HYDROLOGY REPORT

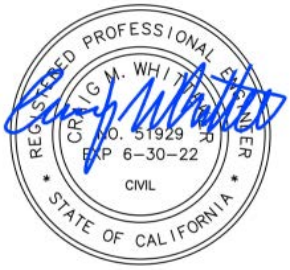
County of Riverside

Whitewood South
APN: 392-320-014
Parcel 1, P.M. 8590
City of Murrieta

Prepared For:
City of Murrieta

Prepared By:
Alliance Land Planning & Engineering, Inc.
2248 Faraday Ave.
Carlsbad, CA 92008

NOVEMBER 2021
Job No. 2036



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PROJECT OVERVIEW

Whitewood South is a proposed multi-family apartment site located o in City of Murrieta, Riverside County, California. The approximate 18.1-acre site is immediately adjacent to east side of Whitewood Road and immediately south of Lee Lane and is currently an undeveloped parcel. The parcel is within a sub-watershed of the San Jacinto River Basin.

EXISTING CONDITION DRAINAGE

The current site is in natural condition and covered in sparce desert vegetation and scrub. Hydrologic soil conditions for the existing site are considered moderately good relative to infiltration and erosion per the soil maps in the Hydrology manual. Small rolling hills surround an ephemeral Creek that bisects the parcel into a southern and northern half. The surrounding area is considered rural.

The Creek runs from west to east as two main subareas drain into it from the south and from the north. The southern 1/3 of the site discharges out the southeast corner pf the parcel separate from where the main Creek leaves, but this flow eventually re-joins the main Creek a relatively short distance east of the project site. The Creek receives run-on from two separate inlet points on the east side of Whitewood road. These inlet points are culvert outlets that convey two upstream tributaries of the main Creek and the confluence occurs on the Whitewood South parcel.

DEVELOPED CONDITION DRAINAGE

The developed condition site will consist of several apartment buildings, drive aisles, covered parking structures, a leasing office, a recreation area, two pools, a dog park, various landscaped parkways and a total of two above ground water quality/hydromod detention basins. The natural Creek bisecting the site will be preserved and will remain in tact.

METHODOLOGY

Peak flowrates for the 100-yr existing and developed conditions have been estimated per methods outlined in the County of Riverside Hydrology Manual via the rational method. Computer modeling using Civil Design software was used to calculate the values reported on the maps provided within this report.

** No offsite analysis for the main Creek has been performed.

A summary of hydrologic parameters used within each model is provided below. Model output is provided within the Appendix B of this report.

EXISTING CONDITION HYDROLOGIC PARAMETERS

Parameter	Unit	BASIN	
		A	B
Area	sf	386,132	209,709
	ac	8.86	4.81
Length	ft	585	435
Hi Elev	ft	1504	1505
Lo Elev	ft	1477	1475
Slope	ft/ft	0.0462	0.0690
Centrd Length	ft	380	240
Imp (AI)	%	8	8
RI		78	78
Low Loss Rate		0.9	0.9
2 yr, 24 hr	in	1.6	1.6
100 yr, 24 hr	in	5.0	5.0
Soil Group*		B	B

* Murrieta C-1.52

DEVELOPED CONDITION HYDROLOGIC PARAMETERS

Parameter	Unit	BASIN	
		A	B
Area	sf	386,132	209,709
	ac	8.86	4.81
Length	ft	985	755
Hi Elev	ft	93	94
Lo Elev	ft	72.5	72
Slope	ft/ft	0.0208	0.0291
Centrd Length	ft	420	445
Imp (AI)	%	87	87
RI		56	56
Low Loss Rate		0.2	0.2
2 yr, 24 hr	in	1.6	1.6
100 yr, 24 hr	in	5.0	5.0
Soil Group*		B	B

* Murrieta C-1.52

RESULTS

A summary of the existing and developed condition 100-yr peak flowrates and volumes are provided below. Basin A was sub-divided into a north and south subarea and flows have been pro-rated per area weighting method.

EXISTING CONDITION 100-YR RESULTS

Basin	Flowrate (Q)
	cfs
A	23.37
B	14.23

DEVELOPED CONDITION 100-YR RESULTS

Basin	Flowrate (Q)
	cfs
A	25.69
B	15.36

BASIN A PRO-RATED DEVELOPED CONDITION 100-YR RESULTS

Basin	Area	Q
	ac	cfs
A North	2.67	7.76
A South	6.17	17.93
TTL	8.84	25.69

HYDROMODIFICATION

There are two above ground hydromod/water quality detention basins proposed for this site. These facilities will capture the required hydromodification volume as calculated by County of Riverside continuous model simulation calculator provided within Exhibit B.7 of the County technical guidance document for the Santa Margarita watershed.

The basins will serve a dual purpose for both hydromod storage and water quality treatment and a separate discussion on the water quality aspects of these basins are provided in the WQMP for this project.

A summary of the hydromod volumes provided within these basins is provided below.

HYDROMOD VOLUME REQUIRED VS VOLUME PROVIDED

Facility	Volume Required *	Volume Provided *
	cf	ac-ft
Above Ground BASIN A	12,951	12,982
Above Ground BASIN B	7,051	8,139

* Volumes per County Calculator (Exhibit B.7). Pls see WQMP for wqt volume calculations.

FEMA FLOODPLAIN and HYDRAULIC ANALYSIS

This project site is shown to not be located within any existing FEMA floodplain. Please see FIRMETTE exhibit in Appendix D of this report.

CONCLUSION

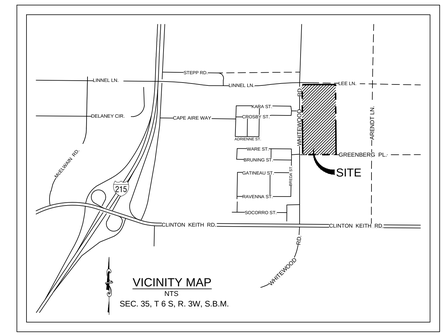
This project is considered acceptable for development from a hydrologic perspective. Given the proposed storage facilities to be utilized for stormwater detention, the developed condition project will return discharge levels to that of the existing condition.

APPENDIX A

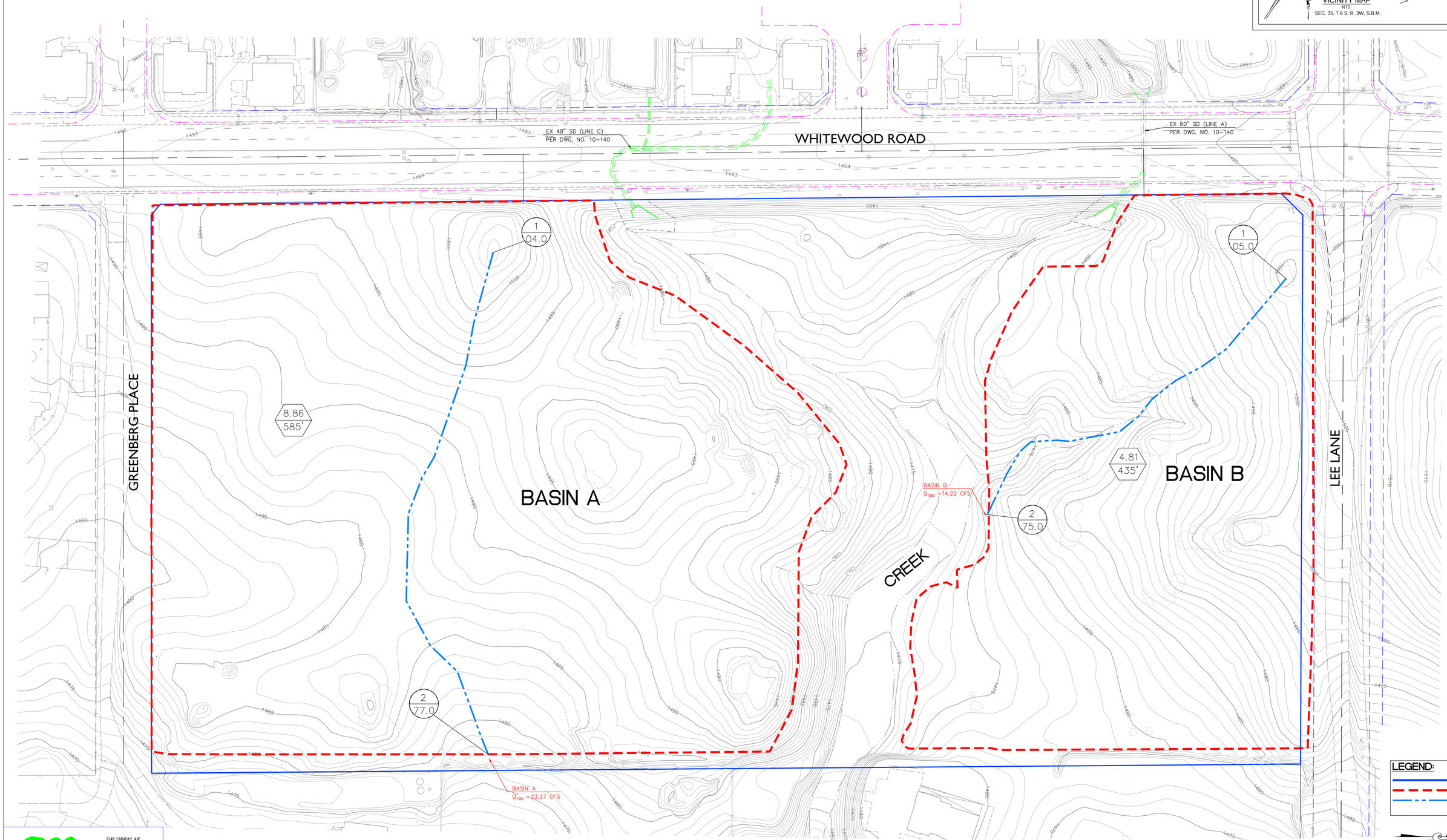
EXHIBITS

EXISTING CONDITION HYDROLOGY
&
DEVELOPED CONDITION HYDROLOGY

MURRIETA WHITEWOOD (SOUTH)
EXISTING CONDITION HYDROLOGY
11/3/21



VICINITY MAP
NTS
SEC. 35, T 6 S, R. 3W, S.B.M.



LEGEND:
- PROPERTY LINE
- SUBAREA
- FLOWPATH

SCALE: 1"=40'

GRAPHIC SCALE
40 0 40 80
(IN FEET)
1 inch = 40 ft.

ALLIANCE
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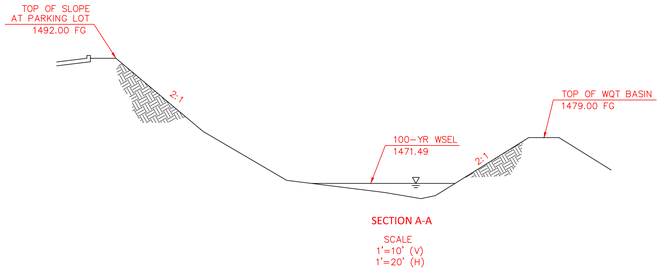
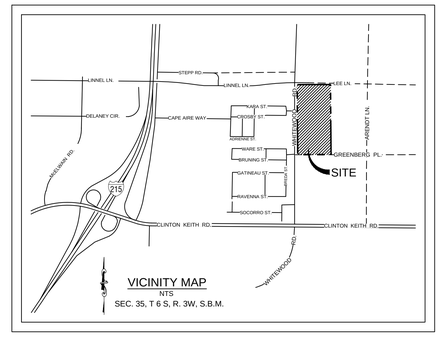
MURRIETA WHITEWOOD
DEVELOPED CONDITION HYDROLOGY
11/04/21





VICINITY MAP
NTS
SEC. 35, T 6 S, R. 3W, S.B.M.

LEGEND:
- PROPERTY LINE
- SUBAREA
- FLOWPATH
- D — PROPOSED STORM DRAIN
- LF — PROPOSED LOWFLOW DRAIN
- PROPOSED HIGH FLOW CATCH BASIN

SCALE: 1"=40'
GRAPHIC SCALE
40 0 40 80
(IN FEET)
1 inch = 40 ft.

HYDROMOD VOLUME REQUIRED VS VOLUME PROVIDED

Facility	Volume Required *	Volume Provided *
	cf	ac-ft
Above Ground BASIN A	12,951	12,982
Above Ground BASIN B	7,051	8,139

*** Volumes per County Calculator (Exhibit B.7). PIs see WQMP for wqt volume calculations.**

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APPENDIX B

RATIONAL METHOD MODEL OUTPUT

EXISTING CONDITION

RATIONAL METHOD 100-YR

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2012 Version 8.0
Rational Hydrology Study Date: 03/21/21 File:2036EXA.out

2036 - EXISTING COND HYDROLOGY
100-YR, 24-HR
BASIN A
RATIONAL METHOD

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

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

Program License Serial Number 6301

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 [Murrieta,Tmc,Rnch CaNorco] area used.
10 year storm 10 minute intensity = 2.360(In/Hr)
10 year storm 60 minute intensity = 0.880(In/Hr)
100 year storm 10 minute intensity = 3.480(In/Hr)
100 year storm 60 minute intensity = 1.300(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.300(In/Hr)
Slope of intensity duration curve = 0.5500

++

Process from Point/Station 1.000 to Point/Station 2.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 585.000(Ft.)
Top (of initial area) elevation = 1504.000(Ft.)
Bottom (of initial area) elevation = 1477.000(Ft.)
Difference in elevation = 27.000(Ft.)
Slope = 0.04615 s(percent)= 4.62
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 12.540 min.
Rainfall intensity = 3.075(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.858
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 = 23.370(CFS)
Total initial stream area = 8.860(Ac.)
Pervious area fraction = 1.000
End of computations, total study area = 8.86 (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 - 2012 Version 8.0
Rational Hydrology Study Date: 03/21/21 File:2036EXB.out

2036 - EXISTING COND HYDROLOGY
100-YR, 24-HR
BASIN B
RATIONAL METHOD

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

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

Program License Serial Number 6301

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 [Murrieta,Tmc,Rnch CaNorco] area used.
10 year storm 10 minute intensity = 2.360(In/Hr)
10 year storm 60 minute intensity = 0.880(In/Hr)
100 year storm 10 minute intensity = 3.480(In/Hr)
100 year storm 60 minute intensity = 1.300(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.300(In/Hr)
Slope of intensity duration curve = 0.5500

++

Process from Point/Station 1.000 to Point/Station 2.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 435.000(Ft.)
Top (of initial area) elevation = 1505.000(Ft.)
Bottom (of initial area) elevation = 1475.000(Ft.)
Difference in elevation = 30.000(Ft.)
Slope = 0.06897 s(percent)= 6.90
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 10.279 min.
Rainfall intensity = 3.430(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.862
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 = 14.223(CFS)
Total initial stream area = 4.810(Ac.)
Pervious area fraction = 1.000
End of computations, total study area = 4.81 (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

DEVELOPED CONDITION

RATIONAL METHOD 100-YR

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2012 Version 8.0
Rational Hydrology Study Date: 03/21/21 File:2036DEVA.out

2036 - DEVELOPED COND WHITEWOOD
100-YR, 24-HR
BASIN A

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

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

Program License Serial Number 6301

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 [Murrieta,Tmc,Rnch CaNorco] area used.
10 year storm 10 minute intensity = 2.360(In/Hr)
10 year storm 60 minute intensity = 0.880(In/Hr)
100 year storm 10 minute intensity = 3.480(In/Hr)
100 year storm 60 minute intensity = 1.300(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.300(In/Hr)
Slope of intensity duration curve = 0.5500

++

Process from Point/Station 1.000 to Point/Station 2.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 983.000(Ft.)
Top (of initial area) elevation = 93.000(Ft.)
Bottom (of initial area) elevation = 72.500(Ft.)
Difference in elevation = 20.500(Ft.)
Slope = 0.02085 s(percent)= 2.09
TC = k(0.323)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.025 min.
Rainfall intensity = 3.301(In/Hr) for a 100.0 year storm
APARTMENT subarea type
Runoff Coefficient = 0.878
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 = 0.200; Impervious fraction = 0.800
Initial subarea runoff = 25.690(CFS)
Total initial stream area = 8.860(Ac.)
Pervious area fraction = 0.200
End of computations, total study area = 8.86 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.200

Area averaged RI index number = 56.0

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2012 Version 8.0
Rational Hydrology Study Date: 03/21/21 File:2036DEVB.out

2036 - DEVELOPED COND WHITEWOOD
100-YR, 24-HR
BASIN B

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

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

Program License Serial Number 6301

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 [Murrieta,Tmc,Rnch CaNorco] area used.
10 year storm 10 minute intensity = 2.360(In/Hr)
10 year storm 60 minute intensity = 0.880(In/Hr)
100 year storm 10 minute intensity = 3.480(In/Hr)
100 year storm 60 minute intensity = 1.300(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.300(In/Hr)
Slope of intensity duration curve = 0.5500

++

Process from Point/Station 1.000 to Point/Station 2.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 756.000(Ft.)
Top (of initial area) elevation = 94.000(Ft.)
Bottom (of initial area) elevation = 72.000(Ft.)
Difference in elevation = 22.000(Ft.)
Slope = 0.02910 s(percent)= 2.91
TC = k(0.323)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 9.286 min.
Rainfall intensity = 3.628(In/Hr) for a 100.0 year storm
APARTMENT subarea type
Runoff Coefficient = 0.880
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 = 0.200; Impervious fraction = 0.800
Initial subarea runoff = 15.358(CFS)
Total initial stream area = 4.810(Ac.)
Pervious area fraction = 0.200
End of computations, total study area = 4.81 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.200

Area averaged RI index number = 56.0

APPENDIX C

HYDROMODIFICATION CALCULATION (EXHIBIT B.7 OUTPUT)

Santa Margarita Region - County HydroMod Iterative Spreadsheet Model

Only for use the unincorporated portions of Riverside County, unless otherwise approved by the Co-Permittee

Development Project Number(s):		Rain Gauge	Temecula Valley
Latitude (decimal format):	33.6033	BMP Type (per WQMP):	Biofiltration
Longitude (decimal format):	-117.1566	BMP Number (Sequential):	Basin A1 & A2

Pre-Development

Pre-Development - Hydrology Information

DRAINAGE AREA (ACRES) - 10 acre max[1]	8.86	2-YEAR, 1-HOUR INTENSITY (IN/HR) - Plate D-4.3	0.53
LONGEST WATERCOURSE (FT) - 1,000' max[1]	585	10-YEAR, 1-HOUR INTENSITY (IN/HR) - Plate D-4.1	1.66
UPSTREAM ELEVATION OF WATERCOURSE (FT)	1504	SLOPE OF THE INTENSITY DURATION - Plate D-4.6	0.56
DOWNSTREAM ELEV. OF WATERCOURSE (FT)	1477	CLOSEST IMPERVIOUS PERCENTAGE (%)	0% Undeveloped - Poor Cover
EXISTING IMPERVIOUS PERCENTAGE (%)	0		
Use 10% of Q2 to avoid Field Screening requirements	Yes		

Pre-Development

Pre-Development - Soils Information

Cover Type #	Subarea Acreage	Cover Type	Vegetative Cover	Soil A %	Soil B %	Soil C %	Soil D %	RI Index AMC I	RI Index AMC II	RI Index AMC III
1	8.86 Ac.	Barren	- Cover		50	50		76	**89**	96
								0	**0**	0
								0	**0**	0
	8.86 Ac.							**Weighted Average RI Numbers =**	**76.0**	**89.0**	**96.0**

Per Dr. Luis Parra, the AMC condition is based on the rainfall record. Applying NEH-4 (1964) for the non-freezing conditions in Riverside County the AMC conditions are:
AMC-I for less than 0.5" of rain the previous 5 days; AMC-II for between 0.5" to 1.1" of rain the previous 5 days; or AMC-III for more than 1.1" for the previous 5 days.

Pre-Development

Pre-Development - Calculated Range of Flow Rates analyzed for Hydromod (Suceptible Range of Flows)

Calculated Upper Flow-rate limit		Calculated Lower Flow-rate limit	
Ex. 10-year Flowrate[1] =	**12.712** cfs	Ex. 10% of the 2-year Flowrate[1] =	**0.899** cfs
(Co-Permitte Approval is required) User-Defined Discharge Values with accompanying Hydrology Study[1]			
Ex. 10-year Flowrate (Attach Study) =	cfs	Ex. 2-year Flowrate (Attach Study) =	cfs

[1]The equations used to determine the 10-year and 10% of the 2-yr are limited to 10-acres and 1,000'. Flowrates from a separate study can be used to over-ride the calculated values so that larger areas (up to 20 acres) and longer watercourse lengths can be used. All values still need to be filled out, even when there is a user-defined discharge value entered.

Post-Project

Post-Project - Hydrograph Information

DRAINAGE AREA (ACRES)	8.86
LONGEST WATERCOURSE (FT)	920
DIFFERENCE IN ELEV (FT) - along watercourse	14
PROPOSED IMPERVIOUS PERCENTAGE (%)	82

Go to "BMP Design" tab to design your BMP, then check results below.
Print both this "HydroMod" Sheet and the "BMP Design" sheet for your submittal.

Post-Project

Post-Project - Soils Information

Cover Type #	Subarea Acreage	Cover Type	Vegetative Cover	Soil A %	Soil B %	Soil C %	Soil D %	RI Index AMC I	RI Index AMC II	RI Index AMC III
22	8.86 Ac.	Urban Landscaping	Good Cover		50	50		43	**63**	80
								0	**0**	0
								0	**0**	0
	8.86 Ac.							**Weighted Average RI Numbers =**	**43.0**	**63.0**	**80.0**

Per Dr. Luis Parra, the AMC condition is based on the rainfall record. Applying NEH-4 (1964) for the non-freezing conditions in Riverside County the AMC conditions are:
AMC-I for less than 0.5" of rain the previous 5 days; AMC-II for between 0.5" to 1.1" of rain the previous 5 days; or AMC-III for more than 1.1" for the previous 5 days.

Results

		First result out of compliance in the rainfall record				See below for the Height in the Basin (Stage) that is causing a non-compliant result	
		Requirement		Proposed			
Hydromod Ponded depth	**2.00 feet**						
Hydromod Drain Time (unclogged)	**60.78 hours**						
Is the HydroMod BMP properly sized?	**Yes, this is acceptable**	---	---	---	---		
Mitigated Q < 110% of Pre-Dev. Q?	**Yes, this is acceptable**	---	---	---	---	Issue @ Stage -	---
Mitigated Duration < 110% of Pre-Dev?*	**Yes, this is acceptable**	---	---	---	---	Issue @ Stage -	---

Responsible-in-charge: _____ Date: _____

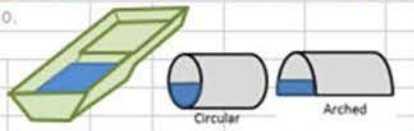
Signature: _____ Spreadsheet Developed by: Benjie Cho, P.E.

BMP Geometry & Detention Calculations

PROPOSED BMP DIMENSIONS

STEP1: Size the BMP, so that the Total Volume > Max HydroMod Vol. (Deeper is ok, it will be refined in the Design Geometry)

Is the BMP a Tank shape? 2 (1 for yes; 2 for no.)

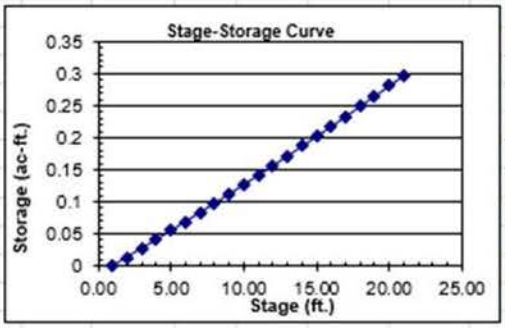


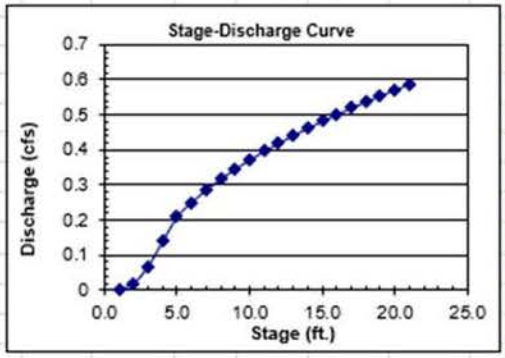
Basin Shaped BMP (Bottom Stage 1st)

Bottom Stage H= 2.0' SS= 2 :1

Top Area		Bottom Area		
Width	98	Width	90	FT
Length	73	Length	65	FT
area =	7154	area =	5850	

Top Stage H= 0.0'





Prop. Top Stg. Vol. =	-	FT3
Prop Bottom Stg Vol =	12,982	FT3
Total Prop. Volume[1] =	12,982	FT3
Max HydroMod Volume =	12,951	FT3
Total Acreage[2] =	5,100	FT2
BMP % of Site =	1.32%	
Max HydroMod Depth[3] =	2.00	FT

[1]Does not include forebay, or low flow trench

[4]Does not account for freeboard or access roads

[2]Does not consider Increased Runoff

Stage (FT)	Storage (AC-FT)	Storage (FT3)	Q (CFS)
0	0	0	0
0.10	0.014	588	0.02
0.20	0.027	1182	0.07
0.30	0.041	1783	0.14
0.40	0.055	2390	0.21
0.50	0.069	3003	0.25
0.60	0.083	3623	0.29
0.70	0.098	4249	0.32
0.80	0.112	4881	0.35
0.90	0.127	5520	0.37
1.00	0.142	6165	0.40
1.10	0.157	6817	0.42
1.20	0.172	7476	0.44
1.30	0.187	8141	0.46
1.40	0.202	8812	0.48
1.50	0.218	9490	0.50
1.60	0.234	10175	0.52
1.70	0.249	10867	0.54
1.80	0.266	11566	0.55
1.90	0.282	12271	0.57
2.00	0.298	12983	0.59
	0.298	12,983	

MINIMUM DESIGN GEOMETRY

STEP3: Delete outlets, then propose the largest lowest orifice that does not, exceed the ex. Q or Duration. If the Q is acceptable, but the duration is exceeded, try decreasing orifice, then adding a weir slightly below the stage that has an issue.

OUTLETS (for Stage-Discharge)

Orifice Outlets			Weir Outlets		
Invert Height (ft)	Diameter (inches)	No. of Orifices	Crest Height (ft)	Crest Width (ft)	No. of Weirs
0	4.00	1			

Hydromod Depth = 2.00 FT

+ 1' Freeboard = 3.00 FT

Top Surface Area

Based on HydroMod Depth +1' of Freeboard

Bottom Stage		
Width	98	FT
Length	73	FT

STEP4: Complete an increased runoff analysis, if the project can impact downstream properties. Incorporate these designs into the WQMP site plan. Add emergency overflow weir, for flows that exceed the Hydromod volumes, sized to the 100-year peak flow rate. Add access roads (< 10% longitudnal slope) with enough width & turn around access for equipment that would be needed to scarify the bottom or remove Bioretention soil media.

Add Infiltration

Enter information from actual infiltration tests			
Yes	**Consider Infiltration (Yes or No)?**		
5	Infiltration rate (in/hr) [3]	0.6771	ft3/sec, Infiltration (over entire bottom)
4	Factor of Safety (3 or greater) [3]	0.1693	ft3/sec, Infiltration / Factor of Safety
120	mins, Max. Time represented by tests		

[3]Per the RC LID Manual, Appendix A.

Only if allowed by the Co-Permittee, these infiltration inputs can be used to simulate Bioretention/Biofiltration rates with Backup Calcs and Data.

FYI, the spreadsheet does not count the duration under the suceptible flowrate. So there are circumstances where as the outlet sizes increases the duration increases as well. That is because some of the flow duration that wasn't counted because it was too low, is now counted, or the compliance check is jumping to the next out of compliance record with different duration exceedance values.

Results

		First result out of compliance in the record				
		Requirement		Proposed		See below for the Height in the Basin (Stage) that is causing a non-compliant result
Hydromod Ponded depth	**2.00 feet**					
Hydromod Drain Time (unclogged	**60.78 hours**					
HydroMod BMP properly sized?	**Yes, this is acceptable**	---	---	---	---	
Mit. Q < 110% of Pre-Dev. Q?	**Yes, this is acceptable**	---	---	---	---	Issue @ Stage = ---
Mit. Duration < 110% of Pre-Dev?*	**Yes, this is acceptable**	---	---	---	---	Issue @ Stage = ---

Santa Margarita Region - County HydroMod Iterative Spreadsheet Model

Only for use the unincorporated portions of Riverside County, unless otherwise approved by the Co-Permittee

Development Project Number(s):		Rain Gauge	Temecula Valley
Latitude (decimal format):	33.6033	BMP Type (per WQMP):	Biofiltration
Longitude (decimal format):	-117.1566	BMP Number (Sequential):	Basin B

Pre-Development

Pre-Development - Hydrology Information

DRAINAGE AREA (ACRES) - 10 acre max[1]	4.81	2-YEAR, 1-HOUR INTENSITY (IN/HR) - Plate D-4.3	0.53
LONGEST WATERCOURSE (FT) - 1,000' max[1]	435	10-YEAR, 1-HOUR INTENSITY (IN/HR) - Plate D-4.1	2.13
UPSTREAM ELEVATION OF WATERCOURSE (FT)	1505	SLOPE OF THE INTENSITY DURATION - Plate D-4.6	0.56
DOWNSTREAM ELEV. OF WATERCOURSE (FT)	1475	CLOSEST IMPERVIOUS PERCENTAGE (%)	0% Undeveloped - Poor Cover
EXISTING IMPERVIOUS PERCENTAGE (%)	0		
Use 10% of Q2 to avoid Field Screening requirements	Yes		

Pre-Development

Pre-Development - Soils Information

Cover Type #	Subarea Acreage	Cover Type	Vegetative Cover	Soil A %	Soil B %	Soil C %	Soil D %	RI Index AMC I	RI Index AMC II	RI Index AMC III
1	4.81 Ac.	Barren	- Cover		50	50		76	**89**	96
								0	**0**	0
								0	**0**	0
	4.81 Ac.						**Weighted Average RI Numbers =**	**76.0**	**89.0**	**96.0**

Per Dr. Luis Parra, the AMC condition is based on the rainfall record. Applying NEH-4 (1964) for the non-freezing conditions in Riverside County the AMC conditions are: AMC-I for less than 0.5" of rain the previous 5 days; AMC-II for between 0.5" to 1.1" of rain the previous 5 days; or AMC-III for more than 1.1" for the previous 5 days.

Pre-Development

Pre-Development - Calculated Range of Flow Rates analyzed for Hydromod (Suceptible Range of Flows)

Calculated Upper Flow-rate limit		Calculated Lower Flow-rate limit	
Ex. 10-year Flowrate[1] =	**8.963** cfs	Ex. 10% of the 2-year Flowrate[1] =	**0.552** cfs

(Co-Permitte Approval is required) User-Defined Discharge Values with accompanying Hydrology Study[1]

Ex. 10-year Flowrate (Attach Study) =	cfs	Ex. 2-year Flowrate (Attach Study) =	cfs

[1]The equations used to determine the 10-year and 10% of the 2-yr are limited to 10-acres and 1,000'. Flowrates from a separate study can be used to over-ride the calculated values so that larger areas (up to 20 acres) and longer watercourse lengths can be used. All values still need to be filled out, even when there is a user-defined discharge value entered.

Post-Project

Post-Project - Hydrograph Information

DRAINAGE AREA (ACRES)	4.81
LONGEST WATERCOURSE (FT)	756
DIFFERENCE IN ELEV (FT) - along watercourse	24
PROPOSED IMPERVIOUS PERCENTAGE (%)	83

Go to "BMP Design" tab to design your BMP, then check results below.
Print both this "HydroMod" Sheet and the "BMP Design" sheet for your submittal.

Post-Project

Post-Project - Soils Information

Cover Type #	Subarea Acreage	Cover Type	Vegetative Cover	Soil A %	Soil B %	Soil C %	Soil D %	RI Index AMC I	RI Index AMC II	RI Index AMC III
22	8.86 Ac.	Urban Landscaping	Good Cover		50	50		43	**63**	80
								0	**0**	0
								0	**0**	0
	8.86 Ac.						**Weighted Average RI Numbers =**	**43.0**	**63.0**	**80.0**

Per Dr. Luis Parra, the AMC condition is based on the rainfall record. Applying NEH-4 (1964) for the non-freezing conditions in Riverside County the AMC conditions are: AMC-I for less than 0.5" of rain the previous 5 days; AMC-II for between 0.5" to 1.1" of rain the previous 5 days; or AMC-III for more than 1.1" for the previous 5 days.

Results

		First result out of compliance in the rainfall record				See below for the Height in the Basin (Stage) that is causing a non-compliant result	
		Requirement		Proposed			
Hydromod Ponded depth	**1.40 feet**						
Hydromod Drain Time (unclogged)	**31.31 hours**						
Is the HydroMod BMP properly sized?	**Yes, this is acceptable**	---	---	---	---		
Mitigated Q < 110% of Pre-Dev. Q?	**Yes, this is acceptable**	---	---	---	---	Error @ Stage -	---
Mitigated Duration < 110% of Pre-Dev?*	**Yes, this is acceptable**	---	---	---	---	Error @ Stage -	---

Responsible-in-charge: _____ Date: _____

Signature: _____ Spreadsheet Developed by: Benjie Cho, P.E.

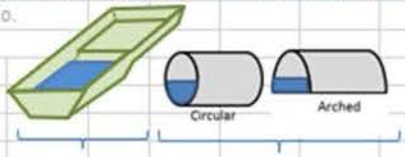
BMP Geometry & Detention Calculations

0.1	feet, Stage Intervals	Larger intervals may incr. the Q at the bottom stg.

PROPOSED BMP DIMENSIONS

STEP1: Size the BMP, so that the Total Volume > Max HydroMod Vol. (Deeper is ok, it will be refined in the Design Geometry)

Is the BMP a Tank shape? 2 (1 for yes; 2 for no.)

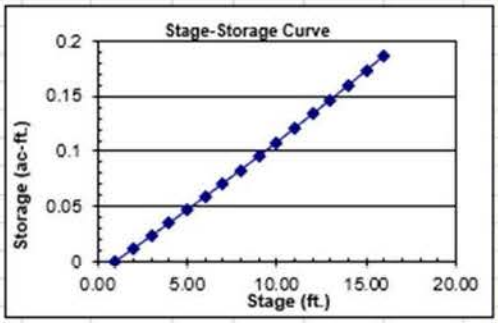


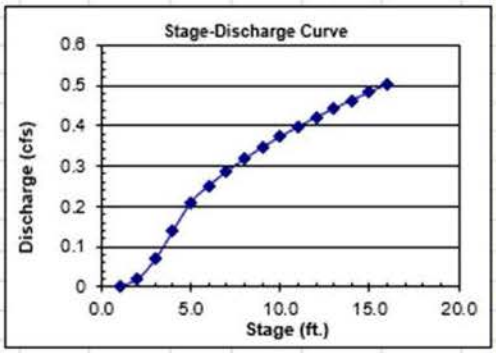
Basin Shaped BMP (Bottom Stage 1st)

Bottom Stage H= 1.5' SS= 2 :1

Top Area		Bottom Area		
Width	51	Width	45	FT
Length	116	Length	110	FT
area =	5916	area =	4950	

Top Stage H= 0.0'





Prop. Top Stg. Vol. =	-	FT3
Prop Bottom Stg Vol =	8,139	FT3
Total Prop. Volume[1] =	8,139	FT3
Max HydroMod Volume =	7,051	FT3
Total Acreage[2] =	5,100	FT2
BMP % of Site =	2.43%	
Max HydroMod Depth[3] =	1.40	FT

[1]Does not include forebay, or low flow trench
[2]Does not account for freeboard or access roads
[3]Does not consider Increased Runoff

MINIMUM DESIGN GEOMETRY

STEP3: Delete outlets, then propose the largest lowest orifice that does not, exceed the ex. Q or Duration. If the Q is acceptable, but the duration is exceeded, try decreasing orifice, then adding a weir slightly below the stage that has an issue.

OUTLETS (for Stage-Discharge)

Orifice Outlets			Weir Outlets		
Invert Height (ft)	Diameter (inches)	No. of Orifices	Crest Height (ft)	Crest Width (ft)	No. of Weirs
0	4.00	1			

Hydromod Depth = 1.40 FT
+1' Freeboard = 2.40 FT

Top Surface Area

Based on HydroMod Depth +1' of Freeboard

Bottom Stage		
Width	51	FT
Length	116	FT

STEP4: Complete an increased runoff analysis, if the project can impact downstream properties. Incorporate these designs into the WQMP site plan. Add emergency overflow weir, for flows that exceed the Hydromod volumes, sized to the 100-year peak flow rate. Add access roads (< 10% longitudnal slope) with enough width & turn around access for equipment that would be needed to scarify the bottom or remove Bioretention soil media.

Stage-Storage-Discharge*

Stage (FT)	Storage (AC-FT)	Storage (FT3)	Q (CFS)
0	0	0	0
0.10	0.011	498	0.02
0.20	0.023	1002	0.07
0.30	0.035	1513	0.14
0.40	0.047	2030	0.21
0.50	0.059	2553	0.25
0.60	0.071	3083	0.29
0.70	0.083	3619	0.32
0.80	0.096	4161	0.35
0.90	0.108	4710	0.37
1.00	0.121	5265	0.40
1.10	0.134	5827	0.42
1.20	0.147	6396	0.44
1.30	0.160	6971	0.46
1.40	0.173	7552	0.48
1.50	0.187	8140	0.50
	0.187	8,140	

Add Infiltration

Enter information from actual infiltration tests			
Yes	Consider Infiltration (Yes or No)?		
5	Infiltration rate (in/hr) [3]	0.5729	ft3/sec, Infiltration (over entire bottom)
4	Factor of Safety (3 or greater) [3]	0.1432	ft3/sec, Infiltration / Factor of Safety
120	mins, Max. Time represented by tests		

[3]Per the RC LID Manual, Appendix A.

Only if allowed by the Co-Permittee, these infiltration inputs can be used to simulate Bioretention/Biofiltration rates with Backup Calcs and Data.

FYI, the spreadsheet does not count the duration under the suceptible flowrate. So there are circumstances where as the outlet sizes increases the duration increases as well. That is because some of the flow duration that wasn't counted because it was too low, is now counted, or the compliance check is jumping to the next out of compliance record with different duration exceedance values.

Results

		First result out of compliance in the record				See below for the Height in the Basin (Stage) that is causing a non-compliant result	
Hydromod Ponded depth	1.40 feet	Requirement		Proposed			
Hydromod Drain Time (unclogged	31.31 hours						
HydroMod BMP properly sized?	Yes, this is acceptable	---	---	---	---		
Mit. Q < 110% of Pre-Dev. Q?	Yes, this is acceptable	---	---	---	---	Issue @ Stage =	---
Mit. Duration < 110% of Pre-Dev?*	Yes, this is acceptable	---	---	---	---	Issue @ Stage =	---

APPENDIX D

FEMA

FIRMETTE EXHBIT

National Flood Hazard Layer FIRMette

FEMA

117°10'1"W 33°36'29"N

117°9'24"W 33°35'59"N

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

1:6,000

Legend

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

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

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

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

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

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

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

N

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

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 10/28/2020 at 2:46 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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

APPENDIX E

CREEK HYDRUALICS

Cross Section for SECTION A-A

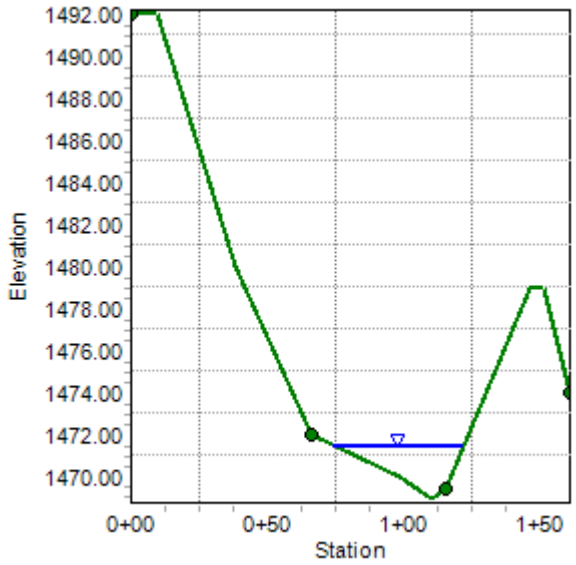
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00900	ft/ft
Normal Depth	2.49	ft
Discharge	254.00	ft^3/s

Cross Section Image



Worksheet for SECTION A-A

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00900	ft/ft
Discharge	254.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00	1492.00
0+10	1492.00
0+38	1480.00
0+66	1472.00
0+98	1470.00
1+10	1469.00
1+15	1469.50
1+46	1479.00
1+51	1479.00
1+61	1474.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 1492.00)	(0+66, 1472.00)	0.020
(0+66, 1472.00)	(1+15, 1469.50)	0.040
(1+15, 1469.50)	(1+61, 1474.00)	0.020

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	2.49	ft

Worksheet for SECTION A-A

Results

Elevation Range	1469.00 to 1492.00 ft		
Flow Area		59.16	ft²
Wetted Perimeter		47.86	ft
Hydraulic Radius		1.24	ft
Top Width		47.44	ft
Normal Depth		2.49	ft
Critical Depth		2.13	ft
Critical Slope		0.02061	ft/ft
Velocity		4.29	ft/s
Velocity Head		0.29	ft
Specific Energy		2.78	ft
Froude Number		0.68	
Flow Type	Subcritical		

GVF Input Data

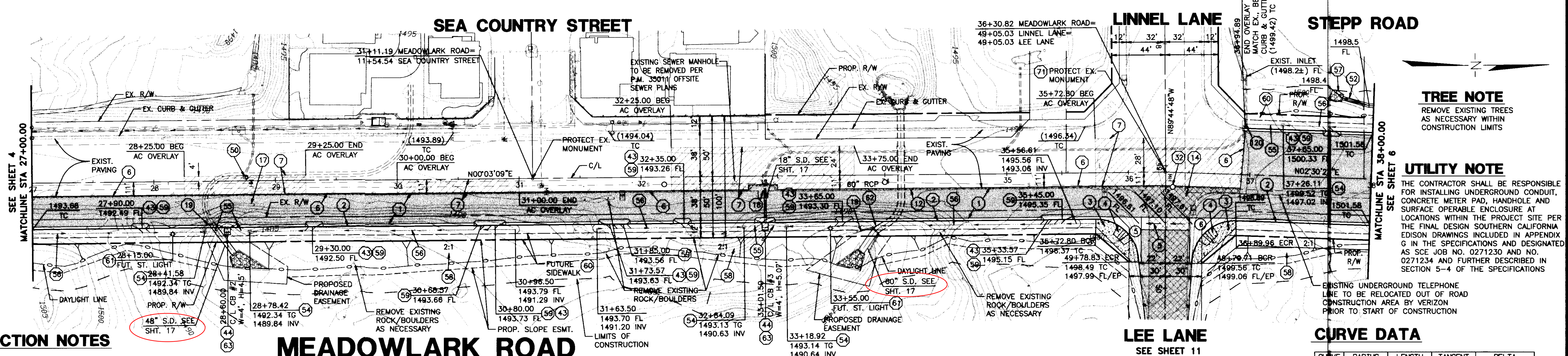
Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	2.49	ft
Critical Depth	2.13	ft
Channel Slope	0.00900	ft/ft
Critical Slope	0.02061	ft/ft

APPENDIX F

STORM DRAIN REFERENCE DRAWINGS



TREE NOTE

REMOVE EXISTING TREES AS NECESSARY WITHIN CONSTRUCTION LIMITS

UTILITY NOTE

THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING UNDERGROUND CONDUIT, CONCRETE METER PAD, HANDHOLE AND SURFACE OPERABLE ENCLOSURE AT LOCATIONS WITHIN THE PROJECT SITE PER THE FINAL DESIGN SOUTHERN CALIFORNIA EDISON DRAWINGS INCLUDED IN APPENDIX G IN THE SPECIFICATIONS AND DESIGNATED AS SCE JOB NO. 0271230 AND NO. 0271234 AND FURTHER DESCRIBED IN SECTION 5-4 OF THE SPECIFICATIONS

CURVE DATA

CURVE	RADIUS	LENGTH	TANGENT	DELTA
5	35.00'	55.46'	35.49'	90°47'40"
6	35.00'	55.99'	36.03'	91°39'34"

GRAPHIC SCALE 1"=40'
40 20 0 40 80 120

CONSTRUCTION NOTES

1. CONST. 0.33' AC PAVEMENT OVER 1.17' AB CLASS 2
2. CONST. 6" CURB AND GUTTER TYPE A-6 PER COM STD. NO. 301
3. CONST. SIDEWALK PER COM STD DWG NO. 319 AND 320
4. CONST. ACCESS RAMP PER COM STD DWG NO. 321A AND 321B TRUNCATED DOMES SHALL BE DARK GRAY & REMOVABLE
5. CONST. CROSS GUTTER PER COM STD DWG NO. 311 AND 312
6. SAWCUT & COLD PLANE EXISTING AC PAVEMENT (SEE DETAIL ON SHT. 2)
7. INSTALL A.C. OVERLAY (0.10' MIN.), GRIND AND OVERLAY TO C/L
12. REMOVE EXISTING AC DIKE
14. REMOVE EXISTING AC PAVEMENT
17. REMOVE EXISTING RIP-RAP
18. REMOVE EXISTING CATCH BASIN
19. REMOVE EXISTING HEADWALL
32. ADJUST EXISTING SEWER MANHOLE TO GRADE (REMOVE AC PAD IF APPLICABLE) BY EMWD
43. CONST. GUTTER DEPRESSION (CASE B) PER COM STD. DWG. NO. 425 (MODIFIED- STRAIGHT GRADE TO CURB FL)
44. CONST. GUTTER DEPRESSION (CASE C) PER COM STD. DWG. NO. 425
50. ADJUST EXISTING STORM DRAIN MANHOLE TO GRADE
52. CONSTRUCT INTERCEPTOR DRAIN PER COM STD. DWG. NO. 432
54. INSTALL ADS 12" DRAIN BASIN & DRAINTECH 1203 SDB 12" ATRIUM GRATE
55. INSTALL 6" HDPE CONNECTOR PIPE PER DETAIL ON SHEET 21
56. INSTALL BIO-SWALE WITH 6" PERFORATED HDPE PIPE PER DETAILS ON SHEET 21
57. CONSTRUCT RIP-RAP ENERGY DISSIPATOR PER COM STD. DWG. NO. 446A
58. HYDROSEED ALL EXPOSED SLOPES AND SURFACES WITH NON-IRRIGATED SEED MIX.
59. PROVIDE 4' CURB OPENING AND CONCRETE CURBED DOWNDRAIN PER DETAIL ON SHEET 21
60. FUTURE 5' SIDEWALK PER COM STD. DWG. NO. 319 & 320, BY OTHERS
61. FUTURE STREET LIGHT PER COM STD. DWG. NO. 620, BY OTHERS
62. REMOVE EXISTING RCP (SIZE PER PLAN)
63. CONST. 4' CURB INLET CATCH BASIN PER COM STD. DWG. NO. 401
71. ADJUST EX. CENTERLINE MONUMENT TO GRADE
120. CONSTRUCT JUNCTION STRUCTURE NO. 4 PER RCFC&WCD STD. DWG NO. JS229

Legend:
- 0.33' AC OVER 1.17' AB CLASS 2 (MEADOWLARK RD.)
- REMOVE EX. AC PAVEMENT
- INSTALL A.C. OVERLAY (0.10' MIN.)
- CONCRETE SIDEWALK

"AS BUILT"

The receipt of As-Built Plans and City's acceptance thereof does not absolve the Subdivider/Developer of any responsibility for their accuracy.

Engineer of work ____ Date ____
RCE ____

Underground Service Alert
Call: TOLL FREE 1-800 277-2600
TWO WORKING DAYS BEFORE YOU DIG

BENCH MARK 0.7 MI. SOUTH ON ANTELOPE RD. FROM THE INT. OF ANTELOPE RD. AND KELLER RD., 300' NORTH OF TRIPLE "C" RANCH RD., 47' WEST OF PP #79182, 17' EAST OF THE EAST AC BERM OF THE NORTH BOUND LANE OF I-15, 7' WEST OF THE WEST E.P. OF ANTELOPE RD., 0.5' EAST OF THE 5 STRAND BARBED WIRE ROW FENCE. SET A BRASS DISK IN TOP OF A 6" DIA. CONC. POST UP 2" MARKED 600-18-68 RESET-1980. ELEVATION:1596.630, DATUM: NGVD 1929 DATE:12-5-80

APPROVED FOR SIGNATURE
JEFFREY J. PITCH 9/28/10 DATE
CITY OF MURRIETA R.C.E. NO. 58994

SEAL: REGISTERED PROFESSIONAL ENGINEER DILESH R. SHETH NO. C65078 CIVIL STATE OF CALIFORNIA

SCALE	
HORIZONTAL	AS NOTED
VERTICAL	AS NOTED

ALBERT A. WEBB ASSOCIATES
CIVIL ENGINEERS
3788 McCRAY ST.
RIVERSIDE CA. 92506
(951) 686-1070

PREPARED BY
Dilesh Sheth 9/23/10
DILESH R. SHETH DATE
R.C.E NO. C65078

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 5 SHEETS 35

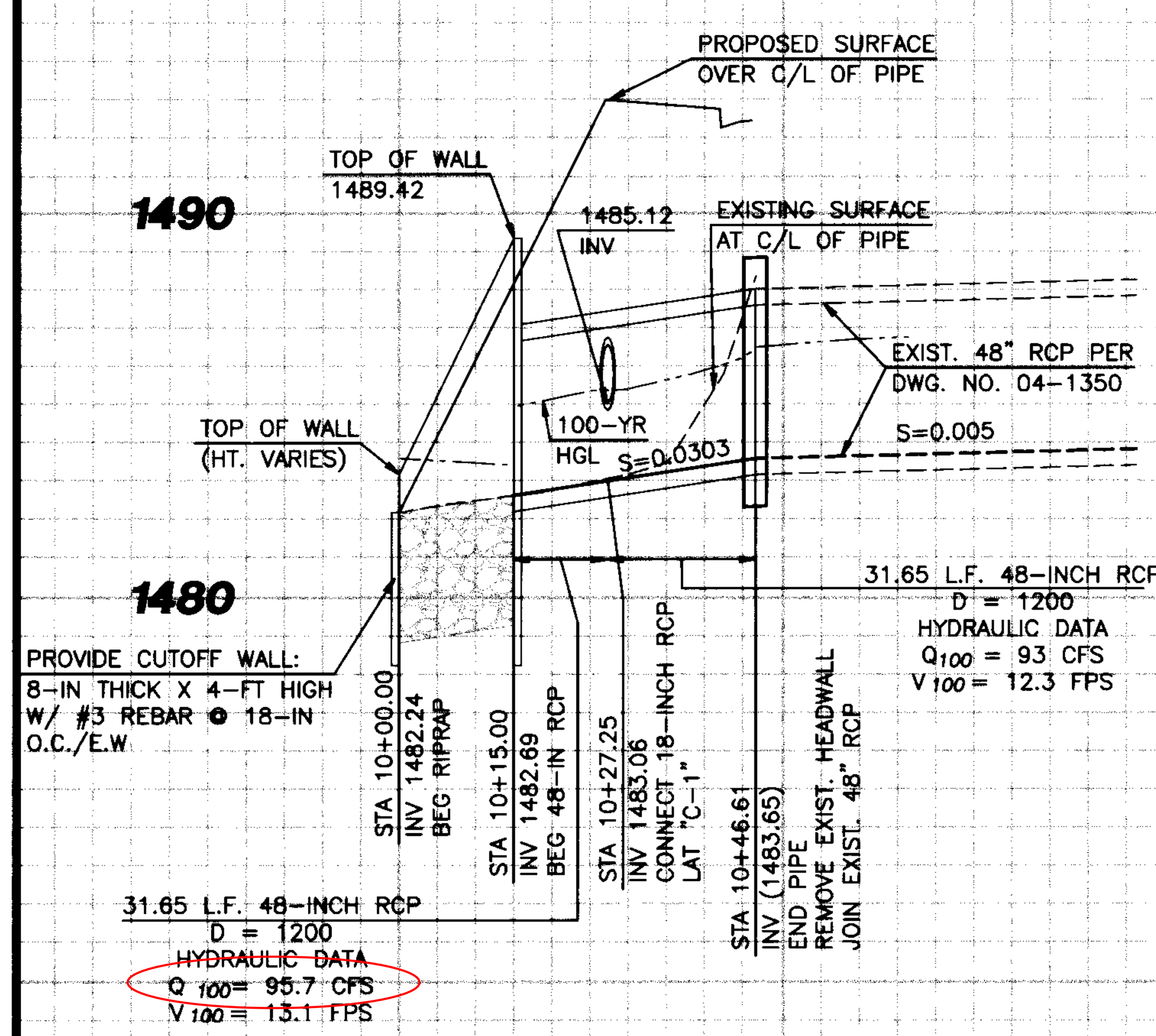
CITY OF MURRIETA
ENGINEERING DEPARTMENT

MEADOWLARK ROAD
STREET IMPROVEMENT PLANS
MEADOWLARK ROAD
STA. 27+00.00 TO STA. 38+00.00

APPROVED
PATRICK A. THOMAS DATE 10-5-10
CITY ENGINEER/DIRECTOR OF PUBLIC WORKS, RCE 44223

DWN BY:
CHKD BY:
FIELD BK:
CIP NO. 8448
PROJECT NO. 09-318
DRAWING NO. 10-140

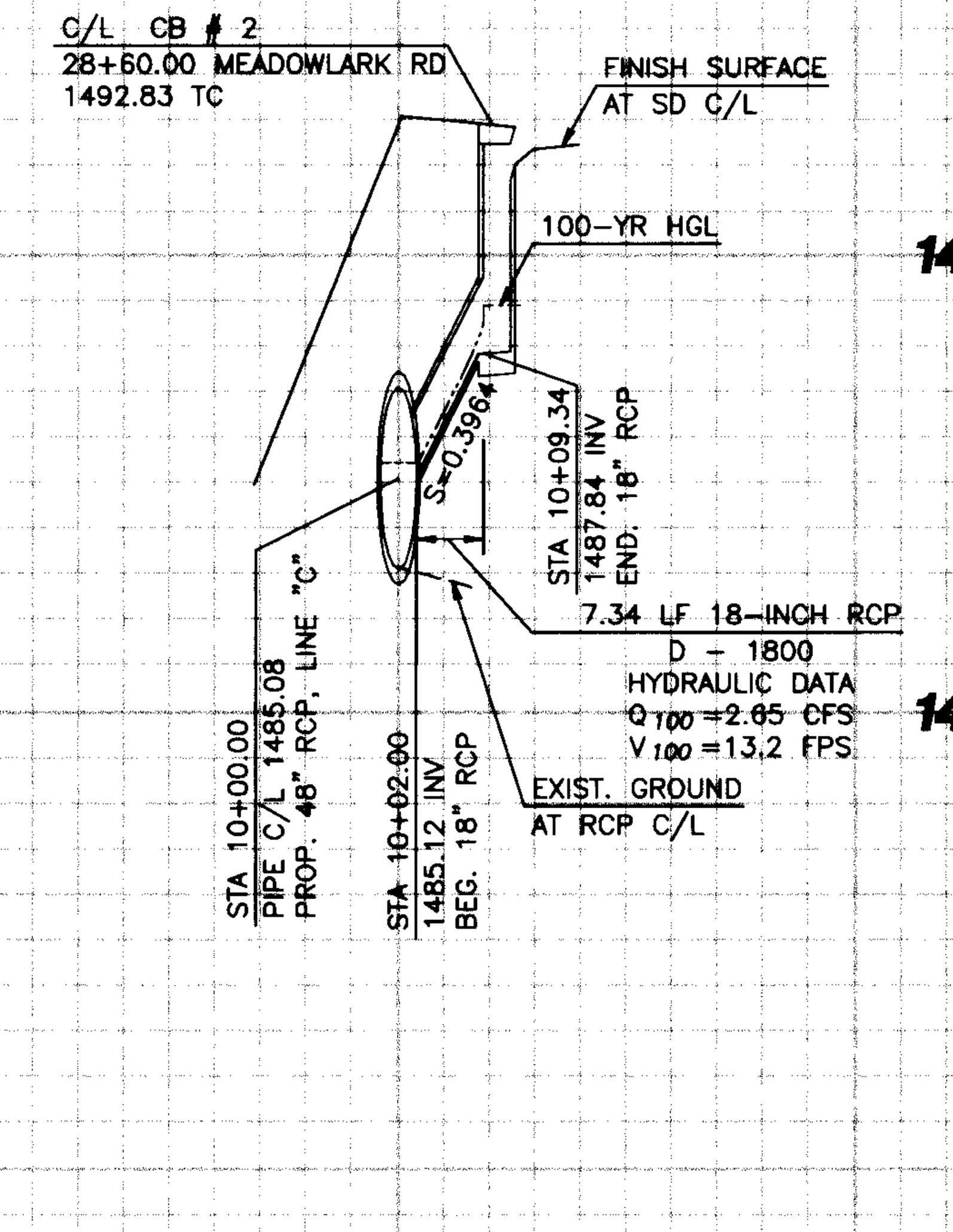
DRAWING NUMBER 10-140
DRAWING NUMBER
DRAWING NUMBER



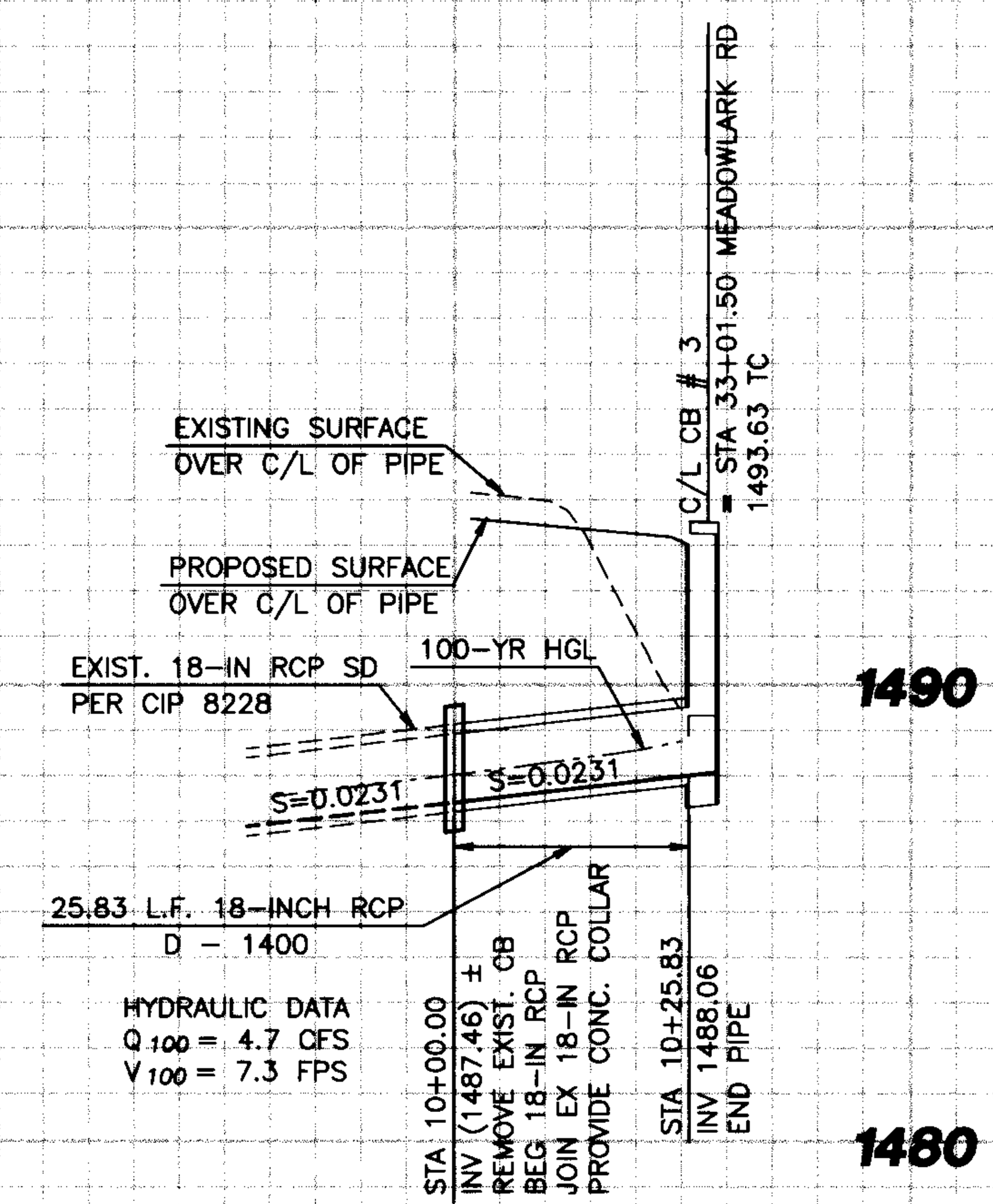
LINE "C"

(FOR EXIST. FACILITY, SEE CITY DWG. 04-1350)

NOTE:
CONTRACTOR TO POTHOLE AND VERIFY LOCATION AND ELEVATION OF EXISTING STORM DRAIN PIPES PRIOR TO BEGINNING OF CONSTRUCTION. CONTRACTOR SHALL ALSO POTHOLE AND VERIFY LOCATION OF ALL EXISTING UNDERGROUND UTILITIES AND PROTECT IN PLACE. CONTRACTOR SHALL NOTIFY UTILITY AGENCY PRIOR TO ALTERATION OF EXISTING FACILITIES.

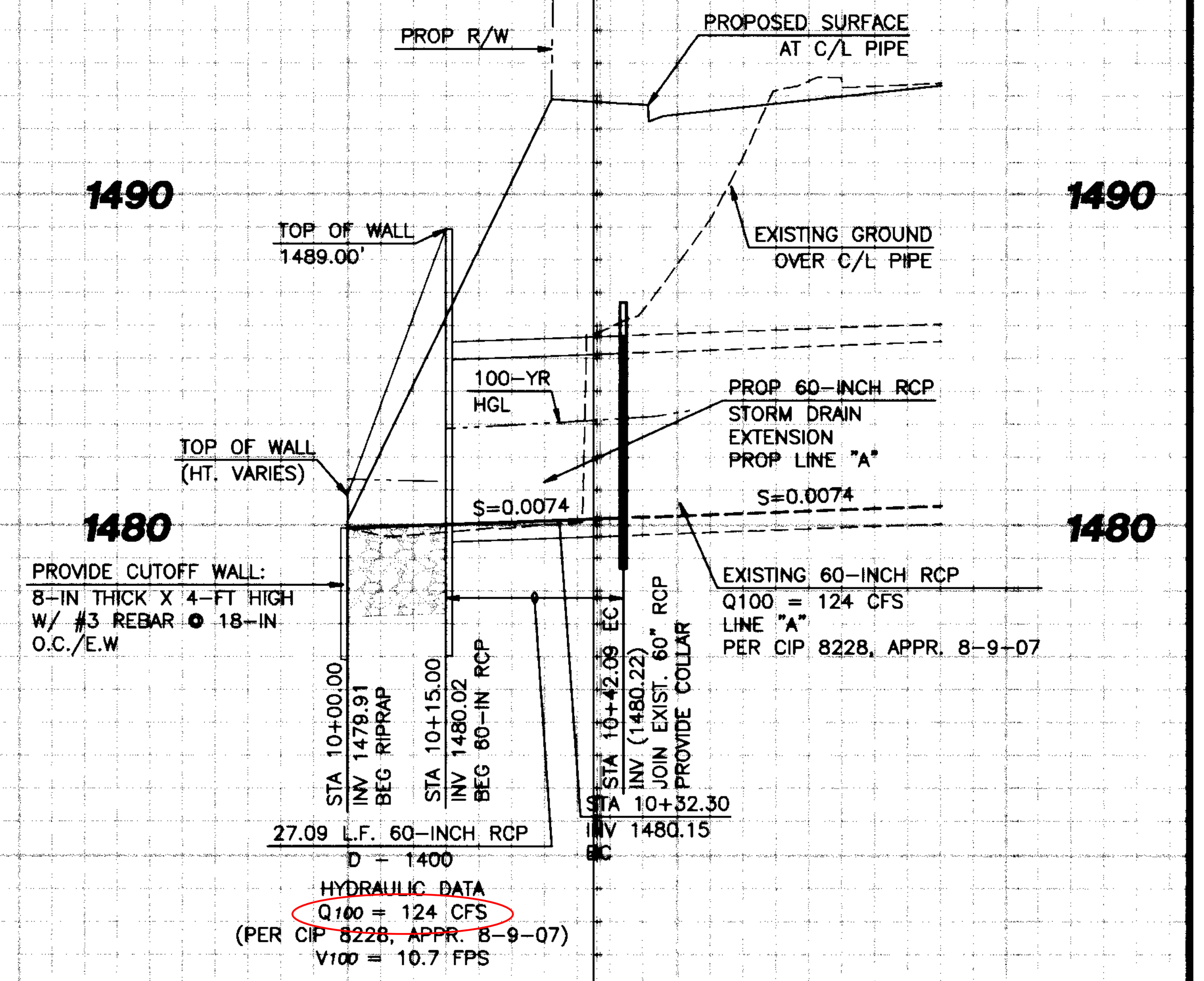


LATERAL "C-1"



LATERAL "A-3"

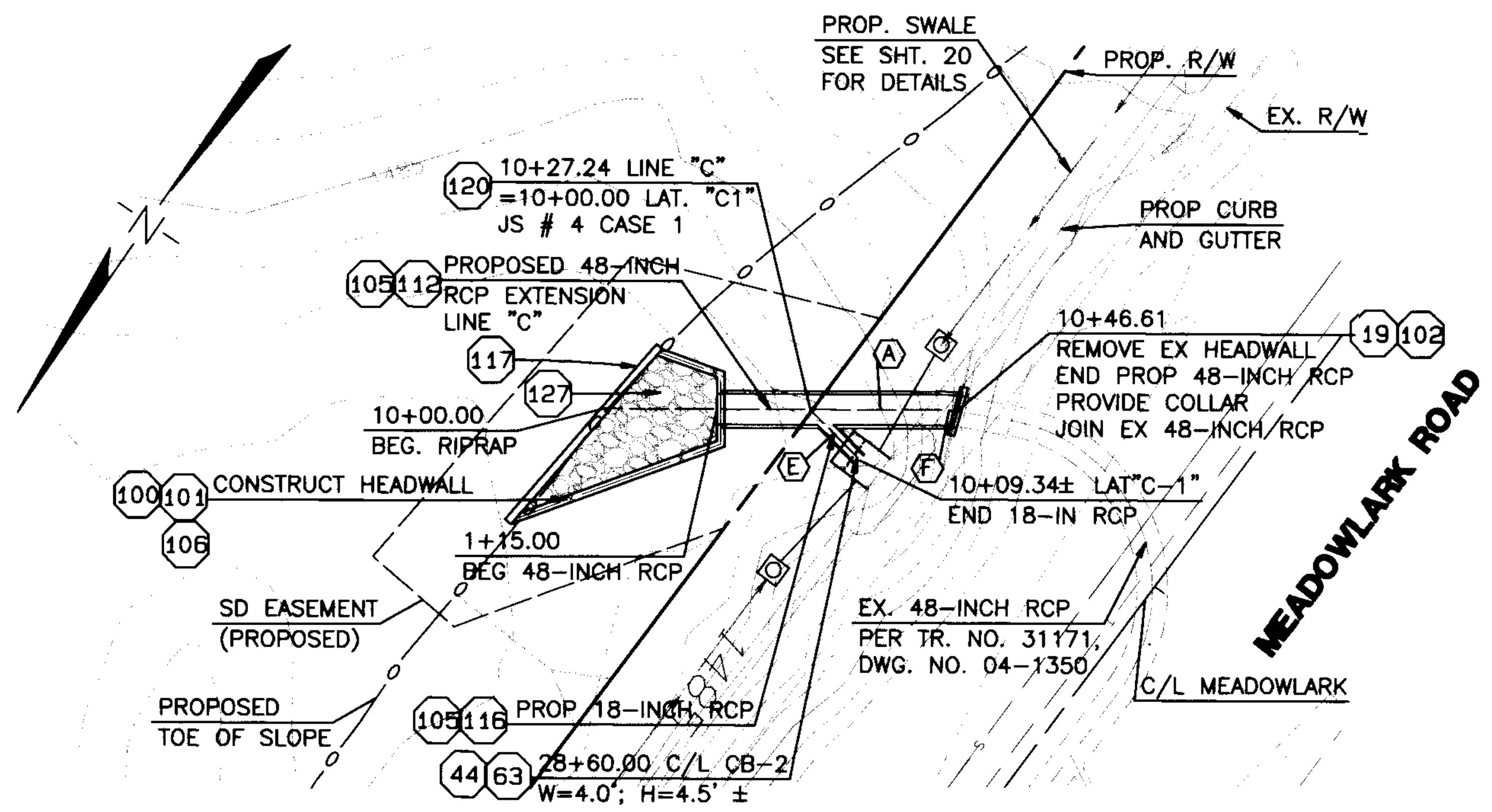
(FOR EXIST. FACILITY, SEE CIP 8228, APPR 8-9-07)



LINE "A"

(FOR EXIST. FACILITY, SEE CIP 8228, APPR 8-9-07)

SCALE:
1" = 4' VERT
1" = 20' HOR



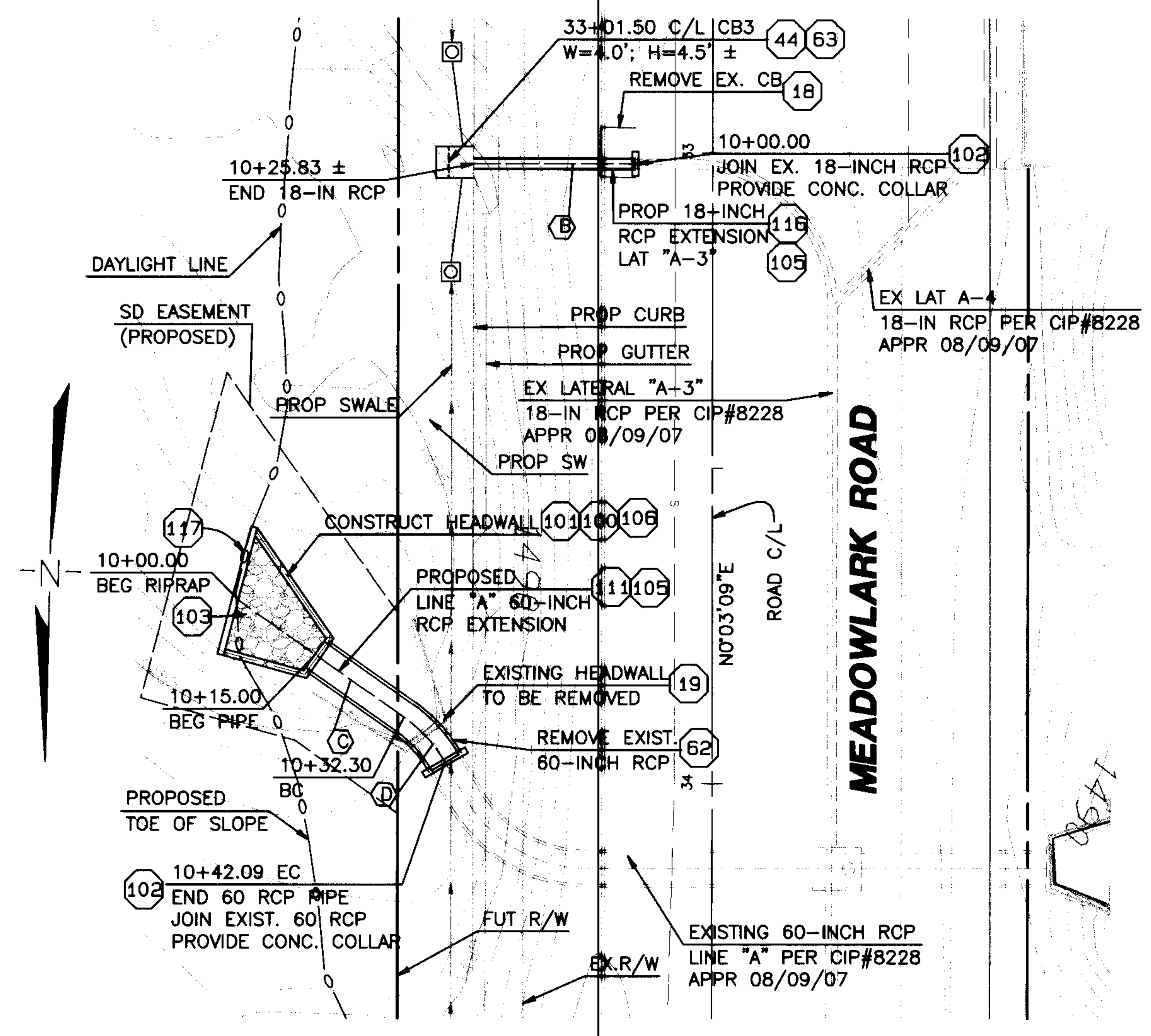
LINE "C" AND LATERAL "C-1"

CONSTRUCTION NOTES:

- (18) REMOVE EXISTING CATCH BASIN
- (19) REMOVE EXISTING HEADWALL
- (44) CONSTRUCT LOCAL DEPRESSION (CASE C) PER COM STD. DWG. NO. 425
- (62) REMOVE EXISTING PIPE (SIZE PER PROFILE)
- (63) CONST. 4' CURB INLET CATCH BASIN PER COM STD. DWG. NO. 401
- (100) CONSTRUCT CALTRANS D90 TYPE A HEADWALL PER DETAILS ON SHEET 21
- (101) INSTALL CABLE RAILING ON TOP OF WALLS PER CALTRANS STANDARD PLAN B11-47
- (102) CONSTRUCT CONCRETE COLLAR PER COM STD. DWG. NO. 451
- (103) INSTALL 1/4 TON RIPRAP 2.7 FT DEEP PER CALTRANS SPECIFICATIONS SECTION 72.
- (105) INSTALL PIPE BEDDING PER RCFC&WCD STANDARD DRAWING M815
- (106) INSTALL INCLINED TRASH RACK PER APWA STANDARD 361
- (111) INSTALL 60-INCH RCP PIPE (D-LOAD PER PROFILE)
- (112) INSTALL 48-INCH RCP PIPE (D-LOAD PER PROFILE)
- (116) INSTALL 18-INCH RCP PIPE (D-LOAD PER PROFILE)
- (117) CONSTRUCT CONCRETE CUTOFF WALL PER THICKNESS HEIGHT, AND BARS AS SHOWN ON PLANS
- (120) CONSTRUCT JUNCTION STRUCTURE NO. 4 PER RCFC&WCD STD. DWG NO. JS229
- (127) INSTALL 1/2-TON RIPRAP TO DEPTH OF 3.4 FT PER CALTRANS SPECS. SECTION 72

CURVE/LINE DATA

NOTE	Δ / BEARING	LENGTH/DIST.	RADIUS	TANGENT
A	N53°28'58"E	44.19'	--	--
B	N89°56'51"W	25.92'	--	--
C	N54°51'53"W	32.30'	--	--
D	24°55'17"	9.79'	22.50'	4.97'
E	N81°31'02"W	9.34'	--	--
F	06°19'10"	2.48'	22.50'	1.24'



LINE "A" AND LAT "A-3"

GRAPHIC SCALE 1"=20'
0 20 40 60

"AS BUILT"
The receipt of As-Built Plans and City's acceptance thereof does not absolve the Subdivider/Developer of any responsibility for their accuracy.
Engineer of work ________ Date ________
RCE ________

Underground Service Alert
Call: TOLL FREE 1-800 422-4133
TWO WORKING DAYS BEFORE YOU DIG

BENCH MARK 0.7 MI. SOUTH ON ANTELOPE RD. FROM THE INT. OF ANTELOPE RD. AND KELLER RD., 300' NORTH OF TRIPLE "C" RANCH RD., 47' WEST OF PP #79182, 17' EAST OF THE EAST AC BERM OF THE NORTH BOUND LANE OF I-15, 7' WEST OF THE WEST E.P. OF ANTELOPE RD., 0.5' EAST OF THE 5 STRAND BARBED WIRE ROW FENCE, SET A BRASS DISK IN TOP OF A 6" DIA. CONC. POST UP 2" MARKED 600-18-68 RESET-1980.
ELEVATION: 1596.630 DATE: 12-5-80

APPROVED FOR SIGNATURE
JEFFREY J. HITCH 9/28/10
CITY OF MURRIETA
R.C.E. NO. 58994

SEAL: REGISTERED PROFESSIONAL ENGINEER DILESH R. SHETH NO. C65078 CIVIL STATE OF CALIFORNIA

SCALE
HORIZONTAL: AS NOTED
VERTICAL: AS NOTED

ALBERT A. WEBB ASSOCIATES
CIVIL ENGINEERS
3788 McCRAY ST.
RIVERSIDE CA. 92506
(951) 686-1070

PREPARED BY
DILESH R. SHETH 9/23/10
R.C.E NO. C65078

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 17 — CITY OF MURRIETA ENGINEERING DEPARTMENT — SHEETS 35

MEADOWLARK ROAD
STORM DRAIN PLANS
LINE "C", LAT "C-1", LAT "A-3" & LINE "A"

APPROVED PATRICK A. THOMAS DATE 10.5.10
CITY ENGINEER/DIRECTOR OF PUBLIC WORKS, RCE 44223

DWN BY:
CHKD BY:
FIELD BK:
CIP NO. 8448
PROJECT NO. 09-318
DRAWING NO. 10-152

DRAWING NUMBER
DRAWING NUMBER
DRAWING NUMBER 10-152

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