DEVELOPMENT PLAN REVIEW – VTPM 38811-2
PARCEL 2 - SITE 6
CITY OF PERRIS
RIVERSIDE COUNTY, CALIFORNIA

Drainage Study Report

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SECTION 1 - GENERAL OVERVIEW

INTRODUCTION

The purpose of this study is to support the entitlement phase and determine minimum drainage improvements required for the proposed industrial development of approximately 26 acres and 509,000 square feet warehouse building with 78 truck docks, and parking lot that lays within the Harvest Landing Specific Plan, located in the City of Perris, County of Riverside CA. More specifically, the project site is bounded to the north by vacant land, the vacated Indian Avenue to the west, vacant land to the south and Barrett Avenue to the east.

The primary objectives of this report are as follows:

1. Delineate the drainage areas tributary to the onsite above/underground basin

2. Based on drainage patterns, ground slope, land use and soil type and using the Riverside County Rational Method, perform hydrologic and hydraulics of onsite drainage facilities.

3. Determine the 100-year peak storm flows based upon the pre-project, proposed land use per the MDP and post-project condition for the 24-hour storm duration utilizing the Unit Hydrograph Method as outlined in the Riverside County Flood Control & Water Conservation District Hydrology Manual.

4. Determine the required underground detention facilities to mitigate the 100-year peak storm flows for the 24-hour storm duration in the post-project condition to flows less than or equal to the proposed land use condition flow rates.

5. Determine the required the minimum storm drain infrastructure to flood protect the project site for the 100-year storm event.

6. Preparation of a hydrology report, which consist of hydrological and analytical results and exhibits.

BACKGROUND

EXISTING CONDITIONS

The project site is located within Riverside County Flood Control's Perris Valley Master Drainage Plan, and tributary to a low point in Perris Boulevard and the existing MDP Line "K" (earthen V-Channel) located about 2600 lineal feet east of Indian Avenue.

The site is in a relatively mild to flat sloping undeveloped terrain on a drainage area which drains easterly towards Barrett Avenue with no offsite flows. All the developed storm flows continue to travel easterly through the property, to Barrett Avenue and the vacant parcels to the east where it ultimately reaches a low point at Perris Boulevard; storm drain flows are intercepted by existing street inlets and the existing MDP Line "K". MDP Line "K" is an earthen "V" channel (w= 16', H=8' & z=1:1) and planned as a future Trapezoidal Channel (b=6', d=8').

DEVELOPED CONDITIONS

The preliminary offsite design is shown on Exhibit F "Harvest Landing Industrial Phase 1 Offsite Master Storm Drain & Low Flow System". The offsite master storm drain system (backbone) will be part of a separate report and therefore excluded. The onsite storm water runoff will be collected and treated using proprietary devices to accommodate the water quality component of mitigation. The onsite storm water runoff will be conveyed to an underground chamber system to mitigate the increased storm runoff to be at or below the current MDP land use condition flow. See the table below for the rational method results:

Description	**Q100 Peak Flow Rates**		
Watershed Area	**A**	B	**A+B**
Proposed	23.51	31.02	47.37
Existing	18.11	18.13	36.24
Onsite MDP	20.24	20.37	40.61

For purposes of this preliminary drainage report, the 100-year 24-hour peak flow rates for the post developed condition, predeveloped condition and proposed developed condition per the land use on the MDP were the only storm events analyzed for mitigation. The project storm mitigation is provided by utilizing the underground storm drain detention system and the outlet control structures. The total mitigation volume required was determined by selecting the flow rates from the recess limb of the proposed unit hydrograph runs for the 100-year 24-hour storm event that are equal or less than the flow rates from the proposed land use conditions. Smaller storm events were analyzed in this, however, since the storm volume demand to mitigate the storm flows from the 100-year 24hour event are considerably larger than volumes produced by the smaller storm events, thus a conservative approach.

MDP Condition Watershed A Volume: 1.89 ac-ft; $Q_{100\text{-}24hr}$: 6.13 cfs
Proposed Condition Watershed A Volume: 2.52 ac-ft; $Q_{100\text{-}24hr}$: 7.16 cfs
Underground Chamber Watershed A Volume: *2.63 ac-ft

MDP Watershed B Volume: 1.78 ac-ft; $Q_{100\text{-}24hr}$: 5.63 cfs
Proposed Condition Watershed B Volume: 2.69 ac-ft; $Q_{100\text{-}24hr}$: 7.27 cfs
Underground Chamber Watershed B Volume: *3.09 ac-ft

*For watershed "A" since this volume is greater than 2.56 ac-ft the underground chambers have enough storage to mitigate peak storm flows to the proposed land use levels. Similarly for watershed "B" since the volume provided by the underground chambers exceeds 2.76 ac-ft, there is enough storage to mitigate peak storm flows to the proposed land use levels. See the table on the following page for the unit hydrograph results:

Watershed A

Storm Duration	SP Q_{peak}	SP V_{TOTAL}	MDP Q_{PEAK}	MDP V_{TOTAL}
1	32.86	1.0485	29.75	0.9574
3	20.66	1.6199	18.19	1.3762
6	17.93	2.0409	14.83	1.6694
24	7.16	3.8446	6.13	2.9684
Acreage	13.13		13.22	

Watershed B

Storm Duration	SP Q_{peak}	SP V_{TOTAL}	MDP Q_{PEAK}	MDP V_{TOTAL}
1	35.37	1.0460	28.24	0.8901
3	21.01	1.6607	17.18	1.2815
6	18.19	2.1206	14.27	1.5568
24	7.27	4.0671	5.63	2.7613
Acreage	12.68		12.58	

METHODOLOGY

HYDROLOGY

Hydrologic calculations were performed using the Riverside County Rational Method from RCFCD & WCD Hydrology Manual, dated April 1978. The 100-year design discharge was computed by generating a hydrologic "link-node" model in which divides the area into drainage sub-areas, each tributary to a concentration point or hydrologic "node" point determined by the proposed layout. The computer results are included in section 2. The following assumptions/guidelines were applied for use of the Rational Method:

1. The map from the Riverside County Hydrology Manual indicates that the study area is primarily Group "B" and "C" soils. A USGS soils map for the project site is included as Exhibit D, under the Exhibit section.
2. Initial sub-areas were drawn to be less than 10-acres in size and less than 1,000 feet in length, per County guidelines. Time of concentration for the initial sub-area is based on Time of Concentration Nomograph for Initial Sub-area from the Hydrology Manual.
3. Antecedent Moisture Condition 2 was used for 100-year storm events.
4. Standard intensity-duration curve data for the project area was used for the Perris Valley area; Plate D-4.1.

HYDRAULICS

Civil Design hydrology module was used for preliminarily sizing the storm drainpipe system. The onsite storm drain infrastructure will consist of pipe sizes ranging from 12"-30" in diameter. A more detailed analysis will be provided in subsequent submittals and a WSPG analysis for onsite storm drainpipe system will be performed during final engineering.

CONCLUSIONS & RECOMMENDATIONS

The hydrology analyses evaluated the proposed development to determine the necessary onsite drainage improvements required to mitigate flows for increased runoff and it has been concluded that:

1. The proposed drainage facilities will adequately convey the 100-year flows and provide flood protection to the project site.
2. The proposed underground pipe chamber system will have sufficient storage to adequately mitigate for increased runoff.

SECTION 2 - HYDROLOGY ANALYSIS

100-YEAR EXISTING ON-SITE HYDROLOGY WATERSHED A (RATIONAL METHOD)

100-YEAR EXISTING ON-SITE HYDROLOGY WATERSHED B (RATIONAL METHOD)

100-YEAR PROPOSED LAND USE MDP ON-SITE HYDROLOGY WATERSHED A (RATIONAL METHOD)

100-YEAR PROPOSED LAND USE MDP ON-SITE HYDROLOGY WATERSHED B (RATIONAL METHOD)

100-YEAR PROPOSED ON-SITE HYDROLOGY WATERSHED A (RATIONAL METHOD)

100-YEAR PROPOSED ON-SITE HYDROLOGY WATERSHED B (RATIONAL METHOD)

100-YEAR PROPOSED ON-SITE HYDROLOGY WATERSHED A + B (RATIONAL METHOD)

100-YEAR PROPOSED OFF-SITE HYDROLOGY WATERSHED X - E FRONTAGE RD (RATIONAL METHOD)

100-YEAR-24 HOUR STORM PROPOSED LAND USE MDP ON-SITE HYDROLOGY WATERSHED A (UNIT HYDROGRAPH METHOD)

100-YEAR-24 HOUR STORM PROPOSED LAND USE MDP ON-SITE HYDROLOGY WATERSHED B (UNIT HYDROGRAPH METHOD)

100-YEAR-24 HOUR STORM PROPOSED ON-SITE HYDROLOGY WATERSHED A (UNIT HYDROGRAPH METHOD)

100-YEAR-24 HOUR STORM PROPOSED ON-SITE HYDROLOGY WATERSHED B (UNIT HYDROGRAPH METHOD)

100-YEAR-6 HOUR STORM PROPOSED LAND USE MDP ON-SITE HYDROLOGY WATERSHED A (UNIT HYDROGRAPH METHOD)

100-YEAR-6 HOUR STORM PROPOSED LAND USE MDP ON-SITE HYDROLOGY WATERSHED B (UNIT HYDROGRAPH METHOD)

100-YEAR-6 HOUR STORM PROPOSED ON-SITE HYDROLOGY WATERSHED A (UNIT HYDROGRAPH METHOD)

100-YEAR-6 HOUR STORM PROPOSED ON-SITE HYDROLOGY WATERSHED B (UNIT HYDROGRAPH METHOD)

100-YEAR-3 HOUR STORM PROPOSED LAND USE MDP ON-SITE HYDROLOGY WATERSHED A (UNIT HYDROGRAPH METHOD)

100-YEAR-3 HOUR STORM PROPOSED LAND USE MDP ON-SITE HYDROLOGY WATERSHED B (UNIT HYDROGRAPH METHOD)

100-YEAR-3 HOUR STORM PROPOSED ON-SITE HYDROLOGY WATERSHED A (UNIT HYDROGRAPH METHOD)

100-YEAR-3 HOUR STORM PROPOSED ON-SITE HYDROLOGY WATERSHED B (UNIT HYDROGRAPH METHOD)

100-YEAR-1 HOUR STORM PROPOSED LAND USE MDP ON-SITE HYDROLOGY WATERSHED A (UNIT HYDROGRAPH METHOD)

100-YEAR-1 HOUR STORM PROPOSED LAND USE MDP ON-SITE HYDROLOGY WATERSHED B (UNIT HYDROGRAPH METHOD)

100-YEAR-1 HOUR STORM PROPOSED ON-SITE HYDROLOGY WATERSHED A (UNIT HYDROGRAPH METHOD)

100-YEAR-1 HOUR STORM PROPOSED ON-SITE HYDROLOGY WATERSHED B (UNIT HYDROGRAPH METHOD)

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 10/01/24 File:qx1006a.out

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

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

20-001 HARVEST LANDING RETAIL CENTER AND BUSINESS PARK
EXISTING CONDITION - WATERSHED A
100-YEAR ANALYSIS

Program License Serial Number 6405

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 [Perris Valley] area used.
10 year storm 10 minute intensity = 1.880(In/Hr)
10 year storm 60 minute intensity = 0.780(In/Hr)
100 year storm 10 minute intensity = 2.690(In/Hr)
100 year storm 60 minute intensity = 1.120(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.120(In/Hr)
Slope of intensity duration curve = 0.4900

++
Process from Point/Station 10.000 to Point/Station 11.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 731.000(Ft.)
Top (of initial area) elevation = 1467.000(Ft.)
Bottom (of initial area) elevation = 1456.000(Ft.)
Difference in elevation = 11.000(Ft.)
Slope = 0.01505 s(percent)= 1.50

```
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   17.153 min.
Rainfall intensity =      2.069(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.761
Decimal fraction soil group A = 0.010
Decimal fraction soil group B = 0.990
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  77.89
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      2.817(CFS)
Total initial stream area =       1.790(Ac.)
Pervious area fraction = 1.000


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Process from Point/Station       11.000 to Point/Station       12.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
------------------------------------------------------------------------
Estimated mean flow rate at midpoint of channel =     10.509(CFS)
Depth of flow =   0.270(Ft.), Average velocity =   1.443(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1             0.00              1.00
      2           100.00              0.00
      3           200.00              1.00
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------
Sub-Channel flow  =     10.509(CFS)
  '     '    flow top width =     53.976(Ft.)
  '     '    velocity=    1.443(Ft/s)
  '     '    area =      7.283(Sq.Ft)
  '     '    Froude number =     0.692

Upstream point elevation =  1456.000(Ft.)
Downstream point elevation =  1448.300(Ft.)
Flow length =   628.000(Ft.)
Travel time  =    7.25 min.
Time of concentration =   24.41 min.
Depth of flow =   0.270(Ft.)
Average velocity =   1.443(Ft/s)
Total irregular channel flow =    10.509(CFS)
Irregular channel normal depth above invert elev. =   0.270(Ft.)
Average velocity of channel(s) =   1.443(Ft/s)
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.769
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.530
Decimal fraction soil group C = 0.470
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  81.76
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.740(In/Hr) for a   100.0 year storm
```

Subarea runoff = 15.289(CFS) for 11.430(Ac.)
Total runoff = 18.106(CFS) Total area = 13.220(Ac.)
Depth of flow = 0.331(Ft.), Average velocity = 1.653(Ft/s)
End of computations, total study area = 13.22 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number = 81.2

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 10/01/24 File:qx1006b.out

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

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

20-001 HARVEST LANDING RETAIL CENTER AND BUSINESS PARK
EXISTING CONDITION - WATERSHED B
100-YEAR ANALYSIS

Program License Serial Number 6405

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 [Perris Valley] area used.
10 year storm 10 minute intensity = 1.880(In/Hr)
10 year storm 60 minute intensity = 0.780(In/Hr)
100 year storm 10 minute intensity = 2.690(In/Hr)
100 year storm 60 minute intensity = 1.120(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.120(In/Hr)
Slope of intensity duration curve = 0.4900

++
Process from Point/Station 20.000 to Point/Station 21.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 587.000(Ft.)
Top (of initial area) elevation = 1466.800(Ft.)
Bottom (of initial area) elevation = 1457.500(Ft.)
Difference in elevation = 9.300(Ft.)

```
Slope =    0.01584  s(percent)=       1.58
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.551 min.
Rainfall intensity =      2.170(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.766
Decimal fraction soil group A = 0.010
Decimal fraction soil group B = 0.990
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  77.89
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      4.408(CFS)
Total initial stream area =        2.650(Ac.)
Pervious area fraction = 1.000


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Process from Point/Station       21.000 to Point/Station       22.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
------------------------------------------------------------------------
Estimated mean flow rate at midpoint of channel =     11.316(CFS)
Depth of flow =   0.277(Ft.), Average velocity =   1.474(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------
Sub-Channel flow  =     11.316(CFS)
  '     '    flow top width =     55.418(Ft.)
  '     '    velocity=    1.474(Ft/s)
  '     '    area =      7.678(Sq.Ft)
  '     '    Froude number =     0.698

Upstream point elevation =  1457.500(Ft.)
Downstream point elevation =  1450.300(Ft.)
Flow length =   583.000(Ft.)
Travel time  =    6.59 min.
Time of concentration =   22.14 min.
Depth of flow =   0.277(Ft.)
Average velocity =   1.474(Ft/s)
Total irregular channel flow =    11.316(CFS)
Irregular channel normal depth above invert elev. =   0.277(Ft.)
Average velocity of channel(s) =   1.474(Ft/s)
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.757
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.820
Decimal fraction soil group C = 0.180
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  79.44
Pervious area fraction =  1.000; Impervious fraction =  0.000
```

Rainfall intensity = 1.825(In/Hr) for a 100.0 year storm
Subarea runoff = 13.719(CFS) for 9.930(Ac.)
Total runoff = 18.127(CFS) Total area = 12.580(Ac.)
Depth of flow = 0.331(Ft.), Average velocity = 1.658(Ft/s)
End of computations, total study area = 12.58 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number = 79.1

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 10/01/24 File:qx1006a.out

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

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

20-001 HARVEST LANDING RETAIL CENTER AND BUSINESS PARK
MDP LANDUSE CONDITION - WATERSHED A
100-YEAR ANALYSIS

Program License Serial Number 6405

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 [Perris Valley] area used.
10 year storm 10 minute intensity = 1.880(In/Hr)
10 year storm 60 minute intensity = 0.780(In/Hr)
100 year storm 10 minute intensity = 2.690(In/Hr)
100 year storm 60 minute intensity = 1.120(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.120(In/Hr)
Slope of intensity duration curve = 0.4900

++
Process from Point/Station 10.000 to Point/Station 11.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 731.000(Ft.)
Top (of initial area) elevation = 1467.000(Ft.)
Bottom (of initial area) elevation = 1456.000(Ft.)
Difference in elevation = 11.000(Ft.)
Slope = 0.01505 s(percent)= 1.50

```
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.622 min.
Rainfall intensity =      2.404(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.762
Decimal fraction soil group A = 0.010
Decimal fraction soil group B = 0.990
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  55.76
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      3.281(CFS)
Total initial stream area =       1.790(Ac.)
Pervious area fraction = 0.500


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Process from Point/Station       11.000 to Point/Station       12.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
------------------------------------------------------------------------
Estimated mean flow rate at midpoint of channel =     11.795(CFS)
Depth of flow =   0.282(Ft.), Average velocity =   1.485(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1             0.00              1.00
      2           100.00              0.00
      3           200.00              1.00
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------
Sub-Channel flow  =     11.795(CFS)
  '     '    flow top width =     56.364(Ft.)
  '     '    velocity=    1.485(Ft/s)
  '     '    area =      7.942(Sq.Ft)
  '     '    Froude number =     0.697

Upstream point elevation =  1456.000(Ft.)
Downstream point elevation =  1448.300(Ft.)
Flow length =   628.000(Ft.)
Travel time  =    7.05 min.
Time of concentration =   19.67 min.
Depth of flow =   0.282(Ft.)
Average velocity =   1.485(Ft/s)
Total irregular channel flow =    11.795(CFS)
Irregular channel normal depth above invert elev. =   0.282(Ft.)
Average velocity of channel(s) =   1.485(Ft/s)
 Adding area flow to channel
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.767
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.530
Decimal fraction soil group C = 0.470
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  62.11
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      1.934(In/Hr) for a   100.0 year storm
```

Subarea runoff = 16.954(CFS) for 11.430(Ac.)
Total runoff = 20.235(CFS) Total area = 13.220(Ac.)
Depth of flow = 0.345(Ft.), Average velocity = 1.700(Ft/s)
End of computations, total study area = 13.22 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.500
Area averaged RI index number = 61.3

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 10/01/24 File:qx1006b.out

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

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

20-001 HARVEST LANDING RETAIL CENTER AND BUSINESS PARK
MDP LANDUSE CONDITION - WATERSHED B
100-YEAR ANALYSIS

Program License Serial Number 6405

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 [Perris Valley] area used.
10 year storm 10 minute intensity = 1.880(In/Hr)
10 year storm 60 minute intensity = 0.780(In/Hr)
100 year storm 10 minute intensity = 2.690(In/Hr)
100 year storm 60 minute intensity = 1.120(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.120(In/Hr)
Slope of intensity duration curve = 0.4900

++
Process from Point/Station 20.000 to Point/Station 21.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 587.000(Ft.)
Top (of initial area) elevation = 1466.800(Ft.)
Bottom (of initial area) elevation = 1457.500(Ft.)
Difference in elevation = 9.300(Ft.)
Slope = 0.01584 s(percent)= 1.58

```
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.443 min.
Rainfall intensity =      2.522(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.767
Decimal fraction soil group A = 0.010
Decimal fraction soil group B = 0.990
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  55.76
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      5.127(CFS)
Total initial stream area =        2.650(Ac.)
Pervious area fraction = 0.500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       21.000 to Point/Station       22.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
------------------------------------------------------------------------
Estimated mean flow rate at midpoint of channel =     12.783(CFS)
Depth of flow =   0.290(Ft.), Average velocity =   1.519(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------
Sub-Channel flow  =     12.783(CFS)
  '     '    flow top width =     58.011(Ft.)
  '     '    velocity=    1.519(Ft/s)
  '     '    area =      8.413(Sq.Ft)
  '     '    Froude number =     0.703

Upstream point elevation =  1457.500(Ft.)
Downstream point elevation =  1450.300(Ft.)
Flow length =   583.000(Ft.)
Travel time  =    6.40 min.
Time of concentration =   17.84 min.
Depth of flow =   0.290(Ft.)
Average velocity =   1.519(Ft/s)
Total irregular channel flow =    12.783(CFS)
Irregular channel normal depth above invert elev. =   0.290(Ft.)
Average velocity of channel(s) =   1.519(Ft/s)
 Adding area flow to channel
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.756
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.820
Decimal fraction soil group C = 0.180
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  58.34
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      2.029(In/Hr) for a   100.0 year storm
```

Subarea runoff = 15.240(CFS) for 9.930(Ac.)
Total runoff = 20.367(CFS) Total area = 12.580(Ac.)
Depth of flow = 0.345(Ft.), Average velocity = 1.707(Ft/s)
End of computations, total study area = 12.58 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.500
Area averaged RI index number = 57.8

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 10/01/24 File:q100p6.out

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

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

20-001 HARVEST LANDING RETAIL CENTER AND BUSINESS PARK
PROPSOED CONDITION - WATERSHED A
100-YEAR ANALYSIS

Program License Serial Number 6405

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 [Perris Valley] area used.
10 year storm 10 minute intensity = 1.880(In/Hr)
10 year storm 60 minute intensity = 0.780(In/Hr)
100 year storm 10 minute intensity = 2.690(In/Hr)
100 year storm 60 minute intensity = 1.120(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.120(In/Hr)
Slope of intensity duration curve = 0.4900

++
Process from Point/Station 10.000 to Point/Station 11.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 759.000(Ft.)
Top (of initial area) elevation = 1469.500(Ft.)
Bottom (of initial area) elevation = 1453.800(Ft.)
Difference in elevation = 15.700(Ft.)
Slope = 0.02069 s(percent)= 2.07

```
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.023 min.
Rainfall intensity =      2.462(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.755
Decimal fraction soil group A = 0.110
Decimal fraction soil group B = 0.890
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  53.36
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      5.654(CFS)
Total initial stream area =        3.040(Ac.)
Pervious area fraction = 0.500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.000 to Point/Station       12.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =  1453.800(Ft.)
Downstream point elevation =  1452.200(Ft.)
Channel length thru subarea  =   259.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =   1.000
Slope or 'Z' of right channel bank = 100.000
Estimated mean flow rate at midpoint of channel =     10.007(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    0.500(Ft.)
Flow(q) thru subarea =     10.007(CFS)
Depth of flow =   0.300(Ft.), Average velocity =   2.195(Ft/s)
Channel flow top width =   30.350(Ft.)
Flow Velocity =    2.19(Ft/s)
Travel time  =    1.97 min.
Time of concentration =   13.99 min.

Sub-Channel No. 1 Critical depth =      0.301(Ft.)
  '     '       '     Critical flow top width =     30.379(Ft.)
  '     '       '     Critical flow velocity=    2.190(Ft/s)
  '     '       '     Critical flow area =      4.569(Sq.Ft)

 Adding area flow to channel
COMMERCIAL subarea type
Runoff Coefficient = 0.873
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.860
Decimal fraction soil group C = 0.140
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  57.82
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      2.286(In/Hr) for a   100.0 year storm
Subarea runoff =      8.782(CFS) for      4.400(Ac.)
Total runoff =     14.436(CFS)      Total area =       7.440(Ac.)
Depth of flow =   0.345(Ft.), Average velocity =   2.405(Ft/s)

Sub-Channel No. 1 Critical depth =      0.348(Ft.)
  '     '       '     Critical flow top width =     35.113(Ft.)
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  '     '       '     Critical flow velocity=    2.365(Ft/s)
  '     '       '     Critical flow area =      6.104(Sq.Ft)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       16.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1446.420(Ft.)
Downstream point/station elevation =  1443.240(Ft.)
Pipe length  =    85.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    14.436(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    14.436(CFS)
Normal flow depth in pipe =   11.20(In.)
Flow top width inside pipe =   17.45(In.)
Critical Depth =   16.71(In.)
Pipe flow velocity =     12.48(Ft/s)
Travel time through pipe =    0.11 min.
Time of concentration (TC) =    14.10 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       16.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      7.440(Ac.)
Runoff from this stream =     14.436(CFS)
Time of concentration =   14.10 min.
Rainfall intensity =     2.277(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station       14.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   370.000(Ft.)
Top (of initial area) elevation =  1455.200(Ft.)
Bottom (of initial area) elevation =  1452.200(Ft.)
Difference in elevation =     3.000(Ft.)
Slope =    0.00811  s(percent)=       0.81
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.368 min.
Rainfall intensity =      2.941(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.883
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.250
Decimal fraction soil group C = 0.750
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  65.75
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      8.982(CFS)
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Total initial stream area =        3.460(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       15.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1444.470(Ft.)
Downstream point/station elevation =  1443.820(Ft.)
Pipe length  =    29.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     8.982(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     8.982(CFS)
Normal flow depth in pipe =   11.44(In.)
Flow top width inside pipe =   12.77(In.)
Critical Depth =   13.86(In.)
Pipe flow velocity =      8.95(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =     8.42 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       15.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      3.460(Ac.)
Runoff from this stream =      8.982(CFS)
Time of concentration =    8.42 min.
Rainfall intensity =     2.931(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.100 to Point/Station       14.200
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   546.000(Ft.)
Top (of initial area) elevation =  1455.200(Ft.)
Bottom (of initial area) elevation =  1449.400(Ft.)
Difference in elevation =     5.800(Ft.)
Slope =    0.01062  s(percent)=       1.06
TC = k(0.420)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.968 min.
Rainfall intensity =      2.372(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1/2 Acre Lot)
Runoff Coefficient = 0.791
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  69.00
Pervious area fraction =  0.600; Impervious fraction =  0.400
Initial subarea runoff =      4.186(CFS)
Total initial stream area =        2.230(Ac.)
Pervious area fraction = 0.600
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.200 to Point/Station       15.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------
Upstream point/station elevation =  1446.120(Ft.)
Downstream point/station elevation =  1443.820(Ft.)
Pipe length  =   321.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.186(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     4.186(CFS)
Normal flow depth in pipe =    9.83(In.)
Flow top width inside pipe =   14.26(In.)
Critical Depth =    9.94(In.)
Pipe flow velocity =      4.91(Ft/s)
Travel time through pipe =    1.09 min.
Time of concentration (TC) =    14.06 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.200 to Point/Station       15.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      2.230(Ac.)
Runoff from this stream =      4.186(CFS)
Time of concentration =   14.06 min.
Rainfall intensity =     2.281(In/Hr)
Summary of stream data:

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


1        8.982      8.42                2.931
2        4.186     14.06                2.281
Largest stream flow has longer or shorter time of concentration
Qp =      8.982 + sum of
        Qa          Tb/Ta
         4.186 *    0.599 =      2.508
Qp =     11.489

Total of 2 streams to confluence:
Flow rates before confluence point:
       8.982       4.186
Area of streams before confluence:
        3.460        2.230
Results of confluence:
Total flow rate =     11.489(CFS)
Time of concentration =     8.422 min.
Effective stream area after confluence =      5.690(Ac.)


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Process from Point/Station       15.000 to Point/Station       16.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------
```

```
Upstream point/station elevation =  1443.820(Ft.)
Downstream point/station elevation =  1443.240(Ft.)
Pipe length  =    97.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    11.489(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    11.489(CFS)
Normal flow depth in pipe =   16.15(In.)
Flow top width inside pipe =   17.70(In.)
Critical Depth =   15.16(In.)
Pipe flow velocity =      5.79(Ft/s)
Travel time through pipe =    0.28 min.
Time of concentration (TC) =     8.70 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       15.000 to Point/Station       16.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      5.690(Ac.)
Runoff from this stream =     11.489(CFS)
Time of concentration =    8.70 min.
Rainfall intensity =     2.885(In/Hr)
Summary of stream data:

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


1       14.436     14.10               2.277
2       11.489      8.70               2.885
Largest stream flow has longer time of concentration
Qp =     14.436 + sum of
        Qb         Ia/Ib
        11.489 *    0.789 =      9.068
Qp =     23.504

Total of 2 main streams to confluence:
Flow rates before confluence point:
      14.436      11.489
Area of streams before confluence:
        7.440        5.690


Results of confluence:
Total flow rate =     23.504(CFS)
Time of concentration =    14.104 min.
Effective stream area after confluence  =     13.130(Ac.)
End of computations, total study area =           13.13 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.278
Area averaged RI index number =  60.8
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 10/01/24 File:q100p6.out

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

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

20-001 HARVEST LANDING RETAIL CENTER AND BUSINESS PARK
PROPSOED CONDITION - WATERSHED B
100-YEAR ANALYSIS

Program License Serial Number 6405

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 [Perris Valley] area used.
10 year storm 10 minute intensity = 1.880(In/Hr)
10 year storm 60 minute intensity = 0.780(In/Hr)
100 year storm 10 minute intensity = 2.690(In/Hr)
100 year storm 60 minute intensity = 1.120(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.120(In/Hr)
Slope of intensity duration curve = 0.4900

++
Process from Point/Station 17.000 to Point/Station 18.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 527.000(Ft.)
Top (of initial area) elevation = 1469.500(Ft.)
Bottom (of initial area) elevation = 1452.700(Ft.)
Difference in elevation = 16.800(Ft.)
Slope = 0.03188 s(percent)= 3.19

```
TC = k(0.323)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.893 min.
Rainfall intensity =      3.026(In/Hr) for a   100.0 year storm
APARTMENT subarea type
Runoff Coefficient = 0.853
Decimal fraction soil group A = 0.010
Decimal fraction soil group B = 0.990
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  55.76
Pervious area fraction =  0.200; Impervious fraction =  0.800
Initial subarea runoff =     18.334(CFS)
Total initial stream area =        7.100(Ac.)
Pervious area fraction = 0.200


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       18.000 to Point/Station       22.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1448.200(Ft.)
Downstream point/station elevation =  1443.900(Ft.)
Pipe length  =    61.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    18.334(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    18.334(CFS)
Normal flow depth in pipe =   10.65(In.)
Flow top width inside pipe =   17.69(In.)
Critical depth could not be calculated.
Pipe flow velocity =     16.85(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =     7.95 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       18.000 to Point/Station       22.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      7.100(Ac.)
Runoff from this stream =     18.334(CFS)
Time of concentration =    7.95 min.
Rainfall intensity =     3.015(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       19.000 to Point/Station       20.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   303.000(Ft.)
Top (of initial area) elevation =  1455.200(Ft.)
Bottom (of initial area) elevation =  1452.700(Ft.)
Difference in elevation =     2.500(Ft.)
Slope =    0.00825  s(percent)=       0.83
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
```

```
Initial area time of concentration =    7.698 min.
Rainfall intensity =      3.063(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.877
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.960
Decimal fraction soil group C = 0.040
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.52
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      9.407(CFS)
Total initial stream area =        3.500(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       20.000 to Point/Station       21.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1445.000(Ft.)
Downstream point/station elevation =  1444.130(Ft.)
Pipe length  =    23.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     9.407(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     9.407(CFS)
Normal flow depth in pipe =    9.68(In.)
Flow top width inside pipe =   14.35(In.)
Critical Depth =   14.02(In.)
Pipe flow velocity =     11.23(Ft/s)
Travel time through pipe =    0.03 min.
Time of concentration (TC) =     7.73 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       20.000 to Point/Station       21.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      3.500(Ac.)
Runoff from this stream =      9.407(CFS)
Time of concentration =    7.73 min.
Rainfall intensity =     3.057(In/Hr)


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Process from Point/Station       14.100 to Point/Station       20.100
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   475.000(Ft.)
Top (of initial area) elevation =  1455.200(Ft.)
Bottom (of initial area) elevation =  1450.100(Ft.)
Difference in elevation =     5.100(Ft.)
Slope =    0.01074  s(percent)=       1.07
TC = k(0.336)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.791 min.
Rainfall intensity =      2.723(In/Hr) for a   100.0 year storm
MOBILE HOME PARK subarea type
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```
Runoff Coefficient = 0.854
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.250
Decimal fraction soil group C = 0.750
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  65.75
Pervious area fraction =  0.250; Impervious fraction =  0.750
Initial subarea runoff =      4.838(CFS)
Total initial stream area =        2.080(Ac.)
Pervious area fraction = 0.250


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       20.100 to Point/Station       21.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1446.730(Ft.)
Downstream point/station elevation =  1444.130(Ft.)
Pipe length  =   343.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.838(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     4.838(CFS)
Normal flow depth in pipe =   10.72(In.)
Flow top width inside pipe =   13.54(In.)
Critical Depth =   10.70(In.)
Pipe flow velocity =      5.15(Ft/s)
Travel time through pipe =    1.11 min.
Time of concentration (TC) =    10.90 min.


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Process from Point/Station       20.100 to Point/Station       21.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      2.080(Ac.)
Runoff from this stream =      4.838(CFS)
Time of concentration =   10.90 min.
Rainfall intensity =     2.583(In/Hr)
Summary of stream data:

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


1        9.407      7.73                3.057
2        4.838     10.90                2.583
Largest stream flow has longer or shorter time of concentration
Qp =      9.407 + sum of
        Qa          Tb/Ta
         4.838 *    0.709 =      3.432
Qp =     12.839

Total of 2 streams to confluence:
Flow rates before confluence point:
       9.407       4.838
Area of streams before confluence:
```

```
        3.500        2.080
Results of confluence:
Total flow rate =     12.839(CFS)
Time of concentration =     7.733 min.
Effective stream area after confluence =      5.580(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       21.000 to Point/Station       22.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1444.130(Ft.)
Downstream point/station elevation =  1443.900(Ft.)
Pipe length  =    14.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    12.839(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    12.839(CFS)
Normal flow depth in pipe =   14.06(In.)
Flow top width inside pipe =   14.88(In.)
Critical Depth =   16.16(In.)
Pipe flow velocity =      8.67(Ft/s)
Travel time through pipe =    0.03 min.
Time of concentration (TC) =     7.76 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       21.000 to Point/Station       22.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      5.580(Ac.)
Runoff from this stream =     12.839(CFS)
Time of concentration =    7.76 min.
Rainfall intensity =     3.051(In/Hr)
Summary of stream data:

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


1       18.334      7.95               3.015
2       12.839      7.76               3.051
Largest stream flow has longer time of concentration
Qp =     18.334 + sum of
        Qb         Ia/Ib
        12.839 *    0.988 =     12.685
Qp =     31.019

Total of 2 main streams to confluence:
Flow rates before confluence point:
      18.334      12.839
Area of streams before confluence:
        7.100        5.580


Results of confluence:
```

Total flow rate = 31.019(CFS)
Time of concentration = 7.953 min.
Effective stream area after confluence = 12.680(Ac.)
End of computations, total study area = 12.68 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.181
Area averaged RI index number = 57.6

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 10/01/24 File:q100ap6.out

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

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

20-001 HARVEST LANDING RETAIL CENTER AND BUSINESS PARK
PROPOSED CONDITION - WATERSHED A + B
100-YEAR ANALYSIS

Program License Serial Number 6405

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 [Perris Valley] area used.
10 year storm 10 minute intensity = 1.880(In/Hr)
10 year storm 60 minute intensity = 0.780(In/Hr)
100 year storm 10 minute intensity = 2.690(In/Hr)
100 year storm 60 minute intensity = 1.120(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.120(In/Hr)
Slope of intensity duration curve = 0.4900

++
Process from Point/Station 10.000 to Point/Station 11.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 759.000(Ft.)
Top (of initial area) elevation = 1469.500(Ft.)
Bottom (of initial area) elevation = 1453.800(Ft.)
Difference in elevation = 15.700(Ft.)
Slope = 0.02069 s(percent)= 2.07

```
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.023 min.
Rainfall intensity =      2.462(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.755
Decimal fraction soil group A = 0.110
Decimal fraction soil group B = 0.890
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  53.36
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      5.654(CFS)
Total initial stream area =        3.040(Ac.)
Pervious area fraction = 0.500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.000 to Point/Station       12.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =  1453.800(Ft.)
Downstream point elevation =  1452.200(Ft.)
Channel length thru subarea  =   259.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =   1.000
Slope or 'Z' of right channel bank = 100.000
Estimated mean flow rate at midpoint of channel =     10.007(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    0.500(Ft.)
Flow(q) thru subarea =     10.007(CFS)
Depth of flow =   0.300(Ft.), Average velocity =   2.195(Ft/s)
Channel flow top width =   30.350(Ft.)
Flow Velocity =    2.19(Ft/s)
Travel time  =    1.97 min.
Time of concentration =   13.99 min.

Sub-Channel No. 1 Critical depth =      0.301(Ft.)
  '     '       '     Critical flow top width =     30.379(Ft.)
  '     '       '     Critical flow velocity=    2.190(Ft/s)
  '     '       '     Critical flow area =      4.569(Sq.Ft)

 Adding area flow to channel
COMMERCIAL subarea type
Runoff Coefficient = 0.873
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.860
Decimal fraction soil group C = 0.140
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  57.82
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      2.286(In/Hr) for a   100.0 year storm
Subarea runoff =      8.782(CFS) for      4.400(Ac.)
Total runoff =     14.436(CFS)      Total area =       7.440(Ac.)
Depth of flow =   0.345(Ft.), Average velocity =   2.405(Ft/s)

Sub-Channel No. 1 Critical depth =      0.348(Ft.)
  '     '       '     Critical flow top width =     35.113(Ft.)
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```
  '     '       '     Critical flow velocity=    2.365(Ft/s)
  '     '       '     Critical flow area =      6.104(Sq.Ft)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       16.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1446.420(Ft.)
Downstream point/station elevation =  1443.240(Ft.)
Pipe length  =    85.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    14.436(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    14.436(CFS)
Normal flow depth in pipe =   11.20(In.)
Flow top width inside pipe =   17.45(In.)
Critical Depth =   16.71(In.)
Pipe flow velocity =     12.48(Ft/s)
Travel time through pipe =    0.11 min.
Time of concentration (TC) =    14.10 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       16.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      7.440(Ac.)
Runoff from this stream =     14.436(CFS)
Time of concentration =   14.10 min.
Rainfall intensity =     2.277(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station       14.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   370.000(Ft.)
Top (of initial area) elevation =  1455.200(Ft.)
Bottom (of initial area) elevation =  1452.200(Ft.)
Difference in elevation =     3.000(Ft.)
Slope =    0.00811  s(percent)=       0.81
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.368 min.
Rainfall intensity =      2.941(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.883
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.250
Decimal fraction soil group C = 0.750
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  65.75
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      8.982(CFS)
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```
Total initial stream area =        3.460(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station       14.000 to Point/Station       15.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1444.470(Ft.)
Downstream point/station elevation =  1443.820(Ft.)
Pipe length  =    29.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     8.982(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     8.982(CFS)
Normal flow depth in pipe =   11.44(In.)
Flow top width inside pipe =   12.77(In.)
Critical Depth =   13.86(In.)
Pipe flow velocity =      8.95(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =     8.42 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       15.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      3.460(Ac.)
Runoff from this stream =      8.982(CFS)
Time of concentration =    8.42 min.
Rainfall intensity =     2.931(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.100 to Point/Station       14.200
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   546.000(Ft.)
Top (of initial area) elevation =  1455.200(Ft.)
Bottom (of initial area) elevation =  1449.400(Ft.)
Difference in elevation =     5.800(Ft.)
Slope =    0.01062  s(percent)=       1.06
TC = k(0.420)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.968 min.
Rainfall intensity =      2.372(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1/2 Acre Lot)
Runoff Coefficient = 0.791
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  69.00
Pervious area fraction =  0.600; Impervious fraction =  0.400
Initial subarea runoff =      4.186(CFS)
Total initial stream area =        2.230(Ac.)
Pervious area fraction = 0.600
```

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Process from Point/Station       14.200 to Point/Station       15.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------
Upstream point/station elevation =  1446.120(Ft.)
Downstream point/station elevation =  1443.820(Ft.)
Pipe length  =   321.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.186(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     4.186(CFS)
Normal flow depth in pipe =    9.83(In.)
Flow top width inside pipe =   14.26(In.)
Critical Depth =    9.94(In.)
Pipe flow velocity =      4.91(Ft/s)
Travel time through pipe =    1.09 min.
Time of concentration (TC) =    14.06 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.200 to Point/Station       15.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      2.230(Ac.)
Runoff from this stream =      4.186(CFS)
Time of concentration =   14.06 min.
Rainfall intensity =     2.281(In/Hr)
Summary of stream data:

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


1        8.982      8.42                2.931
2        4.186     14.06                2.281
Largest stream flow has longer or shorter time of concentration
Qp =      8.982 + sum of
        Qa          Tb/Ta
         4.186 *    0.599 =      2.508
Qp =     11.489

Total of 2 streams to confluence:
Flow rates before confluence point:
       8.982       4.186
Area of streams before confluence:
        3.460        2.230
Results of confluence:
Total flow rate =     11.489(CFS)
Time of concentration =     8.422 min.
Effective stream area after confluence =      5.690(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       15.000 to Point/Station       16.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------
```

```
Upstream point/station elevation =  1443.820(Ft.)
Downstream point/station elevation =  1443.240(Ft.)
Pipe length  =    97.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    11.489(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    11.489(CFS)
Normal flow depth in pipe =   16.15(In.)
Flow top width inside pipe =   17.70(In.)
Critical Depth =   15.16(In.)
Pipe flow velocity =      5.79(Ft/s)
Travel time through pipe =    0.28 min.
Time of concentration (TC) =     8.70 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       15.000 to Point/Station       16.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      5.690(Ac.)
Runoff from this stream =     11.489(CFS)
Time of concentration =    8.70 min.
Rainfall intensity =     2.885(In/Hr)
Summary of stream data:

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


1       14.436     14.10               2.277
2       11.489      8.70               2.885
Largest stream flow has longer time of concentration
Qp =     14.436 + sum of
        Qb         Ia/Ib
        11.489 *    0.789 =      9.068
Qp =     23.504

Total of 2 main streams to confluence:
Flow rates before confluence point:
      14.436      11.489
Area of streams before confluence:
        7.440        5.690


Results of confluence:
Total flow rate =     23.504(CFS)
Time of concentration =    14.104 min.
Effective stream area after confluence  =     13.130(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.000 to Point/Station       24.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1443.240(Ft.)
Downstream point/station elevation =  1437.880(Ft.)
```

```
Pipe length  =   423.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    23.504(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    23.504(CFS)
Normal flow depth in pipe =   21.60(In.)
Flow top width inside pipe =   14.40(In.)
Critical Depth =   20.64(In.)
Pipe flow velocity =      7.90(Ft/s)
Travel time through pipe =    0.89 min.
Time of concentration (TC) =    15.00 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.000 to Point/Station       24.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     13.130(Ac.)
Runoff from this stream =     23.504(CFS)
Time of concentration =   15.00 min.
Rainfall intensity =     2.209(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       22.000 to Point/Station       22.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****
------------------------------------------------------------------------------
Rainfall intensity =      3.015(In/Hr) for a   100.0 year storm
USER INPUT of soil data for subarea
Runoff Coefficient = 0.860
Decimal fraction soil group A = 0.010
Decimal fraction soil group B = 0.860
Decimal fraction soil group C = 0.130
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  57.60
Pervious area fraction =  0.181; Impervious fraction =  0.819
User specified values are as follows:
TC =   7.95 min.  Rain intensity =       3.01(In/Hr)
Total area =        12.68(Ac.)  Total runoff =     31.02(CFS)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       22.000 to Point/Station       23.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1443.900(Ft.)
Downstream point/station elevation =  1441.340(Ft.)
Pipe length  =   383.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    31.019(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    31.019(CFS)
Normal flow depth in pipe =   22.78(In.)
Flow top width inside pipe =   25.65(In.)
Critical Depth =   22.76(In.)
Pipe flow velocity =      7.76(Ft/s)
```

```
Travel time through pipe =    0.82 min.
Time of concentration (TC) =     8.78 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       23.000 to Point/Station       24.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1441.340(Ft.)
Downstream point/station elevation =  1437.880(Ft.)
Pipe length  =   673.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    31.019(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    31.019(CFS)
Normal flow depth in pipe =   26.44(In.)
Flow top width inside pipe =   19.41(In.)
Critical Depth =   22.76(In.)
Pipe flow velocity =      6.77(Ft/s)
Travel time through pipe =    1.66 min.
Time of concentration (TC) =    10.43 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       23.000 to Point/Station       24.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     12.680(Ac.)
Runoff from this stream =     31.019(CFS)
Time of concentration =   10.43 min.
Rainfall intensity =     2.639(In/Hr)
Summary of stream data:

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


1       23.504     15.00               2.209
2       31.019     10.43               2.639
Largest stream flow has longer or shorter time of concentration
Qp =     31.019 + sum of
        Qa          Tb/Ta
        23.504 *    0.696 =     16.350
Qp =     47.369

Total of 2 main streams to confluence:
Flow rates before confluence point:
      23.504      31.019
Area of streams before confluence:
       13.130       12.680


Results of confluence:
Total flow rate =     47.369(CFS)
Time of concentration =    10.432 min.
Effective stream area after confluence  =     25.810(Ac.)
```

End of computations, total study area = 25.81 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.230
Area averaged RI index number = 59.2

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 10/11/24 File:q100frnt6.out

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

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

20-001 HARVEST LANDING RETAIL CENTER AND BUSINESS PARK
PROPOSED CONDITION - FRONTAGE RD
100-YEAR ANALYSIS

Program License Serial Number 6405

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 [Perris Valley] area used.
10 year storm 10 minute intensity = 1.880(In/Hr)
10 year storm 60 minute intensity = 0.780(In/Hr)
100 year storm 10 minute intensity = 2.690(In/Hr)
100 year storm 60 minute intensity = 1.120(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.120(In/Hr)
Slope of intensity duration curve = 0.4900

++
Process from Point/Station 30.000 to Point/Station 30.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****

Rainfall intensity = 1.900(In/Hr) for a 100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.868
Decimal fraction soil group A = 0.000

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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 =  0.100; Impervious fraction =  0.900
User specified values are as follows:
TC =  20.41 min.  Rain intensity =       1.90(In/Hr)
Total area =         2.13(Ac.)  Total runoff =      4.20(CFS)


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Process from Point/Station       30.000 to Point/Station       31.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =  1468.500(Ft.)
End of street segment elevation =  1467.200(Ft.)
Length of street segment  =   372.000(Ft.)
Height of curb above gutter flowline  =    8.0(In.)
Width of half street (curb to crown)  =  43.000(Ft.)
Distance from crown to crossfall grade break  =  41.000(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  =  12.000(Ft.)
Slope from curb to property line (v/hz) =   0.015
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0130
 Manning's N from gutter to grade break =  0.0130
 Manning's N from grade break to crown =  0.0130
Estimated mean flow rate at midpoint of street =      4.583(CFS)
Depth of flow =   0.426(Ft.), Average velocity =   1.938(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  14.960(Ft.)
Flow velocity =   1.94(Ft/s)
Travel time =    3.20 min.     TC =   23.61  min.
 Adding area flow to street
COMMERCIAL subarea type
Runoff Coefficient = 0.856
Decimal fraction soil group A = 0.500
Decimal fraction soil group B = 0.500
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  44.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      1.769(In/Hr) for a   100.0 year storm
Subarea runoff =      0.712(CFS) for      0.470(Ac.)
Total runoff =      4.912(CFS)      Total area =       2.600(Ac.)
Street flow at end of street =      4.912(CFS)
Half street flow at end of street =      4.912(CFS)
Depth of flow =   0.434(Ft.), Average velocity =   1.971(Ft/s)
Flow width (from curb towards crown)=  15.381(Ft.)
End of computations, total study area =            2.60 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100
```

Area averaged RI index number = 53.8

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

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Study date 10/01/24 File: pq100uha24100.out

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

Program License Serial Number 6405

20-001 HARVEST LANDING RETAIL CENTER AND BUSINESS PARK
MDP LANDUSE CONDITION - WATERSHED A
100 YEAR, 24 HOUR STORM EVENT ANALYSIS

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

English Units used in output format

Drainage Area = 13.22(Ac.) = 0.021 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 13.22(Ac.) =
0.021 Sq. Mi.
Length along longest watercourse = 1359.00(Ft.)
Length along longest watercourse measured to centroid = 693.00(Ft.)
Length along longest watercourse = 0.257 Mi.
Length along longest watercourse measured to centroid = 0.131 Mi.
Difference in elevation = 18.70(Ft.)
Slope along watercourse = 72.6534 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.088 Hr.
Lag time = 5.28 Min.
25% of lag time = 1.32 Min.
40% of lag time = 2.11 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

```
Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       13.22               1.80                  23.80

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       13.22               5.00                  66.10

STORM EVENT (YEAR) =  100.00
Area Averaged 2-Year Rainfall =    1.800(In)
Area Averaged 100-Year Rainfall =    5.000(In)

Point rain (area averaged) =    5.000(In)
Areal adjustment factor =  100.00 %
Adjusted average point rain =    5.000(In)

Sub-Area Data:
Area(Ac.)         Runoff Index   Impervious %
    13.220           61.30         0.500
 Total Area Entered =     13.22(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-2     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
61.3  61.3      0.456     0.500        0.251       1.000      0.251
                                                   Sum (F) =   0.251
Area averaged mean soil loss (F) (In/Hr) =  0.251
Minimum soil loss rate ((In/Hr)) =  0.125
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.500
------------------------------------------------------------------------

            U n i t  H y d r o g r a p h
                  VALLEY S-Curve
------------------------------------------------------------------------
            Unit Hydrograph Data
------------------------------------------------------------------------
Unit time period   Time % of lag   Distribution   Unit Hydrograph
    (hrs)                          Graph %           (CFS)
------------------------------------------------------------------------
    1   0.083         94.673         17.575              2.342
    2   0.167        189.345         47.848              6.375
    3   0.250        284.018         16.514              2.200
    4   0.333        378.691          7.359              0.980
    5   0.417        473.363          4.203              0.560
    6   0.500        568.036          2.720              0.362
    7   0.583        662.709          1.772              0.236
    8   0.667        757.381          1.110              0.148
    9   0.750        852.054          0.900              0.120
                               Sum = 100.000   Sum=      13.323
------------------------------------------------------------------------

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

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max		Low	Effective (In/Hr)
1	0.08	0.07	0.040	(0.445)		0.020	0.020
2	0.17	0.07	0.040	(0.443)		0.020	0.020
3	0.25	0.07	0.040	(0.441)		0.020	0.020
4	0.33	0.10	0.060	(0.439)		0.030	0.030
5	0.42	0.10	0.060	(0.438)		0.030	0.030
6	0.50	0.10	0.060	(0.436)		0.030	0.030
7	0.58	0.10	0.060	(0.434)		0.030	0.030
8	0.67	0.10	0.060	(0.433)		0.030	0.030
9	0.75	0.10	0.060	(0.431)		0.030	0.030
10	0.83	0.13	0.080	(0.429)		0.040	0.040
11	0.92	0.13	0.080	(0.428)		0.040	0.040
12	1.00	0.13	0.080	(0.426)		0.040	0.040
13	1.08	0.10	0.060	(0.424)		0.030	0.030
14	1.17	0.10	0.060	(0.422)		0.030	0.030
15	1.25	0.10	0.060	(0.421)		0.030	0.030
16	1.33	0.10	0.060	(0.419)		0.030	0.030
17	1.42	0.10	0.060	(0.417)		0.030	0.030
18	1.50	0.10	0.060	(0.416)		0.030	0.030
19	1.58	0.10	0.060	(0.414)		0.030	0.030
20	1.67	0.10	0.060	(0.412)		0.030	0.030
21	1.75	0.10	0.060	(0.411)		0.030	0.030
22	1.83	0.13	0.080	(0.409)		0.040	0.040
23	1.92	0.13	0.080	(0.408)		0.040	0.040
24	2.00	0.13	0.080	(0.406)		0.040	0.040
25	2.08	0.13	0.080	(0.404)		0.040	0.040
26	2.17	0.13	0.080	(0.403)		0.040	0.040
27	2.25	0.13	0.080	(0.401)		0.040	0.040
28	2.33	0.13	0.080	(0.399)		0.040	0.040
29	2.42	0.13	0.080	(0.398)		0.040	0.040
30	2.50	0.13	0.080	(0.396)		0.040	0.040
31	2.58	0.17	0.100	(0.394)		0.050	0.050
32	2.67	0.17	0.100	(0.393)		0.050	0.050
33	2.75	0.17	0.100	(0.391)		0.050	0.050
34	2.83	0.17	0.100	(0.390)		0.050	0.050
35	2.92	0.17	0.100	(0.388)		0.050	0.050
36	3.00	0.17	0.100	(0.386)		0.050	0.050
37	3.08	0.17	0.100	(0.385)		0.050	0.050
38	3.17	0.17	0.100	(0.383)		0.050	0.050
39	3.25	0.17	0.100	(0.382)		0.050	0.050
40	3.33	0.17	0.100	(0.380)		0.050	0.050
41	3.42	0.17	0.100	(0.378)		0.050	0.050
42	3.50	0.17	0.100	(0.377)		0.050	0.050
43	3.58	0.17	0.100	(0.375)		0.050	0.050
44	3.67	0.17	0.100	(0.374)		0.050	0.050
45	3.75	0.17	0.100	(0.372)		0.050	0.050
46	3.83	0.20	0.120	(0.371)		0.060	0.060
47	3.92	0.20	0.120	(0.369)		0.060	0.060
48	4.00	0.20	0.120	(0.367)		0.060	0.060
49	4.08	0.20	0.120	(0.366)		0.060	0.060
50	4.17	0.20	0.120	(0.364)		0.060	0.060
51	4.25	0.20	0.120	(0.363)		0.060	0.060
52	4.33	0.23	0.140	(0.361)		0.070	0.070
53	4.42	0.23	0.140	(0.360)		0.070	0.070
54	4.50	0.23	0.140	(0.358)		0.070	0.070
55	4.58	0.23	0.140	(0.357)		0.070	0.070

56	4.67	0.23	0.140	(0.355)	0.070	0.070
57	4.75	0.23	0.140	(0.354)	0.070	0.070
58	4.83	0.27	0.160	(0.352)	0.080	0.080
59	4.92	0.27	0.160	(0.350)	0.080	0.080
60	5.00	0.27	0.160	(0.349)	0.080	0.080
61	5.08	0.20	0.120	(0.347)	0.060	0.060
62	5.17	0.20	0.120	(0.346)	0.060	0.060
63	5.25	0.20	0.120	(0.344)	0.060	0.060
64	5.33	0.23	0.140	(0.343)	0.070	0.070
65	5.42	0.23	0.140	(0.341)	0.070	0.070
66	5.50	0.23	0.140	(0.340)	0.070	0.070
67	5.58	0.27	0.160	(0.338)	0.080	0.080
68	5.67	0.27	0.160	(0.337)	0.080	0.080
69	5.75	0.27	0.160	(0.335)	0.080	0.080
70	5.83	0.27	0.160	(0.334)	0.080	0.080
71	5.92	0.27	0.160	(0.332)	0.080	0.080
72	6.00	0.27	0.160	(0.331)	0.080	0.080
73	6.08	0.30	0.180	(0.330)	0.090	0.090
74	6.17	0.30	0.180	(0.328)	0.090	0.090
75	6.25	0.30	0.180	(0.327)	0.090	0.090
76	6.33	0.30	0.180	(0.325)	0.090	0.090
77	6.42	0.30	0.180	(0.324)	0.090	0.090
78	6.50	0.30	0.180	(0.322)	0.090	0.090
79	6.58	0.33	0.200	(0.321)	0.100	0.100
80	6.67	0.33	0.200	(0.319)	0.100	0.100
81	6.75	0.33	0.200	(0.318)	0.100	0.100
82	6.83	0.33	0.200	(0.316)	0.100	0.100
83	6.92	0.33	0.200	(0.315)	0.100	0.100
84	7.00	0.33	0.200	(0.314)	0.100	0.100
85	7.08	0.33	0.200	(0.312)	0.100	0.100
86	7.17	0.33	0.200	(0.311)	0.100	0.100
87	7.25	0.33	0.200	(0.309)	0.100	0.100
88	7.33	0.37	0.220	(0.308)	0.110	0.110
89	7.42	0.37	0.220	(0.307)	0.110	0.110
90	7.50	0.37	0.220	(0.305)	0.110	0.110
91	7.58	0.40	0.240	(0.304)	0.120	0.120
92	7.67	0.40	0.240	(0.302)	0.120	0.120
93	7.75	0.40	0.240	(0.301)	0.120	0.120
94	7.83	0.43	0.260	(0.300)	0.130	0.130
95	7.92	0.43	0.260	(0.298)	0.130	0.130
96	8.00	0.43	0.260	(0.297)	0.130	0.130
97	8.08	0.50	0.300	(0.295)	0.150	0.150
98	8.17	0.50	0.300	(0.294)	0.150	0.150
99	8.25	0.50	0.300	(0.293)	0.150	0.150
100	8.33	0.50	0.300	(0.291)	0.150	0.150
101	8.42	0.50	0.300	(0.290)	0.150	0.150
102	8.50	0.50	0.300	(0.289)	0.150	0.150
103	8.58	0.53	0.320	(0.287)	0.160	0.160
104	8.67	0.53	0.320	(0.286)	0.160	0.160
105	8.75	0.53	0.320	(0.285)	0.160	0.160
106	8.83	0.57	0.340	(0.283)	0.170	0.170
107	8.92	0.57	0.340	(0.282)	0.170	0.170
108	9.00	0.57	0.340	(0.281)	0.170	0.170
109	9.08	0.63	0.380	(0.279)	0.190	0.190
110	9.17	0.63	0.380	(0.278)	0.190	0.190
111	9.25	0.63	0.380	(0.277)	0.190	0.190
112	9.33	0.67	0.400	(0.275)	0.200	0.200

113	9.42	0.67	0.400	(0.274)	0.200	0.200
114	9.50	0.67	0.400	(0.273)	0.200	0.200
115	9.58	0.70	0.420	(0.271)	0.210	0.210
116	9.67	0.70	0.420	(0.270)	0.210	0.210
117	9.75	0.70	0.420	(0.269)	0.210	0.210
118	9.83	0.73	0.440	(0.267)	0.220	0.220
119	9.92	0.73	0.440	(0.266)	0.220	0.220
120	10.00	0.73	0.440	(0.265)	0.220	0.220
121	10.08	0.50	0.300	(0.264)	0.150	0.150
122	10.17	0.50	0.300	(0.262)	0.150	0.150
123	10.25	0.50	0.300	(0.261)	0.150	0.150
124	10.33	0.50	0.300	(0.260)	0.150	0.150
125	10.42	0.50	0.300	(0.258)	0.150	0.150
126	10.50	0.50	0.300	(0.257)	0.150	0.150
127	10.58	0.67	0.400	(0.256)	0.200	0.200
128	10.67	0.67	0.400	(0.255)	0.200	0.200
129	10.75	0.67	0.400	(0.253)	0.200	0.200
130	10.83	0.67	0.400	(0.252)	0.200	0.200
131	10.92	0.67	0.400	(0.251)	0.200	0.200
132	11.00	0.67	0.400	(0.250)	0.200	0.200
133	11.08	0.63	0.380	(0.249)	0.190	0.190
134	11.17	0.63	0.380	(0.247)	0.190	0.190
135	11.25	0.63	0.380	(0.246)	0.190	0.190
136	11.33	0.63	0.380	(0.245)	0.190	0.190
137	11.42	0.63	0.380	(0.244)	0.190	0.190
138	11.50	0.63	0.380	(0.242)	0.190	0.190
139	11.58	0.57	0.340	(0.241)	0.170	0.170
140	11.67	0.57	0.340	(0.240)	0.170	0.170
141	11.75	0.57	0.340	(0.239)	0.170	0.170
142	11.83	0.60	0.360	(0.238)	0.180	0.180
143	11.92	0.60	0.360	(0.236)	0.180	0.180
144	12.00	0.60	0.360	(0.235)	0.180	0.180
145	12.08	0.83	0.500	0.234	(0.250)	0.266
146	12.17	0.83	0.500	0.233	(0.250)	0.267
147	12.25	0.83	0.500	0.232	(0.250)	0.268
148	12.33	0.87	0.520	0.231	(0.260)	0.289
149	12.42	0.87	0.520	0.229	(0.260)	0.291
150	12.50	0.87	0.520	0.228	(0.260)	0.292
151	12.58	0.93	0.560	0.227	(0.280)	0.333
152	12.67	0.93	0.560	0.226	(0.280)	0.334
153	12.75	0.93	0.560	0.225	(0.280)	0.335
154	12.83	0.97	0.580	0.224	(0.290)	0.356
155	12.92	0.97	0.580	0.223	(0.290)	0.357
156	13.00	0.97	0.580	0.221	(0.290)	0.359
157	13.08	1.13	0.680	0.220	(0.340)	0.460
158	13.17	1.13	0.680	0.219	(0.340)	0.461
159	13.25	1.13	0.680	0.218	(0.340)	0.462
160	13.33	1.13	0.680	0.217	(0.340)	0.463
161	13.42	1.13	0.680	0.216	(0.340)	0.464
162	13.50	1.13	0.680	0.215	(0.340)	0.465
163	13.58	0.77	0.460	0.214	(0.230)	0.246
164	13.67	0.77	0.460	0.213	(0.230)	0.247
165	13.75	0.77	0.460	0.212	(0.230)	0.248
166	13.83	0.77	0.460	0.210	(0.230)	0.250
167	13.92	0.77	0.460	0.209	(0.230)	0.251
168	14.00	0.77	0.460	0.208	(0.230)	0.252
169	14.08	0.90	0.540	0.207	(0.270)	0.333

170	14.17	0.90	0.540		0.206	(0.270)	0.334
171	14.25	0.90	0.540		0.205	(0.270)	0.335
172	14.33	0.87	0.520		0.204	(0.260)	0.316
173	14.42	0.87	0.520		0.203	(0.260)	0.317
174	14.50	0.87	0.520		0.202	(0.260)	0.318
175	14.58	0.87	0.520		0.201	(0.260)	0.319
176	14.67	0.87	0.520		0.200	(0.260)	0.320
177	14.75	0.87	0.520		0.199	(0.260)	0.321
178	14.83	0.83	0.500		0.198	(0.250)	0.302
179	14.92	0.83	0.500		0.197	(0.250)	0.303
180	15.00	0.83	0.500		0.196	(0.250)	0.304
181	15.08	0.80	0.480		0.195	(0.240)	0.285
182	15.17	0.80	0.480		0.194	(0.240)	0.286
183	15.25	0.80	0.480		0.193	(0.240)	0.287
184	15.33	0.77	0.460		0.192	(0.230)	0.268
185	15.42	0.77	0.460		0.191	(0.230)	0.269
186	15.50	0.77	0.460		0.190	(0.230)	0.270
187	15.58	0.63	0.380		0.189	(0.190)	0.191
188	15.67	0.63	0.380		0.188	(0.190)	0.192
189	15.75	0.63	0.380		0.187	(0.190)	0.193
190	15.83	0.63	0.380		0.186	(0.190)	0.194
191	15.92	0.63	0.380		0.185	(0.190)	0.195
192	16.00	0.63	0.380		0.184	(0.190)	0.196
193	16.08	0.13	0.080	(	0.183)	0.040	0.040
194	16.17	0.13	0.080	(	0.182)	0.040	0.040
195	16.25	0.13	0.080	(	0.181)	0.040	0.040
196	16.33	0.13	0.080	(	0.180)	0.040	0.040
197	16.42	0.13	0.080	(	0.180)	0.040	0.040
198	16.50	0.13	0.080	(	0.179)	0.040	0.040
199	16.58	0.10	0.060	(	0.178)	0.030	0.030
200	16.67	0.10	0.060	(	0.177)	0.030	0.030
201	16.75	0.10	0.060	(	0.176)	0.030	0.030
202	16.83	0.10	0.060	(	0.175)	0.030	0.030
203	16.92	0.10	0.060	(	0.174)	0.030	0.030
204	17.00	0.10	0.060	(	0.173)	0.030	0.030
205	17.08	0.17	0.100	(	0.172)	0.050	0.050
206	17.17	0.17	0.100	(	0.171)	0.050	0.050
207	17.25	0.17	0.100	(	0.171)	0.050	0.050
208	17.33	0.17	0.100	(	0.170)	0.050	0.050
209	17.42	0.17	0.100	(	0.169)	0.050	0.050
210	17.50	0.17	0.100	(	0.168)	0.050	0.050
211	17.58	0.17	0.100	(	0.167)	0.050	0.050
212	17.67	0.17	0.100	(	0.166)	0.050	0.050
213	17.75	0.17	0.100	(	0.166)	0.050	0.050
214	17.83	0.13	0.080	(	0.165)	0.040	0.040
215	17.92	0.13	0.080	(	0.164)	0.040	0.040
216	18.00	0.13	0.080	(	0.163)	0.040	0.040
217	18.08	0.13	0.080	(	0.162)	0.040	0.040
218	18.17	0.13	0.080	(	0.162)	0.040	0.040
219	18.25	0.13	0.080	(	0.161)	0.040	0.040
220	18.33	0.13	0.080	(	0.160)	0.040	0.040
221	18.42	0.13	0.080	(	0.159)	0.040	0.040
222	18.50	0.13	0.080	(	0.158)	0.040	0.040
223	18.58	0.10	0.060	(	0.158)	0.030	0.030
224	18.67	0.10	0.060	(	0.157)	0.030	0.030
225	18.75	0.10	0.060	(	0.156)	0.030	0.030
226	18.83	0.07	0.040	(	0.155)	0.020	0.020

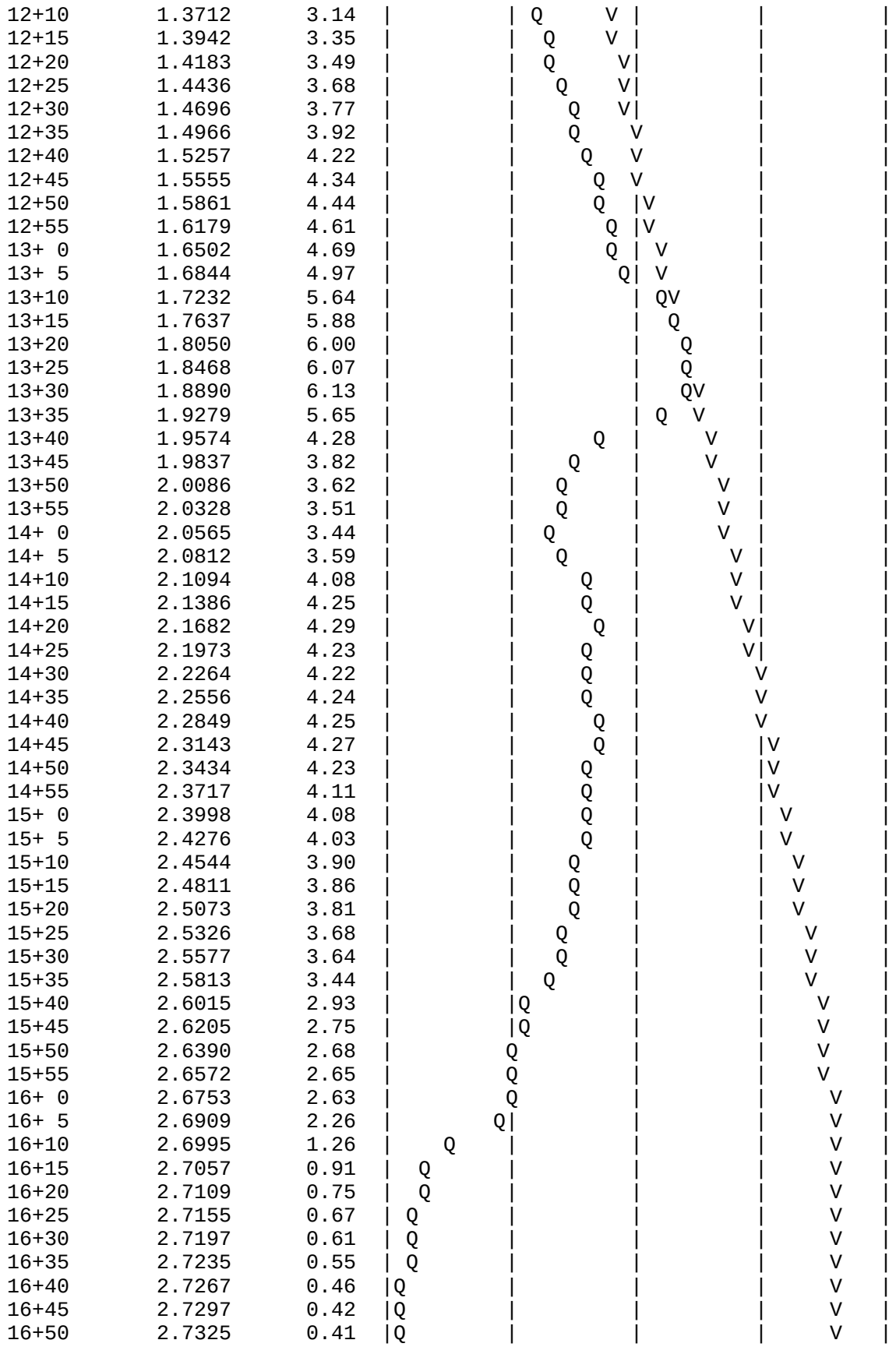
227	18.92	0.07	0.040	(0.155)	0.020	0.020
228	19.00	0.07	0.040	(0.154)	0.020	0.020
229	19.08	0.10	0.060	(0.153)	0.030	0.030
230	19.17	0.10	0.060	(0.152)	0.030	0.030
231	19.25	0.10	0.060	(0.152)	0.030	0.030
232	19.33	0.13	0.080	(0.151)	0.040	0.040
233	19.42	0.13	0.080	(0.150)	0.040	0.040
234	19.50	0.13	0.080	(0.150)	0.040	0.040
235	19.58	0.10	0.060	(0.149)	0.030	0.030
236	19.67	0.10	0.060	(0.148)	0.030	0.030
237	19.75	0.10	0.060	(0.148)	0.030	0.030
238	19.83	0.07	0.040	(0.147)	0.020	0.020
239	19.92	0.07	0.040	(0.146)	0.020	0.020
240	20.00	0.07	0.040	(0.146)	0.020	0.020
241	20.08	0.10	0.060	(0.145)	0.030	0.030
242	20.17	0.10	0.060	(0.144)	0.030	0.030
243	20.25	0.10	0.060	(0.144)	0.030	0.030
244	20.33	0.10	0.060	(0.143)	0.030	0.030
245	20.42	0.10	0.060	(0.142)	0.030	0.030
246	20.50	0.10	0.060	(0.142)	0.030	0.030
247	20.58	0.10	0.060	(0.141)	0.030	0.030
248	20.67	0.10	0.060	(0.141)	0.030	0.030
249	20.75	0.10	0.060	(0.140)	0.030	0.030
250	20.83	0.07	0.040	(0.140)	0.020	0.020
251	20.92	0.07	0.040	(0.139)	0.020	0.020
252	21.00	0.07	0.040	(0.138)	0.020	0.020
253	21.08	0.10	0.060	(0.138)	0.030	0.030
254	21.17	0.10	0.060	(0.137)	0.030	0.030
255	21.25	0.10	0.060	(0.137)	0.030	0.030
256	21.33	0.07	0.040	(0.136)	0.020	0.020
257	21.42	0.07	0.040	(0.136)	0.020	0.020
258	21.50	0.07	0.040	(0.135)	0.020	0.020
259	21.58	0.10	0.060	(0.135)	0.030	0.030
260	21.67	0.10	0.060	(0.134)	0.030	0.030
261	21.75	0.10	0.060	(0.134)	0.030	0.030
262	21.83	0.07	0.040	(0.133)	0.020	0.020
263	21.92	0.07	0.040	(0.133)	0.020	0.020
264	22.00	0.07	0.040	(0.132)	0.020	0.020
265	22.08	0.10	0.060	(0.132)	0.030	0.030
266	22.17	0.10	0.060	(0.132)	0.030	0.030
267	22.25	0.10	0.060	(0.131)	0.030	0.030
268	22.33	0.07	0.040	(0.131)	0.020	0.020
269	22.42	0.07	0.040	(0.130)	0.020	0.020
270	22.50	0.07	0.040	(0.130)	0.020	0.020
271	22.58	0.07	0.040	(0.130)	0.020	0.020
272	22.67	0.07	0.040	(0.129)	0.020	0.020
273	22.75	0.07	0.040	(0.129)	0.020	0.020
274	22.83	0.07	0.040	(0.129)	0.020	0.020
275	22.92	0.07	0.040	(0.128)	0.020	0.020
276	23.00	0.07	0.040	(0.128)	0.020	0.020
277	23.08	0.07	0.040	(0.128)	0.020	0.020
278	23.17	0.07	0.040	(0.127)	0.020	0.020
279	23.25	0.07	0.040	(0.127)	0.020	0.020
280	23.33	0.07	0.040	(0.127)	0.020	0.020
281	23.42	0.07	0.040	(0.127)	0.020	0.020
282	23.50	0.07	0.040	(0.126)	0.020	0.020
283	23.58	0.07	0.040	(0.126)	0.020	0.020

```
284  23.67     0.07      0.040       (  0.126)       0.020        0.020
285  23.75     0.07      0.040       (  0.126)       0.020        0.020
286  23.83     0.07      0.040       (  0.126)       0.020        0.020
287  23.92     0.07      0.040       (  0.125)       0.020        0.020
288  24.00     0.07      0.040       (  0.125)       0.020        0.020
            (Loss Rate Not Used)
    Sum =     100.0                                    Sum =    32.3
     Flood volume = Effective rainfall      2.69(In)
      times area      13.2(Ac.)/[(In)/(Ft.)] =       3.0(Ac.Ft)
     Total soil loss =      2.31(In)
     Total soil loss =     2.540(Ac.Ft)
     Total rainfall =      5.00(In)
     Flood volume =      129301.7 Cubic Feet
     Total soil loss =      110635.1 Cubic Feet
     ---------------------------------------------------------------------
      Peak flow rate of this hydrograph =      6.127(CFS)
     ---------------------------------------------------------------------
     +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                          24 - H O U R    S T O R M
                      R u n o f f      H y d r o g r a p h
     ---------------------------------------------------------------------
                  Hydrograph in   5   Minute intervals ((CFS))

     ---------------------------------------------------------------------
 Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
 ---------------------------------------------------------------------------
   0+ 5       0.0003      0.05  Q         |         |         |         |
   0+10       0.0015      0.17  Q         |         |         |         |
   0+15       0.0030      0.22  Q         |         |         |         |
   0+20       0.0048      0.26  VQ        |         |         |         |
   0+25       0.0071      0.34  VQ        |         |         |         |
   0+30       0.0097      0.37  VQ        |         |         |         |
   0+35       0.0123      0.38  VQ        |         |         |         |
   0+40       0.0150      0.39  VQ        |         |         |         |
   0+45       0.0177      0.39  VQ        |         |         |         |
   0+50       0.0206      0.42  VQ        |         |         |         |
   0+55       0.0239      0.49  VQ        |         |         |         |
   1+ 0       0.0274      0.51  V Q       |         |         |         |
   1+ 5       0.0308      0.50  VQ        |         |         |         |
   1+10       0.0339      0.44  VQ        |         |         |         |
   1+15       0.0367      0.42  VQ        |         |         |         |
   1+20       0.0396      0.41  VQ        |         |         |         |
   1+25       0.0424      0.41  VQ        |         |         |         |
   1+30       0.0452      0.40  VQ        |         |         |         |
   1+35       0.0479      0.40  VQ        |         |         |         |
   1+40       0.0507      0.40  VQ        |         |         |         |
   1+45       0.0535      0.40  VQ        |         |         |         |
   1+50       0.0564      0.42  VQ        |         |         |         |
   1+55       0.0597      0.49  VQ        |         |         |         |
   2+ 0       0.0632      0.51  V Q       |         |         |         |
   2+ 5       0.0668      0.52  V Q       |         |         |         |
   2+10       0.0704      0.52  V Q       |         |         |         |
   2+15       0.0741      0.53  V Q       |         |         |         |
   2+20       0.0777      0.53  |VQ       |         |         |         |
   2+25       0.0814      0.53  |VQ       |         |         |         |
   2+30       0.0850      0.53  |VQ       |         |         |         |
   2+35       0.0889      0.56  |VQ       |         |         |         |
```

2+40	0.0932	0.62	VQ			
2+45	0.0976	0.64	VQ			
2+50	0.1021	0.65	VQ			
2+55	0.1066	0.66	VQ			
3+ 0	0.1112	0.66	VQ			
3+ 5	0.1157	0.66	VQ			
3+10	0.1203	0.67	VQ			
3+15	0.1249	0.67	VQ			
3+20	0.1295	0.67	VQ			
3+25	0.1341	0.67	VQ			
3+30	0.1387	0.67	VQ			
3+35	0.1433	0.67	VQ			
3+40	0.1479	0.67	VQ			
3+45	0.1524	0.67	Q			
3+50	0.1572	0.69	Q			
3+55	0.1624	0.75	VQ			
4+ 0	0.1677	0.78	VQ			
4+ 5	0.1731	0.79	VQ			
4+10	0.1786	0.79	VQ			
4+15	0.1841	0.79	VQ			
4+20	0.1897	0.82	VQ			
4+25	0.1958	0.89	VQ			
4+30	0.2021	0.91	VQ			
4+35	0.2084	0.92	VQ			
4+40	0.2148	0.92	VQ			
4+45	0.2212	0.93	VQ			
4+50	0.2277	0.95	Q			
4+55	0.2347	1.02	VQ			
5+ 0	0.2419	1.04	VQ			
5+ 5	0.2488	1.01	VQ			
5+10	0.2549	0.88	Q			
5+15	0.2607	0.84	Q			
5+20	0.2666	0.85	Q			
5+25	0.2728	0.90	Q			
5+30	0.2791	0.92	Q			
5+35	0.2857	0.95	Q			
5+40	0.2926	1.01	VQ			
5+45	0.2998	1.04	Q			
5+50	0.3070	1.05	Q			
5+55	0.3143	1.06	Q			
6+ 0	0.3216	1.06	Q			
6+ 5	0.3291	1.09	Q			
6+10	0.3370	1.15	Q			
6+15	0.3451	1.18	Q			
6+20	0.3533	1.19	Q			
6+25	0.3615	1.19	Q			
6+30	0.3697	1.19	Q			
6+35	0.3781	1.22	QV			
6+40	0.3870	1.29	Q			
6+45	0.3960	1.31	Q			
6+50	0.4051	1.32	Q			
6+55	0.4142	1.32	Q			
7+ 0	0.4233	1.33	Q			
7+ 5	0.4325	1.33	Q			
7+10	0.4417	1.33	Q			
7+15	0.4508	1.33	QV			
7+20	0.4602	1.36	QV			

7+25	0.4700	1.42	QV				
7+30	0.4799	1.44	QV				
7+35	0.4901	1.48	QV				
7+40	0.5007	1.54	Q				
7+45	0.5115	1.57	Q				
7+50	0.5226	1.61	QV				
7+55	0.5341	1.68	QV				
8+ 0	0.5459	1.70	QV				
8+ 5	0.5580	1.76	Q				
8+10	0.5711	1.90	Q				
8+15	0.5845	1.95	Q				
8+20	0.5980	1.97	QV				
8+25	0.6117	1.98	QV				
8+30	0.6254	1.99	QV				
8+35	0.6393	2.02	Q				
8+40	0.6536	2.08	Q				
8+45	0.6681	2.11	QV				
8+50	0.6829	2.14	QV				
8+55	0.6981	2.21	QV				
9+ 0	0.7135	2.24	QV				
9+ 5	0.7293	2.30	Q				
9+10	0.7461	2.43	QV				
9+15	0.7632	2.48	QV				
9+20	0.7806	2.52	Q				
9+25	0.7985	2.60	Q				
9+30	0.8166	2.63	QV				
9+35	0.8350	2.67	QV				
9+40	0.8539	2.74	QV				
9+45	0.8729	2.77	Q				
9+50	0.8923	2.81	QV				
9+55	0.9121	2.88	QV				
10+ 0	0.9321	2.90	QV				
10+ 5	0.9510	2.75	QV				
10+10	0.9669	2.31	Q	V			
10+15	0.9818	2.16	Q	V			
10+20	0.9963	2.10	Q	V			
10+25	1.0105	2.06	Q	V			
10+30	1.0245	2.03	Q	V			
10+35	1.0392	2.14	Q	V			
10+40	1.0560	2.44	Q	V			
10+45	1.0735	2.55	Q	V			
10+50	1.0914	2.59	Q	V			
10+55	1.1095	2.62	Q	V			
11+ 0	1.1277	2.64	Q	V			
11+ 5	1.1458	2.63	Q	V			
11+10	1.1635	2.57	Q	V			
11+15	1.1811	2.56	Q	V			
11+20	1.1986	2.55	Q	V			
11+25	1.2161	2.54	Q	V			
11+30	1.2336	2.54	Q	V			
11+35	1.2508	2.49	Q	V			
11+40	1.2670	2.36	Q	V			
11+45	1.2829	2.31	Q	V			
11+50	1.2989	2.32	Q	V			
11+55	1.3152	2.37	Q	V			
12+ 0	1.3317	2.39	Q	V			
12+ 5	1.3495	2.59	Q	V			



16+55	2.7353	0.41	Q				V
17+ 0	2.7381	0.40	Q				V
17+ 5	2.7412	0.45	Q				V
17+10	2.7452	0.58	Q				V
17+15	2.7494	0.62	Q				V
17+20	2.7538	0.64	Q				V
17+25	2.7583	0.65	Q				V
17+30	2.7628	0.66	Q				V
17+35	2.7674	0.66	Q				V
17+40	2.7719	0.66	Q				V
17+45	2.7765	0.67	Q				V
17+50	2.7810	0.64	Q				V
17+55	2.7850	0.58	Q				V
18+ 0	2.7888	0.56	Q				V
18+ 5	2.7926	0.55	Q				V
18+10	2.7963	0.54	Q				V
18+15	2.8000	0.54	Q				V
18+20	2.8037	0.54	Q				V
18+25	2.8074	0.53	Q				V
18+30	2.8110	0.53	Q				V
18+35	2.8146	0.51	Q				V
18+40	2.8176	0.45	Q				V
18+45	2.8205	0.42	Q				V
18+50	2.8232	0.39	Q				V
18+55	2.8255	0.32	Q				V
19+ 0	2.8275	0.30	Q				V
19+ 5	2.8296	0.31	Q				V
19+10	2.8321	0.36	Q				V
19+15	2.8347	0.38	Q				V
19+20	2.8376	0.41	Q				V
19+25	2.8409	0.48	Q				V
19+30	2.8443	0.50	Q				V
19+35	2.8477	0.49	Q				V
19+40	2.8507	0.44	Q				V
19+45	2.8536	0.42	Q				V
19+50	2.8563	0.39	Q				V
19+55	2.8585	0.32	Q				V
20+ 0	2.8605	0.30	Q				V
20+ 5	2.8627	0.31	Q				V
20+10	2.8652	0.36	Q				V
20+15	2.8678	0.38	Q				V
20+20	2.8705	0.39	Q				V
20+25	2.8732	0.39	Q				V
20+30	2.8759	0.39	Q				V
20+35	2.8786	0.40	Q				V
20+40	2.8814	0.40	Q				V
20+45	2.8841	0.40	Q				V
20+50	2.8867	0.38	Q				V
20+55	2.8889	0.31	Q				V
21+ 0	2.8909	0.29	Q				V
21+ 5	2.8930	0.30	Q				V
21+10	2.8955	0.36	Q				V
21+15	2.8981	0.38	Q				V
21+20	2.9006	0.36	Q				V
21+25	2.9027	0.31	Q				V
21+30	2.9047	0.29	Q				V
21+35	2.9067	0.30	Q				V

21+40	2.9092	0.36	|Q	|	|	|	V|
21+45	2.9118	0.38	|Q	|	|	|	V|
21+50	2.9144	0.36	|Q	|	|	|	V|
21+55	2.9165	0.31	|Q	|	|	|	V|
22+ 0	2.9184	0.29	|Q	|	|	|	V|
22+ 5	2.9205	0.30	|Q	|	|	|	V|
22+10	2.9230	0.36	|Q	|	|	|	V|
22+15	2.9256	0.38	|Q	|	|	|	V|
22+20	2.9281	0.36	|Q	|	|	|	V|
22+25	2.9302	0.31	|Q	|	|	|	V|
22+30	2.9322	0.29	|Q	|	|	|	V|
22+35	2.9341	0.28	|Q	|	|	|	V|
22+40	2.9360	0.27	|Q	|	|	|	V|
22+45	2.9379	0.27	|Q	|	|	|	V|
22+50	2.9397	0.27	|Q	|	|	|	V|
22+55	2.9416	0.27	|Q	|	|	|	V|
23+ 0	2.9434	0.27	|Q	|	|	|	V|
23+ 5	2.9452	0.27	|Q	|	|	|	V|
23+10	2.9471	0.27	|Q	|	|	|	V|
23+15	2.9489	0.27	|Q	|	|	|	V|
23+20	2.9508	0.27	|Q	|	|	|	V|
23+25	2.9526	0.27	|Q	|	|	|	V|
23+30	2.9544	0.27	|Q	|	|	|	V|
23+35	2.9563	0.27	|Q	|	|	|	V|
23+40	2.9581	0.27	|Q	|	|	|	V|
23+45	2.9599	0.27	|Q	|	|	|	V|
23+50	2.9618	0.27	|Q	|	|	|	V|
23+55	2.9636	0.27	|Q	|	|	|	V|
24+ 0	2.9654	0.27	|Q	|	|	|	V|
24+ 5	2.9670	0.22	Q	|	|	|	V|
24+10	2.9676	0.09	Q	|	|	|	V|
24+15	2.9679	0.05	Q	|	|	|	V|
24+20	2.9681	0.03	Q	|	|	|	V|
24+25	2.9682	0.02	Q	|	|	|	V|
24+30	2.9683	0.01	Q	|	|	|	V|
24+35	2.9683	0.01	Q	|	|	|	V|
24+40	2.9684	0.00	Q	|	|	|	V|

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

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Study date 10/02/24 File: pquh100b624100.out

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

Program License Serial Number 6405

20-001 HARVEST LANDING RETAIL CENTER AND BUSINESS PARK
MDP LANDUSE CONDITION - WATERSHED B
100 YEAR, 24 HOUR STORM EVENT ANALYSIS

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

English Units used in output format

Drainage Area = 12.58(Ac.) = 0.020 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 12.58(Ac.) = 0.020 Sq. Mi.
Length along longest watercourse = 1170.00(Ft.)
Length along longest watercourse measured to centroid = 550.00(Ft.)
Length along longest watercourse = 0.222 Mi.
Length along longest watercourse measured to centroid = 0.104 Mi.
Difference in elevation = 16.50(Ft.)
Slope along watercourse = 74.4615 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.076 Hr.
Lag time = 4.55 Min.
25% of lag time = 1.14 Min.
40% of lag time = 1.82 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

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

12.58 1.80 22.64

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.58	5.00	62.90

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.800(In)
Area Averaged 100-Year Rainfall = 5.000(In)

Point rain (area averaged) = 5.000(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 5.000(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
12.580	57.80	0.500

Total Area Entered = 12.58(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
57.8	57.8	0.492	0.500	0.271	1.000	0.271
					Sum (F) =	0.271

Area averaged mean soil loss (F) (In/Hr) = 0.271
Minimum soil loss rate ((In/Hr)) = 0.135
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.500

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

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	109.928	22.218	2.817
2	0.167	219.855	48.832	6.191
3	0.250	329.783	14.316	1.815
4	0.333	439.710	6.548	0.830
5	0.417	549.638	3.637	0.461
6	0.500	659.565	2.267	0.287
7	0.583	769.493	1.329	0.168
8	0.667	879.421	0.855	0.108
		Sum = 100.000	Sum=	12.678

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

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)

1	0.08	0.07	0.040	(0.480)	0.020	0.020
2	0.17	0.07	0.040	(0.478)	0.020	0.020
3	0.25	0.07	0.040	(0.476)	0.020	0.020
4	0.33	0.10	0.060	(0.475)	0.030	0.030
5	0.42	0.10	0.060	(0.473)	0.030	0.030
6	0.50	0.10	0.060	(0.471)	0.030	0.030
7	0.58	0.10	0.060	(0.469)	0.030	0.030
8	0.67	0.10	0.060	(0.467)	0.030	0.030
9	0.75	0.10	0.060	(0.465)	0.030	0.030
10	0.83	0.13	0.080	(0.464)	0.040	0.040
11	0.92	0.13	0.080	(0.462)	0.040	0.040
12	1.00	0.13	0.080	(0.460)	0.040	0.040
13	1.08	0.10	0.060	(0.458)	0.030	0.030
14	1.17	0.10	0.060	(0.456)	0.030	0.030
15	1.25	0.10	0.060	(0.454)	0.030	0.030
16	1.33	0.10	0.060	(0.453)	0.030	0.030
17	1.42	0.10	0.060	(0.451)	0.030	0.030
18	1.50	0.10	0.060	(0.449)	0.030	0.030
19	1.58	0.10	0.060	(0.447)	0.030	0.030
20	1.67	0.10	0.060	(0.445)	0.030	0.030
21	1.75	0.10	0.060	(0.444)	0.030	0.030
22	1.83	0.13	0.080	(0.442)	0.040	0.040
23	1.92	0.13	0.080	(0.440)	0.040	0.040
24	2.00	0.13	0.080	(0.438)	0.040	0.040
25	2.08	0.13	0.080	(0.437)	0.040	0.040
26	2.17	0.13	0.080	(0.435)	0.040	0.040
27	2.25	0.13	0.080	(0.433)	0.040	0.040
28	2.33	0.13	0.080	(0.431)	0.040	0.040
29	2.42	0.13	0.080	(0.430)	0.040	0.040
30	2.50	0.13	0.080	(0.428)	0.040	0.040
31	2.58	0.17	0.100	(0.426)	0.050	0.050
32	2.67	0.17	0.100	(0.424)	0.050	0.050
33	2.75	0.17	0.100	(0.423)	0.050	0.050
34	2.83	0.17	0.100	(0.421)	0.050	0.050
35	2.92	0.17	0.100	(0.419)	0.050	0.050
36	3.00	0.17	0.100	(0.417)	0.050	0.050
37	3.08	0.17	0.100	(0.416)	0.050	0.050
38	3.17	0.17	0.100	(0.414)	0.050	0.050
39	3.25	0.17	0.100	(0.412)	0.050	0.050
40	3.33	0.17	0.100	(0.410)	0.050	0.050
41	3.42	0.17	0.100	(0.409)	0.050	0.050
42	3.50	0.17	0.100	(0.407)	0.050	0.050
43	3.58	0.17	0.100	(0.405)	0.050	0.050
44	3.67	0.17	0.100	(0.404)	0.050	0.050
45	3.75	0.17	0.100	(0.402)	0.050	0.050
46	3.83	0.20	0.120	(0.400)	0.060	0.060
47	3.92	0.20	0.120	(0.398)	0.060	0.060
48	4.00	0.20	0.120	(0.397)	0.060	0.060
49	4.08	0.20	0.120	(0.395)	0.060	0.060
50	4.17	0.20	0.120	(0.393)	0.060	0.060
51	4.25	0.20	0.120	(0.392)	0.060	0.060
52	4.33	0.23	0.140	(0.390)	0.070	0.070
53	4.42	0.23	0.140	(0.388)	0.070	0.070
54	4.50	0.23	0.140	(0.387)	0.070	0.070
55	4.58	0.23	0.140	(0.385)	0.070	0.070
56	4.67	0.23	0.140	(0.383)	0.070	0.070
57	4.75	0.23	0.140	(0.382)	0.070	0.070

58	4.83	0.27	0.160	(0.380)	0.080	0.080
59	4.92	0.27	0.160	(0.379)	0.080	0.080
60	5.00	0.27	0.160	(0.377)	0.080	0.080
61	5.08	0.20	0.120	(0.375)	0.060	0.060
62	5.17	0.20	0.120	(0.374)	0.060	0.060
63	5.25	0.20	0.120	(0.372)	0.060	0.060
64	5.33	0.23	0.140	(0.370)	0.070	0.070
65	5.42	0.23	0.140	(0.369)	0.070	0.070
66	5.50	0.23	0.140	(0.367)	0.070	0.070
67	5.58	0.27	0.160	(0.366)	0.080	0.080
68	5.67	0.27	0.160	(0.364)	0.080	0.080
69	5.75	0.27	0.160	(0.362)	0.080	0.080
70	5.83	0.27	0.160	(0.361)	0.080	0.080
71	5.92	0.27	0.160	(0.359)	0.080	0.080
72	6.00	0.27	0.160	(0.358)	0.080	0.080
73	6.08	0.30	0.180	(0.356)	0.090	0.090
74	6.17	0.30	0.180	(0.354)	0.090	0.090
75	6.25	0.30	0.180	(0.353)	0.090	0.090
76	6.33	0.30	0.180	(0.351)	0.090	0.090
77	6.42	0.30	0.180	(0.350)	0.090	0.090
78	6.50	0.30	0.180	(0.348)	0.090	0.090
79	6.58	0.33	0.200	(0.346)	0.100	0.100
80	6.67	0.33	0.200	(0.345)	0.100	0.100
81	6.75	0.33	0.200	(0.343)	0.100	0.100
82	6.83	0.33	0.200	(0.342)	0.100	0.100
83	6.92	0.33	0.200	(0.340)	0.100	0.100
84	7.00	0.33	0.200	(0.339)	0.100	0.100
85	7.08	0.33	0.200	(0.337)	0.100	0.100
86	7.17	0.33	0.200	(0.336)	0.100	0.100
87	7.25	0.33	0.200	(0.334)	0.100	0.100
88	7.33	0.37	0.220	(0.333)	0.110	0.110
89	7.42	0.37	0.220	(0.331)	0.110	0.110
90	7.50	0.37	0.220	(0.330)	0.110	0.110
91	7.58	0.40	0.240	(0.328)	0.120	0.120
92	7.67	0.40	0.240	(0.327)	0.120	0.120
93	7.75	0.40	0.240	(0.325)	0.120	0.120
94	7.83	0.43	0.260	(0.324)	0.130	0.130
95	7.92	0.43	0.260	(0.322)	0.130	0.130
96	8.00	0.43	0.260	(0.321)	0.130	0.130
97	8.08	0.50	0.300	(0.319)	0.150	0.150
98	8.17	0.50	0.300	(0.318)	0.150	0.150
99	8.25	0.50	0.300	(0.316)	0.150	0.150
100	8.33	0.50	0.300	(0.315)	0.150	0.150
101	8.42	0.50	0.300	(0.313)	0.150	0.150
102	8.50	0.50	0.300	(0.312)	0.150	0.150
103	8.58	0.53	0.320	(0.310)	0.160	0.160
104	8.67	0.53	0.320	(0.309)	0.160	0.160
105	8.75	0.53	0.320	(0.307)	0.160	0.160
106	8.83	0.57	0.340	(0.306)	0.170	0.170
107	8.92	0.57	0.340	(0.304)	0.170	0.170
108	9.00	0.57	0.340	(0.303)	0.170	0.170
109	9.08	0.63	0.380	(0.302)	0.190	0.190
110	9.17	0.63	0.380	(0.300)	0.190	0.190
111	9.25	0.63	0.380	(0.299)	0.190	0.190
112	9.33	0.67	0.400	(0.297)	0.200	0.200
113	9.42	0.67	0.400	(0.296)	0.200	0.200
114	9.50	0.67	0.400	(0.294)	0.200	0.200

115	9.58	0.70	0.420	(0.293)	0.210	0.210
116	9.67	0.70	0.420	(0.292)	0.210	0.210
117	9.75	0.70	0.420	(0.290)	0.210	0.210
118	9.83	0.73	0.440	(0.289)	0.220	0.220
119	9.92	0.73	0.440	(0.287)	0.220	0.220
120	10.00	0.73	0.440	(0.286)	0.220	0.220
121	10.08	0.50	0.300	(0.285)	0.150	0.150
122	10.17	0.50	0.300	(0.283)	0.150	0.150
123	10.25	0.50	0.300	(0.282)	0.150	0.150
124	10.33	0.50	0.300	(0.281)	0.150	0.150
125	10.42	0.50	0.300	(0.279)	0.150	0.150
126	10.50	0.50	0.300	(0.278)	0.150	0.150
127	10.58	0.67	0.400	(0.276)	0.200	0.200
128	10.67	0.67	0.400	(0.275)	0.200	0.200
129	10.75	0.67	0.400	(0.274)	0.200	0.200
130	10.83	0.67	0.400	(0.272)	0.200	0.200
131	10.92	0.67	0.400	(0.271)	0.200	0.200
132	11.00	0.67	0.400	(0.270)	0.200	0.200
133	11.08	0.63	0.380	(0.268)	0.190	0.190
134	11.17	0.63	0.380	(0.267)	0.190	0.190
135	11.25	0.63	0.380	(0.266)	0.190	0.190
136	11.33	0.63	0.380	(0.264)	0.190	0.190
137	11.42	0.63	0.380	(0.263)	0.190	0.190
138	11.50	0.63	0.380	(0.262)	0.190	0.190
139	11.58	0.57	0.340	(0.261)	0.170	0.170
140	11.67	0.57	0.340	(0.259)	0.170	0.170
141	11.75	0.57	0.340	(0.258)	0.170	0.170
142	11.83	0.60	0.360	(0.257)	0.180	0.180
143	11.92	0.60	0.360	(0.255)	0.180	0.180
144	12.00	0.60	0.360	(0.254)	0.180	0.180
145	12.08	0.83	0.500	(0.253)	0.250	0.250
146	12.17	0.83	0.500	(0.252)	0.250	0.250
147	12.25	0.83	0.500	(0.250)	0.250	0.250
148	12.33	0.87	0.520	0.249	(0.260)	0.271
149	12.42	0.87	0.520	0.248	(0.260)	0.272
150	12.50	0.87	0.520	0.247	(0.260)	0.273
151	12.58	0.93	0.560	0.245	(0.280)	0.315
152	12.67	0.93	0.560	0.244	(0.280)	0.316
153	12.75	0.93	0.560	0.243	(0.280)	0.317
154	12.83	0.97	0.580	0.242	(0.290)	0.338
155	12.92	0.97	0.580	0.240	(0.290)	0.340
156	13.00	0.97	0.580	0.239	(0.290)	0.341
157	13.08	1.13	0.680	0.238	(0.340)	0.442
158	13.17	1.13	0.680	0.237	(0.340)	0.443
159	13.25	1.13	0.680	0.236	(0.340)	0.444
160	13.33	1.13	0.680	0.234	(0.340)	0.446
161	13.42	1.13	0.680	0.233	(0.340)	0.447
162	13.50	1.13	0.680	0.232	(0.340)	0.448
163	13.58	0.77	0.460	(0.231)	0.230	0.230
164	13.67	0.77	0.460	0.230	(0.230)	0.230
165	13.75	0.77	0.460	0.228	(0.230)	0.232
166	13.83	0.77	0.460	0.227	(0.230)	0.233
167	13.92	0.77	0.460	0.226	(0.230)	0.234
168	14.00	0.77	0.460	0.225	(0.230)	0.235
169	14.08	0.90	0.540	0.224	(0.270)	0.316
170	14.17	0.90	0.540	0.223	(0.270)	0.317
171	14.25	0.90	0.540	0.222	(0.270)	0.318

172	14.33	0.87	0.520	0.220	(0.260)	0.300
173	14.42	0.87	0.520	0.219	(0.260)	0.301
174	14.50	0.87	0.520	0.218	(0.260)	0.302
175	14.58	0.87	0.520	0.217	(0.260)	0.303
176	14.67	0.87	0.520	0.216	(0.260)	0.304
177	14.75	0.87	0.520	0.215	(0.260)	0.305
178	14.83	0.83	0.500	0.214	(0.250)	0.286
179	14.92	0.83	0.500	0.213	(0.250)	0.287
180	15.00	0.83	0.500	0.212	(0.250)	0.288
181	15.08	0.80	0.480	0.210	(0.240)	0.270
182	15.17	0.80	0.480	0.209	(0.240)	0.271
183	15.25	0.80	0.480	0.208	(0.240)	0.272
184	15.33	0.77	0.460	0.207	(0.230)	0.253
185	15.42	0.77	0.460	0.206	(0.230)	0.254
186	15.50	0.77	0.460	0.205	(0.230)	0.255
187	15.58	0.63	0.380	(0.204)	0.190	0.190
188	15.67	0.63	0.380	(0.203)	0.190	0.190
189	15.75	0.63	0.380	(0.202)	0.190	0.190
190	15.83	0.63	0.380	(0.201)	0.190	0.190
191	15.92	0.63	0.380	(0.200)	0.190	0.190
192	16.00	0.63	0.380	(0.199)	0.190	0.190
193	16.08	0.13	0.080	(0.198)	0.040	0.040
194	16.17	0.13	0.080	(0.197)	0.040	0.040
195	16.25	0.13	0.080	(0.196)	0.040	0.040
196	16.33	0.13	0.080	(0.195)	0.040	0.040
197	16.42	0.13	0.080	(0.194)	0.040	0.040
198	16.50	0.13	0.080	(0.193)	0.040	0.040
199	16.58	0.10	0.060	(0.192)	0.030	0.030
200	16.67	0.10	0.060	(0.191)	0.030	0.030
201	16.75	0.10	0.060	(0.190)	0.030	0.030
202	16.83	0.10	0.060	(0.189)	0.030	0.030
203	16.92	0.10	0.060	(0.188)	0.030	0.030
204	17.00	0.10	0.060	(0.187)	0.030	0.030
205	17.08	0.17	0.100	(0.186)	0.050	0.050
206	17.17	0.17	0.100	(0.185)	0.050	0.050
207	17.25	0.17	0.100	(0.184)	0.050	0.050
208	17.33	0.17	0.100	(0.183)	0.050	0.050
209	17.42	0.17	0.100	(0.182)	0.050	0.050
210	17.50	0.17	0.100	(0.182)	0.050	0.050
211	17.58	0.17	0.100	(0.181)	0.050	0.050
212	17.67	0.17	0.100	(0.180)	0.050	0.050
213	17.75	0.17	0.100	(0.179)	0.050	0.050
214	17.83	0.13	0.080	(0.178)	0.040	0.040
215	17.92	0.13	0.080	(0.177)	0.040	0.040
216	18.00	0.13	0.080	(0.176)	0.040	0.040
217	18.08	0.13	0.080	(0.175)	0.040	0.040
218	18.17	0.13	0.080	(0.174)	0.040	0.040
219	18.25	0.13	0.080	(0.174)	0.040	0.040
220	18.33	0.13	0.080	(0.173)	0.040	0.040
221	18.42	0.13	0.080	(0.172)	0.040	0.040
222	18.50	0.13	0.080	(0.171)	0.040	0.040
223	18.58	0.10	0.060	(0.170)	0.030	0.030
224	18.67	0.10	0.060	(0.169)	0.030	0.030
225	18.75	0.10	0.060	(0.169)	0.030	0.030
226	18.83	0.07	0.040	(0.168)	0.020	0.020
227	18.92	0.07	0.040	(0.167)	0.020	0.020
228	19.00	0.07	0.040	(0.166)	0.020	0.020

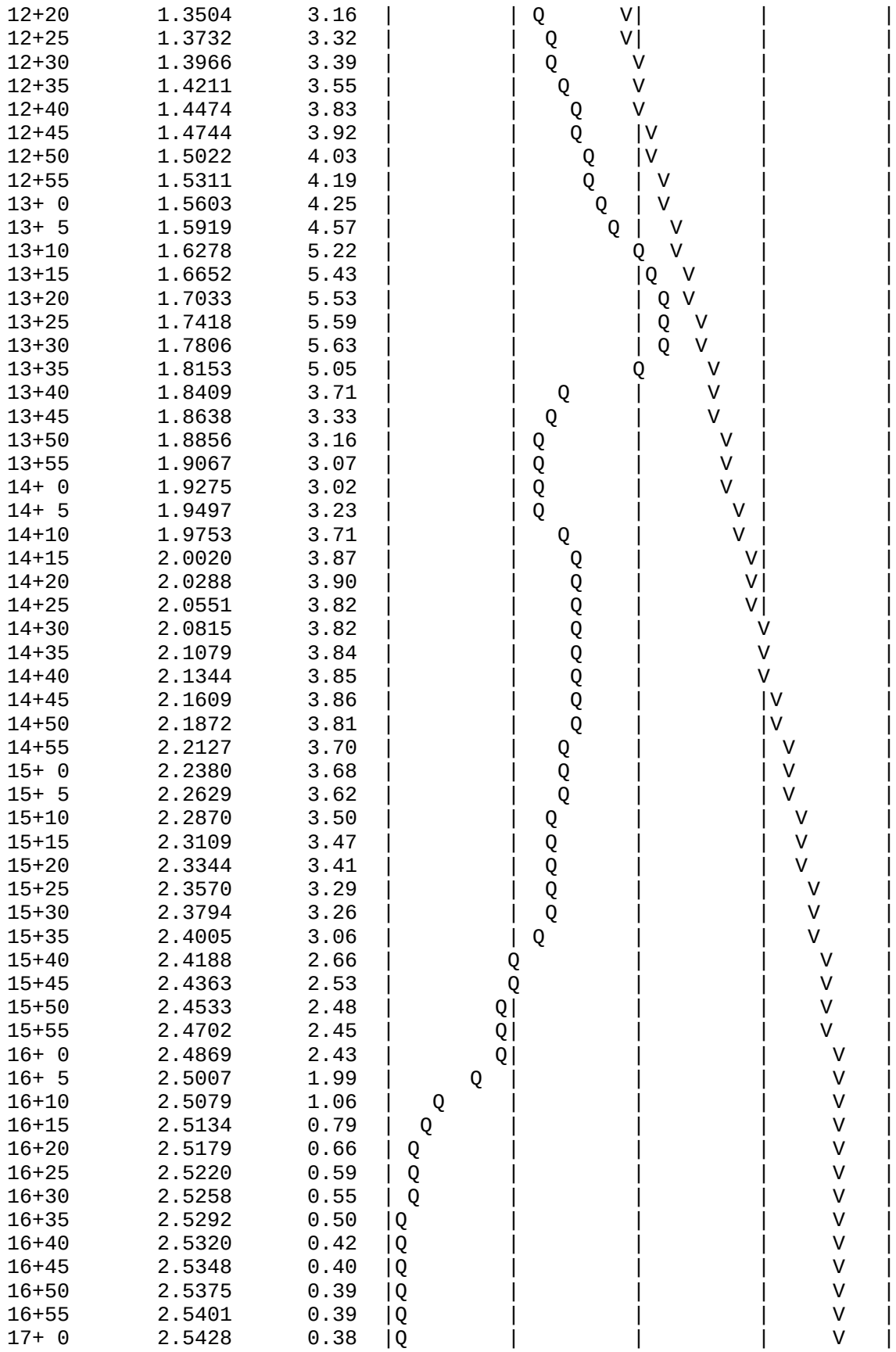
229	19.08	0.10	0.060	(0.165)	0.030	0.030
230	19.17	0.10	0.060	(0.165)	0.030	0.030
231	19.25	0.10	0.060	(0.164)	0.030	0.030
232	19.33	0.13	0.080	(0.163)	0.040	0.040
233	19.42	0.13	0.080	(0.162)	0.040	0.040
234	19.50	0.13	0.080	(0.162)	0.040	0.040
235	19.58	0.10	0.060	(0.161)	0.030	0.030
236	19.67	0.10	0.060	(0.160)	0.030	0.030
237	19.75	0.10	0.060	(0.159)	0.030	0.030
238	19.83	0.07	0.040	(0.159)	0.020	0.020
239	19.92	0.07	0.040	(0.158)	0.020	0.020
240	20.00	0.07	0.040	(0.157)	0.020	0.020
241	20.08	0.10	0.060	(0.157)	0.030	0.030
242	20.17	0.10	0.060	(0.156)	0.030	0.030
243	20.25	0.10	0.060	(0.155)	0.030	0.030
244	20.33	0.10	0.060	(0.155)	0.030	0.030
245	20.42	0.10	0.060	(0.154)	0.030	0.030
246	20.50	0.10	0.060	(0.153)	0.030	0.030
247	20.58	0.10	0.060	(0.153)	0.030	0.030
248	20.67	0.10	0.060	(0.152)	0.030	0.030
249	20.75	0.10	0.060	(0.151)	0.030	0.030
250	20.83	0.07	0.040	(0.151)	0.020	0.020
251	20.92	0.07	0.040	(0.150)	0.020	0.020
252	21.00	0.07	0.040	(0.149)	0.020	0.020
253	21.08	0.10	0.060	(0.149)	0.030	0.030
254	21.17	0.10	0.060	(0.148)	0.030	0.030
255	21.25	0.10	0.060	(0.148)	0.030	0.030
256	21.33	0.07	0.040	(0.147)	0.020	0.020
257	21.42	0.07	0.040	(0.147)	0.020	0.020
258	21.50	0.07	0.040	(0.146)	0.020	0.020
259	21.58	0.10	0.060	(0.146)	0.030	0.030
260	21.67	0.10	0.060	(0.145)	0.030	0.030
261	21.75	0.10	0.060	(0.144)	0.030	0.030
262	21.83	0.07	0.040	(0.144)	0.020	0.020
263	21.92	0.07	0.040	(0.143)	0.020	0.020
264	22.00	0.07	0.040	(0.143)	0.020	0.020
265	22.08	0.10	0.060	(0.143)	0.030	0.030
266	22.17	0.10	0.060	(0.142)	0.030	0.030
267	22.25	0.10	0.060	(0.142)	0.030	0.030
268	22.33	0.07	0.040	(0.141)	0.020	0.020
269	22.42	0.07	0.040	(0.141)	0.020	0.020
270	22.50	0.07	0.040	(0.140)	0.020	0.020
271	22.58	0.07	0.040	(0.140)	0.020	0.020
272	22.67	0.07	0.040	(0.140)	0.020	0.020
273	22.75	0.07	0.040	(0.139)	0.020	0.020
274	22.83	0.07	0.040	(0.139)	0.020	0.020
275	22.92	0.07	0.040	(0.138)	0.020	0.020
276	23.00	0.07	0.040	(0.138)	0.020	0.020
277	23.08	0.07	0.040	(0.138)	0.020	0.020
278	23.17	0.07	0.040	(0.137)	0.020	0.020
279	23.25	0.07	0.040	(0.137)	0.020	0.020
280	23.33	0.07	0.040	(0.137)	0.020	0.020
281	23.42	0.07	0.040	(0.137)	0.020	0.020
282	23.50	0.07	0.040	(0.136)	0.020	0.020
283	23.58	0.07	0.040	(0.136)	0.020	0.020
284	23.67	0.07	0.040	(0.136)	0.020	0.020
285	23.75	0.07	0.040	(0.136)	0.020	0.020

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286  23.83     0.07      0.040       (  0.136)       0.020        0.020
287  23.92     0.07      0.040       (  0.136)       0.020        0.020
288  24.00     0.07      0.040       (  0.135)       0.020        0.020
          (Loss Rate Not Used)
    Sum =     100.0                                  Sum =    31.6
     Flood volume = Effective rainfall      2.63(In)
      times area      12.6(Ac.)/[(In)/(Ft.)] =      2.8(Ac.Ft)
     Total soil loss =      2.37(In)
     Total soil loss =     2.480(Ac.Ft)
     Total rainfall =      5.00(In)
     Flood volume =      120281.7 Cubic Feet
     Total soil loss =      108039.6 Cubic Feet
     ---------------------------------------------------------------------
      Peak flow rate of this hydrograph =      5.634(CFS)
     ---------------------------------------------------------------------
     +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                         24 - H O U R    S T O R M
                    R u n o f f      H y d r o g r a p h
     ---------------------------------------------------------------------
                 Hydrograph in   5   Minute intervals ((CFS))

     ---------------------------------------------------------------------
 Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
 ---------------------------------------------------------------------------
   0+ 5       0.0004      0.06  Q         |         |         |         |
   0+10       0.0016      0.18  Q         |         |         |         |
   0+15       0.0031      0.22  Q         |         |         |         |
   0+20       0.0049      0.26  VQ        |         |         |         |
   0+25       0.0072      0.33  VQ        |         |         |         |
   0+30       0.0097      0.36  VQ        |         |         |         |
   0+35       0.0122      0.37  VQ        |         |         |         |
   0+40       0.0148      0.37  VQ        |         |         |         |
   0+45       0.0174      0.38  VQ        |         |         |         |
   0+50       0.0202      0.41  VQ        |         |         |         |
   0+55       0.0234      0.47  VQ        |         |         |         |
   1+ 0       0.0268      0.49  VQ        |         |         |         |
   1+ 5       0.0300      0.47  VQ        |         |         |         |
   1+10       0.0329      0.41  VQ        |         |         |         |
   1+15       0.0356      0.40  VQ        |         |         |         |
   1+20       0.0383      0.39  VQ        |         |         |         |
   1+25       0.0409      0.39  VQ        |         |         |         |
   1+30       0.0436      0.38  VQ        |         |         |         |
   1+35       0.0462      0.38  VQ        |         |         |         |
   1+40       0.0488      0.38  VQ        |         |         |         |
   1+45       0.0514      0.38  VQ        |         |         |         |
   1+50       0.0543      0.41  VQ        |         |         |         |
   1+55       0.0575      0.47  VQ        |         |         |         |
   2+ 0       0.0609      0.49  VQ        |         |         |         |
   2+ 5       0.0643      0.50  VQ        |         |         |         |
   2+10       0.0677      0.50  V Q       |         |         |         |
   2+15       0.0712      0.50  |VQ       |         |         |         |
   2+20       0.0747      0.51  |VQ       |         |         |         |
   2+25       0.0782      0.51  |VQ       |         |         |         |
   2+30       0.0817      0.51  |VQ       |         |         |         |
   2+35       0.0854      0.54  |VQ       |         |         |         |
   2+40       0.0895      0.60  |VQ       |         |         |         |
   2+45       0.0937      0.62  |VQ       |         |         |         |
```

2+50	0.0980	0.62	VQ				
2+55	0.1024	0.63	VQ				
3+ 0	0.1067	0.63	VQ				
3+ 5	0.1111	0.63	VQ				
3+10	0.1154	0.63	VQ				
3+15	0.1198	0.63	VQ				
3+20	0.1242	0.63	VQ				
3+25	0.1286	0.63	VQ				
3+30	0.1329	0.63	VQ				
3+35	0.1373	0.63	VQ				
3+40	0.1417	0.63	Q				
3+45	0.1460	0.63	Q				
3+50	0.1506	0.66	Q				
3+55	0.1556	0.72	Q				
4+ 0	0.1607	0.74	Q				
4+ 5	0.1659	0.75	VQ				
4+10	0.1711	0.76	VQ				
4+15	0.1763	0.76	VQ				
4+20	0.1817	0.79	VQ				
4+25	0.1876	0.85	VQ				
4+30	0.1936	0.87	VQ				
4+35	0.1996	0.88	VQ				
4+40	0.2057	0.88	VQ				
4+45	0.2118	0.89	Q				
4+50	0.2181	0.92	Q				
4+55	0.2248	0.98	Q				
5+ 0	0.2317	1.00	Q				
5+ 5	0.2382	0.95	Q				
5+10	0.2439	0.83	Q				
5+15	0.2494	0.80	Q				
5+20	0.2550	0.81	Q				
5+25	0.2609	0.86	Q				
5+30	0.2669	0.87	Q				
5+35	0.2732	0.91	Q				
5+40	0.2799	0.97	QV				
5+45	0.2867	0.99	QV				
5+50	0.2936	1.00	Q				
5+55	0.3006	1.01	Q				
6+ 0	0.3075	1.01	Q				
6+ 5	0.3147	1.04	Q				
6+10	0.3223	1.10	Q				
6+15	0.3301	1.12	Q				
6+20	0.3379	1.13	Q				
6+25	0.3457	1.14	QV				
6+30	0.3535	1.14	QV				
6+35	0.3616	1.17	QV				
6+40	0.3701	1.23	QV				
6+45	0.3787	1.25	QV				
6+50	0.3873	1.26	Q				
6+55	0.3960	1.26	Q				
7+ 0	0.4047	1.27	Q				
7+ 5	0.4135	1.27	Q				
7+10	0.4222	1.27	QV				
7+15	0.4309	1.27	QV				
7+20	0.4399	1.30	QV				
7+25	0.4492	1.36	QV				
7+30	0.4587	1.38	QV				

7+35	0.4684	1.41	QV				
7+40	0.4786	1.48	QV				
7+45	0.4890	1.50	QV				
7+50	0.4996	1.54	QV				
7+55	0.5106	1.61	QV				
8+ 0	0.5218	1.63	QV				
8+ 5	0.5335	1.69	QV				
8+10	0.5461	1.82	Q				
8+15	0.5589	1.86	QV				
8+20	0.5719	1.88	QV				
8+25	0.5849	1.89	QV				
8+30	0.5980	1.90	QV				
8+35	0.6112	1.93	QV				
8+40	0.6250	1.99	Q V				
8+45	0.6388	2.01	QV				
8+50	0.6529	2.05	QV				
8+55	0.6675	2.11	QV				
9+ 0	0.6822	2.14	QV				
9+ 5	0.6973	2.20	Q V				
9+10	0.7134	2.33	QV				
9+15	0.7297	2.37	QV				
9+20	0.7464	2.42	QV				
9+25	0.7635	2.49	Q V				
9+30	0.7808	2.51	QV				
9+35	0.7984	2.55	QV				
9+40	0.8164	2.62	QV				
9+45	0.8346	2.64	Q V				
9+50	0.8531	2.68	Q V				
9+55	0.8720	2.75	Q V				
10+ 0	0.8911	2.77	QV				
10+ 5	0.9089	2.58	Q V				
10+10	0.9237	2.15	Q V				
10+15	0.9377	2.03	Q V				
10+20	0.9513	1.97	Q V				
10+25	0.9647	1.94	Q V				
10+30	0.9779	1.92	Q V				
10+35	0.9920	2.05	Q V				
10+40	1.0082	2.35	Q V				
10+45	1.0251	2.44	Q V				
10+50	1.0422	2.49	Q V				
10+55	1.0595	2.51	Q V				
11+ 0	1.0768	2.52	Q V				
11+ 5	1.0941	2.50	Q V				
11+10	1.1109	2.45	Q V				
11+15	1.1277	2.43	Q V				
11+20	1.1443	2.42	Q V				
11+25	1.1610	2.42	Q V				
11+30	1.1776	2.41	Q V				
11+35	1.1938	2.35	Q V				
11+40	1.2091	2.23	Q V				
11+45	1.2243	2.19	Q V				
11+50	1.2394	2.21	Q V				
11+55	1.2550	2.26	Q V				
12+ 0	1.2706	2.27	Q V				
12+ 5	1.2877	2.47	Q V				
12+10	1.3077	2.91	Q V				
12+15	1.3286	3.04	Q V				



17+ 5	2.5458	0.44	Q				V
17+10	2.5497	0.56	Q				V
17+15	2.5538	0.60	Q				V
17+20	2.5580	0.61	Q				V
17+25	2.5623	0.62	Q				V
17+30	2.5666	0.63	Q				V
17+35	2.5710	0.63	Q				V
17+40	2.5753	0.63	Q				V
17+45	2.5797	0.63	Q				V
17+50	2.5839	0.61	Q				V
17+55	2.5876	0.54	Q				V
18+ 0	2.5913	0.53	Q				V
18+ 5	2.5948	0.52	Q				V
18+10	2.5984	0.51	Q				V
18+15	2.6019	0.51	Q				V
18+20	2.6054	0.51	Q				V
18+25	2.6089	0.51	Q				V
18+30	2.6124	0.51	Q				V
18+35	2.6157	0.48	Q				V
18+40	2.6185	0.42	Q				V
18+45	2.6213	0.40	Q				V
18+50	2.6238	0.36	Q				V
18+55	2.6258	0.30	Q				V
19+ 0	2.6277	0.28	Q				V
19+ 5	2.6297	0.29	Q				V
19+10	2.6321	0.35	Q				V
19+15	2.6347	0.36	Q				V
19+20	2.6374	0.40	Q				V
19+25	2.6406	0.47	Q				V
19+30	2.6440	0.49	Q				V
19+35	2.6472	0.47	Q				V
19+40	2.6500	0.41	Q				V
19+45	2.6527	0.40	Q				V
19+50	2.6552	0.36	Q				V
19+55	2.6573	0.30	Q				V
20+ 0	2.6592	0.28	Q				V
20+ 5	2.6612	0.29	Q				V
20+10	2.6636	0.35	Q				V
20+15	2.6661	0.36	Q				V
20+20	2.6687	0.37	Q				V
20+25	2.6712	0.37	Q				V
20+30	2.6738	0.38	Q				V
20+35	2.6765	0.38	Q				V
20+40	2.6791	0.38	Q				V
20+45	2.6817	0.38	Q				V
20+50	2.6841	0.35	Q				V
20+55	2.6861	0.29	Q				V
21+ 0	2.6880	0.27	Q				V
21+ 5	2.6900	0.29	Q				V
21+10	2.6924	0.35	Q				V
21+15	2.6949	0.36	Q				V
21+20	2.6973	0.34	Q				V
21+25	2.6993	0.28	Q				V
21+30	2.7011	0.27	Q				V
21+35	2.7031	0.29	Q				V
21+40	2.7055	0.35	Q				V
21+45	2.7080	0.36	Q				V

21+50	2.7104	0.34	|Q	|	|	|	V|
21+55	2.7124	0.28	|Q	|	|	|	V|
22+ 0	2.7142	0.27	|Q	|	|	|	V|
22+ 5	2.7162	0.29	|Q	|	|	|	V|
22+10	2.7186	0.35	|Q	|	|	|	V|
22+15	2.7211	0.36	|Q	|	|	|	V|
22+20	2.7235	0.34	|Q	|	|	|	V|
22+25	2.7255	0.28	|Q	|	|	|	V|
22+30	2.7273	0.27	|Q	|	|	|	V|
22+35	2.7291	0.26	|Q	|	|	|	V|
22+40	2.7309	0.26	|Q	|	|	|	V|
22+45	2.7327	0.26	|Q	|	|	|	V|
22+50	2.7344	0.25	|Q	|	|	|	V|
22+55	2.7362	0.25	|Q	|	|	|	V|
23+ 0	2.7379	0.25	|Q	|	|	|	V|
23+ 5	2.7397	0.25	|Q	|	|	|	V|
23+10	2.7414	0.25	|Q	|	|	|	V|
23+15	2.7432	0.25	|Q	|	|	|	V|
23+20	2.7449	0.25	|Q	|	|	|	V|
23+25	2.7467	0.25	|Q	|	|	|	V|
23+30	2.7484	0.25	|Q	|	|	|	V|
23+35	2.7502	0.25	|Q	|	|	|	V|
23+40	2.7519	0.25	|Q	|	|	|	V|
23+45	2.7537	0.25	|Q	|	|	|	V|
23+50	2.7554	0.25	|Q	|	|	|	V|
23+55	2.7571	0.25	|Q	|	|	|	V|
24+ 0	2.7589	0.25	|Q	|	|	|	V|
24+ 5	2.7603	0.20	Q	|	|	|	V|
24+10	2.7608	0.07	Q	|	|	|	V|
24+15	2.7610	0.04	Q	|	|	|	V|
24+20	2.7612	0.02	Q	|	|	|	V|
24+25	2.7612	0.01	Q	|	|	|	V|
24+30	2.7613	0.01	Q	|	|	|	V|
24+35	2.7613	0.00	Q	|	|	|	V|

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

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Study date 10/02/24 File: pq6100uh24100.out

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

Program License Serial Number 6405

20-001 HARVEST LANDING RETAIL CENTER AND BUSINESS PARK
PROPOSED CONDITION - WATERSHED A
100 YEAR, 24 HOUR STORM EVENT ANALYSIS

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

English Units used in output format

Drainage Area = 13.13(Ac.) = 0.021 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 13.13(Ac.) = 0.021 Sq. Mi.
Length along longest watercourse = 1103.00(Ft.)
Length along longest watercourse measured to centroid = 759.00(Ft.)
Length along longest watercourse = 0.209 Mi.
Length along longest watercourse measured to centroid = 0.144 Mi.
Difference in elevation = 26.26(Ft.)
Slope along watercourse = 125.7052 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.038 Hr.
Lag time = 2.28 Min.
25% of lag time = 0.57 Min.
40% of lag time = 0.91 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
13.13	1.80	23.63

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
13.13	5.00	65.65

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.800(In)
Area Averaged 100-Year Rainfall = 5.000(In)

Point rain (area averaged) = 5.000(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 5.000(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
13.130	60.80	0.722

Total Area Entered = 13.13(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
60.8	60.8	0.461	0.722	0.162	1.000	0.162
					Sum (F) =	0.162

Area averaged mean soil loss (F) (In/Hr) = 0.162
Minimum soil loss rate ((In/Hr)) = 0.081
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.322

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

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	219.748	46.617	6.169
2	0.167	439.496	42.013	5.559
3	0.250	659.243	8.048	1.065
4	0.333	878.991	3.322	0.440
		Sum =	100.000 Sum=	13.233

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

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.040	(0.286)	0.013	0.027
2	0.17	0.07	0.040	(0.285)	0.013	0.027
3	0.25	0.07	0.040	(0.284)	0.013	0.027
4	0.33	0.10	0.060	(0.283)	0.019	0.041
5	0.42	0.10	0.060	(0.282)	0.019	0.041

6	0.50	0.10	0.060	(0.281)	0.019	0.041
7	0.58	0.10	0.060	(0.280)	0.019	0.041
8	0.67	0.10	0.060	(0.279)	0.019	0.041
9	0.75	0.10	0.060	(0.278)	0.019	0.041
10	0.83	0.13	0.080	(0.277)	0.026	0.054
11	0.92	0.13	0.080	(0.275)	0.026	0.054
12	1.00	0.13	0.080	(0.274)	0.026	0.054
13	1.08	0.10	0.060	(0.273)	0.019	0.041
14	1.17	0.10	0.060	(0.272)	0.019	0.041
15	1.25	0.10	0.060	(0.271)	0.019	0.041
16	1.33	0.10	0.060	(0.270)	0.019	0.041
17	1.42	0.10	0.060	(0.269)	0.019	0.041
18	1.50	0.10	0.060	(0.268)	0.019	0.041
19	1.58	0.10	0.060	(0.267)	0.019	0.041
20	1.67	0.10	0.060	(0.266)	0.019	0.041
21	1.75	0.10	0.060	(0.265)	0.019	0.041
22	1.83	0.13	0.080	(0.264)	0.026	0.054
23	1.92	0.13	0.080	(0.263)	0.026	0.054
24	2.00	0.13	0.080	(0.261)	0.026	0.054
25	2.08	0.13	0.080	(0.260)	0.026	0.054
26	2.17	0.13	0.080	(0.259)	0.026	0.054
27	2.25	0.13	0.080	(0.258)	0.026	0.054
28	2.33	0.13	0.080	(0.257)	0.026	0.054
29	2.42	0.13	0.080	(0.256)	0.026	0.054
30	2.50	0.13	0.080	(0.255)	0.026	0.054
31	2.58	0.17	0.100	(0.254)	0.032	0.068
32	2.67	0.17	0.100	(0.253)	0.032	0.068
33	2.75	0.17	0.100	(0.252)	0.032	0.068
34	2.83	0.17	0.100	(0.251)	0.032	0.068
35	2.92	0.17	0.100	(0.250)	0.032	0.068
36	3.00	0.17	0.100	(0.249)	0.032	0.068
37	3.08	0.17	0.100	(0.248)	0.032	0.068
38	3.17	0.17	0.100	(0.247)	0.032	0.068
39	3.25	0.17	0.100	(0.246)	0.032	0.068
40	3.33	0.17	0.100	(0.245)	0.032	0.068
41	3.42	0.17	0.100	(0.244)	0.032	0.068
42	3.50	0.17	0.100	(0.243)	0.032	0.068
43	3.58	0.17	0.100	(0.242)	0.032	0.068
44	3.67	0.17	0.100	(0.241)	0.032	0.068
45	3.75	0.17	0.100	(0.240)	0.032	0.068
46	3.83	0.20	0.120	(0.239)	0.039	0.081
47	3.92	0.20	0.120	(0.238)	0.039	0.081
48	4.00	0.20	0.120	(0.237)	0.039	0.081
49	4.08	0.20	0.120	(0.236)	0.039	0.081
50	4.17	0.20	0.120	(0.235)	0.039	0.081
51	4.25	0.20	0.120	(0.234)	0.039	0.081
52	4.33	0.23	0.140	(0.233)	0.045	0.095
53	4.42	0.23	0.140	(0.232)	0.045	0.095
54	4.50	0.23	0.140	(0.231)	0.045	0.095
55	4.58	0.23	0.140	(0.230)	0.045	0.095
56	4.67	0.23	0.140	(0.229)	0.045	0.095
57	4.75	0.23	0.140	(0.228)	0.045	0.095
58	4.83	0.27	0.160	(0.227)	0.052	0.108
59	4.92	0.27	0.160	(0.226)	0.052	0.108
60	5.00	0.27	0.160	(0.225)	0.052	0.108
61	5.08	0.20	0.120	(0.224)	0.039	0.081
62	5.17	0.20	0.120	(0.223)	0.039	0.081

63	5.25	0.20	0.120	(0.222)	0.039	0.081
64	5.33	0.23	0.140	(0.221)	0.045	0.095
65	5.42	0.23	0.140	(0.220)	0.045	0.095
66	5.50	0.23	0.140	(0.219)	0.045	0.095
67	5.58	0.27	0.160	(0.218)	0.052	0.108
68	5.67	0.27	0.160	(0.217)	0.052	0.108
69	5.75	0.27	0.160	(0.216)	0.052	0.108
70	5.83	0.27	0.160	(0.215)	0.052	0.108
71	5.92	0.27	0.160	(0.214)	0.052	0.108
72	6.00	0.27	0.160	(0.213)	0.052	0.108
73	6.08	0.30	0.180	(0.212)	0.058	0.122
74	6.17	0.30	0.180	(0.211)	0.058	0.122
75	6.25	0.30	0.180	(0.210)	0.058	0.122
76	6.33	0.30	0.180	(0.209)	0.058	0.122
77	6.42	0.30	0.180	(0.209)	0.058	0.122
78	6.50	0.30	0.180	(0.208)	0.058	0.122
79	6.58	0.33	0.200	(0.207)	0.064	0.136
80	6.67	0.33	0.200	(0.206)	0.064	0.136
81	6.75	0.33	0.200	(0.205)	0.064	0.136
82	6.83	0.33	0.200	(0.204)	0.064	0.136
83	6.92	0.33	0.200	(0.203)	0.064	0.136
84	7.00	0.33	0.200	(0.202)	0.064	0.136
85	7.08	0.33	0.200	(0.201)	0.064	0.136
86	7.17	0.33	0.200	(0.200)	0.064	0.136
87	7.25	0.33	0.200	(0.199)	0.064	0.136
88	7.33	0.37	0.220	(0.198)	0.071	0.149
89	7.42	0.37	0.220	(0.197)	0.071	0.149
90	7.50	0.37	0.220	(0.197)	0.071	0.149
91	7.58	0.40	0.240	(0.196)	0.077	0.163
92	7.67	0.40	0.240	(0.195)	0.077	0.163
93	7.75	0.40	0.240	(0.194)	0.077	0.163
94	7.83	0.43	0.260	(0.193)	0.084	0.176
95	7.92	0.43	0.260	(0.192)	0.084	0.176
96	8.00	0.43	0.260	(0.191)	0.084	0.176
97	8.08	0.50	0.300	(0.190)	0.097	0.203
98	8.17	0.50	0.300	(0.189)	0.097	0.203
99	8.25	0.50	0.300	(0.189)	0.097	0.203
100	8.33	0.50	0.300	(0.188)	0.097	0.203
101	8.42	0.50	0.300	(0.187)	0.097	0.203
102	8.50	0.50	0.300	(0.186)	0.097	0.203
103	8.58	0.53	0.320	(0.185)	0.103	0.217
104	8.67	0.53	0.320	(0.184)	0.103	0.217
105	8.75	0.53	0.320	(0.183)	0.103	0.217
106	8.83	0.57	0.340	(0.182)	0.110	0.230
107	8.92	0.57	0.340	(0.182)	0.110	0.230
108	9.00	0.57	0.340	(0.181)	0.110	0.230
109	9.08	0.63	0.380	(0.180)	0.123	0.257
110	9.17	0.63	0.380	(0.179)	0.123	0.257
111	9.25	0.63	0.380	(0.178)	0.123	0.257
112	9.33	0.67	0.400	(0.177)	0.129	0.271
113	9.42	0.67	0.400	(0.176)	0.129	0.271
114	9.50	0.67	0.400	(0.176)	0.129	0.271
115	9.58	0.70	0.420	(0.175)	0.135	0.285
116	9.67	0.70	0.420	(0.174)	0.135	0.285
117	9.75	0.70	0.420	(0.173)	0.135	0.285
118	9.83	0.73	0.440	(0.172)	0.142	0.298
119	9.92	0.73	0.440	(0.171)	0.142	0.298

120	10.00	0.73	0.440	(0.171)	0.142	0.298
121	10.08	0.50	0.300	(0.170)	0.097	0.203
122	10.17	0.50	0.300	(0.169)	0.097	0.203
123	10.25	0.50	0.300	(0.168)	0.097	0.203
124	10.33	0.50	0.300	(0.167)	0.097	0.203
125	10.42	0.50	0.300	(0.167)	0.097	0.203
126	10.50	0.50	0.300	(0.166)	0.097	0.203
127	10.58	0.67	0.400	(0.165)	0.129	0.271
128	10.67	0.67	0.400	(0.164)	0.129	0.271
129	10.75	0.67	0.400	(0.163)	0.129	0.271
130	10.83	0.67	0.400	(0.162)	0.129	0.271
131	10.92	0.67	0.400	(0.162)	0.129	0.271
132	11.00	0.67	0.400	(0.161)	0.129	0.271
133	11.08	0.63	0.380	(0.160)	0.123	0.257
134	11.17	0.63	0.380	(0.159)	0.123	0.257
135	11.25	0.63	0.380	(0.159)	0.123	0.257
136	11.33	0.63	0.380	(0.158)	0.123	0.257
137	11.42	0.63	0.380	(0.157)	0.123	0.257
138	11.50	0.63	0.380	(0.156)	0.123	0.257
139	11.58	0.57	0.340	(0.155)	0.110	0.230
140	11.67	0.57	0.340	(0.155)	0.110	0.230
141	11.75	0.57	0.340	(0.154)	0.110	0.230
142	11.83	0.60	0.360	(0.153)	0.116	0.244
143	11.92	0.60	0.360	(0.152)	0.116	0.244
144	12.00	0.60	0.360	(0.152)	0.116	0.244
145	12.08	0.83	0.500	0.151	(0.161)	0.349
146	12.17	0.83	0.500	0.150	(0.161)	0.350
147	12.25	0.83	0.500	0.149	(0.161)	0.351
148	12.33	0.87	0.520	0.149	(0.168)	0.371
149	12.42	0.87	0.520	0.148	(0.168)	0.372
150	12.50	0.87	0.520	0.147	(0.168)	0.373
151	12.58	0.93	0.560	0.146	(0.181)	0.414
152	12.67	0.93	0.560	0.146	(0.181)	0.414
153	12.75	0.93	0.560	0.145	(0.181)	0.415
154	12.83	0.97	0.580	0.144	(0.187)	0.436
155	12.92	0.97	0.580	0.143	(0.187)	0.437
156	13.00	0.97	0.580	0.143	(0.187)	0.437
157	13.08	1.13	0.680	0.142	(0.219)	0.538
158	13.17	1.13	0.680	0.141	(0.219)	0.539
159	13.25	1.13	0.680	0.141	(0.219)	0.539
160	13.33	1.13	0.680	0.140	(0.219)	0.540
161	13.42	1.13	0.680	0.139	(0.219)	0.541
162	13.50	1.13	0.680	0.138	(0.219)	0.542
163	13.58	0.77	0.460	0.138	(0.148)	0.322
164	13.67	0.77	0.460	0.137	(0.148)	0.323
165	13.75	0.77	0.460	0.136	(0.148)	0.324
166	13.83	0.77	0.460	0.136	(0.148)	0.324
167	13.92	0.77	0.460	0.135	(0.148)	0.325
168	14.00	0.77	0.460	0.134	(0.148)	0.326
169	14.08	0.90	0.540	0.134	(0.174)	0.406
170	14.17	0.90	0.540	0.133	(0.174)	0.407
171	14.25	0.90	0.540	0.132	(0.174)	0.408
172	14.33	0.87	0.520	0.131	(0.168)	0.389
173	14.42	0.87	0.520	0.131	(0.168)	0.389
174	14.50	0.87	0.520	0.130	(0.168)	0.390
175	14.58	0.87	0.520	0.129	(0.168)	0.391
176	14.67	0.87	0.520	0.129	(0.168)	0.391

177	14.75	0.87	0.520	0.128	(0.168)	0.392
178	14.83	0.83	0.500	0.127	(0.161)	0.372
179	14.92	0.83	0.500	0.127	(0.161)	0.373
180	15.00	0.83	0.500	0.126	(0.161)	0.374
181	15.08	0.80	0.480	0.126	(0.155)	0.354
182	15.17	0.80	0.480	0.125	(0.155)	0.355
183	15.25	0.80	0.480	0.124	(0.155)	0.356
184	15.33	0.77	0.460	0.124	(0.148)	0.336
185	15.42	0.77	0.460	0.123	(0.148)	0.337
186	15.50	0.77	0.460	0.122	(0.148)	0.338
187	15.58	0.63	0.380	0.122	(0.123)	0.258
188	15.67	0.63	0.380	0.121	(0.123)	0.259
189	15.75	0.63	0.380	0.120	(0.123)	0.260
190	15.83	0.63	0.380	0.120	(0.123)	0.260
191	15.92	0.63	0.380	0.119	(0.123)	0.261
192	16.00	0.63	0.380	0.119	(0.123)	0.261
193	16.08	0.13	0.080	(0.118)	0.026	0.054
194	16.17	0.13	0.080	(0.117)	0.026	0.054
195	16.25	0.13	0.080	(0.117)	0.026	0.054
196	16.33	0.13	0.080	(0.116)	0.026	0.054
197	16.42	0.13	0.080	(0.116)	0.026	0.054
198	16.50	0.13	0.080	(0.115)	0.026	0.054
199	16.58	0.10	0.060	(0.114)	0.019	0.041
200	16.67	0.10	0.060	(0.114)	0.019	0.041
201	16.75	0.10	0.060	(0.113)	0.019	0.041
202	16.83	0.10	0.060	(0.113)	0.019	0.041
203	16.92	0.10	0.060	(0.112)	0.019	0.041
204	17.00	0.10	0.060	(0.112)	0.019	0.041
205	17.08	0.17	0.100	(0.111)	0.032	0.068
206	17.17	0.17	0.100	(0.110)	0.032	0.068
207	17.25	0.17	0.100	(0.110)	0.032	0.068
208	17.33	0.17	0.100	(0.109)	0.032	0.068
209	17.42	0.17	0.100	(0.109)	0.032	0.068
210	17.50	0.17	0.100	(0.108)	0.032	0.068
211	17.58	0.17	0.100	(0.108)	0.032	0.068
212	17.67	0.17	0.100	(0.107)	0.032	0.068
213	17.75	0.17	0.100	(0.107)	0.032	0.068
214	17.83	0.13	0.080	(0.106)	0.026	0.054
215	17.92	0.13	0.080	(0.106)	0.026	0.054
216	18.00	0.13	0.080	(0.105)	0.026	0.054
217	18.08	0.13	0.080	(0.105)	0.026	0.054
218	18.17	0.13	0.080	(0.104)	0.026	0.054
219	18.25	0.13	0.080	(0.104)	0.026	0.054
220	18.33	0.13	0.080	(0.103)	0.026	0.054
221	18.42	0.13	0.080	(0.103)	0.026	0.054
222	18.50	0.13	0.080	(0.102)	0.026	0.054
223	18.58	0.10	0.060	(0.102)	0.019	0.041
224	18.67	0.10	0.060	(0.101)	0.019	0.041
225	18.75	0.10	0.060	(0.101)	0.019	0.041
226	18.83	0.07	0.040	(0.100)	0.013	0.027
227	18.92	0.07	0.040	(0.100)	0.013	0.027
228	19.00	0.07	0.040	(0.099)	0.013	0.027
229	19.08	0.10	0.060	(0.099)	0.019	0.041
230	19.17	0.10	0.060	(0.098)	0.019	0.041
231	19.25	0.10	0.060	(0.098)	0.019	0.041
232	19.33	0.13	0.080	(0.097)	0.026	0.054
233	19.42	0.13	0.080	(0.097)	0.026	0.054

234	19.50	0.13	0.080	(0.096)	0.026	0.054
235	19.58	0.10	0.060	(0.096)	0.019	0.041
236	19.67	0.10	0.060	(0.096)	0.019	0.041
237	19.75	0.10	0.060	(0.095)	0.019	0.041
238	19.83	0.07	0.040	(0.095)	0.013	0.027
239	19.92	0.07	0.040	(0.094)	0.013	0.027
240	20.00	0.07	0.040	(0.094)	0.013	0.027
241	20.08	0.10	0.060	(0.093)	0.019	0.041
242	20.17	0.10	0.060	(0.093)	0.019	0.041
243	20.25	0.10	0.060	(0.093)	0.019	0.041
244	20.33	0.10	0.060	(0.092)	0.019	0.041
245	20.42	0.10	0.060	(0.092)	0.019	0.041
246	20.50	0.10	0.060	(0.091)	0.019	0.041
247	20.58	0.10	0.060	(0.091)	0.019	0.041
248	20.67	0.10	0.060	(0.091)	0.019	0.041
249	20.75	0.10	0.060	(0.090)	0.019	0.041
250	20.83	0.07	0.040	(0.090)	0.013	0.027
251	20.92	0.07	0.040	(0.090)	0.013	0.027
252	21.00	0.07	0.040	(0.089)	0.013	0.027
253	21.08	0.10	0.060	(0.089)	0.019	0.041
254	21.17	0.10	0.060	(0.088)	0.019	0.041
255	21.25	0.10	0.060	(0.088)	0.019	0.041
256	21.33	0.07	0.040	(0.088)	0.013	0.027
257	21.42	0.07	0.040	(0.087)	0.013	0.027
258	21.50	0.07	0.040	(0.087)	0.013	0.027
259	21.58	0.10	0.060	(0.087)	0.019	0.041
260	21.67	0.10	0.060	(0.087)	0.019	0.041
261	21.75	0.10	0.060	(0.086)	0.019	0.041
262	21.83	0.07	0.040	(0.086)	0.013	0.027
263	21.92	0.07	0.040	(0.086)	0.013	0.027
264	22.00	0.07	0.040	(0.085)	0.013	0.027
265	22.08	0.10	0.060	(0.085)	0.019	0.041
266	22.17	0.10	0.060	(0.085)	0.019	0.041
267	22.25	0.10	0.060	(0.084)	0.019	0.041
268	22.33	0.07	0.040	(0.084)	0.013	0.027
269	22.42	0.07	0.040	(0.084)	0.013	0.027
270	22.50	0.07	0.040	(0.084)	0.013	0.027
271	22.58	0.07	0.040	(0.083)	0.013	0.027
272	22.67	0.07	0.040	(0.083)	0.013	0.027
273	22.75	0.07	0.040	(0.083)	0.013	0.027
274	22.83	0.07	0.040	(0.083)	0.013	0.027
275	22.92	0.07	0.040	(0.083)	0.013	0.027
276	23.00	0.07	0.040	(0.082)	0.013	0.027
277	23.08	0.07	0.040	(0.082)	0.013	0.027
278	23.17	0.07	0.040	(0.082)	0.013	0.027
279	23.25	0.07	0.040	(0.082)	0.013	0.027
280	23.33	0.07	0.040	(0.082)	0.013	0.027
281	23.42	0.07	0.040	(0.082)	0.013	0.027
282	23.50	0.07	0.040	(0.081)	0.013	0.027
283	23.58	0.07	0.040	(0.081)	0.013	0.027
284	23.67	0.07	0.040	(0.081)	0.013	0.027
285	23.75	0.07	0.040	(0.081)	0.013	0.027
286	23.83	0.07	0.040	(0.081)	0.013	0.027
287	23.92	0.07	0.040	(0.081)	0.013	0.027
288	24.00	0.07	0.040	(0.081)	0.013	0.027
		(Loss Rate Not Used)				
	Sum =	100.0			Sum =	42.2

Flood volume = Effective rainfall 3.51(In)
times area 13.1(Ac.)/[(In)/(Ft.)] = 3.8(Ac.Ft)
Total soil loss = 1.49(In)
Total soil loss = 1.626(Ac.Ft)
Total rainfall = 5.00(In)
Flood volume = 167472.6 Cubic Feet
Total soil loss = 70830.8 Cubic Feet

Peak flow rate of this hydrograph = 7.164(CFS)

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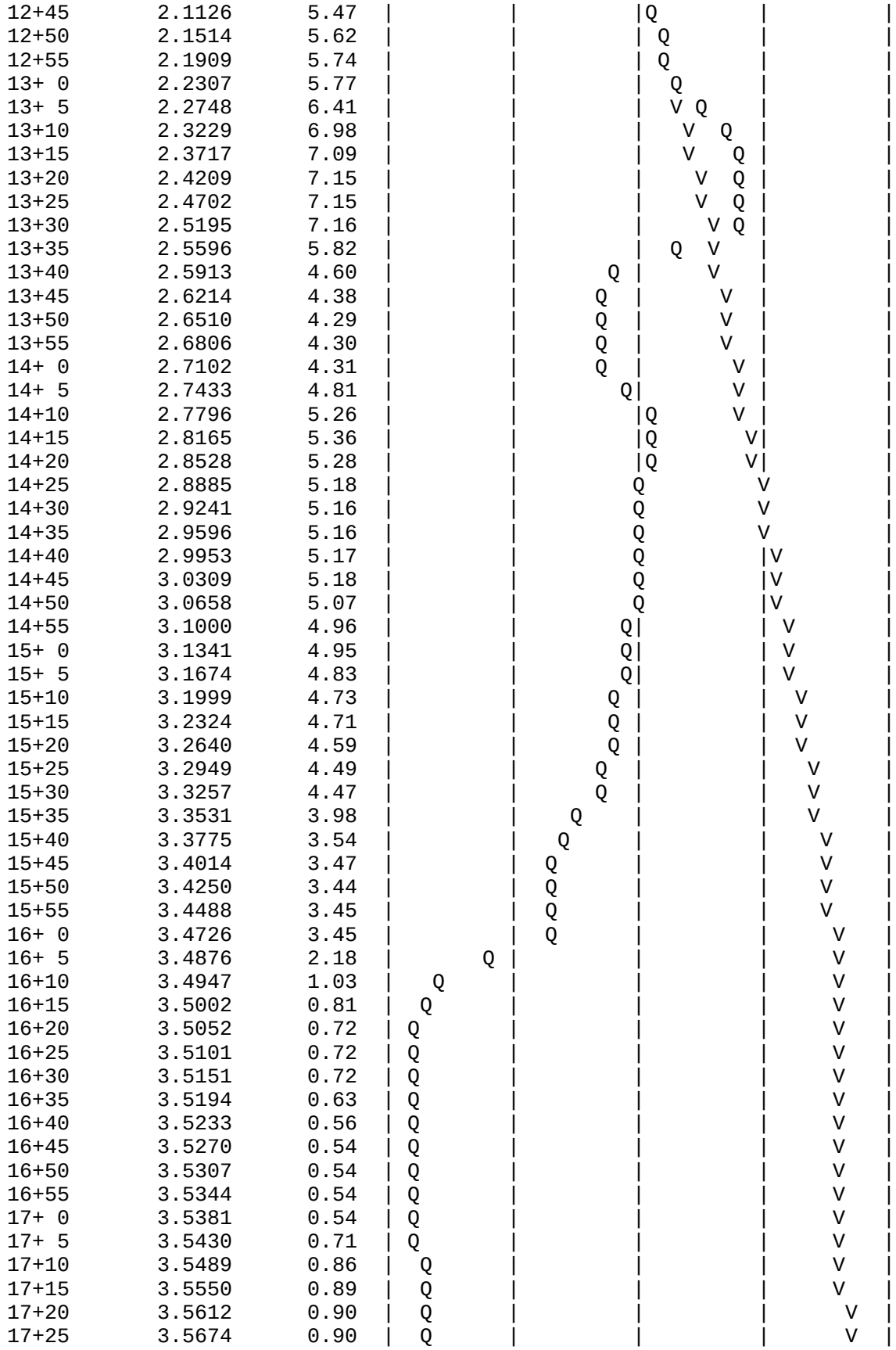
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0012	0.17	Q				
0+10	0.0033	0.32	VQ				
0+15	0.0057	0.35	VQ				
0+20	0.0088	0.44	VQ				
0+25	0.0123	0.52	V Q				
0+30	0.0160	0.53	V Q				
0+35	0.0197	0.54	V Q				
0+40	0.0234	0.54	V Q				
0+45	0.0271	0.54	V Q				
0+50	0.0314	0.62	V Q				
0+55	0.0362	0.70	V Q				
1+ 0	0.0411	0.71	V Q				
1+ 5	0.0455	0.63	V Q				
1+10	0.0493	0.56	V Q				
1+15	0.0531	0.54	V Q				
1+20	0.0568	0.54	V Q				
1+25	0.0605	0.54	V Q				
1+30	0.0642	0.54	V Q				
1+35	0.0679	0.54	V Q				
1+40	0.0716	0.54	V Q				
1+45	0.0753	0.54	V Q				
1+50	0.0796	0.62	V Q				
1+55	0.0844	0.70	V Q				
2+ 0	0.0893	0.71	V Q				
2+ 5	0.0943	0.72	V Q				
2+10	0.0992	0.72	|VQ				
2+15	0.1041	0.72	|VQ				
2+20	0.1091	0.72	|VQ				
2+25	0.1140	0.72	|VQ				
2+30	0.1190	0.72	|VQ				
2+35	0.1245	0.80	|V Q				
2+40	0.1305	0.88	|V Q				
2+45	0.1367	0.89	|V Q				
2+50	0.1428	0.90	|V Q				
2+55	0.1490	0.90	|V Q				
3+ 0	0.1552	0.90	|V Q				
3+ 5	0.1614	0.90	|V Q				
3+10	0.1675	0.90	|V Q				

3+15	0.1737	0.90	V Q			
3+20	0.1799	0.90	V Q			
3+25	0.1861	0.90	V Q			
3+30	0.1923	0.90	VQ			
3+35	0.1984	0.90	VQ			
3+40	0.2046	0.90	VQ			
3+45	0.2108	0.90	VQ			
3+50	0.2176	0.98	VQ			
3+55	0.2248	1.06	V Q			
4+ 0	0.2322	1.07	V Q			
4+ 5	0.2396	1.08	V Q			
4+10	0.2470	1.08	V Q			
4+15	0.2544	1.08	V Q			
4+20	0.2624	1.16	V Q			
4+25	0.2709	1.24	V Q			
4+30	0.2795	1.25	V Q			
4+35	0.2882	1.26	V Q			
4+40	0.2968	1.26	V Q			
4+45	0.3055	1.26	V Q			
4+50	0.3147	1.34	V Q			
4+55	0.3245	1.41	V Q			
5+ 0	0.3343	1.43	V Q			
5+ 5	0.3430	1.27	V Q			
5+10	0.3507	1.12	VQ			
5+15	0.3582	1.09	VQ			
5+20	0.3662	1.16	VQ			
5+25	0.3747	1.24	VQ			
5+30	0.3833	1.25	VQ			
5+35	0.3926	1.34	VQ			
5+40	0.4023	1.41	VQ			
5+45	0.4122	1.43	VQ			
5+50	0.4220	1.44	VQ			
5+55	0.4319	1.44	VQ			
6+ 0	0.4418	1.44	VQ			
6+ 5	0.4523	1.52	V Q			
6+10	0.4633	1.59	V Q			
6+15	0.4743	1.61	V Q			
6+20	0.4855	1.61	VQ			
6+25	0.4966	1.61	VQ			
6+30	0.5077	1.61	VQ			
6+35	0.5194	1.70	VQ			
6+40	0.5316	1.77	V Q			
6+45	0.5439	1.79	V Q			
6+50	0.5563	1.79	V Q			
6+55	0.5686	1.79	V Q			
7+ 0	0.5810	1.79	VQ			
7+ 5	0.5933	1.79	VQ			
7+10	0.6057	1.79	VQ			
7+15	0.6181	1.79	VQ			
7+20	0.6310	1.88	VQ			
7+25	0.6444	1.95	VQ			
7+30	0.6580	1.97	VQ			
7+35	0.6722	2.06	V Q			
7+40	0.6869	2.13	VQ			
7+45	0.7016	2.15	VQ			
7+50	0.7170	2.24	VQ			
7+55	0.7330	2.31	V Q			

8+ 0	0.7490	2.33	|	V Q|	|	|	|
8+ 5	0.7662	2.50	|	V Q|	|	|	|
8+10	0.7845	2.65	|	V Q	|	|	|
8+15	0.8029	2.68	|	V Q	|	|	|
8+20	0.8214	2.69	|	V Q	|	|	|
8+25	0.8400	2.69	|	V Q	|	|	|
8+30	0.8585	2.69	|	V Q	|	|	|
8+35	0.8776	2.77	|	V|Q	|	|	|
8+40	0.8973	2.85	|	V|Q	|	|	|
8+45	0.9170	2.86	|	V|Q	|	|	|
8+50	0.9373	2.95	|	V|Q	|	|	|
8+55	0.9582	3.03	|	V| Q	|	|	|
9+ 0	0.9792	3.04	|	V Q	|	|	|
9+ 5	1.0013	3.22	|	V Q	|	|	|
9+10	1.0245	3.37	|	V Q	|	|	|
9+15	1.0479	3.40	|	V Q	|	|	|
9+20	1.0720	3.49	|	|V Q	|	|	|
9+25	1.0965	3.57	|	|V Q	|	|	|
9+30	1.1212	3.58	|	|V Q	|	|	|
9+35	1.1465	3.67	|	|V Q	|	|	|
9+40	1.1723	3.75	|	| V Q	|	|	|
9+45	1.1982	3.76	|	| V Q	|	|	|
9+50	1.2247	3.85	|	| V Q	|	|	|
9+55	1.2518	3.93	|	| V Q	|	|	|
10+ 0	1.2789	3.94	|	| V Q	|	|	|
10+ 5	1.3021	3.36	|	| Q	|	|	|
10+10	1.3216	2.83	|	|Q V	|	|	|
10+15	1.3404	2.73	|	Q V	|	|	|
10+20	1.3590	2.69	|	Q V	|	|	|
10+25	1.3775	2.69	|	Q V	|	|	|
10+30	1.3960	2.69	|	Q V	|	|	|
10+35	1.4174	3.11	|	| Q V	|	|	|
10+40	1.4414	3.49	|	| QV	|	|	|
10+45	1.4660	3.56	|	| QV	|	|	|
10+50	1.4907	3.59	|	| QV	|	|	|
10+55	1.5154	3.59	|	| QV	|	|	|
11+ 0	1.5401	3.59	|	| Q V	|	|	|
11+ 5	1.5642	3.50	|	| Q V	|	|	|
11+10	1.5878	3.43	|	| Q V	|	|	|
11+15	1.6114	3.41	|	| Q V	|	|	|
11+20	1.6348	3.41	|	| Q V	|	|	|
11+25	1.6583	3.41	|	| Q V	|	|	|
11+30	1.6818	3.41	|	| Q V	|	|	|
11+35	1.7041	3.24	|	| Q V	|	|	|
11+40	1.7254	3.09	|	| Q V	|	|	|
11+45	1.7465	3.06	|	| Q V	|	|	|
11+50	1.7681	3.13	|	| Q V	|	|	|
11+55	1.7902	3.21	|	| Q V	|	|	|
12+ 0	1.8124	3.22	|	| Q V	|	|	|
12+ 5	1.8391	3.88	|	| Q V|	|	|	|
12+10	1.8699	4.47	|	| Q V|	|	|	|
12+15	1.9015	4.59	|	| QV|	|	|	|
12+20	1.9343	4.77	|	| QV	|	|	|
12+25	1.9680	4.89	|	| QV	|	|	|
12+30	2.0019	4.92	|	| QV	|	|	|
12+35	2.0376	5.19	|	| QV	|	|	|
12+40	2.0750	5.42	|	| |Q	|	|	|



17+30	3.5735	0.90	| Q	|	|	|	V |
17+35	3.5797	0.90	| Q	|	|	|	V |
17+40	3.5859	0.90	| Q	|	|	|	V |
17+45	3.5921	0.90	| Q	|	|	|	V |
17+50	3.5977	0.81	| Q	|	|	|	V |
17+55	3.6028	0.74	| Q	|	|	|	V |
18+ 0	3.6077	0.72	| Q	|	|	|	V |
18+ 5	3.6127	0.72	| Q	|	|	|	V |
18+10	3.6176	0.72	| Q	|	|	|	V |
18+15	3.6226	0.72	| Q	|	|	|	V |
18+20	3.6275	0.72	| Q	|	|	|	V |
18+25	3.6325	0.72	| Q	|	|	|	V |
18+30	3.6374	0.72	| Q	|	|	|	V |
18+35	3.6418	0.63	| Q	|	|	|	V |
18+40	3.6456	0.56	| Q	|	|	|	V |
18+45	3.6494	0.54	| Q	|	|	|	V |
18+50	3.6525	0.45	|Q	|	|	|	V |
18+55	3.6551	0.38	|Q	|	|	|	V |
19+ 0	3.6576	0.36	|Q	|	|	|	V |
19+ 5	3.6607	0.44	|Q	|	|	|	V |
19+10	3.6642	0.52	| Q	|	|	|	V |
19+15	3.6679	0.53	| Q	|	|	|	V |
19+20	3.6722	0.62	| Q	|	|	|	V |
19+25	3.6770	0.70	| Q	|	|	|	V |
19+30	3.6819	0.71	| Q	|	|	|	V |
19+35	3.6862	0.63	| Q	|	|	|	V |
19+40	3.6901	0.56	| Q	|	|	|	V |
19+45	3.6938	0.54	| Q	|	|	|	V |
19+50	3.6970	0.45	|Q	|	|	|	V |
19+55	3.6996	0.38	|Q	|	|	|	V |
20+ 0	3.7021	0.36	|Q	|	|	|	V |
20+ 5	3.7051	0.44	|Q	|	|	|	V |
20+10	3.7087	0.52	| Q	|	|	|	V |
20+15	3.7124	0.53	| Q	|	|	|	V |
20+20	3.7161	0.54	| Q	|	|	|	V |
20+25	3.7198	0.54	| Q	|	|	|	V |
20+30	3.7235	0.54	| Q	|	|	|	V |
20+35	3.7272	0.54	| Q	|	|	|	V |
20+40	3.7309	0.54	| Q	|	|	|	V |
20+45	3.7346	0.54	| Q	|	|	|	V |
20+50	3.7377	0.45	|Q	|	|	|	V |
20+55	3.7404	0.38	|Q	|	|	|	V |
21+ 0	3.7429	0.36	|Q	|	|	|	V |
21+ 5	3.7459	0.44	|Q	|	|	|	V |
21+10	3.7495	0.52	| Q	|	|	|	V|
21+15	3.7532	0.53	| Q	|	|	|	V|
21+20	3.7563	0.45	|Q	|	|	|	V|
21+25	3.7589	0.38	|Q	|	|	|	V|
21+30	3.7614	0.36	|Q	|	|	|	V|
21+35	3.7645	0.44	|Q	|	|	|	V|
21+40	3.7680	0.52	| Q	|	|	|	V|
21+45	3.7717	0.53	| Q	|	|	|	V|
21+50	3.7748	0.45	|Q	|	|	|	V|
21+55	3.7774	0.38	|Q	|	|	|	V|
22+ 0	3.7799	0.36	|Q	|	|	|	V|
22+ 5	3.7830	0.44	|Q	|	|	|	V|
22+10	3.7866	0.52	| Q	|	|	|	V|

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   22+15       3.7902      0.53  | Q       |         |         |        V|
   22+20       3.7934      0.45  |Q        |         |         |        V|
   22+25       3.7960      0.38  |Q        |         |         |        V|
   22+30       3.7985      0.36  |Q        |         |         |        V|
   22+35       3.8009      0.36  |Q        |         |         |        V|
   22+40       3.8034      0.36  |Q        |         |         |        V|
   22+45       3.8059      0.36  |Q        |         |         |        V|
   22+50       3.8084      0.36  |Q        |         |         |        V|
   22+55       3.8108      0.36  |Q        |         |         |        V|
   23+ 0       3.8133      0.36  |Q        |         |         |        V|
   23+ 5       3.8158      0.36  |Q        |         |         |        V|
   23+10       3.8182      0.36  |Q        |         |         |        V|
   23+15       3.8207      0.36  |Q        |         |         |        V|
   23+20       3.8232      0.36  |Q        |         |         |        V|
   23+25       3.8257      0.36  |Q        |         |         |        V|
   23+30       3.8281      0.36  |Q        |         |         |        V|
   23+35       3.8306      0.36  |Q        |         |         |        V|
   23+40       3.8331      0.36  |Q        |         |         |        V|
   23+45       3.8355      0.36  |Q        |         |         |        V|
   23+50       3.8380      0.36  |Q        |         |         |        V|
   23+55       3.8405      0.36  |Q        |         |         |        V|
   24+ 0       3.8430      0.36  |Q        |         |         |        V|
   24+ 5       3.8443      0.19  Q         |         |         |        V|
   24+10       3.8446      0.04  Q         |         |         |        V|
   24+15       3.8446      0.01  Q         |         |         |         V
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U n i t H y d r o g r a p h A n a l y s i s

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Study date 10/02/24 File: qp100uhb24100.out

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

Program License Serial Number 6405

20-001 HARVEST LANDING RETAIL CENTER AND BUSINESS PARK
PROPOSED CONDITION - WATERSHED B
100 YEAR, 24 HOUR STORM EVENT ANALYSIS

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

English Units used in output format

Drainage Area = 12.68(Ac.) = 0.020 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 12.68(Ac.) = 0.020 Sq. Mi.
Length along longest watercourse = 818.00(Ft.)
Length along longest watercourse measured to centroid = 475.00(Ft.)
Length along longest watercourse = 0.155 Mi.
Length along longest watercourse measured to centroid = 0.090 Mi.
Difference in elevation = 25.60(Ft.)
Slope along watercourse = 165.2421 Ft./Mi.
Average Manning's 'N' = 0.016
Lag time = 0.028 Hr.
Lag time = 1.68 Min.
25% of lag time = 0.42 Min.
40% of lag time = 0.67 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.68	1.80	22.82

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.68	5.00	63.40

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.800(In)
Area Averaged 100-Year Rainfall = 5.000(In)

Point rain (area averaged) = 5.000(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 5.000(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
12.680	57.60	0.819

Total Area Entered = 12.68(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
57.6	57.6	0.494	0.819	0.130	1.000	0.130
					Sum (F) =	0.130

Area averaged mean soil loss (F) (In/Hr) = 0.130
Minimum soil loss rate ((In/Hr)) = 0.065
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.245

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

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	297.946	56.468	7.216
2	0.167	595.892	37.242	4.759
3	0.250	893.838	6.290	0.804
		Sum = 100.000	Sum=	12.779

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

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.040	(0.230)	0.010	0.030
2	0.17	0.07	0.040	(0.230)	0.010	0.030
3	0.25	0.07	0.040	(0.229)	0.010	0.030
4	0.33	0.10	0.060	(0.228)	0.015	0.045
5	0.42	0.10	0.060	(0.227)	0.015	0.045
6	0.50	0.10	0.060	(0.226)	0.015	0.045

7	0.58	0.10	0.060	(0.225)	0.015	0.045
8	0.67	0.10	0.060	(0.224)	0.015	0.045
9	0.75	0.10	0.060	(0.223)	0.015	0.045
10	0.83	0.13	0.080	(0.222)	0.020	0.060
11	0.92	0.13	0.080	(0.222)	0.020	0.060
12	1.00	0.13	0.080	(0.221)	0.020	0.060
13	1.08	0.10	0.060	(0.220)	0.015	0.045
14	1.17	0.10	0.060	(0.219)	0.015	0.045
15	1.25	0.10	0.060	(0.218)	0.015	0.045
16	1.33	0.10	0.060	(0.217)	0.015	0.045
17	1.42	0.10	0.060	(0.216)	0.015	0.045
18	1.50	0.10	0.060	(0.216)	0.015	0.045
19	1.58	0.10	0.060	(0.215)	0.015	0.045
20	1.67	0.10	0.060	(0.214)	0.015	0.045
21	1.75	0.10	0.060	(0.213)	0.015	0.045
22	1.83	0.13	0.080	(0.212)	0.020	0.060
23	1.92	0.13	0.080	(0.211)	0.020	0.060
24	2.00	0.13	0.080	(0.210)	0.020	0.060
25	2.08	0.13	0.080	(0.210)	0.020	0.060
26	2.17	0.13	0.080	(0.209)	0.020	0.060
27	2.25	0.13	0.080	(0.208)	0.020	0.060
28	2.33	0.13	0.080	(0.207)	0.020	0.060
29	2.42	0.13	0.080	(0.206)	0.020	0.060
30	2.50	0.13	0.080	(0.205)	0.020	0.060
31	2.58	0.17	0.100	(0.204)	0.024	0.076
32	2.67	0.17	0.100	(0.204)	0.024	0.076
33	2.75	0.17	0.100	(0.203)	0.024	0.076
34	2.83	0.17	0.100	(0.202)	0.024	0.076
35	2.92	0.17	0.100	(0.201)	0.024	0.076
36	3.00	0.17	0.100	(0.200)	0.024	0.076
37	3.08	0.17	0.100	(0.199)	0.024	0.076
38	3.17	0.17	0.100	(0.199)	0.024	0.076
39	3.25	0.17	0.100	(0.198)	0.024	0.076
40	3.33	0.17	0.100	(0.197)	0.024	0.076
41	3.42	0.17	0.100	(0.196)	0.024	0.076
42	3.50	0.17	0.100	(0.195)	0.024	0.076
43	3.58	0.17	0.100	(0.195)	0.024	0.076
44	3.67	0.17	0.100	(0.194)	0.024	0.076
45	3.75	0.17	0.100	(0.193)	0.024	0.076
46	3.83	0.20	0.120	(0.192)	0.029	0.091
47	3.92	0.20	0.120	(0.191)	0.029	0.091
48	4.00	0.20	0.120	(0.190)	0.029	0.091
49	4.08	0.20	0.120	(0.190)	0.029	0.091
50	4.17	0.20	0.120	(0.189)	0.029	0.091
51	4.25	0.20	0.120	(0.188)	0.029	0.091
52	4.33	0.23	0.140	(0.187)	0.034	0.106
53	4.42	0.23	0.140	(0.186)	0.034	0.106
54	4.50	0.23	0.140	(0.186)	0.034	0.106
55	4.58	0.23	0.140	(0.185)	0.034	0.106
56	4.67	0.23	0.140	(0.184)	0.034	0.106
57	4.75	0.23	0.140	(0.183)	0.034	0.106
58	4.83	0.27	0.160	(0.182)	0.039	0.121
59	4.92	0.27	0.160	(0.182)	0.039	0.121
60	5.00	0.27	0.160	(0.181)	0.039	0.121
61	5.08	0.20	0.120	(0.180)	0.029	0.091
62	5.17	0.20	0.120	(0.179)	0.029	0.091
63	5.25	0.20	0.120	(0.179)	0.029	0.091

64	5.33	0.23	0.140	(0.178)	0.034	0.106
65	5.42	0.23	0.140	(0.177)	0.034	0.106
66	5.50	0.23	0.140	(0.176)	0.034	0.106
67	5.58	0.27	0.160	(0.175)	0.039	0.121
68	5.67	0.27	0.160	(0.175)	0.039	0.121
69	5.75	0.27	0.160	(0.174)	0.039	0.121
70	5.83	0.27	0.160	(0.173)	0.039	0.121
71	5.92	0.27	0.160	(0.172)	0.039	0.121
72	6.00	0.27	0.160	(0.172)	0.039	0.121
73	6.08	0.30	0.180	(0.171)	0.044	0.136
74	6.17	0.30	0.180	(0.170)	0.044	0.136
75	6.25	0.30	0.180	(0.169)	0.044	0.136
76	6.33	0.30	0.180	(0.169)	0.044	0.136
77	6.42	0.30	0.180	(0.168)	0.044	0.136
78	6.50	0.30	0.180	(0.167)	0.044	0.136
79	6.58	0.33	0.200	(0.166)	0.049	0.151
80	6.67	0.33	0.200	(0.166)	0.049	0.151
81	6.75	0.33	0.200	(0.165)	0.049	0.151
82	6.83	0.33	0.200	(0.164)	0.049	0.151
83	6.92	0.33	0.200	(0.163)	0.049	0.151
84	7.00	0.33	0.200	(0.163)	0.049	0.151
85	7.08	0.33	0.200	(0.162)	0.049	0.151
86	7.17	0.33	0.200	(0.161)	0.049	0.151
87	7.25	0.33	0.200	(0.160)	0.049	0.151
88	7.33	0.37	0.220	(0.160)	0.054	0.166
89	7.42	0.37	0.220	(0.159)	0.054	0.166
90	7.50	0.37	0.220	(0.158)	0.054	0.166
91	7.58	0.40	0.240	(0.157)	0.059	0.181
92	7.67	0.40	0.240	(0.157)	0.059	0.181
93	7.75	0.40	0.240	(0.156)	0.059	0.181
94	7.83	0.43	0.260	(0.155)	0.064	0.196
95	7.92	0.43	0.260	(0.155)	0.064	0.196
96	8.00	0.43	0.260	(0.154)	0.064	0.196
97	8.08	0.50	0.300	(0.153)	0.073	0.227
98	8.17	0.50	0.300	(0.152)	0.073	0.227
99	8.25	0.50	0.300	(0.152)	0.073	0.227
100	8.33	0.50	0.300	(0.151)	0.073	0.227
101	8.42	0.50	0.300	(0.150)	0.073	0.227
102	8.50	0.50	0.300	(0.150)	0.073	0.227
103	8.58	0.53	0.320	(0.149)	0.078	0.242
104	8.67	0.53	0.320	(0.148)	0.078	0.242
105	8.75	0.53	0.320	(0.147)	0.078	0.242
106	8.83	0.57	0.340	(0.147)	0.083	0.257
107	8.92	0.57	0.340	(0.146)	0.083	0.257
108	9.00	0.57	0.340	(0.145)	0.083	0.257
109	9.08	0.63	0.380	(0.145)	0.093	0.287
110	9.17	0.63	0.380	(0.144)	0.093	0.287
111	9.25	0.63	0.380	(0.143)	0.093	0.287
112	9.33	0.67	0.400	(0.143)	0.098	0.302
113	9.42	0.67	0.400	(0.142)	0.098	0.302
114	9.50	0.67	0.400	(0.141)	0.098	0.302
115	9.58	0.70	0.420	(0.141)	0.103	0.317
116	9.67	0.70	0.420	(0.140)	0.103	0.317
117	9.75	0.70	0.420	(0.139)	0.103	0.317
118	9.83	0.73	0.440	(0.139)	0.108	0.332
119	9.92	0.73	0.440	(0.138)	0.108	0.332
120	10.00	0.73	0.440	(0.137)	0.108	0.332

121	10.08	0.50	0.300	(0.137)	0.073	0.227
122	10.17	0.50	0.300	(0.136)	0.073	0.227
123	10.25	0.50	0.300	(0.135)	0.073	0.227
124	10.33	0.50	0.300	(0.135)	0.073	0.227
125	10.42	0.50	0.300	(0.134)	0.073	0.227
126	10.50	0.50	0.300	(0.133)	0.073	0.227
127	10.58	0.67	0.400	(0.133)	0.098	0.302
128	10.67	0.67	0.400	(0.132)	0.098	0.302
129	10.75	0.67	0.400	(0.131)	0.098	0.302
130	10.83	0.67	0.400	(0.131)	0.098	0.302
131	10.92	0.67	0.400	(0.130)	0.098	0.302
132	11.00	0.67	0.400	(0.129)	0.098	0.302
133	11.08	0.63	0.380	(0.129)	0.093	0.287
134	11.17	0.63	0.380	(0.128)	0.093	0.287
135	11.25	0.63	0.380	(0.128)	0.093	0.287
136	11.33	0.63	0.380	(0.127)	0.093	0.287
137	11.42	0.63	0.380	(0.126)	0.093	0.287
138	11.50	0.63	0.380	(0.126)	0.093	0.287
139	11.58	0.57	0.340	(0.125)	0.083	0.257
140	11.67	0.57	0.340	(0.124)	0.083	0.257
141	11.75	0.57	0.340	(0.124)	0.083	0.257
142	11.83	0.60	0.360	(0.123)	0.088	0.272
143	11.92	0.60	0.360	(0.123)	0.088	0.272
144	12.00	0.60	0.360	(0.122)	0.088	0.272
145	12.08	0.83	0.500	0.121	(0.122)	0.379
146	12.17	0.83	0.500	0.121	(0.122)	0.379
147	12.25	0.83	0.500	0.120	(0.122)	0.380
148	12.33	0.87	0.520	0.120	(0.127)	0.400
149	12.42	0.87	0.520	0.119	(0.127)	0.401
150	12.50	0.87	0.520	0.118	(0.127)	0.402
151	12.58	0.93	0.560	0.118	(0.137)	0.442
152	12.67	0.93	0.560	0.117	(0.137)	0.443
153	12.75	0.93	0.560	0.117	(0.137)	0.443
154	12.83	0.97	0.580	0.116	(0.142)	0.464
155	12.92	0.97	0.580	0.115	(0.142)	0.465
156	13.00	0.97	0.580	0.115	(0.142)	0.465
157	13.08	1.13	0.680	0.114	(0.166)	0.566
158	13.17	1.13	0.680	0.114	(0.166)	0.566
159	13.25	1.13	0.680	0.113	(0.166)	0.567
160	13.33	1.13	0.680	0.112	(0.166)	0.567
161	13.42	1.13	0.680	0.112	(0.166)	0.568
162	13.50	1.13	0.680	0.111	(0.166)	0.569
163	13.58	0.77	0.460	0.111	(0.113)	0.349
164	13.67	0.77	0.460	0.110	(0.113)	0.350
165	13.75	0.77	0.460	0.110	(0.113)	0.350
166	13.83	0.77	0.460	0.109	(0.113)	0.351
167	13.92	0.77	0.460	0.109	(0.113)	0.351
168	14.00	0.77	0.460	0.108	(0.113)	0.352
169	14.08	0.90	0.540	0.107	(0.132)	0.433
170	14.17	0.90	0.540	0.107	(0.132)	0.433
171	14.25	0.90	0.540	0.106	(0.132)	0.434
172	14.33	0.87	0.520	0.106	(0.127)	0.414
173	14.42	0.87	0.520	0.105	(0.127)	0.415
174	14.50	0.87	0.520	0.105	(0.127)	0.415
175	14.58	0.87	0.520	0.104	(0.127)	0.416
176	14.67	0.87	0.520	0.104	(0.127)	0.416
177	14.75	0.87	0.520	0.103	(0.127)	0.417

178	14.83	0.83	0.500	0.103	(0.122)	0.397
179	14.92	0.83	0.500	0.102	(0.122)	0.398
180	15.00	0.83	0.500	0.102	(0.122)	0.398
181	15.08	0.80	0.480	0.101	(0.118)	0.379
182	15.17	0.80	0.480	0.100	(0.118)	0.379
183	15.25	0.80	0.480	0.100	(0.118)	0.380
184	15.33	0.77	0.460	0.099	(0.113)	0.361
185	15.42	0.77	0.460	0.099	(0.113)	0.361
186	15.50	0.77	0.460	0.098	(0.113)	0.362
187	15.58	0.63	0.380	(0.098)	0.093	0.287
188	15.67	0.63	0.380	(0.097)	0.093	0.287
189	15.75	0.63	0.380	(0.097)	0.093	0.287
190	15.83	0.63	0.380	(0.096)	0.093	0.287
191	15.92	0.63	0.380	(0.096)	0.093	0.287
192	16.00	0.63	0.380	(0.095)	0.093	0.287
193	16.08	0.13	0.080	(0.095)	0.020	0.060
194	16.17	0.13	0.080	(0.094)	0.020	0.060
195	16.25	0.13	0.080	(0.094)	0.020	0.060
196	16.33	0.13	0.080	(0.094)	0.020	0.060
197	16.42	0.13	0.080	(0.093)	0.020	0.060
198	16.50	0.13	0.080	(0.093)	0.020	0.060
199	16.58	0.10	0.060	(0.092)	0.015	0.045
200	16.67	0.10	0.060	(0.092)	0.015	0.045
201	16.75	0.10	0.060	(0.091)	0.015	0.045
202	16.83	0.10	0.060	(0.091)	0.015	0.045
203	16.92	0.10	0.060	(0.090)	0.015	0.045
204	17.00	0.10	0.060	(0.090)	0.015	0.045
205	17.08	0.17	0.100	(0.089)	0.024	0.076
206	17.17	0.17	0.100	(0.089)	0.024	0.076
207	17.25	0.17	0.100	(0.088)	0.024	0.076
208	17.33	0.17	0.100	(0.088)	0.024	0.076
209	17.42	0.17	0.100	(0.088)	0.024	0.076
210	17.50	0.17	0.100	(0.087)	0.024	0.076
211	17.58	0.17	0.100	(0.087)	0.024	0.076
212	17.67	0.17	0.100	(0.086)	0.024	0.076
213	17.75	0.17	0.100	(0.086)	0.024	0.076
214	17.83	0.13	0.080	(0.085)	0.020	0.060
215	17.92	0.13	0.080	(0.085)	0.020	0.060
216	18.00	0.13	0.080	(0.085)	0.020	0.060
217	18.08	0.13	0.080	(0.084)	0.020	0.060
218	18.17	0.13	0.080	(0.084)	0.020	0.060
219	18.25	0.13	0.080	(0.083)	0.020	0.060
220	18.33	0.13	0.080	(0.083)	0.020	0.060
221	18.42	0.13	0.080	(0.083)	0.020	0.060
222	18.50	0.13	0.080	(0.082)	0.020	0.060
223	18.58	0.10	0.060	(0.082)	0.015	0.045
224	18.67	0.10	0.060	(0.081)	0.015	0.045
225	18.75	0.10	0.060	(0.081)	0.015	0.045
226	18.83	0.07	0.040	(0.081)	0.010	0.030
227	18.92	0.07	0.040	(0.080)	0.010	0.030
228	19.00	0.07	0.040	(0.080)	0.010	0.030
229	19.08	0.10	0.060	(0.079)	0.015	0.045
230	19.17	0.10	0.060	(0.079)	0.015	0.045
231	19.25	0.10	0.060	(0.079)	0.015	0.045
232	19.33	0.13	0.080	(0.078)	0.020	0.060
233	19.42	0.13	0.080	(0.078)	0.020	0.060
234	19.50	0.13	0.080	(0.078)	0.020	0.060

235	19.58	0.10	0.060	(0.077)	0.015	0.045
236	19.67	0.10	0.060	(0.077)	0.015	0.045
237	19.75	0.10	0.060	(0.077)	0.015	0.045
238	19.83	0.07	0.040	(0.076)	0.010	0.030
239	19.92	0.07	0.040	(0.076)	0.010	0.030
240	20.00	0.07	0.040	(0.075)	0.010	0.030
241	20.08	0.10	0.060	(0.075)	0.015	0.045
242	20.17	0.10	0.060	(0.075)	0.015	0.045
243	20.25	0.10	0.060	(0.074)	0.015	0.045
244	20.33	0.10	0.060	(0.074)	0.015	0.045
245	20.42	0.10	0.060	(0.074)	0.015	0.045
246	20.50	0.10	0.060	(0.074)	0.015	0.045
247	20.58	0.10	0.060	(0.073)	0.015	0.045
248	20.67	0.10	0.060	(0.073)	0.015	0.045
249	20.75	0.10	0.060	(0.073)	0.015	0.045
250	20.83	0.07	0.040	(0.072)	0.010	0.030
251	20.92	0.07	0.040	(0.072)	0.010	0.030
252	21.00	0.07	0.040	(0.072)	0.010	0.030
253	21.08	0.10	0.060	(0.071)	0.015	0.045
254	21.17	0.10	0.060	(0.071)	0.015	0.045
255	21.25	0.10	0.060	(0.071)	0.015	0.045
256	21.33	0.07	0.040	(0.071)	0.010	0.030
257	21.42	0.07	0.040	(0.070)	0.010	0.030
258	21.50	0.07	0.040	(0.070)	0.010	0.030
259	21.58	0.10	0.060	(0.070)	0.015	0.045
260	21.67	0.10	0.060	(0.070)	0.015	0.045
261	21.75	0.10	0.060	(0.069)	0.015	0.045
262	21.83	0.07	0.040	(0.069)	0.010	0.030
263	21.92	0.07	0.040	(0.069)	0.010	0.030
264	22.00	0.07	0.040	(0.069)	0.010	0.030
265	22.08	0.10	0.060	(0.068)	0.015	0.045
266	22.17	0.10	0.060	(0.068)	0.015	0.045
267	22.25	0.10	0.060	(0.068)	0.015	0.045
268	22.33	0.07	0.040	(0.068)	0.010	0.030
269	22.42	0.07	0.040	(0.068)	0.010	0.030
270	22.50	0.07	0.040	(0.067)	0.010	0.030
271	22.58	0.07	0.040	(0.067)	0.010	0.030
272	22.67	0.07	0.040	(0.067)	0.010	0.030
273	22.75	0.07	0.040	(0.067)	0.010	0.030
274	22.83	0.07	0.040	(0.067)	0.010	0.030
275	22.92	0.07	0.040	(0.066)	0.010	0.030
276	23.00	0.07	0.040	(0.066)	0.010	0.030
277	23.08	0.07	0.040	(0.066)	0.010	0.030
278	23.17	0.07	0.040	(0.066)	0.010	0.030
279	23.25	0.07	0.040	(0.066)	0.010	0.030
280	23.33	0.07	0.040	(0.066)	0.010	0.030
281	23.42	0.07	0.040	(0.066)	0.010	0.030
282	23.50	0.07	0.040	(0.065)	0.010	0.030
283	23.58	0.07	0.040	(0.065)	0.010	0.030
284	23.67	0.07	0.040	(0.065)	0.010	0.030
285	23.75	0.07	0.040	(0.065)	0.010	0.030
286	23.83	0.07	0.040	(0.065)	0.010	0.030
287	23.92	0.07	0.040	(0.065)	0.010	0.030
288	24.00	0.07	0.040	(0.065)	0.010	0.030

(Loss Rate Not Used)

Sum = 100.0 Sum = 46.2

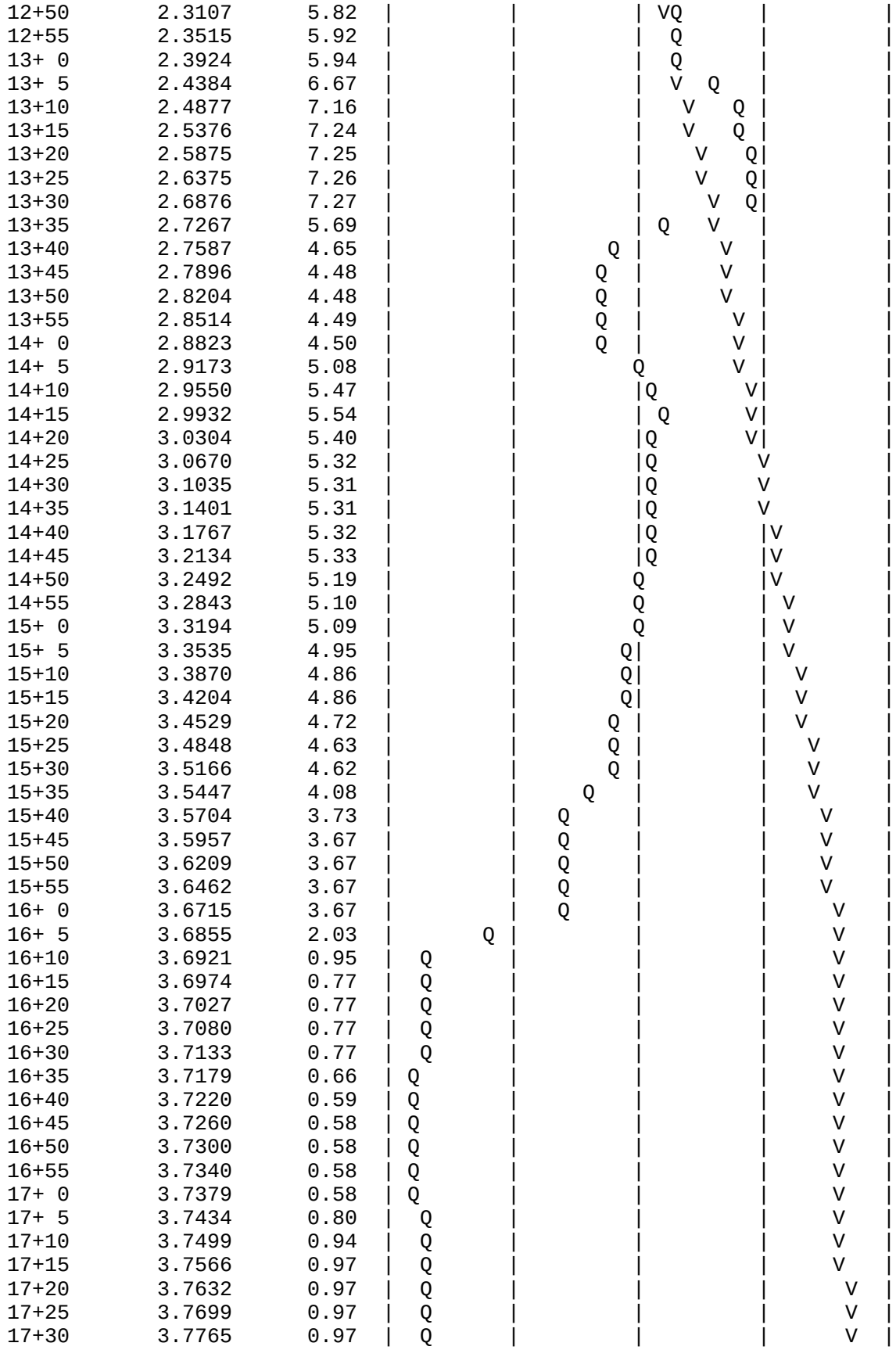
Flood volume = Effective rainfall 3.85(In)

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 times area      12.7(Ac.)/[(In)/(Ft.)] =       4.1(Ac.Ft)
Total soil loss =      1.15(In)
Total soil loss =     1.216(Ac.Ft)
Total rainfall =      5.00(In)
Flood volume =      177163.0 Cubic Feet
Total soil loss =       52973.3 Cubic Feet
---------------------------------------------------------------------
 Peak flow rate of this hydrograph =      7.267(CFS)
---------------------------------------------------------------------
+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                    24 - H O U R    S T O R M
                 R u n o f f      H y d r o g r a p h
---------------------------------------------------------------------
             Hydrograph in   5   Minute intervals ((CFS))

---------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
---------------------------------------------------------------------
  0+ 5       0.0015      0.22  Q         |         |         |         |
  0+10       0.0040      0.36  VQ        |         |         |         |
  0+15       0.0067      0.39  VQ        |         |         |         |
  0+20       0.0101      0.50  VQ        |         |         |         |
  0+25       0.0140      0.57  V Q       |         |         |         |
  0+30       0.0180      0.58  V Q       |         |         |         |
  0+35       0.0220      0.58  V Q       |         |         |         |
  0+40       0.0259      0.58  V Q       |         |         |         |
  0+45       0.0299      0.58  V Q       |         |         |         |
  0+50       0.0347      0.69  V Q       |         |         |         |
  0+55       0.0399      0.76  V  Q      |         |         |         |
  1+ 0       0.0452      0.77  V  Q      |         |         |         |
  1+ 5       0.0498      0.66  V Q       |         |         |         |
  1+10       0.0539      0.59  V Q       |         |         |         |
  1+15       0.0579      0.58  V Q       |         |         |         |
  1+20       0.0619      0.58  V Q       |         |         |         |
  1+25       0.0658      0.58  V Q       |         |         |         |
  1+30       0.0698      0.58  V Q       |         |         |         |
  1+35       0.0738      0.58  V Q       |         |         |         |
  1+40       0.0778      0.58  V Q       |         |         |         |
  1+45       0.0818      0.58  V Q       |         |         |         |
  1+50       0.0865      0.69  V Q       |         |         |         |
  1+55       0.0918      0.76  V  Q      |         |         |         |
  2+ 0       0.0971      0.77  V  Q      |         |         |         |
  2+ 5       0.1024      0.77  |V Q      |         |         |         |
  2+10       0.1077      0.77  |V Q      |         |         |         |
  2+15       0.1131      0.77  |V Q      |         |         |         |
  2+20       0.1184      0.77  |V Q      |         |         |         |
  2+25       0.1237      0.77  |V Q      |         |         |         |
  2+30       0.1290      0.77  |V Q      |         |         |         |
  2+35       0.1351      0.88  |V Q      |         |         |         |
  2+40       0.1417      0.95  |V Q      |         |         |         |
  2+45       0.1483      0.97  |V Q      |         |         |         |
  2+50       0.1550      0.97  |V Q      |         |         |         |
  2+55       0.1616      0.97  |V Q      |         |         |         |
  3+ 0       0.1683      0.97  |V Q      |         |         |         |
  3+ 5       0.1749      0.97  |V Q      |         |         |         |
  3+10       0.1816      0.97  |V Q      |         |         |         |
  3+15       0.1882      0.97  |V Q      |         |         |         |
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3+20	0.1949	0.97	|V Q	|	|	|	|
3+25	0.2015	0.97	|V Q	|	|	|	|
3+30	0.2082	0.97	| VQ	|	|	|	|
3+35	0.2148	0.97	| VQ	|	|	|	|
3+40	0.2214	0.97	| VQ	|	|	|	|
3+45	0.2281	0.97	| VQ	|	|	|	|
3+50	0.2355	1.07	| V Q	|	|	|	|
3+55	0.2434	1.15	| V Q	|	|	|	|
4+ 0	0.2514	1.16	| V Q	|	|	|	|
4+ 5	0.2594	1.16	| V Q	|	|	|	|
4+10	0.2673	1.16	| V Q	|	|	|	|
4+15	0.2753	1.16	| V Q	|	|	|	|
4+20	0.2840	1.27	| V Q	|	|	|	|
4+25	0.2933	1.34	| V Q	|	|	|	|
4+30	0.3026	1.35	| V Q	|	|	|	|
4+35	0.3119	1.35	| V Q	|	|	|	|
4+40	0.3212	1.35	| V Q	|	|	|	|
4+45	0.3305	1.35	| V Q	|	|	|	|
4+50	0.3406	1.46	| V Q	|	|	|	|
4+55	0.3511	1.53	| V Q	|	|	|	|
5+ 0	0.3618	1.54	| V Q	|	|	|	|
5+ 5	0.3709	1.33	| V Q	|	|	|	|
5+10	0.3791	1.18	| VQ	|	|	|	|
5+15	0.3870	1.16	| VQ	|	|	|	|
5+20	0.3958	1.27	| V Q	|	|	|	|
5+25	0.4050	1.34	| V Q	|	|	|	|
5+30	0.4143	1.35	| VQ	|	|	|	|
5+35	0.4244	1.46	| VQ	|	|	|	|
5+40	0.4349	1.53	| V Q	|	|	|	|
5+45	0.4456	1.54	| V Q	|	|	|	|
5+50	0.4562	1.54	| V Q	|	|	|	|
5+55	0.4668	1.54	| V Q	|	|	|	|
6+ 0	0.4775	1.54	| V Q	|	|	|	|
6+ 5	0.4889	1.65	| V Q	|	|	|	|
6+10	0.5008	1.73	| V Q	|	|	|	|
6+15	0.5127	1.74	| VQ	|	|	|	|
6+20	0.5247	1.74	| VQ	|	|	|	|
6+25	0.5367	1.74	| VQ	|	|	|	|
6+30	0.5486	1.74	| VQ	|	|	|	|
6+35	0.5613	1.85	| V Q	|	|	|	|
6+40	0.5746	1.92	| V Q	|	|	|	|
6+45	0.5879	1.93	| V Q	|	|	|	|
6+50	0.6012	1.93	| V Q	|	|	|	|
6+55	0.6145	1.93	| VQ	|	|	|	|
7+ 0	0.6278	1.93	| VQ	|	|	|	|
7+ 5	0.6411	1.93	| VQ	|	|	|	|
7+10	0.6544	1.93	| VQ	|	|	|	|
7+15	0.6677	1.93	| VQ	|	|	|	|
7+20	0.6817	2.04	| V Q	|	|	|	|
7+25	0.6963	2.11	| V Q	|	|	|	|
7+30	0.7109	2.12	| V Q	|	|	|	|
7+35	0.7263	2.23	| VQ	|	|	|	|
7+40	0.7421	2.31	| V Q|	|	|	|	|
7+45	0.7581	2.32	| V Q|	|	|	|	|
7+50	0.7748	2.43	| V Q|	|	|	|	|
7+55	0.7920	2.50	| V Q|	|	|	|	|
8+ 0	0.8093	2.51	| V Q	|	|	|	|

8+ 5	0.8281	2.73	V Q				
8+10	0.8479	2.87	V |Q				
8+15	0.8678	2.90	V |Q				
8+20	0.8878	2.90	V |Q				
8+25	0.9077	2.90	V |Q				
8+30	0.9277	2.90	V|Q				
8+35	0.9484	3.01	V| Q				
8+40	0.9696	3.08	V| Q				
8+45	0.9909	3.09	V| Q				
8+50	1.0129	3.20	V| Q				
8+55	1.0354	3.27	V Q				
9+ 0	1.0580	3.28	V Q				
9+ 5	1.0821	3.50	V Q				
9+10	1.1072	3.64	V Q				
9+15	1.1325	3.67	|V Q				
9+20	1.1585	3.78	|V Q				
9+25	1.1850	3.85	|V Q				
9+30	1.2116	3.86	|V Q				
9+35	1.2390	3.97	| V Q				
9+40	1.2668	4.04	| V Q				
9+45	1.2948	4.06	| V Q				
9+50	1.3234	4.16	| V Q				
9+55	1.3526	4.24	| V Q				
10+ 0	1.3819	4.25	| V Q				
10+ 5	1.4059	3.49	| Q				
10+10	1.4264	2.98	|Q V				
10+15	1.4464	2.90	|Q V				
10+20	1.4663	2.90	|Q V				
10+25	1.4863	2.90	|Q V				
10+30	1.5062	2.90	|Q V				
10+35	1.5299	3.44	| Q V				
10+40	1.5561	3.80	| Q				
10+45	1.5827	3.86	| Q				
10+50	1.6093	3.86	| Q				
10+55	1.6359	3.86	| QV				
11+ 0	1.6625	3.86	| QV				
11+ 5	1.6883	3.75	| QV				
11+10	1.7137	3.68	| Q V				
11+15	1.7390	3.67	| Q V				
11+20	1.7642	3.67	| Q V				
11+25	1.7895	3.67	| Q V				
11+30	1.8148	3.67	| Q V				
11+35	1.8385	3.45	| Q V				
11+40	1.8613	3.31	| Q V				
11+45	1.8839	3.28	| Q V				
11+50	1.9073	3.39	| Q V				
11+55	1.9311	3.46	| Q V				
12+ 0	1.9551	3.48	| Q V|				
12+ 5	1.9843	4.25	| Q V|				
12+10	2.0171	4.76	| Q|				
12+15	2.0505	4.85	| QV				
12+20	2.0850	5.00	| Q				
12+25	2.1202	5.11	| Q				
12+30	2.1555	5.13	| QV				
12+35	2.1929	5.43	| |Q				
12+40	2.2316	5.63	| |VQ				
12+45	2.2707	5.67	| | Q				



17+35	3.7832	0.97	| Q	|	|	|	V |
17+40	3.7898	0.97	| Q	|	|	|	V |
17+45	3.7965	0.97	| Q	|	|	|	V |
17+50	3.8024	0.86	| Q	|	|	|	V |
17+55	3.8078	0.78	| Q	|	|	|	V |
18+ 0	3.8131	0.77	| Q	|	|	|	V |
18+ 5	3.8184	0.77	| Q	|	|	|	V |
18+10	3.8237	0.77	| Q	|	|	|	V |
18+15	3.8291	0.77	| Q	|	|	|	V |
18+20	3.8344	0.77	| Q	|	|	|	V |
18+25	3.8397	0.77	| Q	|	|	|	V |
18+30	3.8450	0.77	| Q	|	|	|	V |
18+35	3.8496	0.66	| Q	|	|	|	V |
18+40	3.8537	0.59	| Q	|	|	|	V |
18+45	3.8576	0.58	| Q	|	|	|	V |
18+50	3.8609	0.47	|Q	|	|	|	V |
18+55	3.8636	0.40	|Q	|	|	|	V |
19+ 0	3.8663	0.39	|Q	|	|	|	V |
19+ 5	3.8697	0.50	|Q	|	|	|	V |
19+10	3.8736	0.57	| Q	|	|	|	V |
19+15	3.8776	0.58	| Q	|	|	|	V |
19+20	3.8823	0.69	| Q	|	|	|	V |
19+25	3.8876	0.76	| Q	|	|	|	V |
19+30	3.8929	0.77	| Q	|	|	|	V |
19+35	3.8975	0.66	| Q	|	|	|	V |
19+40	3.9015	0.59	| Q	|	|	|	V |
19+45	3.9055	0.58	| Q	|	|	|	V |
19+50	3.9088	0.47	|Q	|	|	|	V |
19+55	3.9115	0.40	|Q	|	|	|	V |
20+ 0	3.9142	0.39	|Q	|	|	|	V |
20+ 5	3.9176	0.50	|Q	|	|	|	V |
20+10	3.9215	0.57	| Q	|	|	|	V |
20+15	3.9255	0.58	| Q	|	|	|	V |
20+20	3.9295	0.58	| Q	|	|	|	V |
20+25	3.9334	0.58	| Q	|	|	|	V |
20+30	3.9374	0.58	| Q	|	|	|	V |
20+35	3.9414	0.58	| Q	|	|	|	V |
20+40	3.9454	0.58	| Q	|	|	|	V |
20+45	3.9494	0.58	| Q	|	|	|	V |
20+50	3.9526	0.47	|Q	|	|	|	V |
20+55	3.9554	0.40	|Q	|	|	|	V |
21+ 0	3.9581	0.39	|Q	|	|	|	V |
21+ 5	3.9615	0.50	|Q	|	|	|	V |
21+10	3.9654	0.57	| Q	|	|	|	V |
21+15	3.9694	0.58	| Q	|	|	|	V|
21+20	3.9726	0.47	|Q	|	|	|	V|
21+25	3.9753	0.40	|Q	|	|	|	V|
21+30	3.9780	0.39	|Q	|	|	|	V|
21+35	3.9814	0.50	|Q	|	|	|	V|
21+40	3.9853	0.57	| Q	|	|	|	V|
21+45	3.9893	0.58	| Q	|	|	|	V|
21+50	3.9925	0.47	|Q	|	|	|	V|
21+55	3.9953	0.40	|Q	|	|	|	V|
22+ 0	3.9980	0.39	|Q	|	|	|	V|
22+ 5	4.0014	0.50	|Q	|	|	|	V|
22+10	4.0053	0.57	| Q	|	|	|	V|
22+15	4.0093	0.58	| Q	|	|	|	V|

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   22+20       4.0125      0.47  |Q        |         |         |        V|
   22+25       4.0152      0.40  |Q        |         |         |        V|
   22+30       4.0179      0.39  |Q        |         |         |        V|
   22+35       4.0206      0.39  |Q        |         |         |        V|
   22+40       4.0232      0.39  |Q        |         |         |        V|
   22+45       4.0259      0.39  |Q        |         |         |        V|
   22+50       4.0285      0.39  |Q        |         |         |        V|
   22+55       4.0312      0.39  |Q        |         |         |        V|
   23+ 0       4.0339      0.39  |Q        |         |         |        V|
   23+ 5       4.0365      0.39  |Q        |         |         |        V|
   23+10       4.0392      0.39  |Q        |         |         |        V|
   23+15       4.0418      0.39  |Q        |         |         |        V|
   23+20       4.0445      0.39  |Q        |         |         |        V|
   23+25       4.0472      0.39  |Q        |         |         |        V|
   23+30       4.0498      0.39  |Q        |         |         |        V|
   23+35       4.0525      0.39  |Q        |         |         |        V|
   23+40       4.0551      0.39  |Q        |         |         |        V|
   23+45       4.0578      0.39  |Q        |         |         |        V|
   23+50       4.0605      0.39  |Q        |         |         |        V|
   23+55       4.0631      0.39  |Q        |         |         |        V|
   24+ 0       4.0658      0.39  |Q        |         |         |        V|
   24+ 5       4.0669      0.17  Q         |         |         |        V|
   24+10       4.0671      0.02  Q         |         |         |         V
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U n i t H y d r o g r a p h A n a l y s i s

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

Program License Serial Number 6405

20-001 HARVEST LANDING RETAIL CENTER AND BUSINESS PARK
MDP LANDUSE CONDITION - WATERSHED A
100 YEAR, 6 HOUR STORM EVENT ANALYSIS

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

English Units used in output format

Drainage Area = 13.22(Ac.) = 0.021 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 13.22(Ac.) = 0.021 Sq. Mi.
Length along longest watercourse = 1359.00(Ft.)
Length along longest watercourse measured to centroid = 693.00(Ft.)
Length along longest watercourse = 0.257 Mi.
Length along longest watercourse measured to centroid = 0.131 Mi.
Difference in elevation = 18.70(Ft.)
Slope along watercourse = 72.6534 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.088 Hr.
Lag time = 5.28 Min.
25% of lag time = 1.32 Min.
40% of lag time = 2.11 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
13.22	1.20	15.86

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
13.22	2.50	33.05

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.200(In)
Area Averaged 100-Year Rainfall = 2.500(In)

Point rain (area averaged) = 2.500(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.500(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
13.220	61.30	0.500

Total Area Entered = 13.22(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
61.3	61.3	0.456	0.500	0.251	1.000	0.251
					Sum (F) =	0.251

Area averaged mean soil loss (F) (In/Hr) = 0.251
Minimum soil loss rate ((In/Hr)) = 0.125
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.500

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

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	94.673	17.575	2.342
2	0.167	189.345	47.848	6.375
3	0.250	284.018	16.514	2.200
4	0.333	378.691	7.359	0.980
5	0.417	473.363	4.203	0.560
6	0.500	568.036	2.720	0.362
7	0.583	662.709	1.772	0.236
8	0.667	757.381	1.110	0.148
9	0.750	852.054	0.900	0.120
			Sum = 100.000	Sum= 13.323

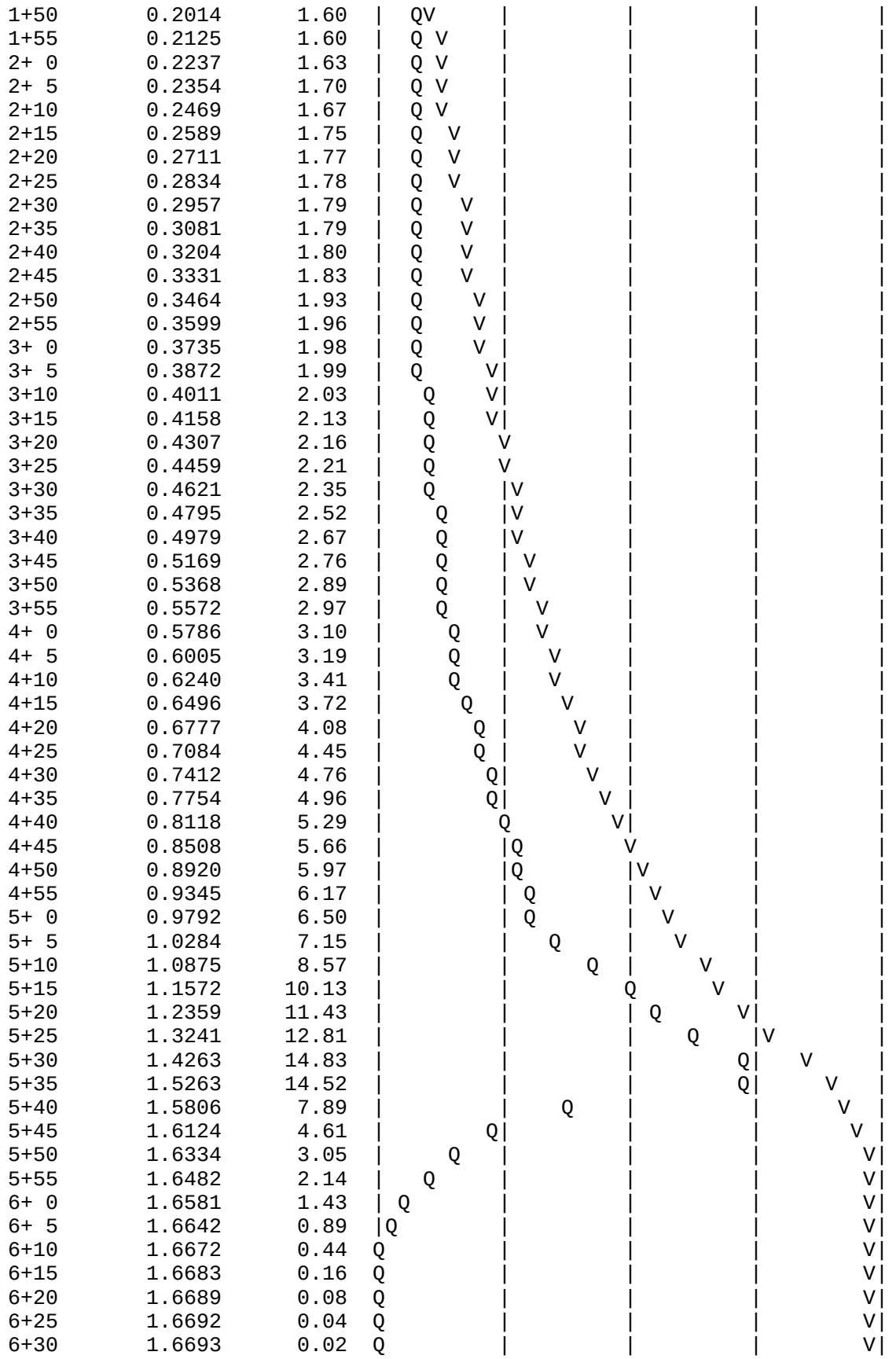
The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)

1	0.08	0.50	0.150	(0.251)	0.075	0.075
2	0.17	0.60	0.180	(0.251)	0.090	0.090
3	0.25	0.60	0.180	(0.251)	0.090	0.090
4	0.33	0.60	0.180	(0.251)	0.090	0.090
5	0.42	0.60	0.180	(0.251)	0.090	0.090
6	0.50	0.70	0.210	(0.251)	0.105	0.105
7	0.58	0.70	0.210	(0.251)	0.105	0.105
8	0.67	0.70	0.210	(0.251)	0.105	0.105
9	0.75	0.70	0.210	(0.251)	0.105	0.105
10	0.83	0.70	0.210	(0.251)	0.105	0.105
11	0.92	0.70	0.210	(0.251)	0.105	0.105
12	1.00	0.80	0.240	(0.251)	0.120	0.120
13	1.08	0.80	0.240	(0.251)	0.120	0.120
14	1.17	0.80	0.240	(0.251)	0.120	0.120
15	1.25	0.80	0.240	(0.251)	0.120	0.120
16	1.33	0.80	0.240	(0.251)	0.120	0.120
17	1.42	0.80	0.240	(0.251)	0.120	0.120
18	1.50	0.80	0.240	(0.251)	0.120	0.120
19	1.58	0.80	0.240	(0.251)	0.120	0.120
20	1.67	0.80	0.240	(0.251)	0.120	0.120
21	1.75	0.80	0.240	(0.251)	0.120	0.120
22	1.83	0.80	0.240	(0.251)	0.120	0.120
23	1.92	0.80	0.240	(0.251)	0.120	0.120
24	2.00	0.90	0.270	(0.251)	0.135	0.135
25	2.08	0.80	0.240	(0.251)	0.120	0.120
26	2.17	0.90	0.270	(0.251)	0.135	0.135
27	2.25	0.90	0.270	(0.251)	0.135	0.135
28	2.33	0.90	0.270	(0.251)	0.135	0.135
29	2.42	0.90	0.270	(0.251)	0.135	0.135
30	2.50	0.90	0.270	(0.251)	0.135	0.135
31	2.58	0.90	0.270	(0.251)	0.135	0.135
32	2.67	0.90	0.270	(0.251)	0.135	0.135
33	2.75	1.00	0.300	(0.251)	0.150	0.150
34	2.83	1.00	0.300	(0.251)	0.150	0.150
35	2.92	1.00	0.300	(0.251)	0.150	0.150
36	3.00	1.00	0.300	(0.251)	0.150	0.150
37	3.08	1.00	0.300	(0.251)	0.150	0.150
38	3.17	1.10	0.330	(0.251)	0.165	0.165
39	3.25	1.10	0.330	(0.251)	0.165	0.165
40	3.33	1.10	0.330	(0.251)	0.165	0.165
41	3.42	1.20	0.360	(0.251)	0.180	0.180
42	3.50	1.30	0.390	(0.251)	0.195	0.195
43	3.58	1.40	0.420	(0.251)	0.210	0.210
44	3.67	1.40	0.420	(0.251)	0.210	0.210
45	3.75	1.50	0.450	(0.251)	0.225	0.225
46	3.83	1.50	0.450	(0.251)	0.225	0.225
47	3.92	1.60	0.480	(0.251)	0.240	0.240
48	4.00	1.60	0.480	(0.251)	0.240	0.240
49	4.08	1.70	0.510	0.251	(0.255)	0.259
50	4.17	1.80	0.540	0.251	(0.270)	0.289
51	4.25	1.90	0.570	0.251	(0.285)	0.319
52	4.33	2.00	0.600	0.251	(0.300)	0.349
53	4.42	2.10	0.630	0.251	(0.315)	0.379
54	4.50	2.10	0.630	0.251	(0.315)	0.379
55	4.58	2.20	0.660	0.251	(0.330)	0.409
56	4.67	2.30	0.690	0.251	(0.345)	0.439
57	4.75	2.40	0.720	0.251	(0.360)	0.469

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58   4.83     2.40      0.720          0.251    (  0.360)        0.469
59   4.92     2.50      0.750          0.251    (  0.375)        0.499
60   5.00     2.60      0.780          0.251    (  0.390)        0.529
61   5.08     3.10      0.930          0.251    (  0.465)        0.679
62   5.17     3.60      1.080          0.251    (  0.540)        0.829
63   5.25     3.90      1.170          0.251    (  0.585)        0.919
64   5.33     4.20      1.260          0.251    (  0.630)        1.009
65   5.42     4.70      1.410          0.251    (  0.705)        1.159
66   5.50     5.60      1.680          0.251    (  0.840)        1.429
67   5.58     1.90      0.570          0.251    (  0.285)        0.319
68   5.67     0.90      0.270       (  0.251)       0.135        0.135
69   5.75     0.60      0.180       (  0.251)       0.090        0.090
70   5.83     0.50      0.150       (  0.251)       0.075        0.075
71   5.92     0.30      0.090       (  0.251)       0.045        0.045
72   6.00     0.20      0.060       (  0.251)       0.030        0.030
          (Loss Rate Not Used)
   Sum =     100.0                                    Sum =    18.2
    Flood volume = Effective rainfall      1.52(In)
     times area      13.2(Ac.)/[(In)/(Ft.)] =       1.7(Ac.Ft)
    Total soil loss =      0.98(In)
    Total soil loss =     1.085(Ac.Ft)
    Total rainfall =      2.50(In)
    Flood volume =       72719.4 Cubic Feet
    Total soil loss =       47246.6 Cubic Feet
    ---------------------------------------------------------------------
     Peak flow rate of this hydrograph =     14.831(CFS)
    ---------------------------------------------------------------------
    +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        6 - H O U R    S T O R M
                   R u n o f f      H y d r o g r a p h
    ---------------------------------------------------------------------
                Hydrograph in   5   Minute intervals ((CFS))

    ---------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        5.0      10.0      15.0      20.0
-----------------------------------------------------------------------
  0+ 5       0.0012      0.18  Q         |         |         |         |
  0+10       0.0060      0.69  VQ        |         |         |         |
  0+15       0.0125      0.95  VQ        |         |         |         |
  0+20       0.0198      1.06  V Q       |         |         |         |
  0+25       0.0274      1.11  V Q       |         |         |         |
  0+30       0.0356      1.18  V Q       |         |         |         |
  0+35       0.0446      1.30  |VQ       |         |         |         |
  0+40       0.0539      1.35  |VQ       |         |         |         |
  0+45       0.0633      1.38  |VQ       |         |         |         |
  0+50       0.0729      1.39  |VQ       |         |         |         |
  0+55       0.0825      1.39  |VQ       |         |         |         |
  1+ 0       0.0923      1.43  | Q       |         |         |         |
  1+ 5       0.1029      1.53  | VQ      |         |         |         |
  1+10       0.1136      1.56  | VQ      |         |         |         |
  1+15       0.1245      1.58  | VQ      |         |         |         |
  1+20       0.1354      1.59  |  Q      |         |         |         |
  1+25       0.1464      1.59  |  Q      |         |         |         |
  1+30       0.1574      1.60  |  Q      |         |         |         |
  1+35       0.1684      1.60  |  QV     |         |         |         |
  1+40       0.1794      1.60  |  QV     |         |         |         |
  1+45       0.1904      1.60  |  QV     |         |         |         |
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    6+35       1.6694      0.01  Q         |         |         |        V|
    6+40       1.6694      0.00  Q         |         |         |        V|
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U n i t H y d r o g r a p h A n a l y s i s

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

Program License Serial Number 6405

20-001 HARVEST LANDING RETAIL CENTER AND BUSINESS PARK
MDP LANDUSE CONDITION - WATERSHED B
100 YEAR, 6 HOUR STORM EVENT ANALYSIS

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

English Units used in output format

Drainage Area = 12.58(Ac.) = 0.020 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 12.58(Ac.) = 0.020 Sq. Mi.
Length along longest watercourse = 1170.00(Ft.)
Length along longest watercourse measured to centroid = 550.00(Ft.)
Length along longest watercourse = 0.222 Mi.
Length along longest watercourse measured to centroid = 0.104 Mi.
Difference in elevation = 16.50(Ft.)
Slope along watercourse = 74.4615 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.076 Hr.
Lag time = 4.55 Min.
25% of lag time = 1.14 Min.
40% of lag time = 1.82 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.58	1.20	15.10

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.58	2.50	31.45

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.200(In)
Area Averaged 100-Year Rainfall = 2.500(In)

Point rain (area averaged) = 2.500(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.500(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
12.580	57.80	0.500

Total Area Entered = 12.58(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
57.8	57.8	0.492	0.500	0.271	1.000	0.271
					Sum (F) =	0.271

Area averaged mean soil loss (F) (In/Hr) = 0.271
Minimum soil loss rate ((In/Hr)) = 0.135
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.500

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

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	109.928	22.218	2.817
2	0.167	219.855	48.832	6.191
3	0.250	329.783	14.316	1.815
4	0.333	439.710	6.548	0.830
5	0.417	549.638	3.637	0.461
6	0.500	659.565	2.267	0.287
7	0.583	769.493	1.329	0.168
8	0.667	879.421	0.855	0.108
		Sum = 100.000	Sum=	12.678

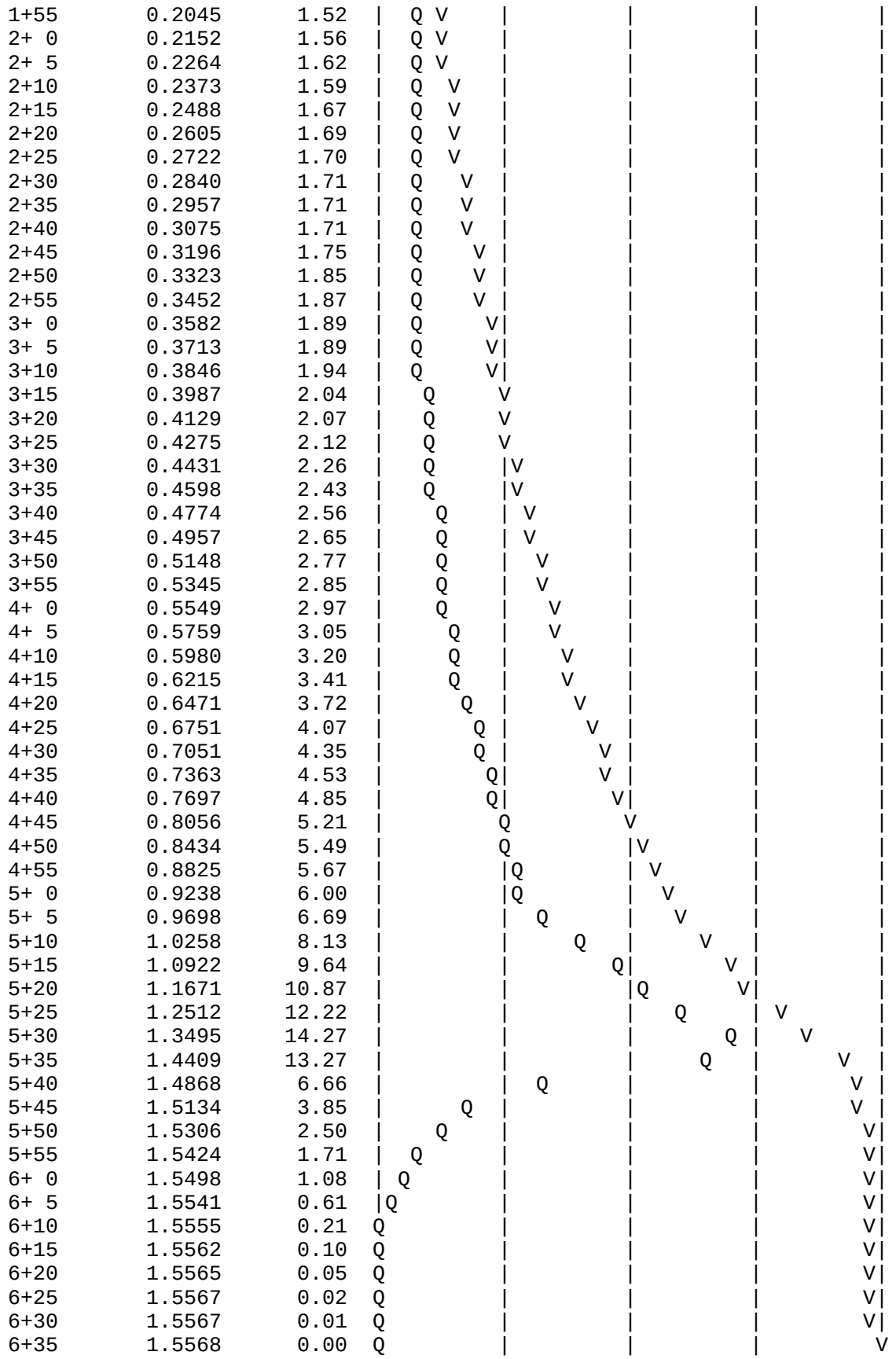
The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.150	(0.271)	0.075	0.075

2	0.17	0.60	0.180	(0.271)	0.090	0.090
3	0.25	0.60	0.180	(0.271)	0.090	0.090
4	0.33	0.60	0.180	(0.271)	0.090	0.090
5	0.42	0.60	0.180	(0.271)	0.090	0.090
6	0.50	0.70	0.210	(0.271)	0.105	0.105
7	0.58	0.70	0.210	(0.271)	0.105	0.105
8	0.67	0.70	0.210	(0.271)	0.105	0.105
9	0.75	0.70	0.210	(0.271)	0.105	0.105
10	0.83	0.70	0.210	(0.271)	0.105	0.105
11	0.92	0.70	0.210	(0.271)	0.105	0.105
12	1.00	0.80	0.240	(0.271)	0.120	0.120
13	1.08	0.80	0.240	(0.271)	0.120	0.120
14	1.17	0.80	0.240	(0.271)	0.120	0.120
15	1.25	0.80	0.240	(0.271)	0.120	0.120
16	1.33	0.80	0.240	(0.271)	0.120	0.120
17	1.42	0.80	0.240	(0.271)	0.120	0.120
18	1.50	0.80	0.240	(0.271)	0.120	0.120
19	1.58	0.80	0.240	(0.271)	0.120	0.120
20	1.67	0.80	0.240	(0.271)	0.120	0.120
21	1.75	0.80	0.240	(0.271)	0.120	0.120
22	1.83	0.80	0.240	(0.271)	0.120	0.120
23	1.92	0.80	0.240	(0.271)	0.120	0.120
24	2.00	0.90	0.270	(0.271)	0.135	0.135
25	2.08	0.80	0.240	(0.271)	0.120	0.120
26	2.17	0.90	0.270	(0.271)	0.135	0.135
27	2.25	0.90	0.270	(0.271)	0.135	0.135
28	2.33	0.90	0.270	(0.271)	0.135	0.135
29	2.42	0.90	0.270	(0.271)	0.135	0.135
30	2.50	0.90	0.270	(0.271)	0.135	0.135
31	2.58	0.90	0.270	(0.271)	0.135	0.135
32	2.67	0.90	0.270	(0.271)	0.135	0.135
33	2.75	1.00	0.300	(0.271)	0.150	0.150
34	2.83	1.00	0.300	(0.271)	0.150	0.150
35	2.92	1.00	0.300	(0.271)	0.150	0.150
36	3.00	1.00	0.300	(0.271)	0.150	0.150
37	3.08	1.00	0.300	(0.271)	0.150	0.150
38	3.17	1.10	0.330	(0.271)	0.165	0.165
39	3.25	1.10	0.330	(0.271)	0.165	0.165
40	3.33	1.10	0.330	(0.271)	0.165	0.165
41	3.42	1.20	0.360	(0.271)	0.180	0.180
42	3.50	1.30	0.390	(0.271)	0.195	0.195
43	3.58	1.40	0.420	(0.271)	0.210	0.210
44	3.67	1.40	0.420	(0.271)	0.210	0.210
45	3.75	1.50	0.450	(0.271)	0.225	0.225
46	3.83	1.50	0.450	(0.271)	0.225	0.225
47	3.92	1.60	0.480	(0.271)	0.240	0.240
48	4.00	1.60	0.480	(0.271)	0.240	0.240
49	4.08	1.70	0.510	(0.271)	0.255	0.255
50	4.17	1.80	0.540	(0.271)	0.270	0.270
51	4.25	1.90	0.570	0.271	(0.285)	0.299
52	4.33	2.00	0.600	0.271	(0.300)	0.329
53	4.42	2.10	0.630	0.271	(0.315)	0.359
54	4.50	2.10	0.630	0.271	(0.315)	0.359
55	4.58	2.20	0.660	0.271	(0.330)	0.389
56	4.67	2.30	0.690	0.271	(0.345)	0.419
57	4.75	2.40	0.720	0.271	(0.360)	0.449
58	4.83	2.40	0.720	0.271	(0.360)	0.449

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59   4.92     2.50      0.750          0.271    (  0.375)        0.479
60   5.00     2.60      0.780          0.271    (  0.390)        0.509
61   5.08     3.10      0.930          0.271    (  0.465)        0.659
62   5.17     3.60      1.080          0.271    (  0.540)        0.809
63   5.25     3.90      1.170          0.271    (  0.585)        0.899
64   5.33     4.20      1.260          0.271    (  0.630)        0.989
65   5.42     4.70      1.410          0.271    (  0.705)        1.139
66   5.50     5.60      1.680          0.271    (  0.840)        1.409
67   5.58     1.90      0.570          0.271    (  0.285)        0.299
68   5.67     0.90      0.270       (  0.271)       0.135        0.135
69   5.75     0.60      0.180       (  0.271)       0.090        0.090
70   5.83     0.50      0.150       (  0.271)       0.075        0.075
71   5.92     0.30      0.090       (  0.271)       0.045        0.045
72   6.00     0.20      0.060       (  0.271)       0.030        0.030
          (Loss Rate Not Used)
   Sum =     100.0                                    Sum =    17.8
    Flood volume = Effective rainfall      1.48(In)
     times area      12.6(Ac.)/[(In)/(Ft.)] =       1.6(Ac.Ft)
    Total soil loss =      1.01(In)
    Total soil loss =     1.064(Ac.Ft)
    Total rainfall =      2.50(In)
    Flood volume =       67812.0 Cubic Feet
    Total soil loss =       46346.5 Cubic Feet
    ---------------------------------------------------------------------
     Peak flow rate of this hydrograph =     14.270(CFS)
    ---------------------------------------------------------------------
    +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        6 - H O U R    S T O R M
                   R u n o f f      H y d r o g r a p h
    ---------------------------------------------------------------------
                Hydrograph in   5   Minute intervals ((CFS))

    ---------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        5.0      10.0      15.0      20.0
----------------------------------------------------------------------
  0+ 5       0.0015      0.21  Q         |         |         |         |
  0+10       0.0064      0.72  VQ        |         |         |         |
  0+15       0.0129      0.95  VQ        |         |         |         |
  0+20       0.0201      1.04  V Q       |         |         |         |
  0+25       0.0275      1.08  V Q       |         |         |         |
  0+30       0.0355      1.15  V Q       |         |         |         |
  0+35       0.0442      1.26  |VQ       |         |         |         |
  0+40       0.0532      1.30  |VQ       |         |         |         |
  0+45       0.0622      1.32  |VQ       |         |         |         |
  0+50       0.0713      1.32  |VQ       |         |         |         |
  0+55       0.0805      1.33  | Q       |         |         |         |
  1+ 0       0.0899      1.37  | Q       |         |         |         |
  1+ 5       0.1000      1.47  | Q       |         |         |         |
  1+10       0.1103      1.49  | Q       |         |         |         |
  1+15       0.1207      1.51  |  Q      |         |         |         |
  1+20       0.1311      1.51  |  Q      |         |         |         |
  1+25       0.1416      1.52  |  Q      |         |         |         |
  1+30       0.1521      1.52  |  Q      |         |         |         |
  1+35       0.1625      1.52  |  QV     |         |         |         |
  1+40       0.1730      1.52  |  QV     |         |         |         |
  1+45       0.1835      1.52  |  QV     |         |         |         |
  1+50       0.1940      1.52  |  QV     |         |         |         |
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U n i t H y d r o g r a p h A n a l y s i s

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Study date 10/02/24 File: pq6100uh6100.out

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

Program License Serial Number 6405

20-001 HARVEST LANDING RETAIL CENTER AND BUSINESS PARK
PROPOSED CONDITION - WATERSHED A
100 YEAR, 6 HOUR STORM EVENT ANALYSIS

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

English Units used in output format

Drainage Area = 13.13(Ac.) = 0.021 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 13.13(Ac.) = 0.021 Sq. Mi.
Length along longest watercourse = 1103.00(Ft.)
Length along longest watercourse measured to centroid = 759.00(Ft.)
Length along longest watercourse = 0.209 Mi.
Length along longest watercourse measured to centroid = 0.144 Mi.
Difference in elevation = 26.26(Ft.)
Slope along watercourse = 125.7052 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.038 Hr.
Lag time = 2.28 Min.
25% of lag time = 0.57 Min.
40% of lag time = 0.91 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
13.13	1.20	15.76

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
13.13	2.50	32.83

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.200(In)
Area Averaged 100-Year Rainfall = 2.500(In)

Point rain (area averaged) = 2.500(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.500(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
13.130	60.80	0.722

Total Area Entered = 13.13(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
60.8	60.8	0.461	0.722	0.162	1.000	0.162
					Sum (F) =	0.162

Area averaged mean soil loss (F) (In/Hr) = 0.162
Minimum soil loss rate ((In/Hr)) = 0.081
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.322

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

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	219.748	46.617	6.169
2	0.167	439.496	42.013	5.559
3	0.250	659.243	8.048	1.065
4	0.333	878.991	3.322	0.440
		Sum =	100.000 Sum=	13.233

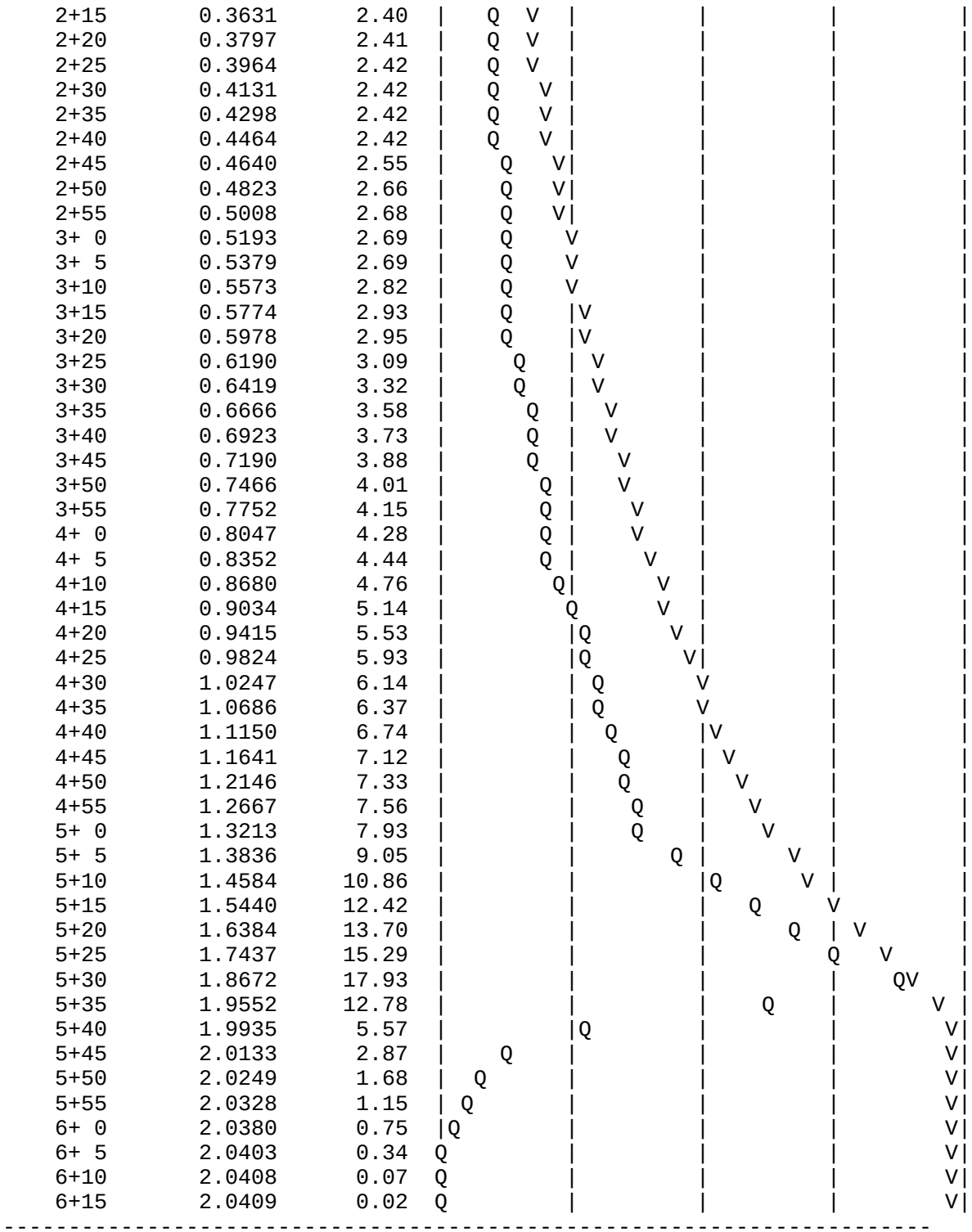
The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.150	(0.162)	0.048	0.102
2	0.17	0.60	0.180	(0.162)	0.058	0.122
3	0.25	0.60	0.180	(0.162)	0.058	0.122
4	0.33	0.60	0.180	(0.162)	0.058	0.122
5	0.42	0.60	0.180	(0.162)	0.058	0.122

6	0.50	0.70	0.210	(0.162)	0.068	0.142
7	0.58	0.70	0.210	(0.162)	0.068	0.142
8	0.67	0.70	0.210	(0.162)	0.068	0.142
9	0.75	0.70	0.210	(0.162)	0.068	0.142
10	0.83	0.70	0.210	(0.162)	0.068	0.142
11	0.92	0.70	0.210	(0.162)	0.068	0.142
12	1.00	0.80	0.240	(0.162)	0.077	0.163
13	1.08	0.80	0.240	(0.162)	0.077	0.163
14	1.17	0.80	0.240	(0.162)	0.077	0.163
15	1.25	0.80	0.240	(0.162)	0.077	0.163
16	1.33	0.80	0.240	(0.162)	0.077	0.163
17	1.42	0.80	0.240	(0.162)	0.077	0.163
18	1.50	0.80	0.240	(0.162)	0.077	0.163
19	1.58	0.80	0.240	(0.162)	0.077	0.163
20	1.67	0.80	0.240	(0.162)	0.077	0.163
21	1.75	0.80	0.240	(0.162)	0.077	0.163
22	1.83	0.80	0.240	(0.162)	0.077	0.163
23	1.92	0.80	0.240	(0.162)	0.077	0.163
24	2.00	0.90	0.270	(0.162)	0.087	0.183
25	2.08	0.80	0.240	(0.162)	0.077	0.163
26	2.17	0.90	0.270	(0.162)	0.087	0.183
27	2.25	0.90	0.270	(0.162)	0.087	0.183
28	2.33	0.90	0.270	(0.162)	0.087	0.183
29	2.42	0.90	0.270	(0.162)	0.087	0.183
30	2.50	0.90	0.270	(0.162)	0.087	0.183
31	2.58	0.90	0.270	(0.162)	0.087	0.183
32	2.67	0.90	0.270	(0.162)	0.087	0.183
33	2.75	1.00	0.300	(0.162)	0.097	0.203
34	2.83	1.00	0.300	(0.162)	0.097	0.203
35	2.92	1.00	0.300	(0.162)	0.097	0.203
36	3.00	1.00	0.300	(0.162)	0.097	0.203
37	3.08	1.00	0.300	(0.162)	0.097	0.203
38	3.17	1.10	0.330	(0.162)	0.106	0.224
39	3.25	1.10	0.330	(0.162)	0.106	0.224
40	3.33	1.10	0.330	(0.162)	0.106	0.224
41	3.42	1.20	0.360	(0.162)	0.116	0.244
42	3.50	1.30	0.390	(0.162)	0.126	0.264
43	3.58	1.40	0.420	(0.162)	0.135	0.285
44	3.67	1.40	0.420	(0.162)	0.135	0.285
45	3.75	1.50	0.450	(0.162)	0.145	0.305
46	3.83	1.50	0.450	(0.162)	0.145	0.305
47	3.92	1.60	0.480	(0.162)	0.155	0.325
48	4.00	1.60	0.480	(0.162)	0.155	0.325
49	4.08	1.70	0.510	0.162	(0.164)	0.348
50	4.17	1.80	0.540	0.162	(0.174)	0.378
51	4.25	1.90	0.570	0.162	(0.184)	0.408
52	4.33	2.00	0.600	0.162	(0.193)	0.438
53	4.42	2.10	0.630	0.162	(0.203)	0.468
54	4.50	2.10	0.630	0.162	(0.203)	0.468
55	4.58	2.20	0.660	0.162	(0.213)	0.498
56	4.67	2.30	0.690	0.162	(0.222)	0.528
57	4.75	2.40	0.720	0.162	(0.232)	0.558
58	4.83	2.40	0.720	0.162	(0.232)	0.558
59	4.92	2.50	0.750	0.162	(0.242)	0.588
60	5.00	2.60	0.780	0.162	(0.251)	0.618
61	5.08	3.10	0.930	0.162	(0.300)	0.768
62	5.17	3.60	1.080	0.162	(0.348)	0.918

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63   5.25     3.90      1.170          0.162    (  0.377)        1.008
64   5.33     4.20      1.260          0.162    (  0.406)        1.098
65   5.42     4.70      1.410          0.162    (  0.455)        1.248
66   5.50     5.60      1.680          0.162    (  0.542)        1.518
67   5.58     1.90      0.570          0.162    (  0.184)        0.408
68   5.67     0.90      0.270       (  0.162)       0.087        0.183
69   5.75     0.60      0.180       (  0.162)       0.058        0.122
70   5.83     0.50      0.150       (  0.162)       0.048        0.102
71   5.92     0.30      0.090       (  0.162)       0.029        0.061
72   6.00     0.20      0.060       (  0.162)       0.019        0.041
          (Loss Rate Not Used)
   Sum =     100.0                                    Sum =    22.4
    Flood volume = Effective rainfall      1.87(In)
     times area      13.1(Ac.)/[(In)/(Ft.)] =       2.0(Ac.Ft)
    Total soil loss =      0.63(In)
    Total soil loss =     0.694(Ac.Ft)
    Total rainfall =      2.50(In)
    Flood volume =       88902.2 Cubic Feet
    Total soil loss =       30247.2 Cubic Feet
    ---------------------------------------------------------------------
     Peak flow rate of this hydrograph =     17.929(CFS)
    ---------------------------------------------------------------------
    +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        6 - H O U R    S T O R M
                    R u n o f f      H y d r o g r a p h
    ---------------------------------------------------------------------
                Hydrograph in   5   Minute intervals ((CFS))

    ---------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        5.0      10.0      15.0      20.0
-------------------------------------------------------------------------
  0+ 5       0.0043      0.63  VQ        |         |         |         |
  0+10       0.0134      1.32  V Q       |         |         |         |
  0+15       0.0240      1.54  V  Q      |         |         |         |
  0+20       0.0351      1.61  V  Q      |         |         |         |
  0+25       0.0462      1.61  V  Q      |         |         |         |
  0+30       0.0582      1.74  |V Q      |         |         |         |
  0+35       0.0709      1.85  |V Q      |         |         |         |
  0+40       0.0838      1.87  |V Q      |         |         |         |
  0+45       0.0968      1.88  |V Q      |         |         |         |
  0+50       0.1098      1.88  | VQ      |         |         |         |
  0+55       0.1228      1.88  | VQ      |         |         |         |
  1+ 0       0.1366      2.01  | V Q     |         |         |         |
  1+ 5       0.1512      2.12  | V Q     |         |         |         |
  1+10       0.1660      2.14  |  VQ     |         |         |         |
  1+15       0.1808      2.15  |  VQ     |         |         |         |
  1+20       0.1956      2.15  |  VQ     |         |         |         |
  1+25       0.2105      2.15  |   Q     |         |         |         |
  1+30       0.2253      2.15  |   Q     |         |         |         |
  1+35       0.2401      2.15  |   Q     |         |         |         |
  1+40       0.2549      2.15  |   Q     |         |         |         |
  1+45       0.2698      2.15  |   QV    |         |         |         |
  1+50       0.2846      2.15  |   QV    |         |         |         |
  1+55       0.2994      2.15  |   QV    |         |         |         |
  2+ 0       0.3151      2.28  |   Q V   |         |         |         |
  2+ 5       0.3307      2.27  |   Q V   |         |         |         |
  2+10       0.3466      2.30  |   Q V   |         |         |         |
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U n i t H y d r o g r a p h A n a l y s i s

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Study date 10/02/24 File: qp100uhb6100.out

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

Program License Serial Number 6405

20-001 HARVEST LANDING RETAIL CENTER AND BUSINESS PARK
MDP LANDUSE CONDITION - WATERSHED B
100 YEAR, 6 HOUR STORM EVENT ANALYSIS

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

English Units used in output format

Drainage Area = 12.68(Ac.) = 0.020 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 12.68(Ac.) = 0.020 Sq. Mi.
Length along longest watercourse = 818.00(Ft.)
Length along longest watercourse measured to centroid = 475.00(Ft.)
Length along longest watercourse = 0.155 Mi.
Length along longest watercourse measured to centroid = 0.090 Mi.
Difference in elevation = 25.60(Ft.)
Slope along watercourse = 165.2421 Ft./Mi.
Average Manning's 'N' = 0.016
Lag time = 0.028 Hr.
Lag time = 1.68 Min.
25% of lag time = 0.42 Min.
40% of lag time = 0.67 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.68	1.20	15.22

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.68	2.50	31.70

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.200(In)
Area Averaged 100-Year Rainfall = 2.500(In)

Point rain (area averaged) = 2.500(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.500(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
12.680	57.60	0.819

Total Area Entered = 12.68(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
57.6	57.6	0.494	0.819	0.130	1.000	0.130
					Sum (F) =	0.130

Area averaged mean soil loss (F) (In/Hr) = 0.130
Minimum soil loss rate ((In/Hr)) = 0.065
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.245

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

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	297.946	56.468	7.216
2	0.167	595.892	37.242	4.759
3	0.250	893.838	6.290	0.804
		Sum = 100.000	Sum=	12.779

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

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.150	(0.130)	0.037	0.113
2	0.17	0.60	0.180	(0.130)	0.044	0.136
3	0.25	0.60	0.180	(0.130)	0.044	0.136
4	0.33	0.60	0.180	(0.130)	0.044	0.136
5	0.42	0.60	0.180	(0.130)	0.044	0.136
6	0.50	0.70	0.210	(0.130)	0.051	0.159

7	0.58	0.70	0.210	(0.130)	0.051	0.159
8	0.67	0.70	0.210	(0.130)	0.051	0.159
9	0.75	0.70	0.210	(0.130)	0.051	0.159
10	0.83	0.70	0.210	(0.130)	0.051	0.159
11	0.92	0.70	0.210	(0.130)	0.051	0.159
12	1.00	0.80	0.240	(0.130)	0.059	0.181
13	1.08	0.80	0.240	(0.130)	0.059	0.181
14	1.17	0.80	0.240	(0.130)	0.059	0.181
15	1.25	0.80	0.240	(0.130)	0.059	0.181
16	1.33	0.80	0.240	(0.130)	0.059	0.181
17	1.42	0.80	0.240	(0.130)	0.059	0.181
18	1.50	0.80	0.240	(0.130)	0.059	0.181
19	1.58	0.80	0.240	(0.130)	0.059	0.181
20	1.67	0.80	0.240	(0.130)	0.059	0.181
21	1.75	0.80	0.240	(0.130)	0.059	0.181
22	1.83	0.80	0.240	(0.130)	0.059	0.181
23	1.92	0.80	0.240	(0.130)	0.059	0.181
24	2.00	0.90	0.270	(0.130)	0.066	0.204
25	2.08	0.80	0.240	(0.130)	0.059	0.181
26	2.17	0.90	0.270	(0.130)	0.066	0.204
27	2.25	0.90	0.270	(0.130)	0.066	0.204
28	2.33	0.90	0.270	(0.130)	0.066	0.204
29	2.42	0.90	0.270	(0.130)	0.066	0.204
30	2.50	0.90	0.270	(0.130)	0.066	0.204
31	2.58	0.90	0.270	(0.130)	0.066	0.204
32	2.67	0.90	0.270	(0.130)	0.066	0.204
33	2.75	1.00	0.300	(0.130)	0.073	0.227
34	2.83	1.00	0.300	(0.130)	0.073	0.227
35	2.92	1.00	0.300	(0.130)	0.073	0.227
36	3.00	1.00	0.300	(0.130)	0.073	0.227
37	3.08	1.00	0.300	(0.130)	0.073	0.227
38	3.17	1.10	0.330	(0.130)	0.081	0.249
39	3.25	1.10	0.330	(0.130)	0.081	0.249
40	3.33	1.10	0.330	(0.130)	0.081	0.249
41	3.42	1.20	0.360	(0.130)	0.088	0.272
42	3.50	1.30	0.390	(0.130)	0.095	0.295
43	3.58	1.40	0.420	(0.130)	0.103	0.317
44	3.67	1.40	0.420	(0.130)	0.103	0.317
45	3.75	1.50	0.450	(0.130)	0.110	0.340
46	3.83	1.50	0.450	(0.130)	0.110	0.340
47	3.92	1.60	0.480	(0.130)	0.117	0.362
48	4.00	1.60	0.480	(0.130)	0.117	0.362
49	4.08	1.70	0.510	(0.130)	0.125	0.385
50	4.17	1.80	0.540	0.130	(0.132)	0.410
51	4.25	1.90	0.570	0.130	(0.140)	0.440
52	4.33	2.00	0.600	0.130	(0.147)	0.470
53	4.42	2.10	0.630	0.130	(0.154)	0.500
54	4.50	2.10	0.630	0.130	(0.154)	0.500
55	4.58	2.20	0.660	0.130	(0.162)	0.530
56	4.67	2.30	0.690	0.130	(0.169)	0.560
57	4.75	2.40	0.720	0.130	(0.176)	0.590
58	4.83	2.40	0.720	0.130	(0.176)	0.590
59	4.92	2.50	0.750	0.130	(0.184)	0.620
60	5.00	2.60	0.780	0.130	(0.191)	0.650
61	5.08	3.10	0.930	0.130	(0.228)	0.800
62	5.17	3.60	1.080	0.130	(0.264)	0.950
63	5.25	3.90	1.170	0.130	(0.286)	1.040

64	5.33	4.20	1.260	0.130	(0.308)		1.130
65	5.42	4.70	1.410	0.130	(0.345)		1.280
66	5.50	5.60	1.680	0.130	(0.411)		1.550
67	5.58	1.90	0.570	0.130	(0.140)		0.440
68	5.67	0.90	0.270	(0.130)	0.066		0.204
69	5.75	0.60	0.180	(0.130)	0.044		0.136
70	5.83	0.50	0.150	(0.130)	0.037		0.113
71	5.92	0.30	0.090	(0.130)	0.022		0.068
72	6.00	0.20	0.060	(0.130)	0.015		0.045

(Loss Rate Not Used)

Sum = 100.0 Sum = 24.1

Flood volume = Effective rainfall 2.01(In)
times area 12.7(Ac.)/[(In)/(Ft.)] = 2.1(Ac.Ft)
Total soil loss = 0.49(In)
Total soil loss = 0.521(Ac.Ft)
Total rainfall = 2.50(In)
Flood volume = 92372.6 Cubic Feet
Total soil loss = 22693.3 Cubic Feet

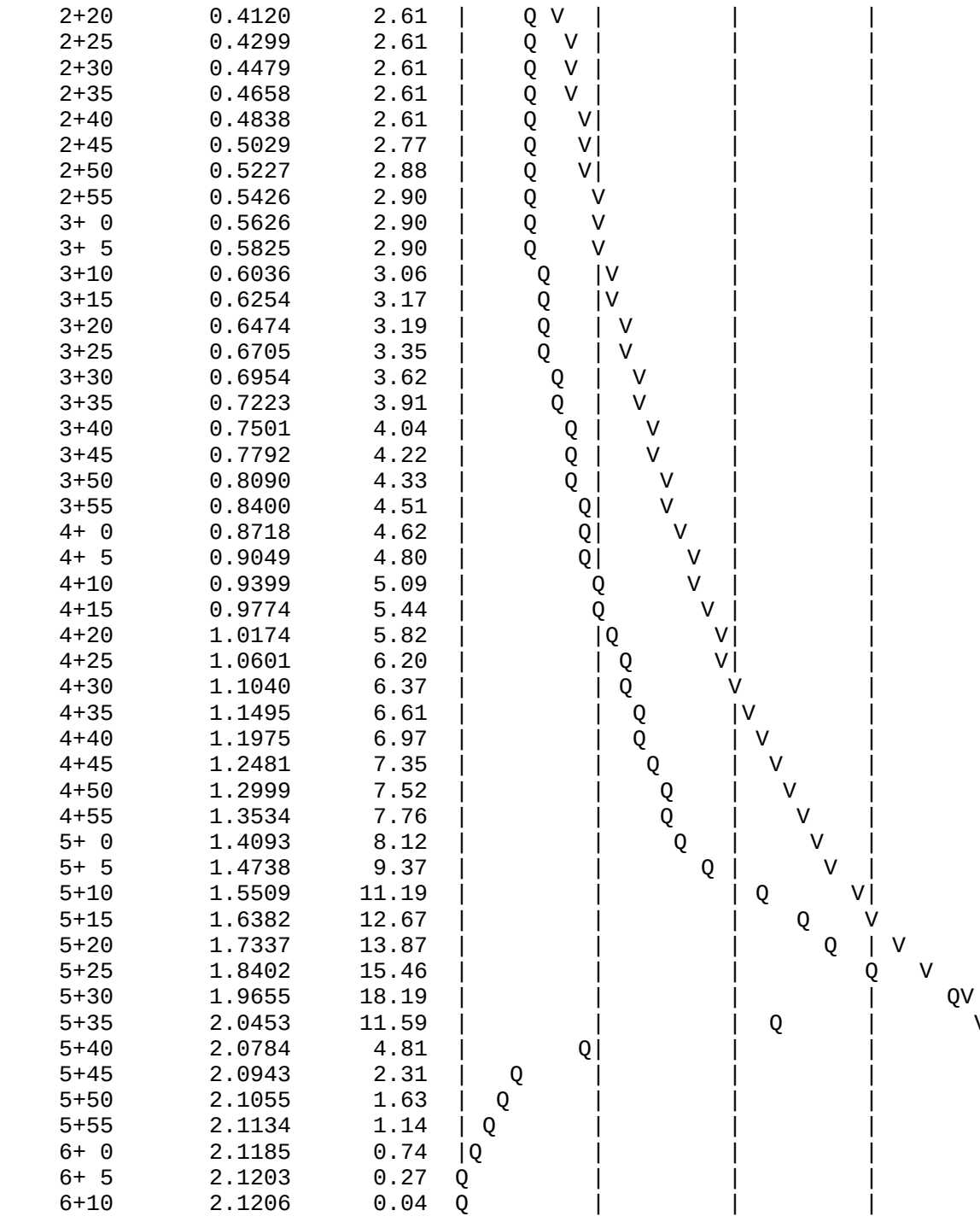
Peak flow rate of this hydrograph = 18.194(CFS)

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

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+ 5	0.0056	0.82	VQ				
0+10	0.0161	1.52	V Q				
0+15	0.0279	1.72	V Q				
0+20	0.0399	1.74	V Q				
0+25	0.0519	1.74	V Q				
0+30	0.0650	1.90	|V Q				
0+35	0.0788	2.01	|V Q				
0+40	0.0928	2.03	|V Q				
0+45	0.1068	2.03	| V Q				
0+50	0.1207	2.03	| V Q				
0+55	0.1347	2.03	| V Q				
1+ 0	0.1498	2.19	| V Q				
1+ 5	0.1656	2.30	| VQ				
1+10	0.1816	2.32	| VQ				
1+15	0.1975	2.32	| VQ				
1+20	0.2135	2.32	| Q				
1+25	0.2294	2.32	| Q				
1+30	0.2454	2.32	| Q				
1+35	0.2614	2.32	| Q				
1+40	0.2773	2.32	| QV				
1+45	0.2933	2.32	| QV				
1+50	0.3092	2.32	| QV				
1+55	0.3252	2.32	| Q V				
2+ 0	0.3423	2.48	| Q V				
2+ 5	0.3590	2.43	| Q V				
2+10	0.3762	2.50	| Q V				
2+15	0.3940	2.59	| Q V				



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

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Study date 10/01/24 File: pq100uha3100.out

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

Program License Serial Number 6405

20-001 HARVEST LANDING RETAIL CENTER AND BUSINESS PARK
MDP LANDUSE CONDITION - WATERSHED A
100 YEAR, 3 HOUR STORM EVENT ANALYSIS

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

English Units used in output format

Drainage Area = 13.22(Ac.) = 0.021 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 13.22(Ac.) = 0.021 Sq. Mi.
Length along longest watercourse = 1359.00(Ft.)
Length along longest watercourse measured to centroid = 693.00(Ft.)
Length along longest watercourse = 0.257 Mi.
Length along longest watercourse measured to centroid = 0.131 Mi.
Difference in elevation = 18.70(Ft.)
Slope along watercourse = 72.6534 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.088 Hr.
Lag time = 5.28 Min.
25% of lag time = 1.32 Min.
40% of lag time = 2.11 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
13.22	0.80	10.58

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
13.22	1.90	25.12

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.800(In)
Area Averaged 100-Year Rainfall = 1.900(In)

Point rain (area averaged) = 1.900(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.900(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
13.220	61.30	0.500

Total Area Entered = 13.22(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
61.3	61.3	0.456	0.500	0.251	1.000	0.251
					Sum (F) =	0.251

Area averaged mean soil loss (F) (In/Hr) = 0.251
Minimum soil loss rate ((In/Hr)) = 0.125
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.500

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

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	94.673	17.575	2.342
2	0.167	189.345	47.848	6.375
3	0.250	284.018	16.514	2.200
4	0.333	378.691	7.359	0.980
5	0.417	473.363	4.203	0.560
6	0.500	568.036	2.720	0.362
7	0.583	662.709	1.772	0.236
8	0.667	757.381	1.110	0.148
9	0.750	852.054	0.900	0.120
			Sum = 100.000	Sum= 13.323

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

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)

1	0.08	1.30	0.296	(0.251)	0.148	0.148	
2	0.17	1.30	0.296	(0.251)	0.148	0.148	
3	0.25	1.10	0.251	(0.251)	0.125	0.125	
4	0.33	1.50	0.342	(0.251)	0.171	0.171	
5	0.42	1.50	0.342	(0.251)	0.171	0.171	
6	0.50	1.80	0.410	(0.251)	0.205	0.205	
7	0.58	1.50	0.342	(0.251)	0.171	0.171	
8	0.67	1.80	0.410	(0.251)	0.205	0.205	
9	0.75	1.80	0.410	(0.251)	0.205	0.205	
10	0.83	1.50	0.342	(0.251)	0.171	0.171	
11	0.92	1.60	0.365	(0.251)	0.182	0.182	
12	1.00	1.80	0.410	(0.251)	0.205	0.205	
13	1.08	2.20	0.502	0.251	(0.251)	0.251	
14	1.17	2.20	0.502	0.251	(0.251)	0.251	
15	1.25	2.20	0.502	0.251	(0.251)	0.251	
16	1.33	2.00	0.456	(0.251)	0.228	0.228	
17	1.42	2.60	0.593	0.251	(0.296)	0.342	
18	1.50	2.70	0.616	0.251	(0.308)	0.365	
19	1.58	2.40	0.547	0.251	(0.274)	0.296	
20	1.67	2.70	0.616	0.251	(0.308)	0.365	
21	1.75	3.30	0.752	0.251	(0.376)	0.502	
22	1.83	3.10	0.707	0.251	(0.353)	0.456	
23	1.92	2.90	0.661	0.251	(0.331)	0.410	
24	2.00	3.00	0.684	0.251	(0.342)	0.433	
25	2.08	3.10	0.707	0.251	(0.353)	0.456	
26	2.17	4.20	0.958	0.251	(0.479)	0.707	
27	2.25	5.00	1.140	0.251	(0.570)	0.889	
28	2.33	3.50	0.798	0.251	(0.399)	0.547	
29	2.42	6.80	1.550	0.251	(0.775)	1.300	
30	2.50	7.30	1.664	0.251	(0.832)	1.414	
31	2.58	8.20	1.869	0.251	(0.935)	1.619	
32	2.67	5.90	1.345	0.251	(0.673)	1.094	
33	2.75	2.00	0.456	(0.251)	0.228	0.228	
34	2.83	1.80	0.410	(0.251)	0.205	0.205	
35	2.92	1.80	0.410	(0.251)	0.205	0.205	
36	3.00	0.60	0.137	(0.251)	0.068	0.068	

(Loss Rate Not Used)

Sum = 100.0 Sum = 15.0

Flood volume = Effective rainfall 1.25(In)
times area 13.2(Ac.)/[(In)/(Ft.)] = 1.4(Ac.Ft)
Total soil loss = 0.65(In)
Total soil loss = 0.717(Ac.Ft)
Total rainfall = 1.90(In)
Flood volume = 59946.9 Cubic Feet
Total soil loss = 31226.2 Cubic Feet

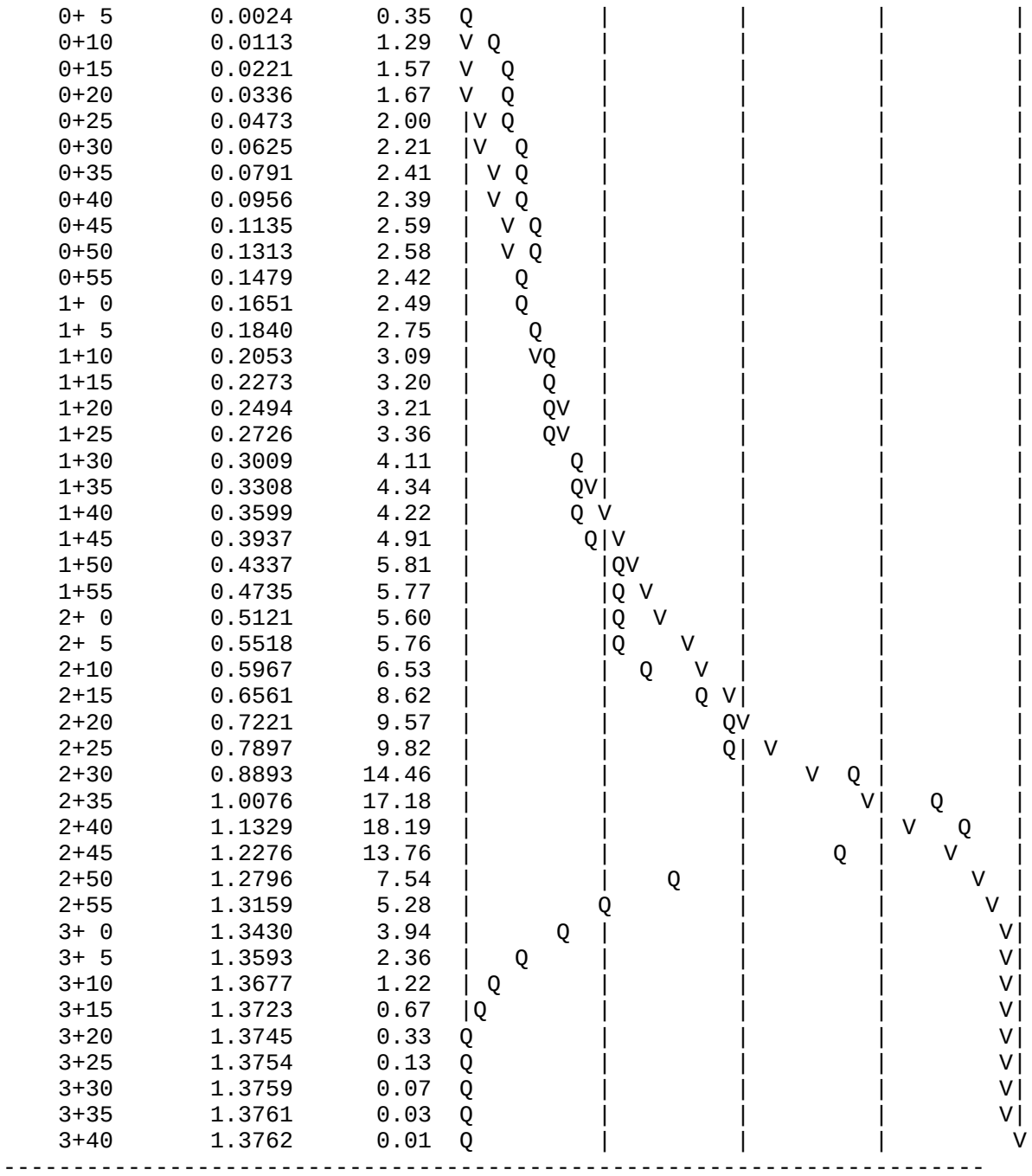
Peak flow rate of this hydrograph = 18.190(CFS)

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

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m) Volume Ac.Ft Q(CFS) 0 5.0 10.0 15.0 20.0



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

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Study date 10/02/24 File: pquh100b63100.out

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

Program License Serial Number 6405

20-001 HARVEST LANDING RETAIL CENTER AND BUSINESS PARK
MDP LANDUSE CONDITION - WATERSHED B
100 YEAR, 3 HOUR STORM EVENT ANALYSIS

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

English Units used in output format

Drainage Area = 12.58(Ac.) = 0.020 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 12.58(Ac.) = 0.020 Sq. Mi.
Length along longest watercourse = 1170.00(Ft.)
Length along longest watercourse measured to centroid = 550.00(Ft.)
Length along longest watercourse = 0.222 Mi.
Length along longest watercourse measured to centroid = 0.104 Mi.
Difference in elevation = 16.50(Ft.)
Slope along watercourse = 74.4615 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.076 Hr.
Lag time = 4.55 Min.
25% of lag time = 1.14 Min.
40% of lag time = 1.82 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.58	0.80	10.06

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.58	1.90	23.90

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.800(In)
Area Averaged 100-Year Rainfall = 1.900(In)

Point rain (area averaged) = 1.900(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.900(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
12.580	57.80	0.500

Total Area Entered = 12.58(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
57.8	57.8	0.492	0.500	0.271	1.000	0.271
					Sum (F) =	0.271

Area averaged mean soil loss (F) (In/Hr) = 0.271
Minimum soil loss rate ((In/Hr)) = 0.135
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.500

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

Unit Hydrograph Data

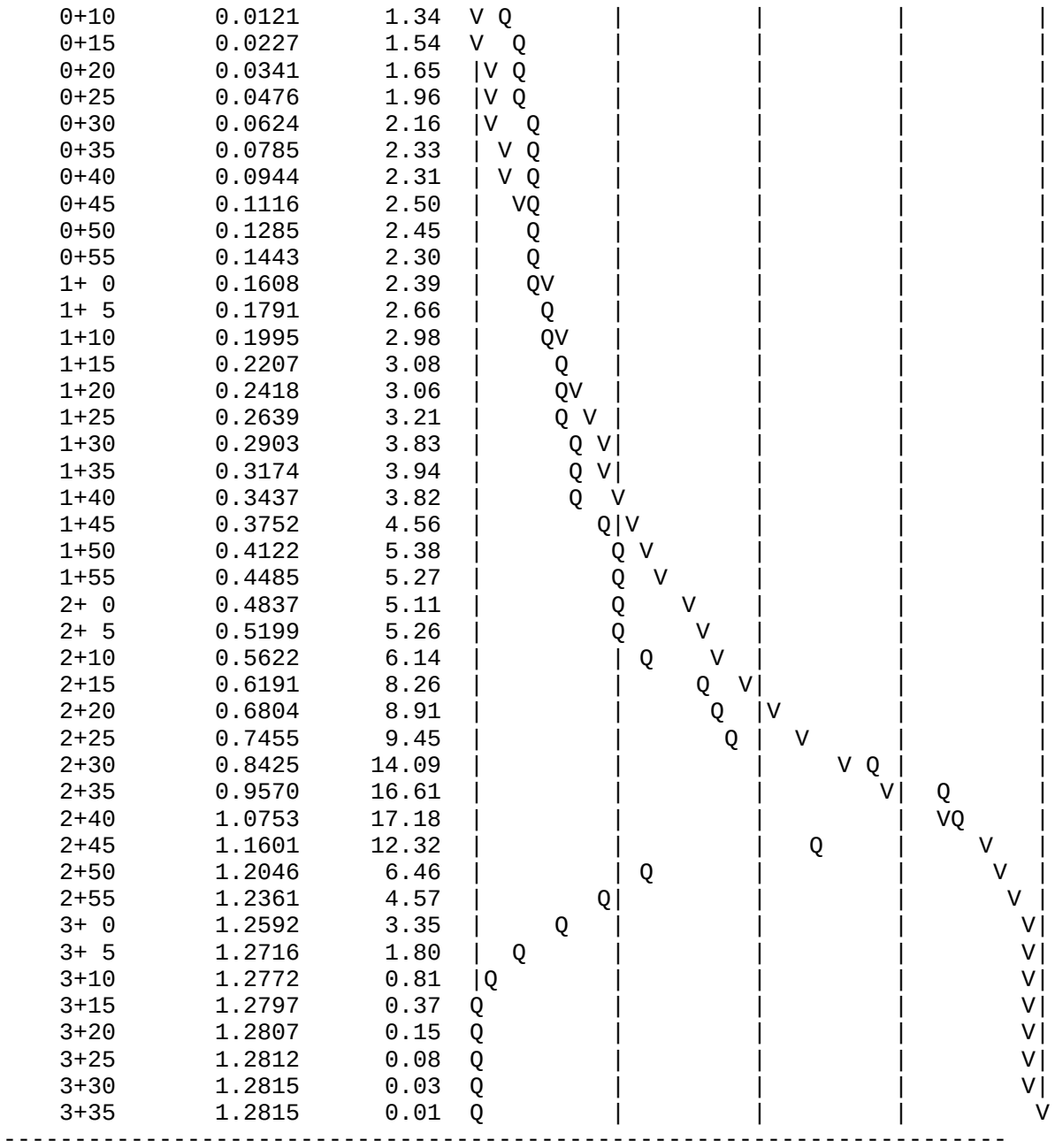
Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	109.928	22.218	2.817
2	0.167	219.855	48.832	6.191
3	0.250	329.783	14.316	1.815
4	0.333	439.710	6.548	0.830
5	0.417	549.638	3.637	0.461
6	0.500	659.565	2.267	0.287
7	0.583	769.493	1.329	0.168
8	0.667	879.421	0.855	0.108
		Sum =	100.000 Sum=	12.678

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

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.296	(0.271)	0.148	0.148

```
 2   0.17     1.30      0.296       (  0.271)       0.148        0.148
 3   0.25     1.10      0.251       (  0.271)       0.125        0.125
 4   0.33     1.50      0.342       (  0.271)       0.171        0.171
 5   0.42     1.50      0.342       (  0.271)       0.171        0.171
 6   0.50     1.80      0.410       (  0.271)       0.205        0.205
 7   0.58     1.50      0.342       (  0.271)       0.171        0.171
 8   0.67     1.80      0.410       (  0.271)       0.205        0.205
 9   0.75     1.80      0.410       (  0.271)       0.205        0.205
10   0.83     1.50      0.342       (  0.271)       0.171        0.171
11   0.92     1.60      0.365       (  0.271)       0.182        0.182
12   1.00     1.80      0.410       (  0.271)       0.205        0.205
13   1.08     2.20      0.502       (  0.271)       0.251        0.251
14   1.17     2.20      0.502       (  0.271)       0.251        0.251
15   1.25     2.20      0.502       (  0.271)       0.251        0.251
16   1.33     2.00      0.456       (  0.271)       0.228        0.228
17   1.42     2.60      0.593          0.271    (  0.296)       0.322
18   1.50     2.70      0.616          0.271    (  0.308)       0.345
19   1.58     2.40      0.547          0.271    (  0.274)       0.276
20   1.67     2.70      0.616          0.271    (  0.308)       0.345
21   1.75     3.30      0.752          0.271    (  0.376)       0.482
22   1.83     3.10      0.707          0.271    (  0.353)       0.436
23   1.92     2.90      0.661          0.271    (  0.331)       0.390
24   2.00     3.00      0.684          0.271    (  0.342)       0.413
25   2.08     3.10      0.707          0.271    (  0.353)       0.436
26   2.17     4.20      0.958          0.271    (  0.479)       0.687
27   2.25     5.00      1.140          0.271    (  0.570)       0.869
28   2.33     3.50      0.798          0.271    (  0.399)       0.527
29   2.42     6.80      1.550          0.271    (  0.775)       1.279
30   2.50     7.30      1.664          0.271    (  0.832)       1.393
31   2.58     8.20      1.869          0.271    (  0.935)       1.599
32   2.67     5.90      1.345          0.271    (  0.673)       1.074
33   2.75     2.00      0.456       (  0.271)       0.228        0.228
34   2.83     1.80      0.410       (  0.271)       0.205        0.205
35   2.92     1.80      0.410       (  0.271)       0.205        0.205
36   3.00     0.60      0.137       (  0.271)       0.068        0.068
          (Loss Rate Not Used)
   Sum =     100.0                                   Sum =    14.7
    Flood volume = Effective rainfall      1.22(In)
     times area      12.6(Ac.)/[(In)/(Ft.)] =       1.3(Ac.Ft)
    Total soil loss =      0.68(In)
    Total soil loss =     0.710(Ac.Ft)
    Total rainfall =      1.90(In)
    Flood volume =       55823.2 Cubic Feet
    Total soil loss =       30936.3 Cubic Feet
    ------------------------------------------------------------------------
     Peak flow rate of this hydrograph =     17.179(CFS)
    ------------------------------------------------------------------------
    ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        3 - H O U R    S T O R M
                    R u n o f f      H y d r o g r a p h
    ------------------------------------------------------------------------
                Hydrograph in   5   Minute intervals ((CFS))

    ------------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        5.0      10.0      15.0      20.0
------------------------------------------------------------------------
  0+ 5       0.0029      0.42  Q         |         |         |         |
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U n i t H y d r o g r a p h A n a l y s i s

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Study date 10/02/24 File: pq6100uh3100.out

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

Program License Serial Number 6405

20-001 HARVEST LANDING RETAIL CENTER AND BUSINESS PARK
PROPOSED CONDITION - WATERSHED A
100 YEAR, 3 HOUR STORM EVENT ANALYSIS

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

English Units used in output format

Drainage Area = 13.13(Ac.) = 0.021 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 13.13(Ac.) = 0.021 Sq. Mi.
Length along longest watercourse = 1103.00(Ft.)
Length along longest watercourse measured to centroid = 759.00(Ft.)
Length along longest watercourse = 0.209 Mi.
Length along longest watercourse measured to centroid = 0.144 Mi.
Difference in elevation = 26.26(Ft.)
Slope along watercourse = 125.7052 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.038 Hr.
Lag time = 2.28 Min.
25% of lag time = 0.57 Min.
40% of lag time = 0.91 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
13.13	0.80	10.50

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
13.13	1.90	24.95

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.800(In)
Area Averaged 100-Year Rainfall = 1.900(In)

Point rain (area averaged) = 1.900(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.900(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
13.130	60.80	0.722

Total Area Entered = 13.13(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
60.8	60.8	0.461	0.722	0.162	1.000	0.162
					Sum (F) =	0.162

Area averaged mean soil loss (F) (In/Hr) = 0.162
Minimum soil loss rate ((In/Hr)) = 0.081
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.322

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

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	219.748	46.617	6.169
2	0.167	439.496	42.013	5.559
3	0.250	659.243	8.048	1.065
4	0.333	878.991	3.322	0.440
		Sum =	100.000 Sum=	13.233

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

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.296	(0.162)	0.096	0.201
2	0.17	1.30	0.296	(0.162)	0.096	0.201
3	0.25	1.10	0.251	(0.162)	0.081	0.170
4	0.33	1.50	0.342	(0.162)	0.110	0.232
5	0.42	1.50	0.342	(0.162)	0.110	0.232

6	0.50	1.80	0.410	(0.162)	0.132	0.278
7	0.58	1.50	0.342	(0.162)	0.110	0.232
8	0.67	1.80	0.410	(0.162)	0.132	0.278
9	0.75	1.80	0.410	(0.162)	0.132	0.278
10	0.83	1.50	0.342	(0.162)	0.110	0.232
11	0.92	1.60	0.365	(0.162)	0.118	0.247
12	1.00	1.80	0.410	(0.162)	0.132	0.278
13	1.08	2.20	0.502	0.162	(0.162)	0.340
14	1.17	2.20	0.502	0.162	(0.162)	0.340
15	1.25	2.20	0.502	0.162	(0.162)	0.340
16	1.33	2.00	0.456	(0.162)	0.147	0.309
17	1.42	2.60	0.593	0.162	(0.191)	0.431
18	1.50	2.70	0.616	0.162	(0.198)	0.454
19	1.58	2.40	0.547	0.162	(0.176)	0.386
20	1.67	2.70	0.616	0.162	(0.198)	0.454
21	1.75	3.30	0.752	0.162	(0.243)	0.591
22	1.83	3.10	0.707	0.162	(0.228)	0.545
23	1.92	2.90	0.661	0.162	(0.213)	0.500
24	2.00	3.00	0.684	0.162	(0.221)	0.522
25	2.08	3.10	0.707	0.162	(0.228)	0.545
26	2.17	4.20	0.958	0.162	(0.309)	0.796
27	2.25	5.00	1.140	0.162	(0.368)	0.978
28	2.33	3.50	0.798	0.162	(0.257)	0.636
29	2.42	6.80	1.550	0.162	(0.500)	1.389
30	2.50	7.30	1.664	0.162	(0.537)	1.503
31	2.58	8.20	1.869	0.162	(0.603)	1.708
32	2.67	5.90	1.345	0.162	(0.434)	1.184
33	2.75	2.00	0.456	(0.162)	0.147	0.309
34	2.83	1.80	0.410	(0.162)	0.132	0.278
35	2.92	1.80	0.410	(0.162)	0.132	0.278
36	3.00	0.60	0.137	(0.162)	0.044	0.093

(Loss Rate Not Used)

Sum = 100.0 Sum = 17.8

Flood volume = Effective rainfall 1.48(In)
times area 13.1(Ac.)/[(In)/(Ft.)] = 1.6(Ac.Ft)
Total soil loss = 0.42(In)
Total soil loss = 0.459(Ac.Ft)
Total rainfall = 1.90(In)
Flood volume = 70564.9 Cubic Feet
Total soil loss = 19987.5 Cubic Feet

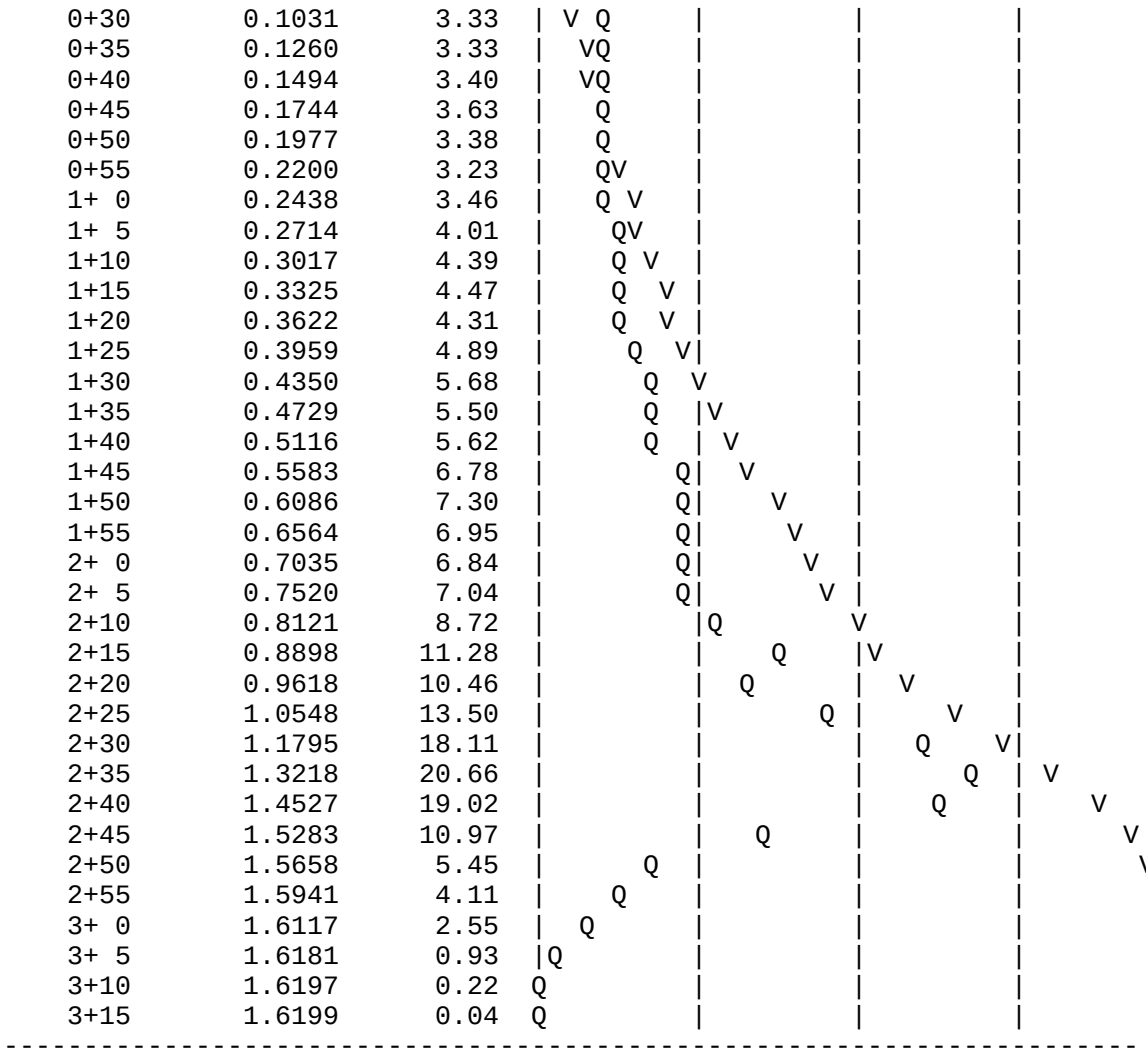
Peak flow rate of this hydrograph = 20.659(CFS)

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

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	7.5	15.0	22.5	30.0
0+ 5	0.0085	1.24	VQ	|	|	|	|
0+10	0.0248	2.36	V Q	|	|	|	|
0+15	0.0412	2.38	|V Q	|	|	|	|
0+20	0.0596	2.68	|V Q	|	|	|	|
0+25	0.0802	2.99	|V Q	|	|	|	|


0+30 0.1031 3.33
0+35 0.1260 3.33
0+40 0.1494 3.40
0+45 0.1744 3.63
0+50 0.1977 3.38
0+55 0.2200 3.23
1+ 0 0.2438 3.46
1+ 5 0.2714 4.01
1+10 0.3017 4.39
1+15 0.3325 4.47
1+20 0.3622 4.31
1+25 0.3959 4.89
1+30 0.4350 5.68
1+35 0.4729 5.50
1+40 0.5116 5.62
1+45 0.5583 6.78
1+50 0.6086 7.30
1+55 0.6564 6.95
2+ 0 0.7035 6.84
2+ 5 0.7520 7.04
2+10 0.8121 8.72
2+15 0.8898 11.28
2+20 0.9618 10.46
2+25 1.0548 13.50
2+30 1.1795 18.11
2+35 1.3218 20.66
2+40 1.4527 19.02
2+45 1.5283 10.97
2+50 1.5658 5.45
2+55 1.5941 4.11
3+ 0 1.6117 2.55
3+ 5 1.6181 0.93
3+10 1.6197 0.22
3+15 1.6199 0.04

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

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

Program License Serial Number 6405

20-001 HARVEST LANDING RETAIL CENTER AND BUSINESS PARK
PROPOSED CONDITION - WATERSHED B
100 YEAR, 3 HOUR STORM EVENT ANALYSIS

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

English Units used in output format

Drainage Area = 12.68(Ac.) = 0.020 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 12.68(Ac.) = 0.020 Sq. Mi.
Length along longest watercourse = 818.00(Ft.)
Length along longest watercourse measured to centroid = 475.00(Ft.)
Length along longest watercourse = 0.155 Mi.
Length along longest watercourse measured to centroid = 0.090 Mi.
Difference in elevation = 25.60(Ft.)
Slope along watercourse = 165.2421 Ft./Mi.
Average Manning's 'N' = 0.016
Lag time = 0.028 Hr.
Lag time = 1.68 Min.
25% of lag time = 0.42 Min.
40% of lag time = 0.67 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.68	0.80	10.14

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.68	1.90	24.09

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.800(In)
Area Averaged 100-Year Rainfall = 1.900(In)

Point rain (area averaged) = 1.900(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.900(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
12.680	57.60	0.819

Total Area Entered = 12.68(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
57.6	57.6	0.494	0.819	0.130	1.000	0.130
					Sum (F) =	0.130

Area averaged mean soil loss (F) (In/Hr) = 0.130
Minimum soil loss rate ((In/Hr)) = 0.065
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.245

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

Unit Hydrograph Data

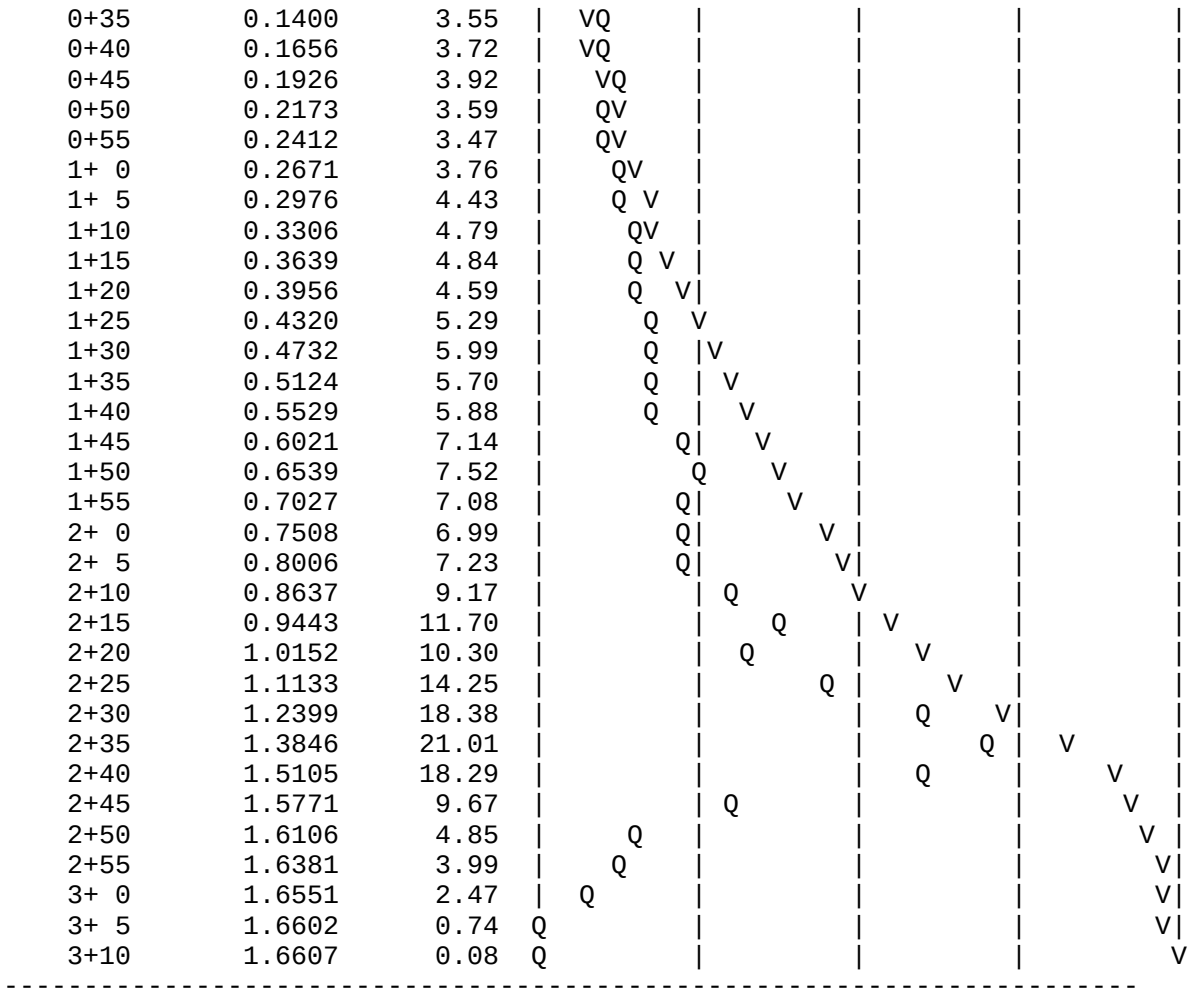
Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	297.946	56.468	7.216
2	0.167	595.892	37.242	4.759
3	0.250	893.838	6.290	0.804
		Sum = 100.000	Sum=	12.779

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

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.296	(0.130)	0.073	0.224
2	0.17	1.30	0.296	(0.130)	0.073	0.224
3	0.25	1.10	0.251	(0.130)	0.061	0.189
4	0.33	1.50	0.342	(0.130)	0.084	0.258
5	0.42	1.50	0.342	(0.130)	0.084	0.258
6	0.50	1.80	0.410	(0.130)	0.100	0.310

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 7   0.58     1.50      0.342       (  0.130)       0.084        0.258
 8   0.67     1.80      0.410       (  0.130)       0.100        0.310
 9   0.75     1.80      0.410       (  0.130)       0.100        0.310
10   0.83     1.50      0.342       (  0.130)       0.084        0.258
11   0.92     1.60      0.365       (  0.130)       0.089        0.275
12   1.00     1.80      0.410       (  0.130)       0.100        0.310
13   1.08     2.20      0.502       (  0.130)       0.123        0.379
14   1.17     2.20      0.502       (  0.130)       0.123        0.379
15   1.25     2.20      0.502       (  0.130)       0.123        0.379
16   1.33     2.00      0.456       (  0.130)       0.112        0.344
17   1.42     2.60      0.593          0.130    (  0.145)        0.463
18   1.50     2.70      0.616          0.130    (  0.151)        0.486
19   1.58     2.40      0.547          0.130    (  0.134)        0.417
20   1.67     2.70      0.616          0.130    (  0.151)        0.486
21   1.75     3.30      0.752          0.130    (  0.184)        0.622
22   1.83     3.10      0.707          0.130    (  0.173)        0.577
23   1.92     2.90      0.661          0.130    (  0.162)        0.531
24   2.00     3.00      0.684          0.130    (  0.167)        0.554
25   2.08     3.10      0.707          0.130    (  0.173)        0.577
26   2.17     4.20      0.958          0.130    (  0.234)        0.828
27   2.25     5.00      1.140          0.130    (  0.279)        1.010
28   2.33     3.50      0.798          0.130    (  0.195)        0.668
29   2.42     6.80      1.550          0.130    (  0.380)        1.420
30   2.50     7.30      1.664          0.130    (  0.407)        1.534
31   2.58     8.20      1.869          0.130    (  0.458)        1.739
32   2.67     5.90      1.345          0.130    (  0.329)        1.215
33   2.75     2.00      0.456       (  0.130)       0.112        0.344
34   2.83     1.80      0.410       (  0.130)       0.100        0.310
35   2.92     1.80      0.410       (  0.130)       0.100        0.310
36   3.00     0.60      0.137       (  0.130)       0.033        0.103
          (Loss Rate Not Used)
   Sum =     100.0                                    Sum =    18.9
    Flood volume = Effective rainfall      1.57(In)
     times area      12.7(Ac.)/[(In)/(Ft.)] =       1.7(Ac.Ft)
    Total soil loss =      0.33(In)
    Total soil loss =     0.347(Ac.Ft)
    Total rainfall =      1.90(In)
    Flood volume =       72342.2 Cubic Feet
    Total soil loss =       15106.9 Cubic Feet
    ---------------------------------------------------------------------
     Peak flow rate of this hydrograph =     21.007(CFS)
    ---------------------------------------------------------------------
    +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        3 - H O U R    S T O R M
                    R u n o f f      H y d r o g r a p h
    ---------------------------------------------------------------------
                Hydrograph in   5   Minute intervals ((CFS))

    ---------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        7.5      15.0      22.5      30.0
-------------------------------------------------------------------------
  0+ 5       0.0111      1.62  V Q       |         |         |         |
  0+10       0.0296      2.68  V  Q      |         |         |         |
  0+15       0.0476      2.61  |V Q      |         |         |         |
  0+20       0.0679      2.95  |V Q      |         |         |         |
  0+25       0.0902      3.25  | V Q     |         |         |         |
  0+30       0.1156      3.68  | V Q     |         |         |         |
```


0+35 0.1400 3.55
0+40 0.1656 3.72
0+45 0.1926 3.92
0+50 0.2173 3.59
0+55 0.2412 3.47
1+ 0 0.2671 3.76
1+ 5 0.2976 4.43
1+10 0.3306 4.79
1+15 0.3639 4.84
1+20 0.3956 4.59
1+25 0.4320 5.29
1+30 0.4732 5.99
1+35 0.5124 5.70
1+40 0.5529 5.88
1+45 0.6021 7.14
1+50 0.6539 7.52
1+55 0.7027 7.08
2+ 0 0.7508 6.99
2+ 5 0.8006 7.23
2+10 0.8637 9.17
2+15 0.9443 11.70
2+20 1.0152 10.30
2+25 1.1133 14.25
2+30 1.2399 18.38
2+35 1.3846 21.01
2+40 1.5105 18.29
2+45 1.5771 9.67
2+50 1.6106 4.85
2+55 1.6381 3.99
3+ 0 1.6551 2.47
3+ 5 1.6602 0.74
3+10 1.6607 0.08

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

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

Program License Serial Number 6405

20-001 HARVEST LANDING RETAIL CENTER AND BUSINESS PARK
MDP LANDUSE CONDITION - WATERSHED A
100 YEAR, 1 HOUR STORM EVENT ANALYSIS

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

English Units used in output format

Drainage Area = 13.22(Ac.) = 0.021 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 13.22(Ac.) = 0.021 Sq. Mi.
Length along longest watercourse = 1359.00(Ft.)
Length along longest watercourse measured to centroid = 693.00(Ft.)
Length along longest watercourse = 0.257 Mi.
Length along longest watercourse measured to centroid = 0.131 Mi.
Difference in elevation = 18.70(Ft.)
Slope along watercourse = 72.6534 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.088 Hr.
Lag time = 5.28 Min.
25% of lag time = 1.32 Min.
40% of lag time = 2.11 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
13.22	0.50	6.61

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
13.22	1.12	14.81

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.500(In)
Area Averaged 100-Year Rainfall = 1.120(In)

Point rain (area averaged) = 1.120(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.120(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
13.220	61.30	0.500

Total Area Entered = 13.22(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
61.3	61.3	0.456	0.500	0.251	1.000	0.251
					Sum (F) =	0.251

Area averaged mean soil loss (F) (In/Hr) = 0.251
Minimum soil loss rate ((In/Hr)) = 0.125
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.500

Slope of intensity-duration curve for a 1 hour storm =0.5000

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

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	94.673	17.575	2.342
2	0.167	189.345	47.848	6.375
3	0.250	284.018	16.514	2.200
4	0.333	378.691	7.359	0.980
5	0.417	473.363	4.203	0.560
6	0.500	568.036	2.720	0.362
7	0.583	662.709	1.772	0.236
8	0.667	757.381	1.110	0.148
9	0.750	852.054	0.900	0.120
		Sum = 100.000	Sum=	13.323

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

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.20	0.564	0.251	(0.282)	0.314
2	0.17	4.30	0.578	0.251	(0.289)	0.327
3	0.25	5.00	0.672	0.251	(0.336)	0.421
4	0.33	5.00	0.672	0.251	(0.336)	0.421
5	0.42	5.80	0.779	0.251	(0.390)	0.529
6	0.50	6.50	0.873	0.251	(0.437)	0.623
7	0.58	7.40	0.994	0.251	(0.497)	0.744
8	0.67	8.60	1.156	0.251	(0.578)	0.905
9	0.75	12.30	1.653	0.251	(0.826)	1.402
10	0.83	29.10	3.911	0.251	(1.955)	3.660
11	0.92	6.80	0.914	0.251	(0.457)	0.663
12	1.00	5.00	0.672	0.251	(0.336)	0.421

(Loss Rate Not Used)

Sum = 100.0 Sum = 10.4

Flood volume = Effective rainfall 0.87(In)
times area 13.2(Ac.)/[(In)/(Ft.)] = 1.0(Ac.Ft)
Total soil loss = 0.25(In)
Total soil loss = 0.276(Ac.Ft)
Total rainfall = 1.12(In)
Flood volume = 41706.3 Cubic Feet
Total soil loss = 12034.5 Cubic Feet

Peak flow rate of this hydrograph = 29.751(CFS)

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

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	7.5	15.0	22.5	30.0
0+ 5	0.0051	0.73	Q				
0+10	0.0241	2.77	VQ				
0+15	0.0500	3.76	V Q				
0+20	0.0824	4.70	V Q				
0+25	0.1192	5.35	V Q				
0+30	0.1638	6.47	V Q				
0+35	0.2169	7.72	VQ				
0+40	0.2808	9.26	VQ				
0+45	0.3630	11.94	Q				
0+50	0.5075	20.98	V Q				
0+55	0.7124	29.75	V Q				
1+ 0	0.8205	15.70	Q V				
1+ 5	0.8837	9.18	Q V				
1+10	0.9149	4.53	Q V				
1+15	0.9333	2.67	Q V				
1+20	0.9447	1.66	Q V				
1+25	0.9517	1.02	Q V				
1+30	0.9561	0.64	Q V				
1+35	0.9571	0.14	Q V				
1+40	0.9574	0.05	Q V				

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

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

Program License Serial Number 6405

20-001 HARVEST LANDING RETAIL CENTER AND BUSINESS PARK
MDP LANDUSE CONDITION - WATERSHED B
100 YEAR, 1 HOUR STORM EVENT ANALYSIS

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

English Units used in output format

Drainage Area = 12.58(Ac.) = 0.020 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 12.58(Ac.) = 0.020 Sq. Mi.
Length along longest watercourse = 1170.00(Ft.)
Length along longest watercourse measured to centroid = 550.00(Ft.)
Length along longest watercourse = 0.222 Mi.
Length along longest watercourse measured to centroid = 0.104 Mi.
Difference in elevation = 16.50(Ft.)
Slope along watercourse = 74.4615 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.076 Hr.
Lag time = 4.55 Min.
25% of lag time = 1.14 Min.
40% of lag time = 1.82 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.58	0.50	6.29

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.58	1.12	14.09

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.500(In)
Area Averaged 100-Year Rainfall = 1.120(In)

Point rain (area averaged) = 1.120(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.120(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
12.580	57.80	0.500

Total Area Entered = 12.58(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
57.8	57.8	0.492	0.500	0.271	1.000	0.271
					Sum (F) =	0.271

Area averaged mean soil loss (F) (In/Hr) = 0.271
Minimum soil loss rate ((In/Hr)) = 0.135
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.500

Slope of intensity-duration curve for a 1 hour storm =0.5000

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

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	109.928	22.218	2.817
2	0.167	219.855	48.832	6.191
3	0.250	329.783	14.316	1.815
4	0.333	439.710	6.548	0.830
5	0.417	549.638	3.637	0.461
6	0.500	659.565	2.267	0.287
7	0.583	769.493	1.329	0.168
8	0.667	879.421	0.855	0.108
		Sum = 100.000	Sum=	12.678

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

Unit Time	Pattern	Storm Rain	Loss rate(In./Hr)	Effective

```
     (Hr.)  Percent   (In/Hr)         Max   |   Low        (In/Hr)
 1   0.08     4.20      0.564          0.271    (  0.282)        0.294
 2   0.17     4.30      0.578          0.271    (  0.289)        0.307
 3   0.25     5.00      0.672          0.271    (  0.336)        0.401
 4   0.33     5.00      0.672          0.271    (  0.336)        0.401
 5   0.42     5.80      0.779          0.271    (  0.390)        0.509
 6   0.50     6.50      0.874          0.271    (  0.437)        0.603
 7   0.58     7.40      0.994          0.271    (  0.497)        0.724
 8   0.67     8.60      1.156          0.271    (  0.578)        0.885
 9   0.75    12.30      1.653          0.271    (  0.826)        1.382
10   0.83    29.10      3.911          0.271    (  1.955)        3.640
11   0.92     6.80      0.914          0.271    (  0.457)        0.643
12   1.00     5.00      0.672          0.271    (  0.336)        0.401
           (Loss Rate Not Used)
   Sum =     100.0                                    Sum =    10.2
    Flood volume = Effective rainfall      0.85(In)
     times area      12.6(Ac.)/[(In)/(Ft.)] =       0.9(Ac.Ft)
    Total soil loss =      0.27(In)
    Total soil loss =     0.284(Ac.Ft)
    Total rainfall =      1.12(In)
    Flood volume =       38771.3 Cubic Feet
    Total soil loss =       12368.1 Cubic Feet
    ------------------------------------------------------------------------
     Peak flow rate of this hydrograph =     28.239(CFS)
    ------------------------------------------------------------------------
    ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        1 - H O U R    S T O R M
                   R u n o f f      H y d r o g r a p h
    ------------------------------------------------------------------------
                Hydrograph in   5   Minute intervals ((CFS))

    ------------------------------------------------------------------------
 Time(h+m) Volume Ac.Ft   Q(CFS)  0        7.5      15.0      22.5      30.0
 ------------------------------------------------------------------------
   0+ 5       0.0057      0.83  VQ        |         |         |         |
   0+10       0.0242      2.68  |V Q      |         |         |         |
   0+15       0.0487      3.57  | V Q     |         |         |         |
   0+20       0.0791      4.42  |  V Q    |         |         |         |
   0+25       0.1138      5.04  |    VQ   |         |         |         |
   0+30       0.1561      6.14  |      VQ |         |         |         |
   0+35       0.2067      7.35  |        Q|         |         |         |
   0+40       0.2679      8.88  |         |QV       |         |         |
   0+45       0.3480     11.64  |         |    Q    |         |         |
   0+50       0.4965     21.56  |         |         | V     Q |         |
   0+55       0.6910     28.24  |         |         |         |V     Q  |
   1+ 0       0.7850     13.64  |         |       Q |         |    V    |
   1+ 5       0.8384      7.75  |         Q         |         |      V  |
   1+10       0.8629      3.57  |   Q     |         |         |       V |
   1+15       0.8768      2.01  | Q       |         |         |        V|
   1+20       0.8846      1.13  |Q        |         |         |        V|
   1+25       0.8888      0.62  Q         |         |         |        V|
   1+30       0.8898      0.14  Q         |         |         |        V|
   1+35       0.8901      0.04  Q         |         |         |        V|
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U n i t H y d r o g r a p h A n a l y s i s

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

Program License Serial Number 6405

20-001 HARVEST LANDING RETAIL CENTER AND BUSINESS PARK
PROPOSED CONDITION - WATERSHED A
100 YEAR, 1 HOUR STORM EVENT ANALYSIS

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

English Units used in output format

Drainage Area = 13.13(Ac.) = 0.021 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 13.13(Ac.) = 0.021 Sq. Mi.
Length along longest watercourse = 1103.00(Ft.)
Length along longest watercourse measured to centroid = 759.00(Ft.)
Length along longest watercourse = 0.209 Mi.
Length along longest watercourse measured to centroid = 0.144 Mi.
Difference in elevation = 26.26(Ft.)
Slope along watercourse = 125.7052 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.038 Hr.
Lag time = 2.28 Min.
25% of lag time = 0.57 Min.
40% of lag time = 0.91 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
13.13	0.50	6.57

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
13.13	1.12	14.71

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.500(In)
Area Averaged 100-Year Rainfall = 1.120(In)

Point rain (area averaged) = 1.120(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.120(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
13.130	60.80	0.722

Total Area Entered = 13.13(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
60.8	60.8	0.461	0.722	0.162	1.000	0.162
					Sum (F) =	0.162

Area averaged mean soil loss (F) (In/Hr) = 0.162
Minimum soil loss rate ((In/Hr)) = 0.081
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.322

Slope of intensity-duration curve for a 1 hour storm =0.5000

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

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	219.748	46.617	6.169
2	0.167	439.496	42.013	5.559
3	0.250	659.243	8.048	1.065
4	0.333	878.991	3.322	0.440
		Sum = 100.000	Sum=	13.233

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

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.20	0.564	0.162	(0.182)	0.403
2	0.17	4.30	0.578	0.162	(0.186)	0.416
3	0.25	5.00	0.672	0.162	(0.217)	0.510

```
 4   0.33     5.00      0.672          0.162    (  0.217)        0.510
 5   0.42     5.80      0.779          0.162    (  0.251)        0.618
 6   0.50     6.50      0.873          0.162    (  0.282)        0.712
 7   0.58     7.40      0.994          0.162    (  0.321)        0.833
 8   0.67     8.60      1.156          0.162    (  0.373)        0.994
 9   0.75    12.30      1.653          0.162    (  0.533)        1.491
10   0.83    29.10      3.911          0.162    (  1.261)        3.749
11   0.92     6.80      0.914          0.162    (  0.295)        0.752
12   1.00     5.00      0.672          0.162    (  0.217)        0.510
           (Loss Rate Not Used)
   Sum =     100.0                                    Sum =    11.5
    Flood volume = Effective rainfall      0.96(In)
     times area      13.1(Ac.)/[(In)/(Ft.)] =       1.0(Ac.Ft)
    Total soil loss =      0.16(In)
    Total soil loss =     0.177(Ac.Ft)
    Total rainfall =      1.12(In)
    Flood volume =       45674.3 Cubic Feet
    Total soil loss =        7700.7 Cubic Feet
    ---------------------------------------------------------------------
     Peak flow rate of this hydrograph =     32.859(CFS)
    ---------------------------------------------------------------------
    +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        1 - H O U R    S T O R M
                   R u n o f f      H y d r o g r a p h
    ---------------------------------------------------------------------
                Hydrograph in   5   Minute intervals ((CFS))

    ---------------------------------------------------------------------
 Time(h+m) Volume Ac.Ft   Q(CFS)  0       10.0      20.0      30.0      40.0
 ---------------------------------------------------------------------------
   0+ 5       0.0171      2.49  V Q       |         |         |         |
   0+10       0.0502      4.81  |V  Q     |         |         |         |
   0+15       0.0908      5.89  |  V Q    |         |         |         |
   0+20       0.1364      6.61  |    VQ   |         |         |         |
   0+25       0.1872      7.38  |      Q  |         |         |         |
   0+30       0.2464      8.60  |       QV|         |         |         |
   0+35       0.3152      9.98  |        Q| V       |         |         |
   0+40       0.3964     11.80  |         |Q   V    |         |         |
   0+45       0.5062     15.93  |         |    Q   V|         |         |
   0+50       0.7325     32.86  |         |         |      V  | Q       |
   0+55       0.9220     27.52  |         |         |      Q  |    V    |
   1+ 0       1.0045     11.98  |         |Q        |         |       V |
   1+ 5       1.0410      5.29  |    Q    |         |         |        V|
   1+10       1.0470      0.87  Q         |         |         |        V|
   1+15       1.0485      0.22  Q         |         |         |         V
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U n i t H y d r o g r a p h A n a l y s i s

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

Program License Serial Number 6405

20-001 HARVEST LANDING RETAIL CENTER AND BUSINESS PARK
PROPOSED CONDITION - WATERSHED B
100 YEAR, 1 HOUR STORM EVENT ANALYSIS

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

English Units used in output format

Drainage Area = 12.68(Ac.) = 0.020 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 12.68(Ac.) = 0.020 Sq. Mi.
Length along longest watercourse = 818.00(Ft.)
Length along longest watercourse measured to centroid = 475.00(Ft.)
Length along longest watercourse = 0.155 Mi.
Length along longest watercourse measured to centroid = 0.090 Mi.
Difference in elevation = 25.60(Ft.)
Slope along watercourse = 165.2421 Ft./Mi.
Average Manning's 'N' = 0.016
Lag time = 0.028 Hr.
Lag time = 1.68 Min.
25% of lag time = 0.42 Min.
40% of lag time = 0.67 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.68	0.50	6.34

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.68	1.12	14.20

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.500(In)
Area Averaged 100-Year Rainfall = 1.120(In)

Point rain (area averaged) = 1.120(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.120(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
12.680	57.60	0.819

Total Area Entered = 12.68(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
57.6	57.6	0.494	0.819	0.130	1.000	0.130
					Sum (F) =	0.130

Area averaged mean soil loss (F) (In/Hr) = 0.130
Minimum soil loss rate ((In/Hr)) = 0.065
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.245

Slope of intensity-duration curve for a 1 hour storm =0.5000

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

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	297.946	56.468	7.216
2	0.167	595.892	37.242	4.759
3	0.250	893.838	6.290	0.804
		Sum = 100.000	Sum=	12.779

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

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.20	0.564	0.130	(0.138)	0.434
2	0.17	4.30	0.578	0.130	(0.141)	0.448
3	0.25	5.00	0.672	0.130	(0.164)	0.542
4	0.33	5.00	0.672	0.130	(0.164)	0.542

5	0.42	5.80	0.779	0.130	(0.191)	0.649
6	0.50	6.50	0.873	0.130	(0.214)	0.744
7	0.58	7.40	0.994	0.130	(0.243)	0.864
8	0.67	8.60	1.156	0.130	(0.283)	1.026
9	0.75	12.30	1.653	0.130	(0.405)	1.523
10	0.83	29.10	3.911	0.130	(0.957)	3.781
11	0.92	6.80	0.914	0.130	(0.224)	0.784
12	1.00	5.00	0.672	0.130	(0.164)	0.542

(Loss Rate Not Used)

Sum = 100.0 Sum = 11.9

Flood volume = Effective rainfall 0.99(In)
times area 12.7(Ac.)/[(In)/(Ft.)] = 1.0(Ac.Ft)
Total soil loss = 0.13(In)
Total soil loss = 0.137(Ac.Ft)
Total rainfall = 1.12(In)
Flood volume = 45562.2 Cubic Feet
Total soil loss = 5983.6 Cubic Feet

Peak flow rate of this hydrograph = 35.372(CFS)

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

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	10.0	20.0	30.0	40.0
0+ 5	0.0216	3.14	V Q	|	|	|	|
0+10	0.0581	5.30	| V Q	|	|	|	|
0+15	0.1022	6.39	| V Q	|	|	|	|
0+20	0.1494	6.85	| VQ	|	|	|	|
0+25	0.2024	7.71	| Q	|	|	|	|
0+30	0.2637	8.90	| Q V	|	|	|	|
0+35	0.3346	10.30	| Q V	|	|	|	|
0+40	0.4181	12.12	| Q V	|	|	|	|
0+45	0.5323	16.57	| Q V	|	|	|	|
0+50	0.7759	35.37	| V	|	|	| Q	|
0+55	0.9473	24.89	| Q	|	| V	|	|
1+ 0	1.0209	10.69	| Q	|	|	| V	|
1+ 5	1.0430	3.21	| Q	|	|	| V	|
1+10	1.0460	0.44	Q	|	|	|	V

SECTION 3 - REFERENCE DATA

USGS SOILS REPORT

PLATE D-4.1

INFILTRATION REPORT (EXCERPT)

CONTECH UNDERGROUND CHAMBER SYSTEM

DCV CALCULATIONS (WQMP)

PP190005 – HARVILL DISTRIBUTION CENTER OFFSITE DRAINAGE IMPROVEMENTS (HYDROLOGY MAPS)

United States Department of Agriculture

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 Western Riverside Area, California



October 1, 2024

Preface

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

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

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

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

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

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

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How Soil Surveys Are Made

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

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

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

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

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

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

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

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

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

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

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

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

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

Soil Map

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

Custom Soil Resource Report
Soil Map



Map Scale: 1:2,390 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 35 70 140 210

Feet: 0 100 200 400 600

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

MAP LEGEND

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

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

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: Western Riverside Area, California
Survey Area Data: Version 17, Aug 30, 2024

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

Date(s) aerial images were photographed: Mar 14, 2022—Mar 17, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
EpA	Exeter sandy loam, deep, 0 to 2 percent slopes	7.2	27.8%
GyC2	Greenfield sandy loam, 2 to 8 percent slopes, eroded	0.3	1.3%
PaA	Pachappa fine sandy loam, 0 to 2 percent slopes	18.3	70.9%
Totals for Area of Interest		**25.8**	**100.0%**

Map Unit Descriptions

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

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

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

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or

landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

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

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

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

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

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

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

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

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

Western Riverside Area, California

EpA—Exeter sandy loam, deep, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: hctk
Elevation: 300 to 700 feet
Mean annual precipitation: 7 to 15 inches
Mean annual air temperature: 64 degrees F
Frost-free period: 250 to 300 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

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

Description of Exeter

Setting

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

Typical profile

H1 - 0 to 16 inches: sandy loam
H2 - 16 to 37 inches: sandy clay loam
H3 - 37 to 50 inches: indurated
H4 - 50 to 60 inches: stratified sandy loam to silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 35 to 60 inches to duripan
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: R019XD029CA - LOAMY
Hydric soil rating: No

Minor Components

Greenfield
Percent of map unit: 5 percent
Hydric soil rating: No

Ramona
Percent of map unit: 5 percent
Hydric soil rating: No

Monserate
Percent of map unit: 5 percent
Hydric soil rating: No

GyC2—Greenfield sandy loam, 2 to 8 percent slopes, eroded

Map Unit Setting
National map unit symbol: hcvw
Elevation: 100 to 3,500 feet
Mean annual precipitation: 9 to 20 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 200 to 300 days
Farmland classification: Prime farmland if irrigated

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

Description of Greenfield

Setting
Landform: Terraces, alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile
H1 - 0 to 26 inches: sandy loam
H2 - 26 to 43 inches: fine sandy loam
H3 - 43 to 60 inches: loam
H4 - 60 to 72 inches: stratified loamy sand to sandy loam

Properties and qualities
Slope: 2 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Ecological site: R019XD029CA - LOAMY
Hydric soil rating: No

Minor Components

Hanford

Percent of map unit: 3 percent
Hydric soil rating: No

Pachappa

Percent of map unit: 3 percent
Hydric soil rating: No

Arlington

Percent of map unit: 3 percent
Hydric soil rating: No

Unnamed

Percent of map unit: 3 percent
Hydric soil rating: No

Ramona

Percent of map unit: 3 percent
Hydric soil rating: No

PaA—Pachappa fine sandy loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: hcxn
Elevation: 1,000 feet
Mean annual precipitation: 14 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 270 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

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

Description of Pachappa

Setting

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

Typical profile

H1 - 0 to 20 inches: fine sandy loam
H2 - 20 to 63 inches: loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 9.0 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 3c
Hydrologic Soil Group: B
Ecological site: R019XD029CA - LOAMY
Hydric soil rating: No

Minor Components

Hanford

Percent of map unit: 5 percent
Hydric soil rating: No

Greenfield

Percent of map unit: 5 percent
Hydric soil rating: No

San emigdio

Percent of map unit: 5 percent
Hydric soil rating: No

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

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 soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

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.

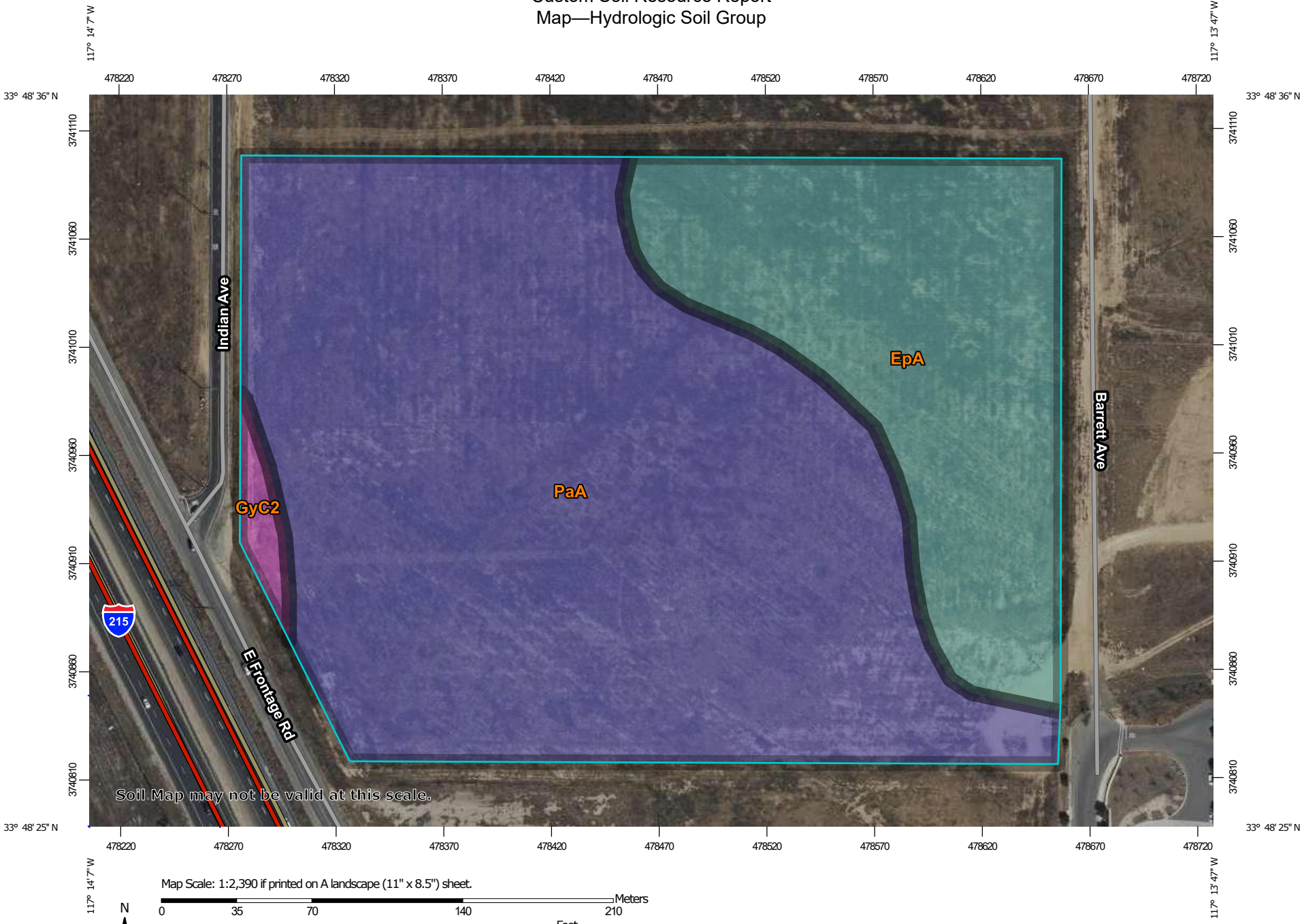
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

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. Only the soils that in their natural condition are in group D are assigned to dual classes.

Custom Soil Resource Report
Map—Hydrologic Soil Group



Map Scale: 1:2,390 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 35 70 140 210

Feet: 0 100 200 400 600

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 1:15,800.

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: Western Riverside Area, California
Survey Area Data: Version 17, Aug 30, 2024

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

Date(s) aerial images were photographed: Mar 14, 2022—Mar 17, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
EpA	Exeter sandy loam, deep, 0 to 2 percent slopes	C	7.2	27.8%
GyC2	Greenfield sandy loam, 2 to 8 percent slopes, eroded	A	0.3	1.3%
PaA	Pachappa fine sandy loam, 0 to 2 percent slopes	B	18.3	70.9%
Totals for Area of Interest			**25.8**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

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RAINFALL INTENSITY–INCHES PER HOUR

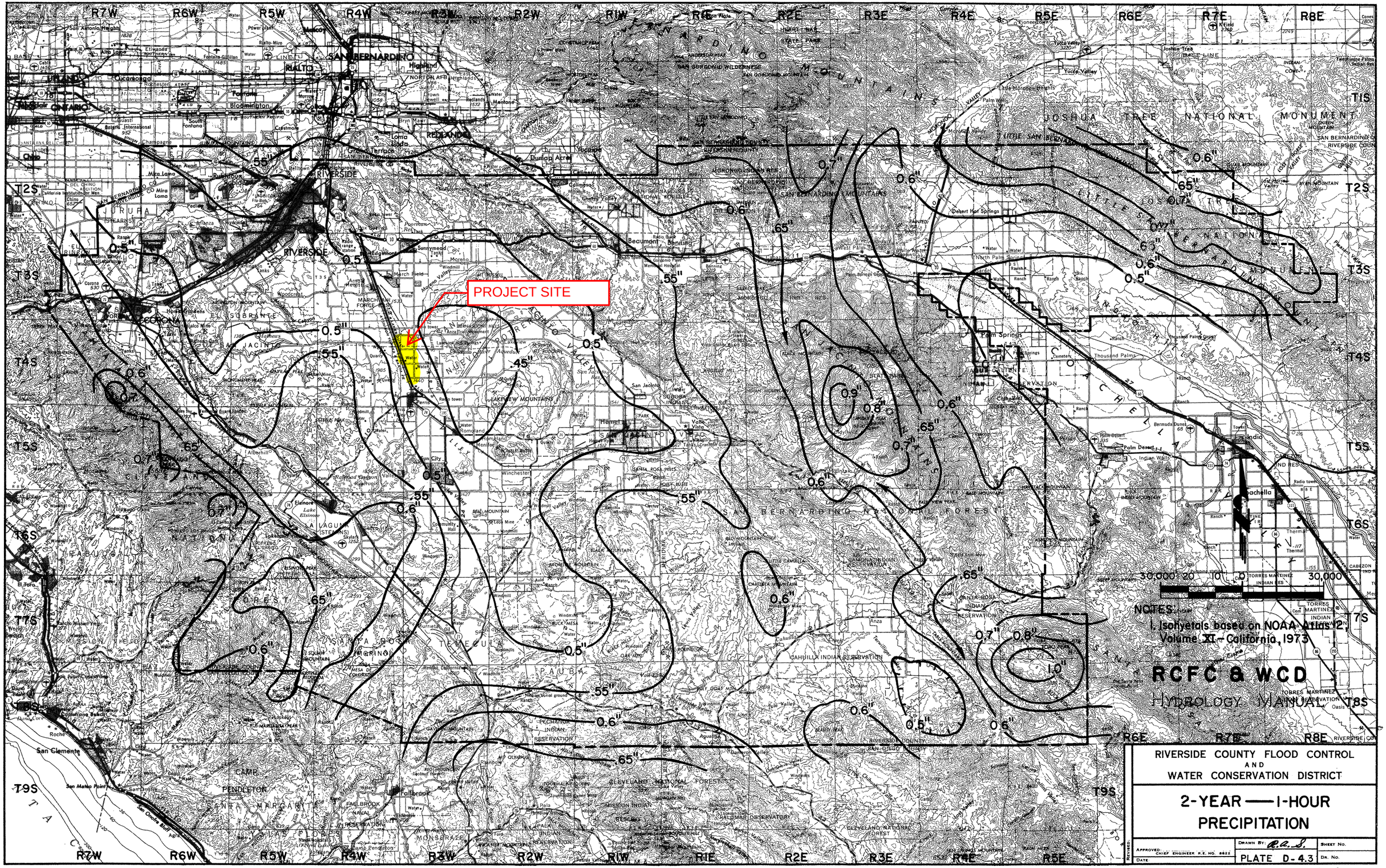
MIRA LOMA			MURRIETA - TEMECULA & RANCHO CALIFORNIA			NORCO			PALM SPRINGS			PERRIS VALLEY		
DURATION MINUTES	FREQUENCY		DURATION MINUTES	FREQUENCY		DURATION MINUTES	FREQUENCY		DURATION MINUTES	FREQUENCY		DURATION MINUTES	FREQUENCY	
	10 YEAR	100 YEAR		10 YEAR	100 YEAR		10 YEAR	100 YEAR		10 YEAR	100 YEAR		10 YEAR	100 YEAR
5	2.84	4.48	5	3.45	5.10	5	2.77	4.16	5	4.23	6.76	5	2.64	3.78
6	2.58	4.07	6	3.12	4.61	6	2.53	3.79	6	3.80	6.08	6	2.41	3.46
7	2.37	3.75	7	2.87	4.24	7	2.34	3.51	7	3.48	5.56	7	2.24	3.21
8	2.21	3.49	8	2.67	3.94	8	2.19	3.29	8	3.22	5.15	8	2.09	3.01
9	2.08	3.28	9	2.50	3.69	9	2.07	3.10	9	3.01	4.81	9	1.98	2.84
10	1.96	3.10	10	2.36	3.48	10	1.96	2.94	10	2.83	4.52	10	1.88	2.69
11	1.87	2.95	11	2.24	3.30	11	1.87	2.80	11	2.67	4.28	11	1.79	2.57
12	1.78	2.82	12	2.13	3.15	12	1.79	2.68	12	2.54	4.07	12	1.72	2.46
13	1.71	2.70	13	2.04	3.01	13	1.72	2.58	13	2.43	3.88	13	1.65	2.37
14	1.64	2.60	14	1.96	2.89	14	1.66	2.48	14	2.33	3.72	14	1.59	2.29
15	1.58	2.50	15	1.89	2.79	15	1.60	2.40	15	2.23	3.58	15	1.54	2.21
16	1.53	2.42	16	1.82	2.69	16	1.55	2.32	16	2.15	3.44	16	1.49	2.14
17	1.48	2.34	17	1.76	2.60	17	1.50	2.25	17	2.08	3.32	17	1.45	2.08
18	1.44	2.27	18	1.71	2.52	18	1.46	2.19	18	2.01	3.22	18	1.41	2.02
19	1.40	2.21	19	1.66	2.45	19	1.42	2.13	19	1.95	3.12	19	1.37	1.97
20	1.36	2.15	20	1.61	2.38	20	1.39	2.08	20	1.89	3.03	20	1.34	1.92
22	1.29	2.04	22	1.53	2.26	22	1.32	1.98	22	1.79	2.86	22	1.28	1.83
24	1.24	1.95	24	1.46	2.15	24	1.26	1.90	24	1.70	2.72	24	1.22	1.75
26	1.18	1.87	26	1.39	2.06	26	1.22	1.82	26	1.62	2.60	26	1.18	1.69
28	1.14	1.80	28	1.34	1.98	28	1.17	1.76	28	1.56	2.49	28	1.13	1.63
30	1.10	1.73	30	1.29	1.90	30	1.13	1.70	30	1.49	2.39	30	1.10	1.57
32	1.06	1.67	32	1.24	1.84	32	1.10	1.64	32	1.44	2.30	32	1.06	1.52
34	1.03	1.62	34	1.20	1.78	34	1.06	1.59	34	1.39	2.22	34	1.03	1.48
36	1.00	1.57	36	1.17	1.72	36	1.03	1.55	36	1.34	2.15	36	1.00	1.44
38	.97	1.53	38	1.13	1.67	38	1.01	1.51	38	1.30	2.09	38	.98	1.40
40	.94	1.49	40	1.10	1.62	40	.98	1.47	40	1.27	2.02	40	.95	1.37
45	.89	1.40	45	1.03	1.52	45	.92	1.39	45	1.18	1.89	45	.90	1.29
50	.84	1.32	50	.97	1.44	50	.88	1.31	50	1.11	1.78	50	.85	1.22
55	.80	1.26	55	.92	1.36	55	.84	1.25	55	1.05	1.68	55	.81	1.17
60	.76	1.20	60	.88	1.30	60	.80	1.20	60	1.00	1.60	60	.78	1.12
65	.73	1.15	65	.84	1.24	65	.77	1.15	65	.95	1.53	65	.75	1.08
70	.70	1.11	70	.81	1.19	70	.74	1.11	70	.91	1.46	70	.72	1.04
75	.68	1.07	75	.78	1.15	75	.72	1.07	75	.88	1.41	75	.70	1.00
80	.65	1.03	80	.75	1.11	80	.69	1.04	80	.85	1.35	80	.68	.97
85	.63	1.00	85	.73	1.07	85	.67	1.01	85	.82	1.31	85	.66	.94
SLOPE = .530			SLOPE = .550			SLOPE = .500			SLOPE = .580			SLOPE = .490		

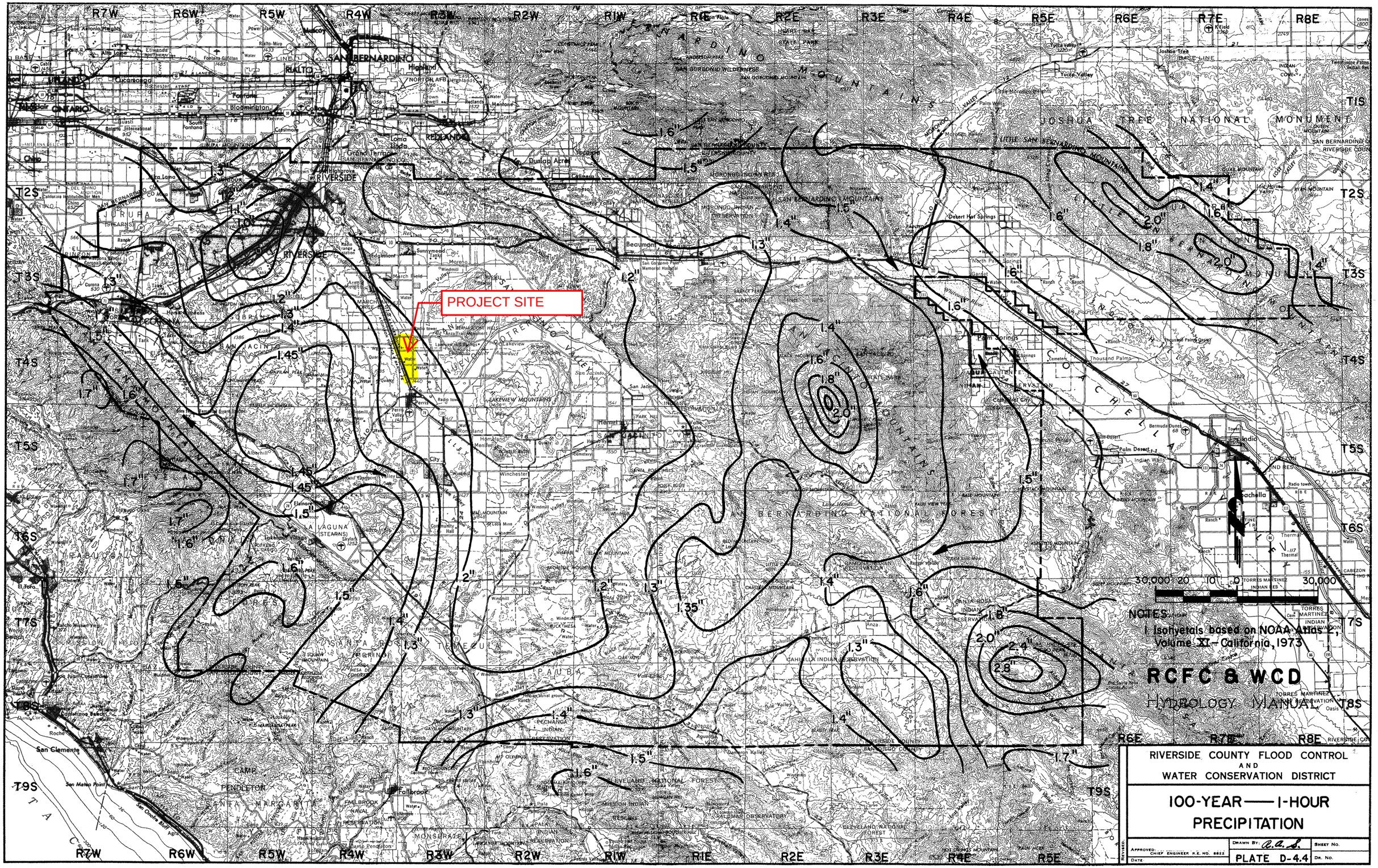
RCFC & WCD

HYDROLOGY MANUAL

STANDARD INTENSITY–DURATION CURVES DATA

PLATE D-4.1 (4 of 6)


PROJECT SITE
0.5"
.55"
.45"
.65"
0.6"
0.7"
0.8"
0.9"
1.0"
NOTES:
1. Isohyetals based on NOAA Atlas 2, Volume XI - California, 1973
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
2-YEAR — 1-HOUR PRECIPITATION
APPROVED CHIEF ENGINEER R.E. NO. 8822
DATE
DRAWN BY: R.A.S.
PLATE D-4.3
SHEET No.
DR. No.
REVISED:


PROJECT SITE
1.6"
1.5"
1.4"
1.3"
1.2"
1.45"
1.7"
2.0"
1.8"
2.4"
2.8"
1.35"
NOTES:
1. Isohyetals based on NOAA Atlas 2, Volume XI - California, 1973
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
100-YEAR — 1-HOUR PRECIPITATION
DRAWN BY: A.A.S.
SHEET NO.
PLATE D-4.4
DR. NO.
APPROVED: CHIEF ENGINEER R.E. NO. 6822
DATE
REVISED

September 20, 2023

Howard Industrial Partners
1944 North Tustin Street, Suite 122
Orange, California 92865

Attention: Mr. Mike Tunney
Vice President

Project No.: **22G183-4**

Subject: **Results of Additional Infiltration Testing**
Harvest Landing Industrial Development
Indian Avenue and Orange Avenue
Perris, California

Reference: 1) Geotechnical Investigation, Proposed Harvest Landing Industrial Development, Indian Avenue and Orange Avenue, Perris, California, prepared for Howard Industrial Partners, by Southern California Geotechnical, Inc. (SCG), SCG Project No. 22G183-1, dated June 13, 2022.

2) Results of Infiltration Testing, Proposed Harvest Landing Industrial Development, Indian Avenue and Orange Avenue, Perris, California, prepared by Southern California Geotechnical, Inc. (SCG), SCG Project No. 22G183-2, dated July 1, 2022.

3) Geotechnical Investigation, Harvest Landing Industrial Development, Indian Avenue and Orange Avenue, Perris, California, prepared for Howard Industrial Partners, by Southern California Geotechnical, Inc. (SCG), SCG Project No. 22G183-3, dated September 21, 2023.

Mr. Tunney:

In accordance with your request, we have conducted infiltration testing at the subject site. We are pleased to present this report summarizing the results of the infiltration testing and our design recommendations.

Scope of Services

The scope of services performed for this project was in general accordance with our Proposal No. 23P306R, dated August 9, 2023. The scope of services included site reconnaissance, subsurface exploration, field testing, and engineering analysis to determine the infiltration rates of the on-site soils. The infiltration testing was performed in general accordance with the guidelines published in Riverside County – Low Impact Development BMP Design Handbook – Section 2.3 of Appendix A, prepared for the Riverside County Department of Environmental Health (RCDEH), dated December, 2013.

Site and Project Description

The site is located at the southwest corner of North Perris Boulevard and Orange Avenue in Perris, California. The site is bounded to the north by Orange Avenue, West Water Avenue, and vacant land, to the west by Interstate 215 Frontage Road and Freeway I-215, to the south by an existing commercial development and a vacant land, and to the east by an existing commercial development, North Perris Boulevard and Barrett Avenue. The western portion of the site is partially transected by Indian Avenue (trending north-south). Orange Avenue (trending east-west) separates the northern portion of the overall site (designated as Phase 2 on the site plans) from Phase 1 in the central to southern portions of the western portion of the overall site. The general location of the site is illustrated on the Site Location Map, enclosed as Plate 1 in Appendix A of this report.

The site consists of several parcels, which total 214.82± acres in size. The west-central area of the site, is developed with four (4) single-family residences (SFRs) which range from approximately 1,200 to 6,160 ft² in size. The residences are of wood-frame and stucco construction and are assumed to be supported on conventional shallow foundations, with slab-on-grade floors. Ground surface cover surrounding the SFRs includes asphaltic concrete with Portland cement concrete driveways, exposed soil, and trees. The remaining areas of the site are vacant and undeveloped. Ground surface cover consists of exposed soil with sparse to moderate native grass and weed growth and occasional trees. A water pump is present approximately 200 feet south of the intersection of Perris Boulevard and Orange Avenue, within the site's boundary. A 3- to 4-foot deep drainage rut is present in the central-eastern area of the site, trending east-west between a dirt road located and the east boundary of the site. Many small stockpiles of plant material and woodchips are located along the eastern side of Indian Avenue, approximately 2 to 4-feet in height. Based on historic aerial photographs obtained from Google Earth, the site was previously used for farming activities. Due to previous tilling activities, the ground surface throughout the site is generally hummocky.

Detailed topographic information was obtained from the Exhibit A-Infiltration Testing Locations plan, prepared by FM Civil Engineers, Inc. Based on this plan, the overall site topography slopes downward to the east at a gradient of 1.5± percent.

Proposed Development

Based on a site plan prepared by RGA, the site will be developed with the following industrial/commercial buildings, located throughout the site.

Building Type	Building Name	Location	Size (ft²)
Industrial	1	Northwest	380,000
Industrial	2	West-Central	88,400
Industrial	3	West-Central	50,000
Industrial	4	Southwest	18,800

Distribution	5	Central	440,000
Commercial	Big Box Retail	Southeast	165,000
Commercial	Shopping Center	Northeast	150,000
Retail	Pad 1	Northeast	6,500
Retail	Pad 2	Northeast	6,500
Restaurant	Pad 3	East	2,305
Retail	Pad 4	East	9,000
Restaurant	Pad 5	Southeast	3,172

Building Nos. 1 through 4 - Industrial Buildings

Dock-high doors will be constructed along a portion of at least one building wall for each of the industrial buildings. The buildings will be surrounded by asphaltic concrete pavements in the parking and drive lanes, Portland cement concrete pavements in the loading dock areas, and limited areas of concrete flatwork and landscape planters throughout.

Detailed structural information has not been provided. We assume the new industrial buildings will be single-story structures of tilt-up concrete construction, typically supported on conventional shallow foundation systems with concrete slab-on-grade floors. Based on the assumed construction, maximum column and wall loads are expected to be on the order of 100 kips and 4 to 7 kips per linear foot, respectively.

Building No. 5 - Distribution Building

Dock-high doors will be constructed along portions of the east and west building walls. The building will be surrounded by asphaltic concrete pavements in the parking and drive lanes, Portland cement concrete pavements in the loading dock areas, and limited areas of concrete flatwork and landscape planters throughout. Two ancillary buildings, 15,300± ft² and 3,300± ft² in size are located to the south of the main distribution building.

Detailed structural information has not been provided. We assume the new main distribution building will be a two-story structure of tilt-up concrete construction, typically supported on conventional shallow foundation system with a concrete slab-on-grade floor. Based on the assumed construction, maximum column and wall loads are expected to be on the order of 700 to 900 kips and 4 to 7 kips per linear foot, respectively.

Commercial – Big Box Retail

Dock-high doors will be constructed along a portion of the east building wall. The building will be surrounded by asphaltic concrete pavements in the parking and drive lanes, Portland cement concrete in the loading dock areas, and limited areas of concrete flatwork and landscape planters

throughout. This commercial development will include an automobile service station located east of the building. The service station will include a canopy, five (5) fuel pump islands, and underground storage tanks (USTs).

Detailed structural information has not been provided. We assume that the commercial building will be a single-story structure of tilt-up concrete construction, typically supported on conventional shallow foundation system with concrete slab-on-grade floors. Based on the assumed construction, maximum column and wall loads are expected to be on the order of 100 kips and 4 to 7 kips per linear foot, respectively. The new pump island canopy is expected to be a steel frame structure, typically supported on deepened shallow foundations. Maximum column loads for the canopy are expected to be in the range of 20 kips, with significant overturning and/or uplift loads.

Commercial – Shopping Center

The shopping center building will consist of eight (8) suites ranging from 2,400± ft² to 54,000± ft² in size. Dock-high doors will be constructed along a portion of the west building walls for four (4) of the suites of the shopping center building. The building will be surrounded by asphaltic concrete pavements in the parking and drive lanes, Portland cement concrete in the loading dock areas, and limited areas of concrete flatwork and landscape planters throughout.

Detailed structural information has not been provided. We assume that the new shopping center building will be a single-story structure of wood frame or masonry block construction, typically supported on conventional shallow foundation systems with a concrete slab-on-grade floor. Based on the assumed construction, maximum column and wall loads are expected to be on the order of 50 kips and 2 to 3 kips per linear foot, respectively.

Retail and Restaurant Buildings

The two fast-food restaurant buildings will include drive-thru lanes. Pad 4 will contain four (4) suites. The buildings will be surrounded by asphaltic concrete pavements in the parking and drive lanes, concrete flatwork, and limited areas of landscape planters throughout.

Detailed structural information has not been provided. We assume that the new retail and restaurant buildings will be single-story structures of wood frame construction, typically supported on conventional shallow foundation systems with concrete slab-on-grade floors. Based on the assumed construction, maximum column and wall loads are expected to be on the order of 20 kips and 1 to 3 kips per linear foot, respectively.

Streets

Barrett Avenue and two access streets will be constructed at the site. It is assumed that the new streets will consist of asphaltic concrete pavements.

General

No significant amounts of below-grade construction, such as basements or crawl spaces, are expected to be included in the proposed development. Based on the assumed topography, cuts and fills of up to 8 to 10± feet are expected to be necessary to achieve the proposed site grades

throughout the site.

Streets

Barrett Avenue and two access streets will be constructed at the site. It is assumed that the new streets will consist of asphaltic concrete pavements.

Previous Studies

Southern California Geotechnical (SCG) previously conducted a geotechnical investigation at the subject site (Reference No. 1). As a part of this study, twenty-three (23) borings (Identified as Boring Nos. B-1 through B-23) were advanced to depths of 15 to 25± feet below the existing site grades. Native alluvium was encountered at each boring locations, extending to at least the maximum depth explored of 25± feet below existing site grades. The alluvium generally consists of medium dense to very dense silty sands to sandy silts, with trace to little clay content. Free water was not encountered during the drilling of the borings. Based on the lack of water within the borings and the moisture contents of the recovered soil samples, the static groundwater is considered to have existed at a depth in excess of 25± feet at the time of the subsurface exploration.

SCG also previously conducted infiltration testing at the subject site (Reference No. 2). The subsurface exploration performed for the infiltration testing consisted of six (6) shallow infiltration trenches (identified as Infiltration Trench Nos. I-1 through I-6) and four (4) deep infiltration borings (identified as Infiltration Boring Nos. I-7 through I-10). The infiltration trenches were excavated to a depth of 7± feet below existing site grades. The infiltration borings were extended to a depth of 50± feet below existing site grades. In addition, one (1) exploratory boring was extended to a depth of 60± feet below site grades. Artificial fill soils were encountered at the ground surface at Infiltration Test No. I-3, extending to a depth of 1± foot below existing site grades. The fill soils consisted of medium dense fine to medium sandy silts with trace quantities of clay and fine gravel. Native alluvium was encountered at the ground surface at all of the remaining boring and trench locations, extending to at least the maximum explored depth of 60± feet below existing site grades. The near-surface alluvium encountered at depths less than 25± feet below existing site grades consisted of medium dense to very dense fine to medium sandy silts, silty fine to medium sands, clayey fine to coarse sands, and hard fine to coarse sandy clays. At depths greater than 25± feet, the alluvium consisted of medium dense to very dense fine sandy silts, fine to medium sandy silts, silty fine to medium sands, and hard fine to medium sandy clays. Based on the results of the testing, SCG recommended infiltration rates of 0.9 to 3.6 inches per hour for the proposed chamber systems. Additionally, SCG did not recommend dry well infiltration at the subject site.

Concurrent Study

SCG concurrently conducted a geotechnical investigation at the subject site (Reference No. 3). As a part of this study, forty-three (43) borings (identified as Boring Nos. B-25 through B-67) were advanced to depths of 10 to 50± feet below the existing site grades.

Younger native alluvium was encountered at the ground surface at Boring Nos. B-25, B-28, B-29, B-31, B-32, B-50, B-55 through B-58, B-60, B-64, and B-67, extending to depths of 2½ to 5½± feet below existing site grades. The alluvium generally consists of loose to medium dense silty

fine sands, silty fine to medium sands, fine sandy silts, clayey fine sands. Occasional layers of very stiff fine sandy clays and silty clays. The younger native alluvial soils are classified as "alluvium" on the boring logs. Native older alluvium was encountered beneath the younger native alluvial soils (at the boring locations listed above) and at the ground surface at the remaining boring locations. All of the borings were terminated within the older alluvium, and the older alluvial soils extend to at least the maximum depth explored of 50± feet below ground surface. The older alluvial soils generally consist of medium dense to very dense well- to poorly-graded silty sands with varying clay content, well-graded to poorly-graded sandy silts with varying clay content, well-graded to poorly-graded clayey sands with varying silt content, and clayey silts. Additionally, layers of very stiff to hard fine sandy clays and silty clays were encountered. The older alluvium generally possesses weak to moderate cementation, and occasionally possesses trace to extensive calcareous nodules and veining.

Groundwater

Free water was not encountered during the drilling of any of the borings. Based on the moisture content of the recovered soil samples and the lack of free water in the borings, the static groundwater table is at a depth greater than the maximum explored depth of 50± feet below existing site grades for this project.

Recent water level data was obtained from the California Department of Water Resources website, http://www.water.ca.gov/waterdatalibrary/. The nearest monitoring well is located on the northeast corner of the site. Water level readings within this monitoring well indicates a groundwater level of 40± feet (March 2023) below the ground surface.

Subsurface Exploration

Scope of Exploration

The subsurface exploration conducted for the infiltration testing consisted of thirty-seven (37) infiltration test borings, advanced to depths of 3 to 10½± feet below the existing site grades. The infiltration borings were advanced using a truck-mounted drilling rig, equipped with 8-inch-diameter hollow stem augers and were logged during drilling by a member of our staff. The approximate locations of the infiltration test borings (identified as Infiltration Test Nos. I-11 through I-37) are indicated on the Infiltration Test Location Plan, enclosed as Plate 2 of this report.

Upon the completion of the infiltration borings, the bottom of each test boring was covered with 2± inches of clean ¾-inch gravel. A sufficient length of 3-inch-diameter perforated PVC casing was then placed into each test hole so that the PVC casing extended from the bottom of the test hole to the ground surface. Clean ¾-inch gravel was then installed in the annulus surrounding the PVC casing.

Geotechnical Conditions

Native younger alluvium was encountered at the ground surface at Infiltration Test Nos. I-11, I-23, I-26 and I-39, extending to depths of 3 to 6± feet below the existing site grades. The younger alluvium generally consists of medium dense silty sands and sandy silts. Native older alluvium was encountered beneath the native younger alluvium and at the ground surface at the remaining

infiltration test locations, extending to at least the maximum depth explored of 10½± feet. The older alluvium generally consists of medium dense to very dense silty sands and sandy silts with trace to little clay content. The older alluvium occasionally possesses weak cementation. The Infiltration Boring Logs, which illustrate the conditions encountered at each of the borings, are included with this report.

Infiltration Testing

As previously mentioned, the infiltration testing was performed in general accordance with the Riverside County guidelines: Riverside County – Low Impact Development BMP Design Handbook – Section 2.3 of Appendix A.

Pre-soaking

In accordance with the county infiltration standards all of the infiltration test borings were pre-soaked prior to the infiltration testing. The pre-soaking process consisted of filling the test borings by inverting a full 5-gallon bottle of clear water supported over each hole so that the water level reaches a level of at least 5 times the hole's radius above the gravel at the bottom of each hole. The pre-soaking was completed after all of the water had percolated through each test hole or after 15 hours since initiating the pre-soak. Based on the results of the pre-soaking process, 30-minute readings were utilized during all of the infiltration tests, except for Infiltration Test Nos. I-24 and I-45. For Infiltration Test Nos. I-24 and I-45, 10-minute readings were utilized during the infiltration tests.

Infiltration Testing

Following the pre-soaking process of the infiltration test borings, SCG performed the infiltration testing. Each test hole was filled with water to a depth of at least 5 times the hole's radius above the gravel at the bottom of each test hole. In accordance with the Riverside County guidelines, in areas where "non-sandy soils" were encountered at the bottom of each infiltration test boring, (where 6 inches of water did not infiltrate into the surrounding soils in less than 25 minutes for two (2) consecutive readings), readings were taken at 30-minute intervals for a total of 6 hours at the test locations. At Infiltration Test Nos. I-24 and I-45, "sandy-soils" were encountered at the bottom of the test borings, (where 6 inches of water did infiltrate into the surrounding soils in less than 25 minutes for two (2) consecutive readings), therefore, readings were taken at 10-minute intervals for 1 hour at the test locations. The water level readings are presented on the spreadsheets enclosed with this report. The infiltration rates for each of the timed intervals are also tabulated on the spreadsheets.

The infiltration rates from the test are tabulated in inches per hour. In accordance with the typically accepted practice, it is recommended that the most conservative reading from the latter part of the infiltration tests be used as the design infiltration rate. The rates are summarized below:

Infiltration Test No.	Depth (feet)	Soil Description	Measured Infiltration Rate (inches/hour)
I-11	4½	YOUNGER ALLUVIUM: Brown Silty fine to coarse Sand, trace Clay	0.2

I-12	4½	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, trace coarse Sand	0.2
I-13	5½	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand	0.2
I-14	7½	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand	0.2
I-15	10½	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand	0.0
I-16	9½	OLDER ALLUVIUM: Dark Brown Silty fine to medium Sand, trace Clay, trace coarse Sand	0.2
I-17	10	OLDER ALLUVIUM: Brown Silty fine to medium Sand to fine to medium Sandy Silt, trace to little Clay, trace coarse Sand	0.0
I-18	7½	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace to little Clay, trace coarse Sand	0.0
I-19	3	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, trace coarse Sand	0.1
I-20	3	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand	0.1
I-21	3½	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, little coarse Sand	0.4
I-22	4½	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, little coarse Sand	0.3
I-23	9	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand	0.1
I-24	9	OLDER ALLUVIUM: Brown Silty fine to coarse Sand	1.7
I-25	9	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, trace coarse Sand	0.1
I-26	7½	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand	0.0
I-27	7	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace coarse Sand	0.1
I-28	5½	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, trace coarse Sand	0.0
I-29	6	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand	0.0
I-30	6	OLDER ALLUVIUM: Brown Silty fine to medium Sand to fine to medium Sandy Silt, trace Clay	0.1
I-31	6	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, trace coarse Sand	0.1
I-32	6½	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, trace coarse Sand	0.1
I-33	6½	OLDER ALLUVIUM: Brown fine to medium Sandy Silt to Silty fine to medium Sand, trace Clay	0.1
I-34	5	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, trace coarse Sand	0.1
I-35	4½	OLDER ALLUVIUM: Light Brown Silty fine to medium Sand, trace Clay, trace coarse Sand	0.1
I-36	5½	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, trace coarse Sand	0.0
I-37	6½	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand	0.1

I-38	6½	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand	0.1
I-39	7½	OLDER ALLUVIUM: Dark Brown Silty fine to medium Sand, little Clay, trace coarse Sand	0.0
I-40	7½	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, trace coarse Sand	0.1
I-41	6	OLDER ALLUVIUM: Brown Silty fine to medium Sand to fine to medium Sandy Silt, trace Clay, trace coarse Sand	0.0
I-42	6	OLDER ALLUVIUM: Brown Silty fine to medium Sand to fine to medium Sandy Silt, trace Clay, trace coarse Sand	0.0
I-43	6	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand	0.0
I-44	4½	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand	0.1
I-45	5	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand	0.8
I-46	5½	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand	0.1
I-47	7	OLDER ALLUVIUM: Brown fine to medium Sandy Silt, little Clay	0.1

Laboratory Testing

Moisture Content

The moisture contents for the recovered soil samples within the borings were determined in accordance with ASTM D-2216 and are expressed as a percentage of the dry weight. These test results are presented on the Boring Logs.

Grain Size Analysis

The grain size distribution of selected soils collected from the bottom of each infiltration test boring have been determined using a range of wire mesh screens. These tests were performed in general accordance with ASTM D-422 and/or ASTM D-1140. The weight of the portion of the sample retained on each screen is recorded and the percentage finer or coarser of the total weight is calculated. The results of these tests are presented on Plates C-1 through C-37 of this report.

Design Recommendations

Thirty-seven (37) infiltration tests were performed at the subject site. As noted above, the calculated infiltration rates at the infiltration test locations range between 0.0 and 1.7 inches per hour. The major factors affecting the lack of infiltration at these locations are the presence of very dense older alluvium with high contents of fine-grained soil. **Based on these conditions and the results of infiltration testing we recommend the following design infiltration rates to be utilized for the proposed infiltration systems:**

Infiltration System(s)	Infiltration Test Nos.	Infiltration Test Depth (ft)	Infiltration System Type	Infiltration System Location	Design Infiltration Rate (inches/hour)
"A"	I-11	4½	Bio-Retention Basin	West	Not Recommended
"B"	I-12	4½	Bio-Retention Basin	West	Not Recommended
"C"	I-13	5½	Below-Grade Chamber	West	Not Recommended
"D"	I-14	7½	Below-Grade Chamber	Northwest	Not Recommended
"E"	I-15 through I-17	9½ to 10½	Bio-Retention Basin	North	Not Recommended
"F"	I-18	7½	Below-Grade Chamber	North	Not Recommended
"G"	I-19 through I-22	3 to 4½	Bio-Retention Basin	South	Not Recommended
"H"	I-23, I-24	9	Bio-Retention Basin	South	Not Recommended
"I" & "J"	I-25 through I-33	5½ to 9	Bio-Retention Basin	Northeast	Not Recommended
"K"	I-34 through I-36	4½ to 5½	Below-Grade Chamber	Southeast	Not Recommended
"L"	I-37	6½	Below-Grade Chamber	Southeast	Not Recommended
"M"	I-38, I-39	6½ to 7½	Below-Grade Chamber	Southeast	Not Recommended
"N"	I-40	7½	Below-Grade Chamber	Northeast	Not Recommended
"O"	I-41	6	Below-Grade Chamber	Northeast	Not Recommended
"P"	I-42	6	Below-Grade Chamber	Northeast	Not Recommended
"Q"	I-43	6	Below-Grade Chamber	Northeast	Not Recommended
"R"	I-44	4½	Below-Grade Chamber	Northeast	Not Recommended*
"S"	I-45	5	Below-Grade Chamber	Northeast	Not Recommended
"T"	I-46	5½	Below-Grade Chamber	Northeast	Not Recommended
"U"	I-47	7	Below-Grade Chamber	Northeast	Not Recommended

*Although the test results indicate an infiltration rate of 0.8 in/hr at this location, the subsurface soil profile at this site includes many soil layers with low permeability. Soil layers with some capacity for infiltration, such as the silty sand layer encountered at Infiltration test-location I-44, are generally interbedded between low permeability soil layers, based on our review of the boring logs for the overall site. Therefore, long-term infiltration is not considered to feasible.

Although infiltration is not considered feasible, the client may desire to use storm water disposal systems that do not rely on infiltration at this site. The design of the proposed storm water

disposal systems should be performed by the project civil engineer, in accordance with the City of Perris, and/or County of Riverside guidelines. However, it is recommended that the system be constructed so as to facilitate removal of silt and clay, or other deleterious materials from any water that may enter the system.

Infiltration Rate Considerations

The infiltration rates presented herein were determined in accordance with the Riverside County guidelines and are considered valid only for the time and place of the actual test. Varying subsurface conditions will exist in other areas of the site, which could alter the recommended infiltration rates presented above. The infiltration rates will decline over time between maintenance cycles as silt or clay particles accumulate on the BMP surface. The infiltration rate is highly dependent upon a number of factors, including density, silt and clay content, grainsize distribution throughout the range of particle sizes, and particle shape. Small changes in these factors can cause large changes in the infiltration rates.

Infiltration rates are based on unsaturated flow. As water is introduced into soils by infiltration, the soils become saturated and the wetting front advances from the unsaturated zone to the saturated zone. Once the soils become saturated, infiltration rates become zero, and water can only move through soils by hydraulic conductivity at a rate determined by pressure head and soil permeability. Changes in soil moisture content will affect the infiltration rate. Infiltration rates should be expected to decrease until the soils become saturated. Soil permeability values will then govern groundwater movement. Permeability values may be on the order of 10 to 20 times less than infiltration rates. The system designer should incorporate adequate factors of safety and allow for overflow design into appropriate traditional storm drain systems, which would transport storm water off-site.

Location of Infiltration Systems

The use of on-site storm water infiltration systems carries a risk of creating adverse geotechnical conditions. Increasing the moisture content of the soil can cause the soil to lose internal shear strength and increase its compressibility, resulting in a change in the designed engineering properties. Overlying structures and pavements in the infiltration area could potentially be damaged due to saturation of the subgrade soils. **Any proposed infiltration systems for this site should be located at least 25 feet away from any structures, including retaining walls.** Even with this provision of locating the infiltration system at least 25 feet from the building(s), it is possible that infiltrating water into the subsurface soils could have an adverse effect on the proposed or existing structures. It should also be noted that utility trenches which happen to collect storm water can also serve as conduits to transmit storm water toward the structure, depending on the slope of the utility trench. Therefore, consideration should also be given to the proposed locations of underground utilities which may pass near the proposed infiltration system.

The infiltration system designer should also give special consideration to the effect that the proposed infiltration systems may have on nearby subterranean structures, open excavations, or descending slopes. In particular, infiltration systems should not be located near the crest of descending slopes, particularly where the slopes are comprised of granular soils. Such systems will require specialized design and analysis to evaluate the potential for slope instability, piping failures and other phenomena that typically

apply to earthen dam design. This type of analysis is beyond the scope of this infiltration test report, but these factors should be considered by the infiltration system designer when locating the infiltration systems.

General Comments

This report has been prepared as an instrument of service for use by the client in order to aid in the evaluation of this property and to assist the architects and engineers in the design and preparation of the project plans and specifications. This report may be provided to the contractor(s) and other design consultants to disclose information relative to the project. However, this report is not intended to be utilized as a specification in and of itself, without appropriate interpretation by the project architect, structural engineer, and/or civil engineer. The design of the proposed storm water infiltration system is the responsibility of the civil engineer. The role of the geotechnical engineer is limited to determination of infiltration rate only. By using the design infiltration rate contained herein, the civil engineer agrees to indemnify, defend, and hold harmless the geotechnical engineer for all aspects of the design and performance of the proposed storm water infiltration system. The reproduction and distribution of this report must be authorized by the client and Southern California Geotechnical, Inc. Furthermore, any reliance on this report by an unauthorized third party is at such party's sole risk, and we accept no responsibility for damage or loss which may occur.

The analysis of this site was based on a subsurface profile interpolated from limited discrete soil samples. While the materials encountered in the project area are considered to be representative of the total area, some variations should be expected between boring locations and testing depths. If the conditions encountered during construction vary significantly from those detailed herein, we should be contacted immediately to determine if the conditions alter the recommendations contained herein.

This report has been based on assumed or provided characteristics of the proposed development. It is recommended that the owner, client, architect, structural engineer, and civil engineer carefully review these assumptions to ensure that they are consistent with the characteristics of the proposed development. If discrepancies exist, they should be brought to our attention to verify that they do not affect the conclusions and recommendations contained herein. We also recommend that the project plans and specifications be submitted to our office for review to verify that our recommendations have been correctly interpreted. The analysis, conclusions, and recommendations contained within this report have been promulgated in accordance with generally accepted professional geotechnical engineering practice. No other warranty is implied or expressed.

Closure

We sincerely appreciate the opportunity to be of service on this project. We look forward to providing additional consulting services during the course of the project. If we may be of further assistance in any manner, please contact our office.

Respectfully Submitted,

SOUTHERN CALIFORNIA GEOTECHNICAL, INC.

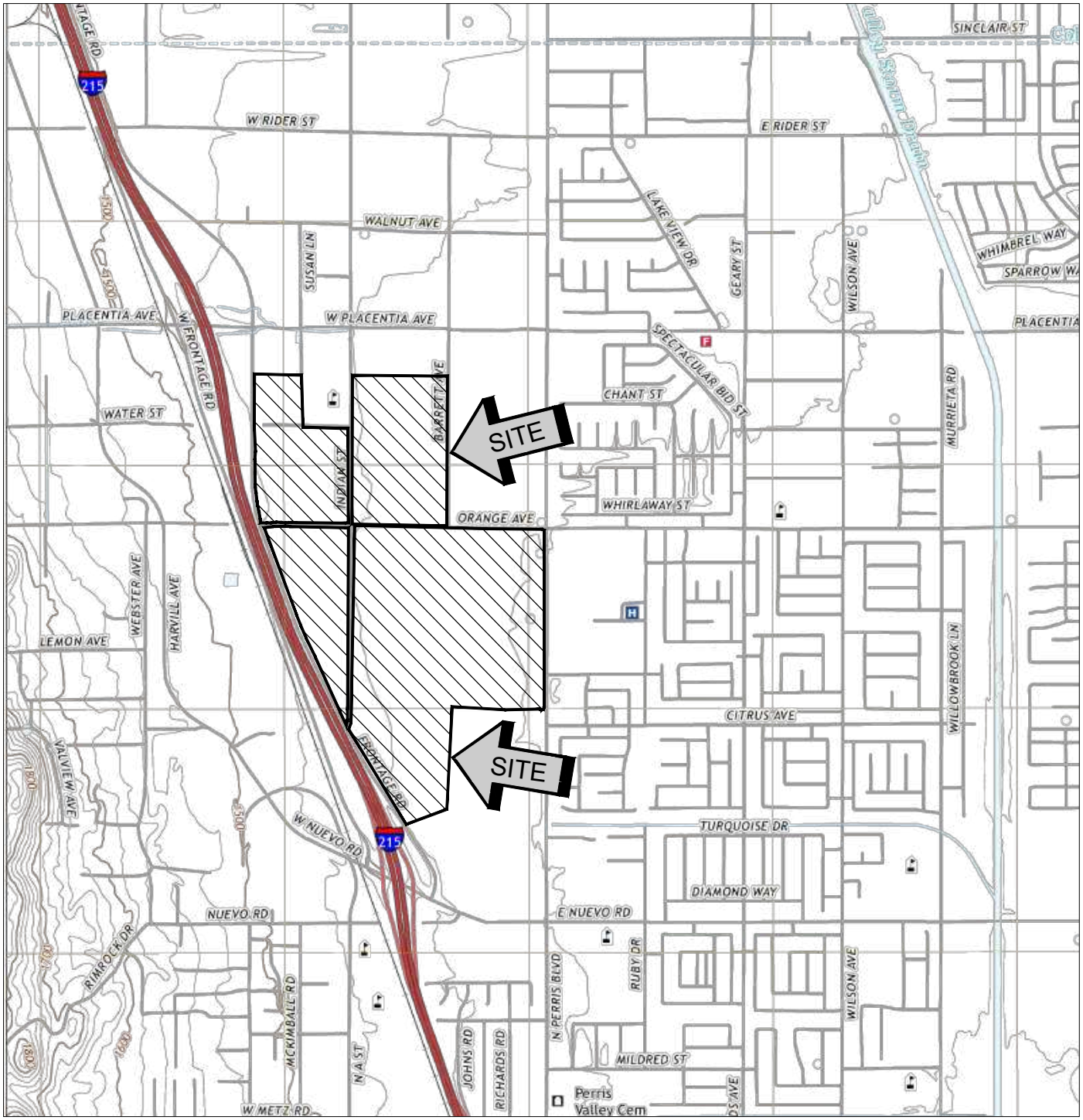
Ryan Bremer
Staff Geologist

Daniel W. Nielsen, GE 3166
Senior Engineer



Distribution: (1) Addressee

Enclosures: Plate 1 - Site Location Map
Plate 2 - Infiltration Test Location Plan
Boring Log Legend and Logs (39 pages)
Infiltration Test Results Spreadsheets (37 pages)
Grain Size Distribution Graphs (37 pages)



SOURCE: USGS TOPOGRAPHIC MAP OF THE PERRIS QUADRANGLE, RIVERSIDE COUNTY, CALIFORNIA, 2021

SITE LOCATION MAP

HARVEST LANDING INDUSTRIAL DEVELOPMENT

PERRIS, CALIFORNIA

SCALE: 1" = 2000'	
DRAWN: RB CHKD: RGT	
SCG PROJECT 22G183-4	
PLATE 1	

SOUTHERN CALIFORNIA GEOTECHNICAL



GEOTECHNICAL LEGEND

- APPROXIMATE INFILTRATION TEST LOCATION
- CONCURRENT BORING LOCATION (SCG PROJECT NO. 22G183-3)
- PREVIOUS BORING LOCATION (SCG PROJECT NO. 22G183-1)
- PREVIOUS INFILTRATION LOCATION (SCG PROJECT NO. 22G183-2)
- PREVIOUS INFILTRATION LOCATION (SCG PROJECT NO. 22G183-2)
- PREVIOUS BORING LOCATION (SCG PROJECT NO. 22G183-2)
- PROPOSED BUILDING
- PROPOSED INFILTRATION SYSTEM LOCATION
- EXISTING STRUCTURE

NOTE: CONCEPTUAL GRADING PLAN PREPARED BY FMCIVIL ENGINEERING.

22885 Savi Ranch Parkway
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SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

NORTH
SoCalGeo

SCALE: 1" = 200'
DRAWN: RB
CHKD: RGT
SCG PROJECT 22G183-4

INFILTRATION TEST LOCATION PLAN

HARVEST LANDING INDUSTRIAL DEVELOPMENT
PERRIS, CALIFORNIA

PLATE 2

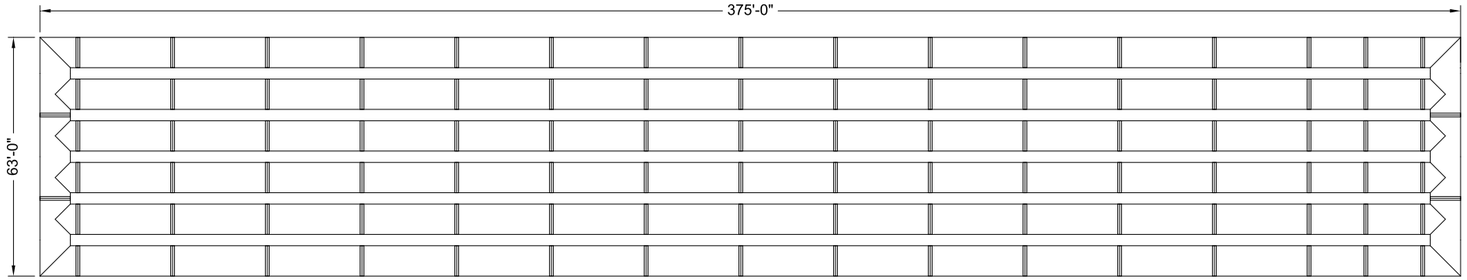
PROJECT SUMMARY

CALCULATION DETAILS
- LOADING = HS20/HS25
- APPROX. LINEAR FOOTAGE = 2,280 LF

STORAGE SUMMARY
- STORAGE VOLUME REQUIRED = N/A
- PIPE STORAGE VOLUME = 114,605 CF
- BACKFILL STORAGE VOLUME = 0 CF
- TOTAL STORAGE PROVIDED = 114,605 CF

PIPE DETAILS
- DIAMETER = 96"
- CORRUGATION = 5x1
- GAGE = 16
- COATING = ALT2
- WALL TYPE = SOLID
- BARREL SPACING = 36"

BACKFILL DETAILS
- WIDTH AT ENDS = 12"
- ABOVE PIPE = 0"
- WIDTH AT SIDES = 12"
- BELOW PIPE = 0"



NOTES

- ALL RISER AND STUB DIMENSIONS ARE TO CENTERLINE. ALL ELEVATIONS, DIMENSIONS, AND LOCATIONS OF RISERS AND INLETS, SHALL BE VERIFIED BY THE ENGINEER OF RECORD PRIOR TO RELEASING FOR FABRICATION.
- ALL FITTINGS AND REINFORCEMENT COMPLY WITH ASTM A998.
- ALL RISERS AND STUBS ARE $2\frac{2}{3}$" x $\frac{1}{2}$" CORRUGATION AND 16 GAGE UNLESS OTHERWISE NOTED.
- RISERS TO BE FIELD TRIMMED TO GRADE.
- QUANTITY OF PIPE SHOWN DOES NOT PROVIDE EXTRA PIPE FOR CONNECTING THE SYSTEM TO EXISTING PIPE OR DRAINAGE STRUCTURES. OUR SYSTEM AS DETAILED PROVIDES NOMINAL INLET AND/OR OUTLET PIPE STUB FOR CONNECTION TO EXISTING DRAINAGE FACILITIES. IF ADDITIONAL PIPE IS NEEDED IT IS THE RESPONSIBILITY OF THE CONTRACTOR.
- BAND TYPE TO BE DETERMINED UPON FINAL DESIGN.
- THE PROJECT SUMMARY IS REFLECTIVE OF THE DYODS DESIGN, QUANTITIES ARE APPROX. AND SHOULD BE VERIFIED UPON FINAL DESIGN AND APPROVAL. FOR EXAMPLE, TOTAL EXCAVATION DOES NOT CONSIDER ALL VARIABLES SUCH AS SHORING AND ONLY ACCOUNTS FOR MATERIAL WITHIN THE ESTIMATED EXCAVATION FOOTPRINT.
- THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

ASSEMBLY
SCALE: 1" = 40'

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CONTECH® CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO60538 20-001 Harvest Landing Site 6
Northerly Chambers
Perris, CA
DETENTION SYSTEM

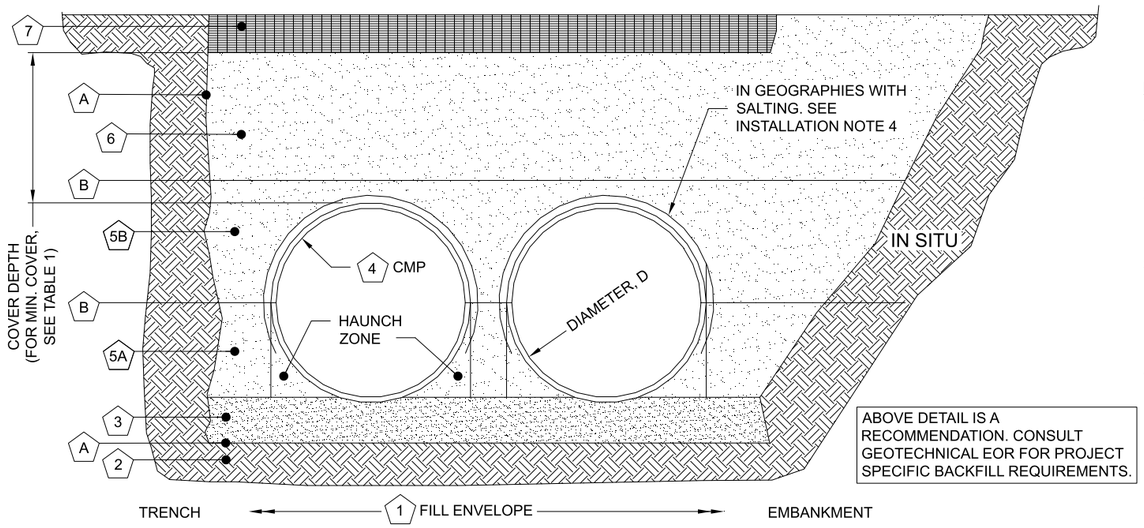
PROJECT No.:	SEQ. No.:	DATE:
42824	60538	10/2/2024
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

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TABLE 1:

DIAMETER, D	MIN. COVER	CORR. PROFILE
6"-10"	12"	1 1/2" x 1/4"
12"-48"	12"	2 2/3" x 1/2"
>48"-96"	12"	3" x 1", 5" x 1"
>96"	D/8	3" x 1", 5" x 1"

- STRUCTURAL BACKFILL MUST EXTEND TO LIMITS OF THE TABLE
- TOTAL HEIGHT OF COMPACTED COVER FOR CONVENTIONAL HIGHWAY LOADS IS MEASURED FROM TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TOP OF RIGID PAVEMENT
- ULTRAFLO ALSO AVAILABLE FOR SIZES 18" - 120" WITH 3/4"x 3/4"x 7 1/2" CORRUGATION



MINIMUM WIDTH DEPENDS ON SITE CONDITIONS AND ENGINEERING JUDGEMENT

INSTALLATION NOTES

1. WHEN PLACING THE FIRST LIFTS OF BACKFILL IT IS IMPORTANT TO MAKE SURE THAT THE BACKFILL IS PROPERLY COMPACTED UNDER AND AROUND THE PIPE HAUNCHES.
2. OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS, AS APPROVED BY SITE ENGINEER.
3. BACKFILL USING CONTROLLED LOW-STRENGTH MATERIAL (CLSM, "FLASH FILL" OR "FLOWABLE FILL") MAY BE USED WHEN THE SPACING BETWEEN THE PIPES WILL NOT ALLOW FOR PLACEMENT AND ADEQUATE COMPACTION OF THE BACKFILL. CONTACT CONTECH FOR FURTHER EVALUATION.
4. IF SALTING AGENTS FOR SNOW AND ICE REMOVAL ARE USED ON OR NEAR THE PROJECT, A GEOMEMBRANE BARRIER IS RECOMMENDED OVER THE UPPER HALF OF THE PIPE. THE GEOMEMBRANE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM A CHANGE IN THE SURROUNDING ENVIRONMENT OVER A PERIOD OF TIME. PLEASE REFER TO THE CORRUGATED METAL PIPE DETENTION DESIGN GUIDE FOR ADDITIONAL INFORMATION.

TABLE 2: SOLID STANDARD

CMP DETENTION AND CMP DRAINAGE STANDARD BACKFILL SPECIFICATIONS

	MATERIAL LOCATION	MATERIAL SPECIFICATION	DESCRIPTION	
1	FILL ENVELOPE WIDTH	PER ENGINEER OF RECORD	MINIMUM TRENCH WIDTH MUST ALLOW ROOM FOR PROPER COMPACTION OF HAUNCH MATERIALS UNDER THE PIPE. THE SUGGESTED MINIMUM TRENCH WIDTH, OR EOR RECOMMENDATION: PIPE ≤ 12": D + 16" PIPE > 12": 1.5D + 12"	MINIMUM EMBANKMENT WIDTH (IN FEET) FOR INITIAL FILL ENVELOPE: PIPE < 24": 3.0D PIPE 24" - 144": D + 4'0" PIPE > 144": D + 10'0"
2	FOUNDATION	**AASHTO 26.5.2** OR PER ENGINEER OF RECORD	PRIOR TO PLACING THE BEDDING, THE FOUNDATION MUST BE CONSTRUCTED TO A UNIFORM AND STABLE GRADE. IN THE EVENT THAT UNSUITABLE FOUNDATION MATERIALS ARE ENCOUNTERED DURING EXCAVATION, THEY SHALL BE REMOVED AND FOUNDATION BROUGHT BACK TO GRADE WITH A FILL MATERIAL APPROVED BY THE ENGINEER OF RECORD.	
3	BEDDING	**AASHTO M 43: 3, 357, 4, 467, 5, 56, 57** (APPROVED REGIONAL EQUIVALENTS INCLUDE CA-7)	ENGINEER OF RECORD TO DETERMINE IF BEDDING IS REQUIRED. PIPE MAY BE PLACED ON THE TRENCH BOTTOM OF A RELATIVELY LOOSE, NATIVE SUITABLE WELL GRADED GRANULAR MATERIAL THAT IS ROUGHLY SHAPED TO FIT THE BOTTOM OF THE PIPE, 2" MIN DEPTH. THE BEDDING MATERIAL MAY BE SUITABLE FOUNDATION SOILS CONFORMING TO AASHTO SOIL CLASSIFICATIONS A1, A2, OR A3 WITH MAXIMUM PARTICLE SIZE OF 3" PER AASHTO 26.3.8.1	
4	CORRUGATED METAL PIPE			
5A	CRITICAL BACKFILL	**AASHTO M 145: A-1, A-2, A-3** *	HAUNCH ZONE MATERIAL SHALL BE HAND SHOVELED OR SHOVEL SLICED INTO PLACE TO ALLOW FOR PROPER COMPACTION WITHOUT SOFT SPOTS. BACKFILL SHALL BE PLACED IN 8" +/- LOOSE LIFTS AND COMPACTED TO 90% STANDARD PROCTOR PER AASHTO T 99. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A THREE LIFT (24") DIFFERENTIAL BETWEEN ANY OF THE PIPES AT ANY TIME DURING THE BACKFILL PROCESS. THE BACKFILL SHOULD BE ADVANCED ALONG THE LENGTH OF THE SYSTEM TO AVOID DIFFERENTIAL LOADING. WELL GRADED GRANULAR MATERIAL WHICH MAY CONTAIN SMALL AMOUNTS OF SILT OR CLAY AND MAXIMUM PARTICLE SIZE OF 3" (PER AASHTO 26.3.8.1 AND 12.4-1.3).	
5B	BACKFILL	**AASHTO M 145: A-1, A-2, A-3**		
6	COVER MATERIAL	UP TO MIN. COVER - SEE 5A AND 5B ABOVE ABOVE MIN. COVER - PER ENGINEER OF RECORD	COVER MATERIAL MAY INCLUDE NON-BITUMINOUS, GRANULAR ROAD BASE MATERIAL WITHIN MIN COVER LIMITS	
7	RIGID OR FLEXIBLE PAVEMENT (IF APPLICABLE)	PER ENGINEER OF RECORD	FLEXIBLE PAVEMENT SHOULD NOT BE COUNTED AS PART OF THE FILL HEIGHT OVER THE CMP. FINAL BACKFILL MATERIAL SELECTION AND COMPACTION REQUIREMENTS SHALL FOLLOW THE PROJECT PLANS AND SPECIFICATIONS PER THE ENGINEER OF RECORD.	
A	OPTIONAL SIDE GEOTEXTILE	NONE	GEOTEXTILE LAYER IS RECOMMENDED ON SIDES OF EXCAVATION TO PREVENT SOIL MIGRATION.	
B	OPTIONAL GEOTEXTILE BETWEEN LAYERS	NONE	IF SOIL TYPES DIFFER AT ANY POINT ABOVE PIPE INVERT, A GEOTEXTILE LAYER IS RECOMMENDED TO BE PLACED BETWEEN THE LAYERS TO PREVENT SOIL MIGRATION.	

NOTES:
- FOR MULTIPLE BARREL INSTALLATIONS, THE RECOMMENDED STANDARD SPACING BETWEEN PARALLEL PIPE RUNS SHALL BE THE PIPE DIAMETER /2 BUT NO LESS THAN 12" FOR DIAMETERS <72". FOR 72" AND LARGER DIAMETERS, THE MINIMUM SPACING IS 36". CONTACT YOUR CONTECH REPRESENTATIVE FOR NONSTANDARD SPACING.

* APPROVED REGIONAL EQUIVALENTS FOR SECTION 5A INCLUDE CA-7, CODOT #67, MIDOT 2G, 34G, OR 21AA STONE OR GRAVEL; #8; #57; MIDOT 6A, 2G, 3G, 34G.

MANUFACTURER RECOMMENDED BACKFILL

NOT TO SCALE

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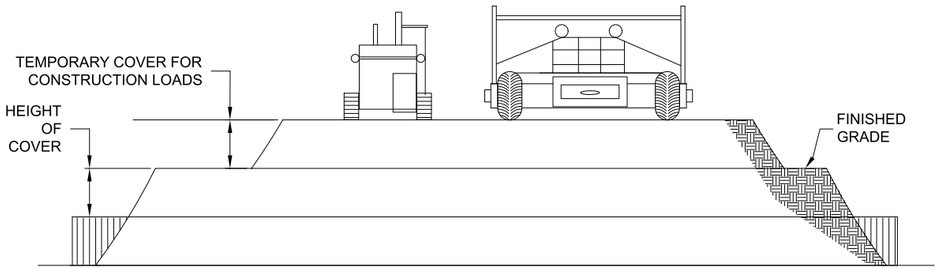
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CONTECH CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO60538 20-001 Harvest Landing Site 6
Northerly Chambers
Perris, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
42824	60538	10/2/2024
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

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CONSTRUCTION LOADS

FOR TEMPORARY CONSTRUCTION VEHICLE LOADS, AN EXTRA AMOUNT OF COMPACTED COVER MAY BE REQUIRED OVER THE TOP OF THE PIPE. THE HEIGHT-OF-COVER SHALL MEET THE MINIMUM REQUIREMENTS SHOWN IN THE TABLE BELOW. THE USE OF HEAVY CONSTRUCTION EQUIPMENT NECESSITATES GREATER PROTECTION FOR THE PIPE THAN FINISHED GRADE COVER MINIMUMS FOR NORMAL HIGHWAY TRAFFIC.

PIPE SPAN, INCHES	AXLE LOADS (kips)			
	18-50	50-75	75-110	110-150
	MINIMUM COVER (FT)			
12-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
126-144	3.5	4.0	4.5	4.5

*MINIMUM COVER MAY VARY, DEPENDING ON LOCAL CONDITIONS. THE CONTRACTOR MUST PROVIDE THE ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. MINIMUM COVER IS MEASURED FROM THE TOP OF THE PIPE TO THE TOP OF THE MAINTAINED CONSTRUCTION ROADWAY SURFACE.

CONSTRUCTION LOADING DIAGRAM

SCALE: N.T.S.

SPECIFICATION FOR DESIGNED DETENTION SYSTEM:

SCOPE
THIS SPECIFICATION COVERS THE MANUFACTURE AND INSTALLATION OF THE DESIGNED DETENTION SYSTEM DETAILED IN THE PROJECT PLANS.

MATERIAL
THE MATERIAL SHALL CONFORM TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2 STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-274 OR ASTM A-92.

THE GALVANIZED STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-218 OR ASTM A-929.

THE POLYMER COATED STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-246 OR ASTM A-742.

THE ALUMINUM COILS SHALL CONFORM TO THE APPLICABLE OF AASHTO M-197 OR ASTM B-744.

CONSTRUCTION LOADS
CONSTRUCTION LOADS MAY BE HIGHER THAN FINAL LOADS. FOLLOW THE MANUFACTURER'S OR NCSPA GUIDELINES.

PIPE
THE PIPE SHALL BE MANUFACTURED IN ACCORDANCE TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2: AASHTO M-36 OR ASTM A-760

GALVANIZED: AASHTO M-36 OR ASTM A-760

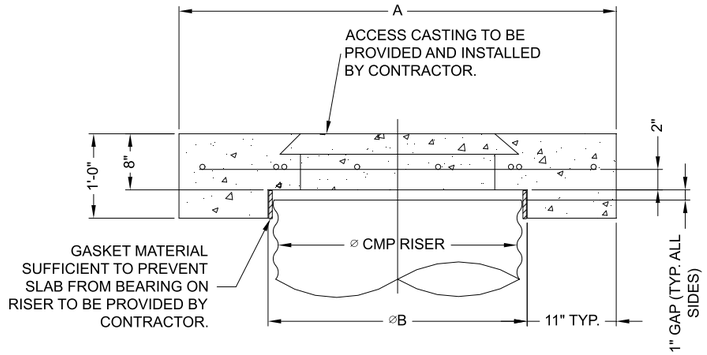
APPLICABLE POLYMER COATED: AASHTO M-245 OR ASTM A-762

ALUMINUM: AASHTO M-196 OR ASTM B-745

APPLICABLE
HANDLING AND ASSEMBLY
SHALL BE IN ACCORDANCE WITH NCSP'S (NATIONAL CORRUGATED STEEL PIPE ASSOCIATION) FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL. SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS FOR ALUMINUM PIPE.
REQUIREMENTS
INSTALLATION
SHALL BE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SECTION 26, DIVISION II DIVISION II OR ASTM A-798 (FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL) OR ASTM B-788 (FOR ALUMINUM PIPE) AND IN CONFORMANCE WITH THE PROJECT PLANS AND SPECIFICATIONS. IF THERE ARE ANY INCONSISTENCIES OR CONFLICTS THE CONTRACTOR SHOULD DISCUSS AND RESOLVE WITH THE SITE ENGINEER.

IT IS ALWAYS THE RESPONSIBILITY OF THE CONTRACTOR TO FOLLOW OSHA GUIDELINES FOR SAFE PRACTICES.

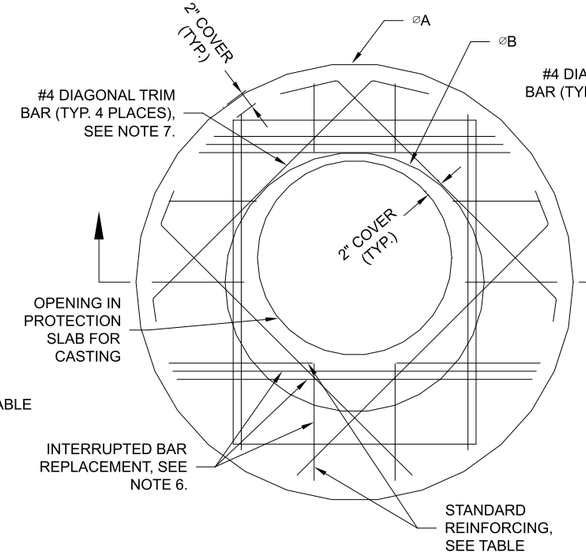
NOTE:
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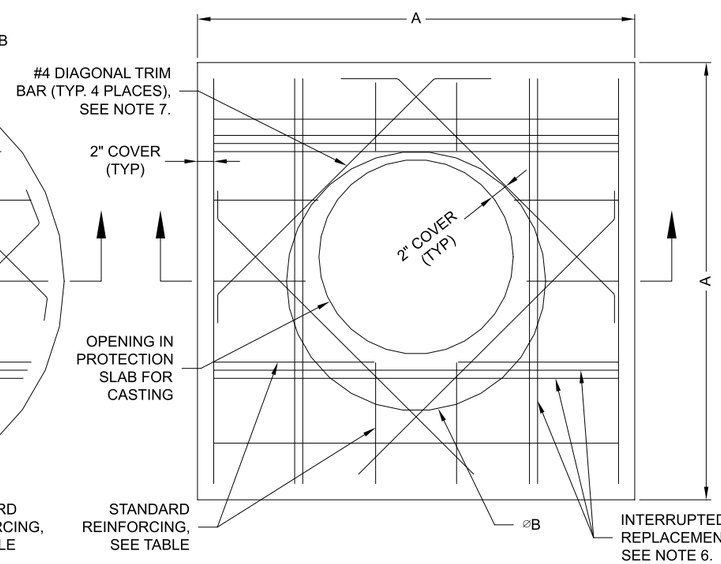
SECTION VIEW

REINFORCING TABLE				
⌀ CMP RISER	A	⌀ B	REINFORCING	**BEARING PRESSURE (PSF)
24"	⌀ 4' 4'X4'	26"	#5 @ 12" OCEW #5 @ 12" OCEW	2,410 1,780
30"	⌀ 4'-6" 4'-6" X 4'-6"	32"	#5 @ 12" OCEW #5 @ 12" OCEW	2,120 1,530
36"	⌀ 5' 5' X 5'	38"	#5 @ 10" OCEW #5 @ 10" OCEW	1,890 1,350
42"	⌀ 5'-6" 5'-6" X 5'-6"	44"	#5 @ 10" OCEW #5 @ 9" OCEW	1,720 1,210
48"	⌀ 6' 6' X 6'	50"	#5 @ 9" OCEW #5 @ 8" OCEW	1,600 1,100

** ASSUMED SOIL BEARING CAPACITY



ROUND OPTION PLAN VIEW



SQUARE OPTION PLAN VIEW

NOTES:

1. DESIGN IN ACCORDANCE WITH AASHTO, 17th EDITION.
2. DESIGN LOAD HS25.
3. EARTH COVER = 1' MAX.
4. CONCRETE STRENGTH = 3,500 psi
5. REINFORCING STEEL = ASTM A615, GRADE 60.
6. PROVIDE ADDITIONAL REINFORCING AROUND OPENINGS EQUAL TO THE BARS INTERRUPTED, HALF EACH SIDE. ADDITIONAL BARS TO BE IN THE SAME PLANE.
7. TRIM OPENING WITH DIAGONAL #4 BARS, EXTEND BARS A MINIMUM OF 12" BEYOND OPENING, BEND BARS AS REQUIRED TO MAINTAIN BAR COVER.
8. PROTECTION SLAB AND ALL MATERIALS TO BE PROVIDED AND INSTALLED BY CONTRACTOR.
9. DETAIL DESIGN BY DELTA ENGINEERING, BINGHAMTON, NY.

MANHOLE CAP DETAIL

SCALE: N.T.S.

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CONTECH CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO60538 20-001 Harvest Landing Site 6
Northerly Chambers
Perris, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
42824	60538	10/2/2024
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

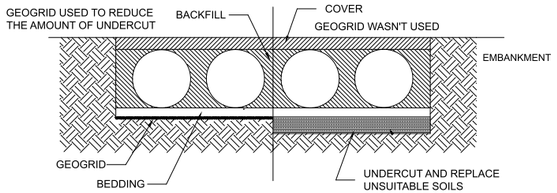
CMP DETENTION INSTALLATION GUIDE

PROPER INSTALLATION OF A FLEXIBLE UNDERGROUND DETENTION SYSTEM WILL ENSURE LONG-TERM PERFORMANCE. THE CONFIGURATION OF THESE SYSTEMS OFTEN REQUIRES SPECIAL CONSTRUCTION PRACTICES THAT DIFFER FROM CONVENTIONAL FLEXIBLE PIPE CONSTRUCTION. CONTECH ENGINEERED SOLUTIONS STRONGLY SUGGESTS SCHEDULING A PRE-CONSTRUCTION MEETING WITH YOUR LOCAL SALES ENGINEER TO DETERMINE IF ADDITIONAL MEASURES, NOT COVERED IN THIS GUIDE, ARE APPROPRIATE FOR YOUR SITE.

FOUNDATION

CONSTRUCT A FOUNDATION THAT CAN SUPPORT THE DESIGN LOADING APPLIED BY THE PIPE AND ADJACENT BACKFILL WEIGHT AS WELL AS MAINTAIN ITS INTEGRITY DURING CONSTRUCTION.

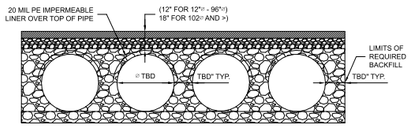
IF SOFT OR UNSUITABLE SOILS ARE ENCOUNTERED, REMOVE THE POOR SOILS DOWN TO A SUITABLE DEPTH AND THEN BUILD UP TO THE APPROPRIATE ELEVATION WITH A COMPETENT BACKFILL MATERIAL. THE STRUCTURAL FILL MATERIAL GRADATION SHOULD NOT ALLOW THE MIGRATION OF FINES, WHICH CAN CAUSE SETTLEMENT OF THE DETENTION SYSTEM OR PAVEMENT ABOVE. IF THE STRUCTURAL FILL MATERIAL IS NOT COMPATIBLE WITH THE UNDERLYING SOILS AN ENGINEERING FABRIC SHOULD BE USED AS A SEPARATOR. IN SOME CASES, USING A STIFF REINFORCING GEOGRID REDUCES OVER EXCAVATION AND REPLACEMENT FILL QUANTITIES.



GRADE THE FOUNDATION SUBGRADE TO A UNIFORM OR SLIGHTLY SLOPING GRADE. IF THE SUBGRADE IS CLAY OR RELATIVELY NON-POROUS AND THE CONSTRUCTION SEQUENCE WILL LAST FOR AN EXTENDED PERIOD OF TIME, IT IS BEST TO SLOPE THE GRADE TO ONE END OF THE SYSTEM. THIS WILL ALLOW EXCESS WATER TO DRAIN QUICKLY, PREVENTING SATURATION OF THE SUBGRADE.

GEOMEMBRANE BARRIER

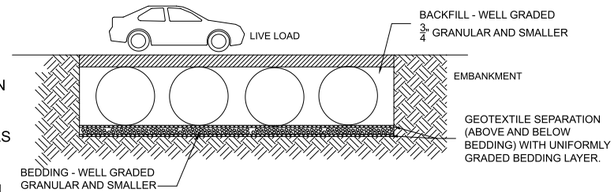
THE RESISTIVITY OF A PROJECT SITE MAY CHANGE OVER TIME DUE TO THE USE OF VARIOUS SALTING, DE-ICING, AND AGRICULTURAL AGENTS APPLIED ON OR NEAR THE AREA. TO MITIGATE THE POTENTIAL IMPACT OF THESE AGENTS, AN HDPE MEMBRANE LINER WILL BE INSTALLED ON THE CROWN OF EACH PIPE, CREATING AN IMPERMEABLE BARRIER. THIS MEASURE IS DESIGNED TO PROTECT THE SYSTEM FROM ENVIRONMENTAL CHANGES THAT COULD LEAD TO PREMATURE CORROSION AND REDUCE THE OVERALL SERVICE LIFE.



IN-SITU TRENCH WALL

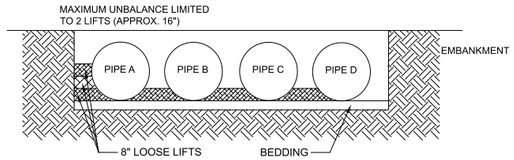
IF EXCAVATION IS REQUIRED, THE TRENCH WALL NEEDS TO BE CAPABLE OF SUPPORTING THE LOAD THAT THE PIPE SHEDS AS THE SYSTEM IS LOADED. IF SOILS ARE NOT CAPABLE OF SUPPORTING THESE LOADS, THE PIPE CAN DEFLECT. PERFORM A SIMPLE SOIL PRESSURE CHECK USING THE APPLIED LOADS TO DETERMINE THE LIMITS OF EXCAVATION BEYOND THE SPRING LINE OF THE OUTER MOST PIPES.

IN MOST CASES THE REQUIREMENTS FOR A SAFE WORK ENVIRONMENT AND PROPER BACKFILL PLACEMENT AND COMPACTION TAKE CARE OF THIS CONCERN.



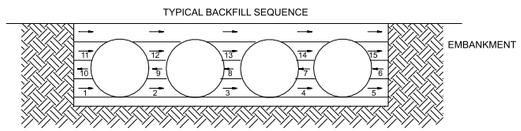
BACKFILL PLACEMENT

MATERIAL SHALL BE WORKED INTO THE PIPE HAUNCHES BY MEANS OF SHOVEL-SLICING, RODDING, AIR TAMPER, VIBRATORY ROD, OR OTHER EFFECTIVE METHODS.

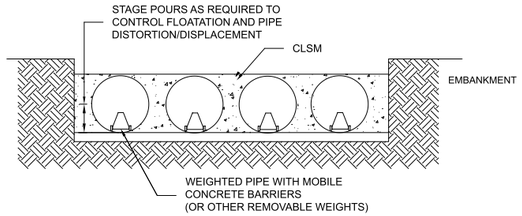


IF AASHTO T99 PROCEDURES ARE DETERMINED INFEASIBLE BY THE GEOTECHNICAL ENGINEER OF RECORD, COMPACTION IS CONSIDERED ADEQUATE WHEN NO FURTHER YIELDING OF THE MATERIAL IS OBSERVED UNDER THE COMPACTOR, OR UNDER FOOT, AND THE GEOTECHNICAL ENGINEER OF RECORD (OR REPRESENTATIVE THEREOF) IS SATISFIED WITH THE LEVEL OF COMPACTION.

FOR LARGE SYSTEMS, CONVEYOR SYSTEMS, BACKHOES WITH LONG REACHES OR DRAGLINES WITH STONE BUCKETS MAY BE USED TO PLACE BACKFILL. ONCE MINIMUM COVER FOR CONSTRUCTION LOADING ACROSS THE ENTIRE WIDTH OF THE SYSTEM IS REACHED, ADVANCE THE EQUIPMENT TO THE END OF THE RECENTLY PLACED FILL, AND BEGIN THE SEQUENCE AGAIN UNTIL THE SYSTEM IS COMPLETELY BACKFILLED. THIS TYPE OF CONSTRUCTION SEQUENCE PROVIDES ROOM FOR STOCKPILED BACKFILL DIRECTLY BEHIND THE BACKHOE, AS WELL AS THE MOVEMENT OF CONSTRUCTION TRAFFIC. MATERIAL STOCKPILES ON TOP OF THE BACKFILLED DETENTION SYSTEM SHOULD BE LIMITED TO 8- TO 10-FEET HIGH AND MUST PROVIDE BALANCED LOADING ACROSS ALL BARRELS. TO DETERMINE THE PROPER COVER OVER THE PIPES TO ALLOW THE MOVEMENT OF CONSTRUCTION EQUIPMENT SEE TABLE 1, OR CONTACT YOUR LOCAL CONTECH SALES ENGINEER.



WHEN FLOWABLE FILL IS USED, YOU MUST PREVENT PIPE FLOATATION. TYPICALLY, SMALL LIFTS ARE PLACED BETWEEN THE PIPES AND THEN ALLOWED TO SET-UP PRIOR TO THE PLACEMENT OF THE NEXT LIFT. THE ALLOWABLE THICKNESS OF THE CLSM LIFT IS A FUNCTION OF A PROPER BALANCE BETWEEN THE UPLIFT FORCE OF THE CLSM, THE OPPOSING WEIGHT OF THE PIPE, AND THE EFFECT OF OTHER RESTRAINING MEASURES. THE PIPE CAN CARRY LIMITED FLUID PRESSURE WITHOUT PIPE DISTORTION OR DISPLACEMENT, WHICH ALSO AFFECTS THE CLSM LIFT THICKNESS. YOUR LOCAL CONTECH SALES ENGINEER CAN HELP DETERMINE THE PROPER LIFT THICKNESS.

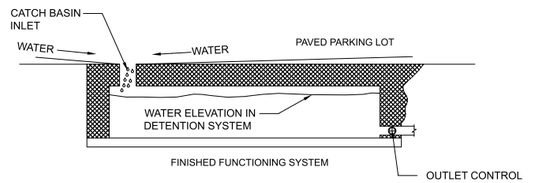


CONSTRUCTION LOADING

TYPICALLY, THE MINIMUM COVER SPECIFIED FOR A PROJECT ASSUMES H-20 LIVE LOAD. BECAUSE CONSTRUCTION LOADS OFTEN EXCEED DESIGN LIVE LOADS, INCREASED TEMPORARY MINIMUM COVER REQUIREMENTS ARE NECESSARY. SINCE CONSTRUCTION EQUIPMENT VARIES FROM JOB TO JOB, IT IS BEST TO ADDRESS EQUIPMENT SPECIFIC MINIMUM COVER REQUIREMENTS WITH YOUR LOCAL CONTECH SALES ENGINEER DURING YOUR PRE-CONSTRUCTION MEETING.

ADDITIONAL CONSIDERATIONS

BECAUSE MOST SYSTEMS ARE CONSTRUCTED BELOW-GRADE, RAINFALL CAN RAPIDLY FILL THE EXCAVATION; POTENTIALLY CAUSING FLOATATION AND MOVEMENT OF THE PREVIOUSLY PLACED PIPES. TO HELP MITIGATE POTENTIAL PROBLEMS, IT IS BEST TO START THE INSTALLATION AT THE DOWNSTREAM END WITH THE OUTLET ALREADY CONSTRUCTED TO ALLOW A ROUTE FOR THE WATER TO ESCAPE. TEMPORARY DIVERSION MEASURES MAY BE REQUIRED FOR HIGH FLOWS DUE TO THE RESTRICTED NATURE OF THE OUTLET PIPE.



CMP DETENTION SYSTEM INSPECTION AND MAINTENANCE

UNDERGROUND STORMWATER DETENTION AND INFILTRATION SYSTEMS MUST BE INSPECTED AND MAINTAINED AT REGULAR INTERVALS FOR PURPOSES OF PERFORMANCE AND LONGEVITY.

INSPECTION

INSPECTION IS THE KEY TO EFFECTIVE MAINTENANCE OF CMP DETENTION SYSTEMS AND IS EASILY PERFORMED. CONTECH RECOMMENDS ONGOING, ANNUAL INSPECTIONS. SITES WITH HIGH TRASH LOAD OR SMALL OUTLET CONTROL ORIFICES MAY NEED MORE FREQUENT INSPECTIONS. THE RATE AT WHICH THE SYSTEM COLLECTS POLLUTANTS WILL DEPEND MORE ON SITE SPECIFIC ACTIVITIES RATHER THAN THE SIZE OR CONFIGURATION OF THE SYSTEM.

INSPECTIONS SHOULD BE PERFORMED MORE OFTEN IN EQUIPMENT WASHDOWN AREAS, IN CLIMATES WHERE SANDING AND/OR SALTING OPERATIONS TAKE PLACE, AND IN OTHER VARIOUS INSTANCES IN WHICH ONE WOULD EXPECT HIGHER ACCUMULATIONS OF SEDIMENT OR ABRASIVE/ CORROSIVE CONDITIONS. A RECORD OF EACH INSPECTION IS TO BE MAINTAINED FOR THE LIFE OF THE SYSTEM

MAINTENANCE

CMP DETENTION SYSTEMS SHOULD BE CLEANED WHEN AN INSPECTION REVEALS ACCUMULATED SEDIMENT OR TRASH IS CLOGGING THE DISCHARGE ORIFICE.

ACCUMULATED SEDIMENT AND TRASH CAN TYPICALLY BE EVACUATED THROUGH THE MANHOLE OVER THE OUTLET ORIFICE. IF MAINTENANCE IS NOT PERFORMED AS RECOMMENDED, SEDIMENT AND TRASH MAY ACCUMULATE IN FRONT OF THE OUTLET ORIFICE. MANHOLE COVERS SHOULD BE SECURELY SEATED FOLLOWING CLEANING ACTIVITIES. CONTECH SUGGESTS THAT ALL SYSTEMS BE DESIGNED WITH AN ACCESS/INSPECTION MANHOLE SITUATED AT OR NEAR THE INLET AND THE OUTLET ORIFICE. SHOULD IT BE NECESSARY TO GET INSIDE THE SYSTEM TO PERFORM MAINTENANCE ACTIVITIES, ALL APPROPRIATE PRECAUTIONS REGARDING CONFINED SPACE ENTRY AND OSHA REGULATIONS SHOULD BE FOLLOWED.

ANNUAL INSPECTIONS ARE BEST PRACTICE FOR ALL UNDERGROUND SYSTEMS. DURING THIS INSPECTION, IF EVIDENCE OF SALTING/DE-ICING AGENTS IS OBSERVED WITHIN THE SYSTEM, IT IS BEST PRACTICE FOR THE SYSTEM TO BE RINSED, INCLUDING ABOVE THE SPRING LINE SOON AFTER THE SPRING THAW AS PART OF THE MAINTENANCE PROGRAM FOR THE SYSTEM.

MAINTAINING AN UNDERGROUND DETENTION OR INFILTRATION SYSTEM IS EASIEST WHEN THERE IS NO FLOW ENTERING THE SYSTEM. FOR THIS REASON, IT IS A GOOD IDEA TO SCHEDULE THE CLEANOUT DURING DRY WEATHER.

THE FOREGOING INSPECTION AND MAINTENANCE EFFORTS HELP ENSURE UNDERGROUND PIPE SYSTEMS USED FOR STORMWATER STORAGE CONTINUE TO FUNCTION AS INTENDED BY IDENTIFYING RECOMMENDED REGULAR INSPECTION AND MAINTENANCE PRACTICES. INSPECTION AND MAINTENANCE RELATED TO THE STRUCTURAL INTEGRITY OF THE PIPE OR THE SOUNDNESS OF PIPE JOINT CONNECTIONS IS BEYOND THE SCOPE OF THIS GUIDE.

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CONTECH CMP DETENTION SYSTEMS

CONTECH **DYODS** DRAWING

DYO60538 20-001 Harvest Landing Site 6
Northerly Chambers
Perris, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
42824	60538	10/2/2024
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

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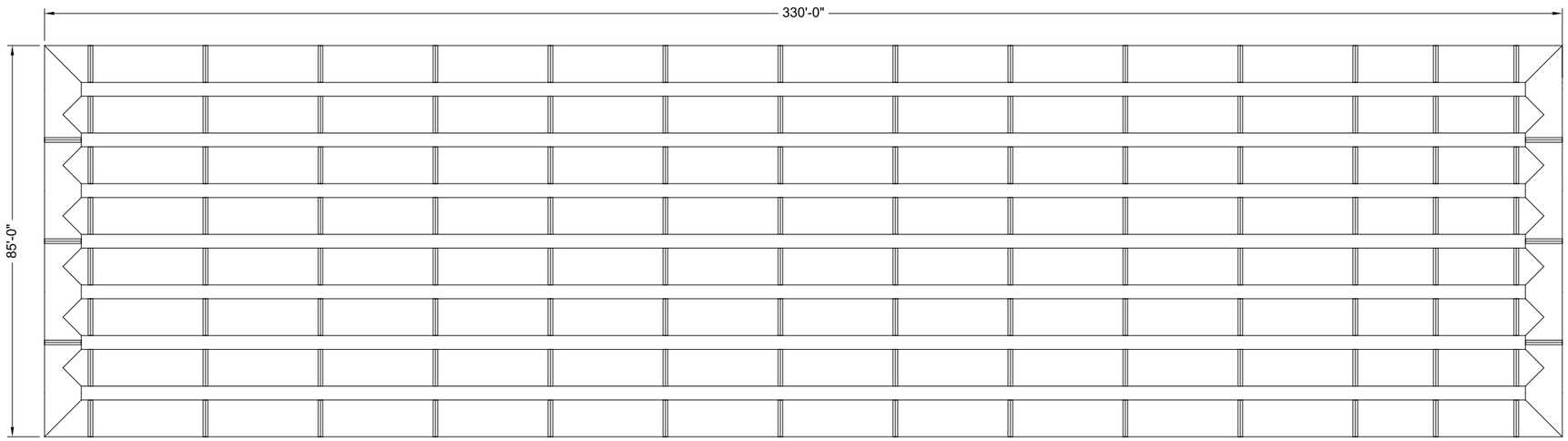
PROJECT SUMMARY

CALCULATION DETAILS
- LOADING = HS20/HS25
- APPROX. LINEAR FOOTAGE = 2,682 LF

STORAGE SUMMARY
- STORAGE VOLUME REQUIRED = N/A
- PIPE STORAGE VOLUME = 134,812 CF
- BACKFILL STORAGE VOLUME = 0 CF
- TOTAL STORAGE PROVIDED = 134,812 CF

PIPE DETAILS
- DIAMETER = 96"
- CORRUGATION = 5x1
- GAGE = 16
- COATING = ALT2
- WALL TYPE = SOLID
- BARREL SPACING = 36"

BACKFILL DETAILS
- WIDTH AT ENDS = 12"
- ABOVE PIPE = 0"
- WIDTH AT SIDES = 12"
- BELOW PIPE = 0"



NOTES

- ALL RISER AND STUB DIMENSIONS ARE TO CENTERLINE. ALL ELEVATIONS, DIMENSIONS, AND LOCATIONS OF RISERS AND INLETS, SHALL BE VERIFIED BY THE ENGINEER OF RECORD PRIOR TO RELEASING FOR FABRICATION.
- ALL FITTINGS AND REINFORCEMENT COMPLY WITH ASTM A998.
- ALL RISERS AND STUBS ARE $2\frac{2}{3}$" x $\frac{1}{2}$" CORRUGATION AND 16 GAGE UNLESS OTHERWISE NOTED.
- RISERS TO BE FIELD TRIMMED TO GRADE.
- QUANTITY OF PIPE SHOWN DOES NOT PROVIDE EXTRA PIPE FOR CONNECTING THE SYSTEM TO EXISTING PIPE OR DRAINAGE STRUCTURES. OUR SYSTEM AS DETAILED PROVIDES NOMINAL INLET AND/OR OUTLET PIPE STUB FOR CONNECTION TO EXISTING DRAINAGE FACILITIES. IF ADDITIONAL PIPE IS NEEDED IT IS THE RESPONSIBILITY OF THE CONTRACTOR.
- BAND TYPE TO BE DETERMINED UPON FINAL DESIGN.
- THE PROJECT SUMMARY IS REFLECTIVE OF THE DYODS DESIGN, QUANTITIES ARE APPROX. AND SHOULD BE VERIFIED UPON FINAL DESIGN AND APPROVAL. FOR EXAMPLE, TOTAL EXCAVATION DOES NOT CONSIDER ALL VARIABLES SUCH AS SHORING AND ONLY ACCOUNTS FOR MATERIAL WITHIN THE ESTIMATED EXCAVATION FOOTPRINT.
- THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

ASSEMBLY
SCALE: 1" = 30'

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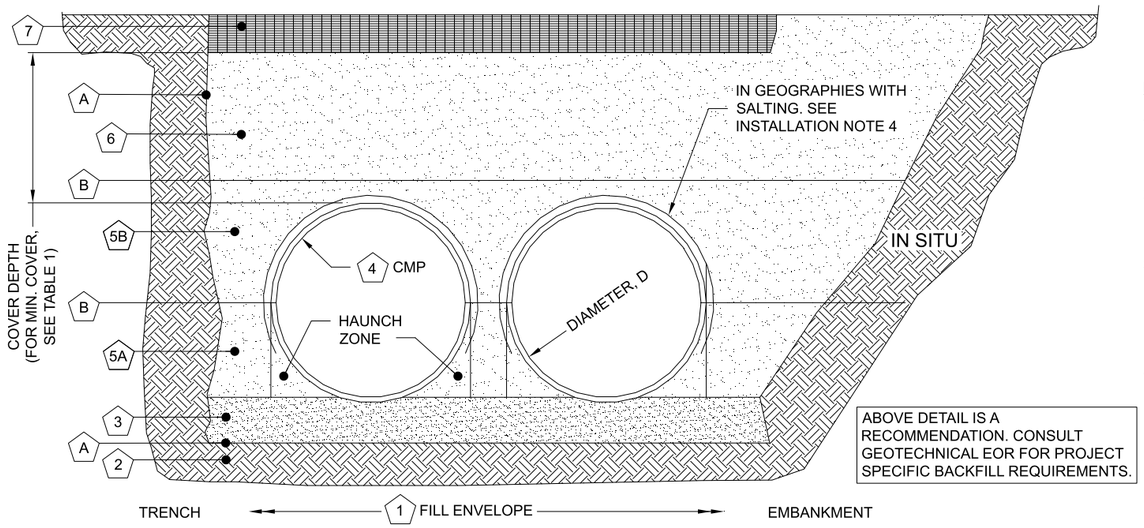
DYO60540 20-001 Harvest Landing Site 6
Southerly Chambers
Perris, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
42826	60540	10/2/2024
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

TABLE 1:

DIAMETER, D	MIN. COVER	CORR. PROFILE
6"-10"	12"	1 1/2" x 1/4"
12"-48"	12"	2 2/3" x 1/2"
>48"-96"	12"	3" x 1", 5" x 1"
>96"	D/8	3" x 1", 5" x 1"

- STRUCTURAL BACKFILL MUST EXTEND TO LIMITS OF THE TABLE
- TOTAL HEIGHT OF COMPACTED COVER FOR CONVENTIONAL HIGHWAY LOADS IS MEASURED FROM TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TOP OF RIGID PAVEMENT
- ULTRAFLO ALSO AVAILABLE FOR SIZES 18" - 120" WITH 3/4"x 3/4"x 7 1/2" CORRUGATION



MINIMUM WIDTH DEPENDS ON SITE CONDITIONS AND ENGINEERING JUDGEMENT

INSTALLATION NOTES

1. WHEN PLACING THE FIRST LIFTS OF BACKFILL IT IS IMPORTANT TO MAKE SURE THAT THE BACKFILL IS PROPERLY COMPACTED UNDER AND AROUND THE PIPE HAUNCHES.
2. OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS, AS APPROVED BY SITE ENGINEER.
3. BACKFILL USING CONTROLLED LOW-STRENGTH MATERIAL (CLSM, "FLASH FILL" OR "FLOWABLE FILL") MAY BE USED WHEN THE SPACING BETWEEN THE PIPES WILL NOT ALLOW FOR PLACEMENT AND ADEQUATE COMPACTION OF THE BACKFILL. CONTACT CONTECH FOR FURTHER EVALUATION.
4. IF SALTING AGENTS FOR SNOW AND ICE REMOVAL ARE USED ON OR NEAR THE PROJECT, A GEOMEMBRANE BARRIER IS RECOMMENDED OVER THE UPPER HALF OF THE PIPE. THE GEOMEMBRANE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM A CHANGE IN THE SURROUNDING ENVIRONMENT OVER A PERIOD OF TIME. PLEASE REFER TO THE CORRUGATED METAL PIPE DETENTION DESIGN GUIDE FOR ADDITIONAL INFORMATION.

TABLE 2: SOLID STANDARD

CMP DETENTION AND CMP DRAINAGE STANDARD BACKFILL SPECIFICATIONS

	MATERIAL LOCATION	MATERIAL SPECIFICATION	DESCRIPTION	
1	FILL ENVELOPE WIDTH	PER ENGINEER OF RECORD	MINIMUM TRENCH WIDTH MUST ALLOW ROOM FOR PROPER COMPACTION OF HAUNCH MATERIALS UNDER THE PIPE. THE SUGGESTED MINIMUM TRENCH WIDTH, OR EOR RECOMMENDATION: PIPE ≤ 12": D + 16" PIPE > 12": 1.5D + 12"	MINIMUM EMBANKMENT WIDTH (IN FEET) FOR INITIAL FILL ENVELOPE: PIPE < 24": 3.0D PIPE 24" - 144": D + 4'0" PIPE > 144": D + 10'0"
2	FOUNDATION	**AASHTO 26.5.2** OR PER ENGINEER OF RECORD	PRIOR TO PLACING THE BEDDING, THE FOUNDATION MUST BE CONSTRUCTED TO A UNIFORM AND STABLE GRADE. IN THE EVENT THAT UNSUITABLE FOUNDATION MATERIALS ARE ENCOUNTERED DURING EXCAVATION, THEY SHALL BE REMOVED AND FOUNDATION BROUGHT BACK TO GRADE WITH A FILL MATERIAL APPROVED BY THE ENGINEER OF RECORD.	
3	BEDDING	**AASHTO M 43: 3, 357, 4, 467, 5, 56, 57** (APPROVED REGIONAL EQUIVALENTS INCLUDE CA-7)	ENGINEER OF RECORD TO DETERMINE IF BEDDING IS REQUIRED. PIPE MAY BE PLACED ON THE TRENCH BOTTOM OF A RELATIVELY LOOSE, NATIVE SUITABLE WELL GRADED GRANULAR MATERIAL THAT IS ROUGHLY SHAPED TO FIT THE BOTTOM OF THE PIPE, 2" MIN DEPTH. THE BEDDING MATERIAL MAY BE SUITABLE FOUNDATION SOILS CONFORMING TO AASHTO SOIL CLASSIFICATIONS A1, A2, OR A3 WITH MAXIMUM PARTICLE SIZE OF 3" PER AASHTO 26.3.8.1	
4	CORRUGATED METAL PIPE			
5A	CRITICAL BACKFILL	**AASHTO M 145: A-1, A-2, A-3** *	HAUNCH ZONE MATERIAL SHALL BE HAND SHOVELED OR SHOVEL SLICED INTO PLACE TO ALLOW FOR PROPER COMPACTION WITHOUT SOFT SPOTS. BACKFILL SHALL BE PLACED IN 8" +/- LOOSE LIFTS AND COMPACTED TO 90% STANDARD PROCTOR PER AASHTO T 99. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A THREE LIFT (24") DIFFERENTIAL BETWEEN ANY OF THE PIPES AT ANY TIME DURING THE BACKFILL PROCESS. THE BACKFILL SHOULD BE ADVANCED ALONG THE LENGTH OF THE SYSTEM TO AVOID DIFFERENTIAL LOADING. WELL GRADED GRANULAR MATERIAL WHICH MAY CONTAIN SMALL AMOUNTS OF SILT OR CLAY AND MAXIMUM PARTICLE SIZE OF 3" (PER AASHTO 26.3.8.1 AND 12.4-1.3).	
5B	BACKFILL	**AASHTO M 145: A-1, A-2, A-3**		
6	COVER MATERIAL	UP TO MIN. COVER - SEE 5A AND 5B ABOVE ABOVE MIN. COVER - PER ENGINEER OF RECORD	COVER MATERIAL MAY INCLUDE NON-BITUMINOUS, GRANULAR ROAD BASE MATERIAL WITHIN MIN COVER LIMITS	
7	RIGID OR FLEXIBLE PAVEMENT (IF APPLICABLE)	PER ENGINEER OF RECORD	FLEXIBLE PAVEMENT SHOULD NOT BE COUNTED AS PART OF THE FILL HEIGHT OVER THE CMP. FINAL BACKFILL MATERIAL SELECTION AND COMPACTION REQUIREMENTS SHALL FOLLOW THE PROJECT PLANS AND SPECIFICATIONS PER THE ENGINEER OF RECORD.	
A	OPTIONAL SIDE GEOTEXTILE	NONE	GEOTEXTILE LAYER IS RECOMMENDED ON SIDES OF EXCAVATION TO PREVENT SOIL MIGRATION.	
B	OPTIONAL GEOTEXTILE BETWEEN LAYERS	NONE	IF SOIL TYPES DIFFER AT ANY POINT ABOVE PIPE INVERT, A GEOTEXTILE LAYER IS RECOMMENDED TO BE PLACED BETWEEN THE LAYERS TO PREVENT SOIL MIGRATION.	

NOTES:
- FOR MULTIPLE BARREL INSTALLATIONS, THE RECOMMENDED STANDARD SPACING BETWEEN PARALLEL PIPE RUNS SHALL BE THE PIPE DIAMETER /2 BUT NO LESS THAN 12" FOR DIAMETERS <72". FOR 72" AND LARGER DIAMETERS, THE MINIMUM SPACING IS 36". CONTACT YOUR CONTECH REPRESENTATIVE FOR NONSTANDARD SPACING.

* APPROVED REGIONAL EQUIVALENTS FOR SECTION 5A INCLUDE CA-7, CODOT #67, MIDOT 2G, 34G, OR 21AA STONE OR GRAVEL; #8; #57; MIDOT 6A, 2G, 3G, 34G.

MANUFACTURER RECOMMENDED BACKFILL

NOT TO SCALE

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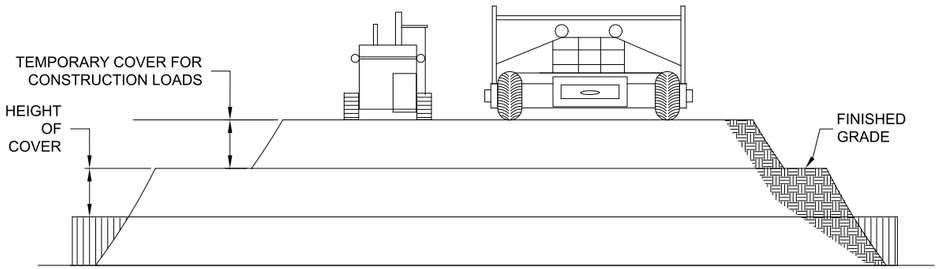
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CONTECH CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO60540 20-001 Harvest Landing Site 6
Southerly Chambers
Perris, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
42826	60540	10/2/2024
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

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CONSTRUCTION LOADS

FOR TEMPORARY CONSTRUCTION VEHICLE LOADS, AN EXTRA AMOUNT OF COMPACTED COVER MAY BE REQUIRED OVER THE TOP OF THE PIPE. THE HEIGHT-OF-COVER SHALL MEET THE MINIMUM REQUIREMENTS SHOWN IN THE TABLE BELOW. THE USE OF HEAVY CONSTRUCTION EQUIPMENT NECESSITATES GREATER PROTECTION FOR THE PIPE THAN FINISHED GRADE COVER MINIMUMS FOR NORMAL HIGHWAY TRAFFIC.

PIPE SPAN, INCHES	AXLE LOADS (kips)			
	18-50	50-75	75-110	110-150
	MINIMUM COVER (FT)			
12-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
126-144	3.5	4.0	4.5	4.5

*MINIMUM COVER MAY VARY, DEPENDING ON LOCAL CONDITIONS. THE CONTRACTOR MUST PROVIDE THE ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. MINIMUM COVER IS MEASURED FROM THE TOP OF THE PIPE TO THE TOP OF THE MAINTAINED CONSTRUCTION ROADWAY SURFACE.

CONSTRUCTION LOADING DIAGRAM

SCALE: N.T.S.

SPECIFICATION FOR DESIGNED DETENTION SYSTEM:

SCOPE
THIS SPECIFICATION COVERS THE MANUFACTURE AND INSTALLATION OF THE DESIGNED DETENTION SYSTEM DETAILED IN THE PROJECT PLANS.

MATERIAL
THE MATERIAL SHALL CONFORM TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2 STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-274 OR ASTM A-92.

THE GALVANIZED STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-218 OR ASTM A-929.

THE POLYMER COATED STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-246 OR ASTM A-742.

THE ALUMINUM COILS SHALL CONFORM TO THE APPLICABLE OF AASHTO M-197 OR ASTM B-744.

CONSTRUCTION LOADS
CONSTRUCTION LOADS MAY BE HIGHER THAN FINAL LOADS. FOLLOW THE MANUFACTURER'S OR NCSPA GUIDELINES.

PIPE
THE PIPE SHALL BE MANUFACTURED IN ACCORDANCE TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2: AASHTO M-36 OR ASTM A-760

GALVANIZED: AASHTO M-36 OR ASTM A-760

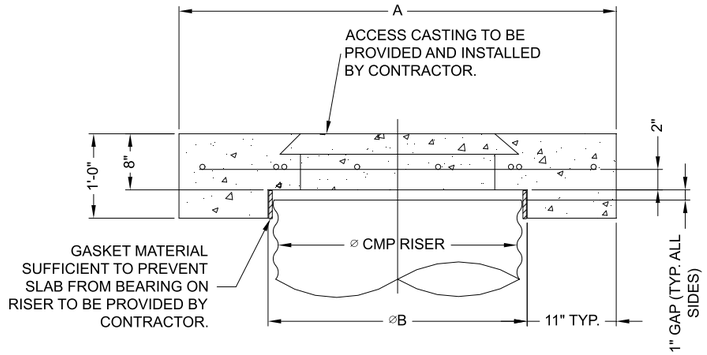
APPLICABLE POLYMER COATED: AASHTO M-245 OR ASTM A-762

ALUMINUM: AASHTO M-196 OR ASTM B-745

APPLICABLE
HANDLING AND ASSEMBLY
SHALL BE IN ACCORDANCE WITH NCSP'S (NATIONAL CORRUGATED STEEL PIPE ASSOCIATION) FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL. SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS FOR ALUMINUM PIPE.
REQUIREMENTS
INSTALLATION
SHALL BE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SECTION 26, DIVISION II DIVISION II OR ASTM A-798 (FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL) OR ASTM B-788 (FOR ALUMINUM PIPE) AND IN CONFORMANCE WITH THE PROJECT PLANS AND SPECIFICATIONS. IF THERE ARE ANY INCONSISTENCIES OR CONFLICTS THE CONTRACTOR SHOULD DISCUSS AND RESOLVE WITH THE SITE ENGINEER.

IT IS ALWAYS THE RESPONSIBILITY OF THE CONTRACTOR TO FOLLOW OSHA GUIDELINES FOR SAFE PRACTICES.

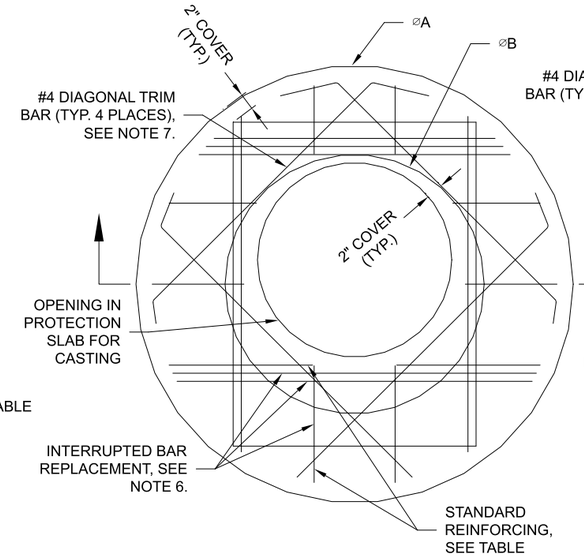
NOTE:
THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.



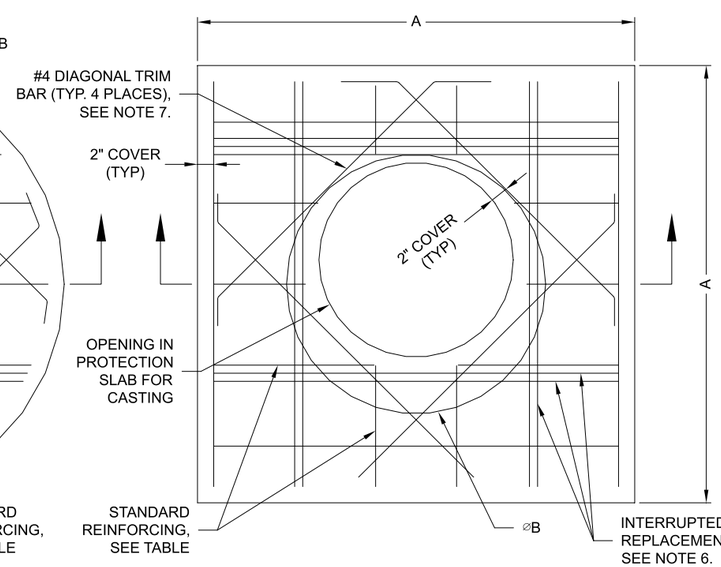
SECTION VIEW

REINFORCING TABLE				
⌀ CMP RISER	A	⌀ B	REINFORCING	**BEARING PRESSURE (PSF)
24"	⌀ 4' 4'X4'	26"	#5 @ 12" OCEW #5 @ 12" OCEW	2,410 1,780
30"	⌀ 4'-6" 4'-6" X 4'-6"	32"	#5 @ 12" OCEW #5 @ 12" OCEW	2,120 1,530
36"	⌀ 5' 5' X 5'	38"	#5 @ 10" OCEW #5 @ 10" OCEW	1,890 1,350
42"	⌀ 5'-6" 5'-6" X 5'-6"	44"	#5 @ 10" OCEW #5 @ 9" OCEW	1,720 1,210
48"	⌀ 6' 6' X 6'	50"	#5 @ 9" OCEW #5 @ 8" OCEW	1,600 1,100

** ASSUMED SOIL BEARING CAPACITY



ROUND OPTION PLAN VIEW



SQUARE OPTION PLAN VIEW

NOTES:

1. DESIGN IN ACCORDANCE WITH AASHTO, 17th EDITION.
2. DESIGN LOAD HS25.
3. EARTH COVER = 1' MAX.
4. CONCRETE STRENGTH = 3,500 psi
5. REINFORCING STEEL = ASTM A615, GRADE 60.
6. PROVIDE ADDITIONAL REINFORCING AROUND OPENINGS EQUAL TO THE BARS INTERRUPTED, HALF EACH SIDE. ADDITIONAL BARS TO BE IN THE SAME PLANE.
7. TRIM OPENING WITH DIAGONAL #4 BARS, EXTEND BARS A MINIMUM OF 12" BEYOND OPENING, BEND BARS AS REQUIRED TO MAINTAIN BAR COVER.
8. PROTECTION SLAB AND ALL MATERIALS TO BE PROVIDED AND INSTALLED BY CONTRACTOR.
9. DETAIL DESIGN BY DELTA ENGINEERING, BINGHAMTON, NY.

MANHOLE CAP DETAIL

SCALE: N.T.S.

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CONTECH CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO60540 20-001 Harvest Landing Site 6
Southerly Chambers
Perris, CA
DETENTION SYSTEM

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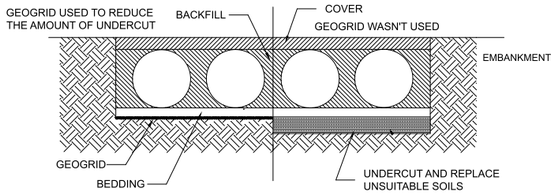
CMP DETENTION INSTALLATION GUIDE

PROPER INSTALLATION OF A FLEXIBLE UNDERGROUND DETENTION SYSTEM WILL ENSURE LONG-TERM PERFORMANCE. THE CONFIGURATION OF THESE SYSTEMS OFTEN REQUIRES SPECIAL CONSTRUCTION PRACTICES THAT DIFFER FROM CONVENTIONAL FLEXIBLE PIPE CONSTRUCTION. CONTECH ENGINEERED SOLUTIONS STRONGLY SUGGESTS SCHEDULING A PRE-CONSTRUCTION MEETING WITH YOUR LOCAL SALES ENGINEER TO DETERMINE IF ADDITIONAL MEASURES, NOT COVERED IN THIS GUIDE, ARE APPROPRIATE FOR YOUR SITE.

FOUNDATION

CONSTRUCT A FOUNDATION THAT CAN SUPPORT THE DESIGN LOADING APPLIED BY THE PIPE AND ADJACENT BACKFILL WEIGHT AS WELL AS MAINTAIN ITS INTEGRITY DURING CONSTRUCTION.

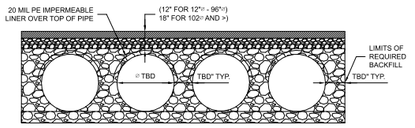
IF SOFT OR UNSUITABLE SOILS ARE ENCOUNTERED, REMOVE THE POOR SOILS DOWN TO A SUITABLE DEPTH AND THEN BUILD UP TO THE APPROPRIATE ELEVATION WITH A COMPETENT BACKFILL MATERIAL. THE STRUCTURAL FILL MATERIAL GRADATION SHOULD NOT ALLOW THE MIGRATION OF FINES, WHICH CAN CAUSE SETTLEMENT OF THE DETENTION SYSTEM OR PAVEMENT ABOVE. IF THE STRUCTURAL FILL MATERIAL IS NOT COMPATIBLE WITH THE UNDERLYING SOILS AN ENGINEERING FABRIC SHOULD BE USED AS A SEPARATOR. IN SOME CASES, USING A STIFF REINFORCING GEOGRID REDUCES OVER EXCAVATION AND REPLACEMENT FILL QUANTITIES.



GRADE THE FOUNDATION SUBGRADE TO A UNIFORM OR SLIGHTLY SLOPING GRADE. IF THE SUBGRADE IS CLAY OR RELATIVELY NON-POROUS AND THE CONSTRUCTION SEQUENCE WILL LAST FOR AN EXTENDED PERIOD OF TIME, IT IS BEST TO SLOPE THE GRADE TO ONE END OF THE SYSTEM. THIS WILL ALLOW EXCESS WATER TO DRAIN QUICKLY, PREVENTING SATURATION OF THE SUBGRADE.

GEOMEMBRANE BARRIER

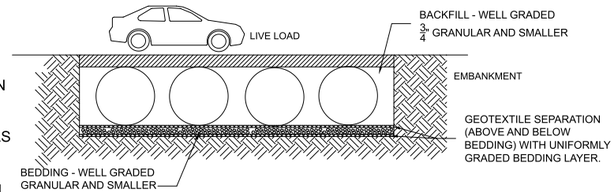
THE RESISTIVITY OF A PROJECT SITE MAY CHANGE OVER TIME DUE TO THE USE OF VARIOUS SALTING, DE-ICING, AND AGRICULTURAL AGENTS APPLIED ON OR NEAR THE AREA. TO MITIGATE THE POTENTIAL IMPACT OF THESE AGENTS, AN HDPE MEMBRANE LINER WILL BE INSTALLED ON THE CROWN OF EACH PIPE, CREATING AN IMPERMEABLE BARRIER. THIS MEASURE IS DESIGNED TO PROTECT THE SYSTEM FROM ENVIRONMENTAL CHANGES THAT COULD LEAD TO PREMATURE CORROSION AND REDUCE THE OVERALL SERVICE LIFE.



IN-SITU TRENCH WALL

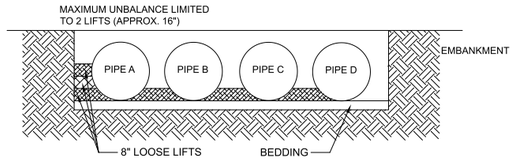
IF EXCAVATION IS REQUIRED, THE TRENCH WALL NEEDS TO BE CAPABLE OF SUPPORTING THE LOAD THAT THE PIPE SHEDS AS THE SYSTEM IS LOADED. IF SOILS ARE NOT CAPABLE OF SUPPORTING THESE LOADS, THE PIPE CAN DEFLECT. PERFORM A SIMPLE SOIL PRESSURE CHECK USING THE APPLIED LOADS TO DETERMINE THE LIMITS OF EXCAVATION BEYOND THE SPRING LINE OF THE OUTER MOST PIPES.

IN MOST CASES THE REQUIREMENTS FOR A SAFE WORK ENVIRONMENT AND PROPER BACKFILL PLACEMENT AND COMPACTION TAKE CARE OF THIS CONCERN.



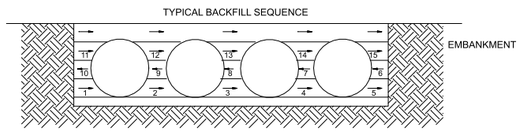
BACKFILL PLACEMENT

MATERIAL SHALL BE WORKED INTO THE PIPE HAUNCHES BY MEANS OF SHOVEL-SLICING, RODDING, AIR TAMPER, VIBRATORY ROD, OR OTHER EFFECTIVE METHODS.

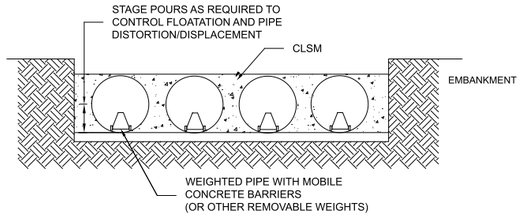


IF AASHTO T99 PROCEDURES ARE DETERMINED INFEASIBLE BY THE GEOTECHNICAL ENGINEER OF RECORD, COMPACTION IS CONSIDERED ADEQUATE WHEN NO FURTHER YIELDING OF THE MATERIAL IS OBSERVED UNDER THE COMPACTOR, OR UNDER FOOT, AND THE GEOTECHNICAL ENGINEER OF RECORD (OR REPRESENTATIVE THEREOF) IS SATISFIED WITH THE LEVEL OF COMPACTION.

FOR LARGE SYSTEMS, CONVEYOR SYSTEMS, BACKHOES WITH LONG REACHES OR DRAGLINES WITH STONE BUCKETS MAY BE USED TO PLACE BACKFILL. ONCE MINIMUM COVER FOR CONSTRUCTION LOADING ACROSS THE ENTIRE WIDTH OF THE SYSTEM IS REACHED, ADVANCE THE EQUIPMENT TO THE END OF THE RECENTLY PLACED FILL, AND BEGIN THE SEQUENCE AGAIN UNTIL THE SYSTEM IS COMPLETELY BACKFILLED. THIS TYPE OF CONSTRUCTION SEQUENCE PROVIDES ROOM FOR STOCKPILED BACKFILL DIRECTLY BEHIND THE BACKHOE, AS WELL AS THE MOVEMENT OF CONSTRUCTION TRAFFIC. MATERIAL STOCKPILES ON TOP OF THE BACKFILLED DETENTION SYSTEM SHOULD BE LIMITED TO 8- TO 10-FEET HIGH AND MUST PROVIDE BALANCED LOADING ACROSS ALL BARRELS. TO DETERMINE THE PROPER COVER OVER THE PIPES TO ALLOW THE MOVEMENT OF CONSTRUCTION EQUIPMENT SEE TABLE 1, OR CONTACT YOUR LOCAL CONTECH SALES ENGINEER.



WHEN FLOWABLE FILL IS USED, YOU MUST PREVENT PIPE FLOATATION. TYPICALLY, SMALL LIFTS ARE PLACED BETWEEN THE PIPES AND THEN ALLOWED TO SET-UP PRIOR TO THE PLACEMENT OF THE NEXT LIFT. THE ALLOWABLE THICKNESS OF THE CLSM LIFT IS A FUNCTION OF A PROPER BALANCE BETWEEN THE UPLIFT FORCE OF THE CLSM, THE OPPOSING WEIGHT OF THE PIPE, AND THE EFFECT OF OTHER RESTRAINING MEASURES. THE PIPE CAN CARRY LIMITED FLUID PRESSURE WITHOUT PIPE DISTORTION OR DISPLACEMENT, WHICH ALSO AFFECTS THE CLSM LIFT THICKNESS. YOUR LOCAL CONTECH SALES ENGINEER CAN HELP DETERMINE THE PROPER LIFT THICKNESS.

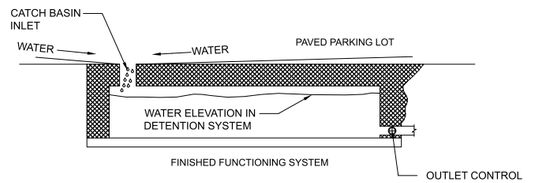


CONSTRUCTION LOADING

TYPICALLY, THE MINIMUM COVER SPECIFIED FOR A PROJECT ASSUMES H-20 LIVE LOAD. BECAUSE CONSTRUCTION LOADS OFTEN EXCEED DESIGN LIVE LOADS, INCREASED TEMPORARY MINIMUM COVER REQUIREMENTS ARE NECESSARY. SINCE CONSTRUCTION EQUIPMENT VARIES FROM JOB TO JOB, IT IS BEST TO ADDRESS EQUIPMENT SPECIFIC MINIMUM COVER REQUIREMENTS WITH YOUR LOCAL CONTECH SALES ENGINEER DURING YOUR PRE-CONSTRUCTION MEETING.

ADDITIONAL CONSIDERATIONS

BECAUSE MOST SYSTEMS ARE CONSTRUCTED BELOW-GRADE, RAINFALL CAN RAPIDLY FILL THE EXCAVATION; POTENTIALLY CAUSING FLOATATION AND MOVEMENT OF THE PREVIOUSLY PLACED PIPES. TO HELP MITIGATE POTENTIAL PROBLEMS, IT IS BEST TO START THE INSTALLATION AT THE DOWNSTREAM END WITH THE OUTLET ALREADY CONSTRUCTED TO ALLOW A ROUTE FOR THE WATER TO ESCAPE. TEMPORARY DIVERSION MEASURES MAY BE REQUIRED FOR HIGH FLOWS DUE TO THE RESTRICTED NATURE OF THE OUTLET PIPE.



CMP DETENTION SYSTEM INSPECTION AND MAINTENANCE

UNDERGROUND STORMWATER DETENTION AND INFILTRATION SYSTEMS MUST BE INSPECTED AND MAINTAINED AT REGULAR INTERVALS FOR PURPOSES OF PERFORMANCE AND LONGEVITY.

INSPECTION

INSPECTION IS THE KEY TO EFFECTIVE MAINTENANCE OF CMP DETENTION SYSTEMS AND IS EASILY PERFORMED. CONTECH RECOMMENDS ONGOING, ANNUAL INSPECTIONS. SITES WITH HIGH TRASH LOAD OR SMALL OUTLET CONTROL ORIFICES MAY NEED MORE FREQUENT INSPECTIONS. THE RATE AT WHICH THE SYSTEM COLLECTS POLLUTANTS WILL DEPEND MORE ON SITE SPECIFIC ACTIVITIES RATHER THAN THE SIZE OR CONFIGURATION OF THE SYSTEM.

INSPECTIONS SHOULD BE PERFORMED MORE OFTEN IN EQUIPMENT WASHDOWN AREAS, IN CLIMATES WHERE SANDING AND/OR SALTING OPERATIONS TAKE PLACE, AND IN OTHER VARIOUS INSTANCES IN WHICH ONE WOULD EXPECT HIGHER ACCUMULATIONS OF SEDIMENT OR ABRASIVE/ CORROSIVE CONDITIONS. A RECORD OF EACH INSPECTION IS TO BE MAINTAINED FOR THE LIFE OF THE SYSTEM

MAINTENANCE

CMP DETENTION SYSTEMS SHOULD BE CLEANED WHEN AN INSPECTION REVEALS ACCUMULATED SEDIMENT OR TRASH IS CLOGGING THE DISCHARGE ORIFICE.

ACCUMULATED SEDIMENT AND TRASH CAN TYPICALLY BE EVACUATED THROUGH THE MANHOLE OVER THE OUTLET ORIFICE. IF MAINTENANCE IS NOT PERFORMED AS RECOMMENDED, SEDIMENT AND TRASH MAY ACCUMULATE IN FRONT OF THE OUTLET ORIFICE. MANHOLE COVERS SHOULD BE SECURELY SEATED FOLLOWING CLEANING ACTIVITIES. CONTECH SUGGESTS THAT ALL SYSTEMS BE DESIGNED WITH AN ACCESS/INSPECTION MANHOLE SITUATED AT OR NEAR THE INLET AND THE OUTLET ORIFICE. SHOULD IT BE NECESSARY TO GET INSIDE THE SYSTEM TO PERFORM MAINTENANCE ACTIVITIES, ALL APPROPRIATE PRECAUTIONS REGARDING CONFINED SPACE ENTRY AND OSHA REGULATIONS SHOULD BE FOLLOWED.

ANNUAL INSPECTIONS ARE BEST PRACTICE FOR ALL UNDERGROUND SYSTEMS. DURING THIS INSPECTION, IF EVIDENCE OF SALTING/DE-ICING AGENTS IS OBSERVED WITHIN THE SYSTEM, IT IS BEST PRACTICE FOR THE SYSTEM TO BE RINSED, INCLUDING ABOVE THE SPRING LINE SOON AFTER THE SPRING THAW AS PART OF THE MAINTENANCE PROGRAM FOR THE SYSTEM.

MAINTAINING AN UNDERGROUND DETENTION OR INFILTRATION SYSTEM IS EASIEST WHEN THERE IS NO FLOW ENTERING THE SYSTEM. FOR THIS REASON, IT IS A GOOD IDEA TO SCHEDULE THE CLEANOUT DURING DRY WEATHER.

THE FOREGOING INSPECTION AND MAINTENANCE EFFORTS HELP ENSURE UNDERGROUND PIPE SYSTEMS USED FOR STORMWATER STORAGE CONTINUE TO FUNCTION AS INTENDED BY IDENTIFYING RECOMMENDED REGULAR INSPECTION AND MAINTENANCE PRACTICES. INSPECTION AND MAINTENANCE RELATED TO THE STRUCTURAL INTEGRITY OF THE PIPE OR THE SOUNDNESS OF PIPE JOINT CONNECTIONS IS BEYOND THE SCOPE OF THIS GUIDE.

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CONTECH CMP DETENTION SYSTEMS

CONTECH **DYODS** DRAWING

DYO60540 20-001 Harvest Landing Site 6
Southerly Chambers
Perris, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
42826	60540	10/2/2024
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

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Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	FMCivil Engineers Inc	Date	10/4/2024
Designed by	Hector Paez	Case No	
Company Project Number/Name	20-001 - Site 6		

BMP Identification

BMP NAME / ID: S6-1 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
S6-1A	*142737.57*	*Roofs*	*1*	*0.89*	*127321.9*			
S6-1C	*114415.59*	*Concrete or Asphalt*	*1*	*0.892*	*102058.7*			

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	FMCivil Engineers Inc	Date	10/4/2024
Designed by	Hector Paez	Case No	
Company Project Number/Name	20-001 - Site 6		

BMP Identification

BMP NAME / ID: S6-2 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
S6-2A	*143823.86*	*Roofs*	*1*	*0.89*	*128290.9*			
S6-2C	*127078.39*	*Concrete or Asphalt*	*1*	*0.892*	*113353.9*			
	270902.25	***Total***			**241644.8**	**0.20**	***1.11***	***1.154***

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	FMCivil Engineers Inc	Date	10/4/2024
Designed by	Hector Paez	Case No	
Company Project Number/Name	20-001 - Site 6		

BMP Identification

BMP NAME / ID: S6-3 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
S6-3A	*88575.34*	*Roofs*	*1*	*0.89*	*79009.2*			
S6-3C	*60762.75*	*Concrete or Asphalt*	*1*	*0.892*	*54200.4*			

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	FMCivil Engineers Inc	Date	10/4/2024
Designed by	Hector Paez	Case No	
Company Project Number/Name	20-001 - Site 6		

BMP Identification

BMP NAME / ID: S6-4 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
S6-4A	*87541.33*	*Roofs*	*1*	*0.89*	*78086.9*			
S6-4C	*60000.62*	*Concrete or Asphalt*	*1*	*0.892*	*53520.6*			

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	FMCivil Engineers Inc	Date	10/4/2024
Designed by	Hector Paez	Case No	
Company Project Number/Name	20-001 - Site 6		

BMP Identification

BMP NAME / ID: S6-5 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
S6-5A	*20936.36*	*Roofs*	*1*	*0.89*	*18675.2*			
S6-5C	*47001.96*	*Concrete or Asphalt*	*1*	*0.892*	*41925.7*			
	67938.32	***Total***			**60600.9**	**0.20**	***0.28***	***0.346***

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	FMCivil Engineers Inc	Date	10/4/2024
Designed by	Hector Paez	Case No	
Company Project Number/Name	20-001 - Site 6		

BMP Identification

BMP NAME / ID: S6-6 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Rainfall Intensity (in/hr)	Design Flow Rate (cfs)	Proposed Flow Rate (cfs)
S6-6A	20934.5	Roofs	1	0.89	18673.6			
S6-6C	52272.3	Concrete or Asphalt	1	0.892	46626.9			
	73206.8	Total			65300.5	0.20	0.30	0.346

Notes:

LINE A-C

LAT. H-10.1

H-10.1

AT. H-10

H-10

K-20

LAT. J-9

J-9

J-9.2

LAT. J-9.2

LAT. J-9.1

J-9.1

J-9

542-AC

552-AC

LAT. J-7.1

J-7.1

LAT. J-7

LAT. J-7

J-7

LAT. J-8

670-AC

J-8

LAT. P-5

P-5

P-4

PORTION OF
8K3
1" = 1000'

TOPEKA

H

H-1

LAT. H-1

H-2

LAT. H-2

LAT.

LINE H

H-3

LAT. H-3

K-24

AT. K-24

K-21

K-22

Water Tank

K-23

LAT. K-23

LAT. K-22

LAT. K-21

K-14

LAT. K-14

K-6

LAT. K-6

LAT. K-20

K-19

LAT. K-19

K-16

LAT. K-16

K-18

LAT. K-18

K-17

LAT. K-17

K-15

LAT. K-15

K-13

LAT. K-13

K-3

LAT. K-3

K

LINE K

J-1

LAT. J-1

J-2

LAT. J-2

J-3

LAT. J-3

J

LINE J

J-5

LAT. J-5

J-4

LAT. J-4

J-6

LAT. J-6

A-D

LINE A-D

A-E

LINE A-E

A-F

LINE A-F

A-G

LINE A-G

L-1

LAT. L-1

L

LINE L

REDLANDS BLVD.

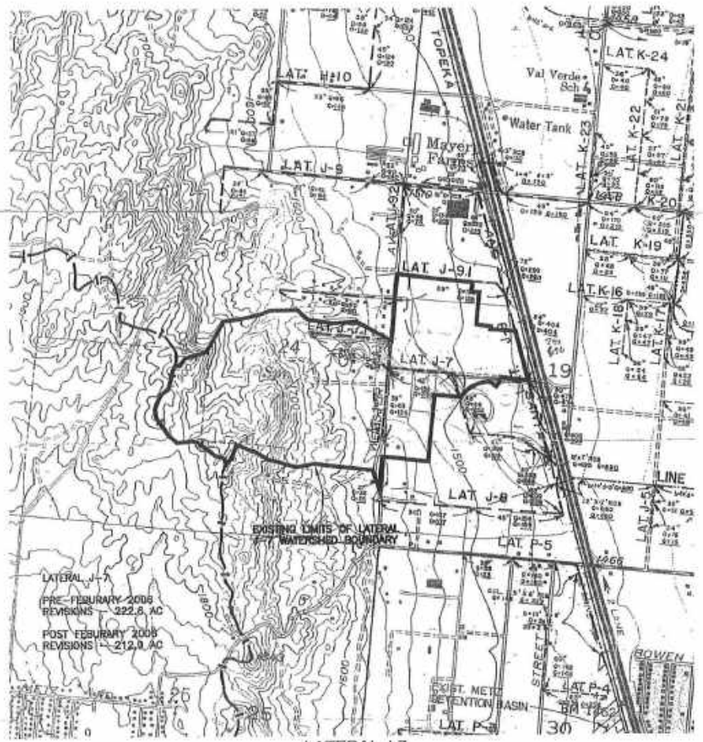
PVSD

M-1

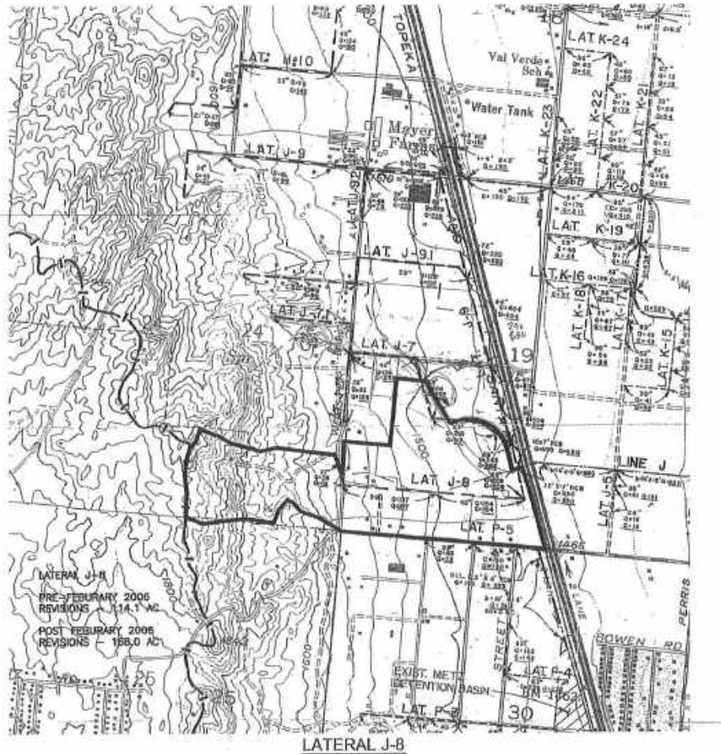
BROWN RD.

REVISED HYDROLOGY MAP
PERRIS MASTER DRAINAGE PLAN

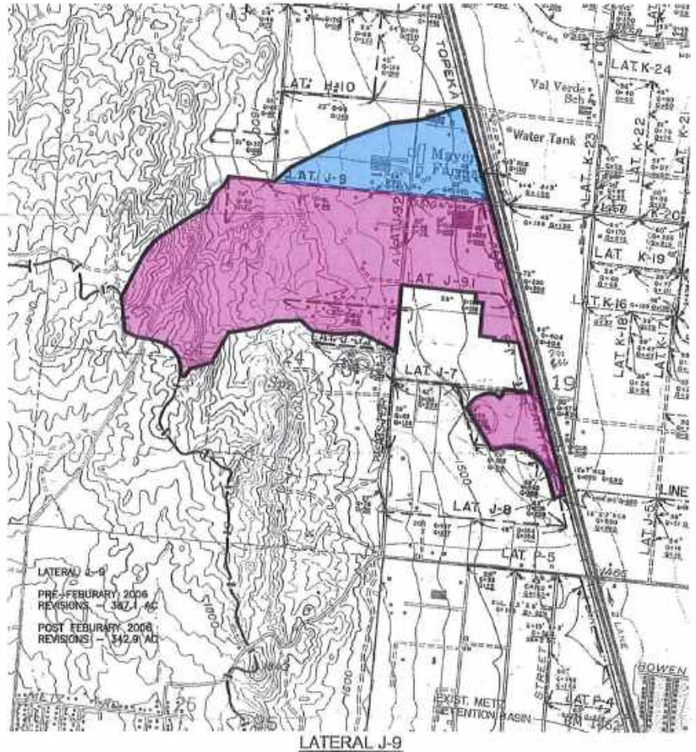
LATERALS J-7, J-8, & J-9



LATERAL J-7



LATERAL J-8



LATERAL J-9

LATERAL No.	PRE-FEBURARY 2006 REVISIONS	POST FEBURARY 2006 REVISIONS	INCREASE/DECREASE (ACRES)
LAT J-8	114.1	168.0	+53.9
LAT J-9	609.8	555.9	-53.9

LEGEND

PROPOSED LATERAL, WATERSHED BOUNDARIES AFTER FEBRUARY 2006 REVISION

N

SCALE: 1"=1000'

WORK CONTAINED WITHIN THESE PLANS SHALL NOT COMMENCE UNTIL AN ENCROACHMENT PERMIT AND/OR GRADING PERMIT HAS BEEN ISSUED.

THE PRIVATE ENGINEER SIGNING THESE PLANS IS RESPONSIBLE FOR ASSURING THE ACCURACY AND ACCEPTABILITY OF THE DESIGN HEREON. IN THE EVENT OF DISCREPANCIES ARISING AFTER COUNTY APPROVAL OR DURING CONSTRUCTION, THE PRIVATE ENGINEER SHALL BE RESPONSIBLE FOR DETERMINING AN ACCEPTABLE SOLUTION AND REVISING THE PLANS FOR APPROVAL BY THE COUNTY.

DATE	BY	MARK	REVISIONS	APPR	DATE
			COUNTY		
	ENGINEER				

SEAL—COUNTY

COUNTY OF RIVERSIDE
TRANSPORTATION DEPARTMENT
APPROVED BY:

ALAN D. FRENCH, P.E.
CIVIL ENGINEER, R.C.E. NO. 45702 — DATE

RECOMMENDED — DATE

SEAL—ENGINEER

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

RECOMMENDED FOR APPROVAL — APPROVED BY:

PLANNING ENGINEER — CHIEF ENGINEER

DATE: — DATE:

ENGINEERING SOLUTIONS
ENGINEERING LAND PLANNING SURVEYING MAPPING
3185 CHICAGO AVENUE, STE. 101
RIVERSIDE, CA. 92507
PHONE - (951) 784-0288
FAX - (951) 784-0287

PREPARED BY:

DATE
EXP. 06-30-07

BENCHMARK:

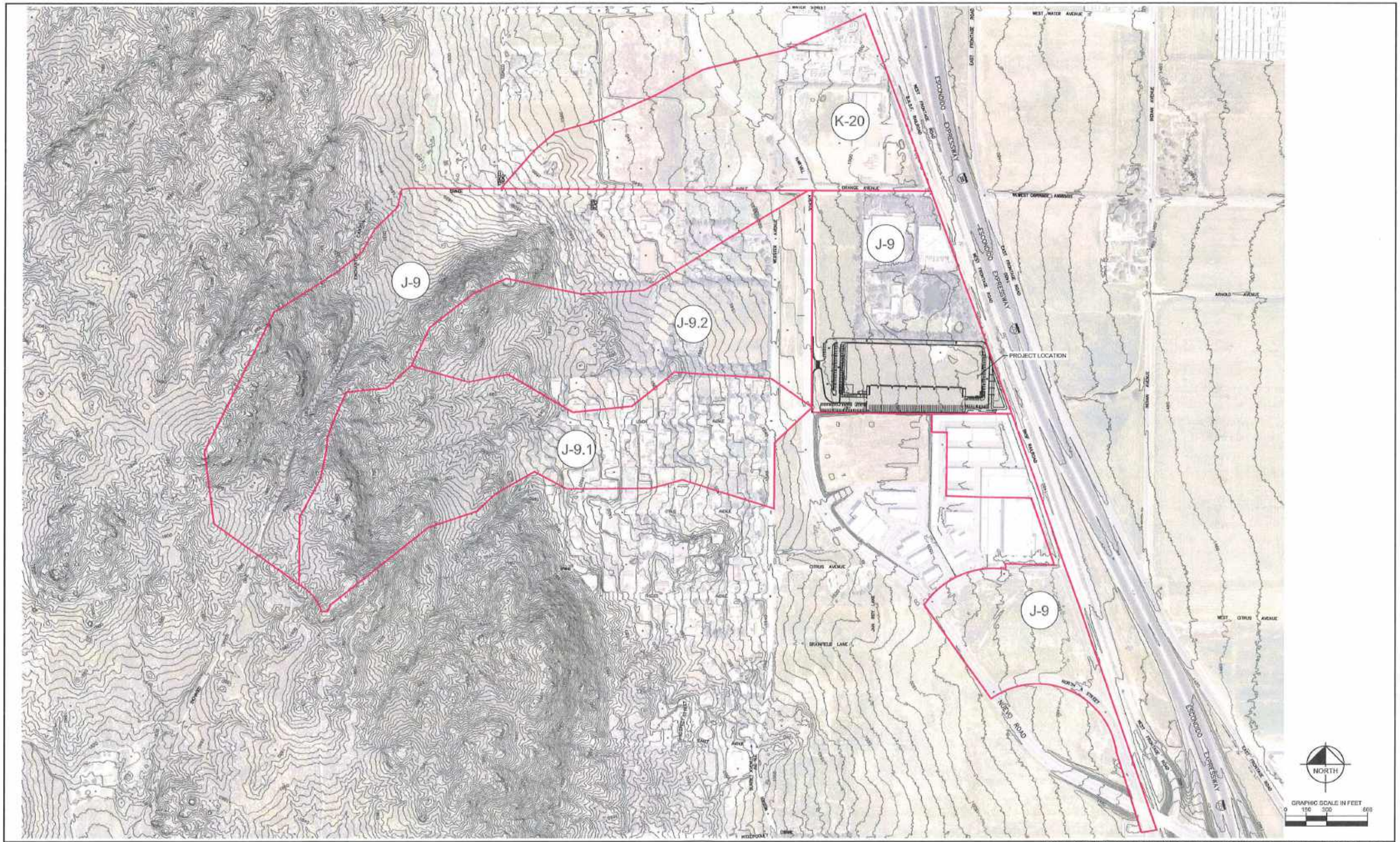
SCALE:

L.P. No. XXXXX
COUNTY OF RIVERSIDE
REVISED HYDROLOGY MAP
PERRIS MASTER DRAINAGE PLAN
LATERALS J-7, J-8, & J-9

SHEET NO. 1 OF 1 SHTS.

FOR: | W.O. | COUNTY FILE NO.:

B:\CAD\Nuevo Industrial Park - NV\PE\ExhibitsNV\P Perris MDP Hydrology map lat 7 and lat 8.dwg, 2/2/2007 1:10:03 PM, Donal Pearce



Kimley»Horn

RCFC MDP DRAINAGE AREA MAP LINE J-9
ROCKEFELLER HARVILL INDUSTRIAL PARK
October 9, 2020

k:\sd_ldev\rockefeller - riverside_harvill\lb\rcfc\2020.10.09 - mdp letter\2020.10.09 - mdp drainage area.dwg 10/9/2020

EXHIBITS

EXHIBIT A: VICINITY MAP

EXHIBIT B: EXISTING HYDROLOGY MAP

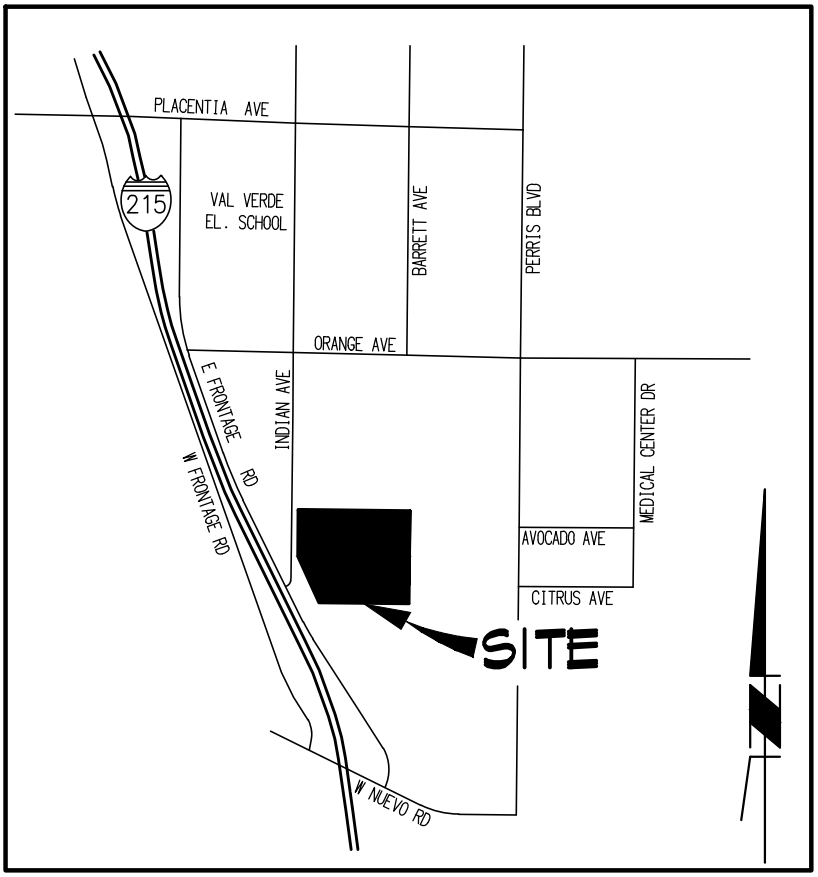
EXHIBIT C: PROPOSED HYDROLOGY MAP

EXHIBIT D: HYDROLOGIC SOILS GROUP MAP

EXHIBIT E: RCFCD MDP FACILITIES OVERLAY

EXHIBIT F: PHASE 1 OFFSITE MASTER STORM DRAIN & LOW FLOW SYSTEM

EXHIBIT G: CONCEPTUAL GRADING



VICINITY MAP

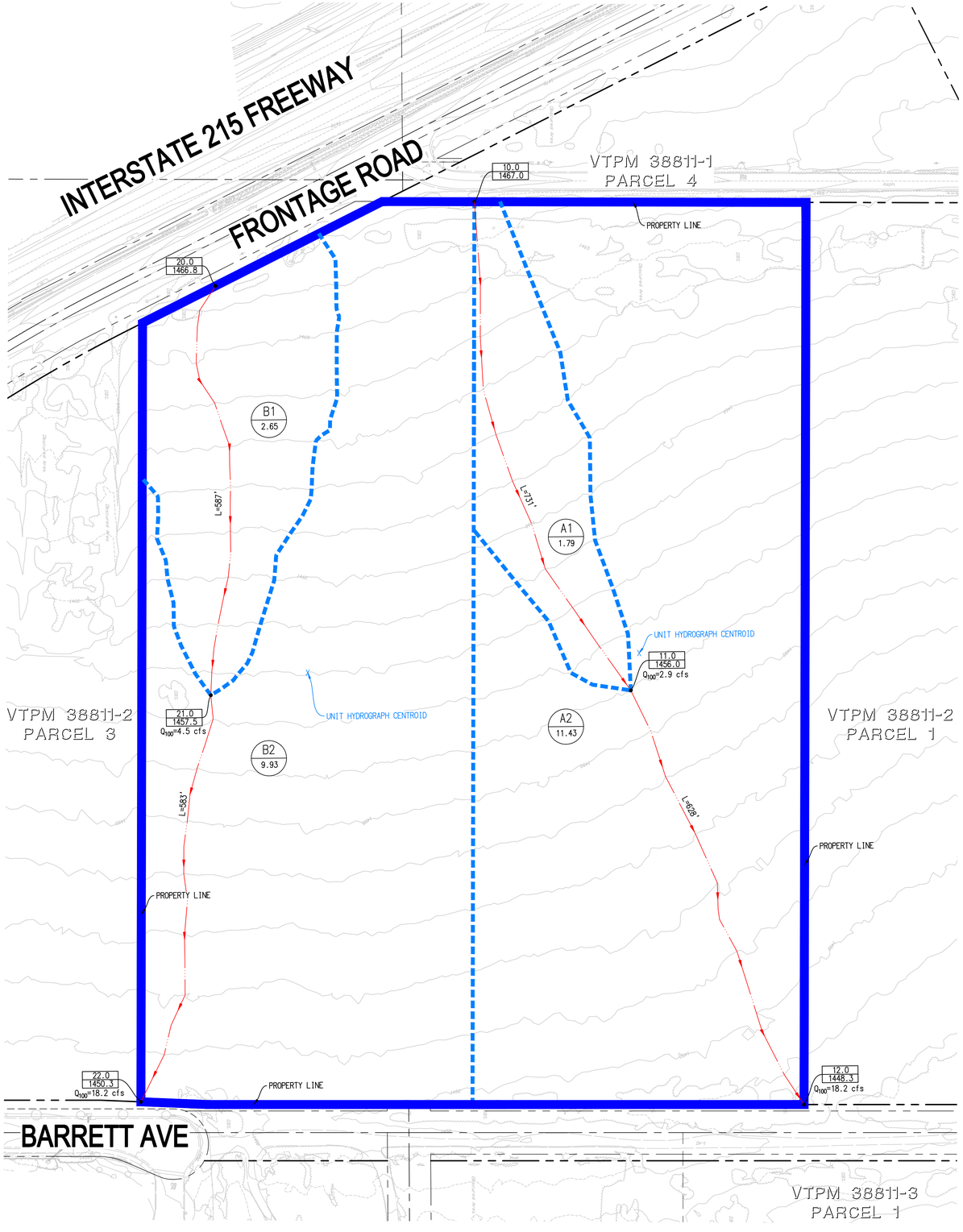
T4S, R3W, SEC 19
NOT TO SCALE

FMCIVIL ENGINEERS INC.
29995 TECHNOLOGY DRIVE, SUITE 306 | MURRIETA | CA 92563
951.331.9873 - FMCIVIL.COM

SITE 6 AT HARVEST LANDING

FIGURE 1
VICINITY MAP

H:\PDATA\20-001 HARVEST LANDING\DWGS\EXHIBITS\20-001-FEDEX-VICINITY-MAP .DWG DANNY 10/2/2024 4:34 PM



LEGEND

- D2 / 2.16 — DRAINAGE BASIN NAME / DRAINAGE BASIN AREA(AC.)
- 11 / 1027.0 — NODE I.D. / ELEVATION
- WATERSHED BOUNDARY
- SUB-WATERSHED BOUNDARY
- FLOW DIRECTION

UNIT HYDROGRAPH PARAMETERS - AREA A			
L_{MC} (FT)	L_C (FT)	Δ ELEV (FT)	N (-)
1,359	693	18.70	0.03

UNIT HYDROGRAPH PARAMETERS - AREA B			
L_{MC} (FT)	L_C (FT)	Δ ELEV (FT)	N (-)
1,170	550	16.50	0.03

SCALE 1"=80'

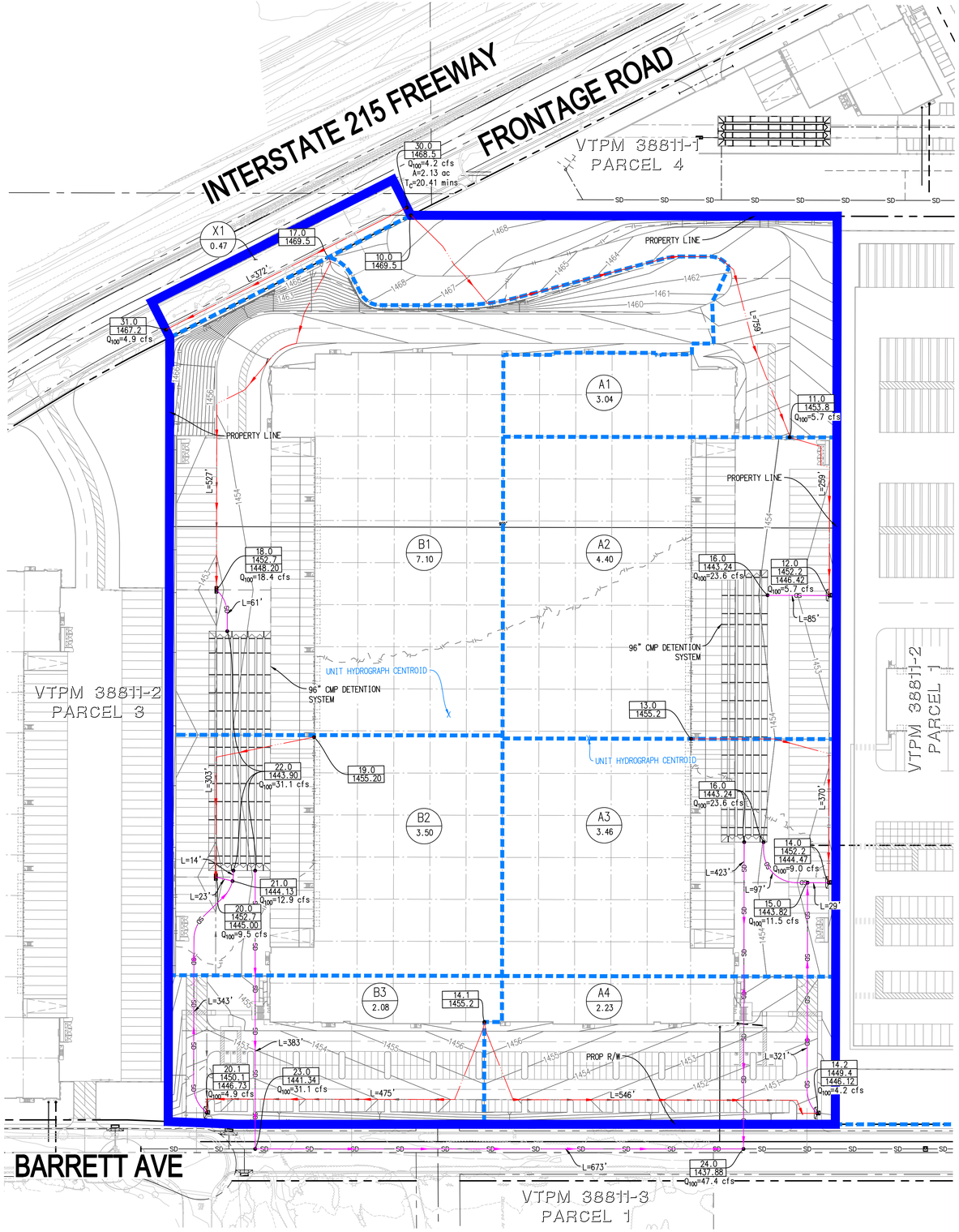
80 40 0 80 160 240

SCALE: 1"=80'

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MURRIETA | CA 92563
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HARVEST LANDING

SITE 6 - EXISTING DRAINAGE



LEGEND

D2 / 2.16 — DRAINAGE BASIN NAME / DRAINAGE BASIN AREA(AC.)

11 / 1027.0 — NODE I.D. / ELEVATION

WATERSHED BOUNDARY

SUB-WATERSHED BOUNDARY

FLOW DIRECTION

PIPE FLOW DIRECTION

UNIT HYDROGRAPH PARAMETERS - AREA A			
L_{MC} (FT)	L_C (FT)	Δ ELEV (FT)	N (-)
1,103	759	26.26	0.015

UNIT HYDROGRAPH PARAMETERS - AREA B			
L_{MC} (FT)	L_C (FT)	Δ ELEV (FT)	N (-)
818	475	25.60	0.015

SCALE 1"=80'

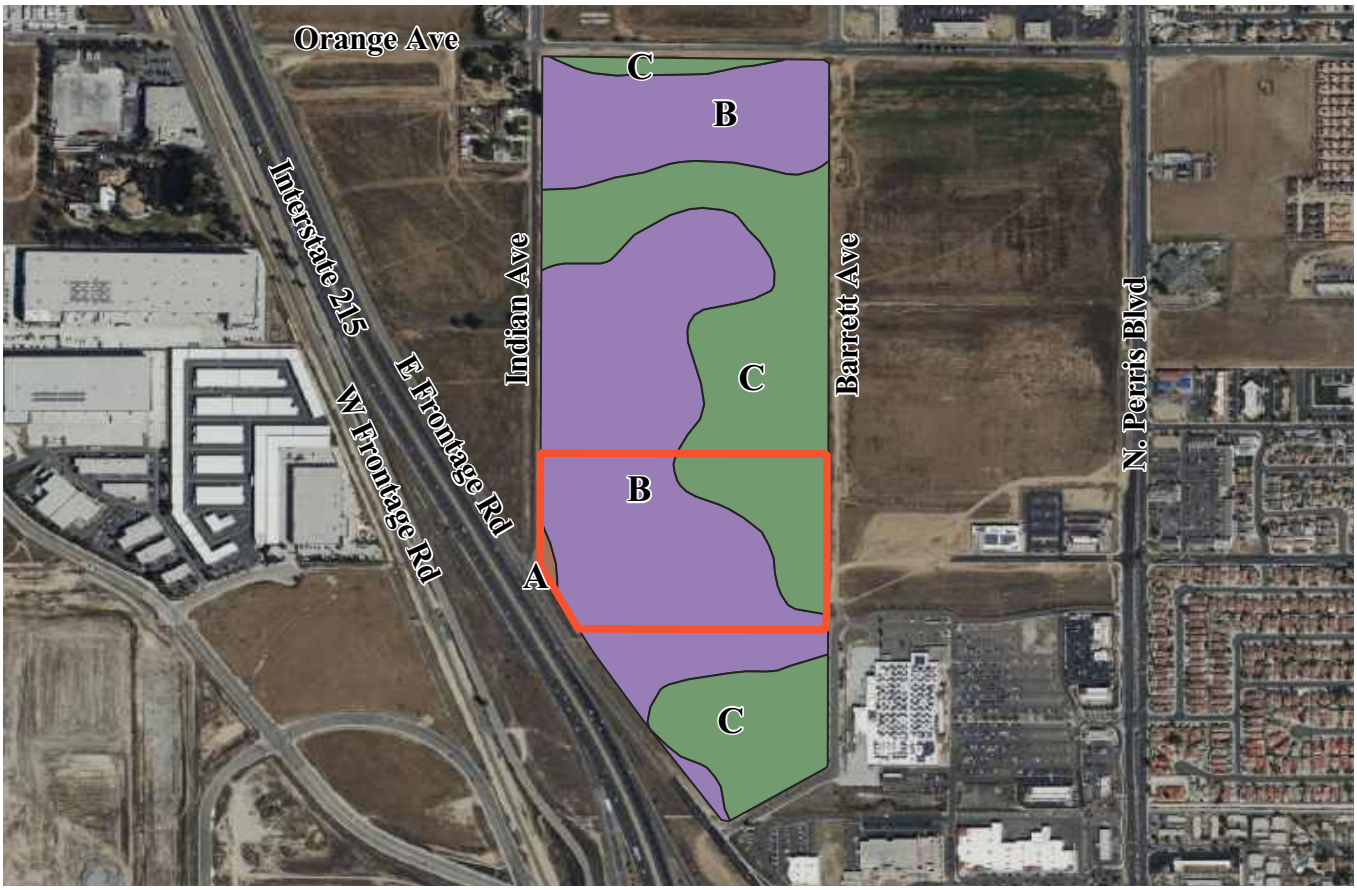
80 40 0 80 160 240

SCALE: 1"=80'

FMCIVIL ENGINEERS INC.
29995 TECHNOLOGY DRIVE, SUITE 306
MURRIETA | CA 92563
951.331.9873 - FMCIVIL.COM

HARVEST LANDING

SITE 6 - PROPOSED DRAINAGE



LEGEND

- SITE 6 BOUNDARY
- HYDROLOGIC SOIL A
- HYDROLOGIC SOIL B
- HYDROLOGIC SOIL C

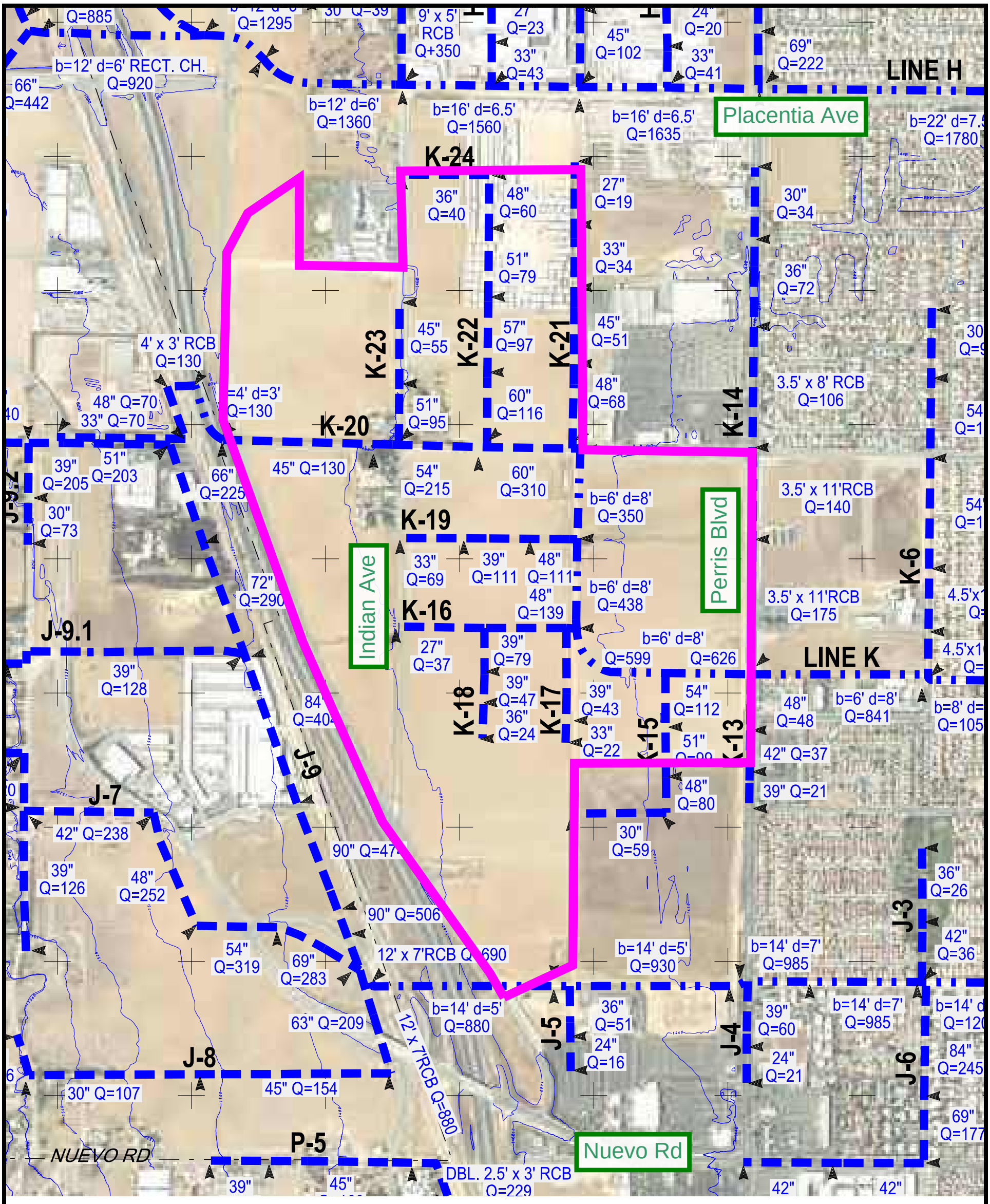
0 500 1,000 ft

FMCIVIL ENGINEERS INC.

Source: USDA Web Soil Survey

HARVEST LANDING

SITE 6 - HYDROLOGICAL SOIL GROUPS



N.T.S.

Site Boundary

MDP Facilities

Perris Harvest Landing MDP Exhibit

FMCIVIL ENGINEERS INC.

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

HARVEST LANDING INDUSTRIAL - PHASE I
OFFSITE MASTER STORM DRAIN & LOW FLOW SYSTEM





VICINITY MAP

T4S, R3W, SEC 19
NOT TO SCALE

APPLICANT/OWNER

HOWARD INDUSTRIAL PARTNERS
1944 NORTH TUSTIN STREET, SUITE 122
ORANGE, CA 92865
CONTACT: TIM HOWARD
(TEL)714-769-9155

ENGINEER

FMCIVIL ENGINEERS INC.
29995 TECHNOLOGY DRIVE, SUITE 306
MURRIETA, CA 92563
CONTACT: FRANCISCO MARTINEZ
(TEL)951-331-9813

ARCHITECT

AO ARCHITECTURE
144 NORTH STREET
ORANGE, CA 92866
CONTACT: STEPHEN PRZYBYLOWSKI
(TEL)714-639-9860

LEGEND

- RIGHT OF WAY
- (1025) EXISTING CONTOUR
- EASEMENT
- SD PROP. ONSITE STORM DRAIN SYSTEM
- SD PROP. OFFSITE STORM DRAIN SYSTEM
- PROP. STORM DRAIN LOW FLOW SYSTEM
- PROP. STORM DRAIN UNDER DRAIN SYSTEM
- W EXISTING WATER LINE
- W PROP. WATER LINE
- SS EXISTING SWR LINE
- SS PROP. SEWER LINE
- SD EXISTING STORM DRAIN PIPE
- E EXISTING OVERHEAD LINES

SCALE 1"=200'

200 100 0 200 400 600

SCALE: 1"=200'

CITY OF PERRIS

HARVEST LANDING INDUSTRIAL - PHASE I
OFFSITE MASTER STORM DRAIN
& LOW FLOW SYSTEM EXHIBIT

SCALE:	AS SHOWN
DATE:	OCT. 2024
DESIGNED:	AJ
CHECKED:	FM
PLN CK REF:	

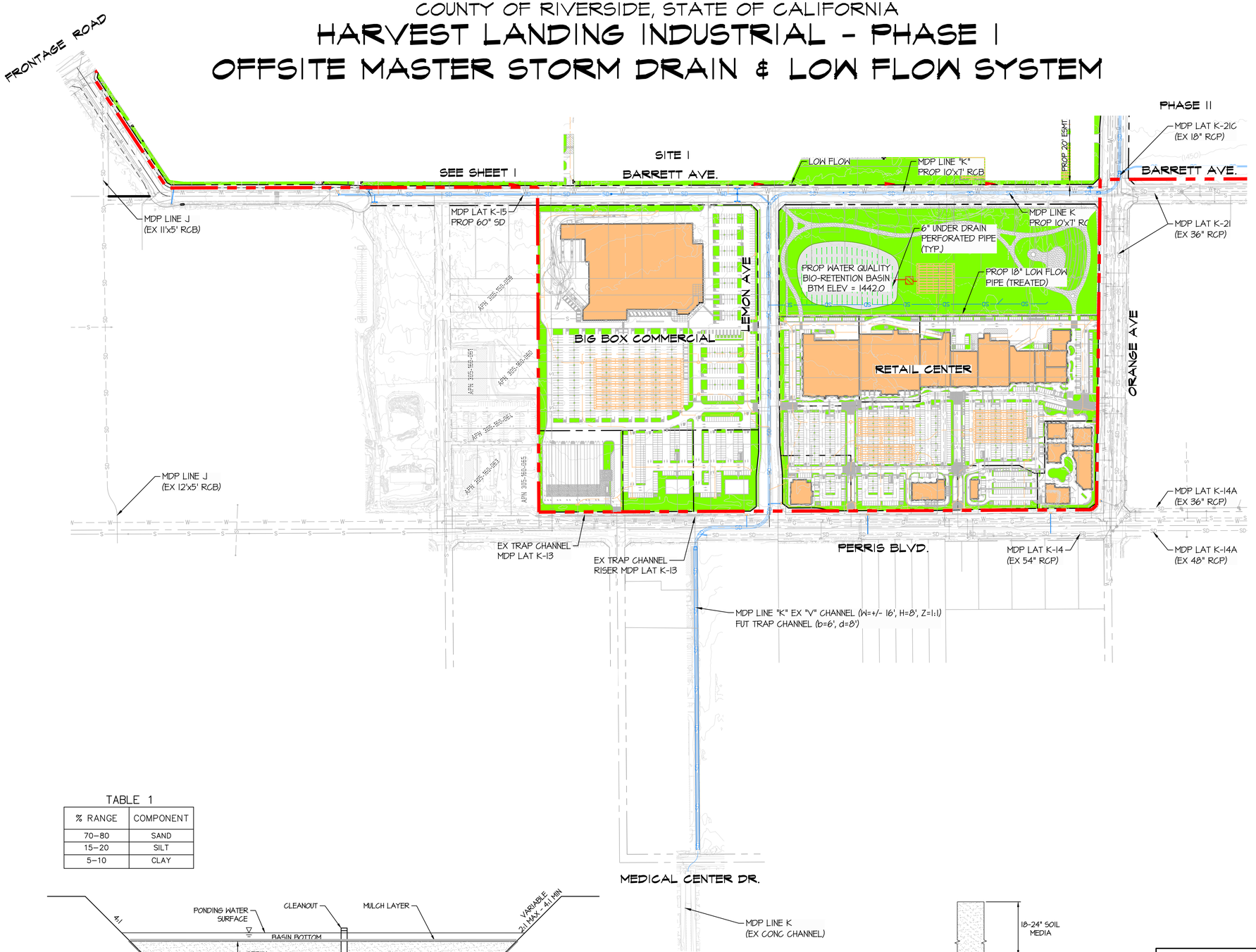
FMCIVIL ENGINEERS INC.
41870 KALMIA STREET, SUITE 120
MURRIETA | CA 92562
951.473.0202 - FMCIVIL.COM

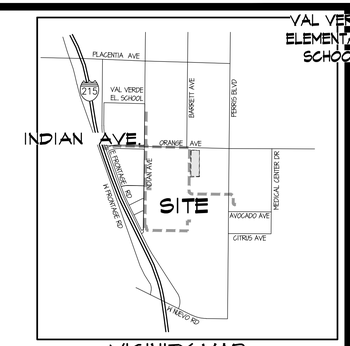
SHEET 1 OF 2 SHEETS

H:\PDATA\20-001 HARVEST LANDING\DWGS\PLOT\ENTITLEMENT\CUP\ALT-3\20-001-CUP_MSD3-01.DWG DANNY 10/7/2024 4:55 PM

COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

HARVEST LANDING INDUSTRIAL - PHASE I
OFFSITE MASTER STORM DRAIN & LOW FLOW SYSTEM





VICINITY MAP
T4S, R3W, SEC 19
NOT TO SCALE

APPLICANT/OWNER
HOWARD INDUSTRIAL PARTNERS
1944 NORTH TUSTIN STREET, SUITE 122
ORANGE, CA 92865
CONTACT: TIM HOWARD
(TEL)714-769-9155

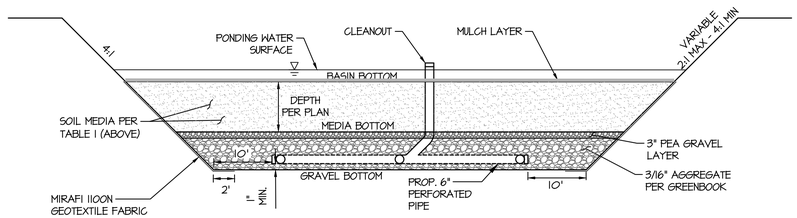
ENGINEER
FMCIVIL ENGINEERS INC.
29995 TECHNOLOGY DRIVE, SUITE 306
MURRIETA, CA 92563
CONTACT: FRANCISCO MARTINEZ
(TEL)951-331-9873

ARCHITECT
AO ARCHITECTURE
144 NORTH STREET
ORANGE, CA 92866
CONTACT: STEPHEN PRZYBYLOWSKI
(TEL)714-639-9860

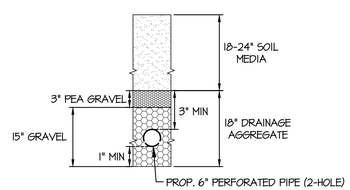
TABLE 1

% RANGE	COMPONENT
70-80	SAND
15-20	SILT
5-10	CLAY

LEGEND
- RIGHT OF WAY
- (1025) EXISTING CONTOUR
- EASEMENT
- SD PROP. ONSITE STORM DRAIN SYSTEM
- SD PROP. OFFSITE STORM DRAIN SYSTEM
- PROP. STORM DRAIN LOW FLOW SYSTEM
- PROP. STORM DRAIN UNDER DRAIN SYSTEM
- W EXISTING WATER LINE
- W PROP. WATER LINE
- SS EXISTING SWR LINE
- SS PROP. SEWER LINE
- SD EXISTING STORM DRAIN PIPE
- E EXISTING OVERHEAD LINES



BASIN CROSS SECTION
N.T.S.



AGGREGATE CROSS SECTION
N.T.S.





CITY OF PERRIS

HARVEST LANDING INDUSTRIAL - PHASE I OFFSITE MASTER STORM DRAIN & LOW FLOW SYSTEM EXHIBIT

SCALE:	AS SHOWN
DATE:	OCT. 2024
DESIGNED:	AJ
CHECKED:	FM
PLN CK REF.:	

FMCIVIL ENGINEERS INC.
41870 KALMIA STREET, SUITE 120
MURRIETA | CA 92562
951.973.0202 - FMCIVIL.COM

SHEET 2 OF 2 SHEETS

H:\PDATA\20-001 HARVEST LANDING\DWGS\PLNCK\ENTITLEMENT\CUP\ALT-3\20-001-CUP_MSD3-01.DWG DANNY 10/8/2024 7:35 AM

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

HARVEST LANDING RETAIL CENTER & BUSINESS PARK
SITE #6 CONCEPTUAL GRADING & DRAINAGE PLAN

VESTING TENTATIVE TRACT MAP 38811-2 - PARCEL 2

LEGEND

- (1025) EXISTING CONTOUR
- 1025 PROPOSED CONTOUR
- A RETAINING WALL
- FENCE
- E SIGN
- MH MANHOLE
- RIGHT OF WAY
- EASEMENT
- PARCEL LINE
- PARCEL MAP BOUNDARY
- STREET CENTER LINE
- SCREEN WALL
- COMBINATION SCREEN/RETAINING WALL
- EXISTING LOT LINE
- RIDGE LINE
- RIBBON GUTTER
- FLOW ARROW
- PROPOSED EDGE OF PAVEMENT
- W EXISTING WATER LINE
- W PROPOSED WATER LINE
- SS EXISTING SWR LINE
- SS PROPOSED SEWER LINE
- SD EXISTING STORM DRAIN PIPE
- SD PROPOSED STORM DRAIN PIPE
- E EXISTING OVERHEAD LINES
- CUT/FILL LINE
- SLOPE SYMBOL

ZONING ORDINANCE

EXISTING ZONING:
HARVEST LANDING SPECIFIC PLANS - MULTIPLE BUSINESS USE (MBU)

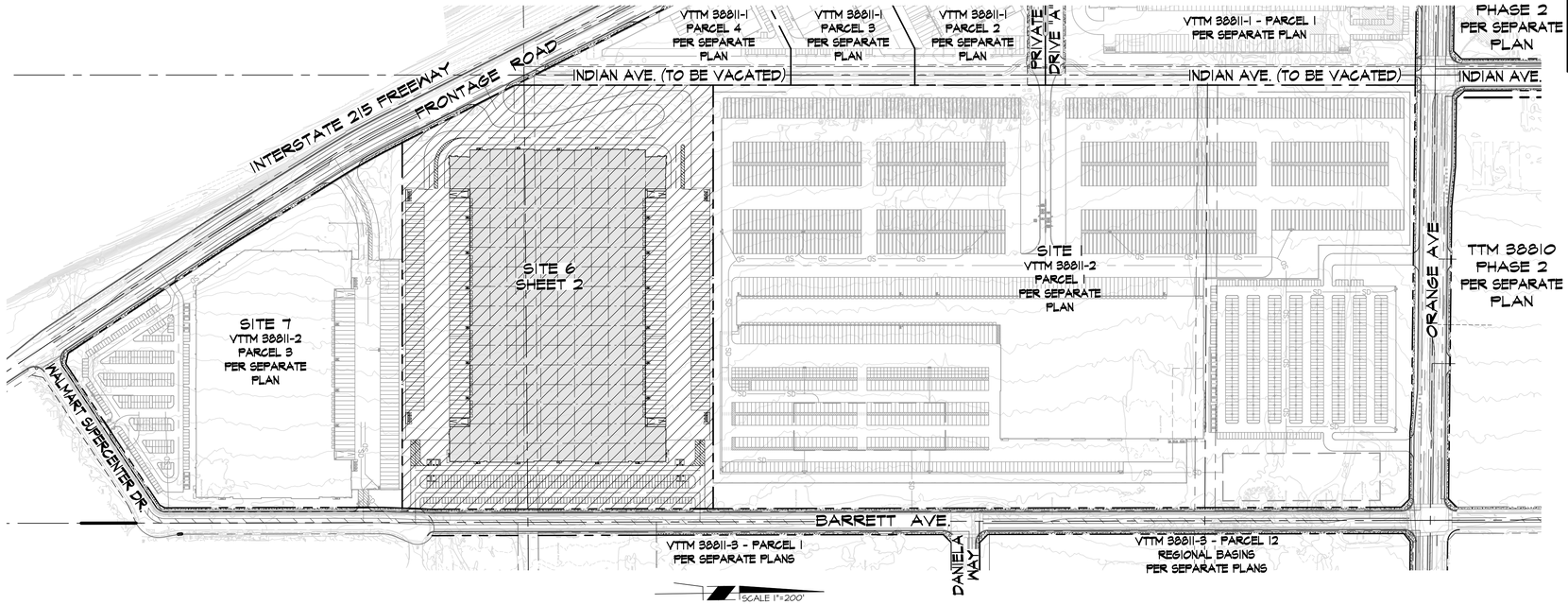
PROPOSED ZONING:
HARVEST LANDING SPECIFIC PLANS - MULTIPLE BUSINESS USE (MBU)

ASSESSOR'S PARCEL NUMBERS:

305-120-004 thru 008, 020 thru 026, &
305-130-001 thru 006, 009, &
305-160-001 thru 003, 025 thru 030, &
305-190-014, 019, 020, 028 thru 031, &
305-220-011, 054 thru 062

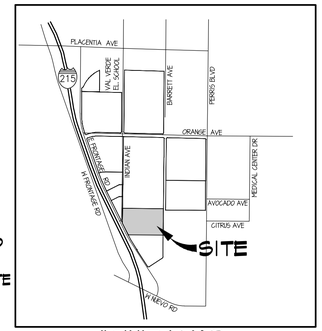
LEGAL DESCRIPTION

BLOCKS 1-4 OF FIGADOTA FARMS NO. 1A AS SHOWN BY MAP ON FILE IN THE OFFICE OF THE COUNTY RECORDER OF THE COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, IN BOOK 16 OF MAPS, PAGE 68 TOGETHER WITH LOTS 1-8, AND 13-20 OF FIGADOTA FARMS AS SHOWN BY MAP ON FILE IN THE OFFICE OF THE COUNTY RECORDER OF THE COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, IN BOOK 16 OF MAPS, PAGE 53 EXCEPTING THAT PORTION LYING WEST OF THE EASTERLY LINE OF THE FRONTAGE ROAD.



INDEX MAP

200 100 0 200 400 600
SCALE: 1"=200'



VICINITY MAP

T4S, R3W, SEC 19
NOT TO SCALE

APPLICANT/OWNER

HOWARD INDUSTRIAL PARTNERS
2244 NORTH PACIFIC STREET
ORANGE, CA 92865
CONTACT: TIM HOWARD
(TEL)714-637-3333

ENGINEER

FMCIVIL ENGINEERS INC.
41870 KALMIA ST., SUITE 120
MURRIETA, CA 92562
CONTACT: FRANCISCO MARTINEZ
(TEL)951-973-0202

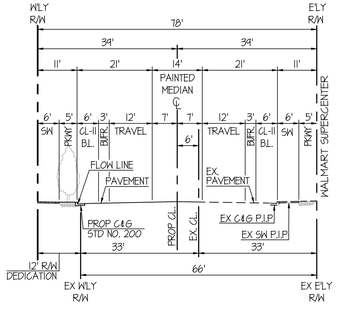
ARCHITECT

AO ARCHITECTURE
144 NORTH STREET
ORANGE, CA 92866
CONTACT: DAN MACDAVID
(TEL)714-634-9860

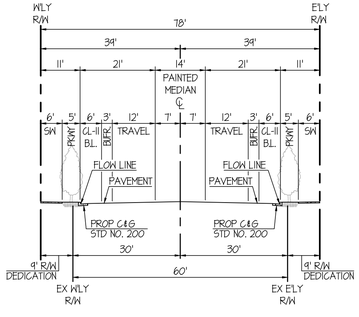
EARTHWORK ESTIMATE:

RAW CUT:	81,530 CY
RAW FILL:	61,100 CY
NET:	20,430 CY EXPORT

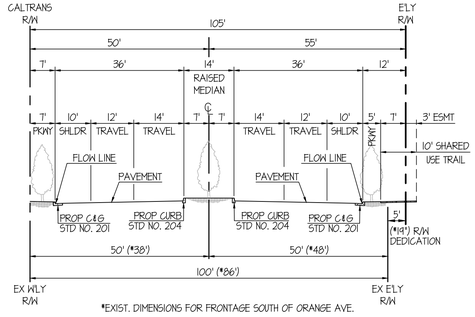
HAUL TRIPS:
ASSUMED (13 CY PER TRIP) = 1,572



BARRETT AVE
(FRONTAGE RD. - N'LY WALMART DWY)
MAJOR COLLECTOR
(78'/56')



BARRETT AVE
(N'LY WALMART DWY - ORANGE AVE)
MAJOR COLLECTOR
(78'/56')



*EXIST. DIMENSIONS FOR FRONTAGE SOUTH OF ORANGE AVE.

FRONTAGE ROAD
SECONDARY ARTERIAL
(105'/84')

CITY OF PERRIS

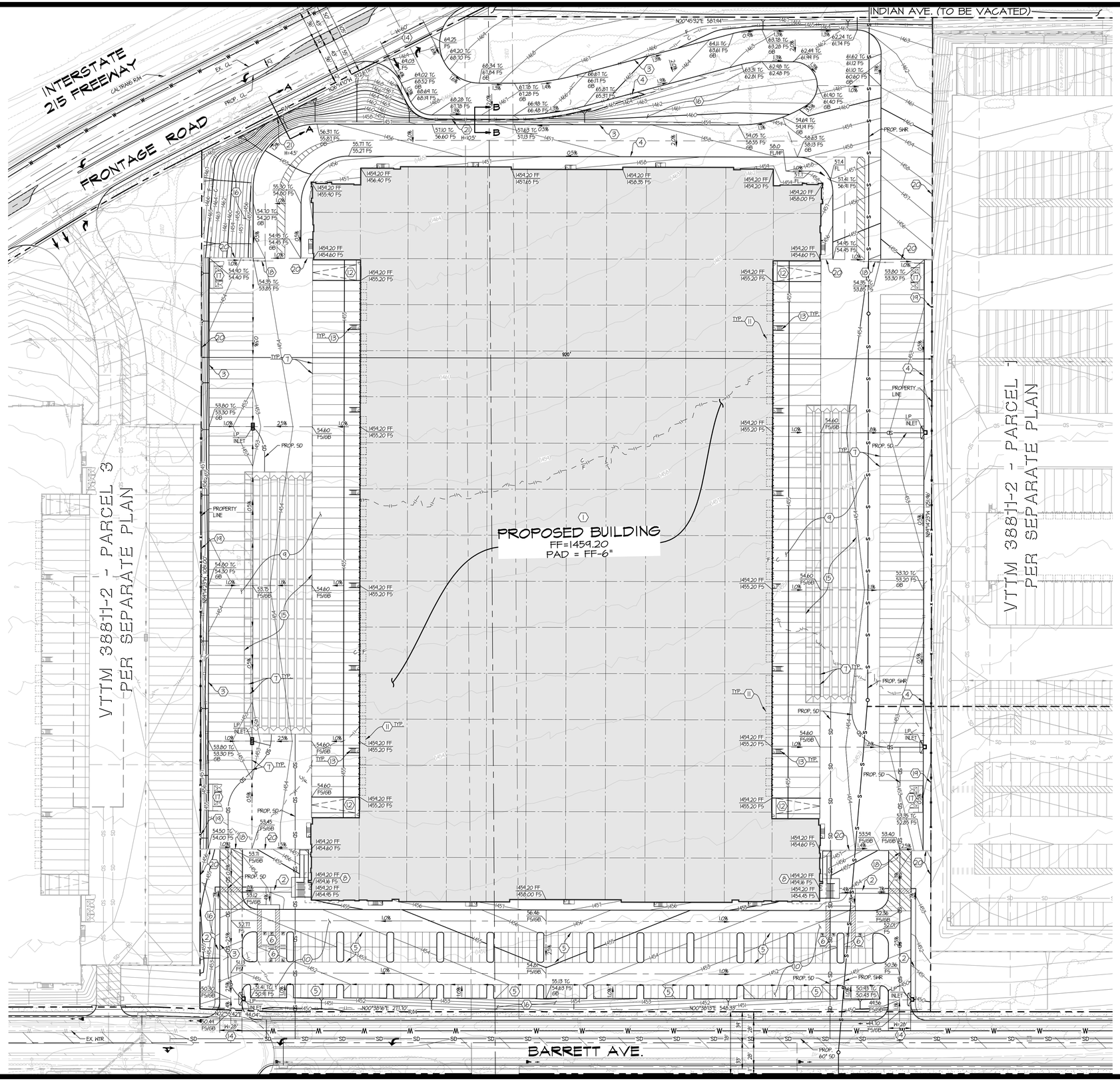
HARVEST LANDING RETAIL CENTER & BUSINESS PARK
SITE #6 CONCEPTUAL GRADING & DRAINAGE PLAN
VESTING TENTATIVE TRACT MAP 38811-2 - PARCEL 2

SCALE:	AS SHOWN
DATE:	OCT. 2024
DESIGNED:	AJ
CHECKED:	FM
PLN CK REF:	

FMCIVIL ENGINEERS INC.
41870 KALMIA STREET, SUITE 120
MURRIETA | CA 92562
951.973.0202 - FMCIVIL.COM

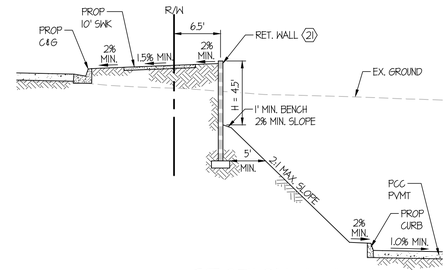
SHEET 1 OF 2 SHEETS

H:\PDATA\20-001 HARVEST LANDING\DWGS\PLNG\ENTITLEMENT\CUP\ALT-3\BLDG-6\20-001-CUP_BLDG6-CG-01.DWG JASON STOUFFER 10/2/2024 4:51 PM

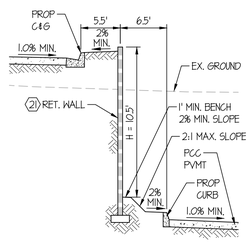


SITE PLAN KEYNOTES

1. PAINTED CONCRETE TILT-UP WAREHOUSE / OFFICE / MANUFACTURING FACILITY. BUILDING TO BE DESIGNED PER ARCHITECT'S PLANS
2. ON SITE ACCESSIBLE SIDEWALK AND CURB RAMPS.
3. CONCRETE CURB
4. CONCRETE CURB & GUTTER
5. STANDARD PARKING STALLS - STRIPE PER STANDARDS SHOWN ON ARCHITECT'S PLANS
6. HANDICAP PARKING STALLS - STRIPE PER STANDARDS SHOWN ON ARCHITECT'S PLANS
7. TRAILER / TRACTOR PARKING STALLS - STRIPE PER STANDARDS SHOWN ON ARCHITECT'S PLANS
8. ACCESSIBLE BUILDING ENTRY WITH ADJACENT BICYCLE RACKS PER ARCHITECT'S PLANS
9. PORTLAND CONC. CEMENT (PCC) PAVED TRUCK YARD ARCHITECT'S PLANS
10. PORTLAND CONC. CEMENT (PCC) PAVED AUTO PARKING ARCHITECT'S PLANS
11. DOCK HIGH TRUCK DOOR PER ARCHITECT'S PLANS
12. GRADE LEVEL RAMP DOOR PER ARCHITECT'S PLANS
13. EXTERIOR MAN DOOR AND STAIRS W/GUARD POST PER ARCHITECT'S PLANS
14. COMMERCIAL DRIVEWAY APPROACH PER RIVERSIDE COUNTY STD.207A, WITH DECORATIVE CONCRETE PAVING PER ARCHITECT'S PLANS
15. UNDERGROUND STORM WATER CHAMBER SYSTEM
16. LANDSCAPE AREA PER LANDSCAPE ARCHITECT'S PLANS
17. APPROXIMATE LOCATION OF TRASH ENCLOSURE
18. ENTRY GATE PER ARCHITECT'S PLANS
19. CHAIN LINK FENCE PER ARCHITECT'S PLANS
20. SCREEN WALL PER ARCHITECT'S PLANS (COMBO RETAINING)
21. RETAINING WALL (H=APPROXIMATE MAXIMUM EXPOSED WALL FACE)



SECTION A-A
HOR. SCALE: 1"=10'



SECTION B-B
HOR. SCALE: 1"=10'

SCALE 1"=60'

60 30 0 60 120 180

SCALE: 1"=60'

CITY OF PERRIS

HARVEST LANDING RETAIL CENTER & BUSINESS PARK
SITE #6 CONCEPTUAL GRADING & DRAINAGE PLAN
VESTING TENTATIVE TRACT MAP 38811-2 - PARCEL 2

SCALE:	AS SHOWN
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PLN CK. REF.:	

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SHEET 2 OF 2 SHEETS

H:\PDATA\20-001 HARVEST LANDING\DWGS\PLNG\ENTITLEMENT\CUP\ALT-3\BLDG-6\20-001-CUP_BLDG6-CG-01.DWG JASON STOUFFER 10/7/2024 4:00 PM