Michael Baker INTERNATIONAL

We Make a Difference

SEVILLA II TRACT 38557
PRELIMINARY HYDROLOGY REPORT
Coachella, California

November 2, 2022

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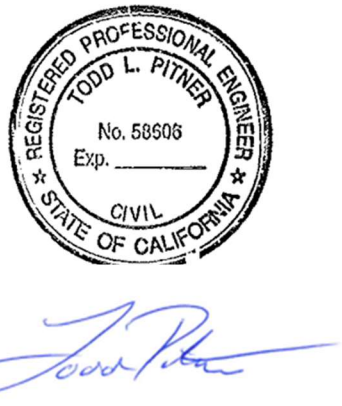

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MBI JN 189548

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1 Introduction

Pulte Homes has retained Michael Baker International to prepare engineering design for tentative tract no. 38557, a new residential development known as Sevilla II. The tract proposes 204 dwelling units and requires a drainage report to show how storm water runoff from the 100-year storm event shall be handled on-site for proper storm water handling and safety to the public.

The project site in located in Coachella, California in the County of Riverside. The tract is about 700 ft south of the Van Buren Street and Avenue 50 intersection, Figure 1 shows the general vicinity of the project location.

Figure 1: Vicinity Map

The objectives of this study include the following:

1. Develop a hydrology map which identifies drainage boundaries and subareas within Tract 38557. Subarea boundaries are based on the proposed development drainage patterns, desired concentration points, and the existing topography.

2. Prepare an analysis of the proposed development hydrology based on the Riverside County Flood Control and Water Conservation District (RCFC&WCD) rational method for the 10- and 100-year storm events.

3. Perform street flooded width analysis and catch basin sizing calculations to determine the sizes and number of catch basins needed to provide required flood protection within the tract.
    a. Required flood protection: the runoff from a 10-year storm event will be contained within street curb lines and runoff from a 100-year storm event shall be contained within street right-of-way limits. A minimum of 1-foot of freeboard shall be provided between the street right-of-way line and any dwelling unit building pad.

4. Determine proposed storm drain facility design with hydraulic calculations based on the proposed site plan and delineated drainage areas.

5. Utilize the short cut synthetic hydrograph to perform retention basin sizing, basins shall be sized to contain the runoff resulting from the 100-year, 24-hour storm event and to evacuate the storm event within 72 hours.

The included calculations are prepared in accordance with the criteria and procedures described in the RCFC&WCD Hydrology Manual (April 1978). To comply with the Colorado River Basin Regional Water Quality Control Board for discretionary new developments and redevelopment projects a separate submittal will be made for the project-specific WQMP.

2 Hydrology

2.1 Project Condition Descriptions

Existing Condition

The site is on active farmland with an existing residence, associated farm barns, and ancillary structures. The neighboring properties consist of residential development and farmland, and there is no offsite run-on to the existing site. The site is generally flat, sloping gently toward the

southeast; site elevations range from approximately 48 to 40 feet below mean sea level. The site currently lies within a FEMA mapped flood plain Zone X, an area determined to be outside the 0.2% annual chance floodplain and of minimal flood hazard; the FIRMette is provided in Appendix F.

Proposed Condition

The hydrology delineation is based on proposed site grading and aerial topography flown and compiled for the project; the proposed project on-site drainage area is approximately 38.4 acres. The proposed drainage pattern is similar to the existing and will generally flow in the southeast direction. Site runoff flows through the proposed streets and is intercepted by catch basins. The collection locations and basin sizes are carefully planned to proportionately collect and convey runoff for retention and eventual drawdown of the storm water volume generated from the site. The proposed on-site water quality basin is designed to retain 100% of the 100-year 24-hour storm and infiltrate within 72 hours. In final design, the basin will be designed with an emergency overflow that discharges to Van Buren Street to the east. Exhibit 1, the Preliminary Hydrology Map, clearly details the various subareas and collection systems to be employed.

2.2 Description of Analysis

Tract 38557 consists of one sub-watershed area; the proposed streets generally flow west to east and north to south before ultimately entering the water quality basin at the southeast corner of the site. Along the way, runoff is intercepted by proposed catch basins and conveyed through proposed storm drain systems into the water quality basin. Site runoff for this sub-watershed was determined based on rational method hydrology analysis. A link-node model was developed to establish peak flows at concentration points along the streets and within the proposed site. This is necessary to establish street flooded widths and determine catch basin locations to ensure that desired flood protection is provided.

2.3 Rational Method

Hydrology calculations for the project conditions to determine 10- and 100-year discharges for the project drainage area are performed per the RCFC&WCD Hydrology Manual guidelines. The guidelines suggest that watershed budgets for drainage areas encompassing less than one square mile be calculated using the rational method (RM). Detailed RM calculations for both the 10- and 100-year storm events are included in Appendix A.

The RM is an empirical computation procedure for developing a peak runoff rate for small watersheds for storms of a specified recurrence interval. The RM equation is based on the assumption that the peak flow is directly proportional to the drainage area, rainfall intensity,

and a loss coefficient, which considers the effects of land use and soil type. The design discharges were computed generated a hydrologic "link-node" model that divides the area into sub-area, each tributary to a concentration point or hydrologic "node" point determined by the existing terrain or proposed site layout. A thorough technical description of the RM is provided in the RCFC&WCD Hydrology Manual.

The Antecedent Moisture Condition (AMC) can be defined as the relative wetness of a watershed just prior to a flood producing storm event and is expressed as the amount of rainfall occurring in a specific period of time prior to a major storm. The generalized definitions of AMC levels are:

AMC I: Lowest runoff potential. The watershed soils are dry enough to allow satisfactory grading or cultivation to take place.

AMC II: Moderate runoff potential, an intermediate condition.

AMC III: Highest runoff potential. The watershed is practically saturated from antecedent rains.

AMC II is applied for the 100-year storm event as outlined in the RCFC&WCD Hydrology Manual.

RCFC&WCD Hydrology Manual reference plates are included in Appendix G; deviations from the RCFC&WCD Hydrology Manual include the precipitation and soil data used. Precipitation data used in this study is taken from the NOAA Atlas 14 website at the project location and is included in Appendix F. See the next section for more information on soil data deviation.

2.3.1 Soil Conditions

The RCFC&WCD uses the SCS soils classification system, which categorizes soils into four hydrologic groups A, B, C and D with D being the least pervious, thus providing the highest runoff potential. Soil data from the USDA's Natural Resources Conservation Service Web Soil Survey is included in Appendix E, the project site drainage area consists of hydrologic soil type B.

2.3.2 Land Use

The developed site will consist mostly of single-family residential homes. The single family residential land use range of 7,200 to 10,000 SF lots is provided on Plate 5-6.3 of the RCFC&WCD Hydrology Manual. The proposed lots are less than 7,200 SF and therefore the

recommended value for average conditions in percent is not used, the highest number of the range provided, 55, is used. The difference of the pre and post land use development condition does not result in any significant impacts to the existing drainage systems.

2.4 Catch Basins

Catch basins are classified as either flow-by or sump catch basins. Each catch basin includes a 4" local depression with a 6" standard curb. Storm flows are contained in the standard curb, gutter, and street cross-section. The street inlet + parallel pipe + area option in the RM calculations is used to confirm catch basin sizes. The input option assumes that a street inlet is to be installed at the top of the street segment and uses the under street pipe flow travel time to determine the time of concentration used for rainfall intensity calculations. Appendix B.1 and B.2 show catch basin sizing summaries for the 10- and 100-year storm events.

The longitudinal slope is determined from the node elevations entered and determines the depth of flow in the street and through the area of the street inlet. The capacity of the street inlet is determined by using the department of transportation HEC-12 manual calculations included in the program. The program compares the street inlet capacity, and the capacity of the drain pipe(s) under the street. It then uses the lesser of the above capacities for the flow entering the street inlet, and assumes the remaining flow, if any, is continued in the street segment below the inlet. The street cross-section data used in the calculations matches those shown in Appendix B.3 and is used to calculate the depth of flow through the depressed section and gutter to determine the curb inlet capacity.

The inlet length is also considered in this calculation, the program first calculates the length required for total flow interception, then calculates the efficiency or amount of flow intercepted using the length entered. If the longitudinal slope of the street is less than one percent, the program considers the inlet to be a sag location and calculates street inlet capacity using either the weir or orifice flow equations, considering the entered height and length of the curb opening. The inlet will operate as a weir until the water submerges the entrance. When the depth of water is about twice the height of the entrance, it will operate as an orifice. When the depth of the water is between these two depths, the inlet will operate somewhere between a weir and orifice.

3 Hydraulics

Hydraulic calculations for the proposed pipe systems will be performed and provided in Final using the Los Angeles County Flood Control District Water Surface Pressure Gradient (WSPGW) CivilDesign design software. WSPGW computes and plots uniform and non-uniform steady flow

water surface profiles and pressure gradients in open channels or closed conduits with irregular or regular sections. The computation procedure is based on solving Bernoulli's equation for the total energy between two sections in a reach. For the preliminary design, the CivilDesign RM program-calculated pipe sizes were taken into consideration when assigning pipe sizes and will be confirmed when invert elevations are determined in later design stages.

3.1 Proposed Improvements

The proposed facilities constitute of two main line storm drain facilities that convey runoff. These systems intercept street flows from storm drain laterals within the proposed development. A complete layout of the proposed improvements can be seen on Exhibit 1, the Proposed Condition Hydrology Map. The storm drain main lines and laterals will be discussed further in Final.

3.2 Flood Attention

There are no anticipated negative downstream or upstream impacts from this development, therefore, no on-site flood attention is needed for this project.

4 Water Quality Treatment Measures

4.1 Water Quality Basins

Low Impact Development (LID) is implemented for this project site and is in accordance with the Riverside County Design Handbook for Low Impact Development Best Management Practices. The project is required to retain 100% of the 100-year 24-hour storm event on-site per the City of Coachella retention requirements. A spreadsheet based on the short cut synthetic hydrograph method approach as prescribed by the RCFC&WCD Hydrology Manual has been utilized to perform the calculations and is found in Appendix D, a summary is provided below.

4.1.1 Proposed Condition Flood Routing

Basin storage capacity is modeled based on the "truncated pyramid" formula, a more conservative estimate than "average end areas" sometimes used. Percolation is taken incrementally, and the proposed drywells are incorporated in the analysis. Rainfall input data for the 100-year, 24-hour storm is input per said Hydrology Manual using the aforementioned NOAA Atlas 14 point precipitation frequency estimates. Basin inflow is modeled in 15-minute

intervals for the 24-hour storm, based on the design storm unit hydrographs presented in the RCFC&WCD Hydrology Manual.

Basin ID:	A
Depth:	6 feet (including 1 ft for freeboard)
Area at Top of Basin:	53,215.5 sf
Max Storage:	268,318.6 cf
Total Flow Volume:	215,303.8 cf
100-Year, 24-Hour Water Surface Elevation:	448.91

The maximum side slope of the basin is 3:1 per the City of Coachella standards and meets the requirement for 1 foot minimum of freeboard. The percolation test results are included in Appendix E and are discussed further in the next section.

4.1.2 Drawdown Time Determination

Drawdown time is the amount of time the design volume takes to pass through the effective storage area of the retention basin. Per the City of Coachella requirement, the drawdown time must not exceed 72 hours in order to implement proper vector control and prevent other nuisance issues. The drawdown time for the proposed basin is analyzed using the most conservative infiltration rate acquired by on-site percolation tests.

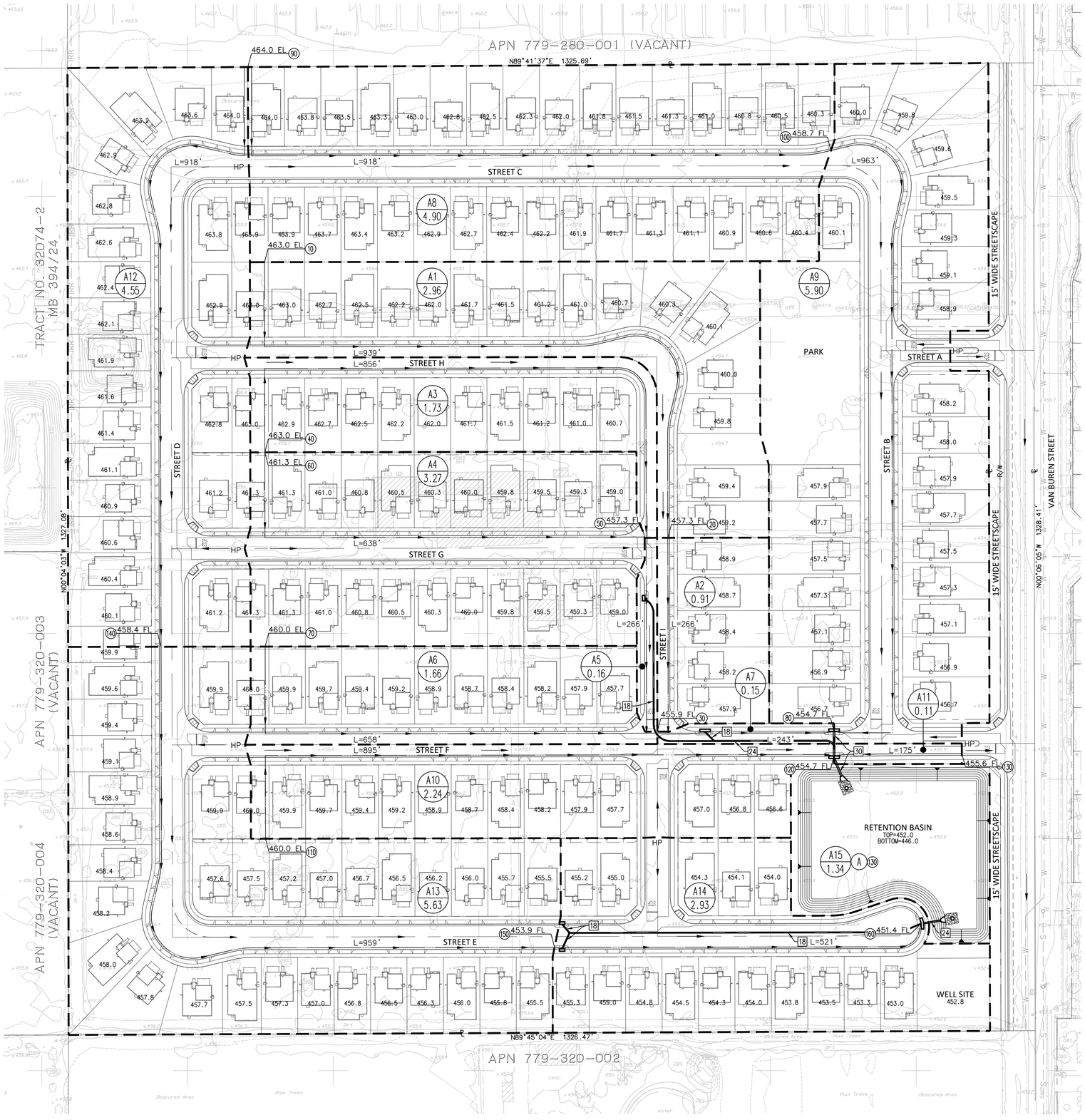
The most conservative infiltration rate at the proposed basin area is 5.5 inches/hour, a design factor of safety prescribed by the Riverside County Design Handbook for Low Impact Development Best Management Practices is used to determine the design infiltration rate. A factor of safety of 3 is applied to the acquired infiltration rate, resulting in a design infiltration rate of 1.83 inches/hour. The design infiltrate rate applied to the total dead storage volume results in a drawdown time of 15.5 hours, which falls within the 72-hour maximum; the drawdown time calculation is included in Appendix D.

5 Conclusion

The methodologies used in this study are in compliance with the City of Coachella and RCFC&WCD criteria. The proposed retention basin will retain 100% of the 100-year, 24-hour storm event. Based on the provided design calculations, the proposed drainage system will capture sufficient on-site runoff to prevent significant flooding during the 100-year storm event. There are no anticipated negative upstream or downstream impacts.

6 References

1. Riverside County Flood Control and Water Conservation District Hydrology Manual, RCFC&WCD April 1978.
2. Standard Specifications & Procedures, City of Coachella, Public Works Department, Dudek June 2007.
3. Design Handbook for Low Impact Development Best Management Practices, RCFC&WCD September 2011.
4. Riverside County Whitewater River Region Stormwater Quality Best Management Practice Design Handbook for Low Impact Development, RCFC&WCD June 2014.



IN THE CITY OF COACHELLA, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

SEVILLA II - TRACT NO. 38557
PRELIMINARY HYDROLOGY MAP

LOCATED WITHIN THE EAST HALF OF SECTION 1, T. 6 S., R. 5 E., S.B.M

LEGEND

- DRAINAGE BOUNDARY
- FLOWLINE
- X# / #.## — DRAINAGE MANAGEMENT SUBAREA / AREA (ACRES)
- (A) — DRAINAGE BASIN IDENTIFICATION
- ###.# FL — ELEVATION OR (FL) FLOWLINE
- (#) — HYDROLOGY NODE
- DIRECTION OF FLOW
- PROPOSED CATCH BASIN
- PROPOSED STORM DRAIN LINE
- [#] — PROPOSED STORM DRAIN SIZE (INCHES)
- PROPOSED HEADWALL, RIP RAP, AND DRYWELL
- —W— EXISTING WATER LINE
- —S— EXISTING SEWER LINE
- —IRR— EXISTING IRRIGATION LINE

SEVILLA II SITE CHARACTERISTICS:

204 SINGLE FAMILY RESIDENTIAL LOTS
AVERAGE LOT SIZE < 7,200 SF
IMPERVIOUS COVER OF 55% USED
SOIL TYPE B

BASIN A:

TRIBUTARY AREA = 38.44 ACRES
TOP AREA = 53,215.5 SF
BOTTOM AREA = 36,731.8 SF
DEPTH = 6 FT (INCLUDING 1 FOOT MINIMUM FREEBOARD)
PROVIDED VOLUME = 268,318.6 CU-FT
REQUIRED VOLUME = 130,155.0 CU-FT
MAX WATER SURFACE ELEVATION = 448.91
EVACUATION TIME AFTER STORM = 15.5 HOURS

SCALE 1"=70'

70 35 0 70 140 210

SCALE: 1"=70'

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SEVILLA II - TENTATIVE TRACT NO. 38557
PRELIMINARY HYDROLOGY MAP
City of Coachella, CA
State of California

SHEET 1 OF 1

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APPENDIX A

RATIONAL METHOD CALCULATIONS

APPENDIX A.1

10-YEAR STORM EVENT

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
Rational Hydrology Study Date: 10/19/22 File:SEVILLA10.out

SEVILLA II
PROPOSED CONDITION
10-YEAR STORM RATIONAL METHOD
BY DP ON 10/18/22

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6482

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [Cathedral City] area used.
10 year storm 10 minute intensity = 2.770(In/Hr)
10 year storm 60 minute intensity = 0.980(In/Hr)
100 year storm 10 minute intensity = 4.520(In/Hr)
100 year storm 60 minute intensity = 1.600(In/Hr)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.980(In/Hr)
Slope of intensity duration curve = 0.5800

++
Process from Point/Station 10.000 to Point/Station 20.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 939.000(Ft.)
Top (of initial area) elevation = 463.000(Ft.)
Bottom (of initial area) elevation = 457.300(Ft.)
Difference in elevation = 5.700(Ft.)
Slope = 0.00607 s(percent)= 0.61
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 16.730 min.
Rainfall intensity = 2.056(In/Hr) for a 10.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.748
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 56.00
Pervious area fraction = 0.500; Impervious fraction = 0.500
Initial subarea runoff = 4.552(CFS)
Total initial stream area = 2.960(Ac.)
Pervious area fraction = 0.500

++
Process from Point/Station 20.000 to Point/Station 30.000

**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****

Top of street segment elevation = 457.300(Ft.)
End of street segment elevation = 455.900(Ft.)
Length of street segment = 266.000(Ft.)
Height of curb above gutter flowline = 6.0(In.)
Width of half street (curb to crown) = 17.000(Ft.)
Distance from crown to crossfall grade break = 15.000(Ft.)
Slope from gutter to grade break (v/hz) = 0.083
Slope from grade break to crown (v/hz) = 0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line = 11.000(Ft.)
Slope from curb to property line (v/hz) = 0.020
Gutter width = 2.000(Ft.)
Gutter hike from flowline = 2.000(In.)
Manning's N in gutter = 0.0150
Manning's N from gutter to grade break = 0.0150
Manning's N from grade break to crown = 0.0150
Estimated mean flow rate at midpoint of street = 5.225(CFS)
Depth of flow = 0.434(Ft.), Average velocity = 2.096(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width = 15.382(Ft.)
Flow velocity = 2.10(Ft/s)
Travel time = 2.12 min. TC = 18.84 min.
Adding area flow to street
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.741
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 56.00
Pervious area fraction = 0.500; Impervious fraction = 0.500
Rainfall intensity = 1.918(In/Hr) for a 10.0 year storm
Subarea runoff = 1.294(CFS) for 0.910(Ac.)
Total runoff = 5.845(CFS) Total area = 3.870(Ac.)
Street flow at end of street = 5.845(CFS)
Half street flow at end of street = 5.845(CFS)
Depth of flow = 0.448(Ft.), Average velocity = 2.154(Ft/s)
Flow width (from curb towards crown)= 16.085(Ft.)

++
Process from Point/Station 30.000 to Point/Station 30.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area = 3.870(Ac.)
Runoff from this stream = 5.845(CFS)
Time of concentration = 18.84 min.
Rainfall intensity = 1.918(In/Hr)
Program is now starting with Main Stream No. 2

++
Process from Point/Station 40.000 to Point/Station 50.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 856.000(Ft.)
Top (of initial area) elevation = 463.000(Ft.)
Bottom (of initial area) elevation = 457.300(Ft.)
Difference in elevation = 5.700(Ft.)
Slope = 0.00666 s(percent)= 0.67
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 15.826 min.
Rainfall intensity = 2.123(In/Hr) for a 10.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.751
Decimal fraction soil group A = 0.000

```
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      2.759(CFS)
Total initial stream area =        1.730(Ac.)
Pervious area fraction = 0.500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       50.000 to Point/Station       50.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      1.730(Ac.)
Runoff from this stream =      2.759(CFS)
Time of concentration =   15.83 min.
Rainfall intensity =     2.123(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       60.000 to Point/Station       50.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   638.000(Ft.)
Top (of initial area) elevation =   461.300(Ft.)
Bottom (of initial area) elevation =   457.300(Ft.)
Difference in elevation =     4.000(Ft.)
Slope =    0.00627  s(percent)=       0.63
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.241 min.
Rainfall intensity =      2.257(In/Hr) for a    10.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.757
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      5.589(CFS)
Total initial stream area =        3.270(Ac.)
Pervious area fraction = 0.500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       50.000 to Point/Station       50.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      3.270(Ac.)
Runoff from this stream =      5.589(CFS)
Time of concentration =   14.24 min.
Rainfall intensity =     2.257(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        2.759     15.83                2.123
2        5.589     14.24                2.257
Largest stream flow has longer or shorter time of concentration
Qp =      5.589 + sum of
         Qa          Tb/Ta
          2.759 *    0.900 =      2.483
Qp =      8.072

Total of 2 streams to confluence:
```

```
Flow rates before confluence point:
       2.759       5.589
Area of streams before confluence:
        1.730        3.270
Results of confluence:
Total flow rate =      8.072(CFS)
Time of concentration =    14.241 min.
Effective stream area after confluence =      5.000(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       50.000 to Point/Station       30.000
**** STREET INLET + AREA  + PIPE  TRAVEL TIME ****
________________________________________________________________________
Top of street segment elevation =   457.300(Ft.)
End of street segment elevation =   455.900(Ft.)
Length of street segment  =   266.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  17.000(Ft.)
Distance from crown to crossfall grade break  =  15.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  11.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150

Street Inlet Calculations:
Street flow before street inlet =      8.072(CFS)
Half street flow before street inlet =      8.072(CFS)
Existing pipe flow before street inlet =      0.000(CFS)
Number of street inlets = 1
Depth of flow =   0.803(Ft.), Average velocity =   2.376(Ft/s)
```

Note: All 10-year flows do not exceed the top of curb; the 0.803 ft depth of flow is at the inlet and includes the 4” depression (typical).

For reference, see the process from points 140-150 and 150-160. The street flow and subarea addition for 140-150 outputs a total street flow of 13.764 cfs with a 0.476 ft depth of flow. The street inlet, area, and pipe travel time for 150-160 shows the street inlet calculation using the same flow of 13.764 and has a 0.786 depth of flow at the inlet due to the depression. The curb would be overtopped with an inlet depth of more than 0.83 ft.

```
U.S. DOT Hydraulic Engineering Circular No. 12 curb inlet calculations:
 Street flow half width at start of inlet =     17.000(Ft.)
 Flow rate in gutter section of street = Qw =      3.813(CFS)
 Ratio of frontal flow to total flow = E0 =  0.4724
 Given curb inlet length  L =      7.000(Ft.)

Half street cross section data points at curb inlet:
              X-coordinate (Ft.)   Y-coordinate (Ft.)
             0.0000             1.0533 right of way
            11.0000             0.8333 top of curb
            11.0000             0.0000 flow line
            13.0000             0.5000 gutter/depression end
            13.0000             0.5000 grade break
            28.0000             0.8000 crown
 Length required for total flow interception = Lt
 Lt = .6 * Q^0.42 * Slope^.3 * (1/(n*Se)^.6 =     11.080(Ft.)
 where Manning's n = 0.0150 and Slope = street slope =  0.0053
 Se = Equivalent Street x-slope including depression =  0.1617
 Gutter depression depth =      4.000(In.)
 Gutter depression width =      2.000(Ft.)
 Efficiency = 1 - (1-L/Lt)^1.8 =  0.8344

Pipe calculations for under street flow rate of      6.735(CFS)
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```
Using a pipe slope =      0.500 %
Upstream point/station elevation =   457.300(Ft.)
Downstream point/station elevation =   455.900(Ft.)
Pipe length  =   266.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     6.735(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     6.735(CFS)
Normal flow depth in pipe =   13.43(In.)
Flow top width inside pipe =   15.67(In.)
Critical Depth =   12.05(In.)
Pipe flow velocity =      4.76(Ft/s)
Travel time through pipe =    0.93 min.
Time of concentration (TC) =    15.17 min.
Maximum flow rate of street inlet(s) =      6.735(CFS)
Maximum pipe flow capacity =      6.735(CFS)
Remaining flow in street below inlet =      1.336(CFS)
 Adding area flow to street
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.754
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      2.175(In/Hr) for a    10.0 year storm
Subarea runoff =      0.262(CFS) for      0.160(Ac.)
Total runoff =      8.334(CFS)    Total area =       5.160(Ac.)
Street flow at end of street =      1.599(CFS)
Half street flow at end of street =      1.599(CFS)
Depth of flow =   0.314(Ft.), Average velocity =   1.587(Ft/s)
Flow width (from curb towards crown)=   9.385(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       30.000 to Point/Station       30.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      5.160(Ac.)
Runoff from this stream =      8.334(CFS)
Time of concentration =   15.17 min.
Rainfall intensity =     2.175(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        5.845     18.84           1.918
2        8.334     15.17           2.175
Largest stream flow has longer or shorter time of concentration
Qp =      8.334 + sum of
         Qa          Tb/Ta
          5.845 *    0.805 =      4.706
Qp =     13.040

Total of 2 main streams to confluence:
Flow rates before confluence point:
       5.845       8.334
Area of streams before confluence:
        3.870        5.160


Results of confluence:
Total flow rate =     13.040(CFS)
Time of concentration =    15.172 min.
Effective stream area after confluence  =      9.030(Ac.)
```

```
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Process from Point/Station       30.000 to Point/Station       30.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      9.030(Ac.)
Runoff from this stream =     13.040(CFS)
Time of concentration =   15.17 min.
Rainfall intensity =     2.175(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       70.000 to Point/Station       30.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   658.000(Ft.)
Top (of initial area) elevation =   460.000(Ft.)
Bottom (of initial area) elevation =   455.900(Ft.)
Difference in elevation =     4.100(Ft.)
Slope =    0.00623  s(percent)=       0.62
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.436 min.
Rainfall intensity =      2.239(In/Hr) for a    10.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.757
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      2.812(CFS)
Total initial stream area =        1.660(Ac.)
Pervious area fraction = 0.500


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Process from Point/Station       30.000 to Point/Station       30.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      1.660(Ac.)
Runoff from this stream =      2.812(CFS)
Time of concentration =   14.44 min.
Rainfall intensity =     2.239(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       13.040     15.17                2.175
2        2.812     14.44                2.239
Largest stream flow has longer time of concentration
Qp =     13.040 + sum of
         Qb         Ia/Ib
          2.812 *    0.972 =      2.732
Qp =     15.773

Total of 2 streams to confluence:
Flow rates before confluence point:
      13.040       2.812
Area of streams before confluence:
        9.030        1.660
Results of confluence:
Total flow rate =     15.773(CFS)
Time of concentration =    15.172 min.
Effective stream area after confluence =     10.690(Ac.)
```

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Process from Point/Station       30.000 to Point/Station       80.000
**** STREET INLET + AREA  + PIPE  TRAVEL TIME ****
_____________________________________________________________________
Top of street segment elevation =   455.900(Ft.)
End of street segment elevation =   454.700(Ft.)
Length of street segment  =   243.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  17.000(Ft.)
Distance from crown to crossfall grade break  =  15.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  11.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150

Street Inlet Calculations:
Street flow before street inlet =      9.037(CFS)
Half street flow before street inlet =      9.037(CFS)
Existing pipe flow before street inlet =      6.735(CFS)
Number of street inlets = 1
Depth of flow =   0.821(Ft.), Average velocity =   2.438(Ft/s)
U.S. DOT Hydraulic Engineering Circular No. 12 curb inlet calculations:
 Street flow half width at start of inlet =     17.000(Ft.)
 Flow rate in gutter section of street = Qw =      3.960(CFS)
 Ratio of frontal flow to total flow = E0 =  0.4381
 Given curb inlet length  L =     14.000(Ft.)
Street slope is less than .5% , depth of flow indicates a weir flow
condition exists for an opening height of   10.00(In.)
Using equation Qweir = 2.3(1.25 for SI) (L + 1.8W)d^1.5)
Total inlet flow capacity=     30.112(CFS)

Half street cross section data points at curb inlet:
              X-coordinate (Ft.)   Y-coordinate (Ft.)
             0.0000             1.0533 right of way
            11.0000             0.8333 top of curb
            11.0000             0.0000 flow line
            13.0000             0.5000 gutter/depression end
            13.0000             0.5000 grade break
            28.0000             0.8000 crown
 Gutter depression depth =      4.000(In.)
 Gutter depression width =      2.000(Ft.)
 Efficiency = 1 - (1-L/Lt)^1.8 =  1.0000
Note: Single inlet capacity is greater than 1/2 street flow

Pipe calculations for under street flow rate of     15.773(CFS)
Using a pipe slope =      0.500 %
Upstream point/station elevation =   455.900(Ft.)
Downstream point/station elevation =   454.700(Ft.)
Pipe length  =   243.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    15.773(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    15.773(CFS)
Normal flow depth in pipe =   19.36(In.)
Flow top width inside pipe =   18.96(In.)
Critical Depth =   17.19(In.)
Pipe flow velocity =      5.80(Ft/s)
Travel time through pipe =    0.70 min.
Time of concentration (TC) =    15.87 min.
Maximum flow rate of street inlet(s) =      9.037(CFS)
Maximum pipe flow capacity =     15.773(CFS)
Remaining flow in street below inlet =      0.000(CFS)
 Adding area flow to street
SINGLE FAMILY (1/4 Acre Lot)
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```
Runoff Coefficient = 0.751
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      2.119(In/Hr) for a    10.0 year storm
Subarea runoff =      0.239(CFS) for      0.150(Ac.)
Total runoff =     16.011(CFS)   Total area =      10.840(Ac.)
Street flow at end of street =      0.239(CFS)
Half street flow at end of street =      0.239(CFS)
Depth of flow =   0.183(Ft.), Average velocity =   1.167(Ft/s)
Flow width (from curb towards crown)=   2.792(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       80.000 to Point/Station       80.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     10.840(Ac.)
Runoff from this stream =     16.011(CFS)
Time of concentration =   15.87 min.
Rainfall intensity =     2.119(In/Hr)


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Process from Point/Station       90.000 to Point/Station      100.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   918.000(Ft.)
Top (of initial area) elevation =   464.000(Ft.)
Bottom (of initial area) elevation =   458.700(Ft.)
Difference in elevation =     5.300(Ft.)
Slope =    0.00577  s(percent)=       0.58
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   16.746 min.
Rainfall intensity =      2.054(In/Hr) for a    10.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.748
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      7.530(CFS)
Total initial stream area =        4.900(Ac.)
Pervious area fraction = 0.500


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Process from Point/Station      100.000 to Point/Station       80.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of street segment elevation =   458.700(Ft.)
End of street segment elevation =   454.700(Ft.)
Length of street segment  =   963.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  17.000(Ft.)
Distance from crown to crossfall grade break  =  15.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  12.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
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 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =     11.076(CFS)
Depth of flow =   0.457(Ft.), Average velocity =   1.943(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  16.501(Ft.)
Flow velocity =   1.94(Ft/s)
Travel time =    8.26 min.     TC =   25.00  min.
 Adding area flow to street
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.724
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      1.628(In/Hr) for a    10.0 year storm
Subarea runoff =      6.953(CFS) for      5.900(Ac.)
Total runoff =     14.483(CFS)   Total area =      10.800(Ac.)
Street flow at end of street =     14.483(CFS)
Half street flow at end of street =      7.242(CFS)
Depth of flow =   0.489(Ft.), Average velocity =   2.137(Ft/s)
Note:  depth of flow exceeds top of street crown.
Flow width (from curb towards crown)=  17.000(Ft.)


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Process from Point/Station       80.000 to Point/Station       80.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =     10.800(Ac.)
Runoff from this stream =     14.483(CFS)
Time of concentration =   25.00 min.
Rainfall intensity =     1.628(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       16.011     15.87                2.119
2       14.483     25.00                1.628
Largest stream flow has longer or shorter time of concentration
Qp =     16.011 + sum of
         Qa          Tb/Ta
         14.483 *    0.635 =      9.192
Qp =     25.204

Total of 2 streams to confluence:
Flow rates before confluence point:
      16.011      14.483
Area of streams before confluence:
       10.840       10.800
Results of confluence:
Total flow rate =     25.204(CFS)
Time of concentration =    15.870 min.
Effective stream area after confluence =     21.640(Ac.)


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Process from Point/Station       80.000 to Point/Station       80.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     21.640(Ac.)
Runoff from this stream =     25.204(CFS)
Time of concentration =   15.87 min.
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Rainfall intensity =     2.119(In/Hr)
Program is now starting with Main Stream No. 2


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Process from Point/Station      110.000 to Point/Station      120.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   895.000(Ft.)
Top (of initial area) elevation =   460.000(Ft.)
Bottom (of initial area) elevation =   454.700(Ft.)
Difference in elevation =     5.300(Ft.)
Slope =    0.00592  s(percent)=       0.59
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   16.493 min.
Rainfall intensity =      2.073(In/Hr) for a    10.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.749
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      3.477(CFS)
Total initial stream area =        2.240(Ac.)
Pervious area fraction = 0.500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      120.000 to Point/Station      120.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      2.240(Ac.)
Runoff from this stream =      3.477(CFS)
Time of concentration =   16.49 min.
Rainfall intensity =     2.073(In/Hr)


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Process from Point/Station      130.000 to Point/Station      120.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   175.000(Ft.)
Top (of initial area) elevation =   455.600(Ft.)
Bottom (of initial area) elevation =   454.700(Ft.)
Difference in elevation =     0.900(Ft.)
Slope =    0.00514  s(percent)=       0.51
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.832 min.
Rainfall intensity =      2.977(In/Hr) for a    10.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.783
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      0.256(CFS)
Total initial stream area =        0.110(Ac.)
Pervious area fraction = 0.500


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Process from Point/Station      120.000 to Point/Station      120.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
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```
Stream flow area =      0.110(Ac.)
Runoff from this stream =      0.256(CFS)
Time of concentration =    8.83 min.
Rainfall intensity =     2.977(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        3.477     16.49                2.073
2        0.256      8.83                2.977
Largest stream flow has longer time of concentration
Qp =      3.477 + sum of
         Qb         Ia/Ib
          0.256 *    0.696 =      0.178
Qp =      3.655

Total of 2 streams to confluence:
Flow rates before confluence point:
       3.477       0.256
Area of streams before confluence:
        2.240        0.110
Results of confluence:
Total flow rate =      3.655(CFS)
Time of concentration =    16.493 min.
Effective stream area after confluence =      2.350(Ac.)


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Process from Point/Station      120.000 to Point/Station       80.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      2.350(Ac.)
Runoff from this stream =      3.655(CFS)
Time of concentration =   16.49 min.
Rainfall intensity =     2.073(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       25.204     15.87           2.119
2        3.655     16.49           2.073
Largest stream flow has longer or shorter time of concentration
Qp =     25.204 + sum of
         Qa          Tb/Ta
          3.655 *    0.962 =      3.517
Qp =     28.721

Total of 2 main streams to confluence:
Flow rates before confluence point:
      25.204       3.655
Area of streams before confluence:
       21.640        2.350


Results of confluence:
Total flow rate =     28.721(CFS)
Time of concentration =    15.870 min.
Effective stream area after confluence  =     23.990(Ac.)


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Process from Point/Station       80.000 to Point/Station      120.000
**** STREET INLET + AREA  + PIPE  TRAVEL TIME ****
________________________________________________________________________
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Note: Although the street flow is not equal on both sides, this 2-inlet option is used here because the street crown is lower than the top of curb and these are sump catch basins.

```
Top of street segment elevation =   454.710(Ft.)
End of street segment elevation =   454.700(Ft.)
Length of street segment  =     0.100(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  17.000(Ft.)
Distance from crown to crossfall grade break  =  15.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  11.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
User-specified maximum inlet flow capacity of     12.948(CFS)
Number of street inlets = 2
Note: Single inlet capacity is greater than 1/2 street flow

Pipe calculations for under street flow rate of     28.721(CFS)
Using a pipe slope =      0.500 %
Upstream point/station elevation =   454.710(Ft.)
Downstream point/station elevation =   454.700(Ft.)
Pipe length  =     0.10(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    28.721(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    28.721(CFS)
Normal flow depth in pipe =   24.33(In.)
Flow top width inside pipe =   23.49(In.)
Critical Depth =   21.91(In.)
Pipe flow velocity =      6.74(Ft/s)
Travel time through pipe =    0.00 min.
Time of concentration (TC) =    15.87 min.
Maximum flow rate of street inlet(s) =     12.948(CFS)
Maximum pipe flow capacity =     28.721(CFS)
Remaining flow in street below inlet =      0.000(CFS)
Sump condition with all flow intercepted by street inlet
Insignificant sub-area being added to street
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.751
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      2.119(In/Hr) for a    10.0 year storm
Subarea runoff =      0.000(CFS) for      0.000(Ac.)
Total runoff =     28.721(CFS)   Total area =      23.990(Ac.)


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Process from Point/Station      120.000 to Point/Station      130.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   451.000(Ft.)
Downstream point/station elevation =   446.000(Ft.)
Pipe length  =    27.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    28.721(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    28.721(CFS)
Normal flow depth in pipe =   10.42(In.)
Flow top width inside pipe =   17.78(In.)
Critical depth could not be calculated.
Pipe flow velocity =     27.09(Ft/s)
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Travel time through pipe =    0.02 min.
Time of concentration (TC) =    15.89 min.


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Process from Point/Station      130.000 to Point/Station      130.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     23.990(Ac.)
Runoff from this stream =     28.721(CFS)
Time of concentration =   15.89 min.
Rainfall intensity =     2.118(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       90.000 to Point/Station      140.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   918.000(Ft.)
Top (of initial area) elevation =   464.000(Ft.)
Bottom (of initial area) elevation =   458.400(Ft.)
Difference in elevation =     5.600(Ft.)
Slope =    0.00610  s(percent)=       0.61
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   16.563 min.
Rainfall intensity =      2.068(In/Hr) for a    10.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.749
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      7.043(CFS)
Total initial stream area =        4.550(Ac.)
Pervious area fraction = 0.500


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Process from Point/Station      140.000 to Point/Station      150.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =   458.400(Ft.)
End of street segment elevation =   453.900(Ft.)
Length of street segment  =   959.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  17.000(Ft.)
Distance from crown to crossfall grade break  =  15.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  11.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =     10.469(CFS)
Depth of flow =   0.442(Ft.), Average velocity =   2.008(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  15.750(Ft.)
Flow velocity =   2.01(Ft/s)
Travel time =    7.96 min.     TC =   24.52  min.
 Adding area flow to street
SINGLE FAMILY (1/4 Acre Lot)
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```
Runoff Coefficient = 0.725
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      1.647(In/Hr) for a    10.0 year storm
Subarea runoff =      6.721(CFS) for      5.630(Ac.)
Total runoff =     13.764(CFS)   Total area =      10.180(Ac.)
Street flow at end of street =     13.764(CFS)
Half street flow at end of street =      6.882(CFS)
Depth of flow =   0.476(Ft.), Average velocity =   2.173(Ft/s)
Note:  depth of flow exceeds top of street crown.
Flow width (from curb towards crown)=  17.000(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      150.000 to Point/Station      160.000
**** STREET INLET + AREA  + PIPE  TRAVEL TIME ****
________________________________________________________________________
Top of street segment elevation =   453.900(Ft.)
End of street segment elevation =   451.400(Ft.)
Length of street segment  =   521.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  17.000(Ft.)
Distance from crown to crossfall grade break  =  15.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  11.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150

Street Inlet Calculations:
Street flow before street inlet =     13.764(CFS)
Half street flow before street inlet =      6.882(CFS)
Existing pipe flow before street inlet =      0.000(CFS)
Number of street inlets = 2
Depth of flow =   0.786(Ft.), Average velocity =   2.203(Ft/s)
U.S. DOT Hydraulic Engineering Circular No. 12 curb inlet calculations:
 Street flow half width at start of inlet =     16.321(Ft.)
 Flow rate in gutter section of street = Qw =      3.436(CFS)
 Ratio of frontal flow to total flow = E0 =  0.4993
 Given curb inlet length  L =      7.000(Ft.)
Street slope is less than .5% , depth of flow indicates a weir flow
condition exists for an opening height of   10.00(In.)
Using equation Qweir = 2.3(1.25 for SI) (L + 1.8W)d^1.5)
Total inlet flow capacity=     17.002(CFS)

Half street cross section data points at curb inlet:
              X-coordinate (Ft.)   Y-coordinate (Ft.)
             0.0000             1.0533 right of way
            11.0000             0.8333 top of curb
            11.0000             0.0000 flow line
            13.0000             0.5000 gutter/depression end
            13.0000             0.5000 grade break
            28.0000             0.8000 crown
 Gutter depression depth =      4.000(In.)
 Gutter depression width =      2.000(Ft.)
 Efficiency = 1 - (1-L/Lt)^1.8 =  1.0000
Note: Single inlet capacity is greater than 1/2 street flow

Pipe calculations for under street flow rate of     13.764(CFS)
Using a pipe slope =      0.500 %
Upstream point/station elevation =   453.900(Ft.)
```

```
Downstream point/station elevation =   451.400(Ft.)
Pipe length  =   521.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    13.764(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    13.764(CFS)
Normal flow depth in pipe =   17.16(In.)
Flow top width inside pipe =   21.67(In.)
Critical Depth =   16.03(In.)
Pipe flow velocity =      5.73(Ft/s)
Travel time through pipe =    1.52 min.
Time of concentration (TC) =    26.04 min.
Maximum flow rate of street inlet(s) =     13.764(CFS)
Maximum pipe flow capacity =     13.764(CFS)
Remaining flow in street below inlet =      0.000(CFS)
 Adding area flow to street
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.721
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      1.590(In/Hr) for a    10.0 year storm
Subarea runoff =      3.361(CFS) for      2.930(Ac.)
Total runoff =     17.125(CFS)   Total area =      13.110(Ac.)
Street flow at end of street =      3.361(CFS)
Half street flow at end of street =      1.680(CFS)
Depth of flow =   0.322(Ft.), Average velocity =   1.549(Ft/s)
Flow width (from curb towards crown)=   9.790(Ft.)


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Process from Point/Station      160.000 to Point/Station      130.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   449.000(Ft.)
Downstream point/station elevation =   446.000(Ft.)
Pipe length  =    24.50(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    17.125(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =    17.125(CFS)
Normal flow depth in pipe =    9.76(In.)
Flow top width inside pipe =   14.30(In.)
Critical depth could not be calculated.
Pipe flow velocity =     20.26(Ft/s)
Travel time through pipe =    0.02 min.
Time of concentration (TC) =    26.06 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      130.000 to Point/Station      130.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     13.110(Ac.)
Runoff from this stream =     17.125(CFS)
Time of concentration =   26.06 min.
Rainfall intensity =     1.590(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       28.721     15.89           2.118
2       17.125     26.06           1.590
Largest stream flow has longer or shorter time of concentration
Qp =     28.721 + sum of
```

```
         Qa           Tb/Ta
         17.125 *     0.610 =      10.440
Qp =      39.161

Total of 2 main streams to confluence:
Flow rates before confluence point:
      28.721      17.125
Area of streams before confluence:
       23.990       13.110


Results of confluence:
Total flow rate =      39.161(CFS)
Time of concentration =    15.887 min.
Effective stream area after confluence  =     37.100(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      130.000 to Point/Station      130.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.764
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  78.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    15.89 min.
Rainfall intensity =      2.118(In/Hr) for a    10.0 year storm
Subarea runoff =      2.169(CFS) for      1.340(Ac.)
Total runoff =     41.330(CFS)    Total area =      38.440(Ac.)
End of computations, total study area =           38.44 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.517
Area averaged RI index number =  56.8
```

APPENDIX A.2

100-YEAR STORM EVENT

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
Rational Hydrology Study Date: 10/19/22 File:SEVILLA100.out

SEVILLA II
PROPOSED CONDITION
100-YEAR STORM
BY DP ON 10/19/22

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6482

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [Cathedral City] area used.
10 year storm 10 minute intensity = 2.770(In/Hr)
10 year storm 60 minute intensity = 0.980(In/Hr)
100 year storm 10 minute intensity = 4.520(In/Hr)
100 year storm 60 minute intensity = 1.600(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.600(In/Hr)
Slope of intensity duration curve = 0.5800

++
Process from Point/Station 10.000 to Point/Station 20.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 939.000(Ft.)
Top (of initial area) elevation = 463.000(Ft.)
Bottom (of initial area) elevation = 457.300(Ft.)
Difference in elevation = 5.700(Ft.)
Slope = 0.00607 s(percent)= 0.61
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 16.730 min.
Rainfall intensity = 3.356(In/Hr) for a 100.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.793
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 56.00
Pervious area fraction = 0.500; Impervious fraction = 0.500
Initial subarea runoff = 7.877(CFS)
Total initial stream area = 2.960(Ac.)
Pervious area fraction = 0.500

++
Process from Point/Station 20.000 to Point/Station 30.000

**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****

Top of street segment elevation = 457.300(Ft.)
End of street segment elevation = 455.900(Ft.)
Length of street segment = 266.000(Ft.)
Height of curb above gutter flowline = 6.0(In.)
Width of half street (curb to crown) = 17.000(Ft.)
Distance from crown to crossfall grade break = 15.000(Ft.)
Slope from gutter to grade break (v/hz) = 0.083
Slope from grade break to crown (v/hz) = 0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line = 11.000(Ft.)
Slope from curb to property line (v/hz) = 0.020
Gutter width = 2.000(Ft.)
Gutter hike from flowline = 2.000(In.)
Manning's N in gutter = 0.0150
Manning's N from gutter to grade break = 0.0150
Manning's N from grade break to crown = 0.0150
Estimated mean flow rate at midpoint of street = 9.050(CFS)
Depth of flow = 0.502(Ft.), Average velocity = 2.502(Ft/s)
Warning: depth of flow exceeds top of curb
Note: depth of flow exceeds top of street crown.
Distance that curb overflow reaches into property = 0.10(Ft.)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width = 17.000(Ft.)
Flow velocity = 2.50(Ft/s)
Travel time = 1.77 min. TC = 18.50 min.
Adding area flow to street
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.788
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 56.00
Pervious area fraction = 0.500; Impervious fraction = 0.500
Rainfall intensity = 3.166(In/Hr) for a 100.0 year storm
Subarea runoff = 2.270(CFS) for 0.910(Ac.)
Total runoff = 10.147(CFS) Total area = 3.870(Ac.)
Street flow at end of street = 10.147(CFS)
Half street flow at end of street = 10.147(CFS)
Depth of flow = 0.521(Ft.), Average velocity = 2.564(Ft/s)
Warning: depth of flow exceeds top of curb
Note: depth of flow exceeds top of street crown.
Distance that curb overflow reaches into property = 1.07(Ft.)
Flow width (from curb towards crown)= 17.000(Ft.)

++
Process from Point/Station 30.000 to Point/Station 30.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area = 3.870(Ac.)
Runoff from this stream = 10.147(CFS)
Time of concentration = 18.50 min.
Rainfall intensity = 3.166(In/Hr)
Program is now starting with Main Stream No. 2

++
Process from Point/Station 40.000 to Point/Station 50.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 856.000(Ft.)
Top (of initial area) elevation = 463.000(Ft.)
Bottom (of initial area) elevation = 457.300(Ft.)
Difference in elevation = 5.700(Ft.)
Slope = 0.00666 s(percent)= 0.67

```
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.826 min.
Rainfall intensity =      3.466(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.796
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      4.770(CFS)
Total initial stream area =        1.730(Ac.)
Pervious area fraction = 0.500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       50.000 to Point/Station       50.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      1.730(Ac.)
Runoff from this stream =      4.770(CFS)
Time of concentration =   15.83 min.
Rainfall intensity =     3.466(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       60.000 to Point/Station       50.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   638.000(Ft.)
Top (of initial area) elevation =   461.300(Ft.)
Bottom (of initial area) elevation =   457.300(Ft.)
Difference in elevation =     4.000(Ft.)
Slope =    0.00627  s(percent)=       0.63
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.241 min.
Rainfall intensity =      3.685(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.800
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      9.644(CFS)
Total initial stream area =        3.270(Ac.)
Pervious area fraction = 0.500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       50.000 to Point/Station       50.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      3.270(Ac.)
Runoff from this stream =      9.644(CFS)
Time of concentration =   14.24 min.
Rainfall intensity =     3.685(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        4.770     15.83                3.466
2        9.644     14.24                3.685
Largest stream flow has longer or shorter time of concentration
```

```
Qp =      9.644 + sum of
        Qa          Tb/Ta
         4.770 *    0.900 =      4.292
Qp =     13.936

Total of 2 streams to confluence:
Flow rates before confluence point:
       4.770       9.644
Area of streams before confluence:
        1.730        3.270
Results of confluence:
Total flow rate =     13.936(CFS)
Time of concentration =    14.241 min.
Effective stream area after confluence =      5.000(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       50.000 to Point/Station       30.000
**** STREET INLET + AREA  + PIPE  TRAVEL TIME ****
________________________________________________________________________
Top of street segment elevation =   457.300(Ft.)
End of street segment elevation =   455.900(Ft.)
Length of street segment  =   266.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  17.000(Ft.)
Distance from crown to crossfall grade break  =  15.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  11.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150

Street Inlet Calculations:
Street flow before street inlet =     13.936(CFS)
Half street flow before street inlet =     13.936(CFS)
Existing pipe flow before street inlet =      0.000(CFS)
Number of street inlets = 1
Depth of flow =   0.893(Ft.), Average velocity =   2.778(Ft/s)
U.S. DOT Hydraulic Engineering Circular No. 12 curb inlet calculations:
 Street flow half width at start of inlet =     17.000(Ft.)
 Flow rate in gutter section of street = Qw =      3.751(CFS)
 Ratio of frontal flow to total flow = E0 =  0.2692
 Given curb inlet length  L =      7.000(Ft.)

Half street cross section data points at curb inlet:
              X-coordinate (Ft.)   Y-coordinate (Ft.)
             0.0000             1.0533 right of way
            11.0000             0.8333 top of curb
            11.0000             0.0000 flow line
            13.0000             0.5000 gutter/depression end
            13.0000             0.5000 grade break
            28.0000             0.8000 crown
 Length required for total flow interception = Lt
 Lt = .6 * Q^0.42 * Slope^.3 * (1/(n*Se)^.6 =     16.046(Ft.)
 where Manning's n = 0.0150 and Slope = street slope =  0.0053
 Se = Equivalent Street x-slope including depression =  0.1279
 Gutter depression depth =      4.000(In.)
 Gutter depression width =      2.000(Ft.)
 Efficiency = 1 - (1-L/Lt)^1.8 =  0.6436

Pipe calculations for under street flow rate of      8.969(CFS)
Using a pipe slope =      0.500 %
Upstream point/station elevation =   457.300(Ft.)
Downstream point/station elevation =   455.900(Ft.)
Pipe length  =   266.00(Ft.)   Manning's N = 0.013
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```
No. of pipes = 1  Required pipe flow  =     8.969(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =     8.969(CFS)
Normal flow depth in pipe =   14.21(In.)
Flow top width inside pipe =   19.64(In.)
Critical Depth =   13.37(In.)
Pipe flow velocity =      5.18(Ft/s)
Travel time through pipe =    0.86 min.
Time of concentration (TC) =    15.10 min.
Maximum flow rate of street inlet(s) =      8.969(CFS)
Maximum pipe flow capacity =      8.969(CFS)
Remaining flow in street below inlet =      4.967(CFS)
 Adding area flow to street
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.798
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      3.562(In/Hr) for a   100.0 year storm
Subarea runoff =      0.455(CFS) for      0.160(Ac.)
Total runoff =     14.390(CFS)    Total area =       5.160(Ac.)
Street flow at end of street =      5.422(CFS)
Half street flow at end of street =      5.422(CFS)
Depth of flow =   0.439(Ft.), Average velocity =   2.115(Ft/s)
Flow width (from curb towards crown)=  15.610(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       30.000 to Point/Station       30.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      5.160(Ac.)
Runoff from this stream =     14.390(CFS)
Time of concentration =   15.10 min.
Rainfall intensity =     3.562(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       10.147     18.50           3.166
2       14.390     15.10           3.562
Largest stream flow has longer or shorter time of concentration
Qp =     14.390 + sum of
         Qa          Tb/Ta
         10.147 *    0.816 =      8.280
Qp =     22.671

Total of 2 main streams to confluence:
Flow rates before confluence point:
      10.147      14.390
Area of streams before confluence:
        3.870        5.160


Results of confluence:
Total flow rate =     22.671(CFS)
Time of concentration =    15.098 min.
Effective stream area after confluence  =      9.030(Ac.)


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Process from Point/Station       30.000 to Point/Station       30.000
**** CONFLUENCE OF MINOR STREAMS ****
```

```
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      9.030(Ac.)
Runoff from this stream =     22.671(CFS)
Time of concentration =   15.10 min.
Rainfall intensity =     3.562(In/Hr)


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Process from Point/Station       70.000 to Point/Station       30.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   658.000(Ft.)
Top (of initial area) elevation =   460.000(Ft.)
Bottom (of initial area) elevation =   455.900(Ft.)
Difference in elevation =     4.100(Ft.)
Slope =    0.00623  s(percent)=       0.62
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.436 min.
Rainfall intensity =      3.656(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.800
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      4.853(CFS)
Total initial stream area =        1.660(Ac.)
Pervious area fraction = 0.500


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Process from Point/Station       30.000 to Point/Station       30.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      1.660(Ac.)
Runoff from this stream =      4.853(CFS)
Time of concentration =   14.44 min.
Rainfall intensity =     3.656(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       22.671     15.10                3.562
2        4.853     14.44                3.656
Largest stream flow has longer time of concentration
Qp =     22.671 + sum of
         Qb         Ia/Ib
          4.853 *    0.974 =      4.729
Qp =     27.400

Total of 2 streams to confluence:
Flow rates before confluence point:
      22.671       4.853
Area of streams before confluence:
        9.030        1.660
Results of confluence:
Total flow rate =     27.400(CFS)
Time of concentration =    15.098 min.
Effective stream area after confluence =     10.690(Ac.)


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Process from Point/Station       30.000 to Point/Station       80.000
**** STREET INLET + AREA  + PIPE  TRAVEL TIME ****
```

```
Top of street segment elevation =   455.900(Ft.)
End of street segment elevation =   454.700(Ft.)
Length of street segment  =   243.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  17.000(Ft.)
Distance from crown to crossfall grade break  =  15.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  11.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150

Street Inlet Calculations:
Street flow before street inlet =     18.431(CFS)
Half street flow before street inlet =     18.431(CFS)
Existing pipe flow before street inlet =      8.969(CFS)
Number of street inlets = 1
Depth of flow =   0.957(Ft.), Average velocity =   2.878(Ft/s)
U.S. DOT Hydraulic Engineering Circular No. 12 curb inlet calculations:
 Street flow half width at start of inlet =     17.000(Ft.)
 Flow rate in gutter section of street = Qw =      4.155(CFS)
 Ratio of frontal flow to total flow = E0 =  0.2254
 Given curb inlet length  L =     14.000(Ft.)
Street slope is less than .5% , depth of flow indicates an orifice flow
condition exists for an opening height of   10.00(In.)
Using equation Qi = .67hL(2gd0)^.5
Total inlet flow capacity=     46.114(CFS)

Half street cross section data points at curb inlet:
              X-coordinate (Ft.)   Y-coordinate (Ft.)
             0.0000             1.0533 right of way
            11.0000             0.8333 top of curb
            11.0000             0.0000 flow line
            13.0000             0.5000 gutter/depression end
            13.0000             0.5000 grade break
            28.0000             0.8000 crown
 Gutter depression depth =      4.000(In.)
 Gutter depression width =      2.000(Ft.)
 Efficiency = 1 - (1-L/Lt)^1.8 =  1.0000
Note: Single inlet capacity is greater than 1/2 street flow

Pipe calculations for under street flow rate of     27.400(CFS)
Using a pipe slope =      0.500 %
Upstream point/station elevation =   455.900(Ft.)
Downstream point/station elevation =   454.700(Ft.)
Pipe length  =   243.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    27.400(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    27.400(CFS)
Normal flow depth in pipe =   23.20(In.)
Flow top width inside pipe =   25.12(In.)
Critical Depth =   21.40(In.)
Pipe flow velocity =      6.72(Ft/s)
Travel time through pipe =    0.60 min.
Time of concentration (TC) =    15.70 min.
Maximum flow rate of street inlet(s) =     18.431(CFS)
Maximum pipe flow capacity =     27.400(CFS)
Remaining flow in street below inlet =      0.000(CFS)
 Adding area flow to street
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.796
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
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Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      3.482(In/Hr) for a   100.0 year storm
Subarea runoff =      0.416(CFS) for      0.150(Ac.)
Total runoff =     27.815(CFS)    Total area =      10.840(Ac.)
Street flow at end of street =      0.416(CFS)
Half street flow at end of street =      0.416(CFS)
Depth of flow =   0.221(Ft.), Average velocity =   1.189(Ft/s)
Flow width (from curb towards crown)=   4.721(Ft.)


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Process from Point/Station       80.000 to Point/Station       80.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     10.840(Ac.)
Runoff from this stream =     27.815(CFS)
Time of concentration =   15.70 min.
Rainfall intensity =     3.482(In/Hr)


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Process from Point/Station       90.000 to Point/Station      100.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   918.000(Ft.)
Top (of initial area) elevation =   464.000(Ft.)
Bottom (of initial area) elevation =   458.700(Ft.)
Difference in elevation =     5.300(Ft.)
Slope =    0.00577  s(percent)=       0.58
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   16.746 min.
Rainfall intensity =      3.354(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.793
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =     13.031(CFS)
Total initial stream area =        4.900(Ac.)
Pervious area fraction = 0.500


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Process from Point/Station      100.000 to Point/Station       80.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of street segment elevation =   458.700(Ft.)
End of street segment elevation =   454.700(Ft.)
Length of street segment  =   963.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  17.000(Ft.)
Distance from crown to crossfall grade break  =  15.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  12.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =     19.360(CFS)
Depth of flow =   0.534(Ft.), Average velocity =   2.313(Ft/s)
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```
Warning: depth of flow exceeds top of curb
Note:  depth of flow exceeds top of street crown.
Distance that curb overflow reaches into property =    1.69(Ft.)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  17.000(Ft.)
Flow velocity =   2.31(Ft/s)
Travel time =    6.94 min.     TC =   23.69  min.
 Adding area flow to street
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.776
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      2.743(In/Hr) for a   100.0 year storm
Subarea runoff =     12.553(CFS) for      5.900(Ac.)
Total runoff =     25.585(CFS)    Total area =      10.800(Ac.)
Street flow at end of street =     25.585(CFS)
Half street flow at end of street =     12.792(CFS)
Depth of flow =   0.585(Ft.), Average velocity =   2.460(Ft/s)
Warning: depth of flow exceeds top of curb
Note:  depth of flow exceeds top of street crown.
Distance that curb overflow reaches into property =    4.23(Ft.)
Flow width (from curb towards crown)=  17.000(Ft.)


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Process from Point/Station       80.000 to Point/Station       80.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =     10.800(Ac.)
Runoff from this stream =     25.585(CFS)
Time of concentration =   23.69 min.
Rainfall intensity =     2.743(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                  (In/Hr)


1       27.815     15.70                3.482
2       25.585     23.69                2.743
Largest stream flow has longer or shorter time of concentration
Qp =     27.815 + sum of
         Qa          Tb/Ta
         25.585 *    0.663 =     16.959
Qp =     44.774

Total of 2 streams to confluence:
Flow rates before confluence point:
      27.815      25.585
Area of streams before confluence:
       10.840       10.800
Results of confluence:
Total flow rate =     44.774(CFS)
Time of concentration =    15.700 min.
Effective stream area after confluence =     21.640(Ac.)


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Process from Point/Station       80.000 to Point/Station       80.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     21.640(Ac.)
Runoff from this stream =     44.774(CFS)
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```
Time of concentration =   15.70 min.
Rainfall intensity =     3.482(In/Hr)
Program is now starting with Main Stream No. 2


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Process from Point/Station      110.000 to Point/Station      120.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   895.000(Ft.)
Top (of initial area) elevation =   460.000(Ft.)
Bottom (of initial area) elevation =   454.700(Ft.)
Difference in elevation =     5.300(Ft.)
Slope =    0.00592  s(percent)=       0.59
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   16.493 min.
Rainfall intensity =      3.384(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.794
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      6.015(CFS)
Total initial stream area =        2.240(Ac.)
Pervious area fraction = 0.500


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Process from Point/Station      120.000 to Point/Station      120.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      2.240(Ac.)
Runoff from this stream =      6.015(CFS)
Time of concentration =   16.49 min.
Rainfall intensity =     3.384(In/Hr)


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Process from Point/Station      130.000 to Point/Station      120.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   175.000(Ft.)
Top (of initial area) elevation =   455.600(Ft.)
Bottom (of initial area) elevation =   454.700(Ft.)
Difference in elevation =     0.900(Ft.)
Slope =    0.00514  s(percent)=       0.51
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.832 min.
Rainfall intensity =      4.861(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.820
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      0.439(CFS)
Total initial stream area =        0.110(Ac.)
Pervious area fraction = 0.500


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Process from Point/Station      120.000 to Point/Station      120.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
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Along Main Stream number: 2 in normal stream number 2
Stream flow area =      0.110(Ac.)
Runoff from this stream =      0.439(CFS)
Time of concentration =    8.83 min.
Rainfall intensity =     4.861(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        6.015     16.49                 3.384
2        0.439      8.83                 4.861
Largest stream flow has longer time of concentration
Qp =      6.015 + sum of
         Qb         Ia/Ib
          0.439 *    0.696 =      0.305
Qp =      6.321

Total of 2 streams to confluence:
Flow rates before confluence point:
       6.015       0.439
Area of streams before confluence:
        2.240        0.110
Results of confluence:
Total flow rate =      6.321(CFS)
Time of concentration =    16.493 min.
Effective stream area after confluence =      2.350(Ac.)


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Process from Point/Station      120.000 to Point/Station       80.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      2.350(Ac.)
Runoff from this stream =      6.321(CFS)
Time of concentration =   16.49 min.
Rainfall intensity =     3.384(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       44.774     15.70            3.482
2        6.321     16.49            3.384
Largest stream flow has longer or shorter time of concentration
Qp =     44.774 + sum of
         Qa          Tb/Ta
          6.321 *    0.952 =      6.017
Qp =     50.791

Total of 2 main streams to confluence:
Flow rates before confluence point:
      44.774       6.321
Area of streams before confluence:
       21.640        2.350


Results of confluence:
Total flow rate =     50.791(CFS)
Time of concentration =    15.700 min.
Effective stream area after confluence  =     23.990(Ac.)


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Process from Point/Station       80.000 to Point/Station      120.000
**** STREET INLET + AREA  + PIPE  TRAVEL TIME ****
```

Note: Although the street flow is not equal on both sides, this 2-inlet option is used here because the street crown is lower than the top of curb and these are sump catch basins.

```
Top of street segment elevation =   454.710(Ft.)
End of street segment elevation =   454.700(Ft.)
Length of street segment  =     0.100(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  17.000(Ft.)
Distance from crown to crossfall grade break  =  15.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  11.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
User-specified maximum inlet flow capacity of     12.948(CFS)
Number of street inlets = 2
Note: Single inlet capacity is greater than 1/2 street flow

Pipe calculations for under street flow rate of     50.791(CFS)
Using a pipe slope =      0.500 %
Upstream point/station elevation =   454.710(Ft.)
Downstream point/station elevation =   454.700(Ft.)
Pipe length  =     0.10(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    50.791(CFS)
Nearest computed pipe diameter  =     39.00(In.)
Calculated individual pipe flow  =    50.791(CFS)
Normal flow depth in pipe =   28.13(In.)
Flow top width inside pipe =   34.98(In.)
Critical Depth =   27.30(In.)
Pipe flow velocity =      7.93(Ft/s)
Travel time through pipe =    0.00 min.
Time of concentration (TC) =    15.70 min.
Maximum flow rate of street inlet(s) =     23.392(CFS)
Maximum pipe flow capacity =     50.791(CFS)
Remaining flow in street below inlet =      0.000(CFS)
Sump condition with all flow intercepted by street inlet
Insignificant sub-area being added to street
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.796
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      3.482(In/Hr) for a   100.0 year storm
Subarea runoff =      0.000(CFS) for      0.000(Ac.)
Total runoff =     50.791(CFS)   Total area =      23.990(Ac.)


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Process from Point/Station      120.000 to Point/Station      130.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   451.000(Ft.)
Downstream point/station elevation =   446.000(Ft.)
Pipe length  =    27.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    50.791(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    50.791(CFS)
Normal flow depth in pipe =   13.50(In.)
Flow top width inside pipe =   20.12(In.)
Critical depth could not be calculated.
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Pipe flow velocity =     31.07(Ft/s)
Travel time through pipe =    0.01 min.
Time of concentration (TC) =    15.72 min.


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Process from Point/Station      130.000 to Point/Station      130.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     23.990(Ac.)
Runoff from this stream =     50.791(CFS)
Time of concentration =   15.72 min.
Rainfall intensity =     3.480(In/Hr)
Program is now starting with Main Stream No. 2


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Process from Point/Station       90.000 to Point/Station      140.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   918.000(Ft.)
Top (of initial area) elevation =   464.000(Ft.)
Bottom (of initial area) elevation =   458.400(Ft.)
Difference in elevation =     5.600(Ft.)
Slope =    0.00610  s(percent)=       0.61
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   16.563 min.
Rainfall intensity =      3.376(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.793
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =     12.186(CFS)
Total initial stream area =        4.550(Ac.)
Pervious area fraction = 0.500


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Process from Point/Station      140.000 to Point/Station      150.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =   458.400(Ft.)
End of street segment elevation =   453.900(Ft.)
Length of street segment  =   959.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  17.000(Ft.)
Distance from crown to crossfall grade break  =  15.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  11.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =     18.347(CFS)
Depth of flow =   0.514(Ft.), Average velocity =   2.398(Ft/s)
Warning: depth of flow exceeds top of curb
Note:  depth of flow exceeds top of street crown.
Distance that curb overflow reaches into property =    0.70(Ft.)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  17.000(Ft.)
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```
Flow velocity =   2.40(Ft/s)
Travel time =    6.66 min.     TC =   23.23  min.
 Adding area flow to street
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.777
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      2.774(In/Hr) for a   100.0 year storm
Subarea runoff =     12.131(CFS) for      5.630(Ac.)
Total runoff =     24.317(CFS)   Total area =      10.180(Ac.)
Street flow at end of street =     24.317(CFS)
Half street flow at end of street =     12.159(CFS)
Depth of flow =   0.564(Ft.), Average velocity =   2.550(Ft/s)
Warning: depth of flow exceeds top of curb
Note:  depth of flow exceeds top of street crown.
Distance that curb overflow reaches into property =    3.18(Ft.)
Flow width (from curb towards crown)=  17.000(Ft.)


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Process from Point/Station      150.000 to Point/Station      160.000
**** STREET INLET + AREA  + PIPE  TRAVEL TIME ****
________________________________________________________________________
Top of street segment elevation =   453.900(Ft.)
End of street segment elevation =   451.400(Ft.)
Length of street segment  =   521.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  17.000(Ft.)
Distance from crown to crossfall grade break  =  15.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  11.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150

Street Inlet Calculations:
Street flow before street inlet =     24.317(CFS)
Half street flow before street inlet =     12.159(CFS)
Existing pipe flow before street inlet =      0.000(CFS)
Number of street inlets = 2
Depth of flow =   0.875(Ft.), Average velocity =   2.603(Ft/s)
U.S. DOT Hydraulic Engineering Circular No. 12 curb inlet calculations:
 Street flow half width at start of inlet =     17.000(Ft.)
 Flow rate in gutter section of street = Qw =      3.605(CFS)
 Ratio of frontal flow to total flow = E0 =  0.2965
 Given curb inlet length  L =      7.000(Ft.)
Street slope is less than .5% , depth of flow indicates an orifice flow
condition exists for an opening height of   10.00(In.)
Using equation Qi = .67hL(2gd0)^.5
Total inlet flow capacity=     21.236(CFS)

Half street cross section data points at curb inlet:
              X-coordinate (Ft.)   Y-coordinate (Ft.)
             0.0000             1.0533 right of way
            11.0000             0.8333 top of curb
            11.0000             0.0000 flow line
            13.0000             0.5000 gutter/depression end
            13.0000             0.5000 grade break
            28.0000             0.8000 crown
 Gutter depression depth =      4.000(In.)
 Gutter depression width =      2.000(Ft.)
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```
 Efficiency = 1 - (1-L/Lt)^1.8 =  1.0000
Note: Single inlet capacity is greater than 1/2 street flow

Pipe calculations for under street flow rate of     24.317(CFS)
Using a pipe slope =      0.500 %
Upstream point/station elevation =   453.900(Ft.)
Downstream point/station elevation =   451.400(Ft.)
Pipe length  =   521.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    24.317(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    24.317(CFS)
Normal flow depth in pipe =   21.02(In.)
Flow top width inside pipe =   27.47(In.)
Critical Depth =   20.16(In.)
Pipe flow velocity =      6.62(Ft/s)
Travel time through pipe =    1.31 min.
Time of concentration (TC) =    24.54 min.
Maximum flow rate of street inlet(s) =     24.317(CFS)
Maximum pipe flow capacity =     24.317(CFS)
Remaining flow in street below inlet =      0.000(CFS)
 Adding area flow to street
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.774
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      2.687(In/Hr) for a   100.0 year storm
Subarea runoff =      6.093(CFS) for      2.930(Ac.)
Total runoff =     30.410(CFS)    Total area =      13.110(Ac.)
Street flow at end of street =      6.093(CFS)
Half street flow at end of street =      3.046(CFS)
Depth of flow =   0.379(Ft.), Average velocity =   1.779(Ft/s)
Flow width (from curb towards crown)=  12.594(Ft.)


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Process from Point/Station      160.000 to Point/Station      130.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   449.000(Ft.)
Downstream point/station elevation =   446.000(Ft.)
Pipe length  =    24.50(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    30.410(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    30.410(CFS)
Normal flow depth in pipe =   12.49(In.)
Flow top width inside pipe =   16.59(In.)
Critical depth could not be calculated.
Pipe flow velocity =     23.25(Ft/s)
Travel time through pipe =    0.02 min.
Time of concentration (TC) =    24.56 min.


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Process from Point/Station      130.000 to Point/Station      130.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     13.110(Ac.)
Runoff from this stream =     30.410(CFS)
Time of concentration =   24.56 min.
Rainfall intensity =     2.686(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                  (In/Hr)
```

```
1       50.791     15.72            3.480
2       30.410     24.56            2.686
Largest stream flow has longer or shorter time of concentration
Qp =     50.791 + sum of
         Qa          Tb/Ta
         30.410 *    0.640 =     19.461
Qp =     70.252

Total of 2 main streams to confluence:
Flow rates before confluence point:
      50.791      30.410
Area of streams before confluence:
       23.990       13.110


Results of confluence:
Total flow rate =     70.252(CFS)
Time of concentration =    15.715 min.
Effective stream area after confluence  =     37.100(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      130.000 to Point/Station      130.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.812
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  78.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    15.72 min.
Rainfall intensity =      3.480(In/Hr) for a   100.0 year storm
Subarea runoff =      3.788(CFS) for      1.340(Ac.)
Total runoff =     74.040(CFS)    Total area =      38.440(Ac.)
End of computations, total study area =           38.44 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.517
Area averaged RI index number =  56.8
```

APPENDIX B

STREET FLOODED WIDTH ANALYSIS SUPPLIMENTAL DATA

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APPENDIX B.1

10-YEAR CATCH BASIN SUMMARY

TRACT 38557 10-YEAR STORM CATCH BASIN SUMMARY										
CB ID	Subarea or Node	Q10 (cfs)	Q10 Captured (cfs)	Flow Condition	CB Size (ft)	Slope	Velocity at CB (fps)	*Q10 Flooded Depth U/S of CB (ft)	**Q10 Flooded Depth at CB (ft)	Velocity D/S of CB (fps)
1	A5	8.07	6.74	Flow-by	7	0.50%	2.38	0.47	0.80	1.59
2	A7	9.04	9.04	Flow-by	14	0.50%	2.44	0.49	0.82	N/A
3	80	6.47	6.47	Sump	14	0.50%	2.13	0.47	0.80	N/A
4	120	6.47	6.47	Sump	14	0.50%	2.13	0.47	0.80	N/A
5	150	6.88	6.88	Flow-by	7	0.50%	2.20	0.48	0.79	N/A
6	150	6.88	6.88	Flow-by	7	0.50%	2.20	0.48	0.79	N/A
7	160	3.36	3.36	Sump	14	0.50%	1.55	0.32	0.65	N/A

Note:
Per the CivilDesign manual, the Street Inlet + Parallel Pipe + Area option used assumes that a street inlet is to be installed at the top of that street segment or reach.

* Flooded depth with 6" curb and normal gutter depression
** Flooded depth with 6" curb plus 4" catch basin gutter depression

8.07 cfs is the flow rate produced from subareas A3&4.
9.04 cfs is the flow rate produced from subareas A1,2,5&6 plus the bypass from CB1, adjusted for time of concentration (TC).
12.95 cfs is the flow rate produced from subareas A7,8,9,10&11, adjusted for TC. See the next page for the normal depth calculation since the program did not show the output.
13.64 cfs is the flow rate produced from subareas A12&13.
3.36 cfs is the flow rate producted from subarea A14.

Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Tuesday, Nov 1 2022

10-Yr Normal Depth Street Flow 80-120 Adjusted for TC

User-defined

Invert Elev (ft)	= 0.17
Slope (%)	= 0.50
N-Value	= 0.015

Calculations

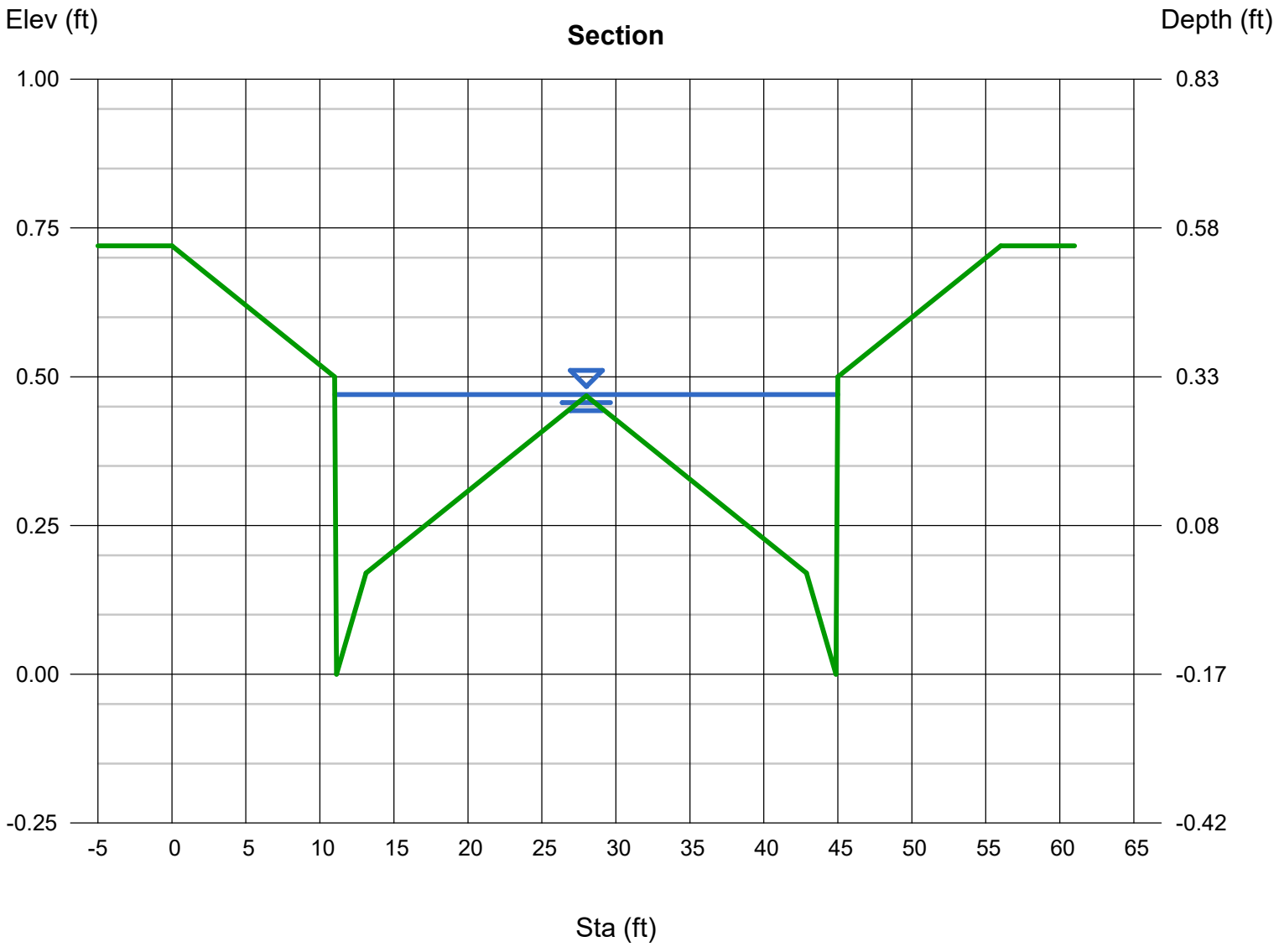
Compute by:	Known Q
Known Q (cfs)	= 12.95

Highlighted

Depth (ft)	= 0.30
Q (cfs)	= 12.95
Area (sqft)	= 6.09
Velocity (ft/s)	= 2.13
Wetted Perim (ft)	= 34.74
Crit Depth, Yc (ft)	= 0.29
Top Width (ft)	= 33.99
EGL (ft)	= 0.37

(Sta, El, n)-(Sta, El, n)...

(0.00, 0.72)-(11.00, 0.50, 0.015)-(13.13, 0.17, 0.015)-(28.00, 0.47, 0.015)-(42.88, 0.17, 0.015)-(45.00, 0.50, 0.015)-(56.00, 0.72, 0.015)



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APPENDIX B.2

100-YEAR CATCH BASIN SUMMARY

TRACT 38557 100-YEAR STORM CATCH BASIN SUMMARY										
CB ID	Subarea or Node	Q100 (cfs)	Q100 Captured (cfs)	Flow Condition	CB Size (ft)	Slope	Velocity at CB (fps)	*Q100 Flooded Depth U/S of CB (ft)	**Q100 Flooded Depth at CB (ft)	Velocity D/S of CB (fps)
1	A5	13.94	8.97	Flow-by	7	0.50%	2.78	0.56	0.89	2.12
2	A7	18.43	18.43	Flow-by	14	0.50%	2.88	0.63	0.96	N/A
3	80	11.70	11.7	Sump	14	0.50%	2.51	0.56	0.89	N/A
4	120	11.70	11.7	Sump	14	0.50%	2.51	0.56	0.89	N/A
5	150	12.16	12.16	Flow-by	7	0.50%	2.60	0.55	0.88	N/A
6	150	12.16	12.16	Flow-by	7	0.50%	2.60	0.55	0.88	N/A
7	160	6.09	6.09	Sump	14	0.50%	1.78	0.38	0.71	N/A

Note:
Per the CivilDesign manual, the Street Inlet + Parallel Pipe + Area option used assumes that a street inlet is to be installed at the top of that street segment or reach.

* Flooded depth with 6" curb and normal gutter depression (R/W is 0.22' higher than the top of curb for all streets except for Street B, which is 0.24' higher; i.e. 0.72'/0.74' is the maximum flooding allowed)
** Flooded depth with 6" curb plus 4" catch basin gutter depression

13.94 cfs is the flow rate produced from subareas A3&4.
18.43 cfs is the flow rate produced from subareas A1,2,5&6 plus the bypass from CB1, adjusted for time of concentration (TC).
23.39 cfs is the flow rate produced from subareas A7,8,9,10&11, adjusted for TC. See the next page for the normal depth calculation since the program did not show the output.
24.32 cfs is the flow rate produced from subareas A12&13.
6.09 cfs is the flow rate producted from subarea A14.

Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Tuesday, Nov 1 2022

100-Yr Normal Depth Street Flow 80-120 Adjusted for TC

User-defined

Invert Elev (ft)	= 0.17
Slope (%)	= 0.50
N-Value	= 0.015

Calculations

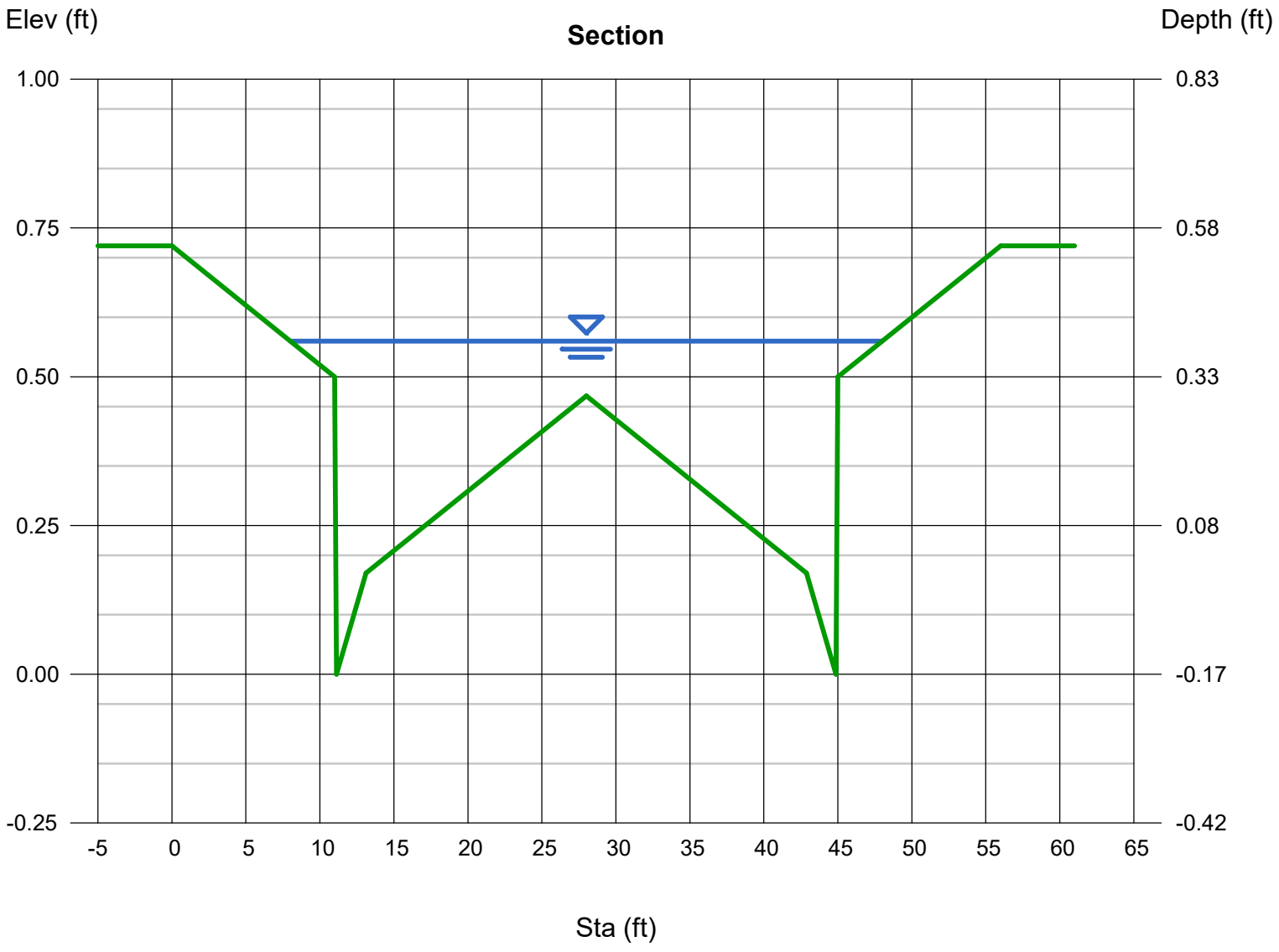
Compute by:	Known Q
Known Q (cfs)	= 23.39

Highlighted

Depth (ft)	= 0.39
Q (cfs)	= 23.39
Area (sqft)	= 9.33
Velocity (ft/s)	= 2.51
Wetted Perim (ft)	= 40.80
Crit Depth, Yc (ft)	= 0.38
Top Width (ft)	= 40.00
EGL (ft)	= 0.49

(Sta, El, n)-(Sta, El, n)...

(0.00, 0.72)-(11.00, 0.50, 0.015)-(13.13, 0.17, 0.015)-(28.00, 0.47, 0.015)-(42.88, 0.17, 0.015)-(45.00, 0.50, 0.015)-(56.00, 0.72, 0.015)



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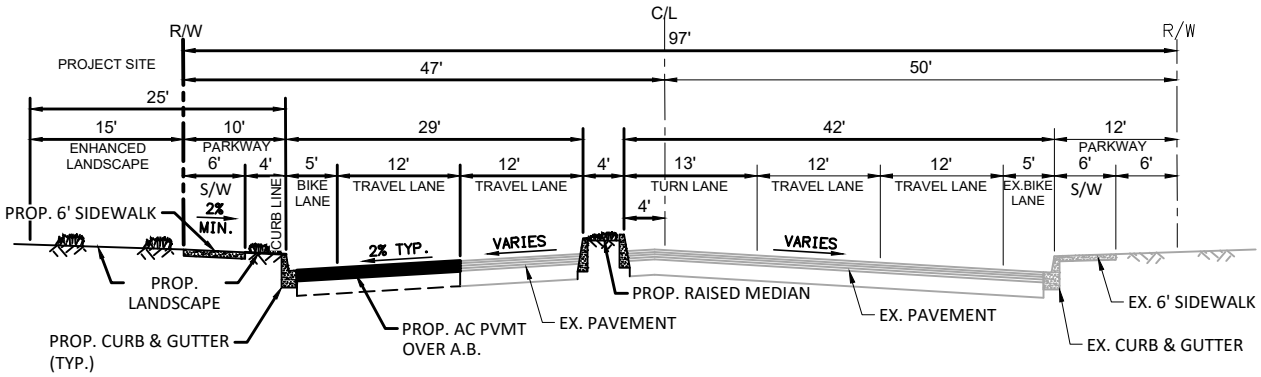
APPENDIX B.3

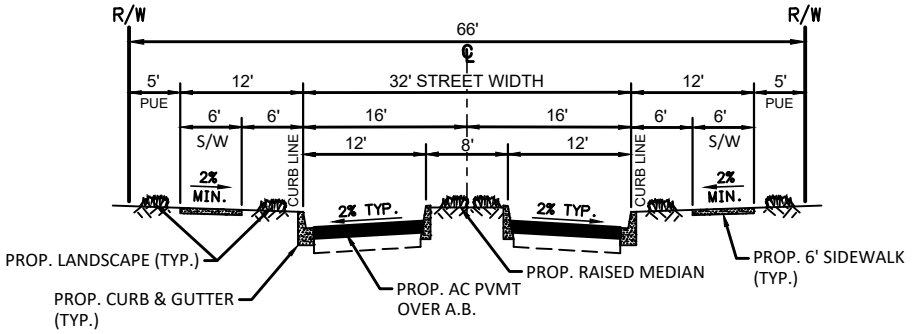
STREET SECTIONS

STREET SECTIONS



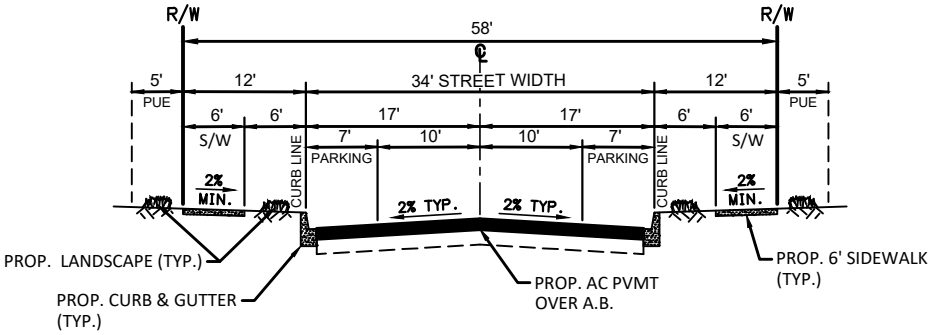
VAN BUREN STREET

TYPICAL SECTION (PUBLIC STREET)
N.T.S.



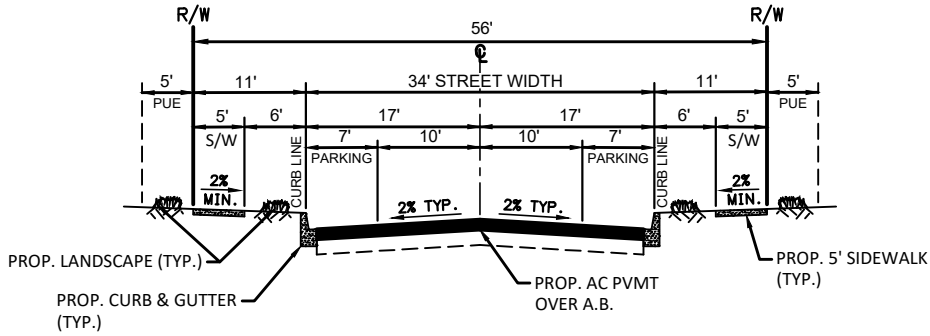
ENTRY WAY "A" & "F"

TYPICAL SECTION (PUBLIC STREET)
N.T.S.



RESIDENTIAL STREET "B"

TYPICAL SECTION (PUBLIC STREET)
N.T.S.



RESIDENTIAL STREET "C" - "I"

TYPICAL SECTION (PUBLIC STREET)
N.T.S.

APPENDIX D

RETENTION BASIN SIZING

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APPENDIX D.1

SHORT CUT SYNTHETIC HYDROGRAPH CALCULATIONS

SEVILLA II HYDROLOGY CALCULATIONS

Using the RCFC&WCD Short Cut Unit Hydrograph Method
Area Designations **Basin A**

Drainage Area (ac.)	**38.4400**				
Unit time (minutes)	**5**	**5**	**5**	**15**	
100 Year Storm Duration (hrs)	1	3	6	24	
Total Precipitation (Plates D-4.4,E-5.2, 5.4, 5.6)(in.)	**1.35**	**2.11**	**2.77**	**4.44**	Or data from NOAA interactive website
Soils Group	B				
AMC index II Runoff Number (plate E-6.1)	56				
Plate E-6.2 Pervious Area Loss Rate (Fp)(in/hr)	0.51	(AMC II)			
Percentage of Impervious Cover (Ai)(%) (plate E-6.3)		**55.00**			
Weighted Average Loss Rate (F=Fp(1-.9Ai))(in./hr.)	0.26	(used for 1, 3, and 6 hour storm, the 24 hour storm uses variable maximum loss rate per plate E-1.1 (3 of 6))			
Low Loss Rate Percent (%)	80				
Retention Basin Percolation Rate (in/hr)	**1.83**	(also used for drywell percolation rate)			

Percolation is taken incrementally.
Basin volume is calculated using the "truncated pyramid" formula, a more conservative estimate than "averaged end areas" sometimes used
Top of basin is 53,215.46 SF.
(Drywell can be "zeroed out" by reducing numbers to less than .001, but should not entered as zeros or program chokes.)
Drywell storage includes 40% of the 1' wide rock bed surrounding the drywell: formula (upper)*PI()*(diam/2)^2+(lower)*PI()*((diam/2)^2+0.4*((diam/2+(grav+0.4166))^2-(diam/2+0.4166)^2))
The drywell wall thickness is assumed at 5" (0.4166) and the gravel bed width is variable "grav"

Drywell design factors **Upper sec. (ft.)=** **5** **Lower sec. (ft.)=** **6** **Ring diam. (ft.) =** **4** **Drywell lower max. (cf)=** **119.38** **Upper max.(cf)=** **62.83**
Gravel bed width around drwyell= **1** ***Drywell total(cf)=** **364.42**
***Two drywells are proposed, has been multiplied by 2.**

Ret. Basin design (area, depth) **Top =** **53215.5** s.f. **Bot. =** **36731.84** **s.f.** **Max. Depth (d)=** **6** **Max. storage=** **268318.62** (d/3)*(bottom+top+(bottom*top)^0.50)
Formulas **vol=(h/3)*(bottom+top+(bottom*top)^0.50)** **area=bottom+(h/d)*(top-bottom)** **h=(vol*3)/(bottom+top+(bottom*top)^0.5)** **(values must be non-zero or error occurs)**
Outside input from: **N/A**

1 Hour Storm in 5 minute increments

Time	Pattern %	Storm Rain (in/hr	Loss Rate Max.	Value Min.	Effective Rain (in/hr	Flow Rate (cfs)	Flow Vol. (cf)	Outside Input (cf)	Drywell Retention Area (sf)	Drywell Period Perc. (cf	Drywell Storage Vol. (cf)	Drywell Storage Depth (ft)	Overflow To Basin (cf)	Retention Area (sf)	Basin Period Perc. (cf)	Basin Storage Vol. (cf)	Basin Storage Depth (ft	Overflow Vol. (cf)	Overflow Rate (cfs)
0:05	3.7	0.5994	0.2576	N/A	0.3419	13.2502	3975.07	0.00	30.89	0.39	364.42	25.50	3610.25	36731.84	466.80	3143.45	0.07	0.00	0.00
0:10	4.8	0.7776	0.2576	N/A	0.5201	20.1573	6047.19	0.00	132.99	1.69	364.42	25.50	6045.50	36924.95	469.25	8719.70	0.19	0.00	0.00
0:15	5.1	0.8262	0.2576	N/A	0.5687	22.0411	6612.32	0.00	132.99	1.69	364.42	25.50	6610.63	37267.52	473.61	14856.72	0.33	0.00	0.00
0:20	4.9	0.7938	0.2576	N/A	0.5363	20.7852	6235.57	0.00	132.99	1.69	364.42	25.50	6233.88	37644.53	478.40	20612.20	0.46	0.00	0.00
0:25	6.6	1.0692	0.2576	N/A	0.8117	31.4598	9437.95	0.00	132.99	1.69	364.42	25.50	9436.26	37998.11	482.89	29565.56	0.66	0.00	0.00
0:30	7.3	1.1826	0.2576	N/A	0.9251	35.8552	10756.57	0.00	132.99	1.69	364.42	25.50	10754.88	38548.14	489.88	39830.56	0.89	0.00	0.00
0:35	8.4	1.3608	0.2576	N/A	1.1033	42.7623	12828.70	0.00	132.99	1.69	364.42	25.50	12827.01	39178.75	497.90	52159.68	1.17	0.00	0.00
0:40	9	1.4580	0.2576	N/A	1.2005	46.5298	13958.95	0.00	132.99	1.69	364.42	25.50	13957.26	39936.17	507.52	65609.42	1.47	0.00	0.00
0:45	12.3	1.9926	0.2576	N/A	1.7351	67.2511	20175.33	0.00	132.99	1.69	364.42	25.50	20173.64	40762.42	518.02	85265.04	1.91	0.00	0.00
0:50	17.6	2.8512	0.2576	N/A	2.5937	100.5307	30159.22	0.00	132.99	1.69	364.42	25.50	30157.53	41969.93	533.37	114889.21	2.57	0.00	0.00
0:55	16.1	2.6082	0.2576	N/A	2.3507	91.1120	27333.59	0.00	132.99	1.69	364.42	25.50	27331.90	43789.83	556.50	141664.61	3.17	0.00	0.00
1:00	4.2	0.6804	0.2576	N/A	0.4229	16.3898	4916.94	0.00	132.99	1.69	364.42	25.50	4915.25	45434.72	577.40	146002.47	3.26	0.00	0.00
	0	0.0000	0.2576	0.00	0.0000	0.0000	0.00	0.00	132.99	1.69	362.73	25.37	0.00	45701.21	580.79	145421.68	3.25	0.00	0.00
	0	0.0000	0.2576	0.00	0.0000	0.0000	0.00	0.00	132.99	1.69	361.04	25.23	0.00	45665.53	580.33	144841.35	3.24	0.00	0.00
1:15	0	0.0000	0.2576	0.00	0.0000	0.0000	0.00	0.00	132.99	1.69	359.35	25.10	0.00	45629.88	579.88	144261.47	3.23	0.00	0.00
					Total volume (cf)		**152437.41**								**Total Overflow (cf)**			**0.00**	

3 Hour Storm in 5 minute increments

Time	Pattern %	Storm Rain (in/hr	Loss Rate Value Max.	Min.	Effective Rain (in/h	Flow Rate (cfs)	Flow Vol. (cf)	Outside Input (cf)	Drywell Retention Area (sf)	Drywell Period Perc. (cf	Drywell Storage Vol. (cf)	Drywell Storage Depth (ft)	Overflow To Basin (cf)	Retention Area (sf)	Basin Period Perc. (cf)	Basin Storage Vol. (cf)	Basin Storage Depth (ft	Overflow Vol. (cf)	Overflow Rate (cfs)
0:05	1.3	0.33	0.26	N/A	0.0716	2.7756	832.69	0.00	30.89	0.39	364.42	25.50	467.87	36731.84	466.80	1.07	0.00	0.00	0.00
0:10	1.3	0.33	0.26	N/A	0.0716	2.7756	832.69	0.00	132.99	1.69	364.42	25.50	831.00	36731.91	466.80	365.27	0.01	0.00	0.00
0:15	1.1	0.28	0.26	0.22	0.0557	2.1591	647.73	0.00	132.99	1.69	364.42	25.50	646.04	36754.28	467.09	544.23	0.01	0.00	0.00
0:20	1.5	0.38	0.26	N/A	0.1223	4.7385	1421.54	0.00	132.99	1.69	364.42	25.50	1419.85	36765.27	467.23	1496.84	0.03	0.00	0.00
0:25	1.5	0.38	0.26	N/A	0.1223	4.7385	1421.54	0.00	132.99	1.69	364.42	25.50	1419.85	36823.80	467.97	2448.72	0.05	0.00	0.00
0:30	1.8	0.46	0.26	N/A	0.1982	7.6827	2304.81	0.00	132.99	1.69	364.42	25.50	2303.12	36882.27	468.71	4283.12	0.10	0.00	0.00
0:35	1.5	0.38	0.26	N/A	0.1223	4.7385	1421.54	0.00	132.99	1.69	364.42	25.50	1419.85	36994.97	470.14	5232.83	0.12	0.00	0.00
0:40	1.8	0.46	0.26	N/A	0.1982	7.6827	2304.81	0.00	132.99	1.69	364.42	25.50	2303.12	37053.31	470.89	7065.05	0.16	0.00	0.00
0:45	1.8	0.46	0.26	N/A	0.1982	7.6827	2304.81	0.00	132.99	1.69	364.42	25.50	2303.12	37165.87	472.32	8895.85	0.20	0.00	0.00
0:50	1.5	0.38	0.26	N/A	0.1223	4.7385	1421.54	0.00	132.99	1.69	364.42	25.50	1419.85	37278.34	473.75	9841.95	0.22	0.00	0.00
0:55	1.6	0.41	0.26	N/A	0.1476	5.7199	1715.96	0.00	132.99	1.69	364.42	25.50	1714.27	37336.46	474.48	11081.74	0.25	0.00	0.00
1:00	1.8	0.46	0.26	N/A	0.1982	7.6827	2304.81	0.00	132.99	1.69	364.42	25.50	2303.12	37412.62	475.45	12909.40	0.29	0.00	0.00
1:05	2.2	0.56	0.26	N/A	0.2995	11.6083	3482.50	0.00	132.99	1.69	364.42	25.50	3480.81	37524.90	476.88	15913.33	0.36	0.00	0.00
1:10	2.2	0.56	0.26	N/A	0.2995	11.6083	3482.50	0.00	132.99	1.69	364.42	25.50	3480.81	37709.44	479.22	18914.92	0.42	0.00	0.00
1:15	2.2	0.56	0.26	N/A	0.2995	11.6083	3482.50	0.00	132.99	1.69	364.42	25.50	3480.81	37893.84	481.57	21914.16	0.49	0.00	0.00
1:20	2	0.51	0.26	N/A	0.2489	9.6455	2893.65	0.00	132.99	1.69	364.42	25.50	2891.96	38078.09	483.91	24322.21	0.54	0.00	0.00
1:25	2.6	0.66	0.26	N/A	0.4008	15.5340	4660.19	0.00	132.99	1.69	364.42	25.50	4658.50	38226.03	485.79	28494.93	0.64	0.00	0.00
1:30	2.7	0.68	0.26	N/A	0.4261	16.5154	4954.62	0.00	132.99	1.69	364.42	25.50	4952.93	38482.37	489.05	32958.81	0.74	0.00	0.00
1:35	2.4	0.61	0.26	N/A	0.3501	13.5712	4071.35	0.00	132.99	1.69	364.42	25.50	4069.66	38756.60	492.53	36535.93	0.82	0.00	0.00
1:40	2.7	0.68	0.26	N/A	0.4261	16.5154	4954.62	0.00	132.99	1.69	364.42	25.50	4952.93	38976.35	495.32	40993.54	0.92	0.00	0.00
1:45	3.3	0.84	0.26	N/A	0.5780	22.4039	6721.16	0.00	132.99	1.69	364.42	25.50	6719.47	39250.20	498.80	47214.20	1.06	0.00	0.00
1:50	3.1	0.78	0.26	N/A	0.5274	20.4410	6132.31	0.00	132.99	1.69	364.42	25.50	6130.62	39632.35	503.66	52841.16	1.18	0.00	0.00
1:55	2.9	0.73	0.26	N/A	0.4767	18.4782	5543.46	0.00	132.99	1.69	364.42	25.50	5541.77	39978.03	508.05	57874.88	1.29	0.00	0.00
2:00	3	0.76	0.26	N/A	0.5021	19.4596	5837.89	0.00	132.99	1.69	364.42	25.50	5836.20	40287.27	511.98	63199.09	1.41	0.00	0.00
2:05	3.1	0.78	0.26	N/A	0.5274	20.4410	6132.31	0.00	132.99	1.69	364.42	25.50	6130.62	40614.35	516.14	68813.57	1.54	0.00	0.00
2:10	4.2	1.06	0.26	N/A	0.8059	31.2366	9370.97	0.00	132.99	1.69	364.42	25.50	9369.28	40959.26	520.52	77662.33	1.74	0.00	0.00
2:15	5	1.27	0.26	N/A	1.0085	39.0879	11726.36	0.00	132.99	1.69	364.42	25.50	11724.67	41502.87	527.43	88859.56	1.99	0.00	0.00
2:20	3.5	0.89	0.26	N/A	0.6287	24.3667	7310.01	0.00	132.99	1.69	364.42	25.50	7308.31	42190.75	536.17	95631.70	2.14	0.00	0.00
2:25	6.8	1.72	0.26	N/A	1.4642	56.7533	17025.98	0.00	132.99	1.69	364.42	25.50	17024.29	42606.78	541.46	112114.53	2.51	0.00	0.00
2:30	7.3	1.85	0.26	N/A	1.5908	61.6603	18498.10	0.00	132.99	1.69	364.42	25.50	18496.41	43619.37	554.33	130056.61	2.91	0.00	0.00
2:35	8.2	2.08	0.26	N/A	1.8187	70.4930	21147.91	0.00	132.99	1.69	364.42	25.50	21146.22	44721.61	568.34	150634.49	3.37	0.00	0.00
2:40	5.9	1.49	0.26	N/A	1.2363	47.9206	14376.17	0.00	132.99	1.69	364.42	25.50	14374.48	45985.77	584.40	164424.57	3.68	0.00	0.00
2:45	2	0.51	0.26	N/A	0.2489	9.6455	2893.65	0.00	132.99	1.69	364.42	25.50	2891.96	46832.94	595.17	166721.36	3.73	0.00	0.00
2:50	1.8	0.46	0.26	N/A	0.1982	7.6827	2304.81	0.00	132.99	1.69	364.42	25.50	2303.12	46974.03	596.96	168427.52	3.77	0.00	0.00
2:55	1.8	0.46	0.26	N/A	0.1982	7.6827	2304.81	0.00	132.99	1.69	364.42	25.50	2303.12	47078.85	598.29	170132.34	3.80	0.00	0.00
3:00	0.6	0.15	0.26	0.12	0.0304	1.1777	353.31	0.00	132.99	1.69	364.42	25.50	351.62	47183.58	599.62	169884.33	3.80	0.00	0.00
	0	0.00	0.26	0.00	0.0000	0.0000	0.00	0.00	132.99	1.69	362.73	25.37	0.00	47168.35	599.43	169284.90	3.79	0.00	0.00
	0	0.00	0.26	0.00	0.0000	0.0000	0.00	0.00	132.99	1.69	361.04	25.23	0.00	47131.52	598.96	168685.94	3.77	0.00	0.00
3:15	0	0.00	0.26	0.00	0.0000	0.0000	0.00	0.00	132.99	1.69	359.35	25.10	0.00	47094.72	598.50	168087.44	3.76	0.00	0.00
	0	0.00	0.26	0.00	0.0000	0.0000	0.00	0.00	132.99	1.69	357.66	24.96	0.00	47057.96	598.03	167489.41	3.75	0.00	0.00
	0	0.00	0.26	0.00	0.0000	0.0000	0.00	0.00	132.99	1.69	355.97	24.83	0.00	47021.22	597.56	166891.85	3.73	0.00	0.00
3:30	0	0.00	0.26	0.00	0.0000	0.0000	0.00	0.00	132.99	1.69	354.28	24.69	0.00	46984.51	597.09	166294.76	3.72	0.00	0.00
	0	0.00	0.26	0.00	0.0000	0.0000	0.00	0.00	132.99	1.69	352.59	24.56	0.00	46947.83	596.63	165698.13	3.71	0.00	0.00
	0	0.00	0.26	0.00	0.0000	0.0000	0.00	0.00	132.99	1.69	350.90	24.42	0.00	46911.17	596.16	165101.97	3.69	0.00	0.00
					Total volume (cf)		**188595.55**								**Total Overflow (cf)**			**0.00**	

6 Hour Storm in 5 minute increments

Time	Pattern %	Storm Rain (in/hr	Loss Rate Value Max.	Min.	Effective Rain (in/hr	Flow Rate (cfs)	Flow Vol. (cf)	Outside Input (cf)	Drywell Retention Area (sf)	Drywell Period Perc. (cf	Drywell Storage Vol. (cf)	Drywell Storage Depth (ft)	Overflow To Basin (cf)	Retention Area (sf)	Basin Period Perc. (cf)	Basin Storage Vol. (cf)	Basin Storage Depth (ft	Overflow Vol. (cf)	Overflow Rate (cfs)
0:05	0.5	0.17	0.26	0.13	0.0332	1.2884	386.52	0.00	30.89	0.39	364.42	25.50	21.70	36731.84	21.70	0.00	0.00	0.00	0.00
0:10	0.6	0.20	0.26	0.16	0.0399	1.5461	463.82	0.00	132.99	1.69	364.42	25.50	462.13	36731.84	462.13	0.00	0.00	0.00	0.00
0:15	0.6	0.20	0.26	0.16	0.0399	1.5461	463.82	0.00	132.99	1.69	364.42	25.50	462.13	36731.84	462.13	0.00	0.00	0.00	0.00
0:20	0.6	0.20	0.26	0.16	0.0399	1.5461	463.82	0.00	132.99	1.69	364.42	25.50	462.13	36731.84	462.13	0.00	0.00	0.00	0.00
0:25	0.6	0.20	0.26	0.16	0.0399	1.5461	463.82	0.00	132.99	1.69	364.42	25.50	462.13	36731.84	462.13	0.00	0.00	0.00	0.00
0:30	0.7	0.23	0.26	0.19	0.0465	1.8038	541.13	0.00	132.99	1.69	364.42	25.50	539.44	36731.84	466.80	72.63	0.00	0.00	0.00
0:35	0.7	0.23	0.26	0.19	0.0465	1.8038	541.13	0.00	132.99	1.69	364.42	25.50	539.44	36736.30	466.86	145.21	0.00	0.00	0.00
0:40	0.7	0.23	0.26	0.19	0.0465	1.8038	541.13	0.00	132.99	1.69	364.42	25.50	539.44	36740.76	466.91	217.73	0.00	0.00	0.00
0:45	0.7	0.23	0.26	0.19	0.0465	1.8038	541.13	0.00	132.99	1.69	364.42	25.50	539.44	36745.22	466.97	290.20	0.01	0.00	0.00
0:50	0.7	0.23	0.26	0.19	0.0465	1.8038	541.13	0.00	132.99	1.69	364.42	25.50	539.44	36749.67	467.03	362.61	0.01	0.00	0.00
0:55	0.7	0.23	0.26	0.19	0.0465	1.8038	541.13	0.00	132.99	1.69	364.42	25.50	539.44	36754.12	467.08	434.96	0.01	0.00	0.00
1:00	0.8	0.27	0.26	0.21	0.0532	2.0614	618.43	0.00	132.99	1.69	364.42	25.50	616.74	36758.56	467.14	584.56	0.01	0.00	0.00
1:05	0.8	0.27	0.26	0.21	0.0532	2.0614	618.43	0.00	132.99	1.69	364.42	25.50	616.74	36767.75	467.26	734.04	0.02	0.00	0.00
1:10	0.8	0.27	0.26	0.21	0.0532	2.0614	618.43	0.00	132.99	1.69	364.42	25.50	616.74	36776.93	467.37	883.40	0.02	0.00	0.00
1:15	0.8	0.27	0.26	0.21	0.0532	2.0614	618.43	0.00	132.99	1.69	364.42	25.50	616.74	36786.11	467.49	1032.65	0.02	0.00	0.00
1:20	0.8	0.27	0.26	0.21	0.0532	2.0614	618.43	0.00	132.99	1.69	364.42	25.50	616.74	36795.28	467.61	1181.78	0.03	0.00	0.00
1:25	0.8	0.27	0.26	0.21	0.0532	2.0614	618.43	0.00	132.99	1.69	364.42	25.50	616.74	36804.44	467.72	1330.80	0.03	0.00	0.00
1:30	0.8	0.27	0.26	0.21	0.0532	2.0614	618.43	0.00	132.99	1.69	364.42	25.50	616.74	36813.60	467.84	1479.70	0.03	0.00	0.00
1:35	0.8	0.27	0.26	0.21	0.0532	2.0614	618.43	0.00	132.99	1.69	364.42	25.50	616.74	36822.74	467.96	1628.48	0.04	0.00	0.00
1:40	0.8	0.27	0.26	0.21	0.0532	2.0614	618.43	0.00	132.99	1.69	364.42	25.50	616.74	36831.88	468.07	1777.15	0.04	0.00	0.00
1:45	0.8	0.27	0.26	0.21	0.0532	2.0614	618.43	0.00	132.99	1.69	364.42	25.50	616.74	36841.02	468.19	1925.70	0.04	0.00	0.00
1:50	0.8	0.27	0.26	0.21	0.0532	2.0614	618.43	0.00	132.99	1.69	364.42	25.50	616.74	36850.14	468.30	2074.14	0.05	0.00	0.00
1:55	0.8	0.27	0.26	0.21	0.0532	2.0614	618.43	0.00	132.99	1.69	364.42	25.50	616.74	36859.26	468.42	2222.45	0.05	0.00	0.00
2:00	0.9	0.30	0.26	0.24	0.0598	2.3191	695.73	0.00	132.99	1.69	364.42	25.50	694.04	36868.37	468.54	2447.96	0.05	0.00	0.00
2:05	0.8	0.27	0.26	0.21	0.0532	2.0614	618.43	0.00	132.99	1.69	364.42	25.50	616.74	36882.23	468.71	2595.99	0.06	0.00	0.00
2:10	0.9	0.30	0.26	0.24	0.0598	2.3191	695.73	0.00	132.99	1.69	364.42	25.50	694.04	36891.32	468.83	2821.20	0.06	0.00	0.00
2:15	0.9	0.30	0.26	0.24	0.0598	2.3191	695.73	0.00	132.99	1.69	364.42	25.50	694.04	36905.16	469.00	3046.24	0.07	0.00	0.00
2:20	0.9	0.30	0.26	0.24	0.0598	2.3191	695.73	0.00	132.99	1.69	364.42	25.50	694.04	36918.98	469.18	3271.11	0.07	0.00	0.00
2:25	0.9	0.30	0.26	0.24	0.0598	2.3191	695.73	0.00	132.99	1.69	364.42	25.50	694.04	36932.79	469.35	3495.79	0.08	0.00	0.00
2:30	0.9	0.30	0.26	0.24	0.0598	2.3191	695.73	0.00	132.99	1.69	364.42	25.50	694.04	36946.60	469.53	3720.31	0.08	0.00	0.00
2:35	0.9	0.30	0.26	0.24	0.0598	2.3191	695.73	0.00	132.99	1.69	364.42	25.50	694.04	36960.39	469.70	3944.64	0.09	0.00	0.00
2:40	0.9	0.30	0.26	0.24	0.0598	2.3191	695.73	0.00	132.99	1.69	364.42	25.50	694.04	36974.17	469.88	4168.81	0.09	0.00	0.00
2:45	1	0.33	0.26	N/A	0.0749	2.9012	870.36	0.00	132.99	1.69	364.42	25.50	868.67	36987.94	470.06	4567.43	0.10	0.00	0.00
2:50	1	0.33	0.26	N/A	0.0749	2.9012	870.36	0.00	132.99	1.69	364.42	25.50	868.67	37012.43	470.37	4965.73	0.11	0.00	0.00
2:55	1	0.33	0.26	N/A	0.0749	2.9012	870.36	0.00	132.99	1.69	364.42	25.50	868.67	37036.90	470.68	5363.73	0.12	0.00	0.00
3:00	1	0.33	0.26	N/A	0.0749	2.9012	870.36	0.00	132.99	1.69	364.42	25.50	868.67	37061.35	470.99	5761.41	0.13	0.00	0.00
3:05	1	0.33	0.26	N/A	0.0749	2.9012	870.36	0.00	132.99	1.69	364.42	25.50	868.67	37085.78	471.30	6158.79	0.14	0.00	0.00
3:10	1.1	0.37	0.26	N/A	0.1081	4.1896	1256.88	0.00	132.99	1.69	364.42	25.50	1255.19	37110.19	471.61	6942.37	0.16	0.00	0.00
3:15	1.1	0.37	0.26	N/A	0.1081	4.1896	1256.88	0.00	132.99	1.69	364.42	25.50	1255.19	37158.33	472.22	7725.34	0.17	0.00	0.00
3:20	1.1	0.37	0.26	N/A	0.1081	4.1896	1256.88	0.00	132.99	1.69	364.42	25.50	1255.19	37206.43	472.83	8507.70	0.19	0.00	0.00
3:25	1.2	0.40	0.26	N/A	0.1413	5.4780	1643.40	0.00	132.99	1.69	364.42	25.50	1641.71	37254.49	473.44	9675.97	0.22	0.00	0.00
3:30	1.3	0.43	0.26	N/A	0.1746	6.7664	2029.92	0.00	132.99	1.69	364.42	25.50	2028.23	37326.26	474.35	11229.84	0.25	0.00	0.00
3:35	1.4	0.47	0.26	N/A	0.2078	8.0548	2416.44	0.00	132.99	1.69	364.42	25.50	2414.75	37421.72	475.57	13169.02	0.29	0.00	0.00
3:40	1.4	0.47	0.26	N/A	0.2078	8.0548	2416.44	0.00	132.99	1.69	364.42	25.50	2414.75	37540.85	477.08	15106.68	0.34	0.00	0.00
3:45	1.5	0.50	0.26	N/A	0.2411	9.3432	2802.95	0.00	132.99	1.69	364.42	25.50	2801.26	37659.89	478.59	17429.35	0.39	0.00	0.00
3:50	1.5	0.50	0.26	N/A	0.2411	9.3432	2802.95	0.00	132.99	1.69	364.42	25.50	2801.26	37802.58	480.41	19750.21	0.44	0.00	0.00
3:55	1.6	0.53	0.26	N/A	0.2743	10.6316	3189.47	0.00	132.99	1.69	364.42	25.50	3187.78	37945.15	482.22	22455.77	0.50	0.00	0.00
4:00	1.6	0.53	0.26	N/A	0.2743	10.6316	3189.47	0.00	132.99	1.69	364.42	25.50	3187.78	38111.37	484.33	25159.22	0.56	0.00	0.00
4:05	1.7	0.57	0.26	N/A	0.3075	11.9200	3575.99	0.00	132.99	1.69	364.42	25.50	3574.30	38277.45	486.44	28247.07	0.63	0.00	0.00
4:10	1.8	0.60	0.26	N/A	0.3408	13.2084	3962.51	0.00	132.99	1.69	364.42	25.50	3960.82	38467.14	488.85	31719.04	0.71	0.00	0.00
4:15	1.9	0.63	0.26	N/A	0.3740	14.4968	4349.03	0.00	132.99	1.69	364.42	25.50	4347.34	38680.44	491.56	35574.81	0.80	0.00	0.00
4:20	2	0.66	0.26	N/A	0.4073	15.7851	4735.54	0.00	132.99	1.69	364.42	25.50	4733.85	38917.31	494.57	39814.09	0.89	0.00	0.00
4:25	2.1	0.70	0.26	N/A	0.4405	17.0735	5122.06	0.00	132.99	1.69	364.42	25.50	5120.37	39177.74	497.88	44436.58	0.99	0.00	0.00
4:30	2.1	0.70	0.26	N/A	0.4405	17.0735	5122.06	0.00	132.99	1.69	364.42	25.50	5120.37	39461.71	501.49	49055.46	1.10	0.00	0.00
4:35	2.2	0.73	0.26	N/A	0.4737	18.3619	5508.58	0.00	132.99	1.69	364.42	25.50	5506.89	39745.46	505.10	54057.25	1.21	0.00	0.00

4:40	2.3	0.76	0.26	N/A	0.5070	19.6503	5895.10	0.00	132.99	1.69	364.42	25.50	5893.41	40052.74	509.00	59441.65	1.33	0.00	0.00
4:45	2.4	0.80	0.26	N/A	0.5402	20.9387	6281.62	0.00	132.99	1.69	364.42	25.50	6279.93	40383.52	513.21	65208.37	1.46	0.00	0.00
4:50	2.4	0.80	0.26	N/A	0.5402	20.9387	6281.62	0.00	132.99	1.69	364.42	25.50	6279.93	40737.79	517.71	70970.59	1.59	0.00	0.00
4:55	2.5	0.83	0.26	N/A	0.5735	22.2271	6668.13	0.00	132.99	1.69	364.42	25.50	6666.44	41091.78	522.21	77114.82	1.72	0.00	0.00
5:00	2.6	0.86	0.26	N/A	0.6067	23.5155	7054.65	0.00	132.99	1.69	364.42	25.50	7052.96	41469.24	527.00	83640.78	1.87	0.00	0.00
5:05	3.1	1.03	0.26	N/A	0.7729	29.9575	8987.24	0.00	132.99	1.69	364.42	25.50	8985.55	41870.14	532.10	92094.23	2.06	0.00	0.00
5:10	3.6	1.20	0.26	N/A	0.9391	36.3994	10919.83	0.00	132.99	1.69	364.42	25.50	10918.14	42389.47	538.70	102473.68	2.29	0.00	0.00
5:15	3.9	1.30	0.26	N/A	1.0388	40.2646	12079.39	0.00	132.99	1.69	364.42	25.50	12077.70	43027.11	546.80	114004.57	2.55	0.00	0.00
5:20	4.2	1.40	0.26	N/A	1.1385	44.1298	13238.94	0.00	132.99	1.69	364.42	25.50	13237.25	43735.48	555.81	126686.01	2.83	0.00	0.00
5:25	4.7	1.56	0.26	N/A	1.3047	50.5718	15171.53	0.00	132.99	1.69	364.42	25.50	15169.84	44514.54	565.71	141290.15	3.16	0.00	0.00
5:30	5.6	1.86	0.26	N/A	**1.6039**	**62.1673**	**18650.19**	0.00	132.99	1.69	364.42	25.50	18648.50	45411.72	577.11	159361.55	3.56	0.00	0.00
5:35	1.9	0.63	0.26	N/A	0.3740	14.4968	4349.03	0.00	132.99	1.69	364.42	25.50	4347.34	46521.90	591.22	163117.66	3.65	0.00	0.00
5:40	0.9	0.30	0.26	0.24	0.0598	2.3191	695.73	0.00	132.99	1.69	364.42	25.50	694.04	46752.65	594.15	163217.56	3.65	0.00	0.00
5:45	0.6	0.20	0.26	0.16	0.0399	1.5461	463.82	0.00	132.99	1.69	364.42	25.50	462.13	46758.79	594.23	163085.46	3.65	0.00	0.00
5:50	0.5	0.17	0.26	0.13	0.0332	1.2884	386.52	0.00	132.99	1.69	364.42	25.50	384.83	46750.67	594.12	162876.17	3.64	0.00	0.00
5:55	0.3	0.10	0.26	0.08	0.0199	0.7730	231.91	0.00	132.99	1.69	364.42	25.50	230.22	46737.81	593.96	162512.43	3.63	0.00	0.00
6:00	0.2	0.07	0.26	0.05	0.0133	0.5154	154.61	0.00	132.99	1.69	364.42	25.50	152.92	46715.47	593.68	162071.67	3.62	0.00	0.00
	0	0.00	0.26	0.00	0.0000	0.0000	0.00	0.00	132.99	1.69	362.73	25.37	0.00	46688.39	593.33	161478.34	3.61	0.00	0.00
	0	0.00	0.26	0.00	0.0000	0.0000	0.00	0.00	132.99	1.69	361.04	25.23	0.00	46651.94	592.87	160885.47	3.60	0.00	0.00
6:15	0	0.00	0.26	0.00	0.0000	0.0000	0.00	0.00	132.99	1.69	359.35	25.10	0.00	46615.52	592.41	160293.07	3.58	0.00	0.00
	0	0.00	0.26	0.00	0.0000	0.0000	0.00	0.00	132.99	1.69	357.66	24.96	0.00	46579.13	591.94	159701.12	3.57	0.00	0.00
	0	0.00	0.26	0.00	0.0000	0.0000	0.00	0.00	132.99	1.69	355.97	24.83	0.00	46542.76	591.48	159109.64	3.56	0.00	0.00
6:30	0	0.00	0.26	0.00	0.0000	0.0000	0.00	0.00	132.99	1.69	354.28	24.69	0.00	46506.42	591.02	158518.62	3.54	0.00	0.00
	0	0.00	0.26	0.00	0.0000	0.0000	0.00	0.00	132.99	1.69	352.59	24.56	0.00	46470.12	590.56	157928.07	3.53	0.00	0.00
	0	0.00	0.26	0.00	0.0000	0.0000	0.00	0.00	132.99	1.69	350.90	24.42	0.00	46433.84	590.10	157337.97	3.52	0.00	0.00
6:45	0	0.00	0.26	0.00	0.0000	0.0000	0.00	0.00	132.99	1.69	349.21	24.29	0.00	46397.58	589.64	156748.33	3.51	0.00	0.00
	0	0.00	0.26	0.00	0.0000	0.0000	0.00	0.00	132.99	1.69	347.52	24.15	0.00	46361.36	589.18	156159.16	3.49	0.00	0.00
	0	0.00	0.26	0.00	0.0000	0.0000	0.00	0.00	132.99	1.69	345.83	24.02	0.00	46325.17	588.72	155570.44	3.48	0.00	0.00
7:00	0	0.00	0.26	0.00	0.0000	0.0000	0.00	0.00	132.99	1.69	344.14	23.89	0.00	46289.00	588.26	154982.19	3.47	0.00	0.00
					Total volume (cf)		**197593.12**								**Total Overflow (cf)**			**0.00**	

24 Hour Storm in 15 minute increments

Time	Pattern %	Storm Rain (in/hr	Loss Rate Value Max.	Min.	Effective Rain (in/hr	Flow Rate (cfs)	Flow Vol. (cf)	Outside Input (cf)	Drywell Retention Area (sf)	Drywell Period Perc. (cf	Drywell Storage Vol. (cf)	Drywell Storage Depth (ft)	Overflow To Basin (cf)	Retention Area (sf)	Basin Period Perc. (cf)	Basin Storage Vol. (cf)	Basin Storage Depth (ft	Overflow Vol. (cf)	Overflow Rate (cfs)
0:15	0.2	0.04	0.45	0.03	0.0071	0.2754	247.82	0.00	30.89	1.18	246.64	16.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0:30	0.3	0.05	0.45	0.04	0.0107	0.4130	371.73	0.00	132.99	5.07	364.42	25.50	248.87	36731.84	248.87	0.00	0.00	0.00	0.00
0:45	0.3	0.05	0.44	0.04	0.0107	0.4130	371.73	0.00	132.99	5.07	364.42	25.50	366.66	36731.84	366.66	0.00	0.00	0.00	0.00
1:00	0.4	0.07	0.44	0.06	0.0142	0.5507	495.64	0.00	132.99	5.07	364.42	25.50	490.57	36731.84	490.57	0.00	0.00	0.00	0.00
1:15	0.3	0.05	0.43	0.04	0.0107	0.4130	371.73	0.00	132.99	5.07	364.42	25.50	366.66	36731.84	366.66	0.00	0.00	0.00	0.00
1:30	0.3	0.05	0.43	0.04	0.0107	0.4130	371.73	0.00	132.99	5.07	364.42	25.50	366.66	36731.84	366.66	0.00	0.00	0.00	0.00
1:45	0.3	0.05	0.42	0.04	0.0107	0.4130	371.73	0.00	132.99	5.07	364.42	25.50	366.66	36731.84	366.66	0.00	0.00	0.00	0.00
2:00	0.4	0.07	0.42	0.06	0.0142	0.5507	495.64	0.00	132.99	5.07	364.42	25.50	490.57	36731.84	490.57	0.00	0.00	0.00	0.00
2:15	0.4	0.07	0.41	0.06	0.0142	0.5507	495.64	0.00	132.99	5.07	364.42	25.50	490.57	36731.84	490.57	0.00	0.00	0.00	0.00
2:30	0.4	0.07	0.41	0.06	0.0142	0.5507	495.64	0.00	132.99	5.07	364.42	25.50	490.57	36731.84	490.57	0.00	0.00	0.00	0.00
2:45	0.5	0.09	0.40	0.07	0.0178	0.6884	619.55	0.00	132.99	5.07	364.42	25.50	614.47	36731.84	614.47	0.00	0.00	0.00	0.00
3:00	0.5	0.09	0.40	0.07	0.0178	0.6884	619.55	0.00	132.99	5.07	364.42	25.50	614.47	36731.84	614.47	0.00	0.00	0.00	0.00
3:15	0.5	0.09	0.39	0.07	0.0178	0.6884	619.55	0.00	132.99	5.07	364.42	25.50	614.47	36731.84	614.47	0.00	0.00	0.00	0.00
3:30	0.5	0.09	0.39	0.07	0.0178	0.6884	619.55	0.00	132.99	5.07	364.42	25.50	614.47	36731.84	614.47	0.00	0.00	0.00	0.00
3:45	0.5	0.09	0.38	0.07	0.0178	0.6884	619.55	0.00	132.99	5.07	364.42	25.50	614.47	36731.84	614.47	0.00	0.00	0.00	0.00
4:00	0.6	0.11	0.38	0.09	0.0213	0.8261	743.45	0.00	132.99	5.07	364.42	25.50	738.38	36731.84	738.38	0.00	0.00	0.00	0.00
4:15	0.6	0.11	0.37	0.09	0.0213	0.8261	743.45	0.00	132.99	5.07	364.42	25.50	738.38	36731.84	738.38	0.00	0.00	0.00	0.00
4:30	0.7	0.12	0.37	0.10	0.0249	0.9637	867.36	0.00	132.99	5.07	364.42	25.50	862.29	36731.84	862.29	0.00	0.00	0.00	0.00
4:45	0.7	0.12	0.36	0.10	0.0249	0.9637	867.36	0.00	132.99	5.07	364.42	25.50	862.29	36731.84	862.29	0.00	0.00	0.00	0.00
5:00	0.8	0.14	0.36	0.11	0.0284	1.1014	991.27	0.00	132.99	5.07	364.42	25.50	986.20	36731.84	986.20	0.00	0.00	0.00	0.00
5:15	0.6	0.11	0.35	0.09	0.0213	0.8261	743.45	0.00	132.99	5.07	364.42	25.50	738.38	36731.84	738.38	0.00	0.00	0.00	0.00
5:30	0.7	0.12	0.35	0.10	0.0249	0.9637	867.36	0.00	132.99	5.07	364.42	25.50	862.29	36731.84	862.29	0.00	0.00	0.00	0.00
5:45	0.8	0.14	0.34	0.11	0.0284	1.1014	991.27	0.00	132.99	5.07	364.42	25.50	986.20	36731.84	986.20	0.00	0.00	0.00	0.00
6:00	0.8	0.14	0.34	0.11	0.0284	1.1014	991.27	0.00	132.99	5.07	364.42	25.50	986.20	36731.84	986.20	0.00	0.00	0.00	0.00
6:15	0.9	0.16	0.33	0.13	0.0320	1.2391	1115.18	0.00	132.99	5.07	364.42	25.50	1110.11	36731.84	1110.11	0.00	0.00	0.00	0.00
6:30	0.9	0.16	0.33	0.13	0.0320	1.2391	1115.18	0.00	132.99	5.07	364.42	25.50	1110.11	36731.84	1110.11	0.00	0.00	0.00	0.00
6:45	1	0.18	0.33	0.14	0.0355	1.3768	1239.09	0.00	132.99	5.07	364.42	25.50	1234.02	36731.84	1234.02	0.00	0.00	0.00	0.00
7:00	1	0.18	0.32	0.14	0.0355	1.3768	1239.09	0.00	132.99	5.07	364.42	25.50	1234.02	36731.84	1234.02	0.00	0.00	0.00	0.00
7:15	1	0.18	0.32	0.14	0.0355	1.3768	1239.09	0.00	132.99	5.07	364.42	25.50	1234.02	36731.84	1234.02	0.00	0.00	0.00	0.00
7:30	1.1	0.20	0.31	0.16	0.0391	1.5144	1363.00	0.00	132.99	5.07	364.42	25.50	1357.93	36731.84	1357.93	0.00	0.00	0.00	0.00
7:45	1.2	0.21	0.31	0.17	0.0426	1.6521	1486.91	0.00	132.99	5.07	364.42	25.50	1481.84	36731.84	1400.40	81.44	0.00	0.00	0.00
8:00	1.3	0.23	0.30	0.18	0.0462	1.7898	1610.82	0.00	132.99	5.07	364.42	25.50	1605.75	36736.84	1400.59	286.59	0.01	0.00	0.00
8:15	1.5	0.27	0.30	0.21	0.0533	2.0652	1858.64	0.00	132.99	5.07	364.42	25.50	1853.57	36749.45	1401.07	739.08	0.02	0.00	0.00
8:30	1.5	0.27	0.30	0.21	0.0533	2.0652	1858.64	0.00	132.99	5.07	364.42	25.50	1853.57	36777.24	1402.13	1190.52	0.03	0.00	0.00
8:45	1.6	0.28	0.29	0.23	0.0568	2.2028	1982.54	0.00	132.99	5.07	364.42	25.50	1977.47	36804.98	1403.19	1764.80	0.04	0.00	0.00
9:00	1.7	0.30	0.29	0.24	0.0604	2.3405	2106.45	0.00	132.99	5.07	364.42	25.50	2101.38	36840.26	1404.53	2461.65	0.06	0.00	0.00
9:15	1.9	0.34	0.28	0.27	0.0675	2.6159	2354.27	0.00	132.99	5.07	364.42	25.50	2349.20	36883.07	1406.17	3404.68	0.08	0.00	0.00
9:30	2	0.36	0.28	N/A	0.0759	2.9426	2648.33	0.00	132.99	5.07	364.42	25.50	2643.26	36941.00	1408.38	4639.57	0.10	0.00	0.00
9:45	2.1	0.37	0.28	N/A	0.0977	3.7861	3407.52	0.00	132.99	5.07	364.42	25.50	3402.45	37016.86	1411.27	6630.75	0.15	0.00	0.00
10:00	2.2	0.39	0.27	N/A	0.1194	4.6282	4165.37	0.00	132.99	5.07	364.42	25.50	4160.30	37139.19	1415.93	9375.11	0.21	0.00	0.00
10:15	1.5	0.27	0.27	0.21	0.0533	2.0652	1858.64	0.00	132.99	5.07	364.42	25.50	1853.57	37307.78	1422.36	9806.32	0.22	0.00	0.00
10:30	1.5	0.27	0.26	0.21	0.0533	2.0652	1858.64	0.00	132.99	5.07	364.42	25.50	1853.57	37334.27	1423.37	10236.51	0.23	0.00	0.00
10:45	2	0.36	0.26	N/A	0.0955	3.7034	3333.03	0.00	132.99	5.07	364.42	25.50	3327.96	37360.70	1424.38	12140.09	0.27	0.00	0.00
11:00	2	0.36	0.26	N/A	0.0994	3.8510	3465.86	0.00	132.99	5.07	364.42	25.50	3460.79	37477.64	1428.84	14172.05	0.32	0.00	0.00
11:15	1.9	0.34	0.25	N/A	0.0854	3.3086	2977.74	0.00	132.99	5.07	364.42	25.50	2972.67	37602.47	1433.59	15711.13	0.35	0.00	0.00
11:30	1.9	0.34	0.25	N/A	0.0891	3.4531	3107.77	0.00	132.99	5.07	364.42	25.50	3102.70	37697.02	1437.20	17376.62	0.39	0.00	0.00
11:45	1.7	0.30	0.24	0.24	0.0604	2.3405	2106.45	0.00	132.99	5.07	364.42	25.50	2101.38	37799.34	1441.10	18036.91	0.40	0.00	0.00
12:00	1.8	0.32	0.24	N/A	0.0787	3.0489	2743.98	0.00	132.99	5.07	364.42	25.50	2738.91	37839.90	1442.65	19333.17	0.43	0.00	0.00
12:15	2.5	0.44	0.24	N/A	0.2066	8.0072	7206.51	0.00	132.99	5.07	364.42	25.50	7201.44	37919.54	1445.68	25088.94	0.56	0.00	0.00
12:30	2.6	0.46	0.23	N/A	0.2279	8.8337	7950.31	0.00	132.99	5.07	364.42	25.50	7945.24	38273.13	1459.16	31575.01	0.71	0.00	0.00
12:45	2.8	0.50	0.23	N/A	0.2669	10.3469	9312.18	0.00	132.99	5.07	364.42	25.50	9307.11	38671.59	1474.35	39407.77	0.88	0.00	0.00
13:00	2.9	0.52	0.23	N/A	0.2882	11.1700	10053.01	0.00	132.99	5.07	364.42	25.50	10047.94	39152.78	1492.70	47963.00	1.07	0.00	0.00
13:15	3.4	0.60	0.22	N/A	0.3804	14.7450	13270.51	0.00	132.99	5.07	364.42	25.50	13265.44	39678.35	1512.74	59715.70	1.34	0.00	0.00
13:30	3.4	0.60	0.22	N/A	**0.3838**	**14.8764**	**13388.76**	0.00	132.99	5.07	364.42	25.50	13383.69	40400.36	1540.26	71559.13	1.60	0.00	0.00
13:45	2.3	0.41	0.22	N/A	0.1918	7.4339	6690.48	0.00	132.99	5.07	364.42	25.50	6685.41	41127.93	1568.00	76676.54	1.71	0.00	0.00

14:00	2.3	0.41	0.21	N/A	0.1951	7.5618	6805.64	0.00	132.99	5.07	364.42	25.50	6800.57	41442.31	1579.99	81897.13	1.83	0.00	0.00
14:15	2.7	0.48	0.21	N/A	0.2694	10.4416	9397.41	0.00	132.99	5.07	364.42	25.50	9392.34	41763.03	1592.22	89697.25	2.01	0.00	0.00
14:30	2.6	0.46	0.21	N/A	0.2548	9.8776	8889.86	0.00	132.99	5.07	364.42	25.50	8884.79	42242.21	1610.48	96971.56	2.17	0.00	0.00
14:45	2.6	0.46	0.20	N/A	0.2580	10.0003	9000.25	0.00	132.99	5.07	364.42	25.50	8995.18	42689.09	1627.52	104339.22	2.33	0.00	0.00
15:00	2.5	0.44	0.20	N/A	0.2434	9.4327	8489.46	0.00	132.99	5.07	364.42	25.50	8484.39	43141.71	1644.78	111178.84	2.49	0.00	0.00
15:15	2.4	0.43	0.20	N/A	0.2287	8.8634	7977.03	0.00	132.99	5.07	364.42	25.50	7971.96	43561.89	1660.80	117490.00	2.63	0.00	0.00
15:30	2.3	0.41	0.19	N/A	0.2139	8.2921	7462.92	0.00	132.99	5.07	364.42	25.50	7457.85	43949.60	1675.58	123272.27	2.76	0.00	0.00
15:45	1.9	0.34	0.19	N/A	0.1459	5.6539	5088.49	0.00	132.99	5.07	364.42	25.50	5083.42	44304.83	1689.12	126666.57	2.83	0.00	0.00
16:00	1.9	0.34	0.19	N/A	0.1488	5.7672	5190.52	0.00	132.99	5.07	364.42	25.50	5185.45	44513.35	1697.07	130154.95	2.91	0.00	0.00
16:15	0.4	0.07	0.19	0.06	0.0142	0.5507	495.64	0.00	132.99	5.07	364.42	25.50	490.57	44727.65	1705.24	128940.28	2.88	0.00	0.00
16:30	0.4	0.07	0.18	0.06	0.0142	0.5507	495.64	0.00	132.99	5.07	364.42	25.50	490.57	44653.03	1702.40	127728.45	2.86	0.00	0.00
16:45	0.3	0.05	0.18	0.04	0.0107	0.4130	371.73	0.00	132.99	5.07	364.42	25.50	366.66	44578.58	1699.56	126395.55	2.83	0.00	0.00
17:00	0.3	0.05	0.18	0.04	0.0107	0.4130	371.73	0.00	132.99	5.07	364.42	25.50	366.66	44496.70	1696.44	125065.77	2.80	0.00	0.00
17:15	0.5	0.09	0.17	0.07	0.0178	0.6884	619.55	0.00	132.99	5.07	364.42	25.50	614.47	44415.01	1693.32	123986.92	2.77	0.00	0.00
17:30	0.5	0.09	0.17	0.07	0.0178	0.6884	619.55	0.00	132.99	5.07	364.42	25.50	614.47	44348.73	1690.80	122910.60	2.75	0.00	0.00
17:45	0.5	0.09	0.17	0.07	0.0178	0.6884	619.55	0.00	132.99	5.07	364.42	25.50	614.47	44282.61	1688.27	121836.80	2.72	0.00	0.00
18:00	0.4	0.07	0.17	0.06	0.0142	0.5507	495.64	0.00	132.99	5.07	364.42	25.50	490.57	44216.64	1685.76	120641.60	2.70	0.00	0.00
18:15	0.4	0.07	0.16	0.06	0.0142	0.5507	495.64	0.00	132.99	5.07	364.42	25.50	490.57	44143.22	1682.96	119449.21	2.67	0.00	0.00
18:30	0.4	0.07	0.16	0.06	0.0142	0.5507	495.64	0.00	132.99	5.07	364.42	25.50	490.57	44069.96	1680.17	118259.61	2.64	0.00	0.00
18:45	0.3	0.05	0.16	0.04	0.0107	0.4130	371.73	0.00	132.99	5.07	364.42	25.50	366.66	43996.88	1677.38	116948.88	2.62	0.00	0.00
19:00	0.2	0.04	0.16	0.03	0.0071	0.2754	247.82	0.00	132.99	5.07	364.42	25.50	242.75	43916.36	1674.31	115517.32	2.58	0.00	0.00
19:15	0.3	0.05	0.16	0.04	0.0107	0.4130	371.73	0.00	132.99	5.07	364.42	25.50	366.66	43828.42	1670.96	114213.02	2.55	0.00	0.00
19:30	0.4	0.07	0.15	0.06	0.0142	0.5507	495.64	0.00	132.99	5.07	364.42	25.50	490.57	43748.29	1667.90	113035.68	2.53	0.00	0.00
19:45	0.3	0.05	0.15	0.04	0.0107	0.4130	371.73	0.00	132.99	5.07	364.42	25.50	366.66	43675.96	1665.15	111737.19	2.50	0.00	0.00
20:00	0.2	0.04	0.15	0.03	0.0071	0.2754	247.82	0.00	132.99	5.07	364.42	25.50	242.75	43596.19	1662.10	110317.84	2.47	0.00	0.00
20:15	0.3	0.05	0.15	0.04	0.0107	0.4130	371.73	0.00	132.99	5.07	364.42	25.50	366.66	43509.00	1658.78	109025.71	2.44	0.00	0.00
20:30	0.3	0.05	0.15	0.04	0.0107	0.4130	371.73	0.00	132.99	5.07	364.42	25.50	366.66	43429.62	1655.75	107736.61	2.41	0.00	0.00
20:45	0.3	0.05	0.14	0.04	0.0107	0.4130	371.73	0.00	132.99	5.07	364.42	25.50	366.66	43350.42	1652.73	106450.54	2.38	0.00	0.00
21:00	0.2	0.04	0.14	0.03	0.0071	0.2754	247.82	0.00	132.99	5.07	364.42	25.50	242.75	43271.42	1649.72	105043.56	2.35	0.00	0.00
21:15	0.3	0.05	0.14	0.04	0.0107	0.4130	371.73	0.00	132.99	5.07	364.42	25.50	366.66	43184.98	1646.43	103763.79	2.32	0.00	0.00
21:30	0.2	0.04	0.14	0.03	0.0071	0.2754	247.82	0.00	132.99	5.07	364.42	25.50	242.75	43106.36	1643.43	102363.11	2.29	0.00	0.00
21:45	0.3	0.05	0.14	0.04	0.0107	0.4130	371.73	0.00	132.99	5.07	364.42	25.50	366.66	43020.31	1640.15	101089.62	2.26	0.00	0.00
22:00	0.2	0.04	0.14	0.03	0.0071	0.2754	247.82	0.00	132.99	5.07	364.42	25.50	242.75	42942.08	1637.17	99695.20	2.23	0.00	0.00
22:15	0.3	0.05	0.13	0.04	0.0107	0.4130	371.73	0.00	132.99	5.07	364.42	25.50	366.66	42856.42	1633.90	98427.95	2.20	0.00	0.00
22:30	0.2	0.04	0.13	0.03	0.0071	0.2754	247.82	0.00	132.99	5.07	364.42	25.50	242.75	42778.57	1630.93	97039.77	2.17	0.00	0.00
22:45	0.2	0.04	0.13	0.03	0.0071	0.2754	247.82	0.00	132.99	5.07	364.42	25.50	242.75	42693.28	1627.68	95654.83	2.14	0.00	0.00
23:00	0.2	0.04	0.13	0.03	0.0071	0.2754	247.82	0.00	132.99	5.07	364.42	25.50	242.75	42608.20	1624.44	94273.14	2.11	0.00	0.00
23:15	0.2	0.04	0.13	0.03	0.0071	0.2754	247.82	0.00	132.99	5.07	364.42	25.50	242.75	42523.32	1621.20	92894.69	2.08	0.00	0.00
23:30	0.2	0.04	0.13	0.03	0.0071	0.2754	247.82	0.00	132.99	5.07	364.42	25.50	242.75	42438.64	1617.97	91519.46	2.05	0.00	0.00
23:45	0.2	0.04	0.13	0.03	0.0071	0.2754	247.82	0.00	132.99	5.07	364.42	25.50	242.75	42354.16	1614.75	90147.46	2.02	0.00	0.00
24:00	0.2	0.04	0.13	0.03	0.0071	0.2754	247.82	0.00	132.99	5.07	364.42	25.50	242.75	42269.87	1611.54	88778.67	1.99	0.00	0.00
	0	0.00	0.13	0.00	0.0000	0.0000	0.00	0.00	132.99	5.07	359.35	25.10	0.00	42185.78	1608.33	87170.34	1.95	0.00	0.00
					Total volume (cf)		**215303.84**								**Total Overflow (cf)**			**0.00**	

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APPENDIX D.2

DRAWDOWN TIME CALCULATION

Sevilla II
Draw-Down Time Check
Above Ground Retention Basin

BASIN	Total Dead Storage Volume	Infiltration Rate *	Infiltration Safety Factor	Design Percolation Rate (P_{design})	Total Area	Total Infiltration	Draw-Down Time
-	(ft^3)	(in/hr)	-	(in/hr)	(sf)	(cfs)	(hrs)
A	87,170	5.50	3	1.83	36,732	1.559	15.53

DRAW DOWN CHECK	GOOD

* Based on the conservative infiltration rate of 5.5 in/hr per onsite percolation testing results

APPENDIX E

SOILS DATA

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APPENDIX E.1

RESULTS OF ON-SITE PERCOLATION TESTING

September 15, 2022

Project No. 13339.003

Pulte Home Company
27401 Los Altos, Ste 400
Mission Viejo, CA 92691

Attention: Mr. David Dewegeli

Subject: Results of Onsite Percolation Testing
Proposed Residential Development - Sevilla II
APN's 779-280-002 & -320-001
City of Coachella, California

Reference: Riverside County Flood Control District, Design Handbook for Low Impact Development Best Management Practices, dated September 2018.

In accordance with your request and authorization, Leighton and Associates, Inc. (Leighton) is pleased to present this percolation test report for the water quality basin associated with the subject development, located southwest of Avenue 50 and Van Buren Street, in the City of Coachella, California (See Figure 1).

PURPOSE AND SCOPE OF WORK

The purpose of our testing was to determine general infiltration rates of onsite soils with respect to the proposed water quality basin, one located within the proposed park site and one located within the proposed basin in the southeastern corner of the subject development (See Figure 2) Services provided for this study consisted of the following:

- Four (4) percolation tests in accordance with the procedures outlined in the above referenced Handbook, at pre-determined locations identified by Michael Baker International.
- Deep exploratory boring to a depth of 21.5 feet below ground surface.
- Compilation of this report that presents the results of our percolation/infiltration testing.

SITE DESCRIPTION

The overall project site is on previous farm land, located southwest of Avenue 50 and Van Buren Street, in the City of Coachella, California (*see Figure 1, Site Location Map*). Topographically, the overall site is generally flat, sloping gently toward the southeast.

Site elevations range from approximately 48 to 40 feet below mean sea level (msl) based on our review of published topographic maps.

Based on the provided site plan by Michael Baker International, we understand that the planned basin within the park site will have a bottom invert with an approximate depth of 5 feet below grade, while the proposed detention basin in the southeastern corner of the site will have a bottom invert with an approximate depth of 7 feet below grade.

SUBSURFACE INVESTIGATION

Our field investigation consisted of excavating four percolation test holes at each of the pre-determined locations within the proposed basins (at approximately 5 to 7 feet bgs) on September 13, 2022. On the same day, we have also excavated, logged, and sampled one deep exploratory hollow-stem auger boring to a maximum depth of approximately 21.5 feet below ground surface (bgs) to collect samples and verify depth to groundwater and/or impermeable strata. The locations of the percolation test holes and exploratory boring are shown on Figure 2.

SOILS AND GROUNDWATER CONDITIONS

Based on the results of this study, the basin site is underlain by Quaternary Younger Alluvium consisting primarily of grayish brown to yellowish brown, silty sand (SM) and sandy silt (ML) with interbedded layers of sandy clay (CL).

Groundwater was not encountered to the depth explored (21.5 ft), and surface water was not observed during this exploration. However, groundwater was encountered as shallow as 28 feet during previous site investigation.

PERCOLATION TEST RESULTS

After presoaking the percolation test holes on September 13, 2022, we returned to site after 24 hours to perform the infiltration testing. Percolation testing was performed in general accordance with the procedures of Appendix A, Section 2.3 of the Riverside County Design Handbook referenced above. Results reported below are the most conservative reading in minutes per inch drop and converted to inches per hour per the Porchet method. No factor of safety (FS) has been applied to these rates. Field test data are included in Appendix A.

Summary of Percolation/Infiltration Test Results

Test Hole #	Ex. Ground Surface Elev. (ft)	Depth BGS (ft)	Percolation Rate (min/in)	Infiltration Rate (in/hr)	Soil Description/Notes
P-1	-45	5	0.49	7.4	Silty SAND (SM)
P-2	-45	5	0.46	7.8	Silty SAND (SM)
P-3	-45	7	0.70	6.4	Silty SAND (SM)
P-4	-45	7	0.74	5.5	Silty SAND (SM)

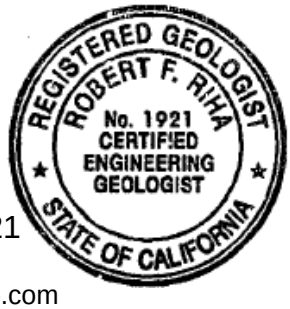
L I M I T A T I O N S

The above findings and recommendations are based on a general interpretation of soils conditions between test locations, utilizing contemporary engineering principles and practice. We make no other warranty, either expressed or implied. Please notify the engineer in the event conditions are encountered that are not reflected in this report.

If you have any question, please do not hesitate to contact this office. We appreciate this opportunity to be of service.

Respectfully submitted,

LEIGHTON AND ASSOCIATES, INC.

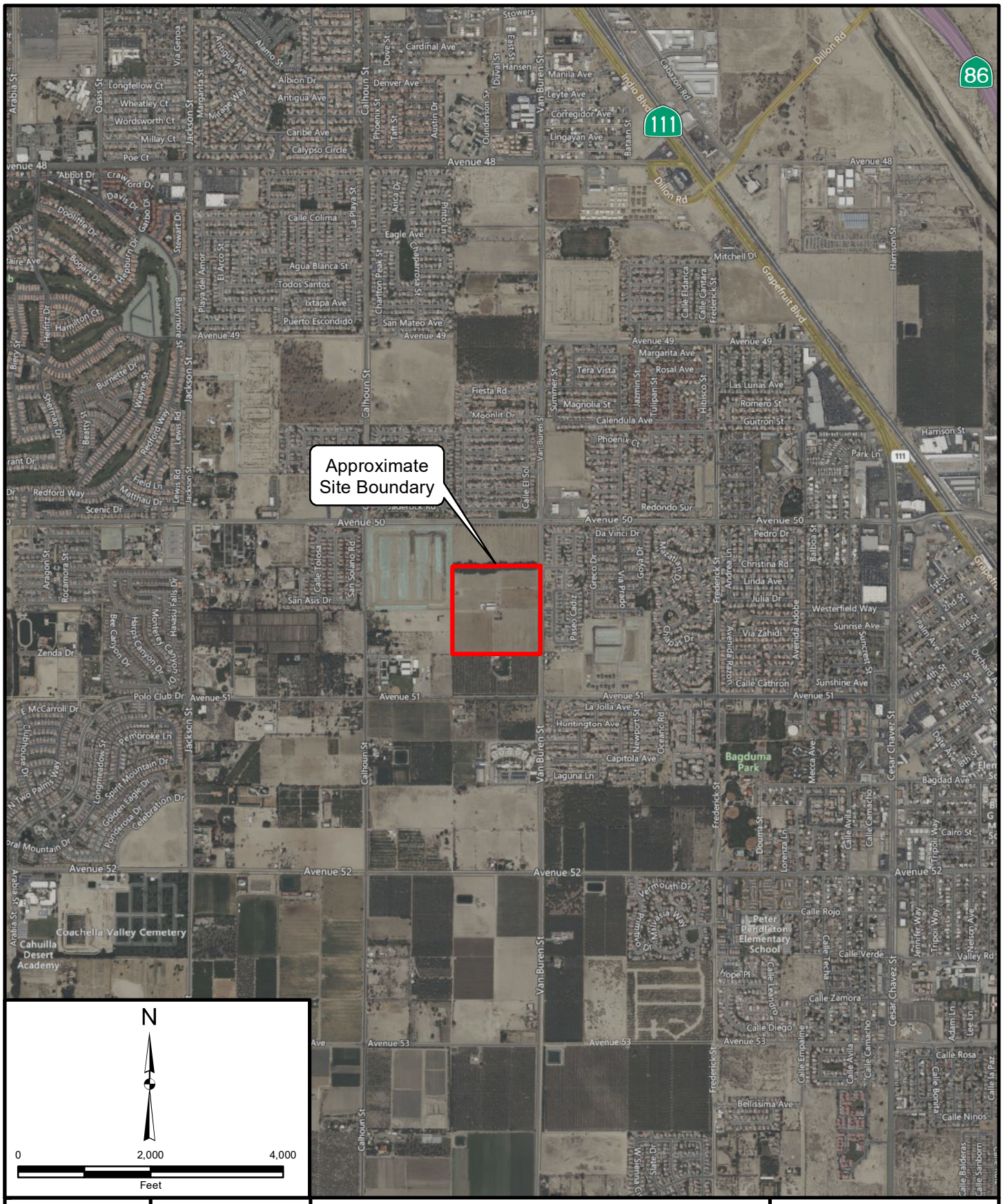


Robert F. Riha, CEG 1921
Senior Principal Geologist
Ext 8914 rriha@leightongroup.com

Bashir Saiid, PE 93187
Senior Project Engineer
Ext 8927 bsaiid@leightongroup.com

Attachments: Figure 1 – Site Location Map
Figure 2 – Boring Location Map
Appendix A – Logs of Exploratory Borings and Percolation Test Results

Distribution: (1) addressee (PDF copy via email)



Project: 13339.003	Eng/Geol: BSS/RFR
Scale: 1 " = 2,000 '	Date: September 2022
Base Map: ESRI ArcGIS Online 2022 Author: (mmurphy)	

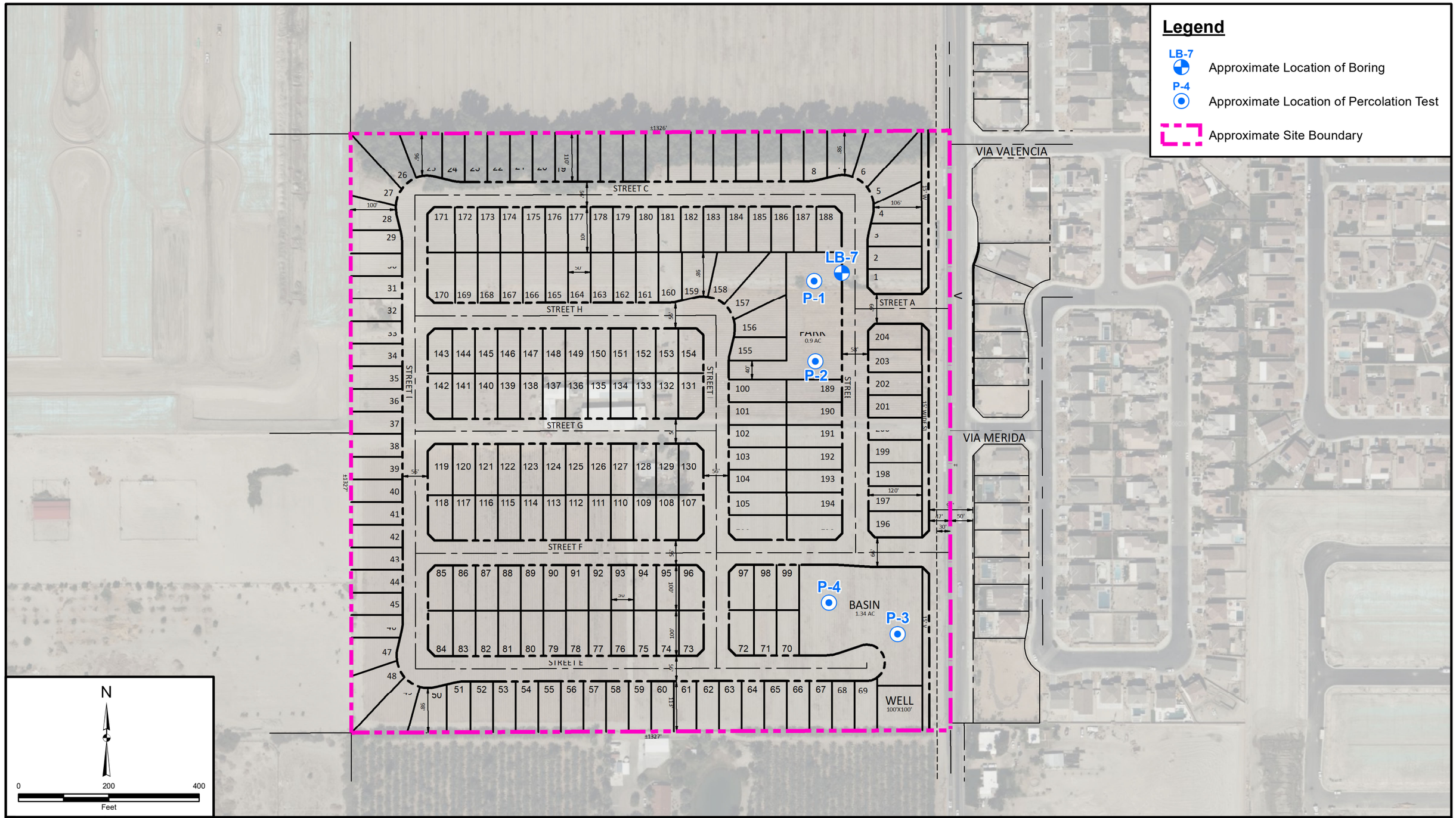
SITE LOCATION MAP

Pulte Sevilla II
APN's 779-280-002 & -320-001
Coachella, California

FIGURE 1

Leighton

Map Saved as V:\Drafting\13339\003\Maps\13339-003_F01_SLM_2022-09-14.mxd on 9/14/2022 11:53:20 AM



Project: 13339.003	Eng/Geol: BSS/RFR
Scale: 1 " = 200 '	Date: September 2022

Base Map: Bing Maps, 2016 2022
Reference: Sevilla II Lotting Study F Rev. 3 by Michael Baker International, 8/31/2022.

Author: Leighton Geomatics (mmurphy)

BORING LOCATION MAP

Pulte Sevilla II
APN's 779-280-002 & -320-001
Coachella, California

FIGURE 2

Leighton

Map Saved as V:\Drafting\13339\003\Maps\13339-003_F02_BLM_2022-09-14A.mxd on 9/14/2022 12:10:51 PM

APPENDIX A

LOG OF EXPLORATORY BORINGS AND PERCOLATION TEST RESULTS

GEOTECHNICAL BORING LOG LB-7

Project No.	13339.003	**Date Drilled**	9-13-22
Project	Pulte Sevilla II	**Logged By**	MJM
Drilling Co.	2R Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	~ -45'
Location	See Boring Location Map	**Sampled By**	MJM

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
-45	0							SM	**Quaternary Alluvium (Qal)** SILTY SAND, very loose, gray, slightly moist, very fine to medium sand	
				S1	2 2 2					
-50	5			S2	2 4 5				loose, some mica	
				S3	3 6 7			CL/ML	SILTY CLAY, stiff, grayish brown, moist, very fine sand, forms ribbon ~3 cm	
-55	10			S4	4 5 8			SM	SILTY SAND, medium dense, grayish brown, moist, fine to medium sand, some mica	
-60	15			S5	4 5 6				same as above	
-65	20			S6	5 9 12				same as above, some clay layered in	
-70	25								TD 21.5' No GW Backfilled 9/13/22	
-75	30									

SAMPLE TYPES:

B	BULK SAMPLE
C	CORE SAMPLE
G	GRAB SAMPLE
R	RING SAMPLE
S	SPLIT SPOON SAMPLE
T	TUBE SAMPLE

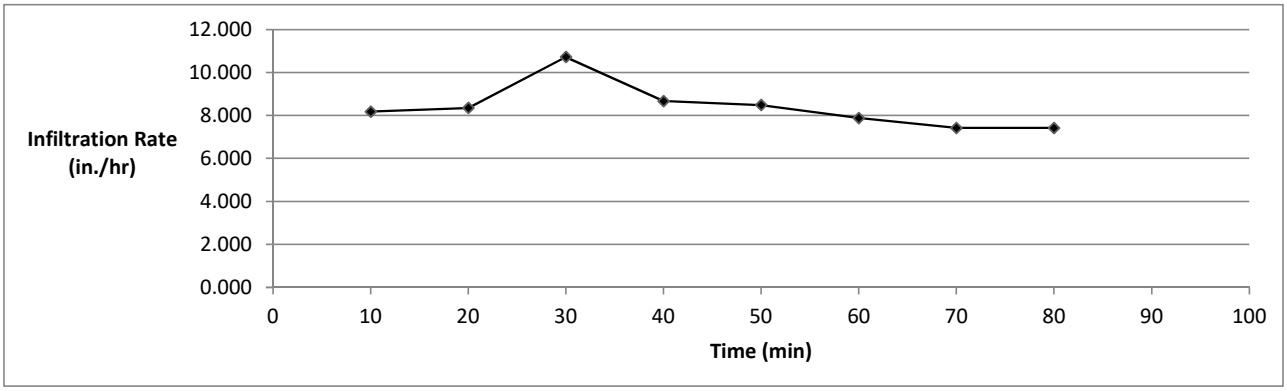
TYPE OF TESTS:

-200	% FINES PASSING	DS	DIRECT SHEAR	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	EI	EXPANSION INDEX	SE	SAND EQUIVALENT
CN	CONSOLIDATION	H	HYDROMETER	SG	SPECIFIC GRAVITY
CO	COLLAPSE	MD	MAXIMUM DENSITY	UC	UNCONFINED COMPRESSIVE STRENGTH
CR	CORROSION	PP	POCKET PENETROMETER		
CU	UNDRAINED TRIAXIAL	RV	R VALUE		

Leighton

Test Hole Number:	P-1	Project	Pulte Sevilla II Perc Basins	
Date Excavated:	9/13/2022	Project Number	13339.003	
Tested by:	MJM	Date Tested	9/14/2022	
Soil Unit:	Alluvial (Qal)	Depth of Test Hole (in.)	60	
USCS Soil Type:	Silty Sand (SM)	Diameter (in.)	8	Sunny ~90 °

Time	Δt (min)	Initial Water Depth (inches)	Final Water Depth (inches)	Change In Water Level (inches)	Infiltration/Percolation Rate	
					inches/hour*	minute/inch
7:44:00 8:09:00	25.00	19.58	58.60	39.02	8.175	0.641
8:12:00 8:37:00	25.00	19.00	59.01	40.01	8.352	0.625
8:38:00 8:48:00	10.00	18.90	45.51	26.61	10.717	0.376
8:49:00 8:59:00	10.00	18.67	41.66	22.99	8.666	0.435
9:08:00 9:18:00	10.00	19.70	41.80	22.10	8.486	0.452
9:20:00 9:30:00	10.00	19.18	40.35	21.17	7.881	0.472
9:33:00 9:43:00	10.00	18.90	39.25	20.35	7.417	0.491
9:44:00 9:55:00	10.00	18.89	39.25	20.36	7.419	0.491



* Based on Prochet Method

Percolation Test Data

P-1

Project Number: 13339.003

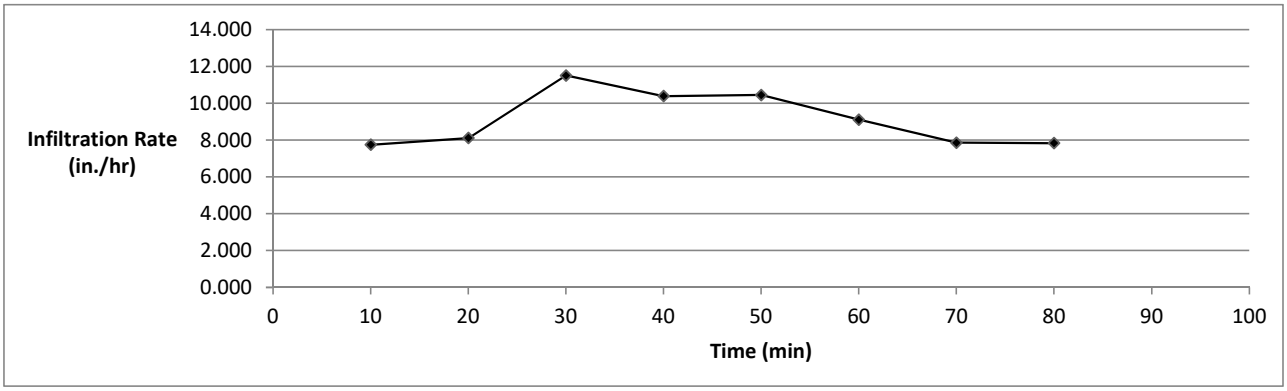
Project Name: *Pulte Sevilla II Perc Basins*

Date: Sep-22

Leighton

Test Hole Number:	P-2	Project	Pulte Sevilla II Perc Basins
Date Excavated:	9/13/2022	Project Number	13339.003
Tested by:	MJM	Date Tested	9/14/2022
Soil Unit:	Alluvial (Qal)	Depth of Test Hole (in.)	60
USCS Soil Type:	Silty Sand (SM)	Diameter (in.)	8

Time	Δt (min)	Initial Water Depth (inches)	Final Water Depth (inches)	Change In Water Level (inches)	Infiltration/Percolation Rate	
					inches/hour*	minute/inch
7:35:00	25.00	20.00	57.50	37.50	7.742	0.667
8:00:00						
8:03:00	25.00	20.50	58.50	38.00	8.107	0.658
8:28:00						
8:28:00	10.00	19.24	46.95	27.71	11.504	0.361
8:38:00						
8:40:00	10.00	19.70	45.25	25.55	10.384	0.391
8:50:00						
8:52:00	10.00	18.80	45.00	26.20	10.445	0.382
9:02:00						
9:04:00	10.00	19.53	42.90	23.37	9.110	0.428
9:14:00						
9:16:00	10.00	19.10	40.25	21.15	7.852	0.473
9:26:00						
9:29:00	10.00	18.20	39.75	21.55	7.830	0.464
9:39:00						



* Based on Prochet Method

Percolation Test Data

P-2

Project Number: 13339.003

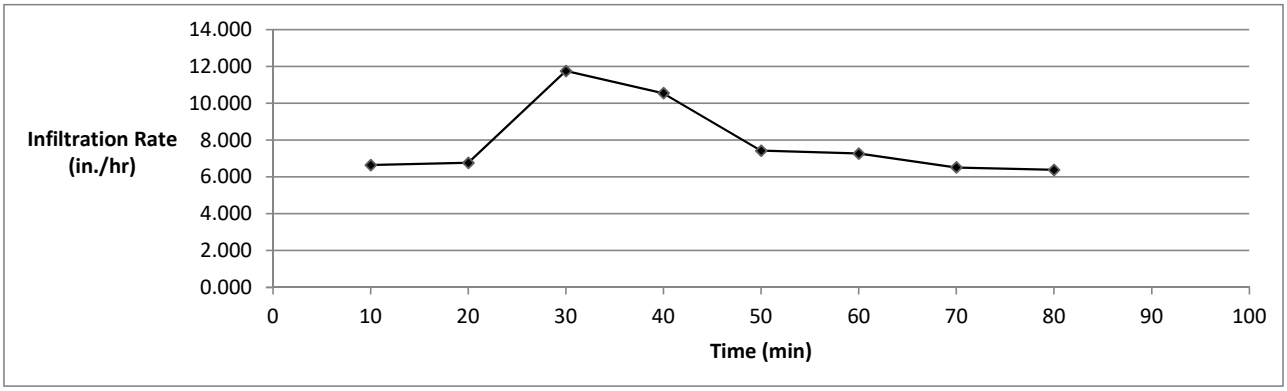
Project Name: *Pulte Sevilla II Perc Basins*

Date: Sep-22

Leighton

Test Hole Number:	P-3	Project	Pulte Sevilla II Perc Basins
Date Excavated:	9/13/2022	Project Number	13339.003
Tested by:	MJM	Date Tested	9/14/2022
Soil Unit:	Alluvial (Qal)	Depth of Test Hole (in.)	84
USCS Soil Type:	Silty Sand (SM)	Diameter (in.)	8

Time	Δt (min)	Initial Water Depth (inches)	Final Water Depth (inches)	Change In Water Level (inches)	Infiltration/Percolation Rate	
					inches/hour*	minute/inch
7:35:00	25.00	22.50	74.40	51.90	6.634	0.482
8:00:00						
8:03:00	25.00	22.50	75.00	52.50	6.765	0.476
8:28:00						
8:28:00	10.00	50.40	73.80	23.40	11.749	0.427
8:38:00						
8:40:00	10.00	55.20	74.00	18.80	10.542	0.532
8:50:00						
8:52:00	10.00	47.16	65.50	18.34	7.418	0.545
9:02:00						
9:04:00	10.00	50.04	66.75	16.71	7.264	0.598
9:14:00						
9:16:00	10.00	49.80	65.25	15.45	6.511	0.647
9:26:00						
9:29:00	10.00	51.96	66.25	14.29	6.376	0.700
9:39:00						



* Based on Prochet Method

Percolation Test Data

P-3

Project Number: 13339.003

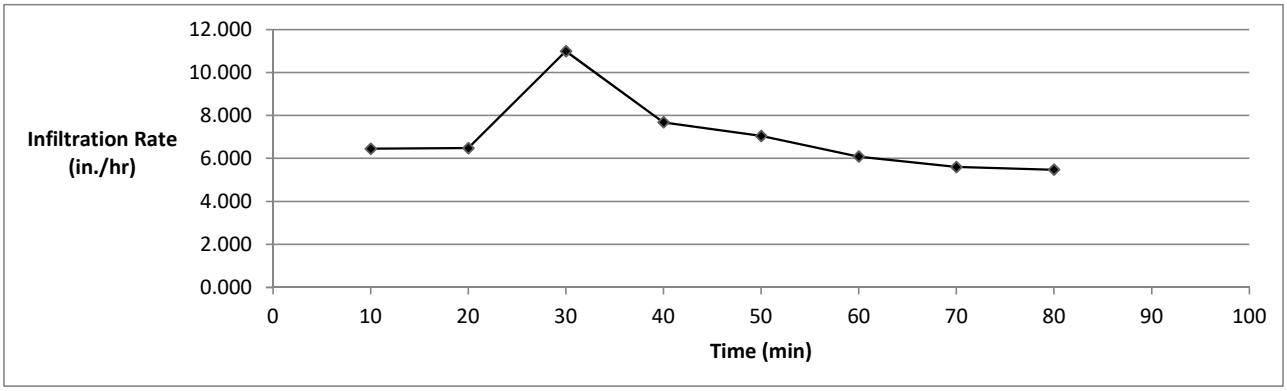
Project Name: *Pulte Sevilla II Perc Basins*

Date: Sep-22

Leighton

Test Hole Number:	P-4	Project	Pulte Sevilla II Perc Basins	
Date Excavated:	9/13/2022	Project Number	13339.003	
Tested by:	MJM	Date Tested	9/14/2022	
Soil Unit:	Alluvial (Qal)	Depth of Test Hole (in.)	84	
USCS Soil Type:	Silty Sand (SM)	Diameter (in.)	8	Sunny ~90 °

Time	Δt (min)	Initial Water Depth (inches)	Final Water Depth (inches)	Change In Water Level (inches)	Infiltration/Percolation Rate	
					inches/hour*	minute/inch
7:35:00 8:00:00	25.00	15.25	72.10	56.85	6.447	0.440
8:03:00 8:28:00	25.00	15.00	72.24	57.24	6.483	0.437
8:28:00 8:38:00	10.00	51.03	73.00	21.97	10.992	0.455
8:40:00 8:50:00	10.00	51.54	68.25	16.71	7.681	0.598
8:52:00 9:02:00	10.00	50.75	66.75	16.00	7.046	0.625
9:04:00 9:14:00	10.00	51.16	65.25	14.09	6.083	0.710
9:16:00 9:26:00	10.00	51.40	64.50	13.10	5.604	0.763
9:29:00 9:39:00	10.00	49.80	63.25	13.45	5.476	0.743



* Based on Prochet Method

Percolation Test Data

P-4

Project Number: 13339.003

Project Name: *Pulte Sevilla II Perc Basins*

Date: Sep-22

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APPENDIX E.2

USDA NRCS CUSTOM SOIL RESOURCE REPORT – SEVILLA II

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

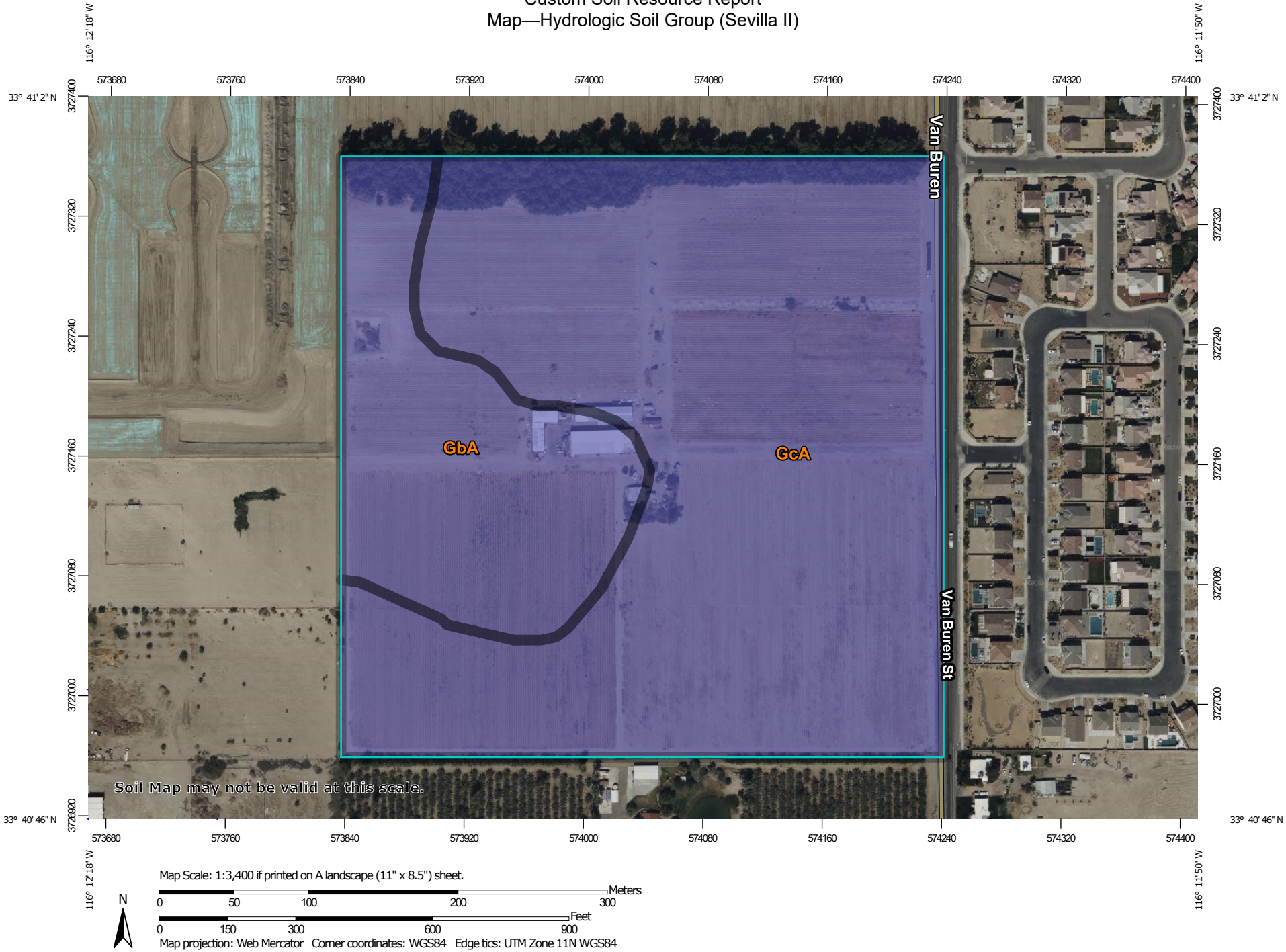
A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Riverside County, Coachella Valley Area, California

Sevilla II

September 23, 2022

Custom Soil Resource Report
Map—Hydrologic Soil Group (Sevilla II)



Map Scale: 1:3,400 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 150 300 600 900

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

MAP LEGEND

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

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Riverside County, Coachella Valley Area, California
Survey Area Data: Version 13, Sep 15, 2021

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

Date(s) aerial images were photographed: Mar 15, 2022—May 28, 2022

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

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

Table—Hydrologic Soil Group (Sevilla II)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
GbA	Gilman fine sandy loam, 0 to 2 percent slopes	B	9.4	23.3%
GcA	Gilman fine sandy loam, wet, 0 to 2 percent slopes	B	30.8	76.7%
Totals for Area of Interest			**40.2**	**100.0%**

Rating Options—Hydrologic Soil Group (Sevilla II)

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

Water Features

This folder contains tabular reports that present soil hydrology information. The reports (tables) include all selected map units and components for each map unit. Water Features include ponding frequency, flooding frequency, and depth to water table.

Hydrologic Soil Group and Surface Runoff (Sevilla II)

This table gives estimates of various soil water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas.

Surface runoff refers to the loss of water from an area by flow over the land surface. Surface runoff classes are based on slope, climate, and vegetative cover. The concept indicates relative runoff for very specific conditions. It is assumed that the surface of the soil is bare and that the retention of surface water resulting from irregularities in the ground surface is minimal. The classes are negligible, very low, low, medium, high, and very high.

Report—Hydrologic Soil Group and Surface Runoff (Sevilla II)

Absence of an entry indicates that the data were not estimated. The dash indicates no documented presence.

Hydrologic Soil Group and Surface Runoff–Riverside County, Coachella Valley Area, California			
Map symbol and soil name	**Pct. of map unit**	**Surface Runoff**	**Hydrologic Soil Group**
GbA—Gilman fine sandy loam, 0 to 2 percent slopes			
Gilman	85	Low	B
GcA—Gilman fine sandy loam, wet, 0 to 2 percent slopes			
Gilman	85	Low	B

Hydrologic Soil Group and Surface Runoff (Sevilla II)

This table gives estimates of various soil water features. The estimates are used in land use planning that involves engineering considerations.

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Gilman	85	Low	B
GcA—Gilman fine sandy loam, wet, 0 to 2 percent slopes			
Gilman	85	Low	B

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APPENDIX F

FLOOD DATA

Michael Baker
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APPENDIX F.1

FEMA FIRMETTE

National Flood Hazard Layer FIRMette

FEMA

116°12'23"W 33°41'10"N

116°11'46"W 33°40'40"N

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

1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

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

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

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

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

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

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

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

N

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

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 9/1/2022 at 3:02 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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

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APPENDIX F.2

NOAA ATLAS 14 POINT PRECIPITATION FREQUENCY ESTIMATES

NOAA Atlas 14, Volume 6, Version 2
Location name: Coachella, California, USA*
Latitude: 33.6819°, Longitude: -116.2012°
Elevation: -43.74 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

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

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

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

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.064** (0.053-0.077)	**0.100** (0.083-0.121)	**0.151** (0.126-0.184)	**0.197** (0.162-0.241)	**0.265** (0.211-0.336)	**0.322** (0.251-0.417)	**0.384** (0.292-0.511)	**0.455** (0.336-0.622)	**0.561** (0.397-0.800)	**0.653** (0.447-0.966)
10-min	**0.091** (0.076-0.110)	**0.143** (0.119-0.173)	**0.217** (0.180-0.264)	**0.282** (0.233-0.346)	**0.379** (0.302-0.481)	**0.461** (0.359-0.597)	**0.551** (0.419-0.732)	**0.652** (0.482-0.891)	**0.804** (0.569-1.15)	**0.937** (0.640-1.38)
15-min	**0.110** (0.092-0.133)	**0.173** (0.144-0.210)	**0.262** (0.218-0.319)	**0.341** (0.281-0.418)	**0.459** (0.365-0.582)	**0.558** (0.435-0.722)	**0.666** (0.507-0.885)	**0.788** (0.583-1.08)	**0.972** (0.688-1.39)	**1.13** (0.774-1.67)
30-min	**0.159** (0.132-0.192)	**0.249** (0.208-0.302)	**0.378** (0.314-0.459)	**0.492** (0.405-0.603)	**0.660** (0.526-0.837)	**0.803** (0.626-1.04)	**0.959** (0.730-1.27)	**1.14** (0.839-1.55)	**1.40** (0.991-2.00)	**1.63** (1.12-2.41)
60-min	**0.222** (0.186-0.269)	**0.349** (0.291-0.423)	**0.530** (0.440-0.644)	**0.689** (0.568-0.844)	**0.926** (0.737-1.17)	**1.13** (0.877-1.46)	**1.35** (1.02-1.79)	**1.59** (1.18-2.17)	**1.96** (1.39-2.80)	**2.29** (1.56-3.38)
2-hr	**0.307** (0.256-0.372)	**0.457** (0.381-0.554)	**0.680** (0.565-0.826)	**0.882** (0.727-1.08)	**1.19** (0.950-1.51)	**1.46** (1.14-1.90)	**1.77** (1.34-2.35)	**2.12** (1.56-2.89)	**2.65** (1.88-3.78)	**3.12** (2.13-4.61)
3-hr	**0.370** (0.309-0.448)	**0.541** (0.451-0.655)	**0.798** (0.663-0.969)	**1.03** (0.853-1.27)	**1.41** (1.12-1.78)	**1.73** (1.35-2.24)	**2.11** (1.60-2.80)	**2.54** (1.87-3.47)	**3.21** (2.27-4.58)	**3.81** (2.60-5.63)
6-hr	**0.489** (0.408-0.592)	**0.706** (0.589-0.856)	**1.04** (0.862-1.26)	**1.35** (1.11-1.65)	**1.83** (1.46-2.32)	**2.27** (1.77-2.94)	**2.77** (2.11-3.68)	**3.36** (2.48-4.59)	**4.28** (3.03-6.11)	**5.11** (3.50-7.56)
12-hr	**0.590** (0.492-0.714)	**0.870** (0.725-1.05)	**1.29** (1.07-1.57)	**1.68** (1.39-2.06)	**2.29** (1.82-2.90)	**2.83** (2.21-3.67)	**3.45** (2.62-4.58)	**4.16** (3.07-5.69)	**5.28** (3.74-7.53)	**6.27** (4.29-9.27)
24-hr	**0.742** (0.657-0.856)	**1.13** (0.995-1.30)	**1.69** (1.49-1.96)	**2.21** (1.93-2.58)	**3.00** (2.54-3.61)	**3.68** (3.05-4.52)	**4.44** (3.61-5.59)	**5.32** (4.20-6.87)	**6.66** (5.05-8.95)	**7.83** (5.75-10.9)
2-day	**0.859** (0.760-0.991)	**1.32** (1.17-1.53)	**1.99** (1.76-2.31)	**2.59** (2.26-3.02)	**3.48** (2.95-4.20)	**4.25** (3.53-5.22)	**5.08** (4.13-6.40)	**6.03** (4.76-7.79)	**7.43** (5.64-10.00)	**8.64** (6.34-12.0)
3-day	**0.922** (0.816-1.06)	**1.43** (1.26-1.65)	**2.15** (1.89-2.48)	**2.78** (2.44-3.25)	**3.73** (3.16-4.50)	**4.53** (3.76-5.57)	**5.41** (4.39-6.80)	**6.38** (5.04-8.25)	**7.83** (5.94-10.5)	**9.06** (6.65-12.6)
4-day	**0.972** (0.860-1.12)	**1.50** (1.33-1.74)	**2.26** (1.99-2.62)	**2.93** (2.56-3.42)	**3.92** (3.32-4.72)	**4.75** (3.94-5.83)	**5.65** (4.59-7.11)	**6.66** (5.26-8.60)	**8.14** (6.18-10.9)	**9.39** (6.90-13.1)
7-day	**1.03** (0.915-1.19)	**1.59** (1.41-1.84)	**2.38** (2.10-2.75)	**3.07** (2.69-3.58)	**4.09** (3.47-4.93)	**4.94** (4.10-6.07)	**5.87** (4.76-7.38)	**6.89** (5.44-8.90)	**8.39** (6.37-11.3)	**9.66** (7.09-13.4)
10-day	**1.07** (0.947-1.23)	**1.64** (1.45-1.89)	**2.45** (2.16-2.83)	**3.16** (2.76-3.68)	**4.20** (3.56-5.05)	**5.06** (4.20-6.22)	**6.00** (4.87-7.55)	**7.04** (5.56-9.10)	**8.56** (6.50-11.5)	**9.84** (7.22-13.7)
20-day	**1.14** (1.01-1.32)	**1.76** (1.56-2.04)	**2.64** (2.33-3.06)	**3.40** (2.98-3.97)	**4.52** (3.83-5.45)	**5.45** (4.52-6.69)	**6.45** (5.23-8.11)	**7.54** (5.96-9.74)	**9.14** (6.93-12.3)	**10.5** (7.69-14.6)
30-day	**1.19** (1.06-1.37)	**1.87** (1.65-2.15)	**2.82** (2.49-3.27)	**3.65** (3.20-4.26)	**4.87** (4.13-5.87)	**5.87** (4.88-7.22)	**6.95** (5.64-8.74)	**8.13** (6.42-10.5)	**9.83** (7.46-13.2)	**11.2** (8.25-15.6)
45-day	**1.29** (1.15-1.49)	**2.06** (1.82-2.38)	**3.14** (2.77-3.63)	**4.08** (3.57-4.76)	**5.46** (4.63-6.57)	**6.59** (5.48-8.10)	**7.81** (6.34-9.82)	**9.13** (7.21-11.8)	**11.0** (8.37-14.8)	**12.6** (9.24-17.5)
60-day	**1.36** (1.21-1.57)	**2.20** (1.94-2.54)	**3.38** (2.98-3.91)	**4.41** (3.85-5.14)	**5.91** (5.00-7.11)	**7.14** (5.93-8.78)	**8.47** (6.87-10.6)	**9.90** (7.82-12.8)	**12.0** (9.07-16.1)	**13.6** (10.0-19.0)

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

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

Please refer to NOAA Atlas 14 document for more information.

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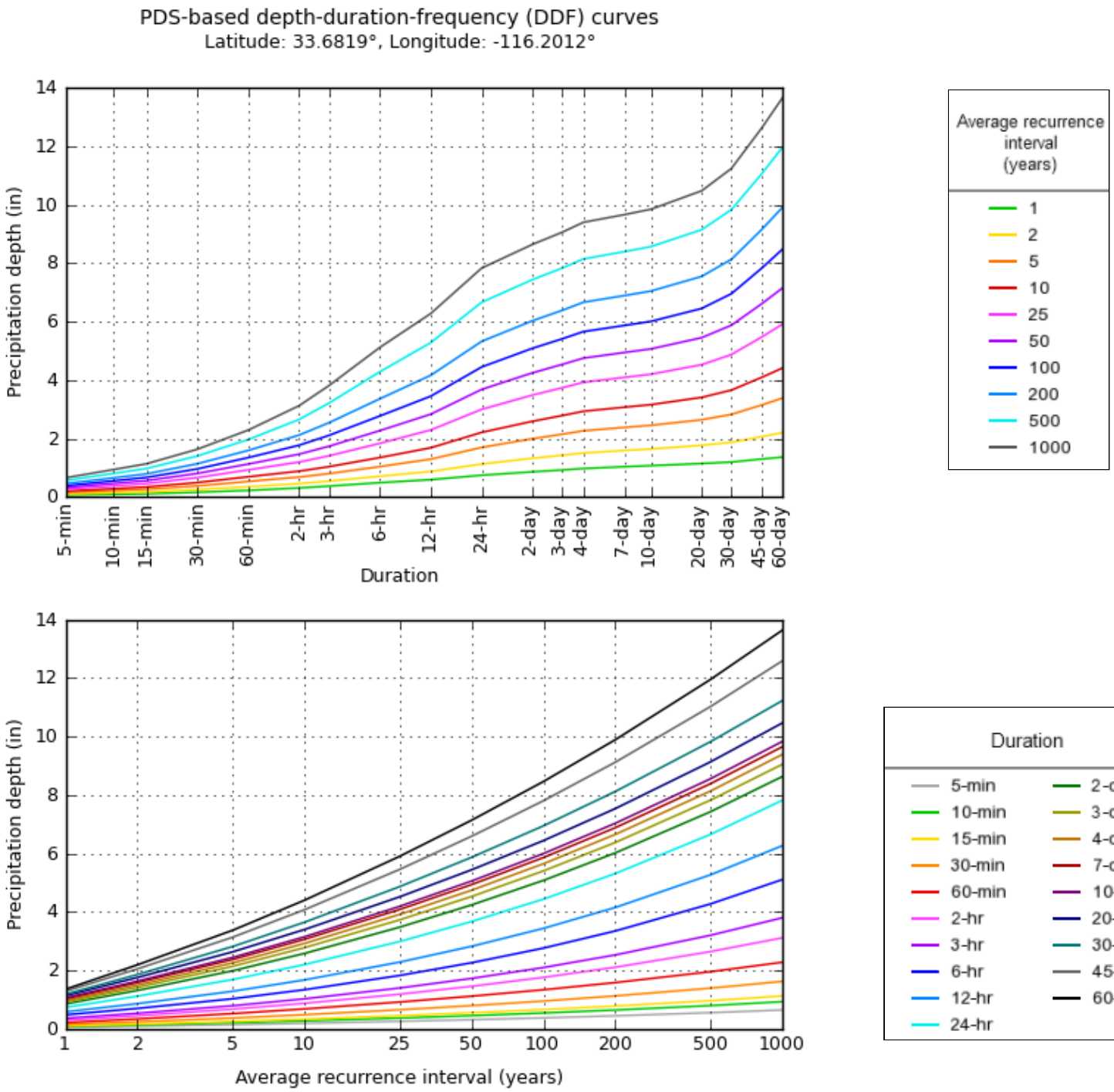
PF graphical



NOAA Atlas 14, Volume 6, Version 2

Created (GMT): Mon Aug 29 19:57:28 2022

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Maps & aerials

Small scale terrain

Large scale terrain

Large scale map

Large scale aerial

Back to Top

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

Disclaimer

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APPENDIX G

RCFC&WCD HYDROLOGY MANUAL PLATES E-6.1-6.3

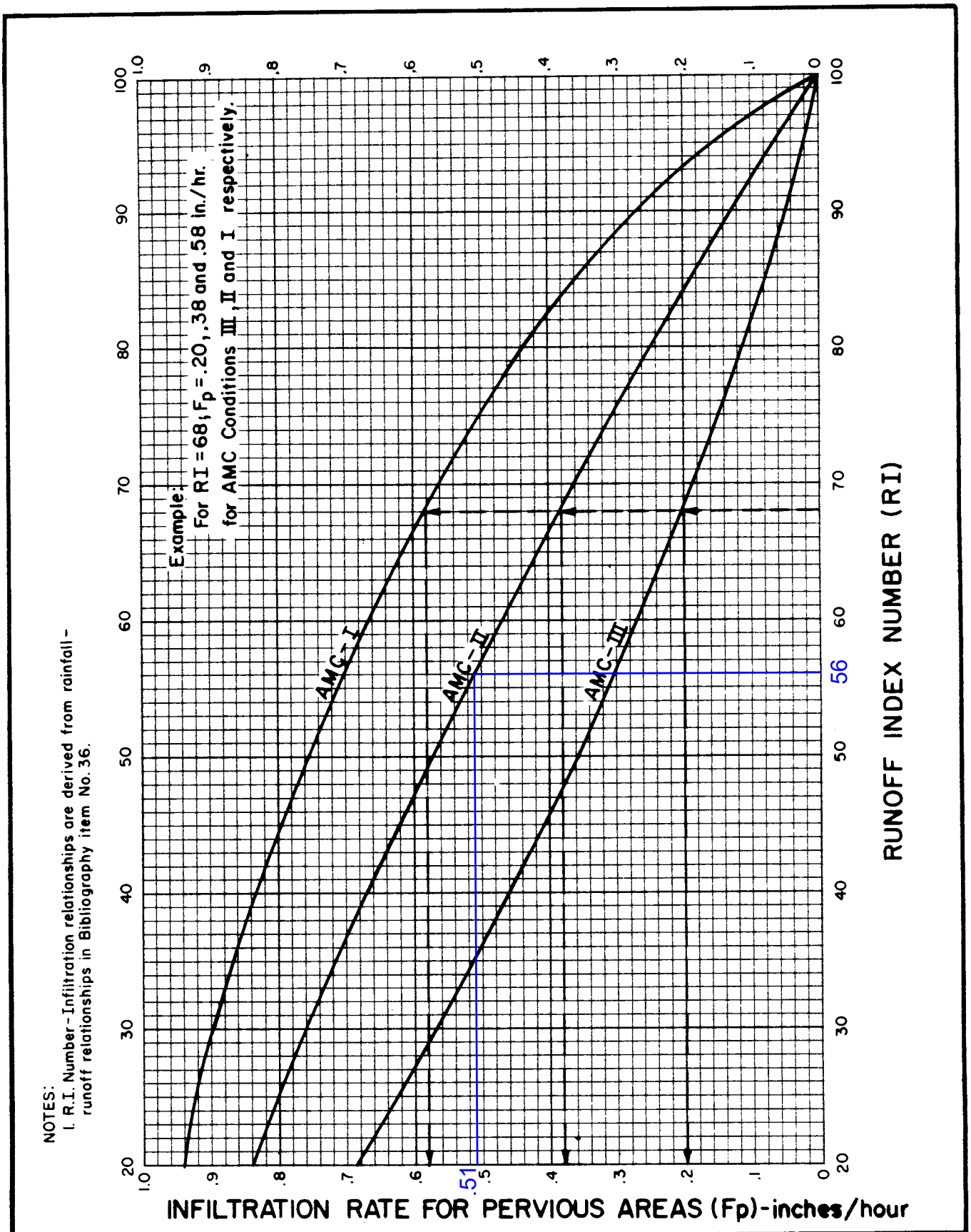
RUNOFF INDEX NUMBERS OF HYDROLOGIC SOIL-COVER COMPLEXES FOR PERVIOUS AREAS-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group A	B	C	D
NATURAL COVERS -					
Barren (Rockland, eroded and graded land)		78	86	91	93
Chaparrel, Broadleaf (Manzonita, ceanothus and scrub oak)	Poor	53	70	80	85
	Fair	40	63	75	81
	Good	31	57	71	78
Chaparrel, Narrowleaf (Chamise and redshank)	Poor	71	82	88	91
	Fair	55	72	81	86
Grass, Annual or Perennial	Poor	67	78	86	89
	Fair	50	69	79	84
	Good	38	61	74	80
Meadows or Cienegas (Areas with seasonally high water table, principal vegetation is sod forming grass)	Poor	63	77	85	88
	Fair	51	70	80	84
	Good	30	58	72	78
Open Brush (Soft wood shrubs - buckwheat, sage, etc.)	Poor	62	76	84	88
	Fair	46	66	77	83
	Good	41	63	75	81
Woodland (Coniferous or broadleaf trees predominate. Canopy density is at least 50 percent)	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	28	55	70	77
Woodland, Grass (Coniferous or broadleaf trees with canopy density from 20 to 50 percent)	Poor	57	73	82	86
	Fair	44	65	77	82
	Good	33	58	72	79
URBAN COVERS -					
Residential or Commercial Landscaping (Lawn, shrubs, etc.)	Good	32	56	69	75
Turf (Irrigated and mowed grass)	Poor	58	74	83	87
	Fair	44	65	77	82
	Good	33	58	72	79
AGRICULTURAL COVERS -					
Fallow (Land plowed but not tilled or seeded)		76	85	90	92

RCFC & WCD
HYDROLOGY MANUAL

RUNOFF INDEX NUMBERS FOR PERVIOUS AREAS

PLATE E-6.1 (1 of 2)



RCFC & WCD

HYDROLOGY MANUAL

INFILTRATION RATE FOR PERVIOUS AREAS VERSUS RUNOFF INDEX NUMBERS

PLATE E-6.2

ACTUAL IMPERVIOUS COVER

Land Use (1)	Range-Percent	Recommended Value For Average Conditions-Percent(2)
Natural or Agriculture	0 - 10	0
Single Family Residential: (3)		
40,000 S. F. (1 Acre) Lots	10 - 25	20
20,000 S. F. (½ Acre) Lots	30 - 45	40
7,200 - 10,000 S. F. Lots	45 - 55	50
Lots are < 7,200 SF		
Multiple Family Residential:		
Condominiums	45 - 70	65
Apartments	65 - 90	80
Mobile Home Park	60 - 85	75
Commercial, Downtown Business or Industrial	80 -100	90

Notes:

1. Land use should be based on ultimate development of the watershed. Long range master plans for the County and incorporated cities should be reviewed to insure reasonable land use assumptions.

2. Recommended values are based on average conditions which may not apply to a particular study area. The percentage impervious may vary greatly even on comparable sized lots due to differences in dwelling size, improvements, etc. Landscape practices should also be considered as it is common in some areas to use ornamental gravels underlain by impervious plastic materials in place of lawns and shrubs. A field investigation of a study area should always be made, and a review of aerial photos, where available may assist in estimating the percentage of impervious cover in developed areas.

3. For typical horse ranch subdivisions increase impervious area 5 percent over the values recommended in the table above.

RCFC & WCD
HYDROLOGY MANUAL

IMPERVIOUS COVER FOR DEVELOPED AREAS

PLATE E-6.3