

**ADDENDUM TO
MASS GRADING
DRAINAGE STUDY
for
OTAY RANCH VILLAGE 8 WEST TRACT NO.19-03
PARCEL C
'LOT1, PORTION OF LOTS 2, 23 & 24'**

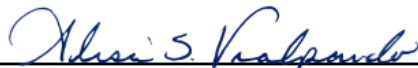
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Date: 09/13/2022

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CHAPTER 1 - ADDENDUM SUMMARY

This addendum to the Otay Ranch Village 8 West Mass Grading Drainage Study has been prepared to assess the developed condition peak runoff rates and proposed drainage system from Parcel C (Lot1, Portion of Lots 2, 23 & 24). This neighborhood was included within the overall master drainage study for Village 8 West but was represented as a mass graded pad. This study will confirm storm drain capacity for both the onsite and downstream existing storm drain system.

The Parcel C pad is approximately 8.58 acres, located immediately at the northeast corner of the intersection of Main Street West and LA Media Pkwy North. Parcel C is accessed through Main Street West and LA Media Pkwy North. It will consist of medium-high density residential apartments for rent, common open space and pool area. Drainage improvements will include curb inlets, cleanouts, and storm drain. See the hydrology map on the following page for proposed drainage facilities and drainage flowpaths.

The 50-year, and 100-year hydrologic analysis included in Chapter 2 determined a Q50 flow of 28.48 cfs and Q100 flow of 32.65 cfs generated from the developed Parcel C site (8.45 acres including a portion of Private Street "A" on the northern lot that drains to the site). The storm drain within Parcel has been sized to convey the peak 50-year flow per City of Chula Vista requirements. On site inlet sizes and storm drain hydraulic analysis will be provided during Final Engineering. The preliminary sizes for the onsite storm drain system were used in the AES model to confirm that the proposed system has adequate capacity please see chapter 2.

Inlet calculations have been provided in Chapter 3 of the report to verify that the existing sump inlet at Node 170 (per the Mass Grading Drainage Study) has adequate capacity to capture the additional flow from the graded slope along the eastern portion of LA Media Pkwy, and the on grade inlet at Node 146 has adequate capacity to capture the additional flow from the southern portion of Pvt Drive 'E' to Main Street West and surroundings of building 4.

The development of Parcel C was anticipated within the overall Mass Grading Plans for Otay Ranch Village 8 West. The drainage study for those mass grading plans determined a Q50 flow rate from Parcel C site to be 33.77 cfs and Q100 flow to be 38.38 cfs. This Addendum revises the peak flow from the same area to be 28.48 cfs for 50 year and 32.65 cfs for 100 year. Comparing the results, the proposed drainage improvements will improve the overall drainage conditions as they will vary time of concentration across the site comparing to the mass graded conditions in the master drainage study, where the site was modeled as one additional subarea. Therefore, the peak flows leaving the site for the 100-Year storm are decreased by 5.29 cfs, and for the 50-Year storm are decreased by 5.73 cfs. As a result, the proposed site design for Parcel C site will not adversely affect the downstream storm drain system.

CHAPTER 2

PROPOSED CONDITION PARCEL C HYDROLOGY ANALYSIS

CHAPTER 2-2
PROPOSED CONDITION PARCEL C HYDROLOGY
ANALYSIS Q50

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*****
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
          2003, 1985, 1981 HYDROLOGY MANUAL
(c) Copyright 1982-2015 Advanced Engineering Software (aes)
Ver. 22.0 Release Date: 07/01/2015 License ID 1239
Analysis prepared by:
Hunsaker & Associates San Diego, Inc.
9707 Waples Street
San Diego, CA 92121
*****
DESCRIPTION OF STUDY
*****
* OTAY VILLAGE 8 WEST - CONSERV LOT 26
*
* HYDROLOGY ANALYSIS
*
* DEVELOPED CONDITIONS 50 YEARS
*
*****
FILE NAME: R:\1691\HYD\DR\CALCS\AES\50PR.DAT
TIME/DATE OF STUDY: 16:36 09/13/2022
-----
USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
-----
2003 SAN DIEGO MANUAL CRITERIA
USER SPECIFIED STORM EVENT(YEAR) = 50.00
6-HOUR DURATION PRECIPITATION (INCHES) = 2.200
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE =
0.95
SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
*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 14.0 9.0 0.020/0.020/0.020 0.50 1.50 0.0313 0.125
0.0130
2 12.0 7.0 0.020/0.020/ --- 0.50 1.50 0.0313 0.125
0.0130
3 12.0 7.0 0.020/0.020/ --- 0.33 1.50 0.0313 0.083
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 = 5.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*****
FLOW PROCESS FROM NODE 130.00 TO NODE 131.00 IS CODE = 21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7900
SOIL CLASSIFICATION IS "D"
S. C. S. CURVE NUMBER (AMC II) = 94
INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
UPSTREAM ELEVATION(FEET) = 480.50
DOWNSTREAM ELEVATION(FEET) = 480.40
ELEVATION DIFFERENCE(FEET) = 0.10
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 4.971
WARNING: THE MINIMUM OVERLAND FLOW SLOPE, 0.5%, IS USED IN Tc
CALCULATION!
50 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.796
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) = 0.50
TOTAL AREA(ACRES) = 0.11 TOTAL RUNOFF(CFS) = 0.50
*****
FLOW PROCESS FROM NODE 131.00 TO NODE 132.00 IS CODE = 91
-----
>>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
=====
UPSTREAM NODE ELEVATION(FEET) = 480.40
DOWNSTREAM NODE ELEVATION(FEET) = 479.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 204.54
"V" GUTTER WIDTH(FEET) = 3.00 GUTTER HIKE(FEET) = 0.083
PAVEMENT LIP(FEET) = 0.010 MANNING'S N = .0130
PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
MAXIMUM DEPTH(FEET) = 0.50
50 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.817
RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7900
SOIL CLASSIFICATION IS "D"
S. C. S. CURVE NUMBER (AMC II) = 94
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.16
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.02
AVERAGE FLOW DEPTH(FEET) = 0.20 FLOOD WIDTH(FEET) = 13.89
"V" GUTTER FLOW TRAVEL TIME(MIN.) = 1.69 Tc(MIN.) = 6.66
SUBAREA AREA(ACRES) = 0.87 SUBAREA RUNOFF(CFS) = 3.31
AREA-AVERAGE RUNOFF COEFFICIENT = 0.790
TOTAL AREA(ACRES) = 1.0 PEAK FLOW RATE(CFS) =
3.73
END OF SUBAREA "V" GUTTER HYDRAULICS:
```

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50PR.txt
DEPTH(FEET) = 0.24 FLOOD WIDTH(FEET) = 17.71
FLOW VELOCITY(FEET/SEC.) = 2.22 DEPTH*VELOCITY(FT*FT/SEC) = 0.53
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 132.00 = 254.54
FEET.
*****
***
FLOW PROCESS FROM NODE 132.00 TO NODE 123.00 IS CODE = 31
-----
----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
===
ELEVATION DATA: UPSTREAM(FEET) = 475.00 DOWNSTREAM(FEET) = 466.00
FLOW LENGTH(FEET) = 499.31 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.) = 6.62
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 3.73
PIPE TRAVEL TIME(MIN.) = 1.26 Tc(MIN.) = 7.92
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 123.00 = 753.85
FEET.
*****
***
FLOW PROCESS FROM NODE 130.00 TO NODE 123.00 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.) = 7.92
RAINFALL INTENSITY(INCH/HR) = 4.31
TOTAL STREAM AREA(ACRES) = 0.98
PEAK FLOW RATE(CFS) AT CONFLUENCE = 3.73
*****
***
FLOW PROCESS FROM NODE 120.00 TO NODE 121.00 IS CODE = 21
-----
----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
===
RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
SOIL CLASSIFICATION IS "C"
S. C. S. CURVE NUMBER (AMC II) = 93
INITIAL SUBAREA FLOW-LENGTH(FEET) = 65.00
UPSTREAM ELEVATION(FEET) = 478.95
DOWNSTREAM ELEVATION(FEET) = 478.30
ELEVATION DIFFERENCE(FEET) = 0.65
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 4.644
50 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.796
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.

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50PR.txt
SUBAREA RUNOFF(CFS) = 0.45
TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.45
*****
***
FLOW PROCESS FROM NODE 121.00 TO NODE 122.00 IS CODE = 91
-----
----
>>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
=====
===
UPSTREAM NODE ELEVATION(FEET) = 478.30
DOWNSTREAM NODE ELEVATION(FEET) = 469.37
CHANNEL LENGTH THRU SUBAREA(FEET) = 435.33
"V" GUTTER WIDTH(FEET) = 3.00 GUTTER HIKE(FEET) = 0.083
PAVEMENT LIP(FEET) = 0.010 MANNING'S N = .0130
PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
MAXIMUM DEPTH(FEET) = 0.50
50 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.720
RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
SOIL CLASSIFICATION IS "C"
S. C. S. CURVE NUMBER (AMC II) = 93
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.51
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.25
AVERAGE FLOW DEPTH(FEET) = 0.18 FLOOD WIDTH(FEET) = 11.51
"V" GUTTER FLOW TRAVEL TIME(MIN.) = 2.23 Tc(MIN.) = 6.88
SUBAREA AREA(ACRES) = 1.11 SUBAREA RUNOFF(CFS) = 4.09
AREA-AVERAGE RUNOFF COEFFICIENT = 0.780
TOTAL AREA(ACRES) = 1.2 PEAK FLOW RATE(CFS) =
4.45
END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) = 0.21 FLOOD WIDTH(FEET) = 15.16
FLOW VELOCITY(FEET/SEC.) = 3.54 DEPTH*VELOCITY(FT*FT/SEC) = 0.76
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 122.00 = 500.33
FEET.
*****
***
FLOW PROCESS FROM NODE 122.00 TO NODE 123.00 IS CODE = 31
-----
----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
===
ELEVATION DATA: UPSTREAM(FEET) = 465.37 DOWNSTREAM(FEET) = 465.05
FLOW LENGTH(FEET) = 31.52 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.62
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 4.45
PIPE TRAVEL TIME(MIN.) = 0.09 Tc(MIN.) = 6.97
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 123.00 = 531.85
FEET.
*****
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FLOW PROCESS FROM NODE    120.00 TO NODE    123.00 IS CODE =   1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
=====
===
TOTAL NUMBER OF STREAMS =   2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM   2 ARE:
TIME OF CONCENTRATION(MIN.) =   6.97
RAINFALL INTENSITY(INCH/HR) =   4.68
TOTAL STREAM AREA(ACRES) =   1.21
PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.45
** CONFLUENCE DATA **
STREAM    RUNOFF      Tc      INTENSITY      AREA
NUMBER    (CFS)      (MIN.)  (INCH/HR)    (ACRE)
   1       3.73       7.92      4.308        0.98
   2       4.45       6.97      4.679        1.21
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/HR)
   1       7.74       6.97      4.679
   2       7.83       7.92      4.308
COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =       7.83   Tc(MIN.) =   7.92
TOTAL AREA(ACRES) =       2.2
LONGEST FLOWPATH FROM NODE    130.00 TO NODE    123.00 =       753.85
FEET.
*****
***
FLOW PROCESS FROM NODE    123.00 TO NODE    104.00 IS CODE =   31
-----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPE SIZE (NON-PRESSURE FLOW)<<<<<
=====
===
ELEVATION DATA: UPSTREAM(FEET) =   465.05  DOWNSTREAM(FEET) =   464.61
FLOW LENGTH(FEET) =   43.39  MANNING'S N =   0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   6.42
ESTIMATED PIPE DIAMETER(INCH) = 18.00  NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =       7.83
PIPE TRAVEL TIME(MIN.) =   0.11   Tc(MIN.) =   8.03
LONGEST FLOWPATH FROM NODE    130.00 TO NODE    104.00 =       797.24
FEET.
*****
***
FLOW PROCESS FROM NODE    123.00 TO NODE    104.00 IS CODE =   1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
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===
TOTAL NUMBER OF STREAMS =   3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM   1 ARE:
TIME OF CONCENTRATION(MIN.) =   8.03
RAINFALL INTENSITY(INCH/HR) =   4.27
TOTAL STREAM AREA(ACRES) =   2.19
PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.83
*****
***
FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =   21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
===
RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7900
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) =   94
INITIAL SUBAREA FLOW-LENGTH(FEET) =   65.00
UPSTREAM ELEVATION(FEET) =   479.00
DOWNSTREAM ELEVATION(FEET) =   478.50
ELEVATION DIFFERENCE(FEET) =   0.50
SUBAREA OVERLAND TIME OF FLOW(MIN.) =   4.641
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
THE MAXIMUM OVERLAND FLOW LENGTH =   58.08
(Reference: Table 3-1B of Hydrology Manual)
THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
50 YEAR RAINFALL INTENSITY(INCH/HR) =   5.796
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) =       0.46
TOTAL AREA(ACRES) =   0.10  TOTAL RUNOFF(CFS) =       0.46
*****
***
FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =   91
-----
>>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
=====
===
UPSTREAM NODE ELEVATION(FEET) =   478.55
DOWNSTREAM NODE ELEVATION(FEET) =   475.50
CHANNEL LENGTH THRU SUBAREA(FEET) =   306.52
"V" GUTTER WIDTH(FEET) =   3.00  GUTTER HIKE(FEET) =   0.083
PAVEMENT LIP(FEET) =   0.010  MANNING'S N = .0130
PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
MAXIMUM DEPTH(FEET) =   0.50
50 YEAR RAINFALL INTENSITY(INCH/HR) =   4.670
RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) =   93
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.49
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.18
AVERAGE FLOW DEPTH(FEET) =   0.17  FLOOD WIDTH(FEET) = 10.71
"V" GUTTER FLOW TRAVEL TIME(MIN.) =   2.35   Tc(MIN.) =   6.99
SUBAREA AREA(ACRES) =   0.56  SUBAREA RUNOFF(CFS) =       2.04

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50PR.txt
AREA-AVERAGE RUNOFF COEFFICIENT = 0.782
TOTAL AREA(ACRES) = 0.7 PEAK FLOW RATE(CFS) =
2.41
END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) = 0.20 FLOOD WIDTH(FEET) = 13.41
FLOW VELOCITY(FEET/SEC.) = 2.39 DEPTH*VELOCITY(FT*FT/SEC) = 0.47
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 371.52
FEET.
*****
***
FLOW PROCESS FROM NODE 102.00 TO NODE 104.00 IS CODE = 31
-----
----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
===
ELEVATION DATA: UPSTREAM(FEET) = 471.50 DOWNSTREAM(FEET) = 464.61
FLOW LENGTH(FEET) = 59.02 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 3.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.35
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 2.41
PIPE TRAVEL TIME(MIN.) = 0.09 Tc(MIN.) = 7.08
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 104.00 = 430.54
FEET.
*****
***
FLOW PROCESS FROM NODE 100.00 TO NODE 104.00 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.) = 7.08
RAINFALL INTENSITY(INCH/HR) = 4.63
TOTAL STREAM AREA(ACRES) = 0.66
PEAK FLOW RATE(CFS) AT CONFLUENCE = 2.41
*****
***
FLOW PROCESS FROM NODE 140.00 TO NODE 141.00 IS CODE = 21
-----
----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
=====
===
RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7900
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 94
INITIAL SUBAREA FLOW-LENGTH(FEET) = 65.00
UPSTREAM ELEVATION(FEET) = 475.50
DOWNSTREAM ELEVATION(FEET) = 475.00

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50PR.txt
ELEVATION DIFFERENCE(FEET) = 0.50
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 4.641
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
THE MAXIMUM OVERLAND FLOW LENGTH = 58.08
(Reference: Table 3-1B of Hydrology Manual)
THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
50 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.796
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) = 0.46
TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.46
*****
***
FLOW PROCESS FROM NODE 141.00 TO NODE 142.00 IS CODE = 91
-----
----
>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<
=====
===
UPSTREAM NODE ELEVATION(FEET) = 475.00
DOWNSTREAM NODE ELEVATION(FEET) = 470.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 377.92
"V" GUTTER WIDTH(FEET) = 3.00 GUTTER HIKE(FEET) = 0.083
PAVEMENT LIP(FEET) = 0.010 MANNING'S N = .0130
PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
MAXIMUM DEPTH(FEET) = 0.50
50 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.795
RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 93
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.94
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.04
AVERAGE FLOW DEPTH(FEET) = 0.24 FLOOD WIDTH(FEET) = 17.39
"V" GUTTER FLOW TRAVEL TIME(MIN.) = 2.07 Tc(MIN.) = 6.71
SUBAREA AREA(ACRES) = 2.38 SUBAREA RUNOFF(CFS) = 8.90
AREA-AVERAGE RUNOFF COEFFICIENT = 0.780
TOTAL AREA(ACRES) = 2.5 PEAK FLOW RATE(CFS) =
9.28
END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) = 0.29 FLOOD WIDTH(FEET) = 22.63
FLOW VELOCITY(FEET/SEC.) = 3.47 DEPTH*VELOCITY(FT*FT/SEC) = 1.01
LONGEST FLOWPATH FROM NODE 140.00 TO NODE 142.00 = 442.92
FEET.
*****
***
FLOW PROCESS FROM NODE 142.00 TO NODE 104.00 IS CODE = 31
-----
----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
===
ELEVATION DATA: UPSTREAM(FEET) = 466.00 DOWNSTREAM(FEET) = 464.61
FLOW LENGTH(FEET) = 172.88 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 12.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.17

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50PR.txt
ESTIMATED PIPE DIAMETER(INCH) = 21.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 9.28
PIPE TRAVEL TIME(MIN.) = 0.47    Tc(MIN.) = 7.18
LONGEST FLOWPATH FROM NODE 140.00 TO NODE 104.00 = 615.80
FEET.
*****
***
FLOW PROCESS FROM NODE 140.00 TO NODE 104.00 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.) = 7.18
RAINFALL INTENSITY(INCH/HR) = 4.59
TOTAL STREAM AREA(ACRES) = 2.48
PEAK FLOW RATE(CFS) AT CONFLUENCE = 9.28
** CONFLUENCE DATA **
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (MIN.) (INCH/HR) (ACRE)
1 7.83 8.03 4.269 2.19
2 2.41 7.08 4.633 0.66
3 9.28 7.18 4.591 2.48
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/HR)
1 18.77 7.08 4.633
2 18.95 7.18 4.591
3 18.68 8.03 4.269
COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 18.95 Tc(MIN.) = 7.18
TOTAL AREA(ACRES) = 5.3
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 104.00 = 797.24
FEET.
*****
***
FLOW PROCESS FROM NODE 104.00 TO NODE 113.00 IS CODE = 31
-----
----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPE SIZE (NON-PRESSURE FLOW)<<<<<
=====
===
ELEVATION DATA: UPSTREAM(FEET) = 464.61 DOWNSTREAM(FEET) = 463.30
FLOW LENGTH(FEET) = 143.50 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 17.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.59
ESTIMATED PIPE DIAMETER(INCH) = 24.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 18.95
PIPE TRAVEL TIME(MIN.) = 0.32    Tc(MIN.) = 7.49

```

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50PR.txt
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 113.00 = 940.74
FEET.
*****
***
FLOW PROCESS FROM NODE 104.00 TO NODE 113.00 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.) = 7.49
RAINFALL INTENSITY(INCH/HR) = 4.47
TOTAL STREAM AREA(ACRES) = 5.33
PEAK FLOW RATE(CFS) AT CONFLUENCE = 18.95
*****
***
FLOW PROCESS FROM NODE 150.00 TO NODE 151.00 IS CODE = 21
-----
----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
===
RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 93
INITIAL SUBAREA FLOW-LENGTH(FEET) = 65.00
UPSTREAM ELEVATION(FEET) = 469.85
DOWNSTREAM ELEVATION(FEET) = 469.30
ELEVATION DIFFERENCE(FEET) = 0.55
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 4.732
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
THE MAXIMUM OVERLAND FLOW LENGTH = 60.39
(Reference: Table 3-1B of Hydrology Manual)
THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
50 YEAR RAINFALL INTENSITY(INCH/HR) = 5.796
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) = 0.45
TOTAL AREA(ACRES) = 0.10    TOTAL RUNOFF(CFS) = 0.45
*****
***
FLOW PROCESS FROM NODE 151.00 TO NODE 152.00 IS CODE = 91
-----
----
>>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
=====
===
UPSTREAM NODE ELEVATION(FEET) = 469.30
DOWNSTREAM NODE ELEVATION(FEET) = 467.70
CHANNEL LENGTH THRU SUBAREA(FEET) = 229.63
"V" GUTTER WIDTH(FEET) = 3.00    GUTTER HIKE(FEET) = 0.083
PAVEMENT LIP(FEET) = 0.010    MANNING'S N = .0130
PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
MAXIMUM DEPTH(FEET) = 0.50

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```

50PR.txt
50 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.773
RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 93
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.42
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 1.89
AVERAGE FLOW DEPTH(FEET) = 0.18 FLOOD WIDTH(FEET) = 11.35
"V" GUTTER FLOW TRAVEL TIME(MIN.) = 2.03 Tc(MIN.) = 6.76
SUBAREA AREA(ACRES) = 0.52 SUBAREA RUNOFF(CFS) = 1.94
AREA-AVERAGE RUNOFF COEFFICIENT = 0.780
TOTAL AREA(ACRES) = 0.6 PEAK FLOW RATE(CFS) =
2.31
END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) = 0.21 FLOOD WIDTH(FEET) = 14.37
FLOW VELOCITY(FEET/SEC.) = 2.02 DEPTH*VELOCITY(FT*FT/SEC) = 0.42
LONGEST FLOWPATH FROM NODE 150.00 TO NODE 152.00 = 294.63
FEET.
*****
***
FLOW PROCESS FROM NODE 152.00 TO NODE 113.00 IS CODE = 31
-----
----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 463.40 DOWNSTREAM(FEET) = 463.30
FLOW LENGTH(FEET) = 14.43 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.) = 4.10
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 2.31
PIPE TRAVEL TIME(MIN.) = 0.06 Tc(MIN.) = 6.82
LONGEST FLOWPATH FROM NODE 150.00 TO NODE 113.00 = 309.06
FEET.
*****
***
FLOW PROCESS FROM NODE 150.00 TO NODE 113.00 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.) = 6.82
RAINFALL INTENSITY(INCH/HR) = 4.75
TOTAL STREAM AREA(ACRES) = 0.62
PEAK FLOW RATE(CFS) AT CONFLUENCE = 2.31
*****
***
FLOW PROCESS FROM NODE 110.00 TO NODE 111.00 IS CODE = 21
-----
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50PR.txt
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
===
RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 93
INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
UPSTREAM ELEVATION(FEET) = 480.72
DOWNSTREAM ELEVATION(FEET) = 480.35
ELEVATION DIFFERENCE(FEET) = 0.37
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 4.503
50 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.796
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) = 0.45
TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.45
*****
***
FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 91
-----
----
>>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
=====
===
UPSTREAM NODE ELEVATION(FEET) = 480.35
DOWNSTREAM NODE ELEVATION(FEET) = 467.38
CHANNEL LENGTH THRU SUBAREA(FEET) = 802.94
"V" GUTTER WIDTH(FEET) = 3.00 GUTTER HIKE(FEET) = 0.083
PAVEMENT LIP(FEET) = 0.010 MANNING'S N = .0130
PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
MAXIMUM DEPTH(FEET) = 0.50
50 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.952
RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 93
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.49
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.94
AVERAGE FLOW DEPTH(FEET) = 0.18 FLOOD WIDTH(FEET) = 12.14
"V" GUTTER FLOW TRAVEL TIME(MIN.) = 4.55 Tc(MIN.) = 9.06
SUBAREA AREA(ACRES) = 1.30 SUBAREA RUNOFF(CFS) = 4.01
AREA-AVERAGE RUNOFF COEFFICIENT = 0.780
TOTAL AREA(ACRES) = 1.4 PEAK FLOW RATE(CFS) =
4.32
END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) = 0.22 FLOOD WIDTH(FEET) = 15.64
FLOW VELOCITY(FEET/SEC.) = 3.24 DEPTH*VELOCITY(FT*FT/SEC) = 0.71
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 112.00 = 852.94
FEET.
*****
***
FLOW PROCESS FROM NODE 112.00 TO NODE 113.00 IS CODE = 31
-----
----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====

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===
ELEVATION DATA: UPSTREAM(FEET) = 463.38 DOWNSTREAM(FEET) = 463.30
FLOW LENGTH(FEET) = 15.09 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.37
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 4.32
PIPE TRAVEL TIME(MIN.) = 0.06 Tc(MIN.) = 9.11
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 113.00 = 868.03
FEET.

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FLOW PROCESS FROM NODE 110.00 TO NODE 113.00 IS CODE = 1
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>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
=====

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TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 3 ARE:
TIME OF CONCENTRATION(MIN.) = 9.11
RAINFALL INTENSITY(INCH/HR) = 3.94
TOTAL STREAM AREA(ACRES) = 1.40
PEAK FLOW RATE(CFS) AT CONFLUENCE = 4.32
** CONFLUENCE DATA **

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FLOW LENGTH(FEET) = 218.49 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.94
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 24.67
PIPE TRAVEL TIME(MIN.) = 0.41 Tc(MIN.) = 7.90
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 114.00 = 1159.23
FEET.

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FLOW PROCESS FROM NODE 180.00 TO NODE 114.00 IS CODE = 81
-----

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

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===

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```

50 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.316
RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
SOIL CLASSIFICATION IS "C"
S. C. S. CURVE NUMBER (AMC II) = 93
AREA-AVERAGE RUNOFF COEFFICIENT = 0.7815
SUBAREA AREA(ACRES) = 0.31 SUBAREA RUNOFF(CFS) = 1.04
TOTAL AREA(ACRES) = 7.7 TOTAL RUNOFF(CFS) = 25.84
TC(MIN.) = 7.90

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```

FLOW PROCESS FROM NODE 114.00 TO NODE 115.00 IS CODE = 31
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```

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

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ELEVATION DATA: UPSTREAM(FEET) = 463.30 DOWNSTREAM(FEET) = 455.59
FLOW LENGTH(FEET) = 140.20 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.36
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 25.84
PIPE TRAVEL TIME(MIN.) = 0.14 Tc(MIN.) = 8.04
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 115.00 = 1299.43
FEET.

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FLOW PROCESS FROM NODE 785.00 TO NODE 785.00 IS CODE = 1
-----

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```

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

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```

TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 8.04
RAINFALL INTENSITY(INCH/HR) = 4.27
TOTAL STREAM AREA(ACRES) = 7.66

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50PR.txt
PEAK FLOW RATE(CFS) AT CONFLUENCE = 25.84
*****
***
FLOW PROCESS FROM NODE 160.00 TO NODE 161.00 IS CODE = 21
-----
----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
===
RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 93
INITIAL SUBAREA FLOW-LENGTH(FEET) = 65.00
UPSTREAM ELEVATION(FEET) = 467.38
DOWNSTREAM ELEVATION(FEET) = 466.31
ELEVATION DIFFERENCE(FEET) = 1.07
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 3.933
50 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.796
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) = 0.27
TOTAL AREA(ACRES) = 0.06 TOTAL RUNOFF(CFS) = 0.27
*****
***
FLOW PROCESS FROM NODE 161.00 TO NODE 162.00 IS CODE = 61
-----
----
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STANDARD CURB SECTION USED)<<<<<
=====
===
UPSTREAM ELEVATION(FEET) = 466.31 DOWNSTREAM ELEVATION(FEET) =
459.68
STREET LENGTH(FEET) = 289.41 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(curbs-to-curb) =
0.0130
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.20
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.23
HALFSTREET FLOOD WIDTH(FEET) = 5.32
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.01
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.70
STREET FLOW TRAVEL TIME(MIN.) = 1.60 Tc(MIN.) = 5.54
50 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.427
RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 93
AREA-AVERAGE RUNOFF COEFFICIENT = 0.780
SUBAREA AREA(ACRES) = 0.44 SUBAREA RUNOFF(CFS) = 1.86

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50PR.txt
TOTAL AREA(ACRES) = 0.5 PEAK FLOW RATE(CFS) = 2.12
END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.27 HALFSTREET FLOOD WIDTH(FEET) = 7.21
FLOW VELOCITY(FEET/SEC.) = 3.31 DEPTH*VELOCITY(FT*FT/SEC.) = 0.90
LONGEST FLOWPATH FROM NODE 160.00 TO NODE 162.00 = 354.41
FEET.
*****
***
FLOW PROCESS FROM NODE 162.00 TO NODE 115.00 IS CODE = 31
-----
----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
===
ELEVATION DATA: UPSTREAM(FEET) = 455.68 DOWNSTREAM(FEET) = 455.59
FLOW LENGTH(FEET) = 8.82 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.60
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 2.12
PIPE TRAVEL TIME(MIN.) = 0.03 Tc(MIN.) = 5.57
LONGEST FLOWPATH FROM NODE 160.00 TO NODE 115.00 = 363.23
FEET.
*****
***
FLOW PROCESS FROM NODE 785.00 TO NODE 785.00 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.) = 5.57
RAINFALL INTENSITY(INCH/HR) = 5.41
TOTAL STREAM AREA(ACRES) = 0.50
PEAK FLOW RATE(CFS) AT CONFLUENCE = 2.12
*****
***
FLOW PROCESS FROM NODE 169.00 TO NODE 171.00 IS CODE = 21
-----
----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
===
RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 93
INITIAL SUBAREA FLOW-LENGTH(FEET) = 65.00
UPSTREAM ELEVATION(FEET) = 467.35
DOWNSTREAM ELEVATION(FEET) = 466.45
ELEVATION DIFFERENCE(FEET) = 0.90
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 4.167

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50 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.796
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) = 0.23
TOTAL AREA(ACRES) = 0.05 TOTAL RUNOFF(CFS) = 0.23
*****
***
FLOW PROCESS FROM NODE 171.00 TO NODE 172.00 IS CODE = 61
-----
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STANDARD CURB SECTION USED)<<<<<
=====
===
UPSTREAM ELEVATION(FEET) = 466.45 DOWNSTREAM ELEVATION(FEET) =
459.70
STREET LENGTH(FEET) = 371.98 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(curbs-to-curbs) =
0.0130
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.68
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.20
HALFSTREET FLOOD WIDTH(FEET) = 3.93
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.49
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.51
STREET FLOW TRAVEL TIME(MIN.) = 2.49 Tc(MIN.) = 6.66
50 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.818
RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 93
AREA-AVERAGE RUNOFF COEFFICIENT = 0.780
SUBAREA AREA(ACRES) = 0.24 SUBAREA RUNOFF(CFS) = 0.90
TOTAL AREA(ACRES) = 0.3 PEAK FLOW RATE(CFS) = 1.09
END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.23 HALFSTREET FLOOD WIDTH(FEET) = 5.39
FLOW VELOCITY(FEET/SEC.) = 2.67 DEPTH*VELOCITY(FT*FT/SEC.) = 0.62
LONGEST FLOWPATH FROM NODE 169.00 TO NODE 172.00 = 436.98
FEET.
*****
***
FLOW PROCESS FROM NODE 172.00 TO NODE 785.00 IS CODE = 31
-----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
===
ELEVATION DATA: UPSTREAM(FEET) = 455.70 DOWNSTREAM(FEET) = 455.59
FLOW LENGTH(FEET) = 23.85 MANNING'S N = 0.013

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ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 2.86
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 1.09
PIPE TRAVEL TIME(MIN.) = 0.14 Tc(MIN.) = 6.80
LONGEST FLOWPATH FROM NODE 169.00 TO NODE 785.00 = 460.83
FEET.
*****
***
FLOW PROCESS FROM NODE 785.00 TO NODE 785.00 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.) = 6.80
RAINFALL INTENSITY(INCH/HR) = 4.75
TOTAL STREAM AREA(ACRES) = 0.29
PEAK FLOW RATE(CFS) AT CONFLUENCE = 1.09
** CONFLUENCE DATA **
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (MIN.) (INCH/ HOUR) (ACRE)
1 25.84 8.04 4.266 7.66
2 2.12 5.57 5.407 0.50
3 1.09 6.80 4.755 0.29
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 23.40 5.57 5.407
2 26.13 6.80 4.755
3 28.48 8.04 4.266
COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 28.48 Tc(MIN.) = 8.04
TOTAL AREA(ACRES) = 8.4
LONGEST FLOWPATH FROM NODE 170.00 TO NODE 785.00 = 1299.43
FEET.
+--+
|
|
|
|
|
|
+--+
+--+
*****
***
FLOW PROCESS FROM NODE 170.00 TO NODE 170.00 IS CODE = 7

```

```

-----
>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<
=====
===
USER-SPECIFIED VALUES ARE AS FOLLOWS:
TC(MIN) = 5.00 RAIN INTENSITY(INCH/HOUR) = 5.80
TOTAL AREA(ACRES) = 1.16 TOTAL RUNOFF(CFS) = 5.85
*****
***
FLOW PROCESS FROM NODE 220.00 TO NODE 170.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
===
50 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.796
*USER SPECIFIED(SUBAREA):
RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3000
S.C.S. CURVE NUMBER (AMC II) = 93
AREA-AVERAGE RUNOFF COEFFICIENT = 0.8009
SUBAREA AREA(ACRES) = 0.16 SUBAREA RUNOFF(CFS) = 0.28
TOTAL AREA(ACRES) = 1.3 TOTAL RUNOFF(CFS) = 6.13
TC(MIN.) = 5.00
*****
***
FLOW PROCESS FROM NODE 170.00 TO NODE 170.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
===
50 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.796
*USER SPECIFIED(SUBAREA):
STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
S.C.S. CURVE NUMBER (AMC II) = 93
AREA-AVERAGE RUNOFF COEFFICIENT = 0.8182
SUBAREA AREA(ACRES) = 0.44 SUBAREA RUNOFF(CFS) = 2.22
TOTAL AREA(ACRES) = 1.8 TOTAL RUNOFF(CFS) = 8.35
TC(MIN.) = 5.00
+-----
---+
|
|
|
|
|
|
+-----
---+
*****
***
FLOW PROCESS FROM NODE 146.00 TO NODE 146.00 IS CODE = 7
-----

```

```

>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<
=====
===
USER-SPECIFIED VALUES ARE AS FOLLOWS:
TC(MIN) = 5.00 RAIN INTENSITY(INCH/HOUR) = 5.80
TOTAL AREA(ACRES) = 0.40 TOTAL RUNOFF(CFS) = 2.02
*****
***
FLOW PROCESS FROM NODE 201.00 TO NODE 146.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
===
50 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.796
RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7900
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 94
AREA-AVERAGE RUNOFF COEFFICIENT = 0.8502
SUBAREA AREA(ACRES) = 0.14 SUBAREA RUNOFF(CFS) = 0.64
TOTAL AREA(ACRES) = 0.5 TOTAL RUNOFF(CFS) = 2.66
TC(MIN.) = 5.00
*****
***
FLOW PROCESS FROM NODE 202.00 TO NODE 146.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
===
50 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.796
RESIDENTIAL (2.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 80
AREA-AVERAGE RUNOFF COEFFICIENT = 0.7306
SUBAREA AREA(ACRES) = 0.23 SUBAREA RUNOFF(CFS) = 0.60
TOTAL AREA(ACRES) = 0.8 TOTAL RUNOFF(CFS) = 3.26
TC(MIN.) = 5.00
+-----
---+
| BEGINING OF ANALYSIS OF DRAINAGE AREAS DRAINING TOWARDS MAIN STREET
WEST |
|
|
|
+-----
---+
=====
===
END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 0.8 TC(MIN.) = 5.00
PEAK FLOW RATE(CFS) = 3.26
=====
===
END OF RATIONAL METHOD ANALYSIS

```

CHAPTER 2-1
PROPOSED CONDITION PARCEL C HYDROLOGY
ANALYSIS Q100

```

*****
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
          2003, 1985, 1981 HYDROLOGY MANUAL
(c) Copyright 1982-2015 Advanced Engineering Software (aes)
Ver. 22.0 Release Date: 07/01/2015 License ID 1239
Analysis prepared by:
Hunsaker & Associates San Diego, Inc.
9707 Waples Street
San Diego, CA 92121
*****
*****
DESCRIPTION OF STUDY
*****
* OTAY VILLAGE 8 WEST - CONSERV LOT 26
*
* HYDROLOGY ANALYSIS
*
* DEVELOPED CONDITIONS 100 YEARS
*
*****
FILE NAME: R:\1691\HYD\DR\CALCS\AES\100PR.DAT
TIME/DATE OF STUDY: 16:29 09/13/2022
-----
USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
-----
2003 SAN DIEGO MANUAL CRITERIA
USER SPECIFIED STORM EVENT(YEAR) = 100.00
6-HOUR DURATION PRECIPITATION (INCHES) = 2.500
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE =
0.95
SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
*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 14.0 9.0 0.020/0.020/0.020 0.50 1.50 0.0313 0.125
0.0130
2 12.0 7.0 0.020/0.020/ --- 0.50 1.50 0.0313 0.125
0.0130
3 12.0 7.0 0.020/0.020/ --- 0.33 1.50 0.0313 0.083
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 = 5.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*****
*****
FLOW PROCESS FROM NODE 130.00 TO NODE 131.00 IS CODE = 21
-----
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7900
SOIL CLASSIFICATION IS "D"
S. C. S. CURVE NUMBER (AMC II) = 94
INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
UPSTREAM ELEVATION(FEET) = 480.50
DOWNSTREAM ELEVATION(FEET) = 480.40
ELEVATION DIFFERENCE(FEET) = 0.10
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 4.971
WARNING: THE MINIMUM OVERLAND FLOW SLOPE, 0.5%, IS USED IN Tc
CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.587
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) = 0.57
TOTAL AREA(ACRES) = 0.11 TOTAL RUNOFF(CFS) = 0.57
*****
*****
FLOW PROCESS FROM NODE 131.00 TO NODE 132.00 IS CODE = 91
-----
-----
>>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
=====
UPSTREAM NODE ELEVATION(FEET) = 480.40
DOWNSTREAM NODE ELEVATION(FEET) = 479.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 204.54
"V" GUTTER WIDTH(FEET) = 3.00 GUTTER HIKE(FEET) = 0.083
PAVEMENT LIP(FEET) = 0.010 MANNING'S N = .0130
PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
MAXIMUM DEPTH(FEET) = 0.50
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.482
RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7900
SOIL CLASSIFICATION IS "D"
S. C. S. CURVE NUMBER (AMC II) = 94
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.46
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.03
AVERAGE FLOW DEPTH(FEET) = 0.21 FLOOD WIDTH(FEET) = 14.84
"V" GUTTER FLOW TRAVEL TIME(MIN.) = 1.68 Tc(MIN.) = 6.65
SUBAREA AREA(ACRES) = 0.87 SUBAREA RUNOFF(CFS) = 3.77
AREA-AVERAGE RUNOFF COEFFICIENT = 0.790
TOTAL AREA(ACRES) = 1.0 PEAK FLOW RATE(CFS) =
4.24
END OF SUBAREA "V" GUTTER HYDRAULICS:

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```

100PR.txt
DEPTH(FEET) = 0.25 FLOOD WIDTH(FEET) = 18.82
FLOW VELOCITY(FEET/SEC.) = 2.26 DEPTH*VELOCITY(FT*FT/SEC) = 0.57
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 132.00 = 254.54
FEET.
*****
***
FLOW PROCESS FROM NODE 132.00 TO NODE 123.00 IS CODE = 31
-----
----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
===
ELEVATION DATA: UPSTREAM(FEET) = 475.00 DOWNSTREAM(FEET) = 466.00
FLOW LENGTH(FEET) = 499.31 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.85
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 4.24
PIPE TRAVEL TIME(MIN.) = 1.21 Tc(MIN.) = 7.86
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 123.00 = 753.85
FEET.
*****
***
FLOW PROCESS FROM NODE 130.00 TO NODE 123.00 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.) = 7.86
RAINFALL INTENSITY(INCH/HR) = 4.92
TOTAL STREAM AREA(ACRES) = 0.98
PEAK FLOW RATE(CFS) AT CONFLUENCE = 4.24
*****
***
FLOW PROCESS FROM NODE 120.00 TO NODE 121.00 IS CODE = 21
-----
----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
===
RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
SOIL CLASSIFICATION IS "C"
S. C. S. CURVE NUMBER (AMC II) = 93
INITIAL SUBAREA FLOW-LENGTH(FEET) = 65.00
UPSTREAM ELEVATION(FEET) = 478.95
DOWNSTREAM ELEVATION(FEET) = 478.30
ELEVATION DIFFERENCE(FEET) = 0.65
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 4.644
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.587
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.

```

```

100PR.txt
SUBAREA RUNOFF(CFS) = 0.51
TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.51
*****
***
FLOW PROCESS FROM NODE 121.00 TO NODE 122.00 IS CODE = 91
-----
----
>>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
=====
===
UPSTREAM NODE ELEVATION(FEET) = 478.30
DOWNSTREAM NODE ELEVATION(FEET) = 469.37
CHANNEL LENGTH THRU SUBAREA(FEET) = 435.33
"V" GUTTER WIDTH(FEET) = 3.00 GUTTER HIKE(FEET) = 0.083
PAVEMENT LIP(FEET) = 0.010 MANNING'S N = .0130
PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
MAXIMUM DEPTH(FEET) = 0.50
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.380
RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
SOIL CLASSIFICATION IS "C"
S. C. S. CURVE NUMBER (AMC II) = 93
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.86
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.30
AVERAGE FLOW DEPTH(FEET) = 0.19 FLOOD WIDTH(FEET) = 12.30
"V" GUTTER FLOW TRAVEL TIME(MIN.) = 2.20 Tc(MIN.) = 6.84
SUBAREA AREA(ACRES) = 1.11 SUBAREA RUNOFF(CFS) = 4.66
AREA-AVERAGE RUNOFF COEFFICIENT = 0.780
TOTAL AREA(ACRES) = 1.2 PEAK FLOW RATE(CFS) =
5.08
END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) = 0.22 FLOOD WIDTH(FEET) = 15.96
FLOW VELOCITY(FEET/SEC.) = 3.67 DEPTH*VELOCITY(FT*FT/SEC) = 0.82
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 122.00 = 500.33
FEET.
*****
***
FLOW PROCESS FROM NODE 122.00 TO NODE 123.00 IS CODE = 31
-----
----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
===
ELEVATION DATA: UPSTREAM(FEET) = 465.37 DOWNSTREAM(FEET) = 465.05
FLOW LENGTH(FEET) = 31.52 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.) = 5.82
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 5.08
PIPE TRAVEL TIME(MIN.) = 0.09 Tc(MIN.) = 6.93
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 123.00 = 531.85
FEET.
*****
***

```

```

FLOW PROCESS FROM NODE    120.00 TO NODE    123.00 IS CODE =   1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
=====
===
TOTAL NUMBER OF STREAMS =   2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM   2 ARE:
TIME OF CONCENTRATION(MIN.) =   6.93
RAINFALL INTENSITY(INCH/HR) =   5.34
TOTAL STREAM AREA(ACRES) =   1.21
PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.08
** CONFLUENCE DATA **
STREAM    RUNOFF      Tc      INTENSITY      AREA
NUMBER    (CFS)      (MIN.)  (INCH/HR)    (ACRE)
   1       4.24       7.86      4.920       0.98
   2       5.08       6.93      5.335       1.21
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/HR)
   1       8.82       6.93      5.335
   2       8.93       7.86      4.920
COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =       8.93   Tc(MIN.) =    7.86
TOTAL AREA(ACRES) =    2.2
LONGEST FLOWPATH FROM NODE    130.00 TO NODE    123.00 =    753.85
FEET.
*****
***
FLOW PROCESS FROM NODE    123.00 TO NODE    104.00 IS CODE =   31
-----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPE SIZE (NON-PRESSURE FLOW)<<<<<
=====
===
ELEVATION DATA: UPSTREAM( FEET) =   465.05  DOWNSTREAM( FEET) =   464.61
FLOW LENGTH( FEET) =   43.39  MANNING' S N =   0.013
DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.9 INCHES
PIPE-FLOW VELOCITY( FEET/SEC.) =   6.57
ESTIMATED PIPE DIAMETER( INCH) =  18.00  NUMBER OF PIPES =    1
PIPE-FLOW( CFS) =       8.93
PIPE TRAVEL TIME( MIN.) =   0.11  Tc( MIN.) =    7.97
LONGEST FLOWPATH FROM NODE    130.00 TO NODE    104.00 =    797.24
FEET.
*****
***
FLOW PROCESS FROM NODE    123.00 TO NODE    104.00 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.) =   7.97
RAINFALL INTENSITY(INCH/HR) =   4.88
TOTAL STREAM AREA(ACRES) =   2.19
PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.93
*****
***
FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =   21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
===
RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7900
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) =   94
INITIAL SUBAREA FLOW-LENGTH( FEET) =   65.00
UPSTREAM ELEVATION( FEET) =   479.00
DOWNSTREAM ELEVATION( FEET) =   478.50
ELEVATION DIFFERENCE( FEET) =    0.50
SUBAREA OVERLAND TIME OF FLOW( MIN.) =   4.641
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
THE MAXIMUM OVERLAND FLOW LENGTH =   58.08
(Reference: Table 3-1B of Hydrology Manual)
THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY( INCH/HR) =   6.587
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF( CFS) =    0.52
TOTAL AREA( ACRES) =    0.10  TOTAL RUNOFF( CFS) =    0.52
*****
***
FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =   91
-----
>>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
=====
===
UPSTREAM NODE ELEVATION( FEET) =   478.55
DOWNSTREAM NODE ELEVATION( FEET) =   475.50
CHANNEL LENGTH THRU SUBAREA( FEET) =   306.52
"V" GUTTER WIDTH( FEET) =    3.00  GUTTER HIKE( FEET) =   0.083
PAVEMENT LIP( FEET) =   0.010  MANNING' S N = .0130
PAVEMENT CROSSFALL( DECIMAL NOTATION) = 0.02000
MAXIMUM DEPTH( FEET) =    0.50
100 YEAR RAINFALL INTENSITY( INCH/HR) =   5.343
RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) =   93
TRAVEL TIME COMPUTED USING ESTIMATED FLOW( CFS) =       1.69
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY( FEET/SEC.) =   2.25
AVERAGE FLOW DEPTH( FEET) =   0.18  FLOOD WIDTH( FEET) =   11.35
"V" GUTTER FLOW TRAVEL TIME( MIN.) =   2.28  Tc( MIN.) =    6.92
SUBAREA AREA( ACRES) =    0.56  SUBAREA RUNOFF( CFS) =    2.33

```

```

100PR.txt
AREA-AVERAGE RUNOFF COEFFICIENT = 0.782
TOTAL AREA(ACRES) = 0.7 PEAK FLOW RATE(CFS) =
2.76
END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) = 0.21 FLOOD WIDTH(FEET) = 14.37
FLOW VELOCITY(FEET/SEC.) = 2.41 DEPTH*VELOCITY(FT*FT/SEC) = 0.50
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 371.52
FEET.
*****
***
FLOW PROCESS FROM NODE 102.00 TO NODE 104.00 IS CODE = 31
-----
----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
===
ELEVATION DATA: UPSTREAM(FEET) = 471.50 DOWNSTREAM(FEET) = 464.61
FLOW LENGTH(FEET) = 59.02 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 3.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.80
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 2.76
PIPE TRAVEL TIME(MIN.) = 0.08 Tc(MIN.) = 7.00
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 104.00 = 430.54
FEET.
*****
***
FLOW PROCESS FROM NODE 100.00 TO NODE 104.00 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.) = 7.00
RAINFALL INTENSITY(INCH/HR) = 5.30
TOTAL STREAM AREA(ACRES) = 0.66
PEAK FLOW RATE(CFS) AT CONFLUENCE = 2.76
*****
***
FLOW PROCESS FROM NODE 140.00 TO NODE 141.00 IS CODE = 21
-----
----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
=====
===
RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7900
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 94
INITIAL SUBAREA FLOW-LENGTH(FEET) = 65.00
UPSTREAM ELEVATION(FEET) = 475.50
DOWNSTREAM ELEVATION(FEET) = 475.00

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100PR.txt
ELEVATION DIFFERENCE(FEET) = 0.50
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 4.641
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
THE MAXIMUM OVERLAND FLOW LENGTH = 58.08
(Reference: Table 3-1B of Hydrology Manual)
THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.587
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) = 0.52
TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.52
*****
***
FLOW PROCESS FROM NODE 141.00 TO NODE 142.00 IS CODE = 91
-----
----
>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<
=====
===
UPSTREAM NODE ELEVATION(FEET) = 475.00
DOWNSTREAM NODE ELEVATION(FEET) = 470.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 377.92
"V" GUTTER WIDTH(FEET) = 3.00 GUTTER HIKE(FEET) = 0.083
PAVEMENT LIP(FEET) = 0.010 MANNING'S N = .0130
PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
MAXIMUM DEPTH(FEET) = 0.50
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.485
RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 93
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.64
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.15
AVERAGE FLOW DEPTH(FEET) = 0.25 FLOOD WIDTH(FEET) = 18.34
"V" GUTTER FLOW TRAVEL TIME(MIN.) = 2.00 Tc(MIN.) = 6.64
SUBAREA AREA(ACRES) = 2.38 SUBAREA RUNOFF(CFS) = 10.18
AREA-AVERAGE RUNOFF COEFFICIENT = 0.780
TOTAL AREA(ACRES) = 2.5 PEAK FLOW RATE(CFS) =
10.62
END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) = 0.30 FLOOD WIDTH(FEET) = 23.91
FLOW VELOCITY(FEET/SEC.) = 3.58 DEPTH*VELOCITY(FT*FT/SEC) = 1.08
LONGEST FLOWPATH FROM NODE 140.00 TO NODE 142.00 = 442.92
FEET.
*****
***
FLOW PROCESS FROM NODE 142.00 TO NODE 104.00 IS CODE = 31
-----
----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
===
ELEVATION DATA: UPSTREAM(FEET) = 466.00 DOWNSTREAM(FEET) = 464.61
FLOW LENGTH(FEET) = 172.88 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.35

```

```

100PR.txt
ESTIMATED PIPE DIAMETER(INCH) = 21.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 10.62
PIPE TRAVEL TIME(MIN.) = 0.45    Tc(MIN.) = 7.09
LONGEST FLOWPATH FROM NODE 140.00 TO NODE 104.00 = 615.80
FEET.
*****
***
FLOW PROCESS FROM NODE 140.00 TO NODE 104.00 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.) = 7.09
RAINFALL INTENSITY(INCH/HR) = 5.26
TOTAL STREAM AREA(ACRES) = 2.48
PEAK FLOW RATE(CFS) AT CONFLUENCE = 10.62
** CONFLUENCE DATA **
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (MIN.) (INCH/HR) (ACRE)
1 8.93 7.97 4.876 2.19
2 2.76 7.00 5.302 0.66
3 10.62 7.09 5.256 2.48
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/HR)
1 21.44 7.00 5.302
2 21.63 7.09 5.256
3 21.31 7.97 4.876
COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 21.63 Tc(MIN.) = 7.09
TOTAL AREA(ACRES) = 5.3
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 104.00 = 797.24
FEET.
*****
***
FLOW PROCESS FROM NODE 104.00 TO NODE 113.00 IS CODE = 31
-----
----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPE SIZE (NON-PRESSURE FLOW)<<<<<
=====
===
ELEVATION DATA: UPSTREAM(FEET) = 464.61 DOWNSTREAM(FEET) = 463.30
FLOW LENGTH(FEET) = 143.50 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.96
ESTIMATED PIPE DIAMETER(INCH) = 27.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 21.63
PIPE TRAVEL TIME(MIN.) = 0.30    Tc(MIN.) = 7.40

```

```

100PR.txt
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 113.00 = 940.74
FEET.
*****
***
FLOW PROCESS FROM NODE 104.00 TO NODE 113.00 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.) = 7.40
RAINFALL INTENSITY(INCH/HR) = 5.12
TOTAL STREAM AREA(ACRES) = 5.33
PEAK FLOW RATE(CFS) AT CONFLUENCE = 21.63
*****
***
FLOW PROCESS FROM NODE 150.00 TO NODE 151.00 IS CODE = 21
-----
----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
===
RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 93
INITIAL SUBAREA FLOW-LENGTH(FEET) = 65.00
UPSTREAM ELEVATION(FEET) = 469.85
DOWNSTREAM ELEVATION(FEET) = 469.30
ELEVATION DIFFERENCE(FEET) = 0.55
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 4.732
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
THE MAXIMUM OVERLAND FLOW LENGTH = 60.39
(Reference: Table 3-1B of Hydrology Manual)
THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/HR) = 6.587
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) = 0.51
TOTAL AREA(ACRES) = 0.10    TOTAL RUNOFF(CFS) = 0.51
*****
***
FLOW PROCESS FROM NODE 151.00 TO NODE 152.00 IS CODE = 91
-----
----
>>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
=====
===
UPSTREAM NODE ELEVATION(FEET) = 469.30
DOWNSTREAM NODE ELEVATION(FEET) = 467.70
CHANNEL LENGTH THRU SUBAREA(FEET) = 229.63
"V" GUTTER WIDTH(FEET) = 3.00    GUTTER HIKE(FEET) = 0.083
PAVEMENT LIP(FEET) = 0.010    MANNING'S N = .0130
PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
MAXIMUM DEPTH(FEET) = 0.50

```

```

100PR.txt
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.437
RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 93
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.62
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 1.91
AVERAGE FLOW DEPTH(FEET) = 0.18 FLOOD WIDTH(FEET) = 12.14
"V" GUTTER FLOW TRAVEL TIME(MIN.) = 2.00 Tc(MIN.) = 6.73
SUBAREA AREA(ACRES) = 0.52 SUBAREA RUNOFF(CFS) = 2.21
AREA-AVERAGE RUNOFF COEFFICIENT = 0.780
TOTAL AREA(ACRES) = 0.6 PEAK FLOW RATE(CFS) =
2.63
END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) = 0.21 FLOOD WIDTH(FEET) = 15.16
FLOW VELOCITY(FEET/SEC.) = 2.09 DEPTH*VELOCITY(FT*FT/SEC) = 0.45
LONGEST FLOWPATH FROM NODE 150.00 TO NODE 152.00 = 294.63
FEET.
*****
***
FLOW PROCESS FROM NODE 152.00 TO NODE 113.00 IS CODE = 31
-----
----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 463.40 DOWNSTREAM(FEET) = 463.30
FLOW LENGTH(FEET) = 14.43 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.25
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 2.63
PIPE TRAVEL TIME(MIN.) = 0.06 Tc(MIN.) = 6.79
LONGEST FLOWPATH FROM NODE 150.00 TO NODE 113.00 = 309.06
FEET.
*****
***
FLOW PROCESS FROM NODE 150.00 TO NODE 113.00 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.) = 6.79
RAINFALL INTENSITY(INCH/HR) = 5.41
TOTAL STREAM AREA(ACRES) = 0.62
PEAK FLOW RATE(CFS) AT CONFLUENCE = 2.63
*****
***
FLOW PROCESS FROM NODE 110.00 TO NODE 111.00 IS CODE = 21
-----
----

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100PR.txt
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
=====
===
RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 93
INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
UPSTREAM ELEVATION(FEET) = 480.72
DOWNSTREAM ELEVATION(FEET) = 480.35
ELEVATION DIFFERENCE(FEET) = 0.37
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 4.503
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.587
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) = 0.51
TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.51
*****
***
FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 91
-----
----
>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<
=====
===
UPSTREAM NODE ELEVATION(FEET) = 480.35
DOWNSTREAM NODE ELEVATION(FEET) = 467.38
CHANNEL LENGTH THRU SUBAREA(FEET) = 802.94
"V" GUTTER WIDTH(FEET) = 3.00 GUTTER HIKE(FEET) = 0.083
PAVEMENT LIP(FEET) = 0.010 MANNING'S N = .0130
PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
MAXIMUM DEPTH(FEET) = 0.50
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.525
RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 93
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.85
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.01
AVERAGE FLOW DEPTH(FEET) = 0.19 FLOOD WIDTH(FEET) = 12.94
"V" GUTTER FLOW TRAVEL TIME(MIN.) = 4.45 Tc(MIN.) = 8.95
SUBAREA AREA(ACRES) = 1.30 SUBAREA RUNOFF(CFS) = 4.59
AREA-AVERAGE RUNOFF COEFFICIENT = 0.780
TOTAL AREA(ACRES) = 1.4 PEAK FLOW RATE(CFS) =
4.94
END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) = 0.23 FLOOD WIDTH(FEET) = 16.59
FLOW VELOCITY(FEET/SEC.) = 3.32 DEPTH*VELOCITY(FT*FT/SEC) = 0.76
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 112.00 = 852.94
FEET.
*****
***
FLOW PROCESS FROM NODE 112.00 TO NODE 113.00 IS CODE = 31
-----
----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

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```

===
ELEVATION DATA: UPSTREAM(FEET) = 463.38 DOWNSTREAM(FEET) = 463.30
FLOW LENGTH(FEET) = 15.09 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.51
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 4.94
PIPE TRAVEL TIME(MIN.) = 0.06 Tc(MIN.) = 9.00
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 113.00 = 868.03
FEET.
*****

```

```

***
FLOW PROCESS FROM NODE 110.00 TO NODE 113.00 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.) = 9.00
RAINFALL INTENSITY(INCH/HR) = 4.51
TOTAL STREAM AREA(ACRES) = 1.40
PEAK FLOW RATE(CFS) AT CONFLUENCE = 4.94
** CONFLUENCE DATA **

```

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HR)	AREA (ACRE)
1	21.63	7.40	5.117	5.33
2	2.63	6.79	5.408	0.62
3	4.94	9.00	4.507	1.40

```

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/HR)
1         26.82    6.79    5.408
2         28.18    7.40    5.117
3         26.18    9.00    4.507

```

```

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

```

```

PEAK FLOW RATE(CFS) = 28.18 Tc(MIN.) = 7.40
TOTAL AREA(ACRES) = 7.3

```

```

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 113.00 = 940.74

```

```

FEET.
*****

```

```

***
FLOW PROCESS FROM NODE 113.00 TO NODE 114.00 IS CODE = 31
-----

```

```

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

```

```

===
ELEVATION DATA: UPSTREAM(FEET) = 463.30 DOWNSTREAM(FEET) = 460.80
FLOW LENGTH(FEET) = 218.49 MANNING'S N = 0.013

```

```

DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.15
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 28.18
PIPE TRAVEL TIME(MIN.) = 0.40 Tc(MIN.) = 7.79
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 114.00 = 1159.23
FEET.
*****

```

```

***
FLOW PROCESS FROM NODE 180.00 TO NODE 114.00 IS CODE = 81
-----

```

```

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

```

```

===
100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.947
RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
SOIL CLASSIFICATION IS "C"
S. C. S. CURVE NUMBER (AMC II) = 93
AREA-AVERAGE RUNOFF COEFFICIENT = 0.7815
SUBAREA AREA(ACRES) = 0.31 SUBAREA RUNOFF(CFS) = 1.20
TOTAL AREA(ACRES) = 7.7 TOTAL RUNOFF(CFS) = 29.62
TC(MIN.) = 7.79
*****

```

```

***
FLOW PROCESS FROM NODE 114.00 TO NODE 115.00 IS CODE = 31
-----

```

```

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

```

```

===
ELEVATION DATA: UPSTREAM(FEET) = 463.30 DOWNSTREAM(FEET) = 455.59
FLOW LENGTH(FEET) = 140.20 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.80
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 29.62
PIPE TRAVEL TIME(MIN.) = 0.14 Tc(MIN.) = 7.93
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 115.00 = 1299.43
FEET.
*****

```

```

***
FLOW PROCESS FROM NODE 785.00 TO NODE 785.00 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.) = 7.93
RAINFALL INTENSITY(INCH/HR) = 4.89
TOTAL STREAM AREA(ACRES) = 7.66
PEAK FLOW RATE(CFS) AT CONFLUENCE = 29.62

```

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```
*****
***
FLOW PROCESS FROM NODE    160.00 TO NODE    161.00 IS CODE = 21
-----
----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
===
RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
SOIL CLASSIFICATION IS "C"
S. C. S. CURVE NUMBER (AMC II) = 93
INITIAL SUBAREA FLOW-LENGTH(FEET) = 65.00
UPSTREAM ELEVATION(FEET) = 467.38
DOWNSTREAM ELEVATION(FEET) = 466.31
ELEVATION DIFFERENCE(FEET) = 1.07
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 3.933
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.587
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) = 0.31
TOTAL AREA(ACRES) = 0.06 TOTAL RUNOFF(CFS) = 0.31
*****
***
FLOW PROCESS FROM NODE    161.00 TO NODE    162.00 IS CODE = 61
-----
----
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STANDARD CURB SECTION USED)<<<<<
=====
===
UPSTREAM ELEVATION(FEET) = 466.31 DOWNSTREAM ELEVATION(FEET) =
459.68
STREET LENGTH(FEET) = 289.41 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) =
0.0130
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.37
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.24
HALFSTREET FLOOD WIDTH(FEET) = 5.74
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.07
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.74
STREET FLOW TRAVEL TIME(MIN.) = 1.57 Tc(MIN.) = 5.51
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.190
RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
SOIL CLASSIFICATION IS "C"
S. C. S. CURVE NUMBER (AMC II) = 93
AREA-AVERAGE RUNOFF COEFFICIENT = 0.780
SUBAREA AREA(ACRES) = 0.44 SUBAREA RUNOFF(CFS) = 2.12
TOTAL AREA(ACRES) = 0.5 PEAK FLOW RATE(CFS) = 2.41
```

100PR.txt

```
END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.28 HALFSTREET FLOOD WIDTH(FEET) = 7.64
FLOW VELOCITY(FEET/SEC.) = 3.44 DEPTH*VELOCITY(FT*FT/SEC.) = 0.96
LONGEST FLOWPATH FROM NODE    160.00 TO NODE    162.00 = 354.41
FEET.
*****
***
FLOW PROCESS FROM NODE    162.00 TO NODE    115.00 IS CODE = 31
-----
----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
===
ELEVATION DATA: UPSTREAM(FEET) = 455.68 DOWNSTREAM(FEET) = 455.59
FLOW LENGTH(FEET) = 8.82 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.78
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 2.41
PIPE TRAVEL TIME(MIN.) = 0.03 Tc(MIN.) = 5.54
LONGEST FLOWPATH FROM NODE    160.00 TO NODE    115.00 = 363.23
FEET.
*****
***
FLOW PROCESS FROM NODE    785.00 TO NODE    785.00 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.) = 5.54
RAINFALL INTENSITY(INCH/HR) = 6.17
TOTAL STREAM AREA(ACRES) = 0.50
PEAK FLOW RATE(CFS) AT CONFLUENCE = 2.41
*****
***
FLOW PROCESS FROM NODE    169.00 TO NODE    171.00 IS CODE = 21
-----
----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
===
RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
SOIL CLASSIFICATION IS "C"
S. C. S. CURVE NUMBER (AMC II) = 93
INITIAL SUBAREA FLOW-LENGTH(FEET) = 65.00
UPSTREAM ELEVATION(FEET) = 467.35
DOWNSTREAM ELEVATION(FEET) = 466.45
ELEVATION DIFFERENCE(FEET) = 0.90
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 4.167
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.587
```

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```

NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) = 0.26
TOTAL AREA(ACRES) = 0.05 TOTAL RUNOFF(CFS) = 0.26
*****
***
FLOW PROCESS FROM NODE 171.00 TO NODE 172.00 IS CODE = 61
-----
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STANDARD CURB SECTION USED)<<<<<
=====
===
UPSTREAM ELEVATION(FEET) = 466.45 DOWNSTREAM ELEVATION(FEET) =
459.70
STREET LENGTH(FEET) = 371.98 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) =
0.0130
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.77
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.21
HALFSTREET FLOOD WIDTH(FEET) = 4.32
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.54
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.54
STREET FLOW TRAVEL TIME(MIN.) = 2.44 Tc(MIN.) = 6.61
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.504
RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 93
AREA-AVERAGE RUNOFF COEFFICIENT = 0.780
SUBAREA AREA(ACRES) = 0.24 SUBAREA RUNOFF(CFS) = 1.03
TOTAL AREA(ACRES) = 0.3 PEAK FLOW RATE(CFS) = 1.24
END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.24 HALFSTREET FLOOD WIDTH(FEET) = 5.81
FLOW VELOCITY(FEET/SEC.) = 2.73 DEPTH*VELOCITY(FT*FT/SEC.) = 0.66
LONGEST FLOWPATH FROM NODE 169.00 TO NODE 172.00 = 436.98
FEET.
*****
***
FLOW PROCESS FROM NODE 172.00 TO NODE 785.00 IS CODE = 31
-----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
===
ELEVATION DATA: UPSTREAM(FEET) = 455.70 DOWNSTREAM(FEET) = 455.59
FLOW LENGTH(FEET) = 23.85 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000

```

100PR.txt

```

DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 2.97
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 1.24
PIPE TRAVEL TIME(MIN.) = 0.13 Tc(MIN.) = 6.74
LONGEST FLOWPATH FROM NODE 169.00 TO NODE 785.00 = 460.83
FEET.
*****
***
FLOW PROCESS FROM NODE 785.00 TO NODE 785.00 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.) = 6.74
RAINFALL INTENSITY(INCH/HR) = 5.43
TOTAL STREAM AREA(ACRES) = 0.29
PEAK FLOW RATE(CFS) AT CONFLUENCE = 1.24
** CONFLUENCE DATA **
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (MIN.) (INCH/HOUR) (ACRE)
1 29.62 7.93 4.891 7.66
2 2.41 5.54 6.168 0.50
3 1.24 6.74 5.433 0.29
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 26.92 5.54 6.168
2 30.03 6.74 5.433
3 32.65 7.93 4.891
COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 32.65 Tc(MIN.) = 7.93
TOTAL AREA(ACRES) = 8.4
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 785.00 = 1299.43
FEET.
+-----+
+
|
|
|
|
|
|
+-----+
+
+-----+
+
*****
***
FLOW PROCESS FROM NODE 170.00 TO NODE 170.00 IS CODE = 7
-----

```

```

>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<
=====
===
USER-SPECIFIED VALUES ARE AS FOLLOWS:
TC(MIN) = 5.00 RAIN INTENSITY(INCH/HOUR) = 6.59
TOTAL AREA(ACRES) = 1.16 TOTAL RUNOFF(CFS) = 6.65
*****
***
FLOW PROCESS FROM NODE 220.00 TO NODE 170.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
===
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.587
*USER SPECIFIED(SUBAREA):
RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3000
S.C.S. CURVE NUMBER (AMC II) = 93
AREA-AVERAGE RUNOFF COEFFICIENT = 0.8012
SUBAREA AREA(ACRES) = 0.16 SUBAREA RUNOFF(CFS) = 0.32
TOTAL AREA(ACRES) = 1.3 TOTAL RUNOFF(CFS) = 6.97
TC(MIN.) = 5.00
*****
***
FLOW PROCESS FROM NODE 170.00 TO NODE 170.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
===
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.587
*USER SPECIFIED(SUBAREA):
STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
S.C.S. CURVE NUMBER (AMC II) = 93
AREA-AVERAGE RUNOFF COEFFICIENT = 0.8184
SUBAREA AREA(ACRES) = 0.44 SUBAREA RUNOFF(CFS) = 2.52
TOTAL AREA(ACRES) = 1.8 TOTAL RUNOFF(CFS) = 9.49
TC(MIN.) = 5.00
+-----+
|
|
|
|
|
|
+-----+
---+
*****
***
FLOW PROCESS FROM NODE 146.00 TO NODE 146.00 IS CODE = 7
-----
>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<

```

```

=====
USER-SPECIFIED VALUES ARE AS FOLLOWS:
TC(MIN) = 5.00 RAIN INTENSITY(INCH/HOUR) = 6.59
TOTAL AREA(ACRES) = 0.40 TOTAL RUNOFF(CFS) = 2.29
*****
***
FLOW PROCESS FROM NODE 201.00 TO NODE 146.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.587
RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7900
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 94
AREA-AVERAGE RUNOFF COEFFICIENT = 0.8486
SUBAREA AREA(ACRES) = 0.14 SUBAREA RUNOFF(CFS) = 0.73
TOTAL AREA(ACRES) = 0.5 TOTAL RUNOFF(CFS) = 3.02
TC(MIN.) = 5.00
*****
***
FLOW PROCESS FROM NODE 202.00 TO NODE 146.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.587
RESIDENTIAL (2.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 80
AREA-AVERAGE RUNOFF COEFFICIENT = 0.7296
SUBAREA AREA(ACRES) = 0.23 SUBAREA RUNOFF(CFS) = 0.68
TOTAL AREA(ACRES) = 0.8 TOTAL RUNOFF(CFS) = 3.70
TC(MIN.) = 5.00
+-----+
| BEGINING OF ANALYSIS OF DRAINAGE AREAS DRAINING TOWARDS MAIN STREET |
| WEST |
| |
| |
| |
+-----+
---+
=====
END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 0.8 TC(MIN.) = 5.00
PEAK FLOW RATE(CFS) = 3.70
=====
END OF RATIONAL METHOD ANALYSIS

```

CHAPTER 3

INLET CALCULATIONS

On-Grade Inlet Calculations

-Curb Inlet Design-

Type of Inlet	Inlet Node Number	Street Grade S (%)	Peak 50-yr Flow Q (cfs)	Gutter Depression a (ft)	Flow Depth y (ft)	Curb Inlet Length Required* (FT)	Curb Inlet Length Specified ** (min.) (FT)
On-grade	146	3.80%	3.26	0.33	0.26	10.3	12.00

* From Equation: $Q = 0.7L(a+y)^{3/2}$

** Length shown on plans (Required Length of Opening + 1 foot)

Existing Inlet at node 146 is 12ft opening

On-Grade Inlet Calculations

-Curb Inlet Design-				
Type of Inlet	Inlet Node Number	Peak 100-yr Flow Q (cfs)	Curb Inlet Length Required* (FT)	Curb Inlet Length Specified ** (min.) (FT)
Sump	170	6.97	3.5	5.00

* From The Orifice Equation: $Q = C \cdot A (2 \cdot g \cdot H)^{1/2}$

The Orifice Coefficient, $C = 0.67$, and Gravitational Constant, $g = 32.2 \text{ ft/s}^2$, and AREA, $A = L \cdot h$

The Inlet Opening Height, $h = 0.5 \text{ ft}$, Per SDRSD D-2

The Head Measured from the Centroid of Orifice, $H = 10''$ (Ponded to TC)-3'' (centroid) = 0.58 ft

$\therefore Q = .67 \cdot L \cdot 0.5 \cdot (2 \cdot 32.2 \cdot 0.58)^{1/2}$, Therefore $L = Q/2$

** Length shown on plans (Required Length of Opening + 1 foot)

Existing Inlet at node 170 is 10ft opening

CHAPTER 3 HYDROLOGY MAP

3.1 Proposed Condition Hydrology Map

CHAPTER 4

References

FINAL

FOR REFERENCE

Drainage Study

For
Otay Ranch
Village 8 West
Chula Vista Tract No. 19-03



Jill Gravely, P.E.
R.C.E. # 70843
Expiration Date: June 30, 2021

Prepared For
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(858) 715-1420

Date: October 25, 2019



Approved by: SH
Date: 12-30-2019

APPENDIX D4
DEVELOPED CONDITIONS HYDROLOGY – WOLF CANYON
PROPOSED Q50

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE

Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT

2003,1985,1981 HYDROLOGY MANUAL

(c) Copyright 1982-2016 Advanced Engineering Software (aes)

Ver. 23.0 Release Date: 07/01/2016 License ID 1508

Analysis prepared by:

***** DESCRIPTION OF STUDY *****

* GRADING P1 CC 3 HYDRO *

* Q50 *

* *

FILE NAME: TC-Q50.DAT

TIME/DATE OF STUDY: 10:48 05/24/2019

----- USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION: -----

2003 SAN DIEGO MANUAL CRITERIA

USER SPECIFIED STORM EVENT(YEAR) = 50.00

6-HOUR DURATION PRECIPITATION (INCHES) = 2.200

SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00

SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95

SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD

NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS

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

HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING

WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR

NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

=== =====

1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150
---	------	------	-------------------	------	------	--------	-------	--------

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET

as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

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

=====

50 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.281
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) = 85
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7203
 SUBAREA AREA(ACRES) = 1.19 SUBAREA RUNOFF(CFS) = 1.17
 TOTAL AREA(ACRES) = 93.9 TOTAL RUNOFF(CFS) = 221.91
 TC(MIN.) = 12.08

FLOW PROCESS FROM NODE 783.00 TO NODE 172.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 427.53 DOWNSTREAM(FEET) = 426.08
 FLOW LENGTH(FEET) = 288.60 MANNING'S N = 0.013
 DEPTH OF FLOW IN 66.0 INCH PIPE IS 51.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 11.12
 ESTIMATED PIPE DIAMETER(INCH) = 66.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 221.91
 PIPE TRAVEL TIME(MIN.) = 0.43 Tc(MIN.) = 12.52
 LONGEST FLOWPATH FROM NODE 0.00 TO NODE 172.00 = 437.10 FEET.

FLOW PROCESS FROM NODE 172.00 TO NODE 172.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

FLOW PROCESS FROM NODE 172.00 TO NODE 172.00 IS CODE = 13

>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<

FLOW PROCESS FROM NODE 170.00 TO NODE 170.00 IS CODE = 21

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

=====

STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "C"

S.C.S. CURVE NUMBER (AMC II) = 98

INITIAL SUBAREA FLOW-LENGTH(FEET) = 613.00

UPSTREAM ELEVATION(FEET) = 463.28

DOWNSTREAM ELEVATION(FEET) = 457.05

ELEVATION DIFFERENCE(FEET) = 6.23

SUBAREA OVERLAND TIME OF FLOW(MIN.) = 3.194

WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN

THE MAXIMUM OVERLAND FLOW LENGTH = 60.16

(Reference: Table 3-1B of Hydrology Manual)

THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN T_c CALCULATION!

50 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.796

NOTE: RAINFALL INTENSITY IS BASED ON T_c = 5-MINUTE.

SUBAREA RUNOFF(CFS) = 5.85

TOTAL AREA(ACRES) = 1.16 TOTAL RUNOFF(CFS) = 5.85

FLOW PROCESS FROM NODE 170.00 TO NODE 170.00 IS CODE = 81

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

50 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.796

NOTE: RAINFALL INTENSITY IS BASED ON T_c = 5-MINUTE.

STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700

SOIL CLASSIFICATION IS "C"

S.C.S. CURVE NUMBER (AMC II) = 98

AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700

SUBAREA AREA(ACRES) = 0.44 SUBAREA RUNOFF(CFS) = 2.22

TOTAL AREA(ACRES) = 1.6 TOTAL RUNOFF(CFS) = 8.07

TC(MIN.) = 3.19

FLOW PROCESS FROM NODE 170.00 TO NODE 171.00 IS CODE = 31

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

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

ELEVATION DATA: UPSTREAM(FEET) = 448.71 DOWNSTREAM(FEET) = 446.86

FLOW LENGTH(FEET) = 184.79 MANNING'S N = 0.013

DEPTH OF FLOW IN 18.0 INCH PIPE IS 12.0 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 6.42

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 8.07

PIPE TRAVEL TIME(MIN.) = 0.48 T_c (MIN.) = 3.67

LONGEST FLOWPATH FROM NODE 170.00 TO NODE 171.00 = 797.79 FEET.

PIPE-FLOW(CFS) = 34.17

PIPE TRAVEL TIME(MIN.) = 0.01 T_c (MIN.) = 3.72

LONGEST FLOWPATH FROM NODE 139.00 TO NODE 146.00 = 1285.34 FEET.

FLOW PROCESS FROM NODE 146.00 TO NODE 146.00 IS CODE = 81

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

50 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.796

NOTE: RAINFALL INTENSITY IS BASED ON T_c = 5-MINUTE.

STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700

SOIL CLASSIFICATION IS "C"

S.C.S. CURVE NUMBER (AMC II) = 98

AREA-AVERAGE RUNOFF COEFFICIENT = 0.8552

SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 2.02

TOTAL AREA(ACRES) = 7.3 TOTAL RUNOFF(CFS) = 36.19

T_c (MIN.) = 3.72

FLOW PROCESS FROM NODE 146.00 TO NODE 146.00 IS CODE = 81

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

50 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.796

NOTE: RAINFALL INTENSITY IS BASED ON T_c = 5-MINUTE.

STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700

SOIL CLASSIFICATION IS "C"

S.C.S. CURVE NUMBER (AMC II) = 98

AREA-AVERAGE RUNOFF COEFFICIENT = 0.8559

SUBAREA AREA(ACRES) = 0.36 SUBAREA RUNOFF(CFS) = 1.82

TOTAL AREA(ACRES) = 7.7 TOTAL RUNOFF(CFS) = 38.00

T_c (MIN.) = 3.72

FLOW PROCESS FROM NODE 146.00 TO NODE 147.00 IS CODE = 31

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

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

ELEVATION DATA: UPSTREAM(FEET) = 453.12 DOWNSTREAM(FEET) = 449.32

FLOW LENGTH(FEET) = 81.80 MANNING'S N = 0.013

DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.2 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 16.81

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

FLOW PROCESS FROM NODE 171.00 TO NODE 171.00 IS CODE = 81

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

=====

50 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.796
NOTE: RAINFALL INTENSITY IS BASED ON T_c = 5-MINUTE.
NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7800
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 93
AREA-AVERAGE RUNOFF COEFFICIENT = 0.7882
SUBAREA AREA(ACRES) = 16.05 SUBAREA RUNOFF(CFS) = 72.57
TOTAL AREA(ACRES) = 17.6 TOTAL RUNOFF(CFS) = 80.63
TC(MIN.) = 3.67

FLOW PROCESS FROM NODE 171.00 TO NODE 171.00 IS CODE = 81

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

=====

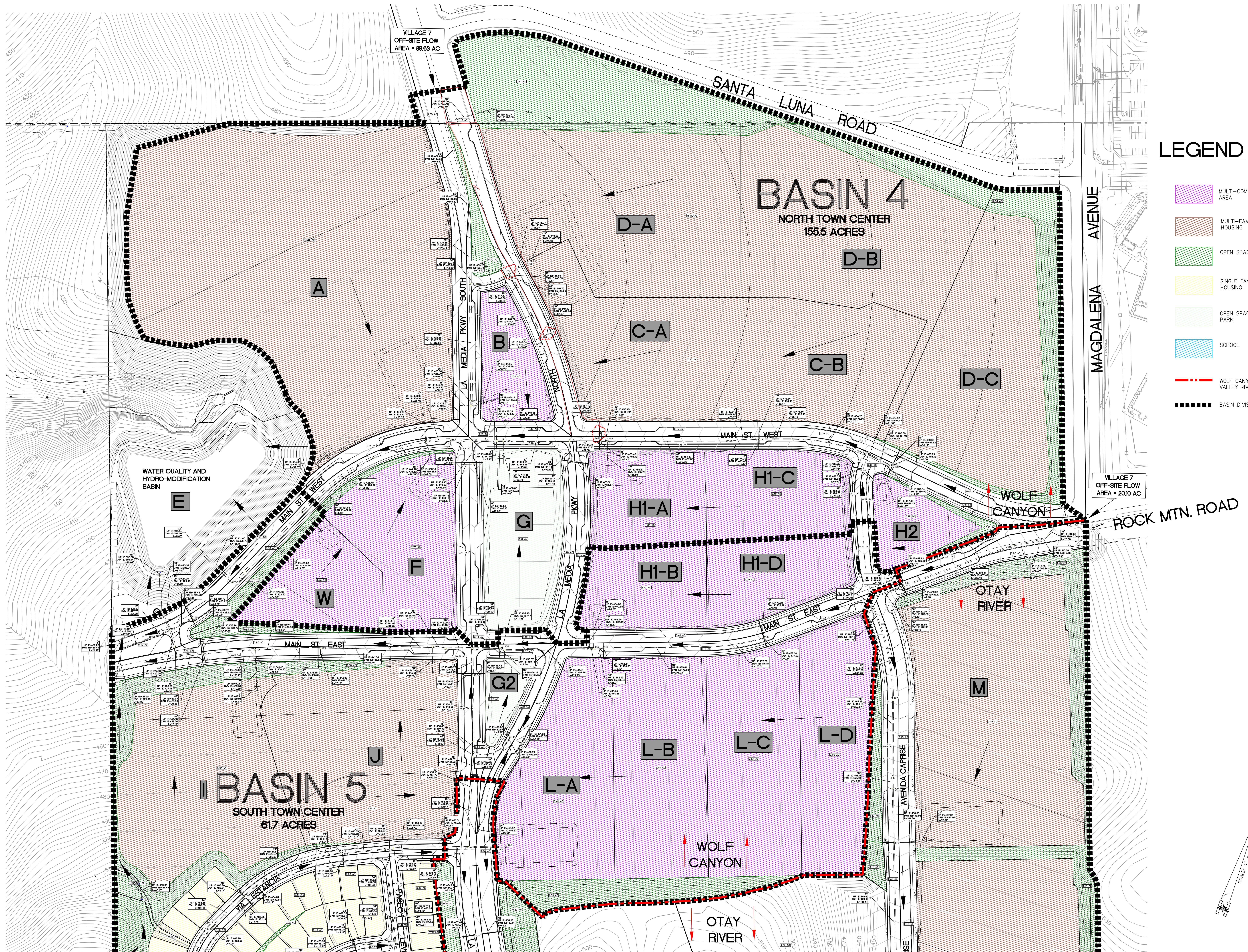
50 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.796
NOTE: RAINFALL INTENSITY IS BASED ON T_c = 5-MINUTE.
NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 85
AREA-AVERAGE RUNOFF COEFFICIENT = 0.7383
SUBAREA AREA(ACRES) = 2.01 SUBAREA RUNOFF(CFS) = 3.50
TOTAL AREA(ACRES) = 19.7 TOTAL RUNOFF(CFS) = 84.13
TC(MIN.) = 3.67

FLOW PROCESS FROM NODE 171.00 TO NODE 171.00 IS CODE = 81

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

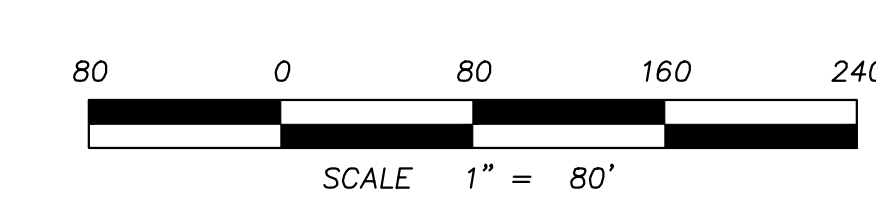
=====

50 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.796
NOTE: RAINFALL INTENSITY IS BASED ON T_c = 5-MINUTE.
NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7800
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 93
AREA-AVERAGE RUNOFF COEFFICIENT = 0.7497
SUBAREA AREA(ACRES) = 7.47 SUBAREA RUNOFF(CFS) = 33.77
TOTAL AREA(ACRES) = 27.1 TOTAL RUNOFF(CFS) = 117.90
TC(MIN.) = 3.67



LEGEND

- MULTI-COMMERCIAL AREA
- MULTI-FAMILY HOUSING
- OPEN SPACE
- SINGLE FAMILY HOUSING
- OPEN SPACE: PARK
- SCHOOL
- WOLF CANYON AND OTAY VALLEY RIVER DIVISION
- BASIN DIVISION



APPENDIX D5
DEVELOPED CONDITIONS HYDROLOGY – WOLF CANYON
PROPOSED Q100

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE

Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT

2003,1985,1981 HYDROLOGY MANUAL

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Ver. 23.0 Release Date: 07/01/2016 License ID 1508

Analysis prepared by:

***** DESCRIPTION OF STUDY *****

* TOWNCENTER NORTH *

* Q100 *

* *

FILE NAME: TC-Q50.DAT

TIME/DATE OF STUDY: 15:14 05/28/2019

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

2003 SAN DIEGO MANUAL CRITERIA

USER SPECIFIED STORM EVENT(YEAR) = 100.00

6-HOUR DURATION PRECIPITATION (INCHES) = 2.500

SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00

SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95

SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD

NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS

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

HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING

WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR

NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

=== =====

1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150
---	------	------	-------------------	------	------	--------	-------	--------

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET

as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

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

=====

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.730
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) = 85
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7849
 SUBAREA AREA(ACRES) = 1.19 SUBAREA RUNOFF(CFS) = 1.33
 TOTAL AREA(ACRES) = 93.9 TOTAL RUNOFF(CFS) = 274.89
 TC(MIN.) = 12.08

FLOW PROCESS FROM NODE 783.00 TO NODE 172.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 427.53 DOWNSTREAM(FEET) = 426.08
 FLOW LENGTH(FEET) = 288.60 MANNING'S N = 0.013
 DEPTH OF FLOW IN 72.0 INCH PIPE IS 55.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 11.76
 ESTIMATED PIPE DIAMETER(INCH) = 72.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 274.89
 PIPE TRAVEL TIME(MIN.) = 0.41 Tc(MIN.) = 12.49
 LONGEST FLOWPATH FROM NODE 0.00 TO NODE 172.00 = 437.10 FEET.

FLOW PROCESS FROM NODE 172.00 TO NODE 172.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

FLOW PROCESS FROM NODE 172.00 TO NODE 172.00 IS CODE = 13

>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<

FLOW PROCESS FROM NODE 170.00 TO NODE 170.00 IS CODE = 21

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

=====

STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "C"

S.C.S. CURVE NUMBER (AMC II) = 98

INITIAL SUBAREA FLOW-LENGTH(FEET) = 613.00

UPSTREAM ELEVATION(FEET) = 463.28

DOWNSTREAM ELEVATION(FEET) = 457.05

ELEVATION DIFFERENCE(FEET) = 6.23

SUBAREA OVERLAND TIME OF FLOW(MIN.) = 3.194

WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN

THE MAXIMUM OVERLAND FLOW LENGTH = 60.16

(Reference: Table 3-1B of Hydrology Manual)

THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN T_c CALCULATION!

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.587

NOTE: RAINFALL INTENSITY IS BASED ON T_c = 5-MINUTE.

SUBAREA RUNOFF(CFS) = 6.65

TOTAL AREA(ACRES) = 1.16 TOTAL RUNOFF(CFS) = 6.65

FLOW PROCESS FROM NODE 170.00 TO NODE 170.00 IS CODE = 81

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

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.587

NOTE: RAINFALL INTENSITY IS BASED ON T_c = 5-MINUTE.

STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700

SOIL CLASSIFICATION IS "C"

S.C.S. CURVE NUMBER (AMC II) = 98

AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700

SUBAREA AREA(ACRES) = 0.44 SUBAREA RUNOFF(CFS) = 2.52

TOTAL AREA(ACRES) = 1.6 TOTAL RUNOFF(CFS) = 9.17

T_c (MIN.) = 3.19

FLOW PROCESS FROM NODE 170.00 TO NODE 171.00 IS CODE = 31

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

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

ELEVATION DATA: UPSTREAM(FEET) = 448.71 DOWNSTREAM(FEET) = 446.86

FLOW LENGTH(FEET) = 184.79 MANNING'S N = 0.013

DEPTH OF FLOW IN 18.0 INCH PIPE IS 13.3 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 6.56

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 9.17

PIPE TRAVEL TIME(MIN.) = 0.47 T_c (MIN.) = 3.66

LONGEST FLOWPATH FROM NODE 170.00 TO NODE 171.00 = 797.79 FEET.

FLOW PROCESS FROM NODE 171.00 TO NODE 171.00 IS CODE = 81

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

=====

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.587
NOTE: RAINFALL INTENSITY IS BASED ON T_c = 5-MINUTE.
NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7800
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 93
AREA-AVERAGE RUNOFF COEFFICIENT = 0.7882
SUBAREA AREA(ACRES) = 16.05 SUBAREA RUNOFF(CFS) = 82.46
TOTAL AREA(ACRES) = 17.6 TOTAL RUNOFF(CFS) = 91.63
TC(MIN.) = 3.66

FLOW PROCESS FROM NODE 171.00 TO NODE 171.00 IS CODE = 81

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

=====

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.587
NOTE: RAINFALL INTENSITY IS BASED ON T_c = 5-MINUTE.
NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 85
AREA-AVERAGE RUNOFF COEFFICIENT = 0.7383
SUBAREA AREA(ACRES) = 2.01 SUBAREA RUNOFF(CFS) = 3.97
TOTAL AREA(ACRES) = 19.7 TOTAL RUNOFF(CFS) = 95.60
TC(MIN.) = 3.66

FLOW PROCESS FROM NODE 171.00 TO NODE 171.00 IS CODE = 81

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

=====

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.587
NOTE: RAINFALL INTENSITY IS BASED ON T_c = 5-MINUTE.
NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7800
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 93
AREA-AVERAGE RUNOFF COEFFICIENT = 0.7497
SUBAREA AREA(ACRES) = 7.47 SUBAREA RUNOFF(CFS) = 38.38
TOTAL AREA(ACRES) = 27.1 TOTAL RUNOFF(CFS) = 133.98
TC(MIN.) = 3.66

PIPE-FLOW(CFS) = 38.83

PIPE TRAVEL TIME(MIN.) = 0.01 T_c (MIN.) = 3.69

LONGEST FLOWPATH FROM NODE 139.00 TO NODE 146.00 = 1285.34 FEET.

FLOW PROCESS FROM NODE 146.00 TO NODE 146.00 IS CODE = 81

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

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.587

NOTE: RAINFALL INTENSITY IS BASED ON T_c = 5-MINUTE.

STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700

SOIL CLASSIFICATION IS "C"

S.C.S. CURVE NUMBER (AMC II) = 98

AREA-AVERAGE RUNOFF COEFFICIENT = 0.8552

SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 2.29

TOTAL AREA(ACRES) = 7.3 TOTAL RUNOFF(CFS) = 41.12

T_c (MIN.) = 3.69

FLOW PROCESS FROM NODE 146.00 TO NODE 146.00 IS CODE = 81

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

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.587

NOTE: RAINFALL INTENSITY IS BASED ON T_c = 5-MINUTE.

STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700

SOIL CLASSIFICATION IS "C"

S.C.S. CURVE NUMBER (AMC II) = 98

AREA-AVERAGE RUNOFF COEFFICIENT = 0.8559

SUBAREA AREA(ACRES) = 0.36 SUBAREA RUNOFF(CFS) = 2.06

TOTAL AREA(ACRES) = 7.7 TOTAL RUNOFF(CFS) = 43.19

T_c (MIN.) = 3.69

FLOW PROCESS FROM NODE 146.00 TO NODE 147.00 IS CODE = 31

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

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

ELEVATION DATA: UPSTREAM(FEET) = 453.12 DOWNSTREAM(FEET) = 449.32

FLOW LENGTH(FEET) = 81.80 MANNING'S N = 0.013

DEPTH OF FLOW IN 24.0 INCH PIPE IS 17.9 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 17.14

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

APPENDIX J

INLET SIZING

=====
Problem Descriptions:

MAIN ST. WEST

NODE 146

L

>>>>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) = 2.02

GUTTER FLOWDEPTH(FEET) = 0.26

BASIN LOCAL DEPRESSION(FEET) = 0.33

FLOWBY BASIN ANALYSIS RESULTS:

BASIN WIDTH	FLOW INTERCEPTION
0.83	0.28
1.00	0.33
1.50	0.49
2.00	0.64
2.50	0.80
3.00	0.95
3.50	1.08
4.00	1.20
4.50	1.32
5.00	1.44
5.50	1.53
6.00	1.62
6.50	1.71
7.00	1.80
7.50	1.89
8.00	1.97
8.31	2.02

=====
Problem Descriptions:

MAIN ST. WEST

NODE 143

R

>>>>STREETFLOW MODEL INPUT INFORMATION<<<<

CONSTANT STREET GRADE(FEET/FEET) = 0.040000

Public Roads nomograph plots for flowby basins and sump basins.

BASIN INFLOW(CFS) = 2.22
BASIN OPENING(FEET) = 0.50
DEPTH OF WATER(FEET) = 0.31

>>>>CALCULATED ESTIMATED SUMP BASIN WIDTH(FEET) = 4.17

=====

Problem Descriptions:

LA MEDIA PKWY NORTH

NODE 170

L

>>>>STREETFLOW MODEL INPUT INFORMATION<<<<

CONSTANT STREET GRADE(FEET/FEET) = 0.011000
CONSTANT STREET FLOW(CFS) = 5.85
AVERAGE STREETFLOW FRICTION FACTOR(MANNING) = 0.015000
CONSTANT SYMMETRICAL STREET HALF-WIDTH(FEET) = 21.50
DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 1.00
INTERIOR STREET CROSSFALL(DECIMAL) = 0.020000
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020000
CONSTANT SYMMETRICAL CURB HEIGHT(FEET) = 0.50
CONSTANT SYMMETRICAL GUTTER-WIDTH(FEET) = 1.50
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) = 0.40
HALFSTREET FLOOD WIDTH(FEET) = 13.69
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.94
PRODUCT OF DEPTH&VELOCITY = 1.17

=====

Problem Descriptions:

LA MEDIA PKWY NORTH

NODE 170

L

>>>>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) = 5.85
BASIN OPENING(FEET) = 0.50
DEPTH OF WATER(FEET) = 0.40

>>>>CALCULATED ESTIMATED SUMP BASIN WIDTH(FEET) = 7.49

=====
Problem Descriptions:

LA MEDIA PKWY NORTH

NODE 148

R

>>>>STREETFLOW MODEL INPUT INFORMATION<<<<

CONSTANT STREET GRADE(FEET/FEET) = 0.014000
CONSTANT STREET FLOW(CFS) = 2.02
AVERAGE STREETFLOW FRICTION FACTOR(MANNING) = 0.015000
CONSTANT SYMMETRICAL STREET HALF-WIDTH(FEET) = 21.50
DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 1.00
INTERIOR STREET CROSSFALL(DECIMAL) = 0.020000
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020000
CONSTANT SYMMETRICAL CURB HEIGHT(FEET) = 0.50
CONSTANT SYMMETRICAL GUTTER-WIDTH(FEET) = 1.50
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) = 0.30
HALFSTREET FLOOD WIDTH(FEET) = 8.69
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.31
PRODUCT OF DEPTH&VELOCITY = 0.69
=====

Problem Descriptions:

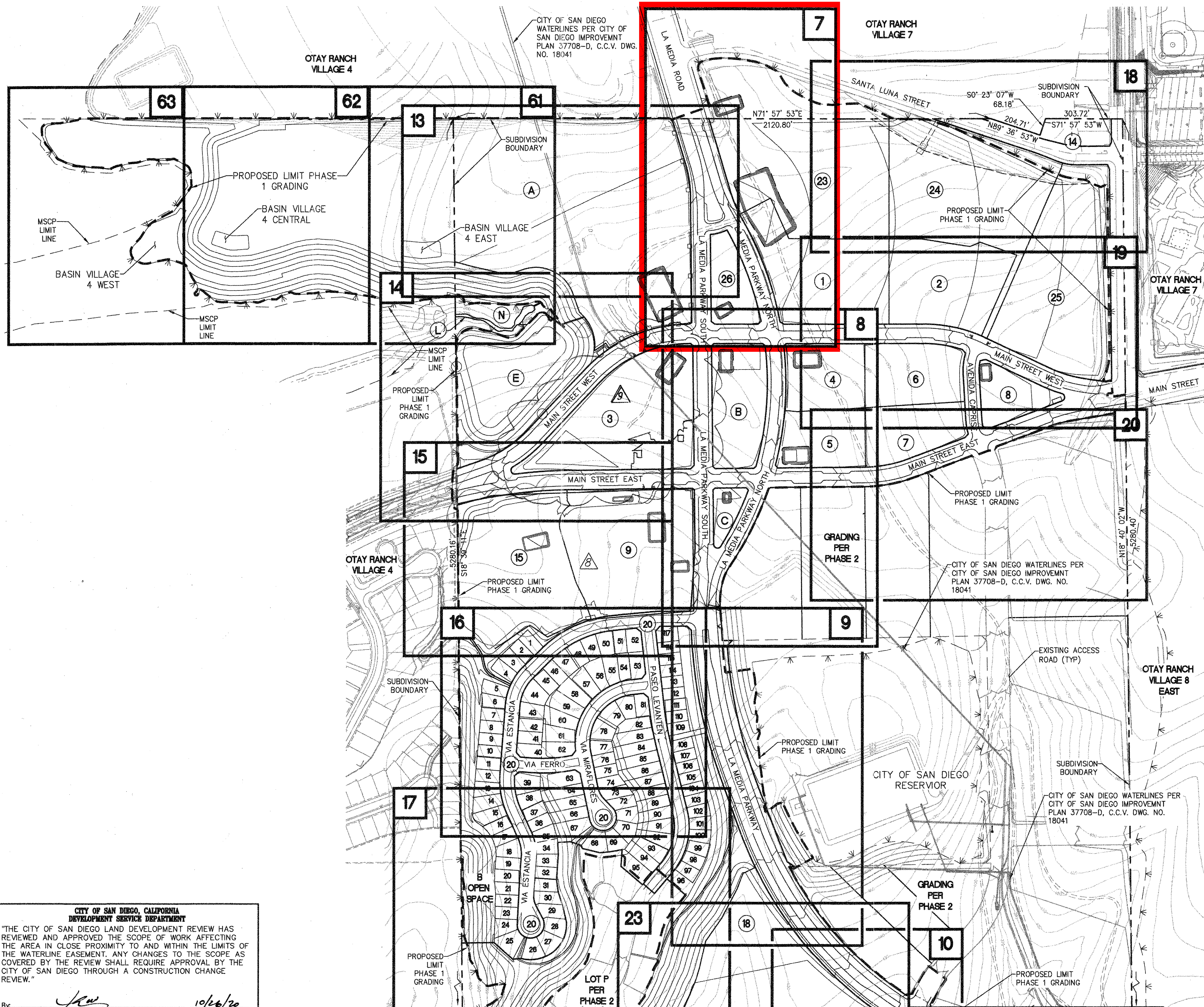
LA MEDIA PKWY NORTH

NODE 148

R

>>>>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.



LEGEND

DESCRIPTION

SYMBOL

SHEET NUMBER	1
SHEET OUTLINE	①
PROPOSED LOT NUMBER MAP NO XXXX	A
PROPOSED PARK LOT NUMBER MAP NO XXXX	LOT X
TM 19-03 LOT PER FUTURE PHASE GRADING	---
SUBDIVISION BOUNDARY	---
LIMITS OF PHASE 1 GRADING	---
PROPOSED RIGHT OF WAY	---
PROPOSED LOT LINE	---
FUTURE LOT LINE/RIGHT OF WAY PER TM 19-03	---
MSCP LIMIT LINE	---
PROPOSED CURB LINE	---
CITY OF SAN DIEGO WATER LINE	---
EXISTING WATER LINE	---
PROP. TEMPORARY FENCE	---

MINIMUM REQUIREMENTS FOR BIOFILTRATION BASIN LINERS:

- LINER MATERIAL REQUIREMENTS
- HDPE OR EPDM FML, MINIMUM 30 MIL THICKNESS. MATERIALS SUCH AS LLDPE OR PVC (PVC ONLY IF BURIED) MAY BE ACCEPTABLE ONLY IF ADDITIONAL JUSTIFICATION IS PROVIDED BY GEOTECHNICAL ENGINEER.
- DESIGN REQUIREMENTS
- MAXIMUM SLOPE OF 3:1 FOR ANY BASIN, AND FOR ANYTHING GREATER THAN 4:1, LINER MATERIAL MUST BE TEXTURED AND/OR INCLUDE MICROSPIKES AND A SLOPE STABILITY ANALYSIS SHOULD BE PROVIDED. (2:1 SLOPES PER GEOTECHNICAL APPROVAL)
 - SLOPE STABILITY ANALYSIS REQUIREMENTS. STABILITY ANALYSIS TO INCLUDE OPTIMIZATION FEATURE, RAPID DRAW DOWN (IF SOIL ABOVE), VENEER STABILITY, AND SEISMIC EVALUATION.
 - DRAINAGE LAYER/SUBDRAIN REQUIRED. DESIGN SHALL BE EVALUATED BASED ON THE ACTION LEAKAGE RATE (ALR).
- SUBGRADE PREPARATION
- SMOOTH, ROLLED PREPARATION, FREE OF PROTRUSIONS OR DEBRIS.
 - SUBCUSHION MATERIAL (EXAMPLE: MINIMUM 12" THICKNESS 3" MAX PARTICLE SIZE WITH 0.5-INCH MAX PROTRUSION UNLESS CUSHION MATERIAL CONSISTING OF EITHER CUSHION GEOTEXTILE OR SAND WILL BE PROVIDED, OR PROVIDE JUSTIFICATION THAT THE PUNCTURE RESISTANCE OF THE MEMBRANE PROPOSED CAN HAVE LARGER BIGGER PARTICLE).
- FIELD TESTING REQUIREMENTS
- MATERIAL SHEAR INTERFACE TESTING (ASTM D5321)
 - SEEM TESTING REQUIRED (PEEL AND SHEAR TEST-NEED SPECIFICATIONS FOR MINIMUM REQUIREMENTS)
 - QUALITY CONTROL DATA TO BE PROVIDED VERIFYING SPECIFICATION REQUIREMENTS (THICKNESS, SPECIFIC GRAVITY, TENSILE/BREAK STRENGTH, ELONGATION AT BREAK, TENSILE/YIELD STRENGTH, ELONGATION AT YIELD, PUNCTURE, TEAR RESISTANCE, CARBON BLACK CONTENT (AS APPLICABLE), CARBON BLACK DISPERSION (AS APPLICABLE), AND ENVIRONMENTAL STRESS CRACK)
- INSTALLATION SUBMITTALS TO BE PROVIDED BY CONTRACTOR FOR APPROVAL BY THE CITY PRIOR TO INSTALLATION:
- ANCHOR TRENCH DETAILS
 - INSTALLER QC MANUAL
 - WELDING/SEEMING PROCEDURE
 - FIELD TESTING PROCEDURE (INCLUDE TRIAL AND DESTRUCTIVE PEEL AND SHEAR TEXTS, ALL SEEMS TO BE VACUUM AND/OR AIR TESTED)
 - PANEL LAYOUT DIAGRAM
 - PIPE PENETRATION DETAILS
 - ATTACHMENT TO STRUCTURES, IF APPLICABLE
 - OVERLYING MATERIAL PLACEMENT EQUIPMENT COMPACTION SPECIFICATION / GRADATION (MAX PARTICLE SIZE IN CONTACT WITH MEMBRANE)

HDPE STORM DRAIN INSTALLATION NOTES:

- REFERENCE MANUFACTURER INSTALLATION GUIDE AND SPECIFICATIONS FOR MAXIMUM JOINT DEFLECTION.
- CURVILINEAR INSTALLATION SPECIFIED PER THIS PLAN ARE BASED ON CHAPTER 5 (INSTALLATION) OF THE A.S. INC. DRAINAGE HANDBOOK. ASSUME THE USE OF "N-12 PLAIN END" (SOIL-TIGHT COUPLERS) UNLESS WATER TIGHT JOINTS ARE SPECIFIED IN WHICH CASE ASSUME THE USE OF "N-12 WT 18" (WATER TIGHT COUPLERS). FOR RADI LESS THAN THAT ACHIEVABLE WITH STANDARD JOINT DEFLECTION, A SERIES OF PREFABRICATED BENDS SHALL BE UTILIZED.
- ALL CONCRETE STRUCTURES USED WITH HDPE PIPE MUST BE WATER TIGHT.

CITY OF SAN DIEGO, CALIFORNIA
DEVELOPMENT SERVICE DEPARTMENT

"THE CITY OF SAN DIEGO LAND DEVELOPMENT REVIEW HAS REVIEWED AND APPROVED THE SCOPE OF WORK AFFECTING THE AREA IN CLOSE PROXIMITY TO AND WITHIN THE LIMITS OF THE WATERLINE EASEMENT. ANY CHANGES TO THE SCOPE AS COVERED BY THE REVIEW SHALL REQUIRE APPROVAL BY THE CITY OF SAN DIEGO THROUGH A CONSTRUCTION CHANGE REVIEW."

By: *[Signature]* For the City Engineer
Date: 10/26/20

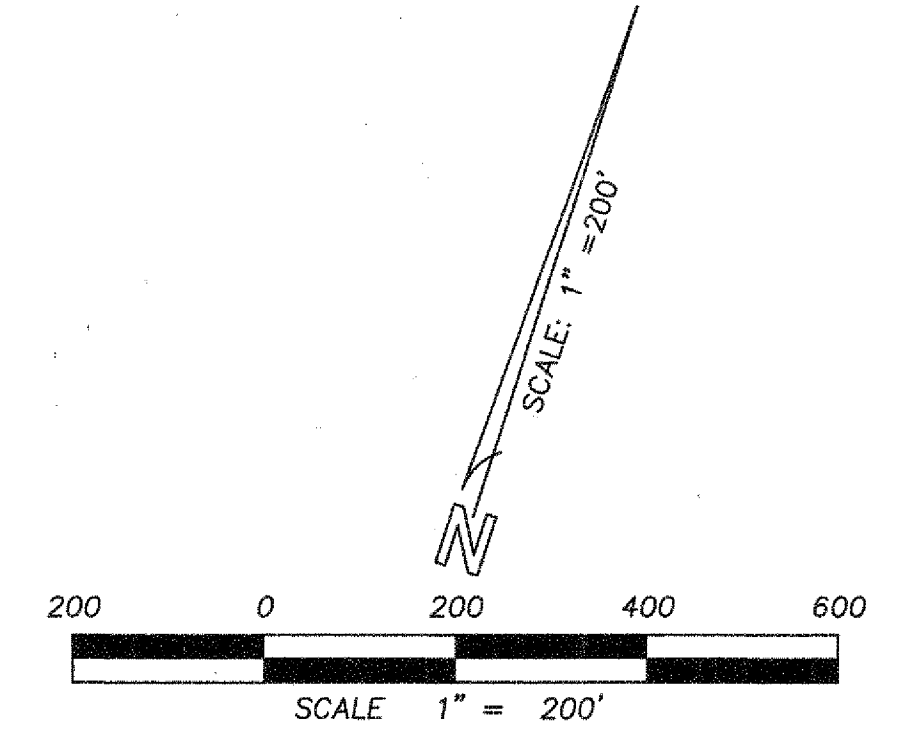
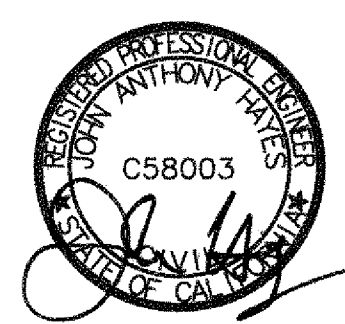
AS BUILT

SIGNATURE DATE

Printed Name P.E. No.

My Registration Expires Discipline

CONTRACTOR:	INSPECTOR:	DATE COMPLETED:	REVISIONS	By	Date	App'd	DATUM	SCALE	Designed By:	Drawn By:	Checked By:	Submitted:	Approved:	CITY OF CHULA VISTA DEVELOPMENT SERVICES DEPARTMENT	DRAWING NO.
CONSTRUCTION RECORD			1. REM GRDING REST. (V4, 404) + HDPE NOTES	HE	3/5/19	SH	CITY OF CHULA VISTA BENCH MARK NO. 5072	HORIZONTAL	JAH	M.J.L.	JAH	10/14/20	10/29/2020	MASS GRADING PLANS FOR	14011-03
			2. ADD ROCK HOLD DOWN AREA	HE	4/15/19	CB	ELEVATION 446.361 NAVD 88	1"=200'						CHULA VISTA TRACT NO. 19-03 PHASE 1	
			3. OFF-SITE + LOT 11 TEMP. SED BASIN REV.	HE	7/22/19	SH	DESCRIPTION: 3" BRASS DISK (LS4324) WELL	VERTICAL						OTAY RANCH, VILLAGE 8 WEST	
			4. GRADING AND BROWDITCH CHANGE	HE	9/26/19	CB	MON @ CL INT. RUTGERS & OTAY LAKES. PT.	NO SCALE							
			5. REPLACEMENT SET DATE	HE	10/14/20	CB	NO. 5072 PER ROS 14841								
			6. GRADING CHNG FOR LOTS 9 & 15	HE	10/14/20	CB	HE 1/3 GRADING REVISIONS FOR LOT 3								



SEE SHEET 18

SEE SHEET 19

NOTE:
FINAL GRADING FOR MIXED-USE, MULTI-FAMILY AND PARK LOTS WILL BE PROVIDED AT THE FINAL SITE DESIGN/PRECISE GRADING PLAN LEVEL. FINAL DESIGN AND LOCATION OF PEDESTRIAN AND DRIVEWAY ACCESS IS SUBJECT TO REVIEW OF DISCRETIONARY PERMITS SUCH AS THE MASTER PRECISE PLAN IN THE TOWN CENTER AND DESIGN REVIEW PERMITS.

SEE LETTER OF PERMISSION
TO GRADE OFFSITE
FROM: OTAY PROJECT LP
DATE: 7-11-19
BY: NICK LEE, SVP

BASIN SANTA
LUNA OFF-SITE
30" CMP RISER
BOT. LENGTH=92.5'
BOT. WIDTH=37'
BOT. ELEV.=455.9

PORTION OF EXISTING STORM
DRAIN TO BE ABANDONED
AND 2 SACK CEMENT/SAND
SLURRED

EXIST HEAD WALL AND
PORTION OF STORM DRAIN
TO BE REMOVED

EXIST 15' SD
EASEMENT

EXIST SD PLUG TO
BE REMOVED

EXIST 60" RCP SD

EXIST MOD TYPE 'A-7'
CO (X=6') PER DWG
NO. 05017

EXIST TYPE 'B'
BROW DITCH

EXIST 60" RCP SD

EXIST MOD TYPE 'A-7'
CO (X=6') PER DWG
NO. 05017

EXIST TYPE 'B'
BROW DITCH

EXIST 60" RCP SD

EXIST MOD TYPE 'A-7'
CO (X=6') PER DWG
NO. 05017

EXIST TYPE 'B'
BROW DITCH

EXIST 60" RCP SD

EXIST MOD TYPE 'A-7'
CO (X=6') PER DWG
NO. 05017

EXIST TYPE 'B'
BROW DITCH

EXIST 60" RCP SD

EXIST MOD TYPE 'A-7'
CO (X=6') PER DWG
NO. 05017

EXIST TYPE 'B'
BROW DITCH

EXIST 60" RCP SD

EXIST MOD TYPE 'A-7'
CO (X=6') PER DWG
NO. 05017

EXIST TYPE 'B'
BROW DITCH

EXIST 60" RCP SD

STORM DRAIN DATA (1500-D)					
BEARING/DELTA	RADIUS	LENGTH	DESCRIPTION	PROFILE SHT.	
C1 15° 59' 33"	526.00'	146.82'	60" RCP*	SHT. 43	
C2 29° 08' 04"	156.00'	79.32'	36" RCP*	SHT. 45	
C3 7° 16' 45"	481.00'	61.11'	18" RCP	SHT. 45	
C4 5° 42' 45"	1240.50'	123.68'	18" RCP	SHT. 45	
C5 6° 53' 28"	520.00'	62.54'	72" RCP*	SHT. 45	
L1 S34° 40' 17"E	---	85.30'	60" RCP*	SHT. 43	
L2 S18° 40' 39"E	---	141.78'	60" RCP*	SHT. 43	
L3 S42° 11' 26"W	---	12.22'	36" RCP*	SHT. 45	
L4 S42° 12' 51"W	---	51.27'	24" RCP*	SHT. 45	
L5 S71° 16' 53"W	---	13.86'	36" RCP*	SHT. 45	
L6 S52° 44' 45"E	---	3.17'	18" RCP	SHT. 45	

STORM DRAIN DATA (1500-D)					
BEARING/DELTA	RADIUS	LENGTH	DESCRIPTION	PROFILE SHT.	
L7 N50° 09' 51"E	---	3.67'	18" RCP	SHT. 45	
L8 N50° 09' 28"E	---	27.67'	18" RCP	SHT. 45	
L9 S18° 40' 34"E	---	324.82'	66" RCP*	SHT. 45	
L10 N71° 15' 12"E	---	44.90'	18" RCP	SHT. 45	
L12 N71° 15' 33"E	---	9.17'	18" RCP	SHT. 45	
L13 N71° 18' 18"E	---	30.17'	18" RCP	SHT. 45	
L14 S18° 40' 30"E	---	89.50'	66" RCP*	SHT. 45	
L15 S18° 40' 30"E	---	56.68'	24" RCP*	SHT. 45	
L16 N71° 19' 30"E	---	28.67'	18" RCP	SHT. 45	
L17 N71° 19' 30"E	---	10.67'	18" RCP	SHT. 45	
L18 S72° 01' 03"W	---	61.37'	42" RCP*	SHT. 46	

STORM DRAIN DATA (1500-D)					
BEARING/DELTA	RADIUS	LENGTH	DESCRIPTION	PROFILE SHT.	
L19 S18° 03' 36"E	---	33.92'	18" RCP*	SHT. 46	
L20 S18° 03' 36"E	---	7.42'	18" RCP*	SHT. 46	
L22 S21° 07' 42"E	---	48.44'	18" RCP*	SHT. 46	
L23 S71° 56' 24"W	---	192.62'	42" RCP	SHT. 46	
L24 S71° 56' 24"W	---	81.80'	42" RCP	SHT. 46	
L25 S18° 03' 36"E	---	22.92'	18" RCP	SHT. 46	
L26 S18° 03' 36"E	---	7.42'	18" RCP	SHT. 46	
L28 S30° 38' 09"E	---	76.21'	18" RCP	SHT. 46	
L29 S24° 50' 59"E	---	53.15'	24" RCP	SHT. 46	
L30 S75° 31' 02"W	---	51.96'	72" RCP*	SHT. 46	
L31 S42° 11' 26"W	---	23.00'	24" RCP*	SHT. 45	

STORM DRAIN DATA (1500-D)					
BEARING/DELTA	RADIUS	LENGTH	DESCRIPTION	PROFILE SHT.	
L32 N55° 27' 29"E	---	22.00'	18" RCP	SHT. 67	
L33 N23° 24' 24"E	---	119.08'	18" RCP*	SHT. 67	
L34 S34° 40' 24"E	---	59.20'	60" RCP*	SHT. 48	

RETAINING WALL NOTES:

- (W) RETAINING WALL 'W' PROFILE PER SHEET 78
(X) RETAINING WALL 'X' PROFILE PER SHEET 78

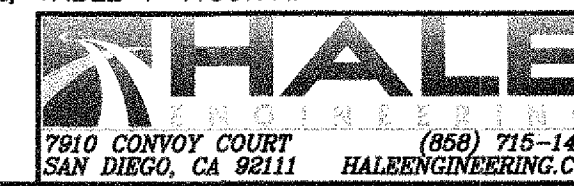
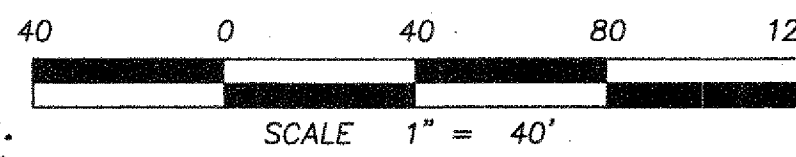
SEE SHEET 14

NOTE:

- STORM DRAIN LINES 'A-1', 'A-2', 'A-6', 'A-7' & 'A-8' STATION IS FROM LA MEDIA PARKWAY SOUTH ONE WAY.
- STORM DRAIN LINES 'A-3', 'A-5', 'A-6' & 'A-7' STATION IS FROM LA MEDIA PARKWAY NORTH ONE WAY.
- STORM DRAIN LINES 'B-1' THROUGH 'B-4', 'B-16' & 'B-17' STATION IS FROM MAIN WEST ONE WAY.
- STORM DRAIN LINE 'A-4' STATION IS FROM LA MEDIA PARKWAY NORTH & SOUTH ONE WAY.

STORM DRAIN NOTE:

THE RADIUS OF PIPES IN CURVES SHALL BE BASED ON STANDARD OR SINGLE BEVEL BELL END PIPE WITHOUT BREAKING JOINTS AND SHALL COMPLY WITH CITY OF SAN DIEGO DRAINAGE DESIGN MANUAL, TABLE 1-1103.7A.



**CITY OF SAN DIEGO, CALIFORNIA
DEVELOPMENT SERVICE DEPARTMENT**
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By: *[Signature]* Date: *10/26/20*

AS BUILT
SIGNATURE _____ DATE _____
P.E. No. _____
My Registration Expires _____ Discipline _____

CONTRACTOR: *CCV DWG NO. 05017 OF SW-219*
INSPECTOR: *CCV DWG NO. 04020 CCV DWG NO. 18041*
DATE COMPLETED: *CCV DWG NO. 04026 CCV DWG NO. 04028 CCV DWG NO. 04029*

By: *HE* REVISIONS: *REMOVE GRADING RESTRICTION (404 PERMIT)* Date: *9/5/19* App'd: *[Signature]*
ADD MSCP FENCING *1/5/19* *CB*
ADD TEMP. SED. BASIN, BROW DITCH, & SD *7/22/19* *SH*
REPLACE SET, DATE 12/14/20 *10/14/20* *CA*

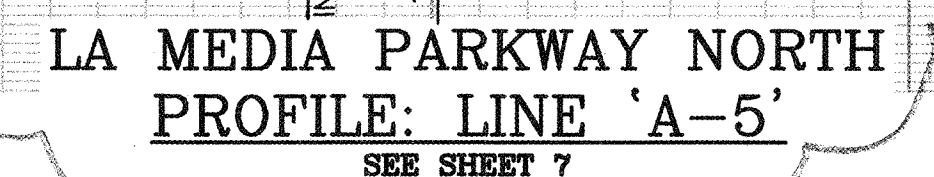
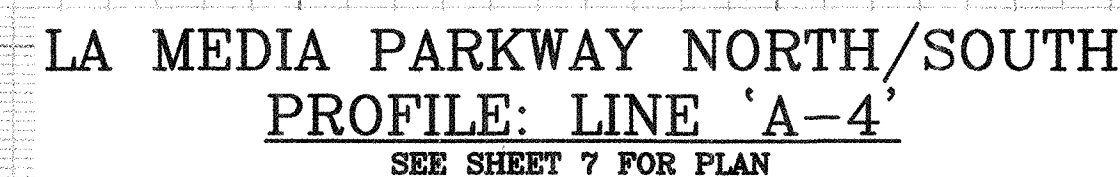
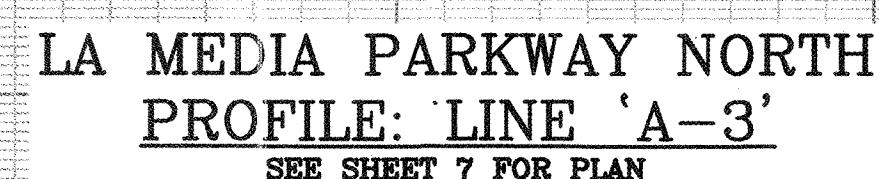
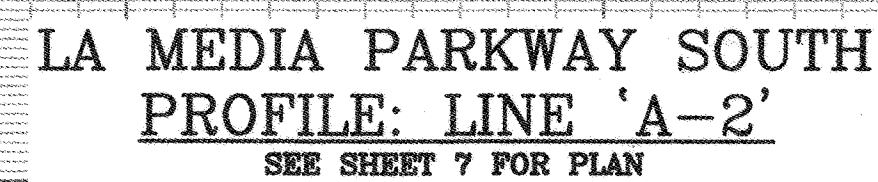
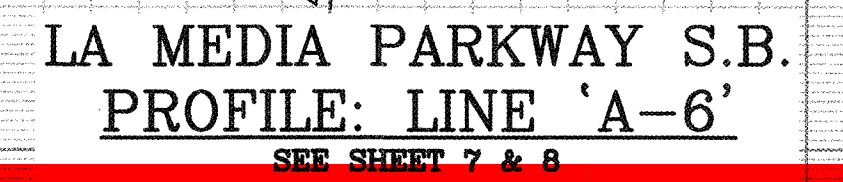
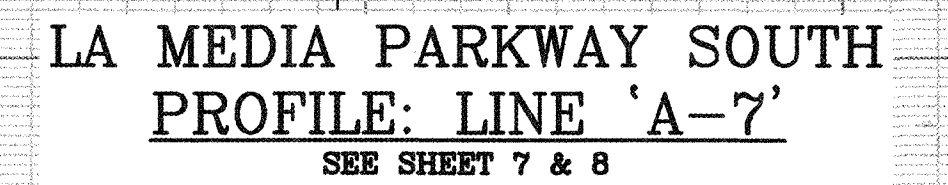
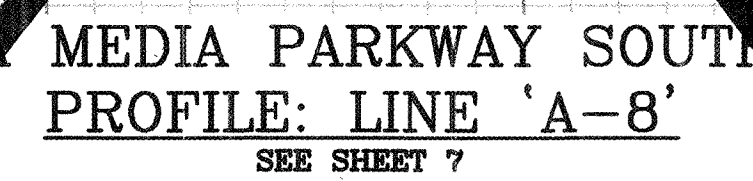
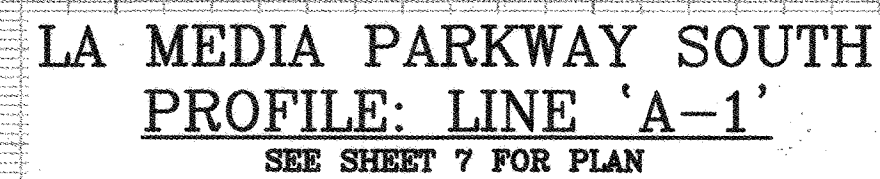
DATUM: *CITY OF CHULA VISTA BENCH MARK NO. 5072 ELEVATION 446.361 NAVD 88*
DESCRIPTION: *3" BRASS DISK (LS4324) WELL MON @ CL INT. RUTGERS & OTAY LAKES, PT. NO. 5072 PER ROS 14841*
SCALE: *HORIZONTAL 1"=40' VERTICAL NO SCALE*

Designed By: *JAH* Drawn By: *MJL* Checked By: *JAH*
Plans Prepared Under Supervision Of: *JOHN A. HAYES* Date: *10/12/20* R.C.E. No. *58003*

Submitted: *10/14/20* By: *[Signature]*
Approved: *10/29/2020* By: *[Signature]*
Planning: *Landscape*

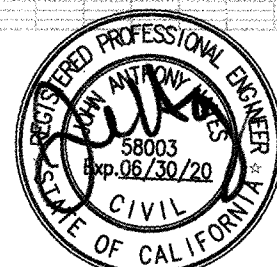
Approved: *10/29/2020* By: *[Signature]*
For the City Engineer

CITY OF CHULA VISTA DEVELOPMENT SERVICES DEPARTMENT
MASS GRADING PLANS FOR
CHULA VISTA TRACT NO. 19-03 PHASE 1
OTAY RANCH, VILLAGE 8 WEST
DRAWING NO. **14011-07**
W.O. No. OR-651G
REPLACEMENT SHEET



For Node 170

STORM DRAIN NOTE:
 *WATER TIGHT JOINTS SHALL BE USED FOR ALL STORM DRAIN PIPE THAT HAS A GRADE GREATER THAN 20% OR HAS A HGL THAT IS 1' HIGHER THAN THE TOP OF PIPE.



AS BUILT	
SIGNATURE _____	DATE _____
Printed Name _____	P.E. No. _____
My Registration Expires _____	Discipline _____
CONSTRUCTION RECORD	
CONTRACTOR:	C.C.V.
INSPECTOR:	C.C.V.
DATE COMPLETED:	C.C.V.
	C.C.V.
	C.C.V.
	C.C.V.

REFERENCES	By	REVISIONS	Date	App'd	DATUM
WJC NO. 05017 W.Q. OR-051-1	HE	CHANGE TO SD PRO.	3-5-14 SH		CITY OF CHULA VISTA BENCH MARK NO. 5072
WJC NO. 05017 W.Q. OR-051-1	HE	CHANGE TO SD PRO.	7-12-14 SH		ELEVATION 446.361 NAVD 83
WJC NO. 04080	HE	CHANGE TO SD PRO.	11-20-14 SH		DESCRIPTION: 3" BRASS DISK (LS4324) HALL
WJC NO. 04080	HE	CHANGE TO SD PRO.	11-20-14 SH		MON @ CL INT. RUTGERS & OTAY LAKES. PT.
WJC NO. 04080	HE	CHANGE TO SD PRO.	11-20-14 SH		NO. 5072 PER ROS 14841

SCALE	Designed By:	Drawn By:	Checked By:
HORIZONTAL	JAH	MJL	JAH
1"=40'	Plans Prepared Under Supervision Of:		Date: <u>8/31/18</u>
VERTICAL	JOHN A. HAYES		R.C.E. No. 58003
1"=8'			

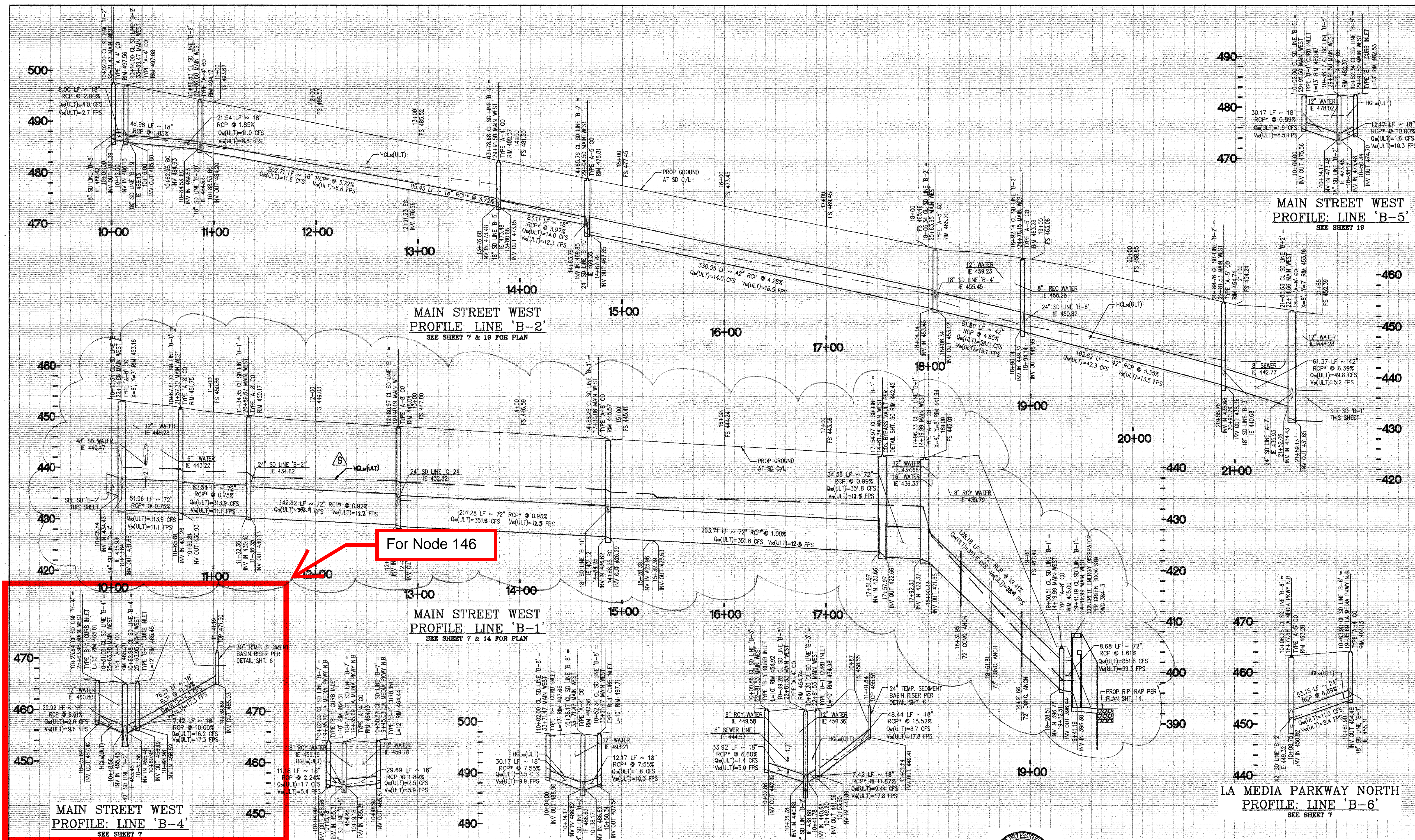
Submitted: 9/18/18
By: [Signature]
Planning: [Signature] Landscape: 73

Approved: 9/18/18
By: [Signature]
For the City Engineer

S:\0410\041003\041003.dwg

CITY OF CHULA VISTA DEVELOPMENT SERVICES DEPARTMENT
MASS GRADING PLANS FOR
CHULA VISTA TRACT NO. 19-03 PHASE 1
OTAY RANCH, VILLAGE 8 WEST

DRAWING NO.		H.E. JOB NO. 120
14011-45		
W.O. No.	OR-651G	



AS BUILT

SIGNATURE _____ DATE _____

Printed Name _____ P.E. No. _____

My Registration Expires _____ Discipline _____

CONSTRUCTION RECORD

CONTRACTOR:	CITY OF CHULA VISTA
INSPECTOR:	JOHN A. HAYES
DATE COMPLETED:	10/24/2020

REFERENCES

DATE	DESCRIPTION
10/24/2020	REVISION 1
10/24/2020	REVISION 2
10/24/2020	REVISION 3
10/24/2020	REVISION 4
10/24/2020	REVISION 5
10/24/2020	REVISION 6
10/24/2020	REVISION 7
10/24/2020	REVISION 8
10/24/2020	REVISION 9
10/24/2020	REVISION 10

LA MEDIA PARKWAY NORTH PROFILE: LINE 'B-7'

SEE SHEET 8

MAIN STREET WEST PROFILE: LINE 'B-8'

SEE SHEET 19

MAIN STREET WEST PROFILE: LINE 'B-3'

SEE SHEET 7

STORM DRAIN NOTE:

* WATER TIGHT JOINTS SHALL BE USED FOR ALL STORM DRAIN PIPE THAT HAS A GRADE GREATER THAN 20% OR HAS A HGL THAT IS 1' HIGHER THAN THE TOP OF PIPE.

CITY OF CHULA VISTA DEVELOPMENT SERVICES DEPARTMENT

MASS GRADING PLANS FOR

CHULA VISTA TRACT NO. 19-03 PHASE 1

OTAY RANCH, VILLAGE 8 WEST

DRAWING NO.

14011-46

W.D. No. OR-651G

DATE

10/24/2020

APPROVED

10/24/2020

FOR THE CITY ENGINEER

John A. Hayes

DESIGNED BY

John A. Hayes

DRAWN BY

M.J.L.

CHECKED BY

J.A.H.

SUBMITTED

10/27/2020

BY

John A. Hayes

PLANNING

Landscaping

DATE

10/12/2020

PLANS PREPARED UNDER SUPERVISION OF

John A. Hayes

R.C.E. No.

58003

SCALE

HORIZONTAL 1"=40'

VERTICAL 1"=8'

DATUM

CITY OF CHULA VISTA BENCH MARK NO. 5072 ELEVATION 446.361 NAVD 88

DESCRIPTION

3" BRASS DISK (LS4324) WELL MON @ CL INT. BUTTERFLY & OTAY LAKES. PT. NO. 5072 PER ROS 14841

HALE

7810 CONVOY COURT

SAN DIEGO, CA 92111

(619) 715-1420

HALEENGINEERING.COM