PRELIMINARY HYDROLOGY REPORT
FOR

TTM 37858
Moreno Valley, CA

Prepared for:

RC Hobbs Companies
1428 E. Chapman Avenue
Orange, CA 92866

Initial Report: April 15, 2020
Revised: February 1, 2021
Revised: May 21, 2021

Prepared by:

Robert M. Beers
8175 Limonite Avenue
Suite E
Jurupa Valley, CA 92509
(951) 317-2041

Preliminary Drainage Report

Friday, May 21, 2021

INTRODUCTION

The following report and calculations were prepared to analyze the 2, 10 & 100-year storm runoff from the development of the TTM 37858 at the northeast corner of Bradshaw Circle and Cactus Avenue in the City of Moreno Valley, Ca. Two infiltration basins are proposed for both mitigation of increased runoff from the site and for onsite BMPs for treatment of site runoff.

SITE BACKGROUND

The proposed project is located on the north side of Cactus Avenue with Bradshaw Circle on the west side of the property. The property is vacant and undeveloped and slopes from east to west.

There is a large undeveloped parcel adjacent to the property on the east property line that drains to swale along the east property line and conveys that offsite drainage to Cactus Avenue at the southeast corner of the property. There are single family residential properties immediately adjacent to the site along the north property line.

The soil type for the area is Type B per Plate C-1.17 "Hydrologic Soils Group Map for Sunnymead" from the Riverside County Hydrology Manual.

METHODOLOGY

Subareas were determined based on the proposed grading of the site. A link-node model was created for each subarea, with flow path length and elevations shown for the upstream and downstream nodes for the subarea. Peak flowrates were determined for each subarea using the CivilDesign Corporation "RIV" rational method hydrology software. The results of those calculations are shown on the site hydrology map included with this report. Separate maps for the existing and developed condition are included with this report.

ANALYSES/DISCUSSION

Rational method hydrology calculations have been prepared for 2, 10 & 100-year existing and proposed condition for the project site. In the existing condition site drainage sheet flows across the property to the west towards Bradshaw Circle. There is a high point at the knuckle of Bradshaw Circle with a portion of the site drainage (Area 1) flowing southerly to Cactus Avenue where it is collected by a series of catch basins along the Cactus Avenue and placed into an offsite storm drain in the existing condition. Area 2 flows go offsite along Bradshaw Circle to the west and thence out to Cactus Avenue where the flows are collected by a series of catch basins along Cactus Avenue.

In the developed condition, the site has been designed to maintain the drainage area flow split with flows being routed through two onsite water quality bioretention basins. The bioretention basins will be located in the proposed landscape area onsite adjacent to Bradshaw Circle street right-of-way and will discharge to Bradshaw Circle.

The drainage areas and peak 2, 10 & 100-year discharges are summarized below:

Rational Method Calculations

Existing Condition

Description	Area (Ac.)	2-year discharge (cfs)	10-year discharge (cfs)	100-year discharge (cfs)	Tc mim.
Area 1	2.93	1.62	3.48	5.90	15.27
Area 2	2.01	1.18	2.51	4.24	14.00
Conf. 1+2	4.94	-	-	9.96	

Proposed Condition

Description	Area (Ac.)	2-year discharge (cfs)	10-year discharge (cfs)	100-year discharge (cfs)	Tc mim.
Area 1	2.19	1.89	3.16	5.04	12.03
Area 2	0.65	0.84	1.42	2.23	7.66
Area 3	1.68	1.46	2.44	3.89	11.85
Conf 2+3	2.33	2.09	3.50	5.56	11.97
Conf 1+2+3	4.91	3.91	6.56	10.45	

In the developed condition the project proposes to convey discharges from the two (2) WQMP basins in storm drains to connect to a new Storm Drain in Bradshaw Circle. This new storm drain will connect to existing RCFCD SD Line F-4 in Cactus Avenue. The plans for the existing SD Line F-4 are included in Section 6 of this report for reference.

We ran a separate hydrology calculation for the existing 100-year condition to model a confluence discharge from the site with a result of 9.96 cfs as the base line contribution of this site to SD Line F-4.

We then ran two sets of WSPG Storm Drain Hydraulic calculations. The first WSPG run is for the existing storm drain which has 10-year discharge numbers on the plans. These calculations verify the HGL shown on the plans. Once we had the base line WSPG run, we then modeled the revised storm drain system to accept the 100-year site discharge in the new storm which would connect to SD Line F-4 at Station 19+50. We did a corresponding decrease in the storm drain lateral inflow to SD Line F-4 at Station 13+55.47 of 9.96 cfs (the onsite existing condition contribution to SD Line F-4) which enters the existing catch basin via surface flow from Cactus Avenue for a net increase of discharge in SD Line F-4 of 0.49 cfs (10.45 cfs -9.96 cfs)

PROPOSED PROJECT BMP's

Based on low soil infiltration test results we have selected bioretention basins onsite as the method for treatment of onsite flows. The details of the proposed bioretention basins are described in detail in the Preliminary Water Quality Management Plan prepared for this project. Site drainage will be routed from the basins to a new storm drain in Bradshaw Circle that will connect to RCFCD SD Line F-4 in Cactus Avenue. The project qualifies for Hydrologic Condition of Concern Exemption No. 3 – see the receiving waters exhibit in Section 6 for reference.

CONCLUSION

Based on the calculations and proposed improvements, onsite flows can be conveyed via storm drain to SD Line F-4 in Cactus Avenue which can handle the net incremental increase of flow of 0.49 cfs, and the proposed site development will not impact offsite properties.

Appendix A
Existing Condition Rational Method Calculations

2-year
10-year
100-year

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 04/15/20
File:ttm37858ex2a.out

TTM 37858 EXISTING CONDITION
2-year flow rates - Area 1
RMB

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

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

Program License Serial Number 6288

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

Storm event (year) = 2.00 Antecedent Moisture Condition = 1

Standard intensity-duration curves data (Plate D-4.1)
For the [Sunnymead-Moreno] area used.
10 year storm 10 minute intensity = 2.010(In/Hr)
10 year storm 60 minute intensity = 0.820(In/Hr)
100 year storm 10 minute intensity = 2.940(In/Hr)
100 year storm 60 minute intensity = 1.200(In/Hr)

Storm event year = 2.0
Calculated rainfall intensity data:
1 hour intensity = 0.554(In/Hr)
Slope of intensity duration curve = 0.5000

++
Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 604.000(Ft.)
Top (of initial area) elevation = 67.400(Ft.)
Bottom (of initial area) elevation = 56.300(Ft.)
Difference in elevation = 11.100(Ft.)
Slope = 0.01838 s(percent)= 1.84
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 15.270 min.
Rainfall intensity = 1.099(In/Hr) for a 2.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.503
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 60.60
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 1.620(CFS)
Total initial stream area = 2.930(Ac.)
Pervious area fraction = 1.000
End of computations, total study area = 2.93 (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 = 78.0

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 04/15/20
File:ttm37858ex2b.out

TTM 37858 EXISTING CONDITION
2-year flow rates Area 2
RMB

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

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

Program License Serial Number 6288

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

Storm event (year) = 2.00 Antecedent Moisture Condition = 1

Standard intensity-duration curves data (Plate D-4.1)
For the [Sunnymead-Moreno] area used.
10 year storm 10 minute intensity = 2.010(In/Hr)
10 year storm 60 minute intensity = 0.820(In/Hr)
100 year storm 10 minute intensity = 2.940(In/Hr)
100 year storm 60 minute intensity = 1.200(In/Hr)

Storm event year = 2.0
Calculated rainfall intensity data:
1 hour intensity = 0.554(In/Hr)
Slope of intensity duration curve = 0.5000

++
Process from Point/Station 200.000 to Point/Station 201.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 516.000(Ft.)
Top (of initial area) elevation = 69.200(Ft.)
Bottom (of initial area) elevation = 58.500(Ft.)
Difference in elevation = 10.700(Ft.)
Slope = 0.02074 s(percent)= 2.07
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 13.996 min.
Rainfall intensity = 1.148(In/Hr) for a 2.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.513
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 60.60
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 1.183(CFS)
Total initial stream area = 2.010(Ac.)
Pervious area fraction = 1.000
End of computations, total study area = 2.01 (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 = 78.0

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 04/15/20
File:ttm37858ex10a.out

TTM 37858 EXISTING CONDITION
10-YEAR FLOW RATES - AREA 1
RMB

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

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

Program License Serial Number 6288

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

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

Standard intensity-duration curves data (Plate D-4.1)
For the [Sunnymead-Moreno] area used.
10 year storm 10 minute intensity = 2.010(In/Hr)
10 year storm 60 minute intensity = 0.820(In/Hr)
100 year storm 10 minute intensity = 2.940(In/Hr)
100 year storm 60 minute intensity = 1.200(In/Hr)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.820(In/Hr)
Slope of intensity duration curve = 0.5000

++
Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

```
Initial area flow distance =   604.000(Ft.)
Top (of initial area) elevation =    67.400(Ft.)
Bottom (of initial area) elevation =    56.300(Ft.)
Difference in elevation =    11.100(Ft.)
Slope =    0.01838  s(percent)=       1.84
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.270 min.
Rainfall intensity =      1.625(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.731
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  78.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      3.481(CFS)
Total initial stream area =        2.930(Ac.)
Pervious area fraction = 1.000
End of computations, total study area =            2.93 (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 =  78.0
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Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 04/15/20
File:ttm37858ex10b.out

TTM 37858 EXISTING CONDITION
10-YEAR FLOW RATES - AREA 2
RMB

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

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

Program License Serial Number 6288

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

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

Standard intensity-duration curves data (Plate D-4.1)
For the [Sunnymead-Moreno] area used.
10 year storm 10 minute intensity = 2.010(In/Hr)
10 year storm 60 minute intensity = 0.820(In/Hr)
100 year storm 10 minute intensity = 2.940(In/Hr)
100 year storm 60 minute intensity = 1.200(In/Hr)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.820(In/Hr)
Slope of intensity duration curve = 0.5000

++
Process from Point/Station 200.000 to Point/Station 201.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 516.000(Ft.)
Top (of initial area) elevation = 69.200(Ft.)
Bottom (of initial area) elevation = 58.500(Ft.)
Difference in elevation = 10.700(Ft.)
Slope = 0.02074 s(percent)= 2.07
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 13.996 min.
Rainfall intensity = 1.698(In/Hr) for a 10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.737
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 78.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 2.514(CFS)
Total initial stream area = 2.010(Ac.)
Pervious area fraction = 1.000
End of computations, total study area = 2.01 (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 = 78.0

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 04/15/20
File:ttm37858ex100a.out

TTM 37858 EXISTING CONDTION
100-YEAR FLOW RATES - AREA 1
RMB

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

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

Program License Serial Number 6288

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

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

Standard intensity-duration curves data (Plate D-4.1)
For the [Sunnymead-Moreno] area used.
10 year storm 10 minute intensity = 2.010(In/Hr)
10 year storm 60 minute intensity = 0.820(In/Hr)
100 year storm 10 minute intensity = 2.940(In/Hr)
100 year storm 60 minute intensity = 1.200(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.200(In/Hr)
Slope of intensity duration curve = 0.5000

++
Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 604.000(Ft.)
Top (of initial area) elevation = 67.400(Ft.)
Bottom (of initial area) elevation = 56.300(Ft.)
Difference in elevation = 11.100(Ft.)
Slope = 0.01838 s(percent)= 1.84
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 15.270 min.
Rainfall intensity = 2.379(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.846
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 89.80
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 5.897(CFS)
Total initial stream area = 2.930(Ac.)
Pervious area fraction = 1.000
End of computations, total study area = 2.93 (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 = 78.0

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 04/15/20
File:ttm37858ex100b.out

TTM 37858 EXISTING CONDTION
100-YEAR FLOW RATES - AREA 2
RMB

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

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

Program License Serial Number 6288

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

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

Standard intensity-duration curves data (Plate D-4.1)
For the [Sunnymead-Moreno] area used.
10 year storm 10 minute intensity = 2.010(In/Hr)
10 year storm 60 minute intensity = 0.820(In/Hr)
100 year storm 10 minute intensity = 2.940(In/Hr)
100 year storm 60 minute intensity = 1.200(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.200(In/Hr)
Slope of intensity duration curve = 0.5000

++
Process from Point/Station 200.000 to Point/Station 201.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 516.000(Ft.)
Top (of initial area) elevation = 69.200(Ft.)
Bottom (of initial area) elevation = 58.500(Ft.)
Difference in elevation = 10.700(Ft.)
Slope = 0.02074 s(percent)= 2.07
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 13.996 min.
Rainfall intensity = 2.485(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.848
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 89.80
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 4.236(CFS)
Total initial stream area = 2.010(Ac.)
Pervious area fraction = 1.000
End of computations, total study area = 2.01 (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 = 78.0

TTM37858confluence

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 05/15/21
File:TTM37858confluence.out

TTM 37858 - Moreno Valley
Confluence existing condition flows for base line condition
RMB

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

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

Program License Serial Number 6288

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

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

Standard intensity-duration curves data (Plate D-4.1)
For the [Sunnymead-Moreno] area used.
10 year storm 10 minute intensity = 2.010(In/Hr)
10 year storm 60 minute intensity = 0.820(In/Hr)
100 year storm 10 minute intensity = 2.940(In/Hr)
100 year storm 60 minute intensity = 1.200(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.200(In/Hr)
Slope of intensity duration curve = 0.5000

++
Process from Point/Station 100.000 to Point/Station 101.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****

Rainfall intensity = 2.379(In/Hr) for a 100.0 year storm
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.816
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 84.40
Pervious area fraction = 1.000; Impervious fraction = 0.000
User specified values are as follows:
TC = 15.27 min. Rain intensity = 2.38(In/Hr)
Total area = 2.93(Ac.) Total runoff = 5.90(CFS)

++
Process from Point/Station 100.000 to Point/Station 101.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 1
Stream flow area = 2.930(Ac.)
Runoff from this stream = 5.900(CFS)
Time of concentration = 15.27 min.
Rainfall intensity = 2.379(In/Hr)

++
Process from Point/Station 200.000 to Point/Station 201.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****

Rainfall intensity = 2.484(In/Hr) for a 100.0 year storm
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.819
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 84.40
Pervious area fraction = 1.000; Impervious fraction = 0.000
User specified values are as follows:
TC = 14.00 min. Rain intensity = 2.48(In/Hr)
Total area = 2.01(Ac.) Total runoff = 4.24(CFS)

++
Process from Point/Station 200.000 to Point/Station 201.000
**** CONFLUENCE OF MINOR STREAMS ****

TTM37858confluence

Along Main Stream number: 1 in normal stream number 2
Stream flow area = 2.010(Ac.)
Runoff from this stream = 4.240(CFS)
Time of concentration = 14.00 min.
Rainfall intensity = 2.484(In/Hr)
Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
1	5.900	15.27	2.379
2	4.240	14.00	2.484

Largest stream flow has longer time of concentration
Qp = 5.900 + sum of
Qb Ia/Ib
4.240 * 0.958 = 4.060
Qp = 9.960

Total of 2 streams to confluence:
Flow rates before confluence point:
5.900 4.240
Area of streams before confluence:
2.930 2.010
Results of confluence:
Total flow rate = 9.960(CFS)
Time of concentration = 15.270 min.
Effective stream area after confluence = 4.940(Ac.)
End of computations, total study area = 4.94 (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 = 69.0

Appendix B
Proposed Condition Rational Method Calculations

2-year
10-year
100-year

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 03/28/20
File:TTM37858dev2a.out

TTM 37858 - Drainage Area A
Developed Condition - 2 year flow rates
RMB

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

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

Program License Serial Number 6288

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

Storm event (year) = 2.00 Antecedent Moisture Condition = 1

Standard intensity-duration curves data (Plate D-4.1)
For the [Sunnymead-Moreno] area used.
10 year storm 10 minute intensity = 2.010(In/Hr)
10 year storm 60 minute intensity = 0.820(In/Hr)
100 year storm 10 minute intensity = 2.940(In/Hr)
100 year storm 60 minute intensity = 1.200(In/Hr)

Storm event year = 2.0
Calculated rainfall intensity data:
1 hour intensity = 0.554(In/Hr)
Slope of intensity duration curve = 0.5000

++
Process from Point/Station 101.000 to Point/Station 102.000
**** INITIAL AREA EVALUATION ****

```
Initial area flow distance =   636.000(Ft.)
Top (of initial area) elevation =    64.500(Ft.)
Bottom (of initial area) elevation =    57.100(Ft.)
Difference in elevation =     7.400(Ft.)
Slope =    0.01164  s(percent)=       1.16
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.924 min.
Rainfall intensity =      1.244(In/Hr) for a     2.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.693
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  36.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      1.840(CFS)
Total initial stream area =        2.134(Ac.)
Pervious area fraction = 0.350


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Process from Point/Station      102.000 to Point/Station      103.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =    53.500(Ft.)
Downstream point/station elevation =    53.000(Ft.)
Pipe length  =     9.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.840(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =     1.840(CFS)
Normal flow depth in pipe =    3.32(In.)
Flow top width inside pipe =   13.97(In.)
Critical Depth =    6.12(In.)
Pipe flow velocity =      8.21(Ft/s)
Travel time through pipe =    0.02 min.
Time of concentration (TC) =    11.94 min.
End of computations, total study area =            2.13 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.350
Area averaged RI index number =  56.0
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Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 05/15/21
File:ttm37858dev10a.out

TTM 37858 - Drainage Area A
Developed Condition - 10 year flow rates
RMB

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

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

Program License Serial Number 6288

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

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

Standard intensity-duration curves data (Plate D-4.1)
For the [Sunnymead-Moreno] area used.
10 year storm 10 minute intensity = 2.010(In/Hr)
10 year storm 60 minute intensity = 0.820(In/Hr)
100 year storm 10 minute intensity = 2.940(In/Hr)
100 year storm 60 minute intensity = 1.200(In/Hr)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.820(In/Hr)
Slope of intensity duration curve = 0.5000

++
Process from Point/Station 201.000 to Point/Station 202.000
**** INITIAL AREA EVALUATION ****

```
Initial area flow distance =   190.000(Ft.)
Top (of initial area) elevation =    60.800(Ft.)
Bottom (of initial area) elevation =    58.800(Ft.)
Difference in elevation =     2.000(Ft.)
Slope =    0.01053  s(percent)=       1.05
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.503 min.
Rainfall intensity =      2.319(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.802
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      1.209(CFS)
Total initial stream area =        0.650(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      304.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
------------------------------------------------------------------------
Upstream point/station elevation =    56.000(Ft.)
Downstream point/station elevation =    55.000(Ft.)
Pipe length  =    46.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.209(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =     1.209(CFS)
Normal flow depth in pipe =    3.40(In.)
Flow top width inside pipe =   14.09(In.)
Critical Depth =    4.92(In.)
Pipe flow velocity =      5.21(Ft/s)
Travel time through pipe =    0.15 min.
Time of concentration (TC) =     7.65 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      304.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      0.650(Ac.)
Runoff from this stream =      1.209(CFS)
Time of concentration =    7.65 min.
```

Rainfall intensity = 2.296(In/Hr)

++
Process from Point/Station 101.000 to Point/Station 302.000
**** INITIAL AREA EVALUATION ****
_____
Initial area flow distance = 580.000(Ft.)
Top (of initial area) elevation = 64.500(Ft.)
Bottom (of initial area) elevation = 58.700(Ft.)
Difference in elevation = 5.800(Ft.)
Slope = 0.01000 s(percent)= 1.00
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.846 min.
Rainfall intensity = 1.845(In/Hr) for a 10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.786
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 56.00
Pervious area fraction = 0.350; Impervious fraction = 0.650
Initial subarea runoff = 2.538(CFS)
Total initial stream area = 1.750(Ac.)
Pervious area fraction = 0.350

++
Process from Point/Station 302.000 to Point/Station 303.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____
Upstream point/station elevation = 55.500(Ft.)
Downstream point/station elevation = 55.000(Ft.)
Pipe length = 43.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 2.538(CFS)
Nearest computed pipe diameter = 12.00(In.)
Calculated individual pipe flow = 2.538(CFS)
Normal flow depth in pipe = 7.13(In.)
Flow top width inside pipe = 11.79(In.)
Critical Depth = 8.18(In.)
Pipe flow velocity = 5.23(Ft/s)
Travel time through pipe = 0.14 min.
Time of concentration (TC) = 11.98 min.

++
Process from Point/Station 302.000 to Point/Station 303.000

**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 2
Stream flow area = 1.750(Ac.)
Runoff from this stream = 2.538(CFS)
Time of concentration = 11.98 min.
Rainfall intensity = 1.835(In/Hr)
Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
1	1.209	7.65	2.296
2	2.538	11.98	1.835

Largest stream flow has longer time of concentration
Qp = 2.538 + sum of
Qb Ia/Ib
1.209 * 0.799 = 0.966
Qp = 3.504

Total of 2 streams to confluence:
Flow rates before confluence point:
1.209 2.538
Area of streams before confluence:
0.650 1.750
Results of confluence:
Total flow rate = 3.504(CFS)
Time of concentration = 11.983 min.
Effective stream area after confluence = 2.400(Ac.)

++
Process from Point/Station 304.000 to Point/Station 104.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****

Upstream point/station elevation = 53.000(Ft.)
Downstream point/station elevation = 49.500(Ft.)
Pipe length = 351.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 3.504(CFS)
Given pipe size = 24.00(In.)
Calculated individual pipe flow = 3.504(CFS)
Normal flow depth in pipe = 6.39(In.)
Flow top width inside pipe = 21.21(In.)
Critical Depth = 7.86(In.)
Pipe flow velocity = 5.22(Ft/s)
Travel time through pipe = 1.12 min.
Time of concentration (TC) = 13.10 min.

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      304.000 to Point/Station      104.000
**** CONFLUENCE OF MINOR STREAMS ****
____________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      2.400(Ac.)
Runoff from this stream =      3.504(CFS)
Time of concentration =   13.10 min.
Rainfall intensity =     1.755(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      101.000 to Point/Station      102.000
**** INITIAL AREA EVALUATION ****
____________________________________________________________________________
Initial area flow distance =   636.000(Ft.)
Top (of initial area) elevation =    64.500(Ft.)
Bottom (of initial area) elevation =    57.100(Ft.)
Difference in elevation =     7.400(Ft.)
Slope =    0.01164  s(percent)=       1.16
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.924 min.
Rainfall intensity =      1.839(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.786
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      3.165(CFS)
Total initial stream area =        2.190(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      103.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
____________________________________________________________________________
Upstream point/station elevation =    53.100(Ft.)
Downstream point/station elevation =    52.000(Ft.)
Pipe length  =    50.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.165(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =     3.165(CFS)
```

```
Normal flow depth in pipe =    5.50(In.)
Flow top width inside pipe =   16.58(In.)
Critical Depth =    8.11(In.)
Pipe flow velocity =      6.91(Ft/s)
Travel time through pipe =    0.12 min.
Time of concentration (TC) =    12.04 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      104.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________________
Upstream point/station elevation =    52.000(Ft.)
Downstream point/station elevation =    49.500(Ft.)
Pipe length  =    81.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.165(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =     3.165(CFS)
Normal flow depth in pipe =    5.04(In.)
Flow top width inside pipe =   16.17(In.)
Critical Depth =    8.11(In.)
Pipe flow velocity =      7.81(Ft/s)
Travel time through pipe =    0.17 min.
Time of concentration (TC) =    12.22 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      104.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      2.190(Ac.)
Runoff from this stream =      3.165(CFS)
Time of concentration =   12.22 min.
Rainfall intensity =     1.817(In/Hr)
Summary of stream data:

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


1        3.504     13.10                1.755
2        3.165     12.22                1.817
Largest stream flow has longer time of concentration
Qp =      3.504 + sum of
          Qb         Ia/Ib
           3.165 *    0.966 =      3.056
Qp =      6.560
```

```
Total of 2 streams to confluence:
Flow rates before confluence point:
       3.504       3.165
Area of streams before confluence:
        2.400        2.190
Results of confluence:
Total flow rate =      6.560(CFS)
Time of concentration =    13.104 min.
Effective stream area after confluence =      4.590(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      105.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
________________________________________________________________________
Upstream point/station elevation =    49.500(Ft.)
Downstream point/station elevation =    49.000(Ft.)
Pipe length  =    35.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     6.560(CFS)
Given pipe size =     24.00(In.)
Calculated individual pipe flow  =     6.560(CFS)
Normal flow depth in pipe =    8.05(In.)
Flow top width inside pipe =   22.66(In.)
Critical Depth =   10.89(In.)
Pipe flow velocity =      7.09(Ft/s)
Travel time through pipe =    0.08 min.
Time of concentration (TC) =    13.19 min.
End of computations, total study area =            4.59 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.350
Area averaged RI index number =  56.0
```

ttm37858dev100

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 02/16/20
File:ttm37858dev100.out

TTM 37858 Drainage Area A
Developed Condition - 100-year flow rates
RMB

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

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

Program License Serial Number 6288

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

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

Standard intensity-duration curves data (Plate D-4.1)
For the [Sunnymead-Moreno] area used.
10 year storm 10 minute intensity = 2.010(In/Hr)
10 year storm 60 minute intensity = 0.820(In/Hr)
100 year storm 10 minute intensity = 2.940(In/Hr)
100 year storm 60 minute intensity = 1.200(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.200(In/Hr)
Slope of intensity duration curve = 0.5000

++

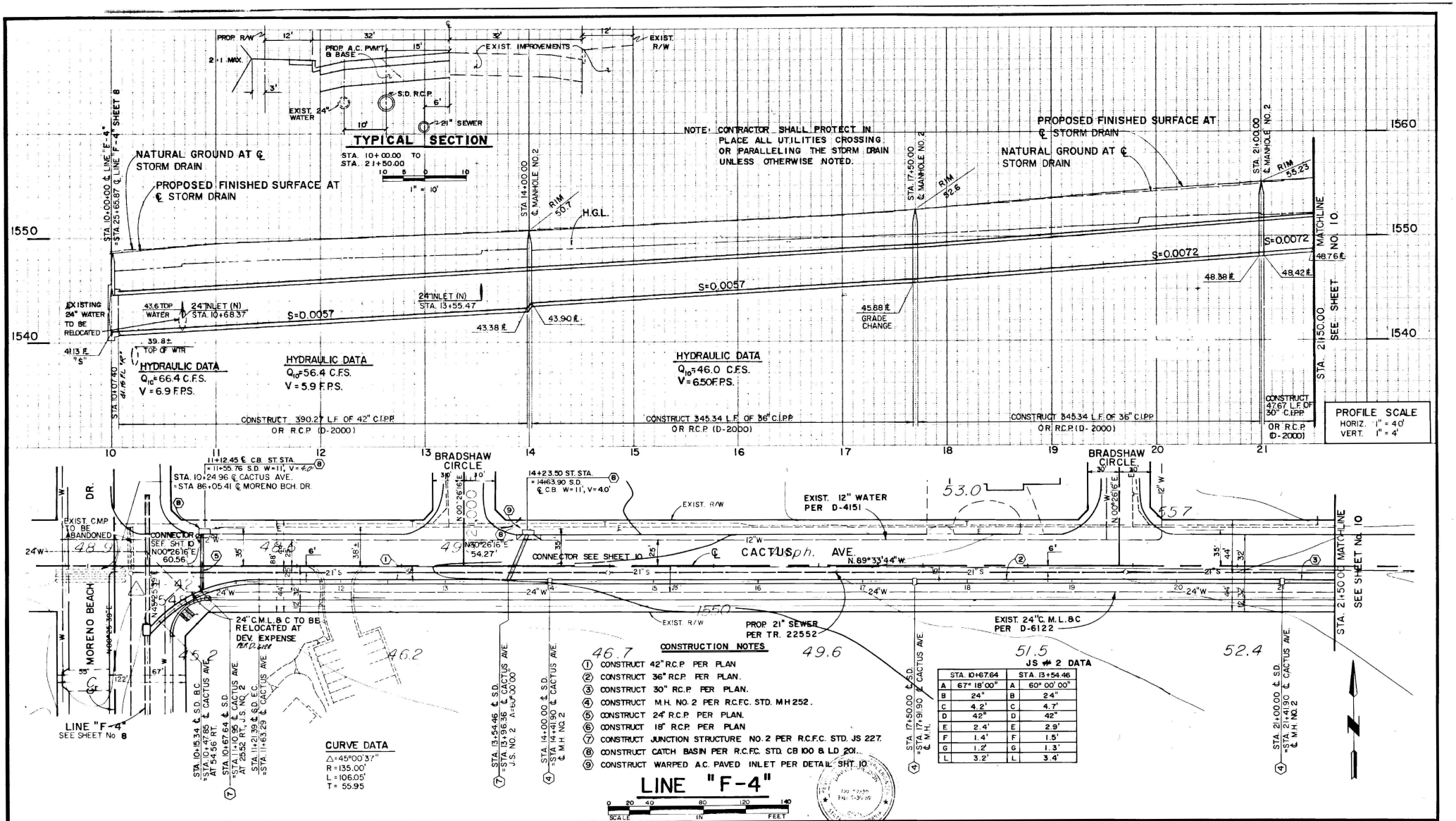
Process from Point/Station 101.000 to Point/Station 102.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 636.000(Ft.)
Top (of initial area) elevation = 64.500(Ft.)
Bottom (of initial area) elevation = 57.100(Ft.)
Difference in elevation = 7.400(Ft.)
Slope = 0.01164 s(percent)= 1.16
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.924 min.
Rainfall intensity = 2.692(In/Hr) for a 100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.855
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 74.80
Pervious area fraction = 0.350; Impervious fraction = 0.650
Initial subarea runoff = 4.911(CFS)
Total initial stream area = 2.134(Ac.)
Pervious area fraction = 0.350

++
Process from Point/Station 102.000 to Point/Station 103.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****

Upstream point/station elevation = 53.500(Ft.)
Downstream point/station elevation = 53.000(Ft.)
Pipe length = 9.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 4.911(CFS)
Given pipe size = 18.00(In.)
Calculated individual pipe flow = 4.911(CFS)
Normal flow depth in pipe = 5.44(In.)
Flow top width inside pipe = 16.53(In.)
Critical Depth = 10.22(In.)
Pipe flow velocity = 10.92(Ft/s)
Travel time through pipe = 0.01 min.
Time of concentration (TC) = 11.94 min.
End of computations, total study area = 2.13 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.350
Area averaged RI index number = 56.0



	STA. 10+67.64		STA. 13+54.46
A	67° 18' 00"	A	60° 00' 00"
B	24"	B	24"
C	4.2'	C	4.7'
D	42"	D	42"
E	2.4'	E	2.9'
F	1.4'	F	1.5'
G	1.2'	G	1.3'
L	3.2'	L	3.4'

J.F. Davidson Associates, Inc.
ENGINEERING PLANNING SURVEYING ARCHITECTURE LANDSCAPE ARCHITECTURE
3650 Lemon Street, P.O. Box 493, Riverside, CA 92502 (714) 686-0844

PREPARED UNDER THE DIRECTION OF: Ralph M. Donaldson
REGISTERED CIVIL ENGINEER NO. 14312
EXP. ON 3-31-89 DATE 3/17/88

SCALE: 1" = 40'
DATE: JAN 1988

BENCH MARK
RIV. CO. BENCH MARK M-33 RESET 184' EASTERLY OF PERRIS BLVD. AND 1' NORTHERLY ℄ J.F. KENNEDY DR. DATED 4-16-67.
ELEV. = 1533.620'

REVISIONS

REF.	DESCRIPTION	APPR.	DATE

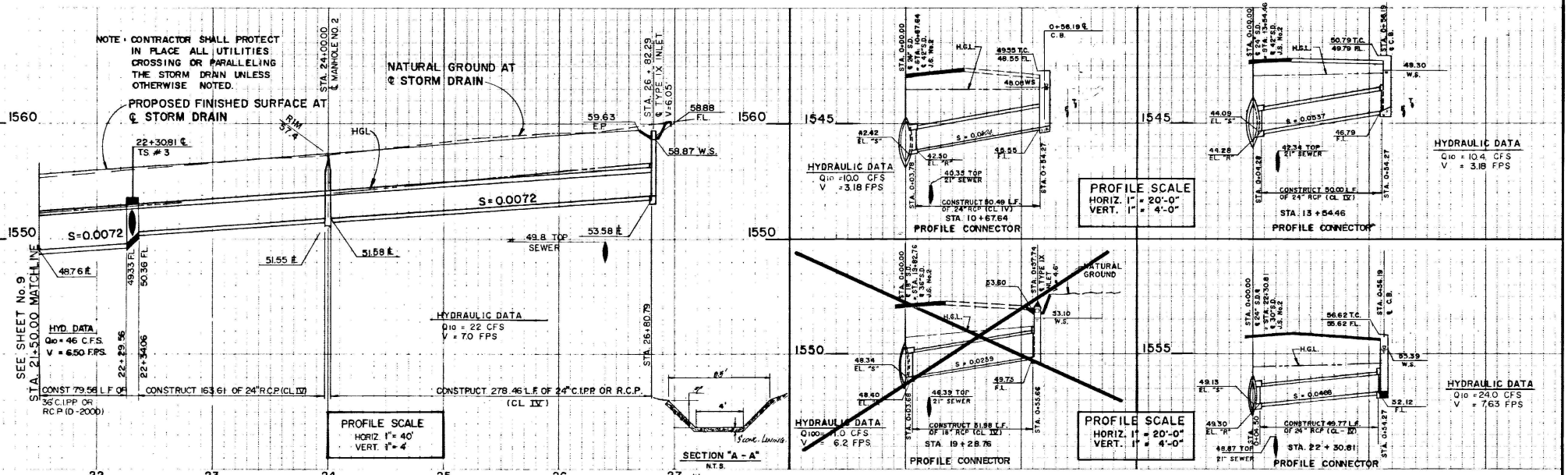
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: David J. Shelton
PLANNING ENGINEER R.E. NO. 19339
DATE: 5/20/88
APPROVED BY: Kenneth Edwards
CHIEF ENGINEER R.E. NO. 12400
DATE: 5-23-88

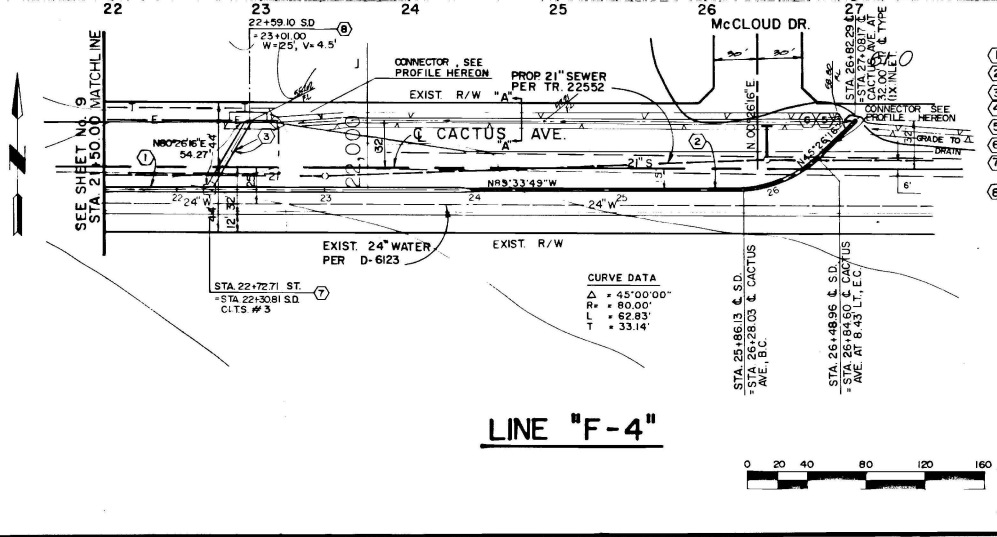
CITY OF MORENO VALLEY
APPROVED BY:
TIM D SERLET R.C.E. NO. 28738 EXP. 9-30-90
CITY ENGINEER
CITY OF MORENO VALLEY, CA DATE:

MORENO A.D.P. SPECIFIC PLAN 193
LINE "F-4"
STA. 10+00.00 - STA. 21+50.00
CACTUS AVENUE

PROJECT NO. 4-0-756
DRAWING NO. 4-0-501
SHEET NO. 9 OF 11

TR 22552

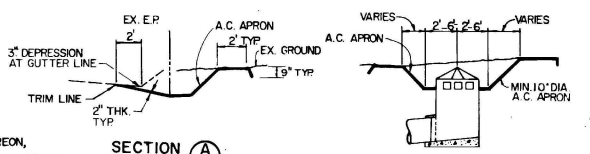




LINE "F-4"

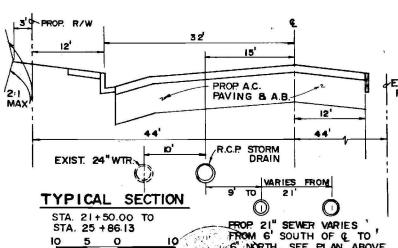
CONSTRUCTION NOTES

1. CONSTRUCT 30" R.C.P. OR C.I.P.P. PER PLAN.
2. CONSTRUCT 24" R.C.P. OR C.I.P.P. PER PLAN.
3. CONSTRUCT 18" R.C.P. PER PLAN.
4. CONSTRUCT MANHOLE NO. 2 PER R.C.F.C. STD. NO. MH 252.
5. CONSTRUCT INLET TYPE IX PER R.C.F.C. STD. NO. CB 107, MODIFIED WITH CONICAL DEBRIS RACK.
6. CONSTRUCT WARPED A.C. PAVED INLET PER DETAIL HEREON, MODIFIED WITH CONICAL DEBRIS RACK.
7. CONSTRUCT TRANSITION STRUCTURE NO. 3 PER R.C.F.C. STD. NO. TS 303. A = 60°00'00", B = 24", C = 4.5'; D = 24", D_2 = 36", L = 4.5'
8. CONSTRUCT CATCH BASIN PER R.C.F.C. STD. CB 100 & LD 201.



SECTION (A) NO SCALE

SECTION (B) NO SCALE



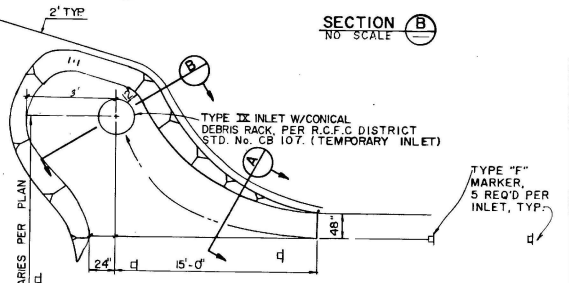
TYPICAL SECTION

STA. 21+50.00 TO STA. 25+86.13

10 5 0 10

1" = 10'

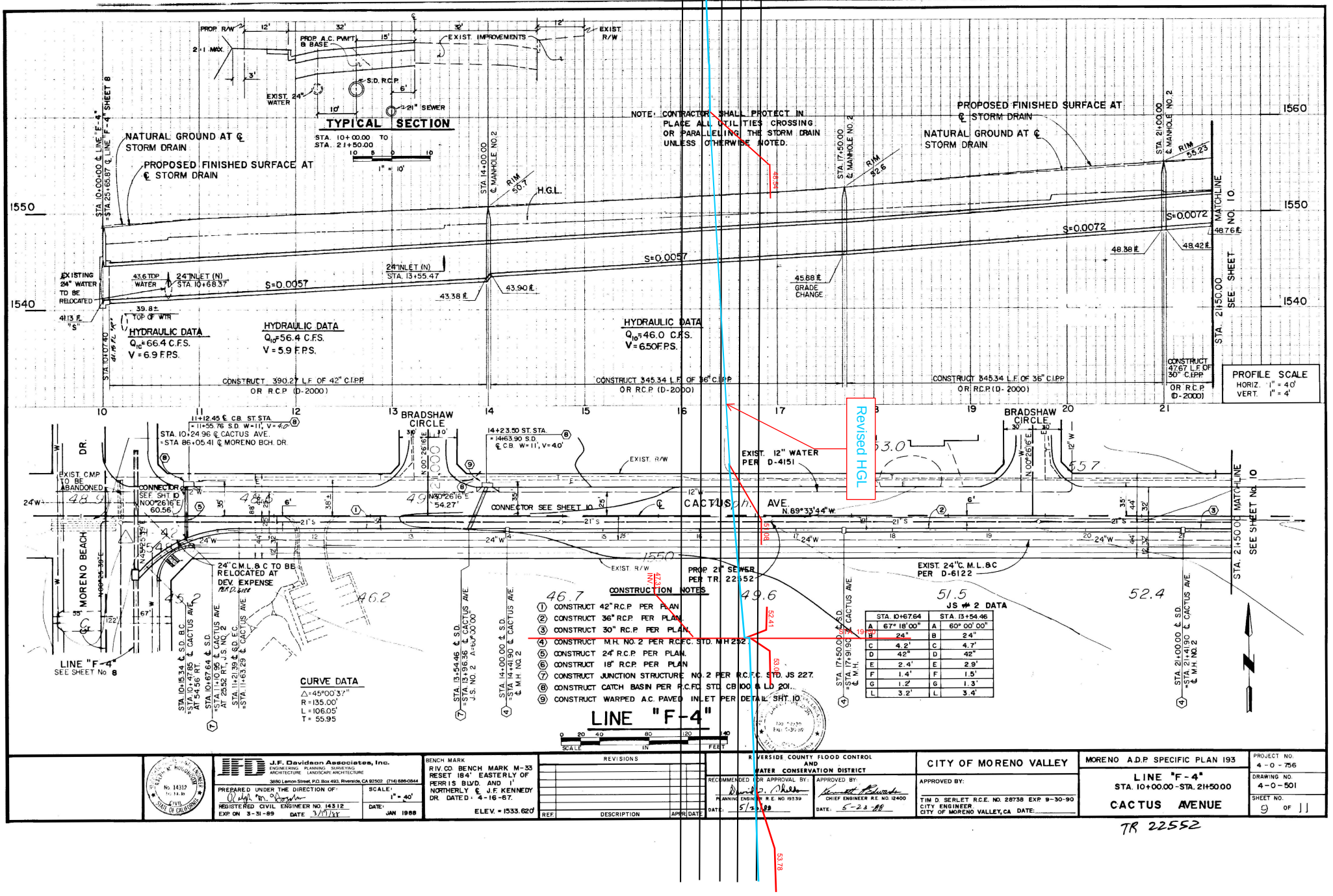
PROP 21" SEWER VARIES FROM 6' SOUTH OF ℄ TO 6' NORTH, SEE PLAN ABOVE.



WARPED A.C. PAVED INLET NO SCALE

	J.F. Davidson Associates, Inc. ENGINEERING PLANNING SURVEYING ARCHITECTURE LANDSCAPE ARCHITECTURE 3880 Lemon Street, P.O. Box 493, Riverside, CA 92502 (714) 686-0844	BENCH MARK: RIVERSIDE COUNTY BENCH MARK M 33 RESET 184' EASTERLY OF PERRIS BLVD. AND 1' NORTHERLY ℄ J.F. KENNEDY DR. DATED 4-16-67. ELEV. = 1533.620'	REVISIONS: REF. / DESCRIPTION / APPR. / DATE	RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT. RECOMMENDED FOR APPROVAL BY: PLANNING ENGINEER R.E. NO. 19339 DATE: 5/20/88. APPROVED BY: CHIEF ENGINEER R.E. NO. 12400 DATE: 5-23-88	CITY OF MORENO VALLEY. APPROVED BY: TIM D. SERLET R.C.E. NO. 28736 EXP. 9-30-90 CITY ENGINEER CITY OF MORENO VALLEY, CA DATE:	MORENO A.D.P. SPECIFIC PLAN 193. LINE "F-4" STA. 21+50.00 - STA. 26+82.29 CACTUS AVENUE	PROJECT NO. 4-0-756. DRAWING NO. 4-0-501. SHEET NO. 10 OF 11
	PREPARED UNDER THE DIRECTION OF: Ralph M. Brown. REGISTERED CIVIL ENGINEER NO. 14312 EXP. ON 3-31-89 DATE 3/17/21. SCALE: 1" = 40'. DATE: JAN 1988						

TR 22552



J.F. Davidson Associates, Inc.
ENGINEERING PLANNING SURVEYING ARCHITECTURE LANDSCAPE ARCHITECTURE
3650 Lemon Street, P.O. Box 493, Riverside, CA 92502 (714) 686-0844

PREPARED UNDER THE DIRECTION OF: Ralph M. Hoornbeek
REGISTERED CIVIL ENGINEER NO. 14312
EXP. ON 3-31-89 DATE 3/17/88
SCALE: 1" = 40'
DATE: JAN 1988

BENCH MARK
RIV. CO. BENCH MARK M-33 RESET 184' EASTERLY OF PERRIS BLVD. AND 1' NORTHERLY ℄ J.F. KENNEDY DR. DATED 4-16-67.
ELEV. = 1533.620'

REVISIONS
REF. | DESCRIPTION | APP'R DATE

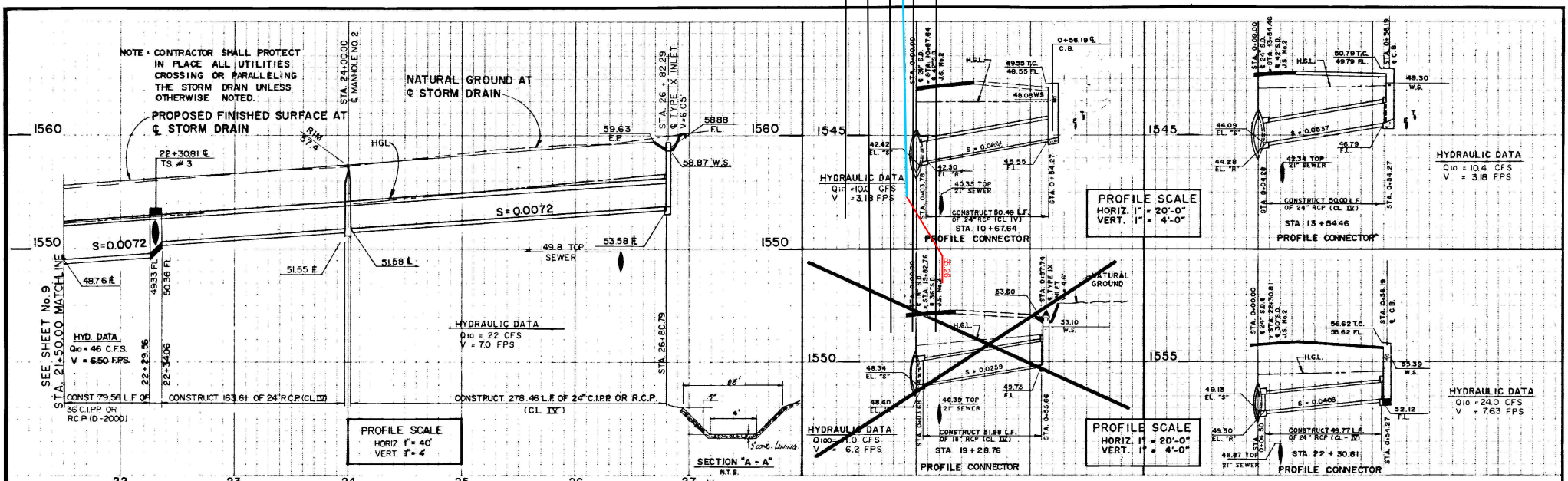
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: Donald D. Sheets
PLANNING ENGINEER R.E. NO. 19339
DATE: 5/23/88
APPROVED BY: Kenneth Edwards
CHIEF ENGINEER R.E. NO. 12400
DATE: 5-23-88

CITY OF MORENO VALLEY
APPROVED BY:
TIM D SERLET R.C.E. NO. 28738 EXP. 9-30-90
CITY ENGINEER
CITY OF MORENO VALLEY, CA DATE:

MORENO A.D.P. SPECIFIC PLAN 193
LINE "F-4"
STA. 10+00.00 - STA. 21+50.00
CACTUS AVENUE

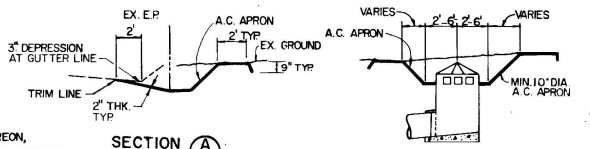
PROJECT NO. 4-0-756
DRAWING NO. 4-0-501
SHEET NO. 9 OF 11

TR 22552



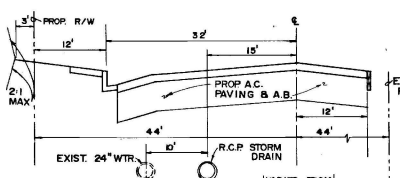
CONSTRUCTION NOTES

1. CONSTRUCT 30" R.C.P. OR C.I.P.P. PER PLAN.
2. CONSTRUCT 24" R.C.P. OR C.I.P.P. PER PLAN.
3. CONSTRUCT 18" R.C.P. PER PLAN.
4. CONSTRUCT MANHOLE NO. 2 PER R.C.F.C. STD. NO. MH 252.
5. CONSTRUCT INLET TYPE IX PER R.C.F.C. STD. NO. CB 107, MODIFIED WITH CONICAL DEBRIS RACK.
6. CONSTRUCT WARPED A.C. PAVED INLET PER DETAIL HEREON, MODIFIED WITH CONICAL DEBRIS RACK.
7. CONSTRUCT TRANSITION STRUCTURE NO. 3 PER R.C.F.C. STD. NO. TS 303. A = 60°00'00", B = 24", C = 4.5'; D = 24", D_2 = 36", L = 4.5'
8. CONSTRUCT CATCH BASIN PER R.C.F.C. STD. CB 100 & LD 201.



SECTION (A) NO SCALE

SECTION (B) NO SCALE



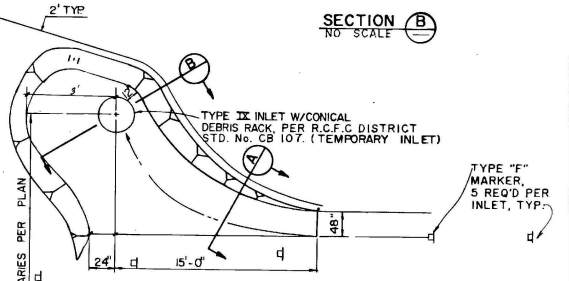
TYPICAL SECTION

STA. 21+50.00 TO STA. 25+86.13

10 5 0 10

1" = 10'

PROP 21" SEWER VARIES FROM 6' SOUTH OF ℄ TO 6' NORTH, SEE PLAN ABOVE.



WARPED A.C. PAVED INLET NO SCALE

LINE "F-4"

J.F. Davidson Associates, Inc.
ENGINEERING · PLANNING · SURVEYING
ARCHITECTURE · LANDSCAPE ARCHITECTURE
3880 Lemon Street, P.O. Box 493, Riverside, CA 92502 (714) 686-0844

PREPARED UNDER THE DIRECTION OF: Ralph W. Brayton
REGISTERED CIVIL ENGINEER NO. 14312
EXP. ON 3-31-89 DATE 3/17/71
SCALE: 1" = 40'
DATE: JAN 1988

BENCH MARK
RIVERSIDE COUNTY BENCH MARK M 33 RESET 184' EASTERLY OF PERRIS BLVD. AND 1' NORTHERLY ℄ J.F. KENNEDY DR.
DATED 4-16-67
ELEV. = 1533.620'

REVISIONS

REF.	DESCRIPTION	APPR.	DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: David T. Sheldon, PLANNING ENGINEER R.E. NO. 19339, DATE: 5/20/88
APPROVED BY: Kenneth Edwards, CHIEF ENGINEER R.E. NO. 12400, DATE: 5-23-88

CITY OF MORENO VALLEY
APPROVED BY:
TIM D. SERLET R.C.E. NO. 28738 EXP. 9-30-90
CITY ENGINEER
CITY OF MORENO VALLEY, CA DATE:

MORENO A.D.P. SPECIFIC PLAN 193
LINE "F-4"
STA. 21+50.00 - STA. 26+82.29
CACTUS AVENUE

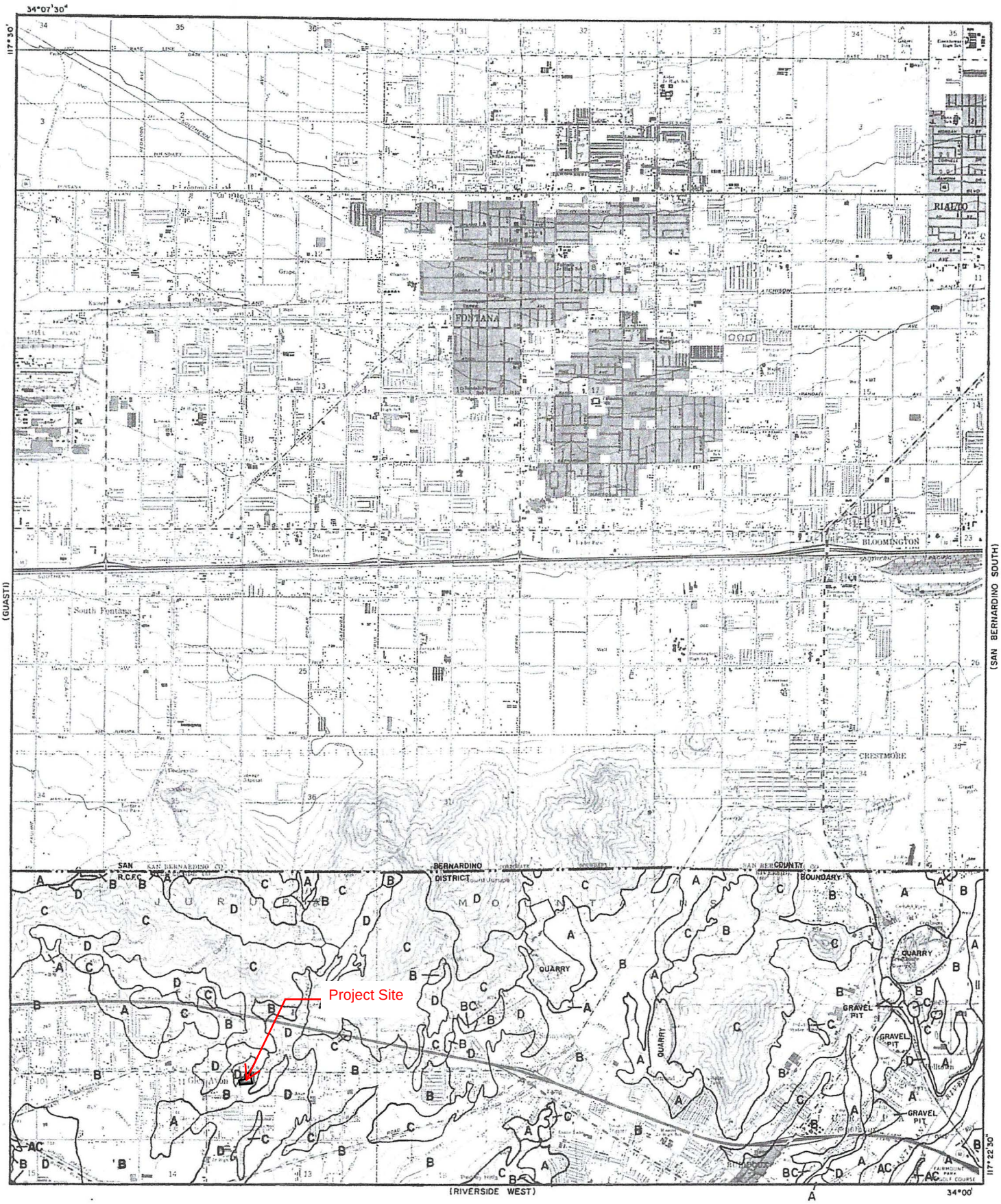
PROJECT NO. 4-0-756
DRAWING NO. 4-0-501
SHEET NO. 10 OF 11

TR 22552

Appendix C
Reference Materials

Soils Map

Hydrology Maps



LEGEND

—— SOILS GROUP BOUNDARY

A SOILS GROUP DESIGNATION

RCFC&WCD

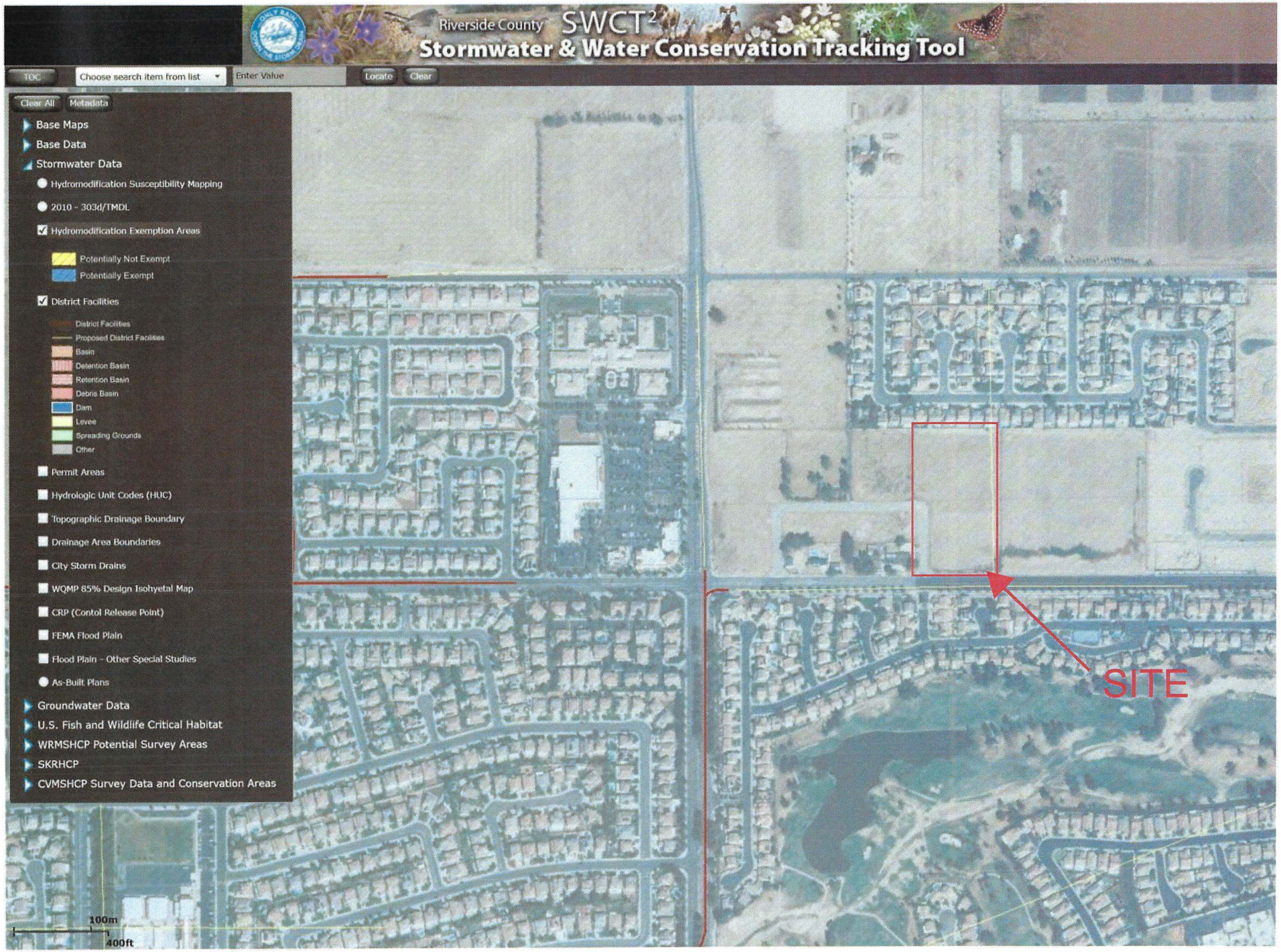
HYDROLOGY MANUAL

N

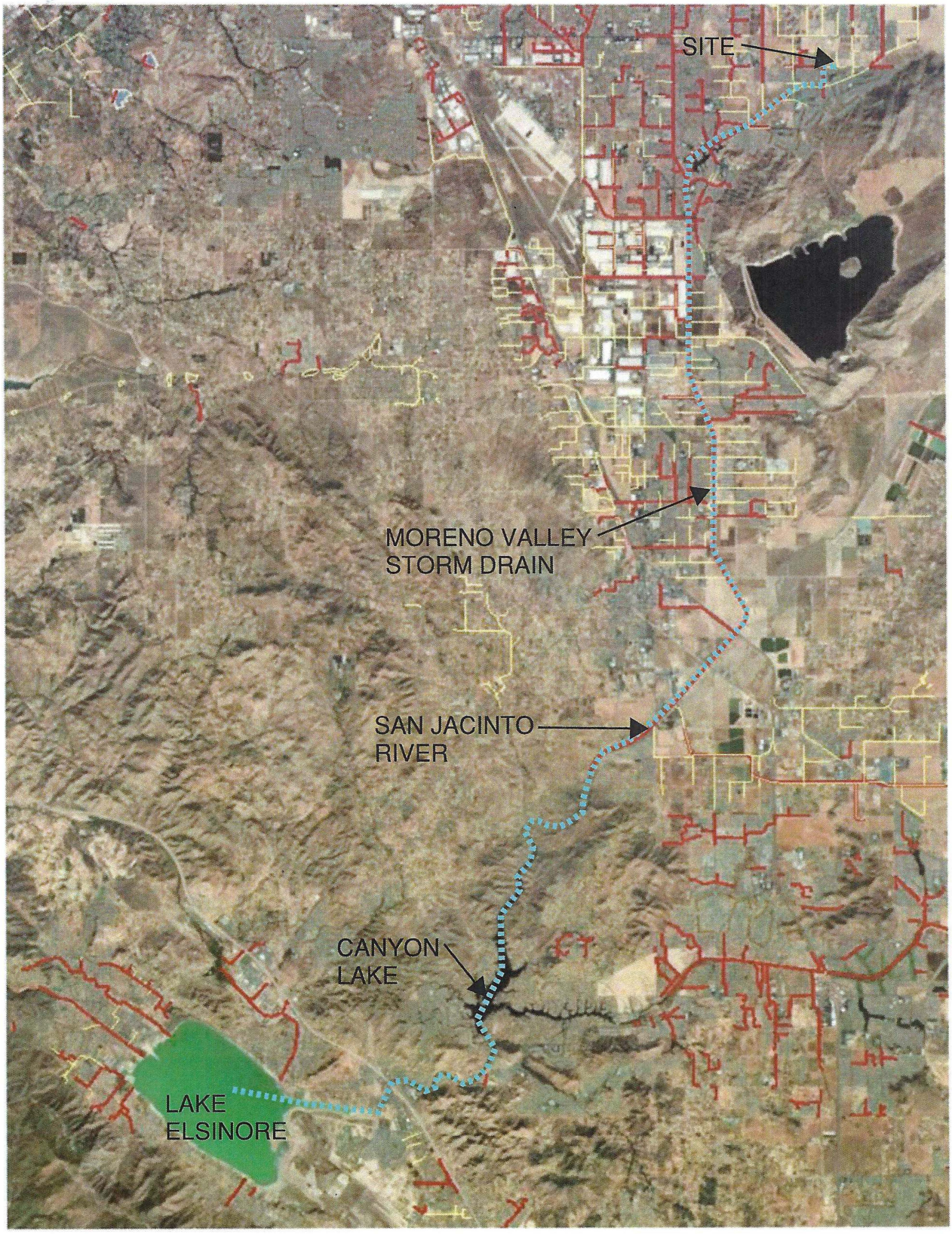
0 FEET 5000

HYDROLOGIC SOILS GROUP MAP FOR FONTANA

PLATE C-1.03


Riverside County SWCT²
Stormwater & Water Conservation Tracking Tool
TOC
Choose search item from list
Enter Value
Locate
Clear
Clear All
Metadata
Base Maps
Base Data
Stormwater Data
Hydromodification Susceptibility Mapping
2010 - 303d/TMDL
Hydromodification Exemption Areas
Potentially Not Exempt
Potentially Exempt
District Facilities
District Facilities
Proposed District Facilities
Basin
Detention Basin
Retention Basin
Debris Basin
Dam
Levee
Spreading Grounds
Other
Permit Areas
Hydrologic Unit Codes (HUC)
Topographic Drainage Boundary
Drainage Area Boundaries
City Storm Drains
WQMP 85% Design Isohyetal Map
CRP (Contol Release Point)
FEMA Flood Plain
Flood Plain - Other Special Studies
As-Built Plans
Groundwater Data
U.S. Fish and Wildlife Critical Habitat
WRMSHCP Potential Survey Areas
SKRHCP
CVMSHCP Survey Data and Conservation Areas
SITE
100m
400ft

RECEIVING WATER EXHIBIT



TENTATIVE TRACT MAP NO. 37893

LEGAL DESCRIPTION:

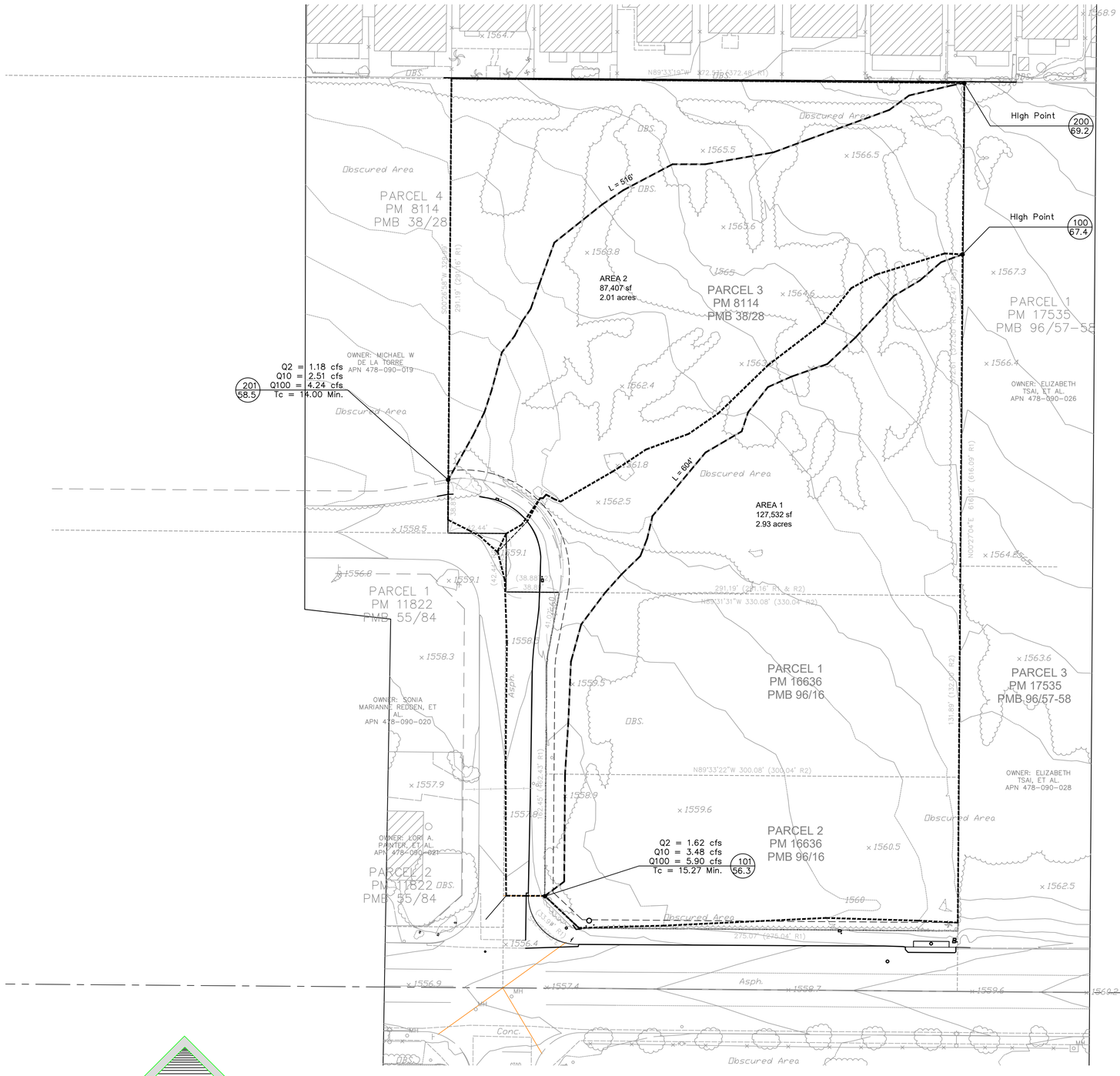
THE LAND IS SITUATED IN THE COUNTY OF RIVERSIDE, CITY OF JURUPA VALLEY, STATE OF CALIFORNIA, AND IS DESCRIBED AS FOLLOWS:

PARCELS 2 AND 3 OF PARCEL MAP 21212, IN THE CITY OF JURUPA VALLEY, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AS SHOWN BY MAP ON FILE IN BOOK 153, PAGES 34 & 35, OF PARCEL MAPS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.

APN'S: 171-101-072-3 & 171-101-073-7

DEVELOPER

RC HOBBS COMPANIES, INC.
1428 E. CHAPMAN AVENUE
ORANGE, CA 92866
ATTN: ROGER HOBBS
714-633-8100



HYDROLOGY DATA

100 YEAR – 1 YEAR RAINFALL INTENSITY = 1.20 INCH

10 YEAR – 1 HOUR RAINFALL INTENSITY = 0.82 INCH

SLOPE USED FOR RAINFALL INTENSITY CURVE = 0.500

AMC I USED FOR 2-YEAR STORM RUNOFF CALCULATIONS
AMC II USED FOR 10-YEAR STORM RUNOFF CALCULATIONS
AMC III USED FOR 100-YEAR STORM RUNOFF CALCULATIONS

ASSUMED HYDROLOGIC LAND USE: UNDEVELOPED

SOIL TYPE B

HYDROLOGY LEGEND

Q100 = 100-YEAR FLOW RATE

Q10 = 10-YEAR FLOW RATE

Q2 = 2-YEAR FLOW RATE

Tc = TIME OF CONCENTRATION – MINUTES

L = FLOW PATH LENGTH IN FEET

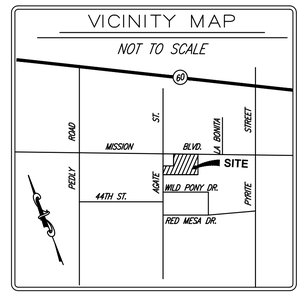
101 / 54.8 — NODE NUMBER / ELEVATION

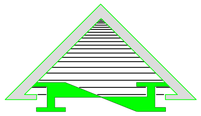
DRAINAGE AREA BOUNDARY

DRAINAGE FLOW PATH

VICINITY MAP

NOT TO SCALE





GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

REGISTERED PROFESSIONAL ENGINEER ROBERT MARK BEERS No. 39405 Exp. 12-31-21 CIVIL STATE OF CALIFORNIA

ROBERT BEERS
8175 Limonite Avenue, Suite E
Jurupa Valley, CA 92509
Ph. (951) 317-2041 Fax (909) 360-2070

Date

Robert M. Beers R.C.E. 39405 Expires 12-31-21

FIELD BOOK REF.

MARK	REVISIONS	APPR.	DATE

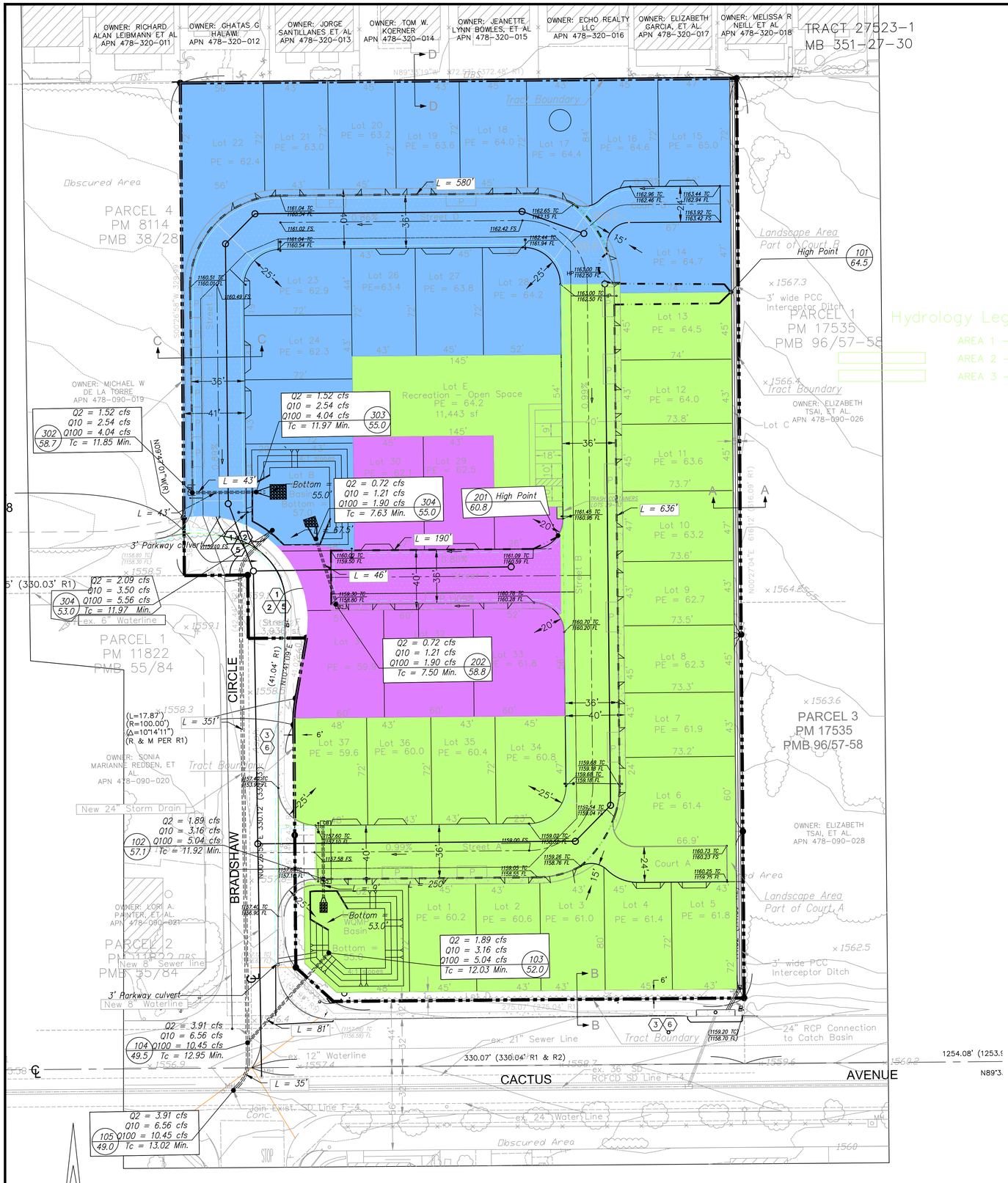
PREPARED FOR:

RC Hobbs Companies
1428 E. Chapman Avenue
Orange, CA 92866
PHONE: (714) 633-8100

TTM 37893
Existing Condition Hydrology Map
City of Jurupa Valley
CALIFORNIA

DATE March 26, 2020
JOB NO.
DRAWN BY R.A.H.
CHECKED BY R.M.B.
SHEET 1 OF 1

DEVELOPED CONDITON HYDRLOGY MAP
TENTATIVE TRACT MAP NO. 37858



HYDROLOGY LEGEND

100 YEAR – 1 YEAR RAINFALL INTENSITY = 1.20 INCH

10 YEAR – 1 HOUR RAINFALL INTENSITY = 0.82 INCH

SLOPE USED FOR RAINFALL INTENSITY CURVE = 0..500

AMC I USED FOR 2-YEAR STORM RUNOFF CALCULATIONS
AMC II USED FOR 10-YEAR STORM RUNOFF CALCULATIONS
AMC III USED FOR 100-YEAR STORM RUNOFF CALCULATIONS

ASSUMED HYDROLOGIC LAND USE: SFR – Condominium

SOIL TYPE B

Q100 = 100-YEAR FLOW RATE

Q10 = 10-YEAR FLOW RATE

Q2 = 2-YEAR FLOW RATE

Tc = TIME OF CONCENTRATION – MINUTES

L = FLOW PATH LENGTH IN FEET

101 / 54.8 NODE NUMBER / ELEVATION

DRAINAGE AREA BOUNDARY

DRAINAGE FLOW PATH

AREA 1 – 95,454 SF – 2.1913 Ac.

AREA 2 – 28,193 SF – 0.6472 Ac.

AREA 3 – 76,216 SF – 1.6846 Ac.

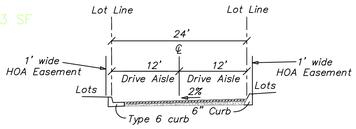
hydrologic soil type – Type B

Hydrology Legend

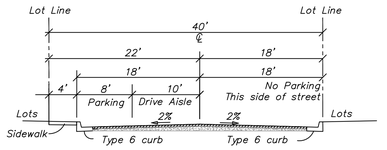
AREA 1 – 92,937 SF

AREA 2 – 38,180 SF

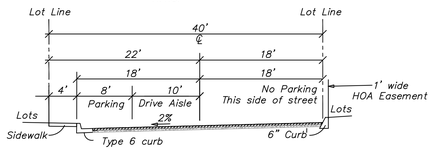
AREA 3 – 71,743 SF



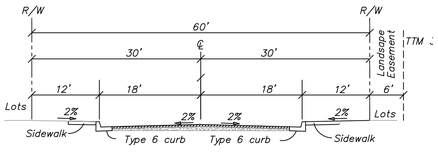
TYPICAL SECTION – Private Streets
COURTS "A" & "B"
3" AC over 6" AB
N.T.S.



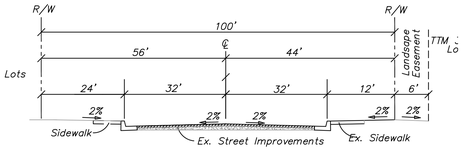
TYPICAL SECTION – PRIVATE STREETS
"A", "B", "D" & "E"
3" AC over 6" AB
N.T.S.



TYPICAL SECTION – PRIVATE STREET "C"
3" AC over 6" AB
N.T.S.



TYPICAL SECTION
BRADSHAW CIRCLE
Offered but not accepted R/W
N.T.S.



TYPICAL SECTION
CACTUS AVE
N.T.S.

LEGAL DESCRIPTION:

PARCEL 1:
PARCEL 3 AND LOT E, PARCEL MAP NO. 8114, IN THE CITY OF MORENO VALLEY, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AS PER PARCEL MAP RECORDED IN BOOK 38, PAGE 28 OF MAPS, RECORDS OF SAID COUNTY.

APN: 478-090-018

PARCEL 2:
PARCELS 1 AND 2 AS SHOWN BY PARCEL MAP NO. 16636, IN THE CITY OF MORENO VALLEY, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA ON FILE IN BOOK 96, PAGE 16 OF PARCEL MAPS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA,

APN'S: 478-090-024-2 AND 478-0909-25-3

Easement Notes

(1) AN EASEMENT FOR PUBLIC STREET PURPOSES OVER THAT PORTION OF SAID LAND WITHIN LOT E AS SHOWN OR DEDICATED UPON THE MAP RECORDED IN BOOK 38, PAGE 28 OF MAPS; ALSO PRIVATE EASEMENTS FOR INGRESS AND EGRESS IN FAVOR OF OWNERS OF LOTS IN SAID PARCEL MAP, SUCH EASEMENTS HAVING BEEN ACQUIRED UNDER CONVEYANCE BY REFERENCE TO SAID MAP.

(2) AN EASEMENT AFFECTING THAT PORTION OF SAID LAND AND FOR THE PURPOSES STATED HEREIN AND INCIDENTAL PURPOSES AS PROVIDED IN THE FOLLOWING
GRANTED TO : SOUTHERN CALIFORNIA EDISON COMPANY
FOR : UNDERGROUND ELECTRICAL SYSTEMS
RECORDED : OCTOBER 14, 1977 IN OFFICIAL RECORDS AS INSTRUMENT NUMBER 203665
AFFECTS : AS DESCRIBED THEREIN

(3) AN EASEMENT AFFECTING THAT PORTION OF SAID LAND AND FOR THE PURPOSES STATED HEREIN AND INCIDENTAL PURPOSES AS PROVIDED IN THE FOLLOWING
GRANTED TO : SOUTHERN CALIFORNIA EDISON COMPANY
FOR : UNDERGROUND CONDUITS
RECORDED : AUGUST 10, 1978 IN OFFICIAL RECORDS AS INSTRUMENT NUMBER 168544
AFFECTS : AS DESCRIBED THEREIN

4. AN EASEMENT IN FAVOR OF THE PUBLIC OVER ANY PORTION OF THE HEREIN DESCRIBED PROPERTY INCLUDED WITHIN PUBLIC ROADS.

(5) AN EASEMENT AFFECTING THAT PORTION OF SAID LAND AND FOR THE PURPOSES STATED HEREIN AND INCIDENTAL PURPOSES AS PROVIDED IN THE FOLLOWING
INSTRUMENT : GRANT OF EASEMENT
GRANTED TO : SOUTHERN CALIFORNIA EDISON COMPANY
FOR : UNDERGROUND ELECTRICAL SYSTEMS LOCATED WITHIN ALL STREETS AND ALLEYS
RECORDED : OCTOBER 14, 1977 IN OFFICIAL RECORDS AS INSTRUMENT NUMBER 203665
AFFECTS : AS DESCRIBED THEREIN

(6) AN EASEMENT AFFECTING THAT PORTION OF SAID LAND AND FOR THE PURPOSES STATED HEREIN AND INCIDENTAL PURPOSES AS PROVIDED IN THE FOLLOWING
INSTRUMENT : GRANT OF EASEMENT
GRANTED TO : SOUTHERN CALIFORNIA EDISON COMPANY
FOR : POLE LINES, CONDUITS OR UNDERGROUND FACILITIES
RECORDED : AUGUST 10, 1978 IN OFFICIAL RECORDS AS INSTRUMENT NUMBER 168544

〈〉 = PLOTTED HEREON

ZONING/LANDUSE

GENERAL PLAN DESIGNATION: Residential

EXISTING ZONING:	R5
PROPOSED ZONING:	R10
EXISTING LANDUSE:	Vacant
PROPOSED LANDUSE:	RESIDENTIAL

PROJECT NOTES

TOTAL GROSS PROJECT SIZE: 4.81± ACRES
TOPOGRAPHY SOURCE: Field Survey December 2019

NUMBER OF RESIDENTIAL LOTS: 37
MINIMUM LOT AREA: 3,095 S.F.
MINIMUM LOT DEPTH: 72'
MINIMUM LOT WIDTH: 43'
LOT SIZE: AS SHOWN ON MAP
DENSITY: 7.90 DU/ACRE
RESIDENTIAL LOT AREA = 126,675 sf
OPEN SPACE LOT AREA = 26,401 SF
STREET AREA = 56,826 sf
ONSITE STREETS ARE PRIVATE STREETS
TRASH CONTAINERS FOR LOTS 29-34 SHALL BE PLACED ALONG STREET 'B'
DRIVEWAYS – 16' WIDE

DEVELOPER/BUILDER

Roger Hobbs Companies, Inc.
1024 E. Chapman Avenue
Orange, CA 92866
ATT: Roger Hobbs
(714) 633-8100

OWNER

Church of Jesus Christ of Latter Day Saints
50 E. North Temple St., 12t Floor
Salt Lake City, UT 84150-6320

ASSESSORS PARCEL NUMBERS

478-090-018, 024 & 025

UTILITY PURVEYORS

WATER:	EMWD
SEWER:	EMWD
GAS:	SOUTHERN CALIFORNIA GAS COMPANY
ELECTRICITY:	CITY OF MORENO VALLEY
TELEPHONE:	AT&T
SCHOOL:	MORENO VALLEY UNIFIED SCHOOL DISTRICT
CATV:	SPECTRUM

LEGEND

T.C.	TOP OF CURB
F.L.	FLOWLINE
F.S.	FINISHED SURFACE
P.E.	PAD ELEVATION
C.B.	CATCH BASIN
H.P.	HIGH POINT
XX	EXIST. LAND USAGE
X	EXIST. ZONING
P	PARKING SPACE

Residential Lots

Lot Number	Width (ft)	Depth (ft)	Area (sf)	Lot Number	Width (ft)	Depth (ft)	Area (sf)
1	45	72	3,240	21	43	72	3,099
2	43	72	3,096	22	56	72	5,016
3	43	72	3,319	23	44	72	3,040
4	45	72	3,316	24	43	72	3,096
5	43	72	3,464	25	43	72	3,096
6	60	73	4,505	26	43	72	3,095
7	43	73.2	3,157	27	45	72	3,240
8	45	73.3	3,303	28	52	72	3,610
9	43	73.5	3,162	29	43	72	3,268
10	47	73.6	3,462	30	45	72	3,418
11	45	73.7	3,321	31	51	72	3,974
12	43	73.8	3,178	32	60	72	4,320
13	45	74	3,332	33	60	72	4,347
14	47	74	3,612	34	45	72	3,249
15	47	72	3,432	35	43	72	3,096
16	45	72	3,355	36	43	72	3,096
17	43	72	3,282	37	48	72	3,503
18	45	72	3,240			subtotal	59,563
19	43	72	3,096				
20	45	72	3,240				

	67,112
Total Residential Lot Area =	126,675

Lettered Lots

Lot	Use	Area (sf)
A	Open Space - WQMP Basin	4,823
B	Open Space - WQMP Basin	4,944
C	Drainage - Wall	3,054
D	Landscape Area	2,137
E	Open Space - Recreation	11,443
	Total Open Space Lot Area =	26,401

Street Lots

Street Name	ROW Width (ft)	Curb to Curb (ft)	Area (sf)
Street A	40	36	8,665
Street B	40	36	16,004
Street C	40	36	6,805
Street D	40	36	9,397
Street E	41	36	7,844
Street F	Varies	36	3,936
Court A	24	24	2,093
Court B	24	24	2,082
Total Street Lot Area =			56,826

REGISTERED PROFESSIONAL ENGINEER ROBERT MARK BEERS No. 39405 Exp. 12-31-21 CIVIL STATE OF CALIFORNIA

ROBERT BEERS
8175 Limonite Avenue, Suite E
Jurupa Valley, CA 92509
Ph. (951) 317-2041 Fax (909) 360-2070

Date Robert M. Beers R.C.E. 39405 Expires 12-31-21

FIELD BOOK REF.

MARK REVISIONS APPR. DATE

PREPARED FOR:
RC Hobbs Company, Inc.
1428 E. Chapman Avenue
Orange, CA 92866
PHONE: (714) 633-8100

TTM 37858
DEVELOPED CONDITON HYDRLOGY MAP
City of Moreno Valley
CALIFORNIA

DATE May 15, 2021
JOB NO.
DRAWN BY R.A.H.
CHECKED BY R.M.B.
SHEET 1 OF 1