TRACT 32535
HYDROLOGY & HYDRAULICS REPORT

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TRACT NO. 32535

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TRACT 32535

Hydrology & Hydraulics
Report

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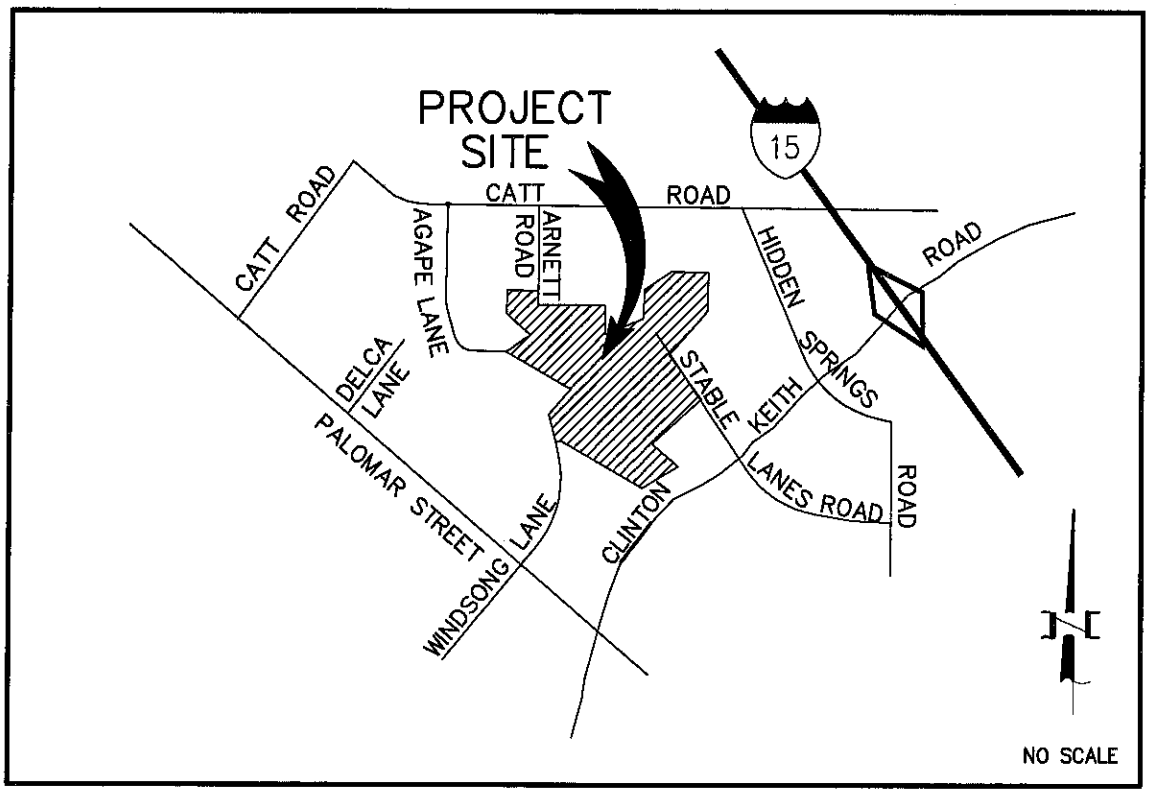

VICINITY MAP

NOT TO SCALE
THOMAS GUIDE 2010
PAGE 927, E-1&2
SEC. 1, T. 7S., R. 4W

PURPOSE

The purpose of this report is to provide hydrologic and hydraulic calculations to support the final design for the onsite storm drain systems proposed for Tentative Tract 32535.

EXISTING CONDITIONS

The site consists of 31.17 acres located within the City Wildomar, County of Riverside, State of California. The site is irregularly shaped and generally located northwesterly of the intersection of Clinton Keith Road and Stable Lane Way. The site is currently occupied by several residential structures to be demolished with this proposed development. The site generally drains southwesterly with waters conveyed via natural defined drainage courses. The site currently receives off site runoff at three locations along it's northeasterly property line. The largest tributary watershed is approximately 150 acres tributary from natural areas North of the 15 Freeway and existing commercial developments South of the freeway along Hidden Springs Road.

PROPOSED CONDITIONS

The project proposes 81 single family residential lots with associated water, sewer, street and storm drain infrastructure. The project will convey all off site runoff through the site without comingling with on site runoff. This will be accomplished by maintaining existing natural drainage courses, by providing public storm drain systems specific to on and off site flows and by providing culverts where natural drainage courses cross proposed streets. The project provides for emergency overflow should clogging occur at the Arnett / Crystal Way sump by providing redundant catch basins at this location. Additional catch basin capacity is available in adjacent facilities should it be needed due to clogging at a single basin.

This hydrology report is based on build out of the City of Wildomar Zoning Plan as well as the proposed on site development density. The calculated Q100 at the downstream point of connection to existing Tract 31353 improvements is 330.4 cfs, 2.3 cfs less than the design Q100 for the 31353 storm drain. The proposed onsite watershed to this point includes a 1.7 acre diversion toward the 31353 system and away from natural water courses and residential properties along Clinton Keith Road. See Diversion Map located in Appendix I. The preservation of open space within TTM 32535 likely contributed to the overall reduction in Q100 to this point of connection in the existing 31353 system. In addition, the storm drain design for Tract 31353 was reviewed during the course of the Tract 32535 plan preparation, hydrologic and hydraulic report development and was found to have be designed in accordance with common engineering practice and was determined to provide an adequate means of storm water discharge to the Wildomar Channel. This minor diversion has been approved by the City and the Flood Control District. The calculated Q100 at the projects downstream point of connection to existing Tract 31837 improvements is 22.1 cfs, 1.1 cfs less than the design Q100 for the 31837 storm drain. Q100 at the Stable Lanes Road culvert is 99.4 cfs. Runoff downstream of this culvert will be slightly reduced (approximately 4 cfs) by the diversion described above.

Note that the City of Wildomar General Plan now includes upstream parcels of higher density than the Zoning Plan. Per agreement with the City of Wildomar and Riverside County Flood Control, detention of the incremental increase in runoff by those parcels benefitting from higher density will provide appropriate mitigation for future flows and this increase in density will not affect current design and existing downstream capacities.

To meet NPDES requirements, on site runoff for first flush runoff (85th percentile) will be conveyed through public street improvements and on site storm drain systems to either an infiltration basin or extended detention basin proposed on site. Runoff in excess of first flush will be routed to an existing publicly maintained storm drain systems. Associated water quality information and calculations are provided in the Water Quality Management Plan prepared by MDS Consulting.

HYDROLOGY

The following preliminary hydrologic calculations within this report have been prepared using 2006 AES Rational Method software for Riverside County. Hydrologic variables include "B" "C" and "D" soil types. Rainfall intensities as follows: 10 yr - 10 min. = 2.32, 10 yr – 60 min. = 0.98, 100 yr – 10 min. = 3.54, 100 yr – 60 min. = 1.50. Calculations have been prepared for both the 10 and 100 year events.

HYDRAULIC

Street capacities have been calculated using Advance Engineering Software's (AES) Hydraulic Element II Package (HELE II), copyright 2006, version 13.0. This has been acceptable to Riverside County Department of Transportation and Riverside County Flood Control and Water Conservation District. The calculations included in this report and located on Appendix C.

Catch basin capacities have been calculated using Advance Engineering Software's (AES) Hydraulic Element I Package (HELE I), copyright 2006, version 13.0, for both on-grade (flowby) and sump (sag) catch basins. This has been acceptable to Riverside County Department of Transportation and Riverside County Flood Control and Water Conservation District. The calculations included in this report and located on Appendix D.

CONCLUSIONS

Based on the following hydrologic calculations, we conclude that the proposed project can be successfully protected from offsite flows from the north and that the project will have negligible impact on adjacent hydrologic an hydraulic conditions. Additionally we conclude that the proposed on site storm drain system will provide adequate conveyance for onsite runoff.

Appendix A-1

RATIONAL METHOD CALCULATION
ON-SITE
10 - YEAR STORM

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```
****************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
       RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                  (RCFC&WCD)  1978 HYDROLOGY MANUAL
        (c) Copyright 1982-2006 Advanced Engineering Software (aes)
                  (Rational Tabling Version 6.0D)
               Release Date: 06/01/2005  License ID 1269

                       Analysis prepared by:

                          MDS Consulting
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              Phone: (949) 251-8821    Fax: (949) 251-0516
                  Email: mdsirvine@mdsconsulting.net

 ************************** DESCRIPTION OF STUDY **************************
* TRACT 32535                                                              *
* ON-SITE HYDROLOGY STUDY                                                  *
* Q10 FREQUENCY                                                            *
 ****************************************************************************

  FILE NAME: C:\AES2006\HYDROSFT\RATSCX\32535\32535.10
  TIME/DATE OF STUDY: 09:49 12/11/2013
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.320
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.980
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  3.540
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.500
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.4809628
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.4792280
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =   10.00   1-HOUR INTENSITY(INCH/HOUR) =   0.990
  SLOPE OF INTENSITY DURATION CURVE = 0.4810
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   18.0     13.0    0.020/0.020/0.020   0.50    2.00 0.0313 0.125 0.0150
  2   20.0     15.0    0.020/0.020/0.020   0.50    2.00 0.0313 0.125 0.0150
  3   14.0      9.0    0.020/0.020/0.020   0.50    2.00 0.0313 0.125 0.0150

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

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    101.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
```

```
  TC(MIN) =  11.78   RAIN INTENSITY(INCH/HOUR) =  2.17
  TOTAL AREA(ACRES) =      5.50   TOTAL RUNOFF(CFS) =       9.80

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE     13.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1278.70  DOWNSTREAM(FEET) =  1276.85
  FLOW LENGTH(FEET) =    39.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.21
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.80
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =  11.83
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     13.00 =    39.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.161
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8232
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =     0.60   SUBAREA RUNOFF(CFS) =     1.07
  TOTAL AREA(ACRES) =       6.10   TOTAL RUNOFF(CFS) =   10.87
  TC(MIN.) =  11.83

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1276.85  DOWNSTREAM(FEET) =  1271.25
  FLOW LENGTH(FEET) =   422.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.58
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.87
  PIPE TRAVEL TIME(MIN.) =   0.93    Tc(MIN.) =  12.76
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     14.00 =   461.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS SINGLE FAMILY (1/4 ACRE)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   273.00
  UPSTREAM ELEVATION(FEET) =   1287.20
  DOWNSTREAM ELEVATION(FEET) =   1279.68
  ELEVATION DIFFERENCE(FEET) =      7.52
```

```
  TC = 0.393*[(  273.00**3)/(     7.52)]**.2 =    7.593
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.675
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8359
  SOIL CLASSIFICATION IS "D"
  SUBAREA RUNOFF(CFS) =      2.68
  TOTAL AREA(ACRES) =      1.20   TOTAL RUNOFF(CFS) =      2.68

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.675
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .7734
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    0.20   SUBAREA RUNOFF(CFS) =    0.41
  TOTAL AREA(ACRES) =      1.40   TOTAL RUNOFF(CFS) =    3.10
  TC(MIN.) =   7.59

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.675
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8177
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.30   SUBAREA RUNOFF(CFS) =    0.66
  TOTAL AREA(ACRES) =      1.70   TOTAL RUNOFF(CFS) =    3.75
  TC(MIN.) =   7.59

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1277.30  DOWNSTREAM(FEET) =  1277.00
  FLOW LENGTH(FEET) =    59.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.16
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      3.75
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =   7.83
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =   332.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.636
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7701
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.20   SUBAREA RUNOFF(CFS) =    0.41
  TOTAL AREA(ACRES) =      1.90   TOTAL RUNOFF(CFS) =    4.16
  TC(MIN.) =   7.83

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     14.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1273.09  DOWNSTREAM(FEET) =  1271.25
  FLOW LENGTH(FEET) =    34.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.13
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.16
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   7.89
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     14.00 =   366.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
==============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF     Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1         4.16     7.89       2.627        1.90
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     14.00 =   366.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF     Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1        10.87    12.76       2.084        6.10
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     14.00 =   461.00 FEET.

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

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
     1      10.87       7.89       2.627
     2      14.17      12.76       2.084

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     14.17   Tc(MIN.) =   12.76
  TOTAL AREA(ACRES) =       8.00

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
==============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1271.25  DOWNSTREAM(FEET) =  1267.15
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.77
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.17
```

```
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =  12.86
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     15.00 =   541.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS SINGLE FAMILY (1/4 ACRE)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   997.00
  UPSTREAM ELEVATION(FEET) =   1292.00
  DOWNSTREAM ELEVATION(FEET) =   1266.32
  ELEVATION DIFFERENCE(FEET) =     25.68
  TC = 0.393*[(  997.00**3)/(    25.68)]**.2 =   12.920
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.072
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .7489
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      2.02
  TOTAL AREA(ACRES) =      1.30   TOTAL RUNOFF(CFS) =      2.02

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.072
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .7991
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.60   SUBAREA RUNOFF(CFS) =    0.99
  TOTAL AREA(ACRES) =      1.90   TOTAL RUNOFF(CFS) =    3.01
  TC(MIN.) =  12.92

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.072
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8205
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    1.60   SUBAREA RUNOFF(CFS) =    2.72
  TOTAL AREA(ACRES) =      3.50   TOTAL RUNOFF(CFS) =    5.73
  TC(MIN.) =  12.92

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =  12.92
  RAINFALL INTENSITY(INCH/HR) =   2.07
  TOTAL STREAM AREA(ACRES) =     3.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.73

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
```

```
        DEVELOPMENT IS SINGLE FAMILY (1/4 ACRE)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1000.00
  UPSTREAM ELEVATION(FEET) =   1291.70
  DOWNSTREAM ELEVATION(FEET) =   1266.32
  ELEVATION DIFFERENCE(FEET) =     25.38
  TC = 0.393*[( 1000.00**3)/(    25.38)]**.2 =   12.973
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.067
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8204
  SOIL CLASSIFICATION IS "D"
  SUBAREA RUNOFF(CFS) =      3.05
  TOTAL AREA(ACRES) =      1.80   TOTAL RUNOFF(CFS) =      3.05

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.067
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .7487
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    0.60   SUBAREA RUNOFF(CFS) =    0.93
  TOTAL AREA(ACRES) =      2.40   TOTAL RUNOFF(CFS) =    3.98
  TC(MIN.) =  12.97

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.067
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .7989
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    0.66
  TOTAL AREA(ACRES) =      2.80   TOTAL RUNOFF(CFS) =    4.64
  TC(MIN.) =  12.97

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     21.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1261.80  DOWNSTREAM(FEET) =  1259.12
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.50
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      4.64
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =  13.01
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     21.00 =  1030.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =  13.01
  RAINFALL INTENSITY(INCH/HR) =   2.06
  TOTAL STREAM AREA(ACRES) =     2.80
```

```
PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.64

** CONFLUENCE DATA **
STREAM     RUNOFF      Tc       INTENSITY      AREA
NUMBER      (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
    1        5.73    12.92        2.072         3.50
    2        4.64    13.01        2.064         2.80

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

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

** PEAK FLOW RATE TABLE **
STREAM     RUNOFF      Tc       INTENSITY
NUMBER      (CFS)    (MIN.)    (INCH/HOUR)
    1       10.34    12.92       2.072
    2       10.35    13.01       2.064

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =     10.34   Tc(MIN.) =   12.92
TOTAL AREA(ACRES) =      6.30
LONGEST FLOWPATH FROM NODE     30.00 TO NODE     21.00 =  1030.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =  1259.12  DOWNSTREAM(FEET) =  1247.06
FLOW LENGTH(FEET) =   306.00   MANNING'S N =  0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  11.55
ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =     10.34
PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =  13.36
LONGEST FLOWPATH FROM NODE     30.00 TO NODE     22.00 =  1336.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =  13.36
RAINFALL INTENSITY(INCH/HR) =   2.04
TOTAL STREAM AREA(ACRES) =      6.30
PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.34

****************************************************************************
FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS SINGLE FAMILY (1/4 ACRE)
TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
```

```
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1000.00
  UPSTREAM ELEVATION(FEET) =   1280.60
  DOWNSTREAM ELEVATION(FEET) =   1252.19
  ELEVATION DIFFERENCE(FEET) =     28.41
  TC = 0.393*[( 1000.00**3)/(    28.41)]**.2 =   12.684
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.090
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .7497
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      7.52
  TOTAL AREA(ACRES) =      4.80   TOTAL RUNOFF(CFS) =      7.52

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.090
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .7497
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    2.10   SUBAREA RUNOFF(CFS) =    3.29
  TOTAL AREA(ACRES) =      6.90   TOTAL RUNOFF(CFS) =   10.81
  TC(MIN.) =  12.68

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     22.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1247.91  DOWNSTREAM(FEET) =  1247.06
  FLOW LENGTH(FEET) =    62.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.68
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     10.81
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =  12.82
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     22.00 =  1062.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =  12.82
  RAINFALL INTENSITY(INCH/HR) =   2.08
  TOTAL STREAM AREA(ACRES) =     6.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.81

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
     1        10.34    13.36       2.038         6.30
     2        10.81    12.82       2.079         6.90

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

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
```

```
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1        20.73    12.82       2.079
     2        20.94    13.36       2.038

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     20.73   Tc(MIN.) =   12.82
  TOTAL AREA(ACRES) =     13.20
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     22.00 =  1336.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1247.06  DOWNSTREAM(FEET) =  1246.94
  FLOW LENGTH(FEET) =    36.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.32
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     20.73
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =  12.93
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     23.00 =  1372.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     51.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS SINGLE FAMILY (1/4 ACRE)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  750.00
  UPSTREAM ELEVATION(FEET) =   1260.80
  DOWNSTREAM ELEVATION(FEET) =   1251.66
  ELEVATION DIFFERENCE(FEET) =      9.14
  TC = 0.393*[(  750.00**3)/(     9.14)]**.2 =   13.391
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.036
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .7471
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      4.41
  TOTAL AREA(ACRES) =      2.90   TOTAL RUNOFF(CFS) =      4.41

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     51.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.036
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .7471
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    0.76
  TOTAL AREA(ACRES) =      3.40   TOTAL RUNOFF(CFS) =    5.17
  TC(MIN.) =  13.39
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     23.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1247.15  DOWNSTREAM(FEET) =  1246.94
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.92
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      5.17
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =  13.45
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     23.00 =   770.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =  13.45
  RAINFALL INTENSITY(INCH/HR) =   2.03
  TOTAL STREAM AREA(ACRES) =     3.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.17

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     60.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS SINGLE FAMILY (1/4 ACRE)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   712.00
  UPSTREAM ELEVATION(FEET) =   1285.00
  DOWNSTREAM ELEVATION(FEET) =   1267.74
  ELEVATION DIFFERENCE(FEET) =     17.26
  TC = 0.393*[(  712.00**3)/(    17.26)]**.2 =   11.430
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.197
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .7547
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      2.82
  TOTAL AREA(ACRES) =      1.70   TOTAL RUNOFF(CFS) =      2.82

****************************************************************************
  FLOW PROCESS FROM NODE     60.10 TO NODE     60.10 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.197
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8243
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    1.40   SUBAREA RUNOFF(CFS) =    2.54
  TOTAL AREA(ACRES) =      3.10   TOTAL RUNOFF(CFS) =    5.36
  TC(MIN.) =  11.43

****************************************************************************
  FLOW PROCESS FROM NODE     60.10 TO NODE     61.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) = 1267.74  DOWNSTREAM ELEVATION(FEET) = 1251.66
  STREET LENGTH(FEET) =   548.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 14.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  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) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.11
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   11.43
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.20
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.45
  STREET FLOW TRAVEL TIME(MIN.) =   2.17   Tc(MIN.) =  13.60
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.021
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .7464
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =     1.00      SUBAREA RUNOFF(CFS) =     1.51
  TOTAL AREA(ACRES) =       4.10        PEAK FLOW RATE(CFS) =       6.86

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  12.00
  FLOW VELOCITY(FEET/SEC.) =  4.33   DEPTH*VELOCITY(FT*FT/SEC.) =   1.54
  LONGEST FLOWPATH FROM NODE     60.00 TO NODE     61.00 =  1260.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     61.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.021
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .7464
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =     0.40   SUBAREA RUNOFF(CFS) =     0.60
  TOTAL AREA(ACRES) =       4.50   TOTAL RUNOFF(CFS) =     7.47
  TC(MIN.) =  13.60

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     61.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.021
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8189
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =     0.30   SUBAREA RUNOFF(CFS) =     0.50
  TOTAL AREA(ACRES) =       4.80   TOTAL RUNOFF(CFS) =     7.96
  TC(MIN.) =  13.60

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     23.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1247.63  DOWNSTREAM(FEET) =  1246.94
```

```
FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   8.84
ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =       7.96
PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =  13.66
LONGEST FLOWPATH FROM NODE     60.00 TO NODE     23.00 =  1290.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =  13.66
RAINFALL INTENSITY(INCH/HR) =   2.02
TOTAL STREAM AREA(ACRES) =     4.80
PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.96

** CONFLUENCE DATA **
STREAM     RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1        5.17    13.45       2.032         3.40
    2        7.96    13.66       2.017         4.80

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

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

** PEAK FLOW RATE TABLE **
STREAM     RUNOFF      Tc      INTENSITY
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1       13.01    13.45       2.032
    2       13.10    13.66       2.017

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =     13.10   Tc(MIN.) =   13.66
TOTAL AREA(ACRES) =      8.20
LONGEST FLOWPATH FROM NODE     60.00 TO NODE     23.00 =  1290.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  11
----------------------------------------------------------------------------
>>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

** MAIN STREAM CONFLUENCE DATA **
STREAM     RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1       13.10    13.66       2.017         8.20
LONGEST FLOWPATH FROM NODE     60.00 TO NODE     23.00 =  1290.00 FEET.

** MEMORY BANK #  2 CONFLUENCE DATA **
STREAM     RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1       20.73    12.93       2.071        13.20
```

```
 LONGEST FLOWPATH FROM NODE     30.00 TO NODE     23.00 =  1372.00 FEET.

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

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc       INTENSITY
 NUMBER     (CFS)     (MIN.)    (INCH/HOUR)
    1       33.13      12.93        2.071
    2       33.29      13.66        2.017

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     33.13   Tc(MIN.) =   12.93
 TOTAL AREA(ACRES) =     21.40

****************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1246.94  DOWNSTREAM(FEET) =  1246.56
 FLOW LENGTH(FEET) =   125.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  27.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.76
 ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     33.13
 PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =  13.29
 LONGEST FLOWPATH FROM NODE     30.00 TO NODE     24.00 =  1497.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =  13.29
 RAINFALL INTENSITY(INCH/HR) =   2.04
 TOTAL STREAM AREA(ACRES) =    21.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     33.13

****************************************************************************
 FLOW PROCESS FROM NODE     70.00 TO NODE     70.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS SINGLE FAMILY (1/4 ACRE)
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   384.00
 UPSTREAM ELEVATION(FEET) =   1285.20
 DOWNSTREAM ELEVATION(FEET) =   1268.82
 ELEVATION DIFFERENCE(FEET) =     16.38
 TC = 0.393*[(  384.00**3)/(    16.38)]**.2 =    7.974
```

```
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.613
 SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .7712
 SOIL CLASSIFICATION IS "B"
 SUBAREA RUNOFF(CFS) =       1.81
 TOTAL AREA(ACRES) =       0.90   TOTAL RUNOFF(CFS) =       1.81

****************************************************************************
 FLOW PROCESS FROM NODE     70.10 TO NODE     70.10 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.613
 SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8346
 SOIL CLASSIFICATION IS "D"
 SUBAREA AREA(ACRES) =     0.10   SUBAREA RUNOFF(CFS) =     0.22
 TOTAL AREA(ACRES) =       1.00   TOTAL RUNOFF(CFS) =     2.03
 TC(MIN.) =   7.97

****************************************************************************
 FLOW PROCESS FROM NODE     70.10 TO NODE     71.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) = 1268.82  DOWNSTREAM ELEVATION(FEET) = 1252.40
 STREET LENGTH(FEET) =   438.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 14.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
 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) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.34
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.25
   HALFSTREET FLOOD WIDTH(FEET) =    6.86
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.78
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.96
 STREET FLOW TRAVEL TIME(MIN.) =   1.93   Tc(MIN.) =   9.90
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.354
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8723
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =     0.30      SUBAREA RUNOFF(CFS) =     0.62
 TOTAL AREA(ACRES) =       1.30        PEAK FLOW RATE(CFS) =       2.65

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   7.36
 FLOW VELOCITY(FEET/SEC.) =  3.85   DEPTH*VELOCITY(FT*FT/SEC.) =   1.01
 LONGEST FLOWPATH FROM NODE     70.00 TO NODE     71.00 =   822.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     71.00 TO NODE     24.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1247.91  DOWNSTREAM(FEET) =  1246.56
 FLOW LENGTH(FEET) =    14.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
```

```
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.91
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.65
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   9.93
  LONGEST FLOWPATH FROM NODE     70.00 TO NODE     24.00 =   836.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 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.) =   9.93
  RAINFALL INTENSITY(INCH/HR) =   2.35
  TOTAL STREAM AREA(ACRES) =     1.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.65

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
     1       33.13    13.29        2.043        21.40
     2        2.65     9.93        2.352         1.30

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

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       27.38     9.93       2.352
     2       35.43    13.29       2.043

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     35.43   Tc(MIN.) =   13.29
  TOTAL AREA(ACRES) =     22.70
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     24.00 =  1497.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1246.56  DOWNSTREAM(FEET) =  1245.10
  FLOW LENGTH(FEET) =  108.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  19.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.42
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     35.43
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =  13.47
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     25.00 =  1605.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.031
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .5937
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =     0.20   SUBAREA RUNOFF(CFS) =     0.24
  TOTAL AREA(ACRES) =      22.90   TOTAL RUNOFF(CFS) =    35.67
  TC(MIN.) =  13.47

******************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.031
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7384
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =     0.60   SUBAREA RUNOFF(CFS) =     0.90
  TOTAL AREA(ACRES) =      23.50   TOTAL RUNOFF(CFS) =    36.57
  TC(MIN.) =  13.47

******************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1245.10  DOWNSTREAM(FEET) =  1245.00
  FLOW LENGTH(FEET) =     34.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  27.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.89
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      36.57
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =  13.56
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     26.00 =  1639.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     26.00 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =  13.56
  RAINFALL INTENSITY(INCH/HR) =   2.02
  TOTAL STREAM AREA(ACRES) =    23.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     36.57

******************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =   7
------------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
==============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  26.02   RAIN INTENSITY(INCH/HOUR) =  1.48
  TOTAL AREA(ACRES) =   159.70   TOTAL RUNOFF(CFS) =    171.20

******************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE     26.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1246.00  DOWNSTREAM(FEET) =  1245.00
```

```
  FLOW LENGTH(FEET) =   111.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  41.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.01
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =    171.20
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =  26.16
  LONGEST FLOWPATH FROM NODE     70.00 TO NODE     26.00 =   947.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     26.00 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.) =  26.16
  RAINFALL INTENSITY(INCH/HR) =   1.48
  TOTAL STREAM AREA(ACRES) =   159.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    171.20

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
     1       36.57    13.56        2.024         23.50
     2      171.20    26.16        1.475        159.70

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

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc       INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1      125.32    13.56       2.024
     2      197.86    26.16       1.475

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    197.86   Tc(MIN.) =   26.16
  TOTAL AREA(ACRES) =    183.20
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     26.00 =  1639.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =    183.20  TC(MIN.) =     26.16
  PEAK FLOW RATE(CFS)    =    197.86
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Appendix A-2

RATIONAL METHOD CALCULATION
ON-SITE
100 - YEAR STORM

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

```
****************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
       RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                  (RCFC&WCD)  1978 HYDROLOGY MANUAL
        (c) Copyright 1982-2006 Advanced Engineering Software (aes)
                  (Rational Tabling Version 6.0D)
               Release Date: 06/01/2005  License ID 1269

                       Analysis prepared by:

                          MDS Consulting
           17320 Redhill Avenue, Suite 350, Irvine, CA 92614
              Phone: (949) 251-8821    Fax: (949) 251-0516
                 Email: mdsirvine@mdsconsulting.net

 ************************** DESCRIPTION OF STUDY **************************
* TRACT 32535                                                              *
* ON-SITE HYDROLOGY STUDY                                                  *
* Q100 FREQUENCY                                                           *
 ****************************************************************************

  FILE NAME: C:\AES2006\HYDROSFT\RATSCX\32535\32535.100
  TIME/DATE OF STUDY: 09:36 12/11/2013
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.320
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.980
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  3.540
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.500
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.4809628
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.4792280
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.500
  SLOPE OF INTENSITY DURATION CURVE = 0.4792
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   18.0     13.0    0.020/0.020/0.020   0.50    2.00 0.0313 0.125 0.0150
  2   20.0     15.0    0.020/0.020/0.020   0.50    2.00 0.0313 0.125 0.0150
  3   14.0      9.0    0.020/0.020/0.020   0.50    2.00 0.0313 0.125 0.0150

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

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    101.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
```

```
  TC(MIN) =  11.78   RAIN INTENSITY(INCH/HOUR) =  3.27
  TOTAL AREA(ACRES) =      5.50   TOTAL RUNOFF(CFS) =      15.30

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE     13.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1278.70  DOWNSTREAM(FEET) =  1276.85
  FLOW LENGTH(FEET) =    39.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.59
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     15.30
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =  11.83
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     13.00 =    39.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.266
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8461
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =     0.60   SUBAREA RUNOFF(CFS) =     1.66
  TOTAL AREA(ACRES) =       6.10   TOTAL RUNOFF(CFS) =   16.96
  TC(MIN.) =  11.83

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1276.85  DOWNSTREAM(FEET) =  1271.25
  FLOW LENGTH(FEET) =   422.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.42
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     16.96
  PIPE TRAVEL TIME(MIN.) =   0.84    Tc(MIN.) =  12.66
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     14.00 =   461.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS SINGLE FAMILY (1/4 ACRE)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   273.00
  UPSTREAM ELEVATION(FEET) =   1287.20
  DOWNSTREAM ELEVATION(FEET) =   1279.68
  ELEVATION DIFFERENCE(FEET) =      7.52
  TC = 0.393*[(  273.00**3)/(     7.52)]**.2 =    7.593
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.039
SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8554
SOIL CLASSIFICATION IS "D"
SUBAREA RUNOFF(CFS) =      4.15
TOTAL AREA(ACRES) =      1.20   TOTAL RUNOFF(CFS) =      4.15

****************************************************************************
FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.039
SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8073
SOIL CLASSIFICATION IS "B"
SUBAREA AREA(ACRES) =    0.20   SUBAREA RUNOFF(CFS) =    0.65
TOTAL AREA(ACRES) =      1.40   TOTAL RUNOFF(CFS) =    4.80
TC(MIN.) =   7.59

****************************************************************************
FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.039
SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8419
SOIL CLASSIFICATION IS "C"
SUBAREA AREA(ACRES) =    0.30   SUBAREA RUNOFF(CFS) =    1.02
TOTAL AREA(ACRES) =      1.70   TOTAL RUNOFF(CFS) =    5.82
TC(MIN.) =   7.59

****************************************************************************
FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =  1277.30  DOWNSTREAM(FEET) =  1277.00
FLOW LENGTH(FEET) =    59.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   4.59
ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      5.82
PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =   7.81
LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =   332.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.986
UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .8097
SOIL CLASSIFICATION IS "D"
SUBAREA AREA(ACRES) =    0.20   SUBAREA RUNOFF(CFS) =    0.65
TOTAL AREA(ACRES) =      1.90   TOTAL RUNOFF(CFS) =    6.46
TC(MIN.) =   7.81

****************************************************************************
FLOW PROCESS FROM NODE     12.00 TO NODE     14.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =  1273.09  DOWNSTREAM(FEET) =  1271.25
```

```
  FLOW LENGTH(FEET) =    34.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.46
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.46
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   7.86
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     14.00 =   366.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF     Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1        6.46     7.86       3.974        1.90
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     14.00 =   366.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF     Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1       16.96    12.66       3.161        6.10
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     14.00 =   461.00 FEET.

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

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)    (INCH/HOUR)
     1      16.99       7.86        3.974
     2      22.10      12.66        3.161

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     22.10   Tc(MIN.) =   12.66
  TOTAL AREA(ACRES) =       8.00

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1271.25  DOWNSTREAM(FEET) =  1267.15
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.93
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.10
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =  12.75
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     15.00 =   541.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS SINGLE FAMILY (1/4 ACRE)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   997.00
  UPSTREAM ELEVATION(FEET) =   1292.00
  DOWNSTREAM ELEVATION(FEET) =   1266.32
  ELEVATION DIFFERENCE(FEET) =     25.68
  TC = 0.393*[(  997.00**3)/(    25.68)]**.2 =   12.920
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.131
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .7872
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      3.20
  TOTAL AREA(ACRES) =      1.30   TOTAL RUNOFF(CFS) =      3.20

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.131
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8277
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.60   SUBAREA RUNOFF(CFS) =    1.56
  TOTAL AREA(ACRES) =      1.90   TOTAL RUNOFF(CFS) =    4.76
  TC(MIN.) =  12.92

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.131
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8441
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    1.60   SUBAREA RUNOFF(CFS) =    4.23
  TOTAL AREA(ACRES) =      3.50   TOTAL RUNOFF(CFS) =    8.99
  TC(MIN.) =  12.92

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =  12.92
  RAINFALL INTENSITY(INCH/HR) =   3.13
  TOTAL STREAM AREA(ACRES) =      3.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.99

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS SINGLE FAMILY (1/4 ACRE)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1000.00
```

```
  UPSTREAM ELEVATION(FEET) =   1291.70
  DOWNSTREAM ELEVATION(FEET) =   1266.32
  ELEVATION DIFFERENCE(FEET) =     25.38
  TC = 0.393*[( 1000.00**3)/(    25.38)]**.2 =   12.973
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.125
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8440
  SOIL CLASSIFICATION IS "D"
  SUBAREA RUNOFF(CFS) =      4.75
  TOTAL AREA(ACRES) =      1.80   TOTAL RUNOFF(CFS) =      4.75

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.125
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .7870
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    0.60   SUBAREA RUNOFF(CFS) =    1.48
  TOTAL AREA(ACRES) =      2.40   TOTAL RUNOFF(CFS) =    6.22
  TC(MIN.) =  12.97

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.125
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8276
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    1.03
  TOTAL AREA(ACRES) =      2.80   TOTAL RUNOFF(CFS) =    7.26
  TC(MIN.) =  12.97

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     21.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1261.80  DOWNSTREAM(FEET) =  1259.12
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.19
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      7.26
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =  13.01
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     21.00 =  1030.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =  13.01
  RAINFALL INTENSITY(INCH/HR) =   3.12
  TOTAL STREAM AREA(ACRES) =     2.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.26

  ** CONFLUENCE DATA **
```

```
 STREAM     RUNOFF      Tc      INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1         8.99    12.92       3.131         3.50
    2         7.26    13.01       3.121         2.80

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

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1        16.20    12.92       3.131
    2        16.22    13.01       3.121

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     16.20   Tc(MIN.) =   12.92
 TOTAL AREA(ACRES) =      6.30
 LONGEST FLOWPATH FROM NODE     30.00 TO NODE     21.00 =  1030.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1259.12  DOWNSTREAM(FEET) =  1247.06
 FLOW LENGTH(FEET) =   306.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.77
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     16.20
 PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =  13.32
 LONGEST FLOWPATH FROM NODE     30.00 TO NODE     22.00 =  1336.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =  13.32
 RAINFALL INTENSITY(INCH/HR) =   3.09
 TOTAL STREAM AREA(ACRES) =     6.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     16.20

****************************************************************************
 FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS SINGLE FAMILY (1/4 ACRE)
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH(FEET) =  1000.00
 UPSTREAM ELEVATION(FEET) =   1280.60
 DOWNSTREAM ELEVATION(FEET) =   1252.19
 ELEVATION DIFFERENCE(FEET) =     28.41
```

```
  TC = 0.393*[( 1000.00**3)/(    28.41)]**.2 =   12.684
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.159
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .7879
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =     11.95
  TOTAL AREA(ACRES) =      4.80   TOTAL RUNOFF(CFS) =     11.95

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.159
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .7879
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    2.10   SUBAREA RUNOFF(CFS) =    5.23
  TOTAL AREA(ACRES) =      6.90   TOTAL RUNOFF(CFS) =   17.17
  TC(MIN.) =  12.68

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     22.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1247.91  DOWNSTREAM(FEET) =  1247.06
  FLOW LENGTH(FEET) =    62.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.55
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     17.17
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =  12.80
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     22.00 =  1062.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =  12.80
  RAINFALL INTENSITY(INCH/HR) =   3.14
  TOTAL STREAM AREA(ACRES) =     6.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     17.17

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
     1       16.20    13.32        3.086         6.30
     2       17.17    12.80        3.144         6.90

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

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
```

```
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1         32.75     12.80       3.144
     2         33.05     13.32       3.086

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     32.75   Tc(MIN.) =   12.80
  TOTAL AREA(ACRES) =     13.20
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     22.00 =  1336.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1247.06  DOWNSTREAM(FEET) =  1246.94
  FLOW LENGTH(FEET) =    36.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  26.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.99
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     32.75
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =  12.91
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     23.00 =  1372.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     51.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS SINGLE FAMILY (1/4 ACRE)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   750.00
  UPSTREAM ELEVATION(FEET) =   1260.80
  DOWNSTREAM ELEVATION(FEET) =   1251.66
  ELEVATION DIFFERENCE(FEET) =      9.14
  TC = 0.393*[(  750.00**3)/(     9.14)]**.2 =   13.391
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.078
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .7857
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      7.01
  TOTAL AREA(ACRES) =      2.90   TOTAL RUNOFF(CFS) =      7.01

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     51.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.078
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .7857
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    1.21
  TOTAL AREA(ACRES) =      3.40   TOTAL RUNOFF(CFS) =    8.22
  TC(MIN.) =  13.39

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     23.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1247.15  DOWNSTREAM(FEET) =  1246.94
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.57
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.22
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =  13.44
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     23.00 =   770.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =  13.44
  RAINFALL INTENSITY(INCH/HR) =   3.07
  TOTAL STREAM AREA(ACRES) =     3.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.22

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     60.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS SINGLE FAMILY (1/4 ACRE)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   712.00
  UPSTREAM ELEVATION(FEET) =   1285.00
  DOWNSTREAM ELEVATION(FEET) =   1267.74
  ELEVATION DIFFERENCE(FEET) =     17.26
  TC = 0.393*[(  712.00**3)/(    17.26)]**.2 =   11.430
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.320
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .7921
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      4.47
  TOTAL AREA(ACRES) =      1.70   TOTAL RUNOFF(CFS) =      4.47

****************************************************************************
  FLOW PROCESS FROM NODE     60.10 TO NODE     60.10 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.320
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8469
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    1.40   SUBAREA RUNOFF(CFS) =    3.94
  TOTAL AREA(ACRES) =      3.10   TOTAL RUNOFF(CFS) =    8.41
  TC(MIN.) =  11.43

****************************************************************************
  FLOW PROCESS FROM NODE     60.10 TO NODE     61.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) = 1267.74  DOWNSTREAM ELEVATION(FEET) = 1251.66
  STREET LENGTH(FEET) =   548.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 14.00
```

```
DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
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) =   0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

  **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.62
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.39
  HALFSTREET FLOOD WIDTH(FEET) =   13.82
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.67
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.83
STREET FLOW TRAVEL TIME(MIN.) =   1.95   Tc(MIN.) =  13.38
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.078
SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .7857
SOIL CLASSIFICATION IS "B"
SUBAREA AREA(ACRES) =    1.00      SUBAREA RUNOFF(CFS) =    2.42
TOTAL AREA(ACRES) =      4.10        PEAK FLOW RATE(CFS) =      10.83

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  14.00
FLOW VELOCITY(FEET/SEC.) =  4.71   DEPTH*VELOCITY(FT*FT/SEC.) =   1.86
LONGEST FLOWPATH FROM NODE     60.00 TO NODE     61.00 =  1260.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     61.00 TO NODE     61.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.078
SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .7857
SOIL CLASSIFICATION IS "B"
SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    0.97
TOTAL AREA(ACRES) =      4.50   TOTAL RUNOFF(CFS) =   11.79
TC(MIN.) =  13.38

****************************************************************************
FLOW PROCESS FROM NODE     61.00 TO NODE     61.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.078
SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8432
SOIL CLASSIFICATION IS "D"
SUBAREA AREA(ACRES) =    0.30   SUBAREA RUNOFF(CFS) =    0.78
TOTAL AREA(ACRES) =      4.80   TOTAL RUNOFF(CFS) =   12.57
TC(MIN.) =  13.38

****************************************************************************
FLOW PROCESS FROM NODE     61.00 TO NODE     23.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =  1247.63  DOWNSTREAM(FEET) =  1246.94
FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   9.78
ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =     12.57
```

```
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =  13.44
  LONGEST FLOWPATH FROM NODE     60.00 TO NODE     23.00 =  1290.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =  13.44
  RAINFALL INTENSITY(INCH/HR) =   3.07
  TOTAL STREAM AREA(ACRES) =     4.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.57

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
     1         8.22    13.44       3.072         3.40
     2        12.57    13.44       3.073         4.80

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

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1        20.79    13.44       3.073
     2        20.79    13.44       3.072

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     20.79   Tc(MIN.) =   13.44
  TOTAL AREA(ACRES) =       8.20
  LONGEST FLOWPATH FROM NODE     60.00 TO NODE     23.00 =  1290.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
     1        20.79    13.44       3.073         8.20
  LONGEST FLOWPATH FROM NODE     60.00 TO NODE     23.00 =  1290.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
     1        32.75    12.91       3.133        13.20
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     23.00 =  1372.00 FEET.

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

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF        Tc       INTENSITY
  NUMBER      (CFS)      (MIN.)    (INCH/HOUR)
     1        52.71      12.91        3.133
     2        52.91      13.44        3.073

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      52.71   Tc(MIN.) =   12.91
  TOTAL AREA(ACRES) =      21.40

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1246.94  DOWNSTREAM(FEET) =  1246.56
  FLOW LENGTH(FEET) =   125.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  33.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.40
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      52.71
  PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =  13.23
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     24.00 =  1497.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =  13.23
  RAINFALL INTENSITY(INCH/HR) =   3.10
  TOTAL STREAM AREA(ACRES) =    21.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     52.71

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     70.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS SINGLE FAMILY (1/4 ACRE)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  384.00
  UPSTREAM ELEVATION(FEET) =   1285.20
  DOWNSTREAM ELEVATION(FEET) =   1268.82
  ELEVATION DIFFERENCE(FEET) =     16.38
  TC = 0.393*[(  384.00**3)/(    16.38)]**.2 =    7.974
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.946
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8056
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      2.86
  TOTAL AREA(ACRES) =      0.90   TOTAL RUNOFF(CFS) =      2.86
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     70.10 TO NODE     70.10 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.946
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8544
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =     0.10   SUBAREA RUNOFF(CFS) =     0.34
  TOTAL AREA(ACRES) =       1.00   TOTAL RUNOFF(CFS) =     3.20
  TC(MIN.) =   7.97

****************************************************************************
  FLOW PROCESS FROM NODE     70.10 TO NODE     71.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1268.82  DOWNSTREAM ELEVATION(FEET) = 1252.40
  STREET LENGTH(FEET) =   438.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 14.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  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) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.67
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    8.62
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.12
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.19
  STREET FLOW TRAVEL TIME(MIN.) =   1.77   Tc(MIN.) =   9.75
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.584
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8796
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =     0.30      SUBAREA RUNOFF(CFS) =     0.95
  TOTAL AREA(ACRES) =       1.30        PEAK FLOW RATE(CFS) =       4.14

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   9.11
  FLOW VELOCITY(FEET/SEC.) =  4.24   DEPTH*VELOCITY(FT*FT/SEC.) =   1.26
  LONGEST FLOWPATH FROM NODE     70.00 TO NODE     71.00 =   822.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     71.00 TO NODE     24.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1247.91  DOWNSTREAM(FEET) =  1246.56
  FLOW LENGTH(FEET) =    14.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.43
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.14
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   9.76
  LONGEST FLOWPATH FROM NODE     70.00 TO NODE     24.00 =   836.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 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.) =   9.76
  RAINFALL INTENSITY(INCH/HR) =   3.58
  TOTAL STREAM AREA(ACRES) =     1.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.14

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
     1        52.71    13.23       3.096        21.40
     2         4.14     9.76       3.581         1.30

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

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1        43.05     9.76       3.581
     2        56.30    13.23       3.096

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     56.30   Tc(MIN.) =   13.23
  TOTAL AREA(ACRES) =     22.70
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     24.00 =  1497.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1246.56  DOWNSTREAM(FEET) =  1245.10
  FLOW LENGTH(FEET) =   108.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.47
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     56.30
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =  13.39
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     25.00 =  1605.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.078
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6715
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    0.20   SUBAREA RUNOFF(CFS) =    0.41
```

```
  TOTAL AREA(ACRES) =      22.90   TOTAL RUNOFF(CFS) =   56.71
  TC(MIN.) =  13.39

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.078
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7864
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.60   SUBAREA RUNOFF(CFS) =    1.45
  TOTAL AREA(ACRES) =     23.50   TOTAL RUNOFF(CFS) =   58.16
  TC(MIN.) =  13.39

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1245.10  DOWNSTREAM(FEET) =  1245.00
  FLOW LENGTH(FEET) =    34.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  33.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.56
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     58.16
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =  13.47
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     26.00 =  1639.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     26.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =  13.47
  RAINFALL INTENSITY(INCH/HR) =   3.07
  TOTAL STREAM AREA(ACRES) =    23.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     58.16

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  29.35   RAIN INTENSITY(INCH/HOUR) =  2.11
  TOTAL AREA(ACRES) =   159.70   TOTAL RUNOFF(CFS) =    290.40

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE     26.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1246.00  DOWNSTREAM(FEET) =  1245.00
  FLOW LENGTH(FEET) =   111.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  66.0 INCH PIPE IS  50.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.86
  ESTIMATED PIPE DIAMETER(INCH) =  66.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =    290.40
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =  29.47
```

```
  LONGEST FLOWPATH FROM NODE     70.00 TO NODE     26.00 =   947.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     26.00 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.) =  29.47
  RAINFALL INTENSITY(INCH/HR) =   2.11
  TOTAL STREAM AREA(ACRES) =   159.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    290.40

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
     1        58.16    13.47       3.069        23.50
     2       290.40    29.47       2.109       159.70

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

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       190.91    13.47       3.069
     2       330.37    29.47       2.109

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    330.37   Tc(MIN.) =   29.47
  TOTAL AREA(ACRES) =    183.20
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     26.00 =  1639.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =    183.20  TC(MIN.) =     29.47
  PEAK FLOW RATE(CFS)    =    330.37
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Appendix B-1

RATIONAL METHOD CALCULATION
OFF-SITE
10 - YEAR STORM

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

```
****************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
       RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                  (RCFC&WCD)  1978 HYDROLOGY MANUAL
        (c) Copyright 1982-2006 Advanced Engineering Software (aes)
                  (Rational Tabling Version 6.0D)
               Release Date: 06/01/2005  License ID 1269

                       Analysis prepared by:

                          MDS Consulting
           17320 Redhill Avenue, Suite 350, Irvine, CA 92614
              Phone: (949) 251-8821    Fax: (949) 251-0516
                  Email: mdsirvine@mdsconsulting.net

 ************************** DESCRIPTION OF STUDY **************************
* TRACT 32535                                                             *
* OFF-SITE HYDROLOGY STUDY                                                *
* Q10 FREQUENCY                                                           *
 **************************************************************************

  FILE NAME: C:\AES2006\HYDROSFT\RATSCX\32535\OFFSITE.10
  TIME/DATE OF STUDY: 13:46 11/08/2013
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.320
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.980
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  3.540
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.500
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.4809628
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.4792280
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =   10.00   1-HOUR INTENSITY(INCH/HOUR) =   0.990
  SLOPE OF INTENSITY DURATION CURVE = 0.4810
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   18.0     13.0    0.020/0.020/0.020   0.50    2.00 0.0313 0.125 0.0150
  2   20.0     15.0    0.020/0.020/0.020   0.50    2.00 0.0313 0.125 0.0150
  3   16.0     11.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0150

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

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
```

```
        DEVELOPMENT IS SINGLE FAMILY (1/4 ACRE)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   727.00
  UPSTREAM ELEVATION(FEET) =   1296.00
  DOWNSTREAM ELEVATION(FEET) =   1280.20
  ELEVATION DIFFERENCE(FEET) =     15.80
  TC = 0.393*[(  727.00**3)/(    15.80)]**.2 =  11.780
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.166
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8234
  SOIL CLASSIFICATION IS "D"
  SUBAREA RUNOFF(CFS) =      9.45
  TOTAL AREA(ACRES) =      5.30   TOTAL RUNOFF(CFS) =      9.45

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    101.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.166
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8847
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.20   SUBAREA RUNOFF(CFS) =    0.38
  TOTAL AREA(ACRES) =      5.50   TOTAL RUNOFF(CFS) =    9.83
  TC(MIN.) =  11.78

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS SINGLE FAMILY(1/2 ACRE)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   863.00
  UPSTREAM ELEVATION(FEET) =   1504.00
  DOWNSTREAM ELEVATION(FEET) =   1444.00
  ELEVATION DIFFERENCE(FEET) =     60.00
  TC = 0.422*[(  863.00**3)/(    60.00)]**.2 =   10.750
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.263
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .7870
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      4.99
  TOTAL AREA(ACRES) =      2.80   TOTAL RUNOFF(CFS) =      4.99

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    201.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.263
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .8114
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    3.40   SUBAREA RUNOFF(CFS) =    6.24
  TOTAL AREA(ACRES) =      6.20   TOTAL RUNOFF(CFS) =   11.23
  TC(MIN.) =  10.75

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1444.00  DOWNSTREAM(FEET) =   1299.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  4545.00   CHANNEL SLOPE =  0.0319
```

```
  CHANNEL FLOW THRU SUBAREA(CFS) =      11.23
  FLOW VELOCITY(FEET/SEC) =   4.60 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =  16.47   Tc(MIN.) =  27.22
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    202.00 =  5408.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.447
  SINGLE-FAMILY(1-ACRE LOT) RUNOFF COEFFICIENT = .5977
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =   33.90   SUBAREA RUNOFF(CFS) =   29.33
  TOTAL AREA(ACRES) =     40.10   TOTAL RUNOFF(CFS) =   40.56
  TC(MIN.) =  27.22

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.447
  SINGLE-FAMILY(1-ACRE LOT) RUNOFF COEFFICIENT = .6892
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =   11.80   SUBAREA RUNOFF(CFS) =   11.77
  TOTAL AREA(ACRES) =     51.90   TOTAL RUNOFF(CFS) =   52.33
  TC(MIN.) =  27.22

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.447
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .7731
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =   21.80   SUBAREA RUNOFF(CFS) =   24.40
  TOTAL AREA(ACRES) =     73.70   TOTAL RUNOFF(CFS) =   76.73
  TC(MIN.) =  27.22

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1291.00  DOWNSTREAM(FEET) =  1289.60
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  29.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.40
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      76.73
  PIPE TRAVEL TIME(MIN.) =  0.13    Tc(MIN.) =  27.36
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    203.00 =  5508.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    203.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    211.00 IS CODE =  21
```

```
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS SINGLE FAMILY(1/2 ACRE)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1060.00
  UPSTREAM ELEVATION(FEET) =   1352.00
  DOWNSTREAM ELEVATION(FEET) =   1308.00
  ELEVATION DIFFERENCE(FEET) =     44.00
  TC = 0.422*[( 1060.00**3)/(    44.00)]**.2 =   12.939
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.070
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .8046
  SOIL CLASSIFICATION IS "D"
  SUBAREA RUNOFF(CFS) =     18.15
  TOTAL AREA(ACRES) =     10.90   TOTAL RUNOFF(CFS) =     18.15

****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    211.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.070
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .8046
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    4.20   SUBAREA RUNOFF(CFS) =    7.00
  TOTAL AREA(ACRES) =     15.10   TOTAL RUNOFF(CFS) =   25.15
  TC(MIN.) =  12.94

****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    222.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1299.00  DOWNSTREAM(FEET) =  1292.80
  FLOW LENGTH(FEET) =   740.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.87
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     25.15
  PIPE TRAVEL TIME(MIN.) =   1.57    Tc(MIN.) =  14.51
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    222.00 =  1800.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    222.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =  14.51
  RAINFALL INTENSITY(INCH/HR) =   1.96
  TOTAL STREAM AREA(ACRES) =    15.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     25.15

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    221.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS SINGLE FAMILY(1/2 ACRE)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
```

```
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   806.00
  UPSTREAM ELEVATION(FEET) =   1422.00
  DOWNSTREAM ELEVATION(FEET) =   1384.00
  ELEVATION DIFFERENCE(FEET) =     38.00
  TC = 0.422*[(  806.00**3)/(    38.00)]**.2 =   11.305
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.209
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .8096
  SOIL CLASSIFICATION IS "D"
  SUBAREA RUNOFF(CFS) =     11.98
  TOTAL AREA(ACRES) =      6.70   TOTAL RUNOFF(CFS) =     11.98

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    221.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.209
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .7848
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.90   SUBAREA RUNOFF(CFS) =    1.56
  TOTAL AREA(ACRES) =      7.60   TOTAL RUNOFF(CFS) =   13.54
  TC(MIN.) =  11.30

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    222.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1384.00  DOWNSTREAM(FEET) =   1299.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  2807.00   CHANNEL SLOPE =  0.0303
  CHANNEL FLOW THRU SUBAREA(CFS) =     13.54
  FLOW VELOCITY(FEET/SEC) =   4.70 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   9.95   Tc(MIN.) =  21.25
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    222.00 =  3613.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    222.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.630
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .6888
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    5.90   SUBAREA RUNOFF(CFS) =    6.63
  TOTAL AREA(ACRES) =     13.50   TOTAL RUNOFF(CFS) =   20.17
  TC(MIN.) =  21.25

****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    222.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.630
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .7549
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    2.70   SUBAREA RUNOFF(CFS) =    3.32
  TOTAL AREA(ACRES) =     16.20   TOTAL RUNOFF(CFS) =   23.49
  TC(MIN.) =  21.25

****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    222.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
==============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.630
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .7843
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    27.50    SUBAREA RUNOFF(CFS) =    35.17
  TOTAL AREA(ACRES) =      43.70    TOTAL RUNOFF(CFS) =    58.66
  TC(MIN.) =  21.25

******************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    222.00 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =  21.25
  RAINFALL INTENSITY(INCH/HR) =   1.63
  TOTAL STREAM AREA(ACRES) =    43.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     58.66

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
     1       25.15    14.51        1.959        15.10
     2       58.66    21.25        1.630        43.70

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

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       65.18    14.51       1.959
     2       79.59    21.25       1.630

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     79.59   Tc(MIN.) =   21.25
  TOTAL AREA(ACRES) =     58.80
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    222.00 =  3613.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    203.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1292.80  DOWNSTREAM(FEET) =  1289.60
  FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  27.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.57
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     79.59
  PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =  21.49
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    203.00 =  3803.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    203.00 IS CODE =  11
```

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

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF     Tc      INTENSITY     AREA
  NUMBER      (CFS)   (MIN.)   (INCH/HOUR)   (ACRE)
     1       79.59    21.49       1.622       58.80
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    203.00 =  3803.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF     Tc      INTENSITY     AREA
  NUMBER      (CFS)   (MIN.)   (INCH/HOUR)   (ACRE)
     1       76.73    27.36       1.444       73.70
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    203.00 =  5508.00 FEET.

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

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
     1      139.85      21.49       1.622
     2      147.59      27.36       1.444

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    139.85   Tc(MIN.) =   21.49
  TOTAL AREA(ACRES) =    132.50

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    203.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    204.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1289.60  DOWNSTREAM(FEET) =  1285.80
  FLOW LENGTH(FEET) =   257.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  35.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.79
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =    139.85
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =  21.78
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    204.00 =  5765.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.612
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8645
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    0.60   SUBAREA RUNOFF(CFS) =    0.84
  TOTAL AREA(ACRES) =    133.10   TOTAL RUNOFF(CFS) =  140.69
  TC(MIN.) =  21.78
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     204.00 TO NODE     204.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.612
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8805
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =     5.60   SUBAREA RUNOFF(CFS) =     7.95
  TOTAL AREA(ACRES) =     138.70   TOTAL RUNOFF(CFS) =  148.63
  TC(MIN.) =  21.78

****************************************************************************
  FLOW PROCESS FROM NODE     204.00 TO NODE     205.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1285.80  DOWNSTREAM(FEET) =   1275.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1086.00   CHANNEL SLOPE =  0.0099
  CHANNEL FLOW THRU SUBAREA(CFS) =     148.63
  FLOW VELOCITY(FEET/SEC) =   5.34 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   3.39   Tc(MIN.) =  25.17
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    205.00 =  6851.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     205.00 TO NODE     205.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.503
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .6782
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =     9.20   SUBAREA RUNOFF(CFS) =     9.38
  TOTAL AREA(ACRES) =     147.90   TOTAL RUNOFF(CFS) =  158.01
  TC(MIN.) =  25.17

****************************************************************************
  FLOW PROCESS FROM NODE     205.00 TO NODE     205.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.503
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .7768
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =     7.00   SUBAREA RUNOFF(CFS) =     8.17
  TOTAL AREA(ACRES) =     154.90   TOTAL RUNOFF(CFS) =  166.19
  TC(MIN.) =  25.17

****************************************************************************
  FLOW PROCESS FROM NODE     205.00 TO NODE     205.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.503
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8795
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =     0.20   SUBAREA RUNOFF(CFS) =     0.26
  TOTAL AREA(ACRES) =     155.10   TOTAL RUNOFF(CFS) =  166.45
  TC(MIN.) =  25.17

****************************************************************************
  FLOW PROCESS FROM NODE     205.00 TO NODE     206.00 IS CODE =  52
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1275.00  DOWNSTREAM(FEET) =   1246.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   615.00   CHANNEL SLOPE =  0.0472
  CHANNEL FLOW THRU SUBAREA(CFS) =    166.45
  FLOW VELOCITY(FEET/SEC) =  12.03 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.85   Tc(MIN.) =  26.02
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    206.00 =  7466.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.479
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .6761
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    3.80   SUBAREA RUNOFF(CFS) =    3.80
  TOTAL AREA(ACRES) =    158.90   TOTAL RUNOFF(CFS) =  170.25
  TC(MIN.) =  26.02

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.479
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .7752
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.80   SUBAREA RUNOFF(CFS) =    0.92
  TOTAL AREA(ACRES) =    159.70   TOTAL RUNOFF(CFS) =  171.17
  TC(MIN.) =  26.02

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   760.00
  UPSTREAM ELEVATION(FEET) =   1331.00
  DOWNSTREAM ELEVATION(FEET) =   1316.00
  ELEVATION DIFFERENCE(FEET) =     15.00
  TC = 0.303*[(  760.00**3)/(    15.00)]**.2 =    9.437
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.409
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8860
  SOIL CLASSIFICATION IS "D"
  SUBAREA RUNOFF(CFS) =     12.59
  TOTAL AREA(ACRES) =      5.90   TOTAL RUNOFF(CFS) =     12.59

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    301.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.409
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8727
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    0.30   SUBAREA RUNOFF(CFS) =    0.63
  TOTAL AREA(ACRES) =      6.20   TOTAL RUNOFF(CFS) =   13.23
```

```
  TC(MIN.) =    9.44
****************************************************************************
  FLOW PROCESS FROM NODE     301.00 TO NODE     302.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1310.00  DOWNSTREAM(FEET) =  1298.00
  FLOW LENGTH(FEET) =    816.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =    8.44
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.23
  PIPE TRAVEL TIME(MIN.) =   1.61    Tc(MIN.) =  11.05
  LONGEST FLOWPATH FROM NODE     300.00 TO NODE     302.00 =  1576.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     302.00 TO NODE     302.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.233
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8851
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =     6.90   SUBAREA RUNOFF(CFS) =   13.64
  TOTAL AREA(ACRES) =      13.10   TOTAL RUNOFF(CFS) =   26.86
  TC(MIN.) =  11.05

****************************************************************************
  FLOW PROCESS FROM NODE     302.00 TO NODE     303.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1298.00  DOWNSTREAM(FEET) =  1294.00
  FLOW LENGTH(FEET) =    480.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =    7.90
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      26.86
  PIPE TRAVEL TIME(MIN.) =   1.01    Tc(MIN.) =  12.06
  LONGEST FLOWPATH FROM NODE     300.00 TO NODE     303.00 =  2056.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     303.00 TO NODE     303.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.141
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8845
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =     6.80   SUBAREA RUNOFF(CFS) =   12.88
  TOTAL AREA(ACRES) =      19.90   TOTAL RUNOFF(CFS) =   39.74
  TC(MIN.) =  12.06

****************************************************************************
  FLOW PROCESS FROM NODE     303.00 TO NODE     303.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.141
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8803
  SOIL CLASSIFICATION IS "C"
```

```
  SUBAREA AREA(ACRES) =     0.20   SUBAREA RUNOFF(CFS) =     0.38
  TOTAL AREA(ACRES) =      20.10   TOTAL RUNOFF(CFS) =    40.12
  TC(MIN.) =  12.06

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    304.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1294.00  DOWNSTREAM(FEET) =   1253.35
  CHANNEL LENGTH THRU SUBAREA(FEET) =   845.00   CHANNEL SLOPE =  0.0481
  CHANNEL FLOW THRU SUBAREA(CFS) =      40.12
  FLOW VELOCITY(FEET/SEC) =   7.97 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.77   Tc(MIN.) =  13.83
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    304.00 =  2901.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    304.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.005
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .7965
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =     6.20   SUBAREA RUNOFF(CFS) =     9.90
  TOTAL AREA(ACRES) =      26.30   TOTAL RUNOFF(CFS) =    50.02
  TC(MIN.) =  13.83

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    304.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.005
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8183
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =     4.50   SUBAREA RUNOFF(CFS) =     7.38
  TOTAL AREA(ACRES) =      30.80   TOTAL RUNOFF(CFS) =    57.41
  TC(MIN.) =  13.83

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    304.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.005
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8837
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =     0.10   SUBAREA RUNOFF(CFS) =     0.18
  TOTAL AREA(ACRES) =      30.90   TOTAL RUNOFF(CFS) =    57.58
  TC(MIN.) =  13.83

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    304.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =  13.83
  RAINFALL INTENSITY(INCH/HR) =   2.00
  TOTAL STREAM AREA(ACRES) =    30.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     57.58
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    308.00 TO NODE    305.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS SINGLE FAMILY (1/4 ACRE)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   532.00
  UPSTREAM ELEVATION(FEET) =   1311.00
  DOWNSTREAM ELEVATION(FEET) =   1283.50
  ELEVATION DIFFERENCE(FEET) =     27.50
  TC = 0.393*[(  532.00**3)/(    27.50)]**.2 =    8.742
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.500
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8130
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      2.24
  TOTAL AREA(ACRES) =      1.10   TOTAL RUNOFF(CFS) =      2.24

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.500
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8321
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    1.20   SUBAREA RUNOFF(CFS) =    2.50
  TOTAL AREA(ACRES) =      2.30   TOTAL RUNOFF(CFS) =    4.73
  TC(MIN.) =   8.74

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    304.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1283.50  DOWNSTREAM(FEET) =   1253.35
  CHANNEL LENGTH THRU SUBAREA(FEET) =   490.00   CHANNEL SLOPE =  0.0615
  CHANNEL FLOW THRU SUBAREA(CFS) =      4.73
  FLOW VELOCITY(FEET/SEC) =   5.17 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.58   Tc(MIN.) =  10.32
  LONGEST FLOWPATH FROM NODE    308.00 TO NODE    304.00 =  1022.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    304.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =  10.32
  RAINFALL INTENSITY(INCH/HR) =   2.31
  TOTAL STREAM AREA(ACRES) =     2.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.73

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    306.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
```

```
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   570.00
  UPSTREAM ELEVATION(FEET) =   1283.50
  DOWNSTREAM ELEVATION(FEET) =   1258.70
  ELEVATION DIFFERENCE(FEET) =     24.80
  TC = 0.303*[(  570.00**3)/(    24.80)]**.2 =    7.182
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.748
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8839
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.73
  TOTAL AREA(ACRES) =      0.30   TOTAL RUNOFF(CFS) =      0.73

****************************************************************************
  FLOW PROCESS FROM NODE    306.00 TO NODE    306.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.748
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8875
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.60   SUBAREA RUNOFF(CFS) =    1.46
  TOTAL AREA(ACRES) =      0.90   TOTAL RUNOFF(CFS) =    2.19
  TC(MIN.) =   7.18

****************************************************************************
  FLOW PROCESS FROM NODE    306.00 TO NODE    304.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1258.70  DOWNSTREAM(FEET) =   1253.35
  CHANNEL LENGTH THRU SUBAREA(FEET) =  108.00   CHANNEL SLOPE =  0.0495
  CHANNEL FLOW THRU SUBAREA(CFS) =      2.19
  FLOW VELOCITY(FEET/SEC) =   3.90 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.46   Tc(MIN.) =   7.64
  LONGEST FLOWPATH FROM NODE    305.00 TO NODE    304.00 =   678.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    304.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   7.64
  RAINFALL INTENSITY(INCH/HR) =   2.67
  TOTAL STREAM AREA(ACRES) =     0.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.19

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
     1        57.58    13.83        2.005        30.90
     2         4.73    10.32        2.308         2.30
     3         2.19     7.64        2.667         0.90

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

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
```

```
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc       INTENSITY
  NUMBER      (CFS)    (MIN.)    (INCH/HOUR)
     1        37.52     7.64       2.667
     2        49.61    10.32       2.308
     3        63.34    13.83       2.005

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     63.34   Tc(MIN.) =   13.83
  TOTAL AREA(ACRES) =     34.10
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    304.00 =  2901.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    307.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1253.35  DOWNSTREAM(FEET) =  1251.75
  FLOW LENGTH(FEET) =    88.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.26
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     63.34
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =  13.94
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    307.00 =  2989.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.997
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8792
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    0.88
  TOTAL AREA(ACRES) =     34.60   TOTAL RUNOFF(CFS) =   64.22
  TC(MIN.) =  13.94

****************************************************************************
  FLOW PROCESS FROM NODE    400.00 TO NODE    401.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   319.00
  UPSTREAM ELEVATION(FEET) =   1259.63
  DOWNSTREAM ELEVATION(FEET) =   1258.16
  ELEVATION DIFFERENCE(FEET) =      1.47
  TC = 0.303*[(  319.00**3)/(     1.47)]**.2 =    8.921
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.476
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8732
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      0.86
  TOTAL AREA(ACRES) =      0.40   TOTAL RUNOFF(CFS) =      0.86

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    401.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
==============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.476
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8863
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =     0.20   SUBAREA RUNOFF(CFS) =     0.44
  TOTAL AREA(ACRES) =       0.60   TOTAL RUNOFF(CFS) =     1.30
  TC(MIN.) =    8.92
==============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =       0.60  TC(MIN.) =       8.92
  PEAK FLOW RATE(CFS)    =       1.30
==============================================================================
==============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Appendix B-2

RATIONAL METHOD CALCULATION
OFF-SITE
100 - YEAR STORM

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

```
****************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
       RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                  (RCFC&WCD)  1978 HYDROLOGY MANUAL
        (c) Copyright 1982-2006 Advanced Engineering Software (aes)
                  (Rational Tabling Version 6.0D)
               Release Date: 06/01/2005  License ID 1269

                       Analysis prepared by:

                          MDS Consulting
           17320 Redhill Avenue, Suite 350, Irvine, CA 92614
              Phone: (949) 251-8821    Fax: (949) 251-0516
                  Email: mdsirvine@mdsconsulting.net

 ************************** DESCRIPTION OF STUDY **************************
* TRACT 32535                                                             *
* OFF-SITE HYDROLOGY STUDY                                                *
* Q100 FREQUENCY                                                          *
 **************************************************************************

  FILE NAME: C:\AES2006\HYDROSFT\RATSCX\32535\OFFSITE.100
  TIME/DATE OF STUDY: 11:33 11/08/2013
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.320
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.980
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  3.540
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.500
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.4809628
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.4792280
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.500
  SLOPE OF INTENSITY DURATION CURVE = 0.4792
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   18.0     13.0    0.020/0.020/0.020   0.50    2.00 0.0313 0.125 0.0150
  2   20.0     15.0    0.020/0.020/0.020   0.50    2.00 0.0313 0.125 0.0150
  3   16.0     11.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0150

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

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
```

```
        DEVELOPMENT IS SINGLE FAMILY (1/4 ACRE)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   727.00
  UPSTREAM ELEVATION(FEET) =   1296.00
  DOWNSTREAM ELEVATION(FEET) =   1280.20
  ELEVATION DIFFERENCE(FEET) =     15.80
  TC = 0.393*[(  727.00**3)/(    15.80)]**.2 =   11.780
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.273
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8462
  SOIL CLASSIFICATION IS "D"
  SUBAREA RUNOFF(CFS) =     14.68
  TOTAL AREA(ACRES) =      5.30   TOTAL RUNOFF(CFS) =     14.68

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    101.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.273
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8892
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.20   SUBAREA RUNOFF(CFS) =    0.58
  TOTAL AREA(ACRES) =      5.50   TOTAL RUNOFF(CFS) =   15.26
  TC(MIN.) =  11.78

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS SINGLE FAMILY(1/2 ACRE)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   863.00
  UPSTREAM ELEVATION(FEET) =   1504.00
  DOWNSTREAM ELEVATION(FEET) =   1444.00
  ELEVATION DIFFERENCE(FEET) =     60.00
  TC = 0.422*[(  863.00**3)/(    60.00)]**.2 =   10.750
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.419
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .8195
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      7.85
  TOTAL AREA(ACRES) =      2.80   TOTAL RUNOFF(CFS) =      7.85

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    201.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.419
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .8379
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    3.40   SUBAREA RUNOFF(CFS) =    9.74
  TOTAL AREA(ACRES) =      6.20   TOTAL RUNOFF(CFS) =   17.59
  TC(MIN.) =  10.75

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1444.00  DOWNSTREAM(FEET) =   1299.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  4545.00   CHANNEL SLOPE =  0.0319
```

```
  CHANNEL FLOW THRU SUBAREA(CFS) =      17.59
  FLOW VELOCITY(FEET/SEC) =   5.17 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =  14.65   Tc(MIN.) =  25.40
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    202.00 =  5408.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.265
  SINGLE-FAMILY(1-ACRE LOT) RUNOFF COEFFICIENT = .6723
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =   33.90   SUBAREA RUNOFF(CFS) =   51.61
  TOTAL AREA(ACRES) =     40.10   TOTAL RUNOFF(CFS) =   69.20
  TC(MIN.) =  25.40

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.265
  SINGLE-FAMILY(1-ACRE LOT) RUNOFF COEFFICIENT = .7494
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =   11.80   SUBAREA RUNOFF(CFS) =   20.03
  TOTAL AREA(ACRES) =     51.90   TOTAL RUNOFF(CFS) =   89.22
  TC(MIN.) =  25.40

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.265
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .8114
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =   21.80   SUBAREA RUNOFF(CFS) =   40.06
  TOTAL AREA(ACRES) =     73.70   TOTAL RUNOFF(CFS) =  129.28
  TC(MIN.) =  25.40

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1291.00  DOWNSTREAM(FEET) =  1289.60
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  34.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.34
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =    129.28
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =  25.52
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    203.00 =  5508.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    203.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    211.00 IS CODE =  21
```

```
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS SINGLE FAMILY(1/2 ACRE)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1060.00
  UPSTREAM ELEVATION(FEET) =   1352.00
  DOWNSTREAM ELEVATION(FEET) =   1308.00
  ELEVATION DIFFERENCE(FEET) =     44.00
  TC = 0.422*[( 1060.00**3)/(    44.00)]**.2 =   12.939
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.129
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .8328
  SOIL CLASSIFICATION IS "D"
  SUBAREA RUNOFF(CFS) =     28.40
  TOTAL AREA(ACRES) =     10.90   TOTAL RUNOFF(CFS) =     28.40

****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    211.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.129
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .8328
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    4.20   SUBAREA RUNOFF(CFS) =   10.94
  TOTAL AREA(ACRES) =     15.10   TOTAL RUNOFF(CFS) =   39.35
  TC(MIN.) =  12.94

****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    222.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1299.00  DOWNSTREAM(FEET) =  1292.80
  FLOW LENGTH(FEET) =   740.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.89
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     39.35
  PIPE TRAVEL TIME(MIN.) =   1.39    Tc(MIN.) =  14.33
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    222.00 =  1800.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    222.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =  14.33
  RAINFALL INTENSITY(INCH/HR) =   2.98
  TOTAL STREAM AREA(ACRES) =    15.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     39.35

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    221.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS SINGLE FAMILY(1/2 ACRE)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
```

```
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   806.00
  UPSTREAM ELEVATION(FEET) =   1422.00
  DOWNSTREAM ELEVATION(FEET) =   1384.00
  ELEVATION DIFFERENCE(FEET) =     38.00
  TC = 0.422*[(  806.00**3)/(    38.00)]**.2 =   11.305
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.338
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .8365
  SOIL CLASSIFICATION IS "D"
  SUBAREA RUNOFF(CFS) =     18.71
  TOTAL AREA(ACRES) =      6.70   TOTAL RUNOFF(CFS) =     18.71

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    221.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.338
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .8178
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.90   SUBAREA RUNOFF(CFS) =    2.46
  TOTAL AREA(ACRES) =      7.60   TOTAL RUNOFF(CFS) =   21.17
  TC(MIN.) =  11.30

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    222.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1384.00  DOWNSTREAM(FEET) =   1299.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  2807.00   CHANNEL SLOPE =  0.0303
  CHANNEL FLOW THRU SUBAREA(CFS) =     21.17
  FLOW VELOCITY(FEET/SEC) =   5.29 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   8.84   Tc(MIN.) =  20.14
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    222.00 =  3613.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    222.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.531
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .7419
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    5.90   SUBAREA RUNOFF(CFS) =   11.08
  TOTAL AREA(ACRES) =     13.50   TOTAL RUNOFF(CFS) =   32.24
  TC(MIN.) =  20.14

****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    222.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.531
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .7967
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    2.70   SUBAREA RUNOFF(CFS) =    5.44
  TOTAL AREA(ACRES) =     16.20   TOTAL RUNOFF(CFS) =   37.69
  TC(MIN.) =  20.14

****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    222.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
==========================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.531
 SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .8193
 SOIL CLASSIFICATION IS "D"
 SUBAREA AREA(ACRES) =    27.50   SUBAREA RUNOFF(CFS) =    57.03
 TOTAL AREA(ACRES) =      43.70   TOTAL RUNOFF(CFS) =    94.72
 TC(MIN.) =  20.14

**************************************************************************
 FLOW PROCESS FROM NODE    222.00 TO NODE    222.00 IS CODE =   1
--------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==========================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =  20.14
 RAINFALL INTENSITY(INCH/HR) =   2.53
 TOTAL STREAM AREA(ACRES) =    43.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     94.72

 ** CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1       39.35    14.33        2.980        15.10
    2       94.72    20.14        2.531        43.70

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

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1      106.72    14.33       2.980
    2      128.14    20.14       2.531

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =    128.14   Tc(MIN.) =   20.14
 TOTAL AREA(ACRES) =     58.80
 LONGEST FLOWPATH FROM NODE    220.00 TO NODE    222.00 =  3613.00 FEET.

**************************************************************************
 FLOW PROCESS FROM NODE    222.00 TO NODE    203.00 IS CODE =  31
--------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1292.80  DOWNSTREAM(FEET) =  1289.60
 FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  45.0 INCH PIPE IS  31.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  15.51
 ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =    128.14
 PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =  20.34
 LONGEST FLOWPATH FROM NODE    220.00 TO NODE    203.00 =  3803.00 FEET.

**************************************************************************
 FLOW PROCESS FROM NODE    203.00 TO NODE    203.00 IS CODE =  11
```

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

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM      RUNOFF      Tc       INTENSITY      AREA
  NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
     1       128.14     20.34        2.519        58.80
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    203.00 =  3803.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM      RUNOFF      Tc       INTENSITY      AREA
  NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
     1       129.28     25.52        2.260        73.70
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    203.00 =  5508.00 FEET.

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc       INTENSITY
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
     1       231.22      20.34        2.519
     2       244.24      25.52        2.260

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    244.24   Tc(MIN.) =   25.52
  TOTAL AREA(ACRES) =    132.50

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    203.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    204.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1289.60  DOWNSTREAM(FEET) =  1285.80
  FLOW LENGTH(FEET) =   257.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  57.0 INCH PIPE IS  42.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.21
  ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =    244.24
  PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =  25.76
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    204.00 =  5765.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.249
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8714
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    0.60   SUBAREA RUNOFF(CFS) =    1.18
  TOTAL AREA(ACRES) =    133.10   TOTAL RUNOFF(CFS) =  245.42
  TC(MIN.) =  25.76
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.249
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8852
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =     5.60   SUBAREA RUNOFF(CFS) =   11.15
  TOTAL AREA(ACRES) =    138.70   TOTAL RUNOFF(CFS) =  256.57
  TC(MIN.) =  25.76

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    205.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1285.80  DOWNSTREAM(FEET) =   1275.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1086.00   CHANNEL SLOPE =  0.0099
  CHANNEL FLOW THRU SUBAREA(CFS) =    256.57
  FLOW VELOCITY(FEET/SEC) =   6.32 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.86   Tc(MIN.) =  28.63
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    205.00 =  6851.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    205.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.138
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .7224
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =     9.20   SUBAREA RUNOFF(CFS) =   14.21
  TOTAL AREA(ACRES) =    147.90   TOTAL RUNOFF(CFS) =  270.78
  TC(MIN.) =  28.63

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    205.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.138
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .8071
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =     7.00   SUBAREA RUNOFF(CFS) =   12.08
  TOTAL AREA(ACRES) =    154.90   TOTAL RUNOFF(CFS) =  282.86
  TC(MIN.) =  28.63

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    205.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.138
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8845
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =     0.20   SUBAREA RUNOFF(CFS) =    0.38
  TOTAL AREA(ACRES) =    155.10   TOTAL RUNOFF(CFS) =  283.24
  TC(MIN.) =  28.63

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    206.00 IS CODE =  52
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1275.00  DOWNSTREAM(FEET) =   1246.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   615.00   CHANNEL SLOPE =  0.0472
  CHANNEL FLOW THRU SUBAREA(CFS) =    283.24
  FLOW VELOCITY(FEET/SEC) =  14.20 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.72   Tc(MIN.) =  29.35
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    206.00 =  7466.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.113
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .7210
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    3.80   SUBAREA RUNOFF(CFS) =    5.79
  TOTAL AREA(ACRES) =    158.90   TOTAL RUNOFF(CFS) =  289.03
  TC(MIN.) =  29.35

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.113
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .8062
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.80   SUBAREA RUNOFF(CFS) =    1.36
  TOTAL AREA(ACRES) =    159.70   TOTAL RUNOFF(CFS) =  290.39
  TC(MIN.) =  29.35

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   760.00
  UPSTREAM ELEVATION(FEET) =   1331.00
  DOWNSTREAM ELEVATION(FEET) =   1316.00
  ELEVATION DIFFERENCE(FEET) =     15.00
  TC = 0.303*[(  760.00**3)/(    15.00)]**.2 =    9.437
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.640
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8902
  SOIL CLASSIFICATION IS "D"
  SUBAREA RUNOFF(CFS) =     19.12
  TOTAL AREA(ACRES) =      5.90   TOTAL RUNOFF(CFS) =     19.12

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    301.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.640
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8799
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    0.30   SUBAREA RUNOFF(CFS) =    0.96
  TOTAL AREA(ACRES) =      6.20   TOTAL RUNOFF(CFS) =   20.08
```

```
  TC(MIN.) =    9.44

****************************************************************************
  FLOW PROCESS FROM NODE     301.00 TO NODE     302.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1310.00  DOWNSTREAM(FEET) =  1298.00
  FLOW LENGTH(FEET) =    816.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =    9.34
  ESTIMATED PIPE DIAMETER(INCH) =  24.00     NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.08
  PIPE TRAVEL TIME(MIN.) =    1.46     Tc(MIN.) =  10.89
  LONGEST FLOWPATH FROM NODE     300.00 TO NODE     302.00 =  1576.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     302.00 TO NODE     302.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.398
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =     6.90    SUBAREA RUNOFF(CFS) =    20.86
  TOTAL AREA(ACRES) =      13.10    TOTAL RUNOFF(CFS) =    40.93
  TC(MIN.) =  10.89

****************************************************************************
  FLOW PROCESS FROM NODE     302.00 TO NODE     303.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1298.00  DOWNSTREAM(FEET) =  1294.00
  FLOW LENGTH(FEET) =    480.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =    8.92
  ESTIMATED PIPE DIAMETER(INCH) =  33.00     NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      40.93
  PIPE TRAVEL TIME(MIN.) =    0.90     Tc(MIN.) =  11.79
  LONGEST FLOWPATH FROM NODE     300.00 TO NODE     303.00 =  2056.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     303.00 TO NODE     303.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.271
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8892
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =     6.80    SUBAREA RUNOFF(CFS) =    19.78
  TOTAL AREA(ACRES) =      19.90    TOTAL RUNOFF(CFS) =    60.71
  TC(MIN.) =  11.79

****************************************************************************
  FLOW PROCESS FROM NODE     303.00 TO NODE     303.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.271
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8861
  SOIL CLASSIFICATION IS "C"
```

```
  SUBAREA AREA(ACRES) =     0.20   SUBAREA RUNOFF(CFS) =     0.58
  TOTAL AREA(ACRES) =      20.10   TOTAL RUNOFF(CFS) =    61.29
  TC(MIN.) =  11.79

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    304.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1294.00  DOWNSTREAM(FEET) =   1253.35
  CHANNEL LENGTH THRU SUBAREA(FEET) =   845.00   CHANNEL SLOPE =  0.0481
  CHANNEL FLOW THRU SUBAREA(CFS) =      61.29
  FLOW VELOCITY(FEET/SEC) =   9.01 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.56   Tc(MIN.) =  13.35
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    304.00 =  2901.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    304.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.082
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8268
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =     6.20   SUBAREA RUNOFF(CFS) =   15.80
  TOTAL AREA(ACRES) =      26.30   TOTAL RUNOFF(CFS) =   77.09
  TC(MIN.) =  13.35

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    304.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.082
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8433
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =     4.50   SUBAREA RUNOFF(CFS) =   11.70
  TOTAL AREA(ACRES) =      30.80   TOTAL RUNOFF(CFS) =   88.79
  TC(MIN.) =  13.35

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    304.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.082
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8887
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =     0.10   SUBAREA RUNOFF(CFS) =    0.27
  TOTAL AREA(ACRES) =      30.90   TOTAL RUNOFF(CFS) =   89.06
  TC(MIN.) =  13.35

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    304.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =  13.35
  RAINFALL INTENSITY(INCH/HR) =   3.08
  TOTAL STREAM AREA(ACRES) =    30.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     89.06
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    308.00 TO NODE    305.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS SINGLE FAMILY (1/4 ACRE)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   532.00
  UPSTREAM ELEVATION(FEET) =   1311.00
  DOWNSTREAM ELEVATION(FEET) =   1283.50
  ELEVATION DIFFERENCE(FEET) =     27.50
  TC = 0.393*[(  532.00**3)/(    27.50)]**.2 =    8.742
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.776
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8384
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      3.48
  TOTAL AREA(ACRES) =      1.10   TOTAL RUNOFF(CFS) =      3.48

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.776
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8526
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    1.20   SUBAREA RUNOFF(CFS) =    3.86
  TOTAL AREA(ACRES) =      2.30   TOTAL RUNOFF(CFS) =    7.34
  TC(MIN.) =   8.74

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    304.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1283.50  DOWNSTREAM(FEET) =   1253.35
  CHANNEL LENGTH THRU SUBAREA(FEET) =   490.00   CHANNEL SLOPE =  0.0615
  CHANNEL FLOW THRU SUBAREA(CFS) =      7.34
  FLOW VELOCITY(FEET/SEC) =   5.74 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.42   Tc(MIN.) =  10.17
  LONGEST FLOWPATH FROM NODE    308.00 TO NODE    304.00 =  1022.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    304.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =  10.17
  RAINFALL INTENSITY(INCH/HR) =   3.51
  TOTAL STREAM AREA(ACRES) =     2.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.34

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    306.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
```

```
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   570.00
  UPSTREAM ELEVATION(FEET) =   1283.50
  DOWNSTREAM ELEVATION(FEET) =   1258.70
  ELEVATION DIFFERENCE(FEET) =     24.80
  TC = 0.303*[(  570.00**3)/(    24.80)]**.2 =    7.182
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.149
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8886
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      1.11
  TOTAL AREA(ACRES) =      0.30   TOTAL RUNOFF(CFS) =      1.11

****************************************************************************
  FLOW PROCESS FROM NODE    306.00 TO NODE    306.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.149
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8913
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.60   SUBAREA RUNOFF(CFS) =    2.22
  TOTAL AREA(ACRES) =      0.90   TOTAL RUNOFF(CFS) =    3.32
  TC(MIN.) =   7.18

****************************************************************************
  FLOW PROCESS FROM NODE    306.00 TO NODE    304.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1258.70  DOWNSTREAM(FEET) =   1253.35
  CHANNEL LENGTH THRU SUBAREA(FEET) =   108.00   CHANNEL SLOPE =  0.0495
  CHANNEL FLOW THRU SUBAREA(CFS) =      3.32
  FLOW VELOCITY(FEET/SEC) =   4.28 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.42   Tc(MIN.) =   7.60
  LONGEST FLOWPATH FROM NODE    305.00 TO NODE    304.00 =   678.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    304.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   7.60
  RAINFALL INTENSITY(INCH/HR) =   4.04
  TOTAL STREAM AREA(ACRES) =     0.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.32

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
     1        89.06    13.35       3.082        30.90
     2         7.34    10.17       3.512         2.30
     3         3.32     7.60       4.037         0.90

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

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
```

```
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc       INTENSITY
  NUMBER      (CFS)    (MIN.)    (INCH/HOUR)
     1        59.52     7.60       4.037
     2        78.03    10.17       3.512
     3        98.04    13.35       3.082

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     98.04   Tc(MIN.) =   13.35
  TOTAL AREA(ACRES) =     34.10
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    304.00 =  2901.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    307.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1253.35  DOWNSTREAM(FEET) =  1251.75
  FLOW LENGTH(FEET) =    88.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  29.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.81
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     98.04
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =  13.45
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    307.00 =  2989.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.071
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8853
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    1.36
  TOTAL AREA(ACRES) =     34.60   TOTAL RUNOFF(CFS) =   99.40
  TC(MIN.) =  13.45

****************************************************************************
  FLOW PROCESS FROM NODE    400.00 TO NODE    401.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   319.00
  UPSTREAM ELEVATION(FEET) =   1259.63
  DOWNSTREAM ELEVATION(FEET) =   1258.16
  ELEVATION DIFFERENCE(FEET) =      1.47
  TC = 0.303*[(  319.00**3)/(     1.47)]**.2 =    8.921
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.739
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8803
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      1.32
  TOTAL AREA(ACRES) =      0.40   TOTAL RUNOFF(CFS) =      1.32

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    401.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
==============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.739
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8904
 SOIL CLASSIFICATION IS "D"
 SUBAREA AREA(ACRES) =     0.20   SUBAREA RUNOFF(CFS) =     0.67
 TOTAL AREA(ACRES) =       0.60   TOTAL RUNOFF(CFS) =    1.98
 TC(MIN.) =   8.92
==============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)      =      0.60  TC(MIN.) =      8.92
 PEAK FLOW RATE(CFS)    =      1.98
==============================================================================
==============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

Appendix C

STREET CAPACITY CALCULATIONS

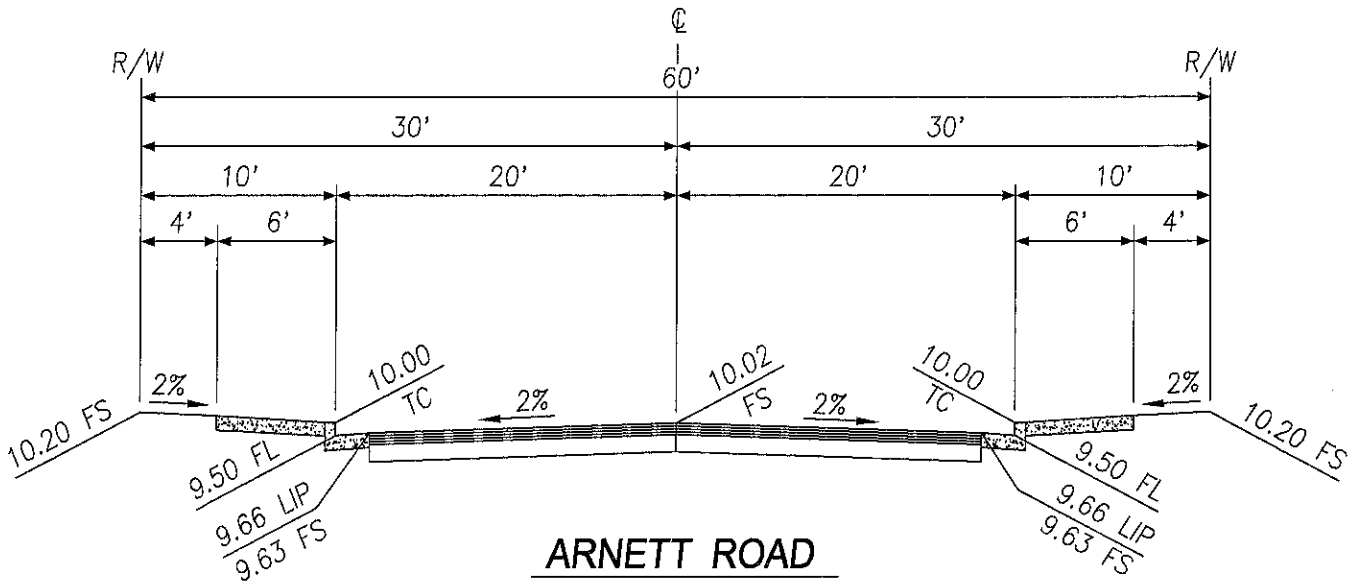
MDS CONSULTING
MORSE SCHULTZ
17320 Redhill Ave.
Suite 350
Irvine, CA 92614
Voice: 949-251-8821
FAX: 949-251-0516
PLANNERS ENGINEERS SURVEYORS

Street Capacity Investigations

10 Year frequency storm shall be contained within the top of curb.

Street [1]	Location	Street Slope (ft/ft) [2]	Capacity to TC Elevation (cfs) [3] ½ Street	Design "Q10" (cfs) [4]	Remarks
ARNETT ROAD	CB #1	0.010	12.3	1.1	[3] > [4] - O.K.
ARNETT ROAD	CB #7	0.006	9.6	2.7	[3] > [4] - O.K.
ARNETT ROAD	CB #5	0.006	9.6	8.0	[3] > [4] - O.K.
ARNETT ROAD.	CB #6	0.006	9.6	5.2	[3] > [4] - O.K.
CRYSTAL WAY	CB #2	0.054	29.6	4.6	[3] > [4] - O.K.
CRYSTAL WAY	CB #3	0.054	29.6	5.7	[3] > [4] - O.K.
CRYSTAL WAY	CB #4	0.045	27.0	7.5	[3] > [4] - O.K.
CRYSTAL WAY	CB #4	0.005	9.0	3.3	[3] > [4] - O.K.
TOUCHSTONE COURT	CB #8	0.035	23.8	3.8	[3] > [4] - O.K.
ARNETT ROAD	@ 28' TC TO TC	0.006	10.4	5.4	[3] > [4] - O.K.

TYPICAL STREET SECTION



ARNETT ROAD

N.T.S.

MDS CONSULTING
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PLANNERS ENGINEERS SURVEYORS

I:\80334\HYDRO\STCAP-AA.dwg 7/29/13

```
==========================================================================
                ** RESULTS OF IRREGULAR CHANNEL ANALYSIS **
                  CALCULATIONS BASED ON MANNINGS EQUATION
               WITH ALL DIMENSIONS IN FEET OR FEET AND SECONDS

==========================================================================
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                          Analysis prepared by:

                              MDS Consulting
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                Phone: (949) 251-8821    Fax: (949) 251-0516
                     Email: mdsirvine@mdsconsulting.net


 ************************* DESCRIPTION OF STUDY *************************
* TRACT 32535, ARNETT ROAD                                               *
* TYPICAL FULL STREET SECTION CAPACITY, 40' TC TO TC                     *
* Q10 = 24.0 CFS, WITH S=0.0100 @ CB #1                                  *
 ************************************************************************

    TIME/DATE OF STUDY: 16:36 07/17/2013
--------------------------------------------------------------------------
            * ENTERED INFORMATION FOR SUBCHANNEL NUMBER  1 :
            NODE NUMBER       "X" COORDINATE      "Y" COORDINATE

                 1                  0.00               10.20
                 2                 10.00               10.00
                 3                 10.13                9.50
                 4                 12.00                9.63
                 5                 12.01                9.66
                 6                 30.00               10.02
            SUBCHANNEL SLOPE(FEET/FEET) = 0.010000
            SUBCHANNEL MANNINGS FRICTION FACTOR = 0.015000

..........................................................................
         SUBCHANNEL FLOW(CFS) =       12.3
         SUBCHANNEL FLOW AREA(SQUARE FEET) =        3.74
         SUBCHANNEL FLOW VELOCITY(FEET/SEC.) =    3.303
         SUBCHANNEL FROUDE NUMBER =  1.312
         SUBCHANNEL FLOW TOP-WIDTH(FEET) =       19.00
         SUBCHANNEL HYDRAULIC DEPTH(FEET) =    0.20

--------------------------------------------------------------------------
--------------------------------------------------------------------------
            * ENTERED INFORMATION FOR SUBCHANNEL NUMBER  2 :
            NODE NUMBER       "X" COORDINATE      "Y" COORDINATE

                 1                 30.00               10.02
                 2                 47.99                9.66
                 3                 48.00                9.63
                 4                 49.87                9.50
                 5                 50.00               10.00
                 6                 60.00               10.20
            SUBCHANNEL SLOPE(FEET/FEET) = 0.010000
            SUBCHANNEL MANNINGS FRICTION FACTOR = 0.015000

..........................................................................
         SUBCHANNEL FLOW(CFS) =       12.3
         SUBCHANNEL FLOW AREA(SQUARE FEET) =        3.74
```

```
SUBCHANNEL FLOW VELOCITY(FEET/SEC.) =    3.303
SUBCHANNEL FROUDE NUMBER =  1.312
SUBCHANNEL FLOW TOP-WIDTH(FEET) =      19.00
SUBCHANNEL HYDRAULIC DEPTH(FEET) =    0.20

--------------------------------------------------------------------------
--------------------------------------------------------------------------
TOTAL IRREGULAR CHANNEL FLOW(CFS) WANTED =      24.00
COMPUTED IRREGULAR CHANNEL FLOW(CFS) =      24.69

ESTIMATED IRREGULAR CHANNEL NORMAL DEPTH WATER SURFACE
ELEVATION.............................     10.00


     NOTE: WATER SURFACE IS BELOW EXTREME
           LEFT AND RIGHT BANK ELEVATIONS.

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

```
==============================================================================
                ** RESULTS OF IRREGULAR CHANNEL ANALYSIS **
                  CALCULATIONS BASED ON MANNINGS EQUATION
               WITH ALL DIMENSIONS IN FEET OR FEET AND SECONDS

==============================================================================
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                          Analysis prepared by:

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               Phone: (949) 251-8821    Fax: (949) 251-0516
                    Email: mdsirvine@mdsconsulting.net


 ************************* DESCRIPTION OF STUDY *************************
* TRACT 32535, ARNETT ROAD                                              *
* TYPICAL FULL STREET SECTION CAPACITY, 40' TC TO TC                    *
* Q10 = 19.0 CFS, WITH S=0.0060 @ CB #5, #6 & #7                        *
 ************************************************************************

    TIME/DATE OF STUDY: 16:31 07/18/2013
------------------------------------------------------------------------
           * ENTERED INFORMATION FOR SUBCHANNEL NUMBER  1 :
           NODE NUMBER      "X" COORDINATE     "Y" COORDINATE

                1                 0.00              10.20
                2                10.00              10.00
                3                10.13               9.50
                4                12.00               9.63
                5                12.01               9.66
                6                30.00              10.02
           SUBCHANNEL SLOPE(FEET/FEET) = 0.006000
           SUBCHANNEL MANNINGS FRICTION FACTOR = 0.015000

........................................................................
         SUBCHANNEL FLOW(CFS) =        9.6
         SUBCHANNEL FLOW AREA(SQUARE FEET) =        3.74
         SUBCHANNEL FLOW VELOCITY(FEET/SEC.) =    2.558
         SUBCHANNEL FROUDE NUMBER =  1.017
         SUBCHANNEL FLOW TOP-WIDTH(FEET) =       19.00
         SUBCHANNEL HYDRAULIC DEPTH(FEET) =    0.20

------------------------------------------------------------------------
------------------------------------------------------------------------
           * ENTERED INFORMATION FOR SUBCHANNEL NUMBER  2 :
           NODE NUMBER      "X" COORDINATE     "Y" COORDINATE

                1                30.00              10.02
                2                47.99               9.66
                3                48.00               9.63
                4                49.87               9.50
                5                50.00              10.00
                6                60.00              10.20
           SUBCHANNEL SLOPE(FEET/FEET) = 0.006000
           SUBCHANNEL MANNINGS FRICTION FACTOR = 0.015000

........................................................................
         SUBCHANNEL FLOW(CFS) =        9.6
         SUBCHANNEL FLOW AREA(SQUARE FEET) =        3.74
```

```
SUBCHANNEL FLOW VELOCITY(FEET/SEC.) =    2.558
SUBCHANNEL FROUDE NUMBER =  1.017
SUBCHANNEL FLOW TOP-WIDTH(FEET) =      19.00
SUBCHANNEL HYDRAULIC DEPTH(FEET) =    0.20

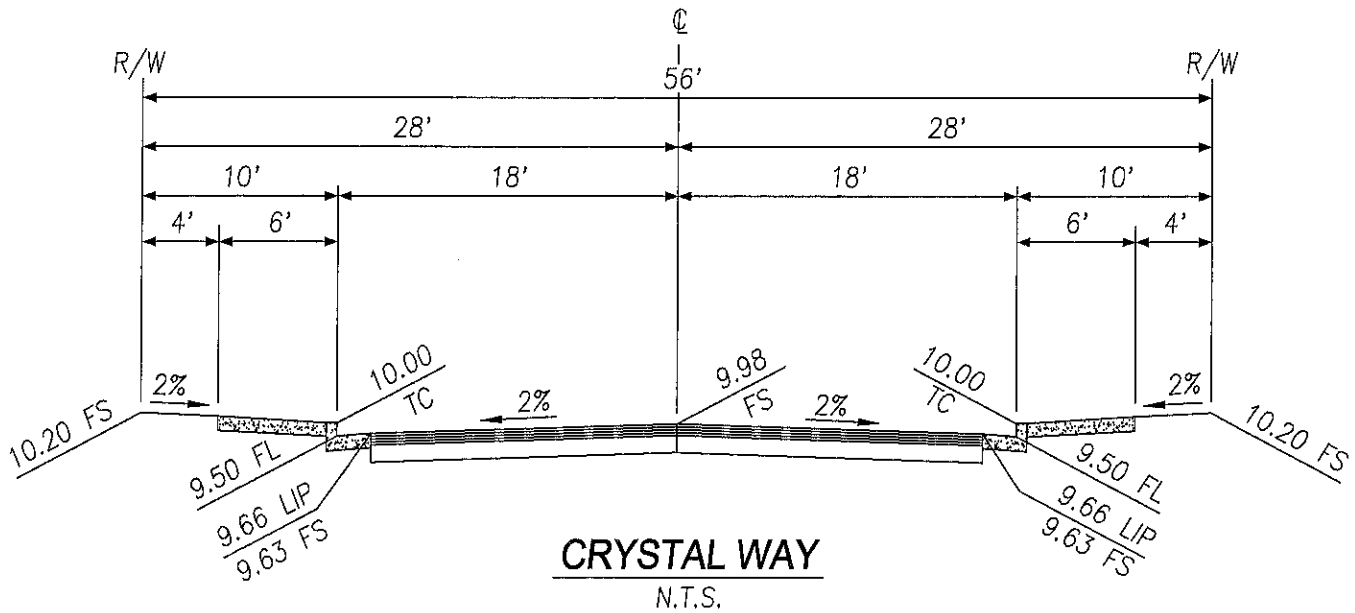
--------------------------------------------------------------------------
--------------------------------------------------------------------------
TOTAL IRREGULAR CHANNEL FLOW(CFS) WANTED =      19.00
COMPUTED IRREGULAR CHANNEL FLOW(CFS) =      19.13

ESTIMATED IRREGULAR CHANNEL NORMAL DEPTH WATER SURFACE
ELEVATION.............................     10.00

     NOTE: WATER SURFACE IS BELOW EXTREME
           LEFT AND RIGHT BANK ELEVATIONS.

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

TYPICAL STREET SECTION



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I:\80334\HYDRO\STCAP-AA.dwg 7/29/13

```
==========================================================================
                ** RESULTS OF IRREGULAR CHANNEL ANALYSIS **
                  CALCULATIONS BASED ON MANNINGS EQUATION
               WITH ALL DIMENSIONS IN FEET OR FEET AND SECONDS

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                    Email: mdsirvine@mdsconsulting.net


 ************************* DESCRIPTION OF STUDY *************************
* TRACT 32535, CRYSTAL WAY                                               *
* TYPICAL FULL STREET SECTION CAPACITY, 36' TC TO TC                     *
* Q10 = 59.0 CFS, WITH S=0.0540 @ CB #2 & #3                             *
 ************************************************************************

    TIME/DATE OF STUDY: 16:11 07/17/2013
--------------------------------------------------------------------------
            * ENTERED INFORMATION FOR SUBCHANNEL NUMBER  1 :
            NODE NUMBER       "X" COORDINATE      "Y" COORDINATE

                 1                  0.00               10.20
                 2                 10.00               10.00
                 3                 10.13                9.50
                 4                 12.00                9.63
                 5                 12.01                9.66
                 6                 28.00                9.98
            SUBCHANNEL SLOPE(FEET/FEET) = 0.054000
            SUBCHANNEL MANNINGS FRICTION FACTOR = 0.015000

..........................................................................
         SUBCHANNEL FLOW(CFS) =       29.6
         SUBCHANNEL FLOW AREA(SQUARE FEET) =        3.73
         SUBCHANNEL FLOW VELOCITY(FEET/SEC.) =     7.936
         SUBCHANNEL FROUDE NUMBER =  3.073
         SUBCHANNEL FLOW TOP-WIDTH(FEET) =       18.00
         SUBCHANNEL HYDRAULIC DEPTH(FEET) =     0.21

--------------------------------------------------------------------------
--------------------------------------------------------------------------
            * ENTERED INFORMATION FOR SUBCHANNEL NUMBER  2 :
            NODE NUMBER       "X" COORDINATE      "Y" COORDINATE

                 1                 28.00                9.98
                 2                 43.99                9.66
                 3                 44.00                9.63
                 4                 45.87                9.50
                 5                 46.00               10.00
                 6                 56.00               10.20
            SUBCHANNEL SLOPE(FEET/FEET) = 0.054000
            SUBCHANNEL MANNINGS FRICTION FACTOR = 0.015000

..........................................................................
         SUBCHANNEL FLOW(CFS) =       29.6
         SUBCHANNEL FLOW AREA(SQUARE FEET) =        3.73
```

```
SUBCHANNEL FLOW VELOCITY(FEET/SEC.) =     7.936
SUBCHANNEL FROUDE NUMBER =  3.073
SUBCHANNEL FLOW TOP-WIDTH(FEET) =       18.00
SUBCHANNEL HYDRAULIC DEPTH(FEET) =     0.21

--------------------------------------------------------------------------
--------------------------------------------------------------------------
TOTAL IRREGULAR CHANNEL FLOW(CFS) WANTED =       59.00
COMPUTED IRREGULAR CHANNEL FLOW(CFS) =       59.17

ESTIMATED IRREGULAR CHANNEL NORMAL DEPTH WATER SURFACE
ELEVATION.............................     10.00

     NOTE: WATER SURFACE IS BELOW EXTREME
           LEFT AND RIGHT BANK ELEVATIONS.

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

```
==========================================================================
                ** RESULTS OF IRREGULAR CHANNEL ANALYSIS **
                  CALCULATIONS BASED ON MANNINGS EQUATION
              WITH ALL DIMENSIONS IN FEET OR FEET AND SECONDS

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                      Email: mdsirvine@mdsconsulting.net


 ************************* DESCRIPTION OF STUDY *************************
* TRACT 32535, CRYSTAL WAY                                               *
* TYPICAL FULL STREET SECTION CAPACITY, 36' TC TO TC                     *
* Q10 = 54.0 CFS, WITH S=0.0450 @ CB #4                                  *
 **************************************************************************

    TIME/DATE OF STUDY: 11:20 05/10/2013
--------------------------------------------------------------------------
            * ENTERED INFORMATION FOR SUBCHANNEL NUMBER  1 :
            NODE NUMBER       "X" COORDINATE      "Y" COORDINATE

                 1                  0.00               10.20
                 2                 10.00               10.00
                 3                 10.13                9.50
                 4                 12.00                9.63
                 5                 12.01                9.66
                 6                 28.00                9.98
            SUBCHANNEL SLOPE(FEET/FEET) = 0.045000
            SUBCHANNEL MANNINGS FRICTION FACTOR = 0.015000

..........................................................................
         SUBCHANNEL FLOW(CFS) =       27.0
         SUBCHANNEL FLOW AREA(SQUARE FEET) =        3.73
         SUBCHANNEL FLOW VELOCITY(FEET/SEC.) =    7.245
         SUBCHANNEL FROUDE NUMBER =  2.806
         SUBCHANNEL FLOW TOP-WIDTH(FEET) =       18.00
         SUBCHANNEL HYDRAULIC DEPTH(FEET) =    0.21

--------------------------------------------------------------------------
--------------------------------------------------------------------------
            * ENTERED INFORMATION FOR SUBCHANNEL NUMBER  2 :
            NODE NUMBER       "X" COORDINATE      "Y" COORDINATE

                 1                 28.00                9.98
                 2                 43.99                9.66
                 3                 44.00                9.63
                 4                 45.87                9.50
                 5                 46.00               10.00
                 6                 56.00               10.20
            SUBCHANNEL SLOPE(FEET/FEET) = 0.045000
            SUBCHANNEL MANNINGS FRICTION FACTOR = 0.015000

..........................................................................
         SUBCHANNEL FLOW(CFS) =       27.0
         SUBCHANNEL FLOW AREA(SQUARE FEET) =        3.73
```

```
SUBCHANNEL FLOW VELOCITY(FEET/SEC.) =     7.245
SUBCHANNEL FROUDE NUMBER =  2.806
SUBCHANNEL FLOW TOP-WIDTH(FEET) =       18.00
SUBCHANNEL HYDRAULIC DEPTH(FEET) =     0.21

--------------------------------------------------------------------------
--------------------------------------------------------------------------
TOTAL IRREGULAR CHANNEL FLOW(CFS) WANTED =       54.00
COMPUTED IRREGULAR CHANNEL FLOW(CFS) =      54.02

ESTIMATED IRREGULAR CHANNEL NORMAL DEPTH WATER SURFACE
ELEVATION.............................     10.00


     NOTE: WATER SURFACE IS BELOW EXTREME
           LEFT AND RIGHT BANK ELEVATIONS.

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

```
==============================================================================
                ** RESULTS OF IRREGULAR CHANNEL ANALYSIS **
                  CALCULATIONS BASED ON MANNINGS EQUATION
               WITH ALL DIMENSIONS IN FEET OR FEET AND SECONDS

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 ************************** DESCRIPTION OF STUDY **************************
* TRACT 32535, CRYSTAL WAY                                                 *
* TYPICAL FULL STREET SECTION CAPACITY, 36' TC TO TC                       *
* Q10 = 18.0 CFS, WITH S=0.0050 @ CB #4                                    *
 ****************************************************************************

    TIME/DATE OF STUDY: 13:42 12/16/2013
------------------------------------------------------------------------------
            * ENTERED INFORMATION FOR SUBCHANNEL NUMBER  1 :
            NODE NUMBER      "X" COORDINATE     "Y" COORDINATE

                 1                 0.00              10.20
                 2                10.00              10.00
                 3                10.13               9.50
                 4                12.00               9.63
                 5                12.01               9.66
                 6                28.00               9.98
            SUBCHANNEL SLOPE(FEET/FEET) = 0.005000
            SUBCHANNEL MANNINGS FRICTION FACTOR = 0.015000

..............................................................................
         SUBCHANNEL FLOW(CFS) =        9.0
         SUBCHANNEL FLOW AREA(SQUARE FEET) =        3.73
         SUBCHANNEL FLOW VELOCITY(FEET/SEC.) =    2.415
         SUBCHANNEL FROUDE NUMBER =  0.935
         SUBCHANNEL FLOW TOP-WIDTH(FEET) =       18.00
         SUBCHANNEL HYDRAULIC DEPTH(FEET) =    0.21

------------------------------------------------------------------------------
------------------------------------------------------------------------------
            * ENTERED INFORMATION FOR SUBCHANNEL NUMBER  2 :
            NODE NUMBER      "X" COORDINATE     "Y" COORDINATE

                 1                28.00               9.98
                 2                43.99               9.66
                 3                44.00               9.63
                 4                45.87               9.50
                 5                46.00              10.00
                 6                56.00              10.20
            SUBCHANNEL SLOPE(FEET/FEET) = 0.005000
            SUBCHANNEL MANNINGS FRICTION FACTOR = 0.015000

..............................................................................
         SUBCHANNEL FLOW(CFS) =        9.0
         SUBCHANNEL FLOW AREA(SQUARE FEET) =        3.73
```

```
SUBCHANNEL FLOW VELOCITY(FEET/SEC.) =     2.415
SUBCHANNEL FROUDE NUMBER =  0.935
SUBCHANNEL FLOW TOP-WIDTH(FEET) =       18.00
SUBCHANNEL HYDRAULIC DEPTH(FEET) =     0.21

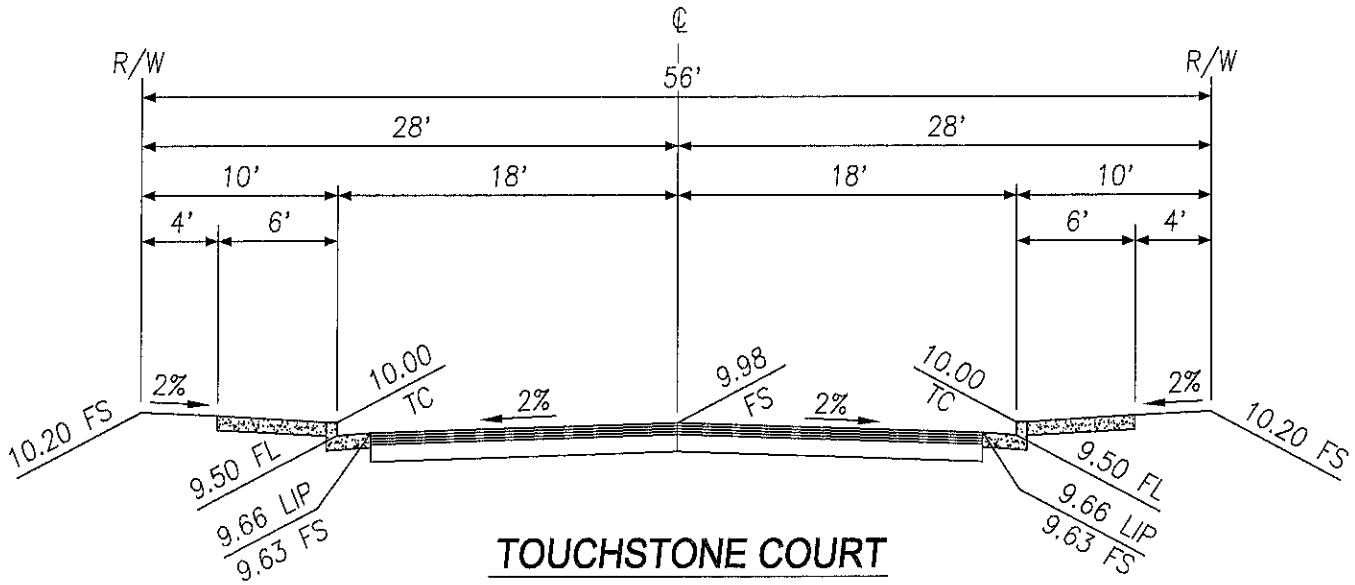
--------------------------------------------------------------------------
--------------------------------------------------------------------------
TOTAL IRREGULAR CHANNEL FLOW(CFS) WANTED =       18.00
COMPUTED IRREGULAR CHANNEL FLOW(CFS) =       18.01

ESTIMATED IRREGULAR CHANNEL NORMAL DEPTH WATER SURFACE
ELEVATION.............................     10.00

     NOTE: WATER SURFACE IS BELOW EXTREME
           LEFT AND RIGHT BANK ELEVATIONS.

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

TYPICAL STREET SECTION



TOUCHSTONE COURT

N.T.S.

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```
==========================================================================
              ** RESULTS OF IRREGULAR CHANNEL ANALYSIS **
                CALCULATIONS BASED ON MANNINGS EQUATION
             WITH ALL DIMENSIONS IN FEET OR FEET AND SECONDS

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 ************************** DESCRIPTION OF STUDY **************************
* TRACT 32535, TOUCHSTONE COURT                                            *
* TYPICAL FULL STREET SECTION CAPACITY, 36' TC TO TC                       *
* Q10 = 47.6 CFS, WITH S=0.0350 @ CB #8                                    *
 **************************************************************************

    TIME/DATE OF STUDY: 14:41 07/18/2013
--------------------------------------------------------------------------
           * ENTERED INFORMATION FOR SUBCHANNEL NUMBER  1 :
           NODE NUMBER      "X" COORDINATE     "Y" COORDINATE

                1                 0.00              10.20
                2                10.00              10.00
                3                10.13               9.50
                4                12.00               9.63
                5                12.01               9.66
                6                28.00               9.98
           SUBCHANNEL SLOPE(FEET/FEET) = 0.035000
           SUBCHANNEL MANNINGS FRICTION FACTOR = 0.015000

..........................................................................
        SUBCHANNEL FLOW(CFS) =       23.8
        SUBCHANNEL FLOW AREA(SQUARE FEET) =        3.73
        SUBCHANNEL FLOW VELOCITY(FEET/SEC.) =     6.389
        SUBCHANNEL FROUDE NUMBER =  2.474
        SUBCHANNEL FLOW TOP-WIDTH(FEET) =       18.00
        SUBCHANNEL HYDRAULIC DEPTH(FEET) =     0.21

--------------------------------------------------------------------------
--------------------------------------------------------------------------
           * ENTERED INFORMATION FOR SUBCHANNEL NUMBER  2 :
           NODE NUMBER      "X" COORDINATE     "Y" COORDINATE

                1                28.00               9.98
                2                43.99               9.66
                3                44.00               9.63
                4                45.87               9.50
                5                46.00              10.00
                6                56.00              10.20
           SUBCHANNEL SLOPE(FEET/FEET) = 0.035000
           SUBCHANNEL MANNINGS FRICTION FACTOR = 0.015000

..........................................................................
        SUBCHANNEL FLOW(CFS) =       23.8
        SUBCHANNEL FLOW AREA(SQUARE FEET) =        3.73
```

```
SUBCHANNEL FLOW VELOCITY(FEET/SEC.) =     6.389
SUBCHANNEL FROUDE NUMBER =  2.474
SUBCHANNEL FLOW TOP-WIDTH(FEET) =       18.00
SUBCHANNEL HYDRAULIC DEPTH(FEET) =     0.21

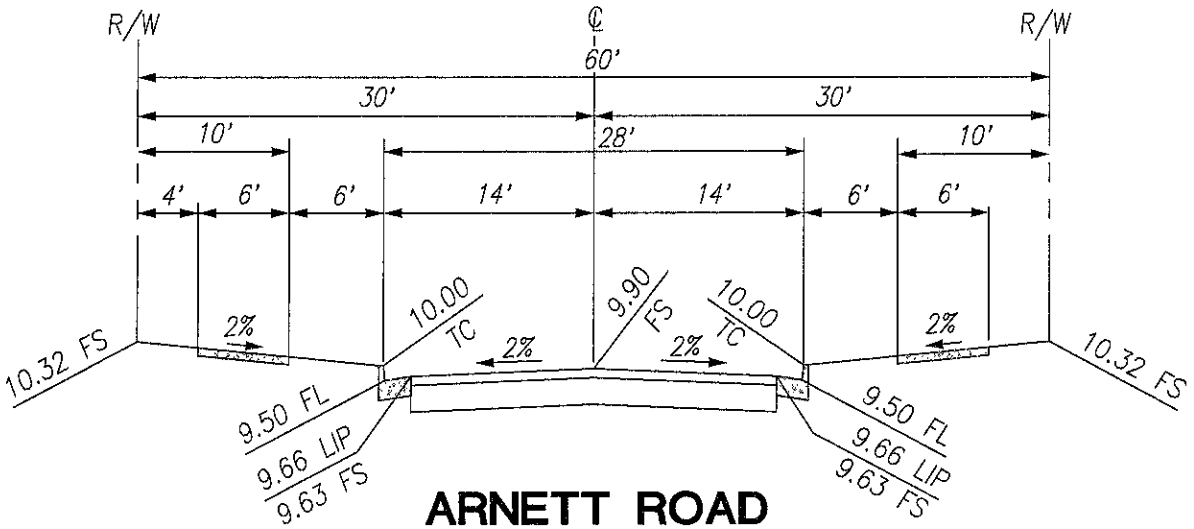
--------------------------------------------------------------------------
--------------------------------------------------------------------------
TOTAL IRREGULAR CHANNEL FLOW(CFS) WANTED =       47.60
COMPUTED IRREGULAR CHANNEL FLOW(CFS) =       47.64

ESTIMATED IRREGULAR CHANNEL NORMAL DEPTH WATER SURFACE
ELEVATION.............................     10.00

     NOTE: WATER SURFACE IS BELOW EXTREME
           LEFT AND RIGHT BANK ELEVATIONS.

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

TYPICAL STREET SECTION



ARNETT ROAD

STA. 20+33.83 TO 23+50.00

NOT TO SCALE

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==========================================================================
              ** RESULTS OF IRREGULAR CHANNEL ANALYSIS **
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             WITH ALL DIMENSIONS IN FEET OR FEET AND SECONDS

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 ************************* DESCRIPTION OF STUDY *************************
* TRACT 32535, ARNETT ROAD FROM STA. 20+33.83 TO 23+50.00                *
* TYPICAL FULL STREET SECTION CAPACITY, 28' TC TO TC                     *
* Q10 = 20.0 CFS, WITH S=0.0060                                          *
 **************************************************************************

    TIME/DATE OF STUDY: 10:21 11/10/2013
--------------------------------------------------------------------------
            * ENTERED INFORMATION FOR SUBCHANNEL NUMBER  1 :
            NODE NUMBER       "X" COORDINATE     "Y" COORDINATE

                 1                  0.00              10.32
                 2                 16.00              10.00
                 3                 16.13               9.50
                 4                 18.00               9.63
                 5                 18.01               9.66
                 6                 30.00               9.90
            SUBCHANNEL SLOPE(FEET/FEET) = 0.006000
            SUBCHANNEL MANNINGS FRICTION FACTOR = 0.015000

..........................................................................
         SUBCHANNEL FLOW(CFS) =       10.4
         SUBCHANNEL FLOW AREA(SQUARE FEET) =        3.49
         SUBCHANNEL FLOW VELOCITY(FEET/SEC.) =     2.979
         SUBCHANNEL FROUDE NUMBER =  1.052
         SUBCHANNEL FLOW TOP-WIDTH(FEET) =       14.00
         SUBCHANNEL HYDRAULIC DEPTH(FEET) =     0.25

--------------------------------------------------------------------------
--------------------------------------------------------------------------
            * ENTERED INFORMATION FOR SUBCHANNEL NUMBER  2 :
            NODE NUMBER       "X" COORDINATE     "Y" COORDINATE

                 1                 30.00               9.90
                 2                 41.99               9.66
                 3                 42.00               9.63
                 4                 43.87               9.50
                 5                 44.00              10.00
                 6                 60.00              10.32
            SUBCHANNEL SLOPE(FEET/FEET) = 0.006000
            SUBCHANNEL MANNINGS FRICTION FACTOR = 0.015000

..........................................................................
         SUBCHANNEL FLOW(CFS) =       10.4
         SUBCHANNEL FLOW AREA(SQUARE FEET) =        3.49
```

```
SUBCHANNEL FLOW VELOCITY(FEET/SEC.) =     2.979
SUBCHANNEL FROUDE NUMBER =  1.052
SUBCHANNEL FLOW TOP-WIDTH(FEET) =       14.00
SUBCHANNEL HYDRAULIC DEPTH(FEET) =    0.25

--------------------------------------------------------------------------
--------------------------------------------------------------------------
TOTAL IRREGULAR CHANNEL FLOW(CFS) WANTED =       20.00
COMPUTED IRREGULAR CHANNEL FLOW(CFS) =      20.78

ESTIMATED IRREGULAR CHANNEL NORMAL DEPTH WATER SURFACE
ELEVATION.............................     10.00


     NOTE: WATER SURFACE IS BELOW EXTREME
           LEFT AND RIGHT BANK ELEVATIONS.

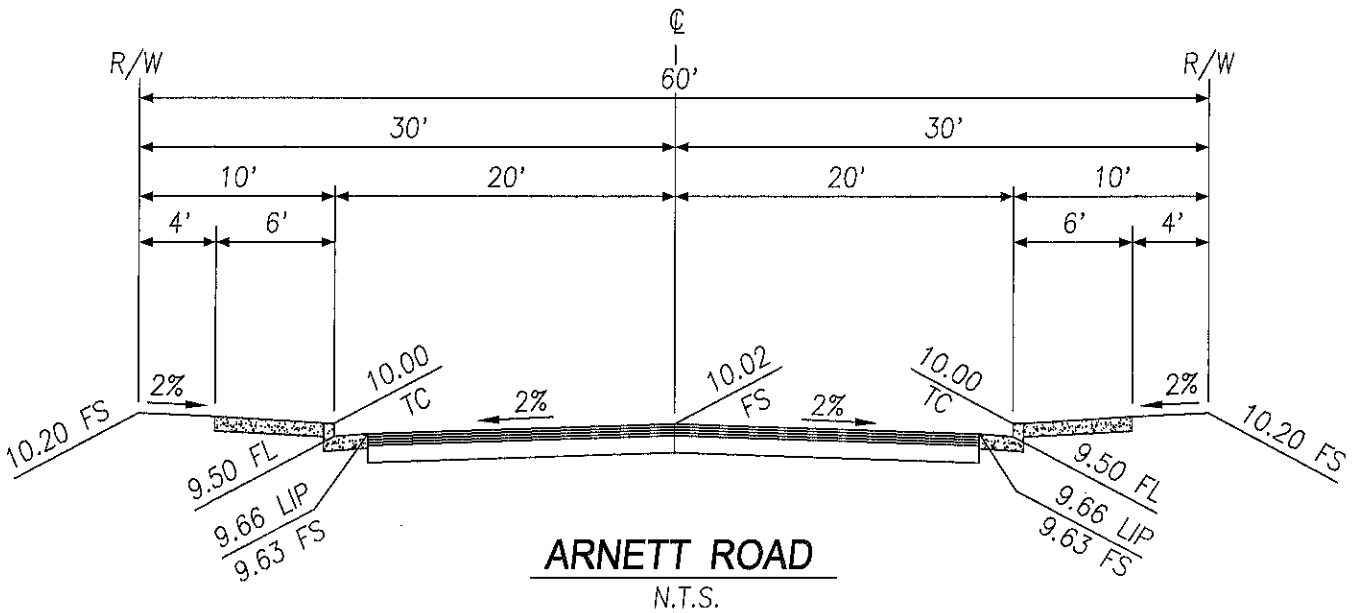
--------------------------------------------------------------------------
```

Street Capacity Investigations

100 Year frequency storm shall be contained within street right-of-way.

Street [1]	Section	Street Slope (ft/ft) [2]	Capacity to RW Elevation (cfs) [3] ½ Street	Design "Q100" (cfs) [4]	Remarks
ARNETT ROAD	CB #1	0.010	35.9	1.7	[3] > [4] - O.K.
ARNETT ROAD	CB #7	0.006	27.8	4.1	[3] > [4] - O.K.
ARNETT ROAD	CB #5	0.006	27.8	14.1	[3] > [4] - O.K.
ARNETT ROAD.	CB #6	0.006	27.8	8.2	[3] > [4] - O.K.
CRYSTAL WAY	CB #2	0.054	80.9	7.3	[3] > [4] - O.K.
CRYSTAL WAY	CB #3	0.054	80.9	9.0	[3] > [4] - O.K.
CRYSTAL WAY	CB #4	0.045	73.8	12.0+2.5 =14.5	[3] > [4] - O.K.
CRYSTAL WAY	CB #4	0.005	24.6	5.2	[3] > [4] - O.K.
TOUCHSTONE COURT	CB #8	0.035	65.1	5.8	[3] > [4] - O.K.
ARNETT ROAD	@ 28' TC TO TC	0.006	38.4	8.4	[3] > [4] - O.K.

TYPICAL STREET SECTION



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==========================================================================
              ** RESULTS OF IRREGULAR CHANNEL ANALYSIS **
                CALCULATIONS BASED ON MANNINGS EQUATION
             WITH ALL DIMENSIONS IN FEET OR FEET AND SECONDS

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                    Email: mdsirvine@mdsconsulting.net


 ************************** DESCRIPTION OF STUDY **************************
* TRACT 32535, ARNETT ROAD                                                *
* TYPICAL FULL STREET SECTION CAPACITY, 60' R/W TO R/W                    *
* Q100 = 71.0 CFS, WITH S=0.0100 @ CB #1                                  *
 **************************************************************************

    TIME/DATE OF STUDY: 16:41 07/17/2013
--------------------------------------------------------------------------
            * ENTERED INFORMATION FOR SUBCHANNEL NUMBER  1 :
            NODE NUMBER      "X" COORDINATE     "Y" COORDINATE

                 1                 0.00              10.20
                 2                10.00              10.00
                 3                10.13               9.50
                 4                12.00               9.63
                 5                12.01               9.66
                 6                30.00              10.02
            SUBCHANNEL SLOPE(FEET/FEET) = 0.010000
            SUBCHANNEL MANNINGS FRICTION FACTOR = 0.015000

..........................................................................
         SUBCHANNEL FLOW(CFS) =       35.9
         SUBCHANNEL FLOW AREA(SQUARE FEET) =        8.43
         SUBCHANNEL FLOW VELOCITY(FEET/SEC.) =    4.258
         SUBCHANNEL FROUDE NUMBER =  1.404
         SUBCHANNEL FLOW TOP-WIDTH(FEET) =      29.50
         SUBCHANNEL HYDRAULIC DEPTH(FEET) =    0.29

--------------------------------------------------------------------------
--------------------------------------------------------------------------
            * ENTERED INFORMATION FOR SUBCHANNEL NUMBER  2 :
            NODE NUMBER      "X" COORDINATE     "Y" COORDINATE

                 1                30.00              10.02
                 2                47.99               9.66
                 3                48.00               9.63
                 4                49.87               9.50
                 5                50.00              10.00
                 6                60.00              10.20
            SUBCHANNEL SLOPE(FEET/FEET) = 0.010000
            SUBCHANNEL MANNINGS FRICTION FACTOR = 0.015000

..........................................................................
         SUBCHANNEL FLOW(CFS) =       35.9
         SUBCHANNEL FLOW AREA(SQUARE FEET) =        8.43
```

```
SUBCHANNEL FLOW VELOCITY(FEET/SEC.) =     4.258
SUBCHANNEL FROUDE NUMBER =  1.404
SUBCHANNEL FLOW TOP-WIDTH(FEET) =       29.50
SUBCHANNEL HYDRAULIC DEPTH(FEET) =    0.29

--------------------------------------------------------------------------
--------------------------------------------------------------------------
TOTAL IRREGULAR CHANNEL FLOW(CFS) WANTED =       71.00
COMPUTED IRREGULAR CHANNEL FLOW(CFS) =      71.80

ESTIMATED IRREGULAR CHANNEL NORMAL DEPTH WATER SURFACE
ELEVATION.............................     10.19


     NOTE: WATER SURFACE IS BELOW EXTREME
           LEFT AND RIGHT BANK ELEVATIONS.

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

```
==========================================================================
              ** RESULTS OF IRREGULAR CHANNEL ANALYSIS **
                CALCULATIONS BASED ON MANNINGS EQUATION
             WITH ALL DIMENSIONS IN FEET OR FEET AND SECONDS

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                    Email: mdsirvine@mdsconsulting.net


 ************************** DESCRIPTION OF STUDY **************************
* TRACT 32535, ARNETT ROAD                                                *
* TYPICAL FULL STREET SECTION CAPACITY, 60' R/W TO R/W                    *
* Q100 = 55.0 CFS, WITH S=0.0060 @ CB #5, #6 & #7                         *
 **************************************************************************

    TIME/DATE OF STUDY: 16:29 07/17/2013
--------------------------------------------------------------------------
            * ENTERED INFORMATION FOR SUBCHANNEL NUMBER  1 :
            NODE NUMBER      "X" COORDINATE     "Y" COORDINATE

                 1                 0.00              10.20
                 2                10.00              10.00
                 3                10.13               9.50
                 4                12.00               9.63
                 5                12.01               9.66
                 6                30.00              10.02
            SUBCHANNEL SLOPE(FEET/FEET) = 0.006000
            SUBCHANNEL MANNINGS FRICTION FACTOR = 0.015000

..........................................................................
         SUBCHANNEL FLOW(CFS) =       27.8
         SUBCHANNEL FLOW AREA(SQUARE FEET) =        8.43
         SUBCHANNEL FLOW VELOCITY(FEET/SEC.) =     3.298
         SUBCHANNEL FROUDE NUMBER =  1.087
         SUBCHANNEL FLOW TOP-WIDTH(FEET) =       29.50
         SUBCHANNEL HYDRAULIC DEPTH(FEET) =     0.29

--------------------------------------------------------------------------
--------------------------------------------------------------------------
            * ENTERED INFORMATION FOR SUBCHANNEL NUMBER  2 :
            NODE NUMBER      "X" COORDINATE     "Y" COORDINATE

                 1                30.00              10.02
                 2                47.99               9.66
                 3                48.00               9.63
                 4                49.87               9.50
                 5                50.00              10.00
                 6                60.00              10.20
            SUBCHANNEL SLOPE(FEET/FEET) = 0.006000
            SUBCHANNEL MANNINGS FRICTION FACTOR = 0.015000

..........................................................................
         SUBCHANNEL FLOW(CFS) =       27.8
         SUBCHANNEL FLOW AREA(SQUARE FEET) =        8.43
```

```
SUBCHANNEL FLOW VELOCITY(FEET/SEC.) =    3.298
SUBCHANNEL FROUDE NUMBER =  1.087
SUBCHANNEL FLOW TOP-WIDTH(FEET) =      29.50
SUBCHANNEL HYDRAULIC DEPTH(FEET) =    0.29

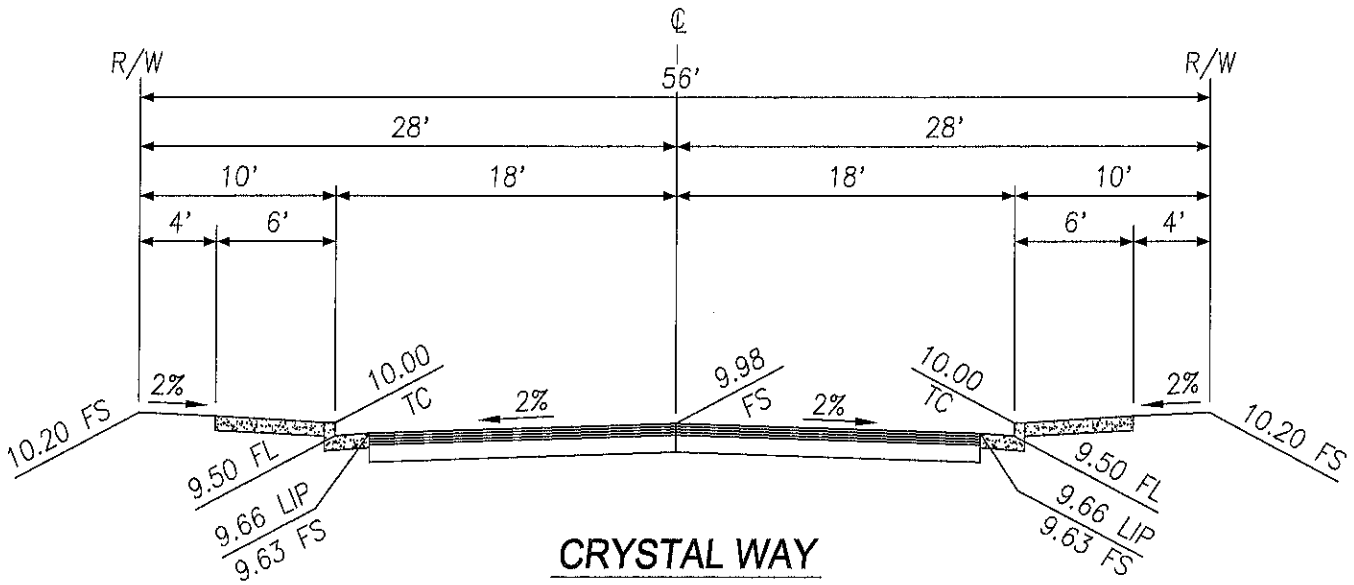
--------------------------------------------------------------------------
--------------------------------------------------------------------------
TOTAL IRREGULAR CHANNEL FLOW(CFS) WANTED =      55.00
COMPUTED IRREGULAR CHANNEL FLOW(CFS) =      55.61

ESTIMATED IRREGULAR CHANNEL NORMAL DEPTH WATER SURFACE
ELEVATION.............................     10.19


     NOTE: WATER SURFACE IS BELOW EXTREME
           LEFT AND RIGHT BANK ELEVATIONS.

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

TYPICAL STREET SECTION



CRYSTAL WAY

N.T.S.

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PLANNERS ENGINEERS SURVEYORS

```
==========================================================================
              ** RESULTS OF IRREGULAR CHANNEL ANALYSIS **
                CALCULATIONS BASED ON MANNINGS EQUATION
             WITH ALL DIMENSIONS IN FEET OR FEET AND SECONDS

==========================================================================
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                          Analysis prepared by:

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 ************************* DESCRIPTION OF STUDY *************************
* TRACT 32535, CRYSTAL WAY                                               *
* TYPICAL FULL STREET SECTION CAPACITY, 56' R/W TO R/W                   *
* Q100 = 161.0 CFS, WITH S=0.0540 @ CB #2 & #3                           *
 ************************************************************************

   TIME/DATE OF STUDY: 16:18 07/17/2013
--------------------------------------------------------------------------
           * ENTERED INFORMATION FOR SUBCHANNEL NUMBER  1 :
           NODE NUMBER      "X" COORDINATE     "Y" COORDINATE

                1                 0.00              10.20
                2                10.00              10.00
                3                10.13               9.50
                4                12.00               9.63
                5                12.01               9.66
                6                28.00               9.98
           SUBCHANNEL SLOPE(FEET/FEET) = 0.054000
           SUBCHANNEL MANNINGS FRICTION FACTOR = 0.015000

..........................................................................
        SUBCHANNEL FLOW(CFS) =       80.9
        SUBCHANNEL FLOW AREA(SQUARE FEET) =        8.05
        SUBCHANNEL FLOW VELOCITY(FEET/SEC.) =   10.048
        SUBCHANNEL FROUDE NUMBER =  3.273
        SUBCHANNEL FLOW TOP-WIDTH(FEET) =      27.50
        SUBCHANNEL HYDRAULIC DEPTH(FEET) =    0.29

--------------------------------------------------------------------------
--------------------------------------------------------------------------
           * ENTERED INFORMATION FOR SUBCHANNEL NUMBER  2 :
           NODE NUMBER      "X" COORDINATE     "Y" COORDINATE

                1                28.00               9.98
                2                43.99               9.66
                3                44.00               9.63
                4                45.87               9.50
                5                46.00              10.00
                6                56.00              10.20
           SUBCHANNEL SLOPE(FEET/FEET) = 0.054000
           SUBCHANNEL MANNINGS FRICTION FACTOR = 0.015000

..........................................................................
        SUBCHANNEL FLOW(CFS) =       80.9
        SUBCHANNEL FLOW AREA(SQUARE FEET) =        8.05
```

```
SUBCHANNEL FLOW VELOCITY(FEET/SEC.) =   10.048
SUBCHANNEL FROUDE NUMBER =  3.273
SUBCHANNEL FLOW TOP-WIDTH(FEET) =      27.50
SUBCHANNEL HYDRAULIC DEPTH(FEET) =    0.29

--------------------------------------------------------------------------
--------------------------------------------------------------------------
TOTAL IRREGULAR CHANNEL FLOW(CFS) WANTED =     161.00
COMPUTED IRREGULAR CHANNEL FLOW(CFS) =     161.79

ESTIMATED IRREGULAR CHANNEL NORMAL DEPTH WATER SURFACE
ELEVATION.............................     10.19


     NOTE: WATER SURFACE IS BELOW EXTREME
           LEFT AND RIGHT BANK ELEVATIONS.

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

```
==========================================================================
              ** RESULTS OF IRREGULAR CHANNEL ANALYSIS **
                CALCULATIONS BASED ON MANNINGS EQUATION
             WITH ALL DIMENSIONS IN FEET OR FEET AND SECONDS

==========================================================================
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                    Email: mdsirvine@mdsconsulting.net


 ************************* DESCRIPTION OF STUDY *************************
* TRACT 32535, CRYSTAL WAY                                               *
* TYPICAL FULL STREET SECTION CAPACITY, 56' R/W TO R/W                   *
* Q100 = 147.0 CFS, WITH S=0.0450 @ CB #4                                *
 ************************************************************************

   TIME/DATE OF STUDY: 10:44 07/29/2013
--------------------------------------------------------------------------
           * ENTERED INFORMATION FOR SUBCHANNEL NUMBER  1 :
           NODE NUMBER      "X" COORDINATE     "Y" COORDINATE

                1                 0.00              10.20
                2                10.00              10.00
                3                10.13               9.50
                4                12.00               9.63
                5                12.01               9.66
                6                28.00               9.98
           SUBCHANNEL SLOPE(FEET/FEET) = 0.045000
           SUBCHANNEL MANNINGS FRICTION FACTOR = 0.015000

..........................................................................
        SUBCHANNEL FLOW(CFS) =       73.8
        SUBCHANNEL FLOW AREA(SQUARE FEET) =        8.05
        SUBCHANNEL FLOW VELOCITY(FEET/SEC.) =     9.173
        SUBCHANNEL FROUDE NUMBER =  2.988
        SUBCHANNEL FLOW TOP-WIDTH(FEET) =       27.50
        SUBCHANNEL HYDRAULIC DEPTH(FEET) =     0.29

--------------------------------------------------------------------------
--------------------------------------------------------------------------
           * ENTERED INFORMATION FOR SUBCHANNEL NUMBER  2 :
           NODE NUMBER      "X" COORDINATE     "Y" COORDINATE

                1                28.00               9.98
                2                43.99               9.66
                3                44.00               9.63
                4                45.87               9.50
                5                46.00              10.00
                6                56.00              10.20
           SUBCHANNEL SLOPE(FEET/FEET) = 0.045000
           SUBCHANNEL MANNINGS FRICTION FACTOR = 0.015000

..........................................................................
        SUBCHANNEL FLOW(CFS) =       73.8
        SUBCHANNEL FLOW AREA(SQUARE FEET) =        8.05
```

```
SUBCHANNEL FLOW VELOCITY(FEET/SEC.) =     9.173
SUBCHANNEL FROUDE NUMBER =  2.988
SUBCHANNEL FLOW TOP-WIDTH(FEET) =       27.50
SUBCHANNEL HYDRAULIC DEPTH(FEET) =    0.29

--------------------------------------------------------------------------
--------------------------------------------------------------------------
TOTAL IRREGULAR CHANNEL FLOW(CFS) WANTED =      147.00
COMPUTED IRREGULAR CHANNEL FLOW(CFS) =     147.69

ESTIMATED IRREGULAR CHANNEL NORMAL DEPTH WATER SURFACE
ELEVATION.............................     10.19


     NOTE: WATER SURFACE IS BELOW EXTREME
           LEFT AND RIGHT BANK ELEVATIONS.

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

```
==========================================================================
              ** RESULTS OF IRREGULAR CHANNEL ANALYSIS **
                CALCULATIONS BASED ON MANNINGS EQUATION
             WITH ALL DIMENSIONS IN FEET OR FEET AND SECONDS

==========================================================================
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 ************************** DESCRIPTION OF STUDY **************************
* TRACT 32535, CRYSTAL WAY                                                *
* TYPICAL FULL STREET SECTION CAPACITY, 56' R/W TO R/W                    *
* Q100 = 49.0 CFS, WITH S=0.0050 @ CB #4                                  *
 **************************************************************************

   TIME/DATE OF STUDY: 13:50 12/16/2013
--------------------------------------------------------------------------
           * ENTERED INFORMATION FOR SUBCHANNEL NUMBER  1 :
           NODE NUMBER      "X" COORDINATE     "Y" COORDINATE

                1                  0.00              10.20
                2                 10.00              10.00
                3                 10.13               9.50
                4                 12.00               9.63
                5                 12.01               9.66
                6                 28.00               9.98
           SUBCHANNEL SLOPE(FEET/FEET) = 0.005000
           SUBCHANNEL MANNINGS FRICTION FACTOR = 0.015000

..........................................................................
        SUBCHANNEL FLOW(CFS) =       24.6
        SUBCHANNEL FLOW AREA(SQUARE FEET) =        8.05
        SUBCHANNEL FLOW VELOCITY(FEET/SEC.) =     3.058
        SUBCHANNEL FROUDE NUMBER =  0.996
        SUBCHANNEL FLOW TOP-WIDTH(FEET) =       27.50
        SUBCHANNEL HYDRAULIC DEPTH(FEET) =     0.29

--------------------------------------------------------------------------
--------------------------------------------------------------------------
           * ENTERED INFORMATION FOR SUBCHANNEL NUMBER  2 :
           NODE NUMBER      "X" COORDINATE     "Y" COORDINATE

                1                 28.00               9.98
                2                 43.99               9.66
                3                 44.00               9.63
                4                 45.87               9.50
                5                 46.00              10.00
                6                 56.00              10.20
           SUBCHANNEL SLOPE(FEET/FEET) = 0.005000
           SUBCHANNEL MANNINGS FRICTION FACTOR = 0.015000

..........................................................................
        SUBCHANNEL FLOW(CFS) =       24.6
        SUBCHANNEL FLOW AREA(SQUARE FEET) =        8.05
```

```
SUBCHANNEL FLOW VELOCITY(FEET/SEC.) =     3.058
SUBCHANNEL FROUDE NUMBER =  0.996
SUBCHANNEL FLOW TOP-WIDTH(FEET) =       27.50
SUBCHANNEL HYDRAULIC DEPTH(FEET) =     0.29

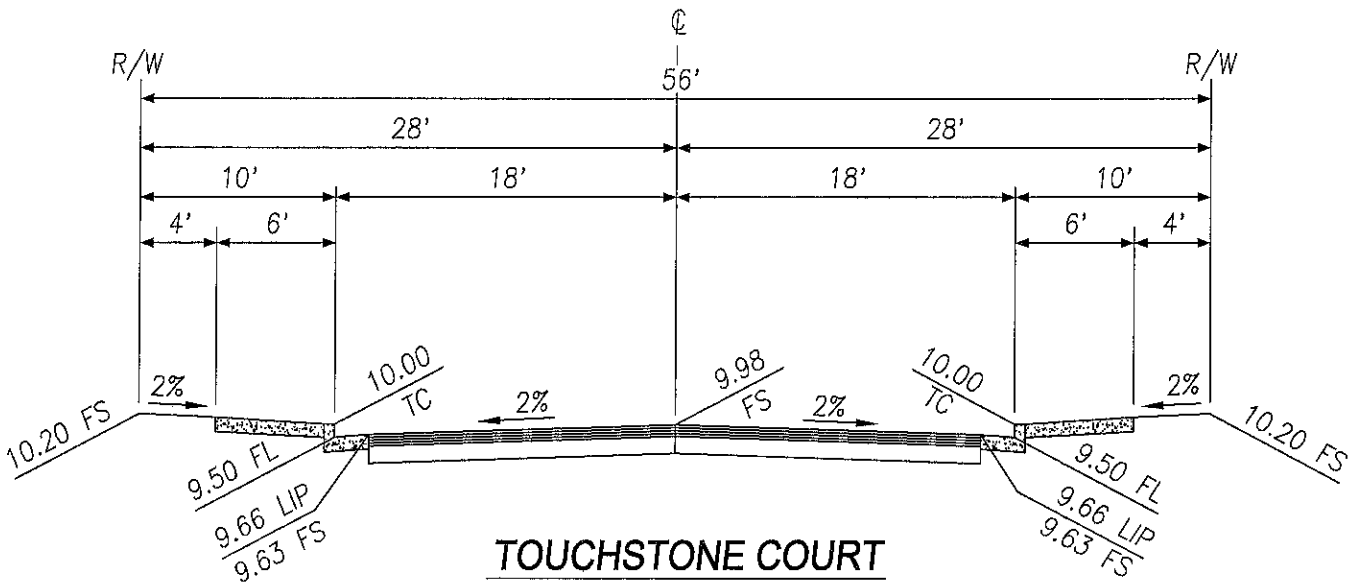
--------------------------------------------------------------------------
--------------------------------------------------------------------------
TOTAL IRREGULAR CHANNEL FLOW(CFS) WANTED =       49.00
COMPUTED IRREGULAR CHANNEL FLOW(CFS) =       49.23

ESTIMATED IRREGULAR CHANNEL NORMAL DEPTH WATER SURFACE
ELEVATION.............................     10.19


     NOTE: WATER SURFACE IS BELOW EXTREME
           LEFT AND RIGHT BANK ELEVATIONS.

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

TYPICAL STREET SECTION



TOUCHSTONE COURT

N.T.S.

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```
==========================================================================
                ** RESULTS OF IRREGULAR CHANNEL ANALYSIS **
                  CALCULATIONS BASED ON MANNINGS EQUATION
               WITH ALL DIMENSIONS IN FEET OR FEET AND SECONDS

==========================================================================
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 ************************* DESCRIPTION OF STUDY *************************
* TRACT 32535, TOUCHSTONE COURT                                          *
* TYPICAL FULL STREET SECTION CAPACITY, 56' R/W TO R/W                   *
* Q100 = 130.0 CFS, WITH S=0.0350 @ CB #8                                *
 **************************************************************************

    TIME/DATE OF STUDY: 14:46 07/18/2013
--------------------------------------------------------------------------
           * ENTERED INFORMATION FOR SUBCHANNEL NUMBER  1 :
           NODE NUMBER       "X" COORDINATE      "Y" COORDINATE

                1                  0.00               10.20
                2                 10.00               10.00
                3                 10.13                9.50
                4                 12.00                9.63
                5                 12.01                9.66
                6                 28.00                9.98
           SUBCHANNEL SLOPE(FEET/FEET) = 0.035000
           SUBCHANNEL MANNINGS FRICTION FACTOR = 0.015000

..........................................................................
         SUBCHANNEL FLOW(CFS) =       65.1
         SUBCHANNEL FLOW AREA(SQUARE FEET) =        8.05
         SUBCHANNEL FLOW VELOCITY(FEET/SEC.) =     8.089
         SUBCHANNEL FROUDE NUMBER =  2.635
         SUBCHANNEL FLOW TOP-WIDTH(FEET) =       27.50
         SUBCHANNEL HYDRAULIC DEPTH(FEET) =     0.29

--------------------------------------------------------------------------
--------------------------------------------------------------------------
           * ENTERED INFORMATION FOR SUBCHANNEL NUMBER  2 :
           NODE NUMBER       "X" COORDINATE      "Y" COORDINATE

                1                 28.00                9.98
                2                 43.99                9.66
                3                 44.00                9.63
                4                 45.87                9.50
                5                 46.00               10.00
                6                 56.00               10.20
           SUBCHANNEL SLOPE(FEET/FEET) = 0.035000
           SUBCHANNEL MANNINGS FRICTION FACTOR = 0.015000

..........................................................................
         SUBCHANNEL FLOW(CFS) =       65.1
         SUBCHANNEL FLOW AREA(SQUARE FEET) =        8.05
```

```
SUBCHANNEL FLOW VELOCITY(FEET/SEC.) =    8.089
SUBCHANNEL FROUDE NUMBER =  2.635
SUBCHANNEL FLOW TOP-WIDTH(FEET) =      27.50
SUBCHANNEL HYDRAULIC DEPTH(FEET) =    0.29

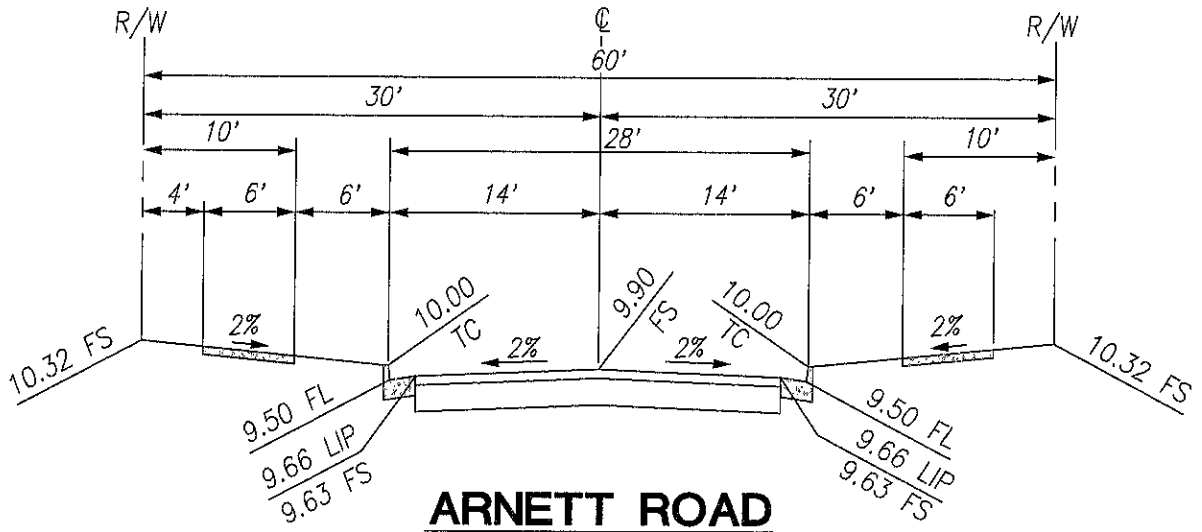
--------------------------------------------------------------------------
--------------------------------------------------------------------------
TOTAL IRREGULAR CHANNEL FLOW(CFS) WANTED =     130.00
COMPUTED IRREGULAR CHANNEL FLOW(CFS) =     130.25

ESTIMATED IRREGULAR CHANNEL NORMAL DEPTH WATER SURFACE
ELEVATION.............................     10.19


     NOTE: WATER SURFACE IS BELOW EXTREME
           LEFT AND RIGHT BANK ELEVATIONS.

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

TYPICAL STREET SECTION



ARNETT ROAD

STA. 20+33.83 TO 23+50.00

NOT TO SCALE

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I:\80334\HYDRO\STCAP-AA.dwg 11/10/13

```
==========================================================================
              ** RESULTS OF IRREGULAR CHANNEL ANALYSIS **
                CALCULATIONS BASED ON MANNINGS EQUATION
             WITH ALL DIMENSIONS IN FEET OR FEET AND SECONDS

==========================================================================
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 ************************** DESCRIPTION OF STUDY **************************
* TRACT 32535, ARNETT ROAD FROM STA. 20+33.83 TO 23+50.00                 *
* TYPICAL FULL STREET SECTION CAPACITY, 60' R/W TO R/W                    *
* Q100 = 76.0 CFS, WITH S=0.0060                                          *
 **************************************************************************

   TIME/DATE OF STUDY: 10:30 11/10/2013
--------------------------------------------------------------------------
          * ENTERED INFORMATION FOR SUBCHANNEL NUMBER  1 :
          NODE NUMBER       "X" COORDINATE      "Y" COORDINATE

               1                  0.00               10.32
               2                 16.00               10.00
               3                 16.13                9.50
               4                 18.00                9.63
               5                 18.01                9.66
               6                 30.00                9.90
          SUBCHANNEL SLOPE(FEET/FEET) = 0.006000
          SUBCHANNEL MANNINGS FRICTION FACTOR = 0.015000

..........................................................................
        SUBCHANNEL FLOW(CFS) =       38.4
        SUBCHANNEL FLOW AREA(SQUARE FEET) =       10.23
        SUBCHANNEL FLOW VELOCITY(FEET/SEC.) =     3.752
        SUBCHANNEL FROUDE NUMBER =  1.123
        SUBCHANNEL FLOW TOP-WIDTH(FEET) =       29.50
        SUBCHANNEL HYDRAULIC DEPTH(FEET) =     0.35

--------------------------------------------------------------------------
--------------------------------------------------------------------------
          * ENTERED INFORMATION FOR SUBCHANNEL NUMBER  2 :
          NODE NUMBER       "X" COORDINATE      "Y" COORDINATE

               1                 30.00                9.90
               2                 41.99                9.66
               3                 42.00                9.63
               4                 43.87                9.50
               5                 44.00               10.00
               6                 60.00               10.32
          SUBCHANNEL SLOPE(FEET/FEET) = 0.006000
          SUBCHANNEL MANNINGS FRICTION FACTOR = 0.015000

..........................................................................
        SUBCHANNEL FLOW(CFS) =       38.4
        SUBCHANNEL FLOW AREA(SQUARE FEET) =       10.23
```

```
SUBCHANNEL FLOW VELOCITY(FEET/SEC.) =     3.752
SUBCHANNEL FROUDE NUMBER =  1.123
SUBCHANNEL FLOW TOP-WIDTH(FEET) =       29.50
SUBCHANNEL HYDRAULIC DEPTH(FEET) =     0.35

--------------------------------------------------------------------------
--------------------------------------------------------------------------
TOTAL IRREGULAR CHANNEL FLOW(CFS) WANTED =       76.00
COMPUTED IRREGULAR CHANNEL FLOW(CFS) =       76.77

ESTIMATED IRREGULAR CHANNEL NORMAL DEPTH WATER SURFACE
ELEVATION.............................     10.31

     NOTE: WATER SURFACE IS BELOW EXTREME
           LEFT AND RIGHT BANK ELEVATIONS.

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

Appendix D

CATCH BASIN SIZE CALCULATIONS

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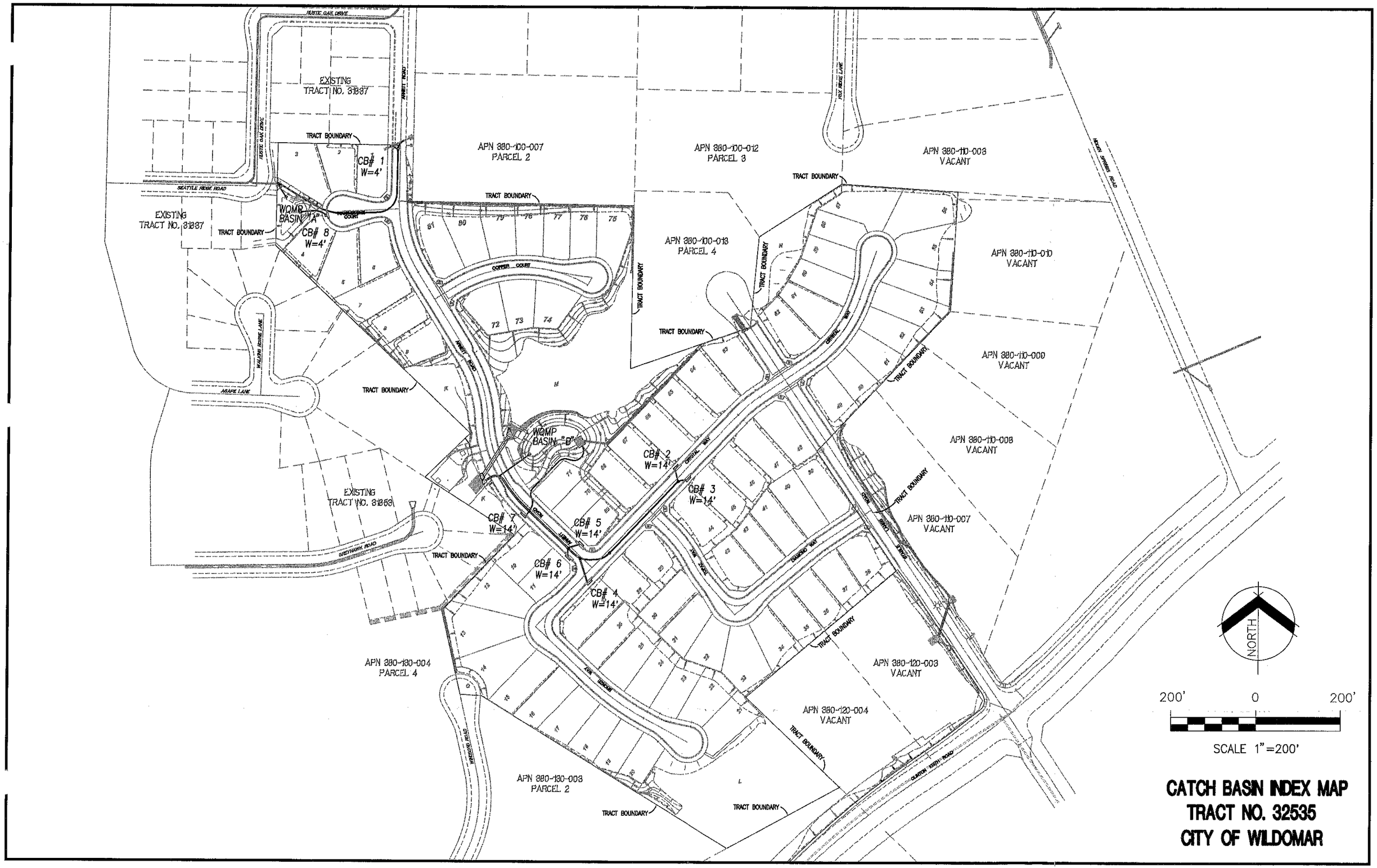

CATCH BASIN INDEX MAP
TRACT NO. 32535
CITY OF WILDOMAR

I:\80334\HYDRO\CB Index Map.dwg 12/03/13

TRACT NO. 32535 – CATCH BASIN SUMMARY

(SEE CALCULATION NEXT PAGES)

CB #	CB TYPE	DESIGN "Q_{100}" (cfs) [1]	STREET SLOPE [2]	STREET DEPTH OF FLOW (ft) [3]	CURB OPENING TYPE "W" (ft) [4]	TOTAL INTERCEPTED "Q" = TOTAL (cfs) [5]	REMARKS
1	SUMP	1.7	POND TO TC ELEV.	0.83	4	1.7	NODE 13 @ ARNETT ROAD
2	FLOW BY	7.3	POND TO TC ELEV.	0.37	14	5.8 C.O. 1.5 TO CB # 5	NODE 31 @ CRYSTAL WAY
3	FLOW BY	9.0	POND TO TC ELEV.	0.39	14	6.5 C.O. 2.5 TO CB # 4	NODE 21 @ CRYSTAL WAY
4	SUMP	17.2 + 2.5 (#3) = 19.7	POND TO TC ELEV.	0.83	14	19.7	NODE 41 @ CRYSTAL WAY
5	SUMP	10.0 + 1.5 (#2) = 11.5	POND TO TC ELEV.	0.83	14	11.5	NODE 61 @ ARNETT ROAD
6	SUMP	8.2 + 0.4 (#7) = 8.6	POND TO TC ELEV.	0.83	14	8.6	NODE 51 @ ARNETT ROAD

TRACT NO. 32535 – CATCH BASIN SUMMARY

(SEE CALCULATION NEXT PAGES)

CB #	CB TYPE	DESIGN "Q_{100}" (cfs) [1]	STREET SLOPE [2]	STREET DEPTH OF FLOW (ft) [3]	CURB OPENING TYPE "W" (ft) [4]	TOTAL INTERCEPTED "Q" = TOTAL (cfs) [5]	REMARKS
7	FLOW BY	6.7	POND TO TC ELEV.	0.44	14	6.3 C.O. 0.4 TO CB # 6	NODE 71 @ ARNETT ROAD
8	SUMP	5.8	POND TO TC ELEV.	0.83	4	5.8	NODE 11 @ TOUCHSTONE COURT

```
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----------------------------------------------------------------------------
  TIME/DATE OF STUDY: 07:46 05/11/2013
============================================================================
 Problem Descriptions:
  TRACT 32535
  CB #1
  Q100 = 1.7 CFS
****************************************************************************
>>>>SUMP TYPE BASIN INPUT INFORMATION<<<<
----------------------------------------------------------------------------


    Curb Inlet Capacities are approximated based on the Bureau of
    Public Roads nomograph plots for flowby basins and sump basins.


    BASIN INFLOW(CFS) =     1.70
    BASIN OPENING(FEET) =  0.70
    DEPTH OF WATER(FEET) =  0.83

    >>>>CALCULATED ESTIMATED SUMP BASIN WIDTH(FEET) =        0.79

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

USED W = 4'

```
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----------------------------------------------------------------------------
  TIME/DATE OF STUDY: 14:39 07/24/2013
============================================================================
 Problem Descriptions:
  TRACT 32535
  CB #2
  Q100 = 7.3 CFS
****************************************************************************
>>>>FLOWBY CATCH BASIN INLET CAPACITY INPUT INFORMATION<<<<
----------------------------------------------------------------------------


    Curb Inlet Capacities are approximated based on the Bureau of
    Public Roads nomograph plots for flowby basins and sump basins.


    STREETFLOW(CFS) =     7.30
    GUTTER FLOWDEPTH(FEET) =  0.37
    BASIN LOCAL DEPRESSION(FEET) =  0.33

----------------------------------------------------------------------------
          FLOWBY BASIN ANALYSIS RESULTS:

       BASIN WIDTH      FLOW INTERCEPTION
            2.07            1.07
            2.50            1.28
            3.00            1.52
            3.50            1.76
            4.00            2.00
            4.50            2.24
            5.00            2.48
            5.50            2.71
            6.00            2.95
            6.50            3.18
            7.00            3.40
            7.50            3.60
            8.00            3.79
            8.50            3.97
            9.00            4.16
            9.50            4.34
           10.00            4.52
           10.50            4.69
           11.00            4.87
           11.50            5.04
           12.00            5.20
           12.50            5.36
           13.00            5.50
           13.50            5.63
           14.00            5.77
           14.50            5.89
           15.00            6.02
```

SEE NEXT PAGE

USE W = 14'

$\therefore Q_{FLOWBY\ TO\ CB\ \#5} = 7.3 - 5.8 = 1.5$ CFS

15.50	6.14
16.00	6.26
16.50	6.38
17.00	6.50
17.50	6.61
18.00	6.73
18.50	6.84
19.00	6.94
19.50	7.05
20.00	7.16
20.50	7.26
20.70	7.30

==========

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****************************************************************************
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                    Email: mdsirvine@mdsconsulting.net

----------------------------------------------------------------------------
  TIME/DATE OF STUDY: 14:22 07/24/2013
============================================================================
 Problem Descriptions:
  TRACT 32535
  DEPTH OF FLOW @ CB #2
  Q100 = 7.3 CFS
****************************************************************************
>>>>STREETFLOW MODEL INPUT INFORMATION<<<<
----------------------------------------------------------------------------
    CONSTANT STREET GRADE(FEET/FEET) = 0.054000
    CONSTANT STREET FLOW(CFS) =     7.30
    AVERAGE STREETFLOW FRICTION FACTOR(MANNING) = 0.015000
    CONSTANT SYMMETRICAL STREET HALF-WIDTH(FEET) =   18.00
    DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   13.00
    INTERIOR STREET CROSSFALL(DECIMAL) = 0.020000
    OUTSIDE  STREET CROSSFALL(DECIMAL) = 0.020000
    CONSTANT SYMMETRICAL CURB HEIGHT(FEET) =   0.50
    CONSTANT SYMMETRICAL GUTTER-WIDTH(FEET) =   2.00
    CONSTANT SYMMETRICAL GUTTER-LIP(FEET) =  0.03125
    CONSTANT SYMMETRICAL GUTTER-HIKE(FEET) =  0.16700
    FLOW ASSUMED TO FILL STREET ON ONE SIDE, AND THEN SPLITS
============================================================================
    STREET FLOW MODEL RESULTS:
----------------------------------------------------------------------------
    STREET FLOW DEPTH(FEET) = 0.37
    HALFSTREET FLOOD WIDTH(FEET) =    10.50
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.65
    PRODUCT OF DEPTH&VELOCITY =    2.08
============================================================================
```

```
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               Phone: (949) 251-8821    Fax: (949) 251-0516
                    Email: mdsirvine@mdsconsulting.net

----------------------------------------------------------------------------
  TIME/DATE OF STUDY: 07:51 05/11/2013
============================================================================
 Problem Descriptions:
  TRACT 32535
  CB #3
  Q100 = 9.0 CFS
****************************************************************************
>>>>FLOWBY CATCH BASIN INLET CAPACITY INPUT INFORMATION<<<<
----------------------------------------------------------------------------


    Curb Inlet Capacities are approximated based on the Bureau of
    Public Roads nomograph plots for flowby basins and sump basins.


    STREETFLOW(CFS) =      9.00
    GUTTER FLOWDEPTH(FEET) =  0.39
    BASIN LOCAL DEPRESSION(FEET) =  0.33

----------------------------------------------------------------------------
          FLOWBY BASIN ANALYSIS RESULTS:

        BASIN WIDTH      FLOW INTERCEPTION
            2.41             1.34
            2.50             1.38
            3.00             1.64
            3.50             1.90
            4.00             2.16
            4.50             2.42
            5.00             2.67
            5.50             2.93
            6.00             3.18
            6.50             3.43
            7.00             3.68
            7.50             3.92
            8.00             4.15
            8.50             4.38
            9.00             4.58
            9.50             4.78
           10.00             4.98
           10.50             5.17
           11.00             5.36
           11.50             5.55
           12.00             5.74
           12.50             5.93
           13.00             6.11
           13.50             6.29
           14.00             6.46
           14.50             6.63
           15.00             6.78
```

SEE NEXT PAGE

USE W = 14'

$\therefore Q_{FLOWBY\ TO\ CB\ \#4} = 9.0 - 6.5 = 2.5\ CFS$

15.50	6.92
16.00	7.06
16.50	7.20
17.00	7.34
17.50	7.47
18.00	7.60
18.50	7.72
19.00	7.85
19.50	7.97
20.00	8.09
20.50	8.21
21.00	8.32
21.50	8.43
22.00	8.55
22.50	8.65
23.00	8.76
23.50	8.87
24.00	8.97
24.15	9.00

==========

```
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----------------------------------------------------------------------------
  TIME/DATE OF STUDY: 13:43 05/10/2013
============================================================================
 Problem Descriptions:
  TRACT 32535
  DEPTH OF FLOW @ CB #3
  Q100 = 9.0 CFS
****************************************************************************
>>>>STREETFLOW MODEL INPUT INFORMATION<<<<
----------------------------------------------------------------------------
    CONSTANT STREET GRADE(FEET/FEET) = 0.054000
    CONSTANT STREET FLOW(CFS) =    9.00
    AVERAGE STREETFLOW FRICTION FACTOR(MANNING) = 0.015000
    CONSTANT SYMMETRICAL STREET HALF-WIDTH(FEET) =   18.00
    DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   13.00
    INTERIOR STREET CROSSFALL(DECIMAL) = 0.020000
    OUTSIDE  STREET CROSSFALL(DECIMAL) = 0.020000
    CONSTANT SYMMETRICAL CURB HEIGHT(FEET) =   0.50
    CONSTANT SYMMETRICAL GUTTER-WIDTH(FEET) =   2.00
    CONSTANT SYMMETRICAL GUTTER-LIP(FEET) =  0.03125
    CONSTANT SYMMETRICAL GUTTER-HIKE(FEET) =  0.16700
    FLOW ASSUMED TO FILL STREET ON ONE SIDE, AND THEN SPLITS
============================================================================
    STREET FLOW MODEL RESULTS:
----------------------------------------------------------------------------
    STREET FLOW DEPTH(FEET) = 0.39
    HALFSTREET FLOOD WIDTH(FEET) =   11.50
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.95
    PRODUCT OF DEPTH&VELOCITY =    2.31
============================================================================
```

```
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----------------------------------------------------------------------------
  TIME/DATE OF STUDY: 08:12 05/10/2013
============================================================================
 Problem Descriptions:
  TRACT 32535
  CB #4                    C.O. FROM CB #3
  Q100 = 17.2 + 2.5 = 19.7 CFS
****************************************************************************
>>>>SUMP TYPE BASIN INPUT INFORMATION<<<<
----------------------------------------------------------------------------


    Curb Inlet Capacities are approximated based on the Bureau of
    Public Roads nomograph plots for flowby basins and sump basins.


    BASIN INFLOW(CFS) =   19.70
    BASIN OPENING(FEET) =  0.70
    DEPTH OF WATER(FEET) =  0.83

    >>>>CALCULATED ESTIMATED SUMP BASIN WIDTH(FEET) =       9.10

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

USE W = 14'

```
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----------------------------------------------------------------------------
  TIME/DATE OF STUDY: 08:07 11/13/2013
============================================================================
 Problem Descriptions: SPLIT FLOW TO OTHER 1/2 STREET
  TRACT 32535
  CB #5                 C.O. FROM CB #2
  Q100 = 12.6 -2.6 + 1.5 = 11.5 CFS
****************************************************************************
>>>>SUMP TYPE BASIN INPUT INFORMATION<<<<
----------------------------------------------------------------------------


    Curb Inlet Capacities are approximated based on the Bureau of
    Public Roads nomograph plots for flowby basins and sump basins.


    BASIN INFLOW(CFS) =   11.50
    BASIN OPENING(FEET) =  0.70
    DEPTH OF WATER(FEET) =  0.83

    >>>>CALCULATED ESTIMATED SUMP BASIN WIDTH(FEET) =       5.31

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

USE W = 14'

```
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----------------------------------------------------------------------------
  TIME/DATE OF STUDY: 07:52 11/11/2013
============================================================================
 Problem Descriptions:
  TRACT 32535
  CB #6                    C.O. FROM CB #7
  Q100 = 8.2 + 0.4 = 8.6 CFS
****************************************************************************
>>>>SUMP TYPE BASIN INPUT INFORMATION<<<<
----------------------------------------------------------------------------

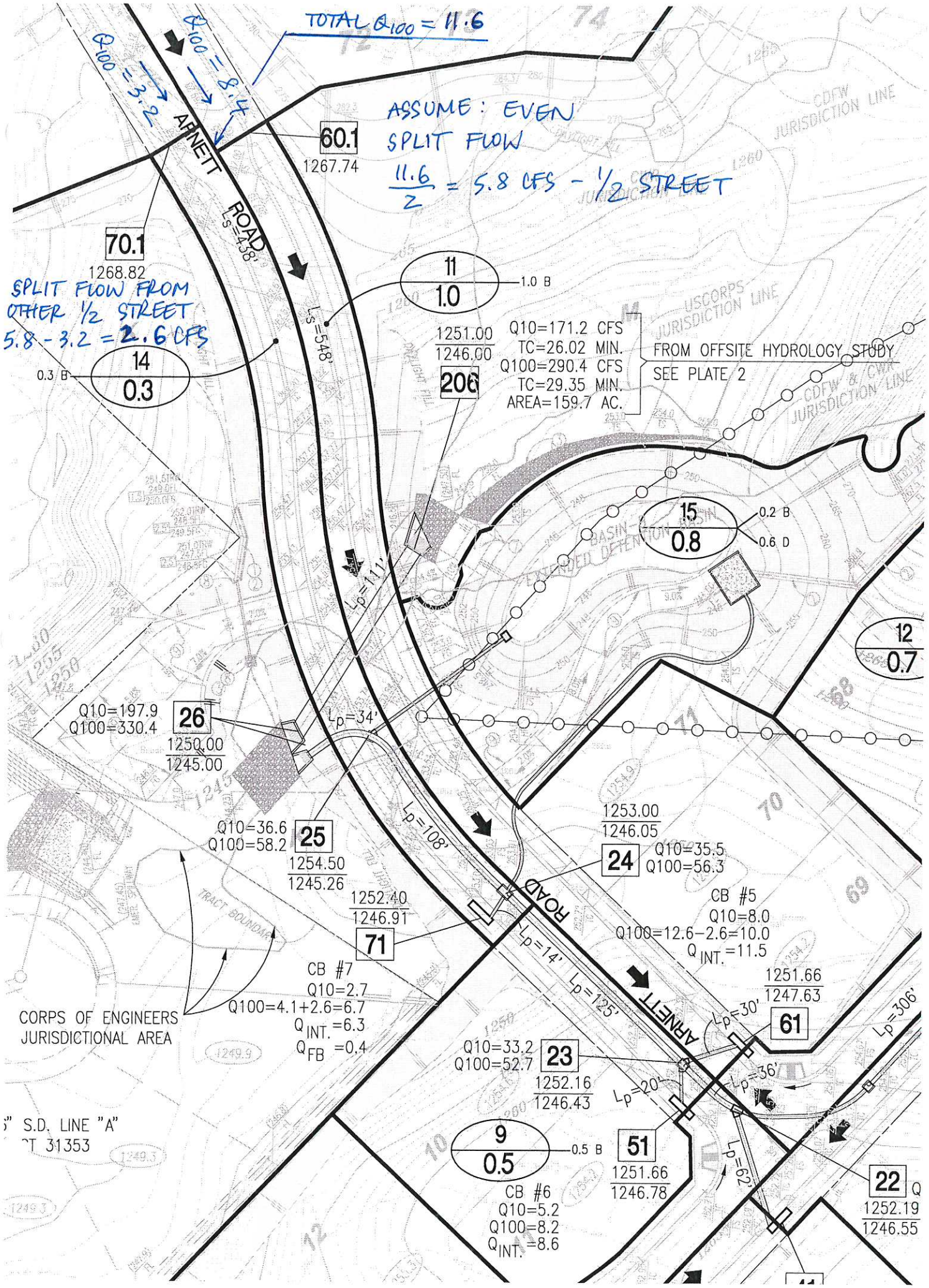

    Curb Inlet Capacities are approximated based on the Bureau of
    Public Roads nomograph plots for flowby basins and sump basins.


    BASIN INFLOW(CFS) =     8.60
    BASIN OPENING(FEET) =  0.70
    DEPTH OF WATER(FEET) =  0.83

    >>>>CALCULATED ESTIMATED SUMP BASIN WIDTH(FEET) =        3.97

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

USE W = 14'


TOTAL Q100 = 11.6
Q100 = 8.4
Q100 = 3.2
ASSUME: EVEN SPLIT FLOW
11.6/2 = 5.8 CFS - 1/2 STREET
ARNETT ROAD
Ls=438'
Ls=548'
60.1
1267.74
70.1
1268.82
SPLIT FLOW FROM OTHER 1/2 STREET
5.8 - 3.2 = 2.6 CFS
11
1.0
1.0 B
14
0.3
0.3 B
1251.00
1246.00
206
Q10=171.2 CFS
TC=26.02 MIN.
Q100=290.4 CFS
TC=29.35 MIN.
AREA=159.7 AC.
FROM OFFSITE HYDROLOGY STUDY
SEE PLATE 2
15
0.8
0.2 B
0.6 D
12
0.7
Lp=111'
Lp=34'
Lp=108'
Lp=14'
Lp=125'
Lp=30'
Lp=36'
Lp=20'
Lp=62'
Lp=306'
Q10=197.9
Q100=330.4
26
1250.00
1245.00
Q10=36.6
Q100=58.2
25
1254.50
1245.26
1253.00
1246.05
24
Q10=35.5
Q100=56.3
CB #5
Q10=8.0
Q100=12.6-2.6=10.0
Q INT.=11.5
1252.40
1246.91
71
CB #7
Q10=2.7
Q100=4.1+2.6=6.7
Q INT.=6.3
Q FB =0.4
CORPS OF ENGINEERS
JURISDICTIONAL AREA
1251.66
1247.63
61
Q10=33.2
Q100=52.7
23
1252.16
1246.43
51
1251.66
1246.78
9
0.5
0.5 B
CB #6
Q10=5.2
Q100=8.2
Q INT.=8.6
22
1252.19
1246.55
S.D. LINE "A"
T 31353

```
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-----------------------------------------------------------------------------
  TIME/DATE OF STUDY: 07:03 11/11/2013
=============================================================================
 Problem Descriptions:
  TRACT 32535
  CB #7                                  SPLIT FLOW FROM OTHER 1/2 STREET
  Q100 = 4.1 + 2.6 = 6.7 CFS
*****************************************************************************
>>>>FLOWBY CATCH BASIN INLET CAPACITY INPUT INFORMATION<<<<
-----------------------------------------------------------------------------


    Curb Inlet Capacities are approximated based on the Bureau of
    Public Roads nomograph plots for flowby basins and sump basins.


    STREETFLOW(CFS) =     6.70
    GUTTER FLOWDEPTH(FEET) = 0.44   SEE NEXT PAGE
    BASIN LOCAL DEPRESSION(FEET) =  0.33

-----------------------------------------------------------------------------
         FLOWBY BASIN ANALYSIS RESULTS:

       BASIN WIDTH      FLOW INTERCEPTION
            1.58             1.03
            2.00             1.28
            2.50             1.58
            3.00             1.88
            3.50             2.18
            4.00             2.47
            4.50             2.76
            5.00             3.03
            5.50             3.29
            6.00             3.52
            6.50             3.75
            7.00             3.97
            7.50             4.19
            8.00             4.41
            8.50             4.61
            9.00             4.81
            9.50             5.00
           10.00             5.17
           10.50             5.34
           11.00             5.49
           11.50             5.64
           12.00             5.78
           12.50             5.92
           13.00             6.05
           13.50             6.17
           14.00             6.29   USE W = 14'
           14.50             6.41
```

$\therefore Q_{FLOWBY}$ TO CB #6 = 6.7 − 6.3 = 0.4 CFS

15.00	6.52
15.50	6.63
15.83	6.70

```
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-----------------------------------------------------------------------------
  TIME/DATE OF STUDY: 07:05 11/11/2013
=============================================================================
 Problem Descriptions:
  TRACT 32535                SPLIT FLOW FROM OTHER 1/2 STREET
  DEPTH OF FLOW @ CB #7
  Q100 = 4.1 + 2.6 = 6.7 CFS
*****************************************************************************
>>>>STREETFLOW MODEL INPUT INFORMATION<<<<
-----------------------------------------------------------------------------
    CONSTANT STREET GRADE(FEET/FEET) = 0.006000
    CONSTANT STREET FLOW(CFS) =     6.70
    AVERAGE STREETFLOW FRICTION FACTOR(MANNING) = 0.015000
    CONSTANT SYMMETRICAL STREET HALF-WIDTH(FEET) =    20.00
    DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =    18.00
    INTERIOR STREET CROSSFALL(DECIMAL) = 0.020000
    OUTSIDE  STREET CROSSFALL(DECIMAL) = 0.020000
    CONSTANT SYMMETRICAL CURB HEIGHT(FEET) =    0.50
    CONSTANT SYMMETRICAL GUTTER-WIDTH(FEET) =    2.00
    CONSTANT SYMMETRICAL GUTTER-LIP(FEET) =  0.03125
    CONSTANT SYMMETRICAL GUTTER-HIKE(FEET) =  0.12500
    FLOW ASSUMED TO FILL STREET ON ONE SIDE, AND THEN SPLITS
=============================================================================
    STREET FLOW MODEL RESULTS:
-----------------------------------------------------------------------------
    STREET FLOW DEPTH(FEET) =  0.44
    HALFSTREET FLOOD WIDTH(FEET) =    16.34
    AVERAGE FLOW VELOCITY(FEET/SEC.) =     2.38
    PRODUCT OF DEPTH&VELOCITY =     1.05
=============================================================================
```

```
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----------------------------------------------------------------------------
  TIME/DATE OF STUDY: 10:39 12/11/2013
============================================================================
 Problem Descriptions:
  TRACT 32535
  CB #8
  Q100 = 5.8 CFS
****************************************************************************
>>>>SUMP TYPE BASIN INPUT INFORMATION<<<<
----------------------------------------------------------------------------


    Curb Inlet Capacities are approximated based on the Bureau of
    Public Roads nomograph plots for flowby basins and sump basins.


    BASIN INFLOW(CFS) =     5.80
    BASIN OPENING(FEET) =  0.70
    DEPTH OF WATER(FEET) =  0.83

    >>>>CALCULATED ESTIMATED SUMP BASIN WIDTH(FEET) =       2.68

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

USE W = 4'

```
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----------------------------------------------------------------------------
  TIME/DATE OF STUDY: 09:59 08/02/2013
============================================================================
 Problem Descriptions:
  TRACR 32535
  LOW FLOW LATERAL "B-2" CAPACITY
  Q BMP = 1.6 CFS
****************************************************************************
>>>>PIPEFLOW HYDRAULIC INPUT INFORMATION<<<<
----------------------------------------------------------------------------
    PIPE DIAMETER(FEET) =    1.500
    FLOWDEPTH(FEET) =    0.540
    PIPE SLOPE(FEET/FEET) =    0.0030
    MANNINGS FRICTION FACTOR = 0.013000
    >>>>> NORMAL DEPTH FLOW(CFS) =      1.60
============================================================================
    NORMAL-DEPTH FLOW INFORMATION:
----------------------------------------------------------------------------
    NORMAL DEPTH(FEET) =      0.54
    FLOW AREA(SQUARE FEET) =      0.57
    FLOW TOP-WIDTH(FEET) =     1.440
    FLOW PRESSURE + MOMENTUM(POUNDS) =           16.65
    FLOW VELOCITY(FEET/SEC.) =           2.785
    FLOW VELOCITY HEAD(FEET) =           0.120
    HYDRAULIC DEPTH(FEET) =      0.40
    FROUDE NUMBER =     0.778
    SPECIFIC ENERGY(FEET) =            0.66
============================================================================
```

Q_{BMP} – SEE NEXT PAGE

= 1.6 CFS ∴ OK

Santa Margarita Watershed

BMP Design Flow Rate, Q_{BMP} (Rev. 03-2012)

Legend: Required Entries / Calculated Cells

Company Name MDS Consulting

Date 7/30/2013

Designed by Dylan Nguyen

County/City Case No

Company Project Number/Name 803-34, North Ranch

Drainage Area Number/Name Basin B

Enter the Area Tributary to this Feature A_T = 23.5 acres

Determine the Effective Impervious Fraction

Type of post-development surface cover (use pull down menu): Mixed Surface Types

Effective Impervious Fraction I_f = 0.50

Calculate the composite Runoff Coefficient, C for the BMP Tributary Area

Use the following equation based on the WEF/ASCE Method

$C = 0.858I_f^3 - 0.78I_f^2 + 0.774I_f + 0.04$

C = 0.34

BMP Design Flow Rate

$Q_{BMP} = C \times I \times A_T$

Q_{BMP} = 1.6 ft^3/s

Notes:

```
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----------------------------------------------------------------------------
  TIME/DATE OF STUDY: 09:49 11/08/2013
============================================================================
 Problem Descriptions:
  TRACT 32535
  REVERSE MODIFIED CURB OUTLET CAPACITY
  W=4.0', S=0.020 @ STABLE LANES ROAD AND CLINTON KEITH ROAD
****************************************************************************
>>>>CHANNEL INPUT INFORMATION<<<<
----------------------------------------------------------------------------
    NORMAL DEPTH(FEET) =   0.33
    CHANNEL Z1(HORIZONTAL/VERTICAL) =    0.00
            Z2(HORIZONTAL/VERTICAL) =    0.00
    BASEWIDTH(FEET) =     4.00
    CONSTANT CHANNEL SLOPE(FEET/FEET) = 0.020000
    MANNINGS FRICTION FACTOR = 0.0150
============================================================================
    NORMAL-DEPTH FLOW INFORMATION:
----------------------------------------------------------------------------
    >>>>> NORMAL DEPTH FLOW(CFS) =       7.98
    FLOW TOP-WIDTH(FEET) =          4.00
    FLOW AREA(SQUARE FEET) =            1.32
    HYDRAULIC DEPTH(FEET) =      0.33
    FLOW AVERAGE VELOCITY(FEET/SEC.) =      6.04
    UNIFORM FROUDE NUMBER =    1.854
    PRESSURE + MOMENTUM(POUNDS) =           107.00
    AVERAGED VELOCITY HEAD(FEET) =       0.567
    SPECIFIC ENERGY(FEET) =      0.897
============================================================================
    CRITICAL-DEPTH FLOW INFORMATION:
----------------------------------------------------------------------------
    CRITICAL FLOW TOP-WIDTH(FEET) =          4.00
    CRITICAL FLOW AREA(SQUARE FEET) =            1.99
    CRITICAL FLOW HYDRAULIC DEPTH(FEET) =      0.50
    CRITICAL FLOW AVERAGE VELOCITY(FEET/SEC.) =      4.01
    CRITICAL DEPTH(FEET) =     0.50
    CRITICAL FLOW PRESSURE + MOMENTUM(POUNDS) =            92.85
    AVERAGED CRITICAL FLOW VELOCITY HEAD(FEET) =       0.250
    CRITICAL FLOW SPECIFIC ENERGY(FEET) =      0.747
============================================================================
```

> 1.4 & 2.0 CFS ∴ OK

Q_{100} AT CLINTON KEITH RD.

Q_{100} AT STABLE LANES RD.

ROCK RIP-RAP CALCULATION
FOR OUTLET OF STORM DRAIN LINES "C" & "E"

STORM DRAIN LINE	Q_{100} (CFS)	V (FPS)	D_0 (FT)
"C"	290.4	13.03	5 x 8
"E"	98.0	6.16	4.5

L_a = riprap apron length (ft)
D_0 = diameter of storm drain (ft)
W = riprap apron width (ft)

Design of riprap using San Diego County Drainage Manual, Chapter 7 (see next pages)

* **Line "C" :**

With V=13.03 fps, from Table 7-1
⇒ Use ½ Ton Rip-Rap, d_{50}=2.3 ft
$L_a = 4 \times D_0 = 4 \times 8 = 32.0$ ft ∴ Use 32 ft
Thickness = $1.5 \times d_{50} = 1.5 \times 2.3 = 3.5$ ft ∴ Use 3.5 ft
$W = 3 \times D_0 = 3 \times 8 = 24.0$ ft ∴ Use 24 ft

* **Line "E" :**

With V=6.16 fps, from Table 7-1
⇒ Use ¼ Ton Rip-Rap, d_{50}=1.8 ft
$L_a = 4 \times D_0 = 4 \times 4.5 = 18.0$ ft ∴ Use 18 ft
Thickness = $1.5 \times d_{50} = 1.5 \times 1.8 = 2.7$ ft ∴ Use 2.7 ft
$W = 3 \times D_0 = 3 \times 4.5 = 13.5$ ft ∴ Use 16 ft

velocities to non-erosive or pre-project levels. In these cases, the engineer shall apply a reasonable design procedure to determine an appropriate riprap design.

7.3.1.1 San Diego Regional Standard Drawing

Apron Length and Width. Riprap apron length and width are a function of the diameter or vertical dimension of the outlet pipe or culvert. The apron length shall be determined using the following equation, with a minimum length of 10 feet:

$$L_a = 4D_O \qquad (7\text{-}1)$$

where ...

L_a = minimum riprap apron length (ft); and
D_o = diameter or width of culvert or storm drain (ft).

Where there is a well-defined channel downstream of the apron, the bottom width of the riprap apron shall be at least equal to the bottom width of the channel. The riprap apron shall extend at least one foot above the maximum tailwater elevation or the computed water surface elevation, whichever is greater. The side slopes of the riprap apron shall be 3H:1V whenever practical, but in no case be steeper than 1.5H:1V.

Where there is no well-defined channel downstream of the apron, the upstream width of the riprap apron shall be equal to twice the width of conduit or the width of the headwall, whichever is greater. The downstream width of the riprap apron shall be at least the width of the upstream end of the apron, plus one conduit diameter (D_o) on each side. Figure 7-1 illustrates the layout of the San Diego regional standard riprap apron.

Riprap Size and Thickness. Flow energy governs the size of the riprap used for energy dissipation. The San Diego Regional Standard Drawings use exit velocity as a surrogate for flow energy (Table 7-1). Riprap apron thickness shall be at least 1.5 times the nominal d_{50} of the specified riprap. Riprap shall be placed over a geotextile filter fabric, and a filter blanket material shall be placed under the fabric as appropriate. The equivalent diameter of stone (d_{50}) shall not exceed the diameter or vertical dimension of the outlet pipe, and the dimensions of the riprap apron shall be adjusted to accommodate the required stone size.

Table 7-1 Rock Size for Riprap Aprons at Storm Drain Outlets

Outlet Velocity (ft/s)	Rock Classification	Size of Stone, d_{50} (ft) [a]
6-10	No. 2 Backing	0.7
10-12	¼ Ton	1.8
12-14	½ Ton	2.3
14-16	1 Ton	2.9
16-18	2 Ton	3.6

[a] Assumes specific weight of 165 lb/ft³. The designer shall take care to apply a unit weight that is applicable to the type of riprap specified for the project, and adjust their calculations if necessary.

7.3.2 Stilling Basins

There are a number of additional types of stilling basins, and it is beyond the scope of this Manual to provide detailed information on each of them. Information about their proper application and design can be obtained from a number of sources, including the FHWA *Hydraulic Design of Energy Dissipaters for Culverts and Channels* (HEC-14), the U.S. Army Corps of Engineers' *Hydraulic Design Criteria* and *Engineer Manuals*, the Bureau of

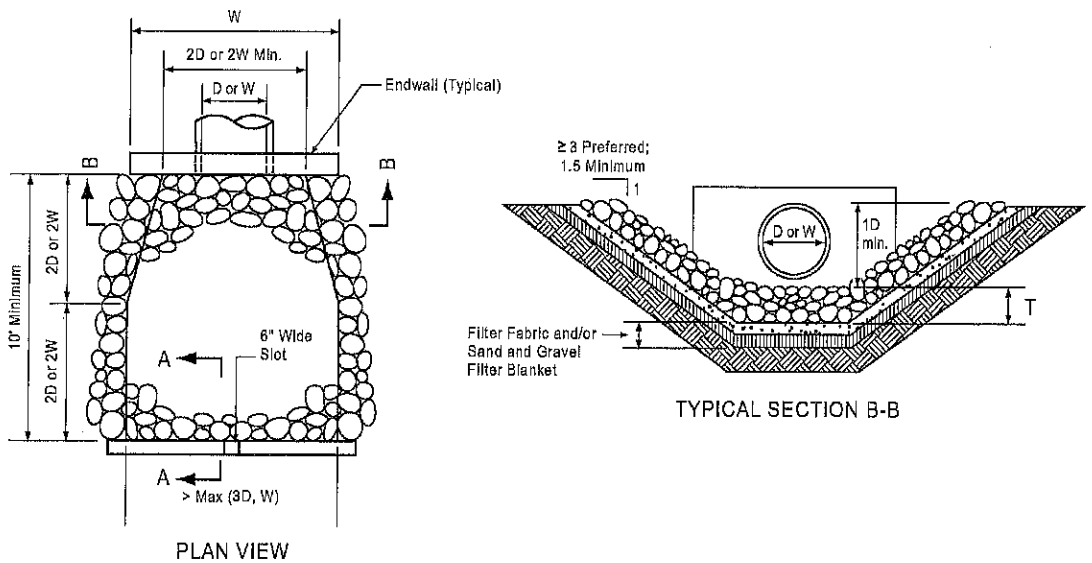

Figure 7-1 San Diego Regional Standard Rock Riprap Apron Layout

Reclamation's *Design of Small Canal Structures*, and other references. The use of riprap, SAF, and CSU stilling basins are allowed, subject to the approval of the governing Agency.

7.3.3 Dissipator Rings

The use of dissipater rings in pipes and culverts can be an efficient manner to reduce exit velocities. FHWA HEC-14 provides a complete discussion of their use and design. Dissipater rings shall be modified to facilitate drainage behind the rings and prevent ponding within the culvert. The use of dissipater rings is limited to urban applications where velocities within the pipe are greater than 20 ft/sec and where no significant bedloads are anticipated, or where other methods of energy dissipation are impracticable.

7.3.4 Impact Basin (SD-RSD No. D-41)

Design standards for the impact basin depicted on San Diego Regional Standard Drawing No. D-41 are based on the USBR Type VI Basin. The original USBR basin has been modified to allow drainage of the basin during dry periods, which enhances the usefulness of the basin in urban environments. The width of D-41 is based on discharge from the storm drain or culvert; this width must be specified on drawings.

Figure 7-2 (FHWA HEC-14, 1983) provides a nomograph that may be used to estimate the energy loss through an impact basin. This energy loss can then be used to estimate the flow velocity exiting the impact basin. The energy loss through the impact basin is a function of the Froude Number of the flow entering the impact basin, calculated in this case as:

$$FR = v_O / \sqrt{g y_e} \qquad (7\text{-}2)$$

$$y_e = \sqrt{A/2} \qquad (7\text{-}3)$$

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

                              MDS Consulting
          17320 Redhill Avenue, Suite 350, Irvine, CA 92614
             Phone: (949) 251-8821    Fax: (949) 251-0516
                  Email: mdsirvine@mdsconsulting.net

----------------------------------------------------------------------------
  TIME/DATE OF STUDY: 08:04 11/13/2013
============================================================================
 Problem Descriptions:
  TRACT 32535
  DEPTH OF FLOW FOR ASPHALT CONCRETE OVERSIDE DRAIN
  AT CLINTON KEITH ROAD
****************************************************************************
>>>>CHANNEL INPUT INFORMATION<<<<
----------------------------------------------------------------------------
    CHANNEL Z1(HORIZONTAL/VERTICAL) =    1.00
            Z2(HORIZONTAL/VERTICAL) =    1.00
    BASEWIDTH(FEET) =      0.75
    CONSTANT CHANNEL SLOPE(FEET/FEET) = 0.200000
    UNIFORM FLOW(CFS) =         2.00
    MANNINGS FRICTION FACTOR = 0.0150
============================================================================
    NORMAL-DEPTH FLOW INFORMATION:
----------------------------------------------------------------------------
    >>>>> NORMAL DEPTH(FEET) =  0.19  < 0.67' ∴ OK.
    FLOW TOP-WIDTH(FEET) =          1.12
    FLOW AREA(SQUARE FEET) =            0.17
    HYDRAULIC DEPTH(FEET) =      0.15
    FLOW AVERAGE VELOCITY(FEET/SEC.) =   11.56 — USE 1/4 TON RIP-RAP
    UNIFORM FROUDE NUMBER =    5.184
    PRESSURE + MOMENTUM(POUNDS) =            45.74
    AVERAGED VELOCITY HEAD(FEET) =       2.076
    SPECIFIC ENERGY(FEET) =      2.261
============================================================================
    CRITICAL-DEPTH FLOW INFORMATION:
----------------------------------------------------------------------------
    CRITICAL FLOW TOP-WIDTH(FEET) =          1.72
    CRITICAL FLOW AREA(SQUARE FEET) =            0.60
    CRITICAL FLOW HYDRAULIC DEPTH(FEET) =      0.35
    CRITICAL FLOW AVERAGE VELOCITY(FEET/SEC.) =      3.34
    CRITICAL DEPTH(FEET) =      0.49
    CRITICAL FLOW PRESSURE + MOMENTUM(POUNDS) =            20.82
    AVERAGED CRITICAL FLOW VELOCITY HEAD(FEET) =       0.173
    CRITICAL FLOW SPECIFIC ENERGY(FEET) =       0.658
============================================================================
```

USE 1/4 TON RIP-RAP , $d_{50} = 1.8$ ft

$L_a = 4 \times D_0 = 4 \times 2.08 = 8.3$ ft ∴ USE 10 ft

$W = 3 \times D_0 = 3 \times 2.08 = 6.2$ ft ∴ USE 7 ft

NOTE : $D_0 = 25'' = 2.08'$ PER R.C.T.D. STD. 306.

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

                              MDS Consulting
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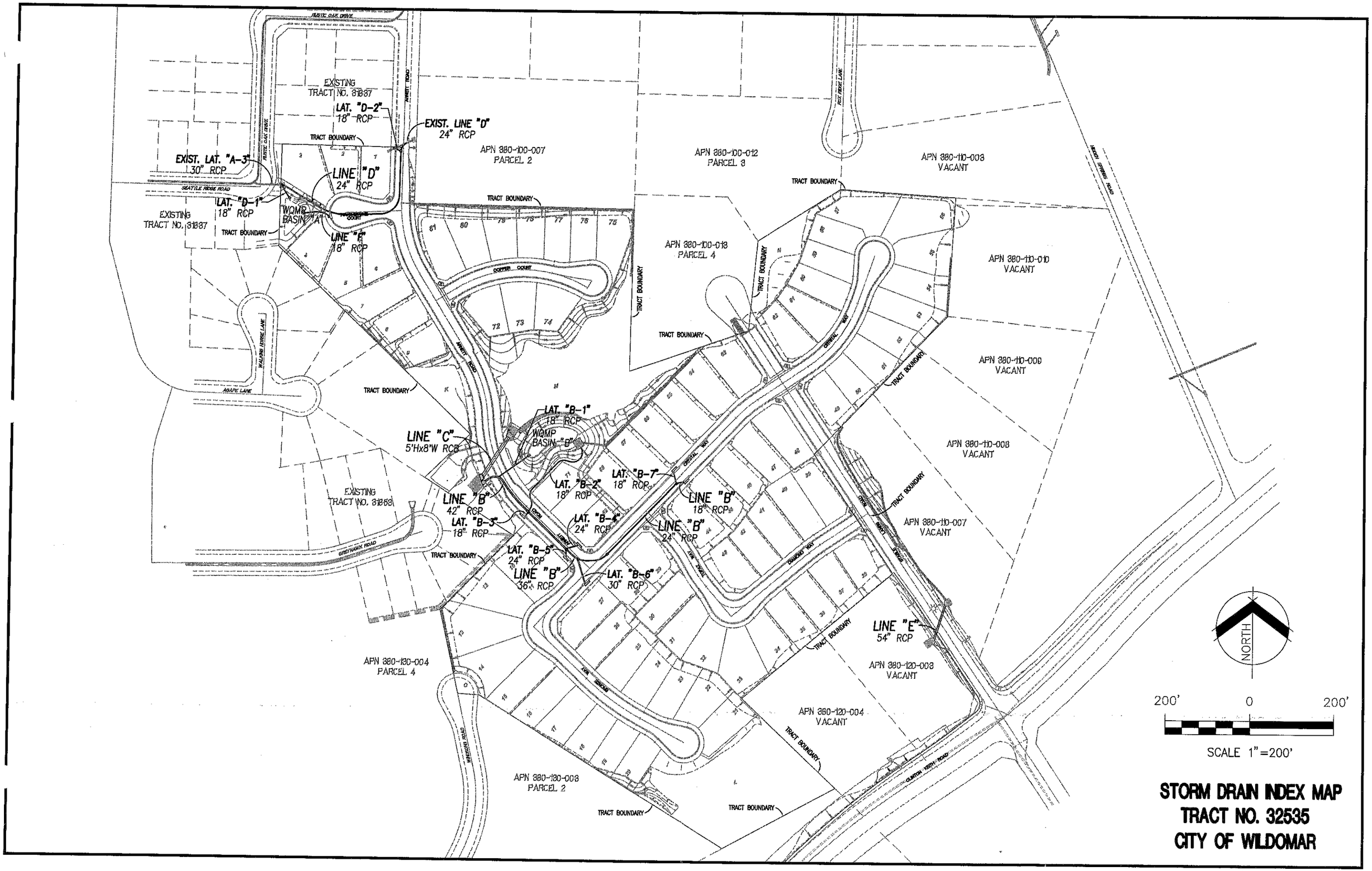
               Phone: (949) 251-8821    Fax: (949) 251-0516
                    Email: mdsirvine@mdsconsulting.net

----------------------------------------------------------------------------
  TIME/DATE OF STUDY: 13:17 11/18/2013
============================================================================
 Problem Descriptions:
  TRACT 32535
  DEPTH OF FLOW FOR ASPHALT CONCRESTE OVERSIDE DRAIN
  AT STABLE LANES ROAD
****************************************************************************
>>>>CHANNEL INPUT INFORMATION<<<<
----------------------------------------------------------------------------
    CHANNEL Z1(HORIZONTAL/VERTICAL) =     1.00
            Z2(HORIZONTAL/VERTICAL) =     1.00
    BASEWIDTH(FEET) =      0.75
    CONSTANT CHANNEL SLOPE(FEET/FEET) = 0.200000
    UNIFORM FLOW(CFS) =         1.40
    MANNINGS FRICTION FACTOR = 0.0150
============================================================================
    NORMAL-DEPTH FLOW INFORMATION:
----------------------------------------------------------------------------
    >>>>> NORMAL DEPTH(FEET) =    0.15  < 0.67' ∴ OK.
    FLOW TOP-WIDTH(FEET) =          1.05
    FLOW AREA(SQUARE FEET) =            0.14
    HYDRAULIC DEPTH(FEET) =      0.13
    FLOW AVERAGE VELOCITY(FEET/SEC.) =    10.32 — USE 1/4 TON RIP-RAP
    UNIFORM FROUDE NUMBER =    5.060
    PRESSURE + MOMENTUM(POUNDS) =            28.59
    AVERAGED VELOCITY HEAD(FEET) =      1.652
    SPECIFIC ENERGY(FEET) =      1.803
============================================================================
    CRITICAL-DEPTH FLOW INFORMATION:
----------------------------------------------------------------------------
    CRITICAL FLOW TOP-WIDTH(FEET) =          1.54
    CRITICAL FLOW AREA(SQUARE FEET) =            0.46
    CRITICAL FLOW HYDRAULIC DEPTH(FEET) =      0.29
    CRITICAL FLOW AVERAGE VELOCITY(FEET/SEC.) =      3.07
    CRITICAL DEPTH(FEET) =      0.40
    CRITICAL FLOW PRESSURE + MOMENTUM(POUNDS) =            13.33
    AVERAGED CRITICAL FLOW VELOCITY HEAD(FEET) =      0.147
    CRITICAL FLOW SPECIFIC ENERGY(FEET) =      0.544
============================================================================
```

Appendix E

100 YEAR HYDRAULIC CALCULATIONS
WATER SURFACE PROFILE CALCULATIONS

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



STORM DRAIN INDEX MAP
TRACT NO. 32535
CITY OF WILDOMAR

I:\80334\HYDRO\SD Index Map.dwg 12/03/13

DATE: 12/ 3/2013
TIME: 13:56

F0515P
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

CARD CODE	SECT NO	CHN TYPE	NO OF PIERS	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	1	2	0	0.00	5.00	14.00			0.00										
CD	18	4			1.50														
CD	24	4			2.00														
CD	30	4			2.50														
CD	36	4			3.00														
CD	42	4			3.50														
CD	48	4			4.00														
CD	54	4			4.50														
CD	60	4			5.00														

F 0 5 1 5 P

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

TRACT 32535 100YR HYDRAULIC CALCULATIONS

HEADING LINE NO 2 IS -

PREPARED BY MDS CONSULTING

HEADING LINE NO 3 IS -

LINE " B " (FN C:\WSPG1\32535\32535.B)

F 0 5 1 5 P

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *

U/S DATA	STATION	INVERT	SECT
	1003.72	1245.00	42

W S ELEV 1245.72

100 YR WS ELEV.
PER LINE "A" TRACT 31353

ELEMENT NO 2 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1016.95	1245.04	42	0.013	0.00	0.00	0.00	0

ELEMENT NO 3 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1037.57	1245.10	42	0.013	0.00	55.00	0.00	0

ELEMENT NO 4 IS A JUNCTION * * * * * * *

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	1039.57	1245.11	42	18	0	0.013	1.9	0.0	1246.20	0.00	60.00	0.00

ELEMENT NO 5 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1053.91	1245.15	42	0.013	0.00	39.00	0.00	0

ELEMENT NO 6 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H

```
                                1134.93 1246.44   42                0.013                                  0.00  15.20    0.00      0

ELEMENT NO    7 IS A REACH            *         *     *
                    U/S DATA   STATION    INVERT  SECT                N                                RADIUS  ANGLE  ANG PT  MAN H
                                1142.78 1246.56   42                0.013                                  0.00   0.00    0.00      0

ELEMENT NO    8 IS A JUNCTION         *         *     *     *                *                 *                *
                    U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3       Q4    INVERT-3 INVERT-4  PHI 3   PHI 4
                                1149.44 1246.57   42    18    18  0.013     0.1      3.5  1246.56  1247.50  90.00   90.00

ELEMENT NO    9 IS A REACH            *         *     *
                    U/S DATA   STATION    INVERT  SECT                N                                RADIUS  ANGLE  ANG PT  MAN H
                                1271.66 1246.94   42                0.013                                  0.00   0.00    0.00      0

ELEMENT NO   10 IS A JUNCTION         *         *     *     *                *                 *                *
                    U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3       Q4    INVERT-3 INVERT-4  PHI 3   PHI 4
                                1276.31 1246.96   36    24    24  0.013    11.7      8.2  1246.97  1246.97  45.00   45.00
                                                     F 0 5 1 5 P                                                        PAGE NO   3

                          WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO   11 IS A REACH            *         *     *
                    U/S DATA   STATION    INVERT  SECT                N                                RADIUS  ANGLE  ANG PT  MAN H
                                1294.23 1247.00   36                0.013                                  0.00   0.00    0.00      0

ELEMENT NO   12 IS A REACH            *         *     *
                    U/S DATA   STATION    INVERT  SECT                N                                RADIUS  ANGLE  ANG PT  MAN H
                                1307.87 1247.06   36                0.013                                  0.00   0.00    0.00      0

ELEMENT NO   13 IS A JUNCTION         *         *     *     *                *                 *                *
                    U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3       Q4    INVERT-3 INVERT-4  PHI 3   PHI 4
                                1313.05 1247.53   24    30     0  0.013    16.6      0.0  1247.30     0.00  45.00    0.00

ELEMENT NO   14 IS A REACH            *         *     *
                    U/S DATA   STATION    INVERT  SECT                N                                RADIUS  ANGLE  ANG PT  MAN H
                                1329.63 1247.74   24                0.013                                  0.00  26.40    0.00      0

ELEMENT NO   15 IS A REACH            *         *     *
                    U/S DATA   STATION    INVERT  SECT                N                                RADIUS  ANGLE  ANG PT  MAN H
                                1346.13 1247.95   24                0.013                                  0.00   0.00    0.00      0

ELEMENT NO   16 IS A REACH            *         *     *
                    U/S DATA   STATION    INVERT  SECT                N                                RADIUS  ANGLE  ANG PT  MAN H
                                1381.53 1248.41   24                0.013                                  0.00  45.00    0.00      0

ELEMENT NO   17 IS A REACH            *         *     *
                    U/S DATA   STATION    INVERT  SECT                N                                RADIUS  ANGLE  ANG PT  MAN H
                                1385.53 1248.59   24                0.013                                  0.00   0.00    0.00      1

ELEMENT NO   18 IS A REACH            *         *     *
                    U/S DATA   STATION    INVERT  SECT                N                                RADIUS  ANGLE  ANG PT  MAN H
                                1610.04 1258.92   24                0.013                                  0.00   0.00    0.00      0

ELEMENT NO   19 IS A REACH            *         *     *
                    U/S DATA   STATION    INVERT  SECT                N                                RADIUS  ANGLE  ANG PT  MAN H
                                1614.40 1259.12   24                0.013                                  0.00   0.00    0.00      0

ELEMENT NO   20 IS A JUNCTION         *         *     *     *                *                 *                *
                    U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3       Q4    INVERT-3 INVERT-4  PHI 3   PHI 4
```

```
                    1618.40 1259.81   18    18     0  0.013      9.7      0.0  1259.80     0.00  70.00    0.00

ELEMENT NO  21 IS A REACH            *         *     *
                  U/S DATA   STATION    INVERT  SECT              N                                RADIUS  ANGLE  ANG PT  MAN H
                             1627.72 1260.61   18              0.013                                 0.00  30.70    0.00      0
                                                   F 0 5 1 5 P                                                   PAGE NO    4

                        WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO  22 IS A REACH            *         *     *
                  U/S DATA   STATION    INVERT  SECT              N                                RADIUS  ANGLE  ANG PT  MAN H
                             1636.07 1261.32   18              0.013                                 0.00   0.00    0.00      0

ELEMENT NO  23 IS A  WALL  ENTRANCE                  *
                  U/S DATA   STATION    INVERT  SECT             FP
                             1636.07 1261.32    1              0.013

ELEMENT NO  24 IS A SYSTEM HEADWORKS                 *                    *
                  U/S DATA   STATION    INVERT  SECT                                   W S ELEV
                             1636.07 1261.32    1                                      1262.82
NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING
LICENSEE: MORSE CONSULTING GROUP                                F0515P                                                  PAGE    1
                                                   WATER SURFACE PROFILE LISTING
                      TRACT 32535  100YR HYDRAULIC CALCULATIONS
                      PREPARED BY MDS CONSULTING
                      LINE " B "  (FN C:\WSPG1\32535\32535.B)

STATION     INVERT   DEPTH     W.S.        Q       VEL     VEL     ENERGY   SUPER  CRITICAL          HGT/   BASE/    ZL   NO  AVBPR
            ELEV   OF FLOW    ELEV                        HEAD   GRD.EL.   ELEV   DEPTH             DIA    ID NO.        PIER

L/ELEM      SO                                          SF AVE     HF                  NORM DEPTH                  ZR
*****************************************************************************************************************************

 1003.72  1245.00    2.211  1247.211      58.2    9.09    1.283  1248.494   0.00    2.390            3.50    0.00   0.00   0   0.00

    1.80  0.00302                                       .006422     0.01                  3.070                   0.00

 1005.52  1245.01    2.194  1247.199      58.2    9.16    1.304  1248.503   0.00    2.390            3.50    0.00   0.00   0   0.00

   11.43  0.00302                                       .006908     0.08                  3.070                   0.00

 1016.95  1245.04    2.108  1247.148      58.2    9.61    1.435  1248.583   0.00    2.390            3.50    0.00   0.00   0   0.00

    7.25  0.00291                                       .007595     0.06                  3.210                   0.00

 1024.20  1245.06    2.059  1247.120      58.2    9.88    1.516  1248.636   0.00    2.390            3.50    0.00   0.00   0   0.00

   13.37  0.00291                                       .008382     0.11                  3.210                   0.00

 1037.57  1245.10    1.981  1247.081      58.2   10.36    1.668  1248.749   0.00    2.390            3.50    0.00   0.00   0   0.00

JUNCT STR 0.00500   LAT. "B-1"                          .010075     0.02                                          0.00

 1039.57  1245.11    1.807  1246.917      56.3   11.24    1.962  1248.879   0.00    2.350            3.50    0.00   0.00   0   0.00

    0.25  0.00279                                       .011261     0.00                  3.110                   0.00

 1039.82  1245.11    1.805  1246.916      56.3   11.25    1.966  1248.882   0.00    2.350            3.50    0.00   0.00   0   0.00
```

14.09	0.00279					.012037	0.17			3.110			0.00		
1053.91	1245.15	1.739	1246.889	56.3	11.80	2.161	1249.050	0.00	2.350		3.50	0.00	0.00	0	0.00
25.45	0.01592					.012248	0.31			1.632			0.00		
1079.36	1245.56	1.785	1247.340	56.3	11.41	2.020	1249.360	0.00	2.350		3.50	0.00	0.00	0	0.00
23.31	0.01592					.011002	0.26			1.632			0.00		
1102.67	1245.93	1.854	1247.780	56.3	10.88	1.836	1249.616	0.00	2.350		3.50	0.00	0.00	0	0.00
15.11	0.01592					.009703	0.15			1.632			0.00		
1117.78	1246.17	1.927	1248.094	56.3	10.37	1.670	1249.764	0.00	2.350		3.50	0.00	0.00	0	0.00
10.30	0.01592					.008565	0.09			1.632			0.00		

WATER SURFACE PROFILE LISTING
TRACT 32535 100YR HYDRAULIC CALCULATIONS
PREPARED BY MDS CONSULTING
LINE " B " (FN C:\WSPG1\32535\32535.B)

STATION / L/ELEM	INVERT ELEV / SO	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD / SF AVE	ENERGY GRD.EL. / HF	SUPER ELEV	CRITICAL DEPTH / NORM DEPTH	HGT/ DIA	BASE/ ID NO.	ZL / ZR	NO PIER	AVBPR
1128.08	1246.33	2.003	1248.334	56.3	9.89	1.518	1249.852	0.00	2.350	3.50	0.00	0.00	0	0.00
6.85	0.01592					.007568	0.05		1.632			0.00		
1134.93	1246.44	2.084	1248.524	56.3	9.43	1.380	1249.904	0.00	2.350	3.50	0.00	0.00	0	0.00
4.42	0.01529					.006724	0.03		1.651			0.00		
1139.35	1246.51	2.162	1248.670	56.3	9.02	1.264	1249.934	0.00	2.350	3.50	0.00	0.00	0	0.00
2.68	0.01529					.005987	0.02		1.651			0.00		
1142.03	1246.55	2.252	1248.800	56.3	8.60	1.149	1249.949	0.00	2.350	3.50	0.00	0.00	0	0.00
0.75	0.01529					.005312	0.00		1.651			0.00		
1142.78	1246.56	2.350	1248.910	56.3	8.20	1.043	1249.953	0.00	2.350	3.50	0.00	0.00	0	0.00
JUNCT STR	0.00150	LAT. "B-3"				.003830	0.03					0.00		
1149.44	1246.57	2.918	1249.488	52.7	6.15	0.587	1250.075	0.00	2.271	3.50	0.00	0.00	0	0.00
122.22	0.00303					.002713	0.33		2.730			0.00		
1271.66	1246.94	2.857	1249.797	52.7	6.27	0.610	1250.407	0.00	2.271	3.50	0.00	0.00	0	0.00
JUNCT STR	0.00430	LAT. "B-4" & "B-5"				.002591	0.01					0.00		
1276.31	1246.96	3.380	1250.340	32.8	4.64	0.334	1250.674	0.00	1.859	3.00	0.00	0.00	0	0.00

17.92	0.00223					.002418	0.04			2.584			0.00		
1294.23	1247.00	3.383	1250.383	32.8	4.64	0.334	1250.717	0.00	1.859		3.00	0.00	0.00	0	0.00
13.64	0.00440					.002418	0.03			1.922			0.00		
1307.87	1247.06	3.356	1250.416	32.8	4.64	0.334	1250.750	0.00	1.859		3.00	0.00	0.00	0	0.00
JUNCT STR	0.09073	LAT. "B-6"				.003773	0.02						0.00		
1313.05	1247.53	3.082	1250.612	16.2	5.16	0.413	1251.025	0.00	1.451		2.00	0.00	0.00	0	0.00
16.58	0.01267					.005128	0.09			1.160			0.00		

WATER SURFACE PROFILE LISTING

TRACT 32535 100YR HYDRAULIC CALCULATIONS
PREPARED BY MDS CONSULTING
LINE " B " (FN C:\WSPG1\32535\32535.B)

STATION / L/ELEM	INVERT ELEV / SO	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD / SF AVE	ENERGY GRD.EL. / HF	SUPER ELEV	CRITICAL DEPTH / NORM DEPTH		HGT/ DIA	BASE/ ID NO.	ZL / ZR	NO PIER	AVBPR
1329.63	1247.74	3.001	1250.741	16.2	5.16	0.413	1251.154	0.00	1.451		2.00	0.00	0.00	0	0.00
16.50	0.01273					.005128	0.08			1.154			0.00		
1346.13	1247.95	2.876	1250.826	16.2	5.16	0.413	1251.239	0.00	1.451		2.00	0.00	0.00	0	0.00
35.40	0.01299					.005128	0.18			1.150			0.00		
1381.53	1248.41	2.656	1251.066	16.2	5.16	0.413	1251.479	0.00	1.451		2.00	0.00	0.00	0	0.00
3.75	0.04500					.005128	0.02			0.800			0.00		
1385.28	1248.58	2.517	1251.096	16.2	5.16	0.413	1251.509	0.00	1.451		2.00	0.00	0.00	0	0.00
HYDRAULIC JUMP													0.00		
1385.28	1248.58	0.795	1249.374	16.2	13.92	3.008	1252.382	0.00	1.451		2.00	0.00	0.00	0	0.00
0.25	0.04500					.046183	0.01			0.800			0.00		
1385.53	1248.59	0.795	1249.385	16.2	13.92	3.008	1252.393	0.00	1.451		2.00	0.00	0.00	0	0.00
102.77	0.04601					.045201	4.65			0.793			0.00		
1488.30	1253.32	0.804	1254.122	16.2	13.71	2.917	1257.039	0.00	1.451		2.00	0.00	0.00	0	0.00
52.76	0.04601					.041536	2.19			0.793			0.00		
1541.06	1255.75	0.833	1256.579	16.2	13.06	2.650	1259.229	0.00	1.451		2.00	0.00	0.00	0	0.00
22.01	0.04601					.036473	0.80			0.793			0.00		
1563.07	1256.76	0.864	1257.623	16.2	12.46	2.411	1260.034	0.00	1.451		2.00	0.00	0.00	0	0.00

13.40	0.04601					.032049	0.43			0.793			0.00		
1576.47	1257.38	0.896	1258.272	16.2	11.88	2.190	1260.462	0.00	1.451		2.00	0.00	0.00	0	0.00
9.32	0.04601					.028166	0.26			0.793			0.00		
1585.79	1257.80	0.929	1258.733	16.2	11.33	1.993	1260.726	0.00	1.451		2.00	0.00	0.00	0	0.00
6.87	0.04601					.024767	0.17			0.793			0.00		

WATER SURFACE PROFILE LISTING

TRACT 32535 100YR HYDRAULIC CALCULATIONS
PREPARED BY MDS CONSULTING
LINE " B " (FN C:\WSPG1\32535\32535.B)

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF			NORM DEPTH			ZR		
1592.66	1258.12	0.964	1259.084	16.2	10.80	1.811	1260.895	0.00	1.451		2.00	0.00	0.00	0	0.00
5.27	0.04601					.021801	0.11			0.793			0.00		
1597.93	1258.36	1.001	1259.364	16.2	10.30	1.647	1261.011	0.00	1.451		2.00	0.00	0.00	0	0.00
4.17	0.04601					.019200	0.08			0.793			0.00		
1602.10	1258.56	1.039	1259.594	16.2	9.82	1.497	1261.091	0.00	1.451		2.00	0.00	0.00	0	0.00
3.26	0.04601					.016924	0.06			0.793			0.00		
1605.36	1258.70	1.080	1259.785	16.2	9.36	1.360	1261.145	0.00	1.451		2.00	0.00	0.00	0	0.00
2.63	0.04601					.014932	0.04			0.793			0.00		
1607.99	1258.83	1.122	1259.948	16.2	8.93	1.237	1261.185	0.00	1.451		2.00	0.00	0.00	0	0.00
2.05	0.04601					.013186	0.03			0.793			0.00		
1610.04	1258.92	1.167	1260.087	16.2	8.51	1.124	1261.211	0.00	1.451		2.00	0.00	0.00	0	0.00
0.34	0.04587					.012220	0.00			0.794			0.00		
1610.38	1258.94	1.176	1260.112	16.2	8.43	1.103	1261.215	0.00	1.451		2.00	0.00	0.00	0	0.00
1.52	0.04587					.011373	0.02			0.794			0.00		
1611.90	1259.01	1.224	1260.229	16.2	8.04	1.003	1261.232	0.00	1.451		2.00	0.00	0.00	0	0.00
1.12	0.04587					.010075	0.01			0.794			0.00		
1613.02	1259.06	1.275	1260.332	16.2	7.66	0.912	1261.244	0.00	1.451		2.00	0.00	0.00	0	0.00
0.78	0.04587					.008940	0.01			0.794			0.00		
1613.80	1259.09	1.329	1260.421	16.2	7.30	0.828	1261.249	0.00	1.451		2.00	0.00	0.00	0	0.00

0.46	0.04587					.007949	0.00			0.794			0.00		
1614.26	1259.11	1.387	1260.500	16.2	6.96	0.753	1261.253	0.00	1.451		2.00	0.00	0.00	0	0.00
0.14	0.04587					.007084	0.00			0.794			0.00		

WATER SURFACE PROFILE LISTING

TRACT 32535 100YR HYDRAULIC CALCULATIONS
PREPARED BY MDS CONSULTING
LINE " B " (FN C:\WSPG1\32535\32535.B)

STATION / L/ELEM	INVERT ELEV / SO	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD / SF AVE	ENERGY GRD.EL. / HF	SUPER ELEV	CRITICAL DEPTH / NORM DEPTH	HGT/ DIA	BASE/ ID NO.	ZL / ZR	NO PIER	AVBPR
1614.40	1259.12	1.451	1260.571	16.2	6.64	0.684	1261.255	0.00	1.451	2.00	0.00	0.00	0	0.00
JUNCT STR	0.17250	LAT. "B-7"				.005254	0.02					0.00		
1618.40	1259.81	1.747	1261.557	6.5	3.68	0.210	1261.767	0.00	0.986	1.50	0.00	0.00	0	0.00
1.39	0.08584					.003829	0.01		0.470			0.00		
1619.79	1259.93	1.648	1261.577	6.5	3.68	0.210	1261.787	0.00	0.986	1.50	0.00	0.00	0	0.00
HYDRAULIC JUMP												0.00		
1619.79	1259.93	0.555	1260.484	6.5	10.94	1.859	1262.343	0.00	0.986	1.50	0.00	0.00	0	0.00
0.33	0.08584					.043743	0.01		0.470			0.00		
1620.12	1259.96	0.563	1260.521	6.5	10.71	1.781	1262.302	0.00	0.986	1.50	0.00	0.00	0	0.00
3.10	0.08584					.039900	0.12		0.470			0.00		
1623.22	1260.22	0.583	1260.806	6.5	10.22	1.622	1262.428	0.00	0.986	1.50	0.00	0.00	0	0.00
2.48	0.08584					.034996	0.09		0.470			0.00		
1625.70	1260.44	0.604	1261.041	6.5	9.75	1.475	1262.516	0.00	0.986	1.50	0.00	0.00	0	0.00
2.02	0.08584					.030728	0.06		0.470			0.00		
1627.72	1260.61	0.627	1261.237	6.5	9.29	1.339	1262.576	0.00	0.986	1.50	0.00	0.00	0	0.00
1.45	0.08503					.027262	0.04		0.470			0.00		
1629.17	1260.73	0.646	1261.380	6.5	8.93	1.238	1262.618	0.00	0.986	1.50	0.00	0.00	0	0.00
1.46	0.08503					.024216	0.04		0.470			0.00		
1630.63	1260.86	0.670	1261.527	6.5	8.51	1.124	1262.651	0.00	0.986	1.50	0.00	0.00	0	0.00
1.21	0.08503					.021286	0.03		0.470			0.00		
1631.84	1260.96	0.695	1261.655	6.5	8.11	1.023	1262.678	0.00	0.986	1.50	0.00	0.00	0	0.00

WATER SURFACE PROFILE LISTING

TRACT 32535 100YR HYDRAULIC CALCULATIONS
PREPARED BY MDS CONSULTING
LINE " B " (FN C:\WSPG1\32535\32535.B)

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF			NORM DEPTH			ZR		
1632.85	1261.05	0.721	1261.767	6.5	7.74	0.930	1262.697	0.00	0.986		1.50	0.00	0.00	0	0.00
0.84	0.08503					.016469	0.01			0.470			0.00		
1633.69	1261.12	0.748	1261.865	6.5	7.38	0.845	1262.710	0.00	0.986		1.50	0.00	0.00	0	0.00
0.67	0.08503					.014502	0.01			0.470			0.00		
1634.36	1261.17	0.777	1261.952	6.5	7.03	0.768	1262.720	0.00	0.986		1.50	0.00	0.00	0	0.00
0.56	0.08503					.012783	0.01			0.470			0.00		
1634.92	1261.22	0.807	1262.029	6.5	6.71	0.699	1262.728	0.00	0.986		1.50	0.00	0.00	0	0.00
0.44	0.08503					.011271	0.00			0.470			0.00		
1635.36	1261.26	0.838	1262.097	6.5	6.39	0.634	1262.731	0.00	0.986		1.50	0.00	0.00	0	0.00
0.31	0.08503					.009952	0.00			0.470			0.00		
1635.67	1261.29	0.872	1262.158	6.5	6.10	0.577	1262.735	0.00	0.986		1.50	0.00	0.00	0	0.00
0.23	0.08503					.008800	0.00			0.470			0.00		
1635.90	1261.31	0.907	1262.213	6.5	5.81	0.525	1262.738	0.00	0.986		1.50	0.00	0.00	0	0.00
0.13	0.08503					.007791	0.00			0.470			0.00		
1636.03	1261.32	0.945	1262.261	6.5	5.54	0.477	1262.738	0.00	0.986		1.50	0.00	0.00	0	0.00
0.04	0.08503					.006903	0.00			0.470			0.00		
1636.07	1261.32	0.986	1262.306	6.5	5.28	0.432	1262.738	0.00	0.986		1.50	0.00	0.00	0	0.00
WALL ENTRANCE													0.00		
1636.07	1261.32	1.651	1262.971	6.5	0.28	0.001	1262.972	0.00	0.189		5.00	14.00	0.00	0	0.00

DATE: 12/ 3/2013
TIME: 17:15

F0515P
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

CARD CODE	SECT NO	CHN TYPE	NO OF PIERS	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	1	2	0	0.00	4.68	4.00			0.00										
CD	18	4			1.50														
CD	24	4			2.00														

F 0 5 1 5 P

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

TRACT 32535 100YR HYDRAULIC CALCULATIONS

HEADING LINE NO 2 IS -

PREPARED BY MDS CONSULTING

HEADING LINE NO 3 IS -

LAT. " B-1 " (FN C:\WSPG1\32535\32535.B1)

F 0 5 1 5 P

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	1004.42	1245.20	18	1247.08

ELEMENT NO 2 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1085.24	1245.44	18	0.013	0.00	0.00	0.00	0

ELEMENT NO 3 IS A WALL ENTRANCE *

U/S DATA	STATION	INVERT	SECT	FP
	1085.24	1245.44	1	0.200

ELEMENT NO 4 IS A SYSTEM HEADWORKS * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	1085.24	1245.44	1	1246.94

NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING
LICENSEE: MORSE CONSULTING GROUP

F0515P
WATER SURFACE PROFILE LISTING

TRACT 32535 100YR HYDRAULIC CALCULATIONS
PREPARED BY MDS CONSULTING
LAT. " B-1 " (FN C:\WSPG1\32535\32535.B1)

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH	HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF		NORM DEPTH			ZR		

****

1004.42	1245.20	1.880	1247.080	3.5	1.98	0.061	1247.141	0.00	0.714		1.50	0.00	0.00	0	0.00
80.82	0.00297					.001110	0.09			0.850			0.00		
1085.24	1245.44	1.730	1247.170	3.5	1.98	0.061	1247.231	0.00	0.714		1.50	0.00	0.00	0	0.00
WALL	ENTRANCE												0.00		
1085.24	1245.44	1.845	1247.285	3.5	0.47	0.003	1247.288	0.00	0.288		4.68	4.00	0.00	0	0.00

DATE: 12/ 3/2013
TIME: 17:19

F0515P

WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

CARD CODE	SECT NO	CHN TYPE	NO OF PIERS	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	1	2	0	0.00	7.50	5.00			0.00										
CD	18	4			1.50														
CD	24	4			2.00														
CD	30	4			2.50														

F 0 5 1 5 P

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

TRACT 32535 100YR HYDRAULIC CALCULATIONS

HEADING LINE NO 2 IS -

PREPARED BY MDS CONSULTING

HEADING LINE NO 3 IS -

LAT. " B-2 " - LOWFLOW LINE (FN C:\WSPG1\32535\32535.B2)

F 0 5 1 5 P

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	1000.00	1246.10	18	1249.00

ELEMENT NO 2 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1054.89	1246.21	18	0.013	0.00	140.00	0.00	0

ELEMENT NO 3 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1063.46	1246.23	18	0.013	0.00	0.00	0.00	0

ELEMENT NO 4 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1087.71	1246.28	18	0.013	0.00	62.00	0.00	0

ELEMENT NO 5 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1171.37	1246.44	18	0.013	0.00	0.00	0.00	0

ELEMENT NO 6 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1198.89	1246.50	18	0.013	0.00	70.00	0.00	0

ELEMENT NO 7 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1221.81	1246.54	18	0.013	0.00	0.00	0.00	0

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ELEMENT NO    8 IS A REACH                 *          *     *
                U/S DATA    STATION    INVERT  SECT                N                                  RADIUS  ANGLE  ANG PT  MAN H
                            1229.15 1246.56    18               0.013                                   0.00   58.40    0.00      0

ELEMENT NO    9 IS A  WALL  ENTRANCE                      *
                U/S DATA    STATION    INVERT  SECT               FP
                            1229.15 1246.56     1               0.013

ELEMENT NO   10 IS A SYSTEM HEADWORKS                     *                    *
                U/S DATA    STATION    INVERT  SECT                                          W S ELEV
                            1229.15 1246.56     1                                              1247.56
NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING
LICENSEE: MORSE CONSULTING GROUP                                F0515P                                                          PAGE     1
                                                   WATER SURFACE PROFILE LISTING
                        TRACT 32535  100YR HYDRAULIC CALCULATIONS
                        PREPARED BY MDS CONSULTING
                        LAT. " B-2 " - LOWFLOW LINE (FN C:\WSPG1\32535\32535.B2)
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STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF			NORM DEPTH			ZR		
1000.00	1246.10	2.900	1249.000	1.6	0.91	0.013	1249.013	0.00	0.475		1.50	0.00	0.00	0	0.00
54.89	0.00200					.000232	0.01			0.600			0.00		
1054.89	1246.21	2.806	1249.016	1.6	0.91	0.013	1249.029	0.00	0.475		1.50	0.00	0.00	0	0.00
8.57	0.00233					.000232	0.00			0.580			0.00		
1063.46	1246.23	2.788	1249.018	1.6	0.91	0.013	1249.031	0.00	0.475		1.50	0.00	0.00	0	0.00
24.25	0.00206					.000232	0.01			0.600			0.00		
1087.71	1246.28	2.746	1249.026	1.6	0.91	0.013	1249.039	0.00	0.475		1.50	0.00	0.00	0	0.00
83.66	0.00191					.000232	0.02			0.610			0.00		
1171.37	1246.44	2.605	1249.045	1.6	0.91	0.013	1249.058	0.00	0.475		1.50	0.00	0.00	0	0.00
27.52	0.00218					.000232	0.01			0.590			0.00		
1198.89	1246.50	2.554	1249.054	1.6	0.91	0.013	1249.067	0.00	0.475		1.50	0.00	0.00	0	0.00
22.92	0.00175					.000232	0.01			0.630			0.00		
1221.81	1246.54	2.519	1249.059	1.6	0.91	0.013	1249.072	0.00	0.475		1.50	0.00	0.00	0	0.00
7.34	0.00272					.000232	0.00			0.550			0.00		
1229.15	1246.56	2.503	1249.063	1.6	0.91	0.013	1249.076	0.00	0.475		1.50	0.00	0.00	0	0.00
WALL ENTRANCE													0.00		
1229.15	1246.56	2.528	1249.088	1.6	0.13	0.000	1249.088	0.00	0.147		7.50	5.00	0.00	0	0.00

DATE: 12/ 3/2013
TIME: 17: 1

F0515P
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

CARD CODE	SECT NO	CHN TYPE	NO OF PIERS	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	1	2	0	0.00	5.00	14.00			0.00										
CD	18	4			1.50														
CD	24	4			2.00														

F 0 5 1 5 P

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

TRACT 32535 100YR HYDRAULIC CALCULATIONS

HEADING LINE NO 2 IS -

PREPARED BY MDS CONSULTING

HEADING LINE NO 3 IS -

LAT. " B-3 " (FN C:\WSPG1\32535\32535.B3)

F 0 5 1 5 P

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	1001.79	1247.50	18	1249.49

ELEMENT NO 2 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1014.81	1247.91	18	0.013	0.00	0.00	0.00	0

ELEMENT NO 3 IS A WALL ENTRANCE *

U/S DATA	STATION	INVERT	SECT	FP
	1014.81	1247.91	1	0.200

ELEMENT NO 4 IS A SYSTEM HEADWORKS * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	1014.81	1247.91	1	1249.41

NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING
LICENSEE: MORSE CONSULTING GROUP

F0515P
WATER SURFACE PROFILE LISTING

TRACT 32535 100YR HYDRAULIC CALCULATIONS
PREPARED BY MDS CONSULTING
LAT. " B-3 " (FN C:\WSPG1\32535\32535.B3)

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH	HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF		NORM DEPTH			ZR		

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1001.79	1247.50	1.990	1249.490	6.3	3.57	0.197	1249.687	0.00	0.970		1.50	0.00	0.00	0	0.00
13.02	0.03149					.003597	0.05			0.600			0.00		
1014.81	1247.91	1.627	1249.537	6.3	3.57	0.197	1249.734	0.00	0.970		1.50	0.00	0.00	0	0.00
WALL	ENTRANCE												0.00		
1014.81	1247.91	2.021	1249.931	6.3	0.22	0.001	1249.932	0.00	0.185		5.00	14.00	0.00	0	0.00

DATE: 12/ 4/2013
TIME: 7:24

F0515P
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

CARD CODE	SECT NO	CHN TYPE	NO OF PIERS	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	1	2	0	0.00	4.50	14.00			0.00										
CD	18	4			1.50														
CD	24	4			2.00														

F 0 5 1 5 P

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

TRACT 32535 100YR HYDRAULIC CALCULATIONS

HEADING LINE NO 2 IS -

PREPARED BY MDS CONSULTING

HEADING LINE NO 3 IS -

LAT. " B-4 " (FN C:\WSPG1\32535\32535.B4)

F 0 5 1 5 P

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	1004.00	1247.04	24	1250.34

ELEMENT NO 2 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1030.23	1247.63	24	0.013	0.00	0.00	0.00	0

ELEMENT NO 3 IS A WALL ENTRANCE *

U/S DATA	STATION	INVERT	SECT	FP
	1030.23	1247.63	1	0.200

ELEMENT NO 4 IS A SYSTEM HEADWORKS * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	1030.23	1247.63	1	1249.63

NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING
LICENSEE: MORSE CONSULTING GROUP

F0515P
WATER SURFACE PROFILE LISTING

TRACT 32535 100YR HYDRAULIC CALCULATIONS
PREPARED BY MDS CONSULTING
LAT. " B-4 " (FN C:\WSPG1\32535\32535.B4)

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH	HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF		NORM DEPTH			ZR		

****

1004.00	1247.04	3.300	1250.340	11.5	3.66	0.208	1250.548	0.00	1.217		2.00	0.00	0.00	0	0.00
26.23	0.02249					.002584	0.07			0.800			0.00		
1030.23	1247.63	2.778	1250.408	11.5	3.66	0.208	1250.616	0.00	1.217		2.00	0.00	0.00	0	0.00
WALL	ENTRANCE														
													0.00		
1030.23	1247.63	3.193	1250.823	11.5	0.26	0.001	1250.824	0.00	0.276		4.50	14.00	0.00	0	0.00

DATE: 12/ 4/2013
TIME: 7:24

F0515P
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

CARD CODE	SECT NO	CHN TYPE	NO OF PIERS	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	1	2	0	0.00	4.98	14.00			0.00										
CD	18	4			1.50														
CD	24	4			2.00														

F 0 5 1 5 P

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

TRACT 32535 100YR HYDRAULIC CALCULATIONS

HEADING LINE NO 2 IS -

PREPARED BY MDS CONSULTING

HEADING LINE NO 3 IS -

LAT. " B-5 " (FN C:\WSPG1\32535\32535.B5)

F 0 5 1 5 P

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	1004.50	1246.99	24	1250.34

ELEMENT NO 2 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1020.53	1247.15	24	0.013	0.00	0.00	0.00	0

ELEMENT NO 3 IS A WALL ENTRANCE *

U/S DATA	STATION	INVERT	SECT	FP
	1020.53	1247.15	1	0.200

ELEMENT NO 4 IS A SYSTEM HEADWORKS * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	1020.53	1247.15	1	1248.65

NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING
LICENSEE: MORSE CONSULTING GROUP

F0515P
WATER SURFACE PROFILE LISTING

TRACT 32535 100YR HYDRAULIC CALCULATIONS
PREPARED BY MDS CONSULTING
LAT. " B-5 " (FN C:\WSPG1\32535\32535.B5)

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH	HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF		NORM DEPTH			ZR		

****

1004.50	1246.99	3.350	1250.340	8.6	2.74	0.116	1250.456	0.00	1.046		2.00	0.00	0.00	0	0.00
16.03	0.00998					.001445	0.02			0.853			0.00		
1020.53	1247.15	3.213	1250.363	8.6	2.74	0.116	1250.479	0.00	1.046		2.00	0.00	0.00	0	0.00
WALL	ENTRANCE												0.00		
1020.53	1247.15	3.445	1250.595	8.6	0.18	0.000	1250.595	0.00	0.227		4.98	14.00	0.00	0	0.00

DATE: 12/ 4/2013
TIME: 7:24

F0515P
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

CARD CODE	SECT NO	CHN TYPE	NO OF PIERS	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	1	2	0	0.00	4.76	14.00			0.00										
CD	18	4			1.50														
CD	24	4			2.00														
CD	30	4			2.50														

F 0 5 1 5 P

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

TRACT 32535 100YR HYDRAULIC CALCULATIONS

HEADING LINE NO 2 IS -

PREPARED BY MDS CONSULTING

HEADING LINE NO 3 IS -

LAT. " B-6 " (FN C:\WSPG1\32535\32535.B6)

F 0 5 1 5 P

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *
U/S DATA STATION INVERT SECT W S ELEV
1004.00 1247.32 30 1250.61

ELEMENT NO 2 IS A REACH * * *
U/S DATA STATION INVERT SECT N RADIUS ANGLE ANG PT MAN H
1062.74 1247.91 30 0.013 0.00 0.00 0.00 0

ELEMENT NO 3 IS A WALL ENTRANCE *
U/S DATA STATION INVERT SECT FP
1062.74 1247.91 1 0.200

ELEMENT NO 4 IS A SYSTEM HEADWORKS * *
U/S DATA STATION INVERT SECT W S ELEV
1062.74 1247.91 1 1250.19

NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING
LICENSEE: MORSE CONSULTING GROUP

F0515P
WATER SURFACE PROFILE LISTING

TRACT 32535 100YR HYDRAULIC CALCULATIONS
PREPARED BY MDS CONSULTING
LAT. " B-6 " (FN C:\WSPG1\32535\32535.B6)

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH	HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF		NORM DEPTH			ZR		

****

1004.00	1247.32	3.290	1250.610	19.7	4.01	0.250	1250.860	0.00	1.506		2.50	0.00	0.00	0	0.00
58.74	0.01004					.002307	0.14			1.220			0.00		
1062.74	1247.91	2.835	1250.745	19.7	4.01	0.250	1250.995	0.00	1.506		2.50	0.00	0.00	0	0.00
WALL	ENTRANCE														
													0.00		
1062.74	1247.91	3.330	1251.240	19.7	0.42	0.003	1251.243	0.00	0.395		4.76	14.00	0.00	0	0.00

DATE: 12/ 5/2013
TIME: 10: 0

F0515P
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING PAGE 1

CARD CODE	SECT NO	CHN TYPE	NO OF PIERS	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	1	2	0	0.00	4.50	14.00			0.00										
CD	18	4			1.50														
CD	24	4			2.00														

F 0 5 1 5 P PAGE NO 3

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

TRACT 32535 100YR HYDRAULIC CALCULATIONS

HEADING LINE NO 2 IS -

PREPARED BY MDS CONSULTING

HEADING LINE NO 3 IS -

LAT. " B-7 " (FN C:\WSPG1\32535\32535.B7)

F 0 5 1 5 P PAGE NO 2

WATER SURFACE PROFILE - ELEMENT CARD LISTING

```
ELEMENT NO   1 IS A SYSTEM OUTLET      *          *      *
                U/S DATA   STATION    INVERT  SECT                                W S ELEV
                             1001.75 1259.80   18                                  1261.56

ELEMENT NO   2 IS A REACH              *          *      *
                U/S DATA   STATION    INVERT  SECT              N                          RADIUS  ANGLE  ANG PT  MAN H
                             1029.98 1261.80   18            0.013                           0.00   0.00    0.00      0

ELEMENT NO   3 IS A  WALL  ENTRANCE                    *
                U/S DATA   STATION    INVERT  SECT             FP
                             1029.98 1261.80    1            0.200

ELEMENT NO   4 IS A SYSTEM HEADWORKS                   *                        *
                U/S DATA   STATION    INVERT  SECT                                W S ELEV
                             1029.98 1261.80    1                                  1263.30
NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING
LICENSEE: MORSE CONSULTING GROUP                    F0515P                                                    PAGE 1
                                          WATER SURFACE PROFILE LISTING
                      TRACT 32535  100YR HYDRAULIC CALCULATIONS
                      PREPARED BY MDS CONSULTING
                      LAT. " B-7 " (FN C:\WSPG1\32535\32535.B7)

STATION     INVERT   DEPTH     W.S.        Q       VEL     VEL     ENERGY   SUPER  CRITICAL          HGT/   BASE/    ZL   NO  AVBPR
             ELEV   OF FLOW    ELEV                        HEAD   GRD.EL.   ELEV   DEPTH             DIA    ID NO.        PIER

L/ELEM      SO                                         SF AVE     HF                    NORM DEPTH                   ZR
*****************************************************************************************************************************
```

1001.75	1259.80	1.760	1261.560	5.8	3.28	0.167	1261.727	0.00	0.930		1.50	0.00	0.00	0	0.00
2.56	0.07085					.003049	0.01			0.460			0.00		
1004.31	1259.98	1.604	1261.585	5.8	3.28	0.167	1261.752	0.00	0.930		1.50	0.00	0.00	0	0.00
HYDRAULIC JUMP													0.00		
1004.31	1259.98	0.507	1260.488	5.8	11.03	1.888	1262.376	0.00	0.930		1.50	0.00	0.00	0	0.00
0.42	0.07085					.048937	0.02			0.460			0.00		
1004.73	1260.01	0.514	1260.525	5.8	10.82	1.818	1262.343	0.00	0.930		1.50	0.00	0.00	0	0.00
5.60	0.07085					.044609	0.25			0.460			0.00		
1010.33	1260.41	0.532	1260.940	5.8	10.32	1.654	1262.594	0.00	0.930		1.50	0.00	0.00	0	0.00
4.13	0.07085					.039095	0.16			0.460			0.00		
1014.46	1260.70	0.551	1261.252	5.8	9.83	1.501	1262.753	0.00	0.930		1.50	0.00	0.00	0	0.00
3.19	0.07085					.034285	0.11			0.460			0.00		
1017.65	1260.93	0.571	1261.497	5.8	9.37	1.363	1262.860	0.00	0.930		1.50	0.00	0.00	0	0.00
2.53	0.07085					.030086	0.08			0.460			0.00		
1020.18	1261.11	0.592	1261.697	5.8	8.94	1.240	1262.937	0.00	0.930		1.50	0.00	0.00	0	0.00
2.06	0.07085					.026399	0.05			0.460			0.00		
1022.24	1261.25	0.613	1261.865	5.8	8.52	1.126	1262.991	0.00	0.930		1.50	0.00	0.00	0	0.00
1.67	0.07085					.023175	0.04			0.460			0.00		
1023.91	1261.37	0.636	1262.006	5.8	8.12	1.025	1263.031	0.00	0.930		1.50	0.00	0.00	0	0.00
1.39	0.07085					.020357	0.03			0.460			0.00		
1025.30	1261.47	0.659	1262.128	5.8	7.74	0.931	1263.059	0.00	0.930		1.50	0.00	0.00	0	0.00
1.13	0.07085					.017889	0.02			0.460			0.00		

WATER SURFACE PROFILE LISTING

TRACT 32535 100YR HYDRAULIC CALCULATIONS
PREPARED BY MDS CONSULTING
LAT. " B-7 " (FN C:\WSPG1\32535\32535.B7)

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF			NORM DEPTH			ZR		
1026.43	1261.55	0.684	1262.232	5.8	7.39	0.848	1263.080	0.00	0.930		1.50	0.00	0.00	0	0.00
0.94	0.07085					.015728	0.01			0.460			0.00		

1027.37	1261.62	0.709	1262.324	5.8	7.05	0.771	1263.095	0.00	0.930		1.50	0.00	0.00	0	0.00
0.76	0.07085					.013833	0.01			0.460			0.00		
1028.13	1261.67	0.736	1262.405	5.8	6.71	0.700	1263.105	0.00	0.930		1.50	0.00	0.00	0	0.00
0.61	0.07085					.012179	0.01			0.460			0.00		
1028.74	1261.71	0.764	1262.476	5.8	6.40	0.636	1263.112	0.00	0.930		1.50	0.00	0.00	0	0.00
0.46	0.07085					.010732	0.00			0.460			0.00		
1029.20	1261.74	0.794	1262.539	5.8	6.11	0.579	1263.118	0.00	0.930		1.50	0.00	0.00	0	0.00
0.35	0.07085					.009466	0.00			0.460			0.00		
1029.55	1261.77	0.825	1262.595	5.8	5.82	0.527	1263.122	0.00	0.930		1.50	0.00	0.00	0	0.00
0.26	0.07085					.008352	0.00			0.460			0.00		
1029.81	1261.79	0.857	1262.645	5.8	5.55	0.478	1263.123	0.00	0.930		1.50	0.00	0.00	0	0.00
0.13	0.07085					.007379	0.00			0.460			0.00		
1029.94	1261.80	0.892	1262.689	5.8	5.29	0.435	1263.124	0.00	0.930		1.50	0.00	0.00	0	0.00
0.04	0.07085					.006523	0.00			0.460			0.00		
1029.98	1261.80	0.930	1262.730	5.8	5.04	0.394	1263.124	0.00	0.930		1.50	0.00	0.00	0	0.00
WALL	ENTRANCE												0.00		
1029.98	1261.80	1.525	1263.325	5.8	0.27	0.001	1263.326	0.00	0.175		4.50	14.00	0.00	0	0.00

DATE: 9/26/2013
TIME: 14:14

F0515P
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

PAGE 1

CARD CODE	SECT NO	CHN TYPE	NO OF PIERS	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	1	2	0	0.00	7.00	8.00			0.00										
CD	2	3	0	0.00	5.00	8.00	0.00	0.00	0.00										
CD	18	4			1.50														
CD	24	4			2.00														
CD	42	4			3.50														
CD	60	4			5.00														
CD	66	4			5.50														

F 0 5 1 5 P

PAGE NO 3

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

TRACT 32535 100YR HYDRAULIC CALCULATIONS

HEADING LINE NO 2 IS -

PREPARED BY MDS CONSULTING

HEADING LINE NO 3 IS -

LINE " C " (FN C:\WSPG1\32535\32535.C)

F 0 5 1 5 P

PAGE NO 2

WATER SURFACE PROFILE - ELEMENT CARD LISTING

100YR WS ELEV.

PER LINE "A" TRACT 31353

ELEMENT NO 1 IS A SYSTEM OUTLET * * *

U/S DATA	STATION	INVERT	SECT
	1000.00	1245.00	2

W S ELEV 1245.72

ELEMENT NO 2 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N
	1110.92	1246.00	2	0.014

RADIUS	ANGLE	ANG PT	MAN H
0.00	0.00	0.00	0

ELEMENT NO 3 IS A WALL ENTRANCE *

U/S DATA	STATION	INVERT	SECT	FP
	1110.92	1246.00	1	0.014

ELEMENT NO 4 IS A SYSTEM HEADWORKS * *

U/S DATA	STATION	INVERT	SECT
	1110.92	1246.00	1

W S ELEV 1251.00

NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING
LICENSEE: MORSE CONSULTING GROUP

F0515P
WATER SURFACE PROFILE LISTING

PAGE 1

TRACT 32535 100YR HYDRAULIC CALCULATIONS
PREPARED BY MDS CONSULTING
LINE " C " (FN C:\WSPG1\32535\32535.C)

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH	HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR

L/ELEM	SO					SF AVE	HF			NORM DEPTH			ZR		
1000.00	1245.00	2.785	1247.785	290.4	13.03	2.637	1250.422	0.00	3.447		5.00	8.00	0.00	0	0.00
35.53	0.00902					.007549	0.27			2.642			0.00		
1035.53	1245.32	2.848	1248.168	290.4	12.75	2.523	1250.691	0.00	3.447		5.00	8.00	0.00	0	0.00
41.96	0.00902					.006863	0.29			2.642			0.00		
1077.49	1245.70	2.987	1248.686	290.4	12.15	2.293	1250.979	0.00	3.447		5.00	8.00	0.00	0	0.00
20.91	0.00902					.006017	0.13			2.642			0.00		
1098.40	1245.89	3.133	1249.020	290.4	11.59	2.085	1251.105	0.00	3.447		5.00	8.00	0.00	0	0.00
9.80	0.00902					.005278	0.05			2.642			0.00		
1108.20	1245.97	3.286	1249.261	290.4	11.05	1.895	1251.156	0.00	3.447		5.00	8.00	0.00	0	0.00
2.72	0.00902					.004632	0.01			2.642			0.00		
1110.92	1246.00	3.447	1249.447	290.4	10.53	1.722	1251.169	0.00	3.447		5.00	8.00	0.00	0	0.00
WALL ENTRANCE													0.00		
1110.92	1246.00	3.448	1249.448	290.4	10.53	1.721	1251.169	0.00	3.447		7.00	8.00	0.00	0	0.00

DATE: 7/25/2013
TIME: 14:41

F0515P
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

CARD CODE	SECT NO	CHN TYPE	NO OF PIERS	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	1	2	0	0.00	5.11	7.00			0.00										
CD	18	4			1.50														
CD	24	4			2.00														
CD	30	4			2.50														

F 0 5 1 5 P

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

TRACT 32535 100YR HYDRAULIC CALCULATIONS

HEADING LINE NO 2 IS -

PREPARED BY MDS CONSULTING

HEADING LINE NO 3 IS -

LINE " D " (FN C:\WSPG1\32535\32535.D)

F 0 5 1 5 P

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *

U/S DATA	STATION	INVERT	SECT
	1003.00	1267.15	30

W S ELEV 1270.00

100 YR WS ELEV.
PER LINE "A" TRACT 31837

ELEMENT NO 2 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1011.04	1267.69	30	0.013	0.00	40.90	0.00	0

ELEMENT NO 3 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1064.33	1271.25	30	0.013	0.00	0.00	0.00	0

ELEMENT NO 4 IS A JUNCTION * * * * * * *

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	1068.32	1271.75	24	18	0	0.013	5.1	0.0	1271.80	0.00	75.00	0.00

ELEMENT NO 5 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1076.21	1271.90	24	0.013	0.00	30.30	0.00	0

ELEMENT NO 6 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1159.96	1273.47	24	0.013	0.00	0.00	0.00	0

ELEMENT NO 7 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1248.24	1275.13	24	0.013	0.00	33.70	0.00	0

```
ELEMENT NO   8 IS A REACH              *         *     *
                  U/S DATA   STATION    INVERT  SECT              N                                  RADIUS  ANGLE  ANG PT  MAN H
                               1281.40 1275.76   24              0.013                                   0.00   0.00    0.00      0

ELEMENT NO   9 IS A REACH              *         *     *
                  U/S DATA   STATION    INVERT  SECT              N                                  RADIUS  ANGLE  ANG PT  MAN H
                               1285.40 1275.83   24              0.013                                   0.00   0.00    0.00      1

ELEMENT NO  10 IS A REACH              *         *     *
                  U/S DATA   STATION    INVERT  SECT              N                                  RADIUS  ANGLE  ANG PT  MAN H
                               1318.60 1276.00   24              0.013                                   0.00   0.00    0.00      0

ELEMENT NO  11 IS A REACH              *         *     *
                  U/S DATA   STATION    INVERT  SECT              N                                  RADIUS  ANGLE  ANG PT  MAN H
                               1386.60 1276.34   24              0.013                                   0.00  86.60    0.00      0

ELEMENT NO  12 IS A REACH              *         *     *
                  U/S DATA   STATION    INVERT  SECT              N                                  RADIUS  ANGLE  ANG PT  MAN H
                               1487.81 1276.85   24              0.013                                   0.00   0.00    0.00      0

ELEMENT NO  13 IS A JUNCTION           *         *     *     *                 *                 *                 *
                  U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3       Q4    INVERT-3 INVERT-4  PHI 3   PHI 4
                               1492.82 1276.87   24    18     0  0.013     1.7      0.0  1276.89     0.00  60.00    0.00
                                                       F 0 5 1 5 P                                                  PAGE NO   3

                        WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO  14 IS A REACH              *         *     *
                  U/S DATA   STATION    INVERT  SECT              N                                  RADIUS  ANGLE  ANG PT  MAN H
                               1514.23 1277.81   24              0.013                                   0.00  64.70    0.00      0

ELEMENT NO  15 IS A REACH              *         *     *
                  U/S DATA   STATION    INVERT  SECT              N                                  RADIUS  ANGLE  ANG PT  MAN H
                               1529.36 1278.70   24              0.013                                   0.00   0.00    0.00      0

ELEMENT NO  16 IS A  WALL  ENTRANCE                    *
                  U/S DATA   STATION    INVERT  SECT             FP
                               1529.36 1278.70    1              0.013

ELEMENT NO  17 IS A SYSTEM HEADWORKS                   *                    *
                  U/S DATA   STATION    INVERT  SECT                                  W S ELEV
                               1529.36 1278.70    1                                    1280.70
NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING
LICENSEE: MORSE CONSULTING GROUP                                F0515P                                                  PAGE    1
                                                   WATER SURFACE PROFILE LISTING
                      TRACT 32535  100YR HYDRAULIC CALCULATIONS
                      PREPARED BY MDS CONSULTING
                      LINE " D "  (FN C:\WSPG1\32535\32535.D)

STATION     INVERT   DEPTH     W.S.        Q       VEL      VEL     ENERGY   SUPER  CRITICAL          HGT/   BASE/    ZL   NO  AVBPR
             ELEV   OF FLOW    ELEV                         HEAD   GRD.EL.   ELEV    DEPTH            DIA    ID NO.        PIER

L/ELEM      SO                                           SF AVE     HF                    NORM DEPTH                 ZR
*****************************************************************************************************************************************

 1003.00  1267.15    0.837  1267.987      22.1   15.34    3.652  1271.639   0.00    1.599            2.50    0.00  0.00   0   0.00

    8.04  0.06716                                       .048245     0.39                    0.771                  0.00
```

1011.04	1267.69	0.850	1268.540	22.1	15.00	3.495	1272.035	0.00	1.599		2.50	0.00	0.00	0	0.00
6.19	0.06680					.045406	0.28			0.772			0.00		
1017.23	1268.10	0.863	1268.966	22.1	14.68	3.348	1272.314	0.00	1.599		2.50	0.00	0.00	0	0.00
10.73	0.06680					.041316	0.44			0.772			0.00		
1027.96	1268.82	0.894	1269.714	22.1	14.01	3.046	1272.760	0.00	1.599		2.50	0.00	0.00	0	0.00
8.00	0.06680					.036224	0.29			0.772			0.00		
1035.96	1269.36	0.926	1270.281	22.1	13.35	2.769	1273.050	0.00	1.599		2.50	0.00	0.00	0	0.00
6.22	0.06680					.031775	0.20			0.772			0.00		
1042.18	1269.77	0.960	1270.730	22.1	12.73	2.517	1273.247	0.00	1.599		2.50	0.00	0.00	0	0.00
5.00	0.06680					.027876	0.14			0.772			0.00		
1047.18	1270.10	0.994	1271.098	22.1	12.14	2.287	1273.385	0.00	1.599		2.50	0.00	0.00	0	0.00
4.06	0.06680					.024455	0.10			0.772			0.00		
1051.24	1270.38	1.030	1271.406	22.1	11.57	2.079	1273.485	0.00	1.599		2.50	0.00	0.00	0	0.00
3.33	0.06680					.021470	0.07			0.772			0.00		
1054.57	1270.60	1.068	1271.666	22.1	11.03	1.890	1273.556	0.00	1.599		2.50	0.00	0.00	0	0.00
2.76	0.06680					.018865	0.05			0.772			0.00		
1057.33	1270.78	1.108	1271.890	22.1	10.52	1.718	1273.608	0.00	1.599		2.50	0.00	0.00	0	0.00
2.29	0.06680					.016582	0.04			0.772			0.00		
1059.62	1270.93	1.149	1272.084	22.1	10.03	1.563	1273.647	0.00	1.599		2.50	0.00	0.00	0	0.00
1.90	0.06680					.014579	0.03			0.772			0.00		

WATER SURFACE PROFILE LISTING

TRACT 32535 100YR HYDRAULIC CALCULATIONS
PREPARED BY MDS CONSULTING
LINE " D " (FN C:\WSPG1\32535\32535.D)

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF			NORM DEPTH			ZR		
1061.52	1271.06	1.192	1272.254	22.1	9.56	1.420	1273.674	0.00	1.599		2.50	0.00	0.00	0	0.00
1.56	0.06680					.012827	0.02			0.772			0.00		
1063.08	1271.17	1.237	1272.403	22.1	9.12	1.292	1273.695	0.00	1.599		2.50	0.00	0.00	0	0.00
1.25	0.06680					.011295	0.01			0.772			0.00		

1064.33	1271.25	1.285	1272.535	22.1	8.69	1.174	1273.709	0.00	1.599		2.50	0.00	0.00	0	0.00
JUNCT STR	0.12531	LAT. "D-1"				.014613	0.06						0.00		
1068.32	1271.75	1.059	1272.809	17.0	10.07	1.573	1274.382	0.00	1.486		2.00	0.00	0.00	0	0.00
7.89	0.01901					.018614	0.15			1.050			0.00		
1076.21	1271.90	1.060	1272.960	17.0	10.05	1.569	1274.529	0.00	1.486		2.00	0.00	0.00	0	0.00
43.01	0.01875					.018582	0.80			1.060			0.00		
1119.22	1272.71	1.060	1273.766	17.0	10.05	1.569	1275.335	0.00	1.486		2.00	0.00	0.00	0	0.00
40.74	0.01875					.018455	0.75			1.060			0.00		
1159.96	1273.47	1.064	1274.534	17.0	10.00	1.553	1276.087	0.00	1.486		2.00	0.00	0.00	0	0.00
59.03	0.01880					.017540	1.04			1.054			0.00		
1218.99	1274.58	1.094	1275.674	17.0	9.66	1.450	1277.124	0.00	1.486		2.00	0.00	0.00	0	0.00
29.25	0.01880					.015772	0.46			1.054			0.00		
1248.24	1275.13	1.137	1276.267	17.0	9.21	1.318	1277.585	0.00	1.486		2.00	0.00	0.00	0	0.00
14.05	0.01900					.013965	0.20			1.050			0.00		
1262.29	1275.40	1.180	1276.577	17.0	8.81	1.205	1277.782	0.00	1.486		2.00	0.00	0.00	0	0.00
9.30	0.01900					.012384	0.12			1.050			0.00		
1271.59	1275.57	1.228	1276.802	17.0	8.40	1.094	1277.896	0.00	1.486		2.00	0.00	0.00	0	0.00
5.92	0.01900					.010974	0.06			1.050			0.00		

WATER SURFACE PROFILE LISTING

TRACT 32535 100YR HYDRAULIC CALCULATIONS
PREPARED BY MDS CONSULTING
LINE " D " (FN C:\WSPG1\32535\32535.D)

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF			NORM DEPTH			ZR		
1277.51	1275.69	1.280	1276.966	17.0	8.00	0.995	1277.961	0.00	1.486		2.00	0.00	0.00	0	0.00
3.89	0.01900					.009743	0.04			1.050			0.00		
1281.40	1275.76	1.335	1277.095	17.0	7.63	0.905	1278.000	0.00	1.486		2.00	0.00	0.00	0	0.00
1.38	0.01750					.008939	0.01			1.080			0.00		
1282.78	1275.78	1.359	1277.143	17.0	7.48	0.868	1278.011	0.00	1.486		2.00	0.00	0.00	0	0.00
2.05	0.01750					.008238	0.02			1.080			0.00		

1284.83	1275.82	1.419	1277.239	17.0	7.13	0.789	1278.028	0.00	1.486		2.00	0.00	0.00	0	0.00
0.57	0.01750					.007354	0.00			1.080			0.00		
1285.40	1275.83	1.486	1277.316	17.0	6.79	0.716	1278.032	0.00	1.486		2.00	0.00	0.00	0	0.00
4.07	0.00512					.006592	0.03			1.750			0.00		
1289.47	1275.85	1.557	1277.408	17.0	6.48	0.651	1278.059	0.00	1.486		2.00	0.00	0.00	0	0.00
25.11	0.00512					.005949	0.15			1.750			0.00		
1314.58	1275.98	1.637	1277.616	17.0	6.18	0.592	1278.208	0.00	1.486		2.00	0.00	0.00	0	0.00
4.02	0.00512					.005639	0.02			1.750			0.00		
1318.60	1276.00	1.643	1277.643	17.0	6.15	0.588	1278.231	0.00	1.486		2.00	0.00	0.00	0	0.00
68.00	0.00500					.005435	0.37			1.780			0.00		
1386.60	1276.34	1.716	1278.056	17.0	5.93	0.546	1278.602	0.00	1.486		2.00	0.00	0.00	0	0.00
67.56	0.00504					.005248	0.35			1.770			0.00		
1454.16	1276.68	1.716	1278.396	17.0	5.93	0.545	1278.941	0.00	1.486		2.00	0.00	0.00	0	0.00
HYDRAULIC JUMP													0.00		
1454.16	1276.68	1.262	1277.942	17.0	8.14	1.028	1278.970	0.00	1.486		2.00	0.00	0.00	0	0.00
0.43	0.00504					.010745	0.00			1.770			0.00		

WATER SURFACE PROFILE LISTING

TRACT 32535 100YR HYDRAULIC CALCULATIONS
PREPARED BY MDS CONSULTING
LINE " D " (FN C:\WSPG1\32535\32535.D)

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF			NORM DEPTH			ZR		
1454.59	1276.68	1.262	1277.945	17.0	8.13	1.027	1278.972	0.00	1.486		2.00	0.00	0.00	0	0.00
8.26	0.00504					.011424	0.09			1.770			0.00		
1462.85	1276.72	1.212	1277.936	17.0	8.53	1.130	1279.066	0.00	1.486		2.00	0.00	0.00	0	0.00
8.39	0.00504					.012904	0.11			1.770			0.00		
1471.24	1276.77	1.165	1277.932	17.0	8.95	1.243	1279.175	0.00	1.486		2.00	0.00	0.00	0	0.00
8.30	0.00504					.014594	0.12			1.770			0.00		
1479.54	1276.81	1.120	1277.928	17.0	9.38	1.367	1279.295	0.00	1.486		2.00	0.00	0.00	0	0.00
8.27	0.00504					.016529	0.14			1.770			0.00		

1487.81	1276.85	1.078	1277.928	17.0	9.84	1.505	1279.433	0.00	1.486		2.00	0.00	0.00	0	0.00
JUNCT STR	0.00399	LAT. "D-2"				.024390	0.12						0.00		
1492.82	1276.87	0.858	1277.728	15.3	11.88	2.191	1279.919	0.00	1.410		2.00	0.00	0.00	0	0.00
3.19	0.04390	-				.030782	0.10			0.780			0.00		
1496.01	1277.01	0.865	1277.875	15.3	11.75	2.144	1280.019	0.00	1.410		2.00	0.00	0.00	0	0.00
10.59	0.04390					.028507	0.30			0.780			0.00		
1506.60	1277.47	0.897	1278.372	15.3	11.21	1.951	1280.323	0.00	1.410		2.00	0.00	0.00	0	0.00
7.63	0.04390					.025058	0.19			0.780			0.00		
1514.23	1277.81	0.931	1278.741	15.3	10.68	1.773	1280.514	0.00	1.410		2.00	0.00	0.00	0	0.00
1.86	0.05882					.022667	0.04			0.720			0.00		
1516.09	1277.92	0.948	1278.867	15.3	10.42	1.684	1280.551	0.00	1.410		2.00	0.00	0.00	0	0.00
3.06	0.05882					.020575	0.06			0.720			0.00		
1519.15	1278.10	0.984	1279.083	15.3	9.94	1.533	1280.616	0.00	1.410		2.00	0.00	0.00	0	0.00
2.49	0.05882					.018119	0.05			0.720			0.00		

WATER SURFACE PROFILE LISTING

TRACT 32535 100YR HYDRAULIC CALCULATIONS
PREPARED BY MDS CONSULTING
LINE " D " (FN C:\WSPG1\32535\32535.D)

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF			NORM DEPTH			ZR		
1521.64	1278.25	1.022	1279.268	15.3	9.47	1.392	1280.660	0.00	1.410		2.00	0.00	0.00	0	0.00
2.04	0.05882					.015964	0.03			0.720			0.00		
1523.68	1278.37	1.061	1279.427	15.3	9.03	1.267	1280.694	0.00	1.410		2.00	0.00	0.00	0	0.00
1.63	0.05882					.014077	0.02			0.720			0.00		
1525.31	1278.46	1.103	1279.565	15.3	8.61	1.151	1280.716	0.00	1.410		2.00	0.00	0.00	0	0.00
1.31	0.05882					.012431	0.02			0.720			0.00		
1526.62	1278.54	1.147	1279.686	15.3	8.21	1.046	1280.732	0.00	1.410		2.00	0.00	0.00	0	0.00
1.03	0.05882					.010985	0.01			0.720			0.00		
1527.65	1278.60	1.193	1279.792	15.3	7.83	0.951	1280.743	0.00	1.410		2.00	0.00	0.00	0	0.00
0.76	0.05882					.009720	0.01			0.720			0.00		

1528.41	1278.64	1.242	1279.886	15.3	7.46	0.865	1280.751	0.00	1.410		2.00	0.00	0.00	0	0.00
0.53	0.05882					.008615	0.00			0.720			0.00		
1528.94	1278.67	1.294	1279.969	15.3	7.12	0.786	1280.755	0.00	1.410		2.00	0.00	0.00	0	0.00
0.32	0.05882					.007649	0.00			0.720			0.00		
1529.26	1278.69	1.349	1280.043	15.3	6.78	0.715	1280.758	0.00	1.410		2.00	0.00	0.00	0	0.00
0.10	0.05882					.006802	0.00			0.720			0.00		
1529.36	1278.70	1.410	1280.110	15.3	6.46	0.649	1280.759	0.00	1.410		2.00	0.00	0.00	0	0.00
WALL	ENTRANCE														
													0.00		
1529.36	1278.70	2.423	1281.123	15.3	0.90	0.013	1281.136	0.00	0.530		5.11	7.00	0.00	0	0.00

DATE: 7/26/2013
TIME: 9:42

F0515P
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

CARD CODE	SECT NO	CHN TYPE	NO OF PIERS	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	1	2	0	0.00	5.54	4.00			0.00										
CD	18	4			1.50														
CD	24	4			2.00														

F 0 5 1 5 P

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

TRACT 32535 100YR HYDRAULIC CALCULATIONS

HEADING LINE NO 2 IS -

PREPARED BY MDS CONSULTING

HEADING LINE NO 3 IS -

LAT. " D-1 " (FN C:\WSPG1\32535\32535.D1)

F 0 5 1 5 P

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	1002.07	1271.80	18	1272.81

ELEMENT NO 2 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1034.37	1273.09	18	0.013	0.00	0.00	0.00	0

ELEMENT NO 3 IS A WALL ENTRANCE *

U/S DATA	STATION	INVERT	SECT	FP
	1034.37	1273.09	1	0.200

ELEMENT NO 4 IS A SYSTEM HEADWORKS * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	1034.37	1273.09	1	1274.59

NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING
LICENSEE: MORSE CONSULTING GROUP

F0515P

WATER SURFACE PROFILE LISTING
TRACT 32535 100YR HYDRAULIC CALCULATIONS
PREPARED BY MDS CONSULTING
LAT. " D-1 " (FN C:\WSPG1\32535\32535.D1)

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH	HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF		NORM DEPTH			ZR		

****

1002.07	1271.80	0.612	1272.412	6.4	9.44	1.384	1273.796	0.00	0.978		1.50	0.00	0.00	0	0.00
3.24	0.03994					.029798	0.10			0.570			0.00		
1005.31	1271.93	0.618	1272.547	6.4	9.30	1.344	1273.891	0.00	0.978		1.50	0.00	0.00	0	0.00
7.90	0.03994					.027388	0.22			0.570			0.00		
1013.21	1272.24	0.641	1272.886	6.4	8.86	1.220	1274.106	0.00	0.978		1.50	0.00	0.00	0	0.00
5.49	0.03994					.024068	0.13			0.570			0.00		
1018.70	1272.46	0.665	1273.129	6.4	8.45	1.110	1274.239	0.00	0.978		1.50	0.00	0.00	0	0.00
4.04	0.03994					.021159	0.09			0.570			0.00		
1022.74	1272.63	0.690	1273.316	6.4	8.06	1.009	1274.325	0.00	0.978		1.50	0.00	0.00	0	0.00
3.13	0.03994					.018600	0.06			0.570			0.00		
1025.87	1272.75	0.715	1273.466	6.4	7.69	0.919	1274.385	0.00	0.978		1.50	0.00	0.00	0	0.00
2.35	0.03994					.016365	0.04			0.570			0.00		
1028.22	1272.85	0.743	1273.588	6.4	7.33	0.835	1274.423	0.00	0.978		1.50	0.00	0.00	0	0.00
1.88	0.03994					.014415	0.03			0.570			0.00		
1030.10	1272.92	0.771	1273.690	6.4	6.99	0.758	1274.448	0.00	0.978		1.50	0.00	0.00	0	0.00
1.43	0.03994					.012699	0.02			0.570			0.00		
1031.53	1272.98	0.801	1273.778	6.4	6.67	0.690	1274.468	0.00	0.978		1.50	0.00	0.00	0	0.00
1.10	0.03994					.011200	0.01			0.570			0.00		
1032.63	1273.02	0.832	1273.853	6.4	6.36	0.627	1274.480	0.00	0.978		1.50	0.00	0.00	0	0.00
0.80	0.03994					.009885	0.01			0.570			0.00		
1033.43	1273.05	0.865	1273.917	6.4	6.06	0.570	1274.487	0.00	0.978		1.50	0.00	0.00	0	0.00
0.54	0.03994					.008737	0.00			0.570			0.00		

WATER SURFACE PROFILE LISTING
TRACT 32535 100YR HYDRAULIC CALCULATIONS
PREPARED BY MDS CONSULTING
LAT. " D-1 " (FN C:\WSPG1\32535\32535.D1)

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF			NORM DEPTH			ZR		
1033.97	1273.07	0.900	1273.974	6.4	5.78	0.518	1274.492	0.00	0.978		1.50	0.00	0.00	0	0.00
0.31	0.03994					.007733	0.00			0.570			0.00		

1034.28	1273.09	0.937	1274.023	6.4	5.51	0.471	1274.494	0.00	0.978		1.50	0.00	0.00	0	0.00
0.09	0.03994					.006848	0.00			0.570			0.00		
1034.37	1273.09	0.978	1274.068	6.4	5.25	0.427	1274.495	0.00	0.978		1.50	0.00	0.00	0	0.00
WALL	ENTRANCE												0.00		
1034.37	1273.09	1.605	1274.695	6.4	1.00	0.015	1274.710	0.00	0.430		5.54	4.00	0.00	0	0.00

DATE: 7/26/2013
TIME: 9:42

F0515P
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING PAGE 1

CARD CODE	SECT NO	CHN TYPE	NO OF PIERS	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	1	2	0	0.00	8.20	4.00			0.00										
CD	18	4			1.50														
CD	24	4			2.00														

F 0 5 1 5 P PAGE NO 3

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

TRACT 32535 100YR HYDRAULIC CALCULATIONS

HEADING LINE NO 2 IS -

PREPARED BY MDS CONSULTING

HEADING LINE NO 3 IS -

LAT. " D-2 " (FN C:\WSPG1\32535\32535.D2)

F 0 5 1 5 P PAGE NO 2

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	1001.83	1276.89	18	1277.93

ELEMENT NO 2 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1016.54	1277.04	18	0.013	0.00	0.00	0.00	0

ELEMENT NO 3 IS A WALL ENTRANCE *

U/S DATA	STATION	INVERT	SECT	FP
	1016.54	1277.04	1	0.200

ELEMENT NO 4 IS A SYSTEM HEADWORKS * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	1016.54	1277.04	1	1280.54

NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING
LICENSEE: MORSE CONSULTING GROUP F0515P PAGE 1

WATER SURFACE PROFILE LISTING
TRACT 32535 100YR HYDRAULIC CALCULATIONS
PREPARED BY MDS CONSULTING
LAT. " D-2 " (FN C:\WSPG1\32535\32535.D2)

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH	HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF		NORM DEPTH			ZR		

****

1001.83	1276.89	1.040	1277.930	1.7	1.30	0.026	1277.956	0.00	0.490		1.50	0.00	0.00	0	0.00
4.22	0.01020					.000406	0.00			0.400			0.00		
1006.05	1276.93	0.996	1277.929	1.7	1.36	0.029	1277.958	0.00	0.490		1.50	0.00	0.00	0	0.00
3.91	0.01020					.000457	0.00			0.400			0.00		
1009.96	1276.97	0.955	1277.928	1.7	1.43	0.032	1277.960	0.00	0.490		1.50	0.00	0.00	0	0.00
3.60	0.01020					.000515	0.00			0.400			0.00		
1013.56	1277.01	0.917	1277.927	1.7	1.50	0.035	1277.962	0.00	0.490		1.50	0.00	0.00	0	0.00
2.98	0.01020					.000578	0.00			0.400			0.00		
1016.54	1277.04	0.885	1277.925	1.7	1.57	0.038	1277.963	0.00	0.490		1.50	0.00	0.00	0	0.00
WALL	ENTRANCE												0.00		
1016.54	1277.04	0.952	1277.992	1.7	0.45	0.003	1277.995	0.00	0.178		8.20	4.00	0.00	0	0.00

DATE: 10/ 3/2013
TIME: 9:44

F0515P
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING PAGE 1

CARD CODE	SECT NO	CHN TYPE	NO OF PIERS	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	1	2	0	0.00	5.85	4.50			0.00										
CD	18	4			1.50														
CD	24	4			2.00														
CD	48	4			4.00														
CD	54	4			4.50														
CD	60	4			5.00														

F 0 5 1 5 P PAGE NO 3

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

TRACT 32535 100YR HYDRAULIC CALCULATIONS

HEADING LINE NO 2 IS -

PREPARED BY MDS CONSULTING

HEADING LINE NO 3 IS -

LINE " E " (FN C:\WSPG1\32535\32535.E)

F 0 5 1 5 P PAGE NO 2

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *
U/S DATA STATION INVERT SECT W S ELEV
1000.00 1251.75 54 1256.25

ELEMENT NO 2 IS A REACH * * *
U/S DATA STATION INVERT SECT N RADIUS ANGLE ANG PT MAN H
1087.91 1253.35 54 0.013 0.00 0.00 0.00 0

ELEMENT NO 3 IS A WALL ENTRANCE *
U/S DATA STATION INVERT SECT FP
1087.91 1253.35 1 0.013

ELEMENT NO 4 IS A SYSTEM HEADWORKS * *
U/S DATA STATION INVERT SECT W S ELEV
1087.91 1253.35 1 1257.85

NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING

LICENSEE: MORSE CONSULTING GROUP F0515P PAGE 1

WATER SURFACE PROFILE LISTING
TRACT 32535 100YR HYDRAULIC CALCULATIONS
PREPARED BY MDS CONSULTING
LINE " E " (FN C:\WSPG1\32535\32535.E)

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH	HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR

L/ELEM	SO					SF AVE	HF			NORM DEPTH			ZR		
1000.00	1251.75	4.500	1256.250	98.0	6.16	0.590	1256.840	0.00	2.908		4.50	0.00	0.00	0	0.00
0.00	0.01820					.002468	0.00			1.893			0.00		
1000.00	1251.75	4.500	1256.250	98.0	6.16	0.590	1256.840	0.00	2.908		4.50	0.00	0.00	0	0.00
22.53	0.01820					.002312	0.05			1.893			0.00		
1022.53	1252.16	4.082	1256.242	98.0	6.46	0.649	1256.891	0.00	2.908		4.50	0.00	0.00	0	0.00
11.10	0.01820					.002248	0.02			1.893			0.00		
1033.63	1252.36	3.840	1256.202	98.0	6.78	0.713	1256.915	0.00	2.908		4.50	0.00	0.00	0	0.00
2.91	0.01820					.002357	0.01			1.893			0.00		
1036.54	1252.41	3.774	1256.189	98.0	6.88	0.735	1256.924	0.00	2.908		4.50	0.00	0.00	0	0.00
HYDRAULIC JUMP													0.00		
1036.54	1252.41	2.212	1254.627	98.0	12.59	2.463	1257.090	0.00	2.908		4.50	0.00	0.00	0	0.00
0.69	0.01820					.010522	0.01			1.893			0.00		
1037.23	1252.43	2.212	1254.640	98.0	12.59	2.461	1257.101	0.00	2.908		4.50	0.00	0.00	0	0.00
16.70	0.01820					.009889	0.17			1.893			0.00		
1053.93	1252.73	2.297	1255.029	98.0	12.00	2.237	1257.266	0.00	2.908		4.50	0.00	0.00	0	0.00
12.17	0.01820					.008713	0.11			1.893			0.00		
1066.10	1252.95	2.385	1255.338	98.0	11.45	2.034	1257.372	0.00	2.908		4.50	0.00	0.00	0	0.00
8.74	0.01820					.007682	0.07			1.893			0.00		
1074.84	1253.11	2.478	1255.590	98.0	10.91	1.849	1257.439	0.00	2.908		4.50	0.00	0.00	0	0.00
6.05	0.01820					.006781	0.04			1.893			0.00		
1080.89	1253.22	2.577	1255.799	98.0	10.40	1.681	1257.480	0.00	2.908		4.50	0.00	0.00	0	0.00
4.08	0.01820					.005993	0.02			1.893			0.00		

WATER SURFACE PROFILE LISTING

TRACT 32535 100YR HYDRAULIC CALCULATIONS
PREPARED BY MDS CONSULTING
LINE " E " (FN C:\WSPG1\32535\32535.E)

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF			NORM DEPTH			ZR		
1084.97	1253.30	2.680	1255.976	98.0	9.92	1.528	1257.504	0.00	2.908		4.50	0.00	0.00	0	0.00

2.24	0.01820					.005302	0.01			1.893			0.00		
1087.21	1253.34	2.790	1256.127	98.0	9.46	1.389	1257.516	0.00	2.908		4.50	0.00	0.00	0	0.00
0.70	0.01820					.004697	0.00			1.893			0.00		
1087.91	1253.35	2.908	1256.258	98.0	9.02	1.262	1257.520	0.00	2.908		4.50	0.00	0.00	0	0.00
WALL	ENTRANCE												0.00		
1087.91	1253.35	3.949	1257.299	98.0	5.51	0.472	1257.771	0.00	2.452		5.85	4.50	0.00	0	0.00

DATE: 12/11/2013
TIME: 10:30

F0515P
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING PAGE 1

CARD CODE	SECT NO	CHN TYPE	NO OF PIERS	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	1	2	0	0.00	2.88	4.00			0.00										
CD	18	4			1.50														
CD	24	4			2.00														

F 0 5 1 5 P PAGE NO 3

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

TRACT 32535 100YR HYDRAULIC CALCULATIONS

HEADING LINE NO 2 IS -

PREPARED BY MDS CONSULTING

HEADING LINE NO 3 IS -

LINE " F " (FN C:\WSPG1\32535\32535.F)

F 0 5 1 5 P PAGE NO 2

WATER SURFACE PROFILE - ELEMENT CARD LISTING

```
ELEMENT NO   1 IS A SYSTEM OUTLET      *         *     *
                   U/S DATA   STATION    INVERT  SECT                                W S ELEV
                                1000.00 1277.00   18                                  1277.50

ELEMENT NO   2 IS A REACH              *         *     *
                   U/S DATA   STATION    INVERT  SECT              N                 RADIUS  ANGLE  ANG PT  MAN H
                                1025.66 1277.13   18            0.013                   0.00   0.00    0.00      0

ELEMENT NO   3 IS A REACH              *         *     *
                   U/S DATA   STATION    INVERT  SECT              N                 RADIUS  ANGLE  ANG PT  MAN H
                                1056.95 1277.29   18            0.013                   0.00  39.80    0.00      0

ELEMENT NO   4 IS A REACH              *         *     *
                   U/S DATA   STATION    INVERT  SECT              N                 RADIUS  ANGLE  ANG PT  MAN H
                                1059.24 1277.30   18            0.013                   0.00   0.00    0.00      0

ELEMENT NO   5 IS A  WALL  ENTRANCE                  *
                   U/S DATA   STATION    INVERT  SECT             FP
                                1059.24 1277.30    1            0.013

ELEMENT NO   6 IS A SYSTEM HEADWORKS                 *                     *
                   U/S DATA   STATION    INVERT  SECT                                W S ELEV
                                1059.24 1277.30    1                                  1278.80
NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING
LICENSEE: MORSE CONSULTING GROUP                          F0515P                                    PAGE    1
                                                   WATER SURFACE PROFILE LISTING
                          TRACT 32535  100YR HYDRAULIC CALCULATIONS
                          PREPARED BY MDS CONSULTING
```

LINE " F " (FN C:\WSPG1\32535\32535.F)

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF			NORM DEPTH			ZR		
1000.00	1277.00	0.930	1277.930	5.8	5.04	0.394	1278.324	0.00	0.930		1.50	0.00	0.00	0	0.00
3.20	0.00507					.005770	0.02			0.990			0.00		
1003.20	1277.02	0.968	1277.984	5.8	4.81	0.359	1278.343	0.00	0.930		1.50	0.00	0.00	0	0.00
22.46	0.00507					.005430	0.12			0.990			0.00		
1025.66	1277.13	0.968	1278.098	5.8	4.81	0.359	1278.457	0.00	0.930		1.50	0.00	0.00	0	0.00
25.63	0.00511					.005268	0.14			0.990			0.00		
1051.29	1277.26	0.990	1278.251	5.8	4.69	0.341	1278.592	0.00	0.930		1.50	0.00	0.00	0	0.00
5.66	0.00511					.005098	0.03			0.990			0.00		
1056.95	1277.29	0.990	1278.280	5.8	4.69	0.341	1278.621	0.00	0.930		1.50	0.00	0.00	0	0.00
2.29	0.00437					.005052	0.01			1.050			0.00		
1059.24	1277.30	0.997	1278.297	5.8	4.65	0.335	1278.632	0.00	0.930		1.50	0.00	0.00	0	0.00
WALL ENTRANCE													0.00		
1059.24	1277.30	1.504	1278.804	5.8	0.96	0.014	1278.818	0.00	0.403		2.88	4.00	0.00	0	0.00

Appendix F

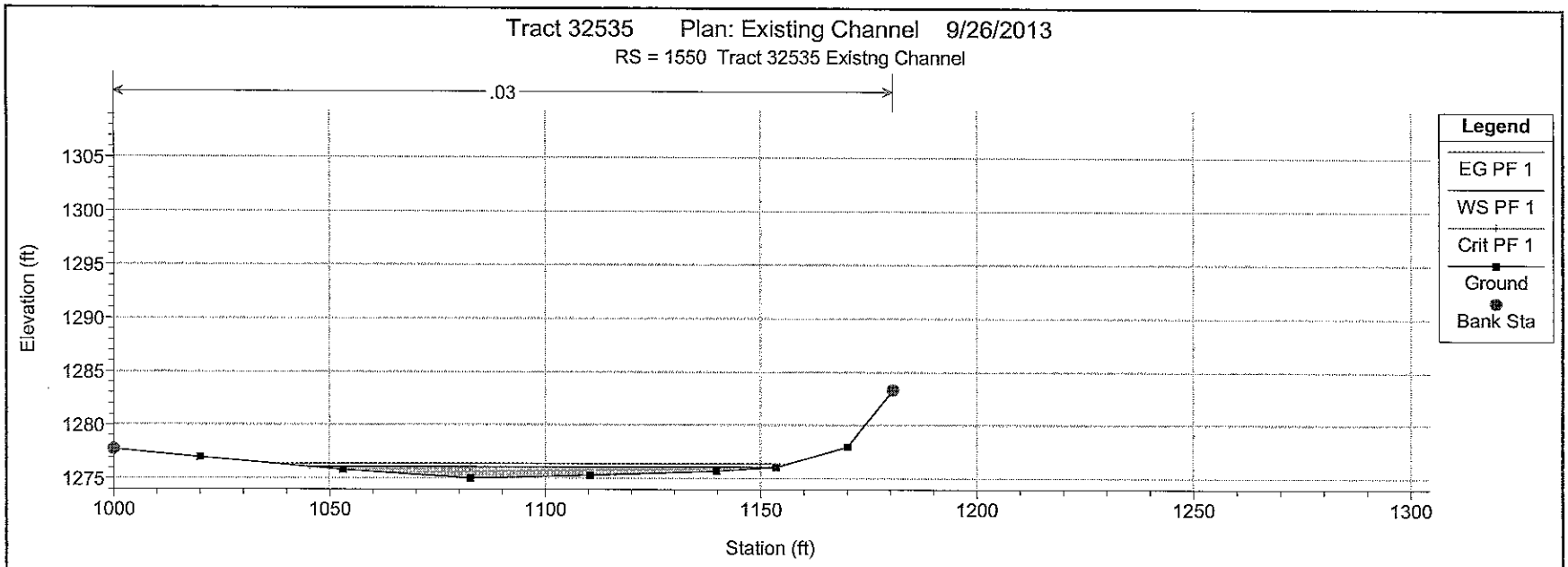
HEC-RAS ANALYSIS FOR EXISTING CHANNEL

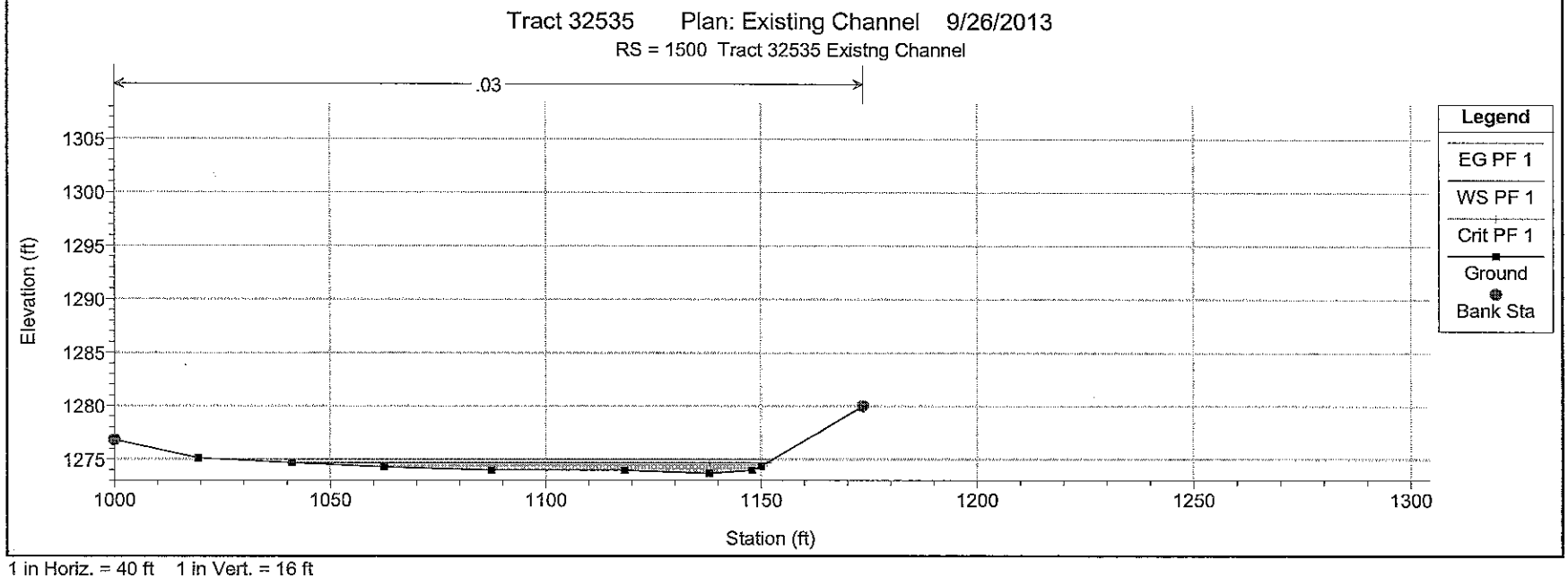
MDS CONSULTING
MORSE SCHULTZ
17320 Redhill Ave.
Suite 350
Irvine, CA 92614
Voice: 949-251-8821
FAX: 949-251-0516
PLANNERS ENGINEERS SURVEYORS

TRACT NO. 32535
EXISTING CHANNEL HYDRAULIC

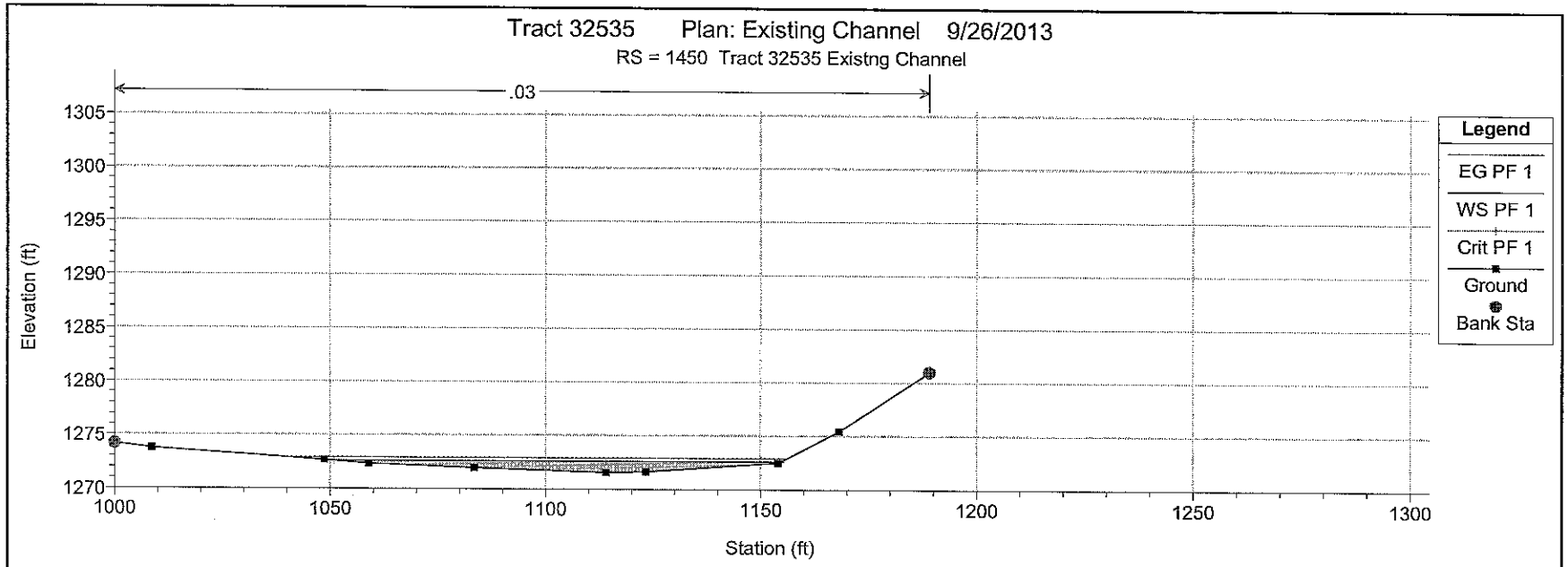
HEC-RAS Plan: Existing Channel River: Existing Natural Reach: Existing Channel Profile: PF 1

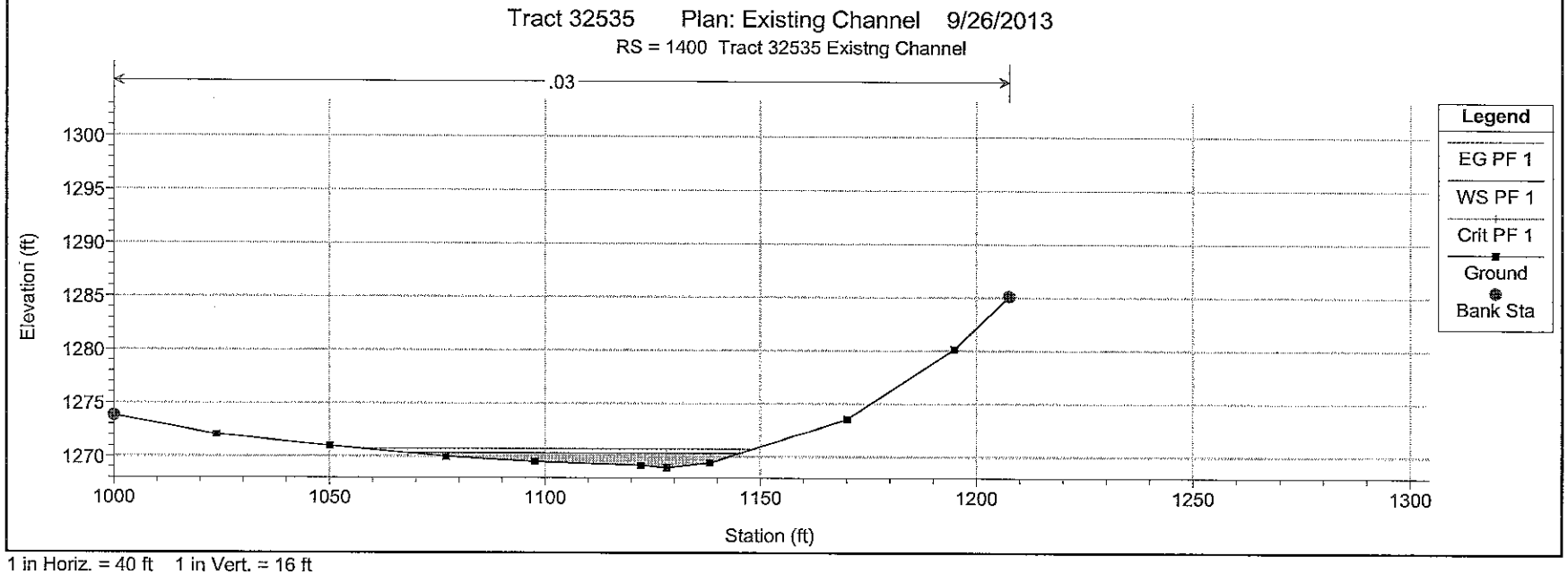
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Existing Channel	1550	PF 1	290.40	1275.05	1276.09	1276.09	1276.40	0.015879	4.45	65.23	108.25	1.01
Existing Channel	1500	PF 1	290.40	1273.70	1274.69	1274.69	1275.00	0.016094	4.43	65.61	110.90	1.01
Existing Channel	1450	PF 1	290.40	1271.55	1272.60	1272.60	1272.92	0.015804	4.52	64.21	103.70	1.01
Existing Channel	1400	PF 1	290.40	1269.00	1270.33	1270.33	1270.71	0.014786	4.99	58.22	77.15	1.01
Existing Channel	1350	PF 1	290.40	1264.56	1266.77	1266.77	1267.29	0.013288	5.84	49.76	47.90	1.01
Existing Channel	1300	PF 1	290.40	1259.60	1261.91	1261.91	1262.54	0.012565	6.39	45.46	36.49	1.01
Existing Channel	1250	PF 1	290.40	1255.86	1258.37	1258.37	1259.05	0.012328	6.61	43.91	32.89	1.01
Existing Channel	1200	PF 1	290.40	1252.50	1254.33	1254.33	1254.90	0.013051	6.05	47.99	43.18	1.01
Existing Channel	1150	PF 1	290.40	1250.24	1251.70	1251.70	1252.14	0.014223	5.30	54.79	64.39	1.01
Existing Channel	1100	PF 1	290.40	1248.60	1251.31		1251.42	0.001348	2.67	108.91	60.62	0.35
Existing Channel	1050	PF 1	290.40	1248.00	1251.31		1251.37	0.000450	1.93	150.47	59.56	0.21
Existing Channel	1000	PF 1	290.40	1246.70	1251.31		1251.35	0.000225	1.47	197.10	69.76	0.15
Existing Channel	990	PF 1	290.40	1246.00	1249.44	1249.44	1251.17	0.004372	10.57	27.48	8.00	1.00
Existing Channel	880	PF 1	290.40	1245.00	1248.44	1248.44	1250.17	0.004369	10.57	27.49	8.00	1.00



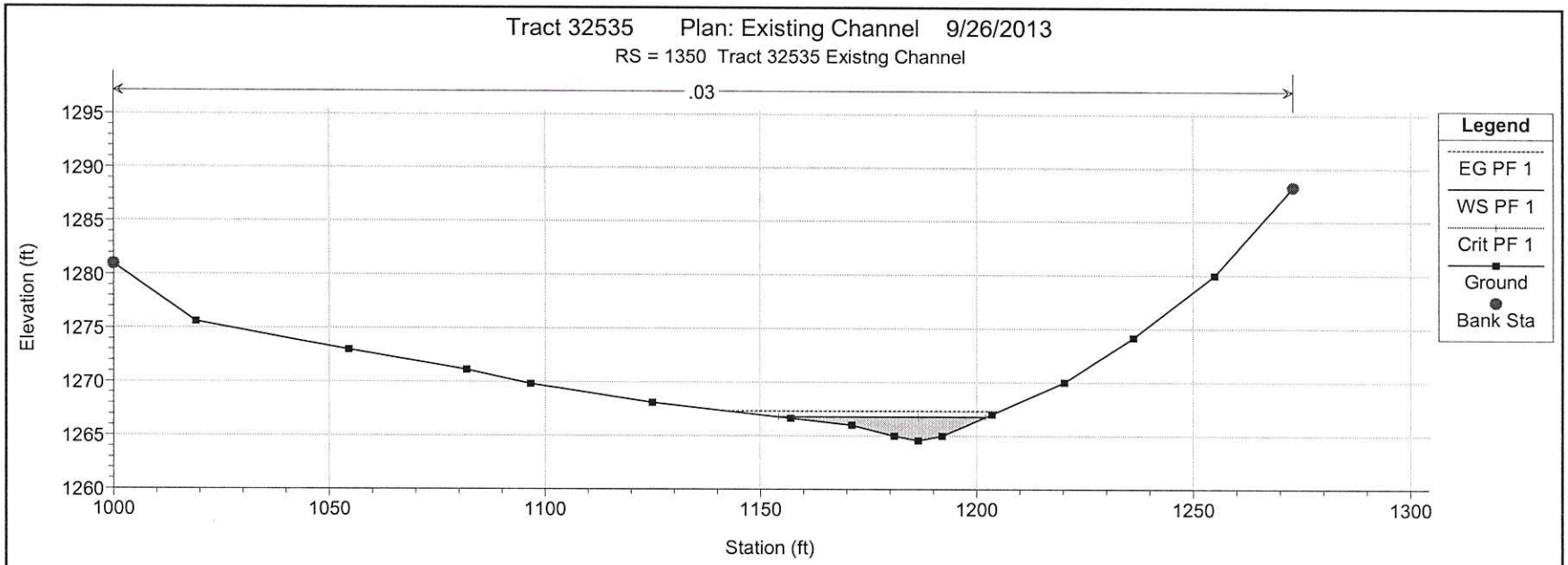


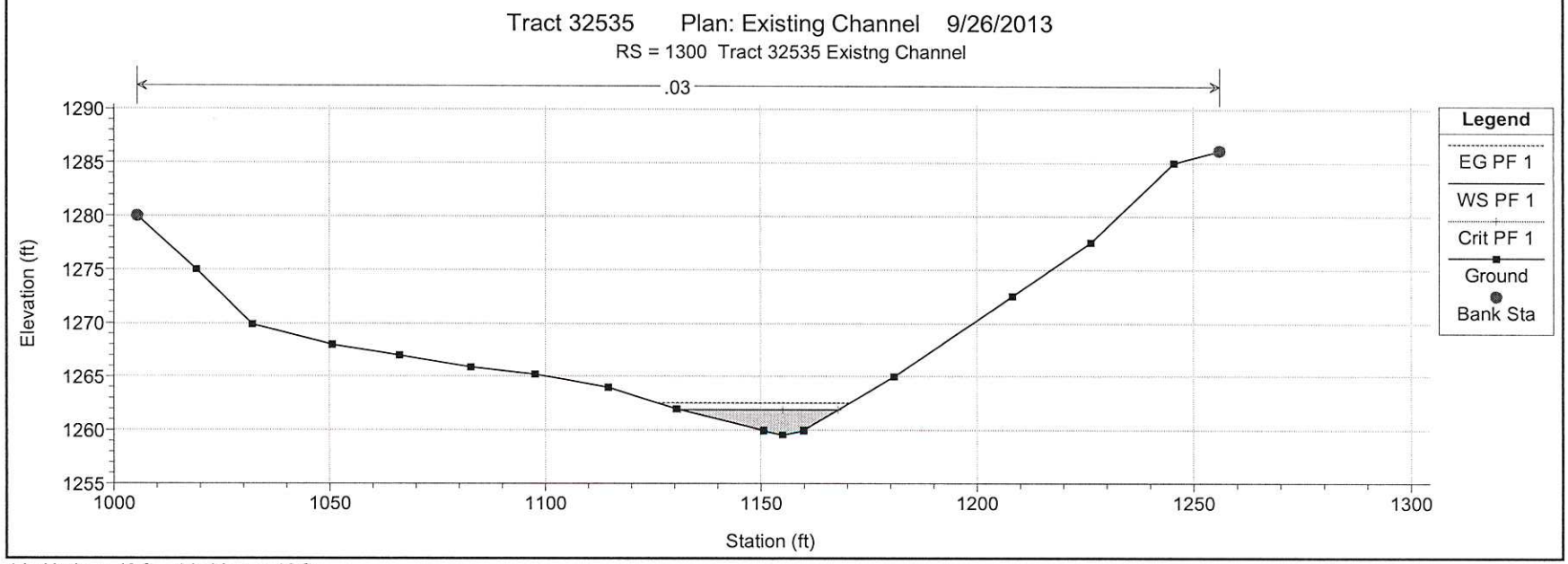
1 in Horiz. = 40 ft 1 in Vert. = 16 ft



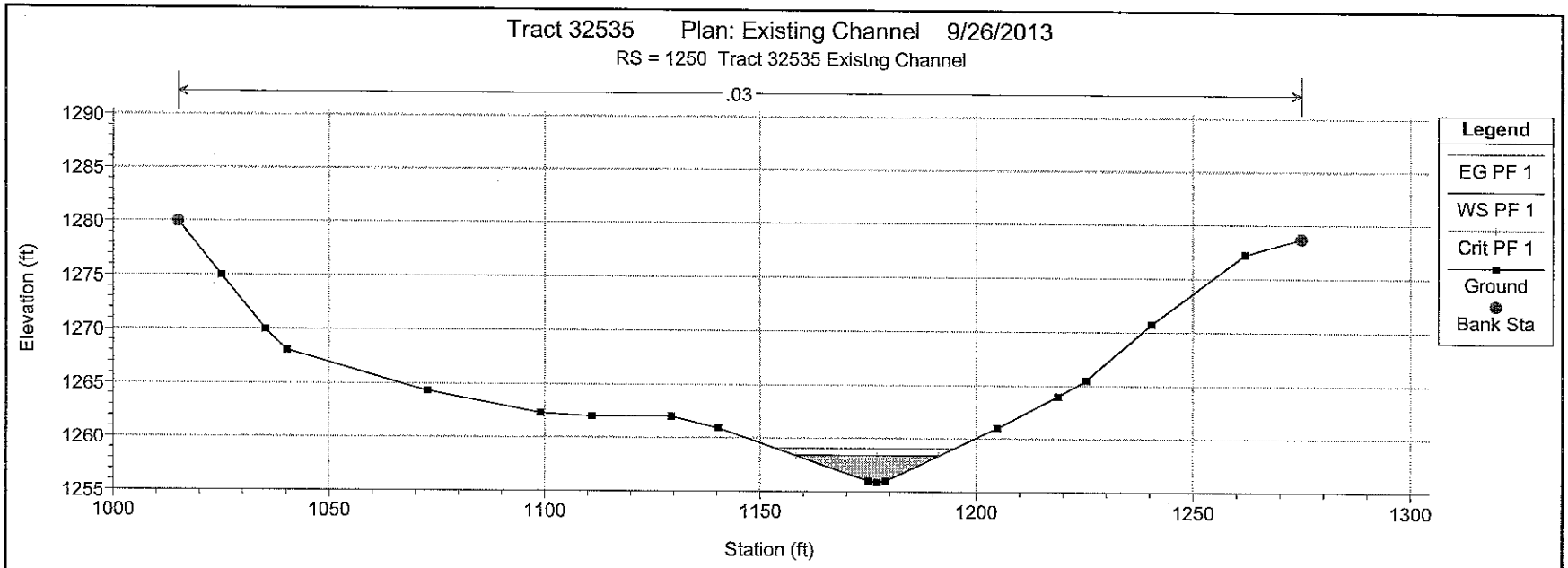


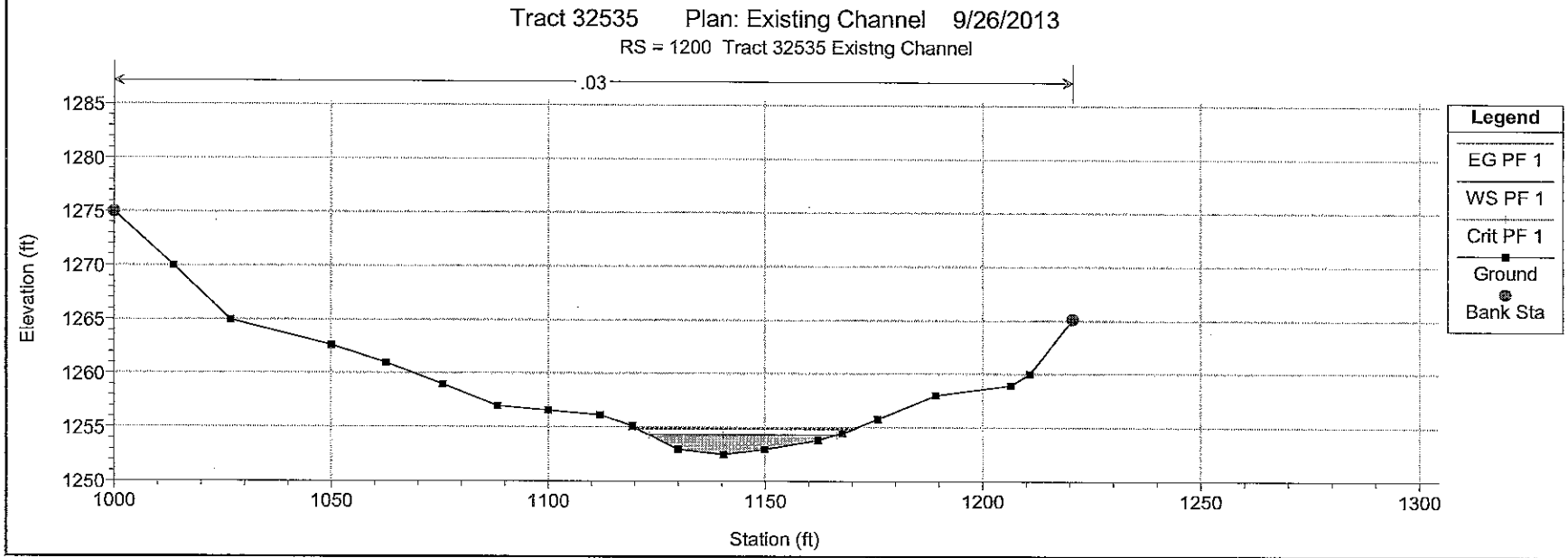
1 in Horiz. = 40 ft 1 in Vert. = 16 ft



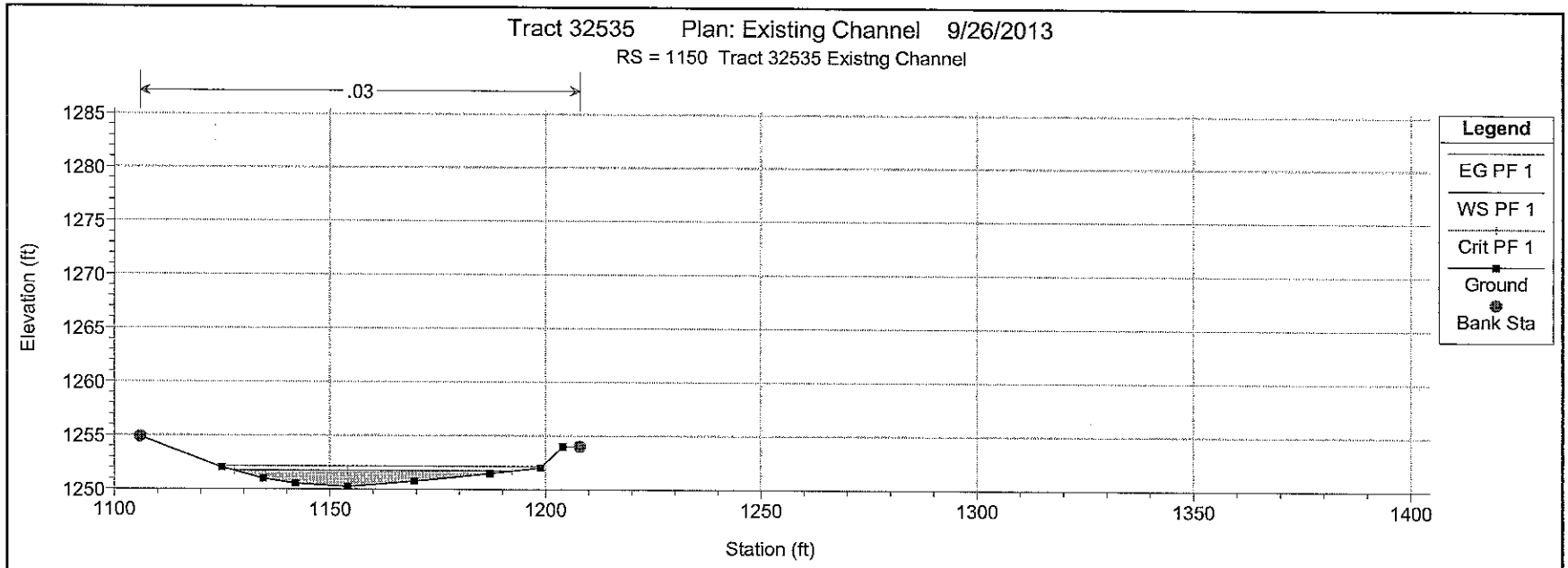


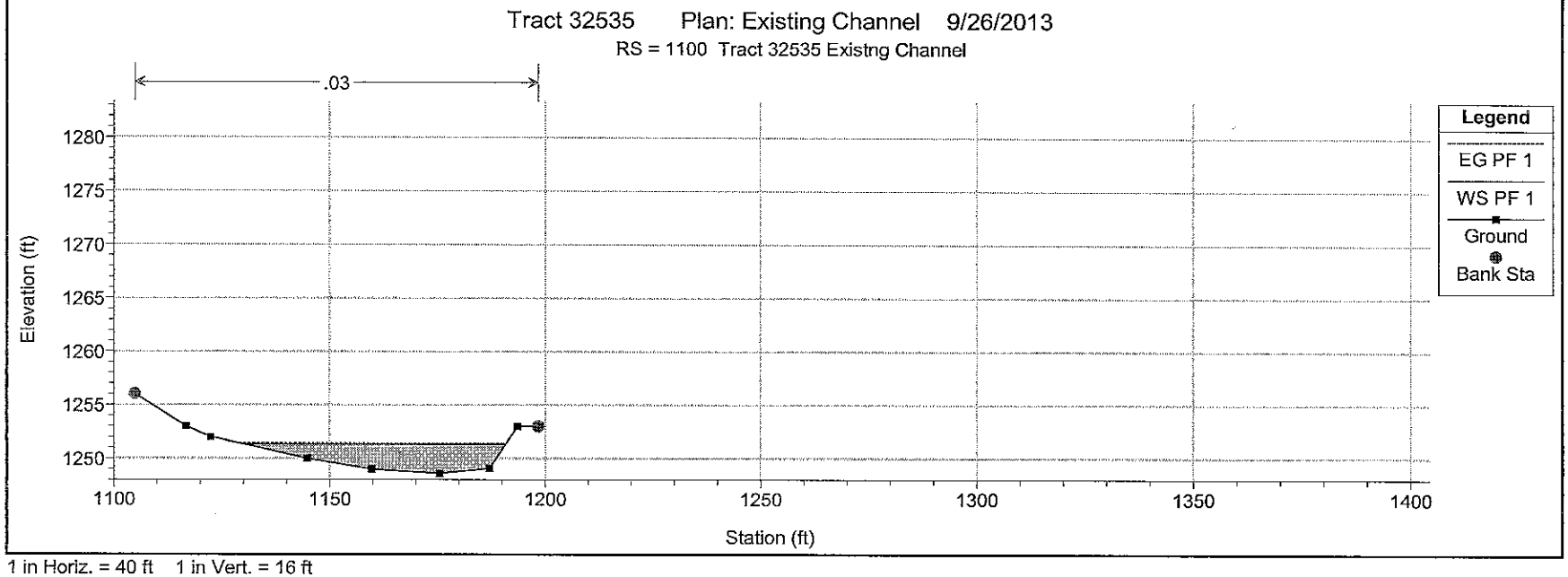
1 in Horiz. = 40 ft 1 in Vert. = 16 ft



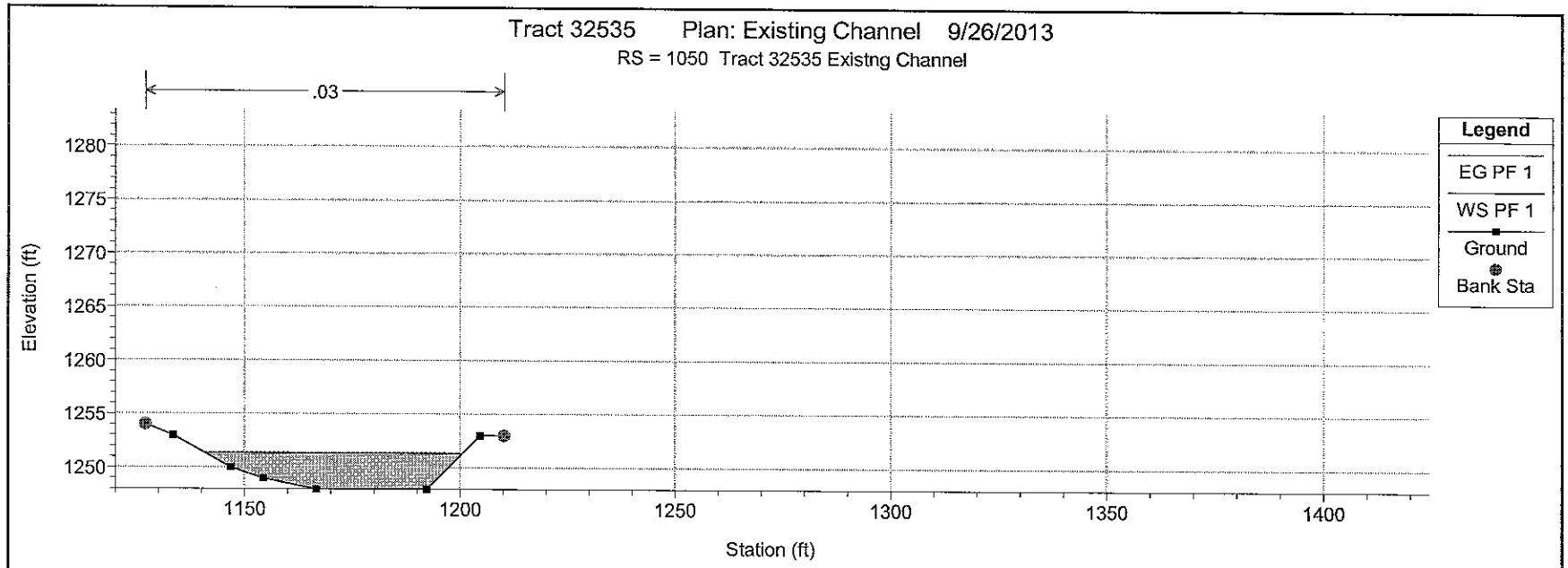


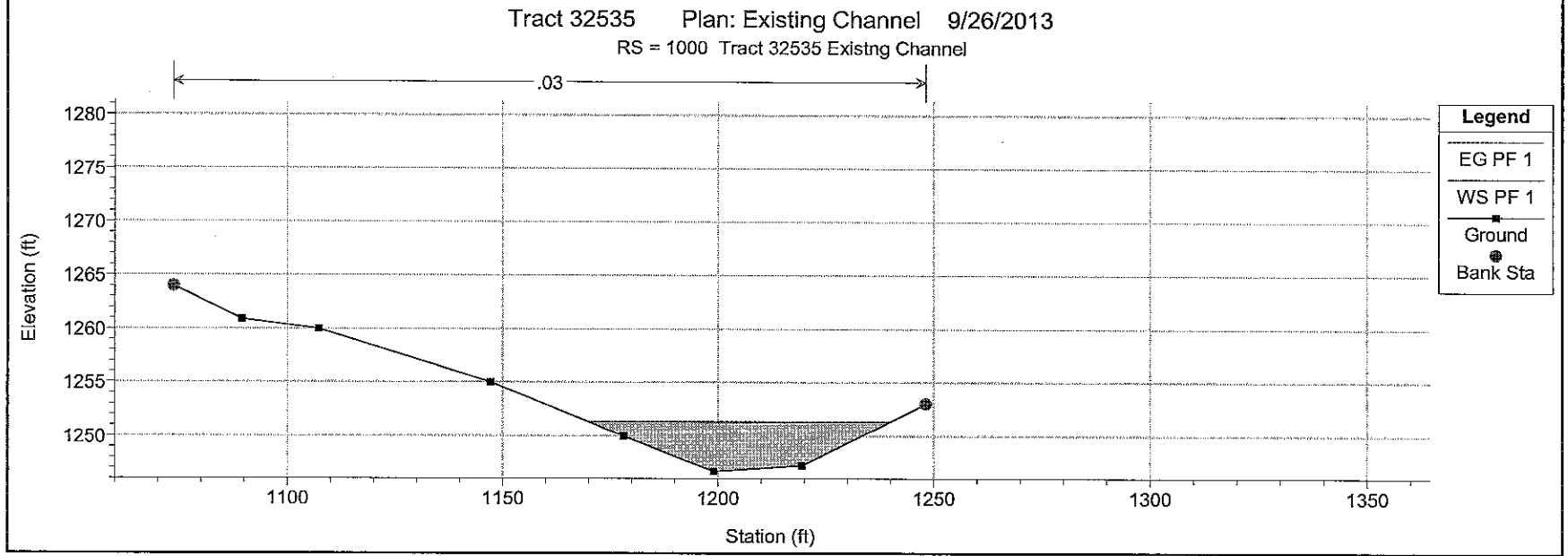
1 in Horiz. = 40 ft 1 in Vert. = 16 ft



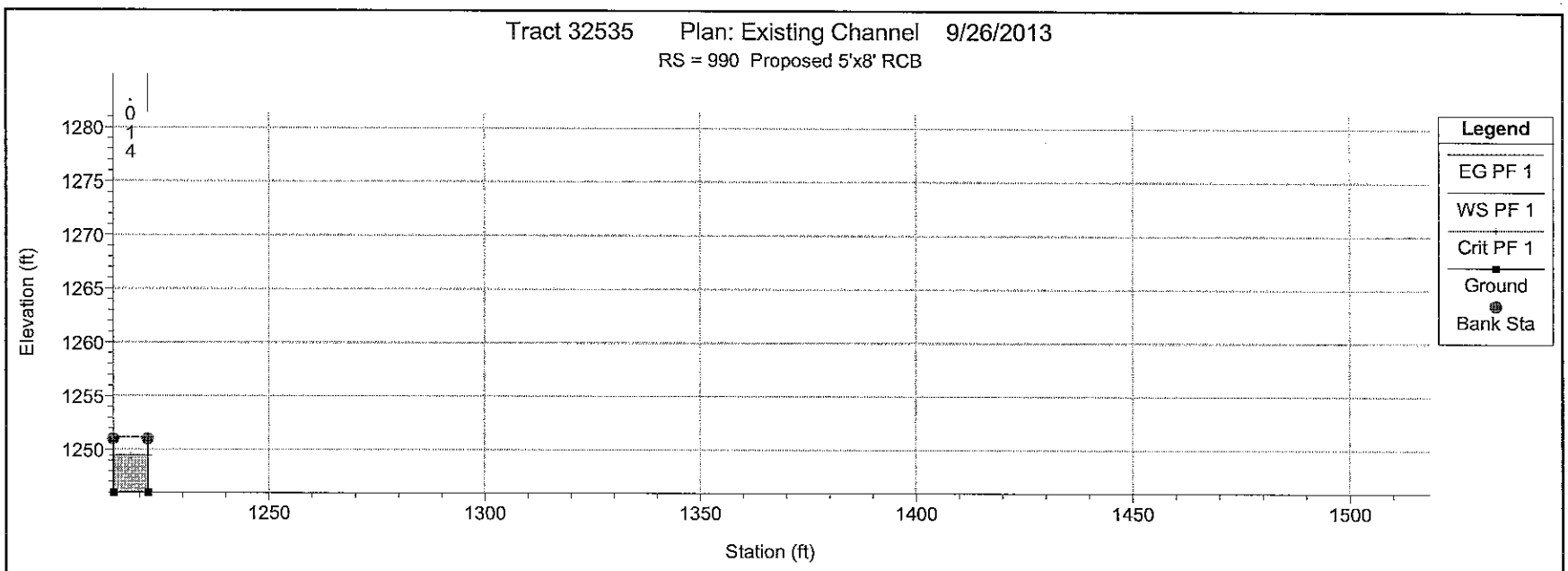


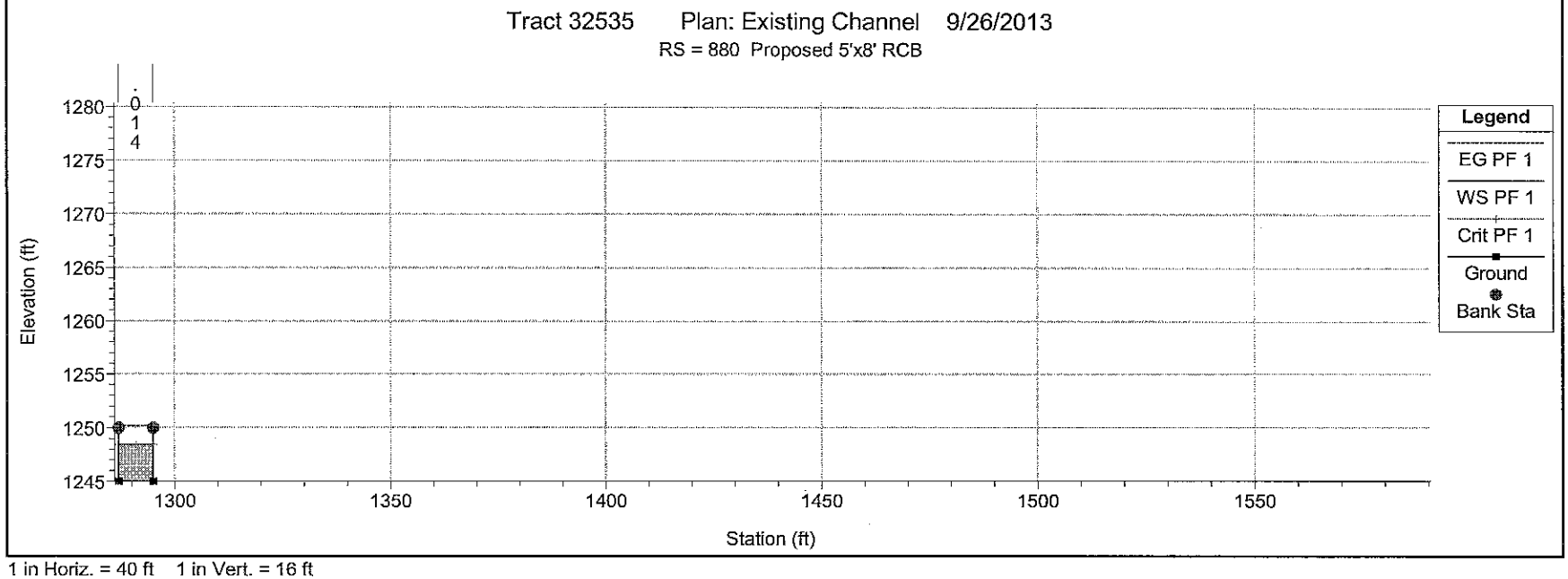
1 in Horiz. = 40 ft 1 in Vert. = 16 ft





1 in Horiz. = 40 ft 1 in Vert. = 16 ft





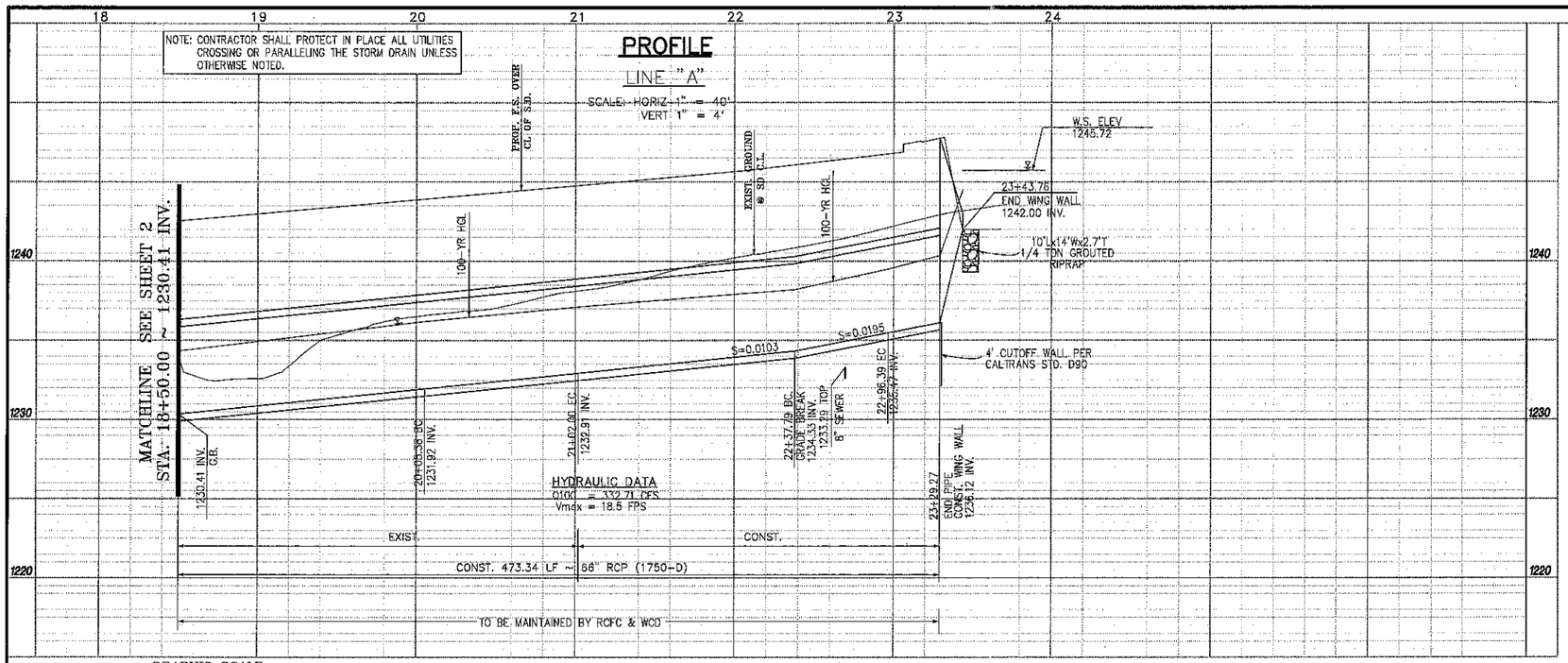
1 in Horiz. = 40 ft 1 in Vert. = 16 ft

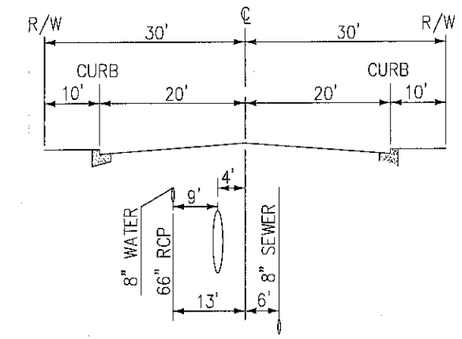
Appendix G

REFERENCE STORM DRAIN PLANS

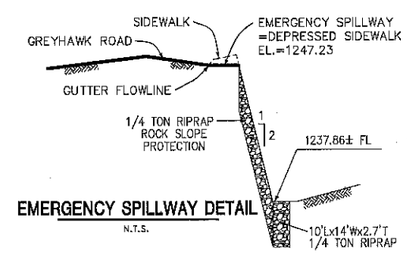
1. TRACT 31353 – LINE "A"
2. TRACT 31837 – LINES "A", "D", LAT. "A3"

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



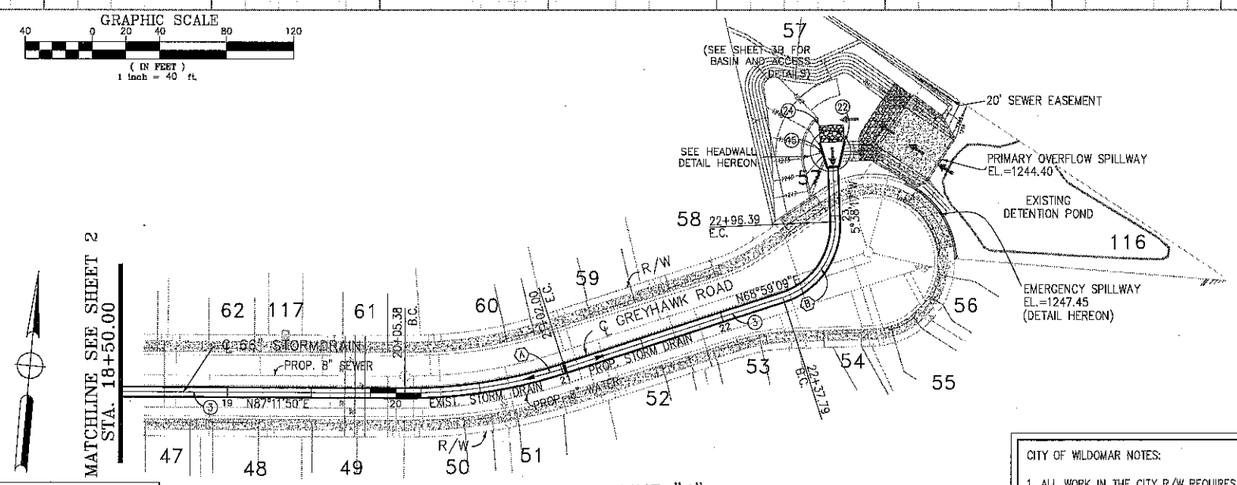


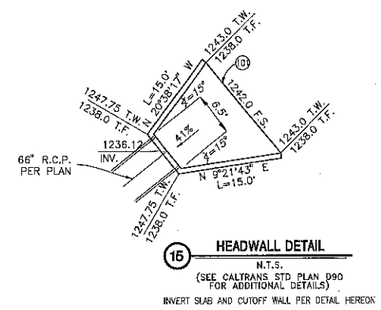
SECTION AT 20+00
1" = 10'



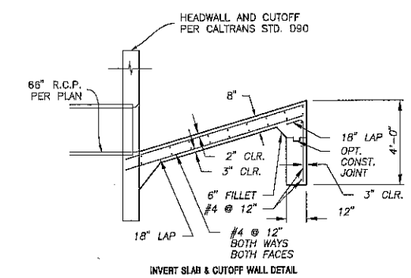
EMERGENCY SPILLWAY DETAIL
N.T.S.

GRAPHIC SCALE
40 0 20 40 80 120
(IN FEET)
1 inch = 40 ft.





15 HEADWALL DETAIL
N.T.S.
(SEE CALTRANS STD. PLAN D90 FOR ADDITIONAL DETAILS)
INVERT SLAB AND CUTOFF WALL PER DETAIL HEREON



INVERT SLAB & CUTOFF WALL DETAIL
N.T.S.

MATCHLINE SEE SHEET 2
STA. 18+50.00

LINE "A"
PLAN

DATA TABLE

NO	DELTA/ BRG.	RADIUS	LENGTH	TANGENT
(A)	D=18°12'42"	304.00'	96.63'	48.72'
(B)	D=74°37'26"	45.00'	58.61'	34.29'

CITY OF WILDOMAR NOTES:

1. ALL WORK IN THE CITY R/W REQUIRES AN ENCROACHMENT PERMIT FROM THE CITY.

2. ANY EXISTING IMPROVEMENTS DISTURBED MUST BE REPLACED TO CITY STANDARDS AND TO THE SATISFACTION OF THE CITY ENGINEER.

CONSTRUCTION NOTES

(3) INSTALL 66" R.C.P. (1750-D)

(15) CONSTRUCT WINGWALL PER CALTRANS STD. PLAN NO. D90 (TYPE A), AND PER DETAIL HEREON

(22) CONSTRUCT TRASH RACK (INCLINED) PER APWA S.P.P.W.C. STD. PLAN 361-0

(24) INSTALL 1/4 TON GROUTED RIPRAP, T=2.7' PER CALTRANS STANDARD SPECIFICATIONS SECTION 72-2.02

(10) 6" THICK PCC W/ #4 BARS @ 18 " O.C. EA. WAY

IP 040198

Don't Dig...Until You Call U.S.A. Toll Free 1-800-227-2600 for the location of buried utility lines. Don't disrupt vital services.
1993 WORKING DAYS BEFORE YOU DIG

BENCHMARK
RIVERSIDE COUNTY DESIGNATION 600-30-68 0.9 MILES NORTH ALONG MURRIETA ROAD FROM CATHOLIC CHURCH IN SUN CITY, 175' OF INTERSECTION OF MURRIETA ROAD AND ROUSE ROAD, 23' NORTH OF ROUSE ROAD AS EXISTING 5" WEST OF POWER PLOE #X9651-E, 2' EAST OF MARKER POST, SET BRASS DISK IN THE TOP OF CONCRETE POST.
DATED: ELEVATION: 1442.035

REV.	REVISIONS	ENGINEER APPR.	ENGINEER DATE	RCFC/ WCD APPR.	RCFC/ WCD DATE
1	SHEET ADDED - REVISED LINE A STA. 18+50.00 TO 23+29.27				

DESIGNED BY:
DRAWN BY:
DATE DRAWN:

SEAL: REGISTERED PROFESSIONAL ENGINEER PATRICK L. PAGADUAN NO. 56820 Exp. 6/30/13 CIVIL STATE OF CALIFORNIA

FOR 1 S.D. STA. 18+50.00 AND BEYOND
HUNSAKER & ASSOCIATES IRVINE, INC.
PLANNING • ENGINEERING • SURVEYING
Thomas Hughes • Irvine, CA 92618 • PH: (949) 583-1010 • FX: (949) 583-0759
PATRICK L. PAGADUAN RCE 56820 DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: DATE:
APPROVED BY: DATE:

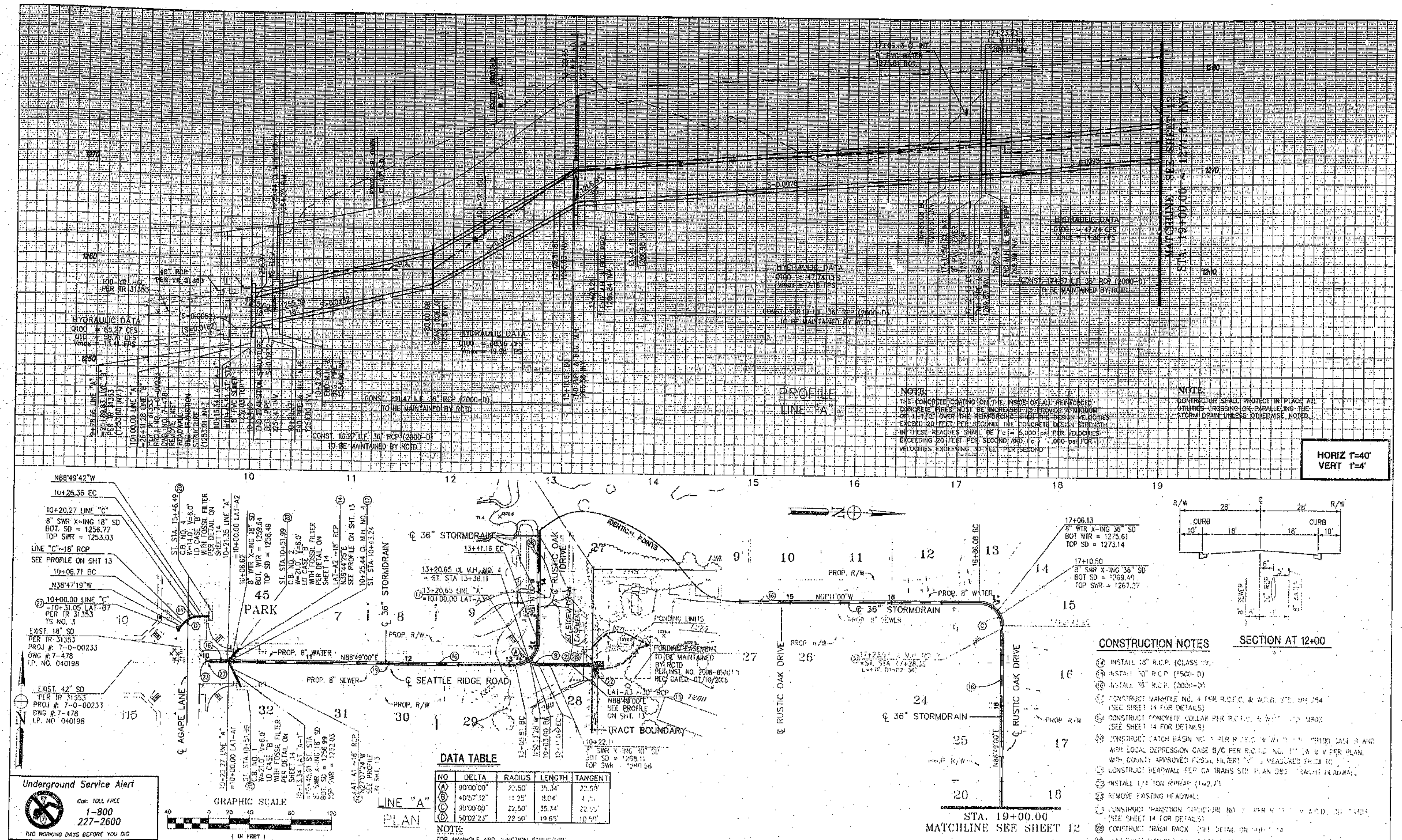
CITY OF WILDOMAR
ACCEPTED BY:
TIM O'ZMURA, DIRECTOR OF PUBLIC WORKS
ACCEPTANCE AS TO CONFORMANCE WITH APPLICABLE CITY STANDARDS AND PRACTICES

MURRIETA VALLEY GREYHAWK ROAD AND KETCHUM ROAD STORM DRAINS
TRACT NO. 31353
LINE "A"

PROJECT NO. 7-0-00232
DRAWING NO. 7-478
SHEET NO. 3A OF 10

Designed By: P.P. | Drawn By: P.P. | Checked By: VV/D.H.

F:\0420\Engineering\Tr_31353\Imp_SD\TR31353_SD_SHT03a.dwg



DATA TABLE

NO	DELTA	RADIUS	LENGTH	TANGENT
A	90°00'00"	22.50'	35.34'	22.50'
B	40°57'32"	11.25'	8.04'	4.20'
C	90°00'00"	22.50'	35.34'	22.50'
D	50°02'23"	22.50'	19.65'	10.50'

NOTE:
FOR MANHOLE AND JUNCTION STRUCTURE HORIZONTAL CONTROL, SEE SHEET 14

CONSTRUCTION NOTES

(14) INSTALL 18" R.C.P. (CLASS IV)
(15) INSTALL 30" R.C.P. (1500-D)
(16) INSTALL 36" R.C.P. (2000-D)
(17) CONSTRUCT MANHOLE NO. 4 PER R.C.F.C. & W.C.D. STD. MH 254 (SEE SHEET 14 FOR DETAILS)
(19) CONSTRUCT CONCRETE COLLAR PER R.C.F.C. & W.C.D. STD. M803 (SEE SHEET 14 FOR DETAILS)
(20) CONSTRUCT CATCH BASIN NO. 1 PER R.C.F.C. & W.C.D. STD. CB100 CASE B AND WITH LOCAL DEPRESSION CASE B/C PER R.C.F.C. NO. ... W & V PER PLAN, WITH COUNTY APPROVED FOSSIL FILTER. "V" IS MEASURED FROM TC
(21) CONSTRUCT HEADWALL PER CA TRANS STD. PLAN D89 STRAIGHT HEADWALL
(22) INSTALL 1/4 TON RIPRAP (1x2.7)
(23) REMOVE EXISTING HEADWALL
(27) CONSTRUCT TRANSITION STRUCTURE NO. 2 PER R.C.F.C. & W.C.D. STD. TS303 (SEE SHEET 14 FOR DETAILS)
(28) CONSTRUCT TRASH RACK (SEE DETAIL ON SHEET 14)
(36) CONSTRUCT MANHOLE NO. 2 PER R.C.F.C. & W.C.D. STD. MH 252 (SEE SHEET 14 FOR DETAILS)

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

NOTE: WORK CONTAINED WITHIN THESE PLANS SHALL NOT COMMENCE UNTIL AN ENCROACHMENT PERMIT AND/OR A GRADING PERMIT HAS BEEN ISSUED.

THE PRIVATE ENGINEER SIGNING THESE PLANS IS RESPONSIBLE FOR ASSURING THE ACCURACY OF DESIGN & ACCEPTABILITY OF THE WORK HEREON. IN THE EVENT OF DISCREPANCIES ARISING AFTER COUNTY APPROVAL OR DURING CONSTRUCTION, THE PRIVATE ENGINEER SHALL BE RESPONSIBLE FOR DETERMINING AN ACCEPTABLE SOLUTION AND REVISING THE PLANS FOR APPROVAL BY THE COUNTY.

MARK	BY	DATE	REVISIONS:	APPR	DATE
ENGINEER				COUNTY	

SEAL: KHALED A. OTHMAN No. 33950 Exp. 6-30-08 CIVIL STATE OF CALIFORNIA

COUNTY OF RIVERSIDE
TRANSPORTATION DEPARTMENT
APPROVED BY:
KHALED A. OTHMAN R.C.E. 33950 DATE 8/24/06
RECOMMENDED BY BOYLE DATE 8/22/06

SEAL: PETER J.C. CHAO No. 31538 Exp. 12-31-06 CIVIL STATE OF CALIFORNIA

PACIFIC COAST LAND CONSULTANTS, Inc.
CIVIL ENGINEERING • LAND PLANNING • LAND SURVEYING
41769 ENTERPRISE CIRCLE NO. # 201
TEMECULA, CALIFORNIA 92590
TEL (951) 719-3770
PREPARED BY
PETER J.C. CHAO R.C.E. NO. 31538 DATE 7/12/06

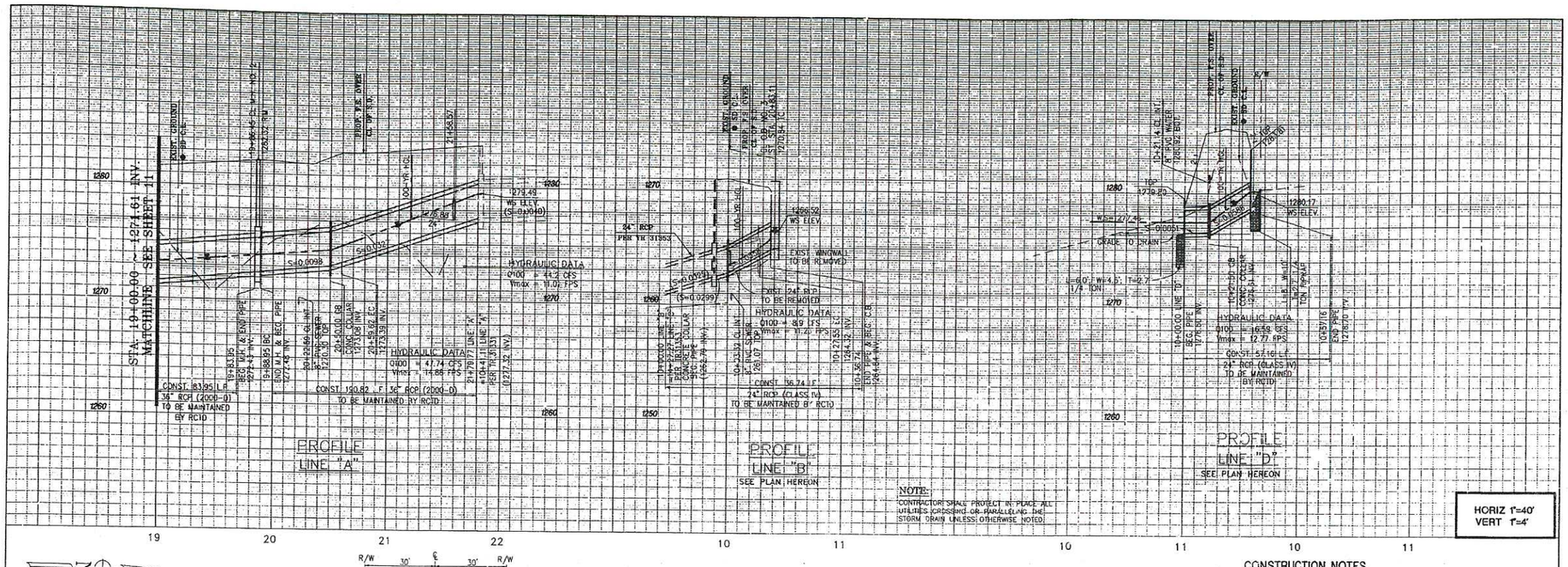
BENCHMARK:
E-21 (USGS) 1254 RESET 1964, ELEV. 1255.326 STD. DISK IN BASE OF WILDOMAR SCHOOL BELL TOWER, 5' W OF N.W. CORNER IN WILDOMAR, AT S.W. CORNER OF CENTRAL STREET & PALOMAR STREET 55' SO. OF C.L. OF CENTRAL ST. 79' W. OF C.L. PALOMAR ST. 142' N.E. OF WILDOMAR SCHOOL APPROXIMATELY 125' SO. OF POST OFFICE
ELEVATION: 1442.035, NGVD 29
SCALE: 1" = 40'

TRACT 31837 - IP NO. 050085
COUNTY OF RIVERSIDE
SCHEDULE "A"
STORM DRAIN PLANS
LINE "A"

SHEET NO. 11 OF 14 SHEETS

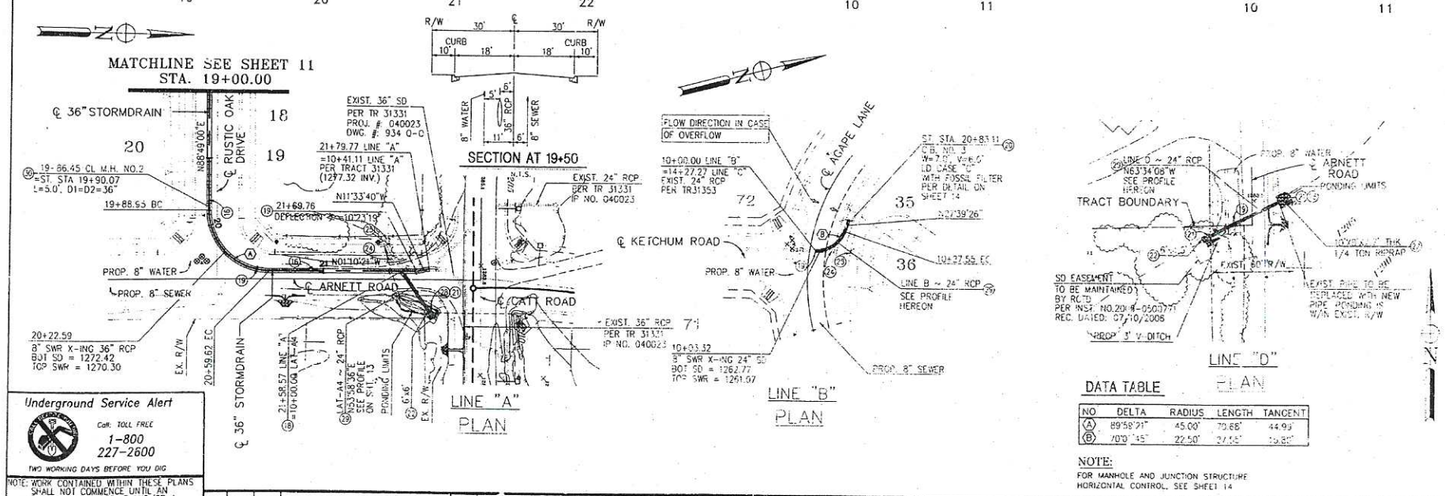
FOR: W.O. # COUNTY FILE NO. 942 55

F I L E D JUL 11 2006



NOTE:
CONTRACTOR SHALL PROTECT IN PLACE ALL UTILITIES CROSSING OR PARALLELING THE STORM DRAIN UNLESS OTHERWISE NOTED.

HORIZ 1"=40'
VERT 1"=4'



CONSTRUCTION NOTES

- (16) INSTALL 36" R.C.P. (2000-D)
- (17) CONSTRUCT MANHOLE NO. 4 PER R.C.F.C. & W.C.D. STD. MH 254 (SEE SHEET 14 FOR DETAILS)
- (18) CONSTRUCT JUNCTION STRUCTURE NO. 2 PER R.C.F.C. & W.C.D. STD. JS227 (SEE SHEET 14 FOR DETAILS)
- (19) CONSTRUCT CONCRETE COLLAR PER R.C.F.C. & W.C.D. STD. M803
- (20) CONSTRUCT CATCH BASIN NO. 1 PER R.C.F.C. & W.C.D. STD. CB100 CASE C AND WITH LOCAL DEPRESSION CASE B/C PER R.C.T.D. NO. 311 (W & V PER PLAN, WITH COUNTY APPROVED FOSSIL FILTER) "V" IS MEASURED FROM TC
- (21) CONSTRUCT HEADWALL PER CALTRANS STD. PLAN DB9 STRAIGHT HEADWALL
- (22) INSTALL 1/4 TON RIPRAP (1=2.7')
- (23) REMOVE EXISTING PIPE
- (24) REMOVE EXISTING WINGWALL
- (25) CONSTRUCT TRASH RACK (SEE DETAIL ON SHEET 14)
- (26) INSTALL 24" R.C.P. (CLASS IV)
- (27) CONSTRUCT MANHOLE NO. 2 PER R.C.F.C. & W.C.D. STD. MH 252 (SEE SHEET 14 FOR DETAILS)

DATA TABLE

NO	DELTA	RADIUS	LENGTH	TANGENT
(A)	89°58'21"	45.00'	70.68'	44.99'
(B)	70°0'45"	22.50'	27.55'	15.80'

NOTE:
FOR MANHOLE AND JUNCTION STRUCTURE HORIZONTAL CONTROL, SEE SHEET 14

GRAPHIC SCALE
(IN FEET)
1 inch = 40 ft

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

NOTE: WORK CONTAINED WITHIN THESE PLANS SHALL NOT COMMENCE UNTIL AN ENCROACHMENT PERMIT AND/OR A GRADING PERMIT HAS BEEN ISSUED.

THE PRIVATE ENGINEER SIGNING THESE PLANS IS RESPONSIBLE FOR ASSURING THE ACCURACY OF DESIGN & ACCEPTABILITY OF THE WORK HEREON. IN THE EVENT OF DISCREPANCIES ARISING AFTER COUNTY APPROVAL OR DURING CONSTRUCTION, THE PRIVATE ENGINEER SHALL BE RESPONSIBLE FOR DETERMINING AN ACCEPTABLE SOLUTION AND REVISING THE PLANS FOR APPROVAL BY THE COUNTY.

MARK	BY	DATE	REVISIONS:	APPR	DATE
ENGINEER				COUNTY	

SEAL: REGISTERED PROFESSIONAL ENGINEER KHALED A. OTHMAN No. 35950 Exp. 6-30-08 CIVIL STATE OF CALIFORNIA

COUNTY OF RIVERSIDE
TRANSPORTATION DEPARTMENT
APPROVED BY:
KHALED A. OTHMAN R.C.E. 35950 DATE 8/24/06
RECOMMENDED BY: BOYLE DATE 8/22/06

SEAL: REGISTERED PROFESSIONAL ENGINEER PETER J.C. CHAO No. 31538 Exp. 12-31-06 CIVIL STATE OF CALIFORNIA

PACIFIC COAST LAND CONSULTANTS, Inc.
LAND ENGINEERING • LAND PLANNING • LAND SURVEYING
41760 ENTERPRISE CIRCLE NO. # 201
TEMECULA, CALIFORNIA 92590
TEL. (951) 719-3770

PREPARED BY:
PETER J.C. CHAO
R.C.E. NO. 31538
DATE 9/20/06

BENCHMARK:
E-21 (USGS) 1254 RESET 1984, ELEV. 1255.320 STD. DISK IN BASE OF WILDOMAR SCHOOL BELL TOWER, 6' W OF N.W CORNER IN WILDOMAR, AT S.W CORNER OF CENTRAL STREET & PALOMAR STREET 55' SO. OF C.L. OF CENTRAL ST. 75' W. OF C.L. PALOMAR ST. 142' N.E OF WILDOMAR SCHOOL APPROXIMATELY 125' SO. OF POST OFFICE
ELEVATION: 1442.035, NGVD 29

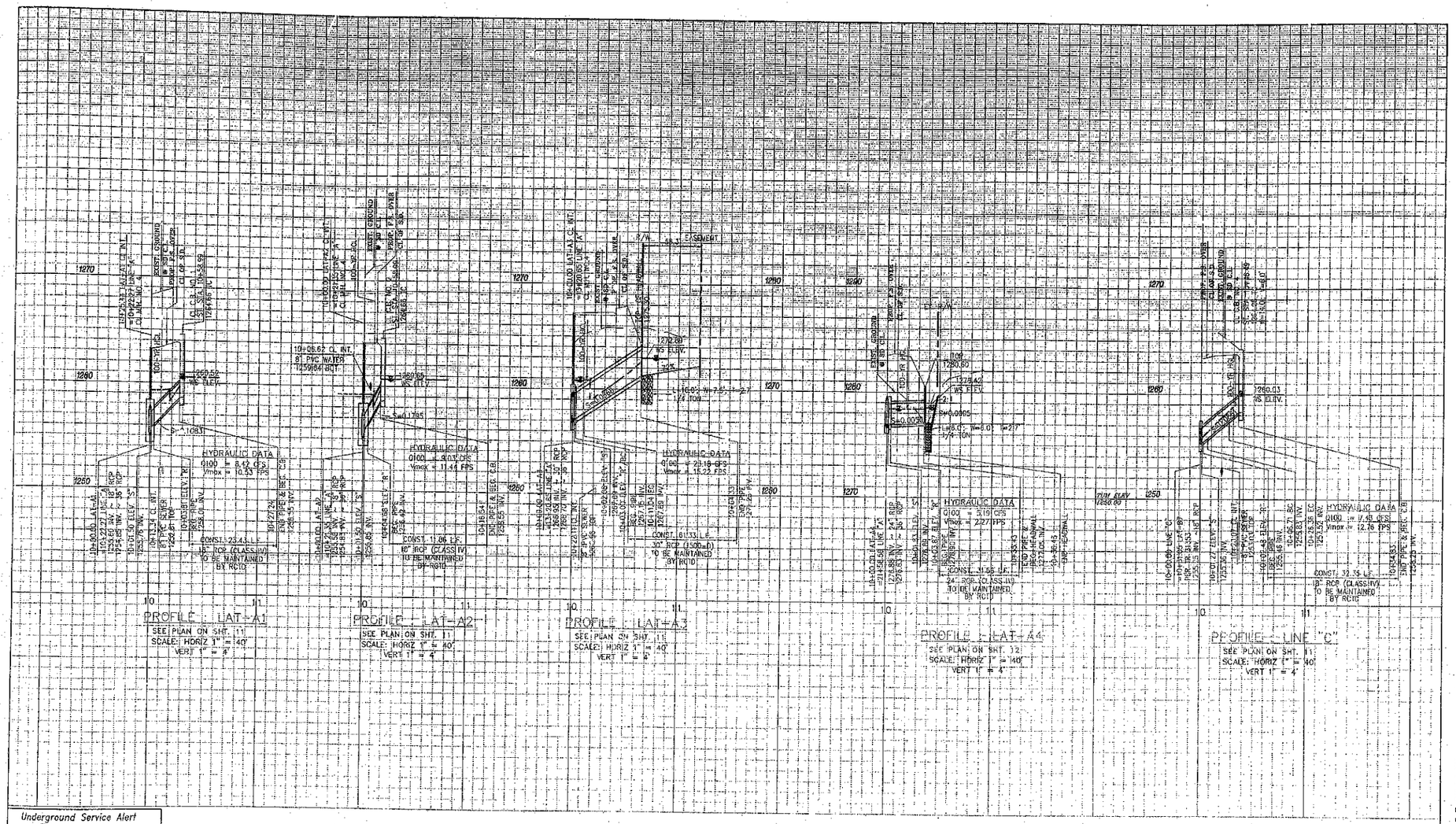
SCALE: 1" = 40'

TRACT 31837 – IP NO. 050085
COUNTY OF RIVERSIDE
SCHEDULE "A"
STORM DRAIN PLANS
LINE "A", LINE "B", LINE "D", LAT-B9

SHEET NO. 12 OF 14 SHEETS

FOR: P.O.#
COUNTY FILE NO. 942SS

FILED JUL 11 2006



NOTE:
SHOULD ALL UNDERGROUND ... BE PLACED

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

NOTE: WORK CONTAINED WITHIN THESE PLANS SHALL NOT COMMENCE UNTIL AN ENCROACHMENT PERMIT AND/OR A GRADING PERMIT HAS BEEN ISSUED.

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MARK	BY	DATE	REVISIONS:	APPR	DATE
ENGINEER				COUNTY	

SEAL: REGISTERED PROFESSIONAL ENGINEER KHALED A. OTHMAN No. 33950 Exp. 6-30-06 CIVIL STATE OF CALIFORNIA

COUNTY OF RIVERSIDE
TRANSPORTATION DEPARTMENT
APPROVED BY:
KHALED A. OTHMAN, R.C.E. 33950 — DATE 8/24/06
RECOMMENDED BY BOYLE — DATE 8/22/06

SEAL: REGISTERED PROFESSIONAL ENGINEER PETER J.C. CHAO No. 31538 Exp. 12-31-06 CIVIL STATE OF CALIFORNIA

PACIFIC COAST LAND CONSULTANTS, Inc.
CIVIL ENGINEERING · LAND PLANNING · LAND SURVEYING
41760 ENTERPRISE CIRCLE NO. # 201
TEMECULA, CALIFORNIA 92590
TEL. (951) 719-3770

PREPARED BY:
PETER J.C. CHAO — R.C.E. NO. 31538 — DATE 11/28/06

BENCHMARK:
E-21 (USGS) 1251 RESET 1984, ELEV. 1255.328 STD. NGS IN BASE OF WILDOMAR SCHOOL BELL TOWER, 6' W OF NW CORNER OF WILDOMAR, AT S.W CORNER OF CENTRAL STREET & PALOMAR STREET 50' SO. OF C.L. OF CENTRAL ST. 70' W OF C.L. PALOMAR ST. 142' N.E OF WILDOMAR SCHOOL APPROXIMATELY 125' SO. OF POST OFFICE
ELEVATION: 1442.035, NGVD 29

SCALE: 1" = 40'

TRACT 31837 - IP NO. 050085
COUNTY OF RIVERSIDE
SCHEDULE "A"
STORM DRAIN PLANS
LATERALS SHEET

SHEET NO. 13 OF 14 SHEETS

FOR: W.O.#
CLIENT FILE NO. 94255

FILED MAY 15 2006

Appendix H

REFERENCES

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

LEGEND

—— SOILS GROUP BOUNDARY

A SOILS GROUP DESIGNATION

RCFC & WCD

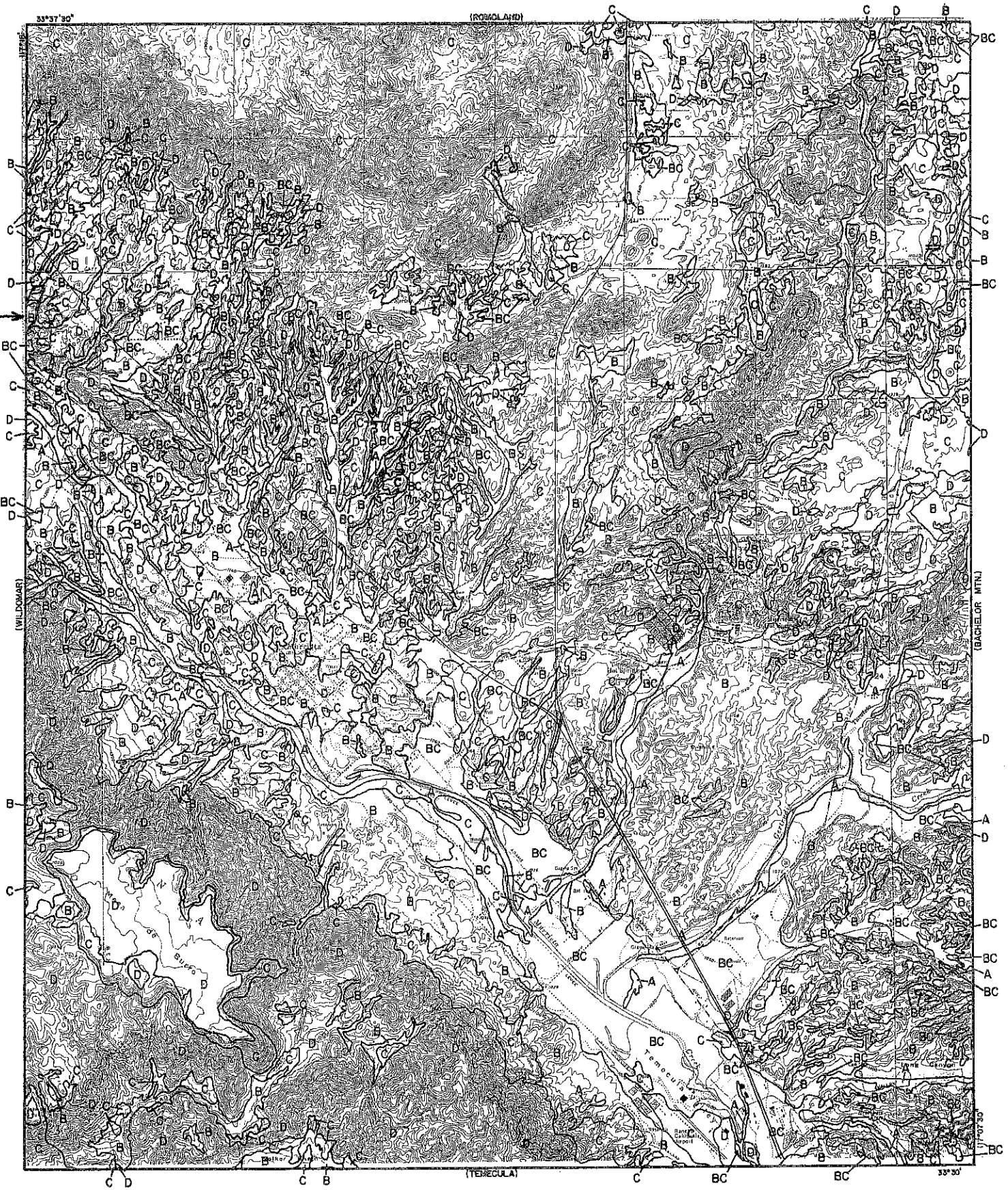
HYDROLOGY MANUAL

N

0 FEET 5000

HYDROLOGIC SOILS GROUP MAP FOR WILDOMAR

PLATE C-1.51



LEGEND

—— SOILS GROUP BOUNDARY

A SOILS GROUP DESIGNATION

RCFC & WCD

HYDROLOGY MANUAL

0 FEET 5000

HYDROLOGIC SOILS GROUP MAP FOR MURRIETA

PLATE C-1.52

RAINFALL INTENSITY—INCHES PER HOUR

CATHEDRAL CITY			CHERRY VALLEY			CORONA			DESERT HOT SPRINGS			ELSINORE - WILDOMAR		
DURATION MINUTES	FREQUENCY 10 YEAR	FREQUENCY 100 YEAR	DURATION MINUTES	FREQUENCY 10 YEAR	FREQUENCY 100 YEAR	DURATION MINUTES	FREQUENCY 10 YEAR	FREQUENCY 100 YEAR	DURATION MINUTES	FREQUENCY 10 YEAR	FREQUENCY 100 YEAR	DURATION MINUTES	FREQUENCY 10 YEAR	FREQUENCY 100 YEAR
5	4.14	6.76	5	3.65	5.49	5	3.10	4.78	5	4.39	6.76	5	3.23	4.94
6	3.73	6.08	6	3.30	4.97	6	2.84	4.38	6	3.95	6.08	6	2.96	4.53
7	3.41	5.56	7	3.03	4.56	7	2.64	4.07	7	3.62	5.56	7	2.75	4.21
8	3.15	5.15	8	2.82	4.24	8	2.47	3.81	8	3.35	5.15	8	2.58	3.95
9	2.95	4.81	9	2.64	3.97	9	2.34	3.60	9	3.13	4.81	9	2.44	3.73
10	2.77	4.52	10	2.49	3.75	10	2.22	3.43	10	2.94	4.52	* 10	2.32	3.54
11	2.62	4.28	11	2.36	3.56	11	2.12	3.27	11	2.78	4.28	11	2.21	3.39
12	2.49	4.07	12	2.25	3.39	12	2.04	3.14	12	2.65	4.07	12	2.12	3.25
13	2.38	3.88	13	2.16	3.25	13	1.96	3.02	13	2.53	3.88	13	2.04	3.13
14	2.28	3.72	14	2.07	3.12	14	1.89	2.92	14	2.42	3.72	14	1.97	3.02
15	2.19	3.58	15	1.99	3.00	15	1.83	2.82	15	2.32	3.58	15	1.91	2.92
16	2.11	3.44	16	1.92	2.90	16	1.77	2.73	16	2.24	3.44	16	1.85	2.83
17	2.04	3.32	17	1.86	2.80	17	1.72	2.66	17	2.16	3.32	17	1.80	2.75
18	1.97	3.22	18	1.80	2.71	18	1.68	2.58	18	2.09	3.22	18	1.75	2.67
19	1.91	3.12	19	1.75	2.64	19	1.63	2.52	19	2.03	3.12	19	1.70	2.60
20	1.85	3.03	20	1.70	2.56	20	1.59	2.46	20	1.97	3.03	20	1.66	2.54
22	1.75	2.86	22	1.61	2.43	22	1.52	2.35	22	1.86	2.86	22	1.59	2.43
24	1.67	2.72	24	1.54	2.32	24	1.46	2.25	24	1.77	2.72	24	1.52	2.33
26	1.59	2.60	26	1.47	2.22	26	1.40	2.17	26	1.69	2.60	26	1.46	2.24
28	1.52	2.49	28	1.41	2.13	28	1.36	2.09	28	1.62	2.49	28	1.41	2.16
30	1.46	2.39	30	1.36	2.05	30	1.31	2.02	30	1.55	2.39	30	1.37	2.09
32	1.41	2.30	32	1.31	1.98	32	1.27	1.96	32	1.50	2.30	32	1.33	2.03
34	1.36	2.22	34	1.27	1.91	34	1.23	1.90	34	1.45	2.22	34	1.29	1.97
36	1.32	2.15	36	1.23	1.85	36	1.20	1.85	36	1.40	2.15	36	1.25	1.92
38	1.28	2.09	38	1.20	1.80	38	1.17	1.81	38	1.36	2.09	38	1.22	1.87
40	1.24	2.02	40	1.16	1.75	40	1.14	1.76	40	1.32	2.02	40	1.19	1.82
45	1.16	1.89	45	1.09	1.64	45	1.08	1.66	45	1.23	1.89	45	1.13	1.72
50	1.09	1.78	50	1.03	1.55	50	1.03	1.58	50	1.16	1.78	50	1.07	1.64
55	1.03	1.68	55	.98	1.47	55	.98	1.51	55	1.09	1.68	55	1.02	1.56
60	.98	1.60	60	.93	1.40	60	.94	1.45	60	1.04	1.60	* 60	.98	1.50
65	.94	1.53	65	.89	1.34	65	.90	1.40	65	.99	1.53	65	.94	1.44
70	.90	1.46	70	.85	1.29	70	.87	1.35	70	.95	1.46	70	.91	1.39
75	.86	1.41	75	.82	1.24	75	.84	1.30	75	.91	1.41	75	.88	1.35
80	.83	1.35	80	.79	1.20	80	.82	1.26	80	.88	1.35	80	.85	1.31
85	.80	1.31	85	.77	1.16	85	.80	1.23	85	.85	1.31	85	.83	1.27
SLOPE = .580			SLOPE = .550			SLOPE = .480			SLOPE = .580			SLOPE = .480		

RCFC & WCD

HYDROLOGY MANUAL

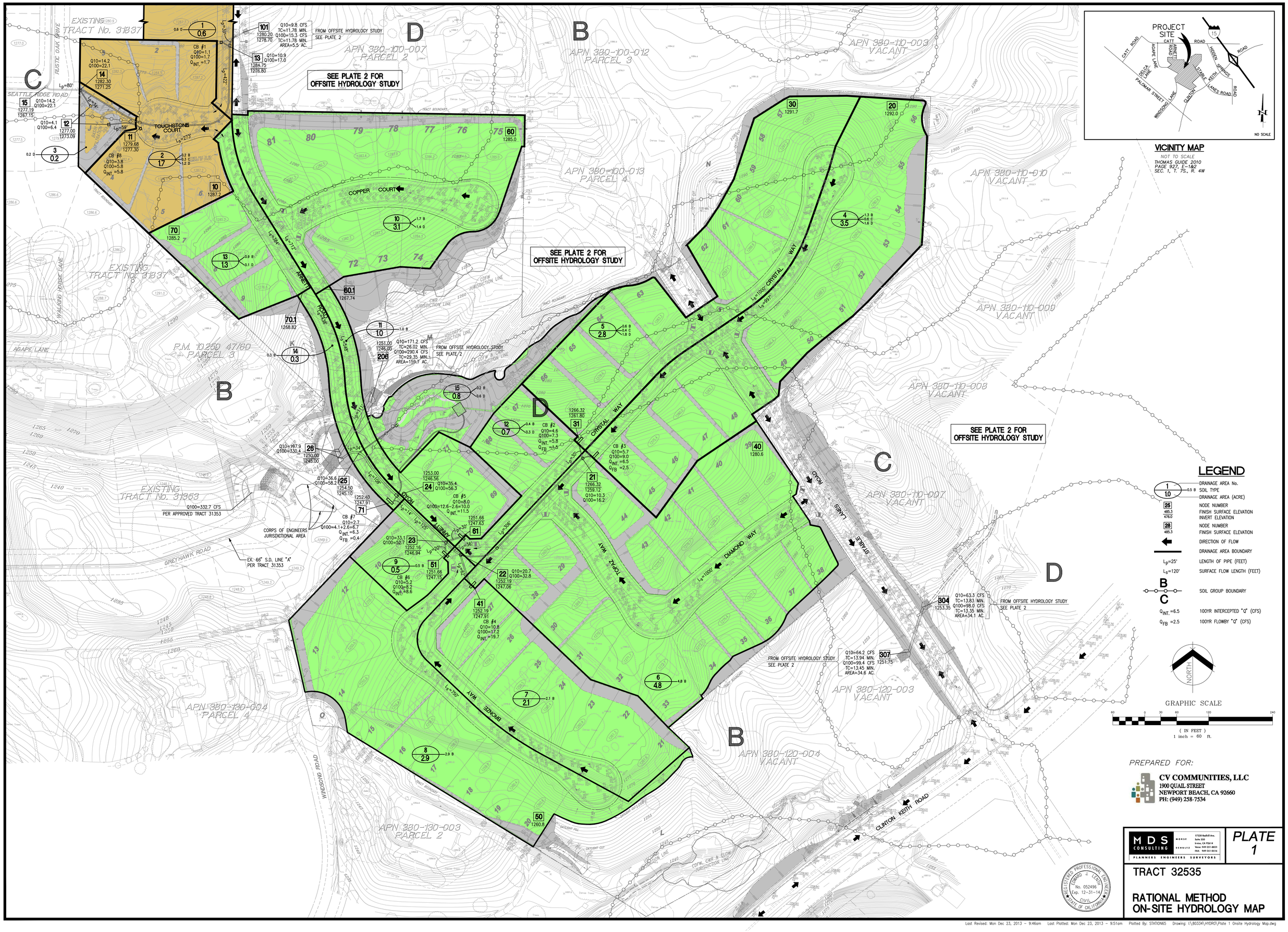
STANDARD INTENSITY-DURATION CURVES DATA

Appendix I

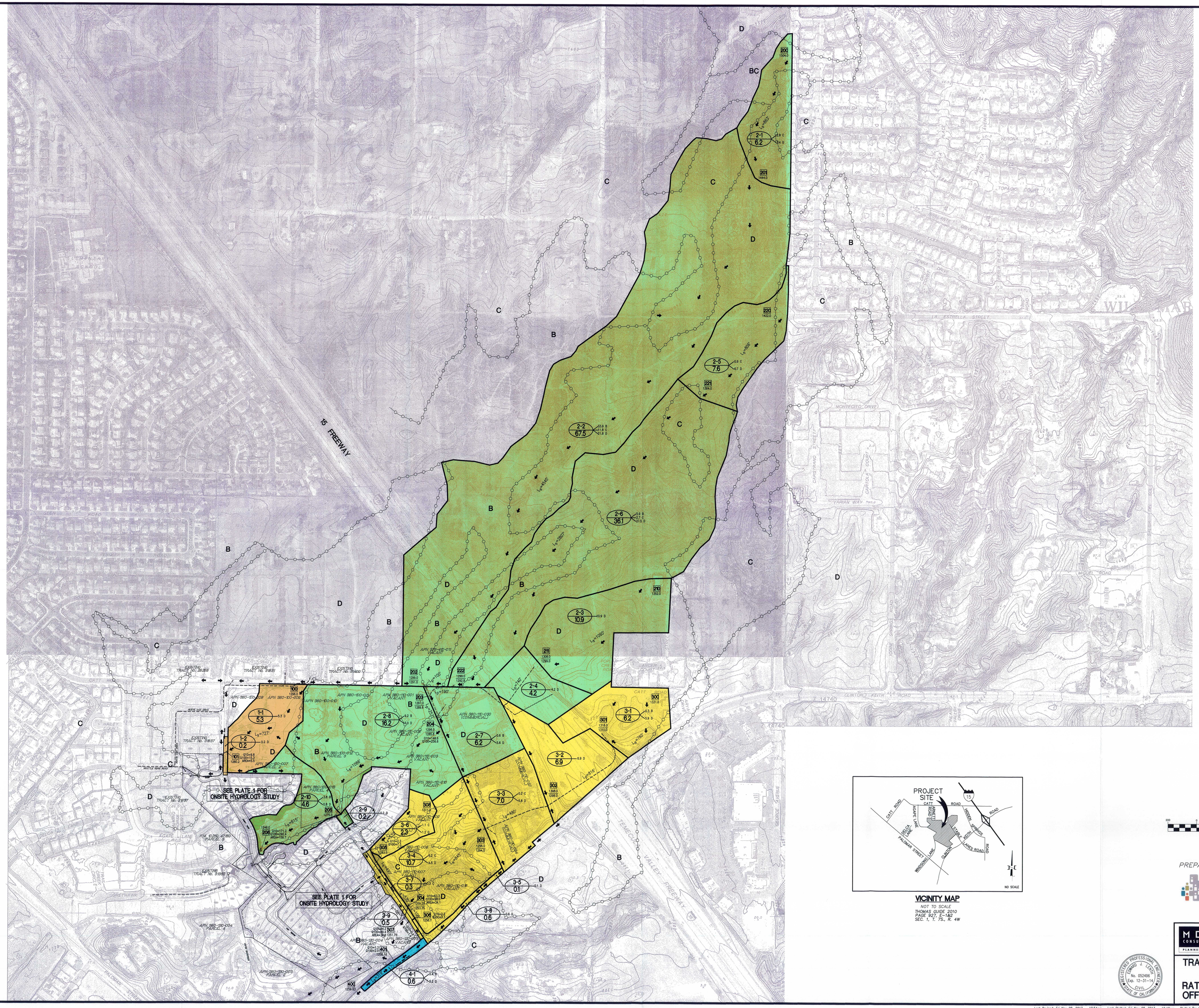
EXHIBITS

1. PLATE 1 – ON-SITE HYDROLOGY MAP
2. PLATE 2 – OFF-SITE HYDROLOGY MAP
3. PLATE 3 – WATERSHED DIVERSION MAP

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



Last Revised: Mon Dec 23, 2013 – 9:46am Last Plotted: Mon Dec 23, 2013 – 9:51am Plotted By: STATION65 Drawing: I:\,80334\HYDRO\Plate 1 Onsite Hydrology Map.dwg



VICINITY MAP

NOT TO SCALE
THOMAS GUIDE 2010
PAGE 927, E-1&2
SEC. 1, T. 7S., R. 4W

LEGEND

1-1 / 5.3	DRAINAGE AREA No.
0.5 B	SOIL TYPE
	DRAINAGE AREA (ACRE)
25 / 485.3 / 476.0	NODE NUMBER / FINISH SURFACE ELEVATION / INVERT ELEVATION
28 / 485.3	NODE NUMBER / FINISH SURFACE ELEVATION
	DIRECTION OF FLOW
	DRAINAGE AREA BOUNDARY
L_p=25'	LENGTH OF PIPE (FEET)
L_s=120'	SURFACE FLOW LENGTH (FEET)
B / C	SOIL GROUP BOUNDARY

NORTH

GRAPHIC SCALE

200 0 100 200 400 800

(IN FEET)
1 inch = 200 ft.

PREPARED FOR:

CV COMMUNITIES, LLC
1900 QUAIL STREET
NEWPORT BEACH, CA 92660
PH: (949) 258-7534

MDS CONSULTING
PLANNERS ENGINEERS SURVEYORS
17320 Redhill Ave.
Suite 200
Irvine, CA 92614
Voice: 949-221-8831
FAX: 949-221-0516

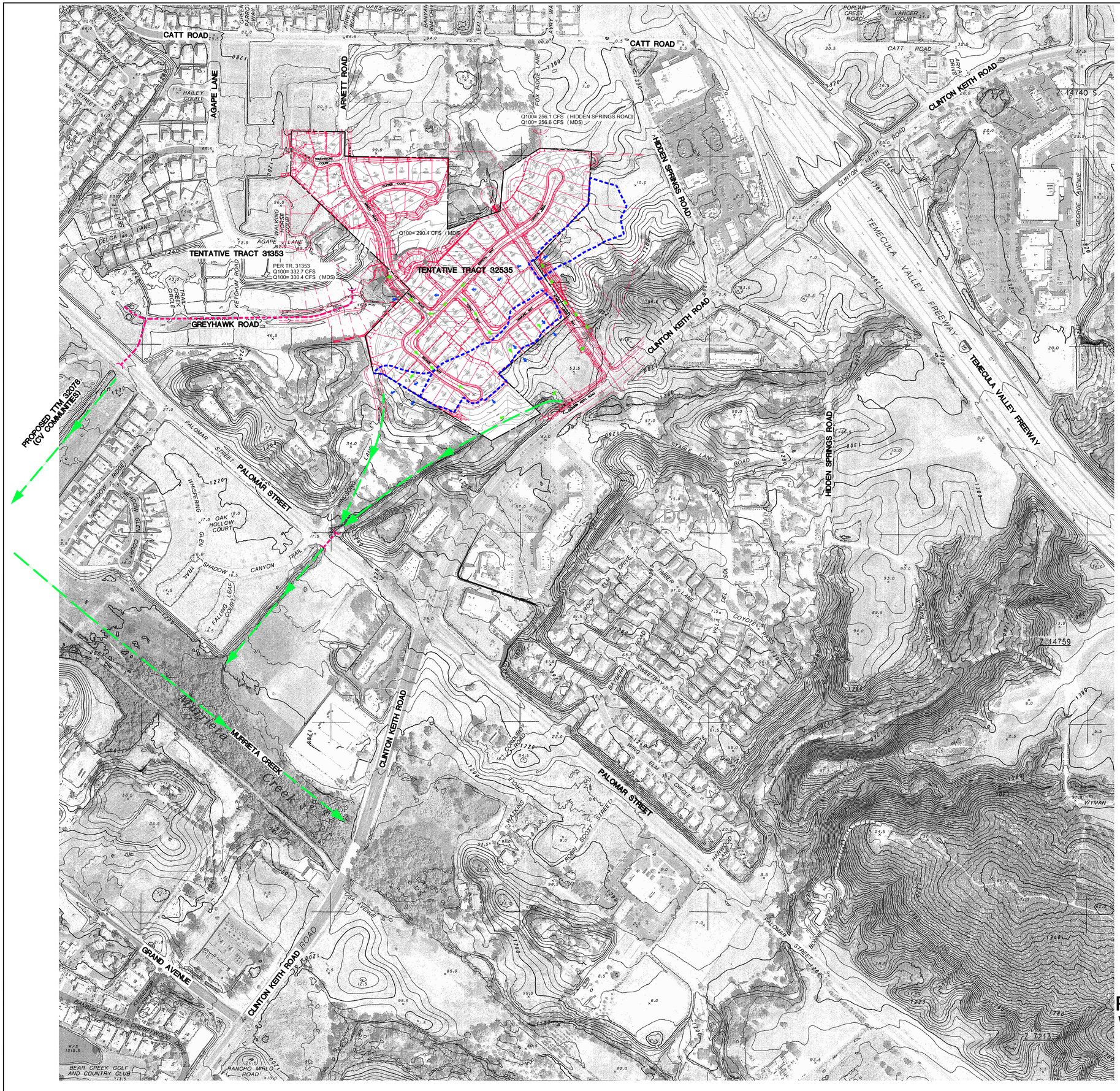
PLATE 2

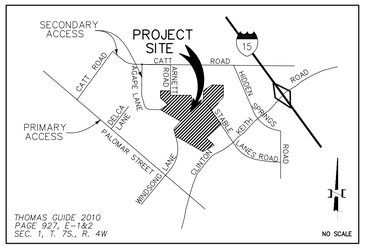
REGISTERED PROFESSIONAL ENGINEER
EDWARD J. LENTH
No. 052496
Exp. 12-31-14
CIVIL
STATE OF CALIFORNIA

TRACT 32353

RATIONAL METHOD
OFF-SITE HYDROLOGY MAP

Last Revised: Fri Nov 08, 2013 - 10:54am Last Plotted: Fri Nov 08, 2013 - 10:10am Plotted By: STATION65 Drawing: I:\80334\HYDRO\Plate 2 Offsite Hydrology Map.dwg





VICINITY MAP

NOT TO SCALE

LEGEND

- PRE DEVELOPMENT FLOW DIRECTION
- POST DEVELOPMENT FLOW DIRECTION
- TRACT BOUNDARY (40.16 AC)
- SUB WATERSHED BOUNDARY
- EXISTING NATURAL CHANNEL
- EXISTING PUBLIC STORM DRAIN

PHOTO MAP

Mapping prepared by the RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT, 1995 Market Street, Riverside, CA. 92501. Survey control by RIVERSIDE COUNTY FLOOD CONTROL and the National Geodetic Survey. Topography by LIDAR techniques, enhanced by digital photogrammetric methods. Aerial photographs are taken at an altitude not to exceed a flying height to contour interval ratio of 1800. Lambert projection: North American datum of 1983, Epoch date 2007.00. Grid ticks based on the California Coordinate System, Zone VI. Date of photography 09-27-2011.

GN TN
MAPPING ANGLE
Y = -00°34'19"
AT CENTER OF TOWNSHIP

SECTION 1
T.7S., R.4W.
SBB & M

©2011 RIVERSIDE COUNTY FLOOD CONTROL

NORTH

0 100 200 400 800

GRAPHIC SCALE
(IN FEET)

PREPARED BY:

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Voice: 949-251-8821
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PLANNERS ENGINEERS SURVEYORS

PREPARED FOR:

CV COMMUNITIES, LLC
1900 QUAIL STREET
NEWPORT BEACH, CA 92660
PH: (949) 258-7534

PLATE 3
RIVERSIDE COUNTY FLOOD CONTROL AND WATERSHED DIVERSION OVERLAY EXHIBIT
TENTATIVE TRACT 32535

CITY OF WILDOMAR, STATE OF CALIFORNIA

DATE PREPARED: SEPTEMBER 24, 2013

SHEET 1 OF 1

I:\80334\HYDRO\PLATE 3 FLOOD CONTROL WS DIV EXH.dwg 9/24/13