PRELIMINARY HYDROLOGY STUDY

FOR

Sempra Energy Yucca Valley Base

7230 PINOEERTOWN ROAD
CITY OF YUCCA VALLEY, CA 92284

Prepared For Owner/Developer:

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July 12, 2012

Project job No. 1211

TABLE OF CONTENTS

Section I Introduction

The following hydrology study has been prepared for Sempra Energy Yucca Valley Base. The site is approximately 2.52 acres and is located at 7230 Pinoeertown Road, in Town of Yucca Valley, County of San Bernardino, California. The general location of the site is illustrated on the Vicinity Map, included as Figure 1 in the Appendix A of this report.

Section II Methodology

For both, the existing and proposed conditions, the peak storm discharge for the drainage sub-areas (see Hydrology Map in Appendix C of this report) were calculated using the San Bernardino County Hydrology Manual. Rational Method Equation, using CIVILD software, was used to calculate the 25-year. The peak 25-year storm runoff is used to size facilities and to demonstrate the runoff from 25-year storm event is contained within the street right-of-way for local and secondary facilities. The parkway culvert capacities calculations are calculated by using Flowmaster software. The Los Angeles County Water Surface Profile Gradient (WSPG) software is utilized to evaluate the water surface profile gradient for the proposed storm drain facilities.

Section III Project Description

Rational Method

The Rational Method was utilized to perform the 25-year Storm Events hydrology analyses for the conditions of the 39 commercial / industrial lots.

Soil Type	B
Land Use	Commercial
AMC	II (25 year storm event)
AMC	III (100 year storm event)

The rainfall precipitation was uniformly distributed throughout the Onsite Areas. The following table shows the values used for the associated 1-hour storm event:

Storm Event (1 Hour Duration)	Precipitation Value
10-Year	0.92 in/hr
100-Year	1.32 in/hr

Existing Conditions

In the existing condition, the project site can be broken down into five distinct drainage zones. Sub area E-1 through E-4 drains towards southeasterly along existing curb & gutter onsite and confluence at node 200 existing parkway drain facility. Sub area E-5 will maintain sheet flow drainage pattern drain towards southerly to offsite adjacent site. No storm water quality facilities were designed and built. Refer to the “Existing Hydrology Map” in Appendix C for an illustration of the existing drainage zones.

The following table illustrates the data and results for the proposed 25-year & 100-year storm event. All calculations can be found in Appendix D of this report.

Drainage Area	Area (Ac.)	25 Year Peak Flow (CFS)	100 Year Peak Flow (CFS)	Time of Concentration (Min.)
E-1 to E-3	2.33	14.61	17.96	4.1 Min.
E-4	0.19	---	---	---
Total	2.52	---	---	---

FEMA Compliance

Per Flood Insurance Rate Maps (FIRMs) 06071C8855H from Federal Emergency Management Agency (FEMA), the subject is located at Floodplain Zone with average depth of less than one foot. Therefore, all proposed building pad elevations should be designed two feet higher than existing grade and one foot higher than the base flood elevation.

Per Flood Insurance Rate Maps (FIRMs) 06071C8855H dated on August 28, 2008 from Federal Emergency Management Agency (FEMA), a portion of the subject project is located at Floodplain Zone A area. With simplified method, base flood elevation per 100 year is about 3347.10 by using the Flow Master program developed by Haestad and quick-2 program developed by FEMA. All calculations and Exhibit could be found in Appendix E of this report. Therefore, Base Flood Elevation shall be 6" above existing natural ground. In an A zone, the lowest building floor shall be elevated to at least two feet above the base flood elevation.

Recommendations:

	Base Flood Elevation	Finish Floor Elevation (min.)
Existing Building	3347.10	3350.05
Proposed Building	3347.10	3350.05

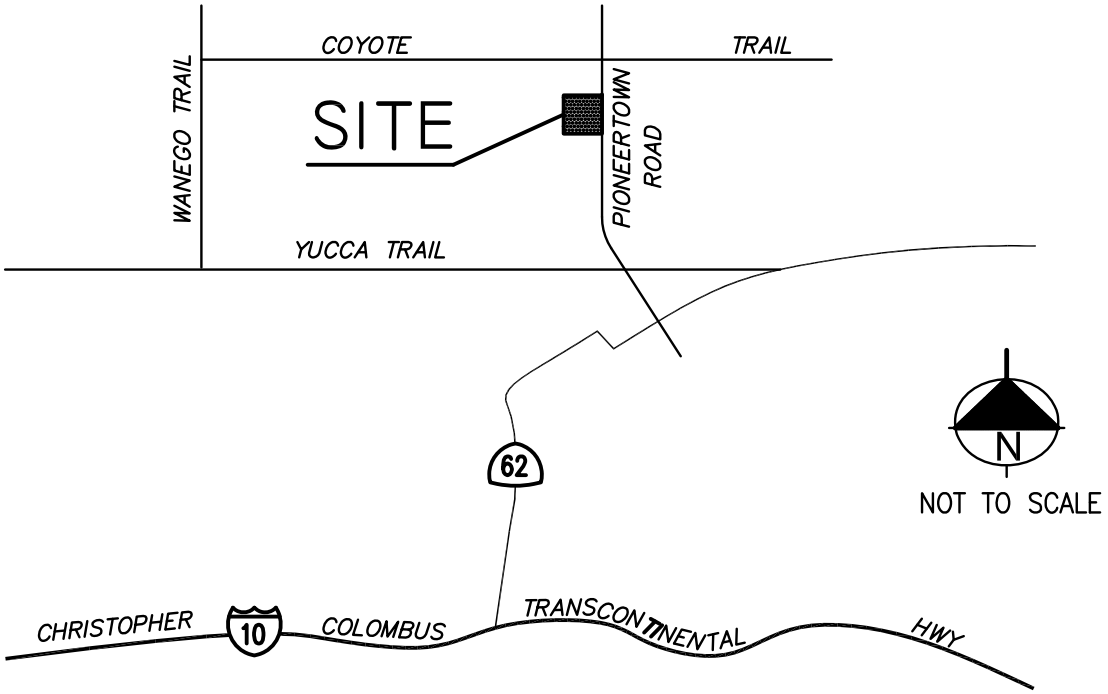
Section IV Findings

The hydrology and hydraulic analyses prepared in this report are comprehensive and evaluate the drainage impacts associated with the development of this project. All construction details of the drainage facilities were shown on Rough/Precise Grading & Drainage Plans and related Improvement Plans. The calculations within this report substantiate that the development can be constructed as shown on the proposed plans with no detrimental effect to surrounding properties.

APPENDIX A

VICINITY MAP

VICINITY MAP



APPENDIX B

(Based on San Bernardino County Hydrology Manual):
Hydrologic Soils Group Map for South central-B Area (C-3)
SBFCD Desert Area Isohyetals 10 Year 1 Hour (B-9)
SBFCD Desert Area Isohyetals 100 Year 1 Hour (B-10)

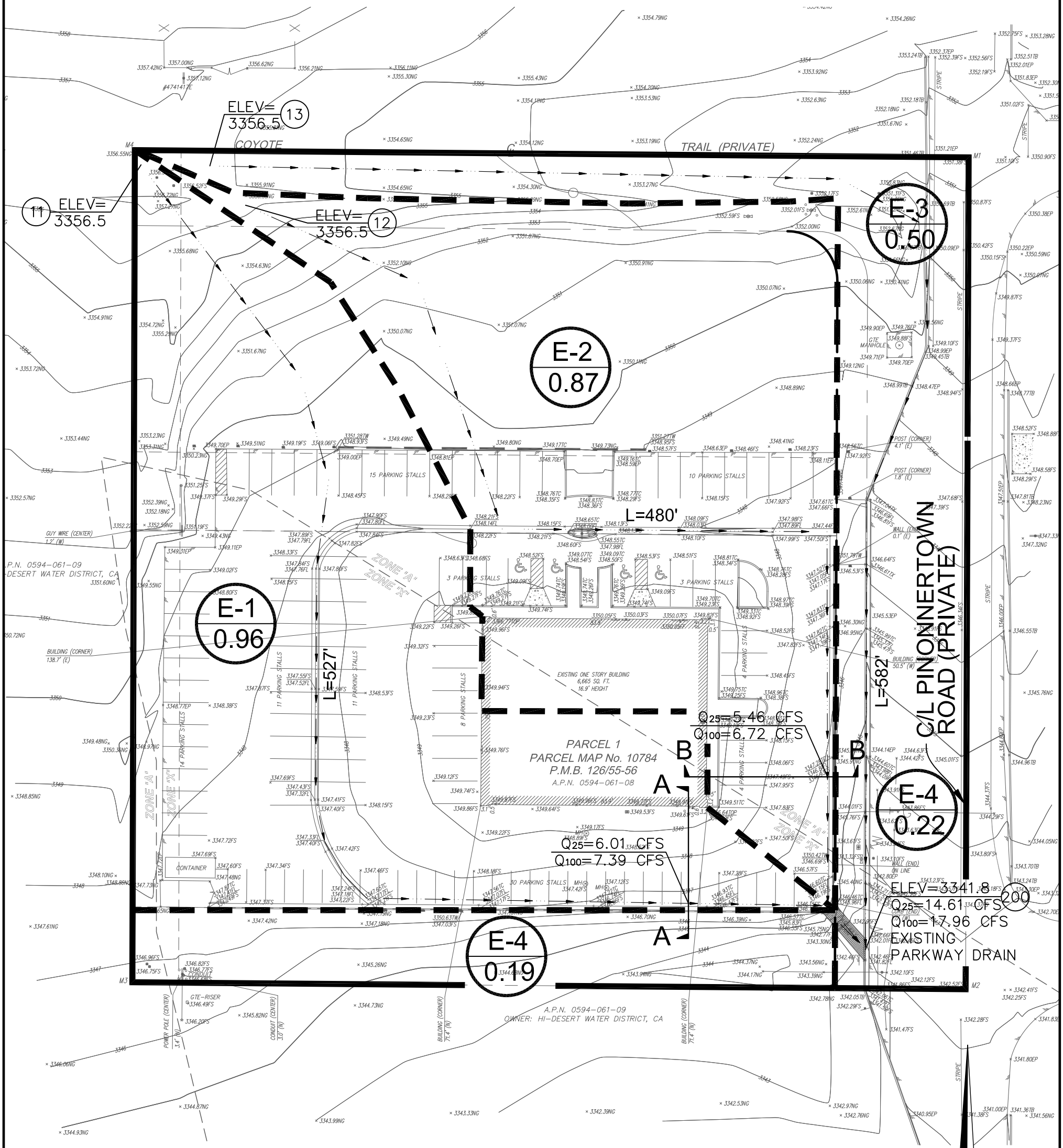
APPENDIX C

Existing Hydrology Map

EXISTING HYDROLOGY MAP

SEMPRA ENERGY YUCCA VALLEY BASE

7230 PINOEERTOWN ROAD, CITY OF YUCCA VALLEY, CA 92284



LEGEND

— - — - —	TRACT BOUNDARY
▬▬▬	DRAINAGE AREA BOUNDARY
▬ ▬ ▬	DRAINAGE SUBAREA BOUNDARY
(10)	NODE NUMBER
Q_{100}	100 YEAR STORM EVENT
Q_{10}	10 YEAR STORM EVENT
Tc	TIME OF CONCENTRATION
CB #2	CATCH BASIN #2
B-1 / 10.3	DRAINAGE AREA NUMBER / DRAINAGE AREA ACREAGE

REGISTERED PROFESSIONAL ENGINEER
WEIDONG LIU
No. 66242
Exp. 06-30-14
CIVIL
STATE OF CALIFORNIA

SCALE: 1"=40'

CITY OF YUCCA VALLEY
COUNTY OF SAN BERNARDINO

W&W Technologies, Inc
Civil Engineering • Subdivision • Land Planning
1750 W. ANDES DRIVE, UPLAND, CA 91784
TEL: (909) 608-7118 • FAX: (909) 946-1137

APPENDIX D

Hydrology Study – Existing Conditions

25-year storm event
100-year storm event

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 07/24/12

1211 JTC YUCCA VALLEY
EXISTING CONDITION
25 YEAR STORM EVENT
SUBAREA E1 TO E3

Program License Serial Number 6069

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

Rational hydrology study storm event year is 25.0
10 Year storm 1 hour rainfall = 0.920(In.)
100 Year storm 1 hour rainfall = 1.320(In.)
Computed rainfall intensity:
Storm year = 25.00 1 hour rainfall = 1.079 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 2

++

Process from Point/Station 11.000(Ft.) to Point/Station 200.000(Ft.)
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 56.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.073(In/Hr)
Initial subarea data:
Initial area flow distance = 189.000(Ft.)
Top (of initial area) elevation = 3356.500(Ft.)
Bottom (of initial area) elevation = 3341.800(Ft.)
Difference in elevation = 14.700(Ft.)
Slope = 0.07778 s(%)= 7.78
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 4.124 min.
Rainfall intensity = 7.032(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.891
Subarea runoff = 6.012(CFS)
Total initial stream area = 0.960(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.073(In/Hr)

++

Process from Point/Station 11.000(Ft.) to Point/Station 200.000(Ft.)
**** CONFLUENCE OF MAIN STREAMS ****

```
 The following data inside Main Stream is listed:
 In Main Stream number: 1
 Stream flow area =      0.960(Ac.)
 Runoff from this stream =      6.012(CFS)
 Time of concentration =    4.12 min.
 Rainfall intensity =     7.032(In/Hr)
 Area averaged loss rate (Fm) =    0.0734(In/Hr)
 Area averaged Pervious ratio (Ap) = 0.1000
 Program is now starting with Main Stream No. 2


 ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 Process from Point/Station       12.000(Ft.) to Point/Station
200.000(Ft.)
 **** INITIAL AREA EVALUATION ****
 ------------------------------------------------------------------------
 COMMERCIAL subarea type
 Decimal fraction soil group A = 0.000
 Decimal fraction soil group B = 1.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 0.000
 SCS curve number for soil(AMC 2)  = 56.00
 Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.073(In/Hr)
 Initial subarea data:
 Initial area flow distance =   188.000(Ft.)
 Top (of initial area) elevation =  3356.500(Ft.)
 Bottom (of initial area) elevation =  3341.800(Ft.)
 Difference in elevation =    14.700(Ft.)
 Slope =    0.07819  s(%)=       7.82
 TC = k(0.304)*[(length^3)/(elevation change)]^0.2
 Initial area time of concentration =    4.111 min.
 Rainfall intensity =      7.048(In/Hr) for a    25.0 year storm
 Effective runoff coefficient used for area (Q=KCIA) is C = 0.891
 Subarea runoff =      5.461(CFS)
 Total initial stream area =        0.870(Ac.)
 Pervious area fraction = 0.100
 Initial area Fm value =    0.073(In/Hr)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 Process from Point/Station       12.000(Ft.) to Point/Station
200.000(Ft.)
 **** CONFLUENCE OF MAIN STREAMS ****
 ------------------------------------------------------------------------
 The following data inside Main Stream is listed:
 In Main Stream number: 2
 Stream flow area =      0.870(Ac.)
 Runoff from this stream =      5.461(CFS)
 Time of concentration =    4.11 min.
 Rainfall intensity =     7.048(In/Hr)
 Area averaged loss rate (Fm) =    0.0734(In/Hr)
 Area averaged Pervious ratio (Ap) = 0.1000
 Program is now starting with Main Stream No. 3


 ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 Process from Point/Station       13.000(Ft.) to Point/Station
200.000(Ft.)
 **** INITIAL AREA EVALUATION ****
 ------------------------------------------------------------------------
 COMMERCIAL subarea type
 Decimal fraction soil group A = 0.000
 Decimal fraction soil group B = 1.000
```

Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 56.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.073(In/Hr)
Initial subarea data:
Initial area flow distance = 187.000(Ft.)
Top (of initial area) elevation = 3356.500(Ft.)
Bottom (of initial area) elevation = 3341.800(Ft.)
Difference in elevation = 14.700(Ft.)
Slope = 0.07861 s(%)= 7.86
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 4.097 min.
Rainfall intensity = 7.064(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.891
Subarea runoff = 3.146(CFS)
Total initial stream area = 0.500(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.073(In/Hr)

++
Process from Point/Station 13.000(Ft.) to Point/Station 200.000(Ft.)
**** CONFLUENCE OF MAIN STREAMS ****
_____
The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area = 0.500(Ac.)
Runoff from this stream = 3.146(CFS)
Time of concentration = 4.10 min.
Rainfall intensity = 7.064(In/Hr)
Area averaged loss rate (Fm) = 0.0734(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Summary of stream data:

Stream No.	Flow rate (CFS)	Area (Ac.)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	6.01	0.960	4.12	0.073	7.032
2	5.46	0.870	4.11	0.073	7.048
3	3.15	0.500	4.10	0.073	7.064

Qmax(1) =
1.000 * 1.000 * 6.012) +
0.998 * 1.000 * 5.461) +
0.995 * 1.000 * 3.146) + = 14.593
Qmax(2) =
1.002 * 0.997 * 6.012) +
1.000 * 1.000 * 5.461) +
0.998 * 1.000 * 3.146) + = 14.607
Qmax(3) =
1.005 * 0.994 * 6.012) +
1.002 * 0.997 * 5.461) +
1.000 * 1.000 * 3.146) + = 14.603

Total of 3 main streams to confluence:
Flow rates before confluence point:
7.012 6.461 4.146
Maximum flow rates at confluence using above data:
14.593 14.607 14.603
Area of streams before confluence:
0.960 0.870 0.500
Effective area values after confluence:

25E

2.330 2.327 2.321

Results of confluence:
Total flow rate = 14.607(CFS)
Time of concentration = 4.111 min.
Effective stream area after confluence = 2.327(Ac.)
Study area average Pervious fraction(Ap) = 0.100
Study area average soil loss rate(Fm) = 0.073(In/Hr)
Study area total = 2.33(Ac.)
End of computations, Total Study Area = 2.33 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged SCS curve number = 56.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 07/24/12

1211 JTC YUCCA VALLEY
EXISTING CONDITION
100 YEAR STORM EVENT
SUBAREA E1 TO E3

Program License Serial Number 6069

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

Rational hydrology study storm event year is 100.0
10 Year storm 1 hour rainfall = 0.920(In.)
100 Year storm 1 hour rainfall = 1.320(In.)
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.320 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 3

++

Process from Point/Station 11.000(Ft.) to Point/Station 200.000(Ft.)
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 56.00
Adjusted SCS curve number for AMC 3 = 75.80
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.044(In/Hr)
Initial subarea data:
Initial area flow distance = 189.000(Ft.)
Top (of initial area) elevation = 3356.500(Ft.)
Bottom (of initial area) elevation = 3341.800(Ft.)
Difference in elevation = 14.700(Ft.)
Slope = 0.07778 s(%)= 7.78
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 4.124 min.
Rainfall intensity = 8.602(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.895
Subarea runoff = 7.394(CFS)
Total initial stream area = 0.960(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.044(In/Hr)

++

Process from Point/Station 11.000(Ft.) to Point/Station 200.000(Ft.)
**** CONFLUENCE OF MAIN STREAMS ****

```
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      0.960(Ac.)
Runoff from this stream =      7.394(CFS)
Time of concentration =    4.12 min.
Rainfall intensity =     8.602(In/Hr)
Area averaged loss rate (Fm) =    0.0440(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000(Ft.) to Point/Station
200.000(Ft.)
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 56.00
Adjusted SCS curve number for AMC 3 = 75.80
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.044(In/Hr)
Initial subarea data:
Initial area flow distance =   188.000(Ft.)
Top (of initial area) elevation =  3356.500(Ft.)
Bottom (of initial area) elevation =  3341.800(Ft.)
Difference in elevation =    14.700(Ft.)
Slope =    0.07819  s(%)=       7.82
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    4.111 min.
Rainfall intensity =      8.621(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.895
Subarea runoff =      6.716(CFS)
Total initial stream area =        0.870(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.044(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000(Ft.) to Point/Station
200.000(Ft.)
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      0.870(Ac.)
Runoff from this stream =      6.716(CFS)
Time of concentration =    4.11 min.
Rainfall intensity =     8.621(In/Hr)
Area averaged loss rate (Fm) =    0.0440(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Program is now starting with Main Stream No. 3


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000(Ft.) to Point/Station
200.000(Ft.)
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
COMMERCIAL subarea type
```

100E
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 56.00
Adjusted SCS curve number for AMC 3 = 75.80
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.044(In/Hr)
Initial subarea data:
Initial area flow distance = 187.000(Ft.)
Top (of initial area) elevation = 3356.500(Ft.)
Bottom (of initial area) elevation = 3341.800(Ft.)
Difference in elevation = 14.700(Ft.)
Slope = 0.07861 s(%)= 7.86
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 4.097 min.
Rainfall intensity = 8.640(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.895
Subarea runoff = 3.868(CFS)
Total initial stream area = 0.500(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.044(In/Hr)

++
Process from Point/Station 13.000(Ft.) to Point/Station 200.000(Ft.)
**** CONFLUENCE OF MAIN STREAMS ****
_____
The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area = 0.500(Ac.)
Runoff from this stream = 3.868(CFS)
Time of concentration = 4.10 min.
Rainfall intensity = 8.640(In/Hr)
Area averaged loss rate (Fm) = 0.0440(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Summary of stream data:

Stream No.	Flow rate (CFS)	Area (Ac.)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	7.39	0.960	4.12	0.044	8.602
2	6.72	0.870	4.11	0.044	8.621
3	3.87	0.500	4.10	0.044	8.640

Qmax(1) =
1.000 * 1.000 * 7.394) +
0.998 * 1.000 * 6.716) +
0.996 * 1.000 * 3.868) + = 17.945
Qmax(2) =
1.002 * 0.997 * 7.394) +
1.000 * 1.000 * 6.716) +
0.998 * 1.000 * 3.868) + = 17.962
Qmax(3) =
1.005 * 0.994 * 7.394) +
1.002 * 0.997 * 6.716) +
1.000 * 1.000 * 3.868) + = 17.957

Total of 3 main streams to confluence:
Flow rates before confluence point:
8.394 7.716 4.868
Maximum flow rates at confluence using above data:
17.945 17.962 17.957

100E
Area of streams before confluence:
0.960 0.870 0.500
Effective area values after confluence:
2.330 2.327 2.321

Results of confluence:
Total flow rate = 17.962(CFS)
Time of concentration = 4.111 min.
Effective stream area after confluence = 2.327(Ac.)
Study area average Pervious fraction(Ap) = 0.100
Study area average soil loss rate(Fm) = 0.044(In/Hr)
Study area total = 2.33(Ac.)
End of computations, Total Study Area = 2.33 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged SCS curve number = 56.0

APPENDIX E

Hydraulic Calculations

Section A-A capacity calculations
Section B-B capacity calculations

Section A-A
Worksheet for Irregular Channel

Project Description	
Project File	k:\w&w technologies inc\haestad\fmw\1211.fm2
Worksheet	Section A-A
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data		
Channel Slope	0.077800	ft/ft
Discharge	7.39	cfs

Elevation range: 3,346.72 ft to 3,360.05 ft.

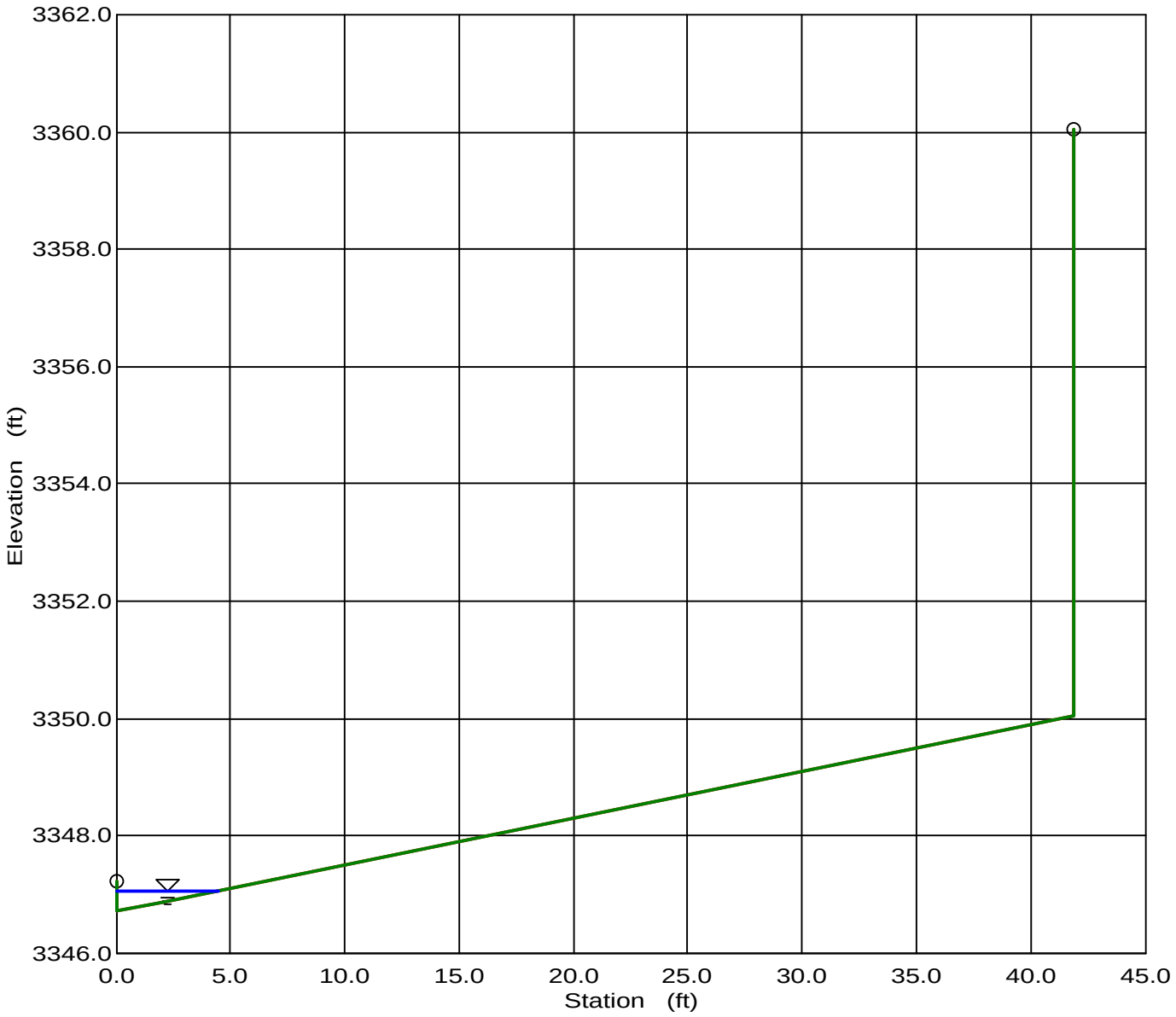
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	3,347.22	0.00	41.90	0.013
0.00	3,346.72			
2.00	3,346.86			
41.90	3,350.05			
41.90	3,360.05			

Results		
Wtd. Mannings Coefficient	0.013	
Water Surface Elevation	3,347.06	ft
Flow Area	0.78	ft²
Wetted Perimeter	4.83	ft
Top Width	4.48	ft
Height	0.34	ft
Critical Depth	3,347.32	ft
Critical Slope	0.004053	ft/ft
Velocity	9.47	ft/s
Velocity Head	1.39	ft
Specific Energy	3,348.45	ft
Froude Number	4.00	
Flow is supercritical.		

Cross Section A-A
Cross Section for Irregular Channel

Project Description	
Project File	k:\w&w technologies inc\haestad\fmw\1211.fm2
Worksheet	Section A-A
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data		
Wtd. Mannings Coefficient	0.013	
Channel Slope	0.077800	ft/ft
Water Surface Elevation	3,347.06	ft
Discharge	7.39	cfs



Section B-B
Worksheet for Irregular Channel

Project Description	
Project File	k:\w&w technologies inc\haestad\fmw\1211.fm2
Worksheet	Section B-B
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data		
Channel Slope	0.078200	ft/ft
Discharge	6.72	cfs

Elevation range: 3,346.78 ft to 3,360.05 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	3,360.05	0.00	50.80	0.013
0.00	3,350.05			
4.90	3,349.51			
4.90	3,349.01			
48.80	3,346.93			
50.80	3,346.78			
50.80	3,347.28			

Results		
Wtd. Mannings Coefficient	0.013	
Water Surface Elevation	3,347.10	ft
Flow Area	0.80	ft²
Wetted Perimeter	5.94	ft
Top Width	5.61	ft
Height	0.32	ft
Critical Depth	3,347.31	ft
Critical Slope	0.004242	ft/ft
Velocity	8.40	ft/s
Velocity Head	1.10	ft
Specific Energy	3,348.20	ft
Froude Number	3.92	
Flow is supercritical.		

Cross Section B-B
Cross Section for Irregular Channel

Project Description	
Project File	k:\w&w technologies inc\haestad\fmw\1211.fm2
Worksheet	Section B-B
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data		
Wtd. Mannings Coefficient	0.013	
Channel Slope	0.078200	ft/ft
Water Surface Elevation	3,347.10	ft
Discharge	6.72	cfs