APPENDIX I2

PRELIMINARY HYDROLOGY REPORT

FUSCOE ENGINEERING

PRELIMINARY HYDROLOGY REPORT

PLACENTIA SENIOR HOUSING

1314 N. Angelina Drive
Placentia, California
92870

prepared for:
National Community Renaissance of California

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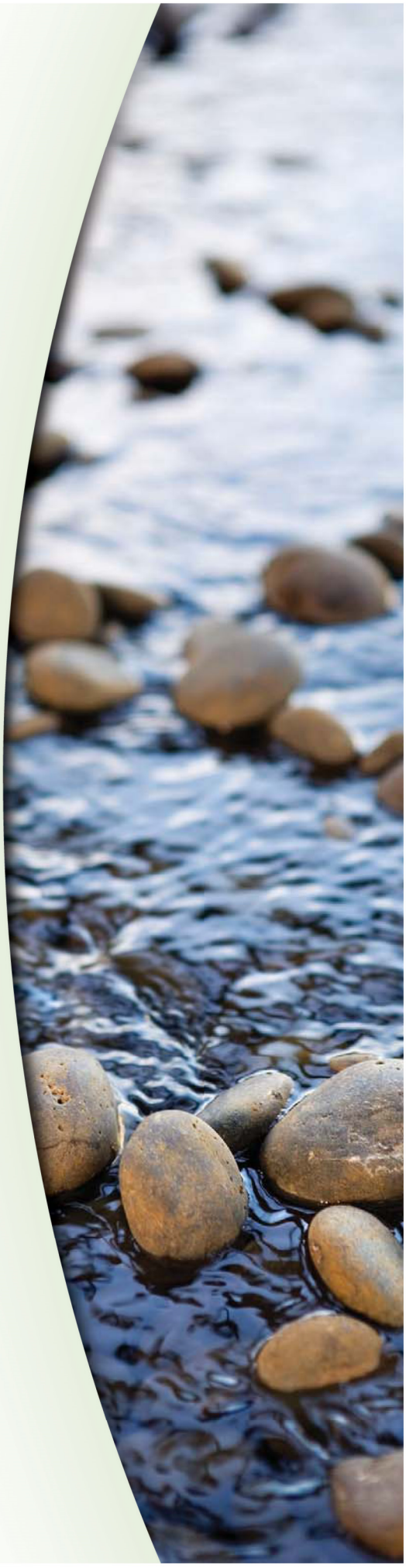
July 2020

Job Number: 1653.010.01

full circle thinking®



PRELIMINARY HYDROLOGY REPORT

Placentia Senior Housing
1314 N. Angelina Drive
Placentia, California
92870

PREPARED BY:
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Project Number:

1653-010-01

Project Manager:

Josh Ruiz, P.E.

Date Prepared:

July 2020

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1.0 INTRODUCTION

1.1 Geographic Setting

The project site is located at 1314 North Angelina Drive within the City of Placentia, CA. The property is bordered by North Angelina Drive to the west, single-family residences to the north and east, and Morse Avenue to the south. A Vicinity Map is included as Figure 1, below.

FIGURE 1 – VICINITY MAP

1.2 Project Description

The project site consists of a rectangular-shaped property on approximately 4 acres of land. The site is relatively flat, with the topography sloping in a westerly and southwesterly direction toward the corner of N. Angelina Drive and Morse Avenue, where there is an existing City of Placentia catch basin (located on N. Angelina Drive).

The site is currently occupied by "Blessed Sacrament Episcopal Church". There are currently two buildings on the property; the westerly structure serves to accommodate church gatherings, while the easterly building serves as a school facility. The property includes associated surface parking and landscape (grass and trees).

The proposed development will include the construction of two residential buildings, to accommodate 65 units. Building 1, to be located at the northerly end of the site, will be a linear two-story structure. Building 2, to be located near the southeasterly corner of the site, will be an L-shaped building, with a three-story component at the westerly end of the building, transitioning to two-stories toward the single-family neighborhood along the easterly property line. The existing church and school facility are anticipated to remain in-place. Associated parking to accommodate the proposed development will also be provided.

1.3 Purpose of this Report

The purpose of this report is to provide a conceptual description of the proposed drainage approach, as well as calculations and exhibits to estimate the values for the existing and proposed condition stormwater flows. The information presented in this report demonstrates that the proposed stormwater design would not adversely impact the existing drainage conditions.

1.4 References

- Orange County Hydrology Manual & Local Drainage Manuals
- AES Hydrologic Software
- Bentley Flowmaster Hydraulic Software
- USDA NRCS Web soil Survey
- City of Placentia Record Drawings (as-built plans)

2.0 HYDROLOGY

2.1 Existing Condition

As mentioned previously in this report, the existing site includes a church building, along with a building used as a school facility. The northerly portion of the site is vegetated with grass and trees. The southerly portion of the site is an asphalt-concrete parking lot.

Based on our review of the existing topography, the drainage pattern is westerly and southwesterly, toward the intersection of N. Angelina Drive and Morse Avenue, via surface flow, including a ribbon gutter within the at-grading parking lot, which conveys stormwater flows toward the southwest corner.

The existing condition hydrology calculations have been prepared, and are included in this report as Appendix 1. The existing condition hydrology map is included in Appendix 6.

2.2 Proposed Condition

The proposed condition will include a detention system to ensure that storm water discharges will not exceed the existing condition 2-year,10-year, 25-year, and 100-year storm events at the site's discharge location at the southwest corner of the property. (In addition, the initial 2-year stormwater runoff will be directed to a hydromodification storage system for retention and infiltration of the required hydromodification volume, which will include a series of drywells that will be connected to the hydromodification storage system. Please see WQMP for 2-year hydromodification analyses.)

The proposed condition hydrology calculations are included in this report as Appendix 2. The proposed condition hydrology map included in Appendix 6.

2.3 Soil Type

The project is within Soil Types "B" and "C", as shown on the Web Soil Survey report, which is included herein as Appendix 3.

3.0 DETENTION ANALYSES

The proposed condition will increase the imperviousness of the site, and therefore the proposed stormwater runoff would be increased. Therefore, detention mitigation will be required. (The 2-year runoff will be directed to a hydromodification tank with Drywell infiltration systems connected, for infiltration purposes; see WQMP.) The peak storm events will be directed to a peak detention system, which will include an outlet to reduce the storm water flows to not exceed those of the existing condition.

The proposed peak storm detention system will consist of the following (conceptual) elements:

- Diversion Structure to allow the 2-year storm event to be directed to the hydromodification and infiltration system (See WQMP for further information);
- Detention Pipe System (approximately 325 lineal feet of 48"-diameter pipe);
- Outlet System (18"-diameter) to be directed to City of Placentia catch basin at N. Angelina Drive.

The detention analyses are included in Appendix 4.

4.0 FEMA

The project is within FEMA Map 06059C0063J (12/3/2009). The site is entirely within Zone X, which depicts area of minimal flood hazard. A CLOMR or LOMR will not be required. A FEMA Map (Firmette) is included in this report as Appendix 5.

5.0 PRE- AND POST- Q SUMMARY

Based on the hydrologic and detention analyses for the project site, the mitigated (detention) post-developed runoff (Qs) will be reduced, as compared to the pre-developed (existing condition) for the various storm events.

The following table summarizes the results for the pre- and post-developed runoff.

Table 1 – Runoff Summary

	Q2 (cfs)	Q10 (cfs)	Q25 (cfs)	Q100 (cfs)
Existing Condition	4.0	7.7	9.3	12.1
Unmitigated Proposed Condition	5.3	9.8	11.7	15.1
Mitigated (Detention) Proposed Condition	4.0	7.2	8.6	10.6

6.0 RESULTS AND CONCLUSIONS

Based on the hydrologic and detention analyses included in this preliminary hydrology report, the proposed project will not adversely impact the existing storm drain system or adjacent offsite areas. The proposed condition storm runoff flow rates (2-, 10-, 25, 100-year storm events) will not exceed the existing condition storm runoff rates, due to the implementation of the proposed detention system. The back-up calculations and exhibits are included in the appendices of this report.

7.0 APPENDICES

Appendix 1 Existing Condition Hydrology

Appendix 2 Proposed Condition Hydrology

Appendix 3 Web Soil Survey

Appendix 4 Detention Analyses

Appendix 5 FEMA Map

Appendix 6 Hydrology Maps

APPENDIX 1

Existing Condition Hydrology

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****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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             Ver. 23.0  Release Date: 07/01/2016  License ID 1355

                          Analysis prepared by:

                            fuscoe engineering
                             16795 Von Karman
                                Suite 100
                                Irvine, CA

 ************************ DESCRIPTION OF STUDY *************************
* Placentia Senior Housing                                             *
* 1314 N. Angelina, Placentia                                          *
* Existing Condition - 2-year storm event                              *
 ************************************************************************

  FILE NAME: EXANG2.DAT
  TIME/DATE OF STUDY: 10:48 04/14/2020
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

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

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    301.70  DOWNSTREAM(FEET) =    298.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.712
```

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EXANG2

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 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.389
 SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "1 DWELLING/ACRE"          B        0.88      0.30     0.800    36   11.71
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.800
 SUBAREA RUNOFF(CFS) =      0.91
 TOTAL AREA(ACRES) =      0.88   PEAK FLOW RATE(CFS) =      0.91

****************************************************************************
 FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    298.00  DOWNSTREAM(FEET) =    297.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =    72.00   CHANNEL SLOPE =  0.0139
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  20.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.317
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL GOOD COVER
 "GRASS"                    B        0.43      0.30     1.000    41
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.11
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.06
 AVERAGE FLOW DEPTH(FEET) =   0.09   TRAVEL TIME(MIN.) =   1.13
 Tc(MIN.) =   12.84
 SUBAREA AREA(ACRES) =     0.43       SUBAREA RUNOFF(CFS) =    0.39
 EFFECTIVE AREA(ACRES) =      1.31     AREA-AVERAGED Fm(INCH/HR) =   0.26
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.87
 TOTAL AREA(ACRES) =        1.3         PEAK FLOW RATE(CFS) =       1.25

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.09   FLOW VELOCITY(FEET/SEC.) =   1.11
 LONGEST FLOWPATH FROM NODE    101.00 TO NODE    103.00 =     402.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  61
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  297.00  DOWNSTREAM ELEVATION(FEET) =  294.80
 STREET LENGTH(FEET) =   283.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 24.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  19.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
```

A2

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A3

```
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.59
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.30
   HALFSTREET FLOOD WIDTH(FEET) =    8.90
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.75
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.53
 STREET FLOW TRAVEL TIME(MIN.) =   2.69   Tc(MIN.) =   15.53
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.181
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 APARTMENTS                 C        0.35      0.25     0.200    50
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      C        0.35      0.25     0.400    50
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.300
 SUBAREA AREA(ACRES) =    0.70      SUBAREA RUNOFF(CFS) =    0.70
 EFFECTIVE AREA(ACRES) =      2.01    AREA-AVERAGED Fm(INCH/HR) =  0.20
 AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  0.67
 TOTAL AREA(ACRES) =        2.0        PEAK FLOW RATE(CFS) =       1.78

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   9.34
 FLOW VELOCITY(FEET/SEC.) =  1.80   DEPTH*VELOCITY(FT*FT/SEC.) =   0.56
 LONGEST FLOWPATH FROM NODE    101.00 TO NODE    104.00 =     685.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    104.00 TO NODE    104.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   15.53
 RAINFALL INTENSITY(INCH/HR) =   1.18
 AREA-AVERAGED Fm(INCH/HR) =  0.20
 AREA-AVERAGED Fp(INCH/HR) =  0.29
 AREA-AVERAGED Ap =  0.67
 EFFECTIVE STREAM AREA(ACRES) =       2.01
 TOTAL STREAM AREA(ACRES) =       2.01
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.78

****************************************************************************
 FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
 ELEVATION DATA: UPSTREAM(FEET) =    300.70  DOWNSTREAM(FEET) =    297.50

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.615
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.555
 SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
```

A4

A4


```
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.83      0.25     0.400    50    9.62
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA RUNOFF(CFS) =      1.09
  TOTAL AREA(ACRES) =      0.83   PEAK FLOW RATE(CFS) =      1.09

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    107.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    297.50  DOWNSTREAM(FEET) =    295.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   186.00   CHANNEL SLOPE =  0.0108
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  24.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.434
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 C        0.58      0.25     0.200    50
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.58      0.25     0.400    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.300
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.80
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.12
  AVERAGE FLOW DEPTH(FEET) =   0.19   TRAVEL TIME(MIN.) =   1.46
  Tc(MIN.) =   11.08
  SUBAREA AREA(ACRES) =     1.16       SUBAREA RUNOFF(CFS) =    1.42
  EFFECTIVE AREA(ACRES) =      1.99     AREA-AVERAGED Fm(INCH/HR) =   0.09
  AREA-AVERAGED Fp(INCH/HR) =   0.25  AREA-AVERAGED Ap =   0.34
  TOTAL AREA(ACRES) =        2.0         PEAK FLOW RATE(CFS) =       2.42

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.21   FLOW VELOCITY(FEET/SEC.) =   2.27
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    107.00 =     516.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    104.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.08
  RAINFALL INTENSITY(INCH/HR) =   1.43
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.34
  EFFECTIVE STREAM AREA(ACRES) =       1.99
  TOTAL STREAM AREA(ACRES) =       1.99
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.42

  ** CONFLUENCE DATA **
   STREAM       Q      Tc    Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
```

A5

1	1.78	15.53	1.181	0.29(0.20)	0.67	2.0	101.00
2	2.42	11.08	1.434	0.25(0.09)	0.34	2.0	105.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	4.01	11.08	1.434	0.27(0.13)	0.48	3.4	105.00
2	3.74	15.53	1.181	0.28(0.14)	0.51	4.0	101.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 4.01 Tc(MIN.) = 11.08
EFFECTIVE AREA(ACRES) = 3.42 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.48
TOTAL AREA(ACRES) = 4.0
LONGEST FLOWPATH FROM NODE 101.00 TO NODE 104.00 = 685.00 FEET.

==========

END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 4.0 TC(MIN.) = 11.08
EFFECTIVE AREA(ACRES) = 3.42 AREA-AVERAGED Fm(INCH/HR)= 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.479
PEAK FLOW RATE(CFS) = 4.01

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	4.01	11.08	1.434	0.27(0.13)	0.48	3.4	105.00
2	3.74	15.53	1.181	0.28(0.14)	0.51	4.0	101.00

==========
==========

END OF RATIONAL METHOD ANALYSIS

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************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                          Analysis prepared by:

                            fuscoe engineering
                             16795 Von Karman
                                Suite 100
                                Irvine, CA

 ************************* DESCRIPTION OF STUDY *************************
* Placentia Senior Housing                                              *
* 1314 N. Angelina, Placentia                                           *
* Existing Condition - 10-year storm event                              *
 ************************************************************************

  FILE NAME: EXANG10.DAT
  TIME/DATE OF STUDY: 10:13 04/14/2020
========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

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

************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    301.70  DOWNSTREAM(FEET) =    298.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.712
```

```
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.493
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "1 DWELLING/ACRE"           B        0.88      0.30     0.800    56   11.71
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.800
 SUBAREA RUNOFF(CFS) =      1.78
 TOTAL AREA(ACRES) =      0.88   PEAK FLOW RATE(CFS) =      1.78

****************************************************************************
 FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    298.00  DOWNSTREAM(FEET) =    297.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =    72.00   CHANNEL SLOPE =  0.0139
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  20.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.387
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL GOOD COVER
 "GRASS"                     B        0.43      0.30     1.000    61
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.19
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.30
 AVERAGE FLOW DEPTH(FEET) =   0.13   TRAVEL TIME(MIN.) =   0.92
 Tc(MIN.) =   12.63
 SUBAREA AREA(ACRES) =     0.43       SUBAREA RUNOFF(CFS) =    0.81
 EFFECTIVE AREA(ACRES) =      1.31     AREA-AVERAGED Fm(INCH/HR) =   0.26
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.87
 TOTAL AREA(ACRES) =        1.3         PEAK FLOW RATE(CFS) =       2.51

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.14   FLOW VELOCITY(FEET/SEC.) =   1.37
 LONGEST FLOWPATH FROM NODE    101.00 TO NODE    103.00 =     402.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  61
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  297.00  DOWNSTREAM ELEVATION(FEET) =  294.80
 STREET LENGTH(FEET) =   283.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 24.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  19.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
```

```
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.17
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   11.94
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.05
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.75
  STREET FLOW TRAVEL TIME(MIN.) =   2.30   Tc(MIN.) =   14.93
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.169
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 C        0.35      0.25     0.200    69
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.35      0.25     0.400    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.300
  SUBAREA AREA(ACRES) =    0.70      SUBAREA RUNOFF(CFS) =    1.32
  EFFECTIVE AREA(ACRES) =      2.01    AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  0.67
  TOTAL AREA(ACRES) =        2.0        PEAK FLOW RATE(CFS) =       3.57

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  12.53
  FLOW VELOCITY(FEET/SEC.) =  2.11   DEPTH*VELOCITY(FT*FT/SEC.) =   0.80
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    104.00 =     685.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    104.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.93
  RAINFALL INTENSITY(INCH/HR) =   2.17
  AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.29
  AREA-AVERAGED Ap =  0.67
  EFFECTIVE STREAM AREA(ACRES) =       2.01
  TOTAL STREAM AREA(ACRES) =       2.01
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.57

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    300.70  DOWNSTREAM(FEET) =    297.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.615
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.791
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
```

```
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.83      0.25     0.400    69    9.62
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA RUNOFF(CFS) =      2.01
  TOTAL AREA(ACRES) =      0.83   PEAK FLOW RATE(CFS) =      2.01

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    107.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    297.50  DOWNSTREAM(FEET) =    295.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   186.00   CHANNEL SLOPE =  0.0108
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  24.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.598
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 C        0.58      0.25     0.200    69
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.58      0.25     0.400    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.300
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.33
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.42
  AVERAGE FLOW DEPTH(FEET) =   0.24   TRAVEL TIME(MIN.) =   1.28
  Tc(MIN.) =   10.90
  SUBAREA AREA(ACRES) =     1.16       SUBAREA RUNOFF(CFS) =    2.63
  EFFECTIVE AREA(ACRES) =      1.99     AREA-AVERAGED Fm(INCH/HR) =   0.09
  AREA-AVERAGED Fp(INCH/HR) =   0.25  AREA-AVERAGED Ap =   0.34
  TOTAL AREA(ACRES) =        2.0         PEAK FLOW RATE(CFS) =       4.50

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.26   FLOW VELOCITY(FEET/SEC.) =   2.69
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    107.00 =     516.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    104.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.90
  RAINFALL INTENSITY(INCH/HR) =   2.60
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.34
  EFFECTIVE STREAM AREA(ACRES) =       1.99
  TOTAL STREAM AREA(ACRES) =       1.99
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.50

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
```

1	3.57	14.93	2.169	0.29(0.20)	0.67	2.0	101.00
2	4.50	10.90	2.598	0.25(0.09)	0.34	2.0	105.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	7.67	10.90	2.598	0.27(0.13)	0.48	3.5	105.00
2	7.30	14.93	2.169	0.28(0.14)	0.51	4.0	101.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 7.67 Tc(MIN.) = 10.90
EFFECTIVE AREA(ACRES) = 3.46 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.48
TOTAL AREA(ACRES) = 4.0
LONGEST FLOWPATH FROM NODE 101.00 TO NODE 104.00 = 685.00 FEET.

==========

END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 4.0 TC(MIN.) = 10.90
EFFECTIVE AREA(ACRES) = 3.46 AREA-AVERAGED Fm(INCH/HR)= 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.480
PEAK FLOW RATE(CFS) = 7.67

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	7.67	10.90	2.598	0.27(0.13)	0.48	3.5	105.00
2	7.30	14.93	2.169	0.28(0.14)	0.51	4.0	101.00

==========
==========

END OF RATIONAL METHOD ANALYSIS

```
************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                          Analysis prepared by:

                            fuscoe engineering
                             16795 Von Karman
                                Suite 100
                                Irvine, CA

 ************************* DESCRIPTION OF STUDY *************************
* Placentia Senior Housing                                              *
* 1314 N. Angelina, Placentia                                           *
* Existing Condition - 25-year storm event                              *
 ************************************************************************

  FILE NAME: EXANG25.DAT
  TIME/DATE OF STUDY: 12:46 04/14/2020
========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

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

************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    301.70  DOWNSTREAM(FEET) =    298.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.712
```

```
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.980
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "1 DWELLING/ACRE"           B        0.88      0.30     0.800    56   11.71
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.800
 SUBAREA RUNOFF(CFS) =      2.17
 TOTAL AREA(ACRES) =      0.88   PEAK FLOW RATE(CFS) =      2.17

****************************************************************************
 FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    298.00  DOWNSTREAM(FEET) =    297.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =    72.00   CHANNEL SLOPE =  0.0139
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  20.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.862
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL GOOD COVER
 "GRASS"                     B        0.43      0.30     1.000    61
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.67
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.39
 AVERAGE FLOW DEPTH(FEET) =   0.15   TRAVEL TIME(MIN.) =   0.86
 Tc(MIN.) =   12.57
 SUBAREA AREA(ACRES) =     0.43       SUBAREA RUNOFF(CFS) =    0.99
 EFFECTIVE AREA(ACRES) =      1.31     AREA-AVERAGED Fm(INCH/HR) =   0.26
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.87
 TOTAL AREA(ACRES) =        1.3         PEAK FLOW RATE(CFS) =       3.07

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.16   FLOW VELOCITY(FEET/SEC.) =   1.48
 LONGEST FLOWPATH FROM NODE    101.00 TO NODE    103.00 =     402.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  61
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  297.00  DOWNSTREAM ELEVATION(FEET) =  294.80
 STREET LENGTH(FEET) =   283.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 24.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  19.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
```

```
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.87
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =   12.98
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.15
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.83
  STREET FLOW TRAVEL TIME(MIN.) =   2.20   Tc(MIN.) =   14.77
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.613
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 C        0.35      0.25     0.200    69
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.35      0.25     0.400    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.300
  SUBAREA AREA(ACRES) =    0.70      SUBAREA RUNOFF(CFS) =    1.60
  EFFECTIVE AREA(ACRES) =      2.01    AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  0.67
  TOTAL AREA(ACRES) =        2.0        PEAK FLOW RATE(CFS) =       4.37

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.65
  FLOW VELOCITY(FEET/SEC.) =  2.21   DEPTH*VELOCITY(FT*FT/SEC.) =   0.88
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    104.00 =     685.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    104.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.77
  RAINFALL INTENSITY(INCH/HR) =   2.61
  AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.29
  AREA-AVERAGED Ap =  0.67
  EFFECTIVE STREAM AREA(ACRES) =       2.01
  TOTAL STREAM AREA(ACRES) =       2.01
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.37

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    300.70  DOWNSTREAM(FEET) =    297.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.615
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.332
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
```

```
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.83      0.25     0.400    69    9.62
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA RUNOFF(CFS) =      2.41
  TOTAL AREA(ACRES) =      0.83   PEAK FLOW RATE(CFS) =      2.41

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    107.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    297.50  DOWNSTREAM(FEET) =    295.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   186.00   CHANNEL SLOPE =  0.0108
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  24.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.116
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 C        0.58      0.25     0.200    69
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.58      0.25     0.400    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.300
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.00
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.57
  AVERAGE FLOW DEPTH(FEET) =   0.25   TRAVEL TIME(MIN.) =   1.21
  Tc(MIN.) =   10.82
  SUBAREA AREA(ACRES) =     1.16       SUBAREA RUNOFF(CFS) =    3.17
  EFFECTIVE AREA(ACRES) =      1.99     AREA-AVERAGED Fm(INCH/HR) =   0.09
  AREA-AVERAGED Fp(INCH/HR) =   0.25  AREA-AVERAGED Ap =   0.34
  TOTAL AREA(ACRES) =        2.0         PEAK FLOW RATE(CFS) =       5.43

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.29   FLOW VELOCITY(FEET/SEC.) =   2.78
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    107.00 =     516.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    104.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.82
  RAINFALL INTENSITY(INCH/HR) =   3.12
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.34
  EFFECTIVE STREAM AREA(ACRES) =       1.99
  TOTAL STREAM AREA(ACRES) =       1.99
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.43

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
```

1	4.37	14.77	2.613	0.29(0.20)	0.67	2.0	101.00
2	5.43	10.82	3.116	0.25(0.09)	0.34	2.0	105.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	9.30	10.82	3.116	0.27(0.13)	0.48	3.5	105.00
2	8.90	14.77	2.613	0.28(0.14)	0.51	4.0	101.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 9.30 Tc(MIN.) = 10.82
EFFECTIVE AREA(ACRES) = 3.46 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.48
TOTAL AREA(ACRES) = 4.0
LONGEST FLOWPATH FROM NODE 101.00 TO NODE 104.00 = 685.00 FEET.

==========

END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 4.0 TC(MIN.) = 10.82
EFFECTIVE AREA(ACRES) = 3.46 AREA-AVERAGED Fm(INCH/HR)= 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.481
PEAK FLOW RATE(CFS) = 9.30

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	9.30	10.82	3.116	0.27(0.13)	0.48	3.5	105.00
2	8.90	14.77	2.613	0.28(0.14)	0.51	4.0	101.00

==========
==========

END OF RATIONAL METHOD ANALYSIS

```
************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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                          Analysis prepared by:

                            fuscoe engineering
                             16795 Von Karman
                                Suite 100
                                Irvine, CA

 ************************* DESCRIPTION OF STUDY *************************
* Placentia Senior Housing                                              *
* 1314 N. Angelina, Placentia                                           *
* Existing Condition - 100-year storm event                             *
 ************************************************************************

  FILE NAME: EXANG100.DAT
  TIME/DATE OF STUDY: 14:12 04/14/2020
========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

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

************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    301.70  DOWNSTREAM(FEET) =    298.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.712
```

```
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.799
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "1 DWELLING/ACRE"           B        0.88      0.30     0.800    76   11.71
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.800
 SUBAREA RUNOFF(CFS) =      2.82
 TOTAL AREA(ACRES) =      0.88   PEAK FLOW RATE(CFS) =      2.82

****************************************************************************
 FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    298.00  DOWNSTREAM(FEET) =    297.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =    72.00   CHANNEL SLOPE =  0.0139
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  20.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.659
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL GOOD COVER
 "GRASS"                     B        0.43      0.30     1.000    80
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.47
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.51
 AVERAGE FLOW DEPTH(FEET) =   0.17   TRAVEL TIME(MIN.) =   0.79
 Tc(MIN.) =   12.50
 SUBAREA AREA(ACRES) =     0.43       SUBAREA RUNOFF(CFS) =    1.30
 EFFECTIVE AREA(ACRES) =      1.31     AREA-AVERAGED Fm(INCH/HR) =   0.26
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.87
 TOTAL AREA(ACRES) =        1.3         PEAK FLOW RATE(CFS) =       4.01

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.18   FLOW VELOCITY(FEET/SEC.) =   1.63
 LONGEST FLOWPATH FROM NODE    101.00 TO NODE    103.00 =     402.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  61
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  297.00  DOWNSTREAM ELEVATION(FEET) =  294.80
 STREET LENGTH(FEET) =   283.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 24.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  19.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
```

```
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.04
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.42
    HALFSTREET FLOOD WIDTH(FEET) =   14.46
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.28
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.95
  STREET FLOW TRAVEL TIME(MIN.) =   2.07   Tc(MIN.) =   14.57
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.352
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 C        0.35      0.25     0.200    86
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.35      0.25     0.400    86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.300
  SUBAREA AREA(ACRES) =    0.70      SUBAREA RUNOFF(CFS) =    2.06
  EFFECTIVE AREA(ACRES) =      2.01    AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  0.67
  TOTAL AREA(ACRES) =        2.0        PEAK FLOW RATE(CFS) =       5.71

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  15.21
  FLOW VELOCITY(FEET/SEC.) =  2.35   DEPTH*VELOCITY(FT*FT/SEC.) =   1.01
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    104.00 =     685.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    104.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.57
  RAINFALL INTENSITY(INCH/HR) =   3.35
  AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.29
  AREA-AVERAGED Ap =  0.67
  EFFECTIVE STREAM AREA(ACRES) =       2.01
  TOTAL STREAM AREA(ACRES) =       2.01
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.71

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    300.70  DOWNSTREAM(FEET) =    297.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.615
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.254
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
```

```
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.83      0.25     0.400    86    9.62
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA RUNOFF(CFS) =      3.10
  TOTAL AREA(ACRES) =      0.83   PEAK FLOW RATE(CFS) =      3.10

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    107.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    297.50  DOWNSTREAM(FEET) =    295.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   186.00   CHANNEL SLOPE =  0.0108
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  24.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.992
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 C        0.58      0.25     0.200    86
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.58      0.25     0.400    86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.300
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.15
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.75
  AVERAGE FLOW DEPTH(FEET) =   0.28   TRAVEL TIME(MIN.) =   1.13
  Tc(MIN.) =   10.74
  SUBAREA AREA(ACRES) =     1.16       SUBAREA RUNOFF(CFS) =    4.09
  EFFECTIVE AREA(ACRES) =      1.99     AREA-AVERAGED Fm(INCH/HR) =   0.09
  AREA-AVERAGED Fp(INCH/HR) =   0.25  AREA-AVERAGED Ap =   0.34
  TOTAL AREA(ACRES) =        2.0         PEAK FLOW RATE(CFS) =       7.00

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.31   FLOW VELOCITY(FEET/SEC.) =   3.03
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    107.00 =     516.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    104.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.74
  RAINFALL INTENSITY(INCH/HR) =   3.99
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.34
  EFFECTIVE STREAM AREA(ACRES) =       1.99
  TOTAL STREAM AREA(ACRES) =       1.99
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.00

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
```

1	5.71	14.57	3.352	0.29(0.20)	0.67	2.0	101.00
2	7.00	10.74	3.992	0.25(0.09)	0.34	2.0	105.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	12.06	10.74	3.992	0.28(0.13)	0.48	3.5	105.00
2	11.56	14.57	3.352	0.28(0.14)	0.51	4.0	101.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 12.06 Tc(MIN.) = 10.74
EFFECTIVE AREA(ACRES) = 3.47 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.28 AREA-AVERAGED Ap = 0.48
TOTAL AREA(ACRES) = 4.0
LONGEST FLOWPATH FROM NODE 101.00 TO NODE 104.00 = 685.00 FEET.

==========

END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 4.0 TC(MIN.) = 10.74
EFFECTIVE AREA(ACRES) = 3.47 AREA-AVERAGED Fm(INCH/HR)= 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.28 AREA-AVERAGED Ap = 0.481
PEAK FLOW RATE(CFS) = 12.06

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	12.06	10.74	3.992	0.28(0.13)	0.48	3.5	105.00
2	11.56	14.57	3.352	0.28(0.14)	0.51	4.0	101.00

==========
==========

END OF RATIONAL METHOD ANALYSIS

```
**************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
==========================================================================
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                          Analysis prepared by:

                            fuscoe engineering
                             16795 Von Karman
                                Suite 100
                                Irvine, CA

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

 Problem Descriptions:
  Placentia Senior Housing
  1314 N. Angelina, Placentia
  Existing Condition  2-year/24-hour hydrograph
==========================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC I:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     2.05 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1         0.88       80.00       56.(AMC II)     0.300        0.178
         2         0.43      100.00       61.(AMC II)     0.300        0.000
         3         0.70       30.00       69.(AMC II)     0.250        0.623
         4         0.83       40.00       69.(AMC II)     0.250        0.534
         5         1.16       30.00       69.(AMC II)     0.250        0.623

    TOTAL AREA (Acres) =      4.00

                                  _
    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.141

                                  _
    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.560
==========================================================================

 Problem Descriptions:
  Placentia Senior Housing
  1314 N. Angelina, Placentia
  Existing Condition  2-year/24-hour hydrograph  (calib coef: 0.777)
--------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.78
    TOTAL CATCHMENT AREA(ACRES) =    4.00
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.141
    LOW LOSS FRACTION = 0.560
    TIME OF CONCENTRATION(MIN.) = 11.08
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =   2
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.19
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.53
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      3-HOUR   POINT RAINFALL VALUE(INCHES) =  0.89
      6-HOUR   POINT RAINFALL VALUE(INCHES) =  1.22
     24-HOUR   POINT RAINFALL VALUE(INCHES) =  2.05

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

   TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     0.27
   TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.41

********************************************************************************
  TIME      VOLUME        Q     0.         2.5        5.0        7.5       10.0
 (HOURS)     (AF)       (CFS)
--------------------------------------------------------------------------------
  0.12      0.0000       0.00  Q          .          .          .          .
  0.30      0.0003       0.04  Q          .          .          .          .
  0.49      0.0010       0.04  Q          .          .          .          .
  0.67      0.0017       0.04  Q          .          .          .          .
  0.86      0.0024       0.04  Q          .          .          .          .
  1.04      0.0031       0.05  Q          .          .          .          .
  1.23      0.0038       0.05  Q          .          .          .          .
  1.41      0.0045       0.05  Q          .          .          .          .
  1.60      0.0052       0.05  Q          .          .          .          .
  1.78      0.0059       0.05  Q          .          .          .          .
  1.97      0.0066       0.05  Q          .          .          .          .
  2.15      0.0073       0.05  Q          .          .          .          .
  2.33      0.0080       0.05  Q          .          .          .          .
  2.52      0.0088       0.05  Q          .          .          .          .
  2.70      0.0095       0.05  Q          .          .          .          .
  2.89      0.0103       0.05  Q          .          .          .          .
  3.07      0.0110       0.05  Q          .          .          .          .
  3.26      0.0118       0.05  Q          .          .          .          .
  3.44      0.0125       0.05  Q          .          .          .          .
  3.63      0.0133       0.05  Q          .          .          .          .
  3.81      0.0141       0.05  Q          .          .          .          .
  4.00      0.0149       0.05  Q          .          .          .          .
  4.18      0.0157       0.05  Q          .          .          .          .
  4.37      0.0165       0.05  Q          .          .          .          .
  4.55      0.0173       0.05  Q          .          .          .          .
  4.74      0.0181       0.05  Q          .          .          .          .
  4.92      0.0189       0.05  Q          .          .          .          .
  5.10      0.0198       0.06  Q          .          .          .          .
  5.29      0.0206       0.06  Q          .          .          .          .
  5.47      0.0215       0.06  Q          .          .          .          .
  5.66      0.0224       0.06  Q          .          .          .          .
  5.84      0.0232       0.06  Q          .          .          .          .
  6.03      0.0241       0.06  Q          .          .          .          .
  6.21      0.0250       0.06  Q          .          .          .          .
  6.40      0.0259       0.06  Q          .          .          .          .
  6.58      0.0268       0.06  Q          .          .          .          .
  6.77      0.0277       0.06  Q          .          .          .          .
  6.95      0.0287       0.06  Q          .          .          .          .
  7.14      0.0296       0.06  Q          .          .          .          .
  7.32      0.0306       0.06  Q          .          .          .          .
  7.51      0.0316       0.06  Q          .          .          .          .
  7.69      0.0326       0.07  Q          .          .          .          .
  7.87      0.0336       0.07  Q          .          .          .          .
  8.06      0.0346       0.07  Q          .          .          .          .
  8.24      0.0356       0.07  Q          .          .          .          .
  8.43      0.0366       0.07  Q          .          .          .          .
  8.61      0.0377       0.07  Q          .          .          .          .
  8.80      0.0388       0.07  Q          .          .          .          .
```

8.98	0.0399	0.07	Q	.	.	.	.
9.17	0.0410	0.07	Q	.	.	.	.
9.35	0.0421	0.07	Q	.	.	.	.
9.54	0.0433	0.08	Q	.	.	.	.
9.72	0.0444	0.08	Q	.	.	.	.
9.91	0.0456	0.08	Q	.	.	.	.
10.09	0.0468	0.08	Q	.	.	.	.
10.28	0.0481	0.08	Q	.	.	.	.
10.46	0.0493	0.08	Q	.	.	.	.
10.64	0.0506	0.09	Q	.	.	.	.
10.83	0.0519	0.09	Q	.	.	.	.
11.01	0.0533	0.09	Q	.	.	.	.
11.20	0.0547	0.09	Q	.	.	.	.
11.38	0.0561	0.09	Q	.	.	.	.
11.57	0.0575	0.10	Q	.	.	.	.
11.75	0.0590	0.10	Q	.	.	.	.
11.94	0.0605	0.10	Q	.	.	.	.
12.12	0.0621	0.12	Q	.	.	.	.
12.31	0.0640	0.13	Q	.	.	.	.
12.49	0.0660	0.13	Q	.	.	.	.
12.68	0.0681	0.14	Q	.	.	.	.
12.86	0.0702	0.14	Q	.	.	.	.
13.05	0.0724	0.14	Q	.	.	.	.
13.23	0.0746	0.15	Q	.	.	.	.
13.41	0.0769	0.15	Q	.	.	.	.
13.60	0.0794	0.16	Q	.	.	.	.
13.78	0.0819	0.17	Q	.	.	.	.
13.97	0.0845	0.18	Q	.	.	.	.
14.15	0.0873	0.18	Q	.	.	.	.
14.34	0.0902	0.20	Q	.	.	.	.
14.52	0.0934	0.21	Q	.	.	.	.
14.71	0.0968	0.23	Q	.	.	.	.
14.89	0.1004	0.24	Q	.	.	.	.
15.08	0.1042	0.27	.Q	.	.	.	.
15.26	0.1085	0.29	.Q	.	.	.	.
15.45	0.1131	0.32	.Q	.	.	.	.
15.63	0.1181	0.33	.Q	.	.	.	.
15.82	0.1255	0.64	. Q	.	.	.	.
16.00	0.1384	1.05	. Q	.	.	.	.
16.18	0.1770	4.01	.	. Q	.	.	.
16.37	0.2109	0.43	.Q	.	.	.	.
16.55	0.2166	0.31	.Q	.	.	.	.
16.74	0.2209	0.25	.Q	.	.	.	.
16.92	0.2245	0.22	Q	.	.	.	.
17.11	0.2277	0.20	Q	.	.	.	.
17.29	0.2305	0.17	Q	.	.	.	.
17.48	0.2330	0.16	Q	.	.	.	.
17.66	0.2354	0.15	Q	.	.	.	.
17.85	0.2376	0.14	Q	.	.	.	.
18.03	0.2396	0.13	Q	.	.	.	.
18.22	0.2414	0.10	Q	.	.	.	.
18.40	0.2429	0.10	Q	.	.	.	.
18.59	0.2444	0.09	Q	.	.	.	.
18.77	0.2457	0.09	Q	.	.	.	.
18.95	0.2470	0.08	Q	.	.	.	.
19.14	0.2483	0.08	Q	.	.	.	.
19.32	0.2495	0.08	Q	.	.	.	.
19.51	0.2507	0.08	Q	.	.	.	.
19.69	0.2518	0.07	Q	.	.	.	.
19.88	0.2529	0.07	Q	.	.	.	.
20.06	0.2540	0.07	Q	.	.	.	.

20.25	0.2550	0.07	Q	.	.	.	.
20.43	0.2560	0.06	Q	.	.	.	.
20.62	0.2570	0.06	Q	.	.	.	.
20.80	0.2579	0.06	Q	.	.	.	.
20.99	0.2589	0.06	Q	.	.	.	.
21.17	0.2598	0.06	Q	.	.	.	.
21.36	0.2606	0.06	Q	.	.	.	.
21.54	0.2615	0.06	Q	.	.	.	.
21.72	0.2624	0.05	Q	.	.	.	.
21.91	0.2632	0.05	Q	.	.	.	.
22.09	0.2640	0.05	Q	.	.	.	.
22.28	0.2648	0.05	Q	.	.	.	.
22.46	0.2656	0.05	Q	.	.	.	.
22.65	0.2663	0.05	Q	.	.	.	.
22.83	0.2671	0.05	Q	.	.	.	.
23.02	0.2678	0.05	Q	.	.	.	.
23.20	0.2686	0.05	Q	.	.	.	.
23.39	0.2693	0.05	Q	.	.	.	.
23.57	0.2700	0.05	Q	.	.	.	.
23.76	0.2707	0.05	Q	.	.	.	.
23.94	0.2714	0.04	Q	.	.	.	.
24.13	0.2720	0.04	Q	.	.	.	.
24.31	0.2724	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1440.4
10%	44.3
20%	22.2
30%	11.1
40%	11.1
50%	11.1
60%	11.1
70%	11.1
80%	11.1
90%	11.1

```
**************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
==========================================================================
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                          Analysis prepared by:

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                                Suite 100
                                Irvine, CA

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

 Problem Descriptions:
  Placentia Senior Housing
  1314 N. Angelina Drive
  Existing Condition - 10-year/24-hour hydrograph
==========================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC II:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     3.68 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)     YIELD
         1         0.88       80.00            56.       0.300        0.284
         2         0.43      100.00            61.       0.300        0.178
         3         0.70       30.00            69.       0.250        0.742
         4         0.83       40.00            69.       0.250        0.677
         5         1.16       30.00            69.       0.250        0.742

    TOTAL AREA (Acres) =      4.00

                                 _
    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.141

                                 _
    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.433
==========================================================================

 Problem Descriptions:
  Placentia Senior Housing
  1314 N. Angelina Drive
  Existing Condition - 10-year/24-hour hydrograph  (calib coef: 0.782)
--------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.78
    TOTAL CATCHMENT AREA(ACRES) =    4.00
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.141
    LOW LOSS FRACTION = 0.433
    TIME OF CONCENTRATION(MIN.) = 10.90
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  10
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.34
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.72
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.95
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      3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.59
      6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.20
     24-HOUR   POINT RAINFALL VALUE(INCHES) =  3.68

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   TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     0.62
   TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.61

********************************************************************************
  TIME      VOLUME        Q     0.         2.5        5.0        7.5       10.0
 (HOURS)     (AF)       (CFS)
--------------------------------------------------------------------------------
  0.01      0.0000       0.00  Q          .          .          .          .
  0.20      0.0008       0.10  Q          .          .          .          .
  0.38      0.0023       0.10  Q          .          .          .          .
  0.56      0.0038       0.10  Q          .          .          .          .
  0.74      0.0054       0.10  Q          .          .          .          .
  0.92      0.0069       0.10  Q          .          .          .          .
  1.10      0.0085       0.10  Q          .          .          .          .
  1.29      0.0101       0.11  Q          .          .          .          .
  1.47      0.0117       0.11  Q          .          .          .          .
  1.65      0.0133       0.11  Q          .          .          .          .
  1.83      0.0149       0.11  Q          .          .          .          .
  2.01      0.0165       0.11  Q          .          .          .          .
  2.19      0.0182       0.11  Q          .          .          .          .
  2.38      0.0198       0.11  Q          .          .          .          .
  2.56      0.0215       0.11  Q          .          .          .          .
  2.74      0.0232       0.11  Q          .          .          .          .
  2.92      0.0249       0.11  Q          .          .          .          .
  3.10      0.0266       0.11  Q          .          .          .          .
  3.28      0.0283       0.12  Q          .          .          .          .
  3.47      0.0301       0.12  Q          .          .          .          .
  3.65      0.0318       0.12  Q          .          .          .          .
  3.83      0.0336       0.12  Q          .          .          .          .
  4.01      0.0354       0.12  Q          .          .          .          .
  4.19      0.0372       0.12  Q          .          .          .          .
  4.37      0.0390       0.12  Q          .          .          .          .
  4.56      0.0409       0.12  Q          .          .          .          .
  4.74      0.0428       0.12  Q          .          .          .          .
  4.92      0.0446       0.13  Q          .          .          .          .
  5.10      0.0465       0.13  Q          .          .          .          .
  5.28      0.0485       0.13  Q          .          .          .          .
  5.46      0.0504       0.13  Q          .          .          .          .
  5.64      0.0524       0.13  Q          .          .          .          .
  5.83      0.0544       0.13  Q          .          .          .          .
  6.01      0.0564       0.13  Q          .          .          .          .
  6.19      0.0584       0.14  Q          .          .          .          .
  6.37      0.0604       0.14  Q          .          .          .          .
  6.55      0.0625       0.14  Q          .          .          .          .
  6.74      0.0646       0.14  Q          .          .          .          .
  6.92      0.0667       0.14  Q          .          .          .          .
  7.10      0.0689       0.14  Q          .          .          .          .
  7.28      0.0711       0.15  Q          .          .          .          .
  7.46      0.0733       0.15  Q          .          .          .          .
  7.64      0.0755       0.15  Q          .          .          .          .
  7.83      0.0778       0.15  Q          .          .          .          .
  8.01      0.0801       0.15  Q          .          .          .          .
  8.19      0.0824       0.16  Q          .          .          .          .
  8.37      0.0848       0.16  Q          .          .          .          .
  8.55      0.0872       0.16  Q          .          .          .          .
```

8.73	0.0896	0.16	Q	.	.	.	.
8.91	0.0921	0.17	Q	.	.	.	.
9.10	0.0946	0.17	Q	.	.	.	.
9.28	0.0972	0.17	Q	.	.	.	.
9.46	0.0998	0.17	Q	.	.	.	.
9.64	0.1024	0.18	Q	.	.	.	.
9.82	0.1051	0.18	Q	.	.	.	.
10.01	0.1079	0.18	Q	.	.	.	.
10.19	0.1107	0.19	Q	.	.	.	.
10.37	0.1135	0.19	Q	.	.	.	.
10.55	0.1164	0.19	Q	.	.	.	.
10.73	0.1194	0.20	Q	.	.	.	.
10.91	0.1224	0.20	Q	.	.	.	.
11.10	0.1255	0.21	Q	.	.	.	.
11.28	0.1287	0.21	Q	.	.	.	.
11.46	0.1319	0.22	Q	.	.	.	.
11.64	0.1352	0.22	Q	.	.	.	.
11.82	0.1386	0.23	Q	.	.	.	.
12.00	0.1421	0.23	Q	.	.	.	.
12.19	0.1462	0.31	.Q	.	.	.	.
12.37	0.1508	0.31	.Q	.	.	.	.
12.55	0.1556	0.32	.Q	.	.	.	.
12.73	0.1605	0.33	.Q	.	.	.	.
12.91	0.1656	0.34	.Q	.	.	.	.
13.09	0.1707	0.35	.Q	.	.	.	.
13.27	0.1761	0.37	.Q	.	.	.	.
13.46	0.1817	0.37	.Q	.	.	.	.
13.64	0.1874	0.39	.Q	.	.	.	.
13.82	0.1934	0.40	.Q	.	.	.	.
14.00	0.1996	0.43	.Q	.	.	.	.
14.18	0.2061	0.44	.Q	.	.	.	.
14.37	0.2130	0.47	.Q	.	.	.	.
14.55	0.2202	0.49	.Q	.	.	.	.
14.73	0.2279	0.53	. Q	.	.	.	.
14.91	0.2361	0.56	. Q	.	.	.	.
15.09	0.2453	0.67	. Q	.	.	.	.
15.27	0.2559	0.74	. Q	.	.	.	.
15.45	0.2678	0.85	. Q	.	.	.	.
15.64	0.2810	0.90	. Q	.	.	.	.
15.82	0.2994	1.55	. Q	.	.	.	.
16.00	0.3282	2.29	. Q.	.	.	.	.
16.18	0.4030	7.67	.	.	.	Q	.
16.36	0.4690	1.12	. Q	.	.	.	.
16.55	0.4837	0.84	. Q	.	.	.	.
16.73	0.4945	0.60	. Q	.	.	.	.
16.91	0.5029	0.51	. Q	.	.	.	.
17.09	0.5101	0.46	.Q	.	.	.	.
17.27	0.5166	0.41	.Q	.	.	.	.
17.45	0.5226	0.38	.Q	.	.	.	.
17.64	0.5282	0.36	.Q	.	.	.	.
17.82	0.5334	0.34	.Q	.	.	.	.
18.00	0.5383	0.32	.Q	.	.	.	.
18.18	0.5425	0.24	Q	.	.	.	.
18.36	0.5460	0.23	Q	.	.	.	.
18.54	0.5493	0.22	Q	.	.	.	.
18.73	0.5525	0.21	Q	.	.	.	.
18.91	0.5555	0.20	Q	.	.	.	.
19.09	0.5584	0.19	Q	.	.	.	.
19.27	0.5612	0.18	Q	.	.	.	.
19.45	0.5639	0.18	Q	.	.	.	.
19.63	0.5665	0.17	Q	.	.	.	.

19.82	0.5690	0.16	Q	.	.	.	.
20.00	0.5715	0.16	Q	.	.	.	.
20.18	0.5738	0.16	Q	.	.	.	.
20.36	0.5761	0.15	Q	.	.	.	.
20.54	0.5784	0.15	Q	.	.	.	.
20.72	0.5805	0.14	Q	.	.	.	.
20.91	0.5827	0.14	Q	.	.	.	.
21.09	0.5848	0.14	Q	.	.	.	.
21.27	0.5868	0.13	Q	.	.	.	.
21.45	0.5888	0.13	Q	.	.	.	.
21.63	0.5907	0.13	Q	.	.	.	.
21.81	0.5926	0.13	Q	.	.	.	.
21.99	0.5945	0.12	Q	.	.	.	.
22.18	0.5963	0.12	Q	.	.	.	.
22.36	0.5981	0.12	Q	.	.	.	.
22.54	0.5999	0.12	Q	.	.	.	.
22.72	0.6016	0.11	Q	.	.	.	.
22.90	0.6033	0.11	Q	.	.	.	.
23.08	0.6050	0.11	Q	.	.	.	.
23.27	0.6066	0.11	Q	.	.	.	.
23.45	0.6082	0.11	Q	.	.	.	.
23.63	0.6098	0.11	Q	.	.	.	.
23.81	0.6114	0.10	Q	.	.	.	.
23.99	0.6129	0.10	Q	.	.	.	.
24.17	0.6145	0.10	Q	.	.	.	.
24.36	0.6152	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1449.7
10%	76.3
20%	32.7
30%	10.9
40%	10.9
50%	10.9
60%	10.9
70%	10.9
80%	10.9
90%	10.9

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**************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
==========================================================================
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                          Analysis prepared by:

                            fuscoe engineering
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                                Suite 100
                                Irvine, CA

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

 Problem Descriptions:
  Placentia Senior Housing
  1314 N. Angeina Drive
  Existing Condition - 25-yr/24-hour hydrograph
==========================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC II:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     4.49 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)     YIELD
         1         0.88       80.00            56.       0.300        0.330
         2         0.43      100.00            61.       0.300        0.239
         3         0.70       30.00            69.       0.250        0.770
         4         0.83       40.00            69.       0.250        0.711
         5         1.16       30.00            69.       0.250        0.770

    TOTAL AREA (Acres) =      4.00

                                 _
    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.141

                                  _
    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.396
==========================================================================

 Problem Descriptions:
  Placentia Senior Housing
  1314 N. Angeina Drive
  Existing Condition - 25-yr/24-hour hydrograph (calib coef: 0.786)
--------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.79
    TOTAL CATCHMENT AREA(ACRES) =    4.00
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.141
    LOW LOSS FRACTION = 0.396
    TIME OF CONCENTRATION(MIN.) = 10.82
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  25
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.87
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.15
```

```
      3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.94
      6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.71
     24-HOUR   POINT RAINFALL VALUE(INCHES) =  4.49

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

   TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     0.80
   TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.70

********************************************************************************
  TIME      VOLUME        Q     0.         2.5        5.0        7.5       10.0
 (HOURS)     (AF)       (CFS)
--------------------------------------------------------------------------------
  0.13      0.0010       0.13  Q          .          .          .          .
  0.31      0.0029       0.13  Q          .          .          .          .
  0.49      0.0048       0.13  Q          .          .          .          .
  0.67      0.0068       0.13  Q          .          .          .          .
  0.85      0.0088       0.13  Q          .          .          .          .
  1.03      0.0108       0.13  Q          .          .          .          .
  1.21      0.0128       0.13  Q          .          .          .          .
  1.39      0.0148       0.14  Q          .          .          .          .
  1.57      0.0168       0.14  Q          .          .          .          .
  1.75      0.0189       0.14  Q          .          .          .          .
  1.93      0.0210       0.14  Q          .          .          .          .
  2.11      0.0231       0.14  Q          .          .          .          .
  2.29      0.0252       0.14  Q          .          .          .          .
  2.48      0.0273       0.14  Q          .          .          .          .
  2.66      0.0294       0.14  Q          .          .          .          .
  2.84      0.0316       0.15  Q          .          .          .          .
  3.02      0.0338       0.15  Q          .          .          .          .
  3.20      0.0360       0.15  Q          .          .          .          .
  3.38      0.0382       0.15  Q          .          .          .          .
  3.56      0.0404       0.15  Q          .          .          .          .
  3.74      0.0427       0.15  Q          .          .          .          .
  3.92      0.0449       0.15  Q          .          .          .          .
  4.10      0.0472       0.15  Q          .          .          .          .
  4.28      0.0496       0.16  Q          .          .          .          .
  4.46      0.0519       0.16  Q          .          .          .          .
  4.64      0.0543       0.16  Q          .          .          .          .
  4.82      0.0567       0.16  Q          .          .          .          .
  5.00      0.0591       0.16  Q          .          .          .          .
  5.18      0.0615       0.16  Q          .          .          .          .
  5.36      0.0640       0.17  Q          .          .          .          .
  5.54      0.0665       0.17  Q          .          .          .          .
  5.72      0.0690       0.17  Q          .          .          .          .
  5.90      0.0715       0.17  Q          .          .          .          .
  6.08      0.0741       0.17  Q          .          .          .          .
  6.26      0.0767       0.18  Q          .          .          .          .
  6.44      0.0793       0.18  Q          .          .          .          .
  6.62      0.0820       0.18  Q          .          .          .          .
  6.80      0.0847       0.18  Q          .          .          .          .
  6.98      0.0874       0.18  Q          .          .          .          .
  7.16      0.0902       0.19  Q          .          .          .          .
  7.34      0.0930       0.19  Q          .          .          .          .
  7.52      0.0958       0.19  Q          .          .          .          .
  7.70      0.0987       0.19  Q          .          .          .          .
  7.89      0.1016       0.20  Q          .          .          .          .
  8.07      0.1046       0.20  Q          .          .          .          .
  8.25      0.1076       0.20  Q          .          .          .          .
  8.43      0.1106       0.21  Q          .          .          .          .
  8.61      0.1137       0.21  Q          .          .          .          .
```

8.79	0.1168	0.21	Q . . . .
8.97	0.1200	0.22	Q . . . .
9.15	0.1233	0.22	Q . . . .
9.33	0.1266	0.22	Q . . . .
9.51	0.1299	0.23	Q . . . .
9.69	0.1333	0.23	Q . . . .
9.87	0.1368	0.23	Q . . . .
10.05	0.1403	0.24	Q . . . .
10.23	0.1439	0.24	Q . . . .
10.41	0.1475	0.25	Q . . . .
10.59	0.1513	0.25	.Q . . . .
10.77	0.1551	0.26	.Q . . . .
10.95	0.1590	0.26	.Q . . . .
11.13	0.1630	0.27	.Q . . . .
11.31	0.1671	0.28	.Q . . . .
11.49	0.1712	0.28	.Q . . . .
11.67	0.1755	0.29	.Q . . . .
11.85	0.1799	0.30	.Q . . . .
12.03	0.1844	0.31	.Q . . . .
12.21	0.1898	0.42	.Q . . . .
12.39	0.1961	0.43	.Q . . . .
12.57	0.2026	0.44	.Q . . . .
12.75	0.2092	0.45	.Q . . . .
12.93	0.2160	0.47	.Q . . . .
13.11	0.2230	0.47	.Q . . . .
13.30	0.2302	0.50	.Q . . . .
13.48	0.2377	0.51	. Q . . . .
13.66	0.2454	0.53	. Q . . . .
13.84	0.2534	0.55	. Q . . . .
14.02	0.2618	0.58	. Q . . . .
14.20	0.2705	0.59	. Q . . . .
14.38	0.2796	0.63	. Q . . . .
14.56	0.2891	0.65	. Q . . . .
14.74	0.2994	0.73	. Q . . . .
14.92	0.3108	0.79	. Q . . . .
15.10	0.3236	0.93	. Q . . . .
15.28	0.3382	1.03	. Q . . . .
15.46	0.3543	1.14	. Q . . . .
15.64	0.3719	1.21	. Q . . . .
15.82	0.3961	2.05	. Q . . . .
16.00	0.4336	2.97	. .Q . . .
16.18	0.5251	9.30	. . . . Q .
16.36	0.6054	1.48	. Q . . . .
16.54	0.6249	1.14	. Q . . . .
16.72	0.6398	0.86	. Q . . . .
16.90	0.6513	0.68	. Q . . . .
17.08	0.6609	0.61	. Q . . . .
17.26	0.6696	0.56	. Q . . . .
17.44	0.6776	0.52	. Q . . . .
17.62	0.6851	0.48	.Q . . . .
17.80	0.6921	0.46	.Q . . . .
17.98	0.6987	0.43	.Q . . . .
18.16	0.7045	0.34	.Q . . . .
18.34	0.7092	0.29	.Q . . . .
18.52	0.7135	0.28	.Q . . . .
18.70	0.7175	0.27	.Q . . . .
18.89	0.7214	0.26	.Q . . . .
19.07	0.7252	0.25	Q . . . .
19.25	0.7288	0.24	Q . . . .
19.43	0.7322	0.23	Q . . . .
19.61	0.7356	0.22	Q . . . .

19.79	0.7388	0.21	Q	.	.	.	.
19.97	0.7420	0.21	Q	.	.	.	.
20.15	0.7450	0.20	Q	.	.	.	.
20.33	0.7480	0.20	Q	.	.	.	.
20.51	0.7508	0.19	Q	.	.	.	.
20.69	0.7536	0.19	Q	.	.	.	.
20.87	0.7564	0.18	Q	.	.	.	.
21.05	0.7590	0.18	Q	.	.	.	.
21.23	0.7616	0.17	Q	.	.	.	.
21.41	0.7642	0.17	Q	.	.	.	.
21.59	0.7667	0.17	Q	.	.	.	.
21.77	0.7691	0.16	Q	.	.	.	.
21.95	0.7715	0.16	Q	.	.	.	.
22.13	0.7738	0.16	Q	.	.	.	.
22.31	0.7761	0.15	Q	.	.	.	.
22.49	0.7784	0.15	Q	.	.	.	.
22.67	0.7806	0.15	Q	.	.	.	.
22.85	0.7828	0.14	Q	.	.	.	.
23.03	0.7849	0.14	Q	.	.	.	.
23.21	0.7870	0.14	Q	.	.	.	.
23.39	0.7891	0.14	Q	.	.	.	.
23.57	0.7911	0.14	Q	.	.	.	.
23.75	0.7931	0.13	Q	.	.	.	.
23.93	0.7951	0.13	Q	.	.	.	.
24.11	0.7971	0.13	Q	.	.	.	.
24.30	0.7980	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1449.9
10%	97.4
20%	32.5
30%	21.6
40%	10.8
50%	10.8
60%	10.8
70%	10.8
80%	10.8
90%	10.8

```
**************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
==========================================================================
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                          Analysis prepared by:

                            fuscoe engineering
                             16795 Von Karman
                                Suite 100
                                Irvine, CA

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

 Problem Descriptions:
  Placentia Senior Housing
  1314 N. Angelina Drive
  Existing Condition  100-yr/24-hour storm event
==========================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC III:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     5.63 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1         0.88       80.00       56.(AMC II)     0.300        0.627
         2         0.43      100.00       61.(AMC II)     0.300        0.613
         3         0.70       30.00       69.(AMC II)     0.250        0.887
         4         0.83       40.00       69.(AMC II)     0.250        0.863
         5         1.16       30.00       69.(AMC II)     0.250        0.887

    TOTAL AREA (Acres) =      4.00

                                 _
    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.141

                                 _
    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.205
==========================================================================

 Problem Descriptions:
  Placentia Senior Housing
  1314 N. Angelina Drive
  Existing Condition  100-yr/24-hour storm event  (calib coef: 0.7848)
--------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.78
    TOTAL CATCHMENT AREA(ACRES) =    4.00
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.141
    LOW LOSS FRACTION = 0.205
    TIME OF CONCENTRATION(MIN.) = 10.74
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) = 100
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.52
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  1.09
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.45
```

```
      3-HOUR   POINT RAINFALL VALUE(INCHES) =  2.43
      6-HOUR   POINT RAINFALL VALUE(INCHES) =  3.36
     24-HOUR   POINT RAINFALL VALUE(INCHES) =  5.63

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

   TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     1.20
   TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.67

****************************************************************************
  TIME      VOLUME       Q    0.        5.0       10.0       15.0       20.0
 (HOURS)     (AF)      (CFS)
----------------------------------------------------------------------------
  0.07      0.0006      0.22  Q         .         .          .          .
  0.25      0.0039      0.22  Q         .         .          .          .
  0.43      0.0071      0.22  Q         .         .          .          .
  0.61      0.0104      0.22  Q         .         .          .          .
  0.79      0.0137      0.22  Q         .         .          .          .
  0.96      0.0170      0.22  Q         .         .          .          .
  1.14      0.0203      0.23  Q         .         .          .          .
  1.32      0.0237      0.23  Q         .         .          .          .
  1.50      0.0271      0.23  Q         .         .          .          .
  1.68      0.0305      0.23  Q         .         .          .          .
  1.86      0.0340      0.23  Q         .         .          .          .
  2.04      0.0374      0.24  Q         .         .          .          .
  2.22      0.0409      0.24  Q         .         .          .          .
  2.40      0.0445      0.24  Q         .         .          .          .
  2.58      0.0480      0.24  Q         .         .          .          .
  2.75      0.0516      0.24  Q         .         .          .          .
  2.93      0.0552      0.25  Q         .         .          .          .
  3.11      0.0589      0.25  Q         .         .          .          .
  3.29      0.0626      0.25  Q         .         .          .          .
  3.47      0.0663      0.25  Q         .         .          .          .
  3.65      0.0700      0.25  Q         .         .          .          .
  3.83      0.0738      0.26  Q         .         .          .          .
  4.01      0.0776      0.26  Q         .         .          .          .
  4.19      0.0815      0.26  Q         .         .          .          .
  4.37      0.0854      0.26  Q         .         .          .          .
  4.54      0.0893      0.27  Q         .         .          .          .
  4.72      0.0933      0.27  Q         .         .          .          .
  4.90      0.0973      0.27  Q         .         .          .          .
  5.08      0.1013      0.28  Q         .         .          .          .
  5.26      0.1054      0.28  Q         .         .          .          .
  5.44      0.1095      0.28  Q         .         .          .          .
  5.62      0.1137      0.28  Q         .         .          .          .
  5.80      0.1179      0.29  Q         .         .          .          .
  5.98      0.1222      0.29  Q         .         .          .          .
  6.16      0.1265      0.29  Q         .         .          .          .
  6.33      0.1309      0.30  Q         .         .          .          .
  6.51      0.1353      0.30  Q         .         .          .          .
  6.69      0.1397      0.30  Q         .         .          .          .
  6.87      0.1442      0.31  Q         .         .          .          .
  7.05      0.1488      0.31  Q         .         .          .          .
  7.23      0.1534      0.32  Q         .         .          .          .
  7.41      0.1581      0.32  Q         .         .          .          .
  7.59      0.1628      0.32  Q         .         .          .          .
  7.77      0.1677      0.33  Q         .         .          .          .
  7.95      0.1725      0.33  Q         .         .          .          .
  8.12      0.1775      0.34  Q         .         .          .          .
  8.30      0.1825      0.34  Q         .         .          .          .
  8.48      0.1876      0.35  Q         .         .          .          .
```

8.66	0.1927	0.35	Q . . . .
8.84	0.1979	0.36	Q . . . .
9.02	0.2033	0.36	Q . . . .
9.20	0.2087	0.37	Q . . . .
9.38	0.2141	0.37	Q . . . .
9.56	0.2197	0.38	Q . . . .
9.74	0.2254	0.39	Q . . . .
9.91	0.2312	0.39	Q . . . .
10.09	0.2371	0.40	Q . . . .
10.27	0.2430	0.41	Q . . . .
10.45	0.2491	0.42	Q . . . .
10.63	0.2554	0.42	Q . . . .
10.81	0.2617	0.44	Q . . . .
10.99	0.2682	0.44	Q . . . .
11.17	0.2749	0.46	Q . . . .
11.35	0.2816	0.46	Q . . . .
11.52	0.2886	0.48	Q . . . .
11.70	0.2957	0.48	Q . . . .
11.88	0.3030	0.50	.Q . . . .
12.06	0.3105	0.51	.Q . . . .
12.24	0.3192	0.66	.Q . . . .
12.42	0.3291	0.68	.Q . . . .
12.60	0.3393	0.70	.Q . . . .
12.78	0.3497	0.71	.Q . . . .
12.96	0.3605	0.74	.Q . . . .
13.14	0.3715	0.76	.Q . . . .
13.32	0.3830	0.79	.Q . . . .
13.49	0.3948	0.81	.Q . . . .
13.67	0.4070	0.85	.Q . . . .
13.85	0.4198	0.87	.Q . . . .
14.03	0.4330	0.92	.Q . . . .
14.21	0.4469	0.96	.Q . . . .
14.39	0.4616	1.03	. Q . . . .
14.57	0.4771	1.07	. Q . . . .
14.75	0.4935	1.16	. Q . . . .
14.93	0.5111	1.22	. Q . . . .
15.10	0.5302	1.36	. Q . . . .
15.28	0.5511	1.46	. Q . . . .
15.46	0.5736	1.59	. Q . . . .
15.64	0.5979	1.70	. Q . . . .
15.82	0.6296	2.59	. Q . . . .
16.00	0.6762	3.70	. Q . . . .
16.18	0.7928	12.06	. . . Q .
16.36	0.8971	2.03	. Q . . . .
16.54	0.9237	1.57	. Q . . . .
16.72	0.9449	1.28	. Q . . . .
16.90	0.9626	1.11	. Q . . . .
17.07	0.9781	0.99	.Q . . . .
17.25	0.9921	0.90	.Q . . . .
17.43	1.0048	0.83	.Q . . . .
17.61	1.0166	0.77	.Q . . . .
17.79	1.0277	0.73	.Q . . . .
17.97	1.0382	0.69	.Q . . . .
18.15	1.0476	0.59	.Q . . . .
18.33	1.0556	0.49	Q . . . .
18.51	1.0628	0.47	Q . . . .
18.68	1.0695	0.45	Q . . . .
18.86	1.0760	0.43	Q . . . .
19.04	1.0823	0.41	Q . . . .
19.22	1.0883	0.40	Q . . . .
19.40	1.0940	0.38	Q . . . .

19.58	1.0996	0.37	Q	.	.	.	.
19.76	1.1050	0.36	Q	.	.	.	.
19.94	1.1102	0.35	Q	.	.	.	.
20.12	1.1153	0.34	Q	.	.	.	.
20.30	1.1203	0.33	Q	.	.	.	.
20.48	1.1251	0.32	Q	.	.	.	.
20.65	1.1298	0.31	Q	.	.	.	.
20.83	1.1343	0.31	Q	.	.	.	.
21.01	1.1388	0.30	Q	.	.	.	.
21.19	1.1431	0.29	Q	.	.	.	.
21.37	1.1474	0.28	Q	.	.	.	.
21.55	1.1516	0.28	Q	.	.	.	.
21.73	1.1557	0.27	Q	.	.	.	.
21.91	1.1597	0.27	Q	.	.	.	.
22.09	1.1636	0.26	Q	.	.	.	.
22.27	1.1674	0.26	Q	.	.	.	.
22.44	1.1712	0.25	Q	.	.	.	.
22.62	1.1749	0.25	Q	.	.	.	.
22.80	1.1786	0.24	Q	.	.	.	.
22.98	1.1822	0.24	Q	.	.	.	.
23.16	1.1857	0.24	Q	.	.	.	.
23.34	1.1892	0.23	Q	.	.	.	.
23.52	1.1926	0.23	Q	.	.	.	.
23.70	1.1960	0.23	Q	.	.	.	.
23.88	1.1993	0.22	Q	.	.	.	.
24.06	1.2026	0.22	Q	.	.	.	.
24.23	1.2042	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1449.9
10%	118.1
20%	32.2
30%	21.5
40%	10.7
50%	10.7
60%	10.7
70%	10.7
80%	10.7
90%	10.7

APPENDIX 2

Proposed Condition Hydrology

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
        (c) Copyright 1983-2016 Advanced Engineering Software (aes)
            Ver. 23.0  Release Date: 07/01/2016  License ID 1355

                        Analysis prepared by:

                          fuscoe engineering
                           16795 Von Karman
                              Suite 100
                              Irvine, CA

 ************************ DESCRIPTION OF STUDY *************************
* Placentia Senior Housing                                              *
* 1314 N. Angelina Drive                                                *
* Proposed Condition - 2-year storm event                               *
 ************************************************************************

  FILE NAME: PRANG2.DAT
  TIME/DATE OF STUDY: 16:31 04/15/2020
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

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

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<        A1
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    301.70  DOWNSTREAM(FEET) =    298.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.677
```

A1

```
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.770
 SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 B        0.98      0.30      0.100    36    7.68
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      1.53
 TOTAL AREA(ACRES) =      0.98   PEAK FLOW RATE(CFS) =      1.53

****************************************************************************
 FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   293.20  DOWNSTREAM(FEET) =   292.60
 FLOW LENGTH(FEET) =   112.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.32
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.53
 PIPE TRAVEL TIME(MIN.) =   0.56    Tc(MIN.) =    8.24
 LONGEST FLOWPATH FROM NODE    101.00 TO NODE    103.00 =     442.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

A2

```
============================================================================
 MAINLINE Tc(MIN.) =    8.24
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.699
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 C        1.03      0.25      0.100    50
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    1.03      SUBAREA RUNOFF(CFS) =    1.55
 EFFECTIVE AREA(ACRES) =      2.01   AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.27  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =        2.0       PEAK FLOW RATE(CFS) =       3.02

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   292.60  DOWNSTREAM(FEET) =   291.60
 FLOW LENGTH(FEET) =   184.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.95
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.02
 PIPE TRAVEL TIME(MIN.) =   0.78    Tc(MIN.) =    9.02
 LONGEST FLOWPATH FROM NODE    101.00 TO NODE    104.00 =     626.00 FEET.

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

```
 FLOW PROCESS FROM NODE    104.00 TO NODE    104.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.02
 RAINFALL INTENSITY(INCH/HR) =   1.61
 AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.27
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       2.01
 TOTAL STREAM AREA(ACRES) =       2.01
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.02

****************************************************************************
 FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
 ELEVATION DATA: UPSTREAM(FEET) =    299.10  DOWNSTREAM(FEET) =    297.60

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.094
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.606
 SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 C        0.72      0.25     0.100    50    9.09
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      1.02
 TOTAL AREA(ACRES) =      0.72   PEAK FLOW RATE(CFS) =      1.02

****************************************************************************
 FLOW PROCESS FROM NODE    106.00 TO NODE    107.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    297.60  DOWNSTREAM(FEET) =    297.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =    71.00   CHANNEL SLOPE =  0.0085
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  24.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.541
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 C        0.18      0.25     0.100    50
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.15
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.76
 AVERAGE FLOW DEPTH(FEET) =   0.16   TRAVEL TIME(MIN.) =   0.67
 Tc(MIN.) =    9.77
 SUBAREA AREA(ACRES) =     0.18       SUBAREA RUNOFF(CFS) =    0.25
 EFFECTIVE AREA(ACRES) =      0.90     AREA-AVERAGED Fm(INCH/HR) =   0.03
```

A3

A4

```
 AREA-AVERAGED Fp(INCH/HR) =   0.25  AREA-AVERAGED Ap =   0.10
 TOTAL AREA(ACRES) =        0.9         PEAK FLOW RATE(CFS) =       1.23

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.17   FLOW VELOCITY(FEET/SEC.) =   1.76
 LONGEST FLOWPATH FROM NODE    105.00 TO NODE    107.00 =     401.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.77
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.541
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 C        0.38      0.25     0.100    50
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.38      SUBAREA RUNOFF(CFS) =    0.52
 EFFECTIVE AREA(ACRES) =      1.28   AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =        1.3       PEAK FLOW RATE(CFS) =       1.75

****************************************************************************
 FLOW PROCESS FROM NODE    107.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   292.10  DOWNSTREAM(FEET) =   291.60
 FLOW LENGTH(FEET) =    89.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.47
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.75
 PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =   10.20
 LONGEST FLOWPATH FROM NODE    105.00 TO NODE    104.00 =     490.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    104.00 TO NODE    104.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.20
 RAINFALL INTENSITY(INCH/HR) =   1.50
 AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.25
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       1.28
 TOTAL STREAM AREA(ACRES) =       1.28
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.75

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

A5

NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	3.02	9.02	1.614	0.27(0.03)	0.10	2.0	101.00
2	1.75	10.20	1.504	0.25(0.03)	0.10	1.3	105.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	4.68	9.02	1.614	0.27(0.03)	0.10	3.1	101.00
2	4.56	10.20	1.504	0.26(0.03)	0.10	3.3	105.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 4.68 Tc(MIN.) = 9.02
EFFECTIVE AREA(ACRES) = 3.14 AREA-AVERAGED Fm(INCH/HR) = 0.03
AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 3.3
LONGEST FLOWPATH FROM NODE 101.00 TO NODE 104.00 = 626.00 FEET.

****
FLOW PROCESS FROM NODE 104.00 TO NODE 108.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========
ELEVATION DATA: UPSTREAM(FEET) = 291.60 DOWNSTREAM(FEET) = 291.00
FLOW LENGTH(FEET) = 118.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.30
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 4.68
PIPE TRAVEL TIME(MIN.) = 0.46 Tc(MIN.) = 9.47
LONGEST FLOWPATH FROM NODE 101.00 TO NODE 108.00 = 744.00 FEET.

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

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<< A6
==========
MAINLINE Tc(MIN.) = 9.47
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.569
SUBAREA LOSS RATE DATA(AMC I):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	C	0.71	0.25	0.100	50

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 0.71 SUBAREA RUNOFF(CFS) = 0.99
EFFECTIVE AREA(ACRES) = 3.85 AREA-AVERAGED Fm(INCH/HR) = 0.03
AREA-AVERAGED Fp(INCH/HR) = 0.26 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 5.35

****
FLOW PROCESS FROM NODE 108.00 TO NODE 109.00 IS CODE = 31

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

```
  ELEVATION DATA: UPSTREAM(FEET) =   291.00  DOWNSTREAM(FEET) =   290.50
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.09
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.35
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    9.52
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    109.00 =     764.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        4.0  TC(MIN.) =      9.52
  EFFECTIVE AREA(ACRES) =      3.85  AREA-AVERAGED Fm(INCH/HR)=  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.26  AREA-AVERAGED Ap = 0.100
  PEAK FLOW RATE(CFS)   =       5.35

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        5.35    9.52    1.565  0.26( 0.03) 0.10       3.9     101.00
      2        5.18   10.70    1.463  0.26( 0.03) 0.10       4.0     105.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                          Analysis prepared by:

                            fuscoe engineering
                             16795 Von Karman
                                Suite 100
                                Irvine, CA

 ************************ DESCRIPTION OF STUDY ************************
* Placentia Senior Housing                                            *
* 1314 N. Angelina Drive                                              *
* Proposed Condition - 10-year storm event                            *
 **********************************************************************

  FILE NAME: PRANG10.DAT
  TIME/DATE OF STUDY: 10:25 04/16/2020
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

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

**************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    301.70  DOWNSTREAM(FEET) =    298.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.677
```

```
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.175
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 B        0.98      0.30     0.100    56    7.68
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      2.77
 TOTAL AREA(ACRES) =      0.98   PEAK FLOW RATE(CFS) =      2.77

****************************************************************************
 FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   293.20  DOWNSTREAM(FEET) =   292.60
 FLOW LENGTH(FEET) =   112.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.85
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.77
 PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =    8.16
 LONGEST FLOWPATH FROM NODE    101.00 TO NODE    103.00 =     442.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    8.16
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.066
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 C        1.03      0.25     0.100    69
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    1.03      SUBAREA RUNOFF(CFS) =    2.82
 EFFECTIVE AREA(ACRES) =      2.01   AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.27  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =        2.0       PEAK FLOW RATE(CFS) =       5.50

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   292.60  DOWNSTREAM(FEET) =   291.60
 FLOW LENGTH(FEET) =   184.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.56
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       5.50
 PIPE TRAVEL TIME(MIN.) =   0.67    Tc(MIN.) =    8.83
 LONGEST FLOWPATH FROM NODE    101.00 TO NODE    104.00 =     626.00 FEET.

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

```
 FLOW PROCESS FROM NODE    104.00 TO NODE    104.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.83
 RAINFALL INTENSITY(INCH/HR) =   2.93
 AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.27
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       2.01
 TOTAL STREAM AREA(ACRES) =       2.01
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.50

****************************************************************************
 FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
 ELEVATION DATA: UPSTREAM(FEET) =    299.10  DOWNSTREAM(FEET) =    297.60

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.094
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.881
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 C        0.72      0.25     0.100    69    9.09
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      1.85
 TOTAL AREA(ACRES) =      0.72   PEAK FLOW RATE(CFS) =      1.85

****************************************************************************
 FLOW PROCESS FROM NODE    106.00 TO NODE    107.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    297.60  DOWNSTREAM(FEET) =    297.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =    71.00   CHANNEL SLOPE =  0.0085
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  24.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.778
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 C        0.18      0.25     0.100    69
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.07
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.98
 AVERAGE FLOW DEPTH(FEET) =   0.21   TRAVEL TIME(MIN.) =   0.60
 Tc(MIN.) =    9.69
 SUBAREA AREA(ACRES) =     0.18       SUBAREA RUNOFF(CFS) =    0.45
 EFFECTIVE AREA(ACRES) =      0.90     AREA-AVERAGED Fm(INCH/HR) =   0.03
```

```
 AREA-AVERAGED Fp(INCH/HR) =   0.25  AREA-AVERAGED Ap =   0.10
 TOTAL AREA(ACRES) =        0.9         PEAK FLOW RATE(CFS) =       2.23

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.21   FLOW VELOCITY(FEET/SEC.) =   2.09
 LONGEST FLOWPATH FROM NODE    105.00 TO NODE    107.00 =     401.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.69
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.778
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 C        0.38      0.25     0.100    69
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.38      SUBAREA RUNOFF(CFS) =    0.94
 EFFECTIVE AREA(ACRES) =      1.28   AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =        1.3       PEAK FLOW RATE(CFS) =       3.17

****************************************************************************
 FLOW PROCESS FROM NODE    107.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   292.10  DOWNSTREAM(FEET) =   291.60
 FLOW LENGTH(FEET) =    89.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.03
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.17
 PIPE TRAVEL TIME(MIN.) =   0.37    Tc(MIN.) =   10.06
 LONGEST FLOWPATH FROM NODE    105.00 TO NODE    104.00 =     490.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    104.00 TO NODE    104.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.06
 RAINFALL INTENSITY(INCH/HR) =   2.72
 AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.25
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       1.28
 TOTAL STREAM AREA(ACRES) =       1.28
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.17

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

NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)		(ACRES)	NODE
1	5.50	8.83	2.930	0.27(0.03)	0.10	2.0	101.00
2	3.17	10.06	2.720	0.25(0.03)	0.10	1.3	105.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)		Ap (ACRES)	Ae	HEADWATER NODE
1	8.50	8.83	2.930	0.27(0.03)	0.10	3.1		101.00
2	8.27	10.06	2.720	0.26(0.03)	0.10	3.3		105.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 8.50 Tc(MIN.) = 8.83
EFFECTIVE AREA(ACRES) = 3.13 AREA-AVERAGED Fm(INCH/HR) = 0.03
AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 3.3
LONGEST FLOWPATH FROM NODE 101.00 TO NODE 104.00 = 626.00 FEET.

****
FLOW PROCESS FROM NODE 104.00 TO NODE 108.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==
ELEVATION DATA: UPSTREAM(FEET) = 291.60 DOWNSTREAM(FEET) = 291.00
FLOW LENGTH(FEET) = 118.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.94
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 8.50
PIPE TRAVEL TIME(MIN.) = 0.40 Tc(MIN.) = 9.23
LONGEST FLOWPATH FROM NODE 101.00 TO NODE 108.00 = 744.00 FEET.

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

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==
MAINLINE Tc(MIN.) = 9.23
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.857
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	C	0.71	0.25	0.100	69

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 0.71 SUBAREA RUNOFF(CFS) = 1.81
EFFECTIVE AREA(ACRES) = 3.84 AREA-AVERAGED Fm(INCH/HR) = 0.03
AREA-AVERAGED Fp(INCH/HR) = 0.26 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 9.79

****
FLOW PROCESS FROM NODE 108.00 TO NODE 109.00 IS CODE = 31

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

```
  ELEVATION DATA: UPSTREAM(FEET) =   291.00  DOWNSTREAM(FEET) =   290.50
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.40
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.79
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    9.27
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    109.00 =     764.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        4.0  TC(MIN.) =      9.27
  EFFECTIVE AREA(ACRES) =      3.84  AREA-AVERAGED Fm(INCH/HR)=  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.26  AREA-AVERAGED Ap = 0.100
  PEAK FLOW RATE(CFS)   =       9.79

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        9.79    9.27    2.850  0.26( 0.03) 0.10       3.8     101.00
      2        9.48   10.50    2.654  0.26( 0.03) 0.10       4.0     105.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                          Analysis prepared by:

                            fuscoe engineering
                             16795 Von Karman
                                Suite 100
                                Irvine, CA

 ************************ DESCRIPTION OF STUDY ************************
* Placentia Senior Housing                                            *
* 1314 N. Angelina Drive                                              *
* Proposed Condition - 25-year storm event                            *
 **********************************************************************

  FILE NAME: PRANG25.DAT
  TIME/DATE OF STUDY: 09:50 04/17/2020
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

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

**************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    301.70  DOWNSTREAM(FEET) =    298.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.677
```

```
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.784
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 B        0.98      0.30     0.100    56    7.68
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      3.31
 TOTAL AREA(ACRES) =      0.98   PEAK FLOW RATE(CFS) =      3.31

****************************************************************************
 FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   293.20  DOWNSTREAM(FEET) =   292.60
 FLOW LENGTH(FEET) =   112.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.00
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.31
 PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =    8.14
 LONGEST FLOWPATH FROM NODE    101.00 TO NODE    103.00 =     442.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    8.14
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.660
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 C        1.03      0.25     0.100    69
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    1.03      SUBAREA RUNOFF(CFS) =    3.37
 EFFECTIVE AREA(ACRES) =      2.01   AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.27  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =        2.0       PEAK FLOW RATE(CFS) =       6.57

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   292.60  DOWNSTREAM(FEET) =   291.60
 FLOW LENGTH(FEET) =   184.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.70
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       6.57
 PIPE TRAVEL TIME(MIN.) =   0.65    Tc(MIN.) =    8.80
 LONGEST FLOWPATH FROM NODE    101.00 TO NODE    104.00 =     626.00 FEET.

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

```
 FLOW PROCESS FROM NODE    104.00 TO NODE    104.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.80
 RAINFALL INTENSITY(INCH/HR) =   3.50
 AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.27
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       2.01
 TOTAL STREAM AREA(ACRES) =       2.01
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.57

****************************************************************************
 FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
 ELEVATION DATA: UPSTREAM(FEET) =    299.10  DOWNSTREAM(FEET) =    297.60

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.094
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.438
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 C        0.72      0.25     0.100    69    9.09
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      2.21
 TOTAL AREA(ACRES) =      0.72   PEAK FLOW RATE(CFS) =      2.21

****************************************************************************
 FLOW PROCESS FROM NODE    106.00 TO NODE    107.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    297.60  DOWNSTREAM(FEET) =    297.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =    71.00   CHANNEL SLOPE =  0.0085
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  24.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.321
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 C        0.18      0.25     0.100    69
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.48
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.06
 AVERAGE FLOW DEPTH(FEET) =   0.22   TRAVEL TIME(MIN.) =   0.58
 Tc(MIN.) =    9.67
 SUBAREA AREA(ACRES) =     0.18       SUBAREA RUNOFF(CFS) =    0.53
 EFFECTIVE AREA(ACRES) =      0.90     AREA-AVERAGED Fm(INCH/HR) =   0.03
```

```
 AREA-AVERAGED Fp(INCH/HR) =   0.25  AREA-AVERAGED Ap =   0.10
 TOTAL AREA(ACRES) =        0.9         PEAK FLOW RATE(CFS) =       2.67

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.23   FLOW VELOCITY(FEET/SEC.) =   2.18
 LONGEST FLOWPATH FROM NODE    105.00 TO NODE    107.00 =     401.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.67
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.321
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 C        0.38      0.25     0.100    69
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.38      SUBAREA RUNOFF(CFS) =    1.13
 EFFECTIVE AREA(ACRES) =      1.28   AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =        1.3       PEAK FLOW RATE(CFS) =       3.80

****************************************************************************
 FLOW PROCESS FROM NODE    107.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   292.10  DOWNSTREAM(FEET) =   291.60
 FLOW LENGTH(FEET) =    89.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.18
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.80
 PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =   10.02
 LONGEST FLOWPATH FROM NODE    105.00 TO NODE    104.00 =     490.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    104.00 TO NODE    104.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.02
 RAINFALL INTENSITY(INCH/HR) =   3.25
 AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.25
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       1.28
 TOTAL STREAM AREA(ACRES) =       1.28
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.80

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

NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	6.57	8.80	3.504	0.27(0.03)	0.10	2.0	101.00
2	3.80	10.02	3.254	0.25(0.03)	0.10	1.3	105.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	10.16	8.80	3.504	0.27(0.03)	0.10	3.1	101.00
2	9.90	10.02	3.254	0.26(0.03)	0.10	3.3	105.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 10.16 Tc(MIN.) = 8.80
EFFECTIVE AREA(ACRES) = 3.13 AREA-AVERAGED Fm(INCH/HR) = 0.03
AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 3.3
LONGEST FLOWPATH FROM NODE 101.00 TO NODE 104.00 = 626.00 FEET.

****
FLOW PROCESS FROM NODE 104.00 TO NODE 108.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========
ELEVATION DATA: UPSTREAM(FEET) = 291.60 DOWNSTREAM(FEET) = 291.00
FLOW LENGTH(FEET) = 118.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 16.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.07
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 10.16
PIPE TRAVEL TIME(MIN.) = 0.39 Tc(MIN.) = 9.18
LONGEST FLOWPATH FROM NODE 101.00 TO NODE 108.00 = 744.00 FEET.

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

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========
MAINLINE Tc(MIN.) = 9.18
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.419
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	C	0.71	0.25	0.100	69

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 0.71 SUBAREA RUNOFF(CFS) = 2.17
EFFECTIVE AREA(ACRES) = 3.84 AREA-AVERAGED Fm(INCH/HR) = 0.03
AREA-AVERAGED Fp(INCH/HR) = 0.26 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 11.74

****
FLOW PROCESS FROM NODE 108.00 TO NODE 109.00 IS CODE = 31

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

```
  ELEVATION DATA: UPSTREAM(FEET) =   291.00  DOWNSTREAM(FEET) =   290.50
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.77
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.74
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    9.22
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    109.00 =     764.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        4.0  TC(MIN.) =      9.22
  EFFECTIVE AREA(ACRES) =      3.84  AREA-AVERAGED Fm(INCH/HR)=  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.26  AREA-AVERAGED Ap = 0.100
  PEAK FLOW RATE(CFS)   =      11.74

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       11.74    9.22    3.412  0.26( 0.03) 0.10       3.8     101.00
      2       11.37   10.45    3.179  0.26( 0.03) 0.10       4.0     105.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                          Analysis prepared by:

                            fuscoe engineering
                             16795 Von Karman
                                Suite 100
                                Irvine, CA

 ************************ DESCRIPTION OF STUDY ************************
* Placentia Senior Housing                                            *
* 1314 N. Angelina Drive                                              *
* Proposed Condition - 100-year storm event                           *
 **********************************************************************

  FILE NAME: PRANG100.DAT
  TIME/DATE OF STUDY: 09:55 04/17/2020
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

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

**************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    301.70  DOWNSTREAM(FEET) =    298.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.677
```

```
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.840
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                  B        0.98      0.30     0.100    76    7.68
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      4.24
 TOTAL AREA(ACRES) =      0.98   PEAK FLOW RATE(CFS) =      4.24

****************************************************************************
 FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   293.20  DOWNSTREAM(FEET) =   292.60
 FLOW LENGTH(FEET) =   112.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  15.0 INCH PIPE IS  11.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.16
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       4.24
 PIPE TRAVEL TIME(MIN.) =   0.45    Tc(MIN.) =    8.13
 LONGEST FLOWPATH FROM NODE    101.00 TO NODE    103.00 =     442.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    8.13
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.684
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  C        1.03      0.25     0.100    86
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    1.03      SUBAREA RUNOFF(CFS) =    4.32
 EFFECTIVE AREA(ACRES) =      2.01   AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.27  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =        2.0       PEAK FLOW RATE(CFS) =       8.42

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   292.60  DOWNSTREAM(FEET) =   291.60
 FLOW LENGTH(FEET) =   184.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.07
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       8.42
 PIPE TRAVEL TIME(MIN.) =   0.61    Tc(MIN.) =    8.73
 LONGEST FLOWPATH FROM NODE    101.00 TO NODE    104.00 =     626.00 FEET.

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

```
 FLOW PROCESS FROM NODE    104.00 TO NODE    104.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.73
 RAINFALL INTENSITY(INCH/HR) =   4.50
 AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.27
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       2.01
 TOTAL STREAM AREA(ACRES) =       2.01
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.42

****************************************************************************
 FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
 ELEVATION DATA: UPSTREAM(FEET) =    299.10  DOWNSTREAM(FEET) =    297.60

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.094
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.392
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 C        0.72      0.25     0.100    86    9.09
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      2.83
 TOTAL AREA(ACRES) =      0.72   PEAK FLOW RATE(CFS) =      2.83

****************************************************************************
 FLOW PROCESS FROM NODE    106.00 TO NODE    107.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    297.60  DOWNSTREAM(FEET) =    297.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =    71.00   CHANNEL SLOPE =  0.0085
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  24.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.254
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 C        0.18      0.25     0.100    86
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.17
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.27
 AVERAGE FLOW DEPTH(FEET) =   0.24   TRAVEL TIME(MIN.) =   0.52
 Tc(MIN.) =    9.62
 SUBAREA AREA(ACRES) =     0.18       SUBAREA RUNOFF(CFS) =    0.69
 EFFECTIVE AREA(ACRES) =      0.90     AREA-AVERAGED Fm(INCH/HR) =   0.03
```

```
 AREA-AVERAGED Fp(INCH/HR) =   0.25  AREA-AVERAGED Ap =   0.10
 TOTAL AREA(ACRES) =        0.9         PEAK FLOW RATE(CFS) =       3.43

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.25   FLOW VELOCITY(FEET/SEC.) =   2.30
 LONGEST FLOWPATH FROM NODE    105.00 TO NODE    107.00 =     401.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.62
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.254
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 C        0.38      0.25     0.100    86
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.38      SUBAREA RUNOFF(CFS) =    1.45
 EFFECTIVE AREA(ACRES) =      1.28   AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =        1.3       PEAK FLOW RATE(CFS) =       4.87

****************************************************************************
 FLOW PROCESS FROM NODE    107.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   292.10  DOWNSTREAM(FEET) =   291.60
 FLOW LENGTH(FEET) =    89.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.50
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       4.87
 PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =    9.94
 LONGEST FLOWPATH FROM NODE    105.00 TO NODE    104.00 =     490.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    104.00 TO NODE    104.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.94
 RAINFALL INTENSITY(INCH/HR) =   4.17
 AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.25
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       1.28
 TOTAL STREAM AREA(ACRES) =       1.28
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.87

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

NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	8.42	8.73	4.496	0.27(0.03)	0.10	2.0	101.00
2	4.87	9.94	4.172	0.25(0.03)	0.10	1.3	105.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	13.03	8.73	4.496	0.27(0.03)	0.10	3.1	101.00
2	12.69	9.94	4.172	0.26(0.03)	0.10	3.3	105.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 13.03 Tc(MIN.) = 8.73
EFFECTIVE AREA(ACRES) = 3.13 AREA-AVERAGED Fm(INCH/HR) = 0.03
AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 3.3
LONGEST FLOWPATH FROM NODE 101.00 TO NODE 104.00 = 626.00 FEET.

****
FLOW PROCESS FROM NODE 104.00 TO NODE 108.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==
ELEVATION DATA: UPSTREAM(FEET) = 291.60 DOWNSTREAM(FEET) = 291.00
FLOW LENGTH(FEET) = 118.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 17.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.47
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 13.03
PIPE TRAVEL TIME(MIN.) = 0.36 Tc(MIN.) = 9.09
LONGEST FLOWPATH FROM NODE 101.00 TO NODE 108.00 = 744.00 FEET.

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

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==
MAINLINE Tc(MIN.) = 9.09
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.393
SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	C	0.71	0.25	0.100	86

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 0.71 SUBAREA RUNOFF(CFS) = 2.79
EFFECTIVE AREA(ACRES) = 3.84 AREA-AVERAGED Fm(INCH/HR) = 0.03
AREA-AVERAGED Fp(INCH/HR) = 0.26 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 15.11

****
FLOW PROCESS FROM NODE 108.00 TO NODE 109.00 IS CODE = 31

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

```
  ELEVATION DATA: UPSTREAM(FEET) =   291.00  DOWNSTREAM(FEET) =   290.50
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.15
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.11
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    9.12
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    109.00 =     764.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        4.0  TC(MIN.) =      9.12
  EFFECTIVE AREA(ACRES) =      3.84  AREA-AVERAGED Fm(INCH/HR)=  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.26  AREA-AVERAGED Ap = 0.100
  PEAK FLOW RATE(CFS)   =      15.11

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       15.11    9.12    4.384  0.26( 0.03) 0.10       3.8     101.00
      2       14.62   10.34    4.081  0.26( 0.03) 0.10       4.0     105.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
==========================================================================
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                          Analysis prepared by:

                            fuscoe engineering
                             16795 Von Karman
                                Suite 100
                                Irvine, CA

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

 Problem Descriptions:
  Placentia Senior Housing
  1314 N. Angelina, Placentia
  Proposed Condition  2-year/24-hour hydrograph
==========================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC I:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     2.05 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1         0.98       10.00       56.(AMC II)     0.300        0.801
         2         3.02       10.00       69.(AMC II)     0.250        0.801

    TOTAL AREA (Acres) =      4.00

                                  _
    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.026

                                 _
    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.199
==========================================================================

 Problem Descriptions:
  Placentia Senior Housing
  1314 N. Angelina, Placentia
  Proposed Condition  2-year/24-hour hydrograph  (calib. coef: 0.869)
--------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.87
    TOTAL CATCHMENT AREA(ACRES) =    4.00
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.026
    LOW LOSS FRACTION = 0.199
    TIME OF CONCENTRATION(MIN.) =  9.52
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =   2
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.19
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.53
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  0.89
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  1.22
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  2.05
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    TOTAL CATCHMENT    RUNOFF  VOLUME(ACRE-FEET) =      0.50
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =      0.18

********************************************************************************
  TIME      VOLUME        Q     0.         2.5        5.0        7.5       10.0
 (HOURS)     (AF)       (CFS)
--------------------------------------------------------------------------------
  0.13       0.0006      0.09  Q          .          .          .          .
  0.29       0.0018      0.09  Q          .          .          .          .
  0.45       0.0029      0.09  Q          .          .          .          .
  0.61       0.0041      0.09  Q          .          .          .          .
  0.77       0.0053      0.09  Q          .          .          .          .
  0.93       0.0065      0.09  Q          .          .          .          .
  1.09       0.0077      0.09  Q          .          .          .          .
  1.24       0.0089      0.09  Q          .          .          .          .
  1.40       0.0102      0.09  Q          .          .          .          .
  1.56       0.0114      0.09  Q          .          .          .          .
  1.72       0.0126      0.09  Q          .          .          .          .
  1.88       0.0139      0.10  Q          .          .          .          .
  2.04       0.0152      0.10  Q          .          .          .          .
  2.20       0.0164      0.10  Q          .          .          .          .
  2.35       0.0177      0.10  Q          .          .          .          .
  2.51       0.0190      0.10  Q          .          .          .          .
  2.67       0.0203      0.10  Q          .          .          .          .
  2.83       0.0216      0.10  Q          .          .          .          .
  2.99       0.0229      0.10  Q          .          .          .          .
  3.15       0.0242      0.10  Q          .          .          .          .
  3.31       0.0256      0.10  Q          .          .          .          .
  3.47       0.0269      0.10  Q          .          .          .          .
  3.62       0.0283      0.10  Q          .          .          .          .
  3.78       0.0296      0.10  Q          .          .          .          .
  3.94       0.0310      0.11  Q          .          .          .          .
  4.10       0.0324      0.11  Q          .          .          .          .
  4.26       0.0338      0.11  Q          .          .          .          .
  4.42       0.0352      0.11  Q          .          .          .          .
  4.58       0.0366      0.11  Q          .          .          .          .
  4.73       0.0381      0.11  Q          .          .          .          .
  4.89       0.0395      0.11  Q          .          .          .          .
  5.05       0.0410      0.11  Q          .          .          .          .
  5.21       0.0425      0.11  Q          .          .          .          .
  5.37       0.0440      0.11  Q          .          .          .          .
  5.53       0.0455      0.11  Q          .          .          .          .
  5.69       0.0470      0.12  Q          .          .          .          .
  5.85       0.0485      0.12  Q          .          .          .          .
  6.00       0.0501      0.12  Q          .          .          .          .
  6.16       0.0516      0.12  Q          .          .          .          .
  6.32       0.0532      0.12  Q          .          .          .          .
  6.48       0.0548      0.12  Q          .          .          .          .
  6.64       0.0564      0.12  Q          .          .          .          .
  6.80       0.0580      0.12  Q          .          .          .          .
  6.96       0.0597      0.13  Q          .          .          .          .
  7.11       0.0613      0.13  Q          .          .          .          .
  7.27       0.0630      0.13  Q          .          .          .          .
  7.43       0.0647      0.13  Q          .          .          .          .
  7.59       0.0664      0.13  Q          .          .          .          .
  7.75       0.0682      0.13  Q          .          .          .          .
  7.91       0.0699      0.14  Q          .          .          .          .
  8.07       0.0717      0.14  Q          .          .          .          .
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8.23	0.0735	0.14	Q . . . .
8.38	0.0753	0.14	Q . . . .
8.54	0.0772	0.14	Q . . . .
8.70	0.0791	0.14	Q . . . .
8.86	0.0810	0.15	Q . . . .
9.02	0.0829	0.15	Q . . . .
9.18	0.0848	0.15	Q . . . .
9.34	0.0868	0.15	Q . . . .
9.49	0.0888	0.15	Q . . . .
9.65	0.0909	0.16	Q . . . .
9.81	0.0929	0.16	Q . . . .
9.97	0.0950	0.16	Q . . . .
10.13	0.0972	0.16	Q . . . .
10.29	0.0994	0.17	Q . . . .
10.45	0.1016	0.17	Q . . . .
10.61	0.1038	0.17	Q . . . .
10.76	0.1061	0.18	Q . . . .
10.92	0.1084	0.18	Q . . . .
11.08	0.1108	0.18	Q . . . .
11.24	0.1133	0.19	Q . . . .
11.40	0.1157	0.19	Q . . . .
11.56	0.1183	0.19	Q . . . .
11.72	0.1208	0.20	Q . . . .
11.87	0.1235	0.20	Q . . . .
12.03	0.1262	0.21	Q . . . .
12.19	0.1292	0.25	.Q . . . .
12.35	0.1326	0.27	.Q . . . .
12.51	0.1361	0.27	.Q . . . .
12.67	0.1397	0.28	.Q . . . .
12.83	0.1434	0.28	.Q . . . .
12.99	0.1472	0.29	.Q . . . .
13.14	0.1511	0.30	.Q . . . .
13.30	0.1552	0.31	.Q . . . .
13.46	0.1593	0.32	.Q . . . .
13.62	0.1636	0.33	.Q . . . .
13.78	0.1680	0.34	.Q . . . .
13.94	0.1726	0.36	.Q . . . .
14.10	0.1774	0.37	.Q . . . .
14.25	0.1826	0.42	.Q . . . .
14.41	0.1881	0.43	.Q . . . .
14.57	0.1940	0.47	.Q . . . .
14.73	0.2003	0.49	.Q . . . .
14.89	0.2071	0.54	. Q . . . .
15.05	0.2144	0.57	. Q . . . .
15.21	0.2225	0.65	. Q . . . .
15.37	0.2314	0.70	. Q . . . .
15.52	0.2407	0.72	. Q . . . .
15.68	0.2508	0.83	. Q . . . .
15.84	0.2644	1.24	. Q . . . .
16.00	0.2838	1.72	. Q . . . .
16.16	0.3302	5.35	. . .Q . .
16.32	0.3717	0.98	. Q . . . .
16.48	0.3829	0.73	. Q . . . .
16.63	0.3917	0.61	. Q . . . .
16.79	0.3990	0.52	. Q . . . .
16.95	0.4054	0.45	.Q . . . .
17.11	0.4109	0.40	.Q . . . .
17.27	0.4159	0.35	.Q . . . .
17.43	0.4203	0.33	.Q . . . .
17.59	0.4244	0.31	.Q . . . .
17.75	0.4283	0.29	.Q . . . .

17.90	0.4321	0.28	.Q	.	.	.	.
18.06	0.4356	0.26	.Q	.	.	.	.
18.22	0.4387	0.21	Q	.	.	.	.
18.38	0.4413	0.20	Q	.	.	.	.
18.54	0.4438	0.19	Q	.	.	.	.
18.70	0.4463	0.18	Q	.	.	.	.
18.86	0.4486	0.17	Q	.	.	.	.
19.01	0.4508	0.17	Q	.	.	.	.
19.17	0.4530	0.16	Q	.	.	.	.
19.33	0.4551	0.16	Q	.	.	.	.
19.49	0.4572	0.15	Q	.	.	.	.
19.65	0.4591	0.15	Q	.	.	.	.
19.81	0.4611	0.14	Q	.	.	.	.
19.97	0.4629	0.14	Q	.	.	.	.
20.13	0.4648	0.14	Q	.	.	.	.
20.28	0.4665	0.13	Q	.	.	.	.
20.44	0.4683	0.13	Q	.	.	.	.
20.60	0.4700	0.13	Q	.	.	.	.
20.76	0.4716	0.13	Q	.	.	.	.
20.92	0.4733	0.12	Q	.	.	.	.
21.08	0.4749	0.12	Q	.	.	.	.
21.24	0.4764	0.12	Q	.	.	.	.
21.39	0.4780	0.12	Q	.	.	.	.
21.55	0.4795	0.11	Q	.	.	.	.
21.71	0.4809	0.11	Q	.	.	.	.
21.87	0.4824	0.11	Q	.	.	.	.
22.03	0.4838	0.11	Q	.	.	.	.
22.19	0.4852	0.11	Q	.	.	.	.
22.35	0.4866	0.10	Q	.	.	.	.
22.51	0.4880	0.10	Q	.	.	.	.
22.66	0.4893	0.10	Q	.	.	.	.
22.82	0.4906	0.10	Q	.	.	.	.
22.98	0.4919	0.10	Q	.	.	.	.
23.14	0.4932	0.10	Q	.	.	.	.
23.30	0.4944	0.10	Q	.	.	.	.
23.46	0.4957	0.09	Q	.	.	.	.
23.62	0.4969	0.09	Q	.	.	.	.
23.77	0.4981	0.09	Q	.	.	.	.
23.93	0.4993	0.09	Q	.	.	.	.
24.09	0.5005	0.09	Q	.	.	.	.
24.25	0.5011	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1447.0
10%	114.2
20%	28.6
30%	19.0
40%	9.5
50%	9.5
60%	9.5
70%	9.5
80%	9.5
90%	9.5

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**************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
==========================================================================
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                          Analysis prepared by:

                            fuscoe engineering
                             16795 Von Karman
                                Suite 100
                                Irvine, CA

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

 Problem Descriptions:
  Placentia Senior Housing
  1314 N. Angelina Drive
  Proposed Condition 10-yr/24-hour hydrograph
==========================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC II:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     3.68 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1         0.98       10.00            56.       0.300        0.855
         2         3.02       10.00            69.       0.250        0.872

    TOTAL AREA (Acres) =      4.00

                                  _
    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.026

                                 _
    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.132
==========================================================================

 Problem Descriptions:
  Placentia Senior Housing
  1314 N. Angelina Drive
  Proposed Condition 10-yr/24-hour hydrograph  (calib coef: 0.867)
--------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.87
    TOTAL CATCHMENT AREA(ACRES) =    4.00
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.026
    LOW LOSS FRACTION = 0.132
    TIME OF CONCENTRATION(MIN.) =  9.27
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  10
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.34
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.72
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.95
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.59
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.20
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  3.68
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    TOTAL CATCHMENT    RUNOFF  VOLUME(ACRE-FEET) =      0.96
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =      0.27

********************************************************************************
  TIME      VOLUME        Q     0.          2.5         5.0         7.5        10.0
 (HOURS)     (AF)       (CFS)
--------------------------------------------------------------------------------
  0.09       0.0006      0.17  Q           .           .           .           .
  0.24       0.0028      0.17  Q           .           .           .           .
  0.40       0.0050      0.17  Q           .           .           .           .
  0.55       0.0072      0.17  Q           .           .           .           .
  0.70       0.0095      0.18  Q           .           .           .           .
  0.86       0.0117      0.18  Q           .           .           .           .
  1.01       0.0140      0.18  Q           .           .           .           .
  1.17       0.0162      0.18  Q           .           .           .           .
  1.32       0.0185      0.18  Q           .           .           .           .
  1.48       0.0208      0.18  Q           .           .           .           .
  1.63       0.0231      0.18  Q           .           .           .           .
  1.79       0.0255      0.18  Q           .           .           .           .
  1.94       0.0278      0.18  Q           .           .           .           .
  2.09       0.0302      0.19  Q           .           .           .           .
  2.25       0.0326      0.19  Q           .           .           .           .
  2.40       0.0350      0.19  Q           .           .           .           .
  2.56       0.0374      0.19  Q           .           .           .           .
  2.71       0.0398      0.19  Q           .           .           .           .
  2.87       0.0423      0.19  Q           .           .           .           .
  3.02       0.0448      0.19  Q           .           .           .           .
  3.18       0.0472      0.20  Q           .           .           .           .
  3.33       0.0498      0.20  Q           .           .           .           .
  3.49       0.0523      0.20  Q           .           .           .           .
  3.64       0.0548      0.20  Q           .           .           .           .
  3.79       0.0574      0.20  Q           .           .           .           .
  3.95       0.0600      0.20  Q           .           .           .           .
  4.10       0.0626      0.21  Q           .           .           .           .
  4.26       0.0652      0.21  Q           .           .           .           .
  4.41       0.0679      0.21  Q           .           .           .           .
  4.57       0.0705      0.21  Q           .           .           .           .
  4.72       0.0732      0.21  Q           .           .           .           .
  4.88       0.0759      0.21  Q           .           .           .           .
  5.03       0.0787      0.22  Q           .           .           .           .
  5.18       0.0815      0.22  Q           .           .           .           .
  5.34       0.0842      0.22  Q           .           .           .           .
  5.49       0.0871      0.22  Q           .           .           .           .
  5.65       0.0899      0.22  Q           .           .           .           .
  5.80       0.0928      0.23  Q           .           .           .           .
  5.96       0.0957      0.23  Q           .           .           .           .
  6.11       0.0986      0.23  Q           .           .           .           .
  6.27       0.1015      0.23  Q           .           .           .           .
  6.42       0.1045      0.23  Q           .           .           .           .
  6.58       0.1075      0.24  Q           .           .           .           .
  6.73       0.1106      0.24  Q           .           .           .           .
  6.88       0.1136      0.24  Q           .           .           .           .
  7.04       0.1167      0.24  Q           .           .           .           .
  7.19       0.1199      0.25  Q           .           .           .           .
  7.35       0.1231      0.25  Q           .           .           .           .
  7.50       0.1263      0.25  .Q          .           .           .           .
  7.66       0.1295      0.26  .Q          .           .           .           .
  7.81       0.1328      0.26  .Q          .           .           .           .
```

7.97	0.1361	0.26	.Q . . . .
8.12	0.1395	0.27	.Q . . . .
8.27	0.1429	0.27	.Q . . . .
8.43	0.1463	0.27	.Q . . . .
8.58	0.1498	0.27	.Q . . . .
8.74	0.1533	0.28	.Q . . . .
8.89	0.1569	0.28	.Q . . . .
9.05	0.1605	0.29	.Q . . . .
9.20	0.1642	0.29	.Q . . . .
9.36	0.1679	0.29	.Q . . . .
9.51	0.1717	0.30	.Q . . . .
9.67	0.1756	0.30	.Q . . . .
9.82	0.1795	0.31	.Q . . . .
9.97	0.1834	0.31	.Q . . . .
10.13	0.1874	0.32	.Q . . . .
10.28	0.1915	0.32	.Q . . . .
10.44	0.1957	0.33	.Q . . . .
10.59	0.1999	0.33	.Q . . . .
10.75	0.2042	0.34	.Q . . . .
10.90	0.2086	0.35	.Q . . . .
11.06	0.2130	0.35	.Q . . . .
11.21	0.2176	0.36	.Q . . . .
11.36	0.2222	0.37	.Q . . . .
11.52	0.2270	0.38	.Q . . . .
11.67	0.2318	0.38	.Q . . . .
11.83	0.2368	0.39	.Q . . . .
11.98	0.2418	0.40	.Q . . . .
12.14	0.2476	0.50	. Q . . . .
12.29	0.2541	0.53	. Q . . . .
12.45	0.2609	0.54	. Q . . . .
12.60	0.2679	0.55	. Q . . . .
12.76	0.2751	0.57	. Q . . . .
12.91	0.2824	0.58	. Q . . . .
13.06	0.2899	0.60	. Q . . . .
13.22	0.2976	0.61	. Q . . . .
13.37	0.3056	0.64	. Q . . . .
13.53	0.3139	0.65	. Q . . . .
13.68	0.3225	0.69	. Q . . . .
13.84	0.3314	0.71	. Q . . . .
13.99	0.3406	0.75	. Q . . . .
14.15	0.3503	0.77	. Q . . . .
14.30	0.3605	0.82	. Q . . . .
14.45	0.3711	0.85	. Q . . . .
14.61	0.3824	0.92	. Q . . . .
14.76	0.3944	0.96	. Q . . . .
14.92	0.4071	1.05	. Q . . . .
15.07	0.4209	1.10	. Q . . . .
15.23	0.4359	1.25	. Q . . . .
15.38	0.4524	1.34	. Q . . . .
15.54	0.4697	1.36	. Q . . . .
15.69	0.4883	1.55	. Q . . . .
15.85	0.5132	2.35	. Q. . . .
16.00	0.5489	3.24	. . Q . . .
16.15	0.6321	9.79	. . . . Q.
16.31	0.7064	1.84	. Q . . . .
16.46	0.7268	1.34	. Q . . . .
16.62	0.7428	1.17	. Q . . . .
16.77	0.7567	1.00	. Q . . . .
16.93	0.7687	0.88	. Q . . . .
17.08	0.7794	0.79	. Q . . . .
17.24	0.7891	0.73	. Q . . . .

17.39	0.7980	0.67	. Q	.	.	.	.
17.55	0.8063	0.63	. Q	.	.	.	.
17.70	0.8140	0.59	. Q	.	.	.	.
17.85	0.8213	0.56	. Q	.	.	.	.
18.01	0.8283	0.53	. Q	.	.	.	.
18.16	0.8343	0.41	.Q	.	.	.	.
18.32	0.8394	0.39	.Q	.	.	.	.
18.47	0.8442	0.37	.Q	.	.	.	.
18.63	0.8489	0.36	.Q	.	.	.	.
18.78	0.8533	0.34	.Q	.	.	.	.
18.94	0.8576	0.33	.Q	.	.	.	.
19.09	0.8618	0.32	.Q	.	.	.	.
19.24	0.8658	0.31	.Q	.	.	.	.
19.40	0.8697	0.30	.Q	.	.	.	.
19.55	0.8735	0.29	.Q	.	.	.	.
19.71	0.8772	0.28	.Q	.	.	.	.
19.86	0.8808	0.28	.Q	.	.	.	.
20.02	0.8842	0.27	.Q	.	.	.	.
20.17	0.8876	0.26	.Q	.	.	.	.
20.33	0.8910	0.26	.Q	.	.	.	.
20.48	0.8942	0.25	.Q	.	.	.	.
20.64	0.8974	0.25	Q	.	.	.	.
20.79	0.9005	0.24	Q	.	.	.	.
20.94	0.9035	0.24	Q	.	.	.	.
21.10	0.9065	0.23	Q	.	.	.	.
21.25	0.9094	0.23	Q	.	.	.	.
21.41	0.9123	0.22	Q	.	.	.	.
21.56	0.9151	0.22	Q	.	.	.	.
21.72	0.9179	0.21	Q	.	.	.	.
21.87	0.9206	0.21	Q	.	.	.	.
22.03	0.9233	0.21	Q	.	.	.	.
22.18	0.9259	0.20	Q	.	.	.	.
22.33	0.9285	0.20	Q	.	.	.	.
22.49	0.9310	0.20	Q	.	.	.	.
22.64	0.9335	0.19	Q	.	.	.	.
22.80	0.9360	0.19	Q	.	.	.	.
22.95	0.9384	0.19	Q	.	.	.	.
23.11	0.9408	0.19	Q	.	.	.	.
23.26	0.9432	0.18	Q	.	.	.	.
23.42	0.9455	0.18	Q	.	.	.	.
23.57	0.9478	0.18	Q	.	.	.	.
23.73	0.9501	0.18	Q	.	.	.	.
23.88	0.9524	0.17	Q	.	.	.	.
24.03	0.9546	0.17	Q	.	.	.	.
24.19	0.9557	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1446.1
10%	120.5
20%	27.8
30%	18.5
40%	9.3
50%	9.3
60%	9.3

```
**************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
==========================================================================
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                          Analysis prepared by:

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                             16795 Von Karman
                                Suite 100
                                Irvine, CA

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

 Problem Descriptions:
  Placentia Senior Housing
  1314 N. Angelina Drive
  Proposed Condition  25-yr/24-hour hydrograph
==========================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC II:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     4.49 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1         0.98       10.00            56.       0.300        0.870
         2         3.02       10.00            69.       0.250        0.888

    TOTAL AREA (Acres) =      4.00

                                  _
    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.026

                                 _
    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.116
==========================================================================

 Problem Descriptions:
  Placentia Senior Housing
  1314 N. Angelina Drive
  Proposed Condition  25-yr/24-hour hydrograph  (calib coef: 0.8715)
--------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.87
    TOTAL CATCHMENT AREA(ACRES) =    4.00
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.026
    LOW LOSS FRACTION = 0.116
    TIME OF CONCENTRATION(MIN.) =  9.22
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  25
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.87
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.15
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.94
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.71
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  4.49
```

TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 1.19
TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = 0.31

****

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	5.0	10.0	15.0	20.0
0.02	0.0000	0.00	Q	.	.	.	.
0.17	0.0013	0.21	Q	.	.	.	.
0.33	0.0040	0.21	Q	.	.	.	.
0.48	0.0067	0.21	Q	.	.	.	.
0.63	0.0094	0.21	Q	.	.	.	.
0.79	0.0122	0.22	Q	.	.	.	.
0.94	0.0149	0.22	Q	.	.	.	.
1.09	0.0177	0.22	Q	.	.	.	.
1.25	0.0205	0.22	Q	.	.	.	.
1.40	0.0233	0.22	Q	.	.	.	.
1.56	0.0261	0.22	Q	.	.	.	.
1.71	0.0289	0.22	Q	.	.	.	.
1.86	0.0318	0.23	Q	.	.	.	.
2.02	0.0347	0.23	Q	.	.	.	.
2.17	0.0376	0.23	Q	.	.	.	.
2.32	0.0405	0.23	Q	.	.	.	.
2.48	0.0434	0.23	Q	.	.	.	.
2.63	0.0464	0.23	Q	.	.	.	.
2.78	0.0494	0.24	Q	.	.	.	.
2.94	0.0524	0.24	Q	.	.	.	.
3.09	0.0554	0.24	Q	.	.	.	.
3.25	0.0584	0.24	Q	.	.	.	.
3.40	0.0615	0.24	Q	.	.	.	.
3.55	0.0646	0.25	Q	.	.	.	.
3.71	0.0677	0.25	Q	.	.	.	.
3.86	0.0709	0.25	Q	.	.	.	.
4.01	0.0740	0.25	Q	.	.	.	.
4.17	0.0772	0.25	Q	.	.	.	.
4.32	0.0805	0.25	Q	.	.	.	.
4.47	0.0837	0.26	Q	.	.	.	.
4.63	0.0870	0.26	Q	.	.	.	.
4.78	0.0903	0.26	Q	.	.	.	.
4.94	0.0936	0.26	Q	.	.	.	.
5.09	0.0970	0.27	Q	.	.	.	.
5.24	0.1004	0.27	Q	.	.	.	.
5.40	0.1038	0.27	Q	.	.	.	.
5.55	0.1072	0.27	Q	.	.	.	.
5.70	0.1107	0.28	Q	.	.	.	.
5.86	0.1142	0.28	Q	.	.	.	.
6.01	0.1178	0.28	Q	.	.	.	.
6.17	0.1214	0.28	Q	.	.	.	.
6.32	0.1250	0.29	Q	.	.	.	.
6.47	0.1287	0.29	Q	.	.	.	.
6.63	0.1324	0.29	Q	.	.	.	.
6.78	0.1361	0.29	Q	.	.	.	.
6.93	0.1399	0.30	Q	.	.	.	.
7.09	0.1437	0.30	Q	.	.	.	.
7.24	0.1475	0.31	Q	.	.	.	.
7.39	0.1514	0.31	Q	.	.	.	.
7.55	0.1554	0.31	Q	.	.	.	.
7.70	0.1594	0.32	Q	.	.	.	.

7.86	0.1634	0.32	Q . . . .
8.01	0.1675	0.32	Q . . . .
8.16	0.1716	0.33	Q . . . .
8.32	0.1758	0.33	Q . . . .
8.47	0.1800	0.34	Q . . . .
8.62	0.1843	0.34	Q . . . .
8.78	0.1886	0.35	Q . . . .
8.93	0.1930	0.35	Q . . . .
9.09	0.1975	0.35	Q . . . .
9.24	0.2020	0.36	Q . . . .
9.39	0.2066	0.36	Q . . . .
9.55	0.2113	0.37	Q . . . .
9.70	0.2160	0.38	Q . . . .
9.85	0.2208	0.38	Q . . . .
10.01	0.2257	0.39	Q . . . .
10.16	0.2306	0.39	Q . . . .
10.31	0.2357	0.40	Q . . . .
10.47	0.2408	0.41	Q . . . .
10.62	0.2460	0.41	Q . . . .
10.78	0.2513	0.42	Q . . . .
10.93	0.2567	0.43	Q . . . .
11.08	0.2622	0.44	Q . . . .
11.24	0.2678	0.45	Q . . . .
11.39	0.2735	0.45	Q . . . .
11.54	0.2794	0.47	Q . . . .
11.70	0.2853	0.47	Q . . . .
11.85	0.2914	0.49	Q . . . .
12.00	0.2977	0.50	Q . . . .
12.16	0.3051	0.68	.Q . . . .
12.31	0.3138	0.69	.Q . . . .
12.47	0.3226	0.71	.Q . . . .
12.62	0.3317	0.72	.Q . . . .
12.77	0.3410	0.74	.Q . . . .
12.93	0.3505	0.76	.Q . . . .
13.08	0.3603	0.79	.Q . . . .
13.23	0.3704	0.80	.Q . . . .
13.39	0.3808	0.84	.Q . . . .
13.54	0.3916	0.86	.Q . . . .
13.70	0.4027	0.90	.Q . . . .
13.85	0.4142	0.92	.Q . . . .
14.00	0.4262	0.97	.Q . . . .
14.16	0.4387	0.99	.Q . . . .
14.31	0.4516	1.05	. Q . . . .
14.46	0.4651	1.08	. Q . . . .
14.62	0.4794	1.16	. Q . . . .
14.77	0.4944	1.21	. Q . . . .
14.92	0.5106	1.33	. Q . . . .
15.08	0.5278	1.39	. Q . . . .
15.23	0.5467	1.57	. Q . . . .
15.39	0.5673	1.68	. Q . . . .
15.54	0.5887	1.70	. Q . . . .
15.69	0.6117	1.93	. Q . . . .
15.85	0.6429	2.98	. Q . . . .
16.00	0.6876	4.06	. Q . . . .
16.15	0.7879	11.74	. . . Q . .
16.31	0.8771	2.30	. Q . . . .
16.46	0.9023	1.67	. Q . . . .
16.61	0.9223	1.47	. Q . . . .
16.77	0.9397	1.27	. Q . . . .
16.92	0.9549	1.12	. Q . . . .
17.08	0.9684	1.01	. Q . . . .

17.23	0.9808	0.94	.Q	.	.	.	.
17.38	0.9924	0.88	.Q	.	.	.	.
17.54	1.0031	0.82	.Q	.	.	.	.
17.69	1.0133	0.77	.Q	.	.	.	.
17.84	1.0228	0.73	.Q	.	.	.	.
18.00	1.0319	0.70	.Q	.	.	.	.
18.15	1.0395	0.51	.Q	.	.	.	.
18.31	1.0458	0.48	Q	.	.	.	.
18.46	1.0518	0.46	Q	.	.	.	.
18.61	1.0575	0.44	Q	.	.	.	.
18.77	1.0630	0.43	Q	.	.	.	.
18.92	1.0683	0.41	Q	.	.	.	.
19.07	1.0734	0.40	Q	.	.	.	.
19.23	1.0784	0.38	Q	.	.	.	.
19.38	1.0832	0.37	Q	.	.	.	.
19.53	1.0878	0.36	Q	.	.	.	.
19.69	1.0924	0.35	Q	.	.	.	.
19.84	1.0968	0.34	Q	.	.	.	.
20.00	1.1011	0.33	Q	.	.	.	.
20.15	1.1052	0.33	Q	.	.	.	.
20.30	1.1093	0.32	Q	.	.	.	.
20.46	1.1133	0.31	Q	.	.	.	.
20.61	1.1172	0.30	Q	.	.	.	.
20.76	1.1210	0.30	Q	.	.	.	.
20.92	1.1248	0.29	Q	.	.	.	.
21.07	1.1284	0.29	Q	.	.	.	.
21.22	1.1320	0.28	Q	.	.	.	.
21.38	1.1355	0.27	Q	.	.	.	.
21.53	1.1390	0.27	Q	.	.	.	.
21.69	1.1424	0.26	Q	.	.	.	.
21.84	1.1457	0.26	Q	.	.	.	.
21.99	1.1490	0.26	Q	.	.	.	.
22.15	1.1522	0.25	Q	.	.	.	.
22.30	1.1554	0.25	Q	.	.	.	.
22.45	1.1585	0.24	Q	.	.	.	.
22.61	1.1616	0.24	Q	.	.	.	.
22.76	1.1646	0.24	Q	.	.	.	.
22.92	1.1676	0.23	Q	.	.	.	.
23.07	1.1705	0.23	Q	.	.	.	.
23.22	1.1734	0.23	Q	.	.	.	.
23.38	1.1763	0.22	Q	.	.	.	.
23.53	1.1791	0.22	Q	.	.	.	.
23.68	1.1819	0.22	Q	.	.	.	.
23.84	1.1846	0.21	Q	.	.	.	.
23.99	1.1873	0.21	Q	.	.	.	.
24.14	1.1900	0.21	Q	.	.	.	.
24.30	1.1914	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1447.5
10%	129.1
20%	27.7
30%	18.4
40%	9.2

```
******************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
==============================================================================
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                          Analysis prepared by:

                            fuscoe engineering
                             16795 Von Karman
                                Suite 100
                                Irvine, CA

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

 Problem Descriptions:
  Placentia Senior Housing
  1314 N. Angelina Drive
  Proposed Condition 100-yr/24-hour hydrograph
==============================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC III:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     5.63 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)     YIELD
         1         0.98       10.00       56.(AMC II)     0.300        0.916
         2         3.02       10.00       69.(AMC II)     0.250        0.934

    TOTAL AREA (Acres) =      4.00

                                  _
    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.026

                                  _
    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.070
==============================================================================

 Problem Descriptions:
  Placentia Senior Housing
  1314 N. Angelina Drive
  Proposed Condition 100-yr/24-hour hydrograph  (calib coef: 0.8665)
------------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.87
    TOTAL CATCHMENT AREA(ACRES) =    4.00
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.026
    LOW LOSS FRACTION = 0.070
    TIME OF CONCENTRATION(MIN.) =  9.12
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) = 100
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.52
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  1.09
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.45
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  2.43
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  3.36
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  5.63
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    TOTAL CATCHMENT    RUNOFF  VOLUME(ACRE-FEET) =      1.53
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =      0.35

********************************************************************************
  TIME      VOLUME        Q     0.          5.0       10.0       15.0       20.0
 (HOURS)     (AF)       (CFS)
--------------------------------------------------------------------------------
  0.04       0.0000       0.00  Q           .          .          .          .
  0.19       0.0018       0.28  Q           .          .          .          .
  0.34       0.0053       0.28  Q           .          .          .          .
  0.50       0.0089       0.29  Q           .          .          .          .
  0.65       0.0125       0.29  Q           .          .          .          .
  0.80       0.0161       0.29  Q           .          .          .          .
  0.95       0.0198       0.29  Q           .          .          .          .
  1.10       0.0234       0.29  Q           .          .          .          .
  1.26       0.0271       0.30  Q           .          .          .          .
  1.41       0.0308       0.30  Q           .          .          .          .
  1.56       0.0346       0.30  Q           .          .          .          .
  1.71       0.0384       0.30  Q           .          .          .          .
  1.86       0.0421       0.30  Q           .          .          .          .
  2.02       0.0460       0.30  Q           .          .          .          .
  2.17       0.0498       0.31  Q           .          .          .          .
  2.32       0.0537       0.31  Q           .          .          .          .
  2.47       0.0576       0.31  Q           .          .          .          .
  2.62       0.0615       0.31  Q           .          .          .          .
  2.78       0.0654       0.32  Q           .          .          .          .
  2.93       0.0694       0.32  Q           .          .          .          .
  3.08       0.0734       0.32  Q           .          .          .          .
  3.23       0.0774       0.32  Q           .          .          .          .
  3.38       0.0815       0.33  Q           .          .          .          .
  3.54       0.0856       0.33  Q           .          .          .          .
  3.69       0.0897       0.33  Q           .          .          .          .
  3.84       0.0939       0.33  Q           .          .          .          .
  3.99       0.0981       0.34  Q           .          .          .          .
  4.14       0.1023       0.34  Q           .          .          .          .
  4.30       0.1066       0.34  Q           .          .          .          .
  4.45       0.1108       0.34  Q           .          .          .          .
  4.60       0.1152       0.35  Q           .          .          .          .
  4.75       0.1195       0.35  Q           .          .          .          .
  4.90       0.1239       0.35  Q           .          .          .          .
  5.06       0.1284       0.35  Q           .          .          .          .
  5.21       0.1329       0.36  Q           .          .          .          .
  5.36       0.1374       0.36  Q           .          .          .          .
  5.51       0.1419       0.36  Q           .          .          .          .
  5.66       0.1465       0.37  Q           .          .          .          .
  5.82       0.1512       0.37  Q           .          .          .          .
  5.97       0.1558       0.37  Q           .          .          .          .
  6.12       0.1606       0.38  Q           .          .          .          .
  6.27       0.1653       0.38  Q           .          .          .          .
  6.42       0.1702       0.39  Q           .          .          .          .
  6.58       0.1750       0.39  Q           .          .          .          .
  6.73       0.1799       0.39  Q           .          .          .          .
  6.88       0.1849       0.40  Q           .          .          .          .
  7.03       0.1899       0.40  Q           .          .          .          .
  7.18       0.1950       0.40  Q           .          .          .          .
  7.34       0.2001       0.41  Q           .          .          .          .
  7.49       0.2053       0.41  Q           .          .          .          .
  7.64       0.2105       0.42  Q           .          .          .          .
```

7.79	0.2158	0.42	Q . . . .
7.94	0.2212	0.43	Q . . . .
8.10	0.2266	0.43	Q . . . .
8.25	0.2321	0.44	Q . . . .
8.40	0.2376	0.44	Q . . . .
8.55	0.2433	0.45	Q . . . .
8.70	0.2489	0.45	Q . . . .
8.86	0.2547	0.46	Q . . . .
9.01	0.2605	0.47	Q . . . .
9.16	0.2665	0.48	Q . . . .
9.31	0.2725	0.48	Q . . . .
9.46	0.2786	0.49	Q . . . .
9.62	0.2847	0.49	Q . . . .
9.77	0.2910	0.50	.Q . . . .
9.92	0.2974	0.51	.Q . . . .
10.07	0.3038	0.52	.Q . . . .
10.22	0.3104	0.53	.Q . . . .
10.38	0.3170	0.54	.Q . . . .
10.53	0.3238	0.54	.Q . . . .
10.68	0.3307	0.56	.Q . . . .
10.83	0.3377	0.56	.Q . . . .
10.98	0.3449	0.58	.Q . . . .
11.14	0.3522	0.58	.Q . . . .
11.29	0.3596	0.60	.Q . . . .
11.44	0.3672	0.61	.Q . . . .
11.59	0.3749	0.62	.Q . . . .
11.74	0.3828	0.63	.Q . . . .
11.90	0.3908	0.65	.Q . . . .
12.05	0.3991	0.66	.Q . . . .
12.20	0.4086	0.86	.Q . . . .
12.35	0.4194	0.87	.Q . . . .
12.50	0.4305	0.89	.Q . . . .
12.66	0.4418	0.91	.Q . . . .
12.81	0.4533	0.94	.Q . . . .
12.96	0.4652	0.95	.Q . . . .
13.11	0.4774	0.99	.Q . . . .
13.26	0.4899	1.00	. Q . . . .
13.42	0.5027	1.04	. Q . . . .
13.57	0.5160	1.07	. Q . . . .
13.72	0.5296	1.11	. Q . . . .
13.87	0.5438	1.14	. Q . . . .
14.02	0.5584	1.20	. Q . . . .
14.18	0.5737	1.24	. Q . . . .
14.33	0.5898	1.32	. Q . . . .
14.48	0.6066	1.36	. Q . . . .
14.63	0.6243	1.46	. Q . . . .
14.78	0.6431	1.52	. Q . . . .
14.94	0.6631	1.67	. Q . . . .
15.09	0.6846	1.75	. Q . . . .
15.24	0.7080	1.97	. Q . . . .
15.39	0.7337	2.11	. Q . . . .
15.54	0.7609	2.21	. Q . . . .
15.70	0.7905	2.50	. Q . . . .
15.85	0.8288	3.60	. Q . . . .
16.00	0.8825	4.95	. Q. . . .
16.15	1.0085	15.11	. . . Q .
16.30	1.1217	2.92	. Q . . . .
16.46	1.1534	2.12	. Q . . . .
16.61	1.1783	1.85	. Q . . . .
16.76	1.2000	1.59	. Q . . . .
16.91	1.2188	1.41	. Q . . . .

17.06	1.2357	1.28	. Q	.	.	.	.
17.22	1.2510	1.17	. Q	.	.	.	.
17.37	1.2652	1.09	. Q	.	.	.	.
17.52	1.2785	1.02	. Q	.	.	.	.
17.67	1.2910	0.97	.Q	.	.	.	.
17.82	1.3028	0.92	.Q	.	.	.	.
17.98	1.3141	0.88	.Q	.	.	.	.
18.13	1.3244	0.75	.Q	.	.	.	.
18.28	1.3332	0.64	.Q	.	.	.	.
18.43	1.3410	0.61	.Q	.	.	.	.
18.58	1.3486	0.59	.Q	.	.	.	.
18.74	1.3559	0.57	.Q	.	.	.	.
18.89	1.3629	0.55	.Q	.	.	.	.
19.04	1.3697	0.53	.Q	.	.	.	.
19.19	1.3763	0.51	.Q	.	.	.	.
19.34	1.3826	0.50	Q	.	.	.	.
19.50	1.3888	0.48	Q	.	.	.	.
19.65	1.3948	0.47	Q	.	.	.	.
19.80	1.4006	0.46	Q	.	.	.	.
19.95	1.4063	0.45	Q	.	.	.	.
20.10	1.4119	0.44	Q	.	.	.	.
20.26	1.4173	0.43	Q	.	.	.	.
20.41	1.4226	0.42	Q	.	.	.	.
20.56	1.4278	0.41	Q	.	.	.	.
20.71	1.4329	0.40	Q	.	.	.	.
20.86	1.4378	0.39	Q	.	.	.	.
21.02	1.4427	0.38	Q	.	.	.	.
21.17	1.4475	0.38	Q	.	.	.	.
21.32	1.4521	0.37	Q	.	.	.	.
21.47	1.4567	0.36	Q	.	.	.	.
21.62	1.4613	0.36	Q	.	.	.	.
21.78	1.4657	0.35	Q	.	.	.	.
21.93	1.4701	0.34	Q	.	.	.	.
22.08	1.4743	0.34	Q	.	.	.	.
22.23	1.4786	0.33	Q	.	.	.	.
22.38	1.4827	0.33	Q	.	.	.	.
22.54	1.4868	0.32	Q	.	.	.	.
22.69	1.4909	0.32	Q	.	.	.	.
22.84	1.4948	0.31	Q	.	.	.	.
22.99	1.4988	0.31	Q	.	.	.	.
23.14	1.5026	0.31	Q	.	.	.	.
23.30	1.5064	0.30	Q	.	.	.	.
23.45	1.5102	0.30	Q	.	.	.	.
23.60	1.5139	0.29	Q	.	.	.	.
23.75	1.5176	0.29	Q	.	.	.	.
23.90	1.5212	0.29	Q	.	.	.	.
24.06	1.5248	0.28	Q	.	.	.	.
24.21	1.5266	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1441.0
10%	127.7
20%	27.4
30%	18.2

APPENDIX 3

Web Soil Survey

United States Department of Agriculture

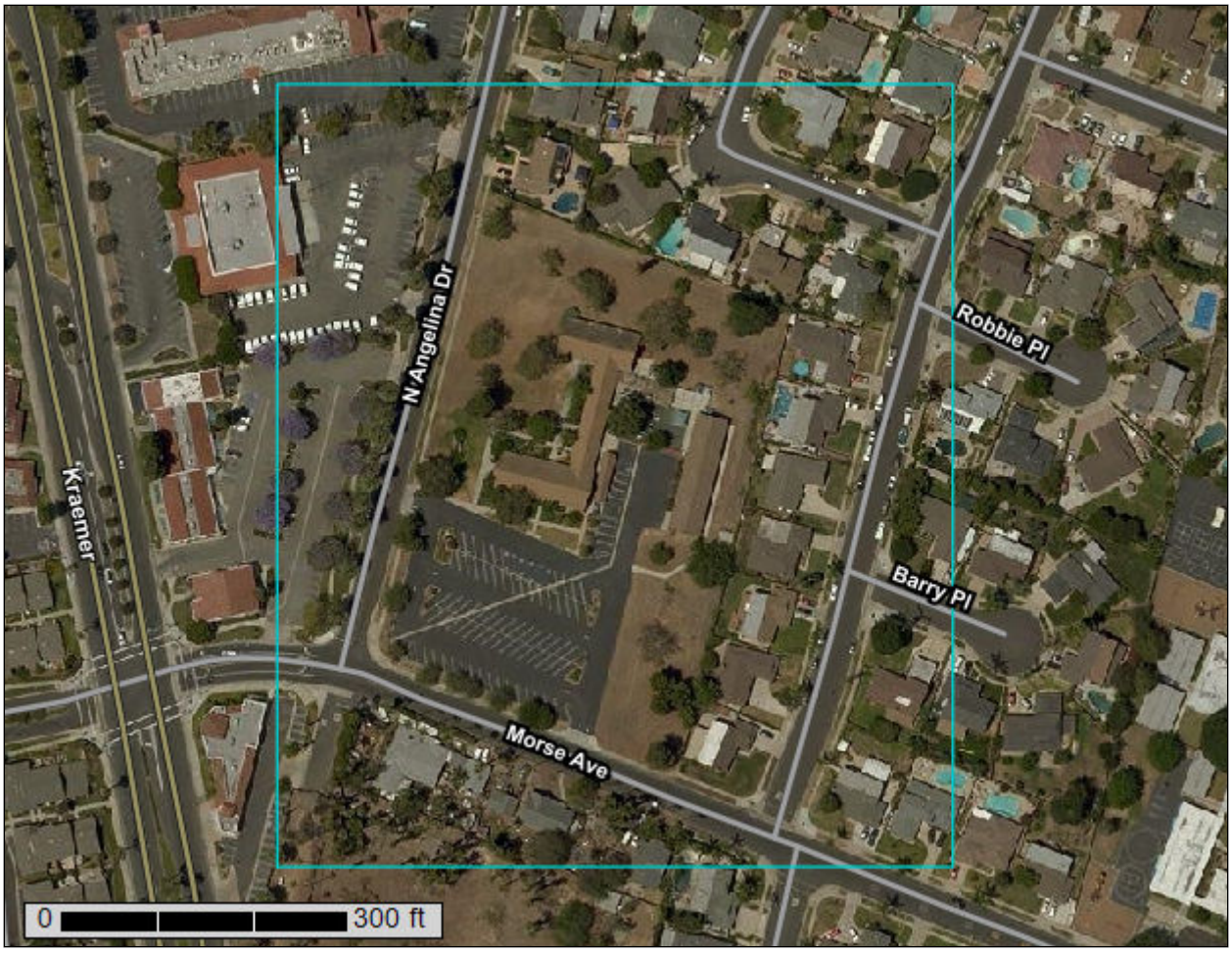
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Orange County and Part of Riverside County, California

1314 N. Angelina, Placentia, CA



April 10, 2020

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

Map Scale: 1:1,670 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 20 40 80 120

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Orange County and Part of Riverside County, California
Survey Area Data: Version 13, Sep 16, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 3, 2010—Jul 2, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND

MAP INFORMATION

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
166	Mocho loam, 0 to 2 percent slopes, warm MAAT, MLRA 19	6.6	49.7%
173	Myford sandy loam, 2 to 9 percent slopes	6.7	50.3%
Totals for Area of Interest		**13.3**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the

development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Orange County and Part of Riverside County, California

166—Mocho loam, 0 to 2 percent slopes, warm MAAT, MLRA 19

Map Unit Setting

National map unit symbol: 2tyyv
Elevation: 20 to 1,920 feet
Mean annual precipitation: 12 to 18 inches
Mean annual air temperature: 62 to 66 degrees F
Frost-free period: 320 to 365 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Mocho and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mocho

Setting

Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from sedimentary rock

Typical profile

Ap - 0 to 10 inches: loam
A - 10 to 16 inches: loam
Bk1 - 16 to 34 inches: loam
Bk2 - 34 to 60 inches: loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 10 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 9.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: LOAMY (1975) (R019XD029CA)
Hydric soil rating: No

Minor Components

Sorrento

Percent of map unit: 6 percent
Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Bolsa, silt loam, drained

Percent of map unit: 3 percent
Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Anacapa

Percent of map unit: 2 percent
Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Hueneme

Percent of map unit: 2 percent
Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Chino, drained

Percent of map unit: 1 percent
Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Mocho, 2 to 9 percent slopes

Percent of map unit: 1 percent
Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

173—Myford sandy loam, 2 to 9 percent slopes

Map Unit Setting

National map unit symbol: hcnl
Elevation: 0 to 1,560 feet
Mean annual precipitation: 11 to 18 inches
Mean annual air temperature: 62 to 65 degrees F
Frost-free period: 320 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Myford and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Myford

Setting

Landform: Terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from sandstone

Typical profile

A1 - 0 to 1 inches: sandy loam
A2 - 1 to 4 inches: sandy loam
A3 - 4 to 12 inches: sandy loam
Bt1 - 12 to 18 inches: sandy clay
Bt2 - 18 to 28 inches: sandy clay loam
Btk1 - 28 to 35 inches: sandy clay loam
Btk2 - 35 to 41 inches: sandy clay loam
B't1 - 41 to 49 inches: sandy clay loam
B't2 - 49 to 61 inches: sandy clay loam
Bt3 - 61 to 71 inches: sandy clay loam
C - 71 to 79 inches: sandy loam

Properties and qualities

Slope: 2 to 9 percent
Depth to restrictive feature: 8 to 20 inches to abrupt textural change
Natural drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent

Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Very low (about 1.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: CLAYPAN (1975) (R019XD061CA)
Hydric soil rating: No

Minor Components

Myford, thick surface

Percent of map unit: 10 percent
Landform: Terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: CLAYPAN (1975) (R019XD061CA)
Hydric soil rating: No

Yorba, gravelly sandy loam

Percent of map unit: 5 percent
Landform: Terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: CLAYPAN (1975) (R019XD061CA)
Hydric soil rating: No

Capistrano

Percent of map unit: 5 percent
Landform: Terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: LOAMY (1975) (R019XD029CA)
Hydric soil rating: No

Chesterton, loamy sand

Percent of map unit: 3 percent
Landform: Terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: CLAYPAN (1975) (R019XD061CA)
Hydric soil rating: No

Water

Percent of map unit: 2 percent
Landform: Depressions

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APPENDIX 4

Detention Analyses

```
**************************************************************************
                    SMALL AREA UNIT HYDROGRAPH MODEL
==========================================================================
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             Ver. 23.0  Release Date: 07/01/2016  License ID 1355

                          Analysis prepared by:

                            fuscoe engineering
                             16795 Von Karman
                                Suite 100
                                Irvine, CA

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

 Problem Descriptions:
  Placentia Senior Housing
  1314 N. Angelina Drive
  Proposed 2-year/24-hour storm event (calib coef: 0.869)
--------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.87
    TOTAL CATCHMENT AREA(ACRES) =    4.00
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.026
    LOW LOSS FRACTION = 0.199
    TIME OF CONCENTRATION(MIN.) =  9.52
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =   2
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.19
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.53
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  0.89
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  1.22
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  2.05

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

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     0.50
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.18

**************************************************************************
  TIME      VOLUME        Q    0.        2.5       5.0       7.5       10.0
 (HOURS)     (AF)       (CFS)
--------------------------------------------------------------------------
  0.13      0.0006      0.09  Q          .         .         .         .
  0.29      0.0018      0.09  Q          .         .         .         .
  0.45      0.0029      0.09  Q          .         .         .         .
  0.61      0.0041      0.09  Q          .         .         .         .
  0.77      0.0053      0.09  Q          .         .         .         .
  0.93      0.0065      0.09  Q          .         .         .         .
  1.09      0.0077      0.09  Q          .         .         .         .
  1.24      0.0089      0.09  Q          .         .         .         .
  1.40      0.0102      0.09  Q          .         .         .         .
  1.56      0.0114      0.09  Q          .         .         .         .
  1.72      0.0126      0.09  Q          .         .         .         .
  1.88      0.0139      0.10  Q          .         .         .         .
  2.04      0.0152      0.10  Q          .         .         .         .
```

2.20	0.0164	0.10	Q	.	.	.	.
2.35	0.0177	0.10	Q	.	.	.	.
2.51	0.0190	0.10	Q	.	.	.	.
2.67	0.0203	0.10	Q	.	.	.	.
2.83	0.0216	0.10	Q	.	.	.	.
2.99	0.0229	0.10	Q	.	.	.	.
3.15	0.0242	0.10	Q	.	.	.	.
3.31	0.0256	0.10	Q	.	.	.	.
3.47	0.0269	0.10	Q	.	.	.	.
3.62	0.0283	0.10	Q	.	.	.	.
3.78	0.0296	0.10	Q	.	.	.	.
3.94	0.0310	0.11	Q	.	.	.	.
4.10	0.0324	0.11	Q	.	.	.	.
4.26	0.0338	0.11	Q	.	.	.	.
4.42	0.0352	0.11	Q	.	.	.	.
4.58	0.0366	0.11	Q	.	.	.	.
4.73	0.0381	0.11	Q	.	.	.	.
4.89	0.0395	0.11	Q	.	.	.	.
5.05	0.0410	0.11	Q	.	.	.	.
5.21	0.0425	0.11	Q	.	.	.	.
5.37	0.0440	0.11	Q	.	.	.	.
5.53	0.0455	0.11	Q	.	.	.	.
5.69	0.0470	0.12	Q	.	.	.	.
5.85	0.0485	0.12	Q	.	.	.	.
6.00	0.0501	0.12	Q	.	.	.	.
6.16	0.0516	0.12	Q	.	.	.	.
6.32	0.0532	0.12	Q	.	.	.	.
6.48	0.0548	0.12	Q	.	.	.	.
6.64	0.0564	0.12	Q	.	.	.	.
6.80	0.0580	0.12	Q	.	.	.	.
6.96	0.0597	0.13	Q	.	.	.	.
7.11	0.0613	0.13	Q	.	.	.	.
7.27	0.0630	0.13	Q	.	.	.	.
7.43	0.0647	0.13	Q	.	.	.	.
7.59	0.0664	0.13	Q	.	.	.	.
7.75	0.0682	0.13	Q	.	.	.	.
7.91	0.0699	0.14	Q	.	.	.	.
8.07	0.0717	0.14	Q	.	.	.	.
8.23	0.0735	0.14	Q	.	.	.	.
8.38	0.0753	0.14	Q	.	.	.	.
8.54	0.0772	0.14	Q	.	.	.	.
8.70	0.0791	0.14	Q	.	.	.	.
8.86	0.0810	0.15	Q	.	.	.	.
9.02	0.0829	0.15	Q	.	.	.	.
9.18	0.0848	0.15	Q	.	.	.	.
9.34	0.0868	0.15	Q	.	.	.	.
9.49	0.0888	0.15	Q	.	.	.	.
9.65	0.0909	0.16	Q	.	.	.	.
9.81	0.0929	0.16	Q	.	.	.	.
9.97	0.0950	0.16	Q	.	.	.	.
10.13	0.0972	0.16	Q	.	.	.	.
10.29	0.0994	0.17	Q	.	.	.	.
10.45	0.1016	0.17	Q	.	.	.	.
10.61	0.1038	0.17	Q	.	.	.	.
10.76	0.1061	0.18	Q	.	.	.	.
10.92	0.1084	0.18	Q	.	.	.	.
11.08	0.1108	0.18	Q	.	.	.	.
11.24	0.1133	0.19	Q	.	.	.	.
11.40	0.1157	0.19	Q	.	.	.	.
11.56	0.1183	0.19	Q	.	.	.	.
11.72	0.1208	0.20	Q	.	.	.	.

11.87	0.1235	0.20	Q	.	.	.	.
12.03	0.1262	0.21	Q	.	.	.	.
12.19	0.1292	0.25	.Q	.	.	.	.
12.35	0.1326	0.27	.Q	.	.	.	.
12.51	0.1361	0.27	.Q	.	.	.	.
12.67	0.1397	0.28	.Q	.	.	.	.
12.83	0.1434	0.28	.Q	.	.	.	.
12.99	0.1472	0.29	.Q	.	.	.	.
13.14	0.1511	0.30	.Q	.	.	.	.
13.30	0.1552	0.31	.Q	.	.	.	.
13.46	0.1593	0.32	.Q	.	.	.	.
13.62	0.1636	0.33	.Q	.	.	.	.
13.78	0.1680	0.34	.Q	.	.	.	.
13.94	0.1726	0.36	.Q	.	.	.	.
14.10	0.1774	0.37	.Q	.	.	.	.
14.25	0.1826	0.42	.Q	.	.	.	.
14.41	0.1881	0.43	.Q	.	.	.	.
14.57	0.1940	0.47	.Q	.	.	.	.
14.73	0.2003	0.49	.Q	.	.	.	.
14.89	0.2071	0.54	. Q	.	.	.	.
15.05	0.2144	0.57	. Q	.			.
15.21	0.2225	0.65	. Q	.			.
15.37	0.2314	0.70	. Q	.			.
15.52	0.2407	0.72	. Q	.			.
15.68	0.2508	0.83	. Q	.	.	.	.
15.84	0.2644	1.24	. Q	.	.	.	.
16.00	0.2838	1.72	. Q	.	.	.	.
16.16	0.3302	5.35	.	.	.Q	.	.
16.32	0.3717	0.98	. Q	.	.	.	.
16.48	0.3829	0.73	. Q	.	.	.	.
16.63	0.3917	0.61	. Q	.	.	.	.
16.79	0.3990	0.52	. Q	.	.	.	.
16.95	0.4054	0.45	.Q	.	.	.	.
17.11	0.4109	0.40	.Q	.	.	.	.
17.27	0.4159	0.35	.Q	.	.	.	.
17.43	0.4203	0.33	.Q	.	.	.	.
17.59	0.4244	0.31	.Q	.	.	.	.
17.75	0.4283	0.29	.Q	.	.	.	.
17.90	0.4321	0.28	.Q	.	.	.	.
18.06	0.4356	0.26	.Q	.	.	.	.
18.22	0.4387	0.21	Q	.	.	.	.
18.38	0.4413	0.20	Q	.	.	.	.
18.54	0.4438	0.19	Q	.	.	.	.
18.70	0.4463	0.18	Q	.	.	.	.
18.86	0.4486	0.17	Q	.	.	.	.
19.01	0.4508	0.17	Q	.	.	.	.
19.17	0.4530	0.16	Q	.	.	.	.
19.33	0.4551	0.16	Q	.	.	.	.
19.49	0.4572	0.15	Q	.	.	.	.
19.65	0.4591	0.15	Q	.	.	.	.
19.81	0.4611	0.14	Q	.	.	.	.
19.97	0.4629	0.14	Q	.	.	.	.
20.13	0.4648	0.14	Q	.	.	.	.
20.28	0.4665	0.13	Q	.	.	.	.
20.44	0.4683	0.13	Q	.	.	.	.
20.60	0.4700	0.13	Q	.	.	.	.
20.76	0.4716	0.13	Q	.	.	.	.
20.92	0.4733	0.12	Q	.	.	.	.
21.08	0.4749	0.12	Q	.	.	.	.
21.24	0.4764	0.12	Q	.	.	.	.
21.39	0.4780	0.12	Q	.	.	.	.

2-year proposed peak flow

21.55	0.4795	0.11	Q	.	.	.	.
21.71	0.4809	0.11	Q	.	.	.	.
21.87	0.4824	0.11	Q	.	.	.	.
22.03	0.4838	0.11	Q	.	.	.	.
22.19	0.4852	0.11	Q	.	.	.	.
22.35	0.4866	0.10	Q	.	.	.	.
22.51	0.4880	0.10	Q	.	.	.	.
22.66	0.4893	0.10	Q	.	.	.	.
22.82	0.4906	0.10	Q	.	.	.	.
22.98	0.4919	0.10	Q	.	.	.	.
23.14	0.4932	0.10	Q	.	.	.	.
23.30	0.4944	0.10	Q	.	.	.	.
23.46	0.4957	0.09	Q	.	.	.	.
23.62	0.4969	0.09	Q	.	.	.	.
23.77	0.4981	0.09	Q	.	.	.	.
23.93	0.4993	0.09	Q	.	.	.	.
24.09	0.5005	0.09	Q	.	.	.	.
24.25	0.5011	0.00	Q	.	.	.	.

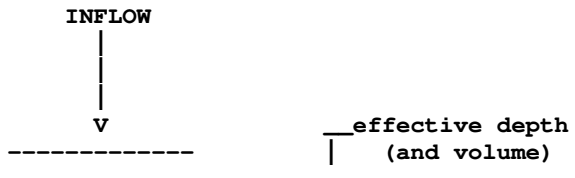
TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

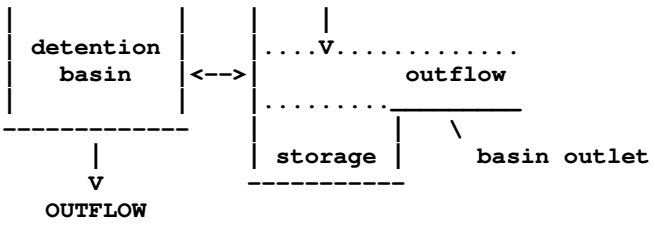
Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1447.0
10%	114.2
20%	28.6
30%	19.0
40%	9.5
50%	9.5
60%	9.5
70%	9.5
80%	9.5
90%	9.5

Problem Descriptions:
Placentia Senior Housing
1314 N. Angelina Drive
Proposed 2-year/24-hour storm event (calib coef: 0.869)

FLOW-THROUGH DETENTION BASIN MODEL

SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
CONSTANT HYDROGRAPH TIME UNIT(MINUTES) = 9.520
DEAD STORAGE(AF) = 0.00
SPECIFIED DEAD STORAGE(AF) FILLED = 0.00
ASSUMED INITIAL DEPTH(FEET) IN STORAGE BASIN = 0.00





Detention System: 325 lineal feet of 48" pipe storage w/ 18" diameter outlet

DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:
TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES = 17

*BASIN-DEPTH (FEET)	STORAGE (ACRE-FEET)	OUTFLOW (CFS)	**	BASIN-DEPTH (FEET)	STORAGE (ACRE-FEET)	OUTFLOW (CFS)	*
0.000	0.000	0.000	**	0.250	0.006	1.000	*
0.500	0.012	2.000	**	0.750	0.018	3.000	*
1.000	0.023	4.400	**	1.250	0.029	6.200	*
1.500	0.035	7.500	**	1.750	0.041	8.700	*
2.000	0.047	9.700	**	2.250	0.053	10.700	*
2.500	0.059	11.500	**	2.750	0.064	12.300	*
3.000	0.070	13.100	**	3.250	0.076	13.800	*
3.500	0.082	14.500	**	3.750	0.088	15.100	*
4.000	0.094	15.700	**				

BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:

INTERVAL NUMBER	DEPTH (FEET)	{S-O*DT/2} (ACRE-FEET)	{S+O*DT/2} (ACRE-FEET)
1	0.00	0.00000	0.00000
2	0.25	-0.00056	0.01256
3	0.50	-0.00111	0.02511
4	0.75	-0.00167	0.03767
5	1.00	-0.00585	0.05185
6	1.25	-0.01165	0.06965
7	1.50	-0.01417	0.08417
8	1.75	-0.01604	0.09804
9	2.00	-0.01660	0.11060
10	2.25	-0.01715	0.12315
11	2.50	-0.01640	0.13440
12	2.75	-0.01664	0.14464
13	3.00	-0.01589	0.15589
14	3.25	-0.01448	0.16648
15	3.50	-0.01307	0.17707
16	3.75	-0.01100	0.18700
17	4.00	-0.00894	0.19694

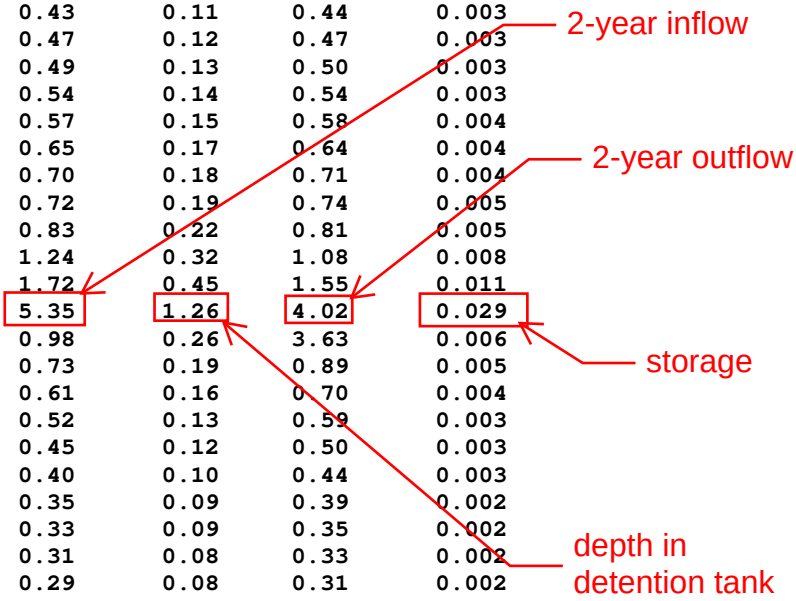
WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)

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

TIME (HRS)	DEAD-STORAGE FILLED(AF)	INFLOW (CFS)	EFFECTIVE DEPTH(FT)	OUTFLOW (CFS)	EFFECTIVE VOLUME(AF)
0.133	0.000	0.09	0.02	0.05	0.001
0.292	0.000	0.09	0.02	0.09	0.001
0.451	0.000	0.09	0.02	0.09	0.001
0.609	0.000	0.09	0.02	0.09	0.001
0.768	0.000	0.09	0.02	0.10	0.001
0.927	0.000	0.09	0.02	0.10	0.001
1.085	0.000	0.09	0.02	0.10	0.001

1.244	0.000	0.09	0.02	0.10	0.001
1.403	0.000	0.09	0.02	0.10	0.001
1.561	0.000	0.09	0.02	0.10	0.001
1.720	0.000	0.09	0.02	0.10	0.001
1.879	0.000	0.10	0.03	0.10	0.001
2.037	0.000	0.10	0.03	0.10	0.001
2.196	0.000	0.10	0.03	0.10	0.001
2.355	0.000	0.10	0.03	0.10	0.001
2.513	0.000	0.10	0.03	0.10	0.001
2.672	0.000	0.10	0.03	0.10	0.001
2.831	0.000	0.10	0.03	0.10	0.001
2.989	0.000	0.10	0.03	0.10	0.001
3.148	0.000	0.10	0.03	0.11	0.001
3.307	0.000	0.10	0.03	0.11	0.001
3.465	0.000	0.10	0.03	0.11	0.001
3.624	0.000	0.10	0.03	0.11	0.001
3.783	0.000	0.10	0.03	0.11	0.001
3.941	0.000	0.11	0.03	0.11	0.001
4.100	0.000	0.11	0.03	0.11	0.001
4.259	0.000	0.11	0.03	0.11	0.001
4.417	0.000	0.11	0.03	0.11	0.001
4.576	0.000	0.11	0.03	0.11	0.001
4.735	0.000	0.11	0.03	0.11	0.001
4.893	0.000	0.11	0.03	0.12	0.001
5.052	0.000	0.11	0.03	0.12	0.001
5.211	0.000	0.11	0.03	0.12	0.001
5.369	0.000	0.11	0.03	0.12	0.001
5.528	0.000	0.11	0.03	0.12	0.001
5.687	0.000	0.12	0.03	0.12	0.001
5.845	0.000	0.12	0.03	0.12	0.001
6.004	0.000	0.12	0.03	0.12	0.001
6.163	0.000	0.12	0.03	0.12	0.001
6.321	0.000	0.12	0.03	0.13	0.001
6.480	0.000	0.12	0.03	0.13	0.001
6.639	0.000	0.12	0.03	0.13	0.001
6.797	0.000	0.12	0.03	0.13	0.001
6.956	0.000	0.13	0.03	0.13	0.001
7.115	0.000	0.13	0.03	0.13	0.001
7.273	0.000	0.13	0.03	0.13	0.001
7.432	0.000	0.13	0.03	0.14	0.001
7.591	0.000	0.13	0.03	0.14	0.001
7.749	0.000	0.13	0.03	0.14	0.001
7.908	0.000	0.14	0.04	0.14	0.001
8.067	0.000	0.14	0.04	0.14	0.001
8.225	0.000	0.14	0.04	0.14	0.001
8.384	0.000	0.14	0.04	0.15	0.001
8.543	0.000	0.14	0.04	0.15	0.001
8.701	0.000	0.14	0.04	0.15	0.001
8.860	0.000	0.15	0.04	0.15	0.001
9.019	0.000	0.15	0.04	0.15	0.001
9.177	0.000	0.15	0.04	0.16	0.001
9.336	0.000	0.15	0.04	0.16	0.001
9.495	0.000	0.15	0.04	0.16	0.001
9.653	0.000	0.16	0.04	0.16	0.001
9.812	0.000	0.16	0.04	0.16	0.001
9.971	0.000	0.16	0.04	0.17	0.001
10.129	0.000	0.16	0.04	0.17	0.001
10.288	0.000	0.17	0.04	0.17	0.001
10.447	0.000	0.17	0.04	0.18	0.001
10.605	0.000	0.17	0.05	0.18	0.001
10.764	0.000	0.18	0.05	0.18	0.001

10.923	0.000	0.18	0.05	0.19	0.001
11.081	0.000	0.18	0.05	0.19	0.001
11.240	0.000	0.19	0.05	0.19	0.001
11.399	0.000	0.19	0.05	0.20	0.001
11.557	0.000	0.19	0.05	0.20	0.001
11.716	0.000	0.20	0.05	0.21	0.001
11.875	0.000	0.20	0.05	0.21	0.001
12.033	0.000	0.21	0.05	0.22	0.001
12.192	0.000	0.25	0.07	0.24	0.002
12.351	0.000	0.27	0.07	0.27	0.002
12.509	0.000	0.27	0.07	0.28	0.002
12.668	0.000	0.28	0.07	0.29	0.002
12.827	0.000	0.28	0.07	0.29	0.002
12.985	0.000	0.29	0.08	0.30	0.002
13.144	0.000	0.30	0.08	0.31	0.002
13.303	0.000	0.31	0.08	0.32	0.002
13.461	0.000	0.32	0.08	0.33	0.002
13.620	0.000	0.33	0.09	0.34	0.002
13.779	0.000	0.34	0.09	0.35	0.002
13.937	0.000	0.36	0.09	0.37	0.002
14.096	0.000	0.37	0.10	0.38	0.002
14.255	0.000	0.42	0.11	0.41	0.003
14.413	0.000	0.43	0.11	0.44	0.003
14.572	0.000	0.47	0.12	0.47	0.003
14.731	0.000	0.49	0.13	0.50	0.003
14.889	0.000	0.54	0.14	0.54	0.003
15.048	0.000	0.57	0.15	0.58	0.004
15.207	0.000	0.65	0.17	0.64	0.004
15.365	0.000	0.70	0.18	0.71	0.004
15.524	0.000	0.72	0.19	0.74	0.005
15.683	0.000	0.83	0.22	0.81	0.005
15.841	0.000	1.24	0.32	1.08	0.008
16.000	0.000	1.72	0.45	1.55	0.011
16.159	0.000	5.35	1.26	4.02	0.029
16.317	0.000	0.98	0.26	3.63	0.006
16.476	0.000	0.73	0.19	0.89	0.005
16.635	0.000	0.61	0.16	0.70	0.004
16.793	0.000	0.52	0.13	0.59	0.003
16.952	0.000	0.45	0.12	0.50	0.003
17.111	0.000	0.40	0.10	0.44	0.003
17.269	0.000	0.35	0.09	0.39	0.002
17.428	0.000	0.33	0.09	0.35	0.002
17.587	0.000	0.31	0.08	0.33	0.002
17.745	0.000	0.29	0.08	0.31	0.002
17.904	0.000	0.28	0.07	0.29	0.002
18.063	0.000	0.26	0.07	0.28	0.002
18.221	0.000	0.21	0.05	0.24	0.001
18.380	0.000	0.20	0.05	0.21	0.001
18.539	0.000	0.19	0.05	0.20	0.001
18.697	0.000	0.18	0.05	0.19	0.001
18.856	0.000	0.17	0.05	0.19	0.001
19.015	0.000	0.17	0.04	0.18	0.001
19.173	0.000	0.16	0.04	0.17	0.001
19.332	0.000	0.16	0.04	0.17	0.001
19.491	0.000	0.15	0.04	0.16	0.001
19.649	0.000	0.15	0.04	0.16	0.001
19.808	0.000	0.14	0.04	0.15	0.001
19.967	0.000	0.14	0.04	0.15	0.001
20.125	0.000	0.14	0.04	0.15	0.001
20.284	0.000	0.13	0.04	0.14	0.001
20.443	0.000	0.13	0.03	0.14	0.001



20.601	0.000	0.13	0.03	0.14	0.001
20.760	0.000	0.13	0.03	0.13	0.001
20.919	0.000	0.12	0.03	0.13	0.001
21.077	0.000	0.12	0.03	0.13	0.001
21.236	0.000	0.12	0.03	0.12	0.001
21.395	0.000	0.12	0.03	0.12	0.001
21.553	0.000	0.11	0.03	0.12	0.001
21.712	0.000	0.11	0.03	0.12	0.001
21.871	0.000	0.11	0.03	0.12	0.001
22.029	0.000	0.11	0.03	0.11	0.001
22.188	0.000	0.11	0.03	0.11	0.001
22.347	0.000	0.10	0.03	0.11	0.001
22.505	0.000	0.10	0.03	0.11	0.001
22.664	0.000	0.10	0.03	0.11	0.001
22.823	0.000	0.10	0.03	0.10	0.001
22.981	0.000	0.10	0.03	0.10	0.001
23.140	0.000	0.10	0.03	0.10	0.001
23.299	0.000	0.10	0.02	0.10	0.001
23.457	0.000	0.09	0.02	0.10	0.001
23.616	0.000	0.09	0.02	0.10	0.001
23.775	0.000	0.09	0.02	0.10	0.001
23.933	0.000	0.09	0.02	0.10	0.001
24.092	0.000	0.09	0.02	0.09	0.001
24.251	0.000	0.00	0.00	0.05	0.000
24.409	0.000	0.00	0.00	0.00	0.000

```
**************************************************************************
                    SMALL AREA UNIT HYDROGRAPH MODEL
==========================================================================
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             Ver. 23.0  Release Date: 07/01/2016  License ID 1355

                          Analysis prepared by:

                            fuscoe engineering
                             16795 Von Karman
                                Suite 100
                                Irvine, CA

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

 Problem Descriptions:
  Placentia Senior Housing
  1314 N. Angelina Drive
  Proposed Pipe Detention 10-year (calib coef: 0.867)
--------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.87
    TOTAL CATCHMENT AREA(ACRES) =    4.00
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.026
    LOW LOSS FRACTION = 0.132
    TIME OF CONCENTRATION(MIN.) =  9.27
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  10
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.34
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.72
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.95
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.59
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.20
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  3.68

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

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     0.96
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.27

**************************************************************************
  TIME      VOLUME        Q    0.        2.5       5.0       7.5       10.0
 (HOURS)     (AF)       (CFS)
--------------------------------------------------------------------------
  0.09      0.0006      0.17  Q          .         .         .         .
  0.24      0.0028      0.17  Q          .         .         .         .
  0.40      0.0050      0.17  Q          .         .         .         .
  0.55      0.0072      0.17  Q          .         .         .         .
  0.70      0.0095      0.18  Q          .         .         .         .
  0.86      0.0117      0.18  Q          .         .         .         .
  1.01      0.0140      0.18  Q          .         .         .         .
  1.17      0.0162      0.18  Q          .         .         .         .
  1.32      0.0185      0.18  Q          .         .         .         .
  1.48      0.0208      0.18  Q          .         .         .         .
  1.63      0.0231      0.18  Q          .         .         .         .
  1.79      0.0255      0.18  Q          .         .         .         .
  1.94      0.0278      0.18  Q          .         .         .         .
```

2.09	0.0302	0.19	Q	.	.	.	.
2.25	0.0326	0.19	Q	.	.	.	.
2.40	0.0350	0.19	Q	.	.	.	.
2.56	0.0374	0.19	Q	.	.	.	.
2.71	0.0398	0.19	Q	.	.	.	.
2.87	0.0423	0.19	Q	.	.	.	.
3.02	0.0448	0.19	Q	.	.	.	.
3.18	0.0472	0.20	Q	.	.	.	.
3.33	0.0498	0.20	Q	.	.	.	.
3.49	0.0523	0.20	Q	.	.	.	.
3.64	0.0548	0.20	Q	.	.	.	.
3.79	0.0574	0.20	Q	.	.	.	.
3.95	0.0600	0.20	Q	.	.	.	.
4.10	0.0626	0.21	Q	.	.	.	.
4.26	0.0652	0.21	Q	.	.	.	.
4.41	0.0679	0.21	Q	.	.	.	.
4.57	0.0705	0.21	Q	.	.	.	.
4.72	0.0732	0.21	Q	.	.	.	.
4.88	0.0759	0.21	Q	.	.	.	.
5.03	0.0787	0.22	Q	.	.	.	.
5.18	0.0815	0.22	Q	.	.	.	.
5.34	0.0842	0.22	Q	.	.	.	.
5.49	0.0871	0.22	Q	.	.	.	.
5.65	0.0899	0.22	Q	.	.	.	.
5.80	0.0928	0.23	Q	.	.	.	.
5.96	0.0957	0.23	Q	.	.	.	.
6.11	0.0986	0.23	Q	.	.	.	.
6.27	0.1015	0.23	Q	.	.	.	.
6.42	0.1045	0.23	Q	.	.	.	.
6.58	0.1075	0.24	Q	.	.	.	.
6.73	0.1106	0.24	Q	.	.	.	.
6.88	0.1136	0.24	Q	.	.	.	.
7.04	0.1167	0.24	Q	.	.	.	.
7.19	0.1199	0.25	Q	.	.	.	.
7.35	0.1231	0.25	Q	.	.	.	.
7.50	0.1263	0.25	.Q	.	.	.	.
7.66	0.1295	0.26	.Q	.	.	.	.
7.81	0.1328	0.26	.Q	.	.	.	.
7.97	0.1361	0.26	.Q	.	.	.	.
8.12	0.1395	0.27	.Q	.	.	.	.
8.27	0.1429	0.27	.Q	.	.	.	.
8.43	0.1463	0.27	.Q	.	.	.	.
8.58	0.1498	0.27	.Q	.	.	.	.
8.74	0.1533	0.28	.Q	.	.	.	.
8.89	0.1569	0.28	.Q	.	.	.	.
9.05	0.1605	0.29	.Q	.	.	.	.
9.20	0.1642	0.29	.Q	.	.	.	.
9.36	0.1679	0.29	.Q	.	.	.	.
9.51	0.1717	0.30	.Q	.	.	.	.
9.67	0.1756	0.30	.Q	.	.	.	.
9.82	0.1795	0.31	.Q	.	.	.	.
9.97	0.1834	0.31	.Q	.	.	.	.
10.13	0.1874	0.32	.Q	.	.	.	.
10.28	0.1915	0.32	.Q	.	.	.	.
10.44	0.1957	0.33	.Q	.	.	.	.
10.59	0.1999	0.33	.Q	.	.	.	.
10.75	0.2042	0.34	.Q	.	.	.	.
10.90	0.2086	0.35	.Q	.	.	.	.
11.06	0.2130	0.35	.Q	.	.	.	.
11.21	0.2176	0.36	.Q	.	.	.	.
11.36	0.2222	0.37	.Q	.	.	.	.

11.52	0.2270	0.38	.Q
11.67	0.2318	0.38	.Q
11.83	0.2368	0.39	.Q
11.98	0.2418	0.40	.Q
12.14	0.2476	0.50	. Q
12.29	0.2541	0.53	. Q
12.45	0.2609	0.54	. Q
12.60	0.2679	0.55	. Q
12.76	0.2751	0.57	. Q
12.91	0.2824	0.58	. Q
13.06	0.2899	0.60	. Q
13.22	0.2976	0.61	. Q
13.37	0.3056	0.64	. Q
13.53	0.3139	0.65	. Q
13.68	0.3225	0.69	. Q
13.84	0.3314	0.71	. Q
13.99	0.3406	0.75	. Q
14.15	0.3503	0.77	. Q
14.30	0.3605	0.82	. Q
14.45	0.3711	0.85	. Q
14.61	0.3824	0.92	. Q
14.76	0.3944	0.96	. Q
14.92	0.4071	1.05	. Q
15.07	0.4209	1.10	. Q
15.23	0.4359	1.25	. Q
15.38	0.4524	1.34	. Q
15.54	0.4697	1.36	. Q
15.69	0.4883	1.55	. Q
15.85	0.5132	2.35	. Q
16.00	0.5489	3.24	. Q
16.15	0.6321	9.79	. Q
16.31	0.7064	1.84	. Q
16.46	0.7268	1.34	. Q
16.62	0.7428	1.17	. Q
16.77	0.7567	1.00	. Q
16.93	0.7687	0.88	. Q
17.08	0.7794	0.79	. Q
17.24	0.7891	0.73	. Q
17.39	0.7980	0.67	. Q
17.55	0.8063	0.63	. Q
17.70	0.8140	0.59	. Q
17.85	0.8213	0.56	. Q
18.01	0.8283	0.53	. Q
18.16	0.8343	0.41	.Q
18.32	0.8394	0.39	.Q
18.47	0.8442	0.37	.Q
18.63	0.8489	0.36	.Q
18.78	0.8533	0.34	.Q
18.94	0.8576	0.33	.Q
19.09	0.8618	0.32	.Q
19.24	0.8658	0.31	.Q
19.40	0.8697	0.30	.Q
19.55	0.8735	0.29	.Q
19.71	0.8772	0.28	.Q
19.86	0.8808	0.28	.Q
20.02	0.8842	0.27	.Q
20.17	0.8876	0.26	.Q
20.33	0.8910	0.26	.Q
20.48	0.8942	0.25	.Q
20.64	0.8974	0.25	Q
20.79	0.9005	0.24	Q

10-year proposed peak flow

20.94	0.9035	0.24	Q	.	.	.	.
21.10	0.9065	0.23	Q	.	.	.	.
21.25	0.9094	0.23	Q	.	.	.	.
21.41	0.9123	0.22	Q	.	.	.	.
21.56	0.9151	0.22	Q	.	.	.	.
21.72	0.9179	0.21	Q	.	.	.	.
21.87	0.9206	0.21	Q	.	.	.	.
22.03	0.9233	0.21	Q	.	.	.	.
22.18	0.9259	0.20	Q	.	.	.	.
22.33	0.9285	0.20	Q	.	.	.	.
22.49	0.9310	0.20	Q	.	.	.	.
22.64	0.9335	0.19	Q	.	.	.	.
22.80	0.9360	0.19	Q	.	.	.	.
22.95	0.9384	0.19	Q	.	.	.	.
23.11	0.9408	0.19	Q	.	.	.	.
23.26	0.9432	0.18	Q	.	.	.	.
23.42	0.9455	0.18	Q	.	.	.	.
23.57	0.9478	0.18	Q	.	.	.	.
23.73	0.9501	0.18	Q	.	.	.	.
23.88	0.9524	0.17	Q	.	.	.	.
24.03	0.9546	0.17	Q	.	.	.	.
24.19	0.9557	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

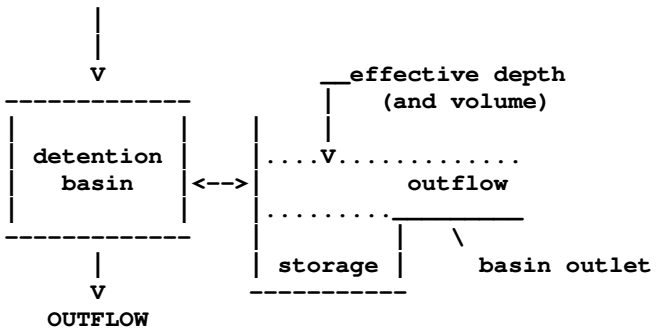
Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1446.1
10%	120.5
20%	27.8
30%	18.5
40%	9.3
50%	9.3
60%	9.3
70%	9.3
80%	9.3
90%	9.3

Problem Descriptions:
Placentia Senior Housing
1314 N. Angelina Drive
Proposed Pipe Detention 10-year (calib coef: 0.867)

FLOW-THROUGH DETENTION BASIN MODEL

SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
CONSTANT HYDROGRAPH TIME UNIT(MINUTES) = 9.270
DEAD STORAGE(AF) = 0.00
SPECIFIED DEAD STORAGE(AF) FILLED = 0.00
ASSUMED INITIAL DEPTH(FEET) IN STORAGE BASIN = 0.00

INFLOW
|



Detention System: 325 lineal feet of 48" pipe storage w/ 18" diameter outlet

DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:
TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES = 11

*BASIN-DEPTH (FEET)	STORAGE (ACRE-FEET)	OUTFLOW (CFS)	**	BASIN-DEPTH (FEET)	STORAGE (ACRE-FEET)	OUTFLOW (CFS)	*
0.000	0.000	0.000	**	0.250	0.006	1.000	*
0.500	0.012	2.000	**	0.750	0.018	3.000	*
1.000	0.023	4.400	**	1.250	0.029	6.200	*
1.500	0.035	7.500	**	1.750	0.041	8.700	*
2.000	0.047	9.700	**	2.250	0.053	10.700	*
2.500	0.059	11.500	**				

BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:

INTERVAL NUMBER	DEPTH (FEET)	{S-O*DT/2} (ACRE-FEET)	{S+O*DT/2} (ACRE-FEET)
1	0.00	0.00000	0.00000
2	0.25	-0.00038	0.01238
3	0.50	-0.00077	0.02477
4	0.75	-0.00115	0.03715
5	1.00	-0.00509	0.05109
6	1.25	-0.01058	0.06858
7	1.50	-0.01288	0.08288
8	1.75	-0.01454	0.09654
9	2.00	-0.01493	0.10893
10	2.25	-0.01531	0.12131
11	2.50	-0.01442	0.13242

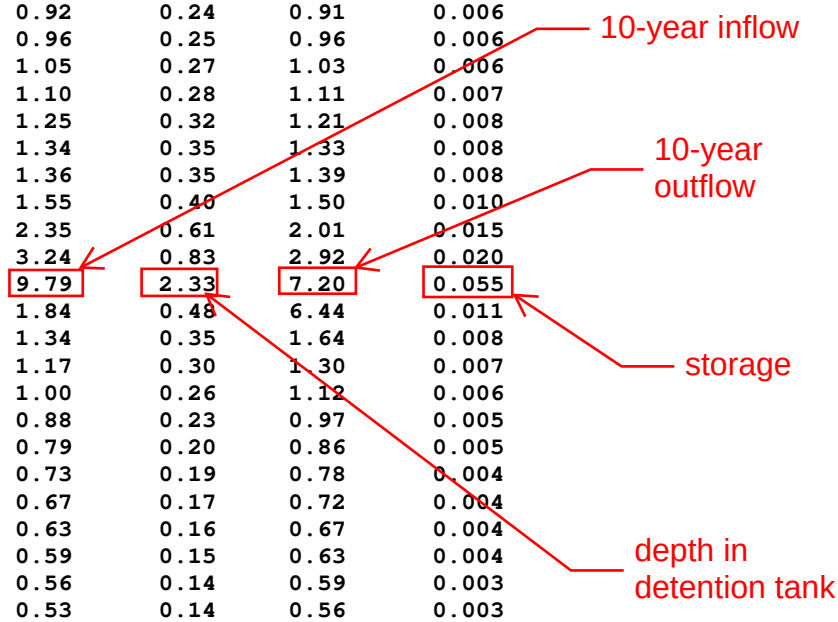
WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)

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

TIME (HRS)	DEAD-STORAGE FILLED(AF)	INFLOW (CFS)	EFFECTIVE DEPTH(FT)	OUTFLOW (CFS)	EFFECTIVE VOLUME(AF)
0.086	0.000	0.17	0.04	0.09	0.001
0.241	0.000	0.17	0.04	0.18	0.001
0.395	0.000	0.17	0.04	0.18	0.001
0.550	0.000	0.17	0.04	0.18	0.001
0.704	0.000	0.18	0.05	0.18	0.001
0.859	0.000	0.18	0.05	0.18	0.001
1.013	0.000	0.18	0.05	0.18	0.001
1.168	0.000	0.18	0.05	0.18	0.001
1.322	0.000	0.18	0.05	0.18	0.001
1.477	0.000	0.18	0.05	0.19	0.001
1.631	0.000	0.18	0.05	0.19	0.001
1.786	0.000	0.18	0.05	0.19	0.001

1.940	0.000	0.18	0.05	0.19	0.001
2.095	0.000	0.19	0.05	0.19	0.001
2.249	0.000	0.19	0.05	0.19	0.001
2.404	0.000	0.19	0.05	0.19	0.001
2.558	0.000	0.19	0.05	0.20	0.001
2.713	0.000	0.19	0.05	0.20	0.001
2.867	0.000	0.19	0.05	0.20	0.001
3.022	0.000	0.19	0.05	0.20	0.001
3.176	0.000	0.20	0.05	0.20	0.001
3.331	0.000	0.20	0.05	0.20	0.001
3.485	0.000	0.20	0.05	0.20	0.001
3.640	0.000	0.20	0.05	0.21	0.001
3.794	0.000	0.20	0.05	0.21	0.001
3.949	0.000	0.20	0.05	0.21	0.001
4.103	0.000	0.21	0.05	0.21	0.001
4.258	0.000	0.21	0.05	0.21	0.001
4.412	0.000	0.21	0.05	0.21	0.001
4.567	0.000	0.21	0.05	0.22	0.001
4.721	0.000	0.21	0.05	0.22	0.001
4.876	0.000	0.21	0.06	0.22	0.001
5.030	0.000	0.22	0.06	0.22	0.001
5.185	0.000	0.22	0.06	0.22	0.001
5.339	0.000	0.22	0.06	0.23	0.001
5.494	0.000	0.22	0.06	0.23	0.001
5.648	0.000	0.22	0.06	0.23	0.001
5.803	0.000	0.23	0.06	0.23	0.001
5.957	0.000	0.23	0.06	0.23	0.001
6.112	0.000	0.23	0.06	0.24	0.001
6.266	0.000	0.23	0.06	0.24	0.001
6.421	0.000	0.23	0.06	0.24	0.001
6.575	0.000	0.24	0.06	0.24	0.001
6.730	0.000	0.24	0.06	0.25	0.001
6.884	0.000	0.24	0.06	0.25	0.001
7.039	0.000	0.24	0.06	0.25	0.002
7.193	0.000	0.25	0.06	0.25	0.002
7.348	0.000	0.25	0.06	0.26	0.002
7.502	0.000	0.25	0.07	0.26	0.002
7.657	0.000	0.26	0.07	0.26	0.002
7.811	0.000	0.26	0.07	0.26	0.002
7.966	0.000	0.26	0.07	0.27	0.002
8.120	0.000	0.27	0.07	0.27	0.002
8.275	0.000	0.27	0.07	0.27	0.002
8.429	0.000	0.27	0.07	0.28	0.002
8.584	0.000	0.27	0.07	0.28	0.002
8.738	0.000	0.28	0.07	0.29	0.002
8.893	0.000	0.28	0.07	0.29	0.002
9.047	0.000	0.29	0.07	0.29	0.002
9.202	0.000	0.29	0.07	0.30	0.002
9.356	0.000	0.29	0.08	0.30	0.002
9.511	0.000	0.30	0.08	0.31	0.002
9.665	0.000	0.30	0.08	0.31	0.002
9.820	0.000	0.31	0.08	0.31	0.002
9.974	0.000	0.31	0.08	0.32	0.002
10.129	0.000	0.32	0.08	0.32	0.002
10.283	0.000	0.32	0.08	0.33	0.002
10.438	0.000	0.33	0.08	0.34	0.002
10.592	0.000	0.33	0.09	0.34	0.002
10.747	0.000	0.34	0.09	0.35	0.002
10.901	0.000	0.35	0.09	0.35	0.002
11.056	0.000	0.35	0.09	0.36	0.002
11.210	0.000	0.36	0.09	0.37	0.002

11.365	0.000	0.37	0.09	0.37	0.002
11.519	0.000	0.38	0.10	0.38	0.002
11.674	0.000	0.38	0.10	0.39	0.002
11.828	0.000	0.39	0.10	0.40	0.002
11.983	0.000	0.40	0.10	0.41	0.002
12.137	0.000	0.50	0.13	0.46	0.003
12.292	0.000	0.53	0.14	0.53	0.003
12.446	0.000	0.54	0.14	0.55	0.003
12.601	0.000	0.55	0.14	0.56	0.003
12.755	0.000	0.57	0.15	0.58	0.004
12.910	0.000	0.58	0.15	0.59	0.004
13.064	0.000	0.60	0.15	0.61	0.004
13.219	0.000	0.61	0.16	0.62	0.004
13.373	0.000	0.64	0.16	0.65	0.004
13.528	0.000	0.65	0.17	0.67	0.004
13.682	0.000	0.69	0.18	0.69	0.004
13.837	0.000	0.71	0.18	0.72	0.004
13.991	0.000	0.75	0.19	0.75	0.005
14.146	0.000	0.77	0.20	0.78	0.005
14.300	0.000	0.82	0.21	0.82	0.005
14.455	0.000	0.85	0.22	0.86	0.005
14.609	0.000	0.92	0.24	0.91	0.006
14.764	0.000	0.96	0.25	0.96	0.006
14.918	0.000	1.05	0.27	1.03	0.006
15.073	0.000	1.10	0.28	1.11	0.007
15.227	0.000	1.25	0.32	1.21	0.008
15.382	0.000	1.34	0.35	1.33	0.008
15.536	0.000	1.36	0.35	1.39	0.008
15.691	0.000	1.55	0.40	1.50	0.010
15.845	0.000	2.35	0.61	2.01	0.015
16.000	0.000	3.24	0.83	2.92	0.020
16.155	0.000	9.79	2.33	7.20	0.055
16.309	0.000	1.84	0.48	6.44	0.011
16.463	0.000	1.34	0.35	1.64	0.008
16.618	0.000	1.17	0.30	1.30	0.007
16.772	0.000	1.00	0.26	1.12	0.006
16.927	0.000	0.88	0.23	0.97	0.005
17.082	0.000	0.79	0.20	0.86	0.005
17.236	0.000	0.73	0.19	0.78	0.004
17.391	0.000	0.67	0.17	0.72	0.004
17.545	0.000	0.63	0.16	0.67	0.004
17.699	0.000	0.59	0.15	0.63	0.004
17.854	0.000	0.56	0.14	0.59	0.003
18.009	0.000	0.53	0.14	0.56	0.003
18.163	0.000	0.41	0.10	0.48	0.003
18.318	0.000	0.39	0.10	0.41	0.002
18.472	0.000	0.37	0.10	0.39	0.002
18.626	0.000	0.36	0.09	0.37	0.002
18.781	0.000	0.34	0.09	0.36	0.002
18.935	0.000	0.33	0.09	0.35	0.002
19.090	0.000	0.32	0.08	0.34	0.002
19.245	0.000	0.31	0.08	0.32	0.002
19.399	0.000	0.30	0.08	0.31	0.002
19.553	0.000	0.29	0.08	0.31	0.002
19.708	0.000	0.28	0.07	0.30	0.002
19.862	0.000	0.28	0.07	0.29	0.002
20.017	0.000	0.27	0.07	0.28	0.002
20.172	0.000	0.26	0.07	0.27	0.002
20.326	0.000	0.26	0.07	0.27	0.002
20.480	0.000	0.25	0.06	0.26	0.002
20.635	0.000	0.25	0.06	0.26	0.002



20.789	0.000	0.24	0.06	0.25	0.001
20.944	0.000	0.24	0.06	0.25	0.001
21.099	0.000	0.23	0.06	0.24	0.001
21.253	0.000	0.23	0.06	0.24	0.001
21.408	0.000	0.22	0.06	0.23	0.001
21.562	0.000	0.22	0.06	0.23	0.001
21.716	0.000	0.21	0.06	0.22	0.001
21.871	0.000	0.21	0.05	0.22	0.001
22.026	0.000	0.21	0.05	0.22	0.001
22.180	0.000	0.20	0.05	0.21	0.001
22.335	0.000	0.20	0.05	0.21	0.001
22.489	0.000	0.20	0.05	0.21	0.001
22.643	0.000	0.19	0.05	0.20	0.001
22.798	0.000	0.19	0.05	0.20	0.001
22.953	0.000	0.19	0.05	0.20	0.001
23.107	0.000	0.19	0.05	0.19	0.001
23.262	0.000	0.18	0.05	0.19	0.001
23.416	0.000	0.18	0.05	0.19	0.001
23.570	0.000	0.18	0.05	0.19	0.001
23.725	0.000	0.18	0.05	0.18	0.001
23.879	0.000	0.17	0.05	0.18	0.001
24.034	0.000	0.17	0.04	0.18	0.001
24.189	0.000	0.00	0.00	0.09	0.000
24.343	0.000	0.00	0.00	0.00	0.000

```
**************************************************************************
                    SMALL AREA UNIT HYDROGRAPH MODEL
==========================================================================
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                          Analysis prepared by:

                            fuscoe engineering
                             16795 Von Karman
                                Suite 100
                                Irvine, CA

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

 Problem Descriptions:
  Placentia Senior Living
  1314 N. Angelina Drive
  Proposed 25-year pipe detention (calib coef: 0.8715)
--------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.87
    TOTAL CATCHMENT AREA(ACRES) =    4.00
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.026
    LOW LOSS FRACTION = 0.116
    TIME OF CONCENTRATION(MIN.) =  9.22
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  25
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.87
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.15
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.94
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.71
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  4.49

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

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     1.19
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.31

**************************************************************************
  TIME      VOLUME        Q    0.        5.0       10.0      15.0      20.0
 (HOURS)     (AF)       (CFS)
--------------------------------------------------------------------------
  0.02      0.0000       0.00  Q         .         .         .         .
  0.17      0.0013       0.21  Q         .         .         .         .
  0.33      0.0040       0.21  Q         .         .         .         .
  0.48      0.0067       0.21  Q         .         .         .         .
  0.63      0.0094       0.21  Q         .         .         .         .
  0.79      0.0122       0.22  Q         .         .         .         .
  0.94      0.0149       0.22  Q         .         .         .         .
  1.09      0.0177       0.22  Q         .         .         .         .
  1.25      0.0205       0.22  Q         .         .         .         .
  1.40      0.0233       0.22  Q         .         .         .         .
  1.56      0.0261       0.22  Q         .         .         .         .
  1.71      0.0289       0.22  Q         .         .         .         .
  1.86      0.0318       0.23  Q         .         .         .         .
```

2.02	0.0347	0.23	Q	.	.	.	.
2.17	0.0376	0.23	Q	.	.	.	.
2.32	0.0405	0.23	Q	.	.	.	.
2.48	0.0434	0.23	Q	.	.	.	.
2.63	0.0464	0.23	Q	.	.	.	.
2.78	0.0494	0.24	Q	.	.	.	.
2.94	0.0524	0.24	Q	.	.	.	.
3.09	0.0554	0.24	Q	.	.	.	.
3.25	0.0584	0.24	Q	.	.	.	.
3.40	0.0615	0.24	Q	.	.	.	.
3.55	0.0646	0.25	Q	.	.	.	.
3.71	0.0677	0.25	Q	.	.	.	.
3.86	0.0709	0.25	Q	.	.	.	.
4.01	0.0740	0.25	Q	.	.	.	.
4.17	0.0772	0.25	Q	.	.	.	.
4.32	0.0805	0.25	Q	.	.	.	.
4.47	0.0837	0.26	Q	.	.	.	.
4.63	0.0870	0.26	Q	.	.	.	.
4.78	0.0903	0.26	Q	.	.	.	.
4.94	0.0936	0.26	Q	.	.	.	.
5.09	0.0970	0.27	Q	.	.	.	.
5.24	0.1004	0.27	Q	.	.	.	.
5.40	0.1038	0.27	Q	.	.	.	.
5.55	0.1072	0.27	Q	.	.	.	.
5.70	0.1107	0.28	Q	.	.	.	.
5.86	0.1142	0.28	Q	.	.	.	.
6.01	0.1178	0.28	Q	.	.	.	.
6.17	0.1214	0.28	Q	.	.	.	.
6.32	0.1250	0.29	Q	.	.	.	.
6.47	0.1287	0.29	Q	.	.	.	.
6.63	0.1324	0.29	Q	.	.	.	.
6.78	0.1361	0.29	Q	.	.	.	.
6.93	0.1399	0.30	Q	.	.	.	.
7.09	0.1437	0.30	Q	.	.	.	.
7.24	0.1475	0.31	Q	.	.	.	.
7.39	0.1514	0.31	Q	.	.	.	.
7.55	0.1554	0.31	Q	.	.	.	.
7.70	0.1594	0.32	Q	.	.	.	.
7.86	0.1634	0.32	Q	.	.	.	.
8.01	0.1675	0.32	Q	.	.	.	.
8.16	0.1716	0.33	Q	.	.	.	.
8.32	0.1758	0.33	Q	.	.	.	.
8.47	0.1800	0.34	Q	.	.	.	.
8.62	0.1843	0.34	Q	.	.	.	.
8.78	0.1886	0.35	Q	.	.	.	.
8.93	0.1930	0.35	Q	.	.	.	.
9.09	0.1975	0.35	Q	.	.	.	.
9.24	0.2020	0.36	Q	.	.	.	.
9.39	0.2066	0.36	Q	.	.	.	.
9.55	0.2113	0.37	Q	.	.	.	.
9.70	0.2160	0.38	Q	.	.	.	.
9.85	0.2208	0.38	Q	.	.	.	.
10.01	0.2257	0.39	Q	.	.	.	.
10.16	0.2306	0.39	Q	.	.	.	.
10.31	0.2357	0.40	Q	.	.	.	.
10.47	0.2408	0.41	Q	.	.	.	.
10.62	0.2460	0.41	Q	.	.	.	.
10.78	0.2513	0.42	Q	.	.	.	.
10.93	0.2567	0.43	Q	.	.	.	.
11.08	0.2622	0.44	Q	.	.	.	.
11.24	0.2678	0.45	Q	.	.	.	.

11.39	0.2735	0.45	Q	.	.	.	.
11.54	0.2794	0.47	Q	.	.	.	.
11.70	0.2853	0.47	Q	.	.	.	.
11.85	0.2914	0.49	Q	.	.	.	.
12.00	0.2977	0.50	Q	.	.	.	.
12.16	0.3051	0.68	.Q	.	.	.	.
12.31	0.3138	0.69	.Q	.	.	.	.
12.47	0.3226	0.71	.Q	.	.	.	.
12.62	0.3317	0.72	.Q	.	.	.	.
12.77	0.3410	0.74	.Q	.	.	.	.
12.93	0.3505	0.76	.Q	.	.	.	.
13.08	0.3603	0.79	.Q	.	.	.	.
13.23	0.3704	0.80	.Q	.	.	.	.
13.39	0.3808	0.84	.Q	.	.	.	.
13.54	0.3916	0.86	.Q	.	.	.	.
13.70	0.4027	0.90	.Q	.	.	.	.
13.85	0.4142	0.92	.Q	.	.	.	.
14.00	0.4262	0.97	.Q	.	.	.	.
14.16	0.4387	0.99	.Q	.	.	.	.
14.31	0.4516	1.05	. Q	.	.	.	.
14.46	0.4651	1.08	. Q	.	.	.	.
14.62	0.4794	1.16	. Q	.	.	.	.
14.77	0.4944	1.21	. Q	.	.	.	.
14.92	0.5106	1.33	. Q	.	.	.	.
15.08	0.5278	1.39	. Q	.	.	.	.
15.23	0.5467	1.57	. Q	.	.	.	.
15.39	0.5673	1.68	. Q	.	.	.	.
15.54	0.5887	1.70	. Q	.	.	.	.
15.69	0.6117	1.93	. Q	.	.	.	.
15.85	0.6429	2.98	. Q	.	.	.	.
16.00	0.6876	4.06	. Q	.	.	.	.
16.15	0.7879	11.74	.	.	. Q	.	.
16.31	0.8771	2.30	. Q	.	.	.	.
16.46	0.9023	1.67	. Q	.	.	.	.
16.61	0.9223	1.47	. Q	.	.	.	.
16.77	0.9397	1.27	. Q	.	.	.	.
16.92	0.9549	1.12	. Q	.	.	.	.
17.08	0.9684	1.01	. Q	.	.	.	.
17.23	0.9808	0.94	.Q	.	.	.	.
17.38	0.9924	0.88	.Q	.	.	.	.
17.54	1.0031	0.82	.Q	.	.	.	.
17.69	1.0133	0.77	.Q	.	.	.	.
17.84	1.0228	0.73	.Q	.	.	.	.
18.00	1.0319	0.70	.Q	.	.	.	.
18.15	1.0395	0.51	.Q	.	.	.	.
18.31	1.0458	0.48	Q	.	.	.	.
18.46	1.0518	0.46	Q	.	.	.	.
18.61	1.0575	0.44	Q	.	.	.	.
18.77	1.0630	0.43	Q	.	.	.	.
18.92	1.0683	0.41	Q	.	.	.	.
19.07	1.0734	0.40	Q	.	.	.	.
19.23	1.0784	0.38	Q	.	.	.	.
19.38	1.0832	0.37	Q	.	.	.	.
19.53	1.0878	0.36	Q	.	.	.	.
19.69	1.0924	0.35	Q	.	.	.	.
19.84	1.0968	0.34	Q	.	.	.	.
20.00	1.1011	0.33	Q	.	.	.	.
20.15	1.1052	0.33	Q	.	.	.	.
20.30	1.1093	0.32	Q	.	.	.	.
20.46	1.1133	0.31	Q	.	.	.	.
20.61	1.1172	0.30	Q	.	.	.	.

25-year proposed peak flow

20.76	1.1210	0.30	Q	.	.	.	.
20.92	1.1248	0.29	Q	.	.	.	.
21.07	1.1284	0.29	Q	.	.	.	.
21.22	1.1320	0.28	Q	.	.	.	.
21.38	1.1355	0.27	Q	.	.	.	.
21.53	1.1390	0.27	Q	.	.	.	.
21.69	1.1424	0.26	Q	.	.	.	.
21.84	1.1457	0.26	Q	.	.	.	.
21.99	1.1490	0.26	Q	.	.	.	.
22.15	1.1522	0.25	Q	.	.	.	.
22.30	1.1554	0.25	Q	.	.	.	.
22.45	1.1585	0.24	Q	.	.	.	.
22.61	1.1616	0.24	Q	.	.	.	.
22.76	1.1646	0.24	Q	.	.	.	.
22.92	1.1676	0.23	Q	.	.	.	.
23.07	1.1705	0.23	Q	.	.	.	.
23.22	1.1734	0.23	Q	.	.	.	.
23.38	1.1763	0.22	Q	.	.	.	.
23.53	1.1791	0.22	Q	.	.	.	.
23.68	1.1819	0.22	Q	.	.	.	.
23.84	1.1846	0.21	Q	.	.	.	.
23.99	1.1873	0.21	Q	.	.	.	.
24.14	1.1900	0.21	Q	.	.	.	.
24.30	1.1914	0.00	Q	.	.	.	.

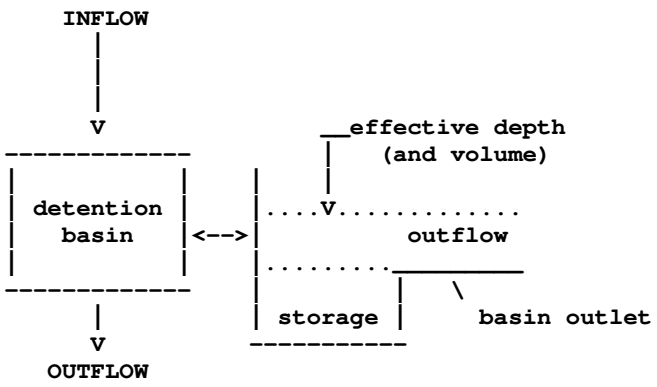
TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1447.5
10%	129.1
20%	27.7
30%	18.4
40%	9.2
50%	9.2
60%	9.2
70%	9.2
80%	9.2
90%	9.2

Problem Descriptions:
Placentia Senior Living
1314 N. Angelina Drive
Proposed 25-year pipe detention (calib coef: 0.8715)

FLOW-THROUGH DETENTION BASIN MODEL

SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
CONSTANT HYDROGRAPH TIME UNIT(MINUTES) = 9.220
DEAD STORAGE(AF) = 0.00
SPECIFIED DEAD STORAGE(AF) FILLED = 0.00
ASSUMED INITIAL DEPTH(FEET) IN STORAGE BASIN = 0.00



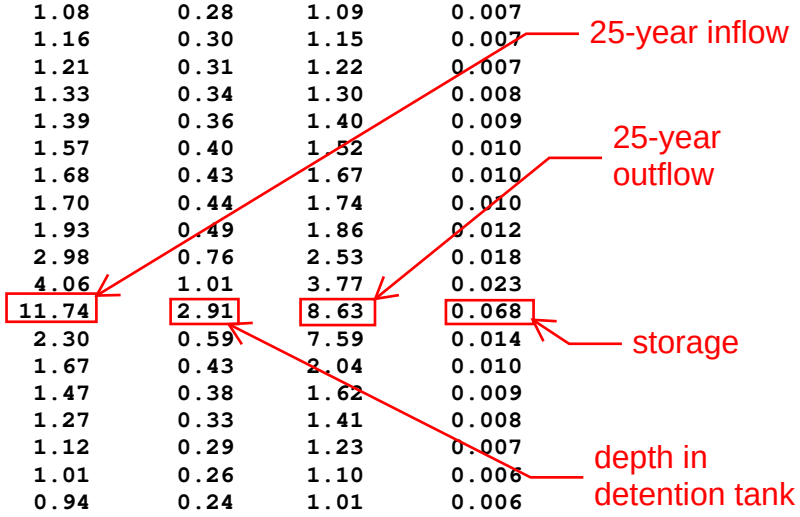
Detention System: 325 lineal feet of 48" pipe storage w/ 18" diameter outlet

```
     DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:
     TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES =  17
     *BASIN-DEPTH   STORAGE     OUTFLOW   **BASIN-DEPTH   STORAGE     OUTFLOW   *
     *    (FEET)  (ACRE-FEET)    (CFS)    **    (FEET)  (ACRE-FEET)    (CFS)    *
     *       0.000       0.000       0.000**       0.250       0.006       1.000*
     *       0.500       0.012       2.000**       0.750       0.018       3.000*
     *       1.000       0.023       4.400**       1.250       0.029       6.200*
     *       1.500       0.035       7.500**       1.750       0.041       8.700*
     *       2.000       0.047       9.700**       2.250       0.053      10.700*
     *       2.500       0.059      11.500**       2.750       0.064      12.300*
     *       3.000       0.070      13.100**       3.250       0.076      13.800*
     *       3.500       0.082      14.500**       3.750       0.088      15.100*
     *       4.000       0.094      15.700**
-------------------------------------------------------------------------------
     BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:
      INTERVAL    DEPTH    {S-O*DT/2}    {S+O*DT/2}
       NUMBER    (FEET)    (ACRE-FEET)   (ACRE-FEET)
           1      0.00        0.00000       0.00000
           2      0.25       -0.00035       0.01235
           3      0.50       -0.00070       0.02470
           4      0.75       -0.00105       0.03705
           5      1.00       -0.00494       0.05094
           6      1.25       -0.01037       0.06837
           7      1.50       -0.01262       0.08262
           8      1.75       -0.01424       0.09624
           9      2.00       -0.01459       0.10859
          10      2.25       -0.01494       0.12094
          11      2.50       -0.01402       0.13202
          12      2.75       -0.01410       0.14210
          13      3.00       -0.01318       0.15318
          14      3.25       -0.01163       0.16363
          15      3.50       -0.01007       0.17407
          16      3.75       -0.00788       0.18388
          17      4.00       -0.00569       0.19369
     WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)
-------------------------------------------------------------------------------
     DETENTION BASIN ROUTING RESULTS:
     NOTE: COMPUTED BASIN DEPTH, OUTFLOW, AND STORAGE QUANTITIES
           OCCUR AT THE GIVEN TIME. BASIN INFLOW VALUES REPRESENT THE
           AVERAGE INFLOW DURING THE RECENT HYDROGRAPH UNIT INTERVAL.

        TIME   DEAD-STORAGE   INFLOW   EFFECTIVE   OUTFLOW   EFFECTIVE
       (HRS)    FILLED(AF)     (CFS)   DEPTH(FT)    (CFS)   VOLUME(AF)
-------------------------------------------------------------------------------
       0.019        0.000      0.00       0.00      0.00       0.000
```

0.172	0.000	0.21	0.05	0.11	0.001
0.326	0.000	0.21	0.05	0.22	0.001
0.480	0.000	0.21	0.05	0.22	0.001
0.633	0.000	0.21	0.06	0.22	0.001
0.787	0.000	0.22	0.06	0.22	0.001
0.941	0.000	0.22	0.06	0.22	0.001
1.094	0.000	0.22	0.06	0.22	0.001
1.248	0.000	0.22	0.06	0.23	0.001
1.402	0.000	0.22	0.06	0.23	0.001
1.555	0.000	0.22	0.06	0.23	0.001
1.709	0.000	0.22	0.06	0.23	0.001
1.863	0.000	0.23	0.06	0.23	0.001
2.016	0.000	0.23	0.06	0.23	0.001
2.170	0.000	0.23	0.06	0.23	0.001
2.324	0.000	0.23	0.06	0.24	0.001
2.477	0.000	0.23	0.06	0.24	0.001
2.631	0.000	0.23	0.06	0.24	0.001
2.785	0.000	0.24	0.06	0.24	0.001
2.938	0.000	0.24	0.06	0.24	0.001
3.092	0.000	0.24	0.06	0.25	0.001
3.246	0.000	0.24	0.06	0.25	0.001
3.399	0.000	0.24	0.06	0.25	0.001
3.553	0.000	0.25	0.06	0.25	0.002
3.707	0.000	0.25	0.06	0.25	0.002
3.860	0.000	0.25	0.06	0.25	0.002
4.014	0.000	0.25	0.06	0.26	0.002
4.168	0.000	0.25	0.07	0.26	0.002
4.321	0.000	0.25	0.07	0.26	0.002
4.475	0.000	0.26	0.07	0.26	0.002
4.629	0.000	0.26	0.07	0.27	0.002
4.782	0.000	0.26	0.07	0.27	0.002
4.936	0.000	0.26	0.07	0.27	0.002
5.090	0.000	0.27	0.07	0.27	0.002
5.243	0.000	0.27	0.07	0.27	0.002
5.397	0.000	0.27	0.07	0.28	0.002
5.551	0.000	0.27	0.07	0.28	0.002
5.704	0.000	0.28	0.07	0.28	0.002
5.858	0.000	0.28	0.07	0.28	0.002
6.012	0.000	0.28	0.07	0.29	0.002
6.165	0.000	0.28	0.07	0.29	0.002
6.319	0.000	0.29	0.07	0.29	0.002
6.473	0.000	0.29	0.07	0.30	0.002
6.626	0.000	0.29	0.08	0.30	0.002
6.780	0.000	0.29	0.08	0.30	0.002
6.934	0.000	0.30	0.08	0.31	0.002
7.087	0.000	0.30	0.08	0.31	0.002
7.241	0.000	0.31	0.08	0.31	0.002
7.395	0.000	0.31	0.08	0.32	0.002
7.548	0.000	0.31	0.08	0.32	0.002
7.702	0.000	0.32	0.08	0.32	0.002
7.856	0.000	0.32	0.08	0.33	0.002
8.009	0.000	0.32	0.08	0.33	0.002
8.163	0.000	0.33	0.08	0.33	0.002
8.317	0.000	0.33	0.08	0.34	0.002
8.470	0.000	0.34	0.09	0.34	0.002
8.624	0.000	0.34	0.09	0.35	0.002
8.778	0.000	0.35	0.09	0.35	0.002
8.931	0.000	0.35	0.09	0.36	0.002
9.085	0.000	0.35	0.09	0.36	0.002
9.239	0.000	0.36	0.09	0.37	0.002
9.392	0.000	0.36	0.09	0.37	0.002

9.546	0.000	0.37	0.09	0.38	0.002
9.700	0.000	0.38	0.10	0.38	0.002
9.853	0.000	0.38	0.10	0.39	0.002
10.007	0.000	0.39	0.10	0.39	0.002
10.161	0.000	0.39	0.10	0.40	0.002
10.314	0.000	0.40	0.10	0.41	0.002
10.468	0.000	0.41	0.10	0.41	0.003
10.622	0.000	0.41	0.11	0.42	0.003
10.775	0.000	0.42	0.11	0.43	0.003
10.929	0.000	0.43	0.11	0.44	0.003
11.083	0.000	0.44	0.11	0.45	0.003
11.236	0.000	0.45	0.12	0.45	0.003
11.390	0.000	0.45	0.12	0.46	0.003
11.544	0.000	0.47	0.12	0.47	0.003
11.697	0.000	0.47	0.12	0.48	0.003
11.851	0.000	0.49	0.13	0.49	0.003
12.005	0.000	0.50	0.13	0.51	0.003
12.158	0.000	0.68	0.17	0.60	0.004
12.312	0.000	0.69	0.18	0.70	0.004
12.466	0.000	0.71	0.18	0.72	0.004
12.619	0.000	0.72	0.18	0.73	0.004
12.773	0.000	0.74	0.19	0.75	0.005
12.927	0.000	0.76	0.19	0.77	0.005
13.080	0.000	0.79	0.20	0.79	0.005
13.234	0.000	0.80	0.21	0.82	0.005
13.388	0.000	0.84	0.22	0.84	0.005
13.541	0.000	0.86	0.22	0.87	0.005
13.695	0.000	0.90	0.23	0.90	0.006
13.849	0.000	0.92	0.24	0.93	0.006
14.002	0.000	0.97	0.25	0.97	0.006
14.156	0.000	0.99	0.25	1.01	0.006
14.310	0.000	1.05	0.27	1.05	0.006
14.463	0.000	1.08	0.28	1.09	0.007
14.617	0.000	1.16	0.30	1.15	0.007
14.771	0.000	1.21	0.31	1.22	0.007
14.924	0.000	1.33	0.34	1.30	0.008
15.078	0.000	1.39	0.36	1.40	0.009
15.232	0.000	1.57	0.40	1.52	0.010
15.385	0.000	1.68	0.43	1.67	0.010
15.539	0.000	1.70	0.44	1.74	0.010
15.693	0.000	1.93	0.49	1.86	0.012
15.846	0.000	2.98	0.76	2.53	0.018
16.000	0.000	4.06	1.01	3.77	0.023
16.154	0.000	11.74	2.91	8.63	0.068
16.307	0.000	2.30	0.59	7.59	0.014
16.461	0.000	1.67	0.43	2.04	0.010
16.615	0.000	1.47	0.38	1.62	0.009
16.768	0.000	1.27	0.33	1.41	0.008
16.922	0.000	1.12	0.29	1.23	0.007
17.076	0.000	1.01	0.26	1.10	0.006
17.229	0.000	0.94	0.24	1.01	0.006
17.383	0.000	0.88	0.23	0.94	0.005
17.537	0.000	0.82	0.21	0.87	0.005
17.690	0.000	0.77	0.20	0.82	0.005
17.844	0.000	0.73	0.19	0.77	0.005
17.998	0.000	0.70	0.18	0.73	0.004
18.151	0.000	0.51	0.13	0.62	0.003
18.305	0.000	0.48	0.12	0.51	0.003
18.459	0.000	0.46	0.12	0.48	0.003
18.612	0.000	0.44	0.11	0.46	0.003
18.766	0.000	0.43	0.11	0.45	0.003



18.920	0.000	0.41	0.11	0.43	0.003
19.073	0.000	0.40	0.10	0.41	0.002
19.227	0.000	0.38	0.10	0.40	0.002
19.381	0.000	0.37	0.10	0.39	0.002
19.534	0.000	0.36	0.09	0.38	0.002
19.688	0.000	0.35	0.09	0.37	0.002
19.842	0.000	0.34	0.09	0.36	0.002
19.995	0.000	0.33	0.09	0.35	0.002
20.149	0.000	0.33	0.08	0.34	0.002
20.303	0.000	0.32	0.08	0.33	0.002
20.456	0.000	0.31	0.08	0.32	0.002
20.610	0.000	0.30	0.08	0.32	0.002
20.764	0.000	0.30	0.08	0.31	0.002
20.917	0.000	0.29	0.07	0.30	0.002
21.071	0.000	0.29	0.07	0.30	0.002
21.225	0.000	0.28	0.07	0.29	0.002
21.378	0.000	0.27	0.07	0.28	0.002
21.532	0.000	0.27	0.07	0.28	0.002
21.686	0.000	0.26	0.07	0.27	0.002
21.839	0.000	0.26	0.07	0.27	0.002
21.993	0.000	0.26	0.07	0.27	0.002
22.147	0.000	0.25	0.06	0.26	0.002
22.300	0.000	0.25	0.06	0.26	0.002
22.454	0.000	0.24	0.06	0.25	0.002
22.608	0.000	0.24	0.06	0.25	0.001
22.761	0.000	0.24	0.06	0.25	0.001
22.915	0.000	0.23	0.06	0.24	0.001
23.069	0.000	0.23	0.06	0.24	0.001
23.222	0.000	0.23	0.06	0.23	0.001
23.376	0.000	0.22	0.06	0.23	0.001
23.530	0.000	0.22	0.06	0.23	0.001
23.683	0.000	0.22	0.06	0.23	0.001
23.837	0.000	0.21	0.06	0.22	0.001
23.991	0.000	0.21	0.05	0.22	0.001
24.144	0.000	0.21	0.05	0.22	0.001
24.298	0.000	0.00	0.00	0.11	0.000
24.452	0.000	0.00	0.00	0.00	0.000

```
**************************************************************************
                    SMALL AREA UNIT HYDROGRAPH MODEL
==========================================================================
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                          Analysis prepared by:

                            fuscoe engineering
                             16795 Von Karman
                                Suite 100
                                Irvine, CA

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

 Problem Descriptions:
  Placentia Senior  Housing
  1314 N. Angelina Drive
  100-year pipe detention (calib coef: 0.8665)
--------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.87
    TOTAL CATCHMENT AREA(ACRES) =    4.00
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.026
    LOW LOSS FRACTION = 0.070
    TIME OF CONCENTRATION(MIN.) =  9.12
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) = 100
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.52
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  1.09
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.45
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  2.43
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  3.36
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  5.63

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

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     1.53
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.35

**************************************************************************
  TIME      VOLUME        Q    0.         5.0       10.0       15.0       20.0
 (HOURS)     (AF)       (CFS)
--------------------------------------------------------------------------
  0.04      0.0000       0.00  Q          .          .          .          .
  0.19      0.0018       0.28  Q          .          .          .          .
  0.34      0.0053       0.28  Q          .          .          .          .
  0.50      0.0089       0.29  Q          .          .          .          .
  0.65      0.0125       0.29  Q          .          .          .          .
  0.80      0.0161       0.29  Q          .          .          .          .
  0.95      0.0198       0.29  Q          .          .          .          .
  1.10      0.0234       0.29  Q          .          .          .          .
  1.26      0.0271       0.30  Q          .          .          .          .
  1.41      0.0308       0.30  Q          .          .          .          .
  1.56      0.0346       0.30  Q          .          .          .          .
  1.71      0.0384       0.30  Q          .          .          .          .
  1.86      0.0421       0.30  Q          .          .          .          .
```

2.02	0.0460	0.30	Q	.	.	.	.
2.17	0.0498	0.31	Q	.	.	.	.
2.32	0.0537	0.31	Q	.	.	.	.
2.47	0.0576	0.31	Q	.	.	.	.
2.62	0.0615	0.31	Q	.	.	.	.
2.78	0.0654	0.32	Q	.	.	.	.
2.93	0.0694	0.32	Q	.	.	.	.
3.08	0.0734	0.32	Q	.	.	.	.
3.23	0.0774	0.32	Q	.	.	.	.
3.38	0.0815	0.33	Q	.	.	.	.
3.54	0.0856	0.33	Q	.	.	.	.
3.69	0.0897	0.33	Q	.	.	.	.
3.84	0.0939	0.33	Q	.	.	.	.
3.99	0.0981	0.34	Q	.	.	.	.
4.14	0.1023	0.34	Q	.	.	.	.
4.30	0.1066	0.34	Q	.	.	.	.
4.45	0.1108	0.34	Q	.	.	.	.
4.60	0.1152	0.35	Q	.	.	.	.
4.75	0.1195	0.35	Q	.	.	.	.
4.90	0.1239	0.35	Q	.	.	.	.
5.06	0.1284	0.35	Q	.	.	.	.
5.21	0.1329	0.36	Q	.	.	.	.
5.36	0.1374	0.36	Q	.	.	.	.
5.51	0.1419	0.36	Q	.	.	.	.
5.66	0.1465	0.37	Q	.	.	.	.
5.82	0.1512	0.37	Q	.	.	.	.
5.97	0.1558	0.37	Q	.	.	.	.
6.12	0.1606	0.38	Q	.	.	.	.
6.27	0.1653	0.38	Q	.	.	.	.
6.42	0.1702	0.39	Q	.	.	.	.
6.58	0.1750	0.39	Q	.	.	.	.
6.73	0.1799	0.39	Q	.	.	.	.
6.88	0.1849	0.40	Q	.	.	.	.
7.03	0.1899	0.40	Q	.	.	.	.
7.18	0.1950	0.40	Q	.	.	.	.
7.34	0.2001	0.41	Q	.	.	.	.
7.49	0.2053	0.41	Q	.	.	.	.
7.64	0.2105	0.42	Q	.	.	.	.
7.79	0.2158	0.42	Q	.	.	.	.
7.94	0.2212	0.43	Q	.	.	.	.
8.10	0.2266	0.43	Q	.	.	.	.
8.25	0.2321	0.44	Q	.	.	.	.
8.40	0.2376	0.44	Q	.	.	.	.
8.55	0.2433	0.45	Q	.	.	.	.
8.70	0.2489	0.45	Q	.	.	.	.
8.86	0.2547	0.46	Q	.	.	.	.
9.01	0.2605	0.47	Q	.	.	.	.
9.16	0.2665	0.48	Q	.	.	.	.
9.31	0.2725	0.48	Q	.	.	.	.
9.46	0.2786	0.49	Q	.	.	.	.
9.62	0.2847	0.49	Q	.	.	.	.
9.77	0.2910	0.50	.Q	.	.	.	.
9.92	0.2974	0.51	.Q	.	.	.	.
10.07	0.3038	0.52	.Q	.	.	.	.
10.22	0.3104	0.53	.Q	.	.	.	.
10.38	0.3170	0.54	.Q	.	.	.	.
10.53	0.3238	0.54	.Q	.	.	.	.
10.68	0.3307	0.56	.Q	.	.	.	.
10.83	0.3377	0.56	.Q	.	.	.	.
10.98	0.3449	0.58	.Q	.	.	.	.
11.14	0.3522	0.58	.Q	.	.	.	.

```
11.29      0.3596      0.60  .Q        .         .         .         .
11.44      0.3672      0.61  .Q        .         .         .         .
11.59      0.3749      0.62  .Q        .         .         .         .
11.74      0.3828      0.63  .Q        .         .         .         .
11.90      0.3908      0.65  .Q        .         .         .         .
12.05      0.3991      0.66  .Q        .         .         .         .
12.20      0.4086      0.86  .Q        .         .         .         .
12.35      0.4194      0.87  .Q        .         .         .         .
12.50      0.4305      0.89  .Q        .         .         .         .
12.66      0.4418      0.91  .Q        .         .         .         .
12.81      0.4533      0.94  .Q        .         .         .         .
12.96      0.4652      0.95  .Q        .         .         .         .
13.11      0.4774      0.99  .Q        .         .         .         .
13.26      0.4899      1.00  . Q       .         .         .         .
13.42      0.5027      1.04  . Q       .         .         .         .
13.57      0.5160      1.07  . Q       .         .         .         .
13.72      0.5296      1.11  . Q       .         .         .         .
13.87      0.5438      1.14  . Q       .         .         .         .
14.02      0.5584      1.20  . Q       .         .         .         .
14.18      0.5737      1.24  . Q       .         .         .         .
14.33      0.5898      1.32  . Q       .                             .
14.48      0.6066      1.36  . Q       .                             .
14.63      0.6243      1.46  . Q       .                             .
14.78      0.6431      1.52  .  Q      .                             .
14.94      0.6631      1.67  .  Q      .                             .
15.09      0.6846      1.75  .  Q      .         .         .         .
15.24      0.7080      1.97  .  Q      .         .         .         .
15.39      0.7337      2.11  .   Q     .         .         .         .
15.54      0.7609      2.21  .   Q     .         .         .         .
15.70      0.7905      2.50  .    Q    .         .         .         .
15.85      0.8288      3.60  .      Q  .         .         .         .
16.00      0.8825      4.95  .       Q .         .         .         .
16.15      1.0085     15.11  .         .         .         Q         .
16.30      1.1217      2.92  .    Q    .         .         .         .
16.46      1.1534      2.12  .   Q     .         .         .         .
16.61      1.1783      1.85  .  Q      .         .         .         .
16.76      1.2000      1.59  .  Q      .         .         .         .
16.91      1.2188      1.41  . Q       .         .         .         .
17.06      1.2357      1.28  . Q       .         .         .         .
17.22      1.2510      1.17  . Q       .         .         .         .
17.37      1.2652      1.09  . Q       .         .         .         .
17.52      1.2785      1.02  . Q       .         .         .         .
17.67      1.2910      0.97  .Q        .         .         .         .
17.82      1.3028      0.92  .Q        .         .         .         .
17.98      1.3141      0.88  .Q        .         .         .         .
18.13      1.3244      0.75  .Q        .         .         .         .
18.28      1.3332      0.64  .Q        .         .         .         .
18.43      1.3410      0.61  .Q        .         .         .         .
18.58      1.3486      0.59  .Q        .         .         .         .
18.74      1.3559      0.57  .Q        .         .         .         .
18.89      1.3629      0.55  .Q        .         .         .         .
19.04      1.3697      0.53  .Q        .         .         .         .
19.19      1.3763      0.51  .Q        .         .         .         .
19.34      1.3826      0.50  Q         .         .         .         .
19.50      1.3888      0.48  Q         .         .         .         .
19.65      1.3948      0.47  Q         .         .         .         .
19.80      1.4006      0.46  Q         .         .         .         .
19.95      1.4063      0.45  Q         .         .         .         .
20.10      1.4119      0.44  Q         .         .         .         .
20.26      1.4173      0.43  Q         .         .         .         .
20.41      1.4226      0.42  Q         .         .         .         .
```

100-year proposed peak flow

20.56	1.4278	0.41	Q	.	.	.	.
20.71	1.4329	0.40	Q	.	.	.	.
20.86	1.4378	0.39	Q	.	.	.	.
21.02	1.4427	0.38	Q	.	.	.	.
21.17	1.4475	0.38	Q	.	.	.	.
21.32	1.4521	0.37	Q	.	.	.	.
21.47	1.4567	0.36	Q	.	.	.	.
21.62	1.4613	0.36	Q	.	.	.	.
21.78	1.4657	0.35	Q	.	.	.	.
21.93	1.4701	0.34	Q	.	.	.	.
22.08	1.4743	0.34	Q	.	.	.	.
22.23	1.4786	0.33	Q	.	.	.	.
22.38	1.4827	0.33	Q	.	.	.	.
22.54	1.4868	0.32	Q	.	.	.	.
22.69	1.4909	0.32	Q	.	.	.	.
22.84	1.4948	0.31	Q	.	.	.	.
22.99	1.4988	0.31	Q	.	.	.	.
23.14	1.5026	0.31	Q	.	.	.	.
23.30	1.5064	0.30	Q	.	.	.	.
23.45	1.5102	0.30	Q	.	.	.	.
23.60	1.5139	0.29	Q	.	.	.	.
23.75	1.5176	0.29	Q	.	.	.	.
23.90	1.5212	0.29	Q	.	.	.	.
24.06	1.5248	0.28	Q	.	.	.	.
24.21	1.5266	0.00	Q	.	.	.	.

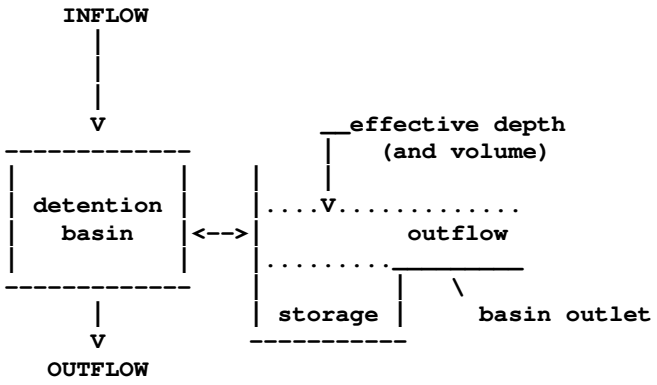
TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1441.0
10%	127.7
20%	27.4
30%	18.2
40%	9.1
50%	9.1
60%	9.1
70%	9.1
80%	9.1
90%	9.1

Problem Descriptions:
Placentia Senior Housing
1314 N. Angelina Drive
100-year pipe detention (calib coef: 0.8665)

FLOW-THROUGH DETENTION BASIN MODEL

SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
CONSTANT HYDROGRAPH TIME UNIT(MINUTES) = 9.120
DEAD STORAGE(AF) = 0.00
SPECIFIED DEAD STORAGE(AF) FILLED = 0.00
ASSUMED INITIAL DEPTH(FEET) IN STORAGE BASIN = 0.00



Detention System:
325 lineal feet of 48" pipe storage w/ 18" diameter outlet

DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:
TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES = 17

*BASIN-DEPTH (FEET)	STORAGE (ACRE-FEET)	OUTFLOW (CFS)	**	BASIN-DEPTH (FEET)	STORAGE (ACRE-FEET)	OUTFLOW (CFS)	*
0.000	0.000	0.000	**	0.250	0.006	1.000	*
0.500	0.012	2.000	**	0.750	0.018	3.000	*
1.000	0.023	4.400	**	1.250	0.029	6.200	*
1.500	0.035	7.500	**	1.750	0.041	8.700	*
2.000	0.047	9.700	**	2.250	0.053	10.700	*
2.500	0.059	11.500	**	2.750	0.064	12.300	*
3.000	0.070	13.100	**	3.250	0.076	13.800	*
3.500	0.082	14.500	**	3.750	0.088	15.100	*
4.000	0.094	15.700	**				

BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:

INTERVAL NUMBER	DEPTH (FEET)	{S-O*DT/2} (ACRE-FEET)	{S+O*DT/2} (ACRE-FEET)
1	0.00	0.00000	0.00000
2	0.25	-0.00028	0.01228
3	0.50	-0.00056	0.02456
4	0.75	-0.00084	0.03684
5	1.00	-0.00464	0.05064
6	1.25	-0.00994	0.06794
7	1.50	-0.01211	0.08211
8	1.75	-0.01364	0.09564
9	2.00	-0.01393	0.10793
10	2.25	-0.01421	0.12021
11	2.50	-0.01323	0.13123
12	2.75	-0.01326	0.14126
13	3.00	-0.01228	0.15228
14	3.25	-0.01068	0.16268
15	3.50	-0.00907	0.17307
16	3.75	-0.00684	0.18284
17	4.00	-0.00461	0.19261

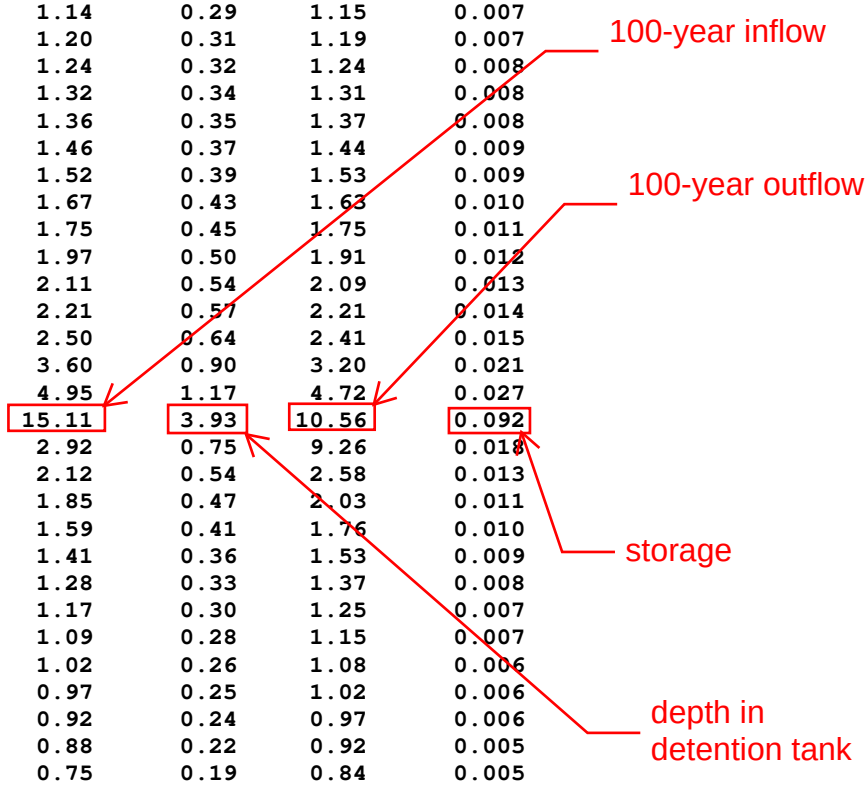
WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)

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

TIME (HRS)	DEAD-STORAGE FILLED(AF)	INFLOW (CFS)	EFFECTIVE DEPTH(FT)	OUTFLOW (CFS)	EFFECTIVE VOLUME(AF)

0.040	0.000	0.00	0.00	0.00	0.000
0.192	0.000	0.28	0.07	0.14	0.002
0.344	0.000	0.28	0.07	0.29	0.002
0.496	0.000	0.29	0.07	0.29	0.002
0.648	0.000	0.29	0.07	0.29	0.002
0.800	0.000	0.29	0.07	0.29	0.002
0.952	0.000	0.29	0.07	0.30	0.002
1.104	0.000	0.29	0.07	0.30	0.002
1.256	0.000	0.30	0.08	0.30	0.002
1.408	0.000	0.30	0.08	0.30	0.002
1.560	0.000	0.30	0.08	0.30	0.002
1.712	0.000	0.30	0.08	0.31	0.002
1.864	0.000	0.30	0.08	0.31	0.002
2.016	0.000	0.30	0.08	0.31	0.002
2.168	0.000	0.31	0.08	0.31	0.002
2.320	0.000	0.31	0.08	0.31	0.002
2.472	0.000	0.31	0.08	0.32	0.002
2.624	0.000	0.31	0.08	0.32	0.002
2.776	0.000	0.32	0.08	0.32	0.002
2.928	0.000	0.32	0.08	0.32	0.002
3.080	0.000	0.32	0.08	0.33	0.002
3.232	0.000	0.32	0.08	0.33	0.002
3.384	0.000	0.33	0.08	0.33	0.002
3.536	0.000	0.33	0.08	0.33	0.002
3.688	0.000	0.33	0.08	0.34	0.002
3.840	0.000	0.33	0.08	0.34	0.002
3.992	0.000	0.34	0.09	0.34	0.002
4.144	0.000	0.34	0.09	0.34	0.002
4.296	0.000	0.34	0.09	0.35	0.002
4.448	0.000	0.34	0.09	0.35	0.002
4.600	0.000	0.35	0.09	0.35	0.002
4.752	0.000	0.35	0.09	0.36	0.002
4.904	0.000	0.35	0.09	0.36	0.002
5.056	0.000	0.35	0.09	0.36	0.002
5.208	0.000	0.36	0.09	0.36	0.002
5.360	0.000	0.36	0.09	0.37	0.002
5.512	0.000	0.36	0.09	0.37	0.002
5.664	0.000	0.37	0.09	0.37	0.002
5.816	0.000	0.37	0.10	0.38	0.002
5.968	0.000	0.37	0.10	0.38	0.002
6.120	0.000	0.38	0.10	0.38	0.002
6.272	0.000	0.38	0.10	0.39	0.002
6.424	0.000	0.39	0.10	0.39	0.002
6.576	0.000	0.39	0.10	0.40	0.002
6.728	0.000	0.39	0.10	0.40	0.002
6.880	0.000	0.40	0.10	0.40	0.002
7.032	0.000	0.40	0.10	0.41	0.002
7.184	0.000	0.40	0.10	0.41	0.002
7.336	0.000	0.41	0.11	0.42	0.003
7.488	0.000	0.41	0.11	0.42	0.003
7.640	0.000	0.42	0.11	0.43	0.003
7.792	0.000	0.42	0.11	0.43	0.003
7.944	0.000	0.43	0.11	0.44	0.003
8.096	0.000	0.43	0.11	0.44	0.003
8.248	0.000	0.44	0.11	0.45	0.003
8.400	0.000	0.44	0.11	0.45	0.003
8.552	0.000	0.45	0.12	0.46	0.003
8.704	0.000	0.45	0.12	0.46	0.003
8.856	0.000	0.46	0.12	0.47	0.003
9.008	0.000	0.47	0.12	0.48	0.003
9.160	0.000	0.48	0.12	0.48	0.003

9.312	0.000	0.48	0.12	0.49	0.003
9.464	0.000	0.49	0.13	0.50	0.003
9.616	0.000	0.49	0.13	0.50	0.003
9.768	0.000	0.50	0.13	0.51	0.003
9.920	0.000	0.51	0.13	0.52	0.003
10.072	0.000	0.52	0.13	0.53	0.003
10.224	0.000	0.53	0.13	0.53	0.003
10.376	0.000	0.54	0.14	0.54	0.003
10.528	0.000	0.54	0.14	0.55	0.003
10.680	0.000	0.56	0.14	0.56	0.003
10.832	0.000	0.56	0.14	0.57	0.003
10.984	0.000	0.58	0.15	0.58	0.004
11.136	0.000	0.58	0.15	0.59	0.004
11.288	0.000	0.60	0.15	0.60	0.004
11.440	0.000	0.61	0.16	0.62	0.004
11.592	0.000	0.62	0.16	0.63	0.004
11.744	0.000	0.63	0.16	0.64	0.004
11.896	0.000	0.65	0.17	0.66	0.004
12.048	0.000	0.66	0.17	0.67	0.004
12.200	0.000	0.86	0.22	0.78	0.005
12.352	0.000	0.87	0.22	0.88	0.005
12.504	0.000	0.89	0.23	0.90	0.005
12.656	0.000	0.91	0.23	0.92	0.006
12.808	0.000	0.94	0.24	0.94	0.006
12.960	0.000	0.95	0.24	0.97	0.006
13.112	0.000	0.99	0.25	0.99	0.006
13.264	0.000	1.00	0.26	1.02	0.006
13.416	0.000	1.04	0.27	1.05	0.006
13.568	0.000	1.07	0.27	1.08	0.007
13.720	0.000	1.11	0.28	1.11	0.007
13.872	0.000	1.14	0.29	1.15	0.007
14.024	0.000	1.20	0.31	1.19	0.007
14.176	0.000	1.24	0.32	1.24	0.008
14.328	0.000	1.32	0.34	1.31	0.008
14.480	0.000	1.36	0.35	1.37	0.008
14.632	0.000	1.46	0.37	1.44	0.009
14.784	0.000	1.52	0.39	1.53	0.009
14.936	0.000	1.67	0.43	1.63	0.010
15.088	0.000	1.75	0.45	1.75	0.011
15.240	0.000	1.97	0.50	1.91	0.012
15.392	0.000	2.11	0.54	2.09	0.013
15.544	0.000	2.21	0.57	2.21	0.014
15.696	0.000	2.50	0.64	2.41	0.015
15.848	0.000	3.60	0.90	3.20	0.021
16.000	0.000	4.95	1.17	4.72	0.027
16.152	0.000	15.11	3.93	10.56	0.092
16.304	0.000	2.92	0.75	9.26	0.018
16.456	0.000	2.12	0.54	2.58	0.013
16.608	0.000	1.85	0.47	2.03	0.011
16.760	0.000	1.59	0.41	1.76	0.010
16.912	0.000	1.41	0.36	1.53	0.009
17.064	0.000	1.28	0.33	1.37	0.008
17.216	0.000	1.17	0.30	1.25	0.007
17.368	0.000	1.09	0.28	1.15	0.007
17.520	0.000	1.02	0.26	1.08	0.006
17.672	0.000	0.97	0.25	1.02	0.006
17.824	0.000	0.92	0.24	0.97	0.006
17.976	0.000	0.88	0.22	0.92	0.005
18.128	0.000	0.75	0.19	0.84	0.005
18.280	0.000	0.64	0.16	0.71	0.004
18.432	0.000	0.61	0.16	0.64	0.004



18.584	0.000	0.59	0.15	0.62	0.004
18.736	0.000	0.57	0.15	0.59	0.003
18.888	0.000	0.55	0.14	0.57	0.003
19.040	0.000	0.53	0.14	0.55	0.003
19.192	0.000	0.51	0.13	0.53	0.003
19.344	0.000	0.50	0.13	0.52	0.003
19.496	0.000	0.48	0.12	0.50	0.003
19.648	0.000	0.47	0.12	0.49	0.003
19.800	0.000	0.46	0.12	0.48	0.003
19.952	0.000	0.45	0.11	0.46	0.003
20.104	0.000	0.44	0.11	0.45	0.003
20.256	0.000	0.43	0.11	0.44	0.003
20.408	0.000	0.42	0.11	0.43	0.003
20.560	0.000	0.41	0.10	0.42	0.003
20.712	0.000	0.40	0.10	0.41	0.002
20.864	0.000	0.39	0.10	0.40	0.002
21.016	0.000	0.38	0.10	0.40	0.002
21.168	0.000	0.38	0.10	0.39	0.002
21.320	0.000	0.37	0.09	0.38	0.002
21.472	0.000	0.36	0.09	0.37	0.002
21.624	0.000	0.36	0.09	0.37	0.002
21.776	0.000	0.35	0.09	0.36	0.002
21.928	0.000	0.34	0.09	0.36	0.002
22.080	0.000	0.34	0.09	0.35	0.002
22.232	0.000	0.33	0.09	0.34	0.002
22.384	0.000	0.33	0.08	0.34	0.002
22.536	0.000	0.32	0.08	0.33	0.002
22.688	0.000	0.32	0.08	0.33	0.002
22.840	0.000	0.31	0.08	0.32	0.002
22.992	0.000	0.31	0.08	0.32	0.002
23.144	0.000	0.31	0.08	0.31	0.002
23.296	0.000	0.30	0.08	0.31	0.002
23.448	0.000	0.30	0.08	0.31	0.002
23.600	0.000	0.29	0.08	0.30	0.002
23.752	0.000	0.29	0.07	0.30	0.002
23.904	0.000	0.29	0.07	0.29	0.002
24.056	0.000	0.28	0.07	0.29	0.002
24.208	0.000	0.00	0.00	0.14	0.000
24.360	0.000	0.00	0.00	0.00	0.000

Peak storm event detention outflow rating table

Rating Table for Circular Orifice - 2

Project Description

Solve For	Discharge

Input Data

Headwater Elevation	3.00	ft
Centroid Elevation	0.750	ft
Tailwater Elevation	0.00	ft
Discharge Coefficient	0.62	
Diameter	18.0	in

Headwater Elevation (ft)	Discharge (ft³/s)	Velocity (ft/s)
0.25		
0.50		
0.75		
1.00	4.4	2.5
1.25	6.2	3.5
1.50	7.5	4.3
1.75	8.7	4.9
2.00	9.7	5.5
2.25	10.7	6.0
2.50	11.5	6.5
2.75	12.3	7.0
3.00	13.1	7.4
3.25	13.8	7.8
3.50	14.5	8.2
3.75	15.1	8.5
4.00	15.7	8.9

1314 N. Angelina Drive Detention & Outflow Summary				
diameter (in)	area (ft2)	length (ft)		Q (cfs) 18" sd orifice
48	12.57	325		
depth in 48" pipe (ft)	area (ft2)	volume (cf)	volume (ac-ft)	
0.25	0.79	255	0.006	1.0
0.50	1.57	511	0.012	2.0
0.75	2.36	766	0.018	3.0
1.00	3.14	1021	0.023	4.4
1.25	3.93	1276	0.029	6.2
1.50	4.71	1532	0.035	7.5
1.75	5.50	1787	0.041	8.7
2.00	6.28	2042	0.047	9.7
2.25	7.07	2297	0.053	10.7
2.50	7.85	2553	0.059	11.5
2.75	8.64	2808	0.064	12.3
3.00	9.42	3063	0.070	13.1
3.25	10.21	3318	0.076	13.8
3.50	11.00	3574	0.082	14.5
3.75	11.78	3829	0.088	15.1
4.00	12.57	4084	0.094	15.7

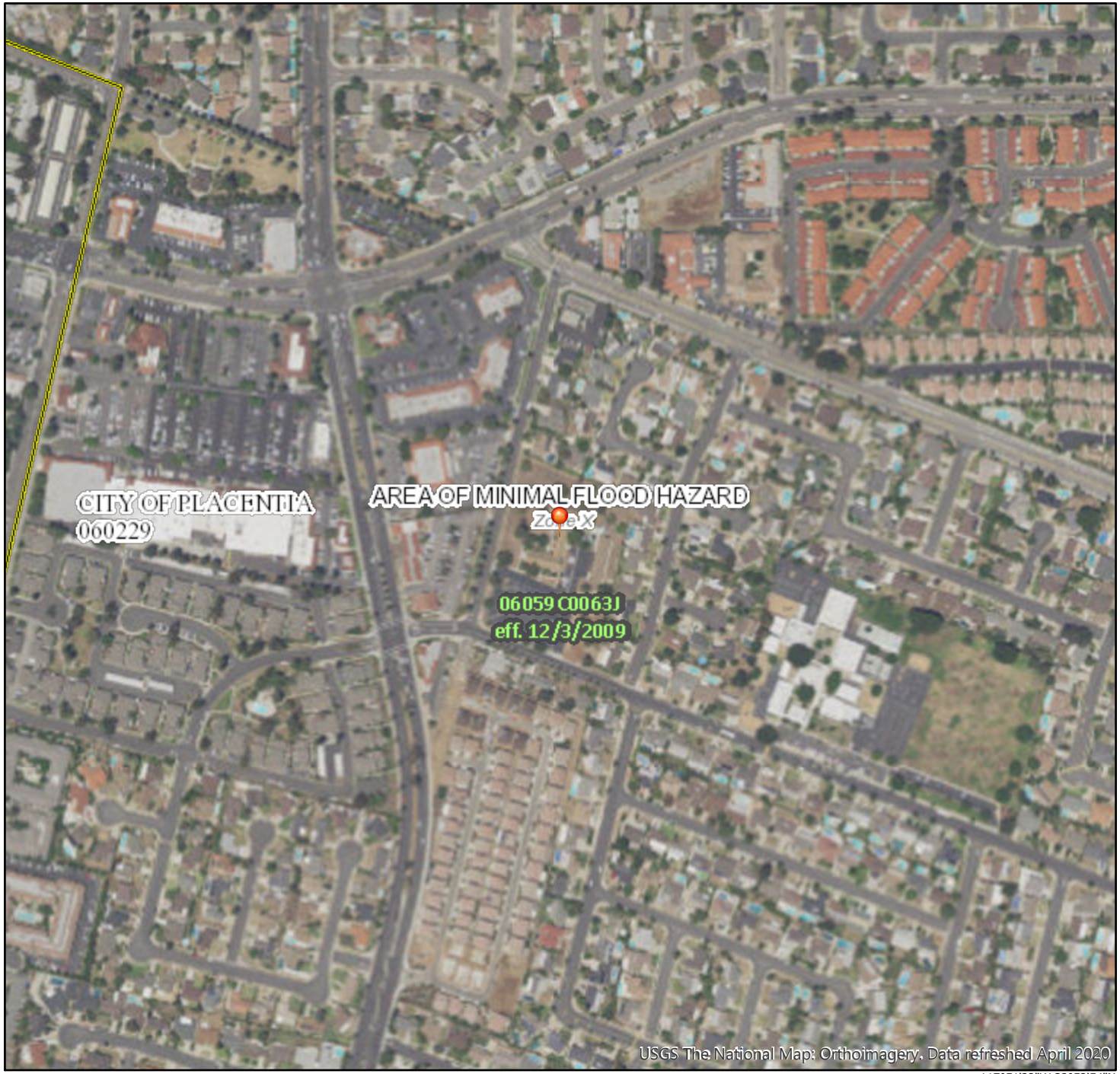
APPENDIX 5

FEMA Map

National Flood Hazard Layer FIRMette

FEMA

117°51'59"W 33°53'24"N



117°51'22"W 33°52'54"N

Feet

0 250 500 1,000 1,500 2,000

1:6,000

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN — Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 — Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- 513 — Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

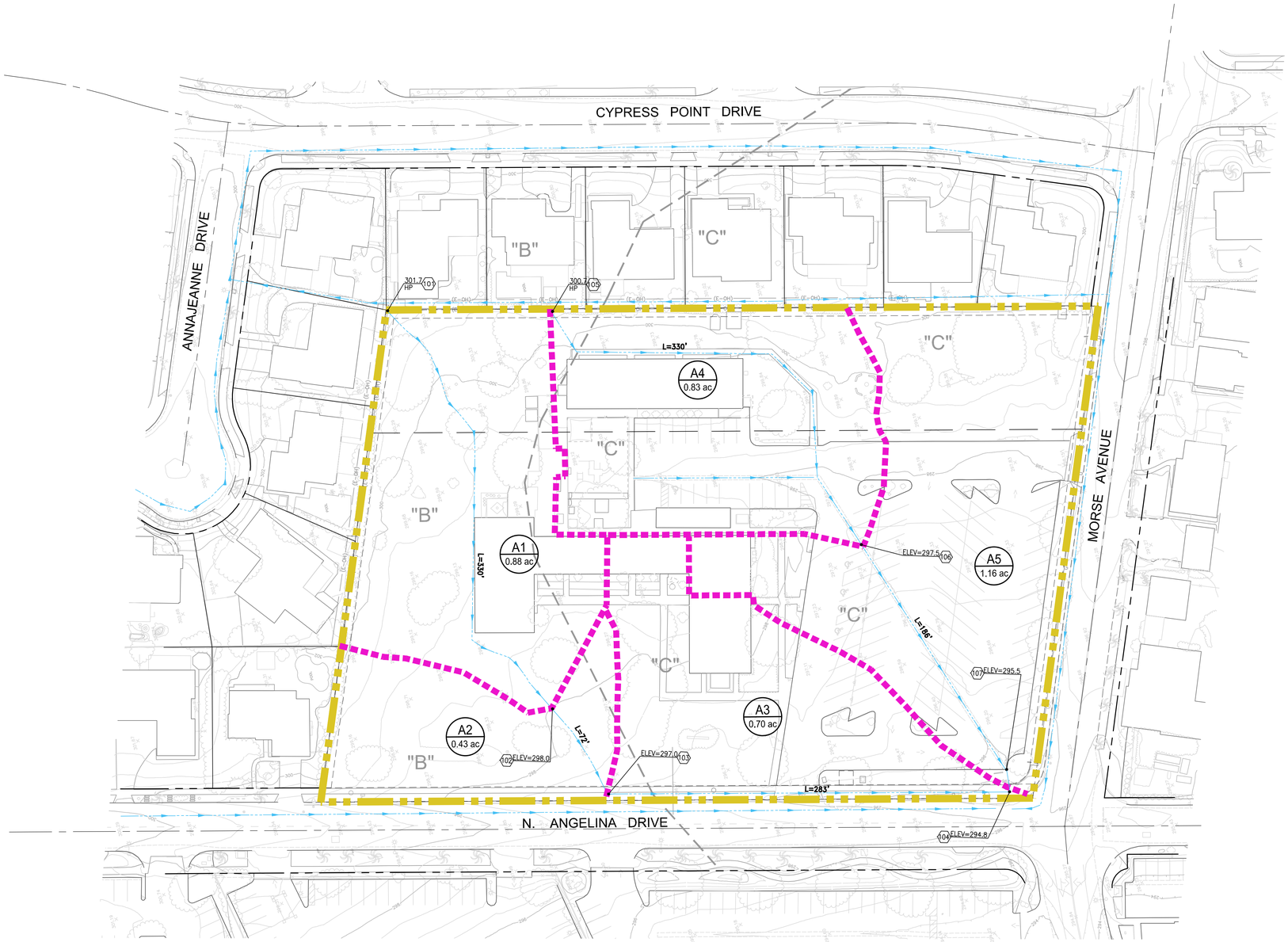
This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 7/6/2020 at 1:20 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

APPENDIX 6

Hydrology Maps



SITE EXISTING CONDITION			
STORM EVENT	Q (CFS)	T_C (MIN)	VOLUME (AC-FT)
2-Year	4.01	11.08	0.27
10-Year	7.67	10.90	0.62
25-Year	9.30	10.82	0.80
100-Year	12.06	10.74	1.20

ASSESSOR PARCEL NO.

340-273-25

SITE ADDRESS

1314 N. ANGELINA DRIVE
PLACENTIA, CALIFORNIA 92870

APPLICANT/OWNER

NATIONAL COMMUNITY RENAISSANCE OF CALIFORNIA
9421 HAVEN AVENUE
RANCHO CUCAMONGA, CA 91730
TEL: (949) 394-7996

CIVIL ENGINEER

FUSCOE ENGINEERING
16795 VON KARMAN, SUITE 100
IRVINE, CA 92606
TEL: 949.474.1960
FAX: 949.474.5315

ABBREVATIONS

AC	ACRE
AC-FT	ACRE-FOOT
CFS	CUBIC FEET PER SECOND
ELEV	ELEVATION
HP	HIGH POINT
L	LENGTH
MIN	MINUTES
Q_2	FLOW RATE - 2-YEAR STORM
S	SLOPE
T_C	TIME OF CONCENTRATION

LEGEND

- DRAINAGE BOUNDARY
- DRAINAGE SUB-BOUNDARY
- XX — NODE
- TIME OF CONCENTRATION FLOW PATH
- L=XXX' — FLOW PATH LENGTH
- XX / X.XXac — DRAINAGE BOUNDARY DESIGNATION AND AREA
- SOIL TYPE DELINEATION

N

40' 0' 20' 40'
SCALE: 1" = 40'

PREPARED BY:
FUSCOE ENGINEERING
16795 Von Karman, Suite 100
Irvine, California 92606
tel 949.474.1960 ◦ fax 949.474.5315
www.fuscoe.com

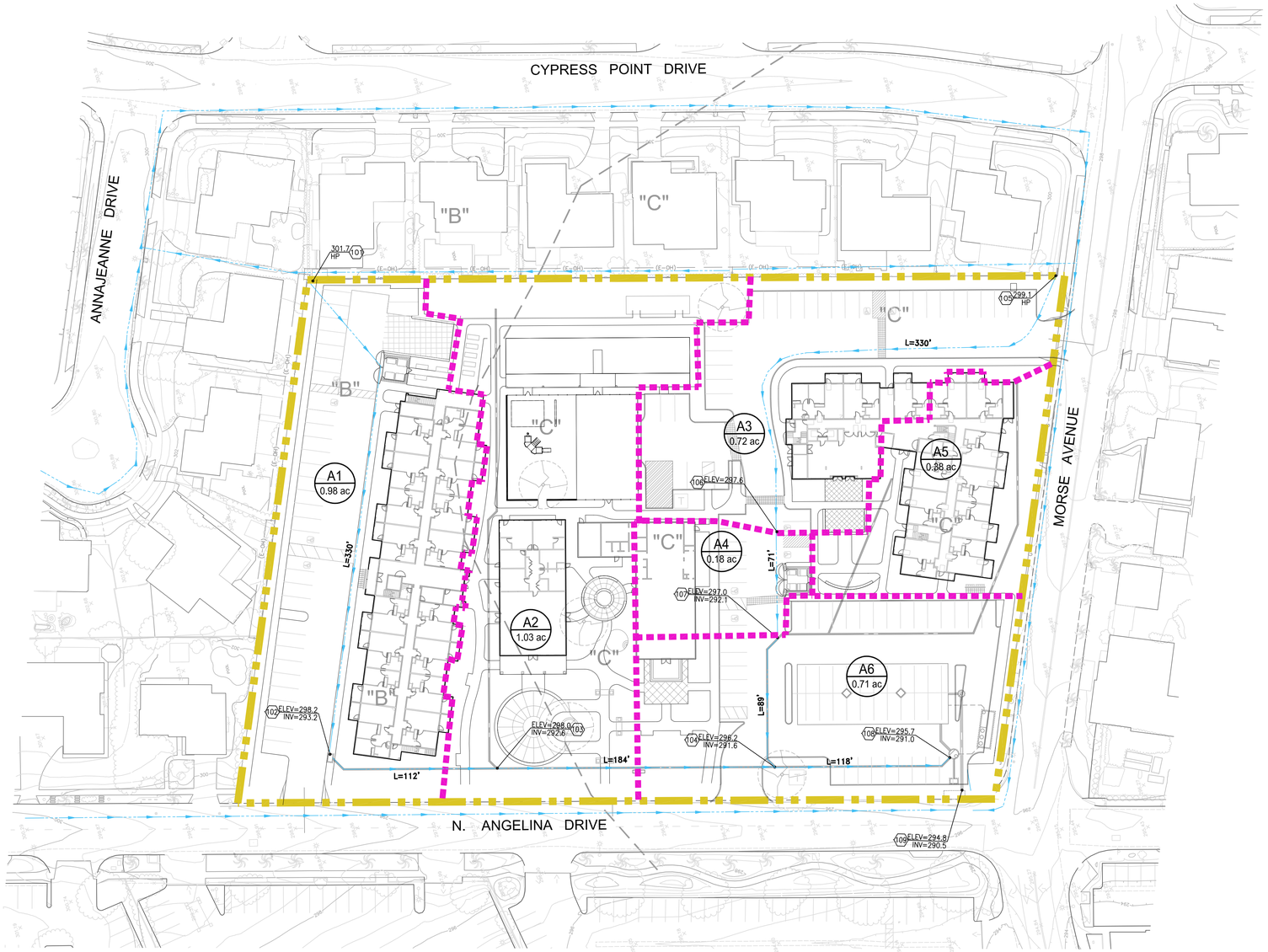
HYDROLOGY MAP
EXISTING CONDITION

PLACENTIA SENIOR HOUSING 1314 N. ANGELINA DRIVE
CITY OF PLACENTIA, CALIFORNIA

PROJECT NO. 1653-010
SHEET 1
OF 1

2020-07-08 | CITY OF PLACENTIA - 1314 N. ANGELINA DRIVE | EXISTING HYDROLOGY MAP | PLAN SET: X

F:\PROJECTS\1653\010_SUPPORT FILES\REPORTS\HYDROLOGY\HYDROLOGY MAPS\1314 N.ANGELINA-PLACENTIA-1653-010-EX.DWG (07-06-20 5:06:30PM) Plotted by: Susan Williams



SITE PROPOSED CONDITION				
STORM EVENT	Q (un-mitigated) (CFS)	Q (mitigated) (CFS)	T_C (MIN)	VOLUME (AC-FT)
2-Year	5.35	4.0	9.52	0.50
10-Year	9.79	7.2	9.27	0.96
25-Year	11.74	8.6	9.22	1.19
100-Year	15.11	10.6	9.12	1.53

ASSESSOR PARCEL NO.

340-273-25

SITE ADDRESS

1314 N. ANGELINA DRIVE
PLACENTIA, CALIFORNIA 92870

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40' 0' 20' 40'
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HYDROLOGY MAP
PROPOSED CONDITION

PLACENTIA SENIOR HOUSING 1314 N. ANGELINA DRIVE
CITY OF PLACENTIA, CALIFORNIA

PROJECT NO. 1653-010
SHEET 1
OF 1

PLAN SET: X
CITY OF PLACENTIA - 1314 N. ANGELINA DRIVE
PROPOSED HYDROLOGY MAP
2020-07-08

F:\PROJECTS\1653\010_SUPPORT FILES\REPORTS\HYDROLOGY\HYDROLOGY MAPS\1314 N ANGELINA-PLACENTIA-1653-010-PRLIMG (07-07-20 9:36:54AM) Plotted by: Susan Williams