Appendix K

Preliminary Hydrology Calculations

Thienes Engineering, Inc.
CIVIL ENGINEERING • LAND SURVEYING

PRELIMINARY HYDROLOGY CALCULATIONS

FOR

WILLOW AVENUE INDUSTRIAL BUILDING
SAN BERNARDINO, CALIFORNIA

PREPARED FOR

SCANNELL PROPERTIES – LAGUNA HILLS
24411 RIDGE ROUTE DRIVE, STE 120
LAGUNA HILLS, CA 92653

JULY 26, 2022

JOB NO. 4097

PREPARED BY

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

PRELIMINARY HYDROLOGY CALCULATIONS

FOR

WILLOW AVENUE INDUSTRIAL BUILDING
RIALTO, CALIFORNIA

PREPARED BY KRISTIE FERRONATO
UNDER THE SUPERVISION OF

____
REINHARD STENZEL DATE:
R.C.E. 56155
EXP. 12/31/2022

INTRODUCTION

PROJECT LOCATION

The project site is located along the west side of Willow Avenue north of Jurupa Avenue in the city of Rialto, California. Please see the following page for a vicinity map.

STUDY PURPOSE

The purpose of this study is to determine the 100-year peak flow rate from the site that will drain to Willow Avenue.

PROJECT STAFF

Thienes Engineering staff involved in this study includes:

Reinhard Stenzel
Mark Benavides

Last Update: 4/26/22
O:\4000-4099\4097\4097VicMap.dwg

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PH.(714)521-4811 FAX(714)521-4173

"VICINITY MAP"

FOR

WILLOW AVENUE INDUSTRIAL BUILDING
RIALTO, CA

APPENDIX	TITLE
A	REFERENCE MATERIALS
B	HYDROLOGY CALCULATIONS
C	DETENTION CALCULATIONS
D	HYDROLOGY MAPS

DISCUSSION

The project site encompasses approximately 5.63 acres. Proposed improvements to the site include a commercial type building of approximately 123,416 square feet. There will be a truck yard on the south side of the building. Vehicle parking will be along the south perimeter and east side of the building. There will be landscaping along the east side of the project site.

Existing Condition Hydrology

The existing site contains two industrial buildings. The site generally drains southeasterly towards Willow Avenue. The existing condition 100-year peak flow rate for the project site is approximately 13.9 cfs. Runoff appears to discharge southeasterly through the existing commercial development, ultimately to Willow Avenue.

FEMA Flood Zone

The project site is located within Flood Zone X (unshaded) per FIRM No. 06071C8667H & 06071C8686H, effective August 28, 2008. Flood Zone X (unshaded) is defined as "area of minimal flood hazard".

Proposed Condition

Proposed conditions will continue to discharge flow to Willow Avenue. Runoff from the northwesterly portion of the building drains south to a grate inlet located at the southwest corner of the site. A proposed storm drain system (Line A) conveys flows east through the truck yard. Runoff will continue from through the drive aisle (nodes 100-113) and will confluence with this easterly storm drain system (Line B). The 100-year undetained peak flow rate for this area is approximately 10.4 cfs.

Runoff from the northeasterly portion of the building and east parking lot (nodes 110-112) drains from west to east to catch basins located along the east parking lot. A storm drain system (Line B) conveys this flow south where it will confluence with the southerly storm drain system (Line A). The 100-year undetained peak flow rate for this area is approximately 4.5 cfs.

The storm drain then discharges flow to Willow Avenue via a parkway culvert. This unique storm drain system requires available head in the truck yard and southerly drive aisle to "burp out" flows through the parkway culvert. Ponding is used for temporary detention as discussed below.

The 100-year undetained peak flow rate for total proposed area is approximately 14.9 cfs.

Detention

Since there is not a public storm drain in Willow Avenue, the development will detain the peak flow to limit the discharge to less than the 100-year existing condition flow rate.

Detention will occur in the truck yard and the southerly drive aisle. The proposed onsite storm drain system conveys runoff southeasterly where flow must "burp out" to Willow Avenue. This creates a unique situation that requires water to pond in order to "push" flow through the storm drain system.

A small area unit hydrograph was established for the area of detention. For preliminary detention modeling, available head was calculated as the difference in elevation between the depth of ponding and the depth of flow at the parkway culvert. These peak flow rates and corresponding water surface elevations were used to determine the outflow rates from the truck yard area used in the detention calculations.

Basin routing results show that approximately 5.2 cfs can discharge from the proposed storm drain system. The remaining volume (0.62 acre-feet) is temporarily stored in the truck yard and drive aisle at depth of about 1.35'.

Summary

The existing condition peak flow rate from the project site is approximately 13.9 cfs. This flow discharges southeasterly to Willow Avenue. Proposed conditions will keep the same drain pattern as existing.

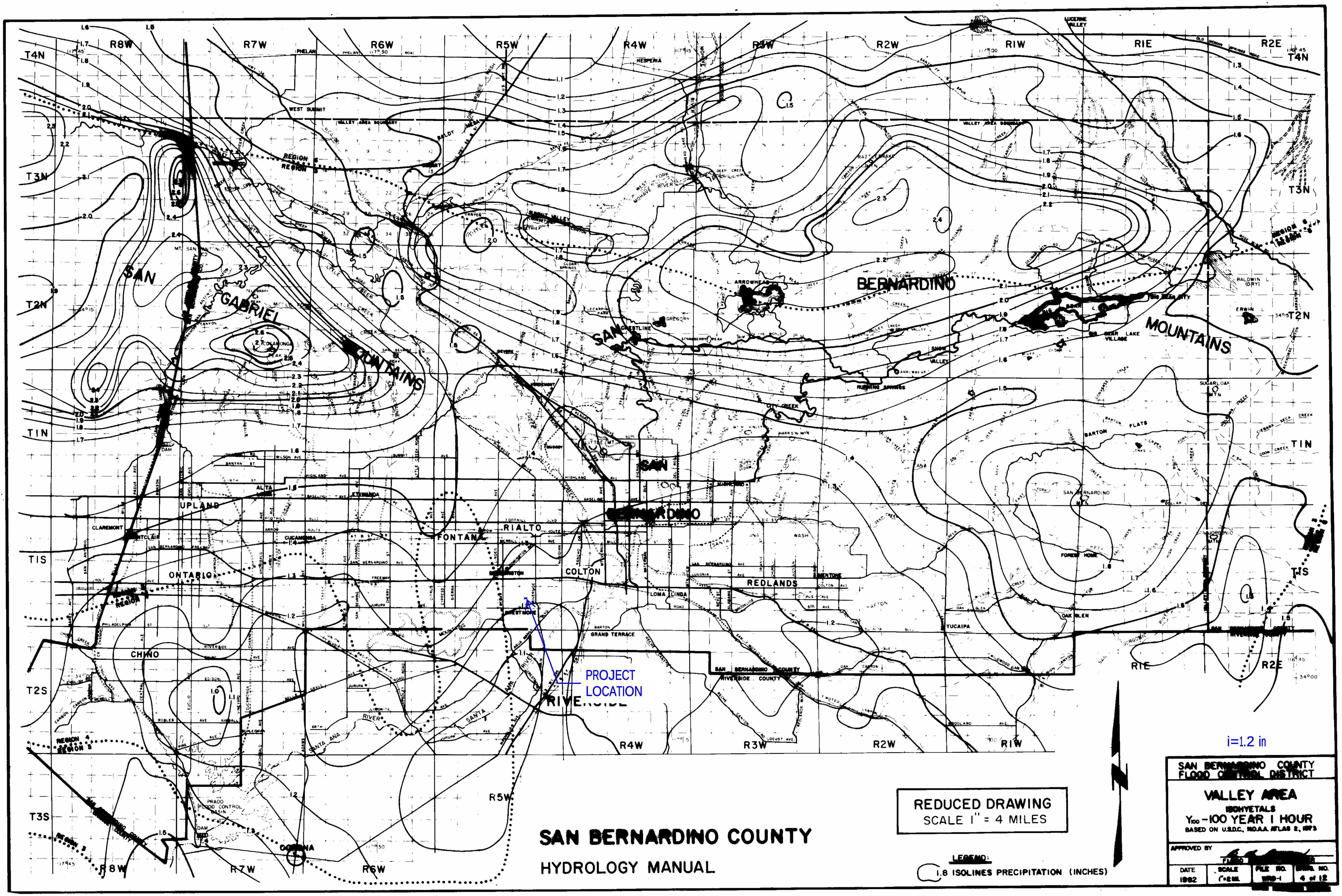
With onsite detention, the overall 100-year peak flow rate is reduced to 5.6 cfs. This is less than the existing condition 100-year peak flow rate.

Methodology

Hydrology calculations were computed using Advanced Engineering Software's (AES) Rational Method Hydrology computer program for San Bernardino County. Hydrographs and detention calculations were computed using AES software's Small Area Unit Hydrograph program. The soil type is "A" per the San Bernardino County Hydrology Manual.

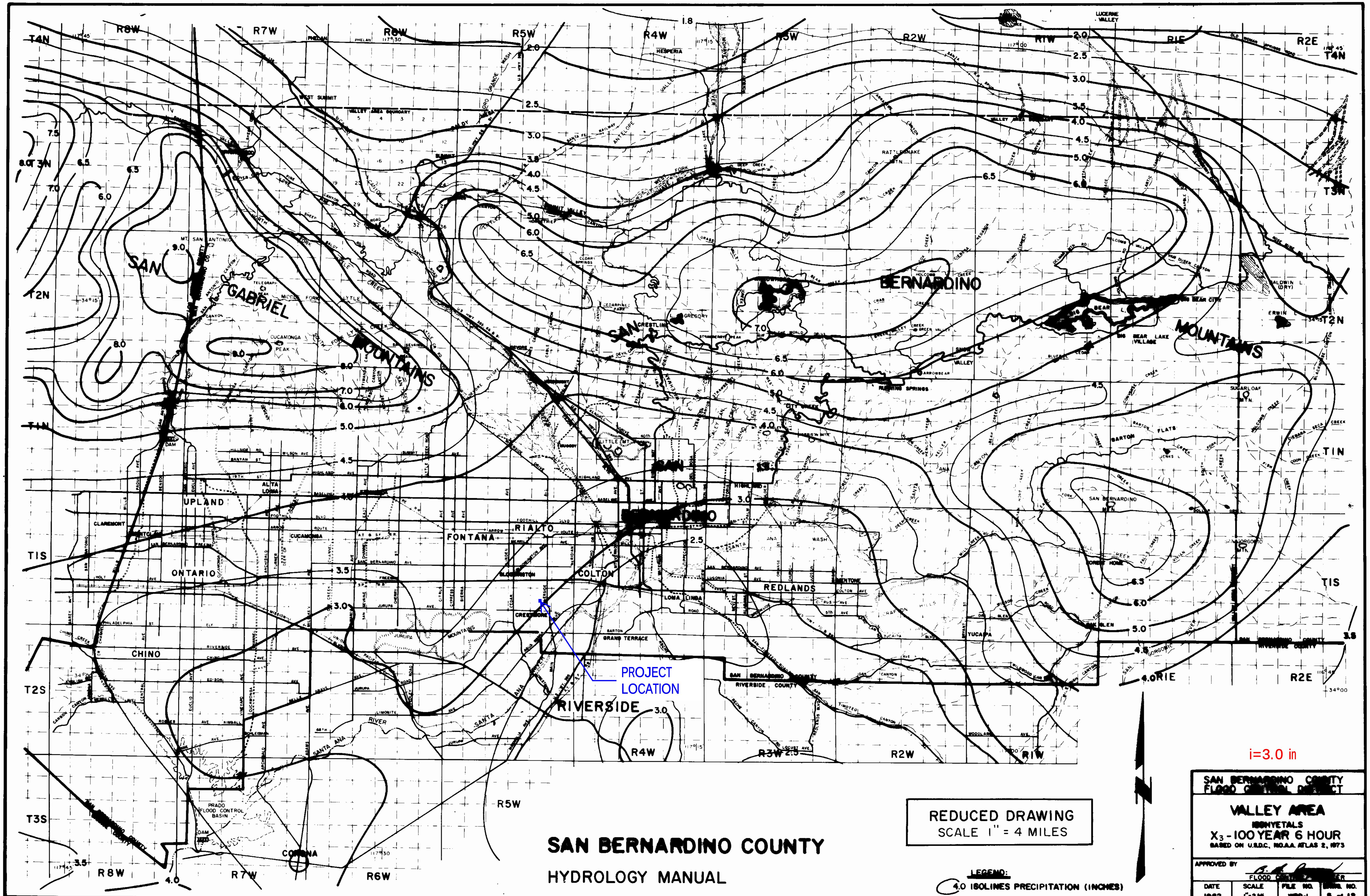
APPENDIX A

REFRENCE MATERAILS



SAN BERNARDINO COUNTY
HYDROLOGY MANUAL
REDUCED DRAWING
SCALE 1" = 4 MILES
LEGEND:
1.8 ISOLINES PRECIPITATION (INCHES)
SAN BERNARDINO COUNTY
FLOOD CONTROL DISTRICT
VALLEY AREA
ISOHYETALS
Y100 - 100 YEAR 1 HOUR
BASED ON U.S.D.C., N.O.A.A. ATLAS 2, 1973
APPROVED BY
DATE 1982
PROJECT LOCATION
i=1.2 in
SAN GABRIEL MOUNTAINS
SAN BERNARDINO MOUNTAINS
UPLAND
CLAREMONT
ONTARIO
CHINO
CUCAMONGA
FONTANA
RIALTO
BLOOMINGTON
COLTON
SAN BERNARDINO
LOMA LINDA
REDLANDS
MENTONE
YUCAIPA
GRAND TERRACE
RIVERSIDE
CORONA
HESPERIA
PHELAN
WEST SUMMIT
LUCERNE VALLEY
BALDWIN L. (DRY)
OAK GLEN
FOREST HOME
PRADO FLOOD CONTROL BASIN
T4N
T3N
T2N
T1N
T1S
T2S
T3S
R8W
R7W
R6W
R5W
R4W
R3W
R2W
R1W
R1E
R2E

FIGURE B-4



SAN BERNARDINO COUNTY
HYDROLOGY MANUAL
REDUCED DRAWING
SCALE 1" = 4 MILES
LEGEND:
4.0 ISOLINES PRECIPITATION (INCHES)
PROJECT LOCATION
i=3.0 in
SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT
VALLEY AREA
ISOHYETALS
X3 - 100 YEAR 6 HOUR
BASED ON U.S.D.C., NOAA ATLAS 2, 1973
APPROVED BY
FLOOD CONTROL ENGINEER
DATE 1982
SCALE 1"=2 MI.
FILE NO. WRD-1
DWG. NO. 5 of 12
RIVERSIDE
SAN BERNARDINO
REDLANDS
COLTON
RIALTO
FONTANA
ONTARIO
UPLAND
CHINO
CORONA
SAN GABRIEL MOUNTAINS
SAN BERNARDINO MOUNTAINS

FIGURE B-5

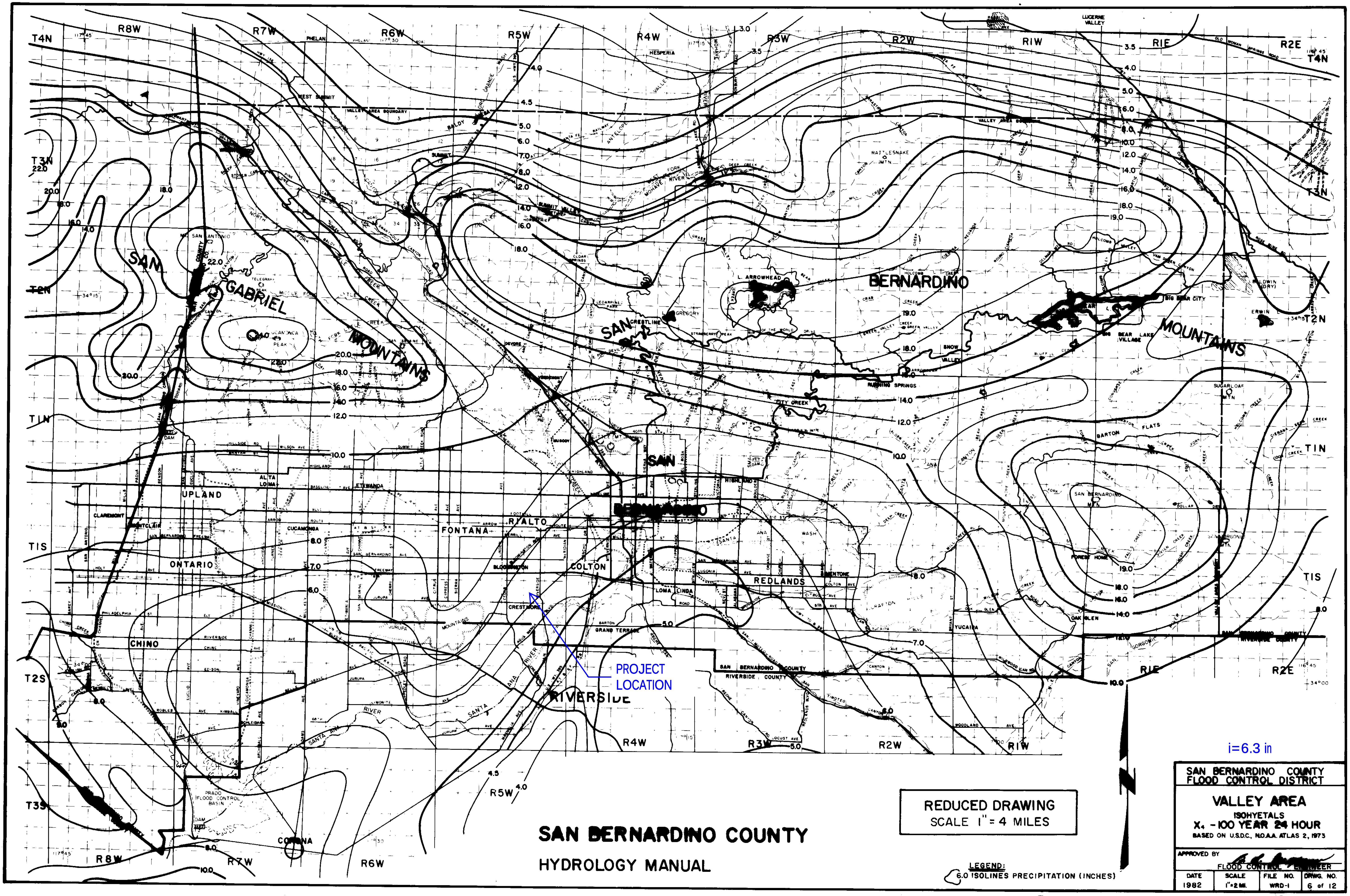
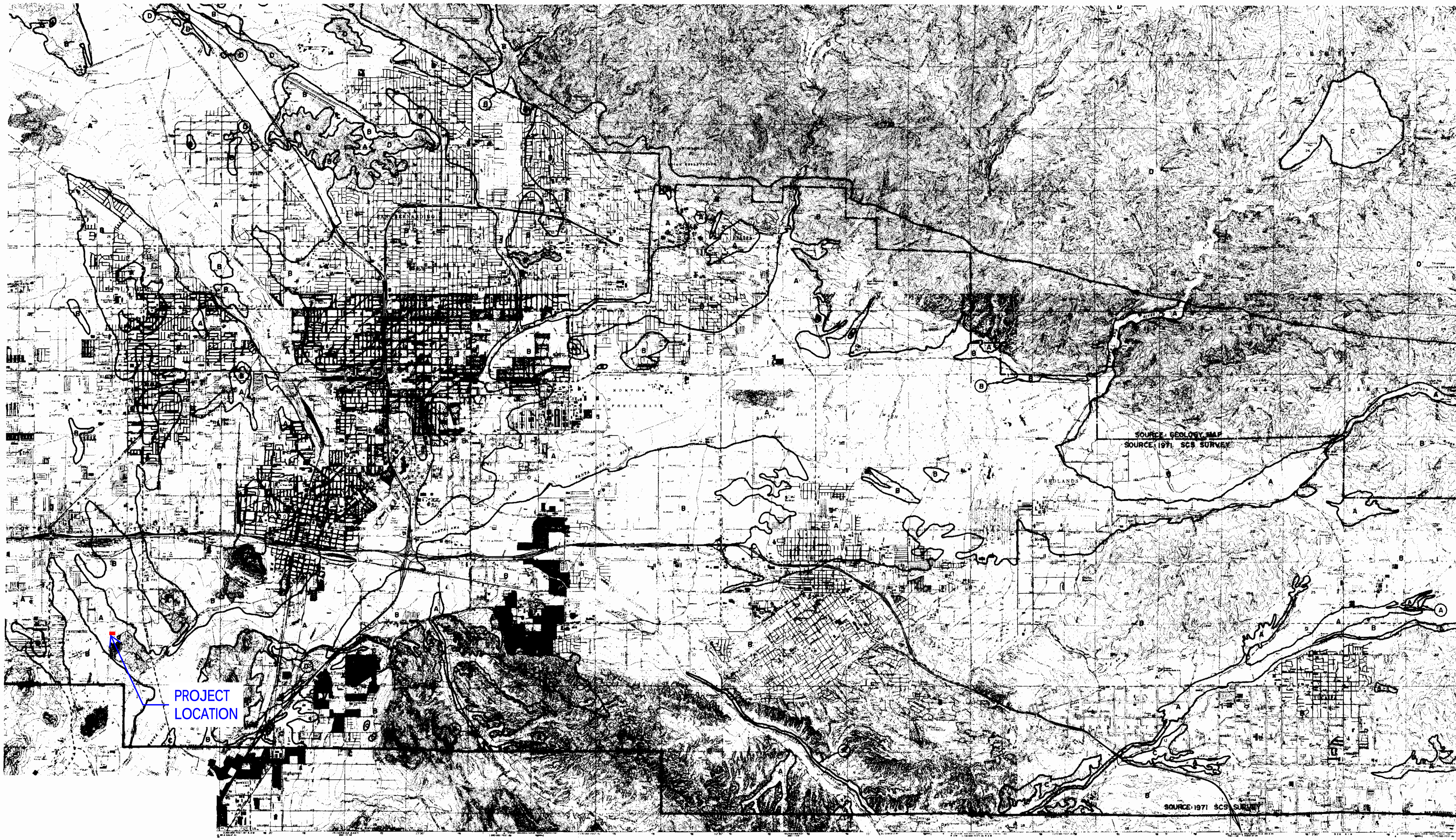
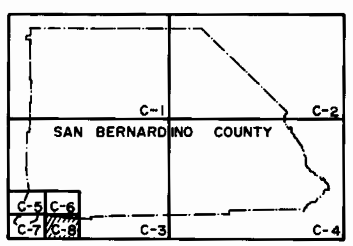

PROJECT
LOCATION
i=6.3 in
SAN BERNARDINO COUNTY
HYDROLOGY MANUAL
REDUCED DRAWING
SCALE 1" = 4 MILES
LEGEND:
6.0 ISOLINES PRECIPITATION (INCHES)
SAN BERNARDINO COUNTY
FLOOD CONTROL DISTRICT
VALLEY AREA
ISOHYETALS
X_4 - 100 YEAR 24 HOUR
BASED ON U.S.D.C., N.O.A.A. ATLAS 2, 1973
APPROVED BY
FLOOD CONTROL ENGINEER
DATE
1982
SCALE
1"=2 MI.
FILE NO.
WRD-1
DRWG. NO.
6 of 12
SAN GABRIEL MOUNTAINS
SAN BERNARDINO MOUNTAINS
UPLAND
ONTARIO
CHINO
FONTANA
RIALTO
COLTON
REDLANDS
LOMA LINDA
RIVERSIDE
CORONA
CUCAMONGA
ETIWANDA
ALTA LOMA
CLAREMONT
MONTCLAIR
BLOOMINGTON
CRESTMORE
GRAND TERRACE
YUCAIPA
MENTONE
HESPERIA
PHELAN
LUCERNE VALLEY
L. ARROWHEAD
BIG BEAR CITY
BEAR LAKE VILLAGE
SUGARLOAF
RUNNING SPRINGS
CRESTLINE
DEVORE
OAK GLEN
FOREST HOME
SAN BERNARDINO MT.
CUCAMONGA PEAK
PRADO FLOOD CONTROL BASIN
T4N
T3N
T2N
T1N
T1S
T2S
T3S
R8W
R7W
R6W
R5W
R4W
R3W
R2W
R1W
R1E
R2E

FIGURE B-6



SAN BERNARDINO COUNTY
HYDROLOGY MANUAL



INDEX MAP

LEGEND

SOIL GROUP BOUNDARY

A SOIL GROUP DESIGNATION

BOUNDARY OF INDICATED SOURCE

SCALE 1:48,000

SCALE REDUCED BY 1/2

SOIL TYPE "A"

HYDROLOGIC SOILS GROUP MAP FOR SOUTHWEST-D AREA

FIGURE C-16

APPENDIX B

HYDROLOGY CALCULATIONS

```
____________________________________________________________________________
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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         (c) Copyright 1983-2016 Advanced Engineering Software (aes)
             Ver. 23.0  Release Date: 07/01/2016  License ID 1435

                           Analysis prepared by:





 ************************** DESCRIPTION OF STUDY **************************
 * TEI JOB NO. 4097                                                       *
 * EXISTING HYDROLOGY (NODES 100)                                         *
 * 100-YEAR STORM EVENT                                                   *
 **************************************************************************

  FILE NAME: W:\4097\E100.DAT
  TIME/DATE OF STUDY: 12:00 04/22/2022
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                   --*TIME-OF-CONCENTRATION MODEL*--

  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
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.2000

  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   928.00
  ELEVATION DATA: UPSTREAM(FEET) =    988.15  DOWNSTREAM(FEET) =    983.86

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   13.706
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.910
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 A        2.49      0.74     0.100    52   13.71
  NATURAL FAIR COVER
  "OPEN BRUSH"               A        1.85      0.55     1.000    66   31.83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.57
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.484
  SUBAREA RUNOFF(CFS) =     10.29
  TOTAL AREA(ACRES) =      4.34   PEAK FLOW RATE(CFS) =     10.29
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        4.3  TC(MIN.) =     13.71
  EFFECTIVE AREA(ACRES) =      4.34  AREA-AVERAGED Fm(INCH/HR)=  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.57  AREA-AVERAGED Ap = 0.484
```

```
  PEAK FLOW RATE(CFS)   =      10.29
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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****************************************************************************
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                          Analysis prepared by:




 ************************** DESCRIPTION OF STUDY **************************
* TEI JOB NO. 4097                                                         *
* EXISTING HYDROLOGY (NODES 200)                                           *
* 100-YEAR STORM EVENT                                                     *
 **************************************************************************

  FILE NAME: W:\4097\E200.DAT
  TIME/DATE OF STUDY: 12:05 04/22/2022
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  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                   --*TIME-OF-CONCENTRATION MODEL*--

  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
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.2000

  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   510.00
  ELEVATION DATA: UPSTREAM(FEET) =    988.32  DOWNSTREAM(FEET) =    985.34

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.294
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.456
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 A       0.84      0.74     0.100    52   10.29
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.74
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.56
  TOTAL AREA(ACRES) =      0.84   PEAK FLOW RATE(CFS) =      2.56
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.8  TC(MIN.) =     10.29
  EFFECTIVE AREA(ACRES) =      0.84  AREA-AVERAGED Fm(INCH/HR)=  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.74  AREA-AVERAGED Ap = 0.100
  PEAK FLOW RATE(CFS)   =       2.56
============================================================================
```

==
END OF RATIONAL METHOD ANALYSIS

```
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                           Analysis prepared by:




 ************************** DESCRIPTION OF STUDY **************************
* TEI JOB NO. 4097                                                         *
* EXISTING HYDROLOGY (NODES 300)                                           *
* 100-YEAR STORM EVENT                                                     *
 **************************************************************************

  FILE NAME: W:\4097\E300.DAT
  TIME/DATE OF STUDY: 11:52 04/22/2022
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  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                  --*TIME-OF-CONCENTRATION MODEL*--

  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
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.2000

  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   314.00
  ELEVATION DATA: UPSTREAM(FEET) =    987.02  DOWNSTREAM(FEET) =    973.38

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   13.183
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.979
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"               A        0.45      0.55     1.000    66   13.18
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.55
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      0.98
  TOTAL AREA(ACRES) =      0.45   PEAK FLOW RATE(CFS) =      0.98
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.4  TC(MIN.) =     13.18
  EFFECTIVE AREA(ACRES) =      0.45  AREA-AVERAGED Fm(INCH/HR)=  0.55
  AREA-AVERAGED Fp(INCH/HR) =  0.55  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =       0.98
```

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

```
____________________________________________________________________________
****************************************************************************
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                           Analysis prepared by:




 ************************** DESCRIPTION OF STUDY **************************
* TEI JOB NO. 4097                                                         *
* PROPOSED HYDROLOGY                                                       *
* 100-YEAR STORM EVENT                                                     *
 **************************************************************************

  FILE NAME: W:\4097\P100.DAT
  TIME/DATE OF STUDY: 13:55 07/26/2022
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  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  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
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.2000

  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   577.00
  ELEVATION DATA: UPSTREAM(FEET) =    987.04  DOWNSTREAM(FEET) =    983.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.835
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.351
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 A       1.49      0.74     0.100     52   10.84
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.74
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      4.39
  TOTAL AREA(ACRES) =      1.49   PEAK FLOW RATE(CFS) =      4.39

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =   979.70  DOWNSTREAM(FEET) =   979.38
  FLOW LENGTH(FEET) =   265.49   MANNING'S N =  0.012
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.66
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.39
  PIPE TRAVEL TIME(MIN.) =   1.67    Tc(MIN.) =   12.50
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     842.49 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.50
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.075
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 A       1.05      0.74     0.100    52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.74
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.05      SUBAREA RUNOFF(CFS) =    2.84
  EFFECTIVE AREA(ACRES) =      2.54   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.74  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        2.5       PEAK FLOW RATE(CFS) =       6.86

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   978.37  DOWNSTREAM(FEET) =   977.79
  FLOW LENGTH(FEET) =   114.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.04
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.86
  PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =   12.88
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    104.00 =     956.49 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    104.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.88
  RAINFALL INTENSITY(INCH/HR) =   3.02
  AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.74
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       2.54
  TOTAL STREAM AREA(ACRES) =       2.54
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.86

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   243.00
  ELEVATION DATA: UPSTREAM(FEET) =    985.30  DOWNSTREAM(FEET) =    983.82

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.589
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.149
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 A       1.32      0.74     0.100    52    7.59
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.74
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      4.84
  TOTAL AREA(ACRES) =      1.32   PEAK FLOW RATE(CFS) =      4.84
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    104.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.59
  RAINFALL INTENSITY(INCH/HR) =   4.15
  AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.74
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       1.32
  TOTAL STREAM AREA(ACRES) =       1.32
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.84

  ** CONFLUENCE DATA **
   STREAM      Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        6.86   12.88    3.021  0.74( 0.07) 0.10       2.5     100.00
      2        4.84    7.59    4.149  0.74( 0.07) 0.10       1.3     103.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM      Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       10.43    7.59    4.149  0.74( 0.07) 0.10       2.8     103.00
      2       10.36   12.88    3.021  0.74( 0.07) 0.10       3.9     100.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      10.43    Tc(MIN.) =     7.59
  EFFECTIVE AREA(ACRES) =       2.82   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.74  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        3.9
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    104.00 =     956.49 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    113.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   977.79  DOWNSTREAM(FEET) =   976.29
  FLOW LENGTH(FEET) =   301.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.54
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.43
  PIPE TRAVEL TIME(MIN.) =   0.91    Tc(MIN.) =    8.49
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    113.00 =    1257.49 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    113.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.49
  RAINFALL INTENSITY(INCH/HR) =   3.88
  AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.74
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       2.82
  TOTAL STREAM AREA(ACRES) =       3.86
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      10.43

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    111.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   370.00
  ELEVATION DATA: UPSTREAM(FEET) =    987.04  DOWNSTREAM(FEET) =    985.17
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.320
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.668
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 A       1.21      0.74     0.100    52    9.32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.74
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      3.91
  TOTAL AREA(ACRES) =      1.21   PEAK FLOW RATE(CFS) =      3.91

****************************************************************************
  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) =   982.16  DOWNSTREAM(FEET) =   978.62
  FLOW LENGTH(FEET) =   196.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.11
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.91
  PIPE TRAVEL TIME(MIN.) =   0.46    Tc(MIN.) =    9.78
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    112.00 =     566.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    112.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.78
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.564
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 A       0.23      0.74     0.100    52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.74
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.23      SUBAREA RUNOFF(CFS) =    0.72
  EFFECTIVE AREA(ACRES) =      1.44   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.74  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.4       PEAK FLOW RATE(CFS) =       4.52

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    113.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   978.62  DOWNSTREAM(FEET) =   976.29
  FLOW LENGTH(FEET) =    42.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.34
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.52
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    9.84
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    113.00 =     608.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    113.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.84
  RAINFALL INTENSITY(INCH/HR) =   3.55
  AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.74
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       1.44
  TOTAL STREAM AREA(ACRES) =       1.44
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.52

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
```

```
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       10.43    8.49    3.878  0.74( 0.07) 0.10       2.8     103.00
      1       10.36   13.78    2.900  0.74( 0.07) 0.10       3.9     100.00
      2        4.52    9.84    3.550  0.74( 0.07) 0.10       1.4     110.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       14.70    8.49    3.878  0.74( 0.07) 0.10       4.1     103.00
      2       14.94    9.84    3.550  0.74( 0.07) 0.10       4.5     110.00
      3       14.04   13.78    2.900  0.74( 0.07) 0.10       5.3     100.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      14.94    Tc(MIN.) =     9.84
  EFFECTIVE AREA(ACRES) =       4.52   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.74  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        5.3
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    113.00 =    1257.49 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    114.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   976.29  DOWNSTREAM(FEET) =   976.23
  FLOW LENGTH(FEET) =     9.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.84
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.94
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    9.86
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    114.00 =    1266.49 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.86
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.545
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  A       0.13      0.74     0.100    52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.74
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.13      SUBAREA RUNOFF(CFS) =    0.41
  EFFECTIVE AREA(ACRES) =      4.65   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.74  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        5.4       PEAK FLOW RATE(CFS) =      14.94
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        5.4  TC(MIN.) =      9.86
  EFFECTIVE AREA(ACRES) =      4.65  AREA-AVERAGED Fm(INCH/HR)=  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.74  AREA-AVERAGED Ap = 0.100
  PEAK FLOW RATE(CFS)   =      14.94

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       14.70    8.52    3.872  0.74( 0.07) 0.10       4.2     103.00
      2       14.94    9.86    3.545  0.74( 0.07) 0.10       4.7     110.00
      3       14.04   13.81    2.898  0.74( 0.07) 0.10       5.4     100.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

APPENDIX C

DETENTION CALCULATIONS

```
****************************************************************************
           NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                     AND LOW LOSS FRACTION ESTIMATIONS
============================================================================
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            Ver. 23.0  Release Date: 07/01/2016  License ID 1435

                          Analysis prepared by:




****************************************************************************
----------------------------------------------------------------------------

 Problem Descriptions:
  TEI JOB NO. 4097
  LOSS RATES

============================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC III:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     6.30 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
        1          5.63       10.00       32.(AMC II)     0.742       0.889

    TOTAL AREA (Acres) =      5.63
                              _
    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.074
                                      _
    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.111
============================================================================
```

```
****************************************************************************
                      SMALL AREA UNIT HYDROGRAPH MODEL
============================================================================
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             Ver. 23.0  Release Date: 07/01/2016  License ID 1435

                          Analysis prepared by:




****************************************************************************
----------------------------------------------------------------------------

 Problem Descriptions:
  TEI JOB NO. 4097
  PROPOSED CONDITION
  100-YEAR STORM EVENT
----------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =    5.63
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.074
    LOW LOSS FRACTION = 0.111
    TIME OF CONCENTRATION(MIN.) =  8.00
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    USER SPECIFIED RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) = 100
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.46
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.90
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.20
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  2.10
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  3.00
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  6.30

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     2.37
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.58

****************************************************************************
  TIME     VOLUME       Q    0.         7.5      15.0      22.5      30.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.13      0.0035      0.63  Q         .         .         .         .
  0.27      0.0105      0.64  Q         .         .         .         .
  0.40      0.0175      0.64  Q         .         .         .         .
  0.53      0.0245      0.64  Q         .         .         .         .
  0.67      0.0316      0.64  Q         .         .         .         .
  0.80      0.0387      0.65  Q         .         .         .         .
  0.93      0.0459      0.65  Q         .         .         .         .
  1.07      0.0530      0.65  Q         .         .         .         .
  1.20      0.0602      0.65  Q         .         .         .         .
  1.33      0.0674      0.66  Q         .         .         .         .
  1.47      0.0747      0.66  Q         .         .         .         .
  1.60      0.0820      0.66  Q         .         .         .         .
  1.73      0.0893      0.67  Q         .         .         .         .
  1.87      0.0966      0.67  Q         .         .         .         .
  2.00      0.1040      0.67  Q         .         .         .         .
  2.13      0.1114      0.67  Q         .         .         .         .
  2.27      0.1189      0.68  Q         .         .         .         .
  2.40      0.1263      0.68  Q         .         .         .         .
  2.53      0.1338      0.68  Q         .         .         .         .
  2.67      0.1414      0.69  Q         .         .         .         .
  2.80      0.1490      0.69  Q         .         .         .         .
  2.93      0.1566      0.69  Q         .         .         .         .
  3.07      0.1642      0.70  Q         .         .         .         .
  3.20      0.1719      0.70  Q         .         .         .         .
  3.33      0.1796      0.70  Q         .         .         .         .
  3.47      0.1874      0.71  Q         .         .         .         .
  3.60      0.1952      0.71  Q         .         .         .         .
  3.73      0.2030      0.71  Q         .         .         .         .
  3.87      0.2109      0.72  Q         .         .         .         .
  4.00      0.2188      0.72  Q         .         .         .         .
  4.13      0.2268      0.72  Q         .         .         .         .
  4.27      0.2348      0.73  Q         .         .         .         .
  4.40      0.2428      0.73  Q         .         .         .         .
  4.53      0.2509      0.73  Q         .         .         .         .
  4.67      0.2590      0.74  Q         .         .         .         .
  4.80      0.2672      0.74  Q         .         .         .         .
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  4.93      0.2754      0.75  Q         .         .         .         .
  5.07      0.2837      0.75  .Q        .         .         .         .
  5.20      0.2920      0.76  .Q        .         .         .         .
  5.33      0.3003      0.76  .Q        .         .         .         .
  5.47      0.3087      0.77  .Q        .         .         .         .
  5.60      0.3172      0.77  .Q        .         .         .         .
  5.73      0.3257      0.77  .Q        .         .         .         .
  5.87      0.3343      0.78  .Q        .         .         .         .
  6.00      0.3429      0.78  .Q        .         .         .         .
  6.13      0.3515      0.79  .Q        .         .         .         .
  6.27      0.3602      0.79  .Q        .         .         .         .
  6.40      0.3690      0.80  .Q        .         .         .         .
  6.53      0.3778      0.80  .Q        .         .         .         .
  6.67      0.3867      0.81  .Q        .         .         .         .
  6.80      0.3956      0.81  .Q        .         .         .         .
  6.93      0.4046      0.82  .Q        .         .         .         .
  7.07      0.4137      0.83  .Q        .         .         .         .
  7.20      0.4228      0.83  .Q        .         .         .         .
  7.33      0.4320      0.84  .Q        .         .         .         .
  7.47      0.4413      0.84  .Q        .         .         .         .
  7.60      0.4506      0.85  .Q        .         .         .         .
  7.73      0.4600      0.85  .Q        .         .         .         .
  7.87      0.4694      0.86  .Q        .         .         .         .
  8.00      0.4789      0.87  .Q        .         .         .         .
  8.13      0.4885      0.88  .Q        .         .         .         .
  8.27      0.4982      0.88  .Q        .         .         .         .
  8.40      0.5080      0.89  .Q        .         .         .         .
  8.53      0.5178      0.89  .Q        .         .         .         .
  8.67      0.5277      0.90  .Q        .         .         .         .
  8.80      0.5377      0.91  .Q        .         .         .         .
  8.93      0.5478      0.92  .Q        .         .         .         .
  9.07      0.5579      0.93  .Q        .         .         .         .
  9.20      0.5682      0.94  .Q        .         .         .         .
  9.33      0.5786      0.94  .Q        .         .         .         .
  9.47      0.5890      0.95  .Q        .         .         .         .
  9.60      0.5995      0.96  .Q        .         .         .         .
  9.73      0.6102      0.97  .Q        .         .         .         .
  9.87      0.6209      0.98  .Q        .         .         .         .
 10.00      0.6318      0.99  .Q        .         .         .         .
 10.13      0.6427      1.00  .Q        .         .         .         .
 10.27      0.6538      1.01  .Q        .         .         .         .
 10.40      0.6650      1.02  .Q        .         .         .         .
 10.53      0.6763      1.03  .Q        .         .         .         .
 10.67      0.6878      1.04  .Q        .         .         .         .
 10.80      0.6994      1.06  .Q        .         .         .         .
 10.93      0.7111      1.07  .Q        .         .         .         .
 11.07      0.7229      1.08  .Q        .         .         .         .
 11.20      0.7349      1.09  .Q        .         .         .         .
 11.33      0.7471      1.11  .Q        .         .         .         .
 11.47      0.7594      1.12  .Q        .         .         .         .
 11.60      0.7719      1.14  .Q        .         .         .         .
 11.73      0.7845      1.15  .Q        .         .         .         .
 11.87      0.7973      1.18  .Q        .         .         .         .
 12.00      0.8104      1.19  .Q        .         .         .         .
 12.13      0.8233      1.17  .Q        .         .         .         .
 12.27      0.8362      1.18  .Q        .         .         .         .
 12.40      0.8494      1.21  .Q        .         .         .         .
 12.53      0.8627      1.22  .Q        .         .         .         .
 12.67      0.8763      1.25  .Q        .         .         .         .
 12.80      0.8902      1.27  .Q        .         .         .         .
 12.93      0.9043      1.30  .Q        .         .         .         .
 13.07      0.9188      1.32  .Q        .         .         .         .
 13.20      0.9335      1.36  .Q        .         .         .         .
 13.33      0.9486      1.38  .Q        .         .         .         .
 13.47      0.9640      1.42  .Q        .         .         .         .
 13.60      0.9798      1.45  .Q        .         .         .         .
 13.73      0.9961      1.50  .Q        .         .         .         .
 13.87      1.0127      1.53  . Q       .         .         .         .
 14.00      1.0299      1.59  . Q       .         .         .         .
 14.13      1.0475      1.61  . Q       .         .         .         .
 14.27      1.0657      1.68  . Q       .         .         .         .
 14.40      1.0845      1.72  . Q       .         .         .         .
 14.53      1.1040      1.82  . Q       .         .         .         .
 14.67      1.1243      1.87  . Q       .         .         .         .
 14.80      1.1456      1.99  . Q       .         .         .         .
 14.93      1.1679      2.06  . Q       .         .         .         .
 15.07      1.1916      2.23  . Q       .         .         .         .
 15.20      1.2168      2.34  .  Q      .         .         .         .
 15.33      1.2439      2.59  .  Q      .         .         .         .
 15.47      1.2719      2.50  .  Q      .         .         .         .
 15.60      1.3006      2.69  .  Q      .         .         .         .
 15.73      1.3321      3.03  .   Q     .         .         .         .
 15.87      1.3712      4.06  .    Q    .         .         .         .
 16.00      1.4255      5.81  .      Q  .         .         .         .
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 16.13      1.5703     20.47  .         .         .      Q  .         .
 16.27      1.7013      3.30  .   Q     .         .         .         .
 16.40      1.7329      2.44  .  Q      .         .         .         .
 16.53      1.7598      2.45  .  Q      .         .         .         .
 16.67      1.7852      2.14  . Q       .         .         .         .
 16.80      1.8076      1.93  . Q       .         .         .         .
 16.93      1.8280      1.77  . Q       .         .         .         .
 17.07      1.8468      1.64  . Q       .         .         .         .
 17.20      1.8644      1.56  . Q       .         .         .         .
 17.33      1.8811      1.47  .Q        .         .         .         .
 17.47      1.8969      1.40  .Q        .         .         .         .
 17.60      1.9120      1.34  .Q        .         .         .         .
 17.73      1.9264      1.28  .Q        .         .         .         .
 17.87      1.9403      1.23  .Q        .         .         .         .
 18.00      1.9537      1.19  .Q        .         .         .         .
 18.13      1.9668      1.20  .Q        .         .         .         .
 18.27      1.9798      1.16  .Q        .         .         .         .
 18.40      1.9925      1.13  .Q        .         .         .         .
 18.53      2.0048      1.10  .Q        .         .         .         .
 18.67      2.0168      1.08  .Q        .         .         .         .
 18.80      2.0285      1.05  .Q        .         .         .         .
 18.93      2.0400      1.03  .Q        .         .         .         .
 19.07      2.0512      1.01  .Q        .         .         .         .
 19.20      2.0621      0.98  .Q        .         .         .         .
 19.33      2.0729      0.97  .Q        .         .         .         .
 19.47      2.0834      0.95  .Q        .         .         .         .
 19.60      2.0938      0.93  .Q        .         .         .         .
 19.73      2.1039      0.91  .Q        .         .         .         .
 19.87      2.1139      0.90  .Q        .         .         .         .
 20.00      2.1238      0.88  .Q        .         .         .         .
 20.13      2.1334      0.87  .Q        .         .         .         .
 20.27      2.1430      0.86  .Q        .         .         .         .
 20.40      2.1524      0.85  .Q        .         .         .         .
 20.53      2.1616      0.83  .Q        .         .         .         .
 20.67      2.1707      0.82  .Q        .         .         .         .
 20.80      2.1797      0.81  .Q        .         .         .         .
 20.93      2.1886      0.80  .Q        .         .         .         .
 21.07      2.1974      0.79  .Q        .         .         .         .
 21.20      2.2060      0.78  .Q        .         .         .         .
 21.33      2.2146      0.77  .Q        .         .         .         .
 21.47      2.2230      0.76  .Q        .         .         .         .
 21.60      2.2314      0.75  .Q        .         .         .         .
 21.73      2.2397      0.75  Q         .         .         .         .
 21.87      2.2478      0.74  Q         .         .         .         .
 22.00      2.2559      0.73  Q         .         .         .         .
 22.13      2.2639      0.72  Q         .         .         .         .
 22.27      2.2718      0.71  Q         .         .         .         .
 22.40      2.2797      0.71  Q         .         .         .         .
 22.53      2.2874      0.70  Q         .         .         .         .
 22.67      2.2951      0.69  Q         .         .         .         .
 22.80      2.3027      0.69  Q         .         .         .         .
 22.93      2.3103      0.68  Q         .         .         .         .
 23.07      2.3178      0.68  Q         .         .         .         .
 23.20      2.3252      0.67  Q         .         .         .         .
 23.33      2.3325      0.66  Q         .         .         .         .
 23.47      2.3398      0.66  Q         .         .         .         .
 23.60      2.3470      0.65  Q         .         .         .         .
 23.73      2.3542      0.65  Q         .         .         .         .
 23.87      2.3613      0.64  Q         .         .         .         .
 24.00      2.3683      0.64  Q         .         .         .         .
 24.13      2.3718      0.00  Q         .         .         .         .
----------------------------------------------------------------------------
-------------------------------------------------------------------------------
    TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
    (Note: 100% of Peak Flow Rate estimate assumed to have
    an instantaneous time duration)

    Percentile of Estimated                Duration
        Peak Flow Rate                     (minutes)
    =======================                =========
              0%                            1440.0
             10%                             112.0
             20%                              16.0
             30%                               8.0
             40%                               8.0
             50%                               8.0
             60%                               8.0
             70%                               8.0
             80%                               8.0
             90%                               8.0

  Problem Descriptions:
   TEI JOB NO. 4097
   PROPOSED CONDITION
```

100-YEAR STORM EVENT

==

FLOW-THROUGH DETENTION BASIN MODEL

SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
CONSTANT HYDROGRAPH TIME UNIT(MINUTES) = 8.000
DEAD STORAGE(AF) = 0.00
SPECIFIED DEAD STORAGE(AF) FILLED = 0.00
ASSUMED INITIAL DEPTH(FEET) IN STORAGE BASIN = 0.00

```
              INFLOW
                |
                |
                |
                V            __effective depth
          -------------     |    (and volume)
          |           |   | |
          | detention |   |....V.............
          |   basin   |<-->|         outflow
          |           |   |.........__________
          -------------   |         |   \
                |         | storage |    basin outlet
                V         -----------
             OUTFLOW
```

DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:
TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES = 8

*BASIN-DEPTH (FEET)	STORAGE (ACRE-FEET)	OUTFLOW (CFS) **	**BASIN-DEPTH (FEET)	STORAGE (ACRE-FEET)	OUTFLOW (CFS) *
* 0.000	0.000	0.000**	0.180	0.010	1.000*
* 0.380	0.040	2.000**	0.580	0.110	3.000*
* 0.780	0.210	4.000**	0.980	0.330	6.000*
* 1.180	0.480	8.000**	1.350	0.620	10.000*

BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:

INTERVAL NUMBER	DEPTH (FEET)	{S-O*DT/2} (ACRE-FEET)	{S+O*DT/2} (ACRE-FEET)
1	0.00	0.00000	0.00000
2	0.18	0.00449	0.01551
3	0.38	0.02898	0.05102
4	0.58	0.09347	0.12653
5	0.78	0.18796	0.23204
6	0.98	0.29694	0.36306
7	1.18	0.43592	0.52408
8	1.35	0.56490	0.67510

WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)

DETENTION BASIN ROUTING RESULTS:
NOTE: COMPUTED BASIN DEPTH, OUTFLOW, AND STORAGE QUANTITIES OCCUR AT THE GIVEN TIME. BASIN INFLOW VALUES REPRESENT THE AVERAGE INFLOW DURING THE RECENT HYDROGRAPH UNIT INTERVAL.

TIME (HRS)	DEAD-STORAGE FILLED(AF)	INFLOW (CFS)	EFFECTIVE DEPTH(FT)	OUTFLOW (CFS)	EFFECTIVE VOLUME(AF)
0.133	0.000	0.63	0.08	0.23	0.005
0.267	0.000	0.64	0.10	0.52	0.006
0.400	0.000	0.64	0.11	0.60	0.006
0.533	0.000	0.64	0.11	0.63	0.006
0.667	0.000	0.64	0.12	0.64	0.006
0.800	0.000	0.65	0.12	0.64	0.006
0.933	0.000	0.65	0.12	0.65	0.006
1.067	0.000	0.65	0.12	0.65	0.006
1.200	0.000	0.65	0.12	0.65	0.007
1.333	0.000	0.66	0.12	0.65	0.007
1.467	0.000	0.66	0.12	0.66	0.007
1.600	0.000	0.66	0.12	0.66	0.007
1.733	0.000	0.67	0.12	0.66	0.007
1.867	0.000	0.67	0.12	0.67	0.007
2.000	0.000	0.67	0.12	0.67	0.007
2.133	0.000	0.67	0.12	0.67	0.007
2.267	0.000	0.68	0.12	0.67	0.007
2.400	0.000	0.68	0.12	0.68	0.007
2.533	0.000	0.68	0.12	0.68	0.007
2.667	0.000	0.69	0.12	0.68	0.007
2.800	0.000	0.69	0.12	0.69	0.007
2.933	0.000	0.69	0.12	0.69	0.007
3.067	0.000	0.70	0.13	0.69	0.007
3.200	0.000	0.70	0.13	0.70	0.007

3.333	0.000	0.70	0.13	0.70	0.007
3.467	0.000	0.71	0.13	0.70	0.007
3.600	0.000	0.71	0.13	0.71	0.007
3.733	0.000	0.71	0.13	0.71	0.007
3.867	0.000	0.72	0.13	0.71	0.007
4.000	0.000	0.72	0.13	0.72	0.007
4.133	0.000	0.72	0.13	0.72	0.007
4.267	0.000	0.73	0.13	0.72	0.007
4.400	0.000	0.73	0.13	0.73	0.007
4.533	0.000	0.73	0.13	0.73	0.007
4.667	0.000	0.74	0.13	0.74	0.007
4.800	0.000	0.74	0.13	0.74	0.007
4.933	0.000	0.75	0.13	0.74	0.007
5.067	0.000	0.75	0.13	0.75	0.007
5.200	0.000	0.76	0.14	0.75	0.008
5.333	0.000	0.76	0.14	0.76	0.008
5.467	0.000	0.77	0.14	0.76	0.008
5.600	0.000	0.77	0.14	0.77	0.008
5.733	0.000	0.77	0.14	0.77	0.008
5.867	0.000	0.78	0.14	0.77	0.008
6.000	0.000	0.78	0.14	0.78	0.008
6.133	0.000	0.79	0.14	0.78	0.008
6.267	0.000	0.79	0.14	0.79	0.008
6.400	0.000	0.80	0.14	0.79	0.008
6.533	0.000	0.80	0.14	0.80	0.008
6.667	0.000	0.81	0.15	0.80	0.008
6.800	0.000	0.81	0.15	0.81	0.008
6.933	0.000	0.82	0.15	0.81	0.008
7.067	0.000	0.83	0.15	0.82	0.008
7.200	0.000	0.83	0.15	0.83	0.008
7.333	0.000	0.84	0.15	0.83	0.008
7.467	0.000	0.84	0.15	0.84	0.008
7.600	0.000	0.85	0.15	0.84	0.008
7.733	0.000	0.85	0.15	0.85	0.009
7.867	0.000	0.86	0.15	0.86	0.009
8.000	0.000	0.87	0.16	0.86	0.009
8.133	0.000	0.88	0.16	0.87	0.009
8.267	0.000	0.88	0.16	0.88	0.009
8.400	0.000	0.89	0.16	0.88	0.009
8.533	0.000	0.89	0.16	0.89	0.009
8.667	0.000	0.90	0.16	0.90	0.009
8.800	0.000	0.91	0.16	0.90	0.009
8.933	0.000	0.92	0.16	0.91	0.009
9.067	0.000	0.93	0.17	0.92	0.009
9.200	0.000	0.94	0.17	0.93	0.009
9.333	0.000	0.94	0.17	0.94	0.009
9.467	0.000	0.95	0.17	0.94	0.009
9.600	0.000	0.96	0.17	0.95	0.010
9.733	0.000	0.97	0.17	0.96	0.010
9.867	0.000	0.98	0.18	0.97	0.010
10.000	0.000	0.99	0.18	0.98	0.010
10.133	0.000	1.00	0.18	0.99	0.010
10.267	0.000	1.01	0.18	1.00	0.010
10.400	0.000	1.02	0.18	1.01	0.010
10.533	0.000	1.03	0.18	1.01	0.010
10.667	0.000	1.04	0.18	1.02	0.011
10.800	0.000	1.06	0.19	1.03	0.011
10.933	0.000	1.07	0.19	1.04	0.011
11.067	0.000	1.08	0.19	1.05	0.012
11.200	0.000	1.09	0.19	1.06	0.012
11.333	0.000	1.11	0.20	1.08	0.012
11.467	0.000	1.12	0.20	1.09	0.013
11.600	0.000	1.14	0.20	1.10	0.013
11.733	0.000	1.15	0.20	1.12	0.014
11.867	0.000	1.18	0.21	1.13	0.014
12.000	0.000	1.19	0.21	1.15	0.015
12.133	0.000	1.17	0.21	1.16	0.015
12.267	0.000	1.18	0.21	1.16	0.015
12.400	0.000	1.21	0.22	1.17	0.015
12.533	0.000	1.22	0.22	1.18	0.016
12.667	0.000	1.25	0.22	1.20	0.016
12.800	0.000	1.27	0.23	1.22	0.017
12.933	0.000	1.30	0.23	1.24	0.017
13.067	0.000	1.32	0.23	1.26	0.018
13.200	0.000	1.36	0.24	1.28	0.019
13.333	0.000	1.38	0.24	1.31	0.020
13.467	0.000	1.42	0.25	1.34	0.021
13.600	0.000	1.45	0.26	1.37	0.021
13.733	0.000	1.50	0.26	1.40	0.023
13.867	0.000	1.53	0.27	1.44	0.024
14.000	0.000	1.59	0.28	1.47	0.025
14.133	0.000	1.61	0.29	1.51	0.026
14.267	0.000	1.68	0.30	1.56	0.027
14.400	0.000	1.72	0.30	1.60	0.029

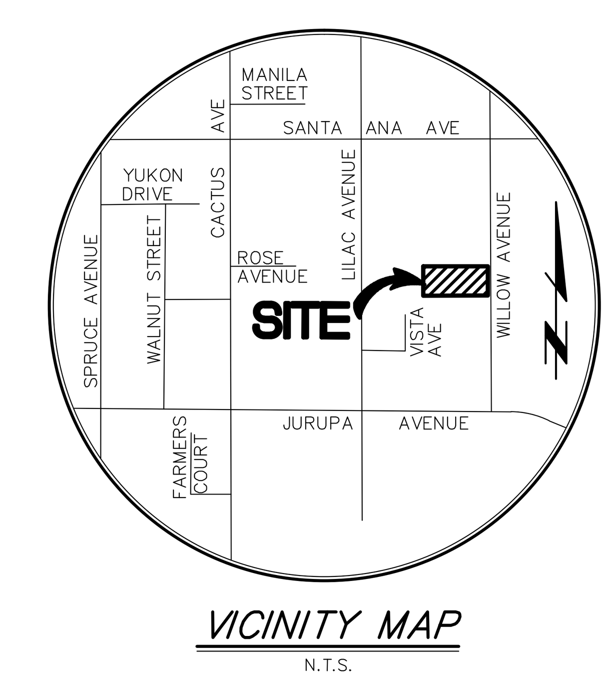
14.533	0.000	1.82	0.32	1.65	0.031
14.667	0.000	1.87	0.33	1.71	0.032
14.800	0.000	1.99	0.34	1.78	0.035
14.933	0.000	2.06	0.36	1.86	0.037
15.067	0.000	2.23	0.38	1.95	0.040
15.200	0.000	2.34	0.39	2.02	0.043
15.333	0.000	2.59	0.41	2.09	0.049
15.467	0.000	2.50	0.42	2.16	0.053
15.600	0.000	2.69	0.43	2.22	0.058
15.733	0.000	3.03	0.45	2.31	0.066
15.867	0.000	4.06	0.50	2.49	0.083
16.000	0.000	5.81	0.59	2.84	0.116
16.133	0.000	20.47	0.92	4.24	0.295
16.267	0.000	3.30	0.89	5.23	0.273
16.400	0.000	2.44	0.84	4.84	0.247
16.533	0.000	2.45	0.81	4.43	0.225
16.667	0.000	2.14	0.77	4.09	0.204
16.800	0.000	1.93	0.73	3.83	0.183
16.933	0.000	1.77	0.68	3.62	0.162
17.067	0.000	1.64	0.65	3.42	0.143
17.200	0.000	1.56	0.61	3.23	0.124
17.333	0.000	1.47	0.57	3.05	0.107
17.467	0.000	1.40	0.53	2.84	0.091
17.600	0.000	1.34	0.48	2.63	0.077
17.733	0.000	1.28	0.45	2.43	0.064
17.867	0.000	1.23	0.42	2.26	0.053
18.000	0.000	1.19	0.39	2.11	0.043
18.133	0.000	1.20	0.34	1.93	0.035
18.267	0.000	1.16	0.30	1.72	0.028
18.400	0.000	1.13	0.27	1.54	0.024
18.533	0.000	1.10	0.25	1.41	0.021
18.667	0.000	1.08	0.23	1.31	0.018
18.800	0.000	1.05	0.22	1.23	0.016
18.933	0.000	1.03	0.21	1.17	0.014
19.067	0.000	1.01	0.20	1.12	0.013
19.200	0.000	0.98	0.19	1.08	0.012
19.333	0.000	0.97	0.19	1.05	0.011
19.467	0.000	0.95	0.18	1.02	0.010
19.600	0.000	0.93	0.17	0.99	0.010
19.733	0.000	0.91	0.17	0.95	0.009
19.867	0.000	0.90	0.16	0.92	0.009
20.000	0.000	0.88	0.16	0.90	0.009
20.133	0.000	0.87	0.16	0.88	0.009
20.267	0.000	0.86	0.16	0.87	0.009
20.400	0.000	0.85	0.15	0.86	0.009
20.533	0.000	0.83	0.15	0.84	0.008
20.667	0.000	0.82	0.15	0.83	0.008
20.800	0.000	0.81	0.15	0.82	0.008
20.933	0.000	0.80	0.14	0.81	0.008
21.067	0.000	0.79	0.14	0.80	0.008
21.200	0.000	0.78	0.14	0.79	0.008
21.333	0.000	0.77	0.14	0.78	0.008
21.467	0.000	0.76	0.14	0.77	0.008
21.600	0.000	0.75	0.14	0.76	0.008
21.733	0.000	0.75	0.13	0.75	0.007
21.867	0.000	0.74	0.13	0.74	0.007
22.000	0.000	0.73	0.13	0.74	0.007
22.133	0.000	0.72	0.13	0.73	0.007
22.267	0.000	0.71	0.13	0.72	0.007
22.400	0.000	0.71	0.13	0.71	0.007
22.533	0.000	0.70	0.13	0.71	0.007
22.667	0.000	0.69	0.13	0.70	0.007
22.800	0.000	0.69	0.12	0.69	0.007
22.933	0.000	0.68	0.12	0.69	0.007
23.067	0.000	0.68	0.12	0.68	0.007
23.200	0.000	0.67	0.12	0.67	0.007
23.333	0.000	0.66	0.12	0.67	0.007
23.467	0.000	0.66	0.12	0.66	0.007
23.600	0.000	0.65	0.12	0.66	0.007
23.733	0.000	0.65	0.12	0.65	0.006
23.867	0.000	0.64	0.12	0.65	0.006
24.000	0.000	0.64	0.12	0.64	0.006
24.133	0.000	0.00	0.03	0.41	0.002
24.267	0.000	0.00	0.01	0.12	0.001

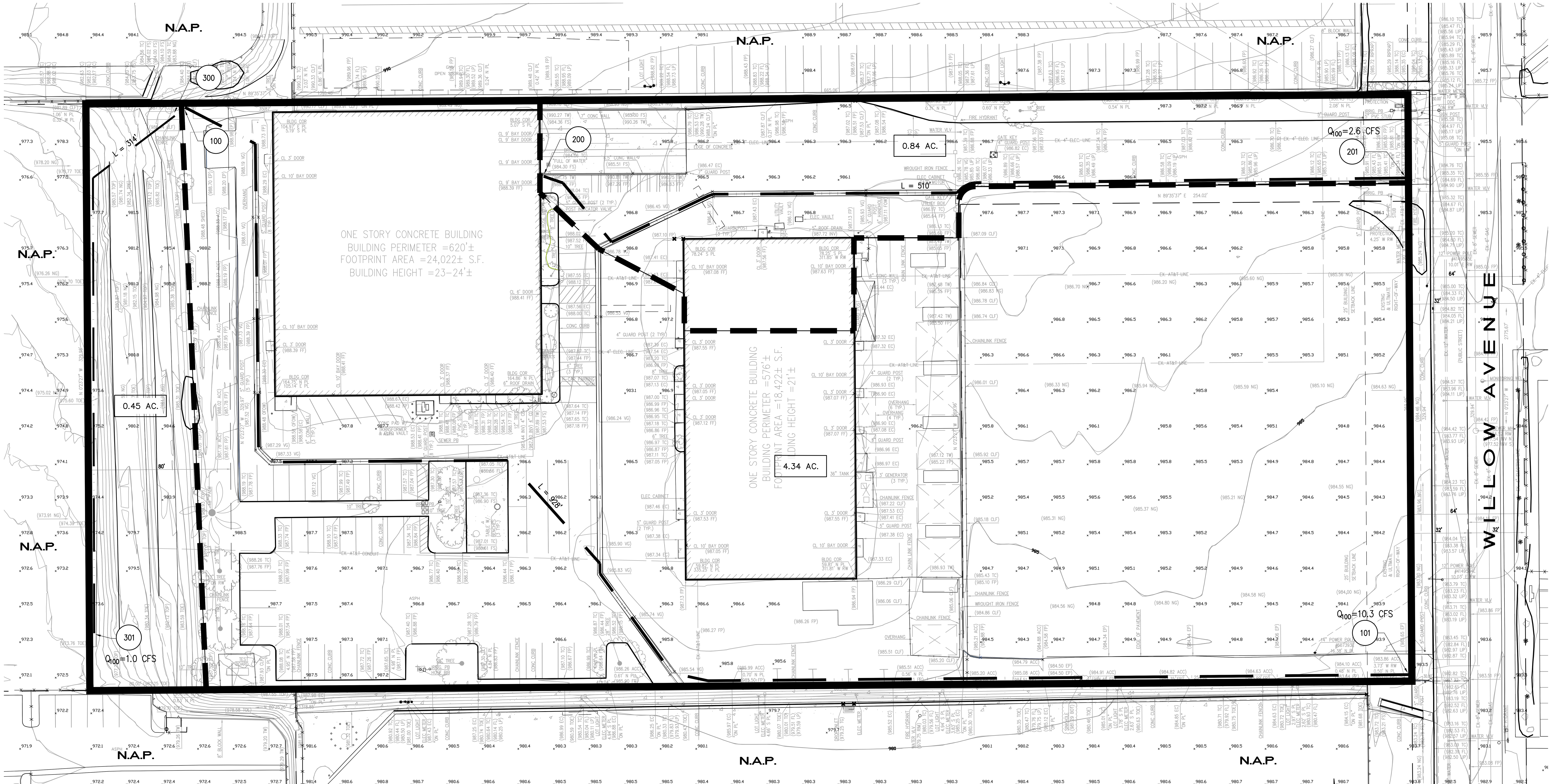
WILLOW AVENUE INDUSTRIAL BUILDING
PONDING AT SOUTHERLY TRUCK YARD

Elevation	Depth (feet)	Area (sq. ft.)	Volume (c.f.)	Σ Volume (c.f.)	Σ Volume (ac-ft)	Qdischage (cfs)
983.82	0.00	0				
			244	244	0.01	1.00
984.00	0.18	2706				
			1385	1,628	0.04	2.00
984.20	0.38	11142				
			3096	4,725	0.11	3.00
984.40	0.58	19821				
			4372	9,097	0.21	4.00
984.60	0.78	23903				
			5274	14,372	0.33	6.00
984.80	0.98	28842				
			6366	20,737	0.48	8.00
985.00	1.18	34814				
			6304	27,041	0.62	10.00
985.17	1.35	39348				

APPENDIX D

HYDROLOGY MAPS





0 15 30 60 90

SCALE: 1"=30'

LEGEND

- PROJECT BOUNDARY
- SUBAREA BOUNDARY
- FLOW PATH
- 1.00 AC. — SUBAREA AREA
- 100 — NODE NUMBER

Last Update: 5/2/22
O:\4000-4099\4097\4097HYD-EX.dwg

PREPARED FOR:

SCANNELL PROPERTIES – LAGUNA HILLS
24411 RIDGE ROUTE DRIVE, SUITE 120
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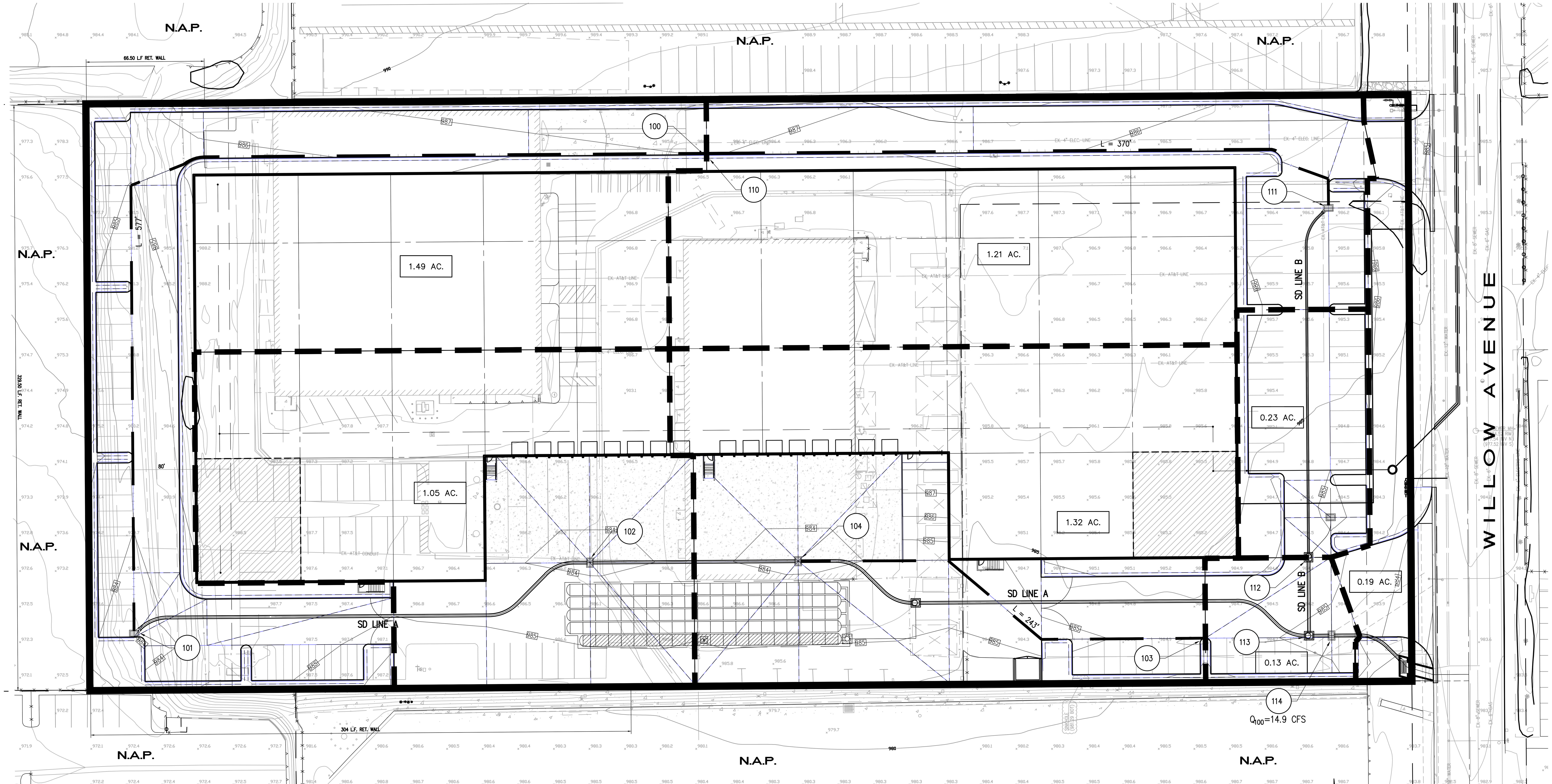
CITY OF RIALTO

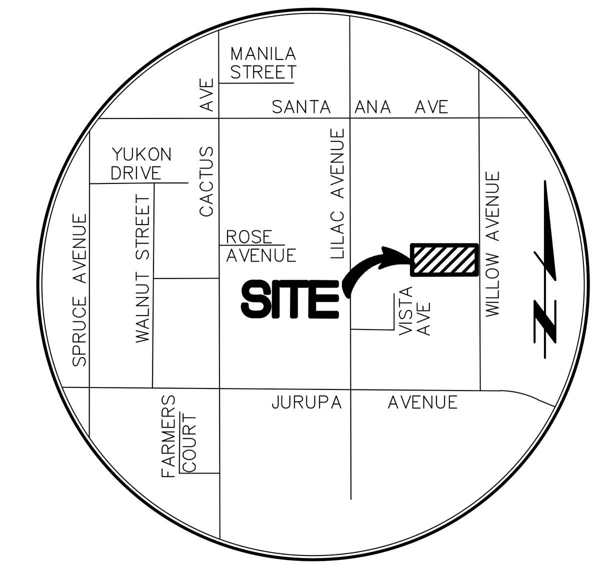
EXISTING HYDROLOGY MAP

WILLOW AVENUE
INDUSTRIAL BUILDING

RIALTO, CALIFORNIA

SHEET 1 OF 1 SHEETS



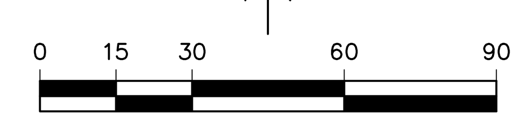


VICINITY MAP

N.T.S.

LEGEND

	PROJECT BOUNDARY
	SUBAREA BOUNDARY
	FLOW PATH
1.00 AC.	SUBAREA AREA
100	NODE NUMBER



SCALE: 1"=30'

Last Update: 7/26/22
G:\4000-4099\4097\4097HYD-PRELIM.dwg

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CITY OF RIALTO

PROPOSED HYDROLOGY MAP

WILLOW AVENUE INDUSTRIAL BUILDING

RIALTO, CALIFORNIA

SHEET 1 OF 1 SHEETS