Appendix K
Digital Files

Appendix L

100-Year Offsite Modified Ration Method Analyses

Backup Information for Offsite Hydrologic Analyses

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MEADOWOOD - OFFSITE ANALYSES

BACK UP INFO FOR OFFSITE DEV.
(REFER TO EXHIBIT TITLED "COMPOSITE LAND PLAN"

LAND USES	% IMP	SOIL TYPE TYPE "A"	TYPE "B"	TYPE "C"	TYPE "D
SF	65	0.66	0.67	0.69	0.71
PO	95	0.87	0.87	0.87	0.87
SC	95	0.87	0.87	0.87	0.87
TC	95	0.87	0.87	0.87	0.87
MF	80	0.76	0.77	0.78	0.79
CAMPUS PARK	0	0.20	0.25	0.30	0.35

* REFER TO ATTACHED EXHIBIT

$C = 0.9 \times (\% \text{ Imp.}) + C_p \times (1 - \% \text{ Imp.})$

SF - SINGLE FAMILY
PO - PROFESSIONAL OFFICE
SC - SPORTS COMPLEX
TC - TOWN CENTER
MF - MULTY FAMILY
HC - HIGHWAY COMMERCIAL

LI	90%	0.83	0.84	0.84	0.85
SLOPES (LANDSCAPED AREAS)	0%	0.20	0.25	0.30	0.35
HC	90%	0.83	0.84	0.84	0.85

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MEADOWOOD
POST PROJECT
BASIN 11000

11000 – 11005

CAMPUS PARK 0% TYPE C SOIL C = 0.30

C = 0.30

11005 – 11010

CAMP. PARK	0%	TYPE C SOIL	C = 0.30	A_1 = 3.6 ac
– " –		TYPE B SOIL	C = 0.25	A_2 = 1 ac
SF	65%	TYPE C SOIL	C = 0.69	A_3 = 2.2 ac
				A_{TOTAL} = 6.8 ac

$$C = \frac{0.3 \times 3.6 + 0.25 \times 1 + 0.69 \times 2.2}{6.8} = 0.42$$

11015 – 11020

CAMP. PARK 0% TYPE C SOIL C = 0.30 C = 0.3

11020 – 11010

SF = 65%	TYPE C SOIL	C = 0.69	A_1 = 1.5 ac
CAMP. PARK = 0%	– " –	C = 0.30	A_2 = 5.5 ac
			A_{TOTAL} = 7.0 ac

$$C = \frac{0.69 \times 1.5 + 0.3 \times 5.5}{7.0} = 0.38$$

11010 – 11025

CAMP PARK	C SOIL	C = 0.30	A_1 = 0.8 ac
SF = 65%	C SOIL	C = 0.69	A_2 = 3.2 ac
SF = 65%	B SOIL	C = 0.67	A_3 = 2.8 ac
			A_{TOTAL} = 6.8 ac

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$$C = \frac{0.30 \times 0.8 + 0.69 \times 3.2 + 0.67 \times 2.8}{6.8} = 0.64$$

11030 - 11035

CAMP. PARK = 0% TYPE C SOIL C = 0.30

C = 0.30

11035 - 11040

CAMP PARK = 0% C SOIL C = 0.30 A_1 = 2.9 ac
SF = 65% C SOIL C = 0.69 A_2 = 1.5 ac
A_{TOTAL} = 4.4 ac

$$C = \frac{0.3 \times 2.9 + 0.69 \times 1.5}{4.4} = 0.43$$

11040 - 11025

SF = 65% C SOIL C = 0.69 A_1 = 2.1 ac
— " — B SOIL C = 0.67 A_2 = 1.8 ac
A_T = 3.9 ac

$$C = \frac{0.69 \times 2.1 + 0.67 \times 1.8}{3.9} = 0.68$$

11045 - 11046

IMP 95% C = 0.87

11046 - 11047 SAME AS 11045 - 11046 C = 0.87

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11027-11026

LANDSC.
SLOPE (IMP) = 0 % TYPE B C = 0.25 A_1 = 0.1ac
PAVEMENT (95%) IMP -"- B C = 0.87 A_2 = 0.3ac
A TOTAL = 0.4ac

$$C = \frac{0.25 \times 0.1 + 0.87 \times 0.3}{0.4} = 0.72$$

11026-11030

LANDS.
SLOPE = 0% TYPE B C = 0.25 A_1 = 0.3ac
PAVEMENT (95%) TYPE B C = 0.87 A_2 = 0.5ac
A TOTAL = 0.8ac

$$C = \frac{0.25 \times 0.3 + 0.87 \times 0.5}{0.8} = 0.64$$

11031-11032

95% B SOIL TYPE C = 0.87

C = 0.87

11032-11033

LANDSC.
SLOPE = 0% TYPE B C = 0.25 A_1 = 0.6 ac
PAVEM. = 95% TYPE B C = Cp = 0.87 A_2 = 0.8 ac
A TOTAL = 1.4 ac

$$C = \frac{0.24 \times 0.6 + 0.87 \times 0.8}{1.4} = 0.60$$

11060-11065

SF = 65% TYPE B SOIL C = 0.67

C = 0.67

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BASIN 11000

11065-11070

SF = 65% TYPE B SOIL C = 0.67 A_1 = 0.2 ac
PO = 95% — " — C = 0.87 A_2 = 3.6 ac
A_{TOTAL} = 3.8 ac

$$C_p = \frac{0.67 \times 0.2 + 0.87 \times 3.6}{3.8} = 0.86$$

1051-1052

95% C = 0.87

11052-11055

SLOPE = 0% TYPE B SOIL C = 0.25 A_1 = 0.7 ac
PAV. = 95% B — " — C = 0.87 A_2 = 0.2 ac
A_T = 0.9 ac

$$C = \frac{0.25 \times 0.7 + 0.87 \times 0.2}{0.9} = 0.39$$

11085-11090

SF = 65% TYPE B C = 0.67

11090-11095

SF = 65% B SOIL C = 0.67 A_1 = 0.4 ac
PO = 95% B SOIL C = 0.87 A_2 = 0.3 ac
A_T = 0.7 ac

$$C = \frac{0.67 \times 0.4 + 0.87 \times 0.3}{0.7} = 0.76$$

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BASIN 11000

11095-11100

PO = 95%	B SOIL	C = 0.87	A_1 = 3.2 ac
SC = 95%	B -"-	C = 0.87	A_2 = 0.1 ac
SF = 65%	-"-	C = 0.67	A_3 = 0.6 ac
			A_T = 3.9 ac

$$C = \frac{0.87 \times 3.2 + 0.87 \times 0.1 + 0.67 \times 0.6}{3.9} = 0.84$$

11110-11115

95% C = 0.87

11115-11120

LANDSCAPE SLOPE = 0%	B SOIL	C = 0.25	A_1 = 1.0 ac
PAV. = 95%	B SOIL	C = 0.87	A_2 = 1.0 ac
			A_T = 2.0 ac

$$C = \frac{0.25 \times 1.0 + 0.87 \times 1.0}{2.0} = 0.56$$

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MEADOWOOD

POST PROJECT
BASIN 14000

1000 – 14010

SF (imp %) = 65 SOIL TYPE B SF C=0.67 A_1 = 8.5ac
SC (imp %) = 95 SOIL TYPE B SC C=0.87 A_2 = 1.9ac
SOIL TYPE C SF C=0.87 A_3 = 1.1ac

$$C = \frac{0.67 \times A_1 + 0.87 \times A_2 + 0.87 \times A_3}{\underbrace{A_1 + A_2 + A_3}_{11.5ac}} = \frac{0.67 \times 8.5 + 0.87 \times 1.9 + 0.87 \times 1.1}{11.5}$$

$\boxed{C = 0.72}$

14000 – 14005

SOIL TYPE C SF(imp) = 65 C = 0.69

C = 0.69

$\boxed{C = 0.69}$

14005 – 14010

SF(imp %) = 65 TYPE B SOIL C = 0.67 A_1 = 7.20ac

PO(imp %) = 95 TYPE B SOIL C = 0.87 A_2 = 0.8 ac

SC(imp %) = 95 TYPE B SOIL C = 0.87 A_3 = 3.1ac

$$C = \frac{0.67 \times A_1 + 0.87 \times A_2 + 0.87 \times A_3}{\underbrace{A_1 + A_2 + A_3}_{11.1ac}} = 0.74$$

$\boxed{C = 0.85}$

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14010 – 14015

SC (IMP %) = 95 SOILS TYPE B C = 0.87 A_1 = 1.1

SF (IMP %) = 65 SOILS TYPE B C = 0.67 A_2 = 0.2

$$C = \frac{0.87 \times A_1 + 0.67 \times A_2}{1.3} = 0.84$$

$\boxed{C = 0.84}$

14017 - 14018

C = 0.84

14020 - 14025

SF (IMP %) = 0.65 TYPE B C = 0.67 A_1 = 0.1

SC = 0.95 – " – C = 0.87 A_2 = 0.1

$$C = \frac{0.67 \times 0.1 + 0.87 \times 0.1}{0.2} = 0.77 \qquad C = 0.77$$

14025 - 14030

TYPE B SC = 0.95 C = 0.87

C = 87

14035 - 14040

C = 0.66 SEE SHT. 3 of 3

14040 - 14019

C = 0.66 SEE SHT. 3 of 3

14017.5 - 14018

PAV. = 95% BSOIL C = 0.87 A_1 = 1ac
LANDSCAPE = 0% BSOIL C = 0.25 A_2 = 1.4

$$C = \frac{0.87 \times 1.0 + 0.25 \times 1.4}{2A} = 0.51$$

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DRAINAGE BASIN 14000

14035-14040

pavement	95%	B SOIL TYPE	C = 0.87	$A_1 = 0.2$
landscape	0%	-11-	C = 0.25	$A_2 = 0.1$ ac
slope		C = 0.66		

14040 – 14019

pavement	= 95%	B SOIL TYPE	C = 0.87	$A_1 = 1.0$ ac
landscape slope	0%	B SOIL TYPE	C = 0.25	$A_2 = 0.5$ ac

$$C = \frac{0.87 \times 1 + 0.25 \times 0.5}{1.5} = 0.66$$

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MEADOWOOD

POST PROJECT
BASIN 15000

2000 - 15021

SF = 65% SOIL TYPE "C" C = 0.69 $A_1 = 0.6$ ac

SF = 65% SOIL TYPE "B" C = 0.67 $A_2 = 5.9$ ac

$$C = \frac{0.83 \times A_1 + 0.82 \times A_2}{\underbrace{A_1 + A_2}_{6.5}} = \frac{0.69 \times 0.6 + 0.67 \times 5.9}{6.5} = 0.67$$

$\boxed{C = 0.67}$

15021 - 15020

SF = 65% SOIL TYPE B C = 0.67 $A_1 = 6.8$ ac

MF = 80% SOIL TYPE B C = 0.77 $A_2 = 0.2$

$A_{TOTAL} = 7.0$ ac

$$C = \frac{0.67 \times 6.8 + 0.77 \times 0.2}{7.0} = 0.67$$

$\boxed{C = 0.82}$

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15000 - 15005

SOIL TYPE C ONLY

SF = 65% C = 0.69 A = 0.2 ac

C = 0.69

$\boxed{C = 0.69}$

15005 - 15010

SF = 65% TYPE "C" SOIL C = 0.69 A_1 = 2 ac

SF = 65% TYPE "B" SOIL C = 0.67 A_2 = 4.8 ac

A_{TOTAL} = 6.8 ac

$$C = \frac{0.69 \times 2 + 0.67 \times 4.8}{6.8} = 0.68$$

$\boxed{C = 0.68}$

15010 - 15015

SF = 65% TYPE "B" SOIL ONLY C = 0.67

15015 - 15020

SF = 65 TYPE "B" SOIL C = 0.67 A_1 = 4.8 ac

SC = 95 TYPE "B" SOIL C = 0.87 A_2 = 0.3 ac

A_{TOTAL} = 5.1 ac

$$C = \frac{0.67 \times 4.8 + 0.87 \times 0.3}{5.1} = 0.68$$

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15020-15025

TC = 95% TYPE "B" SOIL C = 0.87 $A_1 = 0.9$ ac

MF = 80% TYPE "B" SOIL C = 0.77 $A_2 = 0.3$ ac

SC = 95% TYPE "B" SOIL C = 0.87 $A_3 = 0.2$ ac

$A_{TOTAL} = 1.4$ ac

$$C = \frac{0.87 \times 0.9 + 0.77 \times 0.3 + 0.87 \times 0.2}{1.4} = 0.85$$

$\boxed{C = 0.85}$

15025-15030

SF = 65% TYPE "B" SOIL C = 0.67 $A_1 = 0.8$ ac

MF = 80% TYPE "B" SOIL C = 0.77 $A_2 = 5.8$ ac

SF = 65% — " — C = 0.67 $A_3 = 0.2$ ac

TC = 95% — " — C = 0.87 $A_4 = 2.7$ ac

$A_{TOTAL} = 9.5$ ac

$$C = \frac{0.67 \times 0.8 + 0.77 \times 5.8 + 0.67 \times 0.2 + 0.87 \times 2.7}{9.5} = 0.79$$

$\boxed{C = 0.79}$

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15030 - 15060

MF = 80% TYPE "B" SOIL C=0.77 A_1 = 0.1 ac

TC = 95% TYPE "B" SOIL C=0.87 A_2 = 2.0 ac

A_{TOTAL} = 2.1 ac

$$C = \frac{0.77 \times 0.1 + 0.87 \times 2.0}{2.1} = 0.87$$

15035 - 15040

MF = 80% TYPE "B" SOIL C = 0.77

C = 0.77

15040 - 15045

SF = 65% TYPE "B" SOIL C = 0.67 A_1 = 0.4 ac

MF = 80% - " - C = 0.77 A_2 = 1.8 ac

A_{TOTAL} = 2.2 ac

$$C = \frac{0.67 \times 0.4 + 0.77 \times 1.8}{2.2} = 0.75$$

15045 - 15050

MF = 80% TYPE "B" SOIL C = 0.77

C = 0.77

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15050 - 15060

MF = 80% TYPE "B" SOIL C = 0.77 A_1 = 1.6 ac

TC = 95% TYPE "B" SOIL C = 0.87 A_2 = 2.6

A_{TOTAL} = 4.2 ac

$$C = \frac{0.77 \times 1.6 + 0.87 \times 2.6}{4.2} = 0.83$$

15051 - 15052

C = 0.87

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MEADOWOOD

POST PROJECT
BASIN 16000

3000 - 16000

SF(IMP %) = 65
MF(IMP %) = 80

SOIL TYPE "B" SF $C = 0.67$ $A_1 = 4.2ac$
SOIL TYPE "D" SF $C = 0.71$ $A_2 = 2.2ac$
— " — MF $C = 0.79$ $A_3 = 1.2ac$

$$C = \frac{0.67 \times A_1 + 0.71 \times A_2 + 0.79 \times A_3}{A_1 + A_2 + A_3} = \frac{0.67 \times 4.2 + 0.71 \times 2.2 + 0.79 \times 1.}{7.6}$$

$(A_1 + A_2 + A_3 = 7.6)$

$\boxed{C = 0.7}$

4000 - 16000

SOIL TYPE "B" ONLY MF $C = 0.77$
MF(IMP %) = 80

$\boxed{C = 0.77}$

16000 - 16005

SOIL TYPE "B" ONLY MF = 80% IMP. $C = 0.77$

$\boxed{C = 0.77}$

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MEADOWOOD
POST PROJECT
BASIN 16000

16010-16015

SOIL TYPE "B" ONLY MF C=0.77 MF(Y.IMP) = 0.80

$\boxed{C = 0.77}$

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MEADOWOOD

DRAINAGE BASIN 17000

17000 – 17005

CAMPUS PARK = 0% SOIL TYPE B C = 0.25

C = 0.25

17005 – 17010

CAMPUS PARK = 0% SOIL TYPE B C = 0.25 A_1 = 1.6ac

LANDSCAPED SLOPE = 0% – " – C = 0.25 A_2 = 0.3ac

A_T = 1.9ac

$$C = \frac{0.25(1.6+0.3)}{1.9} = 0.25$$

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MEADOWOOD
DRAINAGE BASIN 18000

18000 – 18005

PAVEMENT = 0.95% TYPE B SOIL C = 0.87

C = 0.87

18000 – 18005

C = 0.87 SAME AS 18000 – 18005

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MEADOWOOD
DRAINAGE BASIN – 19000
POST PROJEC – OFF SITE IMROVEMENTS
19000 – 19005
pavement = 95% BTYPE SOIL C=0.87

19005 – 19010

PAVEM. = 95% SOIL TYPE B C=0.87 A_1 = 1.0 ac

LANDSCAPED SLOPE = 0% SOIL TYPE B C=0.25 A_2 = 0.1 ac
$A_{TOT.}$ = 1.0 ac

$$C = \frac{0.87 \times 1.0 + 0.25 \times 0.1}{1.1} = 0.814$$

19015 – 19020

LI = 90% TYPE B SOIL C = 0.84

19020 – 19025

LANDSC. SLOPE = 0% B SOIL TYPE C=0.25 A_1 = 0.2 ac

LI = 90% –"– C=0.84 A_2 = 3.6 ac
A_T = 3.8 ac

$$C = \frac{0.25 \times 0.2 + 0.84 \times 3.6}{3.8} = 0.81$$

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MEADOWOOD - OFF SITE IMPROVEMENTS
POST PROJECT
DRAINAGE BASIN 20000

20000 - 20005

PAVEMENT = 95% TYPE B SOIL C = 0.87

C = 0.87

20005 - 20010

PAVEMENT = 95% TYPE B C = 0.87 A_1 = 1.1ac

LANDSCAPED SLOPES = 0% TYPE B C_p = 0.25 A_2 = 0.1ac

$$C = \frac{0.87 \times 1.1 + 0.25 \times 0.1}{1.2} = 0.82$$

20020 - 20025

PAVEMENT = 0.95% TYPE B SOIL C = 0.87

20025 - 20030

PAVEMENT = 0.95% B SOIL C = 0.87

20046 - 20047

HC = 90% B SOIL C = 0.84 A_1 = 0.1ac
LANDSC. AREA = 0% B SOIL C = 0.25 A_2 = 0.1ac

$$C = \frac{0.84 \cdot 0.1 + 0.25 \cdot 0.1}{0.2} = 0.55$$

20047 - 20048

LANDSC. = 0% TYPE B C = 0.25 A_1 = 0.3ac
HC = 90% — " — C = 0.84 A_2 = 0.9ac

$$C = \frac{0.25 \times 0.3 + 0.84 \times 0.9}{} = 0.69$$

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MEADOWOOD - OFF SITE IMPROVEMENTS
POST PROJECT
DRAINAGE BASIN 21000

21000 - 21005

HC = 90% → C = 0.84 ← TYPE B SOIL

C = 0.84

21005 - 21010

LANDSCAPED SLOPES = 0% B SOIL C = 0.25 A_1 = 1.2ac

HC = 90% B SOIL Cp = 0.84 A_2 = 8.0ac
A_T = 9.2

$$C = \frac{0.25 \times 1.2 + 0.84 \times 8.0}{9.2} = 0.76$$

Drainage Basin 11000

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                          2003,1985,1981 HYDROLOGY MANUAL
         (c) Copyright 1982-2003 Advanced Engineering Software (aes)
             Ver. 1.5A Release Date: 01/01/2003  License ID 1261

                          Analysis prepared by:

 ************************** DESCRIPTION OF STUDY **************************
* Meadowood J-15956 8-5-09                                                 *
* Drainage Basin 11000 Off Site Improvements,                              *
* 100-6 hours storm event, ST                                              *
 ****************************************************************************

  FILE NAME: MW11000.DAT
  TIME/DATE OF STUDY: 14:38 08/13/2009
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.600
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  ========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0   0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

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

****************************************************************************
  FLOW PROCESS FROM NODE  11000.00 TO NODE  11005.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    870.00
  DOWNSTREAM ELEVATION(FEET) =    824.70
  ELEVATION DIFFERENCE(FEET) =     45.30
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.684
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.865
  SUBAREA RUNOFF(CFS) =      0.47
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.47

****************************************************************************
  FLOW PROCESS FROM NODE  11005.00 TO NODE  11010.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
```

```
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==========================================================================
ELEVATION DATA: UPSTREAM(FEET) =    824.70  DOWNSTREAM(FEET) =    485.75
CHANNEL LENGTH THRU SUBAREA(FEET) =  1135.63   CHANNEL SLOPE =  0.2985
CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =   2.000
MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.213
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .4200
S.C.S. CURVE NUMBER (AMC II) =   0
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      8.04
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.18
AVERAGE FLOW DEPTH(FEET) =   0.05   TRAVEL TIME(MIN.) =   5.96
Tc(MIN.) =  12.65
SUBAREA AREA(ACRES) =     6.80       SUBAREA RUNOFF(CFS) =   14.89
AREA-AVERAGE RUNOFF COEFFICIENT =  0.417
TOTAL AREA(ACRES) =      7.00         PEAK FLOW RATE(CFS) =      15.20

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   4.13
LONGEST FLOWPATH FROM NODE  11000.00 TO NODE  11010.00 =  1235.63 FEET.

****************************************************************************
FLOW PROCESS FROM NODE  11010.00 TO NODE  11010.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==========================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =  12.65
RAINFALL INTENSITY(INCH/HR) =   5.21
TOTAL STREAM AREA(ACRES) =     7.00
PEAK FLOW RATE(CFS) AT CONFLUENCE =     15.20

****************************************************************************
FLOW PROCESS FROM NODE  11015.00 TO NODE  11020.00 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .3000
S.C.S. CURVE NUMBER (AMC II) =   0
INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
UPSTREAM ELEVATION(FEET) =    858.67
DOWNSTREAM ELEVATION(FEET) =    804.29
ELEVATION DIFFERENCE(FEET) =     54.38
SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.684
WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.865
SUBAREA RUNOFF(CFS) =      0.47
TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.47

****************************************************************************
FLOW PROCESS FROM NODE  11020.00 TO NODE  11010.00 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==========================================================================
ELEVATION DATA: UPSTREAM(FEET) =    804.29  DOWNSTREAM(FEET) =    485.75
CHANNEL LENGTH THRU SUBAREA(FEET) =   944.95   CHANNEL SLOPE =  0.3371
CHANNEL BASE(FEET) =   35.00   "Z" FACTOR =   2.000
MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.702
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .3800
S.C.S. CURVE NUMBER (AMC II) =   0
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      8.18
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.64
AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   4.32
Tc(MIN.) =  11.01
SUBAREA AREA(ACRES) =     7.00       SUBAREA RUNOFF(CFS) =   15.17
```

```
AREA-AVERAGE RUNOFF COEFFICIENT =  0.378
TOTAL AREA(ACRES) =      7.20          PEAK FLOW RATE(CFS) =      15.51

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.09  FLOW VELOCITY(FEET/SEC.) =   4.97
LONGEST FLOWPATH FROM NODE  11015.00 TO NODE  11010.00 =  1044.95 FEET.

****************************************************************************
FLOW PROCESS FROM NODE  11010.00 TO NODE  11010.00 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.) =  11.01
RAINFALL INTENSITY(INCH/HR) =   5.70
TOTAL STREAM AREA(ACRES) =     7.20
PEAK FLOW RATE(CFS) AT CONFLUENCE =     15.51

** CONFLUENCE DATA **
STREAM     RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1       15.20    12.65        5.213         7.00
    2       15.51    11.01        5.702         7.20

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

** PEAK FLOW RATE TABLE **
STREAM     RUNOFF      Tc      INTENSITY
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1       28.74    11.01       5.702
    2       29.38    12.65       5.213

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =     29.38   Tc(MIN.) =   12.65
TOTAL AREA(ACRES) =     14.20
LONGEST FLOWPATH FROM NODE  11000.00 TO NODE  11010.00 =  1235.63 FEET.

****************************************************************************
FLOW PROCESS FROM NODE  11010.00 TO NODE  11025.00 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    485.75 DOWNSTREAM(FEET) =    419.18
CHANNEL LENGTH THRU SUBAREA(FEET) =   913.18   CHANNEL SLOPE =  0.0729
CHANNEL BASE(FEET) =   40.00   "Z" FACTOR =  16.500
MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.395
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .6400
S.C.S. CURVE NUMBER (AMC II) =   0
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     38.91
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.97
AVERAGE FLOW DEPTH(FEET) =   0.22   TRAVEL TIME(MIN.) =   3.83
Tc(MIN.) =  16.48
SUBAREA AREA(ACRES) =     6.80       SUBAREA RUNOFF(CFS) =   19.13
AREA-AVERAGE RUNOFF COEFFICIENT =  0.476
TOTAL AREA(ACRES) =     21.00          PEAK FLOW RATE(CFS) =      43.90

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.24   FLOW VELOCITY(FEET/SEC.) =   4.17
LONGEST FLOWPATH FROM NODE  11000.00 TO NODE  11025.00 =  2148.81 FEET.

****************************************************************************
FLOW PROCESS FROM NODE  11025.00 TO NODE  11025.00 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.) =  16.48
  RAINFALL INTENSITY(INCH/HR) =   4.40
  TOTAL STREAM AREA(ACRES) =    21.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     43.90

****************************************************************************
  FLOW PROCESS FROM NODE  11030.00 TO NODE  11035.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    804.13
  DOWNSTREAM ELEVATION(FEET) =    753.88
  ELEVATION DIFFERENCE(FEET) =     50.25
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.684
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.865
  SUBAREA RUNOFF(CFS) =      0.47
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.47

****************************************************************************
  FLOW PROCESS FROM NODE  11035.00 TO NODE  11040.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    753.88  DOWNSTREAM(FEET) =    494.97
  CHANNEL LENGTH THRU SUBAREA(FEET) =   603.04   CHANNEL SLOPE =  0.4293
  CHANNEL BASE(FEET) =  100.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.652
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4300
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      5.79
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.25
  AVERAGE FLOW DEPTH(FEET) =   0.03   TRAVEL TIME(MIN.) =   4.47
  Tc(MIN.) =  11.16
  SUBAREA AREA(ACRES) =     4.40       SUBAREA RUNOFF(CFS) =   10.69
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.424
  TOTAL AREA(ACRES) =      4.60         PEAK FLOW RATE(CFS) =      11.03

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.04   FLOW VELOCITY(FEET/SEC.) =   3.12
  LONGEST FLOWPATH FROM NODE  11030.00 TO NODE  11040.00 =   703.04 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE  11040.00 TO NODE  11025.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    494.97  DOWNSTREAM(FEET) =    419.18
  CHANNEL LENGTH THRU SUBAREA(FEET) =   927.78   CHANNEL SLOPE =  0.0817
  CHANNEL BASE(FEET) =    2.50   "Z" FACTOR =   1.250
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.075
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6800
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     17.74
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.63
  AVERAGE FLOW DEPTH(FEET) =   0.69   TRAVEL TIME(MIN.) =   2.03
  Tc(MIN.) =  13.19
  SUBAREA AREA(ACRES) =     3.90       SUBAREA RUNOFF(CFS) =   13.46
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.542
```

```
TOTAL AREA(ACRES) =      8.50          PEAK FLOW RATE(CFS) =      23.36

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.81   FLOW VELOCITY(FEET/SEC.) =   8.19
LONGEST FLOWPATH FROM NODE  11030.00 TO NODE  11025.00 =  1630.82 FEET.

****************************************************************************
FLOW PROCESS FROM NODE  11025.00 TO NODE  11025.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =  13.19
RAINFALL INTENSITY(INCH/HR) =   5.07
TOTAL STREAM AREA(ACRES) =     8.50
PEAK FLOW RATE(CFS) AT CONFLUENCE =     23.36

** CONFLUENCE DATA **
STREAM     RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1       43.90    16.48        4.395        21.00
    2       23.36    13.19        5.075         8.50

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

** PEAK FLOW RATE TABLE **
STREAM     RUNOFF      Tc      INTENSITY
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1       61.39    13.19       5.075
    2       64.14    16.48       4.395

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =     64.14   Tc(MIN.) =   16.48
TOTAL AREA(ACRES) =     29.50
LONGEST FLOWPATH FROM NODE  11000.00 TO NODE  11025.00 =  2148.81 FEET.

****************************************************************************
FLOW PROCESS FROM NODE  11025.00 TO NODE  11026.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   416.18  DOWNSTREAM(FEET) =   404.27
FLOW LENGTH(FEET) =    29.64   MANNING'S N =  0.013
DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  42.50
ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =     64.14
PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =  16.49
LONGEST FLOWPATH FROM NODE  11000.00 TO NODE  11026.00 =  2178.45 FEET.

****************************************************************************
FLOW PROCESS FROM NODE  11026.00 TO NODE  11026.00 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.) =  16.49
RAINFALL INTENSITY(INCH/HR) =   4.39
TOTAL STREAM AREA(ACRES) =    29.50
PEAK FLOW RATE(CFS) AT CONFLUENCE =     64.14

****************************************************************************
FLOW PROCESS FROM NODE  11045.00 TO NODE  11046.00 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
```

```
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .8700
S.C.S. CURVE NUMBER (AMC II) =   0
INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
UPSTREAM ELEVATION(FEET) =    488.91
DOWNSTREAM ELEVATION(FEET) =    485.98
ELEVATION DIFFERENCE(FEET) =      2.93
SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.650
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.485
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) =      1.65
TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      1.65

****************************************************************************
FLOW PROCESS FROM NODE  11046.00 TO NODE  11047.00 IS CODE =  61
----------------------------------------------------------------------------
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
UPSTREAM ELEVATION(FEET) =  485.98  DOWNSTREAM ELEVATION(FEET) =  430.45
STREET LENGTH(FEET) =   576.63   CURB HEIGHT(INCHES) =  6.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  10.00
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) =   0.0180
Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

  **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.95
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.25
  HALFSTREET FLOOD WIDTH(FEET) =    6.38
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.71
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.20
STREET FLOW TRAVEL TIME(MIN.) =   2.04   Tc(MIN.) =   4.69
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.485
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .8700
S.C.S. CURVE NUMBER (AMC II) =   0
AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
SUBAREA AREA(ACRES) =    0.80      SUBAREA RUNOFF(CFS) =    6.60
TOTAL AREA(ACRES) =      1.00        PEAK FLOW RATE(CFS) =       8.25

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.17
FLOW VELOCITY(FEET/SEC.) =  5.25   DEPTH*VELOCITY(FT*FT/SEC.) =   1.52
LONGEST FLOWPATH FROM NODE  11045.00 TO NODE  11047.00 =   666.63 FEET.

****************************************************************************
FLOW PROCESS FROM NODE  11047.00 TO NODE  11026.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   406.47  DOWNSTREAM(FEET) =   404.27
FLOW LENGTH(FEET) =   219.75   MANNING'S N =  0.013
DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   6.31
ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      8.25
PIPE TRAVEL TIME(MIN.) =   0.58    Tc(MIN.) =   5.27
LONGEST FLOWPATH FROM NODE  11045.00 TO NODE  11026.00 =   886.38 FEET.

****************************************************************************
FLOW PROCESS FROM NODE  11026.00 TO NODE  11026.00 IS CODE =   1
----------------------------------------------------------------------------
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   5.27
  RAINFALL INTENSITY(INCH/HR) =   9.17
  TOTAL STREAM AREA(ACRES) =     1.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.25

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
     1       64.14    16.49        4.393         29.50
     2        8.25     5.27        9.168          1.00

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       38.99     5.27        9.168
     2       68.09    16.49        4.393

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     68.09   Tc(MIN.) =   16.49
  TOTAL AREA(ACRES) =     30.50
  LONGEST FLOWPATH FROM NODE  11000.00 TO NODE  11026.00 =  2178.45 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE  11026.00 TO NODE  11030.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   404.27  DOWNSTREAM(FEET) =   371.82
  FLOW LENGTH(FEET) =   374.80   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  24.09
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     68.09
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =  16.75
  LONGEST FLOWPATH FROM NODE  11000.00 TO NODE  11030.00 =  2553.25 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE  11030.00 TO NODE  11030.00 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.) =  16.75
  RAINFALL INTENSITY(INCH/HR) =   4.35
  TOTAL STREAM AREA(ACRES) =    30.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     68.09

****************************************************************************
  FLOW PROCESS FROM NODE  11027.00 TO NODE  11026.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7200
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    416.39
  DOWNSTREAM ELEVATION(FEET) =    411.27
  ELEVATION DIFFERENCE(FEET) =      5.12
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.593
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.485
```

```
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) =      2.73
TOTAL AREA(ACRES) =      0.40   TOTAL RUNOFF(CFS) =      2.73

****************************************************************************
FLOW PROCESS FROM NODE  11026.00 TO NODE  11030.00 IS CODE =  61
----------------------------------------------------------------------------
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
UPSTREAM ELEVATION(FEET) =  411.27  DOWNSTREAM ELEVATION(FEET) =  378.82
STREET LENGTH(FEET) =   378.08   CURB HEIGHT(INCHES) =  6.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  10.00
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) =   0.0180
Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

  **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.16
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.26
  HALFSTREET FLOOD WIDTH(FEET) =    6.71
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.54
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.18
STREET FLOW TRAVEL TIME(MIN.) =   1.39   Tc(MIN.) =   3.98
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.485
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .6400
S.C.S. CURVE NUMBER (AMC II) =   0
AREA-AVERAGE RUNOFF COEFFICIENT =  0.667
SUBAREA AREA(ACRES) =    0.80      SUBAREA RUNOFF(CFS) =    4.86
TOTAL AREA(ACRES) =      1.20        PEAK FLOW RATE(CFS) =       7.59

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.11
FLOW VELOCITY(FEET/SEC.) =  4.89   DEPTH*VELOCITY(FT*FT/SEC.) =   1.41
LONGEST FLOWPATH FROM NODE  11027.00 TO NODE  11030.00 =   438.08 FEET.

****************************************************************************
FLOW PROCESS FROM NODE  11030.00 TO NODE  11030.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =   3.98
RAINFALL INTENSITY(INCH/HR) =   9.49
TOTAL STREAM AREA(ACRES) =     1.20
PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.59

** CONFLUENCE DATA **
STREAM     RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1       68.09    16.75       4.349         30.50
    2        7.59     3.98       9.485          1.20

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

** PEAK FLOW RATE TABLE **
STREAM     RUNOFF      Tc      INTENSITY
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1       38.81     3.98       9.485
    2       71.57    16.75       4.349
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     71.57   Tc(MIN.) =   16.75
  TOTAL AREA(ACRES) =     31.70
  LONGEST FLOWPATH FROM NODE  11000.00 TO NODE  11030.00 =  2553.25 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE  11030.00 TO NODE  11033.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   371.82  DOWNSTREAM(FEET) =   348.01
  FLOW LENGTH(FEET) =   619.82   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  23.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.66
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     71.57
  PIPE TRAVEL TIME(MIN.) =   0.58    Tc(MIN.) =  17.33
  LONGEST FLOWPATH FROM NODE  11000.00 TO NODE  11033.00 =  3173.07 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE  11033.00 TO NODE  11033.00 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.) =  17.33
  RAINFALL INTENSITY(INCH/HR) =   4.25
  TOTAL STREAM AREA(ACRES) =    31.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     71.57

****************************************************************************
  FLOW PROCESS FROM NODE  11031.00 TO NODE  11032.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8700
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    376.70
  DOWNSTREAM ELEVATION(FEET) =    372.49
  ELEVATION DIFFERENCE(FEET) =      4.21
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    1.439
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.485
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.65
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      1.65

****************************************************************************
  FLOW PROCESS FROM NODE  11032.00 TO NODE  11033.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  372.49  DOWNSTREAM ELEVATION(FEET) =  354.50
  STREET LENGTH(FEET) =   547.22   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  10.00
  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) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.63
```

```
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.30
  HALFSTREET FLOOD WIDTH(FEET) =    8.77
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.17
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.96
 STREET FLOW TRAVEL TIME(MIN.) =   2.87   Tc(MIN.) =   4.31
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.485
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .6000
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.634
 SUBAREA AREA(ACRES) =     1.40      SUBAREA RUNOFF(CFS) =     7.97
 TOTAL AREA(ACRES) =       1.60        PEAK FLOW RATE(CFS) =        9.62

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  11.05
 FLOW VELOCITY(FEET/SEC.) =  3.59   DEPTH*VELOCITY(FT*FT/SEC.) =   1.25
 LONGEST FLOWPATH FROM NODE  11031.00 TO NODE  11033.00 =   597.22 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE  11033.00 TO NODE  11033.00 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.) =   4.31
 RAINFALL INTENSITY(INCH/HR) =   9.49
 TOTAL STREAM AREA(ACRES) =     1.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.62

 ** CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
     1       71.57    17.33        4.254         31.70
     2        9.62     4.31        9.485          1.60

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       41.72     4.31       9.485
     2       75.88    17.33       4.254

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     75.88   Tc(MIN.) =   17.33
 TOTAL AREA(ACRES) =     33.30
 LONGEST FLOWPATH FROM NODE  11000.00 TO NODE  11033.00 =  3173.07 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE  11033.00 TO NODE  11055.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   348.01  DOWNSTREAM(FEET) =   344.50
 FLOW LENGTH(FEET) =   351.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  39.0 INCH PIPE IS  30.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.76
 ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     75.88
 PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =  17.88
 LONGEST FLOWPATH FROM NODE  11000.00 TO NODE  11055.00 =  3524.07 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE  11055.00 TO NODE  11055.00 IS CODE =   1
----------------------------------------------------------------------------
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =  17.88
  RAINFALL INTENSITY(INCH/HR) =   4.17
  TOTAL STREAM AREA(ACRES) =    33.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     75.88

****************************************************************************
  FLOW PROCESS FROM NODE  11060.00 TO NODE  11065.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6700
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    408.97
  DOWNSTREAM ELEVATION(FEET) =    401.05
  ELEVATION DIFFERENCE(FEET) =      7.92
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.883
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.485
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.27
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      1.27

****************************************************************************
  FLOW PROCESS FROM NODE  11065.00 TO NODE  11070.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    401.05  DOWNSTREAM(FEET) =    355.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   724.30   CHANNEL SLOPE =  0.0636
  CHANNEL BASE(FEET) =   57.50   "Z" FACTOR =  15.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.205
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8600
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     11.63
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.09
  AVERAGE FLOW DEPTH(FEET) =   0.09   TRAVEL TIME(MIN.) =   5.77
  Tc(MIN.) =   9.65
  SUBAREA AREA(ACRES) =     3.80       SUBAREA RUNOFF(CFS) =   20.28
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.851
  TOTAL AREA(ACRES) =      4.00         PEAK FLOW RATE(CFS) =      21.11

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.13   FLOW VELOCITY(FEET/SEC.) =   2.68
  LONGEST FLOWPATH FROM NODE  11060.00 TO NODE  11070.00 =   824.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE  11070.00 TO NODE  11055.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   355.00  DOWNSTREAM(FEET) =   344.50
  FLOW LENGTH(FEET) =    79.10   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.32
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     21.11
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   9.72
  LONGEST FLOWPATH FROM NODE  11060.00 TO NODE  11055.00 =   903.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE  11055.00 TO NODE  11055.00 IS CODE =   1
```

```
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   9.72
  RAINFALL INTENSITY(INCH/HR) =   6.18
  TOTAL STREAM AREA(ACRES) =     4.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     21.11

****************************************************************************
  FLOW PROCESS FROM NODE  11051.00 TO NODE  11052.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8700
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    354.59
  DOWNSTREAM ELEVATION(FEET) =    354.09
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.927
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.485
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.65
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      1.65

****************************************************************************
  FLOW PROCESS FROM NODE  11052.00 TO NODE  11055.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  354.09  DOWNSTREAM ELEVATION(FEET) =  351.50
  STREET LENGTH(FEET) =   266.19   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 39.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  19.50
  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) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.28
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =   9.06
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.75
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.54
  STREET FLOW TRAVEL TIME(MIN.) =   2.54   Tc(MIN.) =   5.47
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.951
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3900
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.477
  SUBAREA AREA(ACRES) =    0.90      SUBAREA RUNOFF(CFS) =    3.14
  TOTAL AREA(ACRES) =      1.10        PEAK FLOW RATE(CFS) =       4.70

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  10.61
  FLOW VELOCITY(FEET/SEC.) =  1.89   DEPTH*VELOCITY(FT*FT/SEC.) =   0.64
  LONGEST FLOWPATH FROM NODE  11051.00 TO NODE  11055.00 =   316.19 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE  11055.00 TO NODE  11055.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
```

```
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   5.47
  RAINFALL INTENSITY(INCH/HR) =   8.95
  TOTAL STREAM AREA(ACRES) =     1.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.70

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
     1        75.88    17.88        4.170        33.30
     2        21.11     9.72        6.179         4.00
     3         4.70     5.47        8.951         1.10

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1        51.93     5.47        8.951
     2        75.57     9.72        6.179
     3        92.32    17.88        4.170

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     92.32   Tc(MIN.) =   17.88
  TOTAL AREA(ACRES) =     38.40
  LONGEST FLOWPATH FROM NODE  11000.00 TO NODE  11055.00 =  3524.07 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE  11055.00 TO NODE  11080.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   344.50  DOWNSTREAM(FEET) =   336.00
  FLOW LENGTH(FEET) =   201.33   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.63
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     92.32
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =  18.05
  LONGEST FLOWPATH FROM NODE  11000.00 TO NODE  11080.00 =  3725.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE  11080.00 TO NODE  11080.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
==============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE  11085.00 TO NODE  11090.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6700
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    409.14
  DOWNSTREAM ELEVATION(FEET) =    402.40
  ELEVATION DIFFERENCE(FEET) =      6.74
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.098
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.485
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.27
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      1.27

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

```
  FLOW PROCESS FROM NODE  11090.00 TO NODE  11095.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    402.40  DOWNSTREAM(FEET) =    388.14
  CHANNEL LENGTH THRU SUBAREA(FEET) =   223.89   CHANNEL SLOPE =  0.0637
  CHANNEL BASE(FEET) =   40.00   "Z" FACTOR =  15.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.909
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7600
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      3.39
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.48
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   2.53
  Tc(MIN.) =   6.63
  SUBAREA AREA(ACRES) =     0.70       SUBAREA RUNOFF(CFS) =    4.21
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.740
  TOTAL AREA(ACRES) =      0.90         PEAK FLOW RATE(CFS) =       5.27

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   1.79
  LONGEST FLOWPATH FROM NODE  11085.00 TO NODE  11095.00 =   323.89 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE  11095.00 TO NODE  11100.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    388.14  DOWNSTREAM(FEET) =    354.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   413.72   CHANNEL SLOPE =  0.0825
  CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =  11.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.437
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8400
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     15.82
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.77
  AVERAGE FLOW DEPTH(FEET) =   0.11   TRAVEL TIME(MIN.) =   2.49
  Tc(MIN.) =   9.12
  SUBAREA AREA(ACRES) =     3.90       SUBAREA RUNOFF(CFS) =   21.09
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.821
  TOTAL AREA(ACRES) =      4.80         PEAK FLOW RATE(CFS) =      25.38

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.15   FLOW VELOCITY(FEET/SEC.) =   3.33
  LONGEST FLOWPATH FROM NODE  11085.00 TO NODE  11100.00 =   737.61 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE  11100.00 TO NODE  11105.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   339.62  DOWNSTREAM(FEET) =   338.71
  FLOW LENGTH(FEET) =    88.87   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.40
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     25.38
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =   9.30
  LONGEST FLOWPATH FROM NODE  11085.00 TO NODE  11105.00 =   826.48 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE  11105.00 TO NODE  11105.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
```

```
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   9.30
  RAINFALL INTENSITY(INCH/HR) =   6.36
  TOTAL STREAM AREA(ACRES) =     4.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     25.38

****************************************************************************
  FLOW PROCESS FROM NODE  11110.00 TO NODE  11115.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8700
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    351.31
  DOWNSTREAM ELEVATION(FEET) =    350.81
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.927
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.485
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.65
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      1.65

****************************************************************************
  FLOW PROCESS FROM NODE  11115.00 TO NODE  11120.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  350.81  DOWNSTREAM ELEVATION(FEET) =  349.12
  STREET LENGTH(FEET) =   423.39   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 39.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  19.50
  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) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.05
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   11.94
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.31
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.48
  STREET FLOW TRAVEL TIME(MIN.) =   5.38   Tc(MIN.) =   8.30
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.838
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5600
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.604
  SUBAREA AREA(ACRES) =     1.20      SUBAREA RUNOFF(CFS) =     4.60
  TOTAL AREA(ACRES) =      1.40        PEAK FLOW RATE(CFS) =       5.79

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.84
  FLOW VELOCITY(FEET/SEC.) =  1.42   DEPTH*VELOCITY(FT*FT/SEC.) =   0.57
  LONGEST FLOWPATH FROM NODE  11110.00 TO NODE  11120.00 =   473.39 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE  11120.00 TO NODE  11105.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   341.07  DOWNSTREAM(FEET) =   338.71
```

```
FLOW LENGTH(FEET) =   236.11   MANNING'S N =  0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   5.85
ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      5.79
PIPE TRAVEL TIME(MIN.) =   0.67    Tc(MIN.) =   8.98
LONGEST FLOWPATH FROM NODE  11110.00 TO NODE  11105.00 =   709.50 FEET.

****************************************************************************
FLOW PROCESS FROM NODE  11105.00 TO NODE  11105.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =   8.98
RAINFALL INTENSITY(INCH/HR) =   6.50
TOTAL STREAM AREA(ACRES) =     1.40
PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.79

** CONFLUENCE DATA **
STREAM     RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1       25.38     9.30        6.358         4.80
    2        5.79     8.98        6.503         1.40

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

** PEAK FLOW RATE TABLE **
STREAM     RUNOFF      Tc      INTENSITY
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1       30.29     8.98       6.503
    2       31.03     9.30       6.358

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =     31.03   Tc(MIN.) =    9.30
TOTAL AREA(ACRES) =      6.20
LONGEST FLOWPATH FROM NODE  11085.00 TO NODE  11105.00 =   826.48 FEET.

****************************************************************************
FLOW PROCESS FROM NODE  11105.00 TO NODE  11122.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   338.71  DOWNSTREAM(FEET) =   338.20
FLOW LENGTH(FEET) =    50.21   MANNING'S N =  0.013
DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   8.87
ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =     31.03
PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   9.39
LONGEST FLOWPATH FROM NODE  11085.00 TO NODE  11122.00 =   876.69 FEET.

****************************************************************************
FLOW PROCESS FROM NODE  11122.00 TO NODE  11122.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =   9.39
RAINFALL INTENSITY(INCH/HR) =   6.32
TOTAL STREAM AREA(ACRES) =     6.20
PEAK FLOW RATE(CFS) AT CONFLUENCE =     31.03

****************************************************************************
FLOW PROCESS FROM NODE  11123.00 TO NODE  11122.00 IS CODE =  21
```

```
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   145.24
  UPSTREAM ELEVATION(FEET) =    357.00
  DOWNSTREAM ELEVATION(FEET) =    355.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =   11.962
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    75.66
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.404
  SUBAREA RUNOFF(CFS) =      1.08
  TOTAL AREA(ACRES) =      0.80   TOTAL RUNOFF(CFS) =     1.08

****************************************************************************
  FLOW PROCESS FROM NODE  11122.00 TO NODE  11122.00 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.) =  11.96
  RAINFALL INTENSITY(INCH/HR) =   5.40
  TOTAL STREAM AREA(ACRES) =     0.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.08

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
     1       31.03     9.39        6.317          6.20
     2        1.08    11.96        5.404          0.80

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       31.88     9.39       6.317
     2       27.63    11.96       5.404

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     31.88   Tc(MIN.) =    9.39
  TOTAL AREA(ACRES) =      7.00
  LONGEST FLOWPATH FROM NODE  11085.00 TO NODE  11122.00 =   876.69 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE  11122.00 TO NODE  11125.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   338.20  DOWNSTREAM(FEET) =   336.00
  FLOW LENGTH(FEET) =   218.46   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.88
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     31.88
  PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =   9.80
  LONGEST FLOWPATH FROM NODE  11085.00 TO NODE  11125.00 =  1095.15 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE  11125.00 TO NODE  11125.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
```

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

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM      RUNOFF      Tc       INTENSITY      AREA
  NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
     1         31.88     9.80        6.145         7.00
  LONGEST FLOWPATH FROM NODE  11085.00 TO NODE  11125.00 =  1095.15 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM      RUNOFF      Tc       INTENSITY      AREA
  NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
     1         92.32    18.05        4.145        38.40
  LONGEST FLOWPATH FROM NODE  11000.00 TO NODE  11125.00 =  3725.40 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc       INTENSITY
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
     1       82.01       9.80        6.145
     2      113.82      18.05        4.145

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    113.82   Tc(MIN.) =   18.05
  TOTAL AREA(ACRES) =      45.40

****************************************************************************
  FLOW PROCESS FROM NODE  11125.00 TO NODE  11125.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =     45.40  TC(MIN.) =     18.05
  PEAK FLOW RATE(CFS)    =    113.82
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Drainage Basin 14000

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
        (c) Copyright 1982-2003 Advanced Engineering Software (aes)
            Ver. 1.5A Release Date: 01/01/2003  License ID 1261

                          Analysis prepared by:



 ************************** DESCRIPTION OF STUDY **************************
* Meadowood   J-15956   7-31-09                                            *
* Drainage basin 14000 Off site improvements, 100 year storm event,        *
* 6 hours                                                                  *
 ****************************************************************************

  FILE NAME: MW14000.DAT
  TIME/DATE OF STUDY: 13:48 08/13/2009
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.600
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  ========  =================  ======  ===== ====== ===== ========
  1   30.0     20.0   0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

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

+---------------------------------------------------------------------------+
| User specified information obtained from on site analyses                 |
| for drainage basin 1000                                                   |
| (undetained flow)                                                         |
+---------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE   1000.00 TO NODE   1000.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   9.95   RAIN INTENSITY(INCH/HOUR) =  6.09
  TOTAL AREA(ACRES) =     9.60   TOTAL RUNOFF(CFS) =     17.80

****************************************************************************
  FLOW PROCESS FROM NODE   1000.00 TO NODE  14010.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    458.02  DOWNSTREAM(FEET) =    348.00
```

```
CHANNEL LENGTH THRU SUBAREA(FEET) =  1690.20   CHANNEL SLOPE =  0.0651
CHANNEL BASE(FEET) =   70.00   "Z" FACTOR =  15.000
MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.969
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .7200
S.C.S. CURVE NUMBER (AMC II) =   0
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     33.88
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.01
AVERAGE FLOW DEPTH(FEET) =   0.16   TRAVEL TIME(MIN.) =   9.35
Tc(MIN.) =  19.30
SUBAREA AREA(ACRES) =    11.50       SUBAREA RUNOFF(CFS) =   32.87
AREA-AVERAGE RUNOFF COEFFICIENT =  0.531
TOTAL AREA(ACRES) =     21.10         PEAK FLOW RATE(CFS) =      44.48

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.18   FLOW VELOCITY(FEET/SEC.) =   3.39
LONGEST FLOWPATH FROM NODE      0.00 TO NODE  14010.00 =  1690.20 FEET.

****************************************************************************
FLOW PROCESS FROM NODE  14010.00 TO NODE  14010.00 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.) =  19.30
RAINFALL INTENSITY(INCH/HR) =   3.97
TOTAL STREAM AREA(ACRES) =    21.10
PEAK FLOW RATE(CFS) AT CONFLUENCE =     44.48

****************************************************************************
FLOW PROCESS FROM NODE  14000.00 TO NODE  14005.00 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .6900
S.C.S. CURVE NUMBER (AMC II) =   0
INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
UPSTREAM ELEVATION(FEET) =    462.00
DOWNSTREAM ELEVATION(FEET) =    454.00
ELEVATION DIFFERENCE(FEET) =      8.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.690
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.485
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) =      1.96
TOTAL AREA(ACRES) =      0.30   TOTAL RUNOFF(CFS) =      1.96

****************************************************************************
FLOW PROCESS FROM NODE  14005.00 TO NODE  14010.00 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    454.00  DOWNSTREAM(FEET) =    348.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  1966.50   CHANNEL SLOPE =  0.0539
CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =  19.000
MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.196
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .7400
S.C.S. CURVE NUMBER (AMC II) =   0
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     24.64
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.63
AVERAGE FLOW DEPTH(FEET) =   0.27   TRAVEL TIME(MIN.) =   9.02
Tc(MIN.) =  12.71
SUBAREA AREA(ACRES) =    11.10       SUBAREA RUNOFF(CFS) =   42.68
AREA-AVERAGE RUNOFF COEFFICIENT =  0.739
TOTAL AREA(ACRES) =     11.40         PEAK FLOW RATE(CFS) =      43.76
```

```
END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.37   FLOW VELOCITY(FEET/SEC.) =   4.36
LONGEST FLOWPATH FROM NODE  14000.00 TO NODE  14010.00 =  2066.50 FEET.

****************************************************************************
FLOW PROCESS FROM NODE  14010.00 TO NODE  14010.00 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.) =  12.71
RAINFALL INTENSITY(INCH/HR) =   5.20
TOTAL STREAM AREA(ACRES) =    11.40
PEAK FLOW RATE(CFS) AT CONFLUENCE =     43.76

** CONFLUENCE DATA **
STREAM     RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1       44.48    19.30        3.969        21.10
    2       43.76    12.71        5.196        11.40

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

** PEAK FLOW RATE TABLE **
STREAM     RUNOFF      Tc      INTENSITY
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1       73.05    12.71       5.196
    2       77.90    19.30       3.969

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =     77.90   Tc(MIN.) =   19.30
TOTAL AREA(ACRES) =     32.50
LONGEST FLOWPATH FROM NODE  14000.00 TO NODE  14010.00 =  2066.50 FEET.

****************************************************************************
FLOW PROCESS FROM NODE  14010.00 TO NODE  14015.00 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    348.00  DOWNSTREAM(FEET) =    333.25
CHANNEL LENGTH THRU SUBAREA(FEET) =   229.59   CHANNEL SLOPE =  0.0642
CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   8.900
MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.890
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .8400
S.C.S. CURVE NUMBER (AMC II) =   0
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     80.03
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.23
AVERAGE FLOW DEPTH(FEET) =   0.52   TRAVEL TIME(MIN.) =   0.61
Tc(MIN.) =  19.91
SUBAREA AREA(ACRES) =     1.30       SUBAREA RUNOFF(CFS) =    4.25
AREA-AVERAGE RUNOFF COEFFICIENT =  0.613
TOTAL AREA(ACRES) =     33.80         PEAK FLOW RATE(CFS) =      80.59

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.52   FLOW VELOCITY(FEET/SEC.) =   6.24
LONGEST FLOWPATH FROM NODE  14000.00 TO NODE  14015.00 =  2296.09 FEET.

****************************************************************************
FLOW PROCESS FROM NODE  14015.00 TO NODE  14016.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   333.25  DOWNSTREAM(FEET) =   319.72
FLOW LENGTH(FEET) =    94.07   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  19.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  29.53
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     80.59
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =  19.97
  LONGEST FLOWPATH FROM NODE  14000.00 TO NODE  14016.00 =  2390.16 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE  14016.00 TO NODE  14016.00 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.) =  19.97
  RAINFALL INTENSITY(INCH/HR) =   3.88
  TOTAL STREAM AREA(ACRES) =    33.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     80.59

****************************************************************************
  FLOW PROCESS FROM NODE  14017.00 TO NODE  14017.50 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8700
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    349.17
  DOWNSTREAM ELEVATION(FEET) =    348.10
  ELEVATION DIFFERENCE(FEET) =      1.07
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.644
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.485
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.65
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      1.65

****************************************************************************
  FLOW PROCESS FROM NODE  14017.50 TO NODE  14018.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  348.10  DOWNSTREAM ELEVATION(FEET) =  337.45
  STREET LENGTH(FEET) =   358.30   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 39.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  19.50
  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) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.28
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    8.71
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.01
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.90
  STREET FLOW TRAVEL TIME(MIN.) =   1.98   Tc(MIN.) =   4.63
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.485
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5100
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.552
  SUBAREA AREA(ACRES) =    1.50      SUBAREA RUNOFF(CFS) =    7.26
  TOTAL AREA(ACRES) =      1.70        PEAK FLOW RATE(CFS) =       8.91
```

```
END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  10.96
FLOW VELOCITY(FEET/SEC.) =  3.38   DEPTH*VELOCITY(FT*FT/SEC.) =   1.17
LONGEST FLOWPATH FROM NODE  14017.00 TO NODE  14018.00 =   418.30 FEET.

****************************************************************************
FLOW PROCESS FROM NODE  14018.00 TO NODE  14016.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   323.38  DOWNSTREAM(FEET) =   319.72
FLOW LENGTH(FEET) =   365.72   MANNING'S N =  0.013
DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   6.38
ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      8.91
PIPE TRAVEL TIME(MIN.) =   0.96    Tc(MIN.) =   5.58
LONGEST FLOWPATH FROM NODE  14017.00 TO NODE  14016.00 =   784.02 FEET.

****************************************************************************
FLOW PROCESS FROM NODE  14016.00 TO NODE  14016.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =   5.58
RAINFALL INTENSITY(INCH/HR) =   8.83
TOTAL STREAM AREA(ACRES) =     1.70
PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.91

** CONFLUENCE DATA **
STREAM     RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1       80.59    19.97        3.883        33.80
    2        8.91     5.58        8.834         1.70

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

** PEAK FLOW RATE TABLE **
STREAM     RUNOFF      Tc      INTENSITY
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1       44.33     5.58       8.834
    2       84.51    19.97       3.883

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =     84.51   Tc(MIN.) =   19.97
TOTAL AREA(ACRES) =     35.50
LONGEST FLOWPATH FROM NODE  14000.00 TO NODE  14016.00 =  2390.16 FEET.

****************************************************************************
FLOW PROCESS FROM NODE  14016.00 TO NODE  14019.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   319.72  DOWNSTREAM(FEET) =   317.48
FLOW LENGTH(FEET) =   157.13   MANNING'S N =  0.013
DEPTH OF FLOW IN  39.0 INCH PIPE IS  29.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  12.76
ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =     84.51
PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =  20.17
LONGEST FLOWPATH FROM NODE  14000.00 TO NODE  14019.00 =  2547.29 FEET.

****************************************************************************
FLOW PROCESS FROM NODE  14019.00 TO NODE  14019.00 IS CODE =   1
```

```
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =  20.17
  RAINFALL INTENSITY(INCH/HR) =   3.86
  TOTAL STREAM AREA(ACRES) =    35.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     84.51

****************************************************************************
  FLOW PROCESS FROM NODE  14020.00 TO NODE  14025.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    360.04
  DOWNSTREAM ELEVATION(FEET) =    356.00
  ELEVATION DIFFERENCE(FEET) =      4.04
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.730
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.485
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.46
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      1.46

****************************************************************************
  FLOW PROCESS FROM NODE  14025.00 TO NODE  14030.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    356.00  DOWNSTREAM(FEET) =    325.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   384.00   CHANNEL SLOPE =  0.0807
  CHANNEL BASE(FEET) =   35.00   "Z" FACTOR =  15.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.803
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8700
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      5.59
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.11
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   3.04
  Tc(MIN.) =   6.77
  SUBAREA AREA(ACRES) =     1.20       SUBAREA RUNOFF(CFS) =    8.15
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.856
  TOTAL AREA(ACRES) =      1.40         PEAK FLOW RATE(CFS) =       9.35

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.10   FLOW VELOCITY(FEET/SEC.) =   2.51
  LONGEST FLOWPATH FROM NODE  14020.00 TO NODE  14030.00 =   484.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE  14030.00 TO NODE  14019.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   325.00  DOWNSTREAM(FEET) =   317.48
  FLOW LENGTH(FEET) =    86.60   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.76
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      9.35
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   6.86
  LONGEST FLOWPATH FROM NODE  14020.00 TO NODE  14019.00 =   570.60 FEET.

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

```
  FLOW PROCESS FROM NODE  14019.00 TO NODE  14019.00 IS CODE =   1
----------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
======================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   6.86
  RAINFALL INTENSITY(INCH/HR) =   7.73
  TOTAL STREAM AREA(ACRES) =     1.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.35

**********************************************************************
  FLOW PROCESS FROM NODE  14035.00 TO NODE  14040.00 IS CODE =  21
----------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
======================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6600
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
  UPSTREAM ELEVATION(FEET) =    337.08
  DOWNSTREAM ELEVATION(FEET) =    332.58
  ELEVATION DIFFERENCE(FEET) =      4.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.394
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.485
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.88
  TOTAL AREA(ACRES) =      0.30   TOTAL RUNOFF(CFS) =      1.88

**********************************************************************
  FLOW PROCESS FROM NODE  14040.00 TO NODE  14019.00 IS CODE =  61
----------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
======================================================================
  UPSTREAM ELEVATION(FEET) =  332.58  DOWNSTREAM ELEVATION(FEET) =  319.11
  STREET LENGTH(FEET) =   438.85   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 39.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  19.50
  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) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.77
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    8.99
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.12
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.95
  STREET FLOW TRAVEL TIME(MIN.) =   2.35   Tc(MIN.) =   6.74
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.822
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6600
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.660
  SUBAREA AREA(ACRES) =     1.50      SUBAREA RUNOFF(CFS) =     7.74
  TOTAL AREA(ACRES) =       1.80        PEAK FLOW RATE(CFS) =       9.29

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  11.03
  FLOW VELOCITY(FEET/SEC.) =  3.48   DEPTH*VELOCITY(FT*FT/SEC.) =   1.21
  LONGEST FLOWPATH FROM NODE  14035.00 TO NODE  14019.00 =   528.85 FEET.

**********************************************************************
  FLOW PROCESS FROM NODE  14019.00 TO NODE  14019.00 IS CODE =   1
----------------------------------------------------------------------
```

```
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
TOTAL NUMBER OF STREAMS =  3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
TIME OF CONCENTRATION(MIN.) =   6.74
RAINFALL INTENSITY(INCH/HR) =   7.82
TOTAL STREAM AREA(ACRES) =     1.80
PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.29

** CONFLUENCE DATA **
STREAM     RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1       84.51    20.17        3.858        35.50
    2        9.35     6.86        7.731         1.40
    3        9.29     6.74        7.822         1.80

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

** PEAK FLOW RATE TABLE **
STREAM     RUNOFF      Tc      INTENSITY
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1       60.15     6.74       7.822
    2       60.70     6.86       7.731
    3       93.75    20.17       3.858

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =     93.75   Tc(MIN.) =   20.17
TOTAL AREA(ACRES) =     38.70
LONGEST FLOWPATH FROM NODE  14000.00 TO NODE  14019.00 =  2547.29 FEET.

****************************************************************************
FLOW PROCESS FROM NODE  14019.00 TO NODE  14050.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   317.48  DOWNSTREAM(FEET) =   317.07
FLOW LENGTH(FEET) =    40.55   MANNING'S N =  0.013
DEPTH OF FLOW IN  42.0 INCH PIPE IS  33.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  11.37
ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =     93.75
PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =  20.23
LONGEST FLOWPATH FROM NODE  14000.00 TO NODE  14050.00 =  2587.84 FEET.
==============================================================================
END OF STUDY SUMMARY:
TOTAL AREA(ACRES)      =     38.70  TC(MIN.) =     20.23
PEAK FLOW RATE(CFS)    =     93.75
==============================================================================
==============================================================================
END OF RATIONAL METHOD ANALYSIS
```

Drainage Basin 15000

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                          2003,1985,1981 HYDROLOGY MANUAL
        (c) Copyright 1982-2003 Advanced Engineering Software (aes)
            Ver. 1.5A Release Date: 01/01/2003  License ID 1261

                          Analysis prepared by:



 ************************** DESCRIPTION OF STUDY **************************
* Meadowood J-15956 8-03-09                                                *
* Drainage Basin 15000 Off Site Improvements,                              *
* 100-6 hours storm event, ST                                              *
 ****************************************************************************

  FILE NAME: MW15000.DAT
  TIME/DATE OF STUDY: 15:14 08/10/2009
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.600
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

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

+--------------------------------------------------------------------------+
| User specified information obtained from on site analyses                |
| for drainage basin 2000.                                                 |
| (Detained flows)                                                         |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE   2000.00 TO NODE   2000.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  13.93   RAIN INTENSITY(INCH/HOUR) =  4.90
  TOTAL AREA(ACRES) =    59.50   TOTAL RUNOFF(CFS) =     81.84

****************************************************************************
  FLOW PROCESS FROM NODE   2000.00 TO NODE  15021.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    433.44  DOWNSTREAM(FEET) =    390.00
```

```
CHANNEL LENGTH THRU SUBAREA(FEET) =   597.60   CHANNEL SLOPE =  0.0727
CHANNEL BASE(FEET) =  130.00   "Z" FACTOR =   9.000
MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.370
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .6700
S.C.S. CURVE NUMBER (AMC II) =   0
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     91.34
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.69
AVERAGE FLOW DEPTH(FEET) =   0.19   TRAVEL TIME(MIN.) =   2.70
Tc(MIN.) =  16.63
SUBAREA AREA(ACRES) =     6.50       SUBAREA RUNOFF(CFS) =   19.03
AREA-AVERAGE RUNOFF COEFFICIENT =  0.319
TOTAL AREA(ACRES) =     66.00         PEAK FLOW RATE(CFS) =      92.04

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.19   FLOW VELOCITY(FEET/SEC.) =   3.72
LONGEST FLOWPATH FROM NODE      0.00 TO NODE  15021.00 =   597.60 FEET.

****************************************************************************
FLOW PROCESS FROM NODE  15021.00 TO NODE  15020.00 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    390.00  DOWNSTREAM(FEET) =    334.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  1158.10   CHANNEL SLOPE =  0.0484
CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =  11.800
MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.791
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .6700
S.C.S. CURVE NUMBER (AMC II) =   0
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    100.91
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.71
AVERAGE FLOW DEPTH(FEET) =   0.39   TRAVEL TIME(MIN.) =   4.10
Tc(MIN.) =  20.72
SUBAREA AREA(ACRES) =     7.00       SUBAREA RUNOFF(CFS) =   17.78
AREA-AVERAGE RUNOFF COEFFICIENT =  0.353
TOTAL AREA(ACRES) =     73.00         PEAK FLOW RATE(CFS) =      97.63

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.38   FLOW VELOCITY(FEET/SEC.) =   4.66
LONGEST FLOWPATH FROM NODE      0.00 TO NODE  15020.00 =  1755.70 FEET.

****************************************************************************
FLOW PROCESS FROM NODE  15020.00 TO NODE  15020.00 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.) =  20.72
RAINFALL INTENSITY(INCH/HR) =   3.79
TOTAL STREAM AREA(ACRES) =    73.00
PEAK FLOW RATE(CFS) AT CONFLUENCE =     97.63

****************************************************************************
FLOW PROCESS FROM NODE  15000.00 TO NODE  15005.00 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .6900
S.C.S. CURVE NUMBER (AMC II) =   0
INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
UPSTREAM ELEVATION(FEET) =    473.00
DOWNSTREAM ELEVATION(FEET) =    456.00
ELEVATION DIFFERENCE(FEET) =     17.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.426
WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.485
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) =      1.31
TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      1.31

****************************************************************************
FLOW PROCESS FROM NODE  15005.00 TO NODE  15010.00 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    456.00  DOWNSTREAM(FEET) =    402.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   531.50   CHANNEL SLOPE =  0.1016
CHANNEL BASE(FEET) =   80.00   "Z" FACTOR =  12.800
MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.888
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .6800
S.C.S. CURVE NUMBER (AMC II) =   0
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     19.74
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.74
AVERAGE FLOW DEPTH(FEET) =   0.09   TRAVEL TIME(MIN.) =   3.23
Tc(MIN.) =   6.65
SUBAREA AREA(ACRES) =     6.80       SUBAREA RUNOFF(CFS) =   36.47
AREA-AVERAGE RUNOFF COEFFICIENT =  0.680
TOTAL AREA(ACRES) =      7.00         PEAK FLOW RATE(CFS) =      37.56

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.13   FLOW VELOCITY(FEET/SEC.) =   3.47
LONGEST FLOWPATH FROM NODE  15000.00 TO NODE  15010.00 =   631.50 FEET.

****************************************************************************
FLOW PROCESS FROM NODE  15010.00 TO NODE  15015.00 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    402.00  DOWNSTREAM(FEET) =    360.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   687.20   CHANNEL SLOPE =  0.0611
CHANNEL BASE(FEET) =   70.00   "Z" FACTOR =  12.000
MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.121
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .6700
S.C.S. CURVE NUMBER (AMC II) =   0
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     52.59
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.57
AVERAGE FLOW DEPTH(FEET) =   0.20   TRAVEL TIME(MIN.) =   3.20
Tc(MIN.) =   9.86
SUBAREA AREA(ACRES) =     7.30       SUBAREA RUNOFF(CFS) =   29.94
AREA-AVERAGE RUNOFF COEFFICIENT =  0.675
TOTAL AREA(ACRES) =     14.30         PEAK FLOW RATE(CFS) =      59.09

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.22   FLOW VELOCITY(FEET/SEC.) =   3.73
LONGEST FLOWPATH FROM NODE  15000.00 TO NODE  15015.00 =  1318.70 FEET.

****************************************************************************
FLOW PROCESS FROM NODE  15015.00 TO NODE  15020.00 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    360.00  DOWNSTREAM(FEET) =    334.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   561.80   CHANNEL SLOPE =  0.0463
CHANNEL BASE(FEET) =   80.00   "Z" FACTOR =  12.000
MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.230
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .6800
S.C.S. CURVE NUMBER (AMC II) =   0
```

```
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     68.17
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.44
AVERAGE FLOW DEPTH(FEET) =   0.24   TRAVEL TIME(MIN.) =   2.72
Tc(MIN.) =  12.58
SUBAREA AREA(ACRES) =     5.10       SUBAREA RUNOFF(CFS) =   18.14
AREA-AVERAGE RUNOFF COEFFICIENT =  0.676
TOTAL AREA(ACRES) =     19.40         PEAK FLOW RATE(CFS) =      68.62

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.24   FLOW VELOCITY(FEET/SEC.) =   3.46
LONGEST FLOWPATH FROM NODE  15000.00 TO NODE  15020.00 =  1880.50 FEET.

****************************************************************************
FLOW PROCESS FROM NODE  15020.00 TO NODE  15020.00 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.) =  12.58
RAINFALL INTENSITY(INCH/HR) =   5.23
TOTAL STREAM AREA(ACRES) =    19.40
PEAK FLOW RATE(CFS) AT CONFLUENCE =     68.62

** CONFLUENCE DATA **
STREAM     RUNOFF      Tc      INTENSITY     AREA
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
    1       97.63    20.72       3.791        73.00
    2       68.62    12.58       5.230        19.40

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

** PEAK FLOW RATE TABLE **
STREAM     RUNOFF      Tc      INTENSITY
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1      127.91    12.58       5.230
    2      147.37    20.72       3.791

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =    147.37   Tc(MIN.) =   20.72
TOTAL AREA(ACRES) =     92.40
LONGEST FLOWPATH FROM NODE  15000.00 TO NODE  15020.00 =  1880.50 FEET.

****************************************************************************
FLOW PROCESS FROM NODE  15020.00 TO NODE  15025.00 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    334.00  DOWNSTREAM(FEET) =    325.70
CHANNEL LENGTH THRU SUBAREA(FEET) =   319.60   CHANNEL SLOPE =  0.0260
CHANNEL BASE(FEET) =   70.00   "Z" FACTOR =  10.800
MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.643
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .8500
S.C.S. CURVE NUMBER (AMC II) =   0
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    149.54
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.04
AVERAGE FLOW DEPTH(FEET) =   0.49   TRAVEL TIME(MIN.) =   1.32
Tc(MIN.) =  22.04
SUBAREA AREA(ACRES) =     1.40       SUBAREA RUNOFF(CFS) =    4.34
AREA-AVERAGE RUNOFF COEFFICIENT =  0.427
TOTAL AREA(ACRES) =     93.80         PEAK FLOW RATE(CFS) =     147.37

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.49   FLOW VELOCITY(FEET/SEC.) =   4.03
LONGEST FLOWPATH FROM NODE  15000.00 TO NODE  15025.00 =  2200.10 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE  15025.00 TO NODE  15030.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    325.70  DOWNSTREAM(FEET) =    316.35
  CHANNEL LENGTH THRU SUBAREA(FEET) =   274.40   CHANNEL SLOPE =  0.0341
  CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =  29.500
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.548
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7900
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    160.69
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.93
  AVERAGE FLOW DEPTH(FEET) =   0.77   TRAVEL TIME(MIN.) =   0.93
  Tc(MIN.) =  22.97
  SUBAREA AREA(ACRES) =     9.50       SUBAREA RUNOFF(CFS) =   26.62
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.460
  TOTAL AREA(ACRES) =    103.30         PEAK FLOW RATE(CFS) =     168.76

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.78   FLOW VELOCITY(FEET/SEC.) =   5.00
  LONGEST FLOWPATH FROM NODE  15000.00 TO NODE  15030.00 =  2474.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE  15030.00 TO NODE  15060.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    316.36  DOWNSTREAM(FEET) =    304.68
  CHANNEL LENGTH THRU SUBAREA(FEET) =   597.50   CHANNEL SLOPE =  0.0195
  CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =  27.500
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.329
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8700
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    171.80
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.17
  AVERAGE FLOW DEPTH(FEET) =   0.91   TRAVEL TIME(MIN.) =   2.39
  Tc(MIN.) =  25.35
  SUBAREA AREA(ACRES) =     2.10       SUBAREA RUNOFF(CFS) =    6.08
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.469
  TOTAL AREA(ACRES) =    105.40         PEAK FLOW RATE(CFS) =     168.76

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.91   FLOW VELOCITY(FEET/SEC.) =   4.15
  LONGEST FLOWPATH FROM NODE  15000.00 TO NODE  15060.00 =  3072.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE  15060.00 TO NODE  15060.00 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.) =  25.35
  RAINFALL INTENSITY(INCH/HR) =   3.33
  TOTAL STREAM AREA(ACRES) =   105.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    168.76

****************************************************************************
  FLOW PROCESS FROM NODE  15035.00 TO NODE  15040.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
```

```
S.C.S. CURVE NUMBER (AMC II) =   0
INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
UPSTREAM ELEVATION(FEET) =    393.00
DOWNSTREAM ELEVATION(FEET) =    388.67
ELEVATION DIFFERENCE(FEET) =      4.33
SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.645
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.485
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) =      1.46
TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      1.46

****************************************************************************
FLOW PROCESS FROM NODE  15040.00 TO NODE  15045.00 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    388.67  DOWNSTREAM(FEET) =    344.40
CHANNEL LENGTH THRU SUBAREA(FEET) =   795.20   CHANNEL SLOPE =  0.0557
CHANNEL BASE(FEET) =   70.00   "Z" FACTOR =  15.000
MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.258
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .7500
S.C.S. CURVE NUMBER (AMC II) =   0
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      6.19
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.50
AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   8.83
Tc(MIN.) =  12.48
SUBAREA AREA(ACRES) =     2.20       SUBAREA RUNOFF(CFS) =    8.68
AREA-AVERAGE RUNOFF COEFFICIENT =  0.752
TOTAL AREA(ACRES) =      2.40         PEAK FLOW RATE(CFS) =       9.49

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   1.82
LONGEST FLOWPATH FROM NODE  15035.00 TO NODE  15045.00 =   895.20 FEET.

****************************************************************************
FLOW PROCESS FROM NODE  15045.00 TO NODE  15050.00 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    344.40  DOWNSTREAM(FEET) =    311.40
CHANNEL LENGTH THRU SUBAREA(FEET) =   435.40   CHANNEL SLOPE =  0.0758
CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =  38.500
MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.633
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .7700
S.C.S. CURVE NUMBER (AMC II) =   0
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     16.26
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.68
AVERAGE FLOW DEPTH(FEET) =   0.11   TRAVEL TIME(MIN.) =   2.70
Tc(MIN.) =  15.18
SUBAREA AREA(ACRES) =     3.80       SUBAREA RUNOFF(CFS) =   13.56
AREA-AVERAGE RUNOFF COEFFICIENT =  0.763
TOTAL AREA(ACRES) =      6.20         PEAK FLOW RATE(CFS) =      21.92

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.13   FLOW VELOCITY(FEET/SEC.) =   2.95
LONGEST FLOWPATH FROM NODE  15035.00 TO NODE  15050.00 =  1330.60 FEET.

****************************************************************************
FLOW PROCESS FROM NODE  15050.00 TO NODE  15060.00 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    311.40  DOWNSTREAM(FEET) =    304.68
CHANNEL LENGTH THRU SUBAREA(FEET) =   346.20   CHANNEL SLOPE =  0.0194
```

```
CHANNEL BASE(FEET) =   40.00   "Z" FACTOR =   7.000
MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.221
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .8300
S.C.S. CURVE NUMBER (AMC II) =   0
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     29.27
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.44
AVERAGE FLOW DEPTH(FEET) =   0.29   TRAVEL TIME(MIN.) =   2.36
Tc(MIN.) =  17.54
SUBAREA AREA(ACRES) =     4.20       SUBAREA RUNOFF(CFS) =   14.71
AREA-AVERAGE RUNOFF COEFFICIENT =  0.790
TOTAL AREA(ACRES) =     10.40         PEAK FLOW RATE(CFS) =      34.68

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.31   FLOW VELOCITY(FEET/SEC.) =   2.65
LONGEST FLOWPATH FROM NODE  15035.00 TO NODE  15060.00 =  1676.80 FEET.

****************************************************************************
FLOW PROCESS FROM NODE  15060.00 TO NODE  15060.00 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.) =  17.54
RAINFALL INTENSITY(INCH/HR) =   4.22
TOTAL STREAM AREA(ACRES) =    10.40
PEAK FLOW RATE(CFS) AT CONFLUENCE =     34.68

** CONFLUENCE DATA **
STREAM     RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1      168.76    25.35       3.329       105.40
    2       34.68    17.54       4.221        10.40

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

** PEAK FLOW RATE TABLE **
STREAM     RUNOFF      Tc      INTENSITY
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1      167.76    17.54       4.221
    2      196.11    25.35       3.329

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =    196.11   Tc(MIN.) =   25.35
TOTAL AREA(ACRES) =    115.80
LONGEST FLOWPATH FROM NODE  15000.00 TO NODE  15060.00 =  3072.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE  15060.00 TO NODE  15054.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   304.68  DOWNSTREAM(FEET) =   301.16
FLOW LENGTH(FEET) =   138.79   MANNING'S N =  0.013
DEPTH OF FLOW IN  48.0 INCH PIPE IS  35.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  19.55
ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =    196.11
PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =  25.47
LONGEST FLOWPATH FROM NODE  15000.00 TO NODE  15054.00 =  3210.79 FEET.

****************************************************************************
FLOW PROCESS FROM NODE  15054.00 TO NODE  15054.00 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.) =  25.47
  RAINFALL INTENSITY(INCH/HR) =   3.32
  TOTAL STREAM AREA(ACRES) =   115.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    196.11

****************************************************************************
  FLOW PROCESS FROM NODE  15051.00 TO NODE  15052.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8700
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    318.45
  DOWNSTREAM ELEVATION(FEET) =    317.95
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.927
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.485
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      2.48
  TOTAL AREA(ACRES) =      0.30   TOTAL RUNOFF(CFS) =      2.48

****************************************************************************
  FLOW PROCESS FROM NODE  15052.00 TO NODE  15053.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  317.95  DOWNSTREAM ELEVATION(FEET) =  308.76
  STREET LENGTH(FEET) =   983.50   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 39.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  19.50
  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) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.90
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.43
    HALFSTREET FLOOD WIDTH(FEET) =   15.04
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.29
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.98
  STREET FLOW TRAVEL TIME(MIN.) =   7.15   Tc(MIN.) =  10.08
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.035
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =     3.10      SUBAREA RUNOFF(CFS) =   16.28
  TOTAL AREA(ACRES) =       3.40        PEAK FLOW RATE(CFS) =      17.85

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.49   HALFSTREET FLOOD WIDTH(FEET) =  18.27
  FLOW VELOCITY(FEET/SEC.) =  2.58   DEPTH*VELOCITY(FT*FT/SEC.) =   1.27
  *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
         AND L =  983.5 FT WITH ELEVATION-DROP =   9.2 FT, IS   25.6 CFS,
         WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE  15053.00
  LONGEST FLOWPATH FROM NODE  15051.00 TO NODE  15053.00 =  1033.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE  15053.00 TO NODE  15054.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
ELEVATION DATA: UPSTREAM(FEET) =   303.00  DOWNSTREAM(FEET) =   301.61
FLOW LENGTH(FEET) =   105.75   MANNING'S N =  0.013
DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   8.54
ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =     17.85
PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =  10.29
LONGEST FLOWPATH FROM NODE  15051.00 TO NODE  15054.00 =  1139.25 FEET.

****************************************************************************
FLOW PROCESS FROM NODE  15054.00 TO NODE  15054.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==========================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =  10.29
RAINFALL INTENSITY(INCH/HR) =   5.96
TOTAL STREAM AREA(ACRES) =     3.40
PEAK FLOW RATE(CFS) AT CONFLUENCE =     17.85

** CONFLUENCE DATA **
STREAM     RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1      196.11    25.47        3.319        115.80
    2       17.85    10.29        5.957          3.40

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

** PEAK FLOW RATE TABLE **
STREAM     RUNOFF      Tc      INTENSITY
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1      127.11    10.29       5.957
    2      206.05    25.47       3.319

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =    206.05   Tc(MIN.) =   25.47
TOTAL AREA(ACRES) =    119.20
LONGEST FLOWPATH FROM NODE  15000.00 TO NODE  15054.00 =  3210.79 FEET.

****************************************************************************
FLOW PROCESS FROM NODE  15054.00 TO NODE  15070.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
ELEVATION DATA: UPSTREAM(FEET) =   301.61  DOWNSTREAM(FEET) =   301.16
FLOW LENGTH(FEET) =    45.21   MANNING'S N =  0.013
DEPTH OF FLOW IN  57.0 INCH PIPE IS  44.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  13.81
ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =    206.05
PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =  25.53
LONGEST FLOWPATH FROM NODE  15000.00 TO NODE  15070.00 =  3256.00 FEET.
==========================================================================
END OF STUDY SUMMARY:
TOTAL AREA(ACRES)      =    119.20  TC(MIN.) =     25.53
PEAK FLOW RATE(CFS)    =    206.05
==========================================================================
==========================================================================
END OF RATIONAL METHOD ANALYSIS
```

Drainage Basin 16000

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                        2003,1985,1981 HYDROLOGY MANUAL
        (c) Copyright 1982-2003 Advanced Engineering Software (aes)
            Ver. 1.5A Release Date: 01/01/2003  License ID 1261

                          Analysis prepared by:



 ************************** DESCRIPTION OF STUDY **************************
* Meadowood   J-15956   7-30-09                                            *
* Basin 16000 off site improvements, 100 year event, 6 hours               *
*                                                                          *
 ****************************************************************************

  FILE NAME: MW16000.DAT
  TIME/DATE OF STUDY: 14:49 08/10/2009
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.600
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:  CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0   0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

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

+--------------------------------------------------------------------------+
| User specified information obtained from on site analysis                |
| for drainage basin 3000                                                  |
| (detained flow)                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE   3000.00 TO NODE   3000.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  20.36   RAIN INTENSITY(INCH/HOUR) =  3.83
  TOTAL AREA(ACRES) =    61.60   TOTAL RUNOFF(CFS) =     74.10

****************************************************************************
  FLOW PROCESS FROM NODE   3000.00 TO NODE  16000.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    427.02  DOWNSTREAM(FEET) =    353.34
```

```
CHANNEL LENGTH THRU SUBAREA(FEET) =  1266.06   CHANNEL SLOPE =  0.0582
CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =  10.000
MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.373
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .7000
S.C.S. CURVE NUMBER (AMC II) =   0
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     83.04
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.71
AVERAGE FLOW DEPTH(FEET) =   0.33   TRAVEL TIME(MIN.) =   4.48
Tc(MIN.) =  24.84
SUBAREA AREA(ACRES) =     7.60       SUBAREA RUNOFF(CFS) =   17.94
AREA-AVERAGE RUNOFF COEFFICIENT =  0.356
TOTAL AREA(ACRES) =     69.20         PEAK FLOW RATE(CFS) =      83.12

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.33   FLOW VELOCITY(FEET/SEC.) =   4.71
LONGEST FLOWPATH FROM NODE      0.00 TO NODE  16000.00 =  1266.06 FEET.

****************************************************************************
FLOW PROCESS FROM NODE  16000.00 TO NODE  16000.00 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.) =  24.84
RAINFALL INTENSITY(INCH/HR) =   3.37
TOTAL STREAM AREA(ACRES) =    69.20
PEAK FLOW RATE(CFS) AT CONFLUENCE =     83.12

+--------------------------------------------------------------------------+
| User specified information obtained from on site analysis                |
| for drainage basin 4000                                                  |
| (detained flow)                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
FLOW PROCESS FROM NODE   4000.00 TO NODE   4000.00 IS CODE =   7
----------------------------------------------------------------------------
>>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
USER-SPECIFIED VALUES ARE AS FOLLOWS:
TC(MIN) =  10.98   RAIN INTENSITY(INCH/HOUR) =  5.71
TOTAL AREA(ACRES) =    11.20   TOTAL RUNOFF(CFS) =     16.90

****************************************************************************
FLOW PROCESS FROM NODE   4000.00 TO NODE  16000.00 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    380.66  DOWNSTREAM(FEET) =    353.34
CHANNEL LENGTH THRU SUBAREA(FEET) =   215.00   CHANNEL SLOPE =  0.1271
CHANNEL BASE(FEET) =   30.00   "Z" FACTOR =  20.000
MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.419
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .7700
S.C.S. CURVE NUMBER (AMC II) =   0
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     17.73
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.86
AVERAGE FLOW DEPTH(FEET) =   0.14   TRAVEL TIME(MIN.) =   0.93
Tc(MIN.) =  11.91
SUBAREA AREA(ACRES) =     0.40       SUBAREA RUNOFF(CFS) =    1.67
AREA-AVERAGE RUNOFF COEFFICIENT =  0.282
TOTAL AREA(ACRES) =     11.60         PEAK FLOW RATE(CFS) =      17.71

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.14   FLOW VELOCITY(FEET/SEC.) =   3.85
LONGEST FLOWPATH FROM NODE      0.00 TO NODE  16000.00 =   215.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE  16000.00 TO NODE  16000.00 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.) =  11.91
  RAINFALL INTENSITY(INCH/HR) =   5.42
  TOTAL STREAM AREA(ACRES) =    11.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     17.71

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
     1       83.12    24.84        3.373         69.20
     2       17.71    11.91        5.419         11.60

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       57.55    11.91        5.419
     2       94.14    24.84        3.373

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     94.14   Tc(MIN.) =   24.84
  TOTAL AREA(ACRES) =     80.80
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE  16000.00 =  1266.06 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE  16000.00 TO NODE  16005.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    353.44  DOWNSTREAM(FEET) =    324.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   613.26   CHANNEL SLOPE =  0.0480
  CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   9.400
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.226
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     99.72
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.77
  AVERAGE FLOW DEPTH(FEET) =   0.57   TRAVEL TIME(MIN.) =   1.77
  Tc(MIN.) =  26.61
  SUBAREA AREA(ACRES) =     4.50       SUBAREA RUNOFF(CFS) =   11.18
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.368
  TOTAL AREA(ACRES) =     85.30         PEAK FLOW RATE(CFS) =     101.22

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.58   FLOW VELOCITY(FEET/SEC.) =   5.77
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE  16005.00 =  1879.32 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE  16005.00 TO NODE  16010.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   324.00  DOWNSTREAM(FEET) =   320.29
  FLOW LENGTH(FEET) =   167.90   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  28.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.81
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =    101.22
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =  26.79
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE  16010.00 =  2047.22 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE  16010.00 TO NODE  16015.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    320.29  DOWNSTREAM(FEET) =    304.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   499.38   CHANNEL SLOPE =  0.0326
  CHANNEL BASE(FEET) =   20.00   "Z" FACTOR = 12.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.094
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    108.13
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.17
  AVERAGE FLOW DEPTH(FEET) =   0.73   TRAVEL TIME(MIN.) =   1.61
  Tc(MIN.) =  28.40
  SUBAREA AREA(ACRES) =     5.80       SUBAREA RUNOFF(CFS) =   13.82
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.393
  TOTAL AREA(ACRES) =     91.10         PEAK FLOW RATE(CFS) =     110.89

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.74   FLOW VELOCITY(FEET/SEC.) =   5.23
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE  16015.00 =  2546.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE  16015.00 TO NODE  16020.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   304.00  DOWNSTREAM(FEET) =   302.61
  FLOW LENGTH(FEET) =   167.09   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  35.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.18
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =    110.89
  PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =  28.65
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE  16020.00 =  2713.69 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =    91.10  TC(MIN.) =     28.65
  PEAK FLOW RATE(CFS)    =   110.89
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Drainage Basin 17000

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

          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                       2003,1985,1981 HYDROLOGY MANUAL
        (c) Copyright 1982-2003 Advanced Engineering Software (aes)
            Ver. 1.5A Release Date: 01/01/2003  License ID 1261

                          Analysis prepared by:



 ************************** DESCRIPTION OF STUDY **************************
* Meadowood J-15956 8-7-09                                                 *
* Drainage Basin 17000 Off Site Improvements,                              *
* 100 year-6 hour storm event, ST                                          *
 ****************************************************************************

  FILE NAME: MW17000.DAT
  TIME/DATE OF STUDY: 07:29 08/11/2009
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.600
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)   (FT)  (FT)  (FT)    (n)
===  =====  =========  ==================  ======  =====  ======  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

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

****************************************************************************
  FLOW PROCESS FROM NODE  17000.00 TO NODE  17005.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    321.10
  DOWNSTREAM ELEVATION(FEET) =    318.00
  ELEVATION DIFFERENCE(FEET) =      3.10
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =   10.493
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.880
  SUBAREA RUNOFF(CFS) =      0.44
  TOTAL AREA(ACRES) =      0.30   TOTAL RUNOFF(CFS) =      0.44

****************************************************************************
  FLOW PROCESS FROM NODE  17005.00 TO NODE  17010.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
```

```
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    318.00  DOWNSTREAM(FEET) =    293.15
  CHANNEL LENGTH THRU SUBAREA(FEET) =   322.44   CHANNEL SLOPE =  0.0771
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   0.000
  MANNING'S FACTOR = 0.016   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.592
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      1.77
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.31
  AVERAGE FLOW DEPTH(FEET) =   0.14   TRAVEL TIME(MIN.) =   0.85
  Tc(MIN.) =  11.34
  SUBAREA AREA(ACRES) =     1.90       SUBAREA RUNOFF(CFS) =    2.66
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.250
  TOTAL AREA(ACRES) =      2.20         PEAK FLOW RATE(CFS) =       3.08

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.20   FLOW VELOCITY(FEET/SEC.) =   7.87
  LONGEST FLOWPATH FROM NODE  17000.00 TO NODE  17010.00 =   422.44 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE  17010.00 TO NODE  17015.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   293.15  DOWNSTREAM(FEET) =   275.00
  FLOW LENGTH(FEET) =   185.30   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.23
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      3.08
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =  11.62
  LONGEST FLOWPATH FROM NODE  17000.00 TO NODE  17015.00 =   607.74 FEET.
==========================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      2.20  TC(MIN.) =     11.62
  PEAK FLOW RATE(CFS)   =      3.08
==========================================================================
==========================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Drainage Basin 18000

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            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
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            Ver. 1.5A Release Date: 01/01/2003  License ID 1261

                          Analysis prepared by:



 ************************** DESCRIPTION OF STUDY **************************
* Meadowood J-15956 8-7-09                                                 *
* Drainage Basin 18000 Off Site Improvements,                              *
* 100 year-6 hours storm event, ST                                         *
 ****************************************************************************

  FILE NAME: MW18000.DAT
  TIME/DATE OF STUDY: 13:50 08/10/2009
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.600
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  =====  ======  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

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

****************************************************************************
  FLOW PROCESS FROM NODE  18000.00 TO NODE  18005.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8700
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    317.92
  DOWNSTREAM ELEVATION(FEET) =    317.20
  ELEVATION DIFFERENCE(FEET) =      0.72
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.018
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.485
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.65
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      1.65

****************************************************************************
  FLOW PROCESS FROM NODE  18005.00 TO NODE  18010.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
>>>>>(STANDARD CURB SECTION USED)<<<<<
================================================================================
UPSTREAM ELEVATION(FEET) =  317.20  DOWNSTREAM ELEVATION(FEET) =  305.47
STREET LENGTH(FEET) =   710.07   CURB HEIGHT(INCHES) =  6.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  10.00
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) =   0.0180
Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

  **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.07
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.32
  HALFSTREET FLOOD WIDTH(FEET) =    9.77
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.36
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.76
STREET FLOW TRAVEL TIME(MIN.) =   5.01   Tc(MIN.) =   8.02
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.991
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .8700
S.C.S. CURVE NUMBER (AMC II) =   0
AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
SUBAREA AREA(ACRES) =     1.10      SUBAREA RUNOFF(CFS) =    6.69
TOTAL AREA(ACRES) =       1.30        PEAK FLOW RATE(CFS) =       7.91

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  11.76
FLOW VELOCITY(FEET/SEC.) =  2.63   DEPTH*VELOCITY(FT*FT/SEC.) =   0.95
LONGEST FLOWPATH FROM NODE  18000.00 TO NODE  18010.00 =   770.07 FEET.

****************************************************************************
FLOW PROCESS FROM NODE  18010.00 TO NODE  18020.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
ELEVATION DATA: UPSTREAM(FEET) =   274.77  DOWNSTREAM(FEET) =   273.76
FLOW LENGTH(FEET) =   161.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   5.29
ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =       7.91
PIPE TRAVEL TIME(MIN.) =   0.51    Tc(MIN.) =   8.53
LONGEST FLOWPATH FROM NODE  18000.00 TO NODE  18020.00 =   931.07 FEET.
================================================================================
END OF STUDY SUMMARY:
TOTAL AREA(ACRES)      =      1.30  TC(MIN.) =      8.53
PEAK FLOW RATE(CFS)    =      7.91
================================================================================
================================================================================
END OF RATIONAL METHOD ANALYSIS
```

Drainage Basin 19000

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

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            Ver. 1.5A Release Date: 01/01/2003  License ID 1261

                          Analysis prepared by:

 ************************** DESCRIPTION OF STUDY **************************
* Meadowood J-15956 8-7-09                                                 *
* Drainage Basin 19000 Off Site Improvements,                              *
* 100 year-6 hours storm event, ST                                         *
 ***************************************************************************

  FILE NAME: MW19000.DAT
  TIME/DATE OF STUDY: 09:20 08/11/2009
---------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
---------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.600
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  =====  ======  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

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

****************************************************************************
  FLOW PROCESS FROM NODE  19000.00 TO NODE  19005.00 IS CODE =  21
---------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8700
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    304.61
  DOWNSTREAM ELEVATION(FEET) =    303.21
  ELEVATION DIFFERENCE(FEET) =      1.40
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.749
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.485
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.65
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      1.65

****************************************************************************
  FLOW PROCESS FROM NODE  19005.00 TO NODE  19010.00 IS CODE =  61
---------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
>>>>>(STANDARD CURB SECTION USED)<<<<<
==============================================================================
UPSTREAM ELEVATION(FEET) =  303.21  DOWNSTREAM ELEVATION(FEET) =  288.82
STREET LENGTH(FEET) =   730.36   CURB HEIGHT(INCHES) =  6.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  10.00
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) =   0.0180
Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

  **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.96
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.31
  HALFSTREET FLOOD WIDTH(FEET) =    9.30
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.52
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.79
STREET FLOW TRAVEL TIME(MIN.) =   4.83   Tc(MIN.) =   7.58
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.254
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .8100
S.C.S. CURVE NUMBER (AMC II) =   0
AREA-AVERAGE RUNOFF COEFFICIENT =  0.819
SUBAREA AREA(ACRES) =     1.10      SUBAREA RUNOFF(CFS) =    6.46
TOTAL AREA(ACRES) =       1.30        PEAK FLOW RATE(CFS) =       7.73

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  11.21
FLOW VELOCITY(FEET/SEC.) =  2.81   DEPTH*VELOCITY(FT*FT/SEC.) =   0.98
LONGEST FLOWPATH FROM NODE  19000.00 TO NODE  19010.00 =   800.36 FEET.

****************************************************************************
FLOW PROCESS FROM NODE  19010.00 TO NODE  19010.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =   7.58
RAINFALL INTENSITY(INCH/HR) =   7.25
TOTAL STREAM AREA(ACRES) =     1.30
PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.73

****************************************************************************
FLOW PROCESS FROM NODE  19015.00 TO NODE  19020.00 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .8400
S.C.S. CURVE NUMBER (AMC II) =   0
INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
UPSTREAM ELEVATION(FEET) =    306.43
DOWNSTREAM ELEVATION(FEET) =    302.00
ELEVATION DIFFERENCE(FEET) =      4.43
SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.850
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.485
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) =      4.78
TOTAL AREA(ACRES) =      0.60   TOTAL RUNOFF(CFS) =      4.78

****************************************************************************
FLOW PROCESS FROM NODE  19020.00 TO NODE  19025.00 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
```

```
ELEVATION DATA: UPSTREAM(FEET) =    302.00  DOWNSTREAM(FEET) =    267.78
CHANNEL LENGTH THRU SUBAREA(FEET) =   394.45   CHANNEL SLOPE =  0.0868
CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   0.000
MANNING'S FACTOR = 0.016   MAXIMUM DEPTH(FEET) =  10.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.485
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .8100
S.C.S. CURVE NUMBER (AMC II) =   0
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     19.38
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  14.70
AVERAGE FLOW DEPTH(FEET) =   0.66   TRAVEL TIME(MIN.) =   0.45
Tc(MIN.) =   3.30
SUBAREA AREA(ACRES) =     3.80       SUBAREA RUNOFF(CFS) =   29.19
AREA-AVERAGE RUNOFF COEFFICIENT =  0.814
TOTAL AREA(ACRES) =      4.40         PEAK FLOW RATE(CFS) =      33.98

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.99   FLOW VELOCITY(FEET/SEC.) =  17.18
LONGEST FLOWPATH FROM NODE  19015.00 TO NODE  19025.00 =   494.45 FEET.

****************************************************************************
FLOW PROCESS FROM NODE  19025.00 TO NODE  19010.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   267.78  DOWNSTREAM(FEET) =   267.03
FLOW LENGTH(FEET) =    74.95   MANNING'S N =  0.013
DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   8.94
ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =     33.98
PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =   3.44
LONGEST FLOWPATH FROM NODE  19015.00 TO NODE  19010.00 =   569.40 FEET.

****************************************************************************
FLOW PROCESS FROM NODE  19010.00 TO NODE  19010.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =   3.44
RAINFALL INTENSITY(INCH/HR) =   9.49
TOTAL STREAM AREA(ACRES) =     4.40
PEAK FLOW RATE(CFS) AT CONFLUENCE =     33.98

** CONFLUENCE DATA **
STREAM     RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1        7.73     7.58        7.254         1.30
    2       33.98     3.44        9.485         4.40

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

** PEAK FLOW RATE TABLE **
STREAM     RUNOFF      Tc      INTENSITY
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1       37.48     3.44       9.485
    2       33.71     7.58       7.254

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =     37.48   Tc(MIN.) =    3.44
TOTAL AREA(ACRES) =      5.70
LONGEST FLOWPATH FROM NODE  19000.00 TO NODE  19010.00 =   800.36 FEET.

****************************************************************************
FLOW PROCESS FROM NODE  19010.00 TO NODE  19030.00 IS CODE =  31
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   267.03  DOWNSTREAM(FEET) =   266.33
  FLOW LENGTH(FEET) =    65.18   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.33
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     37.48
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   3.55
  LONGEST FLOWPATH FROM NODE  19000.00 TO NODE  19030.00 =   865.54 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =      5.70  TC(MIN.) =      3.55
  PEAK FLOW RATE(CFS)    =     37.48
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Drainage Basin 20000

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

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                       2003,1985,1981 HYDROLOGY MANUAL
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             Ver. 1.5A Release Date: 01/01/2003  License ID 1261

                          Analysis prepared by:



 ************************** DESCRIPTION OF STUDY **************************
* Meadowood J-15956 8-7-09                                                 *
* Drainage Basin 20000 Off Site Improvements,                              *
* 100 year-6 hours storm event, ST                                         *
 ****************************************************************************

  FILE NAME: MW20000.DAT
  TIME/DATE OF STUDY: 09:40 08/14/2009
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.600
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  =====  ======  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

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

****************************************************************************
  FLOW PROCESS FROM NODE  20000.00 TO NODE  20005.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8700
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    287.33
  DOWNSTREAM ELEVATION(FEET) =    285.95
  ELEVATION DIFFERENCE(FEET) =      1.38
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.762
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.485
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.65
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      1.65

****************************************************************************
  FLOW PROCESS FROM NODE  20005.00 TO NODE  20010.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>(STANDARD CURB SECTION USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =  285.95  DOWNSTREAM ELEVATION(FEET) =  267.87
  STREET LENGTH(FEET) =   751.96   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  10.00
  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) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.39
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    9.24
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.78
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.86
  STREET FLOW TRAVEL TIME(MIN.) =   4.51   Tc(MIN.) =   7.28
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.447
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.827
  SUBAREA AREA(ACRES) =     1.20      SUBAREA RUNOFF(CFS) =    7.33
  TOTAL AREA(ACRES) =       1.40        PEAK FLOW RATE(CFS) =       8.62

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  11.29
  FLOW VELOCITY(FEET/SEC.) =  3.10   DEPTH*VELOCITY(FT*FT/SEC.) =   1.09
  LONGEST FLOWPATH FROM NODE  20000.00 TO NODE  20010.00 =   821.96 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE  20010.00 TO NODE  20015.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   261.91  DOWNSTREAM(FEET) =   261.45
  FLOW LENGTH(FEET) =    46.31   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.33
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.62
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   7.40
  LONGEST FLOWPATH FROM NODE  20000.00 TO NODE  20015.00 =   868.27 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE  20015.00 TO NODE  20015.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
==============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE  20020.00 TO NODE  20025.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8700
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    271.47
  DOWNSTREAM ELEVATION(FEET) =    270.87
  ELEVATION DIFFERENCE(FEET) =      0.60
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.207
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.485
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
```

```
  SUBAREA RUNOFF(CFS) =       1.65
  TOTAL AREA(ACRES) =       0.20   TOTAL RUNOFF(CFS) =       1.65

****************************************************************************
  FLOW PROCESS FROM NODE  20025.00 TO NODE  20030.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  270.87  DOWNSTREAM ELEVATION(FEET) =  266.16
  STREET LENGTH(FEET) =   487.33   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  10.00
  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) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.87
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =    9.77
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.80
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.58
  STREET FLOW TRAVEL TIME(MIN.) =   4.50   Tc(MIN.) =   7.71
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.175
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =     0.70      SUBAREA RUNOFF(CFS) =     4.37
  TOTAL AREA(ACRES) =       0.90        PEAK FLOW RATE(CFS) =       5.62

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  11.45
  FLOW VELOCITY(FEET/SEC.) =  1.97   DEPTH*VELOCITY(FT*FT/SEC.) =   0.70
  LONGEST FLOWPATH FROM NODE  20020.00 TO NODE  20030.00 =   547.33 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE  20030.00 TO NODE  20015.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   262.46  DOWNSTREAM(FEET) =   261.45
  FLOW LENGTH(FEET) =   101.43   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.80
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.62
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =   8.00
  LONGEST FLOWPATH FROM NODE  20020.00 TO NODE  20015.00 =   648.76 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE  20015.00 TO NODE  20015.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE  20035.00 TO NODE  20040.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8700
```

```
S.C.S. CURVE NUMBER (AMC II) =   0
INITIAL SUBAREA FLOW-LENGTH(FEET) =    68.00
UPSTREAM ELEVATION(FEET) =    275.28
DOWNSTREAM ELEVATION(FEET) =    274.06
ELEVATION DIFFERENCE(FEET) =      1.22
SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.810
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.485
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) =      1.65
TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      1.65

****************************************************************************
FLOW PROCESS FROM NODE  20040.00 TO NODE  20045.00 IS CODE =  61
----------------------------------------------------------------------------
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
UPSTREAM ELEVATION(FEET) =  274.06  DOWNSTREAM ELEVATION(FEET) =  272.73
STREET LENGTH(FEET) =   310.16   CURB HEIGHT(INCHES) =  6.0
STREET HALFWIDTH(FEET) = 23.49

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  11.75
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) =   0.0180
Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

  **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.35
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.34
  HALFSTREET FLOOD WIDTH(FEET) =   10.90
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.28
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.44
STREET FLOW TRAVEL TIME(MIN.) =   4.03   Tc(MIN.) =   6.84
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.750
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .8700
S.C.S. CURVE NUMBER (AMC II) =   0
AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
SUBAREA AREA(ACRES) =    0.50      SUBAREA RUNOFF(CFS) =    3.37
TOTAL AREA(ACRES) =      0.70        PEAK FLOW RATE(CFS) =       4.72

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  12.52
FLOW VELOCITY(FEET/SEC.) =  1.40   DEPTH*VELOCITY(FT*FT/SEC.) =   0.53
LONGEST FLOWPATH FROM NODE  20035.00 TO NODE  20045.00 =   378.16 FEET.

****************************************************************************
FLOW PROCESS FROM NODE  20045.00 TO NODE  20045.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =   6.84
RAINFALL INTENSITY(INCH/HR) =   7.75
TOTAL STREAM AREA(ACRES) =     0.70
PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.72

****************************************************************************
FLOW PROCESS FROM NODE  20046.00 TO NODE  20047.00 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .5500
S.C.S. CURVE NUMBER (AMC II) =   0
INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
```

```
UPSTREAM ELEVATION(FEET) =    266.20
DOWNSTREAM ELEVATION(FEET) =    265.00
ELEVATION DIFFERENCE(FEET) =      1.20
SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.960
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
         THE MAXIMUM OVERLAND FLOW LENGTH =    73.00
         (Reference: Table 3-1B of Hydrology Manual)
         THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.027
SUBAREA RUNOFF(CFS) =      0.77
TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.77

****************************************************************************
FLOW PROCESS FROM NODE  20047.00 TO NODE  20048.00 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    265.00  DOWNSTREAM(FEET) =    263.50
CHANNEL LENGTH THRU SUBAREA(FEET) =   439.43   CHANNEL SLOPE =  0.0034
CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
MANNING'S FACTOR = 0.016   MAXIMUM DEPTH(FEET) =  10.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.686
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .6900
S.C.S. CURVE NUMBER (AMC II) =   0
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      3.13
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.37
AVERAGE FLOW DEPTH(FEET) =   0.36   TRAVEL TIME(MIN.) =   3.09
Tc(MIN.) =  11.05
SUBAREA AREA(ACRES) =     1.20       SUBAREA RUNOFF(CFS) =    4.71
AREA-AVERAGE RUNOFF COEFFICIENT =  0.670
TOTAL AREA(ACRES) =      1.40         PEAK FLOW RATE(CFS) =       5.33

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.48   FLOW VELOCITY(FEET/SEC.) =   2.78
LONGEST FLOWPATH FROM NODE  20046.00 TO NODE  20048.00 =   539.43 FEET.

****************************************************************************
FLOW PROCESS FROM NODE  20048.00 TO NODE  20045.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   263.50  DOWNSTREAM(FEET) =   262.11
FLOW LENGTH(FEET) =    38.73   MANNING'S N =  0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   9.18
ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      5.33
PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =  11.12
LONGEST FLOWPATH FROM NODE  20046.00 TO NODE  20045.00 =   578.16 FEET.

****************************************************************************
FLOW PROCESS FROM NODE  20045.00 TO NODE  20045.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =  11.12
RAINFALL INTENSITY(INCH/HR) =   5.66
TOTAL STREAM AREA(ACRES) =     1.40
PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.33

** CONFLUENCE DATA **
STREAM     RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1        4.72     6.84        7.750         0.70
```

```
    2        5.33    11.12        5.663          1.40

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1         8.00     6.84       7.750
    2         8.78    11.12       5.663

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      8.78   Tc(MIN.) =   11.12
  TOTAL AREA(ACRES) =      2.10
  LONGEST FLOWPATH FROM NODE  20046.00 TO NODE  20045.00 =   578.16 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE  20045.00 TO NODE  20015.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   262.11  DOWNSTREAM(FEET) =   261.45
  FLOW LENGTH(FEET) =    65.73   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.38
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      8.78
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =  11.30
  LONGEST FLOWPATH FROM NODE  20046.00 TO NODE  20015.00 =   643.89 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE  20015.00 TO NODE  20015.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
    1         8.78    11.30       5.607        2.10
  LONGEST FLOWPATH FROM NODE  20046.00 TO NODE  20015.00 =   643.89 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
    1         8.62     7.40       7.367        1.40
  LONGEST FLOWPATH FROM NODE  20000.00 TO NODE  20015.00 =   868.27 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
    1       14.37       7.40       7.367
    2       15.35      11.30       5.607

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     15.35   Tc(MIN.) =   11.30
  TOTAL AREA(ACRES) =      3.50

****************************************************************************
  FLOW PROCESS FROM NODE  20015.00 TO NODE  20015.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
    1        15.35    11.30       5.607        3.50
  LONGEST FLOWPATH FROM NODE  20000.00 TO NODE  20015.00 =   868.27 FEET.
```

```
** MEMORY BANK #  2 CONFLUENCE DATA **
STREAM      RUNOFF      Tc       INTENSITY      AREA
NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
    1         5.62     8.00        7.005         0.90
LONGEST FLOWPATH FROM NODE  20020.00 TO NODE  20015.00 =   648.76 FEET.

** PEAK FLOW RATE TABLE **
STREAM     RUNOFF       Tc       INTENSITY
NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
    1       16.48       8.00        7.005
    2       19.84      11.30        5.607

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =     19.84   Tc(MIN.) =   11.30
TOTAL AREA(ACRES) =      4.40

****************************************************************************
FLOW PROCESS FROM NODE  20015.00 TO NODE  20015.00 IS CODE =  12
----------------------------------------------------------------------------
>>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
FLOW PROCESS FROM NODE  20015.00 TO NODE  20015.00 IS CODE =  12
----------------------------------------------------------------------------
>>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
FLOW PROCESS FROM NODE  20015.00 TO NODE  20050.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   261.45  DOWNSTREAM(FEET) =   260.50
FLOW LENGTH(FEET) =    95.17   MANNING'S N =  0.013
DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   7.75
ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =     19.84
PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =  11.50
LONGEST FLOWPATH FROM NODE  20000.00 TO NODE  20050.00 =   963.44 FEET.
============================================================================
END OF STUDY SUMMARY:
TOTAL AREA(ACRES)      =      4.40  TC(MIN.) =     11.50
PEAK FLOW RATE(CFS)    =     19.84
============================================================================
============================================================================
END OF RATIONAL METHOD ANALYSIS
```

Drainage Basin 21000

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
        (c) Copyright 1982-2003 Advanced Engineering Software (aes)
            Ver. 1.5A Release Date: 01/01/2003  License ID 1261

                          Analysis prepared by:



 ************************** DESCRIPTION OF STUDY **************************
* Meadowood J-15956 8-7-09                                                 *
* Drainage Basin 21000 Off Site Improvements,                              *
* 100 year-6 hours storm event, ST                                         *
 ****************************************************************************

  FILE NAME: MW21000.DAT
  TIME/DATE OF STUDY: 09:40 08/11/2009
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.600
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

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

****************************************************************************
  FLOW PROCESS FROM NODE  21000.00 TO NODE  21005.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8400
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    266.30
  DOWNSTREAM ELEVATION(FEET) =    265.60
  ELEVATION DIFFERENCE(FEET) =      0.70
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.014
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    58.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.485
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.59
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      1.59
```

```
****************************************************************************
  FLOW PROCESS FROM NODE  21005.00 TO NODE  21010.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    265.60  DOWNSTREAM(FEET) =    264.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   800.85   CHANNEL SLOPE =  0.0020
  CHANNEL BASE(FEET) =   40.00   "Z" FACTOR =  95.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.540
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7600
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     15.63
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.70
  AVERAGE FLOW DEPTH(FEET) =   0.32   TRAVEL TIME(MIN.) =  19.03
  Tc(MIN.) =  23.04
  SUBAREA AREA(ACRES) =     9.20       SUBAREA RUNOFF(CFS) =   24.75
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.762
  TOTAL AREA(ACRES) =      9.40         PEAK FLOW RATE(CFS) =      25.35

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.41   FLOW VELOCITY(FEET/SEC.) =   0.79
  LONGEST FLOWPATH FROM NODE  21000.00 TO NODE  21010.00 =   900.85 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE  21010.00 TO NODE  21015.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   264.00  DOWNSTREAM(FEET) =   262.59
  FLOW LENGTH(FEET) =   140.85   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.32
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     25.35
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =  23.33
  LONGEST FLOWPATH FROM NODE  21000.00 TO NODE  21015.00 =  1041.70 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =      9.40  TC(MIN.) =     23.33
  PEAK FLOW RATE(CFS)    =     25.35
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
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