CRYSTAL COVE

PRELIMINARY HYDROLOGY REPORT

PEN22-0022 (LST22-0008)
Prepared date: January 12, 2022
Revised date: May 10, 2022
Revised date: July 18, 2022

PREPARED FOR:

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CRYSTAL COVE

[File: C:\Wspg1\92600\Hydrology Appendix Index]
JN 926-00

CRYSTAL COVE

Preliminary Hydrology Report
PEN22-0022 (LST22-0008)

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- **Project Description**

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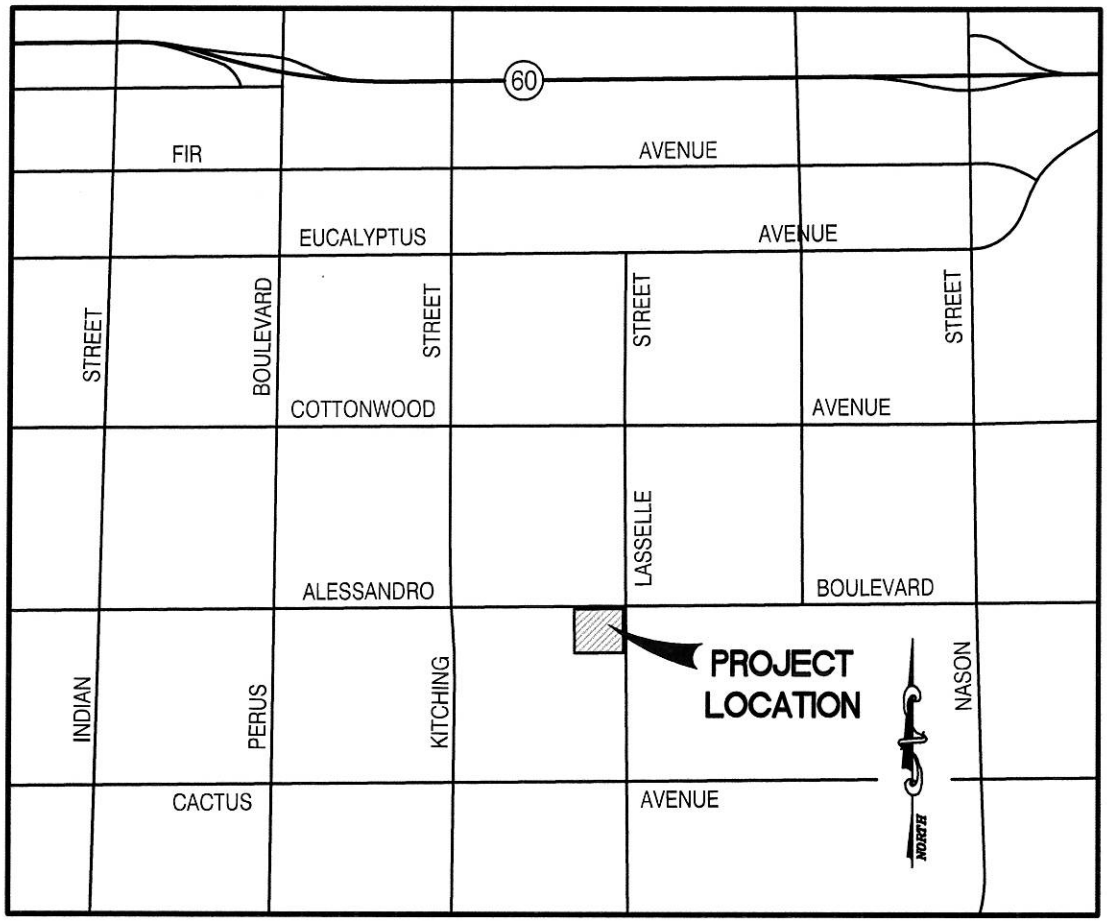

VICINITY MAP

N.T.S.

PURPOSE

The purpose of this report is to provide hydrologic and hydraulic calculations to support the conceptual design for the storm drain system proposed for Crystal Cove.

EXISTING CONDITIONS

The project site consists of 7.9 acres located in the City of Moreno Valley, County of Riverside, California. The project is located at the southwest corner of the intersection of Alessandro Boulevard and Lasselle Street. The surrounding area consists of vacant land, single family residential, and light commercial properties.

The site is currently vacant, naturally drains in a southwesterly direction. All the surface runoff from the project site ultimately drains into the existing street. The site consist of open brush and natural poor cover. The entire project site consists of soil type B.

The project site can be found on Flood Insurance Rate Map (FIRM) No. 06065C0765G, effective on August 28, 2008, Zone X.

PROPOSED CONDITIONS

The project site proposes 200 units apartment, associated infrastructure. On site runoff will be conveyed through private street improvements. The storm drain pipe will convey the storm runoff to the proposed underground chambers to be detained. Runoff Q100=3.0 cfs exits the underground basin through the use of a pump to a storm drain manhole. From here it drains to the existing 36" storm drain underneath Laselle Street (Project No. 06-50182725), then into Sunnymead MDP Line N-2.

The onsite drainage system shall be designed to ensure that runoff from a 100-year storm of 24 hours duration under developed condition is equal or less than the runoff under existing conditions of the same storm frequency. 24-hour storm duration shall be analyzed to determine the detention.

HYDROLOGY

Hydrologic calculations within this report have been prepared using 2016 Advance Engineering Software's (AES) Rational Method software for Riverside County. Hydrologic variables include "B" soil type. Rainfall intensities as follows: 10 yr - 10 min. = 2.01, 10 yr – 60 min. = 0.82, 100 yr – 10 min. = 2.94, 100 yr – 60 min. = 1.20. Calculations have been prepared for both the 10 and 100 year events.

The software used in running the synthetic unit hydrograph for determination of flood volume, is a program by Civil Design Corporation. Parameters for the hydrograph calculations are specified in the Riverside County Flood Control and Water Conservation Hydrology Manual. The Point Precipitations used are based on data from NOAA Atlas 14, Volume 6, and Version 2, a copy of which is found in Appendix E.

CONCLUSIONS

This drainage report includes the post-development hydrology analyses for the 10 and 100-Yr. storm events. Base on this drainage study, we conclude that the proposed storm drain system provides adequate capacity to convey flows for the 100-Yr. storm.

Comparative runoff, Pre & Post Development

Runoff	Rational Method	
	Pre Development	Post Development
Q_{10} (cfs)	**7.4**	**11.6**
Q_{100} (cfs)	**12.4**	**17.0**

CRYSTAL COVE, PEN22-0022 (LST22-0008)
UNDERGROUND DETENTION BASIN #1
PROJECT 926-00

UNDERGROUND DETENTION BASIN #1 OUTPUT SUMMARY

STORM	DURATION	Unit Hydrograph Results Existing Conditions		Unit Hydrograph Results Proposed Conditions		* Basin Routing Results			
		Flood Volume Ac.Ft.	Peak Flow CFS	Flood Volume Ac.Ft.	Peak Flow CFS	Basin Volume Ac.Ft.	Routed Peak CFS	Basin Depth Ft.	W.S. ELEV. Ft.
100-YEAR	24-HOUR	1.10	3.17	2.40	4.33	0.119	3.00	7.02	1567.02

* See Flood Hydrograph Routing calculations on Appendix D

```
**************************************************************************
                HYDRAULIC ELEMENTS - I  PROGRAM PACKAGE
        (C) Copyright 1982-2016 Advanced Engineering Software (aes)
            Ver. 23.0  Release Date: 07/01/2016  License ID 1269

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                          Email: mdsirvine@mdsconsulting.net

--------------------------------------------------------------------------
  TIME/DATE OF STUDY: 14:54 07/12/2022
==========================================================================
 Problem Descriptions:
  CRYSTAL COVE, PEN22-0022 (LST22-0008)
  EXISTING 36" SD CAPACITY (LASSELLE STREET)
  Q = 47.1 CFS, S=0.0050
**************************************************************************
>>>>PIPEFLOW HYDRAULIC INPUT INFORMATION<<<<
--------------------------------------------------------------------------
    PIPE DIAMETER(FEET) =   3.000
    FLOWDEPTH(FEET) =   3.000
    PIPE SLOPE(FEET/FEET) =  0.0050
    MANNINGS FRICTION FACTOR = 0.013000
    >>>>> NORMAL DEPTH FLOW(CFS) =     47.16
==========================================================================
```

PER LASSELLE STREET S.D.
PROJECT NO. 06-5018 2725

> 18.2 + 3.0 CFS = 21.2 ∴ O.K.

PER PEN 22-0022
(LST 22-0008)

A

Appendix A-1

RATIONAL METHOD CALCULATIONS
UNDEVELOPED CONDITION
1. 10 - YEAR STORM

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```
**************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2016 Advanced Engineering Software (aes)
                    (Rational Tabling Version 23.0)
                Release Date: 07/01/2016  License ID 1269

                          Analysis prepared by:

                              MDS Consulting
              17320 Redhill Avenue, Suite 350, Irvine, CA 92614
                          Phone: (949) 251-8821
                      Email: mdsirvine@mdsconsulting.net

 ************************* DESCRIPTION OF STUDY *************************
* CRYSTAL COVE                                                          *
* PRELIMINARY HYDROLOGY STUDY, UNDEVELOPED CONDITION                    *
* 10-YEAR STORM EVENT                                                   *
 ************************************************************************

  FILE NAME: C:\AES2016\HYDROSFT\RATSCX\92600\92600EX.DAT
  TIME/DATE OF STUDY: 08:42 01/12/2022
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.010
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.820
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.940
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5003939
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5001161
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =   10.00   1-HOUR INTENSITY(INCH/HOUR) =   0.828
  SLOPE OF INTENSITY DURATION CURVE = 0.5004
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *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   18.0     13.0    0.020/0.020/0.020   0.50    2.00 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
```

```
 OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 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(FEET) =   540.00
  UPSTREAM ELEVATION(FEET) =   1582.00
  DOWNSTREAM ELEVATION(FEET) =   1570.00
  ELEVATION DIFFERENCE(FEET) =     12.00
  TC = 0.533*[(  540.00**3)/(    12.00)]**.2 =   14.125
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.708
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .5578
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      2.31
  TOTAL AREA(ACRES) =      2.42   TOTAL RUNOFF(CFS) =      2.31

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1570.00  DOWNSTREAM(FEET) =   1568.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   276.00   CHANNEL SLOPE =  0.0072
  CHANNEL FLOW THRU SUBAREA(CFS) =       2.31
  FLOW VELOCITY(FEET/SEC) =   1.51 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   3.05   Tc(MIN.) =   17.17
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =     816.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.549
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .5369
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    6.15   SUBAREA RUNOFF(CFS) =    5.11
  TOTAL AREA(ACRES) =       8.6   TOTAL RUNOFF(CFS) =      7.42
  TC(MIN.) =   17.17
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        8.6  TC(MIN.) =     17.17
  PEAK FLOW RATE(CFS)   =       7.42
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Appendix A-2

RATIONAL METHOD CALCULATIONS
UNDEVELOPED CONDITION
1. 100 - YEAR STORM

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                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2016 Advanced Engineering Software (aes)
                    (Rational Tabling Version 23.0)
                  Release Date: 07/01/2016  License ID 1269

                          Analysis prepared by:

                              MDS Consulting
              17320 Redhill Avenue, Suite 350, Irvine, CA 92614
                          Phone: (949) 251-8821
                      Email: mdsirvine@mdsconsulting.net

 ************************* DESCRIPTION OF STUDY *************************
* CRYATAL COVE                                                          *
* PRELIMINARY HYDROLOGY STUDY, UNDEVELOPED CONDITION                    *
* 100-YEAR STORM EVENT                                                  *
 ************************************************************************

  FILE NAME: C:\AES2016\HYDROSFT\RATSCX\92600\92600EX.DAT
  TIME/DATE OF STUDY: 08:42 01/12/2022
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.010
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.820
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.940
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5003939
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5001161
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.200
  SLOPE OF INTENSITY DURATION CURVE = 0.5001
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *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   18.0     13.0    0.020/0.020/0.020   0.50    2.00 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
```

```
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 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(FEET) =   540.00
  UPSTREAM ELEVATION(FEET) =   1582.00
  DOWNSTREAM ELEVATION(FEET) =   1570.00
  ELEVATION DIFFERENCE(FEET) =     12.00
  TC = 0.533*[(  540.00**3)/(    12.00)]**.2 =   14.125
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.474
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6322
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      3.78
  TOTAL AREA(ACRES) =      2.42   TOTAL RUNOFF(CFS) =      3.78

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1570.00  DOWNSTREAM(FEET) =   1568.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   276.00   CHANNEL SLOPE =  0.0072
  CHANNEL FLOW THRU SUBAREA(CFS) =       3.78
  FLOW VELOCITY(FEET/SEC) =   1.68 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.73   Tc(MIN.) =   16.86
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =     816.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.264
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6153
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    6.15   SUBAREA RUNOFF(CFS) =    8.57
  TOTAL AREA(ACRES) =      8.6   TOTAL RUNOFF(CFS) =     12.35
  TC(MIN.) =   16.86
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       8.6  TC(MIN.) =     16.86
  PEAK FLOW RATE(CFS)   =     12.35
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

B

Appendix B-1

RATIONAL METHOD CALCULATIONS
DEVELOPED CONDITION
1. 10 - YEAR STORM

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                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
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                    (Rational Tabling Version 23.0)
                  Release Date: 07/01/2016  License ID 1269

                          Analysis prepared by:

                               MDS Consulting
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                               Phone: (949) 251-8821
                           Email: mdsirvine@mdsconsulting.net

 ************************* DESCRIPTION OF STUDY *************************
* CRYSTAL COVE                                                          *
* PRELIMINARY HYDROLOGY STUDY, DEVELOPED CONDITION                      *
* 10-YEAR STORM EVENT                                                   *
 ************************************************************************

  FILE NAME: C:\AES2016\HYDROSFT\RATSCX\92600\92600DEV.DAT
  TIME/DATE OF STUDY: 08:42 05/11/2022
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.010
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.820
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.940
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5003939
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5001161
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =   10.00   1-HOUR INTENSITY(INCH/HOUR) =   0.828
  SLOPE OF INTENSITY DURATION CURVE = 0.5004
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *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   18.0     13.0    0.020/0.020/0.020   0.50    2.00 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
```

```
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   930.00
  UPSTREAM ELEVATION(FEET) =   1576.00
  DOWNSTREAM ELEVATION(FEET) =   1568.30
  ELEVATION DIFFERENCE(FEET) =      7.70
  TC = 0.323*[(  930.00**3)/(     7.70)]**.2 =   12.960
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.783
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8334
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      4.99
  TOTAL AREA(ACRES) =      3.36   TOTAL RUNOFF(CFS) =      4.99

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     21.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1566.10  DOWNSTREAM(FEET) =  1564.30
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   5.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.12
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.99
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   12.99
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     21.00 =     950.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 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.) =   12.99
  RAINFALL INTENSITY(INCH/HR) =   1.78
  TOTAL STREAM AREA(ACRES) =     3.36
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.99

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 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(FEET) =   202.00
  UPSTREAM ELEVATION(FEET) =   1573.20
  DOWNSTREAM ELEVATION(FEET) =   1566.20
  ELEVATION DIFFERENCE(FEET) =      7.00
  TC = 0.303*[(  202.00**3)/(     7.00)]**.2 =    4.963
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.872
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8759
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      0.35
  TOTAL AREA(ACRES) =      0.14   TOTAL RUNOFF(CFS) =      0.35

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   2.87
  TOTAL STREAM AREA(ACRES) =     0.14
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.35

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        4.99    12.99        1.781          3.36
      2        0.35     5.00        2.872          0.14

 ********************************WARNING*************************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        2.27     5.00       2.872
      2        5.21    12.99       1.781

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       5.21   Tc(MIN.) =   12.99
  TOTAL AREA(ACRES) =        3.5
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     21.00 =     950.00 FEET.

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

```
 FLOW PROCESS FROM NODE     21.00 TO NODE     53.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1564.30  DOWNSTREAM(FEET) =  1561.20
 FLOW LENGTH(FEET) =   117.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   9.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.16
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       5.21
 PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =   13.22
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     53.00 =    1067.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     53.00 TO NODE     53.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS APARTMENT
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   994.00
 UPSTREAM ELEVATION(FEET) =   1575.90
 DOWNSTREAM ELEVATION(FEET) =   1568.10
 ELEVATION DIFFERENCE(FEET) =      7.80
 TC = 0.323*[(  994.00**3)/(     7.80)]**.2 =   13.453
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.750
 APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8326
 SOIL CLASSIFICATION IS "B"
 SUBAREA RUNOFF(CFS) =      5.67
 TOTAL AREA(ACRES) =      3.89   TOTAL RUNOFF(CFS) =      5.67

****************************************************************************
 FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 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.) =   13.45
 RAINFALL INTENSITY(INCH/HR) =   1.75
 TOTAL STREAM AREA(ACRES) =     3.89
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.67

****************************************************************************
 FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 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(FEET) =   140.00
  UPSTREAM ELEVATION(FEET) =   1571.40
  DOWNSTREAM ELEVATION(FEET) =   1568.00
  ELEVATION DIFFERENCE(FEET) =      3.40
  TC = 0.303*[(  140.00**3)/(     3.40)]**.2 =    4.602
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.872
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8759
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      0.40
  TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      0.40

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     31.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1567.60  DOWNSTREAM(FEET) =  1565.10
  FLOW LENGTH(FEET) =   175.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   2.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.33
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.40
  PIPE TRAVEL TIME(MIN.) =   0.88    Tc(MIN.) =    5.88
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     31.00 =     315.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.649
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8490
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    0.16   SUBAREA RUNOFF(CFS) =    0.36
  TOTAL AREA(ACRES) =       0.3   TOTAL RUNOFF(CFS) =       0.76
  TC(MIN.) =    5.88

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.88
```

```
 RAINFALL INTENSITY(INCH/HR) =   2.65
 TOTAL STREAM AREA(ACRES) =     0.32
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.76

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1         5.67    13.45        1.750          3.89
    2         0.76     5.88        2.649          0.32

 ********************************WARNING*********************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
 WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ************************************************************************

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1         3.24     5.88        2.649
    2         6.17    13.45        1.750

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       6.17   Tc(MIN.) =   13.45
 TOTAL AREA(ACRES) =        4.2
 LONGEST FLOWPATH FROM NODE     30.00 TO NODE     31.00 =     994.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     31.00 TO NODE     52.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1565.10  DOWNSTREAM(FEET) =  1563.70
 FLOW LENGTH(FEET) =     9.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   5.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  16.97
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       6.17
 PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   13.46
 LONGEST FLOWPATH FROM NODE     30.00 TO NODE     52.00 =    1003.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     52.00 TO NODE     52.00 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.) =   13.46
```

```
 RAINFALL INTENSITY(INCH/HR) =   1.75
 TOTAL STREAM AREA(ACRES) =     4.21
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.17

****************************************************************************
 FLOW PROCESS FROM NODE     50.00 TO NODE     51.00 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(FEET) =   202.00
 UPSTREAM ELEVATION(FEET) =   1573.20
 DOWNSTREAM ELEVATION(FEET) =   1566.40
 ELEVATION DIFFERENCE(FEET) =      6.80
 TC = 0.303*[(  202.00**3)/(     6.80)]**.2 =    4.992
 COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.872
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8759
 SOIL CLASSIFICATION IS "B"
 SUBAREA RUNOFF(CFS) =      0.38
 TOTAL AREA(ACRES) =      0.15   TOTAL RUNOFF(CFS) =      0.38

****************************************************************************
 FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1563.90  DOWNSTREAM(FEET) =  1563.70
 FLOW LENGTH(FEET) =    47.00   MANNING'S N =  0.013
 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.) =   2.14
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       0.38
 PIPE TRAVEL TIME(MIN.) =   0.37    Tc(MIN.) =    5.37
 LONGEST FLOWPATH FROM NODE     50.00 TO NODE     52.00 =     249.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     52.00 TO NODE     52.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.37
 RAINFALL INTENSITY(INCH/HR) =   2.77
 TOTAL STREAM AREA(ACRES) =     0.15
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.38

 ** CONFLUENCE DATA **
```

```
                                    DEV10
 STREAM      RUNOFF        Tc       INTENSITY       AREA
 NUMBER       (CFS)      (MIN.)    (INCH/HOUR)     (ACRE)
    1          6.17      13.46         1.750          4.21
    2          0.38       5.37         2.772          0.15

 ********************************WARNING*********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ************************************************************************

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

  ** PEAK FLOW RATE TABLE **
  STREAM      RUNOFF        Tc       INTENSITY
  NUMBER       (CFS)      (MIN.)    (INCH/HOUR)
     1          2.84       5.37         2.772
     2          6.41      13.46         1.750

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =        6.41   Tc(MIN.) =   13.46
  TOTAL AREA(ACRES) =         4.4
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     52.00 =    1003.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1563.70  DOWNSTREAM(FEET) =  1561.20
  FLOW LENGTH(FEET) =    51.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.96
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.41
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   13.54
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     53.00 =    1054.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     53.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM      RUNOFF        Tc       INTENSITY      AREA
  NUMBER       (CFS)      (MIN.)    (INCH/HOUR)    (ACRE)
     1          6.41      13.54         1.744          4.36
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     53.00 =    1054.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM      RUNOFF        Tc       INTENSITY      AREA
```

```
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1        5.21    13.22       1.765        3.50
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     53.00 =    1067.00 FEET.

 ********************************WARNING*********************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
 WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ************************************************************************

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc      INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
     1      11.47      13.22        1.765
     2      11.56      13.54        1.744

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      11.56   Tc(MIN.) =   13.54
 TOTAL AREA(ACRES) =        7.9

****************************************************************************
 FLOW PROCESS FROM NODE     53.00 TO NODE     53.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1561.20  DOWNSTREAM(FEET) =  1560.80
 FLOW LENGTH(FEET) =     7.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.52
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      11.56
 PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   13.55
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     54.00 =    1074.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =        7.9  TC(MIN.) =     13.55
 PEAK FLOW RATE(CFS)   =      11.56
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

Appendix B-2

RATIONAL METHOD CALCULATIONS
DEVELOPED CONDITION
1. 100 - YEAR STORM

MDS CONSULTING
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Suite 350
Irvine, CA 92614
Voice: 949-251-8821
FAX: 949-251-0516
PLANNERS ENGINEERS SURVEYORS

```
*******************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2016 Advanced Engineering Software (aes)
                    (Rational Tabling Version 23.0)
                  Release Date: 07/01/2016  License ID 1269

                          Analysis prepared by:

                              MDS Consulting
                  17320 Redhill Avenue, Suite 350, Irvine, CA 92614
                              Phone: (949) 251-8821
                           Email: mdsirvine@mdsconsulting.net

 ************************** DESCRIPTION OF STUDY **************************
* CRYSTAL COVE                                                            *
* PRELIMINARY HYDROLOGY STUDY, DEVELOPED CONDITION                        *
* 100-YEAR STORM EVENT                                                    *
 *************************************************************************

  FILE NAME: C:\AES2016\HYDROSFT\RATSCX\92600\92600DEV.DAT
  TIME/DATE OF STUDY: 08:39 05/11/2022
-------------------------------------------------------------------------
  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
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.010
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.820
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.940
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5003939
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5001161
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.200
  SLOPE OF INTENSITY DURATION CURVE = 0.5001
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *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   18.0     13.0    0.020/0.020/0.020   0.50    2.00 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
```

```
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   930.00
  UPSTREAM ELEVATION(FEET) =   1576.00
  DOWNSTREAM ELEVATION(FEET) =   1568.30
  ELEVATION DIFFERENCE(FEET) =      7.70
  TC = 0.323*[(  930.00**3)/(     7.70)]**.2 =   12.960
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.582
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8481
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      7.36
  TOTAL AREA(ACRES) =      3.36   TOTAL RUNOFF(CFS) =      7.36

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     21.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1566.10  DOWNSTREAM(FEET) =  1564.30
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.38
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.36
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   12.98
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     21.00 =     950.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 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.) =   12.98
  RAINFALL INTENSITY(INCH/HR) =   2.58
  TOTAL STREAM AREA(ACRES) =     3.36
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.36

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 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(FEET) =   202.00
  UPSTREAM ELEVATION(FEET) =   1573.20
  DOWNSTREAM ELEVATION(FEET) =   1566.20
  ELEVATION DIFFERENCE(FEET) =      7.00
  TC = 0.303*[(  202.00**3)/(     7.00)]**.2 =    4.963
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.158
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8819
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      0.51
  TOTAL AREA(ACRES) =      0.14   TOTAL RUNOFF(CFS) =      0.51

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   4.16
  TOTAL STREAM AREA(ACRES) =     0.14
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.51

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        7.36    12.98        2.580          3.36
      2        0.51     5.00        4.158          0.14

 ***********************************WARNING***********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 *****************************************************************************

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        3.35     5.00       4.158
      2        7.68    12.98       2.580

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.68   Tc(MIN.) =   12.98
  TOTAL AREA(ACRES) =        3.5
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     21.00 =     950.00 FEET.

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

```
 FLOW PROCESS FROM NODE     21.00 TO NODE     53.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1564.30  DOWNSTREAM(FEET) =  1561.20
 FLOW LENGTH(FEET) =   117.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.16
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       7.68
 PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =   13.20
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     53.00 =    1067.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     53.00 TO NODE     53.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS APARTMENT
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   994.00
 UPSTREAM ELEVATION(FEET) =   1575.90
 DOWNSTREAM ELEVATION(FEET) =   1568.10
 ELEVATION DIFFERENCE(FEET) =      7.80
 TC = 0.323*[(  994.00**3)/(     7.80)]**.2 =   13.453
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.535
 APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8474
 SOIL CLASSIFICATION IS "B"
 SUBAREA RUNOFF(CFS) =      8.35
 TOTAL AREA(ACRES) =      3.89   TOTAL RUNOFF(CFS) =      8.35

****************************************************************************
 FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 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.) =   13.45
 RAINFALL INTENSITY(INCH/HR) =   2.53
 TOTAL STREAM AREA(ACRES) =     3.89
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.35

****************************************************************************
 FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 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(FEET) =   140.00
  UPSTREAM ELEVATION(FEET) =   1571.40
  DOWNSTREAM ELEVATION(FEET) =   1568.00
  ELEVATION DIFFERENCE(FEET) =      3.40
  TC = 0.303*[(  140.00**3)/(     3.40)]**.2 =    4.602
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.158
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8819
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      0.59
  TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      0.59

******************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     31.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1567.60  DOWNSTREAM(FEET) =  1565.10
  FLOW LENGTH(FEET) =   175.00   MANNING'S N =  0.013
  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.) =   3.73
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.59
  PIPE TRAVEL TIME(MIN.) =   0.78    Tc(MIN.) =    5.78
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     31.00 =     315.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.867
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8616
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    0.16   SUBAREA RUNOFF(CFS) =    0.53
  TOTAL AREA(ACRES) =       0.3   TOTAL RUNOFF(CFS) =       1.12
  TC(MIN.) =    5.78

******************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.78
```

```
 RAINFALL INTENSITY(INCH/HR) =   3.87
 TOTAL STREAM AREA(ACRES) =     0.32
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.12

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        8.35    13.45        2.535          3.89
     2        1.12     5.78        3.867          0.32

 ********************************WARNING*********************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
 WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ************************************************************************

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1        4.71     5.78       3.867
     2        9.09    13.45       2.535

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       9.09   Tc(MIN.) =   13.45
 TOTAL AREA(ACRES) =        4.2
 LONGEST FLOWPATH FROM NODE     30.00 TO NODE     31.00 =     994.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     31.00 TO NODE     52.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1565.10  DOWNSTREAM(FEET) =  1563.70
 FLOW LENGTH(FEET) =     9.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  18.65
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       9.09
 PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   13.46
 LONGEST FLOWPATH FROM NODE     30.00 TO NODE     52.00 =    1003.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     52.00 TO NODE     52.00 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.) =   13.46
 RAINFALL INTENSITY(INCH/HR) =   2.53
```

```
 TOTAL STREAM AREA(ACRES) =     4.21
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.09

****************************************************************************
 FLOW PROCESS FROM NODE     50.00 TO NODE     51.00 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(FEET) =   202.00
 UPSTREAM ELEVATION(FEET) =   1573.20
 DOWNSTREAM ELEVATION(FEET) =   1566.40
 ELEVATION DIFFERENCE(FEET) =      6.80
 TC = 0.303*[(  202.00**3)/(     6.80)]**.2 =    4.992
 COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.158
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8819
 SOIL CLASSIFICATION IS "B"
 SUBAREA RUNOFF(CFS) =      0.55
 TOTAL AREA(ACRES) =      0.15   TOTAL RUNOFF(CFS) =      0.55

****************************************************************************
 FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1563.90  DOWNSTREAM(FEET) =  1563.70
 FLOW LENGTH(FEET) =    47.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   4.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   2.37
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       0.55
 PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =    5.33
 LONGEST FLOWPATH FROM NODE     50.00 TO NODE     52.00 =     249.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     52.00 TO NODE     52.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.33
 RAINFALL INTENSITY(INCH/HR) =   4.03
 TOTAL STREAM AREA(ACRES) =     0.15
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.55

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc       INTENSITY      AREA
```

```
                                    DEV100
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        9.09     13.46       2.534         4.21
     2        0.55      5.33       4.027         0.15

 ********************************WARNING*********************************
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  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ************************************************************************

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc       INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        4.15      5.33       4.027
      2        9.44     13.46       2.534

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       9.44   Tc(MIN.) =   13.46
  TOTAL AREA(ACRES) =        4.4
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     52.00 =    1003.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1563.70  DOWNSTREAM(FEET) =  1561.20
  FLOW LENGTH(FEET) =    51.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.20
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.44
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   13.53
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     53.00 =    1054.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     53.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        9.44     13.53       2.527        4.36
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     53.00 =    1054.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
```

```
                                    DEV100
     1        7.68    13.20       2.559        3.50
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     53.00 =    1067.00 FEET.

 ****************************************WARNING****************************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ***************************************************************************

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      16.88      13.20        2.559
      2      17.02      13.53        2.527

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      17.02   Tc(MIN.) =   13.53
  TOTAL AREA(ACRES) =        7.9

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     53.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1561.20  DOWNSTREAM(FEET) =  1560.80
  FLOW LENGTH(FEET) =     7.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.96
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.02
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   13.54
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     54.00 =    1074.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        7.9  TC(MIN.) =     13.54
  PEAK FLOW RATE(CFS)   =      17.02
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

C

Appendix C

UNIT HYDROGRAPH CALCULATIONS
UNDEVELOPED CONDITION
1. Q100 / 24 HR DURATION STORM

MDS CONSULTING
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17320 Redhill Ave.
Suite 350
Irvine, CA 92614
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PLANNERS ENGINEERS SURVEYORS

U n i t H y d r o g r a p h A n a l y s i s

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Study date 05/05/22 File: Pre9260024100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6328

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Pre Development
100-yr / 24-hr Storm

Drainage Area = 8.02(Ac.) = 0.013 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 8.02(Ac.) = 0.013 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.281 Hr.
Lag time = 16.86 Min.
25% of lag time = 4.22 Min.
40% of lag time = 6.74 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
8.02	1.96	15.72

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
8.02	4.83	38.74

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.960(In)
Area Averaged 100-Year Rainfall = 4.830(In)

Point rain (area averaged) = 4.830(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 4.830(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
8.020	61.00	0.000

Total Area Entered = 8.02(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
61.0	78.8	0.258	0.000	0.258	1.000	0.258
					Sum (F) =	0.258

Area averaged mean soil loss (F) (In/Hr) = 0.258
Minimum soil loss rate ((In/Hr)) = 0.129
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	29.656	2.855	0.231
2	0.167	59.312	10.409	0.841
3	0.250	88.968	18.236	1.474
4	0.333	118.624	20.077	1.623
5	0.417	148.280	13.008	1.051
6	0.500	177.936	7.514	0.607
7	0.583	207.592	4.803	0.388
8	0.667	237.248	3.738	0.302
9	0.750	266.904	3.010	0.243
10	0.833	296.560	2.517	0.203
11	0.917	326.216	2.014	0.163
12	1.000	355.872	1.772	0.143
13	1.083	385.528	1.457	0.118
14	1.167	415.184	1.258	0.102
15	1.250	444.840	0.991	0.080
16	1.333	474.496	0.929	0.075
17	1.417	504.152	0.888	0.072
18	1.500	533.808	0.740	0.060
19	1.583	563.464	0.640	0.052
20	1.667	593.120	0.551	0.045
21	1.750	622.776	0.499	0.040
22	1.833	652.432	0.418	0.034

23	1.917	682.088	0.347	0.028
24	2.000	711.744	0.297	0.024
25	2.083	741.400	0.297	0.024
26	2.167	771.056	0.297	0.024
27	2.250	800.712	0.438	0.035
		Sum = 100.000	Sum=	8.083

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.039	(0.458)	0.035	0.004
2	0.17	0.07	0.039	(0.456)	0.035	0.004
3	0.25	0.07	0.039	(0.454)	0.035	0.004
4	0.33	0.10	0.058	(0.452)	0.052	0.006
5	0.42	0.10	0.058	(0.451)	0.052	0.006
6	0.50	0.10	0.058	(0.449)	0.052	0.006
7	0.58	0.10	0.058	(0.447)	0.052	0.006
8	0.67	0.10	0.058	(0.445)	0.052	0.006
9	0.75	0.10	0.058	(0.444)	0.052	0.006
10	0.83	0.13	0.077	(0.442)	0.070	0.008
11	0.92	0.13	0.077	(0.440)	0.070	0.008
12	1.00	0.13	0.077	(0.438)	0.070	0.008
13	1.08	0.10	0.058	(0.437)	0.052	0.006
14	1.17	0.10	0.058	(0.435)	0.052	0.006
15	1.25	0.10	0.058	(0.433)	0.052	0.006
16	1.33	0.10	0.058	(0.431)	0.052	0.006
17	1.42	0.10	0.058	(0.430)	0.052	0.006
18	1.50	0.10	0.058	(0.428)	0.052	0.006
19	1.58	0.10	0.058	(0.426)	0.052	0.006
20	1.67	0.10	0.058	(0.425)	0.052	0.006
21	1.75	0.10	0.058	(0.423)	0.052	0.006
22	1.83	0.13	0.077	(0.421)	0.070	0.008
23	1.92	0.13	0.077	(0.420)	0.070	0.008
24	2.00	0.13	0.077	(0.418)	0.070	0.008
25	2.08	0.13	0.077	(0.416)	0.070	0.008
26	2.17	0.13	0.077	(0.414)	0.070	0.008
27	2.25	0.13	0.077	(0.413)	0.070	0.008
28	2.33	0.13	0.077	(0.411)	0.070	0.008
29	2.42	0.13	0.077	(0.409)	0.070	0.008
30	2.50	0.13	0.077	(0.408)	0.070	0.008
31	2.58	0.17	0.097	(0.406)	0.087	0.010
32	2.67	0.17	0.097	(0.404)	0.087	0.010
33	2.75	0.17	0.097	(0.403)	0.087	0.010
34	2.83	0.17	0.097	(0.401)	0.087	0.010
35	2.92	0.17	0.097	(0.399)	0.087	0.010
36	3.00	0.17	0.097	(0.398)	0.087	0.010
37	3.08	0.17	0.097	(0.396)	0.087	0.010
38	3.17	0.17	0.097	(0.394)	0.087	0.010
39	3.25	0.17	0.097	(0.393)	0.087	0.010
40	3.33	0.17	0.097	(0.391)	0.087	0.010

41	3.42	0.17	0.097	(0.390)	0.087	0.010
42	3.50	0.17	0.097	(0.388)	0.087	0.010
43	3.58	0.17	0.097	(0.386)	0.087	0.010
44	3.67	0.17	0.097	(0.385)	0.087	0.010
45	3.75	0.17	0.097	(0.383)	0.087	0.010
46	3.83	0.20	0.116	(0.381)	0.104	0.012
47	3.92	0.20	0.116	(0.380)	0.104	0.012
48	4.00	0.20	0.116	(0.378)	0.104	0.012
49	4.08	0.20	0.116	(0.377)	0.104	0.012
50	4.17	0.20	0.116	(0.375)	0.104	0.012
51	4.25	0.20	0.116	(0.373)	0.104	0.012
52	4.33	0.23	0.135	(0.372)	0.122	0.014
53	4.42	0.23	0.135	(0.370)	0.122	0.014
54	4.50	0.23	0.135	(0.369)	0.122	0.014
55	4.58	0.23	0.135	(0.367)	0.122	0.014
56	4.67	0.23	0.135	(0.366)	0.122	0.014
57	4.75	0.23	0.135	(0.364)	0.122	0.014
58	4.83	0.27	0.155	(0.362)	0.139	0.015
59	4.92	0.27	0.155	(0.361)	0.139	0.015
60	5.00	0.27	0.155	(0.359)	0.139	0.015
61	5.08	0.20	0.116	(0.358)	0.104	0.012
62	5.17	0.20	0.116	(0.356)	0.104	0.012
63	5.25	0.20	0.116	(0.355)	0.104	0.012
64	5.33	0.23	0.135	(0.353)	0.122	0.014
65	5.42	0.23	0.135	(0.351)	0.122	0.014
66	5.50	0.23	0.135	(0.350)	0.122	0.014
67	5.58	0.27	0.155	(0.348)	0.139	0.015
68	5.67	0.27	0.155	(0.347)	0.139	0.015
69	5.75	0.27	0.155	(0.345)	0.139	0.015
70	5.83	0.27	0.155	(0.344)	0.139	0.015
71	5.92	0.27	0.155	(0.342)	0.139	0.015
72	6.00	0.27	0.155	(0.341)	0.139	0.015
73	6.08	0.30	0.174	(0.339)	0.156	0.017
74	6.17	0.30	0.174	(0.338)	0.156	0.017
75	6.25	0.30	0.174	(0.336)	0.156	0.017
76	6.33	0.30	0.174	(0.335)	0.156	0.017
77	6.42	0.30	0.174	(0.333)	0.156	0.017
78	6.50	0.30	0.174	(0.332)	0.156	0.017
79	6.58	0.33	0.193	(0.330)	0.174	0.019
80	6.67	0.33	0.193	(0.329)	0.174	0.019
81	6.75	0.33	0.193	(0.327)	0.174	0.019
82	6.83	0.33	0.193	(0.326)	0.174	0.019
83	6.92	0.33	0.193	(0.324)	0.174	0.019
84	7.00	0.33	0.193	(0.323)	0.174	0.019
85	7.08	0.33	0.193	(0.321)	0.174	0.019
86	7.17	0.33	0.193	(0.320)	0.174	0.019
87	7.25	0.33	0.193	(0.318)	0.174	0.019
88	7.33	0.37	0.213	(0.317)	0.191	0.021
89	7.42	0.37	0.213	(0.316)	0.191	0.021
90	7.50	0.37	0.213	(0.314)	0.191	0.021
91	7.58	0.40	0.232	(0.313)	0.209	0.023
92	7.67	0.40	0.232	(0.311)	0.209	0.023
93	7.75	0.40	0.232	(0.310)	0.209	0.023
94	7.83	0.43	0.251	(0.308)	0.226	0.025

95	7.92	0.43	0.251	(0.307)	0.226	0.025
96	8.00	0.43	0.251	(0.306)	0.226	0.025
97	8.08	0.50	0.290	(0.304)	0.261	0.029
98	8.17	0.50	0.290	(0.303)	0.261	0.029
99	8.25	0.50	0.290	(0.301)	0.261	0.029
100	8.33	0.50	0.290	(0.300)	0.261	0.029
101	8.42	0.50	0.290	(0.298)	0.261	0.029
102	8.50	0.50	0.290	(0.297)	0.261	0.029
103	8.58	0.53	0.309	(0.296)	0.278	0.031
104	8.67	0.53	0.309	(0.294)	0.278	0.031
105	8.75	0.53	0.309	(0.293)	0.278	0.031
106	8.83	0.57	0.328	0.292	(0.296)	0.037
107	8.92	0.57	0.328	0.290	(0.296)	0.038
108	9.00	0.57	0.328	0.289	(0.296)	0.040
109	9.08	0.63	0.367	0.287	(0.330)	0.080
110	9.17	0.63	0.367	0.286	(0.330)	0.081
111	9.25	0.63	0.367	0.285	(0.330)	0.082
112	9.33	0.67	0.386	0.283	(0.348)	0.103
113	9.42	0.67	0.386	0.282	(0.348)	0.104
114	9.50	0.67	0.386	0.281	(0.348)	0.106
115	9.58	0.70	0.406	0.279	(0.365)	0.126
116	9.67	0.70	0.406	0.278	(0.365)	0.128
117	9.75	0.70	0.406	0.277	(0.365)	0.129
118	9.83	0.73	0.425	0.275	(0.383)	0.150
119	9.92	0.73	0.425	0.274	(0.383)	0.151
120	10.00	0.73	0.425	0.273	(0.383)	0.152
121	10.08	0.50	0.290	(0.271)	0.261	0.029
122	10.17	0.50	0.290	(0.270)	0.261	0.029
123	10.25	0.50	0.290	(0.269)	0.261	0.029
124	10.33	0.50	0.290	(0.267)	0.261	0.029
125	10.42	0.50	0.290	(0.266)	0.261	0.029
126	10.50	0.50	0.290	(0.265)	0.261	0.029
127	10.58	0.67	0.386	0.263	(0.348)	0.123
128	10.67	0.67	0.386	0.262	(0.348)	0.124
129	10.75	0.67	0.386	0.261	(0.348)	0.125
130	10.83	0.67	0.386	0.260	(0.348)	0.127
131	10.92	0.67	0.386	0.258	(0.348)	0.128
132	11.00	0.67	0.386	0.257	(0.348)	0.129
133	11.08	0.63	0.367	0.256	(0.330)	0.111
134	11.17	0.63	0.367	0.255	(0.330)	0.113
135	11.25	0.63	0.367	0.253	(0.330)	0.114
136	11.33	0.63	0.367	0.252	(0.330)	0.115
137	11.42	0.63	0.367	0.251	(0.330)	0.116
138	11.50	0.63	0.367	0.250	(0.330)	0.118
139	11.58	0.57	0.328	0.248	(0.296)	0.080
140	11.67	0.57	0.328	0.247	(0.296)	0.081
141	11.75	0.57	0.328	0.246	(0.296)	0.083
142	11.83	0.60	0.348	0.245	(0.313)	0.103
143	11.92	0.60	0.348	0.243	(0.313)	0.104
144	12.00	0.60	0.348	0.242	(0.313)	0.106
145	12.08	0.83	0.483	0.241	(0.435)	0.242
146	12.17	0.83	0.483	0.240	(0.435)	0.243
147	12.25	0.83	0.483	0.239	(0.435)	0.244
148	12.33	0.87	0.502	0.237	(0.452)	0.265

149	12.42	0.87	0.502	0.236	(0.452)	0.266
150	12.50	0.87	0.502	0.235	(0.452)	0.267
151	12.58	0.93	0.541	0.234	(0.487)	0.307
152	12.67	0.93	0.541	0.233	(0.487)	0.308
153	12.75	0.93	0.541	0.231	(0.487)	0.309
154	12.83	0.97	0.560	0.230	(0.504)	0.330
155	12.92	0.97	0.560	0.229	(0.504)	0.331
156	13.00	0.97	0.560	0.228	(0.504)	0.332
157	13.08	1.13	0.657	0.227	(0.591)	0.430
158	13.17	1.13	0.657	0.226	(0.591)	0.431
159	13.25	1.13	0.657	0.225	(0.591)	0.432
160	13.33	1.13	0.657	0.223	(0.591)	0.433
161	13.42	1.13	0.657	0.222	(0.591)	0.435
162	13.50	1.13	0.657	0.221	(0.591)	0.436
163	13.58	0.77	0.444	0.220	(0.400)	0.224
164	13.67	0.77	0.444	0.219	(0.400)	0.225
165	13.75	0.77	0.444	0.218	(0.400)	0.227
166	13.83	0.77	0.444	0.217	(0.400)	0.228
167	13.92	0.77	0.444	0.216	(0.400)	0.229
168	14.00	0.77	0.444	0.214	(0.400)	0.230
169	14.08	0.90	0.522	0.213	(0.469)	0.308
170	14.17	0.90	0.522	0.212	(0.469)	0.309
171	14.25	0.90	0.522	0.211	(0.469)	0.310
172	14.33	0.87	0.502	0.210	(0.452)	0.292
173	14.42	0.87	0.502	0.209	(0.452)	0.293
174	14.50	0.87	0.502	0.208	(0.452)	0.294
175	14.58	0.87	0.502	0.207	(0.452)	0.295
176	14.67	0.87	0.502	0.206	(0.452)	0.296
177	14.75	0.87	0.502	0.205	(0.452)	0.298
178	14.83	0.83	0.483	0.204	(0.435)	0.279
179	14.92	0.83	0.483	0.203	(0.435)	0.280
180	15.00	0.83	0.483	0.202	(0.435)	0.281
181	15.08	0.80	0.464	0.201	(0.417)	0.263
182	15.17	0.80	0.464	0.200	(0.417)	0.264
183	15.25	0.80	0.464	0.199	(0.417)	0.265
184	15.33	0.77	0.444	0.198	(0.400)	0.247
185	15.42	0.77	0.444	0.197	(0.400)	0.248
186	15.50	0.77	0.444	0.196	(0.400)	0.249
187	15.58	0.63	0.367	0.195	(0.330)	0.173
188	15.67	0.63	0.367	0.194	(0.330)	0.174
189	15.75	0.63	0.367	0.193	(0.330)	0.175
190	15.83	0.63	0.367	0.192	(0.330)	0.176
191	15.92	0.63	0.367	0.191	(0.330)	0.177
192	16.00	0.63	0.367	0.190	(0.330)	0.177
193	16.08	0.13	0.077	(0.189)	0.070	0.008
194	16.17	0.13	0.077	(0.188)	0.070	0.008
195	16.25	0.13	0.077	(0.187)	0.070	0.008
196	16.33	0.13	0.077	(0.186)	0.070	0.008
197	16.42	0.13	0.077	(0.185)	0.070	0.008
198	16.50	0.13	0.077	(0.184)	0.070	0.008
199	16.58	0.10	0.058	(0.183)	0.052	0.006
200	16.67	0.10	0.058	(0.182)	0.052	0.006
201	16.75	0.10	0.058	(0.181)	0.052	0.006
202	16.83	0.10	0.058	(0.180)	0.052	0.006

203	16.92	0.10	0.058	(0.179)	0.052	0.006
204	17.00	0.10	0.058	(0.178)	0.052	0.006
205	17.08	0.17	0.097	(0.177)	0.087	0.010
206	17.17	0.17	0.097	(0.177)	0.087	0.010
207	17.25	0.17	0.097	(0.176)	0.087	0.010
208	17.33	0.17	0.097	(0.175)	0.087	0.010
209	17.42	0.17	0.097	(0.174)	0.087	0.010
210	17.50	0.17	0.097	(0.173)	0.087	0.010
211	17.58	0.17	0.097	(0.172)	0.087	0.010
212	17.67	0.17	0.097	(0.171)	0.087	0.010
213	17.75	0.17	0.097	(0.170)	0.087	0.010
214	17.83	0.13	0.077	(0.170)	0.070	0.008
215	17.92	0.13	0.077	(0.169)	0.070	0.008
216	18.00	0.13	0.077	(0.168)	0.070	0.008
217	18.08	0.13	0.077	(0.167)	0.070	0.008
218	18.17	0.13	0.077	(0.166)	0.070	0.008
219	18.25	0.13	0.077	(0.165)	0.070	0.008
220	18.33	0.13	0.077	(0.165)	0.070	0.008
221	18.42	0.13	0.077	(0.164)	0.070	0.008
222	18.50	0.13	0.077	(0.163)	0.070	0.008
223	18.58	0.10	0.058	(0.162)	0.052	0.006
224	18.67	0.10	0.058	(0.161)	0.052	0.006
225	18.75	0.10	0.058	(0.161)	0.052	0.006
226	18.83	0.07	0.039	(0.160)	0.035	0.004
227	18.92	0.07	0.039	(0.159)	0.035	0.004
228	19.00	0.07	0.039	(0.158)	0.035	0.004
229	19.08	0.10	0.058	(0.158)	0.052	0.006
230	19.17	0.10	0.058	(0.157)	0.052	0.006
231	19.25	0.10	0.058	(0.156)	0.052	0.006
232	19.33	0.13	0.077	(0.155)	0.070	0.008
233	19.42	0.13	0.077	(0.155)	0.070	0.008
234	19.50	0.13	0.077	(0.154)	0.070	0.008
235	19.58	0.10	0.058	(0.153)	0.052	0.006
236	19.67	0.10	0.058	(0.153)	0.052	0.006
237	19.75	0.10	0.058	(0.152)	0.052	0.006
238	19.83	0.07	0.039	(0.151)	0.035	0.004
239	19.92	0.07	0.039	(0.151)	0.035	0.004
240	20.00	0.07	0.039	(0.150)	0.035	0.004
241	20.08	0.10	0.058	(0.149)	0.052	0.006
242	20.17	0.10	0.058	(0.149)	0.052	0.006
243	20.25	0.10	0.058	(0.148)	0.052	0.006
244	20.33	0.10	0.058	(0.147)	0.052	0.006
245	20.42	0.10	0.058	(0.147)	0.052	0.006
246	20.50	0.10	0.058	(0.146)	0.052	0.006
247	20.58	0.10	0.058	(0.145)	0.052	0.006
248	20.67	0.10	0.058	(0.145)	0.052	0.006
249	20.75	0.10	0.058	(0.144)	0.052	0.006
250	20.83	0.07	0.039	(0.144)	0.035	0.004
251	20.92	0.07	0.039	(0.143)	0.035	0.004
252	21.00	0.07	0.039	(0.142)	0.035	0.004
253	21.08	0.10	0.058	(0.142)	0.052	0.006
254	21.17	0.10	0.058	(0.141)	0.052	0.006
255	21.25	0.10	0.058	(0.141)	0.052	0.006
256	21.33	0.07	0.039	(0.140)	0.035	0.004

257	21.42	0.07	0.039	(0.140)	0.035	0.004
258	21.50	0.07	0.039	(0.139)	0.035	0.004
259	21.58	0.10	0.058	(0.139)	0.052	0.006
260	21.67	0.10	0.058	(0.138)	0.052	0.006
261	21.75	0.10	0.058	(0.138)	0.052	0.006
262	21.83	0.07	0.039	(0.137)	0.035	0.004
263	21.92	0.07	0.039	(0.137)	0.035	0.004
264	22.00	0.07	0.039	(0.136)	0.035	0.004
265	22.08	0.10	0.058	(0.136)	0.052	0.006
266	22.17	0.10	0.058	(0.135)	0.052	0.006
267	22.25	0.10	0.058	(0.135)	0.052	0.006
268	22.33	0.07	0.039	(0.135)	0.035	0.004
269	22.42	0.07	0.039	(0.134)	0.035	0.004
270	22.50	0.07	0.039	(0.134)	0.035	0.004
271	22.58	0.07	0.039	(0.133)	0.035	0.004
272	22.67	0.07	0.039	(0.133)	0.035	0.004
273	22.75	0.07	0.039	(0.133)	0.035	0.004
274	22.83	0.07	0.039	(0.132)	0.035	0.004
275	22.92	0.07	0.039	(0.132)	0.035	0.004
276	23.00	0.07	0.039	(0.132)	0.035	0.004
277	23.08	0.07	0.039	(0.131)	0.035	0.004
278	23.17	0.07	0.039	(0.131)	0.035	0.004
279	23.25	0.07	0.039	(0.131)	0.035	0.004
280	23.33	0.07	0.039	(0.130)	0.035	0.004
281	23.42	0.07	0.039	(0.130)	0.035	0.004
282	23.50	0.07	0.039	(0.130)	0.035	0.004
283	23.58	0.07	0.039	(0.130)	0.035	0.004
284	23.67	0.07	0.039	(0.130)	0.035	0.004
285	23.75	0.07	0.039	(0.129)	0.035	0.004
286	23.83	0.07	0.039	(0.129)	0.035	0.004
287	23.92	0.07	0.039	(0.129)	0.035	0.004
288	24.00	0.07	0.039	(0.129)	0.035	0.004

(Loss Rate Not Used)

Sum = 100.0 Sum = 19.2

Flood volume = Effective rainfall 1.60(In)
times area 8.0(Ac.)/[(In)/(Ft.)] = 1.1(Ac.Ft)
Total soil loss = 3.23(In)
Total soil loss = 2.157(Ac.Ft)
Total rainfall = 4.83(In)
Flood volume = 46638.9 Cubic Feet
Total soil loss = 93972.8 Cubic Feet

Peak flow rate of this hydrograph = 3.165(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

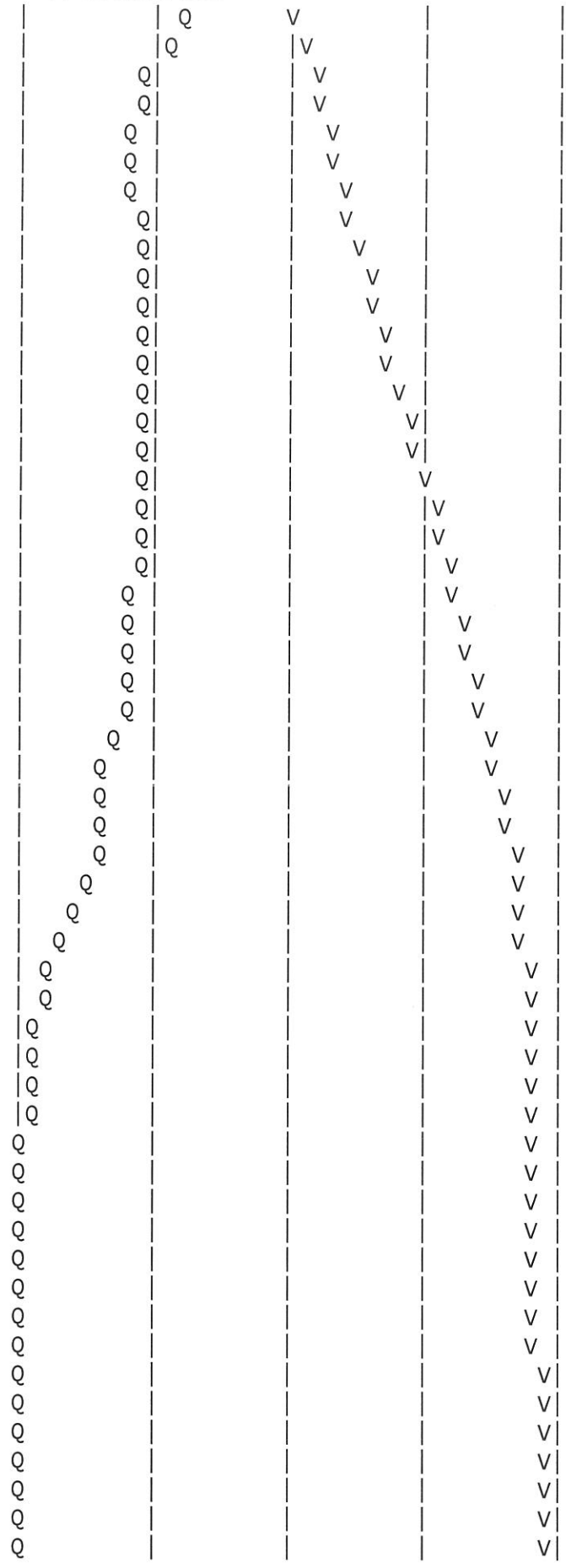
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0000	0.00	Q	|	|	|	|

0+10	0.0000	0.00	Q				
0+15	0.0001	0.01	Q				
0+20	0.0002	0.02	Q				
0+25	0.0004	0.02	Q				
0+30	0.0006	0.03	Q				
0+35	0.0008	0.03	Q				
0+40	0.0010	0.04	Q				
0+45	0.0013	0.04	Q				
0+50	0.0016	0.04	Q				
0+55	0.0018	0.04	Q				
1+ 0	0.0022	0.05	Q				
1+ 5	0.0025	0.05	Q				
1+10	0.0029	0.05	Q				
1+15	0.0032	0.05	Q				
1+20	0.0035	0.05	Q				
1+25	0.0038	0.05	Q				
1+30	0.0042	0.05	Q				
1+35	0.0045	0.05	Q				
1+40	0.0048	0.05	Q				
1+45	0.0051	0.05	Q				
1+50	0.0055	0.05	Q				
1+55	0.0058	0.05	Q				
2+ 0	0.0061	0.05	Q				
2+ 5	0.0065	0.05	Q				
2+10	0.0069	0.06	Q				
2+15	0.0073	0.06	Q				
2+20	0.0077	0.06	Q				
2+25	0.0081	0.06	Q				
2+30	0.0086	0.06	Q				
2+35	0.0090	0.06	Q				
2+40	0.0094	0.06	Q				
2+45	0.0099	0.07	Q				
2+50	0.0103	0.07	Q				
2+55	0.0108	0.07	Q				
3+ 0	0.0113	0.07	Q				
3+ 5	0.0118	0.07	Q				
3+10	0.0124	0.07	Q				
3+15	0.0129	0.07	Q				
3+20	0.0134	0.08	Q				
3+25	0.0139	0.08	Q				
3+30	0.0144	0.08	Q				
3+35	0.0150	0.08	Q				
3+40	0.0155	0.08	Q				
3+45	0.0160	0.08	Q				
3+50	0.0166	0.08	Q				
3+55	0.0171	0.08	Q				
4+ 0	0.0177	0.08	Q				
4+ 5	0.0183	0.09	Q				
4+10	0.0189	0.09	Q				
4+15	0.0195	0.09	Q				
4+20	0.0201	0.09	Q				
4+25	0.0207	0.09	Q				
4+30	0.0214	0.10	Q				
4+35	0.0221	0.10	Q				

4+40	0.0228	0.10	Q				
4+45	0.0235	0.10	Q				
4+50	0.0242	0.10	Q				
4+55	0.0250	0.11	Q				
5+ 0	0.0257	0.11	Q				
5+ 5	0.0265	0.11	Q				
5+10	0.0273	0.11	QV				
5+15	0.0280	0.11	QV				
5+20	0.0287	0.10	QV				
5+25	0.0294	0.10	QV				
5+30	0.0302	0.10	QV				
5+35	0.0309	0.11	QV				
5+40	0.0316	0.11	QV				
5+45	0.0324	0.11	QV				
5+50	0.0332	0.12	QV				
5+55	0.0340	0.12	QV				
6+ 0	0.0349	0.12	QV				
6+ 5	0.0357	0.12	QV				
6+10	0.0365	0.12	QV				
6+15	0.0374	0.13	QV				
6+20	0.0383	0.13	QV				
6+25	0.0392	0.13	QV				
6+30	0.0402	0.13	QV				
6+35	0.0411	0.14	QV				
6+40	0.0421	0.14	QV				
6+45	0.0430	0.14	QV				
6+50	0.0440	0.15	QV				
6+55	0.0451	0.15	QV				
7+ 0	0.0461	0.15	QV				
7+ 5	0.0471	0.15	QV				
7+10	0.0482	0.15	QV				
7+15	0.0492	0.15	QV				
7+20	0.0503	0.15	QV				
7+25	0.0513	0.16	QV				
7+30	0.0524	0.16	QV				
7+35	0.0536	0.16	Q V				
7+40	0.0547	0.17	Q V				
7+45	0.0559	0.17	Q V				
7+50	0.0571	0.18	Q V				
7+55	0.0583	0.18	Q V				
8+ 0	0.0596	0.18	Q V				
8+ 5	0.0609	0.19	Q V				
8+10	0.0623	0.20	Q V				
8+15	0.0637	0.20	Q V				
8+20	0.0651	0.21	Q V				
8+25	0.0666	0.22	Q V				
8+30	0.0681	0.22	Q V				
8+35	0.0697	0.22	Q V				
8+40	0.0712	0.23	Q V				
8+45	0.0728	0.23	Q V				
8+50	0.0745	0.24	Q V				
8+55	0.0762	0.25	Q V				
9+ 0	0.0779	0.26	|QV				
9+ 5	0.0799	0.28	|QV				

9+10	0.0821	0.33	Q V				
9+15	0.0848	0.40	Q V				
9+20	0.0881	0.47	Q V				
9+25	0.0919	0.54	QV				
9+30	0.0960	0.61	QV				
9+35	0.1006	0.67	QV				
9+40	0.1056	0.73	QV				
9+45	0.1110	0.79	QV				
9+50	0.1169	0.85	QV				
9+55	0.1231	0.91	QV				
10+ 0	0.1298	0.97	QV				
10+ 5	0.1367	1.00	Q V				
10+10	0.1432	0.94	Q V				
10+15	0.1486	0.79	Q V				
10+20	0.1527	0.61	Q V				
10+25	0.1562	0.49	Q V				
10+30	0.1591	0.43	Q V				
10+35	0.1620	0.42	Q V				
10+40	0.1653	0.47	Q V				
10+45	0.1694	0.59	Q V				
10+50	0.1744	0.73	Q V				
10+55	0.1800	0.82	Q V				
11+ 0	0.1860	0.87	Q V				
11+ 5	0.1922	0.90	Q V				
11+10	0.1985	0.91	Q V				
11+15	0.2048	0.91	Q V				
11+20	0.2110	0.90	Q V				
11+25	0.2172	0.90	Q V				
11+30	0.2234	0.90	Q V				
11+35	0.2296	0.90	Q V				
11+40	0.2357	0.88	Q V				
11+45	0.2414	0.83	Q V				
11+50	0.2468	0.78	Q V				
11+55	0.2521	0.77	Q V				
12+ 0	0.2574	0.78	Q V				
12+ 5	0.2632	0.84	Q V				
12+10	0.2699	0.97	Q V				
12+15	0.2780	1.18	Q V				
12+20	0.2878	1.41	Q V				
12+25	0.2987	1.58	Q V				
12+30	0.3104	1.70	Q V				
12+35	0.3229	1.81	Q V				
12+40	0.3360	1.91	Q V				
12+45	0.3500	2.02	Q V				
12+50	0.3647	2.14	Q V				
12+55	0.3800	2.23	Q V				
13+ 0	0.3959	2.31	Q V				
13+ 5	0.4125	2.41	Q V				
13+10	0.4301	2.55	Q V				
13+15	0.4489	2.73	Q V				
13+20	0.4691	2.93	Q V				
13+25	0.4902	3.06	Q V				
13+30	0.5119	3.15	Q V				
13+35	0.5337	3.16	Q V				

13+40	0.5546	3.04	
13+45	0.5737	2.77	
13+50	0.5906	2.46	
13+55	0.6063	2.28	
14+ 0	0.6213	2.18	
14+ 5	0.6361	2.14	
14+10	0.6510	2.17	
14+15	0.6665	2.25	
14+20	0.6827	2.35	
14+25	0.6992	2.40	
14+30	0.7158	2.40	
14+35	0.7323	2.39	
14+40	0.7487	2.39	
14+45	0.7652	2.39	
14+50	0.7817	2.39	
14+55	0.7981	2.38	
15+ 0	0.8144	2.36	
15+ 5	0.8304	2.33	
15+10	0.8462	2.30	
15+15	0.8618	2.26	
15+20	0.8771	2.23	
15+25	0.8922	2.19	
15+30	0.9070	2.15	
15+35	0.9215	2.10	
15+40	0.9353	2.01	
15+45	0.9482	1.88	
15+50	0.9602	1.75	
15+55	0.9717	1.66	
16+ 0	0.9828	1.62	
16+ 5	0.9935	1.55	
16+10	1.0030	1.38	
16+15	1.0107	1.12	
16+20	1.0164	0.82	
16+25	1.0207	0.63	
16+30	1.0243	0.52	
16+35	1.0273	0.44	
16+40	1.0299	0.38	
16+45	1.0322	0.33	
16+50	1.0341	0.28	
16+55	1.0358	0.24	
17+ 0	1.0373	0.21	
17+ 5	1.0386	0.19	
17+10	1.0397	0.17	
17+15	1.0408	0.16	
17+20	1.0419	0.15	
17+25	1.0428	0.14	
17+30	1.0437	0.13	
17+35	1.0445	0.12	
17+40	1.0453	0.11	
17+45	1.0460	0.10	
17+50	1.0467	0.10	
17+55	1.0473	0.09	
18+ 0	1.0479	0.08	
18+ 5	1.0484	0.08	

18+10	1.0489	0.07	Q	|	|	|	V|
18+15	1.0493	0.07	Q	|	|	|	V|
18+20	1.0498	0.06	Q	|	|	|	V|
18+25	1.0502	0.06	Q	|	|	|	V|
18+30	1.0507	0.06	Q	|	|	|	V|
18+35	1.0511	0.06	Q	|	|	|	V|
18+40	1.0515	0.06	Q	|	|	|	V|
18+45	1.0519	0.06	Q	|	|	|	V|
18+50	1.0523	0.05	Q	|	|	|	V|
18+55	1.0527	0.05	Q	|	|	|	V|
19+ 0	1.0530	0.05	Q	|	|	|	V|
19+ 5	1.0533	0.04	Q	|	|	|	V|
19+10	1.0536	0.04	Q	|	|	|	V|
19+15	1.0539	0.04	Q	|	|	|	V|
19+20	1.0542	0.05	Q	|	|	|	V|
19+25	1.0545	0.05	Q	|	|	|	V|
19+30	1.0549	0.05	Q	|	|	|	V|
19+35	1.0553	0.05	Q	|	|	|	V|
19+40	1.0557	0.06	Q	|	|	|	V|
19+45	1.0560	0.05	Q	|	|	|	V|
19+50	1.0564	0.05	Q	|	|	|	V|
19+55	1.0567	0.05	Q	|	|	|	V|
20+ 0	1.0570	0.04	Q	|	|	|	V|
20+ 5	1.0573	0.04	Q	|	|	|	V|
20+10	1.0575	0.04	Q	|	|	|	V|
20+15	1.0578	0.04	Q	|	|	|	V|
20+20	1.0581	0.04	Q	|	|	|	V|
20+25	1.0584	0.04	Q	|	|	|	V|
20+30	1.0588	0.05	Q	|	|	|	V|
20+35	1.0591	0.05	Q	|	|	|	V|
20+40	1.0594	0.05	Q	|	|	|	V|
20+45	1.0597	0.05	Q	|	|	|	V|
20+50	1.0600	0.05	Q	|	|	|	V|
20+55	1.0603	0.04	Q	|	|	|	V|
21+ 0	1.0606	0.04	Q	|	|	|	V|
21+ 5	1.0609	0.04	Q	|	|	|	V|
21+10	1.0611	0.04	Q	|	|	|	V|
21+15	1.0614	0.04	Q	|	|	|	V|
21+20	1.0617	0.04	Q	|	|	|	V|
21+25	1.0620	0.04	Q	|	|	|	V|
21+30	1.0623	0.04	Q	|	|	|	V|
21+35	1.0625	0.04	Q	|	|	|	V|
21+40	1.0628	0.04	Q	|	|	|	V|
21+45	1.0631	0.04	Q	|	|	|	V|
21+50	1.0634	0.04	Q	|	|	|	V|
21+55	1.0636	0.04	Q	|	|	|	V|
22+ 0	1.0639	0.04	Q	|	|	|	V|
22+ 5	1.0642	0.04	Q	|	|	|	V|
22+10	1.0644	0.04	Q	|	|	|	V|
22+15	1.0647	0.04	Q	|	|	|	V|
22+20	1.0650	0.04	Q	|	|	|	V|
22+25	1.0653	0.04	Q	|	|	|	V|
22+30	1.0655	0.04	Q	|	|	|	V|
22+35	1.0658	0.04	Q	|	|	|	V|

22+40	1.0660	0.03	Q	|	|	|	V|
22+45	1.0663	0.03	Q	|	|	|	V|
22+50	1.0665	0.03	Q	|	|	|	V|
22+55	1.0667	0.03	Q	|	|	|	V|
23+ 0	1.0669	0.03	Q	|	|	|	V|
23+ 5	1.0672	0.03	Q	|	|	|	V|
23+10	1.0674	0.03	Q	|	|	|	V|
23+15	1.0676	0.03	Q	|	|	|	V|
23+20	1.0678	0.03	Q	|	|	|	V|
23+25	1.0681	0.03	Q	|	|	|	V|
23+30	1.0683	0.03	Q	|	|	|	V|
23+35	1.0685	0.03	Q	|	|	|	V|
23+40	1.0687	0.03	Q	|	|	|	V|
23+45	1.0689	0.03	Q	|	|	|	V|
23+50	1.0692	0.03	Q	|	|	|	V|
23+55	1.0694	0.03	Q	|	|	|	V|
24+ 0	1.0696	0.03	Q	|	|	|	V|
24+ 5	1.0698	0.03	Q	|	|	|	V|
24+10	1.0700	0.03	Q	|	|	|	V|
24+15	1.0701	0.02	Q	|	|	|	V|
24+20	1.0702	0.02	Q	|	|	|	V|
24+25	1.0703	0.01	Q	|	|	|	V|
24+30	1.0704	0.01	Q	|	|	|	V|
24+35	1.0704	0.01	Q	|	|	|	V|
24+40	1.0705	0.01	Q	|	|	|	V|
24+45	1.0705	0.01	Q	|	|	|	V|
24+50	1.0705	0.00	Q	|	|	|	V|
24+55	1.0706	0.00	Q	|	|	|	V|
25+ 0	1.0706	0.00	Q	|	|	|	V|
25+ 5	1.0706	0.00	Q	|	|	|	V|
25+10	1.0706	0.00	Q	|	|	|	V|
25+15	1.0706	0.00	Q	|	|	|	V|
25+20	1.0706	0.00	Q	|	|	|	V|
25+25	1.0706	0.00	Q	|	|	|	V|
25+30	1.0707	0.00	Q	|	|	|	V|
25+35	1.0707	0.00	Q	|	|	|	V|
25+40	1.0707	0.00	Q	|	|	|	V|
25+45	1.0707	0.00	Q	|	|	|	V|
25+50	1.0707	0.00	Q	|	|	|	V|
25+55	1.0707	0.00	Q	|	|	|	V|
26+ 0	1.0707	0.00	Q	|	|	|	V|
26+ 5	1.0707	0.00	Q	|	|	|	V|
26+10	1.0707	0.00	Q	|	|	|	V

D

Appendix D

UNIT HYDROGRAPH AND FLOOD HYDROGRAPH ROUTING CALCULATIONS - BASIN #1 DEVELOPED CONDITION 1. Q100 / 24 HR DURATION STORM

MDS CONSULTING
MORSE SCHULTZ
17320 Redhill Ave.
Suite 350
Irvine, CA 92614
Voice: 949-251-8821
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PLANNERS ENGINEERS SURVEYORS

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2012, Version 8.2
Study date 05/05/22 File: 1Post9260024100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6328

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Post Development
100-yr / 24-hr Storm

Drainage Area = 8.02(Ac.) = 0.013 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 8.02(Ac.) = 0.013 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.205 Hr.
Lag time = 12.30 Min.
25% of lag time = 3.07 Min.
40% of lag time = 4.92 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
8.02	1.96	15.72

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
8.02	4.83	38.74

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.960(In)
Area Averaged 100-Year Rainfall = 4.830(In)

Point rain (area averaged) = 4.830(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 4.830(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
2.640	56.00	0.100
5.380	56.00	1.000

Total Area Entered = 8.02(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
56.0	74.8	0.305	0.100	0.278	0.329	0.091
56.0	74.8	0.305	1.000	0.031	0.671	0.020
					Sum (F) =	0.112

Area averaged mean soil loss (F) (In/Hr) = 0.112
Minimum soil loss rate ((In/Hr)) = 0.056
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.340

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	40.650	4.463	0.361
2	0.167	81.301	18.402	1.487
3	0.250	121.951	27.090	2.190
4	0.333	162.602	17.125	1.384
5	0.417	203.252	8.345	0.675
6	0.500	243.902	5.316	0.430
7	0.583	284.553	3.987	0.322
8	0.667	325.203	3.029	0.245
9	0.750	365.854	2.425	0.196
10	0.833	406.504	1.903	0.154
11	0.917	447.154	1.473	0.119
12	1.000	487.805	1.266	0.102
13	1.083	528.455	1.140	0.092
14	1.167	569.106	0.891	0.072
15	1.250	609.756	0.750	0.061
16	1.333	650.407	0.616	0.050
17	1.417	691.057	0.486	0.039
18	1.500	731.707	0.407	0.033
19	1.583	772.358	0.407	0.033
20	1.667	813.008	0.480	0.039

Sum = 100.000 Sum= 8.083

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.039	(0.198)	0.013	0.026
2	0.17	0.07	0.039	(0.198)	0.013	0.026
3	0.25	0.07	0.039	(0.197)	0.013	0.026
4	0.33	0.10	0.058	(0.196)	0.020	0.038
5	0.42	0.10	0.058	(0.195)	0.020	0.038
6	0.50	0.10	0.058	(0.195)	0.020	0.038
7	0.58	0.10	0.058	(0.194)	0.020	0.038
8	0.67	0.10	0.058	(0.193)	0.020	0.038
9	0.75	0.10	0.058	(0.192)	0.020	0.038
10	0.83	0.13	0.077	(0.192)	0.026	0.051
11	0.92	0.13	0.077	(0.191)	0.026	0.051
12	1.00	0.13	0.077	(0.190)	0.026	0.051
13	1.08	0.10	0.058	(0.189)	0.020	0.038
14	1.17	0.10	0.058	(0.189)	0.020	0.038
15	1.25	0.10	0.058	(0.188)	0.020	0.038
16	1.33	0.10	0.058	(0.187)	0.020	0.038
17	1.42	0.10	0.058	(0.186)	0.020	0.038
18	1.50	0.10	0.058	(0.186)	0.020	0.038
19	1.58	0.10	0.058	(0.185)	0.020	0.038
20	1.67	0.10	0.058	(0.184)	0.020	0.038
21	1.75	0.10	0.058	(0.183)	0.020	0.038
22	1.83	0.13	0.077	(0.183)	0.026	0.051
23	1.92	0.13	0.077	(0.182)	0.026	0.051
24	2.00	0.13	0.077	(0.181)	0.026	0.051
25	2.08	0.13	0.077	(0.180)	0.026	0.051
26	2.17	0.13	0.077	(0.180)	0.026	0.051
27	2.25	0.13	0.077	(0.179)	0.026	0.051
28	2.33	0.13	0.077	(0.178)	0.026	0.051
29	2.42	0.13	0.077	(0.178)	0.026	0.051
30	2.50	0.13	0.077	(0.177)	0.026	0.051
31	2.58	0.17	0.097	(0.176)	0.033	0.064
32	2.67	0.17	0.097	(0.175)	0.033	0.064
33	2.75	0.17	0.097	(0.175)	0.033	0.064
34	2.83	0.17	0.097	(0.174)	0.033	0.064
35	2.92	0.17	0.097	(0.173)	0.033	0.064
36	3.00	0.17	0.097	(0.172)	0.033	0.064
37	3.08	0.17	0.097	(0.172)	0.033	0.064
38	3.17	0.17	0.097	(0.171)	0.033	0.064
39	3.25	0.17	0.097	(0.170)	0.033	0.064
40	3.33	0.17	0.097	(0.170)	0.033	0.064
41	3.42	0.17	0.097	(0.169)	0.033	0.064
42	3.50	0.17	0.097	(0.168)	0.033	0.064
43	3.58	0.17	0.097	(0.168)	0.033	0.064
44	3.67	0.17	0.097	(0.167)	0.033	0.064
45	3.75	0.17	0.097	(0.166)	0.033	0.064

46	3.83	0.20	0.116	(0.165)	0.039	0.077
47	3.92	0.20	0.116	(0.165)	0.039	0.077
48	4.00	0.20	0.116	(0.164)	0.039	0.077
49	4.08	0.20	0.116	(0.163)	0.039	0.077
50	4.17	0.20	0.116	(0.163)	0.039	0.077
51	4.25	0.20	0.116	(0.162)	0.039	0.077
52	4.33	0.23	0.135	(0.161)	0.046	0.089
53	4.42	0.23	0.135	(0.161)	0.046	0.089
54	4.50	0.23	0.135	(0.160)	0.046	0.089
55	4.58	0.23	0.135	(0.159)	0.046	0.089
56	4.67	0.23	0.135	(0.159)	0.046	0.089
57	4.75	0.23	0.135	(0.158)	0.046	0.089
58	4.83	0.27	0.155	(0.157)	0.053	0.102
59	4.92	0.27	0.155	(0.156)	0.053	0.102
60	5.00	0.27	0.155	(0.156)	0.053	0.102
61	5.08	0.20	0.116	(0.155)	0.039	0.077
62	5.17	0.20	0.116	(0.154)	0.039	0.077
63	5.25	0.20	0.116	(0.154)	0.039	0.077
64	5.33	0.23	0.135	(0.153)	0.046	0.089
65	5.42	0.23	0.135	(0.152)	0.046	0.089
66	5.50	0.23	0.135	(0.152)	0.046	0.089
67	5.58	0.27	0.155	(0.151)	0.053	0.102
68	5.67	0.27	0.155	(0.150)	0.053	0.102
69	5.75	0.27	0.155	(0.150)	0.053	0.102
70	5.83	0.27	0.155	(0.149)	0.053	0.102
71	5.92	0.27	0.155	(0.148)	0.053	0.102
72	6.00	0.27	0.155	(0.148)	0.053	0.102
73	6.08	0.30	0.174	(0.147)	0.059	0.115
74	6.17	0.30	0.174	(0.146)	0.059	0.115
75	6.25	0.30	0.174	(0.146)	0.059	0.115
76	6.33	0.30	0.174	(0.145)	0.059	0.115
77	6.42	0.30	0.174	(0.145)	0.059	0.115
78	6.50	0.30	0.174	(0.144)	0.059	0.115
79	6.58	0.33	0.193	(0.143)	0.066	0.128
80	6.67	0.33	0.193	(0.143)	0.066	0.128
81	6.75	0.33	0.193	(0.142)	0.066	0.128
82	6.83	0.33	0.193	(0.141)	0.066	0.128
83	6.92	0.33	0.193	(0.141)	0.066	0.128
84	7.00	0.33	0.193	(0.140)	0.066	0.128
85	7.08	0.33	0.193	(0.139)	0.066	0.128
86	7.17	0.33	0.193	(0.139)	0.066	0.128
87	7.25	0.33	0.193	(0.138)	0.066	0.128
88	7.33	0.37	0.213	(0.137)	0.072	0.140
89	7.42	0.37	0.213	(0.137)	0.072	0.140
90	7.50	0.37	0.213	(0.136)	0.072	0.140
91	7.58	0.40	0.232	(0.136)	0.079	0.153
92	7.67	0.40	0.232	(0.135)	0.079	0.153
93	7.75	0.40	0.232	(0.134)	0.079	0.153
94	7.83	0.43	0.251	(0.134)	0.085	0.166
95	7.92	0.43	0.251	(0.133)	0.085	0.166
96	8.00	0.43	0.251	(0.132)	0.085	0.166
97	8.08	0.50	0.290	(0.132)	0.099	0.191
98	8.17	0.50	0.290	(0.131)	0.099	0.191
99	8.25	0.50	0.290	(0.131)	0.099	0.191

100	8.33	0.50	0.290	(0.130)	0.099	0.191
101	8.42	0.50	0.290	(0.129)	0.099	0.191
102	8.50	0.50	0.290	(0.129)	0.099	0.191
103	8.58	0.53	0.309	(0.128)	0.105	0.204
104	8.67	0.53	0.309	(0.128)	0.105	0.204
105	8.75	0.53	0.309	(0.127)	0.105	0.204
106	8.83	0.57	0.328	(0.126)	0.112	0.217
107	8.92	0.57	0.328	(0.126)	0.112	0.217
108	9.00	0.57	0.328	(0.125)	0.112	0.217
109	9.08	0.63	0.367	0.125	(0.125)	0.242
110	9.17	0.63	0.367	0.124	(0.125)	0.243
111	9.25	0.63	0.367	0.123	(0.125)	0.244
112	9.33	0.67	0.386	0.123	(0.131)	0.264
113	9.42	0.67	0.386	0.122	(0.131)	0.264
114	9.50	0.67	0.386	0.122	(0.131)	0.265
115	9.58	0.70	0.406	0.121	(0.138)	0.285
116	9.67	0.70	0.406	0.121	(0.138)	0.285
117	9.75	0.70	0.406	0.120	(0.138)	0.286
118	9.83	0.73	0.425	0.119	(0.145)	0.306
119	9.92	0.73	0.425	0.119	(0.145)	0.306
120	10.00	0.73	0.425	0.118	(0.145)	0.307
121	10.08	0.50	0.290	(0.118)	0.099	0.191
122	10.17	0.50	0.290	(0.117)	0.099	0.191
123	10.25	0.50	0.290	(0.117)	0.099	0.191
124	10.33	0.50	0.290	(0.116)	0.099	0.191
125	10.42	0.50	0.290	(0.115)	0.099	0.191
126	10.50	0.50	0.290	(0.115)	0.099	0.191
127	10.58	0.67	0.386	0.114	(0.131)	0.272
128	10.67	0.67	0.386	0.114	(0.131)	0.273
129	10.75	0.67	0.386	0.113	(0.131)	0.273
130	10.83	0.67	0.386	0.113	(0.131)	0.274
131	10.92	0.67	0.386	0.112	(0.131)	0.274
132	11.00	0.67	0.386	0.111	(0.131)	0.275
133	11.08	0.63	0.367	0.111	(0.125)	0.256
134	11.17	0.63	0.367	0.110	(0.125)	0.257
135	11.25	0.63	0.367	0.110	(0.125)	0.257
136	11.33	0.63	0.367	0.109	(0.125)	0.258
137	11.42	0.63	0.367	0.109	(0.125)	0.258
138	11.50	0.63	0.367	0.108	(0.125)	0.259
139	11.58	0.57	0.328	0.108	(0.112)	0.221
140	11.67	0.57	0.328	0.107	(0.112)	0.221
141	11.75	0.57	0.328	0.107	(0.112)	0.222
142	11.83	0.60	0.348	0.106	(0.118)	0.242
143	11.92	0.60	0.348	0.106	(0.118)	0.242
144	12.00	0.60	0.348	0.105	(0.118)	0.243
145	12.08	0.83	0.483	0.105	(0.164)	0.378
146	12.17	0.83	0.483	0.104	(0.164)	0.379
147	12.25	0.83	0.483	0.103	(0.164)	0.380
148	12.33	0.87	0.502	0.103	(0.171)	0.399
149	12.42	0.87	0.502	0.102	(0.171)	0.400
150	12.50	0.87	0.502	0.102	(0.171)	0.400
151	12.58	0.93	0.541	0.101	(0.184)	0.440
152	12.67	0.93	0.541	0.101	(0.184)	0.440
153	12.75	0.93	0.541	0.100	(0.184)	0.441

154	12.83	0.97	0.560	0.100	(0.190)	0.460
155	12.92	0.97	0.560	0.099	(0.190)	0.461
156	13.00	0.97	0.560	0.099	(0.190)	0.461
157	13.08	1.13	0.657	0.098	(0.223)	0.559
158	13.17	1.13	0.657	0.098	(0.223)	0.559
159	13.25	1.13	0.657	0.097	(0.223)	0.560
160	13.33	1.13	0.657	0.097	(0.223)	0.560
161	13.42	1.13	0.657	0.096	(0.223)	0.560
162	13.50	1.13	0.657	0.096	(0.223)	0.561
163	13.58	0.77	0.444	0.095	(0.151)	0.349
164	13.67	0.77	0.444	0.095	(0.151)	0.349
165	13.75	0.77	0.444	0.094	(0.151)	0.350
166	13.83	0.77	0.444	0.094	(0.151)	0.350
167	13.92	0.77	0.444	0.093	(0.151)	0.351
168	14.00	0.77	0.444	0.093	(0.151)	0.351
169	14.08	0.90	0.522	0.093	(0.177)	0.429
170	14.17	0.90	0.522	0.092	(0.177)	0.430
171	14.25	0.90	0.522	0.092	(0.177)	0.430
172	14.33	0.87	0.502	0.091	(0.171)	0.411
173	14.42	0.87	0.502	0.091	(0.171)	0.412
174	14.50	0.87	0.502	0.090	(0.171)	0.412
175	14.58	0.87	0.502	0.090	(0.171)	0.413
176	14.67	0.87	0.502	0.089	(0.171)	0.413
177	14.75	0.87	0.502	0.089	(0.171)	0.414
178	14.83	0.83	0.483	0.088	(0.164)	0.395
179	14.92	0.83	0.483	0.088	(0.164)	0.395
180	15.00	0.83	0.483	0.087	(0.164)	0.396
181	15.08	0.80	0.464	0.087	(0.158)	0.377
182	15.17	0.80	0.464	0.087	(0.158)	0.377
183	15.25	0.80	0.464	0.086	(0.158)	0.378
184	15.33	0.77	0.444	0.086	(0.151)	0.359
185	15.42	0.77	0.444	0.085	(0.151)	0.359
186	15.50	0.77	0.444	0.085	(0.151)	0.360
187	15.58	0.63	0.367	0.084	(0.125)	0.283
188	15.67	0.63	0.367	0.084	(0.125)	0.283
189	15.75	0.63	0.367	0.083	(0.125)	0.284
190	15.83	0.63	0.367	0.083	(0.125)	0.284
191	15.92	0.63	0.367	0.083	(0.125)	0.284
192	16.00	0.63	0.367	0.082	(0.125)	0.285
193	16.08	0.13	0.077	(0.082)	0.026	0.051
194	16.17	0.13	0.077	(0.081)	0.026	0.051
195	16.25	0.13	0.077	(0.081)	0.026	0.051
196	16.33	0.13	0.077	(0.081)	0.026	0.051
197	16.42	0.13	0.077	(0.080)	0.026	0.051
198	16.50	0.13	0.077	(0.080)	0.026	0.051
199	16.58	0.10	0.058	(0.079)	0.020	0.038
200	16.67	0.10	0.058	(0.079)	0.020	0.038
201	16.75	0.10	0.058	(0.079)	0.020	0.038
202	16.83	0.10	0.058	(0.078)	0.020	0.038
203	16.92	0.10	0.058	(0.078)	0.020	0.038
204	17.00	0.10	0.058	(0.077)	0.020	0.038
205	17.08	0.17	0.097	(0.077)	0.033	0.064
206	17.17	0.17	0.097	(0.077)	0.033	0.064
207	17.25	0.17	0.097	(0.076)	0.033	0.064

208	17.33	0.17	0.097	(0.076)	0.033	0.064
209	17.42	0.17	0.097	(0.075)	0.033	0.064
210	17.50	0.17	0.097	(0.075)	0.033	0.064
211	17.58	0.17	0.097	(0.075)	0.033	0.064
212	17.67	0.17	0.097	(0.074)	0.033	0.064
213	17.75	0.17	0.097	(0.074)	0.033	0.064
214	17.83	0.13	0.077	(0.074)	0.026	0.051
215	17.92	0.13	0.077	(0.073)	0.026	0.051
216	18.00	0.13	0.077	(0.073)	0.026	0.051
217	18.08	0.13	0.077	(0.072)	0.026	0.051
218	18.17	0.13	0.077	(0.072)	0.026	0.051
219	18.25	0.13	0.077	(0.072)	0.026	0.051
220	18.33	0.13	0.077	(0.071)	0.026	0.051
221	18.42	0.13	0.077	(0.071)	0.026	0.051
222	18.50	0.13	0.077	(0.071)	0.026	0.051
223	18.58	0.10	0.058	(0.070)	0.020	0.038
224	18.67	0.10	0.058	(0.070)	0.020	0.038
225	18.75	0.10	0.058	(0.070)	0.020	0.038
226	18.83	0.07	0.039	(0.069)	0.013	0.026
227	18.92	0.07	0.039	(0.069)	0.013	0.026
228	19.00	0.07	0.039	(0.069)	0.013	0.026
229	19.08	0.10	0.058	(0.068)	0.020	0.038
230	19.17	0.10	0.058	(0.068)	0.020	0.038
231	19.25	0.10	0.058	(0.068)	0.020	0.038
232	19.33	0.13	0.077	(0.067)	0.026	0.051
233	19.42	0.13	0.077	(0.067)	0.026	0.051
234	19.50	0.13	0.077	(0.067)	0.026	0.051
235	19.58	0.10	0.058	(0.066)	0.020	0.038
236	19.67	0.10	0.058	(0.066)	0.020	0.038
237	19.75	0.10	0.058	(0.066)	0.020	0.038
238	19.83	0.07	0.039	(0.066)	0.013	0.026
239	19.92	0.07	0.039	(0.065)	0.013	0.026
240	20.00	0.07	0.039	(0.065)	0.013	0.026
241	20.08	0.10	0.058	(0.065)	0.020	0.038
242	20.17	0.10	0.058	(0.064)	0.020	0.038
243	20.25	0.10	0.058	(0.064)	0.020	0.038
244	20.33	0.10	0.058	(0.064)	0.020	0.038
245	20.42	0.10	0.058	(0.064)	0.020	0.038
246	20.50	0.10	0.058	(0.063)	0.020	0.038
247	20.58	0.10	0.058	(0.063)	0.020	0.038
248	20.67	0.10	0.058	(0.063)	0.020	0.038
249	20.75	0.10	0.058	(0.063)	0.020	0.038
250	20.83	0.07	0.039	(0.062)	0.013	0.026
251	20.92	0.07	0.039	(0.062)	0.013	0.026
252	21.00	0.07	0.039	(0.062)	0.013	0.026
253	21.08	0.10	0.058	(0.062)	0.020	0.038
254	21.17	0.10	0.058	(0.061)	0.020	0.038
255	21.25	0.10	0.058	(0.061)	0.020	0.038
256	21.33	0.07	0.039	(0.061)	0.013	0.026
257	21.42	0.07	0.039	(0.061)	0.013	0.026
258	21.50	0.07	0.039	(0.060)	0.013	0.026
259	21.58	0.10	0.058	(0.060)	0.020	0.038
260	21.67	0.10	0.058	(0.060)	0.020	0.038
261	21.75	0.10	0.058	(0.060)	0.020	0.038

262	21.83	0.07	0.039	(0.060)	0.013	0.026
263	21.92	0.07	0.039	(0.059)	0.013	0.026
264	22.00	0.07	0.039	(0.059)	0.013	0.026
265	22.08	0.10	0.058	(0.059)	0.020	0.038
266	22.17	0.10	0.058	(0.059)	0.020	0.038
267	22.25	0.10	0.058	(0.059)	0.020	0.038
268	22.33	0.07	0.039	(0.058)	0.013	0.026
269	22.42	0.07	0.039	(0.058)	0.013	0.026
270	22.50	0.07	0.039	(0.058)	0.013	0.026
271	22.58	0.07	0.039	(0.058)	0.013	0.026
272	22.67	0.07	0.039	(0.058)	0.013	0.026
273	22.75	0.07	0.039	(0.058)	0.013	0.026
274	22.83	0.07	0.039	(0.057)	0.013	0.026
275	22.92	0.07	0.039	(0.057)	0.013	0.026
276	23.00	0.07	0.039	(0.057)	0.013	0.026
277	23.08	0.07	0.039	(0.057)	0.013	0.026
278	23.17	0.07	0.039	(0.057)	0.013	0.026
279	23.25	0.07	0.039	(0.057)	0.013	0.026
280	23.33	0.07	0.039	(0.057)	0.013	0.026
281	23.42	0.07	0.039	(0.056)	0.013	0.026
282	23.50	0.07	0.039	(0.056)	0.013	0.026
283	23.58	0.07	0.039	(0.056)	0.013	0.026
284	23.67	0.07	0.039	(0.056)	0.013	0.026
285	23.75	0.07	0.039	(0.056)	0.013	0.026
286	23.83	0.07	0.039	(0.056)	0.013	0.026
287	23.92	0.07	0.039	(0.056)	0.013	0.026
288	24.00	0.07	0.039	(0.056)	0.013	0.026

(Loss Rate Not Used)

Sum = 100.0 Sum = 42.3

Flood volume = Effective rainfall 3.53(In)
times area 8.0(Ac.)/[(In)/(Ft.)] = 2.4(Ac.Ft)
Total soil loss = 1.30(In)
Total soil loss = 0.872(Ac.Ft)
Total rainfall = 4.83(In)
Flood volume = 102628.3 Cubic Feet
Total soil loss = 37983.4 Cubic Feet

Peak flow rate of this hydrograph = 4.326(CFS)

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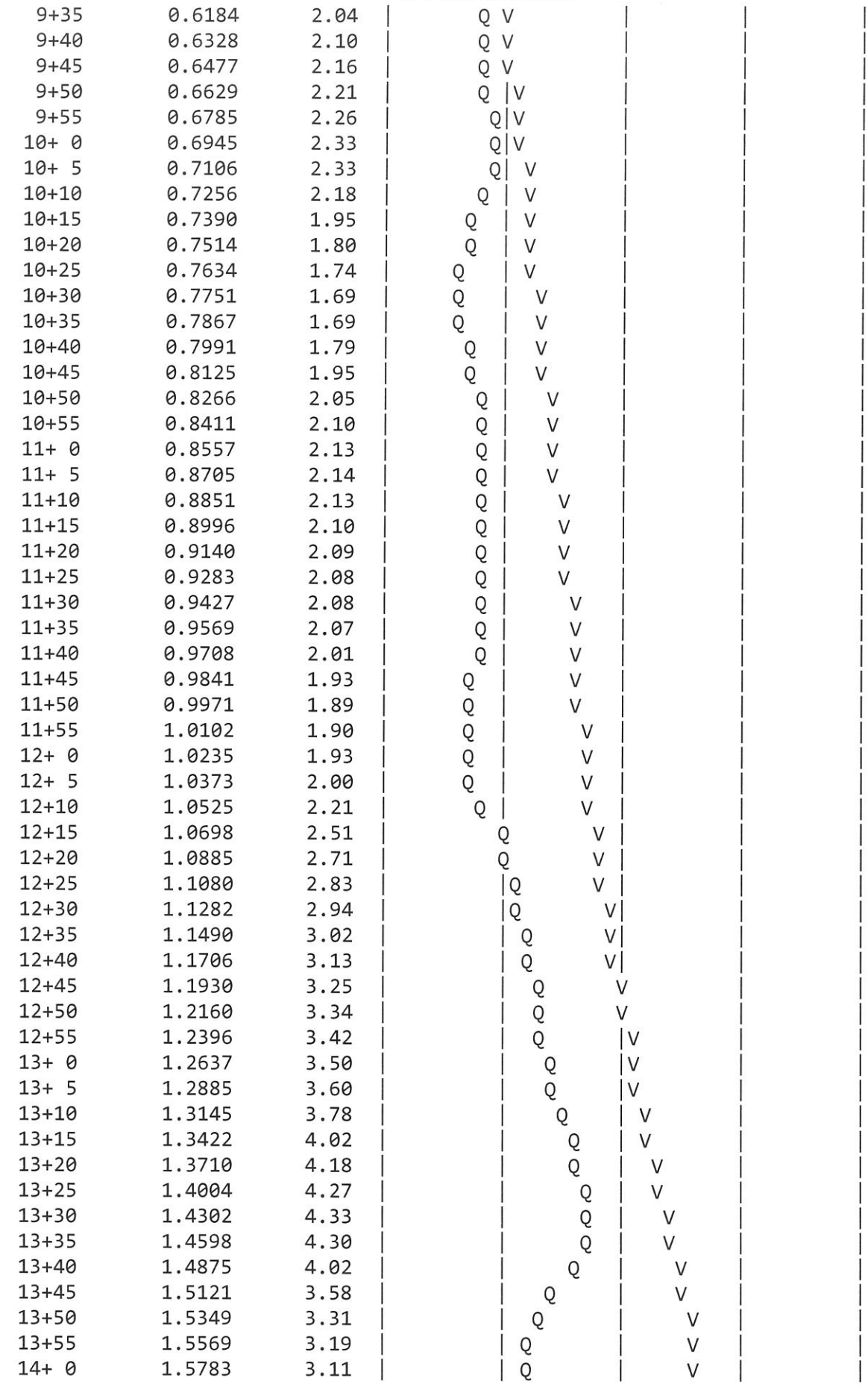
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0001	0.01	Q	|	|	|	|
0+10	0.0004	0.05	Q	|	|	|	|
0+15	0.0011	0.10	Q	|	|	|	|
0+20	0.0021	0.14	Q	|	|	|	|
0+25	0.0033	0.18	Q	|	|	|	|
0+30	0.0048	0.22	Q	|	|	|	|

0+35	0.0065	0.24	Q	|	|	|	|
0+40	0.0083	0.26	VQ	|	|	|	|
0+45	0.0101	0.27	VQ	|	|	|	|
0+50	0.0121	0.28	VQ	|	|	|	|
0+55	0.0142	0.31	VQ	|	|	|	|
1+ 0	0.0165	0.34	VQ	|	|	|	|
1+ 5	0.0190	0.36	VQ	|	|	|	|
1+10	0.0214	0.35	VQ	|	|	|	|
1+15	0.0237	0.33	VQ	|	|	|	|
1+20	0.0259	0.32	VQ	|	|	|	|
1+25	0.0281	0.32	VQ	|	|	|	|
1+30	0.0302	0.31	VQ	|	|	|	|
1+35	0.0324	0.31	VQ	|	|	|	|
1+40	0.0346	0.31	VQ	|	|	|	|
1+45	0.0367	0.31	VQ	|	|	|	|
1+50	0.0389	0.32	VQ	|	|	|	|
1+55	0.0412	0.34	VQ	|	|	|	|
2+ 0	0.0437	0.36	VQ	|	|	|	|
2+ 5	0.0463	0.38	VQ	|	|	|	|
2+10	0.0490	0.39	VQ	|	|	|	|
2+15	0.0517	0.39	VQ	|	|	|	|
2+20	0.0545	0.40	VQ	|	|	|	|
2+25	0.0572	0.40	VQ	|	|	|	|
2+30	0.0600	0.40	|Q	|	|	|	|
2+35	0.0628	0.41	|Q	|	|	|	|
2+40	0.0658	0.43	|Q	|	|	|	|
2+45	0.0690	0.46	|Q	|	|	|	|
2+50	0.0722	0.48	|Q	|	|	|	|
2+55	0.0756	0.49	|Q	|	|	|	|
3+ 0	0.0790	0.49	|Q	|	|	|	|
3+ 5	0.0824	0.50	|Q	|	|	|	|
3+10	0.0859	0.50	|VQ	|	|	|	|
3+15	0.0894	0.50	|VQ	|	|	|	|
3+20	0.0928	0.51	|VQ	|	|	|	|
3+25	0.0964	0.51	|VQ	|	|	|	|
3+30	0.0999	0.51	|VQ	|	|	|	|
3+35	0.1034	0.51	|VQ	|	|	|	|
3+40	0.1069	0.51	|VQ	|	|	|	|
3+45	0.1104	0.51	|VQ	|	|	|	|
3+50	0.1140	0.52	|VQ	|	|	|	|
3+55	0.1177	0.54	|VQ	|	|	|	|
4+ 0	0.1216	0.57	| Q	|	|	|	|
4+ 5	0.1256	0.58	| Q	|	|	|	|
4+10	0.1297	0.59	| Q	|	|	|	|
4+15	0.1339	0.60	| Q	|	|	|	|
4+20	0.1380	0.61	| Q	|	|	|	|
4+25	0.1424	0.63	| Q	|	|	|	|
4+30	0.1469	0.66	| Q	|	|	|	|
4+35	0.1516	0.68	| Q	|	|	|	|
4+40	0.1564	0.69	| Q	|	|	|	|
4+45	0.1612	0.70	| Q	|	|	|	|
4+50	0.1660	0.71	| Q	|	|	|	|
4+55	0.1710	0.73	| Q	|	|	|	|
5+ 0	0.1763	0.76	| VQ	|	|	|	|

5+ 5	0.1816	0.77	Q				
5+10	0.1867	0.74	QV				
5+15	0.1915	0.70	QV				
5+20	0.1961	0.67	QV				
5+25	0.2008	0.68	QV				
5+30	0.2056	0.70	QV				
5+35	0.2105	0.71	QV				
5+40	0.2156	0.74	QV				
5+45	0.2209	0.77	Q				
5+50	0.2263	0.79	Q				
5+55	0.2318	0.80	Q				
6+ 0	0.2373	0.80	QV				
6+ 5	0.2429	0.81	QV				
6+10	0.2487	0.83	QV				
6+15	0.2546	0.86	QV				
6+20	0.2607	0.88	QV				
6+25	0.2669	0.90	QV				
6+30	0.2731	0.90	QV				
6+35	0.2794	0.91	QV				
6+40	0.2858	0.93	QV				
6+45	0.2925	0.97	QV				
6+50	0.2993	0.99	Q V				
6+55	0.3061	1.00	Q V				
7+ 0	0.3131	1.01	QV				
7+ 5	0.3200	1.01	QV				
7+10	0.3270	1.02	QV				
7+15	0.3340	1.02	QV				
7+20	0.3411	1.03	QV				
7+25	0.3483	1.05	QV				
7+30	0.3557	1.08	Q V				
7+35	0.3633	1.10	Q V				
7+40	0.3711	1.13	Q V				
7+45	0.3791	1.16	Q V				
7+50	0.3873	1.19	Q V				
7+55	0.3957	1.22	Q V				
8+ 0	0.4044	1.26	QV				
8+ 5	0.4132	1.29	Q V				
8+10	0.4225	1.34	Q V				
8+15	0.4322	1.41	Q V				
8+20	0.4422	1.45	Q V				
8+25	0.4523	1.47	Q V				
8+30	0.4626	1.49	Q V				
8+35	0.4730	1.51	Q V				
8+40	0.4835	1.53	Q V				
8+45	0.4943	1.57	Q V				
8+50	0.5053	1.60	Q V				
8+55	0.5166	1.63	Q V				
9+ 0	0.5280	1.67	Q V				
9+ 5	0.5398	1.70	Q V				
9+10	0.5519	1.75	Q V				
9+15	0.5644	1.82	Q V				
9+20	0.5773	1.87	Q V				
9+25	0.5906	1.93	Q V				
9+30	0.6043	1.99	Q V				



9+35	0.6184	2.04	
9+40	0.6328	2.10	
9+45	0.6477	2.16	
9+50	0.6629	2.21	
9+55	0.6785	2.26	
10+ 0	0.6945	2.33	
10+ 5	0.7106	2.33	
10+10	0.7256	2.18	
10+15	0.7390	1.95	
10+20	0.7514	1.80	
10+25	0.7634	1.74	
10+30	0.7751	1.69	
10+35	0.7867	1.69	
10+40	0.7991	1.79	
10+45	0.8125	1.95	
10+50	0.8266	2.05	
10+55	0.8411	2.10	
11+ 0	0.8557	2.13	
11+ 5	0.8705	2.14	
11+10	0.8851	2.13	
11+15	0.8996	2.10	
11+20	0.9140	2.09	
11+25	0.9283	2.08	
11+30	0.9427	2.08	
11+35	0.9569	2.07	
11+40	0.9708	2.01	
11+45	0.9841	1.93	
11+50	0.9971	1.89	
11+55	1.0102	1.90	
12+ 0	1.0235	1.93	
12+ 5	1.0373	2.00	
12+10	1.0525	2.21	
12+15	1.0698	2.51	
12+20	1.0885	2.71	
12+25	1.1080	2.83	
12+30	1.1282	2.94	
12+35	1.1490	3.02	
12+40	1.1706	3.13	
12+45	1.1930	3.25	
12+50	1.2160	3.34	
12+55	1.2396	3.42	
13+ 0	1.2637	3.50	
13+ 5	1.2885	3.60	
13+10	1.3145	3.78	
13+15	1.3422	4.02	
13+20	1.3710	4.18	
13+25	1.4004	4.27	
13+30	1.4302	4.33	
13+35	1.4598	4.30	
13+40	1.4875	4.02	
13+45	1.5121	3.58	
13+50	1.5349	3.31	
13+55	1.5569	3.19	
14+ 0	1.5783	3.11	

14+ 5	1.5996	3.09	
14+10	1.6213	3.16	
14+15	1.6441	3.30	
14+20	1.6673	3.38	
14+25	1.6906	3.38	
14+30	1.7137	3.36	
14+35	1.7368	3.34	
14+40	1.7598	3.34	
14+45	1.7828	3.34	
14+50	1.8057	3.33	
14+55	1.8285	3.30	
15+ 0	1.8509	3.26	
15+ 5	1.8732	3.23	
15+10	1.8951	3.19	
15+15	1.9167	3.14	
15+20	1.9381	3.11	
15+25	1.9593	3.07	
15+30	1.9800	3.02	
15+35	2.0004	2.96	
15+40	2.0199	2.83	
15+45	2.0381	2.65	
15+50	2.0556	2.53	
15+55	2.0726	2.47	
16+ 0	2.0894	2.44	
16+ 5	2.1054	2.33	
16+10	2.1189	1.96	
16+15	2.1287	1.43	
16+20	2.1362	1.09	
16+25	2.1426	0.92	
16+30	2.1482	0.81	
16+35	2.1532	0.72	
16+40	2.1576	0.64	
16+45	2.1614	0.56	
16+50	2.1649	0.50	
16+55	2.1681	0.46	
17+ 0	2.1711	0.43	
17+ 5	2.1739	0.41	
17+10	2.1769	0.43	
17+15	2.1801	0.47	
17+20	2.1835	0.49	
17+25	2.1869	0.50	
17+30	2.1903	0.50	
17+35	2.1937	0.50	
17+40	2.1971	0.49	
17+45	2.2006	0.50	
17+50	2.2040	0.50	
17+55	2.2073	0.48	
18+ 0	2.2104	0.45	
18+ 5	2.2134	0.44	
18+10	2.2164	0.43	
18+15	2.2194	0.43	
18+20	2.2223	0.42	
18+25	2.2252	0.42	
18+30	2.2281	0.42	

18+35	2.2310	0.42	|Q	|	|	|	V |
18+40	2.2337	0.40	|Q	|	|	|	V |
18+45	2.2362	0.37	|Q	|	|	|	V |
18+50	2.2386	0.34	|Q	|	|	|	V |
18+55	2.2407	0.31	|Q	|	|	|	V |
19+ 0	2.2427	0.28	|Q	|	|	|	V |
19+ 5	2.2445	0.26	|Q	|	|	|	V |
19+10	2.2463	0.27	|Q	|	|	|	V |
19+15	2.2483	0.29	|Q	|	|	|	V |
19+20	2.2504	0.30	|Q	|	|	|	V |
19+25	2.2526	0.33	|Q	|	|	|	V |
19+30	2.2551	0.36	|Q	|	|	|	V |
19+35	2.2577	0.37	|Q	|	|	|	V |
19+40	2.2601	0.36	|Q	|	|	|	V |
19+45	2.2625	0.34	|Q	|	|	|	V |
19+50	2.2647	0.32	|Q	|	|	|	V |
19+55	2.2667	0.30	|Q	|	|	|	V |
20+ 0	2.2686	0.27	|Q	|	|	|	V |
20+ 5	2.2703	0.25	|Q	|	|	|	V |
20+10	2.2721	0.26	|Q	|	|	|	V |
20+15	2.2740	0.28	|Q	|	|	|	V |
20+20	2.2760	0.29	|Q	|	|	|	V |
20+25	2.2781	0.30	|Q	|	|	|	V |
20+30	2.2802	0.30	|Q	|	|	|	V |
20+35	2.2822	0.30	|Q	|	|	|	V |
20+40	2.2843	0.31	|Q	|	|	|	V |
20+45	2.2865	0.31	|Q	|	|	|	V |
20+50	2.2885	0.30	|Q	|	|	|	V |
20+55	2.2905	0.28	|Q	|	|	|	V |
21+ 0	2.2923	0.26	|Q	|	|	|	V |
21+ 5	2.2939	0.24	Q	|	|	|	V |
21+10	2.2957	0.25	|Q	|	|	|	V |
21+15	2.2976	0.28	|Q	|	|	|	V|
21+20	2.2995	0.29	|Q	|	|	|	V|
21+25	2.3014	0.27	|Q	|	|	|	V|
21+30	2.3031	0.25	Q	|	|	|	V|
21+35	2.3047	0.24	Q	|	|	|	V|
21+40	2.3065	0.25	Q	|	|	|	V|
21+45	2.3083	0.27	|Q	|	|	|	V|
21+50	2.3103	0.28	|Q	|	|	|	V|
21+55	2.3121	0.27	|Q	|	|	|	V|
22+ 0	2.3138	0.25	Q	|	|	|	V|
22+ 5	2.3154	0.23	Q	|	|	|	V|
22+10	2.3171	0.25	Q	|	|	|	V|
22+15	2.3190	0.27	|Q	|	|	|	V|
22+20	2.3210	0.28	|Q	|	|	|	V|
22+25	2.3228	0.27	|Q	|	|	|	V|
22+30	2.3245	0.24	Q	|	|	|	V|
22+35	2.3261	0.23	Q	|	|	|	V|
22+40	2.3276	0.22	Q	|	|	|	V|
22+45	2.3291	0.22	Q	|	|	|	V|
22+50	2.3306	0.22	Q	|	|	|	V|
22+55	2.3321	0.21	Q	|	|	|	V|
23+ 0	2.3336	0.21	Q	|	|	|	V|

23+ 5	2.3350	0.21	Q	|	|	|	V|
23+10	2.3365	0.21	Q	|	|	|	V|
23+15	2.3379	0.21	Q	|	|	|	V|
23+20	2.3393	0.21	Q	|	|	|	V|
23+25	2.3408	0.21	Q	|	|	|	V|
23+30	2.3422	0.21	Q	|	|	|	V|
23+35	2.3436	0.21	Q	|	|	|	V|
23+40	2.3451	0.21	Q	|	|	|	V|
23+45	2.3465	0.21	Q	|	|	|	V|
23+50	2.3479	0.21	Q	|	|	|	V|
23+55	2.3493	0.21	Q	|	|	|	V|
24+ 0	2.3508	0.21	Q	|	|	|	V|
24+ 5	2.3521	0.20	Q	|	|	|	V|
24+10	2.3532	0.16	Q	|	|	|	V|
24+15	2.3539	0.10	Q	|	|	|	V|
24+20	2.3544	0.07	Q	|	|	|	V|
24+25	2.3547	0.05	Q	|	|	|	V|
24+30	2.3550	0.04	Q	|	|	|	V|
24+35	2.3552	0.03	Q	|	|	|	V|
24+40	2.3554	0.03	Q	|	|	|	V|
24+45	2.3555	0.02	Q	|	|	|	V|
24+50	2.3557	0.02	Q	|	|	|	V|
24+55	2.3557	0.01	Q	|	|	|	V|
25+ 0	2.3558	0.01	Q	|	|	|	V|
25+ 5	2.3559	0.01	Q	|	|	|	V|
25+10	2.3559	0.01	Q	|	|	|	V|
25+15	2.3560	0.00	Q	|	|	|	V|
25+20	2.3560	0.00	Q	|	|	|	V|
25+25	2.3560	0.00	Q	|	|	|	V|
25+30	2.3560	0.00	Q	|	|	|	V|
25+35	2.3560	0.00	Q	|	|	|	V

CRYSTAL COVE
Detention Basin #1 Stage/Volume/Outflow Relationship

Elev (ft)		Cummulative Volume (cu-ft)	**Cummulative Volume (ac-ft)**	Q out (Pump) (cfs)
7.50	90.00	5396.00	**0.1239**	3.0000
6.00	72.00	4688.00	**0.1076**	3.0000
5.00	60.00	4099.00	**0.0941**	3.0000
4.00	48.00	3311.00	**0.0760**	3.0000
3.00	36.00	2421.00	**0.0556**	3.0000
2.00	24.00	1467.00	**0.0337**	3.0000
1.00	12.00	472.00	**0.0108**	3.0000
0.00	0.00	0.00	**0.0000**	3.0000

WSE for Q100 = 7.02 ft

Note:

1. Pre developed Peak flow for 100% of Project site Q 100 yr 24hr = 3.1650 cfs
2. Post developed Peak flow Q 100 yr 24-hr = 4.326 cfs
3. Constant Pump Rate = 3.0 cfs
4. WSE for Q 100 is 7.02 ft.
5. Drawdown time is 25.66 hours

Project: 926-00 Storage 1

Chamber Model -	MC-4500	
Units -	Imperial	Click Here for Metric
Number of Chambers -	27	
Number of End Caps -	6	
Voids in the stone (porosity) -	40	%
Base of Stone Elevation -	0.00	ft
Amount of Stone Above Chambers -	18	in
Amount of Stone Below Chambers -	12	in
Area of system -	1181	sf Min. Area - 1181 sf min. area

☑ Include Perimeter Stone in Calculations

StormTech MC-4500 Cumulative Storage Volumes

Height of System (inches)	Incremental Single Chamber (cubic feet)	Incremental Single End Cap (cubic feet)	Incremental Chambers (cubic feet)	Incremental End Cap (cubic feet)	Incremental Stone (cubic feet)	Incremental Ch, EC and Stone (cubic feet)	Cumulative System (cubic feet)	Elevation (feet)
90	0.00	0.00	0.00	0.00	39.37	39.37	5396.96	7.50
89	0.00	0.00	0.00	0.00	39.37	39.37	5357.59	7.42
88	0.00	0.00	0.00	0.00	39.37	39.37	5318.22	7.33
87	0.00	0.00	0.00	0.00	39.37	39.37	5278.86	7.25
86	0.00	0.00	0.00	0.00	39.37	39.37	5239.49	7.17
85	0.00	0.00	0.00	0.00	39.37	39.37	5200.12	7.08
84	0.00	0.00	0.00	0.00	39.37	39.37	5160.76	7.00
83	0.00	0.00	0.00	0.00	39.37	39.37	5121.39	6.92
82	0.00	0.00	0.00	0.00	39.37	39.37	5082.02	6.83
81	0.00	0.00	0.00	0.00	39.37	39.37	5042.66	6.75
80	0.00	0.00	0.00	0.00	39.37	39.37	5003.29	6.67
79	0.00	0.00	0.00	0.00	39.37	39.37	4963.92	6.58
78	0.00	0.00	0.00	0.00	39.37	39.37	4924.56	6.50
77	0.00	0.00	0.00	0.00	39.37	39.37	4885.19	6.42
76	0.00	0.00	0.00	0.00	39.37	39.37	4845.82	6.33
75	0.00	0.00	0.00	0.00	39.37	39.37	4806.46	6.25
74	0.00	0.00	0.00	0.00	39.37	39.37	4767.09	6.17
73	0.00	0.00	0.00	0.00	39.37	39.37	4727.72	6.08
72	0.04	0.00	1.11	0.00	38.92	40.03	4688.36	6.00
71	0.12	0.01	3.13	0.06	38.09	41.28	4648.33	5.92
70	0.16	0.03	4.45	0.16	37.52	42.13	4607.04	5.83
69	0.21	0.05	5.64	0.29	37.00	42.92	4564.91	5.75
68	0.27	0.07	7.25	0.41	36.31	43.96	4521.99	5.67
67	0.45	0.09	12.23	0.53	34.27	47.02	4478.04	5.58
66	0.67	0.11	17.96	0.68	31.91	50.55	4431.02	5.50
65	0.80	0.14	21.57	0.85	30.40	52.82	4380.47	5.42
64	0.91	0.17	24.52	1.01	29.16	54.68	4327.65	5.33
63	1.00	0.19	27.08	1.15	28.08	56.30	4272.97	5.25
62	1.09	0.22	29.36	1.29	27.11	57.76	4216.66	5.17
61	1.16	0.24	31.41	1.45	26.22	59.08	4158.91	5.08
60	1.23	0.27	33.32	1.62	25.39	60.33	4099.82	5.00
59	1.30	0.30	35.09	1.79	24.62	61.49	4039.49	4.92
58	1.36	0.32	36.75	1.94	23.89	62.58	3978.00	4.83
57	1.42	0.35	38.31	2.09	23.21	63.60	3915.42	4.75
56	1.47	0.37	39.78	2.23	22.56	64.57	3851.82	4.67
55	1.53	0.39	41.18	2.36	21.95	65.49	3787.25	4.58
54	1.57	0.42	42.51	2.50	21.36	66.38	3721.75	4.50
53	1.62	0.44	43.78	2.64	20.80	67.22	3655.38	4.42
52	1.67	0.46	44.99	2.78	20.26	68.02	3588.16	4.33
51	1.71	0.48	46.15	2.90	19.75	68.80	3520.14	4.25
50	1.75	0.50	47.25	3.03	19.25	69.54	3451.34	4.17
49	1.79	0.53	48.31	3.15	18.78	70.24	3381.80	4.08
48	1.83	0.55	49.33	3.27	18.32	70.93	3311.56	4.00
47	1.86	0.56	50.31	3.39	17.89	71.59	3240.63	3.92
46	1.90	0.58	51.25	3.50	17.46	72.22	3169.04	3.83
45	1.93	0.60	52.16	3.61	17.06	72.83	3096.82	3.75
44	1.96	0.62	53.03	3.72	16.67	73.42	3024.00	3.67
43	2.00	0.64	53.87	3.83	16.29	73.98	2950.58	3.58
42	2.03	0.66	54.68	3.93	15.92	74.53	2876.59	3.50
41	2.05	0.67	55.45	4.04	15.57	75.06	2802.06	3.42
40	2.08	0.69	56.20	4.14	15.23	75.57	2727.00	3.33
39	2.11	0.71	56.92	4.24	14.90	76.06	2651.43	3.25
38	2.13	0.72	57.61	4.34	14.58	76.54	2575.36	3.17
37	2.16	0.74	58.28	4.44	14.28	77.00	2498.82	3.08
36	2.18	0.76	58.93	4.54	13.98	77.45	2421.82	3.00
35	2.21	0.77	59.55	4.63	13.70	77.87	2344.38	2.92
34	2.23	0.79	60.15	4.72	13.42	78.29	2266.50	2.83
33	2.25	0.80	60.72	4.81	13.15	78.69	2188.22	2.75
32	2.27	0.82	61.27	4.92	12.89	79.08	2109.53	2.67
31	2.29	0.84	61.80	5.04	12.63	79.48	2030.45	2.58
30	2.31	0.85	62.31	5.08	12.41	79.80	1950.97	2.50
29	2.33	0.86	62.80	5.15	12.19	80.14	1871.17	2.42
28	2.34	0.87	63.27	5.23	11.97	80.47	1791.03	2.33
27	2.36	0.89	63.72	5.31	11.76	80.78	1710.57	2.25
26	2.38	0.90	64.15	5.39	11.55	81.09	1629.78	2.17
25	2.39	0.91	64.56	5.46	11.36	81.38	1548.70	2.08
24	2.41	0.92	64.95	5.53	11.17	81.66	1467.32	2.00
23	2.42	0.93	65.32	5.61	11.00	81.92	1385.66	1.92
22	2.43	0.95	65.67	5.67	10.83	82.18	1303.74	1.83
21	2.44	0.96	66.01	5.74	10.67	82.42	1221.56	1.75
20	2.46	0.97	66.33	5.80	10.51	82.65	1139.15	1.67
19	2.47	0.98	66.63	5.87	10.37	82.86	1056.50	1.58
18	2.48	0.99	66.91	5.93	10.23	83.07	973.64	1.50
17	2.49	1.00	67.18	5.99	10.10	83.27	890.56	1.42
16	2.50	1.01	67.44	6.04	9.98	83.45	807.30	1.33
15	2.51	1.02	67.68	6.10	9.86	83.63	723.84	1.25
14	2.51	1.02	67.90	6.15	9.75	83.79	640.21	1.17
13	2.53	1.03	68.23	6.20	9.60	84.02	556.42	1.08
12	0.00	0.00	0.00	0.00	39.37	39.37	472.40	1.00
11	0.00	0.00	0.00	0.00	39.37	39.37	433.03	0.92
10	0.00	0.00	0.00	0.00	39.37	39.37	393.67	0.83
9	0.00	0.00	0.00	0.00	39.37	39.37	354.30	0.75
8	0.00	0.00	0.00	0.00	39.37	39.37	314.93	0.67
7	0.00	0.00	0.00	0.00	39.37	39.37	275.57	0.58
6	0.00	0.00	0.00	0.00	39.37	39.37	236.20	0.50
5	0.00	0.00	0.00	0.00	39.37	39.37	196.83	0.42
4	0.00	0.00	0.00	0.00	39.37	39.37	157.47	0.33
3	0.00	0.00	0.00	0.00	39.37	39.37	118.10	0.25
2	0.00	0.00	0.00	0.00	39.37	39.37	78.73	0.17
1	0.00	0.00	0.00	0.00	39.37	39.37	39.37	0.08

FLOOD HYDROGRAPH ROUTING PROGRAM
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Study date: 05/05/22

Post Development
100-yr / 24-hr Storm

Program License Serial Number 6328

********** HYDROGRAPH INFORMATION **********

From study/file name: 1Post9260024100.rte
**********HYDROGRAPH DATA**********
Number of intervals = 307
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 4.326 (CFS)
Total volume = 2.356 (Ac.Ft)
Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

****

++
Process from Point/Station 0.000 to Point/Station 0.000
**** RETARDING BASIN ROUTING ****

User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 307
Hydrograph time unit = 5.000 (Min.)
Initial depth in storage basin = 0.00(Ft.)

Initial basin depth = 0.00 (Ft.)
Initial basin storage = 0.00 (Ac.Ft)
Initial basin outflow = 0.00 (CFS)

Depth vs. Storage and Depth vs. Discharge data:

R1

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-O*dt/2) (Ac.Ft)	(S+O*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
1.000	0.011	3.000	0.001	0.021
2.000	0.034	3.000	0.024	0.044
3.000	0.056	3.000	0.046	0.066
4.000	0.076	3.000	0.066	0.086
5.000	0.094	3.000	0.084	0.104
6.000	0.108	3.000	0.098	0.118
7.500	0.124	3.000	0.114	0.134

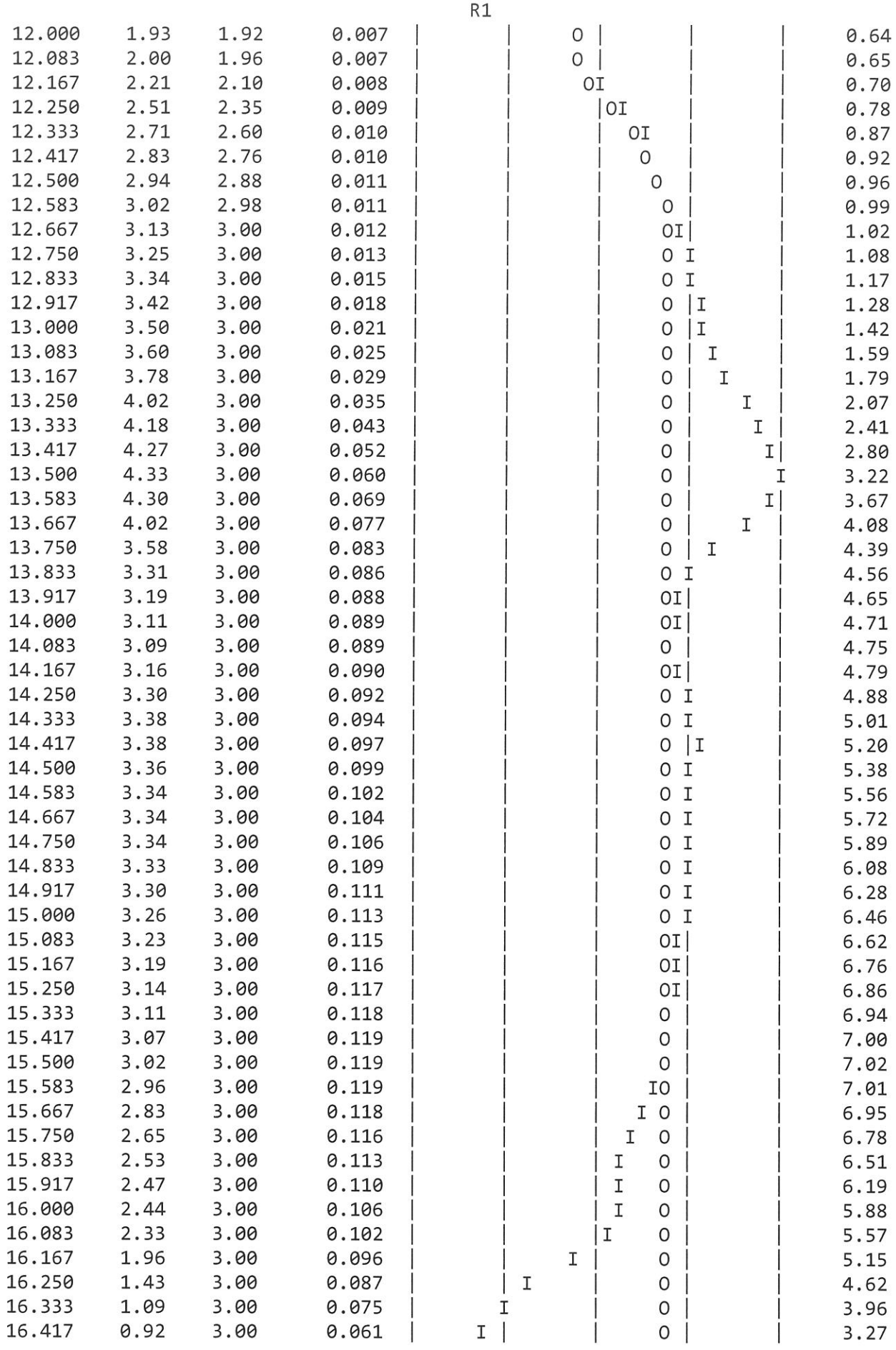
Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0 1.1 2.16 3.24 4.33	Depth (Ft.)
0.083	0.01	0.00	0.000	O	0.00
0.167	0.05	0.03	0.000	O	0.01
0.250	0.10	0.07	0.000	O	0.02
0.333	0.14	0.12	0.000	OI	0.04
0.417	0.18	0.16	0.001	|O	0.05
0.500	0.22	0.20	0.001	|O	0.07
0.583	0.24	0.23	0.001	|O	0.08
0.667	0.26	0.25	0.001	|O	0.08
0.750	0.27	0.26	0.001	|O	0.09
0.833	0.28	0.28	0.001	| O	0.09
0.917	0.31	0.29	0.001	| O	0.10
1.000	0.34	0.32	0.001	| O	0.11
1.083	0.36	0.35	0.001	| O	0.12
1.167	0.35	0.35	0.001	| O	0.12
1.250	0.33	0.34	0.001	| O	0.11
1.333	0.32	0.33	0.001	| O	0.11
1.417	0.32	0.32	0.001	| O	0.11
1.500	0.31	0.32	0.001	| O	0.11
1.583	0.31	0.31	0.001	| O	0.10
1.667	0.31	0.31	0.001	| O	0.10
1.750	0.31	0.31	0.001	| O	0.10
1.833	0.32	0.32	0.001	| O	0.11
1.917	0.34	0.33	0.001	| O	0.11
2.000	0.36	0.35	0.001	| O	0.12
2.083	0.38	0.37	0.001	| O	0.12
2.167	0.39	0.38	0.001	| O	0.13
2.250	0.39	0.39	0.001	| O	0.13
2.333	0.40	0.40	0.001	| O	0.13
2.417	0.40	0.40	0.001	| O	0.13
2.500	0.40	0.40	0.001	| O	0.13
2.583	0.41	0.41	0.001	| O	0.14
2.667	0.43	0.42	0.002	| O	0.14
2.750	0.46	0.44	0.002	| O	0.15
2.833	0.48	0.47	0.002	| O	0.16
2.917	0.49	0.48	0.002	| O	0.16

				R1				
3.000	0.49	0.49	0.002	O				0.16
3.083	0.50	0.50	0.002	O				0.17
3.167	0.50	0.50	0.002	O				0.17
3.250	0.50	0.50	0.002	O				0.17
3.333	0.51	0.51	0.002	O				0.17
3.417	0.51	0.51	0.002	O				0.17
3.500	0.51	0.51	0.002	O				0.17
3.583	0.51	0.51	0.002	O				0.17
3.667	0.51	0.51	0.002	O				0.17
3.750	0.51	0.51	0.002	O				0.17
3.833	0.52	0.52	0.002	O				0.17
3.917	0.54	0.53	0.002	O				0.18
4.000	0.57	0.55	0.002	O				0.18
4.083	0.58	0.57	0.002	O				0.19
4.167	0.59	0.59	0.002	O				0.20
4.250	0.60	0.60	0.002	O				0.20
4.333	0.61	0.60	0.002	O				0.20
4.417	0.63	0.62	0.002	O				0.21
4.500	0.66	0.64	0.002	O				0.21
4.583	0.68	0.67	0.002	OI				0.22
4.667	0.69	0.68	0.003	O				0.23
4.750	0.70	0.69	0.003	O				0.23
4.833	0.71	0.70	0.003	O				0.23
4.917	0.73	0.72	0.003	O				0.24
5.000	0.76	0.74	0.003	O				0.25
5.083	0.77	0.77	0.003	O				0.26
5.167	0.74	0.76	0.003	O				0.25
5.250	0.70	0.72	0.003	O				0.24
5.333	0.67	0.68	0.003	IO				0.23
5.417	0.68	0.67	0.002	OI				0.22
5.500	0.70	0.69	0.003	O				0.23
5.583	0.71	0.71	0.003	O				0.24
5.667	0.74	0.72	0.003	O				0.24
5.750	0.77	0.75	0.003	O				0.25
5.833	0.79	0.78	0.003	O				0.26
5.917	0.80	0.79	0.003	O				0.26
6.000	0.80	0.80	0.003	O				0.27
6.083	0.81	0.81	0.003	OI				0.27
6.167	0.83	0.82	0.003	O				0.27
6.250	0.86	0.85	0.003	O				0.28
6.333	0.88	0.87	0.003	O				0.29
6.417	0.90	0.89	0.003	O				0.30
6.500	0.90	0.90	0.003	O				0.30
6.583	0.91	0.91	0.003	O				0.30
6.667	0.93	0.92	0.003	O				0.31
6.750	0.97	0.95	0.003	O				0.32
6.833	0.99	0.98	0.004	O				0.33
6.917	1.00	0.99	0.004	O				0.33
7.000	1.01	1.00	0.004	O				0.33
7.083	1.01	1.01	0.004	O				0.34
7.167	1.02	1.01	0.004	O				0.34
7.250	1.02	1.02	0.004	O				0.34
7.333	1.03	1.02	0.004	O				0.34
7.417	1.05	1.04	0.004	O				0.35

				R1				
7.500	1.08	1.06	0.004	O|				0.35
7.583	1.10	1.09	0.004	O				0.36
7.667	1.13	1.11	0.004	O				0.37
7.750	1.16	1.15	0.004	O				0.38
7.833	1.19	1.18	0.004	O				0.39
7.917	1.22	1.21	0.004	OI				0.40
8.000	1.26	1.24	0.005	|O				0.41
8.083	1.29	1.27	0.005	|O				0.42
8.167	1.34	1.32	0.005	|O				0.44
8.250	1.41	1.37	0.005	| O				0.46
8.333	1.45	1.43	0.005	| O				0.48
8.417	1.47	1.46	0.005	| O				0.49
8.500	1.49	1.48	0.005	| OI				0.49
8.583	1.51	1.50	0.005	| O				0.50
8.667	1.53	1.52	0.006	| O				0.51
8.750	1.57	1.55	0.006	| O				0.52
8.833	1.60	1.58	0.006	| O				0.53
8.917	1.63	1.61	0.006	| OI				0.54
9.000	1.67	1.65	0.006	| O				0.55
9.083	1.70	1.68	0.006	| O				0.56
9.167	1.75	1.73	0.006	| O				0.58
9.250	1.82	1.79	0.007	| O				0.60
9.333	1.87	1.85	0.007	| O				0.62
9.417	1.93	1.90	0.007	| O |				0.63
9.500	1.99	1.96	0.007	| O |				0.65
9.583	2.04	2.01	0.007	| OI|				0.67
9.667	2.10	2.07	0.008	| O|				0.69
9.750	2.16	2.13	0.008	| O|				0.71
9.833	2.21	2.18	0.008	| O				0.73
9.917	2.26	2.23	0.008	| O				0.74
10.000	2.33	2.29	0.008	| OI				0.76
10.083	2.33	2.33	0.009	| |O				0.78
10.167	2.18	2.26	0.008	| O				0.75
10.250	1.95	2.07	0.008	| IO|				0.69
10.333	1.80	1.88	0.007	| O |				0.63
10.417	1.74	1.77	0.006	| IO |				0.59
10.500	1.69	1.72	0.006	| O |				0.57
10.583	1.69	1.69	0.006	| O |				0.56
10.667	1.79	1.74	0.006	| OI |				0.58
10.750	1.95	1.87	0.007	| OI |				0.62
10.833	2.05	2.00	0.007	| OI|				0.67
10.917	2.10	2.07	0.008	| O|				0.69
11.000	2.13	2.11	0.008	| O|				0.70
11.083	2.14	2.13	0.008	| O|				0.71
11.167	2.13	2.14	0.008	| O|				0.71
11.250	2.10	2.12	0.008	| O|				0.71
11.333	2.09	2.09	0.008	| O|				0.70
11.417	2.08	2.08	0.008	| O|				0.69
11.500	2.08	2.08	0.008	| O|				0.69
11.583	2.07	2.08	0.008	| O|				0.69
11.667	2.01	2.04	0.007	| IO|				0.68
11.750	1.93	1.98	0.007	| O |				0.66
11.833	1.89	1.92	0.007	| O |				0.64
11.917	1.90	1.90	0.007	| O |				0.63



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12.000    1.93    1.92      0.007  |        |      O |        |        |      0.64
12.083    2.00    1.96      0.007  |        |      O |        |        |      0.65
12.167    2.21    2.10      0.008  |        |       OI        |        |      0.70
12.250    2.51    2.35      0.009  |        |        |OI      |        |      0.78
12.333    2.71    2.60      0.010  |        |        |  OI    |        |      0.87
12.417    2.83    2.76      0.010  |        |        |   O    |        |      0.92
12.500    2.94    2.88      0.011  |        |        |    O   |        |      0.96
12.583    3.02    2.98      0.011  |        |        |     O  |        |      0.99
12.667    3.13    3.00      0.012  |        |        |     OI|        |      1.02
12.750    3.25    3.00      0.013  |        |        |     O I        |      1.08
12.833    3.34    3.00      0.015  |        |        |     O I        |      1.17
12.917    3.42    3.00      0.018  |        |        |     O |I       |      1.28
13.000    3.50    3.00      0.021  |        |        |     O |I       |      1.42
13.083    3.60    3.00      0.025  |        |        |     O | I      |      1.59
13.167    3.78    3.00      0.029  |        |        |     O |  I     |      1.79
13.250    4.02    3.00      0.035  |        |        |     O |    I   |      2.07
13.333    4.18    3.00      0.043  |        |        |     O |     I  |      2.41
13.417    4.27    3.00      0.052  |        |        |     O |      I|      2.80
13.500    4.33    3.00      0.060  |        |        |     O |       I      3.22
13.583    4.30    3.00      0.069  |        |        |     O |      I|      3.67
13.667    4.02    3.00      0.077  |        |        |     O |    I   |      4.08
13.750    3.58    3.00      0.083  |        |        |     O | I      |      4.39
13.833    3.31    3.00      0.086  |        |        |     O I        |      4.56
13.917    3.19    3.00      0.088  |        |        |     OI|        |      4.65
14.000    3.11    3.00      0.089  |        |        |     OI|        |      4.71
14.083    3.09    3.00      0.089  |        |        |     O |        |      4.75
14.167    3.16    3.00      0.090  |        |        |     OI|        |      4.79
14.250    3.30    3.00      0.092  |        |        |     O I        |      4.88
14.333    3.38    3.00      0.094  |        |        |     O I        |      5.01
14.417    3.38    3.00      0.097  |        |        |     O |I       |      5.20
14.500    3.36    3.00      0.099  |        |        |     O I        |      5.38
14.583    3.34    3.00      0.102  |        |        |     O I        |      5.56
14.667    3.34    3.00      0.104  |        |        |     O I        |      5.72
14.750    3.34    3.00      0.106  |        |        |     O I        |      5.89
14.833    3.33    3.00      0.109  |        |        |     O I        |      6.08
14.917    3.30    3.00      0.111  |        |        |     O I        |      6.28
15.000    3.26    3.00      0.113  |        |        |     O I        |      6.46
15.083    3.23    3.00      0.115  |        |        |     OI|        |      6.62
15.167    3.19    3.00      0.116  |        |        |     OI|        |      6.76
15.250    3.14    3.00      0.117  |        |        |     OI|        |      6.86
15.333    3.11    3.00      0.118  |        |        |     O |        |      6.94
15.417    3.07    3.00      0.119  |        |        |     O |        |      7.00
15.500    3.02    3.00      0.119  |        |        |     O |        |      7.02
15.583    2.96    3.00      0.119  |        |        |    IO |        |      7.01
15.667    2.83    3.00      0.118  |        |        |   I O |        |      6.95
15.750    2.65    3.00      0.116  |        |        |  I  O |        |      6.78
15.833    2.53    3.00      0.113  |        |        | I   O |        |      6.51
15.917    2.47    3.00      0.110  |        |        | I   O |        |      6.19
16.000    2.44    3.00      0.106  |        |        | I   O |        |      5.88
16.083    2.33    3.00      0.102  |        |        |I    O |        |      5.57
16.167    1.96    3.00      0.096  |        |      I |     O |        |      5.15
16.250    1.43    3.00      0.087  |        | I      |     O |        |      4.62
16.333    1.09    3.00      0.075  |       I        |     O |        |      3.96
16.417    0.92    3.00      0.061  |     I |        |     O |        |      3.27
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				R1				
16.500	0.81	3.00	0.047	I		O		2.58
16.583	0.72	3.00	0.031	I		O		1.88
16.667	0.64	3.00	0.015	I		O		1.19
16.750	0.56	1.29	0.005	I	O			0.43
16.833	0.50	0.56	0.002	IO				0.19
16.917	0.46	0.49	0.002	O				0.16
17.000	0.43	0.45	0.002	O				0.15
17.083	0.41	0.42	0.002	O				0.14
17.167	0.43	0.42	0.002	O				0.14
17.250	0.47	0.45	0.002	O				0.15
17.333	0.49	0.48	0.002	O				0.16
17.417	0.50	0.49	0.002	O				0.16
17.500	0.50	0.50	0.002	O				0.17
17.583	0.50	0.50	0.002	O				0.17
17.667	0.49	0.50	0.002	O				0.17
17.750	0.50	0.50	0.002	O				0.17
17.833	0.50	0.50	0.002	O				0.17
17.917	0.48	0.49	0.002	O				0.16
18.000	0.45	0.47	0.002	O				0.16
18.083	0.44	0.45	0.002	O				0.15
18.167	0.43	0.44	0.002	O				0.15
18.250	0.43	0.43	0.002	O				0.14
18.333	0.42	0.43	0.002	O				0.14
18.417	0.42	0.42	0.002	O				0.14
18.500	0.42	0.42	0.002	O				0.14
18.583	0.42	0.42	0.002	O				0.14
18.667	0.40	0.41	0.001	IO				0.14
18.750	0.37	0.38	0.001	O				0.13
18.833	0.34	0.36	0.001	O				0.12
18.917	0.31	0.33	0.001	O				0.11
19.000	0.28	0.30	0.001	O				0.10
19.083	0.26	0.27	0.001	IO				0.09
19.167	0.27	0.27	0.001	O				0.09
19.250	0.29	0.28	0.001	O				0.09
19.333	0.30	0.30	0.001	O				0.10
19.417	0.33	0.32	0.001	O				0.11
19.500	0.36	0.34	0.001	O				0.11
19.583	0.37	0.36	0.001	O				0.12
19.667	0.36	0.37	0.001	O				0.12
19.750	0.34	0.35	0.001	O				0.12
19.833	0.32	0.33	0.001	O				0.11
19.917	0.30	0.31	0.001	O				0.10
20.000	0.27	0.28	0.001	IO				0.09
20.083	0.25	0.26	0.001	O				0.09
20.167	0.26	0.25	0.001	O				0.08
20.250	0.28	0.27	0.001	OI				0.09
20.333	0.29	0.29	0.001	O				0.10
20.417	0.30	0.30	0.001	O				0.10
20.500	0.30	0.30	0.001	O				0.10
20.583	0.30	0.30	0.001	O				0.10
20.667	0.31	0.30	0.001	O				0.10
20.750	0.31	0.31	0.001	O				0.10
20.833	0.30	0.30	0.001	O				0.10
20.917	0.28	0.29	0.001	O				0.10

21.000	0.26	0.27	0.001	IO					0.09
21.083	0.24	0.25	0.001	O					0.08
21.167	0.25	0.25	0.001	O					0.08
21.250	0.28	0.26	0.001	OI					0.09
21.333	0.29	0.28	0.001	O					0.09
21.417	0.27	0.28	0.001	O					0.09
21.500	0.25	0.26	0.001	O					0.09
21.583	0.24	0.24	0.001	O					0.08
21.667	0.25	0.24	0.001	O					0.08
21.750	0.27	0.26	0.001	OI					0.09
21.833	0.28	0.28	0.001	O					0.09
21.917	0.27	0.28	0.001	IO					0.09
22.000	0.25	0.26	0.001	O					0.09
22.083	0.23	0.24	0.001	O					0.08
22.167	0.25	0.24	0.001	O					0.08
22.250	0.27	0.26	0.001	OI					0.09
22.333	0.28	0.28	0.001	O					0.09
22.417	0.27	0.27	0.001	IO					0.09
22.500	0.24	0.26	0.001	O					0.09
22.583	0.23	0.24	0.001	O					0.08
22.667	0.22	0.23	0.001	O					0.08
22.750	0.22	0.22	0.001	O					0.07
22.833	0.22	0.22	0.001	O					0.07
22.917	0.21	0.22	0.001	O					0.07
23.000	0.21	0.21	0.001	O					0.07
23.083	0.21	0.21	0.001	O					0.07
23.167	0.21	0.21	0.001	O					0.07
23.250	0.21	0.21	0.001	O					0.07
23.333	0.21	0.21	0.001	O					0.07
23.417	0.21	0.21	0.001	O					0.07
23.500	0.21	0.21	0.001	O					0.07
23.583	0.21	0.21	0.001	O					0.07
23.667	0.21	0.21	0.001	O					0.07
23.750	0.21	0.21	0.001	O					0.07
23.833	0.21	0.21	0.001	O					0.07
23.917	0.21	0.21	0.001	O					0.07
24.000	0.21	0.21	0.001	O					0.07
24.083	0.20	0.20	0.001	O					0.07
24.167	0.16	0.18	0.001	O					0.06
24.250	0.10	0.13	0.000	O					0.04
24.333	0.07	0.09	0.000	O					0.03
24.417	0.05	0.06	0.000	O					0.02
24.500	0.04	0.05	0.000	O					0.02
24.583	0.03	0.04	0.000	O					0.01
24.667	0.03	0.03	0.000	O					0.01
24.750	0.02	0.02	0.000	O					0.01
24.833	0.02	0.02	0.000	O					0.01
24.917	0.01	0.01	0.000	O					0.00
25.000	0.01	0.01	0.000	O					0.00
25.083	0.01	0.01	0.000	O					0.00
25.167	0.01	0.01	0.000	O					0.00
25.250	0.00	0.01	0.000	O					0.00
25.333	0.00	0.00	0.000	O					0.00
25.417	0.00	0.00	0.000	O					0.00

```
                                        R1
25.500    0.00    0.00      0.000  O       |       |       |       |     0.00
25.583    0.00    0.00      0.000  O       |       |       |       |     0.00
25.667    0.00    0.00      0.000  O       |       |       |       |     0.00

****************************HYDROGRAPH DATA****************************
                Number of intervals =   308
                Time interval =    5.0 (Min.)
                Maximum/Peak flow rate =        3.000 (CFS)
                Total volume =       2.356 (Ac.Ft)
        Status of hydrographs being held in storage
                   Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
        Peak (CFS)      0.000     0.000     0.000     0.000     0.000
        Vol (Ac.Ft)      0.000     0.000     0.000     0.000     0.000
************************************************************************

------------------------------------------------------------------------
```

E

Appendix E

REFERENCES

MDS CONSULTING
MORSE SCHULTZ
17320 Redhill Ave.
Suite 350
Irvine, CA 92614
Voice: 949-251-8821
FAX: 949-251-0516
PLANNERS ENGINEERS SURVEYORS

RAINFALL INTENSITY—INCHES PER HOUR

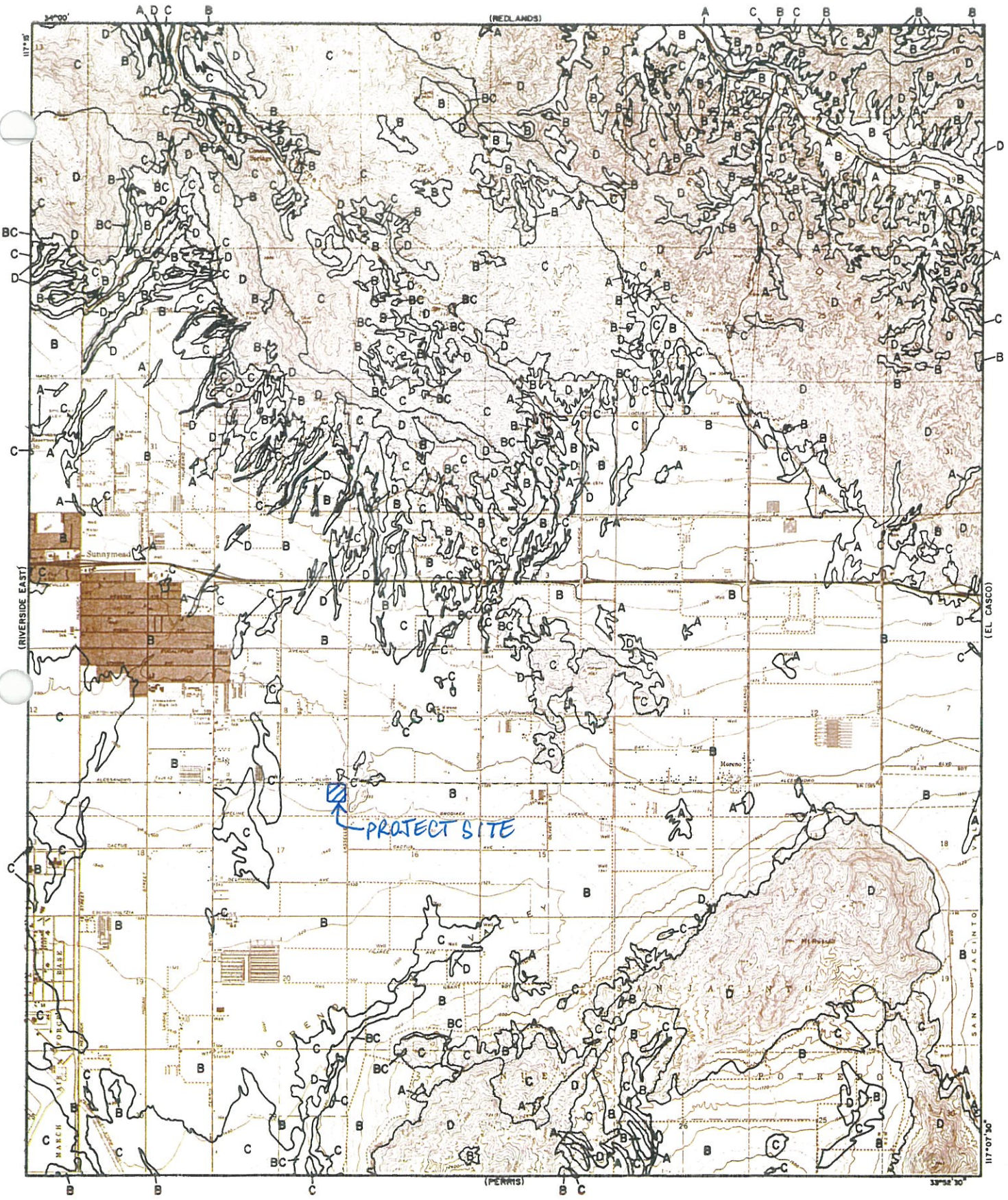
SUNNYMEAD - MORENO			WOODCREST		
DURATION MINUTES	FREQUENCY		DURATION MINUTES	FREQUENCY	
	10 YEAR	100 YEAR		10 YEAR	100 YEAR
5	2.84	4.16	5	3.37	5.30
6	2.59	3.79	6	3.05	4.79
7	2.40	3.51	7	2.80	4.40
8	2.25	3.29	8	2.60	4.09
9	2.12	3.10	9	2.44	3.83
10	2.01	2.94	10	2.30	3.62
11	1.92	2.80	11	2.19	3.43
12	1.83	2.68	12	2.08	3.27
13	1.76	2.58	13	1.99	3.13
14	1.70	2.48	14	1.91	3.01
15	1.64	2.40	15	1.84	2.89
16	1.59	2.32	16	1.78	2.79
17	1.54	2.25	17	1.72	2.70
18	1.50	2.19	18	1.67	2.62
19	1.46	2.13	19	1.62	2.54
20	1.42	2.08	20	1.57	2.47
22	1.35	1.98	22	1.49	2.34
24	1.30	1.90	24	1.42	2.23
26	1.25	1.82	26	1.36	2.14
28	1.20	1.76	28	1.31	2.05
30	1.16	1.70	30	1.26	1.98
32	1.12	1.64	32	1.22	1.91
34	1.09	1.59	34	1.18	1.85
36	1.06	1.55	36	1.14	1.79
38	1.03	1.51	38	1.11	1.74
40	1.00	1.47	40	1.07	1.69
45	.95	1.39	45	1.01	1.58
50	.90	1.31	50	.95	1.49
55	.86	1.25	55	.90	1.42
60	.82	1.20	60	.86	1.35
65	.79	1.15	65	.82	1.29
70	.76	1.11	70	.79	1.24
75	.73	1.07	75	.76	1.19
80	.71	1.04	80	.73	1.15
85	.69	1.01	85	.71	1.11
SLOPE = .500			SLOPE = .550		

RCFC & WCD

HYDROLOGY MANUAL

STANDARD INTENSITY-DURATION CURVES DATA

PLATE D-4.1 (6 of 6)



LEGEND

——— SOILS GROUP BOUNDARY

A SOILS GROUP DESIGNATION

RCFC&WCD

HYDROLOGY MANUAL

N

0 FEET 5000

HYDROLOGIC SOILS GROUP MAP FOR SUNNYMEAD

PLATE C-1.17

NOAA Atlas 14, Volume 6, Version 2
Location name: Moreno Valley, California, USA*
Latitude: 33.9165°, Longitude: -117.2102°
Elevation: 1574.63 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.091 (0.076-0.110)	0.123 (0.103-0.149)	0.166 (0.138-0.202)	0.202 (0.166-0.248)	0.251 (0.200-0.319)	0.290 (0.226-0.376)	0.329 (0.250-0.438)	0.371 (0.274-0.508)	0.428 (0.303-0.612)	0.473 (0.323-0.701)
10-min	0.130 (0.108-0.157)	0.176 (0.147-0.214)	0.238 (0.198-0.290)	0.289 (0.239-0.355)	0.360 (0.287-0.457)	0.415 (0.323-0.538)	0.472 (0.359-0.628)	0.532 (0.392-0.728)	0.614 (0.434-0.877)	0.679 (0.463-1.00)
15-min	0.157 (0.131-0.190)	0.213 (0.178-0.259)	0.288 (0.240-0.350)	0.350 (0.288-0.429)	0.435 (0.347-0.552)	0.502 (0.391-0.651)	0.571 (0.434-0.760)	0.643 (0.474-0.880)	0.742 (0.524-1.06)	0.821 (0.559-1.22)
30-min	0.249 (0.208-0.302)	0.339 (0.282-0.411)	0.458 (0.380-0.556)	0.556 (0.458-0.681)	0.692 (0.550-0.877)	0.798 (0.621-1.03)	0.907 (0.689-1.21)	1.02 (0.753-1.40)	1.18 (0.833-1.69)	1.30 (0.889-1.93)
60-min	0.349 (0.292-0.423)	0.475 (0.396-0.575)	0.641 (0.533-0.779)	0.778 (0.642-0.954)	0.968 (0.771-1.23)	1.12 (0.870-1.45)	1.27 (0.964-1.69)	1.43 (1.06-1.96)	1.65 (1.17-2.36)	1.83 (1.24-2.70)
2-hr	0.518 (0.432-0.627)	0.680 (0.567-0.824)	0.893 (0.743-1.09)	1.07 (0.881-1.31)	1.31 (1.04-1.66)	1.50 (1.16-1.94)	1.69 (1.28-2.24)	1.88 (1.39-2.58)	2.15 (1.52-3.08)	2.36 (1.61-3.50)
3-hr	0.642 (0.536-0.777)	0.833 (0.694-1.01)	1.08 (0.901-1.32)	1.29 (1.06-1.58)	1.57 (1.25-1.99)	1.79 (1.39-2.32)	2.01 (1.52-2.67)	2.24 (1.65-3.06)	2.55 (1.80-3.64)	2.79 (1.90-4.13)
6-hr	0.898 (0.750-1.09)	1.16 (0.964-1.40)	1.49 (1.24-1.82)	1.77 (1.46-2.17)	2.14 (1.71-2.72)	2.43 (1.89-3.15)	2.72 (2.07-3.62)	3.02 (2.23-4.14)	3.43 (2.42-4.90)	3.74 (2.55-5.54)
12-hr	1.16 (0.966-1.40)	1.51 (1.26-1.83)	1.96 (1.63-2.38)	2.33 (1.92-2.86)	2.83 (2.25-3.59)	3.21 (2.50-4.16)	3.59 (2.73-4.78)	3.99 (2.94-5.46)	4.51 (3.19-6.45)	4.92 (3.36-7.29)
24-hr	1.48 (1.31-1.70)	1.96 (1.73-2.26)	2.59 (2.28-3.00)	3.10 (2.71-3.62)	3.79 (3.21-4.56)	4.31 (3.57-5.30)	4.83 (3.92-6.09)	5.37 (4.23-6.95)	6.09 (4.61-8.21)	6.64 (4.86-9.26)
2-day	1.72 (1.52-1.98)	2.32 (2.05-2.68)	3.11 (2.74-3.60)	3.75 (3.28-4.37)	4.61 (3.90-5.55)	5.26 (4.37-6.47)	5.93 (4.80-7.46)	6.60 (5.21-8.55)	7.52 (5.69-10.1)	8.22 (6.02-11.5)
3-day	1.82 (1.61-2.10)	2.48 (2.20-2.87)	3.36 (2.96-3.89)	4.07 (3.56-4.75)	5.03 (4.26-6.07)	5.77 (4.79-7.10)	6.52 (5.28-8.21)	7.29 (5.75-9.44)	8.33 (6.31-11.2)	9.14 (6.69-12.7)
4-day	1.96 (1.74-2.27)	2.71 (2.39-3.13)	3.69 (3.25-4.27)	4.49 (3.92-5.24)	5.57 (4.72-6.72)	6.41 (5.32-7.89)	7.26 (5.88-9.15)	8.14 (6.42-10.5)	9.34 (7.07-12.6)	10.3 (7.51-14.3)
7-day	2.16 (1.91-2.49)	3.03 (2.68-3.50)	4.18 (3.69-4.84)	5.13 (4.49-5.99)	6.43 (5.45-7.75)	7.44 (6.17-9.15)	8.47 (6.86-10.7)	9.53 (7.52-12.3)	11.0 (8.32-14.8)	12.1 (8.87-16.9)
10-day	2.23 (1.97-2.57)	3.16 (2.79-3.65)	4.41 (3.88-5.10)	5.44 (4.75-6.34)	6.86 (5.81-8.26)	7.96 (6.61-9.79)	9.10 (7.37-11.5)	10.3 (8.10-13.3)	11.9 (9.01-16.0)	13.2 (9.64-18.3)
20-day	2.58 (2.28-2.98)	3.71 (3.28-4.28)	5.25 (4.62-6.07)	6.53 (5.71-7.62)	8.34 (7.06-10.1)	9.77 (8.11-12.0)	11.3 (9.12-14.2)	12.8 (10.1-16.6)	15.0 (11.4-20.2)	16.7 (12.2-23.3)
30-day	2.96 (2.62-3.41)	4.24 (3.75-4.90)	6.02 (5.30-6.97)	7.52 (6.58-8.78)	9.66 (8.18-11.6)	11.4 (9.44-14.0)	13.2 (10.7-16.6)	15.1 (11.9-19.5)	17.7 (13.4-23.9)	19.8 (14.5-27.7)
45-day	3.47 (3.07-4.00)	4.92 (4.35-5.68)	6.95 (6.13-8.04)	8.70 (7.60-10.1)	11.2 (9.50-13.5)	13.3 (11.0-16.3)	15.4 (12.5-19.4)	17.7 (14.0-22.9)	21.0 (15.9-28.3)	23.6 (17.3-33.0)
60-day	3.94 (3.49-4.54)	5.51 (4.87-6.36)	7.73 (6.81-8.95)	9.66 (8.45-11.3)	12.5 (10.6-15.0)	14.8 (12.3-18.2)	17.2 (14.0-21.7)	19.9 (15.7-25.7)	23.7 (17.9-31.9)	26.8 (19.6-37.3)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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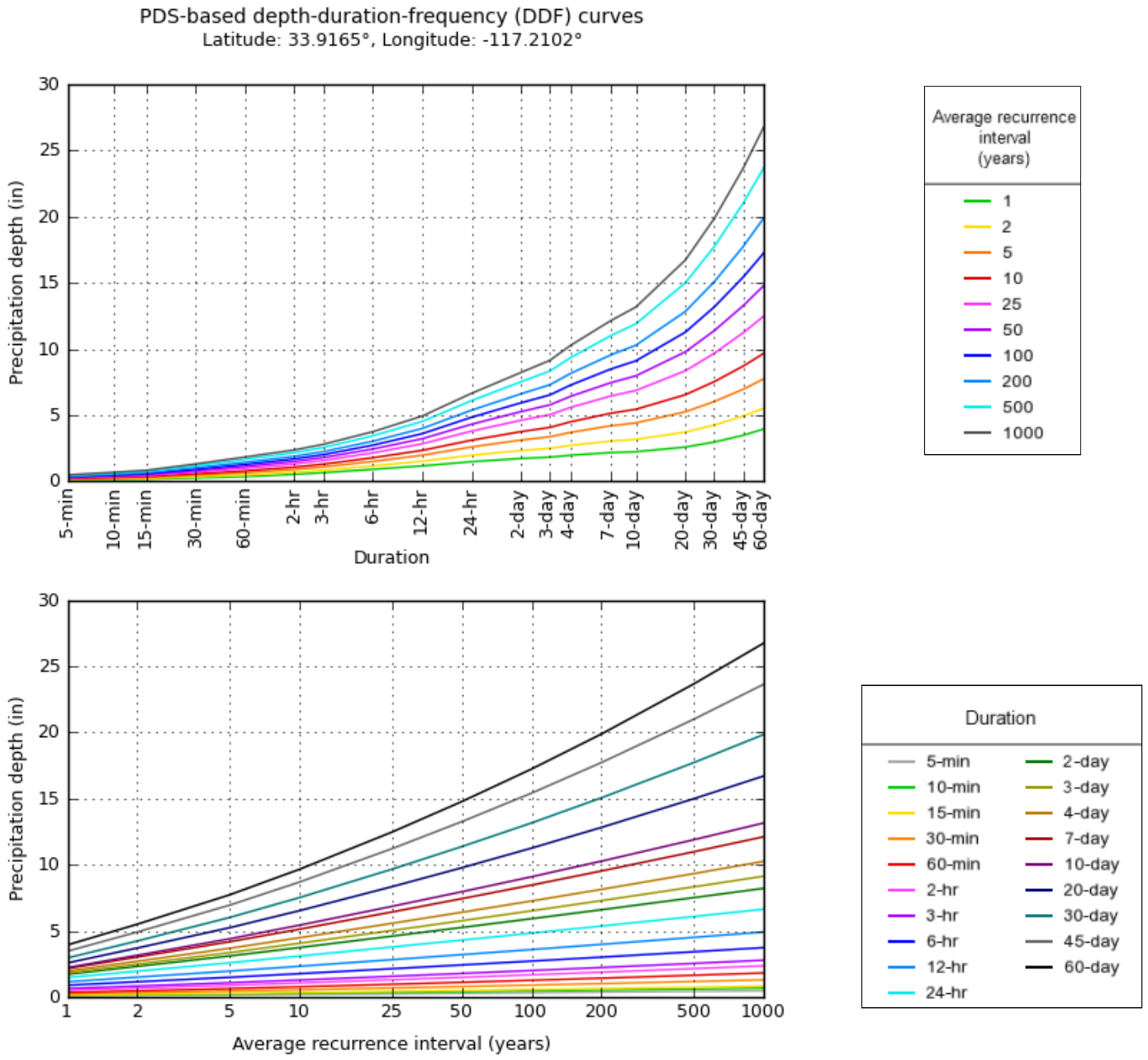
PF graphical



NOAA Atlas 14, Volume 6, Version 2

Created (GMT): Mon Jan 10 02:33:20 2022

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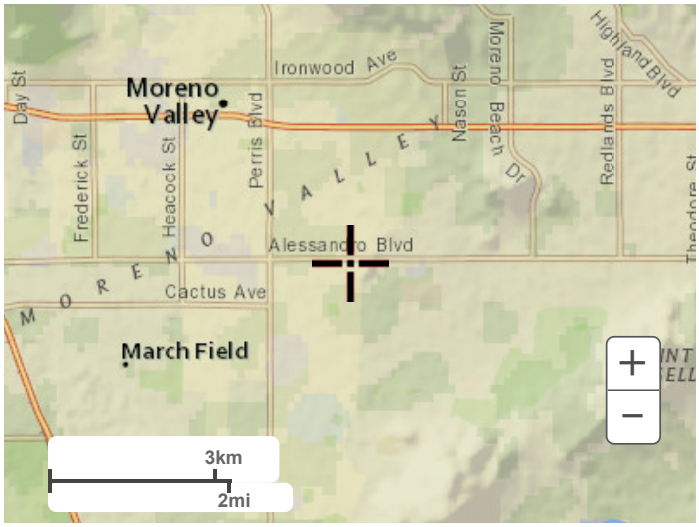
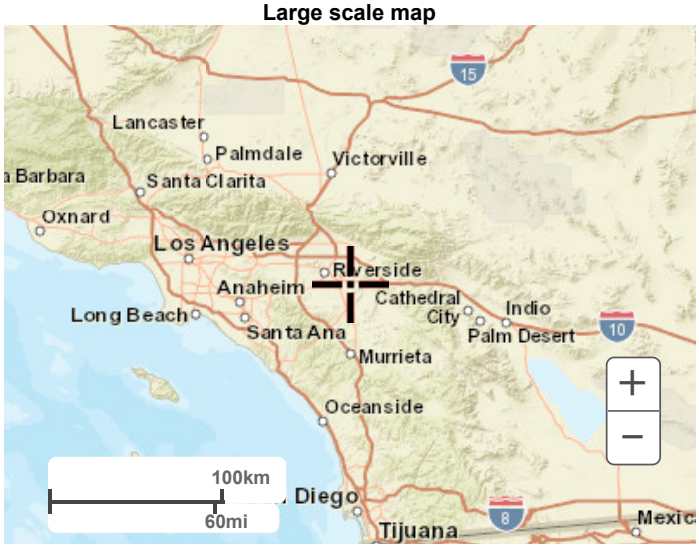
Maps & aerials

Small scale terrain

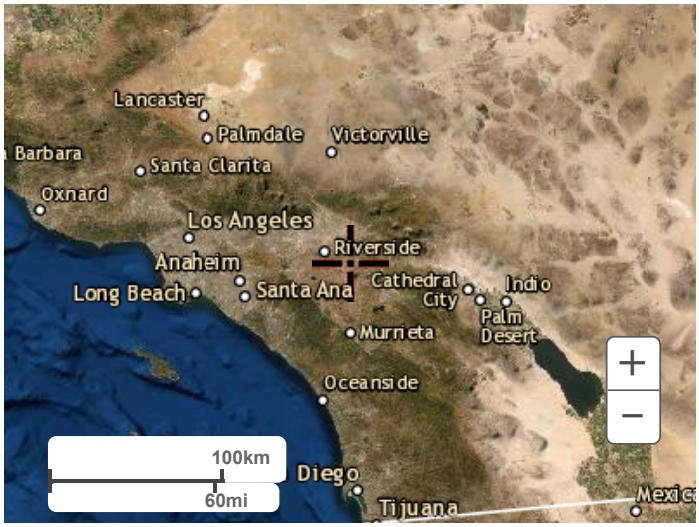


Large scale terrain

Large scale map



Large scale aerial



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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

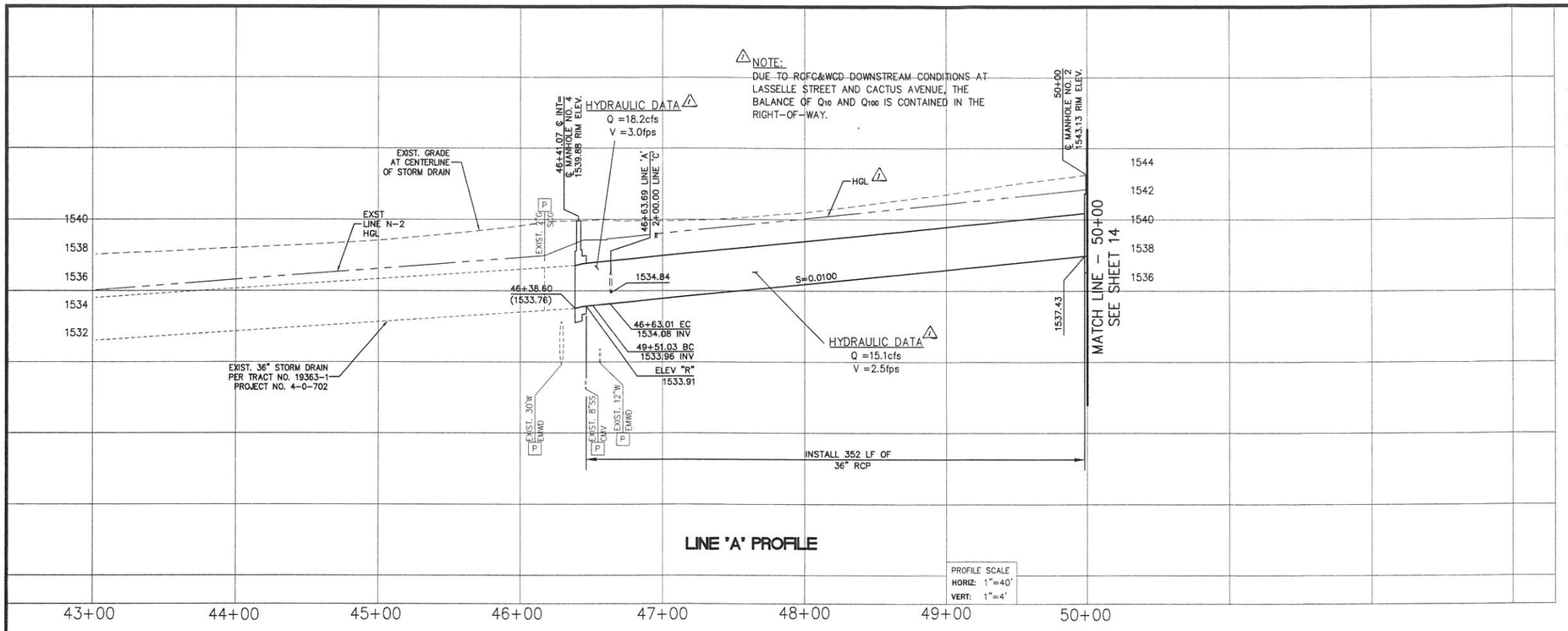
F

Appendix F

REFERENCE OFFSITE STORM DRAIN PLANS

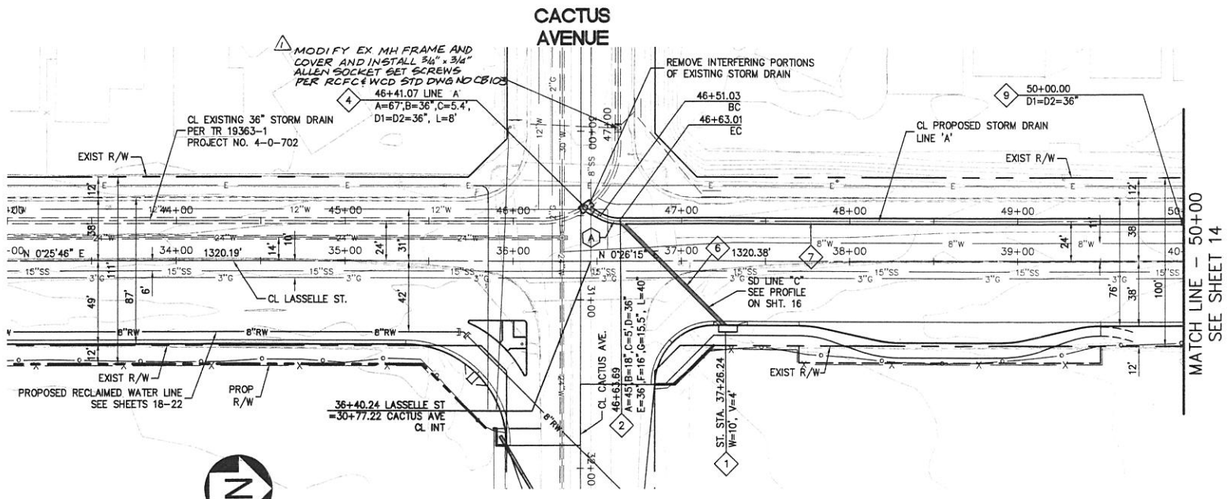
1. LASSELLE STREET STORM DRAIN PLANS
PROJECT NO. 06-50182725

MDS CONSULTING
MORSE SCHULTZ
17320 Redhill Ave.
Suite 350
Irvine, CA 92614
Voice: 949-251-8821
FAX: 949-251-0516
PLANNERS ENGINEERS SURVEYORS



LINE "A" PROFILE

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



LINE "A" PLAN

LASSELLE STREET

GRAPHIC SCALE
40' 20' 0' 40' 80'
Note: For reduced sized prints, original scale is in inches

CONSTRUCTION NOTES:

1. CONSTRUCT CATCH BASIN NO. 1 PER R.C.F.C.&W.C.D. STD. DWG. NO. CB100.
2. CONSTRUCT JUNCTION STRUCTURE NO. 2 PER R.C.F.C.&W.C.D. STD. DWG. NO. JS227.
4. CONSTRUCT MANHOLE NO. 4 PER R.C.F.C.&W.C.D. STD. DWG. NO. MH254 MODIFIED WITH PRESSURE TYPE MANHOLE FRAME AND COVER AND PRESSURE MANHOLE SHAFT PER R.C.F.C.&W.C.D. STD. DWG. NOS. MH256 AND MH258.
6. CONSTRUCT 18" R.C.P. (D-2000)
7. CONSTRUCT 36" R.C.P. (D-1500)
9. CONSTRUCT MANHOLE NO. 2 PER R.C.F.C.&W.C.D. STD. DWG. NO. MH252.

HATCH / LINE LEGEND

- E — EXISTING ELECTRICAL
- FO — EXISTING FIBER OPTIC
- G — EXISTING GAS
- SD — EXISTING STORM DRAIN
- RW — PROPOSED RECLAIMED WATER LINE
- SS — EXISTING SANITARY SEWER
- T — EXISTING TELECOMMUNICATION
- W — EXISTING WATER

DISPOSITION NOTES

- P PROTECT IN PLACE (ITEM AS INDICATED)
- RO RELOCATE BY OTHERS (ITEM AS INDICATED)

LINE / CURVE TABLE

#	DELTA/BRG	RADIUS	LENGTH	TANGENT
A	29°59'35"	22.50'	11.78'	6.03'

NOTE TO CONTRACTOR:

LOCATION, TYPE, AND DEPTH OF EXISTING UTILITIES INCLUDING UTILITIES IDENTIFIED WITH POTHOLE DATA ARE APPROXIMATE. CONTRACTOR SHALL VERIFY THE LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO THE START OF EXCAVATION. CONTRACTOR SHALL TAKE CARE DURING EXCAVATION AND PROTECT IN PLACE ALL UTILITIES ENCOUNTERED. DAMAGED UTILITY FACILITIES SHALL BE REPAIRED AT NO ADDITIONAL COST.

NO WORK SHALL BE DONE ON THIS SITE UNTIL BELOW AGENCY IS NOTIFIED OF INTENTION TO GRADE OR EXCAVATE.
Underground Service Alert
Call: TOLL FREE
1-800 227-2600
TWO WORKING DAYS BEFORE YOU DIG

BENCH MARK
BM NO. M-40-4
NAVD88 ELEV. 1590.938 FEET
ADJ. YEAR: RCFCD FIELD NOTES DATED 4/25/2001
FOUND 3" BRASS DISK STAMPED "M-40-4 RESET 1976" IN CONC. AT SE CORNER OF ALESSANDRO BLVD AND NASON STREET IN MORENO VALLEY, CA. POINT IS LOCATED APPROXIMATELY 56 FEET EAST OF CL OF NASON STREET AND APPROXIMATELY 48 FEET SOUTH OF CL OF ALESSANDRO BLVD.

BASIS OF BEARING
THE BASIS OF BEARING FOR THIS SURVEY IS THE NORTH AMERICAN DATUM OF 1983 (NAD83, CORS96), CALIFORNIA COORDINATE SYSTEM OF 1983 (CCS83), ZONE 6, BASED LOCALLY BETWEEN CORS STATIONS "BILL" (NGS PID AF9686) AND "CLAR" (NGS PID AI4481) BEING N44°41'21"W.

MARK	REVISION	APPR	DATE
1	REV. HYD. DATA & HGL, ADD MH NOTE	WJK	12/11/08

DESIGNED BY ____ DRAWN BY ____ CHECKED BY ____

CITY OF MORENO VALLEY APPROVALS

APPROVED BY	DATE	BY
SUPERVISING SENIOR ENGINEER	8/28/08	WJK
CITY TRAFFIC ENGINEER	8/28/08	EL
MAINTENANCE AND OPERATIONS MANAGER	8/28/08	JMW
SENIOR ENGINEER	8/28/08	WJK

PREM KUMAR C51343
DEPUTY PUBLIC WORKS DIRECTOR/ ASSISTANT CITY ENGINEER
P.E. 52463 EXP. 12/31/2008
8/28/08 DATE

CHRIS A. VOOT
PUBLIC WORKS DIRECTOR/CITY ENGINEER
P.E. 44250 EXP. 06/30/2009
12/11/08 DATE

PLANS PREPARED BY:
PSOMAS
3187 Red Hill Avenue, Suite 250
Costa Mesa, CA 92626
(714) 751-7373 Fax (714) 545-8883
UNDER THE SUPERVISION OF:
NANCY BOYER, PE C68531, EXP 09/30/09

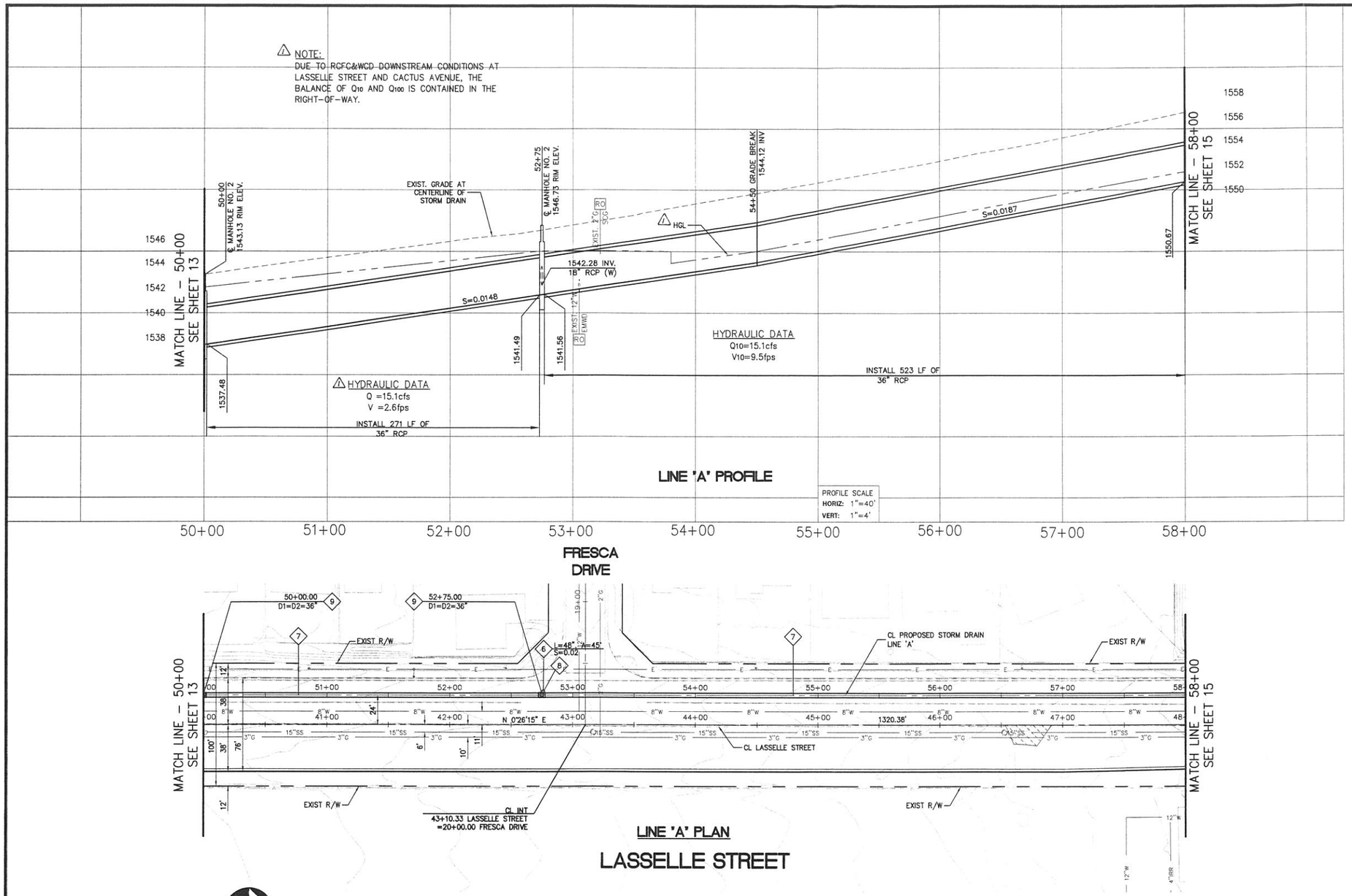
REGISTERED PROFESSIONAL ENGINEER NANCY BOYER No. C68531 Exp. 09/30/09 CIVIL STATE OF CALIFORNIA

CITY OF MORENO VALLEY

LASSELLE STREET
STORM DRAIN IMPROVEMENT PLANS
STA. 43+00 TO STA. 50+00

ACCT. NO. 501.82725
SHEET 13 NO. 43
PROJECT NO. 06-50182725

DWG Name: M:\2MOR150200\Engr\Plan Sheets\SD-04.dwg Plotted by: lfrench on Dec 05, 2008 - 9:17:47



Note: For reduced sized prints, original scale is in inches

CONSTRUCTION NOTES:

6. CONSTRUCT 18" R.C.P. (D-2000)
7. CONSTRUCT 36" R.C.P. (D-1500)
8. CONSTRUCT CONCRETE BULKHEAD PER R.C.F.&W.C.D. STD. DWG. NO. M816.
9. CONSTRUCT MANHOLE NO. 2 PER R.C.F.C.&W.C.D. STD. DWG. NO. MH252.

HATCH / LINE LEGEND

- E — EXISTING ELECTRICAL
- FO — EXISTING FIBER OPTIC
- G — EXISTING GAS
- SD — EXISTING STORM DRAIN
- SS — EXISTING SANITARY SEWER
- T — EXISTING TELECOMMUNICATION
- W — EXISTING WATER

DISPOSITION NOTES

RO RELOCATE BY OTHERS (ITEM AS INDICATED)

NOTE TO CONTRACTOR:

LOCATION, TYPE, AND DEPTH OF EXISTING UTILITIES INCLUDING UTILITIES IDENTIFIED WITH POTHOLE DATA ARE APPROXIMATE. CONTRACTOR SHALL VERIFY THE LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO THE START OF EXCAVATION. CONTRACTOR SHALL TAKE CARE DURING EXCAVATION AND PROTECT IN PLACE ALL UTILITIES ENCOUNTERED. DAMAGED UTILITY FACILITIES SHALL BE REPAIRED AT NO ADDITIONAL COST.

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Underground Service Alert
Call: TOLL FREE
1-800 227-2600
TWO WORKING DAYS BEFORE YOU DIG

BENCH MARK

BM NO. M-40-4
NAVD88 ELEV: 1590.936 FEET
ADJ. YEAR: RCFCD FIELD NOTES DATED 4/25/2001

FOUND 3" BRASS DISK STAMPED "M-40-4 RESET 1976" IN CONC. AT SE CORNER OF ALESSANDRO BLVD AND NASON STREET IN MORENO VALLEY, CA. POINT IS LOCATED APPROXIMATELY 56 FEET EAST OF CL OF NASON STREET AND APPROXIMATELY 48 FEET SOUTH OF CL OF ALESSANDRO BLVD.

BASIS OF BEARING

THE BASIS OF BEARING FOR THIS SURVEY IS THE NORTH AMERICAN DATUM OF 1983 (NAD83, CORS96), CALIFORNIA COORDINATE SYSTEM OF 1983 (CCS83), ZONE 6, BASED LOCALLY BETWEEN CORS STATIONS "BILL" (NGS PID AF9686) AND "CLAR" (NGS PID AI4481) BEING N44°41'21"W.

MARK	REVISION	APPR	DATE
⚠	REV. HYD. DATA & HGL		

DESIGNED BY ____ DRAWN BY ____ CHECKED BY ____

CITY OF MORENO VALLEY APPROVALS

APPROVED BY	DATE	BY
SUPERVISING SENIOR ENGINEER	8/28/08	KS
CITY TRAFFIC ENGINEER	8/28/08	EL
MAINTENANCE AND OPERATIONS MANAGER	8/28/08	RMW
SENIOR ENGINEER	8/28/08	

PREM KUMAR
DEPUTY PUBLIC WORKS DIRECTOR/ ASSISTANT CITY ENGINEER
P.E. 52463 EXP. 12/31/2008
8/28/08 DATE

CHRIS A. VOGT
PUBLIC WORKS DIRECTOR/CITY ENGINEER
P.E. 44250 EXP. 06/30/2009
12/11/08 DATE

PLANS PREPARED BY:
PSOMAS
3187 Red Hill Avenue, Suite 250
Costa Mesa, CA 92626
(714) 751-7373 Fax (714) 545-8883
UNDER THE SUPERVISION OF:
NANCY BOYER, RCE C68531, EXP 06/30/09

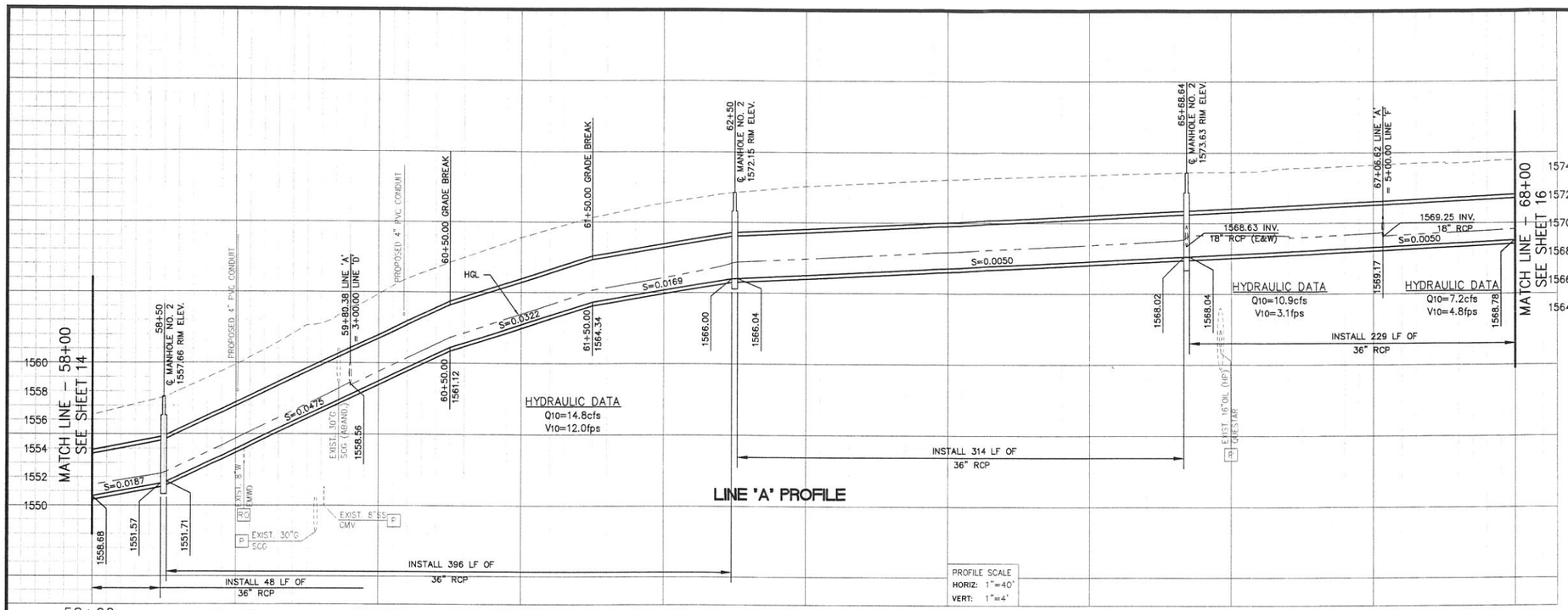
REGISTERED PROFESSIONAL ENGINEER NANCY BOYER No. C68531 Exp. 06/30/09 CIVIL STATE OF CALIFORNIA

CITY OF MORENO VALLEY

LASSELLE STREET
STORM DRAIN IMPROVEMENT PLANS
STA. 50+00 TO STA. 58+00

ACCT. NO. 501.82725
SHEET 14 NO. 43
PROJECT NO. 06-50182725

DWG Name: M:\2MOR150200\Engr\Plan Sheets\SD-05.dwg Plotted by: lfrench on Dec 05, 2008 - 9:17:03



Note: For reduced sized prints, original scale is in inches

CONSTRUCTION NOTES:

1. CONSTRUCT CATCH BASIN NO. 1 PER R.C.F.C.&W.C.D. STD. DWG. NO. CB100.
2. CONSTRUCT JUNCTION STRUCTURE NO. 2 PER R.C.F.C.&W.C.D. STD. DWG. NO. JS227.
6. CONSTRUCT 18" R.C.P. (D-2000)
7. CONSTRUCT 36" R.C.P. (D-1500)
8. CONSTRUCT CONCRETE BULKHEAD PER R.C.F.&W.C.D. STD. DWG. NO. MB16.
9. CONSTRUCT MANHOLE NO. 2 PER R.C.F.C.&W.C.D. STD. DWG. NO. MH252.
10. CONSTRUCT CURB OPENING CATCH BASIN WITH MANHOLE IN STREET PER S.P.P.W.C. STD. PLAN NO. 307-2.

HATCH / LINE LEGEND

- E — EXISTING ELECTRICAL
- FO — EXISTING FIBER OPTIC
- G — EXISTING GAS
- SD — EXISTING STORM DRAIN
- SS — EXISTING SANITARY SEWER
- T — EXISTING TELECOMMUNICATION
- W — EXISTING WATER

DISPOSITION NOTES

- RL RELOCATE (ITEM AS INDICATED)
- P PROTECT IN PLACE (ITEM AS INDICATED)

LINE / CURVE TABLE

#	DELTA/BRG	RADIUS	LENGTH	TANGENT
A	05°20'44"	451.50'	73.65'	36.90'
B	09°21'33"	451.00'	73.76'	73.67'

NOTE TO CONTRACTOR:

LOCATION, TYPE, AND DEPTH OF EXISTING UTILITIES INCLUDING UTILITIES IDENTIFIED WITH POTHOLE DATA ARE APPROXIMATE. CONTRACTOR SHALL VERIFY THE LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO THE START OF EXCAVATION. CONTRACTOR SHALL TAKE CARE DURING EXCAVATION AND PROTECT IN PLACE ALL UTILITIES ENCOUNTERED. DAMAGED UTILITY FACILITIES SHALL BE REPAIRED AT NO ADDITIONAL COST.

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Underground Service Alert
Call: TOLL FREE
1-800 227-2600
TWO WORKING DAYS BEFORE YOU DIG

BENCH MARK	BASIS OF BEARING
BM NO. M-40-4 NAVD88 ELEV: 1590.938 FEET ADJ. YEAR: RCFCD FIELD NOTES DATED 4/25/2001 FOUND 3" BRASS DISK STAMPED "M-40-4 RESET 1978" IN CONC. AT SE CORNER OF ALESSANDRO BLVD AND NASON STREET IN MORENO VALLEY, CA. POINT IS LOCATED APPROXIMATELY 56 FEET EAST OF CL OF NASON STREET AND APPROXIMATELY 48 FEET SOUTH OF CL OF ALESSANDRO BLVD.	THE BASIS OF BEARING FOR THIS SURVEY IS THE NORTH AMERICAN DATUM OF 1983 (NAD83, CORS96), CALIFORNIA COORDINATE SYSTEM OF 1983 (CCS83), ZONE 6, BASED LOCALLY BETWEEN CORS STATIONS "BILL" (NGS PID AF9686) AND "CLAR" (NGS PID AI4481) BEING N44°41'21"W.

MARK	REVISION	APPR. DATE

DESIGNED BY ____ DRAWN BY ____ CHECKED BY ____

CITY OF MORENO VALLEY APPROVALS

APPROVED BY	DATE	BY
SUPERVISING SENIOR ENGINEER	8/28/08	
CITY TRAFFIC ENGINEER	8/28/08	EL
MAINTENANCE AND OPERATIONS MANAGER	8/28/08	
SENIOR ENGINEER	8/28/08	

ARUN PREM KUMAR, RCE 51343, DATE 8/28/08
DEPUTY PUBLIC WORKS DIRECTOR/ ASSISTANT CITY ENGINEER
R.C.E. 52463 EXP. 12/31/2008

CHRIS A. VOGT, DATE 8/28/08
PUBLIC WORKS DIRECTOR/CITY ENGINEER
R.C.E. 44250 EXP. 06/30/2009

PLANS PREPARED BY:
PSOMAS
3187 Red Hill Avenue, Suite 250
Costa Mesa, CA 92626
(714) 751-7373 Fax (714) 545-8883

UNDER THE SUPERVISION OF:
NANCY BOYER, RCE C68531, EXP. 09/30/09

REGISTERED PROFESSIONAL ENGINEER NANCY BOYER No. C68531 Exp. 09/30/09 CIVIL STATE OF CALIFORNIA

CITY OF MORENO VALLEY

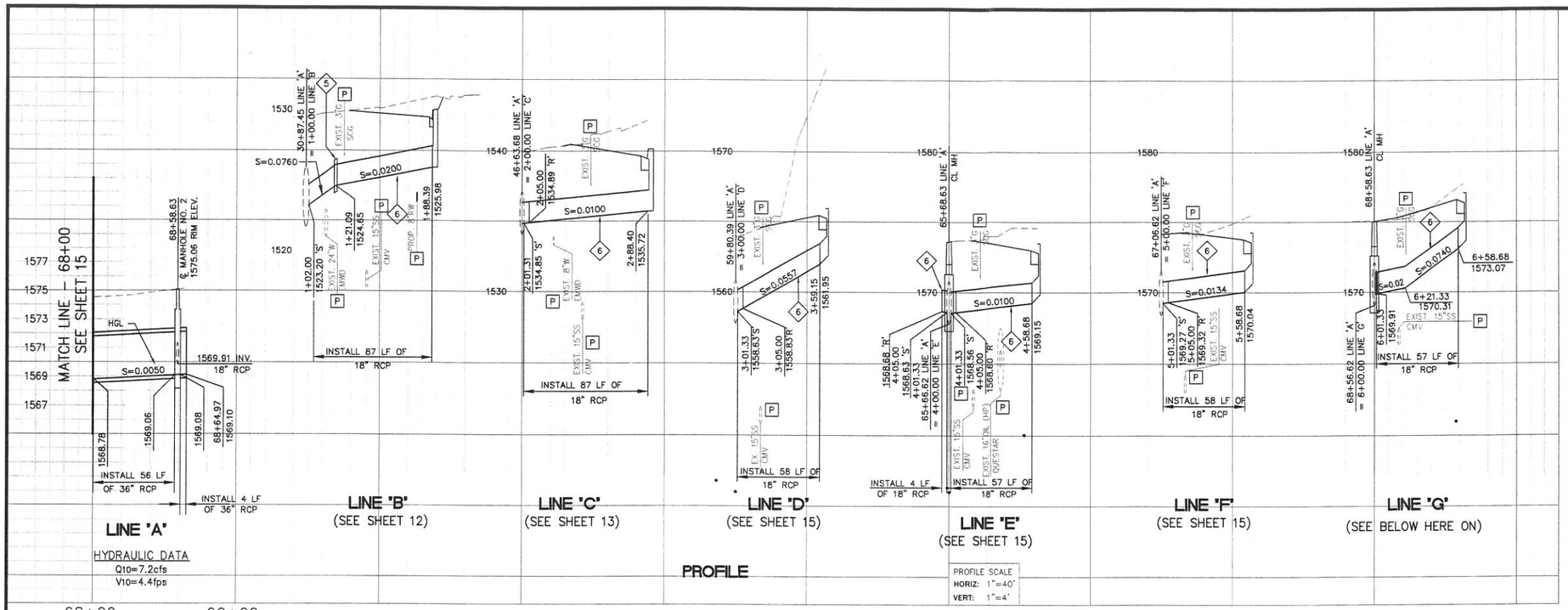
LASSELLE STREET
STORM DRAIN IMPROVEMENT PLANS
STA. 58+00 TO STA. 68+00

ACCT. NO. 501.82725

SHEET 15 NO. 43

PROJECT NO. 06-50182725

DWG Name: M:\JOBS\50182500\Engr\Plan Sheets\50-06.dwg Plotted by: mcampos on Aug 25, 2008 - 11:53:08



CONSTRUCTION NOTES:

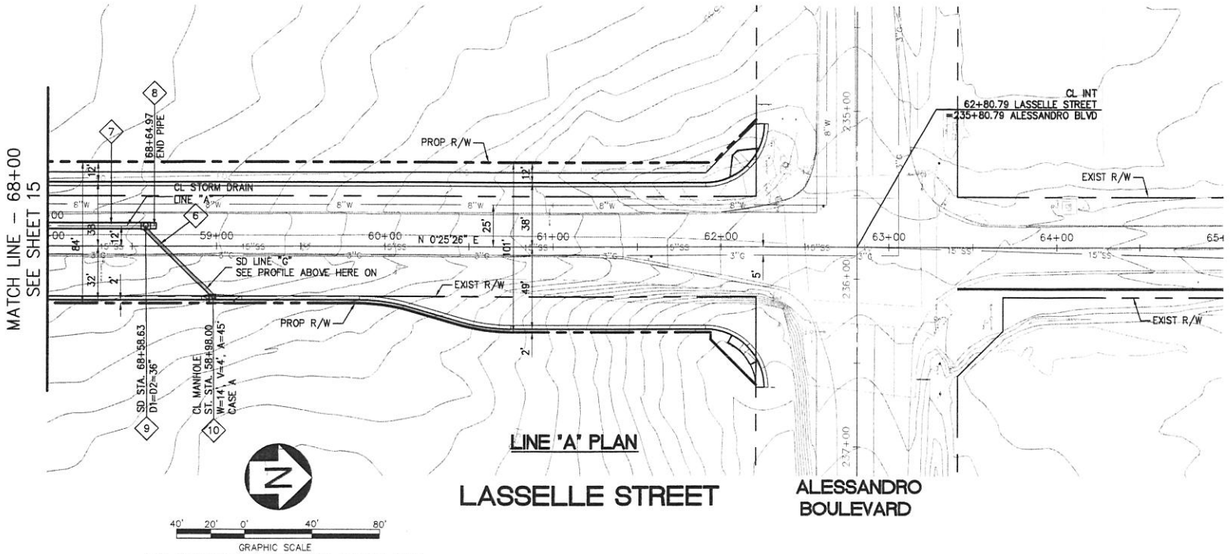
2. CONSTRUCT JUNCTION STRUCTURE NO. 2 PER R.C.F.C.&W.C.D. STD. DWG. NO. JS227.
5. CONSTRUCT CONCRETE COLLAR PER R.C.F.C.&W.C.D. STD. DWG. NO. M803.
6. CONSTRUCT 18" R.C.P. (D-2000)
7. CONSTRUCT 36" R.C.P. (D-1500)
8. CONSTRUCT CONCRETE BULKHEAD PER R.C.F.&W.C.D. STD. DWG. NO. M816.
9. CONSTRUCT MANHOLE NO. 2 PER R.C.F.C.&W.C.D. STD. DWG. NO. MH252.
10. CONSTRUCT CURB OPENING CATCH BASIN WITH MANHOLE IN STREET PER S.P.P.W.C. STD. PLAN NO. 307-2.

HATCH / LINE LEGEND

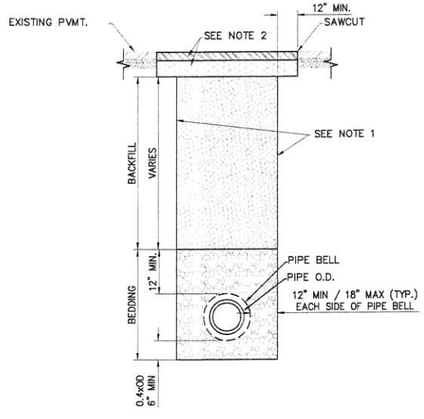
- E — EXISTING ELECTRICAL
- FO — EXISTING FIBER OPTIC
- G — EXISTING GAS
- SD — EXISTING STORM DRAIN
- SS — EXISTING SANITARY SEWER
- T — EXISTING TELECOMMUNICATION
- W — EXISTING WATER

DISPOSITION NOTES

- [P] PROTECT IN PLACE (ITEM AS INDICATED)
- [RL] RELOCATE (ITEM AS INDICATED)
- [RO] RELOCATE BY OTHERS (ITEM AS INDICATED)



Note: For reduced sized prints, original scale is in inches



PIPE TRENCH DETAIL

TRENCH NOTES:

1. TRENCH BACKFILL PER CITY OF MORENO VALLEY STANDARD PLAN NO. 602B.
2. ROADWAY REPAIR OVER TRENCH PER CITY OF MORENO VALLEY STANDARD PLAN NO. 602B.
3. THE CITY SHALL APPROVE PIPE BEDDING PRIOR TO CONSTRUCTION.
4. ALL MATERIAL TO BE PLACED IN 8" LIFTS, MAXIMUM.

NOTE TO CONTRACTOR:

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Underground Service Alert
Call: TOLL FREE
1-800
227-2600
TWO WORKING DAYS BEFORE YOU DIG

BENCH MARK

BM NO. M-40-4
NAVD88 ELEV: 1590.938 FEET
ADJ. YEAR: RCFCD FIELD NOTES DATED 4/25/2001

FOUND 3" BRASS DISK STAMPED "M-40-4 RESET 1976" IN CONC. AT SE CORNER OF ALESSANDRO BLVD AND NASON STREET IN MORENO VALLEY, CA. POINT IS LOCATED APPROXIMATELY 56 FEET EAST OF CL OF NASON STREET AND APPROXIMATELY 48 FEET SOUTH OF CL OF ALESSANDRO BLVD.

BASIS OF BEARING

THE BASIS OF BEARING FOR THIS SURVEY IS THE NORTH AMERICAN DATUM OF 1983 (NAD83, CORS96), CALIFORNIA COORDINATE SYSTEM OF 1983 (CCS83), ZONE 6, BASED LOCALLY BETWEEN CORS STATIONS "BILL" (NGS PID AF9686) AND "CLAR" (NGS PID AI4481) BEING N44°41'21"W.

MARK	REVISION	APPR	DATE

DESIGNED BY _____ DRAWN BY _____ CHECKED BY _____

CITY OF MORENO VALLEY APPROVALS

APPROVED BY	DATE	BY
SUPERVISING SENIOR ENGINEER	8/28/08	RJS
CITY TRAFFIC ENGINEER	8/28/08	EL
MAINTENANCE AND OPERATIONS MANAGER	8/28/08	
SENIOR ENGINEER	8/28/08	

PREM KUMAR C51343
DEPUTY PUBLIC WORKS DIRECTOR/ ASSISTANT CITY ENGINEER
P.E. 52463 EXP. 12/31/2008
8/28/08 DATE

CHRIS A. VOGT
PUBLIC WORKS DIRECTOR/CITY ENGINEER
P.E. 44250 EXP. 06/30/2009
8/28/08 DATE

PLANS PREPARED BY:
PSOMAS
3187 Red Hill Avenue, Suite 250
Costa Mesa, CA 92626
(714) 751-7373 Fax (714) 545-8883

UNDER THE SUPERVISION OF:
NANCY BOYER, PE C68531, Exp 09/30/09

REGISTERED PROFESSIONAL ENGINEER NANCY BOYER No. C68531 Exp. 09/30/09 CIVIL STATE OF CALIFORNIA

CITY OF MORENO VALLEY

LASSELLE STREET
STORM DRAIN IMPROVEMENT PLANS
STA. 68+00 TO END

ACCT. NO. 501.82725

SHEET 16 NO. 43

PROJECT NO.
06-50182725

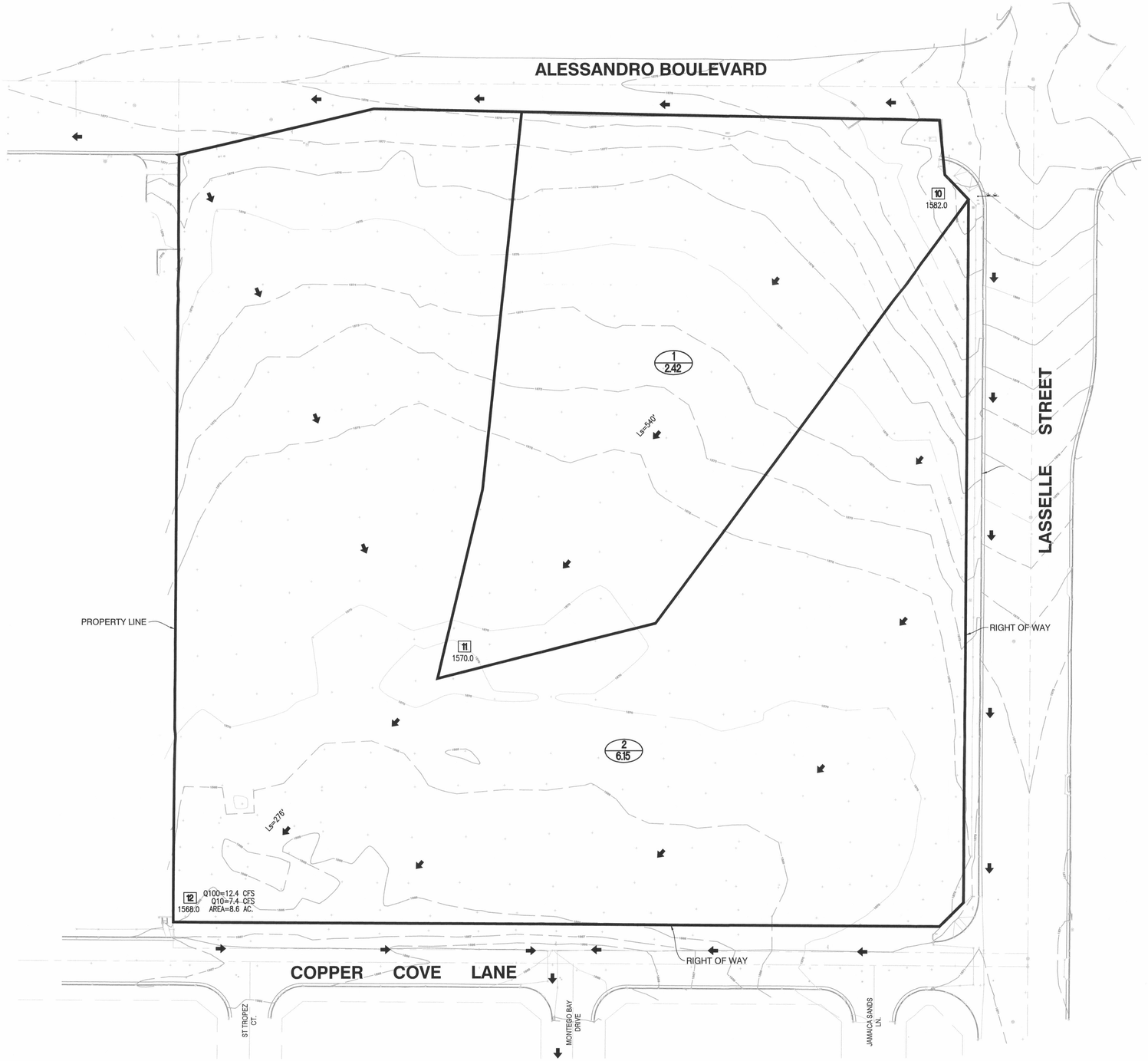
DWG Name: M:\CMOP150\2003\Engr\Plan Sheets\SD-07.dwg Plotted by: lfrench on Aug 26, 2008 - 8:11:25

G

Appendix G

POCKET MAP EXHIBITS

MDS CONSULTING
MORSE SCHULTZ
17320 Redhill Ave.
Suite 350
Irvine, CA 92614
Voice: 949-251-8821
FAX: 949-251-0516
PLANNERS ENGINEERS SURVEYORS



VICINITY MAP

N.T.S.

NOTE:

SOIL TYPE "B"

LEGEND

1 / 1.0	DRAINAGE AREA No. / DRAINAGE AREA (ACRE)
25 / 485.3 / 476.0	NODE NUMBER / FINISH SURFACE ELEVATION / INVERT ELEVATION
26 / 485.3	NODE NUMBER / FINISH SURFACE ELEVATION
←	DIRECTION OF FLOW
	DRAINAGE AREA BOUNDARY
Lp=25'	LENGTH OF PIPE (FEET)
Ls=120'	SURFACE FLOW LENGTH (FEET)

N

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)

1 inch = 40 ft.

PEN22-0022 (LST22-0008)

MDS CONSULTING
MORSE SCHULTZ
17320 Redhill Ave. Suite 350
Irvine, CA 92614
Voice: 949-251-8821
FAX: 949-251-0316
PLANNERS ENGINEERS SURVEYORS

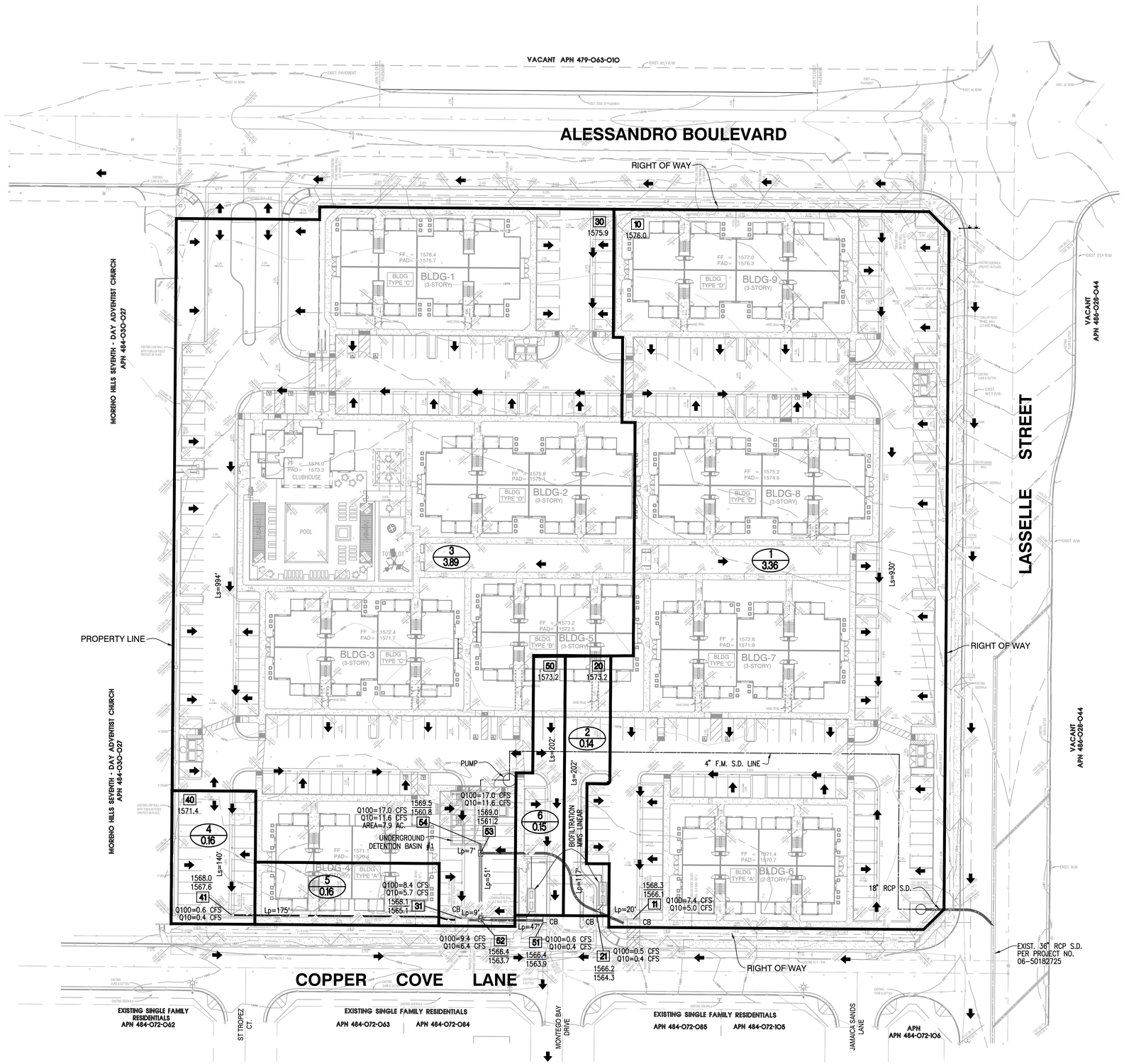
PLATE 1

Date	By	REVISIONS	App'd

REGISTERED PROFESSIONAL ENGINEER
EDWARD J. LEATH
No. 052496
Exp. 12-31-22
CIVIL
STATE OF CALIFORNIA

CRYSTAL COVE
PRELIMINARY HYDROLOGY MAP
UNDEVELOPED CONDITION

Last Revised: Mon May 09, 2022 – 1:51pm Last Plotted: Mon May 09, 2022 – 1:25pm Plotted By: STATION65 Drawing: I:\92600\DRAINAGE\Hydrology\PRELIM\DRAWINGS\92600-PRELIM EXISTING HYDROLOGY MAP.dwg



VICINITY MAP

N.T.S.

NOTE:

SOIL TYPE "B"

LEGEND

1 / 1.0	DRAINAGE AREA No. / DRAINAGE AREA (ACRE)
25 / 485.3 / 476.0	NODE NUMBER / FINISH SURFACE ELEVATION / INVERT ELEVATION
28 / 485.3	NODE NUMBER / FINISH SURFACE ELEVATION
⬅	DIRECTION OF FLOW
	DRAINAGE AREA BOUNDARY
Lp=25'	LENGTH OF PIPE (FEET)
Ls=120'	SURFACE FLOW LENGTH (FEET)

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

PEN22-0022 (LST22-0008)

MDS CONSULTING
MOSES SCHULTZ
17320 Redhill Ave. Suite 330 Irvine, CA 92614
Voice: 949-251-8821 FAX: 949-251-8816
PLANNERS ENGINEERS SURVEYORS

PLATE 2

REGISTERED PROFESSIONAL ENGINEER EDWARD J. LEAHY No. 052496 Exp. 12-31-22 CIVIL STATE OF CALIFORNIA

CRYSTAL COVE
PRELIMINARY HYDROLOGY MAP
DEVELOPED CONDITION

Date	By	REVISIONS	App'd

Last Revised: Wed May 11, 2022 - 9:11am Last Plotted: Wed May 11, 2022 - 9:10am Plotted By: STATION65 Drawing: I:\92600\DRAINAGE\Hydrology\PRELIM\DRAWINGS\92600-PRELIM HYDROLOGY MAP.dwg