

PRELIMINARY HYDROLOGY CALCULATIONS

FOR

**SYCAMORE V
6275 LANCE DRIVE
RIVERSIDE, CALIFORNIA**

PREPARED FOR

**HILLWOOD INVESTMENTS
901 VIA PIEMONTE, SUITE 175
ONTARIO, CA 91764
PHONE: (909) 382-0033
FAX: (909) 382-0073**

**JUNE 23, 2015
REVISED: DECEMBER 8, 2015
REVISED: MARCH 30, 2016
REVISED: JUNE 17, 2016**

JOB NO. 3261

PREPARED BY

**THIENES ENGINEERING
14349 FIRESTONE BLVD.
LA MIRADA, CALIFORNIA 90638
(714) 521-4811**

**PRELIMINARY HYDROLOGY
CALCULATIONS**

FOR

SYCAMORE V

PREPARED BY RICKY HWA
UNDER THE SUPERVISION OF

REINHARD STENZEL DATE:
R.C.E. 56155
EXP. 12/31/16

INTRODUCTION

A: PROJECT LOCATION

The project site is located on the west side of Lance Drive, north of Sierra Ridge Drive, south of Dan Kipper Drive in the City of Riverside, California. Please see following page for vicinity map.

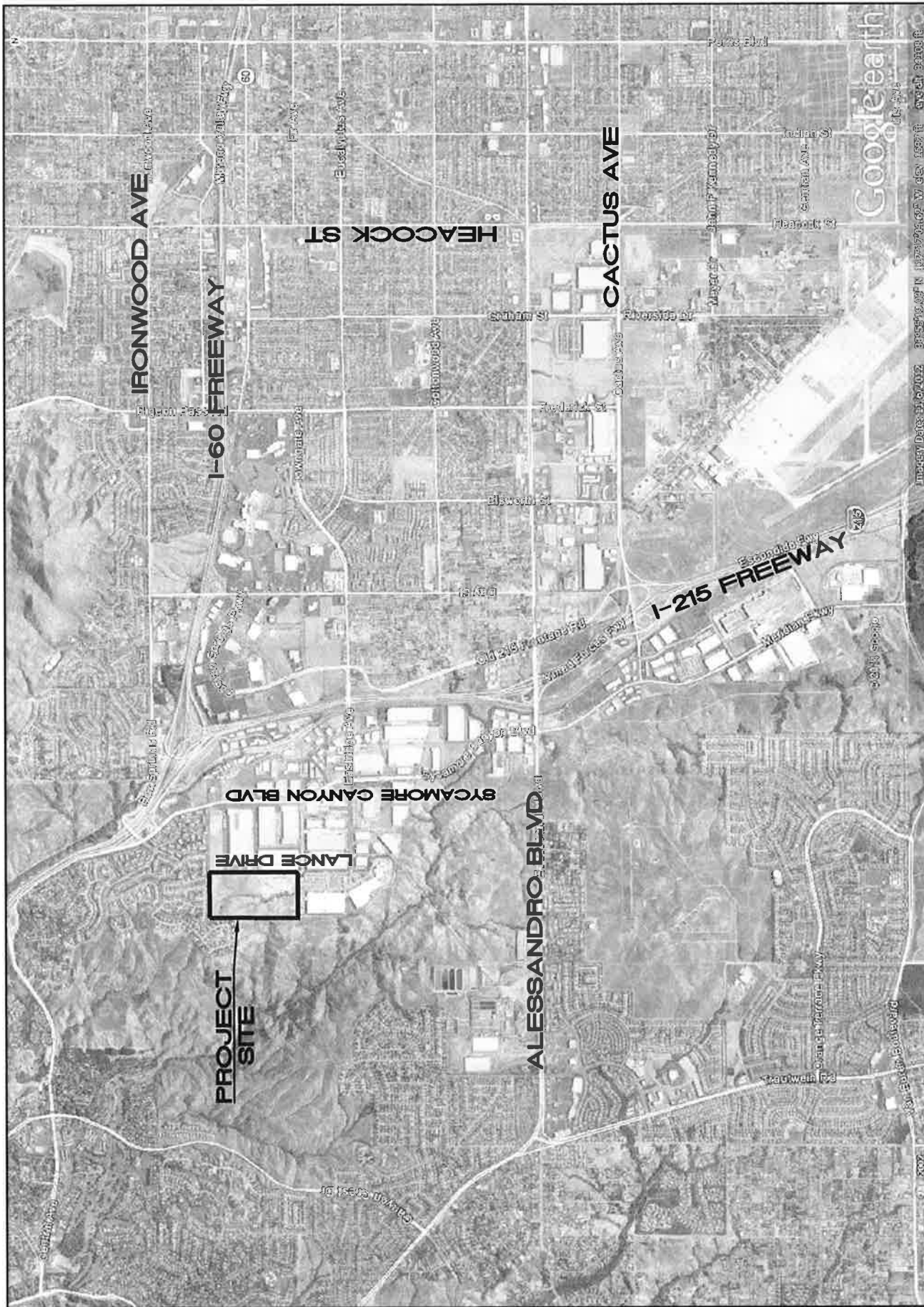
B: STUDY PURPOSE

The purpose of this study is to determine the proposed condition 100-year peak flow rate from the project site that will ultimately drain to the existing 120-inch Eastridge Avenue storm drain south of the site.

C: PROJECT STAFF:

Thienes Engineering staff involved in this study include:

Reinhard Stenzel
Brian Weil
Ricky Hwa



DISCUSSION

The project site encompasses approximately 71.50 acres. Proposed improvements to the site consist of two commercial buildings of approximately 1,012,995 square feet for Building 1 and 362,174 square feet for Building 2. There will be truck yards and vehicle parking lots adjacent to each building. The remainder of the site will be reserved for landscaping. A public storm drain in Lance Drive will be constructed to convey runoff from the project site and the north-westerly offsite residential development to an existing storm drain south of the site.

Master Plan Drainage

Per the Sycamore Canyon Business Park Onsite Hydrology Map and as-built storm drain plans by Albert A. Webb Associates, the project site and its vicinity are tabled to a 120-inch public storm drain in Eastridge Avenue approximately 1,250 feet south of the site. The 120-inch Eastridge Avenue storm drain was designed for 100-year storm events. An existing public storm drain in Lance Drive, tributary to the 120-inch Eastridge Avenue storm drain, is not adequately sized to carry discharge from the project site. Therefore, another public storm drain (60-inch at downstream connection point) traversing from the site to the 120-inch storm drain will be built to convey runoff from the project site and the offsite residential development.

Please see Appendix "A" for master plan hydrology map, as-built plans and other pertinent reference materials.

Existing Condition

The project site is currently an undeveloped dirt lot. The majority of the site (62.80 acres, Nodes 112-142) surface drains southerly to a neighboring property. An existing residential development northwest of the site (15.95 acres, Nodes 100-111) and several small offsite dirt areas adjacent to the westerly property line (3.80 acres total) also drain to the site and, in turn, surface drain southerly to the neighboring property. The 100-year peak flow rate for these areas (82.55 acres total) is approximately 130.5 cfs.

The northeast corner of the project site (3.80 acres, Nodes 200-201) surface drains easterly to Dan Kipper Drive. The 100-year peak flow rate surface draining to Dan Kipper Drive from the project site is approximately 6.9 cfs.

Portions of the site along the easterly property line (0.40 acres for Nodes 300-301 and 3.25 acres for 310-311) surface drain easterly to Lance Drive. The 100-year peak flow rate surface draining to Lance Drive from the project site is approximately 5.4 cfs (0.9 cfs at Node 301 and 4.5 cfs at Node 311).

A small portion of the site along the westerly property line (1.75 acres, Nodes 400-401) surface drains westerly away from the site. The 100-year peak flow rate for this area is approximately 3.0 cfs.

Please see Appendix "B" for existing condition hydrology calculations and Appendix "C" for existing condition hydrology map.

Proposed Condition

The northerly building (Building 2), its southerly truck yard and adjacent parking lots (16.30 acres, Nodes 100-132) drain to catch basins in the truck yard and parking lots. Runoff is then conveyed easterly via a proposed onsite storm drain, then southerly via a proposed public storm drain in Lance Drive to the existing 120-inch offsite storm drain. The 100-year peak flow rate for the Building 2 site is approximately 36.7 cfs.

Vehicle parking lots north of Building 1 (3.65 acres, Nodes 200-223) drain to catch basins in the parking lots. Runoff is then conveyed easterly via another proposed onsite storm drain to Lance Drive, then southerly via the same proposed public storm drain to the existing 120-inch offsite storm drain. The 100-year peak flow rate for these areas is approximately 10.4 cfs.

A vehicle parking lot adjacent to the southeast corner of Building 1 (0.85 acre, Nodes 300-301) drains to a catch basin in the parking lot. This runoff is then conveyed easterly via a private storm drain to the back of a proposed street catch basin (at Node 312), which accepts runoff from the west half of Lance Drive and adjacent onsite side slope (3.40 acres, Nodes 310-312). From the street catch basin, runoff is then conveyed via a lateral to the proposed public storm drain in Lance Drive, then southerly to the existing 120-inch offsite storm drain. The 100-year peak flow rate for these areas is approximately 9.4 cfs.

The existing north-westerly offsite residential development (15.95 acres, Nodes 400-411) and several small offsite dirt areas along the westerly property line (3.85 acres total) will drain to a proposed onsite dirt channel (4.30 acres, Nodes 413-416) adjacent to the westerly property line. Runoff will be conveyed southerly in the dirt channel, then easterly via another proposed onsite storm drain system, which also accepts runoff from the southerly landscape (2.70 acres, at Nodes 425 and 426) as well as from the main Building 1 site (17.95 acres for Nodes 420-423 and 20.30 acres for Nodes 430-452) and a small parking lot at the southeast corner of the site (0.15 acres at Node 454). Similar to the rest of the project site, runoff from these areas is conveyed easterly to the same proposed public storm drain in Lance Drive, then southerly to the existing 120-inch offsite storm drain. The 100-year peak flow rate for these onsite and offsite areas is approximately 125.3 cfs.

The total proposed condition 100-year peak flow rate tributary to the existing 120-inch offsite storm drain – from the project site, the north-westerly offsite residential development and the westerly tributary dirt lots (89.40 acres total) – is approximately 175.0 cfs.

The landscape area east of Building 2 and adjacent to the easterly property line (1.90 acres) will surface drain easterly to Dan Kipper Drive. Similarly, the southerly entry driveway to Building 1 (1.20 acres) and the adjacent landscape (0.30 acres) fronting Lance Drive will surface drain easterly to Lance Drive.

See Appendix "B" for proposed condition hydrology calculations and Appendix "C" for proposed condition hydrology map.

Methodology

Hydrology calculations are computed using Riverside County's Rational Method Program (by AES Software). The soil type is "BC" for the majority of the project site with soil types "B" and "C" scattered throughout the remainder of the site per the Riverside County Hydrology Manual. Type "C" is used in calculations for conservative results. See Appendix "A" for pertinent reference materials.

APPENDIX

DESCRIPTION

A

REFERENCE MATERIALS

B

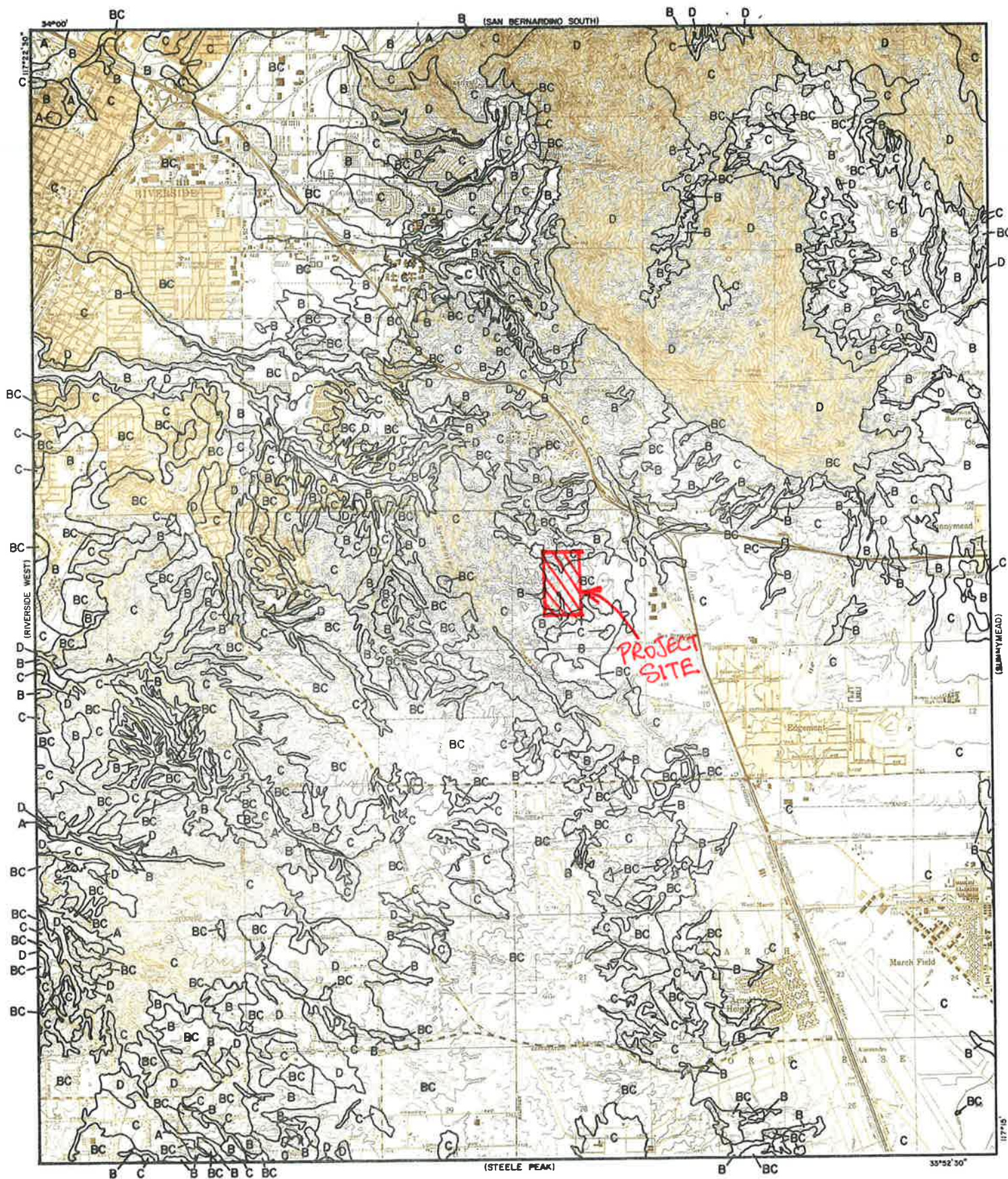
HYDROLOGY CALCULATIONS

C

HYDROLOGY MAP

APPENDIX A

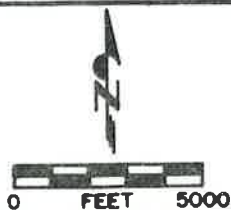
REFERENCE MATERIALS



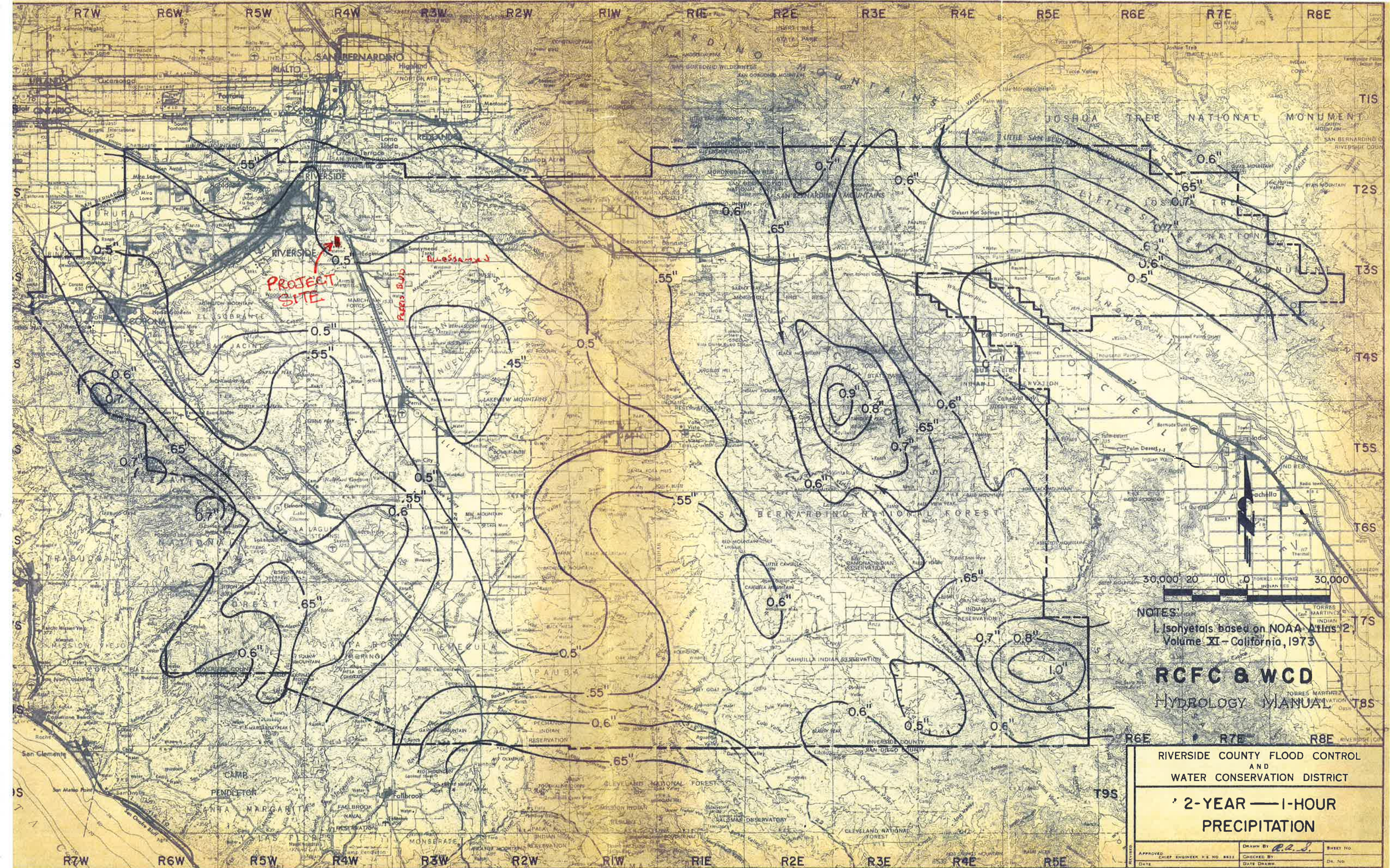
LEGEND

- SOILS GROUP BOUNDARY
- A SOILS GROUP DESIGNATION

RCFC&WCD
HYDROLOGY MANUAL



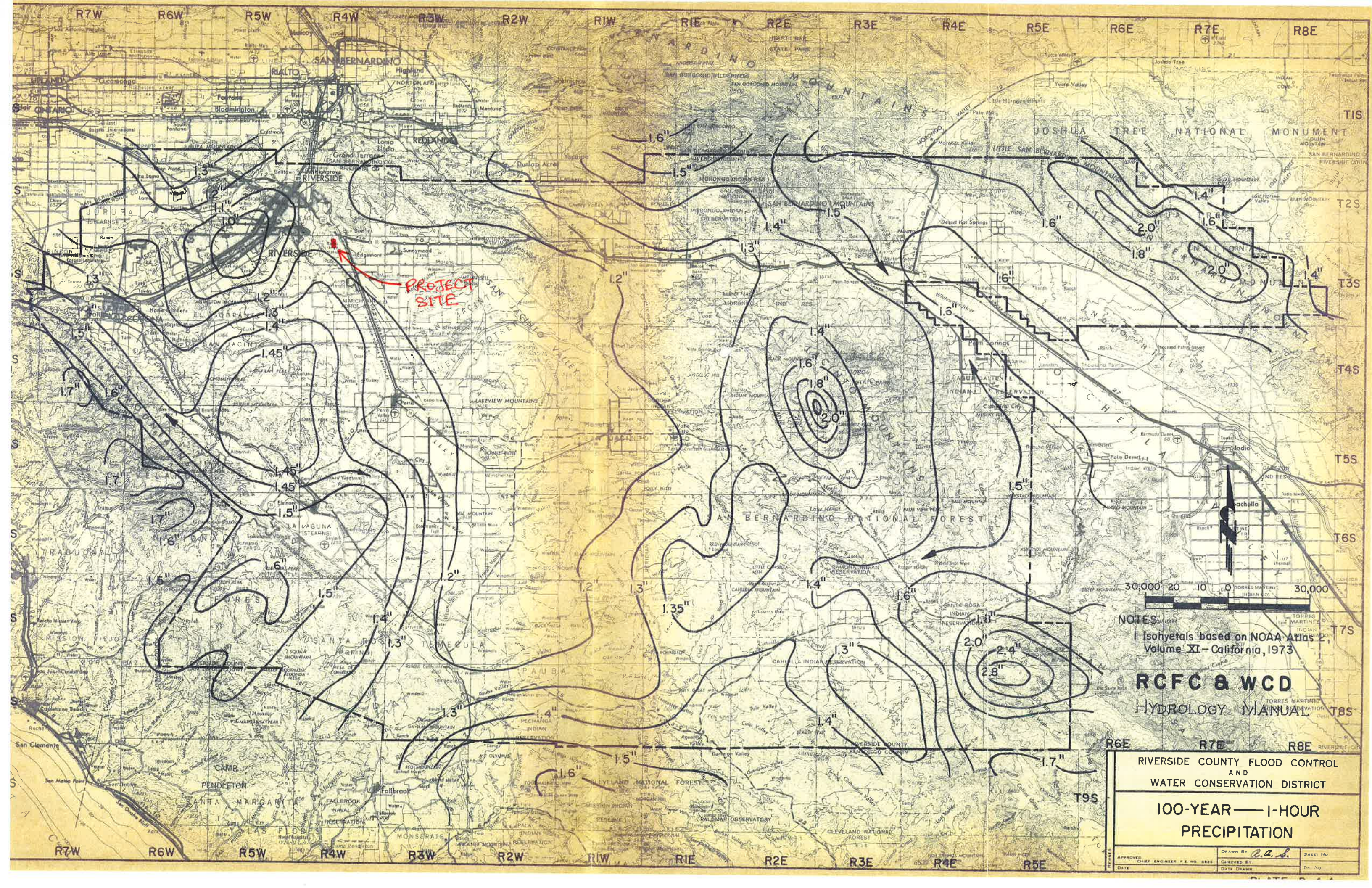
**HYDROLOGIC SOILS GROUP MAP
FOR
RIVERSIDE—EAST**



NOTES:
1. Isohyets based on NOAA Atlas 2,
Volume XI - California, 1973

RCFC & WCD
HYDROLOGY MANUAL

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT		
2-YEAR — 1-HOUR PRECIPITATION		
APPROVED: CHIEF ENGINEER DATE	DRAWN BY: C.E.S. CHECKED BY: DATE DRAWN	SHEET NO. OF DATE



PROJECT SITE

NOTES:
1 Isohyets based on NOAA Atlas 2,
Volume XI—California, 1973

RCFC & WCD
HYDROLOGY MANUAL

RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT

**100-YEAR—1-HOUR
PRECIPITATION**

APPROVED:	CHIEF ENGINEER P.E. NO. 8822	DRAWN BY:	<i>C.A.S.</i>	SHEET NO.	
DATE:		CHECKED BY:		DATE DRAWN:	





SYCAMORE CANYON BUSINESS PARK
ONSITE HYDROLOGY
ALBERT A. WEBB ASSOCIATES
CIVIL ENGINEERS
RIVERSIDE, CALIFORNIA
SCALE 1" = 200'

JUN 05 2001
RIVERSIDE, CALIFORNIA



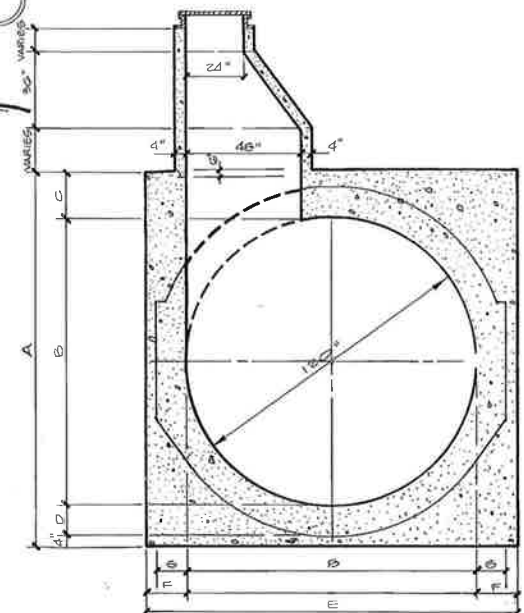
- STORM DRAIN GENERAL NOTES:**
1. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO CLEAR THE RIGHT OF WAY IN ACCORDANCE WITH THE PROVISIONS OF LAW AS IT AFFECTS EACH UTILITY INCLUDING IRRIGATION LINES AND APPURTENANCES AND AT NO COST TO THE CITY.
 2. CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE CITY OF RIVERSIDE DEPARTMENT OF PUBLIC WORKS, STANDARD DRAWINGS, AND THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, CURRENT EDITION.
 3. THE PRIVATE ENGINEER SIGNING THESE PLANS IS RESPONSIBLE FOR ASSURING THE ACCURACY AND ACCEPTABILITY OF THE WORK HEREON IN THE EVENT OF DISCREPANCIES ARISING DURING CONSTRUCTION, THE PRIVATE ENGINEER SHALL BE RESPONSIBLE FOR DETERMINING AN ACCEPTABLE SOLUTION AND REVISING THE PLANS FOR APPROVAL BY THE CITY.
 4. THE DEVELOPER SHALL BE RESPONSIBLE FOR PRESERVING OR REESTABLISHING AND REFERENCING SURVEY MONUMENTS DESTROYED, DISTURBED OR BURIED AS A RESULT OF CONSTRUCTION SHOWN HEREON.
 5. ALL FLAGGED ELEVATIONS SHALL BE STAKED IN THE FIELD BY THE PRIVATE ENGINEER.
 6. THE CONTRACTOR SHALL CALL IN A LOCATION REQUEST TO UNDERGROUND SERVICE ALERT (USA), PHONE NO. 1-800-422-4133, TWO WORKING DAYS BEFORE DIGGING. NO CONSTRUCTION PERMIT WILL BE ISSUED BY THE PUBLIC WORKS DEPARTMENT INVOLVING EXCAVATION FOR UNDERGROUND FACILITIES UNLESS THE APPLICANT HAS BEEN PROVIDED AN INQUIRY IDENTIFICATION NUMBER BY U.S.A.
 7. ON ALL AREAS WITHIN PUBLIC RIGHT OF WAY WHERE THE FILL IS ONE (1) FOOT OR GREATER, A LETTER WILL BE REQUIRED FROM THE SOILS ENGINEER, CERTIFYING THE COMPACTION OF THE FILL BELOW SUBGRADE, PRIOR TO ISSUANCE OF THE CONSTRUCTION PERMIT/CUT SHEETS.
 8. BEFORE THE RIP RAP IS ACCEPTED, AS PLACED, AT THE OUTLET OF ANY DRAINAGE STRUCTURE, IT SHALL BE TESTED UNDER FLOWS AS CLOSE AS POSSIBLE TO DESIGN CONDITIONS WITH WATER OBTAINED FROM FIRE HYDRANTS IN THE IMMEDIATE AREA.

- NOTICE TO CONTRACTOR**
1. THE EXISTENCE, HORIZONTAL AND VERTICAL LOCATIONS OF ANY UNDERGROUND UTILITY, PIPES OR STRUCTURES SHOWN ON THESE PLANS ARE OBTAINED BY A SEARCH OF THE AVAILABLE RECORDS. TO THE BEST OF OUR KNOWLEDGE, THERE ARE NO EXISTING UTILITIES EXCEPT THOSE SHOWN ON THESE PLANS.
 2. THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT THE UTILITY LINES SHOWN AND ANY OTHER LINES NOT OF RECORD OR NOT SHOWN ON THESE PLANS. LOCATIONS OF UTILITIES SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO COMMENCEMENT OF CONSTRUCTION.
 3. CALL UNDERGROUND SERVICE ALERT (U.S.A.) 1-800-422-4133 AT LEAST 48 HOURS PRIOR TO EXCAVATION.

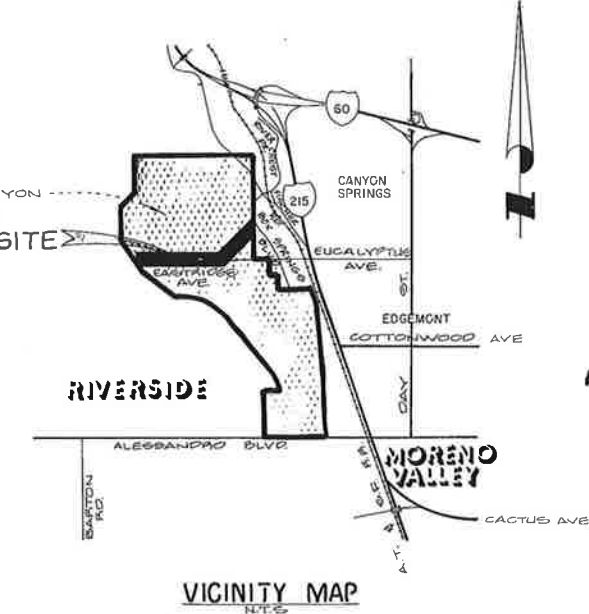
S.D. CONSTRUCTION NOTES

① CONST. J.B. NO. 2 PER RCFC STD. J.B. 227. A=45' B=30' C=11.80' D=120' E=8.80' L=9.35' F=5.64' G=4.67' L=9.35' ELEV. R=1494.41 ELEV. B=1494.30

② CONST. M.H. NO. 4 RCFC STD. MH 264 A=50' B=42' C=11.40' D=120' E=14.80' L=9.50' ELEV. S=1496.65 ELEV. R=1496.76



DIA.	A	B	C	D	E	F	MIN. G
54"	75"	54"	11 1/2"	5 1/2"	75"	10 1/2"	5 1/2"
60"	82"	60"	12"	6"	82"	11"	6"
66"	89"	66"	12 1/2"	6 1/2"	89"	11 1/2"	6 1/2"
72"	96"	72"	13"	7"	96"	12"	7"
84"	110"	84"	14"	8"	110"	13"	8"
96"	124"	96"	15"	9"	124"	14"	9"
108"	139"	108"	16 1/2"	10 1/2"	139"	15 1/2"	10 1/2"
120"	154"	120"	18"	12"	154"	17"	12"



BENCH MARK

U.S.C. & G.S. DESIGNATION 2.749 RIVERSIDE COUNTY
DESIGNATION 600-47-68 STANDARD BRASS DISK STAMPED 2.749 1945
ESTABLISHED BY C. & G.S. 1.7 MILES NORTHWEST ALONG THE ATCHISON
TOPEKA AND SANTA FE RAILWAY FROM THE STATION AT MARCH FIELD, SET
BETWEEN THE TRACK AND U.S. HIGHWAY NO. 395 (1 215) 64.5 FEET
SOUTHWEST OF THE SOUTHWEST CORNER OF THE HIGHWAY, 43.6 FEET
NORTHEAST OF THE NORTHEAST RAIL OF TRACK, 20 FEET SOUTHEAST
OF POST, IRON BENCH MARK DISK SET IN TOP OF A CONCRETE POST
0.4 FEET ABOVE GROUND.

DATE 1970 ELEVATION 1536.119

BUSINESS TAX CERTIFICATE NO. 5751 EXPIRATION DATE: 12-31-92

ALBERT A. WEBB ASSOCIATES
CIVIL ENGINEERS
RIVERSIDE, CALIFORNIA
APPROVED BY *Matthew E. Wall* DATE 5/6/92
R.E. No. 37385
W.O. 90-3000 FOR CITY OF RIVERSIDE F.B. 1034

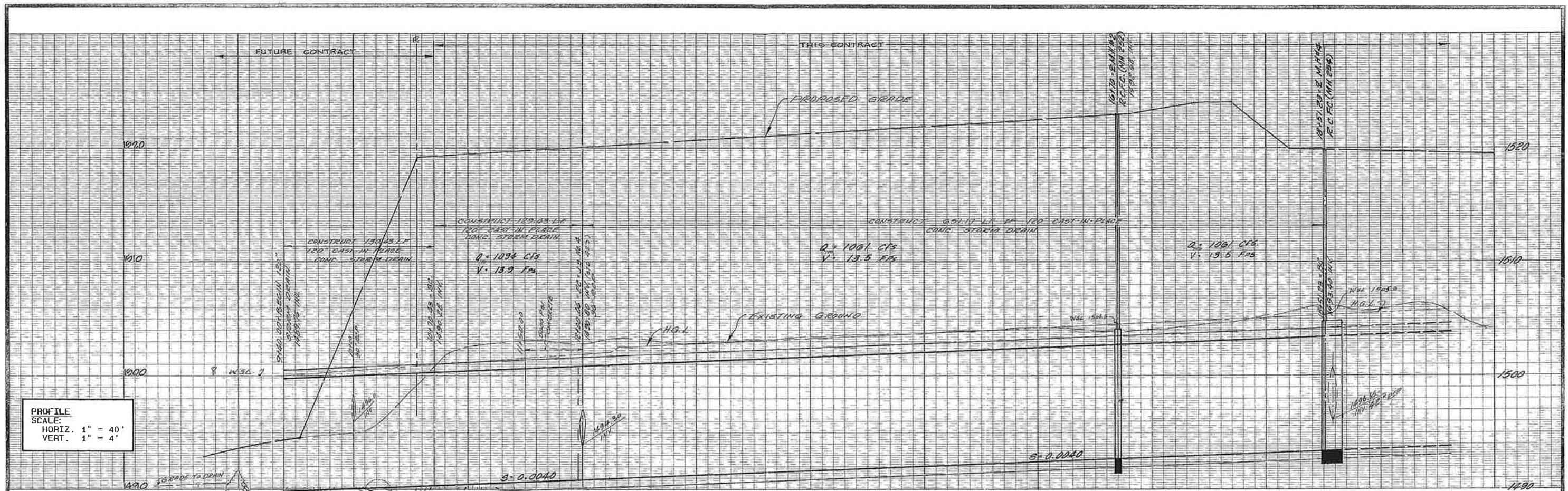
MARK REVISIONS APPR. DATE
DESIGNED BY J.V.P. DRAWN BY D.R.Z. CHECKED BY M.E.W.

CITY OF RIVERSIDE, CALIFORNIA
PUBLIC WORKS DEPARTMENT
APPROVED BY *[Signature]* DATE 5/19/92
DIRECTOR OF PUBLIC WORKS
CHIEF P.W. ENGR.

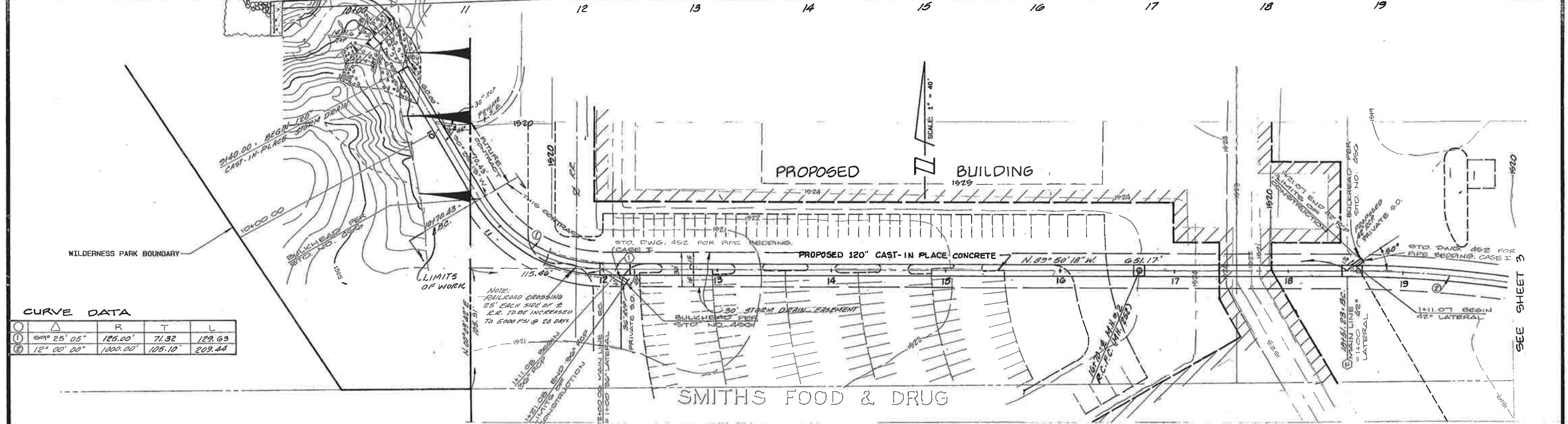
**SYCAMORE CANYON
BUSINESS PARK
STORM DRAIN
EASTRIDGE AVE. SECTION**
SCALE: 1" = 40'

ACCOUNT No. 90-3000
DRAWING NUMBER
D-615
SHEET 1 OF 2
90-3000-D

INDEXED 7-16-92 LTH



PROFILE
 SCALE:
 HORIZ. 1" = 40'
 VERT. 1" = 4'



CURVE DATA

Δ	R	T	L	
1	29° 25' 05"	125.00'	71.32	129.63
2	12° 00' 00"	1000.00'	105.10'	209.44

SEE SHEET NO. 1 FOR S.D. CONSTRUCTION NOTES

BENCH MARK

U.S.C. & G.S. DESIGNATION 2 749, RIVERSIDE COUNTY
 DESIGNATION 600-47-68, STANDARD BRASS DISK STAMPED 2 749 1845
 ESTABLISHED BY C & G S. 1.7 MILES NORTHWEST ALONG THE ATCHISON,
 TOPEKA AND SANTA FE RAILWAY FROM THE STATION AT MARCH FIELD, SET
 BETWEEN THE TRACK AND U.S. HIGHWAY NO. 395 (I 215) 64.5 FEET
 SOUTHWEST OF THE SOUTHWEST CORNER OF THE HIGHWAY, 43.5 FEET
 NORTHEAST OF THE NORTHEAST CORNER OF THE TRACK, 20 FEET SOUTHEAST
 OF POST, IRON BENCH MARK DISK SET IN TOP OF A CONCRETE POST
 0.4 FEET ABOVE GROUND.
 DATE 1970 ELEVATION: 1536.119



UNDERGROUND SERVICE ALERT

CALL: TOLL FREE 1-800-422-4133

TWO WORKING DAYS BEFORE YOU DIG

BUSINESS TAX CERTIFICATE NO. 5751 EXPIRATION DATE: 12-31-92

ALBERT A. WEBB ASSOCIATES
 CIVIL ENGINEERS
 RIVERSIDE, CALIFORNIA

APPROVED BY: *Matthew E. Webb* DATE: 3/31/92
 R.E. No. 37385

REVISIONS	DATE	APPROVED

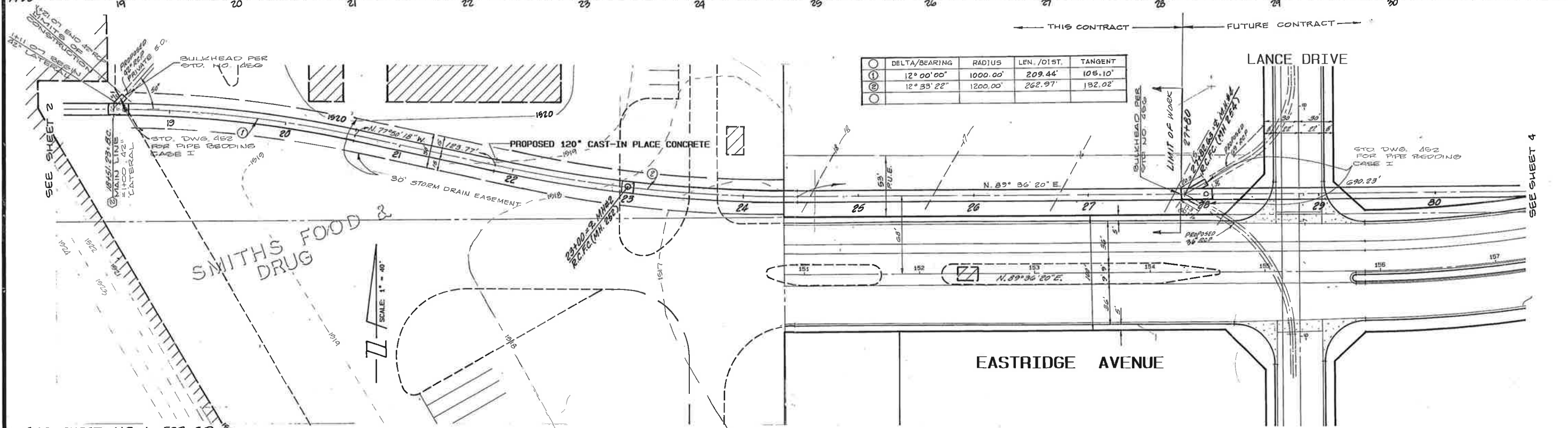
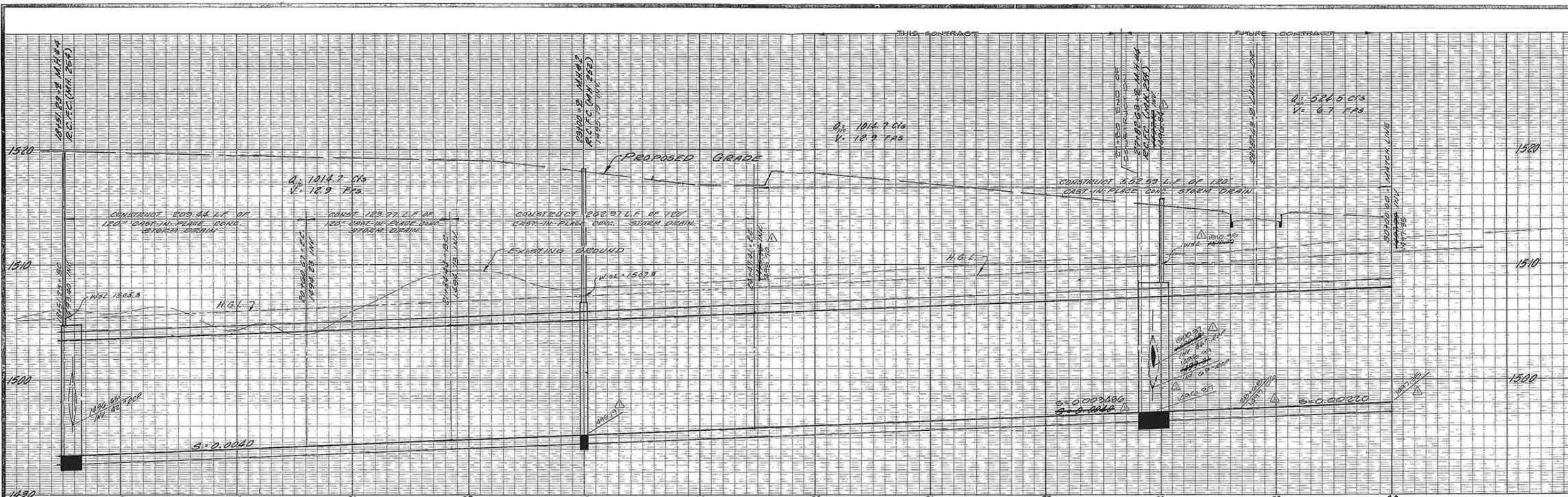
CITY OF RIVERSIDE, CALIFORNIA
 PUBLIC WORKS DEPARTMENT

APPROVED BY: *[Signature]* DATE: 4/1/92
 CHIEF PUBLIC WORKS ENGINEER

SYCAMORE CANYON BUSINESS PARK STORM DRAIN
 EASTRIDGE AVENUE
 STA. 9140.00 TO STA. 18151.23

SCALE: 1" = 40'

ACCOUNT NO. 90-3000
 DRAWING NUMBER **D-615**
 SHEET **2** OF **3**
 90-3000-D



	DELTA/BEARING	RADIUS	LEN., /01ST.	TANGENT
1	12° 00' 00"	1000.00'	209.44'	105.10'
2	12° 35' 22"	1200.00'	262.97'	132.02'

SEE SHEET NO. 1 FOR S.D. CONSTRUCTION NOTES

BENCH MARK

U.S.C. & G.S. DESIGNATION Z 749, RIVERSIDE COUNTY DESIGNATION 600-47-68, STANDARD BRASS DISK STAMPED Z 749 1945 ESTABLISHED BY C.O.S. 1.7 MILES NORTHWEST ALONG THE ATCHISON, TOPEKA AND SANTA FE RAILWAY FROM THE STATION AT MARCH FIELD, SET BETWEEN THE TRACK AND U.S. HIGHWAY NO. 395 (I 215) 64.5 FEET SOUTHWEST OF THE SOUTHWEST CORNER OF THE HIGHWAY, 43.8 FEET NORTHEAST OF THE NORTHEAST RAIL OF TRACK, 20 FEET SOUTHWEST OF POST, IRON BENCH MARK DISK SET IN TOP OF A CONCRETE POST 0.4 FEET ABOVE GROUND.
DATE 1970 ELEVATION: 1536.119



BUSINESS TAX CERTIFICATE NO. 5751 EXPIRATION DATE: 12-31-92
ALBERT A. WEBB ASSOCIATES
CIVIL ENGINEERS
RIVERSIDE, CALIFORNIA
APPROVED BY *Matthew E. Webb* DATE 3/31/92
R.E. No. 37385
W.O. 90-3000 FOR CITY OF RIVERSIDE F.B. 1034

DESIGNED BY J.V.P., DRAWN BY D.R.Z., CHECKED BY M.E.W.
REVISIONS
APPROVED BY *Matthew E. Webb* DATE 3/31/92
R.E. No. 37385

CITY OF RIVERSIDE, CALIFORNIA
PUBLIC WORKS DEPARTMENT
APPROVED BY *Matthew E. Webb* DATE 3/31/92
R.E. No. 37385
DIRECTOR OF PUBLIC WORKS

SYCAMORE CANYON
BUSINESS PARK
STORM DRAIN
EASTRIDGE AVENUE
STA. 18+51.23 TO STA. 30+00.00
SCALE: 1" = 40'

ACCOUNT No. 90-3000
DRAWING NUMBER
D-615
SHEET 3 OF 3
90-3000-D

INDEXED 7-16-92 LK

APPENDIX B

HYDROLOGY CALCULATIONS

EXISTING CONDITION

 RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
 RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
 (RCFC&WCD) 1978 HYDROLOGY MANUAL
 (c) Copyright 1982-99 Advanced Engineering Software (aes)
 Ver. 1.5A Release Date: 01/01/99 License ID 1435

Analysis prepared by:

THIENES ENGINEERING
 16800 VALLEY VIEW AVENUE
 LA MIRADA CA 90638
 PH: (714) 521-4811 FAX: (714) 521-4173

***** DESCRIPTION OF STUDY *****
 * JOB #3261 SYCAMORE V, 6275 LANCE DRIVE, RIVERSIDE COUNTY *
 * EXISTING CONDITION 100-YEAR *
 * NODES 100-142 *

FILE NAME: C:\XDRIVE\3261\3261EX1.DAT
 TIME/DATE OF STUDY: 09:15 06/22/2015

 USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

USER SPECIFIED STORM EVENT(YEAR) = 100.00
 SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
 SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
 2-YEAR, 1-HOUR PRECIPITATION(INCH) = 0.500
 100-YEAR, 1-HOUR PRECIPITATION(INCH) = 1.200
 COMPUTED RAINFALL INTENSITY DATA:
 STORM EVENT = 100.00 1-HOUR INTENSITY(INCH/HOUR) = 1.200
 SLOPE OF INTENSITY DURATION CURVE = 0.5000
 RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
 NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS

FOR ALL DOWNSTREAM ANALYSES

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

NO.	HALF- (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0313 0.167	0.0150

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 100.00 TO NODE 101.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

=====

ASSUMED INITIAL SUBAREA UNIFORM
 DEVELOPMENT IS SINGLE FAMILY(1/2 ACRE)
 $TC = K * [(LENGTH**3) / (ELEVATION CHANGE)]**0.2$
 INITIAL SUBAREA FLOW-LENGTH = 685.00
 UPSTREAM ELEVATION = 1660.00
 DOWNSTREAM ELEVATION = 1628.00
 ELEVATION DIFFERENCE = 32.00
 $TC = 0.422 * [(685.00**3) / (32.00)]**0.2 = 10.612$
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.853
 SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .8063
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) = 13.34
 TOTAL AREA(ACRES) = 5.80 TOTAL RUNOFF(CFS) = 13.34

 FLOW PROCESS FROM NODE 101.00 TO NODE 111.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>(STANDARD CURB SECTION USED)<<<<

=====

UPSTREAM ELEVATION(FEET) = 1628.00 DOWNSTREAM ELEVATION(FEET) = 1624.00
 STREET LENGTH(FEET) = 525.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 22.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 17.00
 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) = 0.0149
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.18
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.51
 HALFSTREET FLOOD WIDTH(FEET) = 17.52
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.79
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.42
 STREET FLOW TRAVEL TIME(MIN.) = 3.14 Tc(MIN.) = 13.75
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.507
 SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .7959
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) = 4.85 SUBAREA RUNOFF(CFS) = 9.68
 TOTAL AREA(ACRES) = 10.65 PEAK FLOW RATE(CFS) = 23.02

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.54 HALFSTREET FLOOD WIDTH(FEET) = 19.31
 FLOW VELOCITY(FEET/SEC.) = 2.94 DEPTH*VELOCITY(FT*FT/SEC.) = 1.60
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 111.00 = 1210.00 FEET.

 FLOW PROCESS FROM NODE 111.00 TO NODE 111.00 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.) = 13.75
 RAINFALL INTENSITY(INCH/HR) = 2.51
 TOTAL STREAM AREA(ACRES) = 10.65
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 23.02

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

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

=====

ASSUMED INITIAL SUBAREA UNIFORM
 DEVELOPMENT IS SINGLE FAMILY(1/2 ACRE)
 $TC = K * [(LENGTH ** 3) / (ELEVATION CHANGE)] ** .2$
 INITIAL SUBAREA FLOW-LENGTH = 795.00
 UPSTREAM ELEVATION = 1660.00
 DOWNSTREAM ELEVATION = 1624.00
 ELEVATION DIFFERENCE = 36.00
 $TC = 0.422 * [(795.00 ** 3) / (36.00)] ** .2 = 11.334$
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.761
 SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .8037
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) = 11.76
 TOTAL AREA(ACRES) = 5.30 TOTAL RUNOFF(CFS) = 11.76

 FLOW PROCESS FROM NODE 111.00 TO NODE 111.00 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.) = 11.33
 RAINFALL INTENSITY(INCH/HR) = 2.76
 TOTAL STREAM AREA(ACRES) = 5.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 11.76

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	23.02	13.75	2.507	10.65
2	11.76	11.33	2.761	5.30

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	30.74	11.33	2.761
2	33.70	13.75	2.507

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 33.70 Tc(MIN.) = 13.75

TOTAL AREA(ACRES) = 15.95

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 111.00 = 1210.00 FEET.

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

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

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

ELEVATION DATA: UPSTREAM(FEET) = 1620.00 DOWNSTREAM(FEET) = 1598.00

FLOW LENGTH(FEET) = 260.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.6 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 20.50

ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 33.70

PIPE TRAVEL TIME(MIN.) = 0.21 Tc(MIN.) = 13.96

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 112.00 = 1470.00 FEET.

FLOW PROCESS FROM NODE 112.00 TO NODE 121.00 IS CODE = 52

>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1596.90 DOWNSTREAM(FEET) = 1569.60

CHANNEL LENGTH THRU SUBAREA(FEET) = 920.00 CHANNEL SLOPE = 0.0297

CHANNEL FLOW THRU SUBAREA(CFS) = 33.70

FLOW VELOCITY(FEET/SEC) = 5.96 (PER LACFD/RCFC&WCD HYDROLOGY MANUAL)

TRAVEL TIME(MIN.) = 2.57 Tc(MIN.) = 16.53

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 121.00 = 2390.00 FEET.

FLOW PROCESS FROM NODE 112.00 TO NODE 121.00 IS CODE = 81

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

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.286

UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7131

SOIL CLASSIFICATION IS "C"

SUBAREA AREA(ACRES) = 9.40 SUBAREA RUNOFF(CFS) = 15.32

TOTAL AREA(ACRES) = 25.35 TOTAL RUNOFF(CFS) = 49.02

TC(MIN) = 16.53

FLOW PROCESS FROM NODE 112.00 TO NODE 121.00 IS CODE = 81

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

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.286

UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7131

SOIL CLASSIFICATION IS "C"

SUBAREA AREA(ACRES) = 0.95 SUBAREA RUNOFF(CFS) = 1.55

TOTAL AREA(ACRES) = 26.30 TOTAL RUNOFF(CFS) = 50.57

TC(MIN) = 16.53

FLOW PROCESS FROM NODE 121.00 TO NODE 121.00 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.) = 16.53

RAINFALL INTENSITY(INCH/HR) = 2.29

TOTAL STREAM AREA(ACRES) = 26.30

PEAK FLOW RATE(CFS) AT CONFLUENCE = 50.57

FLOW PROCESS FROM NODE 120.00 TO NODE 121.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

```

      ASSUMED INITIAL SUBAREA UNIFORM
      DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
INITIAL SUBAREA FLOW-LENGTH = 900.00
UPSTREAM ELEVATION = 1603.90
DOWNSTREAM ELEVATION = 1569.60
ELEVATION DIFFERENCE = 34.30
TC = 0.533*[(900.00**3)/(34.30)]**.2 = 15.556
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.357
UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7176
SOIL CLASSIFICATION IS "C"
SUBAREA RUNOFF(CFS) = 8.37
TOTAL AREA(ACRES) = 4.95 TOTAL RUNOFF(CFS) = 8.37

*****
FLOW PROCESS FROM NODE 121.00 TO NODE 121.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
-----
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 15.56
RAINFALL INTENSITY(INCH/HR) = 2.36
TOTAL STREAM AREA(ACRES) = 4.95
PEAK FLOW RATE(CFS) AT CONFLUENCE = 8.37

** CONFLUENCE DATA **
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (MIN.) (INCH/HOUR) (ACRE)
1 49.24 14.19 2.468 26.30
1 50.57 16.53 2.286 26.30
2 8.37 15.56 2.357 4.95

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 56.87 14.19 2.468
2 55.96 15.56 2.357
3 58.69 16.53 2.286

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 58.69 Tc(MIN.) = 16.53
TOTAL AREA(ACRES) = 31.25
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 121.00 = 2390.00 FEET.

*****
FLOW PROCESS FROM NODE 121.00 TO NODE 131.00 IS CODE = 52
-----
>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 1569.60 DOWNSTREAM(FEET) = 1547.80
CHANNEL LENGTH THRU SUBAREA(FEET) = 840.00 CHANNEL SLOPE = 0.0260
CHANNEL FLOW THRU SUBAREA(CFS) = 58.69
FLOW VELOCITY(FEET/SEC) = 6.53 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) = 2.14 Tc(MIN.) = 18.68
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 131.00 = 3230.00 FEET.

*****
FLOW PROCESS FROM NODE 121.00 TO NODE 131.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.151
UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7039
SOIL CLASSIFICATION IS "C"
SUBAREA AREA(ACRES) = 6.45 SUBAREA RUNOFF(CFS) = 9.77
TOTAL AREA(ACRES) = 37.70 TOTAL RUNOFF(CFS) = 68.46
TC(MIN) = 18.68

*****
FLOW PROCESS FROM NODE 131.00 TO NODE 131.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
-----
TOTAL NUMBER OF STREAMS = 2

```

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 18.68
RAINFALL INTENSITY(INCH/HR) = 2.15
TOTAL STREAM AREA(ACRES) = 37.70
PEAK FLOW RATE(CFS) AT CONFLUENCE = 68.46

FLOW PROCESS FROM NODE 130.00 TO NODE 131.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

=====

ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
TC = $K * [(LENGTH**3) / (ELEVATION\ CHANGE)] ** .2$
INITIAL SUBAREA FLOW-LENGTH = 905.00
UPSTREAM ELEVATION = 1598.40
DOWNSTREAM ELEVATION = 1547.80
ELEVATION DIFFERENCE = 50.60
TC = $0.533 * [(905.00**3) / (50.60)] ** .2 = 14.440$
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.446
UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7230
SOIL CLASSIFICATION IS "C"
SUBAREA RUNOFF(CFS) = 15.47
TOTAL AREA(ACRES) = 8.75 TOTAL RUNOFF(CFS) = 15.47

FLOW PROCESS FROM NODE 130.00 TO NODE 131.00 IS CODE = 81

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

=====

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.446
UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7230
SOIL CLASSIFICATION IS "C"
SUBAREA AREA(ACRES) = 0.85 SUBAREA RUNOFF(CFS) = 1.50
TOTAL AREA(ACRES) = 9.60 TOTAL RUNOFF(CFS) = 16.98
TC(MIN) = 14.44

FLOW PROCESS FROM NODE 131.00 TO NODE 131.00 IS CODE = 1

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

=====

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 14.44
RAINFALL INTENSITY(INCH/HR) = 2.45
TOTAL STREAM AREA(ACRES) = 9.60
PEAK FLOW RATE(CFS) AT CONFLUENCE = 16.98

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	67.46	16.35	2.299	37.70
1	66.04	17.73	2.208	37.70
1	68.46	18.68	2.151	37.70
2	16.98	14.44	2.446	9.60

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	76.54	14.44	2.446
2	83.41	16.35	2.299
3	81.36	17.73	2.208
4	83.39	18.68	2.151

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 83.41 Tc(MIN.) = 16.35
TOTAL AREA(ACRES) = 47.30
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 131.00 = 3230.00 FEET.

FLOW PROCESS FROM NODE 131.00 TO NODE 132.00 IS CODE = 52

>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1547.80 DOWNSTREAM(FEET) = 1541.90
CHANNEL LENGTH THRU SUBAREA(FEET) = 530.00 CHANNEL SLOPE = 0.0111
CHANNEL FLOW THRU SUBAREA(CFS) = 83.41
FLOW VELOCITY(FEET/SEC) = 4.74 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) = 1.86 Tc(MIN.) = 18.21
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 132.00 = 3760.00 FEET.

FLOW PROCESS FROM NODE 131.00 TO NODE 132.00 IS CODE = 81

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

=====

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.178
UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7059
SOIL CLASSIFICATION IS "C"
SUBAREA AREA(ACRES) = 10.60 SUBAREA RUNOFF(CFS) = 16.30
TOTAL AREA(ACRES) = 57.90 TOTAL RUNOFF(CFS) = 99.71
TC(MIN) = 18.21

FLOW PROCESS FROM NODE 132.00 TO NODE 142.00 IS CODE = 52

>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1541.90 DOWNSTREAM(FEET) = 1533.20
CHANNEL LENGTH THRU SUBAREA(FEET) = 430.00 CHANNEL SLOPE = 0.0202
CHANNEL FLOW THRU SUBAREA(CFS) = 99.71
FLOW VELOCITY(FEET/SEC) = 6.75 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) = 1.06 Tc(MIN.) = 19.28
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 142.00 = 4190.00 FEET.

FLOW PROCESS FROM NODE 132.00 TO NODE 142.00 IS CODE = 81

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

=====

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.117
UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7015
SOIL CLASSIFICATION IS "C"
SUBAREA AREA(ACRES) = 9.15 SUBAREA RUNOFF(CFS) = 13.59
TOTAL AREA(ACRES) = 67.05 TOTAL RUNOFF(CFS) = 113.29
TC(MIN) = 19.28

FLOW PROCESS FROM NODE 132.00 TO NODE 142.00 IS CODE = 81

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

=====

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.117
UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7015
SOIL CLASSIFICATION IS "C"
SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 2.97
TOTAL AREA(ACRES) = 69.05 TOTAL RUNOFF(CFS) = 116.26
TC(MIN) = 19.28

FLOW PROCESS FROM NODE 142.00 TO NODE 142.00 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.) = 19.28
RAINFALL INTENSITY(INCH/HR) = 2.12
TOTAL STREAM AREA(ACRES) = 69.05
PEAK FLOW RATE(CFS) AT CONFLUENCE = 116.26

FLOW PROCESS FROM NODE 140.00 TO NODE 141.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

=====

ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
 $TC = K * [(LENGTH**3) / (ELEVATION CHANGE)]**0.2$
INITIAL SUBAREA FLOW-LENGTH = 1000.00
UPSTREAM ELEVATION = 1576.00
DOWNSTREAM ELEVATION = 1557.90
ELEVATION DIFFERENCE = 18.10

TC = 0.533*[(1000.00**3)/(18.10)]**.2 = 18.831
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.142
 UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7033
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) = 9.34
 TOTAL AREA(ACRES) = 6.20 TOTAL RUNOFF(CFS) = 9.34

 FLOW PROCESS FROM NODE 141.00 TO NODE 142.00 IS CODE = 52

>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1557.90 DOWNSTREAM(FEET) = 1533.20
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1285.00 CHANNEL SLOPE = 0.0192
 CHANNEL FLOW THRU SUBAREA(CFS) = 9.34
 FLOW VELOCITY(FEET/SEC) = 3.41 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) = 6.29 Tc(MIN.) = 25.12
 LONGEST FLOWPATH FROM NODE 140.00 TO NODE 142.00 = 2285.00 FEET.

 FLOW PROCESS FROM NODE 142.00 TO NODE 142.00 IS CODE = 81

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

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 1.855
 UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6803
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 9.21
 TOTAL AREA(ACRES) = 13.50 TOTAL RUNOFF(CFS) = 18.55
 TC(MIN) = 25.12

 FLOW PROCESS FROM NODE 142.00 TO NODE 142.00 IS CODE = 1

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

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 25.12
 RAINFALL INTENSITY(INCH/HR) = 1.85
 TOTAL STREAM AREA(ACRES) = 13.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 18.55

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	111.54	17.43	2.226	69.05
1	116.26	19.28	2.117	69.05
1	112.80	20.68	2.044	69.05
1	113.97	21.60	2.000	69.05
2	18.55	25.12	1.855	13.50

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	124.42	17.43	2.226
2	130.50	19.28	2.117
3	128.07	20.68	2.044
4	129.93	21.60	2.000
5	124.25	25.12	1.855

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 130.50 Tc(MIN.) = 19.28
 TOTAL AREA(ACRES) = 82.55
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 142.00 = 4190.00 FEET.

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 82.55 TC(MIN.) = 19.28
 PEAK FLOW RATE(CFS) = 130.50

*** PEAK FLOW RATE TABLE ***

	Q(CFS)	Tc(MIN.)
1	124.42	17.43
2	130.50	19.28
3	128.07	20.68
4	129.93	21.60

5 124.25 25.12

=====

END OF RATIONAL METHOD ANALYSIS

 RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
 RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
 (RCFC&WCD) 1978 HYDROLOGY MANUAL
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 Ver. 1.5A Release Date: 01/01/99 License ID 1435

Analysis prepared by:

THIENES ENGINEERING
 16800 VALLEY VIEW AVENUE
 LA MIRADA CA 90638
 PH: (714) 521-4811 FAX: (714) 521-4173

***** DESCRIPTION OF STUDY *****
 * JOB #3261 SYCAMORE V, 6275 LANCE DRIVE, RIVERSIDE COUNTY *
 * EXISTING CONDITION 100-YEAR *
 * NODES 200-201 *

FILE NAME: C:\XDRIVE\3261\3261EX2.DAT
 TIME/DATE OF STUDY: 14:17 06/17/2016

 USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

USER SPECIFIED STORM EVENT (YEAR) = 100.00
 SPECIFIED MINIMUM PIPE SIZE (INCH) = 12.00
 SPECIFIED PERCENT OF GRADIENTS (DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
 2-YEAR, 1-HOUR PRECIPITATION (INCH) = 0.500
 100-YEAR, 1-HOUR PRECIPITATION (INCH) = 1.200
 COMPUTED RAINFALL INTENSITY DATA:
 STORM EVENT = 100.00 1-HOUR INTENSITY (INCH/HOUR) = 1.200
 SLOPE OF INTENSITY DURATION CURVE = 0.5000
 RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
 NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
 FOR ALL DOWNSTREAM ANALYSES

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

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0313 0.167	0.0150

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 200.00 TO NODE 201.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

=====

ASSUMED INITIAL SUBAREA UNIFORM
 DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
 $TC = K * [(LENGTH^{**3}) / (ELEVATION\ CHANGE)]^{**2}$
 INITIAL SUBAREA FLOW-LENGTH = 760.00
 UPSTREAM ELEVATION = 1602.00
 DOWNSTREAM ELEVATION = 1562.90
 ELEVATION DIFFERENCE = 39.10
 $TC = 0.533 * [(760.00^{**3}) / (39.10)]^{**2} = 13.692$
 100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 2.512
 UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7267
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF (CFS) = 6.94
 TOTAL AREA (ACRES) = 3.80 TOTAL RUNOFF (CFS) = 6.94

=====

END OF STUDY SUMMARY:
 TOTAL AREA (ACRES) = 3.80 TC (MIN.) = 13.69
 PEAK FLOW RATE (CFS) = 6.94

=====

END OF RATIONAL METHOD ANALYSIS

 RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
 RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
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Analysis prepared by:

THIENES ENGINEERING
 16800 VALLEY VIEW AVENUE
 LA MIRADA CA 90638
 PH: (714) 521-4811 FAX: (714) 521-4173

***** DESCRIPTION OF STUDY *****
 * JOB #3261 SYCAMORE V, 6275 LANCE DRIVE, RIVERSIDE *
 * EXISTING CONDITION 100-YEAR *
 * NODES 300-301 *

FILE NAME: C:\XDRIVE\3261\3261EX3A.DAT
 TIME/DATE OF STUDY: 14:19 06/17/2016

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

USER SPECIFIED STORM EVENT(YEAR) = 100.00
 SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
 SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
 2-YEAR, 1-HOUR PRECIPITATION(INCH) = 0.500
 100-YEAR, 1-HOUR PRECIPITATION(INCH) = 1.200
 COMPUTED RAINFALL INTENSITY DATA:
 STORM EVENT = 100.00 1-HOUR INTENSITY(INCH/HOUR) = 1.200
 SLOPE OF INTENSITY DURATION CURVE = 0.5000
 RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
 NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
 FOR ALL DOWNSTREAM ANALYSES

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

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0313 0.167	0.0150

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 300.00 TO NODE 301.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

=====

ASSUMED INITIAL SUBAREA UNIFORM
 DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
 $TC = K * [(LENGTH**3) / (ELEVATION CHANGE)]**0.2$
 INITIAL SUBAREA FLOW-LENGTH = 265.00
 UPSTREAM ELEVATION = 1595.00
 DOWNSTREAM ELEVATION = 1582.00
 ELEVATION DIFFERENCE = 13.00
 $TC = 0.533 * [(265.00**3) / (13.00)]**0.2 = 9.069$
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.087
 UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7537
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) = 0.93
 TOTAL AREA(ACRES) = 0.40 TOTAL RUNOFF(CFS) = 0.93

=====

END OF STUDY SUMMARY:
 TOTAL AREA(ACRES) = 0.40 TC(MIN.) = 9.07
 PEAK FLOW RATE(CFS) = 0.93

=====

END OF RATIONAL METHOD ANALYSIS

 RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
 RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
 (RCFC&WCD) 1978 HYDROLOGY MANUAL
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Analysis prepared by:

THIENES ENGINEERING
 16800 VALLEY VIEW AVENUE
 LA MIRADA CA 90638
 PH: (714) 521-4811 FAX: (714) 521-4173

***** DESCRIPTION OF STUDY *****
 * JOB #3261 SYCAMORE V, 6275 LANCE DRIVE, RIVERSIDE *
 * EXISTING CONDITION 100-YEAR *
 * NODES 310-311 *

FILE NAME: C:\XDRIVE\3261\3261EX3B.DAT
 TIME/DATE OF STUDY: 14:21 06/17/2016

 USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

USER SPECIFIED STORM EVENT(YEAR) = 100.00
 SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
 SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
 2-YEAR, 1-HOUR PRECIPITATION(INCH) = 0.500
 100-YEAR, 1-HOUR PRECIPITATION(INCH) = 1.200
 COMPUTED RAINFALL INTENSITY DATA:
 STORM EVENT = 100.00 1-HOUR INTENSITY(INCH/HOUR) = 1.200
 SLOPE OF INTENSITY DURATION CURVE = 0.5000
 RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
 NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
 FOR ALL DOWNSTREAM ANALYSES

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

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0313 0.167	0.0150

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 310.00 TO NODE 311.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

=====

ASSUMED INITIAL SUBAREA UNIFORM
 DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
 $TC = K * [(LENGTH**3) / (ELEVATION CHANGE)]**0.2$
 INITIAL SUBAREA FLOW-LENGTH = 1625.00
 UPSTREAM ELEVATION = 1564.10
 DOWNSTREAM ELEVATION = 1526.80
 ELEVATION DIFFERENCE = 37.30
 $TC = 0.533 * [(1625.00**3) / (37.30)]**0.2 = 21.806$
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 1.991
 UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6918
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) = 4.48
 TOTAL AREA(ACRES) = 3.25 TOTAL RUNOFF(CFS) = 4.48

=====

END OF STUDY SUMMARY:
 TOTAL AREA(ACRES) = 3.25 TC(MIN.) = 21.81
 PEAK FLOW RATE(CFS) = 4.48

=====

END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
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Analysis prepared by:

THIENES ENGINEERING
16800 VALLEY VIEW AVENUE
LA MIRADA CA 90638
PH: (714) 521-4811 FAX: (714) 521-4173

***** DESCRIPTION OF STUDY *****
* JOB #3261 SYCAMORE V, 6275 LANCE DRIVE, RIVERSIDE COUNTY *
* EXISTING CONDITION 100-YAER *
* NODES 400-401 *

FILE NAME: C:\XDRIVE\3261\3261EX4.DAT
TIME/DATE OF STUDY: 11:27 10/16/2014

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

USER SPECIFIED STORM EVENT(YEAR) = 100.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
2-YEAR, 1-HOUR PRECIPITATION(INCH) = 0.500
100-YEAR, 1-HOUR PRECIPITATION(INCH) = 1.200
COMPUTED RAINFALL INTENSITY DATA:
STORM EVENT = 100.00 1-HOUR INTENSITY(INCH/HOUR) = 1.200
SLOPE OF INTENSITY DURATION CURVE = 0.5000
RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS

FOR ALL DOWNSTREAM ANALYSES

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

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0313 0.167	0.0150

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 400.00 TO NODE 401.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

ASSUMED INITIAL SUBAREA UNIFORM

DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER

TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2

INITIAL SUBAREA FLOW-LENGTH = 870.00

UPSTREAM ELEVATION = 1592.80

DOWNSTREAM ELEVATION = 1560.30

ELEVATION DIFFERENCE = 32.50

TC = 0.533*[(870.00**3)/(32.50)]**.2 = 15.408

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.368

UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7183

SOIL CLASSIFICATION IS "C"

SUBAREA RUNOFF(CFS) = 2.98

TOTAL AREA(ACRES) = 1.75 TOTAL RUNOFF(CFS) = 2.98

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 1.75 TC(MIN.) = 15.41

PEAK FLOW RATE(CFS) = 2.98

END OF RATIONAL METHOD ANALYSIS

PROPOSED CONDITION

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
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Analysis prepared by:

THIENES ENGINEERING
16800 VALLEY VIEW AVENUE
LA MIRADA CA 90638
PH: (714) 521-4811 FAX: (714) 521-4173

***** DESCRIPTION OF STUDY *****
* JOB #3261 SYCAMORE V, RIVERSIDE *
* PROPOSED CONDITION 100-YEAR *
* *

FILE NAME: C:\XDRIVE\3261\3261PR.DAT
TIME/DATE OF STUDY: 11:35 03/30/2016

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

USER SPECIFIED STORM EVENT(YEAR) = 100.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
2-YEAR, 1-HOUR PRECIPITATION(INCH) = 0.500
100-YEAR, 1-HOUR PRECIPITATION(INCH) = 1.200
COMPUTED RAINFALL INTENSITY DATA:
STORM EVENT = 100.00 1-HOUR INTENSITY(INCH/HOUR) = 1.200
SLOPE OF INTENSITY DURATION CURVE = 0.5000
RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
FOR ALL DOWNSTREAM ANALYSES

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

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0313 0.167	0.0150

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.*
MINIMUM LOSS RATE PERCENTAGE FOR 24-HOUR STORM = 0.17

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

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
=====

ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS COMMERCIAL
 $TC = K * [(LENGTH**3) / (ELEVATION CHANGE)]**0.2$
INITIAL SUBAREA FLOW-LENGTH = 910.00
UPSTREAM ELEVATION = 1594.44
DOWNSTREAM ELEVATION = 1585.25
ELEVATION DIFFERENCE = 9.19
 $TC = 0.303 * [(910.00**3) / (9.19)]**0.2 = 11.597$
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.729
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8838
SOIL CLASSIFICATION IS "C"
SUBAREA RUNOFF(CFS) = 8.20
TOTAL AREA(ACRES) = 3.40 TOTAL RUNOFF(CFS) = 8.20

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<
=====

UPSTREAM ELEVATION(FEET) = 1585.25 DOWNSTREAM ELEVATION(FEET) = 1583.38
STREET LENGTH(FEET) = 365.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.64
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.58
HALFSTREET FLOOD WIDTH(FEET) = 23.32
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.50
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.45
STREET FLOW TRAVEL TIME(MIN.) = 2.43 Tc(MIN.) = 14.03
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.482
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8825
SOIL CLASSIFICATION IS "C"
SUBAREA AREA(ACRES) = 4.05 SUBAREA RUNOFF(CFS) = 8.87
TOTAL AREA(ACRES) = 7.45 PEAK FLOW RATE(CFS) = 17.07

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.63 HALFSTREET FLOOD WIDTH(FEET) = 26.21
FLOW VELOCITY(FEET/SEC.) = 2.70 DEPTH*VELOCITY(FT*FT/SEC.) = 1.70
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 1275.00 FEET.

FLOW PROCESS FROM NODE 102.00 TO NODE 112.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 1578.88 DOWNSTREAM(FEET) = 1560.50
FLOW LENGTH(FEET) = 430.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.22
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 17.07
PIPE TRAVEL TIME(MIN.) = 0.50 Tc(MIN.) = 14.53
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 112.00 = 1705.00 FEET.

FLOW PROCESS FROM NODE 112.00 TO NODE 112.00 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.) = 14.53
RAINFALL INTENSITY(INCH/HR) = 2.44
TOTAL STREAM AREA(ACRES) = 7.45
PEAK FLOW RATE(CFS) AT CONFLUENCE = 17.07

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

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

=====

ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS COMMERCIAL
TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
INITIAL SUBAREA FLOW-LENGTH = 325.00
UPSTREAM ELEVATION = 1581.85
DOWNSTREAM ELEVATION = 1569.62
ELEVATION DIFFERENCE = 12.23
TC = 0.303[(325.00**3)/(12.23)]**.2 = 5.905
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.825
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8878
SOIL CLASSIFICATION IS "C"
SUBAREA RUNOFF(CFS) = 1.53
TOTAL AREA(ACRES) = 0.45 TOTAL RUNOFF(CFS) = 1.53

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

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

ELEVATION DATA: UPSTREAM(FEET) = 1566.62 DOWNSTREAM(FEET) = 1561.50
 FLOW LENGTH(FEET) = 84.00 MANNING'S N = 0.012
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN 12.0 INCH PIPE IS 3.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 8.72
 ESTIMATED PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 1.53
 PIPE TRAVEL TIME(MIN.) = 0.16 Tc(MIN.) = 6.07
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 112.00 = 409.00 FEET.

 FLOW PROCESS FROM NODE 112.00 TO NODE 112.00 IS CODE = 1

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

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 6.07
 RAINFALL INTENSITY(INCH/HR) = 3.77
 TOTAL STREAM AREA(ACRES) = 0.45
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 1.53

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	17.07	14.53	2.438	7.45
2	1.53	6.07	3.774	0.45

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	8.65	6.07	3.774
2	18.06	14.53	2.438

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 18.06 Tc(MIN.) = 14.53
 TOTAL AREA(ACRES) = 7.90
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 112.00 = 1705.00 FEET.

 FLOW PROCESS FROM NODE 112.00 TO NODE 132.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 1560.50 DOWNSTREAM(FEET) = 1557.00
 FLOW LENGTH(FEET) = 46.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 15.0 INCH PIPE IS 11.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 17.46
 ESTIMATED PIPE DIAMETER(INCH) = 15.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 18.06
 PIPE TRAVEL TIME(MIN.) = 0.04 Tc(MIN.) = 14.58
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 132.00 = 1751.00 FEET.

 FLOW PROCESS FROM NODE 132.00 TO NODE 132.00 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.) = 14.58
 RAINFALL INTENSITY(INCH/HR) = 2.43
 TOTAL STREAM AREA(ACRES) = 7.90
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 18.06

 FLOW PROCESS FROM NODE 120.00 TO NODE 121.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

=====

ASSUMED INITIAL SUBAREA UNIFORM
 DEVELOPMENT IS COMMERCIAL
 $TC = K * [(LENGTH**3) / (ELEVATION CHANGE)] ** .2$
 INITIAL SUBAREA FLOW-LENGTH = 535.00
 UPSTREAM ELEVATION = 1594.44

DOWNSTREAM ELEVATION = 1591.00
ELEVATION DIFFERENCE = 3.44
TC = 0.303*[(535.00**3)/(3.44)]**.2 = 10.263
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.901
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8846
SOIL CLASSIFICATION IS "C"
SUBAREA RUNOFF(CFS) = 7.83
TOTAL AREA(ACRES) = 3.05 TOTAL RUNOFF(CFS) = 7.83

FLOW PROCESS FROM NODE 121.00 TO NODE 122.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<

=====

UPSTREAM ELEVATION(FEET) = 1591.00 DOWNSTREAM ELEVATION(FEET) = 1582.71
STREET LENGTH(FEET) = 920.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.57
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.53
HALFSTREET FLOOD WIDTH(FEET) = 20.82
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.09
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.65
STREET FLOW TRAVEL TIME(MIN.) = 4.96 Tc(MIN.) = 15.22
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.383
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8819
SOIL CLASSIFICATION IS "C"
SUBAREA AREA(ACRES) = 4.50 SUBAREA RUNOFF(CFS) = 9.46
TOTAL AREA(ACRES) = 7.55 PEAK FLOW RATE(CFS) = 17.28

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.58 HALFSTREET FLOOD WIDTH(FEET) = 23.55
FLOW VELOCITY(FEET/SEC.) = 3.36 DEPTH*VELOCITY(FT*FT/SEC.) = 1.96
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 122.00 = 1455.00 FEET.

FLOW PROCESS FROM NODE 122.00 TO NODE 132.00 IS CODE = 31

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

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 1578.21 DOWNSTREAM(FEET) = 1557.00
FLOW LENGTH(FEET) = 98.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 12.0 INCH PIPE IS 9.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 25.41
ESTIMATED PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 17.28
PIPE TRAVEL TIME(MIN.) = 0.06 Tc(MIN.) = 15.28
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 132.00 = 1553.00 FEET.

FLOW PROCESS FROM NODE 132.00 TO NODE 132.00 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.) = 15.28
RAINFALL INTENSITY(INCH/HR) = 2.38
TOTAL STREAM AREA(ACRES) = 7.55
PEAK FLOW RATE(CFS) AT CONFLUENCE = 17.28

FLOW PROCESS FROM NODE 130.00 TO NODE 131.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

=====

ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS COMMERCIAL

```

TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
INITIAL SUBAREA FLOW-LENGTH = 390.00
UPSTREAM ELEVATION = 1585.13
DOWNSTREAM ELEVATION = 1564.09
ELEVATION DIFFERENCE = 21.04
TC = 0.303*[(390.00**3)/(21.04)]**.2 = 5.910
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.823
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8878
SOIL CLASSIFICATION IS "C"
SUBAREA RUNOFF(CFS) = 2.89
TOTAL AREA(ACRES) = 0.85 TOTAL RUNOFF(CFS) = 2.89

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FLOW PROCESS FROM NODE 131.00 TO NODE 132.00 IS CODE = 31

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

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=====
ELEVATION DATA: UPSTREAM(FEET) = 1561.09 DOWNSTREAM(FEET) = 1557.00
FLOW LENGTH(FEET) = 26.00 MANNING'S N = 0.012
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
DEPTH OF FLOW IN 12.0 INCH PIPE IS 3.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.68
ESTIMATED PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 2.89
PIPE TRAVEL TIME(MIN.) = 0.03 Tc(MIN.) = 5.94
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 132.00 = 416.00 FEET.

```

```

FLOW PROCESS FROM NODE 132.00 TO NODE 132.00 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.) = 5.94
RAINFALL INTENSITY(INCH/HR) = 3.81
TOTAL STREAM AREA(ACRES) = 0.85
PEAK FLOW RATE(CFS) AT CONFLUENCE = 2.89

```

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	8.65	6.12	3.758	7.90
1	18.06	14.58	2.435	7.90
2	17.28	15.28	2.378	7.55
3	2.89	5.94	3.814	0.85

```

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

```

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	18.01	5.94	3.814
2	18.42	6.12	3.758
3	36.38	14.58	2.435
4	36.72	15.28	2.378

```

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 36.72 Tc(MIN.) = 15.28
TOTAL AREA(ACRES) = 16.30
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 132.00 = 1751.00 FEET.

```

```

FLOW PROCESS FROM NODE 132.00 TO NODE 224.00 IS CODE = 31

```

```

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

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 1557.00 DOWNSTREAM(FEET) = 1551.00
FLOW LENGTH(FEET) = 366.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 21.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.06
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 36.72
PIPE TRAVEL TIME(MIN.) = 0.55 Tc(MIN.) = 15.84
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 224.00 = 2117.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE      224.00 TO NODE      224.00 IS CODE =  10
-----
>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<
=====
*****
FLOW PROCESS FROM NODE      200.00 TO NODE      201.00 IS CODE =  21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
=====
      ASSUMED INITIAL SUBAREA UNIFORM
      DEVELOPMENT IS COMMERCIAL
TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
INITIAL SUBAREA FLOW-LENGTH =  275.00
UPSTREAM ELEVATION =  1570.31
DOWNSTREAM ELEVATION =  1566.43
ELEVATION DIFFERENCE =  3.88
TC = 0.303*[( 275.00**3)/( 3.88)]**.2 =  6.721
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.585
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8871
SOIL CLASSIFICATION IS "C"
SUBAREA RUNOFF(CFS) =  4.13
TOTAL AREA(ACRES) =  1.30  TOTAL RUNOFF(CFS) =  4.13
*****
FLOW PROCESS FROM NODE      201.00 TO NODE      212.00 IS CODE =  31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1562.93  DOWNSTREAM(FEET) = 1560.73
FLOW LENGTH(FEET) =  440.00  MANNING'S N =  0.012
DEPTH OF FLOW IN 15.0 INCH PIPE IS 10.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  4.41
ESTIMATED PIPE DIAMETER(INCH) = 15.00  NUMBER OF PIPES =  1
PIPE-FLOW(CFS) =  4.13
PIPE TRAVEL TIME(MIN.) =  1.66  Tc(MIN.) =  8.38
LONGEST FLOWPATH FROM NODE      200.00 TO NODE      212.00 =  715.00 FEET.
1
*****
FLOW PROCESS FROM NODE      212.00 TO NODE      212.00 IS CODE =  1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) =  8.38
RAINFALL INTENSITY(INCH/HR) =  3.21
TOTAL STREAM AREA(ACRES) =  1.30
PEAK FLOW RATE(CFS) AT CONFLUENCE =  4.13
*****
FLOW PROCESS FROM NODE      210.00 TO NODE      211.00 IS CODE =  21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
=====
      ASSUMED INITIAL SUBAREA UNIFORM
      DEVELOPMENT IS COMMERCIAL
TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
INITIAL SUBAREA FLOW-LENGTH =  260.00
UPSTREAM ELEVATION =  1569.07
DOWNSTREAM ELEVATION =  1565.83
ELEVATION DIFFERENCE =  3.24
TC = 0.303*[( 260.00**3)/( 3.24)]**.2 =  6.737
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.581
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8871
SOIL CLASSIFICATION IS "C"
SUBAREA RUNOFF(CFS) =  1.91
TOTAL AREA(ACRES) =  0.60  TOTAL RUNOFF(CFS) =  1.91
*****
FLOW PROCESS FROM NODE      211.00 TO NODE      212.00 IS CODE =  31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1562.83  DOWNSTREAM(FEET) = 1560.73
FLOW LENGTH(FEET) =  18.00  MANNING'S N =  0.012
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000

```

DEPTH OF FLOW IN 12.0 INCH PIPE IS 3.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 11.74
 ESTIMATED PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 1.91
 PIPE TRAVEL TIME(MIN.) = 0.03 Tc(MIN.) = 6.76
 LONGEST FLOWPATH FROM NODE 210.00 TO NODE 212.00 = 278.00 FEET.

 FLOW PROCESS FROM NODE 212.00 TO NODE 212.00 IS CODE = 1

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

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 6.76
 RAINFALL INTENSITY(INCH/HR) = 3.57
 TOTAL STREAM AREA(ACRES) = 0.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 1.91

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	4.13	8.38	3.210	1.30
2	1.91	6.76	3.574	0.60

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	5.24	6.76	3.574
2	5.85	8.38	3.210

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 5.85 Tc(MIN.) = 8.38
 TOTAL AREA(ACRES) = 1.90
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 212.00 = 715.00 FEET.

 FLOW PROCESS FROM NODE 212.00 TO NODE 222.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 1560.73 DOWNSTREAM(FEET) = 1558.35
 FLOW LENGTH(FEET) = 344.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 5.53
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 5.85
 PIPE TRAVEL TIME(MIN.) = 1.04 Tc(MIN.) = 9.42
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 222.00 = 1059.00 FEET.

 FLOW PROCESS FROM NODE 222.00 TO NODE 222.00 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.) = 9.42
 RAINFALL INTENSITY(INCH/HR) = 3.03
 TOTAL STREAM AREA(ACRES) = 1.90
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 5.85

 FLOW PROCESS FROM NODE 220.00 TO NODE 221.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

=====

ASSUMED INITIAL SUBAREA UNIFORM
 DEVELOPMENT IS COMMERCIAL
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH = 625.00
 UPSTREAM ELEVATION = 1570.31
 DOWNSTREAM ELEVATION = 1562.05
 ELEVATION DIFFERENCE = 8.26
 TC = 0.303*[(625.00**3)/(8.26)]**.2 = 9.456

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.023
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8851
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) = 3.48
 TOTAL AREA(ACRES) = 1.30 TOTAL RUNOFF(CFS) = 3.48

 FLOW PROCESS FROM NODE 221.00 TO NODE 222.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 1558.55 DOWNSTREAM(FEET) = 1558.35
 FLOW LENGTH(FEET) = 40.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 15.0 INCH PIPE IS 9.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 4.28
 ESTIMATED PIPE DIAMETER(INCH) = 15.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 3.48
 PIPE TRAVEL TIME(MIN.) = 0.16 Tc(MIN.) = 9.61
 LONGEST FLOWPATH FROM NODE 220.00 TO NODE 222.00 = 665.00 FEET.

 FLOW PROCESS FROM NODE 222.00 TO NODE 222.00 IS CODE = 1

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

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 9.61
 RAINFALL INTENSITY(INCH/HR) = 3.00
 TOTAL STREAM AREA(ACRES) = 1.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 3.48

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	5.24	7.85	3.317	1.90
1	5.85	9.42	3.029	1.90
2	3.48	9.61	2.998	1.30

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	8.08	7.85	3.317
2	9.26	9.42	3.029
3	9.27	9.61	2.998

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 9.27 Tc(MIN.) = 9.61
 TOTAL AREA(ACRES) = 3.20
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 222.00 = 1059.00 FEET.

 FLOW PROCESS FROM NODE 222.00 TO NODE 223.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 1558.35 DOWNSTREAM(FEET) = 1557.73
 FLOW LENGTH(FEET) = 124.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 5.44
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 9.27
 PIPE TRAVEL TIME(MIN.) = 0.38 Tc(MIN.) = 9.99
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 223.00 = 1183.00 FEET.

 FLOW PROCESS FROM NODE 223.00 TO NODE 223.00 IS CODE = 81

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

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.941
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8848
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) = 0.45 SUBAREA RUNOFF(CFS) = 1.17

TOTAL AREA(ACRES) = 3.65 TOTAL RUNOFF(CFS) = 10.44
TC(MIN) = 9.99

FLOW PROCESS FROM NODE 223.00 TO NODE 224.00 IS CODE = 31

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

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

ELEVATION DATA: UPSTREAM(FEET) = 1557.73 DOWNSTREAM(FEET) = 1551.00

FLOW LENGTH(FEET) = 42.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 12.0 INCH PIPE IS 7.8 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 19.43

ESTIMATED PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 10.44

PIPE TRAVEL TIME(MIN.) = 0.04 Tc(MIN.) = 10.03

LONGEST FLOWPATH FROM NODE 200.00 TO NODE 224.00 = 1225.00 FEET.

FLOW PROCESS FROM NODE 224.00 TO NODE 224.00 IS CODE = 11

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

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	9.37	8.28	3.230	3.65
2	10.44	9.84	2.964	3.65
3	10.44	10.03	2.935	3.65

LONGEST FLOWPATH FROM NODE 200.00 TO NODE 224.00 = 1225.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	18.01	6.59	3.620	16.30
2	18.42	6.77	3.572	16.30
3	36.38	15.13	2.390	16.30
4	36.72	15.84	2.336	16.30

LONGEST FLOWPATH FROM NODE 0.00 TO NODE 224.00 = 0.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	25.47	6.59	3.620
2	26.08	6.77	3.572
3	29.29	8.28	3.230
4	34.09	9.84	2.964
5	34.55	10.03	2.935
6	44.88	15.13	2.390
7	45.02	15.84	2.336

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 45.02 Tc(MIN.) = 15.84

TOTAL AREA(ACRES) = 19.95

FLOW PROCESS FROM NODE 224.00 TO NODE 224.00 IS CODE = 12

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

FLOW PROCESS FROM NODE 224.00 TO NODE 313.00 IS CODE = 31

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

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

ELEVATION DATA: UPSTREAM(FEET) = 1551.00 DOWNSTREAM(FEET) = 1521.00

FLOW LENGTH(FEET) = 1452.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.0 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 12.96

ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 45.02

PIPE TRAVEL TIME(MIN.) = 1.87 Tc(MIN.) = 17.70

LONGEST FLOWPATH FROM NODE 200.00 TO NODE 313.00 = 2677.00 FEET.

FLOW PROCESS FROM NODE 313.00 TO NODE 313.00 IS CODE = 10

```

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<
=====
*****
FLOW PROCESS FROM NODE      300.00 TO NODE      301.00 IS CODE =  21
=====
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
=====
      ASSUMED INITIAL SUBAREA UNIFORM
      DEVELOPMENT IS COMMERCIAL
TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
INITIAL SUBAREA FLOW-LENGTH =  280.00
UPSTREAM ELEVATION =  1554.16
DOWNSTREAM ELEVATION =  1541.54
ELEVATION DIFFERENCE =  12.62
TC = 0.303*[( 280.00**3)/( 12.62)]**.2 =  5.366
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.013
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8883
SOIL CLASSIFICATION IS "C"
SUBAREA RUNOFF(CFS) =  3.03
TOTAL AREA(ACRES) =  0.85  TOTAL RUNOFF(CFS) =  3.03
=====
*****
FLOW PROCESS FROM NODE      301.00 TO NODE      312.00 IS CODE =  31
=====
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1538.54  DOWNSTREAM(FEET) = 1523.00
FLOW LENGTH(FEET) =  60.00  MANNING'S N =  0.012
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
DEPTH OF FLOW IN 12.0 INCH PIPE IS  3.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.82
ESTIMATED PIPE DIAMETER(INCH) = 12.00  NUMBER OF PIPES =  1
PIPE-FLOW(CFS) =  3.03
PIPE TRAVEL TIME(MIN.) =  0.06  Tc(MIN.) =  5.42
LONGEST FLOWPATH FROM NODE      300.00 TO NODE      312.00 =  340.00 FEET.
=====
*****
FLOW PROCESS FROM NODE      312.00 TO NODE      312.00 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.) =  5.42
RAINFALL INTENSITY(INCH/HR) =  3.99
TOTAL STREAM AREA(ACRES) =  0.85
PEAK FLOW RATE(CFS) AT CONFLUENCE =  3.03
=====
*****
FLOW PROCESS FROM NODE      310.00 TO NODE      311.00 IS CODE =  21
=====
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
=====
      ASSUMED INITIAL SUBAREA UNIFORM
      DEVELOPMENT IS COMMERCIAL
TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
INITIAL SUBAREA FLOW-LENGTH =  935.00
UPSTREAM ELEVATION =  1562.00
DOWNSTREAM ELEVATION =  1537.80
ELEVATION DIFFERENCE =  24.20
TC = 0.303*[( 935.00**3)/( 24.20)]**.2 =  9.712
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.983
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8849
SOIL CLASSIFICATION IS "C"
SUBAREA RUNOFF(CFS) =  1.98
TOTAL AREA(ACRES) =  0.75  TOTAL RUNOFF(CFS) =  1.98
=====
*****
FLOW PROCESS FROM NODE      310.00 TO NODE      311.00 IS CODE =  81
=====
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.983
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8849
SOIL CLASSIFICATION IS "C"
SUBAREA AREA(ACRES) =  0.45  SUBAREA RUNOFF(CFS) =  1.19
TOTAL AREA(ACRES) =  1.20  TOTAL RUNOFF(CFS) =  3.17
TC(MIN) =  9.71

```

FLOW PROCESS FROM NODE 310.00 TO NODE 311.00 IS CODE = 81

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

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.983
UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7495
SOIL CLASSIFICATION IS "C"
SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 0.89
TOTAL AREA(ACRES) = 1.60 TOTAL RUNOFF(CFS) = 4.06
TC(MIN) = 9.71

FLOW PROCESS FROM NODE 311.00 TO NODE 312.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 1537.80 DOWNSTREAM ELEVATION(FEET) = 1528.20
STREET LENGTH(FEET) = 805.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.87
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.40
HALFSTREET FLOOD WIDTH(FEET) = 13.24
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.77
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.10
STREET FLOW TRAVEL TIME(MIN.) = 4.85 Tc(MIN.) = 14.56
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.436
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8822
SOIL CLASSIFICATION IS "C"
SUBAREA AREA(ACRES) = 0.75 SUBAREA RUNOFF(CFS) = 1.61
TOTAL AREA(ACRES) = 2.35 PEAK FLOW RATE(CFS) = 5.67

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.42 HALFSTREET FLOOD WIDTH(FEET) = 14.18
FLOW VELOCITY(FEET/SEC.) = 2.85 DEPTH*VELOCITY(FT*FT/SEC.) = 1.19
LONGEST FLOWPATH FROM NODE 310.00 TO NODE 312.00 = 1740.00 FEET.

FLOW PROCESS FROM NODE 311.00 TO NODE 312.00 IS CODE = 81

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

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.436
UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7224
SOIL CLASSIFICATION IS "C"
SUBAREA AREA(ACRES) = 1.05 SUBAREA RUNOFF(CFS) = 1.85
TOTAL AREA(ACRES) = 3.40 TOTAL RUNOFF(CFS) = 7.52
TC(MIN) = 14.56

FLOW PROCESS FROM NODE 312.00 TO NODE 312.00 IS CODE = 1

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

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 14.56
RAINFALL INTENSITY(INCH/HR) = 2.44
TOTAL STREAM AREA(ACRES) = 3.40
PEAK FLOW RATE(CFS) AT CONFLUENCE = 7.52

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	3.03	5.42	3.992	0.85
2	7.52	14.56	2.436	3.40

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	5.83	5.42	3.992
2	9.37	14.56	2.436

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 9.37 Tc(MIN.) = 14.56
TOTAL AREA(ACRES) = 4.25
LONGEST FLOWPATH FROM NODE 310.00 TO NODE 312.00 = 1740.00 FEET.

FLOW PROCESS FROM NODE 312.00 TO NODE 313.00 IS CODE = 31

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

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

ELEVATION DATA: UPSTREAM(FEET) = 1523.00 DOWNSTREAM(FEET) = 1521.00
FLOW LENGTH(FEET) = 4.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
DEPTH OF FLOW IN 12.0 INCH PIPE IS 5.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 29.17
ESTIMATED PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 9.37
PIPE TRAVEL TIME(MIN.) = 0.00 Tc(MIN.) = 14.56
LONGEST FLOWPATH FROM NODE 310.00 TO NODE 313.00 = 1744.00 FEET.

FLOW PROCESS FROM NODE 313.00 TO NODE 313.00 IS CODE = 11

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

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	5.83	5.42	3.991	4.25
2	9.37	14.56	2.436	4.25

LONGEST FLOWPATH FROM NODE 310.00 TO NODE 313.00 = 1744.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	25.47	8.75	3.142	19.95
2	26.08	8.92	3.112	19.95
3	29.29	10.40	2.883	19.95
4	34.09	11.84	2.702	19.95
5	34.55	12.03	2.680	19.95
6	44.88	17.00	2.255	19.95
7	45.02	17.70	2.209	19.95

LONGEST FLOWPATH FROM NODE 0.00 TO NODE 313.00 = 0.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	21.69	5.42	3.991
2	31.10	8.75	3.142
3	31.82	8.92	3.112
4	35.98	10.40	2.883
5	41.71	11.84	2.702
6	42.29	12.03	2.680
7	47.83	14.56	2.436
8	53.55	17.00	2.255
9	53.52	17.70	2.209

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 53.55 Tc(MIN.) = 17.00
TOTAL AREA(ACRES) = 24.20

FLOW PROCESS FROM NODE 313.00 TO NODE 313.00 IS CODE = 12

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

```

FLOW PROCESS FROM NODE      313.00 TO NODE      455.00 IS CODE =  31
=====
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1521.00  DOWNSTREAM(FEET) = 1519.00
FLOW LENGTH(FEET) = 108.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 24.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.63
ESTIMATED PIPE DIAMETER(INCH) = 30.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 53.55
PIPE TRAVEL TIME(MIN.) = 0.14  Tc(MIN.) = 17.14
LONGEST FLOWPATH FROM NODE 310.00 TO NODE 455.00 = 1852.00 FEET.

*****
FLOW PROCESS FROM NODE      455.00 TO NODE      455.00 IS CODE =  10
=====
>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<
=====
*****
FLOW PROCESS FROM NODE      400.00 TO NODE      401.00 IS CODE =  21
=====
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
=====
      ASSUMED INITIAL SUBAREA UNIFORM
      DEVELOPMENT IS SINGLE FAMILY(1/2 ACRE)
TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
INITIAL SUBAREA FLOW-LENGTH = 685.00
UPSTREAM ELEVATION = 1660.00
DOWNSTREAM ELEVATION = 1628.00
ELEVATION DIFFERENCE = 32.00
TC = 0.422*[( 685.00**3)/( 32.00)]**.2 = 10.612
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.853
SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .8063
SOIL CLASSIFICATION IS "C"
SUBAREA RUNOFF(CFS) = 13.34
TOTAL AREA(ACRES) = 5.80  TOTAL RUNOFF(CFS) = 13.34

*****
FLOW PROCESS FROM NODE      401.00 TO NODE      411.00 IS CODE =  62
=====
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 1628.00  DOWNSTREAM ELEVATION(FEET) = 1624.00
STREET LENGTH(FEET) = 525.00  CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.27
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.61
HALFSTREET FLOOD WIDTH(FEET) = 24.88
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.19
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.94
STREET FLOW TRAVEL TIME(MIN.) = 2.74  Tc(MIN.) = 13.35
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.544
SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .7971
SOIL CLASSIFICATION IS "C"
SUBAREA AREA(ACRES) = 4.85  SUBAREA RUNOFF(CFS) = 9.83
TOTAL AREA(ACRES) = 10.65  PEAK FLOW RATE(CFS) = 23.18

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.65  HALFSTREET FLOOD WIDTH(FEET) = 27.30
FLOW VELOCITY(FEET/SEC.) = 3.38  DEPTH*VELOCITY(FT*FT/SEC.) = 2.20
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 411.00 = 1210.00 FEET.

*****
FLOW PROCESS FROM NODE      411.00 TO NODE      411.00 IS CODE =  1
=====
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

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=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 13.35
RAINFALL INTENSITY(INCH/HR) = 2.54
TOTAL STREAM AREA(ACRES) = 10.65
PEAK FLOW RATE(CFS) AT CONFLUENCE = 23.18

*****
FLOW PROCESS FROM NODE 410.00 TO NODE 411.00 IS CODE = 21
=====
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
=====
ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS SINGLE FAMILY(1/2 ACRE)
TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
INITIAL SUBAREA FLOW-LENGTH = 795.00
UPSTREAM ELEVATION = 1660.00
DOWNSTREAM ELEVATION = 1624.00
ELEVATION DIFFERENCE = 36.00
TC = 0.422*[( 795.00**3)/( 36.00)]**.2 = 11.334
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.761
SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .8037
SOIL CLASSIFICATION IS "C"
SUBAREA RUNOFF(CFS) = 11.76
TOTAL AREA(ACRES) = 5.30 TOTAL RUNOFF(CFS) = 11.76

*****
FLOW PROCESS FROM NODE 411.00 TO NODE 411.00 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.) = 11.33
RAINFALL INTENSITY(INCH/HR) = 2.76
TOTAL STREAM AREA(ACRES) = 5.30
PEAK FLOW RATE(CFS) AT CONFLUENCE = 11.76

** CONFLUENCE DATA **
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (MIN.) (INCH/HOUR) (ACRE)
1 23.18 13.35 2.544 10.65
2 11.76 11.33 2.761 5.30

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 31.43 11.33 2.761
2 34.01 13.35 2.544

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 34.01 Tc(MIN.) = 13.35
TOTAL AREA(ACRES) = 15.95
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 411.00 = 1210.00 FEET.

*****
FLOW PROCESS FROM NODE 411.00 TO NODE 412.00 IS CODE = 31
=====
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1620.00 DOWNSTREAM(FEET) = 1600.00
FLOW LENGTH(FEET) = 250.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 21.41
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 34.01
PIPE TRAVEL TIME(MIN.) = 0.19 Tc(MIN.) = 13.55
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 412.00 = 1460.00 FEET.

*****
FLOW PROCESS FROM NODE 412.00 TO NODE 412.00 IS CODE = 81
=====
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

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100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.525
UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7274
SOIL CLASSIFICATION IS "C"
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 1.29
TOTAL AREA(ACRES) = 16.65 TOTAL RUNOFF(CFS) = 35.30
TC(MIN) = 13.55

FLOW PROCESS FROM NODE 412.00 TO NODE 413.00 IS CODE = 51

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

=====

ELEVATION DATA: UPSTREAM(FEET)	=	1600.00	DOWNSTREAM(FEET)	=	1591.00
CHANNEL LENGTH THRU SUBAREA(FEET)	=	124.00	CHANNEL SLOPE	=	0.0726
CHANNEL BASE(FEET)	=	10.00	"Z" FACTOR	=	2.000
MANNING'S FACTOR	=	0.035	MAXIMUM DEPTH(FEET)	=	2.00
CHANNEL FLOW THRU SUBAREA(CFS)	=	35.30			
FLOW VELOCITY(FEET/SEC)	=	6.63	FLOW DEPTH(FEET)	=	0.49
TRAVEL TIME(MIN.)	=	0.31	Tc(MIN.)	=	13.86
LONGEST FLOWPATH FROM NODE	400.00 TO NODE	413.00	=	1584.00 FEET.	

FLOW PROCESS FROM NODE 413.00 TO NODE 413.00 IS CODE = 81

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

=====

100 YEAR RAINFALL INTENSITY(INCH/HOUR)	=	2.497			
UNDEVELOPED WATERSHED RUNOFF COEFFICIENT	=	.7259			
SOIL CLASSIFICATION IS	"C"				
SUBAREA AREA(ACRES)	=	0.35	SUBAREA RUNOFF(CFS)	=	0.63
TOTAL AREA(ACRES)	=	17.00	TOTAL RUNOFF(CFS)	=	35.93
TC(MIN)	=	13.86			

FLOW PROCESS FROM NODE 413.00 TO NODE 414.00 IS CODE = 51

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

=====

ELEVATION DATA: UPSTREAM(FEET)	=	1591.00	DOWNSTREAM(FEET)	=	1581.60
CHANNEL LENGTH THRU SUBAREA(FEET)	=	424.00	CHANNEL SLOPE	=	0.0222
CHANNEL BASE(FEET)	=	10.00	"Z" FACTOR	=	2.000
MANNING'S FACTOR	=	0.030	MAXIMUM DEPTH(FEET)	=	2.00
CHANNEL FLOW THRU SUBAREA(CFS)	=	35.93			
FLOW VELOCITY(FEET/SEC)	=	5.01	FLOW DEPTH(FEET)	=	0.64
TRAVEL TIME(MIN.)	=	1.41	Tc(MIN.)	=	15.27
LONGEST FLOWPATH FROM NODE	400.00 TO NODE	414.00	=	2008.00 FEET.	

FLOW PROCESS FROM NODE 413.00 TO NODE 414.00 IS CODE = 81

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

=====

100 YEAR RAINFALL INTENSITY(INCH/HOUR)	=	2.379			
UNDEVELOPED WATERSHED RUNOFF COEFFICIENT	=	.7189			
SOIL CLASSIFICATION IS	"C"				
SUBAREA AREA(ACRES)	=	0.85	SUBAREA RUNOFF(CFS)	=	1.45
TOTAL AREA(ACRES)	=	17.85	TOTAL RUNOFF(CFS)	=	37.39
TC(MIN)	=	15.27			

FLOW PROCESS FROM NODE 413.00 TO NODE 414.00 IS CODE = 81

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

=====

100 YEAR RAINFALL INTENSITY(INCH/HOUR)	=	2.379			
UNDEVELOPED WATERSHED RUNOFF COEFFICIENT	=	.7189			
SOIL CLASSIFICATION IS	"C"				
SUBAREA AREA(ACRES)	=	0.50	SUBAREA RUNOFF(CFS)	=	0.86
TOTAL AREA(ACRES)	=	18.35	TOTAL RUNOFF(CFS)	=	38.24
TC(MIN)	=	15.27			

FLOW PROCESS FROM NODE 414.00 TO NODE 415.00 IS CODE = 51

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

=====

ELEVATION DATA: UPSTREAM(FEET)	=	1581.60	DOWNSTREAM(FEET)	=	1559.80
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CHANNEL LENGTH THRU SUBAREA(FEET) = 770.00 CHANNEL SLOPE = 0.0283
CHANNEL BASE(FEET) = 10.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 38.24
FLOW VELOCITY(FEET/SEC) = 5.54 FLOW DEPTH(FEET) = 0.62
TRAVEL TIME(MIN.) = 2.32 Tc(MIN.) = 17.59
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 415.00 = 2778.00 FEET.

*****
FLOW PROCESS FROM NODE 414.00 TO NODE 415.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.216
UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7085
SOIL CLASSIFICATION IS "C"
SUBAREA AREA(ACRES) = 1.65 SUBAREA RUNOFF(CFS) = 2.59
TOTAL AREA(ACRES) = 20.00 TOTAL RUNOFF(CFS) = 40.83
TC(MIN) = 17.59

*****
FLOW PROCESS FROM NODE 414.00 TO NODE 415.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.216
UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7085
SOIL CLASSIFICATION IS "C"
SUBAREA AREA(ACRES) = 0.65 SUBAREA RUNOFF(CFS) = 1.02
TOTAL AREA(ACRES) = 20.65 TOTAL RUNOFF(CFS) = 41.85
TC(MIN) = 17.59

*****
FLOW PROCESS FROM NODE 415.00 TO NODE 416.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1559.80 DOWNSTREAM(FEET) = 1544.28
CHANNEL LENGTH THRU SUBAREA(FEET) = 814.00 CHANNEL SLOPE = 0.0191
CHANNEL BASE(FEET) = 10.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 41.85
FLOW VELOCITY(FEET/SEC) = 5.02 FLOW DEPTH(FEET) = 0.73
TRAVEL TIME(MIN.) = 2.70 Tc(MIN.) = 20.29
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 416.00 = 3592.00 FEET.

*****
FLOW PROCESS FROM NODE 415.00 TO NODE 416.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.064
UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6975
SOIL CLASSIFICATION IS "C"
SUBAREA AREA(ACRES) = 1.45 SUBAREA RUNOFF(CFS) = 2.09
TOTAL AREA(ACRES) = 22.10 TOTAL RUNOFF(CFS) = 43.94
TC(MIN) = 20.29

*****
FLOW PROCESS FROM NODE 415.00 TO NODE 416.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.064
UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6975
SOIL CLASSIFICATION IS "C"
SUBAREA AREA(ACRES) = 1.85 SUBAREA RUNOFF(CFS) = 2.66
TOTAL AREA(ACRES) = 23.95 TOTAL RUNOFF(CFS) = 46.60
TC(MIN) = 20.29

*****
FLOW PROCESS FROM NODE 416.00 TO NODE 424.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1538.28 DOWNSTREAM(FEET) = 1533.00
FLOW LENGTH(FEET) = 278.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 30.0 INCH PIPE IS 19.9 INCHES

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PIPE-FLOW VELOCITY(FEET/SEC.) = 13.45
ESTIMATED PIPE DIAMETER(INCH) = 30.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 46.60
PIPE TRAVEL TIME(MIN.) = 0.34    Tc(MIN.) = 20.63
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 424.00 = 3870.00 FEET.

*****
FLOW PROCESS FROM NODE 424.00 TO NODE 424.00 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.) = 20.63
RAINFALL INTENSITY(INCH/HR) = 2.05
TOTAL STREAM AREA(ACRES) = 23.95
PEAK FLOW RATE(CFS) AT CONFLUENCE = 46.60

*****
FLOW PROCESS FROM NODE 420.00 TO NODE 421.00 IS CODE = 21
=====
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
=====
ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS COMMERCIAL
TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
INITIAL SUBAREA FLOW-LENGTH = 510.00
UPSTREAM ELEVATION = 1570.10
DOWNSTREAM ELEVATION = 1562.24
ELEVATION DIFFERENCE = 7.86
TC = 0.303*[(510.00**3)/(7.86)]**.2 = 8.454
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.197
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8858
SOIL CLASSIFICATION IS "C"
SUBAREA RUNOFF(CFS) = 12.60
TOTAL AREA(ACRES) = 4.45    TOTAL RUNOFF(CFS) = 12.60

*****
FLOW PROCESS FROM NODE 421.00 TO NODE 422.00 IS CODE = 9
=====
>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<
=====
UPSTREAM NODE ELEVATION(FEET) = 1562.24
DOWNSTREAM NODE ELEVATION(FEET) = 1558.56
CHANNEL LENGTH THRU SUBAREA(FEET) = 530.00
"V" GUTTER WIDTH(FEET) = 3.00    GUTTER HIKE(FEET) = 0.170
PAVEMENT LIP(FEET) = 0.025    MANNING'S N = .0150
PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
MAXIMUM DEPTH(FEET) = 1.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.744
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8839
SOIL CLASSIFICATION IS "C"
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 20.20
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.92
AVERAGE FLOW DEPTH(FEET) = 0.53    FLOOD WIDTH(FEET) = 36.41
"V" GUTTER FLOW TRAVEL TIME(MIN.) = 3.02    Tc(MIN.) = 11.48
SUBAREA AREA(ACRES) = 6.25    SUBAREA RUNOFF(CFS) = 15.16
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 10.70    PEAK FLOW RATE(CFS) = 27.76

*****
END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) = 0.58    FLOOD WIDTH(FEET) = 41.44
FLOW VELOCITY(FEET/SEC.) = 3.13    DEPTH*VELOCITY(FT*FT/SEC) = 1.81
LONGEST FLOWPATH FROM NODE 420.00 TO NODE 422.00 = 1040.00 FEET.

*****
FLOW PROCESS FROM NODE 422.00 TO NODE 423.00 IS CODE = 9
=====
>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<
=====
UPSTREAM NODE ELEVATION(FEET) = 1558.56
DOWNSTREAM NODE ELEVATION(FEET) = 1552.22
CHANNEL LENGTH THRU SUBAREA(FEET) = 620.00
"V" GUTTER WIDTH(FEET) = 3.00    GUTTER HIKE(FEET) = 0.170
PAVEMENT LIP(FEET) = 0.013    MANNING'S N = .0150
PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
MAXIMUM DEPTH(FEET) = 1.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.467
UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7242

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SOIL CLASSIFICATION IS "C"
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 34.25
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.80
AVERAGE FLOW DEPTH(FEET) = 0.57 FLOOD WIDTH(FEET) = 41.88
"V" GUTTER FLOW TRAVEL TIME(MIN.) = 2.72 Tc(MIN.) = 14.20
SUBAREA AREA(ACRES) = 7.25 SUBAREA RUNOFF(CFS) = 12.95
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 17.95 PEAK FLOW RATE(CFS) = 40.71

END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) = 0.60 FLOOD WIDTH(FEET) = 44.75
FLOW VELOCITY(FEET/SEC.) = 3.97 DEPTH*VELOCITY(FT*FT/SEC) = 2.38
LONGEST FLOWPATH FROM NODE 420.00 TO NODE 423.00 = 1660.00 FEET.

*****
FLOW PROCESS FROM NODE 423.00 TO NODE 424.00 IS CODE = 31
=====
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1546.22 DOWNSTREAM(FEET) = 1533.00
FLOW LENGTH(FEET) = 100.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 21.0 INCH PIPE IS 12.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 27.10
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 40.71
PIPE TRAVEL TIME(MIN.) = 0.06 Tc(MIN.) = 14.26
LONGEST FLOWPATH FROM NODE 420.00 TO NODE 424.00 = 1760.00 FEET.

*****
FLOW PROCESS FROM NODE 424.00 TO NODE 424.00 IS CODE = 1
=====
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 14.26
RAINFALL INTENSITY(INCH/HR) = 2.46
TOTAL STREAM AREA(ACRES) = 17.95
PEAK FLOW RATE(CFS) AT CONFLUENCE = 40.71

** CONFLUENCE DATA **
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (MIN.) (INCH/ HOUR) (ACRE)
1 44.97 18.76 2.146 23.95
1 46.60 20.63 2.046 23.95
2 40.71 14.26 2.462 17.95

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 74.88 14.26 2.462
2 80.46 18.76 2.146
3 80.44 20.63 2.046

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 80.46 Tc(MIN.) = 18.76
TOTAL AREA(ACRES) = 41.90
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 424.00 = 3870.00 FEET.

*****
FLOW PROCESS FROM NODE 424.00 TO NODE 425.00 IS CODE = 31
=====
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1533.00 DOWNSTREAM(FEET) = 1531.00
FLOW LENGTH(FEET) = 56.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 30.0 INCH PIPE IS 24.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.01
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 80.46
PIPE TRAVEL TIME(MIN.) = 0.05 Tc(MIN.) = 18.81
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 425.00 = 3926.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE      425.00 TO NODE      425.00 IS CODE = 81
=====
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.143
UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7034
SOIL CLASSIFICATION IS "C"
SUBAREA AREA(ACRES) = 0.95 SUBAREA RUNOFF(CFS) = 1.43
TOTAL AREA(ACRES) = 42.85 TOTAL RUNOFF(CFS) = 81.89
TC(MIN) = 18.81
*****
FLOW PROCESS FROM NODE      425.00 TO NODE      425.00 IS CODE = 81
=====
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.143
UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7034
SOIL CLASSIFICATION IS "C"
SUBAREA AREA(ACRES) = 0.15 SUBAREA RUNOFF(CFS) = 0.23
TOTAL AREA(ACRES) = 43.00 TOTAL RUNOFF(CFS) = 82.12
TC(MIN) = 18.81
*****
FLOW PROCESS FROM NODE      425.00 TO NODE      426.00 IS CODE = 31
=====
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1531.00 DOWNSTREAM(FEET) = 1522.50
FLOW LENGTH(FEET) = 408.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.01
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 82.12
PIPE TRAVEL TIME(MIN.) = 0.42 Tc(MIN.) = 19.24
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 426.00 = 4334.00 FEET.
*****
FLOW PROCESS FROM NODE      426.00 TO NODE      426.00 IS CODE = 81
=====
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.119
UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7017
SOIL CLASSIFICATION IS "C"
SUBAREA AREA(ACRES) = 1.75 SUBAREA RUNOFF(CFS) = 2.60
TOTAL AREA(ACRES) = 44.75 TOTAL RUNOFF(CFS) = 84.72
TC(MIN) = 19.24
*****
FLOW PROCESS FROM NODE      426.00 TO NODE      453.00 IS CODE = 31
=====
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1522.50 DOWNSTREAM(FEET) = 1520.00
FLOW LENGTH(FEET) = 500.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 45.0 INCH PIPE IS 34.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.29
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 84.72
PIPE TRAVEL TIME(MIN.) = 0.90 Tc(MIN.) = 20.13
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 453.00 = 4834.00 FEET.
*****
FLOW PROCESS FROM NODE      453.00 TO NODE      453.00 IS CODE = 10
=====
>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<
=====
*****
FLOW PROCESS FROM NODE      430.00 TO NODE      431.00 IS CODE = 21
=====
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
=====
ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS COMMERCIAL
TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2

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INITIAL SUBAREA FLOW-LENGTH = 480.00
UPSTREAM ELEVATION = 1566.08
DOWNSTREAM ELEVATION = 1559.78
ELEVATION DIFFERENCE = 6.30
TC = 0.303*[( 480.00**3)/( 6.30)]**.2 = 8.520
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.184
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8858
SOIL CLASSIFICATION IS "C"
SUBAREA RUNOFF(CFS) = 11.99
TOTAL AREA(ACRES) = 4.25 TOTAL RUNOFF(CFS) = 11.99

*****
FLOW PROCESS FROM NODE 431.00 TO NODE 432.00 IS CODE = 9
=====
>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<
=====
UPSTREAM NODE ELEVATION(FEET) = 1559.78
DOWNSTREAM NODE ELEVATION(FEET) = 1556.70
CHANNEL LENGTH THRU SUBAREA(FEET) = 500.00
"V" GUTTER WIDTH(FEET) = 3.00 GUTTER HIKE(FEET) = 0.170
PAVEMENT LIP(FEET) = 0.013 MANNING'S N = .0150
PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
MAXIMUM DEPTH(FEET) = 1.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.738
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8838
SOIL CLASSIFICATION IS "C"
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 19.93
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.77
AVERAGE FLOW DEPTH(FEET) = 0.52 FLOOD WIDTH(FEET) = 37.25
"V" GUTTER FLOW TRAVEL TIME(MIN.) = 3.00 Tc(MIN.) = 11.53
SUBAREA AREA(ACRES) = 6.55 SUBAREA RUNOFF(CFS) = 15.85
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 10.80 PEAK FLOW RATE(CFS) = 27.84

END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) = 0.58 FLOOD WIDTH(FEET) = 42.68
FLOW VELOCITY(FEET/SEC.) = 2.98 DEPTH*VELOCITY(FT*FT/SEC) = 1.72
LONGEST FLOWPATH FROM NODE 430.00 TO NODE 432.00 = 980.00 FEET.

*****
FLOW PROCESS FROM NODE 432.00 TO NODE 442.00 IS CODE = 9
=====
>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<
=====
UPSTREAM NODE ELEVATION(FEET) = 1556.70
DOWNSTREAM NODE ELEVATION(FEET) = 1555.24
CHANNEL LENGTH THRU SUBAREA(FEET) = 295.00
"V" GUTTER WIDTH(FEET) = 3.00 GUTTER HIKE(FEET) = 0.170
PAVEMENT LIP(FEET) = 0.013 MANNING'S N = .0150
PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
MAXIMUM DEPTH(FEET) = 1.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.555
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8829
SOIL CLASSIFICATION IS "C"
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 33.70
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.87
AVERAGE FLOW DEPTH(FEET) = 0.63 FLOOD WIDTH(FEET) = 47.95
"V" GUTTER FLOW TRAVEL TIME(MIN.) = 1.71 Tc(MIN.) = 13.24
SUBAREA AREA(ACRES) = 5.20 SUBAREA RUNOFF(CFS) = 11.73
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 16.00 PEAK FLOW RATE(CFS) = 39.57

END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) = 0.66 FLOOD WIDTH(FEET) = 51.14
FLOW VELOCITY(FEET/SEC.) = 2.97 DEPTH*VELOCITY(FT*FT/SEC) = 1.97
LONGEST FLOWPATH FROM NODE 430.00 TO NODE 442.00 = 1275.00 FEET.

*****
FLOW PROCESS FROM NODE 442.00 TO NODE 442.00 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.) = 13.24
RAINFALL INTENSITY(INCH/HR) = 2.55
TOTAL STREAM AREA(ACRES) = 16.00
PEAK FLOW RATE(CFS) AT CONFLUENCE = 39.57

```

FLOW PROCESS FROM NODE 440.00 TO NODE 441.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

=====

ASSUMED INITIAL SUBAREA UNIFORM

DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER

TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2

INITIAL SUBAREA FLOW-LENGTH = 575.00

UPSTREAM ELEVATION = 1561.02

DOWNSTREAM ELEVATION = 1557.62

ELEVATION DIFFERENCE = 3.40

TC = 0.533*[(575.00**3)/(3.40)]**.2 = 18.876

.100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.139

UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7031

SOIL CLASSIFICATION IS "C"

SUBAREA RUNOFF(CFS) = 0.98

TOTAL AREA(ACRES) = 0.65 TOTAL RUNOFF(CFS) = 0.98

FLOW PROCESS FROM NODE 441.00 TO NODE 442.00 IS CODE = 31

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

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 1554.62 DOWNSTREAM(FEET) = 1552.14

FLOW LENGTH(FEET) = 496.00 MANNING'S N = 0.012

ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000

DEPTH OF FLOW IN 12.0 INCH PIPE IS 5.0 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 3.12

ESTIMATED PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 0.98

PIPE TRAVEL TIME(MIN.) = 2.65 Tc(MIN.) = 21.53

LONGEST FLOWPATH FROM NODE 440.00 TO NODE 442.00 = 1071.00 FEET.

FLOW PROCESS FROM NODE 442.00 TO NODE 442.00 IS CODE = 1

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

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

=====

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION(MIN.) = 21.53

RAINFALL INTENSITY(INCH/HR) = 2.00

TOTAL STREAM AREA(ACRES) = 0.65

PEAK FLOW RATE(CFS) AT CONFLUENCE = 0.98

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	39.57	13.24	2.555	16.00
2	0.98	21.53	2.003	0.65

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO

CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	40.17	13.24	2.555
2	32.01	21.53	2.003

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 40.17 Tc(MIN.) = 13.24

TOTAL AREA(ACRES) = 16.65

LONGEST FLOWPATH FROM NODE 430.00 TO NODE 442.00 = 1275.00 FEET.

FLOW PROCESS FROM NODE 442.00 TO NODE 443.00 IS CODE = 31

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

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 1549.74 DOWNSTREAM(FEET) = 1540.50

FLOW LENGTH(FEET) = 228.00 MANNING'S N = 0.012

DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.8 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 17.13

ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1

```

PIPE-FLOW(CFS) = 40.17
PIPE TRAVEL TIME(MIN.) = 0.22 Tc(MIN.) = 13.46
LONGEST FLOWPATH FROM NODE 430.00 TO NODE 443.00 = 1503.00 FEET.

*****
FLOW PROCESS FROM NODE 443.00 TO NODE 443.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.534
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8828
SOIL CLASSIFICATION IS "C"
SUBAREA AREA(ACRES) = 1.85 SUBAREA RUNOFF(CFS) = 4.14
TOTAL AREA(ACRES) = 18.50 TOTAL RUNOFF(CFS) = 44.31
TC(MIN) = 13.46

*****
FLOW PROCESS FROM NODE 443.00 TO NODE 452.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1540.50 DOWNSTREAM(FEET) = 1534.00
FLOW LENGTH(FEET) = 116.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.92
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 44.31
PIPE TRAVEL TIME(MIN.) = 0.10 Tc(MIN.) = 13.56
LONGEST FLOWPATH FROM NODE 430.00 TO NODE 452.00 = 1619.00 FEET.

*****
FLOW PROCESS FROM NODE 452.00 TO NODE 452.00 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.) = 13.56
RAINFALL INTENSITY(INCH/HR) = 2.52
TOTAL STREAM AREA(ACRES) = 18.50
PEAK FLOW RATE(CFS) AT CONFLUENCE = 44.31

*****
FLOW PROCESS FROM NODE 450.00 TO NODE 451.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
=====
ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS COMMERCIAL
TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
INITIAL SUBAREA FLOW-LENGTH = 765.00
UPSTREAM ELEVATION = 1557.91
DOWNSTREAM ELEVATION = 1545.40
ELEVATION DIFFERENCE = 12.51
TC = 0.303*[( 765.00**3)/( 12.51)]**.2 = 9.825
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.965
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8849
SOIL CLASSIFICATION IS "C"
SUBAREA RUNOFF(CFS) = 4.72
TOTAL AREA(ACRES) = 1.80 TOTAL RUNOFF(CFS) = 4.72

*****
FLOW PROCESS FROM NODE 451.00 TO NODE 452.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1541.90 DOWNSTREAM(FEET) = 1534.00
FLOW LENGTH(FEET) = 90.00 MANNING'S N = 0.012
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
DEPTH OF FLOW IN 12.0 INCH PIPE IS 5.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.61
ESTIMATED PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 4.72
PIPE TRAVEL TIME(MIN.) = 0.11 Tc(MIN.) = 9.94
LONGEST FLOWPATH FROM NODE 450.00 TO NODE 452.00 = 855.00 FEET.

*****
FLOW PROCESS FROM NODE 452.00 TO NODE 452.00 IS CODE = 1

```

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

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 9.94
RAINFALL INTENSITY(INCH/HR) = 2.95
TOTAL STREAM AREA(ACRES) = 1.80
PEAK FLOW RATE(CFS) AT CONFLUENCE = 4.72

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	44.31	13.56	2.525	18.50
1	35.25	21.87	1.988	18.50
2	4.72	9.94	2.949	1.80

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	37.19	9.94	2.949
2	48.35	13.56	2.525
3	38.43	21.87	1.988

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 48.35 Tc(MIN.) = 13.56
TOTAL AREA(ACRES) = 20.30
LONGEST FLOWPATH FROM NODE 430.00 TO NODE 452.00 = 1619.00 FEET.

FLOW PROCESS FROM NODE 452.00 TO NODE 453.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 1534.00 DOWNSTREAM(FEET) = 1520.00
FLOW LENGTH(FEET) = 110.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 27.63
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 48.35
PIPE TRAVEL TIME(MIN.) = 0.07 Tc(MIN.) = 13.62
LONGEST FLOWPATH FROM NODE 430.00 TO NODE 453.00 = 1729.00 FEET.

FLOW PROCESS FROM NODE 453.00 TO NODE 453.00 IS CODE = 11

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

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	37.19	10.01	2.938	20.30
2	48.35	13.62	2.518	20.30
3	38.43	21.94	1.984	20.30

LONGEST FLOWPATH FROM NODE 430.00 TO NODE 453.00 = 1729.00 FEET.

** MEMORY BANK # 2 CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	79.90	15.65	2.350	44.75
2	84.72	20.13	2.072	44.75
3	84.47	22.01	1.981	44.75

LONGEST FLOWPATH FROM NODE 0.00 TO NODE 453.00 = 0.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	88.28	10.01	2.938
2	117.89	13.62	2.518
3	125.01	15.65	2.350
4	124.49	20.13	2.072
5	122.65	21.94	1.984
6	122.84	22.01	1.981

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 125.01 Tc(MIN.) = 15.65
TOTAL AREA(ACRES) = 65.05

FLOW PROCESS FROM NODE 453.00 TO NODE 453.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 2 <<<<

FLOW PROCESS FROM NODE 453.00 TO NODE 454.00 IS CODE = 31

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

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

ELEVATION DATA: UPSTREAM(FEET) = 1520.00 DOWNSTREAM(FEET) = 1519.30

FLOW LENGTH(FEET) = 134.00 MANNING'S N = 0.012

DEPTH OF FLOW IN 51.0 INCH PIPE IS 40.5 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 10.35

ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 125.01

PIPE TRAVEL TIME(MIN.) = 0.22 Tc(MIN.) = 15.87

LONGEST FLOWPATH FROM NODE 430.00 TO NODE 454.00 = 1863.00 FEET.

FLOW PROCESS FROM NODE 454.00 TO NODE 454.00 IS CODE = 81

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

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.334

COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8816

SOIL CLASSIFICATION IS "C"

SUBAREA AREA(ACRES) = 0.15 SUBAREA RUNOFF(CFS) = 0.31

TOTAL AREA(ACRES) = 65.20 TOTAL RUNOFF(CFS) = 125.31

TC(MIN) = 15.87

FLOW PROCESS FROM NODE 454.00 TO NODE 455.00 IS CODE = 31

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

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

ELEVATION DATA: UPSTREAM(FEET) = 1519.30 DOWNSTREAM(FEET) = 1519.00

FLOW LENGTH(FEET) = 28.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 48.0 INCH PIPE IS 34.5 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 12.98

ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 125.31

PIPE TRAVEL TIME(MIN.) = 0.04 Tc(MIN.) = 15.90

LONGEST FLOWPATH FROM NODE 430.00 TO NODE 455.00 = 1891.00 FEET.

FLOW PROCESS FROM NODE 455.00 TO NODE 455.00 IS CODE = 11

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

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	88.66	10.28	2.899	65.20
2	118.22	13.88	2.495	65.20
3	125.31	15.90	2.331	65.20
4	124.76	20.38	2.059	65.20
5	122.91	22.19	1.973	65.20
6	123.10	22.26	1.970	65.20

LONGEST FLOWPATH FROM NODE 430.00 TO NODE 455.00 = 1891.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	21.69	5.60	3.929	24.20
2	31.10	8.91	3.114	24.20
3	31.82	9.08	3.085	24.20
4	35.98	10.55	2.862	24.20
5	41.71	11.99	2.685	24.20
6	42.29	12.17	2.664	24.20
7	47.83	14.71	2.424	24.20
8	53.55	17.14	2.245	24.20

9 53.52 17.85 2.200 24.20
 LONGEST FLOWPATH FROM NODE 0.00 TO NODE 455.00 = 0.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	69.97	5.60	3.929
2	107.94	8.91	3.114
3	110.10	9.08	3.085
4	124.44	10.28	2.899
5	125.86	10.55	2.862
6	143.82	11.99	2.685
7	145.99	12.17	2.664
8	163.35	13.88	2.495
9	163.72	14.71	2.424
10	175.01	15.90	2.331
11	174.27	17.14	2.245
12	171.82	17.85	2.200
13	174.84	20.38	2.059
14	170.90	22.19	1.973
15	171.03	22.26	1.970

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 175.01 Tc(MIN.) = 15.90
 TOTAL AREA(ACRES) = 89.40

 FLOW PROCESS FROM NODE 455.00 TO NODE 455.00 IS CODE = 12

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

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 89.40 TC(MIN.) = 15.90
 PEAK FLOW RATE(CFS) = 175.01

*** PEAK FLOW RATE TABLE ***

	Q(CFS)	Tc(MIN.)
1	69.97	5.60
2	107.94	8.91
3	110.10	9.08
4	124.44	10.28
5	125.86	10.55
6	143.82	11.99
7	145.99	12.17
8	163.35	13.88
9	163.72	14.71
10	175.01	15.90
11	174.27	17.14
12	171.82	17.85
13	174.84	20.38
14	170.90	22.19
15	171.03	22.26

END OF RATIONAL METHOD ANALYSIS

APPENDIX C

HYDROLOGY MAP