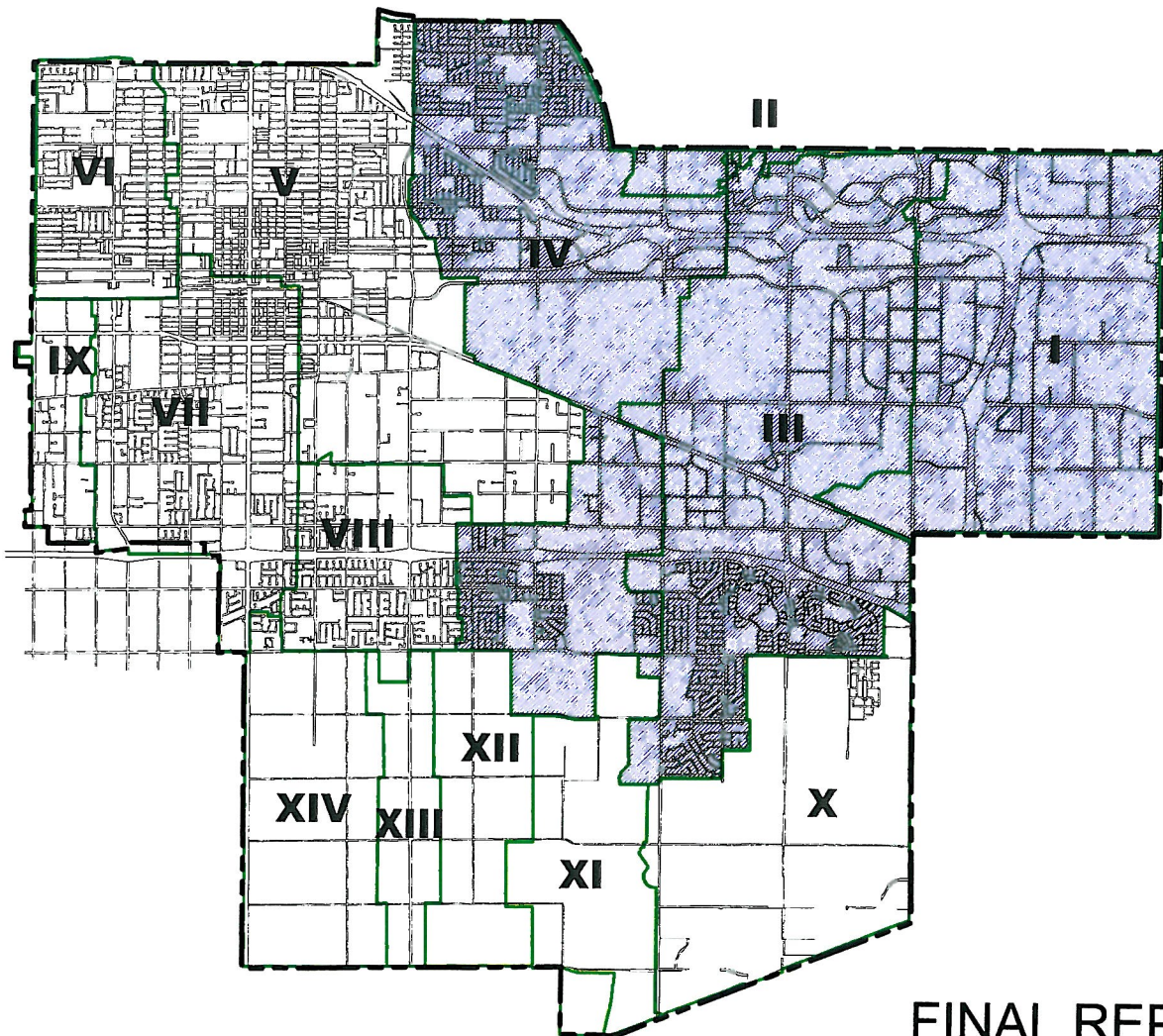


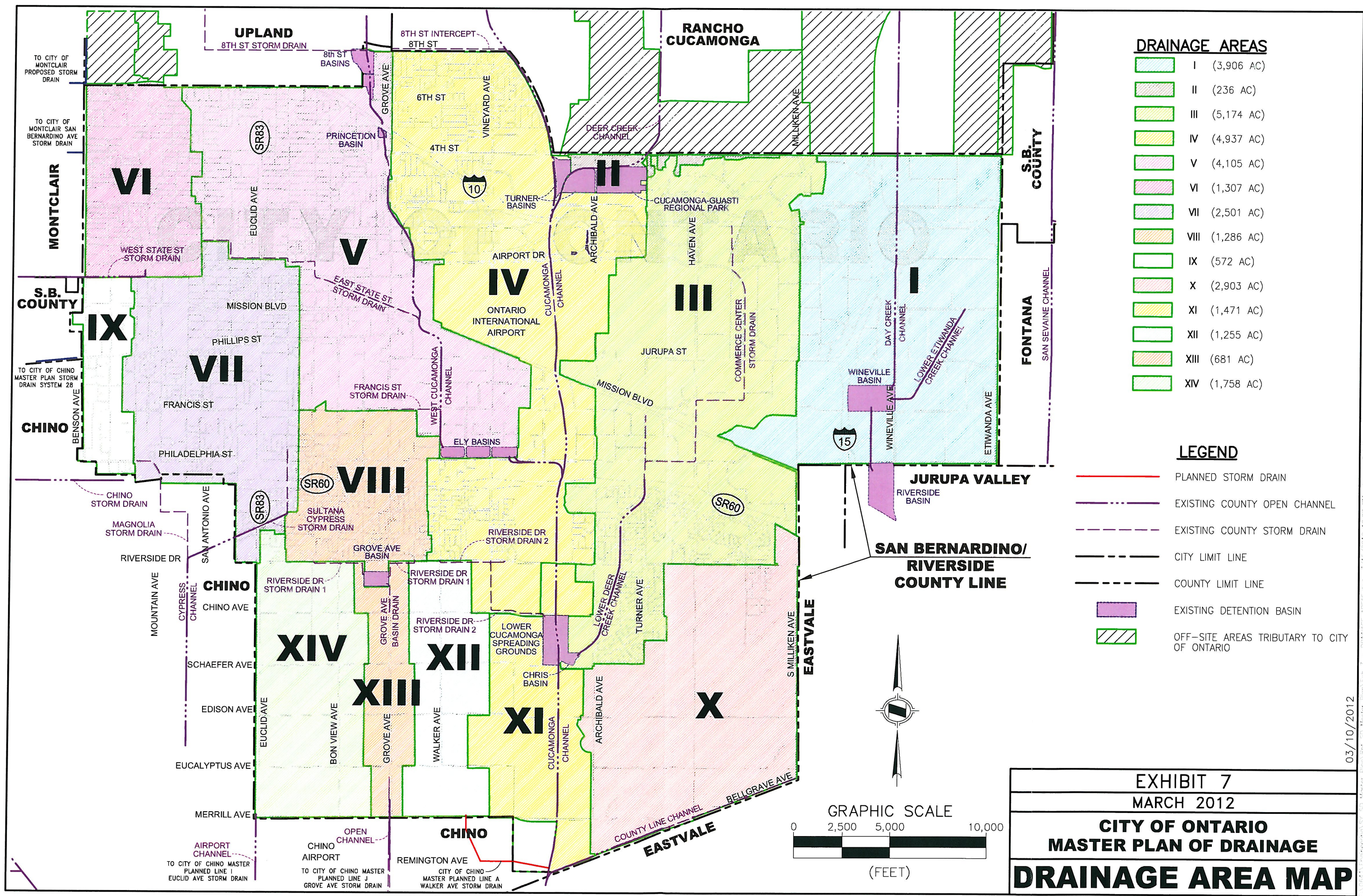


APPENDIX C MASTER PLAN HYDROLOGY CALCULATION

DRAINAGE AREAS I, II, III, IV



FINAL REPORT
MARCH 2012



DRAINAGE AREAS

I	(3,906 AC)
II	(236 AC)
III	(5,174 AC)
IV	(4,937 AC)
V	(4,105 AC)
VI	(1,307 AC)
VII	(2,501 AC)
VIII	(1,286 AC)
IX	(572 AC)
X	(2,903 AC)
XI	(1,471 AC)
XII	(1,255 AC)
XIII	(681 AC)
XIV	(1,758 AC)

LEGEND

	PLANNED STORM DRAIN
	EXISTING COUNTY OPEN CHANNEL
	EXISTING COUNTY STORM DRAIN
	CITY LIMIT LINE
	COUNTY LIMIT LINE
	EXISTING DETENTION BASIN
	OFF-SITE AREAS TRIBUTARY TO CITY OF ONTARIO

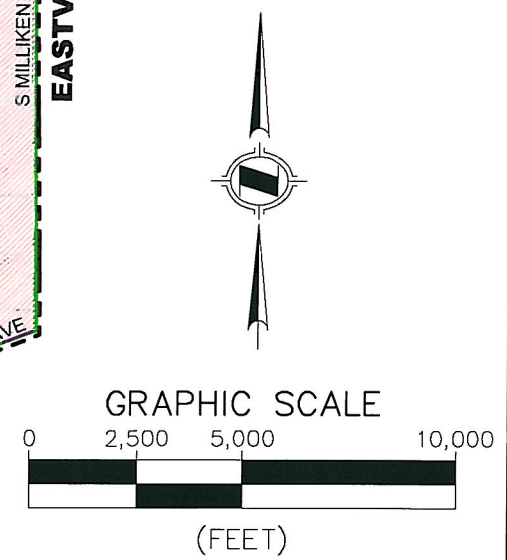
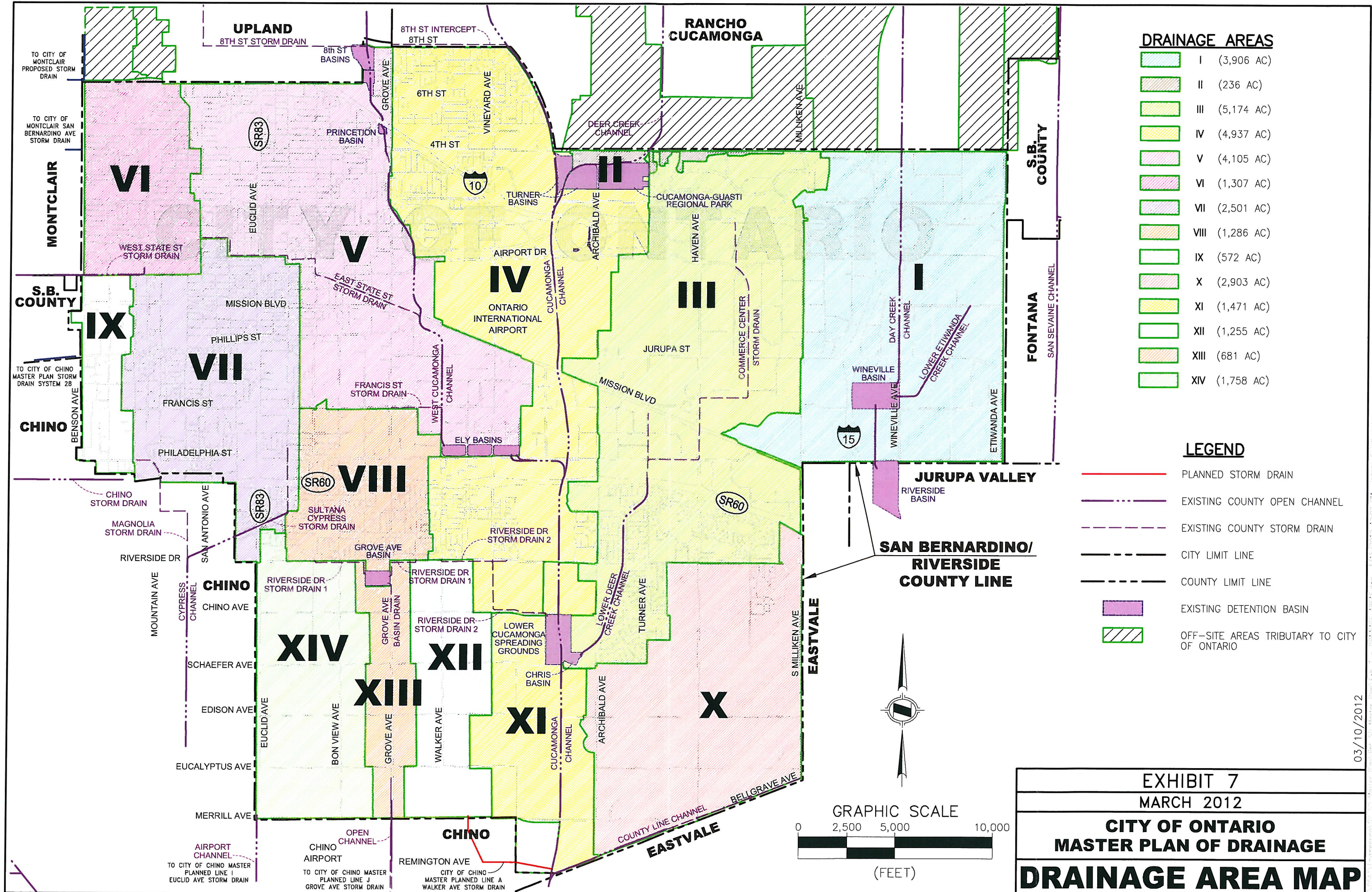


EXHIBIT 7
MARCH 2012
**CITY OF ONTARIO
MASTER PLAN OF DRAINAGE
DRAINAGE AREA MAP**

03/10/2012



DRAINAGE AREAS

I	(3,906 AC)
II	(236 AC)
III	(5,174 AC)
IV	(4,937 AC)
V	(4,105 AC)
VI	(1,307 AC)
VII	(2,501 AC)
VIII	(1,286 AC)
IX	(572 AC)
X	(2,903 AC)
XI	(1,471 AC)
XII	(1,255 AC)
XIII	(681 AC)
XIV	(1,758 AC)

LEGEND

	PLANNED STORM DRAIN
	EXISTING COUNTY OPEN CHANNEL
	EXISTING COUNTY STORM DRAIN
	CITY LIMIT LINE
	COUNTY LIMIT LINE
	EXISTING DETENTION BASIN
	OFF-SITE AREAS TRIBUTARY TO CITY OF ONTARIO

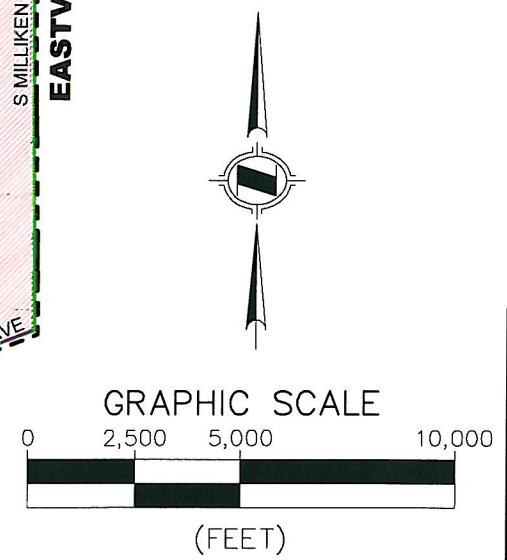


EXHIBIT 7
MARCH 2012
**CITY OF ONTARIO
MASTER PLAN OF DRAINAGE
DRAINAGE AREA MAP**

03/10/2012

SECTION 1

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
(c) Copyright 1983-2011 Advanced Engineering Software (aes)
Ver. 18.0 Release Date: 07/01/2011 License ID 1239

Analysis prepared by:

HUNSAKER & ASSOCIATES
Irvine, Inc
Planning * Engineering * Surveying
Three Hughes * Irvine, California 92618 * (949)583-1010

***** DESCRIPTION OF STUDY *****

* OLD MODEL COLONY EAST AREA A *
* 10-YEAR HYDROLOGY ANALYSIS *
* *
* *

FILE NAME: OMCEA10.DAT
TIME/DATE OF STUDY: 15:22 10/14/2011

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.80
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.0000

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	STREET-CROSSFALL: HEIGHT (FT)	CURB WIDTH (FT)	GUTTER-GEOMETRIES: LIP (FT)	MANNING HIKE (FT)	FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150
2	32.0	27.0	0.020/0.020/0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

UNIT-HYDROGRAPH MODEL SELECTIONS/PARAMETERS:

WATERSHED LAG = 0.80 * Tc
USED "VALLEY UNDEVELOPED" S-GRAPH FOR DEVELOPMENTS OF

2 UNITS/ACRE AND LESS; AND "VALLEY DEVELOPED" S-GRAPH
FOR DEVELOPMENTS OF 3-4 UNITS/ACRE AND MORE.
USER SPECIFIED RAINFALL VALUES:

2-YR 6-HR RAINFALL DEPTH(INCH) = 1.70
2-YR 24-HR RAINFALL DEPTH(INCH) = 3.30
100-YR 6-HR RAINFALL DEPTH(INCH) = 3.70
100-YR 24-HR RAINFALL DEPTH(INCH) = 8.00

SIERRA MADRE DEPTH-AREA FACTORS USED.

DURATION	AREA-AVERAGED RAINFALL(INCH)
5-MINUTES	0.33
30-MINUTES	0.68
1-HOUR	0.90
3-HOUR	1.60
6-HOUR	2.31
24-HOUR	4.36

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR UNIT HYDROGRAPH METHOD

FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 860.00
ELEVATION DATA: UPSTREAM(FEET) = 1055.00 DOWNSTREAM(FEET) = 1040.00

Tc = K * [(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.194
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.897
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	1.10	0.98	0.100	32	10.19
COMMERCIAL	A	7.20	0.98	0.100	32	10.19

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 20.91
TOTAL AREA(ACRES) = 8.30 PEAK FLOW RATE(CFS) = 20.91

FLOW PROCESS FROM NODE 103.00 TO NODE 103.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

=====

MAINLINE Tc(MIN.) = 10.19
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.897
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	0.10	0.98	0.100	32
COMMERCIAL	A	5.10	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 5.20 SUBAREA RUNOFF(CFS) = 13.10

EFFECTIVE AREA(ACRES) = 13.50 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 13.5 PEAK FLOW RATE(CFS) = 34.01

FLOW PROCESS FROM NODE 103.00 TO NODE 104.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 1040.00 DOWNSTREAM(FEET) = 1020.00
FLOW LENGTH(FEET) = 520.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 17.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.20
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 34.01
PIPE TRAVEL TIME(MIN.) = 0.61 Tc(MIN.) = 10.80
LONGEST FLOWPATH FROM NODE 102.00 TO NODE 104.00 = 1380.00 FEET.

FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.80
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.797
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 1.60 0.98 0.100 32
COMMERCIAL A 14.30 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 15.90 SUBAREA RUNOFF(CFS) = 38.63
EFFECTIVE AREA(ACRES) = 29.40 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 29.4 PEAK FLOW RATE(CFS) = 71.43

FLOW PROCESS FROM NODE 104.00 TO NODE 105.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 1020.00 DOWNSTREAM(FEET) = 1010.00
FLOW LENGTH(FEET) = 2080.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 35.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.73
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 71.43
PIPE TRAVEL TIME(MIN.) = 4.49 Tc(MIN.) = 15.29
LONGEST FLOWPATH FROM NODE 102.00 TO NODE 105.00 = 3460.00 FEET.

FLOW PROCESS FROM NODE 105.00 TO NODE 105.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 15.29
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.271
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 2.80 0.98 0.100 32
COMMERCIAL A 27.40 0.98 0.100 32
COMMERCIAL B 0.50 0.75 0.100 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 30.70 SUBAREA RUNOFF(CFS) = 60.07
EFFECTIVE AREA(ACRES) = 60.10 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 60.1 PEAK FLOW RATE(CFS) = 117.58

FLOW PROCESS FROM NODE 105.00 TO NODE 106.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 1010.00 DOWNSTREAM(FEET) = 1005.00
FLOW LENGTH(FEET) = 300.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 31.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.17
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 117.58
PIPE TRAVEL TIME(MIN.) = 0.35 Tc(MIN.) = 15.64
LONGEST FLOWPATH FROM NODE 102.00 TO NODE 106.00 = 3760.00 FEET.

FLOW PROCESS FROM NODE 106.00 TO NODE 106.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 15.64
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.240
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 3.00 0.98 0.100 32
COMMERCIAL A 73.60 0.98 0.100 32
COMMERCIAL B 11.20 0.75 0.100 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.95
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 87.80 SUBAREA RUNOFF(CFS) = 169.55
EFFECTIVE AREA(ACRES) = 147.90 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.96 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 147.9 PEAK FLOW RATE(CFS) = 285.46

FLOW PROCESS FROM NODE 106.00 TO NODE 107.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<


```

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1005.00 DOWNSTREAM(FEET) = 1000.00
FLOW LENGTH(FEET) = 860.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 72.0 INCH PIPE IS 58.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.65
ESTIMATED PIPE DIAMETER(INCH) = 72.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 285.46
PIPE TRAVEL TIME(MIN.) = 1.23 Tc(MIN.) = 16.87
LONGEST FLOWPATH FROM NODE 102.00 TO NODE 107.00 = 4620.00 FEET.

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*****
FLOW PROCESS FROM NODE 107.00 TO NODE 107.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) = 16.87
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.141
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 5.00 0.98 0.100 32
COMMERCIAL A 23.80 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 28.80 SUBAREA RUNOFF(CFS) = 52.96
EFFECTIVE AREA(ACRES) = 176.70 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.96 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 176.7 PEAK FLOW RATE(CFS) = 325.17

```

```

*****
FLOW PROCESS FROM NODE 107.00 TO NODE 108.00 IS CODE = 31
-----

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```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1000.00 DOWNSTREAM(FEET) = 995.00
FLOW LENGTH(FEET) = 280.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 63.0 INCH PIPE IS 47.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.58
ESTIMATED PIPE DIAMETER(INCH) = 63.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 325.17
PIPE TRAVEL TIME(MIN.) = 0.25 Tc(MIN.) = 17.13
LONGEST FLOWPATH FROM NODE 102.00 TO NODE 108.00 = 4900.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 81
-----

```

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) = 17.13
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.122
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 12.50 0.98 0.100 32

```

```

COMMERCIAL A 16.60 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 29.10 SUBAREA RUNOFF(CFS) = 53.02
EFFECTIVE AREA(ACRES) = 205.80 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.96 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 205.8 PEAK FLOW RATE(CFS) = 375.19

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*****
FLOW PROCESS FROM NODE 108.00 TO NODE 110.00 IS CODE = 31
-----

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```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 995.00 DOWNSTREAM(FEET) = 990.00
FLOW LENGTH(FEET) = 300.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 66.0 INCH PIPE IS 52.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.59
ESTIMATED PIPE DIAMETER(INCH) = 66.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 375.19
PIPE TRAVEL TIME(MIN.) = 0.27 Tc(MIN.) = 17.39
LONGEST FLOWPATH FROM NODE 102.00 TO NODE 110.00 = 5200.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 110.00 TO NODE 110.00 IS CODE = 1
-----

```

```

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 17.39
RAINFALL INTENSITY(INCH/HR) = 2.10
AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.96
AREA-AVERAGED Ap = 0.10
EFFECTIVE STREAM AREA(ACRES) = 205.80
TOTAL STREAM AREA(ACRES) = 205.80
PEAK FLOW RATE(CFS) AT CONFLUENCE = 375.19

```

```

*****
FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21
-----

```

```

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

```

```

INITIAL SUBAREA FLOW-LENGTH(FEET) = 3500.00
ELEVATION DATA: UPSTREAM(FEET) = 1050.00 DOWNSTREAM(FEET) = 1000.00

```

```

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 18.600
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.019
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 1.90 0.98 0.100 32 18.60
PUBLIC PARK A 17.70 0.98 0.850 32 29.55

```


SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.777
 SUBAREA RUNOFF(CFS) = 22.25
 TOTAL AREA(ACRES) = 19.60 PEAK FLOW RATE(CFS) = 22.25

1	375.19	17.39	2.102	0.96(0.10)	0.10	205.8	102.00
0.0							
2	22.25	18.93	1.998	0.98(0.76)	0.78	19.6	100.00
732.0							

 FLOW PROCESS FROM NODE 101.00 TO NODE 101.00 IS CODE = 16

>>>>USER SPECIFIED CONSTANT SOURCE FLOW AT NODE<<<<<
 =====
 USER-SPECIFIED CONSTANT SOURCE FLOW = 732.00(CFS)
 USER-SPECIFIED AREA ASSOCIATED TO SOURCE FLOW = 490.00(ACRES)
 * CUMULATIVE SOURCE FLOW DATA: FLOW(CFS) = 732.00 AREA(AC.) = 490.00
 * SUMMED DATA: FLOW(CFS) = 754.25 TOTAL AREA(ACRES) = 509.60

 FLOW PROCESS FROM NODE 101.00 TO NODE 110.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM(FEET) = 1000.00 DOWNSTREAM(FEET) = 990.00
 FLOW LENGTH(FEET) = 480.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 84.0 INCH PIPE IS 63.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 24.30
 ESTIMATED PIPE DIAMETER(INCH) = 84.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 754.25
 PIPE TRAVEL TIME(MIN.) = 0.33 Tc(MIN.) = 18.93
 * TOTAL SOURCE FLOW(CFS) = 732.00
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 110.00 = 3980.00 FEET.

 FLOW PROCESS FROM NODE 110.00 TO NODE 110.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
 =====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 18.93
 RAINFALL INTENSITY(INCH/HR) = 2.00
 AREA-AVERAGED Fm(INCH/HR) = 0.76
 AREA-AVERAGED Fp(INCH/HR) = 0.98
 AREA-AVERAGED Ap = 0.78
 EFFECTIVE STREAM AREA(ACRES) = 19.60
 TOTAL STREAM AREA(ACRES) = 19.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 22.25

* SOURCE FLOW DATA: FLOW(CFS) = 732.00 AREA(ACRES) = 490.0
 * SUMMED DATA: FLOW(CFS) = 754.25 TOTAL AREA(ACRES) = 509.6

** CONFLUENCE DATA **

STREAM SOURCE	Q	Tc	Intensity	Fp(Fm)	Ap	Ae	HEADWATER
NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)	(ACRES)	(ACRES)	NODE
1	375.19	17.39	2.102	0.96(0.10)	0.10	205.8	102.00
2	22.25	18.93	1.998	0.98(0.76)	0.78	19.6	100.00

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

** PEAK FLOW RATE TABLE **

STREAM SOURCE	Q	Tc	Intensity	Fp(Fm)	Ap	Ae	HEADWATER
NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)	(ACRES)	(ACRES)	NODE
1	397.35	17.39	2.102	0.97(0.15)	0.15	223.8	102.00
0.0							
2	377.98	18.93	1.998	0.97(0.15)	0.16	225.4	100.00
732.0							

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 397.35 Tc(MIN.) = 17.39
 EFFECTIVE AREA(ACRES) = 223.81 AREA-AVERAGED Fm(INCH/HR) = 0.15
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.15
 TOTAL AREA(ACRES) = 225.4
 * CUMULATIVE SOURCE FLOW DATA: FLOW(CFS) = 732.00 AREA(AC.) = 490.0
 * SUMMED DATA: FLOW(CFS) = 1129.35 TOTAL AREA(ACRES) = 715.4
 LONGEST FLOWPATH FROM NODE 102.00 TO NODE 110.00 = 5200.00 FEET.

 FLOW PROCESS FROM NODE 110.00 TO NODE 111.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 990.00 DOWNSTREAM(FEET) = 985.00
 FLOW LENGTH(FEET) = 500.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 114.0 INCH PIPE IS 82.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 20.52
 ESTIMATED PIPE DIAMETER(INCH) = 114.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 1129.35
 PIPE TRAVEL TIME(MIN.) = 0.41 Tc(MIN.) = 17.80
 * TOTAL SOURCE FLOW(CFS) = 732.00
 LONGEST FLOWPATH FROM NODE 102.00 TO NODE 111.00 = 5700.00 FEET.

 FLOW PROCESS FROM NODE 111.00 TO NODE 111.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====

MAINLINE Tc(MIN.) = 17.80
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.073
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	19.10	0.98	0.100	32
COMMERCIAL	A	21.00	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 40.10 SUBAREA RUNOFF(CFS) = 71.30
 EFFECTIVE AREA(ACRES) = 263.91 AREA-AVERAGED Fm(INCH/HR) = 0.14
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.15
 TOTAL AREA(ACRES) = 265.5 PEAK FLOW RATE(CFS) = 458.80

* SOURCE FLOW DATA: FLOW(CFS) = 732.00 AREA(ACRES) = 490.0
 * SUMMED DATA: FLOW(CFS) = 1190.80 TOTAL AREA(ACRES) = 755.5

FLOW LENGTH(FEET) = 940.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 120.0 INCH PIPE IS 88.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 19.64
 ESTIMATED PIPE DIAMETER(INCH) = 120.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 1217.09
 PIPE TRAVEL TIME(MIN.) = 0.80 Tc(MIN.) = 18.71
 * TOTAL SOURCE FLOW(CFS) = 732.00
 LONGEST FLOWPATH FROM NODE 102.00 TO NODE 113.00 = 6840.00 FEET.

 FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 985.00 DOWNSTREAM(FEET) = 980.00
 FLOW LENGTH(FEET) = 200.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 96.0 INCH PIPE IS 72.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 29.12
 ESTIMATED PIPE DIAMETER(INCH) = 96.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 1190.80
 PIPE TRAVEL TIME(MIN.) = 0.11 Tc(MIN.) = 17.91
 * TOTAL SOURCE FLOW(CFS) = 732.00
 LONGEST FLOWPATH FROM NODE 102.00 TO NODE 112.00 = 5900.00 FEET.

 FLOW PROCESS FROM NODE 112.00 TO NODE 112.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 17.91
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.065
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	0.30	0.98	0.100	32
COMMERCIAL	A	14.80	0.98	0.100	32
PUBLIC PARK	A	1.30	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.159
 SUBAREA AREA(ACRES) = 16.40 SUBAREA RUNOFF(CFS) = 28.19
 EFFECTIVE AREA(ACRES) = 280.31 AREA-AVERAGED Fm(INCH/HR) = 0.14
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.15
 TOTAL AREA(ACRES) = 281.9 PEAK FLOW RATE(CFS) = 485.09

* SOURCE FLOW DATA: FLOW(CFS) = 732.00 AREA(ACRES) = 490.0
 * SUMMED DATA: FLOW(CFS) = 1217.09 TOTAL AREA(ACRES) = 771.9

 FLOW PROCESS FROM NODE 112.00 TO NODE 113.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 980.00 DOWNSTREAM(FEET) = 972.00

 FLOW PROCESS FROM NODE 113.00 TO NODE 113.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 18.71
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.012
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	7.90	0.98	0.100	32
COMMERCIAL	A	42.70	0.98	0.100	32
PUBLIC PARK	A	6.80	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.189
 SUBAREA AREA(ACRES) = 57.40 SUBAREA RUNOFF(CFS) = 94.42
 EFFECTIVE AREA(ACRES) = 337.71 AREA-AVERAGED Fm(INCH/HR) = 0.15
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.15
 TOTAL AREA(ACRES) = 339.3 PEAK FLOW RATE(CFS) = 566.08

* SOURCE FLOW DATA: FLOW(CFS) = 732.00 AREA(ACRES) = 490.0
 * SUMMED DATA: FLOW(CFS) = 1298.08 TOTAL AREA(ACRES) = 829.3

 FLOW PROCESS FROM NODE 113.00 TO NODE 120.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 972.00 DOWNSTREAM(FEET) = 945.00
 FLOW LENGTH(FEET) = 2800.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 120.0 INCH PIPE IS 88.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 20.91
 ESTIMATED PIPE DIAMETER(INCH) = 120.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 1298.08
 PIPE TRAVEL TIME(MIN.) = 2.23 Tc(MIN.) = 20.94
 * TOTAL SOURCE FLOW(CFS) = 732.00
 LONGEST FLOWPATH FROM NODE 102.00 TO NODE 120.00 = 9640.00 FEET.

 FLOW PROCESS FROM NODE 120.00 TO NODE 120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 20.94
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.880
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/
LAND USE

SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL A	8.90	0.98	0.100	32
COMMERCIAL A	111.10	0.98	0.100	32
PUBLIC PARK A	25.10	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.230
 SUBAREA AREA (ACRES) = 145.10 SUBAREA RUNOFF(CFS) = 216.31
 EFFECTIVE AREA(ACRES) = 482.81 AREA-AVERAGED Fm(INCH/HR) = 0.17
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.18
 TOTAL AREA(ACRES) = 484.4 PEAK FLOW RATE(CFS) = 742.41

* SOURCE FLOW DATA: FLOW(CFS) = 732.00 AREA(ACRES) = 490.0
 * SUMMED DATA: FLOW(CFS) = 1474.41 TOTAL AREA(ACRES) = 974.4

 FLOW PROCESS FROM NODE 120.00 TO NODE 130.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM(FEET) = 945.00 DOWNSTREAM(FEET) = 905.00
 FLOW LENGTH(FEET) = 3100.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 120.0 INCH PIPE IS 87.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 24.13
 ESTIMATED PIPE DIAMETER(INCH) = 120.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 1474.41
 PIPE TRAVEL TIME(MIN.) = 2.14 Tc(MIN.) = 23.09
 * TOTAL SOURCE FLOW(CFS) = 732.00
 LONGEST FLOWPATH FROM NODE 102.00 TO NODE 130.00 = 12740.00 FEET.

 FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====
 MAINLINE Tc(MIN.) = 23.09
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.774
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL A		0.50	0.98	0.100	32
COMMERCIAL A		39.00	0.98	0.100	32
PUBLIC PARK A		13.70	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.293
 SUBAREA AREA(ACRES) = 53.20 SUBAREA RUNOFF(CFS) = 71.24
 EFFECTIVE AREA(ACRES) = 536.01 AREA-AVERAGED Fm(INCH/HR) = 0.18
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.19
 TOTAL AREA(ACRES) = 537.6 PEAK FLOW RATE(CFS) = 767.29

* SOURCE FLOW DATA: FLOW(CFS) = 732.00 AREA(ACRES) = 490.0
 * SUMMED DATA: FLOW(CFS) = 1499.29 TOTAL AREA(ACRES) = 1027.6

 FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 81

 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====
 MAINLINE Tc(MIN.) = 23.09
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.774
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL A		15.50	0.98	0.100	32
COMMERCIAL A		122.00	0.98	0.100	32
PUBLIC PARK A		18.10	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.187
 SUBAREA AREA(ACRES) = 155.60 SUBAREA RUNOFF(CFS) = 222.83
 EFFECTIVE AREA(ACRES) = 691.61 AREA-AVERAGED Fm(INCH/HR) = 0.18
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.19
 TOTAL AREA(ACRES) = 693.2 PEAK FLOW RATE(CFS) = 990.12

* SOURCE FLOW DATA: FLOW(CFS) = 732.00 AREA(ACRES) = 490.0
 * SUMMED DATA: FLOW(CFS) = 1722.12 TOTAL AREA(ACRES) = 1183.2

 FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 71

>>>>PEAK FLOW RATE ESTIMATOR CHANGED TO UNIT-HYDROGRAPH METHOD<<<<<
 >>>>USING TIME-OF-CONCENTRATION OF LONGEST FLOWPATH<<<<<
 =====
 UNIT-HYDROGRAPH DATA:
 RAINFALL(INCH): 5M= 0.33;30M= 0.68;1H= 0.90;3H= 1.60;6H= 2.31;24H= 4.36
 S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
 MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
 Tc(HR) = 0.38; LAG(HR) = 0.31; Fm(INCH/HR) = 0.18; Ybar = 0.23
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.97; 30M = 0.97; 1HR = 0.97;
 3HR = 1.00; 6HR = 1.00; 24HR= 1.00
 UNIT-INTERVAL(MIN) = 2.50 TOTAL AREA(ACRES) = 693.2
 LONGEST FLOWPATH FROM NODE 102.00 TO NODE 130.00 = 12740.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3,n=.0227; Lca/L=0.4,n=.0204; Lca/L=0.5,n=.0187;Lca/L=0.6,n=.0175
 TIME OF PEAK FLOW(HR) = 16.33 RUNOFF VOLUME(AF) = 196.84
 UNIT-HYDROGRAPH METHOD PEAK FLOW RATE(CFS) = 929.87
 TOTAL PEAK FLOW RATE(CFS) = 1661.87 (SOURCE FLOW INCLUDED)
 RATIONAL METHOD PEAK FLOW RATE(CFS) = 1722.12
 (UPSTREAM NODE PEAK FLOW RATE(CFS) = 1722.12)
 PEAK FLOW RATE(CFS) USED = 1722.12
 TOTAL SOURCE FLOW(CFS) = 732.00
 TOTAL AREA ASSOCIATED TO SOURCE FLOW(ACRES) = 490.0

 FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 =====
 TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 PEAK FLOW RATE(CFS) = 990.12 Tc(MIN.) = 23.09

AREA-AVERAGED Fm(INCH/HR) = 0.18 Ybar = 0.23
TOTAL AREA(ACRES) = 693.2

* SOURCE FLOW DATA: FLOW(CFS) = 732.00 AREA(ACRES) = 490.0
* SUMMED DATA: FLOW(CFS) = 1722.12 TOTAL AREA(ACRES) = 1183.2

FLOW PROCESS FROM NODE 121.00 TO NODE 122.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1100.00
ELEVATION DATA: UPSTREAM(FEET) = 975.00 DOWNSTREAM(FEET) = 970.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 14.720
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.323
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	1.20	0.98	0.100	32	14.72
COMMERCIAL	A	3.20	0.98	0.100	32	14.72

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 8.81
TOTAL AREA(ACRES) = 4.40 PEAK FLOW RATE(CFS) = 8.81

FLOW PROCESS FROM NODE 122.00 TO NODE 123.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 970.00 DOWNSTREAM ELEVATION(FEET) = 955.00
STREET LENGTH(FEET) = 1400.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 23.77
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.52
HALFSTREET FLOOD WIDTH(FEET) = 18.32
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.35
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.76
STREET FLOW TRAVEL TIME(MIN.) = 6.96 Tc(MIN.) = 21.68
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.842
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	0.70	0.98	0.100	32
COMMERCIAL	A	18.20	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 18.90 SUBAREA RUNOFF(CFS) = 29.67
EFFECTIVE AREA(ACRES) = 23.30 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 23.3 PEAK FLOW RATE(CFS) = 36.58

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.59 HALFSTREET FLOOD WIDTH(FEET) = 21.69
FLOW VELOCITY(FEET/SEC.) = 3.74 DEPTH*VELOCITY(FT*FT/SEC.) = 2.21
LONGEST FLOWPATH FROM NODE 121.00 TO NODE 123.00 = 2500.00 FEET.

FLOW PROCESS FROM NODE 123.00 TO NODE 124.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 955.00 DOWNSTREAM(FEET) = 940.00
FLOW LENGTH(FEET) = 980.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.29
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 36.58
PIPE TRAVEL TIME(MIN.) = 1.59 Tc(MIN.) = 23.27
LONGEST FLOWPATH FROM NODE 121.00 TO NODE 124.00 = 3480.00 FEET.

FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 23.27
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.765
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	2.30	0.98	0.100	32
COMMERCIAL	A	17.80	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 20.10 SUBAREA RUNOFF(CFS) = 30.17
EFFECTIVE AREA(ACRES) = 43.40 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 43.4 PEAK FLOW RATE(CFS) = 65.15

FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 23.27

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.765
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 2.60 0.98 0.100 32
COMMERCIAL A 66.30 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 68.90 SUBAREA RUNOFF(CFS) = 103.43
EFFECTIVE AREA(ACRES) = 112.30 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 112.3 PEAK FLOW RATE(CFS) = 168.57

FLOW PROCESS FROM NODE 124.00 TO NODE 125.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 940.00 DOWNSTREAM(FEET) = 907.00
FLOW LENGTH(FEET) = 2700.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 54.0 INCH PIPE IS 38.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.77
ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 168.57
PIPE TRAVEL TIME(MIN.) = 3.27 Tc(MIN.) = 26.54
LONGEST FLOWPATH FROM NODE 121.00 TO NODE 125.00 = 6180.00 FEET.

FLOW PROCESS FROM NODE 125.00 TO NODE 125.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 26.54
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.631
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 13.60 0.98 0.100 32
COMMERCIAL A 114.70 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 128.30 SUBAREA RUNOFF(CFS) = 177.13
EFFECTIVE AREA(ACRES) = 240.60 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 240.6 PEAK FLOW RATE(CFS) = 332.17

FLOW PROCESS FROM NODE 125.00 TO NODE 130.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 907.00 DOWNSTREAM(FEET) = 905.00
FLOW LENGTH(FEET) = 400.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 81.0 INCH PIPE IS 60.4 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 11.61
ESTIMATED PIPE DIAMETER(INCH) = 81.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 332.17
PIPE TRAVEL TIME(MIN.) = 0.57 Tc(MIN.) = 27.11
LONGEST FLOWPATH FROM NODE 121.00 TO NODE 130.00 = 6580.00 FEET.

FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 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.) = 27.11
RAINFALL INTENSITY(INCH/HR) = 1.61
AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98
AREA-AVERAGED Ap = 0.10
EFFECTIVE STREAM AREA(ACRES) = 240.60
TOTAL STREAM AREA(ACRES) = 240.60
PEAK FLOW RATE(CFS) AT CONFLUENCE = 332.17

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	AREA (ACRES)	HEADWATER NODE
1	990.12	23.09	693.20	102.00
2	332.17	27.11	240.60	121.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
UNIT-HYDROGRAPH DATA:
RAINFALL(INCH): 5M= 0.33;30M= 0.68;1H= 0.90;3H= 1.60;6H= 2.31;24H= 4.36
S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
Tc(HR) = 0.38; LAG(HR) = 0.31; Fm(INCH/HR) = 0.16; Ybar = 0.21
USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
DEPTH-AREA FACTORS: 5M = 0.96; 30M = 0.96; 1HR = 0.96;
3HR = 0.99; 6HR = 1.00; 24HR= 1.00
UNIT-INTERVAL(MIN) = 2.50 TOTAL AREA(ACRES) = 933.8
LONGEST FLOWPATH FROM NODE 102.00 TO NODE 130.00 = 12740.00 FEET.
EQUIVALENT BASIN FACTOR APPROXIMATIONS:
Lca/L=0.3,n=.0227; Lca/L=0.4,n=.0204; Lca/L=0.5,n=.0187;Lca/L=0.6,n=.0175
TIME OF PEAK FLOW(HR) = 16.33 RUNOFF VOLUME(AF) = 271.89
PEAK FLOW RATE(CFS) = 1254.89
* CUMULATIVE SOURCE FLOW DATA: FLOW(CFS) = 732.00 AREA(AC.) = 490.0
* SUMMED DATA: FLOW(CFS) = 1986.89 TOTAL AREA(ACRES) = 1423.8

FLOW PROCESS FROM NODE 130.00 TO NODE 140.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 905.00 DOWNSTREAM(FEET) = 890.00
FLOW LENGTH(FEET) = 3100.00 MANNING'S N = 0.013
ASSUME FULL-FLOWING PIPELINE

PIPE-FLOW VELOCITY (FEET/SEC.) = 17.31
 ESTIMATED PIPE DIAMETER (INCH) = 120.00 NUMBER OF PIPES = 2
 PIPE-FLOW (CFS) = 1986.89
 PIPE TRAVEL TIME (MIN.) = 2.98 Tc (MIN.) = 26.07
 * TOTAL SOURCE FLOW (CFS) = 732.00
 LONGEST FLOWPATH FROM NODE 102.00 TO NODE 140.00 = 15840.00 FEET.

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.484
 SUBAREA AREA (ACRES) = 21.70
 UNIT-HYDROGRAPH DATA:
 RAINFALL (INCH): 5M= 0.33; 30M= 0.68; 1H= 0.90; 3H= 1.60; 6H= 2.31; 24H= 4.36
 S-GRAPH: VALLEY (DEV.)=100.0%; VALLEY (UNDEV.) / DESERT= 0.0%
 MOUNTAIN= 0.0%; FOOTHILL= 0.0%; DESERT (UNDEV.)= 0.0%
 Tc (HR) = 0.43; LAG (HR) = 0.35; Fm (INCH/HR) = 0.17; Ybar = 0.22
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.95; 30M = 0.95; 1HR = 0.95;
 3HR = 0.99; 6HR = 1.00; 24HR= 1.00
 UNIT-INTERVAL (MIN) = 2.50 TOTAL AREA (ACRES) = 1026.7
 LONGEST FLOWPATH FROM NODE 102.00 TO NODE 140.00 = 15840.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3, n=.0213; Lca/L=0.4, n=.0191; Lca/L=0.5, n=.0175; Lca/L=0.6, n=.0163
 TIME OF PEAK FLOW (HR) = 16.42 RUNOFF VOLUME (AF) = 294.48
 UNIT-HYDROGRAPH PEAK FLOW RATE (CFS) = 1273.29
 TOTAL AREA (ACRES) = 1026.7 PEAK FLOW RATE (CFS) = 1273.29

 FLOW PROCESS FROM NODE 140.00 TO NODE 140.00 IS CODE = 81

>>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW <<<<<

MAINLINE Tc (MIN.) = 26.07
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.649
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	0.40	0.98	0.100	32
COMMERCIAL	A	55.80	0.98	0.100	32
PUBLIC PARK	A	15.00	0.98	0.850	32

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.258
 SUBAREA AREA (ACRES) = 71.20
 UNIT-HYDROGRAPH DATA:
 RAINFALL (INCH): 5M= 0.33; 30M= 0.68; 1H= 0.90; 3H= 1.60; 6H= 2.31; 24H= 4.36
 S-GRAPH: VALLEY (DEV.)=100.0%; VALLEY (UNDEV.) / DESERT= 0.0%
 MOUNTAIN= 0.0%; FOOTHILL= 0.0%; DESERT (UNDEV.)= 0.0%
 Tc (HR) = 0.43; LAG (HR) = 0.35; Fm (INCH/HR) = 0.17; Ybar = 0.22
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.96; 30M = 0.96; 1HR = 0.96;
 3HR = 0.99; 6HR = 1.00; 24HR= 1.00
 UNIT-INTERVAL (MIN) = 2.50 TOTAL AREA (ACRES) = 1005.0
 LONGEST FLOWPATH FROM NODE 102.00 TO NODE 140.00 = 15840.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3, n=.0213; Lca/L=0.4, n=.0191; Lca/L=0.5, n=.0175; Lca/L=0.6, n=.0163
 TIME OF PEAK FLOW (HR) = 16.42 RUNOFF VOLUME (AF) = 290.43
 UNIT-HYDROGRAPH PEAK FLOW RATE (CFS) = 1252.84
 TOTAL AREA (ACRES) = 1005.0 PEAK FLOW RATE (CFS) = 1254.89
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

* SOURCE FLOW DATA: FLOW (CFS) = 732.00 AREA (ACRES) = 490.0
 * SUMMED DATA: FLOW (CFS) = 1986.89 TOTAL AREA (ACRES) = 1495.0

 FLOW PROCESS FROM NODE 140.00 TO NODE 140.00 IS CODE = 81

>>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW <<<<<

MAINLINE Tc (MIN.) = 26.07
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.649
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	10.60	0.98	0.100	32
PUBLIC PARK	A	11.10	0.98	0.850	32

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98

* SOURCE FLOW DATA: FLOW (CFS) = 732.00 AREA (ACRES) = 490.0
 * SUMMED DATA: FLOW (CFS) = 2005.29 TOTAL AREA (ACRES) = 1516.7

=====

END OF STUDY SUMMARY:
 TOTAL AREA (ACRES) = 1026.7 TC (MIN.) = 26.07
 AREA-AVERAGED Fm (INCH/HR) = 0.17 Ybar = 0.22
 PEAK FLOW RATE (CFS) = 1273.29

* CUMULATIVE SOURCE FLOW DATA: FLOW (CFS) = 732.00 AREA (AC.) = 490.0
 * SUMMED DATA: FLOW (CFS) = 2005.29 TOTAL AREA (ACRES) = 1516.7

=====

END OF INTEGRATED RATIONAL/UNIT-HYDROGRAPH METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
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***** DESCRIPTION OF STUDY *****

* OLD MODEL COLONY EAST AREA A *
* 25-YEAR HYDROLOGY ANALYSIS *
* * *

FILE NAME: OMCEA25.DAT
TIME/DATE OF STUDY: 15:21 10/14/2011

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT (YEAR) = 25.00
SPECIFIED MINIMUM PIPE SIZE (INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS (DECIMAL) TO USE FOR FRICTION SLOPE = 0.80
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL
10-YEAR STORM 60-MINUTE INTENSITY (INCH/HOUR) = 1.000
100-YEAR STORM 60-MINUTE INTENSITY (INCH/HOUR) = 1.400
COMPUTED RAINFALL INTENSITY DATA:
STORM EVENT = 25.00 1-HOUR INTENSITY (INCH/HOUR) = 1.1365
SLOPE OF INTENSITY DURATION CURVE = 0.6000

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

Table with columns: NO., HALF-WIDTH (FT), CROWN TO CROSSFALL (FT), STREET-CROSSFALL IN-/OUT-/PARK-SIDE / SIDE/WAY, CURB HEIGHT (FT), GUTTER WIDTH (FT), GEOMETRIES LIP (FT), MANNING HIKE (FT), FACTOR (n). Rows 1 and 2.

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

SIZE PIPE WITH A FLOW CAPACITY GREATER THAN OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

UNIT-HYDROGRAPH MODEL SELECTIONS/PARAMETERS:

WATERSHED LAG = 0.80 * Tc
USED "VALLEY UNDEVELOPED" S-GRAPH FOR DEVELOPMENTS OF 2 UNITS/ACRE AND LESS; AND "VALLEY DEVELOPED" S-GRAPH FOR DEVELOPMENTS OF 3-4 UNITS/ACRE AND MORE.

USER SPECIFIED RAINFALL VALUES:

2-YR 6-HR RAINFALL DEPTH (INCH) = 1.70
2-YR 24-HR RAINFALL DEPTH (INCH) = 3.30
100-YR 6-HR RAINFALL DEPTH (INCH) = 3.70
100-YR 24-HR RAINFALL DEPTH (INCH) = 8.00
SIERRA MADRE DEPTH-AREA FACTORS USED.

Table with columns: DURATION, AREA-AVERAGED RAINFALL (INCH). Rows: 5-MINUTES (0.38), 30-MINUTES (0.79), 1-HOUR (1.04), 3-HOUR (1.87), 6-HOUR (2.71), 24-HOUR (5.30).

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR UNIT HYDROGRAPH METHOD

FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 860.00
ELEVATION DATA: UPSTREAM (FEET) = 1055.00 DOWNSTREAM (FEET) = 1040.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 10.194
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.292
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCSSOIL AREA Fp Ap SCSS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 1.10 0.98 0.100 32 10.19
COMMERCIAL A 7.20 0.98 0.100 32 10.19
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF (CFS) = 23.86
TOTAL AREA (ACRES) = 8.30 PEAK FLOW RATE (CFS) = 23.86

FLOW PROCESS FROM NODE 103.00 TO NODE 103.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 10.19
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.292

SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCSSOIL AREA Fp Ap SCSS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 0.10 0.98 0.100 32
COMMERCIAL A 5.10 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 5.20 SUBAREA RUNOFF(CFS) = 14.95
 EFFECTIVE AREA (ACRES) = 13.50 AREA-AVERAGED Fm (INCH/HR) = 0.10
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
 TOTAL AREA (ACRES) = 13.5 PEAK FLOW RATE (CFS) = 38.81

FLOW PROCESS FROM NODE 103.00 TO NODE 104.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 1040.00 DOWNSTREAM(FEET) = 1020.00
 FLOW LENGTH(FEET) = 520.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 19.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 14.40
 ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 38.81
 PIPE TRAVEL TIME(MIN.) = 0.60 Tc(MIN.) = 10.80
 LONGEST FLOWPATH FROM NODE 102.00 TO NODE 104.00 = 1380.00 FEET.

FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.80
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.181
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	1.60	0.98	0.100	32
COMMERCIAL	A	14.30	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 15.90 SUBAREA RUNOFF(CFS) = 44.12
 EFFECTIVE AREA (ACRES) = 29.40 AREA-AVERAGED Fm (INCH/HR) = 0.10
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
 TOTAL AREA (ACRES) = 29.4 PEAK FLOW RATE (CFS) = 81.58

FLOW PROCESS FROM NODE 104.00 TO NODE 105.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 1020.00 DOWNSTREAM(FEET) = 1010.00
 FLOW LENGTH(FEET) = 2080.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 48.0 INCH PIPE IS 36.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 8.04
 ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 81.58
 PIPE TRAVEL TIME(MIN.) = 4.31 Tc(MIN.) = 15.11
 LONGEST FLOWPATH FROM NODE 102.00 TO NODE 105.00 = 3460.00 FEET.

FLOW PROCESS FROM NODE 105.00 TO NODE 105.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 15.11
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.600
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	2.80	0.98	0.100	32
COMMERCIAL	A	27.40	0.98	0.100	32
COMMERCIAL	B	0.50	0.75	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 30.70 SUBAREA RUNOFF(CFS) = 69.15
 EFFECTIVE AREA (ACRES) = 60.10 AREA-AVERAGED Fm (INCH/HR) = 0.10
 AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.10
 TOTAL AREA (ACRES) = 60.1 PEAK FLOW RATE (CFS) = 135.36

FLOW PROCESS FROM NODE 105.00 TO NODE 106.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 1010.00 DOWNSTREAM(FEET) = 1005.00
 FLOW LENGTH(FEET) = 300.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 45.0 INCH PIPE IS 35.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 14.40
 ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 135.36
 PIPE TRAVEL TIME(MIN.) = 0.35 Tc(MIN.) = 15.46
 LONGEST FLOWPATH FROM NODE 102.00 TO NODE 106.00 = 3760.00 FEET.

FLOW PROCESS FROM NODE 106.00 TO NODE 106.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 15.46
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.565
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	3.00	0.98	0.100	32
COMMERCIAL	A	73.60	0.98	0.100	32
COMMERCIAL	B	11.20	0.75	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.95
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 87.80 SUBAREA RUNOFF(CFS) = 195.18
 EFFECTIVE AREA (ACRES) = 147.90 AREA-AVERAGED Fm (INCH/HR) = 0.10
 AREA-AVERAGED Fp (INCH/HR) = 0.96 AREA-AVERAGED Ap = 0.10
 TOTAL AREA (ACRES) = 147.9 PEAK FLOW RATE (CFS) = 328.63

FLOW PROCESS FROM NODE 106.00 TO NODE 107.00 IS CODE = 31

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1005.00 DOWNSTREAM(FEET) = 1000.00
FLOW LENGTH(FEET) = 860.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 78.0 INCH PIPE IS 58.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.22
ESTIMATED PIPE DIAMETER(INCH) = 78.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 328.63
PIPE TRAVEL TIME(MIN.) = 1.17 Tc(MIN.) = 16.63
LONGEST FLOWPATH FROM NODE 102.00 TO NODE 107.00 = 4620.00 FEET.

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FLOW PROCESS FROM NODE 107.00 TO NODE 107.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.63
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.454
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 5.00 0.98 0.100 32
COMMERCIAL A 23.80 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 28.80 SUBAREA RUNOFF(CFS) = 61.09
EFFECTIVE AREA(ACRES) = 176.70 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.96 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 176.7 PEAK FLOW RATE(CFS) = 375.07

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FLOW PROCESS FROM NODE 107.00 TO NODE 108.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1000.00 DOWNSTREAM(FEET) = 995.00
FLOW LENGTH(FEET) = 280.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 66.0 INCH PIPE IS 50.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.20
ESTIMATED PIPE DIAMETER(INCH) = 66.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 375.07
PIPE TRAVEL TIME(MIN.) = 0.24 Tc(MIN.) = 16.87
LONGEST FLOWPATH FROM NODE 102.00 TO NODE 108.00 = 4900.00 FEET.

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FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.87
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.433
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

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LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 12.50 0.98 0.100 32
COMMERCIAL A 16.60 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 29.10 SUBAREA RUNOFF(CFS) = 61.17
EFFECTIVE AREA(ACRES) = 205.80 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.96 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 205.8 PEAK FLOW RATE(CFS) = 432.86

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FLOW PROCESS FROM NODE 108.00 TO NODE 110.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 995.00 DOWNSTREAM(FEET) = 990.00
FLOW LENGTH(FEET) = 300.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 69.0 INCH PIPE IS 56.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.17
ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 432.86
PIPE TRAVEL TIME(MIN.) = 0.26 Tc(MIN.) = 17.13
LONGEST FLOWPATH FROM NODE 102.00 TO NODE 110.00 = 5200.00 FEET.

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*****
FLOW PROCESS FROM NODE 110.00 TO NODE 110.00 IS CODE = 1
-----

```

```

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 17.13
RAINFALL INTENSITY(INCH/HR) = 2.41
AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.96
AREA-AVERAGED Ap = 0.10
EFFECTIVE STREAM AREA(ACRES) = 205.80
TOTAL STREAM AREA(ACRES) = 205.80
PEAK FLOW RATE(CFS) AT CONFLUENCE = 432.86

```

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*****
FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21
-----

```

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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 3500.00
ELEVATION DATA: UPSTREAM(FEET) = 1050.00 DOWNSTREAM(FEET) = 1000.00

```

```

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 18.600
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.295
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)

```

COMMERCIAL A 1.90 0.98 0.100 32 18.60
 PUBLIC PARK A 17.70 0.98 0.850 32 29.55
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.777
 SUBAREA RUNOFF(CFS) = 27.11
 TOTAL AREA(ACRES) = 19.60 PEAK FLOW RATE(CFS) = 27.11

NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)	(ACRES)	NODE
1	432.86	17.13	2.411	0.96(0.10)	0.10	205.8 102.00
2	27.11	18.91	2.272	0.98(0.76)	0.78	19.6 100.00
898.0						

 FLOW PROCESS FROM NODE 101.00 TO NODE 101.00 IS CODE = 16

>>>>USER SPECIFIED CONSTANT SOURCE FLOW AT NODE<<<<<
 =====
 USER-SPECIFIED CONSTANT SOURCE FLOW = 898.00(CFS)
 USER-SPECIFIED AREA ASSOCIATED TO SOURCE FLOW = 490.00(ACRES)
 * CUMULATIVE SOURCE FLOW DATA: FLOW(CFS) = 898.00 AREA(AC.) = 490.00
 * SUMMED DATA: FLOW(CFS) = 925.11 TOTAL AREA(ACRES) = 509.60

 FLOW PROCESS FROM NODE 101.00 TO NODE 110.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM(FEET) = 1000.00 DOWNSTREAM(FEET) = 990.00
 FLOW LENGTH(FEET) = 480.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 90.0 INCH PIPE IS 68.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 25.50
 ESTIMATED PIPE DIAMETER(INCH) = 90.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 925.11
 PIPE TRAVEL TIME(MIN.) = 0.31 Tc(MIN.) = 18.91
 * TOTAL SOURCE FLOW(CFS) = 898.00
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 110.00 = 3980.00 FEET.

 FLOW PROCESS FROM NODE 110.00 TO NODE 110.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
 =====
 TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 18.91
 RAINFALL INTENSITY(INCH/HR) = 2.27
 AREA-AVERAGED Fm(INCH/HR) = 0.76
 AREA-AVERAGED Fp(INCH/HR) = 0.98
 AREA-AVERAGED Ap = 0.78
 EFFECTIVE STREAM AREA(ACRES) = 19.60
 TOTAL STREAM AREA(ACRES) = 19.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 27.11

* SOURCE FLOW DATA: FLOW(CFS) = 898.00 AREA(ACRES) = 490.0
 * SUMMED DATA: FLOW(CFS) = 925.11 TOTAL AREA(ACRES) = 509.6

** CONFLUENCE DATA **

STREAM SOURCE	Q	Tc	Intensity	Fp(Fm)	Ap	Ae	HEADWATER
---------------	---	----	-----------	--------	----	----	-----------

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

** PEAK FLOW RATE TABLE **
 STREAM SOURCE NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE HEADWATER
 FLOW 1 459.67 17.13 2.411 0.97(0.15) 0.15 223.6 102.00
 0.0 2 433.98 18.91 2.272 0.97(0.15) 0.16 225.4 100.00
 898.0

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 459.67 Tc(MIN.) = 17.13
 EFFECTIVE AREA(ACRES) = 223.55 AREA-AVERAGED Fm(INCH/HR) = 0.15
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.15
 TOTAL AREA(ACRES) = 225.4
 * CUMULATIVE SOURCE FLOW DATA: FLOW(CFS) = 898.00 AREA(AC.) = 490.0
 * SUMMED DATA: FLOW(CFS) = 1357.67 TOTAL AREA(ACRES) = 715.4
 LONGEST FLOWPATH FROM NODE 102.00 TO NODE 110.00 = 5200.00 FEET.

 FLOW PROCESS FROM NODE 110.00 TO NODE 111.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM(FEET) = 990.00 DOWNSTREAM(FEET) = 985.00
 FLOW LENGTH(FEET) = 500.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 120.0 INCH PIPE IS 90.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 21.36
 ESTIMATED PIPE DIAMETER(INCH) = 120.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 1357.67
 PIPE TRAVEL TIME(MIN.) = 0.39 Tc(MIN.) = 17.52
 * TOTAL SOURCE FLOW(CFS) = 898.00
 LONGEST FLOWPATH FROM NODE 102.00 TO NODE 111.00 = 5700.00 FEET.

 FLOW PROCESS FROM NODE 111.00 TO NODE 111.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====
 MAINLINE Tc(MIN.) = 17.52
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.379
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SC5 SOIL AREA Fp Ap SC5
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.162
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 8.90 0.98 0.100 32
 COMMERCIAL A 111.10 0.98 0.100 32
 PUBLIC PARK A 25.10 0.98 0.850 32
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.230
 SUBAREA AREA (ACRES) = 145.10 SUBAREA RUNOFF (CFS) = 253.05
 EFFECTIVE AREA (ACRES) = 482.55 AREA-AVERAGED Fm (INCH/HR) = 0.17
 AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.18
 TOTAL AREA (ACRES) = 484.4 PEAK FLOW RATE (CFS) = 864.33
 * SOURCE FLOW DATA: FLOW (CFS) = 898.00 AREA (ACRES) = 490.0
 * SUMMED DATA: FLOW (CFS) = 1762.33 TOTAL AREA (ACRES) = 974.4

 FLOW PROCESS FROM NODE 120.00 TO NODE 130.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 945.00 DOWNSTREAM (FEET) = 905.00
 FLOW LENGTH (FEET) = 3100.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 126.0 INCH PIPE IS 95.3 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 25.08
 ESTIMATED PIPE DIAMETER (INCH) = 126.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 1762.33
 PIPE TRAVEL TIME (MIN.) = 2.06 Tc (MIN.) = 22.61
 * TOTAL SOURCE FLOW (CFS) = 898.00
 LONGEST FLOWPATH FROM NODE 102.00 TO NODE 130.00 = 12740.00 FEET.

 FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 22.61
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.041
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 0.50 0.98 0.100 32
 COMMERCIAL A 39.00 0.98 0.100 32
 PUBLIC PARK A 13.70 0.98 0.850 32
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.293
 SUBAREA AREA (ACRES) = 53.20 SUBAREA RUNOFF (CFS) = 84.05
 EFFECTIVE AREA (ACRES) = 535.75 AREA-AVERAGED Fm (INCH/HR) = 0.18
 AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.19
 TOTAL AREA (ACRES) = 537.6 PEAK FLOW RATE (CFS) = 896.06
 * SOURCE FLOW DATA: FLOW (CFS) = 898.00 AREA (ACRES) = 490.0
 * SUMMED DATA: FLOW (CFS) = 1794.06 TOTAL AREA (ACRES) = 1027.6

 FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 22.61
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.041
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 15.50 0.98 0.100 32
 COMMERCIAL A 122.00 0.98 0.100 32
 PUBLIC PARK A 18.10 0.98 0.850 32
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.187
 SUBAREA AREA (ACRES) = 155.60 SUBAREA RUNOFF (CFS) = 260.29
 EFFECTIVE AREA (ACRES) = 691.35 AREA-AVERAGED Fm (INCH/HR) = 0.18
 AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.19
 TOTAL AREA (ACRES) = 693.2 PEAK FLOW RATE (CFS) = 1156.36
 * SOURCE FLOW DATA: FLOW (CFS) = 898.00 AREA (ACRES) = 490.0
 * SUMMED DATA: FLOW (CFS) = 2054.36 TOTAL AREA (ACRES) = 1183.2

 FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 71

>>>>PEAK FLOW RATE ESTIMATOR CHANGED TO UNIT-HYDROGRAPH METHOD<<<<<
 >>>>USING TIME-OF-CONCENTRATION OF LONGEST FLOWPATH<<<<<

=====

UNIT-HYDROGRAPH DATA:
 RAINFALL (INCH): 5M= 0.38;30M= 0.79;1H= 1.04;3H= 1.87;6H= 2.71;24H= 5.30
 S-GRAPH: VALLEY (DEV.)=100.0%;VALLEY (UNDEV.)/DESERT= 0.0%
 MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT (UNDEV.)= 0.0%
 Tc (HR) = 0.38; LAG (HR) = 0.30; Fm (INCH/HR) = 0.18; Ybar = 0.22
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.97; 30M = 0.97; 1HR = 0.97;
 3HR = 1.00; 6HR = 1.00; 24HR= 1.00
 UNIT-INTERVAL (MIN) = 2.50 TOTAL AREA (ACRES) = 693.2
 LONGEST FLOWPATH FROM NODE 102.00 TO NODE 130.00 = 12740.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3, n=.0223; Lca/L=0.4, n=.0200; Lca/L=0.5, n=.0183; Lca/L=0.6, n=.0171
 TIME OF PEAK FLOW (HR) = 16.33 RUNOFF VOLUME (AF) = 242.05
 UNIT-HYDROGRAPH METHOD PEAK FLOW RATE (CFS) = 1106.84
 TOTAL PEAK FLOW RATE (CFS) = 2004.84 (SOURCE FLOW INCLUDED)
 RATIONAL METHOD PEAK FLOW RATE (CFS) = 2054.36
 (UPSTREAM NODE PEAK FLOW RATE (CFS) = 2054.36)
 PEAK FLOW RATE (CFS) USED = 2054.36
 TOTAL SOURCE FLOW (CFS) = 898.00
 TOTAL AREA ASSOCIATED TO SOURCE FLOW (ACRES) = 490.0

 FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
PEAK FLOW RATE(CFS) = 1156.36 Tc(MIN.) = 22.61
AREA-AVERAGED Fm(INCH/HR) = 0.18 Ybar = 0.22
TOTAL AREA(ACRES) = 693.2

* SOURCE FLOW DATA: FLOW(CFS) = 898.00 AREA(ACRES) = 490.0
* SUMMED DATA: FLOW(CFS) = 2054.36 TOTAL AREA(ACRES) = 1183.2

FLOW PROCESS FROM NODE 121.00 TO NODE 122.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1100.00
ELEVATION DATA: UPSTREAM(FEET) = 975.00 DOWNSTREAM(FEET) = 970.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 14.720
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.641
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	1.20	0.98	0.100	32	14.72
COMMERCIAL	A	3.20	0.98	0.100	32	14.72

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 10.07
TOTAL AREA(ACRES) = 4.40 PEAK FLOW RATE(CFS) = 10.07

FLOW PROCESS FROM NODE 122.00 TO NODE 123.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 970.00 DOWNSTREAM ELEVATION(FEET) = 955.00
STREET LENGTH(FEET) = 1400.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 27.28
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.54
HALFSTREET FLOOD WIDTH(FEET) = 19.32
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.48
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.89
STREET FLOW TRAVEL TIME(MIN.) = 6.71 Tc(MIN.) = 21.43

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.108
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	0.70	0.98	0.100	32
COMMERCIAL	A	18.20	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 18.90 SUBAREA RUNOFF(CFS) = 34.20
EFFECTIVE AREA(ACRES) = 23.30 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 23.3 PEAK FLOW RATE(CFS) = 42.16

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.62 HALFSTREET FLOOD WIDTH(FEET) = 22.96
FLOW VELOCITY(FEET/SEC.) = 3.86 DEPTH*VELOCITY(FT*FT/SEC.) = 2.38
LONGEST FLOWPATH FROM NODE 121.00 TO NODE 123.00 = 2500.00 FEET.

FLOW PROCESS FROM NODE 123.00 TO NODE 124.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 955.00 DOWNSTREAM(FEET) = 940.00
FLOW LENGTH(FEET) = 980.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 22.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.50
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 42.16
PIPE TRAVEL TIME(MIN.) = 1.56 Tc(MIN.) = 22.98
LONGEST FLOWPATH FROM NODE 121.00 TO NODE 124.00 = 3480.00 FEET.

FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 22.98
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.021
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	2.30	0.98	0.100	32
COMMERCIAL	A	17.80	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 20.10 SUBAREA RUNOFF(CFS) = 34.80
EFFECTIVE AREA(ACRES) = 43.40 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 43.4 PEAK FLOW RATE(CFS) = 75.14

FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<


```

=====
MAINLINE Tc(MIN.) = 22.98
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.021
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
    LAND USE         GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL           A         2.60     0.98    0.100   32
COMMERCIAL           A        66.30     0.98    0.100   32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 68.90      SUBAREA RUNOFF(CFS) = 119.29
EFFECTIVE AREA(ACRES) = 112.30   AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 112.3      PEAK FLOW RATE(CFS) = 194.44

*****
FLOW PROCESS FROM NODE 124.00 TO NODE 125.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 940.00 DOWNSTREAM(FEET) = 907.00
FLOW LENGTH(FEET) = 2700.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 54.0 INCH PIPE IS 44.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.94
ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 194.44
PIPE TRAVEL TIME(MIN.) = 3.23 Tc(MIN.) = 26.21
LONGEST FLOWPATH FROM NODE 121.00 TO NODE 125.00 = 6180.00 FEET.

*****
FLOW PROCESS FROM NODE 125.00 TO NODE 125.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 26.21
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.868
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
    LAND USE         GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL           A         13.60     0.98    0.100   32
COMMERCIAL           A        114.70     0.98    0.100   32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 128.30     SUBAREA RUNOFF(CFS) = 204.44
EFFECTIVE AREA(ACRES) = 240.60   AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 240.6      PEAK FLOW RATE(CFS) = 383.38

*****
FLOW PROCESS FROM NODE 125.00 TO NODE 130.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 907.00 DOWNSTREAM(FEET) = 905.00

```

```

FLOW LENGTH(FEET) = 400.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 84.0 INCH PIPE IS 65.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.95
ESTIMATED PIPE DIAMETER(INCH) = 84.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 383.38
PIPE TRAVEL TIME(MIN.) = 0.56 Tc(MIN.) = 26.77
LONGEST FLOWPATH FROM NODE 121.00 TO NODE 130.00 = 6580.00 FEET.

*****
FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 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.) = 26.77
RAINFALL INTENSITY(INCH/HR) = 1.84
AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98
AREA-AVERAGED Ap = 0.10
EFFECTIVE STREAM AREA(ACRES) = 240.60
TOTAL STREAM AREA(ACRES) = 240.60
PEAK FLOW RATE(CFS) AT CONFLUENCE = 383.38
** CONFLUENCE DATA **
STREAM Q Tc AREA HEADWATER
NUMBER (CFS) (MIN.) (ACRES) NODE
1 1156.36 22.61 693.20 102.00
2 383.38 26.77 240.60 121.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
UNIT-HYDROGRAPH DATA:
RAINFALL(INCH): 5M= 0.38;30M= 0.79;1H= 1.04;3H= 1.87;6H= 2.71;24H= 5.30
S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
Tc(HR) = 0.38; LAG(HR) = 0.30; Fm(INCH/HR) = 0.16; Ybar = 0.20
USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
DEPTH-AREA FACTORS: 5M = 0.96; 30M = 0.96; 1HR = 0.96;
3HR = 0.99; 6HR = 1.00; 24HR= 1.00
UNIT-INTERVAL(MIN) = 2.50 TOTAL AREA(ACRES) = 933.8
LONGEST FLOWPATH FROM NODE 102.00 TO NODE 130.00 = 12740.00 FEET.
EQUIVALENT BASIN FACTOR APPROXIMATIONS:
Lca/L=0.3,n=.0223; Lca/L=0.4,n=.0200; Lca/L=0.5,n=.0183;Lca/L=0.6,n=.0171
TIME OF PEAK FLOW(HR) = 16.33 RUNOFF VOLUME(AF) = 334.21
PEAK FLOW RATE(CFS) = 1491.83
* CUMULATIVE SOURCE FLOW DATA: FLOW(CFS) = 898.00 AREA(AC.) = 490.0
* SUMMED DATA: FLOW(CFS) = 2389.83 TOTAL AREA(ACRES) = 1423.8

*****
FLOW PROCESS FROM NODE 130.00 TO NODE 140.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 905.00 DOWNSTREAM(FEET) = 890.00

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FLOW LENGTH(FEET) = 3100.00 MANNING'S N = 0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) = 17.30
 ESTIMATED PIPE DIAMETER(INCH) = 132.00 NUMBER OF PIPES = 2
 PIPE-FLOW(CFS) = 2389.83
 PIPE TRAVEL TIME(MIN.) = 2.99 Tc(MIN.) = 25.60
 * TOTAL SOURCE FLOW(CFS) = 898.00
 LONGEST FLOWPATH FROM NODE 102.00 TO NODE 140.00 = 15840.00 FEET.

 FLOW PROCESS FROM NODE 140.00 TO NODE 140.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 25.60
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.895
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	0.40	0.98	0.100	32
COMMERCIAL	A	55.80	0.98	0.100	32
PUBLIC PARK	A	15.00	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.258
 SUBAREA AREA(ACRES) = 71.20
 UNIT-HYDROGRAPH DATA:
 RAINFALL(INCH): 5M= 0.38;30M= 0.79;1H= 1.04;3H= 1.87;6H= 2.71;24H= 5.30
 S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
 MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
 Tc(HR) = 0.43; LAG(HR) = 0.34; Fm(INCH/HR) = 0.17; Ybar = 0.21
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.96; 30M = 0.96; 1HR = 0.96;
 3HR = 0.99; 6HR = 1.00; 24HR= 1.00
 UNIT-INTERVAL(MIN) = 2.50 TOTAL AREA(ACRES) = 1005.0
 LONGEST FLOWPATH FROM NODE 102.00 TO NODE 140.00 = 15840.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3,n=.0209; Lca/L=0.4,n=.0187; Lca/L=0.5,n=.0172;Lca/L=0.6,n=.0160
 TIME OF PEAK FLOW(HR) = 16.42 RUNOFF VOLUME(AF) = 357.03
 UNIT-HYDROGRAPH PEAK FLOW RATE(CFS) = 1484.57
 TOTAL AREA(ACRES) = 1005.0 PEAK FLOW RATE(CFS) = 1491.83
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

* SOURCE FLOW DATA: FLOW(CFS) = 898.00 AREA(ACRES) = 490.0
 * SUMMED DATA: FLOW(CFS) = 2389.83 TOTAL AREA(ACRES) = 1495.0

 FLOW PROCESS FROM NODE 140.00 TO NODE 140.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 25.60
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.895
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	10.60	0.98	0.100	32

PUBLIC PARK A 11.10 0.98 0.850 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.484
 SUBAREA AREA(ACRES) = 21.70
 UNIT-HYDROGRAPH DATA:
 RAINFALL(INCH): 5M= 0.38;30M= 0.79;1H= 1.04;3H= 1.87;6H= 2.71;24H= 5.30
 S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
 MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
 Tc(HR) = 0.43; LAG(HR) = 0.34; Fm(INCH/HR) = 0.17; Ybar = 0.21
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.95; 30M = 0.95; 1HR = 0.95;
 3HR = 0.99; 6HR = 1.00; 24HR= 1.00
 UNIT-INTERVAL(MIN) = 2.50 TOTAL AREA(ACRES) = 1026.7
 LONGEST FLOWPATH FROM NODE 102.00 TO NODE 140.00 = 15840.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3,n=.0209; Lca/L=0.4,n=.0187; Lca/L=0.5,n=.0172;Lca/L=0.6,n=.0160
 TIME OF PEAK FLOW(HR) = 16.42 RUNOFF VOLUME(AF) = 362.05
 UNIT-HYDROGRAPH PEAK FLOW RATE(CFS) = 1509.27
 TOTAL AREA(ACRES) = 1026.7 PEAK FLOW RATE(CFS) = 1509.27

* SOURCE FLOW DATA: FLOW(CFS) = 898.00 AREA(ACRES) = 490.0
 * SUMMED DATA: FLOW(CFS) = 2407.27 TOTAL AREA(ACRES) = 1516.7

=====

END OF STUDY SUMMARY:
 TOTAL AREA(ACRES) = 1026.7 TC(MIN.) = 25.60
 AREA-AVERAGED Fm(INCH/HR) = 0.17 Ybar = 0.21
 PEAK FLOW RATE(CFS) = 1509.27
 * CUMULATIVE SOURCE FLOW DATA: FLOW(CFS) = 898.00 AREA(AC.) = 490.0
 * SUMMED DATA: FLOW(CFS) = 2407.27 TOTAL AREA(ACRES) = 1516.7

=====

END OF INTEGRATED RATIONAL/UNIT-HYDROGRAPH METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
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Analysis prepared by:

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***** DESCRIPTION OF STUDY *****
* OLD MODEL COLONY EAST AREA A *
* 100-YEAR HYDROLOGY ANALYSIS *
* *

FILE NAME: OMCEA100.DAT
TIME/DATE OF STUDY: 15:23 10/14/2011

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.80
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.4000

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/ SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150
2	32.0	27.0	0.020/0.020/0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

UNIT-HYDROGRAPH MODEL SELECTIONS/PARAMETERS:

WATERSHED LAG = 0.80 * Tc
USED "VALLEY UNDEVELOPED" S-GRAPH FOR DEVELOPMENTS OF

2 UNITS/ACRE AND LESS; AND "VALLEY DEVELOPED" S-GRAPH
FOR DEVELOPMENTS OF 3-4 UNITS/ACRE AND MORE.
USER SPECIFIED RAINFALL VALUES:

2-YR 6-HR RAINFALL DEPTH(INCH) = 1.70
2-YR 24-HR RAINFALL DEPTH(INCH) = 3.30
100-YR 6-HR RAINFALL DEPTH(INCH) = 3.70
100-YR 24-HR RAINFALL DEPTH(INCH) = 8.00

SIERRA MADRE DEPTH-AREA FACTORS USED.

DURATION	AREA-AVERAGED RAINFALL(INCH)
5-MINUTES	0.52
30-MINUTES	1.06
1-HOUR	1.40
3-HOUR	2.54
6-HOUR	3.70
24-HOUR	8.00

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR UNIT HYDROGRAPH METHOD

FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 860.00
ELEVATION DATA: UPSTREAM(FEET) = 1055.00 DOWNSTREAM(FEET) = 1040.00

Tc = K * [(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.194
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.055
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	1.10	0.98	0.100	32	10.19
COMMERCIAL	A	7.20	0.98	0.100	32	10.19

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 29.56
TOTAL AREA(ACRES) = 8.30 PEAK FLOW RATE(CFS) = 29.56

FLOW PROCESS FROM NODE 103.00 TO NODE 103.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

=====

MAINLINE Tc(MIN.) = 10.19
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.055
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	0.10	0.98	0.100	32
COMMERCIAL	A	5.10	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 5.20 SUBAREA RUNOFF(CFS) = 18.52

EFFECTIVE AREA(ACRES) = 13.50 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 13.5 PEAK FLOW RATE(CFS) = 48.09

FLOW PROCESS FROM NODE 103.00 TO NODE 104.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 1040.00 DOWNSTREAM(FEET) = 1020.00
FLOW LENGTH(FEET) = 520.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.43
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 48.09
PIPE TRAVEL TIME(MIN.) = 0.56 Tc(MIN.) = 10.76
LONGEST FLOWPATH FROM NODE 102.00 TO NODE 104.00 = 1380.00 FEET.

FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.76
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.927
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 1.60 0.98 0.100 32
COMMERCIAL A 14.30 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 15.90 SUBAREA RUNOFF(CFS) = 54.80
EFFECTIVE AREA(ACRES) = 29.40 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 29.4 PEAK FLOW RATE(CFS) = 101.32

FLOW PROCESS FROM NODE 104.00 TO NODE 105.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 1020.00 DOWNSTREAM(FEET) = 1010.00
FLOW LENGTH(FEET) = 2080.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 40.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.41
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 101.32
PIPE TRAVEL TIME(MIN.) = 4.12 Tc(MIN.) = 14.88
LONGEST FLOWPATH FROM NODE 102.00 TO NODE 105.00 = 3460.00 FEET.

FLOW PROCESS FROM NODE 105.00 TO NODE 105.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 14.88
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.232
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 2.80 0.98 0.100 32
COMMERCIAL A 27.40 0.98 0.100 32
COMMERCIAL B 0.50 0.75 0.100 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 30.70 SUBAREA RUNOFF(CFS) = 86.62
EFFECTIVE AREA(ACRES) = 60.10 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 60.1 PEAK FLOW RATE(CFS) = 169.56

FLOW PROCESS FROM NODE 105.00 TO NODE 106.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 1010.00 DOWNSTREAM(FEET) = 1005.00
FLOW LENGTH(FEET) = 300.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 36.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.48
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 169.56
PIPE TRAVEL TIME(MIN.) = 0.32 Tc(MIN.) = 15.20
LONGEST FLOWPATH FROM NODE 102.00 TO NODE 106.00 = 3760.00 FEET.

FLOW PROCESS FROM NODE 106.00 TO NODE 106.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 15.20
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.191
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 3.00 0.98 0.100 32
COMMERCIAL A 73.60 0.98 0.100 32
COMMERCIAL B 11.20 0.75 0.100 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.95
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 87.80 SUBAREA RUNOFF(CFS) = 244.65
EFFECTIVE AREA(ACRES) = 147.90 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.96 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 147.9 PEAK FLOW RATE(CFS) = 411.98

FLOW PROCESS FROM NODE 106.00 TO NODE 107.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<


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>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1005.00  DOWNSTREAM(FEET) = 1000.00
FLOW LENGTH(FEET) = 860.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 84.0 INCH PIPE IS 65.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.88
ESTIMATED PIPE DIAMETER(INCH) = 84.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 411.98
PIPE TRAVEL TIME(MIN.) = 1.11  Tc(MIN.) = 16.31
LONGEST FLOWPATH FROM NODE 102.00 TO NODE 107.00 = 4620.00 FEET.

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FLOW PROCESS FROM NODE 107.00 TO NODE 107.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) = 16.31
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.058
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL            A      5.00     0.98      0.100     32
COMMERCIAL            A     23.80     0.98      0.100     32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 28.80  SUBAREA RUNOFF(CFS) = 76.74
EFFECTIVE AREA(ACRES) = 176.70  AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.96  AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 176.7  PEAK FLOW RATE(CFS) = 471.09

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*****
FLOW PROCESS FROM NODE 107.00 TO NODE 108.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1000.00  DOWNSTREAM(FEET) = 995.00
FLOW LENGTH(FEET) = 280.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 72.0 INCH PIPE IS 55.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 20.34
ESTIMATED PIPE DIAMETER(INCH) = 72.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 471.09
PIPE TRAVEL TIME(MIN.) = 0.23  Tc(MIN.) = 16.54
LONGEST FLOWPATH FROM NODE 102.00 TO NODE 108.00 = 4900.00 FEET.

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```

*****
FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) = 16.54
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.033
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL            A     12.50     0.98      0.100     32

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```

COMMERCIAL            A     16.60     0.98      0.100     32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 29.10  SUBAREA RUNOFF(CFS) = 76.87
EFFECTIVE AREA(ACRES) = 205.80  AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.96  AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 205.8  PEAK FLOW RATE(CFS) = 543.90

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*****
FLOW PROCESS FROM NODE 108.00 TO NODE 110.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====

```

```

ELEVATION DATA: UPSTREAM(FEET) = 995.00  DOWNSTREAM(FEET) = 990.00
FLOW LENGTH(FEET) = 300.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 75.0 INCH PIPE IS 61.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 20.26
ESTIMATED PIPE DIAMETER(INCH) = 75.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 543.90
PIPE TRAVEL TIME(MIN.) = 0.25  Tc(MIN.) = 16.79
LONGEST FLOWPATH FROM NODE 102.00 TO NODE 110.00 = 5200.00 FEET.

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

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TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 16.79
RAINFALL INTENSITY(INCH/HR) = 3.01
AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.96
AREA-AVERAGED Ap = 0.10
EFFECTIVE STREAM AREA(ACRES) = 205.80
TOTAL STREAM AREA(ACRES) = 205.80
PEAK FLOW RATE(CFS) AT CONFLUENCE = 543.90

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*****
FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
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INITIAL SUBAREA FLOW-LENGTH(FEET) = 3500.00
ELEVATION DATA: UPSTREAM(FEET) = 1050.00  DOWNSTREAM(FEET) = 1000.00

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Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 18.600
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.827
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS  Tc
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
COMMERCIAL            A      1.90     0.98      0.100     32  18.60
PUBLIC PARK           A     17.70     0.98      0.850     32  29.55

```

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.777
 SUBAREA RUNOFF(CFS) = 36.50
 TOTAL AREA(ACRES) = 19.60 PEAK FLOW RATE(CFS) = 36.50

1	543.90	16.79	3.006	0.96(0.10)	0.10	205.8	102.00
0.0							
2	36.50	18.89	2.801	0.98(0.76)	0.78	19.6	100.00
1224.0							

 FLOW PROCESS FROM NODE 101.00 TO NODE 101.00 IS CODE = 16

>>>>USER SPECIFIED CONSTANT SOURCE FLOW AT NODE<<<<<
 =====
 USER-SPECIFIED CONSTANT SOURCE FLOW = 1224.00(CFS)
 USER-SPECIFIED AREA ASSOCIATED TO SOURCE FLOW = 490.00(ACRES)
 * CUMULATIVE SOURCE FLOW DATA: FLOW(CFS) = 1224.00 AREA(AC.) = 490.00
 * SUMMED DATA: FLOW(CFS) = 1260.50 TOTAL AREA(ACRES) = 509.60

 FLOW PROCESS FROM NODE 101.00 TO NODE 110.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM(FEET) = 1000.00 DOWNSTREAM(FEET) = 990.00
 FLOW LENGTH(FEET) = 480.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 102.0 INCH PIPE IS 76.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 27.64
 ESTIMATED PIPE DIAMETER(INCH) = 102.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 1260.50
 PIPE TRAVEL TIME(MIN.) = 0.29 Tc(MIN.) = 18.89
 * TOTAL SOURCE FLOW(CFS) = 1224.00
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 110.00 = 3980.00 FEET.

 FLOW PROCESS FROM NODE 110.00 TO NODE 110.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
 =====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 18.89
 RAINFALL INTENSITY(INCH/HR) = 2.80
 AREA-AVERAGED Fm(INCH/HR) = 0.76
 AREA-AVERAGED Fp(INCH/HR) = 0.98
 AREA-AVERAGED Ap = 0.78
 EFFECTIVE STREAM AREA(ACRES) = 19.60
 TOTAL STREAM AREA(ACRES) = 19.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 36.50

* SOURCE FLOW DATA: FLOW(CFS) = 1224.00 AREA(ACRES) = 490.0
 * SUMMED DATA: FLOW(CFS) = 1260.50 TOTAL AREA(ACRES) = 509.6

** CONFLUENCE DATA **

STREAM SOURCE NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	543.90	16.79	3.006	0.96(0.10)	0.10	205.8	102.00
2	36.50	18.89	2.801	0.98(0.76)	0.78	19.6	100.00

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

** PEAK FLOW RATE TABLE **

STREAM SOURCE NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	579.60	16.79	3.006	0.97(0.15)	0.15	223.2	102.00
0.0							
2	542.06	18.89	2.801	0.97(0.15)	0.16	225.4	100.00
1224.0							

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 579.60 Tc(MIN.) = 16.79
 EFFECTIVE AREA(ACRES) = 223.22 AREA-AVERAGED Fm(INCH/HR) = 0.15
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.15
 TOTAL AREA(ACRES) = 225.4
 * CUMULATIVE SOURCE FLOW DATA: FLOW(CFS) = 1224.00 AREA(AC.) = 490.0
 * SUMMED DATA: FLOW(CFS) = 1803.60 TOTAL AREA(ACRES) = 715.4
 LONGEST FLOWPATH FROM NODE 102.00 TO NODE 110.00 = 5200.00 FEET.

 FLOW PROCESS FROM NODE 110.00 TO NODE 111.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 990.00 DOWNSTREAM(FEET) = 985.00
 FLOW LENGTH(FEET) = 500.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 132.0 INCH PIPE IS 102.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 22.83
 ESTIMATED PIPE DIAMETER(INCH) = 132.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 1803.60
 PIPE TRAVEL TIME(MIN.) = 0.37 Tc(MIN.) = 17.16
 * TOTAL SOURCE FLOW(CFS) = 1224.00
 LONGEST FLOWPATH FROM NODE 102.00 TO NODE 111.00 = 5700.00 FEET.

 FLOW PROCESS FROM NODE 111.00 TO NODE 111.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====

MAINLINE Tc(MIN.) = 17.16
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.967
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	19.10	0.98	0.100	32
COMMERCIAL	A	21.00	0.98	0.100	32

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 40.10 SUBAREA RUNOFF(CFS) = 103.57
 EFFECTIVE AREA(ACRES) = 263.32 AREA-AVERAGED Fm(INCH/HR) = 0.14
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.14
 TOTAL AREA(ACRES) = 265.5 PEAK FLOW RATE(CFS) = 670.02

* SOURCE FLOW DATA: FLOW(CFS) = 1224.00 AREA(ACRES) = 490.0
 * SUMMED DATA: FLOW(CFS) = 1894.02 TOTAL AREA(ACRES) = 755.5

FLOW LENGTH(FEET) = 940.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 138.0 INCH PIPE IS 110.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 21.73
 ESTIMATED PIPE DIAMETER(INCH) = 138.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 1932.87
 PIPE TRAVEL TIME(MIN.) = 0.72 Tc(MIN.) = 17.98
 * TOTAL SOURCE FLOW(CFS) = 1224.00
 LONGEST FLOWPATH FROM NODE 102.00 TO NODE 113.00 = 6840.00 FEET.

 FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 985.00 DOWNSTREAM(FEET) = 980.00
 FLOW LENGTH(FEET) = 200.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 114.0 INCH PIPE IS 86.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 32.68
 ESTIMATED PIPE DIAMETER(INCH) = 114.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 1894.02
 PIPE TRAVEL TIME(MIN.) = 0.10 Tc(MIN.) = 17.26
 * TOTAL SOURCE FLOW(CFS) = 1224.00
 LONGEST FLOWPATH FROM NODE 102.00 TO NODE 112.00 = 5900.00 FEET.

 FLOW PROCESS FROM NODE 112.00 TO NODE 112.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 17.26
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.957
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	0.30	0.98	0.100	32
COMMERCIAL	A	14.80	0.98	0.100	32
PUBLIC PARK	A	1.30	0.98	0.850	32

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.159
 SUBAREA AREA(ACRES) = 16.40 SUBAREA RUNOFF(CFS) = 41.35
 EFFECTIVE AREA(ACRES) = 279.72 AREA-AVERAGED Fm(INCH/HR) = 0.14
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.15
 TOTAL AREA(ACRES) = 281.9 PEAK FLOW RATE(CFS) = 708.87

* SOURCE FLOW DATA: FLOW(CFS) = 1224.00 AREA(ACRES) = 490.0
 * SUMMED DATA: FLOW(CFS) = 1932.87 TOTAL AREA(ACRES) = 771.9

 FLOW PROCESS FROM NODE 112.00 TO NODE 113.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 980.00 DOWNSTREAM(FEET) = 972.00

 FLOW PROCESS FROM NODE 113.00 TO NODE 113.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 17.98
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.885
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	7.90	0.98	0.100	32
COMMERCIAL	A	42.70	0.98	0.100	32
PUBLIC PARK	A	6.80	0.98	0.850	32

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.189
 SUBAREA AREA(ACRES) = 57.40 SUBAREA RUNOFF(CFS) = 139.53
 EFFECTIVE AREA(ACRES) = 337.12 AREA-AVERAGED Fm(INCH/HR) = 0.15
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.15
 TOTAL AREA(ACRES) = 339.3 PEAK FLOW RATE(CFS) = 830.35

* SOURCE FLOW DATA: FLOW(CFS) = 1224.00 AREA(ACRES) = 490.0
 * SUMMED DATA: FLOW(CFS) = 2054.35 TOTAL AREA(ACRES) = 829.3

 FLOW PROCESS FROM NODE 113.00 TO NODE 120.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 972.00 DOWNSTREAM(FEET) = 945.00
 FLOW LENGTH(FEET) = 2800.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 138.0 INCH PIPE IS 110.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 23.13
 ESTIMATED PIPE DIAMETER(INCH) = 138.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 2054.35
 PIPE TRAVEL TIME(MIN.) = 2.02 Tc(MIN.) = 20.00
 * TOTAL SOURCE FLOW(CFS) = 1224.00
 LONGEST FLOWPATH FROM NODE 102.00 TO NODE 120.00 = 9640.00 FEET.

 FLOW PROCESS FROM NODE 120.00 TO NODE 120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 20.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.707
 SUBAREA LOSS RATE DATA(AMC II):

```

DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          A         8.90   0.98  0.100 32
COMMERCIAL          A        111.10  0.98  0.100 32
PUBLIC PARK         A         25.10   0.98  0.850 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.230
SUBAREA AREA(ACRES) = 145.10 SUBAREA RUNOFF(CFS) = 324.23
EFFECTIVE AREA(ACRES) = 482.22 AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.18
TOTAL AREA(ACRES) = 484.4 PEAK FLOW RATE(CFS) = 1100.46

* SOURCE FLOW DATA: FLOW(CFS) = 1224.00 AREA(ACRES) = 490.0
* SUMMED DATA: FLOW(CFS) = 2324.46 TOTAL AREA(ACRES) = 974.4

*****
FLOW PROCESS FROM NODE 120.00 TO NODE 130.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 945.00 DOWNSTREAM(FEET) = 905.00
FLOW LENGTH(FEET) = 3100.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 138.0 INCH PIPE IS 107.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 26.73
ESTIMATED PIPE DIAMETER(INCH) = 138.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 2324.46
PIPE TRAVEL TIME(MIN.) = 1.93 Tc(MIN.) = 21.93
* TOTAL SOURCE FLOW(CFS) = 1224.00
LONGEST FLOWPATH FROM NODE 102.00 TO NODE 130.00 = 12740.00 FEET.

*****
FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 21.93
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.561
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          A         0.50   0.98  0.100 32
COMMERCIAL          A        39.00   0.98  0.100 32
PUBLIC PARK         A        13.70   0.98  0.850 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.293
SUBAREA AREA(ACRES) = 53.20 SUBAREA RUNOFF(CFS) = 108.93
EFFECTIVE AREA(ACRES) = 535.42 AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.19
TOTAL AREA(ACRES) = 537.6 PEAK FLOW RATE(CFS) = 1146.12

* SOURCE FLOW DATA: FLOW(CFS) = 1224.00 AREA(ACRES) = 490.0
* SUMMED DATA: FLOW(CFS) = 2370.12 TOTAL AREA(ACRES) = 1027.6

*****
FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 81

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-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 21.93
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.561
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          A        15.50   0.98  0.100 32
COMMERCIAL          A       122.00   0.98  0.100 32
PUBLIC PARK         A        18.10   0.98  0.850 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.187
SUBAREA AREA(ACRES) = 155.60 SUBAREA RUNOFF(CFS) = 333.07
EFFECTIVE AREA(ACRES) = 691.02 AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.19
TOTAL AREA(ACRES) = 693.2 PEAK FLOW RATE(CFS) = 1479.19

* SOURCE FLOW DATA: FLOW(CFS) = 1224.00 AREA(ACRES) = 490.0
* SUMMED DATA: FLOW(CFS) = 2703.19 TOTAL AREA(ACRES) = 1183.2

*****
FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 71
-----
>>>>PEAK FLOW RATE ESTIMATOR CHANGED TO UNIT-HYDROGRAPH METHOD<<<<
>>>>USING TIME-OF-CONCENTRATION OF LONGEST FLOWPATH<<<<
-----
UNIT-HYDROGRAPH DATA:
RAINFALL(INCH): 5M= 0.52;30M= 1.06;1H= 1.40;3H= 2.54;6H= 3.70;24H= 8.00
S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
Tc(HR) = 0.37; LAG(HR) = 0.29; Fm(INCH/HR) = 0.18; Ybar = 0.20
USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
DEPTH-AREA FACTORS: 5M = 0.97; 30M = 0.97; 1HR = 0.97;
3HR = 1.00; 6HR = 1.00; 24HR= 1.00
UNIT-INTERVAL(MIN) = 2.50 TOTAL AREA(ACRES) = 693.2
LONGEST FLOWPATH FROM NODE 102.00 TO NODE 130.00 = 12740.00 FEET.
EQUIVALENT BASIN FACTOR APPROXIMATIONS:
Lca/L=0.3,n=.0216; Lca/L=0.4,n=.0194; Lca/L=0.5,n=.0178;Lca/L=0.6,n=.0166
TIME OF PEAK FLOW(HR) = 16.33 RUNOFF VOLUME(AF) = 375.59
UNIT-HYDROGRAPH METHOD PEAK FLOW RATE(CFS) = 1557.30
TOTAL PEAK FLOW RATE(CFS) = 2781.30 (SOURCE FLOW INCLUDED)
RATIONAL METHOD PEAK FLOW RATE(CFS) = 2703.19
(UPSTREAM NODE PEAK FLOW RATE(CFS) = 2703.19)
PEAK FLOW RATE(CFS) USED = 2781.30
TOTAL SOURCE FLOW(CFS) = 1224.00
TOTAL AREA ASSOCIATED TO SOURCE FLOW(ACRES) = 490.0

*****
FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
-----
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
PEAK FLOW RATE(CFS) = 1557.30 Tc(MIN.) = 21.93

```

AREA-AVERAGED Fm(INCH/HR) = 0.18 Ybar = 0.20
TOTAL AREA(ACRES) = 693.2

* SOURCE FLOW DATA: FLOW(CFS) = 1224.00 AREA(ACRES) = 490.0
* SUMMED DATA: FLOW(CFS) = 2781.30 TOTAL AREA(ACRES) = 1183.2

FLOW PROCESS FROM NODE 121.00 TO NODE 122.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1100.00
ELEVATION DATA: UPSTREAM(FEET) = 975.00 DOWNSTREAM(FEET) = 970.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 14.720
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.253
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	1.20	0.98	0.100	32	14.72
COMMERCIAL	A	3.20	0.98	0.100	32	14.72

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 12.50
TOTAL AREA(ACRES) = 4.40 PEAK FLOW RATE(CFS) = 12.50

FLOW PROCESS FROM NODE 122.00 TO NODE 123.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 970.00 DOWNSTREAM ELEVATION(FEET) = 955.00
STREET LENGTH(FEET) = 1400.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 34.11
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.58
HALFSTREET FLOOD WIDTH(FEET) = 21.11
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.67
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.13
STREET FLOW TRAVEL TIME(MIN.) = 6.36 Tc(MIN.) = 21.08
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.623
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	0.70	0.98	0.100	32
COMMERCIAL	A	18.20	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 18.90 SUBAREA RUNOFF(CFS) = 42.95
EFFECTIVE AREA(ACRES) = 23.30 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 23.3 PEAK FLOW RATE(CFS) = 52.95

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.66 HALFSTREET FLOOD WIDTH(FEET) = 25.07
FLOW VELOCITY(FEET/SEC.) = 4.09 DEPTH*VELOCITY(FT*FT/SEC.) = 2.70
*NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
AND L = 1400.0 FT WITH ELEVATION-DROP = 15.0 FT, IS 56.2 CFS,
WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 123.00
LONGEST FLOWPATH FROM NODE 121.00 TO NODE 123.00 = 2500.00 FEET.

FLOW PROCESS FROM NODE 123.00 TO NODE 124.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 955.00 DOWNSTREAM(FEET) = 940.00
FLOW LENGTH(FEET) = 980.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 24.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.16
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 52.95
PIPE TRAVEL TIME(MIN.) = 1.46 Tc(MIN.) = 22.54
LONGEST FLOWPATH FROM NODE 121.00 TO NODE 124.00 = 3480.00 FEET.

FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 22.54
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.519
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	2.30	0.98	0.100	32
COMMERCIAL	A	17.80	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 20.10 SUBAREA RUNOFF(CFS) = 43.81
EFFECTIVE AREA(ACRES) = 43.40 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 43.4 PEAK FLOW RATE(CFS) = 94.59

FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 81


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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 22.54
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.519
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
    LAND USE            GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL              A      2.60    0.98    0.100    32
COMMERCIAL              A     66.30    0.98    0.100    32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 68.90      SUBAREA RUNOFF (CFS) = 150.16
EFFECTIVE AREA (ACRES) = 112.30   AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 112.3      PEAK FLOW RATE (CFS) = 244.75

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*****
FLOW PROCESS FROM NODE 124.00 TO NODE 125.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 940.00 DOWNSTREAM(FEET) = 907.00
FLOW LENGTH(FEET) = 2700.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 60.0 INCH PIPE IS 46.7 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 14.93
ESTIMATED PIPE DIAMETER (INCH) = 60.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 244.75
PIPE TRAVEL TIME (MIN.) = 3.02 Tc (MIN.) = 25.56
LONGEST FLOWPATH FROM NODE 121.00 TO NODE 125.00 = 6180.00 FEET.

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FLOW PROCESS FROM NODE 125.00 TO NODE 125.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 25.56
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.336
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
    LAND USE            GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL              A     13.60    0.98    0.100    32
COMMERCIAL              A    114.70    0.98    0.100    32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 128.30     SUBAREA RUNOFF (CFS) = 258.52
EFFECTIVE AREA (ACRES) = 240.60   AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 240.6      PEAK FLOW RATE (CFS) = 484.79

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*****
FLOW PROCESS FROM NODE 125.00 TO NODE 130.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 907.00 DOWNSTREAM(FEET) = 905.00
FLOW LENGTH(FEET) = 400.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 90.0 INCH PIPE IS 73.6 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 12.53
ESTIMATED PIPE DIAMETER (INCH) = 90.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 484.79
PIPE TRAVEL TIME (MIN.) = 0.53 Tc (MIN.) = 26.09
LONGEST FLOWPATH FROM NODE 121.00 TO NODE 130.00 = 6580.00 FEET.

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*****
FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
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TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION (MIN.) = 26.09
RAINFALL INTENSITY (INCH/HR) = 2.31
AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.98
AREA-AVERAGED Ap = 0.10
EFFECTIVE STREAM AREA (ACRES) = 240.60
TOTAL STREAM AREA (ACRES) = 240.60
PEAK FLOW RATE (CFS) AT CONFLUENCE = 484.79
** CONFLUENCE DATA **
STREAM      Q      Tc      AREA      HEADWATER
NUMBER      (CFS)  (MIN.)  (ACRES)    NODE
1           1557.30  21.93   693.20     102.00
2           484.79   26.09   240.60     121.00

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COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
UNIT-HYDROGRAPH DATA:
RAINFALL (INCH): 5M= 0.52;30M= 1.06;1H= 1.40;3H= 2.54;6H= 3.70;24H= 8.00
S-GRAPH: VALLEY (DEV.)=100.0%;VALLEY (UNDEV.)/DESERT= 0.0%
          MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT (UNDEV.)= 0.0%
Tc (HR) = 0.37; LAG (HR) = 16.29; Fm (INCH/HR) = 0.16; Ybar = 0.18
USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
DEPTH-AREA FACTORS: 5M = 0.96; 30M = 0.96; 1HR = 0.96;
3HR = 0.99; 6HR = 1.00; 24HR = 1.00
UNIT-INTERVAL (MIN) = 2.50 TOTAL AREA (ACRES) = 933.8
LONGEST FLOWPATH FROM NODE 102.00 TO NODE 130.00 = 12740.00 FEET.
EQUIVALENT BASIN FACTOR APPROXIMATIONS:
Lca/L=0.3,n=.0216; Lca/L=0.4,n=.0194; Lca/L=0.5,n=.0178;Lca/L=0.6,n=.0166
TIME OF PEAK FLOW (HR) = 16.33 RUNOFF VOLUME (AF) = 517.54
PEAK FLOW RATE (CFS) = 2092.80
* CUMULATIVE SOURCE FLOW DATA: FLOW (CFS) = 1224.00 AREA (AC.) = 490.0
* SUMMED DATA: FLOW (CFS) = 3316.80 TOTAL AREA (ACRES) = 1423.8

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FLOW PROCESS FROM NODE 130.00 TO NODE 140.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

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ELEVATION DATA: UPSTREAM(FEET) = 905.00 DOWNSTREAM(FEET) = 890.00
 FLOW LENGTH(FEET) = 3100.00 MANNING'S N = 0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) = 20.07
 ESTIMATED PIPE DIAMETER(INCH) = 144.00 NUMBER OF PIPES = 2
 PIPE-FLOW(CFS) = 3316.80
 PIPE TRAVEL TIME(MIN.) = 2.57 Tc(MIN.) = 24.50
 * TOTAL SOURCE FLOW(CFS) = 1224.00
 LONGEST FLOWPATH FROM NODE 102.00 TO NODE 140.00 = 15840.00 FEET.

PUBLIC PARK A 11.10 0.98 0.850 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.484
 SUBAREA AREA(ACRES) = 21.70
 UNIT-HYDROGRAPH DATA:
 RAINFALL(INCH): 5M= 0.52;30M= 1.06;1H= 1.40;3H= 2.54;6H= 3.70;24H= 8.00
 S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
 MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
 Tc(HR) = 0.41; LAG(HR) = 0.33; Fm(INCH/HR) = 0.17; Ybar = 0.19
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.95; 30M = 0.95; 1HR = 0.95;
 3HR = 0.99; 6HR = 1.00; 24HR= 1.00
 UNIT-INTERVAL(MIN) = 2.50 TOTAL AREA(ACRES) = 1026.7
 LONGEST FLOWPATH FROM NODE 102.00 TO NODE 140.00 = 15840.00 FEET.

 FLOW PROCESS FROM NODE 140.00 TO NODE 140.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

 MAINLINE Tc(MIN.) = 24.50
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.396
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	0.40	0.98	0.100	32
COMMERCIAL	A	55.80	0.98	0.100	32
PUBLIC PARK	A	15.00	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.258
 SUBAREA AREA(ACRES) = 71.20
 UNIT-HYDROGRAPH DATA:
 RAINFALL(INCH): 5M= 0.52;30M= 1.06;1H= 1.40;3H= 2.54;6H= 3.70;24H= 8.00
 S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
 MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
 Tc(HR) = 0.41; LAG(HR) = 0.33; Fm(INCH/HR) = 0.17; Ybar = 0.19
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.96; 30M = 0.96; 1HR = 0.96;
 3HR = 0.99; 6HR = 1.00; 24HR= 1.00

UNIT-INTERVAL(MIN) = 2.50 TOTAL AREA(ACRES) = 1005.0
 LONGEST FLOWPATH FROM NODE 102.00 TO NODE 140.00 = 15840.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3,n=.0200; Lca/L=0.4,n=.0179; Lca/L=0.5,n=.0165;Lca/L=0.6,n=.0154
 TIME OF PEAK FLOW(HR) = 16.42 RUNOFF VOLUME(AF) = 553.19
 UNIT-HYDROGRAPH PEAK FLOW RATE(CFS) = 2095.22
 TOTAL AREA(ACRES) = 1005.0 PEAK FLOW RATE(CFS) = 2095.22

* SOURCE FLOW DATA: FLOW(CFS) = 1224.00 AREA(ACRES) = 490.0
 * SUMMED DATA: FLOW(CFS) = 3319.22 TOTAL AREA(ACRES) = 1495.0

 FLOW PROCESS FROM NODE 140.00 TO NODE 140.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

 MAINLINE Tc(MIN.) = 24.50
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.396
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	10.60	0.98	0.100	32

EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3,n=.0200; Lca/L=0.4,n=.0179; Lca/L=0.5,n=.0165;Lca/L=0.6,n=.0154
 TIME OF PEAK FLOW(HR) = 16.42 RUNOFF VOLUME(AF) = 561.30
 UNIT-HYDROGRAPH PEAK FLOW RATE(CFS) = 2132.07
 TOTAL AREA(ACRES) = 1026.7 PEAK FLOW RATE(CFS) = 2132.07

* SOURCE FLOW DATA: FLOW(CFS) = 1224.00 AREA(ACRES) = 490.0
 * SUMMED DATA: FLOW(CFS) = 3356.07 TOTAL AREA(ACRES) = 1516.7

 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES) = 1026.7 TC(MIN.) = 24.50
 AREA-AVERAGED Fm(INCH/HR) = 0.17 Ybar = 0.19
 PEAK FLOW RATE(CFS) = 2132.07
 * CUMULATIVE SOURCE FLOW DATA: FLOW(CFS) = 1224.00 AREA(AC.) = 490.0
 * SUMMED DATA: FLOW(CFS) = 3356.07 TOTAL AREA(ACRES) = 1516.7

 END OF INTEGRATED RATIONAL/UNIT-HYDROGRAPH METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
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Ver. 18.0 Release Date: 07/01/2011 License ID 1239

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***** DESCRIPTION OF STUDY *****

* OLD MODEL COLONY EAST AREA B
* 10-YEAR HYDROLOGY ANALYSIS
*

FILE NAME: OMCEB10.DAT
TIME/DATE OF STUDY: 15:24 10/14/2011

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.80
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.0000

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

Table with columns: NO., HALF- WIDTH (FT), CROWN TO CROSSFALL (FT), STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY, CURB HEIGHT (FT), GUTTER WIDTH (FT), GEOMETRIES: LIP (FT), HIKE (FT), MANNING FACTOR (n)

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

SIZE PIPE WITH A FLOW CAPACITY GREATER THAN OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

UNIT-HYDROGRAPH MODEL SELECTIONS/PARAMETERS:

WATERSHED LAG = 0.80 * Tc
USED "VALLEY UNDEVELOPED" S-GRAPH FOR DEVELOPMENTS OF

2 UNITS/ACRE AND LESS; AND "VALLEY DEVELOPED" S-GRAPH FOR DEVELOPMENTS OF 3-4 UNITS/ACRE AND MORE.

USER SPECIFIED RAINFALL VALUES:

2-YR 6-HR RAINFALL DEPTH(INCH) = 1.70
2-YR 24-HR RAINFALL DEPTH(INCH) = 3.30
100-YR 6-HR RAINFALL DEPTH(INCH) = 3.70
100-YR 24-HR RAINFALL DEPTH(INCH) = 8.00

SIERRA MADRE DEPTH-AREA FACTORS USED.

AREA-AVERAGED

Table with columns: DURATION, RAINFALL(INCH)
5-MINUTES 0.33
30-MINUTES 0.68
1-HOUR 0.90
3-HOUR 1.60
6-HOUR 2.31
24-HOUR 4.36

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR UNIT HYDROGRAPH METHOD

FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 840.00
ELEVATION DATA: UPSTREAM(FEET) = 908.00 DOWNSTREAM(FEET) = 895.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.343
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.871
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 9.80 0.98 0.100 32 10.34
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 24.47
TOTAL AREA(ACRES) = 9.80 PEAK FLOW RATE(CFS) = 24.47

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 895.00 DOWNSTREAM(FEET) = 880.00
FLOW LENGTH(FEET) = 1380.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.15
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 24.47
PIPE TRAVEL TIME(MIN.) = 2.82 Tc(MIN.) = 13.17
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 2220.00 FEET.

FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 13.17

* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.484

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	7.70	0.98	0.100	32
COMMERCIAL	A	20.70	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA (ACRES) = 28.40 SUBAREA RUNOFF (CFS) = 61.01

EFFECTIVE AREA (ACRES) = 38.20 AREA-AVERAGED Fm (INCH/HR) = 0.10

AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10

TOTAL AREA (ACRES) = 38.2 PEAK FLOW RATE (CFS) = 82.06

FLOW PROCESS FROM NODE 102.00 TO NODE 104.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 880.00 DOWNSTREAM (FEET) = 879.00

FLOW LENGTH (FEET) = 900.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 63.0 INCH PIPE IS 48.0 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 4.64

ESTIMATED PIPE DIAMETER (INCH) = 63.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 82.06

PIPE TRAVEL TIME (MIN.) = 3.23 Tc (MIN.) = 16.40

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 104.00 = 3120.00 FEET.

FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 16.40

* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.178

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	6.30	0.98	0.100	32
COMMERCIAL	A	42.80	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA (ACRES) = 49.10 SUBAREA RUNOFF (CFS) = 91.93

EFFECTIVE AREA (ACRES) = 87.30 AREA-AVERAGED Fm (INCH/HR) = 0.10

AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.10

TOTAL AREA (ACRES) = 87.3 PEAK FLOW RATE (CFS) = 163.44

FLOW PROCESS FROM NODE 104.00 TO NODE 105.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 879.00 DOWNSTREAM (FEET) = 878.00

FLOW LENGTH (FEET) = 1040.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 84.0 INCH PIPE IS 63.6 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 5.23

ESTIMATED PIPE DIAMETER (INCH) = 84.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 163.44

PIPE TRAVEL TIME (MIN.) = 3.32 Tc (MIN.) = 19.72

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 105.00 = 4160.00 FEET.

FLOW PROCESS FROM NODE 105.00 TO NODE 105.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 19.72

* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.950

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	8.90	0.98	0.100	32
COMMERCIAL	A	104.50	0.98	0.100	32
PUBLIC PARK	A	4.20	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.127

SUBAREA AREA (ACRES) = 117.60 SUBAREA RUNOFF (CFS) = 193.29

EFFECTIVE AREA (ACRES) = 204.90 AREA-AVERAGED Fm (INCH/HR) = 0.11

AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.12

TOTAL AREA (ACRES) = 204.9 PEAK FLOW RATE (CFS) = 338.83

FLOW PROCESS FROM NODE 105.00 TO NODE 106.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 878.00 DOWNSTREAM (FEET) = 862.00

FLOW LENGTH (FEET) = 1280.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 69.0 INCH PIPE IS 51.0 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 16.47

ESTIMATED PIPE DIAMETER (INCH) = 69.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 338.83

PIPE TRAVEL TIME (MIN.) = 1.30 Tc (MIN.) = 21.01

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 106.00 = 5440.00 FEET.

FLOW PROCESS FROM NODE 106.00 TO NODE 106.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 21.01

* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.877

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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COMMERCIAL A 5.70 0.98 0.100 32
 COMMERCIAL A 59.30 0.98 0.100 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 65.00 SUBAREA RUNOFF (CFS) = 104.09
 EFFECTIVE AREA (ACRES) = 269.90 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.11
 TOTAL AREA (ACRES) = 269.9 PEAK FLOW RATE (CFS) = 429.45

 FLOW PROCESS FROM NODE 106.00 TO NODE 120.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 862.00 DOWNSTREAM (FEET) = 850.00
 FLOW LENGTH (FEET) = 1320.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 78.0 INCH PIPE IS 61.3 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 15.34
 ESTIMATED PIPE DIAMETER (INCH) = 78.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 429.45
 PIPE TRAVEL TIME (MIN.) = 1.43 Tc (MIN.) = 22.45
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 120.00 = 6760.00 FEET.

 FLOW PROCESS FROM NODE 120.00 TO NODE 120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 22.45
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.804
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	4.00	0.98	0.100	32
COMMERCIAL	A	42.50	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 46.50 SUBAREA RUNOFF (CFS) = 71.41
 EFFECTIVE AREA (ACRES) = 316.40 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.11
 TOTAL AREA (ACRES) = 316.4 PEAK FLOW RATE (CFS) = 483.16

 FLOW PROCESS FROM NODE 120.00 TO NODE 120.00 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.) = 22.45
 RAINFALL INTENSITY (INCH/HR) = 1.80
 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.97
 AREA-AVERAGED Ap = 0.11
 EFFECTIVE STREAM AREA (ACRES) = 316.40

TOTAL STREAM AREA (ACRES) = 316.40
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 483.16

 FLOW PROCESS FROM NODE 110.00 TO NODE 111.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 620.00
 ELEVATION DATA: UPSTREAM (FEET) = 880.00 DOWNSTREAM (FEET) = 870.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]** 0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.085
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.104
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	1.50	0.98	0.100	32	9.08
COMMERCIAL	A	5.40	0.98	0.100	32	9.08

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF (CFS) = 18.67
 TOTAL AREA (ACRES) = 6.90 PEAK FLOW RATE (CFS) = 18.67

 FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 870.00 DOWNSTREAM (FEET) = 865.00
 FLOW LENGTH (FEET) = 630.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.6 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 6.82
 ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 18.67
 PIPE TRAVEL TIME (MIN.) = 1.54 Tc (MIN.) = 10.62
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 112.00 = 1250.00 FEET.

 FLOW PROCESS FROM NODE 112.00 TO NODE 112.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 10.62
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.826
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	1.40	0.98	0.100	32
COMMERCIAL	A	2.60	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 4.00 SUBAREA RUNOFF (CFS) = 9.82
 EFFECTIVE AREA (ACRES) = 10.90 AREA-AVERAGED Fm (INCH/HR) = 0.10

AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
 TOTAL AREA (ACRES) = 10.9 PEAK FLOW RATE (CFS) = 26.76

 FLOW PROCESS FROM NODE 112.00 TO NODE 113.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 865.00 DOWNSTREAM (FEET) = 852.00
 FLOW LENGTH (FEET) = 1800.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.4 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 7.14
 ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 26.76
 PIPE TRAVEL TIME (MIN.) = 4.20 Tc (MIN.) = 14.82
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 113.00 = 3050.00 FEET.

 FLOW PROCESS FROM NODE 113.00 TO NODE 113.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 14.82
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.314
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	3.30	0.98	0.100	32
COMMERCIAL	A	25.00	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 28.30 SUBAREA RUNOFF (CFS) = 56.45
 EFFECTIVE AREA (ACRES) = 39.20 AREA-AVERAGED Fm (INCH/HR) = 0.10
 AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.10
 TOTAL AREA (ACRES) = 39.2 PEAK FLOW RATE (CFS) = 78.19

 FLOW PROCESS FROM NODE 113.00 TO NODE 114.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 852.00 DOWNSTREAM (FEET) = 851.00
 FLOW LENGTH (FEET) = 480.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 54.0 INCH PIPE IS 43.0 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 5.75
 ESTIMATED PIPE DIAMETER (INCH) = 54.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 78.19
 PIPE TRAVEL TIME (MIN.) = 1.39 Tc (MIN.) = 16.22
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 114.00 = 3530.00 FEET.

 FLOW PROCESS FROM NODE 114.00 TO NODE 114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 16.22
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.192

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	2.70	0.98	0.100	32
COMMERCIAL	A	33.00	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 35.70 SUBAREA RUNOFF (CFS) = 67.31
 EFFECTIVE AREA (ACRES) = 74.90 AREA-AVERAGED Fm (INCH/HR) = 0.10
 AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.10
 TOTAL AREA (ACRES) = 74.9 PEAK FLOW RATE (CFS) = 141.22

 FLOW PROCESS FROM NODE 114.00 TO NODE 120.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 851.00 DOWNSTREAM (FEET) = 850.00
 FLOW LENGTH (FEET) = 1480.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 84.0 INCH PIPE IS 65.4 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 4.39
 ESTIMATED PIPE DIAMETER (INCH) = 84.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 141.22
 PIPE TRAVEL TIME (MIN.) = 5.62 Tc (MIN.) = 21.83
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 120.00 = 5010.00 FEET.

 FLOW PROCESS FROM NODE 120.00 TO NODE 120.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION (MIN.) = 21.83
 RAINFALL INTENSITY (INCH/HR) = 1.83
 AREA-AVERAGED Fm (INCH/HR) = 0.10
 AREA-AVERAGED Fp (INCH/HR) = 0.97
 AREA-AVERAGED Ap = 0.10
 EFFECTIVE STREAM AREA (ACRES) = 74.90
 TOTAL STREAM AREA (ACRES) = 74.90
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 141.22

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	483.16	22.45	1.804	0.97 (0.11)	0.11	316.4	100.00
2	141.22	21.83	1.834	0.97 (0.10)	0.10	74.9	110.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	619.55	21.83	1.834	0.97 (0.11)	0.11	382.6	110.00
2	621.92	22.45	1.804	0.97 (0.11)	0.11	391.3	100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 621.92 Tc(MIN.) = 22.45
 EFFECTIVE AREA(ACRES) = 391.30 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.11
 TOTAL AREA(ACRES) = 391.3
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 120.00 = 6760.00 FEET.

AREA-AVERAGED Fm(INCH/HR) = 0.10
 AREA-AVERAGED Fp(INCH/HR) = 0.98
 AREA-AVERAGED Ap = 0.11
 EFFECTIVE STREAM AREA(ACRES) = 515.70
 TOTAL STREAM AREA(ACRES) = 515.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 700.50

FLOW PROCESS FROM NODE 121.00 TO NODE 122.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 620.00
 ELEVATION DATA: UPSTREAM(FEET) = 880.00 DOWNSTREAM(FEET) = 870.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.085
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.104
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	1.90	0.98	0.100	32	9.08
COMMERCIAL	A	7.20	0.98	0.100	32	9.08
PUBLIC PARK	A	0.70	0.98	0.850	32	14.43

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.154
 SUBAREA RUNOFF(CFS) = 26.06
 TOTAL AREA(ACRES) = 9.80 PEAK FLOW RATE(CFS) = 26.06

FLOW PROCESS FROM NODE 122.00 TO NODE 130.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 870.00 DOWNSTREAM(FEET) = 845.00
 FLOW LENGTH(FEET) = 2020.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 8.69
 ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 26.06
 PIPE TRAVEL TIME(MIN.) = 3.87 Tc(MIN.) = 12.96
 LONGEST FLOWPATH FROM NODE 121.00 TO NODE 130.00 = 2640.00 FEET.

FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc(MIN.) = 12.96
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.508
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	6.80	0.98	0.100	32

FLOW PROCESS FROM NODE 120.00 TO NODE 130.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 850.00 DOWNSTREAM(FEET) = 845.00
 FLOW LENGTH(FEET) = 2600.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 120.0 INCH PIPE IS 94.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 9.40
 ESTIMATED PIPE DIAMETER(INCH) = 120.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 621.92
 PIPE TRAVEL TIME(MIN.) = 4.61 Tc(MIN.) = 27.05
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 130.00 = 9360.00 FEET.

FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc(MIN.) = 27.05
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.613
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	8.20	0.98	0.100	32
COMMERCIAL	A	116.20	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 124.40 SUBAREA RUNOFF(CFS) = 169.64
 EFFECTIVE AREA(ACRES) = 515.70 AREA-AVERAGED Fm(INCH/HR) = 0.10
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.11
 TOTAL AREA(ACRES) = 515.7 PEAK FLOW RATE(CFS) = 700.50

FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 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.) = 27.05
 RAINFALL INTENSITY (INCH/HR) = 1.61

COMMERCIAL A 3.00 0.98 0.100 32
 PUBLIC PARK A 8.80 0.98 0.850 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.455
 SUBAREA AREA (ACRES) = 18.60 SUBAREA RUNOFF (CFS) = 34.56
 EFFECTIVE AREA (ACRES) = 28.40 AREA-AVERAGED Fm (INCH/HR) = 0.34
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.35
 TOTAL AREA (ACRES) = 28.4 PEAK FLOW RATE (CFS) = 55.37

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	593.20	12.96	2.508	0.97 (0.13)	0.13	276.9	121.00
2	732.01	26.44	1.635	0.97 (0.12)	0.12	535.4	110.00
3	732.98	27.05	1.613	0.98 (0.12)	0.12	544.1	100.00

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

 FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 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.) = 12.96
 RAINFALL INTENSITY (INCH/HR) = 2.51
 AREA-AVERAGED Fm (INCH/HR) = 0.34
 AREA-AVERAGED Fp (INCH/HR) = 0.98
 AREA-AVERAGED Ap = 0.35
 EFFECTIVE STREAM AREA (ACRES) = 28.40
 TOTAL STREAM AREA (ACRES) = 28.40
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 55.37

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	698.96	26.44	1.635	0.97 (0.10)	0.11	507.0	110.00
1	700.50	27.05	1.613	0.98 (0.10)	0.11	515.7	100.00
2	55.37	12.96	2.508	0.98 (0.34)	0.35	28.4	121.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	593.20	12.96	2.508	0.97 (0.13)	0.13	276.9	121.00
2	732.01	26.44	1.635	0.97 (0.12)	0.12	535.4	110.00
3	732.98	27.05	1.613	0.98 (0.12)	0.12	544.1	100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 732.98 Tc (MIN.) = 27.05
 EFFECTIVE AREA (ACRES) = 544.10 AREA-AVERAGED Fm (INCH/HR) = 0.12
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.12
 TOTAL AREA (ACRES) = 544.1
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 130.00 = 9360.00 FEET.

=====
 END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 544.1 TC (MIN.) = 27.05
 EFFECTIVE AREA (ACRES) = 544.10 AREA-AVERAGED Fm (INCH/HR) = 0.12
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.119
 PEAK FLOW RATE (CFS) = 732.98

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
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***** DESCRIPTION OF STUDY *****
* OLD MODEL COLONY EAST AREA B *
* 25-YEAR HYDROLOGY ANALYSIS *
* *

FILE NAME: OMCEB25.DAT
TIME/DATE OF STUDY: 15:25 10/14/2011

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT (YEAR) = 25.00
SPECIFIED MINIMUM PIPE SIZE (INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS (DECIMAL) TO USE FOR FRICTION SLOPE = 0.80
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL
10-YEAR STORM 60-MINUTE INTENSITY (INCH/HOUR) = 1.000
100-YEAR STORM 60-MINUTE INTENSITY (INCH/HOUR) = 1.400
COMPUTED RAINFALL INTENSITY DATA:
STORM EVENT = 25.00 1-HOUR INTENSITY (INCH/HOUR) = 1.1365
SLOPE OF INTENSITY DURATION CURVE = 0.6000

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF-WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER WIDTH (FT)	GEOMETRIES LIP (FT)	MANNING HIKE (FT)	FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150
2	32.0	27.0	0.020/0.020/0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

UNIT-HYDROGRAPH MODEL SELECTIONS/PARAMETERS:

WATERSHED LAG = 0.80 * Tc
USED "VALLEY UNDEVELOPED" S-GRAPH FOR DEVELOPMENTS OF
2 UNITS/ACRE AND LESS; AND "VALLEY DEVELOPED" S-GRAPH
FOR DEVELOPMENTS OF 3-4 UNITS/ACRE AND MORE.

USER SPECIFIED RAINFALL VALUES:

2-YR 6-HR RAINFALL DEPTH (INCH) = 1.70
2-YR 24-HR RAINFALL DEPTH (INCH) = 3.30
100-YR 6-HR RAINFALL DEPTH (INCH) = 3.70
100-YR 24-HR RAINFALL DEPTH (INCH) = 8.00
SIERRA MADRE DEPTH-AREA FACTORS USED.

DURATION	AREA-AVERAGED RAINFALL (INCH)
5-MINUTES	0.38
30-MINUTES	0.79
1-HOUR	1.04
3-HOUR	1.87
6-HOUR	2.71
24-HOUR	5.30

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR UNIT HYDROGRAPH METHOD

FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 840.00
ELEVATION DATA: UPSTREAM (FEET) = 908.00 DOWNSTREAM (FEET) = 895.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 10.343
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.263
SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	9.80	0.98	0.100	32	10.34

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF (CFS) = 27.92
TOTAL AREA (ACRES) = 9.80 PEAK FLOW RATE (CFS) = 27.92

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 895.00 DOWNSTREAM (FEET) = 880.00
FLOW LENGTH (FEET) = 1380.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 21.4 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 8.28
ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 27.92
PIPE TRAVEL TIME (MIN.) = 2.78 Tc (MIN.) = 13.12
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 2220.00 FEET.

FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 13.12
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.829
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 7.70 0.98 0.100 32
COMMERCIAL A 20.70 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 28.40 SUBAREA RUNOFF(CFS) = 69.82
EFFECTIVE AREA(ACRES) = 38.20 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 38.2 PEAK FLOW RATE(CFS) = 93.91

FLOW PROCESS FROM NODE 102.00 TO NODE 104.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 880.00 DOWNSTREAM(FEET) = 879.00
FLOW LENGTH(FEET) = 900.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 66.0 INCH PIPE IS 50.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.79
ESTIMATED PIPE DIAMETER(INCH) = 66.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 93.91
PIPE TRAVEL TIME(MIN.) = 3.13 Tc(MIN.) = 16.25
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 104.00 = 3120.00 FEET.

FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 16.25
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.488
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 6.30 0.98 0.100 32
COMMERCIAL A 42.80 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 49.10 SUBAREA RUNOFF(CFS) = 105.65
EFFECTIVE AREA(ACRES) = 87.30 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 87.3 PEAK FLOW RATE(CFS) = 187.84

FLOW PROCESS FROM NODE 104.00 TO NODE 105.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 879.00 DOWNSTREAM(FEET) = 878.00
FLOW LENGTH(FEET) = 1040.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 87.0 INCH PIPE IS 68.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.37
ESTIMATED PIPE DIAMETER(INCH) = 87.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 187.84
PIPE TRAVEL TIME(MIN.) = 3.23 Tc(MIN.) = 19.48
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 105.00 = 4160.00 FEET.

FLOW PROCESS FROM NODE 105.00 TO NODE 105.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 19.48
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.232
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 8.90 0.98 0.100 32
COMMERCIAL A 104.50 0.98 0.100 32
PUBLIC PARK A 4.20 0.98 0.850 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.127
SUBAREA AREA(ACRES) = 117.60 SUBAREA RUNOFF(CFS) = 223.14
EFFECTIVE AREA(ACRES) = 204.90 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.12
TOTAL AREA(ACRES) = 204.9 PEAK FLOW RATE(CFS) = 390.85

FLOW PROCESS FROM NODE 105.00 TO NODE 106.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 878.00 DOWNSTREAM(FEET) = 862.00
FLOW LENGTH(FEET) = 1280.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 72.0 INCH PIPE IS 54.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.00
ESTIMATED PIPE DIAMETER(INCH) = 72.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 390.85
PIPE TRAVEL TIME(MIN.) = 1.25 Tc(MIN.) = 20.74
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 106.00 = 5440.00 FEET.

FLOW PROCESS FROM NODE 106.00 TO NODE 106.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 20.74
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.150
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE SCS SOIL GROUP AREA (ACRES) Fp (INCH/HR) Ap (DECIMAL) CN

COMMERCIAL	A	5.70	0.98	0.100	32
COMMERCIAL	A	59.30	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 65.00 SUBAREA RUNOFF(CFS) = 120.06
 EFFECTIVE AREA(ACRES) = 269.90 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.11
 TOTAL AREA(ACRES) = 269.9 PEAK FLOW RATE(CFS) = 495.78

AREA-AVERAGED Ap = 0.11
 EFFECTIVE STREAM AREA(ACRES) = 316.40
 TOTAL STREAM AREA(ACRES) = 316.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 558.60

 FLOW PROCESS FROM NODE 110.00 TO NODE 111.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 620.00
 ELEVATION DATA: UPSTREAM(FEET) = 880.00 DOWNSTREAM(FEET) = 870.00

Tc = K * [(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.085
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.528
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	1.50	0.98	0.100	32	9.08
COMMERCIAL	A	5.40	0.98	0.100	32	9.08

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF(CFS) = 21.30
 TOTAL AREA(ACRES) = 6.90 PEAK FLOW RATE(CFS) = 21.30

 FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 870.00 DOWNSTREAM(FEET) = 865.00
 FLOW LENGTH(FEET) = 630.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 6.98
 ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 21.30
 PIPE TRAVEL TIME(MIN.) = 1.50 Tc(MIN.) = 10.59
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 112.00 = 1250.00 FEET.

 FLOW PROCESS FROM NODE 112.00 TO NODE 112.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

=====

MAINLINE Tc(MIN.) = 10.59
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.218
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	1.40	0.98	0.100	32
COMMERCIAL	A	2.60	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

 FLOW PROCESS FROM NODE 106.00 TO NODE 120.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 862.00 DOWNSTREAM(FEET) = 850.00
 FLOW LENGTH(FEET) = 1320.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 84.0 INCH PIPE IS 62.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 16.04
 ESTIMATED PIPE DIAMETER(INCH) = 84.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 495.78
 PIPE TRAVEL TIME(MIN.) = 1.37 Tc(MIN.) = 22.11
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 120.00 = 6760.00 FEET.

 FLOW PROCESS FROM NODE 120.00 TO NODE 120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

=====

MAINLINE Tc(MIN.) = 22.11
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.069
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	4.00	0.98	0.100	32
COMMERCIAL	A	42.50	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 46.50 SUBAREA RUNOFF(CFS) = 82.50
 EFFECTIVE AREA(ACRES) = 316.40 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.11
 TOTAL AREA(ACRES) = 316.4 PEAK FLOW RATE(CFS) = 558.60

 FLOW PROCESS FROM NODE 120.00 TO NODE 120.00 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.) = 22.11
 RAINFALL INTENSITY(INCH/HR) = 2.07
 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.97

SUBAREA AREA (ACRES) = 4.00 SUBAREA RUNOFF (CFS) = 11.23
 EFFECTIVE AREA (ACRES) = 10.90 AREA-AVERAGED Fm (INCH/HR) = 0.10
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
 TOTAL AREA (ACRES) = 10.9 PEAK FLOW RATE (CFS) = 30.61

 FLOW PROCESS FROM NODE 112.00 TO NODE 113.00 IS CODE = 31

 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM (FEET) = 865.00 DOWNSTREAM (FEET) = 852.00
 FLOW LENGTH (FEET) = 1800.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 24.1 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 7.24
 ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 30.61
 PIPE TRAVEL TIME (MIN.) = 4.14 Tc (MIN.) = 14.73
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 113.00 = 3050.00 FEET.

 FLOW PROCESS FROM NODE 113.00 TO NODE 113.00 IS CODE = 81

 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====
 MAINLINE Tc (MIN.) = 14.73
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.639
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	3.30	0.98	0.100	32
COMMERCIAL	A	25.00	0.98	0.100	32

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 28.30 SUBAREA RUNOFF (CFS) = 64.74
 EFFECTIVE AREA (ACRES) = 39.20 AREA-AVERAGED Fm (INCH/HR) = 0.10
 AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.10
 TOTAL AREA (ACRES) = 39.2 PEAK FLOW RATE (CFS) = 89.68

 FLOW PROCESS FROM NODE 113.00 TO NODE 114.00 IS CODE = 31

 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM (FEET) = 852.00 DOWNSTREAM (FEET) = 851.00
 FLOW LENGTH (FEET) = 480.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 57.0 INCH PIPE IS 45.1 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 5.96
 ESTIMATED PIPE DIAMETER (INCH) = 57.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 89.68
 PIPE TRAVEL TIME (MIN.) = 1.34 Tc (MIN.) = 16.07
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 114.00 = 3530.00 FEET.

 FLOW PROCESS FROM NODE 114.00 TO NODE 114.00 IS CODE = 81

 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====

MAINLINE Tc (MIN.) = 16.07
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.505
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	2.70	0.98	0.100	32
COMMERCIAL	A	33.00	0.98	0.100	32

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 35.70 SUBAREA RUNOFF (CFS) = 77.35
 EFFECTIVE AREA (ACRES) = 74.90 AREA-AVERAGED Fm (INCH/HR) = 0.10
 AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.10
 TOTAL AREA (ACRES) = 74.9 PEAK FLOW RATE (CFS) = 162.28

 FLOW PROCESS FROM NODE 114.00 TO NODE 120.00 IS CODE = 31

 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM (FEET) = 851.00 DOWNSTREAM (FEET) = 850.00
 FLOW LENGTH (FEET) = 1480.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 87.0 INCH PIPE IS 70.9 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 4.50
 ESTIMATED PIPE DIAMETER (INCH) = 87.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 162.28
 PIPE TRAVEL TIME (MIN.) = 5.48 Tc (MIN.) = 21.55
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 120.00 = 5010.00 FEET.

 FLOW PROCESS FROM NODE 120.00 TO NODE 120.00 IS CODE = 1

 >>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
 =====
 TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION (MIN.) = 21.55
 RAINFALL INTENSITY (INCH/HR) = 2.10
 AREA-AVERAGED Fm (INCH/HR) = 0.10
 AREA-AVERAGED Fp (INCH/HR) = 0.97
 AREA-AVERAGED Ap = 0.10
 EFFECTIVE STREAM AREA (ACRES) = 74.90
 TOTAL STREAM AREA (ACRES) = 74.90
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 162.28

*** CONFLUENCE DATA ***

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	558.60	22.11	2.069	0.97 (0.11)	0.11	316.4	100.00
2	162.28	21.55	2.101	0.97 (0.10)	0.10	74.9	110.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO

CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	715.66	21.55	2.101	0.97 (0.11)	0.11	383.3	110.00
2	718.29	22.11	2.069	0.97 (0.11)	0.11	391.3	100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 718.29 Tc (MIN.) = 22.11
 EFFECTIVE AREA (ACRES) = 391.30 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.11
 TOTAL AREA (ACRES) = 391.3
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 120.00 = 6760.00 FEET.

TIME OF CONCENTRATION (MIN.) = 26.57
 RAINFALL INTENSITY (INCH/HR) = 1.85
 AREA-AVERAGED Fm (INCH/HR) = 0.10
 AREA-AVERAGED Fp (INCH/HR) = 0.98
 AREA-AVERAGED Ap = 0.11
 EFFECTIVE STREAM AREA (ACRES) = 515.70
 TOTAL STREAM AREA (ACRES) = 515.70
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 812.01

 FLOW PROCESS FROM NODE 120.00 TO NODE 130.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 850.00 DOWNSTREAM (FEET) = 845.00
 FLOW LENGTH (FEET) = 2600.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 126.0 INCH PIPE IS 100.3 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 9.72
 ESTIMATED PIPE DIAMETER (INCH) = 126.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 718.29
 PIPE TRAVEL TIME (MIN.) = 4.46 Tc (MIN.) = 26.57
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 130.00 = 9360.00 FEET.

 FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 26.57
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.853
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	8.20	0.98	0.100	32
COMMERCIAL	A	116.20	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 124.40 SUBAREA RUNOFF (CFS) = 196.54
 EFFECTIVE AREA (ACRES) = 515.70 AREA-AVERAGED Fm (INCH/HR) = 0.10
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.11
 TOTAL AREA (ACRES) = 515.7 PEAK FLOW RATE (CFS) = 812.01

 FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

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

 FLOW PROCESS FROM NODE 121.00 TO NODE 122.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 620.00
 ELEVATION DATA: UPSTREAM (FEET) = 880.00 DOWNSTREAM (FEET) = 870.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.085
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.528
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	1.90	0.98	0.100	32	9.08
COMMERCIAL	A	7.20	0.98	0.100	32	9.08
PUBLIC PARK	A	0.70	0.98	0.850	32	14.43

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.154
 SUBAREA RUNOFF (CFS) = 29.79
 TOTAL AREA (ACRES) = 9.80 PEAK FLOW RATE (CFS) = 29.79

 FLOW PROCESS FROM NODE 122.00 TO NODE 130.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 870.00 DOWNSTREAM (FEET) = 845.00
 FLOW LENGTH (FEET) = 2020.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 27.0 INCH PIPE IS 21.4 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 8.83
 ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 29.79
 PIPE TRAVEL TIME (MIN.) = 3.81 Tc (MIN.) = 12.90
 LONGEST FLOWPATH FROM NODE 121.00 TO NODE 130.00 = 2640.00 FEET.

 FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 12.90
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.859
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL	AREA	Fp	Ap	SCS
-------------------------------	------	----	----	-----

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
COMMERCIAL	A	6.80	0.98	0.100	32
COMMERCIAL	A	3.00	0.98	0.100	32
PUBLIC PARK	A	8.80	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.455
SUBAREA AREA(ACRES) = 18.60 SUBAREA RUNOFF(CFS) = 40.43
EFFECTIVE AREA(ACRES) = 28.40 AREA-AVERAGED F_m (INCH/HR) = 0.34
AREA-AVERAGED F_p (INCH/HR) = 0.98 AREA-AVERAGED A_p = 0.35
TOTAL AREA(ACRES) = 28.4 PEAK FLOW RATE(CFS) = 64.32

PEAK FLOW RATE(CFS) = 850.63

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	688.65	12.90	2.859	0.98 (0.13)	0.13	280.2	121.00
2	849.53	26.01	1.877	0.97 (0.12)	0.12	536.1	110.00
3	850.63	26.57	1.853	0.98 (0.12)	0.12	544.1	100.00

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

FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 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) = 2.86
AREA-AVERAGED F_m (INCH/HR) = 0.34
AREA-AVERAGED F_p (INCH/HR) = 0.98
AREA-AVERAGED A_p = 0.35
EFFECTIVE STREAM AREA(ACRES) = 28.40
TOTAL STREAM AREA(ACRES) = 28.40
PEAK FLOW RATE(CFS) AT CONFLUENCE = 64.32

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	810.30	26.01	1.877	0.98 (0.10)	0.11	507.7	110.00
1	812.01	26.57	1.853	0.98 (0.10)	0.11	515.7	100.00
2	64.32	12.90	2.859	0.98 (0.34)	0.35	28.4	121.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	688.65	12.90	2.859	0.98 (0.13)	0.13	280.2	121.00
2	849.53	26.01	1.877	0.97 (0.12)	0.12	536.1	110.00
3	850.63	26.57	1.853	0.98 (0.12)	0.12	544.1	100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 850.63 Tc(MIN.) = 26.57
EFFECTIVE AREA(ACRES) = 544.10 AREA-AVERAGED F_m (INCH/HR) = 0.12
AREA-AVERAGED F_p (INCH/HR) = 0.98 AREA-AVERAGED A_p = 0.12
TOTAL AREA(ACRES) = 544.1
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 130.00 = 9360.00 FEET.

=====
END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 544.1 TC(MIN.) = 26.57
EFFECTIVE AREA(ACRES) = 544.10 AREA-AVERAGED F_m (INCH/HR) = 0.12
AREA-AVERAGED F_p (INCH/HR) = 0.98 AREA-AVERAGED A_p = 0.119

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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***** DESCRIPTION OF STUDY *****

* OLD MODEL COLONY EAST AREA B *
* 100-YEAR HYDROLOGY ANALYSIS *
* * *

FILE NAME: OMCEB100.DAT
TIME/DATE OF STUDY: 15:26 10/14/2011

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT (YEAR) = 100.00
SPECIFIED MINIMUM PIPE SIZE (INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS (DECIMAL) TO USE FOR FRICTION SLOPE = 0.80
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE (LOG(I; IN/HR) vs. LOG(Tc; MIN)) = 0.6000
USER SPECIFIED 1-HOUR INTENSITY (INCH/HOUR) = 1.4000

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF-CROWN TO STREET-CROSSFALL:		STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER WIDTH (FT)	GUTTER-GEOMETRIES:		
	WIDTH (FT)	CROSSFALL (FT)				LIP (FT)	HIKE (FT)	FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150
2	32.0	27.0	0.020/0.020/0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

SIZE PIPE WITH A FLOW CAPACITY GREATER THAN OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.

*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

UNIT-HYDROGRAPH MODEL SELECTIONS/PARAMETERS:

WATERSHED LAG = 0.80 * Tc
USED "VALLEY UNDEVELOPED" S-GRAPH FOR DEVELOPMENTS OF

2 UNITS/ACRE AND LESS; AND "VALLEY DEVELOPED" S-GRAPH FOR DEVELOPMENTS OF 3-4 UNITS/ACRE AND MORE.

USER SPECIFIED RAINFALL VALUES:

2-YR 6-HR RAINFALL DEPTH (INCH) = 1.70
2-YR 24-HR RAINFALL DEPTH (INCH) = 3.30
100-YR 6-HR RAINFALL DEPTH (INCH) = 3.70
100-YR 24-HR RAINFALL DEPTH (INCH) = 8.00

SIERRA MADRE DEPTH-AREA FACTORS USED.

DURATION	AREA-AVERAGED RAINFALL (INCH)
5-MINUTES	0.52
30-MINUTES	1.06
1-HOUR	1.40
3-HOUR	2.54
6-HOUR	3.70
24-HOUR	8.00

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR UNIT HYDROGRAPH METHOD

FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 840.00
ELEVATION DATA: UPSTREAM (FEET) = 908.00 DOWNSTREAM (FEET) = 895.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]** 0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 10.343
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 4.020
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	9.80	0.98	0.100	32	10.34

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF (CFS) = 34.60
 TOTAL AREA (ACRES) = 9.80 PEAK FLOW RATE (CFS) = 34.60

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 895.00 DOWNSTREAM (FEET) = 880.00
 FLOW LENGTH (FEET) = 1380.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 22.3 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 8.82
 ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 34.60
 PIPE TRAVEL TIME (MIN.) = 2.61 Tc (MIN.) = 12.95
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 2220.00 FEET.

FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.95

* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.513

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	7.70	0.98	0.100	32
COMMERCIAL	A	20.70	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA (ACRES) = 28.40 SUBAREA RUNOFF (CFS) = 87.30

EFFECTIVE AREA (ACRES) = 38.20 AREA-AVERAGED Fm (INCH/HR) = 0.10

AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10

TOTAL AREA (ACRES) = 38.2 PEAK FLOW RATE (CFS) = 117.42

FLOW PROCESS FROM NODE 102.00 TO NODE 104.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 880.00 DOWNSTREAM (FEET) = 879.00

FLOW LENGTH (FEET) = 900.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 72.0 INCH PIPE IS 54.9 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 5.07

ESTIMATED PIPE DIAMETER (INCH) = 72.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 117.42

PIPE TRAVEL TIME (MIN.) = 2.96 Tc (MIN.) = 15.91

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 104.00 = 3120.00 FEET.

FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 15.91

* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.105

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	6.30	0.98	0.100	32
COMMERCIAL	A	42.80	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA (ACRES) = 49.10 SUBAREA RUNOFF (CFS) = 132.90

EFFECTIVE AREA (ACRES) = 87.30 AREA-AVERAGED Fm (INCH/HR) = 0.10

AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.10

TOTAL AREA (ACRES) = 87.3 PEAK FLOW RATE (CFS) = 236.30

FLOW PROCESS FROM NODE 104.00 TO NODE 105.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 879.00 DOWNSTREAM (FEET) = 878.00

FLOW LENGTH (FEET) = 1040.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 96.0 INCH PIPE IS 73.5 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 5.72

ESTIMATED PIPE DIAMETER (INCH) = 96.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 236.30

PIPE TRAVEL TIME (MIN.) = 3.03 Tc (MIN.) = 18.94

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 105.00 = 4160.00 FEET.

FLOW PROCESS FROM NODE 105.00 TO NODE 105.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 18.94

* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.797

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	8.90	0.98	0.100	32
COMMERCIAL	A	104.50	0.98	0.100	32
PUBLIC PARK	A	4.20	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.127

SUBAREA AREA (ACRES) = 117.60 SUBAREA RUNOFF (CFS) = 282.90

EFFECTIVE AREA (ACRES) = 204.90 AREA-AVERAGED Fm (INCH/HR) = 0.11

AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.12

TOTAL AREA (ACRES) = 204.9 PEAK FLOW RATE (CFS) = 494.97

FLOW PROCESS FROM NODE 105.00 TO NODE 106.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 878.00 DOWNSTREAM (FEET) = 862.00

FLOW LENGTH (FEET) = 1280.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 78.0 INCH PIPE IS 60.3 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 17.97

ESTIMATED PIPE DIAMETER (INCH) = 78.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 494.97

PIPE TRAVEL TIME (MIN.) = 1.19 Tc (MIN.) = 20.12

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 106.00 = 5440.00 FEET.

FLOW PROCESS FROM NODE 106.00 TO NODE 106.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 20.12

* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.696

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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COMMERCIAL A 5.70 0.98 0.100 32
 COMMERCIAL A 59.30 0.98 0.100 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.100
 SUBAREA AREA (ACRES) = 65.00 SUBAREA RUNOFF (CFS) = 152.03
 EFFECTIVE AREA (ACRES) = 269.90 AREA-AVERAGED F_m (INCH/HR) = 0.11
 AREA-AVERAGED F_p (INCH/HR) = 0.98 AREA-AVERAGED A_p = 0.11
 TOTAL AREA (ACRES) = 269.9 PEAK FLOW RATE (CFS) = 628.52

TOTAL STREAM AREA (ACRES) = 316.40
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 708.91

 FLOW PROCESS FROM NODE 110.00 TO NODE 111.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 620.00
 ELEVATION DATA: UPSTREAM (FEET) = 880.00 DOWNSTREAM (FEET) = 870.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
 SUBAREA ANALYSIS USED MINIMUM T_c (MIN.) = 9.085
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 4.345
 SUBAREA T_c AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN	T_c (MIN.)
COMMERCIAL	A	1.50	0.98	0.100	32	9.08
COMMERCIAL	A	5.40	0.98	0.100	32	9.08

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.100
 SUBAREA RUNOFF (CFS) = 26.38
 TOTAL AREA (ACRES) = 6.90 PEAK FLOW RATE (CFS) = 26.38

 FLOW PROCESS FROM NODE 106.00 TO NODE 120.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 862.00 DOWNSTREAM (FEET) = 850.00
 FLOW LENGTH (FEET) = 1320.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 90.0 INCH PIPE IS 70.7 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 16.88
 ESTIMATED PIPE DIAMETER (INCH) = 90.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 628.52
 PIPE TRAVEL TIME (MIN.) = 1.30 T_c (MIN.) = 21.43
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 120.00 = 6760.00 FEET.

 FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 870.00 DOWNSTREAM (FEET) = 865.00
 FLOW LENGTH (FEET) = 630.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.4 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 7.41
 ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 26.38
 PIPE TRAVEL TIME (MIN.) = 1.42 T_c (MIN.) = 10.50
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 112.00 = 1250.00 FEET.

 FLOW PROCESS FROM NODE 120.00 TO NODE 120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE T_c (MIN.) = 21.43
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.597
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN
COMMERCIAL	A	4.00	0.98	0.100	32
COMMERCIAL	A	42.50	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.100
 SUBAREA AREA (ACRES) = 46.50 SUBAREA RUNOFF (CFS) = 104.59
 EFFECTIVE AREA (ACRES) = 316.40 AREA-AVERAGED F_m (INCH/HR) = 0.11
 AREA-AVERAGED F_p (INCH/HR) = 0.97 AREA-AVERAGED A_p = 0.11
 TOTAL AREA (ACRES) = 316.4 PEAK FLOW RATE (CFS) = 708.91

 FLOW PROCESS FROM NODE 112.00 TO NODE 112.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE T_c (MIN.) = 10.50
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.983
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN
COMMERCIAL	A	1.40	0.98	0.100	32
COMMERCIAL	A	2.60	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.100
 SUBAREA AREA (ACRES) = 4.00 SUBAREA RUNOFF (CFS) = 13.99
 EFFECTIVE AREA (ACRES) = 10.90 AREA-AVERAGED F_m (INCH/HR) = 0.10

 FLOW PROCESS FROM NODE 120.00 TO NODE 120.00 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.) = 21.43
 RAINFALL INTENSITY (INCH/HR) = 2.60
 AREA-AVERAGED F_m (INCH/HR) = 0.11
 AREA-AVERAGED F_p (INCH/HR) = 0.97
 AREA-AVERAGED A_p = 0.11
 EFFECTIVE STREAM AREA (ACRES) = 316.40

AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
 TOTAL AREA (ACRES) = 10.9 PEAK FLOW RATE (CFS) = 38.12

 FLOW PROCESS FROM NODE 112.00 TO NODE 113.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 865.00 DOWNSTREAM (FEET) = 852.00
 FLOW LENGTH (FEET) = 1800.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 25.6 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 7.70
 ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 38.12
 PIPE TRAVEL TIME (MIN.) = 3.90 Tc (MIN.) = 14.40
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 113.00 = 3050.00 FEET.

 FLOW PROCESS FROM NODE 113.00 TO NODE 113.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 14.40
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.297
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	3.30	0.98	0.100	32
COMMERCIAL	A	25.00	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 28.30 SUBAREA RUNOFF (CFS) = 81.48
 EFFECTIVE AREA (ACRES) = 39.20 AREA-AVERAGED Fm (INCH/HR) = 0.10
 AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.10
 TOTAL AREA (ACRES) = 39.2 PEAK FLOW RATE (CFS) = 112.86

 FLOW PROCESS FROM NODE 113.00 TO NODE 114.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 852.00 DOWNSTREAM (FEET) = 851.00
 FLOW LENGTH (FEET) = 480.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 63.0 INCH PIPE IS 48.2 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 6.36
 ESTIMATED PIPE DIAMETER (INCH) = 63.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 112.86
 PIPE TRAVEL TIME (MIN.) = 1.26 Tc (MIN.) = 15.66
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 114.00 = 3530.00 FEET.

 FLOW PROCESS FROM NODE 114.00 TO NODE 114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

 MAINLINE Tc (MIN.) = 15.66

* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.135

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	2.70	0.98	0.100	32
COMMERCIAL	A	33.00	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 35.70 SUBAREA RUNOFF (CFS) = 97.59
 EFFECTIVE AREA (ACRES) = 74.90 AREA-AVERAGED Fm (INCH/HR) = 0.10
 AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.10
 TOTAL AREA (ACRES) = 74.9 PEAK FLOW RATE (CFS) = 204.75

 FLOW PROCESS FROM NODE 114.00 TO NODE 120.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 851.00 DOWNSTREAM (FEET) = 850.00
 FLOW LENGTH (FEET) = 1480.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 96.0 INCH PIPE IS 75.9 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 4.81
 ESTIMATED PIPE DIAMETER (INCH) = 96.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 204.75
 PIPE TRAVEL TIME (MIN.) = 5.13 Tc (MIN.) = 20.79
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 120.00 = 5010.00 FEET.

 FLOW PROCESS FROM NODE 120.00 TO NODE 120.00 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.) = 20.79
 RAINFALL INTENSITY (INCH/HR) = 2.64
 AREA-AVERAGED Fm (INCH/HR) = 0.10
 AREA-AVERAGED Fp (INCH/HR) = 0.97
 AREA-AVERAGED Ap = 0.10
 EFFECTIVE STREAM AREA (ACRES) = 74.90
 TOTAL STREAM AREA (ACRES) = 74.90
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 204.75

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	708.91	21.43	2.597	0.97 (0.11)	0.11	316.4	100.00
2	204.75	20.79	2.644	0.97 (0.10)	0.10	74.9	110.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	905.66	20.79	2.644	0.97(0.11)	0.11	381.9	110.00
2	909.83	21.43	2.597	0.97(0.11)	0.11	391.3	100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 909.83 Tc(MIN.) = 21.43
 EFFECTIVE AREA(ACRES) = 391.30 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.11
 TOTAL AREA(ACRES) = 391.3
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 120.00 = 6760.00 FEET.

AREA-AVERAGED Fm(INCH/HR) = 0.10
 AREA-AVERAGED Fp(INCH/HR) = 0.98
 AREA-AVERAGED Ap = 0.11
 EFFECTIVE STREAM AREA(ACRES) = 515.70
 TOTAL STREAM AREA(ACRES) = 515.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 1034.58

FLOW PROCESS FROM NODE 120.00 TO NODE 130.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 850.00 DOWNSTREAM(FEET) = 845.00
 FLOW LENGTH(FEET) = 2600.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 138.0 INCH PIPE IS 109.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 10.33
 ESTIMATED PIPE DIAMETER(INCH) = 138.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 909.83
 PIPE TRAVEL TIME(MIN.) = 4.20 Tc(MIN.) = 25.62
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 130.00 = 9360.00 FEET.

FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 25.62
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.333
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	8.20	0.98	0.100	32
COMMERCIAL	A	116.20	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 124.40 SUBAREA RUNOFF(CFS) = 250.23
 EFFECTIVE AREA(ACRES) = 515.70 AREA-AVERAGED Fm(INCH/HR) = 0.10
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.11
 TOTAL AREA(ACRES) = 515.7 PEAK FLOW RATE(CFS) = 1034.58

FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 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.) = 25.62
 RAINFALL INTENSITY(INCH/HR) = 2.33

FLOW PROCESS FROM NODE 121.00 TO NODE 122.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 620.00
 ELEVATION DATA: UPSTREAM(FEET) = 880.00 DOWNSTREAM(FEET) = 870.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.085
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.345
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	1.90	0.98	0.100	32	9.08
COMMERCIAL	A	7.20	0.98	0.100	32	9.08
PUBLIC PARK	A	0.70	0.98	0.850	32	14.43

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.154
 SUBAREA RUNOFF(CFS) = 37.01
 TOTAL AREA(ACRES) = 9.80 PEAK FLOW RATE(CFS) = 37.01

FLOW PROCESS FROM NODE 122.00 TO NODE 130.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 870.00 DOWNSTREAM(FEET) = 845.00
 FLOW LENGTH(FEET) = 2020.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 22.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 9.42
 ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 37.01
 PIPE TRAVEL TIME(MIN.) = 3.57 Tc(MIN.) = 12.66
 LONGEST FLOWPATH FROM NODE 121.00 TO NODE 130.00 = 2640.00 FEET.

FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.66
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.561
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	6.80	0.98	0.100	32

COMMERCIAL A 3.00 0.98 0.100 32
 PUBLIC PARK A 8.80 0.98 0.850 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.455
 SUBAREA AREA (ACRES) = 18.60 SUBAREA RUNOFF (CFS) = 52.19
 EFFECTIVE AREA (ACRES) = 28.40 AREA-AVERAGED Fm (INCH/HR) = 0.34
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.35
 TOTAL AREA (ACRES) = 28.4 PEAK FLOW RATE (CFS) = 82.27

**** PEAK FLOW RATE TABLE ****

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	880.47	12.66	3.561	0.97 (0.13)	0.13	284.9	121.00
2	1083.66	24.99	2.368	0.97 (0.12)	0.12	534.7	110.00
3	1085.45	25.62	2.333	0.98 (0.12)	0.12	544.1	100.00

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

FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 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.) = 12.66
 RAINFALL INTENSITY (INCH/HR) = 3.56
 AREA-AVERAGED Fm (INCH/HR) = 0.34
 AREA-AVERAGED Fp (INCH/HR) = 0.98
 AREA-AVERAGED Ap = 0.35
 EFFECTIVE STREAM AREA (ACRES) = 28.40
 TOTAL STREAM AREA (ACRES) = 28.40
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 82.27

**** CONFLUENCE DATA ****

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1031.88	24.99	2.368	0.97 (0.10)	0.11	506.3	110.00
1	1034.58	25.62	2.333	0.98 (0.10)	0.11	515.7	100.00
2	82.27	12.66	3.561	0.98 (0.34)	0.35	28.4	121.00

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

**** PEAK FLOW RATE TABLE ****

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	880.47	12.66	3.561	0.97 (0.13)	0.13	284.9	121.00
2	1083.66	24.99	2.368	0.97 (0.12)	0.12	534.7	110.00
3	1085.45	25.62	2.333	0.98 (0.12)	0.12	544.1	100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 1085.45 Tc (MIN.) = 25.62
 EFFECTIVE AREA (ACRES) = 544.10 AREA-AVERAGED Fm (INCH/HR) = 0.12
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.12
 TOTAL AREA (ACRES) = 544.1
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 130.00 = 9360.00 FEET.

=====
 END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 544.1 TC (MIN.) = 25.62
 EFFECTIVE AREA (ACRES) = 544.10 AREA-AVERAGED Fm (INCH/HR) = 0.12
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.119
 PEAK FLOW RATE (CFS) = 1085.45

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
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***** DESCRIPTION OF STUDY *****

* OLD MODEL COLONY EAST AREA C *
* 10-YEAR HYDROLOGY ANALYSIS *
*

FILE NAME: OMCEC10.DAT
TIME/DATE OF STUDY: 15:27 10/14/2011

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

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--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT (YEAR) = 10.00
SPECIFIED MINIMUM PIPE SIZE (INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS (DECIMAL) TO USE FOR FRICTION SLOPE = 0.80
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE (LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
USER SPECIFIED 1-HOUR INTENSITY (INCH/HOUR) = 1.0000

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150
2	32.0	27.0	0.020/0.020/0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

UNIT-HYDROGRAPH MODEL SELECTIONS/PARAMETERS:

WATERSHED LAG = 0.80 * Tc
USED "VALLEY UNDEVELOPED" S-GRAPH FOR DEVELOPMENTS OF

2 UNITS/ACRE AND LESS; AND "VALLEY DEVELOPED" S-GRAPH
FOR DEVELOPMENTS OF 3-4 UNITS/ACRE AND MORE.

USER SPECIFIED RAINFALL VALUES:

2-YR 6-HR RAINFALL DEPTH (INCH) = 1.70
2-YR 24-HR RAINFALL DEPTH (INCH) = 3.30
100-YR 6-HR RAINFALL DEPTH (INCH) = 3.70
100-YR 24-HR RAINFALL DEPTH (INCH) = 8.00

SIERRA MADRE DEPTH-AREA FACTORS USED.

DURATION	AREA-AVERAGED RAINFALL (INCH)
5-MINUTES	0.33
30-MINUTES	0.68
1-HOUR	0.90
3-HOUR	1.60
6-HOUR	2.31
24-HOUR	4.36

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR UNIT HYDROGRAPH METHOD

FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 1470.00
ELEVATION DATA: UPSTREAM (FEET) = 1048.00 DOWNSTREAM (FEET) = 1045.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 19.402
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.969
SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	3.90	0.98	0.100	32	19.40
COMMERCIAL	A	5.70	0.98	0.100	32	19.40

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF (CFS) = 16.17
TOTAL AREA (ACRES) = 9.60 PEAK FLOW RATE (CFS) = 16.17

FLOW PROCESS FROM NODE 101.00 TO NODE 101.00 IS CODE = 16

>>>>USER SPECIFIED CONSTANT SOURCE FLOW AT NODE<<<<<<

=====

USER-SPECIFIED CONSTANT SOURCE FLOW = 427.00 (CFS)
USER-SPECIFIED AREA ASSOCIATED TO SOURCE FLOW = 286.00 (ACRES)
* CUMULATIVE SOURCE FLOW DATA: FLOW (CFS) = 427.00 AREA (AC.) = 286.00
* SUMMED DATA: FLOW (CFS) = 443.17 TOTAL AREA (ACRES) = 295.60

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 31

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

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ELEVATION DATA: UPSTREAM(FEET) = 1045.00 DOWNSTREAM(FEET) = 1030.00
FLOW LENGTH(FEET) = 1300.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 75.0 INCH PIPE IS 60.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.85
ESTIMATED PIPE DIAMETER(INCH) = 75.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 443.17
PIPE TRAVEL TIME(MIN.) = 1.29 Tc(MIN.) = 20.69
* TOTAL SOURCE FLOW(CFS) = 427.00
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 2770.00 FEET.

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FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc(MIN.) = 20.69
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.894
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL         A       2.50   0.98  0.100  32
COMMERCIAL         A       32.60  0.98  0.100  32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 35.10 SUBAREA RUNOFF(CFS) = 56.76
EFFECTIVE AREA(ACRES) = 44.70 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 44.7 PEAK FLOW RATE(CFS) = 72.29

* SOURCE FLOW DATA: FLOW(CFS) = 427.00 AREA(ACRES) = 286.0
* SUMMED DATA: FLOW(CFS) = 499.29 TOTAL AREA(ACRES) = 330.7

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FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 1030.00 DOWNSTREAM(FEET) = 1028.00
FLOW LENGTH(FEET) = 640.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 102.0 INCH PIPE IS 77.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.73
ESTIMATED PIPE DIAMETER(INCH) = 102.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 499.29
PIPE TRAVEL TIME(MIN.) = 0.99 Tc(MIN.) = 21.68
* TOTAL SOURCE FLOW(CFS) = 427.00
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 103.00 = 3410.00 FEET.

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*****
FLOW PROCESS FROM NODE 103.00 TO NODE 103.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc(MIN.) = 21.68
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.842

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SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL         A       2.70   0.98  0.100  32
COMMERCIAL         A       22.80  0.98  0.100  32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 25.50 SUBAREA RUNOFF(CFS) = 40.03
EFFECTIVE AREA(ACRES) = 70.20 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 70.2 PEAK FLOW RATE(CFS) = 110.20

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* SOURCE FLOW DATA: FLOW(CFS) = 427.00 AREA(ACRES) = 286.0
* SUMMED DATA: FLOW(CFS) = 537.20 TOTAL AREA(ACRES) = 356.2

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*****
FLOW PROCESS FROM NODE 103.00 TO NODE 104.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 1028.00 DOWNSTREAM(FEET) = 1025.00
FLOW LENGTH(FEET) = 830.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 102.0 INCH PIPE IS 78.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.54
ESTIMATED PIPE DIAMETER(INCH) = 102.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 537.20
PIPE TRAVEL TIME(MIN.) = 1.20 Tc(MIN.) = 22.88
* TOTAL SOURCE FLOW(CFS) = 427.00
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 104.00 = 4240.00 FEET.

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*****
FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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=====
MAINLINE Tc(MIN.) = 22.88
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.783
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL         A       0.40   0.98  0.100  32
COMMERCIAL         A       2.30   0.98  0.100  32
PUBLIC PARK        A       5.70   0.98  0.850  32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.609
SUBAREA AREA(ACRES) = 8.40 SUBAREA RUNOFF(CFS) = 8.99
EFFECTIVE AREA(ACRES) = 78.60 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.15
TOTAL AREA(ACRES) = 78.6 PEAK FLOW RATE(CFS) = 115.50

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* SOURCE FLOW DATA: FLOW(CFS) = 427.00 AREA(ACRES) = 286.0
* SUMMED DATA: FLOW(CFS) = 542.50 TOTAL AREA(ACRES) = 364.6

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*****
FLOW PROCESS FROM NODE 110.00 TO NODE 111.00 IS CODE = 21

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 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 2100.00
 ELEVATION DATA: UPSTREAM (FEET) = 1040.00 DOWNSTREAM (FEET) = 1025.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 17.418
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.100
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	8.70	0.98	0.100	32	17.42
COMMERCIAL	A	29.10	0.98	0.100	32	17.42

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF (CFS) = 68.14
 TOTAL AREA (ACRES) = 37.80 PEAK FLOW RATE (CFS) = 68.14

 FLOW PROCESS FROM NODE 111.00 TO NODE 111.00 IS CODE = 16

>>>>USER SPECIFIED CONSTANT SOURCE FLOW AT NODE<<<<<

USER-SPECIFIED CONSTANT SOURCE FLOW = 371.00 (CFS)
 USER-SPECIFIED AREA ASSOCIATED TO SOURCE FLOW = 248.00 (ACRES)
 * CUMULATIVE SOURCE FLOW DATA: FLOW (CFS) = 371.00 AREA (AC.) = 248.00
 * SUMMED DATA: FLOW (CFS) = 439.14 TOTAL AREA (ACRES) = 285.80

 FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 1025.00 DOWNSTREAM (FEET) = 1014.00
 FLOW LENGTH (FEET) = 1700.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 84.0 INCH PIPE IS 65.7 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 13.60
 ESTIMATED PIPE DIAMETER (INCH) = 84.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 439.14
 PIPE TRAVEL TIME (MIN.) = 2.08 Tc (MIN.) = 19.50
 * TOTAL SOURCE FLOW (CFS) = 371.00
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 112.00 = 3800.00 FEET.

 FLOW PROCESS FROM NODE 112.00 TO NODE 112.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 19.50
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.963
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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COMMERCIAL	A	26.20	0.98	0.100	32
COMMERCIAL	A	110.00	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 136.20 SUBAREA RUNOFF (CFS) = 228.63
 EFFECTIVE AREA (ACRES) = 174.00 AREA-AVERAGED Fm (INCH/HR) = 0.10
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
 TOTAL AREA (ACRES) = 174.00 PEAK FLOW RATE (CFS) = 292.09

* SOURCE FLOW DATA: FLOW (CFS) = 371.00 AREA (ACRES) = 248.0
 * SUMMED DATA: FLOW (CFS) = 663.09 TOTAL AREA (ACRES) = 422.0

 FLOW PROCESS FROM NODE 112.00 TO NODE 113.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 1014.00 DOWNSTREAM (FEET) = 1010.00
 FLOW LENGTH (FEET) = 730.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 102.0 INCH PIPE IS 78.1 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 14.21
 ESTIMATED PIPE DIAMETER (INCH) = 102.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 663.09
 PIPE TRAVEL TIME (MIN.) = 0.86 Tc (MIN.) = 20.36
 * TOTAL SOURCE FLOW (CFS) = 371.00
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 113.00 = 4530.00 FEET.

 FLOW PROCESS FROM NODE 113.00 TO NODE 113.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 20.36
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.913
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	26.50	0.98	0.100	32
COMMERCIAL	A	7.60	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 34.10 SUBAREA RUNOFF (CFS) = 55.71
 EFFECTIVE AREA (ACRES) = 208.10 AREA-AVERAGED Fm (INCH/HR) = 0.10
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
 TOTAL AREA (ACRES) = 208.1 PEAK FLOW RATE (CFS) = 339.98

* SOURCE FLOW DATA: FLOW (CFS) = 371.00 AREA (ACRES) = 248.0
 * SUMMED DATA: FLOW (CFS) = 710.98 TOTAL AREA (ACRES) = 456.1

 FLOW PROCESS FROM NODE 113.00 TO NODE 114.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 1010.00 DOWNSTREAM(FEET) = 1000.00
 FLOW LENGTH(FEET) = 1020.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 93.0 INCH PIPE IS 72.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 17.91
 ESTIMATED PIPE DIAMETER(INCH) = 93.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 710.98
 PIPE TRAVEL TIME(MIN.) = 0.95 Tc(MIN.) = 21.31
 * TOTAL SOURCE FLOW(CFS) = 371.00
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 114.00 = 5550.00 FEET.

 FLOW PROCESS FROM NODE 114.00 TO NODE 114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 21.31
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.861
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	20.90	0.98	0.100	32
COMMERCIAL	A	4.40	0.98	0.100	32
PUBLIC PARK	A	21.40	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.444
 SUBAREA AREA(ACRES) = 46.70 SUBAREA RUNOFF(CFS) = 60.04
 EFFECTIVE AREA(ACRES) = 254.80 AREA-AVERAGED Fm(INCH/HR) = 0.16
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.16
 TOTAL AREA(ACRES) = 254.8 PEAK FLOW RATE(CFS) = 390.36

* SOURCE FLOW DATA: FLOW(CFS) = 371.00 AREA(ACRES) = 248.0
 * SUMMED DATA: FLOW(CFS) = 761.36 TOTAL AREA(ACRES) = 502.8

 FLOW PROCESS FROM NODE 120.00 TO NODE 121.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 690.00
 ELEVATION DATA: UPSTREAM(FEET) = 1030.00 DOWNSTREAM(FEET) = 1024.00

$Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.729
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.809
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	0.70	0.98	0.100	32	10.73
COMMERCIAL	A	9.30	0.98	0.100	32	10.73

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF(CFS) = 24.40
 TOTAL AREA(ACRES) = 10.00 PEAK FLOW RATE(CFS) = 24.40

FLOW PROCESS FROM NODE 121.00 TO NODE 122.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 1024.00 DOWNSTREAM(FEET) = 1018.00
 FLOW LENGTH(FEET) = 1000.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 6.51
 ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 24.40
 PIPE TRAVEL TIME(MIN.) = 2.56 Tc(MIN.) = 13.29
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 122.00 = 1690.00 FEET.

 FLOW PROCESS FROM NODE 122.00 TO NODE 122.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 13.29
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.471
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	2.40	0.98	0.100	32
COMMERCIAL	A	16.60	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 19.00 SUBAREA RUNOFF(CFS) = 40.58
 EFFECTIVE AREA(ACRES) = 29.00 AREA-AVERAGED Fm(INCH/HR) = 0.10
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 29.0 PEAK FLOW RATE(CFS) = 61.94

 FLOW PROCESS FROM NODE 122.00 TO NODE 123.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 1018.00 DOWNSTREAM(FEET) = 1000.00
 FLOW LENGTH(FEET) = 2350.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 30.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 8.87
 ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 61.94
 PIPE TRAVEL TIME(MIN.) = 4.41 Tc(MIN.) = 17.70
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 123.00 = 4040.00 FEET.

 FLOW PROCESS FROM NODE 123.00 TO NODE 123.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 17.70
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.080
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	9.90	0.98	0.100	32
COMMERCIAL	A	81.20	0.98	0.100	32
PUBLIC PARK	A	0.30	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.102
 SUBAREA AREA(ACRES) = 91.40 SUBAREA RUNOFF(CFS) = 162.88
 EFFECTIVE AREA(ACRES) = 120.40 AREA-AVERAGED Fm(INCH/HR) = 0.10
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 120.4 PEAK FLOW RATE(CFS) = 214.62

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	6.10	0.98	0.100	32
COMMERCIAL	A	9.50	0.98	0.100	32
COMMERCIAL	B	6.60	0.75	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.91
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 22.20 SUBAREA RUNOFF(CFS) = 55.26
 EFFECTIVE AREA(ACRES) = 32.20 AREA-AVERAGED Fm(INCH/HR) = 0.09
 AREA-AVERAGED Fp(INCH/HR) = 0.93 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 32.2 PEAK FLOW RATE(CFS) = 80.08

 FLOW PROCESS FROM NODE 130.00 TO NODE 131.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 640.00
 ELEVATION DATA: UPSTREAM(FEET) = 1015.00 DOWNSTREAM(FEET) = 1005.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.259
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.069
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	2.90	0.98	0.100	32	9.26
COMMERCIAL	A	7.10	0.98	0.100	32	9.26

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF(CFS) = 26.74
 TOTAL AREA(ACRES) = 10.00 PEAK FLOW RATE(CFS) = 26.74

 FLOW PROCESS FROM NODE 131.00 TO NODE 132.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 1005.00 DOWNSTREAM(FEET) = 998.00
 FLOW LENGTH(FEET) = 600.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 8.51
 ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 26.74
 PIPE TRAVEL TIME(MIN.) = 1.18 Tc(MIN.) = 10.43
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 132.00 = 1240.00 FEET.

 FLOW PROCESS FROM NODE 132.00 TO NODE 132.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 10.43
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.856

 FLOW PROCESS FROM NODE 132.00 TO NODE 133.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 998.00 DOWNSTREAM(FEET) = 995.00
 FLOW LENGTH(FEET) = 680.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 48.0 INCH PIPE IS 36.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 7.72
 ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 80.08
 PIPE TRAVEL TIME(MIN.) = 1.47 Tc(MIN.) = 11.90
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 133.00 = 1920.00 FEET.

 FLOW PROCESS FROM NODE 133.00 TO NODE 133.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 11.90
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.639
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	3.70	0.98	0.100	32
COMMERCIAL	A	4.80	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 8.50 SUBAREA RUNOFF(CFS) = 19.45
 EFFECTIVE AREA(ACRES) = 40.70 AREA-AVERAGED Fm(INCH/HR) = 0.09
 AREA-AVERAGED Fp(INCH/HR) = 0.94 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 40.7 PEAK FLOW RATE(CFS) = 93.24

 FLOW PROCESS FROM NODE 133.00 TO NODE 134.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 995.00 DOWNSTREAM(FEET) = 988.00
 FLOW LENGTH(FEET) = 640.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 42.0 INCH PIPE IS 34.1 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 11.15
ESTIMATED PIPE DIAMETER (INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 93.24
PIPE TRAVEL TIME (MIN.) = 0.96 Tc (MIN.) = 12.86
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 134.00 = 2560.00 FEET.

SUBAREA AREA (ACRES) = 67.40 SUBAREA RUNOFF (CFS) = 133.02
EFFECTIVE AREA (ACRES) = 147.10 AREA-AVERAGED Fm (INCH/HR) = 0.09
AREA-AVERAGED Fp (INCH/HR) = 0.93 AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 147.1 PEAK FLOW RATE (CFS) = 290.11

FLOW PROCESS FROM NODE 134.00 TO NODE 134.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 12.86
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.520
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	26.60	0.98	0.100	32
COMMERCIAL	B	5.60	0.75	0.100	56
COMMERCIAL	A	6.80	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.94
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 39.00 SUBAREA RUNOFF (CFS) = 85.14
EFFECTIVE AREA (ACRES) = 79.70 AREA-AVERAGED Fm (INCH/HR) = 0.09
AREA-AVERAGED Fp (INCH/HR) = 0.94 AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 79.7 PEAK FLOW RATE (CFS) = 174.00

FLOW PROCESS FROM NODE 134.00 TO NODE 135.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 988.00 DOWNSTREAM (FEET) = 987.00
FLOW LENGTH (FEET) = 800.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 81.0 INCH PIPE IS 63.0 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 5.83
ESTIMATED PIPE DIAMETER (INCH) = 81.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 174.00
PIPE TRAVEL TIME (MIN.) = 2.29 Tc (MIN.) = 15.15
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 135.00 = 3360.00 FEET.

FLOW PROCESS FROM NODE 135.00 TO NODE 135.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 15.15
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.284
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	31.00	0.98	0.100	32
COMMERCIAL	A	17.70	0.98	0.100	32
COMMERCIAL	B	18.70	0.75	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.91
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

FLOW PROCESS FROM NODE 135.00 TO NODE 136.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 987.00 DOWNSTREAM (FEET) = 980.00
FLOW LENGTH (FEET) = 1200.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 75.0 INCH PIPE IS 55.6 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 11.90
ESTIMATED PIPE DIAMETER (INCH) = 75.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 290.11
PIPE TRAVEL TIME (MIN.) = 1.68 Tc (MIN.) = 16.83
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 136.00 = 4560.00 FEET.

FLOW PROCESS FROM NODE 136.00 TO NODE 136.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 16.83
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.144
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	39.80	0.98	0.100	32
COMMERCIAL	A	24.90	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 64.70 SUBAREA RUNOFF (CFS) = 119.18
EFFECTIVE AREA (ACRES) = 211.80 AREA-AVERAGED Fm (INCH/HR) = 0.09
AREA-AVERAGED Fp (INCH/HR) = 0.94 AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 211.8 PEAK FLOW RATE (CFS) = 390.79

FLOW PROCESS FROM NODE 136.00 TO NODE 137.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 980.00 DOWNSTREAM (FEET) = 970.00
FLOW LENGTH (FEET) = 2150.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 87.0 INCH PIPE IS 65.3 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 11.75
ESTIMATED PIPE DIAMETER (INCH) = 87.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 390.79
PIPE TRAVEL TIME (MIN.) = 3.05 Tc (MIN.) = 19.88
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 137.00 = 6710.00 FEET.

FLOW PROCESS FROM NODE 137.00 TO NODE 137.00 IS CODE = 81

 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====

MAINLINE Tc(MIN.) = 19.88
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.940
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	7.30	0.98	0.100	32
COMMERCIAL	A	18.90	0.98	0.100	32
PUBLIC PARK	A	4.10	0.98	0.850	32
PUBLIC PARK	A	9.90	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.361
 SUBAREA AREA(ACRES) = 40.20 SUBAREA RUNOFF(CFS) = 57.46
 EFFECTIVE AREA(ACRES) = 252.00 AREA-AVERAGED Fm(INCH/HR) = 0.14
 AREA-AVERAGED Fp(INCH/HR) = 0.96 AREA-AVERAGED Ap = 0.14
 TOTAL AREA(ACRES) = 252.0 PEAK FLOW RATE(CFS) = 409.38

 FLOW PROCESS FROM NODE 140.00 TO NODE 141.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 =====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 3400.00
 ELEVATION DATA: UPSTREAM(FEET) = 1012.00 DOWNSTREAM(FEET) = 992.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 21.956
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.828
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	52.00	0.98	0.100	32	21.96
COMMERCIAL	A	29.60	0.98	0.100	32	21.96
COMMERCIAL	B	23.20	0.75	0.100	56	21.96
PUBLIC PARK	A	6.10	0.98	0.850	32	34.88

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.94
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.141
 SUBAREA RUNOFF(CFS) = 169.17
 TOTAL AREA(ACRES) = 110.90 PEAK FLOW RATE(CFS) = 169.17

 FLOW PROCESS FROM NODE 150.00 TO NODE 151.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 =====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 2900.00
 ELEVATION DATA: UPSTREAM(FEET) = 980.00 DOWNSTREAM(FEET) = 946.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 17.948
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.063
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	7.00	0.98	0.100	32	17.95
COMMERCIAL	A	58.80	0.98	0.100	32	17.95

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF(CFS) = 116.39
 TOTAL AREA(ACRES) = 65.80 PEAK FLOW RATE(CFS) = 116.39

 FLOW PROCESS FROM NODE 160.00 TO NODE 161.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 =====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 2650.00
 ELEVATION DATA: UPSTREAM(FEET) = 975.00 DOWNSTREAM(FEET) = 946.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 17.553
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.091
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	5.40	0.98	0.100	32	17.55
PUBLIC PARK	A	20.00	0.98	0.850	32	27.89

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.691
 SUBAREA RUNOFF(CFS) = 32.40
 TOTAL AREA(ACRES) = 25.40 PEAK FLOW RATE(CFS) = 32.40

 FLOW PROCESS FROM NODE 170.00 TO NODE 171.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 =====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 4900.00
 ELEVATION DATA: UPSTREAM(FEET) = 955.00 DOWNSTREAM(FEET) = 870.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 20.470
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.906
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	2.00	0.98	0.100	32	20.47
COMMERCIAL	A	2.50	0.98	0.100	32	20.47
PUBLIC PARK	A	25.10	0.98	0.850	32	32.52

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.736
 SUBAREA RUNOFF(CFS) = 31.67
 TOTAL AREA(ACRES) = 29.60 PEAK FLOW RATE(CFS) = 31.67

 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES) = 29.6 TC(MIN.) = 20.47
 =====

EFFECTIVE AREA (ACRES) = 29.60 AREA-AVERAGED F_m (INCH/HR) = 0.72
AREA-AVERAGED F_p (INCH/HR) = 0.97 AREA-AVERAGED A_p = 0.736
PEAK FLOW RATE (CFS) = 31.67

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

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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***** DESCRIPTION OF STUDY *****

* OLD MODEL COLONY EAST AREA C *
* 25-YEAR HYDROLOGY ANALYSIS *
* * *

FILE NAME: OMCEC25.DAT
TIME/DATE OF STUDY: 15:28 10/14/2011

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT (YEAR) = 25.00
SPECIFIED MINIMUM PIPE SIZE (INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS (DECIMAL) TO USE FOR FRICTION SLOPE = 0.80
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL
10-YEAR STORM 60-MINUTE INTENSITY (INCH/HOUR) = 1.000
100-YEAR STORM 60-MINUTE INTENSITY (INCH/HOUR) = 1.400
COMPUTED RAINFALL INTENSITY DATA:
STORM EVENT = 25.00 1-HOUR INTENSITY (INCH/HOUR) = 1.1365
SLOPE OF INTENSITY DURATION CURVE = 0.6000

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

Table with columns: NO., HALF-WIDTH (FT), CROWN TO CROSSFALL (FT), STREET-CROSSFALL IN-/OUT-/PARK-SIDE / SIDE/ WAY, CURB HEIGHT (FT), GUTTER WIDTH (FT), LIP (FT), HIKE (FT), GEOMETRIES (n), MANNING FACTOR. Contains 2 rows of data.

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

SIZE PIPE WITH A FLOW CAPACITY GREATER THAN OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.

*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

UNIT-HYDROGRAPH MODEL SELECTIONS/PARAMETERS:

WATERSHED LAG = 0.80 * Tc
USED "VALLEY UNDEVELOPED" S-GRAPH FOR DEVELOPMENTS OF 2 UNITS/ACRE AND LESS; AND "VALLEY DEVELOPED" S-GRAPH FOR DEVELOPMENTS OF 3-4 UNITS/ACRE AND MORE.

USER SPECIFIED RAINFALL VALUES:

2-YR 6-HR RAINFALL DEPTH (INCH) = 1.70
2-YR 24-HR RAINFALL DEPTH (INCH) = 3.30
100-YR 6-HR RAINFALL DEPTH (INCH) = 3.70
100-YR 24-HR RAINFALL DEPTH (INCH) = 8.00
SIERRA MADRE DEPTH-AREA FACTORS USED.

Table with columns: DURATION, AREA-AVERAGED RAINFALL (INCH). Rows include 5-MINUTES, 30-MINUTES, 1-HOUR, 3-HOUR, 6-HOUR, 24-HOUR.

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR UNIT HYDROGRAPH METHOD

FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 1470.00
ELEVATION DATA: UPSTREAM (FEET) = 1048.00 DOWNSTREAM (FEET) = 1045.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]**0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 19.402

* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.237

SUBAREA Tc AND LOSS RATE DATA (AMC II):

Table with columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN, Tc (MIN.). Rows include COMMERCIAL.

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA RUNOFF (CFS) = 18.49

TOTAL AREA (ACRES) = 9.60 PEAK FLOW RATE (CFS) = 18.49

FLOW PROCESS FROM NODE 101.00 TO NODE 101.00 IS CODE = 16

>>>>USER SPECIFIED CONSTANT SOURCE FLOW AT NODE<<<<<

=====

USER-SPECIFIED CONSTANT SOURCE FLOW = 524.00 (CFS)

USER-SPECIFIED AREA ASSOCIATED TO SOURCE FLOW = 286.00 (ACRES)

* CUMULATIVE SOURCE FLOW DATA: FLOW (CFS) = 524.00 AREA (AC.) = 286.00

* SUMMED DATA: FLOW (CFS) = 542.49 TOTAL AREA (ACRES) = 295.60

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 31

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1045.00 DOWNSTREAM(FEET) = 1030.00
FLOW LENGTH(FEET) = 1300.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 81.0 INCH PIPE IS 64.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.74
ESTIMATED PIPE DIAMETER(INCH) = 81.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 542.49
PIPE TRAVEL TIME(MIN.) = 1.22 Tc(MIN.) = 20.62
* TOTAL SOURCE FLOW(CFS) = 524.00
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 2770.00 FEET.

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FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
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MAINLINE Tc(MIN.) = 20.62
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.157
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          A       2.50   0.98  0.100  32
COMMERCIAL          A       32.60   0.98  0.100  32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 35.10 SUBAREA RUNOFF(CFS) = 65.06
EFFECTIVE AREA(ACRES) = 44.70 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 44.7 PEAK FLOW RATE(CFS) = 82.85

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* SOURCE FLOW DATA: FLOW(CFS) = 524.00 AREA(ACRES) = 286.0
* SUMMED DATA: FLOW(CFS) = 606.85 TOTAL AREA(ACRES) = 330.7

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*****
FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 1030.00 DOWNSTREAM(FEET) = 1028.00
FLOW LENGTH(FEET) = 640.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 108.0 INCH PIPE IS 85.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.18
ESTIMATED PIPE DIAMETER(INCH) = 108.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 606.85
PIPE TRAVEL TIME(MIN.) = 0.95 Tc(MIN.) = 21.58
* TOTAL SOURCE FLOW(CFS) = 524.00
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 103.00 = 3410.00 FEET.

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*****
FLOW PROCESS FROM NODE 103.00 TO NODE 103.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
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MAINLINE Tc(MIN.) = 21.58
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.099
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          A       2.70   0.98  0.100  32
COMMERCIAL          A       22.80   0.98  0.100  32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 25.50 SUBAREA RUNOFF(CFS) = 45.94
EFFECTIVE AREA(ACRES) = 70.20 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 70.2 PEAK FLOW RATE(CFS) = 126.47

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* SOURCE FLOW DATA: FLOW(CFS) = 524.00 AREA(ACRES) = 286.0
* SUMMED DATA: FLOW(CFS) = 650.47 TOTAL AREA(ACRES) = 356.2

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*****
FLOW PROCESS FROM NODE 103.00 TO NODE 104.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====

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```

ELEVATION DATA: UPSTREAM(FEET) = 1028.00 DOWNSTREAM(FEET) = 1025.00
FLOW LENGTH(FEET) = 830.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 108.0 INCH PIPE IS 85.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.02
ESTIMATED PIPE DIAMETER(INCH) = 108.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 650.47
PIPE TRAVEL TIME(MIN.) = 1.15 Tc(MIN.) = 22.73
* TOTAL SOURCE FLOW(CFS) = 524.00
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 104.00 = 4240.00 FEET.

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FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
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MAINLINE Tc(MIN.) = 22.73
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.035
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          A       0.40   0.98  0.100  32
COMMERCIAL          A       2.30   0.98  0.100  32
PUBLIC PARK         A       5.70   0.98  0.850  32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.609
SUBAREA AREA(ACRES) = 8.40 SUBAREA RUNOFF(CFS) = 10.90
EFFECTIVE AREA(ACRES) = 78.60 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.15
TOTAL AREA(ACRES) = 78.6 PEAK FLOW RATE(CFS) = 133.30

```

```

* SOURCE FLOW DATA: FLOW(CFS) = 524.00 AREA(ACRES) = 286.0
* SUMMED DATA: FLOW(CFS) = 657.30 TOTAL AREA(ACRES) = 364.6

```

FLOW PROCESS FROM NODE 110.00 TO NODE 111.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 2100.00
ELEVATION DATA: UPSTREAM (FEET) = 1040.00 DOWNSTREAM (FEET) = 1025.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 17.418
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.387

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	8.70	0.98	0.100	32	17.42
COMMERCIAL	A	29.10	0.98	0.100	32	17.42

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF (CFS) = 77.89
TOTAL AREA (ACRES) = 37.80 PEAK FLOW RATE (CFS) = 77.89

FLOW PROCESS FROM NODE 111.00 TO NODE 111.00 IS CODE = 16

>>>>USER SPECIFIED CONSTANT SOURCE FLOW AT NODE<<<<<

=====

USER-SPECIFIED CONSTANT SOURCE FLOW = 455.00 (CFS)
USER-SPECIFIED AREA ASSOCIATED TO SOURCE FLOW = 248.00 (ACRES)
* CUMULATIVE SOURCE FLOW DATA: FLOW (CFS) = 455.00 AREA (AC.) = 248.00
* SUMMED DATA: FLOW (CFS) = 532.89 TOTAL AREA (ACRES) = 285.80

FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 1025.00 DOWNSTREAM (FEET) = 1014.00
FLOW LENGTH (FEET) = 1700.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 90.0 INCH PIPE IS 71.1 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 14.24
ESTIMATED PIPE DIAMETER (INCH) = 90.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 532.89
PIPE TRAVEL TIME (MIN.) = 1.99 Tc (MIN.) = 19.41
* TOTAL SOURCE FLOW (CFS) = 455.00
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 112.00 = 3800.00 FEET.

FLOW PROCESS FROM NODE 112.00 TO NODE 112.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 19.41
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.237
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	26.20	0.98	0.100	32
COMMERCIAL	A	110.00	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 136.20 SUBAREA RUNOFF (CFS) = 262.28
EFFECTIVE AREA (ACRES) = 174.00 AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 174.0 PEAK FLOW RATE (CFS) = 335.07

* SOURCE FLOW DATA: FLOW (CFS) = 455.00 AREA (ACRES) = 248.0
* SUMMED DATA: FLOW (CFS) = 790.07 TOTAL AREA (ACRES) = 422.0

FLOW PROCESS FROM NODE 112.00 TO NODE 113.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 1014.00 DOWNSTREAM (FEET) = 1010.00
FLOW LENGTH (FEET) = 730.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 108.0 INCH PIPE IS 84.5 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 14.79
ESTIMATED PIPE DIAMETER (INCH) = 108.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 790.07
PIPE TRAVEL TIME (MIN.) = 0.82 Tc (MIN.) = 20.23
* TOTAL SOURCE FLOW (CFS) = 455.00
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 113.00 = 4530.00 FEET.

FLOW PROCESS FROM NODE 113.00 TO NODE 113.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 20.23
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.182
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	26.50	0.98	0.100	32
COMMERCIAL	A	7.60	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 34.10 SUBAREA RUNOFF (CFS) = 63.98
EFFECTIVE AREA (ACRES) = 208.10 AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 208.1 PEAK FLOW RATE (CFS) = 390.43

* SOURCE FLOW DATA: FLOW (CFS) = 455.00 AREA (ACRES) = 248.0
* SUMMED DATA: FLOW (CFS) = 845.43 TOTAL AREA (ACRES) = 456.1

FLOW PROCESS FROM NODE 113.00 TO NODE 114.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<


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>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1010.00 DOWNSTREAM(FEET) = 1000.00
FLOW LENGTH(FEET) = 1020.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 102.0 INCH PIPE IS 75.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.91
ESTIMATED PIPE DIAMETER(INCH) = 102.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 845.43
PIPE TRAVEL TIME(MIN.) = 0.90 Tc(MIN.) = 21.13
* TOTAL SOURCE FLOW(CFS) = 455.00
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 114.00 = 5550.00 FEET.

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FLOW PROCESS FROM NODE 114.00 TO NODE 114.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) = 21.13
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.126
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap      SCS
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL           A      20.90   0.98    0.100   32
COMMERCIAL           A      4.40    0.98    0.100   32
PUBLIC PARK          A      21.40   0.98    0.850   32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.444
SUBAREA AREA(ACRES) = 46.70 SUBAREA RUNOFF(CFS) = 71.17
EFFECTIVE AREA(ACRES) = 254.80 AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.16
TOTAL AREA(ACRES) = 254.8 PEAK FLOW RATE(CFS) = 451.08

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* SOURCE FLOW DATA: FLOW(CFS) = 455.00 AREA(ACRES) = 248.0
* SUMMED DATA: FLOW(CFS) = 906.08 TOTAL AREA(ACRES) = 502.8

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FLOW PROCESS FROM NODE 120.00 TO NODE 121.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

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=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 690.00
ELEVATION DATA: UPSTREAM(FEET) = 1030.00 DOWNSTREAM(FEET) = 1024.00

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Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.729
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.193
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap      SCS  Tc
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL           A      0.70    0.98    0.100   32  10.73
COMMERCIAL           A      9.30    0.98    0.100   32  10.73
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 27.86
TOTAL AREA(ACRES) = 10.00 PEAK FLOW RATE(CFS) = 27.86

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

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ELEVATION DATA: UPSTREAM(FEET) = 1024.00 DOWNSTREAM(FEET) = 1018.00
FLOW LENGTH(FEET) = 1000.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 24.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.60
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 27.86
PIPE TRAVEL TIME(MIN.) = 2.53 Tc(MIN.) = 13.25
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 122.00 = 1690.00 FEET.

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FLOW PROCESS FROM NODE 122.00 TO NODE 122.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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=====
MAINLINE Tc(MIN.) = 13.25
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.812
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap      SCS
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL           A      2.40    0.98    0.100   32
COMMERCIAL           A      16.60   0.98    0.100   32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 19.00 SUBAREA RUNOFF(CFS) = 46.42
EFFECTIVE AREA(ACRES) = 29.00 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 29.0 PEAK FLOW RATE(CFS) = 70.85

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FLOW PROCESS FROM NODE 122.00 TO NODE 123.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 1018.00 DOWNSTREAM(FEET) = 1000.00
FLOW LENGTH(FEET) = 2350.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 31.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.26
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 70.85
PIPE TRAVEL TIME(MIN.) = 4.23 Tc(MIN.) = 17.48
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 123.00 = 4040.00 FEET.

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FLOW PROCESS FROM NODE 123.00 TO NODE 123.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc(MIN.) = 17.48

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* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.382
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	9.90	0.98	0.100	32
COMMERCIAL	A	81.20	0.98	0.100	32
PUBLIC PARK	A	0.30	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.102
 SUBAREA AREA (ACRES) = 91.40 SUBAREA RUNOFF (CFS) = 187.71
 EFFECTIVE AREA (ACRES) = 120.40 AREA-AVERAGED Fm (INCH/HR) = 0.10
 AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.10
 TOTAL AREA (ACRES) = 120.4 PEAK FLOW RATE (CFS) = 247.32

MAINLINE Tc (MIN.) = 10.38
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.256
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	6.10	0.98	0.100	32
COMMERCIAL	A	9.50	0.98	0.100	32
COMMERCIAL	B	6.60	0.75	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.91
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 22.20 SUBAREA RUNOFF (CFS) = 63.24
 EFFECTIVE AREA (ACRES) = 32.20 AREA-AVERAGED Fm (INCH/HR) = 0.09
 AREA-AVERAGED Fp (INCH/HR) = 0.93 AREA-AVERAGED Ap = 0.10
 TOTAL AREA (ACRES) = 32.2 PEAK FLOW RATE (CFS) = 91.67

 FLOW PROCESS FROM NODE 130.00 TO NODE 131.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

 INITIAL SUBAREA FLOW-LENGTH (FEET) = 640.00
 ELEVATION DATA: UPSTREAM (FEET) = 1015.00 DOWNSTREAM (FEET) = 1005.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]** 0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.259
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.488
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	2.90	0.98	0.100	32	9.26
COMMERCIAL	A	7.10	0.98	0.100	32	9.26

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF (CFS) = 30.51
 TOTAL AREA (ACRES) = 10.00 PEAK FLOW RATE (CFS) = 30.51

 FLOW PROCESS FROM NODE 131.00 TO NODE 132.00 IS CODE = 31

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

 ELEVATION DATA: UPSTREAM (FEET) = 1005.00 DOWNSTREAM (FEET) = 998.00
 FLOW LENGTH (FEET) = 600.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 19.7 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 8.90
 ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 30.51
 PIPE TRAVEL TIME (MIN.) = 1.12 Tc (MIN.) = 10.38
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 132.00 = 1240.00 FEET.

 FLOW PROCESS FROM NODE 132.00 TO NODE 132.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====

 FLOW PROCESS FROM NODE 132.00 TO NODE 133.00 IS CODE = 31

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

 ELEVATION DATA: UPSTREAM (FEET) = 998.00 DOWNSTREAM (FEET) = 995.00
 FLOW LENGTH (FEET) = 680.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 51.0 INCH PIPE IS 38.3 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 8.02
 ESTIMATED PIPE DIAMETER (INCH) = 51.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 91.67
 PIPE TRAVEL TIME (MIN.) = 1.41 Tc (MIN.) = 11.80
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 133.00 = 1920.00 FEET.

 FLOW PROCESS FROM NODE 133.00 TO NODE 133.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====
 MAINLINE Tc (MIN.) = 11.80
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.016
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	3.70	0.98	0.100	32
COMMERCIAL	A	4.80	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 8.50 SUBAREA RUNOFF (CFS) = 22.33
 EFFECTIVE AREA (ACRES) = 40.70 AREA-AVERAGED Fm (INCH/HR) = 0.09
 AREA-AVERAGED Fp (INCH/HR) = 0.94 AREA-AVERAGED Ap = 0.10
 TOTAL AREA (ACRES) = 40.7 PEAK FLOW RATE (CFS) = 107.04

 FLOW PROCESS FROM NODE 133.00 TO NODE 134.00 IS CODE = 31

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

 ELEVATION DATA: UPSTREAM (FEET) = 995.00 DOWNSTREAM (FEET) = 988.00

FLOW LENGTH(FEET) = 640.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 45.0 INCH PIPE IS 34.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 11.65
 ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 107.04
 PIPE TRAVEL TIME(MIN.) = 0.92 Tc(MIN.) = 12.71
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 134.00 = 2560.00 FEET.

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.91
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 67.40 SUBAREA RUNOFF(CFS) = 153.23
 EFFECTIVE AREA(ACRES) = 147.10 AREA-AVERAGED Fm(INCH/HR) = 0.09
 AREA-AVERAGED Fp(INCH/HR) = 0.93 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 147.1 PEAK FLOW RATE(CFS) = 334.23

 FLOW PROCESS FROM NODE 134.00 TO NODE 134.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 12.71
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.884
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	26.60	0.98	0.100	32
COMMERCIAL	B	5.60	0.75	0.100	56
COMMERCIAL	A	6.80	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.94
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 39.00 SUBAREA RUNOFF(CFS) = 97.91
 EFFECTIVE AREA(ACRES) = 79.70 AREA-AVERAGED Fm(INCH/HR) = 0.09
 AREA-AVERAGED Fp(INCH/HR) = 0.94 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 79.7 PEAK FLOW RATE(CFS) = 200.10

 FLOW PROCESS FROM NODE 134.00 TO NODE 135.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 988.00 DOWNSTREAM(FEET) = 987.00
 FLOW LENGTH(FEET) = 800.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 84.0 INCH PIPE IS 68.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 5.98
 ESTIMATED PIPE DIAMETER(INCH) = 84.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 200.10
 PIPE TRAVEL TIME(MIN.) = 2.23 Tc(MIN.) = 14.94
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 135.00 = 3360.00 FEET.

 FLOW PROCESS FROM NODE 135.00 TO NODE 135.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 14.94
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.617
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	31.00	0.98	0.100	32
COMMERCIAL	A	17.70	0.98	0.100	32
COMMERCIAL	B	18.70	0.75	0.100	56

 FLOW PROCESS FROM NODE 135.00 TO NODE 136.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 987.00 DOWNSTREAM(FEET) = 980.00
 FLOW LENGTH(FEET) = 1200.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 78.0 INCH PIPE IS 59.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 12.26
 ESTIMATED PIPE DIAMETER(INCH) = 78.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 334.23
 PIPE TRAVEL TIME(MIN.) = 1.63 Tc(MIN.) = 16.57
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 136.00 = 4560.00 FEET.

 FLOW PROCESS FROM NODE 136.00 TO NODE 136.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 16.57
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.460
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	39.80	0.98	0.100	32
COMMERCIAL	A	24.90	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 64.70 SUBAREA RUNOFF(CFS) = 137.54
 EFFECTIVE AREA(ACRES) = 211.80 AREA-AVERAGED Fm(INCH/HR) = 0.09
 AREA-AVERAGED Fp(INCH/HR) = 0.94 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 211.8 PEAK FLOW RATE(CFS) = 450.89

 FLOW PROCESS FROM NODE 136.00 TO NODE 137.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 980.00 DOWNSTREAM(FEET) = 970.00
 FLOW LENGTH(FEET) = 2150.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 90.0 INCH PIPE IS 70.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 12.08
 ESTIMATED PIPE DIAMETER(INCH) = 90.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 450.89
 PIPE TRAVEL TIME(MIN.) = 2.97 Tc(MIN.) = 19.54
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 137.00 = 6710.00 FEET.

 FLOW PROCESS FROM NODE 137.00 TO NODE 137.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 19.54

* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.228

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	7.30	0.98	0.100	32	17.95
COMMERCIAL	A	18.90	0.98	0.100	32	17.95
PUBLIC PARK	A	4.10	0.98	0.850	32	17.95
PUBLIC PARK	A	9.90	0.98	0.850	32	17.95

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.361

SUBAREA AREA (ACRES) = 40.20 SUBAREA RUNOFF (CFS) = 67.87

EFFECTIVE AREA (ACRES) = 252.00 AREA-AVERAGED Fm (INCH/HR) = 0.14

AREA-AVERAGED Fp (INCH/HR) = 0.96 AREA-AVERAGED Ap = 0.14

TOTAL AREA (ACRES) = 252.0 PEAK FLOW RATE (CFS) = 474.64

 FLOW PROCESS FROM NODE 140.00 TO NODE 141.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 3400.00

ELEVATION DATA: UPSTREAM (FEET) = 1012.00 DOWNSTREAM (FEET) = 992.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]**0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 21.956

* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.077

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	52.00	0.98	0.100	32	21.96
COMMERCIAL	A	29.60	0.98	0.100	32	21.96
COMMERCIAL	B	23.20	0.75	0.100	56	21.96
PUBLIC PARK	A	6.10	0.98	0.850	32	34.88

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.94

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.141

SUBAREA RUNOFF (CFS) = 194.08

TOTAL AREA (ACRES) = 110.90 PEAK FLOW RATE (CFS) = 194.08

 FLOW PROCESS FROM NODE 150.00 TO NODE 151.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 2900.00

ELEVATION DATA: UPSTREAM (FEET) = 980.00 DOWNSTREAM (FEET) = 946.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]**0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 17.948

* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.345

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	7.00	0.98	0.100	32	17.95
COMMERCIAL	A	58.80	0.98	0.100	32	17.95

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA RUNOFF (CFS) = 133.07

TOTAL AREA (ACRES) = 65.80 PEAK FLOW RATE (CFS) = 133.07

 FLOW PROCESS FROM NODE 160.00 TO NODE 161.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 2650.00

ELEVATION DATA: UPSTREAM (FEET) = 975.00 DOWNSTREAM (FEET) = 946.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]**0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 17.553

* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.376

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	5.40	0.98	0.100	32	17.55
PUBLIC PARK	A	20.00	0.98	0.850	32	27.89

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.691

SUBAREA RUNOFF (CFS) = 38.93

TOTAL AREA (ACRES) = 25.40 PEAK FLOW RATE (CFS) = 38.93

 FLOW PROCESS FROM NODE 170.00 TO NODE 171.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 4900.00

ELEVATION DATA: UPSTREAM (FEET) = 955.00 DOWNSTREAM (FEET) = 870.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]**0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 20.470

* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.167

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	2.00	0.98	0.100	32	20.47
COMMERCIAL	A	2.50	0.98	0.100	32	20.47
PUBLIC PARK	A	25.10	0.98	0.850	32	32.52

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.736

SUBAREA RUNOFF (CFS) = 38.60

TOTAL AREA (ACRES) = 29.60 PEAK FLOW RATE (CFS) = 38.60

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 29.6 TC (MIN.) = 20.47
EFFECTIVE AREA (ACRES) = 29.60 AREA-AVERAGED F_m (INCH/HR) = 0.72
AREA-AVERAGED F_p (INCH/HR) = 0.97 AREA-AVERAGED A_p = 0.736
PEAK FLOW RATE (CFS) = 38.60

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END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
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***** DESCRIPTION OF STUDY *****
* OLD MODEL COLONY EAST AREA C *
* 100-YEAR HYDROLOGY ANALYSIS *
* *

FILE NAME: OMCEC100.DAT
TIME/DATE OF STUDY: 15:28 10/14/2011

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

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--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT (YEAR) = 100.00
SPECIFIED MINIMUM PIPE SIZE (INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS (DECIMAL) TO USE FOR FRICTION SLOPE = 0.80
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE (LOG(I; IN/HR) vs. LOG(Tc; MIN)) = 0.6000
USER SPECIFIED 1-HOUR INTENSITY (INCH/HOUR) = 1.4000

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP HEIGHT (FT)	HIKE HEIGHT (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150
2	32.0	27.0	0.020/0.020/0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
 - (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
- *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

UNIT-HYDROGRAPH MODEL SELECTIONS/PARAMETERS:

WATERSHED LAG = 0.80 * Tc
USED "VALLEY UNDEVELOPED" S-GRAPH FOR DEVELOPMENTS OF

2 UNITS/ACRE AND LESS; AND "VALLEY DEVELOPED" S-GRAPH
FOR DEVELOPMENTS OF 3-4 UNITS/ACRE AND MORE.

USER SPECIFIED RAINFALL VALUES:

2-YR 6-HR RAINFALL DEPTH (INCH) = 1.70
2-YR 24-HR RAINFALL DEPTH (INCH) = 3.30
100-YR 6-HR RAINFALL DEPTH (INCH) = 3.70
100-YR 24-HR RAINFALL DEPTH (INCH) = 8.00
SIERRA MADRE DEPTH-AREA FACTORS USED.

DURATION	AREA-AVERAGED RAINFALL (INCH)
5-MINUTES	0.52
30-MINUTES	1.06
1-HOUR	1.40
3-HOUR	2.54
6-HOUR	3.70
24-HOUR	8.00

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR UNIT HYDROGRAPH METHOD

FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

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INITIAL SUBAREA FLOW-LENGTH (FEET) = 1470.00
ELEVATION DATA: UPSTREAM (FEET) = 1048.00 DOWNSTREAM (FEET) = 1045.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 19.402
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.756
SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	3.90	0.98	0.100	32	19.40
COMMERCIAL	A	5.70	0.98	0.100	32	19.40

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF (CFS) = 22.97
TOTAL AREA (ACRES) = 9.60 PEAK FLOW RATE (CFS) = 22.97

FLOW PROCESS FROM NODE 101.00 TO NODE 101.00 IS CODE = 16

>>>>USER SPECIFIED CONSTANT SOURCE FLOW AT NODE<<<<<<
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USER-SPECIFIED CONSTANT SOURCE FLOW = 714.00 (CFS)
USER-SPECIFIED AREA ASSOCIATED TO SOURCE FLOW = 286.00 (ACRES)
* CUMULATIVE SOURCE FLOW DATA: FLOW (CFS) = 714.00 AREA (AC.) = 286.00
* SUMMED DATA: FLOW (CFS) = 736.97 TOTAL AREA (ACRES) = 295.60

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 31

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


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ELEVATION DATA: UPSTREAM(FEET) = 1045.00 DOWNSTREAM(FEET) = 1030.00
FLOW LENGTH(FEET) = 1300.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 90.0 INCH PIPE IS 73.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.04
ESTIMATED PIPE DIAMETER(INCH) = 90.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 736.97
PIPE TRAVEL TIME(MIN.) = 1.14 Tc(MIN.) = 20.54
* TOTAL SOURCE FLOW(CFS) = 714.00
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 2770.00 FEET.

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FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 20.54
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.664
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          A       2.50    0.98    0.100   32
COMMERCIAL          A      32.60    0.98    0.100   32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 35.10 SUBAREA RUNOFF(CFS) = 81.06
EFFECTIVE AREA(ACRES) = 44.70 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 44.7 PEAK FLOW RATE(CFS) = 103.23

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* SOURCE FLOW DATA: FLOW(CFS) = 714.00 AREA(ACRES) = 286.0
* SUMMED DATA: FLOW(CFS) = 817.23 TOTAL AREA(ACRES) = 330.7

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FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 1030.00 DOWNSTREAM(FEET) = 1028.00
FLOW LENGTH(FEET) = 640.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 120.0 INCH PIPE IS 97.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.00
ESTIMATED PIPE DIAMETER(INCH) = 120.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 817.23
PIPE TRAVEL TIME(MIN.) = 0.89 Tc(MIN.) = 21.43
* TOTAL SOURCE FLOW(CFS) = 714.00
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 103.00 = 3410.00 FEET.

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FLOW PROCESS FROM NODE 103.00 TO NODE 103.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 21.43
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.597

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SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          A       2.70    0.98    0.100   32
COMMERCIAL          A      22.80    0.98    0.100   32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 25.50 SUBAREA RUNOFF(CFS) = 57.36
EFFECTIVE AREA(ACRES) = 70.20 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 70.2 PEAK FLOW RATE(CFS) = 157.90

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* SOURCE FLOW DATA: FLOW(CFS) = 714.00 AREA(ACRES) = 286.0
* SUMMED DATA: FLOW(CFS) = 871.90 TOTAL AREA(ACRES) = 356.2

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FLOW PROCESS FROM NODE 103.00 TO NODE 104.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 1028.00 DOWNSTREAM(FEET) = 1025.00
FLOW LENGTH(FEET) = 830.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 120.0 INCH PIPE IS 96.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.91
ESTIMATED PIPE DIAMETER(INCH) = 120.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 871.90
PIPE TRAVEL TIME(MIN.) = 1.07 Tc(MIN.) = 22.50
* TOTAL SOURCE FLOW(CFS) = 714.00
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 104.00 = 4240.00 FEET.

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FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 22.50
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.522
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          A       0.40    0.98    0.100   32
COMMERCIAL          A       2.30    0.98    0.100   32
PUBLIC PARK         A       5.70    0.98    0.850   32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.609
SUBAREA AREA(ACRES) = 8.40 SUBAREA RUNOFF(CFS) = 14.58
EFFECTIVE AREA(ACRES) = 78.60 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.15
TOTAL AREA(ACRES) = 78.6 PEAK FLOW RATE(CFS) = 167.74

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* SOURCE FLOW DATA: FLOW(CFS) = 714.00 AREA(ACRES) = 286.0
* SUMMED DATA: FLOW(CFS) = 881.74 TOTAL AREA(ACRES) = 364.6

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FLOW PROCESS FROM NODE 110.00 TO NODE 111.00 IS CODE = 21

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 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 2100.00
 ELEVATION DATA: UPSTREAM (FEET) = 1040.00 DOWNSTREAM (FEET) = 1025.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 17.418
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.941
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	8.70	0.98	0.100	32	17.42
COMMERCIAL	A	29.10	0.98	0.100	32	17.42

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF (CFS) = 96.72
 TOTAL AREA (ACRES) = 37.80 PEAK FLOW RATE (CFS) = 96.72

 FLOW PROCESS FROM NODE 111.00 TO NODE 111.00 IS CODE = 16

>>>>USER SPECIFIED CONSTANT SOURCE FLOW AT NODE<<<<<<

USER-SPECIFIED CONSTANT SOURCE FLOW = 620.00 (CFS)
 USER-SPECIFIED AREA ASSOCIATED TO SOURCE FLOW = 248.00 (ACRES)
 * CUMULATIVE SOURCE FLOW DATA: FLOW (CFS) = 620.00 AREA (AC.) = 248.00
 * SUMMED DATA: FLOW (CFS) = 716.72 TOTAL AREA (ACRES) = 285.80

 FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 1025.00 DOWNSTREAM (FEET) = 1014.00
 FLOW LENGTH (FEET) = 1700.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 102.0 INCH PIPE IS 77.8 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 15.44
 ESTIMATED PIPE DIAMETER (INCH) = 102.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 716.72
 PIPE TRAVEL TIME (MIN.) = 1.84 Tc (MIN.) = 19.25
 * TOTAL SOURCE FLOW (CFS) = 620.00
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 112.00 = 3800.00 FEET.

 FLOW PROCESS FROM NODE 112.00 TO NODE 112.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc (MIN.) = 19.25
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.769
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	26.20	0.98	0.100	32
COMMERCIAL	A	110.00	0.98	0.100	32

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 136.20 SUBAREA RUNOFF (CFS) = 327.47
 EFFECTIVE AREA (ACRES) = 174.00 AREA-AVERAGED Fm (INCH/HR) = 0.10
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
 TOTAL AREA (ACRES) = 174.0 PEAK FLOW RATE (CFS) = 418.36

* SOURCE FLOW DATA: FLOW (CFS) = 620.00 AREA (ACRES) = 248.0
 * SUMMED DATA: FLOW (CFS) = 1038.36 TOTAL AREA (ACRES) = 422.0

 FLOW PROCESS FROM NODE 112.00 TO NODE 113.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 1014.00 DOWNSTREAM (FEET) = 1010.00
 FLOW LENGTH (FEET) = 730.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 120.0 INCH PIPE IS 93.2 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 15.86
 ESTIMATED PIPE DIAMETER (INCH) = 120.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 1038.36
 PIPE TRAVEL TIME (MIN.) = 0.77 Tc (MIN.) = 20.02
 * TOTAL SOURCE FLOW (CFS) = 620.00
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 113.00 = 4530.00 FEET.

 FLOW PROCESS FROM NODE 113.00 TO NODE 113.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc (MIN.) = 20.02
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.705
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	26.50	0.98	0.100	32
COMMERCIAL	A	7.60	0.98	0.100	32

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 34.10 SUBAREA RUNOFF (CFS) = 80.02
 EFFECTIVE AREA (ACRES) = 208.10 AREA-AVERAGED Fm (INCH/HR) = 0.10
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
 TOTAL AREA (ACRES) = 208.1 PEAK FLOW RATE (CFS) = 488.33

* SOURCE FLOW DATA: FLOW (CFS) = 620.00 AREA (ACRES) = 248.0
 * SUMMED DATA: FLOW (CFS) = 1108.33 TOTAL AREA (ACRES) = 456.1

 FLOW PROCESS FROM NODE 113.00 TO NODE 114.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 1010.00 DOWNSTREAM(FEET) = 1000.00
 FLOW LENGTH(FEET) = 1020.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 114.0 INCH PIPE IS 82.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 20.29
 ESTIMATED PIPE DIAMETER(INCH) = 114.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 1108.33
 PIPE TRAVEL TIME(MIN.) = 0.84 Tc(MIN.) = 20.86
 * TOTAL SOURCE FLOW(CFS) = 620.00
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 114.00 = 5550.00 FEET.

 FLOW PROCESS FROM NODE 114.00 TO NODE 114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc(MIN.) = 20.86
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.639
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	20.90	0.98	0.100	32
COMMERCIAL	A	4.40	0.98	0.100	32
PUBLIC PARK	A	21.40	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.444
 SUBAREA AREA(ACRES) = 46.70 SUBAREA RUNOFF(CFS) = 92.74
 EFFECTIVE AREA(ACRES) = 254.80 AREA-AVERAGED Fm(INCH/HR) = 0.16
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.16
 TOTAL AREA(ACRES) = 254.8 PEAK FLOW RATE(CFS) = 568.76

* SOURCE FLOW DATA: FLOW(CFS) = 620.00 AREA(ACRES) = 248.0
 * SUMMED DATA: FLOW(CFS) = 1188.76 TOTAL AREA(ACRES) = 502.8

 FLOW PROCESS FROM NODE 120.00 TO NODE 121.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 690.00
 ELEVATION DATA: UPSTREAM(FEET) = 1030.00 DOWNSTREAM(FEET) = 1024.00

$Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.729
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.933
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	0.70	0.98	0.100	32	10.73
COMMERCIAL	A	9.30	0.98	0.100	32	10.73

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF(CFS) = 34.52
 TOTAL AREA(ACRES) = 10.00 PEAK FLOW RATE(CFS) = 34.52

FLOW PROCESS FROM NODE 121.00 TO NODE 122.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 1024.00 DOWNSTREAM(FEET) = 1018.00
 FLOW LENGTH(FEET) = 1000.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 25.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 7.01
 ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 34.52
 PIPE TRAVEL TIME(MIN.) = 2.38 Tc(MIN.) = 13.10
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 122.00 = 1690.00 FEET.

 FLOW PROCESS FROM NODE 122.00 TO NODE 122.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 13.10
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.488
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	2.40	0.98	0.100	32
COMMERCIAL	A	16.60	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 19.00 SUBAREA RUNOFF(CFS) = 57.98
 EFFECTIVE AREA(ACRES) = 29.00 AREA-AVERAGED Fm(INCH/HR) = 0.10
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 29.0 PEAK FLOW RATE(CFS) = 88.49

 FLOW PROCESS FROM NODE 122.00 TO NODE 123.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 1018.00 DOWNSTREAM(FEET) = 1000.00
 FLOW LENGTH(FEET) = 2350.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 45.0 INCH PIPE IS 34.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 9.74
 ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 88.49
 PIPE TRAVEL TIME(MIN.) = 4.02 Tc(MIN.) = 17.13
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 123.00 = 4040.00 FEET.

 FLOW PROCESS FROM NODE 123.00 TO NODE 123.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 17.13
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.970
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	9.90	0.98	0.100	32
COMMERCIAL	A	81.20	0.98	0.100	32
PUBLIC PARK	A	0.30	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.102
SUBAREA AREA (ACRES) = 91.40 SUBAREA RUNOFF (CFS) = 236.13
EFFECTIVE AREA (ACRES) = 120.40 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 120.4 PEAK FLOW RATE (CFS) = 311.12

FLOW PROCESS FROM NODE 130.00 TO NODE 131.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 640.00
ELEVATION DATA: UPSTREAM (FEET) = 1015.00 DOWNSTREAM (FEET) = 1005.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.259
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 4.296
SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	2.90	0.98	0.100	32	9.26
COMMERCIAL	A	7.10	0.98	0.100	32	9.26

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF (CFS) = 37.79
TOTAL AREA (ACRES) = 10.00 PEAK FLOW RATE (CFS) = 37.79

FLOW PROCESS FROM NODE 131.00 TO NODE 132.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 1005.00 DOWNSTREAM (FEET) = 998.00
FLOW LENGTH (FEET) = 600.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 23.4 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 9.19
ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 37.79
PIPE TRAVEL TIME (MIN.) = 1.09 Tc (MIN.) = 10.35
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 132.00 = 1240.00 FEET.

FLOW PROCESS FROM NODE 132.00 TO NODE 132.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<<<

=====

MAINLINE Tc (MIN.) = 10.35
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 4.019

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	6.10	0.98	0.100	32
COMMERCIAL	A	9.50	0.98	0.100	32
COMMERCIAL	B	6.60	0.75	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.91
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 22.20 SUBAREA RUNOFF (CFS) = 78.49
EFFECTIVE AREA (ACRES) = 32.20 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.93 AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 32.2 PEAK FLOW RATE (CFS) = 113.78

FLOW PROCESS FROM NODE 132.00 TO NODE 133.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 998.00 DOWNSTREAM (FEET) = 995.00
FLOW LENGTH (FEET) = 680.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 54.0 INCH PIPE IS 43.0 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 8.37
ESTIMATED PIPE DIAMETER (INCH) = 54.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 113.78
PIPE TRAVEL TIME (MIN.) = 1.35 Tc (MIN.) = 11.70
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 133.00 = 1920.00 FEET.

FLOW PROCESS FROM NODE 133.00 TO NODE 133.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<<<

=====

MAINLINE Tc (MIN.) = 11.70
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.733
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	3.70	0.98	0.100	32
COMMERCIAL	A	4.80	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 8.50 SUBAREA RUNOFF (CFS) = 27.81
EFFECTIVE AREA (ACRES) = 40.70 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.94 AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 40.7 PEAK FLOW RATE (CFS) = 133.31

FLOW PROCESS FROM NODE 133.00 TO NODE 134.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 995.00 DOWNSTREAM (FEET) = 988.00
FLOW LENGTH (FEET) = 640.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 39.0 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 12.19
 ESTIMATED PIPE DIAMETER (INCH) = 48.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 133.31
 PIPE TRAVEL TIME (MIN.) = 0.88 Tc (MIN.) = 12.58
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 134.00 = 2560.00 FEET.

 FLOW PROCESS FROM NODE 134.00 TO NODE 134.00 IS CODE = 81

>>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 12.58
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.575
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	26.60	0.98	0.100	32
COMMERCIAL	B	5.60	0.75	0.100	56
COMMERCIAL	A	6.80	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.94
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 39.00 SUBAREA RUNOFF (CFS) = 122.18
 EFFECTIVE AREA (ACRES) = 79.70 AREA-AVERAGED Fm (INCH/HR) = 0.09
 AREA-AVERAGED Fp (INCH/HR) = 0.94 AREA-AVERAGED Ap = 0.10
 TOTAL AREA (ACRES) = 79.7 PEAK FLOW RATE (CFS) = 249.69

 FLOW PROCESS FROM NODE 134.00 TO NODE 135.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 988.00 DOWNSTREAM (FEET) = 987.00
 FLOW LENGTH (FEET) = 800.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 93.0 INCH PIPE IS 71.8 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 6.39
 ESTIMATED PIPE DIAMETER (INCH) = 93.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 249.69
 PIPE TRAVEL TIME (MIN.) = 2.09 Tc (MIN.) = 14.66
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 135.00 = 3360.00 FEET.

 FLOW PROCESS FROM NODE 135.00 TO NODE 135.00 IS CODE = 81

>>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 14.66
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.260
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	31.00	0.98	0.100	32
COMMERCIAL	A	17.70	0.98	0.100	32
COMMERCIAL	B	18.70	0.75	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.91
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA (ACRES) = 67.40 SUBAREA RUNOFF (CFS) = 192.24
 EFFECTIVE AREA (ACRES) = 147.10 AREA-AVERAGED Fm (INCH/HR) = 0.09
 AREA-AVERAGED Fp (INCH/HR) = 0.93 AREA-AVERAGED Ap = 0.10
 TOTAL AREA (ACRES) = 147.1 PEAK FLOW RATE (CFS) = 419.37

 FLOW PROCESS FROM NODE 135.00 TO NODE 136.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 987.00 DOWNSTREAM (FEET) = 980.00
 FLOW LENGTH (FEET) = 1200.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 84.0 INCH PIPE IS 66.1 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 12.91
 ESTIMATED PIPE DIAMETER (INCH) = 84.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 419.37
 PIPE TRAVEL TIME (MIN.) = 1.55 Tc (MIN.) = 16.21
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 136.00 = 4560.00 FEET.

 FLOW PROCESS FROM NODE 136.00 TO NODE 136.00 IS CODE = 81

>>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 16.21
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.070
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	39.80	0.98	0.100	32
COMMERCIAL	A	24.90	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 64.70 SUBAREA RUNOFF (CFS) = 173.08
 EFFECTIVE AREA (ACRES) = 211.80 AREA-AVERAGED Fm (INCH/HR) = 0.09
 AREA-AVERAGED Fp (INCH/HR) = 0.94 AREA-AVERAGED Ap = 0.10
 TOTAL AREA (ACRES) = 211.8 PEAK FLOW RATE (CFS) = 567.21

 FLOW PROCESS FROM NODE 136.00 TO NODE 137.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 980.00 DOWNSTREAM (FEET) = 970.00
 FLOW LENGTH (FEET) = 2150.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 102.0 INCH PIPE IS 73.4 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 12.98
 ESTIMATED PIPE DIAMETER (INCH) = 102.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 567.21
 PIPE TRAVEL TIME (MIN.) = 2.76 Tc (MIN.) = 18.97
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 137.00 = 6710.00 FEET.

 FLOW PROCESS FROM NODE 137.00 TO NODE 137.00 IS CODE = 81

 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
 =====

MAINLINE Tc(MIN.) = 18.97
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.793
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 7.30 0.98 0.100 32
 COMMERCIAL A 18.90 0.98 0.100 32
 PUBLIC PARK A 4.10 0.98 0.850 32
 PUBLIC PARK A 9.90 0.98 0.850 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.361
 SUBAREA AREA(ACRES) = 40.20 SUBAREA RUNOFF(CFS) = 88.32
 EFFECTIVE AREA(ACRES) = 252.00 AREA-AVERAGED Fm(INCH/HR) = 0.14
 AREA-AVERAGED Fp(INCH/HR) = 0.96 AREA-AVERAGED Ap = 0.14
 TOTAL AREA(ACRES) = 252.0 PEAK FLOW RATE(CFS) = 602.84

 FLOW PROCESS FROM NODE 140.00 TO NODE 141.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 =====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 3400.00
 ELEVATION DATA: UPSTREAM(FEET) = 1012.00 DOWNSTREAM(FEET) = 992.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 21.956
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.559
 SUBAREA Tc AND LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
 COMMERCIAL A 52.00 0.98 0.100 32 21.96
 COMMERCIAL A 29.60 0.98 0.100 32 21.96
 COMMERCIAL B 23.20 0.75 0.100 56 21.96
 PUBLIC PARK A 6.10 0.98 0.850 32 34.88
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.94
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.141
 SUBAREA RUNOFF(CFS) = 242.15
 TOTAL AREA(ACRES) = 110.90 PEAK FLOW RATE(CFS) = 242.15

 FLOW PROCESS FROM NODE 150.00 TO NODE 151.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 =====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 2900.00
 ELEVATION DATA: UPSTREAM(FEET) = 980.00 DOWNSTREAM(FEET) = 946.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 17.948
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.888
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
 COMMERCIAL A 7.00 0.98 0.100 32 17.95
 COMMERCIAL A 58.80 0.98 0.100 32 17.95
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF(CFS) = 165.26
 TOTAL AREA(ACRES) = 65.80 PEAK FLOW RATE(CFS) = 165.26

 FLOW PROCESS FROM NODE 160.00 TO NODE 161.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 =====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 2650.00
 ELEVATION DATA: UPSTREAM(FEET) = 975.00 DOWNSTREAM(FEET) = 946.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 17.553
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.927
 SUBAREA Tc AND LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
 COMMERCIAL A 5.40 0.98 0.100 32 17.55
 PUBLIC PARK A 20.00 0.98 0.850 32 27.89
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.691
 SUBAREA RUNOFF(CFS) = 51.52
 TOTAL AREA(ACRES) = 25.40 PEAK FLOW RATE(CFS) = 51.52

 FLOW PROCESS FROM NODE 170.00 TO NODE 171.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 =====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 4900.00
 ELEVATION DATA: UPSTREAM(FEET) = 955.00 DOWNSTREAM(FEET) = 870.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 20.470
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.669
 SUBAREA Tc AND LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
 COMMERCIAL A 2.00 0.98 0.100 32 20.47
 COMMERCIAL A 2.50 0.98 0.100 32 20.47
 PUBLIC PARK A 25.10 0.98 0.850 32 32.52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.736
 SUBAREA RUNOFF(CFS) = 51.99
 TOTAL AREA(ACRES) = 29.60 PEAK FLOW RATE(CFS) = 51.99

 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES) = 29.6 TC(MIN.) = 20.47

EFFECTIVE AREA (ACRES) = 29.60 AREA-AVERAGED Fm (INCH/HR) = 0.72
AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.736
PEAK FLOW RATE (CFS) = 51.99

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

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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***** DESCRIPTION OF STUDY *****

* OLD MODEL COLONY EAST AREA D *
* 10-YEAR HYDROLOGY ANALYSIS *
* * *

FILE NAME: OMCED10.DAT
TIME/DATE OF STUDY: 15:30 10/14/2011

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT (YEAR) = 10.00
SPECIFIED MINIMUM PIPE SIZE (INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS (DECIMAL) TO USE FOR FRICTION SLOPE = 0.80
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE (LOG(I; IN/HR) vs. LOG(Tc; MIN)) = 0.6000
USER SPECIFIED 1-HOUR INTENSITY (INCH/HOUR) = 1.0000

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150
2	32.0	27.0	0.020/0.020/0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

UNIT-HYDROGRAPH MODEL SELECTIONS/PARAMETERS:

WATERSHED LAG = 0.80 * Tc
USED "VALLEY UNDEVELOPED" S-GRAPH FOR DEVELOPMENTS OF

2 UNITS/ACRE AND LESS; AND "VALLEY DEVELOPED" S-GRAPH
FOR DEVELOPMENTS OF 3-4 UNITS/ACRE AND MORE.

USER SPECIFIED RAINFALL VALUES:

2-YR 6-HR RAINFALL DEPTH (INCH) = 1.70
2-YR 24-HR RAINFALL DEPTH (INCH) = 3.30
100-YR 6-HR RAINFALL DEPTH (INCH) = 3.70
100-YR 24-HR RAINFALL DEPTH (INCH) = 8.00

SIERRA MADRE DEPTH-AREA FACTORS USED.

DURATION	AREA-AVERAGED RAINFALL (INCH)
5-MINUTES	0.33
30-MINUTES	0.68
1-HOUR	0.90
3-HOUR	1.60
6-HOUR	2.31
24-HOUR	4.36

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR UNIT HYDROGRAPH METHOD

FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 880.00
ELEVATION DATA: UPSTREAM (FEET) = 985.00 DOWNSTREAM (FEET) = 975.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 11.209
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.736

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	0.80	0.98	0.100	32	11.21
COMMERCIAL	A	5.30	0.98	0.100	32	11.21
PUBLIC PARK	A	3.30	0.98	0.850	32	17.81

SUBAREA Tc AND LOSS RATE DATA (AMC II):
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.363
SUBAREA RUNOFF (CFS) = 20.15
TOTAL AREA (ACRES) = 9.40 PEAK FLOW RATE (CFS) = 20.15

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 2 USED)<<<<<

=====

UPSTREAM ELEVATION (FEET) = 975.00 DOWNSTREAM ELEVATION (FEET) = 973.00
STREET LENGTH (FEET) = 340.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 27.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

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) = 41.72
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.67
 HALFSTREET FLOOD WIDTH(FEET) = 25.98
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.07
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.06
 STREET FLOW TRAVEL TIME(MIN.) = 1.85 Tc(MIN.) = 13.05
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.497

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	1.60	0.98	0.100	32
COMMERCIAL	A	13.90	0.98	0.100	32
PUBLIC PARK	A	6.40	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.319
 SUBAREA AREA(ACRES) = 21.90 SUBAREA RUNOFF(CFS) = 43.08
 EFFECTIVE AREA(ACRES) = 31.30 AREA-AVERAGED Fm(INCH/HR) = 0.32
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.33
 TOTAL AREA(ACRES) = 31.3 PEAK FLOW RATE(CFS) = 61.21

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.75 HALFSTREET FLOOD WIDTH(FEET) = 33.99
 FLOW VELOCITY(FEET/SEC.) = 3.33 DEPTH*VELOCITY(FT*FT/SEC.) = 2.50
 *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
 AND L = 340.0 FT WITH ELEVATION-DROP = 2.0 FT, IS 56.5 CFS,
 WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 102.00
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 1220.00 FEET.

 FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 31

 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM(FEET) = 973.00 DOWNSTREAM(FEET) = 960.00
 FLOW LENGTH(FEET) = 740.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 26.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 12.03
 ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 61.21
 PIPE TRAVEL TIME(MIN.) = 1.03 Tc(MIN.) = 14.08
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 103.00 = 1960.00 FEET.

 FLOW PROCESS FROM NODE 103.00 TO NODE 103.00 IS CODE = 81

 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====
 MAINLINE Tc(MIN.) = 14.08
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.386

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	2.60	0.98	0.100	32
COMMERCIAL	A	18.40	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 21.00' SUBAREA RUNOFF(CFS) = 43.26
 EFFECTIVE AREA(ACRES) = 52.30 AREA-AVERAGED Fm(INCH/HR) = 0.23
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.24
 TOTAL AREA(ACRES) = 52.3 PEAK FLOW RATE(CFS) = 101.35

 FLOW PROCESS FROM NODE 103.00 TO NODE 104.00 IS CODE = 31

 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM(FEET) = 960.00 DOWNSTREAM(FEET) = 925.00
 FLOW LENGTH(FEET) = 2800.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 45.0 INCH PIPE IS 31.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 12.26
 ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 101.35
 PIPE TRAVEL TIME(MIN.) = 3.81 Tc(MIN.) = 17.89
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 104.00 = 4760.00 FEET.

 FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 IS CODE = 81

 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====
 MAINLINE Tc(MIN.) = 17.89
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.067
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	6.60	0.98	0.100	32
COMMERCIAL	A	68.40	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 75.00 SUBAREA RUNOFF(CFS) = 132.96
 EFFECTIVE AREA(ACRES) = 127.30 AREA-AVERAGED Fm(INCH/HR) = 0.15
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.16
 TOTAL AREA(ACRES) = 127.3 PEAK FLOW RATE(CFS) = 219.29

 FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 IS CODE = 1

 >>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 =====
 TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 17.89
 RAINFALL INTENSITY(INCH/HR) = 2.07
 AREA-AVERAGED Fm(INCH/HR) = 0.15

AREA-AVERAGED F_p (INCH/HR) = 0.97
 AREA-AVERAGED A_p = 0.16
 EFFECTIVE STREAM AREA (ACRES) = 127.30
 TOTAL STREAM AREA (ACRES) = 127.30
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 219.29

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.100
 SUBAREA AREA (ACRES) = 9.10 SUBAREA RUNOFF (CFS) = 20.69
 EFFECTIVE AREA (ACRES) = 22.20 AREA-AVERAGED F_m (INCH/HR) = 0.20
 AREA-AVERAGED F_p (INCH/HR) = 0.98 AREA-AVERAGED A_p = 0.20
 TOTAL AREA (ACRES) = 22.2 PEAK FLOW RATE (CFS) = 48.50

 FLOW PROCESS FROM NODE 105.00 TO NODE 106.00 IS CODE = 21

 FLOW PROCESS FROM NODE 107.00 TO NODE 108.00 IS CODE = 31

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

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

INITIAL SUBAREA FLOW-LENGTH (FEET) = 880.00
 ELEVATION DATA: UPSTREAM (FEET) = 990.00 DOWNSTREAM (FEET) = 975.00

ELEVATION DATA: UPSTREAM (FEET) = 968.00 DOWNSTREAM (FEET) = 940.00
 FLOW LENGTH (FEET) = 2000.00 MANNING'S N = 0.013

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
 SUBAREA ANALYSIS USED MINIMUM T_c (MIN.) = 10.336
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.873

DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.7 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 10.61
 ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 48.50

SUBAREA T_c AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN	T_c (MIN.)
COMMERCIAL	A	1.30	0.98	0.100	32	10.34
COMMERCIAL	A	8.80	0.98	0.100	32	10.34
PUBLIC PARK	A	3.00	0.98	0.850	32	16.42

 SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.272
 SUBAREA RUNOFF (CFS) = 30.74
 TOTAL AREA (ACRES) = 13.10 PEAK FLOW RATE (CFS) = 30.74

PIPE TRAVEL TIME (MIN.) = 3.14 T_c (MIN.) = 15.16
 LONGEST FLOWPATH FROM NODE 105.00 TO NODE 108.00 = 3680.00 FEET.

 FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE T_c (MIN.) = 15.16
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.282
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN
COMMERCIAL	A	7.30	0.98	0.100	32
COMMERCIAL	A	21.00	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.100
 SUBAREA AREA (ACRES) = 28.30 SUBAREA RUNOFF (CFS) = 55.65
 EFFECTIVE AREA (ACRES) = 50.50 AREA-AVERAGED F_m (INCH/HR) = 0.14
 AREA-AVERAGED F_p (INCH/HR) = 0.98 AREA-AVERAGED A_p = 0.14
 TOTAL AREA (ACRES) = 50.5 PEAK FLOW RATE (CFS) = 97.33

 FLOW PROCESS FROM NODE 108.00 TO NODE 104.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 940.00 DOWNSTREAM (FEET) = 925.00
 FLOW LENGTH (FEET) = 1500.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 45.0 INCH PIPE IS 33.4 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 11.08
 ESTIMATED PIPE DIAMETER (INCH) = 45.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 97.33
 PIPE TRAVEL TIME (MIN.) = 2.26 T_c (MIN.) = 17.42
 LONGEST FLOWPATH FROM NODE 105.00 TO NODE 104.00 = 5180.00 FEET.

 FLOW PROCESS FROM NODE 106.00 TO NODE 107.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 975.00 DOWNSTREAM (FEET) = 968.00
 FLOW LENGTH (FEET) = 800.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 22.2 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 7.91
 ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 30.74
 PIPE TRAVEL TIME (MIN.) = 1.69 T_c (MIN.) = 12.02
 LONGEST FLOWPATH FROM NODE 105.00 TO NODE 107.00 = 1680.00 FEET.

 FLOW PROCESS FROM NODE 107.00 TO NODE 107.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE T_c (MIN.) = 12.02
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.624
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN
COMMERCIAL	A	4.40	0.98	0.100	32
COMMERCIAL	A	4.70	0.98	0.100	32

 FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 17.42
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.100
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 3.30 0.98 0.100 32
 COMMERCIAL A 7.10 0.98 0.100 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 10.40 SUBAREA RUNOFF (CFS) = 18.75
 EFFECTIVE AREA (ACRES) = 60.90 AREA-AVERAGED Fm (INCH/HR) = 0.13
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.14
 TOTAL AREA (ACRES) = 60.9 PEAK FLOW RATE (CFS) = 107.80

 FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION (MIN.) = 17.42
 RAINFALL INTENSITY (INCH/HR) = 2.10
 AREA-AVERAGED Fm (INCH/HR) = 0.13
 AREA-AVERAGED Fp (INCH/HR) = 0.98
 AREA-AVERAGED Ap = 0.14
 EFFECTIVE STREAM AREA (ACRES) = 60.90
 TOTAL STREAM AREA (ACRES) = 60.90
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 107.80

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	219.29	17.89	2.067	0.97 (0.15)	0.16	127.3	100.00
2	107.80	17.42	2.100	0.98 (0.13)	0.14	60.9	105.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	325.06	17.42	2.100	0.98 (0.15)	0.15	184.9	105.00
2	325.28	17.89	2.067	0.97 (0.15)	0.15	188.2	100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 325.28 Tc (MIN.) = 17.89
 EFFECTIVE AREA (ACRES) = 188.20 AREA-AVERAGED Fm (INCH/HR) = 0.15
 AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.15
 TOTAL AREA (ACRES) = 188.2

LONGEST FLOWPATH FROM NODE 105.00 TO NODE 104.00 = 5180.00 FEET.

 FLOW PROCESS FROM NODE 104.00 TO NODE 120.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 925.00 DOWNSTREAM (FEET) = 915.00
 FLOW LENGTH (FEET) = 1700.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 78.0 INCH PIPE IS 58.1 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 12.27
 ESTIMATED PIPE DIAMETER (INCH) = 78.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 325.28
 PIPE TRAVEL TIME (MIN.) = 2.31 Tc (MIN.) = 20.19
 LONGEST FLOWPATH FROM NODE 105.00 TO NODE 120.00 = 6880.00 FEET.

 FLOW PROCESS FROM NODE 120.00 TO NODE 120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 20.19
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.922
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 2.90 0.98 0.100 32
 COMMERCIAL A 30.40 0.98 0.100 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 33.30 SUBAREA RUNOFF (CFS) = 54.68
 EFFECTIVE AREA (ACRES) = 221.50 AREA-AVERAGED Fm (INCH/HR) = 0.14
 AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.14
 TOTAL AREA (ACRES) = 221.5 PEAK FLOW RATE (CFS) = 355.36

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	355.40	19.73	1.949	0.98 (0.14)	0.14	218.2	105.00
2	355.36	20.19	1.922	0.97 (0.14)	0.14	221.5	100.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 355.40 Tc (MIN.) = 19.73
 AREA-AVERAGED Fm (INCH/HR) = 0.14 AREA-AVERAGED Fp (INCH/HR) = 0.98
 AREA-AVERAGED Ap = 0.14 EFFECTIVE AREA (ACRES) = 218.18

 FLOW PROCESS FROM NODE 120.00 TO NODE 120.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION (MIN.) = 19.73
 RAINFALL INTENSITY (INCH/HR) = 1.95
 AREA-AVERAGED Fm (INCH/HR) = 0.14

AREA-AVERAGED Fp (INCH/HR) = 0.98
 AREA-AVERAGED Ap = 0.14
 EFFECTIVE STREAM AREA (ACRES) = 218.18
 TOTAL STREAM AREA (ACRES) = 221.50
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 355.40

FLOW LENGTH (FEET) = 700.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 27.0 INCH PIPE IS 21.0 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 10.38
 ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 34.52
 PIPE TRAVEL TIME (MIN.) = 1.12 Tc (MIN.) = 12.15
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 112.00 = 1680.00 FEET.

 FLOW PROCESS FROM NODE 110.00 TO NODE 111.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 980.00
 ELEVATION DATA: UPSTREAM (FEET) = 985.00 DOWNSTREAM (FEET) = 970.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 11.025
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.763
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	1.50	0.98	0.100	32	11.03
COMMERCIAL	A	5.40	0.98	0.100	32	11.03
PUBLIC PARK	A	2.40	0.98	0.850	32	17.52

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.294
 SUBAREA RUNOFF (CFS) = 20.73
 TOTAL AREA (ACRES) = 9.30 PEAK FLOW RATE (CFS) = 20.73

 FLOW PROCESS FROM NODE 111.00 TO NODE 111.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 11.03
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.763
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	2.00	0.98	0.100	32
COMMERCIAL	A	2.80	0.98	0.100	32
PUBLIC PARK	A	1.30	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.260
 SUBAREA AREA (ACRES) = 6.10 SUBAREA RUNOFF (CFS) = 13.78
 EFFECTIVE AREA (ACRES) = 15.40 AREA-AVERAGED Fm (INCH/HR) = 0.27
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.28
 TOTAL AREA (ACRES) = 15.4 PEAK FLOW RATE (CFS) = 34.52

 FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 970.00 DOWNSTREAM (FEET) = 958.00

 FLOW PROCESS FROM NODE 112.00 TO NODE 112.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 12.15
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.607
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	1.60	0.98	0.100	32
COMMERCIAL	A	13.10	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 14.70 SUBAREA RUNOFF (CFS) = 33.20
 EFFECTIVE AREA (ACRES) = 30.10 AREA-AVERAGED Fm (INCH/HR) = 0.19
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.19
 TOTAL AREA (ACRES) = 30.1 PEAK FLOW RATE (CFS) = 65.55

 FLOW PROCESS FROM NODE 112.00 TO NODE 113.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 958.00 DOWNSTREAM (FEET) = 950.00
 FLOW LENGTH (FEET) = 560.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 27.2 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 11.44
 ESTIMATED PIPE DIAMETER (INCH) = 36.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 65.55
 PIPE TRAVEL TIME (MIN.) = 0.82 Tc (MIN.) = 12.96
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 113.00 = 2240.00 FEET.

 FLOW PROCESS FROM NODE 113.00 TO NODE 113.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 12.96
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.507
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	4.00	0.98	0.100	32
COMMERCIAL	A	25.70	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA (ACRES) = 29.70 SUBAREA RUNOFF (CFS) = 64.42
EFFECTIVE AREA (ACRES) = 59.80 AREA-AVERAGED Fm (INCH/HR) = 0.14
AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.15
TOTAL AREA (ACRES) = 59.8 PEAK FLOW RATE (CFS) = 127.27

FLOW PROCESS FROM NODE 113.00 TO NODE 114.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 950.00 DOWNSTREAM (FEET) = 935.00
FLOW LENGTH (FEET) = 1320.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 36.6 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 12.38
ESTIMATED PIPE DIAMETER (INCH) = 48.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 127.27
PIPE TRAVEL TIME (MIN.) = 1.78 Tc (MIN.) = 14.74
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 114.00 = 3560.00 FEET.

FLOW PROCESS FROM NODE 114.00 TO NODE 114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 14.74
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.321
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 3.60 0.98 0.100 32
COMMERCIAL A 26.50 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 30.10 SUBAREA RUNOFF (CFS) = 60.25
EFFECTIVE AREA (ACRES) = 89.90 AREA-AVERAGED Fm (INCH/HR) = 0.13
AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.13
TOTAL AREA (ACRES) = 89.9 PEAK FLOW RATE (CFS) = 177.50

FLOW PROCESS FROM NODE 114.00 TO NODE 115.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 935.00 DOWNSTREAM (FEET) = 928.00
FLOW LENGTH (FEET) = 650.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 54.0 INCH PIPE IS 43.0 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 13.08
ESTIMATED PIPE DIAMETER (INCH) = 54.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 177.50
PIPE TRAVEL TIME (MIN.) = 0.83 Tc (MIN.) = 15.57
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 115.00 = 4210.00 FEET.

FLOW PROCESS FROM NODE 115.00 TO NODE 115.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 15.57
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.247
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 3.30 0.98 0.100 32
COMMERCIAL A 45.30 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 48.60 SUBAREA RUNOFF (CFS) = 94.00
EFFECTIVE AREA (ACRES) = 138.50 AREA-AVERAGED Fm (INCH/HR) = 0.12
AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.12
TOTAL AREA (ACRES) = 138.5 PEAK FLOW RATE (CFS) = 265.44

FLOW PROCESS FROM NODE 115.00 TO NODE 116.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 928.00 DOWNSTREAM (FEET) = 920.00
FLOW LENGTH (FEET) = 700.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 63.0 INCH PIPE IS 48.3 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 14.89
ESTIMATED PIPE DIAMETER (INCH) = 63.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 265.44
PIPE TRAVEL TIME (MIN.) = 0.78 Tc (MIN.) = 16.35
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 116.00 = 4910.00 FEET.

FLOW PROCESS FROM NODE 116.00 TO NODE 116.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 16.35
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.181
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 6.50 0.98 0.100 32
COMMERCIAL A 29.40 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 35.90 SUBAREA RUNOFF (CFS) = 67.33
EFFECTIVE AREA (ACRES) = 174.40 AREA-AVERAGED Fm (INCH/HR) = 0.11
AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.12
TOTAL AREA (ACRES) = 174.4 PEAK FLOW RATE (CFS) = 324.64

FLOW PROCESS FROM NODE 116.00 TO NODE 120.00 IS CODE = 31

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

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ELEVATION DATA: UPSTREAM( FEET) = 920.00 DOWNSTREAM( FEET) = 915.00
FLOW LENGTH( FEET) = 500.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 69.0 INCH PIPE IS 54.2 INCHES
PIPE-FLOW VELOCITY( FEET/SEC.) = 14.83
ESTIMATED PIPE DIAMETER( INCH) = 69.00 NUMBER OF PIPES = 1
PIPE-FLOW( CFS) = 324.64
PIPE TRAVEL TIME( MIN.) = 0.56 Tc( MIN.) = 16.92
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 120.00 = 5410.00 FEET.

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FLOW PROCESS FROM NODE 120.00 TO NODE 120.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
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TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION( MIN.) = 16.92
RAINFALL INTENSITY( INCH/HR) = 2.14
AREA-AVERAGED Fm( INCH/HR) = 0.11
AREA-AVERAGED Fp( INCH/HR) = 0.98
AREA-AVERAGED Ap = 0.12
EFFECTIVE STREAM AREA( ACRES) = 174.40
TOTAL STREAM AREA( ACRES) = 174.40
PEAK FLOW RATE( CFS) AT CONFLUENCE = 324.64

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** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	355.40	19.73	1.949	0.98(0.14)	0.14	218.2	105.00
1	355.36	20.19	1.922	0.97(0.14)	0.14	221.5	100.00
2	324.64	16.92	2.138	0.98(0.11)	0.12	174.4	110.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	661.10	16.92	2.138	0.98(0.13)	0.13	361.5	110.00
2	649.83	19.73	1.949	0.97(0.13)	0.13	392.6	105.00
3	645.44	20.19	1.922	0.97(0.13)	0.13	395.9	100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

```

PEAK FLOW RATE( CFS) = 661.10 Tc( MIN.) = 16.92
EFFECTIVE AREA( ACRES) = 361.48 AREA-AVERAGED Fm( INCH/HR) = 0.13
AREA-AVERAGED Fp( INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.13
TOTAL AREA( ACRES) = 395.9
LONGEST FLOWPATH FROM NODE 105.00 TO NODE 120.00 = 6880.00 FEET.

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FLOW PROCESS FROM NODE 120.00 TO NODE 121.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

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ELEVATION DATA: UPSTREAM( FEET) = 915.00 DOWNSTREAM( FEET) = 910.00
FLOW LENGTH( FEET) = 850.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 102.0 INCH PIPE IS 75.6 INCHES
PIPE-FLOW VELOCITY( FEET/SEC.) = 14.66
ESTIMATED PIPE DIAMETER( INCH) = 102.00 NUMBER OF PIPES = 1
PIPE-FLOW( CFS) = 661.10
PIPE TRAVEL TIME( MIN.) = 0.97 Tc( MIN.) = 17.88
LONGEST FLOWPATH FROM NODE 105.00 TO NODE 121.00 = 7730.00 FEET.

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FLOW PROCESS FROM NODE 121.00 TO NODE 121.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc( MIN.) = 17.88
* 10 YEAR RAINFALL INTENSITY( INCH/HR) = 2.067
SUBAREA LOSS RATE DATA( AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 9.70 0.98 0.100 32
COMMERCIAL A 20.90 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp( INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA( ACRES) = 30.60 SUBAREA RUNOFF( CFS) = 54.25
EFFECTIVE AREA( ACRES) = 392.08 AREA-AVERAGED Fm( INCH/HR) = 0.12
AREA-AVERAGED Fp( INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.13
TOTAL AREA( ACRES) = 426.5 PEAK FLOW RATE( CFS) = 685.69

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FLOW PROCESS FROM NODE 121.00 TO NODE 122.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM( FEET) = 910.00 DOWNSTREAM( FEET) = 905.00
FLOW LENGTH( FEET) = 520.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 93.0 INCH PIPE IS 71.2 INCHES
PIPE-FLOW VELOCITY( FEET/SEC.) = 17.70
ESTIMATED PIPE DIAMETER( INCH) = 93.00 NUMBER OF PIPES = 1
PIPE-FLOW( CFS) = 685.69
PIPE TRAVEL TIME( MIN.) = 0.49 Tc( MIN.) = 18.37
LONGEST FLOWPATH FROM NODE 105.00 TO NODE 122.00 = 8250.00 FEET.

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FLOW PROCESS FROM NODE 122.00 TO NODE 122.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc( MIN.) = 18.37
* 10 YEAR RAINFALL INTENSITY( INCH/HR) = 2.034
SUBAREA LOSS RATE DATA( AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 27.80 0.98 0.100 32
COMMERCIAL A 12.00 0.98 0.100 32

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SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.100
 SUBAREA AREA(ACRES) = 39.80 SUBAREA RUNOFF(CFS) = 69.37
 EFFECTIVE AREA(ACRES) = 431.88 AREA-AVERAGED F_m (INCH/HR) = 0.12
 AREA-AVERAGED F_p (INCH/HR) = 0.98 AREA-AVERAGED A_p = 0.12
 TOTAL AREA(ACRES) = 466.3 PEAK FLOW RATE(CFS) = 743.34

 FLOW PROCESS FROM NODE 122.00 TO NODE 123.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 905.00 DOWNSTREAM(FEET) = 890.00
 FLOW LENGTH(FEET) = 1600.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 96.0 INCH PIPE IS 74.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 17.87
 ESTIMATED PIPE DIAMETER(INCH) = 96.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 743.34
 PIPE TRAVEL TIME(MIN.) = 1.49 T_c (MIN.) = 19.86
 LONGEST FLOWPATH FROM NODE 105.00 TO NODE 123.00 = 9850.00 FEET.

 FLOW PROCESS FROM NODE 123.00 TO NODE 123.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE T_c (MIN.) = 19.86
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.941
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN
COMMERCIAL	A	10.80	0.98	0.100	32
COMMERCIAL	A	30.60	0.98	0.100	32
PUBLIC PARK	A	1.80	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.131
 SUBAREA AREA(ACRES) = 43.20 SUBAREA RUNOFF(CFS) = 70.50
 EFFECTIVE AREA(ACRES) = 475.08 AREA-AVERAGED F_m (INCH/HR) = 0.12
 AREA-AVERAGED F_p (INCH/HR) = 0.98 AREA-AVERAGED A_p = 0.13
 TOTAL AREA(ACRES) = 509.5 PEAK FLOW RATE(CFS) = 777.64

 FLOW PROCESS FROM NODE 123.00 TO NODE 124.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 890.00 DOWNSTREAM(FEET) = 880.00
 FLOW LENGTH(FEET) = 400.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 81.0 INCH PIPE IS 62.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 26.07
 ESTIMATED PIPE DIAMETER(INCH) = 81.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 777.64
 PIPE TRAVEL TIME(MIN.) = 0.26 T_c (MIN.) = 20.12
 LONGEST FLOWPATH FROM NODE 105.00 TO NODE 124.00 = 10250.00 FEET.

 FLOW PROCESS FROM NODE 130.00 TO NODE 131.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 960.00
 ELEVATION DATA: UPSTREAM(FEET) = 976.00 DOWNSTREAM(FEET) = 966.00

$T_c = K * [(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20$
 SUBAREA ANALYSIS USED MINIMUM T_c (MIN.) = 11.810
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.652

SUBAREA T_c AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN	T_c (MIN.)
COMMERCIAL	A	4.30	0.98	0.100	32	11.81
COMMERCIAL	A	4.80	0.98	0.100	32	11.81
PUBLIC PARK	A	0.90	0.98	0.850	32	18.76

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.168
 SUBAREA RUNOFF(CFS) = 22.40
 TOTAL AREA(ACRES) = 10.00 PEAK FLOW RATE(CFS) = 22.40

 FLOW PROCESS FROM NODE 131.00 TO NODE 132.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 2 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 966.00 DOWNSTREAM ELEVATION(FEET) = 954.00
 STREET LENGTH(FEET) = 800.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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) = 32.09
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.54
 HALFSTREET FLOOD WIDTH(FEET) = 19.26
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.11
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.24
 STREET FLOW TRAVEL TIME(MIN.) = 3.24 T_c (MIN.) = 15.05
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.293

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN
COMMERCIAL	A	2.80	0.98	0.100	32
COMMERCIAL	A	7.00	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.100
 SUBAREA AREA (ACRES) = 9.80 SUBAREA RUNOFF(CFS) = 19.36
 EFFECTIVE AREA (ACRES) = 19.80 AREA-AVERAGED F_m (INCH/HR) = 0.13
 AREA-AVERAGED F_p (INCH/HR) = 0.97 AREA-AVERAGED A_p = 0.13
 TOTAL AREA (ACRES) = 19.8 PEAK FLOW RATE(CFS) = 38.53

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.57 HALFSTREET FLOOD WIDTH (FEET) = 20.74
 FLOW VELOCITY (FEET/SEC.) = 4.29 DEPTH*VELOCITY (FT*FT/SEC.) = 2.46
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 132.00 = 1760.00 FEET.

 FLOW PROCESS FROM NODE 132.00 TO NODE 134.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 954.00 DOWNSTREAM (FEET) = 940.00
 FLOW LENGTH (FEET) = 850.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.6 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 10.70
 ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 38.53
 PIPE TRAVEL TIME (MIN.) = 1.32 T_c (MIN.) = 16.38
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 134.00 = 2610.00 FEET.

 FLOW PROCESS FROM NODE 134.00 TO NODE 134.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE T_c (MIN.) = 16.38
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.180
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN
COMMERCIAL	A	6.70	0.98	0.100	32
COMMERCIAL	A	9.20	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.100
 SUBAREA AREA (ACRES) = 15.90 SUBAREA RUNOFF (CFS) = 29.79
 EFFECTIVE AREA (ACRES) = 35.70 AREA-AVERAGED F_m (INCH/HR) = 0.12
 AREA-AVERAGED F_p (INCH/HR) = 0.97 AREA-AVERAGED A_p = 0.12
 TOTAL AREA (ACRES) = 35.7 PEAK FLOW RATE (CFS) = 66.31

 FLOW PROCESS FROM NODE 134.00 TO NODE 135.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 940.00 DOWNSTREAM (FEET) = 916.00
 FLOW LENGTH (FEET) = 1940.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 29.5 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 10.70

ESTIMATED PIPE DIAMETER (INCH) = 36.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 66.31
 PIPE TRAVEL TIME (MIN.) = 3.02 T_c (MIN.) = 19.40
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 135.00 = 4550.00 FEET.

 FLOW PROCESS FROM NODE 135.00 TO NODE 135.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE T_c (MIN.) = 19.40
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.969
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN
COMMERCIAL	A	34.40	0.98	0.100	32
COMMERCIAL	A	18.50	0.98	0.100	32
PUBLIC PARK	A	3.00	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.140
 SUBAREA AREA (ACRES) = 55.90 SUBAREA RUNOFF (CFS) = 92.18
 EFFECTIVE AREA (ACRES) = 91.60 AREA-AVERAGED F_m (INCH/HR) = 0.13
 AREA-AVERAGED F_p (INCH/HR) = 0.98 AREA-AVERAGED A_p = 0.13
 TOTAL AREA (ACRES) = 91.6 PEAK FLOW RATE (CFS) = 151.72

 FLOW PROCESS FROM NODE 135.00 TO NODE 136.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 916.00 DOWNSTREAM (FEET) = 905.00
 FLOW LENGTH (FEET) = 580.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 48.0 INCH PIPE IS 34.2 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 15.83
 ESTIMATED PIPE DIAMETER (INCH) = 48.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 151.72
 PIPE TRAVEL TIME (MIN.) = 0.61 T_c (MIN.) = 20.01
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 136.00 = 5130.00 FEET.

 FLOW PROCESS FROM NODE 136.00 TO NODE 136.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE T_c (MIN.) = 20.01
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.933
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN
COMMERCIAL	A	52.40	0.98	0.100	32
COMMERCIAL	A	5.00	0.98	0.100	32
PUBLIC PARK	A	10.30	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.214
 SUBAREA AREA (ACRES) = 67.70 SUBAREA RUNOFF (CFS) = 105.04

EFFECTIVE AREA (ACRES) = 159.30 AREA-AVERAGED Fm (INCH/HR) = 0.16
AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.17
TOTAL AREA (ACRES) = 159.3 PEAK FLOW RATE (CFS) = 253.77

FLOW PROCESS FROM NODE 140.00 TO NODE 141.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 1050.00
ELEVATION DATA: UPSTREAM (FEET) = 900.00 DOWNSTREAM (FEET) = 890.00

FLOW PROCESS FROM NODE 136.00 TO NODE 137.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 905.00 DOWNSTREAM (FEET) = 895.00
FLOW LENGTH (FEET) = 1250.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 66.0 INCH PIPE IS 51.1 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 12.86
ESTIMATED PIPE DIAMETER (INCH) = 66.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 253.77
PIPE TRAVEL TIME (MIN.) = 1.62 Tc (MIN.) = 21.63
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 137.00 = 6380.00 FEET.

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 12.462
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.568
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 9.90 0.98 0.100 32 12.46
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF (CFS) = 22.01
TOTAL AREA (ACRES) = 9.90 PEAK FLOW RATE (CFS) = 22.01

FLOW PROCESS FROM NODE 137.00 TO NODE 137.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 21.63
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.845
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 14.40 0.98 0.100 32
COMMERCIAL A 32.90 0.98 0.100 32
PUBLIC PARK A 0.10 0.98 0.850 32
COMMERCIAL A 0.90 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.102
SUBAREA AREA (ACRES) = 48.30 SUBAREA RUNOFF (CFS) = 75.88
EFFECTIVE AREA (ACRES) = 207.60 AREA-AVERAGED Fm (INCH/HR) = 0.15
AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.15
TOTAL AREA (ACRES) = 207.6 PEAK FLOW RATE (CFS) = 317.00

FLOW PROCESS FROM NODE 141.00 TO NODE 142.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 890.00 DOWNSTREAM ELEVATION (FEET) = 880.00
STREET LENGTH (FEET) = 1500.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 27.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

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) = 34.77
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.63
HALFSTREET FLOOD WIDTH (FEET) = 23.38
AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.07
PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 1.92
STREET FLOW TRAVEL TIME (MIN.) = 8.13 Tc (MIN.) = 20.59
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.900

SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 7.40 0.98 0.100 32
COMMERCIAL A 8.20 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 15.60 SUBAREA RUNOFF (CFS) = 25.30
EFFECTIVE AREA (ACRES) = 25.50 AREA-AVERAGED Fm (INCH/HR) = 0.10

FLOW PROCESS FROM NODE 137.00 TO NODE 138.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 895.00 DOWNSTREAM (FEET) = 880.00
FLOW LENGTH (FEET) = 330.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 41.1 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 25.87
ESTIMATED PIPE DIAMETER (INCH) = 51.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 317.00
PIPE TRAVEL TIME (MIN.) = 0.21 Tc (MIN.) = 21.84
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 138.00 = 6710.00 FEET.

AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 25.5 PEAK FLOW RATE (CFS) = 41.36

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH (FEET) = 0.66 HALFSTREET FLOOD WIDTH (FEET) = 25.01
FLOW VELOCITY (FEET/SEC.) = 3.21 DEPTH*VELOCITY (FT*FT/SEC.) = 2.11
LONGEST FLOWPATH FROM NODE 140.00 TO NODE 142.00 = 2550.00 FEET.

FLOW PROCESS FROM NODE 142.00 TO NODE 143.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 880.00 DOWNSTREAM (FEET) = 855.00
FLOW LENGTH (FEET) = 2350.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.3 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 9.22
ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 41.36
PIPE TRAVEL TIME (MIN.) = 4.25 Tc (MIN.) = 24.84
LONGEST FLOWPATH FROM NODE 140.00 TO NODE 143.00 = 4900.00 FEET.

FLOW PROCESS FROM NODE 143.00 TO NODE 143.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====

MAINLINE Tc (MIN.) = 24.84
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.697
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	6.50	0.98	0.100	32
COMMERCIAL	A	19.90	0.98	0.100	32
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	50.10	0.98	0.500	32
PUBLIC PARK	A	16.00	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.446
SUBAREA AREA (ACRES) = 92.50 SUBAREA RUNOFF (CFS) = 105.07
EFFECTIVE AREA (ACRES) = 118.00 AREA-AVERAGED Fm (INCH/HR) = 0.36
AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.37
TOTAL AREA (ACRES) = 118.0 PEAK FLOW RATE (CFS) = 141.78

FLOW PROCESS FROM NODE 143.00 TO NODE 144.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 855.00 DOWNSTREAM (FEET) = 850.00
FLOW LENGTH (FEET) = 570.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 54.0 INCH PIPE IS 38.6 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 11.65
ESTIMATED PIPE DIAMETER (INCH) = 54.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 141.78
PIPE TRAVEL TIME (MIN.) = 0.82 Tc (MIN.) = 25.66
LONGEST FLOWPATH FROM NODE 140.00 TO NODE 144.00 = 5470.00 FEET.

FLOW PROCESS FROM NODE 144.00 TO NODE 144.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====

MAINLINE Tc (MIN.) = 25.66
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.665
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	5.30	0.98	0.100	32
COMMERCIAL	A	17.60	0.98	0.100	32
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	46.00	0.98	0.500	32
PUBLIC PARK	A	4.20	0.98	0.850	32
PUBLIC PARK	A	9.30	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.446
SUBAREA AREA (ACRES) = 82.40 SUBAREA RUNOFF (CFS) = 91.19
EFFECTIVE AREA (ACRES) = 200.40 AREA-AVERAGED Fm (INCH/HR) = 0.39
AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.40
TOTAL AREA (ACRES) = 200.4 PEAK FLOW RATE (CFS) = 229.52

FLOW PROCESS FROM NODE 144.00 TO NODE 144.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====

MAINLINE Tc (MIN.) = 25.66
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.665
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	3.50	0.98	0.100	32
COMMERCIAL	A	31.50	0.98	0.100	32
PUBLIC PARK	A	4.50	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.185
SUBAREA AREA (ACRES) = 39.50 SUBAREA RUNOFF (CFS) = 52.75
EFFECTIVE AREA (ACRES) = 239.90 AREA-AVERAGED Fm (INCH/HR) = 0.36
AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.37
TOTAL AREA (ACRES) = 239.9 PEAK FLOW RATE (CFS) = 282.27

FLOW PROCESS FROM NODE 144.00 TO NODE 145.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 850.00 DOWNSTREAM (FEET) = 849.00
FLOW LENGTH (FEET) = 1200.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 108.0 INCH PIPE IS 78.3 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 5.71
 ESTIMATED PIPE DIAMETER (INCH) = 108.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 282.27
 PIPE TRAVEL TIME (MIN.) = 3.50 Tc (MIN.) = 29.16
 LONGEST FLOWPATH FROM NODE 140.00 TO NODE 145.00 = 6670.00 FEET.

PIPE-FLOW (CFS) = 88.37
 PIPE TRAVEL TIME (MIN.) = 4.07 Tc (MIN.) = 20.38
 LONGEST FLOWPATH FROM NODE 145.10 TO NODE 145.00 = 4750.00 FEET.

 FLOW PROCESS FROM NODE 145.00 TO NODE 145.00 IS CODE = 1

 FLOW PROCESS FROM NODE 145.00 TO NODE 145.00 IS CODE = 81

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION (MIN.) = 29.16
 RAINFALL INTENSITY (INCH/HR) = 1.54
 AREA-AVERAGED Fm (INCH/HR) = 0.36
 AREA-AVERAGED Fp (INCH/HR) = 0.98
 AREA-AVERAGED Ap = 0.37
 EFFECTIVE STREAM AREA (ACRES) = 239.90
 TOTAL STREAM AREA (ACRES) = 239.90
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 282.27

=====

MAINLINE Tc (MIN.) = 20.38
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.912
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	1.10	0.98	0.100	32
COMMERCIAL	A	42.20	0.98	0.100	32
PUBLIC PARK	A	0.20	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.103
 SUBAREA AREA (ACRES) = 43.50 SUBAREA RUNOFF (CFS) = 70.90
 EFFECTIVE AREA (ACRES) = 91.10 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.11
 TOTAL AREA (ACRES) = 91.1 PEAK FLOW RATE (CFS) = 147.57

 FLOW PROCESS FROM NODE 145.10 TO NODE 145.20 IS CODE = 21

 FLOW PROCESS FROM NODE 145.00 TO NODE 145.00 IS CODE = 1

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 2000.00
 ELEVATION DATA: UPSTREAM (FEET) = 898.00 DOWNSTREAM (FEET) = 880.00

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION (MIN.) = 20.38
 RAINFALL INTENSITY (INCH/HR) = 1.91
 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.98
 AREA-AVERAGED Ap = 0.11
 EFFECTIVE STREAM AREA (ACRES) = 91.10
 TOTAL STREAM AREA (ACRES) = 91.10
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 147.57

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 16.309
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.185
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	0.50	0.98	0.100	32	16.31
COMMERCIAL	A	45.50	0.98	0.100	32	16.31
PUBLIC PARK	A	1.60	0.98	0.850	32	25.91

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.125
 SUBAREA RUNOFF (CFS) = 88.37
 TOTAL AREA (ACRES) = 47.60 PEAK FLOW RATE (CFS) = 88.37

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	282.27	29.16	1.542	0.98 (0.36)	0.37	239.9	140.00
2	147.57	20.38	1.912	0.98 (0.11)	0.11	91.1	145.10

 FLOW PROCESS FROM NODE 145.20 TO NODE 145.00 IS CODE = 31

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

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	406.41	20.38	1.912	0.98 (0.27)	0.28	258.7	145.10
2	399.50	29.16	1.542	0.98 (0.29)	0.30	331.0	140.00

=====

ELEVATION DATA: UPSTREAM (FEET) = 880.00 DOWNSTREAM (FEET) = 849.00
 FLOW LENGTH (FEET) = 2750.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 42.0 INCH PIPE IS 31.9 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 11.27
 ESTIMATED PIPE DIAMETER (INCH) = 42.00 NUMBER OF PIPES = 1

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 406.41 Tc(MIN.) = 20.38
 EFFECTIVE AREA(ACRES) = 258.73 AREA-AVERAGED Fm(INCH/HR) = 0.27
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.28
 TOTAL AREA(ACRES) = 331.0
 LONGEST FLOWPATH FROM NODE 140.00 TO NODE 145.00 = 6670.00 FEET.

FLOW PROCESS FROM NODE 145.00 TO NODE 146.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 849.00 DOWNSTREAM(FEET) = 847.00
 FLOW LENGTH(FEET) = 1030.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 102.0 INCH PIPE IS 80.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 8.48
 ESTIMATED PIPE DIAMETER(INCH) = 102.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 406.41
 PIPE TRAVEL TIME(MIN.) = 2.02 Tc(MIN.) = 22.40
 LONGEST FLOWPATH FROM NODE 140.00 TO NODE 146.00 = 7700.00 FEET.

FLOW PROCESS FROM NODE 146.00 TO NODE 146.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 22.40
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.806
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	28.70	0.98	0.100	32
COMMERCIAL	A	57.00	0.98	0.100	32
PUBLIC PARK	A	10.40	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.181
 SUBAREA AREA(ACRES) = 96.10 SUBAREA RUNOFF(CFS) = 140.94
 EFFECTIVE AREA(ACRES) = 354.83 AREA-AVERAGED Fm(INCH/HR) = 0.25
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.25
 TOTAL AREA(ACRES) = 427.1 PEAK FLOW RATE(CFS) = 498.41

FLOW PROCESS FROM NODE 146.00 TO NODE 147.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 847.00 DOWNSTREAM(FEET) = 846.00
 FLOW LENGTH(FEET) = 700.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 120.0 INCH PIPE IS 88.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 8.05
 ESTIMATED PIPE DIAMETER(INCH) = 120.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 498.41
 PIPE TRAVEL TIME(MIN.) = 1.45 Tc(MIN.) = 23.85
 LONGEST FLOWPATH FROM NODE 140.00 TO NODE 147.00 = 8400.00 FEET.

FLOW PROCESS FROM NODE 147.00 TO NODE 147.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 23.85
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.739
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	19.40	0.98	0.100	32
COMMERCIAL	A	24.30	0.98	0.100	32
PUBLIC PARK	A	0.30	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.105
 SUBAREA AREA(ACRES) = 44.00 SUBAREA RUNOFF(CFS) = 64.82
 EFFECTIVE AREA(ACRES) = 398.83 AREA-AVERAGED Fm(INCH/HR) = 0.23
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.24
 TOTAL AREA(ACRES) = 471.1 PEAK FLOW RATE(CFS) = 541.92

FLOW PROCESS FROM NODE 147.00 TO NODE 148.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 846.00 DOWNSTREAM(FEET) = 840.00
 FLOW LENGTH(FEET) = 850.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 90.0 INCH PIPE IS 69.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 14.85
 ESTIMATED PIPE DIAMETER(INCH) = 90.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 541.92
 PIPE TRAVEL TIME(MIN.) = 0.95 Tc(MIN.) = 24.80
 LONGEST FLOWPATH FROM NODE 140.00 TO NODE 148.00 = 9250.00 FEET.

FLOW PROCESS FROM NODE 148.00 TO NODE 148.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 24.80
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.699
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	4.50	0.98	0.100	32
COMMERCIAL	A	94.70	0.98	0.100	32
PUBLIC PARK	A	13.00	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.187
 SUBAREA AREA(ACRES) = 112.20 SUBAREA RUNOFF(CFS) = 153.16
 EFFECTIVE AREA(ACRES) = 511.03 AREA-AVERAGED Fm(INCH/HR) = 0.22
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.22
 TOTAL AREA(ACRES) = 583.3 PEAK FLOW RATE(CFS) = 680.56

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 583.3 TC(MIN.) = 24.80
EFFECTIVE AREA(ACRES) = 511.03 AREA-AVERAGED Fm(INCH/HR)= 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.225
PEAK FLOW RATE(CFS) = 680.56

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	680.56	24.80	1.699	0.98 (0.22)	0.22	511.0	145.10
2	618.65	33.65	1.415	0.97 (0.24)	0.24	583.3	140.00

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

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 48.31
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.70
HALFSTREET FLOOD WIDTH(FEET) = 28.93
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.18
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.23
STREET FLOW TRAVEL TIME(MIN.) = 1.78 Tc(MIN.) = 12.99

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.846
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 1.60 0.98 0.100 32
COMMERCIAL A 13.90 0.98 0.100 32
PUBLIC PARK A 6.40 0.98 0.850 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.319
SUBAREA AREA(ACRES) = 21.90 SUBAREA RUNOFF(CFS) = 49.96
EFFECTIVE AREA(ACRES) = 31.30 AREA-AVERAGED Fm(INCH/HR) = 0.32
AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.33
TOTAL AREA(ACRES) = 31.3 PEAK FLOW RATE(CFS) = 71.04

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.79 HALFSTREET FLOOD WIDTH(FEET) = 37.37
FLOW VELOCITY(FEET/SEC.) = 3.41 DEPTH*VELOCITY(FT*FT/SEC.) = 2.68
*NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
AND L = 340.0 FT WITH ELEVATION-DROP = 2.0 FT, IS 65.0 CFS,
WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 102.00
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 1220.00 FEET.

FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 973.00 DOWNSTREAM(FEET) = 960.00
FLOW LENGTH(FEET) = 740.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.66
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 71.04
PIPE TRAVEL TIME(MIN.) = 0.97 Tc(MIN.) = 13.97
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 103.00 = 1960.00 FEET.

FLOW PROCESS FROM NODE 103.00 TO NODE 103.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====

MAINLINE Tc(MIN.) = 13.97
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.725
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 2.60 0.98 0.100 32
COMMERCIAL A 18.40 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 21.00 SUBAREA RUNOFF(CFS) = 49.66
EFFECTIVE AREA(ACRES) = 52.30 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.24
TOTAL AREA(ACRES) = 52.3 PEAK FLOW RATE(CFS) = 117.30

FLOW PROCESS FROM NODE 103.00 TO NODE 104.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 960.00 DOWNSTREAM(FEET) = 925.00
FLOW LENGTH(FEET) = 2800.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 35.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.48
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 117.30
PIPE TRAVEL TIME(MIN.) = 3.74 Tc(MIN.) = 17.71
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 104.00 = 4760.00 FEET.

FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) = 17.71
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.364
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 6.60 0.98 0.100 32
COMMERCIAL A 68.40 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 75.00 SUBAREA RUNOFF(CFS) = 152.96
EFFECTIVE AREA(ACRES) = 127.30 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.16
TOTAL AREA(ACRES) = 127.3 PEAK FLOW RATE(CFS) = 253.24

FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 17.71

RAINFALL INTENSITY(INCH/HR) = 2.36
 AREA-AVERAGED Fm(INCH/HR) = 0.15
 AREA-AVERAGED Fp(INCH/HR) = 0.97
 AREA-AVERAGED Ap = 0.16
 EFFECTIVE STREAM AREA(ACRES) = 127.30
 TOTAL STREAM AREA(ACRES) = 127.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 253.24

COMMERCIAL A 4.40 0.98 0.100 32
 COMMERCIAL A 4.70 0.98 0.100 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 9.10 SUBAREA RUNOFF(CFS) = 23.71
 EFFECTIVE AREA(ACRES) = 22.20 AREA-AVERAGED Fm(INCH/HR) = 0.20
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.20
 TOTAL AREA(ACRES) = 22.2 PEAK FLOW RATE(CFS) = 55.88

 FLOW PROCESS FROM NODE 105.00 TO NODE 106.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 880.00
 ELEVATION DATA: UPSTREAM(FEET) = 990.00 DOWNSTREAM(FEET) = 975.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.336
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.265
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	1.30	0.98	0.100	32	10.34
COMMERCIAL	A	8.80	0.98	0.100	32	10.34
PUBLIC PARK	A	3.00	0.98	0.850	32	16.42

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.272
 SUBAREA RUNOFF(CFS) = 35.37
 TOTAL AREA(ACRES) = 13.10 PEAK FLOW RATE(CFS) = 35.37

 FLOW PROCESS FROM NODE 106.00 TO NODE 107.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 975.00 DOWNSTREAM(FEET) = 968.00
 FLOW LENGTH(FEET) = 800.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 22.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 8.28
 ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 35.37
 PIPE TRAVEL TIME(MIN.) = 1.61 Tc(MIN.) = 11.95
 LONGEST FLOWPATH FROM NODE 105.00 TO NODE 107.00 = 1680.00 FEET.

 FLOW PROCESS FROM NODE 107.00 TO NODE 107.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.95
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.993
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	7.30	0.98	0.100	32
COMMERCIAL	A	21.00	0.98	0.100	32

 FLOW PROCESS FROM NODE 107.00 TO NODE 108.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 968.00 DOWNSTREAM(FEET) = 940.00
 FLOW LENGTH(FEET) = 2000.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 27.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 10.74
 ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 55.88
 PIPE TRAVEL TIME(MIN.) = 3.10 Tc(MIN.) = 15.05
 LONGEST FLOWPATH FROM NODE 105.00 TO NODE 108.00 = 3680.00 FEET.

 FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 15.05
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.606
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	7.30	0.98	0.100	32
COMMERCIAL	A	21.00	0.98	0.100	32

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 28.30 SUBAREA RUNOFF(CFS) = 63.89
 EFFECTIVE AREA(ACRES) = 50.50 AREA-AVERAGED Fm(INCH/HR) = 0.14
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.14
 TOTAL AREA(ACRES) = 50.5 PEAK FLOW RATE(CFS) = 112.03

 FLOW PROCESS FROM NODE 108.00 TO NODE 104.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 940.00 DOWNSTREAM(FEET) = 925.00
 FLOW LENGTH(FEET) = 1500.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 48.0 INCH PIPE IS 34.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 11.52
 ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 112.03
 PIPE TRAVEL TIME(MIN.) = 2.17 Tc(MIN.) = 17.22

LONGEST FLOWPATH FROM NODE 105.00 TO NODE 104.00 = 5180.00 FEET.

FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 17.22
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.404
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 3.30 0.98 0.100 32
COMMERCIAL A 7.10 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 10.40 SUBAREA RUNOFF(CFS) = 21.58
EFFECTIVE AREA(ACRES) = 60.90 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.14
TOTAL AREA(ACRES) = 60.9 PEAK FLOW RATE(CFS) = 124.42

FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 17.22
RAINFALL INTENSITY(INCH/HR) = 2.40
AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.98
AREA-AVERAGED Ap = 0.14
EFFECTIVE STREAM AREA(ACRES) = 60.90
TOTAL STREAM AREA(ACRES) = 60.90
PEAK FLOW RATE(CFS) AT CONFLUENCE = 124.42

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	253.24	17.71	2.364	0.97(0.15)	0.16	127.3	100.00
2	124.42	17.22	2.404	0.98(0.13)	0.14	60.9	105.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	375.13	17.22	2.404	0.97(0.15)	0.15	184.7	105.00
2	375.46	17.71	2.364	0.97(0.15)	0.15	188.2	100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 375.46 Tc(MIN.) = 17.71
EFFECTIVE AREA(ACRES) = 188.20 AREA-AVERAGED Fm(INCH/HR) = 0.15

AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.15
TOTAL AREA(ACRES) = 188.2
LONGEST FLOWPATH FROM NODE 105.00 TO NODE 104.00 = 5180.00 FEET.

FLOW PROCESS FROM NODE 104.00 TO NODE 120.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 925.00 DOWNSTREAM(FEET) = 915.00
FLOW LENGTH(FEET) = 1700.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 81.0 INCH PIPE IS 62.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.64
ESTIMATED PIPE DIAMETER(INCH) = 81.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 375.46
PIPE TRAVEL TIME(MIN.) = 2.24 Tc(MIN.) = 19.95
LONGEST FLOWPATH FROM NODE 105.00 TO NODE 120.00 = 6880.00 FEET.

FLOW PROCESS FROM NODE 120.00 TO NODE 120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 19.95
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.200
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 2.90 0.98 0.100 32
COMMERCIAL A 30.40 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 33.30 SUBAREA RUNOFF(CFS) = 63.02
EFFECTIVE AREA(ACRES) = 221.50 AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.14
TOTAL AREA(ACRES) = 221.5 PEAK FLOW RATE(CFS) = 410.86

FLOW PROCESS FROM NODE 120.00 TO NODE 120.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 19.95
RAINFALL INTENSITY(INCH/HR) = 2.20
AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.97
AREA-AVERAGED Ap = 0.14
EFFECTIVE STREAM AREA(ACRES) = 221.50
TOTAL STREAM AREA(ACRES) = 221.50
PEAK FLOW RATE(CFS) AT CONFLUENCE = 410.86

FLOW PROCESS FROM NODE 110.00 TO NODE 111.00 IS CODE = 21

 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 980.00
 ELEVATION DATA: UPSTREAM (FEET) = 985.00 DOWNSTREAM (FEET) = 970.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 11.025
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.141
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	1.50	0.98	0.100	32	11.03
COMMERCIAL	A	5.40	0.98	0.100	32	11.03
PUBLIC PARK	A	2.40	0.98	0.850	32	17.52

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.294
 SUBAREA RUNOFF (CFS) = 23.89
 TOTAL AREA (ACRES) = 9.30 PEAK FLOW RATE (CFS) = 23.89

 FLOW PROCESS FROM NODE 111.00 TO NODE 111.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

 MAINLINE Tc (MIN.) = 11.03
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.141
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	2.00	0.98	0.100	32
COMMERCIAL	A	2.80	0.98	0.100	32
PUBLIC PARK	A	1.30	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.260
 SUBAREA AREA (ACRES) = 6.10 SUBAREA RUNOFF (CFS) = 15.85
 EFFECTIVE AREA (ACRES) = 15.40 AREA-AVERAGED Fm (INCH/HR) = 0.27
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.28
 TOTAL AREA (ACRES) = 15.4 PEAK FLOW RATE (CFS) = 39.74

 FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 31

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

 ELEVATION DATA: UPSTREAM (FEET) = 970.00 DOWNSTREAM (FEET) = 958.00
 FLOW LENGTH (FEET) = 700.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.8 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 10.94
 ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 39.74
 PIPE TRAVEL TIME (MIN.) = 1.07 Tc (MIN.) = 12.09
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 112.00 = 1680.00 FEET.

 FLOW PROCESS FROM NODE 112.00 TO NODE 112.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

 MAINLINE Tc (MIN.) = 12.09
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.971
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	1.60	0.98	0.100	32
COMMERCIAL	A	13.10	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 14.70 SUBAREA RUNOFF (CFS) = 38.02
 EFFECTIVE AREA (ACRES) = 30.10 AREA-AVERAGED Fm (INCH/HR) = 0.19
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.19
 TOTAL AREA (ACRES) = 30.1 PEAK FLOW RATE (CFS) = 75.42

 FLOW PROCESS FROM NODE 112.00 TO NODE 113.00 IS CODE = 31

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

 ELEVATION DATA: UPSTREAM (FEET) = 958.00 DOWNSTREAM (FEET) = 950.00
 FLOW LENGTH (FEET) = 560.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 27.7 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 11.95
 ESTIMATED PIPE DIAMETER (INCH) = 39.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 75.42
 PIPE TRAVEL TIME (MIN.) = 0.78 Tc (MIN.) = 12.87
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 113.00 = 2240.00 FEET.

 FLOW PROCESS FROM NODE 113.00 TO NODE 113.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

 MAINLINE Tc (MIN.) = 12.87
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.862
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	4.00	0.98	0.100	32
COMMERCIAL	A	25.70	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 29.70 SUBAREA RUNOFF (CFS) = 73.89
 EFFECTIVE AREA (ACRES) = 59.80 AREA-AVERAGED Fm (INCH/HR) = 0.14
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.15
 TOTAL AREA (ACRES) = 59.8 PEAK FLOW RATE (CFS) = 146.35

 FLOW PROCESS FROM NODE 113.00 TO NODE 114.00 IS CODE = 31

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 950.00 DOWNSTREAM(FEET) = 935.00
FLOW LENGTH(FEET) = 1320.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 38.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.86
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 146.35
PIPE TRAVEL TIME(MIN.) = 1.71 Tc(MIN.) = 14.58
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 114.00 = 3560.00 FEET.

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FLOW PROCESS FROM NODE 114.00 TO NODE 114.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 14.58
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.655
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL              A      3.60     0.98     0.100     32
COMMERCIAL              A      26.50    0.98     0.100     32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 30.10 SUBAREA RUNOFF(CFS) = 69.30
EFFECTIVE AREA(ACRES) = 89.90 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.13
TOTAL AREA(ACRES) = 89.9 PEAK FLOW RATE(CFS) = 204.53

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FLOW PROCESS FROM NODE 114.00 TO NODE 115.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 935.00 DOWNSTREAM(FEET) = 928.00
FLOW LENGTH(FEET) = 650.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 57.0 INCH PIPE IS 45.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.56
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 204.53
PIPE TRAVEL TIME(MIN.) = 0.80 Tc(MIN.) = 15.38
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 115.00 = 4210.00 FEET.

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FLOW PROCESS FROM NODE 115.00 TO NODE 115.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 15.38
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.572
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN

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COMMERCIAL              A      3.30     0.98     0.100     32
COMMERCIAL              A      45.30    0.98     0.100     32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 48.60 SUBAREA RUNOFF(CFS) = 108.23
EFFECTIVE AREA(ACRES) = 138.50 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.12
TOTAL AREA(ACRES) = 138.5 PEAK FLOW RATE(CFS) = 305.99

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FLOW PROCESS FROM NODE 115.00 TO NODE 116.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 928.00 DOWNSTREAM(FEET) = 920.00
FLOW LENGTH(FEET) = 700.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 66.0 INCH PIPE IS 51.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.38
ESTIMATED PIPE DIAMETER(INCH) = 66.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 305.99
PIPE TRAVEL TIME(MIN.) = 0.76 Tc(MIN.) = 16.14
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 116.00 = 4910.00 FEET.

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*****
FLOW PROCESS FROM NODE 116.00 TO NODE 116.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 16.14
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.499
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL              A      6.50     0.98     0.100     32
COMMERCIAL              A      29.40    0.98     0.100     32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 35.90 SUBAREA RUNOFF(CFS) = 77.58
EFFECTIVE AREA(ACRES) = 174.40 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.12
TOTAL AREA(ACRES) = 174.4 PEAK FLOW RATE(CFS) = 374.44

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FLOW PROCESS FROM NODE 116.00 TO NODE 120.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 920.00 DOWNSTREAM(FEET) = 915.00
FLOW LENGTH(FEET) = 500.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 72.0 INCH PIPE IS 58.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.27
ESTIMATED PIPE DIAMETER(INCH) = 72.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 374.44
PIPE TRAVEL TIME(MIN.) = 0.55 Tc(MIN.) = 16.69

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LONGEST FLOWPATH FROM NODE 110.00 TO NODE 120.00 = 5410.00 FEET.

LONGEST FLOWPATH FROM NODE 105.00 TO NODE 121.00 = 7730.00 FEET.

FLOW PROCESS FROM NODE 120.00 TO NODE 120.00 IS CODE = 1

FLOW PROCESS FROM NODE 121.00 TO NODE 121.00 IS CODE = 81

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION (MIN.) = 16.69
RAINFALL INTENSITY (INCH/HR) = 2.45
AREA-AVERAGED Fm (INCH/HR) = 0.11
AREA-AVERAGED Fp (INCH/HR) = 0.98
AREA-AVERAGED Ap = 0.12
EFFECTIVE STREAM AREA (ACRES) = 174.40
TOTAL STREAM AREA (ACRES) = 174.40
PEAK FLOW RATE (CFS) AT CONFLUENCE = 374.44

=====

MAINLINE Tc (MIN.) = 17.62
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.371
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	9.70	0.98	0.100	32
COMMERCIAL	A	20.90	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 30.60 SUBAREA RUNOFF (CFS) = 62.61
EFFECTIVE AREA (ACRES) = 391.92 AREA-AVERAGED Fm (INCH/HR) = 0.12
AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.13
TOTAL AREA (ACRES) = 426.5 PEAK FLOW RATE (CFS) = 792.39

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	410.86	19.46	2.233	0.97(0.14)	0.14	218.0	105.00
1	410.86	19.95	2.200	0.97(0.14)	0.14	221.5	100.00
2	374.44	16.69	2.449	0.98(0.11)	0.12	174.4	110.00

FLOW PROCESS FROM NODE 121.00 TO NODE 122.00 IS CODE = 31

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

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	763.05	16.69	2.449	0.97(0.13)	0.13	361.3	110.00
2	750.70	19.46	2.233	0.98(0.13)	0.13	392.4	105.00
3	745.42	19.95	2.200	0.97(0.13)	0.13	395.9	100.00

=====

ELEVATION DATA: UPSTREAM (FEET) = 910.00 DOWNSTREAM (FEET) = 905.00
FLOW LENGTH (FEET) = 520.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 96.0 INCH PIPE IS 77.9 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 18.14
ESTIMATED PIPE DIAMETER (INCH) = 96.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 792.39
PIPE TRAVEL TIME (MIN.) = 0.48 Tc (MIN.) = 18.10
LONGEST FLOWPATH FROM NODE 105.00 TO NODE 122.00 = 8250.00 FEET.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 763.05 Tc (MIN.) = 16.69
EFFECTIVE AREA (ACRES) = 361.32 AREA-AVERAGED Fm (INCH/HR) = 0.13
AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.13
TOTAL AREA (ACRES) = 395.9
LONGEST FLOWPATH FROM NODE 105.00 TO NODE 120.00 = 6880.00 FEET.

FLOW PROCESS FROM NODE 122.00 TO NODE 122.00 IS CODE = 81

FLOW PROCESS FROM NODE 120.00 TO NODE 121.00 IS CODE = 31

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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

=====

MAINLINE Tc (MIN.) = 18.10
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.333
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	27.80	0.98	0.100	32
COMMERCIAL	A	12.00	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 39.80 SUBAREA RUNOFF (CFS) = 80.08
EFFECTIVE AREA (ACRES) = 431.72 AREA-AVERAGED Fm (INCH/HR) = 0.12
AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.12
TOTAL AREA (ACRES) = 466.3 PEAK FLOW RATE (CFS) = 859.15

=====

ELEVATION DATA: UPSTREAM (FEET) = 915.00 DOWNSTREAM (FEET) = 910.00
FLOW LENGTH (FEET) = 850.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 108.0 INCH PIPE IS 79.4 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 15.22
ESTIMATED PIPE DIAMETER (INCH) = 108.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 763.05
PIPE TRAVEL TIME (MIN.) = 0.93 Tc (MIN.) = 17.62

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FLOW PROCESS FROM NODE 122.00 TO NODE 123.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 905.00 DOWNSTREAM(FEET) = 890.00
FLOW LENGTH(FEET) = 1600.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 102.0 INCH PIPE IS 77.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.58
ESTIMATED PIPE DIAMETER(INCH) = 102.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 859.15
PIPE TRAVEL TIME(MIN.) = 1.44 Tc(MIN.) = 19.53
LONGEST FLOWPATH FROM NODE 105.00 TO NODE 123.00 = 9850.00 FEET.
*****
FLOW PROCESS FROM NODE 123.00 TO NODE 123.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 19.53
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.229
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 10.80 0.98 0.100 32
COMMERCIAL A 30.60 0.98 0.100 32
PUBLIC PARK A 1.80 0.98 0.850 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.131
SUBAREA AREA(ACRES) = 43.20 SUBAREA RUNOFF(CFS) = 81.67
EFFECTIVE AREA(ACRES) = 474.92 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.13
TOTAL AREA(ACRES) = 509.5 PEAK FLOW RATE(CFS) = 900.23
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FLOW PROCESS FROM NODE 123.00 TO NODE 124.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 890.00 DOWNSTREAM(FEET) = 880.00
FLOW LENGTH(FEET) = 400.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 84.0 INCH PIPE IS 68.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 26.76
ESTIMATED PIPE DIAMETER(INCH) = 84.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 900.23
PIPE TRAVEL TIME(MIN.) = 0.25 Tc(MIN.) = 19.78
LONGEST FLOWPATH FROM NODE 105.00 TO NODE 124.00 = 10250.00 FEET.
*****
FLOW PROCESS FROM NODE 130.00 TO NODE 131.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 960.00

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ELEVATION DATA: UPSTREAM(FEET) = 976.00 DOWNSTREAM(FEET) = 966.00
Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 11.810
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.014
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 4.30 0.98 0.100 32 11.81
COMMERCIAL A 4.80 0.98 0.100 32 11.81
PUBLIC PARK A 0.90 0.98 0.850 32 18.76
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.168
SUBAREA RUNOFF(CFS) = 25.65
TOTAL AREA(ACRES) = 10.00 PEAK FLOW RATE(CFS) = 25.65
*****

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FLOW PROCESS FROM NODE 131.00 TO NODE 132.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 966.00 DOWNSTREAM ELEVATION(FEET) = 954.00
STREET LENGTH(FEET) = 800.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 32.00
DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020
SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 36.77
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.57
HALFSTREET FLOOD WIDTH(FEET) = 20.37
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.24
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.40
STREET FLOW TRAVEL TIME(MIN.) = 3.15 Tc(MIN.) = 14.96
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.616
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 2.80 0.98 0.100 32
COMMERCIAL A 7.00 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 9.80 SUBAREA RUNOFF(CFS) = 22.21
EFFECTIVE AREA(ACRES) = 19.80 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.13
TOTAL AREA(ACRES) = 19.8 PEAK FLOW RATE(CFS) = 44.28

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END OF SUBAREA STREET FLOW HYDRAULICS:

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DEPTH(FEET) = 0.60 HALFSTREET FLOOD WIDTH(FEET) = 21.90
FLOW VELOCITY(FEET/SEC.) = 4.44 DEPTH*VELOCITY(FT*FT/SEC.) = 2.65
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 132.00 = 1760.00 FEET.

FLOW PROCESS FROM NODE 132.00 TO NODE 134.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 954.00 DOWNSTREAM(FEET) = 940.00
FLOW LENGTH(FEET) = 850.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 23.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.91
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 44.28
PIPE TRAVEL TIME(MIN.) = 1.30 Tc(MIN.) = 16.26
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 134.00 = 2610.00 FEET.

FLOW PROCESS FROM NODE 134.00 TO NODE 134.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 16.26
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.488
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 6.70 0.98 0.100 32
COMMERCIAL A 9.20 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 15.90 SUBAREA RUNOFF(CFS) = 34.21
EFFECTIVE AREA(ACRES) = 35.70 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.12
TOTAL AREA(ACRES) = 35.7 PEAK FLOW RATE(CFS) = 76.22

FLOW PROCESS FROM NODE 134.00 TO NODE 135.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 940.00 DOWNSTREAM(FEET) = 916.00
FLOW LENGTH(FEET) = 1940.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 29.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.24
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 76.22
PIPE TRAVEL TIME(MIN.) = 2.88 Tc(MIN.) = 19.13
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 135.00 = 4550.00 FEET.

FLOW PROCESS FROM NODE 135.00 TO NODE 135.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 19.13
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.256
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 34.40 0.98 0.100 32
COMMERCIAL A 18.50 0.98 0.100 32
PUBLIC PARK A 3.00 0.98 0.850 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.140
SUBAREA AREA(ACRES) = 55.90 SUBAREA RUNOFF(CFS) = 106.64
EFFECTIVE AREA(ACRES) = 91.60 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.13
TOTAL AREA(ACRES) = 91.6 PEAK FLOW RATE(CFS) = 175.41

FLOW PROCESS FROM NODE 135.00 TO NODE 136.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 916.00 DOWNSTREAM(FEET) = 905.00
FLOW LENGTH(FEET) = 580.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 39.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.05
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 175.41
PIPE TRAVEL TIME(MIN.) = 0.60 Tc(MIN.) = 19.73
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 136.00 = 5130.00 FEET.

FLOW PROCESS FROM NODE 136.00 TO NODE 136.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 19.73
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.215
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 52.40 0.98 0.100 32
COMMERCIAL A 5.00 0.98 0.100 32
PUBLIC PARK A 10.30 0.98 0.850 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.214
SUBAREA AREA(ACRES) = 67.70 SUBAREA RUNOFF(CFS) = 122.23
EFFECTIVE AREA(ACRES) = 159.30 AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.17
TOTAL AREA(ACRES) = 159.3 PEAK FLOW RATE(CFS) = 294.22

FLOW PROCESS FROM NODE 136.00 TO NODE 137.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

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>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 905.00 DOWNSTREAM(FEET) = 895.00
FLOW LENGTH(FEET) = 1250.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 69.0 INCH PIPE IS 54.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.27
ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 294.22
PIPE TRAVEL TIME(MIN.) = 1.57 Tc(MIN.) = 21.30
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 137.00 = 6380.00 FEET.

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FLOW PROCESS FROM NODE 137.00 TO NODE 137.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) = 21.30
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.115
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL         A       14.40   0.98  0.100  32
COMMERCIAL         A       32.90   0.98  0.100  32
PUBLIC PARK        A        0.10   0.98  0.850  32
COMMERCIAL         A        0.90   0.98  0.100  32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.102
SUBAREA AREA(ACRES) = 48.30 SUBAREA RUNOFF(CFS) = 87.65
EFFECTIVE AREA(ACRES) = 207.60 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.15
TOTAL AREA(ACRES) = 207.6 PEAK FLOW RATE(CFS) = 367.62

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FLOW PROCESS FROM NODE 137.00 TO NODE 138.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 895.00 DOWNSTREAM(FEET) = 880.00
FLOW LENGTH(FEET) = 330.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 54.0 INCH PIPE IS 43.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 26.87
ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 367.62
PIPE TRAVEL TIME(MIN.) = 0.20 Tc(MIN.) = 21.51
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 138.00 = 6710.00 FEET.

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FLOW PROCESS FROM NODE 140.00 TO NODE 141.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 1050.00
ELEVATION DATA: UPSTREAM(FEET) = 900.00 DOWNSTREAM(FEET) = 890.00

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Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 12.462
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.918
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS   Tc
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL         A       9.90   0.98  0.100  32  12.46
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 25.13
TOTAL AREA(ACRES) = 9.90 PEAK FLOW RATE(CFS) = 25.13

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*****
FLOW PROCESS FROM NODE 141.00 TO NODE 142.00 IS CODE = 62
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<<
=====
UPSTREAM ELEVATION(FEET) = 890.00 DOWNSTREAM ELEVATION(FEET) = 880.00
STREET LENGTH(FEET) = 1500.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 32.00

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DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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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

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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 39.83
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.65
HALFSTREET FLOOD WIDTH(FEET) = 24.64
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.18
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.07
STREET FLOW TRAVEL TIME(MIN.) = 7.86 Tc(MIN.) = 20.32
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.176
SUBAREA LOSS RATE DATA(AMC II):

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DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL         A       7.40   0.98  0.100  32
COMMERCIAL         A       8.20   0.98  0.100  32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 15.60 SUBAREA RUNOFF(CFS) = 29.18
EFFECTIVE AREA(ACRES) = 25.50 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 25.5 PEAK FLOW RATE(CFS) = 47.70

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END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.69 HALFSTREET FLOOD WIDTH(FEET) = 27.35
FLOW VELOCITY(FEET/SEC.) = 3.33 DEPTH*VELOCITY(FT*FT/SEC.) = 2.29
LONGEST FLOWPATH FROM NODE 140.00 TO NODE 142.00 = 2550.00 FEET.

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FLOW PROCESS FROM NODE 142.00 TO NODE 143.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 880.00 DOWNSTREAM(FEET) = 855.00
FLOW LENGTH(FEET) = 2350.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 26.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.36
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 47.70
PIPE TRAVEL TIME(MIN.) = 4.18 Tc(MIN.) = 24.51
LONGEST FLOWPATH FROM NODE 140.00 TO NODE 143.00 = 4900.00 FEET.

FLOW PROCESS FROM NODE 143.00 TO NODE 143.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 24.51
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.945
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 6.50 0.98 0.100 32
COMMERCIAL A 19.90 0.98 0.100 32
RESIDENTIAL
"5-7 DWELLINGS/ACRE" A 50.10 0.98 0.500 32
PUBLIC PARK A 16.00 0.98 0.850 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.446
SUBAREA AREA(ACRES) = 92.50 SUBAREA RUNOFF(CFS) = 125.68
EFFECTIVE AREA(ACRES) = 118.00 AREA-AVERAGED Fm(INCH/HR) = 0.36
AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 118.0 PEAK FLOW RATE(CFS) = 168.08

FLOW PROCESS FROM NODE 143.00 TO NODE 144.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 855.00 DOWNSTREAM(FEET) = 850.00
FLOW LENGTH(FEET) = 570.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 57.0 INCH PIPE IS 41.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.12
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 168.08
PIPE TRAVEL TIME(MIN.) = 0.78 Tc(MIN.) = 25.29
LONGEST FLOWPATH FROM NODE 140.00 TO NODE 144.00 = 5470.00 FEET.

FLOW PROCESS FROM NODE 144.00 TO NODE 144.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 25.29
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.909
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 5.30 0.98 0.100 32
COMMERCIAL A 17.60 0.98 0.100 32
RESIDENTIAL
"5-7 DWELLINGS/ACRE" A 46.00 0.98 0.500 32
PUBLIC PARK A 4.20 0.98 0.850 32
PUBLIC PARK A 9.30 0.98 0.850 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.446
SUBAREA AREA(ACRES) = 82.40 SUBAREA RUNOFF(CFS) = 109.27
EFFECTIVE AREA(ACRES) = 200.40 AREA-AVERAGED Fm(INCH/HR) = 0.39
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.40
TOTAL AREA(ACRES) = 200.4 PEAK FLOW RATE(CFS) = 273.49

FLOW PROCESS FROM NODE 144.00 TO NODE 144.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 25.29
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.909
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 3.50 0.98 0.100 32
COMMERCIAL A 31.50 0.98 0.100 32
PUBLIC PARK A 4.50 0.98 0.850 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.185
SUBAREA AREA(ACRES) = 39.50 SUBAREA RUNOFF(CFS) = 61.42
EFFECTIVE AREA(ACRES) = 239.90 AREA-AVERAGED Fm(INCH/HR) = 0.36
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 239.9 PEAK FLOW RATE(CFS) = 334.91

FLOW PROCESS FROM NODE 144.00 TO NODE 145.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 850.00 DOWNSTREAM(FEET) = 849.00
FLOW LENGTH(FEET) = 1200.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 114.0 INCH PIPE IS 84.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.94
ESTIMATED PIPE DIAMETER(INCH) = 114.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 334.91
PIPE TRAVEL TIME(MIN.) = 3.36 Tc(MIN.) = 28.65
LONGEST FLOWPATH FROM NODE 140.00 TO NODE 145.00 = 6670.00 FEET.

FLOW PROCESS FROM NODE 145.00 TO NODE 145.00 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.) = 28.65
RAINFALL INTENSITY (INCH/HR) = 1.77
AREA-AVERAGED Fm (INCH/HR) = 0.36
AREA-AVERAGED Fp (INCH/HR) = 0.98
AREA-AVERAGED Ap = 0.37
EFFECTIVE STREAM AREA (ACRES) = 239.90
TOTAL STREAM AREA (ACRES) = 239.90
PEAK FLOW RATE (CFS) AT CONFLUENCE = 334.91

FLOW PROCESS FROM NODE 145.10 TO NODE 145.20 IS CODE = 21
=====

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 2000.00
ELEVATION DATA: UPSTREAM (FEET) = 898.00 DOWNSTREAM (FEET) = 880.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 16.309
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.483
SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	0.50	0.98	0.100	32	16.31
COMMERCIAL	A	45.50	0.98	0.100	32	16.31
PUBLIC PARK	A	1.60	0.98	0.850	32	25.91

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.125
SUBAREA RUNOFF (CFS) = 101.15
TOTAL AREA (ACRES) = 47.60 PEAK FLOW RATE (CFS) = 101.15

FLOW PROCESS FROM NODE 145.20 TO NODE 145.00 IS CODE = 31
=====

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

ELEVATION DATA: UPSTREAM (FEET) = 880.00 DOWNSTREAM (FEET) = 849.00
FLOW LENGTH (FEET) = 2750.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 32.8 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 11.73
ESTIMATED PIPE DIAMETER (INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 101.15
PIPE TRAVEL TIME (MIN.) = 3.91 Tc (MIN.) = 20.22
LONGEST FLOWPATH FROM NODE 145.10 TO NODE 145.00 = 4750.00 FEET.

FLOW PROCESS FROM NODE 145.00 TO NODE 145.00 IS CODE = 81
=====

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

=====
MAINLINE Tc (MIN.) = 20.22
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.183
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	1.10	0.98	0.100	32
COMMERCIAL	A	42.20	0.98	0.100	32
PUBLIC PARK	A	0.20	0.98	0.850	32

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.103
SUBAREA AREA (ACRES) = 43.50 SUBAREA RUNOFF (CFS) = 81.52
EFFECTIVE AREA (ACRES) = 91.10 AREA-AVERAGED Fm (INCH/HR) = 0.11
AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.11
TOTAL AREA (ACRES) = 91.1 PEAK FLOW RATE (CFS) = 169.80

FLOW PROCESS FROM NODE 145.00 TO NODE 145.00 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.) = 20.22
RAINFALL INTENSITY (INCH/HR) = 2.18
AREA-AVERAGED Fm (INCH/HR) = 0.11
AREA-AVERAGED Fp (INCH/HR) = 0.98
AREA-AVERAGED Ap = 0.11
EFFECTIVE STREAM AREA (ACRES) = 91.10
TOTAL STREAM AREA (ACRES) = 91.10
PEAK FLOW RATE (CFS) AT CONFLUENCE = 169.80

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	334.91	28.65	1.771	0.98 (0.36)	0.37	239.9	140.00
2	169.80	20.22	2.183	0.98 (0.11)	0.11	91.1	145.10

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	475.00	20.22	2.183	0.98 (0.27)	0.28	260.3	145.10
2	470.91	28.65	1.771	0.98 (0.29)	0.30	331.0	140.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE (CFS) = 475.00 Tc (MIN.) = 20.22
EFFECTIVE AREA (ACRES) = 260.35 AREA-AVERAGED Fm (INCH/HR) = 0.27
AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.28
TOTAL AREA (ACRES) = 331.0
LONGEST FLOWPATH FROM NODE 140.00 TO NODE 145.00 = 6670.00 FEET.

FLOW PROCESS FROM NODE 145.00 TO NODE 146.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 849.00 DOWNSTREAM(FEET) = 847.00
 FLOW LENGTH(FEET) = 1030.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 108.0 INCH PIPE IS 85.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 8.81
 ESTIMATED PIPE DIAMETER(INCH) = 108.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 475.00
 PIPE TRAVEL TIME(MIN.) = 1.95 Tc(MIN.) = 22.16
 LONGEST FLOWPATH FROM NODE 140.00 TO NODE 146.00 = 7700.00 FEET.

FLOW PROCESS FROM NODE 146.00 TO NODE 146.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 22.16
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.066
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	28.70	0.98	0.100	32
COMMERCIAL	A	57.00	0.98	0.100	32
PUBLIC PARK	A	10.40	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.181
 SUBAREA AREA(ACRES) = 96.10 SUBAREA RUNOFF(CFS) = 163.39
 EFFECTIVE AREA(ACRES) = 356.45 AREA-AVERAGED Fm(INCH/HR) = 0.25
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.25
 TOTAL AREA(ACRES) = 427.1 PEAK FLOW RATE(CFS) = 583.81

FLOW PROCESS FROM NODE 146.00 TO NODE 147.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 847.00 DOWNSTREAM(FEET) = 846.00
 FLOW LENGTH(FEET) = 700.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 126.0 INCH PIPE IS 95.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 8.34
 ESTIMATED PIPE DIAMETER(INCH) = 126.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 583.81
 PIPE TRAVEL TIME(MIN.) = 1.40 Tc(MIN.) = 23.56
 LONGEST FLOWPATH FROM NODE 140.00 TO NODE 147.00 = 8400.00 FEET.

FLOW PROCESS FROM NODE 147.00 TO NODE 147.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 23.56
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.991

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	19.40	0.98	0.100	32
COMMERCIAL	A	24.30	0.98	0.100	32
PUBLIC PARK	A	0.30	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.105
 SUBAREA AREA(ACRES) = 44.00 SUBAREA RUNOFF(CFS) = 74.80
 EFFECTIVE AREA(ACRES) = 400.45 AREA-AVERAGED Fm(INCH/HR) = 0.23
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.24
 TOTAL AREA(ACRES) = 471.1 PEAK FLOW RATE(CFS) = 634.71

FLOW PROCESS FROM NODE 147.00 TO NODE 148.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 846.00 DOWNSTREAM(FEET) = 840.00
 FLOW LENGTH(FEET) = 850.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 96.0 INCH PIPE IS 73.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 15.48
 ESTIMATED PIPE DIAMETER(INCH) = 96.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 634.71
 PIPE TRAVEL TIME(MIN.) = 0.92 Tc(MIN.) = 24.48
 LONGEST FLOWPATH FROM NODE 140.00 TO NODE 148.00 = 9250.00 FEET.

FLOW PROCESS FROM NODE 148.00 TO NODE 148.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 24.48
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.946
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	4.50	0.98	0.100	32
COMMERCIAL	A	94.70	0.98	0.100	32
PUBLIC PARK	A	13.00	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.187
 SUBAREA AREA(ACRES) = 112.20 SUBAREA RUNOFF(CFS) = 178.13
 EFFECTIVE AREA(ACRES) = 512.65 AREA-AVERAGED Fm(INCH/HR) = 0.22
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.23
 TOTAL AREA(ACRES) = 583.3 PEAK FLOW RATE(CFS) = 796.62

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 583.3 TC(MIN.) = 24.48
 EFFECTIVE AREA(ACRES) = 512.65 AREA-AVERAGED Fm(INCH/HR) = 0.22
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.225
 PEAK FLOW RATE(CFS) = 796.62

** PEAK FLOW RATE TABLE **

STREAM	Q	Tc	Intensity	Fp(Fm)	Ap	Ae	HEADWATER
--------	---	----	-----------	---------	----	----	-----------

NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)	(ACRES)	NODE
1	796.62	24.48	1.946	0.98 (0.22)	0.23	512.6 145.10
2	730.39	32.97	1.628	0.97 (0.24)	0.24	583.3 140.00

=====
 END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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***** DESCRIPTION OF STUDY *****

* OLD MODEL COLONY EAST AREA D *
* 100-YEAR HYDROLOGY ANALYSIS *
* *

FILE NAME: OMCED100.DAT
TIME/DATE OF STUDY: 15:31 10/14/2011

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT (YEAR) = 100.00
SPECIFIED MINIMUM PIPE SIZE (INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS (DECIMAL) TO USE FOR FRICTION SLOPE = 0.80
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE (LOG(I; IN/HR) vs. LOG(Tc; MIN)) = 0.6000
USER SPECIFIED 1-HOUR INTENSITY (INCH/HOUR) = 1.4000

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF-CROWN TO STREET-CROSSFALL:		STREET-CROSSFALL:				CURB GUTTER-GEOMETRIES:			MANNING FACTOR
	WIDTH (FT)	CROSSFALL (FT)	IN-SIDE	OUT-SIDE	HEIGHT (FT)	WIDTH (FT)	LIP (FT)	HIKE (FT)		
1	30.0	20.0	0.018/0.018	0.020	0.67	2.00	0.0312	0.167	0.0150	
2	32.0	27.0	0.020/0.020	0.020	0.67	2.00	0.0312	0.167	0.0150	

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

SIZE PIPE WITH A FLOW CAPACITY GREATER THAN OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.

*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

UNIT-HYDROGRAPH MODEL SELECTIONS/PARAMETERS:

WATERSHED LAG = 0.80 * Tc
USED "VALLEY UNDEVELOPED" S-GRAPH FOR DEVELOPMENTS OF

2 UNITS/ACRE AND LESS; AND "VALLEY DEVELOPED" S-GRAPH FOR DEVELOPMENTS OF 3-4 UNITS/ACRE AND MORE.

USER SPECIFIED RAINFALL VALUES:

2-YR 6-HR RAINFALL DEPTH (INCH) = 1.70
2-YR 24-HR RAINFALL DEPTH (INCH) = 3.30
100-YR 6-HR RAINFALL DEPTH (INCH) = 3.70
100-YR 24-HR RAINFALL DEPTH (INCH) = 8.00

SIERRA MADRE DEPTH-AREA FACTORS USED.

AREA-AVERAGED

DURATION	RAINFALL (INCH)
5-MINUTES	0.52
30-MINUTES	1.06
1-HOUR	1.40
3-HOUR	2.54
6-HOUR	3.70
24-HOUR	8.00

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR UNIT HYDROGRAPH METHOD

FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 880.00
ELEVATION DATA: UPSTREAM (FEET) = 985.00 DOWNSTREAM (FEET) = 975.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 11.209
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.831
SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	0.80	0.98	0.100	32	11.21
COMMERCIAL	A	5.30	0.98	0.100	32	11.21
PUBLIC PARK	A	3.30	0.98	0.850	32	17.81

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.363
SUBAREA RUNOFF (CFS) = 29.41
TOTAL AREA (ACRES) = 9.40 PEAK FLOW RATE (CFS) = 29.41

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<<<

=====

UPSTREAM ELEVATION (FEET) = 975.00 DOWNSTREAM ELEVATION (FEET) = 973.00
STREET LENGTH (FEET) = 340.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 27.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 61.04
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.75
 HALFSTREET FLOOD WIDTH(FEET) = 33.99
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.32
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 2.50
 STREET FLOW TRAVEL TIME(MIN.) = 1.71 Tc(MIN.) = 12.92

* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.518
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	1.60	0.98	0.100	32
COMMERCIAL	A	13.90	0.98	0.100	32
PUBLIC PARK	A	6.40	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.319
 SUBAREA AREA(ACRES) = 21.90 SUBAREA RUNOFF(CFS) = 63.21
 EFFECTIVE AREA(ACRES) = 31.30 AREA-AVERAGED Fm(INCH/HR) = 0.32
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.33
 TOTAL AREA(ACRES) = 31.3 PEAK FLOW RATE(CFS) = 89.98

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.84 HALFSTREET FLOOD WIDTH(FEET) = 40.44
 FLOW VELOCITY(FEET/SEC.) = 3.65 DEPTH*VELOCITY(FT*FT/SEC.) = 3.05
 *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
 AND L = 340.0 FT WITH ELEVATION-DROP = 2.0 FT, IS 81.5 CFS,
 WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 102.00
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 1220.00 FEET.

 FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM(FEET) = 973.00 DOWNSTREAM(FEET) = 960.00
 FLOW LENGTH(FEET) = 740.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 29.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 13.39
 ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 89.98
 PIPE TRAVEL TIME(MIN.) = 0.92 Tc(MIN.) = 13.84
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 103.00 = 1960.00 FEET.

 FLOW PROCESS FROM NODE 103.00 TO NODE 103.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====
 MAINLINE Tc(MIN.) = 13.84
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.376

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	2.60	0.98	0.100	32
COMMERCIAL	A	18.40	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 21.00 SUBAREA RUNOFF(CFS) = 61.96
 EFFECTIVE AREA(ACRES) = 52.30 AREA-AVERAGED Fm(INCH/HR) = 0.23
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.24
 TOTAL AREA(ACRES) = 52.3 PEAK FLOW RATE(CFS) = 147.92

 FLOW PROCESS FROM NODE 103.00 TO NODE 104.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM(FEET) = 960.00 DOWNSTREAM(FEET) = 925.00
 FLOW LENGTH(FEET) = 2800.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 51.0 INCH PIPE IS 37.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 13.42
 ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 147.92
 PIPE TRAVEL TIME(MIN.) = 3.48 Tc(MIN.) = 17.32
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 104.00 = 4760.00 FEET.

 FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====
 MAINLINE Tc(MIN.) = 17.32
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.951
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	6.60	0.98	0.100	32
COMMERCIAL	A	68.40	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 75.00 SUBAREA RUNOFF(CFS) = 192.61
 EFFECTIVE AREA(ACRES) = 127.30 AREA-AVERAGED Fm(INCH/HR) = 0.15
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.16
 TOTAL AREA(ACRES) = 127.3 PEAK FLOW RATE(CFS) = 320.54

 FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 =====
 TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 17.32
 RAINFALL INTENSITY (INCH/HR) = 2.95
 AREA-AVERAGED Fm(INCH/HR) = 0.15

AREA-AVERAGED Fp (INCH/HR) = 0.97
 AREA-AVERAGED Ap = 0.16
 EFFECTIVE STREAM AREA (ACRES) = 127.30
 TOTAL STREAM AREA (ACRES) = 127.30
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 320.54

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 9.10 SUBAREA RUNOFF (CFS) = 29.53
 EFFECTIVE AREA (ACRES) = 22.20 AREA-AVERAGED Fm (INCH/HR) = 0.20
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.20
 TOTAL AREA (ACRES) = 22.2 PEAK FLOW RATE (CFS) = 70.07

FLOW PROCESS FROM NODE 105.00 TO NODE 106.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 880.00
 ELEVATION DATA: UPSTREAM (FEET) = 990.00 DOWNSTREAM (FEET) = 975.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 10.336
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 4.022
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	1.30	0.98	0.100	32	10.34
COMMERCIAL	A	8.80	0.98	0.100	32	10.34
PUBLIC PARK	A	3.00	0.98	0.850	32	16.42

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.272
 SUBAREA RUNOFF (CFS) = 44.29
 TOTAL AREA (ACRES) = 13.10 PEAK FLOW RATE (CFS) = 44.29

FLOW PROCESS FROM NODE 106.00 TO NODE 107.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 975.00 DOWNSTREAM (FEET) = 968.00
 FLOW LENGTH (FEET) = 800.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.2 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 8.76
 ESTIMATED PIPE DIAMETER (INCH) = 36.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 44.29
 PIPE TRAVEL TIME (MIN.) = 1.52 Tc (MIN.) = 11.86
 LONGEST FLOWPATH FROM NODE 105.00 TO NODE 107.00 = 1680.00 FEET.

FLOW PROCESS FROM NODE 107.00 TO NODE 107.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc (MIN.) = 11.86
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.703
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	4.40	0.98	0.100	32
COMMERCIAL	A	4.70	0.98	0.100	32

FLOW PROCESS FROM NODE 107.00 TO NODE 108.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 968.00 DOWNSTREAM (FEET) = 940.00
 FLOW LENGTH (FEET) = 2000.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 29.3 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 11.38
 ESTIMATED PIPE DIAMETER (INCH) = 36.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 70.07
 PIPE TRAVEL TIME (MIN.) = 2.93 Tc (MIN.) = 14.79
 LONGEST FLOWPATH FROM NODE 105.00 TO NODE 108.00 = 3680.00 FEET.

FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc (MIN.) = 14.79
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.244
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	7.30	0.98	0.100	32
COMMERCIAL	A	21.00	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 28.30 SUBAREA RUNOFF (CFS) = 80.15
 EFFECTIVE AREA (ACRES) = 50.50 AREA-AVERAGED Fm (INCH/HR) = 0.14
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.14
 TOTAL AREA (ACRES) = 50.5 PEAK FLOW RATE (CFS) = 141.04

FLOW PROCESS FROM NODE 108.00 TO NODE 104.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 940.00 DOWNSTREAM (FEET) = 925.00
 FLOW LENGTH (FEET) = 1500.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 51.0 INCH PIPE IS 39.1 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 12.10
 ESTIMATED PIPE DIAMETER (INCH) = 51.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 141.04
 PIPE TRAVEL TIME (MIN.) = 2.07 Tc (MIN.) = 16.85
 LONGEST FLOWPATH FROM NODE 105.00 TO NODE 104.00 = 5180.00 FEET.

 FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 16.85
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.999
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	3.30	0.98	0.100	32
COMMERCIAL	A	7.10	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 10.40 SUBAREA RUNOFF (CFS) = 27.16
 EFFECTIVE AREA (ACRES) = 60.90 AREA-AVERAGED Fm (INCH/HR) = 0.13
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.14
 TOTAL AREA (ACRES) = 60.9 PEAK FLOW RATE (CFS) = 157.07

 FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 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.) = 16.85
 RAINFALL INTENSITY (INCH/HR) = 3.00
 AREA-AVERAGED Fm (INCH/HR) = 0.13
 AREA-AVERAGED Fp (INCH/HR) = 0.98
 AREA-AVERAGED Ap = 0.14
 EFFECTIVE STREAM AREA (ACRES) = 60.90
 TOTAL STREAM AREA (ACRES) = 60.90
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 157.07

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	320.54	17.32	2.951	0.97 (0.15)	0.16	127.3	100.00
2	157.07	16.85	2.999	0.98 (0.13)	0.14	60.9	105.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	474.44	16.85	2.999	0.97 (0.15)	0.15	184.8	105.00
2	474.96	17.32	2.951	0.97 (0.15)	0.15	188.2	100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 474.96 Tc (MIN.) = 17.32
 EFFECTIVE AREA (ACRES) = 188.20 AREA-AVERAGED Fm (INCH/HR) = 0.15
 AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.15
 TOTAL AREA (ACRES) = 188.2

LONGEST FLOWPATH FROM NODE 105.00 TO NODE 104.00 = 5180.00 FEET.

 FLOW PROCESS FROM NODE 104.00 TO NODE 120.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 925.00 DOWNSTREAM (FEET) = 915.00
 FLOW LENGTH (FEET) = 1700.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 87.0 INCH PIPE IS 70.3 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 13.29
 ESTIMATED PIPE DIAMETER (INCH) = 87.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 474.96
 PIPE TRAVEL TIME (MIN.) = 2.13 Tc (MIN.) = 19.45
 LONGEST FLOWPATH FROM NODE 105.00 TO NODE 120.00 = 6880.00 FEET.

 FLOW PROCESS FROM NODE 120.00 TO NODE 120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 19.45
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.752
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	2.90	0.98	0.100	32
COMMERCIAL	A	30.40	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 33.30 SUBAREA RUNOFF (CFS) = 79.57
 EFFECTIVE AREA (ACRES) = 221.50 AREA-AVERAGED Fm (INCH/HR) = 0.14
 AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.14
 TOTAL AREA (ACRES) = 221.5 PEAK FLOW RATE (CFS) = 520.89

 FLOW PROCESS FROM NODE 120.00 TO NODE 120.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION (MIN.) = 19.45
 RAINFALL INTENSITY (INCH/HR) = 2.75
 AREA-AVERAGED Fm (INCH/HR) = 0.14
 AREA-AVERAGED Fp (INCH/HR) = 0.97
 AREA-AVERAGED Ap = 0.14
 EFFECTIVE STREAM AREA (ACRES) = 221.50
 TOTAL STREAM AREA (ACRES) = 221.50
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 520.89

 FLOW PROCESS FROM NODE 110.00 TO NODE 111.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 980.00
ELEVATION DATA: UPSTREAM(FEET) = 985.00 DOWNSTREAM(FEET) = 970.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 11.025
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.869
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 1.50 0.98 0.100 32 11.03
COMMERCIAL A 5.40 0.98 0.100 32 11.03
PUBLIC PARK A 2.40 0.98 0.850 32 17.52
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.294
SUBAREA RUNOFF(CFS) = 29.99
TOTAL AREA(ACRES) = 9.30 PEAK FLOW RATE(CFS) = 29.99

FLOW PROCESS FROM NODE 111.00 TO NODE 111.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.03
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.869
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 2.00 0.98 0.100 32
COMMERCIAL A 2.80 0.98 0.100 32
PUBLIC PARK A 1.30 0.98 0.850 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.260
SUBAREA AREA(ACRES) = 6.10 SUBAREA RUNOFF(CFS) = 19.85
EFFECTIVE AREA(ACRES) = 15.40 AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.28
TOTAL AREA(ACRES) = 15.4 PEAK FLOW RATE(CFS) = 49.84

FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 970.00 DOWNSTREAM(FEET) = 958.00
FLOW LENGTH(FEET) = 700.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 22.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.60
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 49.84
PIPE TRAVEL TIME(MIN.) = 1.01 Tc(MIN.) = 12.03
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 112.00 = 1680.00 FEET.

FLOW PROCESS FROM NODE 112.00 TO NODE 112.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.03
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.671
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 1.60 0.98 0.100 32
COMMERCIAL A 13.10 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 14.70 SUBAREA RUNOFF(CFS) = 47.28
EFFECTIVE AREA(ACRES) = 30.10 AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.19
TOTAL AREA(ACRES) = 30.1 PEAK FLOW RATE(CFS) = 94.38

FLOW PROCESS FROM NODE 112.00 TO NODE 113.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 958.00 DOWNSTREAM(FEET) = 950.00
FLOW LENGTH(FEET) = 560.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 30.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.61
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 94.38
PIPE TRAVEL TIME(MIN.) = 0.74 Tc(MIN.) = 12.77
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 113.00 = 2240.00 FEET.

FLOW PROCESS FROM NODE 113.00 TO NODE 113.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.77
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.542
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 4.00 0.98 0.100 32
COMMERCIAL A 25.70 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 29.70 SUBAREA RUNOFF(CFS) = 92.08
EFFECTIVE AREA(ACRES) = 59.80 AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.15
TOTAL AREA(ACRES) = 59.8 PEAK FLOW RATE(CFS) = 182.96

FLOW PROCESS FROM NODE 113.00 TO NODE 114.00 IS CODE = 31

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

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ELEVATION DATA: UPSTREAM(FEET) = 950.00  DOWNSTREAM(FEET) = 935.00
FLOW LENGTH(FEET) = 1320.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 54.0 INCH PIPE IS 43.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.44
ESTIMATED PIPE DIAMETER(INCH) = 54.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 182.96
PIPE TRAVEL TIME(MIN.) = 1.64  Tc(MIN.) = 14.41
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 114.00 = 3560.00 FEET.

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FLOW PROCESS FROM NODE 114.00 TO NODE 114.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
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MAINLINE Tc(MIN.) = 14.41
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.295
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL            A        3.60      0.98      0.100     32
COMMERCIAL            A       26.50      0.98      0.100     32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 30.10  SUBAREA RUNOFF(CFS) = 86.62
EFFECTIVE AREA(ACRES) = 89.90  AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.98  AREA-AVERAGED Ap = 0.13
TOTAL AREA(ACRES) = 89.9  PEAK FLOW RATE(CFS) = 256.26

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FLOW PROCESS FROM NODE 114.00 TO NODE 115.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 935.00  DOWNSTREAM(FEET) = 928.00
FLOW LENGTH(FEET) = 650.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 63.0 INCH PIPE IS 48.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.45
ESTIMATED PIPE DIAMETER(INCH) = 63.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 256.26
PIPE TRAVEL TIME(MIN.) = 0.75  Tc(MIN.) = 15.16
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 115.00 = 4210.00 FEET.

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FLOW PROCESS FROM NODE 115.00 TO NODE 115.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
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MAINLINE Tc(MIN.) = 15.16
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.196
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL            A        3.30      0.98      0.100     32
COMMERCIAL            A       45.30      0.98      0.100     32

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SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 48.60  SUBAREA RUNOFF(CFS) = 135.53
EFFECTIVE AREA(ACRES) = 138.50  AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.98  AREA-AVERAGED Ap = 0.12
TOTAL AREA(ACRES) = 138.5  PEAK FLOW RATE(CFS) = 383.80

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FLOW PROCESS FROM NODE 115.00 TO NODE 116.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 928.00  DOWNSTREAM(FEET) = 920.00
FLOW LENGTH(FEET) = 700.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 72.0 INCH PIPE IS 55.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.29
ESTIMATED PIPE DIAMETER(INCH) = 72.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 383.80
PIPE TRAVEL TIME(MIN.) = 0.72  Tc(MIN.) = 15.87
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 116.00 = 4910.00 FEET.

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FLOW PROCESS FROM NODE 116.00 TO NODE 116.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
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MAINLINE Tc(MIN.) = 15.87
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.109
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL            A        6.50      0.98      0.100     32
COMMERCIAL            A       29.40      0.98      0.100     32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 35.90  SUBAREA RUNOFF(CFS) = 97.30
EFFECTIVE AREA(ACRES) = 174.40  AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.98  AREA-AVERAGED Ap = 0.12
TOTAL AREA(ACRES) = 174.4  PEAK FLOW RATE(CFS) = 470.22

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FLOW PROCESS FROM NODE 116.00 TO NODE 120.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 920.00  DOWNSTREAM(FEET) = 915.00
FLOW LENGTH(FEET) = 500.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 81.0 INCH PIPE IS 60.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.41
ESTIMATED PIPE DIAMETER(INCH) = 81.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 470.22
PIPE TRAVEL TIME(MIN.) = 0.51  Tc(MIN.) = 16.38
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 120.00 = 5410.00 FEET.

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FLOW PROCESS FROM NODE 120.00 TO NODE 120.00 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.) =	16.38
RAINFALL INTENSITY(INCH/HR) =	3.05
AREA-AVERAGED Fm(INCH/HR) =	0.11
AREA-AVERAGED Fp(INCH/HR) =	0.98
AREA-AVERAGED Ap =	0.12
EFFECTIVE STREAM AREA(ACRES) =	174.40
TOTAL STREAM AREA(ACRES) =	174.40
PEAK FLOW RATE(CFS) AT CONFLUENCE =	470.22

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	520.79	18.99	2.792	0.97(0.14)	0.14	218.1	105.00
1	520.89	19.45	2.752	0.97(0.14)	0.14	221.5	100.00
2	470.22	16.38	3.051	0.98(0.11)	0.12	174.4	110.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	963.36	16.38	3.051	0.98(0.13)	0.13	362.6	110.00
2	949.66	18.99	2.792	0.97(0.13)	0.13	392.5	105.00
3	943.36	19.45	2.752	0.97(0.13)	0.13	395.9	100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) =	963.36	Tc(MIN.) =	16.38
EFFECTIVE AREA(ACRES) =	362.60	AREA-AVERAGED Fm(INCH/HR) =	0.13
AREA-AVERAGED Fp(INCH/HR) =	0.98	AREA-AVERAGED Ap =	0.13
TOTAL AREA(ACRES) =	395.9		
LONGEST FLOWPATH FROM NODE	105.00 TO NODE	120.00 =	6880.00 FEET.

FLOW PROCESS FROM NODE 120.00 TO NODE 121.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) =	915.00	DOWNSTREAM(FEET) =	910.00
FLOW LENGTH(FEET) =	850.00	MANNING'S N =	0.013
DEPTH OF FLOW IN 114.0 INCH PIPE IS	90.8 INCHES		
PIPE-FLOW VELOCITY(FEET/SEC.) =	15.91		
ESTIMATED PIPE DIAMETER(INCH) =	114.00	NUMBER OF PIPES =	1
PIPE-FLOW(CFS) =	963.36		
PIPE TRAVEL TIME(MIN.) =	0.89	Tc(MIN.) =	17.27
LONGEST FLOWPATH FROM NODE	105.00 TO NODE	121.00 =	7730.00 FEET.

FLOW PROCESS FROM NODE 121.00 TO NODE 121.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) =	17.27				
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	2.955				
SUBAREA LOSS RATE DATA(AMC II):					
DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	9.70	0.98	0.100	32
COMMERCIAL	A	20.90	0.98	0.100	32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =	0.98				
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =	0.100				
SUBAREA AREA(ACRES) =	30.60	SUBAREA RUNOFF(CFS) =	78.70		
EFFECTIVE AREA(ACRES) =	393.20	AREA-AVERAGED Fm(INCH/HR) =	0.12		
AREA-AVERAGED Fp(INCH/HR) =	0.98	AREA-AVERAGED Ap =	0.13		
TOTAL AREA(ACRES) =	426.5	PEAK FLOW RATE(CFS) =	1001.81		

FLOW PROCESS FROM NODE 121.00 TO NODE 122.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) =	910.00	DOWNSTREAM(FEET) =	905.00
FLOW LENGTH(FEET) =	520.00	MANNING'S N =	0.013
DEPTH OF FLOW IN 108.0 INCH PIPE IS	81.2 INCHES		
PIPE-FLOW VELOCITY(FEET/SEC.) =	19.52		
ESTIMATED PIPE DIAMETER(INCH) =	108.00	NUMBER OF PIPES =	1
PIPE-FLOW(CFS) =	1001.81		
PIPE TRAVEL TIME(MIN.) =	0.44	Tc(MIN.) =	17.72
LONGEST FLOWPATH FROM NODE	105.00 TO NODE	122.00 =	8250.00 FEET.

FLOW PROCESS FROM NODE 122.00 TO NODE 122.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) =	17.72				
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	2.911				
SUBAREA LOSS RATE DATA(AMC II):					
DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	27.80	0.98	0.100	32
COMMERCIAL	A	12.00	0.98	0.100	32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =	0.98				
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =	0.100				
SUBAREA AREA(ACRES) =	39.80	SUBAREA RUNOFF(CFS) =	100.77		
EFFECTIVE AREA(ACRES) =	433.00	AREA-AVERAGED Fm(INCH/HR) =	0.12		
AREA-AVERAGED Fp(INCH/HR) =	0.98	AREA-AVERAGED Ap =	0.13		
TOTAL AREA(ACRES) =	466.3	PEAK FLOW RATE(CFS) =	1086.77		

FLOW PROCESS FROM NODE 122.00 TO NODE 123.00 IS CODE = 31

```

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 905.00 DOWNSTREAM(FEET) = 890.00
FLOW LENGTH(FEET) = 1600.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 114.0 INCH PIPE IS 82.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.85
ESTIMATED PIPE DIAMETER(INCH) = 114.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 1086.77
PIPE TRAVEL TIME(MIN.) = 1.34 Tc(MIN.) = 19.06
LONGEST FLOWPATH FROM NODE 105.00 TO NODE 123.00 = 9850.00 FEET.

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FLOW PROCESS FROM NODE 123.00 TO NODE 123.00 IS CODE = 81
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>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) = 19.06
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.786
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 10.80 0.98 0.100 32
COMMERCIAL A 30.60 0.98 0.100 32
PUBLIC PARK A 1.80 0.98 0.850 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.131
SUBAREA AREA(ACRES) = 43.20 SUBAREA RUNOFF(CFS) = 103.33
EFFECTIVE AREA(ACRES) = 476.20 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.13
TOTAL AREA(ACRES) = 509.5 PEAK FLOW RATE(CFS) = 1141.44

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*****
FLOW PROCESS FROM NODE 123.00 TO NODE 124.00 IS CODE = 31
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>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 890.00 DOWNSTREAM(FEET) = 880.00
FLOW LENGTH(FEET) = 400.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 93.0 INCH PIPE IS 73.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 28.61
ESTIMATED PIPE DIAMETER(INCH) = 93.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 1141.44
PIPE TRAVEL TIME(MIN.) = 0.23 Tc(MIN.) = 19.29
LONGEST FLOWPATH FROM NODE 105.00 TO NODE 124.00 = 10250.00 FEET.

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*****
FLOW PROCESS FROM NODE 130.00 TO NODE 131.00 IS CODE = 21
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>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 960.00
ELEVATION DATA: UPSTREAM(FEET) = 976.00 DOWNSTREAM(FEET) = 966.00

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Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 11.810
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.713
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 4.30 0.98 0.100 32 11.81
COMMERCIAL A 4.80 0.98 0.100 32 11.81
PUBLIC PARK A 0.90 0.98 0.850 32 18.76
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.168
SUBAREA RUNOFF(CFS) = 31.94
TOTAL AREA(ACRES) = 10.00 PEAK FLOW RATE(CFS) = 31.94

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FLOW PROCESS FROM NODE 131.00 TO NODE 132.00 IS CODE = 62
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>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION # 2 USED)<<<<<
=====
UPSTREAM ELEVATION(FEET) = 966.00 DOWNSTREAM ELEVATION(FEET) = 954.00
STREET LENGTH(FEET) = 800.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 32.00
DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020
SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 45.84
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.60
HALFSTREET FLOOD WIDTH(FEET) = 22.22
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.47
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.69
STREET FLOW TRAVEL TIME(MIN.) = 2.98 Tc(MIN.) = 14.79
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.243
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 2.80 0.98 0.100 32
COMMERCIAL A 7.00 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 9.80 SUBAREA RUNOFF(CFS) = 27.75
EFFECTIVE AREA(ACRES) = 19.80 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.13
TOTAL AREA(ACRES) = 19.8 PEAK FLOW RATE(CFS) = 55.47

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END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.64 HALFSTREET FLOOD WIDTH(FEET) = 23.91
FLOW VELOCITY(FEET/SEC.) = 4.70 DEPTH*VELOCITY(FT*FT/SEC.) = 2.99

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LONGEST FLOWPATH FROM NODE 130.00 TO NODE 132.00 = 1760.00 FEET.

FLOW PROCESS FROM NODE 132.00 TO NODE 134.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 954.00 DOWNSTREAM(FEET) = 940.00
FLOW LENGTH(FEET) = 850.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 24.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.59
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 55.47
PIPE TRAVEL TIME(MIN.) = 1.22 Tc(MIN.) = 16.01
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 134.00 = 2610.00 FEET.

FLOW PROCESS FROM NODE 134.00 TO NODE 134.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 16.01
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.093
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 6.70 0.98 0.100 32
COMMERCIAL A 9.20 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 15.90 SUBAREA RUNOFF(CFS) = 42.86
EFFECTIVE AREA(ACRES) = 35.70 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.12
TOTAL AREA(ACRES) = 35.7 PEAK FLOW RATE(CFS) = 95.64

FLOW PROCESS FROM NODE 134.00 TO NODE 135.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 940.00 DOWNSTREAM(FEET) = 916.00
FLOW LENGTH(FEET) = 1940.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 32.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.84
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 95.64
PIPE TRAVEL TIME(MIN.) = 2.73 Tc(MIN.) = 18.74
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 135.00 = 4550.00 FEET.

FLOW PROCESS FROM NODE 135.00 TO NODE 135.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 18.74

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.814

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	34.40	0.98	0.100	32
COMMERCIAL	A	18.50	0.98	0.100	32
PUBLIC PARK	A	3.00	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.140
SUBAREA AREA(ACRES) = 55.90 SUBAREA RUNOFF(CFS) = 134.68
EFFECTIVE AREA(ACRES) = 91.60 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.13
TOTAL AREA(ACRES) = 91.6 PEAK FLOW RATE(CFS) = 221.36

FLOW PROCESS FROM NODE 135.00 TO NODE 136.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 916.00 DOWNSTREAM(FEET) = 905.00
FLOW LENGTH(FEET) = 580.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 54.0 INCH PIPE IS 40.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.27
ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 221.36
PIPE TRAVEL TIME(MIN.) = 0.56 Tc(MIN.) = 19.30
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 136.00 = 5130.00 FEET.

FLOW PROCESS FROM NODE 136.00 TO NODE 136.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 19.30
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.765
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 52.40 0.98 0.100 32
COMMERCIAL A 5.00 0.98 0.100 32
PUBLIC PARK A 10.30 0.98 0.850 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.214
SUBAREA AREA(ACRES) = 67.70 SUBAREA RUNOFF(CFS) = 155.72
EFFECTIVE AREA(ACRES) = 159.30 AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.17
TOTAL AREA(ACRES) = 159.3 PEAK FLOW RATE(CFS) = 373.03

FLOW PROCESS FROM NODE 136.00 TO NODE 137.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 905.00 DOWNSTREAM(FEET) = 895.00
FLOW LENGTH(FEET) = 1250.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 75.0 INCH PIPE IS 60.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.04
ESTIMATED PIPE DIAMETER(INCH) = 75.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 373.03
PIPE TRAVEL TIME(MIN.) = 1.48 Tc(MIN.) = 20.79
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 137.00 = 6380.00 FEET.

FLOW PROCESS FROM NODE 137.00 TO NODE 137.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 20.79

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.644

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	14.40	0.98	0.100	32
COMMERCIAL	A	32.90	0.98	0.100	32
PUBLIC PARK	A	0.10	0.98	0.850	32
COMMERCIAL	A	0.90	0.98	0.100	32

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.97

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.102

SUBAREA AREA(ACRES) = 48.30 SUBAREA RUNOFF(CFS) = 110.65

EFFECTIVE AREA(ACRES) = 207.60 AREA-AVERAGED Fm(INCH/HR) = 0.15

AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.15

TOTAL AREA(ACRES) = 207.6 PEAK FLOW RATE(CFS) = 466.45

FLOW PROCESS FROM NODE 137.00 TO NODE 138.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 895.00 DOWNSTREAM(FEET) = 880.00

FLOW LENGTH(FEET) = 330.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 60.0 INCH PIPE IS 46.2 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 28.76

ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 466.45

PIPE TRAVEL TIME(MIN.) = 0.19 Tc(MIN.) = 20.98

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 138.00 = 6710.00 FEET.

FLOW PROCESS FROM NODE 140.00 TO NODE 141.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1050.00

ELEVATION DATA: UPSTREAM(FEET) = 900.00 DOWNSTREAM(FEET) = 890.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 12.462

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.595

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	9.90	0.98	0.100	32	12.46

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.98

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100

SUBAREA RUNOFF(CFS) = 31.16

TOTAL AREA(ACRES) = 9.90 PEAK FLOW RATE(CFS) = 31.16

FLOW PROCESS FROM NODE 141.00 TO NODE 142.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 2 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 890.00 DOWNSTREAM ELEVATION(FEET) = 880.00

STREET LENGTH(FEET) = 1500.00 CURB HEIGHT(INCHES) = 8.0

STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 49.63

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.69

HALFSTREET FLOOD WIDTH(FEET) = 28.19

AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.36

PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.33

STREET FLOW TRAVEL TIME(MIN.) = 7.45 Tc(MIN.) = 19.91

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.714

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	7.40	0.98	0.100	32
COMMERCIAL	A	8.20	0.98	0.100	32

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.97

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA(ACRES) = 15.60 SUBAREA RUNOFF(CFS) = 36.73

EFFECTIVE AREA(ACRES) = 25.50 AREA-AVERAGED Fm(INCH/HR) = 0.10

AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10

TOTAL AREA(ACRES) = 25.5 PEAK FLOW RATE(CFS) = 60.04

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.73 HALFSTREET FLOOD WIDTH(FEET) = 32.20

FLOW VELOCITY(FEET/SEC.) = 3.49 DEPTH*VELOCITY(FT*FT/SEC.) = 2.56

*NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,

AND L = 1500.0 FT WITH ELEVATION-DROP = 10.0 FT, IS 43.0 CFS,

WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 142.00

LONGEST FLOWPATH FROM NODE 140.00 TO NODE 142.00 = 2550.00 FEET.


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FLOW PROCESS FROM NODE 142.00 TO NODE 143.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM( FEET) = 880.00 DOWNSTREAM( FEET) = 855.00
FLOW LENGTH( FEET) = 2350.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 28.7 INCHES
PIPE-FLOW VELOCITY( FEET/SEC.) = 9.92
ESTIMATED PIPE DIAMETER( INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW( CFS) = 60.04
PIPE TRAVEL TIME( MIN.) = 3.95 Tc( MIN.) = 23.86
LONGEST FLOWPATH FROM NODE 140.00 TO NODE 143.00 = 4900.00 FEET.

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*****
FLOW PROCESS FROM NODE 143.00 TO NODE 143.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc( MIN.) = 23.86
* 100 YEAR RAINFALL INTENSITY( INCH/HR) = 2.435
SUBAREA LOSS RATE DATA( AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 6.50 0.98 0.100 32
COMMERCIAL A 19.90 0.98 0.100 32
RESIDENTIAL
"5-7 DWELLINGS/ACRE" A 50.10 0.98 0.500 32
PUBLIC PARK A 16.00 0.98 0.850 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp( INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.446
SUBAREA AREA( ACRES) = 92.50 SUBAREA RUNOFF( CFS) = 166.44
EFFECTIVE AREA( ACRES) = 118.00 AREA-AVERAGED Fm( INCH/HR) = 0.36
AREA-AVERAGED Fp( INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.37
TOTAL AREA( ACRES) = 118.0 PEAK FLOW RATE( CFS) = 220.08

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*****
FLOW PROCESS FROM NODE 143.00 TO NODE 144.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM( FEET) = 855.00 DOWNSTREAM( FEET) = 850.00
FLOW LENGTH( FEET) = 570.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 63.0 INCH PIPE IS 46.1 INCHES
PIPE-FLOW VELOCITY( FEET/SEC.) = 12.96
ESTIMATED PIPE DIAMETER( INCH) = 63.00 NUMBER OF PIPES = 1
PIPE-FLOW( CFS) = 220.08
PIPE TRAVEL TIME( MIN.) = 0.73 Tc( MIN.) = 24.59
LONGEST FLOWPATH FROM NODE 140.00 TO NODE 144.00 = 5470.00 FEET.

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*****
FLOW PROCESS FROM NODE 144.00 TO NODE 144.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc( MIN.) = 24.59
* 100 YEAR RAINFALL INTENSITY( INCH/HR) = 2.391
SUBAREA LOSS RATE DATA( AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 5.30 0.98 0.100 32
COMMERCIAL A 17.60 0.98 0.100 32
RESIDENTIAL
"5-7 DWELLINGS/ACRE" A 46.00 0.98 0.500 32
PUBLIC PARK A 4.20 0.98 0.850 32
PUBLIC PARK A 9.30 0.98 0.850 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp( INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.446
SUBAREA AREA( ACRES) = 82.40 SUBAREA RUNOFF( CFS) = 145.04
EFFECTIVE AREA( ACRES) = 200.40 AREA-AVERAGED Fm( INCH/HR) = 0.39
AREA-AVERAGED Fp( INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.40
TOTAL AREA( ACRES) = 200.4 PEAK FLOW RATE( CFS) = 360.47

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*****
FLOW PROCESS FROM NODE 144.00 TO NODE 144.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc( MIN.) = 24.59
* 100 YEAR RAINFALL INTENSITY( INCH/HR) = 2.391
SUBAREA LOSS RATE DATA( AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 3.50 0.98 0.100 32
COMMERCIAL A 31.50 0.98 0.100 32
PUBLIC PARK A 4.50 0.98 0.850 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp( INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.185
SUBAREA AREA( ACRES) = 39.50 SUBAREA RUNOFF( CFS) = 78.56
EFFECTIVE AREA( ACRES) = 239.90 AREA-AVERAGED Fm( INCH/HR) = 0.36
AREA-AVERAGED Fp( INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.37
TOTAL AREA( ACRES) = 239.9 PEAK FLOW RATE( CFS) = 439.03

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*****
FLOW PROCESS FROM NODE 144.00 TO NODE 145.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM( FEET) = 850.00 DOWNSTREAM( FEET) = 849.00
FLOW LENGTH( FEET) = 1200.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 126.0 INCH PIPE IS 93.7 INCHES
PIPE-FLOW VELOCITY( FEET/SEC.) = 6.36
ESTIMATED PIPE DIAMETER( INCH) = 126.00 NUMBER OF PIPES = 1
PIPE-FLOW( CFS) = 439.03
PIPE TRAVEL TIME( MIN.) = 3.15 Tc( MIN.) = 27.74
LONGEST FLOWPATH FROM NODE 140.00 TO NODE 145.00 = 6670.00 FEET.

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FLOW PROCESS FROM NODE 145.00 TO NODE 145.00 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.) = 27.74
RAINFALL INTENSITY(INCH/HR) = 2.22
AREA-AVERAGED Fm(INCH/HR) = 0.36
AREA-AVERAGED Fp(INCH/HR) = 0.98
AREA-AVERAGED Ap = 0.37
EFFECTIVE STREAM AREA(ACRES) = 239.90
TOTAL STREAM AREA(ACRES) = 239.90
PEAK FLOW RATE(CFS) AT CONFLUENCE = 439.03

FLOW PROCESS FROM NODE 145.10 TO NODE 145.20 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 2000.00
ELEVATION DATA: UPSTREAM(FEET) = 898.00 DOWNSTREAM(FEET) = 880.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 16.309
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.059
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 0.50 0.98 0.100 32 16.31
COMMERCIAL A 45.50 0.98 0.100 32 16.31
PUBLIC PARK A 1.60 0.98 0.850 32 25.91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.125
SUBAREA RUNOFF(CFS) = 125.81
TOTAL AREA(ACRES) = 47.60 PEAK FLOW RATE(CFS) = 125.81

FLOW PROCESS FROM NODE 145.20 TO NODE 145.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 880.00 DOWNSTREAM(FEET) = 849.00
FLOW LENGTH(FEET) = 2750.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 36.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.32
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 125.81
PIPE TRAVEL TIME(MIN.) = 3.72 Tc(MIN.) = 20.03
LONGEST FLOWPATH FROM NODE 145.10 TO NODE 145.00 = 4750.00 FEET.

FLOW PROCESS FROM NODE 145.00 TO NODE 145.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 20.03
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.704
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 1.10 0.98 0.100 32
COMMERCIAL A 42.20 0.98 0.100 32
PUBLIC PARK A 0.20 0.98 0.850 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.103
SUBAREA AREA(ACRES) = 43.50 SUBAREA RUNOFF(CFS) = 101.91
EFFECTIVE AREA(ACRES) = 91.10 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.11
TOTAL AREA(ACRES) = 91.1 PEAK FLOW RATE(CFS) = 212.52

FLOW PROCESS FROM NODE 145.00 TO NODE 145.00 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.) = 20.03
RAINFALL INTENSITY(INCH/HR) = 2.70
AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.98
AREA-AVERAGED Ap = 0.11
EFFECTIVE STREAM AREA(ACRES) = 91.10
TOTAL STREAM AREA(ACRES) = 91.10
PEAK FLOW RATE(CFS) AT CONFLUENCE = 212.52

** CONFLUENCE DATA **

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. It lists data for two streams.

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

** PEAK FLOW RATE TABLE **

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. It lists peak flow rate data for two streams.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 612.21 Tc(MIN.) = 27.74
EFFECTIVE AREA(ACRES) = 331.00 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.30
TOTAL AREA(ACRES) = 331.0
LONGEST FLOWPATH FROM NODE 140.00 TO NODE 145.00 = 6670.00 FEET.

 FLOW PROCESS FROM NODE 145.00 TO NODE 146.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 849.00 DOWNSTREAM(FEET) = 847.00
 FLOW LENGTH(FEET) = 1030.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 120.0 INCH PIPE IS 92.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 9.43
 ESTIMATED PIPE DIAMETER(INCH) = 120.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 612.21
 PIPE TRAVEL TIME(MIN.) = 1.82 Tc(MIN.) = 29.56
 LONGEST FLOWPATH FROM NODE 140.00 TO NODE 146.00 = 7700.00 FEET.

 FLOW PROCESS FROM NODE 146.00 TO NODE 146.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 29.56
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.141
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	28.70	0.98	0.100	32
COMMERCIAL	A	57.00	0.98	0.100	32
PUBLIC PARK	A	10.40	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.181
 SUBAREA AREA(ACRES) = 96.10 SUBAREA RUNOFF(CFS) = 169.90
 EFFECTIVE AREA(ACRES) = 427.10 AREA-AVERAGED Fm(INCH/HR) = 0.26
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.27
 TOTAL AREA(ACRES) = 427.1 PEAK FLOW RATE(CFS) = 721.36

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	752.39	21.85	2.567	0.98(0.25)	0.25	360.4	145.10
2	721.36	29.56	2.141	0.98(0.26)	0.27	427.1	140.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 752.39 Tc(MIN.) = 21.85
 AREA-AVERAGED Fm(INCH/HR) = 0.25 AREA-AVERAGED Fp(INCH/HR) = 0.98
 AREA-AVERAGED Ap = 0.25 EFFECTIVE AREA(ACRES) = 360.43

 FLOW PROCESS FROM NODE 146.00 TO NODE 147.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 847.00 DOWNSTREAM(FEET) = 846.00
 FLOW LENGTH(FEET) = 700.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 138.0 INCH PIPE IS 105.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 8.87
 ESTIMATED PIPE DIAMETER(INCH) = 138.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 752.39
 PIPE TRAVEL TIME(MIN.) = 1.32 Tc(MIN.) = 23.16
 LONGEST FLOWPATH FROM NODE 140.00 TO NODE 147.00 = 8400.00 FEET.

 FLOW PROCESS FROM NODE 147.00 TO NODE 147.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 23.16
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.478
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	19.40	0.98	0.100	32
COMMERCIAL	A	24.30	0.98	0.100	32
PUBLIC PARK	A	0.30	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.105
 SUBAREA AREA(ACRES) = 44.00 SUBAREA RUNOFF(CFS) = 94.07
 EFFECTIVE AREA(ACRES) = 404.43 AREA-AVERAGED Fm(INCH/HR) = 0.23
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.24
 TOTAL AREA(ACRES) = 471.1 PEAK FLOW RATE(CFS) = 817.78

 FLOW PROCESS FROM NODE 147.00 TO NODE 148.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 846.00 DOWNSTREAM(FEET) = 840.00
 FLOW LENGTH(FEET) = 850.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 108.0 INCH PIPE IS 78.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 16.62
 ESTIMATED PIPE DIAMETER(INCH) = 108.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 817.78
 PIPE TRAVEL TIME(MIN.) = 0.85 Tc(MIN.) = 24.02
 LONGEST FLOWPATH FROM NODE 140.00 TO NODE 148.00 = 9250.00 FEET.

 FLOW PROCESS FROM NODE 148.00 TO NODE 148.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 24.02
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.425
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	4.50	0.98	0.100	32
COMMERCIAL	A	94.70	0.98	0.100	32
PUBLIC PARK	A	13.00	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.187
 SUBAREA AREA(ACRES) = 112.20 SUBAREA RUNOFF(CFS) = 226.47
 EFFECTIVE AREA(ACRES) = 516.63 AREA-AVERAGED Fm(INCH/HR) = 0.22

AREA-AVERAGED F_p (INCH/HR) = 0.98 AREA-AVERAGED A_p = 0.23
TOTAL AREA (ACRES) = 583.3 PEAK FLOW RATE (CFS) = 1024.90

=====
END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 583.3 TC (MIN.) = 24.02
EFFECTIVE AREA (ACRES) = 516.63 AREA-AVERAGED F_m (INCH/HR) = 0.22
AREA-AVERAGED F_p (INCH/HR) = 0.98 AREA-AVERAGED A_p = 0.226
PEAK FLOW RATE (CFS) = 1024.90

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	F_p (F_m) (INCH/HR)	A_p	A_e (ACRES)	HEADWATER NODE
1	1024.90	24.02	2.425	0.98 (0.22)	0.23	516.6	145.10
2	952.55	31.76	2.051	0.97 (0.24)	0.24	583.3	140.00

=====
END OF RATIONAL METHOD ANALYSIS

SECTION 3

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
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Ver. 18.0 Release Date: 07/01/2011 License ID 1239

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***** DESCRIPTION OF STUDY *****

* OLD MODEL COLONY EAST AREA E *
* 10-YEAR HYDROLOGY ANALYSIS *
*

FILE NAME: OMCEE10.DAT
TIME/DATE OF STUDY: 15:33 10/14/2011

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.80
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.0000

ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF-	CROWN TO	STREET-CROSSFALL:	CURB	GUTTER-GEOMETRIES:	MANNING			
	WIDTH	CROSSFALL	IN- / OUT-/PARK-	HEIGHT	WIDTH	LIP	HIKE	FACTOR	
	(FT)	(FT)	SIDE / SIDE/ WAY	(FT)	(FT)	(FT)	(FT)	(n)	
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150	
2	32.0	27.0	0.020/0.020/0.020	0.67	2.00	0.0312	0.167	0.0150	

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
 2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
- *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

UNIT-HYDROGRAPH MODEL SELECTIONS/PARAMETERS:

WATERSHED LAG = 0.80 * Tc
USED "VALLEY UNDEVELOPED" S-GRAPH FOR DEVELOPMENTS OF

2 UNITS/ACRE AND LESS; AND "VALLEY DEVELOPED" S-GRAPH
FOR DEVELOPMENTS OF 3-4 UNITS/ACRE AND MORE.

USER SPECIFIED RAINFALL VALUES:

2-YR 6-HR RAINFALL DEPTH(INCH) = 1.70
2-YR 24-HR RAINFALL DEPTH(INCH) = 3.30
100-YR 6-HR RAINFALL DEPTH(INCH) = 3.70
100-YR 24-HR RAINFALL DEPTH(INCH) = 8.00
SIERRA MADRE DEPTH-AREA FACTORS USED.

AREA-AVERAGED

DURATION	RAINFALL(INCH)
5-MINUTES	0.33
30-MINUTES	0.68
1-HOUR	0.90
3-HOUR	1.60
6-HOUR	2.31
24-HOUR	4.36

ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR UNIT HYDROGRAPH METHOD

FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 780.00
ELEVATION DATA: UPSTREAM(FEET) = 1040.00 DOWNSTREAM(FEET) = 1029.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.229
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.891
SUBAREA Tc AND LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	1.50	1.33	0.100	17	10.23
COMMERCIAL	A	4.00	1.33	0.100	17	10.23

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 13.65
TOTAL AREA(ACRES) = 5.50 PEAK FLOW RATE(CFS) = 13.65

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 1029.00 DOWNSTREAM ELEVATION(FEET) = 1025.00
STREET LENGTH(FEET) = 450.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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) = 23.34
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.54
HALFSTREET FLOOD WIDTH(FEET) = 18.84
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.12
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.67
STREET FLOW TRAVEL TIME(MIN.) = 2.40 Tc(MIN.) = 12.63
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.547

SUBAREA LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	3.40	1.33	0.100	17
COMMERCIAL	A	5.50	1.33	0.100	17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 8.90 SUBAREA RUNOFF(CFS) = 19.34
EFFECTIVE AREA(ACRES) = 14.40 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 14.4 PEAK FLOW RATE(CFS) = 31.28

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.58 HALFSTREET FLOOD WIDTH(FEET) = 21.16
FLOW VELOCITY(FEET/SEC.) = 3.35 DEPTH*VELOCITY(FT*FT/SEC.) = 1.95
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 1230.00 FEET.

FLOW PROCESS FROM NODE 102.00 TO NODE 104.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 1025.00 DOWNSTREAM(FEET) = 1012.00
FLOW LENGTH(FEET) = 930.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 21.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.38
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 31.28
PIPE TRAVEL TIME(MIN.) = 1.65 Tc(MIN.) = 14.29
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 104.00 = 2160.00 FEET.

FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====

MAINLINE Tc(MIN.) = 14.29
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.366
SUBAREA LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	7.90	1.33	0.100	17
COMMERCIAL	A	31.00	1.33	0.100	17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 38.90 SUBAREA RUNOFF(CFS) = 78.17
EFFECTIVE AREA(ACRES) = 53.30 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 53.3 PEAK FLOW RATE(CFS) = 107.11

FLOW PROCESS FROM NODE 104.00 TO NODE 105.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 1012.00 DOWNSTREAM(FEET) = 1010.00
FLOW LENGTH(FEET) = 1200.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 63.0 INCH PIPE IS 51.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.70
ESTIMATED PIPE DIAMETER(INCH) = 63.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 107.11
PIPE TRAVEL TIME(MIN.) = 3.51 Tc(MIN.) = 17.79
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 105.00 = 3360.00 FEET.

FLOW PROCESS FROM NODE 105.00 TO NODE 105.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====

MAINLINE Tc(MIN.) = 17.79
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.074
SUBAREA LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	4.00	1.33	0.100	17
COMMERCIAL	A	21.10	1.33	0.100	17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 25.10 SUBAREA RUNOFF(CFS) = 43.84
EFFECTIVE AREA(ACRES) = 78.40 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 78.4 PEAK FLOW RATE(CFS) = 136.95

FLOW PROCESS FROM NODE 105.00 TO NODE 110.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 1010.00 DOWNSTREAM(FEET) = 994.00
FLOW LENGTH(FEET) = 1900.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 41.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.14
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 136.95
PIPE TRAVEL TIME(MIN.) = 2.84 Tc(MIN.) = 20.64
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 110.00 = 5260.00 FEET.

FLOW PROCESS FROM NODE 110.00 TO NODE 110.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 20.64

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.897

SUBAREA LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	4.60	1.33	0.100	17
COMMERCIAL	A	15.80	1.33	0.100	17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA(ACRES) = 20.40 SUBAREA RUNOFF(CFS) = 32.39

EFFECTIVE AREA(ACRES) = 98.80 AREA-AVERAGED Fm(INCH/HR) = 0.13

AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.10

TOTAL AREA(ACRES) = 98.8 PEAK FLOW RATE(CFS) = 156.89

FLOW PROCESS FROM NODE 110.00 TO NODE 110.00 IS CODE = 10

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

FLOW PROCESS FROM NODE 106.00 TO NODE 107.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 970.00

ELEVATION DATA: UPSTREAM(FEET) = 1040.00 DOWNSTREAM(FEET) = 1025.00

$Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.958

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.774

SUBAREA Tc AND LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	2.30	1.33	0.100	17	10.96
COMMERCIAL	A	1.20	1.33	0.100	17	10.96

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA RUNOFF(CFS) = 8.32

TOTAL AREA(ACRES) = 3.50 PEAK FLOW RATE(CFS) = 8.32

FLOW PROCESS FROM NODE 107.00 TO NODE 108.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1025.00 DOWNSTREAM(FEET) = 1023.00

FLOW LENGTH(FEET) = 500.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 21.0 INCH PIPE IS 16.0 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 4.23

ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 8.32

PIPE TRAVEL TIME(MIN.) = 1.97 Tc(MIN.) = 12.93

LONGEST FLOWPATH FROM NODE 106.00 TO NODE 108.00 = 1470.00 FEET.

FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.93

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.512

SUBAREA LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	1.50	1.33	0.100	17
COMMERCIAL	A	9.90	1.33	0.100	17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA(ACRES) = 11.40 SUBAREA RUNOFF(CFS) = 24.41

EFFECTIVE AREA(ACRES) = 14.90 AREA-AVERAGED Fm(INCH/HR) = 0.13

AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.10

TOTAL AREA(ACRES) = 14.9 PEAK FLOW RATE(CFS) = 31.90

FLOW PROCESS FROM NODE 108.00 TO NODE 109.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1023.00 DOWNSTREAM(FEET) = 1020.00

FLOW LENGTH(FEET) = 480.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.4 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 7.07

ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 31.90

PIPE TRAVEL TIME(MIN.) = 1.13 Tc(MIN.) = 14.06

LONGEST FLOWPATH FROM NODE 106.00 TO NODE 109.00 = 1950.00 FEET.

FLOW PROCESS FROM NODE 109.00 TO NODE 109.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 14.06

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.389

SUBAREA LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	1.60	1.33	0.100	17
COMMERCIAL	A	10.00	1.33	0.100	17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA(ACRES) = 11.60 SUBAREA RUNOFF(CFS) = 23.55

EFFECTIVE AREA(ACRES) = 26.50 AREA-AVERAGED Fm(INCH/HR) = 0.13

AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.10
 TOTAL AREA (ACRES) = 26.5 PEAK FLOW RATE (CFS) = 53.80

 FLOW PROCESS FROM NODE 109.00 TO NODE 109.10 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 1020.00 DOWNSTREAM (FEET) = 1010.00
 FLOW LENGTH (FEET) = 1020.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 27.0 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 9.47
 ESTIMATED PIPE DIAMETER (INCH) = 36.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 53.80
 PIPE TRAVEL TIME (MIN.) = 1.80 Tc (MIN.) = 15.85
 LONGEST FLOWPATH FROM NODE 106.00 TO NODE 109.10 = 2970.00 FEET.

 FLOW PROCESS FROM NODE 109.10 TO NODE 109.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 15.85
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.222
 SUBAREA LOSS RATE DATA (AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	6.70	1.33	0.100	17
COMMERCIAL	A	51.00	1.33	0.100	17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 57.70 SUBAREA RUNOFF (CFS) = 108.52
 EFFECTIVE AREA (ACRES) = 84.20 AREA-AVERAGED Fm (INCH/HR) = 0.13
 AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.10
 TOTAL AREA (ACRES) = 84.2 PEAK FLOW RATE (CFS) = 158.36

 FLOW PROCESS FROM NODE 109.10 TO NODE 109.20 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 1010.00 DOWNSTREAM (FEET) = 1005.00
 FLOW LENGTH (FEET) = 790.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 57.0 INCH PIPE IS 45.7 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 10.40
 ESTIMATED PIPE DIAMETER (INCH) = 57.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 158.36
 PIPE TRAVEL TIME (MIN.) = 1.27 Tc (MIN.) = 17.12
 LONGEST FLOWPATH FROM NODE 106.00 TO NODE 109.20 = 3760.00 FEET.

 FLOW PROCESS FROM NODE 109.20 TO NODE 109.20 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 17.12
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.122
 SUBAREA LOSS RATE DATA (AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	3.60	1.33	0.100	17
COMMERCIAL	A	18.10	1.33	0.100	17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 21.70 SUBAREA RUNOFF (CFS) = 38.86
 EFFECTIVE AREA (ACRES) = 105.90 AREA-AVERAGED Fm (INCH/HR) = 0.13
 AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.10
 TOTAL AREA (ACRES) = 105.9 PEAK FLOW RATE (CFS) = 189.62

 FLOW PROCESS FROM NODE 109.20 TO NODE 109.20 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION (MIN.) = 17.12
 RAINFALL INTENSITY (INCH/HR) = 2.12
 AREA-AVERAGED Fm (INCH/HR) = 0.13
 AREA-AVERAGED Fp (INCH/HR) = 1.33
 AREA-AVERAGED Ap = 0.10
 EFFECTIVE STREAM AREA (ACRES) = 105.90
 TOTAL STREAM AREA (ACRES) = 105.90
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 189.62

 FLOW PROCESS FROM NODE 120.00 TO NODE 121.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 650.00
 ELEVATION DATA: UPSTREAM (FEET) = 1025.00 DOWNSTREAM (FEET) = 1015.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.346
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.052
 SUBAREA Tc AND LOSS RATE DATA (AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	1.80	1.33	0.100	17	9.35
COMMERCIAL	A	4.70	1.33	0.100	17	9.35

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF (CFS) = 17.07
 TOTAL AREA (ACRES) = 6.50 PEAK FLOW RATE (CFS) = 17.07

 FLOW PROCESS FROM NODE 121.00 TO NODE 122.00 IS CODE = 31

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1015.00 DOWNSTREAM(FEET) = 1012.00
FLOW LENGTH(FEET) = 1160.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 22.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.31
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 17.07
PIPE TRAVEL TIME(MIN.) = 4.49 Tc(MIN.) = 13.83
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 122.00 = 1810.00 FEET.

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*****
FLOW PROCESS FROM NODE 122.00 TO NODE 122.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 13.83
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.412
SUBAREA LOSS RATE DATA(AMC I):
DEVELOPMENT TYPE/   SCS SOIL  AREA   Fp   Ap   SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          A       5.60   1.33  0.100  17
COMMERCIAL          A      16.90   1.33  0.100  17
COMMERCIAL          A       3.40   1.33  0.100  17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 25.90 SUBAREA RUNOFF(CFS) = 53.13
EFFECTIVE AREA(ACRES) = 32.40 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 32.4 PEAK FLOW RATE(CFS) = 66.46

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*****
FLOW PROCESS FROM NODE 122.00 TO NODE 109.20 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

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ELEVATION DATA: UPSTREAM(FEET) = 1012.00 DOWNSTREAM(FEET) = 1005.00
FLOW LENGTH(FEET) = 2500.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 38.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.17
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 66.46
PIPE TRAVEL TIME(MIN.) = 6.76 Tc(MIN.) = 20.59
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 109.20 = 4310.00 FEET.

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*****
FLOW PROCESS FROM NODE 109.20 TO NODE 109.20 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 20.59
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.900
SUBAREA LOSS RATE DATA(AMC I):
DEVELOPMENT TYPE/   SCS SOIL  AREA   Fp   Ap   SCS

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```

LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          A      10.90   1.33  0.100  17
COMMERCIAL          A      73.40   1.33  0.100  17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 84.30 SUBAREA RUNOFF(CFS) = 134.06
EFFECTIVE AREA(ACRES) = 116.70 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 116.7 PEAK FLOW RATE(CFS) = 185.59

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*****
FLOW PROCESS FROM NODE 109.20 TO NODE 109.20 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====

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TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 20.59
RAINFALL INTENSITY(INCH/HR) = 1.90
AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 1.33
AREA-AVERAGED Ap = 0.10
EFFECTIVE STREAM AREA(ACRES) = 116.70
TOTAL STREAM AREA(ACRES) = 116.70
PEAK FLOW RATE(CFS) AT CONFLUENCE = 185.59

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** CONFLUENCE DATA **

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STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	189.62	17.12	2.122	1.33(0.13)	0.10	105.9	106.00
2	185.59	20.59	1.900	1.33(0.13)	0.10	116.7	120.00

```

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

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** PEAK FLOW RATE TABLE **

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STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	363.36	17.12	2.122	1.33(0.13)	0.10	202.9	106.00
2	354.00	20.59	1.900	1.33(0.13)	0.10	222.6	120.00

```

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 363.36 Tc(MIN.) = 17.12
EFFECTIVE AREA(ACRES) = 202.93 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 222.6
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 109.20 = 4310.00 FEET.

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*****
FLOW PROCESS FROM NODE 109.20 TO NODE 110.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

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ELEVATION DATA: UPSTREAM(FEET) = 1005.00 DOWNSTREAM(FEET) = 994.00

```

FLOW LENGTH(FEET) = 1540.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 78.0 INCH PIPE IS 58.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 13.55
 ESTIMATED PIPE DIAMETER(INCH) = 78.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 363.36
 PIPE TRAVEL TIME(MIN.) = 1.89 Tc(MIN.) = 19.01
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 110.00 = 5850.00 FEET.

EFFECTIVE AREA(ACRES) = 331.62 AREA-AVERAGED Fm(INCH/HR) = 0.13
 AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 342.2
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 110.00 = 5850.00 FEET.

 FLOW PROCESS FROM NODE 110.00 TO NODE 110.00 IS CODE = 81

 FLOW PROCESS FROM NODE 110.00 TO NODE 110.00 IS CODE = 12

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

>>>>CLEAR MEMORY BANK # 1 <<<<<
 =====

MAINLINE Tc(MIN.) = 19.01
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.993
 SUBAREA LOSS RATE DATA(AMC I):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 3.40 1.33 0.100 17
 COMMERCIAL A 17.40 1.33 0.100 17
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 20.80 SUBAREA RUNOFF(CFS) = 34.82
 EFFECTIVE AREA(ACRES) = 223.73 AREA-AVERAGED Fm(INCH/HR) = 0.13
 AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 243.4 PEAK FLOW RATE(CFS) = 374.52

 FLOW PROCESS FROM NODE 110.00 TO NODE 140.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 994.00 DOWNSTREAM(FEET) = 992.00
 FLOW LENGTH(FEET) = 200.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 84.0 INCH PIPE IS 63.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 16.85
 ESTIMATED PIPE DIAMETER(INCH) = 84.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 527.12
 PIPE TRAVEL TIME(MIN.) = 0.20 Tc(MIN.) = 20.83
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 140.00 = 6050.00 FEET.

 FLOW PROCESS FROM NODE 110.00 TO NODE 110.00 IS CODE = 11

 FLOW PROCESS FROM NODE 140.00 TO NODE 140.00 IS CODE = 1

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

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	374.52	19.01	1.993	1.33(0.13)	0.10	223.7	106.00
2	365.25	22.52	1.800	1.33(0.13)	0.10	243.4	120.00

LONGEST FLOWPATH FROM NODE 120.00 TO NODE 110.00 = 5850.00 FEET.

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 20.83
 RAINFALL INTENSITY(INCH/HR) = 1.89
 AREA-AVERAGED Fm(INCH/HR) = 0.13
 AREA-AVERAGED Fp(INCH/HR) = 1.33
 AREA-AVERAGED Ap = 0.10
 EFFECTIVE STREAM AREA(ACRES) = 331.62
 TOTAL STREAM AREA(ACRES) = 342.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 527.12

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	156.89	20.64	1.897	1.33(0.13)	0.10	98.8	100.00

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 110.00 = 5260.00 FEET.

 FLOW PROCESS FROM NODE 130.00 TO NODE 131.00 IS CODE = 21

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	526.90	19.01	1.993	1.33(0.13)	0.10	314.8	106.00
2	527.12	20.64	1.897	1.33(0.13)	0.10	331.6	100.00
3	513.51	22.52	1.800	1.33(0.13)	0.10	342.2	120.00

TOTAL AREA(ACRES) = 342.2

=====

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 =====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1030.00
 ELEVATION DATA: UPSTREAM(FEET) = 1030.00 DOWNSTREAM(FEET) = 1018.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 527.12 Tc(MIN.) = 20.636

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 11.878
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.643
 SUBAREA Tc AND LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS	Tc
-------------------	----------	------	----	----	-----	----

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN	(MIN.)
COMMERCIAL	A	1.30	1.33	0.100	17	11.88
RESIDENTIAL						
"11+ DWELLINGS/ACRE"	A	1.10	1.33	0.200	17	12.66
PUBLIC PARK	A	0.10	1.33	0.850	17	18.87

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.174
SUBAREA RUNOFF (CFS) = 5.43
TOTAL AREA (ACRES) = 2.50 PEAK FLOW RATE (CFS) = 5.43

FLOW PROCESS FROM NODE 131.00 TO NODE 132.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 1018.00 DOWNSTREAM ELEVATION (FEET) = 1010.00
STREET LENGTH (FEET) = 1200.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 27.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSSTREETS 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) = 8.70
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH (FEET) = 0.43
HALFSSTREET FLOOD WIDTH (FEET) = 13.36
AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.20
PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 0.94
STREET FLOW TRAVEL TIME (MIN.) = 9.08 T_c (MIN.) = 20.96
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.880

SUBAREA LOSS RATE DATA (AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN
COMMERCIAL	A	2.20	1.33	0.100	17
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	A	1.70	1.33	0.200	17
PUBLIC PARK	A	0.20	1.33	0.850	17
SCHOOL	A	0.40	1.33	0.600	17

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.216
SUBAREA AREA (ACRES) = 4.50 SUBAREA RUNOFF (CFS) = 6.45
EFFECTIVE AREA (ACRES) = 7.00 AREA-AVERAGED F_m (INCH/HR) = 0.27
AREA-AVERAGED F_p (INCH/HR) = 1.33 AREA-AVERAGED A_p = 0.20
TOTAL AREA (ACRES) = 7.0 PEAK FLOW RATE (CFS) = 10.16

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH (FEET) = 0.44 HALFSSTREET FLOOD WIDTH (FEET) = 14.25
FLOW VELOCITY (FEET/SEC.) = 2.29 DEPTH*VELOCITY (FT*FT/SEC.) = 1.01
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 132.00 = 2230.00 FEET.

FLOW PROCESS FROM NODE 132.00 TO NODE 133.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 1010.00 DOWNSTREAM (FEET) = 1008.00
FLOW LENGTH (FEET) = 800.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.2 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 3.81
ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 10.16
PIPE TRAVEL TIME (MIN.) = 3.50 T_c (MIN.) = 24.46
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 133.00 = 3030.00 FEET.

FLOW PROCESS FROM NODE 133.00 TO NODE 133.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE T_c (MIN.) = 24.46
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.713
SUBAREA LOSS RATE DATA (AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN
COMMERCIAL	A	2.00	1.33	0.100	17
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	A	14.70	1.33	0.200	17
COMMERCIAL	A	1.00	1.33	0.100	17

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.183
SUBAREA AREA (ACRES) = 17.70 SUBAREA RUNOFF (CFS) = 23.42
EFFECTIVE AREA (ACRES) = 24.70 AREA-AVERAGED F_m (INCH/HR) = 0.25
AREA-AVERAGED F_p (INCH/HR) = 1.33 AREA-AVERAGED A_p = 0.19
TOTAL AREA (ACRES) = 24.7 PEAK FLOW RATE (CFS) = 32.53

FLOW PROCESS FROM NODE 133.00 TO NODE 134.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 1008.00 DOWNSTREAM (FEET) = 1006.00
FLOW LENGTH (FEET) = 660.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 29.2 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 5.30
ESTIMATED PIPE DIAMETER (INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 32.53
PIPE TRAVEL TIME (MIN.) = 2.08 T_c (MIN.) = 26.54
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 134.00 = 3690.00 FEET.

FLOW PROCESS FROM NODE 134.00 TO NODE 134.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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=====
MAINLINE Tc(MIN.) = 26.54
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.631
SUBAREA LOSS RATE DATA(AMC I ):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap        SCS
LAND USE                GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
COMMERCIAL              A       4.70     1.33     0.100    17
RESIDENTIAL
"11+ DWELLINGS/ACRE"   A       1.50     1.33     0.200    17
COMMERCIAL              A       9.30     1.33     0.100    17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.110
SUBAREA AREA(ACRES) = 15.50      SUBAREA RUNOFF(CFS) = 20.73
EFFECTIVE AREA(ACRES) = 40.20    AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 1.33  AREA-AVERAGED Ap = 0.16
TOTAL AREA(ACRES) = 40.2        PEAK FLOW RATE(CFS) = 51.44

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*****
FLOW PROCESS FROM NODE 134.00 TO NODE 140.00 IS CODE = 31

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

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=====
ELEVATION DATA: UPSTREAM(FEET) = 1006.00 DOWNSTREAM(FEET) = 992.00
FLOW LENGTH(FEET) = 2200.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 28.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.00
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 51.44
PIPE TRAVEL TIME(MIN.) = 4.58 Tc(MIN.) = 31.12
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 140.00 = 5890.00 FEET.

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*****
FLOW PROCESS FROM NODE 140.00 TO NODE 140.00 IS CODE = 81

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-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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=====
MAINLINE Tc(MIN.) = 31.12
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.483
SUBAREA LOSS RATE DATA(AMC I ):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap        SCS
LAND USE                GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
COMMERCIAL              A      12.00     1.33     0.100    17
COMMERCIAL              A      38.80     1.33     0.100    17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 50.80      SUBAREA RUNOFF(CFS) = 61.72
EFFECTIVE AREA(ACRES) = 91.00    AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 1.33  AREA-AVERAGED Ap = 0.13
TOTAL AREA(ACRES) = 91.0        PEAK FLOW RATE(CFS) = 107.79

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*****
FLOW PROCESS FROM NODE 140.00 TO NODE 140.00 IS CODE = 1

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-----
>>>>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.) = 31.12
RAINFALL INTENSITY(INCH/HR) = 1.48
AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 1.33
AREA-AVERAGED Ap = 0.13
EFFECTIVE STREAM AREA(ACRES) = 91.00
TOTAL STREAM AREA(ACRES) = 91.00
PEAK FLOW RATE(CFS) AT CONFLUENCE = 107.79

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** CONFLUENCE DATA **

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STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	526.90	19.21	1.980	1.33(0.13)	0.10	314.8	106.00
1	527.12	20.83	1.886	1.33(0.13)	0.10	331.6	100.00
1	513.51	22.73	1.791	1.33(0.13)	0.10	342.2	120.00
2	107.79	31.12	1.483	1.33(0.17)	0.13	91.0	130.00

```

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

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** PEAK FLOW RATE TABLE **

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STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	618.60	19.21	1.980	1.33(0.14)	0.10	370.9	106.00
2	621.41	20.83	1.886	1.33(0.14)	0.10	392.5	100.00
3	610.63	22.73	1.791	1.33(0.14)	0.10	408.7	120.00
4	525.97	31.12	1.483	1.33(0.14)	0.11	433.2	130.00

```

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 621.41 Tc(MIN.) = 20.83
EFFECTIVE AREA(ACRES) = 392.55 AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 433.2
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 140.00 = 6050.00 FEET.

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*****
FLOW PROCESS FROM NODE 140.00 TO NODE 150.00 IS CODE = 31

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

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 992.00 DOWNSTREAM(FEET) = 986.00
FLOW LENGTH(FEET) = 350.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 81.0 INCH PIPE IS 60.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 21.52
ESTIMATED PIPE DIAMETER(INCH) = 81.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 621.41
PIPE TRAVEL TIME(MIN.) = 0.27 Tc(MIN.) = 21.11
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 150.00 = 6400.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 150.00 TO NODE 150.00 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.) = 21.11
RAINFALL INTENSITY(INCH/HR) = 1.87
AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 1.33
AREA-AVERAGED Ap = 0.10
EFFECTIVE STREAM AREA(ACRES) = 392.55
TOTAL STREAM AREA(ACRES) = 433.20
PEAK FLOW RATE(CFS) AT CONFLUENCE = 621.41

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```

*****
FLOW PROCESS FROM NODE 136.00 TO NODE 137.00 IS CODE = 21
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```

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
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INITIAL SUBAREA FLOW-LENGTH(FEET) = 600.00
ELEVATION DATA: UPSTREAM(FEET) = 1006.00 DOWNSTREAM(FEET) = 1000.00

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Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.866
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.954
SUBAREA Tc AND LOSS RATE DATA(AMC I ):
DEVELOPMENT TYPE/   SCS SOIL  AREA   Fp   Ap   SCS  Tc
  LAND USE          GROUP  (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL          A      1.30   1.33  0.100  17   9.87
COMMERCIAL          A      2.40   1.33  0.100  17   9.87
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 9.39
TOTAL AREA(ACRES) = 3.70 PEAK FLOW RATE(CFS) = 9.39

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*****
FLOW PROCESS FROM NODE 137.00 TO NODE 138.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 1000.00 DOWNSTREAM(FEET) = 997.00
FLOW LENGTH(FEET) = 400.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.62
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 9.39
PIPE TRAVEL TIME(MIN.) = 1.19 Tc(MIN.) = 11.05
LONGEST FLOWPATH FROM NODE 136.00 TO NODE 138.00 = 1000.00 FEET.

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*****
FLOW PROCESS FROM NODE 138.00 TO NODE 138.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 11.05

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* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.759
SUBAREA LOSS RATE DATA(AMC I ):
DEVELOPMENT TYPE/   SCS SOIL  AREA   Fp   Ap   SCS
  LAND USE          GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          A      1.50   1.33  0.100  17
COMMERCIAL          A      5.20   1.33  0.100  17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 6.70 SUBAREA RUNOFF(CFS) = 15.84
EFFECTIVE AREA(ACRES) = 10.40 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 10.4 PEAK FLOW RATE(CFS) = 24.59

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*****
FLOW PROCESS FROM NODE 138.00 TO NODE 139.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 997.00 DOWNSTREAM(FEET) = 995.00
FLOW LENGTH(FEET) = 700.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 26.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.85
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 24.59
PIPE TRAVEL TIME(MIN.) = 2.40 Tc(MIN.) = 13.46
LONGEST FLOWPATH FROM NODE 136.00 TO NODE 139.00 = 1700.00 FEET.

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*****
FLOW PROCESS FROM NODE 139.00 TO NODE 139.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 13.46
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.452
SUBAREA LOSS RATE DATA(AMC I ):
DEVELOPMENT TYPE/   SCS SOIL  AREA   Fp   Ap   SCS
  LAND USE          GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          A      2.20   1.33  0.100  17
COMMERCIAL          A     12.20   1.33  0.100  17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 14.40 SUBAREA RUNOFF(CFS) = 30.06
EFFECTIVE AREA(ACRES) = 24.80 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 24.8 PEAK FLOW RATE(CFS) = 51.77

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*****
FLOW PROCESS FROM NODE 139.00 TO NODE 150.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 995.00 DOWNSTREAM(FEET) = 986.00
FLOW LENGTH(FEET) = 960.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.6 INCHES

```


PIPE-FLOW VELOCITY (FEET/SEC.) = 9.24
 ESTIMATED PIPE DIAMETER (INCH) = 36.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 51.77
 PIPE TRAVEL TIME (MIN.) = 1.73 Tc (MIN.) = 15.19
 LONGEST FLOWPATH FROM NODE 136.00 TO NODE 150.00 = 2660.00 FEET.

NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)	(ACRES)	NODE
1	733.97	15.19	2.280	1.33 (0.14)	0.10	376.2 136.00
2	761.97	19.48	1.964	1.33 (0.14)	0.10	457.9 106.00
3	757.58	21.11	1.872	1.33 (0.14)	0.10	479.5 100.00
4	739.41	23.00	1.778	1.33 (0.14)	0.10	495.7 120.00
5	631.04	31.40	1.475	1.33 (0.14)	0.10	520.2 130.00

 FLOW PROCESS FROM NODE 150.00 TO NODE 150.00 IS CODE = 81

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE (CFS) = 761.97 Tc (MIN.) = 19.48
 EFFECTIVE AREA (ACRES) = 457.94 AREA-AVERAGED Fm (INCH/HR) = 0.14
 AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.10
 TOTAL AREA (ACRES) = 520.2
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 150.00 = 6400.00 FEET.

>>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 15.19
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.280
 SUBAREA LOSS RATE DATA (AMC I):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 28.00 1.33 0.100 17
 COMMERCIAL A 34.20 1.33 0.100 17
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 62.20 SUBAREA RUNOFF (CFS) = 120.22
 EFFECTIVE AREA (ACRES) = 87.00 AREA-AVERAGED Fm (INCH/HR) = 0.13
 AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.10
 TOTAL AREA (ACRES) = 87.0 PEAK FLOW RATE (CFS) = 168.15

 FLOW PROCESS FROM NODE 150.00 TO NODE 200.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 986.00 DOWNSTREAM (FEET) = 970.00
 FLOW LENGTH (FEET) = 1530.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 93.0 INCH PIPE IS 75.7 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 18.52
 ESTIMATED PIPE DIAMETER (INCH) = 93.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 761.97
 PIPE TRAVEL TIME (MIN.) = 1.38 Tc (MIN.) = 20.86
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 200.00 = 7930.00 FEET.

 FLOW PROCESS FROM NODE 150.00 TO NODE 150.00 IS CODE = 1

>>>> DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>> AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION (MIN.) = 15.19
 RAINFALL INTENSITY (INCH/HR) = 2.28
 AREA-AVERAGED Fm (INCH/HR) = 0.13
 AREA-AVERAGED Fp (INCH/HR) = 1.33
 AREA-AVERAGED Ap = 0.10
 EFFECTIVE STREAM AREA (ACRES) = 87.00
 TOTAL STREAM AREA (ACRES) = 87.00
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 168.15

 FLOW PROCESS FROM NODE 200.00 TO NODE 200.00 IS CODE = 81

>>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 20.86
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.885
 SUBAREA LOSS RATE DATA (AMC I):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 72.80 1.33 0.100 17
 COMMERCIAL A 88.30 1.33 0.100 17
 PUBLIC PARK A 5.20 1.33 0.850 17
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.123
 SUBAREA AREA (ACRES) = 166.30 SUBAREA RUNOFF (CFS) = 257.59
 EFFECTIVE AREA (ACRES) = 624.24 AREA-AVERAGED Fm (INCH/HR) = 0.14
 AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.11
 TOTAL AREA (ACRES) = 686.5 PEAK FLOW RATE (CFS) = 978.04

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	618.60	19.48	1.964	1.33 (0.14)	0.10	370.9	106.00
1	621.41	21.11	1.872	1.33 (0.14)	0.10	392.5	100.00
1	610.63	23.00	1.778	1.33 (0.14)	0.10	408.7	120.00
1	525.97	31.40	1.475	1.33 (0.14)	0.11	433.2	130.00
2	168.15	15.19	2.280	1.33 (0.13)	0.10	87.0	136.00

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	985.93	16.57	2.165	1.33 (0.15)	0.11	542.5	136.00
2	978.04	20.86	1.885	1.33 (0.14)	0.11	624.2	106.00
3	963.81	22.48	1.802	1.33 (0.14)	0.11	645.8	100.00
4	936.88	24.38	1.717	1.33 (0.14)	0.11	662.0	120.00

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

** PEAK FLOW RATE TABLE **

STREAM	Q	Tc	Intensity	Fp (Fm)	Ap	Ae	HEADWATER
--------	---	----	-----------	---------	----	----	-----------

5 797.49 32.84 1.436 1.33 (0.14) 0.11 686.5 130.00
 NEW PEAK FLOW DATA ARE:
 PEAK FLOW RATE(CFS) = 985.93 Tc(MIN.) = 16.57
 AREA-AVERAGED Fm(INCH/HR) = 0.15 AREA-AVERAGED Fp(INCH/HR) = 1.33
 AREA-AVERAGED Ap = 0.11 EFFECTIVE AREA(ACRES) = 542.47

 FLOW PROCESS FROM NODE 200.00 TO NODE 200.00 IS CODE = 71

 >>>>PEAK FLOW RATE ESTIMATOR CHANGED TO UNIT-HYDROGRAPH METHOD<<<<<
 >>>>USING TIME-OF-CONCENTRATION OF LONGEST FLOWPATH<<<<<
 =====
 UNIT-HYDROGRAPH DATA:
 RAINFALL(INCH): 5M= 0.33;30M= 0.68;1H= 0.90;3H= 1.60;6H= 2.31;24H= 4.36
 S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
 MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
 Tc(HR) = 0.41; LAG(HR) = 0.33; Fm(INCH/HR) = 0.14; Ybar = 0.16
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC I CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.97; 30M = 0.97; 1HR = 0.97;
 3HR = 1.00; 6HR = 1.00; 24HR= 1.00
 UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 686.5
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 200.00 = 7930.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3,n=.0311; Lca/L=0.4,n=.0279; Lca/L=0.5,n=.0256;Lca/L=0.6,n=.0239
 TIME OF PEAK FLOW(HR) = 16.42 RUNOFF VOLUME(AF) = 212.22
 UNIT-HYDROGRAPH METHOD PEAK FLOW RATE(CFS) = 901.90
 TOTAL PEAK FLOW RATE(CFS) = 901.90 (SOURCE FLOW INCLUDED)
 RATIONAL METHOD PEAK FLOW RATE(CFS) = 985.93
 (UPSTREAM NODE PEAK FLOW RATE(CFS) = 985.93)
 PEAK FLOW RATE(CFS) USED = 985.93

 FLOW PROCESS FROM NODE 200.00 TO NODE 201.00 IS CODE = 31

 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM(FEET) = 970.00 DOWNSTREAM(FEET) = 950.00
 FLOW LENGTH(FEET) = 990.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 93.0 INCH PIPE IS 70.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 25.64
 ESTIMATED PIPE DIAMETER(INCH) = 93.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 985.93
 PIPE TRAVEL TIME(MIN.) = 0.64 Tc(MIN.) = 25.02
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 201.00 = 8920.00 FEET.

 FLOW PROCESS FROM NODE 201.00 TO NODE 201.00 IS CODE = 81

 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====
 MAINLINE Tc(MIN.) = 25.02
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.690
 SUBAREA LOSS RATE DATA(AMC I):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

COMMERCIAL A 9.60 1.33 0.100 17
 COMMERCIAL A 58.40 1.33 0.100 17
 PUBLIC PARK A 4.80 1.33 0.850 17
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.149
 SUBAREA AREA(ACRES) = 72.80
 UNIT-HYDROGRAPH DATA:
 RAINFALL(INCH): 5M= 0.33;30M= 0.68;1H= 0.90;3H= 1.60;6H= 2.31;24H= 4.36
 S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
 MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
 Tc(HR) = 0.42; LAG(HR) = 0.33; Fm(INCH/HR) = 0.15; Ybar = 0.16
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC I CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.97; 30M = 0.97; 1HR = 0.97;
 3HR = 0.99; 6HR = 1.00; 24HR= 1.00
 UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 759.3
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 201.00 = 8920.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3,n=.0303; Lca/L=0.4,n=.0272; Lca/L=0.5,n=.0250;Lca/L=0.6,n=.0233
 TIME OF PEAK FLOW(HR) = 16.42 RUNOFF VOLUME(AF) = 233.71
 UNIT-HYDROGRAPH PEAK FLOW RATE(CFS) = 986.79
 TOTAL AREA(ACRES) = 759.3 PEAK FLOW RATE(CFS) = 986.79

 FLOW PROCESS FROM NODE 201.00 TO NODE 201.00 IS CODE = 1

 >>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 =====
 TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 PEAK FLOW RATE(CFS) = 986.79 Tc(MIN.) = 25.02
 AREA-AVERAGED Fm(INCH/HR) = 0.15 Ybar = 0.16
 TOTAL AREA(ACRES) = 759.3

 FLOW PROCESS FROM NODE 202.00 TO NODE 203.00 IS CODE = 21

 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 =====
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
 ELEVATION DATA: UPSTREAM(FEET) = 1010.00 DOWNSTREAM(FEET) = 1000.00
 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 12.102
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.613
 SUBAREA Tc AND LOSS RATE DATA(AMC I):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
 COMMERCIAL A 6.00 1.33 0.100 17 12.10
 COMMERCIAL A 7.60 1.33 0.100 17 12.10
 SCHOOL A 1.90 1.33 0.600 17 16.40
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.161
 SUBAREA RUNOFF(CFS) = 33.47
 TOTAL AREA(ACRES) = 15.50 PEAK FLOW RATE(CFS) = 33.47

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*****
FLOW PROCESS FROM NODE 203.00 TO NODE 204.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1000.00 DOWNSTREAM(FEET) = 990.00
FLOW LENGTH(FEET) = 1100.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 23.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.11
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 33.47
PIPE TRAVEL TIME(MIN.) = 2.26 Tc(MIN.) = 14.36
LONGEST FLOWPATH FROM NODE 202.00 TO NODE 204.00 = 2100.00 FEET.

*****
FLOW PROCESS FROM NODE 204.00 TO NODE 204.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 14.36
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.358
SUBAREA LOSS RATE DATA(AMC I ):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 8.50 1.33 0.100 17
COMMERCIAL A 10.30 1.33 0.100 17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 18.80 SUBAREA RUNOFF(CFS) = 37.65
EFFECTIVE AREA(ACRES) = 34.30 AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.13
TOTAL AREA(ACRES) = 34.3 PEAK FLOW RATE(CFS) = 67.56

*****
FLOW PROCESS FROM NODE 204.00 TO NODE 205.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 990.00 DOWNSTREAM(FEET) = 980.00
FLOW LENGTH(FEET) = 1400.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 30.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.93
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 67.56
PIPE TRAVEL TIME(MIN.) = 2.61 Tc(MIN.) = 16.98
LONGEST FLOWPATH FROM NODE 202.00 TO NODE 205.00 = 3500.00 FEET.

*****
FLOW PROCESS FROM NODE 205.00 TO NODE 205.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.98
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.133

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SUBAREA LOSS RATE DATA(AMC I ):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 16.60 1.33 0.100 17
COMMERCIAL A 29.50 1.33 0.100 17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 46.10 SUBAREA RUNOFF(CFS) = 82.99
EFFECTIVE AREA(ACRES) = 80.40 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.11
TOTAL AREA(ACRES) = 80.4 PEAK FLOW RATE(CFS) = 143.60

*****
FLOW PROCESS FROM NODE 205.00 TO NODE 206.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 980.00 DOWNSTREAM(FEET) = 955.00
FLOW LENGTH(FEET) = 1200.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 34.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.04
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 143.60
PIPE TRAVEL TIME(MIN.) = 1.25 Tc(MIN.) = 18.22
LONGEST FLOWPATH FROM NODE 202.00 TO NODE 206.00 = 4700.00 FEET.

*****
FLOW PROCESS FROM NODE 206.00 TO NODE 206.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.22
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.044
SUBAREA LOSS RATE DATA(AMC I ):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 11.30 1.33 0.100 17
COMMERCIAL A 5.50 1.33 0.100 17
COMMERCIAL A 13.90 1.33 0.100 17
PUBLIC PARK A 3.60 1.33 0.850 17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.179
SUBAREA AREA(ACRES) = 34.30 SUBAREA RUNOFF(CFS) = 55.78
EFFECTIVE AREA(ACRES) = 114.70 AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.13
TOTAL AREA(ACRES) = 114.7 PEAK FLOW RATE(CFS) = 192.95

*****
FLOW PROCESS FROM NODE 206.00 TO NODE 201.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 955.00 DOWNSTREAM(FEET) = 950.00
FLOW LENGTH(FEET) = 2000.00 MANNING'S N = 0.013

```

DEPTH OF FLOW IN 75.0 INCH PIPE IS 56.3 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 7.80
 ESTIMATED PIPE DIAMETER (INCH) = 75.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 192.95
 PIPE TRAVEL TIME (MIN.) = 4.27 Tc (MIN.) = 22.49
 LONGEST FLOWPATH FROM NODE 202.00 TO NODE 201.00 = 6700.00 FEET.

 FLOW PROCESS FROM NODE 201.00 TO NODE 201.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION (MIN.) = 22.49
 RAINFALL INTENSITY (INCH/HR) = 1.80
 AREA-AVERAGED Fm (INCH/HR) = 0.18
 AREA-AVERAGED Fp (INCH/HR) = 1.33
 AREA-AVERAGED Ap = 0.13
 EFFECTIVE STREAM AREA (ACRES) = 114.70
 TOTAL STREAM AREA (ACRES) = 114.70
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 192.95

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	AREA (ACRES)	HEADWATER NODE
1	986.79	25.02	759.30	120.00
2	192.95	22.49	114.70	202.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 UNIT-HYDROGRAPH DATA:
 RAINFALL (INCH): 5M= 0.33;30M= 0.68;1H= 0.90;3H= 1.60;6H= 2.31;24H= 4.36
 S-GRAPH: VALLEY (DEV.)=100.0%;VALLEY (UNDEV.)/DESERT= 0.0%
 MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT (UNDEV.)= 0.0%
 Tc (HR) = 0.42; LAG (HR) = 0.33; Fm (INCH/HR) = 0.15; Ybar = 0.16
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC I CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.96; 30M = 0.96; 1HR = 0.96;
 3HR = 0.99; 6HR = 1.00; 24HR= 1.00
 UNIT-INTERVAL (MIN) = 5.00 TOTAL AREA (ACRES) = 874.0
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 201.00 = 8920.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3,n=.0303; Lca/L=0.4,n=.0272; Lca/L=0.5,n=.0250;Lca/L=0.6,n=.0233
 TIME OF PEAK FLOW (HR) = 16.42 RUNOFF VOLUME (AF) = 268.22
 PEAK FLOW RATE (CFS) = 1127.71

 FLOW PROCESS FROM NODE 201.00 TO NODE 207.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 950.00 DOWNSTREAM (FEET) = 926.00
 FLOW LENGTH (FEET) = 1850.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 108.0 INCH PIPE IS 79.1 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 22.58
 ESTIMATED PIPE DIAMETER (INCH) = 108.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 1127.71
 PIPE TRAVEL TIME (MIN.) = 1.37 Tc (MIN.) = 26.39
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 207.00 = 10770.00 FEET.

 FLOW PROCESS FROM NODE 207.00 TO NODE 207.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 26.39
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.637
 SUBAREA LOSS RATE DATA (AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	13.30	1.33	0.100	17
COMMERCIAL	A	47.10	1.33	0.100	17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 60.40

UNIT-HYDROGRAPH DATA:
 RAINFALL (INCH): 5M= 0.33;30M= 0.68;1H= 0.90;3H= 1.60;6H= 2.31;24H= 4.36
 S-GRAPH: VALLEY (DEV.)=100.0%;VALLEY (UNDEV.)/DESERT= 0.0%
 MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT (UNDEV.)= 0.0%
 Tc (HR) = 0.44; LAG (HR) = 0.35; Fm (INCH/HR) = 0.15; Ybar = 0.16
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC I CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.96; 30M = 0.96; 1HR = 0.96;
 3HR = 0.99; 6HR = 1.00; 24HR= 1.00
 UNIT-INTERVAL (MIN) = 5.00 TOTAL AREA (ACRES) = 934.4
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 207.00 = 10770.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3,n=.0282; Lca/L=0.4,n=.0253; Lca/L=0.5,n=.0232;Lca/L=0.6,n=.0217
 TIME OF PEAK FLOW (HR) = 16.42 RUNOFF VOLUME (AF) = 287.01
 UNIT-HYDROGRAPH PEAK FLOW RATE (CFS) = 1177.08
 TOTAL AREA (ACRES) = 934.4 PEAK FLOW RATE (CFS) = 1177.08

 FLOW PROCESS FROM NODE 207.00 TO NODE 208.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 926.00 DOWNSTREAM (FEET) = 914.00
 FLOW LENGTH (FEET) = 1020.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 108.0 INCH PIPE IS 85.9 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 21.70
 ESTIMATED PIPE DIAMETER (INCH) = 108.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 1177.08
 PIPE TRAVEL TIME (MIN.) = 0.78 Tc (MIN.) = 27.17
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 208.00 = 11790.00 FEET.

 FLOW PROCESS FROM NODE 208.00 TO NODE 208.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 27.17

* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.608
SUBAREA LOSS RATE DATA (AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 10.50 1.33 0.100 17
COMMERCIAL A 47.20 1.33 0.100 17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 57.70
UNIT-HYDROGRAPH DATA:
RAINFALL (INCH): 5M= 0.33; 30M= 0.68; 1H= 0.90; 3H= 1.60; 6H= 2.31; 24H= 4.36
S-GRAPH: VALLEY (DEV.)=100.0%; VALLEY (UNDEV.)/DESERT= 0.0%
MOUNTAIN= 0.0%; FOOTHILL= 0.0%; DESERT (UNDEV.)= 0.0%
Tc (HR) = 0.45; LAG (HR) = 0.36; Fm (INCH/HR) = 0.15; Ybar = 0.16
USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC I CONDITION.
DEPTH-AREA FACTORS: 5M = 0.96; 30M = 0.96; 1HR = 0.96;
3HR = 0.99; 6HR = 1.00; 24HR= 1.00
UNIT-INTERVAL (MIN) = 5.00 TOTAL AREA (ACRES) = 992.1
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 208.00 = 11790.00 FEET.
EQUIVALENT BASIN FACTOR APPROXIMATIONS:
Lca/L=0.3, n=.0272; Lca/L=0.4, n=.0244; Lca/L=0.5, n=.0224; Lca/L=0.6, n=.0209
TIME OF PEAK FLOW (HR) = 16.42 RUNOFF VOLUME (AF) = 304.95
UNIT-HYDROGRAPH PEAK FLOW RATE (CFS) = 1223.74
TOTAL AREA (ACRES) = 992.1 PEAK FLOW RATE (CFS) = 1223.74

FLOW PROCESS FROM NODE 208.00 TO NODE 209.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 914.00 DOWNSTREAM (FEET) = 895.00
FLOW LENGTH (FEET) = 1650.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 114.0 INCH PIPE IS 83.3 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 22.05
ESTIMATED PIPE DIAMETER (INCH) = 114.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 1223.74
PIPE TRAVEL TIME (MIN.) = 1.25 Tc (MIN.) = 28.42
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 209.00 = 13440.00 FEET.

FLOW PROCESS FROM NODE 209.00 TO NODE 209.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 28.42
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.566
SUBAREA LOSS RATE DATA (AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 31.70 1.33 0.100 17
COMMERCIAL A 23.60 1.33 0.100 17
COMMERCIAL A 166.00 1.33 0.100 17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 221.30

UNIT-HYDROGRAPH DATA:
RAINFALL (INCH): 5M= 0.33; 30M= 0.68; 1H= 0.90; 3H= 1.60; 6H= 2.31; 24H= 4.36
S-GRAPH: VALLEY (DEV.)=100.0%; VALLEY (UNDEV.)/DESERT= 0.0%
MOUNTAIN= 0.0%; FOOTHILL= 0.0%; DESERT (UNDEV.)= 0.0%
Tc (HR) = 0.47; LAG (HR) = 0.38; Fm (INCH/HR) = 0.15; Ybar = 0.16
USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC I CONDITION.
DEPTH-AREA FACTORS: 5M = 0.95; 30M = 0.95; 1HR = 0.95;
3HR = 0.99; 6HR = 1.00; 24HR= 1.00
UNIT-INTERVAL (MIN) = 5.00 TOTAL AREA (ACRES) = 1213.4
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 209.00 = 13440.00 FEET.
EQUIVALENT BASIN FACTOR APPROXIMATIONS:
Lca/L=0.3, n=.0259; Lca/L=0.4, n=.0232; Lca/L=0.5, n=.0213; Lca/L=0.6, n=.0199
TIME OF PEAK FLOW (HR) = 16.42 RUNOFF VOLUME (AF) = 373.72
UNIT-HYDROGRAPH PEAK FLOW RATE (CFS) = 1434.24
TOTAL AREA (ACRES) = 1213.4 PEAK FLOW RATE (CFS) = 1434.24

FLOW PROCESS FROM NODE 209.00 TO NODE 220.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 895.00 DOWNSTREAM (FEET) = 888.00
FLOW LENGTH (FEET) = 900.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 126.0 INCH PIPE IS 99.6 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 19.54
ESTIMATED PIPE DIAMETER (INCH) = 126.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 1434.24
PIPE TRAVEL TIME (MIN.) = 0.77 Tc (MIN.) = 29.19
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 220.00 = 14340.00 FEET.

FLOW PROCESS FROM NODE 220.00 TO NODE 220.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
PEAK FLOW RATE (CFS) = 1434.24 Tc (MIN.) = 29.19
AREA-AVERAGED Fm (INCH/HR) = 0.15 Ybar = 0.16
TOTAL AREA (ACRES) = 1213.4

FLOW PROCESS FROM NODE 210.00 TO NODE 211.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 800.00
ELEVATION DATA: UPSTREAM (FEET) = 980.00 DOWNSTREAM (FEET) = 965.00
Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.761
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.973
SUBAREA Tc AND LOSS RATE DATA (AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN	(MIN.)
COMMERCIAL	A	1.20	1.33	0.100	17	9.76
COMMERCIAL	A	3.60	1.33	0.100	17	9.76
PUBLIC PARK	A	1.00	1.33	0.850	17	15.51

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.229
SUBAREA RUNOFF (CFS) = 13.93
TOTAL AREA (ACRES) = 5.80 PEAK FLOW RATE (CFS) = 13.93

FLOW PROCESS FROM NODE 211.00 TO NODE 212.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 965.00 DOWNSTREAM ELEVATION (FEET) = 960.00
STREET LENGTH (FEET) = 650.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 27.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

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) = 29.69

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH (FEET) = 0.58
HALFSTREET FLOOD WIDTH (FEET) = 21.32
AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.13
PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 1.83
STREET FLOW TRAVEL TIME (MIN.) = 3.46 Tc (MIN.) = 13.22
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.479

SUBAREA LOSS RATE DATA (AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 1.90 1.33 0.100 17
COMMERCIAL A 12.00 1.33 0.100 17
PUBLIC PARK A 1.70 1.33 0.850 17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.182
SUBAREA AREA (ACRES) = 15.60 SUBAREA RUNOFF (CFS) = 31.41
EFFECTIVE AREA (ACRES) = 21.40 AREA-AVERAGED Fm (INCH/HR) = 0.26
AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.19
TOTAL AREA (ACRES) = 21.4 PEAK FLOW RATE (CFS) = 42.76

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH (FEET) = 0.65 HALFSTREET FLOOD WIDTH (FEET) = 24.64
FLOW VELOCITY (FEET/SEC.) = 3.41 DEPTH*VELOCITY (FT*FT/SEC.) = 2.22
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 212.00 = 1450.00 FEET.

FLOW PROCESS FROM NODE 212.00 TO NODE 213.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 960.00 DOWNSTREAM (FEET) = 950.00
FLOW LENGTH (FEET) = 900.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.5 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 9.44
ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 42.76
PIPE TRAVEL TIME (MIN.) = 1.59 Tc (MIN.) = 14.81
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 213.00 = 2350.00 FEET.

FLOW PROCESS FROM NODE 213.00 TO NODE 213.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====

MAINLINE Tc (MIN.) = 14.81
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.315
SUBAREA LOSS RATE DATA (AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 7.10 1.33 0.100 17
COMMERCIAL A 31.40 1.33 0.100 17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 38.50 SUBAREA RUNOFF (CFS) = 75.63
EFFECTIVE AREA (ACRES) = 59.90 AREA-AVERAGED Fm (INCH/HR) = 0.18
AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.13
TOTAL AREA (ACRES) = 59.9 PEAK FLOW RATE (CFS) = 115.24

FLOW PROCESS FROM NODE 213.00 TO NODE 214.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 950.00 DOWNSTREAM (FEET) = 930.00
FLOW LENGTH (FEET) = 1300.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 32.1 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 13.66
ESTIMATED PIPE DIAMETER (INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 115.24
PIPE TRAVEL TIME (MIN.) = 1.59 Tc (MIN.) = 16.39
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 214.00 = 3650.00 FEET.

FLOW PROCESS FROM NODE 214.00 TO NODE 214.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====

MAINLINE Tc (MIN.) = 16.39
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.178
SUBAREA LOSS RATE DATA (AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 5.30 1.33 0.100 17
 COMMERCIAL A 52.10 1.33 0.100 17
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 57.40 SUBAREA RUNOFF (CFS) = 105.66
 EFFECTIVE AREA (ACRES) = 117.30 AREA-AVERAGED Fm (INCH/HR) = 0.16
 AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.12
 TOTAL AREA (ACRES) = 117.3 PEAK FLOW RATE (CFS) = 213.51

 FLOW PROCESS FROM NODE 214.00 TO NODE 215.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM (FEET) = 930.00 DOWNSTREAM (FEET) = 920.00
 FLOW LENGTH (FEET) = 1200.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 63.0 INCH PIPE IS 45.9 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 12.63
 ESTIMATED PIPE DIAMETER (INCH) = 63.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 213.51
 PIPE TRAVEL TIME (MIN.) = 1.58 Tc (MIN.) = 17.98
 LONGEST FLOWPATH FROM NODE 210.00 TO NODE 215.00 = 4850.00 FEET.

 FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====
 MAINLINE Tc (MIN.) = 17.98
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.061
 SUBAREA LOSS RATE DATA (AMC I):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 7.70 1.33 0.100 17
 COMMERCIAL A 32.20 1.33 0.100 17
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 39.90 SUBAREA RUNOFF (CFS) = 69.24
 EFFECTIVE AREA (ACRES) = 157.20 AREA-AVERAGED Fm (INCH/HR) = 0.15
 AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.11
 TOTAL AREA (ACRES) = 157.2 PEAK FLOW RATE (CFS) = 270.37

 FLOW PROCESS FROM NODE 215.00 TO NODE 216.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM (FEET) = 920.00 DOWNSTREAM (FEET) = 905.00
 FLOW LENGTH (FEET) = 840.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 57.0 INCH PIPE IS 46.5 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 17.47
 ESTIMATED PIPE DIAMETER (INCH) = 57.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 270.37

PIPE TRAVEL TIME (MIN.) = 0.80 Tc (MIN.) = 18.78
 LONGEST FLOWPATH FROM NODE 210.00 TO NODE 216.00 = 5690.00 FEET.

 FLOW PROCESS FROM NODE 216.00 TO NODE 216.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====
 MAINLINE Tc (MIN.) = 18.78
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.008
 SUBAREA LOSS RATE DATA (AMC I):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 16.70 1.33 0.100 17
 COMMERCIAL A 34.60 1.33 0.100 17
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 51.30 SUBAREA RUNOFF (CFS) = 86.56
 EFFECTIVE AREA (ACRES) = 208.50 AREA-AVERAGED Fm (INCH/HR) = 0.15
 AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.11
 TOTAL AREA (ACRES) = 208.5 PEAK FLOW RATE (CFS) = 349.40

 FLOW PROCESS FROM NODE 216.00 TO NODE 217.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM (FEET) = 905.00 DOWNSTREAM (FEET) = 890.00
 FLOW LENGTH (FEET) = 1490.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 72.0 INCH PIPE IS 54.4 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 15.25
 ESTIMATED PIPE DIAMETER (INCH) = 72.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 349.40
 PIPE TRAVEL TIME (MIN.) = 1.63 Tc (MIN.) = 20.41
 LONGEST FLOWPATH FROM NODE 210.00 TO NODE 217.00 = 7180.00 FEET.

 FLOW PROCESS FROM NODE 217.00 TO NODE 217.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====
 MAINLINE Tc (MIN.) = 20.41
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.910
 SUBAREA LOSS RATE DATA (AMC I):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 6.10 1.33 0.100 17
 COMMERCIAL A 22.00 1.33 0.100 17
 COMMERCIAL A 4.70 1.33 0.100 17
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 32.80 SUBAREA RUNOFF (CFS) = 52.46
 EFFECTIVE AREA (ACRES) = 241.30 AREA-AVERAGED Fm (INCH/HR) = 0.14
 AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.11
 TOTAL AREA (ACRES) = 241.3 PEAK FLOW RATE (CFS) = 383.52

 FLOW PROCESS FROM NODE 217.00 TO NODE 220.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 890.00 DOWNSTREAM(FEET) = 888.00
 FLOW LENGTH(FEET) = 1400.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 108.0 INCH PIPE IS 80.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 7.52
 ESTIMATED PIPE DIAMETER(INCH) = 108.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 383.52
 PIPE TRAVEL TIME(MIN.) = 3.10 Tc(MIN.) = 23.51
 LONGEST FLOWPATH FROM NODE 210.00 TO NODE 220.00 = 8580.00 FEET.

 FLOW PROCESS FROM NODE 220.00 TO NODE 220.00 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.) = 23.51
 RAINFALL INTENSITY(INCH/HR) = 1.75
 AREA-AVERAGED Fm(INCH/HR) = 0.14
 AREA-AVERAGED Fp(INCH/HR) = 1.33
 AREA-AVERAGED Ap = 0.11
 EFFECTIVE STREAM AREA(ACRES) = 241.30
 TOTAL STREAM AREA(ACRES) = 241.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 383.52

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	AREA (ACRES)	HEADWATER NODE
1	1434.24	29.19	1213.40	120.00
2	383.52	23.51	241.30	210.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

UNIT-HYDROGRAPH DATA:
 RAINFALL(INCH): 5M= 0.33;30M= 0.68;1H= 0.90;3H= 1.60;6H= 2.31;24H= 4.36
 S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
 MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
 Tc(HR) = 0.49; LAG(HR) = 0.39; Fm(INCH/HR) = 0.15; Ybar = 0.16
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC I CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.94; 30M = 0.94; 1HR = 0.94;
 3HR = 0.99; 6HR = 1.00; 24HR= 1.00
 UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 1454.7
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 220.00 = 14340.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3,n=.0253; Lca/L=0.4,n=.0226; Lca/L=0.5,n=.0208;Lca/L=0.6,n=.0194
 TIME OF PEAK FLOW(HR) = 16.42 RUNOFF VOLUME(AF) = 447.94
 PEAK FLOW RATE(CFS) = 1661.83

 FLOW PROCESS FROM NODE 220.00 TO NODE 221.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 888.00 DOWNSTREAM(FEET) = 880.00
 FLOW LENGTH(FEET) = 800.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 126.0 INCH PIPE IS 101.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 22.18
 ESTIMATED PIPE DIAMETER(INCH) = 126.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 1661.83
 PIPE TRAVEL TIME(MIN.) = 0.60 Tc(MIN.) = 29.79
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 221.00 = 15140.00 FEET.

 FLOW PROCESS FROM NODE 221.00 TO NODE 221.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 29.79
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.522
 SUBAREA LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	2.70	1.33	0.100	17
COMMERCIAL	A	66.40	1.33	0.100	17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 69.10

UNIT-HYDROGRAPH DATA:

RAINFALL(INCH): 5M= 0.33;30M= 0.68;1H= 0.90;3H= 1.60;6H= 2.31;24H= 4.36
 S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%

MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
 Tc(HR) = 0.50; LAG(HR) = 0.40; Fm(INCH/HR) = 0.15; Ybar = 0.16

USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC I CONDITION.

DEPTH-AREA FACTORS: 5M = 0.93; 30M = 0.93; 1HR = 0.93;
 3HR = 0.99; 6HR = 0.99; 24HR= 1.00

UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 1523.8

LONGEST FLOWPATH FROM NODE 120.00 TO NODE 221.00 = 15140.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:

Lca/L=0.3,n=.0247; Lca/L=0.4,n=.0222; Lca/L=0.5,n=.0204;Lca/L=0.6,n=.0190
 TIME OF PEAK FLOW(HR) = 16.42 RUNOFF VOLUME(AF) = 469.36

UNIT-HYDROGRAPH PEAK FLOW RATE(CFS) = 1706.73

TOTAL AREA(ACRES) = 1523.8 PEAK FLOW RATE(CFS) = 1706.73

 FLOW PROCESS FROM NODE 221.00 TO NODE 222.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 880.00 DOWNSTREAM(FEET) = 875.00
 FLOW LENGTH(FEET) = 420.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 126.0 INCH PIPE IS 96.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 24.11
 ESTIMATED PIPE DIAMETER(INCH) = 126.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 1706.73

PIPE TRAVEL TIME(MIN.) = 0.29 Tc(MIN.) = 30.08
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 222.00 = 15560.00 FEET.

FLOW PROCESS FROM NODE 222.00 TO NODE 222.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc(MIN.) = 30.08
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.513
SUBAREA LOSS RATE DATA (AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	4.30	1.33	0.100	17
COMMERCIAL	A	109.00	1.33	0.100	17
RESIDENTIAL "5-7 DWELLINGS/ACRE"	A	21.90	1.33	0.500	17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.165
SUBAREA AREA (ACRES) = 135.20
UNIT-HYDROGRAPH DATA:
RAINFALL (INCH): 5M= 0.33;30M= 0.68;1H= 0.90;3H= 1.60;6H= 2.31;24H= 4.36
S-GRAPH: VALLEY (DEV.)=100.0%;VALLEY (UNDEV.)/DESERT= 0.0%
MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT (UNDEV.)= 0.0%
Tc (HR) = 0.50; LAG (HR) = 0.40; Fm (INCH/HR) = 0.15; Ybar = 0.16
USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC I CONDITION.
DEPTH-AREA FACTORS: 5M = 0.93; 30M = 0.93; 1HR = 0.93;
3HR = 0.99; 6HR = 0.99; 24HR= 1.00
UNIT-INTERVAL (MIN) = 5.00 TOTAL AREA (ACRES) = 1659.0
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 222.00 = 15560.00 FEET.
EQUIVALENT BASIN FACTOR APPROXIMATIONS:
Lca/L=0.3,n=.0245; Lca/L=0.4,n=.0220; Lca/L=0.5,n=.0202;Lca/L=0.6,n=.0188
TIME OF PEAK FLOW (HR) = 16.50 RUNOFF VOLUME (AF) = 508.37
UNIT-HYDROGRAPH PEAK FLOW RATE (CFS) = 1825.72
TOTAL AREA (ACRES) = 1659.0 PEAK FLOW RATE (CFS) = 1825.72

FLOW PROCESS FROM NODE 222.00 TO NODE 223.00 IS CODE = 31

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

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ELEVATION DATA: UPSTREAM (FEET) = 875.00 DOWNSTREAM (FEET) = 870.00
FLOW LENGTH (FEET) = 2400.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 138.0 INCH PIPE IS 105.5 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 10.72
ESTIMATED PIPE DIAMETER (INCH) = 138.00 NUMBER OF PIPES = 2
PIPE-FLOW (CFS) = 1825.72
PIPE TRAVEL TIME (MIN.) = 3.73 Tc (MIN.) = 33.81
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 223.00 = 17960.00 FEET.

FLOW PROCESS FROM NODE 223.00 TO NODE 223.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 33.81
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.411
SUBAREA LOSS RATE DATA (AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	3.20	1.33	0.100	17
COMMERCIAL	A	39.30	1.33	0.100	17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 42.50
UNIT-HYDROGRAPH DATA:
RAINFALL (INCH): 5M= 0.33;30M= 0.68;1H= 0.90;3H= 1.60;6H= 2.31;24H= 4.36
S-GRAPH: VALLEY (DEV.)=100.0%;VALLEY (UNDEV.)/DESERT= 0.0%
MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT (UNDEV.)= 0.0%
Tc (HR) = 0.56; LAG (HR) = 0.45; Fm (INCH/HR) = 0.15; Ybar = 0.16
USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC I CONDITION.
DEPTH-AREA FACTORS: 5M = 0.92; 30M = 0.92; 1HR = 0.92;
3HR = 0.99; 6HR = 0.99; 24HR= 1.00
UNIT-INTERVAL (MIN) = 5.00 TOTAL AREA (ACRES) = 1701.5
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 223.00 = 17960.00 FEET.
EQUIVALENT BASIN FACTOR APPROXIMATIONS:
Lca/L=0.3,n=.0242; Lca/L=0.4,n=.0217; Lca/L=0.5,n=.0199;Lca/L=0.6,n=.0186
TIME OF PEAK FLOW (HR) = 16.50 RUNOFF VOLUME (AF) = 521.54
UNIT-HYDROGRAPH PEAK FLOW RATE (CFS) = 1793.82
TOTAL AREA (ACRES) = 1701.5 PEAK FLOW RATE (CFS) = 1825.72
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 223.00 TO NODE 223.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc(MIN.) = 33.81
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.411
SUBAREA LOSS RATE DATA (AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	15.50	1.33	0.100	17
COMMERCIAL	A	99.00	1.33	0.100	17
COMMERCIAL	A	3.20	1.33	0.100	17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 117.70
UNIT-HYDROGRAPH DATA:
RAINFALL (INCH): 5M= 0.33;30M= 0.68;1H= 0.90;3H= 1.60;6H= 2.31;24H= 4.36
S-GRAPH: VALLEY (DEV.)=100.0%;VALLEY (UNDEV.)/DESERT= 0.0%
MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT (UNDEV.)= 0.0%
Tc (HR) = 0.56; LAG (HR) = 0.45; Fm (INCH/HR) = 0.15; Ybar = 0.16
USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC I CONDITION.
DEPTH-AREA FACTORS: 5M = 0.92; 30M = 0.92; 1HR = 0.92;
3HR = 0.99; 6HR = 0.99; 24HR= 1.00
UNIT-INTERVAL (MIN) = 5.00 TOTAL AREA (ACRES) = 1819.2
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 223.00 = 17960.00 FEET.
EQUIVALENT BASIN FACTOR APPROXIMATIONS:
Lca/L=0.3,n=.0242; Lca/L=0.4,n=.0217; Lca/L=0.5,n=.0199;Lca/L=0.6,n=.0186
TIME OF PEAK FLOW (HR) = 16.50 RUNOFF VOLUME (AF) = 557.97

UNIT-HYDROGRAPH PEAK FLOW RATE(CFS) = 1908.17
 TOTAL AREA(ACRES) = 1819.2 PEAK FLOW RATE(CFS) = 1908.17

 FLOW PROCESS FROM NODE 223.00 TO NODE 224.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 870.00 DOWNSTREAM(FEET) = 865.00
 FLOW LENGTH(FEET) = 500.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 138.0 INCH PIPE IS 101.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 23.36
 ESTIMATED PIPE DIAMETER(INCH) = 138.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 1908.17
 PIPE TRAVEL TIME(MIN.) = 0.36 Tc(MIN.) = 34.17
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 224.00 = 18460.00 FEET.

 FLOW PROCESS FROM NODE 224.00 TO NODE 224.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 34.17
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.402
 SUBAREA LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	0.80	1.33	0.100	17
COMMERCIAL	A	51.70	1.33	0.100	17
RESIDENTIAL "5-7 DWELLINGS/ACRE"	A	18.80	1.33	0.500	17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.205
 SUBAREA AREA(ACRES) = 71.30
 UNIT-HYDROGRAPH DATA:
 RAINFALL(INCH): 5M= 0.33;30M= 0.68;1H= 0.90;3H= 1.60;6H= 2.31;24H= 4.36
 S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
 MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
 Tc(HR) = 0.57; LAG(HR) = 0.46; Fm(INCH/HR) = 0.16; Ybar = 0.16
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC I CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.92; 30M = 0.92; 1HR = 0.92;
 3HR = 0.99; 6HR = 0.99; 24HR= 1.00
 UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 1890.5
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 224.00 = 18460.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3,n=.0240; Lca/L=0.4,n=.0215; Lca/L=0.5,n=.0197;Lca/L=0.6,n=.0184
 TIME OF PEAK FLOW(HR) = 16.50 RUNOFF VOLUME(AF) = 577.56
 UNIT-HYDROGRAPH PEAK FLOW RATE(CFS) = 1958.15
 TOTAL AREA(ACRES) = 1890.5 PEAK FLOW RATE(CFS) = 1958.15

 FLOW PROCESS FROM NODE 224.00 TO NODE 225.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 865.00 DOWNSTREAM(FEET) = 860.00
 FLOW LENGTH(FEET) = 1080.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 120.0 INCH PIPE IS 95.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 14.60
 ESTIMATED PIPE DIAMETER(INCH) = 120.00 NUMBER OF PIPES = 2
 PIPE-FLOW(CFS) = 1958.15
 PIPE TRAVEL TIME(MIN.) = 1.23 Tc(MIN.) = 35.40
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 225.00 = 19540.00 FEET.

 FLOW PROCESS FROM NODE 225.00 TO NODE 225.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 35.40
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.372
 SUBAREA LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	23.60	1.33	0.100	17
COMMERCIAL	A	28.20	1.33	0.100	17
COMMERCIAL	A	19.10	1.33	0.100	17
PUBLIC PARK	A	6.90	1.33	0.850	17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.167
 SUBAREA AREA(ACRES) = 77.80
 UNIT-HYDROGRAPH DATA:
 RAINFALL(INCH): 5M= 0.33;30M= 0.68;1H= 0.90;3H= 1.60;6H= 2.31;24H= 4.36
 S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
 MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
 Tc(HR) = 0.59; LAG(HR) = 0.47; Fm(INCH/HR) = 0.16; Ybar = 0.17
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC I CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.91; 30M = 0.91; 1HR = 0.91;
 3HR = 0.99; 6HR = 0.99; 24HR= 1.00
 UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 1968.3
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 225.00 = 19540.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3,n=.0237; Lca/L=0.4,n=.0212; Lca/L=0.5,n=.0195;Lca/L=0.6,n=.0182
 TIME OF PEAK FLOW(HR) = 16.50 RUNOFF VOLUME(AF) = 599.91
 UNIT-HYDROGRAPH PEAK FLOW RATE(CFS) = 1974.42
 TOTAL AREA(ACRES) = 1968.3 PEAK FLOW RATE(CFS) = 1974.42

 FLOW PROCESS FROM NODE 225.00 TO NODE 300.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 860.00 DOWNSTREAM(FEET) = 835.00
 FLOW LENGTH(FEET) = 4100.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 114.0 INCH PIPE IS 91.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 16.20
 ESTIMATED PIPE DIAMETER(INCH) = 114.00 NUMBER OF PIPES = 2
 PIPE-FLOW(CFS) = 1974.42
 PIPE TRAVEL TIME(MIN.) = 4.22 Tc(MIN.) = 39.62

LONGEST FLOWPATH FROM NODE 120.00 TO NODE 300.00 = 23640.00 FEET.

FLOW PROCESS FROM NODE 300.00 TO NODE 300.00 IS CODE = 10

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

FLOW PROCESS FROM NODE 230.00 TO NODE 231.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
ELEVATION DATA: UPSTREAM(FEET) = 1030.00 DOWNSTREAM(FEET) = 1020.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 12.899
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.515
SUBAREA Tc AND LOSS RATE DATA(AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"11+ DWELLINGS/ACRE" A 7.60 1.33 0.200 17 12.90
PUBLIC PARK A 1.50 1.33 0.850 17 19.23
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.307
SUBAREA RUNOFF(CFS) = 17.26
TOTAL AREA(ACRES) = 9.10 PEAK FLOW RATE(CFS) = 17.26

FLOW PROCESS FROM NODE 231.00 TO NODE 232.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 1020.00 DOWNSTREAM(FEET) = 1005.00
FLOW LENGTH(FEET) = 1400.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.44
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 17.26
PIPE TRAVEL TIME(MIN.) = 3.13 Tc(MIN.) = 16.03
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 232.00 = 2400.00 FEET.

FLOW PROCESS FROM NODE 232.00 TO NODE 232.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====

MAINLINE Tc(MIN.) = 16.03
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.207
SUBAREA LOSS RATE DATA(AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

COMMERCIAL A 2.80 1.33 0.100 17
RESIDENTIAL
"11+ DWELLINGS/ACRE" A 22.30 1.33 0.200 17
PUBLIC PARK A 4.30 1.33 0.850 17
SCHOOL A 6.70 1.33 0.600 17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.344
SUBAREA AREA(ACRES) = 36.10 SUBAREA RUNOFF(CFS) = 56.88
EFFECTIVE AREA(ACRES) = 45.20 AREA-AVERAGED Fm(INCH/HR) = 0.45
AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.34
TOTAL AREA(ACRES) = 45.2 PEAK FLOW RATE(CFS) = 71.62

FLOW PROCESS FROM NODE 232.00 TO NODE 232.10 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 1005.00 DOWNSTREAM(FEET) = 1000.00
FLOW LENGTH(FEET) = 800.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 31.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.67
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 71.62
PIPE TRAVEL TIME(MIN.) = 1.54 Tc(MIN.) = 17.57
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 232.10 = 3200.00 FEET.

FLOW PROCESS FROM NODE 232.10 TO NODE 232.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====

MAINLINE Tc(MIN.) = 17.57
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.089
SUBAREA LOSS RATE DATA(AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 5.00 1.33 0.100 17
RESIDENTIAL
"11+ DWELLINGS/ACRE" A 6.30 1.33 0.200 17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.156
SUBAREA AREA(ACRES) = 11.30 SUBAREA RUNOFF(CFS) = 19.15
EFFECTIVE AREA(ACRES) = 56.50 AREA-AVERAGED Fm(INCH/HR) = 0.40
AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.30
TOTAL AREA(ACRES) = 56.5 PEAK FLOW RATE(CFS) = 85.96

FLOW PROCESS FROM NODE 232.10 TO NODE 233.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 1000.00 DOWNSTREAM(FEET) = 990.00
FLOW LENGTH(FEET) = 500.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 26.9 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 14.06
 ESTIMATED PIPE DIAMETER (INCH) = 39.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 85.96
 PIPE TRAVEL TIME (MIN.) = 0.59 Tc (MIN.) = 18.16
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 233.00 = 3700.00 FEET.

 FLOW PROCESS FROM NODE 233.00 TO NODE 233.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 18.16
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.048
 SUBAREA LOSS RATE DATA (AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	3.60	1.33	0.100	17
COMMERCIAL	A	15.40	1.33	0.100	17

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 19.00 SUBAREA RUNOFF (CFS) = 32.75
 EFFECTIVE AREA (ACRES) = 75.50 AREA-AVERAGED Fm (INCH/HR) = 0.33
 AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.25
 TOTAL AREA (ACRES) = 75.5 PEAK FLOW RATE (CFS) = 116.62

 FLOW PROCESS FROM NODE 233.00 TO NODE 234.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 990.00 DOWNSTREAM (FEET) = 978.00
 FLOW LENGTH (FEET) = 980.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 45.0 INCH PIPE IS 35.9 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 12.35
 ESTIMATED PIPE DIAMETER (INCH) = 45.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 116.62
 PIPE TRAVEL TIME (MIN.) = 1.32 Tc (MIN.) = 19.49
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 234.00 = 4680.00 FEET.

 FLOW PROCESS FROM NODE 234.00 TO NODE 234.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 19.49
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.964
 SUBAREA LOSS RATE DATA (AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	12.50	1.33	0.100	17
COMMERCIAL	A	28.90	1.33	0.100	17

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 41.40 SUBAREA RUNOFF (CFS) = 68.22
 EFFECTIVE AREA (ACRES) = 116.90 AREA-AVERAGED Fm (INCH/HR) = 0.26

AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.20
 TOTAL AREA (ACRES) = 116.9 PEAK FLOW RATE (CFS) = 179.09

 FLOW PROCESS FROM NODE 234.00 TO NODE 235.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 978.00 DOWNSTREAM (FEET) = 965.00
 FLOW LENGTH (FEET) = 1100.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 54.0 INCH PIPE IS 41.5 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 13.66
 ESTIMATED PIPE DIAMETER (INCH) = 54.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 179.09
 PIPE TRAVEL TIME (MIN.) = 1.34 Tc (MIN.) = 20.83
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 235.00 = 5780.00 FEET.

 FLOW PROCESS FROM NODE 235.00 TO NODE 235.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc (MIN.) = 20.83
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.887
 SUBAREA LOSS RATE DATA (AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	1.60	1.33	0.100	17
COMMERCIAL	A	5.90	1.33	0.100	17
COMMERCIAL	A	15.20	1.33	0.100	17
PUBLIC PARK	A	1.20	1.33	0.850	17

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.138
 SUBAREA AREA (ACRES) = 23.90 SUBAREA RUNOFF (CFS) = 36.65
 EFFECTIVE AREA (ACRES) = 140.80 AREA-AVERAGED Fm (INCH/HR) = 0.25
 AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.19
 TOTAL AREA (ACRES) = 140.8 PEAK FLOW RATE (CFS) = 207.65

 FLOW PROCESS FROM NODE 235.00 TO NODE 236.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 965.00 DOWNSTREAM (FEET) = 960.00
 FLOW LENGTH (FEET) = 300.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 54.0 INCH PIPE IS 40.6 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 16.19
 ESTIMATED PIPE DIAMETER (INCH) = 54.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 207.65
 PIPE TRAVEL TIME (MIN.) = 0.31 Tc (MIN.) = 21.14
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 236.00 = 6080.00 FEET.

 FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 21.14
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.870
SUBAREA LOSS RATE DATA (AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 3.20 1.33 0.100 17
COMMERCIAL A 2.70 1.33 0.100 17
COMMERCIAL A 1.60 1.33 0.100 17
PUBLIC PARK A 1.80 1.33 0.850 17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.245
SUBAREA AREA (ACRES) = 9.30 SUBAREA RUNOFF (CFS) = 12.93
EFFECTIVE AREA (ACRES) = 150.10 AREA-AVERAGED Fm (INCH/HR) = 0.25
AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.19
TOTAL AREA (ACRES) = 150.1 PEAK FLOW RATE (CFS) = 218.47

FLOW PROCESS FROM NODE 236.00 TO NODE 237.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 960.00 DOWNSTREAM (FEET) = 950.00
FLOW LENGTH (FEET) = 600.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 54.0 INCH PIPE IS 42.5 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 16.26
ESTIMATED PIPE DIAMETER (INCH) = 54.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 218.47
PIPE TRAVEL TIME (MIN.) = 0.61 Tc (MIN.) = 21.75
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 237.00 = 6680.00 FEET.

FLOW PROCESS FROM NODE 237.00 TO NODE 237.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 21.75
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.838
SUBAREA LOSS RATE DATA (AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 17.50 1.33 0.100 17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 17.50 SUBAREA RUNOFF (CFS) = 26.86
EFFECTIVE AREA (ACRES) = 167.60 AREA-AVERAGED Fm (INCH/HR) = 0.24
AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.18
TOTAL AREA (ACRES) = 167.6 PEAK FLOW RATE (CFS) = 241.02

FLOW PROCESS FROM NODE 237.00 TO NODE 238.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 950.00 DOWNSTREAM (FEET) = 910.00
FLOW LENGTH (FEET) = 3000.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 60.0 INCH PIPE IS 44.3 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 15.49
ESTIMATED PIPE DIAMETER (INCH) = 60.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 241.02
PIPE TRAVEL TIME (MIN.) = 3.23 Tc (MIN.) = 24.98
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 238.00 = 9680.00 FEET.

FLOW PROCESS FROM NODE 238.00 TO NODE 238.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 24.98
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.692
SUBAREA LOSS RATE DATA (AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 64.00 1.33 0.100 17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 64.00 SUBAREA RUNOFF (CFS) = 89.80
EFFECTIVE AREA (ACRES) = 231.60 AREA-AVERAGED Fm (INCH/HR) = 0.21
AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.16
TOTAL AREA (ACRES) = 231.6 PEAK FLOW RATE (CFS) = 308.74

FLOW PROCESS FROM NODE 238.00 TO NODE 239.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 910.00 DOWNSTREAM (FEET) = 888.00
FLOW LENGTH (FEET) = 1300.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 63.0 INCH PIPE IS 46.5 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 18.03
ESTIMATED PIPE DIAMETER (INCH) = 63.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 308.74
PIPE TRAVEL TIME (MIN.) = 1.20 Tc (MIN.) = 26.18
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 239.00 = 10980.00 FEET.

FLOW PROCESS FROM NODE 239.00 TO NODE 239.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 26.18
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.645
SUBAREA LOSS RATE DATA (AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 163.20 1.33 0.100 17
COMMERCIAL A 10.00 1.33 0.100 17

COMMERCIAL A 80.00 1.33 0.100 17
 COMMERCIAL A 0.50 1.33 0.100 17
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 253.70 SUBAREA RUNOFF (CFS) = 345.23
 EFFECTIVE AREA (ACRES) = 485.30 AREA-AVERAGED Fm (INCH/HR) = 0.17
 AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.13
 TOTAL AREA (ACRES) = 485.3 PEAK FLOW RATE (CFS) = 644.16

 FLOW PROCESS FROM NODE 239.00 TO NODE 240.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 888.00 DOWNSTREAM (FEET) = 875.00
 FLOW LENGTH (FEET) = 2250.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 102.0 INCH PIPE IS 74.5 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 14.50
 ESTIMATED PIPE DIAMETER (INCH) = 102.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 644.16
 PIPE TRAVEL TIME (MIN.) = 2.59 Tc (MIN.) = 28.77
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 240.00 = 13230.00 FEET.

 FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 28.77
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.554
 SUBAREA LOSS RATE DATA (AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	5.60	1.33	0.100	17
COMMERCIAL	A	15.70	1.33	0.100	17

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 21.30 SUBAREA RUNOFF (CFS) = 27.25
 EFFECTIVE AREA (ACRES) = 506.60 AREA-AVERAGED Fm (INCH/HR) = 0.17
 AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.13
 TOTAL AREA (ACRES) = 506.6 PEAK FLOW RATE (CFS) = 644.16
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 28.77
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.554
 SUBAREA LOSS RATE DATA (AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	199.70	1.33	0.100	17
COMMERCIAL	B	102.30	0.94	0.100	36

COMMERCIAL C 16.70 0.81 0.100 50
 COMMERCIAL A 57.40 1.33 0.100 17
 PUBLIC PARK A 11.00 1.33 0.850 17
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.23
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.121
 SUBAREA AREA (ACRES) = 387.10 SUBAREA RUNOFF (CFS) = 489.74
 EFFECTIVE AREA (ACRES) = 893.70 AREA-AVERAGED Fm (INCH/HR) = 0.16
 AREA-AVERAGED Fp (INCH/HR) = 1.28 AREA-AVERAGED Ap = 0.12
 TOTAL AREA (ACRES) = 893.7 PEAK FLOW RATE (CFS) = 1121.68

 FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 71

>>>>PEAK FLOW RATE ESTIMATOR CHANGED TO UNIT-HYDROGRAPH METHOD<<<<<
 >>>>USING TIME-OF-CONCENTRATION OF LONGEST FLOWPATH<<<<<

UNIT-HYDROGRAPH DATA:
 RAINFALL (INCH): 5M= 0.33; 30M= 0.68; 1H= 0.90; 3H= 1.60; 6H= 2.31; 24H= 4.36
 S-GRAPH: VALLEY (DEV.)=100.0%; VALLEY (UNDEV.) / DESERT= 0.0%
 MOUNTAIN= 0.0%; FOOTHILL= 0.0%; DESERT (UNDEV.)= 0.0%
 Tc (HR) = 0.48; LAG (HR) = 0.38; Fm (INCH/HR) = 0.16; Ybar = 0.17
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC I CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.96; 30M = 0.96; 1HR = 0.96;
 3HR = 0.99; 6HR = 1.00; 24HR = 1.00
 UNIT-INTERVAL (MIN) = 5.00 TOTAL AREA (ACRES) = 893.7
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 240.00 = 13230.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3, n=.0275; Lca/L=0.4, n=.0247; Lca/L=0.5, n=.0227; Lca/L=0.6, n=.0211
 TIME OF PEAK FLOW (HR) = 16.42 RUNOFF VOLUME (AF) = 271.76
 UNIT-HYDROGRAPH METHOD PEAK FLOW RATE (CFS) = 1053.16
 TOTAL PEAK FLOW RATE (CFS) = 1053.16 (SOURCE FLOW INCLUDED)
 RATIONAL METHOD PEAK FLOW RATE (CFS) = 1121.68
 (UPSTREAM NODE PEAK FLOW RATE (CFS) = 1121.68)
 PEAK FLOW RATE (CFS) USED = 1121.68

 FLOW PROCESS FROM NODE 240.00 TO NODE 242.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 875.00 DOWNSTREAM (FEET) = 860.00
 FLOW LENGTH (FEET) = 350.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 84.0 INCH PIPE IS 65.2 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 34.97
 ESTIMATED PIPE DIAMETER (INCH) = 84.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 1121.68
 PIPE TRAVEL TIME (MIN.) = 0.17 Tc (MIN.) = 28.93
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 242.00 = 13580.00 FEET.

 FLOW PROCESS FROM NODE 242.00 TO NODE 242.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 28.93

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.549
SUBAREA LOSS RATE DATA(AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 9.20 1.33 0.100 17
COMMERCIAL A 107.00 1.33 0.100 17
COMMERCIAL A 10.30 1.33 0.100 17
PUBLIC PARK A 3.70 1.33 0.850 17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.121
SUBAREA AREA(ACRES) = 130.20
UNIT-HYDROGRAPH DATA:
RAINFALL(INCH): 5M= 0.33;30M= 0.68;1H= 0.90;3H= 1.60;6H= 2.31;24H= 4.36
S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
Tc(HR) = 0.48; LAG(HR) = 0.39; Fm(INCH/HR) = 0.16; Ybar = 0.17
USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC I CONDITION.
DEPTH-AREA FACTORS: 5M = 0.95; 30M = 0.95; 1HR = 0.95;
3HR = 0.99; 6HR = 1.00; 24HR= 1.00
UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 1023.9
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 242.00 = 13580.00 FEET.
EQUIVALENT BASIN FACTOR APPROXIMATIONS:
Lca/L=0.3,n=.0275; Lca/L=0.4,n=.0246; Lca/L=0.5,n=.0226;Lca/L=0.6,n=.0211
TIME OF PEAK FLOW(HR) = 16.42 RUNOFF VOLUME(AF) = 311.34
UNIT-HYDROGRAPH PEAK FLOW RATE(CFS) = 1193.25
TOTAL AREA(ACRES) = 1023.9 PEAK FLOW RATE(CFS) = 1193.25

FLOW PROCESS FROM NODE 242.00 TO NODE 243.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 860.00 DOWNSTREAM(FEET) = 840.00
FLOW LENGTH(FEET) = 1400.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 108.0 INCH PIPE IS 79.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.72
ESTIMATED PIPE DIAMETER(INCH) = 108.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 1193.25
PIPE TRAVEL TIME(MIN.) = 0.98 Tc(MIN.) = 29.92
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 243.00 = 14980.00 FEET.

FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====

MAINLINE Tc(MIN.) = 29.92
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.518
SUBAREA LOSS RATE DATA(AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 26.20 1.33 0.100 17
COMMERCIAL A 124.50 1.33 0.100 17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA(ACRES) = 150.70
UNIT-HYDROGRAPH DATA:
RAINFALL(INCH): 5M= 0.33;30M= 0.68;1H= 0.90;3H= 1.60;6H= 2.31;24H= 4.36
S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
Tc(HR) = 0.50; LAG(HR) = 0.40; Fm(INCH/HR) = 0.16; Ybar = 0.17
USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC I CONDITION.
DEPTH-AREA FACTORS: 5M = 0.95; 30M = 0.95; 1HR = 0.95;
3HR = 0.99; 6HR = 1.00; 24HR= 1.00
UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 1174.6
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 243.00 = 14980.00 FEET.
EQUIVALENT BASIN FACTOR APPROXIMATIONS:
Lca/L=0.3,n=.0264; Lca/L=0.4,n=.0237; Lca/L=0.5,n=.0218;Lca/L=0.6,n=.0203
TIME OF PEAK FLOW(HR) = 16.42 RUNOFF VOLUME(AF) = 358.16
UNIT-HYDROGRAPH PEAK FLOW RATE(CFS) = 1324.55
TOTAL AREA(ACRES) = 1174.6 PEAK FLOW RATE(CFS) = 1324.55

FLOW PROCESS FROM NODE 243.00 TO NODE 300.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 840.00 DOWNSTREAM(FEET) = 835.00
FLOW LENGTH(FEET) = 1300.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 138.0 INCH PIPE IS 112.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.61
ESTIMATED PIPE DIAMETER(INCH) = 138.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 1324.55
PIPE TRAVEL TIME(MIN.) = 1.48 Tc(MIN.) = 31.40
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 300.00 = 16280.00 FEET.

FLOW PROCESS FROM NODE 300.00 TO NODE 300.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====

MAINLINE Tc(MIN.) = 31.40
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.475
SUBAREA LOSS RATE DATA(AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 51.60 1.33 0.100 17
COMMERCIAL A 142.40 1.33 0.100 17
COMMERCIAL B 5.00 0.94 0.100 36
COMMERCIAL A 1.90 1.33 0.100 17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.32
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 200.90
UNIT-HYDROGRAPH DATA:
RAINFALL(INCH): 5M= 0.33;30M= 0.68;1H= 0.90;3H= 1.60;6H= 2.31;24H= 4.36
S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
Tc(HR) = 0.52; LAG(HR) = 0.42; Fm(INCH/HR) = 0.15; Ybar = 0.17
USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC I CONDITION.
DEPTH-AREA FACTORS: 5M = 0.94; 30M = 0.94; 1HR = 0.94;

3HR = 0.99; 6HR = 1.00; 24HR= 1.00
 UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 1375.5
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 300.00 = 16280.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3,n=.0258; Lca/L=0.4,n=.0231; Lca/L=0.5,n=.0212;Lca/L=0.6,n=.0198
 TIME OF PEAK FLOW(HR) = 16.50 RUNOFF VOLUME(AF) = 420.53
 UNIT-HYDROGRAPH PEAK FLOW RATE(CFS) = 1523.12
 TOTAL AREA(ACRES) = 1375.5 PEAK FLOW RATE(CFS) = 1523.12

 FLOW PROCESS FROM NODE 300.00 TO NODE 300.00 IS CODE = 11

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

** MAIN STREAM CONFLUENCE DATA **
 PEAK FLOW RATE(CFS) = 1523.12 Tc(MIN.) = 31.40
 AREA-AVERAGED Fm (INCH/HR) = 0.15 Ybar = 0.17
 TOTAL AREA(ACRES) = 1375.5
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 300.00 = 16280.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **
 PEAK FLOW RATE(CFS) = 1974.42 Tc(MIN.) = 39.62
 AREA-AVERAGED Fm (INCH/HR) = 0.16 Ybar = 0.17
 TOTAL AREA(ACRES) = 1968.3
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 300.00 = 23640.00 FEET.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 UNIT-HYDROGRAPH DATA:
 RAINFALL (INCH): 5M= 0.33;30M= 0.68;1H= 0.90;3H= 1.60;6H= 2.31;24H= 4.36
 S-GRAPH: VALLEY (DEV.)=100.0%;VALLEY (UNDEV.) /DESERT= 0.0%
 MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT (UNDEV.)= 0.0%
 Tc (HR) = 0.66; LAG (HR) = 0.53; Fm (INCH/HR) = 0.16; Ybar = 0.17
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC I CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.85; 30M = 0.85; 1HR = 0.85;
 3HR = 0.98; 6HR = 0.99; 24HR= 0.99
 UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 3343.8
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 300.00 = 23640.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3,n=.0227; Lca/L=0.4,n=.0203; Lca/L=0.5,n=.0187;Lca/L=0.6,n=.0174
 TIME OF PEAK FLOW(HR) = 16.58 RUNOFF VOLUME(AF) = 1015.52
 PEAK FLOW RATE(CFS) = 2973.36

 FLOW PROCESS FROM NODE 300.00 TO NODE 300.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<<
 =====

 FLOW PROCESS FROM NODE 300.00 TO NODE 301.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 835.00 DOWNSTREAM(FEET) = 825.00

FLOW LENGTH(FEET) = 880.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 120.0 INCH PIPE IS 92.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 22.83
 ESTIMATED PIPE DIAMETER(INCH) = 120.00 NUMBER OF PIPES = 2
 PIPE-FLOW(CFS) = 2973.36
 PIPE TRAVEL TIME(MIN.) = 0.64 Tc(MIN.) = 40.26
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 301.00 = 24520.00 FEET.

 FLOW PROCESS FROM NODE 301.00 TO NODE 301.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<
 =====

MAINLINE Tc(MIN.) = 40.26
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.270
 SUBAREA LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	30.90	1.33	0.100	17
COMMERCIAL	A	81.90	1.33	0.100	17
COMMERCIAL	B	24.40	0.94	0.100	36
COMMERCIAL	A	7.50	1.33	0.100	17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.26
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 144.70

UNIT-HYDROGRAPH DATA:
 RAINFALL (INCH): 5M= 0.33;30M= 0.68;1H= 0.90;3H= 1.60;6H= 2.31;24H= 4.36
 S-GRAPH: VALLEY (DEV.)=100.0%;VALLEY (UNDEV.) /DESERT= 0.0%
 MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT (UNDEV.)= 0.0%
 Tc (HR) = 0.67; LAG (HR) = 0.54; Fm (INCH/HR) = 0.15; Ybar = 0.17
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC I CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.84; 30M = 0.84; 1HR = 0.84;
 3HR = 0.98; 6HR = 0.99; 24HR= 0.99

UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 3488.5
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 301.00 = 24520.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3,n=.0225; Lca/L=0.4,n=.0202; Lca/L=0.5,n=.0185;Lca/L=0.6,n=.0173
 TIME OF PEAK FLOW(HR) = 16.58 RUNOFF VOLUME(AF) = 1059.90
 UNIT-HYDROGRAPH PEAK FLOW RATE(CFS) = 3056.84
 TOTAL AREA(ACRES) = 3488.5 PEAK FLOW RATE(CFS) = 3056.84

 FLOW PROCESS FROM NODE 301.00 TO NODE 400.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 825.00 DOWNSTREAM(FEET) = 800.00
 FLOW LENGTH(FEET) = 2200.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 120.0 INCH PIPE IS 95.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 22.87
 ESTIMATED PIPE DIAMETER(INCH) = 120.00 NUMBER OF PIPES = 2
 PIPE-FLOW(CFS) = 3056.84
 PIPE TRAVEL TIME(MIN.) = 1.60 Tc(MIN.) = 41.86
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 400.00 = 26720.00 FEET.

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*****
FLOW PROCESS FROM NODE 400.00 TO NODE 400.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
PEAK FLOW RATE(CFS) = 3056.84 Tc(MIN.) = 41.86
AREA-AVERAGED Fm(INCH/HR) = 0.15 Ybar = 0.17
TOTAL AREA(ACRES) = 3488.5

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FLOW PROCESS FROM NODE 302.00 TO NODE 303.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 1060.00
ELEVATION DATA: UPSTREAM(FEET) = 825.00 DOWNSTREAM(FEET) = 820.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 14.397
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.355
SUBAREA Tc AND LOSS RATE DATA(AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 4.40 1.33 0.100 17 14.40
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 8.80
TOTAL AREA(ACRES) = 4.40 PEAK FLOW RATE(CFS) = 8.80

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*****
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) = 820.00 DOWNSTREAM(FEET) = 815.00
FLOW LENGTH(FEET) = 840.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.05
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 8.80
PIPE TRAVEL TIME(MIN.) = 2.77 Tc(MIN.) = 17.17
LONGEST FLOWPATH FROM NODE 302.00 TO NODE 304.00 = 1900.00 FEET.

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*****
FLOW PROCESS FROM NODE 304.00 TO NODE 304.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.17
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.119
SUBAREA LOSS RATE DATA(AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 10.10 1.33 0.100 17
COMMERCIAL B 2.60 0.94 0.100 36
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.25
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 12.70 SUBAREA RUNOFF(CFS) = 22.79
EFFECTIVE AREA(ACRES) = 36.30 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 1.30 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 36.3 PEAK FLOW RATE(CFS) = 64.97

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LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 19.20 1.33 0.100 17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 19.20 SUBAREA RUNOFF(CFS) = 34.32
EFFECTIVE AREA(ACRES) = 23.60 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 23.6 PEAK FLOW RATE(CFS) = 42.18

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*****
FLOW PROCESS FROM NODE 304.00 TO NODE 304.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.17
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.119
SUBAREA LOSS RATE DATA(AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 10.10 1.33 0.100 17
COMMERCIAL B 2.60 0.94 0.100 36
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.25
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 12.70 SUBAREA RUNOFF(CFS) = 22.79
EFFECTIVE AREA(ACRES) = 36.30 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 1.30 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 36.3 PEAK FLOW RATE(CFS) = 64.97

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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) = 815.00 DOWNSTREAM(FEET) = 810.00
FLOW LENGTH(FEET) = 650.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 29.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.16
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 64.97
PIPE TRAVEL TIME(MIN.) = 1.18 Tc(MIN.) = 18.35
LONGEST FLOWPATH FROM NODE 302.00 TO NODE 305.00 = 2550.00 FEET.

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*****
FLOW PROCESS FROM NODE 305.00 TO NODE 305.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.35
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.036
SUBAREA LOSS RATE DATA(AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 24.20 1.33 0.100 17
COMMERCIAL A 6.70 1.33 0.100 17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33

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SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 30.90 SUBAREA RUNOFF (CFS) = 52.92
 EFFECTIVE AREA (ACRES) = 67.20 AREA-AVERAGED Fm (INCH/HR) = 0.13
 AREA-AVERAGED Fp (INCH/HR) = 1.31 AREA-AVERAGED Ap = 0.10
 TOTAL AREA (ACRES) = 67.2 PEAK FLOW RATE (CFS) = 115.18

PIPE-FLOW VELOCITY (FEET/SEC.) = 10.17
 ESTIMATED PIPE DIAMETER (INCH) = 66.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 200.23
 PIPE TRAVEL TIME (MIN.) = 0.33 Tc (MIN.) = 21.08
 LONGEST FLOWPATH FROM NODE 302.00 TO NODE 400.00 = 4150.00 FEET.

 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) = 810.00 DOWNSTREAM (FEET) = 801.00
 FLOW LENGTH (FEET) = 1400.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 51.0 INCH PIPE IS 39.7 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 9.71
 ESTIMATED PIPE DIAMETER (INCH) = 51.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 115.18
 PIPE TRAVEL TIME (MIN.) = 2.40 Tc (MIN.) = 20.75
 LONGEST FLOWPATH FROM NODE 302.00 TO NODE 306.00 = 3950.00 FEET.

 FLOW PROCESS FROM NODE 306.00 TO NODE 306.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 20.75
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.891
 SUBAREA LOSS RATE DATA (AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	18.70	1.33	0.100	17
RESIDENTIAL "5-7 DWELLINGS/ACRE"	A	24.10	1.33	0.500	17
RESIDENTIAL "5-7 DWELLINGS/ACRE"	C	14.40	0.81	0.500	50
RESIDENTIAL "11+ DWELLINGS/ACRE"	A	2.80	1.33	0.200	17
PUBLIC PARK	A	4.30	1.33	0.850	17
SCHOOL	A	11.50	1.33	0.600	17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.21
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.425
 SUBAREA AREA (ACRES) = 75.80 SUBAREA RUNOFF (CFS) = 93.81
 EFFECTIVE AREA (ACRES) = 143.00 AREA-AVERAGED Fm (INCH/HR) = 0.34
 AREA-AVERAGED Fp (INCH/HR) = 1.23 AREA-AVERAGED Ap = 0.27
 TOTAL AREA (ACRES) = 143.0 PEAK FLOW RATE (CFS) = 200.23

 FLOW PROCESS FROM NODE 306.00 TO NODE 400.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 801.00 DOWNSTREAM (FEET) = 800.00
 FLOW LENGTH (FEET) = 200.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 66.0 INCH PIPE IS 51.0 INCHES

 FLOW PROCESS FROM NODE 400.00 TO NODE 400.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION (MIN.) = 21.08
 RAINFALL INTENSITY (INCH/HR) = 1.87
 AREA-AVERAGED Fm (INCH/HR) = 0.34
 AREA-AVERAGED Fp (INCH/HR) = 1.23
 AREA-AVERAGED Ap = 0.27
 EFFECTIVE STREAM AREA (ACRES) = 143.00
 TOTAL STREAM AREA (ACRES) = 143.00
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 200.23
 ** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	AREA (ACRES)	HEADWATER NODE
1	3056.84	41.86	3488.50	120.00
2	200.23	21.08	143.00	302.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 UNIT-HYDROGRAPH DATA:
 RAINFALL (INCH): 5M= 0.33;30M= 0.68;1H= 0.90;3H= 1.60;6H= 2.31;24H= 4.36
 S-GRAPH: VALLEY (DEV.)=100.0%;VALLEY (UNDEV.)/DESERT= 0.0%
 MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT (UNDEV.)= 0.0%
 Tc (HR) = 0.70; LAG (HR) = 0.56; Fm (INCH/HR) = 0.16; Ybar = 0.17
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC I CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.84; 30M = 0.84; 1HR = 0.84;
 3HR = 0.98; 6HR = 0.99; 24HR = 0.99
 UNIT-INTERVAL (MIN) = 5.00 TOTAL AREA (ACRES) = 3631.5
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 400.00 = 26720.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3,n=.0220; Lca/L=0.4,n=.0198; Lca/L=0.5,n=.0182;Lca/L=0.6,n=.0169
 TIME OF PEAK FLOW (HR) = 16.58 RUNOFF VOLUME (AF) = 1095.85
 PEAK FLOW RATE (CFS) = 3060.32

 FLOW PROCESS FROM NODE 400.00 TO NODE 432.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 800.00 DOWNSTREAM (FEET) = 786.00
 FLOW LENGTH (FEET) = 2400.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 138.0 INCH PIPE IS 105.6 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 17.94
 ESTIMATED PIPE DIAMETER (INCH) = 138.00 NUMBER OF PIPES = 2
 PIPE-FLOW (CFS) = 3060.32

PIPE TRAVEL TIME(MIN.) = 2.23 Tc(MIN.) = 44.09
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 432.00 = 29120.00 FEET.

FLOW PROCESS FROM NODE 432.00 TO NODE 432.00 IS CODE = 10

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

FLOW PROCESS FROM NODE 401.00 TO NODE 402.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 550.00
ELEVATION DATA: UPSTREAM(FEET) = 855.00 DOWNSTREAM(FEET) = 845.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.455
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.241

SUBAREA Tc AND LOSS RATE DATA(AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 2.20 1.33 0.100 17 8.45
COMMERCIAL A 6.20 1.33 0.100 17 8.45

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 23.50
TOTAL AREA(ACRES) = 8.40 PEAK FLOW RATE(CFS) = 23.50

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) = 845.00 DOWNSTREAM(FEET) = 840.00
FLOW LENGTH(FEET) = 920.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.20
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 23.50
PIPE TRAVEL TIME(MIN.) = 2.47 Tc(MIN.) = 10.93
LONGEST FLOWPATH FROM NODE 401.00 TO NODE 403.00 = 1470.00 FEET.

FLOW PROCESS FROM NODE 403.00 TO NODE 403.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.93
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.779
SUBAREA LOSS RATE DATA(AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

COMMERCIAL A 3.10 1.33 0.100 17
COMMERCIAL A 20.70 1.33 0.100 17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 23.80 SUBAREA RUNOFF(CFS) = 56.67
EFFECTIVE AREA(ACRES) = 32.20 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 32.2 PEAK FLOW RATE(CFS) = 76.67

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) = 840.00 DOWNSTREAM(FEET) = 830.00
FLOW LENGTH(FEET) = 1300.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 33.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.35
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 76.67
PIPE TRAVEL TIME(MIN.) = 2.32 Tc(MIN.) = 13.24
LONGEST FLOWPATH FROM NODE 401.00 TO NODE 404.00 = 2770.00 FEET.

FLOW PROCESS FROM NODE 404.00 TO NODE 404.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 13.24
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.476
SUBAREA LOSS RATE DATA(AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 2.20 1.33 0.100 17
COMMERCIAL A 34.10 1.33 0.100 17
PUBLIC PARK A 11.50 1.33 0.850 17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.280
SUBAREA AREA(ACRES) = 47.80 SUBAREA RUNOFF(CFS) = 90.48
EFFECTIVE AREA(ACRES) = 80.00 AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.21
TOTAL AREA(ACRES) = 80.0 PEAK FLOW RATE(CFS) = 158.37

FLOW PROCESS FROM NODE 404.00 TO NODE 405.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 830.00 DOWNSTREAM(FEET) = 825.00
FLOW LENGTH(FEET) = 1050.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 60.0 INCH PIPE IS 48.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.33
ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 158.37

PIPE TRAVEL TIME(MIN.) = 1.88 Tc(MIN.) = 15.12
LONGEST FLOWPATH FROM NODE 401.00 TO NODE 405.00 = 3820.00 FEET.

DEPTH(FEET) = 2.58 FLOW VELOCITY(FEET/SEC.) = 5.12
LONGEST FLOWPATH FROM NODE 401.00 TO NODE 406.00 = 5970.00 FEET.

FLOW PROCESS FROM NODE 405.00 TO NODE 405.00 IS CODE = 81

FLOW PROCESS FROM NODE 406.00 TO NODE 420.00 IS CODE = 51

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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

=====

MAINLINE Tc(MIN.) = 15.12
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.287
SUBAREA LOSS RATE DATA(AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 6.10 1.33 0.100 17
COMMERCIAL A 13.90 1.33 0.100 17
PUBLIC PARK A 2.40 1.33 0.850 17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.180
SUBAREA AREA(ACRES) = 22.40 SUBAREA RUNOFF(CFS) = 41.27
EFFECTIVE AREA(ACRES) = 102.40 AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.20
TOTAL AREA(ACRES) = 102.4 PEAK FLOW RATE(CFS) = 186.03

=====

ELEVATION DATA: UPSTREAM(FEET) = 805.00 DOWNSTREAM(FEET) = 801.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 400.00 CHANNEL SLOPE = 0.0100
CHANNEL BASE(FEET) = 9.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 7.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.761
SUBAREA LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
PUBLIC PARK A 0.30 1.33 0.850 17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 221.35
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.26
AVERAGE FLOW DEPTH(FEET) = 2.54 TRAVEL TIME(MIN.) = 1.27
Tc(MIN.) = 23.36

FLOW PROCESS FROM NODE 405.00 TO NODE 406.00 IS CODE = 51

=====

SUBAREA AREA(ACRES) = 0.30 SUBAREA RUNOFF(CFS) = 0.17
EFFECTIVE AREA(ACRES) = 175.30 AREA-AVERAGED Fm(INCH/HR) = 0.42
AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 175.3 PEAK FLOW RATE(CFS) = 221.27
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 825.00 DOWNSTREAM(FEET) = 805.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 2150.00 CHANNEL SLOPE = 0.0093
CHANNEL BASE(FEET) = 9.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 7.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.821
SUBAREA LOSS RATE DATA(AMC I):

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.54 FLOW VELOCITY(FEET/SEC.) = 5.25
LONGEST FLOWPATH FROM NODE 401.00 TO NODE 420.00 = 6370.00 FEET.

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 13.90 1.33 0.100 17
RESIDENTIAL
"5-7 DWELLINGS/ACRE" A 37.30 1.33 0.500 17
RESIDENTIAL
"11+ DWELLINGS/ACRE" A 1.20 1.33 0.200 17
PUBLIC PARK A 7.30 1.33 0.850 17
SCHOOL A 12.90 1.33 0.600 17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.471
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 225.43
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.14
AVERAGE FLOW DEPTH(FEET) = 2.61 TRAVEL TIME(MIN.) = 6.97
Tc(MIN.) = 22.09
SUBAREA AREA(ACRES) = 72.60 SUBAREA RUNOFF(CFS) = 78.10
EFFECTIVE AREA(ACRES) = 175.00 AREA-AVERAGED Fm(INCH/HR) = 0.42
AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 175.0 PEAK FLOW RATE(CFS) = 221.27

FLOW PROCESS FROM NODE 420.00 TO NODE 420.00 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.) = 23.36
RAINFALL INTENSITY(INCH/HR) = 1.76
AREA-AVERAGED Fm(INCH/HR) = 0.42
AREA-AVERAGED Fp(INCH/HR) = 1.33
AREA-AVERAGED Ap = 0.31
EFFECTIVE STREAM AREA(ACRES) = 175.30
TOTAL STREAM AREA(ACRES) = 175.30
PEAK FLOW RATE(CFS) AT CONFLUENCE = 221.27

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

FLOW PROCESS FROM NODE 410.00 TO NODE 411.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 830.00
ELEVATION DATA: UPSTREAM (FEET) = 855.00 DOWNSTREAM (FEET) = 838.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.733
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.978
SUBAREA Tc AND LOSS RATE DATA (AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 5.10 1.33 0.100 17 9.73
PUBLIC PARK A 4.40 1.33 0.850 17 15.46
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.447
SUBAREA RUNOFF (CFS) = 20.38
TOTAL AREA (ACRES) = 9.50 PEAK FLOW RATE (CFS) = 20.38

FLOW PROCESS FROM NODE 411.00 TO NODE 412.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 838.00 DOWNSTREAM (FEET) = 832.00
FLOW LENGTH (FEET) = 1400.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.2 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 5.49
ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 20.38
PIPE TRAVEL TIME (MIN.) = 4.25 Tc (MIN.) = 13.98
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 412.00 = 2230.00 FEET.

FLOW PROCESS FROM NODE 412.00 TO NODE 412.00 IS CODE = 81

>>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW <<<<<

=====

MAINLINE Tc (MIN.) = 13.98
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.396
SUBAREA LOSS RATE DATA (AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 0.90 1.33 0.100 17
COMMERCIAL A 23.60 1.33 0.100 17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 24.50 SUBAREA RUNOFF (CFS) = 49.91
EFFECTIVE AREA (ACRES) = 34.00 AREA-AVERAGED Fm (INCH/HR) = 0.26
AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.20
TOTAL AREA (ACRES) = 34.0 PEAK FLOW RATE (CFS) = 65.32

FLOW PROCESS FROM NODE 412.00 TO NODE 415.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 832.00 DOWNSTREAM (FEET) = 810.00
FLOW LENGTH (FEET) = 1900.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 26.9 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 10.69
ESTIMATED PIPE DIAMETER (INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 65.32
PIPE TRAVEL TIME (MIN.) = 2.96 Tc (MIN.) = 16.94
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 415.00 = 4130.00 FEET.

FLOW PROCESS FROM NODE 415.00 TO NODE 415.00 IS CODE = 81

>>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW <<<<<

=====

MAINLINE Tc (MIN.) = 16.94
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.135
SUBAREA LOSS RATE DATA (AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 0.50 1.33 0.100 17
COMMERCIAL A 42.00 1.33 0.100 17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 42.50 SUBAREA RUNOFF (CFS) = 76.60
EFFECTIVE AREA (ACRES) = 76.50 AREA-AVERAGED Fm (INCH/HR) = 0.19
AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.14
TOTAL AREA (ACRES) = 76.5 PEAK FLOW RATE (CFS) = 133.94

FLOW PROCESS FROM NODE 415.00 TO NODE 415.00 IS CODE = 81

>>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW <<<<<

=====

MAINLINE Tc (MIN.) = 16.94
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.135
SUBAREA LOSS RATE DATA (AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 18.40 1.33 0.100 17
COMMERCIAL A 68.40 1.33 0.100 17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 86.80 SUBAREA RUNOFF (CFS) = 156.45
EFFECTIVE AREA (ACRES) = 163.30 AREA-AVERAGED Fm (INCH/HR) = 0.16
AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.12
TOTAL AREA (ACRES) = 163.3 PEAK FLOW RATE (CFS) = 290.39

FLOW PROCESS FROM NODE 415.00 TO NODE 420.00 IS CODE = 51

>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<
>>>> TRAVEL TIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 810.00 DOWNSTREAM (FEET) = 801.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 2780.00 CHANNEL SLOPE = 0.0032
CHANNEL BASE (FEET) = 9.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 7.00
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.543
 SUBAREA LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	9.34	1.33	0.100	17
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	27.60	1.33	0.500	17
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	A	1.20	1.33	0.200	17
PUBLIC PARK	A	5.66	1.33	0.850	17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.452
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 309.09
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.80
 AVERAGE FLOW DEPTH(FEET) = 3.92 TRAVEL TIME(MIN.) = 12.19
 Tc(MIN.) = 29.14
 SUBAREA AREA(ACRES) = 43.80 SUBAREA RUNOFF(CFS) = 37.16
 EFFECTIVE AREA(ACRES) = 207.10 AREA-AVERAGED Fm(INCH/HR) = 0.25
 AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.19
 TOTAL AREA(ACRES) = 207.1 PEAK FLOW RATE(CFS) = 290.39
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 3.80 FLOW VELOCITY(FEET/SEC.) = 3.74
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 420.00 = 6910.00 FEET.

1	493.54	23.36	1.761	1.33(0.34)	0.25	341.3	401.00
2	475.61	29.14	1.543	1.33(0.33)	0.25	382.4	410.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 493.54 Tc(MIN.) = 23.36
 EFFECTIVE AREA(ACRES) = 341.31 AREA-AVERAGED Fm(INCH/HR) = 0.34
 AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.25
 TOTAL AREA(ACRES) = 382.4
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 420.00 = 6910.00 FEET.

 FLOW PROCESS FROM NODE 420.00 TO NODE 430.00 IS CODE = 51

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 801.00 DOWNSTREAM(FEET) = 790.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 3500.00 CHANNEL SLOPE = 0.0031
 CHANNEL BASE(FEET) = 12.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.341

SUBAREA LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	29.80	1.33	0.100	17
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	98.30	1.33	0.500	17
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	A	21.20	1.33	0.200	17
COMMERCIAL	A	7.00	1.33	0.100	17
PUBLIC PARK	A	16.70	1.33	0.850	17
PUBLIC PARK	A	3.60	1.33	0.850	17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.421
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 556.38
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.34
 AVERAGE FLOW DEPTH(FEET) = 4.83 TRAVEL TIME(MIN.) = 13.43
 Tc(MIN.) = 36.79
 SUBAREA AREA(ACRES) = 176.60 SUBAREA RUNOFF(CFS) = 124.32
 EFFECTIVE AREA(ACRES) = 517.91 AREA-AVERAGED Fm(INCH/HR) = 0.41
 AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.31
 TOTAL AREA(ACRES) = 559.0 PEAK FLOW RATE(CFS) = 493.54
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 4.57 FLOW VELOCITY(FEET/SEC.) = 4.21
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 430.00 = 10410.00 FEET.

 FLOW PROCESS FROM NODE 430.00 TO NODE 430.00 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.) = 36.79

 FLOW PROCESS FROM NODE 420.00 TO NODE 420.00 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.) = 29.14
 RAINFALL INTENSITY(INCH/HR) = 1.54
 AREA-AVERAGED Fm(INCH/HR) = 0.25
 AREA-AVERAGED Fp(INCH/HR) = 1.33
 AREA-AVERAGED Ap = 0.19
 EFFECTIVE STREAM AREA(ACRES) = 207.10
 TOTAL STREAM AREA(ACRES) = 207.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 290.39

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	221.27	23.36	1.761	1.33(0.42)	0.31	175.3	401.00
2	290.39	29.14	1.543	1.33(0.25)	0.19	207.1	410.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	221.27	23.36	1.761	1.33(0.42)	0.31	175.3	401.00
2	290.39	29.14	1.543	1.33(0.25)	0.19	207.1	410.00

RAINFALL INTENSITY (INCH/HR) = 1.34
 AREA-AVERAGED Fm (INCH/HR) = 0.41
 AREA-AVERAGED Fp (INCH/HR) = 1.33
 AREA-AVERAGED Ap = 0.31
 EFFECTIVE STREAM AREA (ACRES) = 517.91
 TOTAL STREAM AREA (ACRES) = 559.00
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 493.54

FLOW LENGTH (FEET) = 900.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 42.0 INCH PIPE IS 33.0 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 5.02
 ESTIMATED PIPE DIAMETER (INCH) = 42.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 40.68
 PIPE TRAVEL TIME (MIN.) = 2.99 Tc (MIN.) = 16.24
 LONGEST FLOWPATH FROM NODE 421.00 TO NODE 423.00 = 1980.00 FEET.

 FLOW PROCESS FROM NODE 421.00 TO NODE 422.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====
 INITIAL SUBAREA FLOW-LENGTH (FEET) = 1080.00
 ELEVATION DATA: UPSTREAM (FEET) = 840.00 DOWNSTREAM (FEET) = 832.00

$Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 13.253
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.475
 SUBAREA Tc AND LOSS RATE DATA (AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	0.80	1.33	0.100	17	13.25
COMMERCIAL	A	9.30	1.33	0.100	17	13.25

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF (CFS) = 21.29
 TOTAL AREA (ACRES) = 10.10 PEAK FLOW RATE (CFS) = 21.29

 FLOW PROCESS FROM NODE 422.00 TO NODE 422.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====
 MAINLINE Tc (MIN.) = 13.25
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.475
 SUBAREA LOSS RATE DATA (AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	0.80	1.33	0.100	17
COMMERCIAL	A	8.40	1.33	0.100	17

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 9.20 SUBAREA RUNOFF (CFS) = 19.39
 EFFECTIVE AREA (ACRES) = 19.30 AREA-AVERAGED Fm (INCH/HR) = 0.13
 AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.10
 TOTAL AREA (ACRES) = 19.3 PEAK FLOW RATE (CFS) = 40.68

 FLOW PROCESS FROM NODE 422.00 TO NODE 423.00 IS CODE = 31

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

=====
 ELEVATION DATA: UPSTREAM (FEET) = 832.00 DOWNSTREAM (FEET) = 830.00

 FLOW PROCESS FROM NODE 423.00 TO NODE 423.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====
 MAINLINE Tc (MIN.) = 16.24
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.190
 SUBAREA LOSS RATE DATA (AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	11.20	1.33	0.100	17
COMMERCIAL	A	7.90	1.33	0.100	17
COMMERCIAL	A	9.00	1.33	0.100	17
PUBLIC PARK	A	4.50	1.33	0.850	17

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.204
 SUBAREA AREA (ACRES) = 32.60 SUBAREA RUNOFF (CFS) = 56.34
 EFFECTIVE AREA (ACRES) = 51.90 AREA-AVERAGED Fm (INCH/HR) = 0.22
 AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.17
 TOTAL AREA (ACRES) = 51.9 PEAK FLOW RATE (CFS) = 92.08

 FLOW PROCESS FROM NODE 423.00 TO NODE 424.00 IS CODE = 31

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

=====
 ELEVATION DATA: UPSTREAM (FEET) = 830.00 DOWNSTREAM (FEET) = 818.00
 FLOW LENGTH (FEET) = 750.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 31.5 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 12.84
 ESTIMATED PIPE DIAMETER (INCH) = 39.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 92.08
 PIPE TRAVEL TIME (MIN.) = 0.97 Tc (MIN.) = 17.21
 LONGEST FLOWPATH FROM NODE 421.00 TO NODE 424.00 = 2730.00 FEET.

 FLOW PROCESS FROM NODE 424.00 TO NODE 424.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====
 MAINLINE Tc (MIN.) = 17.21
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.115
 SUBAREA LOSS RATE DATA (AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	8.00	1.33	0.100	17
PUBLIC PARK	A	3.00	1.33	0.850	17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.305
 SUBAREA AREA(ACRES) = 11.00 SUBAREA RUNOFF(CFS) = 16.94
 EFFECTIVE AREA(ACRES) = 62.90 AREA-AVERAGED Fm(INCH/HR) = 0.25
 AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.19
 TOTAL AREA(ACRES) = 62.9 PEAK FLOW RATE(CFS) = 105.50

 FLOW PROCESS FROM NODE 424.00 TO NODE 425.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 818.00 DOWNSTREAM(FEET) = 800.00
 FLOW LENGTH(FEET) = 2700.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 51.0 INCH PIPE IS 36.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 9.77
 ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 105.50
 PIPE TRAVEL TIME(MIN.) = 4.61 Tc(MIN.) = 21.82
 LONGEST FLOWPATH FROM NODE 421.00 TO NODE 425.00 = 5430.00 FEET.

 FLOW PROCESS FROM NODE 425.00 TO NODE 425.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 21.82
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.835
 SUBAREA LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	51.80	1.33	0.100	17
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	76.20	1.33	0.500	17
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	A	17.20	1.33	0.200	17
PUBLIC PARK	A	12.60	1.33	0.850	17
PUBLIC PARK	A	4.80	1.33	0.850	17
PUBLIC PARK	A	8.20	1.33	0.850	17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.401
 SUBAREA AREA(ACRES) = 170.80 SUBAREA RUNOFF(CFS) = 200.17
 EFFECTIVE AREA(ACRES) = 233.70 AREA-AVERAGED Fm(INCH/HR) = 0.46
 AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.34
 TOTAL AREA(ACRES) = 233.7 PEAK FLOW RATE(CFS) = 289.79

 FLOW PROCESS FROM NODE 425.00 TO NODE 430.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 800.00 DOWNSTREAM(FEET) = 790.00
 FLOW LENGTH(FEET) = 1060.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 66.0 INCH PIPE IS 53.7 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 14.00
 ESTIMATED PIPE DIAMETER(INCH) = 66.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 289.79
 PIPE TRAVEL TIME(MIN.) = 1.26 Tc(MIN.) = 23.08
 LONGEST FLOWPATH FROM NODE 421.00 TO NODE 430.00 = 6490.00 FEET.

 FLOW PROCESS FROM NODE 430.00 TO NODE 430.00 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.) = 23.08
 RAINFALL INTENSITY(INCH/HR) = 1.77
 AREA-AVERAGED Fm(INCH/HR) = 0.46
 AREA-AVERAGED Fp(INCH/HR) = 1.33
 AREA-AVERAGED Ap = 0.34
 EFFECTIVE STREAM AREA(ACRES) = 233.70
 TOTAL STREAM AREA(ACRES) = 233.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 289.79

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	493.54	36.79	1.341	1.33(0.41)	0.31	517.9	401.00
1	475.61	42.73	1.226	1.33(0.40)	0.30	559.0	410.00
2	289.79	23.08	1.774	1.33(0.46)	0.34	233.7	421.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	743.86	23.08	1.774	1.33(0.43)	0.32	558.7	421.00
2	688.12	36.79	1.341	1.33(0.43)	0.32	751.6	401.00
3	652.58	42.73	1.226	1.33(0.42)	0.31	792.7	410.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 743.86 Tc(MIN.) = 23.08
 EFFECTIVE AREA(ACRES) = 558.69 AREA-AVERAGED Fm(INCH/HR) = 0.43
 AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.32
 TOTAL AREA(ACRES) = 792.7
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 430.00 = 10410.00 FEET.

 FLOW PROCESS FROM NODE 430.00 TO NODE 430.00 IS CODE = 71

>>>>PEAK FLOW RATE ESTIMATOR CHANGED TO UNIT-HYDROGRAPH METHOD<<<<<
 >>>>USING TIME-OF-CONCENTRATION OF LONGEST FLOWPATH<<<<<

=====

UNIT-HYDROGRAPH DATA:
 RAINFALL(INCH): 5M= 0.33;30M= 0.68;1H= 0.90;3H= 1.60;6H= 2.31;24H= 4.36
 S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%

MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
Tc(HR) = 0.71; LAG(HR) = 0.57; Fm(INCH/HR) = 0.42; Ybar = 0.35
USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC I CONDITION.
DEPTH-AREA FACTORS: 5M = 0.96; 30M = 0.96; 1HR = 0.96;
3HR = 0.99; 6HR = 1.00; 24HR= 1.00
UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 792.7
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 430.00 = 10410.00 FEET.
EQUIVALENT BASIN FACTOR APPROXIMATIONS:
Lca/L=0.3,n=.0435; Lca/L=0.4,n=.0390; Lca/L=0.5,n=.0358;Lca/L=0.6,n=.0334
TIME OF PEAK FLOW(HR) = 16.58 RUNOFF VOLUME(AF) = 191.54
UNIT-HYDROGRAPH METHOD PEAK FLOW RATE(CFS) = 638.39
TOTAL PEAK FLOW RATE(CFS) = 638.39 (SOURCE FLOW INCLUDED)
RATIONAL METHOD PEAK FLOW RATE(CFS) = 743.86
(UPSTREAM NODE PEAK FLOW RATE(CFS) = 743.86)
PEAK FLOW RATE(CFS) USED = 743.86

FLOW PROCESS FROM NODE 430.00 TO NODE 431.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 790.00 DOWNSTREAM(FEET) = 788.00
FLOW LENGTH(FEET) = 1300.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 132.0 INCH PIPE IS 107.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.97
ESTIMATED PIPE DIAMETER(INCH) = 132.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 743.86
PIPE TRAVEL TIME(MIN.) = 2.41 Tc(MIN.) = 45.14
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 431.00 = 11710.00 FEET.

FLOW PROCESS FROM NODE 431.00 TO NODE 431.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 45.14
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.186
SUBAREA LOSS RATE DATA(AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 5.60 1.33 0.100 17
PUBLIC PARK A 7.40 1.33 0.850 17
PUBLIC PARK A 5.30 1.33 0.850 17
SCHOOL A 17.30 1.33 0.600 17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.611
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 35.60
UNIT-HYDROGRAPH DATA:
RAINFALL(INCH): 5M= 0.33;30M= 0.68;1H= 0.90;3H= 1.60;6H= 2.31;24H= 4.36
S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
Tc(HR) = 0.75; LAG(HR) = 0.60; Fm(INCH/HR) = 0.43; Ybar = 0.36
USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC I CONDITION.

DEPTH-AREA FACTORS: 5M = 0.96; 30M = 0.96; 1HR = 0.96;
3HR = 0.99; 6HR = 1.00; 24HR= 1.00
UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 828.3
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 431.00 = 11710.00 FEET.
EQUIVALENT BASIN FACTOR APPROXIMATIONS:
Lca/L=0.3,n=.0413; Lca/L=0.4,n=.0371; Lca/L=0.5,n=.0340;Lca/L=0.6,n=.0318
TIME OF PEAK FLOW(HR) = 16.67 RUNOFF VOLUME(AF) = 196.65
UNIT-HYDROGRAPH PEAK FLOW RATE(CFS) = 648.95
TOTAL AREA(ACRES) = 828.3 PEAK FLOW RATE(CFS) = 743.86
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 431.00 TO NODE 432.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 788.00 DOWNSTREAM(FEET) = 786.00
FLOW LENGTH(FEET) = 1300.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 132.0 INCH PIPE IS 107.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.97
ESTIMATED PIPE DIAMETER(INCH) = 132.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 743.86
PIPE TRAVEL TIME(MIN.) = 2.41 Tc(MIN.) = 47.55
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 432.00 = 13010.00 FEET.

FLOW PROCESS FROM NODE 432.00 TO NODE 432.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 47.55
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.150
SUBAREA LOSS RATE DATA(AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 45.00 1.33 0.100 17
COMMERCIAL A 112.20 1.33 0.100 17
COMMERCIAL A 0.70 1.33 0.100 17
PUBLIC PARK A 5.50 1.33 0.850 17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.125
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 163.40
UNIT-HYDROGRAPH DATA:
RAINFALL(INCH): 5M= 0.33;30M= 0.68;1H= 0.90;3H= 1.60;6H= 2.31;24H= 4.36
S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
Tc(HR) = 0.79; LAG(HR) = 0.63; Fm(INCH/HR) = 0.39; Ybar = 0.33
USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC I CONDITION.
DEPTH-AREA FACTORS: 5M = 0.96; 30M = 0.96; 1HR = 0.96;
3HR = 0.99; 6HR = 1.00; 24HR= 1.00
UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 991.7
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 432.00 = 13010.00 FEET.
EQUIVALENT BASIN FACTOR APPROXIMATIONS:

Lca/L=0.3,n=.0396; Lca/L=0.4,n=.0355; Lca/L=0.5,n=.0326;Lca/L=0.6,n=.0304
TIME OF PEAK FLOW(HR) = 16.67 RUNOFF VOLUME(AF) = 246.10
UNIT-HYDROGRAPH PEAK FLOW RATE(CFS) = 771.14
TOTAL AREA(ACRES) = 991.7 PEAK FLOW RATE(CFS) = 771.14

FLOW PROCESS FROM NODE 432.00 TO NODE 432.00 IS CODE = 11

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

** MAIN STREAM CONFLUENCE DATA **
PEAK FLOW RATE(CFS) = 771.14 Tc(MIN.) = 47.55
AREA-AVERAGED Fm(INCH/HR) = 0.39 Ybar = 0.33
TOTAL AREA(ACRES) = 991.7
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 432.00 = 13010.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **
PEAK FLOW RATE(CFS) = 3060.32 Tc(MIN.) = 44.09
AREA-AVERAGED Fm(INCH/HR) = 0.16 Ybar = 0.17
TOTAL AREA(ACRES) = 3631.5
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 432.00 = 29120.00 FEET.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
UNIT-HYDROGRAPH DATA:
RAINFALL(INCH): 5M= 0.33;30M= 0.68;1H= 0.90;3H= 1.60;6H= 2.31;24H= 4.36
S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
Tc(HR) = 0.73; LAG(HR) = 0.59; Fm(INCH/HR) = 0.21; Ybar = 0.21
USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC I CONDITION.
DEPTH-AREA FACTORS: 5M = 0.80; 30M = 0.80; 1HR = 0.80;
3HR = 0.97; 6HR = 0.98; 24HR= 0.99
UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 4623.2
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 432.00 = 29120.00 FEET.
EQUIVALENT BASIN FACTOR APPROXIMATIONS:
Lca/L=0.3,n=.0216; Lca/L=0.4,n=.0194; Lca/L=0.5,n=.0178;Lca/L=0.6,n=.0166
TIME OF PEAK FLOW(HR) = 16.67 RUNOFF VOLUME(AF) = 1334.99
PEAK FLOW RATE(CFS) = 3508.91

FLOW PROCESS FROM NODE 432.00 TO NODE 432.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<<
=====

FLOW PROCESS FROM NODE 432.00 TO NODE 433.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 786.00	DOWNSTREAM(FEET) = 750.00
FLOW LENGTH(FEET) = 4000.00	MANNING'S N = 0.013
DEPTH OF FLOW IN 132.0 INCH PIPE IS 104.8 INCHES	
PIPE-FLOW VELOCITY(FEET/SEC.) = 21.69	
ESTIMATED PIPE DIAMETER(INCH) = 132.00	NUMBER OF PIPES = 2

PIPE-FLOW(CFS) = 3508.91
PIPE TRAVEL TIME(MIN.) = 3.07 Tc(MIN.) = 47.17
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 433.00 = 33120.00 FEET.

FLOW PROCESS FROM NODE 433.00 TO NODE 433.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<
=====

MAINLINE Tc(MIN.) = 47.17
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.155
SUBAREA LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	75.60	1.33	0.100	17
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	91.90	1.33	0.500	17
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	A	41.30	1.33	0.200	17
COMMERCIAL	A	4.80	1.33	0.100	17
PUBLIC PARK	A	18.40	1.33	0.850	17
SCHOOL	A	10.00	1.33	0.600	17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.347
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 242.00
UNIT-HYDROGRAPH DATA:
RAINFALL(INCH): 5M= 0.33;30M= 0.68;1H= 0.90;3H= 1.60;6H= 2.31;24H= 4.36
S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
Tc(HR) = 0.79; LAG(HR) = 0.63; Fm(INCH/HR) = 0.22; Ybar = 0.21
USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC I CONDITION.
DEPTH-AREA FACTORS: 5M = 0.79; 30M = 0.79; 1HR = 0.79;
3HR = 0.97; 6HR = 0.98; 24HR= 0.99
UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 4865.2
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 433.00 = 33120.00 FEET.
EQUIVALENT BASIN FACTOR APPROXIMATIONS:
Lca/L=0.3,n=.0210; Lca/L=0.4,n=.0189; Lca/L=0.5,n=.0173;Lca/L=0.6,n=.0162
TIME OF PEAK FLOW(HR) = 16.67 RUNOFF VOLUME(AF) = 1389.11
UNIT-HYDROGRAPH PEAK FLOW RATE(CFS) = 3534.16
TOTAL AREA(ACRES) = 4865.2 PEAK FLOW RATE(CFS) = 3534.16

FLOW PROCESS FROM NODE 433.00 TO NODE 434.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 750.00	DOWNSTREAM(FEET) = 730.00
FLOW LENGTH(FEET) = 1800.00	MANNING'S N = 0.013
DEPTH OF FLOW IN 126.0 INCH PIPE IS 102.7 INCHES	
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.38	
ESTIMATED PIPE DIAMETER(INCH) = 126.00	NUMBER OF PIPES = 2
PIPE-FLOW(CFS) = 3534.16	
PIPE TRAVEL TIME(MIN.) = 1.28	Tc(MIN.) = 48.45

LONGEST FLOWPATH FROM NODE 120.00 TO NODE 434.00 = 34920.00 FEET.

FLOW PROCESS FROM NODE 434.00 TO NODE 434.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
PEAK FLOW RATE (CFS) = 3534.16 Tc (MIN.) = 48.45
AREA-AVERAGED Fm (INCH/HR) = 0.22 Ybar = 0.21
TOTAL AREA (ACRES) = 4865.2

FLOW PROCESS FROM NODE 433.10 TO NODE 433.20 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 6400.00
ELEVATION DATA: UPSTREAM (FEET) = 790.00 DOWNSTREAM (FEET) = 735.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 26.213
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.644
SUBAREA Tc AND LOSS RATE DATA (AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 8.90 1.33 0.100 17 26.21
COMMERCIAL C 12.00 0.81 0.100 50 26.21
RESIDENTIAL
"5-7 DWELLINGS/ACRE" A 78.50 1.33 0.500 17 33.54
RESIDENTIAL
"5-7 DWELLINGS/ACRE" C 78.40 0.81 0.500 50 33.54
PUBLIC PARK A 6.50 1.33 0.850 17 41.65
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.09
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.467
SUBAREA RUNOFF (CFS) = 188.51
TOTAL AREA (ACRES) = 184.30 PEAK FLOW RATE (CFS) = 188.51

FLOW PROCESS FROM NODE 433.20 TO NODE 434.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 735.00 DOWNSTREAM (FEET) = 730.00
FLOW LENGTH (FEET) = 1100.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 66.0 INCH PIPE IS 50.4 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 9.68
ESTIMATED PIPE DIAMETER (INCH) = 66.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 188.51
PIPE TRAVEL TIME (MIN.) = 1.89 Tc (MIN.) = 28.11
LONGEST FLOWPATH FROM NODE 433.10 TO NODE 434.00 = 7500.00 FEET.

FLOW PROCESS FROM NODE 434.00 TO NODE 434.00 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.) = 28.11
RAINFALL INTENSITY (INCH/HR) = 1.58
AREA-AVERAGED Fm (INCH/HR) = 0.51
AREA-AVERAGED Fp (INCH/HR) = 1.09
AREA-AVERAGED Ap = 0.47
EFFECTIVE STREAM AREA (ACRES) = 184.30
TOTAL STREAM AREA (ACRES) = 184.30
PEAK FLOW RATE (CFS) AT CONFLUENCE = 188.51
** CONFLUENCE DATA **
STREAM Q Tc AREA HEADWATER
NUMBER (CFS) (MIN.) (ACRES) NODE
1 3534.16 48.45 4865.20 120.00
2 188.51 28.11 184.30 433.10

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
UNIT-HYDROGRAPH DATA:
RAINFALL (INCH): 5M= 0.33;30M= 0.68;1H= 0.90;3H= 1.60;6H= 2.31;24H= 4.36
S-GRAPH: VALLEY (DEV.)=100.0%;VALLEY (UNDEV.) / DESERT= 0.0%
MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT (UNDEV.)= 0.0%
Tc (HR) = 0.81; LAG (HR) = 0.65; Fm (INCH/HR) = 0.23; Ybar = 0.22
USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC I CONDITION.
DEPTH-AREA FACTORS: 5M = 0.79; 30M = 0.79; 1HR = 0.79;
3HR = 0.97; 6HR = 0.98; 24HR= 0.99
UNIT-INTERVAL (MIN) = 5.00 TOTAL AREA (ACRES) = 5049.5
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 434.00 = 34920.00 FEET.
EQUIVALENT BASIN FACTOR APPROXIMATIONS:
Lca/L=0.3,n=.0208; Lca/L=0.4,n=.0187; Lca/L=0.5,n=.0172; Lca/L=0.6,n=.0160
TIME OF PEAK FLOW (HR) = 16.67 RUNOFF VOLUME (AF) = 1424.49
PEAK FLOW RATE (CFS) = 3544.91

FLOW PROCESS FROM NODE 434.00 TO NODE 434.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 48.45
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.137
SUBAREA LOSS RATE DATA (AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 12.10 1.33 0.100 17
RESIDENTIAL
"5-7 DWELLINGS/ACRE" A 52.10 1.33 0.500 17
RESIDENTIAL
"5-7 DWELLINGS/ACRE" C 1.30 0.81 0.500 50
PUBLIC PARK A 24.60 1.33 0.850 17
PUBLIC PARK A 2.00 1.33 0.850 17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.32
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.549

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* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 92.10
UNIT-HYDROGRAPH DATA:
RAINFALL(INCH): 5M= 0.33;30M= 0.68;1H= 0.90;3H= 1.60;6H= 2.31;24H= 4.36
S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
          MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
Tc(HR) = 0.81; LAG(HR) = 0.65; Fm(INCH/HR) = 0.24; Ybar = 0.23
USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC I CONDITION.
DEPTH-AREA FACTORS: 5M = 0.78; 30M = 0.78; 1HR = 0.78;
3HR = 0.97; 6HR = 0.98; 24HR= 0.99
UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 5141.6
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 434.00 = 34920.00 FEET.
EQUIVALENT BASIN FACTOR APPROXIMATIONS:
Lca/L=0.3,n=.0208; Lca/L=0.4,n=.0187; Lca/L=0.5,n=.0172;Lca/L=0.6,n=.0160
TIME OF PEAK FLOW(HR) = 16.67 RUNOFF VOLUME(AF) = 1438.95
UNIT-HYDROGRAPH PEAK FLOW RATE(CFS) = 3578.54
TOTAL AREA(ACRES) = 5141.6 PEAK FLOW RATE(CFS) = 3578.54
=====
END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 5141.6 TC(MIN.) = 48.45
AREA-AVERAGED Fm(INCH/HR)= 0.24 Ybar = 0.23
PEAK FLOW RATE(CFS) = 3578.54
=====
END OF INTEGRATED RATIONAL/UNIT-HYDROGRAPH METHOD ANALYSIS

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RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
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***** DESCRIPTION OF STUDY *****

* OLD MODEL COLONY EAST AREA E *
* 25-YEAR HYDROLOGY ANALYSIS *

FILE NAME: OMCEE25.DAT
TIME/DATE OF STUDY: 15:33 10/14/2011

=====
USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.80
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL
10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) = 1.000
100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) = 1.400
COMPUTED RAINFALL INTENSITY DATA:
STORM EVENT = 25.00 1-HOUR INTENSITY(INCH/HOUR) = 1.1365
SLOPE OF INTENSITY DURATION CURVE = 0.6000

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

Table with columns: NO., HALF-WIDTH (FT), CROWN TO CROSSFALL (FT), STREET-CROSSFALL IN-/OUT-/PARK-SIDE / SIDE/ WAY, CURB HEIGHT (FT), GUTTER WIDTH (FT), GEOMETRIES LIP (FT), MANNING HIKE (FT), FACTOR (n)

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
SIZE PIPE WITH A FLOW CAPACITY GREATER THAN OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

UNIT-HYDROGRAPH MODEL SELECTIONS/PARAMETERS:

WATERSHED LAG = 0.80 * Tc
USED "VALLEY UNDEVELOPED" S-GRAPH FOR DEVELOPMENTS OF 2 UNITS/ACRE AND LESS; AND "VALLEY DEVELOPED" S-GRAPH FOR DEVELOPMENTS OF 3-4 UNITS/ACRE AND MORE.

USER SPECIFIED RAINFALL VALUES:
2-YR 6-HR RAINFALL DEPTH (INCH) = 1.70
2-YR 24-HR RAINFALL DEPTH (INCH) = 3.30
100-YR 6-HR RAINFALL DEPTH (INCH) = 3.70
100-YR 24-HR RAINFALL DEPTH (INCH) = 8.00
SIERRA MADRE DEPTH-AREA FACTORS USED.

Table with columns: DURATION, AREA-AVERAGED RAINFALL (INCH)
5-MINUTES 0.38
30-MINUTES 0.79
1-HOUR 1.04
3-HOUR 1.87
6-HOUR 2.71
24-HOUR 5.30

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR UNIT HYDROGRAPH METHOD

FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 780.00
ELEVATION DATA: UPSTREAM(FEET) = 1040.00 DOWNSTREAM(FEET) = 1029.00

Tc = K * [(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.229
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.285
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 1.50 0.98 0.100 32 10.23
COMMERCIAL A 4.00 0.98 0.100 32 10.23
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 15.78
TOTAL AREA(ACRES) = 5.50 PEAK FLOW RATE(CFS) = 15.78

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

=====
UPSTREAM ELEVATION(FEET) = 1029.00 DOWNSTREAM ELEVATION(FEET) = 1025.00
STREET LENGTH(FEET) = 450.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 27.04
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.56
 HALFSTREET FLOOD WIDTH(FEET) = 20.00
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.23
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.80
 STREET FLOW TRAVEL TIME(MIN.) = 2.32 Tc(MIN.) = 12.55
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.905
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	3.40	0.98	0.100	32
COMMERCIAL	A	5.50	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 8.90 SUBAREA RUNOFF(CFS) = 22.49
 EFFECTIVE AREA(ACRES) = 14.40 AREA-AVERAGED Fm(INCH/HR) = 0.10
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 14.4 PEAK FLOW RATE(CFS) = 36.39

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.61 HALFSTREET FLOOD WIDTH(FEET) = 22.48
 FLOW VELOCITY(FEET/SEC.) = 3.47 DEPTH*VELOCITY(FT*FT/SEC.) = 2.11
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 1230.00 FEET.

 FLOW PROCESS FROM NODE 102.00 TO NODE 104.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 1025.00 DOWNSTREAM(FEET) = 1012.00
 FLOW LENGTH(FEET) = 930.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 9.90
 ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 36.39
 PIPE TRAVEL TIME(MIN.) = 1.57 Tc(MIN.) = 14.12
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 104.00 = 2160.00 FEET.

 FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 14.12
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.707
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	4.00	0.98	0.100	32
COMMERCIAL	A	21.10	0.98	0.100	32

COMMERCIAL	A	7.90	0.98	0.100	32
COMMERCIAL	A	31.00	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 38.90 SUBAREA RUNOFF(CFS) = 91.38
 EFFECTIVE AREA(ACRES) = 53.30 AREA-AVERAGED Fm(INCH/HR) = 0.10
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 53.3 PEAK FLOW RATE(CFS) = 125.20

 FLOW PROCESS FROM NODE 104.00 TO NODE 105.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 1012.00 DOWNSTREAM(FEET) = 1010.00
 FLOW LENGTH(FEET) = 1200.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 69.0 INCH PIPE IS 51.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 6.02
 ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 125.20
 PIPE TRAVEL TIME(MIN.) = 3.32 Tc(MIN.) = 17.44
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 105.00 = 3360.00 FEET.

 FLOW PROCESS FROM NODE 105.00 TO NODE 105.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 17.44
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.385
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	4.00	0.98	0.100	32
COMMERCIAL	A	21.10	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 25.10 SUBAREA RUNOFF(CFS) = 51.68
 EFFECTIVE AREA(ACRES) = 78.40 AREA-AVERAGED Fm(INCH/HR) = 0.10
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 78.4 PEAK FLOW RATE(CFS) = 161.42

 FLOW PROCESS FROM NODE 105.00 TO NODE 110.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 1010.00 DOWNSTREAM(FEET) = 994.00
 FLOW LENGTH(FEET) = 1900.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 57.0 INCH PIPE IS 41.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 11.84
 ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 161.42
 PIPE TRAVEL TIME(MIN.) = 2.67 Tc(MIN.) = 20.11

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 110.00 = 5260.00 FEET.

FLOW PROCESS FROM NODE 110.00 TO NODE 110.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 20.11

* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.190

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	4.60	0.98	0.100	32
COMMERCIAL	A	15.80	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA (ACRES) = 20.40 SUBAREA RUNOFF (CFS) = 38.41

EFFECTIVE AREA (ACRES) = 98.80 AREA-AVERAGED Fm (INCH/HR) = 0.10

AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10

TOTAL AREA (ACRES) = 98.8 PEAK FLOW RATE (CFS) = 186.03

FLOW PROCESS FROM NODE 110.00 TO NODE 110.00 IS CODE = 10

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

FLOW PROCESS FROM NODE 106.00 TO NODE 107.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 970.00

ELEVATION DATA: UPSTREAM (FEET) = 1040.00 DOWNSTREAM (FEET) = 1025.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]**0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 10.958

* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.152

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	2.30	0.98	0.100	32	10.96
COMMERCIAL	A	1.20	0.98	0.100	32	10.96

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA RUNOFF (CFS) = 9.62

TOTAL AREA (ACRES) = 3.50 PEAK FLOW RATE (CFS) = 9.62

FLOW PROCESS FROM NODE 107.00 TO NODE 108.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 1025.00 DOWNSTREAM (FEET) = 1023.00

FLOW LENGTH (FEET) = 500.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.5 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 4.47

ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 9.62

PIPE TRAVEL TIME (MIN.) = 1.86 Tc (MIN.) = 12.82

LONGEST FLOWPATH FROM NODE 106.00 TO NODE 108.00 = 1470.00 FEET.

FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 12.82

* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.869

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	1.50	0.98	0.100	32
COMMERCIAL	A	9.90	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA (ACRES) = 11.40 SUBAREA RUNOFF (CFS) = 28.44

EFFECTIVE AREA (ACRES) = 14.90 AREA-AVERAGED Fm (INCH/HR) = 0.10

AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10

TOTAL AREA (ACRES) = 14.9 PEAK FLOW RATE (CFS) = 37.17

FLOW PROCESS FROM NODE 108.00 TO NODE 109.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 1023.00 DOWNSTREAM (FEET) = 1020.00

FLOW LENGTH (FEET) = 480.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 33.0 INCH PIPE IS 26.9 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 7.18

ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 37.17

PIPE TRAVEL TIME (MIN.) = 1.11 Tc (MIN.) = 13.94

LONGEST FLOWPATH FROM NODE 106.00 TO NODE 109.00 = 1950.00 FEET.

FLOW PROCESS FROM NODE 109.00 TO NODE 109.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 13.94

* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.729

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	1.60	0.98	0.100	32
COMMERCIAL	A	10.00	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA (ACRES) = 11.60 SUBAREA RUNOFF (CFS) = 27.47
EFFECTIVE AREA (ACRES) = 26.50 AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 26.5 PEAK FLOW RATE (CFS) = 62.76

FLOW PROCESS FROM NODE 109.00 TO NODE 109.10 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 1020.00 DOWNSTREAM (FEET) = 1010.00
FLOW LENGTH (FEET) = 1020.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 27.8 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 9.91
ESTIMATED PIPE DIAMETER (INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 62.76
PIPE TRAVEL TIME (MIN.) = 1.72 Tc (MIN.) = 15.65
LONGEST FLOWPATH FROM NODE 106.00 TO NODE 109.10 = 2970.00 FEET.

FLOW PROCESS FROM NODE 109.10 TO NODE 109.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 15.65
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.545
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 6.70 0.98 0.100 32
COMMERCIAL A 51.00 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 57.70 SUBAREA RUNOFF (CFS) = 127.12
EFFECTIVE AREA (ACRES) = 84.20 AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 84.2 PEAK FLOW RATE (CFS) = 185.50

FLOW PROCESS FROM NODE 109.10 TO NODE 109.20 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 1010.00 DOWNSTREAM (FEET) = 1005.00
FLOW LENGTH (FEET) = 790.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 63.0 INCH PIPE IS 45.8 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 11.00
ESTIMATED PIPE DIAMETER (INCH) = 63.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 185.50
PIPE TRAVEL TIME (MIN.) = 1.20 Tc (MIN.) = 16.85
LONGEST FLOWPATH FROM NODE 106.00 TO NODE 109.20 = 3760.00 FEET.

FLOW PROCESS FROM NODE 109.20 TO NODE 109.20 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 16.85
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.435
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 3.60 0.98 0.100 32
COMMERCIAL A 18.10 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 21.70 SUBAREA RUNOFF (CFS) = 45.66
EFFECTIVE AREA (ACRES) = 105.90 AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 105.9 PEAK FLOW RATE (CFS) = 222.81

FLOW PROCESS FROM NODE 109.20 TO NODE 109.20 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION (MIN.) = 16.85
RAINFALL INTENSITY (INCH/HR) = 2.44
AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.98
AREA-AVERAGED Ap = 0.10
EFFECTIVE STREAM AREA (ACRES) = 105.90
TOTAL STREAM AREA (ACRES) = 105.90
PEAK FLOW RATE (CFS) AT CONFLUENCE = 222.81

FLOW PROCESS FROM NODE 120.00 TO NODE 121.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 650.00
ELEVATION DATA: UPSTREAM (FEET) = 1025.00 DOWNSTREAM (FEET) = 1015.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.346
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.468
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 1.80 0.98 0.100 32 9.35
COMMERCIAL A 4.70 0.98 0.100 32 9.35
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF (CFS) = 19.72
TOTAL AREA (ACRES) = 6.50 PEAK FLOW RATE (CFS) = 19.72

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FLOW PROCESS FROM NODE 121.00 TO NODE 122.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1015.00 DOWNSTREAM(FEET) = 1012.00
FLOW LENGTH(FEET) = 1160.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 22.7 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 4.52
ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 19.72
PIPE TRAVEL TIME (MIN.) = 4.28 Tc (MIN.) = 13.62
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 122.00 = 1810.00 FEET.

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*****
FLOW PROCESS FROM NODE 122.00 TO NODE 122.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc (MIN.) = 13.62
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.766
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 5.60 0.98 0.100 32
COMMERCIAL A 16.90 0.98 0.100 32
COMMERCIAL A 3.40 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 25.90 SUBAREA RUNOFF (CFS) = 62.21
EFFECTIVE AREA (ACRES) = 32.40 AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 32.4 PEAK FLOW RATE (CFS) = 77.82

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*****
FLOW PROCESS FROM NODE 122.00 TO NODE 109.20 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1012.00 DOWNSTREAM(FEET) = 1005.00
FLOW LENGTH(FEET) = 2500.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 40.6 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 6.42
ESTIMATED PIPE DIAMETER (INCH) = 51.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 77.82
PIPE TRAVEL TIME (MIN.) = 6.49 Tc (MIN.) = 20.11
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 109.20 = 4310.00 FEET.

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*****
FLOW PROCESS FROM NODE 109.20 TO NODE 109.20 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc (MIN.) = 20.11
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.190

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SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 10.90 0.98 0.100 32
COMMERCIAL A 73.40 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 84.30 SUBAREA RUNOFF (CFS) = 158.73
EFFECTIVE AREA (ACRES) = 116.70 AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 116.7 PEAK FLOW RATE (CFS) = 219.73

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*****
FLOW PROCESS FROM NODE 109.20 TO NODE 109.20 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====

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```

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION (MIN.) = 20.11
RAINFALL INTENSITY (INCH/HR) = 2.19
AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.98
AREA-AVERAGED Ap = 0.10
EFFECTIVE STREAM AREA (ACRES) = 116.70
TOTAL STREAM AREA (ACRES) = 116.70
PEAK FLOW RATE (CFS) AT CONFLUENCE = 219.73

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** CONFLUENCE DATA **

```

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	222.81	16.85	2.435	0.98 (0.10)	0.10	105.9	106.00
2	219.73	20.11	2.190	0.98 (0.10)	0.10	116.7	120.00

```

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

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** PEAK FLOW RATE TABLE **

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STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	428.47	16.85	2.435	0.98 (0.10)	0.10	203.6	106.00
2	419.13	20.11	2.190	0.98 (0.10)	0.10	222.6	120.00

```

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE (CFS) = 428.47 Tc (MIN.) = 16.85
EFFECTIVE AREA (ACRES) = 203.65 AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 222.6
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 109.20 = 4310.00 FEET.

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*****
FLOW PROCESS FROM NODE 109.20 TO NODE 110.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

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```

=====
ELEVATION DATA: UPSTREAM(FEET) = 1005.00 DOWNSTREAM(FEET) = 994.00
FLOW LENGTH(FEET) = 1540.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 81.0 INCH PIPE IS 64.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.96
ESTIMATED PIPE DIAMETER(INCH) = 81.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 428.47
PIPE TRAVEL TIME(MIN.) = 1.84 Tc(MIN.) = 18.69
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 110.00 = 5850.00 FEET.

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*****
FLOW PROCESS FROM NODE 110.00 TO NODE 110.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

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MAINLINE Tc(MIN.) = 18.69
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.288
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 3.40 0.98 0.100 32
COMMERCIAL A 17.40 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 20.80 SUBAREA RUNOFF(CFS) = 41.02
EFFECTIVE AREA(ACRES) = 224.45 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 243.4 PEAK FLOW RATE(CFS) = 442.59

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*****
FLOW PROCESS FROM NODE 110.00 TO NODE 110.00 IS CODE = 11
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>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<
=====

```

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	442.59	18.69	2.288	0.98(0.10)	0.10	224.4	106.00
2	433.74	21.96	2.078	0.98(0.10)	0.10	243.4	120.00

LONGEST FLOWPATH FROM NODE 120.00 TO NODE 110.00 = 5850.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	186.03	20.11	2.190	0.98(0.10)	0.10	98.8	100.00

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 110.00 = 5260.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	623.58	18.69	2.288	0.98(0.10)	0.10	316.2	106.00
2	624.75	20.11	2.190	0.98(0.10)	0.10	331.5	100.00
3	609.81	21.96	2.078	0.97(0.10)	0.10	342.2	120.00

TOTAL AREA(ACRES) = 342.2

```

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 624.75 Tc(MIN.) = 20.115
EFFECTIVE AREA(ACRES) = 331.53 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 342.2
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 110.00 = 5850.00 FEET.

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*****
FLOW PROCESS FROM NODE 110.00 TO NODE 110.00 IS CODE = 12
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>>>>CLEAR MEMORY BANK # 1 <<<<
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*****
FLOW PROCESS FROM NODE 110.00 TO NODE 140.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

```

```

ELEVATION DATA: UPSTREAM(FEET) = 994.00 DOWNSTREAM(FEET) = 992.00
FLOW LENGTH(FEET) = 200.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 87.0 INCH PIPE IS 71.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.33
ESTIMATED PIPE DIAMETER(INCH) = 87.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 624.75
PIPE TRAVEL TIME(MIN.) = 0.19 Tc(MIN.) = 20.31
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 140.00 = 6050.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 140.00 TO NODE 140.00 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.) = 20.31
RAINFALL INTENSITY(INCH/HR) = 2.18
AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98
AREA-AVERAGED Ap = 0.10
EFFECTIVE STREAM AREA(ACRES) = 331.53
TOTAL STREAM AREA(ACRES) = 342.20
PEAK FLOW RATE(CFS) AT CONFLUENCE = 624.75

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*****
FLOW PROCESS FROM NODE 130.00 TO NODE 131.00 IS CODE = 21
-----

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```

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

```

```

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1030.00
ELEVATION DATA: UPSTREAM(FEET) = 1030.00 DOWNSTREAM(FEET) = 1018.00

```

```

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 11.878
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.003

```

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	1.30	0.98	0.100	32	11.88
RESIDENTIAL						
"11+ DWELLINGS/ACRE"	A	1.10	0.98	0.200	32	12.66
PUBLIC PARK	A	0.10	0.98	0.850	32	18.87

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.174
SUBAREA RUNOFF (CFS) = 6.38
TOTAL AREA (ACRES) = 2.50 PEAK FLOW RATE (CFS) = 6.38

FLOW PROCESS FROM NODE 131.00 TO NODE 132.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

=====

UPSTREAM ELEVATION (FEET) = 1018.00 DOWNSTREAM ELEVATION (FEET) = 1010.00
STREET LENGTH (FEET) = 1200.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 27.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

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) = 10.37
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH (FEET) = 0.45
HALFSTREET FLOOD WIDTH (FEET) = 14.36
AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.30
PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 1.03
STREET FLOW TRAVEL TIME (MIN.) = 8.69 Tc (MIN.) = 20.57
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.161

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	2.20	0.98	0.100	32
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	A	1.70	0.98	0.200	32
PUBLIC PARK	A	0.20	0.98	0.850	32
SCHOOL	A	0.40	0.98	0.600	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.216
SUBAREA AREA (ACRES) = 4.50 SUBAREA RUNOFF (CFS) = 7.90
EFFECTIVE AREA (ACRES) = 7.00 AREA-AVERAGED Fm (INCH/HR) = 0.20
AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.20
TOTAL AREA (ACRES) = 7.0 PEAK FLOW RATE (CFS) = 12.38

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH (FEET) = 0.47 HALFSTREET FLOOD WIDTH (FEET) = 15.47

FLOW VELOCITY (FEET/SEC.) = 2.40 DEPTH*VELOCITY (FT*FT/SEC.) = 1.12
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 132.00 = 2230.00 FEET.

FLOW PROCESS FROM NODE 132.00 TO NODE 133.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 1010.00 DOWNSTREAM (FEET) = 1008.00
FLOW LENGTH (FEET) = 800.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.9 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 3.94
ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 12.38
PIPE TRAVEL TIME (MIN.) = 3.38 Tc (MIN.) = 23.95
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 133.00 = 3030.00 FEET.

FLOW PROCESS FROM NODE 133.00 TO NODE 133.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 23.95
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.972
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	2.00	0.98	0.100	32
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	A	14.70	0.98	0.200	32
COMMERCIAL	A	1.00	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.183
SUBAREA AREA (ACRES) = 17.70 SUBAREA RUNOFF (CFS) = 28.57
EFFECTIVE AREA (ACRES) = 24.70 AREA-AVERAGED Fm (INCH/HR) = 0.18
AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.19
TOTAL AREA (ACRES) = 24.7 PEAK FLOW RATE (CFS) = 39.76

FLOW PROCESS FROM NODE 133.00 TO NODE 134.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 1008.00 DOWNSTREAM (FEET) = 1006.00
FLOW LENGTH (FEET) = 660.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 31.2 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 5.59
ESTIMATED PIPE DIAMETER (INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 39.76
PIPE TRAVEL TIME (MIN.) = 1.97 Tc (MIN.) = 25.92
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 134.00 = 3690.00 FEET.

FLOW PROCESS FROM NODE 134.00 TO NODE 134.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 25.92
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.881
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 4.70 0.98 0.100 32
RESIDENTIAL
"11+ DWELLINGS/ACRE" A 1.50 0.98 0.200 32
COMMERCIAL A 9.30 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.110
SUBAREA AREA(ACRES) = 15.50 SUBAREA RUNOFF(CFS) = 24.74
EFFECTIVE AREA(ACRES) = 40.20 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.16
TOTAL AREA(ACRES) = 40.2 PEAK FLOW RATE(CFS) = 62.47

FLOW PROCESS FROM NODE 134.00 TO NODE 140.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 1006.00 DOWNSTREAM(FEET) = 992.00
FLOW LENGTH(FEET) = 2200.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 30.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.41
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 62.47
PIPE TRAVEL TIME(MIN.) = 4.36 Tc(MIN.) = 30.28
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 140.00 = 5890.00 FEET.

FLOW PROCESS FROM NODE 140.00 TO NODE 140.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 30.28
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.713
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 12.00 0.98 0.100 32
COMMERCIAL A 38.80 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 50.80 SUBAREA RUNOFF(CFS) = 73.86
EFFECTIVE AREA(ACRES) = 91.00 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.13
TOTAL AREA(ACRES) = 91.0 PEAK FLOW RATE(CFS) = 130.27

FLOW PROCESS FROM NODE 140.00 TO NODE 140.00 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.) = 30.28
RAINFALL INTENSITY(INCH/HR) = 1.71
AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.98
AREA-AVERAGED Ap = 0.13
EFFECTIVE STREAM AREA(ACRES) = 91.00
TOTAL STREAM AREA(ACRES) = 91.00
PEAK FLOW RATE(CFS) AT CONFLUENCE = 130.27

** CONFLUENCE DATA **

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. It lists data for 4 different stream nodes.

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

** PEAK FLOW RATE TABLE **

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. It lists peak flow rates for 4 stream nodes.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 737.60 Tc(MIN.) = 20.31
EFFECTIVE AREA(ACRES) = 392.55 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 433.2
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 140.00 = 6050.00 FEET.

FLOW PROCESS FROM NODE 140.00 TO NODE 150.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 992.00 DOWNSTREAM(FEET) = 986.00
FLOW LENGTH(FEET) = 350.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 84.0 INCH PIPE IS 67.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 22.16
ESTIMATED PIPE DIAMETER(INCH) = 84.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 737.60
PIPE TRAVEL TIME(MIN.) = 0.26 Tc(MIN.) = 20.57
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 150.00 = 6400.00 FEET.

FLOW PROCESS FROM NODE 150.00 TO NODE 150.00 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.) = 20.57
RAINFALL INTENSITY (INCH/HR) = 2.16
AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.98
AREA-AVERAGED Ap = 0.10
EFFECTIVE STREAM AREA (ACRES) = 392.55
TOTAL STREAM AREA (ACRES) = 433.20
PEAK FLOW RATE (CFS) AT CONFLUENCE = 737.60

FLOW PROCESS FROM NODE 136.00 TO NODE 137.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 600.00
ELEVATION DATA: UPSTREAM (FEET) = 1006.00 DOWNSTREAM (FEET) = 1000.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.866
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.357
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 1.30 0.98 0.100 32 9.87
COMMERCIAL A 2.40 0.98 0.100 32 9.87
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF (CFS) = 10.86
TOTAL AREA (ACRES) = 3.70 PEAK FLOW RATE (CFS) = 10.86

FLOW PROCESS FROM NODE 137.00 TO NODE 138.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 1000.00 DOWNSTREAM (FEET) = 997.00
FLOW LENGTH (FEET) = 400.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.4 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 5.76
ESTIMATED PIPE DIAMETER (INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 10.86
PIPE TRAVEL TIME (MIN.) = 1.16 Tc (MIN.) = 11.02
LONGEST FLOWPATH FROM NODE 136.00 TO NODE 138.00 = 1000.00 FEET.

FLOW PROCESS FROM NODE 138.00 TO NODE 138.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 11.02
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.141
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 1.50 0.98 0.100 32
COMMERCIAL A 5.20 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 6.70 SUBAREA RUNOFF (CFS) = 18.35
EFFECTIVE AREA (ACRES) = 10.40 AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 10.4 PEAK FLOW RATE (CFS) = 28.49

FLOW PROCESS FROM NODE 138.00 TO NODE 139.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 997.00 DOWNSTREAM (FEET) = 995.00
FLOW LENGTH (FEET) = 700.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.5 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 5.10
ESTIMATED PIPE DIAMETER (INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 28.49
PIPE TRAVEL TIME (MIN.) = 2.29 Tc (MIN.) = 13.31
LONGEST FLOWPATH FROM NODE 136.00 TO NODE 139.00 = 1700.00 FEET.

FLOW PROCESS FROM NODE 139.00 TO NODE 139.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 13.31
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.805
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 2.20 0.98 0.100 32
COMMERCIAL A 12.20 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 14.40 SUBAREA RUNOFF (CFS) = 35.09
EFFECTIVE AREA (ACRES) = 24.80 AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 24.8 PEAK FLOW RATE (CFS) = 60.43

FLOW PROCESS FROM NODE 139.00 TO NODE 150.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 995.00 DOWNSTREAM (FEET) = 986.00

FLOW LENGTH(FEET) = 960.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 27.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 9.67
 ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 60.43
 PIPE TRAVEL TIME(MIN.) = 1.66 Tc(MIN.) = 14.97
 LONGEST FLOWPATH FROM NODE 136.00 TO NODE 150.00 = 2660.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	866.07	14.97	2.615	0.98(0.10)	0.10	378.6	136.00
2	902.44	19.14	2.256	0.98(0.10)	0.10	460.0	106.00
3	899.12	20.57	2.160	0.98(0.10)	0.10	479.6	100.00
4	879.31	22.41	2.052	0.97(0.10)	0.10	495.8	120.00
5	756.33	30.55	1.704	0.98(0.10)	0.10	520.2	130.00

 FLOW PROCESS FROM NODE 150.00 TO NODE 150.00 IS CODE = 81

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 902.44 Tc(MIN.) = 19.14
 EFFECTIVE AREA(ACRES) = 459.96 AREA-AVERAGED Fm(INCH/HR) = 0.10
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 520.2
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 150.00 = 6400.00 FEET.

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

 FLOW PROCESS FROM NODE 150.00 TO NODE 200.00 IS CODE = 31

MAINLINE Tc(MIN.) = 14.97
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.615
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 28.00 0.98 0.100 32
 COMMERCIAL A 34.20 0.98 0.100 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 62.20 SUBAREA RUNOFF(CFS) = 140.91
 EFFECTIVE AREA(ACRES) = 87.00 AREA-AVERAGED Fm(INCH/HR) = 0.10
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 87.0 PEAK FLOW RATE(CFS) = 197.09

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

 ELEVATION DATA: UPSTREAM(FEET) = 986.00 DOWNSTREAM(FEET) = 970.00
 FLOW LENGTH(FEET) = 1530.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 102.0 INCH PIPE IS 77.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 19.61
 ESTIMATED PIPE DIAMETER(INCH) = 102.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 902.44
 PIPE TRAVEL TIME(MIN.) = 1.30 Tc(MIN.) = 20.44
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 200.00 = 7930.00 FEET.

 FLOW PROCESS FROM NODE 150.00 TO NODE 150.00 IS CODE = 1

 FLOW PROCESS FROM NODE 200.00 TO NODE 200.00 IS CODE = 81

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

 TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 14.97
 RAINFALL INTENSITY(INCH/HR) = 2.61
 AREA-AVERAGED Fm(INCH/HR) = 0.10
 AREA-AVERAGED Fp(INCH/HR) = 0.97
 AREA-AVERAGED Ap = 0.10
 EFFECTIVE STREAM AREA(ACRES) = 87.00
 TOTAL STREAM AREA(ACRES) = 87.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 197.09

 MAINLINE Tc(MIN.) = 20.44
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.168
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 72.80 0.98 0.100 32
 COMMERCIAL A 88.30 0.98 0.100 32
 PUBLIC PARK A 5.20 0.98 0.850 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.123
 SUBAREA AREA(ACRES) = 166.30 SUBAREA RUNOFF(CFS) = 306.53
 EFFECTIVE AREA(ACRES) = 626.26 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.11
 TOTAL AREA(ACRES) = 686.5 PEAK FLOW RATE(CFS) = 1162.56

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	733.46	19.14	2.256	0.98(0.10)	0.10	373.0	106.00
1	737.60	20.57	2.160	0.98(0.10)	0.10	392.6	100.00
1	726.27	22.41	2.052	0.97(0.10)	0.10	408.8	120.00
1	630.55	30.55	1.704	0.98(0.10)	0.11	433.2	130.00
2	197.09	14.97	2.615	0.97(0.10)	0.10	87.0	136.00

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1167.15	16.27	2.487	0.98(0.11)	0.11	544.9	136.00
2	1162.56	20.44	2.168	0.98(0.11)	0.11	626.3	106.00

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

3	1148.90	21.87	2.082	0.98 (0.11)	0.11	645.9	100.00
4	1118.90	23.72	1.984	0.98 (0.11)	0.11	662.1	120.00
5	959.56	31.93	1.659	0.98 (0.11)	0.11	686.5	130.00

NEW PEAK FLOW DATA ARE:
 PEAK FLOW RATE(CFS) = 1167.15 Tc(MIN.) = 16.27
 AREA-AVERAGED Fm(INCH/HR) = 0.11 AREA-AVERAGED Fp(INCH/HR) = 0.98
 AREA-AVERAGED Ap = 0.11 EFFECTIVE AREA(ACRES) = 544.88

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	9.60	0.98	0.100	32
COMMERCIAL	A	58.40	0.98	0.100	32
PUBLIC PARK	A	4.80	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.149
 SUBAREA AREA(ACRES) = 72.80

UNIT-HYDROGRAPH DATA:
 RAINFALL(INCH): 5M= 0.38;30M= 0.79;1H= 1.04;3H= 1.87;6H= 2.71;24H= 5.30
 S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%

MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
 Tc(HR) = 0.41; LAG(HR) = 0.32; Fm(INCH/HR) = 0.11; Ybar = 0.15

USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.97; 30M = 0.97; 1HR = 0.97;
 3HR = 0.99; 6HR = 1.00; 24HR = 1.00

UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 759.3
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 201.00 = 8920.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:

Lca/L=0.3,n=.0295; Lca/L=0.4,n=.0264; Lca/L=0.5,n=.0243;Lca/L=0.6,n=.0226
 TIME OF PEAK FLOW(HR) = 16.42 RUNOFF VOLUME(AF) = 287.81
 UNIT-HYDROGRAPH PEAK FLOW RATE(CFS) = 1175.62
 TOTAL AREA(ACRES) = 759.3 PEAK FLOW RATE(CFS) = 1175.62

 FLOW PROCESS FROM NODE 200.00 TO NODE 200.00 IS CODE = 71

>>>>PEAK FLOW RATE ESTIMATOR CHANGED TO UNIT-HYDROGRAPH METHOD<<<<<
 >>>>USING TIME-OF-CONCENTRATION OF LONGEST FLOWPATH<<<<<

UNIT-HYDROGRAPH DATA:
 RAINFALL(INCH): 5M= 0.38;30M= 0.79;1H= 1.04;3H= 1.87;6H= 2.71;24H= 5.30
 S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%

MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
 Tc(HR) = 0.40; LAG(HR) = 0.32; Fm(INCH/HR) = 0.11; Ybar = 0.15

USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.97; 30M = 0.97; 1HR = 0.97;
 3HR = 1.00; 6HR = 1.00; 24HR = 1.00

UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 686.5
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 200.00 = 7930.00 FEET.

EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3,n=.0303; Lca/L=0.4,n=.0272; Lca/L=0.5,n=.0249;Lca/L=0.6,n=.0233

TIME OF PEAK FLOW(HR) = 16.33 RUNOFF VOLUME(AF) = 261.32
 UNIT-HYDROGRAPH METHOD PEAK FLOW RATE(CFS) = 1072.43

TOTAL PEAK FLOW RATE(CFS) = 1072.43 (SOURCE FLOW INCLUDED)
 RATIONAL METHOD PEAK FLOW RATE(CFS) = 1167.15
 (UPSTREAM NODE PEAK FLOW RATE(CFS) = 1167.15)

PEAK FLOW RATE(CFS) USED = 1167.15

 FLOW PROCESS FROM NODE 201.00 TO NODE 201.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

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

PEAK FLOW RATE(CFS) = 1175.62 Tc(MIN.) = 24.33
 AREA-AVERAGED Fm(INCH/HR) = 0.11 Ybar = 0.15
 TOTAL AREA(ACRES) = 759.3

 FLOW PROCESS FROM NODE 200.00 TO NODE 201.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 970.00 DOWNSTREAM(FEET) = 950.00
 FLOW LENGTH(FEET) = 990.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 102.0 INCH PIPE IS 72.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 26.99
 ESTIMATED PIPE DIAMETER(INCH) = 102.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 1167.15
 PIPE TRAVEL TIME(MIN.) = 0.61 Tc(MIN.) = 24.33
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 201.00 = 8920.00 FEET.

 FLOW PROCESS FROM NODE 202.00 TO NODE 203.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
 ELEVATION DATA: UPSTREAM(FEET) = 1010.00 DOWNSTREAM(FEET) = 1000.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 12.102
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.970

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	6.00	0.98	0.100	32	12.10
COMMERCIAL	A	7.60	0.98	0.100	32	12.10
SCHOOL	A	1.90	0.98	0.600	32	16.40

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.161
 SUBAREA RUNOFF(CFS) = 39.24

 FLOW PROCESS FROM NODE 201.00 TO NODE 201.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 24.33
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.954

SUBAREA LOSS RATE DATA(AMC II):

TOTAL AREA(ACRES) = 15.50 PEAK FLOW RATE(CFS) = 39.24

FLOW PROCESS FROM NODE 203.00 TO NODE 204.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 1000.00 DOWNSTREAM(FEET) = 990.00
FLOW LENGTH(FEET) = 1100.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.55
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 39.24
PIPE TRAVEL TIME(MIN.) = 2.14 Tc(MIN.) = 14.25
LONGEST FLOWPATH FROM NODE 202.00 TO NODE 204.00 = 2100.00 FEET.

FLOW PROCESS FROM NODE 204.00 TO NODE 204.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.25
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.693
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 8.50 0.98 0.100 32
COMMERCIAL A 10.30 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 18.80 SUBAREA RUNOFF(CFS) = 43.92
EFFECTIVE AREA(ACRES) = 34.30 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.13
TOTAL AREA(ACRES) = 34.3 PEAK FLOW RATE(CFS) = 79.29

FLOW PROCESS FROM NODE 204.00 TO NODE 205.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 990.00 DOWNSTREAM(FEET) = 980.00
FLOW LENGTH(FEET) = 1400.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 32.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.32
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 79.29
PIPE TRAVEL TIME(MIN.) = 2.50 Tc(MIN.) = 16.75
LONGEST FLOWPATH FROM NODE 202.00 TO NODE 205.00 = 3500.00 FEET.

FLOW PROCESS FROM NODE 205.00 TO NODE 205.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.75
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.444
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 16.60 0.98 0.100 32
COMMERCIAL A 29.50 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 46.10 SUBAREA RUNOFF(CFS) = 97.35
EFFECTIVE AREA(ACRES) = 80.40 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.11
TOTAL AREA(ACRES) = 80.4 PEAK FLOW RATE(CFS) = 168.94

FLOW PROCESS FROM NODE 205.00 TO NODE 206.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 980.00 DOWNSTREAM(FEET) = 955.00
FLOW LENGTH(FEET) = 1200.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 36.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.72
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 168.94
PIPE TRAVEL TIME(MIN.) = 1.20 Tc(MIN.) = 17.95
LONGEST FLOWPATH FROM NODE 202.00 TO NODE 206.00 = 4700.00 FEET.

FLOW PROCESS FROM NODE 206.00 TO NODE 206.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.95
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.345
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 11.30 0.98 0.100 32
COMMERCIAL A 5.50 0.98 0.100 32
COMMERCIAL A 13.90 0.98 0.100 32
PUBLIC PARK A 3.60 0.98 0.850 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.179
SUBAREA AREA(ACRES) = 34.30 SUBAREA RUNOFF(CFS) = 67.00
EFFECTIVE AREA(ACRES) = 114.70 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.13
TOTAL AREA(ACRES) = 114.7 PEAK FLOW RATE(CFS) = 228.78

FLOW PROCESS FROM NODE 206.00 TO NODE 201.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 955.00 DOWNSTREAM(FEET) = 950.00
 FLOW LENGTH(FEET) = 2000.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 78.0 INCH PIPE IS 62.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 8.05
 ESTIMATED PIPE DIAMETER(INCH) = 78.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 228.78
 PIPE TRAVEL TIME(MIN.) = 4.14 Tc(MIN.) = 22.09
 LONGEST FLOWPATH FROM NODE 202.00 TO NODE 201.00 = 6700.00 FEET.

PIPE-FLOW VELOCITY(FEET/SEC.) = 23.50
 ESTIMATED PIPE DIAMETER(INCH) = 114.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 1343.88
 PIPE TRAVEL TIME(MIN.) = 1.31 Tc(MIN.) = 25.64
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 207.00 = 10770.00 FEET.

 FLOW PROCESS FROM NODE 207.00 TO NODE 207.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc(MIN.) = 25.64
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.893
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	13.30	0.98	0.100	32
COMMERCIAL	A	47.10	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 60.40

UNIT-HYDROGRAPH DATA:
 RAINFALL(INCH): 5M= 0.38;30M= 0.79;1H= 1.04;3H= 1.87;6H= 2.71;24H= 5.30
 S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
 MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
 Tc(HR) = 0.43; LAG(HR) = 0.34; Fm(INCH/HR) = 0.11; Ybar = 0.15
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.96; 30M = 0.96; 1HR = 0.96;
 3HR = 0.99; 6HR = 1.00; 24HR= 1.00
 UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 934.4
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 207.00 = 10770.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3,n=.0274; Lca/L=0.4,n=.0245; Lca/L=0.5,n=.0225;Lca/L=0.6,n=.0210
 TIME OF PEAK FLOW(HR) = 16.42 RUNOFF VOLUME(AF) = 353.43
 UNIT-HYDROGRAPH PEAK FLOW RATE(CFS) = 1416.74
 TOTAL AREA(ACRES) = 934.4 PEAK FLOW RATE(CFS) = 1416.74

 FLOW PROCESS FROM NODE 207.00 TO NODE 208.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 926.00 DOWNSTREAM(FEET) = 914.00
 FLOW LENGTH(FEET) = 1020.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 120.0 INCH PIPE IS 87.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 23.06
 ESTIMATED PIPE DIAMETER(INCH) = 120.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 1416.74
 PIPE TRAVEL TIME(MIN.) = 0.74 Tc(MIN.) = 26.38
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 208.00 = 11790.00 FEET.

 FLOW PROCESS FROM NODE 208.00 TO NODE 208.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

 FLOW PROCESS FROM NODE 201.00 TO NODE 201.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 22.09
 RAINFALL INTENSITY(INCH/HR) = 2.07
 AREA-AVERAGED Fm(INCH/HR) = 0.13
 AREA-AVERAGED Fp(INCH/HR) = 0.97
 AREA-AVERAGED Ap = 0.13
 EFFECTIVE STREAM AREA(ACRES) = 114.70
 TOTAL STREAM AREA(ACRES) = 114.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 228.78

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	AREA (ACRES)	HEADWATER NODE
1	1175.62	24.33	759.30	120.00
2	228.78	22.09	114.70	202.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 UNIT-HYDROGRAPH DATA:
 RAINFALL(INCH): 5M= 0.38;30M= 0.79;1H= 1.04;3H= 1.87;6H= 2.71;24H= 5.30
 S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
 MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
 Tc(HR) = 0.41; LAG(HR) = 0.32; Fm(INCH/HR) = 0.11; Ybar = 0.15
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.96; 30M = 0.96; 1HR = 0.96;
 3HR = 0.99; 6HR = 1.00; 24HR= 1.00
 UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 874.0
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 201.00 = 8920.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3,n=.0295; Lca/L=0.4,n=.0264; Lca/L=0.5,n=.0243;Lca/L=0.6,n=.0226
 TIME OF PEAK FLOW(HR) = 16.42 RUNOFF VOLUME(AF) = 330.31
 PEAK FLOW RATE(CFS) = 1343.88

 FLOW PROCESS FROM NODE 201.00 TO NODE 207.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 950.00 DOWNSTREAM(FEET) = 926.00
 FLOW LENGTH(FEET) = 1850.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 114.0 INCH PIPE IS 85.7 INCHES

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=====
MAINLINE Tc(MIN.) = 26.38
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.861
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp      Ap      SCS
    LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL            A        10.50    0.98    0.100    32
COMMERCIAL            A        47.20    0.98    0.100    32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 57.70
UNIT-HYDROGRAPH DATA:
RAINFALL(INCH): 5M= 0.38;30M= 0.79;1H= 1.04;3H= 1.87;6H= 2.71;24H= 5.30
S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
          MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
Tc(HR) = 0.44; LAG(HR) = 0.35; Fm(INCH/HR) = 0.11; Ybar = 0.15
USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
DEPTH-AREA FACTORS: 5M = 0.96; 30M = 0.96; 1HR = 0.96;
3HR = 0.99; 6HR = 1.00; 24HR= 1.00
UNIT-INTERVAL(MIN) = 5.00  TOTAL AREA(ACRES) = 992.1
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 208.00 = 11790.00 FEET.
EQUIVALENT BASIN FACTOR APPROXIMATIONS:
Lca/L=0.3,n=.0264; Lca/L=0.4,n=.0237; Lca/L=0.5,n=.0218;Lca/L=0.6,n=.0203
TIME OF PEAK FLOW(HR) = 16.42  RUNOFF VOLUME(AF) = 375.52
UNIT-HYDROGRAPH PEAK FLOW RATE(CFS) = 1480.49
TOTAL AREA(ACRES) = 992.1  PEAK FLOW RATE(CFS) = 1480.49

*****
FLOW PROCESS FROM NODE 208.00 TO NODE 209.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 914.00  DOWNSTREAM(FEET) = 895.00
FLOW LENGTH(FEET) = 1650.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 120.0 INCH PIPE IS 91.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 22.96
ESTIMATED PIPE DIAMETER(INCH) = 120.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 1480.49
PIPE TRAVEL TIME(MIN.) = 1.20  Tc(MIN.) = 27.57
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 209.00 = 13440.00 FEET.

*****
FLOW PROCESS FROM NODE 209.00 TO NODE 209.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 27.57
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.812
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp      Ap      SCS
    LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL            A        31.70    0.98    0.100    32
COMMERCIAL            A        23.60    0.98    0.100    32
COMMERCIAL            A        166.00   0.98    0.100    32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98

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SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 221.30
UNIT-HYDROGRAPH DATA:
RAINFALL(INCH): 5M= 0.38;30M= 0.79;1H= 1.04;3H= 1.87;6H= 2.71;24H= 5.30
S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
          MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
Tc(HR) = 0.46; LAG(HR) = 0.37; Fm(INCH/HR) = 0.11; Ybar = 0.15
USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
DEPTH-AREA FACTORS: 5M = 0.95; 30M = 0.95; 1HR = 0.95;
3HR = 0.99; 6HR = 1.00; 24HR= 1.00
UNIT-INTERVAL(MIN) = 5.00  TOTAL AREA(ACRES) = 1213.4
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 209.00 = 13440.00 FEET.
EQUIVALENT BASIN FACTOR APPROXIMATIONS:
Lca/L=0.3,n=.0251; Lca/L=0.4,n=.0225; Lca/L=0.5,n=.0207;Lca/L=0.6,n=.0193
TIME OF PEAK FLOW(HR) = 16.42  RUNOFF VOLUME(AF) = 460.15
UNIT-HYDROGRAPH PEAK FLOW RATE(CFS) = 1743.18
TOTAL AREA(ACRES) = 1213.4  PEAK FLOW RATE(CFS) = 1743.18

*****
FLOW PROCESS FROM NODE 209.00 TO NODE 220.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 895.00  DOWNSTREAM(FEET) = 888.00
FLOW LENGTH(FEET) = 900.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 138.0 INCH PIPE IS 104.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 20.69
ESTIMATED PIPE DIAMETER(INCH) = 138.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 1743.18
PIPE TRAVEL TIME(MIN.) = 0.73  Tc(MIN.) = 28.30
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 220.00 = 14340.00 FEET.

*****
FLOW PROCESS FROM NODE 220.00 TO NODE 220.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
PEAK FLOW RATE(CFS) = 1743.18  Tc(MIN.) = 28.30
AREA-AVERAGED Fm(INCH/HR) = 0.11  Ybar = 0.15
TOTAL AREA(ACRES) = 1213.4

*****
FLOW PROCESS FROM NODE 210.00 TO NODE 211.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 800.00
ELEVATION DATA: UPSTREAM(FEET) = 980.00  DOWNSTREAM(FEET) = 965.00

Tc = K * [(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.761
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.379

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SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	1.20	0.98	0.100	32	9.76
COMMERCIAL	A	3.60	0.98	0.100	32	9.76
PUBLIC PARK	A	1.00	0.98	0.850	32	15.51

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.229
 SUBAREA RUNOFF(CFS) = 16.47
 TOTAL AREA(ACRES) = 5.80 PEAK FLOW RATE(CFS) = 16.47

FLOW PROCESS FROM NODE 211.00 TO NODE 212.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 2 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 965.00 DOWNSTREAM ELEVATION(FEET) = 960.00
 STREET LENGTH(FEET) = 650.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 35.20

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.61
 HALFSTREET FLOOD WIDTH(FEET) = 22.80
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.27
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.01
 STREET FLOW TRAVEL TIME(MIN.) = 3.32 Tc(MIN.) = 13.08

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.835

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	1.90	0.98	0.100	32
COMMERCIAL	A	12.00	0.98	0.100	32
PUBLIC PARK	A	1.70	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.182
 SUBAREA AREA(ACRES) = 15.60 SUBAREA RUNOFF(CFS) = 37.32
 EFFECTIVE AREA(ACRES) = 21.40 AREA-AVERAGED Fm(INCH/HR) = 0.19
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.19
 TOTAL AREA(ACRES) = 21.4 PEAK FLOW RATE(CFS) = 50.95

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.68 HALFSTREET FLOOD WIDTH(FEET) = 27.24
 FLOW VELOCITY(FEET/SEC.) = 3.57 DEPTH*VELOCITY(FT*FT/SEC.) = 2.45
 LONGEST FLOWPATH FROM NODE 210.00 TO NODE 212.00 = 1450.00 FEET.

FLOW PROCESS FROM NODE 212.00 TO NODE 213.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 960.00 DOWNSTREAM(FEET) = 950.00
 FLOW LENGTH(FEET) = 900.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 9.91
 ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 50.95
 PIPE TRAVEL TIME(MIN.) = 1.51 Tc(MIN.) = 14.59
 LONGEST FLOWPATH FROM NODE 210.00 TO NODE 213.00 = 2350.00 FEET.

FLOW PROCESS FROM NODE 213.00 TO NODE 213.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 14.59
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.655
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	7.10	0.98	0.100	32
COMMERCIAL	A	31.40	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 38.50 SUBAREA RUNOFF(CFS) = 88.60
 EFFECTIVE AREA(ACRES) = 59.90 AREA-AVERAGED Fm(INCH/HR) = 0.13
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.13
 TOTAL AREA(ACRES) = 59.9 PEAK FLOW RATE(CFS) = 136.08

FLOW PROCESS FROM NODE 213.00 TO NODE 214.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 950.00 DOWNSTREAM(FEET) = 930.00
 FLOW LENGTH(FEET) = 1300.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 48.0 INCH PIPE IS 34.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 14.24
 ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 136.08
 PIPE TRAVEL TIME(MIN.) = 1.52 Tc(MIN.) = 16.11
 LONGEST FLOWPATH FROM NODE 210.00 TO NODE 214.00 = 3650.00 FEET.

FLOW PROCESS FROM NODE 214.00 TO NODE 214.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 16.11
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.501

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	5.30	0.98	0.100	32
COMMERCIAL	A	52.10	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 57.40 SUBAREA RUNOFF (CFS) = 124.18
EFFECTIVE AREA (ACRES) = 117.30 AREA-AVERAGED Fm (INCH/HR) = 0.11
AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.12
TOTAL AREA (ACRES) = 117.3 PEAK FLOW RATE (CFS) = 251.99

FLOW PROCESS FROM NODE 214.00 TO NODE 215.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 930.00 DOWNSTREAM (FEET) = 920.00
FLOW LENGTH (FEET) = 1200.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 66.0 INCH PIPE IS 49.8 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 13.09
ESTIMATED PIPE DIAMETER (INCH) = 66.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 251.99
PIPE TRAVEL TIME (MIN.) = 1.53 Tc (MIN.) = 17.64
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 215.00 = 4850.00 FEET.

FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====

MAINLINE Tc (MIN.) = 17.64
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.369
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	7.70	0.98	0.100	32
COMMERCIAL	A	32.20	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 39.90 SUBAREA RUNOFF (CFS) = 81.57
EFFECTIVE AREA (ACRES) = 157.20 AREA-AVERAGED Fm (INCH/HR) = 0.11
AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.11
TOTAL AREA (ACRES) = 157.2 PEAK FLOW RATE (CFS) = 319.59

FLOW PROCESS FROM NODE 215.00 TO NODE 216.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 920.00 DOWNSTREAM (FEET) = 905.00
FLOW LENGTH (FEET) = 840.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 63.0 INCH PIPE IS 46.8 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 18.54

ESTIMATED PIPE DIAMETER (INCH) = 63.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 319.59
PIPE TRAVEL TIME (MIN.) = 0.76 Tc (MIN.) = 18.40
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 216.00 = 5690.00 FEET.

FLOW PROCESS FROM NODE 216.00 TO NODE 216.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====

MAINLINE Tc (MIN.) = 18.40
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.310
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	16.70	0.98	0.100	32
COMMERCIAL	A	34.60	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 51.30 SUBAREA RUNOFF (CFS) = 102.16
EFFECTIVE AREA (ACRES) = 208.50 AREA-AVERAGED Fm (INCH/HR) = 0.11
AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.11
TOTAL AREA (ACRES) = 208.5 PEAK FLOW RATE (CFS) = 413.42

FLOW PROCESS FROM NODE 216.00 TO NODE 217.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 905.00 DOWNSTREAM (FEET) = 890.00
FLOW LENGTH (FEET) = 1490.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 75.0 INCH PIPE IS 59.9 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 15.74
ESTIMATED PIPE DIAMETER (INCH) = 75.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 413.42
PIPE TRAVEL TIME (MIN.) = 1.58 Tc (MIN.) = 19.97
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 217.00 = 7180.00 FEET.

FLOW PROCESS FROM NODE 217.00 TO NODE 217.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====

MAINLINE Tc (MIN.) = 19.97
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.199
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	6.10	0.98	0.100	32
COMMERCIAL	A	22.00	0.98	0.100	32
COMMERCIAL	A	4.70	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 32.80 SUBAREA RUNOFF (CFS) = 62.03
EFFECTIVE AREA (ACRES) = 241.30 AREA-AVERAGED Fm (INCH/HR) = 0.11

AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.11
 TOTAL AREA (ACRES) = 241.3 PEAK FLOW RATE (CFS) = 454.57

 FLOW PROCESS FROM NODE 217.00 TO NODE 220.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 890.00 DOWNSTREAM (FEET) = 888.00
 FLOW LENGTH (FEET) = 1400.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 114.0 INCH PIPE IS 87.2 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 7.82
 ESTIMATED PIPE DIAMETER (INCH) = 114.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 454.57
 PIPE TRAVEL TIME (MIN.) = 2.99 Tc (MIN.) = 22.96
 LONGEST FLOWPATH FROM NODE 210.00 TO NODE 220.00 = 8580.00 FEET.

 FLOW PROCESS FROM NODE 220.00 TO NODE 220.00 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.) = 22.96
 RAINFALL INTENSITY (INCH/HR) = 2.02
 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.97
 AREA-AVERAGED Ap = 0.11
 EFFECTIVE STREAM AREA (ACRES) = 241.30
 TOTAL STREAM AREA (ACRES) = 241.30
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 454.57

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	AREA (ACRES)	HEADWATER NODE
1	1743.18	28.30	1213.40	120.00
2	454.57	22.96	241.30	210.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

UNIT-HYDROGRAPH DATA:

RAINFALL (INCH): 5M= 0.38;30M= 0.79;1H= 1.04;3H= 1.87;6H= 2.71;24H= 5.30
 S-GRAPH: VALLEY (DEV.)=100.0%;VALLEY (UNDEV.)/DESERT= 0.0%

MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT (UNDEV.)= 0.0%
 Tc (HR) = 0.47; LAG (HR) = 0.38; Fm (INCH/HR) = 0.11; Ybar = 0.15

USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.

DEPTH-AREA FACTORS: 5M = 0.94; 30M = 0.94; 1HR = 0.94;
 3HR = 0.99; 6HR = 1.00; 24HR = 1.00

UNIT-INTERVAL (MIN) = 5.00 TOTAL AREA (ACRES) = 1454.7

LONGEST FLOWPATH FROM NODE 120.00 TO NODE 220.00 = 14340.00 FEET.

EQUIVALENT BASIN FACTOR APPROXIMATIONS:

Lca/L=0.3,n=.0245; Lca/L=0.4,n=.0220; Lca/L=0.5,n=.0202;Lca/L=0.6,n=.0188

TIME OF PEAK FLOW (HR) = 16.42 RUNOFF VOLUME (AF) = 551.50

PEAK FLOW RATE (CFS) = 2026.55

 FLOW PROCESS FROM NODE 220.00 TO NODE 221.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 888.00 DOWNSTREAM (FEET) = 880.00
 FLOW LENGTH (FEET) = 800.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 138.0 INCH PIPE IS 106.7 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 23.51
 ESTIMATED PIPE DIAMETER (INCH) = 138.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 2026.55
 PIPE TRAVEL TIME (MIN.) = 0.57 Tc (MIN.) = 28.87
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 221.00 = 15140.00 FEET.

 FLOW PROCESS FROM NODE 221.00 TO NODE 221.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 28.87
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.763
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	2.70	0.98	0.100	32
COMMERCIAL	A	66.40	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA (ACRES) = 69.10

UNIT-HYDROGRAPH DATA:

RAINFALL (INCH): 5M= 0.38;30M= 0.79;1H= 1.04;3H= 1.87;6H= 2.71;24H= 5.30
 S-GRAPH: VALLEY (DEV.)=100.0%;VALLEY (UNDEV.)/DESERT= 0.0%

MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT (UNDEV.)= 0.0%

Tc (HR) = 0.48; LAG (HR) = 0.38; Fm (INCH/HR) = 0.11; Ybar = 0.15

USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.

DEPTH-AREA FACTORS: 5M = 0.93; 30M = 0.93; 1HR = 0.93;

3HR = 0.99; 6HR = 0.99; 24HR = 1.00

UNIT-INTERVAL (MIN) = 5.00 TOTAL AREA (ACRES) = 1523.8

LONGEST FLOWPATH FROM NODE 120.00 TO NODE 221.00 = 15140.00 FEET.

EQUIVALENT BASIN FACTOR APPROXIMATIONS:

Lca/L=0.3,n=.0240; Lca/L=0.4,n=.0215; Lca/L=0.5,n=.0197;Lca/L=0.6,n=.0184

TIME OF PEAK FLOW (HR) = 16.42 RUNOFF VOLUME (AF) = 577.86

UNIT-HYDROGRAPH PEAK FLOW RATE (CFS) = 2081.16

TOTAL AREA (ACRES) = 1523.8 PEAK FLOW RATE (CFS) = 2081.16

 FLOW PROCESS FROM NODE 221.00 TO NODE 222.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 880.00 DOWNSTREAM (FEET) = 875.00
 FLOW LENGTH (FEET) = 420.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 138.0 INCH PIPE IS 101.2 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 25.48

ESTIMATED PIPE DIAMETER(INCH) = 138.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 2081.16
 PIPE TRAVEL TIME(MIN.) = 0.27 Tc(MIN.) = 29.14
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 222.00 = 15560.00 FEET.

 FLOW PROCESS FROM NODE 222.00 TO NODE 222.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 29.14
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.753
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 4.30 0.98 0.100 32
 COMMERCIAL A 109.00 0.98 0.100 32
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE" A 21.90 0.98 0.500 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.165
 SUBAREA AREA(ACRES) = 135.20

UNIT-HYDROGRAPH DATA:
 RAINFALL(INCH): 5M= 0.38;30M= 0.79;1H= 1.04;3H= 1.87;6H= 2.71;24H= 5.30
 S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
 MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
 Tc(HR) = 0.49; LAG(HR) = 0.39; Fm(INCH/HR) = 0.11; Ybar = 0.15
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.93; 30M = 0.93; 1HR = 0.93;
 3HR = 0.99; 6HR = 0.99; 24HR= 1.00
 UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 1659.0
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 222.00 = 15560.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3,n=.0237; Lca/L=0.4,n=.0213; Lca/L=0.5,n=.0196;Lca/L=0.6,n=.0182
 TIME OF PEAK FLOW(HR) = 16.42 RUNOFF VOLUME(AF) = 625.96
 UNIT-HYDROGRAPH PEAK FLOW RATE(CFS) = 2227.22
 TOTAL AREA(ACRES) = 1659.0 PEAK FLOW RATE(CFS) = 2227.22

 FLOW PROCESS FROM NODE 222.00 TO NODE 223.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 875.00 DOWNSTREAM(FEET) = 870.00
 FLOW LENGTH(FEET) = 2400.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 126.0 INCH PIPE IS 99.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 10.12
 ESTIMATED PIPE DIAMETER(INCH) = 126.00 NUMBER OF PIPES = 3
 PIPE-FLOW(CFS) = 2227.22
 PIPE TRAVEL TIME(MIN.) = 3.95 Tc(MIN.) = 33.09
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 223.00 = 17960.00 FEET.

 FLOW PROCESS FROM NODE 223.00 TO NODE 223.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 33.09
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.624
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 3.20 0.98 0.100 32
 COMMERCIAL A 39.30 0.98 0.100 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 42.50

UNIT-HYDROGRAPH DATA:
 RAINFALL(INCH): 5M= 0.38;30M= 0.79;1H= 1.04;3H= 1.87;6H= 2.71;24H= 5.30
 S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
 MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
 Tc(HR) = 0.55; LAG(HR) = 0.44; Fm(INCH/HR) = 0.11; Ybar = 0.15
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.92; 30M = 0.92; 1HR = 0.92;
 3HR = 0.99; 6HR = 0.99; 24HR= 1.00
 UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 1701.5
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 223.00 = 17960.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3,n=.0237; Lca/L=0.4,n=.0212; Lca/L=0.5,n=.0195;Lca/L=0.6,n=.0182
 TIME OF PEAK FLOW(HR) = 16.50 RUNOFF VOLUME(AF) = 642.16
 UNIT-HYDROGRAPH PEAK FLOW RATE(CFS) = 2153.94
 TOTAL AREA(ACRES) = 1701.5 PEAK FLOW RATE(CFS) = 2227.22
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 FLOW PROCESS FROM NODE 223.00 TO NODE 223.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 33.09
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.624
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 15.50 0.98 0.100 32
 COMMERCIAL A 99.00 0.98 0.100 32
 COMMERCIAL A 3.20 0.98 0.100 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 117.70

UNIT-HYDROGRAPH DATA:
 RAINFALL(INCH): 5M= 0.38;30M= 0.79;1H= 1.04;3H= 1.87;6H= 2.71;24H= 5.30
 S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
 MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
 Tc(HR) = 0.55; LAG(HR) = 0.44; Fm(INCH/HR) = 0.11; Ybar = 0.15
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.92; 30M = 0.92; 1HR = 0.92;
 3HR = 0.99; 6HR = 0.99; 24HR= 1.00
 UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 1819.2
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 223.00 = 17960.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:

Lca/L=0.3,n=.0237; Lca/L=0.4,n=.0212; Lca/L=0.5,n=.0195;Lca/L=0.6,n=.0182
 TIME OF PEAK FLOW(HR) = 16.50 RUNOFF VOLUME(AF) = 686.99
 UNIT-HYDROGRAPH PEAK FLOW RATE(CFS) = 2290.89
 TOTAL AREA(ACRES) = 1819.2 PEAK FLOW RATE(CFS) = 2290.89

 FLOW PROCESS FROM NODE 223.00 TO NODE 224.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 870.00 DOWNSTREAM(FEET) = 865.00
 FLOW LENGTH(FEET) = 500.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 144.0 INCH PIPE IS 112.3 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 24.20
 ESTIMATED PIPE DIAMETER(INCH) = 144.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 2290.89
 PIPE TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 33.44
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 224.00 = 18460.00 FEET.

 FLOW PROCESS FROM NODE 224.00 TO NODE 224.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 33.44
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.614
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	0.80	0.98	0.100	32
COMMERCIAL	A	51.70	0.98	0.100	32
RESIDENTIAL "5-7 DWELLINGS/ACRE"	A	18.80	0.98	0.500	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.205
 SUBAREA AREA(ACRES) = 71.30

UNIT-HYDROGRAPH DATA:
 RAINFALL(INCH): 5M= 0.38;30M= 0.79;1H= 1.04;3H= 1.87;6H= 2.71;24H= 5.30
 S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
 MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
 Tc(HR) = 0.56; LAG(HR) = 0.45; Fm(INCH/HR) = 0.11; Ybar = 0.16
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.92; 30M = 0.92; 1HR = 0.92;
 3HR = 0.99; 6HR = 0.99; 24HR= 1.00
 UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 1890.5
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 224.00 = 18460.00 FEET.

EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3,n=.0234; Lca/L=0.4,n=.0210; Lca/L=0.5,n=.0193;Lca/L=0.6,n=.0180
 TIME OF PEAK FLOW(HR) = 16.50 RUNOFF VOLUME(AF) = 711.16
 UNIT-HYDROGRAPH PEAK FLOW RATE(CFS) = 2354.70
 TOTAL AREA(ACRES) = 1890.5 PEAK FLOW RATE(CFS) = 2354.70

 FLOW PROCESS FROM NODE 224.00 TO NODE 225.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 865.00 DOWNSTREAM(FEET) = 860.00
 FLOW LENGTH(FEET) = 1080.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 132.0 INCH PIPE IS 98.6 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 15.47
 ESTIMATED PIPE DIAMETER(INCH) = 132.00 NUMBER OF PIPES = 2
 PIPE-FLOW(CFS) = 2354.70
 PIPE TRAVEL TIME(MIN.) = 1.16 Tc(MIN.) = 34.60
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 225.00 = 19540.00 FEET.

 FLOW PROCESS FROM NODE 225.00 TO NODE 225.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 34.60
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.581
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	23.60	0.98	0.100	32
COMMERCIAL	A	28.20	0.98	0.100	32
COMMERCIAL	A	19.10	0.98	0.100	32
PUBLIC PARK	A	6.90	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.167
 SUBAREA AREA(ACRES) = 77.80

UNIT-HYDROGRAPH DATA:
 RAINFALL(INCH): 5M= 0.38;30M= 0.79;1H= 1.04;3H= 1.87;6H= 2.71;24H= 5.30
 S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
 MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
 Tc(HR) = 0.58; LAG(HR) = 0.46; Fm(INCH/HR) = 0.12; Ybar = 0.16
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.91; 30M = 0.91; 1HR = 0.91;
 3HR = 0.99; 6HR = 0.99; 24HR= 1.00
 UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 1968.3
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 225.00 = 19540.00 FEET.

EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3,n=.0231; Lca/L=0.4,n=.0207; Lca/L=0.5,n=.0190;Lca/L=0.6,n=.0178
 TIME OF PEAK FLOW(HR) = 16.50 RUNOFF VOLUME(AF) = 738.72
 UNIT-HYDROGRAPH PEAK FLOW RATE(CFS) = 2389.38
 TOTAL AREA(ACRES) = 1968.3 PEAK FLOW RATE(CFS) = 2389.38

 FLOW PROCESS FROM NODE 225.00 TO NODE 300.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 860.00 DOWNSTREAM(FEET) = 835.00
 FLOW LENGTH(FEET) = 4100.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 126.0 INCH PIPE IS 94.2 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 17.21
 ESTIMATED PIPE DIAMETER(INCH) = 126.00 NUMBER OF PIPES = 2

PIPE-FLOW(CFS) = 2389.38
 PIPE TRAVEL TIME(MIN.) = 3.97 Tc(MIN.) = 38.57
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 300.00 = 23640.00 FEET.

 FLOW PROCESS FROM NODE 300.00 TO NODE 300.00 IS CODE = 10

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

 FLOW PROCESS FROM NODE 230.00 TO NODE 231.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 =====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
 ELEVATION DATA: UPSTREAM(FEET) = 1030.00 DOWNSTREAM(FEET) = 1020.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 12.899
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.859
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"11+ DWELLINGS/ACRE"	A	7.60	0.98	0.200	32	12.90
PUBLIC PARK	A	1.50	0.98	0.850	32	19.23
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98						
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.307						
SUBAREA RUNOFF(CFS) = 20.96						
TOTAL AREA(ACRES) = 9.10 PEAK FLOW RATE(CFS) = 20.96						

 FLOW PROCESS FROM NODE 231.00 TO NODE 232.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 1020.00 DOWNSTREAM(FEET) = 1005.00
 FLOW LENGTH(FEET) = 1400.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 7.87
 ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 20.96
 PIPE TRAVEL TIME(MIN.) = 2.96 Tc(MIN.) = 15.86
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 232.00 = 2400.00 FEET.

 FLOW PROCESS FROM NODE 232.00 TO NODE 232.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====

MAINLINE Tc(MIN.) = 15.86
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.525
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	2.80	0.98	0.100	32
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	A	22.30	0.98	0.200	32
PUBLIC PARK	A	4.30	0.98	0.850	32
SCHOOL	A	6.70	0.98	0.600	32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.344					
SUBAREA AREA(ACRES) = 36.10 SUBAREA RUNOFF(CFS) = 71.14					
EFFECTIVE AREA(ACRES) = 45.20 AREA-AVERAGED Fm(INCH/HR) = 0.33					
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.34					
TOTAL AREA(ACRES) = 45.2 PEAK FLOW RATE(CFS) = 89.37					

 FLOW PROCESS FROM NODE 232.00 TO NODE 232.10 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 1005.00 DOWNSTREAM(FEET) = 1000.00
 FLOW LENGTH(FEET) = 800.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 48.0 INCH PIPE IS 34.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 9.12
 ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 89.37
 PIPE TRAVEL TIME(MIN.) = 1.46 Tc(MIN.) = 17.32
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 232.10 = 3200.00 FEET.

 FLOW PROCESS FROM NODE 232.10 TO NODE 232.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====

MAINLINE Tc(MIN.) = 17.32
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.395
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	5.00	0.98	0.100	32
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	A	6.30	0.98	0.200	32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.156					
SUBAREA AREA(ACRES) = 11.30 SUBAREA RUNOFF(CFS) = 22.81					
EFFECTIVE AREA(ACRES) = 56.50 AREA-AVERAGED Fm(INCH/HR) = 0.29					
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.30					
TOTAL AREA(ACRES) = 56.5 PEAK FLOW RATE(CFS) = 106.89					

 FLOW PROCESS FROM NODE 232.10 TO NODE 233.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 1000.00 DOWNSTREAM(FEET) = 990.00

FLOW LENGTH (FEET) = 500.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 42.0 INCH PIPE IS 29.5 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 14.82
 ESTIMATED PIPE DIAMETER (INCH) = 42.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 106.89
 PIPE TRAVEL TIME (MIN.) = 0.56 Tc (MIN.) = 17.89
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 233.00 = 3700.00 FEET.

 FLOW PROCESS FROM NODE 233.00 TO NODE 233.00 IS CODE = 81

 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====

MAINLINE Tc (MIN.) = 17.89
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.349
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	3.60	0.98	0.100	32
COMMERCIAL	A	15.40	0.98	0.100	32

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 19.00 SUBAREA RUNOFF (CFS) = 38.51
 EFFECTIVE AREA (ACRES) = 75.50 AREA-AVERAGED Fm (INCH/HR) = 0.24
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.25
 TOTAL AREA (ACRES) = 75.5 PEAK FLOW RATE (CFS) = 143.08

 FLOW PROCESS FROM NODE 233.00 TO NODE 234.00 IS CODE = 31

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

 ELEVATION DATA: UPSTREAM (FEET) = 990.00 DOWNSTREAM (FEET) = 978.00
 FLOW LENGTH (FEET) = 980.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 51.0 INCH PIPE IS 36.3 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 13.24
 ESTIMATED PIPE DIAMETER (INCH) = 51.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 143.08
 PIPE TRAVEL TIME (MIN.) = 1.23 Tc (MIN.) = 19.12
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 234.00 = 4680.00 FEET.

 FLOW PROCESS FROM NODE 234.00 TO NODE 234.00 IS CODE = 81

 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====

MAINLINE Tc (MIN.) = 19.12
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.257
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	12.50	0.98	0.100	32
COMMERCIAL	A	28.90	0.98	0.100	32

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA (ACRES) = 41.40 SUBAREA RUNOFF (CFS) = 80.47
 EFFECTIVE AREA (ACRES) = 116.90 AREA-AVERAGED Fm (INCH/HR) = 0.19
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.20
 TOTAL AREA (ACRES) = 116.9 PEAK FLOW RATE (CFS) = 217.29

 FLOW PROCESS FROM NODE 234.00 TO NODE 235.00 IS CODE = 31

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

 ELEVATION DATA: UPSTREAM (FEET) = 978.00 DOWNSTREAM (FEET) = 965.00
 FLOW LENGTH (FEET) = 1100.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 57.0 INCH PIPE IS 45.9 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 14.21
 ESTIMATED PIPE DIAMETER (INCH) = 57.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 217.29
 PIPE TRAVEL TIME (MIN.) = 1.29 Tc (MIN.) = 20.41
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 235.00 = 5780.00 FEET.

 FLOW PROCESS FROM NODE 235.00 TO NODE 235.00 IS CODE = 81

 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====

MAINLINE Tc (MIN.) = 20.41
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.170
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	1.60	0.98	0.100	32
COMMERCIAL	A	5.90	0.98	0.100	32
COMMERCIAL	A	15.20	0.98	0.100	32
PUBLIC PARK	A	1.20	0.98	0.850	32

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.138
 SUBAREA AREA (ACRES) = 23.90 SUBAREA RUNOFF (CFS) = 43.80
 EFFECTIVE AREA (ACRES) = 140.80 AREA-AVERAGED Fm (INCH/HR) = 0.18
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.19
 TOTAL AREA (ACRES) = 140.8 PEAK FLOW RATE (CFS) = 251.96

 FLOW PROCESS FROM NODE 235.00 TO NODE 236.00 IS CODE = 31

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

 ELEVATION DATA: UPSTREAM (FEET) = 965.00 DOWNSTREAM (FEET) = 960.00
 FLOW LENGTH (FEET) = 300.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 57.0 INCH PIPE IS 44.8 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 16.86
 ESTIMATED PIPE DIAMETER (INCH) = 57.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 251.96
 PIPE TRAVEL TIME (MIN.) = 0.30 Tc (MIN.) = 20.71
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 236.00 = 6080.00 FEET.

FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 20.71
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.152
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	3.20	0.98	0.100	32
COMMERCIAL	A	2.70	0.98	0.100	32
COMMERCIAL	A	1.60	0.98	0.100	32
PUBLIC PARK	A	1.80	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.245
SUBAREA AREA (ACRES) = 9.30 SUBAREA RUNOFF (CFS) = 16.01
EFFECTIVE AREA (ACRES) = 150.10 AREA-AVERAGED Fm (INCH/HR) = 0.19
AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.19
TOTAL AREA (ACRES) = 150.1 PEAK FLOW RATE (CFS) = 265.60

FLOW PROCESS FROM NODE 236.00 TO NODE 237.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 960.00 DOWNSTREAM (FEET) = 950.00
FLOW LENGTH (FEET) = 600.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 60.0 INCH PIPE IS 43.8 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 17.29
ESTIMATED PIPE DIAMETER (INCH) = 60.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 265.60
PIPE TRAVEL TIME (MIN.) = 0.58 Tc (MIN.) = 21.29
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 237.00 = 6680.00 FEET.

FLOW PROCESS FROM NODE 237.00 TO NODE 237.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 21.29
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.116
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	17.50	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 17.50 SUBAREA RUNOFF (CFS) = 31.80
EFFECTIVE AREA (ACRES) = 167.60 AREA-AVERAGED Fm (INCH/HR) = 0.18
AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.18
TOTAL AREA (ACRES) = 167.6 PEAK FLOW RATE (CFS) = 292.63

FLOW PROCESS FROM NODE 237.00 TO NODE 238.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 950.00 DOWNSTREAM (FEET) = 910.00
FLOW LENGTH (FEET) = 3000.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 63.0 INCH PIPE IS 49.3 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 16.11
ESTIMATED PIPE DIAMETER (INCH) = 63.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 292.63
PIPE TRAVEL TIME (MIN.) = 3.10 Tc (MIN.) = 24.39
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 238.00 = 9680.00 FEET.

FLOW PROCESS FROM NODE 238.00 TO NODE 238.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 24.39
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.950
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	64.00	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 64.00 SUBAREA RUNOFF (CFS) = 106.73
EFFECTIVE AREA (ACRES) = 231.60 AREA-AVERAGED Fm (INCH/HR) = 0.15
AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.16
TOTAL AREA (ACRES) = 231.6 PEAK FLOW RATE (CFS) = 374.33

FLOW PROCESS FROM NODE 238.00 TO NODE 239.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 910.00 DOWNSTREAM (FEET) = 888.00
FLOW LENGTH (FEET) = 1300.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 66.0 INCH PIPE IS 51.8 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 18.73
ESTIMATED PIPE DIAMETER (INCH) = 66.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 374.33
PIPE TRAVEL TIME (MIN.) = 1.16 Tc (MIN.) = 25.55
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 239.00 = 10980.00 FEET.

FLOW PROCESS FROM NODE 239.00 TO NODE 239.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 25.55
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.897
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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COMMERCIAL A 163.20 0.98 0.100 32
 COMMERCIAL A 10.00 0.98 0.100 32
 COMMERCIAL A 80.00 0.98 0.100 32
 COMMERCIAL A 0.50 0.98 0.100 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 253.70 SUBAREA RUNOFF(CFS) = 410.88
 EFFECTIVE AREA(ACRES) = 485.30 AREA-AVERAGED Fm(INCH/HR) = 0.12
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.13
 TOTAL AREA(ACRES) = 485.3 PEAK FLOW RATE(CFS) = 774.06

COMMERCIAL A 199.70 0.98 0.100 32
 COMMERCIAL B 102.30 0.75 0.100 56
 COMMERCIAL C 16.70 0.57 0.100 69
 COMMERCIAL A 57.40 0.98 0.100 32
 PUBLIC PARK A 11.00 0.98 0.850 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.91
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.121
 SUBAREA AREA(ACRES) = 387.10 SUBAREA RUNOFF(CFS) = 586.66
 EFFECTIVE AREA(ACRES) = 893.70 AREA-AVERAGED Fm(INCH/HR) = 0.12
 AREA-AVERAGED Fp(INCH/HR) = 0.95 AREA-AVERAGED Ap = 0.12
 TOTAL AREA(ACRES) = 893.7 PEAK FLOW RATE(CFS) = 1348.46

 FLOW PROCESS FROM NODE 239.00 TO NODE 240.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 888.00 DOWNSTREAM(FEET) = 875.00
 FLOW LENGTH(FEET) = 2250.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 108.0 INCH PIPE IS 81.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 15.12
 ESTIMATED PIPE DIAMETER(INCH) = 108.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 774.06
 PIPE TRAVEL TIME(MIN.) = 2.48 Tc(MIN.) = 28.03
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 240.00 = 13230.00 FEET.

 FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 28.03
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.794
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	5.60	0.98	0.100	32
COMMERCIAL	A	15.70	0.98	0.100	32

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 21.30 SUBAREA RUNOFF(CFS) = 32.53
 EFFECTIVE AREA(ACRES) = 506.60 AREA-AVERAGED Fm(INCH/HR) = 0.12
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.13
 TOTAL AREA(ACRES) = 506.6 PEAK FLOW RATE(CFS) = 774.06
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 28.03
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.794
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	5.60	0.98	0.100	32
COMMERCIAL	A	15.70	0.98	0.100	32

 FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 71

>>>>PEAK FLOW RATE ESTIMATOR CHANGED TO UNIT-HYDROGRAPH METHOD<<<<<
 >>>>USING TIME-OF-CONCENTRATION OF LONGEST FLOWPATH<<<<<

UNIT-HYDROGRAPH DATA:
 RAINFALL(INCH): 5M= 0.38; 30M= 0.79; 1H= 1.04; 3H= 1.87; 6H= 2.71; 24H= 5.30
 S-GRAPH: VALLEY(DEV.)=100.0%; VALLEY(UNDEV.) / DESERT= 0.0%
 MOUNTAIN= 0.0%; FOOTHILL= 0.0%; DESERT(UNDEV.) = 0.0%
 Tc(HR) = 0.47; LAG(HR) = 0.37; Fm(INCH/HR) = 0.12; Ybar = 0.16
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.96; 30M = 0.96; 1HR = 0.96;
 3HR = 0.99; 6HR = 1.00; 24HR= 1.00
 UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 893.7
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 240.00 = 13230.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3, n=.0268; Lca/L=0.4, n=.0240; Lca/L=0.5, n=.0221; Lca/L=0.6, n=.0206
 TIME OF PEAK FLOW(HR) = 16.42 RUNOFF VOLUME(AF) = 335.76
 UNIT-HYDROGRAPH METHOD PEAK FLOW RATE(CFS) = 1281.73
 TOTAL PEAK FLOW RATE(CFS) = 1281.73 (SOURCE FLOW INCLUDED)
 RATIONAL METHOD PEAK FLOW RATE(CFS) = 1348.46
 (UPSTREAM NODE PEAK FLOW RATE(CFS) = 1348.46)
 PEAK FLOW RATE(CFS) USED = 1348.46

 FLOW PROCESS FROM NODE 240.00 TO NODE 242.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 875.00 DOWNSTREAM(FEET) = 860.00
 FLOW LENGTH(FEET) = 350.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 90.0 INCH PIPE IS 69.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 36.62
 ESTIMATED PIPE DIAMETER(INCH) = 90.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 1348.46
 PIPE TRAVEL TIME(MIN.) = 0.16 Tc(MIN.) = 28.19
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 242.00 = 13580.00 FEET.

 FLOW PROCESS FROM NODE 242.00 TO NODE 242.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 28.19
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.788
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	9.20	0.98	0.100	32
COMMERCIAL	A	107.00	0.98	0.100	32
COMMERCIAL	A	10.30	0.98	0.100	32
PUBLIC PARK	A	3.70	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.121
 SUBAREA AREA(ACRES) = 130.20

UNIT-HYDROGRAPH DATA:
 RAINFALL(INCH): 5M= 0.38;30M= 0.79;1H= 1.04;3H= 1.87;6H= 2.71;24H= 5.30
 S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
 MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
 Tc(HR) = 0.47; LAG(HR) = 0.38; Fm(INCH/HR) = 0.12; Ybar = 0.16
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.95; 30M = 0.95; 1HR = 0.95;
 3HR = 0.99; 6HR = 1.00; 24HR= 1.00
 UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 1023.9
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 242.00 = 13580.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3,n=.0268; Lca/L=0.4,n=.0240; Lca/L=0.5,n=.0220;Lca/L=0.6,n=.0206
 TIME OF PEAK FLOW(HR) = 16.42 RUNOFF VOLUME(AF) = 384.51
 UNIT-HYDROGRAPH PEAK FLOW RATE(CFS) = 1452.79
 TOTAL AREA(ACRES) = 1023.9 PEAK FLOW RATE(CFS) = 1452.79

 FLOW PROCESS FROM NODE 242.00 TO NODE 243.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 860.00 DOWNSTREAM(FEET) = 840.00
 FLOW LENGTH(FEET) = 1400.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 114.0 INCH PIPE IS 88.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 24.74
 ESTIMATED PIPE DIAMETER(INCH) = 114.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 1452.79
 PIPE TRAVEL TIME(MIN.) = 0.94 Tc(MIN.) = 29.13
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 243.00 = 14980.00 FEET.

 FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 29.13
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.753
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	26.20	0.98	0.100	32
COMMERCIAL	A	124.50	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 150.70
 UNIT-HYDROGRAPH DATA:
 RAINFALL(INCH): 5M= 0.38;30M= 0.79;1H= 1.04;3H= 1.87;6H= 2.71;24H= 5.30
 S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
 MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
 Tc(HR) = 0.49; LAG(HR) = 0.39; Fm(INCH/HR) = 0.12; Ybar = 0.16
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.95; 30M = 0.95; 1HR = 0.95;
 3HR = 0.99; 6HR = 1.00; 24HR= 1.00
 UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 1174.6
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 243.00 = 14980.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3,n=.0257; Lca/L=0.4,n=.0231; Lca/L=0.5,n=.0212;Lca/L=0.6,n=.0198
 TIME OF PEAK FLOW(HR) = 16.42 RUNOFF VOLUME(AF) = 442.14
 UNIT-HYDROGRAPH PEAK FLOW RATE(CFS) = 1612.16
 TOTAL AREA(ACRES) = 1174.6 PEAK FLOW RATE(CFS) = 1612.16

 FLOW PROCESS FROM NODE 243.00 TO NODE 300.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 840.00 DOWNSTREAM(FEET) = 835.00
 FLOW LENGTH(FEET) = 1300.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 120.0 INCH PIPE IS 87.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 13.18
 ESTIMATED PIPE DIAMETER(INCH) = 120.00 NUMBER OF PIPES = 2
 PIPE-FLOW(CFS) = 1612.16
 PIPE TRAVEL TIME(MIN.) = 1.64 Tc(MIN.) = 30.77
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 300.00 = 16280.00 FEET.

 FLOW PROCESS FROM NODE 300.00 TO NODE 300.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 30.77
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.697
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	51.60	0.98	0.100	32
COMMERCIAL	A	142.40	0.98	0.100	32
COMMERCIAL	B	5.00	0.75	0.100	56
COMMERCIAL	A	1.90	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 200.90
 UNIT-HYDROGRAPH DATA:
 RAINFALL(INCH): 5M= 0.38;30M= 0.79;1H= 1.04;3H= 1.87;6H= 2.71;24H= 5.30
 S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
 MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
 Tc(HR) = 0.51; LAG(HR) = 0.41; Fm(INCH/HR) = 0.11; Ybar = 0.15

USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.94; 30M = 0.94; 1HR = 0.94;
 3HR = 0.99; 6HR = 1.00; 24HR= 1.00
 UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 1375.5
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 300.00 = 16280.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3,n=.0252; Lca/L=0.4,n=.0226; Lca/L=0.5,n=.0208;Lca/L=0.6,n=.0194
 TIME OF PEAK FLOW(HR) = 16.50 RUNOFF VOLUME(AF) = 518.93
 UNIT-HYDROGRAPH PEAK FLOW RATE(CFS) = 1813.13
 TOTAL AREA(ACRES) = 1375.5 PEAK FLOW RATE(CFS) = 1813.13

 FLOW PROCESS FROM NODE 300.00 TO NODE 300.00 IS CODE = 11

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

** MAIN STREAM CONFLUENCE DATA **
 PEAK FLOW RATE(CFS) = 1813.13 Tc(MIN.) = 30.77
 AREA-AVERAGED Fm(INCH/HR) = 0.11 Ybar = 0.15
 TOTAL AREA(ACRES) = 1375.5
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 300.00 = 16280.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **
 PEAK FLOW RATE(CFS) = 2389.38 Tc(MIN.) = 38.57
 AREA-AVERAGED Fm(INCH/HR) = 0.12 Ybar = 0.16
 TOTAL AREA(ACRES) = 1968.3
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 300.00 = 23640.00 FEET.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 UNIT-HYDROGRAPH DATA:
 RAINFALL(INCH): 5M= 0.38;30M= 0.79;1H= 1.04;3H= 1.87;6H= 2.71;24H= 5.30
 S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
 MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
 Tc(HR) = 0.64; LAG(HR) = 0.51; Fm(INCH/HR) = 0.11; Ybar = 0.16
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.85; 30M = 0.85; 1HR = 0.85;
 3HR = 0.98; 6HR = 0.99; 24HR= 0.99
 UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 3343.8
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 300.00 = 23640.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3,n=.0221; Lca/L=0.4,n=.0198; Lca/L=0.5,n=.0182;Lca/L=0.6,n=.0170
 TIME OF PEAK FLOW(HR) = 16.58 RUNOFF VOLUME(AF) = 1251.29
 PEAK FLOW RATE(CFS) = 3567.56

 FLOW PROCESS FROM NODE 300.00 TO NODE 300.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<<
 =====

 FLOW PROCESS FROM NODE 300.00 TO NODE 301.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 835.00 DOWNSTREAM(FEET) = 825.00
 FLOW LENGTH(FEET) = 880.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 126.0 INCH PIPE IS 102.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 23.64
 ESTIMATED PIPE DIAMETER(INCH) = 126.00 NUMBER OF PIPES = 2
 PIPE-FLOW(CFS) = 3567.56
 PIPE TRAVEL TIME(MIN.) = 0.62 Tc(MIN.) = 39.19
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 301.00 = 24520.00 FEET.

 FLOW PROCESS FROM NODE 301.00 TO NODE 301.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<
 =====

MAINLINE Tc(MIN.) = 39.19
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.467
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	30.90	0.98	0.100	32
COMMERCIAL	A	81.90	0.98	0.100	32
COMMERCIAL	B	24.40	0.75	0.100	56
COMMERCIAL	A	7.50	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.94
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 144.70
 UNIT-HYDROGRAPH DATA:
 RAINFALL(INCH): 5M= 0.38;30M= 0.79;1H= 1.04;3H= 1.87;6H= 2.71;24H= 5.30
 S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
 MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
 Tc(HR) = 0.65; LAG(HR) = 0.52; Fm(INCH/HR) = 0.11; Ybar = 0.16
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.84; 30M = 0.84; 1HR = 0.84;
 3HR = 0.98; 6HR = 0.99; 24HR= 0.99
 UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 3488.5
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 301.00 = 24520.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3,n=.0219; Lca/L=0.4,n=.0196; Lca/L=0.5,n=.0180;Lca/L=0.6,n=.0168
 TIME OF PEAK FLOW(HR) = 16.58 RUNOFF VOLUME(AF) = 1306.07
 UNIT-HYDROGRAPH PEAK FLOW RATE(CFS) = 3673.20
 TOTAL AREA(ACRES) = 3488.5 PEAK FLOW RATE(CFS) = 3673.20

 FLOW PROCESS FROM NODE 301.00 TO NODE 400.00 IS CODE = 31

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

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ELEVATION DATA: UPSTREAM(FEET) = 825.00 DOWNSTREAM(FEET) = 800.00
 FLOW LENGTH(FEET) = 2200.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 132.0 INCH PIPE IS 98.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 24.22
 ESTIMATED PIPE DIAMETER(INCH) = 132.00 NUMBER OF PIPES = 2
 PIPE-FLOW(CFS) = 3673.20
 PIPE TRAVEL TIME(MIN.) = 1.51 Tc(MIN.) = 40.71

LONGEST FLOWPATH FROM NODE 120.00 TO NODE 400.00 = 26720.00 FEET.

FLOW PROCESS FROM NODE 400.00 TO NODE 400.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
PEAK FLOW RATE(CFS) = 3673.20 Tc(MIN.) = 40.71
AREA-AVERAGED Fm(INCH/HR) = 0.11 Ybar = 0.16
TOTAL AREA(ACRES) = 3488.5

FLOW PROCESS FROM NODE 302.00 TO NODE 303.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1060.00
ELEVATION DATA: UPSTREAM(FEET) = 825.00 DOWNSTREAM(FEET) = 820.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 14.397
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.676
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 4.40 0.98 0.100 32 14.40
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 10.21
TOTAL AREA(ACRES) = 4.40 PEAK FLOW RATE(CFS) = 10.21

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) = 820.00 DOWNSTREAM(FEET) = 815.00
FLOW LENGTH(FEET) = 840.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 16.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.17
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 10.21
PIPE TRAVEL TIME(MIN.) = 2.71 Tc(MIN.) = 17.11
LONGEST FLOWPATH FROM NODE 302.00 TO NODE 304.00 = 1900.00 FEET.

FLOW PROCESS FROM NODE 304.00 TO NODE 304.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.11
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.413

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 19.20 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 19.20 SUBAREA RUNOFF(CFS) = 40.01
EFFECTIVE AREA(ACRES) = 23.60 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 23.6 PEAK FLOW RATE(CFS) = 49.18

FLOW PROCESS FROM NODE 304.00 TO NODE 304.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.11
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.413
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 10.10 0.98 0.100 32
COMMERCIAL B 2.60 0.75 0.100 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.93
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 12.70 SUBAREA RUNOFF(CFS) = 26.52
EFFECTIVE AREA(ACRES) = 36.30 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.96 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 36.3 PEAK FLOW RATE(CFS) = 75.70

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) = 815.00 DOWNSTREAM(FEET) = 810.00
FLOW LENGTH(FEET) = 650.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 33.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.34
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 75.70
PIPE TRAVEL TIME(MIN.) = 1.16 Tc(MIN.) = 18.27
LONGEST FLOWPATH FROM NODE 302.00 TO NODE 305.00 = 2550.00 FEET.

FLOW PROCESS FROM NODE 305.00 TO NODE 305.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.27
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.320
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 24.20 0.98 0.100 32

COMMERCIAL A 6.70 0.98 0.100 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.100
 SUBAREA AREA (ACRES) = 30.90 SUBAREA RUNOFF (CFS) = 61.80
 EFFECTIVE AREA (ACRES) = 67.20 AREA-AVERAGED F_m (INCH/HR) = 0.10
 AREA-AVERAGED F_p (INCH/HR) = 0.97 AREA-AVERAGED A_p = 0.10
 TOTAL AREA (ACRES) = 67.2 PEAK FLOW RATE (CFS) = 134.46

FLOW LENGTH (FEET) = 200.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 72.0 INCH PIPE IS 54.4 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 10.75
 ESTIMATED PIPE DIAMETER (INCH) = 72.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 246.49
 PIPE TRAVEL TIME (MIN.) = 0.31 T_c (MIN.) = 20.89
 LONGEST FLOWPATH FROM NODE 302.00 TO NODE 400.00 = 4150.00 FEET.

FLOW PROCESS FROM NODE 305.00 TO NODE 306.00 IS CODE = 31

FLOW PROCESS FROM NODE 400.00 TO NODE 400.00 IS CODE = 1

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

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 810.00 DOWNSTREAM (FEET) = 801.00
 FLOW LENGTH (FEET) = 1400.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 54.0 INCH PIPE IS 42.2 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 10.09
 ESTIMATED PIPE DIAMETER (INCH) = 54.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 134.46
 PIPE TRAVEL TIME (MIN.) = 2.31 T_c (MIN.) = 20.58
 LONGEST FLOWPATH FROM NODE 302.00 TO NODE 306.00 = 3950.00 FEET.

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION (MIN.) = 20.89
 RAINFALL INTENSITY (INCH/HR) = 2.14
 AREA-AVERAGED F_m (INCH/HR) = 0.24
 AREA-AVERAGED F_p (INCH/HR) = 0.90
 AREA-AVERAGED A_p = 0.27
 EFFECTIVE STREAM AREA (ACRES) = 143.00
 TOTAL STREAM AREA (ACRES) = 143.00
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 246.49

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	T_c (MIN.)	AREA (ACRES)	HEADWATER NODE
1	3673.20	40.71	3488.50	120.00
2	246.49	20.89	143.00	302.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

UNIT-HYDROGRAPH DATA:

RAINFALL (INCH): 5M= 0.38; 30M= 0.79; 1H= 1.04; 3H= 1.87; 6H= 2.71; 24H= 5.30

S-GRAPH: VALLEY (DEV.)=100.0%; VALLEY (UNDEV.)/DESERT= 0.0%

MOUNTAIN= 0.0%; FOOTHILL= 0.0%; DESERT (UNDEV.)= 0.0%

T_c (HR) = 0.68; LAG (HR) = 0.54; F_m (INCH/HR) = 0.12; Y_{bar} = 0.16

USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.

DEPTH-AREA FACTORS: 5M = 0.84; 30M = 0.84; 1HR = 0.84;

3HR = 0.98; 6HR = 0.99; 24HR = 0.99

UNIT-INTERVAL (MIN) = 5.00 TOTAL AREA (ACRES) = 3631.5

LONGEST FLOWPATH FROM NODE 120.00 TO NODE 400.00 = 26720.00 FEET.

EQUIVALENT BASIN FACTOR APPROXIMATIONS:

$L_{ca}/L=0.3, n=.0214$; $L_{ca}/L=0.4, n=.0192$; $L_{ca}/L=0.5, n=.0176$; $L_{ca}/L=0.6, n=.0165$

TIME OF PEAK FLOW (HR) = 16.58 RUNOFF VOLUME (AF) = 1351.37

PEAK FLOW RATE (CFS) = 3711.01

FLOW PROCESS FROM NODE 400.00 TO NODE 432.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 800.00 DOWNSTREAM (FEET) = 786.00
 FLOW LENGTH (FEET) = 2400.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 126.0 INCH PIPE IS 99.2 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 16.92

FLOW PROCESS FROM NODE 306.00 TO NODE 400.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 801.00 DOWNSTREAM (FEET) = 800.00

ESTIMATED PIPE DIAMETER(INCH) = 126.00 NUMBER OF PIPES = 3
 PIPE-FLOW(CFS) = 3711.01
 PIPE TRAVEL TIME(MIN.) = 2.36 Tc(MIN.) = 43.07
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 432.00 = 29120.00 FEET.

 FLOW PROCESS FROM NODE 432.00 TO NODE 432.00 IS CODE = 10

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

 FLOW PROCESS FROM NODE 401.00 TO NODE 402.00 IS CODE = 21

 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 =====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 550.00
 ELEVATION DATA: UPSTREAM(FEET) = 855.00 DOWNSTREAM(FEET) = 845.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.455
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.683
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	2.20	0.98	0.100	32	8.45
COMMERCIAL	A	6.20	0.98	0.100	32	8.45

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF(CFS) = 27.11
 TOTAL AREA(ACRES) = 8.40 PEAK FLOW RATE(CFS) = 27.11

 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) = 845.00 DOWNSTREAM(FEET) = 840.00
 FLOW LENGTH(FEET) = 920.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 21.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 6.49
 ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 27.11
 PIPE TRAVEL TIME(MIN.) = 2.36 Tc(MIN.) = 10.82
 LONGEST FLOWPATH FROM NODE 401.00 TO NODE 403.00 = 1470.00 FEET.

 FLOW PROCESS FROM NODE 403.00 TO NODE 403.00 IS CODE = 81

 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<
 =====

MAINLINE Tc(MIN.) = 10.82
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.177
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	3.10	0.98	0.100	32
COMMERCIAL	A	20.70	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 23.80 SUBAREA RUNOFF(CFS) = 65.96
 EFFECTIVE AREA(ACRES) = 32.20 AREA-AVERAGED Fm(INCH/HR) = 0.10
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 32.2 PEAK FLOW RATE(CFS) = 89.24

 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) = 840.00 DOWNSTREAM(FEET) = 830.00
 FLOW LENGTH(FEET) = 1300.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 45.0 INCH PIPE IS 34.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 9.77
 ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 89.24
 PIPE TRAVEL TIME(MIN.) = 2.22 Tc(MIN.) = 13.04
 LONGEST FLOWPATH FROM NODE 401.00 TO NODE 404.00 = 2770.00 FEET.

 FLOW PROCESS FROM NODE 404.00 TO NODE 404.00 IS CODE = 81

 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<
 =====

MAINLINE Tc(MIN.) = 13.04
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.840
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	2.20	0.98	0.100	32
COMMERCIAL	A	34.10	0.98	0.100	32
PUBLIC PARK	A	11.50	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.280
 SUBAREA AREA(ACRES) = 47.80 SUBAREA RUNOFF(CFS) = 110.43
 EFFECTIVE AREA(ACRES) = 80.00 AREA-AVERAGED Fm(INCH/HR) = 0.20
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.21
 TOTAL AREA(ACRES) = 80.0 PEAK FLOW RATE(CFS) = 189.91

 FLOW PROCESS FROM NODE 404.00 TO NODE 405.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 830.00 DOWNSTREAM(FEET) = 825.00
 FLOW LENGTH(FEET) = 1050.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 66.0 INCH PIPE IS 49.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 9.89

ESTIMATED PIPE DIAMETER(INCH) = 66.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 189.91
PIPE TRAVEL TIME(MIN.) = 1.77 Tc(MIN.) = 14.81
LONGEST FLOWPATH FROM NODE 401.00 TO NODE 405.00 = 3820.00 FEET.

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.92 FLOW VELOCITY(FEET/SEC.) = 5.48
LONGEST FLOWPATH FROM NODE 401.00 TO NODE 406.00 = 5970.00 FEET.

FLOW PROCESS FROM NODE 405.00 TO NODE 405.00 IS CODE = 81

FLOW PROCESS FROM NODE 406.00 TO NODE 420.00 IS CODE = 51

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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

=====

MAINLINE Tc(MIN.) = 14.81
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.632
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	6.10	0.98	0.100	32
COMMERCIAL	A	13.90	0.98	0.100	32
PUBLIC PARK	A	2.40	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.180
SUBAREA AREA(ACRES) = 22.40 SUBAREA RUNOFF(CFS) = 49.51
EFFECTIVE AREA(ACRES) = 102.40 AREA-AVERAGED Fm(INCH/HR) = 0.20
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.20
TOTAL AREA(ACRES) = 102.4 PEAK FLOW RATE(CFS) = 224.39

=====

ELEVATION DATA: UPSTREAM(FEET) = 805.00 DOWNSTREAM(FEET) = 801.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 400.00 CHANNEL SLOPE = 0.0100
CHANNEL BASE(FEET) = 9.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 7.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.043
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	A	0.30	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 284.39
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.62
AVERAGE FLOW DEPTH(FEET) = 2.87 TRAVEL TIME(MIN.) = 1.19
Tc(MIN.) = 22.57
SUBAREA AREA(ACRES) = 0.30 SUBAREA RUNOFF(CFS) = 0.33
EFFECTIVE AREA(ACRES) = 175.30 AREA-AVERAGED Fm(INCH/HR) = 0.31
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 175.3 PEAK FLOW RATE(CFS) = 284.22
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 405.00 TO NODE 406.00 IS CODE = 51

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.87 FLOW VELOCITY(FEET/SEC.) = 5.62
LONGEST FLOWPATH FROM NODE 401.00 TO NODE 420.00 = 6370.00 FEET.

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

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 22.57
RAINFALL INTENSITY(INCH/HR) = 2.04
AREA-AVERAGED Fm(INCH/HR) = 0.31
AREA-AVERAGED Fp(INCH/HR) = 0.98
AREA-AVERAGED Ap = 0.31
EFFECTIVE STREAM AREA(ACRES) = 175.30
TOTAL STREAM AREA(ACRES) = 175.30
PEAK FLOW RATE(CFS) AT CONFLUENCE = 284.22

=====

ELEVATION DATA: UPSTREAM(FEET) = 825.00 DOWNSTREAM(FEET) = 805.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 2150.00 CHANNEL SLOPE = 0.0093
CHANNEL BASE(FEET) = 9.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 7.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.110
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	13.90	0.98	0.100	32
RESIDENTIAL	A	37.30	0.98	0.500	32
"5-7 DWELLINGS/ACRE"	A	37.30	0.98	0.500	32
RESIDENTIAL	A	1.20	0.98	0.200	32
"11+ DWELLINGS/ACRE"	A	1.20	0.98	0.200	32
PUBLIC PARK	A	7.30	0.98	0.850	32
SCHOOL	A	12.90	0.98	0.600	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.471
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 278.63
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.44
AVERAGE FLOW DEPTH(FEET) = 2.89 TRAVEL TIME(MIN.) = 6.58
Tc(MIN.) = 21.39
SUBAREA AREA(ACRES) = 72.60 SUBAREA RUNOFF(CFS) = 107.86
EFFECTIVE AREA(ACRES) = 175.00 AREA-AVERAGED Fm(INCH/HR) = 0.31
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 175.0 PEAK FLOW RATE(CFS) = 284.22

FLOW PROCESS FROM NODE 420.00 TO NODE 420.00 IS CODE = 1

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

=====

FLOW PROCESS FROM NODE 410.00 TO NODE 411.00 IS CODE = 21

FLOW PROCESS FROM NODE 410.00 TO NODE 411.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 830.00
ELEVATION DATA: UPSTREAM (FEET) = 855.00 DOWNSTREAM (FEET) = 838.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.733
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.385

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	5.10	0.98	0.100	32	9.73
PUBLIC PARK	A	4.40	0.98	0.850	32	15.46

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.447

SUBAREA RUNOFF (CFS) = 25.21

TOTAL AREA (ACRES) = 9.50 PEAK FLOW RATE (CFS) = 25.21

FLOW PROCESS FROM NODE 411.00 TO NODE 412.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 838.00 DOWNSTREAM (FEET) = 832.00
FLOW LENGTH (FEET) = 1400.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 22.6 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 5.81
ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 25.21
PIPE TRAVEL TIME (MIN.) = 4.02 Tc (MIN.) = 13.75
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 412.00 = 2230.00 FEET.

FLOW PROCESS FROM NODE 412.00 TO NODE 412.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 13.75
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.751
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	0.90	0.98	0.100	32
COMMERCIAL	A	23.60	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 24.50 SUBAREA RUNOFF (CFS) = 58.51
EFFECTIVE AREA (ACRES) = 34.00 AREA-AVERAGED Fm (INCH/HR) = 0.19
AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.20
TOTAL AREA (ACRES) = 34.0 PEAK FLOW RATE (CFS) = 78.31

FLOW PROCESS FROM NODE 412.00 TO NODE 415.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 832.00 DOWNSTREAM (FEET) = 810.00
FLOW LENGTH (FEET) = 1900.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 31.5 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 10.92
ESTIMATED PIPE DIAMETER (INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 78.31
PIPE TRAVEL TIME (MIN.) = 2.90 Tc (MIN.) = 16.65
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 415.00 = 4130.00 FEET.

FLOW PROCESS FROM NODE 415.00 TO NODE 415.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 16.65
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.453
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	0.50	0.98	0.100	32
COMMERCIAL	A	42.00	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 42.50 SUBAREA RUNOFF (CFS) = 90.09
EFFECTIVE AREA (ACRES) = 76.50 AREA-AVERAGED Fm (INCH/HR) = 0.14
AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.14
TOTAL AREA (ACRES) = 76.5 PEAK FLOW RATE (CFS) = 159.26

FLOW PROCESS FROM NODE 415.00 TO NODE 415.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 16.65
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.453
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	18.40	0.98	0.100	32
COMMERCIAL	A	68.40	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 86.80 SUBAREA RUNOFF (CFS) = 183.99
EFFECTIVE AREA (ACRES) = 163.30 AREA-AVERAGED Fm (INCH/HR) = 0.12
AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.12
TOTAL AREA (ACRES) = 163.3 PEAK FLOW RATE (CFS) = 343.24

FLOW PROCESS FROM NODE 415.00 TO NODE 420.00 IS CODE = 51

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

ELEVATION DATA: UPSTREAM (FEET) = 810.00 DOWNSTREAM (FEET) = 801.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 2780.00 CHANNEL SLOPE = 0.0032
 CHANNEL BASE (FEET) = 9.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 7.00
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.785

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	9.34	0.98	0.100	32
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	27.60	0.98	0.500	32
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	A	1.20	0.98	0.200	32
PUBLIC PARK	A	5.66	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.452
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 369.85
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 3.98
 AVERAGE FLOW DEPTH (FEET) = 4.26 TRAVEL TIME (MIN.) = 11.63
 Tc (MIN.) = 28.28
 SUBAREA AREA (ACRES) = 43.80 SUBAREA RUNOFF (CFS) = 52.99
 EFFECTIVE AREA (ACRES) = 207.10 AREA-AVERAGED Fm (INCH/HR) = 0.19
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.19
 TOTAL AREA (ACRES) = 207.1 PEAK FLOW RATE (CFS) = 343.24
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 4.12 FLOW VELOCITY (FEET/SEC.) = 3.90
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 420.00 = 6910.00 FEET.

 FLOW PROCESS FROM NODE 420.00 TO NODE 420.00 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.) = 28.28
 RAINFALL INTENSITY (INCH/HR) = 1.78
 AREA-AVERAGED Fm (INCH/HR) = 0.19
 AREA-AVERAGED Fp (INCH/HR) = 0.98
 AREA-AVERAGED Ap = 0.19
 EFFECTIVE STREAM AREA (ACRES) = 207.10
 TOTAL STREAM AREA (ACRES) = 207.10
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 343.24

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	284.22	22.57	2.043	0.98 (0.31)	0.31	175.3	401.00
2	343.24	28.28	1.785	0.98 (0.19)	0.19	207.1	410.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	602.48	22.57	2.043	0.98 (0.25)	0.25	340.6	401.00
2	585.17	28.28	1.785	0.98 (0.24)	0.25	382.4	410.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 602.48 Tc (MIN.) = 22.57
 EFFECTIVE AREA (ACRES) = 340.61 AREA-AVERAGED Fm (INCH/HR) = 0.25
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.25
 TOTAL AREA (ACRES) = 382.4
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 420.00 = 6910.00 FEET.

 FLOW PROCESS FROM NODE 420.00 TO NODE 430.00 IS CODE = 51

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 801.00 DOWNSTREAM (FEET) = 790.00
 CHANNEL LENGTH THRU SUBAREA (FEET) = 3500.00 CHANNEL SLOPE = 0.0031
 CHANNEL BASE (FEET) = 12.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 6.00
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.564

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	29.80	0.98	0.100	32
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	98.30	0.98	0.500	32
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	A	21.20	0.98	0.200	32
COMMERCIAL	A	7.00	0.98	0.100	32
PUBLIC PARK	A	16.70	0.98	0.850	32
PUBLIC PARK	A	3.60	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.421
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 694.75
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.60
 AVERAGE FLOW DEPTH (FEET) = 5.37 TRAVEL TIME (MIN.) = 12.67
 Tc (MIN.) = 35.24
 SUBAREA AREA (ACRES) = 176.60 SUBAREA RUNOFF (CFS) = 183.36
 EFFECTIVE AREA (ACRES) = 517.21 AREA-AVERAGED Fm (INCH/HR) = 0.30
 AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.31
 TOTAL AREA (ACRES) = 559.0 PEAK FLOW RATE (CFS) = 602.48
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 5.02 FLOW VELOCITY (FEET/SEC.) = 4.43
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 430.00 = 10410.00 FEET.

 FLOW PROCESS FROM NODE 430.00 TO NODE 430.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<<

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TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION (MIN.) = 35.24
 RAINFALL INTENSITY (INCH/HR) = 1.56
 AREA-AVERAGED Fm (INCH/HR) = 0.30
 AREA-AVERAGED Fp (INCH/HR) = 0.97
 AREA-AVERAGED Ap = 0.31
 EFFECTIVE STREAM AREA (ACRES) = 517.21
 TOTAL STREAM AREA (ACRES) = 559.00
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 602.48

ELEVATION DATA: UPSTREAM (FEET) = 832.00 DOWNSTREAM (FEET) = 830.00
 FLOW LENGTH (FEET) = 900.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 45.0 INCH PIPE IS 34.2 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 5.24
 ESTIMATED PIPE DIAMETER (INCH) = 45.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 47.16
 PIPE TRAVEL TIME (MIN.) = 2.86 Tc (MIN.) = 16.12
 LONGEST FLOWPATH FROM NODE 421.00 TO NODE 423.00 = 1980.00 FEET.

 FLOW PROCESS FROM NODE 421.00 TO NODE 422.00 IS CODE = 21

 FLOW PROCESS FROM NODE 423.00 TO NODE 423.00 IS CODE = 81

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 1080.00
 ELEVATION DATA: UPSTREAM (FEET) = 840.00 DOWNSTREAM (FEET) = 832.00

 $Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 13.253
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.812
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	0.80	0.98	0.100	32	13.25
COMMERCIAL	A	9.30	0.98	0.100	32	13.25

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF (CFS) = 24.68
 TOTAL AREA (ACRES) = 10.10 PEAK FLOW RATE (CFS) = 24.68

MAINLINE Tc (MIN.) = 16.12
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.501
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	11.20	0.98	0.100	32
COMMERCIAL	A	7.90	0.98	0.100	32
COMMERCIAL	A	9.00	0.98	0.100	32
PUBLIC PARK	A	4.50	0.98	0.850	32

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.204
 SUBAREA AREA (ACRES) = 32.60 SUBAREA RUNOFF (CFS) = 67.56
 EFFECTIVE AREA (ACRES) = 51.90 AREA-AVERAGED Fm (INCH/HR) = 0.16
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.17
 TOTAL AREA (ACRES) = 51.9 PEAK FLOW RATE (CFS) = 109.31

 FLOW PROCESS FROM NODE 422.00 TO NODE 422.00 IS CODE = 81

 FLOW PROCESS FROM NODE 423.00 TO NODE 424.00 IS CODE = 31

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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

MAINLINE Tc (MIN.) = 13.25
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.812
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	0.80	0.98	0.100	32
COMMERCIAL	A	8.40	0.98	0.100	32

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 9.20 SUBAREA RUNOFF (CFS) = 22.48
 EFFECTIVE AREA (ACRES) = 19.30 AREA-AVERAGED Fm (INCH/HR) = 0.10
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
 TOTAL AREA (ACRES) = 19.3 PEAK FLOW RATE (CFS) = 47.16

ELEVATION DATA: UPSTREAM (FEET) = 830.00 DOWNSTREAM (FEET) = 818.00
 FLOW LENGTH (FEET) = 750.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 42.0 INCH PIPE IS 33.0 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 13.47
 ESTIMATED PIPE DIAMETER (INCH) = 42.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 109.31
 PIPE TRAVEL TIME (MIN.) = 0.93 Tc (MIN.) = 17.04
 LONGEST FLOWPATH FROM NODE 421.00 TO NODE 424.00 = 2730.00 FEET.

 FLOW PROCESS FROM NODE 422.00 TO NODE 423.00 IS CODE = 31

 FLOW PROCESS FROM NODE 424.00 TO NODE 424.00 IS CODE = 81

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

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 MAINLINE Tc (MIN.) = 17.04
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.418
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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COMMERCIAL A 8.00 0.98 0.100 32
 PUBLIC PARK A 3.00 0.98 0.850 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.305
 SUBAREA AREA (ACRES) = 11.00 SUBAREA RUNOFF (CFS) = 21.00
 EFFECTIVE AREA (ACRES) = 62.90 AREA-AVERAGED Fm (INCH/HR) = 0.18
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.19
 TOTAL AREA (ACRES) = 62.9 PEAK FLOW RATE (CFS) = 126.45

FLOW LENGTH (FEET) = 1060.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 75.0 INCH PIPE IS 56.0 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 15.15
 ESTIMATED PIPE DIAMETER (INCH) = 75.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 372.44
 PIPE TRAVEL TIME (MIN.) = 1.17 Tc (MIN.) = 22.63
 LONGEST FLOWPATH FROM NODE 421.00 TO NODE 430.00 = 6490.00 FEET.

 FLOW PROCESS FROM NODE 424.00 TO NODE 425.00 IS CODE = 31

 FLOW PROCESS FROM NODE 430.00 TO NODE 430.00 IS CODE = 1

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

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 818.00 DOWNSTREAM (FEET) = 800.00
 FLOW LENGTH (FEET) = 2700.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 54.0 INCH PIPE IS 39.3 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 10.19
 ESTIMATED PIPE DIAMETER (INCH) = 54.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 126.45
 PIPE TRAVEL TIME (MIN.) = 4.42 Tc (MIN.) = 21.46
 LONGEST FLOWPATH FROM NODE 421.00 TO NODE 425.00 = 5430.00 FEET.

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION (MIN.) = 22.63
 RAINFALL INTENSITY (INCH/HR) = 2.04
 AREA-AVERAGED Fm (INCH/HR) = 0.34
 AREA-AVERAGED Fp (INCH/HR) = 0.98
 AREA-AVERAGED Ap = 0.34
 EFFECTIVE STREAM AREA (ACRES) = 233.70
 TOTAL STREAM AREA (ACRES) = 233.70
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 372.44

 FLOW PROCESS FROM NODE 425.00 TO NODE 425.00 IS CODE = 81

** CONFLUENCE DATA **

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	602.48	35.24	1.564	0.98 (0.30)	0.31	517.2	401.00
1	585.17	41.10	1.426	0.98 (0.29)	0.30	559.0	410.00
2	372.44	22.63	2.040	0.98 (0.34)	0.34	233.7	421.00

MAINLINE Tc (MIN.) = 21.46

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

* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.106

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	51.80	0.98	0.100	32
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	76.20	0.98	0.500	32
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	A	17.20	0.98	0.200	32
PUBLIC PARK	A	12.60	0.98	0.850	32
PUBLIC PARK	A	4.80	0.98	0.850	32
PUBLIC PARK	A	8.20	0.98	0.850	32

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	905.41	22.63	2.040	0.97 (0.32)	0.32	565.8	421.00
2	870.86	35.24	1.564	0.98 (0.31)	0.32	750.9	401.00
3	823.44	41.10	1.426	0.98 (0.31)	0.31	792.7	410.00

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.401
 SUBAREA AREA (ACRES) = 170.80 SUBAREA RUNOFF (CFS) = 263.67
 EFFECTIVE AREA (ACRES) = 233.70 AREA-AVERAGED Fm (INCH/HR) = 0.34
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.34
 TOTAL AREA (ACRES) = 233.7 PEAK FLOW RATE (CFS) = 372.44

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE (CFS) = 905.41 Tc (MIN.) = 22.63
 EFFECTIVE AREA (ACRES) = 565.76 AREA-AVERAGED Fm (INCH/HR) = 0.32
 AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.32
 TOTAL AREA (ACRES) = 792.7
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 430.00 = 10410.00 FEET.

 FLOW PROCESS FROM NODE 425.00 TO NODE 430.00 IS CODE = 31

 FLOW PROCESS FROM NODE 430.00 TO NODE 430.00 IS CODE = 71

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

>>>>PEAK FLOW RATE ESTIMATOR CHANGED TO UNIT-HYDROGRAPH METHOD<<<<<
 >>>>USING TIME-OF-CONCENTRATION OF LONGEST FLOWPATH<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 800.00 DOWNSTREAM (FEET) = 790.00

UNIT-HYDROGRAPH DATA:

RAINFALL(INCH): 5M= 0.38;30M= 0.79;1H= 1.04;3H= 1.87;6H= 2.71;24H= 5.30
 S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
 MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
 Tc(HR) = 0.68; LAG(HR) = 0.55; Fm(INCH/HR) = 0.31; Ybar = 0.34
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.96; 30M = 0.96; 1HR = 0.96;
 3HR = 0.99; 6HR = 1.00; 24HR= 1.00
 UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 792.7
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 430.00 = 10410.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3,n=.0418; Lca/L=0.4,n=.0375; Lca/L=0.5,n=.0345;Lca/L=0.6,n=.0322
 TIME OF PEAK FLOW(HR) = 16.58 RUNOFF VOLUME(AF) = 237.69
 UNIT-HYDROGRAPH METHOD PEAK FLOW RATE(CFS) = 812.24
 TOTAL PEAK FLOW RATE(CFS) = 812.24 (SOURCE FLOW INCLUDED)
 RATIONAL METHOD PEAK FLOW RATE(CFS) = 905.41
 (UPSTREAM NODE PEAK FLOW RATE(CFS) = 905.41)
 PEAK FLOW RATE(CFS) USED = 905.41

 FLOW PROCESS FROM NODE 430.00 TO NODE 431.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 790.00 DOWNSTREAM(FEET) = 788.00
 FLOW LENGTH(FEET) = 1300.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 144.0 INCH PIPE IS 113.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 9.50
 ESTIMATED PIPE DIAMETER(INCH) = 144.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 905.41
 PIPE TRAVEL TIME(MIN.) = 2.28 Tc(MIN.) = 43.38
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 431.00 = 11710.00 FEET.

 FLOW PROCESS FROM NODE 431.00 TO NODE 431.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 43.38
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.381
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	5.60	0.98	0.100	32
PUBLIC PARK	A	7.40	0.98	0.850	32
PUBLIC PARK	A	5.30	0.98	0.850	32
SCHOOL	A	17.30	0.98	0.600	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.611
 SUBAREA AREA(ACRES) = 35.60
 UNIT-HYDROGRAPH DATA:
 RAINFALL(INCH): 5M= 0.38;30M= 0.79;1H= 1.04;3H= 1.87;6H= 2.71;24H= 5.30
 S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
 MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
 Tc(HR) = 0.72; LAG(HR) = 0.58; Fm(INCH/HR) = 0.32; Ybar = 0.35
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.

DEPTH-AREA FACTORS: 5M = 0.96; 30M = 0.96; 1HR = 0.96;
 3HR = 0.99; 6HR = 1.00; 24HR= 1.00
 UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 828.3
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 431.00 = 11710.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3,n=.0397; Lca/L=0.4,n=.0356; Lca/L=0.5,n=.0327;Lca/L=0.6,n=.0305
 TIME OF PEAK FLOW(HR) = 16.67 RUNOFF VOLUME(AF) = 244.19
 UNIT-HYDROGRAPH PEAK FLOW RATE(CFS) = 800.66
 TOTAL AREA(ACRES) = 828.3 PEAK FLOW RATE(CFS) = 905.41
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 FLOW PROCESS FROM NODE 431.00 TO NODE 432.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 788.00 DOWNSTREAM(FEET) = 786.00
 FLOW LENGTH(FEET) = 1300.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 144.0 INCH PIPE IS 113.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 9.50
 ESTIMATED PIPE DIAMETER(INCH) = 144.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 905.41
 PIPE TRAVEL TIME(MIN.) = 2.28 Tc(MIN.) = 45.66
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 432.00 = 13010.00 FEET.

 FLOW PROCESS FROM NODE 432.00 TO NODE 432.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 45.66
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.339
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	45.00	0.98	0.100	32
COMMERCIAL	A	112.20	0.98	0.100	32
COMMERCIAL	A	0.70	0.98	0.100	32
PUBLIC PARK	A	5.50	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.125
 SUBAREA AREA(ACRES) = 163.40
 UNIT-HYDROGRAPH DATA:
 RAINFALL(INCH): 5M= 0.38;30M= 0.79;1H= 1.04;3H= 1.87;6H= 2.71;24H= 5.30
 S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
 MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
 Tc(HR) = 0.76; LAG(HR) = 0.61; Fm(INCH/HR) = 0.29; Ybar = 0.32
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.96; 30M = 0.96; 1HR = 0.96;
 3HR = 0.99; 6HR = 1.00; 24HR= 1.00
 UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 991.7
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 432.00 = 13010.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3,n=.0380; Lca/L=0.4,n=.0341; Lca/L=0.5,n=.0313;Lca/L=0.6,n=.0292
 TIME OF PEAK FLOW(HR) = 16.67 RUNOFF VOLUME(AF) = 305.08

UNIT-HYDROGRAPH PEAK FLOW RATE (CFS) = 963.17
TOTAL AREA (ACRES) = 991.7 PEAK FLOW RATE (CFS) = 963.17

FLOW PROCESS FROM NODE 432.00 TO NODE 432.00 IS CODE = 11

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

** MAIN STREAM CONFLUENCE DATA **
PEAK FLOW RATE (CFS) = 963.17 Tc (MIN.) = 45.66
AREA-AVERAGED Fm (INCH/HR) = 0.29 Ybar = 0.32
TOTAL AREA (ACRES) = 991.7
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 432.00 = 13010.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **
PEAK FLOW RATE (CFS) = 3711.01 Tc (MIN.) = 43.07
AREA-AVERAGED Fm (INCH/HR) = 0.12 Ybar = 0.16
TOTAL AREA (ACRES) = 3631.5
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 432.00 = 29120.00 FEET.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
UNIT-HYDROGRAPH DATA:
RAINFALL (INCH): 5M= 0.38;30M= 0.79;1H= 1.04;3H= 1.87;6H= 2.71;24H= 5.30
S-GRAPH: VALLEY (DEV.)=100.0%;VALLEY (UNDEV.)/DESERT= 0.0%
MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT (UNDEV.)= 0.0%
Tc (HR) = 0.72; LAG (HR) = 0.57; Fm (INCH/HR) = 0.15; Ybar = 0.20
USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
DEPTH-AREA FACTORS: 5M = 0.80; 30M = 0.80; 1HR = 0.80;
3HR = 0.97; 6HR = 0.98; 24HR= 0.99
UNIT-INTERVAL (MIN) = 5.00 TOTAL AREA (ACRES) = 4623.2
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 432.00 = 29120.00 FEET.
EQUIVALENT BASIN FACTOR APPROXIMATIONS:
Lca/L=0.3,n=.0211; Lca/L=0.4,n=.0189; Lca/L=0.5,n=.0174;Lca/L=0.6,n=.0162
TIME OF PEAK FLOW (HR) = 16.67 RUNOFF VOLUME (AF) = 1647.54
PEAK FLOW RATE (CFS) = 4189.93

FLOW PROCESS FROM NODE 432.00 TO NODE 432.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<
=====

FLOW PROCESS FROM NODE 432.00 TO NODE 433.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 786.00 DOWNSTREAM (FEET) = 750.00
FLOW LENGTH (FEET) = 4000.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 144.0 INCH PIPE IS 108.6 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 22.89
ESTIMATED PIPE DIAMETER (INCH) = 144.00 NUMBER OF PIPES = 2
PIPE-FLOW (CFS) = 4189.93
PIPE TRAVEL TIME (MIN.) = 2.91 Tc (MIN.) = 45.98

LONGEST FLOWPATH FROM NODE 120.00 TO NODE 433.00 = 33120.00 FEET.

FLOW PROCESS FROM NODE 433.00 TO NODE 433.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====

MAINLINE Tc (MIN.) = 45.98
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.333
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 75.60 0.98 0.100 32
RESIDENTIAL
"5-7 DWELLINGS/ACRE" A 91.90 0.98 0.500 32
RESIDENTIAL
"11+ DWELLINGS/ACRE" A 41.30 0.98 0.200 32
COMMERCIAL A 4.80 0.98 0.100 32
PUBLIC PARK A 18.40 0.98 0.850 32
SCHOOL A 10.00 0.98 0.600 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.347
SUBAREA AREA (ACRES) = 242.00

UNIT-HYDROGRAPH DATA:
RAINFALL (INCH): 5M= 0.38;30M= 0.79;1H= 1.04;3H= 1.87;6H= 2.71;24H= 5.30
S-GRAPH: VALLEY (DEV.)=100.0%;VALLEY (UNDEV.)/DESERT= 0.0%
MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT (UNDEV.)= 0.0%
Tc (HR) = 0.77; LAG (HR) = 0.61; Fm (INCH/HR) = 0.16; Ybar = 0.20
USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
DEPTH-AREA FACTORS: 5M = 0.79; 30M = 0.79; 1HR = 0.79;
3HR = 0.97; 6HR = 0.98; 24HR= 0.99
UNIT-INTERVAL (MIN) = 5.00 TOTAL AREA (ACRES) = 4865.2
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 433.00 = 33120.00 FEET.
EQUIVALENT BASIN FACTOR APPROXIMATIONS:
Lca/L=0.3,n=.0205; Lca/L=0.4,n=.0184; Lca/L=0.5,n=.0169;Lca/L=0.6,n=.0158
TIME OF PEAK FLOW (HR) = 16.67 RUNOFF VOLUME (AF) = 1714.52
UNIT-HYDROGRAPH PEAK FLOW RATE (CFS) = 4281.79
TOTAL AREA (ACRES) = 4865.2 PEAK FLOW RATE (CFS) = 4281.79

FLOW PROCESS FROM NODE 433.00 TO NODE 434.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 750.00 DOWNSTREAM (FEET) = 730.00
FLOW LENGTH (FEET) = 1800.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 138.0 INCH PIPE IS 106.9 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 24.79
ESTIMATED PIPE DIAMETER (INCH) = 138.00 NUMBER OF PIPES = 2
PIPE-FLOW (CFS) = 4281.79
PIPE TRAVEL TIME (MIN.) = 1.21 Tc (MIN.) = 47.19
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 434.00 = 34920.00 FEET.

FLOW PROCESS FROM NODE 434.00 TO NODE 434.00 IS CODE = 1

=====
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<<
=====

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
PEAK FLOW RATE (CFS) = 4281.79 Tc (MIN.) = 47.19
AREA-AVERAGED Fm (INCH/HR) = 0.16 Ybar = 0.20
TOTAL AREA (ACRES) = 4865.2

FLOW PROCESS FROM NODE 433.10 TO NODE 433.20 IS CODE = 21
=====

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 6400.00
ELEVATION DATA: UPSTREAM (FEET) = 790.00 DOWNSTREAM (FEET) = 735.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 26.213
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.868
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 8.90 0.98 0.100 32 26.21
COMMERCIAL C 12.00 0.57 0.100 69 26.21
RESIDENTIAL
"5-7 DWELLINGS/ACRE" A 78.50 0.98 0.500 32 33.54
RESIDENTIAL
"5-7 DWELLINGS/ACRE" C 78.40 0.57 0.500 69 33.54
PUBLIC PARK A 6.50 0.98 0.850 32 41.65
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.78
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.467
SUBAREA RUNOFF (CFS) = 249.18
TOTAL AREA (ACRES) = 184.30 PEAK FLOW RATE (CFS) = 249.18

FLOW PROCESS FROM NODE 433.20 TO NODE 434.00 IS CODE = 31
=====

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

ELEVATION DATA: UPSTREAM (FEET) = 735.00 DOWNSTREAM (FEET) = 730.00
FLOW LENGTH (FEET) = 1100.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 72.0 INCH PIPE IS 57.5 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 10.29
ESTIMATED PIPE DIAMETER (INCH) = 72.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 249.18
PIPE TRAVEL TIME (MIN.) = 1.78 Tc (MIN.) = 27.99
LONGEST FLOWPATH FROM NODE 433.10 TO NODE 434.00 = 7500.00 FEET.

FLOW PROCESS FROM NODE 434.00 TO NODE 434.00 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.) = 27.99
RAINFALL INTENSITY (INCH/HR) = 1.80
AREA-AVERAGED Fm (INCH/HR) = 0.37
AREA-AVERAGED Fp (INCH/HR) = 0.78
AREA-AVERAGED Ap = 0.47
EFFECTIVE STREAM AREA (ACRES) = 184.30
TOTAL STREAM AREA (ACRES) = 184.30
PEAK FLOW RATE (CFS) AT CONFLUENCE = 249.18
** CONFLUENCE DATA **
STREAM Q Tc AREA HEADWATER
NUMBER (CFS) (MIN.) (ACRES) NODE
1 4281.79 47.19 4865.20 120.00
2 249.18 27.99 184.30 433.10
=====

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
UNIT-HYDROGRAPH DATA:
RAINFALL (INCH): 5M= 0.38;30M= 0.79;1H= 1.04;3H= 1.87;6H= 2.71;24H= 5.30
S-GRAPH: VALLEY (DEV.)=100.0%;VALLEY (UNDEV.)/DESERT= 0.0%
MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT (UNDEV.)= 0.0%
Tc (HR) = 0.79; LAG (HR) = 0.63; Fm (INCH/HR) = 0.17; Ybar = 0.21
USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
DEPTH-AREA FACTORS: 5M = 0.79; 30M = 0.79; 1HR = 0.79;
3HR = 0.97; 6HR = 0.98; 24HR= 0.99
UNIT-INTERVAL (MIN) = 5.00 TOTAL AREA (ACRES) = 5049.5
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 434.00 = 34920.00 FEET.
EQUIVALENT BASIN FACTOR APPROXIMATIONS:
Lca/L=0.3,n=.0203; Lca/L=0.4,n=.0182; Lca/L=0.5,n=.0167;Lca/L=0.6,n=.0156
TIME OF PEAK FLOW (HR) = 16.67 RUNOFF VOLUME (AF) = 1763.39
PEAK FLOW RATE (CFS) = 4330.47

FLOW PROCESS FROM NODE 434.00 TO NODE 434.00 IS CODE = 81
=====

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<
=====

MAINLINE Tc (MIN.) = 47.19
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.313
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 12.10 0.98 0.100 32
RESIDENTIAL
"5-7 DWELLINGS/ACRE" A 52.10 0.98 0.500 32
RESIDENTIAL
"5-7 DWELLINGS/ACRE" C 1.30 0.57 0.500 69
PUBLIC PARK A 24.60 0.98 0.850 32
PUBLIC PARK A 2.00 0.98 0.850 32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.549
SUBAREA AREA (ACRES) = 92.10
UNIT-HYDROGRAPH DATA:
RAINFALL (INCH): 5M= 0.38;30M= 0.79;1H= 1.04;3H= 1.87;6H= 2.71;24H= 5.30
S-GRAPH: VALLEY (DEV.)=100.0%;VALLEY (UNDEV.)/DESERT= 0.0%

MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
 Tc(HR) = 0.79; LAG(HR) = 0.63; Fm(INCH/HR) = 0.18; Ybar = 0.22
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.78; 30M = 0.78; 1HR = 0.78;
 3HR = 0.97; 6HR = 0.98; 24HR= 0.99
 UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 5141.6
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 434.00 = 34920.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3,n=.0203; Lca/L=0.4,n=.0182; Lca/L=0.5,n=.0167;Lca/L=0.6,n=.0156
 TIME OF PEAK FLOW(HR) = 16.67 RUNOFF VOLUME(AF) = 1781.54
 UNIT-HYDROGRAPH PEAK FLOW RATE(CFS) = 4374.17
 TOTAL AREA(ACRES) = 5141.6 PEAK FLOW RATE(CFS) = 4374.17

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 5141.6 TC(MIN.) = 47.19
 AREA-AVERAGED Fm(INCH/HR)= 0.18 Ybar = 0.22
 PEAK FLOW RATE(CFS) = 4374.17

=====

END OF INTEGRATED RATIONAL/UNIT-HYDROGRAPH METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
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***** DESCRIPTION OF STUDY *****

* OLD MODEL COLONY EAST AREA E *
* 100-YEAR HYDROLOGY ANALYSIS *
*

FILE NAME: OMCEE100.DAT
TIME/DATE OF STUDY: 15:34 10/14/2011

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.80
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.4000

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

Table with columns: NO., HALF-WIDTH (FT), CROWN TO CROSSFALL (FT), STREET-CROSSFALL IN- / OUT- / SIDE / SIDE / WAY, CURB HEIGHT (FT), GUTTER WIDTH (FT), LIP (FT), HIKE (FT), MANNING FACTOR (n). Rows 1 and 2.

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

SIZE PIPE WITH A FLOW CAPACITY GREATER THAN OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.

*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

UNIT-HYDROGRAPH MODEL SELECTIONS/PARAMETERS:

WATERSHED LAG = 0.80 * Tc
USED "VALLEY UNDEVELOPED" S-GRAPH FOR DEVELOPMENTS OF

2 UNITS/ACRE AND LESS; AND "VALLEY DEVELOPED" S-GRAPH
FOR DEVELOPMENTS OF 3-4 UNITS/ACRE AND MORE.

USER SPECIFIED RAINFALL VALUES:

2-YR 6-HR RAINFALL DEPTH(INCH) = 1.70
2-YR 24-HR RAINFALL DEPTH(INCH) = 3.30
100-YR 6-HR RAINFALL DEPTH(INCH) = 3.70
100-YR 24-HR RAINFALL DEPTH(INCH) = 8.00
SIERRA MADRE DEPTH-AREA FACTORS USED.

AREA-AVERAGED

Table with columns: DURATION, RAINFALL(INCH). Rows: 5-MINUTES (0.52), 30-MINUTES (1.06), 1-HOUR (1.40), 3-HOUR (2.54), 6-HOUR (3.70), 24-HOUR (8.00).

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR UNIT HYDROGRAPH METHOD

FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 780.00
ELEVATION DATA: UPSTREAM(FEET) = 1040.00 DOWNSTREAM(FEET) = 1029.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.229
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.047
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ LAND USE GROUP (ACRES) Fp (INCH/HR) Ap (DECIMAL) SCS CN (MIN.)
COMMERCIAL A 1.50 0.98 0.100 32 10.23
COMMERCIAL A 4.00 0.98 0.100 32 10.23
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 19.55
TOTAL AREA(ACRES) = 5.50 PEAK FLOW RATE(CFS) = 19.55

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<

UPSTREAM ELEVATION(FEET) = 1029.00 DOWNSTREAM ELEVATION(FEET) = 1025.00
STREET LENGTH(FEET) = 450.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 33.60
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.59
HALFSTREET FLOOD WIDTH(FEET) = 21.80
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.40
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.02
STREET FLOW TRAVEL TIME(MIN.) = 2.21 Tc(MIN.) = 12.44
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.599

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 3.40 0.98 0.100 32
COMMERCIAL A 5.50 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 8.90 SUBAREA RUNOFF(CFS) = 28.05
EFFECTIVE AREA(ACRES) = 14.40 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 14.4 PEAK FLOW RATE(CFS) = 45.38

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.65 HALFSTREET FLOOD WIDTH(FEET) = 24.49
FLOW VELOCITY(FEET/SEC.) = 3.67 DEPTH*VELOCITY(FT*FT/SEC.) = 2.38
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 1230.00 FEET.

FLOW PROCESS FROM NODE 102.00 TO NODE 104.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 1025.00 DOWNSTREAM(FEET) = 1012.00
FLOW LENGTH(FEET) = 930.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 22.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.49
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 45.38
PIPE TRAVEL TIME(MIN.) = 1.48 Tc(MIN.) = 13.91
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 104.00 = 2160.00 FEET.

FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 13.91
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.365
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 7.90 0.98 0.100 32
COMMERCIAL A 31.00 0.98 0.100 32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 38.90 SUBAREA RUNOFF(CFS) = 114.39
EFFECTIVE AREA(ACRES) = 53.30 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 53.3 PEAK FLOW RATE(CFS) = 156.74

FLOW PROCESS FROM NODE 104.00 TO NODE 105.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 1012.00 DOWNSTREAM(FEET) = 1010.00
FLOW LENGTH(FEET) = 1200.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 75.0 INCH PIPE IS 56.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.37
ESTIMATED PIPE DIAMETER(INCH) = 75.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 156.74
PIPE TRAVEL TIME(MIN.) = 3.14 Tc(MIN.) = 17.05
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 105.00 = 3360.00 FEET.

FLOW PROCESS FROM NODE 105.00 TO NODE 105.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 17.05
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.978
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 4.00 0.98 0.100 32
COMMERCIAL A 21.10 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 25.10 SUBAREA RUNOFF(CFS) = 65.07
EFFECTIVE AREA(ACRES) = 78.40 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 78.4 PEAK FLOW RATE(CFS) = 203.25

FLOW PROCESS FROM NODE 105.00 TO NODE 110.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 1010.00 DOWNSTREAM(FEET) = 994.00
FLOW LENGTH(FEET) = 1900.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 60.0 INCH PIPE IS 46.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.39
ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 203.25
PIPE TRAVEL TIME(MIN.) = 2.56 Tc(MIN.) = 19.61
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 110.00 = 5260.00 FEET.

FLOW PROCESS FROM NODE 110.00 TO NODE 110.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 19.61

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.739

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	4.60	0.98	0.100	32
COMMERCIAL	A	15.80	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 20.40 SUBAREA RUNOFF(CFS) = 48.49
EFFECTIVE AREA(ACRES) = 98.80 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 98.8 PEAK FLOW RATE(CFS) = 234.85

FLOW PROCESS FROM NODE 110.00 TO NODE 110.00 IS CODE = 10

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

FLOW PROCESS FROM NODE 106.00 TO NODE 107.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 970.00

ELEVATION DATA: UPSTREAM(FEET) = 1040.00 DOWNSTREAM(FEET) = 1025.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.958

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.883

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	2.30	0.98	0.100	32	10.96
COMMERCIAL	A	1.20	0.98	0.100	32	10.96

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 11.92
TOTAL AREA(ACRES) = 3.50 PEAK FLOW RATE(CFS) = 11.92

FLOW PROCESS FROM NODE 107.00 TO NODE 108.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1025.00 DOWNSTREAM(FEET) = 1023.00

FLOW LENGTH(FEET) = 500.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.3 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 4.63
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 11.92
PIPE TRAVEL TIME(MIN.) = 1.80 Tc(MIN.) = 12.76
LONGEST FLOWPATH FROM NODE 106.00 TO NODE 108.00 = 1470.00 FEET.

FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 12.76

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.544

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	1.50	0.98	0.100	32
COMMERCIAL	A	9.90	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 11.40 SUBAREA RUNOFF(CFS) = 35.36
EFFECTIVE AREA(ACRES) = 14.90 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 14.9 PEAK FLOW RATE(CFS) = 46.22

FLOW PROCESS FROM NODE 108.00 TO NODE 109.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1023.00 DOWNSTREAM(FEET) = 1020.00

FLOW LENGTH(FEET) = 480.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 36.0 INCH PIPE IS 28.9 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 7.61

ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 46.22

PIPE TRAVEL TIME(MIN.) = 1.05 Tc(MIN.) = 13.81

LONGEST FLOWPATH FROM NODE 106.00 TO NODE 109.00 = 1950.00 FEET.

FLOW PROCESS FROM NODE 109.00 TO NODE 109.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.81

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.380

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	1.60	0.98	0.100	32
COMMERCIAL	A	10.00	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 11.60 SUBAREA RUNOFF(CFS) = 34.27
EFFECTIVE AREA(ACRES) = 26.50 AREA-AVERAGED Fm(INCH/HR) = 0.10

AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 26.5 PEAK FLOW RATE (CFS) = 78.28

FLOW PROCESS FROM NODE 109.00 TO NODE 109.10 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 1020.00 DOWNSTREAM (FEET) = 1010.00
FLOW LENGTH (FEET) = 1020.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 30.5 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 10.45
ESTIMATED PIPE DIAMETER (INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 78.28
PIPE TRAVEL TIME (MIN.) = 1.63 Tc (MIN.) = 15.44
LONGEST FLOWPATH FROM NODE 106.00 TO NODE 109.10 = 2970.00 FEET.

FLOW PROCESS FROM NODE 109.10 TO NODE 109.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 15.44
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.161
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 6.70 0.98 0.100 32
COMMERCIAL A 51.00 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 57.70 SUBAREA RUNOFF (CFS) = 159.10
EFFECTIVE AREA (ACRES) = 84.20 AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 84.2 PEAK FLOW RATE (CFS) = 232.18

FLOW PROCESS FROM NODE 109.10 TO NODE 109.20 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 1010.00 DOWNSTREAM (FEET) = 1005.00
FLOW LENGTH (FEET) = 790.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 66.0 INCH PIPE IS 52.5 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 11.46
ESTIMATED PIPE DIAMETER (INCH) = 66.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 232.18
PIPE TRAVEL TIME (MIN.) = 1.15 Tc (MIN.) = 16.59
LONGEST FLOWPATH FROM NODE 106.00 TO NODE 109.20 = 3760.00 FEET.

FLOW PROCESS FROM NODE 109.20 TO NODE 109.20 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc (MIN.) = 16.59

* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.028

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 3.60 0.98 0.100 32
COMMERCIAL A 18.10 0.98 0.100 32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 21.70 SUBAREA RUNOFF (CFS) = 57.23
EFFECTIVE AREA (ACRES) = 105.90 AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 105.9 PEAK FLOW RATE (CFS) = 279.31

FLOW PROCESS FROM NODE 109.20 TO NODE 109.20 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

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TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION (MIN.) = 16.59
RAINFALL INTENSITY (INCH/HR) = 3.03
AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.98
AREA-AVERAGED Ap = 0.10
EFFECTIVE STREAM AREA (ACRES) = 105.90
TOTAL STREAM AREA (ACRES) = 105.90
PEAK FLOW RATE (CFS) AT CONFLUENCE = 279.31

FLOW PROCESS FROM NODE 120.00 TO NODE 121.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

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INITIAL SUBAREA FLOW-LENGTH (FEET) = 650.00

ELEVATION DATA: UPSTREAM (FEET) = 1025.00 DOWNSTREAM (FEET) = 1015.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.346
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 4.272
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 1.80 0.98 0.100 32 9.35
COMMERCIAL A 4.70 0.98 0.100 32 9.35
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF (CFS) = 24.42
TOTAL AREA (ACRES) = 6.50 PEAK FLOW RATE (CFS) = 24.42

FLOW PROCESS FROM NODE 121.00 TO NODE 122.00 IS CODE = 31

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1015.00 DOWNSTREAM(FEET) = 1012.00
FLOW LENGTH(FEET) = 1160.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.77
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 24.42
PIPE TRAVEL TIME(MIN.) = 4.05 Tc(MIN.) = 13.40
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 122.00 = 1810.00 FEET.

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FLOW PROCESS FROM NODE 122.00 TO NODE 122.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 13.40
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.442
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          A         5.60   0.98 0.100 32
COMMERCIAL          A        16.90   0.98 0.100 32
COMMERCIAL          A         3.40   0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 25.90 SUBAREA RUNOFF(CFS) = 77.97
EFFECTIVE AREA(ACRES) = 32.40 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 32.4 PEAK FLOW RATE(CFS) = 97.53

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FLOW PROCESS FROM NODE 122.00 TO NODE 109.20 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 1012.00 DOWNSTREAM(FEET) = 1005.00
FLOW LENGTH(FEET) = 2500.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 57.0 INCH PIPE IS 42.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.87
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 97.53
PIPE TRAVEL TIME(MIN.) = 6.06 Tc(MIN.) = 19.46
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 109.20 = 4310.00 FEET.

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*****
FLOW PROCESS FROM NODE 109.20 TO NODE 109.20 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 19.46
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.751
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS

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LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          A         10.90   0.98 0.100 32
COMMERCIAL          A         73.40   0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 84.30 SUBAREA RUNOFF(CFS) = 201.35
EFFECTIVE AREA(ACRES) = 116.70 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 116.7 PEAK FLOW RATE(CFS) = 278.74

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*****
FLOW PROCESS FROM NODE 109.20 TO NODE 109.20 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
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TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 19.46
RAINFALL INTENSITY(INCH/HR) = 2.75
AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98
AREA-AVERAGED Ap = 0.10
EFFECTIVE STREAM AREA(ACRES) = 116.70
TOTAL STREAM AREA(ACRES) = 116.70
PEAK FLOW RATE(CFS) AT CONFLUENCE = 278.74

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** CONFLUENCE DATA **
STREAM   Q      Tc  Intensity  Fp(Fm)  Ap  Ae  HEADWATER
NUMBER   (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1       279.31 16.59 3.028 0.98(0.10) 0.10 105.9 106.00
2       278.74 19.46 2.751 0.98(0.10) 0.10 116.7 120.00

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

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** PEAK FLOW RATE TABLE **
STREAM   Q      Tc  Intensity  Fp(Fm)  Ap  Ae  HEADWATER
NUMBER   (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1       541.68 16.59 3.028 0.98(0.10) 0.10 205.4 106.00
2       531.68 19.46 2.751 0.98(0.10) 0.10 222.6 120.00

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COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 541.68 Tc(MIN.) = 16.59
EFFECTIVE AREA(ACRES) = 205.38 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 222.6
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 109.20 = 4310.00 FEET.

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FLOW PROCESS FROM NODE 109.20 TO NODE 110.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 1005.00 DOWNSTREAM(FEET) = 994.00

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FLOW LENGTH(FEET) = 1540.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 90.0 INCH PIPE IS 68.9 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 14.93
 ESTIMATED PIPE DIAMETER(INCH) = 90.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 541.68
 PIPE TRAVEL TIME(MIN.) = 1.72 Tc(MIN.) = 18.31
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 110.00 = 5850.00 FEET.

EFFECTIVE AREA(ACRES) = 332.79 AREA-AVERAGED Fm(INCH/HR) = 0.10
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 342.2
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 110.00 = 5850.00 FEET.

 FLOW PROCESS FROM NODE 110.00 TO NODE 110.00 IS CODE = 12

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

 FLOW PROCESS FROM NODE 110.00 TO NODE 110.00 IS CODE = 81

 FLOW PROCESS FROM NODE 110.00 TO NODE 140.00 IS CODE = 31

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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

 MAINLINE Tc(MIN.) = 18.31
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.854
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 3.40 0.98 0.100 32
 COMMERCIAL A 17.40 0.98 0.100 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 20.80 SUBAREA RUNOFF(CFS) = 51.60
 EFFECTIVE AREA(ACRES) = 226.18 AREA-AVERAGED Fm(INCH/HR) = 0.10
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 243.4 PEAK FLOW RATE(CFS) = 561.12

 ELEVATION DATA: UPSTREAM(FEET) = 994.00 DOWNSTREAM(FEET) = 992.00
 FLOW LENGTH(FEET) = 200.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 96.0 INCH PIPE IS 76.2 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 18.49
 ESTIMATED PIPE DIAMETER (INCH) = 96.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 791.59
 PIPE TRAVEL TIME(MIN.) = 0.18 Tc(MIN.) = 19.79
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 140.00 = 6050.00 FEET.

 FLOW PROCESS FROM NODE 110.00 TO NODE 110.00 IS CODE = 11

 FLOW PROCESS FROM NODE 140.00 TO NODE 140.00 IS CODE = 1

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

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	561.12	18.31	2.854	0.98(0.10)	0.10	226.2	106.00
2	551.46	21.18	2.615	0.98(0.10)	0.10	243.4	120.00

LONGEST FLOWPATH FROM NODE 120.00 TO NODE 110.00 = 5850.00 FEET.

 TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 19.79
 RAINFALL INTENSITY(INCH/HR) = 2.72
 AREA-AVERAGED Fm(INCH/HR) = 0.10
 AREA-AVERAGED Fp(INCH/HR) = 0.98
 AREA-AVERAGED Ap = 0.10
 EFFECTIVE STREAM AREA(ACRES) = 332.79
 TOTAL STREAM AREA(ACRES) = 342.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 791.59

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	234.85	19.61	2.739	0.98(0.10)	0.10	98.8	100.00

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 110.00 = 5260.00 FEET.

 FLOW PROCESS FROM NODE 130.00 TO NODE 131.00 IS CODE = 21

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	789.94	18.31	2.854	0.98(0.10)	0.10	318.4	106.00
2	791.59	19.61	2.739	0.98(0.10)	0.10	332.8	100.00
3	775.30	21.18	2.615	0.97(0.10)	0.10	342.2	120.00

TOTAL AREA(ACRES) = 342.2

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

 INITIAL SUBAREA FLOW-LENGTH(FEET) = 1030.00
 ELEVATION DATA: UPSTREAM(FEET) = 1030.00 DOWNSTREAM(FEET) = 1018.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 11.878
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.700

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 791.59 Tc(MIN.) = 19.609

 SUBAREA Tc AND LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN	(MIN.)
COMMERCIAL	A	1.30	0.98	0.100	32	11.88
RESIDENTIAL						
"11+ DWELLINGS/ACRE"	A	1.10	0.98	0.200	32	12.66
PUBLIC PARK	A	0.10	0.98	0.850	32	18.87

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.174
SUBAREA RUNOFF (CFS) = 7.94
TOTAL AREA (ACRES) = 2.50 PEAK FLOW RATE (CFS) = 7.94

FLOW PROCESS FROM NODE 131.00 TO NODE 132.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 1018.00 DOWNSTREAM ELEVATION (FEET) = 1010.00
STREET LENGTH (FEET) = 1200.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 27.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSSTREETS 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) = 13.02
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH (FEET) = 0.47
HALFSTREET FLOOD WIDTH (FEET) = 15.78
AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.43
PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 1.15
STREET FLOW TRAVEL TIME (MIN.) = 8.23 T_c (MIN.) = 20.11
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.697

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN
COMMERCIAL	A	2.20	0.98	0.100	32
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	A	1.70	0.98	0.200	32
PUBLIC PARK	A	0.20	0.98	0.850	32
SCHOOL	A	0.40	0.98	0.600	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.216
SUBAREA AREA (ACRES) = 4.50 SUBAREA RUNOFF (CFS) = 10.07
EFFECTIVE AREA (ACRES) = 7.00 AREA-AVERAGED F_m (INCH/HR) = 0.20
AREA-AVERAGED F_p (INCH/HR) = 0.97 AREA-AVERAGED A_p = 0.20
TOTAL AREA (ACRES) = 7.0 PEAK FLOW RATE (CFS) = 15.76

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH (FEET) = 0.50 HALFSTREET FLOOD WIDTH (FEET) = 17.05
FLOW VELOCITY (FEET/SEC.) = 2.54 DEPTH*VELOCITY (FT*FT/SEC.) = 1.27
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 132.00 = 2230.00 FEET.

FLOW PROCESS FROM NODE 132.00 TO NODE 133.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 1010.00 DOWNSTREAM (FEET) = 1008.00
FLOW LENGTH (FEET) = 800.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.4 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 4.20
ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 15.76
PIPE TRAVEL TIME (MIN.) = 3.17 T_c (MIN.) = 23.29
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 133.00 = 3030.00 FEET.

FLOW PROCESS FROM NODE 133.00 TO NODE 133.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE T_c (MIN.) = 23.29
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.470
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN
COMMERCIAL	A	2.00	0.98	0.100	32
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	A	14.70	0.98	0.200	32
COMMERCIAL	A	1.00	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.183
SUBAREA AREA (ACRES) = 17.70 SUBAREA RUNOFF (CFS) = 36.51
EFFECTIVE AREA (ACRES) = 24.70 AREA-AVERAGED F_m (INCH/HR) = 0.18
AREA-AVERAGED F_p (INCH/HR) = 0.98 AREA-AVERAGED A_p = 0.19
TOTAL AREA (ACRES) = 24.7 PEAK FLOW RATE (CFS) = 50.84

FLOW PROCESS FROM NODE 133.00 TO NODE 134.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 1008.00 DOWNSTREAM (FEET) = 1006.00
FLOW LENGTH (FEET) = 660.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 32.0 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 6.06
ESTIMATED PIPE DIAMETER (INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 50.84
PIPE TRAVEL TIME (MIN.) = 1.82 T_c (MIN.) = 25.10
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 134.00 = 3690.00 FEET.

FLOW PROCESS FROM NODE 134.00 TO NODE 134.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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=====
MAINLINE Tc (MIN.) = 25.10
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.362
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          A       4.70    0.98    0.100   32
RESIDENTIAL
"11+ DWELLINGS/ACRE" A       1.50    0.98    0.200   32
COMMERCIAL          A       9.30    0.98    0.100   32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.110
SUBAREA AREA (ACRES) = 15.50    SUBAREA RUNOFF (CFS) = 31.45
EFFECTIVE AREA (ACRES) = 40.20    AREA-AVERAGED Fm (INCH/HR) = 0.15
AREA-AVERAGED Fp (INCH/HR) = 0.98    AREA-AVERAGED Ap = 0.16
TOTAL AREA (ACRES) = 40.2    PEAK FLOW RATE (CFS) = 79.87

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*****
FLOW PROCESS FROM NODE 134.00 TO NODE 140.00 IS CODE = 31

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

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=====
ELEVATION DATA: UPSTREAM (FEET) = 1006.00 DOWNSTREAM (FEET) = 992.00
FLOW LENGTH (FEET) = 2200.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 34.2 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 8.87
ESTIMATED PIPE DIAMETER (INCH) = 45.00    NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 79.87
PIPE TRAVEL TIME (MIN.) = 4.13    Tc (MIN.) = 29.24
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 140.00 = 5890.00 FEET.

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*****
FLOW PROCESS FROM NODE 140.00 TO NODE 140.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc (MIN.) = 29.24
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.155
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          A       12.00   0.98    0.100   32
COMMERCIAL          A       38.80   0.98    0.100   32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 50.80    SUBAREA RUNOFF (CFS) = 94.07
EFFECTIVE AREA (ACRES) = 91.00    AREA-AVERAGED Fm (INCH/HR) = 0.12
AREA-AVERAGED Fp (INCH/HR) = 0.98    AREA-AVERAGED Ap = 0.13
TOTAL AREA (ACRES) = 91.0    PEAK FLOW RATE (CFS) = 166.48

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*****
FLOW PROCESS FROM NODE 140.00 TO NODE 140.00 IS CODE = 1

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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

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=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION (MIN.) = 29.24
RAINFALL INTENSITY (INCH/HR) = 2.16
AREA-AVERAGED Fm (INCH/HR) = 0.12
AREA-AVERAGED Fp (INCH/HR) = 0.98
AREA-AVERAGED Ap = 0.13
EFFECTIVE STREAM AREA (ACRES) = 91.00
TOTAL STREAM AREA (ACRES) = 91.00
PEAK FLOW RATE (CFS) AT CONFLUENCE = 166.48

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** CONFLUENCE DATA **

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STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	789.94	18.49	2.837	0.98 (0.10)	0.10	318.4	106.00
1	791.59	19.79	2.724	0.98 (0.10)	0.10	332.8	100.00
1	775.30	21.36	2.602	0.97 (0.10)	0.10	342.2	120.00
2	166.48	29.24	2.155	0.98 (0.12)	0.13	91.0	130.00

```

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

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** PEAK FLOW RATE TABLE **

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STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	930.54	18.49	2.837	0.97 (0.10)	0.10	376.0	106.00
2	935.80	19.79	2.724	0.97 (0.10)	0.10	394.4	100.00
3	923.66	21.36	2.602	0.97 (0.10)	0.10	408.7	120.00
4	803.54	29.24	2.155	0.98 (0.10)	0.11	433.2	130.00

```

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE (CFS) = 935.80    Tc (MIN.) = 19.79
EFFECTIVE AREA (ACRES) = 394.38    AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.97    AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 433.2
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 140.00 = 6050.00 FEET.

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*****
FLOW PROCESS FROM NODE 140.00 TO NODE 150.00 IS CODE = 31

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

```

```

=====
ELEVATION DATA: UPSTREAM (FEET) = 992.00 DOWNSTREAM (FEET) = 986.00
FLOW LENGTH (FEET) = 350.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 93.0 INCH PIPE IS 72.6 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 23.68
ESTIMATED PIPE DIAMETER (INCH) = 93.00    NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 935.80
PIPE TRAVEL TIME (MIN.) = 0.25    Tc (MIN.) = 20.04
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 150.00 = 6400.00 FEET.

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*****
FLOW PROCESS FROM NODE 150.00 TO NODE 150.00 IS CODE = 1

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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 20.04
RAINFALL INTENSITY(INCH/HR) = 2.70
AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.97
AREA-AVERAGED Ap = 0.10
EFFECTIVE STREAM AREA(ACRES) = 394.38
TOTAL STREAM AREA(ACRES) = 433.20
PEAK FLOW RATE(CFS) AT CONFLUENCE = 935.80

FLOW PROCESS FROM NODE 136.00 TO NODE 137.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 600.00
ELEVATION DATA: UPSTREAM(FEET) = 1006.00 DOWNSTREAM(FEET) = 1000.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.866
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.136
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 1.30 0.98 0.100 32 9.87
COMMERCIAL A 2.40 0.98 0.100 32 9.87
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 13.45
TOTAL AREA(ACRES) = 3.70 PEAK FLOW RATE(CFS) = 13.45

FLOW PROCESS FROM NODE 137.00 TO NODE 138.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 1000.00 DOWNSTREAM(FEET) = 997.00
FLOW LENGTH(FEET) = 400.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.15
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 13.45
PIPE TRAVEL TIME(MIN.) = 1.08 Tc(MIN.) = 10.95
LONGEST FLOWPATH FROM NODE 136.00 TO NODE 138.00 = 1000.00 FEET.

FLOW PROCESS FROM NODE 138.00 TO NODE 138.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.95

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.885

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 1.50 0.98 0.100 32
COMMERCIAL A 5.20 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 6.70 SUBAREA RUNOFF(CFS) = 22.84
EFFECTIVE AREA(ACRES) = 10.40 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 10.4 PEAK FLOW RATE(CFS) = 35.45

FLOW PROCESS FROM NODE 138.00 TO NODE 139.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 997.00 DOWNSTREAM(FEET) = 995.00
FLOW LENGTH(FEET) = 700.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 28.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.38
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 35.45
PIPE TRAVEL TIME(MIN.) = 2.17 Tc(MIN.) = 13.12
LONGEST FLOWPATH FROM NODE 136.00 TO NODE 139.00 = 1700.00 FEET.

FLOW PROCESS FROM NODE 139.00 TO NODE 139.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 13.12
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.486
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 2.20 0.98 0.100 32
COMMERCIAL A 12.20 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 14.40 SUBAREA RUNOFF(CFS) = 43.91
EFFECTIVE AREA(ACRES) = 24.80 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 24.8 PEAK FLOW RATE(CFS) = 75.63

FLOW PROCESS FROM NODE 139.00 TO NODE 150.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 995.00 DOWNSTREAM(FEET) = 986.00
FLOW LENGTH(FEET) = 960.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 30.2 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 10.20
 ESTIMATED PIPE DIAMETER (INCH) = 42.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 75.63
 PIPE TRAVEL TIME (MIN.) = 1.57 Tc (MIN.) = 14.69
 LONGEST FLOWPATH FROM NODE 136.00 TO NODE 150.00 = 2660.00 FEET.

NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)	(ACRES)	NODE
1	1095.93	14.69	3.257	0.97 (0.10)	0.10	381.7 136.00
2	1143.31	18.73	2.815	0.97 (0.10)	0.10	463.0 106.00
3	1139.85	20.04	2.704	0.97 (0.10)	0.10	481.4 100.00
4	1118.33	21.61	2.584	0.97 (0.10)	0.10	495.7 120.00
5	963.77	29.49	2.144	0.98 (0.10)	0.10	520.2 130.00

 FLOW PROCESS FROM NODE 150.00 TO NODE 150.00 IS CODE = 81

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE (CFS) = 1143.31 Tc (MIN.) = 18.73
 EFFECTIVE AREA (ACRES) = 462.95 AREA-AVERAGED Fm (INCH/HR) = 0.10
 AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.10
 TOTAL AREA (ACRES) = 520.2
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 150.00 = 6400.00 FEET.

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 14.69
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.257
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 28.00 0.98 0.100 32
 COMMERCIAL A 34.20 0.98 0.100 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 62.20 SUBAREA RUNOFF (CFS) = 176.89
 EFFECTIVE AREA (ACRES) = 87.00 AREA-AVERAGED Fm (INCH/HR) = 0.10
 AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.10
 TOTAL AREA (ACRES) = 87.0 PEAK FLOW RATE (CFS) = 247.42

 FLOW PROCESS FROM NODE 150.00 TO NODE 200.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 986.00 DOWNSTREAM (FEET) = 970.00
 FLOW LENGTH (FEET) = 1530.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 114.0 INCH PIPE IS 82.0 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 20.95
 ESTIMATED PIPE DIAMETER (INCH) = 114.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 1143.31
 PIPE TRAVEL TIME (MIN.) = 1.22 Tc (MIN.) = 19.95
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 200.00 = 7930.00 FEET.

 FLOW PROCESS FROM NODE 150.00 TO NODE 150.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

 FLOW PROCESS FROM NODE 200.00 TO NODE 200.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION (MIN.) = 14.69
 RAINFALL INTENSITY (INCH/HR) = 3.26
 AREA-AVERAGED Fm (INCH/HR) = 0.10
 AREA-AVERAGED Fp (INCH/HR) = 0.97
 AREA-AVERAGED Ap = 0.10
 EFFECTIVE STREAM AREA (ACRES) = 87.00
 TOTAL STREAM AREA (ACRES) = 87.00
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 247.42

MAINLINE Tc (MIN.) = 19.95
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.711
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 72.80 0.98 0.100 32
 COMMERCIAL A 88.30 0.98 0.100 32
 PUBLIC PARK A 5.20 0.98 0.850 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.123
 SUBAREA AREA (ACRES) = 166.30 SUBAREA RUNOFF (CFS) = 387.67
 EFFECTIVE AREA (ACRES) = 629.25 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.11
 TOTAL AREA (ACRES) = 686.5 PEAK FLOW RATE (CFS) = 1475.12

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	930.54	18.73	2.815	0.97 (0.10)	0.10	376.0	106.00
1	935.80	20.04	2.704	0.97 (0.10)	0.10	394.4	100.00
1	923.66	21.61	2.584	0.97 (0.10)	0.10	408.7	120.00
1	803.54	29.49	2.144	0.98 (0.10)	0.11	433.2	130.00
2	247.42	14.69	3.257	0.97 (0.10)	0.10	87.0	136.00

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1477.46	15.93	3.102	0.98 (0.11)	0.11	548.0	136.00
2	1475.12	19.95	2.711	0.97 (0.11)	0.11	629.3	106.00
3	1458.27	21.28	2.607	0.97 (0.11)	0.11	647.7	100.00
4	1425.44	22.85	2.498	0.97 (0.11)	0.11	662.0	120.00

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

** PEAK FLOW RATE TABLE **

STREAM	Q	Tc	Intensity	Fp (Fm)	Ap	Ae	HEADWATER
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5 1225.15 30.79 2.089 0.98 (0.11) 0.11 686.5 130.00
 NEW PEAK FLOW DATA ARE:
 PEAK FLOW RATE(CFS) = 1477.46 Tc(MIN.) = 15.93
 AREA-AVERAGED Fm(INCH/HR) = 0.11 AREA-AVERAGED Fp(INCH/HR) = 0.98
 AREA-AVERAGED Ap = 0.11 EFFECTIVE AREA(ACRES) = 548.04

 FLOW PROCESS FROM NODE 200.00 TO NODE 200.00 IS CODE = 71

>>>>PEAK FLOW RATE ESTIMATOR CHANGED TO UNIT-HYDROGRAPH METHOD<<<<<
 >>>>USING TIME-OF-CONCENTRATION OF LONGEST FLOWPATH<<<<<

UNIT-HYDROGRAPH DATA:
 RAINFALL(INCH): 5M= 0.52;30M= 1.06;1H= 1.40;3H= 2.54;6H= 3.70;24H= 8.00
 S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
 MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
 Tc(HR) = 0.38; LAG(HR) = 0.30; Fm(INCH/HR) = 0.11; Ybar = 0.13
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.97; 30M = 0.97; 1HR = 0.97;
 3HR = 1.00; 6HR = 1.00; 24HR= 1.00
 UNIT-INTERVAL(MIN) = 2.50 TOTAL AREA(ACRES) = 686.5
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 200.00 = 7930.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3,n=.0292; Lca/L=0.4,n=.0262; Lca/L=0.5,n=.0240;Lca/L=0.6,n=.0224
 TIME OF PEAK FLOW(HR) = 16.33 RUNOFF VOLUME(AF) = 402.75
 UNIT-HYDROGRAPH METHOD PEAK FLOW RATE(CFS) = 1556.49
 TOTAL PEAK FLOW RATE(CFS) = 1556.49 (SOURCE FLOW INCLUDED)
 RATIONAL METHOD PEAK FLOW RATE(CFS) = 1477.46
 (UPSTREAM NODE PEAK FLOW RATE(CFS) = 1477.46)
 PEAK FLOW RATE(CFS) USED = 1556.49

 FLOW PROCESS FROM NODE 200.00 TO NODE 201.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 970.00 DOWNSTREAM(FEET) = 950.00
 FLOW LENGTH(FEET) = 990.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 108.0 INCH PIPE IS 86.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 28.44
 ESTIMATED PIPE DIAMETER(INCH) = 108.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 1556.49
 PIPE TRAVEL TIME(MIN.) = 0.58 Tc(MIN.) = 23.43
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 201.00 = 8920.00 FEET.

 FLOW PROCESS FROM NODE 201.00 TO NODE 201.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 23.43
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.461
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

COMMERCIAL A 9.60 0.98 0.100 32
 COMMERCIAL A 58.40 0.98 0.100 32
 PUBLIC PARK A 4.80 0.98 0.850 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.149
 SUBAREA AREA(ACRES) = 72.80

UNIT-HYDROGRAPH DATA:
 RAINFALL(INCH): 5M= 0.52;30M= 1.06;1H= 1.40;3H= 2.54;6H= 3.70;24H= 8.00
 S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
 MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
 Tc(HR) = 0.39; LAG(HR) = 0.31; Fm(INCH/HR) = 0.11; Ybar = 0.13
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.97; 30M = 0.97; 1HR = 0.97;
 3HR = 0.99; 6HR = 1.00; 24HR= 1.00
 UNIT-INTERVAL(MIN) = 2.50 TOTAL AREA(ACRES) = 759.3
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 201.00 = 8920.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3,n=.0284; Lca/L=0.4,n=.0255; Lca/L=0.5,n=.0234;Lca/L=0.6,n=.0218
 TIME OF PEAK FLOW(HR) = 16.33 RUNOFF VOLUME(AF) = 443.71
 UNIT-HYDROGRAPH PEAK FLOW RATE(CFS) = 1681.01
 TOTAL AREA(ACRES) = 759.3 PEAK FLOW RATE(CFS) = 1681.01

 FLOW PROCESS FROM NODE 201.00 TO NODE 201.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 PEAK FLOW RATE(CFS) = 1681.01 Tc(MIN.) = 23.43
 AREA-AVERAGED Fm(INCH/HR) = 0.11 Ybar = 0.13
 TOTAL AREA(ACRES) = 759.3

 FLOW PROCESS FROM NODE 202.00 TO NODE 203.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
 ELEVATION DATA: UPSTREAM(FEET) = 1010.00 DOWNSTREAM(FEET) = 1000.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 12.102
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.658
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	6.00	0.98	0.100	32	12.10
COMMERCIAL	A	7.60	0.98	0.100	32	12.10
SCHOOL	A	1.90	0.98	0.600	32	16.40

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.161
 SUBAREA RUNOFF(CFS) = 48.84
 TOTAL AREA(ACRES) = 15.50 PEAK FLOW RATE(CFS) = 48.84


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*****
FLOW PROCESS FROM NODE 203.00 TO NODE 204.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1000.00 DOWNSTREAM(FEET) = 990.00
FLOW LENGTH(FEET) = 1100.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.7 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 9.05
ESTIMATED PIPE DIAMETER (INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 48.84
PIPE TRAVEL TIME (MIN.) = 2.03 Tc (MIN.) = 14.13
LONGEST FLOWPATH FROM NODE 202.00 TO NODE 204.00 = 2100.00 FEET.

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*****
FLOW PROCESS FROM NODE 204.00 TO NODE 204.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc (MIN.) = 14.13
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.334
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL         A       8.50   0.98  0.100  32
COMMERCIAL         A      10.30  0.98  0.100  32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 18.80 SUBAREA RUNOFF (CFS) = 54.76
EFFECTIVE AREA (ACRES) = 34.30 AREA-AVERAGED Fm (INCH/HR) = 0.12
AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.13
TOTAL AREA (ACRES) = 34.3 PEAK FLOW RATE (CFS) = 99.07

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*****
FLOW PROCESS FROM NODE 204.00 TO NODE 205.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 990.00 DOWNSTREAM(FEET) = 980.00
FLOW LENGTH(FEET) = 1400.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 36.0 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 9.79
ESTIMATED PIPE DIAMETER (INCH) = 48.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 99.07
PIPE TRAVEL TIME (MIN.) = 2.38 Tc (MIN.) = 16.51
LONGEST FLOWPATH FROM NODE 202.00 TO NODE 205.00 = 3500.00 FEET.

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*****
FLOW PROCESS FROM NODE 205.00 TO NODE 205.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc (MIN.) = 16.51
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.036

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SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL         A      16.60  0.98  0.100  32
COMMERCIAL         A      29.50  0.98  0.100  32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 46.10 SUBAREA RUNOFF (CFS) = 121.93
EFFECTIVE AREA (ACRES) = 80.40 AREA-AVERAGED Fm (INCH/HR) = 0.11
AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.11
TOTAL AREA (ACRES) = 80.4 PEAK FLOW RATE (CFS) = 211.82

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*****
FLOW PROCESS FROM NODE 205.00 TO NODE 206.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 980.00 DOWNSTREAM(FEET) = 955.00
FLOW LENGTH(FEET) = 1200.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 40.6 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 17.51
ESTIMATED PIPE DIAMETER (INCH) = 51.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 211.82
PIPE TRAVEL TIME (MIN.) = 1.14 Tc (MIN.) = 17.65
LONGEST FLOWPATH FROM NODE 202.00 TO NODE 206.00 = 4700.00 FEET.

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*****
FLOW PROCESS FROM NODE 206.00 TO NODE 206.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc (MIN.) = 17.65
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.917
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL         A      11.30  0.98  0.100  32
COMMERCIAL         A      5.50  0.98  0.100  32
COMMERCIAL         A      13.90  0.98  0.100  32
PUBLIC PARK        A       3.60  0.98  0.850  32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.179
SUBAREA AREA (ACRES) = 34.30 SUBAREA RUNOFF (CFS) = 84.67
EFFECTIVE AREA (ACRES) = 114.70 AREA-AVERAGED Fm (INCH/HR) = 0.13
AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.13
TOTAL AREA (ACRES) = 114.7 PEAK FLOW RATE (CFS) = 287.84

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*****
FLOW PROCESS FROM NODE 206.00 TO NODE 201.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 955.00 DOWNSTREAM(FEET) = 950.00
FLOW LENGTH(FEET) = 2000.00 MANNING'S N = 0.013

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DEPTH OF FLOW IN 87.0 INCH PIPE IS 65.6 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 8.62
 ESTIMATED PIPE DIAMETER (INCH) = 87.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 287.84
 PIPE TRAVEL TIME (MIN.) = 3.87 Tc (MIN.) = 21.52
 LONGEST FLOWPATH FROM NODE 202.00 TO NODE 201.00 = 6700.00 FEET.

PIPE-FLOW (CFS) = 1922.26
 PIPE TRAVEL TIME (MIN.) = 1.19 Tc (MIN.) = 24.63
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 207.00 = 10770.00 FEET.

 FLOW PROCESS FROM NODE 201.00 TO NODE 201.00 IS CODE = 1

 FLOW PROCESS FROM NODE 207.00 TO NODE 207.00 IS CODE = 81

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION (MIN.) = 21.52
 RAINFALL INTENSITY (INCH/HR) = 2.59
 AREA-AVERAGED Fm (INCH/HR) = 0.13
 AREA-AVERAGED Fp (INCH/HR) = 0.97
 AREA-AVERAGED Ap = 0.13
 EFFECTIVE STREAM AREA (ACRES) = 114.70
 TOTAL STREAM AREA (ACRES) = 114.70
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 287.84

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	AREA (ACRES)	HEADWATER NODE
1	1681.01	23.43	759.30	120.00
2	287.84	21.52	114.70	202.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

UNIT-HYDROGRAPH DATA:
 RAINFALL (INCH): 5M= 0.52;30M= 1.06;1H= 1.40;3H= 2.54;6H= 3.70;24H= 8.00
 S-GRAPH: VALLEY (DEV.)=100.0%;VALLEY (UNDEV.)/DESERT= 0.0%
 MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT (UNDEV.)= 0.0%
 Tc (HR) = 0.39; LAG (HR) = 0.31; Fm (INCH/HR) = 0.11; Ybar = 0.13
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.96; 30M = 0.96; 1HR = 0.96;
 3HR = 0.99; 6HR = 1.00; 24HR= 1.00
 UNIT-INTERVAL (MIN) = 2.50 TOTAL AREA (ACRES) = 874.0
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 201.00 = 8920.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3,n=.0284; Lca/L=0.4,n=.0255; Lca/L=0.5,n=.0234;Lca/L=0.6,n=.0218
 TIME OF PEAK FLOW (HR) = 16.33 RUNOFF VOLUME (AF) = 509.34
 PEAK FLOW RATE (CFS) = 1922.26

MAINLINE Tc (MIN.) = 24.63
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.389
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCSSOIL AREA Fp Ap SCSS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 13.30 0.98 0.100 32
 COMMERCIAL A 47.10 0.98 0.100 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 60.40
 UNIT-HYDROGRAPH DATA:
 RAINFALL (INCH): 5M= 0.52;30M= 1.06;1H= 1.40;3H= 2.54;6H= 3.70;24H= 8.00
 S-GRAPH: VALLEY (DEV.)=100.0%;VALLEY (UNDEV.)/DESERT= 0.0%
 MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT (UNDEV.)= 0.0%
 Tc (HR) = 0.41; LAG (HR) = 0.33; Fm (INCH/HR) = 0.11; Ybar = 0.13
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.96; 30M = 0.96; 1HR = 0.96;
 3HR = 0.99; 6HR = 1.00; 24HR= 1.00
 UNIT-INTERVAL (MIN) = 2.50 TOTAL AREA (ACRES) = 934.4
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 207.00 = 10770.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3,n=.0263; Lca/L=0.4,n=.0236; Lca/L=0.5,n=.0217;Lca/L=0.6,n=.0202
 TIME OF PEAK FLOW (HR) = 16.42 RUNOFF VOLUME (AF) = 544.97
 UNIT-HYDROGRAPH PEAK FLOW RATE (CFS) = 1999.11
 TOTAL AREA (ACRES) = 934.4 PEAK FLOW RATE (CFS) = 1999.11

 FLOW PROCESS FROM NODE 201.00 TO NODE 207.00 IS CODE = 31

 FLOW PROCESS FROM NODE 207.00 TO NODE 208.00 IS CODE = 31

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

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

ELEVATION DATA: UPSTREAM (FEET) = 950.00 DOWNSTREAM (FEET) = 926.00
 FLOW LENGTH (FEET) = 1850.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 132.0 INCH PIPE IS 96.5 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 25.81
 ESTIMATED PIPE DIAMETER (INCH) = 132.00 NUMBER OF PIPES = 1

ELEVATION DATA: UPSTREAM (FEET) = 926.00 DOWNSTREAM (FEET) = 914.00
 FLOW LENGTH (FEET) = 1020.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 132.0 INCH PIPE IS 104.4 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 24.80
 ESTIMATED PIPE DIAMETER (INCH) = 132.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 1999.11
 PIPE TRAVEL TIME (MIN.) = 0.69 Tc (MIN.) = 25.31
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 208.00 = 11790.00 FEET.

 FLOW PROCESS FROM NODE 208.00 TO NODE 208.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====

MAINLINE Tc (MIN.) = 25.31

* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.350
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 10.50 0.98 0.100 32
 COMMERCIAL A 47.20 0.98 0.100 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 57.70
 UNIT-HYDROGRAPH DATA:
 RAINFALL (INCH): 5M= 0.52; 30M= 1.06; 1H= 1.40; 3H= 2.54; 6H= 3.70; 24H= 8.00
 S-GRAPH: VALLEY (DEV.)=100.0%; VALLEY (UNDEV.)/DESERT= 0.0%
 MOUNTAIN= 0.0%; FOOHILL= 0.0%; DESERT (UNDEV.)= 0.0%
 Tc (HR) = 0.42; LAG (HR) = 0.34; Fm (INCH/HR) = 0.11; Ybar = 0.13
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.96; 30M = 0.96; 1HR = 0.96;
 3HR = 0.99; 6HR = 1.00; 24HR= 1.00
 UNIT-INTERVAL (MIN) = 2.50 TOTAL AREA (ACRES) = 992.1
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 208.00 = 11790.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3, n=.0253; Lca/L=0.4, n=.0227; Lca/L=0.5, n=.0209; Lca/L=0.6, n=.0195
 TIME OF PEAK FLOW (HR) = 16.42 RUNOFF VOLUME (AF) = 578.99
 UNIT-HYDROGRAPH PEAK FLOW RATE (CFS) = 2089.86
 TOTAL AREA (ACRES) = 992.1 PEAK FLOW RATE (CFS) = 2089.86

 FLOW PROCESS FROM NODE 208.00 TO NODE 209.00 IS CODE = 31

 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM (FEET) = 914.00 DOWNSTREAM (FEET) = 895.00
 FLOW LENGTH (FEET) = 1650.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 138.0 INCH PIPE IS 103.0 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 25.13
 ESTIMATED PIPE DIAMETER (INCH) = 138.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 2089.86
 PIPE TRAVEL TIME (MIN.) = 1.09 Tc (MIN.) = 26.41
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 209.00 = 13440.00 FEET.

 FLOW PROCESS FROM NODE 209.00 TO NODE 209.00 IS CODE = 81

 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====

MAINLINE Tc (MIN.) = 26.41
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.291
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 31.70 0.98 0.100 32
 COMMERCIAL A 23.60 0.98 0.100 32
 COMMERCIAL A 166.00 0.98 0.100 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 221.30

UNIT-HYDROGRAPH DATA:
 RAINFALL (INCH): 5M= 0.52; 30M= 1.06; 1H= 1.40; 3H= 2.54; 6H= 3.70; 24H= 8.00
 S-GRAPH: VALLEY (DEV.)=100.0%; VALLEY (UNDEV.)/DESERT= 0.0%
 MOUNTAIN= 0.0%; FOOHILL= 0.0%; DESERT (UNDEV.)= 0.0%
 Tc (HR) = 0.44; LAG (HR) = 0.35; Fm (INCH/HR) = 0.11; Ybar = 0.13
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.95; 30M = 0.95; 1HR = 0.95;
 3HR = 0.99; 6HR = 1.00; 24HR= 1.00
 UNIT-INTERVAL (MIN) = 2.50 TOTAL AREA (ACRES) = 1213.4
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 209.00 = 13440.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3, n=.0241; Lca/L=0.4, n=.0216; Lca/L=0.5, n=.0198; Lca/L=0.6, n=.0185
 TIME OF PEAK FLOW (HR) = 16.42 RUNOFF VOLUME (AF) = 709.36
 UNIT-HYDROGRAPH PEAK FLOW RATE (CFS) = 2469.71
 TOTAL AREA (ACRES) = 1213.4 PEAK FLOW RATE (CFS) = 2469.71

 FLOW PROCESS FROM NODE 209.00 TO NODE 220.00 IS CODE = 31

 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM (FEET) = 895.00 DOWNSTREAM (FEET) = 888.00
 FLOW LENGTH (FEET) = 900.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 120.0 INCH PIPE IS 93.1 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 18.89
 ESTIMATED PIPE DIAMETER (INCH) = 120.00 NUMBER OF PIPES = 2
 PIPE-FLOW (CFS) = 2469.71
 PIPE TRAVEL TIME (MIN.) = 0.79 Tc (MIN.) = 27.20
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 220.00 = 14340.00 FEET.

 FLOW PROCESS FROM NODE 220.00 TO NODE 220.00 IS CODE = 1

 >>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 =====
 TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 PEAK FLOW RATE (CFS) = 2469.71 Tc (MIN.) = 27.20
 AREA-AVERAGED Fm (INCH/HR) = 0.11 Ybar = 0.13
 TOTAL AREA (ACRES) = 1213.4

 FLOW PROCESS FROM NODE 210.00 TO NODE 211.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 =====
 INITIAL SUBAREA FLOW-LENGTH (FEET) = 800.00
 ELEVATION DATA: UPSTREAM (FEET) = 980.00 DOWNSTREAM (FEET) = 965.00
 Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.761
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 4.162
 SUBAREA Tc AND LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN	(MIN.)
COMMERCIAL	A	1.20	0.98	0.100	32	9.76
COMMERCIAL	A	3.60	0.98	0.100	32	9.76
PUBLIC PARK	A	1.00	0.98	0.850	32	15.51

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.229
SUBAREA RUNOFF(CFS) = 20.56
TOTAL AREA(ACRES) = 5.80 PEAK FLOW RATE(CFS) = 20.56

FLOW PROCESS FROM NODE 211.00 TO NODE 212.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 965.00 DOWNSTREAM ELEVATION(FEET) = 960.00
STREET LENGTH(FEET) = 650.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 44.10
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.66
HALFSTREET FLOOD WIDTH(FEET) = 24.91
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.45
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.26
STREET FLOW TRAVEL TIME(MIN.) = 3.14 Tc(MIN.) = 12.90

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.521

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	1.90	0.98	0.100	32
COMMERCIAL	A	12.00	0.98	0.100	32
PUBLIC PARK	A	1.70	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.182
SUBAREA AREA(ACRES) = 15.60 SUBAREA RUNOFF(CFS) = 46.94
EFFECTIVE AREA(ACRES) = 21.40 AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.19
TOTAL AREA(ACRES) = 21.4 PEAK FLOW RATE(CFS) = 64.15

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.73 HALFSTREET FLOOD WIDTH(FEET) = 32.09
FLOW VELOCITY(FEET/SEC.) = 3.74 DEPTH*VELOCITY(FT*FT/SEC.) = 2.74
*NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
AND L = 650.0 FT WITH ELEVATION-DROP = 5.0 FT, IS 52.7 CFS,
WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 212.00
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 212.00 = 1450.00 FEET.

FLOW PROCESS FROM NODE 212.00 TO NODE 213.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 960.00 DOWNSTREAM(FEET) = 950.00
FLOW LENGTH(FEET) = 900.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 27.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.48
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 64.15
PIPE TRAVEL TIME(MIN.) = 1.43 Tc(MIN.) = 14.33
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 213.00 = 2350.00 FEET.

FLOW PROCESS FROM NODE 213.00 TO NODE 213.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 14.33
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.305
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 7.10 0.98 0.100 32
COMMERCIAL A 31.40 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 38.50 SUBAREA RUNOFF(CFS) = 111.15
EFFECTIVE AREA(ACRES) = 59.90 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.13
TOTAL AREA(ACRES) = 59.9 PEAK FLOW RATE(CFS) = 171.15

FLOW PROCESS FROM NODE 213.00 TO NODE 214.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 950.00 DOWNSTREAM(FEET) = 930.00
FLOW LENGTH(FEET) = 1300.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 38.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.97
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 171.15
PIPE TRAVEL TIME(MIN.) = 1.45 Tc(MIN.) = 15.78
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 214.00 = 3650.00 FEET.

FLOW PROCESS FROM NODE 214.00 TO NODE 214.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 15.78

* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.120
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 5.30 0.98 0.100 32
 COMMERCIAL A 52.10 0.98 0.100 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 57.40 SUBAREA RUNOFF (CFS) = 156.14
 EFFECTIVE AREA (ACRES) = 117.30 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.12
 TOTAL AREA (ACRES) = 117.3 PEAK FLOW RATE (CFS) = 317.30

 FLOW PROCESS FROM NODE 214.00 TO NODE 215.00 IS CODE = 31

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

 ELEVATION DATA: UPSTREAM (FEET) = 930.00 DOWNSTREAM (FEET) = 920.00
 FLOW LENGTH (FEET) = 1200.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 72.0 INCH PIPE IS 54.3 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 13.87
 ESTIMATED PIPE DIAMETER (INCH) = 72.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 317.30
 PIPE TRAVEL TIME (MIN.) = 1.44 Tc (MIN.) = 17.22
 LONGEST FLOWPATH FROM NODE 210.00 TO NODE 215.00 = 4850.00 FEET.

 FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81

 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====
 MAINLINE Tc (MIN.) = 17.22
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.960
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 7.70 0.98 0.100 32
 COMMERCIAL A 32.20 0.98 0.100 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 39.90 SUBAREA RUNOFF (CFS) = 102.81
 EFFECTIVE AREA (ACRES) = 157.20 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.11
 TOTAL AREA (ACRES) = 157.2 PEAK FLOW RATE (CFS) = 403.27

 FLOW PROCESS FROM NODE 215.00 TO NODE 216.00 IS CODE = 31

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

 ELEVATION DATA: UPSTREAM (FEET) = 920.00 DOWNSTREAM (FEET) = 905.00
 FLOW LENGTH (FEET) = 840.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 69.0 INCH PIPE IS 50.8 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 19.67
 ESTIMATED PIPE DIAMETER (INCH) = 69.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 403.27
 PIPE TRAVEL TIME (MIN.) = 0.71 Tc (MIN.) = 17.93
 LONGEST FLOWPATH FROM NODE 210.00 TO NODE 216.00 = 5690.00 FEET.

 FLOW PROCESS FROM NODE 216.00 TO NODE 216.00 IS CODE = 81

 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====

MAINLINE Tc (MIN.) = 17.93
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.889
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 16.70 0.98 0.100 32
 COMMERCIAL A 34.60 0.98 0.100 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 51.30 SUBAREA RUNOFF (CFS) = 128.90
 EFFECTIVE AREA (ACRES) = 208.50 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.11
 TOTAL AREA (ACRES) = 208.5 PEAK FLOW RATE (CFS) = 522.12

 FLOW PROCESS FROM NODE 216.00 TO NODE 217.00 IS CODE = 31

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

 ELEVATION DATA: UPSTREAM (FEET) = 905.00 DOWNSTREAM (FEET) = 890.00
 FLOW LENGTH (FEET) = 1490.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 84.0 INCH PIPE IS 62.9 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 16.88
 ESTIMATED PIPE DIAMETER (INCH) = 84.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 522.12
 PIPE TRAVEL TIME (MIN.) = 1.47 Tc (MIN.) = 19.41
 LONGEST FLOWPATH FROM NODE 210.00 TO NODE 217.00 = 7180.00 FEET.

 FLOW PROCESS FROM NODE 217.00 TO NODE 217.00 IS CODE = 81

 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====
 MAINLINE Tc (MIN.) = 19.41
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.756
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 6.10 0.98 0.100 32
 COMMERCIAL A 22.00 0.98 0.100 32
 COMMERCIAL A 4.70 0.98 0.100 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 32.80 SUBAREA RUNOFF (CFS) = 78.48

EFFECTIVE AREA(ACRES) = 241.30 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.11
 TOTAL AREA(ACRES) = 241.3 PEAK FLOW RATE(CFS) = 575.55

 FLOW PROCESS FROM NODE 217.00 TO NODE 220.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 890.00 DOWNSTREAM(FEET) = 888.00
 FLOW LENGTH(FEET) = 1400.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 126.0 INCH PIPE IS 93.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 8.33
 ESTIMATED PIPE DIAMETER(INCH) = 126.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 575.55
 PIPE TRAVEL TIME(MIN.) = 2.80 Tc(MIN.) = 22.21
 LONGEST FLOWPATH FROM NODE 210.00 TO NODE 220.00 = 8580.00 FEET.

 FLOW PROCESS FROM NODE 220.00 TO NODE 220.00 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.) = 22.21
 RAINFALL INTENSITY(INCH/HR) = 2.54
 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.97
 AREA-AVERAGED Ap = 0.11
 EFFECTIVE STREAM AREA(ACRES) = 241.30
 TOTAL STREAM AREA(ACRES) = 241.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 575.55
 ** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	AREA (ACRES)	HEADWATER NODE
1	2469.71	27.20	1213.40	120.00
2	575.55	22.21	241.30	210.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

UNIT-HYDROGRAPH DATA:
 RAINFALL(INCH): 5M= 0.52;30M= 1.06;1H= 1.40;3H= 2.54;6H= 3.70;24H= 8.00
 S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
 MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
 Tc(HR) = 0.45; LAG(HR) = 0.36; Fm(INCH/HR) = 0.11; Ybar = 0.13
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.94; 30M = 0.94; 1HR = 0.94;
 3HR = 0.99; 6HR = 1.00; 24HR= 1.00
 UNIT-INTERVAL(MIN) = 2.50 TOTAL AREA(ACRES) = 1454.7
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 220.00 = 14340.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3,n=.0235; Lca/L=0.4,n=.0211; Lca/L=0.5,n=.0194;Lca/L=0.6,n=.0181
 TIME OF PEAK FLOW(HR) = 16.42 RUNOFF VOLUME(AF) = 850.19
 PEAK FLOW RATE(CFS) = 2857.75

 FLOW PROCESS FROM NODE 220.00 TO NODE 221.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 888.00 DOWNSTREAM(FEET) = 880.00
 FLOW LENGTH(FEET) = 800.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 120.0 INCH PIPE IS 94.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 21.45
 ESTIMATED PIPE DIAMETER(INCH) = 120.00 NUMBER OF PIPES = 2
 PIPE-FLOW(CFS) = 2857.75
 PIPE TRAVEL TIME(MIN.) = 0.62 Tc(MIN.) = 27.82
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 221.00 = 15140.00 FEET.

 FLOW PROCESS FROM NODE 221.00 TO NODE 221.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 27.82
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.220
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	2.70	0.98	0.100	32
COMMERCIAL	A	66.40	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 69.10
 UNIT-HYDROGRAPH DATA:
 RAINFALL(INCH): 5M= 0.52;30M= 1.06;1H= 1.40;3H= 2.54;6H= 3.70;24H= 8.00
 S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
 MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
 Tc(HR) = 0.46; LAG(HR) = 0.37; Fm(INCH/HR) = 0.11; Ybar = 0.13
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.93; 30M = 0.93; 1HR = 0.93;
 3HR = 0.99; 6HR = 0.99; 24HR= 1.00
 UNIT-INTERVAL(MIN) = 2.50 TOTAL AREA(ACRES) = 1523.8
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 221.00 = 15140.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3,n=.0231; Lca/L=0.4,n=.0207; Lca/L=0.5,n=.0190;Lca/L=0.6,n=.0178
 TIME OF PEAK FLOW(HR) = 16.42 RUNOFF VOLUME(AF) = 890.81
 UNIT-HYDROGRAPH PEAK FLOW RATE(CFS) = 2961.12
 TOTAL AREA(ACRES) = 1523.8 PEAK FLOW RATE(CFS) = 2961.12

 FLOW PROCESS FROM NODE 221.00 TO NODE 222.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 880.00 DOWNSTREAM(FEET) = 875.00
 FLOW LENGTH(FEET) = 420.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 120.0 INCH PIPE IS 90.5 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 23.31
 ESTIMATED PIPE DIAMETER (INCH) = 120.00 NUMBER OF PIPES = 2
 PIPE-FLOW (CFS) = 2961.12
 PIPE TRAVEL TIME (MIN.) = 0.30 Tc (MIN.) = 28.12
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 222.00 = 15560.00 FEET.

 FLOW PROCESS FROM NODE 222.00 TO NODE 222.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 28.12
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.206
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 4.30 0.98 0.100 32
 COMMERCIAL A 109.00 0.98 0.100 32
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE" A 21.90 0.98 0.500 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.165
 SUBAREA AREA (ACRES) = 135.20

UNIT-HYDROGRAPH DATA:
 RAINFALL (INCH): 5M= 0.52; 30M= 1.06; 1H= 1.40; 3H= 2.54; 6H= 3.70; 24H= 8.00
 S-GRAPH: VALLEY (DEV.)=100.0%; VALLEY (UNDEV.) / DESERT= 0.0%
 MOUNTAIN= 0.0%; FOOTHILL= 0.0%; DESERT (UNDEV.)= 0.0%
 Tc (HR) = 0.47; LAG (HR) = 0.37; Fm (INCH/HR) = 0.11; Ybar = 0.13
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.93; 30M = 0.93; 1HR = 0.93;
 3HR = 0.99; 6HR = 0.99; 24HR= 1.00
 UNIT-INTERVAL (MIN) = 2.50 TOTAL AREA (ACRES) = 1659.0
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 222.00 = 15560.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3, n=.0229; Lca/L=0.4, n=.0205; Lca/L=0.5, n=.0189; Lca/L=0.6, n=.0176
 TIME OF PEAK FLOW (HR) = 16.42 RUNOFF VOLUME (AF) = 965.30
 UNIT-HYDROGRAPH PEAK FLOW RATE (CFS) = 3184.46
 TOTAL AREA (ACRES) = 1659.0 PEAK FLOW RATE (CFS) = 3184.46

 FLOW PROCESS FROM NODE 222.00 TO NODE 223.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 875.00 DOWNSTREAM (FEET) = 870.00
 FLOW LENGTH (FEET) = 2400.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 144.0 INCH PIPE IS 114.0 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 11.06
 ESTIMATED PIPE DIAMETER (INCH) = 144.00 NUMBER OF PIPES = 3
 PIPE-FLOW (CFS) = 3184.46
 PIPE TRAVEL TIME (MIN.) = 3.62 Tc (MIN.) = 31.74
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 223.00 = 17960.00 FEET.

 FLOW PROCESS FROM NODE 223.00 TO NODE 223.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 31.74
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.051
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 3.20 0.98 0.100 32
 COMMERCIAL A 39.30 0.98 0.100 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 42.50

UNIT-HYDROGRAPH DATA:
 RAINFALL (INCH): 5M= 0.52; 30M= 1.06; 1H= 1.40; 3H= 2.54; 6H= 3.70; 24H= 8.00
 S-GRAPH: VALLEY (DEV.)=100.0%; VALLEY (UNDEV.) / DESERT= 0.0%
 MOUNTAIN= 0.0%; FOOTHILL= 0.0%; DESERT (UNDEV.)= 0.0%
 Tc (HR) = 0.53; LAG (HR) = 0.42; Fm (INCH/HR) = 0.11; Ybar = 0.13
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.92; 30M = 0.92; 1HR = 0.92;
 3HR = 0.99; 6HR = 0.99; 24HR= 1.00
 UNIT-INTERVAL (MIN) = 5.00 TOTAL AREA (ACRES) = 1701.5
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 223.00 = 17960.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3, n=.0227; Lca/L=0.4, n=.0204; Lca/L=0.5, n=.0187; Lca/L=0.6, n=.0174
 TIME OF PEAK FLOW (HR) = 16.50 RUNOFF VOLUME (AF) = 990.26
 UNIT-HYDROGRAPH PEAK FLOW RATE (CFS) = 3013.87
 TOTAL AREA (ACRES) = 1701.5 PEAK FLOW RATE (CFS) = 3184.46
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 FLOW PROCESS FROM NODE 223.00 TO NODE 223.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 31.74
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.051
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 15.50 0.98 0.100 32
 COMMERCIAL A 99.00 0.98 0.100 32
 COMMERCIAL A 3.20 0.98 0.100 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 117.70

UNIT-HYDROGRAPH DATA:
 RAINFALL (INCH): 5M= 0.52; 30M= 1.06; 1H= 1.40; 3H= 2.54; 6H= 3.70; 24H= 8.00
 S-GRAPH: VALLEY (DEV.)=100.0%; VALLEY (UNDEV.) / DESERT= 0.0%
 MOUNTAIN= 0.0%; FOOTHILL= 0.0%; DESERT (UNDEV.)= 0.0%
 Tc (HR) = 0.53; LAG (HR) = 0.42; Fm (INCH/HR) = 0.11; Ybar = 0.13
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.92; 30M = 0.92; 1HR = 0.92;
 3HR = 0.99; 6HR = 0.99; 24HR= 1.00
 UNIT-INTERVAL (MIN) = 5.00 TOTAL AREA (ACRES) = 1819.2
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 223.00 = 17960.00 FEET.

EQUIVALENT BASIN FACTOR APPROXIMATIONS:

Lca/L=0.3,n=.0227; Lca/L=0.4,n=.0204; Lca/L=0.5,n=.0187;Lca/L=0.6,n=.0174
TIME OF PEAK FLOW(HR) = 16.50 RUNOFF VOLUME(AF) = 1059.34
UNIT-HYDROGRAPH PEAK FLOW RATE(CFS) = 3205.28
TOTAL AREA(ACRES) = 1819.2 PEAK FLOW RATE(CFS) = 3205.28

FLOW PROCESS FROM NODE 223.00 TO NODE 224.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 870.00 DOWNSTREAM(FEET) = 865.00
FLOW LENGTH(FEET) = 500.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 126.0 INCH PIPE IS 98.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 22.14
ESTIMATED PIPE DIAMETER(INCH) = 126.00 NUMBER OF PIPES = 2
PIPE-FLOW(CFS) = 3205.28
PIPE TRAVEL TIME(MIN.) = 0.38 Tc(MIN.) = 32.12
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 224.00 = 18460.00 FEET.

FLOW PROCESS FROM NODE 224.00 TO NODE 224.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 32.12
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.037
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 23.60 0.98 0.100 32
COMMERCIAL A 28.20 0.98 0.100 32
COMMERCIAL A 19.10 0.98 0.100 32
PUBLIC PARK A 6.90 0.98 0.850 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.167
SUBAREA AREA(ACRES) = 77.80
UNIT-HYDROGRAPH DATA:
RAINFALL(INCH): 5M= 0.52;30M= 1.06;1H= 1.40;3H= 2.54;6H= 3.70;24H= 8.00
S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
Tc(HR) = 0.56; LAG(HR) = 0.44; Fm(INCH/HR) = 0.12; Ybar = 0.14
USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
DEPTH-AREA FACTORS: 5M = 0.91; 30M = 0.91; 1HR = 0.91;
3HR = 0.99; 6HR = 0.99; 24HR= 1.00
UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 1890.5
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 224.00 = 18460.00 FEET.
EQUIVALENT BASIN FACTOR APPROXIMATIONS:

Lca/L=0.3,n=.0225; Lca/L=0.4,n=.0202; Lca/L=0.5,n=.0185;Lca/L=0.6,n=.0173
TIME OF PEAK FLOW(HR) = 16.50 RUNOFF VOLUME(AF) = 1096.92
UNIT-HYDROGRAPH PEAK FLOW RATE(CFS) = 3298.12
TOTAL AREA(ACRES) = 1890.5 PEAK FLOW RATE(CFS) = 3298.12

FLOW PROCESS FROM NODE 224.00 TO NODE 225.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 865.00 DOWNSTREAM(FEET) = 860.00
FLOW LENGTH(FEET) = 1080.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 126.0 INCH PIPE IS 98.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.07
ESTIMATED PIPE DIAMETER(INCH) = 126.00 NUMBER OF PIPES = 3
PIPE-FLOW(CFS) = 3298.12
PIPE TRAVEL TIME(MIN.) = 1.19 Tc(MIN.) = 33.31
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 225.00 = 19540.00 FEET.

FLOW PROCESS FROM NODE 225.00 TO NODE 225.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 33.31
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.993
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 23.60 0.98 0.100 32
COMMERCIAL A 28.20 0.98 0.100 32
COMMERCIAL A 19.10 0.98 0.100 32
PUBLIC PARK A 6.90 0.98 0.850 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.167
SUBAREA AREA(ACRES) = 77.80

UNIT-HYDROGRAPH DATA:
RAINFALL(INCH): 5M= 0.52;30M= 1.06;1H= 1.40;3H= 2.54;6H= 3.70;24H= 8.00
S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
Tc(HR) = 0.56; LAG(HR) = 0.44; Fm(INCH/HR) = 0.12; Ybar = 0.14
USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
DEPTH-AREA FACTORS: 5M = 0.91; 30M = 0.91; 1HR = 0.91;
3HR = 0.99; 6HR = 0.99; 24HR= 1.00
UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 1968.3
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 225.00 = 19540.00 FEET.

EQUIVALENT BASIN FACTOR APPROXIMATIONS:
Lca/L=0.3,n=.0223; Lca/L=0.4,n=.0200; Lca/L=0.5,n=.0183;Lca/L=0.6,n=.0171
TIME OF PEAK FLOW(HR) = 16.50 RUNOFF VOLUME(AF) = 1139.62
UNIT-HYDROGRAPH PEAK FLOW RATE(CFS) = 3354.86
TOTAL AREA(ACRES) = 1968.3 PEAK FLOW RATE(CFS) = 3354.86

FLOW PROCESS FROM NODE 225.00 TO NODE 300.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 860.00 DOWNSTREAM(FEET) = 835.00
FLOW LENGTH(FEET) = 4100.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 144.0 INCH PIPE IS 106.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.77

ESTIMATED PIPE DIAMETER(INCH) = 144.00 NUMBER OF PIPES = 2
 PIPE-FLOW(CFS) = 3354.86
 PIPE TRAVEL TIME(MIN.) = 3.64 Tc(MIN.) = 36.95
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 300.00 = 23640.00 FEET.

 FLOW PROCESS FROM NODE 300.00 TO NODE 300.00 IS CODE = 10

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

 FLOW PROCESS FROM NODE 230.00 TO NODE 231.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
 ELEVATION DATA: UPSTREAM(FEET) = 1030.00 DOWNSTREAM(FEET) = 1020.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 12.899
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.521
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"11+ DWELLINGS/ACRE"	A	7.60	0.98	0.200	32	12.90
PUBLIC PARK	A	1.50	0.98	0.850	32	19.23

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.307
 SUBAREA RUNOFF(CFS) = 26.39
 TOTAL AREA(ACRES) = 9.10 PEAK FLOW RATE(CFS) = 26.39

 FLOW PROCESS FROM NODE 231.00 TO NODE 232.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 1020.00 DOWNSTREAM(FEET) = 1005.00
 FLOW LENGTH(FEET) = 1400.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 27.0 INCH PIPE IS 20.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 8.18
 ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 26.39
 PIPE TRAVEL TIME(MIN.) = 2.85 Tc(MIN.) = 15.75
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 232.00 = 2400.00 FEET.

 FLOW PROCESS FROM NODE 232.00 TO NODE 232.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 15.75
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.123

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	2.80	0.98	0.100	32
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	A	22.30	0.98	0.200	32
PUBLIC PARK	A	4.30	0.98	0.850	32
SCHOOL	A	6.70	0.98	0.600	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.344
 SUBAREA AREA(ACRES) = 36.10 SUBAREA RUNOFF(CFS) = 90.59
 EFFECTIVE AREA(ACRES) = 45.20 AREA-AVERAGED Fm(INCH/HR) = 0.33
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.34
 TOTAL AREA(ACRES) = 45.2 PEAK FLOW RATE(CFS) = 113.72

 FLOW PROCESS FROM NODE 232.00 TO NODE 232.10 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 1005.00 DOWNSTREAM(FEET) = 1000.00
 FLOW LENGTH(FEET) = 800.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 51.0 INCH PIPE IS 39.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 9.58
 ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 113.72
 PIPE TRAVEL TIME(MIN.) = 1.39 Tc(MIN.) = 17.14
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 232.10 = 3200.00 FEET.

 FLOW PROCESS FROM NODE 232.10 TO NODE 232.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 17.14
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.969
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	5.00	0.98	0.100	32
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	A	6.30	0.98	0.200	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.156
 SUBAREA AREA(ACRES) = 11.30 SUBAREA RUNOFF(CFS) = 28.65
 EFFECTIVE AREA(ACRES) = 56.50 AREA-AVERAGED Fm(INCH/HR) = 0.29
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.30
 TOTAL AREA(ACRES) = 56.5 PEAK FLOW RATE(CFS) = 136.07

 FLOW PROCESS FROM NODE 232.10 TO NODE 233.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 1000.00 DOWNSTREAM(FEET) = 990.00
 FLOW LENGTH(FEET) = 500.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 45.0 INCH PIPE IS 33.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 15.65
 ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 136.07
 PIPE TRAVEL TIME(MIN.) = 0.53 Tc(MIN.) = 17.68
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 233.00 = 3700.00 FEET.

 FLOW PROCESS FROM NODE 233.00 TO NODE 233.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc(MIN.) = 17.68
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.915
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	3.60	0.98	0.100	32
COMMERCIAL	A	15.40	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 19.00 SUBAREA RUNOFF(CFS) = 48.17
 EFFECTIVE AREA(ACRES) = 75.50 AREA-AVERAGED Fm(INCH/HR) = 0.24
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.25
 TOTAL AREA(ACRES) = 75.5 PEAK FLOW RATE(CFS) = 181.50

 FLOW PROCESS FROM NODE 233.00 TO NODE 234.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 990.00 DOWNSTREAM(FEET) = 978.00
 FLOW LENGTH(FEET) = 980.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 54.0 INCH PIPE IS 41.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 13.90
 ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 181.50
 PIPE TRAVEL TIME(MIN.) = 1.17 Tc(MIN.) = 18.85
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 234.00 = 4680.00 FEET.

 FLOW PROCESS FROM NODE 234.00 TO NODE 234.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc(MIN.) = 18.85
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.804
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	12.50	0.98	0.100	32
COMMERCIAL	A	28.90	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 41.40 SUBAREA RUNOFF(CFS) = 100.86
 EFFECTIVE AREA(ACRES) = 116.90 AREA-AVERAGED Fm(INCH/HR) = 0.19
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.20
 TOTAL AREA(ACRES) = 116.9 PEAK FLOW RATE(CFS) = 274.85

 FLOW PROCESS FROM NODE 234.00 TO NODE 235.00 IS CODE = 31

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

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ELEVATION DATA: UPSTREAM(FEET) = 978.00 DOWNSTREAM(FEET) = 965.00
 FLOW LENGTH(FEET) = 1100.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 63.0 INCH PIPE IS 49.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 15.16
 ESTIMATED PIPE DIAMETER(INCH) = 63.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 274.85
 PIPE TRAVEL TIME(MIN.) = 1.21 Tc(MIN.) = 20.06
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 235.00 = 5780.00 FEET.

 FLOW PROCESS FROM NODE 235.00 TO NODE 235.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc(MIN.) = 20.06
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.702
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	1.60	0.98	0.100	32
COMMERCIAL	A	5.90	0.98	0.100	32
COMMERCIAL	A	15.20	0.98	0.100	32
PUBLIC PARK	A	1.20	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.138
 SUBAREA AREA(ACRES) = 23.90 SUBAREA RUNOFF(CFS) = 55.23
 EFFECTIVE AREA(ACRES) = 140.80 AREA-AVERAGED Fm(INCH/HR) = 0.18
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.19
 TOTAL AREA(ACRES) = 140.8 PEAK FLOW RATE(CFS) = 319.28

 FLOW PROCESS FROM NODE 235.00 TO NODE 236.00 IS CODE = 31

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

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ELEVATION DATA: UPSTREAM(FEET) = 965.00 DOWNSTREAM(FEET) = 960.00
 FLOW LENGTH(FEET) = 300.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 63.0 INCH PIPE IS 48.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 17.98
 ESTIMATED PIPE DIAMETER(INCH) = 63.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 319.28
 PIPE TRAVEL TIME(MIN.) = 0.28 Tc(MIN.) = 20.34
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 236.00 = 6080.00 FEET.

FLOW PROCESS FROM NODE 237.00 TO NODE 238.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 950.00 DOWNSTREAM(FEET) = 910.00
FLOW LENGTH(FEET) = 3000.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 69.0 INCH PIPE IS 53.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.11
ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 371.08
PIPE TRAVEL TIME(MIN.) = 2.92 Tc(MIN.) = 23.81
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 238.00 = 9680.00 FEET.

FLOW PROCESS FROM NODE 238.00 TO NODE 238.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 23.81
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.437
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 64.00 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 64.00 SUBAREA RUNOFF(CFS) = 134.78
EFFECTIVE AREA(ACRES) = 231.60 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.16
TOTAL AREA(ACRES) = 231.6 PEAK FLOW RATE(CFS) = 475.82

FLOW PROCESS FROM NODE 238.00 TO NODE 239.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 910.00 DOWNSTREAM(FEET) = 888.00
FLOW LENGTH(FEET) = 1300.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 72.0 INCH PIPE IS 56.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.85
ESTIMATED PIPE DIAMETER(INCH) = 72.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 475.82
PIPE TRAVEL TIME(MIN.) = 1.09 Tc(MIN.) = 24.90
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 239.00 = 10980.00 FEET.

FLOW PROCESS FROM NODE 239.00 TO NODE 239.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 24.90
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.373
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 20.34
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.679
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 3.20 0.98 0.100 32
COMMERCIAL A 2.70 0.98 0.100 32
COMMERCIAL A 1.60 0.98 0.100 32
PUBLIC PARK A 1.80 0.98 0.850 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.245
SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 20.43
EFFECTIVE AREA(ACRES) = 150.10 AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.19
TOTAL AREA(ACRES) = 150.1 PEAK FLOW RATE(CFS) = 336.89

FLOW PROCESS FROM NODE 236.00 TO NODE 237.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 960.00 DOWNSTREAM(FEET) = 950.00
FLOW LENGTH(FEET) = 600.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 63.0 INCH PIPE IS 50.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.04
ESTIMATED PIPE DIAMETER(INCH) = 63.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 336.89
PIPE TRAVEL TIME(MIN.) = 0.55 Tc(MIN.) = 20.89
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 237.00 = 6680.00 FEET.

FLOW PROCESS FROM NODE 237.00 TO NODE 237.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 20.89
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.637
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 17.50 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 17.50 SUBAREA RUNOFF(CFS) = 39.99
EFFECTIVE AREA(ACRES) = 167.60 AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.18
TOTAL AREA(ACRES) = 167.6 PEAK FLOW RATE(CFS) = 371.08

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
COMMERCIAL	A	163.20	0.98	0.100	32
COMMERCIAL	A	10.00	0.98	0.100	32
COMMERCIAL	A	80.00	0.98	0.100	32
COMMERCIAL	A	0.50	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 253.70 SUBAREA RUNOFF(CFS) = 519.50
 EFFECTIVE AREA (ACRES) = 485.30 AREA-AVERAGED Fm(INCH/HR) = 0.12
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.13
 TOTAL AREA (ACRES) = 485.3 PEAK FLOW RATE(CFS) = 981.84

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
COMMERCIAL	A	199.70	0.98	0.100	32
COMMERCIAL	B	102.30	0.75	0.100	56
COMMERCIAL	C	16.70	0.57	0.100	69
COMMERCIAL	A	57.40	0.98	0.100	32
PUBLIC PARK	A	11.00	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.91
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.121
 SUBAREA AREA (ACRES) = 387.10 SUBAREA RUNOFF(CFS) = 745.04
 EFFECTIVE AREA (ACRES) = 893.70 AREA-AVERAGED Fm(INCH/HR) = 0.12
 AREA-AVERAGED Fp(INCH/HR) = 0.95 AREA-AVERAGED Ap = 0.12
 TOTAL AREA (ACRES) = 893.7 PEAK FLOW RATE(CFS) = 1714.11

 FLOW PROCESS FROM NODE 239.00 TO NODE 240.00 IS CODE = 31

 FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 71

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM(FEET) = 888.00 DOWNSTREAM(FEET) = 875.00
 FLOW LENGTH(FEET) = 2250.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 120.0 INCH PIPE IS 86.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 16.13
 ESTIMATED PIPE DIAMETER(INCH) = 120.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 981.84
 PIPE TRAVEL TIME(MIN.) = 2.32 Tc(MIN.) = 27.23
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 240.00 = 13230.00 FEET.

>>>>PEAK FLOW RATE ESTIMATOR CHANGED TO UNIT-HYDROGRAPH METHOD<<<<<
 >>>>USING TIME-OF-CONCENTRATION OF LONGEST FLOWPATH<<<<<
 =====

UNIT-HYDROGRAPH DATA:
 RAINFALL(INCH): 5M= 0.52;30M= 1.06;1H= 1.40;3H= 2.54;6H= 3.70;24H= 8.00
 S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
 MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
 Tc(HR) = 0.45; LAG(HR) = 0.36; Fm(INCH/HR) = 0.12; Ybar = 0.14
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.96; 30M = 0.96; 1HR = 0.96;
 3HR = 0.99; 6HR = 1.00; 24HR= 1.00
 UNIT-INTERVAL(MIN) = 2.50 TOTAL AREA(ACRES) = 893.7
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 240.00 = 13230.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3, n=.0260; Lca/L=0.4, n=.0233; Lca/L=0.5, n=.0214; Lca/L=0.6, n=.0200
 TIME OF PEAK FLOW(HR) = 16.42 RUNOFF VOLUME(AF) = 518.58
 UNIT-HYDROGRAPH METHOD PEAK FLOW RATE(CFS) = 1795.18
 TOTAL PEAK FLOW RATE(CFS) = 1795.18 (SOURCE FLOW INCLUDED)
 RATIONAL METHOD PEAK FLOW RATE(CFS) = 1714.11
 (UPSTREAM NODE PEAK FLOW RATE(CFS) = 1714.11)
 PEAK FLOW RATE(CFS) USED = 1795.18

 FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81

 FLOW PROCESS FROM NODE 240.00 TO NODE 242.00 IS CODE = 31

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====
 MAINLINE Tc(MIN.) = 27.23
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.249
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 5.60 0.98 0.100 32
 COMMERCIAL A 15.70 0.98 0.100 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 21.30 SUBAREA RUNOFF(CFS) = 41.25
 EFFECTIVE AREA (ACRES) = 506.60 AREA-AVERAGED Fm(INCH/HR) = 0.12
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.13
 TOTAL AREA (ACRES) = 506.6 PEAK FLOW RATE(CFS) = 981.84
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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

ELEVATION DATA: UPSTREAM(FEET) = 875.00 DOWNSTREAM(FEET) = 860.00
 FLOW LENGTH(FEET) = 350.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 102.0 INCH PIPE IS 76.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 39.61
 ESTIMATED PIPE DIAMETER(INCH) = 102.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 1795.18
 PIPE TRAVEL TIME(MIN.) = 0.15 Tc(MIN.) = 27.38
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 242.00 = 13580.00 FEET.

 FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81

 FLOW PROCESS FROM NODE 242.00 TO NODE 242.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====
 MAINLINE Tc(MIN.) = 27.23
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.249
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 27.38

* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.242

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	9.20	0.98	0.100	32
COMMERCIAL	A	107.00	0.98	0.100	32
COMMERCIAL	A	10.30	0.98	0.100	32
PUBLIC PARK	A	3.70	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.121

SUBAREA AREA (ACRES) = 130.20

UNIT-HYDROGRAPH DATA:

RAINFALL (INCH): 5M= 0.52; 30M= 1.06; 1H= 1.40; 3H= 2.54; 6H= 3.70; 24H= 8.00

S-GRAPH: VALLEY (DEV.)=100.0%; VALLEY (UNDEV.)/DESERT= 0.0%

MOUNTAIN= 0.0%; FOOTHILL= 0.0%; DESERT (UNDEV.)= 0.0%

Tc (HR) = 0.46; LAG (HR) = 0.37; Fm (INCH/HR) = 0.12; Ybar = 0.14

USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.

DEPTH-AREA FACTORS: 5M = 0.95; 30M = 0.95; 1HR = 0.95;

3HR = 0.99; 6HR = 1.00; 24HR= 1.00

UNIT-INTERVAL (MIN) = 2.50 TOTAL AREA (ACRES) = 1023.9

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 242.00 = 13580.00 FEET.

EQUIVALENT BASIN FACTOR APPROXIMATIONS:

Lca/L=0.3,n=.0260; Lca/L=0.4,n=.0233; Lca/L=0.5,n=.0214; Lca/L=0.6,n=.0200

TIME OF PEAK FLOW (HR) = 16.42 RUNOFF VOLUME (AF) = 593.78

UNIT-HYDROGRAPH PEAK FLOW RATE (CFS) = 2039.56

TOTAL AREA (ACRES) = 1023.9 PEAK FLOW RATE (CFS) = 2039.56

FLOW PROCESS FROM NODE 242.00 TO NODE 243.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 860.00 DOWNSTREAM (FEET) = 840.00

FLOW LENGTH (FEET) = 1400.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 132.0 INCH PIPE IS 97.4 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 27.12

ESTIMATED PIPE DIAMETER (INCH) = 132.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 2039.56

PIPE TRAVEL TIME (MIN.) = 0.86 Tc (MIN.) = 28.24

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 243.00 = 14980.00 FEET.

FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 28.24

* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.201

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	26.20	0.98	0.100	32

COMMERCIAL A 124.50 0.98 0.100 32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA (ACRES) = 150.70

UNIT-HYDROGRAPH DATA:

RAINFALL (INCH): 5M= 0.52; 30M= 1.06; 1H= 1.40; 3H= 2.54; 6H= 3.70; 24H= 8.00

S-GRAPH: VALLEY (DEV.)=100.0%; VALLEY (UNDEV.)/DESERT= 0.0%

MOUNTAIN= 0.0%; FOOTHILL= 0.0%; DESERT (UNDEV.)= 0.0%

Tc (HR) = 0.47; LAG (HR) = 0.38; Fm (INCH/HR) = 0.12; Ybar = 0.14

USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.

DEPTH-AREA FACTORS: 5M = 0.95; 30M = 0.95; 1HR = 0.95;

3HR = 0.99; 6HR = 1.00; 24HR= 1.00

UNIT-INTERVAL (MIN) = 2.50 TOTAL AREA (ACRES) = 1174.6

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 243.00 = 14980.00 FEET.

EQUIVALENT BASIN FACTOR APPROXIMATIONS:

Lca/L=0.3,n=.0249; Lca/L=0.4,n=.0224; Lca/L=0.5,n=.0205; Lca/L=0.6,n=.0192

TIME OF PEAK FLOW (HR) = 16.42 RUNOFF VOLUME (AF) = 682.57

UNIT-HYDROGRAPH PEAK FLOW RATE (CFS) = 2301.42

TOTAL AREA (ACRES) = 1174.6 PEAK FLOW RATE (CFS) = 2301.42

FLOW PROCESS FROM NODE 243.00 TO NODE 300.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 840.00 DOWNSTREAM (FEET) = 835.00

FLOW LENGTH (FEET) = 1300.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 132.0 INCH PIPE IS 105.1 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 14.18

ESTIMATED PIPE DIAMETER (INCH) = 132.00 NUMBER OF PIPES = 2

PIPE-FLOW (CFS) = 2301.42

PIPE TRAVEL TIME (MIN.) = 1.53 Tc (MIN.) = 29.76

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 300.00 = 16280.00 FEET.

FLOW PROCESS FROM NODE 300.00 TO NODE 300.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 29.76

* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.132

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	51.60	0.98	0.100	32
COMMERCIAL	A	142.40	0.98	0.100	32
COMMERCIAL	B	5.00	0.75	0.100	56
COMMERCIAL	A	1.90	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA (ACRES) = 200.90

UNIT-HYDROGRAPH DATA:

RAINFALL (INCH): 5M= 0.52; 30M= 1.06; 1H= 1.40; 3H= 2.54; 6H= 3.70; 24H= 8.00

S-GRAPH: VALLEY (DEV.)=100.0%; VALLEY (UNDEV.)/DESERT= 0.0%

MOUNTAIN= 0.0%; FOOTHILL= 0.0%; DESERT (UNDEV.)= 0.0%

Tc(HR) = 0.50; LAG(HR) = 0.40; Fm(INCH/HR) = 0.11; Ybar = 0.13
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.94; 30M = 0.94; 1HR = 0.94;
 3HR = 0.99; 6HR = 1.00; 24HR= 1.00
 UNIT-INTERVAL(MIN) = 2.50 TOTAL AREA(ACRES) = 1375.5
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 300.00 = 16280.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3,n=.0244; Lca/L=0.4,n=.0219; Lca/L=0.5,n=.0201;Lca/L=0.6,n=.0188
 TIME OF PEAK FLOW(HR) = 16.42 RUNOFF VOLUME(AF) = 800.90
 UNIT-HYDROGRAPH PEAK FLOW RATE(CFS) = 2589.49
 TOTAL AREA(ACRES) = 1375.5 PEAK FLOW RATE(CFS) = 2589.49

 FLOW PROCESS FROM NODE 300.00 TO NODE 300.00 IS CODE = 11

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

** MAIN STREAM CONFLUENCE DATA **
 PEAK FLOW RATE(CFS) = 2589.49 Tc(MIN.) = 29.76
 AREA-AVERAGED Fm(INCH/HR) = 0.11 Ybar = 0.13
 TOTAL AREA(ACRES) = 1375.5
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 300.00 = 16280.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **
 PEAK FLOW RATE(CFS) = 3354.86 Tc(MIN.) = 36.95
 AREA-AVERAGED Fm(INCH/HR) = 0.12 Ybar = 0.14
 TOTAL AREA(ACRES) = 1968.3
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 300.00 = 23640.00 FEET.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 UNIT-HYDROGRAPH DATA:
 RAINFALL(INCH): 5M= 0.52;30M= 1.06;1H= 1.40;3H= 2.54;6H= 3.70;24H= 8.00
 S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
 MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
 Tc(HR) = 0.62; LAG(HR) = 0.49; Fm(INCH/HR) = 0.11; Ybar = 0.14
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.85; 30M = 0.85; 1HR = 0.85;
 3HR = 0.98; 6HR = 0.99; 24HR= 0.99
 UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 3343.8
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 300.00 = 23640.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3,n=.0212; Lca/L=0.4,n=.0190; Lca/L=0.5,n=.0174;Lca/L=0.6,n=.0163
 TIME OF PEAK FLOW(HR) = 16.58 RUNOFF VOLUME(AF) = 1931.23
 PEAK FLOW RATE(CFS) = 4958.30

 FLOW PROCESS FROM NODE 300.00 TO NODE 300.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<
 =====

 FLOW PROCESS FROM NODE 300.00 TO NODE 301.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM(FEET) = 835.00 DOWNSTREAM(FEET) = 825.00
 FLOW LENGTH(FEET) = 880.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 144.0 INCH PIPE IS 114.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 25.83
 ESTIMATED PIPE DIAMETER(INCH) = 144.00 NUMBER OF PIPES = 2
 PIPE-FLOW(CFS) = 4958.30
 PIPE TRAVEL TIME(MIN.) = 0.57 Tc(MIN.) = 37.52
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 301.00 = 24520.00 FEET.

 FLOW PROCESS FROM NODE 301.00 TO NODE 301.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====

MAINLINE Tc(MIN.) = 37.52
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.855
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	30.90	0.98	0.100	32
COMMERCIAL	A	81.90	0.98	0.100	32
COMMERCIAL	B	24.40	0.75	0.100	56
COMMERCIAL	A	7.50	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.94
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 144.70
 UNIT-HYDROGRAPH DATA:
 RAINFALL(INCH): 5M= 0.52;30M= 1.06;1H= 1.40;3H= 2.54;6H= 3.70;24H= 8.00
 S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
 MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
 Tc(HR) = 0.63; LAG(HR) = 0.50; Fm(INCH/HR) = 0.11; Ybar = 0.13
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.84; 30M = 0.84; 1HR = 0.84;
 3HR = 0.98; 6HR = 0.99; 24HR= 0.99
 UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 3488.5
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 301.00 = 24520.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3,n=.0210; Lca/L=0.4,n=.0188; Lca/L=0.5,n=.0173;Lca/L=0.6,n=.0161
 TIME OF PEAK FLOW(HR) = 16.58 RUNOFF VOLUME(AF) = 2015.78
 UNIT-HYDROGRAPH PEAK FLOW RATE(CFS) = 5123.88
 TOTAL AREA(ACRES) = 3488.5 PEAK FLOW RATE(CFS) = 5123.88

 FLOW PROCESS FROM NODE 301.00 TO NODE 400.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 825.00 DOWNSTREAM(FEET) = 800.00
 FLOW LENGTH(FEET) = 2200.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 144.0 INCH PIPE IS 117.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 25.84
 ESTIMATED PIPE DIAMETER(INCH) = 144.00 NUMBER OF PIPES = 2
 PIPE-FLOW(CFS) = 5123.88

PIPE TRAVEL TIME(MIN.) = 1.42 Tc(MIN.) = 38.94
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 400.00 = 26720.00 FEET.

FLOW PROCESS FROM NODE 400.00 TO NODE 400.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
PEAK FLOW RATE(CFS) = 5123.88 Tc(MIN.) = 38.94
AREA-AVERAGED Fm(INCH/HR) = 0.11 Ybar = 0.13
TOTAL AREA(ACRES) = 3488.5

FLOW PROCESS FROM NODE 302.00 TO NODE 303.00 IS CODE = 12

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1060.00
ELEVATION DATA: UPSTREAM(FEET) = 825.00 DOWNSTREAM(FEET) = 820.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 14.397
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.297
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	4.40	0.98	0.100	32	14.40

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 12.67
TOTAL AREA(ACRES) = 4.40 PEAK FLOW RATE(CFS) = 12.67

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) = 820.00 DOWNSTREAM(FEET) = 815.00
FLOW LENGTH(FEET) = 840.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.53
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 12.67
PIPE TRAVEL TIME(MIN.) = 2.53 Tc(MIN.) = 16.93
LONGEST FLOWPATH FROM NODE 302.00 TO NODE 304.00 = 1900.00 FEET.

FLOW PROCESS FROM NODE 304.00 TO NODE 304.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

MAINLINE Tc(MIN.) = 16.93

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.991
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	19.20	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 19.20 SUBAREA RUNOFF(CFS) = 50.01
EFFECTIVE AREA(ACRES) = 23.60 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 23.6 PEAK FLOW RATE(CFS) = 61.47

FLOW PROCESS FROM NODE 304.00 TO NODE 304.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

MAINLINE Tc(MIN.) = 16.93
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.991
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	10.10	0.98	0.100	32
COMMERCIAL	B	2.60	0.75	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.93
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 12.70 SUBAREA RUNOFF(CFS) = 33.13
EFFECTIVE AREA(ACRES) = 36.30 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.96 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 36.3 PEAK FLOW RATE(CFS) = 94.60

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) = 815.00 DOWNSTREAM(FEET) = 810.00
FLOW LENGTH(FEET) = 650.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 36.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.79
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 94.60
PIPE TRAVEL TIME(MIN.) = 1.11 Tc(MIN.) = 18.03
LONGEST FLOWPATH FROM NODE 302.00 TO NODE 305.00 = 2550.00 FEET.

FLOW PROCESS FROM NODE 305.00 TO NODE 305.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

MAINLINE Tc(MIN.) = 18.03
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.880
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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COMMERCIAL A 24.20 0.98 0.100 32
 COMMERCIAL A 6.70 0.98 0.100 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 30.90 SUBAREA RUNOFF(CFS) = 77.38
 EFFECTIVE AREA (ACRES) = 67.20 AREA-AVERAGED Fm(INCH/HR) = 0.10
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.10
 TOTAL AREA (ACRES) = 67.2 PEAK FLOW RATE(CFS) = 168.34

ELEVATION DATA: UPSTREAM(FEET) = 801.00 DOWNSTREAM(FEET) = 800.00
 FLOW LENGTH(FEET) = 200.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 78.0 INCH PIPE IS 60.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 11.37
 ESTIMATED PIPE DIAMETER(INCH) = 78.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 314.77
 PIPE TRAVEL TIME(MIN.) = 0.29 Tc(MIN.) = 20.49
 LONGEST FLOWPATH FROM NODE 302.00 TO NODE 400.00 = 4150.00 FEET.

 FLOW PROCESS FROM NODE 305.00 TO NODE 306.00 IS CODE = 31

 FLOW PROCESS FROM NODE 400.00 TO NODE 400.00 IS CODE = 1

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

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====
 ELEVATION DATA: UPSTREAM(FEET) = 810.00 DOWNSTREAM(FEET) = 801.00
 FLOW LENGTH(FEET) = 1400.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 60.0 INCH PIPE IS 44.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 10.77
 ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 168.34
 PIPE TRAVEL TIME(MIN.) = 2.17 Tc(MIN.) = 20.20
 LONGEST FLOWPATH FROM NODE 302.00 TO NODE 306.00 = 3950.00 FEET.

=====
 TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 20.49
 RAINFALL INTENSITY(INCH/HR) = 2.67
 AREA-AVERAGED Fm(INCH/HR) = 0.24
 AREA-AVERAGED Fp(INCH/HR) = 0.90
 AREA-AVERAGED Ap = 0.27
 EFFECTIVE STREAM AREA(ACRES) = 143.00
 TOTAL STREAM AREA(ACRES) = 143.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 314.77

 FLOW PROCESS FROM NODE 306.00 TO NODE 306.00 IS CODE = 81

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	AREA (ACRES)	HEADWATER NODE
1	5123.88	38.94	3488.50	120.00
2	314.77	20.49	143.00	302.00

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====
 MAINLINE Tc(MIN.) = 20.20
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.690
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	18.70	0.98	0.100	32
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	24.10	0.98	0.500	32
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	C	14.40	0.57	0.500	69
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	A	2.80	0.98	0.200	32
PUBLIC PARK	A	4.30	0.98	0.850	32
SCHOOL	A	11.50	0.98	0.600	32

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.88
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.425
 SUBAREA AREA (ACRES) = 75.80 SUBAREA RUNOFF(CFS) = 157.90
 EFFECTIVE AREA (ACRES) = 143.00 AREA-AVERAGED Fm(INCH/HR) = 0.24
 AREA-AVERAGED Fp(INCH/HR) = 0.90 AREA-AVERAGED Ap = 0.27
 TOTAL AREA (ACRES) = 143.0 PEAK FLOW RATE(CFS) = 314.77

=====
 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 UNIT-HYDROGRAPH DATA:
 RAINFALL(INCH): 5M= 0.52;30M= 1.06;1H= 1.40;3H= 2.54;6H= 3.70;24H= 8.00
 S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
 MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
 Tc(HR) = 0.65; LAG(HR) = 0.52; Fm(INCH/HR) = 0.12; Ybar = 0.14
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.84; 30M = 0.84; 1HR = 0.84;
 3HR = 0.98; 6HR = 0.99; 24HR = 0.99
 UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 3631.5
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 400.00 = 26720.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3,n=.0205; Lca/L=0.4,n=.0184; Lca/L=0.5,n=.0169;Lca/L=0.6,n=.0158
 TIME OF PEAK FLOW(HR) = 16.58 RUNOFF VOLUME(AF) = 2087.03
 PEAK FLOW RATE(CFS) = 5213.64

 FLOW PROCESS FROM NODE 306.00 TO NODE 400.00 IS CODE = 31

 FLOW PROCESS FROM NODE 400.00 TO NODE 432.00 IS CODE = 31

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

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 ELEVATION DATA: UPSTREAM(FEET) = 800.00 DOWNSTREAM(FEET) = 786.00
 FLOW LENGTH(FEET) = 2400.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 144.0 INCH PIPE IS 111.6 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 18.48
 ESTIMATED PIPE DIAMETER (INCH) = 144.00 NUMBER OF PIPES = 3
 PIPE-FLOW (CFS) = 5213.64
 PIPE TRAVEL TIME (MIN.) = 2.16 Tc (MIN.) = 41.10
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 432.00 = 29120.00 FEET.

 FLOW PROCESS FROM NODE 432.00 TO NODE 432.00 IS CODE = 10

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

 FLOW PROCESS FROM NODE 401.00 TO NODE 402.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 =====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 550.00
 ELEVATION DATA: UPSTREAM (FEET) = 855.00 DOWNSTREAM (FEET) = 845.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.455
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 4.537
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	2.20	0.98	0.100	32	8.45
COMMERCIAL	A	6.20	0.98	0.100	32	8.45

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF (CFS) = 33.56
 TOTAL AREA (ACRES) = 8.40 PEAK FLOW RATE (CFS) = 33.56

 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) = 845.00 DOWNSTREAM (FEET) = 840.00
 FLOW LENGTH (FEET) = 920.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 26.0 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 6.69
 ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 33.56
 PIPE TRAVEL TIME (MIN.) = 2.29 Tc (MIN.) = 10.75
 LONGEST FLOWPATH FROM NODE 401.00 TO NODE 403.00 = 1470.00 FEET.

 FLOW PROCESS FROM NODE 403.00 TO NODE 403.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====

MAINLINE Tc (MIN.) = 10.75
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.929

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	3.10	0.98	0.100	32
COMMERCIAL	A	20.70	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 23.80 SUBAREA RUNOFF (CFS) = 82.06
 EFFECTIVE AREA (ACRES) = 32.20 AREA-AVERAGED Fm (INCH/HR) = 0.10
 AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.10
 TOTAL AREA (ACRES) = 32.2 PEAK FLOW RATE (CFS) = 111.02

 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) = 840.00 DOWNSTREAM (FEET) = 830.00
 FLOW LENGTH (FEET) = 1300.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 48.0 INCH PIPE IS 38.7 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 10.22
 ESTIMATED PIPE DIAMETER (INCH) = 48.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 111.02
 PIPE TRAVEL TIME (MIN.) = 2.12 Tc (MIN.) = 12.87
 LONGEST FLOWPATH FROM NODE 401.00 TO NODE 404.00 = 2770.00 FEET.

 FLOW PROCESS FROM NODE 404.00 TO NODE 404.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====

MAINLINE Tc (MIN.) = 12.87
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.526

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	2.20	0.98	0.100	32
COMMERCIAL	A	34.10	0.98	0.100	32
PUBLIC PARK	A	11.50	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.280
 SUBAREA AREA (ACRES) = 47.80 SUBAREA RUNOFF (CFS) = 139.94
 EFFECTIVE AREA (ACRES) = 80.00 AREA-AVERAGED Fm (INCH/HR) = 0.20
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.21
 TOTAL AREA (ACRES) = 80.0 PEAK FLOW RATE (CFS) = 239.31

 FLOW PROCESS FROM NODE 404.00 TO NODE 405.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 830.00 DOWNSTREAM (FEET) = 825.00
 FLOW LENGTH (FEET) = 1050.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 72.0 INCH PIPE IS 54.2 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 10.48
 ESTIMATED PIPE DIAMETER (INCH) = 72.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 239.31
 PIPE TRAVEL TIME (MIN.) = 1.67 Tc (MIN.) = 14.54
 LONGEST FLOWPATH FROM NODE 401.00 TO NODE 405.00 = 3820.00 FEET.

TOTAL AREA (ACRES) = 175.0 PEAK FLOW RATE (CFS) = 369.35
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH (FEET) = 3.32 FLOW VELOCITY (FEET/SEC.) = 5.88
 LONGEST FLOWPATH FROM NODE 401.00 TO NODE 406.00 = 5970.00 FEET.

 FLOW PROCESS FROM NODE 405.00 TO NODE 405.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 14.54
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.277
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	6.10	0.98	0.100	32
COMMERCIAL	A	13.90	0.98	0.100	32
PUBLIC PARK	A	2.40	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.180
 SUBAREA AREA (ACRES) = 22.40 SUBAREA RUNOFF (CFS) = 62.53
 EFFECTIVE AREA (ACRES) = 102.40 AREA-AVERAGED Fm (INCH/HR) = 0.20
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.20
 TOTAL AREA (ACRES) = 102.4 PEAK FLOW RATE (CFS) = 283.92

 FLOW PROCESS FROM NODE 405.00 TO NODE 406.00 IS CODE = 51

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 825.00 DOWNSTREAM (FEET) = 805.00
 CHANNEL LENGTH THRU SUBAREA (FEET) = 2150.00 CHANNEL SLOPE = 0.0093
 CHANNEL BASE (FEET) = 9.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 7.00
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.651
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	13.90	0.98	0.100	32
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	37.30	0.98	0.500	32
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	A	1.20	0.98	0.200	32
PUBLIC PARK	A	7.30	0.98	0.850	32
SCHOOL	A	12.90	0.98	0.600	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.471
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 355.84
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.81
 AVERAGE FLOW DEPTH (FEET) = 3.26 TRAVEL TIME (MIN.) = 6.17
 Tc (MIN.) = 20.70
 SUBAREA AREA (ACRES) = 72.60 SUBAREA RUNOFF (CFS) = 143.18
 EFFECTIVE AREA (ACRES) = 175.00 AREA-AVERAGED Fm (INCH/HR) = 0.31
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.31

 FLOW PROCESS FROM NODE 406.00 TO NODE 420.00 IS CODE = 51

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 805.00 DOWNSTREAM (FEET) = 801.00
 CHANNEL LENGTH THRU SUBAREA (FEET) = 400.00 CHANNEL SLOPE = 0.0100
 CHANNEL BASE (FEET) = 9.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 7.00
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.569
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	A	0.30	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 369.58
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.03
 AVERAGE FLOW DEPTH (FEET) = 3.26 TRAVEL TIME (MIN.) = 1.11
 Tc (MIN.) = 21.81
 SUBAREA AREA (ACRES) = 0.30 SUBAREA RUNOFF (CFS) = 0.47
 EFFECTIVE AREA (ACRES) = 175.30 AREA-AVERAGED Fm (INCH/HR) = 0.31
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.31
 TOTAL AREA (ACRES) = 175.3 PEAK FLOW RATE (CFS) = 369.35
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH (FEET) = 3.26 FLOW VELOCITY (FEET/SEC.) = 6.03
 LONGEST FLOWPATH FROM NODE 401.00 TO NODE 420.00 = 6370.00 FEET.

 FLOW PROCESS FROM NODE 420.00 TO NODE 420.00 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.) = 21.81
 RAINFALL INTENSITY (INCH/HR) = 2.57
 AREA-AVERAGED Fm (INCH/HR) = 0.31
 AREA-AVERAGED Fp (INCH/HR) = 0.98
 AREA-AVERAGED Ap = 0.31
 EFFECTIVE STREAM AREA (ACRES) = 175.30
 TOTAL STREAM AREA (ACRES) = 175.30
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 369.35

 FLOW PROCESS FROM NODE 410.00 TO NODE 411.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 830.00
 ELEVATION DATA: UPSTREAM (FEET) = 855.00 DOWNSTREAM (FEET) = 838.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.733
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 4.169
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	5.10	0.98	0.100	32	9.73
PUBLIC PARK	A	4.40	0.98	0.850	32	15.46

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.447
 SUBAREA RUNOFF (CFS) = 31.92
 TOTAL AREA (ACRES) = 9.50 PEAK FLOW RATE (CFS) = 31.92

FLOW PROCESS FROM NODE 411.00 TO NODE 412.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 838.00 DOWNSTREAM (FEET) = 832.00
 FLOW LENGTH (FEET) = 1400.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.7 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 6.16
 ESTIMATED PIPE DIAMETER (INCH) = 36.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 31.92
 PIPE TRAVEL TIME (MIN.) = 3.79 Tc (MIN.) = 13.52
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 412.00 = 2230.00 FEET.

FLOW PROCESS FROM NODE 412.00 TO NODE 412.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

=====

MAINLINE Tc (MIN.) = 13.52
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.423
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	0.90	0.98	0.100	32
COMMERCIAL	A	23.60	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 24.50 SUBAREA RUNOFF (CFS) = 73.33
 EFFECTIVE AREA (ACRES) = 34.00 AREA-AVERAGED Fm (INCH/HR) = 0.19
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.20
 TOTAL AREA (ACRES) = 34.0 PEAK FLOW RATE (CFS) = 98.87

FLOW PROCESS FROM NODE 412.00 TO NODE 415.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 832.00 DOWNSTREAM (FEET) = 810.00
 FLOW LENGTH (FEET) = 1900.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 45.0 INCH PIPE IS 31.9 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 11.83
 ESTIMATED PIPE DIAMETER (INCH) = 45.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 98.87
 PIPE TRAVEL TIME (MIN.) = 2.68 Tc (MIN.) = 16.20
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 415.00 = 4130.00 FEET.

FLOW PROCESS FROM NODE 415.00 TO NODE 415.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

=====

MAINLINE Tc (MIN.) = 16.20
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.072
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	0.50	0.98	0.100	32
COMMERCIAL	A	42.00	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 42.50 SUBAREA RUNOFF (CFS) = 113.76
 EFFECTIVE AREA (ACRES) = 76.50 AREA-AVERAGED Fm (INCH/HR) = 0.14
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.14
 TOTAL AREA (ACRES) = 76.5 PEAK FLOW RATE (CFS) = 201.87

FLOW PROCESS FROM NODE 415.00 TO NODE 415.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

=====

MAINLINE Tc (MIN.) = 16.20
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.072
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	18.40	0.98	0.100	32
COMMERCIAL	A	68.40	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 86.80 SUBAREA RUNOFF (CFS) = 232.34
 EFFECTIVE AREA (ACRES) = 163.30 AREA-AVERAGED Fm (INCH/HR) = 0.12
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.12
 TOTAL AREA (ACRES) = 163.3 PEAK FLOW RATE (CFS) = 434.21

FLOW PROCESS FROM NODE 415.00 TO NODE 420.00 IS CODE = 51

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

ELEVATION DATA: UPSTREAM(FEET) = 810.00 DOWNSTREAM(FEET) = 801.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 2780.00 CHANNEL SLOPE = 0.0032
 CHANNEL BASE(FEET) = 9.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 7.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.254

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	9.34	0.98	0.100	32
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	27.60	0.98	0.500	32
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	A	1.20	0.98	0.200	32
PUBLIC PARK	A	5.66	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.452
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 470.09
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.23
 AVERAGE FLOW DEPTH(FEET) = 4.77 TRAVEL TIME(MIN.) = 10.94
 Tc(MIN.) = 27.14
 SUBAREA AREA(ACRES) = 43.80 SUBAREA RUNOFF(CFS) = 71.47
 EFFECTIVE AREA(ACRES) = 207.10 AREA-AVERAGED Fm(INCH/HR) = 0.19
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.19
 TOTAL AREA(ACRES) = 207.1 PEAK FLOW RATE(CFS) = 434.21
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 4.60 FLOW VELOCITY(FEET/SEC.) = 4.15
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 420.00 = 6910.00 FEET.

 FLOW PROCESS FROM NODE 420.00 TO NODE 420.00 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.) = 27.14
 RAINFALL INTENSITY(INCH/HR) = 2.25
 AREA-AVERAGED Fm(INCH/HR) = 0.19
 AREA-AVERAGED Fp(INCH/HR) = 0.98
 AREA-AVERAGED Ap = 0.19
 EFFECTIVE STREAM AREA(ACRES) = 207.10
 TOTAL STREAM AREA(ACRES) = 207.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 434.21

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (DECIMAL)	Ae (ACRES)	HEADWATER NODE
1	369.35	21.81	2.569	0.98(0.31)	0.31	175.3	401.00
2	434.21	27.14	2.254	0.98(0.19)	0.19	207.1	410.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	771.59	21.81	2.569	0.98(0.25)	0.25	341.7	401.00
2	751.99	27.14	2.254	0.98(0.24)	0.25	382.4	410.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 771.59 Tc(MIN.) = 21.81
 EFFECTIVE AREA(ACRES) = 341.73 AREA-AVERAGED Fm(INCH/HR) = 0.25
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.25
 TOTAL AREA(ACRES) = 382.4
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 420.00 = 6910.00 FEET.

 FLOW PROCESS FROM NODE 420.00 TO NODE 430.00 IS CODE = 51

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

 ELEVATION DATA: UPSTREAM(FEET) = 801.00 DOWNSTREAM(FEET) = 790.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 3500.00 CHANNEL SLOPE = 0.0031
 CHANNEL BASE(FEET) = 12.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00

==>>WARNING: FLOW IN CHANNEL EXCEEDS CHANNEL

CAPACITY(NORMAL DEPTH EQUAL TO SPECIFIED MAXIMUM
 ALLOWABLE DEPTH).
 AS AN APPROXIMATION, FLOWDEPTH IS SET AT MAXIMUM
 ALLOWABLE DEPTH AND IS USED FOR TRAVELTIME CALCULATIONS.

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.987

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	29.80	0.98	0.100	32
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	98.30	0.98	0.500	32
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	A	21.20	0.98	0.200	32
COMMERCIAL	A	7.00	0.98	0.100	32
PUBLIC PARK	A	16.70	0.98	0.850	32
PUBLIC PARK	A	3.60	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.421
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 899.34
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.00
 AVERAGE FLOW DEPTH(FEET) = 6.00 TRAVEL TIME(MIN.) = 11.68
 Tc(MIN.) = 33.48
 SUBAREA AREA(ACRES) = 176.60 SUBAREA RUNOFF(CFS) = 250.53
 EFFECTIVE AREA(ACRES) = 518.33 AREA-AVERAGED Fm(INCH/HR) = 0.30
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.31
 TOTAL AREA(ACRES) = 559.0 PEAK FLOW RATE(CFS) = 785.34

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 5.69 FLOW VELOCITY(FEET/SEC.) = 4.75
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 430.00 = 10410.00 FEET.

TOTAL AREA (ACRES) = 19.3 PEAK FLOW RATE (CFS) = 58.48

FLOW PROCESS FROM NODE 430.00 TO NODE 430.00 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.) = 33.48
RAINFALL INTENSITY (INCH/HR) = 1.99
AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.97
AREA-AVERAGED Ap = 0.31
EFFECTIVE STREAM AREA (ACRES) = 518.33
TOTAL STREAM AREA (ACRES) = 559.00
PEAK FLOW RATE (CFS) AT CONFLUENCE = 785.34

FLOW PROCESS FROM NODE 421.00 TO NODE 422.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 1080.00
ELEVATION DATA: UPSTREAM (FEET) = 840.00 DOWNSTREAM (FEET) = 832.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 13.253
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.464
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 0.80 0.98 0.100 32 13.25
COMMERCIAL A 9.30 0.98 0.100 32 13.25
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF (CFS) = 30.61
TOTAL AREA (ACRES) = 10.10 PEAK FLOW RATE (CFS) = 30.61

FLOW PROCESS FROM NODE 422.00 TO NODE 422.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 13.25
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.464
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 0.80 0.98 0.100 32
COMMERCIAL A 8.40 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 9.20 SUBAREA RUNOFF (CFS) = 27.88
EFFECTIVE AREA (ACRES) = 19.30 AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10

FLOW PROCESS FROM NODE 422.00 TO NODE 423.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW) <<<<<

ELEVATION DATA: UPSTREAM (FEET) = 832.00 DOWNSTREAM (FEET) = 830.00
FLOW LENGTH (FEET) = 900.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 37.9 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 5.49
ESTIMATED PIPE DIAMETER (INCH) = 48.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 58.48
PIPE TRAVEL TIME (MIN.) = 2.73 Tc (MIN.) = 15.98
LONGEST FLOWPATH FROM NODE 421.00 TO NODE 423.00 = 1980.00 FEET.

FLOW PROCESS FROM NODE 423.00 TO NODE 423.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 15.98
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.096
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 11.20 0.98 0.100 32
COMMERCIAL A 7.90 0.98 0.100 32
COMMERCIAL A 9.00 0.98 0.100 32
PUBLIC PARK A 4.50 0.98 0.850 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.204
SUBAREA AREA (ACRES) = 32.60 SUBAREA RUNOFF (CFS) = 85.01
EFFECTIVE AREA (ACRES) = 51.90 AREA-AVERAGED Fm (INCH/HR) = 0.16
AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.17
TOTAL AREA (ACRES) = 51.9 PEAK FLOW RATE (CFS) = 137.10

FLOW PROCESS FROM NODE 423.00 TO NODE 424.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW) <<<<<

ELEVATION DATA: UPSTREAM (FEET) = 830.00 DOWNSTREAM (FEET) = 818.00
FLOW LENGTH (FEET) = 750.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 33.8 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 14.50
ESTIMATED PIPE DIAMETER (INCH) = 48.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 137.10
PIPE TRAVEL TIME (MIN.) = 0.86 Tc (MIN.) = 16.85
LONGEST FLOWPATH FROM NODE 421.00 TO NODE 424.00 = 2730.00 FEET.

FLOW PROCESS FROM NODE 424.00 TO NODE 424.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 16.85
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.000
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	8.00	0.98	0.100	32
PUBLIC PARK	A	3.00	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.305
 SUBAREA AREA(ACRES) = 11.00 SUBAREA RUNOFF(CFS) = 26.76
 EFFECTIVE AREA(ACRES) = 62.90 AREA-AVERAGED Fm(INCH/HR) = 0.18
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.19
 TOTAL AREA(ACRES) = 62.9 PEAK FLOW RATE(CFS) = 159.37

FLOW PROCESS FROM NODE 424.00 TO NODE 425.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 818.00 DOWNSTREAM(FEET) = 800.00
 FLOW LENGTH(FEET) = 2700.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 57.0 INCH PIPE IS 44.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 10.66
 ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 159.37
 PIPE TRAVEL TIME(MIN.) = 4.22 Tc(MIN.) = 21.07
 LONGEST FLOWPATH FROM NODE 421.00 TO NODE 425.00 = 5430.00 FEET.

FLOW PROCESS FROM NODE 425.00 TO NODE 425.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 21.07
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.623
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	51.80	0.98	0.100	32
RESIDENTIAL "5-7 DWELLINGS/ACRE"	A	76.20	0.98	0.500	32
RESIDENTIAL "11+ DWELLINGS/ACRE"	A	17.20	0.98	0.200	32
PUBLIC PARK	A	12.60	0.98	0.850	32
PUBLIC PARK	A	4.80	0.98	0.850	32
PUBLIC PARK	A	8.20	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.401
 SUBAREA AREA(ACRES) = 170.80 SUBAREA RUNOFF(CFS) = 343.16
 EFFECTIVE AREA(ACRES) = 233.70 AREA-AVERAGED Fm(INCH/HR) = 0.34
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.34
 TOTAL AREA(ACRES) = 233.7 PEAK FLOW RATE(CFS) = 481.20

FLOW PROCESS FROM NODE 425.00 TO NODE 430.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 800.00 DOWNSTREAM(FEET) = 790.00
 FLOW LENGTH(FEET) = 1060.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 81.0 INCH PIPE IS 63.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 16.02
 ESTIMATED PIPE DIAMETER(INCH) = 81.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 481.20
 PIPE TRAVEL TIME(MIN.) = 1.10 Tc(MIN.) = 22.17
 LONGEST FLOWPATH FROM NODE 421.00 TO NODE 430.00 = 6490.00 FEET.

FLOW PROCESS FROM NODE 430.00 TO NODE 430.00 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.) = 22.17
 RAINFALL INTENSITY(INCH/HR) = 2.54
 AREA-AVERAGED Fm(INCH/HR) = 0.34
 AREA-AVERAGED Fp(INCH/HR) = 0.98
 AREA-AVERAGED Ap = 0.34
 EFFECTIVE STREAM AREA(ACRES) = 233.70
 TOTAL STREAM AREA(ACRES) = 233.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 481.20

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	785.34	33.48	1.987	0.97(0.30)	0.31	518.3	401.00
1	762.27	39.12	1.810	0.98(0.29)	0.30	559.0	410.00
2	481.20	22.17	2.544	0.98(0.34)	0.34	233.7	421.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1173.42	22.17	2.544	0.97(0.32)	0.32	576.9	421.00
2	1145.07	33.48	1.987	0.97(0.31)	0.32	752.0	401.00
3	1083.46	39.12	1.810	0.98(0.31)	0.31	792.7	410.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 1173.42 Tc(MIN.) = 22.17
 EFFECTIVE AREA(ACRES) = 576.90 AREA-AVERAGED Fm(INCH/HR) = 0.32
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.32
 TOTAL AREA(ACRES) = 792.7
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 430.00 = 10410.00 FEET.

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*****
FLOW PROCESS FROM NODE 430.00 TO NODE 430.00 IS CODE = 71
-----
>>>>PEAK FLOW RATE ESTIMATOR CHANGED TO UNIT-HYDROGRAPH METHOD<<<<<
>>>>USING TIME-OF-CONCENTRATION OF LONGEST FLOWPATH<<<<<
=====
UNIT-HYDROGRAPH DATA:
RAINFALL(INCH): 5M= 0.52;30M= 1.06;1H= 1.40;3H= 2.54;6H= 3.70;24H= 8.00
S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
Tc(HR) = 0.65; LAG(HR) = 0.52; Fm(INCH/HR) = 0.31; Ybar = 0.31
USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
DEPTH-AREA FACTORS: 5M = 0.96; 30M = 0.96; 1HR = 0.96;
3HR = 0.99; 6HR = 1.00; 24HR= 1.00
UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 792.7
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 430.00 = 10410.00 FEET.
EQUIVALENT BASIN FACTOR APPROXIMATIONS:
Lca/L=0.3,n=.0398; Lca/L=0.4,n=.0357; Lca/L=0.5,n=.0328;Lca/L=0.6,n=.0306
TIME OF PEAK FLOW(HR) = 16.58 RUNOFF VOLUME(AF) = 373.51
UNIT-HYDROGRAPH METHOD PEAK FLOW RATE(CFS) = 1176.75
TOTAL PEAK FLOW RATE(CFS) = 1176.75 (SOURCE FLOW INCLUDED)
RATIONAL METHOD PEAK FLOW RATE(CFS) = 1173.42
(UPSTREAM NODE PEAK FLOW RATE(CFS) = 1173.42)
PEAK FLOW RATE(CFS) USED = 1176.75

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*****
FLOW PROCESS FROM NODE 430.00 TO NODE 431.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 790.00 DOWNSTREAM(FEET) = 788.00
FLOW LENGTH(FEET) = 1300.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 126.0 INCH PIPE IS 92.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.62
ESTIMATED PIPE DIAMETER(INCH) = 126.00 NUMBER OF PIPES = 2
PIPE-FLOW(CFS) = 1176.75
PIPE TRAVEL TIME(MIN.) = 2.51 Tc(MIN.) = 41.63
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 431.00 = 11710.00 FEET.

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*****
FLOW PROCESS FROM NODE 431.00 TO NODE 431.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) = 41.63
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.743
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 5.60 0.98 0.100 32
PUBLIC PARK A 7.40 0.98 0.850 32
PUBLIC PARK A 5.30 0.98 0.850 32
SCHOOL A 17.30 0.98 0.600 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.611

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SUBAREA AREA(ACRES) = 35.60
UNIT-HYDROGRAPH DATA:
RAINFALL(INCH): 5M= 0.52;30M= 1.06;1H= 1.40;3H= 2.54;6H= 3.70;24H= 8.00
S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
Tc(HR) = 0.69; LAG(HR) = 0.56; Fm(INCH/HR) = 0.32; Ybar = 0.32
USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
DEPTH-AREA FACTORS: 5M = 0.96; 30M = 0.96; 1HR = 0.96;
3HR = 0.99; 6HR = 1.00; 24HR= 1.00
UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 828.3
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 431.00 = 11710.00 FEET.
EQUIVALENT BASIN FACTOR APPROXIMATIONS:
Lca/L=0.3,n=.0381; Lca/L=0.4,n=.0342; Lca/L=0.5,n=.0314;Lca/L=0.6,n=.0293
TIME OF PEAK FLOW(HR) = 16.58 RUNOFF VOLUME(AF) = 384.31
UNIT-HYDROGRAPH PEAK FLOW RATE(CFS) = 1171.77
TOTAL AREA(ACRES) = 828.3 PEAK FLOW RATE(CFS) = 1176.75
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 431.00 TO NODE 432.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 788.00 DOWNSTREAM(FEET) = 786.00
FLOW LENGTH(FEET) = 1300.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 126.0 INCH PIPE IS 92.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.62
ESTIMATED PIPE DIAMETER(INCH) = 126.00 NUMBER OF PIPES = 2
PIPE-FLOW(CFS) = 1176.75
PIPE TRAVEL TIME(MIN.) = 2.51 Tc(MIN.) = 44.14
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 432.00 = 13010.00 FEET.

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*****
FLOW PROCESS FROM NODE 432.00 TO NODE 432.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) = 44.14
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.683
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 45.00 0.98 0.100 32
COMMERCIAL A 112.20 0.98 0.100 32
COMMERCIAL A 0.70 0.98 0.100 32
PUBLIC PARK A 5.50 0.98 0.850 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.125
SUBAREA AREA(ACRES) = 163.40
UNIT-HYDROGRAPH DATA:
RAINFALL(INCH): 5M= 0.52;30M= 1.06;1H= 1.40;3H= 2.54;6H= 3.70;24H= 8.00
S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
Tc(HR) = 0.74; LAG(HR) = 0.59; Fm(INCH/HR) = 0.29; Ybar = 0.29
USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.

```

DEPTH-AREA FACTORS: 5M = 0.96; 30M = 0.96; 1HR = 0.96;
3HR = 0.99; 6HR = 1.00; 24HR= 1.00
UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 991.7
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 432.00 = 13010.00 FEET.
EQUIVALENT BASIN FACTOR APPROXIMATIONS:
Lca/L=0.3,n=.0368; Lca/L=0.4,n=.0330; Lca/L=0.5,n=.0303;Lca/L=0.6,n=.0283
TIME OF PEAK FLOW(HR) = 16.67 RUNOFF VOLUME(AF) = 478.30
UNIT-HYDROGRAPH PEAK FLOW RATE(CFS) = 1368.91
TOTAL AREA(ACRES) = 991.7 PEAK FLOW RATE(CFS) = 1368.91

FLOW PROCESS FROM NODE 432.00 TO NODE 432.00 IS CODE = 11

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

** MAIN STREAM CONFLUENCE DATA **
PEAK FLOW RATE(CFS) = 1368.91 Tc(MIN.) = 44.14
AREA-AVERAGED Fm(INCH/HR) = 0.29 Ybar = 0.29
TOTAL AREA(ACRES) = 991.7
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 432.00 = 13010.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **
PEAK FLOW RATE(CFS) = 5213.64 Tc(MIN.) = 41.10
AREA-AVERAGED Fm(INCH/HR) = 0.12 Ybar = 0.14
TOTAL AREA(ACRES) = 3631.5
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 432.00 = 29120.00 FEET.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
UNIT-HYDROGRAPH DATA:
RAINFALL(INCH): 5M= 0.52;30M= 1.06;1H= 1.40;3H= 2.54;6H= 3.70;24H= 8.00
S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
Tc(HR) = 0.69; LAG(HR) = 0.55; Fm(INCH/HR) = 0.15; Ybar = 0.17
USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
DEPTH-AREA FACTORS: 5M = 0.80; 30M = 0.80; 1HR = 0.80;
3HR = 0.97; 6HR = 0.98; 24HR= 0.99
UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 4623.2
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 432.00 = 29120.00 FEET.
EQUIVALENT BASIN FACTOR APPROXIMATIONS:
Lca/L=0.3,n=.0202; Lca/L=0.4,n=.0181; Lca/L=0.5,n=.0166;Lca/L=0.6,n=.0155
TIME OF PEAK FLOW(HR) = 16.58 RUNOFF VOLUME(AF) = 2552.08
PEAK FLOW RATE(CFS) = 6007.32

FLOW PROCESS FROM NODE 432.00 TO NODE 432.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<
=====

FLOW PROCESS FROM NODE 432.00 TO NODE 433.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 786.00 DOWNSTREAM(FEET) = 750.00
FLOW LENGTH(FEET) = 4000.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 138.0 INCH PIPE IS 111.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 22.35
ESTIMATED PIPE DIAMETER(INCH) = 138.00 NUMBER OF PIPES = 3
PIPE-FLOW(CFS) = 6007.32
PIPE TRAVEL TIME(MIN.) = 2.98 Tc(MIN.) = 44.09
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 433.00 = 33120.00 FEET.

FLOW PROCESS FROM NODE 433.00 TO NODE 433.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====

MAINLINE Tc(MIN.) = 44.09
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.684
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 75.60 0.98 0.100 32
RESIDENTIAL
"5-7 DWELLINGS/ACRE" A 91.90 0.98 0.500 32
RESIDENTIAL
"11+ DWELLINGS/ACRE" A 41.30 0.98 0.200 32
COMMERCIAL A 4.80 0.98 0.100 32
PUBLIC PARK A 18.40 0.98 0.850 32
SCHOOL A 10.00 0.98 0.600 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.347
SUBAREA AREA(ACRES) = 242.00

UNIT-HYDROGRAPH DATA:
RAINFALL(INCH): 5M= 0.52;30M= 1.06;1H= 1.40;3H= 2.54;6H= 3.70;24H= 8.00
S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
Tc(HR) = 0.73; LAG(HR) = 0.59; Fm(INCH/HR) = 0.16; Ybar = 0.18
USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
DEPTH-AREA FACTORS: 5M = 0.79; 30M = 0.79; 1HR = 0.79;
3HR = 0.97; 6HR = 0.98; 24HR= 0.99
UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 4865.2
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 433.00 = 33120.00 FEET.
EQUIVALENT BASIN FACTOR APPROXIMATIONS:
Lca/L=0.3,n=.0197; Lca/L=0.4,n=.0176; Lca/L=0.5,n=.0162;Lca/L=0.6,n=.0151
TIME OF PEAK FLOW(HR) = 16.67 RUNOFF VOLUME(AF) = 2657.92
UNIT-HYDROGRAPH PEAK FLOW RATE(CFS) = 6013.40
TOTAL AREA(ACRES) = 4865.2 PEAK FLOW RATE(CFS) = 6013.40

FLOW PROCESS FROM NODE 433.00 TO NODE 434.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 750.00 DOWNSTREAM(FEET) = 730.00
FLOW LENGTH(FEET) = 1800.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 132.0 INCH PIPE IS 107.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 24.11

ESTIMATED PIPE DIAMETER(INCH) = 132.00 NUMBER OF PIPES = 3
 PIPE-FLOW(CFS) = 6013.40
 PIPE TRAVEL TIME(MIN.) = 1.24 Tc(MIN.) = 45.33
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 434.00 = 34920.00 FEET.

LONGEST FLOWPATH FROM NODE 433.10 TO NODE 434.00 = 7500.00 FEET.

 FLOW PROCESS FROM NODE 434.00 TO NODE 434.00 IS CODE = 1

 FLOW PROCESS FROM NODE 434.00 TO NODE 434.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

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

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 PEAK FLOW RATE(CFS) = 6013.40 Tc(MIN.) = 45.33
 AREA-AVERAGED Fm(INCH/HR) = 0.16 Ybar = 0.18
 TOTAL AREA(ACRES) = 4865.2

TIME OF CONCENTRATION(MIN.) = 27.87
 RAINFALL INTENSITY(INCH/HR) = 2.22
 AREA-AVERAGED Fm(INCH/HR) = 0.37
 AREA-AVERAGED Fp(INCH/HR) = 0.78
 AREA-AVERAGED Ap = 0.47
 EFFECTIVE STREAM AREA(ACRES) = 184.30
 TOTAL STREAM AREA(ACRES) = 184.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 321.01
 ** CONFLUENCE DATA **

 FLOW PROCESS FROM NODE 433.10 TO NODE 433.20 IS CODE = 21

STREAM NUMBER	Q (CFS)	Tc (MIN.)	AREA (ACRES)	HEADWATER NODE
1	6013.40	45.33	4865.20	120.00
2	321.01	27.87	184.30	433.10

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

INITIAL SUBAREA FLOW-LENGTH(FEET) = 6400.00
 ELEVATION DATA: UPSTREAM(FEET) = 790.00 DOWNSTREAM(FEET) = 735.00

UNIT-HYDROGRAPH DATA:
 RAINFALL(INCH): 5M= 0.52;30M= 1.06;1H= 1.40;3H= 2.54;6H= 3.70;24H= 8.00
 S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
 MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 26.213
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.301
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	8.90	0.98	0.100	32	26.21
COMMERCIAL	C	12.00	0.57	0.100	69	26.21
RESIDENTIAL "5-7 DWELLINGS/ACRE"	A	78.50	0.98	0.500	32	33.54
RESIDENTIAL "5-7 DWELLINGS/ACRE"	C	78.40	0.57	0.500	69	33.54
PUBLIC PARK	A	6.50	0.98	0.850	32	41.65

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.78
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.467
 SUBAREA RUNOFF(CFS) = 321.01
 TOTAL AREA(ACRES) = 184.30 PEAK FLOW RATE(CFS) = 321.01

Tc(HR) = 0.76; LAG(HR) = 0.60; Fm(INCH/HR) = 0.17; Ybar = 0.19
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.79; 30M = 0.79; 1HR = 0.79;
 3HR = 0.97; 6HR = 0.98; 24HR = 0.99

UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 5049.5
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 434.00 = 34920.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3,n=.0195; Lca/L=0.4,n=.0175; Lca/L=0.5,n=.0160;Lca/L=0.6,n=.0150
 TIME OF PEAK FLOW(HR) = 16.67 RUNOFF VOLUME(AF) = 2737.72
 PEAK FLOW RATE(CFS) = 6126.79

 FLOW PROCESS FROM NODE 433.20 TO NODE 434.00 IS CODE = 31

 FLOW PROCESS FROM NODE 434.00 TO NODE 434.00 IS CODE = 81

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

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 735.00 DOWNSTREAM(FEET) = 730.00
 FLOW LENGTH(FEET) = 1100.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 81.0 INCH PIPE IS 61.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 11.08
 ESTIMATED PIPE DIAMETER(INCH) = 81.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 321.01
 PIPE TRAVEL TIME(MIN.) = 1.65 Tc(MIN.) = 27.87

MAINLINE Tc(MIN.) = 45.33
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.656
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	12.10	0.98	0.100	32
RESIDENTIAL "5-7 DWELLINGS/ACRE"	A	52.10	0.98	0.500	32
RESIDENTIAL "5-7 DWELLINGS/ACRE"	C	1.30	0.57	0.500	69
PUBLIC PARK	A	24.60	0.98	0.850	32

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PUBLIC PARK          A          2.00    0.98    0.850    32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.549
SUBAREA AREA (ACRES) = 92.10
UNIT-HYDROGRAPH DATA:
RAINFALL(INCH): 5M= 0.52;30M= 1.06;1H= 1.40;3H= 2.54;6H= 3.70;24H= 8.00
S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
          MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
Tc(HR) = 0.76; LAG(HR) = 0.60; Fm(INCH/HR) = 0.18; Ybar = 0.19
USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
DEPTH-AREA FACTORS: 5M = 0.78; 30M = 0.78; 1HR = 0.78;
3HR = 0.97; 6HR = 0.98; 24HR= 0.99
UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 5141.6
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 434.00 = 34920.00 FEET.
EQUIVALENT BASIN FACTOR APPROXIMATIONS:
Lca/L=0.3,n=.0195; Lca/L=0.4,n=.0175; Lca/L=0.5,n=.0160;Lca/L=0.6,n=.0150
TIME OF PEAK FLOW(HR) = 16.67 RUNOFF VOLUME(AF) = 2767.51
UNIT-HYDROGRAPH PEAK FLOW RATE(CFS) = 6194.06
TOTAL AREA(ACRES) = 5141.6 PEAK FLOW RATE(CFS) = 6194.06
=====
END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 5141.6 TC(MIN.) = 45.33
AREA-AVERAGED Fm(INCH/HR)= 0.18 Ybar = 0.19
PEAK FLOW RATE(CFS) = 6194.06
=====
END OF INTEGRATED RATIONAL/UNIT-HYDROGRAPH METHOD ANALYSIS

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SECTION 4

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
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Ver. 18.0 Release Date: 07/01/2011 License ID 1239

Analysis prepared by:

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***** DESCRIPTION OF STUDY *****

* OLD MODEL COLONY EAST AREA F - BASIN II *
* 10-YEAR HYDROLOGY ANALYSIS *
* *

FILE NAME: OMCEI10.DAT
TIME/DATE OF STUDY: 15:07 11/08/2011

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.80
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.0000

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0313 0.167	0.0150
2	32.0	27.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

UNIT-HYDROGRAPH MODEL SELECTIONS/PARAMETERS:

WATERSHED LAG = 0.80 * Tc
USED "VALLEY UNDEVELOPED" S-GRAPH FOR DEVELOPMENTS OF

2 UNITS/ACRE AND LESS; AND "VALLEY DEVELOPED" S-GRAPH
FOR DEVELOPMENTS OF 3-4 UNITS/ACRE AND MORE.

USER SPECIFIED RAINFALL VALUES:

2-YR 6-HR RAINFALL DEPTH(INCH) = 1.70
2-YR 24-HR RAINFALL DEPTH(INCH) = 3.30
100-YR 6-HR RAINFALL DEPTH(INCH) = 3.70
100-YR 24-HR RAINFALL DEPTH(INCH) = 8.00
SIERRA MADRE DEPTH-AREA FACTORS USED.

AREA-AVERAGED

DURATION	RAINFALL(INCH)
5-MINUTES	0.33
30-MINUTES	0.68
1-HOUR	0.90
3-HOUR	1.60
6-HOUR	2.31
24-HOUR	4.36

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR UNIT HYDROGRAPH METHOD

FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 3050.00
ELEVATION DATA: UPSTREAM(FEET) = 1050.00 DOWNSTREAM(FEET) = 1045.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 27.143
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.610
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	5.90	0.98	0.100	32	27.14
COMMERCIAL	A	5.60	0.98	0.100	32	27.14

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 15.65
TOTAL AREA(ACRES) = 11.50 PEAK FLOW RATE(CFS) = 15.65

FLOW PROCESS FROM NODE 101.00 TO NODE 101.00 IS CODE = 16

>>>>USER SPECIFIED CONSTANT SOURCE FLOW AT NODE<<<<<

=====

USER-SPECIFIED CONSTANT SOURCE FLOW = 427.00(CFS)
USER-SPECIFIED AREA ASSOCIATED TO SOURCE FLOW = 286.00(ACRES)
* CUMULATIVE SOURCE FLOW DATA: FLOW(CFS) = 427.00 AREA(AC.) = 286.00
* SUMMED DATA: FLOW(CFS) = 442.65 TOTAL AREA(ACRES) = 297.50

FLOW PROCESS FROM NODE 101.00 TO NODE 101.00 IS CODE = 16

>>>>USER SPECIFIED CONSTANT SOURCE FLOW AT NODE<<<<<

=====

USER-SPECIFIED CONSTANT SOURCE FLOW = 109.00 (CFS)
 USER-SPECIFIED AREA ASSOCIATED TO SOURCE FLOW = 73.00 (ACRES)
 * CUMULATIVE SOURCE FLOW DATA: FLOW(CFS) = 536.00 AREA(AC.) = 359.00
 * SUMMED DATA: FLOW(CFS) = 551.65 TOTAL AREA(ACRES) = 370.50

 FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 1045.00 DOWNSTREAM(FEET) = 1040.00
 FLOW LENGTH(FEET) = 1200.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 102.0 INCH PIPE IS 75.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 12.33
 ESTIMATED PIPE DIAMETER(INCH) = 102.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 551.65
 PIPE TRAVEL TIME(MIN.) = 1.62 Tc(MIN.) = 28.77
 * TOTAL SOURCE FLOW(CFS) = 536.00
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 4250.00 FEET.

 FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 28.77
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.554
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	5.50	0.98	0.100	32
COMMERCIAL	A	6.60	0.98	0.100	32
COMMERCIAL	A	4.70	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 16.80 SUBAREA RUNOFF(CFS) = 22.03
 EFFECTIVE AREA(ACRES) = 28.30 AREA-AVERAGED Fm(INCH/HR) = 0.10
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 28.3 PEAK FLOW RATE(CFS) = 37.11

* SOURCE FLOW DATA: FLOW(CFS) = 536.00 AREA(ACRES) = 359.0
 * SUMMED DATA: FLOW(CFS) = 573.11 TOTAL AREA(ACRES) = 387.3

 FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 16

>>>>USER SPECIFIED CONSTANT SOURCE FLOW AT NODE<<<<<

=====

USER-SPECIFIED CONSTANT SOURCE FLOW = 79.00 (CFS)
 USER-SPECIFIED AREA ASSOCIATED TO SOURCE FLOW = 53.00 (ACRES)
 * CUMULATIVE SOURCE FLOW DATA: FLOW(CFS) = 615.00 AREA(AC.) = 412.00
 * SUMMED DATA: FLOW(CFS) = 652.11 TOTAL AREA(ACRES) = 440.30

 FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 1040.00 DOWNSTREAM(FEET) = 1030.00
 FLOW LENGTH(FEET) = 2600.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 108.0 INCH PIPE IS 83.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 12.38
 ESTIMATED PIPE DIAMETER(INCH) = 108.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 652.11
 PIPE TRAVEL TIME(MIN.) = 3.50 Tc(MIN.) = 32.27
 * TOTAL SOURCE FLOW(CFS) = 615.00
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 103.00 = 6850.00 FEET.

 FLOW PROCESS FROM NODE 103.00 TO NODE 103.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 32.27
 RAINFALL INTENSITY(INCH/HR) = 1.45
 AREA-AVERAGED Fm(INCH/HR) = 0.10
 AREA-AVERAGED Fp(INCH/HR) = 0.98
 AREA-AVERAGED Ap = 0.10
 EFFECTIVE STREAM AREA(ACRES) = 28.30
 TOTAL STREAM AREA(ACRES) = 28.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 37.11

* SOURCE FLOW DATA: FLOW(CFS) = 615.00 AREA(ACRES) = 412.0
 * SUMMED DATA: FLOW(CFS) = 652.11 TOTAL AREA(ACRES) = 440.3

 FLOW PROCESS FROM NODE 104.00 TO NODE 103.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 900.00
 ELEVATION DATA: UPSTREAM(FEET) = 1045.00 DOWNSTREAM(FEET) = 1030.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 11.165
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.743
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "11+ DWELLINGS/ACRE"	A	7.50	0.98	0.200	32	11.17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
 SUBAREA RUNOFF(CFS) = 17.20
 TOTAL AREA(ACRES) = 7.50 PEAK FLOW RATE(CFS) = 17.20

FLOW PROCESS FROM NODE 103.00 TO NODE 103.00 IS CODE = 16

 >>>>USER SPECIFIED CONSTANT SOURCE FLOW AT NODE<<<<<
 =====
 USER-SPECIFIED CONSTANT SOURCE FLOW = 49.00 (CFS)
 USER-SPECIFIED AREA ASSOCIATED TO SOURCE FLOW = 33.00 (ACRES)
 * CUMULATIVE SOURCE FLOW DATA: FLOW(CFS) = 49.00 AREA(AC.) = 33.00
 * SUMMED DATA: FLOW(CFS) = 66.20 TOTAL AREA(ACRES) = 40.50

 FLOW PROCESS FROM NODE 103.00 TO NODE 103.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
 =====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION (MIN.) = 11.17
 RAINFALL INTENSITY (INCH/HR) = 2.74
 AREA-AVERAGED Fm (INCH/HR) = 0.20
 AREA-AVERAGED Fp (INCH/HR) = 0.98
 AREA-AVERAGED Ap = 0.20
 EFFECTIVE STREAM AREA (ACRES) = 7.50
 TOTAL STREAM AREA (ACRES) = 7.50
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 17.20

* SOURCE FLOW DATA: FLOW(CFS) = 49.00 AREA(ACRES) = 33.0
 * SUMMED DATA: FLOW(CFS) = 66.20 TOTAL AREA(ACRES) = 40.5

** CONFLUENCE DATA **

STREAM SOURCE NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	37.11	32.27	1.451	0.98 (0.10)	0.10	28.3	100.00
2	17.20	11.17	2.743	0.98 (0.20)	0.20	7.5	104.00

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

** PEAK FLOW RATE TABLE **

STREAM SOURCE NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	42.29	11.17	2.743	0.98 (0.14)	0.14	17.3	104.00
2	45.59	32.27	1.451	0.97 (0.12)	0.12	35.8	100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE (CFS) = 45.59 Tc (MIN.) = 32.27
 EFFECTIVE AREA (ACRES) = 35.80 AREA-AVERAGED Fm (INCH/HR) = 0.12
 AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.12

TOTAL AREA (ACRES) = 35.8
 * CUMULATIVE SOURCE FLOW DATA: FLOW(CFS) = 664.00 AREA(AC.) = 445.0
 * SUMMED DATA: FLOW(CFS) = 709.59 TOTAL AREA(ACRES) = 480.8
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 103.00 = 6850.00 FEET.

 FLOW PROCESS FROM NODE 103.00 TO NODE 105.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 1030.00 DOWNSTREAM (FEET) = 1020.00
 FLOW LENGTH (FEET) = 780.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 87.0 INCH PIPE IS 71.2 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 19.62
 ESTIMATED PIPE DIAMETER (INCH) = 87.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 709.59
 PIPE TRAVEL TIME (MIN.) = 0.66 Tc (MIN.) = 32.93
 * TOTAL SOURCE FLOW (CFS) = 664.00
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 105.00 = 7630.00 FEET.

 FLOW PROCESS FROM NODE 105.00 TO NODE 105.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====

MAINLINE Tc (MIN.) = 32.93
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.433
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCSSOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 3.80 0.98 0.100 32
 COMMERCIAL A 5.70 0.98 0.100 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 9.50 SUBAREA RUNOFF (CFS) = 11.42
 EFFECTIVE AREA (ACRES) = 45.30 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.12
 TOTAL AREA (ACRES) = 45.3 PEAK FLOW RATE (CFS) = 53.80

* SOURCE FLOW DATA: FLOW(CFS) = 664.00 AREA(ACRES) = 445.0
 * SUMMED DATA: FLOW(CFS) = 717.80 TOTAL AREA(ACRES) = 490.3

** PEAK FLOW RATE TABLE **

STREAM SOURCE NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	60.88	11.83	2.649	0.98 (0.12)	0.12	26.8	104.00
2	53.80	32.93	1.433	0.98 (0.11)	0.11	45.3	100.00

NEW PEAK FLOW DATA ARE:
 PEAK FLOW RATE (CFS) = 60.88 Tc (MIN.) = 11.83
 AREA-AVERAGED Fm (INCH/HR) = 0.12 AREA-AVERAGED Fp (INCH/HR) = 0.98

AREA-AVERAGED Ap = 0.13 EFFECTIVE AREA (ACRES) = 26.79

* CUMULATIVE SOURCE FLOW DATA:

FLOW (CFS) = 664.00 AREA (ACRES) = 445.0

* SUMMED DATA:

FLOW (CFS) = 724.88 TOTAL AREA (ACRES) = 471.8

***** FLOW PROCESS FROM NODE 105.00 TO NODE 106.00 IS CODE = 31

----->>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 1020.00 DOWNSTREAM (FEET) = 1005.00
FLOW LENGTH (FEET) = 2640.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 108.0 INCH PIPE IS 77.3 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 14.88
ESTIMATED PIPE DIAMETER (INCH) = 108.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 724.88
PIPE TRAVEL TIME (MIN.) = 2.96 Tc (MIN.) = 14.78
* TOTAL SOURCE FLOW (CFS) = 664.00
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 106.00 = 10270.00 FEET.

***** FLOW PROCESS FROM NODE 106.00 TO NODE 106.00 IS CODE = 81

----->>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 14.78
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.317
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
PUBLIC PARK A 74.70 0.98 0.850 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
SUBAREA AREA (ACRES) = 74.70 SUBAREA RUNOFF (CFS) = 100.08
EFFECTIVE AREA (ACRES) = 101.49 AREA-AVERAGED Fm (INCH/HR) = 0.64
AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.66
TOTAL AREA (ACRES) = 120.0 PEAK FLOW RATE (CFS) = 152.96

* SOURCE FLOW DATA: FLOW (CFS) = 664.00 AREA (ACRES) = 445.0
* SUMMED DATA: FLOW (CFS) = 816.96 TOTAL AREA (ACRES) = 565.0

***** FLOW PROCESS FROM NODE 106.00 TO NODE 107.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 1005.00 DOWNSTREAM (FEET) = 1000.00
FLOW LENGTH (FEET) = 1740.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 126.0 INCH PIPE IS 93.9 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 11.81
ESTIMATED PIPE DIAMETER (INCH) = 126.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 816.96

PIPE TRAVEL TIME (MIN.) = 2.46 Tc (MIN.) = 17.24
* TOTAL SOURCE FLOW (CFS) = 664.00
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 107.00 = 12010.00 FEET.

***** FLOW PROCESS FROM NODE 107.00 TO NODE 107.00 IS CODE = 81

----->>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 17.24
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.113
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
PUBLIC PARK A 45.00 0.98 0.850 32
PUBLIC PARK B 26.20 0.75 0.850 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.89
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
SUBAREA AREA (ACRES) = 71.20 SUBAREA RUNOFF (CFS) = 86.87
EFFECTIVE AREA (ACRES) = 172.69 AREA-AVERAGED Fm (INCH/HR) = 0.69
AREA-AVERAGED Fp (INCH/HR) = 0.94 AREA-AVERAGED Ap = 0.74
TOTAL AREA (ACRES) = 191.2 PEAK FLOW RATE (CFS) = 221.18

* SOURCE FLOW DATA: FLOW (CFS) = 664.00 AREA (ACRES) = 445.0
* SUMMED DATA: FLOW (CFS) = 885.18 TOTAL AREA (ACRES) = 636.2

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 191.2 Tc (MIN.) = 17.24
EFFECTIVE AREA (ACRES) = 172.69 AREA-AVERAGED Fm (INCH/HR) = 0.69
AREA-AVERAGED Fp (INCH/HR) = 0.94 AREA-AVERAGED Ap = 0.738
PEAK FLOW RATE (CFS) = 221.18

* CUMULATIVE SOURCE FLOW DATA: FLOW (CFS) = 664.00 AREA (AC.) = 445.0
* SUMMED DATA: FLOW (CFS) = 885.18 TOTAL AREA (ACRES) = 636.2

** PEAK FLOW RATE TABLE **

Table with 8 columns: STREAM SOURCE, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp (Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. It lists two flow paths with their respective peak flow rates and parameters.

-----END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
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***** DESCRIPTION OF STUDY *****

* OLD MODEL COLONY EAST AREA F - BASIN II *
* 25-YEAR HYDROLOGY ANALYSIS *
* *

FILE NAME: OMCEI125.DAT
TIME/DATE OF STUDY: 15:11 11/08/2011

=====
USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT (YEAR) = 25.00
SPECIFIED MINIMUM PIPE SIZE (INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS (DECIMAL) TO USE FOR FRICTION SLOPE = 0.80
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL
10-YEAR STORM 60-MINUTE INTENSITY (INCH/HOUR) = 1.000
100-YEAR STORM 60-MINUTE INTENSITY (INCH/HOUR) = 1.400
COMPUTED RAINFALL INTENSITY DATA:
STORM EVENT = 25.00 1-HOUR INTENSITY (INCH/HOUR) = 1.1365
SLOPE OF INTENSITY DURATION CURVE = 0.6000

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

Table with columns: NO., WIDTH (FT), CROSSFALL (FT), STREET-CROSSFALL IN- / OUT- / PARK- SIDE / SIDE / WAY, CURB HEIGHT (FT), GUTTER WIDTH (FT), GEOMETRIES LIP (FT), MANNING HIKE (FT), FACTOR (n)

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
SIZE PIPE WITH A FLOW CAPACITY GREATER THAN OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

UNIT-HYDROGRAPH MODEL SELECTIONS/PARAMETERS:

WATERSHED LAG = 0.80 * Tc
USED "VALLEY UNDEVELOPED" S-GRAPH FOR DEVELOPMENTS OF 2 UNITS/ACRE AND LESS; AND "VALLEY DEVELOPED" S-GRAPH FOR DEVELOPMENTS OF 3-4 UNITS/ACRE AND MORE.

USER SPECIFIED RAINFALL VALUES:

2-YR 6-HR RAINFALL DEPTH (INCH) = 1.70
2-YR 24-HR RAINFALL DEPTH (INCH) = 3.30
100-YR 6-HR RAINFALL DEPTH (INCH) = 3.70
100-YR 24-HR RAINFALL DEPTH (INCH) = 8.00
SIERRA MADRE DEPTH-AREA FACTORS USED.

Table with columns: DURATION, AREA-AVERAGED RAINFALL (INCH)
5-MINUTES 0.38
30-MINUTES 0.79
1-HOUR 1.04
3-HOUR 1.87
6-HOUR 2.71
24-HOUR 5.30

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR UNIT HYDROGRAPH METHOD

FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====
INITIAL SUBAREA FLOW-LENGTH (FEET) = 3050.00
ELEVATION DATA: UPSTREAM (FEET) = 1050.00 DOWNSTREAM (FEET) = 1045.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 27.143
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.829
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 5.90 0.98 0.100 32 27.14
COMMERCIAL A 5.60 0.98 0.100 32 27.14
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF (CFS) = 17.92
TOTAL AREA (ACRES) = 11.50 PEAK FLOW RATE (CFS) = 17.92

FLOW PROCESS FROM NODE 101.00 TO NODE 101.00 IS CODE = 16

>>>>USER SPECIFIED CONSTANT SOURCE FLOW AT NODE<<<<<
=====
USER-SPECIFIED CONSTANT SOURCE FLOW = 524.00 (CFS)
USER-SPECIFIED AREA ASSOCIATED TO SOURCE FLOW = 286.00 (ACRES)
* CUMULATIVE SOURCE FLOW DATA: FLOW (CFS) = 524.00 AREA (AC.) = 286.00
* SUMMED DATA: FLOW (CFS) = 541.92 TOTAL AREA (ACRES) = 297.50

FLOW PROCESS FROM NODE 101.00 TO NODE 101.00 IS CODE = 16

```

>>>>USER SPECIFIED CONSTANT SOURCE FLOW AT NODE<<<<
=====
USER-SPECIFIED CONSTANT SOURCE FLOW = 134.00(CFS)
USER-SPECIFIED AREA ASSOCIATED TO SOURCE FLOW = 73.00(ACRES)
* CUMULATIVE SOURCE FLOW DATA: FLOW(CFS) = 658.00 AREA(AC.) = 359.00
* SUMMED DATA: FLOW(CFS) = 675.92 TOTAL AREA(ACRES) = 370.50
*****
FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1045.00 DOWNSTREAM(FEET) = 1040.00
FLOW LENGTH(FEET) = 1200.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 108.0 INCH PIPE IS 83.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.88
ESTIMATED PIPE DIAMETER(INCH) = 108.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 675.92
PIPE TRAVEL TIME(MIN.) = 1.55 Tc(MIN.) = 28.70
* TOTAL SOURCE FLOW(CFS) = 658.00
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 4250.00 FEET.
*****
FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 28.70
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.769
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 5.50 0.98 0.100 32
COMMERCIAL A 6.60 0.98 0.100 32
COMMERCIAL A 4.70 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 16.80 SUBAREA RUNOFF(CFS) = 25.28
EFFECTIVE AREA(ACRES) = 28.30 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 28.3 PEAK FLOW RATE(CFS) = 42.58
* SOURCE FLOW DATA: FLOW(CFS) = 658.00 AREA(ACRES) = 359.0
* SUMMED DATA: FLOW(CFS) = 700.58 TOTAL AREA(ACRES) = 387.3
*****
FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 16
-----
>>>>USER SPECIFIED CONSTANT SOURCE FLOW AT NODE<<<<
=====
USER-SPECIFIED CONSTANT SOURCE FLOW = 97.00(CFS)
USER-SPECIFIED AREA ASSOCIATED TO SOURCE FLOW = 53.00(ACRES)
* CUMULATIVE SOURCE FLOW DATA: FLOW(CFS) = 755.00 AREA(AC.) = 412.00
* SUMMED DATA: FLOW(CFS) = 797.58 TOTAL AREA(ACRES) = 440.30

```

```

*****
FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1040.00 DOWNSTREAM(FEET) = 1030.00
FLOW LENGTH(FEET) = 2600.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 114.0 INCH PIPE IS 93.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.87
ESTIMATED PIPE DIAMETER(INCH) = 114.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 797.58
PIPE TRAVEL TIME(MIN.) = 3.37 Tc(MIN.) = 32.06
* TOTAL SOURCE FLOW(CFS) = 755.00
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 103.00 = 6850.00 FEET.
*****
FLOW PROCESS FROM NODE 103.00 TO NODE 103.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 32.06
RAINFALL INTENSITY(INCH/HR) = 1.66
AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98
AREA-AVERAGED Ap = 0.10
EFFECTIVE STREAM AREA(ACRES) = 28.30
TOTAL STREAM AREA(ACRES) = 28.30
PEAK FLOW RATE(CFS) AT CONFLUENCE = 42.58
* SOURCE FLOW DATA: FLOW(CFS) = 755.00 AREA(ACRES) = 412.0
* SUMMED DATA: FLOW(CFS) = 797.58 TOTAL AREA(ACRES) = 440.3
*****
FLOW PROCESS FROM NODE 104.00 TO NODE 103.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 900.00
ELEVATION DATA: UPSTREAM(FEET) = 1045.00 DOWNSTREAM(FEET) = 1030.00
Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 11.165
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.117
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"11+ DWELLINGS/ACRE" A 7.50 0.98 0.200 32 11.17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA RUNOFF(CFS) = 19.72
TOTAL AREA(ACRES) = 7.50 PEAK FLOW RATE(CFS) = 19.72

```

 FLOW PROCESS FROM NODE 103.00 TO NODE 103.00 IS CODE = 16

>>>>USER SPECIFIED CONSTANT SOURCE FLOW AT NODE<<<<<

=====

USER-SPECIFIED CONSTANT SOURCE FLOW = 60.00 (CFS)
 USER-SPECIFIED AREA ASSOCIATED TO SOURCE FLOW = 33.00 (ACRES)
 * CUMULATIVE SOURCE FLOW DATA: FLOW(CFS) = 60.00 AREA(AC.) = 33.00
 * SUMMED DATA: FLOW(CFS) = 79.72 TOTAL AREA(ACRES) = 40.50

 FLOW PROCESS FROM NODE 103.00 TO NODE 103.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 11.17
 RAINFALL INTENSITY(INCH/HR) = 3.12
 AREA-AVERAGED Fm(INCH/HR) = 0.20
 AREA-AVERAGED Fp(INCH/HR) = 0.98
 AREA-AVERAGED Ap = 0.20
 EFFECTIVE STREAM AREA(ACRES) = 7.50
 TOTAL STREAM AREA(ACRES) = 7.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 19.72

* SOURCE FLOW DATA: FLOW(CFS) = 60.00 AREA(ACRES) = 33.0
 * SUMMED DATA: FLOW(CFS) = 79.72 TOTAL AREA(ACRES) = 40.5

** CONFLUENCE DATA **

STREAM SOURCE NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	42.58	32.06	1.655	0.98(0.10)	0.10	28.3	100.00
755.0							
2	19.72	11.17	3.117	0.98(0.20)	0.20	7.5	104.00
60.0							

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

** PEAK FLOW RATE TABLE **

STREAM SOURCE NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	48.46	11.17	3.117	0.98(0.14)	0.14	17.4	104.00
60.0							
2	52.43	32.06	1.655	0.97(0.12)	0.12	35.8	100.00
755.0							

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 52.43 Tc(MIN.) = 32.06

EFFECTIVE AREA(ACRES) = 35.80 AREA-AVERAGED Fm(INCH/HR) = 0.12
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.12
 TOTAL AREA(ACRES) = 35.8

* CUMULATIVE SOURCE FLOW DATA: FLOW(CFS) = 815.00 AREA(AC.) = 445.0
 * SUMMED DATA: FLOW(CFS) = 867.43 TOTAL AREA(ACRES) = 480.8
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 103.00 = 6850.00 FEET.

 FLOW PROCESS FROM NODE 103.00 TO NODE 105.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 1030.00 DOWNSTREAM(FEET) = 1020.00
 FLOW LENGTH(FEET) = 780.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 96.0 INCH PIPE IS 73.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 20.89
 ESTIMATED PIPE DIAMETER(INCH) = 96.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 867.43
 PIPE TRAVEL TIME(MIN.) = 0.62 Tc(MIN.) = 32.69
 * TOTAL SOURCE FLOW(CFS) = 815.00
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 105.00 = 7630.00 FEET.

 FLOW PROCESS FROM NODE 105.00 TO NODE 105.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 32.69
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.636
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ LAND USE SCS SOIL GROUP AREA (ACRES) Fp (INCH/HR) Ap (DECIMAL) SCS CN
 COMMERCIAL A 3.80 0.98 0.100 32
 COMMERCIAL A 5.70 0.98 0.100 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 9.50 SUBAREA RUNOFF(CFS) = 13.16
 EFFECTIVE AREA(ACRES) = 45.30 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.12
 TOTAL AREA(ACRES) = 45.3 PEAK FLOW RATE(CFS) = 62.08

* SOURCE FLOW DATA: FLOW(CFS) = 815.00 AREA(ACRES) = 445.0
 * SUMMED DATA: FLOW(CFS) = 877.08 TOTAL AREA(ACRES) = 490.3

** PEAK FLOW RATE TABLE **

STREAM SOURCE NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	69.91	11.79	3.017	0.97(0.12)	0.13	26.9	104.00
60.0							
2	62.08	32.69	1.636	0.98(0.11)	0.12	45.3	100.00
755.0							

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 69.91 Tc(MIN.) = 11.79
 AREA-AVERAGED Fm(INCH/HR) = 0.12 AREA-AVERAGED Fp(INCH/HR) = 0.97
 AREA-AVERAGED Ap = 0.13 EFFECTIVE AREA(ACRES) = 26.85

* CUMULATIVE SOURCE FLOW DATA:
 FLOW(CFS) = 815.00 AREA(ACRES) = 445.0
 * SUMMED DATA:
 FLOW(CFS) = 884.91 TOTAL AREA(ACRES) = 471.9

 FLOW PROCESS FROM NODE 105.00 TO NODE 106.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 1020.00 DOWNSTREAM(FEET) = 1005.00
 FLOW LENGTH(FEET) = 2640.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 114.0 INCH PIPE IS 85.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 15.55
 ESTIMATED PIPE DIAMETER(INCH) = 114.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 884.91
 PIPE TRAVEL TIME(MIN.) = 2.83 Tc(MIN.) = 14.62
 * TOTAL SOURCE FLOW(CFS) = 815.00
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 106.00 = 10270.00 FEET.

 FLOW PROCESS FROM NODE 106.00 TO NODE 106.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 14.62
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.652
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	A	74.70	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
 SUBAREA AREA(ACRES) = 74.70 SUBAREA RUNOFF(CFS) = 122.56
 EFFECTIVE AREA(ACRES) = 101.55 AREA-AVERAGED Fm(INCH/HR) = 0.64
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.66
 TOTAL AREA(ACRES) = 120.0 PEAK FLOW RATE(CFS) = 183.63

* SOURCE FLOW DATA: FLOW(CFS) = 815.00 AREA(ACRES) = 445.0
 * SUMMED DATA: FLOW(CFS) = 998.63 TOTAL AREA(ACRES) = 565.0

 FLOW PROCESS FROM NODE 106.00 TO NODE 107.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 1005.00 DOWNSTREAM(FEET) = 1000.00
 FLOW LENGTH(FEET) = 1740.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 132.0 INCH PIPE IS 105.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 12.26

ESTIMATED PIPE DIAMETER(INCH) = 132.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 998.63
 PIPE TRAVEL TIME(MIN.) = 2.37 Tc(MIN.) = 16.98
 * TOTAL SOURCE FLOW(CFS) = 815.00
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 107.00 = 12010.00 FEET.

 FLOW PROCESS FROM NODE 107.00 TO NODE 107.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 16.98
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.424
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	A	45.00	0.98	0.850	32
PUBLIC PARK	B	26.20	0.75	0.850	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.89
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
 SUBAREA AREA(ACRES) = 71.20 SUBAREA RUNOFF(CFS) = 106.74
 EFFECTIVE AREA(ACRES) = 172.75 AREA-AVERAGED Fm(INCH/HR) = 0.69
 AREA-AVERAGED Fp(INCH/HR) = 0.94 AREA-AVERAGED Ap = 0.74
 TOTAL AREA(ACRES) = 191.2 PEAK FLOW RATE(CFS) = 269.52

* SOURCE FLOW DATA: FLOW(CFS) = 815.00 AREA(ACRES) = 445.0
 * SUMMED DATA: FLOW(CFS) = 1084.52 TOTAL AREA(ACRES) = 636.2

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 191.2 TC(MIN.) = 16.98
 EFFECTIVE AREA(ACRES) = 172.75 AREA-AVERAGED Fm(INCH/HR) = 0.69
 AREA-AVERAGED Fp(INCH/HR) = 0.94 AREA-AVERAGED Ap = 0.738
 PEAK FLOW RATE(CFS) = 269.52

* CUMULATIVE SOURCE FLOW DATA: FLOW(CFS) = 815.00 AREA(AC.) = 445.0

* SUMMED DATA: FLOW(CFS) = 1084.52 TOTAL AREA(ACRES) = 636.2

** PEAK FLOW RATE TABLE **

STREAM SOURCE NUMBER FLOW	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (ACRES)	Ae (ACRES)	HEADWATER NODE
1	269.52	16.98	2.424	0.94 (0.69)	0.74	172.8	104.00
60.0							
2	148.73	37.90	1.497	0.94 (0.63)	0.68	191.2	100.00
755.0							

=====

END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
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***** DESCRIPTION OF STUDY *****

* OLD MODEL COLONY EAST AREA F - BASIN II *
* 100-YEAR HYDROLOGY ANALYSIS *
*

FILE NAME: OMCII100.DAT
TIME/DATE OF STUDY: 15:15 11/08/2011

=====
USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT (YEAR) = 100.00
SPECIFIED MINIMUM PIPE SIZE (INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS (DECIMAL) TO USE FOR FRICTION SLOPE = 0.80
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE (LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
USER SPECIFIED 1-HOUR INTENSITY (INCH/HOUR) = 1.4000

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

Table with 10 columns: NO., WIDTH (FT), CROSSFALL (FT), SIDE, IN- / OUT- / PARK- / SIDE / WAY, HEIGHT (FT), CURB GUTTER-GEOMETRIES: MANNING, WIDTH (FT), LIP (FT), HIKE (FT), FACTOR (n). Rows 1 and 2.

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

SIZE PIPE WITH A FLOW CAPACITY GREATER THAN OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.

*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

UNIT-HYDROGRAPH MODEL SELECTIONS/PARAMETERS:

WATERSHED LAG = 0.80 * Tc
USED "VALLEY UNDEVELOPED" S-GRAPH FOR DEVELOPMENTS OF

2 UNITS/ACRE AND LESS; AND "VALLEY DEVELOPED" S-GRAPH
FOR DEVELOPMENTS OF 3-4 UNITS/ACRE AND MORE.

USER SPECIFIED RAINFALL VALUES:

2-YR 6-HR RAINFALL DEPTH (INCH) = 1.70
2-YR 24-HR RAINFALL DEPTH (INCH) = 3.30
100-YR 6-HR RAINFALL DEPTH (INCH) = 3.70
100-YR 24-HR RAINFALL DEPTH (INCH) = 8.00
SIERRA MADRE DEPTH-AREA FACTORS USED.

AREA-AVERAGED

Table with 2 columns: DURATION, RAINFALL (INCH). Rows: 5-MINUTES (0.52), 30-MINUTES (1.06), 1-HOUR (1.40), 3-HOUR (2.54), 6-HOUR (3.70), 24-HOUR (8.00).

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR UNIT HYDROGRAPH METHOD

FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 3050.00
ELEVATION DATA: UPSTREAM (FEET) = 1050.00 DOWNSTREAM (FEET) = 1045.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 27.143
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.253
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 5.90 0.98 0.100 32 27.14
COMMERCIAL A 5.60 0.98 0.100 32 27.14
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF (CFS) = 22.31
TOTAL AREA (ACRES) = 11.50 PEAK FLOW RATE (CFS) = 22.31

FLOW PROCESS FROM NODE 101.00 TO NODE 101.00 IS CODE = 16

>>>>USER SPECIFIED CONSTANT SOURCE FLOW AT NODE<<<<

USER-SPECIFIED CONSTANT SOURCE FLOW = 714.00 (CFS)
USER-SPECIFIED AREA ASSOCIATED TO SOURCE FLOW = 286.00 (ACRES)
* CUMULATIVE SOURCE FLOW DATA: FLOW (CFS) = 714.00 AREA (AC.) = 286.00
* SUMMED DATA: FLOW (CFS) = 736.31 TOTAL AREA (ACRES) = 297.50

FLOW PROCESS FROM NODE 101.00 TO NODE 101.00 IS CODE = 16

>>>>USER SPECIFIED CONSTANT SOURCE FLOW AT NODE<<<<

USER-SPECIFIED CONSTANT SOURCE FLOW = 183.00 (CFS)
 USER-SPECIFIED AREA ASSOCIATED TO SOURCE FLOW = 73.00 (ACRES)
 * CUMULATIVE SOURCE FLOW DATA: FLOW (CFS) = 897.00 AREA (AC.) = 359.00
 * SUMMED DATA: FLOW (CFS) = 919.31 TOTAL AREA (ACRES) = 370.50

 FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 1045.00 DOWNSTREAM (FEET) = 1040.00
 FLOW LENGTH (FEET) = 1200.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 120.0 INCH PIPE IS 94.6 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 13.85
 ESTIMATED PIPE DIAMETER (INCH) = 120.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 919.31
 PIPE TRAVEL TIME (MIN.) = 1.44 Tc (MIN.) = 28.59
 * TOTAL SOURCE FLOW (CFS) = 897.00
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 4250.00 FEET.

 FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 28.59
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.184
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	5.50	0.98	0.100	32
COMMERCIAL	A	6.60	0.98	0.100	32
COMMERCIAL	A	4.70	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 16.80 SUBAREA RUNOFF (CFS) = 31.55
 EFFECTIVE AREA (ACRES) = 28.30 AREA-AVERAGED Fm (INCH/HR) = 0.10
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
 TOTAL AREA (ACRES) = 28.3 PEAK FLOW RATE (CFS) = 53.15

* SOURCE FLOW DATA: FLOW (CFS) = 897.00 AREA (ACRES) = 359.0
 * SUMMED DATA: FLOW (CFS) = 950.15 TOTAL AREA (ACRES) = 387.3

 FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 16

>>>>USER SPECIFIED CONSTANT SOURCE FLOW AT NODE<<<<<

=====

USER-SPECIFIED CONSTANT SOURCE FLOW = 132.00 (CFS)
 USER-SPECIFIED AREA ASSOCIATED TO SOURCE FLOW = 53.00 (ACRES)
 * CUMULATIVE SOURCE FLOW DATA: FLOW (CFS) = 1029.00 AREA (AC.) = 412.00
 * SUMMED DATA: FLOW (CFS) = 1082.15 TOTAL AREA (ACRES) = 440.30

 FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 1040.00 DOWNSTREAM (FEET) = 1030.00
 FLOW LENGTH (FEET) = 2600.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 132.0 INCH PIPE IS 99.3 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 14.11
 ESTIMATED PIPE DIAMETER (INCH) = 132.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 1082.15
 PIPE TRAVEL TIME (MIN.) = 3.07 Tc (MIN.) = 31.66
 * TOTAL SOURCE FLOW (CFS) = 1029.00
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 103.00 = 6850.00 FEET.

 FLOW PROCESS FROM NODE 103.00 TO NODE 103.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION (MIN.) = 31.66
 RAINFALL INTENSITY (INCH/HR) = 2.05
 AREA-AVERAGED Fm (INCH/HR) = 0.10
 AREA-AVERAGED Fp (INCH/HR) = 0.98
 AREA-AVERAGED Ap = 0.10
 EFFECTIVE STREAM AREA (ACRES) = 28.30
 TOTAL STREAM AREA (ACRES) = 28.30
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 53.15

* SOURCE FLOW DATA: FLOW (CFS) = 1029.00 AREA (ACRES) = 412.0
 * SUMMED DATA: FLOW (CFS) = 1082.15 TOTAL AREA (ACRES) = 440.3

 FLOW PROCESS FROM NODE 104.00 TO NODE 103.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 900.00
 ELEVATION DATA: UPSTREAM (FEET) = 1045.00 DOWNSTREAM (FEET) = 1030.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 11.165
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.840
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "11+ DWELLINGS/ACRE"	A	7.50	0.98	0.200	32	11.17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
 SUBAREA RUNOFF (CFS) = 24.60
 TOTAL AREA (ACRES) = 7.50 PEAK FLOW RATE (CFS) = 24.60

FLOW PROCESS FROM NODE 103.00 TO NODE 103.00 IS CODE = 16

 >>>>USER SPECIFIED CONSTANT SOURCE FLOW AT NODE<<<<<
 =====
 USER-SPECIFIED CONSTANT SOURCE FLOW = 82.00 (CFS)
 USER-SPECIFIED AREA ASSOCIATED TO SOURCE FLOW = 33.00 (ACRES)
 * CUMULATIVE SOURCE FLOW DATA: FLOW(CFS) = 82.00 AREA (AC.) = 33.00
 * SUMMED DATA: FLOW(CFS) = 106.60 TOTAL AREA (ACRES) = 40.50

 FLOW PROCESS FROM NODE 103.00 TO NODE 103.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION (MIN.) = 11.17
 RAINFALL INTENSITY (INCH/HR) = 3.84
 AREA-AVERAGED Fm (INCH/HR) = 0.20
 AREA-AVERAGED Fp (INCH/HR) = 0.98
 AREA-AVERAGED Ap = 0.20
 EFFECTIVE STREAM AREA (ACRES) = 7.50
 TOTAL STREAM AREA (ACRES) = 7.50
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 24.60

* SOURCE FLOW DATA: FLOW(CFS) = 82.00 AREA (ACRES) = 33.0
 * SUMMED DATA: FLOW(CFS) = 106.60 TOTAL AREA (ACRES) = 40.5

** CONFLUENCE DATA **

STREAM SOURCE NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	53.15	31.66	2.055	0.98 (0.10)	0.10	28.3	100.00
1029.0							
2	24.60	11.17	3.840	0.98 (0.20)	0.20	7.5	104.00
82.0							

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

** PEAK FLOW RATE TABLE **

STREAM SOURCE NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	60.44	11.17	3.840	0.98 (0.14)	0.14	17.5	104.00
82.0							
2	65.70	31.66	2.055	0.97 (0.12)	0.12	35.8	100.00
1029.0							

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE (CFS) = 65.70 Tc (MIN.) = 31.66
 EFFECTIVE AREA (ACRES) = 35.80 AREA-AVERAGED Fm (INCH/HR) = 0.12
 AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.12

TOTAL AREA (ACRES) = 35.8
 * CUMULATIVE SOURCE FLOW DATA: FLOW(CFS) = 1111.00 AREA (AC.) = 445.0
 * SUMMED DATA: FLOW(CFS) = 1176.70 TOTAL AREA (ACRES) = 480.8
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 103.00 = 6850.00 FEET.

 FLOW PROCESS FROM NODE 103.00 TO NODE 105.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 1030.00 DOWNSTREAM (FEET) = 1020.00
 FLOW LENGTH (FEET) = 780.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 108.0 INCH PIPE IS 82.5 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 22.58
 ESTIMATED PIPE DIAMETER (INCH) = 108.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 1176.70
 PIPE TRAVEL TIME (MIN.) = 0.58 Tc (MIN.) = 32.23
 * TOTAL SOURCE FLOW (CFS) = 1111.00
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 105.00 = 7630.00 FEET.

 FLOW PROCESS FROM NODE 105.00 TO NODE 105.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====

MAINLINE Tc (MIN.) = 32.23
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.032
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCSSOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 3.80 0.98 0.100 32
 COMMERCIAL A 5.70 0.98 0.100 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 9.50 SUBAREA RUNOFF (CFS) = 16.54
 EFFECTIVE AREA (ACRES) = 45.30 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.12
 TOTAL AREA (ACRES) = 45.3 PEAK FLOW RATE (CFS) = 78.23

* SOURCE FLOW DATA: FLOW(CFS) = 1111.00 AREA (ACRES) = 445.0
 * SUMMED DATA: FLOW(CFS) = 1189.23 TOTAL AREA (ACRES) = 490.3

** PEAK FLOW RATE TABLE **

STREAM SOURCE NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	87.44	11.74	3.726	0.98 (0.12)	0.12	27.0	104.00
82.0							
2	78.23	32.23	2.032	0.98 (0.11)	0.12	45.3	100.00
1029.0							

NEW PEAK FLOW DATA ARE:
 PEAK FLOW RATE (CFS) = 87.44 Tc (MIN.) = 11.74
 AREA-AVERAGED Fm (INCH/HR) = 0.12 AREA-AVERAGED Fp (INCH/HR) = 0.98

AREA-AVERAGED Ap = 0.13 EFFECTIVE AREA (ACRES) = 26.98

* CUMULATIVE SOURCE FLOW DATA:

FLOW (CFS) = 1111.00 AREA (ACRES) = 445.0

* SUMMED DATA:

FLOW (CFS) = 1198.44 TOTAL AREA (ACRES) = 472.0

FLOW PROCESS FROM NODE 105.00 TO NODE 106.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 1020.00 DOWNSTREAM (FEET) = 1005.00

FLOW LENGTH (FEET) = 2640.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 126.0 INCH PIPE IS 97.4 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 16.68

ESTIMATED PIPE DIAMETER (INCH) = 126.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 1198.44

PIPE TRAVEL TIME (MIN.) = 2.64 Tc (MIN.) = 14.38

* TOTAL SOURCE FLOW (CFS) = 1111.00

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 106.00 = 10270.00 FEET.

FLOW PROCESS FROM NODE 106.00 TO NODE 106.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 14.38

* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.299

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

PUBLIC PARK A 74.70 0.98 0.850 32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850

SUBAREA AREA (ACRES) = 74.70 SUBAREA RUNOFF (CFS) = 166.07

EFFECTIVE AREA (ACRES) = 101.68 AREA-AVERAGED Fm (INCH/HR) = 0.64

AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.66

TOTAL AREA (ACRES) = 120.0 PEAK FLOW RATE (CFS) = 243.15

* SOURCE FLOW DATA: FLOW (CFS) = 1111.00 AREA (ACRES) = 445.0

* SUMMED DATA: FLOW (CFS) = 1354.15 TOTAL AREA (ACRES) = 565.0

FLOW PROCESS FROM NODE 106.00 TO NODE 107.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 1005.00 DOWNSTREAM (FEET) = 1000.00

FLOW LENGTH (FEET) = 1740.00 MANNING'S N = 0.013

ASSUME FULL-FLOWING PIPELINE

PIPE-FLOW VELOCITY (FEET/SEC.) = 17.39

ESTIMATED PIPE DIAMETER (INCH) = 114.00 NUMBER OF PIPES = 2

PIPE-FLOW (CFS) = 1354.15

PIPE TRAVEL TIME (MIN.) = 1.67 Tc (MIN.) = 16.05

* TOTAL SOURCE FLOW (CFS) = 1111.00

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 107.00 = 12010.00 FEET.

FLOW PROCESS FROM NODE 107.00 TO NODE 107.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 16.05

* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.089

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

PUBLIC PARK A 45.00 0.98 0.850 32

PUBLIC PARK B 26.20 0.75 0.850 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.89

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850

SUBAREA AREA (ACRES) = 71.20 SUBAREA RUNOFF (CFS) = 149.37

EFFECTIVE AREA (ACRES) = 172.88 AREA-AVERAGED Fm (INCH/HR) = 0.69

AREA-AVERAGED Fp (INCH/HR) = 0.94 AREA-AVERAGED Ap = 0.74

TOTAL AREA (ACRES) = 191.2 PEAK FLOW RATE (CFS) = 373.29

* SOURCE FLOW DATA: FLOW (CFS) = 1111.00 AREA (ACRES) = 445.0

* SUMMED DATA: FLOW (CFS) = 1484.29 TOTAL AREA (ACRES) = 636.2

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 191.2 Tc (MIN.) = 16.05

EFFECTIVE AREA (ACRES) = 172.88 AREA-AVERAGED Fm (INCH/HR) = 0.69

AREA-AVERAGED Fp (INCH/HR) = 0.94 AREA-AVERAGED Ap = 0.737

PEAK FLOW RATE (CFS) = 373.29

* CUMULATIVE SOURCE FLOW DATA: FLOW (CFS) = 1111.00 AREA (AC.) = 445.0

* SUMMED DATA: FLOW (CFS) = 1484.29 TOTAL AREA (ACRES) = 636.2

** PEAK FLOW RATE TABLE **

STREAM Q Tc Intensity Fp (Fm) Ap Ae HEADWATER

SOURCE NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE

FLOW

1 357.14 16.99 2.985 0.94 (0.69) 0.74 172.9 104.00

82.0

2 212.52 37.11 1.868 0.94 (0.63) 0.68 191.2 100.00

1029.0

END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
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Ver. 18.0 Release Date: 07/01/2011 License ID 1239

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***** DESCRIPTION OF STUDY *****

* OLD MODEL COLONY EAST AREA F *
* 10-YEAR HYDROLOGY ANALYSIS *
*

FILE NAME: OMCEF10.DAT
TIME/DATE OF STUDY: 15:28 11/08/2011

=====
USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.80
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE (LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.0000

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

Table with columns: NO., WIDTH (FT), CROSSFALL (FT), STREET-CROSSFALL IN- / OUT- / SIDE / SIDE / WAY, CURB HEIGHT (FT), GUTTER WIDTH (FT), GEOMETRIES LIP (FT), MANNING HIKE (FT), FACTOR (n). Rows 1 and 2.

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

SIZE PIPE WITH A FLOW CAPACITY GREATER THAN OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

UNIT-HYDROGRAPH MODEL SELECTIONS/PARAMETERS:

WATERSHED LAG = 0.80 * Tc
USED "VALLEY UNDEVELOPED" S-GRAPH FOR DEVELOPMENTS OF

2 UNITS/ACRE AND LESS; AND "VALLEY DEVELOPED" S-GRAPH
FOR DEVELOPMENTS OF 3-4 UNITS/ACRE AND MORE.

USER SPECIFIED RAINFALL VALUES:

2-YR 6-HR RAINFALL DEPTH(INCH) = 1.70
2-YR 24-HR RAINFALL DEPTH(INCH) = 3.30
100-YR 6-HR RAINFALL DEPTH(INCH) = 3.70
100-YR 24-HR RAINFALL DEPTH(INCH) = 8.00
SIERRA MADRE DEPTH-AREA FACTORS USED.

AREA-AVERAGED

Table with columns: DURATION, RAINFALL(INCH). Rows: 5-MINUTES, 30-MINUTES, 1-HOUR, 3-HOUR, 6-HOUR, 24-HOUR.

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR UNIT HYDROGRAPH METHOD

FLOW PROCESS FROM NODE 110.00 TO NODE 111.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 2640.00
ELEVATION DATA: UPSTREAM(FEET) = 1045.00 DOWNSTREAM(FEET) = 1035.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 21.669
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.842

Table with columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN, Tc (MIN.). Rows: COMMERCIAL, RESIDENTIAL, PUBLIC PARK.

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.94
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.749
SUBAREA RUNOFF(CFS) = 41.17
TOTAL AREA(ACRES) = 40.10 PEAK FLOW RATE(CFS) = 41.17

FLOW PROCESS FROM NODE 111.00 TO NODE 111.00 IS CODE = 16

>>>>USER SPECIFIED CONSTANT SOURCE FLOW AT NODE<<<<<

USER-SPECIFIED CONSTANT SOURCE FLOW = 603.00 (CFS)
USER-SPECIFIED AREA ASSOCIATED TO SOURCE FLOW = 403.00 (ACRES)
* CUMULATIVE SOURCE FLOW DATA: FLOW(CFS) = 603.00 AREA(AC.) = 403.00
* SUMMED DATA: FLOW(CFS) = 644.17 TOTAL AREA(ACRES) = 443.10

```

FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1035.00 DOWNSTREAM(FEET) = 1020.00
FLOW LENGTH(FEET) = 700.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 78.0 INCH PIPE IS 60.0 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 23.52
ESTIMATED PIPE DIAMETER(INCH) = 78.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 644.17
PIPE TRAVEL TIME(MIN.) = 0.50 Tc(MIN.) = 22.16
* TOTAL SOURCE FLOW(CFS) = 603.00
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 112.00 = 3340.00 FEET.

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*****
FLOW PROCESS FROM NODE 120.00 TO NODE 121.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 730.00
ELEVATION DATA: UPSTREAM(FEET) = 1030.00 DOWNSTREAM(FEET) = 1020.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.020
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.927
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS   Tc
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL         B       4.10   0.75  0.100  56   10.02
RESIDENTIAL
"11+ DWELLINGS/ACRE" B       7.00   0.75  0.200  56   10.68
RESIDENTIAL
"11+ DWELLINGS/ACRE" B       7.80   0.75  0.200  56   10.68
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.75
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.178
SUBAREA RUNOFF(CFS) = 47.51
TOTAL AREA(ACRES) = 18.90 PEAK FLOW RATE(CFS) = 47.51

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*****
FLOW PROCESS FROM NODE 121.00 TO NODE 121.00 IS CODE = 16
-----

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>>>>USER SPECIFIED CONSTANT SOURCE FLOW AT NODE<<<<
=====
USER-SPECIFIED CONSTANT SOURCE FLOW = 28.00(CFS)
USER-SPECIFIED AREA ASSOCIATED TO SOURCE FLOW = 18.00(ACRES)
* CUMULATIVE SOURCE FLOW DATA: FLOW(CFS) = 28.00 AREA(AC.) = 18.00
* SUMMED DATA: FLOW(CFS) = 75.51 TOTAL AREA(ACRES) = 36.90

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*****
FLOW PROCESS FROM NODE 130.00 TO NODE 131.00 IS CODE = 21
-----

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```

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

```

```

INITIAL SUBAREA FLOW-LENGTH(FEET) = 980.00
ELEVATION DATA: UPSTREAM(FEET) = 1045.00 DOWNSTREAM(FEET) = 1020.00

```

```

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.955
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.938
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS   Tc
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL         A       0.80   0.98  0.100  32   9.95
PUBLIC PARK        A       1.30   0.98  0.850  32   15.82
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.564
SUBAREA RUNOFF(CFS) = 4.51
TOTAL AREA(ACRES) = 2.10 PEAK FLOW RATE(CFS) = 4.51

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*****
FLOW PROCESS FROM NODE 131.00 TO NODE 132.00 IS CODE = 62
-----

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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 1020.00 DOWNSTREAM ELEVATION(FEET) = 1000.00
STREET LENGTH(FEET) = 1600.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 32.00

```

```

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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

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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.67
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.38
HALFSTREET FLOOD WIDTH(FEET) = 11.04
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.73
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.03
STREET FLOW TRAVEL TIME(MIN.) = 9.78 Tc(MIN.) = 19.74
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.949
SUBAREA LOSS RATE DATA(AMC II):

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DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL         A       1.40   0.98  0.100  32
RESIDENTIAL
"11+ DWELLINGS/ACRE" A       1.90   0.98  0.200  32
COMMERCIAL         A       0.50   0.98  0.100  32
PUBLIC PARK        A       0.10   0.98  0.850  32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.168
SUBAREA AREA(ACRES) = 3.90 SUBAREA RUNOFF(CFS) = 6.26
EFFECTIVE AREA(ACRES) = 6.00 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.31

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TOTAL AREA(ACRES) = 6.0 PEAK FLOW RATE(CFS) = 8.91

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.39 HALFSTREET FLOOD WIDTH(FEET) = 11.78
FLOW VELOCITY(FEET/SEC.) = 2.83 DEPTH*VELOCITY(FT*FT/SEC.) = 1.11
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 132.00 = 2580.00 FEET.

FLOW PROCESS FROM NODE 132.00 TO NODE 133.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<

UPSTREAM ELEVATION(FEET) = 1000.00 DOWNSTREAM ELEVATION(FEET) = 990.00
STREET LENGTH(FEET) = 1900.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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) = 27.35
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.60
HALFSTREET FLOOD WIDTH(FEET) = 22.27
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.66
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.60
STREET FLOW TRAVEL TIME(MIN.) = 11.92 Tc(MIN.) = 31.66
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.467

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 2.20 0.98 0.100 32
COMMERCIAL A 27.50 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 29.70 SUBAREA RUNOFF(CFS) = 36.62
EFFECTIVE AREA(ACRES) = 35.70 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.13
TOTAL AREA(ACRES) = 35.7 PEAK FLOW RATE(CFS) = 42.93

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.69 HALFSTREET FLOOD WIDTH(FEET) = 27.66
FLOW VELOCITY(FEET/SEC.) = 2.96 DEPTH*VELOCITY(FT*FT/SEC.) = 2.04
*NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
AND L = 1900.0 FT WITH ELEVATION-DROP = 10.0 FT, IS 52.8 CFS,
WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 133.00
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 133.00 = 4480.00 FEET.

FLOW PROCESS FROM NODE 133.00 TO NODE 133.10 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 990.00 DOWNSTREAM(FEET) = 985.00
FLOW LENGTH(FEET) = 1150.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 28.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.62
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 42.93
PIPE TRAVEL TIME(MIN.) = 2.89 Tc(MIN.) = 34.56
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 133.10 = 5630.00 FEET.

FLOW PROCESS FROM NODE 133.10 TO NODE 133.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 34.56
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.392
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 9.10 0.98 0.100 32
COMMERCIAL A 33.70 0.98 0.100 32
PUBLIC PARK A 0.70 0.98 0.850 32
PUBLIC PARK A 0.50 0.98 0.850 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.120
SUBAREA AREA(ACRES) = 44.00 SUBAREA RUNOFF(CFS) = 50.49
EFFECTIVE AREA(ACRES) = 79.70 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.13
TOTAL AREA(ACRES) = 79.7 PEAK FLOW RATE(CFS) = 91.01

FLOW PROCESS FROM NODE 133.10 TO NODE 134.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 985.00 DOWNSTREAM(FEET) = 980.00
FLOW LENGTH(FEET) = 950.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 38.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.45
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 91.01
PIPE TRAVEL TIME(MIN.) = 1.87 Tc(MIN.) = 36.43
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 134.00 = 6580.00 FEET.

FLOW PROCESS FROM NODE 134.00 TO NODE 134.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 36.43
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.349

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	17.50	0.98	0.100	32
COMMERCIAL	A	26.20	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 43.70 SUBAREA RUNOFF (CFS) = 49.22
EFFECTIVE AREA (ACRES) = 123.40 AREA-AVERAGED Fm (INCH/HR) = 0.11
AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.12
TOTAL AREA (ACRES) = 123.4 PEAK FLOW RATE (CFS) = 137.12

PIPE-FLOW VELOCITY (FEET/SEC.) = 16.87
ESTIMATED PIPE DIAMETER (INCH) = 57.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 257.59
PIPE TRAVEL TIME (MIN.) = 0.59 Tc (MIN.) = 39.59
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 150.00 = 9080.00 FEET.

FLOW PROCESS FROM NODE 134.00 TO NODE 135.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 980.00 DOWNSTREAM (FEET) = 960.00
FLOW LENGTH (FEET) = 1900.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 37.3 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 12.33
ESTIMATED PIPE DIAMETER (INCH) = 51.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 137.12
PIPE TRAVEL TIME (MIN.) = 2.57 Tc (MIN.) = 39.00
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 135.00 = 8480.00 FEET.

FLOW PROCESS FROM NODE 135.00 TO NODE 135.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 39.00
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.295
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	36.40	0.98	0.100	32
COMMERCIAL	A	77.60	0.98	0.100	32
PUBLIC PARK	A	8.60	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.153
SUBAREA AREA (ACRES) = 122.60 SUBAREA RUNOFF (CFS) = 126.47
EFFECTIVE AREA (ACRES) = 246.00 AREA-AVERAGED Fm (INCH/HR) = 0.13
AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.13
TOTAL AREA (ACRES) = 246.0 PEAK FLOW RATE (CFS) = 257.59

FLOW PROCESS FROM NODE 135.00 TO NODE 150.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 960.00 DOWNSTREAM (FEET) = 950.00
FLOW LENGTH (FEET) = 600.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 57.0 INCH PIPE IS 45.8 INCHES

FLOW PROCESS FROM NODE 150.00 TO NODE 150.00 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.) = 39.59
RAINFALL INTENSITY (INCH/HR) = 1.28
AREA-AVERAGED Fm (INCH/HR) = 0.13
AREA-AVERAGED Fp (INCH/HR) = 0.98
AREA-AVERAGED Ap = 0.13
EFFECTIVE STREAM AREA (ACRES) = 246.00
TOTAL STREAM AREA (ACRES) = 246.00
PEAK FLOW RATE (CFS) AT CONFLUENCE = 257.59

FLOW PROCESS FROM NODE 140.00 TO NODE 141.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 1000.00
ELEVATION DATA: UPSTREAM (FEET) = 1000.00 DOWNSTREAM (FEET) = 985.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 11.160
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.743
SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	1.70	0.98	0.100	32	11.16
COMMERCIAL	A	8.10	0.98	0.100	32	11.16

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF (CFS) = 23.34
TOTAL AREA (ACRES) = 9.80 PEAK FLOW RATE (CFS) = 23.34

FLOW PROCESS FROM NODE 141.00 TO NODE 142.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 985.00 DOWNSTREAM (FEET) = 980.00
FLOW LENGTH (FEET) = 700.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 22.0 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 6.71
ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 23.34

PIPE TRAVEL TIME(MIN.) = 1.74 Tc(MIN.) = 12.90
LONGEST FLOWPATH FROM NODE 140.00 TO NODE 142.00 = 1700.00 FEET.

FLOW PROCESS FROM NODE 142.00 TO NODE 142.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 12.90
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.515
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	5.90	0.98	0.100	32
COMMERCIAL	A	23.80	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 29.70 SUBAREA RUNOFF(CFS) = 64.63
EFFECTIVE AREA(ACRES) = 39.50 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 39.5 PEAK FLOW RATE(CFS) = 85.95

FLOW PROCESS FROM NODE 142.00 TO NODE 143.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 980.00 DOWNSTREAM(FEET) = 970.00
FLOW LENGTH(FEET) = 720.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 31.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.96
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 85.95
PIPE TRAVEL TIME(MIN.) = 1.00 Tc(MIN.) = 13.90
LONGEST FLOWPATH FROM NODE 140.00 TO NODE 143.00 = 2420.00 FEET.

FLOW PROCESS FROM NODE 143.00 TO NODE 143.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 13.90
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.405
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	7.30	0.98	0.100	32
COMMERCIAL	A	13.30	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 20.60 SUBAREA RUNOFF(CFS) = 42.78
EFFECTIVE AREA(ACRES) = 60.10 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 60.1 PEAK FLOW RATE(CFS) = 124.80

FLOW PROCESS FROM NODE 143.00 TO NODE 144.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 970.00 DOWNSTREAM(FEET) = 965.00
FLOW LENGTH(FEET) = 400.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 34.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.87
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 124.80
PIPE TRAVEL TIME(MIN.) = 0.52 Tc(MIN.) = 14.42
LONGEST FLOWPATH FROM NODE 140.00 TO NODE 144.00 = 2820.00 FEET.

FLOW PROCESS FROM NODE 144.00 TO NODE 144.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 14.42
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.353
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	6.00	0.98	0.100	32
COMMERCIAL	A	11.00	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 17.00 SUBAREA RUNOFF(CFS) = 34.50
EFFECTIVE AREA(ACRES) = 77.10 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 77.1 PEAK FLOW RATE(CFS) = 156.48

FLOW PROCESS FROM NODE 144.00 TO NODE 145.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 965.00 DOWNSTREAM(FEET) = 963.00
FLOW LENGTH(FEET) = 300.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 57.0 INCH PIPE IS 44.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.65
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 156.48
PIPE TRAVEL TIME(MIN.) = 0.47 Tc(MIN.) = 14.89
LONGEST FLOWPATH FROM NODE 140.00 TO NODE 145.00 = 3120.00 FEET.

FLOW PROCESS FROM NODE 145.00 TO NODE 145.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 14.89
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.308

PIPE TRAVEL TIME (MIN.) = 3.32 Tc (MIN.) = 19.91
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 151.00 = 11430.00 FEET.

FLOW PROCESS FROM NODE 151.00 TO NODE 151.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 19.91

* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.938

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	35.90	0.98	0.100	32	17.37
COMMERCIAL	B	25.10	0.75	0.100	56	17.37
COMMERCIAL	A	2.40	0.98	0.100	32	17.37
COMMERCIAL	B	0.10	0.75	0.100	56	17.37

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.88

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA (ACRES) = 63.50 SUBAREA RUNOFF (CFS) = 105.71

EFFECTIVE AREA (ACRES) = 310.61 AREA-AVERAGED Fm (INCH/HR) = 0.11

AREA-AVERAGED Fp (INCH/HR) = 0.96 AREA-AVERAGED Ap = 0.11

TOTAL AREA (ACRES) = 453.5 PEAK FLOW RATE (CFS) = 511.92

FLOW PROCESS FROM NODE 160.00 TO NODE 161.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 2360.00

ELEVATION DATA: UPSTREAM (FEET) = 905.00 DOWNSTREAM (FEET) = 890.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]**0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 18.681

* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.014

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	0.20	0.98	0.100	32	18.68
COMMERCIAL	A	59.40	0.98	0.100	32	18.68
PUBLIC PARK	A	0.40	0.98	0.850	32	29.68

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.105

SUBAREA RUNOFF (CFS) = 103.23

TOTAL AREA (ACRES) = 60.00 PEAK FLOW RATE (CFS) = 103.23

FLOW PROCESS FROM NODE 170.00 TO NODE 171.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 2300.00

ELEVATION DATA: UPSTREAM (FEET) = 880.00 DOWNSTREAM (FEET) = 860.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]**0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 17.366

* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.104

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	7.00	0.98	0.100	32	17.37
COMMERCIAL	A	29.30	0.98	0.100	32	17.37

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA RUNOFF (CFS) = 65.56

TOTAL AREA (ACRES) = 36.30 PEAK FLOW RATE (CFS) = 65.56

FLOW PROCESS FROM NODE 180.00 TO NODE 181.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 3700.00

ELEVATION DATA: UPSTREAM (FEET) = 870.00 DOWNSTREAM (FEET) = 850.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]**0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 23.099

* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.773

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	9.80	0.98	0.100	32	23.10
COMMERCIAL	A	56.40	0.98	0.100	32	23.10

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA RUNOFF (CFS) = 99.83

TOTAL AREA (ACRES) = 66.20 PEAK FLOW RATE (CFS) = 99.83

FLOW PROCESS FROM NODE 190.00 TO NODE 191.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 2250.00

ELEVATION DATA: UPSTREAM (FEET) = 850.00 DOWNSTREAM (FEET) = 840.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]**0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 19.687

* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.952

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	9.50	0.98	0.100	32	19.69
COMMERCIAL	A	37.30	0.98	0.100	32	19.69

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA RUNOFF (CFS) = 78.09

TOTAL AREA (ACRES) = 46.80 PEAK FLOW RATE (CFS) = 78.09

FLOW PROCESS FROM NODE 200.00 TO NODE 201.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 2000.00
 ELEVATION DATA: UPSTREAM (FEET) = 835.00 DOWNSTREAM (FEET) = 830.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 21.072
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.874
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	12.50	0.98	0.100	32	21.07
COMMERCIAL	A	26.90	0.98	0.100	32	21.07

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF (CFS) = 62.98
 TOTAL AREA (ACRES) = 39.40 PEAK FLOW RATE (CFS) = 62.98

FLOW PROCESS FROM NODE 210.00 TO NODE 211.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 4100.00
 ELEVATION DATA: UPSTREAM (FEET) = 830.00 DOWNSTREAM (FEET) = 780.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 20.453
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.907
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	21.30	0.98	0.100	32	20.45
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	A	48.80	0.98	0.500	32	26.17
COMMERCIAL	A	13.20	0.98	0.100	32	20.45
PUBLIC PARK	A	35.80	0.98	0.850	32	32.50
COMMERCIAL	A	9.40	0.98	0.100	32	20.45

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.461
 SUBAREA RUNOFF (CFS) = 168.62
 TOTAL AREA (ACRES) = 128.50 PEAK FLOW RATE (CFS) = 168.62

=====

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 128.50 TC (MIN.) = 20.45
 EFFECTIVE AREA (ACRES) = 128.50 AREA-AVERAGED Fm (INCH/HR) = 0.45
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.461
 PEAK FLOW RATE (CFS) = 168.62

=====

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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***** DESCRIPTION OF STUDY *****

* OLD MODEL COLONY EAST AREA F *
* 25-YEAR HYDROLOGY ANALYSIS *
* *

FILE NAME: OMCEF25.DAT
TIME/DATE OF STUDY: 15:30 11/08/2011

=====
USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.80
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL
10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) = 1.000
100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) = 1.400
COMPUTED RAINFALL INTENSITY DATA:
STORM EVENT = 25.00 1-HOUR INTENSITY(INCH/HOUR) = 1.1365
SLOPE OF INTENSITY DURATION CURVE = 0.6000

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

Table with columns: NO., WIDTH (FT), CROSSFALL (FT), IN- / OUT- / PARK- SIDE / SIDE/ WAY, HEIGHT (FT), WIDTH (FT), LIP (FT), HIKE (FT), MANNING FACTOR (n). Rows 1 and 2.

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
SIZE PIPE WITH A FLOW CAPACITY GREATER THAN OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

UNIT-HYDROGRAPH MODEL SELECTIONS/PARAMETERS:

WATERSHED LAG = 0.80 * Tc
USED "VALLEY UNDEVELOPED" S-GRAPH FOR DEVELOPMENTS OF 2 UNITS/ACRE AND LESS; AND "VALLEY DEVELOPED" S-GRAPH FOR DEVELOPMENTS OF 3-4 UNITS/ACRE AND MORE.

USER SPECIFIED RAINFALL VALUES:

2-YR 6-HR RAINFALL DEPTH(INCH) = 1.70
2-YR 24-HR RAINFALL DEPTH(INCH) = 3.30
100-YR 6-HR RAINFALL DEPTH(INCH) = 3.70
100-YR 24-HR RAINFALL DEPTH(INCH) = 8.00
SIERRA MADRE DEPTH-AREA FACTORS USED.

Table with columns: DURATION, RAINFALL(INCH). Rows: 5-MINUTES, 30-MINUTES, 1-HOUR, 3-HOUR, 6-HOUR, 24-HOUR.

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR UNIT HYDROGRAPH METHOD

FLOW PROCESS FROM NODE 110.00 TO NODE 111.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 2640.00
ELEVATION DATA: UPSTREAM(FEET) = 1045.00 DOWNSTREAM(FEET) = 1035.00

Table with columns: DEVELOPMENT TYPE/ LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN, Tc (MIN.). Rows: COMMERCIAL A, COMMERCIAL B, RESIDENTIAL, PUBLIC PARK.

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 21.669
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.094
SUBAREA Tc AND LOSS RATE DATA(AMC II):
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.94
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.749
SUBAREA RUNOFF(CFS) = 50.24
TOTAL AREA(ACRES) = 40.10 PEAK FLOW RATE(CFS) = 50.24

FLOW PROCESS FROM NODE 111.00 TO NODE 111.00 IS CODE = 16

>>>>USER SPECIFIED CONSTANT SOURCE FLOW AT NODE<<<<<

USER-SPECIFIED CONSTANT SOURCE FLOW = 740.00(CFS)
USER-SPECIFIED AREA ASSOCIATED TO SOURCE FLOW = 403.00(ACRES)
* CUMULATIVE SOURCE FLOW DATA: FLOW(CFS) = 740.00 AREA(AC.) = 403.00
* SUMMED DATA: FLOW(CFS) = 790.24 TOTAL AREA(ACRES) = 443.10

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*****
FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1035.00 DOWNSTREAM(FEET) = 1020.00
FLOW LENGTH(FEET) = 700.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 84.0 INCH PIPE IS 65.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 24.72
ESTIMATED PIPE DIAMETER(INCH) = 84.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 790.24
PIPE TRAVEL TIME(MIN.) = 0.47 Tc(MIN.) = 22.14
* TOTAL SOURCE FLOW(CFS) = 740.00
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 112.00 = 3340.00 FEET.

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FLOW PROCESS FROM NODE 120.00 TO NODE 121.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 730.00
ELEVATION DATA: UPSTREAM(FEET) = 1030.00 DOWNSTREAM(FEET) = 1020.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.020
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.326
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL B 4.10 0.75 0.100 56 10.02
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 7.00 0.75 0.200 56 10.68
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 7.80 0.75 0.200 56 10.68
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.75
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.178
SUBAREA RUNOFF(CFS) = 54.31
TOTAL AREA(ACRES) = 18.90 PEAK FLOW RATE(CFS) = 54.31

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*****
FLOW PROCESS FROM NODE 121.00 TO NODE 121.00 IS CODE = 16
-----
>>>>USER SPECIFIED CONSTANT SOURCE FLOW AT NODE<<<<
=====
USER-SPECIFIED CONSTANT SOURCE FLOW = 38.00(CFS)
USER-SPECIFIED AREA ASSOCIATED TO SOURCE FLOW = 18.00(ACRES)
* CUMULATIVE SOURCE FLOW DATA: FLOW(CFS) = 38.00 AREA(AC.) = 18.00
* SUMMED DATA: FLOW(CFS) = 92.31 TOTAL AREA(ACRES) = 36.90

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*****
FLOW PROCESS FROM NODE 130.00 TO NODE 131.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

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>>>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 980.00
ELEVATION DATA: UPSTREAM(FEET) = 1045.00 DOWNSTREAM(FEET) = 1020.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.955
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.339
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 0.80 0.98 0.100 32 9.95
PUBLIC PARK A 1.30 0.98 0.850 32 15.82
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.564
SUBAREA RUNOFF(CFS) = 5.27
TOTAL AREA(ACRES) = 2.10 PEAK FLOW RATE(CFS) = 5.27

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FLOW PROCESS FROM NODE 131.00 TO NODE 132.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 1020.00 DOWNSTREAM ELEVATION(FEET) = 1000.00
STREET LENGTH(FEET) = 1600.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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

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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.95
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.39
HALFSTREET FLOOD WIDTH(FEET) = 11.78
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.84
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.12
STREET FLOW TRAVEL TIME(MIN.) = 9.40 Tc(MIN.) = 19.35
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.241
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 1.40 0.98 0.100 32
RESIDENTIAL
"11+ DWELLINGS/ACRE" A 1.90 0.98 0.200 32
COMMERCIAL A 0.50 0.98 0.100 32
PUBLIC PARK A 0.10 0.98 0.850 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.168
SUBAREA AREA(ACRES) = 3.90 SUBAREA RUNOFF(CFS) = 7.29

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EFFECTIVE AREA (ACRES) = 6.00 AREA-AVERAGED Fm (INCH/HR) = 0.30
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.31
 TOTAL AREA (ACRES) = 6.0 PEAK FLOW RATE (CFS) = 10.49

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.41 HALFSTREET FLOOD WIDTH (FEET) = 12.62
 FLOW VELOCITY (FEET/SEC.) = 2.94 DEPTH*VELOCITY (FT*FT/SEC.) = 1.21
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 132.00 = 2580.00 FEET.

 FLOW PROCESS FROM NODE 132.00 TO NODE 133.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 2 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 1000.00 DOWNSTREAM ELEVATION (FEET) = 990.00
 STREET LENGTH (FEET) = 1900.00 CURB HEIGHT (INCHES) = 8.0
 STREET HALFWIDTH (FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 27.00
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

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) = 32.00
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH (FEET) = 0.63
 HALFSTREET FLOOD WIDTH (FEET) = 23.69
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.76
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 1.74
 STREET FLOW TRAVEL TIME (MIN.) = 11.49 Tc (MIN.) = 30.84
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.694

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	2.20	0.98	0.100	32
COMMERCIAL	A	27.50	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 29.70 SUBAREA RUNOFF (CFS) = 42.69
 EFFECTIVE AREA (ACRES) = 35.70 AREA-AVERAGED Fm (INCH/HR) = 0.13
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.13
 TOTAL AREA (ACRES) = 35.7 PEAK FLOW RATE (CFS) = 50.22

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.72 HALFSTREET FLOOD WIDTH (FEET) = 30.93
 FLOW VELOCITY (FEET/SEC.) = 3.06 DEPTH*VELOCITY (FT*FT/SEC.) = 2.21

*NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
 AND L = 1900.0 FT WITH ELEVATION-DROP = 10.0 FT, IS 60.4 CFS,
 WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 133.00
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 133.00 = 4480.00 FEET.

 FLOW PROCESS FROM NODE 133.00 TO NODE 133.10 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 990.00 DOWNSTREAM (FEET) = 985.00
 FLOW LENGTH (FEET) = 1150.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 42.0 INCH PIPE IS 29.6 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 6.92
 ESTIMATED PIPE DIAMETER (INCH) = 42.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 50.22
 PIPE TRAVEL TIME (MIN.) = 2.77 Tc (MIN.) = 33.61
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 133.10 = 5630.00 FEET.

 FLOW PROCESS FROM NODE 133.10 TO NODE 133.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 33.61
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.609
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	9.10	0.98	0.100	32
COMMERCIAL	A	33.70	0.98	0.100	32
PUBLIC PARK	A	0.70	0.98	0.850	32
PUBLIC PARK	A	0.50	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.120
 SUBAREA AREA (ACRES) = 44.00 SUBAREA RUNOFF (CFS) = 59.07
 EFFECTIVE AREA (ACRES) = 79.70 AREA-AVERAGED Fm (INCH/HR) = 0.12
 AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.13
 TOTAL AREA (ACRES) = 79.7 PEAK FLOW RATE (CFS) = 106.56

 FLOW PROCESS FROM NODE 133.10 TO NODE 134.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 985.00 DOWNSTREAM (FEET) = 980.00
 FLOW LENGTH (FEET) = 950.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 51.0 INCH PIPE IS 40.6 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 8.80
 ESTIMATED PIPE DIAMETER (INCH) = 51.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 106.56
 PIPE TRAVEL TIME (MIN.) = 1.80 Tc (MIN.) = 35.41
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 134.00 = 6580.00 FEET.

 FLOW PROCESS FROM NODE 134.00 TO NODE 134.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 35.41
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.560
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	17.50	0.98	0.100	32
COMMERCIAL	A	26.20	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 43.70 SUBAREA RUNOFF(CFS) = 57.50
 EFFECTIVE AREA(ACRES) = 123.40 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.12
 TOTAL AREA(ACRES) = 123.4 PEAK FLOW RATE(CFS) = 160.50

 FLOW PROCESS FROM NODE 134.00 TO NODE 135.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 980.00 DOWNSTREAM(FEET) = 960.00
 FLOW LENGTH(FEET) = 1900.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 54.0 INCH PIPE IS 39.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 12.82
 ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 160.50
 PIPE TRAVEL TIME(MIN.) = 2.47 Tc(MIN.) = 37.88
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 135.00 = 8480.00 FEET.

 FLOW PROCESS FROM NODE 135.00 TO NODE 135.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 37.88
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.498
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	36.40	0.98	0.100	32
COMMERCIAL	A	77.60	0.98	0.100	32
PUBLIC PARK	A	8.60	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.153
 SUBAREA AREA(ACRES) = 122.60 SUBAREA RUNOFF(CFS) = 148.85
 EFFECTIVE AREA(ACRES) = 246.00 AREA-AVERAGED Fm(INCH/HR) = 0.13
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.13
 TOTAL AREA(ACRES) = 246.0 PEAK FLOW RATE(CFS) = 302.48

 FLOW PROCESS FROM NODE 135.00 TO NODE 150.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 960.00 DOWNSTREAM(FEET) = 950.00

FLOW LENGTH(FEET) = 600.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 63.0 INCH PIPE IS 46.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 17.86
 ESTIMATED PIPE DIAMETER(INCH) = 63.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 302.48
 PIPE TRAVEL TIME(MIN.) = 0.56 Tc(MIN.) = 38.44
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 150.00 = 9080.00 FEET.

 FLOW PROCESS FROM NODE 150.00 TO NODE 150.00 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.) = 38.44
 RAINFALL INTENSITY(INCH/HR) = 1.48
 AREA-AVERAGED Fm(INCH/HR) = 0.13
 AREA-AVERAGED Fp(INCH/HR) = 0.98
 AREA-AVERAGED Ap = 0.13
 EFFECTIVE STREAM AREA(ACRES) = 246.00
 TOTAL STREAM AREA(ACRES) = 246.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 302.48

 FLOW PROCESS FROM NODE 140.00 TO NODE 141.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
 ELEVATION DATA: UPSTREAM(FEET) = 1000.00 DOWNSTREAM(FEET) = 985.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 11.160
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.118
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	1.70	0.98	0.100	32	11.16
COMMERCIAL	A	8.10	0.98	0.100	32	11.16

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF(CFS) = 26.64
 TOTAL AREA(ACRES) = 9.80 PEAK FLOW RATE(CFS) = 26.64

 FLOW PROCESS FROM NODE 141.00 TO NODE 142.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 985.00 DOWNSTREAM(FEET) = 980.00
 FLOW LENGTH(FEET) = 700.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 7.10

ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 26.64
 PIPE TRAVEL TIME (MIN.) = 1.64 Tc (MIN.) = 12.80
 LONGEST FLOWPATH FROM NODE 140.00 TO NODE 142.00 = 1700.00 FEET.

TOTAL AREA (ACRES) = 60.1 PEAK FLOW RATE (CFS) = 143.46

 FLOW PROCESS FROM NODE 142.00 TO NODE 142.00 IS CODE = 81

 FLOW PROCESS FROM NODE 143.00 TO NODE 144.00 IS CODE = 31

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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

=====

MAINLINE Tc (MIN.) = 12.80
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.871
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	5.90	0.98	0.100	32
COMMERCIAL	A	23.80	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 29.70 SUBAREA RUNOFF (CFS) = 74.15
 EFFECTIVE AREA (ACRES) = 39.50 AREA-AVERAGED Fm (INCH/HR) = 0.10
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
 TOTAL AREA (ACRES) = 39.5 PEAK FLOW RATE (CFS) = 98.61

=====

ELEVATION DATA: UPSTREAM (FEET) = 970.00 DOWNSTREAM (FEET) = 965.00
 FLOW LENGTH (FEET) = 400.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 48.0 INCH PIPE IS 39.3 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 13.03
 ESTIMATED PIPE DIAMETER (INCH) = 48.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 143.46
 PIPE TRAVEL TIME (MIN.) = 0.51 Tc (MIN.) = 14.27
 LONGEST FLOWPATH FROM NODE 140.00 TO NODE 144.00 = 2820.00 FEET.

 FLOW PROCESS FROM NODE 142.00 TO NODE 143.00 IS CODE = 31

 FLOW PROCESS FROM NODE 144.00 TO NODE 144.00 IS CODE = 81

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 980.00 DOWNSTREAM (FEET) = 970.00
 FLOW LENGTH (FEET) = 720.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 42.0 INCH PIPE IS 32.0 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 12.52
 ESTIMATED PIPE DIAMETER (INCH) = 42.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 98.61
 PIPE TRAVEL TIME (MIN.) = 0.96 Tc (MIN.) = 13.76
 LONGEST FLOWPATH FROM NODE 140.00 TO NODE 143.00 = 2420.00 FEET.

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 14.27
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.690
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	6.00	0.98	0.100	32
COMMERCIAL	A	11.00	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 17.00 SUBAREA RUNOFF (CFS) = 39.67
 EFFECTIVE AREA (ACRES) = 77.10 AREA-AVERAGED Fm (INCH/HR) = 0.10
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
 TOTAL AREA (ACRES) = 77.1 PEAK FLOW RATE (CFS) = 179.90

 FLOW PROCESS FROM NODE 143.00 TO NODE 143.00 IS CODE = 81

 FLOW PROCESS FROM NODE 144.00 TO NODE 145.00 IS CODE = 31

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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

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MAINLINE Tc (MIN.) = 13.76
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.750
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	7.30	0.98	0.100	32
COMMERCIAL	A	13.30	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 20.60 SUBAREA RUNOFF (CFS) = 49.17
 EFFECTIVE AREA (ACRES) = 60.10 AREA-AVERAGED Fm (INCH/HR) = 0.10
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10

=====

ELEVATION DATA: UPSTREAM (FEET) = 965.00 DOWNSTREAM (FEET) = 963.00
 FLOW LENGTH (FEET) = 300.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 60.0 INCH PIPE IS 46.5 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 11.02
 ESTIMATED PIPE DIAMETER (INCH) = 60.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 179.90
 PIPE TRAVEL TIME (MIN.) = 0.45 Tc (MIN.) = 14.73
 LONGEST FLOWPATH FROM NODE 140.00 TO NODE 145.00 = 3120.00 FEET.

 FLOW PROCESS FROM NODE 145.00 TO NODE 145.00 IS CODE = 81

 FLOW PROCESS FROM NODE 145.00 TO NODE 145.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 14.73
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.640
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 12.30 0.98 0.100 32
 COMMERCIAL A 12.10 0.98 0.100 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 24.40 SUBAREA RUNOFF(CFS) = 55.83
 EFFECTIVE AREA(ACRES) = 101.50 AREA-AVERAGED Fm(INCH/HR) = 0.10
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 101.5 PEAK FLOW RATE(CFS) = 232.26

DEPTH OF FLOW IN 63.0 INCH PIPE IS 51.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 16.70
 ESTIMATED PIPE DIAMETER(INCH) = 63.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 316.88
 PIPE TRAVEL TIME(MIN.) = 0.70 Tc(MIN.) = 16.38
 LONGEST FLOWPATH FROM NODE 140.00 TO NODE 150.00 = 4420.00 FEET.

 FLOW PROCESS FROM NODE 145.00 TO NODE 146.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 963.00 DOWNSTREAM(FEET) = 960.00
 FLOW LENGTH(FEET) = 600.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 69.0 INCH PIPE IS 54.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 10.49
 ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 232.26
 PIPE TRAVEL TIME(MIN.) = 0.95 Tc(MIN.) = 15.68
 LONGEST FLOWPATH FROM NODE 140.00 TO NODE 146.00 = 3720.00 FEET.

 FLOW PROCESS FROM NODE 146.00 TO NODE 146.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc(MIN.) = 15.68
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.543
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 4.20 0.98 0.100 32
 COMMERCIAL A 38.30 0.98 0.100 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 42.50 SUBAREA RUNOFF(CFS) = 93.52
 EFFECTIVE AREA(ACRES) = 144.00 AREA-AVERAGED Fm(INCH/HR) = 0.10
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 144.0 PEAK FLOW RATE(CFS) = 316.88

 FLOW PROCESS FROM NODE 146.00 TO NODE 150.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 960.00 DOWNSTREAM(FEET) = 950.00
 FLOW LENGTH(FEET) = 700.00 MANNING'S N = 0.013

 FLOW PROCESS FROM NODE 150.00 TO NODE 150.00 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.) = 16.38
 RAINFALL INTENSITY(INCH/HR) = 2.48
 AREA-AVERAGED Fm(INCH/HR) = 0.10
 AREA-AVERAGED Fp(INCH/HR) = 0.98
 AREA-AVERAGED Ap = 0.10
 EFFECTIVE STREAM AREA(ACRES) = 144.00
 TOTAL STREAM AREA(ACRES) = 144.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 316.88

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	302.48	38.44	1.485	0.98(0.13)	0.13	246.0	130.00
2	316.88	16.38	2.477	0.98(0.10)	0.10	144.0	140.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	540.29	16.38	2.477	0.98(0.11)	0.11	248.8	140.00
2	487.21	38.44	1.485	0.98(0.12)	0.12	390.0	130.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 540.29 Tc(MIN.) = 16.38
 EFFECTIVE AREA(ACRES) = 248.82 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.11
 TOTAL AREA(ACRES) = 390.0
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 150.00 = 9080.00 FEET.

 FLOW PROCESS FROM NODE 150.00 TO NODE 151.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 950.00 DOWNSTREAM(FEET) = 940.00
 FLOW LENGTH(FEET) = 2350.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 102.0 INCH PIPE IS 73.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 12.40

ESTIMATED PIPE DIAMETER(INCH) = 102.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 540.29
 PIPE TRAVEL TIME(MIN.) = 3.16 Tc(MIN.) = 19.54
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 151.00 = 11430.00 FEET.

ELEVATION DATA: UPSTREAM(FEET) = 880.00 DOWNSTREAM(FEET) = 860.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 17.366
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.391

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	7.00	0.98	0.100	32	17.37
COMMERCIAL	A	29.30	0.98	0.100	32	17.37

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF(CFS) = 74.94
 TOTAL AREA(ACRES) = 36.30 PEAK FLOW RATE(CFS) = 74.94

 FLOW PROCESS FROM NODE 151.00 TO NODE 151.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 19.54
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.228
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	35.90	0.98	0.100	32
COMMERCIAL	B	25.10	0.75	0.100	56
COMMERCIAL	A	2.40	0.98	0.100	32
COMMERCIAL	B	0.10	0.75	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.88
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 63.50 SUBAREA RUNOFF(CFS) = 122.29
 EFFECTIVE AREA(ACRES) = 312.32 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.96 AREA-AVERAGED Ap = 0.11
 TOTAL AREA(ACRES) = 453.5 PEAK FLOW RATE(CFS) = 596.25

 FLOW PROCESS FROM NODE 180.00 TO NODE 181.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 3700.00
 ELEVATION DATA: UPSTREAM(FEET) = 870.00 DOWNSTREAM(FEET) = 850.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 23.099
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.015

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	9.80	0.98	0.100	32	23.10
COMMERCIAL	A	56.40	0.98	0.100	32	23.10

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF(CFS) = 114.26
 TOTAL AREA(ACRES) = 66.20 PEAK FLOW RATE(CFS) = 114.26

 FLOW PROCESS FROM NODE 190.00 TO NODE 191.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 2250.00
 ELEVATION DATA: UPSTREAM(FEET) = 850.00 DOWNSTREAM(FEET) = 840.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 19.687
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.218

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	9.50	0.98	0.100	32	19.69
COMMERCIAL	A	37.30	0.98	0.100	32	19.69

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

 FLOW PROCESS FROM NODE 160.00 TO NODE 161.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 2360.00
 ELEVATION DATA: UPSTREAM(FEET) = 905.00 DOWNSTREAM(FEET) = 890.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 18.681
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.289
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	0.20	0.98	0.100	32	18.68
COMMERCIAL	A	59.40	0.98	0.100	32	18.68
PUBLIC PARK	A	0.40	0.98	0.850	32	29.68

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.105
 SUBAREA RUNOFF(CFS) = 118.07
 TOTAL AREA(ACRES) = 60.00 PEAK FLOW RATE(CFS) = 118.07

 FLOW PROCESS FROM NODE 170.00 TO NODE 171.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 2300.00

SUBAREA RUNOFF(CFS) = 89.31
 TOTAL AREA(ACRES) = 46.80 PEAK FLOW RATE(CFS) = 89.31

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

 FLOW PROCESS FROM NODE 200.00 TO NODE 201.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 2000.00
 ELEVATION DATA: UPSTREAM(FEET) = 835.00 DOWNSTREAM(FEET) = 830.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 21.072
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.129
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	12.50	0.98	0.100	32	21.07
COMMERCIAL	A	26.90	0.98	0.100	32	21.07

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF(CFS) = 72.05
 TOTAL AREA(ACRES) = 39.40 PEAK FLOW RATE(CFS) = 72.05

 FLOW PROCESS FROM NODE 210.00 TO NODE 211.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 4100.00
 ELEVATION DATA: UPSTREAM(FEET) = 830.00 DOWNSTREAM(FEET) = 780.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 20.453
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.168
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	21.30	0.98	0.100	32	20.45
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	A	48.80	0.98	0.500	32	26.17
COMMERCIAL	A	13.20	0.98	0.100	32	20.45
PUBLIC PARK	A	35.80	0.98	0.850	32	32.50
COMMERCIAL	A	9.40	0.98	0.100	32	20.45

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.461
 SUBAREA RUNOFF(CFS) = 198.74
 TOTAL AREA(ACRES) = 128.50 PEAK FLOW RATE(CFS) = 198.74

=====

END OF STUDY SUMMARY:
 TOTAL AREA(ACRES) = 128.50 TC(MIN.) = 20.45
 EFFECTIVE AREA(ACRES) = 128.50 AREA-AVERAGED Fm(INCH/HR) = 0.45
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.461
 PEAK FLOW RATE(CFS) = 198.74

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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***** DESCRIPTION OF STUDY *****

* OLD MODEL COLONY EAST AREA F *
* 100-YEAR HYDROLOGY ANALYSIS *
*

FILE NAME: OMCEF100.DAT
TIME/DATE OF STUDY: 15:31 11/08/2011

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USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
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--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT (YEAR) = 100.00
SPECIFIED MINIMUM PIPE SIZE (INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS (DECIMAL) TO USE FOR FRICTION SLOPE = 0.80
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE (LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
USER SPECIFIED 1-HOUR INTENSITY (INCH/HOUR) = 1.4000

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

Table with columns: NO., HALF-CROWN TO STREET-CROSSFALL, STREET-CROSSFALL, CURB GUTTER-GEOMETRIES, MANNING, HEIGHT, WIDTH, LIP, HIKE, FACTOR. Contains 2 rows of data.

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

SIZE PIPE WITH A FLOW CAPACITY GREATER THAN OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

UNIT-HYDROGRAPH MODEL SELECTIONS/PARAMETERS:

WATERSHED LAG = 0.80 * Tc
USED "VALLEY UNDEVELOPED" S-GRAPH FOR DEVELOPMENTS OF

2 UNITS/ACRE AND LESS; AND "VALLEY DEVELOPED" S-GRAPH
FOR DEVELOPMENTS OF 3-4 UNITS/ACRE AND MORE.

USER SPECIFIED RAINFALL VALUES:

2-YR 6-HR RAINFALL DEPTH (INCH) = 1.70
2-YR 24-HR RAINFALL DEPTH (INCH) = 3.30
100-YR 6-HR RAINFALL DEPTH (INCH) = 3.70
100-YR 24-HR RAINFALL DEPTH (INCH) = 8.00
SIERRA MADRE DEPTH-AREA FACTORS USED.

AREA-AVERAGED

Table with columns: DURATION, RAINFALL (INCH). Rows include 5-MINUTES, 30-MINUTES, 1-HOUR, 3-HOUR, 6-HOUR, 24-HOUR.

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR UNIT HYDROGRAPH METHOD

FLOW PROCESS FROM NODE 110.00 TO NODE 111.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====
INITIAL SUBAREA FLOW-LENGTH (FEET) = 2640.00
ELEVATION DATA: UPSTREAM (FEET) = 1045.00 DOWNSTREAM (FEET) = 1035.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 21.669
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.579
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 2.50 0.98 0.100 32 21.67
COMMERCIAL B 2.20 0.75 0.100 56 21.67
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.80 0.75 0.200 56 23.09
PUBLIC PARK A 29.10 0.98 0.850 32 34.43
PUBLIC PARK B 5.50 0.75 0.850 56 34.43
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.94
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.749
SUBAREA RUNOFF (CFS) = 67.76
TOTAL AREA (ACRES) = 40.10 PEAK FLOW RATE (CFS) = 67.76

FLOW PROCESS FROM NODE 111.00 TO NODE 111.00 IS CODE = 16

>>>>USER SPECIFIED CONSTANT SOURCE FLOW AT NODE<<<<<

=====
USER-SPECIFIED CONSTANT SOURCE FLOW = 1008.00 (CFS)
USER-SPECIFIED AREA ASSOCIATED TO SOURCE FLOW = 403.00 (ACRES)
* CUMULATIVE SOURCE FLOW DATA: FLOW (CFS) = 1008.00 AREA (AC.) = 403.00
* SUMMED DATA: FLOW (CFS) = 1075.76 TOTAL AREA (ACRES) = 443.10

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FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1035.00 DOWNSTREAM(FEET) = 1020.00
FLOW LENGTH(FEET) = 700.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 93.0 INCH PIPE IS 74.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 26.51
ESTIMATED PIPE DIAMETER(INCH) = 93.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 1075.76
PIPE TRAVEL TIME(MIN.) = 0.44 Tc(MIN.) = 22.11
* TOTAL SOURCE FLOW(CFS) = 1008.00
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 112.00 = 3340.00 FEET.

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FLOW PROCESS FROM NODE 120.00 TO NODE 121.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 730.00
ELEVATION DATA: UPSTREAM(FEET) = 1030.00 DOWNSTREAM(FEET) = 1020.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.020
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.097
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp    Ap    SCS  Tc
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL           B      4.10    0.75    0.100  56  10.02
RESIDENTIAL
"11+ DWELLINGS/ACRE" B      7.00    0.75    0.200  56  10.68
RESIDENTIAL
"11+ DWELLINGS/ACRE" B      7.80    0.75    0.200  56  10.68
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.75
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.178
SUBAREA RUNOFF(CFS) = 67.43
TOTAL AREA(ACRES) = 18.90 PEAK FLOW RATE(CFS) = 67.43

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FLOW PROCESS FROM NODE 121.00 TO NODE 121.00 IS CODE = 16
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>>>>USER SPECIFIED CONSTANT SOURCE FLOW AT NODE<<<<
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USER-SPECIFIED CONSTANT SOURCE FLOW = 46.00(CFS)
USER-SPECIFIED AREA ASSOCIATED TO SOURCE FLOW = 18.00(ACRES)
* CUMULATIVE SOURCE FLOW DATA: FLOW(CFS) = 46.00 AREA(AC.) = 18.00
* SUMMED DATA: FLOW(CFS) = 113.43 TOTAL AREA(ACRES) = 36.90

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FLOW PROCESS FROM NODE 130.00 TO NODE 131.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
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INITIAL SUBAREA FLOW-LENGTH(FEET) = 980.00
ELEVATION DATA: UPSTREAM(FEET) = 1045.00 DOWNSTREAM(FEET) = 1020.00

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Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.955
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.113
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp    Ap    SCS  Tc
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL           A      0.80    0.98    0.100  32  9.95
PUBLIC PARK          A      1.30    0.98    0.850  32  15.82
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.564
SUBAREA RUNOFF(CFS) = 6.73
TOTAL AREA(ACRES) = 2.10 PEAK FLOW RATE(CFS) = 6.73

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FLOW PROCESS FROM NODE 131.00 TO NODE 132.00 IS CODE = 62
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 1020.00 DOWNSTREAM ELEVATION(FEET) = 1000.00
STREET LENGTH(FEET) = 1600.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 32.00

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DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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

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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.41
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.42
HALFSTREET FLOOD WIDTH(FEET) = 13.09
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.00
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.26
STREET FLOW TRAVEL TIME(MIN.) = 8.90 Tc(MIN.) = 18.86
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.804
SUBAREA LOSS RATE DATA(AMC II):

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DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp    Ap    SCS
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL           A      1.40    0.98    0.100  32
RESIDENTIAL
"11+ DWELLINGS/ACRE" A      1.90    0.98    0.200  32
COMMERCIAL           A      0.50    0.98    0.100  32
PUBLIC PARK          A      0.10    0.98    0.850  32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.168
SUBAREA AREA(ACRES) = 3.90 SUBAREA RUNOFF(CFS) = 9.27
EFFECTIVE AREA(ACRES) = 6.00 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.31

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TOTAL AREA(ACRES) = 6.0 PEAK FLOW RATE(CFS) = 13.53

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.44 HALFSTREET FLOOD WIDTH(FEET) = 14.10
FLOW VELOCITY(FEET/SEC.) = 3.11 DEPTH*VELOCITY(FT*FT/SEC.) = 1.37
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 132.00 = 2580.00 FEET.

FLOW PROCESS FROM NODE 132.00 TO NODE 133.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<

UPSTREAM ELEVATION(FEET) = 1000.00 DOWNSTREAM ELEVATION(FEET) = 990.00
STREET LENGTH(FEET) = 1900.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 40.96

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.68
HALFSTREET FLOOD WIDTH(FEET) = 26.71
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.93
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.99
STREET FLOW TRAVEL TIME(MIN.) = 10.81 Tc(MIN.) = 29.66
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.136

Subarea Loss Rate Data (AMC II) table with columns: DEVELOPMENT TYPE/ LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 29.70 SUBAREA RUNOFF(CFS) = 54.50
EFFECTIVE AREA(ACRES) = 35.70 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.13
TOTAL AREA(ACRES) = 35.7 PEAK FLOW RATE(CFS) = 64.42

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.78 HALFSTREET FLOOD WIDTH(FEET) = 36.42
FLOW VELOCITY(FEET/SEC.) = 3.20 DEPTH*VELOCITY(FT*FT/SEC.) = 2.49

*NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
AND L = 1900.0 FT WITH ELEVATION-DROP = 10.0 FT, IS 75.0 CFS,
WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 133.00
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 133.00 = 4480.00 FEET.

FLOW PROCESS FROM NODE 133.00 TO NODE 133.10 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 990.00 DOWNSTREAM(FEET) = 985.00
FLOW LENGTH(FEET) = 1150.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 33.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.31
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 64.42
PIPE TRAVEL TIME(MIN.) = 2.62 Tc(MIN.) = 32.28
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 133.10 = 5630.00 FEET.

FLOW PROCESS FROM NODE 133.10 TO NODE 133.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 32.28
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.031
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 9.10 0.98 0.100 32
COMMERCIAL A 33.70 0.98 0.100 32
PUBLIC PARK A 0.70 0.98 0.850 32
PUBLIC PARK A 0.50 0.98 0.850 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.120
SUBAREA AREA(ACRES) = 44.00 SUBAREA RUNOFF(CFS) = 75.76
EFFECTIVE AREA(ACRES) = 79.70 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.13
TOTAL AREA(ACRES) = 79.7 PEAK FLOW RATE(CFS) = 136.78

FLOW PROCESS FROM NODE 133.10 TO NODE 134.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 985.00 DOWNSTREAM(FEET) = 980.00
FLOW LENGTH(FEET) = 950.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 57.0 INCH PIPE IS 43.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.45
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 136.78
PIPE TRAVEL TIME(MIN.) = 1.68 Tc(MIN.) = 33.96
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 134.00 = 6580.00 FEET.

FLOW PROCESS FROM NODE 134.00 TO NODE 134.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 33.96
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.970

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	17.50	0.98	0.100	32
COMMERCIAL	A	26.20	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 43.70 SUBAREA RUNOFF(CFS) = 73.64
EFFECTIVE AREA(ACRES) = 123.40 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.12
TOTAL AREA(ACRES) = 123.4 PEAK FLOW RATE(CFS) = 206.07

FLOW PROCESS FROM NODE 134.00 TO NODE 135.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 980.00 DOWNSTREAM(FEET) = 960.00
FLOW LENGTH(FEET) = 1900.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 57.0 INCH PIPE IS 46.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.41
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 206.07
PIPE TRAVEL TIME(MIN.) = 2.36 Tc(MIN.) = 36.32
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 135.00 = 8480.00 FEET.

FLOW PROCESS FROM NODE 135.00 TO NODE 135.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 36.32
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.892
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	36.40	0.98	0.100	32
COMMERCIAL	A	77.60	0.98	0.100	32
PUBLIC PARK	A	8.60	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.153
SUBAREA AREA(ACRES) = 122.60 SUBAREA RUNOFF(CFS) = 192.34
EFFECTIVE AREA(ACRES) = 246.00 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.13
TOTAL AREA(ACRES) = 246.0 PEAK FLOW RATE(CFS) = 389.76

FLOW PROCESS FROM NODE 135.00 TO NODE 150.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 960.00 DOWNSTREAM(FEET) = 950.00
FLOW LENGTH(FEET) = 600.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 69.0 INCH PIPE IS 50.8 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 19.01
ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 389.76
PIPE TRAVEL TIME(MIN.) = 0.53 Tc(MIN.) = 36.85
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 150.00 = 9080.00 FEET.

FLOW PROCESS FROM NODE 150.00 TO NODE 150.00 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.) = 36.85
RAINFALL INTENSITY(INCH/HR) = 1.88
AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.98
AREA-AVERAGED Ap = 0.13
EFFECTIVE STREAM AREA(ACRES) = 246.00
TOTAL STREAM AREA(ACRES) = 246.00
PEAK FLOW RATE(CFS) AT CONFLUENCE = 389.76

FLOW PROCESS FROM NODE 140.00 TO NODE 141.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
ELEVATION DATA: UPSTREAM(FEET) = 1000.00 DOWNSTREAM(FEET) = 985.00

Tc = K * [(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 11.160
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.841
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	1.70	0.98	0.100	32	11.16
COMMERCIAL	A	8.10	0.98	0.100	32	11.16

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 33.02
TOTAL AREA(ACRES) = 9.80 PEAK FLOW RATE(CFS) = 33.02

FLOW PROCESS FROM NODE 141.00 TO NODE 142.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 985.00 DOWNSTREAM(FEET) = 980.00
FLOW LENGTH(FEET) = 700.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 22.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.52
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 33.02

PIPE TRAVEL TIME(MIN.) = 1.55 Tc(MIN.) = 12.71
LONGEST FLOWPATH FROM NODE 140.00 TO NODE 142.00 = 1700.00 FEET.

FLOW PROCESS FROM NODE 142.00 TO NODE 142.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc(MIN.) = 12.71

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.552

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	5.90	0.98	0.100	32
COMMERCIAL	A	23.80	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA(ACRES) = 29.70 SUBAREA RUNOFF(CFS) = 92.35

EFFECTIVE AREA(ACRES) = 39.50 AREA-AVERAGED Fm(INCH/HR) = 0.10

AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10

TOTAL AREA(ACRES) = 39.5 PEAK FLOW RATE(CFS) = 122.82

FLOW PROCESS FROM NODE 142.00 TO NODE 143.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 980.00 DOWNSTREAM(FEET) = 970.00

FLOW LENGTH(FEET) = 720.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 45.0 INCH PIPE IS 35.5 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 13.15

ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 122.82

PIPE TRAVEL TIME(MIN.) = 0.91 Tc(MIN.) = 13.62

LONGEST FLOWPATH FROM NODE 140.00 TO NODE 143.00 = 2420.00 FEET.

FLOW PROCESS FROM NODE 143.00 TO NODE 143.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 13.62

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.407

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	7.30	0.98	0.100	32
COMMERCIAL	A	13.30	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA(ACRES) = 20.60 SUBAREA RUNOFF(CFS) = 61.37

EFFECTIVE AREA(ACRES) = 60.10 AREA-AVERAGED Fm(INCH/HR) = 0.10

AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10

TOTAL AREA(ACRES) = 60.1 PEAK FLOW RATE(CFS) = 179.04

FLOW PROCESS FROM NODE 143.00 TO NODE 144.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 970.00 DOWNSTREAM(FEET) = 965.00

FLOW LENGTH(FEET) = 400.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 54.0 INCH PIPE IS 40.4 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 14.01

ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 179.04

PIPE TRAVEL TIME(MIN.) = 0.48 Tc(MIN.) = 14.10

LONGEST FLOWPATH FROM NODE 140.00 TO NODE 144.00 = 2820.00 FEET.

FLOW PROCESS FROM NODE 144.00 TO NODE 144.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 14.10

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.338

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	6.00	0.98	0.100	32
COMMERCIAL	A	11.00	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA(ACRES) = 17.00 SUBAREA RUNOFF(CFS) = 49.58

EFFECTIVE AREA(ACRES) = 77.10 AREA-AVERAGED Fm(INCH/HR) = 0.10

AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10

TOTAL AREA(ACRES) = 77.1 PEAK FLOW RATE(CFS) = 224.86

FLOW PROCESS FROM NODE 144.00 TO NODE 145.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 965.00 DOWNSTREAM(FEET) = 963.00

FLOW LENGTH(FEET) = 300.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 66.0 INCH PIPE IS 49.7 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 11.71

ESTIMATED PIPE DIAMETER(INCH) = 66.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 224.86

PIPE TRAVEL TIME(MIN.) = 0.43 Tc(MIN.) = 14.53

LONGEST FLOWPATH FROM NODE 140.00 TO NODE 145.00 = 3120.00 FEET.

FLOW PROCESS FROM NODE 145.00 TO NODE 145.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 14.53

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.279

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	12.30	0.98	0.100	32
COMMERCIAL	A	12.10	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 24.40 SUBAREA RUNOFF(CFS) = 69.86
EFFECTIVE AREA(ACRES) = 101.50 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 101.5 PEAK FLOW RATE(CFS) = 290.61

ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 397.22
PIPE TRAVEL TIME(MIN.) = 0.66 Tc(MIN.) = 16.09
LONGEST FLOWPATH FROM NODE 140.00 TO NODE 150.00 = 4420.00 FEET.

FLOW PROCESS FROM NODE 150.00 TO NODE 150.00 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.) = 16.09
RAINFALL INTENSITY(INCH/HR) = 3.08
AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98
AREA-AVERAGED Ap = 0.10
EFFECTIVE STREAM AREA(ACRES) = 144.00
TOTAL STREAM AREA(ACRES) = 144.00
PEAK FLOW RATE(CFS) AT CONFLUENCE = 397.22

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	389.76	36.85	1.876	0.98(0.13)	0.13	246.0	130.00
2	397.22	16.09	3.084	0.98(0.10)	0.10	144.0	140.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	685.27	16.09	3.084	0.98(0.11)	0.11	251.4	140.00
2	626.26	36.85	1.876	0.98(0.12)	0.12	390.0	130.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 685.27 Tc(MIN.) = 16.09
EFFECTIVE AREA(ACRES) = 251.39 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.11
TOTAL AREA(ACRES) = 390.0
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 150.00 = 9080.00 FEET.

FLOW PROCESS FROM NODE 150.00 TO NODE 151.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 950.00 DOWNSTREAM(FEET) = 940.00
FLOW LENGTH(FEET) = 2350.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 108.0 INCH PIPE IS 83.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.02
ESTIMATED PIPE DIAMETER(INCH) = 108.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 685.27

FLOW PROCESS FROM NODE 145.00 TO NODE 146.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 963.00 DOWNSTREAM(FEET) = 960.00
FLOW LENGTH(FEET) = 600.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 75.0 INCH PIPE IS 59.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.09
ESTIMATED PIPE DIAMETER(INCH) = 75.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 290.61
PIPE TRAVEL TIME(MIN.) = 0.90 Tc(MIN.) = 15.43
LONGEST FLOWPATH FROM NODE 140.00 TO NODE 146.00 = 3720.00 FEET.

FLOW PROCESS FROM NODE 146.00 TO NODE 146.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<
=====

MAINLINE Tc(MIN.) = 15.43
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.162
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	4.20	0.98	0.100	32
COMMERCIAL	A	38.30	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 42.50 SUBAREA RUNOFF(CFS) = 117.23
EFFECTIVE AREA(ACRES) = 144.00 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 144.0 PEAK FLOW RATE(CFS) = 397.22

FLOW PROCESS FROM NODE 146.00 TO NODE 150.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 960.00 DOWNSTREAM(FEET) = 950.00
FLOW LENGTH(FEET) = 700.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 69.0 INCH PIPE IS 55.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.74

PIPE TRAVEL TIME(MIN.) = 3.01 Tc(MIN.) = 19.09
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 151.00 = 11430.00 FEET.

$Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 17.366
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.946
SUBAREA Tc AND LOSS RATE DATA(AMC II):

FLOW PROCESS FROM NODE 151.00 TO NODE 151.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 19.09
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.783
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	35.90	0.98	0.100	32
COMMERCIAL	B	25.10	0.75	0.100	56
COMMERCIAL	A	2.40	0.98	0.100	32
COMMERCIAL	B	0.10	0.75	0.100	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.88
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 63.50 SUBAREA RUNOFF(CFS) = 153.98
EFFECTIVE AREA (ACRES) = 314.89 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.96 AREA-AVERAGED Ap = 0.11
TOTAL AREA(ACRES) = 453.5 PEAK FLOW RATE(CFS) = 758.24

DEVELOPMENT TYPE/ LAND USE GROUP (ACRES) Fp (INCH/HR) Ap (DECIMAL) SCS Tc (MIN.)

COMMERCIAL	A	7.00	0.98	0.100	32	17.37
COMMERCIAL	A	29.30	0.98	0.100	32	17.37

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 93.05
TOTAL AREA(ACRES) = 36.30 PEAK FLOW RATE(CFS) = 93.05

FLOW PROCESS FROM NODE 160.00 TO NODE 161.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 2360.00
ELEVATION DATA: UPSTREAM(FEET) = 905.00 DOWNSTREAM(FEET) = 890.00

$Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 18.681
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.820
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	0.20	0.98	0.100	32	18.68
COMMERCIAL	A	59.40	0.98	0.100	32	18.68
PUBLIC PARK	A	0.40	0.98	0.850	32	29.68

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.105
SUBAREA RUNOFF(CFS) = 146.73
TOTAL AREA(ACRES) = 60.00 PEAK FLOW RATE(CFS) = 146.73

FLOW PROCESS FROM NODE 180.00 TO NODE 181.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 3700.00
ELEVATION DATA: UPSTREAM(FEET) = 870.00 DOWNSTREAM(FEET) = 850.00

$Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 23.099
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.482
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	9.80	0.98	0.100	32	23.10
COMMERCIAL	A	56.40	0.98	0.100	32	23.10

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 142.09
TOTAL AREA(ACRES) = 66.20 PEAK FLOW RATE(CFS) = 142.09

FLOW PROCESS FROM NODE 170.00 TO NODE 171.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 2300.00
ELEVATION DATA: UPSTREAM(FEET) = 880.00 DOWNSTREAM(FEET) = 860.00

FLOW PROCESS FROM NODE 190.00 TO NODE 191.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 2250.00
ELEVATION DATA: UPSTREAM(FEET) = 850.00 DOWNSTREAM(FEET) = 840.00

$Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 19.687
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.732
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	9.50	0.98	0.100	32	19.69
COMMERCIAL	A	37.30	0.98	0.100	32	19.69

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 110.97
TOTAL AREA(ACRES) = 46.80 PEAK FLOW RATE(CFS) = 110.97

FLOW PROCESS FROM NODE 200.00 TO NODE 201.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 2000.00
ELEVATION DATA: UPSTREAM (FEET) = 835.00 DOWNSTREAM (FEET) = 830.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 21.072
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.623

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	12.50	0.98	0.100	32	21.07
COMMERCIAL	A	26.90	0.98	0.100	32	21.07

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF (CFS) = 89.55
TOTAL AREA (ACRES) = 39.40 PEAK FLOW RATE (CFS) = 89.55

FLOW PROCESS FROM NODE 210.00 TO NODE 211.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 4100.00
ELEVATION DATA: UPSTREAM (FEET) = 830.00 DOWNSTREAM (FEET) = 780.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 20.453
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.670

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	21.30	0.98	0.100	32	20.45
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	A	48.80	0.98	0.500	32	26.17
COMMERCIAL	A	13.20	0.98	0.100	32	20.45
PUBLIC PARK	A	35.80	0.98	0.850	32	32.50
COMMERCIAL	A	9.40	0.98	0.100	32	20.45

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.461
SUBAREA RUNOFF (CFS) = 256.86
TOTAL AREA (ACRES) = 128.50 PEAK FLOW RATE (CFS) = 256.86

=====

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 128.5 TC (MIN.) = 20.45
EFFECTIVE AREA (ACRES) = 128.50 AREA-AVERAGED Fm (INCH/HR) = 0.45
AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.461
PEAK FLOW RATE (CFS) = 256.86

=====

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
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***** DESCRIPTION OF STUDY *****

* ONTARIO MASTER PLAN OF DRAINAGE - BASIN IV (AREA A) *
* 100-YEAR HYDROLOGY ANALYSIS *
*

FILE NAME: OIVA1100.DAT
TIME/DATE OF STUDY: 14:07 10/17/2011

=====
USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT (YEAR) = 100.00
SPECIFIED MINIMUM PIPE SIZE (INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS (DECIMAL) TO USE FOR FRICTION SLOPE = 0.80
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE (LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
USER SPECIFIED 1-HOUR INTENSITY (INCH/HOUR) = 1.4000

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

Table with columns: NO., HALF-WIDTH (FT), CROWN TO CROSSFALL (FT), STREET-CROSSFALL IN-/OUT-SIDE, PARK-/WAY, CURB HEIGHT (FT), GUTTER WIDTH (FT), GEOMETRIES LIP (FT), MANNING HIKE (FT), FACTOR (n)

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

SIZE PIPE WITH A FLOW CAPACITY GREATER THAN OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

UNIT-HYDROGRAPH MODEL SELECTIONS/PARAMETERS:

WATERSHED LAG = 0.80 * Tc
USED "VALLEY UNDEVELOPED" S-GRAPH FOR DEVELOPMENTS OF

2 UNITS/ACRE AND LESS; AND "VALLEY DEVELOPED" S-GRAPH
FOR DEVELOPMENTS OF 3-4 UNITS/ACRE AND MORE.

USER SPECIFIED RAINFALL VALUES:

2-YR 6-HR RAINFALL DEPTH (INCH) = 1.70
2-YR 24-HR RAINFALL DEPTH (INCH) = 3.20
100-YR 6-HR RAINFALL DEPTH (INCH) = 3.50
100-YR 24-HR RAINFALL DEPTH (INCH) = 8.50
SIERRA MADRE DEPTH-AREA FACTORS USED.

AREA-AVERAGED

Table with columns: DURATION, RAINFALL (INCH)
5-MINUTES 0.52
30-MINUTES 1.06
1-HOUR 1.40
3-HOUR 2.46
6-HOUR 3.50
24-HOUR 8.50

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR UNIT HYDROGRAPH METHOD

FLOW PROCESS FROM NODE 1.00 TO NODE 2.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 2200.00
ELEVATION DATA: UPSTREAM (FEET) = 1170.00 DOWNSTREAM (FEET) = 1145.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 16.171
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.075
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCSSOIL AREA Fp Ap SCSS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 2.30 0.98 0.100 32 16.17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF (CFS) = 6.16
TOTAL AREA (ACRES) = 2.30 PEAK FLOW RATE (CFS) = 6.16

FLOW PROCESS FROM NODE 2.00 TO NODE 3.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 1145.00 DOWNSTREAM ELEVATION (FEET) = 1125.00
STREET LENGTH (FEET) = 1750.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 27.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

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) = 10.84
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.42
HALFSTREET FLOOD WIDTH(FEET) = 13.04
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.87
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.20
STREET FLOW TRAVEL TIME(MIN.) = 10.18 Tc(MIN.) = 26.35
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.294
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 2.40 0.98 0.100 32
RESIDENTIAL
"5-7 DWELLINGS/ACRE" A 2.30 0.98 0.500 32
RESIDENTIAL
"11+ DWELLINGS/ACRE" A 0.30 0.98 0.200 32
COMMERCIAL A 0.10 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.286
SUBAREA AREA(ACRES) = 5.10 SUBAREA RUNOFF(CFS) = 9.25
EFFECTIVE AREA(ACRES) = 7.40 AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.23
TOTAL AREA(ACRES) = 7.4 PEAK FLOW RATE(CFS) = 13.79

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.45 HALFSTREET FLOOD WIDTH(FEET) = 14.47
FLOW VELOCITY(FEET/SEC.) = 3.02 DEPTH*VELOCITY(FT*FT/SEC.) = 1.35
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 3.00 = 3950.00 FEET.

PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.32
STREET FLOW TRAVEL TIME(MIN.) = 12.49 Tc(MIN.) = 38.83
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.818
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 2.80 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 2.80 SUBAREA RUNOFF(CFS) = 4.33
EFFECTIVE AREA(ACRES) = 10.20 AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.19
TOTAL AREA(ACRES) = 10.2 PEAK FLOW RATE(CFS) = 14.96

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.48 HALFSTREET FLOOD WIDTH(FEET) = 16.31
FLOW VELOCITY(FEET/SEC.) = 2.62 DEPTH*VELOCITY(FT*FT/SEC.) = 1.27
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 4.00 = 5950.00 FEET.

=====
END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 10.2 TC(MIN.) = 38.83
EFFECTIVE AREA(ACRES) = 10.20 AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.193
PEAK FLOW RATE(CFS) = 14.96
=====

END OF RATIONAL METHOD ANALYSIS

FLOW PROCESS FROM NODE 3.00 TO NODE 4.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<<<
=====

UPSTREAM ELEVATION(FEET) = 1125.00 DOWNSTREAM ELEVATION(FEET) = 1110.00
STREET LENGTH(FEET) = 2000.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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) = 15.96
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.49
HALFSTREET FLOOD WIDTH(FEET) = 16.73
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.67

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Analysis prepared by:

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***** DESCRIPTION OF STUDY *****
* ONTARIO MASTER PLAN OF DRAINAGE - BASIN IV (AREA A) *
* 25-YEAR HYDROLOGY ANALYSIS *
* *

FILE NAME: OIVA125.DAT
TIME/DATE OF STUDY: 14:14 10/17/2011

=====
USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.80
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL
10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) = 0.950
100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) = 1.400
COMPUTED RAINFALL INTENSITY DATA:
STORM EVENT = 25.00 1-HOUR INTENSITY(INCH/HOUR) = 1.1070
SLOPE OF INTENSITY DURATION CURVE = 0.6000

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

Table with columns: NO., HALF-WIDTH (FT), CROWN TO CROSSFALL (FT), STREET-CROSSFALL IN-/OUT-SIDE (FT), STREET-CROSSFALL PARK-/HIKE (FT), CURB HEIGHT (FT), GUTTER WIDTH (FT), GEOMETRIES LIP (FT), MANNING FACTOR (n)

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

SIZE PIPE WITH A FLOW CAPACITY GREATER THAN OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

UNIT-HYDROGRAPH MODEL SELECTIONS/PARAMETERS:

WATERSHED LAG = 0.80 * Tc
USED "VALLEY UNDEVELOPED" S-GRAPH FOR DEVELOPMENTS OF 2 UNITS/ACRE AND LESS; AND "VALLEY DEVELOPED" S-GRAPH FOR DEVELOPMENTS OF 3-4 UNITS/ACRE AND MORE.

USER SPECIFIED RAINFALL VALUES:

2-YR 6-HR RAINFALL DEPTH(INCH) = 1.70
2-YR 24-HR RAINFALL DEPTH(INCH) = 3.20
100-YR 6-HR RAINFALL DEPTH(INCH) = 3.50
100-YR 24-HR RAINFALL DEPTH(INCH) = 8.50
SIERRA MADRE DEPTH-AREA FACTORS USED.

Table with columns: DURATION, AREA-AVERAGED RAINFALL(INCH)
5-MINUTES 0.38
30-MINUTES 0.79
1-HOUR 1.04
3-HOUR 1.87
6-HOUR 2.71
24-HOUR 5.30

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR UNIT HYDROGRAPH METHOD

=====
FLOW PROCESS FROM NODE 1.00 TO NODE 2.00 IS CODE = 21
=====

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 2200.00
ELEVATION DATA: UPSTREAM(FEET) = 1170.00 DOWNSTREAM(FEET) = 1145.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 16.171
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.431
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ LAND USE SCS SOIL AREA Fp Ap SCS Tc
GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 2.30 0.98 0.100 32 16.17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 4.83
TOTAL AREA(ACRES) = 2.30 PEAK FLOW RATE(CFS) = 4.83

=====
FLOW PROCESS FROM NODE 2.00 TO NODE 3.00 IS CODE = 62
=====

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

=====
UPSTREAM ELEVATION(FEET) = 1145.00 DOWNSTREAM ELEVATION(FEET) = 1125.00
STREET LENGTH(FEET) = 1750.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.34
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.39
 HALFSTREET FLOOD WIDTH(FEET) = 11.67
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.69
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.05
 STREET FLOW TRAVEL TIME(MIN.) = 10.86 Tc(MIN.) = 27.03
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.786

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	2.40	0.98	0.100	32
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	2.30	0.98	0.500	32
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	A	0.30	0.98	0.200	32
COMMERCIAL	A	0.10	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.286
 SUBAREA AREA(ACRES) = 5.10 SUBAREA RUNOFF(CFS) = 6.92
 EFFECTIVE AREA(ACRES) = 7.40 AREA-AVERAGED Fm(INCH/HR) = 0.22
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.23
 TOTAL AREA(ACRES) = 7.4 PEAK FLOW RATE(CFS) = 10.41

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.41 HALFSTREET FLOOD WIDTH(FEET) = 12.83
 FLOW VELOCITY(FEET/SEC.) = 2.84 DEPTH*VELOCITY(FT*FT/SEC.) = 1.18
 LONGEST FLOWPATH FROM NODE 1.00 TO NODE 3.00 = 3950.00 FEET.

 FLOW PROCESS FROM NODE 3.00 TO NODE 4.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 2 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 1125.00 DOWNSTREAM ELEVATION(FEET) = 1110.00
 STREET LENGTH(FEET) = 2000.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.06
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.46

HALFSTREET FLOOD WIDTH(FEET) = 14.94
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.49
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.14
 STREET FLOW TRAVEL TIME(MIN.) = 13.39 Tc(MIN.) = 40.42
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.403
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	2.80	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 2.80 SUBAREA RUNOFF(CFS) = 3.29
 EFFECTIVE AREA(ACRES) = 10.20 AREA-AVERAGED Fm(INCH/HR) = 0.19
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.19
 TOTAL AREA(ACRES) = 10.2 PEAK FLOW RATE(CFS) = 11.15

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.45 HALFSTREET FLOOD WIDTH(FEET) = 14.47
 FLOW VELOCITY(FEET/SEC.) = 2.44 DEPTH*VELOCITY(FT*FT/SEC.) = 1.09
 LONGEST FLOWPATH FROM NODE 1.00 TO NODE 4.00 = 5950.00 FEET.

=====

END OF STUDY SUMMARY:
 TOTAL AREA(ACRES) = 10.2 TC(MIN.) = 40.42
 EFFECTIVE AREA(ACRES) = 10.20 AREA-AVERAGED Fm(INCH/HR) = 0.19
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.193
 PEAK FLOW RATE(CFS) = 11.15

=====

END OF RATIONAL METHOD ANALYSIS

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***** DESCRIPTION OF STUDY *****

* ONTARIO MASTER PLAN OF DRAINAGE - BASIN IV (AREA A) *
* 10-YEAR HYDROLOGY ANALYSIS *
*

FILE NAME: OIVA110.DAT
TIME/DATE OF STUDY: 14:16 10/17/2011

=====
USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT (YEAR) = 10.00
SPECIFIED MINIMUM PIPE SIZE (INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS (DECIMAL) TO USE FOR FRICTION SLOPE = 0.80
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE (LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
USER SPECIFIED 1-HOUR INTENSITY (INCH/HOUR) = 0.9500

ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

Table with columns: NO., HALF-WIDTH (FT), CROWN TO CROSSFALL (FT), STREET-CROSSFALL IN-/OUT-/PARK-WAY, CURB HEIGHT (FT), GUTTER WIDTH (FT), GEOMETRIES LIP (FT), MANNING HIKE (FT), FACTOR (n). Rows 1 and 2.

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

SIZE PIPE WITH A FLOW CAPACITY GREATER THAN OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

UNIT-HYDROGRAPH MODEL SELECTIONS/PARAMETERS:

WATERSHED LAG = 0.80 * Tc
USED "VALLEY UNDEVELOPED" S-GRAPH FOR DEVELOPMENTS OF

2 UNITS/ACRE AND LESS; AND "VALLEY DEVELOPED" S-GRAPH
FOR DEVELOPMENTS OF 3-4 UNITS/ACRE AND MORE.

USER SPECIFIED RAINFALL VALUES:
2-YR 6-HR RAINFALL DEPTH (INCH) = 1.70
2-YR 24-HR RAINFALL DEPTH (INCH) = 3.20
100-YR 6-HR RAINFALL DEPTH (INCH) = 3.50
100-YR 24-HR RAINFALL DEPTH (INCH) = 8.50
SIERRA MADRE DEPTH-AREA FACTORS USED.

Table with columns: DURATION, RAINFALL (INCH). Rows: 5-MINUTES (0.33), 30-MINUTES (0.68), 1-HOUR (0.90), 3-HOUR (1.60), 6-HOUR (2.31), 24-HOUR (4.36).

ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR UNIT HYDROGRAPH METHOD

FLOW PROCESS FROM NODE 1.00 TO NODE 2.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 2200.00
ELEVATION DATA: UPSTREAM (FEET) = 1170.00 DOWNSTREAM (FEET) = 1145.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 16.171
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.086
SUBAREA Tc AND LOSS RATE DATA (AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 2.30 1.33 0.100 17 16.17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF (CFS) = 4.04
TOTAL AREA (ACRES) = 2.30 PEAK FLOW RATE (CFS) = 4.04

FLOW PROCESS FROM NODE 2.00 TO NODE 3.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 1145.00 DOWNSTREAM ELEVATION (FEET) = 1125.00
STREET LENGTH (FEET) = 1750.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 27.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSSTREETS 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) = 6.70
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.37
HALFSTREET FLOOD WIDTH(FEET) = 10.56
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.56
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.95
STREET FLOW TRAVEL TIME(MIN.) = 11.37 Tc(MIN.) = 27.54

* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.516
SUBAREA LOSS RATE DATA(AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 2.40 1.33 0.100 17
RESIDENTIAL
"5-7 DWELLINGS/ACRE" A 2.30 1.33 0.500 17
RESIDENTIAL
"11+ DWELLINGS/ACRE" A 0.30 1.33 0.200 17
COMMERCIAL A 0.10 1.33 0.100 17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.286
SUBAREA AREA (ACRES) = 5.10 SUBAREA RUNOFF(CFS) = 5.21
EFFECTIVE AREA (ACRES) = 7.40 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.23
TOTAL AREA (ACRES) = 7.4 PEAK FLOW RATE(CFS) = 8.07

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.39 HALFSTREET FLOOD WIDTH(FEET) = 11.51
FLOW VELOCITY(FEET/SEC.) = 2.66 DEPTH*VELOCITY(FT*FT/SEC.) = 1.04
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 3.00 = 3950.00 FEET.

FLOW PROCESS FROM NODE 3.00 TO NODE 4.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<<<

=====

UPSTREAM ELEVATION(FEET) = 1125.00 DOWNSTREAM ELEVATION(FEET) = 1110.00
STREET LENGTH(FEET) = 2000.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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) = 9.42
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.43
HALFSTREET FLOOD WIDTH(FEET) = 13.46
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.35

PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.01
STREET FLOW TRAVEL TIME(MIN.) = 14.18 Tc(MIN.) = 41.72
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.181
SUBAREA LOSS RATE DATA(AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 2.80 1.33 0.100 17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA (ACRES) = 2.80 SUBAREA RUNOFF(CFS) = 2.68
EFFECTIVE AREA (ACRES) = 10.20 AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.19
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA (ACRES) = 10.2 PEAK FLOW RATE(CFS) = 8.75

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.42 HALFSTREET FLOOD WIDTH(FEET) = 13.04
FLOW VELOCITY(FEET/SEC.) = 2.31 DEPTH*VELOCITY(FT*FT/SEC.) = 0.97
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 4.00 = 5950.00 FEET.

=====

END OF STUDY SUMMARY:
TOTAL AREA (ACRES) = 10.2 TC(MIN.) = 41.72
EFFECTIVE AREA (ACRES) = 10.20 AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.193
PEAK FLOW RATE(CFS) = 8.75

=====

END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
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***** DESCRIPTION OF STUDY *****
* ONTARIO MASTER PLAN OF DRAINAGE - BASIN IV (AREA A) *
* 100-YEAR HYDROLOGY ANALYSIS *
* P. PAGADUAN 11-30-2011 *

FILE NAME: IVAL00.DAT
TIME/DATE OF STUDY: 14:43 11/30/2011

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.80
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE (LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.4000

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	HIKE LIP (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167
2	32.0	27.0	0.020/0.020/0.020	0.67	2.00	0.0312	0.167

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN

OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

UNIT-HYDROGRAPH MODEL SELECTIONS/PARAMETERS:

WATERSHED LAG = 0.80 * Tc

USED "VALLEY UNDEVELOPED" S-GRAPH FOR DEVELOPMENTS OF

2 UNITS/ACRE AND LESS; AND "VALLEY DEVELOPED" S-GRAPH
FOR DEVELOPMENTS OF 3-4 UNITS/ACRE AND MORE.

USER SPECIFIED RAINFALL VALUES:

2-YR 6-HR RAINFALL DEPTH(INCH) = 1.70
2-YR 24-HR RAINFALL DEPTH(INCH) = 3.20
100-YR 6-HR RAINFALL DEPTH(INCH) = 3.50
100-YR 24-HR RAINFALL DEPTH(INCH) = 8.50
SIERRA MADRE DEPTH-AREA FACTORS USED.

DURATION	AREA-AVERAGED RAINFALL(INCH)
5-MINUTES	0.52
30-MINUTES	1.06
1-HOUR	1.40
3-HOUR	2.46
6-HOUR	3.50
24-HOUR	8.50

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR UNIT HYDROGRAPH METHOD

FLOW PROCESS FROM NODE 104.00 TO NODE 105.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1390.00
ELEVATION DATA: UPSTREAM(FEET) = 1170.00 DOWNSTREAM(FEET) = 1135.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 11.478
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.777
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	4.40	0.98	0.100	32	11.48
RESIDENTIAL "5-7 DWELLINGS/ACRE"	A	8.40	0.98	0.500	32	14.69

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.363
SUBAREA RUNOFF(CFS) = 39.43
TOTAL AREA(ACRES) = 12.80 PEAK FLOW RATE(CFS) = 39.43

FLOW PROCESS FROM NODE 105.00 TO NODE 106.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<<<

=====

UPSTREAM ELEVATION(FEET) = 1135.00 DOWNSTREAM ELEVATION(FEET) = 1128.00
STREET LENGTH(FEET) = 950.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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 = 0.0150

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 69.92
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH (FEET) = 0.76
 HALFSTREET FLOOD WIDTH (FEET) = 34.41
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.74
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 2.83
 STREET FLOW TRAVEL TIME (MIN.) = 4.23 Tc (MIN.) = 15.71
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.128
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	5.90	0.98	0.100	32
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	18.80	0.98	0.500	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.404
 SUBAREA AREA (ACRES) = 24.70 SUBAREA RUNOFF (CFS) = 60.78
 EFFECTIVE AREA (ACRES) = 37.50 AREA-AVERAGED Fm (INCH/HR) = 0.38
 AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.39
 TOTAL AREA (ACRES) = 37.5 PEAK FLOW RATE (CFS) = 92.75

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.82 HALFSTREET FLOOD WIDTH (FEET) = 39.53
 FLOW VELOCITY (FEET/SEC.) = 4.00 DEPTH*VELOCITY (FT*FT/SEC.) = 3.27
 *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
 AND L = 950.0 FT WITH ELEVATION-DROP = 7.0 FT, IS 70.6 CFS,
 WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 106.00
 LONGEST FLOWPATH FROM NODE 104.00 TO NODE 106.00 = 2340.00 FEET.

 FLOW PROCESS FROM NODE 106.00 TO NODE 110.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM (FEET) = 1128.00 DOWNSTREAM (FEET) = 1105.00
 FLOW LENGTH (FEET) = 1315.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 30.3 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 13.40
 ESTIMATED PIPE DIAMETER (INCH) = 39.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 92.75
 PIPE TRAVEL TIME (MIN.) = 1.64 Tc (MIN.) = 17.34
 LONGEST FLOWPATH FROM NODE 104.00 TO NODE 110.00 = 3655.00 FEET.

 FLOW PROCESS FROM NODE 110.00 TO NODE 110.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====
 MAINLINE Tc (MIN.) = 17.34
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.948

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	9.00	0.98	0.100	32
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	21.90	0.98	0.500	32
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	A	13.70	0.98	0.200	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.327
 SUBAREA AREA (ACRES) = 44.60 SUBAREA RUNOFF (CFS) = 105.53
 EFFECTIVE AREA (ACRES) = 82.10 AREA-AVERAGED Fm (INCH/HR) = 0.35
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.36
 TOTAL AREA (ACRES) = 82.1 PEAK FLOW RATE (CFS) = 192.18

 FLOW PROCESS FROM NODE 110.00 TO NODE 120.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM (FEET) = 1105.00 DOWNSTREAM (FEET) = 1095.00
 FLOW LENGTH (FEET) = 1180.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 60.0 INCH PIPE IS 44.3 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 12.35
 ESTIMATED PIPE DIAMETER (INCH) = 60.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 192.18
 PIPE TRAVEL TIME (MIN.) = 1.59 Tc (MIN.) = 18.94
 LONGEST FLOWPATH FROM NODE 104.00 TO NODE 120.00 = 4835.00 FEET.

 FLOW PROCESS FROM NODE 120.00 TO NODE 120.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 =====
 TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION (MIN.) = 18.94
 RAINFALL INTENSITY (INCH/HR) = 2.80
 AREA-AVERAGED Fm (INCH/HR) = 0.35
 AREA-AVERAGED Fp (INCH/HR) = 0.98
 AREA-AVERAGED Ap = 0.36
 EFFECTIVE STREAM AREA (ACRES) = 82.10
 TOTAL STREAM AREA (ACRES) = 82.10
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 192.18

 FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 =====
 INITIAL SUBAREA FLOW-LENGTH (FEET) = 1000.00
 ELEVATION DATA: UPSTREAM (FEET) = 1156.00 DOWNSTREAM (FEET) = 1136.00
 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 10.536
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.976
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	2.80	0.98	0.100	32	10.54
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	A	7.20	0.98	0.500	32	13.48

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.388
 SUBAREA RUNOFF (CFS) = 32.38
 TOTAL AREA (ACRES) = 10.00 PEAK FLOW RATE (CFS) = 32.38

 FLOW PROCESS FROM NODE 112.00 TO NODE 113.00 IS CODE = 62

>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>> (STREET TABLE SECTION # 2 USED) <<<<<
 =====
 UPSTREAM ELEVATION (FEET) = 1136.00 DOWNSTREAM ELEVATION (FEET) = 1120.00
 STREET LENGTH (FEET) = 1210.00 CURB HEIGHT (INCHES) = 8.0
 STREET HALFWIDTH (FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 27.00
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

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 = 0.0150

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 70.35
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH (FEET) = 0.70
 HALFSTREET FLOOD WIDTH (FEET) = 28.30
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.74
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 3.30
 STREET FLOW TRAVEL TIME (MIN.) = 4.26 Tc (MIN.) = 14.79

* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.243
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	8.90	0.98	0.100	32
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	19.20	0.98	0.500	32
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	A	0.90	0.98	0.200	32
COMMERCIAL	A	0.10	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.367
 SUBAREA AREA (ACRES) = 29.10 SUBAREA RUNOFF (CFS) = 75.57
 EFFECTIVE AREA (ACRES) = 39.10 AREA-AVERAGED Fm (INCH/HR) = 0.36
 AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.37
 TOTAL AREA (ACRES) = 39.1 PEAK FLOW RATE (CFS) = 101.36

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.77 HALFSTREET FLOOD WIDTH (FEET) = 36.21
 FLOW VELOCITY (FEET/SEC.) = 5.08 DEPTH*VELOCITY (FT*FT/SEC.) = 3.94
 *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
 AND L = 1210.0 FT WITH ELEVATION-DROP = 16.0 FT, IS 85.3 CFS,
 WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 113.00
 LONGEST FLOWPATH FROM NODE 111.00 TO NODE 113.00 = 2210.00 FEET.

 FLOW PROCESS FROM NODE 113.00 TO NODE 120.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 1120.00 DOWNSTREAM (FEET) = 1095.00
 FLOW LENGTH (FEET) = 1330.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 42.0 INCH PIPE IS 29.0 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 14.31
 ESTIMATED PIPE DIAMETER (INCH) = 42.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 101.36
 PIPE TRAVEL TIME (MIN.) = 1.55 Tc (MIN.) = 16.34
 LONGEST FLOWPATH FROM NODE 111.00 TO NODE 120.00 = 3540.00 FEET.

 FLOW PROCESS FROM NODE 120.00 TO NODE 120.00 IS CODE = 81

>>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====

MAINLINE Tc (MIN.) = 16.34
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.055
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	10.00	0.98	0.100	32
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	25.60	0.98	0.500	32
COMMERCIAL	A	1.50	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.376
 SUBAREA AREA (ACRES) = 37.10 SUBAREA RUNOFF (CFS) = 89.78
 EFFECTIVE AREA (ACRES) = 76.20 AREA-AVERAGED Fm (INCH/HR) = 0.36
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.37
 TOTAL AREA (ACRES) = 76.2 PEAK FLOW RATE (CFS) = 184.52

 FLOW PROCESS FROM NODE 120.00 TO NODE 120.00 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.) = 16.34
 RAINFALL INTENSITY (INCH/HR) = 3.06
 AREA-AVERAGED Fm (INCH/HR) = 0.36
 AREA-AVERAGED Fp (INCH/HR) = 0.98

AREA-AVERAGED Ap = 0.37
 EFFECTIVE STREAM AREA(ACRES) = 76.20
 TOTAL STREAM AREA(ACRES) = 76.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 184.52

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	192.18	18.94	2.797	0.98(0.35)	0.36	82.1	104.00
2	184.52	16.34	3.055	0.98(0.36)	0.37	76.2	111.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	367.87	16.34	3.055	0.97(0.36)	0.37	147.0	111.00
2	358.96	18.94	2.797	0.98(0.36)	0.36	158.3	104.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 367.87 Tc(MIN.) = 16.34
 EFFECTIVE AREA(ACRES) = 147.04 AREA-AVERAGED Fm(INCH/HR) = 0.36
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.37
 TOTAL AREA(ACRES) = 158.3
 LONGEST FLOWPATH FROM NODE 104.00 TO NODE 120.00 = 4835.00 FEET.

PEAK FLOW RATE(CFS) AT CONFLUENCE = 367.87

 FLOW PROCESS FROM NODE 121.00 TO NODE 122.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 870.00
 ELEVATION DATA: UPSTREAM(FEET) = 1140.00 DOWNSTREAM(FEET) = 1122.00

Tc = K * [(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.898
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.128
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	1.50	0.98	0.100	32	9.90
RESIDENTIAL "5-7 DWELLINGS/ACRE"	A	7.80	0.98	0.500	32	12.67

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.435
 SUBAREA RUNOFF(CFS) = 30.99
 TOTAL AREA(ACRES) = 9.30 PEAK FLOW RATE(CFS) = 30.99

 FLOW PROCESS FROM NODE 122.00 TO NODE 123.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 2 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 1122.00 DOWNSTREAM ELEVATION(FEET) = 1104.00
 STREET LENGTH(FEET) = 980.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 67.64
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.66
 HALFSTREET FLOOD WIDTH(FEET) = 24.85
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.31
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 3.48
 STREET FLOW TRAVEL TIME(MIN.) = 3.08 Tc(MIN.) = 12.97
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.509

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	5.80	0.98	0.100	32

 FLOW PROCESS FROM NODE 120.00 TO NODE 130.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 1095.00 DOWNSTREAM(FEET) = 1073.00
 FLOW LENGTH(FEET) = 2620.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 75.0 INCH PIPE IS 58.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 14.36
 ESTIMATED PIPE DIAMETER(INCH) = 75.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 367.87
 PIPE TRAVEL TIME(MIN.) = 3.04 Tc(MIN.) = 19.38
 LONGEST FLOWPATH FROM NODE 104.00 TO NODE 130.00 = 7455.00 FEET.

 FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 19.38
 RAINFALL INTENSITY(INCH/HR) = 2.76
 AREA-AVERAGED Fm(INCH/HR) = 0.36
 AREA-AVERAGED Fp(INCH/HR) = 0.97
 AREA-AVERAGED Ap = 0.37
 EFFECTIVE STREAM AREA(ACRES) = 147.04
 TOTAL STREAM AREA(ACRES) = 158.30

RESIDENTIAL
 "5-7 DWELLINGS/ACRE" A 20.30 0.98 0.500 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.411
 SUBAREA AREA (ACRES) = 26.10 SUBAREA RUNOFF (CFS) = 73.01
 EFFECTIVE AREA (ACRES) = 35.40 AREA-AVERAGED Fm (INCH/HR) = 0.41
 AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.42
 TOTAL AREA (ACRES) = 35.4 PEAK FLOW RATE (CFS) = 98.83

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.73 HALFSTREET FLOOD WIDTH (FEET) = 31.99
 FLOW VELOCITY (FEET/SEC.) = 5.79 DEPTH*VELOCITY (FT*FT/SEC.) = 4.24
 *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
 AND L = 980.0 FT WITH ELEVATION-DROP = 18.0 FT, IS 83.5 CFS,
 WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 123.00
 LONGEST FLOWPATH FROM NODE 121.00 TO NODE 123.00 = 1850.00 FEET.

 FLOW PROCESS FROM NODE 123.00 TO NODE 124.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM (FEET) = 1104.00 DOWNSTREAM (FEET) = 1091.00
 FLOW LENGTH (FEET) = 1300.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 45.0 INCH PIPE IS 33.8 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 11.10
 ESTIMATED PIPE DIAMETER (INCH) = 45.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 98.83
 PIPE TRAVEL TIME (MIN.) = 1.95 Tc (MIN.) = 14.92
 LONGEST FLOWPATH FROM NODE 121.00 TO NODE 124.00 = 3150.00 FEET.

 FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====
 MAINLINE Tc (MIN.) = 14.92
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.226
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	14.40	0.98	0.100	32
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	26.00	0.98	0.500	32

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.357
 SUBAREA AREA (ACRES) = 40.40 SUBAREA RUNOFF (CFS) = 104.63
 EFFECTIVE AREA (ACRES) = 75.80 AREA-AVERAGED Fm (INCH/HR) = 0.38
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.39
 TOTAL AREA (ACRES) = 75.8 PEAK FLOW RATE (CFS) = 194.45

 FLOW PROCESS FROM NODE 124.00 TO NODE 130.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM (FEET) = 1091.00 DOWNSTREAM (FEET) = 1073.00
 FLOW LENGTH (FEET) = 1290.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 54.0 INCH PIPE IS 41.4 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 14.85
 ESTIMATED PIPE DIAMETER (INCH) = 54.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 194.45
 PIPE TRAVEL TIME (MIN.) = 1.45 Tc (MIN.) = 16.37
 LONGEST FLOWPATH FROM NODE 121.00 TO NODE 130.00 = 4440.00 FEET.

 FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====
 MAINLINE Tc (MIN.) = 16.37
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.052
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	13.80	0.98	0.100	32
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	21.60	0.98	0.500	32
SCHOOL	A	44.40	0.98	0.600	32

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.486
 SUBAREA AREA (ACRES) = 79.80 SUBAREA RUNOFF (CFS) = 185.12
 EFFECTIVE AREA (ACRES) = 155.60 AREA-AVERAGED Fm (INCH/HR) = 0.43
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.44
 TOTAL AREA (ACRES) = 155.6 PEAK FLOW RATE (CFS) = 367.67

 FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 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.) = 16.37
 RAINFALL INTENSITY (INCH/HR) = 3.05
 AREA-AVERAGED Fm (INCH/HR) = 0.43
 AREA-AVERAGED Fp (INCH/HR) = 0.98
 AREA-AVERAGED Ap = 0.44
 EFFECTIVE STREAM AREA (ACRES) = 155.60
 TOTAL STREAM AREA (ACRES) = 155.60
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 367.67

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	367.87	19.38	2.758	0.97 (0.36)	0.37	147.0	111.00
1	358.96	21.98	2.557	0.98 (0.36)	0.36	158.3	104.00
2	367.67	16.37	3.052	0.98 (0.43)	0.44	155.6	121.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	716.43	16.37	3.052	0.97(0.40)	0.41	279.8	121.00
2	694.38	19.38	2.758	0.98(0.39)	0.40	302.6	111.00
3	657.35	21.98	2.557	0.97(0.39)	0.40	313.9	104.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 716.43 Tc (MIN.) = 16.37
 EFFECTIVE AREA (ACRES) = 279.81 AREA-AVERAGED Fm (INCH/HR) = 0.40
 AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.41
 TOTAL AREA (ACRES) = 313.9
 LONGEST FLOWPATH FROM NODE 104.00 TO NODE 130.00 = 7455.00 FEET.

EFFECTIVE AREA (ACRES) = 375.21 AREA-AVERAGED Fm (INCH/HR) = 0.38
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.391
 PEAK FLOW RATE (CFS) = 815.63

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	815.63	18.93	2.797	0.98(0.38)	0.39	375.2	121.00
2	780.81	21.95	2.560	0.98(0.38)	0.39	398.0	111.00
3	741.60	24.56	2.392	0.97(0.38)	0.39	409.3	104.00

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

 FLOW PROCESS FROM NODE 130.00 TO NODE 140.00 IS CODE = 31

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

=====
 ELEVATION DATA: UPSTREAM (FEET) = 1073.00 DOWNSTREAM (FEET) = 1060.00
 FLOW LENGTH (FEET) = 2250.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 102.0 INCH PIPE IS 82.1 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 14.64
 ESTIMATED PIPE DIAMETER (INCH) = 102.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 716.43
 PIPE TRAVEL TIME (MIN.) = 2.56 Tc (MIN.) = 18.93
 LONGEST FLOWPATH FROM NODE 104.00 TO NODE 140.00 = 9705.00 FEET.

 FLOW PROCESS FROM NODE 140.00 TO NODE 140.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====
 MAINLINE Tc (MIN.) = 18.93
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.797
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	27.50	0.98	0.100	32
RESIDENTIAL "5-7 DWELLINGS/ACRE"	A	57.00	0.98	0.500	32
RESIDENTIAL "11+ DWELLINGS/ACRE"	A	10.90	0.98	0.200	32

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.350
 SUBAREA AREA (ACRES) = 95.40 SUBAREA RUNOFF (CFS) = 210.81
 EFFECTIVE AREA (ACRES) = 375.21 AREA-AVERAGED Fm (INCH/HR) = 0.38
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.39
 TOTAL AREA (ACRES) = 409.3 PEAK FLOW RATE (CFS) = 815.63
 =====

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 409.3 TC (MIN.) = 18.93

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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***** DESCRIPTION OF STUDY *****
* ONTARIO MASTER PLAN OF DRAINAGE - BASIN IV (AREA A) *
* 25-YEAR HYDROLOGY ANALYSIS *
* P. PAGADUAN 11-30-2011 *

FILE NAME: IVA25.DAT
TIME/DATE OF STUDY: 15:03 11/30/2011

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.80
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL
10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) = 0.950
100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) = 1.400
COMPUTED RAINFALL INTENSITY DATA:
STORM EVENT = 25.00 1-HOUR INTENSITY(INCH/HOUR) = 1.1070
SLOPE OF INTENSITY DURATION CURVE = 0.6000

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF-WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL IN- / OUT- / PARK-SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER WIDTH (FT)	GUTTER GEOMETRIES LIP (FT)	STREET GEOMETRIES HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150
2	32.0	27.0	0.020/0.020/0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

UNIT-HYDROGRAPH MODEL SELECTIONS/PARAMETERS:

WATERSHED LAG = 0.80 * Tc
USED "VALLEY UNDEVELOPED" S-GRAPH FOR DEVELOPMENTS OF
2 UNITS/ACRE AND LESS; AND "VALLEY DEVELOPED" S-GRAPH
FOR DEVELOPMENTS OF 3-4 UNITS/ACRE AND MORE.

USER SPECIFIED RAINFALL VALUES:
2-YR 6-HR RAINFALL DEPTH(INCH) = 1.70
2-YR 24-HR RAINFALL DEPTH(INCH) = 3.20
100-YR 6-HR RAINFALL DEPTH(INCH) = 3.50
100-YR 24-HR RAINFALL DEPTH(INCH) = 8.50
SIERRA MADRE DEPTH-AREA FACTORS USED.

DURATION	AREA-AVERAGED RAINFALL(INCH)
5-MINUTES	0.38
30-MINUTES	0.79
1-HOUR	1.04
3-HOUR	1.87
6-HOUR	2.71
24-HOUR	5.30

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR UNIT HYDROGRAPH METHOD

FLOW PROCESS FROM NODE 104.00 TO NODE 105.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1390.00
ELEVATION DATA: UPSTREAM(FEET) = 1170.00 DOWNSTREAM(FEET) = 1135.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 11.478
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.986
SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	4.40	0.98	0.100	32	11.48
RESIDENTIAL "5-7 DWELLINGS/ACRE"	A	8.40	0.98	0.500	32	14.69

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.363
SUBAREA RUNOFF(CFS) = 30.33
TOTAL AREA(ACRES) = 12.80 PEAK FLOW RATE(CFS) = 30.33

FLOW PROCESS FROM NODE 105.00 TO NODE 106.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 1135.00 DOWNSTREAM ELEVATION(FEET) = 1128.00
STREET LENGTH(FEET) = 950.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020
 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 = 0.0150

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 53.31
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.70
 HALFSTREET FLOOD WIDTH(FEET) = 28.61
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.55
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.48
 STREET FLOW TRAVEL TIME(MIN.) = 4.46 Tc(MIN.) = 15.94
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.452

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	5.90	0.98	0.100	32
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	18.80	0.98	0.500	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.404
 SUBAREA AREA(ACRES) = 24.70 SUBAREA RUNOFF(CFS) = 45.74
 EFFECTIVE AREA(ACRES) = 37.50 AREA-AVERAGED Fm(INCH/HR) = 0.38
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.39
 TOTAL AREA(ACRES) = 37.5 PEAK FLOW RATE(CFS) = 69.92

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.76 HALFSTREET FLOOD WIDTH(FEET) = 34.41
 FLOW VELOCITY(FEET/SEC.) = 3.74 DEPTH*VELOCITY(FT*FT/SEC.) = 2.83
 *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
 AND L = 950.0 FT WITH ELEVATION-DROP = 7.0 FT, IS 54.0 CFS,
 WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 106.00
 LONGEST FLOWPATH FROM NODE 104.00 TO NODE 106.00 = 2340.00 FEET.

 FLOW PROCESS FROM NODE 106.00 TO NODE 110.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM(FEET) = 1128.00 DOWNSTREAM(FEET) = 1105.00
 FLOW LENGTH(FEET) = 1315.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 12.61
 ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 69.92
 PIPE TRAVEL TIME(MIN.) = 1.74 Tc(MIN.) = 17.68
 LONGEST FLOWPATH FROM NODE 104.00 TO NODE 110.00 = 3655.00 FEET.

 FLOW PROCESS FROM NODE 110.00 TO NODE 110.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====

MAINLINE Tc(MIN.) = 17.68
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.304
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	9.00	0.98	0.100	32
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	21.90	0.98	0.500	32
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	A	13.70	0.98	0.200	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.327
 SUBAREA AREA(ACRES) = 44.60 SUBAREA RUNOFF(CFS) = 79.69
 EFFECTIVE AREA(ACRES) = 82.10 AREA-AVERAGED Fm(INCH/HR) = 0.35
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.36
 TOTAL AREA(ACRES) = 82.1 PEAK FLOW RATE(CFS) = 144.63

 FLOW PROCESS FROM NODE 110.00 TO NODE 120.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM(FEET) = 1105.00 DOWNSTREAM(FEET) = 1095.00
 FLOW LENGTH(FEET) = 1180.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 54.0 INCH PIPE IS 39.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 11.51
 ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 144.63
 PIPE TRAVEL TIME(MIN.) = 1.71 Tc(MIN.) = 19.39
 LONGEST FLOWPATH FROM NODE 104.00 TO NODE 120.00 = 4835.00 FEET.

 FLOW PROCESS FROM NODE 120.00 TO NODE 120.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 =====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 19.39
 RAINFALL INTENSITY(INCH/HR) = 2.18
 AREA-AVERAGED Fm(INCH/HR) = 0.35
 AREA-AVERAGED Fp(INCH/HR) = 0.98
 AREA-AVERAGED Ap = 0.36
 EFFECTIVE STREAM AREA(ACRES) = 82.10
 TOTAL STREAM AREA(ACRES) = 82.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 144.63

 FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
 ELEVATION DATA: UPSTREAM(FEET) = 1156.00 DOWNSTREAM(FEET) = 1136.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.536
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.144
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	2.80	0.98	0.100	32	10.54
RESIDENTIAL "5-7 DWELLINGS/ACRE"	A	7.20	0.98	0.500	32	13.48

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.388
 SUBAREA RUNOFF(CFS) = 24.89
 TOTAL AREA(ACRES) = 10.00 PEAK FLOW RATE(CFS) = 24.89

 FLOW PROCESS FROM NODE 112.00 TO NODE 113.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 2 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 1136.00 DOWNSTREAM ELEVATION(FEET) = 1120.00
 STREET LENGTH(FEET) = 1210.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 53.60
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.64
 HALFSTREET FLOOD WIDTH(FEET) = 24.17
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.44
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.85
 STREET FLOW TRAVEL TIME(MIN.) = 4.54 Tc(MIN.) = 15.07
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.536
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	8.90	0.98	0.100	32
RESIDENTIAL "5-7 DWELLINGS/ACRE"	A	19.20	0.98	0.500	32
RESIDENTIAL "11+ DWELLINGS/ACRE"	A	0.90	0.98	0.200	32
COMMERCIAL	A	0.10	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.367
 SUBAREA AREA(ACRES) = 29.10 SUBAREA RUNOFF(CFS) = 57.04
 EFFECTIVE AREA(ACRES) = 39.10 AREA-AVERAGED Fm(INCH/HR) = 0.36
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.37

TOTAL AREA(ACRES) = 39.1 PEAK FLOW RATE(CFS) = 76.46

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.71 HALFSTREET FLOOD WIDTH(FEET) = 30.09
 FLOW VELOCITY(FEET/SEC.) = 4.81 DEPTH*VELOCITY(FT*FT/SEC.) = 3.43
 *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
 AND L = 1210.0 FT WITH ELEVATION-DROP = 16.0 FT, IS 65.5 CFS,
 WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 113.00
 LONGEST FLOWPATH FROM NODE 111.00 TO NODE 113.00 = 2210.00 FEET.

 FLOW PROCESS FROM NODE 113.00 TO NODE 120.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 1120.00 DOWNSTREAM(FEET) = 1095.00
 FLOW LENGTH(FEET) = 1330.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 27.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 13.15
 ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 76.46
 PIPE TRAVEL TIME(MIN.) = 1.69 Tc(MIN.) = 16.76
 LONGEST FLOWPATH FROM NODE 111.00 TO NODE 120.00 = 3540.00 FEET.

 FLOW PROCESS FROM NODE 120.00 TO NODE 120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 16.76
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.379
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	10.00	0.98	0.100	32
RESIDENTIAL "5-7 DWELLINGS/ACRE"	A	25.60	0.98	0.500	32
COMMERCIAL	A	1.50	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.376
 SUBAREA AREA(ACRES) = 37.10 SUBAREA RUNOFF(CFS) = 67.21
 EFFECTIVE AREA(ACRES) = 76.20 AREA-AVERAGED Fm(INCH/HR) = 0.36
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.37
 TOTAL AREA(ACRES) = 76.2 PEAK FLOW RATE(CFS) = 138.16

 FLOW PROCESS FROM NODE 120.00 TO NODE 120.00 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.) = 16.76
 RAINFALL INTENSITY(INCH/HR) = 2.38

AREA-AVERAGED Fm (INCH/HR) = 0.36
 AREA-AVERAGED Fp (INCH/HR) = 0.98
 AREA-AVERAGED Ap = 0.37
 EFFECTIVE STREAM AREA (ACRES) = 76.20
 TOTAL STREAM AREA (ACRES) = 76.20
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 138.16

EFFECTIVE STREAM AREA (ACRES) = 147.17
 TOTAL STREAM AREA (ACRES) = 158.30
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 276.76

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	144.63	19.39	2.180	0.98 (0.35)	0.36	82.1	104.00
2	138.16	16.76	2.379	0.98 (0.36)	0.37	76.2	111.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	276.76	16.76	2.379	0.97 (0.36)	0.37	147.2	111.00
2	269.13	19.39	2.180	0.98 (0.36)	0.36	158.3	104.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 276.76 Tc (MIN.) = 16.76
 EFFECTIVE AREA (ACRES) = 147.17 AREA-AVERAGED Fm (INCH/HR) = 0.36
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.37
 TOTAL AREA (ACRES) = 158.3
 LONGEST FLOWPATH FROM NODE 104.00 TO NODE 120.00 = 4835.00 FEET.

 FLOW PROCESS FROM NODE 120.00 TO NODE 130.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 1095.00 DOWNSTREAM (FEET) = 1073.00
 FLOW LENGTH (FEET) = 2620.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 69.0 INCH PIPE IS 50.9 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 13.49
 ESTIMATED PIPE DIAMETER (INCH) = 69.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 276.76
 PIPE TRAVEL TIME (MIN.) = 3.24 Tc (MIN.) = 20.00
 LONGEST FLOWPATH FROM NODE 104.00 TO NODE 130.00 = 7455.00 FEET.

 FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 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.) = 20.00
 RAINFALL INTENSITY (INCH/HR) = 2.14
 AREA-AVERAGED Fm (INCH/HR) = 0.36
 AREA-AVERAGED Fp (INCH/HR) = 0.98
 AREA-AVERAGED Ap = 0.37

 FLOW PROCESS FROM NODE 121.00 TO NODE 122.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 870.00
 ELEVATION DATA: UPSTREAM (FEET) = 1140.00 DOWNSTREAM (FEET) = 1122.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.898
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.264
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	1.50	0.98	0.100	32	9.90
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	A	7.80	0.98	0.500	32	12.67

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.435
 SUBAREA RUNOFF (CFS) = 23.76
 TOTAL AREA (ACRES) = 9.30 PEAK FLOW RATE (CFS) = 23.76

 FLOW PROCESS FROM NODE 122.00 TO NODE 123.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 2 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 1122.00 DOWNSTREAM ELEVATION (FEET) = 1104.00
 STREET LENGTH (FEET) = 980.00 CURB HEIGHT (INCHES) = 8.0
 STREET HALFWIDTH (FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 27.00
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

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 = 0.0150

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 51.45
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH (FEET) = 0.60
 HALFSTREET FLOOD WIDTH (FEET) = 22.32
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.97
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 3.01
 STREET FLOW TRAVEL TIME (MIN.) = 3.28 Tc (MIN.) = 13.18
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.748
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL	AREA	Fp	Ap	SCS
-------------------------------	------	----	----	-----

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 5.80 0.98 0.100 32
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE" A 20.30 0.98 0.500 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.411
 SUBAREA AREA (ACRES) = 26.10 SUBAREA RUNOFF (CFS) = 55.14
 EFFECTIVE AREA (ACRES) = 35.40 AREA-AVERAGED Fm(INCH/HR) = 0.41
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.42
 TOTAL AREA (ACRES) = 35.4 PEAK FLOW RATE (CFS) = 74.59

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.67 HALFSTREET FLOOD WIDTH (FEET) = 26.19
 FLOW VELOCITY (FEET/SEC.) = 5.44 DEPTH*VELOCITY (FT*FT/SEC.) = 3.67
 LONGEST FLOWPATH FROM NODE 121.00 TO NODE 123.00 = 1850.00 FEET.

 FLOW PROCESS FROM NODE 123.00 TO NODE 124.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 1104.00 DOWNSTREAM (FEET) = 1091.00
 FLOW LENGTH (FEET) = 1300.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 42.0 INCH PIPE IS 29.2 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 10.46
 ESTIMATED PIPE DIAMETER (INCH) = 42.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 74.59
 PIPE TRAVEL TIME (MIN.) = 2.07 Tc (MIN.) = 15.25
 LONGEST FLOWPATH FROM NODE 121.00 TO NODE 124.00 = 3150.00 FEET.

 FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 15.25
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.518
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	14.40	0.98	0.100	32
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	26.00	0.98	0.500	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.357
 SUBAREA AREA (ACRES) = 40.40 SUBAREA RUNOFF (CFS) = 78.87
 EFFECTIVE AREA (ACRES) = 75.80 AREA-AVERAGED Fm (INCH/HR) = 0.38
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.39
 TOTAL AREA (ACRES) = 75.8 PEAK FLOW RATE (CFS) = 146.12

 FLOW PROCESS FROM NODE 124.00 TO NODE 130.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 1091.00 DOWNSTREAM (FEET) = 1073.00
 FLOW LENGTH (FEET) = 1290.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 48.0 INCH PIPE IS 37.8 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 13.76
 ESTIMATED PIPE DIAMETER (INCH) = 48.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 146.12
 PIPE TRAVEL TIME (MIN.) = 1.56 Tc (MIN.) = 16.82
 LONGEST FLOWPATH FROM NODE 121.00 TO NODE 130.00 = 4440.00 FEET.

 FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 16.82
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.375
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	13.80	0.98	0.100	32
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	21.60	0.98	0.500	32
SCHOOL	A	44.40	0.98	0.600	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.486
 SUBAREA AREA (ACRES) = 79.80 SUBAREA RUNOFF (CFS) = 136.48
 EFFECTIVE AREA (ACRES) = 155.60 AREA-AVERAGED Fm (INCH/HR) = 0.43
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.44
 TOTAL AREA (ACRES) = 155.6 PEAK FLOW RATE (CFS) = 272.83

 FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 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.) = 16.82
 RAINFALL INTENSITY (INCH/HR) = 2.37
 AREA-AVERAGED Fm (INCH/HR) = 0.43
 AREA-AVERAGED Fp (INCH/HR) = 0.98
 AREA-AVERAGED Ap = 0.44
 EFFECTIVE STREAM AREA (ACRES) = 155.60
 TOTAL STREAM AREA (ACRES) = 155.60
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 272.83

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	276.76	20.00	2.140	0.97 (0.36)	0.37	147.2	111.00
1	269.13	22.70	1.984	0.98 (0.36)	0.36	158.3	104.00
2	272.83	16.82	2.375	0.98 (0.43)	0.44	155.6	121.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO

CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	536.16	16.82	2.375	0.97(0.40)	0.41	279.4	121.00
2	516.78	20.00	2.140	0.98(0.39)	0.40	302.8	111.00
3	487.22	22.70	1.984	0.97(0.39)	0.40	313.9	104.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 536.16 Tc (MIN.) = 16.82
 EFFECTIVE AREA (ACRES) = 279.37 AREA-AVERAGED Fm (INCH/HR) = 0.40
 AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.41
 TOTAL AREA (ACRES) = 313.9
 LONGEST FLOWPATH FROM NODE 104.00 TO NODE 130.00 = 7455.00 FEET.

AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.391
 PEAK FLOW RATE (CFS) = 603.07

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	603.07	19.55	2.170	0.97(0.38)	0.39	374.8	121.00
2	573.05	22.78	1.979	0.98(0.38)	0.39	398.2	111.00
3	541.87	25.49	1.850	0.97(0.38)	0.39	409.3	104.00

END OF RATIONAL METHOD ANALYSIS

FLOW PROCESS FROM NODE 130.00 TO NODE 140.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 1073.00 DOWNSTREAM (FEET) = 1060.00
 FLOW LENGTH (FEET) = 2250.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 93.0 INCH PIPE IS 71.7 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 13.73
 ESTIMATED PIPE DIAMETER (INCH) = 93.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 536.16
 PIPE TRAVEL TIME (MIN.) = 2.73 Tc (MIN.) = 19.55
 LONGEST FLOWPATH FROM NODE 104.00 TO NODE 140.00 = 9705.00 FEET.

FLOW PROCESS FROM NODE 140.00 TO NODE 140.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 19.55
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.170
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	27.50	0.98	0.100	32
RESIDENTIAL "5-7 DWELLINGS/ACRE"	A	57.00	0.98	0.500	32
RESIDENTIAL "11+ DWELLINGS/ACRE"	A	10.90	0.98	0.200	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.350
 SUBAREA AREA (ACRES) = 95.40 SUBAREA RUNOFF (CFS) = 156.95
 EFFECTIVE AREA (ACRES) = 374.77 AREA-AVERAGED Fm (INCH/HR) = 0.38
 AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.39
 TOTAL AREA (ACRES) = 409.3 PEAK FLOW RATE (CFS) = 603.07

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 409.3 TC (MIN.) = 19.55
 EFFECTIVE AREA (ACRES) = 374.77 AREA-AVERAGED Fm (INCH/HR) = 0.38

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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***** DESCRIPTION OF STUDY *****
* ONTARIO MASTER PLAN OF DRAINAGE - BASIN IV (AREA A) *
* 10-YEAR HYDROLOGY ANALYSIS *
* P. PAGADUAN 11-30-2011 *

FILE NAME: IVA10.DAT
TIME/DATE OF STUDY: 15:08 11/30/2011

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.80
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE (LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.9500

ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF- CROWN TO		STREET-CROSSFALL:		CURB GUTTER-GEOMETRIES:		MANNING		
	WIDTH (FT)	CROSSFALL (FT)	IN- / SIDE	OUT- / SIDE/ WAY	HEIGHT (FT)	WIDTH (FT)	LIP (FT)	HIKE (FT)	FACTOR (n)
1	30.0	20.0	0.018/0.018	0.020	0.67	2.00	0.0312	0.167	0.0150
2	32.0	27.0	0.020/0.020	0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

UNIT-HYDROGRAPH MODEL SELECTIONS/PARAMETERS:

WATERSHED LAG = 0.80 * Tc
USED "VALLEY UNDEVELOPED" S-GRAPH FOR DEVELOPMENTS OF

2 UNITS/ACRE AND LESS; AND "VALLEY DEVELOPED" S-GRAPH
FOR DEVELOPMENTS OF 3-4 UNITS/ACRE AND MORE.

USER SPECIFIED RAINFALL VALUES:

2-YR 6-HR RAINFALL DEPTH(INCH) = 1.70
2-YR 24-HR RAINFALL DEPTH(INCH) = 3.20
100-YR 6-HR RAINFALL DEPTH(INCH) = 3.50
100-YR 24-HR RAINFALL DEPTH(INCH) = 8.50
SIERRA MADRE DEPTH-AREA FACTORS USED.

AREA-AVERAGED

DURATION	RAINFALL (INCH)
5-MINUTES	0.33
30-MINUTES	0.68
1-HOUR	0.90
3-HOUR	1.60
6-HOUR	2.31
24-HOUR	4.36

ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR UNIT HYDROGRAPH METHOD

FLOW PROCESS FROM NODE 104.00 TO NODE 105.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 1390.00
ELEVATION DATA: UPSTREAM (FEET) = 1170.00 DOWNSTREAM (FEET) = 1135.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 11.478
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.563
SUBAREA Tc AND LOSS RATE DATA (AMC I) :
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 4.40 1.33 0.100 17 11.48
RESIDENTIAL
"5-7 DWELLINGS/ACRE" A 8.40 1.33 0.500 17 14.69
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.363
SUBAREA RUNOFF (CFS) = 23.98
TOTAL AREA (ACRES) = 12.80 PEAK FLOW RATE (CFS) = 23.98

FLOW PROCESS FROM NODE 105.00 TO NODE 106.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<<<

UPSTREAM ELEVATION (FEET) = 1135.00 DOWNSTREAM ELEVATION (FEET) = 1128.00
STREET LENGTH (FEET) = 950.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 27.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 41.27
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.65
HALFSTREET FLOOD WIDTH(FEET) = 24.49
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.34
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.16
STREET FLOW TRAVEL TIME(MIN.) = 4.75 Tc(MIN.) = 16.22
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.082

SUBAREA LOSS RATE DATA(AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 5.90 1.33 0.100 17
RESIDENTIAL
"5-7 DWELLINGS/ACRE" A 18.80 1.33 0.500 17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.404
SUBAREA AREA(ACRES) = 24.70 SUBAREA RUNOFF(CFS) = 34.35
EFFECTIVE AREA(ACRES) = 37.50 AREA-AVERAGED Fm(INCH/HR) = 0.52
AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.39
TOTAL AREA(ACRES) = 37.5 PEAK FLOW RATE(CFS) = 52.79

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.70 HALFSTREET FLOOD WIDTH(FEET) = 28.40
FLOW VELOCITY(FEET/SEC.) = 3.54 DEPTH*VELOCITY(FT*FT/SEC.) = 2.47
LONGEST FLOWPATH FROM NODE 104.00 TO NODE 106.00 = 2340.00 FEET.

FLOW PROCESS FROM NODE 106.00 TO NODE 110.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 1128.00 DOWNSTREAM(FEET) = 1105.00
FLOW LENGTH(FEET) = 1315.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.81
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 52.79
PIPE TRAVEL TIME(MIN.) = 1.86 Tc(MIN.) = 18.08
LONGEST FLOWPATH FROM NODE 104.00 TO NODE 110.00 = 3655.00 FEET.

FLOW PROCESS FROM NODE 110.00 TO NODE 110.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 18.08
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.951
SUBAREA LOSS RATE DATA(AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

COMMERCIAL A 9.00 1.33 0.100 17
RESIDENTIAL
"5-7 DWELLINGS/ACRE" A 21.90 1.33 0.500 17
RESIDENTIAL
"11+ DWELLINGS/ACRE" A 13.70 1.33 0.200 17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.327
SUBAREA AREA(ACRES) = 44.60 SUBAREA RUNOFF(CFS) = 60.88
EFFECTIVE AREA(ACRES) = 82.10 AREA-AVERAGED Fm(INCH/HR) = 0.47
AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.36
TOTAL AREA(ACRES) = 82.1 PEAK FLOW RATE(CFS) = 109.25

FLOW PROCESS FROM NODE 110.00 TO NODE 120.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 1105.00 DOWNSTREAM(FEET) = 1095.00
FLOW LENGTH(FEET) = 1180.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 36.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.68
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 109.25
PIPE TRAVEL TIME(MIN.) = 1.84 Tc(MIN.) = 19.92
LONGEST FLOWPATH FROM NODE 104.00 TO NODE 120.00 = 4835.00 FEET.

FLOW PROCESS FROM NODE 120.00 TO NODE 120.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 19.92
RAINFALL INTENSITY(INCH/HR) = 1.84
AREA-AVERAGED Fm(INCH/HR) = 0.47
AREA-AVERAGED Fp(INCH/HR) = 1.33
AREA-AVERAGED Ap = 0.36
EFFECTIVE STREAM AREA(ACRES) = 82.10
TOTAL STREAM AREA(ACRES) = 82.10
PEAK FLOW RATE(CFS) AT CONFLUENCE = 109.25

FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
ELEVATION DATA: UPSTREAM(FEET) = 1156.00 DOWNSTREAM(FEET) = 1136.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.536
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.698
SUBAREA Tc AND LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/ LAND USE SCS SOIL GROUP AREA (ACRES) Fp (INCH/HR) Ap (DECIMAL) SCS CN Tc (MIN.)

COMMERCIAL	A	2.80	1.33	0.100	17	10.54
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	A	7.20	1.33	0.500	17	13.48

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.388
 SUBAREA RUNOFF(CFS) = 19.64
 TOTAL AREA(ACRES) = 10.00 PEAK FLOW RATE(CFS) = 19.64

 FLOW PROCESS FROM NODE 112.00 TO NODE 113.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 2 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 1136.00 DOWNSTREAM ELEVATION(FEET) = 1120.00
 STREET LENGTH(FEET) = 1210.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 41.61

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.60
 HALFSTREET FLOOD WIDTH(FEET) = 21.90
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.17
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.49
 STREET FLOW TRAVEL TIME(MIN.) = 4.83 Tc(MIN.) = 15.37

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.151

SUBAREA LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	8.90	1.33	0.100	17
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	19.20	1.33	0.500	17
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	A	0.90	1.33	0.200	17
COMMERCIAL	A	0.10	1.33	0.100	17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.367
 SUBAREA AREA(ACRES) = 29.10 SUBAREA RUNOFF(CFS) = 43.57
 EFFECTIVE AREA(ACRES) = 39.10 AREA-AVERAGED Fm(INCH/HR) = 0.49
 AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.37
 TOTAL AREA(ACRES) = 39.1 PEAK FLOW RATE(CFS) = 58.29

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.66 HALFSTREET FLOOD WIDTH(FEET) = 25.01
 FLOW VELOCITY(FEET/SEC.) = 4.52 DEPTH*VELOCITY(FT*FT/SEC.) = 2.98

LONGEST FLOWPATH FROM NODE 111.00 TO NODE 113.00 = 2210.00 FEET.

 FLOW PROCESS FROM NODE 113.00 TO NODE 120.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 1120.00 DOWNSTREAM(FEET) = 1095.00
 FLOW LENGTH(FEET) = 1330.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 24.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 12.35
 ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 58.29
 PIPE TRAVEL TIME(MIN.) = 1.79 Tc(MIN.) = 17.16
 LONGEST FLOWPATH FROM NODE 111.00 TO NODE 120.00 = 3540.00 FEET.

 FLOW PROCESS FROM NODE 120.00 TO NODE 120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 17.16
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.013
 SUBAREA LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	10.00	1.33	0.100	17
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	25.60	1.33	0.500	17
COMMERCIAL	A	1.50	1.33	0.100	17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.376
 SUBAREA AREA(ACRES) = 37.10 SUBAREA RUNOFF(CFS) = 50.54
 EFFECTIVE AREA(ACRES) = 76.20 AREA-AVERAGED Fm(INCH/HR) = 0.50
 AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.37
 TOTAL AREA(ACRES) = 76.2 PEAK FLOW RATE(CFS) = 103.98

 FLOW PROCESS FROM NODE 120.00 TO NODE 120.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 17.16
 RAINFALL INTENSITY(INCH/HR) = 2.01
 AREA-AVERAGED Fm(INCH/HR) = 0.50
 AREA-AVERAGED Fp(INCH/HR) = 1.33
 AREA-AVERAGED Ap = 0.37
 EFFECTIVE STREAM AREA(ACRES) = 76.20
 TOTAL STREAM AREA(ACRES) = 76.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 103.98

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	109.25	19.92	1.841	1.33 (0.47)	0.36	82.1	104.00
2	103.98	17.16	2.013	1.33 (0.50)	0.37	76.2	111.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	209.95	17.16	2.013	1.33 (0.49)	0.37	146.9	111.00
2	201.43	19.92	1.841	1.33 (0.48)	0.36	158.3	104.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 209.95 Tc(MIN.) = 17.16
EFFECTIVE AREA(ACRES) = 146.94 AREA-AVERAGED Fm(INCH/HR) = 0.49
AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 158.3
LONGEST FLOWPATH FROM NODE 104.00 TO NODE 120.00 = 4835.00 FEET.

FLOW PROCESS FROM NODE 120.00 TO NODE 130.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 1095.00 DOWNSTREAM(FEET) = 1073.00
FLOW LENGTH(FEET) = 2620.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 60.0 INCH PIPE IS 48.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.39
ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 209.95
PIPE TRAVEL TIME(MIN.) = 3.52 Tc(MIN.) = 20.69
LONGEST FLOWPATH FROM NODE 104.00 TO NODE 130.00 = 7455.00 FEET.

FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 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.) = 20.69
RAINFALL INTENSITY(INCH/HR) = 1.80
AREA-AVERAGED Fm(INCH/HR) = 0.49
AREA-AVERAGED Fp(INCH/HR) = 1.33
AREA-AVERAGED Ap = 0.37
EFFECTIVE STREAM AREA(ACRES) = 146.94
TOTAL STREAM AREA(ACRES) = 158.30
PEAK FLOW RATE(CFS) AT CONFLUENCE = 209.95

FLOW PROCESS FROM NODE 121.00 TO NODE 122.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 870.00
ELEVATION DATA: UPSTREAM(FEET) = 1140.00 DOWNSTREAM(FEET) = 1122.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.898
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.801
SUBAREA Tc AND LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	1.50	1.33	0.100	17	9.90
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	A	7.80	1.33	0.500	17	12.67

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.435
SUBAREA RUNOFF(CFS) = 18.60
TOTAL AREA(ACRES) = 9.30 PEAK FLOW RATE(CFS) = 18.60

FLOW PROCESS FROM NODE 122.00 TO NODE 123.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 1122.00 DOWNSTREAM ELEVATION(FEET) = 1104.00
STREET LENGTH(FEET) = 980.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 39.75
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.56
HALFSTREET FLOOD WIDTH(FEET) = 20.16
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.67
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.62
STREET FLOW TRAVEL TIME(MIN.) = 3.50 Tc(MIN.) = 13.39
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.336

SUBAREA LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	5.80	1.33	0.100	17
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	20.30	1.33	0.500	17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.411
SUBAREA AREA(ACRES) = 26.10 SUBAREA RUNOFF(CFS) = 42.05
EFFECTIVE AREA(ACRES) = 35.40 AREA-AVERAGED Fm(INCH/HR) = 0.55

AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.42
 TOTAL AREA (ACRES) = 35.4 PEAK FLOW RATE (CFS) = 56.76

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.62 HALFSTREET FLOOD WIDTH (FEET) = 23.22
 FLOW VELOCITY (FEET/SEC.) = 5.09 DEPTH*VELOCITY (FT*FT/SEC.) = 3.17
 LONGEST FLOWPATH FROM NODE 121.00 TO NODE 123.00 = 1850.00 FEET.

 FLOW PROCESS FROM NODE 123.00 TO NODE 124.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 1104.00 DOWNSTREAM (FEET) = 1091.00
 FLOW LENGTH (FEET) = 1300.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 28.1 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 9.61
 ESTIMATED PIPE DIAMETER (INCH) = 36.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 56.76
 PIPE TRAVEL TIME (MIN.) = 2.26 Tc (MIN.) = 15.65
 LONGEST FLOWPATH FROM NODE 121.00 TO NODE 124.00 = 3150.00 FEET.

 FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 15.65
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.128
 SUBAREA LOSS RATE DATA (AMC I):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 14.40 1.33 0.100 17
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE" A 26.00 1.33 0.500 17
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.357
 SUBAREA AREA (ACRES) = 40.40 SUBAREA RUNOFF (CFS) = 60.11
 EFFECTIVE AREA (ACRES) = 75.80 AREA-AVERAGED Fm (INCH/HR) = 0.51
 AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.39
 TOTAL AREA (ACRES) = 75.8 PEAK FLOW RATE (CFS) = 110.23

 FLOW PROCESS FROM NODE 124.00 TO NODE 130.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 1091.00 DOWNSTREAM (FEET) = 1073.00
 FLOW LENGTH (FEET) = 1290.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 45.0 INCH PIPE IS 32.2 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 13.02
 ESTIMATED PIPE DIAMETER (INCH) = 45.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 110.23
 PIPE TRAVEL TIME (MIN.) = 1.65 Tc (MIN.) = 17.30

LONGEST FLOWPATH FROM NODE 121.00 TO NODE 130.00 = 4440.00 FEET.

 FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 17.30
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.003
 SUBAREA LOSS RATE DATA (AMC I):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 13.80 1.33 0.100 17
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE" A 21.60 1.33 0.500 17
 SCHOOL A 44.40 1.33 0.600 17
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.486
 SUBAREA AREA (ACRES) = 79.80 SUBAREA RUNOFF (CFS) = 97.49
 EFFECTIVE AREA (ACRES) = 155.60 AREA-AVERAGED Fm (INCH/HR) = 0.58
 AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.44
 TOTAL AREA (ACRES) = 155.6 PEAK FLOW RATE (CFS) = 199.24

 FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION (MIN.) = 17.30
 RAINFALL INTENSITY (INCH/HR) = 2.00
 AREA-AVERAGED Fm (INCH/HR) = 0.58
 AREA-AVERAGED Fp (INCH/HR) = 1.33
 AREA-AVERAGED Ap = 0.44
 EFFECTIVE STREAM AREA (ACRES) = 155.60
 TOTAL STREAM AREA (ACRES) = 155.60
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 199.24

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	209.95	20.69	1.800	1.33 (0.49)	0.37	146.9	111.00
1	201.43	23.45	1.669	1.33 (0.48)	0.36	158.3	104.00
2	199.24	17.30	2.003	1.33 (0.58)	0.44	155.6	121.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	402.04	17.30	2.003	1.33 (0.54)	0.41	278.5	121.00
2	380.66	20.69	1.800	1.33 (0.53)	0.40	302.5	111.00
3	353.86	23.45	1.669	1.33 (0.53)	0.40	313.9	104.00

3 380.96 26.51 1.551 1.33(0.52) 0.39 409.3 104.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 402.04 Tc(MIN.) = 17.30
 EFFECTIVE AREA(ACRES) = 278.49 AREA-AVERAGED Fm(INCH/HR) = 0.54
 AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.41
 TOTAL AREA(ACRES) = 313.9
 LONGEST FLOWPATH FROM NODE 104.00 TO NODE 130.00 = 7455.00 FEET.

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

 FLOW PROCESS FROM NODE 130.00 TO NODE 140.00 IS CODE = 31

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

=====
 ELEVATION DATA: UPSTREAM(FEET) = 1073.00 DOWNSTREAM(FEET) = 1060.00
 FLOW LENGTH(FEET) = 2250.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 84.0 INCH PIPE IS 63.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 12.81
 ESTIMATED PIPE DIAMETER(INCH) = 84.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 402.04
 PIPE TRAVEL TIME(MIN.) = 2.93 Tc(MIN.) = 20.23
 LONGEST FLOWPATH FROM NODE 104.00 TO NODE 140.00 = 9705.00 FEET.

 FLOW PROCESS FROM NODE 140.00 TO NODE 140.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====
 MAINLINE Tc(MIN.) = 20.23
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.824
 SUBAREA LOSS RATE DATA(AMC I):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 27.50 1.33 0.100 17
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE" A 57.00 1.33 0.500 17
 RESIDENTIAL
 "11+ DWELLINGS/ACRE" A 10.90 1.33 0.200 17
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.350
 SUBAREA AREA(ACRES) = 95.40 SUBAREA RUNOFF(CFS) = 116.66
 EFFECTIVE AREA(ACRES) = 373.89 AREA-AVERAGED Fm(INCH/HR) = 0.52
 AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.39
 TOTAL AREA(ACRES) = 409.3 PEAK FLOW RATE(CFS) = 438.86

=====
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES) = 409.3 TC(MIN.) = 20.23
 EFFECTIVE AREA(ACRES) = 373.89 AREA-AVERAGED Fm(INCH/HR) = 0.52
 AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.391
 PEAK FLOW RATE(CFS) = 438.86

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	438.86	20.23	1.824	1.33(0.52)	0.39	373.9	121.00
2	408.98	23.68	1.660	1.33(0.52)	0.39	397.9	111.00

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Analysis prepared by:

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***** DESCRIPTION OF STUDY *****
* ONTARIO MASTER PLAN OF DRAINAGE - BASIN IV (AREA A30) *
* 100-YEAR HYDROLOGY ANALYSIS *
* P. PAGADUAN 1-6-2011 *

FILE NAME: O4A30100.DAT
TIME/DATE OF STUDY: 13:24 01/06/2011

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.80
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE (LOG(I; IN/HR) vs. LOG(Tc; MIN)) = 0.6000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.4000

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF- CROWN TO		STREET-CROSSFALL:		CURB GUTTER-GEOMETRIES:		MANNING		
	WIDTH	CROSSFALL	IN- /	OUT-/PARK-	HEIGHT	WIDTH	LIP	HIKE	
	(FT)	(FT)	SIDE /	SIDE/ WAY	(FT)	(FT)	(FT)	(n)	
1	30.0	20.0	0.018/0.018/0.020		0.67	2.00	0.0313	0.167	0.0150
2	32.0	27.0	0.020/0.020/0.020		0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

UNIT-HYDROGRAPH MODEL SELECTIONS/PARAMETERS:

WATERSHED LAG = 0.80 * Tc
USED "VALLEY UNDEVELOPED" S-GRAPH FOR DEVELOPMENTS OF

2 UNITS/ACRE AND LESS; AND "VALLEY DEVELOPED" S-GRAPH
FOR DEVELOPMENTS OF 3-4 UNITS/ACRE AND MORE.

USER SPECIFIED RAINFALL VALUES:

2-YR 6-HR RAINFALL DEPTH(INCH) = 1.70
2-YR 24-HR RAINFALL DEPTH(INCH) = 3.20
100-YR 6-HR RAINFALL DEPTH(INCH) = 3.50
100-YR 24-HR RAINFALL DEPTH(INCH) = 8.50
SIERRA MADRE DEPTH-AREA FACTORS USED.

AREA-AVERAGED

DURATION	RAINFALL(INCH)
5-MINUTES	0.52
30-MINUTES	1.06
1-HOUR	1.40
3-HOUR	2.46
6-HOUR	3.50
24-HOUR	8.50

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR UNIT HYDROGRAPH METHOD

FLOW PROCESS FROM NODE 130.00 TO NODE 131.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 620.00
ELEVATION DATA: UPSTREAM(FEET) = 1115.00 DOWNSTREAM(FEET) = 1110.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.436
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.999
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	1.70	0.98	0.100	32	10.44
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	A	6.80	0.98	0.500	32	13.35

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.420
SUBAREA RUNOFF(CFS) = 27.46
TOTAL AREA(ACRES) = 8.50 PEAK FLOW RATE(CFS) = 27.46

FLOW PROCESS FROM NODE 131.00 TO NODE 132.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 1110.00 DOWNSTREAM ELEVATION(FEET) = 1085.00
STREET LENGTH(FEET) = 1560.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 60.45
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.65
 HALFSTREET FLOOD WIDTH(FEET) = 24.43
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.91
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 3.17
 STREET FLOW TRAVEL TIME(MIN.) = 5.30 Tc(MIN.) = 15.73
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.125

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	7.20	0.98	0.100	32
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	19.30	0.98	0.500	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.391
 SUBAREA AREA(ACRES) = 26.50 SUBAREA RUNOFF(CFS) = 65.44
 EFFECTIVE AREA(ACRES) = 35.00 AREA-AVERAGED Fm(INCH/HR) = 0.39
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.40
 TOTAL AREA(ACRES) = 35.0 PEAK FLOW RATE(CFS) = 86.22

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.72 HALFSTREET FLOOD WIDTH(FEET) = 30.62
 FLOW VELOCITY(FEET/SEC.) = 5.32 DEPTH*VELOCITY(FT*FT/SEC.) = 3.82
 *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
 AND L = 1560.0 FT WITH ELEVATION-DROP = 25.0 FT, IS 73.9 CFS,
 WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 132.00
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 132.00 = 2180.00 FEET.

 FLOW PROCESS FROM NODE 132.00 TO NODE 133.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<
 =====
 ELEVATION DATA: UPSTREAM(FEET) = 1085.00 DOWNSTREAM(FEET) = 1075.00
 FLOW LENGTH(FEET) = 1460.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 45.0 INCH PIPE IS 35.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 9.23
 ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 86.22
 PIPE TRAVEL TIME(MIN.) = 2.64 Tc(MIN.) = 18.37
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 133.00 = 3640.00 FEET.

 FLOW PROCESS FROM NODE 133.00 TO NODE 133.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<
 =====
 MAINLINE Tc(MIN.) = 18.37
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.848

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	10.40	0.98	0.100	32
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	17.70	0.98	0.500	32
PUBLIC PARK	A	9.00	0.98	0.850	32
SCHOOL	A	9.40	0.98	0.600	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.498
 SUBAREA AREA(ACRES) = 46.50 SUBAREA RUNOFF(CFS) = 98.85
 EFFECTIVE AREA(ACRES) = 81.50 AREA-AVERAGED Fm(INCH/HR) = 0.44
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.46
 TOTAL AREA(ACRES) = 81.5 PEAK FLOW RATE(CFS) = 176.34

 FLOW PROCESS FROM NODE 133.00 TO NODE 134.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<
 =====
 ELEVATION DATA: UPSTREAM(FEET) = 1075.00 DOWNSTREAM(FEET) = 1055.00
 FLOW LENGTH(FEET) = 1930.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 54.0 INCH PIPE IS 43.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 12.83
 ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 176.34
 PIPE TRAVEL TIME(MIN.) = 2.51 Tc(MIN.) = 20.88
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 134.00 = 5570.00 FEET.

 FLOW PROCESS FROM NODE 134.00 TO NODE 134.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<
 =====
 MAINLINE Tc(MIN.) = 20.88
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.638
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	14.00	0.98	0.100	32
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	44.70	0.98	0.500	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.405
 SUBAREA AREA(ACRES) = 58.70 SUBAREA RUNOFF(CFS) = 118.51
 EFFECTIVE AREA(ACRES) = 140.20 AREA-AVERAGED Fm(INCH/HR) = 0.42
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.43
 TOTAL AREA(ACRES) = 140.2 PEAK FLOW RATE(CFS) = 279.41

 FLOW PROCESS FROM NODE 134.00 TO NODE 135.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 1055.00 DOWNSTREAM(FEET) = 1045.00
 FLOW LENGTH(FEET) = 700.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 63.0 INCH PIPE IS 45.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 16.53
 ESTIMATED PIPE DIAMETER(INCH) = 63.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 279.41
 PIPE TRAVEL TIME(MIN.) = 0.71 Tc(MIN.) = 21.58
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 135.00 = 6270.00 FEET.

 FLOW PROCESS FROM NODE 135.00 TO NODE 135.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 21.58
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.586
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	14.20	0.98	0.100	32
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	A	60.50	0.98	0.200	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.181
 SUBAREA AREA(ACRES) = 74.70 SUBAREA RUNOFF(CFS) = 161.97
 EFFECTIVE AREA(ACRES) = 214.90 AREA-AVERAGED Fm(INCH/HR) = 0.34
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.35
 TOTAL AREA(ACRES) = 214.9 PEAK FLOW RATE(CFS) = 434.81

 FLOW PROCESS FROM NODE 135.00 TO NODE 136.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 1045.00 DOWNSTREAM(FEET) = 1035.00
 FLOW LENGTH(FEET) = 1350.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 81.0 INCH PIPE IS 64.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 14.21
 ESTIMATED PIPE DIAMETER(INCH) = 81.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 434.81
 PIPE TRAVEL TIME(MIN.) = 1.58 Tc(MIN.) = 23.16
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 136.00 = 7620.00 FEET.

 FLOW PROCESS FROM NODE 136.00 TO NODE 136.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 23.16
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.478
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	29.00	0.98	0.100	32
RESIDENTIAL					

"5-7 DWELLINGS/ACRE"	A	30.20	0.98	0.500	32
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	A	13.70	0.98	0.200	32
SCHOOL	A	9.00	0.98	0.600	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.319
 SUBAREA AREA(ACRES) = 81.90 SUBAREA RUNOFF(CFS) = 159.72
 EFFECTIVE AREA(ACRES) = 296.80 AREA-AVERAGED Fm(INCH/HR) = 0.33
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.34
 TOTAL AREA(ACRES) = 296.8 PEAK FLOW RATE(CFS) = 573.74

 FLOW PROCESS FROM NODE 136.00 TO NODE 137.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 1035.00 DOWNSTREAM(FEET) = 1020.00
 FLOW LENGTH(FEET) = 3030.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 96.0 INCH PIPE IS 78.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 13.02
 ESTIMATED PIPE DIAMETER(INCH) = 96.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 573.74
 PIPE TRAVEL TIME(MIN.) = 3.88 Tc(MIN.) = 27.04
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 137.00 = 10650.00 FEET.

 FLOW PROCESS FROM NODE 137.00 TO NODE 137.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 27.04
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.258
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	25.00	0.98	0.100	32
COMMERCIAL	A	13.20	0.98	0.100	32
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	A	27.30	0.98	0.200	32
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	A	23.30	0.98	0.200	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.157
 SUBAREA AREA(ACRES) = 88.80 SUBAREA RUNOFF(CFS) = 168.25
 EFFECTIVE AREA(ACRES) = 385.60 AREA-AVERAGED Fm(INCH/HR) = 0.29
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.30
 TOTAL AREA(ACRES) = 385.6 PEAK FLOW RATE(CFS) = 683.26

=====

END OF STUDY SUMMARY:
 TOTAL AREA(ACRES) = 385.6 TC(MIN.) = 27.04
 EFFECTIVE AREA(ACRES) = 385.60 AREA-AVERAGED Fm(INCH/HR) = 0.29
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.297
 PEAK FLOW RATE(CFS) = 683.26

=====

END OF RATIONAL METHOD ANALYSIS

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***** DESCRIPTION OF STUDY *****

* ONTARIO MASTER PLAN OF DRAINAGE - BASIN IV (AREA A30) *
* 25-YEAR HYDROLOGY ANALYSIS *
* P. PAGADUAN 1-6-2011 *

FILE NAME: O4A3025.DAT
TIME/DATE OF STUDY: 13:32 01/06/2011

=====
USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.80
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL
10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) = 0.950
100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) = 1.400
COMPUTED RAINFALL INTENSITY DATA:
STORM EVENT = 25.00 1-HOUR INTENSITY(INCH/HOUR) = 1.1070
SLOPE OF INTENSITY DURATION CURVE = 0.6000

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

Table with columns: NO., HALF-WIDTH (FT), CROWN TO CROSSFALL (FT), STREET-CROSSFALL: IN- / OUT- / PARK-SIDE / SIDE / WAY, CURB HEIGHT (FT), GUTTER WIDTH (FT), LIP HIKE (FT), GUTTER GEOMETRIES: LIP HIKE (FT), MANNING FACTOR (n)

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

SIZE PIPE WITH A FLOW CAPACITY GREATER THAN OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

UNIT-HYDROGRAPH MODEL SELECTIONS/PARAMETERS:

WATERSHED LAG = 0.80 * Tc
USED "VALLEY UNDEVELOPED" S-GRAPH FOR DEVELOPMENTS OF 2 UNITS/ACRE AND LESS; AND "VALLEY DEVELOPED" S-GRAPH FOR DEVELOPMENTS OF 3-4 UNITS/ACRE AND MORE.

USER SPECIFIED RAINFALL VALUES:

2-YR 6-HR RAINFALL DEPTH (INCH) = 1.70
2-YR 24-HR RAINFALL DEPTH (INCH) = 3.20
100-YR 6-HR RAINFALL DEPTH (INCH) = 3.50
100-YR 24-HR RAINFALL DEPTH (INCH) = 8.50

SIERRA MADRE DEPTH-AREA FACTORS USED.

AREA-AVERAGED

DURATION RAINFALL (INCH)

5-MINUTES 0.38
30-MINUTES 0.79
1-HOUR 1.04
3-HOUR 1.87
6-HOUR 2.71
24-HOUR 5.30

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR UNIT HYDROGRAPH METHOD

FLOW PROCESS FROM NODE 130.00 TO NODE 131.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 620.00

ELEVATION DATA: UPSTREAM (FEET) = 1115.00 DOWNSTREAM (FEET) = 1110.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 10.436

* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.162

SUBAREA Tc AND LOSS RATE DATA (AMC II):

Table with columns: DEVELOPMENT TYPE / LAND USE, SCS SOIL AREA GROUP (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN, Tc (MIN.)

"5-7 DWELLINGS/ACRE" A 6.80 0.98 0.500 32 13.35

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.420

SUBAREA RUNOFF (CFS) = 21.05

TOTAL AREA (ACRES) = 8.50 PEAK FLOW RATE (CFS) = 21.05

FLOW PROCESS FROM NODE 131.00 TO NODE 132.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 2 USED)<<<<<

=====

UPSTREAM ELEVATION (FEET) = 1110.00 DOWNSTREAM ELEVATION (FEET) = 1085.00

STREET LENGTH (FEET) = 1560.00 CURB HEIGHT (INCHES) = 8.0

STREET HALFWIDTH (FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 27.00

INSIDE STREET CROSSFALL (DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 45.82

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.60

HALFSTREET FLOOD WIDTH(FEET) = 21.90

AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.60

PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.74

STREET FLOW TRAVEL TIME(MIN.) = 5.66 Tc(MIN.) = 16.09

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.438

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	7.20	0.98	0.100	32
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	19.30	0.98	0.500	32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.391					
SUBAREA AREA(ACRES) = 26.50 SUBAREA RUNOFF(CFS) = 49.05					
EFFECTIVE AREA(ACRES) = 35.00 AREA-AVERAGED Fm(INCH/HR) = 0.39					
AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.40					
TOTAL AREA(ACRES) = 35.0 PEAK FLOW RATE(CFS) = 64.57					

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.66 HALFSTREET FLOOD WIDTH(FEET) = 25.07

FLOW VELOCITY(FEET/SEC.) = 4.99 DEPTH*VELOCITY(FT*FT/SEC.) = 3.29

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 132.00 = 2180.00 FEET.

FLOW PROCESS FROM NODE 132.00 TO NODE 133.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 1085.00 DOWNSTREAM(FEET) = 1075.00
 FLOW LENGTH(FEET) = 1460.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 42.0 INCH PIPE IS 30.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 8.72
 ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 64.57
 PIPE TRAVEL TIME(MIN.) = 2.79 Tc(MIN.) = 18.89
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 133.00 = 3640.00 FEET.

FLOW PROCESS FROM NODE 133.00 TO NODE 133.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 18.89
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.215
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	10.40	0.98	0.100	32
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	17.70	0.98	0.500	32
PUBLIC PARK	A	9.00	0.98	0.850	32
SCHOOL	A	9.40	0.98	0.600	32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.498					
SUBAREA AREA(ACRES) = 46.50 SUBAREA RUNOFF(CFS) = 72.35					
EFFECTIVE AREA(ACRES) = 81.50 AREA-AVERAGED Fm(INCH/HR) = 0.44					
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.46					
TOTAL AREA(ACRES) = 81.5 PEAK FLOW RATE(CFS) = 129.89					

FLOW PROCESS FROM NODE 133.00 TO NODE 134.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 1075.00 DOWNSTREAM(FEET) = 1055.00
 FLOW LENGTH(FEET) = 1930.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 48.0 INCH PIPE IS 39.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 11.87
 ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 129.89
 PIPE TRAVEL TIME(MIN.) = 2.71 Tc(MIN.) = 21.60
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 134.00 = 5570.00 FEET.

FLOW PROCESS FROM NODE 134.00 TO NODE 134.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 21.60
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.044
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	14.00	0.98	0.100	32
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	44.70	0.98	0.500	32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.405					
SUBAREA AREA(ACRES) = 58.70 SUBAREA RUNOFF(CFS) = 87.13					
EFFECTIVE AREA(ACRES) = 140.20 AREA-AVERAGED Fm(INCH/HR) = 0.42					
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.43					
TOTAL AREA(ACRES) = 140.2 PEAK FLOW RATE(CFS) = 204.45					

FLOW PROCESS FROM NODE 134.00 TO NODE 135.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 1055.00 DOWNSTREAM(FEET) = 1045.00

FLOW LENGTH(FEET) = 700.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 54.0 INCH PIPE IS 43.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 15.06
 ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 204.45
 PIPE TRAVEL TIME(MIN.) = 0.77 Tc(MIN.) = 22.37
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 135.00 = 6270.00 FEET.

 FLOW PROCESS FROM NODE 135.00 TO NODE 135.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 22.37
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.001
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	14.20	0.98	0.100	32
RESIDENTIAL "11+ DWELLINGS/ACRE"	A	60.50	0.98	0.200	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.181
 SUBAREA AREA(ACRES) = 74.70 SUBAREA RUNOFF(CFS) = 122.66
 EFFECTIVE AREA(ACRES) = 214.90 AREA-AVERAGED Fm(INCH/HR) = 0.34
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.35
 TOTAL AREA(ACRES) = 214.9 PEAK FLOW RATE(CFS) = 321.72

 FLOW PROCESS FROM NODE 135.00 TO NODE 136.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 1045.00 DOWNSTREAM(FEET) = 1035.00
 FLOW LENGTH(FEET) = 1350.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 72.0 INCH PIPE IS 58.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 13.14
 ESTIMATED PIPE DIAMETER(INCH) = 72.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 321.72
 PIPE TRAVEL TIME(MIN.) = 1.71 Tc(MIN.) = 24.08
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 136.00 = 7620.00 FEET.

 FLOW PROCESS FROM NODE 136.00 TO NODE 136.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 24.08
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.914
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	29.00	0.98	0.100	32
RESIDENTIAL "5-7 DWELLINGS/ACRE"	A	30.20	0.98	0.500	32

RESIDENTIAL
 "11+ DWELLINGS/ACRE" A 13.70 0.98 0.200 32
 SCHOOL A 9.00 0.98 0.600 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.319
 SUBAREA AREA(ACRES) = 81.90 SUBAREA RUNOFF(CFS) = 118.17
 EFFECTIVE AREA(ACRES) = 296.80 AREA-AVERAGED Fm(INCH/HR) = 0.33
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.34
 TOTAL AREA(ACRES) = 296.8 PEAK FLOW RATE(CFS) = 423.14

 FLOW PROCESS FROM NODE 136.00 TO NODE 137.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 1035.00 DOWNSTREAM(FEET) = 1020.00
 FLOW LENGTH(FEET) = 3030.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 87.0 INCH PIPE IS 68.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 12.18
 ESTIMATED PIPE DIAMETER(INCH) = 87.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 423.14
 PIPE TRAVEL TIME(MIN.) = 4.15 Tc(MIN.) = 28.23
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 137.00 = 10650.00 FEET.

 FLOW PROCESS FROM NODE 137.00 TO NODE 137.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 28.23
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.740
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	25.00	0.98	0.100	32
COMMERCIAL	A	13.20	0.98	0.100	32
RESIDENTIAL "11+ DWELLINGS/ACRE"	A	27.30	0.98	0.200	32
RESIDENTIAL "11+ DWELLINGS/ACRE"	A	23.30	0.98	0.200	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.157
 SUBAREA AREA(ACRES) = 88.80 SUBAREA RUNOFF(CFS) = 126.85
 EFFECTIVE AREA(ACRES) = 385.60 AREA-AVERAGED Fm(INCH/HR) = 0.29
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.30
 TOTAL AREA(ACRES) = 385.6 PEAK FLOW RATE(CFS) = 503.49

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 385.6 TC(MIN.) = 28.23
 EFFECTIVE AREA(ACRES) = 385.60 AREA-AVERAGED Fm(INCH/HR) = 0.29
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.297
 PEAK FLOW RATE(CFS) = 503.49

END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
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***** DESCRIPTION OF STUDY *****
* ONTARIO MASTER PLAN OF DRAINAGE - BASIN IV (AREA A30) *
* 10-YEAR HYDROLOGY ANALYSIS *
* P. PAGADUAN 1-6-2011 *

FILE NAME: O4A3010.DAT
TIME/DATE OF STUDY: 13:37 01/06/2011

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT (YEAR) = 10.00
SPECIFIED MINIMUM PIPE SIZE (INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS (DECIMAL) TO USE FOR FRICTION SLOPE = 0.80
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE (LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
USER SPECIFIED 1-HOUR INTENSITY (INCH/HOUR) = 0.9500

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF-WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL IN- / OUT- / SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER WIDTH (FT)	GEOMETRIES LIP (FT)	STREET HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150
2	32.0	27.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN

OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

UNIT-HYDROGRAPH MODEL SELECTIONS/PARAMETERS:

WATERSHED LAG = 0.80 * Tc

USED "VALLEY UNDEVELOPED" S-GRAPH FOR DEVELOPMENTS OF

2 UNITS/ACRE AND LESS; AND "VALLEY DEVELOPED" S-GRAPH
FOR DEVELOPMENTS OF 3-4 UNITS/ACRE AND MORE.

USER SPECIFIED RAINFALL VALUES:

2-YR 6-HR RAINFALL DEPTH (INCH) = 1.70
2-YR 24-HR RAINFALL DEPTH (INCH) = 3.20
100-YR 6-HR RAINFALL DEPTH (INCH) = 3.50
100-YR 24-HR RAINFALL DEPTH (INCH) = 8.50
SIERRA MADRE DEPTH-AREA FACTORS USED.

AREA-AVERAGED

DURATION	RAINFALL (INCH)
5-MINUTES	0.33
30-MINUTES	0.68
1-HOUR	0.90
3-HOUR	1.60
6-HOUR	2.31
24-HOUR	4.36

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR UNIT HYDROGRAPH METHOD

FLOW PROCESS FROM NODE 130.00 TO NODE 131.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 620.00
ELEVATION DATA: UPSTREAM (FEET) = 1115.00 DOWNSTREAM (FEET) = 1110.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 10.436

* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.713

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	1.70	0.98	0.100	32	10.44
RESIDENTIAL "5-7 DWELLINGS/ACRE"	A	6.80	0.98	0.500	32	13.35

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.420
SUBAREA RUNOFF (CFS) = 17.62
TOTAL AREA (ACRES) = 8.50 PEAK FLOW RATE (CFS) = 17.62

FLOW PROCESS FROM NODE 131.00 TO NODE 132.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 2 USED)<<<<<

=====

UPSTREAM ELEVATION (FEET) = 1110.00 DOWNSTREAM ELEVATION (FEET) = 1085.00
STREET LENGTH (FEET) = 1560.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 27.00

INSIDE STREET CROSSFALL (DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

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) = 37.99
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.57
 HALFSTREET FLOOD WIDTH(FEET) = 20.37
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.38
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.48
 STREET FLOW TRAVEL TIME(MIN.) = 5.94 Tc(MIN.) = 16.38
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.071

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	7.20	0.98	0.100	32
RESIDENTIAL "5-7 DWELLINGS/ACRE"	A	19.30	0.98	0.500	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.391
 SUBAREA AREA(ACRES) = 26.50 SUBAREA RUNOFF(CFS) = 40.28
 EFFECTIVE AREA(ACRES) = 35.00 AREA-AVERAGED Fm(INCH/HR) = 0.39
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.40
 TOTAL AREA(ACRES) = 35.0 PEAK FLOW RATE(CFS) = 52.99

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.62 HALFSTREET FLOOD WIDTH(FEET) = 23.22
 FLOW VELOCITY(FEET/SEC.) = 4.75 DEPTH*VELOCITY(FT*FT/SEC.) = 2.96
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 132.00 = 2180.00 FEET.

 FLOW PROCESS FROM NODE 132.00 TO NODE 133.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM(FEET) = 1085.00 DOWNSTREAM(FEET) = 1075.00
 FLOW LENGTH(FEET) = 1460.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 28.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 8.29
 ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 52.99
 PIPE TRAVEL TIME(MIN.) = 2.93 Tc(MIN.) = 19.31
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 133.00 = 3640.00 FEET.

 FLOW PROCESS FROM NODE 133.00 TO NODE 133.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====
 MAINLINE Tc(MIN.) = 19.31
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.876
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	14.00	0.98	0.100	32
RESIDENTIAL "5-7 DWELLINGS/ACRE"	A	44.70	0.98	0.500	32

COMMERCIAL	A	10.40	0.98	0.100	32
RESIDENTIAL "5-7 DWELLINGS/ACRE"	A	17.70	0.98	0.500	32
PUBLIC PARK	A	9.00	0.98	0.850	32
SCHOOL	A	9.40	0.98	0.600	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.498
 SUBAREA AREA(ACRES) = 46.50 SUBAREA RUNOFF(CFS) = 58.16
 EFFECTIVE AREA(ACRES) = 81.50 AREA-AVERAGED Fm(INCH/HR) = 0.44
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.46
 TOTAL AREA(ACRES) = 81.5 PEAK FLOW RATE(CFS) = 105.01

 FLOW PROCESS FROM NODE 133.00 TO NODE 134.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM(FEET) = 1075.00 DOWNSTREAM(FEET) = 1055.00
 FLOW LENGTH(FEET) = 1930.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 45.0 INCH PIPE IS 35.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 11.35
 ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 105.01
 PIPE TRAVEL TIME(MIN.) = 2.83 Tc(MIN.) = 22.14
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 134.00 = 5570.00 FEET.

 FLOW PROCESS FROM NODE 134.00 TO NODE 134.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====
 MAINLINE Tc(MIN.) = 22.14
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.728
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	14.00	0.98	0.100	32
RESIDENTIAL "5-7 DWELLINGS/ACRE"	A	44.70	0.98	0.500	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.405
 SUBAREA AREA(ACRES) = 58.70 SUBAREA RUNOFF(CFS) = 70.43
 EFFECTIVE AREA(ACRES) = 140.20 AREA-AVERAGED Fm(INCH/HR) = 0.42
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.43
 TOTAL AREA(ACRES) = 140.2 PEAK FLOW RATE(CFS) = 164.59

 FLOW PROCESS FROM NODE 134.00 TO NODE 135.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM(FEET) = 1055.00 DOWNSTREAM(FEET) = 1045.00
 FLOW LENGTH(FEET) = 700.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 51.0 INCH PIPE IS 38.2 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 14.42
 ESTIMATED PIPE DIAMETER (INCH) = 51.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 164.59
 PIPE TRAVEL TIME (MIN.) = 0.81 Tc (MIN.) = 22.95
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 135.00 = 6270.00 FEET.

 FLOW PROCESS FROM NODE 135.00 TO NODE 135.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 22.95
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.691
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	14.20	0.98	0.100	32
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	A	60.50	0.98	0.200	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.181
 SUBAREA AREA (ACRES) = 74.70 SUBAREA RUNOFF (CFS) = 101.81
 EFFECTIVE AREA (ACRES) = 214.90 AREA-AVERAGED Fm (INCH/HR) = 0.34
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.35
 TOTAL AREA (ACRES) = 214.9 PEAK FLOW RATE (CFS) = 261.76

 FLOW PROCESS FROM NODE 135.00 TO NODE 136.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 1045.00 DOWNSTREAM (FEET) = 1035.00
 FLOW LENGTH (FEET) = 1350.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 69.0 INCH PIPE IS 51.1 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 12.68
 ESTIMATED PIPE DIAMETER (INCH) = 69.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 261.76
 PIPE TRAVEL TIME (MIN.) = 1.77 Tc (MIN.) = 24.73
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 136.00 = 7620.00 FEET.

 FLOW PROCESS FROM NODE 136.00 TO NODE 136.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 24.73
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.617
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	29.00	0.98	0.100	32
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	30.20	0.98	0.500	32
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	A	13.70	0.98	0.200	32

SCHOOL A 9.00 0.98 0.600 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.319
 SUBAREA AREA (ACRES) = 81.90 SUBAREA RUNOFF (CFS) = 96.25
 EFFECTIVE AREA (ACRES) = 296.80 AREA-AVERAGED Fm (INCH/HR) = 0.33
 AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.34
 TOTAL AREA (ACRES) = 296.8 PEAK FLOW RATE (CFS) = 343.72

 FLOW PROCESS FROM NODE 136.00 TO NODE 137.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 1035.00 DOWNSTREAM (FEET) = 1020.00
 FLOW LENGTH (FEET) = 3030.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 81.0 INCH PIPE IS 62.5 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 11.60
 ESTIMATED PIPE DIAMETER (INCH) = 81.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 343.72
 PIPE TRAVEL TIME (MIN.) = 4.36 Tc (MIN.) = 29.08
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 137.00 = 10650.00 FEET.

 FLOW PROCESS FROM NODE 137.00 TO NODE 137.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 29.08
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.467
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	25.00	0.98	0.100	32
COMMERCIAL	A	13.20	0.98	0.100	32
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	A	27.30	0.98	0.200	32
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	A	23.30	0.98	0.200	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.157
 SUBAREA AREA (ACRES) = 88.80 SUBAREA RUNOFF (CFS) = 105.01
 EFFECTIVE AREA (ACRES) = 385.60 AREA-AVERAGED Fm (INCH/HR) = 0.29
 AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.30
 TOTAL AREA (ACRES) = 385.6 PEAK FLOW RATE (CFS) = 408.67

=====

END OF STUDY SUMMARY:
 TOTAL AREA (ACRES) = 385.6 TC (MIN.) = 29.08
 EFFECTIVE AREA (ACRES) = 385.60 AREA-AVERAGED Fm (INCH/HR) = 0.29
 AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.297
 PEAK FLOW RATE (CFS) = 408.67

=====

END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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***** DESCRIPTION OF STUDY *****
* ONTARIO MASTER PLAN OF DRAINAGE - BASIN IV (AREA B) *
* 100-YEAR HYDROLOGY ANALYSIS *
* P. PAGADUAN 8-9-2011 *

FILE NAME: IVB100.DAT
TIME/DATE OF STUDY: 07:39 08/10/2011

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.80
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.4000

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/ SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150
2	32.0	27.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

UNIT-HYDROGRAPH MODEL SELECTIONS/PARAMETERS:

WATERSHED LAG = 0.80 * Tc
USED "VALLEY UNDEVELOPED" S-GRAPH FOR DEVELOPMENTS OF

2 UNITS/ACRE AND LESS; AND "VALLEY DEVELOPED" S-GRAPH
FOR DEVELOPMENTS OF 3-4 UNITS/ACRE AND MORE.

USER SPECIFIED RAINFALL VALUES:

2-YR 6-HR RAINFALL DEPTH(INCH) = 1.70
2-YR 24-HR RAINFALL DEPTH(INCH) = 3.20
100-YR 6-HR RAINFALL DEPTH(INCH) = 3.50
100-YR 24-HR RAINFALL DEPTH(INCH) = 8.50
SIERRA MADRE DEPTH-AREA FACTORS USED.

AREA-AVERAGED

DURATION	RAINFALL(INCH)
5-MINUTES	0.52
30-MINUTES	1.06
1-HOUR	1.40
3-HOUR	2.46
6-HOUR	3.50
24-HOUR	8.50

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR UNIT HYDROGRAPH METHOD

FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 970.00
ELEVATION DATA: UPSTREAM(FEET) = 1085.00 DOWNSTREAM(FEET) = 1063.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.150
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.066
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	0.40	0.98	0.100	32	10.15
COMMERCIAL	A	9.00	0.98	0.100	32	10.15

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 33.57
TOTAL AREA(ACRES) = 9.40 PEAK FLOW RATE(CFS) = 33.57

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 1063.00 DOWNSTREAM ELEVATION(FEET) = 1048.00
STREET LENGTH(FEET) = 840.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0150

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 50.13
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.60
HALFSTREET FLOOD WIDTH(FEET) = 22.22
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.89
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.95

STREET FLOW TRAVEL TIME(MIN.) = 2.86 Tc(MIN.) = 13.01
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.503
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	2.50	0.98	0.100	32
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	3.30	0.98	0.500	32
PUBLIC PARK	A	6.80	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.610
SUBAREA AREA(ACRES) = 12.60 SUBAREA RUNOFF(CFS) = 32.98
EFFECTIVE AREA(ACRES) = 22.00 AREA-AVERAGED Fm(INCH/HR) = 0.38
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.39
TOTAL AREA(ACRES) = 22.0 PEAK FLOW RATE(CFS) = 61.79

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.64 HALFSTREET FLOOD WIDTH(FEET) = 24.12
FLOW VELOCITY(FEET/SEC.) = 5.14 DEPTH*VELOCITY(FT*FT/SEC.) = 3.30
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 1810.00 FEET.

FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 1048.00 DOWNSTREAM ELEVATION(FEET) = 1040.00
STREET LENGTH(FEET) = 400.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 74.07
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.66
HALFSTREET FLOOD WIDTH(FEET) = 25.33
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.61
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 3.73

STREET FLOW TRAVEL TIME(MIN.) = 1.19 Tc(MIN.) = 14.20
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.324

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	2.10	0.98	0.100	32
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	4.50	0.98	0.500	32
PUBLIC PARK	A	3.10	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.525
SUBAREA AREA(ACRES) = 9.70 SUBAREA RUNOFF(CFS) = 24.54
EFFECTIVE AREA(ACRES) = 31.70 AREA-AVERAGED Fm(INCH/HR) = 0.42
AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 31.7 PEAK FLOW RATE(CFS) = 82.79

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.69 HALFSTREET FLOOD WIDTH(FEET) = 27.45
FLOW VELOCITY(FEET/SEC.) = 5.76 DEPTH*VELOCITY(FT*FT/SEC.) = 3.96
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 103.00 = 2210.00 FEET.

FLOW PROCESS FROM NODE 103.00 TO NODE 104.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 1040.00 DOWNSTREAM(FEET) = 1018.00
FLOW LENGTH(FEET) = 1360.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 28.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.78
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 82.79
PIPE TRAVEL TIME(MIN.) = 1.77 Tc(MIN.) = 15.98
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 104.00 = 3570.00 FEET.

FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 15.98
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.097
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	7.70	0.98	0.100	32
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	19.70	0.98	0.500	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.388
SUBAREA AREA(ACRES) = 27.40 SUBAREA RUNOFF(CFS) = 67.05
EFFECTIVE AREA(ACRES) = 59.10 AREA-AVERAGED Fm(INCH/HR) = 0.40
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.41
TOTAL AREA(ACRES) = 59.1 PEAK FLOW RATE(CFS) = 143.38

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*****
FLOW PROCESS FROM NODE 104.00 TO NODE 110.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1018.00 DOWNSTREAM(FEET) = 1015.00
FLOW LENGTH(FEET) = 1070.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 66.0 INCH PIPE IS 49.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.58
ESTIMATED PIPE DIAMETER(INCH) = 66.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 143.38
PIPE TRAVEL TIME(MIN.) = 2.35 Tc(MIN.) = 18.33
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 110.00 = 4640.00 FEET.
```

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*****
FLOW PROCESS FROM NODE 110.00 TO NODE 110.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 18.33
RAINFALL INTENSITY(INCH/HR) = 2.85
AREA-AVERAGED Fm(INCH/HR) = 0.40
AREA-AVERAGED Fp(INCH/HR) = 0.98
AREA-AVERAGED Ap = 0.41
EFFECTIVE STREAM AREA(ACRES) = 59.10
TOTAL STREAM AREA(ACRES) = 59.10
PEAK FLOW RATE(CFS) AT CONFLUENCE = 143.38
```

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*****
FLOW PROCESS FROM NODE 105.00 TO NODE 106.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 550.00
ELEVATION DATA: UPSTREAM(FEET) = 1070.00 DOWNSTREAM(FEET) = 1062.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.840
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.417
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp    Ap    SCS  Tc
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL          A      3.00   0.98   0.100  32   8.84
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 11.66
TOTAL AREA(ACRES) = 3.00 PEAK FLOW RATE(CFS) = 11.66
```

```
*****
FLOW PROCESS FROM NODE 106.00 TO NODE 107.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
```

```
>>>>(STREET TABLE SECTION # 2 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 1062.00 DOWNSTREAM ELEVATION(FEET) = 1045.00
STREET LENGTH(FEET) = 830.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0150
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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 32.57
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.52
HALFSTREET FLOOD WIDTH(FEET) = 18.21
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.65
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.43
STREET FLOW TRAVEL TIME(MIN.) = 2.98 Tc(MIN.) = 11.82
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.711
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp    Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          A      3.80   0.98   0.100  32
RESIDENTIAL
"5-7 DWELLINGS/ACRE"  A      9.50   0.98   0.500  32
COMMERCIAL          A      0.50   0.98   0.100  32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.375
SUBAREA AREA(ACRES) = 13.80 SUBAREA RUNOFF(CFS) = 41.55
EFFECTIVE AREA(ACRES) = 16.80 AREA-AVERAGED Fm(INCH/HR) = 0.32
AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.33
TOTAL AREA(ACRES) = 16.8 PEAK FLOW RATE(CFS) = 51.30

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.60 HALFSTREET FLOOD WIDTH(FEET) = 21.85
FLOW VELOCITY(FEET/SEC.) = 5.17 DEPTH*VELOCITY(FT*FT/SEC.) = 3.08
LONGEST FLOWPATH FROM NODE 105.00 TO NODE 107.00 = 1380.00 FEET.
```

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*****
FLOW PROCESS FROM NODE 107.00 TO NODE 108.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 1045.00 DOWNSTREAM ELEVATION(FEET) = 1035.00
STREET LENGTH(FEET) = 880.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020
```


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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 67.36
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.70
 HALFSTREET FLOOD WIDTH(FEET) = 29.03
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.41
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 3.10
 STREET FLOW TRAVEL TIME(MIN.) = 3.32 Tc(MIN.) = 15.14
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.198
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	3.80	0.98	0.100	32
RESIDENTIAL "5-7 DWELLINGS/ACRE"	A	8.80	0.98	0.500	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.379
 SUBAREA AREA(ACRES) = 12.60 SUBAREA RUNOFF(CFS) = 32.07
 EFFECTIVE AREA(ACRES) = 29.40 AREA-AVERAGED Fm(INCH/HR) = 0.34
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.35
 TOTAL AREA(ACRES) = 29.4 PEAK FLOW RATE(CFS) = 75.62

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.73 HALFSTREET FLOOD WIDTH(FEET) = 31.46
 FLOW VELOCITY(FEET/SEC.) = 4.52 DEPTH*VELOCITY(FT*FT/SEC.) = 3.28
 LONGEST FLOWPATH FROM NODE 105.00 TO NODE 108.00 = 2260.00 FEET.

 FLOW PROCESS FROM NODE 108.00 TO NODE 110.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 1035.00 DOWNSTREAM(FEET) = 1015.00
 FLOW LENGTH(FEET) = 1340.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 27.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 12.18
 ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 75.62
 PIPE TRAVEL TIME(MIN.) = 1.83 Tc(MIN.) = 16.98
 LONGEST FLOWPATH FROM NODE 105.00 TO NODE 110.00 = 3600.00 FEET.

 FLOW PROCESS FROM NODE 110.00 TO NODE 110.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 16.98
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.986
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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COMMERCIAL	A	18.60	0.98	0.100	32
RESIDENTIAL "5-7 DWELLINGS/ACRE"	A	6.30	0.98	0.500	32
SCHOOL	A	9.20	0.98	0.600	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.309
 SUBAREA AREA(ACRES) = 34.10 SUBAREA RUNOFF(CFS) = 82.40
 EFFECTIVE AREA(ACRES) = 63.50 AREA-AVERAGED Fm(INCH/HR) = 0.32
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.33
 TOTAL AREA(ACRES) = 63.5 PEAK FLOW RATE(CFS) = 152.41

 FLOW PROCESS FROM NODE 110.00 TO NODE 110.00 IS CODE = 1

 >>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 16.98
 RAINFALL INTENSITY(INCH/HR) = 2.99
 AREA-AVERAGED Fm(INCH/HR) = 0.32
 AREA-AVERAGED Fp(INCH/HR) = 0.97
 AREA-AVERAGED Ap = 0.33
 EFFECTIVE STREAM AREA(ACRES) = 63.50
 TOTAL STREAM AREA(ACRES) = 63.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 152.41

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	143.38	18.33	2.852	0.98(0.40)	0.41	59.1	100.00
2	152.41	16.98	2.986	0.97(0.32)	0.33	63.5	105.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	292.49	16.98	2.986	0.97(0.36)	0.37	118.2	105.00
2	288.12	18.33	2.852	0.97(0.36)	0.37	122.6	100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 292.49 Tc(MIN.) = 16.98
 EFFECTIVE AREA(ACRES) = 118.24 AREA-AVERAGED Fm(INCH/HR) = 0.36
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.37
 TOTAL AREA(ACRES) = 122.6
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 110.00 = 4640.00 FEET.

 FLOW PROCESS FROM NODE 110.00 TO NODE 120.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 1015.00 DOWNSTREAM(FEET) = 1012.00
 FLOW LENGTH(FEET) = 1120.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 84.0 INCH PIPE IS 68.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 8.76
 ESTIMATED PIPE DIAMETER(INCH) = 84.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 292.49
 PIPE TRAVEL TIME(MIN.) = 2.13 Tc(MIN.) = 19.11
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 120.00 = 5760.00 FEET.

 FLOW PROCESS FROM NODE 120.00 TO NODE 120.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 19.11
 RAINFALL INTENSITY(INCH/HR) = 2.78
 AREA-AVERAGED Fm(INCH/HR) = 0.36
 AREA-AVERAGED Fp(INCH/HR) = 0.97
 AREA-AVERAGED Ap = 0.37
 EFFECTIVE STREAM AREA(ACRES) = 118.24
 TOTAL STREAM AREA(ACRES) = 122.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 292.49

 FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
 ELEVATION DATA: UPSTREAM(FEET) = 1050.00 DOWNSTREAM(FEET) = 1035.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 11.160
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.841
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	2.70	0.98	0.100	32	11.16
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	A	5.80	0.98	0.500	32	14.28

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.373
 SUBAREA RUNOFF(CFS) = 26.60
 TOTAL AREA(ACRES) = 8.50 PEAK FLOW RATE(CFS) = 26.60

 FLOW PROCESS FROM NODE 112.00 TO NODE 112.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 11.16
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.841
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	1.50	0.98	0.100	32
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	3.50	0.98	0.500	32

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.380
 SUBAREA AREA(ACRES) = 5.00 SUBAREA RUNOFF(CFS) = 15.62
 EFFECTIVE AREA(ACRES) = 13.50 AREA-AVERAGED Fm(INCH/HR) = 0.37
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.38
 TOTAL AREA(ACRES) = 13.5 PEAK FLOW RATE(CFS) = 42.22

 FLOW PROCESS FROM NODE 112.00 TO NODE 120.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 2 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 1035.00 DOWNSTREAM ELEVATION(FEET) = 1012.00
 STREET LENGTH(FEET) = 1500.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 86.25
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.72
 HALFSTREET FLOOD WIDTH(FEET) = 31.04
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.24
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 3.78
 STREET FLOW TRAVEL TIME(MIN.) = 4.78 Tc(MIN.) = 15.94
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.102
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	11.80	0.98	0.100	32
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	23.70	0.98	0.500	32

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.367
 SUBAREA AREA(ACRES) = 35.50 SUBAREA RUNOFF(CFS) = 87.67
 EFFECTIVE AREA(ACRES) = 49.00 AREA-AVERAGED Fm(INCH/HR) = 0.36
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.37
 TOTAL AREA(ACRES) = 49.0 PEAK FLOW RATE(CFS) = 120.90

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.80 HALFSTREET FLOOD WIDTH(FEET) = 38.53
 FLOW VELOCITY(FEET/SEC.) = 5.58 DEPTH*VELOCITY(FT*FT/SEC.) = 4.45
 *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,

AND L = 1500.0 FT WITH ELEVATION-DROP = 23.0 FT, IS 100.2 CFS,
 WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 120.00
 LONGEST FLOWPATH FROM NODE 111.00 TO NODE 120.00 = 2500.00 FEET.

PIPE-FLOW(CFS) = 399.27
 PIPE TRAVEL TIME(MIN.) = 1.63 Tc(MIN.) = 20.73
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 130.00 = 6820.00 FEET.

 FLOW PROCESS FROM NODE 120.00 TO NODE 120.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 15.94
 RAINFALL INTENSITY(INCH/HR) = 3.10
 AREA-AVERAGED Fm(INCH/HR) = 0.36
 AREA-AVERAGED Fp(INCH/HR) = 0.98
 AREA-AVERAGED Ap = 0.37
 EFFECTIVE STREAM AREA(ACRES) = 49.00
 TOTAL STREAM AREA(ACRES) = 49.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 120.90

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	292.49	19.11	2.782	0.97(0.36)	0.37	118.2	105.00
1	288.12	20.46	2.670	0.97(0.36)	0.37	122.6	100.00
2	120.90	15.94	3.102	0.98(0.36)	0.37	49.0	111.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	397.04	15.94	3.102	0.97(0.36)	0.37	147.6	111.00
2	399.27	19.11	2.782	0.97(0.36)	0.37	167.2	105.00
3	389.97	20.46	2.670	0.97(0.36)	0.37	171.6	100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 399.27 Tc(MIN.) = 19.11
 EFFECTIVE AREA(ACRES) = 167.24 AREA-AVERAGED Fm(INCH/HR) = 0.36
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.37
 TOTAL AREA(ACRES) = 171.6
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 120.00 = 5760.00 FEET.

 FLOW PROCESS FROM NODE 120.00 TO NODE 130.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 1012.00 DOWNSTREAM(FEET) = 1008.00
 FLOW LENGTH(FEET) = 1060.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 90.0 INCH PIPE IS 69.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 10.86
 ESTIMATED PIPE DIAMETER(INCH) = 90.00 NUMBER OF PIPES = 1

 FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 20.73
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.649
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	2.00	0.98	0.100	32
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	A	24.30	0.98	0.200	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.192
 SUBAREA AREA(ACRES) = 26.30 SUBAREA RUNOFF(CFS) = 58.25
 EFFECTIVE AREA(ACRES) = 193.54 AREA-AVERAGED Fm(INCH/HR) = 0.33
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.34
 TOTAL AREA(ACRES) = 197.9 PEAK FLOW RATE(CFS) = 403.00

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	405.94	17.56	2.926	0.97(0.33)	0.34	173.9	111.00
2	403.00	20.73	2.649	0.97(0.33)	0.34	193.5	105.00
3	394.21	22.09	2.550	0.98(0.34)	0.35	197.9	100.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 405.94 Tc(MIN.) = 17.56
 AREA-AVERAGED Fm(INCH/HR) = 0.33 AREA-AVERAGED Fp(INCH/HR) = 0.97
 AREA-AVERAGED Ap = 0.34 EFFECTIVE AREA(ACRES) = 173.91

 FLOW PROCESS FROM NODE 130.00 TO NODE 140.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 1008.00 DOWNSTREAM(FEET) = 1007.00
 FLOW LENGTH(FEET) = 430.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 102.0 INCH PIPE IS 74.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 9.19
 ESTIMATED PIPE DIAMETER(INCH) = 102.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 405.94
 PIPE TRAVEL TIME(MIN.) = 0.78 Tc(MIN.) = 18.34
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 140.00 = 7250.00 FEET.

 FLOW PROCESS FROM NODE 140.00 TO NODE 140.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 18.34

* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.851
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	3.00	0.98	0.100	32	11.53
COMMERCIAL	A	9.00	0.98	0.100	32	14.75

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 12.00 SUBAREA RUNOFF (CFS) = 29.73
 EFFECTIVE AREA (ACRES) = 185.91 AREA-AVERAGED Fm (INCH/HR) = 0.32
 AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.33
 TOTAL AREA (ACRES) = 209.9 PEAK FLOW RATE (CFS) = 423.89

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	3.50	0.98	0.100	32	11.53
RESIDENTIAL	A	7.50	0.98	0.500	32	14.75

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.373
 SUBAREA RUNOFF (CFS) = 33.69
 TOTAL AREA (ACRES) = 11.00 PEAK FLOW RATE (CFS) = 33.69

 FLOW PROCESS FROM NODE 151.00 TO NODE 152.00 IS CODE = 62

 FLOW PROCESS FROM NODE 140.00 TO NODE 153.00 IS CODE = 31

>>>> COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>> USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM (FEET) = 1007.00 DOWNSTREAM (FEET) = 990.00
 FLOW LENGTH (FEET) = 1280.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 72.0 INCH PIPE IS 57.2 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 17.59
 ESTIMATED PIPE DIAMETER (INCH) = 72.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 423.89
 PIPE TRAVEL TIME (MIN.) = 1.21 Tc (MIN.) = 19.55
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 153.00 = 8530.00 FEET.

 >>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>> (STREET TABLE SECTION # 2 USED)<<<<<
 =====
 UPSTREAM ELEVATION (FEET) = 1010.00 DOWNSTREAM ELEVATION (FEET) = 998.00
 STREET LENGTH (FEET) = 1420.00 CURB HEIGHT (INCHES) = 8.0
 STREET HALFWIDTH (FEET) = 32.00
 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 27.00
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020
 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 = 0.0150

 FLOW PROCESS FROM NODE 153.00 TO NODE 153.00 IS CODE = 1

>>>> DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 =====
 TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION (MIN.) = 19.55
 RAINFALL INTENSITY (INCH/HR) = 2.74
 AREA-AVERAGED Fm (INCH/HR) = 0.32
 AREA-AVERAGED Fp (INCH/HR) = 0.97
 AREA-AVERAGED Ap = 0.33
 EFFECTIVE STREAM AREA (ACRES) = 185.91
 TOTAL STREAM AREA (ACRES) = 209.90
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 423.89

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 74.76
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH (FEET) = 0.76
 HALFSTREET FLOOD WIDTH (FEET) = 34.41
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.00
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 3.03
 STREET FLOW TRAVEL TIME (MIN.) = 5.91 Tc (MIN.) = 17.44
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.938
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	16.80	0.98	0.100	32	11.53
RESIDENTIAL	A	10.40	0.98	0.500	32	14.75
"11+ DWELLINGS/ACRE"	A	2.00	0.98	0.200	32	14.75
PUBLIC PARK	A	5.70	0.98	0.850	32	14.75

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.347
 SUBAREA AREA (ACRES) = 34.90 SUBAREA RUNOFF (CFS) = 81.64
 EFFECTIVE AREA (ACRES) = 45.90 AREA-AVERAGED Fm (INCH/HR) = 0.34
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.35
 TOTAL AREA (ACRES) = 45.9 PEAK FLOW RATE (CFS) = 107.13

 FLOW PROCESS FROM NODE 150.00 TO NODE 151.00 IS CODE = 21

>>>> RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >> USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 =====
 INITIAL SUBAREA FLOW-LENGTH (FEET) = 980.00
 ELEVATION DATA: UPSTREAM (FEET) = 1022.00 DOWNSTREAM (FEET) = 1010.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]** 0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 11.529
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.767

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.83 HALFSTREET FLOOD WIDTH (FEET) = 40.32

FLOW VELOCITY (FEET/SEC.) = 4.38 DEPTH*VELOCITY (FT*FT/SEC.) = 3.65
 *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
 AND L_s = 1420.0 FT WITH ELEVATION-DROP = 12.0 FT, IS 92.9 CFS,
 WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 152.00
 LONGEST FLOWPATH FROM NODE 150.00 TO NODE 152.00 = 2400.00 FEET.

AREA-AVERAGED F_p (INCH/HR) = 0.98
 AREA-AVERAGED A_p = 0.36
 EFFECTIVE STREAM AREA (ACRES) = 133.60
 TOTAL STREAM AREA (ACRES) = 133.60
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 249.13

 FLOW PROCESS FROM NODE 152.00 TO NODE 153.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 998.00 DOWNSTREAM (FEET) = 990.00
 FLOW LENGTH (FEET) = 2780.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 57.0 INCH PIPE IS 45.9 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 7.01
 ESTIMATED PIPE DIAMETER (INCH) = 57.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 107.13
 PIPE TRAVEL TIME (MIN.) = 6.61 T_c (MIN.) = 24.05
 LONGEST FLOWPATH FROM NODE 150.00 TO NODE 153.00 = 5180.00 FEET.

 FLOW PROCESS FROM NODE 153.00 TO NODE 153.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE T_c (MIN.) = 24.05
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.423
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F _p (INCH/HR)	A _p (DECIMAL)	SCS CN
COMMERCIAL	A	10.90	0.98	0.100	32
COMMERCIAL	A	3.30	0.98	0.100	32
RESIDENTIAL "5-7 DWELLINGS/ACRE"	A	19.00	0.98	0.500	32
RESIDENTIAL "11+ DWELLINGS/ACRE"	A	29.40	0.98	0.200	32
SCHOOL	A	25.10	0.98	0.600	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.363
 SUBAREA AREA (ACRES) = 87.70 SUBAREA RUNOFF (CFS) = 163.28
 EFFECTIVE AREA (ACRES) = 133.60 AREA-AVERAGED F_m (INCH/HR) = 0.35
 AREA-AVERAGED F_p (INCH/HR) = 0.98 AREA-AVERAGED A_p = 0.36
 TOTAL AREA (ACRES) = 133.6 PEAK FLOW RATE (CFS) = 249.13

 FLOW PROCESS FROM NODE 153.00 TO NODE 153.00 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.) = 24.05
 RAINFALL INTENSITY (INCH/HR) = 2.42
 AREA-AVERAGED F_m (INCH/HR) = 0.35

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	T _c (MIN.)	Intensity (INCH/HR)	F _p (F _m) (INCH/HR)	A _p	A _e (ACRES)	HEADWATER NODE
1	423.89	19.55	2.743	0.97 (0.32)	0.33	185.9	111.00
1	419.81	22.73	2.507	0.97 (0.32)	0.33	205.5	105.00
1	410.74	24.09	2.421	0.98 (0.32)	0.33	209.9	100.00
2	249.13	24.05	2.423	0.98 (0.35)	0.36	133.6	150.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	T _c (MIN.)	Intensity (INCH/HR)	F _p (F _m) (INCH/HR)	A _p	A _e (ACRES)	HEADWATER NODE
1	657.76	19.55	2.743	0.97 (0.33)	0.34	294.5	111.00
2	664.73	22.73	2.507	0.98 (0.33)	0.34	331.8	105.00
3	660.11	24.05	2.423	0.98 (0.33)	0.34	343.4	150.00
4	659.60	24.09	2.421	0.98 (0.33)	0.34	343.5	100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 664.73 T_c (MIN.) = 22.73
 EFFECTIVE AREA (ACRES) = 331.78 AREA-AVERAGED F_m (INCH/HR) = 0.33
 AREA-AVERAGED F_p (INCH/HR) = 0.98 AREA-AVERAGED A_p = 0.34
 TOTAL AREA (ACRES) = 343.5
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 153.00 = 8530.00 FEET.

 FLOW PROCESS FROM NODE 153.00 TO NODE 170.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 990.00 DOWNSTREAM (FEET) = 972.00
 FLOW LENGTH (FEET) = 1280.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 84.0 INCH PIPE IS 67.5 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 20.07
 ESTIMATED PIPE DIAMETER (INCH) = 84.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 664.73
 PIPE TRAVEL TIME (MIN.) = 1.06 T_c (MIN.) = 23.79
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 170.00 = 9810.00 FEET.

 FLOW PROCESS FROM NODE 170.00 TO NODE 170.00 IS CODE = 10

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

 FLOW PROCESS FROM NODE 160.00 TO NODE 161.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 750.00
 ELEVATION DATA: UPSTREAM (FEET) = 998.00 DOWNSTREAM (FEET) = 988.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 10.184
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 4.058

SUBAREA Tc AND LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
 COMMERCIAL A 0.50 0.98 0.100 32 10.18
 COMMERCIAL A 4.70 0.98 0.100 32 10.18
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF (CFS) = 18.53
 TOTAL AREA (ACRES) = 5.20 PEAK FLOW RATE (CFS) = 18.53

 FLOW PROCESS FROM NODE 161.00 TO NODE 162.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 2 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 988.00 DOWNSTREAM ELEVATION (FEET) = 987.00
 STREET LENGTH (FEET) = 390.00 CURB HEIGHT (INCHES) = 8.0
 STREET HALFWIDTH (FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 27.00
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

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 = 0.0150

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 27.27
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH (FEET) = 0.67
 HALFSTREET FLOOD WIDTH (FEET) = 25.76
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.02
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 1.36
 STREET FLOW TRAVEL TIME (MIN.) = 3.21 Tc (MIN.) = 13.40
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.442

SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 1.90 0.98 0.100 32
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE" A 4.40 0.98 0.500 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.379
 SUBAREA AREA (ACRES) = 6.30 SUBAREA RUNOFF (CFS) = 17.42
 EFFECTIVE AREA (ACRES) = 11.50 AREA-AVERAGED Fm (INCH/HR) = 0.25

AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.25
 TOTAL AREA (ACRES) = 11.5 PEAK FLOW RATE (CFS) = 33.07

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.71 HALFSTREET FLOOD WIDTH (FEET) = 29.67
 FLOW VELOCITY (FEET/SEC.) = 2.11 DEPTH*VELOCITY (FT*FT/SEC.) = 1.50
 LONGEST FLOWPATH FROM NODE 160.00 TO NODE 162.00 = 1140.00 FEET.

 FLOW PROCESS FROM NODE 162.00 TO NODE 163.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 987.00 DOWNSTREAM (FEET) = 978.00
 FLOW LENGTH (FEET) = 1160.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 22.2 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 7.78
 ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 33.07
 PIPE TRAVEL TIME (MIN.) = 2.48 Tc (MIN.) = 15.88
 LONGEST FLOWPATH FROM NODE 160.00 TO NODE 163.00 = 2300.00 FEET.

 FLOW PROCESS FROM NODE 163.00 TO NODE 163.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 15.88
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.108
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 21.10 0.98 0.100 32
 COMMERCIAL A 3.50 0.98 0.100 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 24.60 SUBAREA RUNOFF (CFS) = 66.65
 EFFECTIVE AREA (ACRES) = 36.10 AREA-AVERAGED Fm (INCH/HR) = 0.15
 AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.15
 TOTAL AREA (ACRES) = 36.1 PEAK FLOW RATE (CFS) = 96.27

 FLOW PROCESS FROM NODE 163.00 TO NODE 163.00 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.) = 15.88
 RAINFALL INTENSITY (INCH/HR) = 3.11
 AREA-AVERAGED Fm (INCH/HR) = 0.15
 AREA-AVERAGED Fp (INCH/HR) = 0.97
 AREA-AVERAGED Ap = 0.15
 EFFECTIVE STREAM AREA (ACRES) = 36.10
 TOTAL STREAM AREA (ACRES) = 36.10

PEAK FLOW RATE(CFS) AT CONFLUENCE = 96.27

FLOW PROCESS FROM NODE 164.00 TO NODE 165.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 850.00

ELEVATION DATA: UPSTREAM(FEET) = 992.00 DOWNSTREAM(FEET) = 986.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 12.159

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.648

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	2.60	0.98	0.100	32	12.16
RESIDENTIAL "11+ DWELLINGS/ACRE"	A	7.40	0.98	0.200	32	12.96

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.174

SUBAREA RUNOFF(CFS) = 31.31

TOTAL AREA(ACRES) = 10.00 PEAK FLOW RATE(CFS) = 31.31

FLOW PROCESS FROM NODE 165.00 TO NODE 166.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 2 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 986.00 DOWNSTREAM ELEVATION(FEET) = 984.00

STREET LENGTH(FEET) = 370.00 CURB HEIGHT(INCHES) = 8.0

STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0150

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 60.97

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.76

HALFSTREET FLOOD WIDTH(FEET) = 34.84

AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.21

PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.44

STREET FLOW TRAVEL TIME(MIN.) = 1.92 Tc(MIN.) = 14.08

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.341

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	4.20	0.98	0.100	32

COMMERCIAL	A	4.80	0.98	0.100	32
RESIDENTIAL "11+ DWELLINGS/ACRE"	A	2.80	0.98	0.200	32
COMMERCIAL	A	8.60	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.114

SUBAREA AREA(ACRES) = 20.40 SUBAREA RUNOFF(CFS) = 59.31

EFFECTIVE AREA(ACRES) = 30.40 AREA-AVERAGED Fm(INCH/HR) = 0.13

AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.13

TOTAL AREA(ACRES) = 30.4 PEAK FLOW RATE(CFS) = 87.85

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.84 HALFSTREET FLOOD WIDTH(FEET) = 40.56

FLOW VELOCITY(FEET/SEC.) = 3.53 DEPTH*VELOCITY(FT*FT/SEC.) = 2.96

*NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
AND L = 370.0 FT WITH ELEVATION-DROP = 2.0 FT, IS 77.2 CFS,
WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 166.00

LONGEST FLOWPATH FROM NODE 164.00 TO NODE 166.00 = 1220.00 FEET.

FLOW PROCESS FROM NODE 166.00 TO NODE 163.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 984.00 DOWNSTREAM(FEET) = 978.00

FLOW LENGTH(FEET) = 640.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 45.0 INCH PIPE IS 31.5 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 10.62

ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 87.85

PIPE TRAVEL TIME(MIN.) = 1.00 Tc(MIN.) = 15.08

LONGEST FLOWPATH FROM NODE 164.00 TO NODE 163.00 = 1860.00 FEET.

FLOW PROCESS FROM NODE 163.00 TO NODE 163.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

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

=====

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION(MIN.) = 15.08

RAINFALL INTENSITY(INCH/HR) = 3.21

AREA-AVERAGED Fm(INCH/HR) = 0.13

AREA-AVERAGED Fp(INCH/HR) = 0.97

AREA-AVERAGED Ap = 0.13

EFFECTIVE STREAM AREA(ACRES) = 30.40

TOTAL STREAM AREA(ACRES) = 30.40

PEAK FLOW RATE(CFS) AT CONFLUENCE = 87.85

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	96.27	15.88	3.108	0.97(0.15)	0.15	36.1	160.00
2	87.85	15.08	3.206	0.97(0.13)	0.13	30.4	164.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	182.29	15.08	3.206	0.97(0.14)	0.14	64.7	164.00
2	181.33	15.88	3.108	0.97(0.14)	0.14	66.5	160.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 182.29 Tc (MIN.) = 15.08
 EFFECTIVE AREA (ACRES) = 64.68 AREA-AVERAGED Fm (INCH/HR) = 0.14
 AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.14
 TOTAL AREA (ACRES) = 66.5
 LONGEST FLOWPATH FROM NODE 160.00 TO NODE 163.00 = 2300.00 FEET.

 FLOW PROCESS FROM NODE 163.00 TO NODE 170.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 978.00 DOWNSTREAM (FEET) = 972.00
 FLOW LENGTH (FEET) = 2090.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 72.0 INCH PIPE IS 53.3 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 8.12
 ESTIMATED PIPE DIAMETER (INCH) = 72.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 182.29
 PIPE TRAVEL TIME (MIN.) = 4.29 Tc (MIN.) = 19.37
 LONGEST FLOWPATH FROM NODE 160.00 TO NODE 170.00 = 4390.00 FEET.

 FLOW PROCESS FROM NODE 170.00 TO NODE 170.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 19.37
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.759
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	42.70	0.98	0.100	32
COMMERCIAL	A	5.60	0.98	0.100	32
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	5.10	0.98	0.500	32
COMMERCIAL	A	10.30	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.132
 SUBAREA AREA (ACRES) = 63.70 SUBAREA RUNOFF (CFS) = 150.78
 EFFECTIVE AREA (ACRES) = 128.38 AREA-AVERAGED Fm (INCH/HR) = 0.13
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.14
 TOTAL AREA (ACRES) = 130.2 PEAK FLOW RATE (CFS) = 303.35

 FLOW PROCESS FROM NODE 170.00 TO NODE 170.00 IS CODE = 11

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

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	303.35	19.37	2.759	0.98(0.13)	0.14	128.4	164.00
2	299.85	20.17	2.692	0.97(0.13)	0.14	130.2	160.00

LONGEST FLOWPATH FROM NODE 160.00 TO NODE 170.00 = 4390.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	657.76	20.62	2.657	0.97(0.33)	0.34	294.5	111.00
2	664.73	23.79	2.439	0.98(0.33)	0.34	331.8	105.00
3	660.11	25.12	2.361	0.98(0.33)	0.34	343.4	150.00
4	659.60	25.15	2.359	0.98(0.33)	0.34	343.5	100.00

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 170.00 = 9810.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	948.24	19.37	2.759	0.98(0.27)	0.27	405.1	164.00
2	953.10	20.17	2.692	0.97(0.27)	0.28	418.4	160.00
3	953.51	20.62	2.657	0.97(0.27)	0.28	424.7	111.00
4	934.86	23.79	2.439	0.98(0.28)	0.28	462.0	105.00
5	921.09	25.12	2.361	0.98(0.28)	0.29	473.6	150.00
6	920.34	25.15	2.359	0.97(0.28)	0.29	473.7	100.00

TOTAL AREA (ACRES) = 473.7

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 953.51 Tc (MIN.) = 20.618
 EFFECTIVE AREA (ACRES) = 424.73 AREA-AVERAGED Fm (INCH/HR) = 0.27
 AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.28
 TOTAL AREA (ACRES) = 473.7
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 170.00 = 9810.00 FEET.

 FLOW PROCESS FROM NODE 170.00 TO NODE 170.00 IS CODE = 12

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

 FLOW PROCESS FROM NODE 170.00 TO NODE 180.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 972.00 DOWNSTREAM (FEET) = 968.00
 FLOW LENGTH (FEET) = 780.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 120.0 INCH PIPE IS 89.0 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 15.26
 ESTIMATED PIPE DIAMETER (INCH) = 120.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 953.51

PIPE TRAVEL TIME(MIN.) = 0.85 Tc(MIN.) = 21.47
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 180.00 = 10590.00 FEET.

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0150

 FLOW PROCESS FROM NODE 180.00 TO NODE 180.00 IS CODE = 1

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 77.68

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.72
 HALFSTREET FLOOD WIDTH(FEET) = 31.04
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.71
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 3.41
 STREET FLOW TRAVEL TIME(MIN.) = 4.84 Tc(MIN.) = 15.43
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.162

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	7.80	0.98	0.100	32
COMMERCIAL	A	20.90	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA(ACRES) = 28.70 SUBAREA RUNOFF(CFS) = 79.17

EFFECTIVE AREA(ACRES) = 39.60 AREA-AVERAGED Fm(INCH/HR) = 0.10

AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10

TOTAL AREA(ACRES) = 39.6 PEAK FLOW RATE(CFS) = 109.23

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.80 HALFSTREET FLOOD WIDTH(FEET) = 38.61

FLOW VELOCITY(FEET/SEC.) = 5.02 DEPTH*VELOCITY(FT*FT/SEC.) = 4.01

*NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,

AND L = 1370.0 FT WITH ELEVATION-DROP = 17.0 FT, IS 87.4 CFS,

WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 180.00

LONGEST FLOWPATH FROM NODE 171.00 TO NODE 180.00 = 2170.00 FEET.

 FLOW PROCESS FROM NODE 180.00 TO NODE 180.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

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

=====

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION(MIN.) = 15.43

RAINFALL INTENSITY(INCH/HR) = 3.16

AREA-AVERAGED Fm(INCH/HR) = 0.10

AREA-AVERAGED Fp(INCH/HR) = 0.98

AREA-AVERAGED Ap = 0.10

EFFECTIVE STREAM AREA(ACRES) = 39.60

TOTAL STREAM AREA(ACRES) = 39.60

PEAK FLOW RATE(CFS) AT CONFLUENCE = 109.23

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	948.24	20.22	2.688	0.98(0.27)	0.27	405.1	164.00
1	953.10	21.03	2.626	0.97(0.27)	0.28	418.4	160.00
1	953.51	21.47	2.594	0.97(0.27)	0.28	424.7	111.00
1	934.86	24.64	2.388	0.98(0.28)	0.28	462.0	105.00

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION(MIN.) = 21.47

RAINFALL INTENSITY(INCH/HR) = 2.59

AREA-AVERAGED Fm(INCH/HR) = 0.27

AREA-AVERAGED Fp(INCH/HR) = 0.98

AREA-AVERAGED Ap = 0.28

EFFECTIVE STREAM AREA(ACRES) = 424.73

TOTAL STREAM AREA(ACRES) = 473.70

PEAK FLOW RATE(CFS) AT CONFLUENCE = 953.51

 FLOW PROCESS FROM NODE 171.00 TO NODE 172.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 800.00

ELEVATION DATA: UPSTREAM(FEET) = 995.00 DOWNSTREAM(FEET) = 985.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.586

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.964

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	1.90	0.98	0.100	32	10.59
COMMERCIAL	A	9.00	0.98	0.100	32	10.59

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA RUNOFF(CFS) = 37.93

TOTAL AREA(ACRES) = 10.90 PEAK FLOW RATE(CFS) = 37.93

 FLOW PROCESS FROM NODE 172.00 TO NODE 180.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 2 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 985.00 DOWNSTREAM ELEVATION(FEET) = 968.00

STREET LENGTH(FEET) = 1370.00 CURB HEIGHT(INCHES) = 8.0

STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

1	921.09	25.99	2.313	0.98(0.28)	0.29	473.6	150.00
1	920.34	26.03	2.311	0.97(0.28)	0.29	473.7	100.00
2	109.23	15.43	3.162	0.98(0.10)	0.10	39.6	171.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	974.28	15.43	3.162	0.98(0.25)	0.25	348.7	171.00
2	1040.58	20.22	2.688	0.97(0.25)	0.26	444.7	164.00
3	1043.23	21.03	2.626	0.98(0.25)	0.26	458.0	160.00
4	1042.47	21.47	2.594	0.97(0.25)	0.26	464.3	111.00
5	1016.48	24.64	2.388	0.98(0.26)	0.27	501.6	105.00
6	1000.05	25.99	2.313	0.98(0.26)	0.27	513.2	150.00
7	999.22	26.03	2.311	0.97(0.26)	0.27	513.3	100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 1043.23 Tc(MIN.) = 21.03
EFFECTIVE AREA(ACRES) = 457.98 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.26
TOTAL AREA(ACRES) = 513.3
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 180.00 = 10590.00 FEET.

SUBAREA AREA(ACRES) = 76.80 SUBAREA RUNOFF(CFS) = 160.64
EFFECTIVE AREA(ACRES) = 534.78 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.24
TOTAL AREA(ACRES) = 590.1 PEAK FLOW RATE(CFS) = 1057.24

FLOW PROCESS FROM NODE 181.00 TO NODE 182.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 950.00
ELEVATION DATA: UPSTREAM(FEET) = 1010.00 DOWNSTREAM(FEET) = 985.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.771
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.160
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	0.80	0.98	0.100	32	9.77
COMMERCIAL	A	6.30	0.98	0.100	32	9.77

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 25.96

TOTAL AREA(ACRES) = 7.10 PEAK FLOW RATE(CFS) = 25.96

FLOW PROCESS FROM NODE 182.00 TO NODE 183.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 985.00 DOWNSTREAM ELEVATION(FEET) = 978.00
STREET LENGTH(FEET) = 850.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 49.40
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.67
HALFSTREET FLOOD WIDTH(FEET) = 25.98
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.64
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.44
STREET FLOW TRAVEL TIME(MIN.) = 3.90 Tc(MIN.) = 13.67
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.401

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

FLOW PROCESS FROM NODE 180.00 TO NODE 1000.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 968.00 DOWNSTREAM(FEET) = 950.00
FLOW LENGTH(FEET) = 2930.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 120.0 INCH PIPE IS 89.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.70
ESTIMATED PIPE DIAMETER(INCH) = 120.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 1043.23
PIPE TRAVEL TIME(MIN.) = 2.92 Tc(MIN.) = 23.95
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 1000.00 = 13520.00 FEET.

FLOW PROCESS FROM NODE 1000.00 TO NODE 1000.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 23.95
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.429

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 8.70 0.98 0.100 32
COMMERCIAL A 56.40 0.98 0.100 32
COMMERCIAL A 10.50 0.98 0.100 32
SCHOOL A 1.20 0.98 0.600 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.108

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 2.10 0.98 0.100 32
COMMERCIAL A 13.60 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 15.70 SUBAREA RUNOFF (CFS) = 46.68
EFFECTIVE AREA (ACRES) = 22.80 AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 22.8 PEAK FLOW RATE (CFS) = 67.79

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH (FEET) = 0.74 HALFSTREET FLOOD WIDTH (FEET) = 32.51
FLOW VELOCITY (FEET/SEC.) = 3.89 DEPTH*VELOCITY (FT*FT/SEC.) = 2.87
*NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
AND L = 850.0 FT WITH ELEVATION-DROP = 7.0 FT, IS 51.1 CFS,
WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 183.00
LONGEST FLOWPATH FROM NODE 181.00 TO NODE 183.00 = 1800.00 FEET.

FLOW PROCESS FROM NODE 183.00 TO NODE 190.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 978.00 DOWNSTREAM (FEET) = 960.00
FLOW LENGTH (FEET) = 1600.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 28.0 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 10.63
ESTIMATED PIPE DIAMETER (INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 67.79
PIPE TRAVEL TIME (MIN.) = 2.51 Tc (MIN.) = 16.18
LONGEST FLOWPATH FROM NODE 181.00 TO NODE 190.00 = 3400.00 FEET.

FLOW PROCESS FROM NODE 190.00 TO NODE 190.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc (MIN.) = 16.18
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.074
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 7.90 0.98 0.100 32
COMMERCIAL A 26.20 0.98 0.100 32
PUBLIC PARK A 0.50 0.98 0.850 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.111
SUBAREA AREA (ACRES) = 34.60 SUBAREA RUNOFF (CFS) = 92.35
EFFECTIVE AREA (ACRES) = 57.40 AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.11
TOTAL AREA (ACRES) = 57.4 PEAK FLOW RATE (CFS) = 153.43

FLOW PROCESS FROM NODE 191.00 TO NODE 192.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 1050.00
ELEVATION DATA: UPSTREAM (FEET) = 970.00 DOWNSTREAM (FEET) = 965.00
Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 14.315
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.308
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 2.70 0.98 0.100 32 14.32
PUBLIC PARK A 3.90 0.98 0.850 32 22.74
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.543
SUBAREA RUNOFF (CFS) = 16.50
TOTAL AREA (ACRES) = 6.60 PEAK FLOW RATE (CFS) = 16.50

FLOW PROCESS FROM NODE 192.00 TO NODE 193.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 965.00 DOWNSTREAM (FEET) = 960.00
FLOW LENGTH (FEET) = 1460.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 19.7 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 4.82
ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 16.50
PIPE TRAVEL TIME (MIN.) = 5.05 Tc (MIN.) = 19.36
LONGEST FLOWPATH FROM NODE 191.00 TO NODE 193.00 = 2510.00 FEET.

FLOW PROCESS FROM NODE 193.00 TO NODE 193.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc (MIN.) = 19.36
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.760
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 4.00 0.98 0.100 32
PUBLIC PARK A 4.90 0.98 0.850 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.513
SUBAREA AREA (ACRES) = 8.90 SUBAREA RUNOFF (CFS) = 18.10
EFFECTIVE AREA (ACRES) = 15.50 AREA-AVERAGED Fm (INCH/HR) = 0.51
AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.53
TOTAL AREA (ACRES) = 15.5 PEAK FLOW RATE (CFS) = 31.35

FLOW PROCESS FROM NODE 193.00 TO NODE 1000.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 960.00 DOWNSTREAM(FEET) = 950.00
FLOW LENGTH(FEET) = 2980.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.54
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 31.35
PIPE TRAVEL TIME(MIN.) = 8.97 Tc(MIN.) = 28.33
LONGEST FLOWPATH FROM NODE 191.00 TO NODE 1000.00 = 5490.00 FEET.

FLOW PROCESS FROM NODE 1000.00 TO NODE 1000.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 28.33
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.196
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	7.50	0.98	0.100	32
PUBLIC PARK	A	9.70	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.523
SUBAREA AREA(ACRES) = 17.20 SUBAREA RUNOFF(CFS) = 26.10
EFFECTIVE AREA(ACRES) = 32.70 AREA-AVERAGED Fm(INCH/HR) = 0.51
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.52
TOTAL AREA(ACRES) = 32.7 PEAK FLOW RATE(CFS) = 49.59

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 32.7 TC(MIN.) = 28.33
EFFECTIVE AREA(ACRES) = 32.70 AREA-AVERAGED Fm(INCH/HR) = 0.51
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.524
PEAK FLOW RATE(CFS) = 49.59

=====

END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
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***** DESCRIPTION OF STUDY *****

* ONTARIO MASTER PLAN OF DRAINAGE - BASIN IV (AREA B) *
* 25-YEAR HYDROLOGY ANALYSIS *
* P. PAGADUAN 8-10-2011 *

FILE NAME: IVB25.DAT
TIME/DATE OF STUDY: 07:47 08/10/2011

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USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.80
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL
10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) = 0.950
100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) = 1.400
COMPUTED RAINFALL INTENSITY DATA:
STORM EVENT = 25.00 1-HOUR INTENSITY(INCH/HOUR) = 1.1070
SLOPE OF INTENSITY DURATION CURVE = 0.6000

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150
2	32.0	27.0	0.020/0.020/0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

UNIT-HYDROGRAPH MODEL SELECTIONS/PARAMETERS:

WATERSHED LAG = 0.80 * Tc
USED "VALLEY UNDEVELOPED" S-GRAPH FOR DEVELOPMENTS OF
2 UNITS/ACRE AND LESS; AND "VALLEY DEVELOPED" S-GRAPH
FOR DEVELOPMENTS OF 3-4 UNITS/ACRE AND MORE.

USER SPECIFIED RAINFALL VALUES:

2-YR 6-HR RAINFALL DEPTH(INCH) = 1.70
2-YR 24-HR RAINFALL DEPTH(INCH) = 3.20
100-YR 6-HR RAINFALL DEPTH(INCH) = 3.50
100-YR 24-HR RAINFALL DEPTH(INCH) = 8.50
SIERRA MADRE DEPTH-AREA FACTORS USED.

DURATION	AREA-AVERAGED RAINFALL(INCH)
5-MINUTES	0.38
30-MINUTES	0.79
1-HOUR	1.04
3-HOUR	1.87
6-HOUR	2.71
24-HOUR	5.30

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR UNIT HYDROGRAPH METHOD

FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 970.00
ELEVATION DATA: UPSTREAM(FEET) = 1085.00 DOWNSTREAM(FEET) = 1063.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.150
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.215
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	0.40	0.98	0.100	32	10.15
COMMERCIAL	A	9.00	0.98	0.100	32	10.15

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 26.37
TOTAL AREA(ACRES) = 9.40 PEAK FLOW RATE(CFS) = 26.37

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 1063.00 DOWNSTREAM ELEVATION(FEET) = 1048.00
STREET LENGTH(FEET) = 840.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 38.64

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.56
 HALFSTREET FLOOD WIDTH(FEET) = 20.06
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.59
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.57
 STREET FLOW TRAVEL TIME(MIN.) = 3.05 Tc(MIN.) = 13.20

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.746

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	2.50	0.98	0.100	32
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	3.30	0.98	0.500	32
PUBLIC PARK	A	6.80	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.610
 SUBAREA AREA(ACRES) = 12.60 SUBAREA RUNOFF(CFS) = 24.40
 EFFECTIVE AREA(ACRES) = 22.00 AREA-AVERAGED Fm(INCH/HR) = 0.38
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.39
 TOTAL AREA(ACRES) = 22.0 PEAK FLOW RATE(CFS) = 46.80

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.59 HALFSTREET FLOOD WIDTH(FEET) = 21.64
 FLOW VELOCITY(FEET/SEC.) = 4.80 DEPTH*VELOCITY(FT*FT/SEC.) = 2.84
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 1810.00 FEET.

FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 2 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 1048.00 DOWNSTREAM ELEVATION(FEET) = 1040.00
 STREET LENGTH(FEET) = 400.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.020
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 55.91

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.61
 HALFSTREET FLOOD WIDTH(FEET) = 22.69

AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.24
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 3.20
 STREET FLOW TRAVEL TIME(MIN.) = 1.27 Tc(MIN.) = 14.47
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.598

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	2.10	0.98	0.100	32
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	4.50	0.98	0.500	32
PUBLIC PARK	A	3.10	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.525
 SUBAREA AREA(ACRES) = 9.70 SUBAREA RUNOFF(CFS) = 18.21
 EFFECTIVE AREA(ACRES) = 31.70 AREA-AVERAGED Fm(INCH/HR) = 0.42
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.43
 TOTAL AREA(ACRES) = 31.7 PEAK FLOW RATE(CFS) = 62.09

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.63 HALFSTREET FLOOD WIDTH(FEET) = 23.64
 FLOW VELOCITY(FEET/SEC.) = 5.37 DEPTH*VELOCITY(FT*FT/SEC.) = 3.39
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 103.00 = 2210.00 FEET.

FLOW PROCESS FROM NODE 103.00 TO NODE 104.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1040.00 DOWNSTREAM(FEET) = 1018.00
 FLOW LENGTH(FEET) = 1360.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 11.97
 ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 62.09
 PIPE TRAVEL TIME(MIN.) = 1.89 Tc(MIN.) = 16.37
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 104.00 = 3570.00 FEET.

FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 16.37
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.413
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	7.70	0.98	0.100	32
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	19.70	0.98	0.500	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.388
 SUBAREA AREA(ACRES) = 27.40 SUBAREA RUNOFF(CFS) = 50.20
 EFFECTIVE AREA(ACRES) = 59.10 AREA-AVERAGED Fm(INCH/HR) = 0.40
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.41

TOTAL AREA (ACRES) = 59.1 PEAK FLOW RATE (CFS) = 107.02

 FLOW PROCESS FROM NODE 104.00 TO NODE 110.00 IS CODE = 31

 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<
 =====
 ELEVATION DATA: UPSTREAM (FEET) = 1018.00 DOWNSTREAM (FEET) = 1015.00
 FLOW LENGTH (FEET) = 1070.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 57.0 INCH PIPE IS 46.5 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 6.92
 ESTIMATED PIPE DIAMETER (INCH) = 57.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 107.02
 PIPE TRAVEL TIME (MIN.) = 2.58 Tc (MIN.) = 18.94
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 110.00 = 4640.00 FEET.

 FLOW PROCESS FROM NODE 110.00 TO NODE 110.00 IS CODE = 1

 >>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<<
 =====
 TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION (MIN.) = 18.94
 RAINFALL INTENSITY (INCH/HR) = 2.21
 AREA-AVERAGED Fm (INCH/HR) = 0.40
 AREA-AVERAGED Fp (INCH/HR) = 0.98
 AREA-AVERAGED Ap = 0.41
 EFFECTIVE STREAM AREA (ACRES) = 59.10
 TOTAL STREAM AREA (ACRES) = 59.10
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 107.02

 FLOW PROCESS FROM NODE 105.00 TO NODE 106.00 IS CODE = 21

 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 =====
 INITIAL SUBAREA FLOW-LENGTH (FEET) = 550.00
 ELEVATION DATA: UPSTREAM (FEET) = 1070.00 DOWNSTREAM (FEET) = 1062.00

 $Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.840
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.493
 SUBAREA Tc AND LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
 COMMERCIAL A 3.00 0.98 0.100 32 8.84
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF (CFS) = 9.17
 TOTAL AREA (ACRES) = 3.00 PEAK FLOW RATE (CFS) = 9.17

 FLOW PROCESS FROM NODE 106.00 TO NODE 107.00 IS CODE = 62

 >>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<
 >>>>(STREET TABLE SECTION # 2 USED)<<<<<<
 =====
 UPSTREAM ELEVATION (FEET) = 1062.00 DOWNSTREAM ELEVATION (FEET) = 1045.00
 STREET LENGTH (FEET) = 830.00 CURB HEIGHT (INCHES) = 8.0
 STREET HALFWIDTH (FEET) = 32.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 27.00
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

 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 = 0.0150

 **TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 25.07
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH (FEET) = 0.49
 HALFSTREET FLOOD WIDTH (FEET) = 16.42
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.34
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 2.11
 STREET FLOW TRAVEL TIME (MIN.) = 3.18 Tc (MIN.) = 12.02
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.904
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 3.80 0.98 0.100 32
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE" A 9.50 0.98 0.500 32
 COMMERCIAL A 0.50 0.98 0.100 32
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.375
 SUBAREA AREA (ACRES) = 13.80 SUBAREA RUNOFF (CFS) = 31.52
 EFFECTIVE AREA (ACRES) = 16.80 AREA-AVERAGED Fm (INCH/HR) = 0.32
 AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.33
 TOTAL AREA (ACRES) = 16.8 PEAK FLOW RATE (CFS) = 39.10

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.55 HALFSTREET FLOOD WIDTH (FEET) = 19.63
 FLOW VELOCITY (FEET/SEC.) = 4.83 DEPTH*VELOCITY (FT*FT/SEC.) = 2.66
 LONGEST FLOWPATH FROM NODE 105.00 TO NODE 107.00 = 1380.00 FEET.

 FLOW PROCESS FROM NODE 107.00 TO NODE 108.00 IS CODE = 62

 >>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<
 >>>>(STREET TABLE SECTION # 2 USED)<<<<<<
 =====
 UPSTREAM ELEVATION (FEET) = 1045.00 DOWNSTREAM ELEVATION (FEET) = 1035.00
 STREET LENGTH (FEET) = 880.00 CURB HEIGHT (INCHES) = 8.0
 STREET HALFWIDTH (FEET) = 32.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 27.00
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 51.13
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.65
 HALFSTREET FLOOD WIDTH(FEET) = 24.49
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.13
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.68
 STREET FLOW TRAVEL TIME(MIN.) = 3.55 Tc(MIN.) = 15.57
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.487
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	3.80	0.98	0.100	32
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	8.80	0.98	0.500	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.379
 SUBAREA AREA(ACRES) = 12.60 SUBAREA RUNOFF(CFS) = 24.00
 EFFECTIVE AREA(ACRES) = 29.40 AREA-AVERAGED Fm(INCH/HR) = 0.34
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.35
 TOTAL AREA(ACRES) = 29.4 PEAK FLOW RATE(CFS) = 56.79

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.67 HALFSTREET FLOOD WIDTH(FEET) = 25.55
 FLOW VELOCITY(FEET/SEC.) = 4.25 DEPTH*VELOCITY(FT*FT/SEC.) = 2.84
 LONGEST FLOWPATH FROM NODE 105.00 TO NODE 108.00 = 2260.00 FEET.

 FLOW PROCESS FROM NODE 108.00 TO NODE 110.00 IS CODE = 31

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

 ELEVATION DATA: UPSTREAM(FEET) = 1035.00 DOWNSTREAM(FEET) = 1015.00
 FLOW LENGTH(FEET) = 1340.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 26.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 11.09
 ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 56.79
 PIPE TRAVEL TIME(MIN.) = 2.01 Tc(MIN.) = 17.59
 LONGEST FLOWPATH FROM NODE 105.00 TO NODE 110.00 = 3600.00 FEET.

 FLOW PROCESS FROM NODE 110.00 TO NODE 110.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

 MAINLINE Tc(MIN.) = 17.59
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.312
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	18.60	0.98	0.100	32
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	6.30	0.98	0.500	32
SCHOOL	A	9.20	0.98	0.600	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.309
 SUBAREA AREA(ACRES) = 34.10 SUBAREA RUNOFF(CFS) = 61.71
 EFFECTIVE AREA(ACRES) = 63.50 AREA-AVERAGED Fm(INCH/HR) = 0.32
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.33
 TOTAL AREA(ACRES) = 63.5 PEAK FLOW RATE(CFS) = 113.87

 FLOW PROCESS FROM NODE 110.00 TO NODE 110.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

 TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 17.59
 RAINFALL INTENSITY(INCH/HR) = 2.31
 AREA-AVERAGED Fm(INCH/HR) = 0.32
 AREA-AVERAGED Fp(INCH/HR) = 0.97
 AREA-AVERAGED Ap = 0.33
 EFFECTIVE STREAM AREA(ACRES) = 63.50
 TOTAL STREAM AREA(ACRES) = 63.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 113.87

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	107.02	18.94	2.211	0.98(0.40)	0.41	59.1	100.00
2	113.87	17.59	2.312	0.97(0.32)	0.33	63.5	105.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	218.76	17.59	2.312	0.97(0.36)	0.37	118.4	105.00
2	215.12	18.94	2.211	0.97(0.36)	0.37	122.6	100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 218.76 Tc(MIN.) = 17.59
 EFFECTIVE AREA(ACRES) = 118.36 AREA-AVERAGED Fm(INCH/HR) = 0.36
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.37
 TOTAL AREA(ACRES) = 122.6
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 110.00 = 4640.00 FEET.

 FLOW PROCESS FROM NODE 110.00 TO NODE 120.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

```

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1015.00 DOWNSTREAM(FEET) = 1012.00
FLOW LENGTH(FEET) = 1120.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 78.0 INCH PIPE IS 57.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.28
ESTIMATED PIPE DIAMETER(INCH) = 78.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 218.76
PIPE TRAVEL TIME(MIN.) = 2.25 Tc(MIN.) = 19.84
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 120.00 = 5760.00 FEET.

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*****
FLOW PROCESS FROM NODE 120.00 TO NODE 120.00 IS CODE = 1
-----

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```

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 19.84
RAINFALL INTENSITY(INCH/HR) = 2.15
AREA-AVERAGED Fm(INCH/HR) = 0.36
AREA-AVERAGED Fp(INCH/HR) = 0.97
AREA-AVERAGED Ap = 0.37
EFFECTIVE STREAM AREA(ACRES) = 118.36
TOTAL STREAM AREA(ACRES) = 122.60
PEAK FLOW RATE(CFS) AT CONFLUENCE = 218.76

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```

*****
FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
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INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
ELEVATION DATA: UPSTREAM(FEET) = 1050.00 DOWNSTREAM(FEET) = 1035.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 11.160
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.037
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS  Tc
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL          A      2.70   0.98   0.100  32  11.16
RESIDENTIAL
"5-7 DWELLINGS/ACRE"  A      5.80   0.98   0.500  32  14.28
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.373
SUBAREA RUNOFF(CFS) = 20.45
TOTAL AREA(ACRES) = 8.50 PEAK FLOW RATE(CFS) = 20.45

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*****
FLOW PROCESS FROM NODE 112.00 TO NODE 112.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 11.16

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```

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.037
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          A      1.50   0.98   0.100  32
RESIDENTIAL
"5-7 DWELLINGS/ACRE"  A      3.50   0.98   0.500  32
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.380
SUBAREA AREA(ACRES) = 5.00 SUBAREA RUNOFF(CFS) = 12.00
EFFECTIVE AREA(ACRES) = 13.50 AREA-AVERAGED Fm(INCH/HR) = 0.37
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 13.5 PEAK FLOW RATE(CFS) = 32.45

```

```

*****
FLOW PROCESS FROM NODE 112.00 TO NODE 120.00 IS CODE = 62
-----

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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 1035.00 DOWNSTREAM ELEVATION(FEET) = 1012.00
STREET LENGTH(FEET) = 1500.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 32.00

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DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

```

```

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

```

```

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 65.70
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.67
HALFSTREET FLOOD WIDTH(FEET) = 25.45
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.93
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 3.29
STREET FLOW TRAVEL TIME(MIN.) = 5.07 Tc(MIN.) = 16.23
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.426
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          A      11.80   0.98   0.100  32
RESIDENTIAL
"5-7 DWELLINGS/ACRE"  A      23.70   0.98   0.500  32
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.367
SUBAREA AREA(ACRES) = 35.50 SUBAREA RUNOFF(CFS) = 66.08
EFFECTIVE AREA(ACRES) = 49.00 AREA-AVERAGED Fm(INCH/HR) = 0.36
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 49.0 PEAK FLOW RATE(CFS) = 91.10

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```

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.73 HALFSTREET FLOOD WIDTH(FEET) = 32.20

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FLOW VELOCITY(FEET/SEC.) = 5.29 DEPTH*VELOCITY(FT*FT/SEC.) = 3.89
 *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
 AND L = 1500.0 FT WITH ELEVATION-DROP = 23.0 FT, IS 76.8 CFS,
 WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 120.00
 LONGEST FLOWPATH FROM NODE 111.00 TO NODE 120.00 = 2500.00 FEET.

PIPE-FLOW VELOCITY(FEET/SEC.) = 10.12
 ESTIMATED PIPE DIAMETER(INCH) = 81.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 297.70
 PIPE TRAVEL TIME(MIN.) = 1.75 Tc(MIN.) = 21.59
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 130.00 = 6820.00 FEET.

 FLOW PROCESS FROM NODE 120.00 TO NODE 120.00 IS CODE = 1

 FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 81

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 16.23
 RAINFALL INTENSITY(INCH/HR) = 2.43
 AREA-AVERAGED Fm(INCH/HR) = 0.36
 AREA-AVERAGED Fp(INCH/HR) = 0.98
 AREA-AVERAGED Ap = 0.37
 EFFECTIVE STREAM AREA(ACRES) = 49.00
 TOTAL STREAM AREA(ACRES) = 49.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 91.10

=====

MAINLINE Tc(MIN.) = 21.59
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.044
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	2.00	0.98	0.100	32
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	A	24.30	0.98	0.200	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.192
 SUBAREA AREA(ACRES) = 26.30 SUBAREA RUNOFF(CFS) = 43.94
 EFFECTIVE AREA(ACRES) = 193.66 AREA-AVERAGED Fm(INCH/HR) = 0.33
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.34
 TOTAL AREA(ACRES) = 197.9 PEAK FLOW RATE(CFS) = 297.90

** CONFLUENCE DATA **

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	218.76	19.84	2.150	0.97(0.36)	0.37	118.4	105.00
1	215.12	21.24	2.064	0.97(0.36)	0.37	122.6	100.00
2	91.10	16.23	2.426	0.98(0.36)	0.37	49.0	111.00

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	301.96	17.97	2.282	0.97(0.33)	0.34	172.1	111.00
2	297.90	21.59	2.044	0.98(0.33)	0.34	193.7	105.00
3	290.64	22.99	1.968	0.98(0.34)	0.35	197.9	100.00

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

** PEAK FLOW RATE TABLE **

NEW PEAK FLOW DATA ARE:

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	297.53	16.23	2.426	0.98(0.36)	0.37	145.8	111.00
2	297.70	19.84	2.150	0.97(0.36)	0.37	167.4	105.00
3	290.26	21.24	2.064	0.97(0.36)	0.37	171.6	100.00

PEAK FLOW RATE(CFS) = 301.96 Tc(MIN.) = 17.97
 AREA-AVERAGED Fm(INCH/HR) = 0.33 AREA-AVERAGED Fp(INCH/HR) = 0.97
 AREA-AVERAGED Ap = 0.34 EFFECTIVE AREA(ACRES) = 172.10

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 297.70 Tc(MIN.) = 19.84
 EFFECTIVE AREA(ACRES) = 167.36 AREA-AVERAGED Fm(INCH/HR) = 0.36
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.37
 TOTAL AREA(ACRES) = 171.6
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 120.00 = 5760.00 FEET.

 FLOW PROCESS FROM NODE 130.00 TO NODE 140.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 1008.00 DOWNSTREAM(FEET) = 1007.00
 FLOW LENGTH(FEET) = 430.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 87.0 INCH PIPE IS 71.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 8.36
 ESTIMATED PIPE DIAMETER(INCH) = 87.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 301.96
 PIPE TRAVEL TIME(MIN.) = 0.86 Tc(MIN.) = 18.83
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 140.00 = 7250.00 FEET.

 FLOW PROCESS FROM NODE 120.00 TO NODE 130.00 IS CODE = 31

 FLOW PROCESS FROM NODE 140.00 TO NODE 140.00 IS CODE = 81

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

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1012.00 DOWNSTREAM(FEET) = 1008.00
 FLOW LENGTH(FEET) = 1060.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 81.0 INCH PIPE IS 62.1 INCHES

```

=====
MAINLINE Tc(MIN.) = 18.83
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.219
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          A        3.00    0.98    0.100   32
COMMERCIAL          A        9.00    0.98    0.100   32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 12.00    SUBAREA RUNOFF(CFS) = 22.91
EFFECTIVE AREA(ACRES) = 184.10  AREA-AVERAGED Fm(INCH/HR) = 0.32
AREA-AVERAGED Fp(INCH/HR) = 0.97  AREA-AVERAGED Ap = 0.33
TOTAL AREA(ACRES) = 209.9    PEAK FLOW RATE(CFS) = 315.12

```

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*****
FLOW PROCESS FROM NODE 140.00 TO NODE 153.00 IS CODE = 31
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```

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

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 1007.00  DOWNSTREAM(FEET) = 990.00
FLOW LENGTH(FEET) = 1280.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 66.0 INCH PIPE IS 49.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.51
ESTIMATED PIPE DIAMETER(INCH) = 66.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 315.12
PIPE TRAVEL TIME(MIN.) = 1.29    Tc(MIN.) = 20.12
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 153.00 = 8530.00 FEET.

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```

*****
FLOW PROCESS FROM NODE 153.00 TO NODE 153.00 IS CODE = 1
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```

```

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

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```

=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 20.12
RAINFALL INTENSITY(INCH/HR) = 2.13
AREA-AVERAGED Fm(INCH/HR) = 0.32
AREA-AVERAGED Fp(INCH/HR) = 0.97
AREA-AVERAGED Ap = 0.33
EFFECTIVE STREAM AREA(ACRES) = 184.10
TOTAL STREAM AREA(ACRES) = 209.90
PEAK FLOW RATE(CFS) AT CONFLUENCE = 315.12

```

```

*****
FLOW PROCESS FROM NODE 150.00 TO NODE 151.00 IS CODE = 21
-----

```

```

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

```

```

=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 980.00
ELEVATION DATA: UPSTREAM(FEET) = 1022.00  DOWNSTREAM(FEET) = 1010.00
Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20

```

```

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 11.529
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.978
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS  Tc
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL          A        3.50    0.98    0.100   32  11.53
RESIDENTIAL
"5-7 DWELLINGS/ACRE"  A        7.50    0.98    0.500   32  14.75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.373
SUBAREA RUNOFF(CFS) = 25.89
TOTAL AREA(ACRES) = 11.00    PEAK FLOW RATE(CFS) = 25.89

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*****
FLOW PROCESS FROM NODE 151.00 TO NODE 152.00 IS CODE = 62
-----

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```

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<

```

```

=====
UPSTREAM ELEVATION(FEET) = 1010.00  DOWNSTREAM ELEVATION(FEET) = 998.00
STREET LENGTH(FEET) = 1420.00  CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 32.00

```

```

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

```

```

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

```

```

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 56.90
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.70
HALFSTREET FLOOD WIDTH(FEET) = 28.61
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.79
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.65
STREET FLOW TRAVEL TIME(MIN.) = 6.25    Tc(MIN.) = 17.78
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.297

```

```

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          A        16.80    0.98    0.100   32
RESIDENTIAL
"5-7 DWELLINGS/ACRE"  A        10.40    0.98    0.500   32
RESIDENTIAL
"11+ DWELLINGS/ACRE"  A         2.00    0.98    0.200   32
PUBLIC PARK          A         5.70    0.98    0.850   32

```

```

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.347
SUBAREA AREA(ACRES) = 34.90    SUBAREA RUNOFF(CFS) = 61.50
EFFECTIVE AREA(ACRES) = 45.90  AREA-AVERAGED Fm(INCH/HR) = 0.34
AREA-AVERAGED Fp(INCH/HR) = 0.98  AREA-AVERAGED Ap = 0.35
TOTAL AREA(ACRES) = 45.9    PEAK FLOW RATE(CFS) = 80.64

```

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.77 HALFSTREET FLOOD WIDTH(FEET) = 36.10
FLOW VELOCITY(FEET/SEC.) = 4.06 DEPTH*VELOCITY(FT*FT/SEC.) = 3.14
*NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
AND L = 1420.0 FT WITH ELEVATION-DROP = 12.0 FT, IS 71.2 CFS,
WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 152.00
LONGEST FLOWPATH FROM NODE 150.00 TO NODE 152.00 = 2400.00 FEET.

RAINFALL INTENSITY(INCH/HR) = 1.88
AREA-AVERAGED Fm(INCH/HR) = 0.35
AREA-AVERAGED Fp(INCH/HR) = 0.98
AREA-AVERAGED Ap = 0.36
EFFECTIVE STREAM AREA(ACRES) = 133.60
TOTAL STREAM AREA(ACRES) = 133.60
PEAK FLOW RATE(CFS) AT CONFLUENCE = 183.44

FLOW PROCESS FROM NODE 152.00 TO NODE 153.00 IS CODE = 31

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

=====
ELEVATION DATA: UPSTREAM(FEET) = 998.00 DOWNSTREAM(FEET) = 990.00
FLOW LENGTH(FEET) = 2780.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 41.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.51
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 80.64
PIPE TRAVEL TIME(MIN.) = 7.12 Tc(MIN.) = 24.90
LONGEST FLOWPATH FROM NODE 150.00 TO NODE 153.00 = 5180.00 FEET.

FLOW PROCESS FROM NODE 153.00 TO NODE 153.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====
MAINLINE Tc(MIN.) = 24.90
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.877
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 10.90 0.98 0.100 32
COMMERCIAL A 3.30 0.98 0.100 32
RESIDENTIAL
"5-7 DWELLINGS/ACRE" A 19.00 0.98 0.500 32
RESIDENTIAL
"11+ DWELLINGS/ACRE" A 29.40 0.98 0.200 32
SCHOOL A 25.10 0.98 0.600 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.363
SUBAREA AREA(ACRES) = 87.70 SUBAREA RUNOFF(CFS) = 120.16
EFFECTIVE AREA(ACRES) = 133.60 AREA-AVERAGED Fm(INCH/HR) = 0.35
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.36
TOTAL AREA(ACRES) = 133.6 PEAK FLOW RATE(CFS) = 183.44

FLOW PROCESS FROM NODE 153.00 TO NODE 153.00 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.) = 24.90

** CONFLUENCE DATA **

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Rows 1-2.

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

** PEAK FLOW RATE TABLE **

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Rows 1-4.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 491.33 Tc(MIN.) = 23.74
EFFECTIVE AREA(ACRES) = 333.06 AREA-AVERAGED Fm(INCH/HR) = 0.33
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.34
TOTAL AREA(ACRES) = 343.5
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 153.00 = 8530.00 FEET.

FLOW PROCESS FROM NODE 153.00 TO NODE 170.00 IS CODE = 31

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

=====
ELEVATION DATA: UPSTREAM(FEET) = 990.00 DOWNSTREAM(FEET) = 972.00
FLOW LENGTH(FEET) = 1280.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 75.0 INCH PIPE IS 60.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.61
ESTIMATED PIPE DIAMETER(INCH) = 75.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 491.33
PIPE TRAVEL TIME(MIN.) = 1.15 Tc(MIN.) = 24.89
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 170.00 = 9810.00 FEET.

FLOW PROCESS FROM NODE 170.00 TO NODE 170.00 IS CODE = 10

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

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FLOW PROCESS FROM NODE 160.00 TO NODE 161.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 750.00
ELEVATION DATA: UPSTREAM(FEET) = 998.00 DOWNSTREAM(FEET) = 988.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.184
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.208
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 0.50 0.98 0.100 32 10.18
COMMERCIAL A 4.70 0.98 0.100 32 10.18
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 14.56
TOTAL AREA(ACRES) = 5.20 PEAK FLOW RATE(CFS) = 14.56
*****
FLOW PROCESS FROM NODE 161.00 TO NODE 162.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 988.00 DOWNSTREAM ELEVATION(FEET) = 987.00
STREET LENGTH(FEET) = 390.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 21.18
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.62
HALFSTREET FLOOD WIDTH(FEET) = 23.22
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.90
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.18
STREET FLOW TRAVEL TIME(MIN.) = 3.43 Tc(MIN.) = 13.61
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.696
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 1.90 0.98 0.100 32
RESIDENTIAL
"5-7 DWELLINGS/ACRE" A 4.40 0.98 0.500 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.379

SUBAREA AREA(ACRES) = 6.30 SUBAREA RUNOFF(CFS) = 13.19
EFFECTIVE AREA(ACRES) = 11.50 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.25
TOTAL AREA(ACRES) = 11.5 PEAK FLOW RATE(CFS) = 25.35

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.66 HALFSTREET FLOOD WIDTH(FEET) = 24.85
FLOW VELOCITY(FEET/SEC.) = 1.99 DEPTH*VELOCITY(FT*FT/SEC.) = 1.30
LONGEST FLOWPATH FROM NODE 160.00 TO NODE 162.00 = 1140.00 FEET.
*****
FLOW PROCESS FROM NODE 162.00 TO NODE 163.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 987.00 DOWNSTREAM(FEET) = 978.00
FLOW LENGTH(FEET) = 1160.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.29
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 25.35
PIPE TRAVEL TIME(MIN.) = 2.65 Tc(MIN.) = 16.26
LONGEST FLOWPATH FROM NODE 160.00 TO NODE 163.00 = 2300.00 FEET.
*****
FLOW PROCESS FROM NODE 163.00 TO NODE 163.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.26
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.423
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 21.10 0.98 0.100 32
COMMERCIAL A 3.50 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 24.60 SUBAREA RUNOFF(CFS) = 51.48
EFFECTIVE AREA(ACRES) = 36.10 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.15
TOTAL AREA(ACRES) = 36.1 PEAK FLOW RATE(CFS) = 74.01
*****
FLOW PROCESS FROM NODE 163.00 TO NODE 163.00 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.) = 16.26
RAINFALL INTENSITY(INCH/HR) = 2.42
AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.97
AREA-AVERAGED Ap = 0.15

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EFFECTIVE STREAM AREA (ACRES) = 36.10
 TOTAL STREAM AREA (ACRES) = 36.10
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 74.01

 FLOW PROCESS FROM NODE 164.00 TO NODE 165.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 =====
 INITIAL SUBAREA FLOW-LENGTH (FEET) = 850.00
 ELEVATION DATA: UPSTREAM (FEET) = 992.00 DOWNSTREAM (FEET) = 986.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 12.159
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.885
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	2.60	0.98	0.100	32	12.16
RESIDENTIAL "11+ DWELLINGS/ACRE"	A	7.40	0.98	0.200	32	12.96

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.174
 SUBAREA RUNOFF (CFS) = 24.44
 TOTAL AREA (ACRES) = 10.00 PEAK FLOW RATE (CFS) = 24.44

 FLOW PROCESS FROM NODE 165.00 TO NODE 166.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<
 >>>>(STREET TABLE SECTION # 2 USED)<<<<<<
 =====
 UPSTREAM ELEVATION (FEET) = 986.00 DOWNSTREAM ELEVATION (FEET) = 984.00
 STREET LENGTH (FEET) = 370.00 CURB HEIGHT (INCHES) = 8.0
 STREET HALFWIDTH (FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 27.00
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

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 = 0.0150

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 47.59
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH (FEET) = 0.71
 HALFSTREET FLOOD WIDTH (FEET) = 29.46
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.07
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 2.17
 STREET FLOW TRAVEL TIME (MIN.) = 2.01 Tc (MIN.) = 14.17

* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.632
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
COMMERCIAL	A	4.20	0.98	0.100	32
COMMERCIAL	A	4.80	0.98	0.100	32
RESIDENTIAL "11+ DWELLINGS/ACRE"	A	2.80	0.98	0.200	32
COMMERCIAL	A	8.60	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.114
 SUBAREA AREA (ACRES) = 20.40 SUBAREA RUNOFF (CFS) = 46.28
 EFFECTIVE AREA (ACRES) = 30.40 AREA-AVERAGED Fm (INCH/HR) = 0.13
 AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.13
 TOTAL AREA (ACRES) = 30.4 PEAK FLOW RATE (CFS) = 68.44

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.79 HALFSTREET FLOOD WIDTH (FEET) = 37.47
 FLOW VELOCITY (FEET/SEC.) = 3.28 DEPTH*VELOCITY (FT*FT/SEC.) = 2.58
 *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
 AND L = 370.0 FT WITH ELEVATION-DROP = 2.0 FT, IS 60.6 CFS,
 WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 166.00
 LONGEST FLOWPATH FROM NODE 164.00 TO NODE 166.00 = 1220.00 FEET.

 FLOW PROCESS FROM NODE 166.00 TO NODE 163.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<
 =====
 ELEVATION DATA: UPSTREAM (FEET) = 984.00 DOWNSTREAM (FEET) = 978.00
 FLOW LENGTH (FEET) = 640.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 30.6 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 9.81
 ESTIMATED PIPE DIAMETER (INCH) = 39.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 68.44
 PIPE TRAVEL TIME (MIN.) = 1.09 Tc (MIN.) = 15.26
 LONGEST FLOWPATH FROM NODE 164.00 TO NODE 163.00 = 1860.00 FEET.

 FLOW PROCESS FROM NODE 163.00 TO NODE 163.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<<
 =====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION (MIN.) = 15.26
 RAINFALL INTENSITY (INCH/HR) = 2.52
 AREA-AVERAGED Fm (INCH/HR) = 0.13
 AREA-AVERAGED Fp (INCH/HR) = 0.97
 AREA-AVERAGED Ap = 0.13
 EFFECTIVE STREAM AREA (ACRES) = 30.40
 TOTAL STREAM AREA (ACRES) = 30.40
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 68.44

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
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1	74.01	16.26	2.423	0.97(0.15)	0.15	36.1	160.00
2	68.44	15.26	2.517	0.97(0.13)	0.13	30.4	164.00

 FLOW PROCESS FROM NODE 170.00 TO NODE 170.00 IS CODE = 11

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

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	140.75	15.26	2.517	0.98(0.14)	0.14	64.3	164.00
2	139.73	16.26	2.423	0.97(0.14)	0.14	66.5	160.00

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	231.78	19.91	2.146	0.98(0.13)	0.14	128.0	164.00
2	228.47	20.92	2.083	0.97(0.13)	0.14	130.2	160.00

LONGEST FLOWPATH FROM NODE 160.00 TO NODE 170.00 = 4390.00 FEET.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 140.75 Tc(MIN.) = 15.26
 EFFECTIVE AREA(ACRES) = 64.27 AREA-AVERAGED Fm(INCH/HR) = 0.14
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.14
 TOTAL AREA(ACRES) = 66.5
 LONGEST FLOWPATH FROM NODE 160.00 TO NODE 163.00 = 2300.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	488.24	21.27	2.062	0.97(0.33)	0.34	292.1	111.00
2	491.33	24.89	1.877	0.98(0.33)	0.34	333.1	105.00
3	487.65	26.04	1.827	0.98(0.33)	0.34	342.7	150.00
4	484.68	26.32	1.815	0.98(0.33)	0.34	343.5	100.00

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 170.00 = 9810.00 FEET.

 FLOW PROCESS FROM NODE 163.00 TO NODE 170.00 IS CODE = 31

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	710.79	19.91	2.146	0.98(0.27)	0.27	401.4	164.00
2	714.36	20.92	2.083	0.97(0.27)	0.28	417.4	160.00
3	714.25	21.27	2.062	0.98(0.27)	0.28	422.3	111.00
4	695.62	24.89	1.877	0.98(0.28)	0.28	463.3	105.00
5	686.02	26.04	1.827	0.97(0.28)	0.29	472.9	150.00
6	681.68	26.32	1.815	0.97(0.28)	0.29	473.7	100.00

TOTAL AREA(ACRES) = 473.7

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 978.00 DOWNSTREAM(FEET) = 972.00
 FLOW LENGTH(FEET) = 2090.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 63.0 INCH PIPE IS 51.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 7.49
 ESTIMATED PIPE DIAMETER(INCH) = 63.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 140.75
 PIPE TRAVEL TIME(MIN.) = 4.65 Tc(MIN.) = 19.91
 LONGEST FLOWPATH FROM NODE 160.00 TO NODE 170.00 = 4390.00 FEET.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 714.36 Tc(MIN.) = 20.916
 EFFECTIVE AREA(ACRES) = 417.42 AREA-AVERAGED Fm(INCH/HR) = 0.27
 AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.28
 TOTAL AREA(ACRES) = 473.7
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 170.00 = 9810.00 FEET.

 FLOW PROCESS FROM NODE 170.00 TO NODE 170.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 19.91
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.146
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	42.70	0.98	0.100	32
COMMERCIAL	A	5.60	0.98	0.100	32
RESIDENTIAL "5-7 DWELLINGS/ACRE"	A	5.10	0.98	0.500	32
COMMERCIAL	A	10.30	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.132
 SUBAREA AREA(ACRES) = 63.70 SUBAREA RUNOFF(CFS) = 115.64
 EFFECTIVE AREA(ACRES) = 127.97 AREA-AVERAGED Fm(INCH/HR) = 0.13
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.14
 TOTAL AREA(ACRES) = 130.2 PEAK FLOW RATE(CFS) = 231.78

 FLOW PROCESS FROM NODE 170.00 TO NODE 170.00 IS CODE = 12

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

 FLOW PROCESS FROM NODE 170.00 TO NODE 180.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 972.00 DOWNSTREAM(FEET) = 968.00
 FLOW LENGTH(FEET) = 780.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 108.0 INCH PIPE IS 79.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 14.21

ESTIMATED PIPE DIAMETER (INCH) = 108.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 714.36
 PIPE TRAVEL TIME (MIN.) = 0.91 Tc (MIN.) = 21.83
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 180.00 = 10590.00 FEET.

 FLOW PROCESS FROM NODE 180.00 TO NODE 180.00 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.) = 21.83
 RAINFALL INTENSITY (INCH/HR) = 2.03
 AREA-AVERAGED Fm (INCH/HR) = 0.27
 AREA-AVERAGED Fp (INCH/HR) = 0.97
 AREA-AVERAGED Ap = 0.28
 EFFECTIVE STREAM AREA (ACRES) = 417.42
 TOTAL STREAM AREA (ACRES) = 473.70
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 714.36

 FLOW PROCESS FROM NODE 171.00 TO NODE 172.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 800.00
 ELEVATION DATA: UPSTREAM (FEET) = 995.00 DOWNSTREAM (FEET) = 985.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 10.586
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.135
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	1.90	0.98	0.100	32	10.59
COMMERCIAL	A	9.00	0.98	0.100	32	10.59

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF (CFS) = 29.80
 TOTAL AREA (ACRES) = 10.90 PEAK FLOW RATE (CFS) = 29.80

 FLOW PROCESS FROM NODE 172.00 TO NODE 180.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 2 USED)<<<<<

=====

UPSTREAM ELEVATION (FEET) = 985.00 DOWNSTREAM ELEVATION (FEET) = 968.00
 STREET LENGTH (FEET) = 1370.00 CURB HEIGHT (INCHES) = 8.0
 STREET HALFWIDTH (FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 27.00
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

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 = 0.0150

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 60.67
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.67
 HALFSTREET FLOOD WIDTH (FEET) = 25.98
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.46
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 3.00
 STREET FLOW TRAVEL TIME (MIN.) = 5.11 Tc (MIN.) = 15.70
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.475
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	7.80	0.98	0.100	32
COMMERCIAL	A	20.90	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 28.70 SUBAREA RUNOFF (CFS) = 61.40
 EFFECTIVE AREA (ACRES) = 39.60 AREA-AVERAGED Fm (INCH/HR) = 0.10
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
 TOTAL AREA (ACRES) = 39.6 PEAK FLOW RATE (CFS) = 84.72

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.74 HALFSTREET FLOOD WIDTH (FEET) = 32.94
 FLOW VELOCITY (FEET/SEC.) = 4.79 DEPTH*VELOCITY (FT*FT/SEC.) = 3.55
 *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
 AND L = 1370.0 FT WITH ELEVATION-DROP = 17.0 FT, IS 68.6 CFS,
 WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 180.00
 LONGEST FLOWPATH FROM NODE 171.00 TO NODE 180.00 = 2170.00 FEET.

 FLOW PROCESS FROM NODE 180.00 TO NODE 180.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION (MIN.) = 15.70
 RAINFALL INTENSITY (INCH/HR) = 2.47
 AREA-AVERAGED Fm (INCH/HR) = 0.10
 AREA-AVERAGED Fp (INCH/HR) = 0.98
 AREA-AVERAGED Ap = 0.10
 EFFECTIVE STREAM AREA (ACRES) = 39.60
 TOTAL STREAM AREA (ACRES) = 39.60
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 84.72

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	710.79	20.83	2.089	0.98 (0.27)	0.27	401.4	164.00
1	714.36	21.83	2.030	0.97 (0.27)	0.28	417.4	160.00

1	714.25	22.19	2.011	0.98(0.27)	0.28	422.3	111.00
1	695.62	25.80	1.837	0.98(0.28)	0.28	463.3	105.00
1	686.02	26.99	1.788	0.97(0.28)	0.29	472.9	150.00
1	681.68	27.27	1.777	0.97(0.28)	0.29	473.7	100.00
2	84.72	15.70	2.475	0.98(0.10)	0.10	39.6	171.00

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.108
SUBAREA AREA(ACRES) = 76.80 SUBAREA RUNOFF(CFS) = 122.21
EFFECTIVE AREA(ACRES) = 533.82 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.24
TOTAL AREA(ACRES) = 590.1 PEAK FLOW RATE(CFS) = 788.43

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	734.06	15.70	2.475	0.98(0.25)	0.25	342.2	171.00
2	781.76	20.83	2.089	0.98(0.25)	0.26	441.0	164.00
3	783.25	21.83	2.030	0.97(0.25)	0.26	457.0	160.00
4	782.45	22.19	2.011	0.98(0.25)	0.26	461.9	111.00
5	757.60	25.80	1.837	0.98(0.26)	0.27	502.9	105.00
6	746.27	26.99	1.788	0.97(0.26)	0.27	512.5	150.00
7	741.53	27.27	1.777	0.97(0.26)	0.27	513.3	100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 783.25 Tc(MIN.) = 21.83
EFFECTIVE AREA(ACRES) = 457.02 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.26
TOTAL AREA(ACRES) = 513.3
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 180.00 = 10590.00 FEET.

FLOW PROCESS FROM NODE 181.00 TO NODE 182.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 950.00
ELEVATION DATA: UPSTREAM(FEET) = 1010.00 DOWNSTREAM(FEET) = 985.00

Tc = K*[(LENGTH** 3.00) / (ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.771
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.289
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	0.80	0.98	0.100	32	9.77
COMMERCIAL	A	6.30	0.98	0.100	32	9.77

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 20.39
TOTAL AREA(ACRES) = 7.10 PEAK FLOW RATE(CFS) = 20.39

FLOW PROCESS FROM NODE 182.00 TO NODE 183.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 985.00 DOWNSTREAM ELEVATION(FEET) = 978.00
STREET LENGTH(FEET) = 850.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 38.60
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.62
HALFSTREET FLOOD WIDTH(FEET) = 23.33
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.43
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.14
STREET FLOW TRAVEL TIME(MIN.) = 4.13 Tc(MIN.) = 13.90
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.662

FLOW PROCESS FROM NODE 180.00 TO NODE 1000.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 968.00 DOWNSTREAM(FEET) = 950.00
FLOW LENGTH(FEET) = 2930.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 108.0 INCH PIPE IS 79.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.56
ESTIMATED PIPE DIAMETER(INCH) = 108.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 783.25
PIPE TRAVEL TIME(MIN.) = 3.14 Tc(MIN.) = 24.97
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 1000.00 = 13520.00 FEET.

FLOW PROCESS FROM NODE 1000.00 TO NODE 1000.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 24.97
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.873

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	8.70	0.98	0.100	32
COMMERCIAL	A	56.40	0.98	0.100	32
COMMERCIAL	A	10.50	0.98	0.100	32
SCHOOL	A	1.20	0.98	0.600	32

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	2.10	0.98	0.100	32
COMMERCIAL	A	13.60	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 15.70 SUBAREA RUNOFF (CFS) = 36.23
EFFECTIVE AREA (ACRES) = 22.80 AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 22.8 PEAK FLOW RATE (CFS) = 52.62

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH (FEET) = 0.68 HALFSTREET FLOOD WIDTH (FEET) = 27.24
FLOW VELOCITY (FEET/SEC.) = 3.69 DEPTH*VELOCITY (FT*FT/SEC.) = 2.53
LONGEST FLOWPATH FROM NODE 181.00 TO NODE 183.00 = 1800.00 FEET.

FLOW PROCESS FROM NODE 183.00 TO NODE 190.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 978.00 DOWNSTREAM (FEET) = 960.00
FLOW LENGTH (FEET) = 1600.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.1 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 10.01
ESTIMATED PIPE DIAMETER (INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 52.62
PIPE TRAVEL TIME (MIN.) = 2.66 Tc (MIN.) = 16.57
LONGEST FLOWPATH FROM NODE 181.00 TO NODE 190.00 = 3400.00 FEET.

FLOW PROCESS FROM NODE 190.00 TO NODE 190.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc (MIN.) = 16.57
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.396
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	7.90	0.98	0.100	32
COMMERCIAL	A	26.20	0.98	0.100	32
PUBLIC PARK	A	0.50	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.111
SUBAREA AREA (ACRES) = 34.60 SUBAREA RUNOFF (CFS) = 71.25
EFFECTIVE AREA (ACRES) = 57.40 AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.11
TOTAL AREA (ACRES) = 57.4 PEAK FLOW RATE (CFS) = 118.41

FLOW PROCESS FROM NODE 191.00 TO NODE 192.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 1050.00
ELEVATION DATA: UPSTREAM (FEET) = 970.00 DOWNSTREAM (FEET) = 965.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 14.315
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.616

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	2.70	0.98	0.100	32	14.32
PUBLIC PARK	A	3.90	0.98	0.850	32	22.74

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.543
SUBAREA RUNOFF (CFS) = 12.39
TOTAL AREA (ACRES) = 6.60 PEAK FLOW RATE (CFS) = 12.39

FLOW PROCESS FROM NODE 192.00 TO NODE 193.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 965.00 DOWNSTREAM (FEET) = 960.00
FLOW LENGTH (FEET) = 1460.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.7 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 4.49
ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 12.39
PIPE TRAVEL TIME (MIN.) = 5.42 Tc (MIN.) = 19.73
LONGEST FLOWPATH FROM NODE 191.00 TO NODE 193.00 = 2510.00 FEET.

FLOW PROCESS FROM NODE 193.00 TO NODE 193.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc (MIN.) = 19.73
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.157
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	4.00	0.98	0.100	32
PUBLIC PARK	A	4.90	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.513
SUBAREA AREA (ACRES) = 8.90 SUBAREA RUNOFF (CFS) = 13.27
EFFECTIVE AREA (ACRES) = 15.50 AREA-AVERAGED Fm (INCH/HR) = 0.51
AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.53
TOTAL AREA (ACRES) = 15.5 PEAK FLOW RATE (CFS) = 22.94

FLOW PROCESS FROM NODE 193.00 TO NODE 1000.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 960.00 DOWNSTREAM(FEET) = 950.00
FLOW LENGTH(FEET) = 2980.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.17
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 22.94
PIPE TRAVEL TIME(MIN.) = 9.61 Tc(MIN.) = 29.35
LONGEST FLOWPATH FROM NODE 191.00 TO NODE 1000.00 = 5490.00 FEET.

FLOW PROCESS FROM NODE 1000.00 TO NODE 1000.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 29.35
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.700
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	7.50	0.98	0.100	32
PUBLIC PARK	A	9.70	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.523
SUBAREA AREA(ACRES) = 17.20 SUBAREA RUNOFF(CFS) = 18.43
EFFECTIVE AREA(ACRES) = 32.70 AREA-AVERAGED Fm(INCH/HR) = 0.51
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.52
TOTAL AREA(ACRES) = 32.7 PEAK FLOW RATE(CFS) = 34.99

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 32.7 TC(MIN.) = 29.35
EFFECTIVE AREA(ACRES) = 32.70 AREA-AVERAGED Fm(INCH/HR) = 0.51
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.524
PEAK FLOW RATE(CFS) = 34.99

=====

END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
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***** DESCRIPTION OF STUDY *****
* ONTARIO MASTER PLAN OF DRAINAGE - BASIN IV (AREA B) *
* 10-YEAR HYDROLOGY ANALYSIS *
* P. PAGADUAN 8-10-2011 *

FILE NAME: IVB10.DAT
TIME/DATE OF STUDY: 08:57 08/10/2011

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

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--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT (YEAR) = 10.00
SPECIFIED MINIMUM PIPE SIZE (INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS (DECIMAL) TO USE FOR FRICTION SLOPE = 0.80
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE (LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
USER SPECIFIED 1-HOUR INTENSITY (INCH/HOUR) = 0.9500

ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150
2	32.0	27.0	0.020/0.020/0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

UNIT-HYDROGRAPH MODEL SELECTIONS/PARAMETERS:
WATERSHED LAG = 0.80 * Tc
USED "VALLEY UNDEVELOPED" S-GRAPH FOR DEVELOPMENTS OF

2 UNITS/ACRE AND LESS; AND "VALLEY DEVELOPED" S-GRAPH
FOR DEVELOPMENTS OF 3-4 UNITS/ACRE AND MORE.
USER SPECIFIED RAINFALL VALUES:

2-YR 6-HR RAINFALL DEPTH (INCH) = 1.70
2-YR 24-HR RAINFALL DEPTH (INCH) = 3.20
100-YR 6-HR RAINFALL DEPTH (INCH) = 3.50
100-YR 24-HR RAINFALL DEPTH (INCH) = 8.50
SIERRA MADRE DEPTH-AREA FACTORS USED.

DURATION	AREA-AVERAGED RAINFALL (INCH)
5-MINUTES	0.33
30-MINUTES	0.68
1-HOUR	0.90
3-HOUR	1.60
6-HOUR	2.31
24-HOUR	4.36

ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR UNIT HYDROGRAPH METHOD

FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 970.00
ELEVATION DATA: UPSTREAM (FEET) = 1085.00 DOWNSTREAM (FEET) = 1063.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 10.150
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.759
SUBAREA Tc AND LOSS RATE DATA (AMC I):
DEVELOPMENT TYPE/ SCSSOIL AREA Fp Ap SCSS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 0.40 1.33 0.100 17 10.15
COMMERCIAL A 9.00 1.33 0.100 17 10.15
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF (CFS) = 22.22
TOTAL AREA (ACRES) = 9.40 PEAK FLOW RATE (CFS) = 22.22

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 1063.00 DOWNSTREAM ELEVATION (FEET) = 1048.00
STREET LENGTH (FEET) = 840.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 27.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

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 = 0.0150

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 30.97
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH (FEET) = 0.53
HALFSTREET FLOOD WIDTH (FEET) = 18.37
AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.35
PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 2.28
STREET FLOW TRAVEL TIME (MIN.) = 3.22 Tc (MIN.) = 13.37
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.338
SUBAREA LOSS RATE DATA (AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	2.50	1.33	0.100	17
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	3.30	1.33	0.500	17
PUBLIC PARK	A	6.80	1.33	0.850	17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.610
SUBAREA AREA (ACRES) = 12.60 SUBAREA RUNOFF (CFS) = 17.34
EFFECTIVE AREA (ACRES) = 22.00 AREA-AVERAGED Fm (INCH/HR) = 0.52
AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.39
TOTAL AREA (ACRES) = 22.0 PEAK FLOW RATE (CFS) = 36.00

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH (FEET) = 0.55 HALFSTREET FLOOD WIDTH (FEET) = 19.48
FLOW VELOCITY (FEET/SEC.) = 4.52 DEPTH*VELOCITY (FT*FT/SEC.) = 2.48
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 1810.00 FEET.

FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

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UPSTREAM ELEVATION (FEET) = 1048.00 DOWNSTREAM ELEVATION (FEET) = 1040.00
STREET LENGTH (FEET) = 400.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 27.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

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 = 0.0150

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 42.59
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH (FEET) = 0.57
HALFSTREET FLOOD WIDTH (FEET) = 20.37
AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.91
PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 2.78

STREET FLOW TRAVEL TIME (MIN.) = 1.36 Tc (MIN.) = 14.73
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.206
SUBAREA LOSS RATE DATA (AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	2.10	1.33	0.100	17
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	4.50	1.33	0.500	17
PUBLIC PARK	A	3.10	1.33	0.850	17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.525
SUBAREA AREA (ACRES) = 9.70 SUBAREA RUNOFF (CFS) = 13.17
EFFECTIVE AREA (ACRES) = 31.70 AREA-AVERAGED Fm (INCH/HR) = 0.57
AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.43
TOTAL AREA (ACRES) = 31.7 PEAK FLOW RATE (CFS) = 46.56

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH (FEET) = 0.58 HALFSTREET FLOOD WIDTH (FEET) = 21.11
FLOW VELOCITY (FEET/SEC.) = 5.01 DEPTH*VELOCITY (FT*FT/SEC.) = 2.91
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 103.00 = 2210.00 FEET.

FLOW PROCESS FROM NODE 103.00 TO NODE 104.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 1040.00 DOWNSTREAM (FEET) = 1018.00
FLOW LENGTH (FEET) = 1360.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 24.5 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 10.84
ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 46.56
PIPE TRAVEL TIME (MIN.) = 2.09 Tc (MIN.) = 16.82
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 104.00 = 3570.00 FEET.

FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 16.82
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.037
SUBAREA LOSS RATE DATA (AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	7.70	1.33	0.100	17
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	19.70	1.33	0.500	17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.388
SUBAREA AREA (ACRES) = 27.40 SUBAREA RUNOFF (CFS) = 37.55
EFFECTIVE AREA (ACRES) = 59.10 AREA-AVERAGED Fm (INCH/HR) = 0.55
AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.41
TOTAL AREA (ACRES) = 59.1 PEAK FLOW RATE (CFS) = 79.29

FLOW PROCESS FROM NODE 104.00 TO NODE 110.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 1018.00 DOWNSTREAM(FEET) = 1015.00
FLOW LENGTH(FEET) = 1070.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 41.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.43
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 79.29
PIPE TRAVEL TIME(MIN.) = 2.78 Tc(MIN.) = 19.60
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 110.00 = 4640.00 FEET.

FLOW PROCESS FROM NODE 110.00 TO NODE 110.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 19.60
RAINFALL INTENSITY(INCH/HR) = 1.86
AREA-AVERAGED Fm(INCH/HR) = 0.55
AREA-AVERAGED Fp(INCH/HR) = 1.33
AREA-AVERAGED Ap = 0.41
EFFECTIVE STREAM AREA(ACRES) = 59.10
TOTAL STREAM AREA(ACRES) = 59.10
PEAK FLOW RATE(CFS) AT CONFLUENCE = 79.29

FLOW PROCESS FROM NODE 105.00 TO NODE 106.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 550.00
ELEVATION DATA: UPSTREAM(FEET) = 1070.00 DOWNSTREAM(FEET) = 1062.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.840
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.997
SUBAREA Tc AND LOSS RATE DATA(AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 3.00 1.33 0.100 17 8.84
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 7.73
TOTAL AREA(ACRES) = 3.00 PEAK FLOW RATE(CFS) = 7.73

FLOW PROCESS FROM NODE 106.00 TO NODE 107.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 2 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 1062.00 DOWNSTREAM ELEVATION(FEET) = 1045.00
STREET LENGTH(FEET) = 830.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 20.13

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.46
HALFSTREET FLOOD WIDTH(FEET) = 14.99
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.13
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.89
STREET FLOW TRAVEL TIME(MIN.) = 3.35 Tc(MIN.) = 12.19
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.472

SUBAREA LOSS RATE DATA(AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 3.80 1.33 0.100 17
RESIDENTIAL
"5-7 DWELLINGS/ACRE" A 9.50 1.33 0.500 17
COMMERCIAL A 0.50 1.33 0.100 17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.375
SUBAREA AREA(ACRES) = 13.80 SUBAREA RUNOFF(CFS) = 24.51
EFFECTIVE AREA(ACRES) = 16.80 AREA-AVERAGED Fm(INCH/HR) = 0.43
AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.33
TOTAL AREA(ACRES) = 16.8 PEAK FLOW RATE(CFS) = 30.82

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.52 HALFSTREET FLOOD WIDTH(FEET) = 17.84
FLOW VELOCITY(FEET/SEC.) = 4.57 DEPTH*VELOCITY(FT*FT/SEC.) = 2.35
LONGEST FLOWPATH FROM NODE 105.00 TO NODE 107.00 = 1380.00 FEET.

FLOW PROCESS FROM NODE 107.00 TO NODE 108.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 1045.00 DOWNSTREAM ELEVATION(FEET) = 1035.00
STREET LENGTH(FEET) = 880.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 39.92
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.60
 HALFSTREET FLOOD WIDTH(FEET) = 22.22
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.89
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.35
 STREET FLOW TRAVEL TIME(MIN.) = 3.77 Tc(MIN.) = 15.96
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.103
 SUBAREA LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	3.80	1.33	0.100	17
RESIDENTIAL "5-7 DWELLINGS/ACRE"	A	8.80	1.33	0.500	17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.379
 SUBAREA AREA(ACRES) = 12.60 SUBAREA RUNOFF(CFS) = 18.13
 EFFECTIVE AREA(ACRES) = 29.40 AREA-AVERAGED Fm(INCH/HR) = 0.46
 AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.35
 TOTAL AREA(ACRES) = 29.4 PEAK FLOW RATE(CFS) = 43.38

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.62 HALFSTREET FLOOD WIDTH(FEET) = 22.96
 FLOW VELOCITY(FEET/SEC.) = 3.97 DEPTH*VELOCITY(FT*FT/SEC.) = 2.45
 LONGEST FLOWPATH FROM NODE 105.00 TO NODE 108.00 = 2260.00 FEET.

 FLOW PROCESS FROM NODE 108.00 TO NODE 110.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 1035.00 DOWNSTREAM(FEET) = 1015.00
 FLOW LENGTH(FEET) = 1340.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 23.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 10.40
 ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 43.38
 PIPE TRAVEL TIME(MIN.) = 2.15 Tc(MIN.) = 18.10
 LONGEST FLOWPATH FROM NODE 105.00 TO NODE 110.00 = 3600.00 FEET.

 FLOW PROCESS FROM NODE 110.00 TO NODE 110.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 18.10
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.950
 SUBAREA LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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COMMERCIAL	A	18.60	1.33	0.100	17
RESIDENTIAL "5-7 DWELLINGS/ACRE"	A	6.30	1.33	0.500	17
SCHOOL	A	9.20	1.33	0.600	17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.309
 SUBAREA AREA(ACRES) = 34.10 SUBAREA RUNOFF(CFS) = 47.25
 EFFECTIVE AREA(ACRES) = 63.50 AREA-AVERAGED Fm(INCH/HR) = 0.43
 AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.33
 TOTAL AREA(ACRES) = 63.5 PEAK FLOW RATE(CFS) = 86.57

 FLOW PROCESS FROM NODE 110.00 TO NODE 110.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 18.10
 RAINFALL INTENSITY(INCH/HR) = 1.95
 AREA-AVERAGED Fm(INCH/HR) = 0.43
 AREA-AVERAGED Fp(INCH/HR) = 1.33
 AREA-AVERAGED Ap = 0.33
 EFFECTIVE STREAM AREA(ACRES) = 63.50
 TOTAL STREAM AREA(ACRES) = 63.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 86.57

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	79.29	19.60	1.859	1.33(0.55)	0.41	59.1	100.00
2	86.57	18.10	1.950	1.33(0.43)	0.33	63.5	105.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	164.87	18.10	1.950	1.33(0.49)	0.37	118.1	105.00
2	160.69	19.60	1.859	1.33(0.49)	0.37	122.6	100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 164.87 Tc(MIN.) = 18.10
 EFFECTIVE AREA(ACRES) = 118.10 AREA-AVERAGED Fm(INCH/HR) = 0.49
 AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.37
 TOTAL AREA(ACRES) = 122.6
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 110.00 = 4640.00 FEET.

 FLOW PROCESS FROM NODE 110.00 TO NODE 120.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 1015.00 DOWNSTREAM(FEET) = 1012.00
 FLOW LENGTH(FEET) = 1120.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 69.0 INCH PIPE IS 53.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 7.66
 ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 164.87
 PIPE TRAVEL TIME(MIN.) = 2.44 Tc(MIN.) = 20.54
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 120.00 = 5760.00 FEET.

 FLOW PROCESS FROM NODE 120.00 TO NODE 120.00 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.) = 20.54
 RAINFALL INTENSITY(INCH/HR) = 1.81
 AREA-AVERAGED Fm(INCH/HR) = 0.49
 AREA-AVERAGED Fp(INCH/HR) = 1.33
 AREA-AVERAGED Ap = 0.37
 EFFECTIVE STREAM AREA(ACRES) = 118.10
 TOTAL STREAM AREA(ACRES) = 122.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 164.87

 FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 21

 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 =====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
 ELEVATION DATA: UPSTREAM(FEET) = 1050.00 DOWNSTREAM(FEET) = 1035.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 11.160
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.606
 SUBAREA Tc AND LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	2.70	1.33	0.100	17	11.16
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	A	5.80	1.33	0.500	17	14.28

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.373
 SUBAREA RUNOFF(CFS) = 16.15
 TOTAL AREA(ACRES) = 8.50 PEAK FLOW RATE(CFS) = 16.15

 FLOW PROCESS FROM NODE 112.00 TO NODE 112.00 IS CODE = 81

 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<
 =====

MAINLINE Tc(MIN.) = 11.16
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.606
 SUBAREA LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	1.50	1.33	0.100	17
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	3.50	1.33	0.500	17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.380
 SUBAREA AREA(ACRES) = 5.00 SUBAREA RUNOFF(CFS) = 9.46
 EFFECTIVE AREA(ACRES) = 13.50 AREA-AVERAGED Fm(INCH/HR) = 0.50
 AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.38
 TOTAL AREA(ACRES) = 13.5 PEAK FLOW RATE(CFS) = 25.61

 FLOW PROCESS FROM NODE 112.00 TO NODE 120.00 IS CODE = 62

 >>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<
 >>>>(STREET TABLE SECTION # 2 USED)<<<<<<
 =====

UPSTREAM ELEVATION(FEET) = 1035.00 DOWNSTREAM ELEVATION(FEET) = 1012.00
 STREET LENGTH(FEET) = 1500.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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 = 0.0150

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 50.92
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.62
 HALFSTREET FLOOD WIDTH(FEET) = 23.06
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.62
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.86
 STREET FLOW TRAVEL TIME(MIN.) = 5.41 Tc(MIN.) = 16.57
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.056

SUBAREA LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	11.80	1.33	0.100	17
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	23.70	1.33	0.500	17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.367
 SUBAREA AREA(ACRES) = 35.50 SUBAREA RUNOFF(CFS) = 50.12
 EFFECTIVE AREA(ACRES) = 49.00 AREA-AVERAGED Fm(INCH/HR) = 0.49
 AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.37
 TOTAL AREA(ACRES) = 49.0 PEAK FLOW RATE(CFS) = 69.04

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.68 HALFSTREET FLOOD WIDTH(FEET) = 26.40
 FLOW VELOCITY(FEET/SEC.) = 5.00 DEPTH*VELOCITY(FT*FT/SEC.) = 3.38
 LONGEST FLOWPATH FROM NODE 111.00 TO NODE 120.00 = 2500.00 FEET.

 FLOW PROCESS FROM NODE 120.00 TO NODE 120.00 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.) = 16.57
 RAINFALL INTENSITY (INCH/HR) = 2.06
 AREA-AVERAGED Fm (INCH/HR) = 0.49
 AREA-AVERAGED Fp (INCH/HR) = 1.33
 AREA-AVERAGED Ap = 0.37
 EFFECTIVE STREAM AREA (ACRES) = 49.00
 TOTAL STREAM AREA (ACRES) = 49.00
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 69.04

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	164.87	20.54	1.807	1.33 (0.49)	0.37	118.1	105.00
1	160.69	22.04	1.733	1.33 (0.49)	0.37	122.6	100.00
2	69.04	16.57	2.056	1.33 (0.49)	0.37	49.0	111.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	227.08	16.57	2.056	1.33 (0.49)	0.37	144.3	111.00
2	222.95	20.54	1.807	1.33 (0.49)	0.37	167.1	105.00
3	215.46	22.04	1.733	1.33 (0.49)	0.37	171.6	100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 227.08 Tc (MIN.) = 16.57
 EFFECTIVE AREA (ACRES) = 144.26 AREA-AVERAGED Fm (INCH/HR) = 0.49
 AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.37
 TOTAL AREA (ACRES) = 171.6
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 120.00 = 5760.00 FEET.

 FLOW PROCESS FROM NODE 120.00 TO NODE 130.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 1012.00 DOWNSTREAM (FEET) = 1008.00
 FLOW LENGTH (FEET) = 1060.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 72.0 INCH PIPE IS 57.5 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 9.38
 ESTIMATED PIPE DIAMETER (INCH) = 72.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 227.08
 PIPE TRAVEL TIME (MIN.) = 1.88 Tc (MIN.) = 18.45
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 130.00 = 6820.00 FEET.

 FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 18.45
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.928
 SUBAREA LOSS RATE DATA (AMC I):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 2.00 1.33 0.100 17
 RESIDENTIAL
 "11+ DWELLINGS/ACRE" A 24.30 1.33 0.200 17
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.192
 SUBAREA AREA (ACRES) = 26.30 SUBAREA RUNOFF (CFS) = 39.58
 EFFECTIVE AREA (ACRES) = 170.56 AREA-AVERAGED Fm (INCH/HR) = 0.45
 AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.34
 TOTAL AREA (ACRES) = 197.9 PEAK FLOW RATE (CFS) = 227.08
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 FLOW PROCESS FROM NODE 130.00 TO NODE 140.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 1008.00 DOWNSTREAM (FEET) = 1007.00
 FLOW LENGTH (FEET) = 430.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 81.0 INCH PIPE IS 60.5 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 7.92
 ESTIMATED PIPE DIAMETER (INCH) = 81.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 227.08
 PIPE TRAVEL TIME (MIN.) = 0.91 Tc (MIN.) = 19.36
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 140.00 = 7250.00 FEET.

 FLOW PROCESS FROM NODE 140.00 TO NODE 140.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 19.36
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.873
 SUBAREA LOSS RATE DATA (AMC I):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 3.00 1.33 0.100 17
 COMMERCIAL A 9.00 1.33 0.100 17
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 12.00 SUBAREA RUNOFF (CFS) = 18.79
 EFFECTIVE AREA (ACRES) = 182.56 AREA-AVERAGED Fm (INCH/HR) = 0.43
 AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.32
 TOTAL AREA (ACRES) = 209.9 PEAK FLOW RATE (CFS) = 236.90

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*****
FLOW PROCESS FROM NODE 140.00 TO NODE 153.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1007.00 DOWNSTREAM(FEET) = 990.00
FLOW LENGTH(FEET) = 1280.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 60.0 INCH PIPE IS 43.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.43
ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 236.90
PIPE TRAVEL TIME(MIN.) = 1.38 Tc(MIN.) = 20.74
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 153.00 = 8530.00 FEET.
*****
FLOW PROCESS FROM NODE 153.00 TO NODE 153.00 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.) = 20.74
RAINFALL INTENSITY(INCH/HR) = 1.80
AREA-AVERAGED Fm(INCH/HR) = 0.43
AREA-AVERAGED Fp(INCH/HR) = 1.33
AREA-AVERAGED Ap = 0.32
EFFECTIVE STREAM AREA(ACRES) = 182.56
TOTAL STREAM AREA(ACRES) = 209.90
PEAK FLOW RATE(CFS) AT CONFLUENCE = 236.90
*****
FLOW PROCESS FROM NODE 150.00 TO NODE 151.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 980.00
ELEVATION DATA: UPSTREAM(FEET) = 1022.00 DOWNSTREAM(FEET) = 1010.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 11.529
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.556
SUBAREA Tc AND LOSS RATE DATA(AMC I ):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 3.50 1.33 0.100 17 11.53
RESIDENTIAL
"5-7 DWELLINGS/ACRE" A 7.50 1.33 0.500 17 14.75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.373
SUBAREA RUNOFF(CFS) = 20.40
TOTAL AREA(ACRES) = 11.00 PEAK FLOW RATE(CFS) = 20.40
*****
FLOW PROCESS FROM NODE 151.00 TO NODE 152.00 IS CODE = 62

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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<<
=====
UPSTREAM ELEVATION(FEET) = 1010.00 DOWNSTREAM ELEVATION(FEET) = 998.00
STREET LENGTH(FEET) = 1420.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 44.01
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.65
HALFSTREET FLOOD WIDTH(FEET) = 24.43
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.57
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.31
STREET FLOW TRAVEL TIME(MIN.) = 6.62 Tc(MIN.) = 18.15
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.947
SUBAREA LOSS RATE DATA(AMC I ):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 16.80 1.33 0.100 17
RESIDENTIAL
"5-7 DWELLINGS/ACRE" A 10.40 1.33 0.500 17
RESIDENTIAL
"11+ DWELLINGS/ACRE" A 2.00 1.33 0.200 17
PUBLIC PARK A 5.70 1.33 0.850 17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.347
SUBAREA AREA(ACRES) = 34.90 SUBAREA RUNOFF(CFS) = 46.65
EFFECTIVE AREA(ACRES) = 45.90 AREA-AVERAGED Fm(INCH/HR) = 0.47
AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.35
TOTAL AREA(ACRES) = 45.9 PEAK FLOW RATE(CFS) = 61.02

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.71 HALFSTREET FLOOD WIDTH(FEET) = 29.98
FLOW VELOCITY(FEET/SEC.) = 3.85 DEPTH*VELOCITY(FT*FT/SEC.) = 2.75
*NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
AND L = 1420.0 FT WITH ELEVATION-DROP = 12.0 FT, IS 55.8 CFS,
WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 152.00
LONGEST FLOWPATH FROM NODE 150.00 TO NODE 152.00 = 2400.00 FEET.
*****
FLOW PROCESS FROM NODE 152.00 TO NODE 153.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 998.00 DOWNSTREAM(FEET) = 990.00

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FLOW LENGTH (FEET) = 2780.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 48.0 INCH PIPE IS 35.1 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 6.19
 ESTIMATED PIPE DIAMETER (INCH) = 48.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 61.02
 PIPE TRAVEL TIME (MIN.) = 7.48 Tc (MIN.) = 25.63
 LONGEST FLOWPATH FROM NODE 150.00 TO NODE 153.00 = 5180.00 FEET.

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	365.21	20.74	1.797	1.33 (0.45)	0.34	290.7	111.00
2	360.70	24.76	1.616	1.33 (0.45)	0.34	334.5	105.00
3	357.29	25.63	1.582	1.33 (0.45)	0.34	341.6	150.00
4	351.50	26.27	1.559	1.33 (0.45)	0.34	343.5	100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 365.21 Tc (MIN.) = 20.74
 EFFECTIVE AREA (ACRES) = 290.65 AREA-AVERAGED Fm (INCH/HR) = 0.45
 AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.34
 TOTAL AREA (ACRES) = 343.5
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 153.00 = 8530.00 FEET.

 FLOW PROCESS FROM NODE 153.00 TO NODE 170.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 990.00 DOWNSTREAM (FEET) = 972.00
 FLOW LENGTH (FEET) = 1280.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 69.0 INCH PIPE IS 51.7 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 17.50
 ESTIMATED PIPE DIAMETER (INCH) = 69.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 365.21
 PIPE TRAVEL TIME (MIN.) = 1.22 Tc (MIN.) = 21.96
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 170.00 = 9810.00 FEET.

 FLOW PROCESS FROM NODE 170.00 TO NODE 170.00 IS CODE = 10

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

 FLOW PROCESS FROM NODE 160.00 TO NODE 161.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

 INITIAL SUBAREA FLOW-LENGTH (FEET) = 750.00
 ELEVATION DATA: UPSTREAM (FEET) = 998.00 DOWNSTREAM (FEET) = 988.00

Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 10.184
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.753
 SUBAREA Tc AND LOSS RATE DATA (AMC I):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
 COMMERCIAL A 0.50 1.33 0.100 17 10.18

 FLOW PROCESS FROM NODE 153.00 TO NODE 153.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 25.63
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.582
 SUBAREA LOSS RATE DATA (AMC I):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 10.90 1.33 0.100 17
 COMMERCIAL A 3.30 1.33 0.100 17
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE" A 19.00 1.33 0.500 17
 RESIDENTIAL
 "11+ DWELLINGS/ACRE" A 29.40 1.33 0.200 17
 SCHOOL A 25.10 1.33 0.600 17
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.363
 SUBAREA AREA (ACRES) = 87.70 SUBAREA RUNOFF (CFS) = 86.82
 EFFECTIVE AREA (ACRES) = 133.60 AREA-AVERAGED Fm (INCH/HR) = 0.48
 AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.36
 TOTAL AREA (ACRES) = 133.6 PEAK FLOW RATE (CFS) = 132.80

 FLOW PROCESS FROM NODE 153.00 TO NODE 153.00 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.) = 25.63
 RAINFALL INTENSITY (INCH/HR) = 1.58
 AREA-AVERAGED Fm (INCH/HR) = 0.48
 AREA-AVERAGED Fp (INCH/HR) = 1.33
 AREA-AVERAGED Ap = 0.36
 EFFECTIVE STREAM AREA (ACRES) = 133.60
 TOTAL STREAM AREA (ACRES) = 133.60
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 132.80

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	236.90	20.74	1.797	1.33 (0.43)	0.32	182.6	111.00
1	228.56	24.76	1.616	1.33 (0.44)	0.33	205.4	105.00
1	221.49	26.27	1.559	1.33 (0.44)	0.33	209.9	100.00
2	132.80	25.63	1.582	1.33 (0.48)	0.36	133.6	150.00

COMMERCIAL A 4.70 1.33 0.100 17 10.18
 SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.100
 SUBAREA RUNOFF (CFS) = 12.26
 TOTAL AREA (ACRES) = 5.20 PEAK FLOW RATE (CFS) = 12.26

 FLOW PROCESS FROM NODE 161.00 TO NODE 162.00 IS CODE = 62

 >>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 2 USED)<<<<<

 UPSTREAM ELEVATION (FEET) = 988.00 DOWNSTREAM ELEVATION (FEET) = 987.00
 STREET LENGTH (FEET) = 390.00 CURB HEIGHT (INCHES) = 8.0
 STREET HALFWIDTH (FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 27.00
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

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 = 0.0150

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 17.38
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH (FEET) = 0.59
 HALFSTREET FLOOD WIDTH (FEET) = 21.48
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 1.81
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 1.06
 STREET FLOW TRAVEL TIME (MIN.) = 3.59 T_c (MIN.) = 13.78

* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.297
 SUBAREA LOSS RATE DATA (AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN
COMMERCIAL	A	1.90	1.33	0.100	17
RESIDENTIAL "5-7 DWELLINGS/ACRE"	A	4.40	1.33	0.500	17

 SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.379
 SUBAREA AREA (ACRES) = 6.30 SUBAREA RUNOFF (CFS) = 10.17
 EFFECTIVE AREA (ACRES) = 11.50 AREA-AVERAGED F_m (INCH/HR) = 0.34
 AREA-AVERAGED F_p (INCH/HR) = 1.33 AREA-AVERAGED A_p = 0.25
 TOTAL AREA (ACRES) = 11.5 PEAK FLOW RATE (CFS) = 20.29

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.61 HALFSTREET FLOOD WIDTH (FEET) = 22.80
 FLOW VELOCITY (FEET/SEC.) = 1.88 DEPTH*VELOCITY (FT*FT/SEC.) = 1.16
 LONGEST FLOWPATH FROM NODE 160.00 TO NODE 162.00 = 1140.00 FEET.

 FLOW PROCESS FROM NODE 162.00 TO NODE 163.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 987.00 DOWNSTREAM (FEET) = 978.00
 FLOW LENGTH (FEET) = 1160.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 27.0 INCH PIPE IS 18.8 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 6.86
 ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 20.29
 PIPE TRAVEL TIME (MIN.) = 2.82 T_c (MIN.) = 16.59
 LONGEST FLOWPATH FROM NODE 160.00 TO NODE 163.00 = 2300.00 FEET.

 FLOW PROCESS FROM NODE 163.00 TO NODE 163.00 IS CODE = 81

 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

 MAINLINE T_c (MIN.) = 16.59
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.054
 SUBAREA LOSS RATE DATA (AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN
COMMERCIAL	A	21.10	1.33	0.100	17
COMMERCIAL	A	3.50	1.33	0.100	17

 SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.100
 SUBAREA AREA (ACRES) = 24.60 SUBAREA RUNOFF (CFS) = 42.54
 EFFECTIVE AREA (ACRES) = 36.10 AREA-AVERAGED F_m (INCH/HR) = 0.20
 AREA-AVERAGED F_p (INCH/HR) = 1.33 AREA-AVERAGED A_p = 0.15
 TOTAL AREA (ACRES) = 36.1 PEAK FLOW RATE (CFS) = 60.33

 FLOW PROCESS FROM NODE 163.00 TO NODE 163.00 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.) = 16.59
 RAINFALL INTENSITY (INCH/HR) = 2.05
 AREA-AVERAGED F_m (INCH/HR) = 0.20
 AREA-AVERAGED F_p (INCH/HR) = 1.33
 AREA-AVERAGED A_p = 0.15
 EFFECTIVE STREAM AREA (ACRES) = 36.10
 TOTAL STREAM AREA (ACRES) = 36.10
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 60.33

 FLOW PROCESS FROM NODE 164.00 TO NODE 165.00 IS CODE = 21

 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

 INITIAL SUBAREA FLOW-LENGTH (FEET) = 850.00
 ELEVATION DATA: UPSTREAM (FEET) = 992.00 DOWNSTREAM (FEET) = 986.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
 SUBAREA ANALYSIS USED MINIMUM T_c (MIN.) = 12.159

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.476
 SUBAREA Tc AND LOSS RATE DATA(AMC I):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
 COMMERCIAL A 2.60 1.33 0.100 17 12.16
 RESIDENTIAL
 "11+ DWELLINGS/ACRE" A 7.40 1.33 0.200 17 12.96
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.174
 SUBAREA RUNOFF(CFS) = 20.20
 TOTAL AREA(ACRES) = 10.00 PEAK FLOW RATE(CFS) = 20.20

 FLOW PROCESS FROM NODE 165.00 TO NODE 166.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 2 USED)<<<<<

 UPSTREAM ELEVATION(FEET) = 986.00 DOWNSTREAM ELEVATION(FEET) = 984.00
 STREET LENGTH(FEET) = 370.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 39.48
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.67
 HALFSTREET FLOOD WIDTH(FEET) = 25.66
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.94
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.97
 STREET FLOW TRAVEL TIME(MIN.) = 2.10 Tc(MIN.) = 14.26
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.250

SUBAREA LOSS RATE DATA(AMC I):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 4.20 1.33 0.100 17
 COMMERCIAL A 4.80 1.33 0.100 17
 RESIDENTIAL
 "11+ DWELLINGS/ACRE" A 2.80 1.33 0.200 17
 COMMERCIAL A 8.60 1.33 0.100 17
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.114
 SUBAREA AREA(ACRES) = 20.40 SUBAREA RUNOFF(CFS) = 38.54
 EFFECTIVE AREA(ACRES) = 30.40 AREA-AVERAGED Fm(INCH/HR) = 0.18
 AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.13
 TOTAL AREA(ACRES) = 30.4 PEAK FLOW RATE(CFS) = 56.71

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.74 HALFSTREET FLOOD WIDTH(FEET) = 33.25

FLOW VELOCITY(FEET/SEC.) = 3.17 DEPTH*VELOCITY(FT*FT/SEC.) = 2.36
 *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
 AND L = 370.0 FT WITH ELEVATION-DROP = 2.0 FT, IS 51.0 CFS,
 WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 166.00
 LONGEST FLOWPATH FROM NODE 164.00 TO NODE 166.00 = 1220.00 FEET.

 FLOW PROCESS FROM NODE 166.00 TO NODE 163.00 IS CODE = 31

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

 ELEVATION DATA: UPSTREAM(FEET) = 984.00 DOWNSTREAM(FEET) = 978.00
 FLOW LENGTH(FEET) = 640.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 28.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 9.31
 ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 56.71
 PIPE TRAVEL TIME(MIN.) = 1.15 Tc(MIN.) = 15.40
 LONGEST FLOWPATH FROM NODE 164.00 TO NODE 163.00 = 1860.00 FEET.

 FLOW PROCESS FROM NODE 163.00 TO NODE 163.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 15.40
 RAINFALL INTENSITY(INCH/HR) = 2.15
 AREA-AVERAGED Fm(INCH/HR) = 0.18
 AREA-AVERAGED Fp(INCH/HR) = 1.33
 AREA-AVERAGED Ap = 0.13
 EFFECTIVE STREAM AREA(ACRES) = 30.40
 TOTAL STREAM AREA(ACRES) = 30.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 56.71

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	60.33	16.59	2.054	1.33(0.20)	0.15	36.1	160.00
2	56.71	15.40	2.148	1.33(0.18)	0.13	30.4	164.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	115.54	15.40	2.148	1.33(0.19)	0.14	63.9	164.00
2	114.33	16.59	2.054	1.33(0.19)	0.14	66.5	160.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 115.54 Tc(MIN.) = 15.40
 EFFECTIVE AREA(ACRES) = 63.91 AREA-AVERAGED Fm(INCH/HR) = 0.19

AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.14
 TOTAL AREA (ACRES) = 66.5
 LONGEST FLOWPATH FROM NODE 160.00 TO NODE 163.00 = 2300.00 FEET.

 FLOW PROCESS FROM NODE 163.00 TO NODE 170.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 978.00 DOWNSTREAM (FEET) = 972.00
 FLOW LENGTH (FEET) = 2090.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 60.0 INCH PIPE IS 45.6 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 7.22
 ESTIMATED PIPE DIAMETER (INCH) = 60.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 115.54
 PIPE TRAVEL TIME (MIN.) = 4.83 Tc (MIN.) = 20.23
 LONGEST FLOWPATH FROM NODE 160.00 TO NODE 170.00 = 4390.00 FEET.

 FLOW PROCESS FROM NODE 170.00 TO NODE 170.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 20.23
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.824
 SUBAREA LOSS RATE DATA (AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	42.70	1.33	0.100	17
COMMERCIAL	A	5.60	1.33	0.100	17
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	5.10	1.33	0.500	17
COMMERCIAL	A	10.30	1.33	0.100	17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.132
 SUBAREA AREA (ACRES) = 63.70 SUBAREA RUNOFF (CFS) = 94.52
 EFFECTIVE AREA (ACRES) = 127.61 AREA-AVERAGED Fm (INCH/HR) = 0.18
 AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.14
 TOTAL AREA (ACRES) = 130.2 PEAK FLOW RATE (CFS) = 188.63

 FLOW PROCESS FROM NODE 170.00 TO NODE 170.00 IS CODE = 11

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

***** MAIN STREAM CONFLUENCE DATA ****

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	188.63	20.23	1.824	1.33 (0.18)	0.14	127.6	164.00
2	185.17	21.43	1.762	1.33 (0.18)	0.14	130.2	160.00

LONGEST FLOWPATH FROM NODE 160.00 TO NODE 170.00 = 4390.00 FEET.

***** MEMORY BANK # 1 CONFLUENCE DATA ****

STREAM	Q	Tc	Intensity	Fp (Fm)	Ap	Ae	HEADWATER
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NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)	(ACRES)	NODE
1	365.21	21.96	1.736	1.33 (0.45)	0.34	290.7 111.00
2	360.70	25.99	1.570	1.33 (0.45)	0.34	334.5 105.00
3	357.29	26.86	1.539	1.33 (0.45)	0.34	341.6 150.00
4	351.50	27.52	1.516	1.33 (0.45)	0.34	343.5 100.00

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 170.00 = 9810.00 FEET.

***** PEAK FLOW RATE TABLE ****

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	547.96	20.23	1.824	1.33 (0.36)	0.27	395.4	164.00
2	548.66	21.43	1.762	1.33 (0.36)	0.27	413.8	160.00
3	547.36	21.96	1.736	1.33 (0.37)	0.28	420.9	111.00
4	523.30	25.99	1.570	1.33 (0.38)	0.28	464.7	105.00
5	516.28	26.86	1.539	1.33 (0.38)	0.29	471.8	150.00
6	507.87	27.52	1.516	1.33 (0.38)	0.29	473.7	100.00

TOTAL AREA (ACRES) = 473.7

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE (CFS) = 548.66 Tc (MIN.) = 21.425
 EFFECTIVE AREA (ACRES) = 413.80 AREA-AVERAGED Fm (INCH/HR) = 0.36
 AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.27
 TOTAL AREA (ACRES) = 473.7
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 170.00 = 9810.00 FEET.

 FLOW PROCESS FROM NODE 170.00 TO NODE 170.00 IS CODE = 12

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

 FLOW PROCESS FROM NODE 170.00 TO NODE 180.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 972.00 DOWNSTREAM (FEET) = 968.00
 FLOW LENGTH (FEET) = 780.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 96.0 INCH PIPE IS 73.9 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 13.21
 ESTIMATED PIPE DIAMETER (INCH) = 96.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 548.66
 PIPE TRAVEL TIME (MIN.) = 0.98 Tc (MIN.) = 22.41
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 180.00 = 10590.00 FEET.

 FLOW PROCESS FROM NODE 180.00 TO NODE 180.00 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.) = 22.41
 RAINFALL INTENSITY (INCH/HR) = 1.72
 AREA-AVERAGED Fm (INCH/HR) = 0.36

AREA-AVERAGED Fp (INCH/HR) = 1.33
 AREA-AVERAGED Ap = 0.27
 EFFECTIVE STREAM AREA (ACRES) = 413.80
 TOTAL STREAM AREA (ACRES) = 473.70
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 548.66

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	7.80	1.33	0.100	17
COMMERCIAL	A	20.90	1.33	0.100	17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 28.70 SUBAREA RUNOFF (CFS) = 50.96
 EFFECTIVE AREA (ACRES) = 39.60 AREA-AVERAGED Fm (INCH/HR) = 0.13
 AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.10
 TOTAL AREA (ACRES) = 39.6 PEAK FLOW RATE (CFS) = 70.32

 FLOW PROCESS FROM NODE 171.00 TO NODE 172.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 800.00
 ELEVATION DATA: UPSTREAM (FEET) = 995.00 DOWNSTREAM (FEET) = 985.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 10.586
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.690
 SUBAREA Tc AND LOSS RATE DATA (AMC I):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
 COMMERCIAL A 1.90 1.33 0.100 17 10.59
 COMMERCIAL A 9.00 1.33 0.100 17 10.59
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF (CFS) = 25.09
 TOTAL AREA (ACRES) = 10.90 PEAK FLOW RATE (CFS) = 25.09

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.70 HALFSTREET FLOOD WIDTH (FEET) = 28.93
 FLOW VELOCITY (FEET/SEC.) = 4.62 DEPTH*VELOCITY (FT*FT/SEC.) = 3.24
 LONGEST FLOWPATH FROM NODE 171.00 TO NODE 180.00 = 2170.00 FEET.

 FLOW PROCESS FROM NODE 180.00 TO NODE 180.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION (MIN.) = 15.92
 RAINFALL INTENSITY (INCH/HR) = 2.11
 AREA-AVERAGED Fm (INCH/HR) = 0.13
 AREA-AVERAGED Fp (INCH/HR) = 1.33
 AREA-AVERAGED Ap = 0.10
 EFFECTIVE STREAM AREA (ACRES) = 39.60
 TOTAL STREAM AREA (ACRES) = 39.60
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 70.32

 FLOW PROCESS FROM NODE 172.00 TO NODE 180.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<
 >>>>(STREET TABLE SECTION # 2 USED)<<<<<<

=====

UPSTREAM ELEVATION (FEET) = 985.00 DOWNSTREAM ELEVATION (FEET) = 968.00
 STREET LENGTH (FEET) = 1370.00 CURB HEIGHT (INCHES) = 8.0
 STREET HALFWIDTH (FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 27.00
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

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 = 0.0150

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 50.74
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH (FEET) = 0.64
 HALFSTREET FLOOD WIDTH (FEET) = 23.96
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.28
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 2.73
 STREET FLOW TRAVEL TIME (MIN.) = 5.34 Tc (MIN.) = 15.92
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.106
 SUBAREA LOSS RATE DATA (AMC I):

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	547.96	21.21	1.773	1.33 (0.36)	0.27	395.4	164.00
1	548.66	22.41	1.715	1.33 (0.36)	0.27	413.8	160.00
1	547.36	22.94	1.691	1.33 (0.37)	0.28	420.9	111.00
1	523.30	26.99	1.534	1.33 (0.38)	0.28	464.7	105.00
1	516.28	27.86	1.505	1.33 (0.38)	0.29	471.8	150.00
1	507.87	28.53	1.484	1.33 (0.38)	0.29	473.7	100.00
2	70.32	15.92	2.106	1.33 (0.13)	0.10	39.6	171.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	578.72	15.92	2.106	1.33 (0.34)	0.25	336.4	171.00
2	606.41	21.21	1.773	1.33 (0.34)	0.26	435.0	164.00
3	605.06	22.41	1.715	1.33 (0.34)	0.26	453.4	160.00
4	602.91	22.94	1.691	1.33 (0.35)	0.26	460.5	111.00
5	573.25	26.99	1.534	1.33 (0.36)	0.27	504.3	105.00
6	565.20	27.86	1.505	1.33 (0.36)	0.27	511.4	150.00

7 556.03 28.53 1.484 1.33(0.36) 0.27 513.3 100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 606.41 Tc(MIN.) = 21.21
EFFECTIVE AREA(ACRES) = 434.95 AREA-AVERAGED Fm(INCH/HR) = 0.34
AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.26
TOTAL AREA(ACRES) = 513.3
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 180.00 = 10590.00 FEET.

FLOW PROCESS FROM NODE 180.00 TO NODE 1000.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 968.00 DOWNSTREAM(FEET) = 950.00
FLOW LENGTH(FEET) = 2930.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 96.0 INCH PIPE IS 74.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.47
ESTIMATED PIPE DIAMETER(INCH) = 96.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 606.41
PIPE TRAVEL TIME(MIN.) = 3.37 Tc(MIN.) = 24.59
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 1000.00 = 13520.00 FEET.

FLOW PROCESS FROM NODE 1000.00 TO NODE 1000.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 24.59
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.623
SUBAREA LOSS RATE DATA(AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 8.70 1.33 0.100 17
COMMERCIAL A 56.40 1.33 0.100 17
COMMERCIAL A 10.50 1.33 0.100 17
SCHOOL A 1.20 1.33 0.600 17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.108
SUBAREA AREA(ACRES) = 76.80 SUBAREA RUNOFF(CFS) = 102.26
EFFECTIVE AREA(ACRES) = 511.75 AREA-AVERAGED Fm(INCH/HR) = 0.31
AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.23
TOTAL AREA(ACRES) = 590.1 PEAK FLOW RATE(CFS) = 606.41
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 181.00 TO NODE 182.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 950.00
ELEVATION DATA: UPSTREAM(FEET) = 1010.00 DOWNSTREAM(FEET) = 985.00

Tc = K * [(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.771
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.823
SUBAREA Tc AND LOSS RATE DATA(AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 0.80 1.33 0.100 17 9.77
COMMERCIAL A 6.30 1.33 0.100 17 9.77
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 17.19
TOTAL AREA(ACRES) = 7.10 PEAK FLOW RATE(CFS) = 17.19

FLOW PROCESS FROM NODE 182.00 TO NODE 183.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 985.00 DOWNSTREAM ELEVATION(FEET) = 978.00
STREET LENGTH(FEET) = 850.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 32.34
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.59
HALFSTREET FLOOD WIDTH(FEET) = 21.80
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.27
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.95
STREET FLOW TRAVEL TIME(MIN.) = 4.33 Tc(MIN.) = 14.10

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.265
SUBAREA LOSS RATE DATA(AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 2.10 1.33 0.100 17
COMMERCIAL A 13.60 1.33 0.100 17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 15.70 SUBAREA RUNOFF(CFS) = 30.13
EFFECTIVE AREA(ACRES) = 22.80 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 22.8 PEAK FLOW RATE(CFS) = 43.76

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.65 HALFSTREET FLOOD WIDTH(FEET) = 24.54
FLOW VELOCITY(FEET/SEC.) = 3.52 DEPTH*VELOCITY(FT*FT/SEC.) = 2.29
LONGEST FLOWPATH FROM NODE 181.00 TO NODE 183.00 = 1800.00 FEET.

```

*****
FLOW PROCESS FROM NODE 183.00 TO NODE 190.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 978.00 DOWNSTREAM(FEET) = 960.00
FLOW LENGTH(FEET) = 1600.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.52
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 43.76
PIPE TRAVEL TIME(MIN.) = 2.80 Tc(MIN.) = 16.90
LONGEST FLOWPATH FROM NODE 181.00 TO NODE 190.00 = 3400.00 FEET.
*****
FLOW PROCESS FROM NODE 190.00 TO NODE 190.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) = 16.90
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.032
SUBAREA LOSS RATE DATA(AMC I ):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 7.90 1.33 0.100 17
COMMERCIAL A 26.20 1.33 0.100 17
PUBLIC PARK A 0.50 1.33 0.850 17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.111
SUBAREA AREA(ACRES) = 34.60 SUBAREA RUNOFF(CFS) = 58.69
EFFECTIVE AREA(ACRES) = 57.40 AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.11
TOTAL AREA(ACRES) = 57.4 PEAK FLOW RATE(CFS) = 97.65
*****
FLOW PROCESS FROM NODE 191.00 TO NODE 192.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 1050.00
ELEVATION DATA: UPSTREAM(FEET) = 970.00 DOWNSTREAM(FEET) = 965.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 14.315
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.245
SUBAREA Tc AND LOSS RATE DATA(AMC I ):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 2.70 1.33 0.100 17 14.32
PUBLIC PARK A 3.90 1.33 0.850 17 22.74
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.543
SUBAREA RUNOFF(CFS) = 9.05
TOTAL AREA(ACRES) = 6.60 PEAK FLOW RATE(CFS) = 9.05

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*****
FLOW PROCESS FROM NODE 192.00 TO NODE 193.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 965.00 DOWNSTREAM(FEET) = 960.00
FLOW LENGTH(FEET) = 1460.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.15
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 9.05
PIPE TRAVEL TIME(MIN.) = 5.86 Tc(MIN.) = 20.18
LONGEST FLOWPATH FROM NODE 191.00 TO NODE 193.00 = 2510.00 FEET.
*****
FLOW PROCESS FROM NODE 193.00 TO NODE 193.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) = 20.18
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.827
SUBAREA LOSS RATE DATA(AMC I ):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 4.00 1.33 0.100 17
PUBLIC PARK A 4.90 1.33 0.850 17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.513
SUBAREA AREA(ACRES) = 8.90 SUBAREA RUNOFF(CFS) = 9.18
EFFECTIVE AREA(ACRES) = 15.50 AREA-AVERAGED Fm(INCH/HR) = 0.70
AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.53
TOTAL AREA(ACRES) = 15.5 PEAK FLOW RATE(CFS) = 15.74
*****
FLOW PROCESS FROM NODE 193.00 TO NODE 1000.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 960.00 DOWNSTREAM(FEET) = 950.00
FLOW LENGTH(FEET) = 2980.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 21.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.60
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 15.74
PIPE TRAVEL TIME(MIN.) = 10.80 Tc(MIN.) = 30.97
LONGEST FLOWPATH FROM NODE 191.00 TO NODE 1000.00 = 5490.00 FEET.
*****
FLOW PROCESS FROM NODE 1000.00 TO NODE 1000.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) = 30.97

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* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.413

SUBAREA LOSS RATE DATA (AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	7.50	1.33	0.100	17
PUBLIC PARK	A	9.70	1.33	0.850	17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.523
SUBAREA AREA (ACRES) = 17.20 SUBAREA RUNOFF (CFS) = 11.12
EFFECTIVE AREA (ACRES) = 32.70 AREA-AVERAGED Fm (INCH/HR) = 0.70
AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.52
TOTAL AREA (ACRES) = 32.7 PEAK FLOW RATE (CFS) = 21.08

=====
END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 32.7 TC (MIN.) = 30.97
EFFECTIVE AREA (ACRES) = 32.70 AREA-AVERAGED Fm (INCH/HR) = 0.70
AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.524
PEAK FLOW RATE (CFS) = 21.08
=====

=====
END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
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Analysis prepared by:

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***** DESCRIPTION OF STUDY *****
* ONTARIO MASTER PLAN OF DRAINAGE - BASIN IV (AREA C) *
* 100-YEAR HYDROLOGY ANALYSIS *
* P. PAGADUAN 10-11-2010 *

FILE NAME: OIVC100.DAT
TIME/DATE OF STUDY: 14:36 01/06/2011

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

---*TIME-OF-CONCENTRATION MODEL*---

USER SPECIFIED STORM EVENT(YEAR) = 100.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.80
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.4000

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150
2	32.0	27.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

UNIT-HYDROGRAPH MODEL SELECTIONS/PARAMETERS:

WATERSHED LAG = 0.80 * Tc
USED "VALLEY UNDEVELOPED" S-GRAPH FOR DEVELOPMENTS OF

2 UNITS/ACRE AND LESS; AND "VALLEY DEVELOPED" S-GRAPH
FOR DEVELOPMENTS OF 3-4 UNITS/ACRE AND MORE.
USER SPECIFIED RAINFALL VALUES:

2-YR 6-HR RAINFALL DEPTH(INCH) = 1.70
2-YR 24-HR RAINFALL DEPTH(INCH) = 3.30
100-YR 6-HR RAINFALL DEPTH(INCH) = 3.50
100-YR 24-HR RAINFALL DEPTH(INCH) = 8.50
SIERRA MADRE DEPTH-AREA FACTORS USED.

AREA-AVERAGED

DURATION	RAINFALL(INCH)
5-MINUTES	0.52
30-MINUTES	1.06
1-HOUR	1.40
3-HOUR	2.46
6-HOUR	3.50
24-HOUR	8.50

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR UNIT HYDROGRAPH METHOD

FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 980.00
ELEVATION DATA: UPSTREAM(FEET) = 1055.00 DOWNSTREAM(FEET) = 1042.00

Tc = K*[(LENGTH** 3.00) / (ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 11.345
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.803
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	6.50	0.98	0.100	32	11.35
COMMERCIAL	A	0.50	0.98	0.100	32	11.35

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 23.34
TOTAL AREA(ACRES) = 7.00 PEAK FLOW RATE(CFS) = 23.34

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 1042.00 DOWNSTREAM(FEET) = 1035.00
FLOW LENGTH(FEET) = 760.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.54
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 23.34
PIPE TRAVEL TIME(MIN.) = 1.68 Tc(MIN.) = 13.03
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 1740.00 FEET.

```

*****
FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 13.03
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.501
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA   Fp     Ap     SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          A       9.40   0.98   0.100  32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 9.40   SUBAREA RUNOFF(CFS) = 28.79
EFFECTIVE AREA(ACRES) = 16.40  AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98  AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 16.4   PEAK FLOW RATE(CFS) = 50.23

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*****
FLOW PROCESS FROM NODE 110.00 TO NODE 111.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 1200.00
ELEVATION DATA: UPSTREAM(FEET) = 1045.00  DOWNSTREAM(FEET) = 1030.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 12.450
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.597
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA   Fp     Ap     SCS  Tc
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL          A       1.40   0.98   0.100  32  12.45
RESIDENTIAL
"5-7 DWELLINGS/ACRE"  A       4.60   0.98   0.500  32  15.93
RESIDENTIAL
"11+ DWELLINGS/ACRE"  A       2.40   0.98   0.200  32  13.27
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.348
SUBAREA RUNOFF(CFS) = 24.63
TOTAL AREA(ACRES) = 8.40   PEAK FLOW RATE(CFS) = 24.63

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*****
FLOW PROCESS FROM NODE 112.00 TO NODE 113.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
ELEVATION DATA: UPSTREAM(FEET) = 1045.00  DOWNSTREAM(FEET) = 1028.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.884
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.899
SUBAREA Tc AND LOSS RATE DATA(AMC II):

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DEVELOPMENT TYPE/   SCS SOIL  AREA   Fp     Ap     SCS  Tc
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL          A       2.30   0.98   0.100  32  10.88
RESIDENTIAL
"5-7 DWELLINGS/ACRE"  A       4.40   0.98   0.500  32  13.93
RESIDENTIAL
"11+ DWELLINGS/ACRE"  A       2.00   0.98   0.200  32  11.60
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.325
SUBAREA RUNOFF(CFS) = 28.05
TOTAL AREA(ACRES) = 8.70   PEAK FLOW RATE(CFS) = 28.05

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*****
FLOW PROCESS FROM NODE 113.00 TO NODE 114.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 1028.00  DOWNSTREAM ELEVATION(FEET) = 1018.00
STREET LENGTH(FEET) = 700.00  CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 32.00

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DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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

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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 56.45
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.64
HALFSTREET FLOOD WIDTH(FEET) = 24.33
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.62
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.98
STREET FLOW TRAVEL TIME(MIN.) = 2.52  Tc(MIN.) = 13.41
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.440
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA   Fp     Ap     SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          A       7.50   0.98   0.100  32
RESIDENTIAL
"5-7 DWELLINGS/ACRE"  A      10.20   0.98   0.500  32
RESIDENTIAL
"11+ DWELLINGS/ACRE"  A       2.40   0.98   0.200  32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.315
SUBAREA AREA(ACRES) = 20.10  SUBAREA RUNOFF(CFS) = 56.68
EFFECTIVE AREA(ACRES) = 28.80  AREA-AVERAGED Fm(INCH/HR) = 0.31
AREA-AVERAGED Fp(INCH/HR) = 0.98  AREA-AVERAGED Ap = 0.32
TOTAL AREA(ACRES) = 28.8   PEAK FLOW RATE(CFS) = 81.13

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END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.72  HALFSTREET FLOOD WIDTH(FEET) = 30.51

```

FLOW VELOCITY (FEET/SEC.) = 5.02 DEPTH*VELOCITY (FT*FT/SEC.) = 3.60
 *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
 AND L = 700.0 FT WITH ELEVATION-DROP = 10.0 FT, IS 69.7 CFS,
 WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 114.00
 LONGEST FLOWPATH FROM NODE 112.00 TO NODE 114.00 = 1700.00 FEET.

LONGEST FLOWPATH FROM NODE 112.00 TO NODE 116.00 = 4200.00 FEET.

 FLOW PROCESS FROM NODE 114.00 TO NODE 115.00 IS CODE = 31

 FLOW PROCESS FROM NODE 116.00 TO NODE 116.00 IS CODE = 81

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM (FEET) = 1018.00 DOWNSTREAM (FEET) = 1012.00
 FLOW LENGTH (FEET) = 900.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 45.0 INCH PIPE IS 34.0 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 9.07
 ESTIMATED PIPE DIAMETER (INCH) = 45.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 81.13
 PIPE TRAVEL TIME (MIN.) = 1.65 Tc (MIN.) = 15.06
 LONGEST FLOWPATH FROM NODE 112.00 TO NODE 115.00 = 2600.00 FEET.

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====

MAINLINE Tc (MIN.) = 17.36
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.946
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	9.10	0.98	0.100	32
COMMERCIAL	A	63.90	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 73.00 SUBAREA RUNOFF (CFS) = 187.16
 EFFECTIVE AREA (ACRES) = 141.00 AREA-AVERAGED Fm (INCH/HR) = 0.19
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.20
 TOTAL AREA (ACRES) = 141.0 PEAK FLOW RATE (CFS) = 349.37

 FLOW PROCESS FROM NODE 115.00 TO NODE 115.00 IS CODE = 81

 FLOW PROCESS FROM NODE 116.00 TO NODE 120.00 IS CODE = 31

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====

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

MAINLINE Tc (MIN.) = 15.06
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.208
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	10.70	0.98	0.100	32
RESIDENTIAL "5-7 DWELLINGS/ACRE"	A	15.70	0.98	0.500	32
RESIDENTIAL "11+ DWELLINGS/ACRE"	A	12.80	0.98	0.200	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.293
 SUBAREA AREA (ACRES) = 39.20 SUBAREA RUNOFF (CFS) = 103.12
 EFFECTIVE AREA (ACRES) = 68.00 AREA-AVERAGED Fm (INCH/HR) = 0.30
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.30
 TOTAL AREA (ACRES) = 68.0 PEAK FLOW RATE (CFS) = 178.24

ELEVATION DATA: UPSTREAM (FEET) = 1000.00 DOWNSTREAM (FEET) = 980.00
 FLOW LENGTH (FEET) = 1900.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 72.0 INCH PIPE IS 53.3 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 15.55
 ESTIMATED PIPE DIAMETER (INCH) = 72.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 349.37
 PIPE TRAVEL TIME (MIN.) = 2.04 Tc (MIN.) = 19.40
 LONGEST FLOWPATH FROM NODE 112.00 TO NODE 120.00 = 6100.00 FEET.

 FLOW PROCESS FROM NODE 120.00 TO NODE 120.00 IS CODE = 81

 FLOW PROCESS FROM NODE 115.00 TO NODE 116.00 IS CODE = 31

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM (FEET) = 1012.00 DOWNSTREAM (FEET) = 1000.00
 FLOW LENGTH (FEET) = 1600.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 60.0 INCH PIPE IS 43.8 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 11.60
 ESTIMATED PIPE DIAMETER (INCH) = 60.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 178.24
 PIPE TRAVEL TIME (MIN.) = 2.30 Tc (MIN.) = 17.36

MAINLINE Tc (MIN.) = 19.40
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.757
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	4.50	0.98	0.100	32
COMMERCIAL	A	130.20	0.98	0.100	32
PUBLIC PARK	A	3.30	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.118
 SUBAREA AREA (ACRES) = 138.00 SUBAREA RUNOFF (CFS) = 328.09
 EFFECTIVE AREA (ACRES) = 279.00 AREA-AVERAGED Fm (INCH/HR) = 0.15
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.16
 TOTAL AREA (ACRES) = 279.0 PEAK FLOW RATE (CFS) = 653.39
 =====

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 279.0 TC (MIN.) = 19.40
EFFECTIVE AREA (ACRES) = 279.00 AREA-AVERAGED F_m (INCH/HR) = 0.15
AREA-AVERAGED F_p (INCH/HR) = 0.98 AREA-AVERAGED A_p = 0.158
PEAK FLOW RATE (CFS) = 653.39

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END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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Analysis prepared by:

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***** DESCRIPTION OF STUDY *****

* ONTARIO MASTER PLAN OF DRAINAGE - BASIN IV (AREA C) *
* 25-YEAR HYDROLOGY ANALYSIS *
* P. PAGADUAN 10-11-2010 *

FILE NAME: OIVC25.DAT
TIME/DATE OF STUDY: 14:40 01/06/2011

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USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

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--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT (YEAR) = 25.00
SPECIFIED MINIMUM PIPE SIZE (INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS (DECIMAL) TO USE FOR FRICTION SLOPE = 0.80
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL
10-YEAR STORM 60-MINUTE INTENSITY (INCH/HOUR) = 0.950
100-YEAR STORM 60-MINUTE INTENSITY (INCH/HOUR) = 1.400
COMPUTED RAINFALL INTENSITY DATA:
STORM EVENT = 25.00 1-HOUR INTENSITY (INCH/HOUR) = 1.1070
SLOPE OF INTENSITY DURATION CURVE = 0.6000

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL IN- / OUT-/PARK-SIDE / SIDE/WAY	CURB HEIGHT (FT)	GUTTER WIDTH (FT)	GEOMETRIES LIP (FT)	MANNING HIKE (FT)	FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150
2	32.0	27.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
 2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
- *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

UNIT-HYDROGRAPH MODEL SELECTIONS/PARAMETERS:

WATERSHED LAG = 0.80 * Tc
USED "VALLEY UNDEVELOPED" S-GRAPH FOR DEVELOPMENTS OF 2 UNITS/ACRE AND LESS; AND "VALLEY DEVELOPED" S-GRAPH FOR DEVELOPMENTS OF 3-4 UNITS/ACRE AND MORE.

USER SPECIFIED RAINFALL VALUES:

2-YR 6-HR RAINFALL DEPTH (INCH) = 1.70
2-YR 24-HR RAINFALL DEPTH (INCH) = 3.30
100-YR 6-HR RAINFALL DEPTH (INCH) = 3.50
100-YR 24-HR RAINFALL DEPTH (INCH) = 8.50
SIERRA MADRE DEPTH-AREA FACTORS USED.

DURATION	AREA-AVERAGED RAINFALL (INCH)
5-MINUTES	0.38
30-MINUTES	0.79
1-HOUR	1.04
3-HOUR	1.87
6-HOUR	2.71
24-HOUR	5.30

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR UNIT HYDROGRAPH METHOD

FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 980.00
ELEVATION DATA: UPSTREAM (FEET) = 1055.00 DOWNSTREAM (FEET) = 1042.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 11.345
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.007
SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	6.50	0.98	0.100	32	11.35
COMMERCIAL	A	0.50	0.98	0.100	32	11.35

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF (CFS) = 18.33
TOTAL AREA (ACRES) = 7.00 PEAK FLOW RATE (CFS) = 18.33

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 1042.00 DOWNSTREAM (FEET) = 1035.00
FLOW LENGTH (FEET) = 760.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.6 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 7.03
ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 18.33
PIPE TRAVEL TIME (MIN.) = 1.80 Tc (MIN.) = 13.15

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 1740.00 FEET.

FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 13.15

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.753

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	9.40	0.98	0.100	32	

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA(ACRES) = 9.40 SUBAREA RUNOFF(CFS) = 22.46

EFFECTIVE AREA(ACRES) = 16.40 AREA-AVERAGED Fm(INCH/HR) = 0.10

AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10

TOTAL AREA(ACRES) = 16.4 PEAK FLOW RATE(CFS) = 39.19

FLOW PROCESS FROM NODE 110.00 TO NODE 111.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1200.00

ELEVATION DATA: UPSTREAM(FEET) = 1045.00 DOWNSTREAM(FEET) = 1030.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 12.450

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.844

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	1.40	0.98	0.100	32	12.45

RESIDENTIAL

"5-7 DWELLINGS/ACRE" A 4.60 0.98 0.500 32 15.93

RESIDENTIAL

"11+ DWELLINGS/ACRE" A 2.40 0.98 0.200 32 13.27

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.348

SUBAREA RUNOFF(CFS) = 18.94

TOTAL AREA(ACRES) = 8.40 PEAK FLOW RATE(CFS) = 18.94

FLOW PROCESS FROM NODE 112.00 TO NODE 113.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00

ELEVATION DATA: UPSTREAM(FEET) = 1045.00 DOWNSTREAM(FEET) = 1028.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.884

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.083

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	2.30	0.98	0.100	32	10.88

RESIDENTIAL

"5-7 DWELLINGS/ACRE" A 4.40 0.98 0.500 32 13.93

RESIDENTIAL

"11+ DWELLINGS/ACRE" A 2.00 0.98 0.200 32 11.60

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.325

SUBAREA RUNOFF(CFS) = 21.66

TOTAL AREA(ACRES) = 8.70 PEAK FLOW RATE(CFS) = 21.66

FLOW PROCESS FROM NODE 113.00 TO NODE 114.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 2 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 1028.00 DOWNSTREAM ELEVATION(FEET) = 1018.00

STREET LENGTH(FEET) = 700.00 CURB HEIGHT(INCHES) = 8.0

STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 43.35

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.60

HALFSTREET FLOOD WIDTH(FEET) = 21.95

AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.33

PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.58

STREET FLOW TRAVEL TIME(MIN.) = 2.70 Tc(MIN.) = 13.58

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.700

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	7.50	0.98	0.100	32	

RESIDENTIAL

"5-7 DWELLINGS/ACRE" A 10.20 0.98 0.500 32

RESIDENTIAL

"11+ DWELLINGS/ACRE" A 2.40 0.98 0.200 32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.315

SUBAREA AREA(ACRES) = 20.10 SUBAREA RUNOFF(CFS) = 43.28

EFFECTIVE AREA(ACRES) = 28.80 AREA-AVERAGED Fm(INCH/HR) = 0.31

AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.32

TOTAL AREA(ACRES) = 28.8 PEAK FLOW RATE(CFS) = 61.94

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.66 HALFSTREET FLOOD WIDTH (FEET) = 25.22
 FLOW VELOCITY (FEET/SEC.) = 4.73 DEPTH*VELOCITY (FT*FT/SEC.) = 3.13
 LONGEST FLOWPATH FROM NODE 112.00 TO NODE 114.00 = 1700.00 FEET.

 FLOW PROCESS FROM NODE 114.00 TO NODE 115.00 IS CODE = 31

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

 ELEVATION DATA: UPSTREAM (FEET) = 1018.00 DOWNSTREAM (FEET) = 1012.00
 FLOW LENGTH (FEET) = 900.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 42.0 INCH PIPE IS 29.6 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 8.56
 ESTIMATED PIPE DIAMETER (INCH) = 42.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 61.94
 PIPE TRAVEL TIME (MIN.) = 1.75 Tc (MIN.) = 15.33
 LONGEST FLOWPATH FROM NODE 112.00 TO NODE 115.00 = 2600.00 FEET.

 FLOW PROCESS FROM NODE 115.00 TO NODE 115.00 IS CODE = 81

 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

 MAINLINE Tc (MIN.) = 15.33
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.510
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	10.70	0.98	0.100	32
RESIDENTIAL "5-7 DWELLINGS/ACRE"	A	15.70	0.98	0.500	32
RESIDENTIAL "11+ DWELLINGS/ACRE"	A	12.80	0.98	0.200	32

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.293
 SUBAREA AREA (ACRES) = 39.20 SUBAREA RUNOFF (CFS) = 78.48
 EFFECTIVE AREA (ACRES) = 68.00 AREA-AVERAGED Fm (INCH/HR) = 0.30
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.30
 TOTAL AREA (ACRES) = 68.0 PEAK FLOW RATE (CFS) = 135.50

 FLOW PROCESS FROM NODE 115.00 TO NODE 116.00 IS CODE = 31

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

 ELEVATION DATA: UPSTREAM (FEET) = 1012.00 DOWNSTREAM (FEET) = 1000.00
 FLOW LENGTH (FEET) = 1600.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 54.0 INCH PIPE IS 39.7 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 10.82
 ESTIMATED PIPE DIAMETER (INCH) = 54.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 135.50
 PIPE TRAVEL TIME (MIN.) = 2.46 Tc (MIN.) = 17.80
 LONGEST FLOWPATH FROM NODE 112.00 TO NODE 116.00 = 4200.00 FEET.

 FLOW PROCESS FROM NODE 116.00 TO NODE 116.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

 MAINLINE Tc (MIN.) = 17.80
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.295
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	9.10	0.98	0.100	32
COMMERCIAL	A	63.90	0.98	0.100	32

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 73.00 SUBAREA RUNOFF (CFS) = 144.40
 EFFECTIVE AREA (ACRES) = 141.00 AREA-AVERAGED Fm (INCH/HR) = 0.19
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.20
 TOTAL AREA (ACRES) = 141.0 PEAK FLOW RATE (CFS) = 266.76

 FLOW PROCESS FROM NODE 116.00 TO NODE 120.00 IS CODE = 31

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

 ELEVATION DATA: UPSTREAM (FEET) = 1000.00 DOWNSTREAM (FEET) = 980.00
 FLOW LENGTH (FEET) = 1900.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 63.0 INCH PIPE IS 50.5 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 14.33
 ESTIMATED PIPE DIAMETER (INCH) = 63.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 266.76
 PIPE TRAVEL TIME (MIN.) = 2.21 Tc (MIN.) = 20.01
 LONGEST FLOWPATH FROM NODE 112.00 TO NODE 120.00 = 6100.00 FEET.

 FLOW PROCESS FROM NODE 120.00 TO NODE 120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

 MAINLINE Tc (MIN.) = 20.01
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.140
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	4.50	0.98	0.100	32
COMMERCIAL	A	130.20	0.98	0.100	32
PUBLIC PARK	A	3.30	0.98	0.850	32

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.118
 SUBAREA AREA (ACRES) = 138.00 SUBAREA RUNOFF (CFS) = 251.47
 EFFECTIVE AREA (ACRES) = 279.00 AREA-AVERAGED Fm (INCH/HR) = 0.15
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.16
 TOTAL AREA (ACRES) = 279.0 PEAK FLOW RATE (CFS) = 498.47

 END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 279.0 TC (MIN.) = 20.01
EFFECTIVE AREA (ACRES) = 279.00 AREA-AVERAGED F_m (INCH/HR) = 0.15
AREA-AVERAGED F_p (INCH/HR) = 0.98 AREA-AVERAGED A_p = 0.158
PEAK FLOW RATE (CFS) = 498.47

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END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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Analysis prepared by:

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***** DESCRIPTION OF STUDY *****

* ONTARIO MASTER PLAN OF DRAINAGE - BASIN IV (AREA C) *
* 10-YEAR HYDROLOGY ANALYSIS *
* P. PAGADUAN 10-11-2010 *

FILE NAME: OIVC10.DAT
TIME/DATE OF STUDY: 14:45 01/06/2011

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USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

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--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT (YEAR) = 10.00
SPECIFIED MINIMUM PIPE SIZE (INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS (DECIMAL) TO USE FOR FRICTION SLOPE = 0.80
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE (LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
USER SPECIFIED 1-HOUR INTENSITY (INCH/HOUR) = 0.9500

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0313 0.167	0.0150
2	32.0	27.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

UNIT-HYDROGRAPH MODEL SELECTIONS/PARAMETERS:

WATERSHED LAG = 0.80 * Tc
USED "VALLEY UNDEVELOPED" S-GRAPH FOR DEVELOPMENTS OF

2 UNITS/ACRE AND LESS; AND "VALLEY DEVELOPED" S-GRAPH
FOR DEVELOPMENTS OF 3-4 UNITS/ACRE AND MORE.

USER SPECIFIED RAINFALL VALUES:

2-YR 6-HR RAINFALL DEPTH (INCH) = 1.70
2-YR 24-HR RAINFALL DEPTH (INCH) = 3.30
100-YR 6-HR RAINFALL DEPTH (INCH) = 3.50
100-YR 24-HR RAINFALL DEPTH (INCH) = 8.50
SIERRA MADRE DEPTH-AREA FACTORS USED.

AREA-AVERAGED

DURATION	RAINFALL (INCH)
5-MINUTES	0.33
30-MINUTES	0.68
1-HOUR	0.90
3-HOUR	1.60
6-HOUR	2.31
24-HOUR	4.36

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR UNIT HYDROGRAPH METHOD

FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

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INITIAL SUBAREA FLOW-LENGTH (FEET) = 980.00
ELEVATION DATA: UPSTREAM (FEET) = 1055.00 DOWNSTREAM (FEET) = 1042.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 11.345
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.581
SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	6.50	0.98	0.100	32	11.35
COMMERCIAL	A	0.50	0.98	0.100	32	11.35

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF (CFS) = 15.64
TOTAL AREA (ACRES) = 7.00 PEAK FLOW RATE (CFS) = 15.64

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 1042.00 DOWNSTREAM (FEET) = 1035.00
FLOW LENGTH (FEET) = 760.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.3 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 6.88
ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 15.64
PIPE TRAVEL TIME (MIN.) = 1.84 Tc (MIN.) = 13.19
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 1740.00 FEET.

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*****
FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc (MIN.) = 13.19
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.358
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          A         9.40   0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 9.40 SUBAREA RUNOFF (CFS) = 19.12
EFFECTIVE AREA (ACRES) = 16.40 AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 16.4 PEAK FLOW RATE (CFS) = 33.36

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*****
FLOW PROCESS FROM NODE 110.00 TO NODE 111.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH (FEET) = 1200.00
ELEVATION DATA: UPSTREAM (FEET) = 1045.00 DOWNSTREAM (FEET) = 1030.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 12.450
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.441
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA   Fp   Ap   SCS  Tc
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL          A         1.40   0.98 0.100 32 12.45
RESIDENTIAL
"5-7 DWELLINGS/ACRE" A         4.60   0.98 0.500 32 15.93
RESIDENTIAL
"11+ DWELLINGS/ACRE" A         2.40   0.98 0.200 32 13.27
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.348
SUBAREA RUNOFF (CFS) = 15.89
TOTAL AREA (ACRES) = 8.40 PEAK FLOW RATE (CFS) = 15.89

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*****
FLOW PROCESS FROM NODE 112.00 TO NODE 113.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH (FEET) = 1000.00
ELEVATION DATA: UPSTREAM (FEET) = 1045.00 DOWNSTREAM (FEET) = 1028.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 10.884
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.646
SUBAREA Tc AND LOSS RATE DATA (AMC II):

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DEVELOPMENT TYPE/   SCS SOIL  AREA   Fp   Ap   SCS  Tc
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL          A         2.30   0.98 0.100 32 10.88
RESIDENTIAL
"5-7 DWELLINGS/ACRE" A         4.40   0.98 0.500 32 13.93
RESIDENTIAL
"11+ DWELLINGS/ACRE" A         2.00   0.98 0.200 32 11.60
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.325
SUBAREA RUNOFF (CFS) = 18.23
TOTAL AREA (ACRES) = 8.70 PEAK FLOW RATE (CFS) = 18.23

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*****
FLOW PROCESS FROM NODE 113.00 TO NODE 114.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<
=====
UPSTREAM ELEVATION (FEET) = 1028.00 DOWNSTREAM ELEVATION (FEET) = 1018.00
STREET LENGTH (FEET) = 700.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 32.00

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DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 27.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

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

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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 36.35
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH (FEET) = 0.57
HALFSTREET FLOOD WIDTH (FEET) = 20.48
AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.15
PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 2.35
STREET FLOW TRAVEL TIME (MIN.) = 2.81 Tc (MIN.) = 13.70
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.305
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          A         7.50   0.98 0.100 32
RESIDENTIAL
"5-7 DWELLINGS/ACRE" A         10.20   0.98 0.500 32
RESIDENTIAL
"11+ DWELLINGS/ACRE" A         2.40   0.98 0.200 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.315
SUBAREA AREA (ACRES) = 20.10 SUBAREA RUNOFF (CFS) = 36.14
EFFECTIVE AREA (ACRES) = 28.80 AREA-AVERAGED Fm (INCH/HR) = 0.31
AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.32
TOTAL AREA (ACRES) = 28.8 PEAK FLOW RATE (CFS) = 51.70

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END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH (FEET) = 0.63 HALFSTREET FLOOD WIDTH (FEET) = 23.48

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FLOW VELOCITY (FEET/SEC.) = 4.53 DEPTH*VELOCITY (FT*FT/SEC.) = 2.85
LONGEST FLOWPATH FROM NODE 112.00 TO NODE 114.00 = 1700.00 FEET.

FLOW PROCESS FROM NODE 116.00 TO NODE 116.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 18.10
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.950
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 9.10 0.98 0.100 32
COMMERCIAL A 63.90 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 73.00 SUBAREA RUNOFF (CFS) = 121.68
EFFECTIVE AREA (ACRES) = 141.00 AREA-AVERAGED Fm (INCH/HR) = 0.19
AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.20
TOTAL AREA (ACRES) = 141.0 PEAK FLOW RATE (CFS) = 222.89

FLOW PROCESS FROM NODE 114.00 TO NODE 115.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 1018.00 DOWNSTREAM (FEET) = 1012.00
FLOW LENGTH (FEET) = 900.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 27.8 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 8.17
ESTIMATED PIPE DIAMETER (INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 51.70
PIPE TRAVEL TIME (MIN.) = 1.84 Tc (MIN.) = 15.53
LONGEST FLOWPATH FROM NODE 112.00 TO NODE 115.00 = 2600.00 FEET.

FLOW PROCESS FROM NODE 115.00 TO NODE 115.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 15.53
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.137
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 10.70 0.98 0.100 32
RESIDENTIAL
"5-7 DWELLINGS/ACRE" A 15.70 0.98 0.500 32
RESIDENTIAL
"11+ DWELLINGS/ACRE" A 12.80 0.98 0.200 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.293
SUBAREA AREA (ACRES) = 39.20 SUBAREA RUNOFF (CFS) = 65.33
EFFECTIVE AREA (ACRES) = 68.00 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.30
TOTAL AREA (ACRES) = 68.0 PEAK FLOW RATE (CFS) = 112.69

FLOW PROCESS FROM NODE 115.00 TO NODE 116.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 1012.00 DOWNSTREAM (FEET) = 1000.00
FLOW LENGTH (FEET) = 1600.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 36.5 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 10.37
ESTIMATED PIPE DIAMETER (INCH) = 51.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 112.69
PIPE TRAVEL TIME (MIN.) = 2.57 Tc (MIN.) = 18.10
LONGEST FLOWPATH FROM NODE 112.00 TO NODE 116.00 = 4200.00 FEET.

FLOW PROCESS FROM NODE 116.00 TO NODE 120.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 1000.00 DOWNSTREAM (FEET) = 980.00
FLOW LENGTH (FEET) = 1900.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 60.0 INCH PIPE IS 45.9 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 13.83
ESTIMATED PIPE DIAMETER (INCH) = 60.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 222.89
PIPE TRAVEL TIME (MIN.) = 2.29 Tc (MIN.) = 20.39
LONGEST FLOWPATH FROM NODE 112.00 TO NODE 120.00 = 6100.00 FEET.

FLOW PROCESS FROM NODE 120.00 TO NODE 120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 20.39
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.815
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 4.50 0.98 0.100 32
COMMERCIAL A 130.20 0.98 0.100 32
PUBLIC PARK A 3.30 0.98 0.850 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.118
SUBAREA AREA (ACRES) = 138.00 SUBAREA RUNOFF (CFS) = 211.16
EFFECTIVE AREA (ACRES) = 279.00 AREA-AVERAGED Fm (INCH/HR) = 0.15
AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.16
TOTAL AREA (ACRES) = 279.0 PEAK FLOW RATE (CFS) = 416.99

END OF STUDY SUMMARY:
TOTAL AREA (ACRES) = 279.0 TC (MIN.) = 20.39
EFFECTIVE AREA (ACRES) = 279.00 AREA-AVERAGED Fm (INCH/HR) = 0.15

AREA-AVERAGED F_p (INCH/HR) = 0.98 AREA-AVERAGED A_p = 0.158
PEAK FLOW RATE(CFS) = 416.99

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=====
END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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***** DESCRIPTION OF STUDY *****
* ONTARIO MASTER PLAN OF DRAINAGE - BASIN IV (AREA F) *
* 100-YEAR HYDROLOGY ANALYSIS *

FILE NAME: OIVF100.DAT
TIME/DATE OF STUDY: 14:34 10/17/2011

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT (YEAR) = 100.00
SPECIFIED MINIMUM PIPE SIZE (INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS (DECIMAL) TO USE FOR FRICTION SLOPE = 0.80
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE (LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
USER SPECIFIED 1-HOUR INTENSITY (INCH/HOUR) = 1.4000

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIPI (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150
2	32.0	27.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

UNIT-HYDROGRAPH MODEL SELECTIONS/PARAMETERS:
WATERSHED LAG = 0.80 * Tc
USED "VALLEY UNDEVELOPED" S-GRAPH FOR DEVELOPMENTS OF

2 UNITS/ACRE AND LESS; AND "VALLEY DEVELOPED" S-GRAPH
FOR DEVELOPMENTS OF 3-4 UNITS/ACRE AND MORE.

USER SPECIFIED RAINFALL VALUES:
2-YR 6-HR RAINFALL DEPTH (INCH) = 1.70
2-YR 24-HR RAINFALL DEPTH (INCH) = 3.20
100-YR 6-HR RAINFALL DEPTH (INCH) = 3.50
100-YR 24-HR RAINFALL DEPTH (INCH) = 8.50
SIERRA MADRE DEPTH-AREA FACTORS USED.

DURATION	AREA-AVERAGED RAINFALL (INCH)
5-MINUTES	0.52
30-MINUTES	1.06
1-HOUR	1.40
3-HOUR	2.46
6-HOUR	3.50
24-HOUR	8.50

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR UNIT HYDROGRAPH METHOD

FLOW PROCESS FROM NODE 210.00 TO NODE 211.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 700.00
ELEVATION DATA: UPSTREAM (FEET) = 895.00 DOWNSTREAM (FEET) = 892.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 12.431
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.600
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ LAND USE SCS SOIL GROUP AREA (ACRES) Fp (INCH/HR) Ap (DECIMAL) SCS CN Tc (MIN.)
COMMERCIAL A 1.30 0.98 0.100 32 12.43
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF (CFS) = 4.10
TOTAL AREA (ACRES) = 1.30 PEAK FLOW RATE (CFS) = 4.10

FLOW PROCESS FROM NODE 211.00 TO NODE 212.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

=====

UPSTREAM ELEVATION (FEET) = 892.00 DOWNSTREAM ELEVATION (FEET) = 884.00
STREET LENGTH (FEET) = 1200.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 27.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

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) = 7.70
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.41
HALFSTREET FLOOD WIDTH(FEET) = 12.67
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.14
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.88
STREET FLOW TRAVEL TIME(MIN.) = 9.32 Tc(MIN.) = 21.76
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.573

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 2.20 0.98 0.100 32
COMMERCIAL A 1.00 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 7.13
EFFECTIVE AREA(ACRES) = 4.50 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 4.5 PEAK FLOW RATE(CFS) = 10.03

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.44 HALFSTREET FLOOD WIDTH(FEET) = 14.15
FLOW VELOCITY(FEET/SEC.) = 2.29 DEPTH*VELOCITY(FT*FT/SEC.) = 1.01
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 212.00 = 1900.00 FEET.

FLOW PROCESS FROM NODE 212.00 TO NODE 212.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 21.76
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.573
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 0.30 0.98 0.100 32
COMMERCIAL A 7.50 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 7.80 SUBAREA RUNOFF(CFS) = 17.38
EFFECTIVE AREA(ACRES) = 12.30 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 12.3 PEAK FLOW RATE(CFS) = 27.41

FLOW PROCESS FROM NODE 212.00 TO NODE 213.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<

UPSTREAM ELEVATION(FEET) = 884.00 DOWNSTREAM ELEVATION(FEET) = 874.00
STREET LENGTH(FEET) = 900.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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) = 42.02
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.61
HALFSTREET FLOOD WIDTH(FEET) = 22.75
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.92
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.40
STREET FLOW TRAVEL TIME(MIN.) = 3.83 Tc(MIN.) = 25.59
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.335

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 2.50 0.98 0.100 32
COMMERCIAL A 12.00 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 14.50 SUBAREA RUNOFF(CFS) = 29.20
EFFECTIVE AREA(ACRES) = 26.80 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 26.8 PEAK FLOW RATE(CFS) = 53.96

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.66 HALFSTREET FLOOD WIDTH(FEET) = 25.12
FLOW VELOCITY(FEET/SEC.) = 4.15 DEPTH*VELOCITY(FT*FT/SEC.) = 2.74
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 213.00 = 2800.00 FEET.

FLOW PROCESS FROM NODE 213.00 TO NODE 214.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 874.00 DOWNSTREAM(FEET) = 865.00
FLOW LENGTH(FEET) = 1650.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 31.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.50
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 53.96
PIPE TRAVEL TIME(MIN.) = 3.67 Tc(MIN.) = 29.25
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 214.00 = 4450.00 FEET.

FLOW PROCESS FROM NODE 214.00 TO NODE 214.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 29.25

* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.154
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	7.20	0.98	0.100	32
COMMERCIAL	A	20.60	0.98	0.100	32
PUBLIC PARK	A	0.70	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.118
 SUBAREA AREA (ACRES) = 28.50 SUBAREA RUNOFF (CFS) = 52.30
 EFFECTIVE AREA (ACRES) = 55.30 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.11
 TOTAL AREA (ACRES) = 55.3 PEAK FLOW RATE (CFS) = 101.91

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH (FEET) = 0.59
 HALFSTREET FLOOD WIDTH (FEET) = 21.48
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.53
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 2.66
 STREET FLOW TRAVEL TIME (MIN.) = 3.24 Tc (MIN.) = 11.32
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.809

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	0.50	0.98	0.100	32
COMMERCIAL	A	12.90	0.98	0.100	32
PUBLIC PARK	A	1.10	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.157
 SUBAREA AREA (ACRES) = 14.50 SUBAREA RUNOFF (CFS) = 47.71
 EFFECTIVE AREA (ACRES) = 19.30 AREA-AVERAGED Fm (INCH/HR) = 0.15
 AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.15
 TOTAL AREA (ACRES) = 19.3 PEAK FLOW RATE (CFS) = 63.54

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.66 HALFSTREET FLOOD WIDTH (FEET) = 24.96
 FLOW VELOCITY (FEET/SEC.) = 4.95 DEPTH*VELOCITY (FT*FT/SEC.) = 3.25
 LONGEST FLOWPATH FROM NODE 215.00 TO NODE 217.00 = 1310.00 FEET.

 FLOW PROCESS FROM NODE 240.00 TO NODE 241.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 970.00
 ELEVATION DATA: UPSTREAM (FEET) = 865.00 DOWNSTREAM (FEET) = 862.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 15.119
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.201
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	7.50	0.98	0.100	32	15.12
PUBLIC PARK	A	0.40	0.98	0.850	32	24.02

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.138
 SUBAREA RUNOFF (CFS) = 21.80
 TOTAL AREA (ACRES) = 7.90 PEAK FLOW RATE (CFS) = 21.80

 FLOW PROCESS FROM NODE 241.00 TO NODE 242.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 2 USED)<<<<<

=====

UPSTREAM ELEVATION (FEET) = 862.00 DOWNSTREAM ELEVATION (FEET) = 850.00
 STREET LENGTH (FEET) = 1150.00 CURB HEIGHT (INCHES) = 8.0
 STREET HALFWIDTH (FEET) = 32.00

 FLOW PROCESS FROM NODE 215.00 TO NODE 216.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 430.00
 ELEVATION DATA: UPSTREAM (FEET) = 890.00 DOWNSTREAM (FEET) = 884.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.078
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 4.663

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	4.50	0.98	0.100	32	8.08
PUBLIC PARK	A	0.30	0.98	0.850	32	12.84

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.147
 SUBAREA RUNOFF (CFS) = 19.52
 TOTAL AREA (ACRES) = 4.80 PEAK FLOW RATE (CFS) = 19.52

 FLOW PROCESS FROM NODE 216.00 TO NODE 217.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 2 USED)<<<<<

=====

UPSTREAM ELEVATION (FEET) = 884.00 DOWNSTREAM ELEVATION (FEET) = 870.00
 STREET LENGTH (FEET) = 880.00 CURB HEIGHT (INCHES) = 8.0
 STREET HALFWIDTH (FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 27.00
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

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) = 43.49

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 27.00
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

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) = 54.50
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH (FEET) = 0.67
 HALFSTREET FLOOD WIDTH (FEET) = 25.55
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.08
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 2.72
 STREET FLOW TRAVEL TIME (MIN.) = 4.70 Tc (MIN.) = 19.82
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.721
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	27.10	0.98	0.100	32
PUBLIC PARK	A	0.70	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.119
 SUBAREA AREA (ACRES) = 27.80 SUBAREA RUNOFF (CFS) = 65.18
 EFFECTIVE AREA (ACRES) = 35.70 AREA-AVERAGED Fm (INCH/HR) = 0.12
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.12
 TOTAL AREA (ACRES) = 35.7 PEAK FLOW RATE (CFS) = 83.57

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.76 HALFSTREET FLOOD WIDTH (FEET) = 34.52
 FLOW VELOCITY (FEET/SEC.) = 4.46 DEPTH*VELOCITY (FT*FT/SEC.) = 3.38
 *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
 AND L = 1150.0 FT WITH ELEVATION-DROP = 12.0 FT, IS 86.1 CFS,
 WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 242.00
 LONGEST FLOWPATH FROM NODE 240.00 TO NODE 242.00 = 2120.00 FEET.

 FLOW PROCESS FROM NODE 242.00 TO NODE 242.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc (MIN.) = 19.82
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.721
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	4.00	0.98	0.100	32
COMMERCIAL	A	42.50	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 46.50 SUBAREA RUNOFF (CFS) = 109.80
 EFFECTIVE AREA (ACRES) = 82.20 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.11
 TOTAL AREA (ACRES) = 82.2 PEAK FLOW RATE (CFS) = 193.37

 FLOW PROCESS FROM NODE 242.00 TO NODE 243.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 850.00 DOWNSTREAM (FEET) = 846.00
 FLOW LENGTH (FEET) = 1350.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 72.0 INCH PIPE IS 55.4 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 8.29
 ESTIMATED PIPE DIAMETER (INCH) = 72.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 193.37
 PIPE TRAVEL TIME (MIN.) = 2.71 Tc (MIN.) = 22.53
 LONGEST FLOWPATH FROM NODE 240.00 TO NODE 243.00 = 3470.00 FEET.

 FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc (MIN.) = 22.53
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.519
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	7.60	0.98	0.100	32
COMMERCIAL	A	54.10	0.98	0.100	32
PUBLIC PARK	A	1.90	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.122
 SUBAREA AREA (ACRES) = 63.60 SUBAREA RUNOFF (CFS) = 137.38
 EFFECTIVE AREA (ACRES) = 145.80 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.12
 TOTAL AREA (ACRES) = 145.8 PEAK FLOW RATE (CFS) = 315.83

 FLOW PROCESS FROM NODE 250.00 TO NODE 251.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 650.00
 ELEVATION DATA: UPSTREAM (FEET) = 840.00 DOWNSTREAM (FEET) = 835.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 10.736
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.931
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	3.30	0.98	0.100	32	10.74
COMMERCIAL	A	6.00	0.98	0.100	32	10.74
PUBLIC PARK	A	1.20	0.98	0.850	32	17.06

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.186

SUBAREA RUNOFF(CFS) = 35.44
TOTAL AREA(ACRES) = 10.50 PEAK FLOW RATE(CFS) = 35.44

FLOW PROCESS FROM NODE 251.00 TO NODE 252.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 835.00 DOWNSTREAM ELEVATION(FEET) = 832.00
STREET LENGTH(FEET) = 1050.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 64.91

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.84
HALFSTREET FLOOD WIDTH(FEET) = 40.81
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.57
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.17
STREET FLOW TRAVEL TIME(MIN.) = 6.81 Tc(MIN.) = 17.55

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.928

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	22.90	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA(ACRES) = 22.90 SUBAREA RUNOFF(CFS) = 58.33

EFFECTIVE AREA(ACRES) = 33.40 AREA-AVERAGED Fm(INCH/HR) = 0.12

AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.13

TOTAL AREA(ACRES) = 33.4 PEAK FLOW RATE(CFS) = 84.28

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.90 HALFSTREET FLOOD WIDTH(FEET) = 43.74
FLOW VELOCITY(FEET/SEC.) = 2.79 DEPTH*VELOCITY(FT*FT/SEC.) = 2.51

*NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,

AND L = 1050.0 FT WITH ELEVATION-DROP = 3.0 FT, IS 62.1 CFS,
WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 252.00

LONGEST FLOWPATH FROM NODE 250.00 TO NODE 252.00 = 1700.00 FEET.

FLOW PROCESS FROM NODE 252.00 TO NODE 253.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 832.00 DOWNSTREAM(FEET) = 820.00
FLOW LENGTH(FEET) = 2290.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 35.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.38
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 84.28
PIPE TRAVEL TIME(MIN.) = 4.55 Tc(MIN.) = 22.10
LONGEST FLOWPATH FROM NODE 250.00 TO NODE 253.00 = 3990.00 FEET.

FLOW PROCESS FROM NODE 253.00 TO NODE 253.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 22.10

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.549

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	A	9.60	0.98	0.850	32
PUBLIC PARK	A	48.50	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850

SUBAREA AREA(ACRES) = 58.10 SUBAREA RUNOFF(CFS) = 89.96

EFFECTIVE AREA(ACRES) = 91.50 AREA-AVERAGED Fm(INCH/HR) = 0.57

AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.59

TOTAL AREA(ACRES) = 91.5 PEAK FLOW RATE(CFS) = 162.86

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 91.5 TC(MIN.) = 22.10

EFFECTIVE AREA(ACRES) = 91.50 AREA-AVERAGED Fm(INCH/HR) = 0.57

AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.586

PEAK FLOW RATE(CFS) = 162.86

END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
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***** DESCRIPTION OF STUDY *****

* ONTARIO MASTER PLAN OF DRAINAGE - BASIN IV (AREA F) *
* 25-YEAR HYDROLOGY ANALYSIS *
* *

FILE NAME: OIVF25.DAT
TIME/DATE OF STUDY: 14:33 10/17/2011

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT (YEAR) = 25.00
SPECIFIED MINIMUM PIPE SIZE (INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS (DECIMAL) TO USE FOR FRICTION SLOPE = 0.80
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL
10-YEAR STORM 60-MINUTE INTENSITY (INCH/HOUR) = 0.950
100-YEAR STORM 60-MINUTE INTENSITY (INCH/HOUR) = 1.400
COMPUTED RAINFALL INTENSITY DATA:
STORM EVENT = 25.00 1-HOUR INTENSITY (INCH/HOUR) = 1.1070
SLOPE OF INTENSITY DURATION CURVE = 0.6000

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0312 0.167	0.0150
2	32.0	27.0	0.020/0.020/0.020	0.67	2.00 0.0312 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
 2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
- *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

UNIT-HYDROGRAPH MODEL SELECTIONS/PARAMETERS:

WATERSHED LAG = 0.80 * Tc
USED "VALLEY UNDEVELOPED" S-GRAPH FOR DEVELOPMENTS OF
2 UNITS/ACRE AND LESS; AND "VALLEY DEVELOPED" S-GRAPH
FOR DEVELOPMENTS OF 3-4 UNITS/ACRE AND MORE.

USER SPECIFIED RAINFALL VALUES:

2-YR 6-HR RAINFALL DEPTH (INCH) = 1.70
2-YR 24-HR RAINFALL DEPTH (INCH) = 3.20
100-YR 6-HR RAINFALL DEPTH (INCH) = 3.50
100-YR 24-HR RAINFALL DEPTH (INCH) = 8.50
SIERRA MADRE DEPTH-AREA FACTORS USED.

DURATION	AREA-AVERAGED RAINFALL (INCH)
5-MINUTES	0.38
30-MINUTES	0.79
1-HOUR	1.04
3-HOUR	1.87
6-HOUR	2.71
24-HOUR	5.30

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR UNIT HYDROGRAPH METHOD

FLOW PROCESS FROM NODE 210.00 TO NODE 211.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 700.00
ELEVATION DATA: UPSTREAM (FEET) = 895.00 DOWNSTREAM (FEET) = 892.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 12.431
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.847
SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	1.30	0.98	0.100	32	12.43

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF (CFS) = 3.22
TOTAL AREA (ACRES) = 1.30 PEAK FLOW RATE (CFS) = 3.22

FLOW PROCESS FROM NODE 211.00 TO NODE 212.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

=====

UPSTREAM ELEVATION (FEET) = 892.00 DOWNSTREAM ELEVATION (FEET) = 884.00
STREET LENGTH (FEET) = 1200.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 27.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

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) = 5.99
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.39
HALFSTREET FLOOD WIDTH(FEET) = 11.35
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.03
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.78
STREET FLOW TRAVEL TIME(MIN.) = 9.87 Tc(MIN.) = 22.30
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.005

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 2.20 0.98 0.100 32
COMMERCIAL A 1.00 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 5.49
EFFECTIVE AREA(ACRES) = 4.50 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 4.5 PEAK FLOW RATE(CFS) = 7.72

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.41 HALFSTREET FLOOD WIDTH(FEET) = 12.67
FLOW VELOCITY(FEET/SEC.) = 2.15 DEPTH*VELOCITY(FT*FT/SEC.) = 0.89
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 212.00 = 1900.00 FEET.

FLOW PROCESS FROM NODE 212.00 TO NODE 212.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 22.30
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.005
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 0.30 0.98 0.100 32
COMMERCIAL A 7.50 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 7.80 SUBAREA RUNOFF(CFS) = 13.39
EFFECTIVE AREA(ACRES) = 12.30 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 12.3 PEAK FLOW RATE(CFS) = 21.11

FLOW PROCESS FROM NODE 212.00 TO NODE 213.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<

UPSTREAM ELEVATION(FEET) = 884.00 DOWNSTREAM ELEVATION(FEET) = 874.00

STREET LENGTH(FEET) = 900.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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) = 32.31
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.57
HALFSTREET FLOOD WIDTH(FEET) = 20.53
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.67
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.09
STREET FLOW TRAVEL TIME(MIN.) = 4.09 Tc(MIN.) = 26.39
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.812

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 2.50 0.98 0.100 32
COMMERCIAL A 12.00 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 14.50 SUBAREA RUNOFF(CFS) = 22.37
EFFECTIVE AREA(ACRES) = 26.80 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 26.8 PEAK FLOW RATE(CFS) = 41.35

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.61 HALFSTREET FLOOD WIDTH(FEET) = 22.64
FLOW VELOCITY(FEET/SEC.) = 3.89 DEPTH*VELOCITY(FT*FT/SEC.) = 2.38
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 213.00 = 2800.00 FEET.

FLOW PROCESS FROM NODE 213.00 TO NODE 214.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 874.00 DOWNSTREAM(FEET) = 865.00
FLOW LENGTH(FEET) = 1650.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 27.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.09
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 41.35
PIPE TRAVEL TIME(MIN.) = 3.88 Tc(MIN.) = 30.27
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 214.00 = 4450.00 FEET.

FLOW PROCESS FROM NODE 214.00 TO NODE 214.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<


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=====
MAINLINE Tc (MIN.) = 30.27
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.669
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          A       7.20   0.98  0.100 32
COMMERCIAL          A       20.60  0.98  0.100 32
PUBLIC PARK         A       0.70   0.98  0.850 32
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.118
SUBAREA AREA (ACRES) = 28.50   SUBAREA RUNOFF (CFS) = 39.84
EFFECTIVE AREA (ACRES) = 55.30   AREA-AVERAGED Fm (INCH/HR) = 0.11
AREA-AVERAGED Fp (INCH/HR) = 0.98   AREA-AVERAGED Ap = 0.11
TOTAL AREA (ACRES) = 55.3   PEAK FLOW RATE (CFS) = 77.74

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FLOW PROCESS FROM NODE 215.00 TO NODE 216.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

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=====
INITIAL SUBAREA FLOW-LENGTH (FEET) = 430.00
ELEVATION DATA: UPSTREAM (FEET) = 890.00   DOWNSTREAM (FEET) = 884.00

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Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.078
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.687
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS   Tc
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL          A       4.50   0.98  0.100 32   8.08
PUBLIC PARK         A       0.30   0.98  0.850 32   12.84
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.147
SUBAREA RUNOFF (CFS) = 15.31
TOTAL AREA (ACRES) = 4.80   PEAK FLOW RATE (CFS) = 15.31

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*****
FLOW PROCESS FROM NODE 216.00 TO NODE 217.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<

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=====
UPSTREAM ELEVATION (FEET) = 884.00   DOWNSTREAM ELEVATION (FEET) = 870.00
STREET LENGTH (FEET) = 880.00   CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 32.00

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DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 27.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

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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

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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 33.85
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH (FEET) = 0.55
HALFSTREET FLOOD WIDTH (FEET) = 19.48
AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.25
PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 2.33
STREET FLOW TRAVEL TIME (MIN.) = 3.45   Tc (MIN.) = 11.53
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.978
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          A       0.50   0.98  0.100 32
COMMERCIAL          A       12.90  0.98  0.100 32
PUBLIC PARK         A       1.10   0.98  0.850 32
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.157
SUBAREA AREA (ACRES) = 14.50   SUBAREA RUNOFF (CFS) = 36.87
EFFECTIVE AREA (ACRES) = 19.30   AREA-AVERAGED Fm (INCH/HR) = 0.15
AREA-AVERAGED Fp (INCH/HR) = 0.97   AREA-AVERAGED Ap = 0.15
TOTAL AREA (ACRES) = 19.3   PEAK FLOW RATE (CFS) = 49.12

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END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH (FEET) = 0.61   HALFSTREET FLOOD WIDTH (FEET) = 22.53
FLOW VELOCITY (FEET/SEC.) = 4.66   DEPTH*VELOCITY (FT*FT/SEC.) = 2.84
LONGEST FLOWPATH FROM NODE 215.00 TO NODE 217.00 = 1310.00 FEET.

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FLOW PROCESS FROM NODE 240.00 TO NODE 241.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

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=====
INITIAL SUBAREA FLOW-LENGTH (FEET) = 970.00
ELEVATION DATA: UPSTREAM (FEET) = 865.00   DOWNSTREAM (FEET) = 862.00

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Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 15.119
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.531
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS   Tc
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL          A       7.50   0.98  0.100 32   15.12
PUBLIC PARK         A       0.40   0.98  0.850 32   24.02
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.138
SUBAREA RUNOFF (CFS) = 17.04
TOTAL AREA (ACRES) = 7.90   PEAK FLOW RATE (CFS) = 17.04

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*****
FLOW PROCESS FROM NODE 241.00 TO NODE 242.00 IS CODE = 62
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<

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=====
UPSTREAM ELEVATION (FEET) = 862.00   DOWNSTREAM ELEVATION (FEET) = 850.00

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STREET LENGTH (FEET) = 1150.00 CURB HEIGHT (INCHES) = 8.0
 STREET HALFWIDTH (FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 27.00
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

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) = 42.37
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH (FEET) = 0.62
 HALFSTREET FLOOD WIDTH (FEET) = 23.11
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.83
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 2.38
 STREET FLOW TRAVEL TIME (MIN.) = 5.01 Tc (MIN.) = 20.12
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.132
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	27.10	0.98	0.100	32
PUBLIC PARK	A	0.70	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.119
 SUBAREA AREA (ACRES) = 27.80 SUBAREA RUNOFF (CFS) = 50.45
 EFFECTIVE AREA (ACRES) = 35.70 AREA-AVERAGED Fm (INCH/HR) = 0.12
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.12
 TOTAL AREA (ACRES) = 35.7 PEAK FLOW RATE (CFS) = 64.65

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.70 HALFSTREET FLOOD WIDTH (FEET) = 29.03
 FLOW VELOCITY (FEET/SEC.) = 4.23 DEPTH*VELOCITY (FT*FT/SEC.) = 2.98
 *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
 AND L = 1150.0 FT WITH ELEVATION-DROP = 12.0 FT, IS 67.4 CFS,
 WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 242.00
 LONGEST FLOWPATH FROM NODE 240.00 TO NODE 242.00 = 2120.00 FEET.

 FLOW PROCESS FROM NODE 242.00 TO NODE 242.00 IS CODE = 81
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 20.12
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.132
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	4.00	0.98	0.100	32
COMMERCIAL	A	42.50	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 46.50 SUBAREA RUNOFF (CFS) = 85.15
 EFFECTIVE AREA (ACRES) = 82.20 AREA-AVERAGED Fm (INCH/HR) = 0.11

AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.11
 TOTAL AREA (ACRES) = 82.2 PEAK FLOW RATE (CFS) = 149.80

 FLOW PROCESS FROM NODE 242.00 TO NODE 243.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 850.00 DOWNSTREAM (FEET) = 846.00
 FLOW LENGTH (FEET) = 1350.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 66.0 INCH PIPE IS 49.7 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 7.80
 ESTIMATED PIPE DIAMETER (INCH) = 66.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 149.80
 PIPE TRAVEL TIME (MIN.) = 2.88 Tc (MIN.) = 23.01
 LONGEST FLOWPATH FROM NODE 240.00 TO NODE 243.00 = 3470.00 FEET.

 FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 23.01
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.968
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	7.60	0.98	0.100	32
COMMERCIAL	A	54.10	0.98	0.100	32
PUBLIC PARK	A	1.90	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.122
 SUBAREA AREA (ACRES) = 63.60 SUBAREA RUNOFF (CFS) = 105.79
 EFFECTIVE AREA (ACRES) = 145.80 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.12
 TOTAL AREA (ACRES) = 145.8 PEAK FLOW RATE (CFS) = 243.41

 FLOW PROCESS FROM NODE 250.00 TO NODE 251.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 650.00
 ELEVATION DATA: UPSTREAM (FEET) = 840.00 DOWNSTREAM (FEET) = 835.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 10.736
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.108
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	3.30	0.98	0.100	32	10.74
COMMERCIAL	A	6.00	0.98	0.100	32	10.74
PUBLIC PARK	A	1.20	0.98	0.850	32	17.06

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.186
 SUBAREA RUNOFF (CFS) = 27.66
 TOTAL AREA (ACRES) = 10.50 PEAK FLOW RATE (CFS) = 27.66

 FLOW PROCESS FROM NODE 251.00 TO NODE 252.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 2 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 835.00 DOWNSTREAM ELEVATION (FEET) = 832.00
 STREET LENGTH (FEET) = 1050.00 CURB HEIGHT (INCHES) = 8.0
 STREET HALFWIDTH (FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 27.00
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

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) = 50.32
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH (FEET) = 0.79
 HALFSTREET FLOOD WIDTH (FEET) = 37.79
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.38
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 1.88
 STREET FLOW TRAVEL TIME (MIN.) = 7.35 Tc (MIN.) = 18.08
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.274

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	22.90	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 22.90 SUBAREA RUNOFF (CFS) = 44.85
 EFFECTIVE AREA (ACRES) = 33.40 AREA-AVERAGED Fm (INCH/HR) = 0.12
 AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.13
 TOTAL AREA (ACRES) = 33.4 PEAK FLOW RATE (CFS) = 64.62

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.84 HALFSTREET FLOOD WIDTH (FEET) = 40.75
 FLOW VELOCITY (FEET/SEC.) = 2.57 DEPTH*VELOCITY (FT*FT/SEC.) = 2.16
 *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
 AND L = 1050.0 FT WITH ELEVATION-DROP = 3.0 FT, IS 48.7 CFS,
 WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 252.00
 LONGEST FLOWPATH FROM NODE 250.00 TO NODE 252.00 = 1700.00 FEET.

 FLOW PROCESS FROM NODE 252.00 TO NODE 253.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 832.00 DOWNSTREAM (FEET) = 820.00
 FLOW LENGTH (FEET) = 2290.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 42.0 INCH PIPE IS 34.1 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 7.72
 ESTIMATED PIPE DIAMETER (INCH) = 42.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 64.62
 PIPE TRAVEL TIME (MIN.) = 4.94 Tc (MIN.) = 23.03
 LONGEST FLOWPATH FROM NODE 250.00 TO NODE 253.00 = 3990.00 FEET.

 FLOW PROCESS FROM NODE 253.00 TO NODE 253.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 23.03
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.967
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	A	9.60	0.98	0.850	32
PUBLIC PARK	A	48.50	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
 SUBAREA AREA (ACRES) = 58.10 SUBAREA RUNOFF (CFS) = 59.50
 EFFECTIVE AREA (ACRES) = 91.50 AREA-AVERAGED Fm (INCH/HR) = 0.57
 AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.59
 TOTAL AREA (ACRES) = 91.5 PEAK FLOW RATE (CFS) = 114.89

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END OF STUDY SUMMARY:
 TOTAL AREA (ACRES) = 91.5 TC (MIN.) = 23.03
 EFFECTIVE AREA (ACRES) = 91.50 AREA-AVERAGED Fm (INCH/HR) = 0.57
 AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.586
 PEAK FLOW RATE (CFS) = 114.89

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END OF RATIONAL METHOD ANALYSIS

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RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
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***** DESCRIPTION OF STUDY *****

* ONTARIO MASTER PLAN OF DRAINAGE - BASIN IV (AREA F) *
* 10-YEAR HYDROLOGY ANALYSIS *
*

FILE NAME: OIVF10.DAT
TIME/DATE OF STUDY: 14:31 10/17/2011

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USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
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--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.80
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.9500

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

Table with columns: NO., HALF-CROWN TO WIDTH (FT), CROWN TO CROSSFALL (FT), STREET-CROSSFALL IN- / OUT- / PARK- SIDE / SIDE / WAY, CURB HEIGHT (FT), GUTTER WIDTH (FT), GEOMETRIES LIP (FT), MANNING HIKE (FT), FACTOR (n). Rows 1 and 2.

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

SIZE PIPE WITH A FLOW CAPACITY GREATER THAN OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

UNIT-HYDROGRAPH MODEL SELECTIONS/PARAMETERS:

WATERSHED LAG = 0.80 * Tc
USED "VALLEY UNDEVELOPED" S-GRAPH FOR DEVELOPMENTS OF

2 UNITS/ACRE AND LESS; AND "VALLEY DEVELOPED" S-GRAPH FOR DEVELOPMENTS OF 3-4 UNITS/ACRE AND MORE.

USER SPECIFIED RAINFALL VALUES:

2-YR 6-HR RAINFALL DEPTH(INCH) = 1.70
2-YR 24-HR RAINFALL DEPTH(INCH) = 3.20
100-YR 6-HR RAINFALL DEPTH(INCH) = 3.50
100-YR 24-HR RAINFALL DEPTH(INCH) = 8.50
SIERRA MADRE DEPTH-AREA FACTORS USED.

AREA-AVERAGED

Table with columns: DURATION, RAINFALL(INCH). Rows: 5-MINUTES (0.33), 30-MINUTES (0.68), 1-HOUR (0.90), 3-HOUR (1.60), 6-HOUR (2.31), 24-HOUR (4.36).

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR UNIT HYDROGRAPH METHOD

FLOW PROCESS FROM NODE 210.00 TO NODE 211.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 700.00
ELEVATION DATA: UPSTREAM(FEET) = 895.00 DOWNSTREAM(FEET) = 892.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 12.431
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.443
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ LAND USE, SCS SOIL GROUP (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN, Tc (MIN.)
COMMERCIAL A 1.30 0.98 0.100 32 12.43
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 2.74
TOTAL AREA(ACRES) = 1.30 PEAK FLOW RATE(CFS) = 2.74

FLOW PROCESS FROM NODE 211.00 TO NODE 212.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<

UPSTREAM ELEVATION(FEET) = 892.00 DOWNSTREAM ELEVATION(FEET) = 884.00
STREET LENGTH(FEET) = 1200.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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) = 5.08
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.37
HALFSTREET FLOOD WIDTH(FEET) = 10.56
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.95
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.72
STREET FLOW TRAVEL TIME(MIN.) = 10.27 Tc(MIN.) = 22.70

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.702
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 2.20 0.98 0.100 32
COMMERCIAL A 1.00 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 4.62
EFFECTIVE AREA(ACRES) = 4.50 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 4.5 PEAK FLOW RATE(CFS) = 6.50

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.39 HALFSTREET FLOOD WIDTH(FEET) = 11.78
FLOW VELOCITY(FEET/SEC.) = 2.06 DEPTH*VELOCITY(FT*FT/SEC.) = 0.81
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 212.00 = 1900.00 FEET.

FLOW PROCESS FROM NODE 212.00 TO NODE 212.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 22.70
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.702
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 0.30 0.98 0.100 32
COMMERCIAL A 7.50 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 7.80 SUBAREA RUNOFF(CFS) = 11.26
EFFECTIVE AREA(ACRES) = 12.30 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 12.3 PEAK FLOW RATE(CFS) = 17.76

FLOW PROCESS FROM NODE 212.00 TO NODE 213.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 884.00 DOWNSTREAM ELEVATION(FEET) = 874.00
STREET LENGTH(FEET) = 900.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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) = 27.15
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.54
HALFSTREET FLOOD WIDTH(FEET) = 19.16
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.52
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.90
STREET FLOW TRAVEL TIME(MIN.) = 4.27 Tc(MIN.) = 26.97
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.535

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 2.50 0.98 0.100 32
COMMERCIAL A 12.00 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 14.50 SUBAREA RUNOFF(CFS) = 18.76
EFFECTIVE AREA(ACRES) = 26.80 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 26.8 PEAK FLOW RATE(CFS) = 34.67

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.58 HALFSTREET FLOOD WIDTH(FEET) = 21.11
FLOW VELOCITY(FEET/SEC.) = 3.73 DEPTH*VELOCITY(FT*FT/SEC.) = 2.17
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 213.00 = 2800.00 FEET.

FLOW PROCESS FROM NODE 213.00 TO NODE 214.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 874.00 DOWNSTREAM(FEET) = 865.00
FLOW LENGTH(FEET) = 1650.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 26.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.71
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 34.67
PIPE TRAVEL TIME(MIN.) = 4.10 Tc(MIN.) = 31.07
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 214.00 = 4450.00 FEET.

FLOW PROCESS FROM NODE 214.00 TO NODE 214.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 31.07

* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.410
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	7.20	0.98	0.100	32
COMMERCIAL	A	20.60	0.98	0.100	32
PUBLIC PARK	A	0.70	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.118
 SUBAREA AREA (ACRES) = 28.50 SUBAREA RUNOFF (CFS) = 33.21
 EFFECTIVE AREA (ACRES) = 55.30 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.11
 TOTAL AREA (ACRES) = 55.3 PEAK FLOW RATE (CFS) = 64.87

 FLOW PROCESS FROM NODE 215.00 TO NODE 216.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 =====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 430.00
 ELEVATION DATA: UPSTREAM (FEET) = 890.00 DOWNSTREAM (FEET) = 884.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.078
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.164

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	4.50	0.98	0.100	32	8.08
PUBLIC PARK	A	0.30	0.98	0.850	32	12.84

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.147
 SUBAREA RUNOFF (CFS) = 13.05
 TOTAL AREA (ACRES) = 4.80 PEAK FLOW RATE (CFS) = 13.05

 FLOW PROCESS FROM NODE 216.00 TO NODE 217.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 2 USED)<<<<<
 =====

UPSTREAM ELEVATION (FEET) = 884.00 DOWNSTREAM ELEVATION (FEET) = 870.00
 STREET LENGTH (FEET) = 880.00 CURB HEIGHT (INCHES) = 8.0
 STREET HALFWIDTH (FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 27.00
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

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) = 28.71

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH (FEET) = 0.52
 HALFSTREET FLOOD WIDTH (FEET) = 18.21
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.09
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 2.14
 STREET FLOW TRAVEL TIME (MIN.) = 3.58 Tc (MIN.) = 11.66
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.539

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	0.50	0.98	0.100	32
COMMERCIAL	A	12.90	0.98	0.100	32
PUBLIC PARK	A	1.10	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.157
 SUBAREA AREA (ACRES) = 14.50 SUBAREA RUNOFF (CFS) = 31.13
 EFFECTIVE AREA (ACRES) = 19.30 AREA-AVERAGED Fm (INCH/HR) = 0.15
 AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.15
 TOTAL AREA (ACRES) = 19.3 PEAK FLOW RATE (CFS) = 41.48

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.58 HALFSTREET FLOOD WIDTH (FEET) = 21.11
 FLOW VELOCITY (FEET/SEC.) = 4.46 DEPTH*VELOCITY (FT*FT/SEC.) = 2.59
 LONGEST FLOWPATH FROM NODE 215.00 TO NODE 217.00 = 1310.00 FEET.

 FLOW PROCESS FROM NODE 240.00 TO NODE 241.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 =====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 970.00
 ELEVATION DATA: UPSTREAM (FEET) = 865.00 DOWNSTREAM (FEET) = 862.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 15.119
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.172

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	7.50	0.98	0.100	32	15.12
PUBLIC PARK	A	0.40	0.98	0.850	32	24.02

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.138
 SUBAREA RUNOFF (CFS) = 14.49
 TOTAL AREA (ACRES) = 7.90 PEAK FLOW RATE (CFS) = 14.49

 FLOW PROCESS FROM NODE 241.00 TO NODE 242.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 2 USED)<<<<<
 =====

UPSTREAM ELEVATION (FEET) = 862.00 DOWNSTREAM ELEVATION (FEET) = 850.00
 STREET LENGTH (FEET) = 1150.00 CURB HEIGHT (INCHES) = 8.0
 STREET HALFWIDTH (FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 27.00
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

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) = 35.88
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH (FEET) = 0.59
 HALFSTREET FLOOD WIDTH (FEET) = 21.64
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.68
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 2.18
 STREET FLOW TRAVEL TIME (MIN.) = 5.20 Tc (MIN.) = 20.32
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.819
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	27.10	0.98	0.100	32
PUBLIC PARK	A	0.70	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.119
 SUBAREA AREA (ACRES) = 27.80 SUBAREA RUNOFF (CFS) = 42.61
 EFFECTIVE AREA (ACRES) = 35.70 AREA-AVERAGED Fm (INCH/HR) = 0.12
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.12
 TOTAL AREA (ACRES) = 35.7 PEAK FLOW RATE (CFS) = 54.59

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.67 HALFSTREET FLOOD WIDTH (FEET) = 25.55
 FLOW VELOCITY (FEET/SEC.) = 4.08 DEPTH*VELOCITY (FT*FT/SEC.) = 2.73
 *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
 AND L = 1150.0 FT WITH ELEVATION-DROP = 12.0 FT, IS 57.5 CFS,
 WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 242.00
 LONGEST FLOWPATH FROM NODE 240.00 TO NODE 242.00 = 2120.00 FEET.

 FLOW PROCESS FROM NODE 242.00 TO NODE 242.00 IS CODE = 81

 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====
 MAINLINE Tc (MIN.) = 20.32
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.819
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	4.00	0.98	0.100	32
COMMERCIAL	A	42.50	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 46.50 SUBAREA RUNOFF (CFS) = 72.04
 EFFECTIVE AREA (ACRES) = 82.20 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.11
 TOTAL AREA (ACRES) = 82.2 PEAK FLOW RATE (CFS) = 126.63

 FLOW PROCESS FROM NODE 242.00 TO NODE 243.00 IS CODE = 31

 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW) <<<<<
 =====
 ELEVATION DATA: UPSTREAM (FEET) = 850.00 DOWNSTREAM (FEET) = 846.00
 FLOW LENGTH (FEET) = 1350.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 60.0 INCH PIPE IS 49.1 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 7.36
 ESTIMATED PIPE DIAMETER (INCH) = 60.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 126.63
 PIPE TRAVEL TIME (MIN.) = 3.06 Tc (MIN.) = 23.38
 LONGEST FLOWPATH FROM NODE 240.00 TO NODE 243.00 = 3470.00 FEET.

 FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 81

 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====
 MAINLINE Tc (MIN.) = 23.38
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.672
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	7.60	0.98	0.100	32
COMMERCIAL	A	54.10	0.98	0.100	32
PUBLIC PARK	A	1.90	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.122
 SUBAREA AREA (ACRES) = 63.60 SUBAREA RUNOFF (CFS) = 88.89
 EFFECTIVE AREA (ACRES) = 145.80 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.12
 TOTAL AREA (ACRES) = 145.8 PEAK FLOW RATE (CFS) = 204.67

 FLOW PROCESS FROM NODE 250.00 TO NODE 251.00 IS CODE = 21

 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 =====
 INITIAL SUBAREA FLOW-LENGTH (FEET) = 650.00
 ELEVATION DATA: UPSTREAM (FEET) = 840.00 DOWNSTREAM (FEET) = 835.00
 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 10.736
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.668
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	3.30	0.98	0.100	32	10.74
COMMERCIAL	A	6.00	0.98	0.100	32	10.74
PUBLIC PARK	A	1.20	0.98	0.850	32	17.06

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.186

SUBAREA RUNOFF(CFS) = 23.50
TOTAL AREA(ACRES) = 10.50 PEAK FLOW RATE(CFS) = 23.50

FLOW PROCESS FROM NODE 251.00 TO NODE 252.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 835.00 DOWNSTREAM ELEVATION(FEET) = 832.00
STREET LENGTH(FEET) = 1050.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 42.59
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.75
HALFSTREET FLOOD WIDTH(FEET) = 33.99
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.32
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.74
STREET FLOW TRAVEL TIME(MIN.) = 7.56 Tc(MIN.) = 18.29

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.937
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 22.90 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 22.90 SUBAREA RUNOFF(CFS) = 37.92
EFFECTIVE AREA(ACRES) = 33.40 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.13
TOTAL AREA(ACRES) = 33.4 PEAK FLOW RATE(CFS) = 54.52

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.81 HALFSTREET FLOOD WIDTH(FEET) = 39.04
FLOW VELOCITY(FEET/SEC.) = 2.43 DEPTH*VELOCITY(FT*FT/SEC.) = 1.96
*NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
AND L = 1050.0 FT WITH ELEVATION-DROP = 3.0 FT, IS 41.5 CFS,
WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 252.00
LONGEST FLOWPATH FROM NODE 250.00 TO NODE 252.00 = 1700.00 FEET.

FLOW PROCESS FROM NODE 252.00 TO NODE 253.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 832.00 DOWNSTREAM(FEET) = 820.00

FLOW LENGTH(FEET) = 2290.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 29.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.58
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 54.52
PIPE TRAVEL TIME(MIN.) = 5.03 Tc(MIN.) = 23.33
LONGEST FLOWPATH FROM NODE 250.00 TO NODE 253.00 = 3990.00 FEET.

FLOW PROCESS FROM NODE 253.00 TO NODE 253.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 23.33
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.675
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
PUBLIC PARK A 9.60 0.98 0.850 32
PUBLIC PARK A 48.50 0.98 0.850 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
SUBAREA AREA(ACRES) = 58.10 SUBAREA RUNOFF(CFS) = 44.22
EFFECTIVE AREA(ACRES) = 91.50 AREA-AVERAGED Fm(INCH/HR) = 0.57
AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.59
TOTAL AREA(ACRES) = 91.5 PEAK FLOW RATE(CFS) = 90.84

END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 91.5 TC(MIN.) = 23.33
EFFECTIVE AREA(ACRES) = 91.50 AREA-AVERAGED Fm(INCH/HR) = 0.57
AREA-AVERAGED Fp(INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.586
PEAK FLOW RATE(CFS) = 90.84

END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
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Analysis prepared by:

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***** DESCRIPTION OF STUDY *****
* ONTARIO MASTER PLAN OF DRAINAGE - BASIN IV (AREA G, H, I) *
* 100-YEAR HYDROLOGY ANALYSIS *
* P. PAGADUAN 8-29-2011 *

FILE NAME: OIVG100.DAT
TIME/DATE OF STUDY: 16:25 08/29/2011

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT (YEAR) = 100.00
SPECIFIED MINIMUM PIPE SIZE (INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS (DECIMAL) TO USE FOR FRICTION SLOPE = 0.80
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE (LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
USER SPECIFIED 1-HOUR INTENSITY (INCH/HOUR) = 1.3000

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/ SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150
2	32.0	27.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

UNIT-HYDROGRAPH MODEL SELECTIONS/PARAMETERS:
WATERSHED LAG = 0.80 * Tc
USED "VALLEY UNDEVELOPED" S-GRAPH FOR DEVELOPMENTS OF

2 UNITS/ACRE AND LESS; AND "VALLEY DEVELOPED" S-GRAPH
FOR DEVELOPMENTS OF 3-4 UNITS/ACRE AND MORE.
USER SPECIFIED RAINFALL VALUES:

2-YR 6-HR RAINFALL DEPTH (INCH) = 1.50
2-YR 24-HR RAINFALL DEPTH (INCH) = 2.70
100-YR 6-HR RAINFALL DEPTH (INCH) = 3.30
100-YR 24-HR RAINFALL DEPTH (INCH) = 7.00
SIERRA MADRE DEPTH-AREA FACTORS USED.

DURATION	AREA-AVERAGED RAINFALL (INCH)
5-MINUTES	0.48
30-MINUTES	0.99
1-HOUR	1.30
3-HOUR	2.30
6-HOUR	3.30
24-HOUR	7.00

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR UNIT HYDROGRAPH METHOD

FLOW PROCESS FROM NODE 320.10 TO NODE 320.20 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 750.00
ELEVATION DATA: UPSTREAM (FEET) = 820.00 DOWNSTREAM (FEET) = 815.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 11.698
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.467
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCSSOIL AREA Fp Ap SCSS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 6.20 0.98 0.100 32 11.70
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF (CFS) = 18.80
TOTAL AREA (ACRES) = 6.20 PEAK FLOW RATE (CFS) = 18.80

FLOW PROCESS FROM NODE 320.20 TO NODE 320.30 IS CODE = 91

>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<

UPSTREAM NODE ELEVATION (FEET) = 815.00
DOWNSTREAM NODE ELEVATION (FEET) = 814.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 250.00
"V" GUTTER WIDTH (FEET) = 5.00 GUTTER HIKE (FEET) = 0.800
PAVEMENT LIP (FEET) = 0.100 MANNING'S N = .0150
PAVEMENT CROSSFALL (DECIMAL NOTATION) = 0.10000
MAXIMUM DEPTH (FEET) = 3.00
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.320
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCSSOIL AREA Fp Ap SCSS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

PUBLIC PARK A 1.80 0.98 0.850 32
 COMMERCIAL A 9.90 0.98 0.100 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.215
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 35.16
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.76
 AVERAGE FLOW DEPTH (FEET) = 1.39 FLOOD WIDTH (FEET) = 14.85
 "V" GUTTER FLOW TRAVEL TIME (MIN.) = 0.88 Tc (MIN.) = 12.57
 SUBAREA AREA (ACRES) = 11.70 SUBAREA RUNOFF (CFS) = 32.75
 EFFECTIVE AREA (ACRES) = 17.90 AREA-AVERAGED Fm (INCH/HR) = 0.17
 AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.18
 TOTAL AREA (ACRES) = 17.9 PEAK FLOW RATE (CFS) = 50.73

END OF SUBAREA "V" GUTTER HYDRAULICS:
 DEPTH (FEET) = 1.56 FLOOD WIDTH (FEET) = 18.18
 FLOW VELOCITY (FEET/SEC.) = 5.01 DEPTH*VELOCITY (FT*FT/SEC) = 7.80
 LONGEST FLOWPATH FROM NODE 320.10 TO NODE 320.30 = 1000.00 FEET.

 FLOW PROCESS FROM NODE 320.30 TO NODE 320.40 IS CODE = 91

>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<

UPSTREAM NODE ELEVATION (FEET) = 814.00
 DOWNSTREAM NODE ELEVATION (FEET) = 810.00
 CHANNEL LENGTH THRU SUBAREA (FEET) = 900.00
 "V" GUTTER WIDTH (FEET) = 5.00 GUTTER HIKE (FEET) = 0.800
 PAVEMENT LIP (FEET) = 0.100 MANNING'S N = .0150
 PAVEMENT CROSSFALL (DECIMAL NOTATION) = 0.10000
 MAXIMUM DEPTH (FEET) = 3.00
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.955
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	A	2.00	0.98	0.850	32
COMMERCIAL	A	17.90	0.98	0.100	32

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.175
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 75.61
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.58
 AVERAGE FLOW DEPTH (FEET) = 1.73 FLOOD WIDTH (FEET) = 21.62
 "V" GUTTER FLOW TRAVEL TIME (MIN.) = 2.69 Tc (MIN.) = 15.26
 SUBAREA AREA (ACRES) = 19.90 SUBAREA RUNOFF (CFS) = 49.87
 EFFECTIVE AREA (ACRES) = 37.80 AREA-AVERAGED Fm (INCH/HR) = 0.17
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.18
 TOTAL AREA (ACRES) = 37.8 PEAK FLOW RATE (CFS) = 94.73

END OF SUBAREA "V" GUTTER HYDRAULICS:
 DEPTH (FEET) = 1.85 FLOOD WIDTH (FEET) = 24.08
 FLOW VELOCITY (FEET/SEC.) = 5.79 DEPTH*VELOCITY (FT*FT/SEC) = 10.73
 LONGEST FLOWPATH FROM NODE 320.10 TO NODE 320.40 = 1900.00 FEET.

 FLOW PROCESS FROM NODE 320.00 TO NODE 321.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

 INITIAL SUBAREA FLOW-LENGTH (FEET) = 320.00
 ELEVATION DATA: UPSTREAM (FEET) = 820.00 DOWNSTREAM (FEET) = 818.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]** 0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 13.392
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.197
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
PUBLIC PARK	A	6.30	0.98	0.850	32	13.39

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
 SUBAREA RUNOFF (CFS) = 13.43
 TOTAL AREA (ACRES) = 6.30 PEAK FLOW RATE (CFS) = 13.43

 FLOW PROCESS FROM NODE 321.00 TO NODE 322.00 IS CODE = 91

>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<

UPSTREAM NODE ELEVATION (FEET) = 818.00
 DOWNSTREAM NODE ELEVATION (FEET) = 810.00
 CHANNEL LENGTH THRU SUBAREA (FEET) = 970.00
 "V" GUTTER WIDTH (FEET) = 5.00 GUTTER HIKE (FEET) = 0.800
 PAVEMENT LIP (FEET) = 0.100 MANNING'S N = .0150
 PAVEMENT CROSSFALL (DECIMAL NOTATION) = 0.10000
 MAXIMUM DEPTH (FEET) = 3.00
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.884
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	A	19.80	0.98	0.850	32

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 31.57
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.44
 AVERAGE FLOW DEPTH (FEET) = 1.20 FLOOD WIDTH (FEET) = 11.00
 "V" GUTTER FLOW TRAVEL TIME (MIN.) = 2.51 Tc (MIN.) = 15.90
 SUBAREA AREA (ACRES) = 19.80 SUBAREA RUNOFF (CFS) = 36.62
 EFFECTIVE AREA (ACRES) = 26.10 AREA-AVERAGED Fm (INCH/HR) = 0.83
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.85
 TOTAL AREA (ACRES) = 26.1 PEAK FLOW RATE (CFS) = 48.28

END OF SUBAREA "V" GUTTER HYDRAULICS:
 DEPTH (FEET) = 1.37 FLOOD WIDTH (FEET) = 14.46
 FLOW VELOCITY (FEET/SEC.) = 6.79 DEPTH*VELOCITY (FT*FT/SEC) = 9.33
 LONGEST FLOWPATH FROM NODE 320.00 TO NODE 322.00 = 1290.00 FEET.

 FLOW PROCESS FROM NODE 322.00 TO NODE 323.00 IS CODE = 91

>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<

UPSTREAM NODE ELEVATION (FEET) = 810.00

DOWNSTREAM NODE ELEVATION (FEET) = 800.00
 CHANNEL LENGTH THRU SUBAREA (FEET) = 950.00
 "V" GUTTER WIDTH (FEET) = 5.00 GUTTER HIKE (FEET) = 0.800
 PAVEMENT LIP (FEET) = 0.100 MANNING'S N = .0150
 PAVEMENT CROSSFALL (DECIMAL NOTATION) = 0.10000
 MAXIMUM DEPTH (FEET) = 3.00
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.691
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	A	2.30	0.98	0.850	32
PUBLIC PARK	A	41.30	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 84.70
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.16
 AVERAGE FLOW DEPTH (FEET) = 1.57 FLOOD WIDTH (FEET) = 18.44
 "V" GUTTER FLOW TRAVEL TIME (MIN.) = 1.94 Tc (MIN.) = 17.84
 SUBAREA AREA (ACRES) = 43.60 SUBAREA RUNOFF (CFS) = 73.09
 EFFECTIVE AREA (ACRES) = 69.70 AREA-AVERAGED Fm (INCH/HR) = 0.83
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.85
 TOTAL AREA (ACRES) = 69.7 PEAK FLOW RATE (CFS) = 116.85

END OF SUBAREA "V" GUTTER HYDRAULICS:
 DEPTH (FEET) = 1.73 FLOOD WIDTH (FEET) = 21.68
 FLOW VELOCITY (FEET/SEC.) = 8.57 DEPTH*VELOCITY (FT*FT/SEC) = 14.87
 LONGEST FLOWPATH FROM NODE 320.00 TO NODE 323.00 = 2240.00 FEET.

 FLOW PROCESS FROM NODE 323.00 TO NODE 324.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<
 =====
 ELEVATION DATA: UPSTREAM (FEET) = 800.00 DOWNSTREAM (FEET) = 778.00
 FLOW LENGTH (FEET) = 1650.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 45.0 INCH PIPE IS 34.5 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 12.85
 ESTIMATED PIPE DIAMETER (INCH) = 45.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 116.85
 PIPE TRAVEL TIME (MIN.) = 2.14 Tc (MIN.) = 19.98
 LONGEST FLOWPATH FROM NODE 320.00 TO NODE 324.00 = 3890.00 FEET.

 FLOW PROCESS FROM NODE 324.00 TO NODE 324.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<
 =====
 MAINLINE Tc (MIN.) = 19.98
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.515
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	A	3.80	0.98	0.850	32
PUBLIC PARK	A	78.00	0.98	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
 SUBAREA AREA (ACRES) = 81.80 SUBAREA RUNOFF (CFS) = 124.11
 EFFECTIVE AREA (ACRES) = 151.50 AREA-AVERAGED Fm (INCH/HR) = 0.83
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.85
 TOTAL AREA (ACRES) = 151.5 PEAK FLOW RATE (CFS) = 229.87

 FLOW PROCESS FROM NODE 324.00 TO NODE 345.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<
 =====
 ELEVATION DATA: UPSTREAM (FEET) = 778.00 DOWNSTREAM (FEET) = 770.00
 FLOW LENGTH (FEET) = 1340.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 66.0 INCH PIPE IS 53.5 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 11.14
 ESTIMATED PIPE DIAMETER (INCH) = 66.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 229.87
 PIPE TRAVEL TIME (MIN.) = 2.01 Tc (MIN.) = 21.99
 LONGEST FLOWPATH FROM NODE 320.00 TO NODE 345.00 = 5230.00 FEET.

 FLOW PROCESS FROM NODE 345.00 TO NODE 345.00 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.) = 21.99
 RAINFALL INTENSITY (INCH/HR) = 2.37
 AREA-AVERAGED Fm (INCH/HR) = 0.83
 AREA-AVERAGED Fp (INCH/HR) = 0.98
 AREA-AVERAGED Ap = 0.85
 EFFECTIVE STREAM AREA (ACRES) = 151.50
 TOTAL STREAM AREA (ACRES) = 151.50
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 229.87

 FLOW PROCESS FROM NODE 340.00 TO NODE 341.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 =====
 INITIAL SUBAREA FLOW-LENGTH (FEET) = 1000.00
 ELEVATION DATA: UPSTREAM (FEET) = 840.00 DOWNSTREAM (FEET) = 830.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 12.102
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.397
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	2.50	0.98	0.100	32	12.10

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF (CFS) = 7.42

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TOTAL AREA (ACRES) = 2.50 PEAK FLOW RATE (CFS) = 7.42
*****
FLOW PROCESS FROM NODE 341.00 TO NODE 342.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<<
=====
UPSTREAM ELEVATION (FEET) = 830.00 DOWNSTREAM ELEVATION (FEET) = 815.00
STREET LENGTH (FEET) = 1030.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 27.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

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) = 10.25
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH (FEET) = 0.40
HALFSTREET FLOOD WIDTH (FEET) = 12.09
AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.10
PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 1.24
STREET FLOW TRAVEL TIME (MIN.) = 5.53 Tc (MIN.) = 17.63
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.710
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 2.40 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 2.40 SUBAREA RUNOFF (CFS) = 5.64
EFFECTIVE AREA (ACRES) = 4.90 AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 4.9 PEAK FLOW RATE (CFS) = 11.52

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH (FEET) = 0.41 HALFSTREET FLOOD WIDTH (FEET) = 12.73
FLOW VELOCITY (FEET/SEC.) = 3.19 DEPTH*VELOCITY (FT*FT/SEC.) = 1.31
LONGEST FLOWPATH FROM NODE 340.00 TO NODE 342.00 = 2030.00 FEET.

*****
FLOW PROCESS FROM NODE 342.00 TO NODE 342.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc (MIN.) = 17.63
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.710
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 15.70 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 15.70 SUBAREA RUNOFF (CFS) = 36.92
EFFECTIVE AREA (ACRES) = 28.50 AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 28.5 PEAK FLOW RATE (CFS) = 67.02

*****
FLOW PROCESS FROM NODE 342.00 TO NODE 343.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM (FEET) = 815.00 DOWNSTREAM (FEET) = 805.00
FLOW LENGTH (FEET) = 700.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 27.7 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 11.47
ESTIMATED PIPE DIAMETER (INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 67.02
PIPE TRAVEL TIME (MIN.) = 1.02 Tc (MIN.) = 18.65
LONGEST FLOWPATH FROM NODE 340.00 TO NODE 343.00 = 2730.00 FEET.

*****
FLOW PROCESS FROM NODE 343.00 TO NODE 343.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc (MIN.) = 18.65
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.621
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 14.70 0.98 0.100 32
RESIDENTIAL
"5-7 DWELLINGS/ACRE" A 8.70 0.98 0.500 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.249
SUBAREA AREA (ACRES) = 23.40 SUBAREA RUNOFF (CFS) = 50.09

```

EFFECTIVE AREA (ACRES) = 51.90 AREA-AVERAGED Fm (INCH/HR) = 0.16
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.17
 TOTAL AREA (ACRES) = 51.9 PEAK FLOW RATE (CFS) = 114.81

 FLOW PROCESS FROM NODE 343.00 TO NODE 344.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 805.00 DOWNSTREAM (FEET) = 798.00
 FLOW LENGTH (FEET) = 600.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 45.0 INCH PIPE IS 36.2 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 12.06
 ESTIMATED PIPE DIAMETER (INCH) = 45.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 114.81
 PIPE TRAVEL TIME (MIN.) = 0.83 Tc (MIN.) = 19.48
 LONGEST FLOWPATH FROM NODE 340.00 TO NODE 344.00 = 3330.00 FEET.

 FLOW PROCESS FROM NODE 344.00 TO NODE 344.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc (MIN.) = 19.48
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.553
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 15.50 0.98 0.100 32
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE" A 41.90 0.98 0.500 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.392
 SUBAREA AREA (ACRES) = 57.40 SUBAREA RUNOFF (CFS) = 112.16
 EFFECTIVE AREA (ACRES) = 109.30 AREA-AVERAGED Fm (INCH/HR) = 0.28
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.29
 TOTAL AREA (ACRES) = 109.3 PEAK FLOW RATE (CFS) = 223.81

 FLOW PROCESS FROM NODE 344.00 TO NODE 345.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 798.00 DOWNSTREAM (FEET) = 770.00
 FLOW LENGTH (FEET) = 1980.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 57.0 INCH PIPE IS 43.3 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 15.48
 ESTIMATED PIPE DIAMETER (INCH) = 57.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 223.81
 PIPE TRAVEL TIME (MIN.) = 2.13 Tc (MIN.) = 21.61
 LONGEST FLOWPATH FROM NODE 340.00 TO NODE 345.00 = 5310.00 FEET.

 FLOW PROCESS FROM NODE 345.00 TO NODE 345.00 IS CODE = 81

 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc (MIN.) = 21.61
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.399
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 22.80 0.98 0.100 32
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE" A 32.90 0.98 0.500 32
 RESIDENTIAL
 "11+ DWELLINGS/ACRE" A 54.70 0.98 0.200 32
 RESIDENTIAL
 "11+ DWELLINGS/ACRE" A 2.70 0.98 0.200 32
 COMMERCIAL A 4.90 0.98 0.100 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.260
 SUBAREA AREA (ACRES) = 118.00 SUBAREA RUNOFF (CFS) = 227.83
 EFFECTIVE AREA (ACRES) = 227.30 AREA-AVERAGED Fm (INCH/HR) = 0.27
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.27
 TOTAL AREA (ACRES) = 227.3 PEAK FLOW RATE (CFS) = 436.47

 FLOW PROCESS FROM NODE 345.00 TO NODE 345.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<<

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION (MIN.) = 21.61
 RAINFALL INTENSITY (INCH/HR) = 2.40
 AREA-AVERAGED Fm (INCH/HR) = 0.27
 AREA-AVERAGED Fp (INCH/HR) = 0.98
 AREA-AVERAGED Ap = 0.27
 EFFECTIVE STREAM AREA (ACRES) = 227.30
 TOTAL STREAM AREA (ACRES) = 227.30
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 436.47

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	229.87	21.99	2.374	0.98 (0.83)	0.85	151.5	320.00
2	436.47	21.61	2.399	0.98 (0.27)	0.27	227.3	340.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	666.02	21.61	2.399	0.98 (0.49)	0.50	376.2	340.00
2	661.30	21.99	2.374	0.98 (0.49)	0.50	378.8	320.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 666.02 Tc(MIN.) = 21.61
 EFFECTIVE AREA(ACRES) = 376.22 AREA-AVERAGED Fm(INCH/HR) = 0.49
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.50
 TOTAL AREA(ACRES) = 378.8
 LONGEST FLOWPATH FROM NODE 340.00 TO NODE 345.00 = 5310.00 FEET.

STREET FLOW DEPTH(FEET) = 0.62
 HALFSTREET FLOOD WIDTH(FEET) = 22.85
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.72
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.29
 STREET FLOW TRAVEL TIME(MIN.) = 2.24 Tc(MIN.) = 13.97
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.116

 FLOW PROCESS FROM NODE 345.00 TO NODE 345.00 IS CODE = 10

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

 FLOW PROCESS FROM NODE 360.00 TO NODE 361.00 IS CODE = 21

 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 =====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 950.00
 ELEVATION DATA: UPSTREAM(FEET) = 840.00 DOWNSTREAM(FEET) = 830.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 11.736
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.460
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	1.40	0.98	0.100	32	11.74
RESIDENTIAL "11+ DWELLINGS/ACRE"	A	9.00	0.98	0.200	32	12.51

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.187
 SUBAREA RUNOFF(CFS) = 30.69
 TOTAL AREA(ACRES) = 10.40 PEAK FLOW RATE(CFS) = 30.69

 FLOW PROCESS FROM NODE 361.00 TO NODE 362.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 2 USED)<<<<<
 =====
 UPSTREAM ELEVATION(FEET) = 830.00 DOWNSTREAM ELEVATION(FEET) = 825.00
 STREET LENGTH(FEET) = 500.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 40.29
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "11+ DWELLINGS/ACRE"	A	7.30	0.98	0.200	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
 SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 19.19
 EFFECTIVE AREA(ACRES) = 17.70 AREA-AVERAGED Fm(INCH/HR) = 0.19
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.19
 TOTAL AREA(ACRES) = 17.7 PEAK FLOW RATE(CFS) = 46.66

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.64 HALFSTREET FLOOD WIDTH(FEET) = 24.22
 FLOW VELOCITY(FEET/SEC.) = 3.85 DEPTH*VELOCITY(FT*FT/SEC.) = 2.48
 LONGEST FLOWPATH FROM NODE 360.00 TO NODE 362.00 = 1450.00 FEET.

 FLOW PROCESS FROM NODE 362.00 TO NODE 362.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====
 MAINLINE Tc(MIN.) = 13.97
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.116

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	5.30	0.98	0.100	32
RESIDENTIAL "5-7 DWELLINGS/ACRE"	A	13.60	0.98	0.500	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.388
 SUBAREA AREA(ACRES) = 18.90 SUBAREA RUNOFF(CFS) = 46.58
 EFFECTIVE AREA(ACRES) = 36.60 AREA-AVERAGED Fm(INCH/HR) = 0.29
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.29
 TOTAL AREA(ACRES) = 36.6 PEAK FLOW RATE(CFS) = 93.24

 FLOW PROCESS FROM NODE 362.00 TO NODE 363.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM(FEET) = 825.00 DOWNSTREAM(FEET) = 810.00
 FLOW LENGTH(FEET) = 1550.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 45.0 INCH PIPE IS 32.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 10.86
 ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 93.24
 PIPE TRAVEL TIME(MIN.) = 2.38 Tc(MIN.) = 16.35

LONGEST FLOWPATH FROM NODE 360.00 TO NODE 363.00 = 3000.00 FEET.

AREA-AVERAGED Fp (INCH/HR) = 0.97 AREA-AVERAGED Ap = 0.35
TOTAL AREA (ACRES) = 102.0 PEAK FLOW RATE (CFS) = 201.63

FLOW PROCESS FROM NODE 363.00 TO NODE 363.00 IS CODE = 81

FLOW PROCESS FROM NODE 364.00 TO NODE 354.00 IS CODE = 31

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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

=====

MAINLINE Tc (MIN.) = 16.35
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.836
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 7.40 0.98 0.100 32
RESIDENTIAL
"5-7 DWELLINGS/ACRE" A 16.00 0.98 0.500 32
RESIDENTIAL
"11+ DWELLINGS/ACRE" A 0.10 0.98 0.200 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.373
SUBAREA AREA (ACRES) = 23.50 SUBAREA RUNOFF (CFS) = 52.29
EFFECTIVE AREA (ACRES) = 60.10 AREA-AVERAGED Fm (INCH/HR) = 0.32
AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.32
TOTAL AREA (ACRES) = 60.1 PEAK FLOW RATE (CFS) = 136.29

=====

ELEVATION DATA: UPSTREAM (FEET) = 778.00 DOWNSTREAM (FEET) = 775.00
FLOW LENGTH (FEET) = 1330.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 78.0 INCH PIPE IS 58.1 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 7.60
ESTIMATED PIPE DIAMETER (INCH) = 78.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 201.63
PIPE TRAVEL TIME (MIN.) = 2.92 Tc (MIN.) = 22.55
LONGEST FLOWPATH FROM NODE 360.00 TO NODE 354.00 = 6890.00 FEET.

FLOW PROCESS FROM NODE 363.00 TO NODE 364.00 IS CODE = 31

FLOW PROCESS FROM NODE 354.00 TO NODE 354.00 IS CODE = 1

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

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 810.00 DOWNSTREAM (FEET) = 778.00
FLOW LENGTH (FEET) = 2560.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 37.3 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 13.01
ESTIMATED PIPE DIAMETER (INCH) = 48.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 136.29
PIPE TRAVEL TIME (MIN.) = 3.28 Tc (MIN.) = 19.63
LONGEST FLOWPATH FROM NODE 360.00 TO NODE 364.00 = 5560.00 FEET.

=====

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION (MIN.) = 22.55
RAINFALL INTENSITY (INCH/HR) = 2.34
AREA-AVERAGED Fm (INCH/HR) = 0.34
AREA-AVERAGED Fp (INCH/HR) = 0.97
AREA-AVERAGED Ap = 0.35
EFFECTIVE STREAM AREA (ACRES) = 102.00
TOTAL STREAM AREA (ACRES) = 102.00
PEAK FLOW RATE (CFS) AT CONFLUENCE = 201.63

FLOW PROCESS FROM NODE 364.00 TO NODE 364.00 IS CODE = 81

FLOW PROCESS FROM NODE 350.00 TO NODE 351.00 IS CODE = 21

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

MAINLINE Tc (MIN.) = 19.63
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.541
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 10.90 0.98 0.100 32
RESIDENTIAL
"5-7 DWELLINGS/ACRE" A 31.00 0.98 0.500 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.396
SUBAREA AREA (ACRES) = 41.90 SUBAREA RUNOFF (CFS) = 81.27
EFFECTIVE AREA (ACRES) = 102.00 AREA-AVERAGED Fm (INCH/HR) = 0.34

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 860.00
ELEVATION DATA: UPSTREAM (FEET) = 840.00 DOWNSTREAM (FEET) = 832.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 11.560
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.492
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 8.70 0.98 0.100 32 11.56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF (CFS) = 26.58
TOTAL AREA (ACRES) = 8.70 PEAK FLOW RATE (CFS) = 26.58

FLOW PROCESS FROM NODE 351.00 TO NODE 352.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 832.00 DOWNSTREAM ELEVATION(FEET) = 825.00
STREET LENGTH(FEET) = 1200.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 53.18
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.72
HALFSTREET FLOOD WIDTH(FEET) = 31.04
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.23
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.33
STREET FLOW TRAVEL TIME(MIN.) = 6.20 Tc(MIN.) = 17.76
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.699

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 0.80 0.98 0.100 32
COMMERCIAL A 21.80 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 22.60 SUBAREA RUNOFF(CFS) = 52.92
EFFECTIVE AREA(ACRES) = 31.30 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 31.3 PEAK FLOW RATE(CFS) = 73.29

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.79 HALFSTREET FLOOD WIDTH(FEET) = 38.21
FLOW VELOCITY(FEET/SEC.) = 3.42 DEPTH*VELOCITY(FT*FT/SEC.) = 2.72
*NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
AND L = 1200.0 FT WITH ELEVATION-DROP = 7.0 FT, IS 60.0 CFS,
WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 352.00
LONGEST FLOWPATH FROM NODE 350.00 TO NODE 352.00 = 2060.00 FEET.

FLOW PROCESS FROM NODE 352.00 TO NODE 352.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 17.76
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.699
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

COMMERCIAL A 4.70 0.98 0.100 32
COMMERCIAL A 14.50 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 19.20 SUBAREA RUNOFF(CFS) = 44.96
EFFECTIVE AREA(ACRES) = 50.50 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 50.5 PEAK FLOW RATE(CFS) = 118.24

FLOW PROCESS FROM NODE 352.00 TO NODE 353.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 825.00 DOWNSTREAM(FEET) = 805.00
FLOW LENGTH(FEET) = 1500.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 34.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.87
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 118.24
PIPE TRAVEL TIME(MIN.) = 1.94 Tc(MIN.) = 19.70
LONGEST FLOWPATH FROM NODE 350.00 TO NODE 353.00 = 3560.00 FEET.

FLOW PROCESS FROM NODE 353.00 TO NODE 353.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 19.70
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.536
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 21.00 0.98 0.100 32
RESIDENTIAL
"5-7 DWELLINGS/ACRE" A 16.60 0.98 0.500 32
RESIDENTIAL
"11+ DWELLINGS/ACRE" A 12.40 0.98 0.200 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.258
SUBAREA AREA(ACRES) = 50.00 SUBAREA RUNOFF(CFS) = 102.82
EFFECTIVE AREA(ACRES) = 100.50 AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.18
TOTAL AREA(ACRES) = 100.5 PEAK FLOW RATE(CFS) = 213.66

FLOW PROCESS FROM NODE 353.00 TO NODE 354.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 805.00 DOWNSTREAM(FEET) = 775.00
FLOW LENGTH(FEET) = 2560.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 57.0 INCH PIPE IS 45.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.14

ESTIMATED PIPE DIAMETER (INCH) = 57.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 213.66
 PIPE TRAVEL TIME (MIN.) = 3.02 Tc (MIN.) = 22.72
 LONGEST FLOWPATH FROM NODE 350.00 TO NODE 354.00 = 6120.00 FEET.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE (CFS) = 521.47 Tc (MIN.) = 22.55
 EFFECTIVE AREA (ACRES) = 272.73 AREA-AVERAGED Fm (INCH/HR) = 0.29
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.30
 TOTAL AREA (ACRES) = 274.0
 LONGEST FLOWPATH FROM NODE 360.00 TO NODE 354.00 = 6890.00 FEET.

 FLOW PROCESS FROM NODE 354.00 TO NODE 354.00 IS CODE = 81

 FLOW PROCESS FROM NODE 354.00 TO NODE 345.00 IS CODE = 31

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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

=====

MAINLINE Tc (MIN.) = 22.72
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.328
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	20.80	0.98	0.100	32
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	50.70	0.98	0.500	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.384
 SUBAREA AREA (ACRES) = 71.50 SUBAREA RUNOFF (CFS) = 125.75
 EFFECTIVE AREA (ACRES) = 172.00 AREA-AVERAGED Fm (INCH/HR) = 0.26
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.26
 TOTAL AREA (ACRES) = 172.0 PEAK FLOW RATE (CFS) = 320.61

=====

ELEVATION DATA: UPSTREAM (FEET) = 775.00 DOWNSTREAM (FEET) = 770.00
 FLOW LENGTH (FEET) = 1350.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 102.0 INCH PIPE IS 75.2 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 11.63
 ESTIMATED PIPE DIAMETER (INCH) = 102.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 521.47
 PIPE TRAVEL TIME (MIN.) = 1.94 Tc (MIN.) = 24.48
 LONGEST FLOWPATH FROM NODE 360.00 TO NODE 345.00 = 8240.00 FEET.

 FLOW PROCESS FROM NODE 354.00 TO NODE 354.00 IS CODE = 1

 FLOW PROCESS FROM NODE 345.00 TO NODE 345.00 IS CODE = 11

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

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

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION (MIN.) = 22.72
 RAINFALL INTENSITY (INCH/HR) = 2.33
 AREA-AVERAGED Fm (INCH/HR) = 0.26
 AREA-AVERAGED Fp (INCH/HR) = 0.98
 AREA-AVERAGED Ap = 0.26
 EFFECTIVE STREAM AREA (ACRES) = 172.00
 TOTAL STREAM AREA (ACRES) = 172.00
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 320.61

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	521.47	24.48	2.226	0.98 (0.29)	0.30	272.7	360.00
2	521.19	24.65	2.217	0.98 (0.29)	0.30	274.0	350.00

LONGEST FLOWPATH FROM NODE 360.00 TO NODE 345.00 = 8240.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	666.02	21.61	2.399	0.98 (0.49)	0.50	376.2	340.00
2	661.30	21.99	2.374	0.98 (0.49)	0.50	378.8	320.00

LONGEST FLOWPATH FROM NODE 340.00 TO NODE 345.00 = 5310.00 FEET.

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	201.63	22.55	2.339	0.97 (0.34)	0.35	102.0	360.00
2	320.61	22.72	2.328	0.98 (0.26)	0.26	172.0	350.00

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1167.45	21.61	2.399	0.98 (0.41)	0.42	617.0	340.00
2	1165.48	21.99	2.374	0.98 (0.41)	0.42	623.7	320.00
3	1130.65	24.48	2.226	0.98 (0.41)	0.42	651.5	360.00
4	1127.18	24.65	2.217	0.98 (0.41)	0.42	652.8	350.00

TOTAL AREA (ACRES) = 652.8

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	521.47	22.55	2.339	0.98 (0.29)	0.30	272.7	360.00
2	521.19	22.72	2.328	0.98 (0.29)	0.30	274.0	350.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE (CFS) = 1167.45 Tc (MIN.) = 21.611
 EFFECTIVE AREA (ACRES) = 616.95 AREA-AVERAGED Fm (INCH/HR) = 0.41
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.42

TOTAL AREA(ACRES) = 652.8
LONGEST FLOWPATH FROM NODE 360.00 TO NODE 345.00 = 8240.00 FEET.

FLOW PROCESS FROM NODE 345.00 TO NODE 345.00 IS CODE = 71

>>>>PEAK FLOW RATE ESTIMATOR CHANGED TO UNIT-HYDROGRAPH METHOD<<<<<
>>>>USING TIME-OF-CONCENTRATION OF LONGEST FLOWPATH<<<<<

UNIT-HYDROGRAPH DATA:
RAINFALL(INCH): 5M= 0.48;30M= 0.99;1H= 1.30;3H= 2.30;6H= 3.30;24H= 7.00
S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
Tc(HR) = 0.41; LAG(HR) = 0.33; Fm(INCH/HR) = 0.41; Ybar = 0.42
USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
DEPTH-AREA FACTORS: 5M = 0.97; 30M = 0.97; 1HR = 0.97;
3HR = 1.00; 6HR = 1.00; 24HR= 1.00
UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 652.8
LONGEST FLOWPATH FROM NODE 360.00 TO NODE 345.00 = 8240.00 FEET.
EQUIVALENT BASIN FACTOR APPROXIMATIONS:
Lca/L=0.3,n=.0316; Lca/L=0.4,n=.0283; Lca/L=0.5,n=.0260;Lca/L=0.6,n=.0243
TIME OF PEAK FLOW(HR) = 16.42 RUNOFF VOLUME(AF) = 232.32
UNIT-HYDROGRAPH METHOD PEAK FLOW RATE(CFS) = 1112.07
TOTAL PEAK FLOW RATE(CFS) = 1112.07 (SOURCE FLOW INCLUDED)
RATIONAL METHOD PEAK FLOW RATE(CFS) = 1167.45
(UPSTREAM NODE PEAK FLOW RATE(CFS) = 1167.45)
PEAK FLOW RATE(CFS) USED = 1167.45

FLOW PROCESS FROM NODE 345.00 TO NODE 346.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 770.00 DOWNSTREAM(FEET) = 752.00
FLOW LENGTH(FEET) = 2560.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 120.0 INCH PIPE IS 92.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.96
ESTIMATED PIPE DIAMETER(INCH) = 120.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 1167.45
PIPE TRAVEL TIME(MIN.) = 2.38 Tc(MIN.) = 26.86
LONGEST FLOWPATH FROM NODE 360.00 TO NODE 346.00 = 10800.00 FEET.

FLOW PROCESS FROM NODE 346.00 TO NODE 346.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 26.86
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.106
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 1.00 0.98 0.100 32
RESIDENTIAL
"5-7 DWELLINGS/ACRE" A 70.00 0.98 0.500 32

COMMERCIAL A 9.40 0.98 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.448
SUBAREA AREA(ACRES) = 80.40
UNIT-HYDROGRAPH DATA:
RAINFALL(INCH): 5M= 0.48;30M= 0.99;1H= 1.30;3H= 2.30;6H= 3.30;24H= 7.00
S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
Tc(HR) = 0.45; LAG(HR) = 0.36; Fm(INCH/HR) = 0.41; Ybar = 0.42
USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
DEPTH-AREA FACTORS: 5M = 0.97; 30M = 0.97; 1HR = 0.97;
3HR = 1.00; 6HR = 1.00; 24HR= 1.00
UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 733.2
LONGEST FLOWPATH FROM NODE 360.00 TO NODE 346.00 = 10800.00 FEET.
EQUIVALENT BASIN FACTOR APPROXIMATIONS:
Lca/L=0.3,n=.0280; Lca/L=0.4,n=.0251; Lca/L=0.5,n=.0230;Lca/L=0.6,n=.0215
TIME OF PEAK FLOW(HR) = 16.42 RUNOFF VOLUME(AF) = 259.54
UNIT-HYDROGRAPH PEAK FLOW RATE(CFS) = 1191.12
TOTAL AREA(ACRES) = 733.2 PEAK FLOW RATE(CFS) = 1191.12

FLOW PROCESS FROM NODE 346.00 TO NODE 347.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 752.00 DOWNSTREAM(FEET) = 740.00
FLOW LENGTH(FEET) = 2530.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 132.0 INCH PIPE IS 98.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.66
ESTIMATED PIPE DIAMETER(INCH) = 132.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 1191.12
PIPE TRAVEL TIME(MIN.) = 2.69 Tc(MIN.) = 29.55
LONGEST FLOWPATH FROM NODE 360.00 TO NODE 347.00 = 13330.00 FEET.

FLOW PROCESS FROM NODE 347.00 TO NODE 347.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 29.55
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.988
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 2.80 0.98 0.100 32
RESIDENTIAL
"5-7 DWELLINGS/ACRE" A 144.30 0.98 0.500 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.492
SUBAREA AREA(ACRES) = 147.10
UNIT-HYDROGRAPH DATA:
RAINFALL(INCH): 5M= 0.48;30M= 0.99;1H= 1.30;3H= 2.30;6H= 3.30;24H= 7.00
S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%
MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
Tc(HR) = 0.49; LAG(HR) = 0.39; Fm(INCH/HR) = 0.42; Ybar = 0.43

USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
DEPTH-AREA FACTORS: 5M = 0.96; 30M = 0.96; 1HR = 0.96;
3HR = 0.99; 6HR = 1.00; 24HR= 1.00
UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 880.3
LONGEST FLOWPATH FROM NODE 360.00 TO NODE 347.00 = 13330.00 FEET.
EQUIVALENT BASIN FACTOR APPROXIMATIONS:
Lca/L=0.3,n=.0258; Lca/L=0.4,n=.0231; Lca/L=0.5,n=.0213;Lca/L=0.6,n=.0198
TIME OF PEAK FLOW(HR) = 16.42 RUNOFF VOLUME(AF) = 306.02
UNIT-HYDROGRAPH PEAK FLOW RATE(CFS) = 1294.40
TOTAL AREA(ACRES) = 880.3 PEAK FLOW RATE(CFS) = 1294.40

=====
END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 880.3 TC(MIN.) = 29.55
AREA-AVERAGED Fm(INCH/HR) = 0.42 Ybar = 0.43
PEAK FLOW RATE(CFS) = 1294.40
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END OF INTEGRATED RATIONAL/UNIT-HYDROGRAPH METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
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***** DESCRIPTION OF STUDY *****

* ONTARIO MASTER PLAN OF DRAINAGE - BASIN IV (AREA G, H, I) *
* 25-YEAR HYDROLOGY ANALYSIS *
* P. PAGADUAN 8-29-2011 *

FILE NAME: OIVG25.DAT
TIME/DATE OF STUDY: 16:22 08/29/2011

=====
USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
=====

---*TIME-OF-CONCENTRATION MODEL*---

USER SPECIFIED STORM EVENT(YEAR) = 25.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.80
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL
10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) = 0.900
100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) = 1.300
COMPUTED RAINFALL INTENSITY DATA:
STORM EVENT = 25.00 1-HOUR INTENSITY(INCH/HOUR) = 1.0385
SLOPE OF INTENSITY DURATION CURVE = 0.6000

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

Table with columns: NO., WIDTH (FT), CROSSFALL (FT), IN-/OUT-/PARK-SIDE / SIDE/WAY, HEIGHT (FT), CURB GUTTER-GEOMETRIES, MANNING, LIP (FT), HIKE (FT), FACTOR (n)

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
SIZE PIPE WITH A FLOW CAPACITY GREATER THAN OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

UNIT-HYDROGRAPH MODEL SELECTIONS/PARAMETERS:

WATERSHED LAG = 0.80 * Tc
USED "VALLEY UNDEVELOPED" S-GRAPH FOR DEVELOPMENTS OF 2 UNITS/ACRE AND LESS; AND "VALLEY DEVELOPED" S-GRAPH FOR DEVELOPMENTS OF 3-4 UNITS/ACRE AND MORE.

USER SPECIFIED RAINFALL VALUES:

2-YR 6-HR RAINFALL DEPTH(INCH) = 1.50
2-YR 24-HR RAINFALL DEPTH(INCH) = 2.70
100-YR 6-HR RAINFALL DEPTH(INCH) = 3.30
100-YR 24-HR RAINFALL DEPTH(INCH) = 7.00
SIERRA MADRE DEPTH-AREA FACTORS USED.

Table with columns: DURATION, RAINFALL(INCH)
5-MINUTES 0.38
30-MINUTES 0.79
1-HOUR 1.04
3-HOUR 1.87
6-HOUR 2.71
24-HOUR 5.30

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR UNIT HYDROGRAPH METHOD

FLOW PROCESS FROM NODE 320.10 TO NODE 320.20 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 750.00
ELEVATION DATA: UPSTREAM(FEET) = 820.00 DOWNSTREAM(FEET) = 815.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 11.698
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.770
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 6.20 0.98 0.100 32 11.70
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 14.91
TOTAL AREA(ACRES) = 6.20 PEAK FLOW RATE(CFS) = 14.91

FLOW PROCESS FROM NODE 320.20 TO NODE 320.30 IS CODE = 91

>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<

=====
UPSTREAM NODE ELEVATION(FEET) = 815.00
DOWNSTREAM NODE ELEVATION(FEET) = 814.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 250.00
"V" GUTTER WIDTH(FEET) = 5.00 GUTTER HIKE(FEET) = 0.800
PAVEMENT LIP(FEET) = 0.100 MANNING'S N = .0150
PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.10000
MAXIMUM DEPTH(FEET) = 3.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.649
SUBAREA LOSS RATE DATA(AMC II):


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UPSTREAM NODE ELEVATION (FEET) = 810.00
DOWNSTREAM NODE ELEVATION (FEET) = 800.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 950.00
"V" GUTTER WIDTH (FEET) = 5.00 GUTTER HIKE (FEET) = 0.800
PAVEMENT LIP (FEET) = 0.100 MANNING'S N = .0150
PAVEMENT CROSSFALL (DECIMAL NOTATION) = 0.10000
MAXIMUM DEPTH (FEET) = 3.00
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.134
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
PUBLIC PARK A 2.30 0.98 0.850 32
PUBLIC PARK A 41.30 0.98 0.850 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 59.93
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.77
AVERAGE FLOW DEPTH (FEET) = 1.41 FLOOD WIDTH (FEET) = 15.28
"V" GUTTER FLOW TRAVEL TIME (MIN.) = 2.04 Tc (MIN.) = 18.06
SUBAREA AREA (ACRES) = 43.60 SUBAREA RUNOFF (CFS) = 51.23
EFFECTIVE AREA (ACRES) = 69.70 AREA-AVERAGED Fm (INCH/HR) = 0.83
AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.85
TOTAL AREA (ACRES) = 69.7 PEAK FLOW RATE (CFS) = 81.89

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END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH (FEET) = 1.56 FLOOD WIDTH (FEET) = 18.14
FLOW VELOCITY (FEET/SEC.) = 8.11 DEPTH*VELOCITY (FT*FT/SEC) = 12.63
LONGEST FLOWPATH FROM NODE 320.00 TO NODE 323.00 = 2240.00 FEET.

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*****
FLOW PROCESS FROM NODE 323.00 TO NODE 324.00 IS CODE = 31

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-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM (FEET) = 800.00 DOWNSTREAM (FEET) = 778.00
FLOW LENGTH (FEET) = 1650.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 30.7 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 11.71
ESTIMATED PIPE DIAMETER (INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 81.89
PIPE TRAVEL TIME (MIN.) = 2.35 Tc (MIN.) = 20.41
LONGEST FLOWPATH FROM NODE 320.00 TO NODE 324.00 = 3890.00 FEET.

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*****
FLOW PROCESS FROM NODE 324.00 TO NODE 324.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc (MIN.) = 20.41
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.983
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
PUBLIC PARK A 3.80 0.98 0.850 32

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PUBLIC PARK A 78.00 0.98 0.850 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
SUBAREA AREA (ACRES) = 81.80 SUBAREA RUNOFF (CFS) = 84.99
EFFECTIVE AREA (ACRES) = 151.50 AREA-AVERAGED Fm (INCH/HR) = 0.83
AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.85
TOTAL AREA (ACRES) = 151.5 PEAK FLOW RATE (CFS) = 157.42

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*****
FLOW PROCESS FROM NODE 324.00 TO NODE 345.00 IS CODE = 31

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-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM (FEET) = 778.00 DOWNSTREAM (FEET) = 770.00
FLOW LENGTH (FEET) = 1340.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 60.0 INCH PIPE IS 43.5 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 10.33
ESTIMATED PIPE DIAMETER (INCH) = 60.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 157.42
PIPE TRAVEL TIME (MIN.) = 2.16 Tc (MIN.) = 22.57
LONGEST FLOWPATH FROM NODE 320.00 TO NODE 345.00 = 5230.00 FEET.

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*****
FLOW PROCESS FROM NODE 345.00 TO NODE 345.00 IS CODE = 1

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-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION (MIN.) = 22.57
RAINFALL INTENSITY (INCH/HR) = 1.87
AREA-AVERAGED Fm (INCH/HR) = 0.83
AREA-AVERAGED Fp (INCH/HR) = 0.98
AREA-AVERAGED Ap = 0.85
EFFECTIVE STREAM AREA (ACRES) = 151.50
TOTAL STREAM AREA (ACRES) = 151.50
PEAK FLOW RATE (CFS) AT CONFLUENCE = 157.42

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*****
FLOW PROCESS FROM NODE 340.00 TO NODE 341.00 IS CODE = 21

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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH (FEET) = 1000.00
ELEVATION DATA: UPSTREAM (FEET) = 840.00 DOWNSTREAM (FEET) = 830.00

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Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 12.102
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.714
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 2.50 0.98 0.100 32 12.10
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98

```

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF(CFS) = 5.89
 TOTAL AREA(ACRES) = 2.50 PEAK FLOW RATE(CFS) = 5.89

 FLOW PROCESS FROM NODE 341.00 TO NODE 342.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 2 USED)<<<<<
 =====

UPSTREAM ELEVATION(FEET) = 830.00 DOWNSTREAM ELEVATION(FEET) = 815.00
 STREET LENGTH(FEET) = 1030.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.10
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.38
 HALFSTREET FLOOD WIDTH(FEET) = 10.93
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.93
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.10
 STREET FLOW TRAVEL TIME(MIN.) = 5.87 Tc(MIN.) = 17.97
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.141

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	2.40	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 4.41
 EFFECTIVE AREA(ACRES) = 4.90 AREA-AVERAGED Fm(INCH/HR) = 0.10
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 4.9 PEAK FLOW RATE(CFS) = 9.01

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.39 HALFSTREET FLOOD WIDTH(FEET) = 11.46
 FLOW VELOCITY(FEET/SEC.) = 3.00 DEPTH*VELOCITY(FT*FT/SEC.) = 1.16
 LONGEST FLOWPATH FROM NODE 340.00 TO NODE 342.00 = 2030.00 FEET.

 FLOW PROCESS FROM NODE 342.00 TO NODE 342.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====

MAINLINE Tc(MIN.) = 17.97
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.141
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	14.70	0.98	0.100	32
RESIDENTIAL "5-7 DWELLINGS/ACRE"	A	8.70	0.98	0.500	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
COMMERCIAL	A	7.90	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 7.90 SUBAREA RUNOFF(CFS) = 14.53
 EFFECTIVE AREA(ACRES) = 12.80 AREA-AVERAGED Fm(INCH/HR) = 0.10
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 12.8 PEAK FLOW RATE(CFS) = 23.54

 FLOW PROCESS FROM NODE 342.00 TO NODE 342.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====

MAINLINE Tc(MIN.) = 17.97
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.141
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	15.70	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.97
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 15.70 SUBAREA RUNOFF(CFS) = 28.87
 EFFECTIVE AREA(ACRES) = 28.50 AREA-AVERAGED Fm(INCH/HR) = 0.10
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 28.5 PEAK FLOW RATE(CFS) = 52.41

 FLOW PROCESS FROM NODE 342.00 TO NODE 343.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 815.00 DOWNSTREAM(FEET) = 805.00
 FLOW LENGTH(FEET) = 700.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 25.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 10.81
 ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 52.41
 PIPE TRAVEL TIME(MIN.) = 1.08 Tc(MIN.) = 19.05
 LONGEST FLOWPATH FROM NODE 340.00 TO NODE 343.00 = 2730.00 FEET.

 FLOW PROCESS FROM NODE 343.00 TO NODE 343.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====

MAINLINE Tc(MIN.) = 19.05
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.067
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	14.70	0.98	0.100	32
RESIDENTIAL "5-7 DWELLINGS/ACRE"	A	8.70	0.98	0.500	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.249
 SUBAREA AREA (ACRES) = 23.40 SUBAREA RUNOFF (CFS) = 38.43
 EFFECTIVE AREA (ACRES) = 51.90 AREA-AVERAGED Fm (INCH/HR) = 0.16
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.17
 TOTAL AREA (ACRES) = 51.9 PEAK FLOW RATE (CFS) = 88.95

 FLOW PROCESS FROM NODE 345.00 TO NODE 345.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 22.21
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.885
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	22.80	0.98	0.100	32
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	32.90	0.98	0.500	32
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	A	54.70	0.98	0.200	32
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	A	2.70	0.98	0.200	32
COMMERCIAL	A	4.90	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.260
 SUBAREA AREA (ACRES) = 118.00 SUBAREA RUNOFF (CFS) = 173.26
 EFFECTIVE AREA (ACRES) = 227.30 AREA-AVERAGED Fm (INCH/HR) = 0.27
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.27
 TOTAL AREA (ACRES) = 227.3 PEAK FLOW RATE (CFS) = 331.34

 FLOW PROCESS FROM NODE 345.00 TO NODE 345.00 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.) = 22.21
 RAINFALL INTENSITY (INCH/HR) = 1.89
 AREA-AVERAGED Fm (INCH/HR) = 0.27
 AREA-AVERAGED Fp (INCH/HR) = 0.98
 AREA-AVERAGED Ap = 0.27
 EFFECTIVE STREAM AREA (ACRES) = 227.30
 TOTAL STREAM AREA (ACRES) = 227.30
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 331.34

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	157.42	22.57	1.867	0.98 (0.83)	0.85	151.5	320.00
2	331.34	22.21	1.885	0.98 (0.27)	0.27	227.3	340.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	488.75	22.21	1.885	0.98 (0.49)	0.50	376.4	340.00
2	485.06	22.57	1.867	0.98 (0.49)	0.50	378.8	320.00

 FLOW PROCESS FROM NODE 343.00 TO NODE 344.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 805.00 DOWNSTREAM (FEET) = 798.00
 FLOW LENGTH (FEET) = 600.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 42.0 INCH PIPE IS 31.6 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 11.46
 ESTIMATED PIPE DIAMETER (INCH) = 42.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 88.95
 PIPE TRAVEL TIME (MIN.) = 0.87 Tc (MIN.) = 19.92
 LONGEST FLOWPATH FROM NODE 340.00 TO NODE 344.00 = 3330.00 FEET.

 FLOW PROCESS FROM NODE 344.00 TO NODE 344.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 19.92
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.012
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	15.50	0.98	0.100	32
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	41.90	0.98	0.500	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.392
 SUBAREA AREA (ACRES) = 57.40 SUBAREA RUNOFF (CFS) = 84.21
 EFFECTIVE AREA (ACRES) = 109.30 AREA-AVERAGED Fm (INCH/HR) = 0.28
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.29
 TOTAL AREA (ACRES) = 109.3 PEAK FLOW RATE (CFS) = 170.60

 FLOW PROCESS FROM NODE 344.00 TO NODE 345.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 798.00 DOWNSTREAM (FEET) = 770.00
 FLOW LENGTH (FEET) = 1980.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 51.0 INCH PIPE IS 39.7 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 14.41
 ESTIMATED PIPE DIAMETER (INCH) = 51.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 170.60
 PIPE TRAVEL TIME (MIN.) = 2.29 Tc (MIN.) = 22.21
 LONGEST FLOWPATH FROM NODE 340.00 TO NODE 345.00 = 5310.00 FEET.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 488.75 Tc(MIN.) = 22.21
 EFFECTIVE AREA(ACRES) = 376.39 AREA-AVERAGED Fm(INCH/HR) = 0.49
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.50
 TOTAL AREA(ACRES) = 378.8
 LONGEST FLOWPATH FROM NODE 340.00 TO NODE 345.00 = 5310.00 FEET.

 FLOW PROCESS FROM NODE 345.00 TO NODE 345.00 IS CODE = 10

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

 FLOW PROCESS FROM NODE 360.00 TO NODE 361.00 IS CODE = 21

 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 950.00
 ELEVATION DATA: UPSTREAM(FEET) = 840.00 DOWNSTREAM(FEET) = 830.00

Tc = K * [(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 11.736
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.764
 SUBAREA Tc AND LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
 COMMERCIAL A 1.40 0.98 0.100 32 11.74
 RESIDENTIAL
 "11+ DWELLINGS/ACRE" A 9.00 0.98 0.200 32 12.51
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.187
 SUBAREA RUNOFF(CFS) = 24.17
 TOTAL AREA(ACRES) = 10.40 PEAK FLOW RATE(CFS) = 24.17

 FLOW PROCESS FROM NODE 361.00 TO NODE 362.00 IS CODE = 62

 >>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 2 USED)<<<<<

 UPSTREAM ELEVATION(FEET) = 830.00 DOWNSTREAM ELEVATION(FEET) = 825.00
 STREET LENGTH(FEET) = 500.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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) = 31.67
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.57
 HALFSTREET FLOOD WIDTH(FEET) = 20.79
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.51
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.01
 STREET FLOW TRAVEL TIME(MIN.) = 2.38 Tc(MIN.) = 14.11
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.475

SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE" A 7.30 0.98 0.200 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
 SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 14.98
 EFFECTIVE AREA(ACRES) = 17.70 AREA-AVERAGED Fm(INCH/HR) = 0.19
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.19
 TOTAL AREA(ACRES) = 17.7 PEAK FLOW RATE(CFS) = 36.44

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.60 HALFSTREET FLOOD WIDTH(FEET) = 21.95
 FLOW VELOCITY(FEET/SEC.) = 3.64 DEPTH*VELOCITY(FT*FT/SEC.) = 2.17
 LONGEST FLOWPATH FROM NODE 360.00 TO NODE 362.00 = 1450.00 FEET.

 FLOW PROCESS FROM NODE 362.00 TO NODE 362.00 IS CODE = 81

 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====

MAINLINE Tc(MIN.) = 14.11
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.475
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 5.30 0.98 0.100 32
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE" A 13.60 0.98 0.500 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.388
 SUBAREA AREA(ACRES) = 18.90 SUBAREA RUNOFF(CFS) = 35.66
 EFFECTIVE AREA(ACRES) = 36.60 AREA-AVERAGED Fm(INCH/HR) = 0.29
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.29
 TOTAL AREA(ACRES) = 36.6 PEAK FLOW RATE(CFS) = 72.11

 FLOW PROCESS FROM NODE 362.00 TO NODE 363.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 825.00 DOWNSTREAM(FEET) = 810.00
 FLOW LENGTH(FEET) = 1550.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 31.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 9.98
 ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1

 FLOW PROCESS FROM NODE 351.00 TO NODE 352.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 2 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 832.00 DOWNSTREAM ELEVATION(FEET) = 825.00
 STREET LENGTH(FEET) = 1200.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 41.93
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.67
 HALFSTREET FLOOD WIDTH(FEET) = 26.19
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.06
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.06

STREET FLOW TRAVEL TIME(MIN.) = 6.53 Tc(MIN.) = 18.09
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.132

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	0.80	0.98	0.100	32
COMMERCIAL	A	21.80	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 22.60 SUBAREA RUNOFF(CFS) = 41.38
 EFFECTIVE AREA(ACRES) = 31.30 AREA-AVERAGED Fm(INCH/HR) = 0.10
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 31.3 PEAK FLOW RATE(CFS) = 57.31

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.74 HALFSTREET FLOOD WIDTH(FEET) = 32.62
 FLOW VELOCITY(FEET/SEC.) = 3.28 DEPTH*VELOCITY(FT*FT/SEC.) = 2.42
 *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
 AND L = 1200.0 FT WITH ELEVATION-DROP = 7.0 FT, IS 47.5 CFS,
 WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 352.00
 LONGEST FLOWPATH FROM NODE 350.00 TO NODE 352.00 = 2060.00 FEET.

 FLOW PROCESS FROM NODE 352.00 TO NODE 352.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 18.09
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.132
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	4.70	0.98	0.100	32
COMMERCIAL	A	14.50	0.98	0.100	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 19.20 SUBAREA RUNOFF(CFS) = 35.16
 EFFECTIVE AREA(ACRES) = 50.50 AREA-AVERAGED Fm(INCH/HR) = 0.10
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 50.5 PEAK FLOW RATE(CFS) = 92.47

 FLOW PROCESS FROM NODE 352.00 TO NODE 353.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 825.00 DOWNSTREAM(FEET) = 805.00
 FLOW LENGTH(FEET) = 1500.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 42.0 INCH PIPE IS 30.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 12.20
 ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 92.47
 PIPE TRAVEL TIME(MIN.) = 2.05 Tc(MIN.) = 20.14
 LONGEST FLOWPATH FROM NODE 350.00 TO NODE 353.00 = 3560.00 FEET.

 FLOW PROCESS FROM NODE 353.00 TO NODE 353.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 20.14
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.999
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	21.00	0.98	0.100	32
RESIDENTIAL "5-7 DWELLINGS/ACRE"	A	16.60	0.98	0.500	32
RESIDENTIAL "11+ DWELLINGS/ACRE"	A	12.40	0.98	0.200	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.258
 SUBAREA AREA(ACRES) = 50.00 SUBAREA RUNOFF(CFS) = 78.66
 EFFECTIVE AREA(ACRES) = 100.50 AREA-AVERAGED Fm(INCH/HR) = 0.17
 AREA-AVERAGED Fp(INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.18
 TOTAL AREA(ACRES) = 100.5 PEAK FLOW RATE(CFS) = 165.08

 FLOW PROCESS FROM NODE 353.00 TO NODE 354.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 805.00 DOWNSTREAM(FEET) = 775.00
 FLOW LENGTH(FEET) = 2560.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 54.0 INCH PIPE IS 38.8 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 13.48
 ESTIMATED PIPE DIAMETER (INCH) = 54.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 165.08
 PIPE TRAVEL TIME (MIN.) = 3.17 Tc (MIN.) = 23.31
 LONGEST FLOWPATH FROM NODE 350.00 TO NODE 354.00 = 6120.00 FEET.

1	395.42	23.31	1.831	0.98 (0.29)	0.30	274.0	350.00
2	395.37	23.32	1.831	0.97 (0.29)	0.30	274.0	360.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE (CFS) = 395.42 Tc (MIN.) = 23.31
 EFFECTIVE AREA (ACRES) = 273.96 AREA-AVERAGED Fm (INCH/HR) = 0.29
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.30
 TOTAL AREA (ACRES) = 274.0
 LONGEST FLOWPATH FROM NODE 360.00 TO NODE 354.00 = 6890.00 FEET.

 FLOW PROCESS FROM NODE 354.00 TO NODE 354.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 23.31
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.831
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 20.80 0.98 0.100 32
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE" A 50.70 0.98 0.500 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.384
 SUBAREA AREA (ACRES) = 71.50 SUBAREA RUNOFF (CFS) = 93.78
 EFFECTIVE AREA (ACRES) = 172.00 AREA-AVERAGED Fm (INCH/HR) = 0.26
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.26
 TOTAL AREA (ACRES) = 172.0 PEAK FLOW RATE (CFS) = 243.70

 FLOW PROCESS FROM NODE 354.00 TO NODE 345.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 775.00 DOWNSTREAM (FEET) = 770.00
 FLOW LENGTH (FEET) = 1350.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 90.0 INCH PIPE IS 69.8 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 10.76
 ESTIMATED PIPE DIAMETER (INCH) = 90.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 395.42
 PIPE TRAVEL TIME (MIN.) = 2.09 Tc (MIN.) = 25.40
 LONGEST FLOWPATH FROM NODE 360.00 TO NODE 345.00 = 8240.00 FEET.

 FLOW PROCESS FROM NODE 345.00 TO NODE 345.00 IS CODE = 11

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

 FLOW PROCESS FROM NODE 354.00 TO NODE 354.00 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.) = 23.31
 RAINFALL INTENSITY (INCH/HR) = 1.83
 AREA-AVERAGED Fm (INCH/HR) = 0.26
 AREA-AVERAGED Fp (INCH/HR) = 0.98
 AREA-AVERAGED Ap = 0.26
 EFFECTIVE STREAM AREA (ACRES) = 172.00
 TOTAL STREAM AREA (ACRES) = 172.00
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 243.70

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	395.42	25.40	1.739	0.98 (0.29)	0.30	274.0	350.00
2	395.37	25.41	1.739	0.97 (0.29)	0.30	274.0	360.00

LONGEST FLOWPATH FROM NODE 360.00 TO NODE 345.00 = 8240.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	488.75	22.21	1.885	0.98 (0.49)	0.50	376.4	340.00
2	485.06	22.57	1.867	0.98 (0.49)	0.50	378.8	320.00

LONGEST FLOWPATH FROM NODE 340.00 TO NODE 345.00 = 5310.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	869.32	22.21	1.885	0.98 (0.41)	0.42	616.0	340.00
2	867.41	22.57	1.867	0.98 (0.41)	0.42	622.3	320.00
3	835.51	25.40	1.739	0.98 (0.41)	0.42	652.8	350.00
4	835.34	25.41	1.739	0.98 (0.41)	0.42	652.8	360.00

TOTAL AREA (ACRES) = 652.8

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	151.73	23.32	1.831	0.97 (0.34)	0.35	102.0	360.00
2	243.70	23.31	1.831	0.98 (0.26)	0.26	172.0	350.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE (CFS) = 869.32 Tc (MIN.) = 22.212

EFFECTIVE AREA (ACRES) = 615.99 AREA-AVERAGED Fm (INCH/HR) = 0.41
 AREA-AVERAGED Fp (INCH/HR) = 0.98 AREA-AVERAGED Ap = 0.42
 TOTAL AREA (ACRES) = 652.8
 LONGEST FLOWPATH FROM NODE 360.00 TO NODE 345.00 = 8240.00 FEET.

 FLOW PROCESS FROM NODE 345.00 TO NODE 345.00 IS CODE = 71

>>>>PEAK FLOW RATE ESTIMATOR CHANGED TO UNIT-HYDROGRAPH METHOD<<<<<
 >>>>USING TIME-OF-CONCENTRATION OF LONGEST FLOWPATH<<<<<

UNIT-HYDROGRAPH DATA:
 RAINFALL (INCH): 5M= 0.38;30M= 0.79;1H= 1.04;3H= 1.87;6H= 2.71;24H= 5.30
 S-GRAPH: VALLEY (DEV.)=100.0%;VALLEY (UNDEV.)/DESERT= 0.0%
 MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT (UNDEV.)= 0.0%
 Tc (HR) = 0.42; LAG (HR) = 0.34; Fm (INCH/HR) = 0.41; Ybar = 0.44
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.97; 30M = 0.97; 1HR = 0.97;
 3HR = 1.00; 6HR = 1.00; 24HR= 1.00
 UNIT-INTERVAL (MIN) = 5.00 TOTAL AREA (ACRES) = 652.8
 LONGEST FLOWPATH FROM NODE 360.00 TO NODE 345.00 = 8240.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3,n=.0328; Lca/L=0.4,n=.0294; Lca/L=0.5,n=.0270;Lca/L=0.6,n=.0252
 TIME OF PEAK FLOW (HR) = 16.42 RUNOFF VOLUME (AF) = 169.70
 UNIT-HYDROGRAPH METHOD PEAK FLOW RATE (CFS) = 844.01
 TOTAL PEAK FLOW RATE (CFS) = 844.01 (SOURCE FLOW INCLUDED)
 RATIONAL METHOD PEAK FLOW RATE (CFS) = 869.32
 (UPSTREAM NODE PEAK FLOW RATE (CFS) = 869.32)
 PEAK FLOW RATE (CFS) USED = 869.32

 FLOW PROCESS FROM NODE 345.00 TO NODE 346.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 ELEVATION DATA: UPSTREAM (FEET) = 770.00 DOWNSTREAM (FEET) = 752.00
 FLOW LENGTH (FEET) = 2560.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 108.0 INCH PIPE IS 82.3 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 16.72
 ESTIMATED PIPE DIAMETER (INCH) = 108.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 869.32
 PIPE TRAVEL TIME (MIN.) = 2.55 Tc (MIN.) = 27.96
 LONGEST FLOWPATH FROM NODE 360.00 TO NODE 346.00 = 10800.00 FEET.

 FLOW PROCESS FROM NODE 346.00 TO NODE 346.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 MAINLINE Tc (MIN.) = 27.96
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.642
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	1.00	0.98	0.100	32

RESIDENTIAL
 "5-7 DWELLINGS/ACRE" A 70.00 0.98 0.500 32
 COMMERCIAL A 9.40 0.98 0.100 32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.448
 SUBAREA AREA (ACRES) = 80.40
 UNIT-HYDROGRAPH DATA:
 RAINFALL (INCH): 5M= 0.38;30M= 0.79;1H= 1.04;3H= 1.87;6H= 2.71;24H= 5.30
 S-GRAPH: VALLEY (DEV.)=100.0%;VALLEY (UNDEV.)/DESERT= 0.0%
 MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT (UNDEV.)= 0.0%
 Tc (HR) = 0.47; LAG (HR) = 0.37; Fm (INCH/HR) = 0.41; Ybar = 0.44
 USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
 DEPTH-AREA FACTORS: 5M = 0.97; 30M = 0.97; 1HR = 0.97;
 3HR = 1.00; 6HR = 1.00; 24HR= 1.00
 UNIT-INTERVAL (MIN) = 5.00 TOTAL AREA (ACRES) = 733.2
 LONGEST FLOWPATH FROM NODE 360.00 TO NODE 346.00 = 10800.00 FEET.
 EQUIVALENT BASIN FACTOR APPROXIMATIONS:
 Lca/L=0.3,n=.0291; Lca/L=0.4,n=.0261; Lca/L=0.5,n=.0240;Lca/L=0.6,n=.0224
 TIME OF PEAK FLOW (HR) = 16.42 RUNOFF VOLUME (AF) = 189.52
 UNIT-HYDROGRAPH PEAK FLOW RATE (CFS) = 882.28
 TOTAL AREA (ACRES) = 733.2 PEAK FLOW RATE (CFS) = 882.28

 FLOW PROCESS FROM NODE 346.00 TO NODE 347.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 ELEVATION DATA: UPSTREAM (FEET) = 752.00 DOWNSTREAM (FEET) = 740.00
 FLOW LENGTH (FEET) = 2530.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 114.0 INCH PIPE IS 92.7 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 14.29
 ESTIMATED PIPE DIAMETER (INCH) = 114.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 882.28
 PIPE TRAVEL TIME (MIN.) = 2.95 Tc (MIN.) = 30.91
 LONGEST FLOWPATH FROM NODE 360.00 TO NODE 347.00 = 13330.00 FEET.

 FLOW PROCESS FROM NODE 347.00 TO NODE 347.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 MAINLINE Tc (MIN.) = 30.91
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.546
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	2.80	0.98	0.100	32
RESIDENTIAL "5-7 DWELLINGS/ACRE"	A	144.30	0.98	0.500	32

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.492
 SUBAREA AREA (ACRES) = 147.10
 UNIT-HYDROGRAPH DATA:
 RAINFALL (INCH): 5M= 0.38;30M= 0.79;1H= 1.04;3H= 1.87;6H= 2.71;24H= 5.30
 S-GRAPH: VALLEY (DEV.)=100.0%;VALLEY (UNDEV.)/DESERT= 0.0%

MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
Tc(HR) = 0.52; LAG(HR) = 0.41; Fm(INCH/HR) = 0.42; Ybar = 0.45
USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC II CONDITION.
DEPTH-AREA FACTORS: 5M = 0.96; 30M = 0.96; 1HR = 0.96;
3HR = 0.99; 6HR = 1.00; 24HR= 1.00
UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 880.3
LONGEST FLOWPATH FROM NODE 360.00 TO NODE 347.00 = 13330.00 FEET.
EQUIVALENT BASIN FACTOR APPROXIMATIONS:
Lca/L=0.3,n=.0270; Lca/L=0.4,n=.0242; Lca/L=0.5,n=.0222;Lca/L=0.6,n=.0208
TIME OF PEAK FLOW(HR) = 16.50 RUNOFF VOLUME(AF) = 223.18
UNIT-HYDROGRAPH PEAK FLOW RATE(CFS) = 971.10
TOTAL AREA(ACRES) = 880.3 PEAK FLOW RATE(CFS) = 971.10

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END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 880.3 TC(MIN.) = 30.91
AREA-AVERAGED Fm(INCH/HR) = 0.42 Ybar = 0.45
PEAK FLOW RATE(CFS) = 971.10

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END OF INTEGRATED RATIONAL/UNIT-HYDROGRAPH METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
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***** DESCRIPTION OF STUDY *****
* ONTARIO MASTER PLAN OF DRAINAGE - BASIN IV (AREA G, H, I) *
* 10-YEAR HYDROLOGY ANALYSIS *
* P. PAGADUAN 8-29-2011 *

FILE NAME: OIVG10.DAT
TIME/DATE OF STUDY: 16:28 08/29/2011

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.80
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE (LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.9000

ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150
2	32.0	27.0	0.020/0.020/0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

UNIT-HYDROGRAPH MODEL SELECTIONS/PARAMETERS:
WATERSHED LAG = 0.80 * Tc
USED "VALLEY UNDEVELOPED" S-GRAPH FOR DEVELOPMENTS OF

2 UNITS/ACRE AND LESS; AND "VALLEY DEVELOPED" S-GRAPH
FOR DEVELOPMENTS OF 3-4 UNITS/ACRE AND MORE.
USER SPECIFIED RAINFALL VALUES:

2-YR 6-HR RAINFALL DEPTH(INCH) = 1.50
2-YR 24-HR RAINFALL DEPTH(INCH) = 2.70
100-YR 6-HR RAINFALL DEPTH(INCH) = 3.30
100-YR 24-HR RAINFALL DEPTH(INCH) = 7.00
SIERRA MADRE DEPTH-AREA FACTORS USED.

AREA-AVERAGED

DURATION	RAINFALL(INCH)
5-MINUTES	0.33
30-MINUTES	0.68
1-HOUR	0.90
3-HOUR	1.60
6-HOUR	2.31
24-HOUR	4.36

ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR UNIT HYDROGRAPH METHOD

FLOW PROCESS FROM NODE 320.10 TO NODE 320.20 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 750.00
ELEVATION DATA: UPSTREAM(FEET) = 820.00 DOWNSTREAM(FEET) = 815.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 11.698
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.400
SUBAREA Tc AND LOSS RATE DATA(AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 6.20 1.33 0.100 17 11.70
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 12.65
TOTAL AREA(ACRES) = 6.20 PEAK FLOW RATE(CFS) = 12.65

FLOW PROCESS FROM NODE 320.20 TO NODE 320.30 IS CODE = 91

>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<

UPSTREAM NODE ELEVATION(FEET) = 815.00
DOWNSTREAM NODE ELEVATION(FEET) = 814.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 250.00
"V" GUTTER WIDTH(FEET) = 5.00 GUTTER HIKE(FEET) = 0.800
PAVEMENT LIP(FEET) = 0.100 MANNING'S N = .0150
PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.10000
MAXIMUM DEPTH(FEET) = 3.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.293

SUBAREA LOSS RATE DATA(AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

PUBLIC PARK A 1.80 1.33 0.850 17
 COMMERCIAL A 9.90 1.33 0.100 17
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.215
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 23.21
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.51
 AVERAGE FLOW DEPTH (FEET) = 1.22 FLOOD WIDTH (FEET) = 11.43
 "V" GUTTER FLOW TRAVEL TIME (MIN.) = 0.92 Tc (MIN.) = 12.62
 SUBAREA AREA (ACRES) = 11.70 SUBAREA RUNOFF (CFS) = 21.14
 EFFECTIVE AREA (ACRES) = 17.90 AREA-AVERAGED Fm (INCH/HR) = 0.23
 AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.18
 TOTAL AREA (ACRES) = 17.9 PEAK FLOW RATE (CFS) = 33.19

END OF SUBAREA "V" GUTTER HYDRAULICS:
 DEPTH (FEET) = 1.37 FLOOD WIDTH (FEET) = 14.36
 FLOW VELOCITY (FEET/SEC.) = 4.72 DEPTH*VELOCITY (FT*FT/SEC) = 6.46
 LONGEST FLOWPATH FROM NODE 320.10 TO NODE 320.30 = 1000.00 FEET.

 FLOW PROCESS FROM NODE 320.30 TO NODE 320.40 IS CODE = 91

>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<

UPSTREAM NODE ELEVATION (FEET) = 814.00
 DOWNSTREAM NODE ELEVATION (FEET) = 810.00
 CHANNEL LENGTH THRU SUBAREA (FEET) = 900.00
 "V" GUTTER WIDTH (FEET) = 5.00 GUTTER HIKE (FEET) = 0.800
 PAVEMENT LIP (FEET) = 0.100 MANNING'S N = .0150
 PAVEMENT CROSSFALL (DECIMAL NOTATION) = 0.10000
 MAXIMUM DEPTH (FEET) = 3.00
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.028
 SUBAREA LOSS RATE DATA (AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	A	2.00	1.33	0.850	17
COMMERCIAL	A	17.90	1.33	0.100	17

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.175
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 49.23
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.21
 AVERAGE FLOW DEPTH (FEET) = 1.52 FLOOD WIDTH (FEET) = 17.40
 "V" GUTTER FLOW TRAVEL TIME (MIN.) = 2.88 Tc (MIN.) = 15.50
 SUBAREA AREA (ACRES) = 19.90 SUBAREA RUNOFF (CFS) = 32.14
 EFFECTIVE AREA (ACRES) = 37.80 AREA-AVERAGED Fm (INCH/HR) = 0.23
 AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.18
 TOTAL AREA (ACRES) = 37.8 PEAK FLOW RATE (CFS) = 61.05

END OF SUBAREA "V" GUTTER HYDRAULICS:
 DEPTH (FEET) = 1.62 FLOOD WIDTH (FEET) = 19.45
 FLOW VELOCITY (FEET/SEC.) = 5.39 DEPTH*VELOCITY (FT*FT/SEC) = 8.74
 LONGEST FLOWPATH FROM NODE 320.10 TO NODE 320.40 = 1900.00 FEET.

 FLOW PROCESS FROM NODE 320.00 TO NODE 321.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

 INITIAL SUBAREA FLOW-LENGTH (FEET) = 320.00
 ELEVATION DATA: UPSTREAM (FEET) = 820.00 DOWNSTREAM (FEET) = 818.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]** 0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 13.392
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.213
 SUBAREA Tc AND LOSS RATE DATA (AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
PUBLIC PARK	A	6.30	1.33	0.850	17	13.39

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
 SUBAREA RUNOFF (CFS) = 6.15
 TOTAL AREA (ACRES) = 6.30 PEAK FLOW RATE (CFS) = 6.15

 FLOW PROCESS FROM NODE 321.00 TO NODE 322.00 IS CODE = 91

>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<

UPSTREAM NODE ELEVATION (FEET) = 818.00
 DOWNSTREAM NODE ELEVATION (FEET) = 810.00
 CHANNEL LENGTH THRU SUBAREA (FEET) = 970.00
 "V" GUTTER WIDTH (FEET) = 5.00 GUTTER HIKE (FEET) = 0.800
 PAVEMENT LIP (FEET) = 0.100 MANNING'S N = .0150
 PAVEMENT CROSSFALL (DECIMAL NOTATION) = 0.10000
 MAXIMUM DEPTH (FEET) = 3.00
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.959
 SUBAREA LOSS RATE DATA (AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	A	19.80	1.33	0.850	17

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 13.30
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.35
 AVERAGE FLOW DEPTH (FEET) = 0.90 FLOOD WIDTH (FEET) = 5.00
 "V" GUTTER FLOW TRAVEL TIME (MIN.) = 3.02 Tc (MIN.) = 16.41
 SUBAREA AREA (ACRES) = 19.80 SUBAREA RUNOFF (CFS) = 14.79
 EFFECTIVE AREA (ACRES) = 26.10 AREA-AVERAGED Fm (INCH/HR) = 1.13
 AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.85
 TOTAL AREA (ACRES) = 26.1 PEAK FLOW RATE (CFS) = 19.50

END OF SUBAREA "V" GUTTER HYDRAULICS:
 DEPTH (FEET) = 1.02 FLOOD WIDTH (FEET) = 7.45
 FLOW VELOCITY (FEET/SEC.) = 5.98 DEPTH*VELOCITY (FT*FT/SEC) = 6.11
 LONGEST FLOWPATH FROM NODE 320.00 TO NODE 322.00 = 1290.00 FEET.

 FLOW PROCESS FROM NODE 322.00 TO NODE 323.00 IS CODE = 91

>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<

UPSTREAM NODE ELEVATION (FEET) = 810.00

DOWNSTREAM NODE ELEVATION (FEET) = 800.00
 CHANNEL LENGTH THRU SUBAREA (FEET) = 950.00
 "V" GUTTER WIDTH (FEET) = 5.00 GUTTER HIKE (FEET) = 0.800
 PAVEMENT LIP (FEET) = 0.100 MANNING'S N = .0150
 PAVEMENT CROSSFALL (DECIMAL NOTATION) = 0.10000
 MAXIMUM DEPTH (FEET) = 3.00
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.817
 SUBAREA LOSS RATE DATA (AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	A	2.30	1.33	0.850	17
PUBLIC PARK	A	41.30	1.33	0.850	17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 32.92
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.20
 AVERAGE FLOW DEPTH (FEET) = 1.17 FLOOD WIDTH (FEET) = 10.38
 "V" GUTTER FLOW TRAVEL TIME (MIN.) = 2.20 Tc (MIN.) = 18.61
 SUBAREA AREA (ACRES) = 43.60 SUBAREA RUNOFF (CFS) = 26.99
 EFFECTIVE AREA (ACRES) = 69.70 AREA-AVERAGED Fm (INCH/HR) = 1.13
 AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.85
 TOTAL AREA (ACRES) = 69.7 PEAK FLOW RATE (CFS) = 43.15

END OF SUBAREA "V" GUTTER HYDRAULICS:
 DEPTH (FEET) = 1.28 FLOOD WIDTH (FEET) = 12.52
 FLOW VELOCITY (FEET/SEC.) = 7.45 DEPTH*VELOCITY (FT*FT/SEC) = 9.51
 LONGEST FLOWPATH FROM NODE 320.00 TO NODE 323.00 = 2240.00 FEET.

 FLOW PROCESS FROM NODE 323.00 TO NODE 324.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM (FEET) = 800.00 DOWNSTREAM (FEET) = 778.00
 FLOW LENGTH (FEET) = 1650.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 22.1 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 10.19
 ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 43.15
 PIPE TRAVEL TIME (MIN.) = 2.70 Tc (MIN.) = 21.31
 LONGEST FLOWPATH FROM NODE 320.00 TO NODE 324.00 = 3890.00 FEET.

 FLOW PROCESS FROM NODE 324.00 TO NODE 324.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====
 MAINLINE Tc (MIN.) = 21.31
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.675
 SUBAREA LOSS RATE DATA (AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	A	3.80	1.33	0.850	17
PUBLIC PARK	A	78.00	1.33	0.850	17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
 SUBAREA AREA (ACRES) = 81.80 SUBAREA RUNOFF (CFS) = 40.21
 EFFECTIVE AREA (ACRES) = 151.50 AREA-AVERAGED Fm (INCH/HR) = 1.13
 AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.85
 TOTAL AREA (ACRES) = 151.5 PEAK FLOW RATE (CFS) = 74.47

 FLOW PROCESS FROM NODE 324.00 TO NODE 345.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM (FEET) = 778.00 DOWNSTREAM (FEET) = 770.00
 FLOW LENGTH (FEET) = 1340.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 45.0 INCH PIPE IS 33.1 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 8.55
 ESTIMATED PIPE DIAMETER (INCH) = 45.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 74.47
 PIPE TRAVEL TIME (MIN.) = 2.61 Tc (MIN.) = 23.92
 LONGEST FLOWPATH FROM NODE 320.00 TO NODE 345.00 = 5230.00 FEET.

 FLOW PROCESS FROM NODE 345.00 TO NODE 345.00 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.) = 23.92
 RAINFALL INTENSITY (INCH/HR) = 1.56
 AREA-AVERAGED Fm (INCH/HR) = 1.13
 AREA-AVERAGED Fp (INCH/HR) = 1.33
 AREA-AVERAGED Ap = 0.85
 EFFECTIVE STREAM AREA (ACRES) = 151.50
 TOTAL STREAM AREA (ACRES) = 151.50
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 74.47

 FLOW PROCESS FROM NODE 340.00 TO NODE 341.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 =====
 INITIAL SUBAREA FLOW-LENGTH (FEET) = 1000.00
 ELEVATION DATA: UPSTREAM (FEET) = 840.00 DOWNSTREAM (FEET) = 830.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 12.102
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.352
 SUBAREA Tc AND LOSS RATE DATA (AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	2.50	1.33	0.100	17	12.10

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF (CFS) = 4.99

TOTAL AREA (ACRES) = 2.50 PEAK FLOW RATE (CFS) = 4.99

 FLOW PROCESS FROM NODE 341.00 TO NODE 342.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 2 USED)<<<<<

=====

UPSTREAM ELEVATION (FEET) = 830.00 DOWNSTREAM ELEVATION (FEET) = 815.00
 STREET LENGTH (FEET) = 1030.00 CURB HEIGHT (INCHES) = 8.0
 STREET HALFWIDTH (FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 27.00
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSSTREETS 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) = 6.85
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH (FEET) = 0.36
 HALFSSTREET FLOOD WIDTH (FEET) = 10.09
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.84
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 1.02
 STREET FLOW TRAVEL TIME (MIN.) = 6.05 Tc (MIN.) = 18.16
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.844

SUBAREA LOSS RATE DATA (AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	2.40	1.33	0.100	17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 2.40 SUBAREA RUNOFF (CFS) = 3.70
 EFFECTIVE AREA (ACRES) = 4.90 AREA-AVERAGED Fm (INCH/HR) = 0.13
 AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.10
 TOTAL AREA (ACRES) = 4.9 PEAK FLOW RATE (CFS) = 7.55

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.37 HALFSSTREET FLOOD WIDTH (FEET) = 10.56
 FLOW VELOCITY (FEET/SEC.) = 2.89 DEPTH*VELOCITY (FT*FT/SEC.) = 1.07
 LONGEST FLOWPATH FROM NODE 340.00 TO NODE 342.00 = 2030.00 FEET.

 FLOW PROCESS FROM NODE 342.00 TO NODE 342.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 18.16
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.844
 SUBAREA LOSS RATE DATA (AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	7.90	1.33	0.100	17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 7.90 SUBAREA RUNOFF (CFS) = 12.17
 EFFECTIVE AREA (ACRES) = 12.80 AREA-AVERAGED Fm (INCH/HR) = 0.13
 AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.10
 TOTAL AREA (ACRES) = 12.8 PEAK FLOW RATE (CFS) = 19.71

 FLOW PROCESS FROM NODE 342.00 TO NODE 342.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 18.16
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.844
 SUBAREA LOSS RATE DATA (AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	15.70	1.33	0.100	17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 15.70 SUBAREA RUNOFF (CFS) = 24.18
 EFFECTIVE AREA (ACRES) = 28.50 AREA-AVERAGED Fm (INCH/HR) = 0.13
 AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.10
 TOTAL AREA (ACRES) = 28.5 PEAK FLOW RATE (CFS) = 43.89

 FLOW PROCESS FROM NODE 342.00 TO NODE 343.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 815.00 DOWNSTREAM (FEET) = 805.00
 FLOW LENGTH (FEET) = 700.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 21.8 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 10.52
 ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 43.89
 PIPE TRAVEL TIME (MIN.) = 1.11 Tc (MIN.) = 19.27
 LONGEST FLOWPATH FROM NODE 340.00 TO NODE 343.00 = 2730.00 FEET.

 FLOW PROCESS FROM NODE 343.00 TO NODE 343.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 19.27
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.779
 SUBAREA LOSS RATE DATA (AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	14.70	1.33	0.100	17
RESIDENTIAL "5-7 DWELLINGS/ACRE"	A	8.70	1.33	0.500	17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.249
 SUBAREA AREA (ACRES) = 23.40 SUBAREA RUNOFF (CFS) = 30.52

EFFECTIVE AREA (ACRES) = 51.90 AREA-AVERAGED Fm (INCH/HR) = 0.22
 AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.17
 TOTAL AREA (ACRES) = 51.9 PEAK FLOW RATE (CFS) = 72.75

 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc (MIN.) = 22.59
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.617
 SUBAREA LOSS RATE DATA (AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	22.80	1.33	0.100	17
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	32.90	1.33	0.500	17
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	A	54.70	1.33	0.200	17
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	A	2.70	1.33	0.200	17
COMMERCIAL	A	4.90	1.33	0.100	17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.260
 SUBAREA AREA (ACRES) = 118.00 SUBAREA RUNOFF (CFS) = 135.05
 EFFECTIVE AREA (ACRES) = 227.30 AREA-AVERAGED Fm (INCH/HR) = 0.36
 AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.27
 TOTAL AREA (ACRES) = 227.3 PEAK FLOW RATE (CFS) = 256.87

 FLOW PROCESS FROM NODE 345.00 TO NODE 345.00 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.) = 22.59
 RAINFALL INTENSITY (INCH/HR) = 1.62
 AREA-AVERAGED Fm (INCH/HR) = 0.36
 AREA-AVERAGED Fp (INCH/HR) = 1.33
 AREA-AVERAGED Ap = 0.27
 EFFECTIVE STREAM AREA (ACRES) = 227.30
 TOTAL STREAM AREA (ACRES) = 227.30
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 256.87

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	74.47	23.92	1.563	1.33 (1.13)	0.85	151.5	320.00
2	256.87	22.59	1.617	1.33 (0.36)	0.27	227.3	340.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	331.34	22.59	1.617	1.33 (0.66)	0.50	370.4	340.00
2	320.20	23.92	1.563	1.33 (0.67)	0.50	378.8	320.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

 FLOW PROCESS FROM NODE 343.00 TO NODE 344.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 805.00 DOWNSTREAM (FEET) = 798.00
 FLOW LENGTH (FEET) = 600.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 29.3 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 10.90
 ESTIMATED PIPE DIAMETER (INCH) = 39.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 72.75
 PIPE TRAVEL TIME (MIN.) = 0.92 Tc (MIN.) = 20.18
 LONGEST FLOWPATH FROM NODE 340.00 TO NODE 344.00 = 3330.00 FEET.

 FLOW PROCESS FROM NODE 344.00 TO NODE 344.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc (MIN.) = 20.18
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.730
 SUBAREA LOSS RATE DATA (AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	15.50	1.33	0.100	17
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	41.90	1.33	0.500	17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.392
 SUBAREA AREA (ACRES) = 57.40 SUBAREA RUNOFF (CFS) = 62.50
 EFFECTIVE AREA (ACRES) = 109.30 AREA-AVERAGED Fm (INCH/HR) = 0.38
 AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.29
 TOTAL AREA (ACRES) = 109.3 PEAK FLOW RATE (CFS) = 132.96

 FLOW PROCESS FROM NODE 344.00 TO NODE 345.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 798.00 DOWNSTREAM (FEET) = 770.00
 FLOW LENGTH (FEET) = 1980.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 48.0 INCH PIPE IS 34.6 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 13.70
 ESTIMATED PIPE DIAMETER (INCH) = 48.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 132.96
 PIPE TRAVEL TIME (MIN.) = 2.41 Tc (MIN.) = 22.59
 LONGEST FLOWPATH FROM NODE 340.00 TO NODE 345.00 = 5310.00 FEET.

 FLOW PROCESS FROM NODE 345.00 TO NODE 345.00 IS CODE = 81

```

PEAK FLOW RATE(CFS) = 331.34 Tc(MIN.) = 22.59
EFFECTIVE AREA(ACRES) = 370.39 AREA-AVERAGED Fm(INCH/HR) = 0.66
AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 378.8
LONGEST FLOWPATH FROM NODE 340.00 TO NODE 345.00 = 5310.00 FEET.

*****
FLOW PROCESS FROM NODE 345.00 TO NODE 345.00 IS CODE = 10
-----
>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<
=====
*****
FLOW PROCESS FROM NODE 360.00 TO NODE 361.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 950.00
ELEVATION DATA: UPSTREAM(FEET) = 840.00 DOWNSTREAM(FEET) = 830.00

Tc = K * [(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 11.736
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.396
SUBAREA Tc AND LOSS RATE DATA(AMC I ):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 1.40 1.33 0.100 17 11.74
RESIDENTIAL
"11+ DWELLINGS/ACRE" A 9.00 1.33 0.200 17 12.51
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.187
SUBAREA RUNOFF(CFS) = 20.10
TOTAL AREA(ACRES) = 10.40 PEAK FLOW RATE(CFS) = 20.10

*****
FLOW PROCESS FROM NODE 361.00 TO NODE 362.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 830.00 DOWNSTREAM ELEVATION(FEET) = 825.00
STREET LENGTH(FEET) = 500.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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) = 26.25
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.54
HALFSTREET FLOOD WIDTH(FEET) = 19.32
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.35
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.82
STREET FLOW TRAVEL TIME(MIN.) = 2.49 Tc(MIN.) = 14.23
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.135
SUBAREA LOSS RATE DATA(AMC I ):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" A 7.30 1.33 0.200 17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 12.28
EFFECTIVE AREA(ACRES) = 17.70 AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.19
TOTAL AREA(ACRES) = 17.7 PEAK FLOW RATE(CFS) = 29.94

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.56 HALFSTREET FLOOD WIDTH(FEET) = 20.32
FLOW VELOCITY(FEET/SEC.) = 3.47 DEPTH*VELOCITY(FT*FT/SEC.) = 1.96
LONGEST FLOWPATH FROM NODE 360.00 TO NODE 362.00 = 1450.00 FEET.

*****
FLOW PROCESS FROM NODE 362.00 TO NODE 362.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 14.23
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.135
SUBAREA LOSS RATE DATA(AMC I ):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 5.30 1.33 0.100 17
RESIDENTIAL
"5-7 DWELLINGS/ACRE" A 13.60 1.33 0.500 17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.388
SUBAREA AREA(ACRES) = 18.90 SUBAREA RUNOFF(CFS) = 27.55
EFFECTIVE AREA(ACRES) = 36.60 AREA-AVERAGED Fm(INCH/HR) = 0.39
AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.29
TOTAL AREA(ACRES) = 36.6 PEAK FLOW RATE(CFS) = 57.49

*****
FLOW PROCESS FROM NODE 362.00 TO NODE 363.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 825.00 DOWNSTREAM(FEET) = 810.00
FLOW LENGTH(FEET) = 1550.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 28.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.46
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 57.49
PIPE TRAVEL TIME(MIN.) = 2.73 Tc(MIN.) = 16.96

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LONGEST FLOWPATH FROM NODE 360.00 TO NODE 363.00 = 3000.00 FEET.

AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.35
TOTAL AREA (ACRES) = 102.0 PEAK FLOW RATE (CFS) = 113.26

FLOW PROCESS FROM NODE 363.00 TO NODE 363.00 IS CODE = 81

FLOW PROCESS FROM NODE 364.00 TO NODE 354.00 IS CODE = 31

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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

MAINLINE Tc (MIN.) = 16.96
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.921
SUBAREA LOSS RATE DATA (AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 7.40 1.33 0.100 17
RESIDENTIAL
"5-7 DWELLINGS/ACRE" A 16.00 1.33 0.500 17
RESIDENTIAL
"11+ DWELLINGS/ACRE" A 0.10 1.33 0.200 17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.373
SUBAREA AREA (ACRES) = 23.50 SUBAREA RUNOFF (CFS) = 30.16
EFFECTIVE AREA (ACRES) = 60.10 AREA-AVERAGED Fm (INCH/HR) = 0.43
AREA-AVERAGED Fp (INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.32
TOTAL AREA (ACRES) = 60.1 PEAK FLOW RATE (CFS) = 80.62

ELEVATION DATA: UPSTREAM (FEET) = 778.00 DOWNSTREAM (FEET) = 775.00
FLOW LENGTH (FEET) = 1330.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 63.0 INCH PIPE IS 46.7 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 6.59
ESTIMATED PIPE DIAMETER (INCH) = 63.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 113.26
PIPE TRAVEL TIME (MIN.) = 3.37 Tc (MIN.) = 24.08
LONGEST FLOWPATH FROM NODE 360.00 TO NODE 354.00 = 6890.00 FEET.

FLOW PROCESS FROM NODE 363.00 TO NODE 364.00 IS CODE = 31

FLOW PROCESS FROM NODE 354.00 TO NODE 354.00 IS CODE = 1

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

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 810.00 DOWNSTREAM (FEET) = 778.00
FLOW LENGTH (FEET) = 2560.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 31.2 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 11.34
ESTIMATED PIPE DIAMETER (INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 80.62
PIPE TRAVEL TIME (MIN.) = 3.76 Tc (MIN.) = 20.72
LONGEST FLOWPATH FROM NODE 360.00 TO NODE 364.00 = 5560.00 FEET.

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION (MIN.) = 24.08
RAINFALL INTENSITY (INCH/HR) = 1.56
AREA-AVERAGED Fm (INCH/HR) = 0.47
AREA-AVERAGED Fp (INCH/HR) = 1.33
AREA-AVERAGED Ap = 0.35
EFFECTIVE STREAM AREA (ACRES) = 102.00
TOTAL STREAM AREA (ACRES) = 102.00
PEAK FLOW RATE (CFS) AT CONFLUENCE = 113.26

FLOW PROCESS FROM NODE 364.00 TO NODE 364.00 IS CODE = 81

FLOW PROCESS FROM NODE 350.00 TO NODE 351.00 IS CODE = 21

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

MAINLINE Tc (MIN.) = 20.72
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.703
SUBAREA LOSS RATE DATA (AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 10.90 1.33 0.100 17
RESIDENTIAL
"5-7 DWELLINGS/ACRE" A 31.00 1.33 0.500 17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.396
SUBAREA AREA (ACRES) = 41.90 SUBAREA RUNOFF (CFS) = 44.41
EFFECTIVE AREA (ACRES) = 102.00 AREA-AVERAGED Fm (INCH/HR) = 0.47

INITIAL SUBAREA FLOW-LENGTH (FEET) = 860.00
ELEVATION DATA: UPSTREAM (FEET) = 840.00 DOWNSTREAM (FEET) = 832.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 11.560
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.417
SUBAREA Tc AND LOSS RATE DATA (AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 8.70 1.33 0.100 17 11.56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF (CFS) = 17.89
TOTAL AREA (ACRES) = 8.70 PEAK FLOW RATE (CFS) = 17.89

FLOW PROCESS FROM NODE 351.00 TO NODE 352.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 832.00 DOWNSTREAM ELEVATION(FEET) = 825.00
STREET LENGTH(FEET) = 1200.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 35.32
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.64
HALFSTREET FLOOD WIDTH(FEET) = 24.12
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.94
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.88

STREET FLOW TRAVEL TIME(MIN.) = 6.80 Tc(MIN.) = 18.36
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.831

SUBAREA LOSS RATE DATA(AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 0.80 1.33 0.100 17
COMMERCIAL A 21.80 1.33 0.100 17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 22.60 SUBAREA RUNOFF(CFS) = 34.55
EFFECTIVE AREA(ACRES) = 31.30 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 31.3 PEAK FLOW RATE(CFS) = 47.85

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.70 HALFSTREET FLOOD WIDTH(FEET) = 28.82
FLOW VELOCITY(FEET/SEC.) = 3.16 DEPTH*VELOCITY(FT*FT/SEC.) = 2.21
*NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
AND L = 1200.0 FT WITH ELEVATION-DROP = 7.0 FT, IS 40.2 CFS,
WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 352.00
LONGEST FLOWPATH FROM NODE 350.00 TO NODE 352.00 = 2060.00 FEET.

FLOW PROCESS FROM NODE 352.00 TO NODE 352.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 18.36
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.831
SUBAREA LOSS RATE DATA(AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

COMMERCIAL A 4.70 1.33 0.100 17
COMMERCIAL A 14.50 1.33 0.100 17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 19.20 SUBAREA RUNOFF(CFS) = 29.35
EFFECTIVE AREA(ACRES) = 50.50 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 50.5 PEAK FLOW RATE(CFS) = 77.20

FLOW PROCESS FROM NODE 352.00 TO NODE 353.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 825.00 DOWNSTREAM(FEET) = 805.00
FLOW LENGTH(FEET) = 1500.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 29.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.64
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 77.20
PIPE TRAVEL TIME(MIN.) = 2.15 Tc(MIN.) = 20.51
LONGEST FLOWPATH FROM NODE 350.00 TO NODE 353.00 = 3560.00 FEET.

FLOW PROCESS FROM NODE 353.00 TO NODE 353.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 20.51
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.714
SUBAREA LOSS RATE DATA(AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 21.00 1.33 0.100 17
RESIDENTIAL "5-7 DWELLINGS/ACRE" A 16.60 1.33 0.500 17
RESIDENTIAL "11+ DWELLINGS/ACRE" A 12.40 1.33 0.200 17
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.258
SUBAREA AREA(ACRES) = 50.00 SUBAREA RUNOFF(CFS) = 61.73
EFFECTIVE AREA(ACRES) = 100.50 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.18
TOTAL AREA(ACRES) = 100.5 PEAK FLOW RATE(CFS) = 133.58

FLOW PROCESS FROM NODE 353.00 TO NODE 354.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 805.00 DOWNSTREAM(FEET) = 775.00
FLOW LENGTH(FEET) = 2560.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 37.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.60

ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 133.58
 PIPE TRAVEL TIME(MIN.) = 3.39 Tc(MIN.) = 23.89
 LONGEST FLOWPATH FROM NODE 350.00 TO NODE 354.00 = 6120.00 FEET.

 FLOW PROCESS FROM NODE 354.00 TO NODE 354.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 23.89
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.564
 SUBAREA LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	20.80	1.33	0.100	17
RESIDENTIAL "5-7 DWELLINGS/ACRE"	A	50.70	1.33	0.500	17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 1.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.384
 SUBAREA AREA(ACRES) = 71.50 SUBAREA RUNOFF(CFS) = 67.84
 EFFECTIVE AREA(ACRES) = 172.00 AREA-AVERAGED Fm(INCH/HR) = 0.35
 AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.26
 TOTAL AREA(ACRES) = 172.0 PEAK FLOW RATE(CFS) = 187.84

 FLOW PROCESS FROM NODE 354.00 TO NODE 354.00 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.) = 23.89
 RAINFALL INTENSITY(INCH/HR) = 1.56
 AREA-AVERAGED Fm(INCH/HR) = 0.35
 AREA-AVERAGED Fp(INCH/HR) = 1.33
 AREA-AVERAGED Ap = 0.26
 EFFECTIVE STREAM AREA(ACRES) = 172.00
 TOTAL STREAM AREA(ACRES) = 172.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 187.84

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	113.26	24.08	1.556	1.33(0.47)	0.35	102.0	360.00
2	187.84	23.89	1.564	1.33(0.35)	0.26	172.0	350.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	300.98	23.89	1.564	1.33(0.39)	0.30	273.2	350.00
2	299.97	24.08	1.556	1.33(0.39)	0.30	274.0	360.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 300.98 Tc(MIN.) = 23.89
 EFFECTIVE AREA(ACRES) = 273.21 AREA-AVERAGED Fm(INCH/HR) = 0.39
 AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.30
 TOTAL AREA(ACRES) = 274.0
 LONGEST FLOWPATH FROM NODE 360.00 TO NODE 354.00 = 6890.00 FEET.

 FLOW PROCESS FROM NODE 354.00 TO NODE 345.00 IS CODE = 31

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

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ELEVATION DATA: UPSTREAM(FEET) = 775.00 DOWNSTREAM(FEET) = 770.00
 FLOW LENGTH(FEET) = 1350.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 81.0 INCH PIPE IS 63.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 10.04
 ESTIMATED PIPE DIAMETER(INCH) = 81.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 300.98
 PIPE TRAVEL TIME(MIN.) = 2.24 Tc(MIN.) = 26.14
 LONGEST FLOWPATH FROM NODE 360.00 TO NODE 345.00 = 8240.00 FEET.

 FLOW PROCESS FROM NODE 345.00 TO NODE 345.00 IS CODE = 11

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

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	300.98	26.14	1.482	1.33(0.39)	0.30	273.2	350.00
2	299.97	26.32	1.475	1.33(0.39)	0.30	274.0	360.00

LONGEST FLOWPATH FROM NODE 360.00 TO NODE 345.00 = 8240.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	331.34	22.59	1.617	1.33(0.66)	0.50	370.4	340.00
2	320.20	23.92	1.563	1.33(0.67)	0.50	378.8	320.00

LONGEST FLOWPATH FROM NODE 340.00 TO NODE 345.00 = 5310.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	623.90	22.59	1.617	1.33(0.56)	0.42	606.6	340.00
2	616.15	23.92	1.563	1.33(0.56)	0.42	628.8	320.00
3	592.21	26.14	1.482	1.33(0.55)	0.42	652.0	350.00
4	588.92	26.32	1.475	1.33(0.55)	0.42	652.8	360.00

TOTAL AREA(ACRES) = 652.8

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 623.90 Tc(MIN.) = 22.593
 EFFECTIVE AREA(ACRES) = 606.56 AREA-AVERAGED Fm(INCH/HR) = 0.56
 AREA-AVERAGED Fp(INCH/HR) = 1.33 AREA-AVERAGED Ap = 0.42

TOTAL AREA(ACRES) = 652.8
LONGEST FLOWPATH FROM NODE 360.00 TO NODE 345.00 = 8240.00 FEET.

FLOW PROCESS FROM NODE 345.00 TO NODE 345.00 IS CODE = 71

>>>>PEAK FLOW RATE ESTIMATOR CHANGED TO UNIT-HYDROGRAPH METHOD<<<<<
>>>>USING TIME-OF-CONCENTRATION OF LONGEST FLOWPATH<<<<<

UNIT-HYDROGRAPH DATA:

RAINFALL(INCH): 5M= 0.33;30M= 0.68;1H= 0.90;3H= 1.60;6H= 2.31;24H= 4.36

S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%

MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%

Tc(HR) = 0.44; LAG(HR) = 0.35; Fm(INCH/HR) = 0.55; Ybar = 0.45

USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC I CONDITION.

DEPTH-AREA FACTORS: 5M = 0.97; 30M = 0.97; 1HR = 0.97;

3HR = 1.00; 6HR = 1.00; 24HR= 1.00

UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 652.8

LONGEST FLOWPATH FROM NODE 360.00 TO NODE 345.00 = 8240.00 FEET.

EQUIVALENT BASIN FACTOR APPROXIMATIONS:

Lca/L=0.3,n=.0339; Lca/L=0.4,n=.0304; Lca/L=0.5,n=.0280;Lca/L=0.6,n=.0261

TIME OF PEAK FLOW(HR) = 16.42 RUNOFF VOLUME(AF) = 135.92

UNIT-HYDROGRAPH METHOD PEAK FLOW RATE(CFS) = 659.78

TOTAL PEAK FLOW RATE(CFS) = 659.78 (SOURCE FLOW INCLUDED)

RATIONAL METHOD PEAK FLOW RATE(CFS) = 623.90

(UPSTREAM NODE PEAK FLOW RATE(CFS) = 623.90)

PEAK FLOW RATE(CFS) USED = 659.78

FLOW PROCESS FROM NODE 345.00 TO NODE 346.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 770.00 DOWNSTREAM(FEET) = 752.00

FLOW LENGTH(FEET) = 2560.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 96.0 INCH PIPE IS 75.8 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 15.50

ESTIMATED PIPE DIAMETER(INCH) = 96.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 659.78

PIPE TRAVEL TIME(MIN.) = 2.75 Tc(MIN.) = 29.08

LONGEST FLOWPATH FROM NODE 360.00 TO NODE 346.00 = 10800.00 FEET.

FLOW PROCESS FROM NODE 346.00 TO NODE 346.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 29.08

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.390

SUBAREA LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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COMMERCIAL	A	1.00	1.33	0.100	17
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RESIDENTIAL					
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"5-7 DWELLINGS/ACRE"	A	70.00	1.33	0.500	17
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COMMERCIAL	A	9.40	1.33	0.100	17
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SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 1.33

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.448

SUBAREA AREA(ACRES) = 80.40

UNIT-HYDROGRAPH DATA:

RAINFALL(INCH): 5M= 0.33;30M= 0.68;1H= 0.90;3H= 1.60;6H= 2.31;24H= 4.36

S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%

MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%

Tc(HR) = 0.48; LAG(HR) = 0.39; Fm(INCH/HR) = 0.56; Ybar = 0.45

USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC I CONDITION.

DEPTH-AREA FACTORS: 5M = 0.97; 30M = 0.97; 1HR = 0.97;

3HR = 1.00; 6HR = 1.00; 24HR= 1.00

UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 733.2

LONGEST FLOWPATH FROM NODE 360.00 TO NODE 346.00 = 10800.00 FEET.

EQUIVALENT BASIN FACTOR APPROXIMATIONS:

Lca/L=0.3,n=.0303; Lca/L=0.4,n=.0271; Lca/L=0.5,n=.0249;Lca/L=0.6,n=.0233

TIME OF PEAK FLOW(HR) = 16.42 RUNOFF VOLUME(AF) = 151.76

UNIT-HYDROGRAPH PEAK FLOW RATE(CFS) = 673.62

TOTAL AREA(ACRES) = 733.2 PEAK FLOW RATE(CFS) = 673.62

FLOW PROCESS FROM NODE 346.00 TO NODE 347.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 752.00 DOWNSTREAM(FEET) = 740.00

FLOW LENGTH(FEET) = 2530.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 108.0 INCH PIPE IS 78.3 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 13.63

ESTIMATED PIPE DIAMETER(INCH) = 108.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 673.62

PIPE TRAVEL TIME(MIN.) = 3.09 Tc(MIN.) = 32.17

LONGEST FLOWPATH FROM NODE 360.00 TO NODE 347.00 = 13330.00 FEET.

FLOW PROCESS FROM NODE 347.00 TO NODE 347.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 32.17

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.308

SUBAREA LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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COMMERCIAL	A	2.80	1.33	0.100	17
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RESIDENTIAL					
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"5-7 DWELLINGS/ACRE"	A	144.30	1.33	0.500	17
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SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 1.33

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.492

* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

* IMPVIOUS AREA USED FOR RUNOFF ESTIMATES.

SUBAREA AREA(ACRES) = 147.10

UNIT-HYDROGRAPH DATA:

RAINFALL(INCH): 5M= 0.33;30M= 0.68;1H= 0.90;3H= 1.60;6H= 2.31;24H= 4.36

S-GRAPH: VALLEY(DEV.)=100.0%;VALLEY(UNDEV.)/DESERT= 0.0%

MOUNTAIN= 0.0%;FOOTHILL= 0.0%;DESERT(UNDEV.)= 0.0%
Tc(HR) = 0.54; LAG(HR) = 0.43; Fm(INCH/HR) = 0.57; Ybar = 0.46
USED SIERRA MADRE DEPTH-AREA CURVES WITH AMC I CONDITION.
DEPTH-AREA FACTORS: 5M = 0.96; 30M = 0.96; 1HR = 0.96;
3HR = 0.99; 6HR = 1.00; 24HR= 1.00
UNIT-INTERVAL(MIN) = 5.00 TOTAL AREA(ACRES) = 880.3
LONGEST FLOWPATH FROM NODE 360.00 TO NODE 347.00 = 13330.00 FEET.
EQUIVALENT BASIN FACTOR APPROXIMATIONS:
Lca/L=0.3,n=.0281; Lca/L=0.4,n=.0252; Lca/L=0.5,n=.0231;Lca/L=0.6,n=.0216
TIME OF PEAK FLOW(HR) = 16.50 RUNOFF VOLUME(AF) = 178.61
UNIT-HYDROGRAPH PEAK FLOW RATE(CFS) = 762.93
TOTAL AREA(ACRES) = 880.3 PEAK FLOW RATE(CFS) = 762.93

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END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 880.3 TC(MIN.) = 32.17
AREA-AVERAGED Fm(INCH/HR)= 0.57 Ybar = 0.46
PEAK FLOW RATE(CFS) = 762.93
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END OF INTEGRATED RATIONAL/UNIT-HYDROGRAPH METHOD ANALYSIS
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