Revised Draft SEIR Appendix 5.5a

Entrada South Hydrology and Drainage Concept

LAND DEVELOPMENT DIVISION
STORM DRAIN & HYDROLOGY UNIT

TO: HUNSAKER & ASSOCIATES, INC. DATE 3/10/25
ATTN: JASON FUKUMITSU
CC: ALIREZA SAZEGARI

REVIEW OF HYDROLOGY STUDY

PD NO.	**2712**	**DATE OF REPORT**	**2/14/2025**
TR. NO.	**53295**	**PLAN CHECK NO.**	**6**
		PLAN CASE NO.	**ESTU2022000056**

We have reviewed your Hydrology Study and LID Plan.

[X] The Hydrology Study has been approved.

[X] The LID Plan has been approved.

[X] Refer to comments below:

COMMENTS:

1. Work within soft bottom drainage areas (which may include but is not limited to soft bottom basins, channels, watercourses, grade to drain) will require maintenance permits from Fish and Game, Army Corps of Engineers, and RWQCB prior to approval of the storm drain, and the permits must be still active prior to acceptance.

2. A Community Facilities District must be established prior to the recordation of the final map. This CFD will be to finance the future ongoing maintenance and capital replacement of all water quality devices/systems identified to be maintained by the County of Los Angeles.

3. Revise hydrology study when infrastructure alternative is chosen to reflect final engineering

REVIEWED BY _____
CHRISTIAN ASCENCIO - (626) 458-4921

APPROVED BY: _____
ALEX MIKHAILPOOR

HYDROLOGY STUDY
APPROVED

REVIEWED BY: _____ DATE 03/12/2025

APPROVED BY: _____ DATE 03/12/2025

COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS
LAND DEVELOPMENT DIVISION

Hydrology and Drainage Concept Report for Entrada South (Vesting Tentative Tract 53295)

ESTU2022000056

VOLUME 1

County of Los Angeles

Hunsaker Project No:
0015-035-038
February 13, 2025

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Under the supervision of:

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CIVIL
STATE OF CALIFORNIA

Jason H. Fukumitsu 02/14/25

Jason H. Fukumitsu Date

TABLE OF CONTENTS

VOLUME I

1. INTRODUCTION……..…..…1

1.1 Purpose

1.2 Project Description

2. METHODOLOGY…….…....3

2.1 Hydrologic

2.2 Hydraulics

3. DESIGN CRITERIA…….…..…4

3.1 Hydrologic Design Criteria

3.2 Hydraulic Design Criteria

4. DISCUSSION/ RESULTS…….…....5

4.1 Discussion

4.2 Watershed Description/ Results

5. WATER QUALITY REQUIREMENTS …….…..…....8

6. RECOMMENDATIONS & SUMMARY…… ……..……..…..…..9

7. REFERENCES……..…....…11

8. APPENDICES

Appendix A: Maps/Exhibits

A-1: Entrada South Proposed Hydrology Map

A-2: Entrada South Conveyance Lengths Exhibit

A-3: Entrada South Unnamed Canyon 2 Exhibit

A-4: Entrada South Existing Golf Course Overlay

Appendix B: Proposed Calculations

B-1: Tc Calculations (Hydrocalc)

B-2: Modified Rational Method of Hydrology LAR04 Results (Clear & Burn)

B-2.1: 100 Watershed LAR04 Results

B-2.2: 200 Watershed LAR04 Results

B-2.3: 300 Watershed LAR04 Results

B-2.4: 400 Watershed LAR04 Results

B-2.5: 500 Watershed LAR04 Results

B-3: Watershed Calculations

B-3.1: Proposed Debris Production Calculation

B-3.2: Proposed Bulk Flow Calculation

B-4: Hydraulic Method Results (WSPG)

B-4.1: Line “A” of PD 2637 & Line “B” of MTD 1764

B-4.2: Line “A” of MTD 1764

B-4.3: Laterals “1S” and “1T”

B-4.4: Line “C” of PD 2638 & Line “B” of PD 2637

B-4.5: Line “A6” of PD 2641

B-4.6: Line “D” of PD 2637 (Non-Compliance Study)

B-5: Proposed Hydrology Summary Table

B-6: 200-Watershed LAT/Mainline Summary Table

B-7: Debris Basin Calculations

Appendix C: Hydrologic References

C-1: 50-Year, 24-Hour Isohyet (LACDPW)

C-2: Los Angeles County Proportion Impervious Data Table

C-3: Los Angeles County Debris Production Rates for Santa Clara Basin

C-4: Los Angeles County Peak Bulking Factors for Santa Clara Basin

VOLUME II

Appendix D: Reference Plans

D-1: Drainage Concept Hydrology Study LID/SUSMP Report
Job No. 0930, By Alliance Land Planning & Engineering, Inc.
Date: 12/2010

D-2: PD 2637

D-3: PD 2638

D-4: MTD 1764

D-5: PD 2640

D-6: PD 2641

D-7: PD 2514-13

D-8: AVTTM 61105-01, 02, 05, & 06

D-9: Westridge Tract 45433

D-10: DS 542

D-11. PD 1052

D-12. Drainage Concept Hydrology Study LID/Water Quality Report Revision
Job No. 0930, By Alliance Land Planning & Engineering, Inc.
Date: 12/2017

VOLUME III – Entrada South – Evaluation of Conformance with Project LID Performance Standard

VOLUME IV – Entrada South Drainage Channel Analysis

1. INTRODUCTION

1.1 PURPOSE

The purpose of this report is to present the Final Hydrology Design for Entrada South (VTTM 53295) revised site plan. The report analyzes existing and proposed rough graded conditions for 50 –year, and Capital Storms along with the LID requirements.
A 24-Hour storm analysis based upon the Los Angeles County Rational, and Modified Rational Methods of Hydrology were used for clear, burned, and bulked conditions for the watershed(s).
Volume 1 of this report will supersede a previously approved Drainage Concept/Hydrology study on 11/16/17 per Alliance Land Planning & Engineering.
The first part of the report is divided into eight sections. Section 1 contains the introduction, and project description; Section 2 discusses the methodology used in the hydrologic analysis; Section 3 summarizes the design criteria used; Section 4 will discuss the results of this study; Section 5 includes the water quality requirements; Section 6 includes the recommendation & summary, and Section 7 includes a list of the references used in the preparation of this report. Section 8 includes all the appendices.
Volume 2 of this Drainage Concept Report includes all the references used in preparation of this report.
Volume 3 of this Drainage Concept Report includes Entrada South Conformance with the Newhall Low Impact Development Standard Memorandum prepared by Geosyntec.
Volume 4 of this report includes the Entrada South Drainage Channel Analysis for Unnamed Canyon 2.

1.2 PROJECT DESCRIPTION

The Entrada South Project consists of 430.9 acres of the 1,634 square miles of the Santa Clara River Basin Watershed. The project site is located south of Magic Mountain Park, east of Mission Village, west of the Old Road, and east of Westridge Parkway. The project site is downstream of the existing development of "Westridge" (Tract 45433) and golf course.

Existing Conditions:

Calculations and a map for existing conditions can be found in the aforementioned approved Drainage Concept Report by Alliance Land Planning & Engineering (Appendix D-1).
The project site is an undeveloped natural area and canyons. There are four debris basins that are intercepting natural flow and debris, and a prior storm drain that drains into the existing storm drain system in the Magic Mountain Parkway.
The existing storm drain along Magic Mountain Parkway is designed for both the Mission Village development and the proposed Entrada South development. The Westridge and Mission Village hydrology studies are made part of this report for the offsite hydrologic information. See Appendix D-9 and Appendix D-10 for copies of the proposed hydrology Exhibit for Mission Village and the Hydrology Concept Plan for Westridge

Proposed Conditions:

The project site will consist of commercial, residential, business, a park, a golf course, recreation, debris basins, and water quality basins. The natural Canyon ("Unnamed Canyon 2") will remain natural in the post-development condition and a grade stabilizing analysis will be performed by PACE Advanced Water Engineering (Volume IV).
The post-development storm flows will be consistent with the pre-development flow patterns. All-natural areas will pass through debris basins prior to entering the proposed drainage system, to remove all pollutants. All onsite drainage facilities will be designed and constructed to accommodate upstream areas. The site anticipates no upstream or downstream flooding.
There are no adverse post-development conditions anticipated for significant flooding, erosion, sedimentation/debris, nor negative water quality impacts.

2. METHODOLOGY

2.1 HYDROLOGIC

The project site has been divided into six (6) watersheds for analysis purposes, which include offsite areas. Each drainage watershed was delineated based on the proposed site grading and existing topography from the contributing undeveloped areas. The proposed drainage watersheds generally follow the natural drainage courses. Each of the main watersheds was delineated into subareas of less than 40 acres for the hydrology analysis. Two hydrologic methods were used for the drainage analysis - the Rational Method and the Modified Rational Methods included in the Los Angeles County Hydrology Manual.

The time of concentration (T_c) for each subarea was computed using the Los Angeles County-approved Hydrocalc. The program evaluates several hydrologic parameters such as soil type, land use, imperviousness, storm frequency, length, and slope of each reach to calculate a time of concentration. This data was used with the Los Angeles County-approved LAR04 software application to determine peak flow rates for all storm events.

Using the times of concentrations for each subarea, the Modified Rational Method was then used to calculate the 50-Year, 24-Hour peak runoff flow for each subarea. The undeveloped tributary areas were analyzed using a burned coefficient to calculate peak runoff rates. Unburned coefficients were used for all developed conditions as well as undeveloped conditions for storms other than the 50-year Capital Storm event.

The project's land use and imperviousness were determined from the Land Use and Imperviousness Table provided in the Los Angeles County Hydrology Manual. Soil types and rainfall corresponding to each subarea were obtained from the Hydrologic Maps in the Los Angeles County Hydrology Manual. Map H1-44 was used for this site.

2.2 HYDRAULICS

A hydraulic analysis was performed to evaluate water surface elevations and pipe capacities based on Manning's Equation. Manning's Equation is an empirical equation that applies to uniform flow in closed conduits and is a function of the velocity, flow area, and slope. Manning's Equation can be rearranged to solve for the friction slope which is used to determine the water surface profile. The analysis was performed using WSPG hydraulic software which computes uniform and non-uniform steady-flow water surface profiles and pressure gradients in a network of open channels and closed conduits. The use of WSPG software has been approved by the Los Angeles County Flood Control District.

A hydrograph analysis was also performed to determine the detention basin peak outflow. A hydrograph shows the rate of flow in relation to the time at a given point.

3. DESIGN CRITERIA

3.1 HYDROLOGIC DESIGN CRITERIA

Los Angeles County requires that several design criteria be followed when using the Rational and Modified Rational Method of Hydrology to determine capital flood flow.

The design criteria used are summarized below:

Hydrology Method:	Los Angeles County Flood Control District Rational Method and Modified Rational Method.
Hydrology Modeling Software	Hydrocalc, LAR04
Design Storm:	50-Year (burned-natural) 50-Year (clear-developed area)
50-Year Isohyet:	5.9”-6.3”
Soil Types:	98 and 20
Land Use and Imperviousness:	Undeveloped (1%) Golf Course (3%) Developed, Park (10%) Multifamily (74%) Commercial (91%) Water Storage Facility (91%)
Debris Potential Zone:	DPA-8 (35,500 cy / mi^2); area $\leq$ 0.1 mi^2
Peak Bulking Rate:	1.360 / mi^2; DPA-8 (area $\leq$ 0.1 mi^2)

3.2 HYDRAULIC DESIGN CRITERIA

The design criteria used is summarized below:

Hydraulic Method:	Manning’s Equation	
Hydraulic Software:	WSPG	
Manning’s Equation:	$Q = \frac{1.49}{n} * A * R^{\frac{2}{3}} * S^{\frac{1}{2}}$	
Roughness Coefficient:	n=0.013	for Reinforced Concrete Box and Reinforced Concrete Pipe

4. DISCUSSION/RESULTS

4.1 DISCUSSION

The hydrology analysis was based on the Los Angeles design criteria for the Modified Rational Method. Utilizing the HydroCalc 1.0.3. to determine the Tc (Time of Concentration), and the LAR04 to obtain the Hydrology Results.

LACFCD requires that storm drain facilities upstream of debris basins must be designed for the 50-year storm. In order to meet this requirement by LACFCD, the revised hydrology per the updated site plan for VTTM 53295 was designed for the 50-yr storm. As a result of the updated site plan and the 50-yr storm event, runoff from the proposed site increased. Mitigation measures to accommodate the increased flows are proposed. In order to avoid adverse impacts to existing storm drain facilities and adjacent properties, it is proposed that portions of the flows be diverted around efficiently.

4.2 WATERSHED DESCRIPTION/RESULTS

The project site has been divided into six watersheds for analysis purposes. The total drainage area, including some offsite contributing area, covers a total of 722.40 acres.

Watershed 100

Watershed-100 is 59.4 acres and generally flows from south to north, beginning in Tract 45433 then through the existing golf course, and continuing north through Entrada South Tract 53295. Said watershed has a total of (9) subareas which includes subarea 100A. Subarea 100A is 28.1 acres, it includes two storm drain outlets from an existing development (TR 45433) and an offsite golf course. The flow rate of the mentioned subarea is per approved DS 542 (Appendix D-10). The proposed watershed improvements consist of a natural area, a golf course, debris basins, a water quality basin, and a natural channel (Unnamed Canyon 2). See Appendix A-4 for golf course limits (not bulked).

The runoff from the entire watershed will eventually outlet to a debris basin south of Magic Mountain Parkway. Unnamed Canyon 2 runoff will have a separate inlet also into the debris basin. Flow is then getting picked up to the double box culvert Line D per PD 2637 and then into an existing channel (Line B of PD1052). 915.1 cfs comes from the approved DS 542 which includes the existing golf course (100A). Additionally, 66.7 cfs is added per the runoff from Watershed-100. The proposed 100-watershed and the corresponding Q from Westridge will ultimately be draining 981.8 cfs.

Watershed 200

Watershed-200 flows from the southwesterly corner of Entrada South Tract 53295 and continues northerly to the northwest corner of the tract. Watershed-200 is 160.1 acres and consists of a commercial area, a debris basin, and residential and multifamily condominiums. Watershed 200 is comprised of nineteen (19) subareas that drain to existing PD 2640 and PD 2641 which ultimately drains to the river.
PD 2640 and PD 2641 were designed with the previously approved Entrada South development. The revised Entrada South site plan and storm drain system will change the lateral locations and runoffs, but the total runoff flowing to the existing storm drain that is generated from this watershed, will be the same or lower than the approved plans, this is achieved by taking out 150cfs from legacy due to site plan changes, see table in Appendix B-6. Only one stretch before legacy will have a greater runoff than the approved plans. To ensure the pipe had enough capacity for the additional flow, hydraulic analysis was performed to Line "A6" of PD 2641, see Appendix B-4.5.
The proposed 200-watershed will ultimately be draining a total of 1,557.6 cfs of peak flows to PD 2640 and PD2641. 1,557.6 cfs is the sum of the peak flows without routing. Results for the 200-watershed analysis can be found in Appendix B-1 and Appendix B-2.2.

Watershed 300

Watershed-300 is 85.8 acres and falls entirely within Entrada South Tract 53295. It drains from south to northeast, generally along "A" Street. It consists of a commercial area, a water quality basin, and residential and multifamily condominiums. Watershed 300 is comprised of (11) subareas that drain to PD 2637 in Magic Mountain Parkway and to MTD 1764 in The Old Road.
Proposed watershed 300 will be draining 170.7 cfs to Line "A" of PD 2637. The total runoff draining to Line "A" of PD 2637 does exceed the design flow rate but does not exceed the pipe capacity. A hydraulic analysis was conducted to verify the pipe had sufficient capacity. For hydraulic results of Line "A" of PD 2637 and Line "B" of MTD 1764, see appendix B-4.1. Ultimately, the proposed Watershed 300 will be draining 1,291.8 cfs to Line "A" of MTD 1764, which also exceeds the design flow rate of the pipe. To ensure the pipe had the capacity and the additional flow does not impact downstream of the proposed project site, hydraulic analyses were conducted for Line "A" of MTD 1764 and the revised HGL is overlapped to latest approved plans and existing catch basins downstream, see results in Appendix B-4.2 and B-4.3.

Watershed 400

Watershed-400 is 78.4 acres, entirely within Tract 53295, and drains from the vicinity of the intersection of Commerce Center Drive and Magic Mountain Drive to the Magic Mountain Entrance. It consists of a commercial area, and multifamily condominiums. Watershed 400 is comprised of (6) subareas. This watershed drains to Line "C" of PD 2638, then to Line "B" of 2637, and ultimately outlets to the trapezoidal channel Line B of PD 1052.
The proposed 400-watershed will be draining 98.3 cfs to Line "C" of PD 2638. To ensure the pipe had capacity for the additional flow, a hydraulic analysis was performed to Line "C" of PD 2638 and Line "B" of PD 2637, see Appendix B-4.4.
Ultimately, 170.4 cfs will be draining to the trapezoidal channel of PD 1052 from the 400-watershed, which does not exceed the design flow.
The total runoff draining to the trapezoidal channel of "Line B" in PD 1052 will be 1,152.5 cfs. This is a combination of 100-Watershed and 400-Watershed per combined routing analysis. This does not exceed the channel Q50 design of 1,160cfs.

Watershed 500

Watershed-500 is 43.2 acres and drains from the south (in Tract 45433) to the north through Tract 53295 to The Old Road. It consists of a golf course, natural area, debris basin, and commercial area. Watershed 500 drains 78.7 cfs to Line "A" of MTD 1764 which is designed for 75.0 cfs. Due to the additional flow, hydraulic analysis was conducted of Line "A" of MTD 1764, see results in Appendix B-4.2. See Appendix A-4 for golf course limits (not bulked).

Watershed 600

Watershed 600 is 3.9 acres of natural area located in the easterly corner of the proposed project site, west of the Old Road. Watershed 600 drains 17.3cfs to Line "DD" of PD 2514-13 which is designed for 22.0 cfs, therefore there is no impact.
There is no proposed development in the area south of Watershed-600 and subarea 501. The offsite runoff is draining toward TR 45433. Therefore, no hydrologic analysis is performed in this report, see approved TR45433 hydrology for drainage detail.

5. WATER QUALITY REQUIREMENTS

An updated memorandum will be prepared by Geosyntec and will be submitted as Volume 3 of this Drainage Concept Report.

6. RECOMMENDATIONS & SUMMARY

Based upon the hydrologic and hydraulic analyses performed, the proposed improvements for the revised VTTM 53295 will not adversely impact the existing storm drain facilities or adjacent properties, since the following mitigation measures will be applied.
Part of the existing tributary area for Watershed 100 is diverted to Watershed 300. The reasons for this diversion are summarized below.

Per the latest approved revised hydrology per Alliance Land Planning & Engineering on 11/16/17 (See Appendix D-12), the offsite runoff from Westridge Developments was calculated to be 746.0 cfs. Per the DS542 hydrology (See Appendix D-10) which was approved on 12/26/17 the runoff from the Westridge Developments was revaluated. A previously unaccounted runoff per the Alliance hydrology was discovered and per the updated calculations the updated runoff discharge came up to be 915.1 cfs. The main reason for the diversion was the increased runoff from Westridge Developments (TR 45433). The design Q for Line D per PD 2637 is 949.2 and the design Q for Line B per PD 1052 is 1160 cfs. If part of the existing tributary area for Watershed 100 was not diverted to Watershed 300 the proposed flow rate would have exceeded the design flow rate for both Line D per PD 2637 and Line B per 1052. It would have also exceeded the pipe capacity for Line D. A non-compliance hydraulic analysis was done for Line D (See Appendix B-4.6) showing the H.G.L. coming out of the proposed finished surface. Hydraulic analysis was also done for Line A of MTD 1764 and Line A of PD 2637 to demonstrate the increased proposed flow rate due to the diversion does not negatively impact the pipe capacity.

The hydraulic analysis demonstrated that Line A of MTD 1764 and Line A of PD 2637 are sufficient for the increased runoff from Watershed 300, see B-4.1 and B-4.2 of Appendix B. Additionally, B-4.2 of Appendix B includes the hydraulic analysis for the riprap section. The updated analysis, reflecting the increased flow, indicates that velocities at the downstream river bottom remain below 3 fps, consistent with the original design parameters. The only concern was the increase in velocity of Line A of PD 2637. This diversion was accepted for this case because of the three proposed alternatives to address the concern in the increased velocity of Line A of PD2637. The first alternative (1A) proposes to construct a parallel line to Line A of PD2637, the second alternative (1B) proposes the removal and reconstruction of Line A of PD2637 to address the increase in velocity and the third alternative (B) proposed the construction of a new line through Media Center Lane, Entertainment Drive and Sky View Lane. One of these alternatives will be chosen during final engineering to address the increase in velocity for Line A of PD2637. The second condition this diversion was accepted was the as-built storm drain plans will be updated to document the increased Q and HGL.

Below are the summary tables for the proposed watersheds, debris basins, and water quality basins.

Table 1: Watershed Summary Tables

Watershed	Qcap[1] (CFS)	Qdesign [2](CFS)	PD No.
100[3]	981.8	949.2	P.D. 2637
200[4]	1,557.6	1,557.6	P.D. 2640
300	1,291.8	1,126	MTD 1764
400[3]	170.4	1,160	P.D. 2637
500	78.7	75	MTD 1764
600	17.3	22	PD 2514-13

Note:
1. Qcap (Capital Q) is based on the revised Entrada South hydrology, see Proposed Hydrology Summary Table (B-5, Appendix B: Proposed Calculation)
2. Qdesign is acquired from approved PDs plan (Appendix D: Reference Plans)
3. Watershed 100 and 400 outlets to Line "B" of PD 1052. Qcap combined is 1,157.2 cfs which is less than Qdesign of 1,160 cfs
4. See (B-6, Appendix B: Proposed Calculation) for 200-watershed balance summary table

Table 2: Debris Basin Summary Table

Basin #	Debris Volume Req.[1] (cy)	Debris Volume Provided (cy)	Maintenance Responsibility
1	149	155	Maintained by LACFCD
2	387	392	Maintained by LACFCD
3	334	345	Maintained by LACFCD
4	492	522	Maintained by LACFCD
5	380	453	Maintained by LACFCD
6	1,747	1,979	Maintained by LACFCD
7	167	172	Maintained by LACFCD

Note:
1. Debris Volume Required is calculated per Sedimentation Manual

Table 3: Water Quality Summary Table

Basin #	Volume Required (ac-ft)	Volume Provided (ac-ft)	Maintenance Responsibility
B	0.21	4.60	Maintained by Los Angeles County
C	0.17	0.90	Maintained by Los Angeles County

7. REFERENCES

Los Angeles County Department of Public Works Hydrology Manual, January 2006

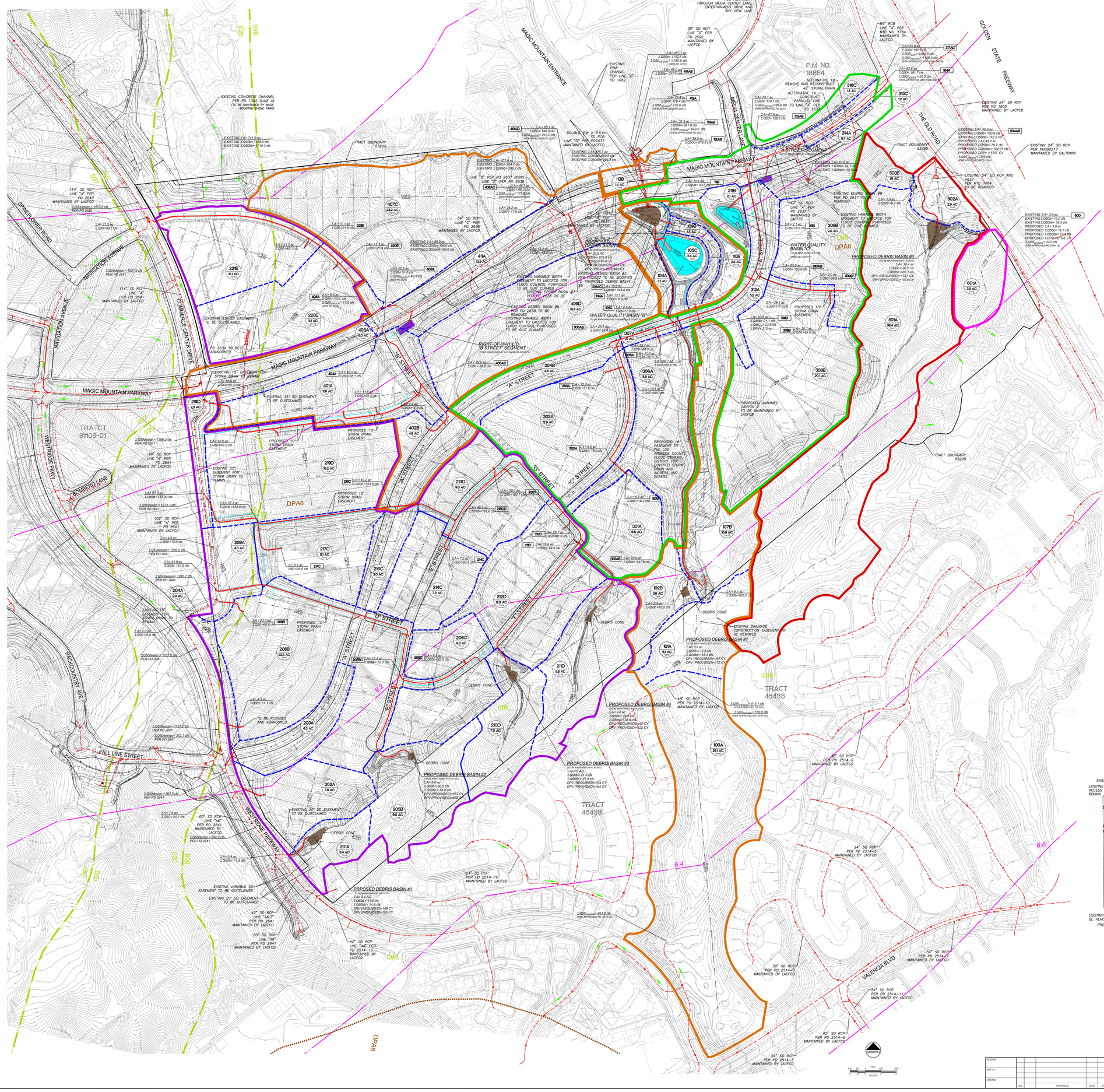
Los Angeles County Department of Public Works Sedimentation Manual, March 2006

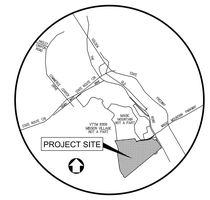
Los Angeles County Department of Public Works Hydraulic Manual, March 1982

APPENDICES

Appendix A: Maps/Exhibits

A-1: Entrada South Proposed Hydrology Map





LEGEND:

- PHASING LIMITS
- PROPOSED 100 & 400 WATERSHED AREA
- PROPOSED 200 WATERSHED AREA
- PROPOSED 300 WATERSHED AREA
- PROPOSED 500 WATERSHED AREA
- PROPOSED 600 WATERSHED AREA
- PROPOSED SUBAREA BOUNDARY
- TIME OF CONCENTRATION PATH
- EXISTING STORM DRAIN
- PROPOSED STORM DRAIN
- WATER QUALITY
- ALTERNATIVE 1A AND 1B IN ADDITION TO LINE "A" PER PD 2637
- ALTERNATIVE 1B IN ADDITION TO LINE "A" PER PD 2637
- SUBAREA NODE
- AREA(#)
- TIME OF CONCENTRATION
- DEBRIS PRODUCTION AREA
- SOIL CLASSIFICATION AREA
- ARMY CORPS OF ENGINEERS JURISDICTION
- EXISTING FLOODPLAIN SANTA CLARA RIVER WATER SURFACE ELEVATION
- EXISTING FLOODWAY
- FEMA ZONE
- OFFSITE FLOW PATH
- NATURAL CHANNEL
- WATER QUALITY BASIN
- RIGHT-OF-WAY-LID
- DEBRIS BASIN

DRAINAGE DESIGN CRITERIA:

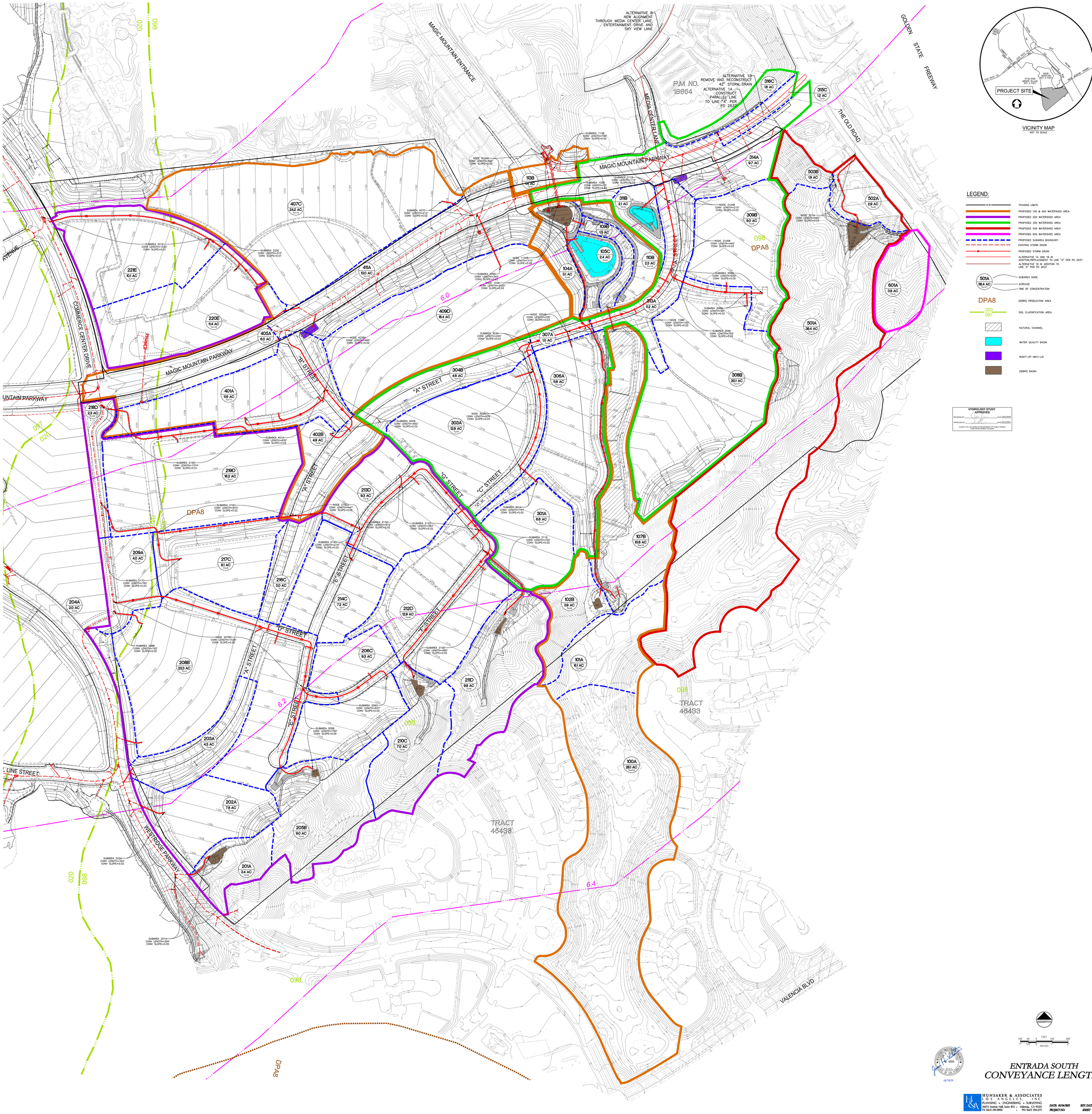
1. 50–YR, 24–HR ISOHYETS: 5.9–6.3
2. SOIL TYPES 99 AND 20
3. DESIGN STORM: 50–YR, 24–HR
4. PERCENT IMPERVIOUS VALUES: 2S, 10S, 74R, 80S, 90S, 91E
5. DPA = 8, 35,500 CY PER SQ MI
6. BULK FACTOR= 1.26

NOTE:
1. NOT WITHIN COUNTY ADOPTED FLOODWAY
2. NOT WITHIN FEMA FLOOD ZONE "A"
3. ALL DEBRIS BASINS AND ALL CATCH BASINS SERVING CATCH BASINS ARE PUBLICLY MAINTAINED.
4. ALL LATERALS SERVING A BUILDER SITE WILL BE PRIVATELY MAINTAINED.
5. ALL MAINLINES ARE PUBLICLY MAINTAINED UNLESS NOTED OTHERWISE.

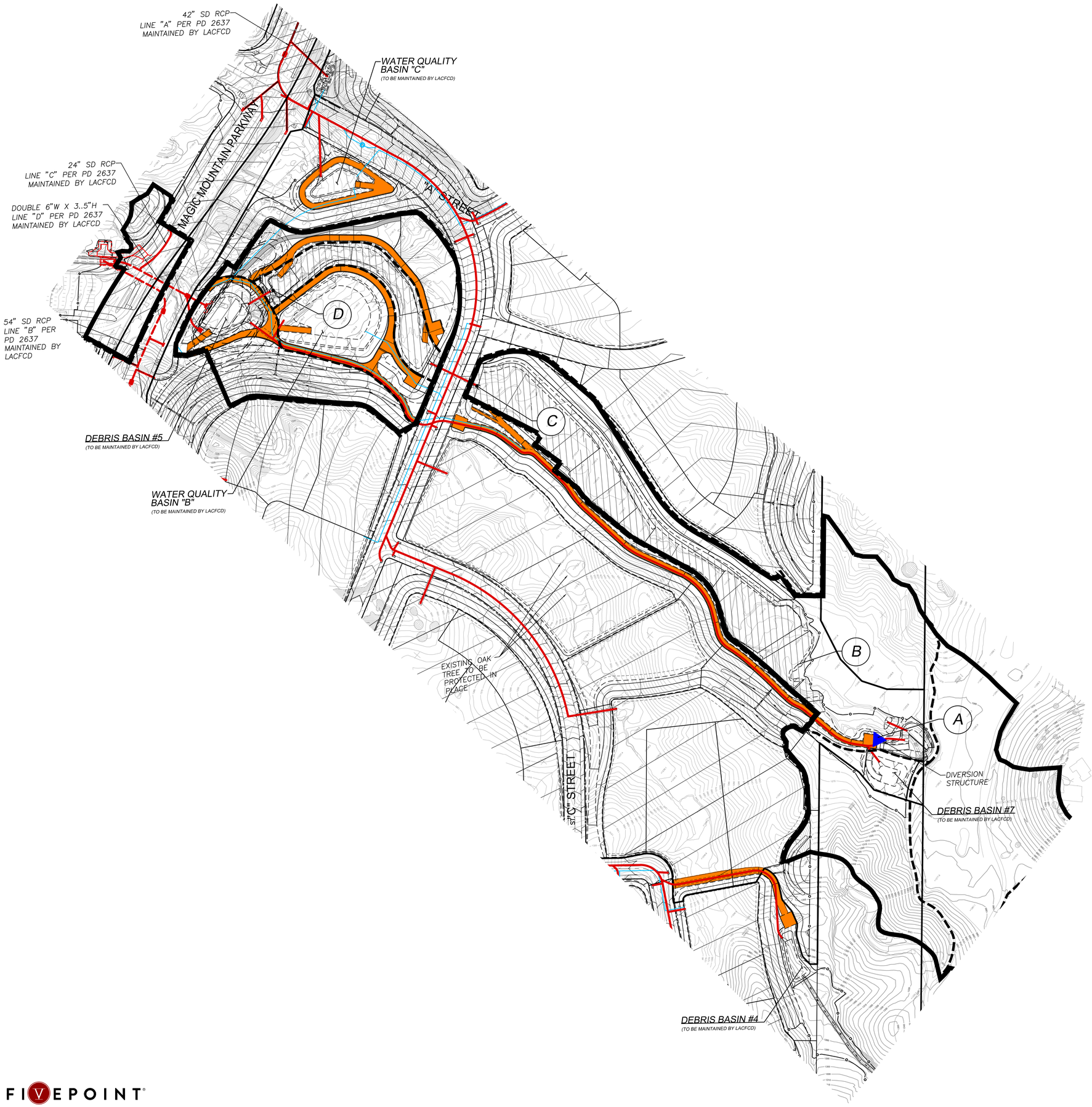
Entrada South Proposed Condition

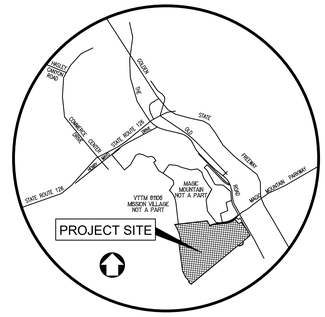
Subarea	Node	Soil Type	DPA Zone	Burn Factor	Backing Factor	% Imp	Area (Ac)	EXHIBA (Ac)	Mb Hr Isohyet (in)	Mb Hr Tc (mins)	Mb Hr Flow (cfs)	Q@6 (cfs)	Q@10 (cfs)	Q@25 (cfs)	Q@50 (cfs)	Q@100 (cfs)	2@PV (Ac-ft)	Future Q@50 (cfs)	Note	Land Use
100A		99	8	0.54	1.36	0.03	281.1	28.1	6.2	13								915.1	Subarea 100 & upstream lots are tributary to approved 36 Inch RCP. 915.1 cfs added from approved 36 Inch RCP	Golf Course
101A		99	8	0.54	1.36	0.03	61.1	6.1	6.2	5	19.5	19.5	19.8	19.8				103.5		Golf Course
102B	102AB	99	8	0.54	1.36	0.03	39.0	3.9	6.2	5	12.5	12.5	12.7	12.7	16.3		327	16.3	Debris Basin #7	Natural/Debris Basin
103A		99	8	0	1.36	0.10	3.1	0.3	6	6	0.9	0.9	0.9	0.9						Natural
103B	103AC	99	8	0	1.36	0.10	2.1	0.2	6	6	0.6	0.6	0.6	0.6			364.4		Debris Basin #6	Open Space/Debris Basin
104A		99	8	0	1.36	0.10	31.0	3.1	6	6	8.9	8.9	9.0	9.0			1979		Water Quality Basin "6"	Water Quality Basin
107B	106AC	99	8	0.54	1.36	0.10	10.6	1.1	6	5	3.8	3.8	3.9	3.9			1979.5			Natural/Canyon
108B	108B	99	8	0.54	1.36	0.10	10.7	1.1	6	5	3.8	3.8	3.9	3.9			213			Natural/Canyon
110B		99	8	0	1.36	0.10	2.3	0.2	6	5	0.8	0.8	0.8	0.8						Existing Cal/Trans Rd/Natural
111B		99	8	0	1.36	0.10	2.3	0.2	6	5	0.8	0.8	0.8	0.8						Natural
113B	112AB	99	8	0	1.36	0.80	1.4	0.1	6	5	0.5	0.5	0.5	0.5						Natural
114A		99	8	0	1.36	0.80	1.4	0.1	6	5	0.5	0.5	0.5	0.5						Natural
200A		99	8	0.54	1.36	0.10	3.4	0.3	6	5	1.1	1.1	1.1	1.1						Natural/Debris Basin
201A		99	8	0	1.36	0.10	3.4	0.3	6	5	1.1	1.1	1.1	1.1						Natural/Debris Basin
202A		99	8	0	1.36	0.10	4.3	0.4	6	5	1.4	1.4	1.4	1.4						Natural/Debris Basin
202B		99	8	0	1.36	0.10	4.3	0.4	6	5	1.4	1.4	1.4	1.4						Natural/Debris Basin
203A		99	8	0	1.36	0.10	13.5	1.4	6	5	4.4	4.4	4.5	4.5						Natural/Debris Basin
203B		99	8	0.54	1.36	0.10	7.2	0.7	6	5	2.3	2.3	2.4	2.4						Natural/Debris Basin
204A		99	8	0	1.36	0.74	8.3	0.8	6	5	2.7	2.7	2.8	2.8			357		Debris Basin #5	Natural/Debris Basin
204B		99	8	0	1.36	0.74	8.3	0.8	6	5	2.7	2.7	2.8	2.8					Debris Basin #5	Multi-Family Condo
205A	207AC	99	8	0	1.36	0.74	7	0.7	6	5	26.5	26.5	26.5	26.5						Multi-Family Condo
205B		99	8	0	1.36	0.74	7	0.7	6	5	26.5	26.5	26.5	26.5						Multi-Family Condo
206A		99	8	0	1.36	0.74	4.5	0.5	6	5	13.5	13.5	13.5	13.5						Multi-Family Condo
206B		99	8	0.54	1.36	0.74	7.2	0.7	6	5	19.8	19.8	19.8	19.8			324		Debris Basin #5	Natural/Debris Basin
206C		99	8	0.54	1.36	0.74	9.8	0.9	6	5	25.2	25.2	25.2	25.2			402		Debris Basin #5	Natural/Debris Basin
206D		99	8	0	1.36	0.74	2.1	0.2	6	5	6.8	6.8	6.8	6.8					Debris Basin #5	Multi-Family Condo
207AC		99	8	0	1.36	0.74	7	0.7	6	5	20.5	20.5	20.5	20.5						Multi-Family Condo
207B	210AB	99	8	0	1.36	0.74	7.2	0.7	6	5	20.5	20.5	20.5	20.5						Multi-Family Condo
208A		99	8	0	1.36	0.74	4.2	0.4	6	5	11.9	11.9	11.9	11.9						Multi-Family Condo
208B		99	8	0	1.36	0.74	3.5	0.3	6	5	9.3	9.3	9.3	9.3						Public Road
209A		99	8	0	1.36	0.74	3.5	0.3	6	5	9.3	9.3	9.3	9.3						Multi-Family Condo
209B		99	8	0	1.36	0.74	10.2	1.0	6	5	29.1	29.1	29.1	29.1						Multi-Family Condo/Mixed Residential
210A		99	8	0	1.36	0.74	10.2	1.0	6	5	29.1	29.1	29.1	29.1						Condo/Commercial Business Park
211A		99	8	0	1.36	0.74	10.2	1.0	6	5	29.1	29.1	29.1	29.1						Condo/Commercial Business Park
211B	202A	99	8	0	1.36	0.74	8.8	0.9	6	5	25.2	25.2	25.2	25.2						Multi-Family Condo
212A		99	8	0	1.36	0.91	4.8	0.4	6	5	13.5	13.5	13.5	13.5						Multi-Family Condo
212B	204AB	99	8	0	1.36	0.91	4.8	0.4	6	5	13.5	13.5	13.5	13.5						Public Road
213A		99	8	0	1.36	0.91	10.5	1.0	6	5	29.5	29.5	29.5	29.5						Public Park/Recreation
213B	212AB	99	8	0	1.36	0.91	10.5	1.0	6	5	29.5	29.5	29.5	29.5						Public Road
214A		99	8	0	1.36	0.91	4.1	0.4	6	5	12.0	12.0	12.0	12.0						Public Road
214B		99	8	0	1.36	0.91	4.1	0.4	6	5	12.0	12.0	12.0	12.0						Public Road
214C		99	8	0	1.36	0.74	7.2	0.7	6	5	20.5	20.5	20.5	20.5						Multi-Family Condo
215A	213AB	99	8	0	1.36	0.74	4.2	0.4	6	5	11.9	11.9	11.9	11.9						Multi-Family Condo
215B		99	8	0	1.36	0.74	3.5	0.3	6	5	9.3	9.3	9.3	9.3						Public Road
215C		99	8	0	1.36	0.74	3.5	0.3	6	5	9.3	9.3	9.3	9.3						Public Road
215D		99	8	0	1.36	0.74	10.2	1.0	6	5	29.1	29.1	29.1	29.1						Multi-Family Condo/Mixed Residential
216A		99	8	0	1.36	0.74	10.2	1.0	6	5	29.1	29.1	29.1	29.1						Condo/Commercial Business Park
216B		99	8	0	1.36	0.74	10.2	1.0	6	5	29.1	29.1	29.1	29.1						Condo/Commercial Business Park
217A		99	8	0	1.36	0.74	8.8	0.9	6	5	25.2	25.2	25.2	25.2						Multi-Family Condo
217B	202A	99	8	0	1.36	0.74	8.8	0.9	6	5	25.2	25.2	25.2	25.2						Multi-Family Condo
218A		99	8	0	1.36	0.80	5.2	0.5	6	5	15.1	15.1	15.1	15.1						Public Road
218B		99	8	0	1.36	0.80	5.2	0.5	6	5	15.1	15.1	15.1	15.1						Public Road
219A		99	8	0	1.36	0.80	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Public Road
219B		99	8	0	1.36	0.80	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Public Road
219C		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Public Road
219D		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Public Road
301A		99	8	0	1.36	0.10	1.2	0.1	6	5	0.3	0.3	0.3	0.3						Open Space
301B	317AC	99	8	0	1.36	0.50	1.2	0.1	6	5	0.3	0.3	0.3	0.3						Public Road
302A								80.6										187.9		
302B																	1261.8			
303A	303AB	99	8	0	1.36	0.74	11.6	1.2	6	5	33.8	33.8	33.8	33.8						Multi-Family Condo
303B	304A	99	8	0	1.36	0.74	11.6	1.2	6	5	33.8	33.8	33.8	33.8						Multi-Family Condo
304A								16.5										38.5		
304B	306AB							46.2										107.8		
305A	306A	99	8	0	1.36	0.91	6.5	0.6	6	5	19.0	19.0	19.0	19.0						Public Road
305B	306B	99	8	0	1.36	0.91	6.5	0.6	6	5	19.0	19.0	19.0	19.0						Public Road
306A								16.6										38.8		
306B								201.4										469.9		
307A		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
307B								15										35.0		
308A		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
308B								15										35.0		
309A		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
309B								90										209.9		
310A		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
310B								23										53.7		
311A		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
311B								21										49.0		
312A		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
312B								97										226.4		
313A		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
313B								52										121.4		
314A		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
314B								97										226.4		
315A		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
315B								12										28.0		
315C		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
315C								18										42.0		
316A		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
316B								97										226.4		
316C		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
316C								18										42.0		
317A		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
317B								97										226.4		
317C		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
317AC								97										226.4		
318A		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
318B								97										226.4		
319A		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
319B								97										226.4		
319C		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
319AC								97										226.4		
320A		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
320B								97										226.4		
320C		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
320AC								97										226.4		
321A		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
321B								97										226.4		
321C		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
321AC								97										226.4		
322A		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
322B								97										226.4		
322C		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
322AC								97										226.4		
323A		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
323B								97										226.4		
323C		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
323AC								97										226.4		
324A		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
324B								97										226.4		
324C		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
324AC								97										226.4		
325A		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
325B								97										226.4		
325C		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
325AC								97										226.4		
326A		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
326B								97										226.4		
326C		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
326AC								97										226.4		
327A		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
327B								97										226.4		
327C		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
327AC								97										226.4		
328A		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
328B								97										226.4		
328C		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
328AC								97										226.4		
329A		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
329B								97										226.4		
329C		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
329AC								97										226.4		
330A		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
330B								97										226.4		
330C		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
330AC								97										226.4		
331A		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
331B								97										226.4		
331C		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
331AC								97										226.4		
332A		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
332B								97										226.4		
332C		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
332AC								97										226.4		
333A		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
333B								97										226.4		
333C		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
333AC								97										226.4		
334A		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
334B								97										226.4		
334C		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
334AC								97										226.4		
335A		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
335B								97										226.4		
335C		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
335AC								97										226.4		
336A		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
336B								97										226.4		
336C		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
336AC								97										226.4		
337A		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
337B								97										226.4		
337C		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
337AC								97										226.4		
338A		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
338B								97										226.4		
338C		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
338AC								97										226.4		
339A		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
339B								97										226.4		
339C		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
339AC								97										226.4		
340A		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
340B								97										226.4		
340C		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
340AC								97										226.4		
341A		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
341B								97										226.4		
341C		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
341AC								97										226.4		
342A		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
342B								97										226.4		
342C		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
342AC								97										226.4		
343A		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
343B								97										226.4		
343C		99	8	0	1.36	0.74	9.0	0.9	6	5	26.1	26.1	26.1	26.1						Multi-Family Condo
343AC			

A-2: Entrada South Conveyance Lengths Exhibit


MAGIC MOUNTAIN ENTRANCE
ALTERNATIVE 1B
NEW ALIGNMENT
THROUGH MEDIA CENTER LANE,
ENTERTAINMENT DRIVE AND
SKY VIEW LANE
P.M. NO. 18654
ALTERNATIVE 1B
REMOVE AND RECONSTRUCT
42" STORM DRAIN
ALTERNATIVE 1A
CONSTRUCT
PARALLEL LINE
TO LINE "A" PER
PD 2637
GOLDEN STATE FREEWAY
THE OLD ROAD
MEDIA CENTER LANE
MAGIC MOUNTAIN PARKWAY
COMMERCE CENTER DRIVE
"A" STREET
"B" STREET
"C" STREET
"D" STREET
"E" STREET
"F" STREET
"G" STREET
WESTRIDGE PARKWAY
VALENCIA BLVD
TRACT 45433
DPA8
098
020
097
6.0
6.2
6.4
407C 24.2 AC Tc=14
411A 13.0 AC Tc=13
409D 18.4 AC Tc=14
405A 6.0 AC Tc=11
401A 11.6 AC Tc=11
218D 2.3 AC Tc=8
219D 16.2 AC Tc=7
209A 4.0 AC Tc=8
217C 8.1 AC Tc=8
216C 3.0 AC Tc=8
214C 7.2 AC Tc=7
213D 9.3 AC Tc=6
212D 12.9 AC Tc=8
206C 9.3 AC Tc=7
204A 2.0 AC Tc=9
208B 23.3 AC Tc=7
203A 4.3 AC Tc=9
202A 7.9 AC Tc=9
205B 9.0 AC Tc=5
201A 3.4 AC Tc=9
210C 7.0 AC Tc=6
211D 9.8 AC Tc=8
221E 10.1 AC Tc=13
220E 11.4 AC Tc=5
402B 4.9 AC Tc=6
304B 4.6 AC Tc=10
303A 12.9 AC Tc=9
307A 1.0 AC Tc=6
306A 11.6 AC Tc=10
301A 6.6 AC Tc=7
113B 1.4 AC Tc=5
109B 1.5 AC
105C 2.4 AC Tc=5
104A 3.1 AC Tc=6
311B 2.1 AC Tc=5
110B 2.3 AC Tc=5
313A 5.2 AC Tc=6
316C 1.8 AC Tc=5
315C 1.2 AC Tc=5
314A 9.7 AC Tc=12
503B 1.9 AC Tc=6
309B 9.0 AC Tc=6
502A 2.9 AC Tc=6
501A 38.4 AC Tc=17
601A 3.9 AC Tc=6
308B 20.1 AC Tc=13
102B 3.9 AC Tc=6
101A 6.1 AC Tc=9
100A 28.1 AC Tc=13
107B 10.8 AC Tc=13
PROJECT SITE
VICINITY MAP
NOT TO SCALE
LEGEND:
PHASING LIMITS
PROPOSED 100 & 400 WATERSHED AREA
PROPOSED 200 WATERSHED AREA
PROPOSED 300 WATERSHED AREA
PROPOSED 500 WATERSHED AREA
PROPOSED 600 WATERSHED AREA
PROPOSED SUBAREA BOUNDARY
EXISTING STORM DRAIN
PROPOSED STORM DRAIN
ALTERNATIVE 1A AND 1B IN ADDITION/REPLACEMENT TO LINE "A" PER PD 2637
ALTERNATIVE 1B IN ADDITION TO LINE "A" PER PD 2637
SUBAREA NODE
ACREAGE
TIME OF CONCENTRATION
DEBRIS PRODUCTION AREA
SOIL CLASSIFICATION AREA
NATURAL CHANNEL
WATER QUALITY BASIN
RIGHT-OF-WAY-LID
DEBRIS BASIN
HYDROLOGY STUDY APPROVED
RECOMMEND BY: DATE 05/12/2025
APPROVED BY: DATE 05/12/2025
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS
LAND DEVELOPMENT DIVISION
NORTH
FEET
INCHES
ENTRADA SOUTH
CONVEYANCE LENGTHS
HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING • ENGINEERING • SURVEYING
26074 Avenue Hall, Suite #23 • Valencia, CA 91355
FX: (661) 294-9890 • PH: (661) 294-2211
DATE: 05/04/2023
PROJECT NO:
REV. DATE:
SHEET 1 OF 1

A-3: Entrada South Unnamed Canyon 2 Exhibit





VICINITY MAP
NOT TO SCALE

LEGEND:

- PHASING LIMITS
- PROPOSED WATERSHED 100 BOUNDARY PER PROPOSED ENTRADA SOUTH HYDROLOGY MAP
- PROPOSED SUBAREA BOUNDARY FOR WATERSHED 100 PER PROPOSED ENTRADA SOUTH HYDROLOGY MAP
- EXISTING STORM DRAIN
- PROPOSED STORM DRAIN
- WQ — WATER QUALITY
- ACCESS ROAD
- NATURAL CHANNEL
- DIVERSION STRUCTURE

SUMMARY TABLE:

Node	Area	Q	QB	QBB	ΣQ	ΣQB	ΣQBB	DV	ΣDV	Note
A	N/A	13.0			13.0			N/A	N/A	Diversion Flow
B	6.2	12.1	12.3	14.0	25.1	25.3	27.0	213	213	Subarea 107B
C	4.4	8.5	8.8	9.9	33.6	34.1	36.9		213	
D	1.5	3.7	3.8		37.3	37.9	40.7		213	Subarea 109B

HYDROLOGY STUDY
APPROVED
REVIEWED BY:_____DATE 03/12/2025
APPROVED BY:_____DATE_____
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS
LAND DEVELOPMENT DIVISION

NORTH

100' 50' 0 100' 200'
FEET
1" 1/2 0 1" 2"
INCHES

TRACT 53295
UNNAMED CANYON 2 EXHIBIT
ENTRADA SOUTH

REGISTERED PROFESSIONAL ENGINEER
JOHN T. FOX
No. 40695
CIVIL
STATE OF CALIFORNIA
02/14/25

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
26074 Avenue Hall, Suite #23 ▪ Valencia, CA 91355
FX: (661) 294-9890 ▪ PH: (661) 294-2211

DATE: 02/04/2025 REV. DATE:
PROJECT NO: 0015-035-019 SHEET 1 OF 1

HES057-01_ENTRADA SOUTH UNNAMED CANYON 2 EXHIBIT.DWG

FIVEPOINT

G:\Newhall Ranch\53295 Entrada South\Hydrology\HES057-01_Entrada South Unnamed Canyon 2 Exhibit.dwg Plotted on Feb 04, 2025 by smorris

A-4: Entrada South Existing Golf Course Overlay



HYDROLOGY STUDY
APPROVED

REVIEWED BY: _____ DATE 03/12/2025

APPROVED BY: _____ DATE 03/12/2025

COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS
LAND DEVELOPMENT DIVISION

LEGEND:

- PROPOSED 100 & 400 WATERSHED AREA
- PROPOSED 200 WATERSHED AREA
- PROPOSED 300 WATERSHED AREA
- PROPOSED 500 WATERSHED AREA
- PROPOSED SUBAREA BOUNDARY
- EXISTING GOLF COURSE

501A — SUBAREA NODE
38.4 AC — ACREAGE
Tc=17 — TIME OF CONCENTRATION

REGISTERED PROFESSIONAL ENGINEER
JAMES R. HUNSAKER
40695
CIVIL
STATE OF CALIFORNIA

02/14/25

NORTH

FEET
100' 25' 0 50' 100'
INCHES
1" 1/2 0 1 2"

ENTRADA SOUTH
EXISTING GOLF COURSE

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING • ENGINEERING • SURVEYING
26074 Avenue Hall, Suite #23 • Valencia, CA 91355
FX: (661) 294-9890 • PH: (661) 294-2211

DATE: 10/05/2022 REV. DATE:
PROJECT NO: SHEET 1 OF 1

D:\Hunsker Assoc\LA2329 Entrada\Storm Hydrology\Design Backup\Golf Course Use Watershed Plotted on Nov 13, 2024 by smiles

Appendix B: Proposed Calculations

B-1: Tc Calculations (Hydrocalc)

Peak Flow Hydrologic Analysis

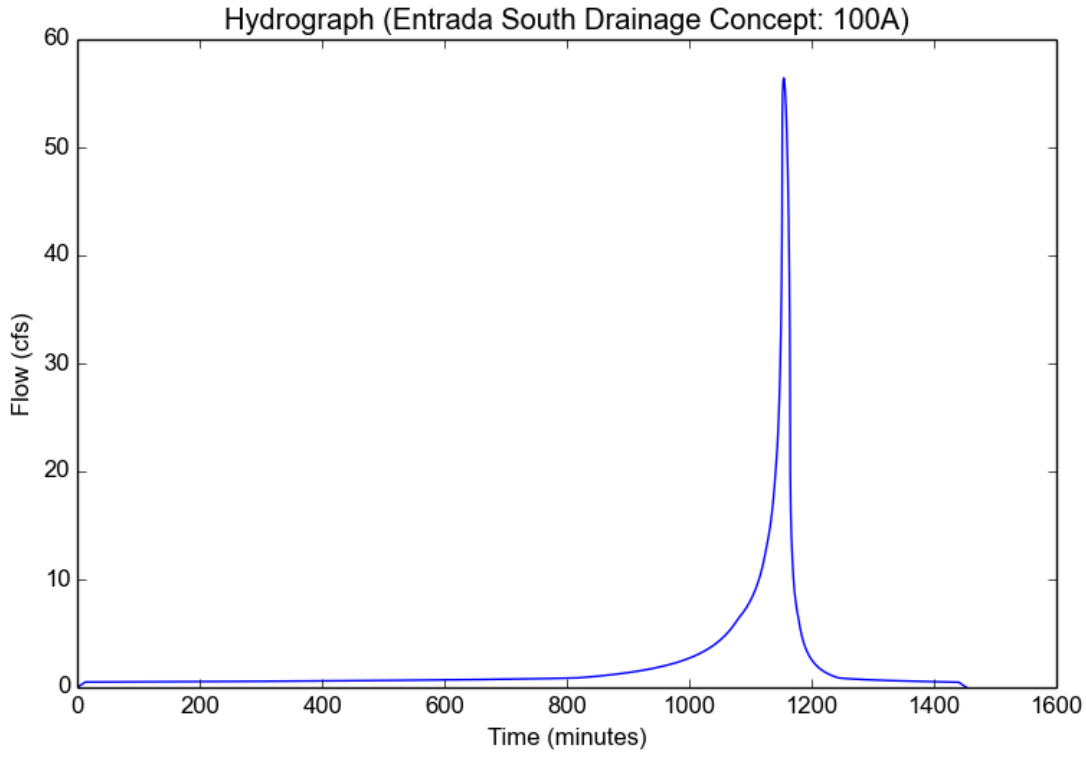
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	100A
Area (ac)	28.1
Flow Path Length (ft)	2000.0
Flow Path Slope (vft/hft)	0.05
50-yr Rainfall Depth (in)	6.4
Percent Impervious	0.03
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.4
Peak Intensity (in/hr)	2.4369
Undeveloped Runoff Coefficient (Cu)	0.8216
Developed Runoff Coefficient (Cd)	0.8239
Time of Concentration (min)	13.0
Clear Peak Flow Rate (cfs)	56.4196
Burned Peak Flow Rate (cfs)	56.4196
24-Hr Clear Runoff Volume (ac-ft)	4.3015
24-Hr Clear Runoff Volume (cu-ft)	187372.2106



Peak Flow Hydrologic Analysis

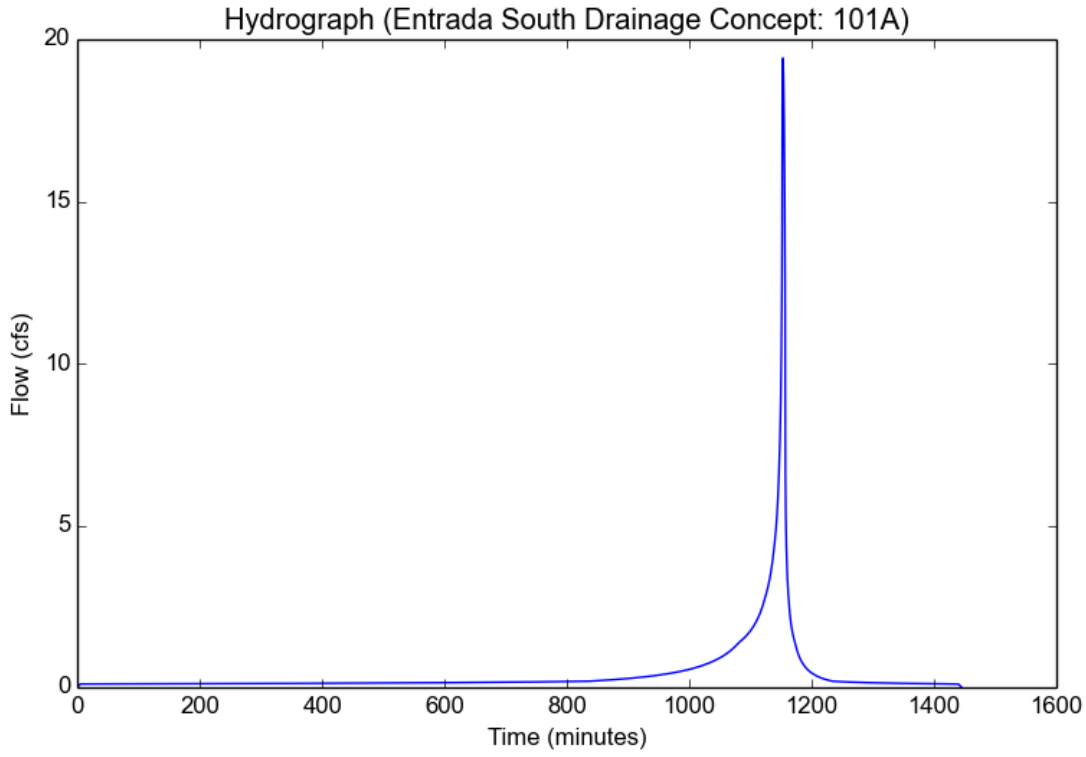
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	101A
Area (ac)	6.1
Flow Path Length (ft)	500.0
Flow Path Slope (vft/hft)	0.05
50-yr Rainfall Depth (in)	6.2
Percent Impervious	0.03
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0.34
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.2
Peak Intensity (in/hr)	3.6991
Undeveloped Runoff Coefficient (Cu)	0.8596
Developed Runoff Coefficient (Cd)	0.8609
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	19.4248
Burned Peak Flow Rate (cfs)	19.8598
24-Hr Clear Runoff Volume (ac-ft)	0.8868
24-Hr Clear Runoff Volume (cu-ft)	38628.9199



Peak Flow Hydrologic Analysis

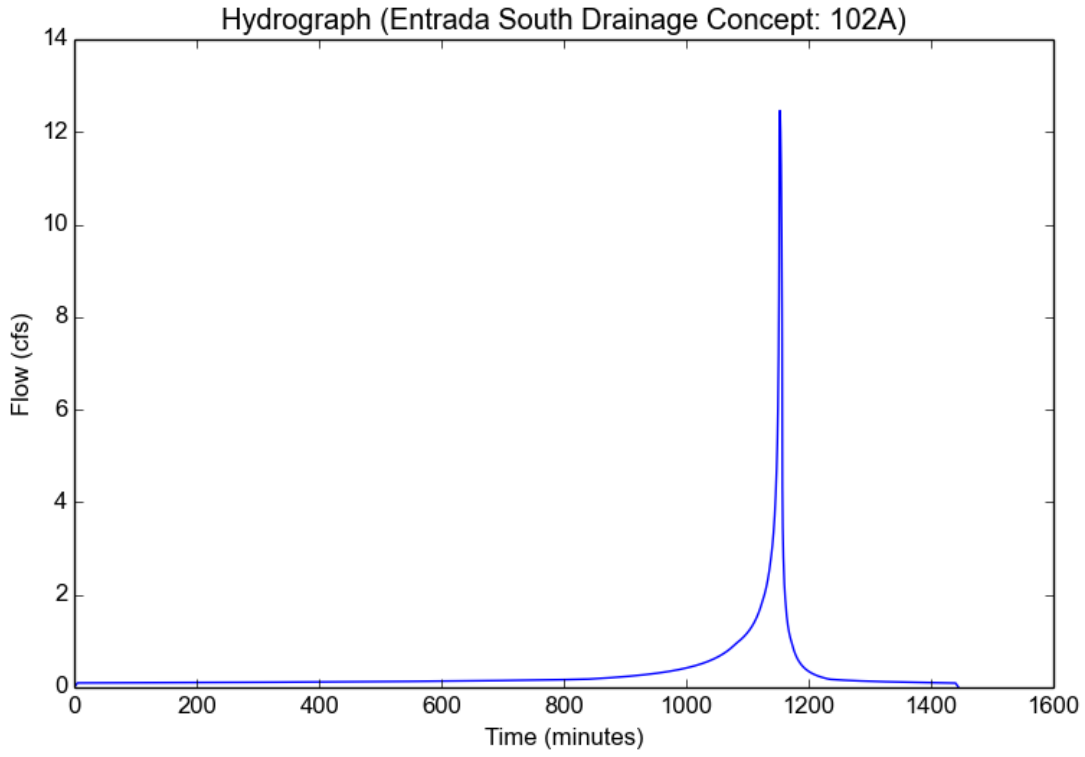
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	102B
Area (ac)	3.9
Flow Path Length (ft)	700.0
Flow Path Slope (vft/hft)	0.13
50-yr Rainfall Depth (in)	6.2
Percent Impervious	0.1
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0.34
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.2
Peak Intensity (in/hr)	3.6991
Undeveloped Runoff Coefficient (Cu)	0.8596
Developed Runoff Coefficient (Cd)	0.8637
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	12.4599
Burned Peak Flow Rate (cfs)	12.7324
24-Hr Clear Runoff Volume (ac-ft)	0.6558
24-Hr Clear Runoff Volume (cu-ft)	28568.5425



Peak Flow Hydrologic Analysis

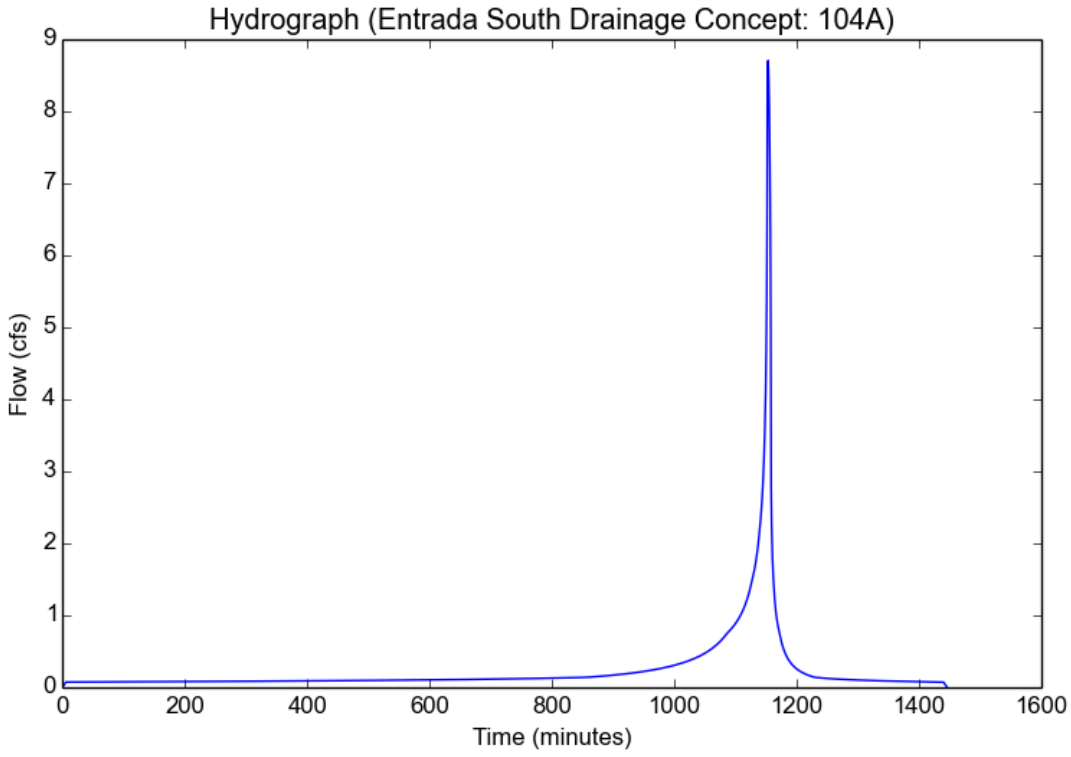
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	104A
Area (ac)	3.1
Flow Path Length (ft)	697.0
Flow Path Slope (vft/hft)	0.1
50-yr Rainfall Depth (in)	6.0
Percent Impervious	0.1
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.0
Peak Intensity (in/hr)	3.2858
Undeveloped Runoff Coefficient (Cu)	0.8496
Developed Runoff Coefficient (Cd)	0.8546
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	8.7052
Burned Peak Flow Rate (cfs)	8.7052
24-Hr Clear Runoff Volume (ac-ft)	0.4961
24-Hr Clear Runoff Volume (cu-ft)	21612.1575



Peak Flow Hydrologic Analysis

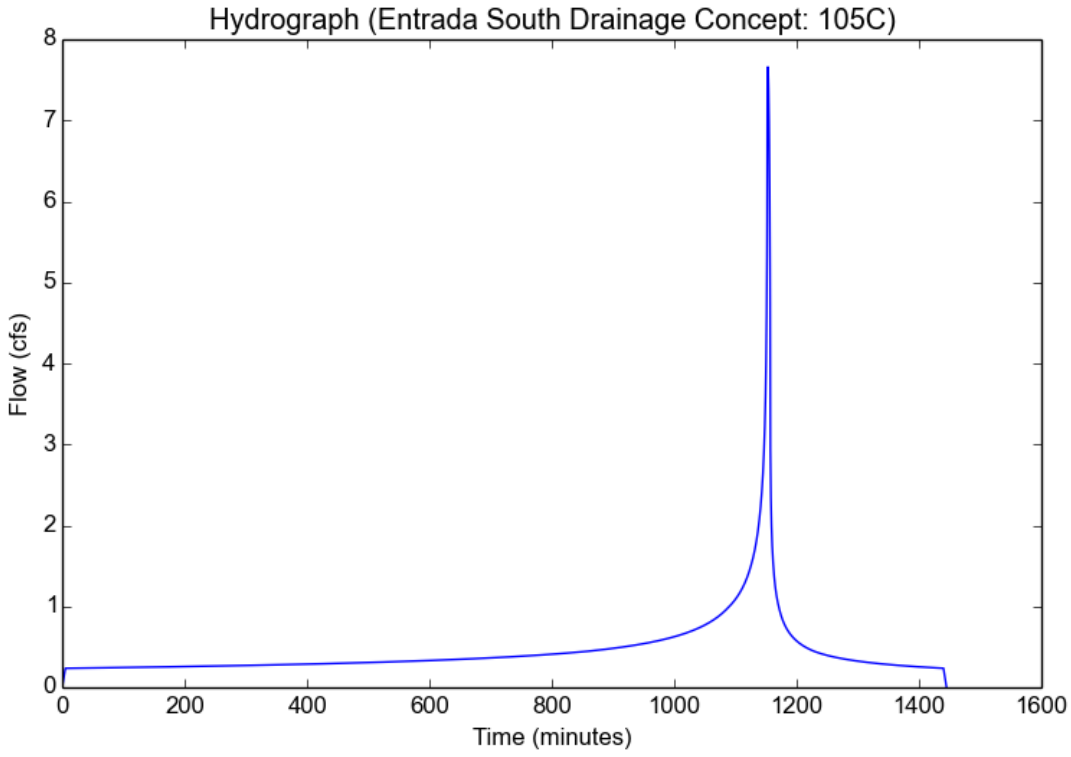
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	105C
Area (ac)	2.4
Flow Path Length (ft)	225.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	6.0
Percent Impervious	0.8
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.0
Peak Intensity (in/hr)	3.5798
Undeveloped Runoff Coefficient (Cu)	0.8577
Developed Runoff Coefficient (Cd)	0.8915
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	7.6595
Burned Peak Flow Rate (cfs)	7.6595
24-Hr Clear Runoff Volume (ac-ft)	0.9184
24-Hr Clear Runoff Volume (cu-ft)	40006.7964



Peak Flow Hydrologic Analysis

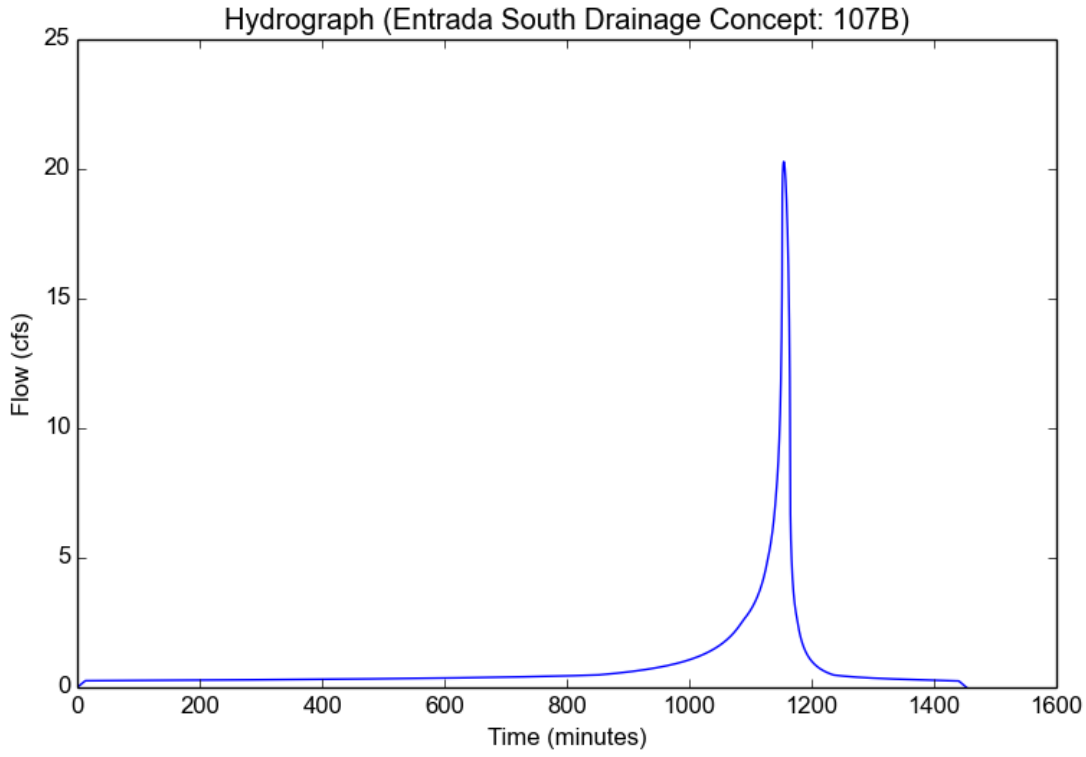
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	107B
Area (ac)	10.6
Flow Path Length (ft)	1670.0
Flow Path Slope (vft/hft)	0.03
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.1
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0.34
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.1
Peak Intensity (in/hr)	2.3227
Undeveloped Runoff Coefficient (Cu)	0.8155
Developed Runoff Coefficient (Cd)	0.8239
Time of Concentration (min)	13.0
Clear Peak Flow Rate (cfs)	20.2857
Burned Peak Flow Rate (cfs)	20.844
24-Hr Clear Runoff Volume (ac-ft)	1.7386
24-Hr Clear Runoff Volume (cu-ft)	75732.5305



Peak Flow Hydrologic Analysis

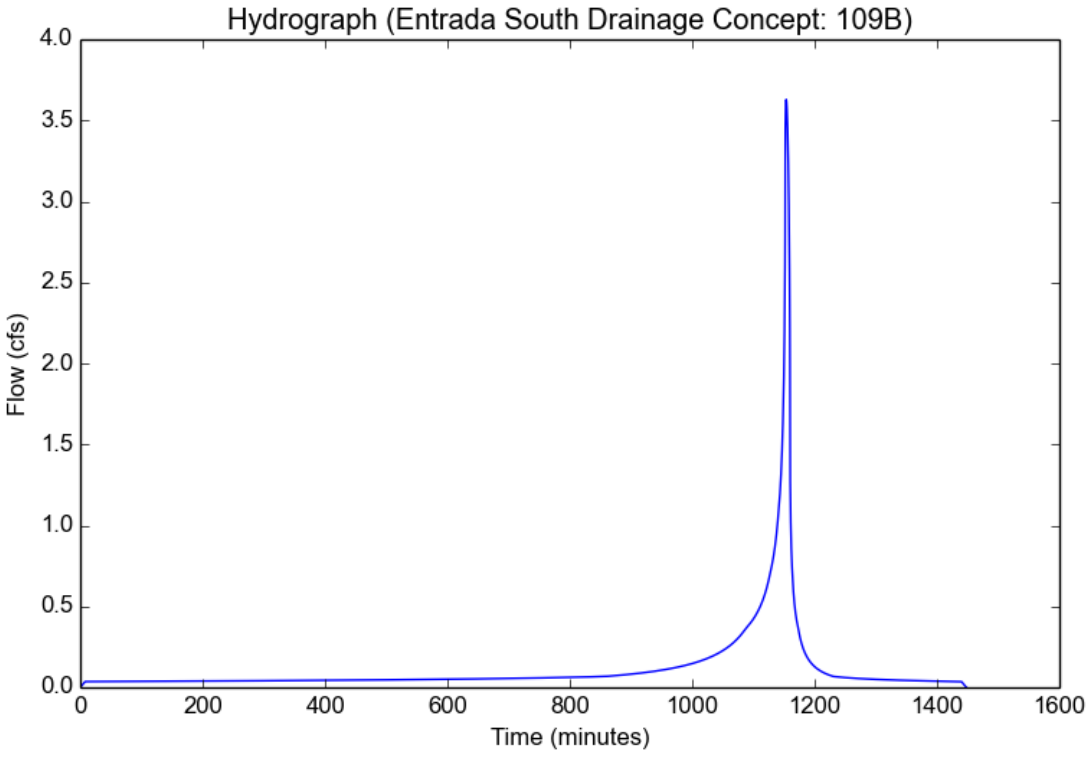
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	109B
Area (ac)	1.5
Flow Path Length (ft)	667.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	6.0
Percent Impervious	0.1
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0.34
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.0
Peak Intensity (in/hr)	2.8702
Undeveloped Runoff Coefficient (Cu)	0.8365
Developed Runoff Coefficient (Cd)	0.8429
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	3.6289
Burned Peak Flow Rate (cfs)	3.7191
24-Hr Clear Runoff Volume (ac-ft)	0.24
24-Hr Clear Runoff Volume (cu-ft)	10456.3144



Peak Flow Hydrologic Analysis

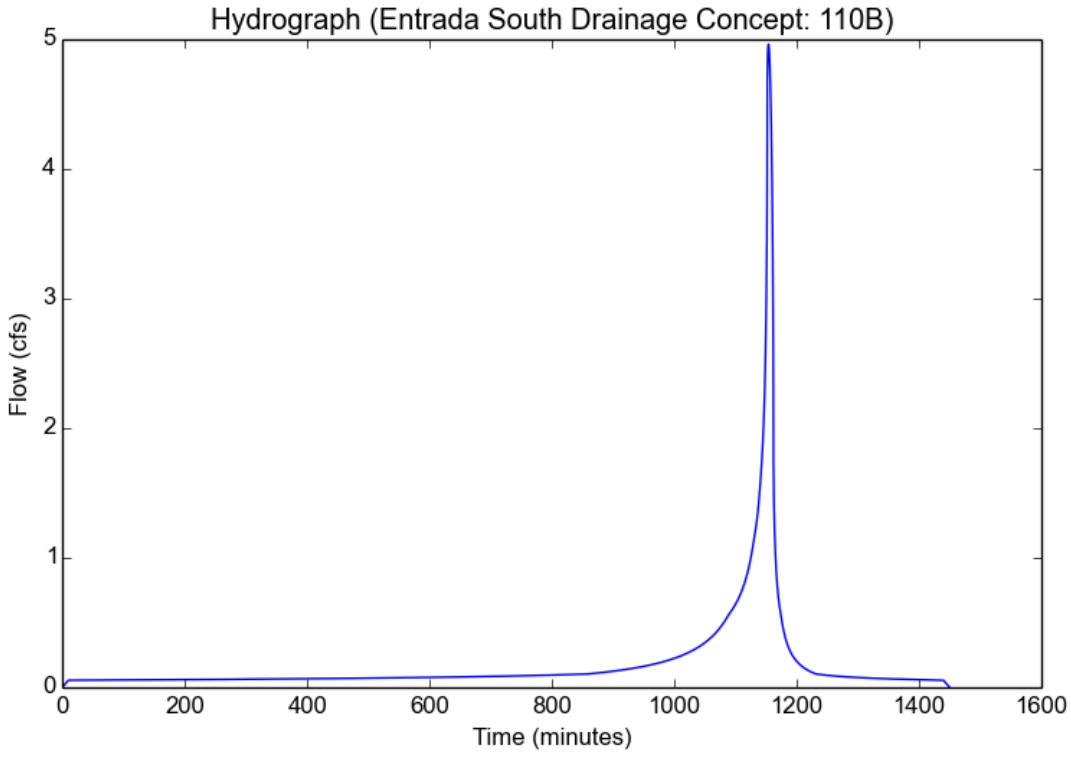
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	110B
Area (ac)	2.3
Flow Path Length (ft)	776.0
Flow Path Slope (vft/hft)	0.01
50-yr Rainfall Depth (in)	6.0
Percent Impervious	0.1
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.0
Peak Intensity (in/hr)	2.5845
Undeveloped Runoff Coefficient (Cu)	0.8276
Developed Runoff Coefficient (Cd)	0.8348
Time of Concentration (min)	10.0
Clear Peak Flow Rate (cfs)	4.9623
Burned Peak Flow Rate (cfs)	4.9623
24-Hr Clear Runoff Volume (ac-ft)	0.3681
24-Hr Clear Runoff Volume (cu-ft)	16033.746



Peak Flow Hydrologic Analysis

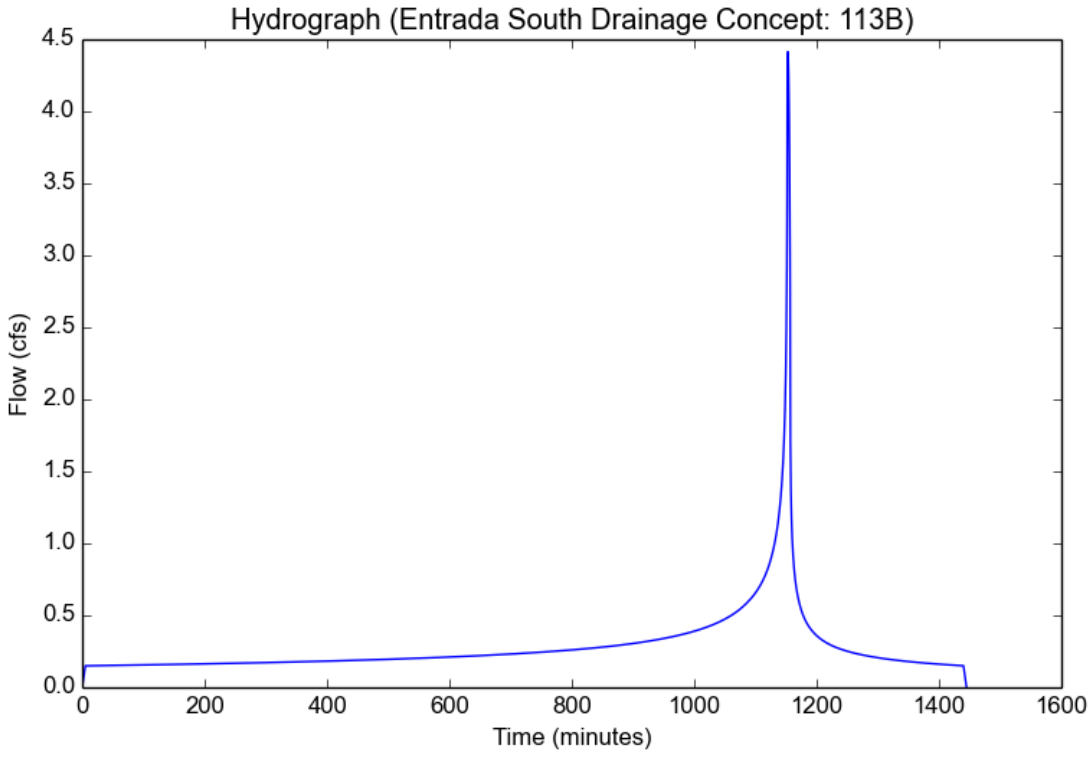
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	113B
Area (ac)	1.4
Flow Path Length (ft)	400.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	5.9
Percent Impervious	0.9
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.9
Peak Intensity (in/hr)	3.5201
Undeveloped Runoff Coefficient (Cu)	0.8567
Developed Runoff Coefficient (Cd)	0.8957
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	4.414
Burned Peak Flow Rate (cfs)	4.414
24-Hr Clear Runoff Volume (ac-ft)	0.5704
24-Hr Clear Runoff Volume (cu-ft)	24846.5004



Peak Flow Hydrologic Analysis

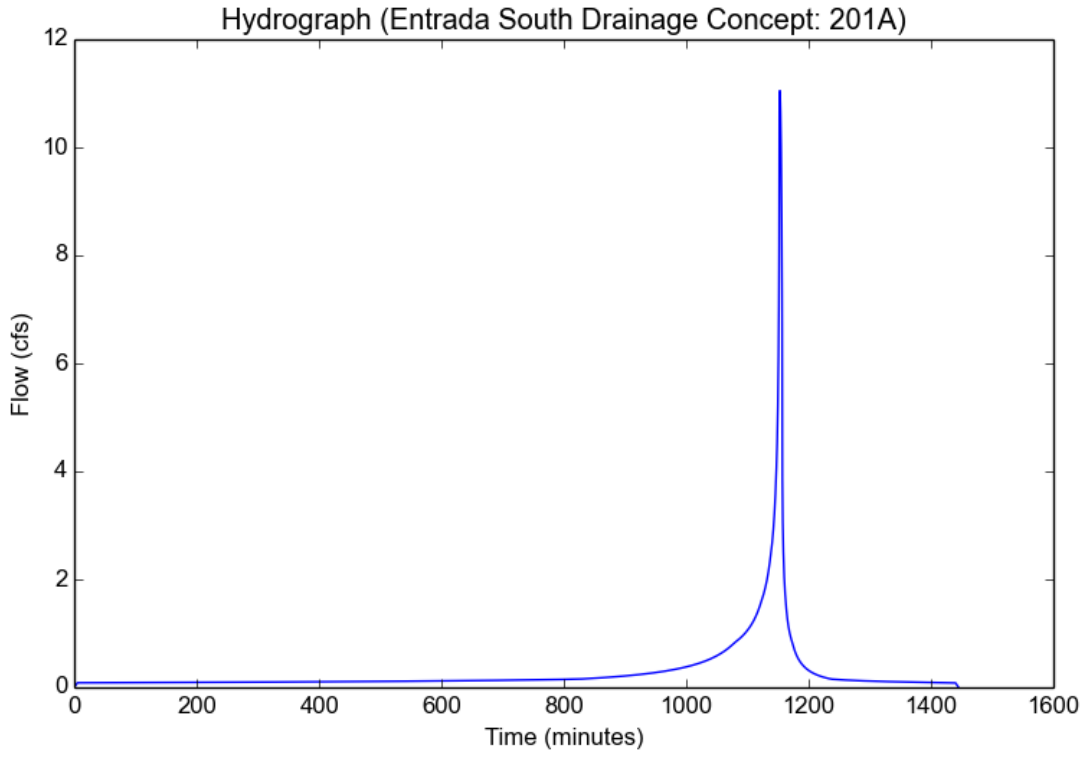
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	201A
Area (ac)	3.4
Flow Path Length (ft)	377.0
Flow Path Slope (vft/hft)	0.23
50-yr Rainfall Depth (in)	6.3
Percent Impervious	0.1
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0.34
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.3
Peak Intensity (in/hr)	3.7588
Undeveloped Runoff Coefficient (Cu)	0.8606
Developed Runoff Coefficient (Cd)	0.8646
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	11.0491
Burned Peak Flow Rate (cfs)	11.2895
24-Hr Clear Runoff Volume (ac-ft)	0.5858
24-Hr Clear Runoff Volume (cu-ft)	25515.7229



Peak Flow Hydrologic Analysis

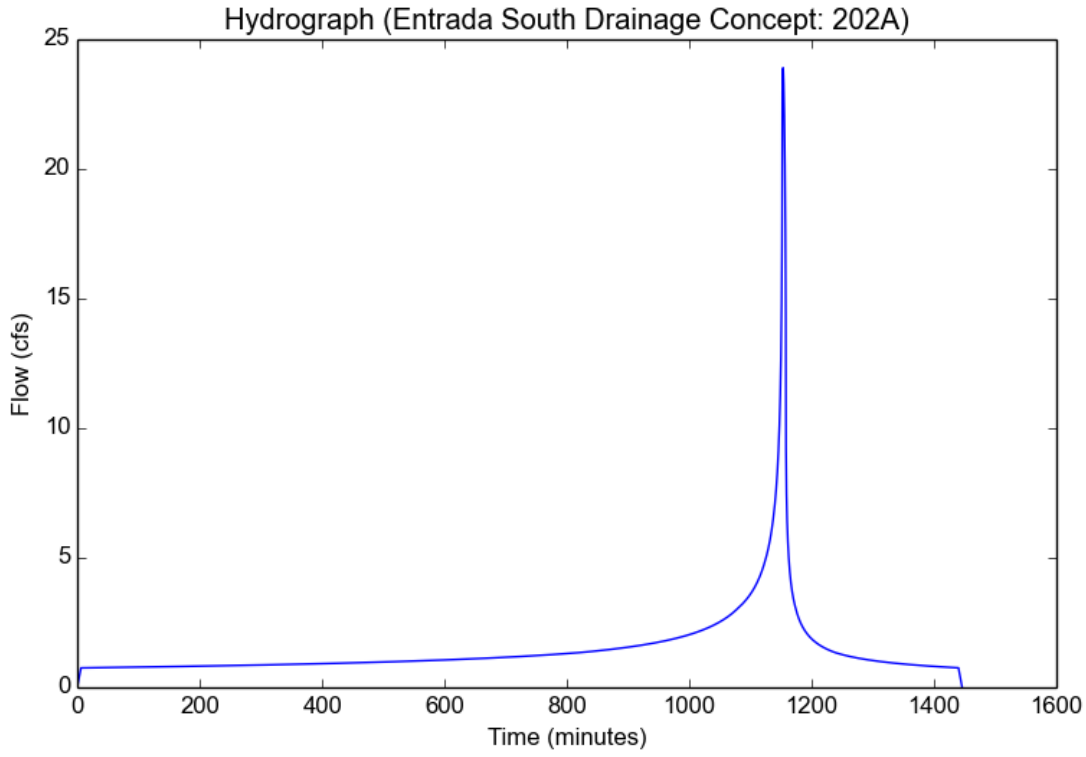
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	202A
Area (ac)	7.8
Flow Path Length (ft)	570.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	6.3
Percent Impervious	0.74
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.3
Peak Intensity (in/hr)	3.4501
Undeveloped Runoff Coefficient (Cu)	0.8547
Developed Runoff Coefficient (Cd)	0.8882
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	23.9029
Burned Peak Flow Rate (cfs)	23.9029
24-Hr Clear Runoff Volume (ac-ft)	2.9873
24-Hr Clear Runoff Volume (cu-ft)	130127.8386



Peak Flow Hydrologic Analysis

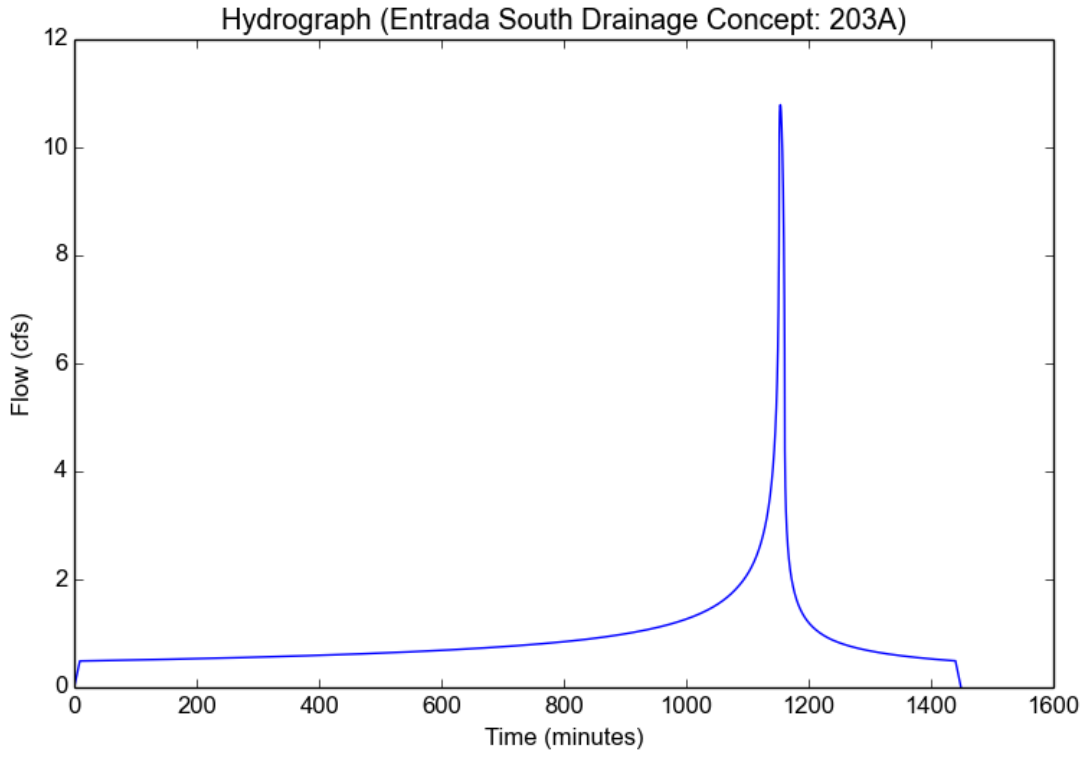
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	203A
Area (ac)	4.3
Flow Path Length (ft)	1000.0
Flow Path Slope (vft/hft)	0.03
50-yr Rainfall Depth (in)	6.2
Percent Impervious	0.91
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.2
Peak Intensity (in/hr)	2.8062
Undeveloped Runoff Coefficient (Cu)	0.8345
Developed Runoff Coefficient (Cd)	0.8941
Time of Concentration (min)	9.0
Clear Peak Flow Rate (cfs)	10.7888
Burned Peak Flow Rate (cfs)	10.7888
24-Hr Clear Runoff Volume (ac-ft)	1.857
24-Hr Clear Runoff Volume (cu-ft)	80889.6537



Peak Flow Hydrologic Analysis

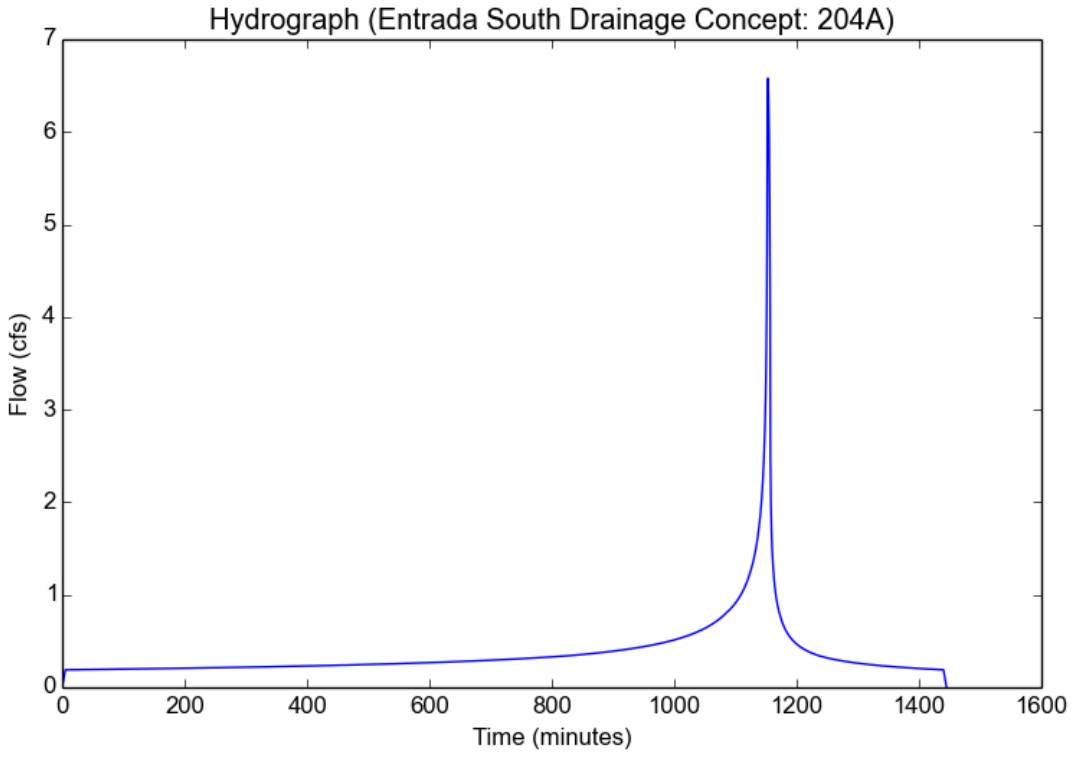
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	204A
Area (ac)	2.0
Flow Path Length (ft)	183.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	6.2
Percent Impervious	0.74
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.2
Peak Intensity (in/hr)	3.6991
Undeveloped Runoff Coefficient (Cu)	0.8596
Developed Runoff Coefficient (Cd)	0.8895
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	6.5807
Burned Peak Flow Rate (cfs)	6.5807
24-Hr Clear Runoff Volume (ac-ft)	0.753
24-Hr Clear Runoff Volume (cu-ft)	32801.9856



Peak Flow Hydrologic Analysis

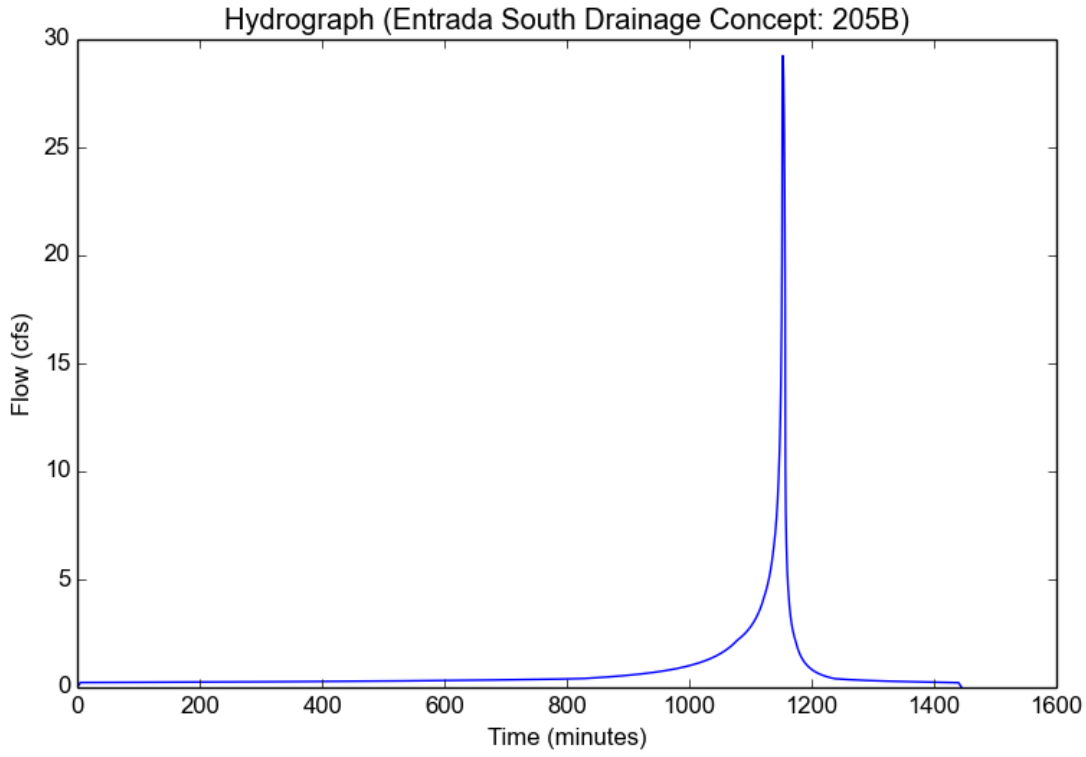
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	205B
Area (ac)	9.0
Flow Path Length (ft)	545.0
Flow Path Slope (vft/hft)	0.3
50-yr Rainfall Depth (in)	6.3
Percent Impervious	0.1
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0.34
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.3
Peak Intensity (in/hr)	3.7588
Undeveloped Runoff Coefficient (Cu)	0.8606
Developed Runoff Coefficient (Cd)	0.8646
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	29.2477
Burned Peak Flow Rate (cfs)	29.884
24-Hr Clear Runoff Volume (ac-ft)	1.5505
24-Hr Clear Runoff Volume (cu-ft)	67541.6196



Peak Flow Hydrologic Analysis

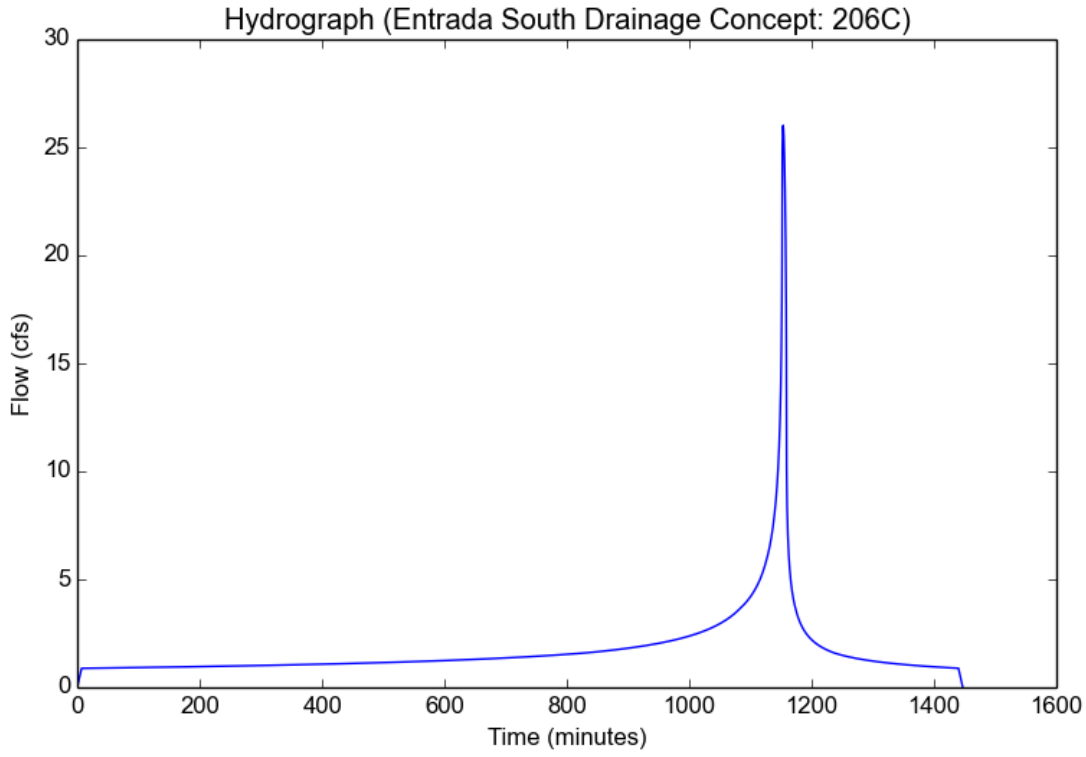
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	206C
Area (ac)	9.3
Flow Path Length (ft)	630.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	6.2
Percent Impervious	0.74
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.2
Peak Intensity (in/hr)	3.158
Undeveloped Runoff Coefficient (Cu)	0.8456
Developed Runoff Coefficient (Cd)	0.8858
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	26.017
Burned Peak Flow Rate (cfs)	26.017
24-Hr Clear Runoff Volume (ac-ft)	3.5015
24-Hr Clear Runoff Volume (cu-ft)	152524.9033



Peak Flow Hydrologic Analysis

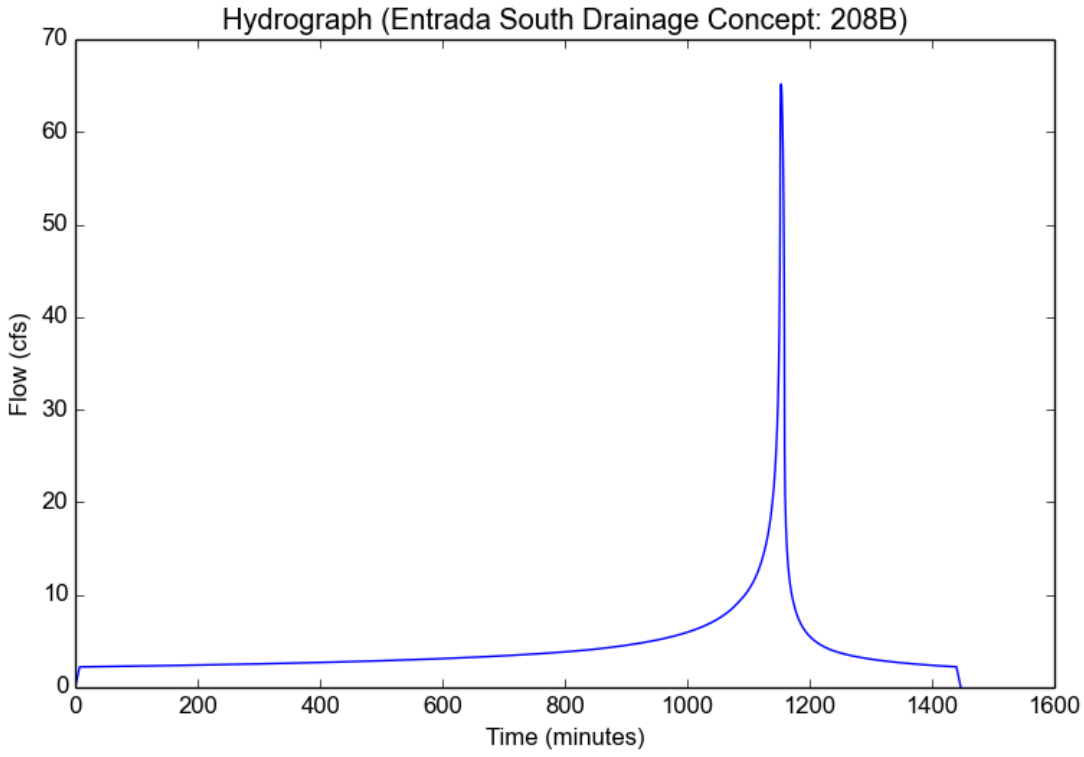
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	208B
Area (ac)	23.3
Flow Path Length (ft)	623.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	6.2
Percent Impervious	0.74
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.2
Peak Intensity (in/hr)	3.158
Undeveloped Runoff Coefficient (Cu)	0.8456
Developed Runoff Coefficient (Cd)	0.8858
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	65.1824
Burned Peak Flow Rate (cfs)	65.1824
24-Hr Clear Runoff Volume (ac-ft)	8.7726
24-Hr Clear Runoff Volume (cu-ft)	382132.2846



Peak Flow Hydrologic Analysis

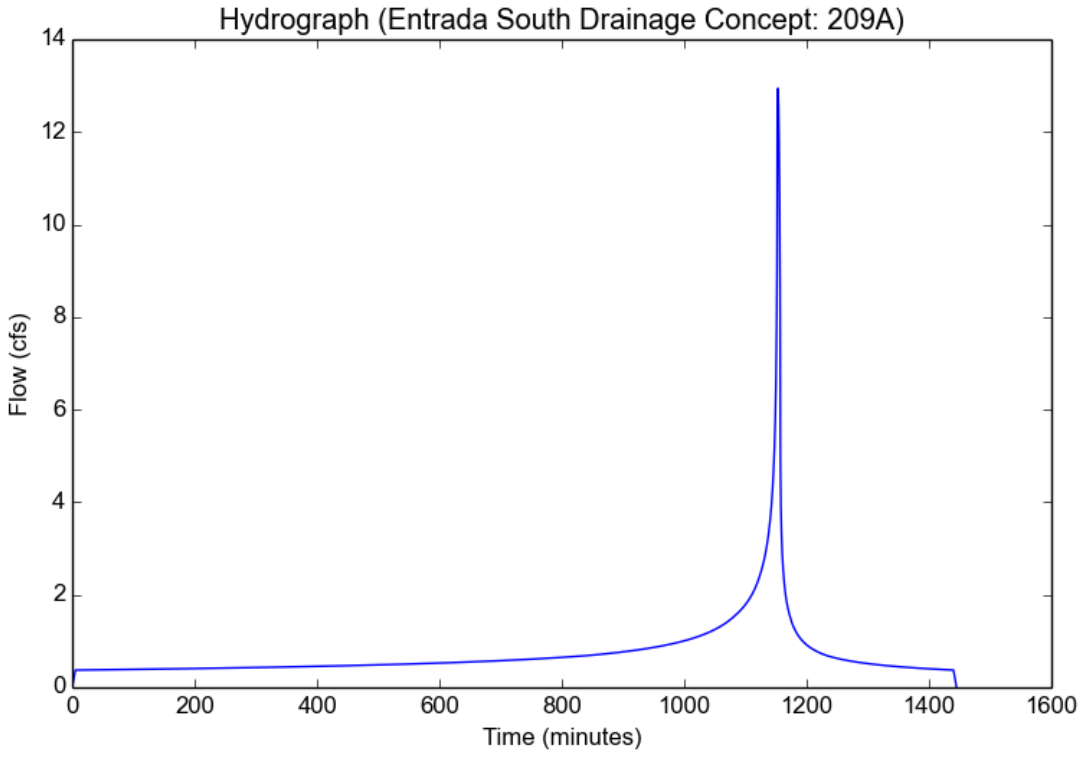
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	209A
Area (ac)	4.0
Flow Path Length (ft)	430.0
Flow Path Slope (vft/hft)	0.05
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.74
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.1
Peak Intensity (in/hr)	3.6394
Undeveloped Runoff Coefficient (Cu)	0.8586
Developed Runoff Coefficient (Cd)	0.8892
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	12.9454
Burned Peak Flow Rate (cfs)	12.9454
24-Hr Clear Runoff Volume (ac-ft)	1.4802
24-Hr Clear Runoff Volume (cu-ft)	64477.5108



Peak Flow Hydrologic Analysis

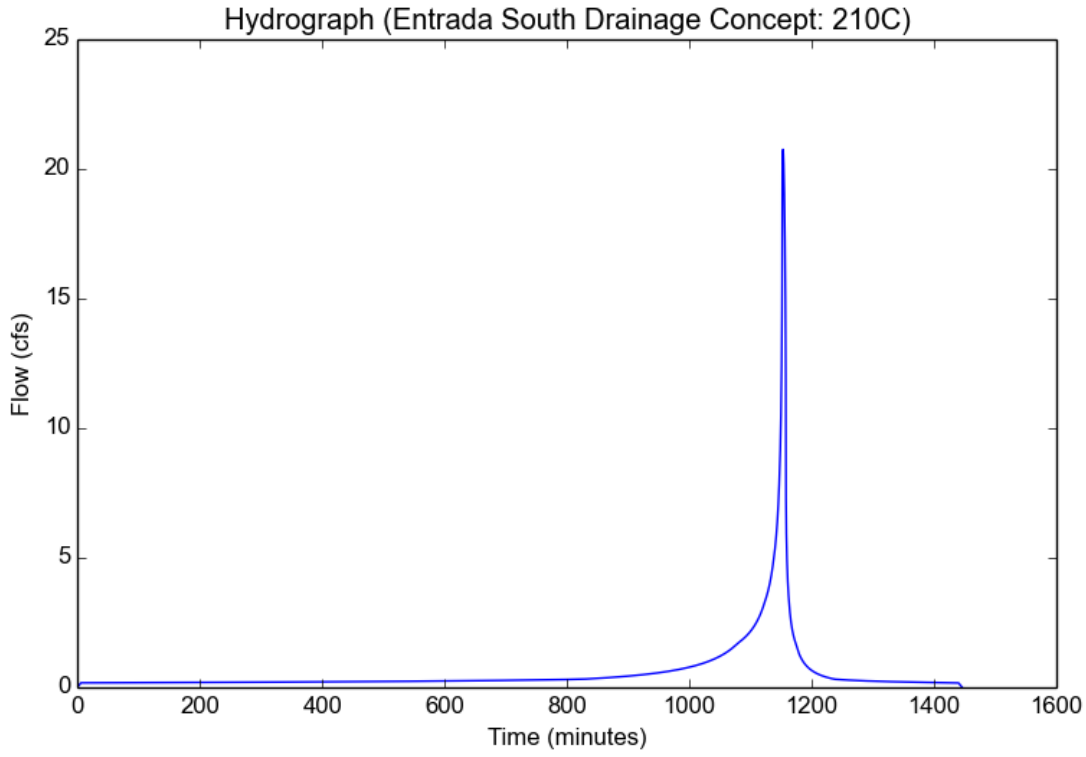
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	210D
Area (ac)	7.0
Flow Path Length (ft)	907.0
Flow Path Slope (vft/hft)	0.14
50-yr Rainfall Depth (in)	6.3
Percent Impervious	0.1
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0.34
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.3
Peak Intensity (in/hr)	3.4501
Undeveloped Runoff Coefficient (Cu)	0.8547
Developed Runoff Coefficient (Cd)	0.8593
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	20.7519
Burned Peak Flow Rate (cfs)	21.218
24-Hr Clear Runoff Volume (ac-ft)	1.2059
24-Hr Clear Runoff Volume (cu-ft)	52528.6653



Peak Flow Hydrologic Analysis

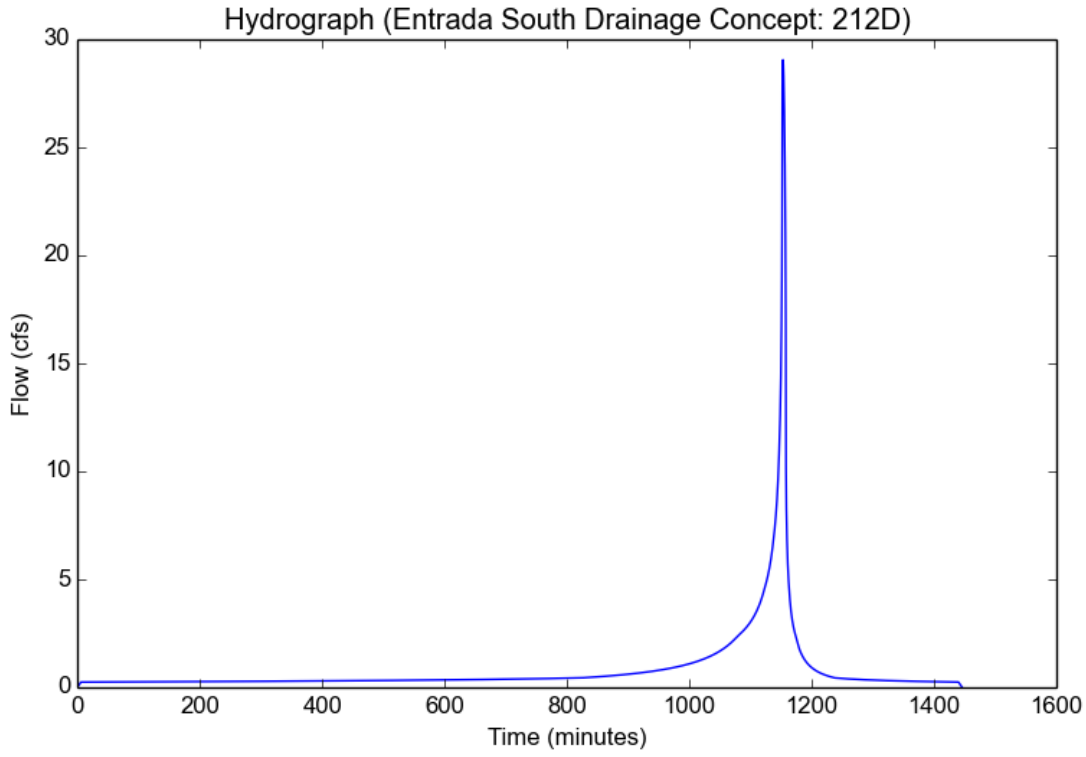
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	211D
Area (ac)	9.8
Flow Path Length (ft)	909.0
Flow Path Slope (vft/hft)	0.15
50-yr Rainfall Depth (in)	6.3
Percent Impervious	0.1
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0.34
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.3
Peak Intensity (in/hr)	3.4501
Undeveloped Runoff Coefficient (Cu)	0.8547
Developed Runoff Coefficient (Cd)	0.8593
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	29.0527
Burned Peak Flow Rate (cfs)	29.7052
24-Hr Clear Runoff Volume (ac-ft)	1.6882
24-Hr Clear Runoff Volume (cu-ft)	73540.1314



Peak Flow Hydrologic Analysis

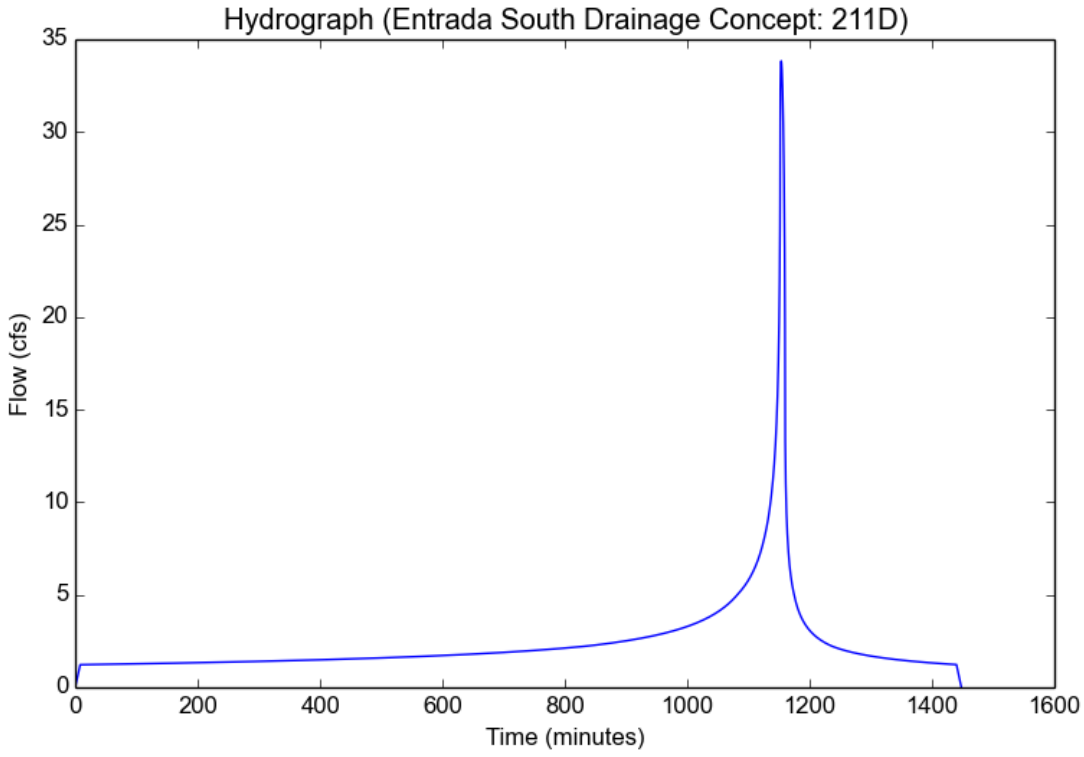
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	212D
Area (ac)	12.9
Flow Path Length (ft)	795.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	6.2
Percent Impervious	0.74
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.2
Peak Intensity (in/hr)	2.9659
Undeveloped Runoff Coefficient (Cu)	0.8395
Developed Runoff Coefficient (Cd)	0.8843
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	33.8328
Burned Peak Flow Rate (cfs)	33.8328
24-Hr Clear Runoff Volume (ac-ft)	4.8569
24-Hr Clear Runoff Volume (cu-ft)	211565.4173



Peak Flow Hydrologic Analysis

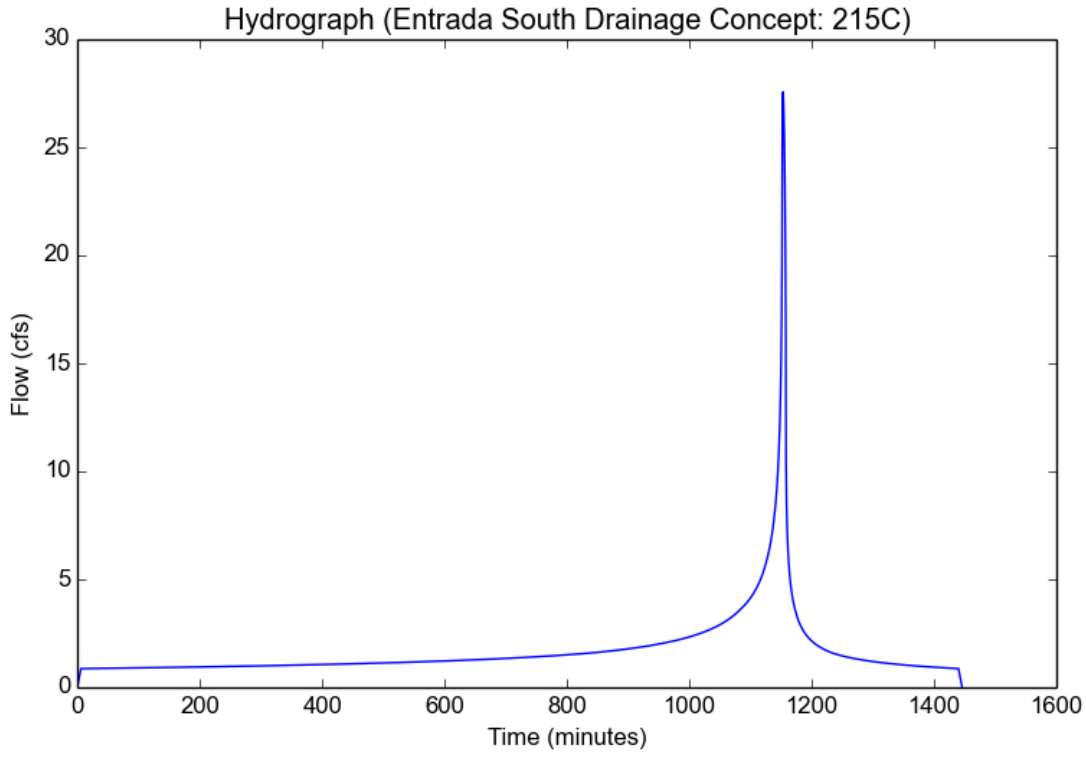
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	213D
Area (ac)	9.3
Flow Path Length (ft)	462.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.74
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.1
Peak Intensity (in/hr)	3.3405
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8873
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	27.5671
Burned Peak Flow Rate (cfs)	27.5671
24-Hr Clear Runoff Volume (ac-ft)	3.4414
24-Hr Clear Runoff Volume (cu-ft)	149907.6813



Peak Flow Hydrologic Analysis

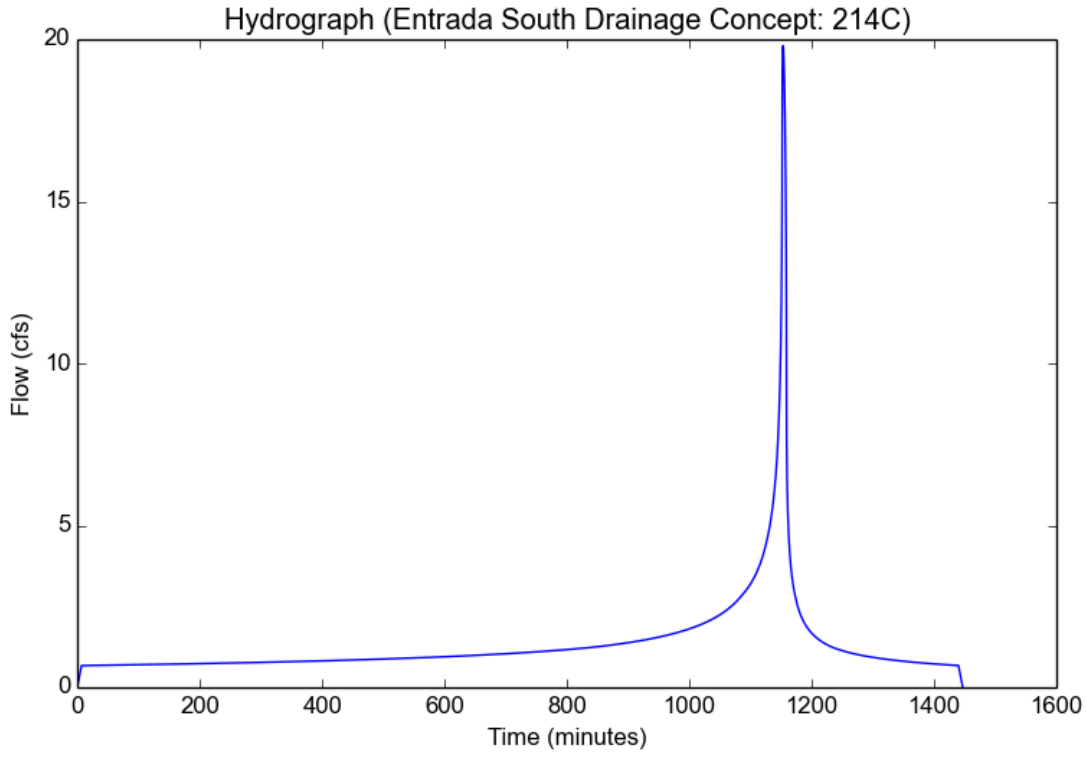
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	214C
Area (ac)	7.2
Flow Path Length (ft)	700.0
Flow Path Slope (vft/hft)	0.025
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.74
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.1
Peak Intensity (in/hr)	3.1071
Undeveloped Runoff Coefficient (Cu)	0.844
Developed Runoff Coefficient (Cd)	0.8854
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	19.808
Burned Peak Flow Rate (cfs)	19.808
24-Hr Clear Runoff Volume (ac-ft)	2.6643
24-Hr Clear Runoff Volume (cu-ft)	116056.0055



Peak Flow Hydrologic Analysis

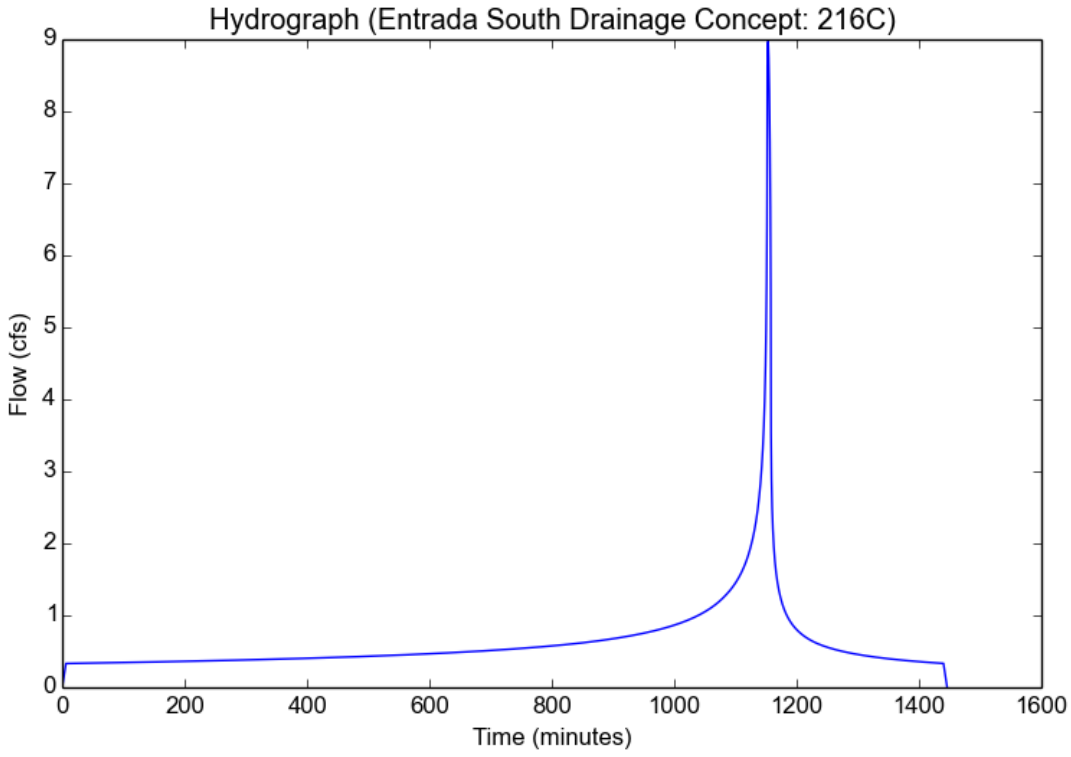
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	216C
Area (ac)	3.0
Flow Path Length (ft)	670.0
Flow Path Slope (vft/hft)	0.06
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.9
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.1
Peak Intensity (in/hr)	3.3405
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8951
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	8.9707
Burned Peak Flow Rate (cfs)	8.9707
24-Hr Clear Runoff Volume (ac-ft)	1.2646
24-Hr Clear Runoff Volume (cu-ft)	55086.369



Peak Flow Hydrologic Analysis

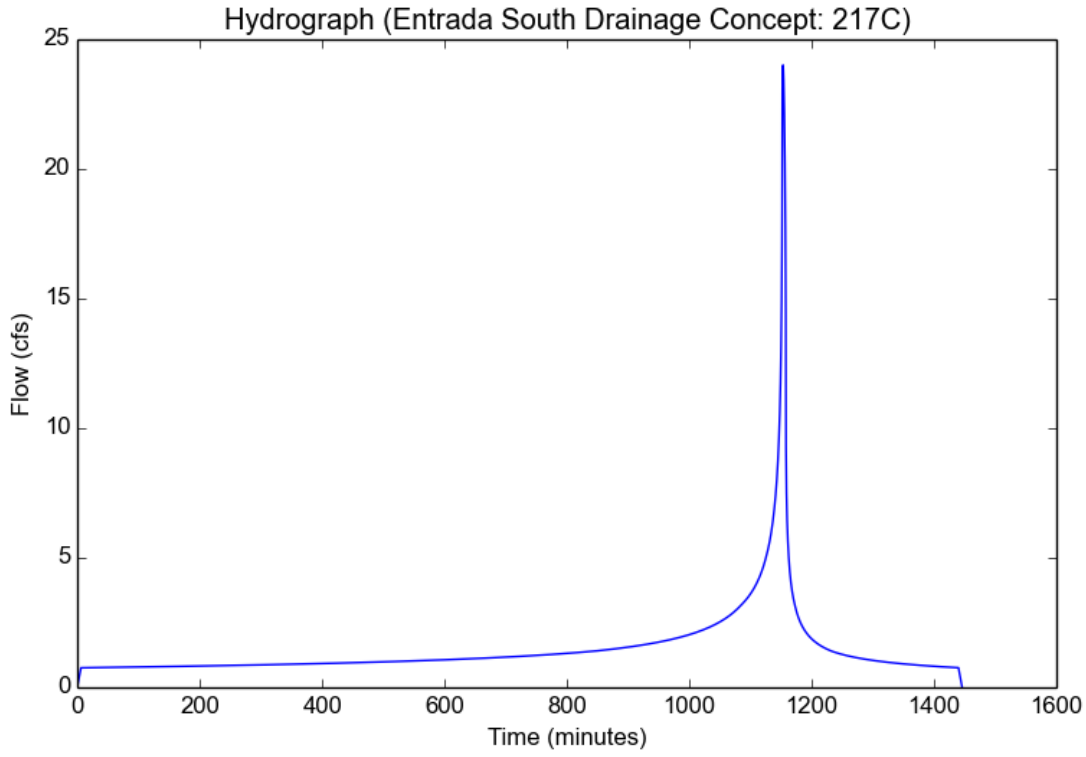
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	217C
Area (ac)	8.1
Flow Path Length (ft)	485.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.74
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.1
Peak Intensity (in/hr)	3.3405
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8873
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	24.01
Burned Peak Flow Rate (cfs)	24.01
24-Hr Clear Runoff Volume (ac-ft)	2.9974
24-Hr Clear Runoff Volume (cu-ft)	130564.7547



Peak Flow Hydrologic Analysis

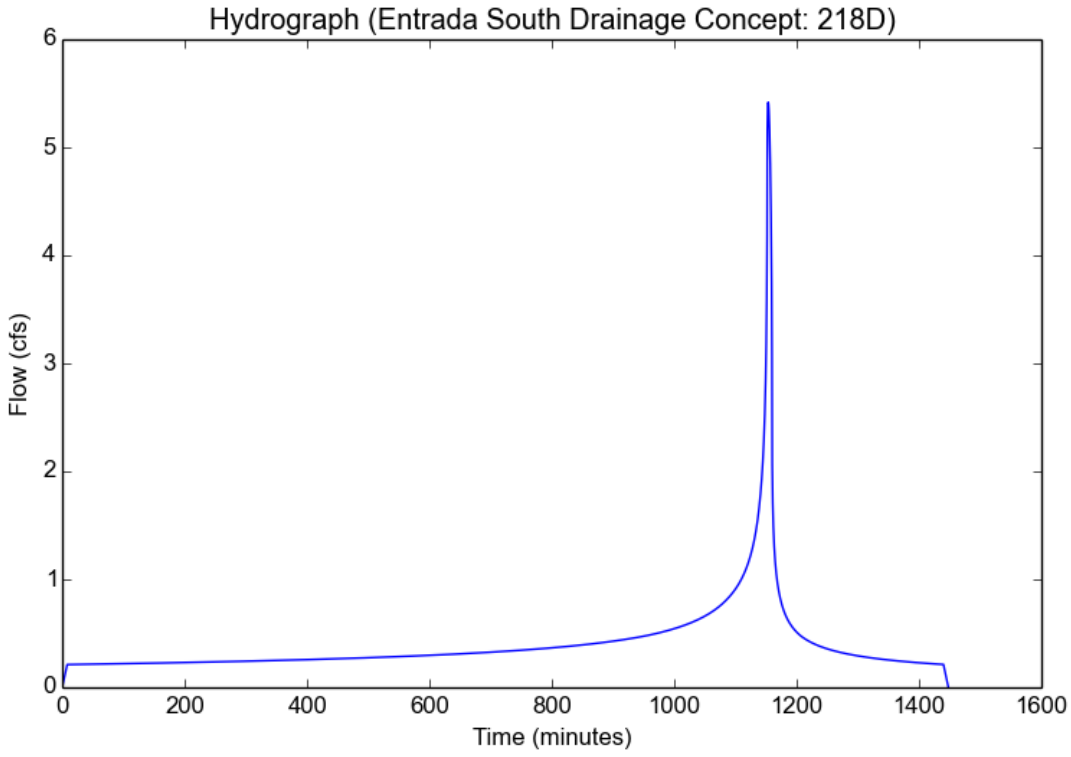
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	218D
Area (ac)	2.3
Flow Path Length (ft)	744.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	6.0
Percent Impervious	0.74
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.0
Peak Intensity (in/hr)	2.8702
Undeveloped Runoff Coefficient (Cu)	0.5948
Developed Runoff Coefficient (Cd)	0.8207
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	5.4176
Burned Peak Flow Rate (cfs)	5.4176
24-Hr Clear Runoff Volume (ac-ft)	0.8091
24-Hr Clear Runoff Volume (cu-ft)	35243.1986



Peak Flow Hydrologic Analysis

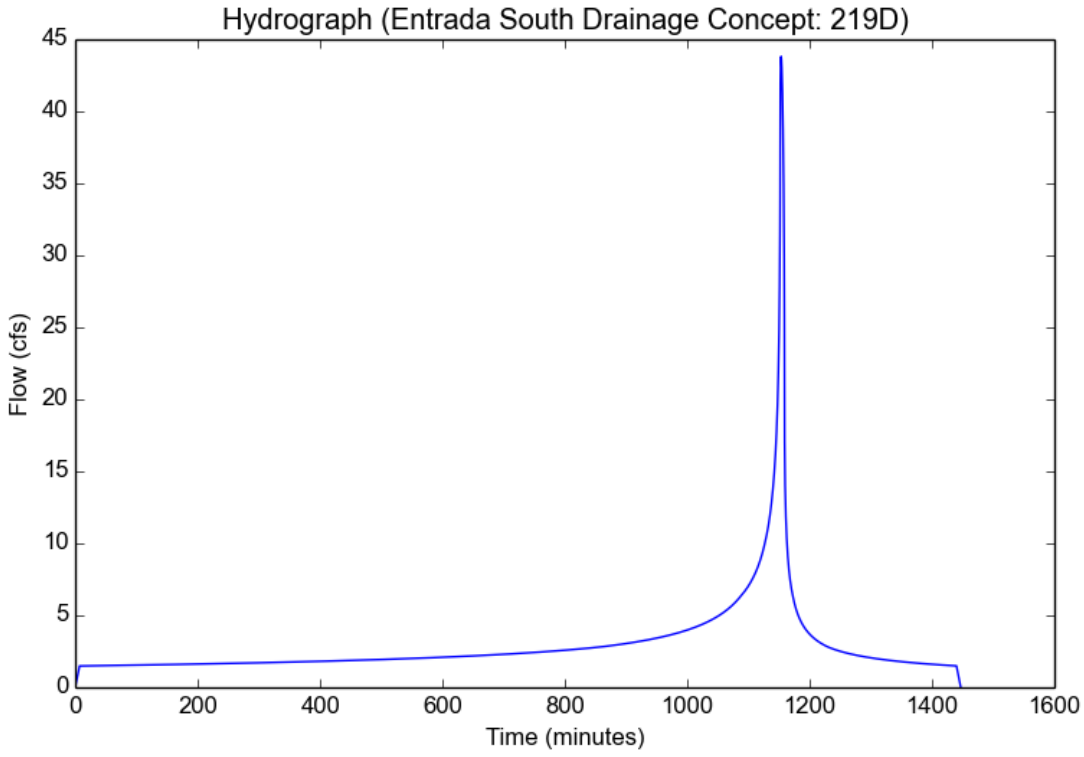
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	219D
Area (ac)	16.2
Flow Path Length (ft)	560.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	6.0
Percent Impervious	0.74
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.0
Peak Intensity (in/hr)	3.0561
Undeveloped Runoff Coefficient (Cu)	0.8424
Developed Runoff Coefficient (Cd)	0.885
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	43.8169
Burned Peak Flow Rate (cfs)	43.8169
24-Hr Clear Runoff Volume (ac-ft)	5.8901
24-Hr Clear Runoff Volume (cu-ft)	256573.3082



Peak Flow Hydrologic Analysis

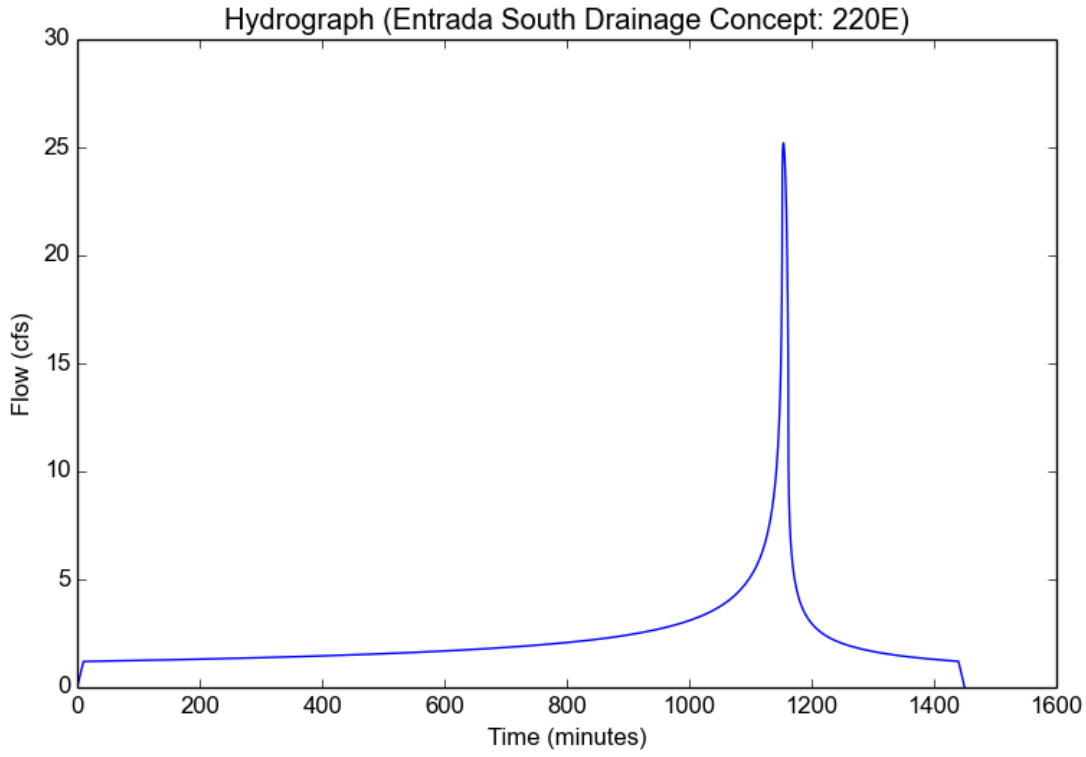
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	220E
Area (ac)	11.1
Flow Path Length (ft)	1065.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	5.9
Percent Impervious	0.91
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.9
Peak Intensity (in/hr)	2.5414
Undeveloped Runoff Coefficient (Cu)	0.8262
Developed Runoff Coefficient (Cd)	0.8934
Time of Concentration (min)	10.0
Clear Peak Flow Rate (cfs)	25.2011
Burned Peak Flow Rate (cfs)	25.2011
24-Hr Clear Runoff Volume (ac-ft)	4.5573
24-Hr Clear Runoff Volume (cu-ft)	198514.9158



Peak Flow Hydrologic Analysis

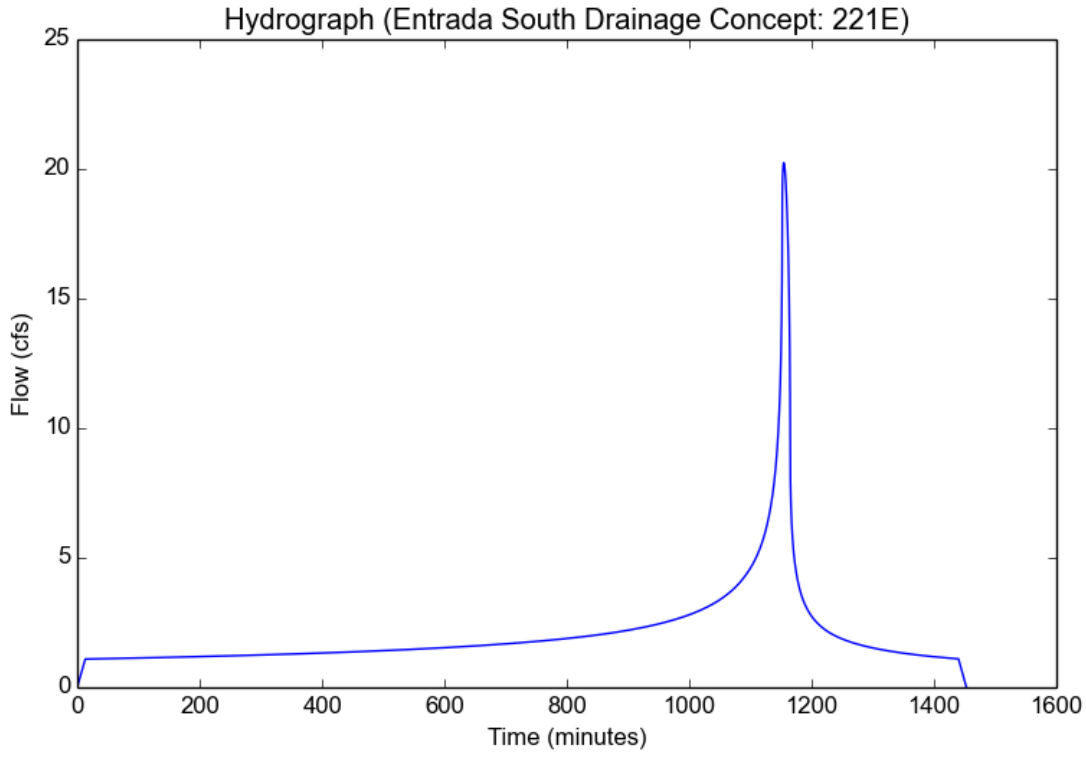
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	221E
Area (ac)	10.1
Flow Path Length (ft)	1610.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	5.9
Percent Impervious	0.91
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.9
Peak Intensity (in/hr)	2.2466
Undeveloped Runoff Coefficient (Cu)	0.8114
Developed Runoff Coefficient (Cd)	0.892
Time of Concentration (min)	13.0
Clear Peak Flow Rate (cfs)	20.2403
Burned Peak Flow Rate (cfs)	20.2403
24-Hr Clear Runoff Volume (ac-ft)	4.1467
24-Hr Clear Runoff Volume (cu-ft)	180628.781



Peak Flow Hydrologic Analysis

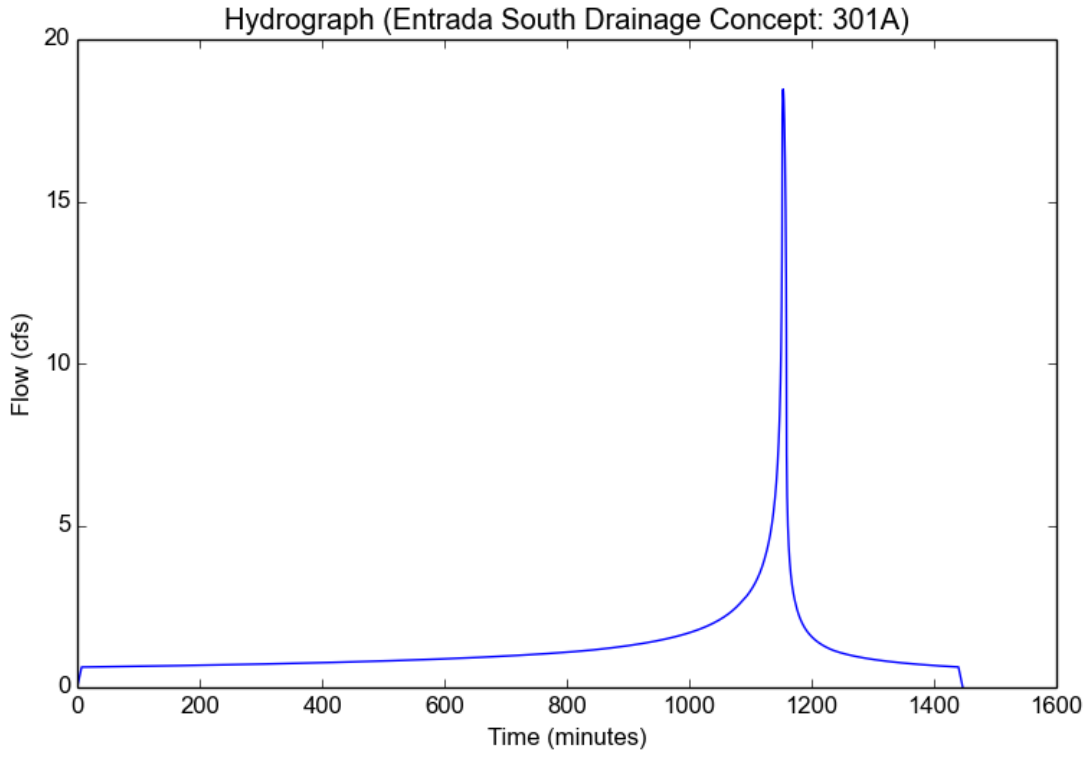
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	301A
Area (ac)	6.6
Flow Path Length (ft)	578.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	6.2
Percent Impervious	0.74
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.2
Peak Intensity (in/hr)	3.158
Undeveloped Runoff Coefficient (Cu)	0.8456
Developed Runoff Coefficient (Cd)	0.8858
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	18.4637
Burned Peak Flow Rate (cfs)	18.4637
24-Hr Clear Runoff Volume (ac-ft)	2.4849
24-Hr Clear Runoff Volume (cu-ft)	108243.4798



Peak Flow Hydrologic Analysis

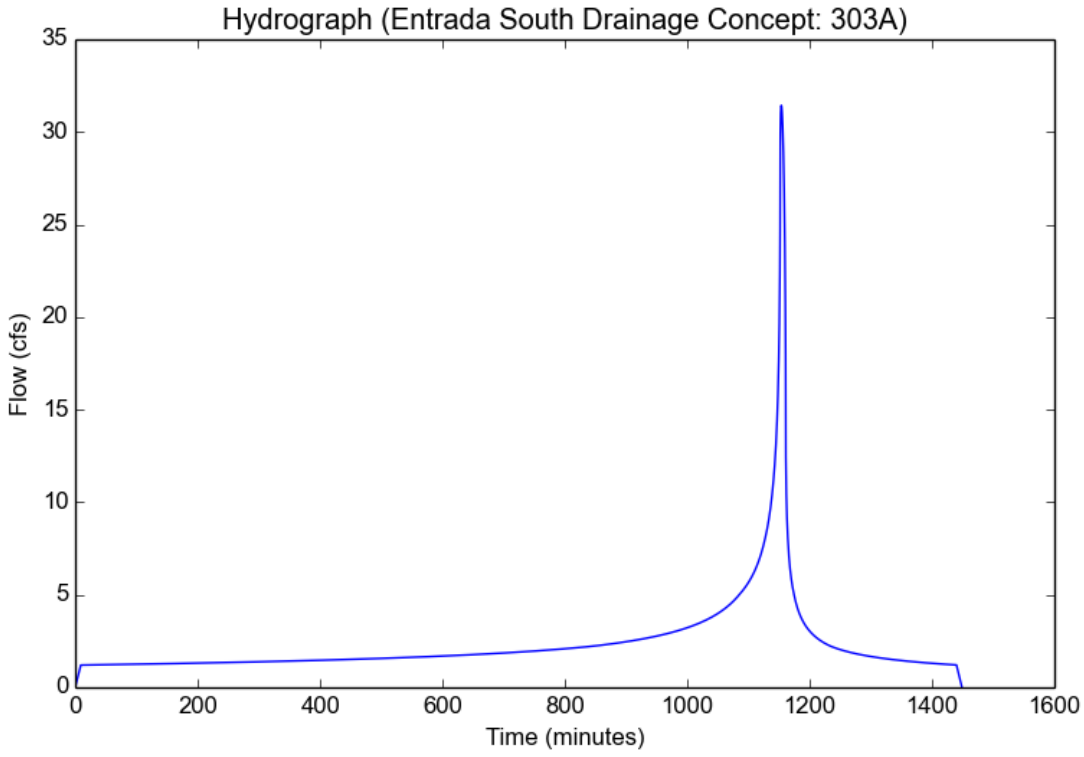
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	303A
Area (ac)	12.9
Flow Path Length (ft)	880.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.74
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.1
Peak Intensity (in/hr)	2.7609
Undeveloped Runoff Coefficient (Cu)	0.8331
Developed Runoff Coefficient (Cd)	0.8826
Time of Concentration (min)	9.0
Clear Peak Flow Rate (cfs)	31.4349
Burned Peak Flow Rate (cfs)	31.4349
24-Hr Clear Runoff Volume (ac-ft)	4.7735
24-Hr Clear Runoff Volume (cu-ft)	207933.217



Peak Flow Hydrologic Analysis

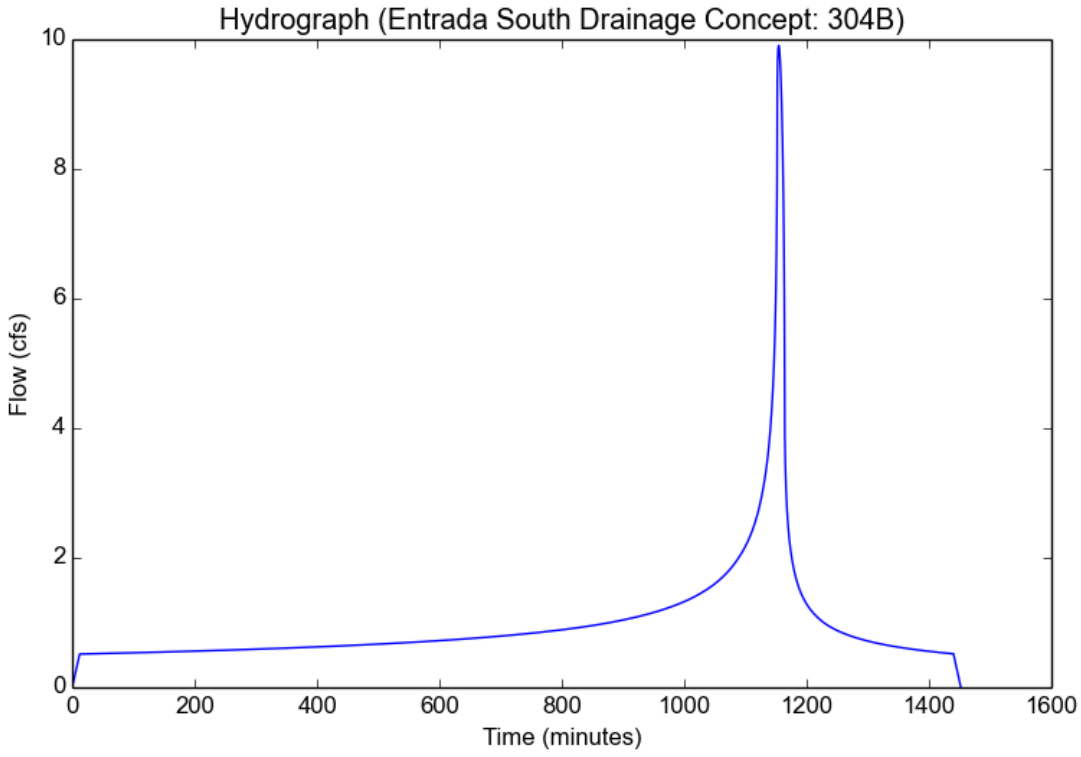
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	304B
Area (ac)	4.6
Flow Path Length (ft)	1192.0
Flow Path Slope (vft/hft)	0.01
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.91
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.1
Peak Intensity (in/hr)	2.4118
Undeveloped Runoff Coefficient (Cu)	0.8202
Developed Runoff Coefficient (Cd)	0.8928
Time of Concentration (min)	12.0
Clear Peak Flow Rate (cfs)	9.905
Burned Peak Flow Rate (cfs)	9.905
24-Hr Clear Runoff Volume (ac-ft)	1.9539
24-Hr Clear Runoff Volume (cu-ft)	85109.9324



Peak Flow Hydrologic Analysis

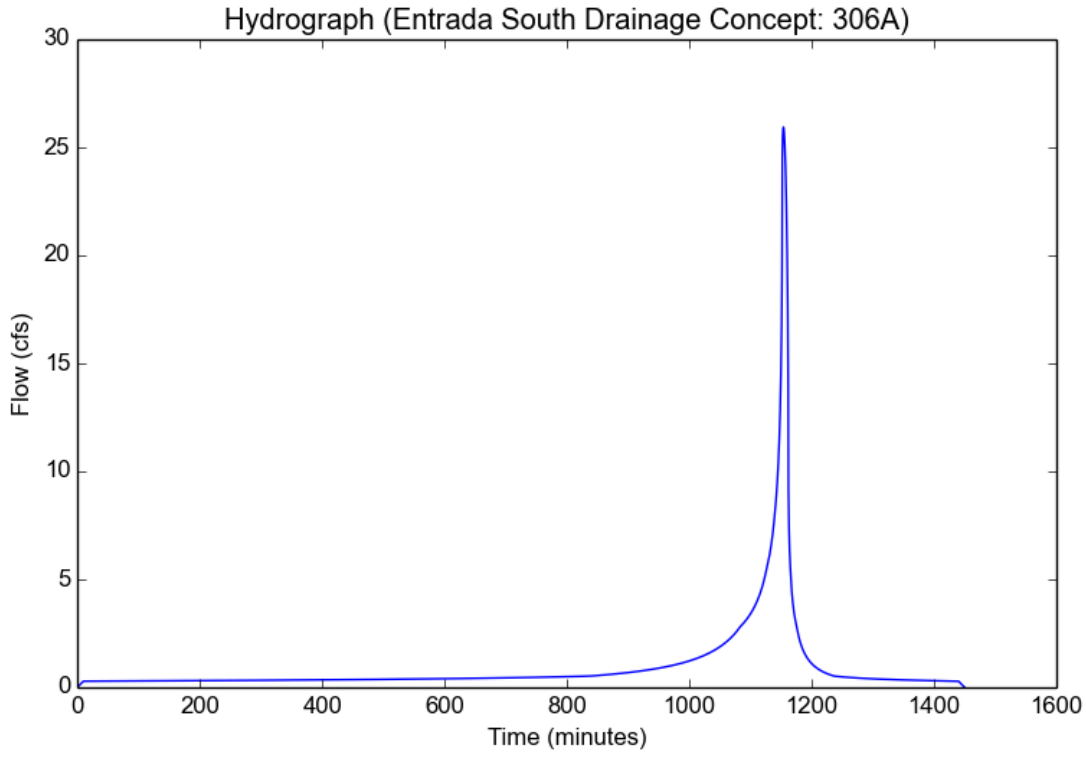
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	306A
Area (ac)	11.6
Flow Path Length (ft)	1235.0
Flow Path Slope (vft/hft)	0.04
50-yr Rainfall Depth (in)	6.2
Percent Impervious	0.1
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.2
Peak Intensity (in/hr)	2.6706
Undeveloped Runoff Coefficient (Cu)	0.8303
Developed Runoff Coefficient (Cd)	0.8372
Time of Concentration (min)	10.0
Clear Peak Flow Rate (cfs)	25.9369
Burned Peak Flow Rate (cfs)	25.9369
24-Hr Clear Runoff Volume (ac-ft)	1.9502
24-Hr Clear Runoff Volume (cu-ft)	84952.3636



Peak Flow Hydrologic Analysis

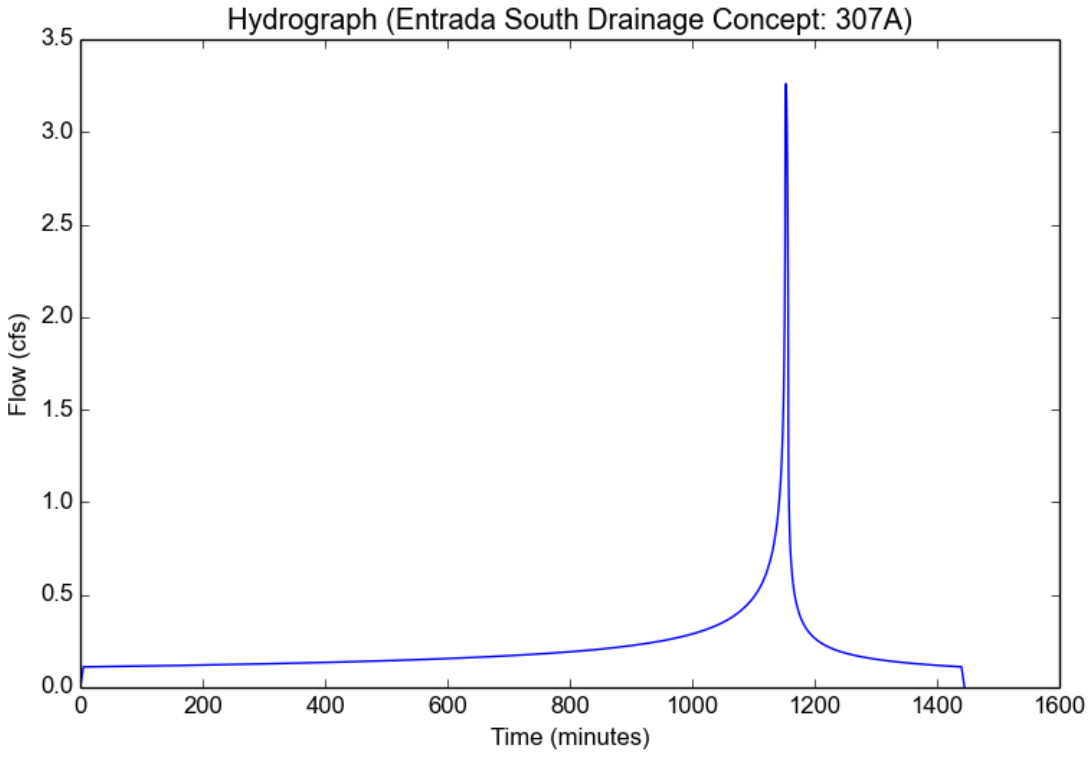
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	307A
Area (ac)	1.0
Flow Path Length (ft)	396.0
Flow Path Slope (vft/hft)	0.046
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.9
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.1
Peak Intensity (in/hr)	3.6394
Undeveloped Runoff Coefficient (Cu)	0.8586
Developed Runoff Coefficient (Cd)	0.8959
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.2604
Burned Peak Flow Rate (cfs)	3.2604
24-Hr Clear Runoff Volume (ac-ft)	0.4215
24-Hr Clear Runoff Volume (cu-ft)	18362.226



Peak Flow Hydrologic Analysis

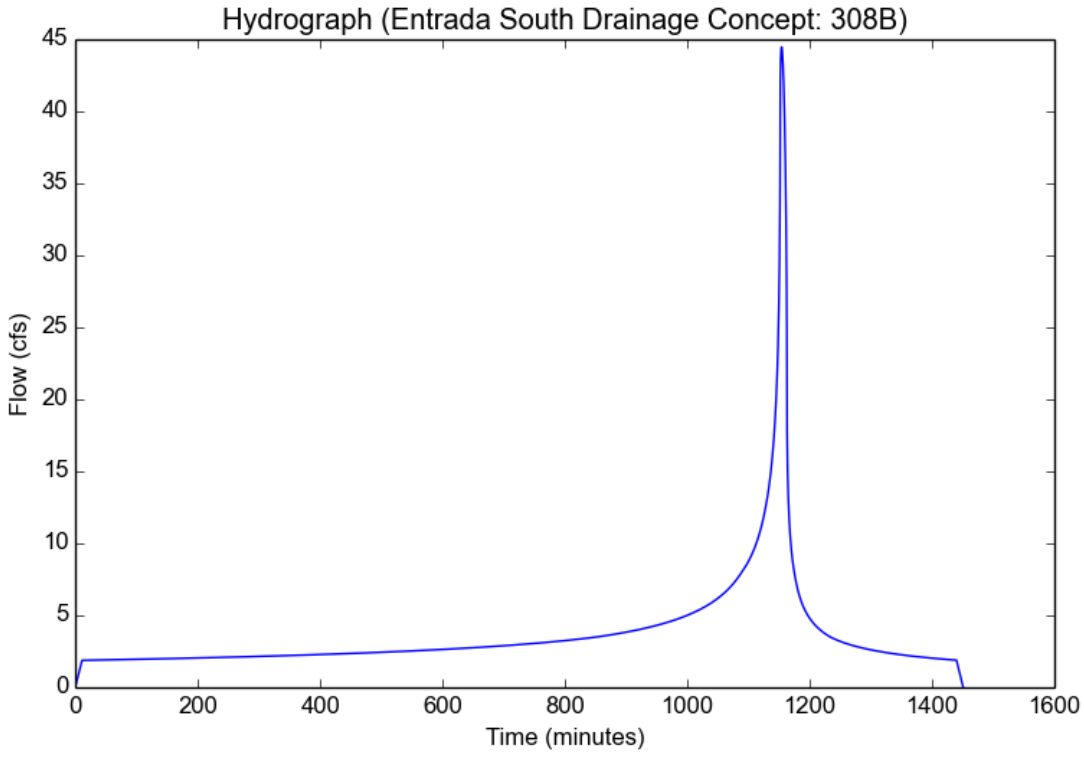
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	308B
Area (ac)	20.1
Flow Path Length (ft)	1258.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.74
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.1
Peak Intensity (in/hr)	2.5124
Undeveloped Runoff Coefficient (Cu)	0.8253
Developed Runoff Coefficient (Cd)	0.8806
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	44.4691
Burned Peak Flow Rate (cfs)	44.4691
24-Hr Clear Runoff Volume (ac-ft)	7.4378
24-Hr Clear Runoff Volume (cu-ft)	323989.5338



Peak Flow Hydrologic Analysis

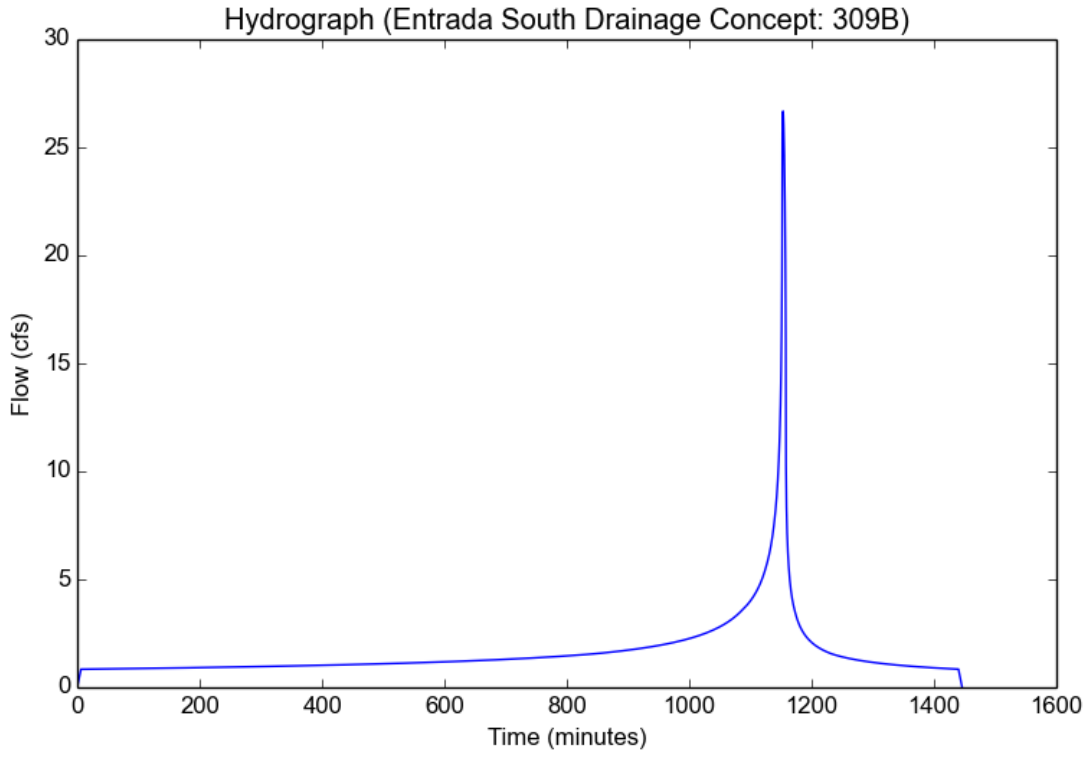
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	309B
Area (ac)	9.0
Flow Path Length (ft)	545.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.74
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.1
Peak Intensity (in/hr)	3.3405
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8873
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	26.6778
Burned Peak Flow Rate (cfs)	26.6778
24-Hr Clear Runoff Volume (ac-ft)	3.3304
24-Hr Clear Runoff Volume (cu-ft)	145071.9497



Peak Flow Hydrologic Analysis

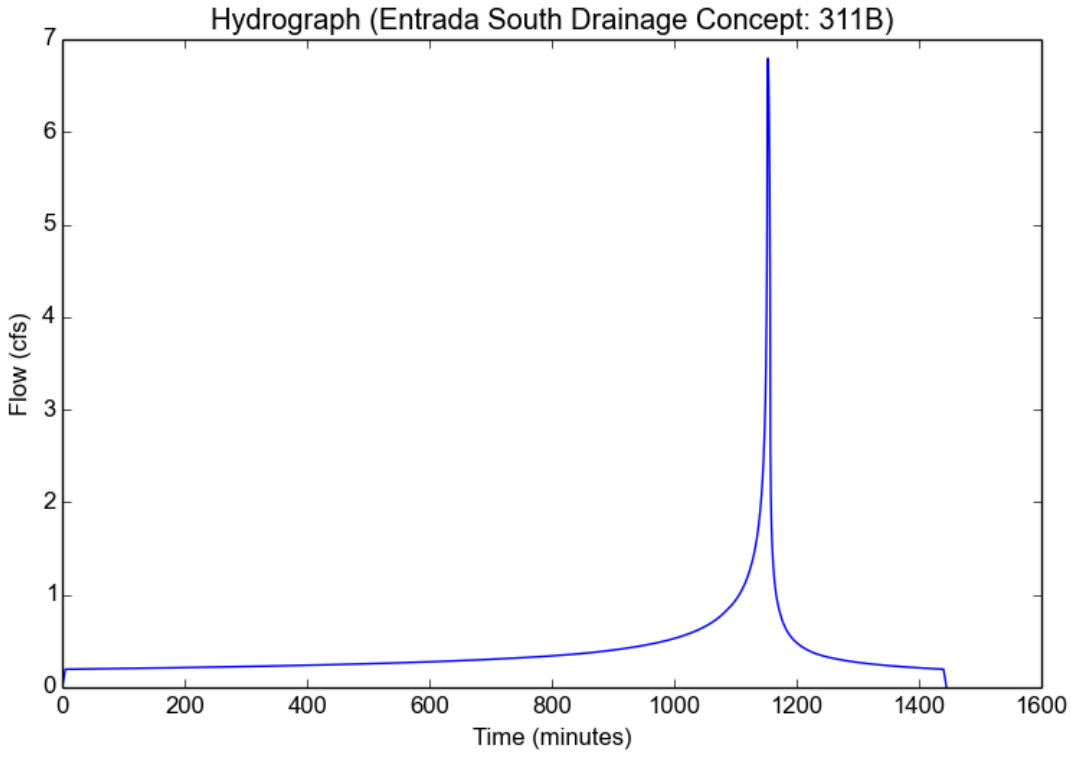
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	311B
Area (ac)	2.1
Flow Path Length (ft)	385.0
Flow Path Slope (vft/hft)	0.05
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.74
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.1
Peak Intensity (in/hr)	3.6394
Undeveloped Runoff Coefficient (Cu)	0.8586
Developed Runoff Coefficient (Cd)	0.8892
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	6.7963
Burned Peak Flow Rate (cfs)	6.7963
24-Hr Clear Runoff Volume (ac-ft)	0.7771
24-Hr Clear Runoff Volume (cu-ft)	33850.6932



Peak Flow Hydrologic Analysis

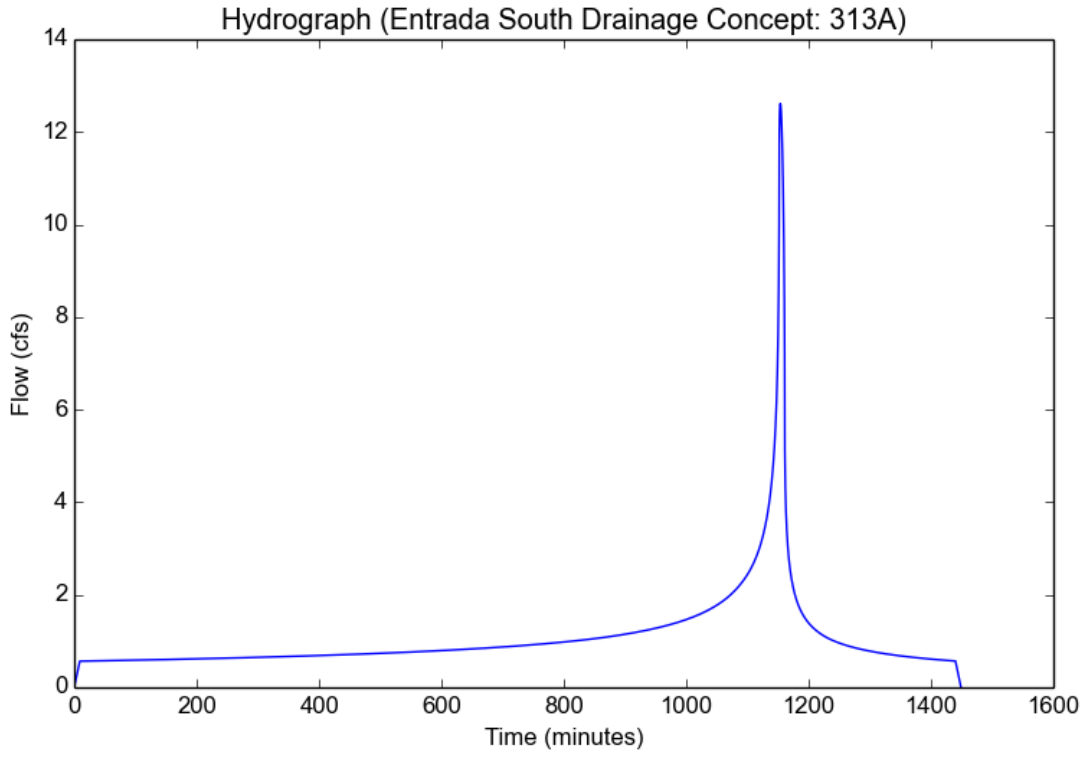
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	313A
Area (ac)	5.2
Flow Path Length (ft)	1200.0
Flow Path Slope (vft/hft)	0.06
50-yr Rainfall Depth (in)	6.0
Percent Impervious	0.9
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.0
Peak Intensity (in/hr)	2.7157
Undeveloped Runoff Coefficient (Cu)	0.8317
Developed Runoff Coefficient (Cd)	0.8932
Time of Concentration (min)	9.0
Clear Peak Flow Rate (cfs)	12.6128
Burned Peak Flow Rate (cfs)	12.6128
24-Hr Clear Runoff Volume (ac-ft)	2.1553
24-Hr Clear Runoff Volume (cu-ft)	93883.7975



Peak Flow Hydrologic Analysis

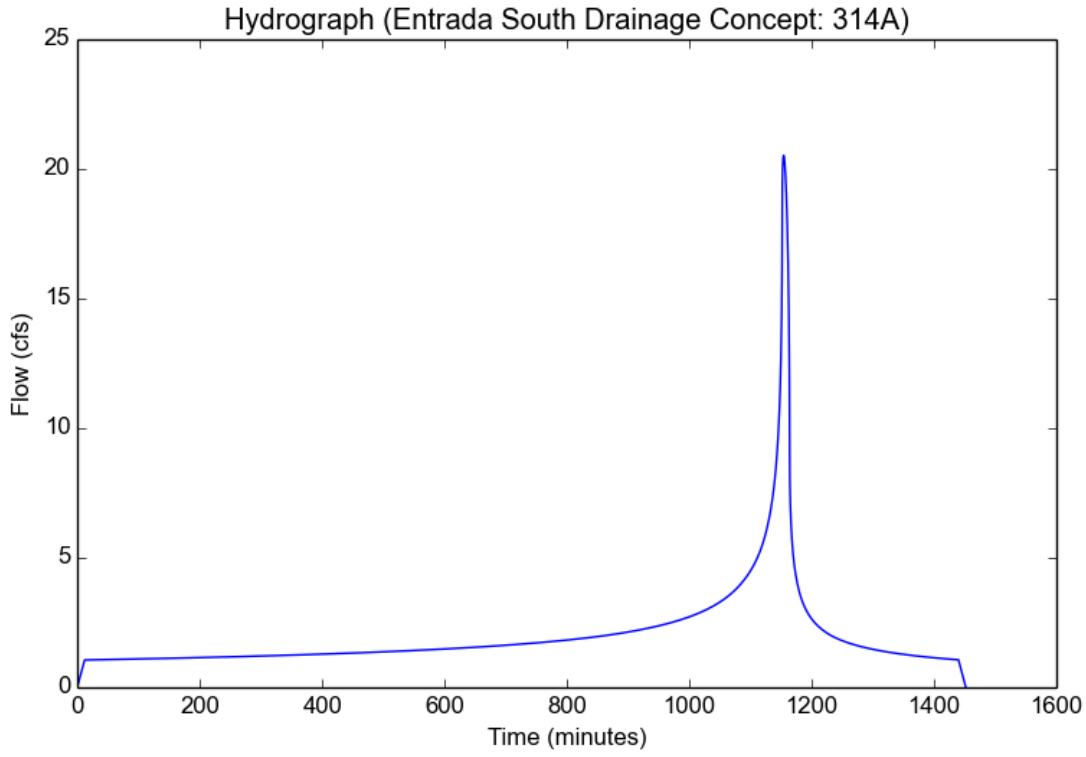
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	314A
Area (ac)	9.7
Flow Path Length (ft)	1435.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	6.0
Percent Impervious	0.9
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.0
Peak Intensity (in/hr)	2.3722
Undeveloped Runoff Coefficient (Cu)	0.8181
Developed Runoff Coefficient (Cd)	0.8918
Time of Concentration (min)	12.0
Clear Peak Flow Rate (cfs)	20.5211
Burned Peak Flow Rate (cfs)	20.5211
24-Hr Clear Runoff Volume (ac-ft)	4.0204
24-Hr Clear Runoff Volume (cu-ft)	175128.2405



Peak Flow Hydrologic Analysis

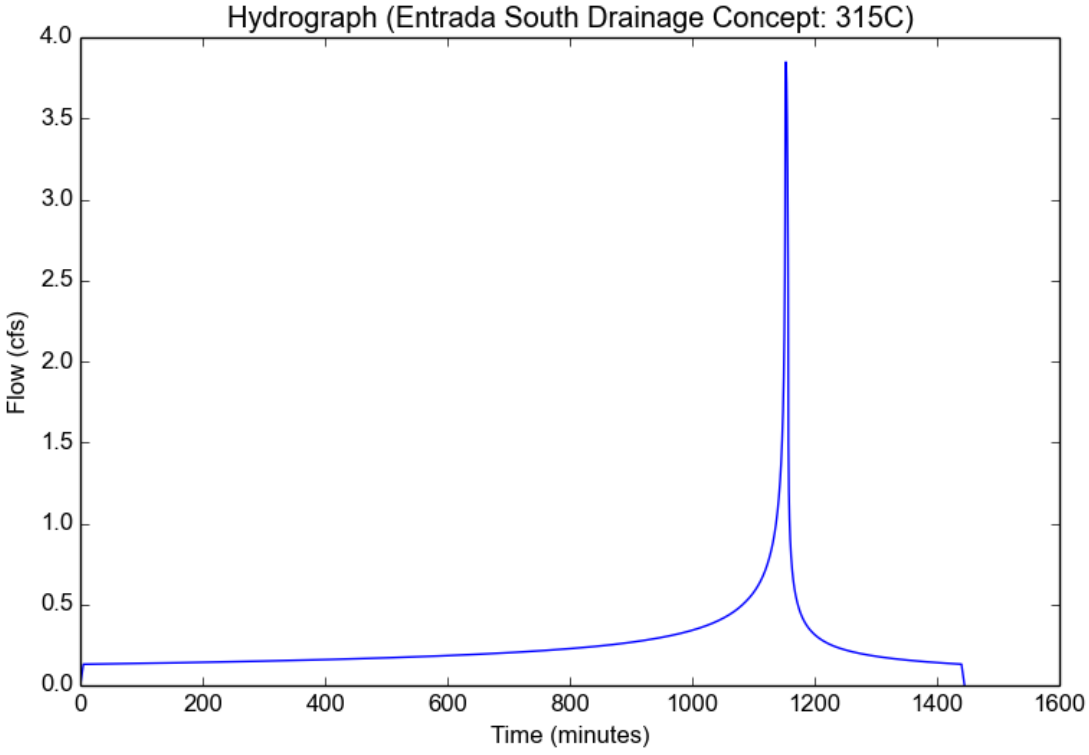
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	315C
Area (ac)	1.2
Flow Path Length (ft)	562.0
Flow Path Slope (vft/hft)	0.06
50-yr Rainfall Depth (in)	6.0
Percent Impervious	0.9
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.0
Peak Intensity (in/hr)	3.5798
Undeveloped Runoff Coefficient (Cu)	0.8577
Developed Runoff Coefficient (Cd)	0.8958
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.848
Burned Peak Flow Rate (cfs)	3.848
24-Hr Clear Runoff Volume (ac-ft)	0.4974
24-Hr Clear Runoff Volume (cu-ft)	21665.7027



Peak Flow Hydrologic Analysis

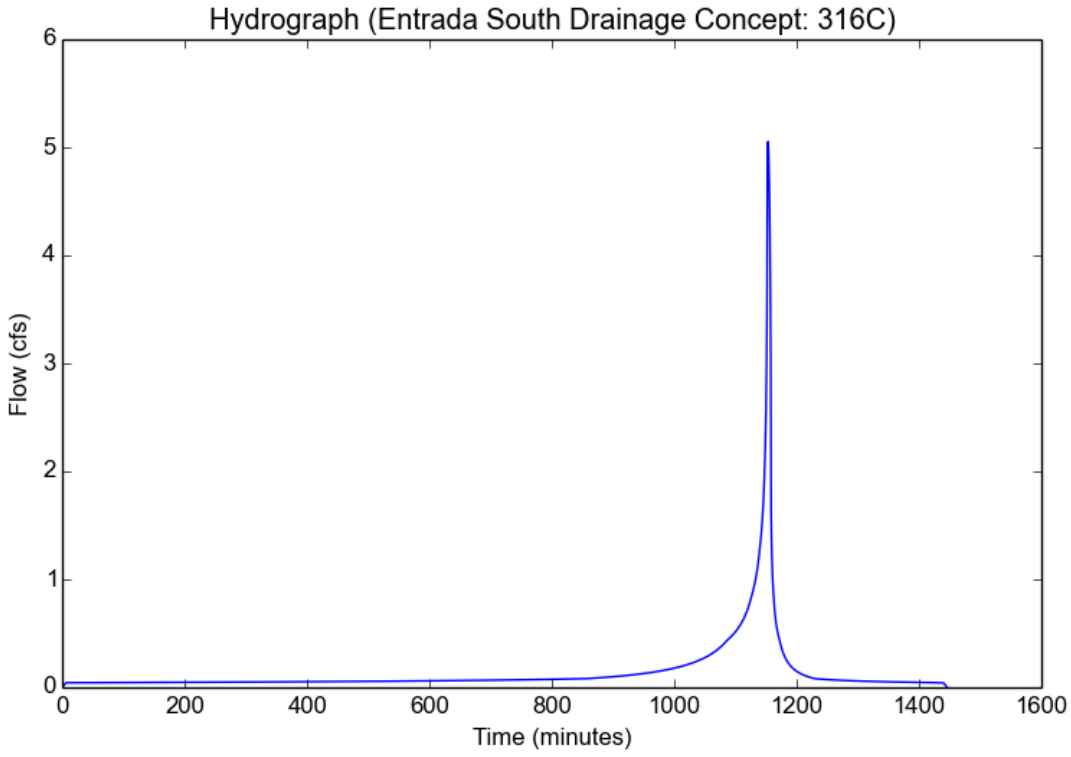
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	316C
Area (ac)	1.8
Flow Path Length (ft)	600.0
Flow Path Slope (vft/hft)	0.04
50-yr Rainfall Depth (in)	6.0
Percent Impervious	0.1
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.0
Peak Intensity (in/hr)	3.2858
Undeveloped Runoff Coefficient (Cu)	0.8496
Developed Runoff Coefficient (Cd)	0.8546
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	5.0546
Burned Peak Flow Rate (cfs)	5.0546
24-Hr Clear Runoff Volume (ac-ft)	0.2881
24-Hr Clear Runoff Volume (cu-ft)	12548.9947



Peak Flow Hydrologic Analysis

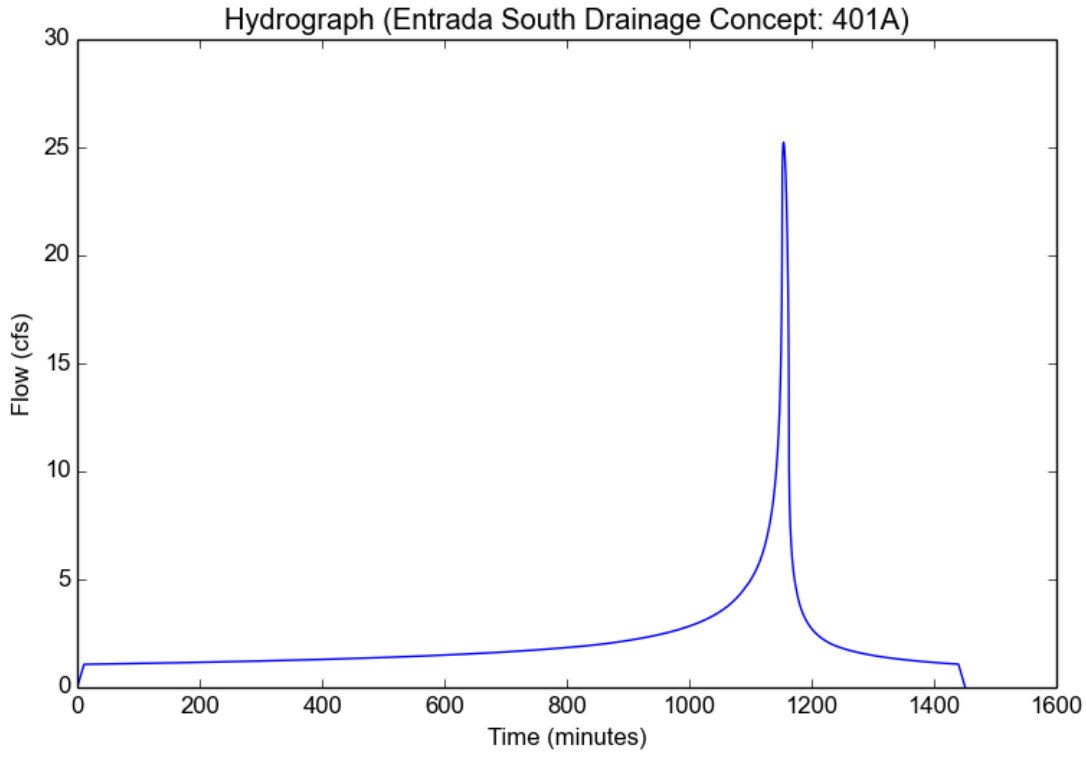
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	401A
Area (ac)	11.6
Flow Path Length (ft)	1300.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	6.0
Percent Impervious	0.74
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.0
Peak Intensity (in/hr)	2.4712
Undeveloped Runoff Coefficient (Cu)	0.8234
Developed Runoff Coefficient (Cd)	0.8801
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	25.2287
Burned Peak Flow Rate (cfs)	25.2287
24-Hr Clear Runoff Volume (ac-ft)	4.2176
24-Hr Clear Runoff Volume (cu-ft)	183718.1833



Peak Flow Hydrologic Analysis

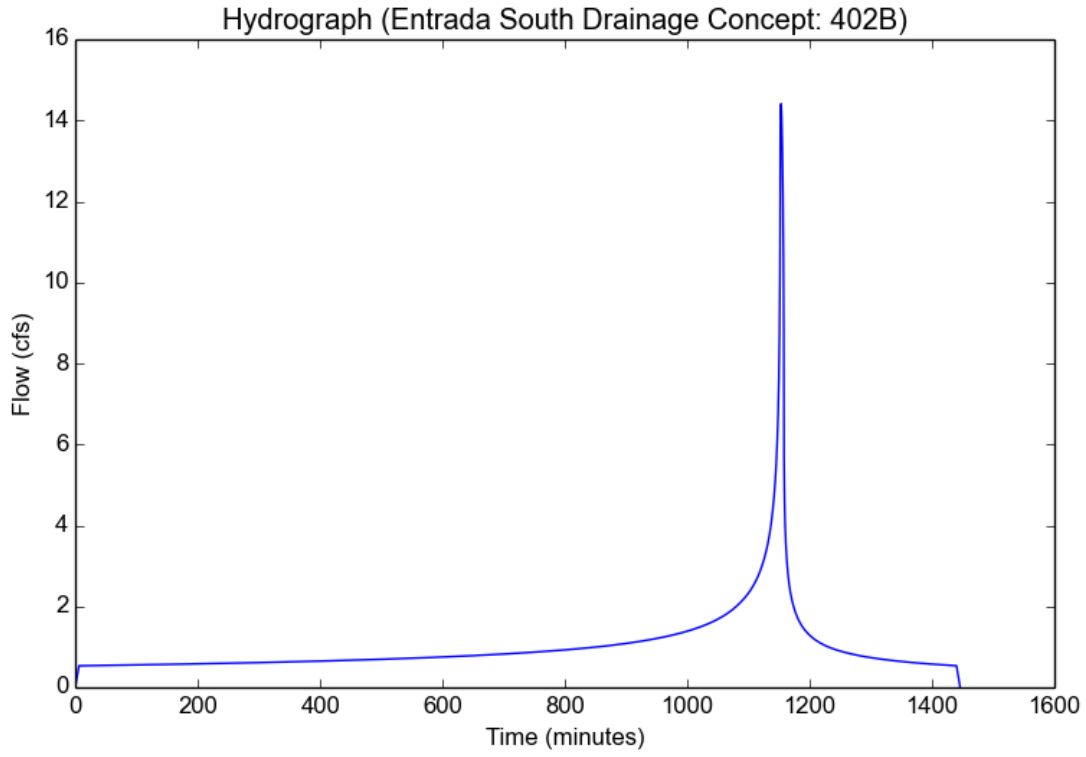
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	402B
Area (ac)	4.9
Flow Path Length (ft)	714.0
Flow Path Slope (vft/hft)	0.06
50-yr Rainfall Depth (in)	6.0
Percent Impervious	0.9
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.0
Peak Intensity (in/hr)	3.2858
Undeveloped Runoff Coefficient (Cu)	0.8496
Developed Runoff Coefficient (Cd)	0.895
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	14.4092
Burned Peak Flow Rate (cfs)	14.4092
24-Hr Clear Runoff Volume (ac-ft)	2.0309
24-Hr Clear Runoff Volume (cu-ft)	88467.7218



Peak Flow Hydrologic Analysis

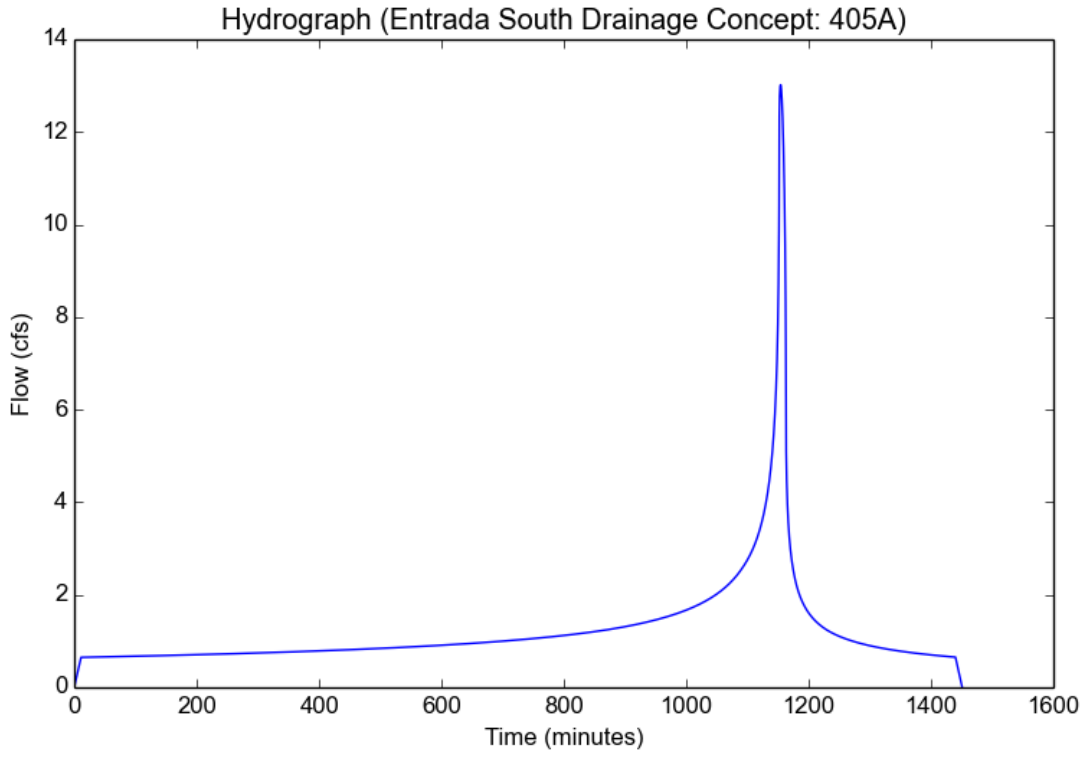
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	405A
Area (ac)	6.0
Flow Path Length (ft)	1260.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	5.9
Percent Impervious	0.91
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.9
Peak Intensity (in/hr)	2.4301
Undeveloped Runoff Coefficient (Cu)	0.8212
Developed Runoff Coefficient (Cd)	0.8929
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	13.0189
Burned Peak Flow Rate (cfs)	13.0189
24-Hr Clear Runoff Volume (ac-ft)	2.4634
24-Hr Clear Runoff Volume (cu-ft)	107304.8992



Peak Flow Hydrologic Analysis

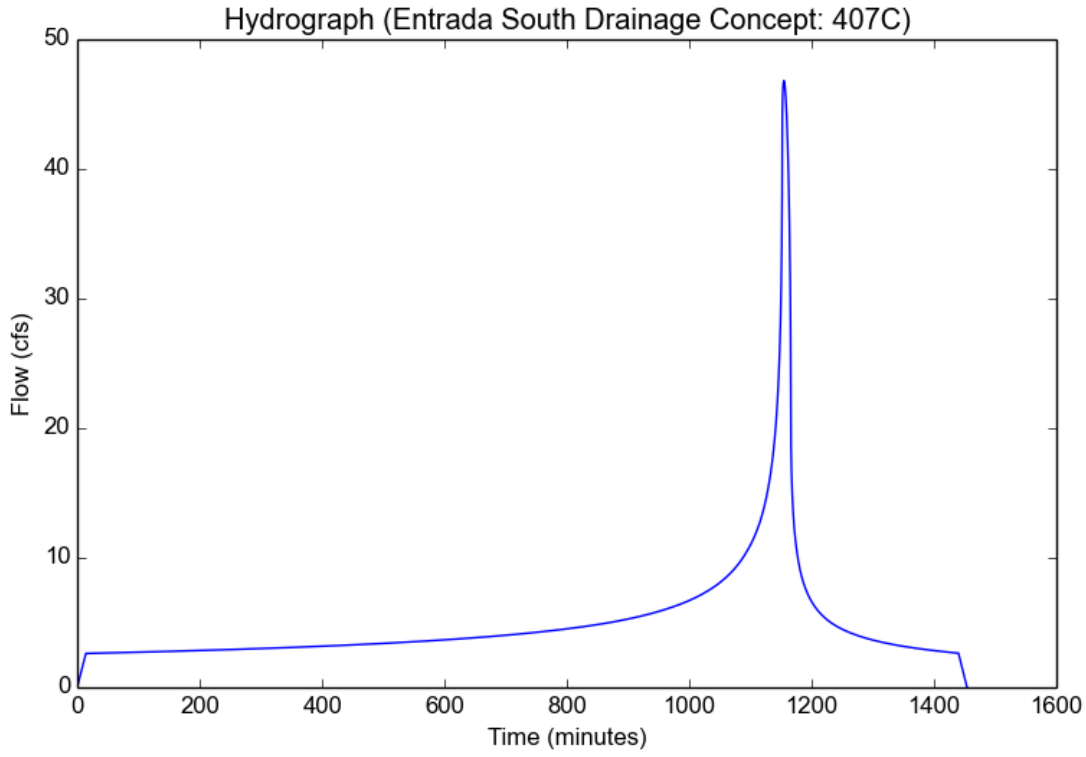
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	407C
Area (ac)	24.2
Flow Path Length (ft)	1812.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	5.9
Percent Impervious	0.91
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.9
Peak Intensity (in/hr)	2.1697
Undeveloped Runoff Coefficient (Cu)	0.8073
Developed Runoff Coefficient (Cd)	0.8917
Time of Concentration (min)	14.0
Clear Peak Flow Rate (cfs)	46.8172
Burned Peak Flow Rate (cfs)	46.8172
24-Hr Clear Runoff Volume (ac-ft)	9.9356
24-Hr Clear Runoff Volume (cu-ft)	432793.0246



Peak Flow Hydrologic Analysis

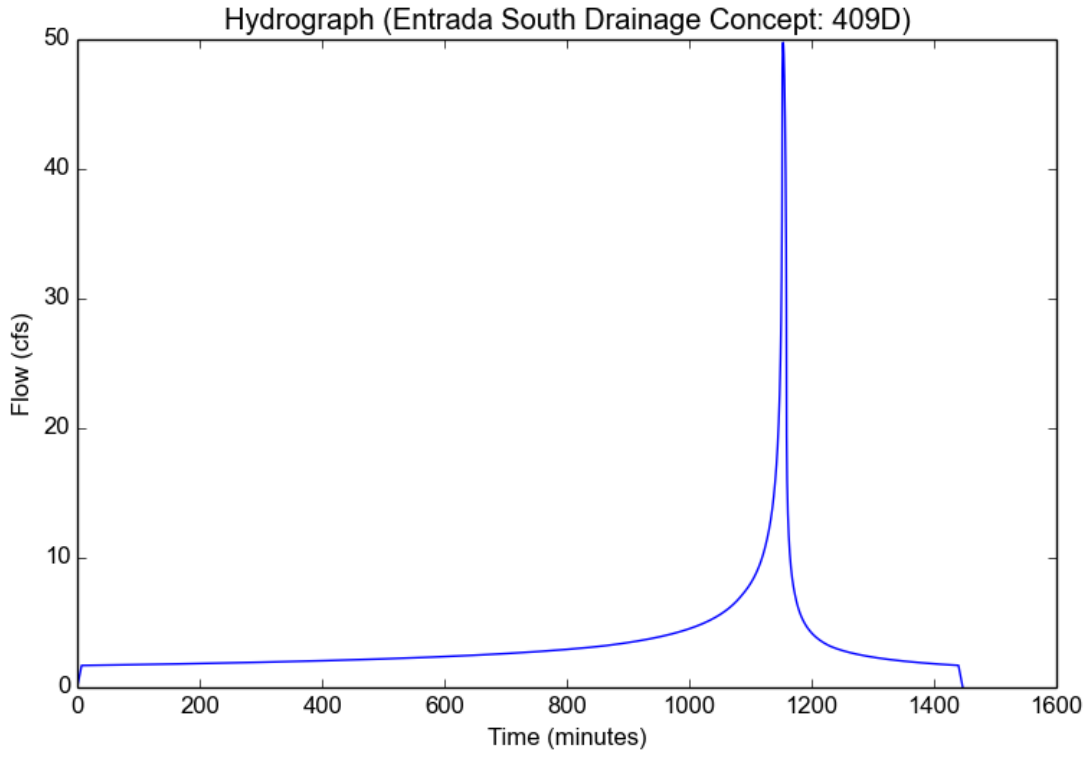
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	409D
Area (ac)	18.4
Flow Path Length (ft)	575.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	6.0
Percent Impervious	0.74
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.0
Peak Intensity (in/hr)	3.0561
Undeveloped Runoff Coefficient (Cu)	0.8424
Developed Runoff Coefficient (Cd)	0.885
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	49.7673
Burned Peak Flow Rate (cfs)	49.7673
24-Hr Clear Runoff Volume (ac-ft)	6.69
24-Hr Clear Runoff Volume (cu-ft)	291416.5969



Peak Flow Hydrologic Analysis

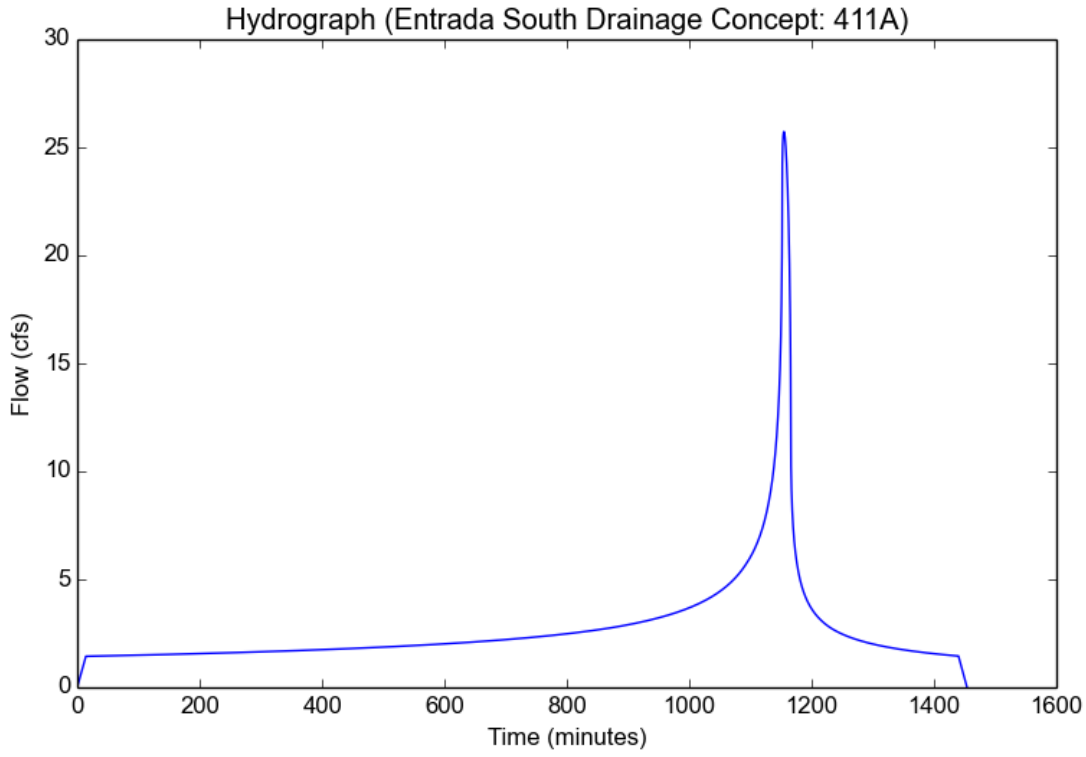
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	411A
Area (ac)	13.3
Flow Path Length (ft)	1946.0
Flow Path Slope (vft/hft)	0.03
50-yr Rainfall Depth (in)	5.9
Percent Impervious	0.91
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.9
Peak Intensity (in/hr)	2.1697
Undeveloped Runoff Coefficient (Cu)	0.8073
Developed Runoff Coefficient (Cd)	0.8917
Time of Concentration (min)	14.0
Clear Peak Flow Rate (cfs)	25.7301
Burned Peak Flow Rate (cfs)	25.7301
24-Hr Clear Runoff Volume (ac-ft)	5.4605
24-Hr Clear Runoff Volume (cu-ft)	237857.3235



Peak Flow Hydrologic Analysis

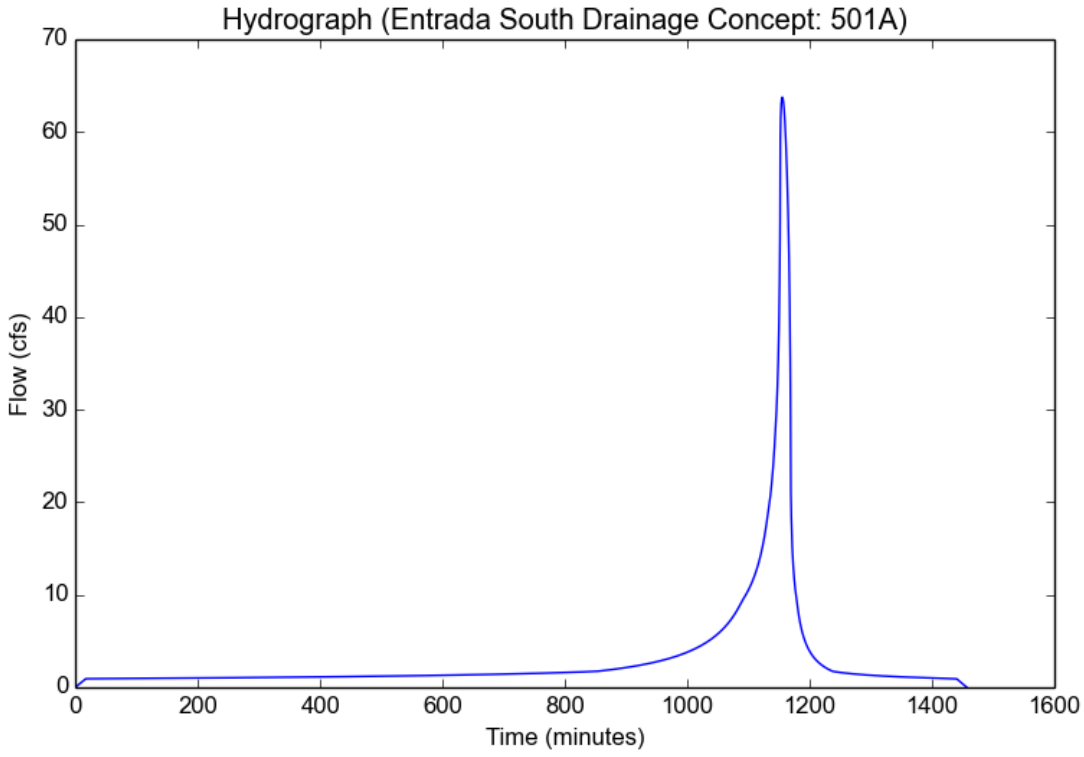
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	501A
Area (ac)	38.4
Flow Path Length (ft)	2897.0
Flow Path Slope (vft/hft)	0.05
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.1
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0.34
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.1
Peak Intensity (in/hr)	2.0476
Undeveloped Runoff Coefficient (Cu)	0.8008
Developed Runoff Coefficient (Cd)	0.8108
Time of Concentration (min)	17.0
Clear Peak Flow Rate (cfs)	63.7469
Burned Peak Flow Rate (cfs)	65.6224
24-Hr Clear Runoff Volume (ac-ft)	6.2969
24-Hr Clear Runoff Volume (cu-ft)	274290.7902



Peak Flow Hydrologic Analysis

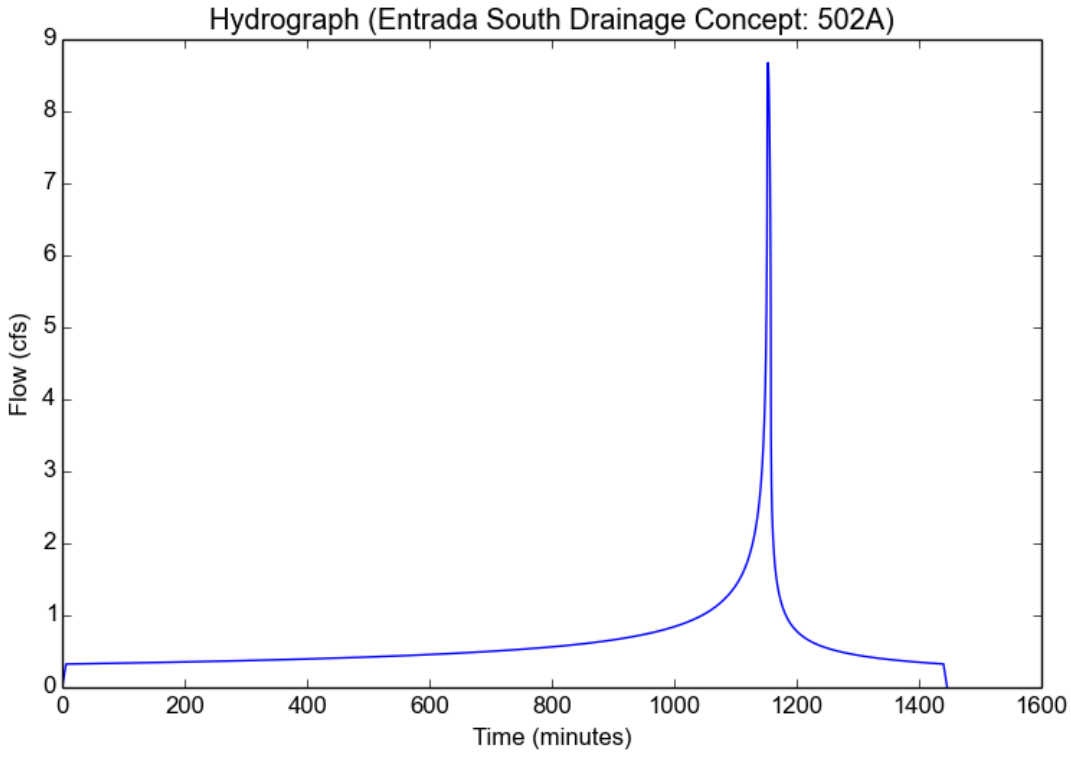
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	502A
Area (ac)	2.9
Flow Path Length (ft)	391.0
Flow Path Slope (vft/hft)	0.01
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.91
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.1
Peak Intensity (in/hr)	3.3405
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8956
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	8.6764
Burned Peak Flow Rate (cfs)	8.6764
24-Hr Clear Runoff Volume (ac-ft)	1.2318
24-Hr Clear Runoff Volume (cu-ft)	53656.7036



Peak Flow Hydrologic Analysis

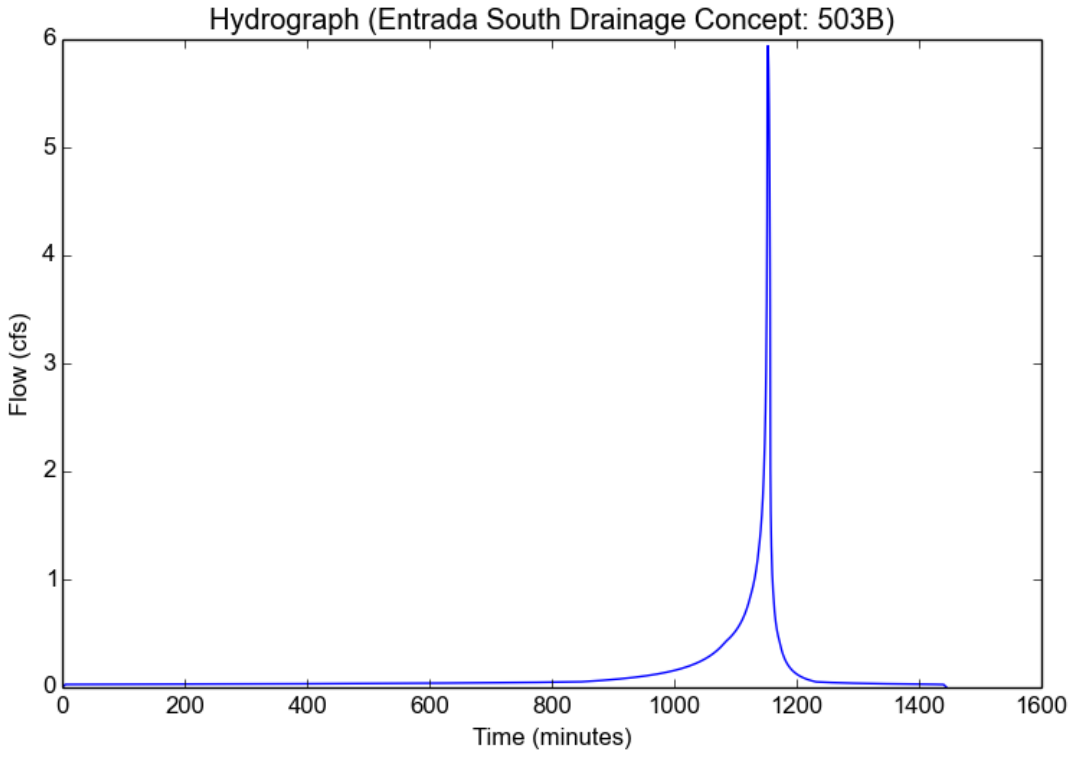
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	503B
Area (ac)	1.9
Flow Path Length (ft)	240.0
Flow Path Slope (vft/hft)	0.05
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.01
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0.34
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.1
Peak Intensity (in/hr)	3.6394
Undeveloped Runoff Coefficient (Cu)	0.8586
Developed Runoff Coefficient (Cd)	0.8591
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	5.9403
Burned Peak Flow Rate (cfs)	6.0751
24-Hr Clear Runoff Volume (ac-ft)	0.2568
24-Hr Clear Runoff Volume (cu-ft)	11184.1265



Peak Flow Hydrologic Analysis

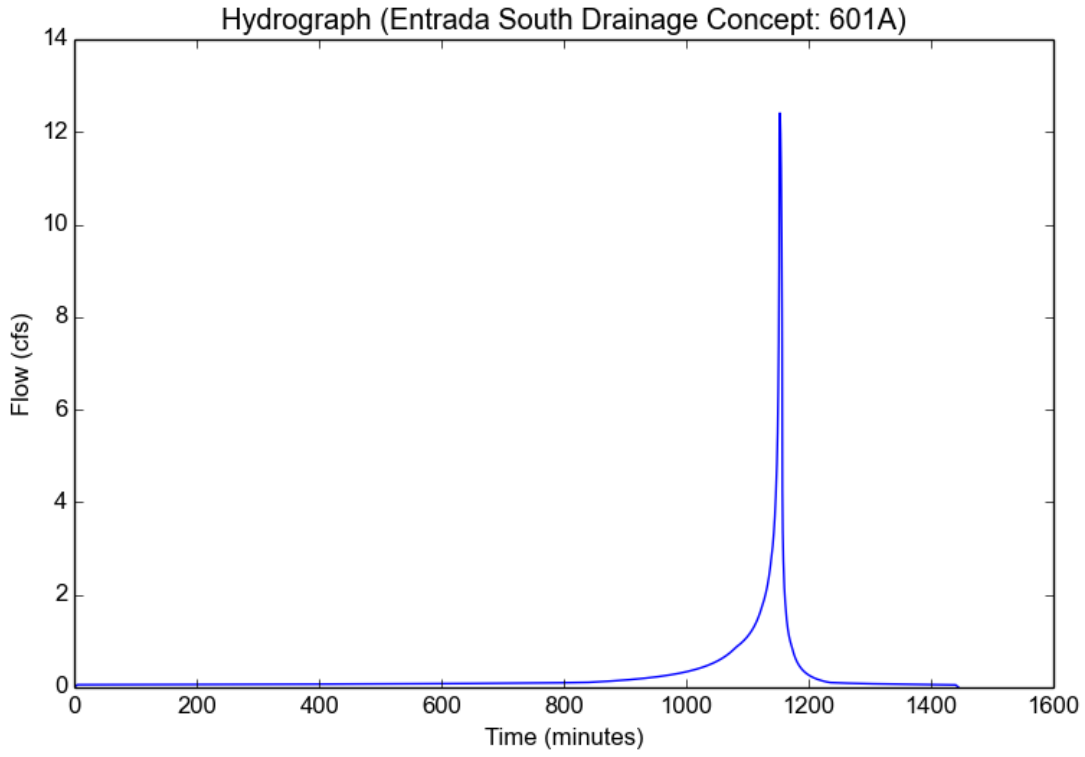
File location: G:/Newhall Ranch/53295 Entrada/Storm/Hydrology/Calculations/Hydrocalc/Proposed/Entrada South Drainage Concept Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Entrada South Drainage Concept
Subarea ID	601A
Area (ac)	3.9
Flow Path Length (ft)	670.0
Flow Path Slope (vft/hft)	0.13
50-yr Rainfall Depth (in)	6.2
Percent Impervious	0.01
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0.34
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.2
Peak Intensity (in/hr)	3.6991
Undeveloped Runoff Coefficient (Cu)	0.8596
Developed Runoff Coefficient (Cd)	0.8601
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	12.4075
Burned Peak Flow Rate (cfs)	12.6872
24-Hr Clear Runoff Volume (ac-ft)	0.5416
24-Hr Clear Runoff Volume (cu-ft)	23591.0742



B-2: Modified Rational Method of Hydrology LAR04 Results (Clear & Burn)

B-2.1: 100 Watershed LAR04 Results

Clear

Program Package Serial Number: 2061

11/13/24 FILE: p-100 INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 1

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\scr_soilx_34.dat

ENTRADA SOUTH PROPOSED WATERSHED

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
3582	101A	6.1	19.49	6.1	19.49	0	0.	.00000	.00	.00	0.	98	5	A31	.03
3582	102B	3.9	12.50	3.9	12.50	0	0.	.00000	.00	.00	0.	98	5	A31	.10
3582	103AB	3.9	12.50	10.0	32.00	4	2430.	.02000	8.00	.00	0.	98	0	A31	.00
3582	104A	3.1	8.93	13.1	28.70	0	0.	.00000	.00	.00	0.	98	6	A31	.10
3582	105C	2.4	7.94	2.4	7.94	0	0.	.00000	.00	.00	0.	98	5	A31	.80
3582	106AC	2.4	7.94	15.5	33.13	0	0.	.00000	.00	.00	0.	98	0	A31	.00
3582	107B	10.6	20.58	10.6	20.58	0	0.	.00000	.00	.00	0.	98	13	A31	.10
3582	108B	.0	.00	10.6	20.58	4	150.	.02000	3.50	.00	0.	98	99	A31	.00
3582	109B	1.5	3.73	12.1	24.27	4	75.	.02000	3.50	.00	0.	98	8	A31	.10
3582	110B	2.3	5.15	14.4	29.33	0	0.	.00000	.00	.00	0.	98	10	A31	.10
3582	111B	.0	.00	14.4	29.33	0	0.	.00000	.00	.00	0.	98	99	A31	.00
3582	112AB	14.4	29.33	29.9	62.18	5	310.	.09000	6.00	.00	0.	98	0	A31	.00
3582	113B	1.4	4.65	1.4	4.65	4	160.	.02000	2.00	.00	0.	98	5	A31	.90
3582	114AB	1.4	4.39	31.3	65.58	0	0.	.00000	.00	.00	0.	98	0	A31	.00

Burn

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\scr_soilx_34.dat

ENTRADA SOUTH PROPOSED WATERSHED

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
3582	101A	6.1	19.92	6.1	19.92	0	0.	.00000	.00	.00	0.	298	5	A31	.03
3582	102B	3.9	12.76	3.9	12.76	0	0.	.00000	.00	.00	0.	298	5	A31	.10
3582	103AB	3.9	12.76	10.0	32.68	4	2430.	.02000	8.00	.00	0.	98	0	A31	.00
3582	104A	3.1	8.93	13.1	29.28	0	0.	.00000	.00	.00	0.	98	6	A31	.10
3582	105C	2.4	7.94	2.4	7.94	0	0.	.00000	.00	.00	0.	98	5	A31	.80
3582	106AC	2.4	7.94	15.5	33.68	0	0.	.00000	.00	.00	0.	98	0	A31	.00
3582	107B	10.6	21.10	10.6	21.10	0	0.	.00000	.00	.00	0.	298	13	A31	.10
3582	108B	.0	.00	10.6	21.10	4	150.	.02000	3.50	.00	0.	98	99	A31	.00
3582	109B	1.5	3.81	12.1	24.88	4	75.	.02000	3.50	.00	0.	298	8	A31	.10
3582	110B	2.3	5.15	14.4	29.95	0	0.	.00000	.00	.00	0.	98	10	A31	.10
3582	111B	.0	.00	14.4	29.95	0	0.	.00000	.00	.00	0.	98	99	A31	.00
3582	112AB	14.4	29.95	29.9	63.35	5	310.	.09000	6.00	.00	0.	98	0	A31	.00
3582	113B	1.4	4.65	1.4	4.65	4	160.	.02000	2.00	.00	0.	98	5	A31	.90
3582	114AB	1.4	4.39	31.3	66.72	0	0.	.00000	.00	.00	0.	98	0	A31	.00

B-2.2: 200 Watershed LAR04 Results

Clear

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\scr_soilx_34.dat

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
3582	201A	3.4	11.28	3.4	11.28	4	260.	.05000	3.50	.00	0.	98	5	A32	.10
3582	202A	7.8	24.05	11.2	34.65	4	320.	.02000	2.00	.00	0.	98	6	A32	.74
3582	203A	4.3	11.08	15.5	44.57	0	0.	.00000	.00	.00	0.	98	9	A32	.91
3582	204A	2.0	6.82	17.5	50.60	0	0.	.00000	.00	.00	0.	98	5	A32	.74
3582	205B	9.0	29.86	9.0	29.86	4	750.	.05000	3.50	.00	0.	98	5	A32	.10
3582	206C	9.3	26.51	9.3	26.51	4	637.	.02000	2.00	.00	0.	98	7	A32	.74
3582	207BC	9.3	26.12	18.3	52.75	4	1530.	.03000	4.00	.00	0.	98	0	A32	.00
3582	208B	23.3	66.41	41.6	109.90	4	162.	.02000	2.00	.00	0.	98	7	A32	.74
3582	209A	4.0	13.63	21.5	62.66	0	0.	.00000	.00	.00	0.	98	5	A32	.74
3582	210D	7.0	20.88	7.0	20.88	4	999.	.05000	3.50	.00	0.	98	6	A32	.10
3582	211D	9.8	29.24	16.8	48.43	4	702.	.02000	3.50	.00	0.	98	6	A32	.10
3582	212D	12.9	34.52	29.7	80.71	4	687.	.02000	3.50	.00	0.	98	8	A32	.74
3582	213D	9.3	28.67	39.0	101.68	4	972.	.02000	3.50	.00	0.	98	6	A32	.74
3582	214C	7.2	20.52	7.2	20.52	4	216.	.02000	3.50	.00	0.	98	7	A32	.74
3582	215CD	39.0	100.12	46.2	117.62	4	447.	.02000	3.50	.00	0.	98	0	A32	.00
3582	216C	3.0	9.32	49.2	122.50	4	870.	.02000	3.50	.00	0.	98	6	A32	.90
3582	217C	8.1	24.97	57.3	132.00	4	760.	.02000	3.50	.00	0.	98	6	A32	.74
3582	218D	2.3	5.73	2.3	5.73	0	0.	.00000	.00	.00	0.	20	8	A32	.74
3582	219D	16.2	46.18	18.5	51.91	4	1074.	.01000	2.00	.00	0.	98	7	A32	.74
3582	220E	11.1	27.39	11.1	27.39	4	315.	.01000	3.00	.00	0.	98	10	A32	.91
3582	221E	10.1	21.90	21.2	49.12	4	1030.	.01000	3.00	.00	0.	98	13	A32	.91

Burn

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\scr_soilx_34.dat

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
3582	201A	3.4	11.51	3.4	11.51	4	260.	.05000	3.50	.00	0.	298	5	A32	.10
3582	202A	7.8	24.05	11.2	34.86	4	320.	.02000	2.00	.00	0.	98	6	A32	.74
3582	203A	4.3	11.08	15.5	44.83	0	0.	.00000	.00	.00	0.	98	9	A32	.91
3582	204A	2.0	6.82	17.5	50.86	0	0.	.00000	.00	.00	0.	98	5	A32	.74
3582	205B	9.0	30.46	9.0	30.46	4	750.	.05000	3.50	.00	0.	298	5	A32	.10
3582	206C	9.3	26.51	9.3	26.51	4	637.	.02000	2.00	.00	0.	98	7	A32	.74
3582	207BC	9.3	26.12	18.3	53.34	4	1530.	.03000	4.00	.00	0.	98	0	A32	.00
3582	208B	23.3	66.41	41.6	110.50	4	162.	.02000	2.00	.00	0.	98	7	A32	.74
3582	209A	4.0	13.63	21.5	62.92	0	0.	.00000	.00	.00	0.	98	5	A32	.74
3582	210D	7.0	21.32	7.0	21.32	4	999.	.05000	3.50	.00	0.	298	6	A32	.10
3582	211D	9.8	29.85	16.8	49.47	4	702.	.02000	3.50	.00	0.	298	6	A32	.10
3582	212D	12.9	34.52	29.7	81.76	4	687.	.02000	3.50	.00	0.	98	8	A32	.74
3582	213D	9.3	28.67	39.0	102.72	4	972.	.02000	3.50	.00	0.	98	6	A32	.74
3582	214C	7.2	20.52	7.2	20.52	4	216.	.02000	3.50	.00	0.	98	7	A32	.74
3582	215CD	39.0	101.15	46.2	118.63	4	447.	.02000	3.50	.00	0.	98	0	A32	.00
3582	216C	3.0	9.32	49.2	123.51	4	870.	.02000	3.50	.00	0.	98	6	A32	.90
3582	217C	8.1	24.97	57.3	132.98	4	760.	.02000	3.50	.00	0.	98	6	A32	.74
3582	218D	2.3	5.73	2.3	5.73	0	0.	.00000	.00	.00	0.	20	8	A32	.74
3582	219D	16.2	46.18	18.5	51.91	4	1074.	.01000	2.00	.00	0.	98	7	A32	.74
3582	220E	11.1	27.39	11.1	27.39	4	315.	.01000	3.00	.00	0.	98	10	A32	.91
3582	221E	10.1	21.90	21.2	49.12	4	1030.	.01000	3.00	.00	0.	98	13	A32	.91

B-2.3: 300 Watershed LAR04 Results

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\scr_soilx_34.dat

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
3582 301A	6.6	18.20	6.6	18.20	4	147.	.02000	2.00	.00	0.	98	7	A31	.74
3582 302A	.0	.00	6.6	18.20	4	635.	.03000	3.50	.00	0.	98	99	A31	.00
3582 303A	12.9	31.76	19.5	48.97	4	200.	.03000	3.50	.00	0.	98	9	A31	.74
3582 304B	4.6	10.02	4.6	10.02	0	0.	.00000	.00	.00	0.	98	12	A31	.91
3582 305AB	4.6	10.02	24.1	58.81	4	230.	.03000	3.50	.00	0.	98	0	A31	.00
3582 306A	11.6	25.98	35.7	84.23	4	793.	.03000	3.50	.00	0.	98	10	A31	.10
3582 307A	1.0	3.32	36.7	85.76	0	0.	.00000	.00	.00	0.	98	5	A31	.90
3582 308B	20.1	45.01	20.1	45.01	4	80.	.02000	2.00	.00	0.	98	11	A31	.74
3582 309B	9.0	26.84	29.1	71.85	4	630.	.05000	2.50	.00	0.	98	6	A31	.74
3582 310AB	29.1	70.65	65.8	154.96	4	440.	.03000	3.50	.00	0.	98	0	A31	.00
3582 311B	2.1	6.93	2.1	6.93	4	110.	.02000	2.00	.00	0.	98	5	A31	.74
3582 312AB	2.1	6.67	67.9	158.49	4	210.	.03000	3.50	.00	0.	98	0	A31	.00
3582 313A	5.2	12.95	73.1	170.69	0	0.	.00000	.00	.00	0.	98	9	A31	.90
3582 314A	9.7	21.12	82.8	191.68	0	0.	.00000	.00	.00	0.	98	12	A31	.90
3582 315C	1.2	3.99	1.2	3.99	0	0.	.00000	.00	.00	0.	98	5	A31	.90
3582 316C	1.8	5.19	3.0	9.17	0	0.	.00000	.00	.00	0.	98	6	A31	.10
3582 317AC	3.0	9.17	85.8	197.91	0	0.	.00000	.00	.00	0.	98	0	A31	.00

B-2.4: 400 Watershed LAR04 Results

Clear
Combined with 100-Watershed

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\scr_soilx_34.dat

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
3582	401A	11.6	25.17	11.6	25.17	4	635.	.02000	2.00	.00	0.	98	11	A30	.74
3582	402B	4.9	14.25	4.9	14.25	4	462.	.02000	2.00	.00	0.	98	6	A30	.90
3582	403AB	4.9	13.88	16.5	38.57	4	460.	.02000	2.50	.00	0.	98	0	A30	.00
3582	404A	.0	.00	16.5	38.05	0	0.	.00000	.00	.00	0.	98	99	A30	.00
3582	405A	6.0	13.21	22.5	50.97	0	0.	.00000	.00	.00	0.	98	11	A30	.91
3582	406A	.0	.00	22.5	50.97	0	0.	.00000	.00	.00	0.	98	99	A30	.00
3582	407C	24.2	47.55	24.2	47.55	4	212.	.02000	2.50	.00	0.	98	14	A30	.91
3582	408AC	24.2	47.50	46.7	98.32	0	0.	.00000	.00	.00	0.	98	0	A30	.00
3582	409D	18.4	49.15	18.4	49.15	4	340.	.22000	2.00	.00	0.	98	7	A30	.74
3582	410AD	18.4	49.02	65.1	146.03	4	662.	.02000	4.50	.00	0.	98	0	A30	.00
3582	411A	13.3	26.13	78.4	170.37	0	0.	.00000	.00	.00	0.	98	14	A30	.91
3582	412A	.0	.00	78.4	170.37	0	0.	.00000	.00	.00	0.	98	99	A30	.00
3582	413B*	31.3	66.00	31.3	66.00	0	0.	.00000	.00	.00	0.	98	0	A30	.00
3582	414AB	31.3	66.00	109.7	235.37	0	0.	.00000	.00	.00	0.	98	0	A30	.00

NOTES:
*413B is per 100-Watershed Hydrograph. See next sheet for hydrograph input data.

```
7 83582  413B    31.3 411155     66.200  4
8  5   0.      0. 100.      1. 200.      1. 300.      1. 400.      1.
8 10 500.      1. 600.      1. 700.      2. 800.      2. 900.      2.
8 151000.      3.1050.      5.1100.      8.1110.     10.1120.     12.
8 201130.     15.1131.     15.1132.     16.1133.     16.1134.     17.
8 251135.     17.1136.     18.1137.     18.1138.     19.1139.     19.
8 301140.     20.1141.     21.1142.     22.1143.     23.1144.     24.
8 351145.     25.1146.     26.1147.     28.1148.     30.1149.     34.
8 401150.     40.1151.     46.1152.     53.1153.     60.1154.     65.
8 451155.     66.1156.     65.1157.     64.1158.     60.1159.     56.
8 501160.     52.1161.     47.1162.     42.1163.     37.1164.     32.
8 551165.     27.1166.     23.1167.     19.1168.     17.1169.     16.
8 601170.     14.1171.     14.1172.     13.1173.     12.1174.     11.
8 651175.     11.1176.     10.1177.     10.1178.      9.1179.      9.
8 701180.      9.1181.      8.1182.      8.1183.      8.1184.      7.
8 751185.      7.1186.      7.1187.      6.1188.      6.1189.      6.
8 801190.      6.1191.      6.1192.      5.1193.      5.1194.      5.
8 851195.      5.1196.      5.1197.      5.1198.      5.1199.      4.
8 901200.      4.1201.      4.1202.      4.1203.      4.1204.      4.
8 951205.      4.1206.      4.1207.      4.1208.      4.1209.      3.
81001210.      3.1211.      3.1212.      3.1213.      3.1214.      3.
81051215.      3.1216.      3.1217.      3.1218.      3.1219.      3.
81101220.      3.1221.      3.1222.      3.1223.      3.1224.      3.
81151225.      2.1226.      2.1227.      2.1228.      2.1229.      2.
81201230.      2.1231.      2.1232.      2.1233.      2.1234.      2.
81251235.      2.1236.      2.1237.      2.1238.      2.1239.      2.
81301240.      2.1241.      2.1242.      2.1243.      2.1244.      2.
81351245.      2.1246.      2.1247.      2.1248.      2.1249.      2.
81401250.      2.1251.      2.1252.      2.1253.      2.1254.      2.
81451255.      2.1256.      2.1257.      2.1258.      2.1259.      2.
81501260.      2.1261.      2.1262.      2.1263.      2.1264.      2.
81551265.      2.1266.      2.1267.      2.1268.      2.1269.      2.
81601270.      2.1271.      2.1272.      2.1273.      2.1274.      2.
81651275.      2.1276.      2.1277.      2.1278.      2.1279.      2.
81701280.      2.1281.      2.1282.      2.1283.      2.1284.      2.
81751285.      2.1286.      2.1287.      2.1288.      2.1289.      1.
81801290.      1.1291.      1.1292.      1.1293.      1.1294.      1.
81851295.      1.1296.      1.1297.      1.1298.      1.1299.      1.
81901300.      1.1310.      1.1320.      1.1330.      1.1340.      1.
81951350.      1.1360.      1.1370.      1.1380.      1.1390.      1.
82001400.      1.1420.      1.1440.      1.1460.      1.1500.      1.
```

Burn
Combined with 100-Watershed

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\scr_soilx_34.dat

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
3582 401A	11.6	25.17	11.6	25.17	4	635.	.02000	2.00	.00	0.	98	11	A30	.74
3582 402B	4.9	14.25	4.9	14.25	4	462.	.02000	2.00	.00	0.	98	6	A30	.90
3582 403AB	4.9	13.88	16.5	38.57	4	460.	.02000	2.50	.00	0.	98	0	A30	.00
3582 404A	.0	.00	16.5	38.05	0	0.	.00000	.00	.00	0.	98	99	A30	.00
3582 405A	6.0	13.21	22.5	50.97	0	0.	.00000	.00	.00	0.	98	11	A30	.91
3582 406A	.0	.00	22.5	50.97	0	0.	.00000	.00	.00	0.	98	99	A30	.00
3582 407C	24.2	47.55	24.2	47.55	4	212.	.02000	2.50	.00	0.	98	14	A30	.91
3582 408AC	24.2	47.50	46.7	98.32	0	0.	.00000	.00	.00	0.	98	0	A30	.00
3582 409D	18.4	49.15	18.4	49.15	4	340.	.22000	2.00	.00	0.	98	7	A30	.74
3582 410AD	18.4	49.02	65.1	146.03	4	662.	.02000	4.50	.00	0.	98	0	A30	.00
3582 411A	13.3	26.13	78.4	170.37	0	0.	.00000	.00	.00	0.	98	14	A30	.91
3582 412A	.0	.00	78.4	170.37	0	0.	.00000	.00	.00	0.	98	99	A30	.00
3582 413B*	31.3	67.00	31.3	67.00	0	0.	.00000	.00	.00	0.	98	0	A30	.00
3582 414AB	31.3	67.00	109.7	237.37	0	0.	.00000	.00	.00	0.	98	0	A30	.00

NOTES:
*413B is per 100-Watershed Hydrograph. See next sheet for hydrograph input data.

```
7 83582  413B    31.3 411155     67.200  4
8  5   0.      0. 100.      1. 200.      1. 300.      1. 400.      1.
8 10 500.      2. 600.      2. 700.      2. 800.      2. 900.      2.
8 151000.      4.1050.      6.1100.      8.1110.     11.1120.     13.
8 201130.     16.1131.     16.1132.     16.1133.     17.1134.     17.
8 251135.     18.1136.     18.1137.     19.1138.     19.1139.     20.
8 301140.     21.1141.     22.1142.     22.1143.     23.1144.     24.
8 351145.     26.1146.     28.1147.     29.1148.     31.1149.     35.
8 401150.     41.1151.     47.1152.     54.1153.     61.1154.     66.
8 451155.     67.1156.     67.1157.     65.1158.     62.1159.     57.
8 501160.     53.1161.     48.1162.     43.1163.     38.1164.     32.
8 551165.     28.1166.     24.1167.     20.1168.     18.1169.     16.
8 601170.     15.1171.     14.1172.     13.1173.     13.1174.     12.
8 651175.     11.1176.     11.1177.     10.1178.     10.1179.     10.
8 701180.      9.1181.      9.1182.      8.1183.      8.1184.      8.
8 751185.      7.1186.      7.1187.      7.1188.      7.1189.      6.
8 801190.      6.1191.      6.1192.      6.1193.      6.1194.      6.
8 851195.      5.1196.      5.1197.      5.1198.      5.1199.      5.
8 901200.      5.1201.      5.1202.      4.1203.      4.1204.      4.
8 951205.      4.1206.      4.1207.      4.1208.      4.1209.      4.
81001210.      4.1211.      4.1212.      4.1213.      4.1214.      3.
81051215.      3.1216.      3.1217.      3.1218.      3.1219.      3.
81101220.      3.1221.      3.1222.      3.1223.      3.1224.      3.
81151225.      3.1226.      3.1227.      3.1228.      3.1229.      3.
81201230.      3.1231.      3.1232.      3.1233.      3.1234.      2.
81251235.      2.1236.      2.1237.      2.1238.      2.1239.      2.
81301240.      2.1241.      2.1242.      2.1243.      2.1244.      2.
81351245.      2.1246.      2.1247.      2.1248.      2.1249.      2.
81401250.      2.1251.      2.1252.      2.1253.      2.1254.      2.
81451255.      2.1256.      2.1257.      2.1258.      2.1259.      2.
81501260.      2.1261.      2.1262.      2.1263.      2.1264.      2.
81551265.      2.1266.      2.1267.      2.1268.      2.1269.      2.
81601270.      2.1271.      2.1272.      2.1273.      2.1274.      2.
81651275.      2.1276.      2.1277.      2.1278.      2.1279.      2.
81701280.      2.1281.      2.1282.      2.1283.      2.1284.      2.
81751285.      2.1286.      2.1287.      2.1288.      2.1289.      2.
81801290.      2.1291.      2.1292.      2.1293.      2.1294.      2.
81851295.      2.1296.      2.1297.      2.1298.      2.1299.      2.
81901300.      2.1310.      2.1320.      2.1330.      2.1340.      2.
81951350.      1.1360.      1.1370.      1.1380.      1.1390.      1.
82001400.      1.1420.      1.1440.      1.1460.      1.1500.      1.
```

B-2.5: 500 Watershed LAR04 Results

Clear

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\scr_soilx_34.dat

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
3582	501A	38.4	64.88	38.4	64.88	4	560.	.03000	3.50	.00	0.	98	17	A31	.10
3582	502A	2.9	8.73	41.3	72.06	0	0.	.00000	.00	.00	0.	98	6	A31	.91
3582	503B	1.9	6.07	1.9	6.07	0	0.	.00000	.00	.00	0.	98	5	A31	.01
3582	504AB	1.9	6.07	43.2	76.81	0	0.	.00000	.00	.00	0.	98	0	A31	.00

Burn

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\scr_soilx_34.dat

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
3582	501A	38.4	66.65	38.4	66.65	4	560.	.03000	3.50	.00	0.	298	17	A31	.10
3582	502A	2.9	8.73	41.3	73.83	0	0.	.00000	.00	.00	0.	98	6	A31	.91
3582	503B	1.9	6.20	1.9	6.20	0	0.	.00000	.00	.00	0.	298	5	A31	.01
3582	504AB	1.9	6.20	43.2	78.69	0	0.	.00000	.00	.00	0.	98	0	A31	.00

B-3: Watershed Calculations

B-3.1: Proposed Debris Production Calculation

PROPOSED WATERSHED 100

PROPOSED SUBAREA 102B

Using eq 3.3.3 of sedimentation manual (March 2006)

$$DP = DPR_{(A)} \times A_u \left(\frac{A_u}{A}\right) + DPR_{(A_u)} \times A_u \left(\frac{A_d}{A}\right)$$ **Equation 3.3.3**

$$A_d = A_{d_1} + A_{d_2} + A_{d_3}$$

$$A_u = A - A_d$$

$DPR_{(A)}$	35500	CU YD/SQ MI	DPR FOR DPA 8 (Total Area)
$DPR_{(AU)}$	35500	CU YD/SQ MI	DPR FOR DPA 8 (Undeveloped Area)
A	0.0061	SQ MI	
A_U	0.0047	SQ MI	Undeveloped Area
A_D	0.0014	SQ MI	Developed Area

DP= 166.85 CU YD

PROPOSED SUBAREA 107B

Using eq 3.3.3 of sedimentation manual (March 2006)

$DPR_{(A)}$	35500	CU YD/SQ MI	DPR FOR DPA 8 (Total Area)
$DPR_{(AU)}$	35500	CU YD/SQ MI	DPR FOR DPA 8 (Undeveloped Area)
A	0.0166	SQ MI	
A_U	0.0060	SQ MI	Undeveloped Area
A_D	0.0106	SQ MI	Developed Area

DP= 213.00 CU YD

PROPOSED WATERSHED 200

PROPOSED SUBAREA 201A

Using eq 3.3.3 of sedimentation manual (March 2006)

$$DP = DPR_{(A)} \times A_u \left(\frac{A_u}{A}\right) + DPR_{(A_u)} \times A_u \left(\frac{A_d}{A}\right) \qquad \textbf{Equation 3.3.3}$$

$$A_d = A_{d_1} + A_{d_2} + A_{d_3}$$

$$A_u = A - A_d$$

$DPR_{(A)}$	35500	CU YD/SQ MI	DPR FOR DPA 8 (Total Area)
$DPR_{(AU)}$	35500	CU YD/SQ MI	DPR FOR DPA 8 (Undeveloped Area)
A	0.0053	SQ MI	
A_U	0.0042	SQ MI	Undeveloped Area
A_D	0.0011	SQ MI	Developed Area
DP=	149.10	CU YD	

PROPOSED SUBAREA 205B

Using eq 3.3.3 of sedimentation manual (March 2006)

$DPR_{(A)}$	35500	CU YD/SQ MI	DPR FOR DPA 8 (Total Area)
$DPR_{(AU)}$	35500	CU YD/SQ MI	DPR FOR DPA 8 (Undeveloped Area)
A	0.0141	SQ MI	
A_U	0.0109	SQ MI	Undeveloped Area
A_D	0.0032	SQ MI	Developed Area
DP=	386.95	CU YD	

PROPOSED SUBAREA 210D

Using eq 3.3.3 of sedimentation manual (March 2006)

$DPR_{(A)}$	35500	CU YD/SQ MI	DPR FOR DPA 8 (Total Area)
$DPR_{(AU)}$	35500	CU YD/SQ MI	DPR FOR DPA 8 (Undeveloped Area)
A	0.0110	SQ MI	
A_U	0.0094	SQ MI	Undeveloped Area
A_D	0.0016	SQ MI	Developed Area
DP=	333.70	CU YD	

PROPOSED SUBAREA 211D

Using eq 3.3.3 of sedimentation manual (March 2006)

$DPR_{(A)}$	35500	CU YD/SQ MI	DPR FOR DPA 8 (Total Area)
$DPR_{(AU)}$	35500	CU YD/SQ MI	DPR FOR DPA 8 (Undeveloped Area)
A	0.0153	SQ MI	
A_U	0.0139	SQ MI	Undeveloped Area
A_D	0.0014	SQ MI	Developed Area

DP= 492.03 CU YD

PROPOSED WATERSHED 500

PROPOSED SUBAREA 501A

Using eq 3.3.3 of sedimentation manual (March 2006)

$$DP = DPR_{(A)} \times A_u \left(\frac{A_u}{A}\right) + DPR_{(A_u)} \times A_u \left(\frac{A_d}{A}\right)$$ **Equation 3.3.3**

$$A_d = A_{d_1} + A_{d_2} + A_{d_3}$$

$$A_u = A - A_d$$

$DPR_{(A)}$	35500	CU YD/SQ MI	DPR FOR DPA 8 (Total Area)
$DPR_{(AU)}$	35500	CU YD/SQ MI	DPR FOR DPA 8 (Undeveloped Area)
A	0.0600	SQ MI	
A_U	0.0462	SQ MI	Undeveloped Area
A_D	0.0138	SQ MI	Developed Area

DP= 1640.10 CU YD

PROPOSED SUBAREA 503B

Using eq 3.3.1 of sedimentation manual (March 2006)

$$DP = DPR_{(A)} \times A$$ **Equation 3.3.1**

DP = Debris Production in yd^3

DPR = Debris Production Rate in yd^3/mi^2

$DPR_{(A)}$	35500	CU YD/SQ MI	DPR FOR DPA 8 (Total Area)
A	0.0030	SQ MI	Total Area

DP= 106.50 CU YD

PROPOSED WATERSHED 600

PROPOSED SUBAREA 601A

Using eq 3.3.1 of sedimentation manual (March 2006)

Equation 3.3.1

$$DP = DPR_{(A)} \times A$$

DP = Debris Production in yd^3
DPR = Debris Production Rate in yd^3/mi^2

$DPR_{(A)}$	35500	CU YD/SQ MI	DPR FOR DPA 8 (Total Area)
A	0.0061	SQ MI	Total Area
DP=	216.55	CU YD	

B-3.2: Proposed Bulk Flow Calculation

PROPOSED WATERSHED 100

PROPOSED SUBAREA 102B

REFER TO EQUATION 3.4.3 IN SEDIMENTATION MANUAL-2nd EDITION MARCH 2006

For partially developed watersheds (see Figure 3.3.3):

$$Q_B = BF_{(A)} \times \left(\frac{Q_{(A)}\ A_u}{A}\right)\left(\frac{A_u}{A}\right) + BF_{(A_u)} \times \left(\frac{Q_{(A)}\ A_u}{A}\right)\left(\frac{A_d}{A}\right) + \left(\frac{Q_{(A)}\ A_d}{A}\right) \qquad \textbf{Equation 3.4.3}$$

Q=Burned Discharge	12.76	CFS	
$BF_{(A)}$	1.360	unitless	BF FOR DPA 8 (Total Area)
$BF_{(Au)}$	1.360	unitless	BF FOR DPA 8 (Undeveloped Area)
A	0.0061	SQ MI	Total Area
A_U	0.0047	SQ MI	Undeveloped Area
A_d	0.0014	SQ MI	Developed Area
Q=	16.30	CFS	

PROPOSED SUBAREA 107B

REFER TO EQUATION 3.4.3 IN SEDIMENTATION MANUAL-2nd EDITION MARCH 2006

Q=Burned Discharge	21.10	CFS	
$BF_{(A)}$	1.360	unitless	BF FOR DPA 8 (Total Area)
$BF_{(Au)}$	1.360	unitless	BF FOR DPA 8 (Undeveloped Area)
A	0.0166	SQ MI	Total Area
A_U	0.0060	SQ MI	Undeveloped Area
A_d	0.0106	SQ MI	Developed Area
Q=	23.85	CFS	

PROPOSED WATERSHED 200

PROPOSED SUBAREA 201A

REFER TO EQUATION 3.4.3 IN SEDIMENTATION MANUAL-2nd EDITION MARCH 2006

For partially developed watersheds (see Figure 3.3.3):

$$Q_B = BF_{(A)} \times \left(\frac{Q_{(A)}\ A_u}{A}\right)\left(\frac{A_u}{A}\right) + BF_{(A_u)} \times \left(\frac{Q_{(A)}\ A_u}{A}\right)\left(\frac{A_d}{A}\right) + \left(\frac{Q_{(A)}\ A_d}{A}\right) \qquad \textbf{Equation 3.4.3}$$

Q=Burned Discharge	11.51	CFS	
$BF_{(A)}$	1.360	unitless	BF FOR DPA 8 (Total Area)
$BF_{(Au)}$	1.360	unitless	BF FOR DPA 8 (Undeveloped Area)
A	0.0053	SQ MI	Total Area
A_U	0.0042	SQ MI	Undeveloped Area
A_d	0.0011	SQ MI	Developed Area
Q=	14.79	CFS	

PROPOSED SUBAREA 205B

REFER TO EQUATION 3.4.3 IN SEDIMENTATION MANUAL-2nd EDITION MARCH 2006

Q=Burned Discharge	30.46	CFS	
$BF_{(A)}$	1.360	unitless	BF FOR DPA 8 (Total Area)
$BF_{(Au)}$	1.360	unitless	BF FOR DPA 8 (Undeveloped Area)
A	0.0141	SQ MI	Total Area
A_U	0.0109	SQ MI	Undeveloped Area
A_d	0.0032	SQ MI	Developed Area
Q=	38.94	CFS	

PROPOSED SUBAREA 210D

REFER TO EQUATION 3.4.3 IN SEDIMENTATION MANUAL-2nd EDITION MARCH 2006

Q=Burned Discharge	21.32	CFS	
$BF_{(A)}$	1.360	unitless	BF FOR DPA 8 (Total Area)
$BF_{(Au)}$	1.360	unitless	BF FOR DPA 8 (Undeveloped Area)
A	0.0110	SQ MI	Total Area
A_U	0.0094	SQ MI	Undeveloped Area
A_d	0.0016	SQ MI	Developed Area
Q=	27.88	CFS	

PROPOSED SUBAREA 211D

REFER TO EQUATION 3.4.3 IN SEDIMENTATION MANUAL-2nd EDITION MARCH 2006

Q=Burned Discharge	29.85	CFS	
$BF_{(A)}$	1.360	unitless	BF FOR DPA 8 (Total Area)
$BF_{(Au)}$	1.360	unitless	BF FOR DPA 8 (Undeveloped Area)
A	0.0153	SQ MI	Total Area
A_U	0.0139	SQ MI	Undeveloped Area
A_d	0.0014	SQ MI	Developed Area
Q=	39.61	CFS	

PROPOSED WATERSHED 500

PROPOSED SUBAREA 501A

REFER TO EQUATION 3.4.3 IN SEDIMENTATION MANUAL-2nd EDITION MARCH 2006

For partially developed watersheds (see Figure 3.3.3):

$$Q_B = BF_{(A)} \times \left(\frac{Q_{(A)}\ A_u}{A}\right)\left(\frac{A_u}{A}\right) + BF_{(A_u)} \times \left(\frac{Q_{(A)}\ A_u}{A}\right)\left(\frac{A_d}{A}\right) + \left(\frac{Q_{(A)}\ A_d}{A}\right)$$

Equation 3.4.3

Q=Burned Discharge	66.65	CFS	
$BF_{(A)}$	1.360	unitless	BF FOR DPA 8 (Total Area)
$BF_{(Au)}$	1.360	unitless	BF FOR DPA 8 (Undeveloped Area)
A	0.0600	SQ MI	Total Area
A_U	0.0462	SQ MI	Undeveloped Area
A_d	0.0138	SQ MI	Developed Area
Q=	85.13	CFS	

PROPOSED SUBAREA 503B

REFER TO EQUATION 3.4.1 IN SEDIMENTATION MANUAL-2nd EDITION MARCH 2006

For single undeveloped watersheds (see Figure 3.3.1):

$$Q_B = BF_{(A)} \times Q_{(A)}$$

Equation 3.4.1

Q=Burned Discharge	6.20	CFS	
$BF_{(A)}$	1.360	unitless	BF FOR DPA 8 (Total Area)
Q=	8.43	CFS	

PROPOSED WATERSHED 600

PROPOSED SUBAREA 601A

REFER TO EQUATION 3.4.1 IN SEDIMENTATION MANUAL-2nd EDITION MARCH 2006

For single undeveloped watersheds (see Figure 3.3.1):

$$Q_B = BF_{(A)} \times Q_{(A)}$$ **Equation 3.4.1**

Q=Burned Discharge	12.69	CFS	
$BF_{(A)}$	1.360	unitless	BF FOR DPA 8 (Total Area)
Q=	17.26	CFS	

B-4: Hydraulic Method Results (WSPG)

B-4.1: Line “A” of PD 2637 & Line “B” of MTD 1764

```
T1 Magic Mountain Parkway DS 542                                                0
T2 SD Line A
T3 Entered by: W Lee 01/22/2014
SO      5.0001079.560  1                        1081.640
R      30.2101081.220  1      .013                              .000    .000 0
R      37.6001081.710  1      .013                              .240    .000 0
JX     37.6201081.710  1  2   .013    2.650         1082.380     -71.0        .001
R     320.0301100.260  1      .013                             9.173    .000 0
R     329.9001100.880  1      .013                              .322    .000 0
JX    329.9201100.880  1  3   .013    1.09          1101.930     -71.6        .001
R     486.8101109.040  1      .013                             5.119    .000 0
JX    486.8101109.040  1  3   .014    3.160         1109.780     -90.0        .001
R     542.4601112.066  1      .013                             3.402    .000 0
JX    542.4701112.068  1  2   .013    4.510         1112.800     -90.0        .001
R     668.7001118.900  1      .013                             2.535    .000 0
JX    668.7501118.930  1  3   .013    3.260         1119.930      90.0        .002
R     698.5201120.700  1      .013                             1.087    .000 0
JX    698.5201120.700  1  1   .013     .001         1121.000     -43.6        .002
R     759.6201123.970  1      .013                             1.896    .000 0
JX    927.5901131.268  1  2   .013     .001         1132.070     -69.8       5.466
R     996.8501134.310  1      .013                             2.283    .000 1
JX   1053.7401136.760  1  2   .013    2.130         1137.640      65.6     -36.847
JX   1108.9301139.200  1  2   .013    4.200         1140.390      44.2     -34.541
R    1134.0401140.370  1      .013                          -15.993    .000 0
R    1187.2101142.660  1      .013                              .000    .000 0
SH   1187.2101142.660  1                        1142.660
CD   1  4   1    .000   3.500     .000  .000  .000   .00
CD   2  4   1    .000   2.000     .000  .000  .000   .00
CD   3  4   1    .000   1.500     .000  .000  .000   .00
Q           170.700   .0
```

LINE B PER MTD 1764
LINE A PER PD 2637

Program Package Serial Number: 1656

WATER SURFACE PROFILE LISTING Date: 7- 3-2024 Time: 3:48: 3

Magic Mountain Parkway DS 542
SD Line A
Entered by: W Lee 01/22/2014

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
5.000	1079.560	2.299	1081.859	191.70	28.62	12.72	1094.58	.00	3.46	3.32	3.500	.000	.00	1 .0
25.210	.0658					.0613	1.54	2.30	3.55	2.25	.013	.00	.00	PIPE
30.210	1081.220	2.309	1083.528	191.70	28.48	12.59	1096.12	.05	3.46	3.32	3.500	.000	.00	1 .0
7.390	.0663					.0607	.45	2.36	3.52	2.24	.013	.00	.00	PIPE
37.600	1081.710	2.312	1084.022	191.70	28.43	12.55	1096.57	.00	3.46	3.31	3.500	.000	.00	1 .0
JUNCT STR	.0000					.0621	.00	2.36	3.51		.013	.00	.00	PIPE
37.620	1081.710	2.252	1083.962	189.05	28.89	12.96	1096.92	.05	3.45	3.35	3.500	.000	.00	1 .0
42.575	.0657					.0631	2.69	2.30	3.64	2.23	.013	.00	.00	PIPE
80.195	1084.506	2.261	1086.768	189.05	28.75	12.83	1099.60	.05	3.45	3.35	3.500	.000	.00	1 .0
166.019	.0657					.0592	9.84	2.31	3.61	2.23	.013	.00	.00	PIPE
246.214	1095.411	2.358	1097.770	189.05	27.41	11.67	1109.44	.04	3.45	3.28	3.500	.000	.00	1 .0
73.816	.0657					.0527	3.89	2.40	3.33	2.23	.013	.00	.00	PIPE
320.030	1100.260	2.463	1102.723	189.05	26.13	10.61	1113.33	.04	3.45	3.20	3.500	.000	.00	1 .0
9.870	.0628					.0493	.49	2.50	3.06	2.26	.013	.00	.00	PIPE
329.900	1100.880	2.479	1103.359	189.05	25.95	10.46	1113.82	.00	3.45	3.18	3.500	.000	.00	1 .0
JUNCT STR	.0000					.0493	.00	2.52	3.02		.013	.00	.00	PIPE
329.920	1100.880	2.450	1103.330	187.96	26.13	10.61	1113.94	.04	3.45	3.21	3.500	.000	.00	1 .0
156.890	.0520					.0477	7.49	2.49	3.08	2.41	.013	.00	.00	PIPE

Program Package Serial Number: 1656

WATER SURFACE PROFILE LISTING Date: 7- 3-2024 Time: 3:48: 3

Magic Mountain Parkway DS 542
SD Line A
Entered by: W Lee 01/22/2014

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
486.810	1109.040	2.535	1111.575	187.96	25.19	9.85	1121.43	.00	3.45	3.13	3.500	.000	.00	1 .0
JUNCT STR	.0000					.0545	.00	2.60	2.87		.014	.00	.00	PIPE
486.810	1109.040	2.447	1111.487	184.80	25.73	10.28	1121.76	.07	3.45	3.21	3.500	.000	.00	1 .0
55.650	.0544					.0470	2.62	2.52	3.03	2.34	.013	.00	.00	PIPE
542.460	1112.066	2.499	1114.565	184.80	25.14	9.82	1124.38	.00	3.45	3.16	3.500	.000	.00	1 .0
JUNCT STR	.1963					.0477	.00	2.52	2.91		.013	.00	.00	PIPE
542.470	1112.068	2.376	1114.444	180.29	25.93	10.44	1124.88	.02	3.45	3.27	3.500	.000	.00	1 .0
15.236	.0541					.0495	.75	2.40	3.13	2.30	.013	.00	.00	PIPE
557.706	1112.893	2.384	1115.277	180.29	25.83	10.36	1125.63	.02	3.45	3.26	3.500	.000	.00	1 .0
110.994	.0541					.0466	5.17	2.41	3.11	2.30	.013	.00	.00	PIPE
668.700	1118.900	2.490	1121.390	180.29	24.63	9.42	1130.81	.00	3.45	3.17	3.500	.000	.00	1 .0
JUNCT STR	.6007					.0453	.00	2.53	2.86		.013	.00	.00	PIPE
668.750	1118.930	2.401	1121.331	177.03	25.16	9.83	1131.16	.04	3.44	3.25	3.500	.000	.00	1 .0
29.770	.0595					.0452	1.35	2.44	3.01	2.20	.013	.00	.00	PIPE
698.520	1120.700	2.456	1123.156	177.03	24.54	9.35	1132.51	.03	3.44	3.20	3.500	.000	.00	1 .0
61.100	.0535					.0416	2.54	2.49	2.88	2.28	.013	.00	.00	PIPE
759.620	1123.970	2.567	1126.536	177.03	23.41	8.51	1135.05	.03	3.44	3.10	3.500	.000	.00	1 .0
JUNCT STR	.0434					.0353	5.94	2.60	2.64		.013	.00	.00	PIPE

Program Package Serial Number: 1656

WATER SURFACE PROFILE LISTING Date: 7- 3-2024 Time: 3:48: 3

Magic Mountain Parkway DS 542
SD Line A
Entered by: W Lee 01/22/2014

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
927.590	1131.268	2.846	1134.114	177.03	21.13	6.93	1141.05	.02	3.44	2.73	3.500	.000	.00	1 .0
28.819	.0439					.0303	.87	2.87	2.12	2.46	.013	.00	.00	PIPE
956.409	1132.534	2.973	1135.507	177.03	20.32	6.41	1141.92	.02	3.44	2.50	3.500	.000	.00	1 .0
25.269	.0439					.0282	.71	2.99	1.92	2.46	.013	.00	.00	PIPE
981.678	1133.644	3.158	1136.802	177.03	19.37	5.83	1142.63	.01	3.44	2.08	3.500	.000	.00	1 .0
15.172	.0439					.0276	.42	3.17	1.63	2.46	.013	.00	.00	PIPE
996.850	1134.310	3.440	1137.750	177.03	18.47	5.30	1143.05	3.50	3.44	.91	3.500	.000	.00	1 .0
JUNCT STR	.0431							3.50	1.00		.013	.00	.00	PIPE
1053.740	1136.760	3.438	1140.198	174.90	18.25	5.17	1145.37	3.50	3.44	.93	3.500	.000	.00	1 .0
JUNCT STR	.0442							3.50	1.00		.013	.00	.00	PIPE
1108.930	1139.200	2.746	1141.946	170.70	21.08	6.90	1148.85	.44	3.43	2.88	3.500	.000	.00	1 .0
25.110	.0466					.0301	.76	3.19	2.22	2.34	.013	.00	.00	PIPE
1134.040	1140.370	2.864	1143.234	170.70	20.25	6.37	1149.60	.00	3.43	2.70	3.500	.000	.00	1 .0
19.457	.0431					.0280	.55	2.86	2.02	2.41	.013	.00	.00	PIPE
1153.497	1141.208	2.970	1144.178	170.70	19.61	5.97	1150.15	.00	3.43	2.51	3.500	.000	.00	1 .0
21.315	.0431					.0262	.56	2.97	1.86	2.41	.013	.00	.00	PIPE
1174.812	1142.126	3.154	1145.280	170.70	18.70	5.43	1150.71	.00	3.43	2.09	3.500	.000	.00	1 .0
12.398	.0431					.0256	.32	3.15	1.58	2.41	.013	.00	.00	PIPE

Program Package Serial Number: 1656

WATER SURFACE PROFILE LISTING Date: 7- 3-2024 Time: 3:48: 3

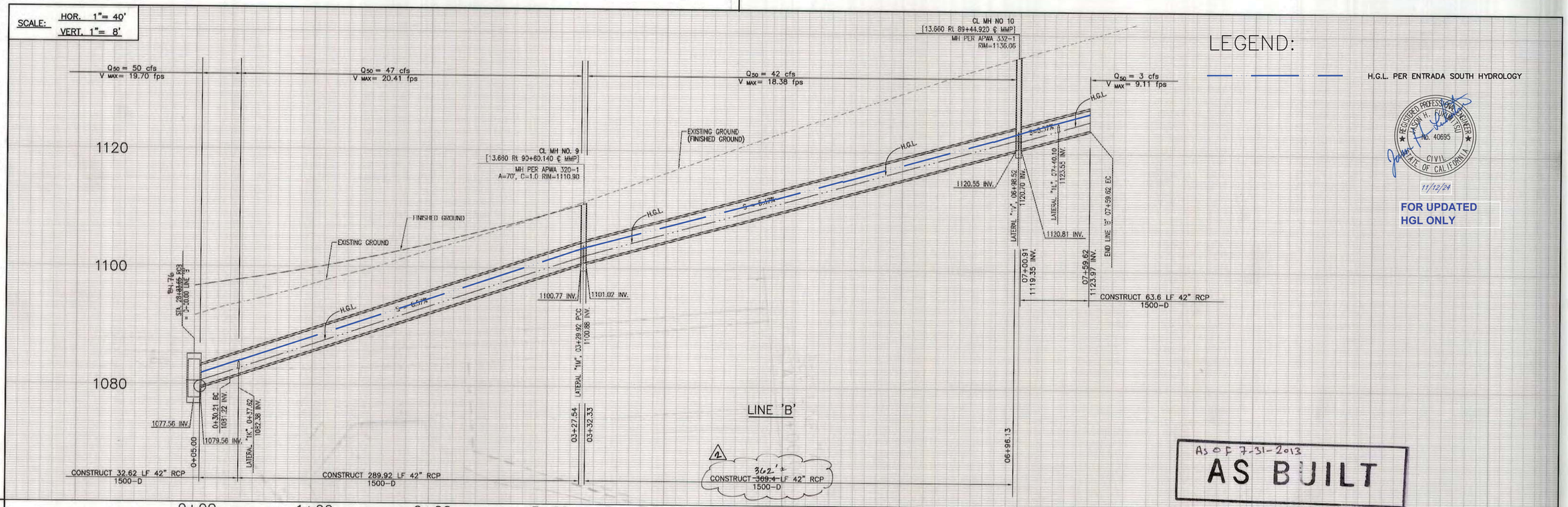
Magic Mountain Parkway DS 542

SD Line A

Entered by: W Lee 01/22/2014

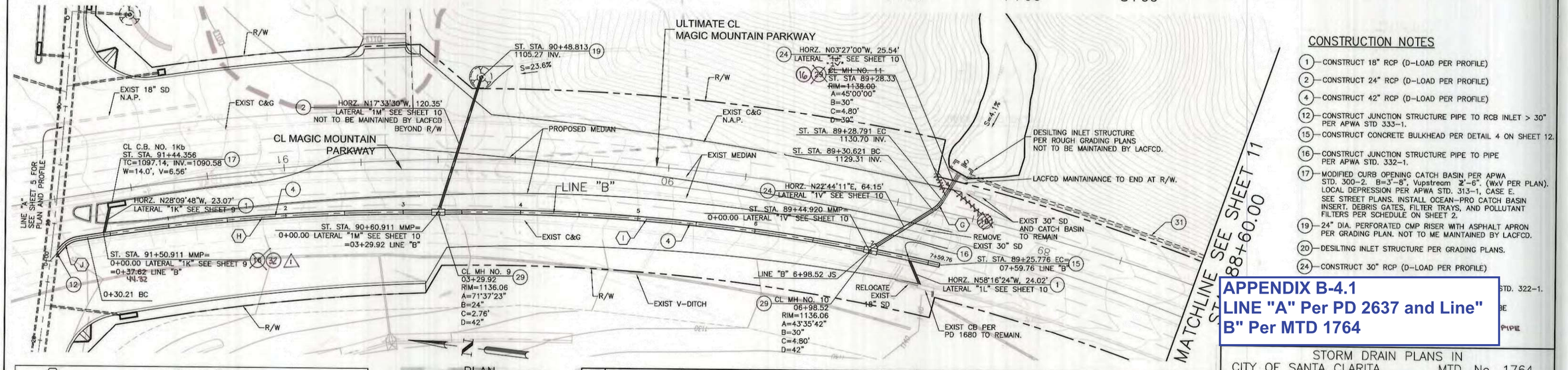
Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1187.210	1142.660	3.431	1146.091	170.70	17.82	4.93	1151.03	.00	3.43	.97	3.500	.000	.00	1 .0

SCALE: HOR. 1"= 40'
VERT. 1"= 8'



FOR UPDATED HGL ONLY

AS OF 7-31-2013
AS BUILT



CONSTRUCTION NOTES

1. CONSTRUCT 18" RCP (D-LOAD PER PROFILE)
2. CONSTRUCT 24" RCP (D-LOAD PER PROFILE)
4. CONSTRUCT 42" RCP (D-LOAD PER PROFILE)
12. CONSTRUCT JUNCTION STRUCTURE PIPE TO RCB INLET > 30" PER APWA STD 333-1.
15. CONSTRUCT CONCRETE BULKHEAD PER DETAIL 4 ON SHEET 12.
16. CONSTRUCT JUNCTION STRUCTURE PIPE TO PIPE PER APWA STD. 332-1.
17. MODIFIED CURB OPENING CATCH BASIN PER APWA STD. 300-2. B=3'-8", Vupstream 2'-6". (WxV PER PLAN). LOCAL DEPRESSION PER APWA STD. 313-1, CASE E. SEE STREET PLANS. INSTALL OCEAN-PRO CATCH BASIN INSERT. DEBRIS GATES, FILTER TRAYS, AND POLLUTANT FILTERS PER SCHEDULE ON SHEET 2.
19. 24" DIA. PERFORATED CMP RISER WITH ASPHALT APRON PER GRADING PLAN. NOT TO ME MAINTAINED BY LACFCD.
20. DESILTING INLET STRUCTURE PER GRADING PLANS.
24. CONSTRUCT 30" RCP (D-LOAD PER PROFILE)

APPENDIX B-4.1
LINE "A" Per PD 2637 and Line" B" Per MTD 1764

Curve Data				
CURVE	RADIUS	LENGTH	TANGENT	DELTA
G	25.00'	11.330'	5.764'	25°58'01"
H	1764.00'	299.715'	150.219'	09°44'06"
I	1754.929'	429.836'	215.999'	14°02'01"
J	22.50'	15.46'	8.05'	39°22'14"
K	11.25'	5.63'	2.87'	28°39'21"
L	1830.24'	414.77'	208.28'	12°59'04"

PLAN
SCALE: 1" = 40'
40' 20' 0' 40' 80'
GRAPHIC SCALE

APPROVED FOR CONSTRUCTION BY:
ROBERT G. NEWMAN, P.E., L.S.
DIRECTOR OF PUBLIC WORKS
CITY OF SANTA CLARITA
DATE 6-7-06

NO.	REVISIONS	REVISED BY	APPROVED BY	DATE
1	REVISED JUNCTION STRUCTURE			9-12-07
2	AS-BUILT REVISION FROM INSPECTOR FIELD NOTES			2-22-10

JON M. AUSTIN RCE 58726 Exp. 03/31/07 CIVIL STATE OF CALIFORNIA
PROJECT ENGINEER DATE 5-31-06

MetroPointe Engineers
3555 Harbor Gateway South, Suite A
Costa Mesa, CA 92626
(714) 438-1095

STORM DRAIN PLANS IN
CITY OF SANTA CLARITA MTD. No. 1764
CITY OF SANTA CLARITA
STORM DRAIN PLAN AND PROFILE
MTD NO. 1764
SYSTEM "B"

DWG | SHEET 7 OF 21

SCALE: HOR. 1"=40'
VERT. 1"=8'

LEGEND:

H.G.L. PER ENTRADA SOUTH HYDROLOGY

FOR UPDATED HGL ONLY

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA 11/19/24

P.D. No. 2637

DDN No. 43-F551

STORM DRAIN LINE "A"

Q = 56.2 cfs, Vmax = 21.4 fps — 3+29.92 LINE A 10+00.00 LINE A-8
Q = 55.6 cfs, Vmax = 19.8 fps — 4+86.81 LINE A 10+00.00 LINE A-7
Q = 53.5 cfs, Vmax = 19.4 fps — 5+42.47 LINE A 10+00.00 LINE A-3
Q = 52.5 cfs, Vmax = 19.5 fps — 6+68.76 LINE A 10+00.00 LINE A-5
Q = 51.0 cfs, Vmax = 19.0 fps — 7+01.56 LINE A 10+00.00 LINE A-6
Q = 51.0 cfs, Vmax = 18.8 fps — 9+27.59 LINE A 10+00.00 LINE A-9
Q = 49.9 cfs, Vmax = 16.9 fps — 9+94.52 LINE A
Q = 43.8 cfs, Vmax = 12.6 fps — 10+53.74 LINE A 10+00.00 LINE A-1
Q = 38.6 cfs, Vmax = 14.7 fps — 11+08.93 LINE A 10+00.00 LINE A-2

EX. GROUND OVER CL SD
PROPOSED FG OVER CL SD
HGL
EX. 42" RCP
EX. 18" RCP PER MTD 1764
1107.50 RIM
1101.93 INV.
1100.78 INV.
1112.89 INV.
1119.93 INV.
S=(0.0544)
1128.00 RIM
1120.57 INV.
1120.77 INV.
1124.00 INV.
6" WATER
42" WATER
EX. LATERAL "1M"
6+99.06 END EX. RCP
7+06.88 BEGIN EX. RCP
EX. 18" RCP PER MTD 1764
7+59.62 PCC
(7+23.87) INV.
JOIN EX. 42" RCP
MTD NO. 1764
52.74 LF
366.98
1142.17 RIM
1134.11 INV.
9+92.19 END RCP
9+96.85 BEGIN RCP-PRC
1137.64 INV.
S=0.0442
1132.07 INV.
S=0.0440
9+96.85 PRC
1134.53 INV.
232.57 LF 42" RCP D-900
8" RECLAIMED WATER
24" WATER
42" WATER
12" SEWER
1140.39 INV.
1142.66 INV.
11+87.21 END RCP
190.36 LF 42" RCP D-900

STORM DRAIN LINE "A-6"

Q = 20.3 cfs, V max = 23.5 fps
Q = 20.3 cfs, V max = 24.7 cfs
R/W
10.80'
11.8'
1149.30 TW
1149.00 TOP OF WEIR
1151.00 TOP OF WALL
1152.5 MAX DEBRIS CONE
1147.02 W.S.EL
5.0%
1145.37INV.
1145.00INV.
1148.00 40% DEBRIS CONE
S=0.0617
24" WATER
HGL
S=0.0400
10+00.00 LINE A-6
1120.70INV.
7+01.56 EX. 42" RCP MTD NO. 1764
10+36.29 BC
1122.16 INV.
11+13.25 EC
1125.24" INV.
42" WATER
11+75.97
1127.74 INV.
175.97 LF, 42" RCP D-1000
66.06 LF 42" RCP
12+42.03
1145.00INV.
1/2" ADDITIONAL CONC. COVER OVER INVERT STEEL D-1600

MAGIC MOUNTAIN PARKWAY

LINE "A-8" 18" RCP, PROFILE ON SHEET 6, NOT TO BE MAINTAINED BY LACFCD BEYOND R/W
LINE "A-7" 18" RCP PROFILE ON SHEET 6
LINE "A-5" 18" RCP PROFILE ON SHEET 6
LINE "A-3" 18" RCP, PROFILE ON SHEET 6, NOT TO BE MAINTAINED BY LACFCD BEYOND R/W
LINE "A-6" 42" RCP SEE RIGHT
LINE "A-9" 24" RCP, PROFILE ON SHEET 6, NOT TO BE MAINTAINED BY LACFCD BEYOND R/W
LINE "A-2" 18" RCP PROFILE ON SHEET 6
LINE "A-1" 24" RCP PROFILE ON SHEET 6
LINE "A-4" 18" RCP PROFILE ON SHEET 6

11+38.71 LINE "A-3" 1120.65 INV.
INLET PER GRADING PLAN
PROP. CABLE & ELEC.
SIDEWALK
WATER VAULT
PROP. 42" WATER
PROP. 24" WATER
REMOVE EX. 42" RCP AND SD INLET PER MTD 1764
ST. STA 189+59.03 CL CB#1, A=90° W=14', V=5.11', H=2"
11+13.38 LINE "A-8" 01+13.38 PCC EX. 18" RCP MTD NO. 1764
EX. ELEC.
EX. 16" WATER
EX. LATERAL "1M" EX. 18" RCP PER MTD 1764
EX. LINE "5" EX. 42" RCP PER MTD 1764
EX. TEL.
PROP. 42" WATER
PROP. 24" SEWER
PROP. 24" RECLAIMED WATER
EX. CL MH INT. 10+00.00 LINE "A-8" 0+00.00 LATERAL "1M" 3+29.92 EX. 42" RCP MTD NO. 1764
R/W SIDEWALK
10+00.00 LINE "A-3" 5+42.47 EX. 42" RCP MTD NO. 1764
10+00.00 LINE "A-5" 6+68.75 EX. 42" RCP MTD NO. 1764
CL INT 10+00.00 LINE "A-5" 6+68.75 EX. 42" RCP MTD NO. 1764
10+00.00 LINE "A" 7+59.62 PCC EX. 42" RCP MTD NO. 1764 8+00
REMOVE EXISTING JUNCTION STRUCTURE PER MTD 1764
REMOVE EXISTING BULKHEAD
EX. 18" LINE "1L" PER MTD 1764 TO BE REMOVED
EX. 16" WATER
ST. CL
45.40'
VARIES
8" CF
CL INT 10+00.00 LINE "A-9" 9+26.95 42" RCP
CL INT 10+00.00 LINE "A-6" 7+01.56 EX. 42" RCP MTD NO. 1764, D=42"
CL INT 10+00.00 LINE "A-4" 10+69.39 LINE "A-1"
ST. STA 187+72.80 CL CB#2, A=90° W=14', V=4.55', H=2"
ST. STA 182+60.92 CL CB#3, A=44° W=10', V=4.5"
ST. STA 182+52.70 CL CB#5, A=62° W=10', V=5.75'
INLET PER GRADING PLAN
11+87.21 END OF 42" RCP
11+52.83 LINE "A-9" 1141.00 INV. PROP. 12" SS
PROP. 8" RW
PROP. TEL.
EX. ELEC. FIELD VERIFY
CL INT 10+00 LINE "A-2" 11+08.93 LINE "A"
PROP. GAS
CL INT 10+00.00 LINE "A-1" 10+53.74 LINE "A" 9+96.85 PRC
PROP. 24" SS
CL SDMH 9+94.52 LINE "A" D=42"
PROP. ELEC.
PROP. 24" RW
PROP. 12" WATER
MEDIA CENTER LANE
11+34.04 EC
11+13.25 EC
EX. 24" WATER
PROP. TEL & ELEC.
8" CF
12+42.03 LINE "A-6" 1145.00INV.
11+75.97 1127.74 INV.
PROP. 24" WATER
PROP. 42" WATER
DEBRIS BASIN #8 SEE SHEET 8

CONSTRUCTION NOTES:

1. CONSTRUCT 18" RCP (D-LOAD PER PROFILE)
2. CONSTRUCT 24" RCP (D-LOAD PER PROFILE)
5. CONSTRUCT 42" RCP (D-LOAD PER PROFILE)
7. CONSTRUCT JUNCTION STRUCTURE PIPE TO PIPE PER SPPWC STD. 331-3.
8. CONSTRUCT MANHOLE PIPE TO PIPE PER SPPWC STD. 322-2.
9. CONSTRUCT CURB OPENING CATCH BASIN PER SPPWC STD. 300-3 AND LOCAL DEPRESSION PER SPPWC STANDARD PLAN 313-3, PER STREET PLAN. INSTALL AUTOMATIC RETRACTABLE SCREEN (ARS) AND CONNECTOR PIPE SCREEN PER DETAIL SHEET 12.
12. CONSTRUCT CONCRETE COLLAR FOR RCP PER SPPWC STD. 380-4.
23. PROVIDE RUBBER GA… TRANSITION (3 JOINT…
28. CONSTRUCT BRICK A…
29. CONSTRUCT CLEANOU…
33. CONSTRUCT MANHOLE… STD. 320-2.
35. CONSTRUCT BACKFILL…
38. CONSTRUCT CONCRETE BLANKET PER SPPWC 225-2

GRAPHIC SCALE: 1" = 40'

JUNCTION STRUCTURE TABLE

LINE #	A	B	C	D	EL S	EL R
A-1	65°35'	24"	2.26'	42"	1137.64	1137.75
A-2	44°11'	18"	3.22'	42"	1140.30	1140.70
					112.80	1113.02
					140.88	1140.95
					119.93	1119.99
					109.78	1110.12
					132.07	1132.20

APPENDIX B-4.1
LINE "A" Per PD 2637 and Line" B" Per MTD 1764

Line Table		
Line #	Length	Bearing
L1	53.17'	N11° 52' 12"W
L2	138.13'	N79° 21' 38"W
L3	105.89'	N49° 35' 06"E
L4	138.71'	N27° 44' 55"W
L5	47.93'	S25° 33' 05"E
L6	~~57.15'~~ 12.30'	N40° 12' 41"E

Line Table		
Line #	Length	Bearing
L7	55.61'	N16° 51' 31"E
L8	36.29'	N22° 34' 09"E
L9	128.77'	N26° 25' 37"W
L10	48.82'	N31° 11' 51"W
L11	152.83'	N03° 31' 53"E

Curve Table				
Curve #	Length	Radius	Delta	Tangent
C1	237.23'	1754.99'	007°44'42"	118.80'
C2	137.20'	90.00'	087°20'34"	85.92'
C3	13.52'	22.50'	034°25'01"	6.97'
C4	76.96'	90.00'	048°59'46"	41.01'
C5	15.27'	90.00'	09°43'17"	7.65'

Line Table		
Line #	Length	Bearing
L12	40.91'	N 49°55'59" E

REVIEWED LAND DEVELOPMENT DIVISION
BY STORM DRAIN SECTION 08/13/2018 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	REVISED LINE A4 PER RELOCATED CATCH BASIN	Jason H Fukumitsu		5/28/19

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA 8/10/18 JASON H. FUKUMITSU DATE

STORM DRAIN PLANS IN
DS 542 P.D. No. 2637
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
26074 Avenue Hall, Suite 23 ▪ Valencia, CA 91355 ▪ PH: (661) 294-2211 ▪ FX: (661) 294-9890

DWG

SHEET 3 OF 17

G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2637\HW102-03 - Sheet 3.dwg Plotted On Jun 27, 2018 - 5:35pm by dinar

B-4.2: Line “A” of MTD 1764

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T1 MTD 1764                                                                  0
T2 LINE A
T3 BY Rip Rap Outlet Structure
SO   1122.2821037.270  2                        1039.770
R    1174.4101038.320  2      .040                                 .000    .000 0
TS   1200.0001042.125  1      .040                                 .000
R    1288.6801055.310  1      .040                                 .000
TS   1308.6901059.060  3      .013                                 .000
R    1308.7001059.082  3      .013                                 .000
TS   1308.7101059.084  3      .013                                 .000
R    1339.8901059.290  3      .013                                 .000    .000 0
R    1616.5501060.670  3      .013                               -9.656    .000 0
JX   1683.1901061.000  3  4   .013   48.000         1063.370         84.0        .000
R    1720.1201061.190  3      .013                                 .000    .000 0
R    1983.4001062.510  3      .013                               -9.196    .000 1
R    2043.4701062.810  3      .013                                 .000    .000 0
R    2180.4301063.490  3      .013                                4.784    .000 0
R    2236.7901064.110  3      .013                                1.969    .000 1
R    2486.2201066.830  3      .013                               -3.930    .000 0
TS   2496.0601066.930  5      .013                               -0.155
JX   2884.7601077.680  5  6   .013  197.100         1079.560         45.0       -6.124
R    3378.6101091.310  5      .013                               -7.781    .000 0
JX   3441.0901091.940  5  7   .013   78.700         1092.150         45.0        -.983
R    3849.3901096.030  5      .013                               -6.432    .000 0
JX   4044.6801097.990  5  9   .013   10.000         1099.880        -90.0       11.189
R    4084.0001098.380  5      .013                                2.253    .000 0
SH   4084.0001098.380  5                        1098.300
CD   1  1   0    .000   3.000   10.000 2.000 2.000   .00
CD   2  1   0    .000   1.000   58.00074.50074.500   .00
CD   3  3   0    .000   8.000   10.000  .000  .000   .00
CD   4  4   1    .000   3.000     .000  .000  .000   .00
CD   5  3   0    .000   7.000   10.000  .000  .000   .00
CD   6  4   1    .000   3.500     .000  .000  .000   .00
CD   7  4   1    .000   4.500     .000  .000  .000   .00
CD   8  4   1    .000   1.500     .000  .000  .000   .00
CD   9  4   1    .000   2.000     .000  .000  .000   .00
Q          1006.000   .0
```

MTD 1764
LINE A
BY Rip Rap Outlet Structure

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1122.282	1037.270	2.500	1039.770	1339.80	2.19	.07	1039.84	.00	1.48	430.50	1.000	58.000	****	0 .0
3.331	.0201					.0023	.01	2.50	.32	1.54	.040	.00	****	TRAP
1125.613	1037.337	2.433	1039.770	1339.80	2.30	.08	1039.85	.00	1.48	420.55	1.000	58.000	****	0 .0
3.257	.0201					.0027	.01	2.43	.34	1.54	.040	.00	****	TRAP
1128.871	1037.403	2.368	1039.771	1339.80	2.41	.09	1039.86	.00	1.48	410.84	1.000	58.000	****	0 .0
3.187	.0201					.0030	.01	2.37	.37	1.54	.040	.00	****	TRAP
1132.057	1037.467	2.304	1039.771	1339.80	2.53	.10	1039.87	.00	1.48	401.36	1.000	58.000	****	0 .0
3.120	.0201					.0034	.01	2.30	.39	1.54	.040	.00	****	TRAP
1135.177	1037.530	2.242	1039.772	1339.80	2.65	.11	1039.88	.00	1.48	392.11	1.000	58.000	****	0 .0
3.056	.0201					.0039	.01	2.24	.41	1.54	.040	.00	****	TRAP
1138.234	1037.591	2.182	1039.773	1339.80	2.78	.12	1039.89	.00	1.48	383.08	1.000	58.000	****	0 .0
2.997	.0201					.0044	.01	2.18	.44	1.54	.040	.00	****	TRAP
1141.231	1037.652	2.123	1039.774	1339.80	2.92	.13	1039.91	.00	1.48	374.27	1.000	58.000	****	0 .0
2.943	.0201					.0050	.01	2.12	.46	1.54	.040	.00	****	TRAP
1144.174	1037.711	2.065	1039.776	1339.80	3.06	.15	1039.92	.00	1.48	365.67	1.000	58.000	****	0 .0
2.895	.0201					.0057	.02	2.06	.49	1.54	.040	.00	****	TRAP
1147.068	1037.769	2.009	1039.778	1339.80	3.21	.16	1039.94	.00	1.48	357.28	1.000	58.000	****	0 .0
2.854	.0201					.0065	.02	2.01	.52	1.54	.040	.00	****	TRAP

MTD 1764
LINE A
BY Rip Rap Outlet Structure

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1149.922	1037.827	1.954	1039.781	1339.80	3.37	.18	1039.96	.00	1.48	349.09	1.000	58.000	****	0 .0
2.822	.0201					.0074	.02	1.95	.56	1.54	.040	.00	****	TRAP
1152.744	1037.884	1.900	1039.784	1339.80	3.53	.19	1039.98	.00	1.48	341.10	1.000	58.000	****	0 .0
2.804	.0201					.0084	.02	1.90	.59	1.54	.040	.00	****	TRAP
1155.548	1037.940	1.848	1039.788	1339.80	3.71	.21	1040.00	.00	1.48	333.31	1.000	58.000	****	0 .0
2.441	.0201					.0095	.02	1.85	.63	1.54	.040	.00	****	TRAP
1157.989	1037.990	1.802	1039.792	1339.80	3.87	.23	1040.02	.00	1.48	326.53	1.000	58.000	****	0 .0
HYDRAULIC JUMP														
1157.989	1037.990	1.196	1039.186	1339.80	7.61	.90	1040.09	.00	1.48	236.24	1.000	58.000	****	0 .0
.755	.0201					.0647	.05	1.20	1.55	1.54	.040	.00	****	TRAP
1158.744	1038.004	1.175	1039.179	1339.80	7.84	.95	1040.13	.00	1.48	233.02	1.000	58.000	****	0 .0
1.176	.0201					.0719	.08	1.17	1.61	1.54	.040	.00	****	TRAP
1159.920	1038.028	1.140	1039.168	1339.80	8.22	1.05	1040.22	.00	1.48	227.88	1.000	58.000	****	0 .0
1.155	.0201					.0819	.09	1.14	1.71	1.54	.040	.00	****	TRAP
1161.075	1038.051	1.106	1039.158	1339.80	8.62	1.15	1040.31	.00	1.48	222.87	1.000	58.000	****	0 .0
1.132	.0201					.0931	.11	1.11	1.82	1.54	.040	.00	****	TRAP
1162.207	1038.074	1.074	1039.148	1339.80	9.04	1.27	1040.42	.00	1.48	217.98	1.000	58.000	****	0 .0
1.106	.0201					.1060	.12	1.07	1.93	1.54	.040	.00	****	TRAP

MTD 1764
LINE A
BY Rip Rap Outlet Structure

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1163.313	1038.096	1.042	1039.138	1339.80	9.48	1.40	1040.53	.00	1.48	213.21	1.000	58.000	****	0 .0
1.079	.0201					.1207	.13	1.04	2.05	1.54	.040	.00	****	TRAP
1164.393	1038.118	1.011	1039.129	1339.80	9.95	1.54	1040.67	.00	1.48	208.57	1.000	58.000	****	0 .0
1.052	.0201					.1373	.14	1.01	2.18	1.54	.040	.00	****	TRAP
1165.444	1038.139	.980	1039.120	1339.80	10.43	1.69	1040.81	.00	1.48	204.04	1.000	58.000	****	0 .0
1.023	.0201					.1564	.16	.98	2.32	1.54	.040	.00	****	TRAP
1166.468	1038.160	.951	1039.111	1339.80	10.94	1.86	1040.97	.00	1.48	199.63	1.000	58.000	****	0 .0
.995	.0201					.1780	.18	.95	2.46	1.54	.040	.00	****	TRAP
1167.463	1038.180	.922	1039.102	1339.80	11.48	2.05	1041.15	.00	1.48	195.33	1.000	58.000	****	0 .0
.966	.0201					.2027	.20	.92	2.62	1.54	.040	.00	****	TRAP
1168.429	1038.199	.894	1039.093	1339.80	12.04	2.25	1041.34	.00	1.48	191.14	1.000	58.000	****	0 .0
.938	.0201					.2309	.22	.89	2.78	1.54	.040	.00	****	TRAP
1169.366	1038.218	.866	1039.085	1339.80	12.62	2.47	1041.56	.00	1.48	187.06	1.000	58.000	****	0 .0
.909	.0201					.2630	.24	.87	2.95	1.54	.040	.00	****	TRAP
1170.276	1038.237	.839	1039.076	1339.80	13.24	2.72	1041.80	.00	1.48	183.08	1.000	58.000	****	0 .0
.881	.0201					.2995	.26	.84	3.14	1.54	.040	.00	****	TRAP
1171.157	1038.254	.813	1039.068	1339.80	13.89	2.99	1042.06	.00	1.48	179.21	1.000	58.000	****	0 .0
.854	.0201					.3413	.29	.81	3.34	1.54	.040	.00	****	TRAP

MTD 1764
LINE A
BY Rip Rap Outlet Structure

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1172.010	1038.272	.788	1039.060	1339.80	14.56	3.29	1042.35	.00	1.48	175.44	1.000	58.000	****	0 .0
.826	.0201					.3889	.32	.79	3.54	1.54	.040	.00	****	TRAP
1172.837	1038.288	.764	1039.052	1339.80	15.27	3.62	1042.67	.00	1.48	171.76	1.000	58.000	****	0 .0
.800	.0201					.4432	.35	.76	3.77	1.54	.040	.00	****	TRAP
1173.636	1038.304	.739	1039.044	1339.80	16.02	3.99	1043.03	.00	1.48	168.18	1.000	58.000	****	0 .0
.774	.0201					.5051	.39	.74	4.00	1.54	.040	.00	****	TRAP
1174.410	1038.320	.716	1039.036	1339.80	16.80	4.38	1043.42	.00	1.48	164.70	1.000	58.000	****	0 .0
TRANS STR	.1487					.3461	8.86	.72	4.26		.040	.00	****	TRAP
1200.000	1042.125	3.279	1045.404	1339.80	24.68	9.46	1054.86	.00	5.71	23.11	3.000	10.000	2.00	0 .0
41.259	.1487					.1607	6.63	3.28	2.84	3.31	.040	.00	2.00	TRAP
1241.259	1048.259	3.210	1051.469	1339.80	25.42	10.03	1061.50	.00	5.71	22.84	3.000	10.000	2.00	0 .0
29.483	.1487					.1790	5.28	3.21	2.95	3.31	.040	.00	2.00	TRAP
1270.742	1052.643	3.102	1055.745	1339.80	26.66	11.04	1066.78	.00	5.71	22.41	3.000	10.000	2.00	0 .0
17.938	.1487					.2043	3.67	3.10	3.14	3.31	.040	.00	2.00	TRAP
1288.680	1055.310	2.996	1058.306	1339.80	27.96	12.14	1070.45	.00	5.71	21.99	3.000	10.000	2.00	0 .0
TRANS STR	.1874					.0142	.28	3.00	3.34		.013	.00	2.00	TRAP
1308.690	1059.060	7.642	1066.702	1339.80	17.53	4.77	1071.47	.00	8.00	10.00	8.000	10.000	.00	0 .0
.010	2.1951					.0053	.00	7.64	1.12	.93	.013	.00	.00	BOX

---------- WARNING - Flow depth near top of box conduit ----------

Program Package Serial Number: 1656

WATER SURFACE PROFILE LISTING Date: 1-14-2025 Time: 3:24:39

MTD 1764
LINE A
BY Rip Rap Outlet Structure

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1308.700	1059.082	7.739	1066.821	1339.80	17.31	4.65	1071.47	.00	8.00	10.00	8.000	10.000	.00	0 .0
TRANS STR	.1951					.0053	.00	7.74	1.10		.013	.00	.00	BOX
		---------- WARNING - Flow depth near top of box conduit ----------												
1308.710	1059.084	7.646	1066.730	1339.80	17.52	4.77	1071.50	.00	8.00	10.00	8.000	10.000	.00	0 .0
31.180	.0066					.0052	.16	7.65	1.12	7.05	.013	.00	.00	BOX
		---------- WARNING - Flow depth near top of box conduit ----------												
1339.890	1059.290	7.876	1067.167	1339.80	17.01	4.49	1071.66	.05	8.00	10.00	8.000	10.000	.00	0 .0
128.605	.0050					.0050	.64	7.93	1.07	7.88	.013	.00	.00	BOX
		---------- WARNING - Flow depth near top of box conduit ----------												
1468.495	1059.932	7.876	1067.808	1339.80	17.01	4.49	1072.30	.05	8.00	10.00	8.000	10.000	.00	0 .0
148.055	.0050					.0049	.72	7.93	1.07	7.88	.013	.00	.00	BOX
		---------- WARNING - Flow depth near top of box conduit ----------												

MTD 1764
LINE A
BY Rip Rap Outlet Structure

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1616.550	1060.670	8.000	1068.670	1339.80	16.75	4.36	1073.03	.00	8.00	10.00	8.000	10.000	.00	0 .0
JUNCT STR	.0050					.0069	.46	8.00	1.04		.013	.00	.00	BOX
		---------- WARNING - Flow depth near top of box conduit ----------												
1683.190	1061.000	8.659	1069.659	1291.80	16.15	4.05	1073.71	.00	8.00	10.00	8.000	10.000	.00	0 .0
36.930	.0051					.0069	.25	8.66	1.01	7.56	.013	.00	.00	BOX
1720.120	1061.190	8.723	1069.913	1291.80	16.15	4.05	1073.96	.00	8.00	10.00	8.000	10.000	.00	0 .0
263.280	.0050					.0069	1.81	.00	1.01	7.64	.013	.00	.00	BOX
1983.400	1062.510	9.676	1072.186	1291.80	16.15	4.05	1076.23	.00	8.00	10.00	8.000	10.000	.00	0 .0
60.070	.0050					.0069	.41	9.68	1.01	7.65	.013	.00	.00	BOX
2043.470	1062.810	9.789	1072.599	1291.80	16.15	4.05	1076.65	.00	8.00	10.00	8.000	10.000	.00	0 .0
136.960	.0050					.0069	.94	.00	1.01	7.67	.013	.00	.00	BOX
2180.430	1063.490	10.239	1073.729	1291.80	16.15	4.05	1077.78	.00	8.00	10.00	8.000	10.000	.00	0 .0
56.360	.0110					.0069	.39	.00	1.01	5.63	.013	.00	.00	BOX
2236.790	1064.110	10.329	1074.439	1291.80	16.15	4.05	1078.49	.00	8.00	10.00	8.000	10.000	.00	0 .0
54.299	.0109					.0069	.37	.00	1.01	5.65	.013	.00	.00	BOX
2291.089	1064.702	10.146	1074.848	1291.80	16.15	4.05	1078.90	.00	8.00	10.00	8.000	10.000	.00	0 .0
HYDRAULIC JUMP														

MTD 1764
LINE A
BY Rip Rap Outlet Structure

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
2291.089	1064.702	5.140	1069.842	1291.80	25.13	9.81	1079.65	.05	8.00	10.00	8.000	10.000	.00	0 .0
13.207	.0109					.0140	.19	5.19	1.95	5.65	.013	.00	.00	BOX
2304.297	1064.846	5.132	1069.978	1291.80	25.17	9.84	1079.82	.05	8.00	10.00	8.000	10.000	.00	0 .0
181.923	.0109					.0150	2.73	5.19	1.96	5.65	.013	.00	.00	BOX
2486.220	1066.830	4.893	1071.723	1291.80	26.40	10.82	1082.55	.06	8.00	10.00	8.000	10.000	.00	0 .0
TRANS STR	.0102					.0161	.16	4.95	2.10		.013	.00	.00	BOX
2496.060	1066.930	4.869	1071.799	1291.80	26.53	10.93	1082.73	.06	7.00	10.00	7.000	10.000	.00	0 .0
JUNCT STR	.0277					.0193	7.50	4.93	2.12		.013	.00	.00	BOX
2884.760	1077.680	3.821	1081.501	1094.70	28.65	12.74	1094.24	.07	7.00	10.00	7.000	10.000	.00	0 .0
.675	.0276					.0224	.02	3.89	2.58	3.54	.013	.00	.00	BOX
2885.436	1077.699	3.822	1081.521	1094.70	28.64	12.74	1094.26	.07	7.00	10.00	7.000	10.000	.00	0 .0
147.809	.0276					.0210	3.11	3.89	2.58	3.54	.013	.00	.00	BOX
3033.244	1081.778	4.009	1085.787	1094.70	27.31	11.58	1097.37	.06	7.00	10.00	7.000	10.000	.00	0 .0
93.706	.0276					.0185	1.73	4.07	2.40	3.54	.013	.00	.00	BOX
3126.950	1084.364	4.204	1088.569	1094.70	26.04	10.53	1099.10	.06	7.00	10.00	7.000	10.000	.00	0 .0
65.988	.0276					.0162	1.07	4.26	2.24	3.54	.013	.00	.00	BOX
3192.938	1086.186	4.409	1090.595	1094.70	24.83	9.57	1100.17	.05	7.00	10.00	7.000	10.000	.00	0 .0
49.028	.0276					.0142	.70	4.46	2.08	3.54	.013	.00	.00	BOX

MTD 1764
LINE A
BY Rip Rap Outlet Structure

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
3241.966	1087.539	4.625	1092.163	1094.70	23.67	8.70	1100.86	.05	7.00	10.00	7.000	10.000	.00	0 .0
37.503	.0276					.0125	.47	4.67	1.94	3.54	.013	.00	.00	BOX
3279.469	1088.574	4.850	1093.424	1094.70	22.57	7.91	1101.33	.04	7.00	10.00	7.000	10.000	.00	0 .0
29.104	.0276					.0110	.32	4.89	1.81	3.54	.013	.00	.00	BOX
3308.573	1089.377	5.087	1094.464	1094.70	21.52	7.19	1101.65	.04	7.00	10.00	7.000	10.000	.00	0 .0
22.666	.0276					.0097	.22	5.13	1.68	3.54	.013	.00	.00	BOX
3331.239	1090.003	5.335	1095.338	1094.70	20.52	6.54	1101.88	.04	7.00	10.00	7.000	10.000	.00	0 .0
17.538	.0276					.0086	.15	5.37	1.57	3.54	.013	.00	.00	BOX
3348.776	1090.487	5.596	1096.082	1094.70	19.56	5.94	1102.03	.03	7.00	10.00	7.000	10.000	.00	0 .0
13.326	.0276					.0076	.10	5.63	1.46	3.54	.013	.00	.00	BOX
3362.102	1090.854	5.869	1096.723	1094.70	18.65	5.40	1102.13	.03	7.00	10.00	7.000	10.000	.00	0 .0
9.779	.0276					.0067	.07	5.90	1.36	3.54	.013	.00	.00	BOX
3371.882	1091.124	6.155	1097.280	1094.70	17.78	4.91	1102.19	.03	7.00	10.00	7.000	10.000	.00	0 .0
6.729	.0276					.0059	.04	6.18	1.26	3.54	.013	.00	.00	BOX
3378.610	1091.310	6.456	1097.766	1094.70	16.96	4.46	1102.23	.02	7.00	10.00	7.000	10.000	.00	0 .0
JUNCT STR	.0101					.0074	.47	6.48	1.18		.013	.00	.00	BOX

---------- WARNING - Flow depth near top of box conduit ----------

MTD 1764
LINE A
BY Rip Rap Outlet Structure

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
3441.090	1091.940	4.990	1096.929	1016.00	20.36	6.44	1103.37	.04	6.85	10.00	7.000	10.000	.00	0 .0
9.246	.0100					.0094	.09	5.02	1.61	4.87	.013	.00	.00	BOX
3450.336	1092.033	4.993	1097.026	1016.00	20.35	6.43	1103.45	.04	6.85	10.00	7.000	10.000	.00	0 .0
277.644	.0100					.0088	2.44	5.03	1.60	4.87	.013	.00	.00	BOX
3727.980	1094.814	5.237	1100.051	1016.00	19.40	5.84	1105.90	.03	6.85	10.00	7.000	10.000	.00	0 .0
121.410	.0100					.0077	.94	5.27	1.49	4.87	.013	.00	.00	BOX
3849.390	1096.030	5.493	1101.523	1016.00	18.50	5.31	1106.84	.11	6.85	10.00	7.000	10.000	.00	0 .0
JUNCT STR	.0100					.0065	1.27	5.60	1.39		.013	.00	.00	BOX
4044.680	1097.990	5.957	1103.946	1006.00	16.89	4.43	1108.38	.09	6.80	10.00	7.000	10.000	.00	0 .0
20.599	.0099					.0055	.11	6.05	1.22	4.85	.013	.00	.00	BOX
4065.279	1098.194	6.181	1104.375	1006.00	16.28	4.11	1108.49	.08	6.80	10.00	7.000	10.000	.00	0 .0
14.480	.0099					.0049	.07	6.26	1.15	4.85	.013	.00	.00	BOX
4079.759	1098.338	6.482	1104.820	1006.00	15.52	3.74	1108.56	.07	6.80	10.00	7.000	10.000	.00	0 .0
4.241	.0099					.0044	.02	6.56	1.07	4.85	.013	.00	.00	BOX
		---------- WARNING - Flow depth near top of box conduit ----------												
4084.000	1098.380	6.800	1105.180	1006.00	14.79	3.40	1108.58	.07	6.80	10.00	7.000	10.000	.00	0 .0

SCALE: HOR. 1"= 40'
VERT. 1"= 8'

Q_{50} = 1180 cfs
V_{MAX} = 32.56 fps

Q_{50} = 1180 cfs
V_{MAX} = 15.63 fps

Q_{50} = 1132 cfs
V_{MAX} = 14.19 fps

SANTA CLARA RIVER

HGL SANTA CLARA RIVER

ELEV 1070.0'

PROVIDE SUPPORT PER APWA STD. 224-1

ELEV 1059.31'

ELEV 1055.31'

EXISTING GROUND

HGL

ELEV 1037.27'

ELEV 1038.32'

ELEV 1037.25'

2.00% MIN

4'-6"

EXISTING ARMORFLEX

STA. 12+88.88 BEGIN TRANS.
1055.31'

STA. 13+08.69 END TRANS.
1058.06

EXIST. 18"SS
1046.12 INV.

13+39.89 BC
*1059.21 INV.

RELOCATE 24" GAS (SO. CAL. GAS)

EXIST. 8" GAS (SO. CAL. GAS)

RELOCATE ELEC. CONDUIT (FIELD VERIFY)

CONSTRUCT 375.14 LF 10'W x 8'H RCB
SEE DETAILS ON SHEETS 15 & 16
USE CONC & REINF FOR 20' MAX. EARTH COVER
PER CALTRANS STANDARD PLAN D80C ON SHEET 16.

TRANSITION STRUCTURE PER CALTRANS STD. PLAN D86A
SEE SHEET 19.

EXIST 30" R.C. PIPE @ LEFT

EXIST 6" DIP FORCE MAIN @LEFT

STA 11+00.00
1037.25'

STA 11+22.28
1037.27'

STA 11+74.41
BEGIN TRANSITION
1038.32'

STA 12+00.00
END TRANSITION

CONSTRUCT 166.4 LF
RIPRAP OUTLET STRUCTURE
PER DETAILS ON
SHEET 12 AND 12B

LINE 'A'

CL SKYVIEW LANE
STA. 16+77.84

CL MH NO. 1
STA. 17+58.69
RIM=1080.0

FINISHED GROUND

EXISTING GROUND

S=0.50%

16+16.35 EC
*1080.59 INV.

LATERAL "1W" 16+31.36
1082.89 INV.

36" STORM DRAIN 16+83.75
1083.37 INV.

LATERAL "1X" 16+97.64
1082.89 INV.

17+20.12 BC
*1061.11 INV.

RELOCATED PROPOSED 18"OIL EXXON/MOBIL
1084.29 INV.

*1061.51 INV.

CONSTRUCT 116.17 LF 10'W x 8'H RCB
SEE DETAILS ON SHEETS 15 & 16

MATCHLINE SEE SHEET 4
STA. 18+00.00

LEGEND:

H.G.L. FOR DIVERSION Q PER PROPOSED ENTRADA SOUTH HYDROLOGY

REGISTERED PROFESSIONAL ENGINEER
JASON A. FUSCO
No. 40695
CIVIL
STATE OF CALIFORNIA

02/14/25

FOR UPDATED HGL ONLY

As of 7-31-2013
AS BUILT

REGISTERED PROFESSIONAL ENGINEER
JEFFREY B. MCKINNEY
NO. C60053
6/30/2010
CIVIL
STATE OF CALIFORNIA

2

* ALL RCB INVERT ELEVATIONS TO BE 1" HIGHER THAN DESIGN INVERT.

** NOT TO BE MAINTAINED BY LACFCD.

CONSTRUCTION NOTES

1. CONSTRUCT 18" RCP (D-LOAD PER PROFILE)
6. CONSTRUCT 10' x 8' RCB PER CALTRANS STD D80A ON SHEET 16.
8. CONSTRUCT MANHOLE CONCRETE BOX STORM DRAIN PER APWA STD 323-1.
9. CONSTRUCT TRANSITION STRUCTURE PER CALTRANS DETAIL D86A ON SHEET 20.
11. CONSTRUCT JUNCTION STRUCTURE PIPE TO RCB INLET < 30" PER APWA STD 334-1.
12. CONSTRUCT JUNCTION STRUCTURE PIPE TO RCB INLET > 30" PER APWA STD 333-1.
14. CONSTRUCT RIPRAP OUTLET STRUCTURE PER DETAIL 2 ON SHEET 12A.
17. MODIFIED CURB OPENING CATCH BASIN PER APWA STD. 300-2 MINIMUM B=3'-8", MINIMUM Vupstream 2'-6". (WxV PER PLAN LOCAL DEPRESSION PER APWA STD. 313-1, CASE E. SEE STREET PLANS. INSTALL OCEAN-PRO CATCH BASIN INSERT, 3 DEBRIS GATES, 5 FILTER TRAYS, AND 10 POLLUTANT FILTERS.
25. CONSTRUCT 4' WIDE, 4" THICK PCC PEDESTRIAN ACCESS TO MANHOLE PER DETAIL 3 ON SHEET 12. CONSTRUCT MINIMUM 5'X CONCRETE PAD AROUND MANHOLE LID.
26. CONSTRUCT CHAIN LINK FENCE AND GATE PER APWA STD. 600-2.
27. CONSTRUCT 16' WIDE DRIVEWAY APPROACH PER APWA STD. 110-1, TYPE A. W=16', X=3', Y=4'. DRIVEWAY SHALL BE 6" THICK PCC.
30. CONSTRUCT 6" THICK A.C. ACCESS ROAD PER SECTION HERE.

...RIPRAP PAD PER DETAIL ON

...RIPRAP PAD PER DETAIL

APPENDIX B-4.2
LINE "A" Per MTD 1764

LEGEND

A / 10 — SECTION — SHEET

TYPICAL SECTION — RCB
No Scale

BEDDING MATERIAL BELOW BOTTOM OF RCB SHALL BE 12" C.A.B.

slope 1:6

slope 1:6

EXISTING ARMORFLEX NOT TO BE MAINTAINED BY LACFCD

STA 12+88.68 — (SEE SHEET 16 FOR RCB DETAILS)

SANTA CLARA RIVER

STA. 11+22.28 BEGIN TRAP CHANNEL

STA. 11+74.41 BEGIN TRANSITION

STA. 12+00.00 END TRANSITION

STA. 12+88.88 BEGIN TRANS.

STA. 13+08.69 END TRANS.

C 12B

B 12B

A 12B

EXIST MH

EXIST. 18"SS

EXISTING CONC. CHANNEL PER PD 1680 TO REMAIN

PROPOSED 24" SD PER CALTRANS EA 07 187014

PROPOSED CL "THE OLD ROAD"

989

REMOVE EXIST SD

EXISTING 18" SD TO BE REMOVED

CONNECT 12" PVC (C.B. NO. 1Xb=1072.5') INV.

CL MH NO. 1 STA. 17+58.69 RIM=1080.0

1079.50

END REMOVE EX. SD

CL CB NO. 1Wb STA.685+84.52 TOR TC=1079.0 INV=1073.44 W=14' V=6.56'

CL INTERSECTION STA. 16+72.64

EXIST. C&G

HORZ. N51°52'44"W 24.84'
LATERAL "1W" SEE SHEET 11

N10°08'05"W

CONNECT 4" PVC SUBDRAIN TO 12" PVC. **

CL CB NO. 1Xb STA.685+65.327 TOR TC=1078.5 INV=1067.44 W=14' V=6.88' 7.5'

HORZ. N51°52'44"E 36.22'
LATERAL "1X" SEE SHT. 11

CL INT 16+83.31= 0+00.00 = LATERAL "1X" A=35°43'39" B=18" C=5'

EXIST 36" RCP PER PD 2592 TO REMAIN

FUTURE, PUBLIC ENTRANCE

SKYVIEW LANE (PRIVATE AND FUTURE)

CL INT 16+22.98= 0+00.00 = LATERAL "1W" A=35°43'39" B=18" C=5'

CONNECT EXIST 36" SD STA. 16+84.04 A=96°1'35", B=36", C=4'

PROPOSED 20' WIDE EASEMENT TO CITY OF SANTA CLARITA FOR COVERED STORM DRAIN, APPURTENANT STRUCTURES, AND INGRESS AND EGRESS PURPOSES. SEE SHEET 21 FOR DATA.

EXIST SEWER PC 11819

REMOVE EX. A.C. ROAD

JOIN EXISTING A.C. ACCESS ROAD @ CL STA.

EASEMENT TO CITY OF SANTA CLARITA FOR FLOOD CONTROL PURPOSES SEE SHEET 21 FOR DATA.

EASEMENT TO THE CITY OF SANTA CLARITA FOR INGRESS AND EGRESS PURPOSES. SEE SHEET 21 FOR DATA.

LINE 'A'

40'X40' TURNAROUND

PROTECT EXISTING ARMOR FLEX

DAYLIGHT

48"

N06°29'17"W 639.89'

EXIST 24" GAS

FLOW

6" AC ON 4" CAB

S=2% S=2%

AC PAVEMENT DETAIL
No Scale

PLAN
SCALE: 1" = 40'

40' 20' 0' 40' 80'
GRAPHIC SCALE

Curve Data				
CURVE	RADIUS	LENGTH	TANGENT	DELTA
A	1640.36'	276.67'	138.67'	09°39'48"
B	1640.36'	263.28'	131.92'	09°11'46"

APPROVED FOR CONSTRUCTION BY:

ROBERT G. NEWMAN, P.E., L.S.
DIRECTOR OF PUBLIC WORKS
CITY OF SANTA CLARITA

for RGN 7-26-07
DATE

NO.	REVISIONS	REVISED BY	APPROVED BY	DATE
1	Outlet Structure Revised per sheet 3B (Void Sheet 3A). Old Road superelevation revision and PVC connect to C.B. No.1xb.	7/18/07		8-1-07
2	REVISE TRUCK TURNAROUND AND ADJACENT FENCING.	9/5/2009		9-15-09
3	AS-BUILT REVISIONS FROM INSPECTOR FIELD NOTES	1/19/2010		2-23-10

REGISTERED PROFESSIONAL ENGINEER
JON M. AUSTIN
RCE 58726
Exp. 03/31/07
CIVIL
STATE OF CALIFORNIA

PROJECT ENGINEER 7/18/07
DATE

MetroPointe Engineers
3555 Harbor Gateway South, Suite A
Costa Mesa, CA 92626
(714) 438-1095

STORM DRAIN PLANS IN
CITY OF SANTA CLARITA MTD. No. 1764

CITY OF SANTA CLARITA

STORM DRAIN PLAN AND PROFILE
MTD NO. 1764
SYSTEM A
FROM STA. 10+00 TO STA. 18+00

DWG

SHEET 3B OF 21

DRAWING

DRAWING NUMBER

SAFCO PRODUCTS • NEW HOPE, MINNESOTA
REORDER BY PART NUMBER 6502

Storm Drain - MTD 1764
Sheet 3B of 21

01986

SCALE: HOR. 1"= 40'
VERT. 1"= 8'

LEGEND:

H.G.L. FOR DIVERSION Q PER PROPOSED ENTRADA SOUTH HYDROLOGY

REGISTERED PROFESSIONAL ENGINEER
JASON N. FUNG
No. 40695
CIVIL
STATE OF CALIFORNIA
11/12/24

FOR UPDATED HGL ONLY

AS OF 7-31-2013
AS BUILT

Q 50 = 1132 cfs
V MAX = 24.18 fps

Q 50 = 1132 cfs
V MAX = 26.94 fps

Q 50 = 1132 cfs
V MAX = 28.51 fps

Q 50 = 1132 cfs
V MAX = 28.21 fps

Q 50 = 1126 cfs
V MAX = 27.24 fps

1090
1070
1050

MATCHLINE SEE SHEET 3
STA. 18+00.00

MATCHLINE SEE SHEET 5
STA. 28+00.00

EXISTING GROUND
FINISHED GROUND
H.G.L.

CL MH NO. 2
STA. 21+80.43 GB
RIM=1078.27

CL MH NO. 3
STA. 24+95.06
RIM=1082.93

CL MH NO. 4
STA. 27+75.00
RIM=1091.10

S=0.50%
S=1.09%
S=2.76%

*1061.51 INV.
19+83.40 EC
*1062.43 INV.
20+43.47 BC
*1062.73 INV.
21+80.43 GB
1063.41 INV.
LATERAL "1T" 21+92.40
1065.51 INV.
LATERAL "1S" 22+14.82
1065.76 INV.
22+36.79 PCC
*1064.03 INV.
LATERAL "1U" 23+75.74
1067.51 INV.
LATERAL "1R" 24+37.85
1067.55 INV.
24+86.22
*1066.75 INV.
24+96.06
1066.85 INV.
LATERAL "1Q" 25+35.37
1071.00 INV.
LATERAL "1R" 26+71.71
1073.67 INV.
SLURRY BACKFILL SUPPORT
27+92.05
PROPOSED 24" VCP SEWER
1068.74 INV.
*1075.25 INV.

CONSTRUCT 686.22 LF 10'W x 8'H RCB
SEE DETAIL ON SHEETS 15 & 16

CONSTRUCT 686.22 LF 10'W x 8'H RCB
SEE DETAIL ON SHEETS 15 & 16

LINE 'A' (2)

CONSTRUCT ~~45.31~~ 39.31 LF
10'W x 7'H RCB
SEE DETAIL ON SHEET 14

TRANS 10'W x 8'H RCB
TO 10'W x 7'H RCB

CONSTRUCT 215.76 LF 10'W x 7'H RCB
SEE DETAIL ON SHEETS 15 & 16

CONSTRUCT 48.87 LF 10'W x 7'H RCB
SEE DETAIL ON SHEETS 15 & 16

* ALL RCB INVERT ELEVATIONS TO BE 1" HIGHER THAN DESIGN INVERT ELEVATIONS

18 19 20 21 22 23 24 25 26 27 28

TYPE 30S-Z INLET
684+21.7±, 110.2'± RT
TG= 1075.8±, V=4'±
NOT TO BE MAINTAINED BY LACFCD

PROP. STORM DRAIN PER CALTRANS EA 07-187014

24"W 600mm RCP 30'± @ 4.6%±

CL C.B. NO. 1Sb
ST. STA. 684+17.652
TC=1076.61, INV.=1070.03
W=7', V=6.56'

EXIST. CONC. CHANNEL TO BE REMOVED

(2) CL INT LACSD 6" SSFM
0+57.22 – LATERAL "1S"
PROVIDE PIPE SUPPORT PER LACSD STD PLAN S-a-217. PROVIDE MINIMUM 8" CLEARANCE FROM BOTTOM OF 6" SSFM TO TOP OF 24" RCP.

684+41.146 THE OLD ROAD= 10+00.00

EXISTING 6" SSFM

6"SSFM
CL THE OLD ROAD

HORZ. N71°45'04"E, 107.86'
LATERAL "1S" SEE SHEET 10

CL INT 22+00.49=
0+00.00 – LATERAL "1T"

CL INT 22+14.82=
0+00.00 – LATERAL "1S"

HORZ. N72°06'17"E, 13.12'
LATERAL "1T" SEE SHEET 10

ST. STA. 684+21.074
TG=1079.02, INV.=1070.79
NOT TO BE MAINTAINED BY LACFCD

CL INT 23+75.74=
0+00.00 – LATERAL "1U"

CL INT 24+37.85=
0+00.00 – LATERAL "1R"

CL C.B. NO. 1Rb
ST. STA. 683+50.00
TC=1081.25, INV.=1080.91
W=7', V=6.56'

STA. 24+96.06
END TRANS.

CL MH NO. 3
STA 24+95.06
RIM=1082.93

STA. 24+86.22
BEGIN TRANS.

LAT "1R" SEE SHEET 10A

HORZ. N66°04'48"E, 24.70'
LATERAL "1Q" SEE SHEET 11

HORZ. N66°04'48"E, 4.00'
LATERAL "1Q" SEE SHEET 11

RETAINING WALL SEE SEPARATE PLAN

SEE GRADING PLAN

CL INT 25+35.37=
0+00.00 – LATERAL "1Q"

CL C.B. NO. 1Qb
ST. STA. 683+20.508
TC=1084.78, INV.=1076.56
W=7', V=8.22'

ST. STA. 683+20.960
TG=1084.77, INV.=1081.18

ST. STA. 92+11.325 MMP
TC=1089.15, INV.=1082.21
W=7', V=6.89'

HORZ. N78°04'11"E, 61.87'
LATERAL "1P" SEE SHEET 10

CL C.B. NO. 1Pb
ST. STA. 682+55.033=
TC=1088.97, INV.=1081.87
W=10', V=7.22

HORZ. N63°18'07"E, 85.65'
LATERAL "1P" SEE SHEET 10

CL MH NO. 4
STA. 27+75.00
RIM=1090.84
1091.10

CL INT 27+51.06=
0+00.00 – LATERAL "1P"

PROPOSED 24" VCP SEWER (BY OTHERS)

EXIST. TERRACE DRAIN

EXIST. CONC. CHANNEL TO BE REMOVED

CONTINUE BRIDGE DETAIL B-2, STD. PLAN BD-3 TO OUTLET STRUCTURE, REFERENCE SHEET 20. IN UNPAVED AREAS.

PROPOSED 20' WIDE EASEMENT TO LACFCD FOR COVERED STORM DRAIN, APPURTENANT STRUCTURES, AND INGRESS AND EGRESS PURPOSES. SEE SHEET 21 FOR DATA

CL C.B. NO. 1Tc
ST. STA. 684+21.317
TC=1078.89, INV.=1067.91
W=14', V=10.98'

HORZ. N71°56'35"E, 4.01'
LATERAL "1T" SEE SHEET 10A

19+83.40 EC
20+43.47 BC
22+36.79 PRC
N25°20'5"W

PLAN
SCALE: 1" = 40'
40' 20' 0' 40' 80'
GRAPHIC SCALE

APPROVED FOR CONSTRUCTION BY:

ROBERT G. NEWMAN, P.E., L.S.
DIRECTOR OF PUBLIC WORKS
CITY OF SANTA CLARITA
DATE

CONSTRUCTION NOTES

1. CONSTRUCT 18" RCP (D-LOAD PER PROFILE)
2. CONSTRUCT 24" RCP (D-LOAD PER PROFILE)
6. CONSTRUCT 10' x 8' RCB PER CALTRANS STD D80A ON SHEET 16.
7. CONSTRUCT 10' x 7' RCB PER CALTRANS STD D80A ON SHEET 16.
8. CONSTRUCT MANHOLE CONCRETE BOX STORM DRAIN PER APWA STD 323-1.
10. CONSTRUCT TRANSITION STRUCTURE SINGLE RCB TO SINGLE RCB PER APWA STD 341-1.
11. CONSTRUCT JUNCTION STRUCTURE PIPE TO RCB INLET < 30" PER APWA STD 334-1.
17. MODIFIED CURB OPENING CATCH BASIN PER APWA STD. 300-2. B=3'-8", Vupstream ≥ 2'-6". (WxV PER PLAN). LOCAL DEPRESSION PER APWA STD. 313-1, CASE E. SEE STREET PLANS. INSTALL OCEAN-PRO CATCH BASIN INSERT. DEBRIS GATES, FILTER TRAYS, AND POLLUTANT FILTERS PER SCHEDULE ON SHEET 2.
18. GRATING CATCH BASIN PER STREET PLANS. NOT TO BE MAINTAINED BY LACFCD.
19. 24" DIA. PERFORATED CMP RISER WITH ASPHALT APRON PER GRADING PLAN. NOT TO BE MAINTAINED BY LACFCD.

APPENDIX B-4.2
LINE "A" Per MTD 1764

Curve Data				
CURVE	RADIUS	LENGTH	TANGENT	DELTA
B	1640.36'	263.28'	131.93'	09°11'46"
C	1640.36'	193.32'	96.77'	06°45'08"
D	3636.48'	1612.61'	819.78'	25°24'29"

NO.	REVISIONS	REVISED BY	APPROVED BY	DATE
1	LACSD 24" VCP SEWER CROSSING	6/29/07		9-17-07
2	OLD ROAD SUPERELEVATION REVISION, SEE CALTRANS PLAN SET SHEET P-8. RELOCATED LATERAL "1R"	6/29/07		9-17-07
3	AS-BUILT REVISION FROM INSPECTOR FIELD NOTES			1/19/2010

REGISTERED PROFESSIONAL ENGINEER
JON M. AUSTIN
RCE 58726
Exp. 03/31/10
CIVIL
STATE OF CALIFORNIA
PROJECT ENGINEER 6/29/07
DATE

MetroPointe Engineers
3555 Harbor Gateway South, Suite A
Costa Mesa, CA 92626
(714) 438-1095

STORM DRAIN PLANS IN
CITY OF SANTA CLARITA MTD. No. 1764

CITY OF SANTA CLARITA

STORM DRAIN PLAN AND PROFILE
MTD NO. 1764
SYSTEM A
FROM STA. 18+00 TO STA. 28+00

DWG | SHEET 4A OF 21

SCALE: HOR. 1"= 40'
VERT. 1"= 8'

LEGEND:

H.G.L. FOR DIVERSION Q PER PROPOSED ENTRADA SOUTH HYDROLOGY

JASON H. FORSYTHE No. 40695 REGISTERED PROFESSIONAL ENGINEER CIVIL STATE OF CALIFORNIA

11/12/24

FOR UPDATED HGL ONLY

As of 7-31-2013
AS BUILT

*ALL RCB INVERT ELEVATIONS TO BE 1' HIGHER THAN DESIGN INVERT ELEVATIONS.

Q_{50}= 1126 cfs
V_{MAX}= 27.16 fps

Q_{50}= 1077 cfs
V_{MAX}= 27.61 fps

Q_{50}= 1016 cfs
V_{MAX}= 18.96 fps

MATCHLINE SEE SHEET 4 STA. 28+00.00

MATCHLINE SEE SHEET 6 STA. 38+00.00

1110
1090
1070

EXISTING GROUND
FINISHED GROUND
H.G.L.
S=2.76%
S=1.00%

CL MMP STA. 29+20.95
PROVIDE SUPPORT PER APWA STD. 224-1
PROTECT IN PLACE 3-3" EXIST. ELECT CONDUIT (FIELD VERIFY)

CL MH NO. 5 STA. 30+75.00 RIM=1099.45 1099.53
CL MH NO. 6 STA. 33+78.61 RIM=1104.53 1109.69
CL MH NO. 7 STA. 37+00.00 RIM=1107.84 1108.02

1075.25 INV. LATERAL "1H" 28+30.35 1078.06 INV.
PROPOSED 42" WTR 1084.30 INV.
PROTECT IN PLACE EXIST. TELE CONDUIT (FIELD VERIFY)
LINE 'B' 28+84.76 1079.56 INV.
PROTECT IN PLACE EXIST. 20" WTR C.L.W.A. 48"COVER (FIELD VERIFY)
RELOCATE EXIST. 16" ACP WTR VALENCIA WATER (FIELD VERIFY)
PROTECT IN PLACE EXIST. CABLE TV (FIELD VERIFY)
PROTECT IN PLACE 4-5" EXIST. ELECT (FIELD VERIFY)
LATERAL "1J" 30+12.20 1083.07' INV.
LATERAL "1H" 30+42.38 1083.74 INV.
LATERAL "1G" 30+80.89 1084.45 INV.
PROTECT IN PLACE EXIST. ELECT (FIELD VERIFY)
LATERAL "1Z" 32+34.97 1090.00 INV.
33+78.61 1091.23 INV.
LATERAL "1F" 33+84.34 1093.29 INV.
LATERAL "1E" 34+41.09 1092.15 INV.
LATERAL "1D" 35+26.93 1095.37 INV.
1095.46 INV.

CONSTRUCT 556.33 LF 10'W x 7'H RCB SEE DETAILS ON SHEETS 15 & 16
CONSTRUCT 556.33 LF 10'W x 7'H RCB SEE DETAILS ON SHEETS 15 & 16
CONSTRUCT 358.91 LF 10'W x 7'H RCB SEE DETAILS ON SHEETS 15 & 16

LINE 'A'

28 29 30 31 32 33 34 35 36 37 38

CL MAGIC MOUNTAIN PARKWAY
EXIST 18" SD
CL INT. 91+71.086 MMP =STA. 682+07.799 THE OLD ROAD
CL INT. 30+04.41 S.D. =STA. 91+59.42 MMP
CL INT. 30+17.33= 0+00.00 LATERAL "1Y"
CL INT. 30+12.20= 0+00.00 LATERAL "1J"
CL INT. 28+30.29 0+00.00 LATERAL "1H"
CL INT. 28+67.87 0+00.00 LINE 'B'
CL C.B. NO. 1Jd ST. STA. 681+71.538 TC=1096.78, INV.=1090.39 W=14', V=6.56'
HORZ. N72°09'47"E, 99.12' LATERAL "1J" SEE SHEET 9
CL C.B. NO. 1Hb ST. STA. 681+66.580 TC=1098.47, INV.=1090.03 W=14', V=8.50'
CL INT. 30+80.89= 0+00.00 LATERAL "1G"
EXIST 10'X5' RCB TO BE REMOVED
CL INT. 32+34.97= 0+00.00 LATERAL "1Z"
CL INT. 33+84.26 0+00.00 LATERAL "1F"
EXIST (2) 54" RCP TO BE REMOVED
ST. STA. 678+83.437 =10+00.00
CL C.B. NO. 1Db ST. STA. 680+21.467 TC=1106.51, INV.=1099.92 W=7', V=6.56'
HORZ. N51°04'44"E, 85.65' LATERAL "1D" SEE SHEET 9 PROVIDE RUBBER GASKET JOINTS.
PROP. MEDIAN
CL THE OLD ROAD
LINE 'A'
CL INT. 35+26.84 0+00.00 LATERAL "1D"
CL MH NO. 7 37+00.00 RIM=1107.84 1108.02 DEBRIS CONE DPV=1775 CY S=0.1%
PROP. V-DITCH PER ROUGH GRADING PLANS.
R/W

HORZ. N58°48'44"E, 24.66' LATERAL "1H" SEE SHEET 9
CL INT. 30+42.38= 0+00.00 LATERAL "1H"
CL MH NO. 5 30+75.00 RIM=1099.45 1099.53
HORZ. N61°51'11"E, 66.16' LATERAL "1N" SEE SHEET 10
CL C.B. NO. 1Nb ST. STA. 91+47.647 MMP TC=1094.20, INV.=1087.69 W=14', V=6.56'
HORZ. S46°34'26"W, 74.28' LATERAL "1Y" SEE SHEET 11
CL C.B. NO. 1Yb STA. 91+29.234 MMP= TC=1101.02, INV=1094.46 W=7.0', V=6.56'
LINE 'B' SEE SHEET 7 FOR PLAN & PROFILE
PC = 0+39.21
CL C.B. NO. 1Gb ST. STA. 681+55.239 TC=1100.54, INV.=1090.99 W=5', V=2.9'
HORZ. N58°06'20"W, 49.00' LATERAL "1G" SEE SHEET 9
HORZ. N53°38'02"E, 23.33' LATERAL "1Z" SEE SHEET 11
CL C.B. NO. 1Zb ST. STA. 681+10.040 TG=1103.27, INV=1096.56 W=5.5', V=6.72'
CL MH NO. 6 33+78.61 RIM=1104.53 1104.69
HORZ. N53°19'32"E, 7.65' LATERAL "1F" SEE SHEET 20
CL C.B. NO. 1Fa ST. STA. 680+63.443 TC=1104.95, INV.=1098.35 W=14', V=6.56'
LINE "C" SEE SHEET 8 FOR PLAN AND PROFILE
SEE CHEVRON GRADING PLAN
PROPOSED 24"VCP SEWER (BY OTHERS)

Curve Data				
CURVE	RADIUS	LENGTH	TANGENT	DELTA
D	3636.46'	1612.61'	819.78'	25°24'29"
E	22.50'	15.46'	8.05'	39°22'14"

PLAN
SCALE: 1" = 40'
40' 20' 0' 40' 80'
GRAPHIC SCALE

APPROVED FOR CONSTRUCTION BY:
ROBERT G. NEWMAN, P.E., L.S.
DIRECTOR OF PUBLIC WORKS
CITY OF SANTA CLARITA
DATE 6-7-06

NO.	REVISIONS	REVISED BY	APPROVED BY	DATE
1	LACSD 24"VCP SEWER CROSSING	8/29/07		9-12-07

JON M. AUSTIN RCE 58726 Exp. 03/31/07 CIVIL STATE OF CALIFORNIA
PROJECT ENGINEER 5-31-06 DATE

MetroPointe Engineers
3555 Harbor Gateway South, Suite A
Costa Mesa, CA 92626
(714) 438-1095

CONSTRUCTION NOTES

1. CONSTRUCT 18" RCP (D-LOAD PER PROFILE)
5. CONSTRUCT 54" RCP (D-LOAD PER PROFILE)
7. CONSTRUCT 10' x 7' RCB PER CALTRANS STD D80A ON SHEET 16.
8. CONSTRUCT MANHOLE CONCRETE BOX STORM DRAIN PER APWA STD 323-1.
11. CONSTRUCT JUNCTION STRUCTURE PIPE TO RCB INLET < 30" PER APWA STD 334-1.
12. CONSTRUCT JUNCTION STRUCTURE PIPE TO RCB INLET > 30" PER APWA STD 333-1.
17. MODIFIED CURB OPENING CATCH BASIN PER APWA STD. 300-2. B=3'-8", Vupstream ≥ 2'-6". (WxV PER PLAN). LOCAL DEPRESSION PER APWA STD. 313-1, CASE E. SEE STREET PLANS. INSTALL OCEAN-PRO CATCH BASIN INSERT, DEBRIS GATES, FILTER TRAYS, AND POLLUTANT FILTERS PER SCHEDULE ON SHEET 2.
19. 24" DIA. PERFORATED CMP RISER WITH ASPHALT APRON PER GRADING PLAN. NOT TO BE MAINTAINED BY LACFCD.
22. CONSTRUCT MANHOLE PIPE TO PIPE PER APWA STD. 320-1.
31. CURBSIDE GRATING CATCH BASIN PER CHEVRON GRADING PLANS. NOT TO BE MAINTAINED BY LACFCD.

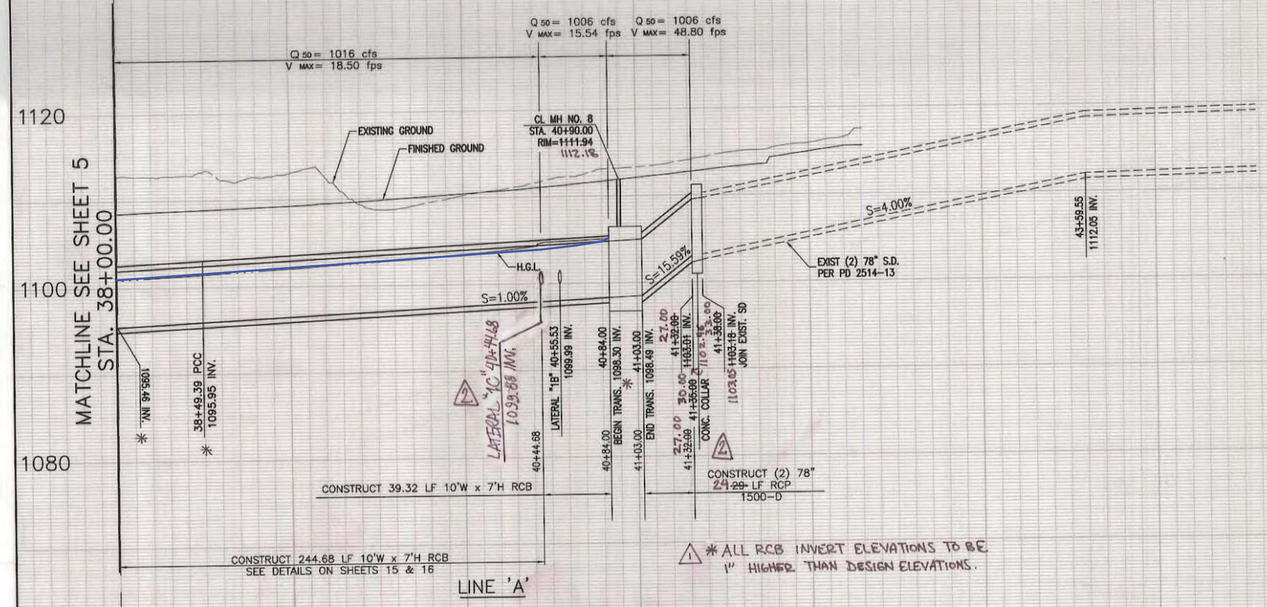
APPENDIX B-4.2
LINE "A" Per MTD 1764

STORM DRAIN PLANS IN CITY OF SANTA CLARITA MTD. No. 1764
CITY OF SANTA CLARITA

STORM DRAIN PLAN AND PROFILE
MTD NO. 1764
SYSTEM A
FROM STA. 28+00 TO STA. 38+00

DWG SHEET 5 OF 21

SCALE: HOR. 1"= 40'
VERT. 1"= 8'



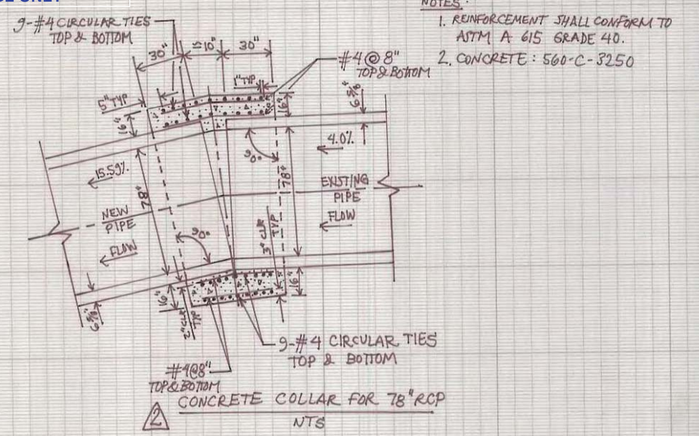
⚠1 * ALL RCB INVERT ELEVATIONS TO BE 1" HIGHER THAN DESIGN ELEVATIONS.

REGISTERED PROFESSIONAL ENGINEER
JASON H. FORMATTSU
No. 40695
CIVIL
STATE OF CALIFORNIA
11/12/24

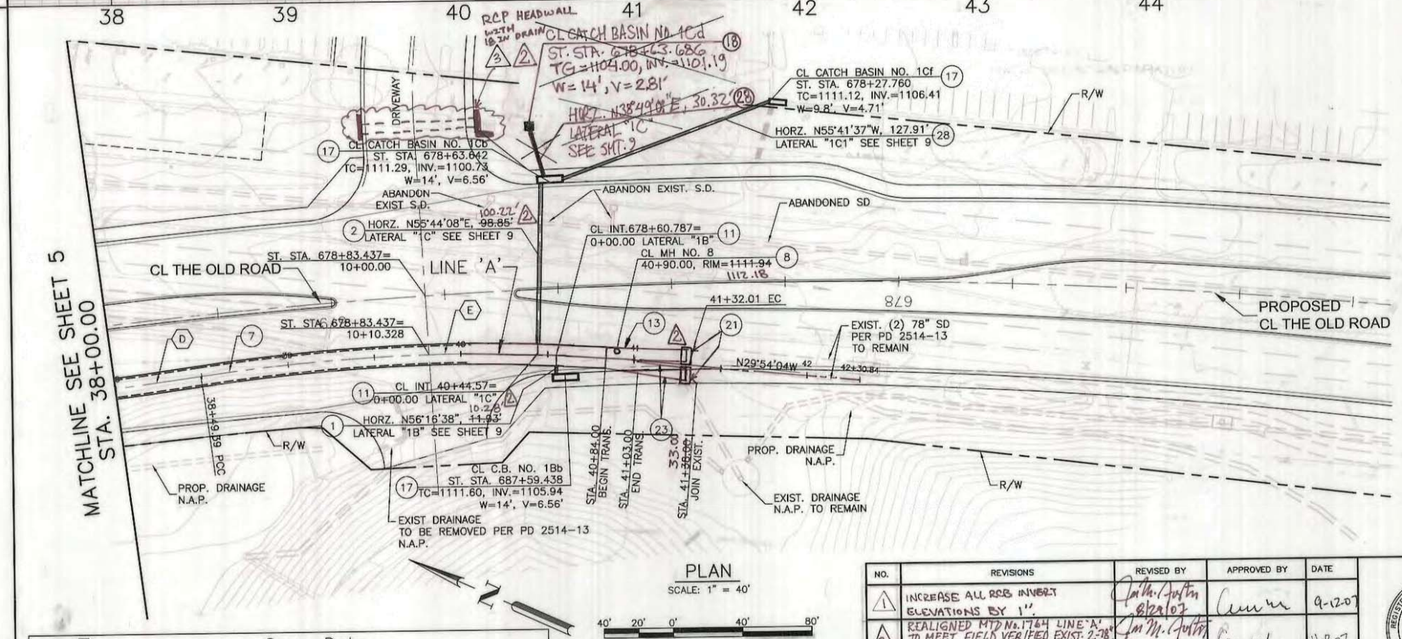
FOR UPDATED HGL ONLY

LEGEND:

H.G.L. FOR DIVERSION Q PER PROPOSED ENTRADA SOUTH HYDROLOGY



NOTES:
1. REINFORCEMENT SHALL CONFORM TO ASTM A 615 GRADE 40.
2. CONCRETE: 560-C-3250



PLAN
SCALE: 1" = 40'
40' 20' 0' 40' 80'
GRAPHIC SCALE

Curve Data				
CURVE	RADIUS	LENGTH	TANGENT	DELTA
D	3636.48'	1612.61'	819.78'	25°24'29"
E	~~1148.25'~~	~~282.61'~~	~~142.02'~~	~~14°06'07"~~
⚠2	1000.00'	245.81'	123.53'	14°05'02"

APPROVED FOR CONSTRUCTION BY:
ROBERT G. NEWMAN, P.E., L.S.
DIRECTOR OF PUBLIC WORKS
CITY OF SANTA CLARITA
DATE 6-7-06

NO.	REVISIONS	REVISED BY	APPROVED BY	DATE
⚠1	INCREASE ALL RCB INVERT ELEVATIONS BY 1"	8/22/07		9-12-07
⚠2	REALIGNED MTD No.1764 LINE 'A' TO MEET FIELD VERIFIED EXIST. 2-78" CONCRETE COLLAR. DETAIL FOR 78"RCP	11-6-07		11-8-07
⚠3	AS-BUILT REVISION. LAT 1C EXT. NOT CONSTRUCTED.	1/19/2010		2-23-10

REGISTERED PROFESSIONAL ENGINEER
JON M. AUSTIN
RCE 58726
Exp. 03/31/07
CIVIL
STATE OF CALIFORNIA
PROJECT ENGINEER 5-31-06 DATE

MetroPointe Engineers
3555 Harbor Gateway South, Suite A
Costa Mesa, CA 92626
(714) 438-1095

As of 7-31-2013
AS BUILT

CONSTRUCTION NOTES

1. CONSTRUCT 18" RCP (D-LOAD PER PROFILE)
2. CONSTRUCT 24" RCP (D-LOAD PER PROFILE)
7. CONSTRUCT 10' x 7' RCB PER CALTRANS STD D80A ON SHEET 16.
11. CONSTRUCT JUNCTION STRUCTURE PIPE TO RCB INLET < 30" PER APWA STD 334-1.
13. CONSTRUCT TRANSITION STRUCTURE DOUBLE RCP TO SINGLE RCB PER MODIFIED APWA STD 342-1 & 343-1 PER DETAIL 1 SHEET 12.
17. MODIFIED CURB OPENING CATCH BASIN PER APWA STD. 300-2. B=3'-8", Vupstream ≥ 2'-6". (WxV PER PLAN). LOCAL DEPRESSION PER APWA STD. 313-1, CASE E. SEE STREET PLANS. INSTALL OCEAN-PRO CATCH BASIN INSERT. DEBRIS GATES, FILTER TRAYS, AND POLLUTANT FILTERS PER SCHEDULE ON SHEET 2.
18. GRATING CATCH BASIN PER STREET PLANS. NOT TO BE MAINTAINED BY LACFCD.
21. CONSTRUCT CONCRETE COLLAR FOR RCP PER APWA STD. ~~380-2~~ DETAIL HEREON. ⚠2
23. CONSTRUCT 78" RCP (D-LOAD PER PROFILE)

...G PLANS. NOT TO BE

APPENDIX B-4.2
LINE "A" Per MTD 1764

STORM DRAIN PLANS IN
CITY OF SANTA CLARITA MTD. No. 1764
CITY OF SANTA CLARITA

STORM DRAIN PLAN AND PROFILE
MTD NO. 1764
SYSTEM A
FROM STA. 38+00 TO 41+38.00

DWG SHEET 6 OF 21

DRAWING NUMBER

Storm Drain - MTD 1764
Sheet 6 of 21
01986
10/25/11

NUMBER

B-4.3: Laterals “1S” and “1T”

```
T1 MTD1764                                                                    0
T2 CB LAT "1S"
T3 AS
SO    005.0001066.180  1                        1074.170
R     066.0001066.510  1      .013                              .000    .000 0
R     107.0001070.030  1      .013                              .000    .000 0
WE    107.0001070.030  2      .500
R     110.0001070.030  2      .014
WX    110.0001070.030  2      .500
R     146.0001071.620  1      .013
WE    146.0001071.620  3      .500
R     149.0001071.620  3      .014
SH    149.0001071.620  3                        1071.650
CD   1  4   1    .000   2.000     .000  .000  .000   .00
CD   2  2   0    .000   6.560    3.000  .000  .000   .00
CD   3  2   0    .000   4.000    3.000  .000  .000   .00
Q             3.000   .0
```

Program Package Serial Number: 1656

WATER SURFACE PROFILE LISTING Date: 6-21-2024 Time:12:59:43

MTD1764
CB LAT "1S"
AS

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
5.000	1066.180	7.990	1074.170	3.00	.95	.01	1074.18	.00	.60	.00	2.000	.000	.00	1 .0
61.000	.0054					.0002	.01	7.99	.00	.58	.013	.00	.00	PIPE
66.000	1066.510	7.671	1074.181	3.00	.95	.01	1074.19	.00	.60	.00	2.000	.000	.00	1 .0
41.000	.0859					.0002	.01	7.67	.00	.29	.013	.00	.00	PIPE
107.000	1070.030	4.158	1074.188	3.00	.95	.01	1074.20	.00	.60	.00	2.000	.000	.00	1 .0
WALL	ENTRANCE													
107.000	1070.030	4.179	1074.209	3.00	.24	.00	1074.21	.00	.31	3.00	6.560	3.000	.00	0 .0
3.000	.0000					.0000	.00	4.18	.02	.00	.014	.00	.00	RECTANG
110.000	1070.030	4.179	1074.209	3.00	.24	.00	1074.21	.00	.31	3.00	6.560	3.000	.00	0 .0
WALL	EXIT													
110.000	1070.030	4.179	1074.209	3.00	.95	.01	1074.22	.00	.60	.00	2.000	.000	.00	1 .0
36.000	.0442					.0002	.01	4.18	.00	.34	.013	.00	.00	PIPE
146.000	1071.620	2.596	1074.216	3.00	.95	.01	1074.23	.00	.60	.00	2.000	.000	.00	1 .0
WALL	ENTRANCE													
146.000	1071.620	2.614	1074.234	3.00	.38	.00	1074.24	.00	.31	3.00	4.000	3.000	.00	0 .0
3.000	.0000					.0000	.00	2.61	.04	.00	.014	.00	.00	RECTANG
149.000	1071.620	2.614	1074.234	3.00	.38	.00	1074.24	.00	.31	3.00	4.000	3.000	.00	0 .0

```
T1 MTD1764                                                                  0
T2 CB LAT "1T"
T3 AS
SO    005.0001065.540  1                        1073.890
R     013.0001067.910  1      .013                              .000    .000 0
WE    013.0001067.910  2      .500
R     016.0001067.910  2      .014
WX    016.0001067.910  2      .500
R     020.0001070.790  4      .013
WE    020.0001070.790  3      .500
R     023.0001070.790  3      .014
SH    023.0001070.790  3                        1070.790
CD   1  4   1    .000   1.500     .000  .000  .000   .00
CD   2  2   0    .000  10.980    3.000  .000  .000   .00
CD   3  2   0    .000   8.230    3.000  .000  .000   .00
CD   4  4   1    .000   1.000     .000  .000  .000   .00
Q            4.000   .0
```

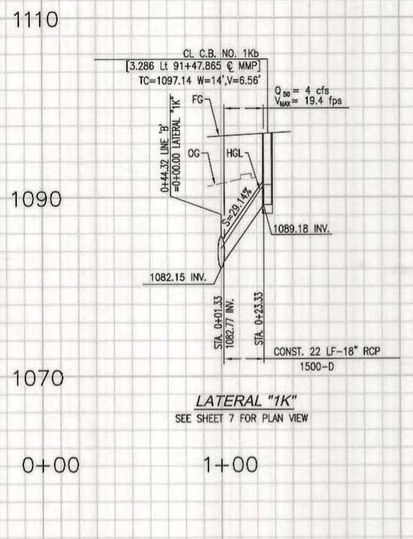
Program Package Serial Number: 1656

WATER SURFACE PROFILE LISTING Date: 6-21-2024 Time: 1: 0:23

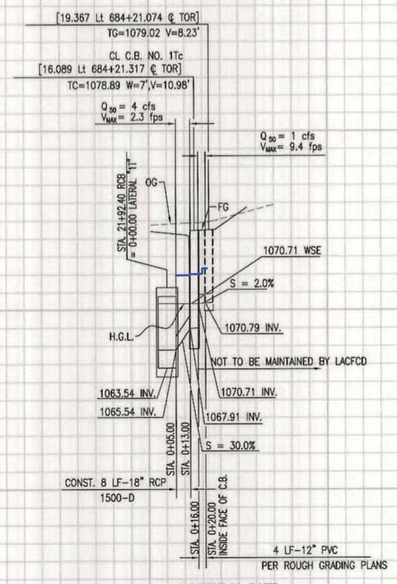
MTD1764
CB LAT "1T"
AS

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
5.000	1065.540	8.350	1073.890	4.00	2.26	.08	1073.97	.00	.77	.00	1.500	.000	.00	1 .0
8.000	.2962					.0015	.01	8.35	.00	.27	.013	.00	.00	PIPE
13.000	1067.910	5.992	1073.902	4.00	2.26	.08	1073.98	.00	.77	.00	1.500	.000	.00	1 .0
WALL	ENTRANCE													
13.000	1067.910	6.111	1074.021	4.00	.22	.00	1074.02	.00	.38	3.00	10.980	3.000	.00	0 .0
3.000	.0000					.0000	.00	6.11	.02	.00	.014	.00	.00	RECTANG
16.000	1067.910	6.111	1074.021	4.00	.22	.00	1074.02	.00	.38	3.00	10.980	3.000	.00	0 .0
WALL	EXIT													
16.000	1067.910	6.112	1074.022	4.00	5.09	.40	1074.42	.00	.85	.00	1.000	.000	.00	1 .0
4.000	.7200					.0126	.05	6.11	.00	.25	.013	.00	.00	PIPE
20.000	1070.790	3.282	1074.072	4.00	5.09	.40	1074.48	.00	.85	.00	1.000	.000	.00	1 .0
WALL	ENTRANCE													
20.000	1070.790	3.884	1074.674	4.00	.34	.00	1074.68	.00	.38	3.00	8.230	3.000	.00	0 .0
3.000	.0000					.0000	.00	3.88	.03	.00	.014	.00	.00	RECTANG
23.000	1070.790	3.884	1074.674	4.00	.34	.00	1074.68	.00	.38	3.00	8.230	3.000	.00	0 .0

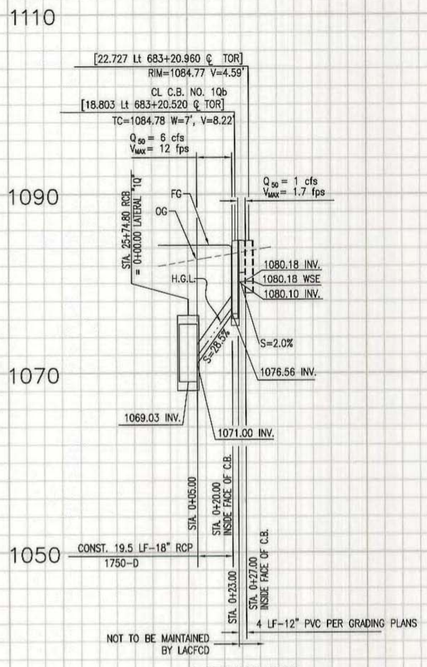
SCALE: HOR. 1"= 40'
VERT. 1"= 8'



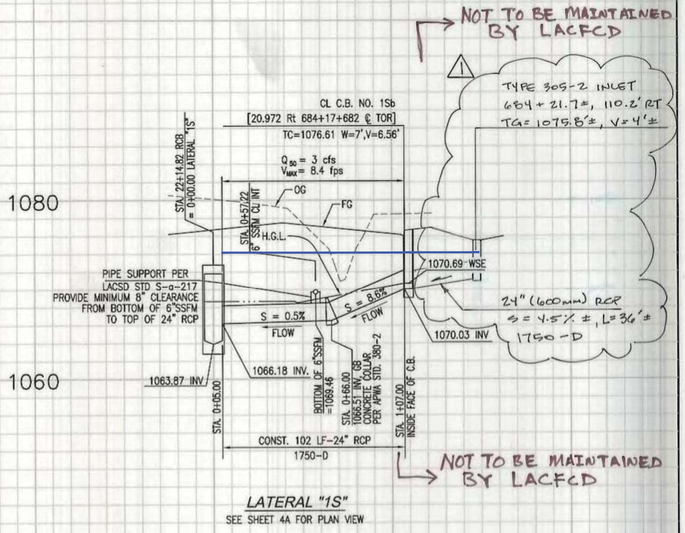
LATERAL "1K"
SEE SHEET 7 FOR PLAN VIEW



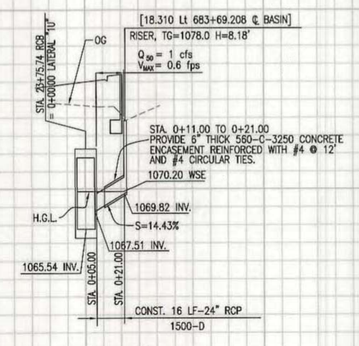
LATERAL "1T"
SEE SHEET 4A FOR PLAN VIEW



LATERAL "1Q"
SEE SHEET 4A FOR PLAN VIEW



LATERAL "1S"
SEE SHEET 4A FOR PLAN VIEW



LATERAL "1U"
SEE SHEET 4A FOR PLAN VIEW

LEGEND:

REVISED H.G.L. PER PROPOSED ENTRADA SOUTH HYDROLOGY

REGISTERED PROFESSIONAL ENGINEER
JASON A. [illegible] YUSU
No. 40695
CIVIL
STATE OF CALIFORNIA
11/12/24

FOR UPDATED HGL ONLY

As of 7-31-2013
AS BUILT

APPENDIX B-4.3
Laterals "1S" and "1T"

NO.	REVISIONS	REVISED BY	APPROVED BY	DATE
1	AS-BUILT REVISION FROM INSPECTOR FIELD NOTES	JMcClue		2-23-10

APPROVED FOR CONSTRUCTION BY:
ROBERT G. NEWMAN, P.E., L.S.
DIRECTOR OF PUBLIC WORKS
CITY OF SANTA CLARITA
DATE 9-17-09

REGISTERED PROFESSIONAL ENGINEER
JON M. AUSTIN
RCE 58726
Exp. 03/31/10
CIVIL
STATE OF CALIFORNIA
PROJECT ENGINEER
DATE 8/29/07

MetroPointe Engineers
3555 Harbor Gateway South, Suite A
Costa Mesa, CA 92626
(714) 438-1095

STORM DRAIN PLANS IN
CITY OF SANTA CLARITA MTD NO. 1764
CITY OF SANTA CLARITA
STORM DRAIN PLAN AND PROFILE
MTD NO. 1764
LATERALS

DWG | SHEET 10A OF 21

B-4.4: Line “C” of PD 2638 & Line “B” of PD 2637

```
T1 PD 2637/2638                                                                 0
T2 LINE C
T3 BY WLL
SO    854.6901156.000  1                        1159.206
R    1018.6701157.040  1      .013                            .000    .000 0
R    1088.1801157.500  1      .013                          88.503    .000 0
R    1156.5001158.000  1      .013                          -1.580    .000 0
R    1185.0001158.305  1      .013                           -.659    .000 0
JX   1185.4901158.310  1  2   .013    4.500         1159.990        -90.0        -.011
R    1276.0001159.280  1      .013                          -2.094    .000 0
JX   1276.5401159.286  1  2   .013    2.300         1160.660         90.0        -.012
R    1288.0001159.407  1      .013                           -.265    .000 0
JX   1288.5401159.413  1  2   .013    0.001         1161.150        -90.0        -.012
R    1500.1201161.680  1      .013                          -4.894    .000 0
JX   1503.6801161.715  1  4   .013   49.200         1162.180        -45.0        -.082
R    1555.9801162.280  1      .013                          -1.210    .000 0
JX   1565.3301162.350  1  4   .013   47.600         1162.910         55.0        -.216
R    1586.1901162.600  1      .013                          -0.483    .000 0
R    1618.8201162.990  1      .013                         -10.386    .000 0
JX   1620.2401163.010  1  2   .013    6.800         1164.610         90.0        0.000
R    1629.2701163.120  1      .013                            .000    .000 0
R    1648.0401163.340  1      .013                           8.962    .000 0
JX   1683.0101163.760  1  2   .013    9.000         1165.250        -90.0        0.811
R    1788.6301165.030  1      .013                          -2.449    .000 0
JX   1791.3701165.060  1  2   .013    0.001         1166.580        -49.0        -.064
R    1975.5601172.300  1      .013                          -4.271    .000 0
R    2255.2501183.400  1      .013                            .000    .000 0
JX   2260.1701184.070  1  4   .013    0.001         1185.060        -45.0         .000
TS   2265.3501184.740  4      .013                            .000
R    2468.7601191.540  4      .013                            .000         0
R    2600.2901195.930  4      .013                          -1.870    .000 0
TS   2605.7801197.120  3      .013                            .078    .000 0
R    2858.7201205.210  3      .013                          -3.597   0.000 0
R    2930.7001207.500  3      .013                          -1.023   0.000 0
JX   2934.0901207.720  3  2   .013   12.900         1208.180         31.0       -8.633
R    2965.7301208.630  3      .013                         -80.571    .000 0
R    2983.4701209.190  3      .013                            .000    .000 0
SH   2983.4701209.190  3                        1209.190
CD   1  4   1    .000   4.500     .000  .000  .000   .00
CD   2  4   1    .000   1.500     .000  .000  .000   .00
CD   3  4   1    .000   2.500     .000  .000  .000   .00
CD   4  4   1    .000   3.500     .000  .000  .000   .00
Q           38.100   .0
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Program Package Serial Number: 1656

WATER SURFACE PROFILE LISTING Date:11-12-2024 Time:11:58:34

PD 2637/2638
LINE C
BY WLL

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
854.690	1156.000	3.800	1159.800	170.40	11.89	2.20	1162.00	.00	3.80	3.26	4.500	.000	.00	1 .0
57.532	.0063					.0069	.40	3.80	1.00	4.50	.013	.00	.00	PIPE
912.222	1156.365	4.031	1160.396	170.40	11.34	2.00	1162.39	.00	3.80	2.75	4.500	.000	.00	1 .0
106.448	.0063					.0066	.70	4.03	.85	4.50	.013	.00	.00	PIPE
1018.670	1157.040	4.115	1161.155	170.40	11.18	1.94	1163.09	.11	3.80	2.52	4.500	.000	.00	1 .0
69.510	.0066					.0065	.45	4.22	.80	4.04	.013	.00	.00	PIPE
1088.180	1157.500	4.101	1161.601	170.40	11.20	1.95	1163.55	.00	3.80	2.56	4.500	.000	.00	1 .0
19.580	.0073					.0066	.13	4.10	.81	3.74	.013	.00	.00	PIPE
1107.760	1157.643	4.063	1161.706	170.40	11.28	1.97	1163.68	.00	3.80	2.67	4.500	.000	.00	1 .0
HYDRAULIC JUMP														
1107.760	1157.643	3.546	1161.189	170.40	12.68	2.50	1163.68	.01	3.80	3.68	4.500	.000	.00	1 .0
48.740	.0073					.0084	.41	3.55	1.17	3.74	.013	.00	.00	PIPE
1156.500	1158.000	3.447	1161.447	170.40	13.04	2.64	1164.09	.01	3.80	3.81	4.500	.000	.00	1 .0
4.741	.0107					.0086	.04	3.45	1.24	3.15	.013	.00	.00	PIPE
1161.241	1158.051	3.466	1161.517	170.40	12.96	2.61	1164.13	.01	3.80	3.79	4.500	.000	.00	1 .0
23.759	.0107					.0081	.19	3.47	1.23	3.15	.013	.00	.00	PIPE
1185.000	1158.305	3.641	1161.946	170.40	12.36	2.37	1164.32	.01	3.80	3.54	4.500	.000	.00	1 .0
JUNCT STR	.0102					.0089	.00	3.65	1.10		.013	.00	.00	PIPE

PD 2637/2638
LINE C
BY WLL

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
1185.490	1158.310	3.164	1161.474	165.90	13.89	2.99	1164.47	.01	3.76	4.11	4.500	.000	.00	1 .0
90.510	.0107					.0096	.87	3.17	1.44	3.09	.013	.00	.00	PIPE
1276.000	1159.280	3.267	1162.547	165.90	13.41	2.79	1165.34	.01	3.76	4.01	4.500	.000	.00	1 .0
JUNCT STR	.0111					.0098	.01	3.28	1.35		.013	.00	.00	PIPE
1276.540	1159.286	3.102	1162.388	163.60	13.99	3.04	1165.43	.01	3.74	4.16	4.500	.000	.00	1 .0
11.460	.0106					.0103	.12	3.11	1.47	3.07	.013	.00	.00	PIPE
1288.000	1159.407	3.105	1162.512	163.60	13.98	3.03	1165.55	.01	3.74	4.16	4.500	.000	.00	1 .0
JUNCT STR	.0111					.0103	.01	3.11	1.47		.013	.00	.00	PIPE
1288.540	1159.413	3.106	1162.519	163.60	13.97	3.03	1165.55	.01	3.73	4.16	4.500	.000	.00	1 .0
130.136	.0107					.0097	1.27	3.12	1.47	3.05	.013	.00	.00	PIPE
1418.676	1160.807	3.232	1164.039	163.60	13.38	2.78	1166.82	.01	3.73	4.05	4.500	.000	.00	1 .0
52.532	.0107					.0088	.46	3.24	1.36	3.05	.013	.00	.00	PIPE
1471.208	1161.370	3.382	1164.752	163.60	12.76	2.53	1167.28	.01	3.73	3.89	4.500	.000	.00	1 .0
22.734	.0107					.0079	.18	3.39	1.24	3.05	.013	.00	.00	PIPE
1493.943	1161.614	3.547	1165.161	163.60	12.16	2.30	1167.46	.01	3.73	3.68	4.500	.000	.00	1 .0
6.177	.0107					.0071	.04	3.55	1.12	3.05	.013	.00	.00	PIPE
1500.120	1161.680	3.735	1165.415	163.60	11.59	2.09	1167.50	.01	3.73	3.38	4.500	.000	.00	1 .0
JUNCT STR	.0098					.0051	.02	3.74	1.00		.013	.00	.00	PIPE

PD 2637/2638
LINE C
BY WLL

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1503.680	1161.715	5.572	1167.287	114.40	7.19	.80	1168.09	.00	3.15	.00	4.500	.000	.00	1 .0
52.300	.0108					.0034	.18	.00	.00	2.41	.013	.00	.00	PIPE
1555.980	1162.280	5.203	1167.483	114.40	7.19	.80	1168.29	.00	3.15	.00	4.500	.000	.00	1 .0
JUNCT STR	.0075					.0023	.02	.00	.00		.013	.00	.00	PIPE
1565.330	1162.350	5.949	1168.299	66.80	4.20	.27	1168.57	.00	2.38	.00	4.500	.000	.00	1 .0
20.860	.0120					.0012	.02	.00	.00	1.72	.013	.00	.00	PIPE
1586.190	1162.600	5.727	1168.327	66.80	4.20	.27	1168.60	.00	2.38	.00	4.500	.000	.00	1 .0
32.630	.0120					.0012	.04	.00	.00	1.72	.013	.00	.00	PIPE
1618.820	1162.990	5.394	1168.384	66.80	4.20	.27	1168.66	.00	2.38	.00	4.500	.000	.00	1 .0
JUNCT STR	.0141					.0010	.00	5.39	.00		.013	.00	.00	PIPE
1620.240	1163.010	5.481	1168.491	60.00	3.77	.22	1168.71	.00	2.25	.00	4.500	.000	.00	1 .0
9.030	.0122					.0009	.01	5.48	.00	1.62	.013	.00	.00	PIPE
1629.270	1163.120	5.379	1168.499	60.00	3.77	.22	1168.72	.00	2.25	.00	4.500	.000	.00	1 .0
18.770	.0117					.0009	.02	.00	.00	1.63	.013	.00	.00	PIPE
1648.040	1163.340	5.191	1168.531	60.00	3.77	.22	1168.75	.00	2.25	.00	4.500	.000	.00	1 .0
JUNCT STR	.0120					.0008	.03	.00	.00		.013	.00	.00	PIPE
1683.010	1163.760	4.921	1168.681	51.00	3.21	.16	1168.84	.00	2.07	.00	4.500	.000	.00	1 .0
37.396	.0120					.0007	.02	.00	.00	1.49	.013	.00	.00	PIPE

PD 2637/2638
LINE C
BY WLL

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
1720.406	1164.210	4.500	1168.710	51.00	3.21	.16	1168.87	4.50	2.07	.00	4.500	.000	.00	1 .0
35.175	.0120					.0006	.02	4.50	.00	1.49	.013	.00	.00	PIPE
1755.581	1164.633	4.082	1168.715	51.00	3.36	.18	1168.89	.00	2.07	2.61	4.500	.000	.00	1 .0
19.661	.0120					.0006	.01	4.08	.25	1.49	.013	.00	.00	PIPE
1775.242	1164.869	3.840	1168.709	51.00	3.53	.19	1168.90	.00	2.07	3.18	4.500	.000	.00	1 .0
13.388	.0120					.0007	.01	3.84	.29	1.49	.013	.00	.00	PIPE
1788.630	1165.030	3.672	1168.702	51.00	3.67	.21	1168.91	.00	2.07	3.49	4.500	.000	.00	1 .0
JUNCT STR	.0110					.0007	.00	3.67	.32		.013	.00	.00	PIPE
1791.370	1165.060	3.640	1168.700	51.00	3.70	.21	1168.91	.00	2.07	3.54	4.500	.000	.00	1 .0
.987	.0393					.0007	.00	3.64	.33	1.10	.013	.00	.00	PIPE
1792.357	1165.099	3.597	1168.696	51.00	3.74	.22	1168.91	.00	2.07	3.60	4.500	.000	.00	1 .0
HYDRAULIC JUMP														
1792.357	1165.099	1.099	1166.198	51.00	16.95	4.46	1170.66	.01	2.07	3.87	4.500	.000	.00	1 .0
42.125	.0393					.0393	1.66	1.11	3.39	1.10	.013	.00	.00	PIPE
1834.481	1166.755	1.099	1167.854	51.00	16.95	4.46	1172.32	.01	2.07	3.87	4.500	.000	.00	1 .0
141.079	.0393					.0395	5.57	1.11	3.39	1.10	.013	.00	.00	PIPE
1975.560	1172.300	1.097	1173.397	51.00	17.01	4.49	1177.89	.00	2.07	3.86	4.500	.000	.00	1 .0
64.540	.0397					.0397	2.56	1.10	3.40	1.10	.013	.00	.00	PIPE

PD 2637/2638
LINE C
BY WLL

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
2040.099	1174.861	1.097	1175.958	51.00	17.01	4.49	1180.45	.00	2.07	3.86	4.500	.000	.00	1 .0
146.121	.0397					.0413	6.04	1.10	3.40	1.10	.013	.00	.00	PIPE
2186.221	1180.661	1.074	1181.735	51.00	17.50	4.75	1186.49	.00	2.07	3.84	4.500	.000	.00	1 .0
69.029	.0397					.0461	3.18	1.07	3.54	1.10	.013	.00	.00	PIPE
2255.250	1183.400	1.039	1184.439	51.00	18.35	5.23	1189.67	.00	2.07	3.79	4.500	.000	.00	1 .0
JUNCT STR	.1362					.0460	.23	1.04	3.78		.013	.00	.00	PIPE
2260.170	1184.070	1.075	1185.145	51.00	17.49	4.75	1189.89	.00	2.07	3.84	4.500	.000	.00	1 .0
TRANS STR	.1293					.0382	.20	1.08	3.54		.013	.00	.00	PIPE
2265.350	1184.740	1.260	1186.000	51.00	16.36	4.15	1190.15	.00	2.23	3.36	3.500	.000	.00	1 .0
45.538	.0334					.0334	1.52	1.26	2.99	1.26	.013	.00	.00	PIPE
2310.888	1186.262	1.260	1187.522	51.00	16.36	4.15	1191.68	.00	2.23	3.36	3.500	.000	.00	1 .0
157.872	.0334					.0345	5.44	1.26	2.99	1.26	.013	.00	.00	PIPE
2468.760	1191.540	1.240	1192.780	51.00	16.71	4.34	1197.12	.01	2.23	3.35	3.500	.000	.00	1 .0
4.076	.0334					.0355	.14	1.25	3.08	1.26	.013	.00	.00	PIPE
2472.836	1191.676	1.239	1192.915	51.00	16.72	4.34	1197.26	.01	2.23	3.35	3.500	.000	.00	1 .0
83.990	.0334					.0380	3.20	1.25	3.09	1.26	.013	.00	.00	PIPE
2556.825	1194.479	1.197	1195.677	51.00	17.54	4.78	1200.45	.01	2.23	3.32	3.500	.000	.00	1 .0
43.465	.0334					.0434	1.89	1.20	3.30	1.26	.013	.00	.00	PIPE

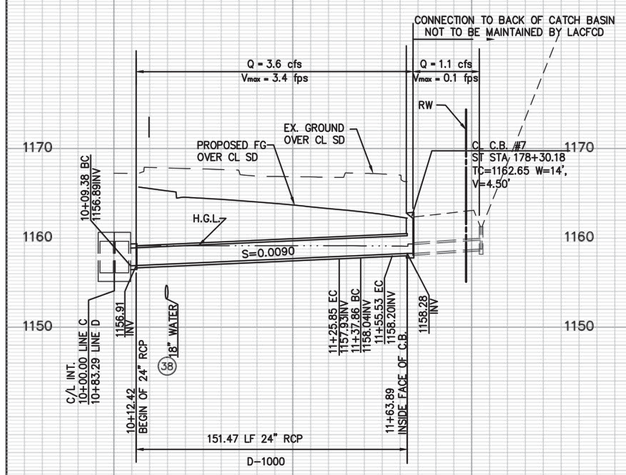
PD 2637/2638
LINE C
BY WLL

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
2600.290	1195.930	1.156	1197.086	51.00	18.39	5.25	1202.34	.01	2.23	3.29	3.500	.000	.00	1 .0
TRANS STR	.2167					.0390	.21	1.16	3.53		.013	.00	.00	PIPE
2605.780	1197.120	1.538	1198.658	51.00	16.10	4.02	1202.68	.00	2.31	2.43	2.500	.000	.00	1 .0
96.965	.0320					.0314	3.05	1.54	2.49	1.53	.013	.00	.00	PIPE
2702.745	1200.221	1.548	1201.769	51.00	15.97	3.96	1205.73	.00	2.31	2.43	2.500	.000	.00	1 .0
112.499	.0320					.0294	3.30	1.55	2.45	1.53	.013	.00	.00	PIPE
2815.243	1203.819	1.612	1205.432	51.00	15.23	3.60	1209.03	.00	2.31	2.39	2.500	.000	.00	1 .0
43.477	.0320					.0261	1.13	1.62	2.27	1.53	.013	.00	.00	PIPE
2858.720	1205.210	1.682	1206.892	51.00	14.52	3.27	1210.17	.00	2.31	2.35	2.500	.000	.00	1 .0
8.669	.0318					.0241	.21	1.69	2.09	1.54	.013	.00	.00	PIPE
2867.389	1205.486	1.702	1207.188	51.00	14.32	3.19	1210.37	.00	2.31	2.33	2.500	.000	.00	1 .0
22.787	.0318					.0224	.51	1.71	2.04	1.54	.013	.00	.00	PIPE
2890.176	1206.211	1.778	1207.989	51.00	13.66	2.90	1210.88	.00	2.31	2.27	2.500	.000	.00	1 .0
15.410	.0318					.0201	.31	1.78	1.87	1.54	.013	.00	.00	PIPE
2905.586	1206.701	1.860	1208.561	51.00	13.02	2.63	1211.19	.00	2.31	2.18	2.500	.000	.00	1 .0
10.872	.0318					.0180	.20	1.86	1.71	1.54	.013	.00	.00	PIPE
2916.458	1207.047	1.949	1208.996	51.00	12.42	2.39	1211.39	.00	2.31	2.07	2.500	.000	.00	1 .0
7.484	.0318					.0162	.12	1.95	1.55	1.54	.013	.00	.00	PIPE

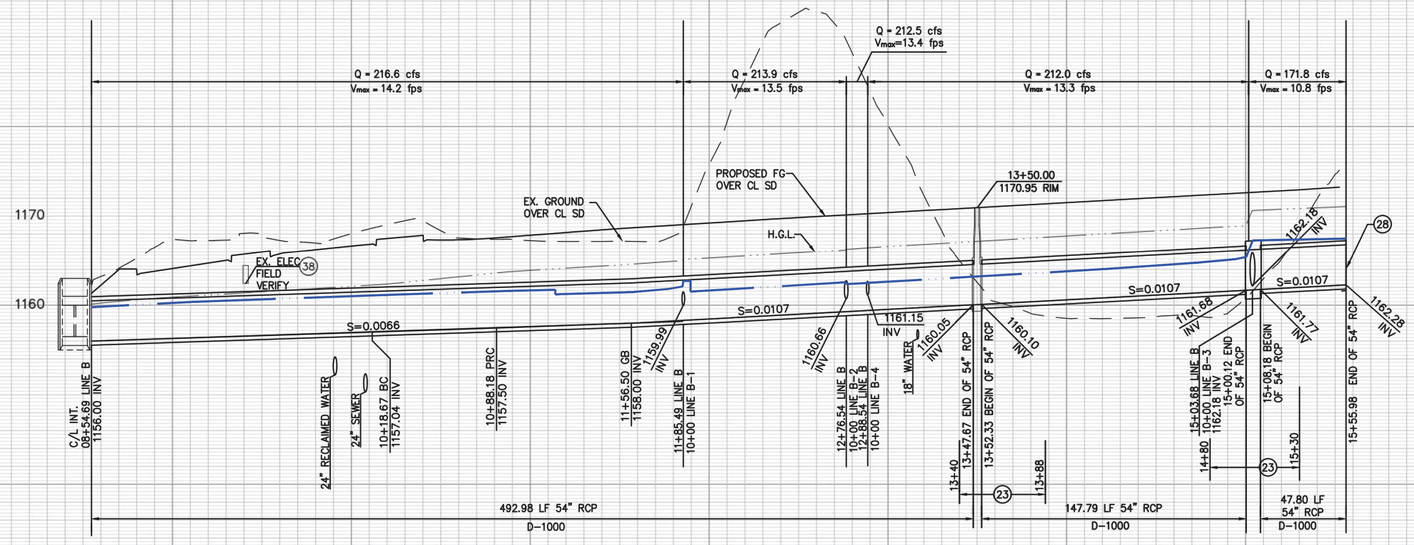
PD 2637/2638
LINE C
BY WLL

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
2923.942	1207.285	2.050	1209.335	51.00	11.84	2.18	1211.51	.00	2.31	1.92	2.500	.000	.00	1 .0
4.810	.0318					.0148	.07	2.05	1.39	1.54	.013	.00	.00	PIPE
2928.752	1207.438	2.166	1209.604	51.00	11.29	1.98	1211.58	.00	2.31	1.70	2.500	.000	.00	1 .0
1.948	.0318					.0138	.03	2.17	1.22	1.54	.013	.00	.00	PIPE
2930.700	1207.500	2.312	1209.812	51.00	10.76	1.80	1211.61	2.50	2.31	1.32	2.500	.000	.00	1 .0
JUNCT STR	.0649					.0110	.04	2.50	1.00		.013	.00	.00	PIPE
2934.090	1207.720	3.238	1210.958	38.10	7.76	.94	1211.89	.00	2.09	.00	2.500	.000	.00	1 .0
31.640	.0288					.0086	.27	.00	.00	1.32	.013	.00	.00	PIPE
2965.730	1208.630	2.778	1211.408	38.10	7.76	.94	1212.34	.00	2.09	.00	2.500	.000	.00	1 .0
12.111	.0316					.0086	.10	2.78	.00	1.28	.013	.00	.00	PIPE
2977.841	1209.012	2.500	1211.512	38.10	7.76	.94	1212.45	.00	2.09	.00	2.500	.000	.00	1 .0
5.629	.0316					.0080	.05	2.50	.00	1.28	.013	.00	.00	PIPE
2983.470	1209.190	2.281	1211.470	38.10	8.11	1.02	1212.49	.00	2.09	1.41	2.500	.000	.00	1 .0

SCALE: HOR. 1"=40'
VERT. 1"=8'



STORM DRAIN "C"



STORM DRAIN LINE "B"

LEGEND:

H.G.L. PER ENTRADA SOUTH HYDROLOGY

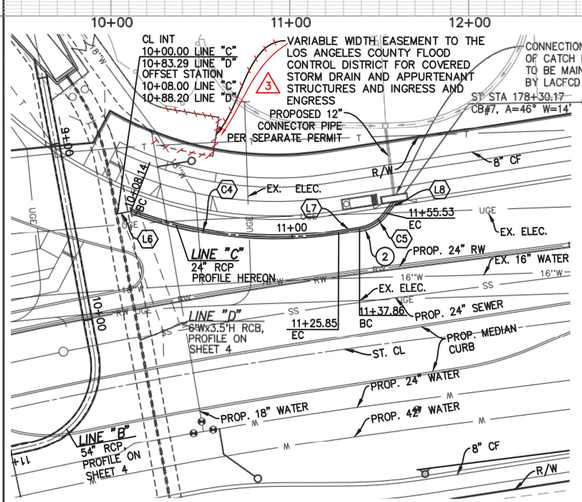
REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

11/12/24

FOR UPDATED HGL ONLY

P.D. No. 2637

DDN No. 43-F551



MAGIC MOUNTAIN PARKWAY
STORM DRAIN "C"

GRAPHIC SCALE: 1" = 40'

JUNCTION STRUCTURE TABLE

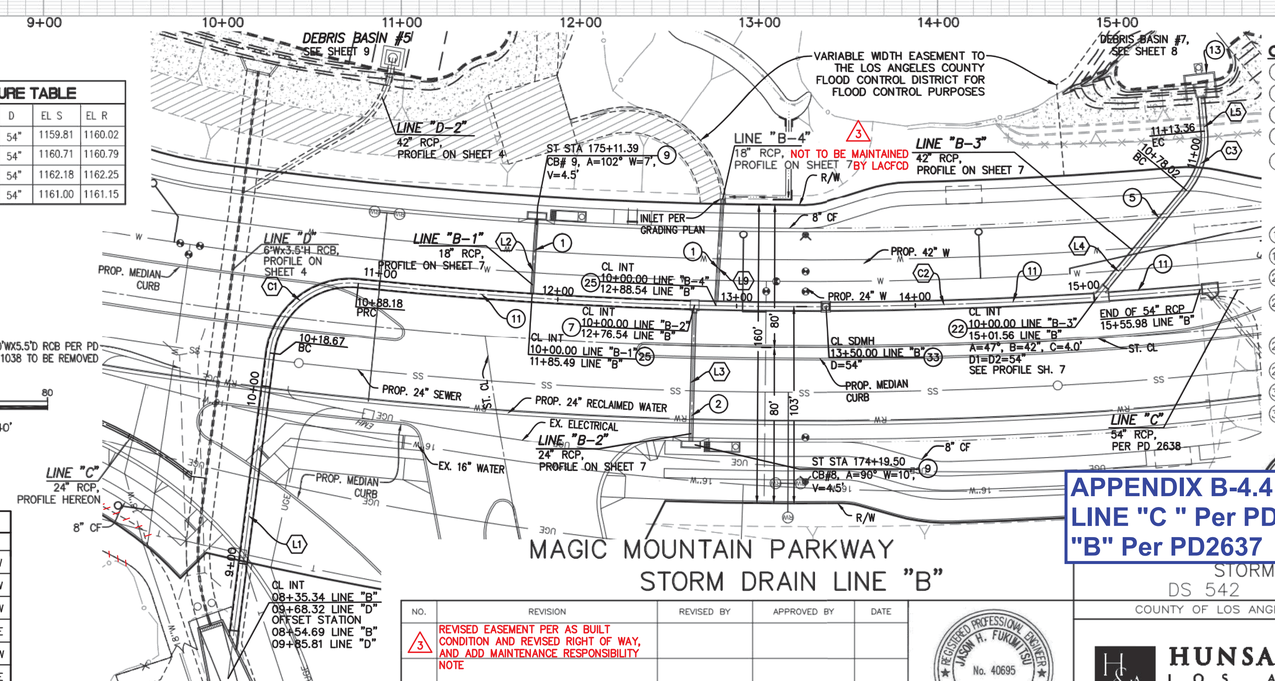
LINE #	A	B	C	D	EL S	EL R
B-1	90°00'	18"	–	54"	1159.81	1160.02
B-2	90°00'	24"	1.75'	54"	1160.71	1160.79
B-3	46°35'	42"	3.98'	54"	1162.18	1162.25
B-4	87°45'	18"	–	54"	1161.00	1161.15

GRAPHIC SCALE: 1" = 40'

10'WX5.5'D RCB PER PD 1038 TO BE REMOVED

Curve Table				
Curve #	Length	Radius	Delta	Tangent
C1	69.51	45.00	088°29'58"	43.84
C2	361.61	2477.00	007°19'25"	158.52
C3	35.34	45.00	045°00'00"	18.64
C4	117.71	232.00	029°04'11"	60.15
C5	17.67	22.50	045°00'00"	9.32

Line Table		
Line #	Length	Bearing
L1	183.34'	N11° 56' 19"W
L2	37.50'	N15° 41' 22"W
L3	76.49'	N17° 47' 43"W
L4	78.02	N20° 25' 05"E
L5	18.97	N24° 34' 55"W
L6	7.64	N78° 03' 42"E
L7	12.01	S79° 55' 59"W
L8	8.36	S34° 55' 59"W
L9	59.79	N15° 49' 00"E



MAGIC MOUNTAIN PARKWAY
STORM DRAIN LINE "B"

CONSTRUCTION NOTES:

1. CONSTRUCT 18" RCP (D-LOAD PER PROFILE)
2. CONSTRUCT 24" RCP (D-LOAD PER PROFILE)
5. CONSTRUCT 42" RCP (D-LOAD PER PROFILE)
7. CONSTRUCT JUNCTION STRUCTURE PIPE TO PIPE PER SPPWC STD. 331-3.
9. CONSTRUCT CURB OPENING CATCH BASIN PER SPPWC STD. 300-3 AND LOCAL DEPRESSION PER SPPWC STANDARD PLAN 313-3, PER STREET PLAN. INSTALL AUTOMATIC RETRACTABLE SCREEN (ARS) AND CONNECTOR PIPE SCREEN PER DETAIL SHEET 12.
11. CONSTRUCT 54" RCP (D-LOAD PER PROFILE)
13. CONSTRUCT DESILTING INLET PER DETAIL ON SHEET NO. 8
22. CONSTRUCT TRANSITION STRUCTURE PIPE PER SPPWC STD. 340-2.
23. PROVIDE RUBBER GASKET JOINTS ON BOTH SIDES OF CUT/FILL TRANSITION (3 JOINTS MIN. EACH SIDE OR 24' MIN EACH SIDE)
25. CONSTRUCT JUNCTION STRUCTURE PIPE TO PIPE PER SPPWC STD. 332-3.
28. CONSTRUCT BRICK AND MOTOR PLUG
33. CONSTRUCT MANHOLE PIPE TO PIPE PER SPPWC STD. 320-2.
38. CONSTRUCT CONCRETE BLANKET PER SPPWC 225-2

REVIEWED LAND DEVELOPMENT DIVISION
BY _____ STORM DRAIN SECTION
08/13/2018 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
3	REVISED EASEMENT PER AS BUILT CONDITION AND REVISED RIGHT OF WAY, AND ADD MAINTENANCE RESPONSIBILITY NOTE			

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
8/10/18
JASON H. FUKUMITSU DATE

APPENDIX B-4.4
LINE "C " Per PD 2641 and Line "B" Per PD2637

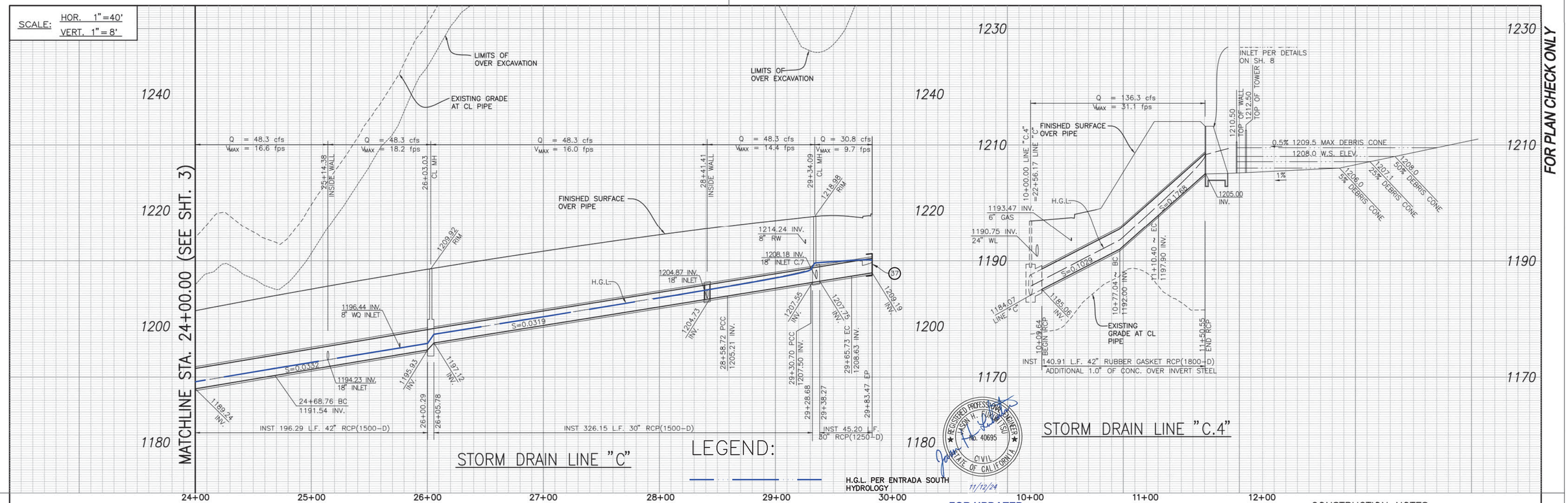
STORM DRAIN PLANS IN
DS 542 P.D. No. 2637
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

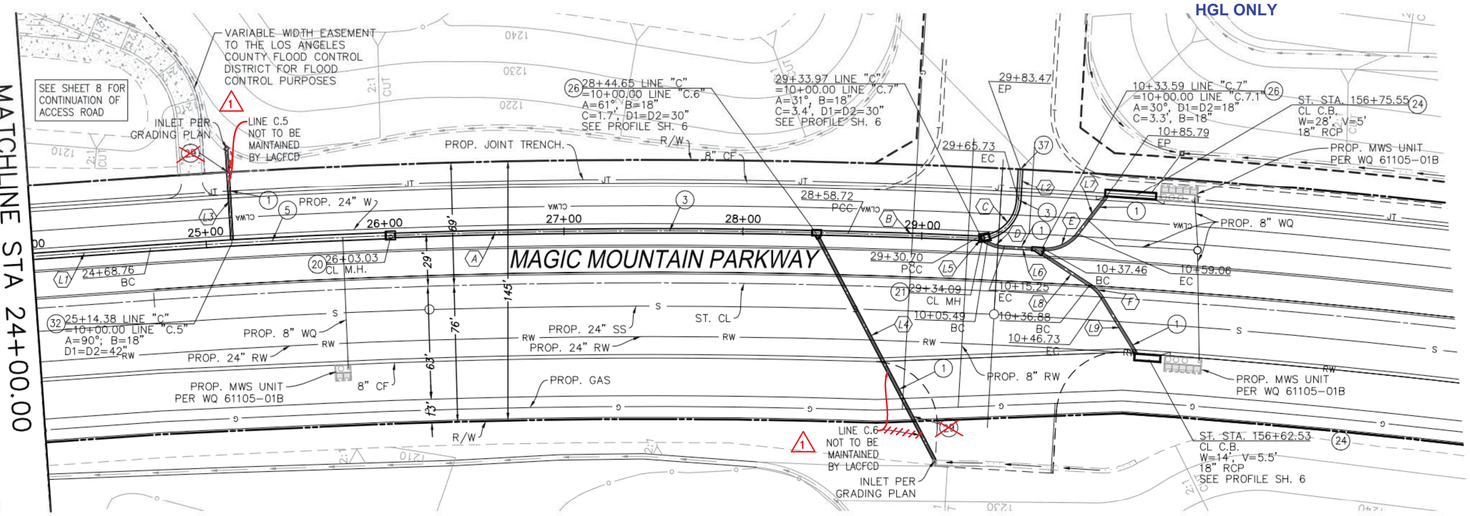
HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
26074 Avenue Hall, Suite 23 ▪ Valencia, CA 91355 ▪ PH: (661) 294-2211 ▪ FX: (661) 294-9890

DWG

G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2637\HW102-05 - Sheet 5.dwg Plotted On Jul 18, 2018 - 2:11pm by wolson

SCALE: HOR. 1"=40'
VERT. 1"=8'





SD LINE "C" LINE TABLE		
LINE	LENGTH	BEARING
L1	64.76'	N56°01'25"E
L2	17.74'	N26°37'46"W
L3	52.15'	N33°191'39"W
L4	143.33'	S57°39'51"E
L5	5.49'	S87°39'58"W
L6	22.21'	S62°49'18"W
L7	26.73'	S07°48'38"W
L8	36.99'	S61°37'45"E
L9	36.88'	S86°42'51"E

SD LINE "C" CURVE TABLE				
LINE	DELTA	RADIUS	LENGTH	TANGENT
A	05°32'42"	4029.46'	389.96'	195.13'
B	01°01'24"	4029.46'	71.98'	35.99'
C	89°13'18"	22.50'	35.04'	22.20'
D	24°50'39"	22.50'	9.76'	4.96'
E	55°00'40"	22.50'	21.60'	11.72'
F	25°05'06"	22.50'	9.85'	5.01'

FOR UPDATED HGL ONLY

CONSTRUCTION NOTES:

1. INSTALL 18" R.C.P. (SEE PROFILE FOR D-LOAD)
3. INSTALL 30" R.C.P. (SEE PROFILE FOR D-LOAD)
5. INSTALL 42" R.C.P. (SEE PROFILE FOR D-LOAD)
20. CONSTRUCT M.H. PER S.P.P.W.C. STD. PLAN 320-2
21. CONSTRUCT M.H. PER S.P.P.W.C. STD. PLAN 321-2
24. CONSTRUCT MODIFIED CURB OPENING CATCH BASIN PER S.P.P.W.C. STD. PLAN NO. 300-3
26. CONSTRUCT T.S. PER S.P.P.W.C. STD. PLAN 340-2
29. ~~CONSTRUCT CLEANOUT PER DETAIL 29 ON SHEET 5~~
32. CONSTRUCT J.S. PER S.P.P.W.C. STD. PLAN 332-2
37. CONSTRUCT 8" BRICK AND MORTAR PLUG

APPENDIX B-4.4
LINE "C " Per PD 2641 and Line "B" Per PD2637

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-XUEN IP No. 2522 Exp. 09/20 GEOTECHNICAL STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRICE No. 1208 STATE OF CALIFORNIA

REVIEWED LAND DEVELOPMENT DIVISION
BY _____ STORM DRAIN SECTION
08/20/18 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
1	REVISED MAINTENANCE RESPONSIBILITY NOTE ON LINES C.5 AND C.6			

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
B-16-18
JASON H. FUKUMITSU DATE

STORM DRAIN PLANS IN
TRACT No. 61105-1 P.D. No. 2638
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
26074 Avenue Hall, Suite 23 ▪ Valencia, CA 91355 ▪ PH: (661) 294-2211 ▪ FX: (661) 294-9890

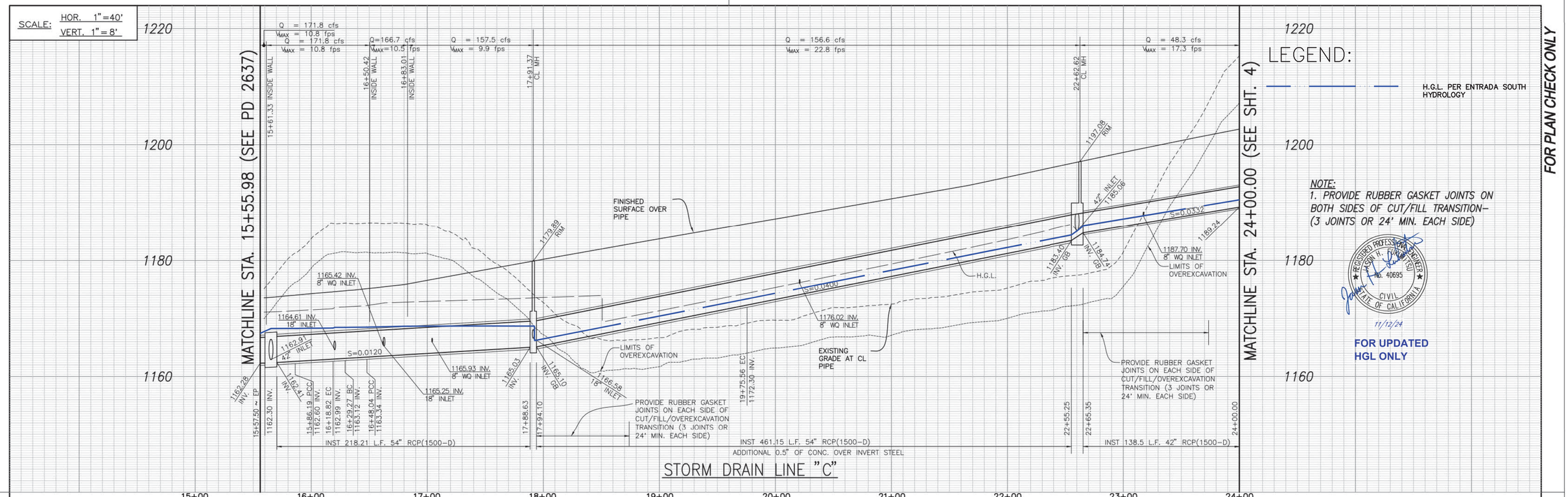
DWG

SHEET 4 OF 9

DDN 43-F552

C:\Hensall Ranch\18-8509 Shadowbox Village\Plan\Civil\4d\[Plan-Grading-Sheet.dwg 8/8/2018 2:09:29 PM by ormorris

SCALE: HOR. 1"=40'
VERT. 1"=8'



STORM DRAIN LINE "C"

LEGEND:

H.G.L. PER ENTRADA SOUTH HYDROLOGY

NOTE:
1. PROVIDE RUBBER GASKET JOINTS ON BOTH SIDES OF CUT/FILL TRANSITION- (3 JOINTS OR 24' MIN. EACH SIDE)

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

11/12/24

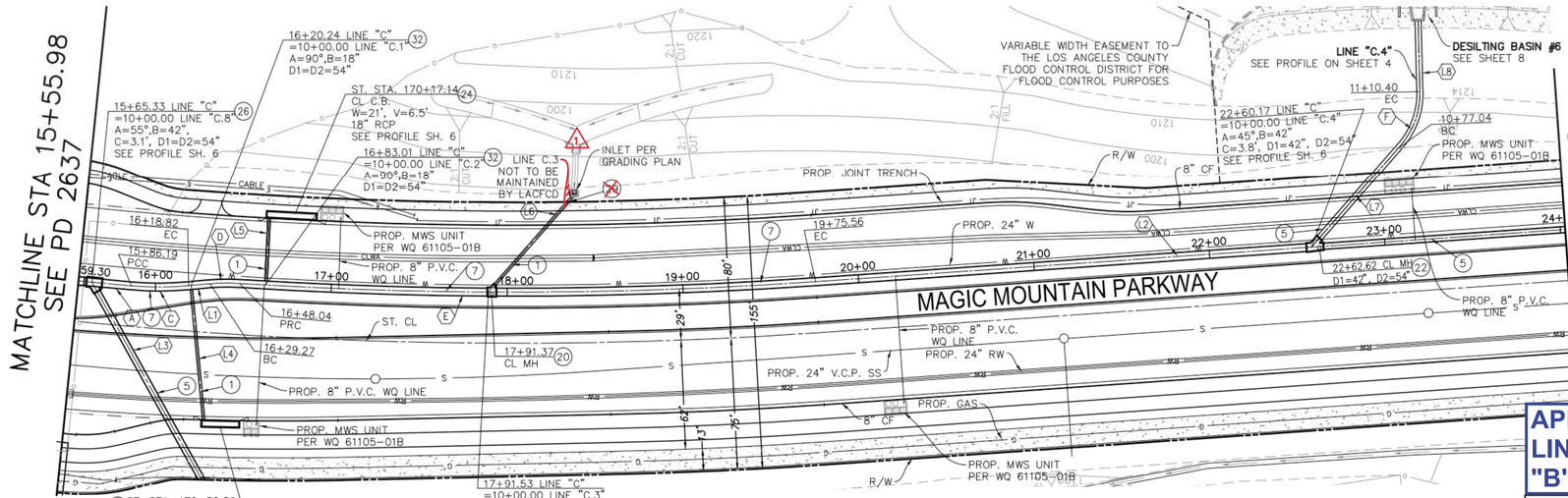
FOR UPDATED HGL ONLY

FOR PLAN CHECK ONLY

DDN 43-F552

CONSTRUCTION NOTES:

1. INSTALL 18" R.C.P. (SEE PROFILE FOR D-LOAD)
5. INSTALL 42" R.C.P. (SEE PROFILE FOR D-LOAD)
7. INSTALL 54" R.C.P. (SEE PROFILE FOR D-LOAD)
20. CONSTRUCT M.H. PER S.P.P.W.C. STD. PLAN 320-2
22. CONSTRUCT M.H. PER S.P.P.W.C. STD. PLAN 322-2
24. CONSTRUCT MODIFIED CURB OPENING CATCH BASIN PER S.P.P.W.C. STD. PLAN NO. 300-3 LD PER S.P.P.W.C. 313-3 CASE E, H=2'(TYP.)
26. CONSTRUCT T.S. PER S.P.P.W.C. STD. PLAN 340-2
~~29.~~ CONSTRUCT CLEANOUT PER DETAIL 29 ON SHEET 5
32. CONSTRUCT J.S. PER S.P.P.W.C. STD. PLAN 332-2



SD LINE "C" LINE TABLE		
LINE	LENGTH	BEARING
L1	10.46'	N54°39'21"E
L2	428.44'	N56°01'25"E
L3	120.20'	S59°05'27"E
L4	77.14'	N35°20'39"W
L5	38.51'	N27°11'34"W
L6	68.78'	S11°27'02"W
L7	77.04'	S11°01'25"W
L8	40.16'	S31°27'00"E

SD LINE "C" CURVE TABLE				
LINE	DELTA	RADIUS	LENGTH	TANGENT
A	00°41'56"	2477.00'	30.21'	5.11'
C	10°23'08"	180.00'	32.63'	16.36'
D	08°57'43"	120.00'	18.77'	9.40'
E	07°35'39"	2471.00'	327.51'	164.00'
F	42°28'26"	45.00'	33.36'	17.49'

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-KUEN LO No. 2522 Exp. 2/20 GEOTECHNICAL STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRICE No. 1709 STATE OF CALIFORNIA

REVIEWED LAND DEVELOPMENT DIVISION
BY _____ 08/20/18
STORM DRAIN SECTION DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
1	REVISED MAINTENANCE RESPONSIBILITY NOTE ON LINE C.3			

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

JASON H. FUKUMITSU 8-16-18 DATE

APPENDIX B-4.4
LINE "C " Per PD 2641 and Line "B" Per PD2637

STORM DRAIN PLANS IN
TRACT No. 61105-1 P.D. No. 2638
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
26074 Avenue Hall, Suite 23 ▪ Valencia, CA 91355 ▪ PH: (661) 294-2211 ▪ FX: (661) 294-9890

DWG

G:\Newhall Ranch\5,825\25\Design\Vol1\25x36\Sht\Line\PSD\DrDB\JB\Plot\Plot\PSD_2525B3 Rdsn.dgn\Sheet1.dgn 10k 2Alg3=2Alg 2B3=B1=B1 48x36x4b P5=x3024 - 8.48cm by ormonn

B-4.5: Line “A6” of PD 2641

```
T1 PD 2641                                                                                                  0
T2 LINE A6
T3 BY WLL
SO   1016.2701271.180  1                          1286.827
R    1026.7701272.330  1      .013                                          .000    .000 0
R    1040.9501273.880  1      .013                                         9.027    .000 0
JX   1116.1501282.117  1  2   .013   11.100         1284.790          -80.0       -3.624
JX   1134.6901284.150  1  2   .013    1.000         1285.800           90.0        -.272
R    1233.7701295.005  1      .013                                       -5.272    .000 0
JX   1235.7201295.219  1  3   .013   24.100         1296.500          -44.0        -.093
R    1242.0801295.910  1      .013                                        .000    .000 0
JX   1300.0001299.860  1  2   .013    2.600         1301.730          -55.0       -3.141
JX   1308.5501300.438  1  2   .013    3.300         1303.320           58.0        -.397
R    1497.6701313.240  1      .013                                       -8.918    .000 0
R    1502.3301313.560  1      .013                                       -0.222    .000 0
R    1601.5001318.130  1      .013                                       -4.715    .000 0
R    1748.3701324.890  1      .013                                         .000    .000 0
R    1781.2401326.400  1      .013                                       20.926    .000 0
JX   1785.5001326.410  1  3   .013   11.500         1327.200          -44.0        2.712
R    1799.9801326.460  1      .013                                        9.218    .000 0
JX   1805.9301326.480  1  4   .013  145.500         1327.370          -30.0        3.788
R    1826.9101326.550  1      .013                                       13.356    .000 0
R    1854.6401326.640  1      .013                                         .000    .000 0
R    1934.4901326.890  1      .013                                      -38.125    .000 0
R    2081.5001327.370  1      .013                                         .000    .000 0
R    2100.8301327.430  1      .013                                        9.232    .000 0
JX   2103.6701327.440  1  2   .013     .001         1331.520          -90.0         .000
R    2162.5701327.630  1      .013                                         .000    .000 0
R    2214.9401327.800  1      .013                                       25.004    .000 0
R    2308.3501328.100  1      .013                                         .000    .000 0
SH   2308.3501328.100  1                          1328.100
CD   1  4   1    .000   5.000     .000  .000  .000   .00
CD   2  4   1    .000   1.500     .000  .000  .000   .00
CD   3  4   1    .000   2.000     .000  .000  .000   .00
CD   4  4   1    .000   3.500     .000  .000  .000   .00
CD   5  4   1    .000   4.500     .000  .000  .000   .00
Q           207.400   .0
```

Program Package Serial Number: 1656

WATER SURFACE PROFILE LISTING Date:10-14-2024 Time:11:21:24

PD 2641
LINE A6
BY WLL

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1016.270	1271.180	15.647	1286.827	406.50	20.70	6.66	1293.48	.00	4.89	.00	5.000	.000	.00	1 .0
10.500	.1095					.0244	.26	15.65	.00	2.42	.013	.00	.00	PIPE
1026.770	1272.330	14.753	1287.083	406.50	20.70	6.66	1293.74	.00	4.89	.00	5.000	.000	.00	1 .0
6.874	.1093					.0244	.17	.00	.00	2.42	.013	.00	.00	PIPE
1033.644	1273.081	14.370	1287.451	406.50	20.70	6.66	1294.11	.00	4.89	.00	5.000	.000	.00	1 .0
HYDRAULIC JUMP														
1033.644	1273.081	2.663	1275.744	406.50	38.24	22.71	1298.45	5.00	4.89	4.99	5.000	.000	.00	1 .0
7.306	.1093					.0783	.57	5.00	4.62	2.42	.013	.00	.00	PIPE
1040.950	1273.880	2.675	1276.555	406.50	38.02	22.44	1299.00	.06	4.89	4.99	5.000	.000	.00	1 .0
JUNCT STR	.1095					.0755	5.67	2.73	4.58		.013	.00	.00	PIPE
1116.150	1282.117	2.679	1284.796	395.40	36.92	21.16	1305.96	.05	4.88	4.99	5.000	.000	.00	1 .0
JUNCT STR	.1097					.0719	1.33	2.73	4.44		.013	.00	.00	PIPE
1134.690	1284.150	2.705	1286.855	394.40	36.37	20.54	1307.40	.19	4.88	4.98	5.000	.000	.00	1 .0
5.358	.1096					.0700	.37	2.90	4.35	2.37	.013	.00	.00	PIPE
1140.048	1284.737	2.717	1287.454	394.40	36.17	20.32	1307.77	.19	4.88	4.98	5.000	.000	.00	1 .0
39.414	.1096					.0654	2.58	2.91	4.31	2.37	.013	.00	.00	PIPE
1179.462	1289.055	2.824	1291.879	394.40	34.49	18.47	1310.35	.17	4.88	4.96	5.000	.000	.00	1 .0
30.245	.1096					.0578	1.75	2.99	4.00	2.37	.013	.00	.00	PIPE

PD 2641
LINE A6
BY WLL

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1209.707	1292.369	2.937	1295.306	394.40	32.88	16.79	1312.10	.15	4.88	4.92	5.000	.000	.00	1 .0
24.063	.1096					.0511	1.23	3.09	3.71	2.37	.013	.00	.00	PIPE
1233.770	1295.005	3.057	1298.062	394.40	31.35	15.27	1313.33	.12	4.88	4.87	5.000	.000	.00	1 .0
JUNCT STR	.1097					.0527	.10	3.18	3.44		.013	.00	.00	PIPE
1235.720	1295.219	2.772	1297.991	370.30	33.14	17.05	1315.04	.00	4.85	4.97	5.000	.000	.00	1 .0
6.360	.1087					.0567	.36	2.77	3.89	2.30	.013	.00	.00	PIPE
1242.080	1295.910	2.796	1298.706	370.30	32.79	16.70	1315.40	.13	4.85	4.96	5.000	.000	.00	1 .0
JUNCT STR	.0682					.0549	3.18	2.93	3.83		.013	.00	.00	PIPE
1300.000	1299.860	2.815	1302.675	367.70	32.28	16.18	1318.86	.13	4.84	4.96	5.000	.000	.00	1 .0
JUNCT STR	.0676					.0545	.47	2.95	3.75		.013	.00	.00	PIPE
1308.550	1300.438	2.780	1303.217	364.40	32.50	16.40	1319.62	.13	4.84	4.97	5.000	.000	.00	1 .0
13.023	.0677					.0547	.71	2.91	3.81	2.61	.013	.00	.00	PIPE
1321.573	1301.319	2.792	1304.112	364.40	32.31	16.21	1320.32	.13	4.84	4.97	5.000	.000	.00	1 .0
82.266	.0677					.0511	4.21	2.92	3.78	2.61	.013	.00	.00	PIPE
1403.839	1306.888	2.903	1309.791	364.40	30.81	14.74	1324.53	.12	4.84	4.93	5.000	.000	.00	1 .0
54.324	.0677					.0452	2.46	3.02	3.51	2.61	.013	.00	.00	PIPE
1458.163	1310.566	3.021	1313.587	364.40	29.37	13.40	1326.99	.11	4.84	4.89	5.000	.000	.00	1 .0
39.507	.0677					.0400	1.58	3.13	3.25	2.61	.013	.00	.00	PIPE

PD 2641
LINE A6
BY WLL

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1497.670	1313.240	3.146	1316.386	364.40	28.01	12.18	1328.57	.10	4.84	4.83	5.000	.000	.00	1 .0
4.660	.0687					.0373	.17	3.24	3.01	2.60	.013	.00	.00	PIPE
1502.330	1313.560	3.164	1316.724	364.40	27.82	12.02	1328.74	.10	4.84	4.82	5.000	.000	.00	1 .0
21.132	.0461					.0365	.77	3.26	2.97	2.94	.013	.00	.00	PIPE
1523.462	1314.534	3.190	1317.724	364.40	27.56	11.79	1329.52	.09	4.84	4.81	5.000	.000	.00	1 .0
78.038	.0461					.0341	2.66	3.28	2.93	2.94	.013	.00	.00	PIPE
1601.500	1318.130	3.326	1321.455	364.40	26.27	10.72	1332.17	.00	4.84	4.72	5.000	.000	.00	1 .0
13.605	.0460					.0316	.43	3.33	2.70	2.94	.013	.00	.00	PIPE
1615.105	1318.756	3.357	1322.113	364.40	25.99	10.49	1332.60	.00	4.84	4.70	5.000	.000	.00	1 .0
48.803	.0460					.0295	1.44	3.36	2.65	2.94	.013	.00	.00	PIPE
1663.908	1321.002	3.505	1324.507	364.40	24.78	9.54	1334.04	.00	4.84	4.58	5.000	.000	.00	1 .0
35.965	.0460					.0263	.95	3.51	2.44	2.94	.013	.00	.00	PIPE
1699.873	1322.658	3.664	1326.322	364.40	23.63	8.67	1334.99	.00	4.84	4.42	5.000	.000	.00	1 .0
27.380	.0460					.0236	.65	3.66	2.23	2.94	.013	.00	.00	PIPE
1727.252	1323.918	3.838	1327.756	364.40	22.53	7.88	1335.64	.00	4.84	4.22	5.000	.000	.00	1 .0
21.118	.0460					.0213	.45	3.84	2.03	2.94	.013	.00	.00	PIPE
1748.370	1324.890	4.031	1328.922	364.40	21.48	7.16	1336.09	.63	4.84	3.95	5.000	.000	.00	1 .0
14.143	.0459					.0194	.27	4.66	1.83	2.94	.013	.00	.00	PIPE

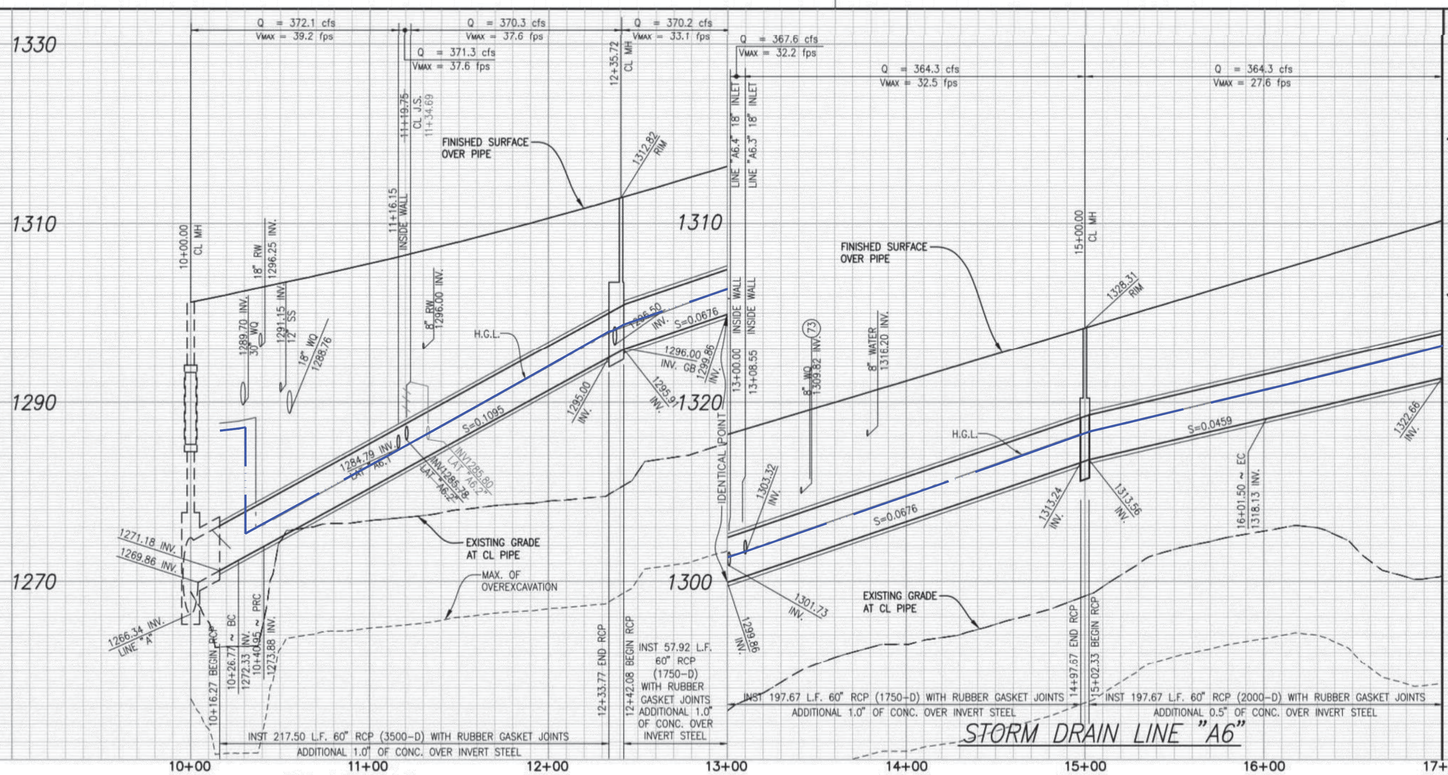
PD 2641
LINE A6
BY WLL

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1762.513	1325.540	4.217	1329.757	364.40	20.62	6.60	1336.36	.53	4.84	3.63	5.000	.000	.00	1 .0
12.319	.0459					.0180	.22	4.75	1.65	2.94	.013	.00	.00	PIPE
1774.832	1326.106	4.473	1330.579	364.40	19.66	6.00	1336.58	.41	4.84	3.07	5.000	.000	.00	1 .0
6.408	.0459					.0172	.11	4.88	1.41	2.94	.013	.00	.00	PIPE
1781.240	1326.400	4.836	1331.236	364.40	18.75	5.46	1336.69	5.00	4.84	1.78	5.000	.000	.00	1 .0
JUNCT STR	.0023					.0178	.08	5.00	1.00		.013	.00	.00	PIPE
1785.500	1326.410	5.630	1332.040	352.90	17.97	5.02	1337.06	.00	4.81	.00	5.000	.000	.00	1 .0
14.480	.0034					.0184	.27	.00	.00	5.00	.013	.00	.00	PIPE
1799.980	1326.460	6.167	1332.627	352.90	17.97	5.02	1337.64	.00	4.81	.00	5.000	.000	.00	1 .0
JUNCT STR	.0034					.0124	.07	.00	.00		.013	.00	.00	PIPE
1805.930	1326.480	9.773	1336.253	207.40	10.56	1.73	1337.99	.00	4.10	.00	5.000	.000	.00	1 .0
20.980	.0033					.0063	.13	.00	.00	5.00	.013	.00	.00	PIPE
1826.910	1326.550	9.970	1336.520	207.40	10.56	1.73	1338.25	.00	4.10	.00	5.000	.000	.00	1 .0
27.730	.0032					.0063	.18	9.97	.00	5.00	.013	.00	.00	PIPE
1854.640	1326.640	10.055	1336.696	207.40	10.56	1.73	1338.43	.00	4.10	.00	5.000	.000	.00	1 .0
79.850	.0031					.0063	.51	.00	.00	5.00	.013	.00	.00	PIPE
1934.490	1326.890	10.537	1337.427	207.40	10.56	1.73	1339.16	.00	4.10	.00	5.000	.000	.00	1 .0
147.010	.0033					.0063	.93	10.54	.00	5.00	.013	.00	.00	PIPE

PD 2641
LINE A6
BY WLL

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
2081.500	1327.370	10.990	1338.360	207.40	10.56	1.73	1340.09	.00	4.10	.00	5.000	.000	.00	1 .0
19.330	.0031					.0063	.12	.00	.00	5.00	.013	.00	.00	PIPE
2100.830	1327.430	11.163	1338.593	207.40	10.56	1.73	1340.33	.00	4.10	.00	5.000	.000	.00	1 .0
JUNCT STR	.0035					.0063	.02	11.16	.00		.013	.00	.00	PIPE
2103.670	1327.440	11.171	1338.611	207.40	10.56	1.73	1340.34	.00	4.10	.00	5.000	.000	.00	1 .0
58.900	.0032					.0063	.37	11.17	.00	5.00	.013	.00	.00	PIPE
2162.570	1327.630	11.355	1338.985	207.40	10.56	1.73	1340.72	.00	4.10	.00	5.000	.000	.00	1 .0
52.370	.0032					.0063	.33	.00	.00	5.00	.013	.00	.00	PIPE
2214.940	1327.800	11.700	1339.500	207.40	10.56	1.73	1341.23	.00	4.10	.00	5.000	.000	.00	1 .0
93.410	.0032					.0063	.59	11.70	.00	5.00	.013	.00	.00	PIPE
2308.350	1328.100	11.992	1340.092	207.40	10.56	1.73	1341.82	.00	4.10	.00	5.000	.000	.00	1 .0

SCALE: HOR. 1"=40'
VERT. 1"=8'



LEGEND:

REVISED H.G.L. PER PROPOSED ENTRADA SOUTH HYDROLOGY

P.D. NO. 2641

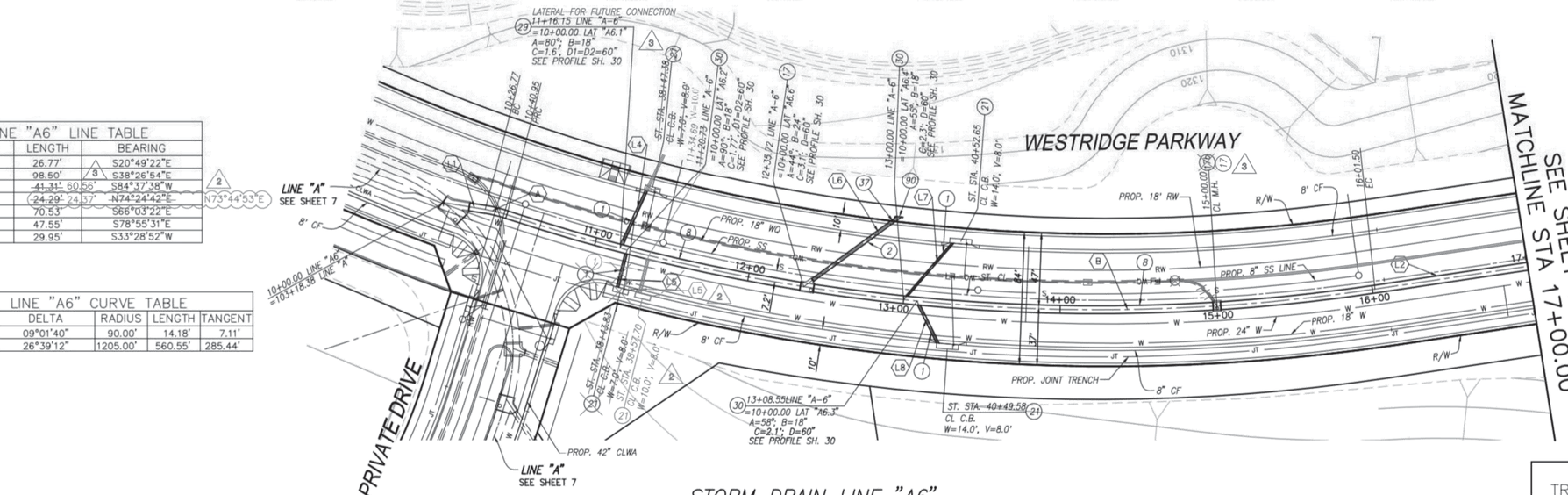
REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

11/12/24

FOR UPDATED HGL ONLY

LINE "A6" LINE TABLE		
LINE	LENGTH	BEARING
L1	26.77'	S20°49'22"E
L2	98.50'	S38°26'54"E
L3	41.31' 60.56'	S84°37'38"W
L4	24.29' 24.37'	N74°24'42"E
L5	70.53'	S66°03'22"E
L6	47.55'	S78°55'31"E
L7	29.95'	S33°28'52"W

LINE "A6" CURVE TABLE				
	DELTA	RADIUS	LENGTH	TANGENT
A	09°01'40"	90.00'	14.18'	7.11'
B	26°39'12"	1205.00'	560.55'	285.44'



CONSTRUCTION NOTES

1. INSTALL 18" R.C.P. (SEE PROFILE FOR D-LOAD)
2. INSTALL 24" R.C.P. (SEE PROFILE FOR D-LOAD)
8. INSTALL 60" R.C.P. (SEE PROFILE FOR D-LOAD)
9. INSTALL 96" R.C.P. (SEE PROFILE FOR D-LOAD)
17. CONSTRUCT M.H. PER S.P.P.W.C.. STD. PLAN 320-2
17a. ~~CONSTRUCT MODIFIED M.H. PER S.P.P.W.C. STD. PLAN NO. 320-2 PER DETAILS ON SHEET 33~~
21. CONSTRUCT CURB OPENING CATCH BASIN PER S.P.P.W.C. STD. PLAN NO. 300-3 (MODIFIED CATCH BASIN PER DETAIL ON SHEET 38 AND SHEET 39
29. CONSTRUCT J.S. PER S.P.P.W.C. STD. PLAN 331-3
30. CONSTRUCT J.S. PER S.P.P.W.C. STD. PLAN 332-2
37. CONSTRUCT CLEANOUT PER DETAIL 37 ON SHEET 25
90. CONSTRUCT BRICK AND MORTAR PLUG

Dwg No. 43-F553.1-38

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-KUEN No. 9522

REGISTERED ENGINEERING GEOLOGIST ANDREW A. [illegible] No. 1209 CALIFORNIA

APPENDIX B-4.5
LINE "A6" Per PD 2641

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

GRAPHIC SCALE: 1" = 40'

REVIEWED LAND DEVELOPMENT DIVISION
BY [signature] STORM DRAIN SECTION 10/04/2018 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	ADDED STRUCTURAL DETAIL SHEETS 38 AND 39. ADDED CONSTRUCTION NOTE 91.REVISED CONSTRUCTION NOTE 21.			8/14/19
	REVISED TOTAL SHEET NUMBER. REVISE HYDRAULIC ELEMENTS REVISE AND ADD LATERALS/MAINLINE			
	REVISED "00" PRIVATE DRIVE			
3	REMOVED CATCH BASIN ON WESTRIDGE PARKWAY, EXTENDED LAT A6.1, ADDED LABELS AND UPDATED WATER QUALITY LINE			3/15/2021

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
JASON H. FUKUMITSU DATE 8/29/18

STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
26074 Avenue Hall, Suite 23 • Valencia, CA 91355 • PH: (661) 294-2211 • FX: (661) 294-9890

DWG

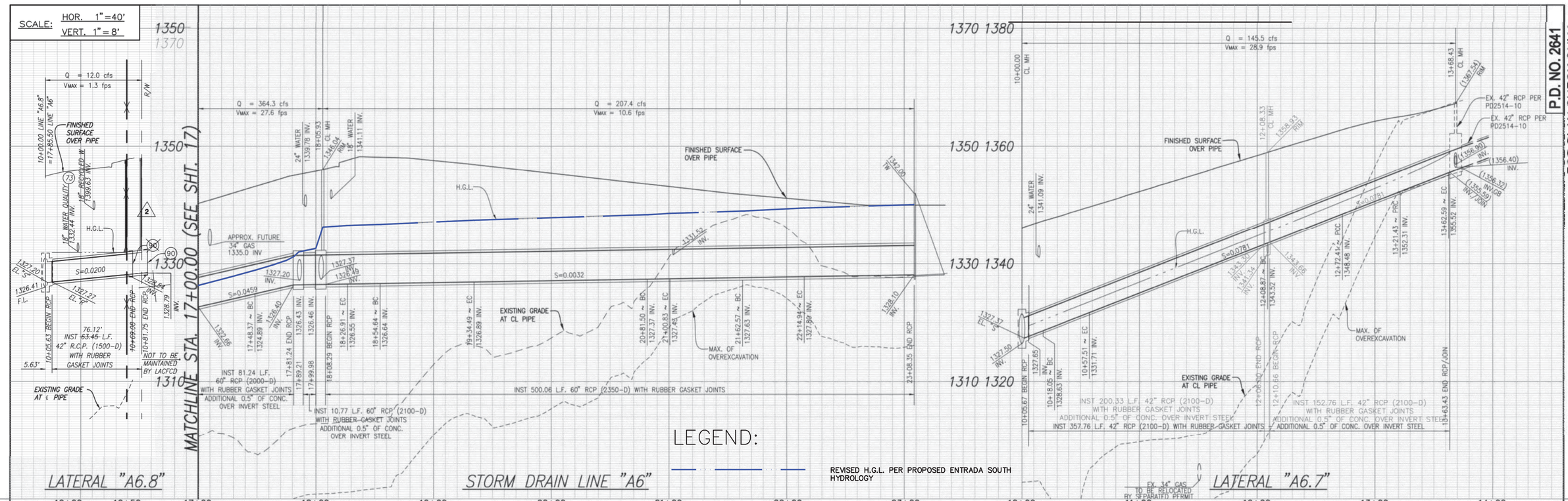
SHEET 17 OF 37 39

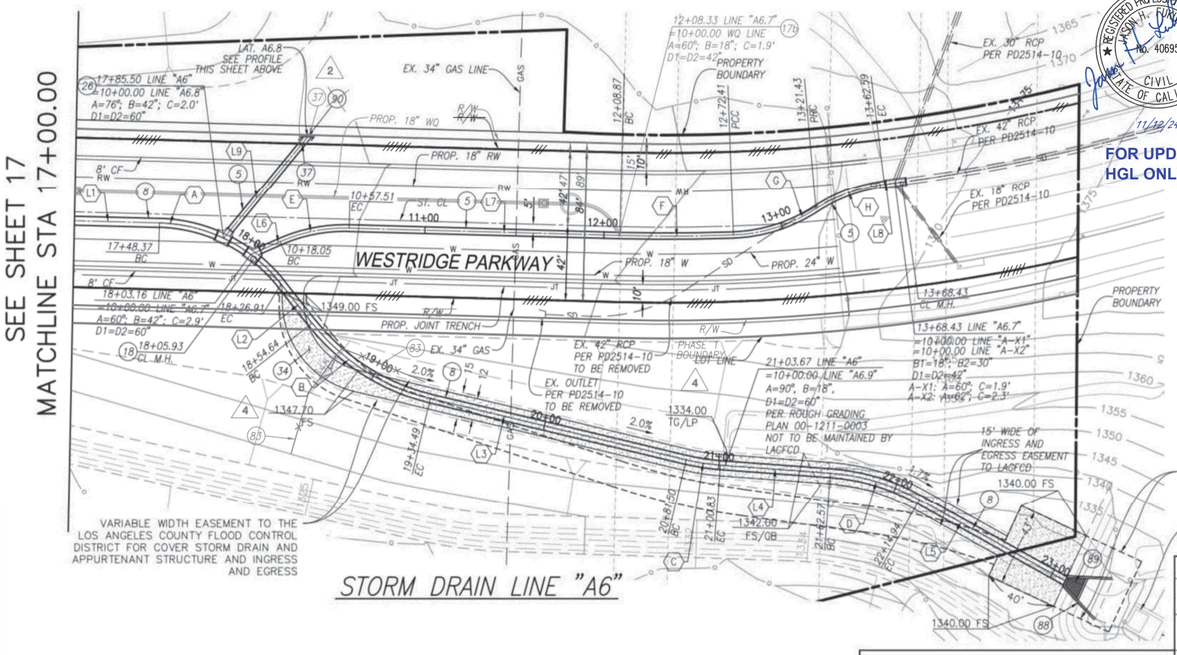
© Vtenhall Ranch\61105\Missions\Design\61105dp(S)\Storm\P60-6864\HM0860172.SBI_Plan.dwg8Plot:tenhall 1:1Sep/21/2021 8:40pm by jashway - AutoCAD 2021 by ormond

SCALE: HOR. 1"=40'
VERT. 1"=8'

P.D. NO. 2641

FOR PLAN CHECK ONLY





FOR UPDATED HGL ONLY

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
7/12/24

LINE "A6" LINE TABLE

LINE	LENGTH	BEARING
L1	48.37'	S38°26'54"E
L2	27.73'	N11°33'06"E
L3	147.01'	N26°34'23"W
L4	61.74'	N35°48'19"W
L5	93.41'	N10°48'03"W

LINE "A6" CURVE TABLE

	DELTA	RADIUS	LENGTH	TANGENT
A	50°00'00"	90.00'	78.54'	41.97'
B	38°07'29"	120.00'	79.85'	41.47'
C	09°13'56"	120.00'	19.34'	9.69'
D	25°00'16"	120.00'	52.37'	26.61'

LINE "A6.7" LINE TABLE

LINE	LENGTH	BEARING
L6	18.05'	N63°33'50"W
L7	151.37'	S38°26'54"E
L8	0.84'	S47°04'02"E

LINE "A6.7" CURVE TABLE

	DELTA	RADIUS	LENGTH	TANGENT
E	25°06'56"	90.00'	39.45'	20.05'
F	03°37'21"	1005.00'	63.54'	31.78'
G	31°12'04"	90.00'	49.01'	25.13'
H	26°12'18"	90.00'	41.16'	20.95'

LINE "A6.8" LINE TABLE

LINE	LENGTH	BEARING
L9	74.08' 81.75'	N89°25'59"E

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
2

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
4

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRICE No. 1709 STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-KUEN TO No. 2522 Exp. 6/30 GEOTECHNICAL STATE OF CALIFORNIA

CONSTRUCTION NOTES

5 INSTALL 42" R.C.P. (SEE PROFILE FOR D-LOAD)
8 INSTALL 60" R.C.P. (SEE PROFILE FOR D-LOAD)
18 CONSTRUCT M.H. PER S.P.P.W.C., STD. PLAN 322-2
26 CONSTRUCT T.S. PER S.P.P.W.C., STD. PLAN 340-2
34 CONSTRUCT 3" ASPHALT CONCRETE OVER 4" CRUSHED MISCELLANEOUS BASE PER DETAIL ON SHEET 22 (WIDTH PER PLAN)
37 CONSTRUCT CLEANOUT PER DETAIL 37 ON SHEET 25
88 CONSTRUCT HEADWALL PER CALTRANS STANDARD D90
89 INSTALL INCLINED TRASH RACK PER S.P.P.W.C. 361-2
90 CONSTRUCT BRICK AND MORTAR PLUG
176 CONSTRUCT MODIFIED M.H. PER S.P.P.W.C. STD. PLAN NO. 320-2 PER DETAIL ON SHEET 33
73 CONSTRUCT CONCRETE BLANKET PER S.P.P.W.C. 225
83 CONSTRUCT CHAIN LINK FENCE AND GATE PER S.P.P.W.C. 225

APPENDIX B-4.5
LINE "A6" Per PD 2641

Dwg No. 43-F553.1-38

REVIEWED LAND DEVELOPMENT DIVISION
BY Ken Mg STORM DRAIN SECTION 10/04/2018 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	REVISED TOTAL SHEET NUMBER.	Jason H Fukumitsu		8/14/19
	REVISE HYDRAULIC ELEMENTS REVISE AND ADD LATERALS/MAINLINE REVISED "00" PRIVATE DRIVE			
4	REVISE RIGHT OF WAY AND BOUNDARY LINE ADDED FENCING AND GATE	Jason H Fukumitsu	A.D.	9/28/2021

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
8/29/18 DATE

STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
26074 Avenue Hall, Suite 23 ▪ Valencia, CA 91355 ▪ PH: (661) 294-2211 ▪ FX: (661) 294-9890

DWG | SHEET 18 OF 39 39

J:\drp\Projects\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2641\VM\0080-18_SD_Plan.dwg Plotted on Aug 28, 2018--1:51pm by wallaei

B-4.6: Line “D” of PD 2637 (Non-Compliance Study)

```
T1 Magic Mountain Parkway                                                0
T2 SD Box
T3 Non-Compliance Study for Line D
SO    700.0001146.870  1                        1150.370
R     960.0001154.670  1      .014                          .000
JX    986.1801155.440  1  5   .014  170.400*       1156.000        45.0         .000
TS   1000.0001155.870  2      .014                          .000
WX   1000.0001155.870  3
R    1004.0001155.880  3      .013                          .000    .000 0
R    1057.1701156.060  3      .013                        25.400    .000 0
JX   1066.1401156.090  3  4   .013    4.700**       1156.890       -45.0         .000
R    1258.4201156.750  3      .013                          .000    .000 0
R    1303.4001161.000  3      .013                          .000    .000 0
R    1311.6301166.100  3      .013                          .000    .000 0
WE   1311.6301166.100  3      .500
R    1311.6301166.100  6      .014                          .000
TS   1317.4001168.000  7      .014                          .000
R    1317.4001168.000  7      .014                          .000
SH   1317.4001168.000  7                        1168.000
CD   1  1   0    .000   7.000    8.000 1.000 1.000   .00
CD   2  2   0    .000   7.000   13.000  .000  .000   .00
CD   3  3   1   1.000   3.500   12.000  .000  .000   .00
CD   4  4   1    .000   1.500     .000  .000  .000   .00
CD   5  4   1    .000   4.500     .000  .000  .000   .00
CD   6  2   0    .000   6.000   15.000  .000  .000   .00
CD   7  2   0    .000   6.000   36.000  .000  .000   .00
Q          1110.600*** .0
```

Notes:

* Q per Proposed Entrada South Hydrology-Per Watershed 400 QCap

** Q per Proposed Entrada South Hydrology-Per Subarea 113B

*** 1110.6 cfs is the projected flow for Line D, highlighting non-compliance due to the additional 132.1 cfs, which is the difference between the approved 38.6 cfs (Per Approved PD 2637 and the proposed 170.7 cfs in Watershed 300.

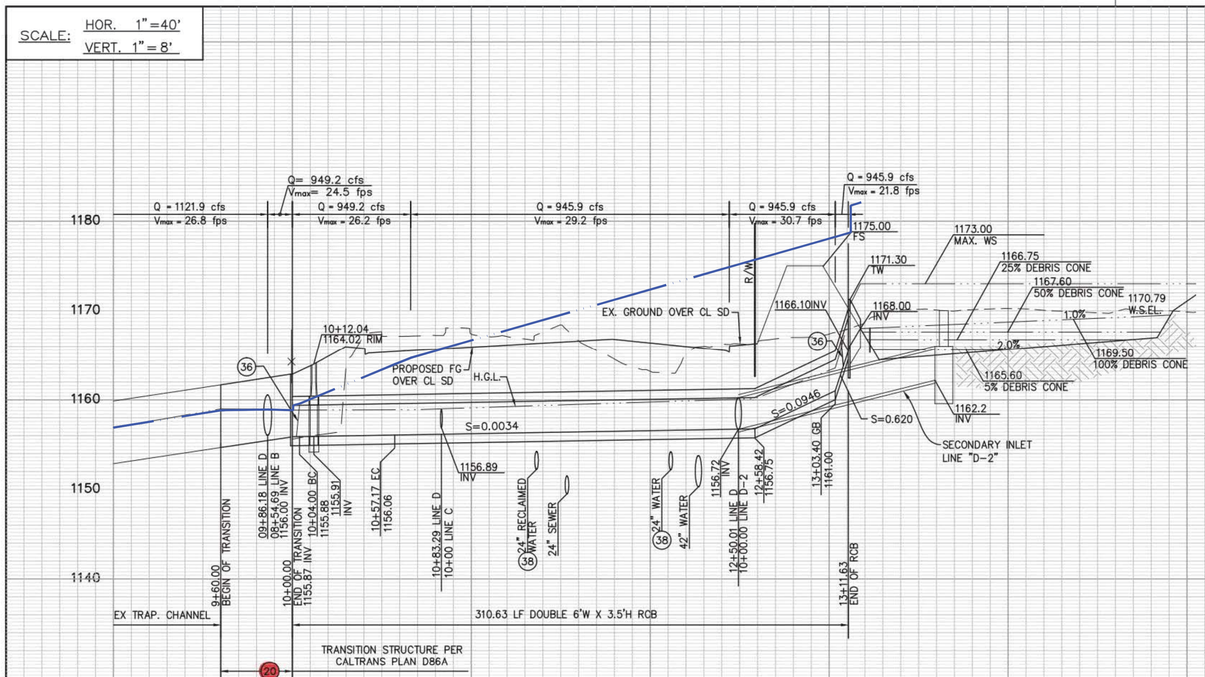
Magic Mountain Parkway
SD Box

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
700.000	1146.870	3.780	1150.650	1285.70	28.88	12.95	1163.60	.00	6.96	15.56	7.000	8.000	1.00	0 .0
97.508	.0300					.0222	2.17	3.78	3.01	3.52	.014	.00	1.00	TRAP
797.508	1149.795	3.879	1153.674	1285.70	27.91	12.09	1165.77	.00	6.96	15.76	7.000	8.000	1.00	0 .0
94.567	.0300					.0199	1.88	3.88	2.88	3.52	.014	.00	1.00	TRAP
892.075	1152.632	4.020	1156.652	1285.70	26.61	10.99	1167.64	.00	6.96	16.04	7.000	8.000	1.00	0 .0
67.925	.0300					.0174	1.18	4.02	2.70	3.52	.014	.00	1.00	TRAP
960.000	1154.670	4.166	1158.836	1285.70	25.37	9.99	1168.83	.00	6.96	16.33	7.000	8.000	1.00	0 .0
JUNCT STR	.0294					.0202	.53	4.17	2.54		.014	.00	1.00	TRAP
986.180	1155.440	3.460	1158.900	1115.30	28.13	12.28	1171.18	.00	6.45	14.92	7.000	8.000	1.00	0 .0
TRANS STR	.0311					.0266	.37	3.46	3.04		.014	.00	1.00	TRAP
1000.000	1155.870	2.958	1158.828	1115.30	29.00	13.06	1171.89	.00	6.11	13.00	7.000	13.000	.00	0 .0
WALL	EXIT													
1000.000	1155.870	3.500	1159.370	1115.30	28.71	12.80	1172.17	.00	3.50	12.00	3.500	12.000	.00	1 1.0
4.000	.0025					.0574	.23	3.50	2.82	3.50	.013	.00	.00	BOX
1004.000	1155.880	3.720	1159.600	1115.30	28.71	12.80	1172.40	.00	3.50	12.00	3.500	12.000	.00	1 1.0
53.170	.0034					.0574	3.05	.00	2.82	3.50	.013	.00	.00	BOX
1057.170	1156.060	7.951	1164.011	1115.30	28.71	12.80	1176.81	.00	3.50	12.00	3.500	12.000	.00	1 1.0
JUNCT STR	.0033					.0569	.51	7.95	2.82		.013	.00	.00	BOX

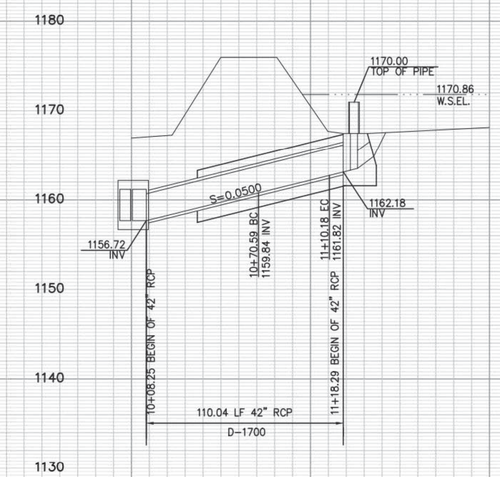
Magic Mountain Parkway
SD Box

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope				SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch	
1066.140	1156.090	8.642	1164.732	1110.60	28.59	12.69	1177.42	.00	3.50	12.00	3.500	12.000	.00	1 1.0
192.280	.0034				.0569	10.94	8.64	2.81	3.50	.013	.00	.00	BOX	
1258.420	1156.750	18.927	1175.677	1110.60	28.59	12.69	1188.37	.00	3.50	12.00	3.500	12.000	.00	1 1.0
44.980	.0945				.0569	2.56	18.93	2.81	2.40	.013	.00	.00	BOX	
1303.400	1161.000	17.238	1178.238	1110.60	28.59	12.69	1190.93	.00	3.50	12.00	3.500	12.000	.00	1 1.0
8.230	.6197				.0569	.47	17.24	2.81	1.23	.013	.00	.00	BOX	
1311.630	1166.100	12.606	1178.706	1110.60	28.59	12.69	1191.40	.00	3.50	12.00	3.500	12.000	.00	1 1.0
WALL	ENTRANCE													
1311.630	1166.100	15.622	1181.722	1110.60	4.74	.35	1182.07	.00	5.54	15.00	6.000	15.000	.00	0 .0
TRANS STR	.3293				.0001	.00	15.62	.21		.014	.00	.00	RECTANG	
1317.400	1168.000	14.066	1182.066	1110.60	2.19	.07	1182.14	.00	3.09	36.00	6.000	36.000	.00	0 .0

SCALE: HOR. 1"=40'
VERT. 1"=8'



STORM DRAIN LINE "D"



LINE "D-2" SECONDARY INLET

LEGEND:

H.G.L. PER NON-COMPLIANCE STUDY

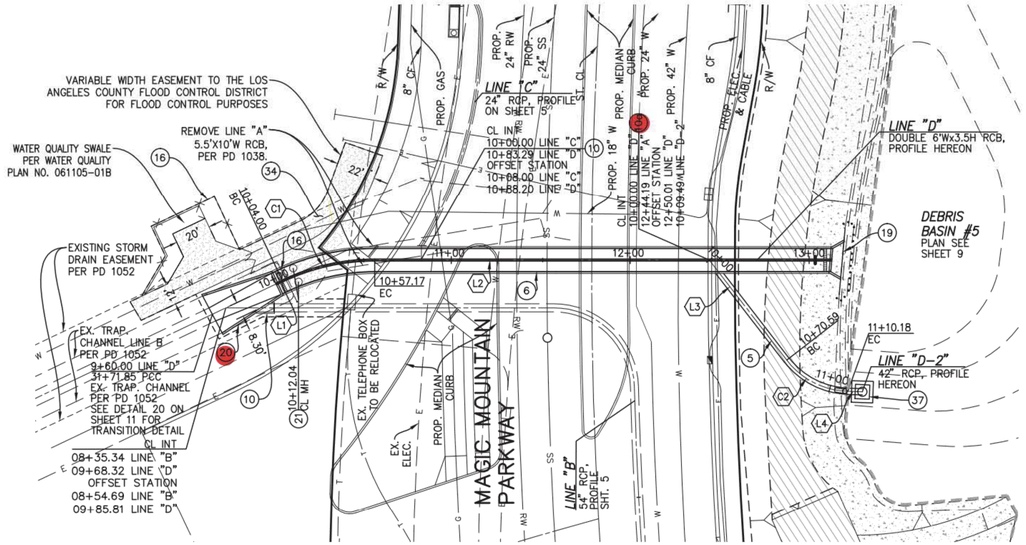
REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

11/14/24

FOR UPDATED HGL ONLY

P.D. No. 2637

DDN No. 43-F551



STORM DRAIN LINE "D"

OUTLET STRUCTURE										
A	B	D	H	W	L	M	N	a	ANGLE
1'	9"	6"	7'	12'-7"	40'	N/A	N/A	1161.67'	4°

INLET STRUCTURE					
H	a	L	M	N	ANGLE
6'	1169.0'	5.8'	7.09'	N/A	30°

Not a part of this approval

CONSTRUCT MODIFIED JUNCTION STRUCTURE AT WING WALL WITH PARAPET

Line Table		
Line #	Length	Bearing
L1	4.00'	N37° 19' 36"W
L2	255.47'	N11° 56' 18"W
L3	70.59'	N40° 16' 26"E
L4	8.12'	N10° 07' 55"W

Curve Table				
Curve #	Length	Radius	Delta	Tangent
C1	53.17'	120.00'	025°23'18"	27.03'
C2	39.59'	45.00'	050°24'21"	21.18'

JUNCTION STRUCTURE TABLE						
LINE #	A	B	C	D	EL S	EL R
D-2	52'13"	36"	3.13'	72"	1156.72	1156.72

GRAPHIC SCALE: 1" = 40'

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRICE No. 1705 STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-KUEN P No. 25210 Exp. 6/30 CIVIL STATE OF CALIFORNIA

CONSTRUCTION NOTES:

1. (5) CONSTRUCT 42" RCP (D-1040 PER PROFILE)
2. (6) CONSTRUCT DOUBLE REINFORCED CONCRETE BOX CULVERT PER S.P.P.W.C. 390-1. USE 6'W X 4'H REINFORCED CONCRETE BASE FOR STRUCTURE STEEL, SEE NOTES HEREON. (6'W x 3.5'H)
3. (10) CONSTRUCT JUNCTION STRUCTURE PIPE TO RCB PER SPPWC 333-2
4. (10a) CONSTRUCT MODIFIED JUNCTION STRUCTURE PIPE TO RCB PER SPPWC 333-2, SEE SHEET 16 AND 17 FOR DETAIL.
5. (16) CONSTRUCT CHAIN LINK FENCE PER SPPWC STD. PLAN NO 600-3
6. (19) CONSTRUCT ELEVATED INLET PER DETAIL ON SHEET 10
7. (20) CONSTRUCT MODIFIED TRANSITION STRUCTURE PER CALTRANS DETAIL D86A, SEE DETAIL 20 ON SHEET 11
8. (21) CONSTRUCT MANHOLE CONCRETE BOX STORM DRAIN PER SPPWC STD 323-2
9. (34) CONSTRUCT VARIABLE WIDTH 3" ASPHALT CONCRETE OVER 4" CRUSHED AGGREGATE BASE PER DETAIL ON SHEET 11
10. (36) INSTALL SLOPE PROTECTION BARRIER PER SPPWC STD. 360-2, USE 2(TWO) 4'(H) X6'(W) AND MODIFIED TO 3.5'(H) X 6'(W)
11. (37) INSTALL DEBRIS DAMS AND OUTLET WORKS PER LOS ANGELES COUNTY PUBLIC WORKS STANDARD PLAN #3097-0
12. (38) CONSTRUCT CONCRETE BLANKET PER SPPWC 225-2

STANDARD 390-1 PRECAST REINFORCED CONCRETE BOX NOTES:

1. THE FOLLOWING NOTES REFER TO KEY DETAILS IN THE STANDARD PLAN. THESE NOTES ARE NOT ALL ENCOMPASSING. THE CONTRACTOR SHOULD REVIEW THE STANDARD PLAN IN ITS ENTIRETY.
2. M… TAIL ON SHEET 6
3. E…
4. … CRETE BOX BEVELS
5. V… N SHEET 13

APPENDIX B-4.6
LINE "D" Per PD 2637

REVIEWED LAND DEVELOPMENT DIVISION
BY _____ STORM DRAIN SECTION 08/13/2018 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
1	ADD INLET AND OUTLET STRUCTURE DIMENSION AND			11/15/18
	REVISE CONSTRUCTION NOTE PER STRUCTURAL REVIEW. REMOVING NOT A PART OF THIS APPROVAL			

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
8/10/18
JASON H. FUKUMITSU DATE

STORM DRAIN PLANS IN
DS 542 P.D. No. 2637
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
26074 Avenue Hall, Suite 23 ▪ Valencia, CA 91355 ▪ PH: (661) 294-2211 ▪ FX: (661) 294-9890

DWG | SHEET 4 OF 17

G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2637\HMW102-04 – Sheet 4.dwg Plotted On Jul 25, 2018–1:13pm by wallanl

B-5: Proposed Hydrology Summary Table

Entrada South Proposed Condition

Subarea	Node	Soil Type	DPA Zone	Burn Factor	Bulking Factor	% Imp	Area (Ac)	ΣAREA (Ac)	50-Yr Isohyet (in)	50-Yr Tc (min)	50-Yr Flow (cfs)	ΣQ50 (cfs)	Qb (cfs)	ΣQb (cfs)	Q50bb (cfs)	ΣQ50bb (cfs)	ΣDPV (cy)	Future ΣQcap (cfs)	Note	Land Use
100A		98	8	0	1.36	0.03	28.1	28.1	6.2	13								915.1	Subarea 100 & upstream Q's are modeled in approved DS 542. 915.1 cfs added from approved DS 542.	Golf Course
101A		98	8	0.34	1.36	0.03	6.1	6.1	6.2	5	19.5	19.5	19.9	19.9				935.0		Golf Course
102B		98	8	0.34	1.36	0.10	3.9	3.9	6.2	5	12.5	12.5	12.8	12.8	16.3		167	12.8	Debris Basin #7	Natural/Debris Basin
	103AB							10.0				32.0		32.7				947.8		
104A		98	8	0	1.36	0.10	3.1	13.1	6.0	6	8.9	28.7	8.9	29.3				944.4	Debris Basin #5	Open Space/Debris Basin
105C			8	0	1.36	0.80	2.4	2.4	6.0	5	7.9	7.9	7.9	7.9					Water Quality Basin "B"	Water Quality Basin
	106AC	98						15.5				33.1		33.7				948.8		
107B		98	8	0.34	1.36	0.10	10.6	10.6	6.1	13	20.6	20.6	21.1	21.1	23.9		213			Natural/Canyon
	108B							10.6				20.6		21.1						
109B		98	8	0.34	1.36	0.10	1.5	12.1	6.0	8	3.7	24.3	3.8	24.9						Unamed Canyon
110B		98	8	0	1.36	0.10	2.3	14.4	6.0	10	5.2	29.3	5.2	30.0						Recreation
	111B							14.4				29.3		30.0						
	112AB							29.9				62.2		63.4				978.5		
113B		98	8	0	1.36	0.90	1.4	1.4	5.9	5	4.7	4.7	4.7	4.7						Public Road
	114AB							31.3				65.6		66.7				981.8		
201A		98	8	0.34	1.36	0.10	3.4	3.4	6.3	5	11.3	11.3	11.5	11.5	14.8		149		Debris Basin #1	Natural/Debris Basin
202A		98	8	0	1.36	0.74	7.8	11.2	6.3	6	24.1	34.7	24.1	34.9						Multi Family Condo
203A		98	8	0	1.36	0.91	4.3	15.5	6.3	9	11.1	44.6	11.1	44.8						Public Road
204A		98	8	0	1.36	0.74	2.0	17.5	6.3	5	6.8	50.6	6.8	50.9						Open Space
205B		98	8	0.34	1.36	0.10	9.0	9.0	6.3	5	29.9	29.9	30.5	30.5	38.9		387		Debris Basin #2	Natural/Debris Basin
206C		98	8	0	1.36	0.74	9.3	9.3	6.3	7	26.5	26.5	26.5	26.5						Multi Family Condo
	207BC							18.3				52.8		53.3						
208B		98	8	0	1.36	0.74	23.3	41.6	6.3	7	66.4	109.9	66.4	110.5						Multi Family Condo
209A		98	8	0	1.36	0.74	4.0	21.5	6.3	5	13.6	62.7	13.6	62.9						Multi Family Condo
210D		98	8	0.34	1.36	0.10	7.0	7.0	6.3	6	20.9	20.9	21.3	21.3	27.9		334		Debris Basin #3	Natural/Debris Basin
211D		98	8	0.34	1.36	0.10	9.8	16.8	6.3	6	29.2	48.4	29.9	49.5	39.6		492		Debris Basin #4	Natural/Debris Basin
212D		98	8	0	1.36	0.74	12.9	29.7	6.3	8	34.5	80.7	34.5	81.8					Multi Family Condo	Multi Family Condo
213D		98	8	0	1.36	0.74	9.3	39.0	6.3	6	28.7	101.7	28.7	102.7						Multi Family Condo
214C		98	8	0	1.36	0.74	7.2	7.2	6.3	7	20.5	20.5	20.5	20.5						Multi Family Condo
	215CD							46.2				117.6		118.6						
216C		98	8	0	1.36	0.90	3.0	49.2	6.3	6	9.3	122.5	9.3	123.5						Public Road
217C		98	8	0	1.36	0.74	8.1	57.3	6.3	6	25.0	132.0	25.0	133.0						Multi Family Condo
218D		20	8	0	1.36	0.74	2.3	2.3	6.3	8	5.7	5.7	5.7	5.7						Open Space/Acess Road
219D		98	8	0	1.36	0.74	16.2	18.5	6.3	7	46.2	51.9	46.2	51.9						Multi Family Condo/Mixed Residential
220E		98	8	0	1.36	0.91	11.1	11.1	6.3	10	27.4	27.4	27.4	27.4						Commercial Business Park
221E		98	8	0	1.36	0.91	10.1	21.2	6.3	13	21.9	49.1	21.9	49.1						Commercial Business Park
301A		98	8	0	1.36	0.74	6.6	6.6	6.2	7	18.2	18.2	18.2	18.2						Multi Family Condo
	302A							6.6				18.2		18.2						
303A		98	8	0	1.36	0.74	12.9	19.5	6.1	9	31.8	49.0	31.8	49.0						Multi Family Condo
304B		98	8	0	1.36	0.91	4.6	4.6	6.1	12	10.0	10.0	10.0	10.0						Public Road
	305AB							24.1				58.8		58.8						
306A		98	8	0	1.36	0.10	11.6	35.7	6.2	10	26.0	84.2	26.0	84.2						Public Park/Recreation
307A		98	8	0	1.36	0.90	1.0	36.7	6.1	5	3.3	85.8	3.3	85.8						Public Road
308B		98	8	0	1.36	0.74	20.1	20.1	6.1	11	45.0	45.0	45.0	45.0						Multi Family Condo
309B		98	8	0	1.36	0.74	9.0	29.1	6.1	6	26.8	71.9	26.8	71.9						Multi Family Condo
	310AB		8		1.36			65.8				155.0		155.0						Public Road
311B		98	8	0	1.36	0.74	2.1	2.1	6.1	5	6.9	6.9	6.9	6.9					Water Quality Basin "C"	Water Quality Basin/Open Space
	312AB							67.9				158.5		158.5					Connect to PD2637	
313A		98	8	0	1.36	0.90	5.2	73.1	6.0	9	13.0	170.7	13.0	170.7						Public Road
314A		98	8	0	1.36	0.90	9.7	82.8	6.0	12	21.1	191.7	21.1	191.7						Public Road
315C		98	8	0	1.36	0.10	1.2	1.8	6.0	5	4.0	4.0	4.0	4.0						Open Space
316C		98	8	0	1.36	0.00	1.2	3.0	6.0	6	5.2	9.2	5.2	9.2						Public Road
	317AC							85.8				197.9		197.9				1291.8		
401A		98	8	0	1.36	0.74	11.6	11.6	6.0	11	25.2	25.2	25.2	25.2						Multi Family Condo
402B		98	8	0	1.36	0.90	4.9	4.9	6.0	6	14.3	14.3	14.3	14.3						Public Road
	403AB							16.5				38.6		38.6						
	404A							16.5				38.1		38.1						
405A		98	8	0	1.36	0.91	6.0	22.5	5.9	11	13.2	51.0	13.2	51.0						Public Road
	406A							22.5				51.0		51.0						
407C		98	8	0	1.36	0.91	24.2	24.2	5.9	14	47.6	47.6	47.6	47.6						Commercial Business Park
	408AC							46.7				98.3		98.3						
409D		98	8	0	1.36	0.74	18.4	18.4	6.0	7	49.2	49.2	49.2	49.2						Multi Family Condo
	410AD							65.1				146.0		146.0						
411A		98	8	0	1.36	0.91	13.3	78.4	5.9	14	26.1	170.4	26.1	170.4						Public Road
	412A							78.4				170.4		170.4						
	413B							31.3				66.0		67.0					Addition of Watershed 100 Hydrograph	
	414AB							109.7				235.4		237.4				1,152.5	Combined Flow of Watershed 100 and 400	
501A		98	8	0.34	1.36	0.10	38.4	38.4	6.1	17	64.9	64.9	66.7	66.7	85.1		1640.1		Debris Basin #6	Natural/Debris Basin
502A		98	8	0	1.36	0.91	2.9	41.3	6.1	6	8.7	72.1	8.7	73.8						Commercial Business ParK
503B		98	8	0.34	1.36	0.01	1.9	1.9	6.1	5	6.1	6.1	6.2	6.2	8.5		106.50			Natural
	504AB							43.2				76.8		78.7				78.70		
601A		98	8	0.34	1.36	0.01	3.9	3.9	6.2	5	12.4	12.4	12.7	12.7	17.3		216.6	216.6	Values per HydroCalc	Natural

B-6: 200-Watershed LAT/Mainline Summary Table

200- Watershed Summary Table [8]

	LATERALS					MAINLINE				
Subarea	**PD[1] LAT Name**	**Qdesign LAT per approved PD**	**Qpeak LAT per ES Hydrology**	**Q DELTA PEAK LAT [QES-QPD]**	**D/S node Cumulative ΔQ**	**Approved PD Q ROUTED U/S of LAT**	**Approved PD Q ROUTED D/S of LAT**	**Approved PD DESIGN**	**Revised Q design (Approved Qdesign+ cumulative Δ Q)[3]**	**Delta Q (revised- design)**
						364.3		364.3	364.3	0.0
201A	LAT "A6.8"	12.0	11.5	-0.5						
					-0.5	370.2	364.3	370.2	369.7	-0.5
202A	LAT "A6.6"	12.0	24.1	12.1						
					11.6		364.3	364.3	375.9	11.6
						371.3				
203A	LAT "A6.1"	0.8	11.1	10.3						
					21.9		372.1	372.1	394.0	21.9
Legacy [2]	Line A	929.8	779.8	-150.0						
					-128.1	1,157.2		1,157.2	1,029.1	-128.1
UN-USED	LAT "A.6"	10.0	0.0	-10.0						
					-138.1	1,157.2	1,157.2	1,157.2	1,019.1	-138.1
204A	LAT "A.17"	82.0	6.8	-75.2						
					-213.3	1,240.7	1,240.7	1,240.7	1,027.4	-213.3
208B[4]	LAT "A.16"	25.0	110.5	85.5						
					-127.8	1,266.2	1,266.2	1,266.2	1,138.4	-127.8
209A	LAT "A.15"	8.0	13.6	5.6						
					-122.2	1,273.7	1,273.7	1,273.7	1,151.5	-122.2
217C[5]	LAT "A.14"	36.0	133.0	97.0						
					-25.2	1,306.2	1,306.2	1,306.2	1,281.0	-25.2
219D[6]	LAT "A.13"	66.0	51.9	-14.1						
					-39.3		1,306.2	1,306.2	1,266.9	-39.3
North of Magic Mountin Parkway										
						1,521.6		1,521.6	1,482.3	-39.3
221E[7]	LAT "A.30"	36.0	49.1	13.1						
					-26.2	1,557.6		1,557.6	1,531.4	-26.2
Total (cfs)		1,217.6	1,191.4	-26.2						

Notes

1. PD Values are per the latest approved revisions of PD2640 and PD2641 plans
2. Legacy Undeveloped Q50B=584.2 cfs
   Legacy Ultimate Q50 to be limited to Q50B=750 cfs
3. Revised Q is the approved Mainline Q + cumulative ΔQ for each Lateral
4. Subarea 208B Q includes total suabreas: 205B, 206C and 208B
5. Subarea 217C Q includes total suabreas: 210D, 211D,212D,213D,214C,216C and 217C
6. Subarea 219D Q includes total suabreas: 218D and 219D
7. Subarea 222E Q includes total suabreas: 220E and 221E
8. Values are in CFS

B-7: Debris Basin Calculation

Project Entrada South
Basin 1

%	Required Volume
100	149
50	75
25	37
5	8

Elevation	depth	Area (sf)	Volume (CF)	total Volume (CF)	Total Volume (CY)	% of required debris
1336.00		0				
1336.15	0.15	3120.37	234.03	234	9	5%
1336.30	0.15	3199.42	473.98	708	26	
1336.45	0.15	3279.09	485.89	1,194	44	25%
1336.60	0.15	3359.39	497.89	1,692	63	
1336.75	0.15	3440.32	509.98	2,202	82	50%
1337.25	0.50	3714.58	1788.73	3,990	148	
1337.30	0.05	3742.39	186.42	4,177	155	100%

Project Entrada South
Basin 2

%	Required Volume
100	387
50	194
25	97
5	19

Elevation	depth	Area (sf)	Volume (CF)	total Volume (CF)	Total Volume (CY)	% of required debris
1330.00		0				
1330.60	0.60	2005.07	601.52	602	22	5%
1331.00	0.40	2115.92	824.20	1,426	53	
1331.60	0.60	2362.68	1343.58	2,769	103	25%
1332.00	0.40	2735.58	1019.65	3,789	140	
1332.50	0.50	3188.21	1480.95	5,270	195	50%
1333.00	0.50	3418.97	1651.80	6,922	256	
1334.00	1.00	3908.98	3663.98	10,586	392	100%

Project Entrada South
Basin 3

%	Required Volume
100	334
50	167
25	84
5	17

Elevation	depth	Area (sf)	Volume (CF)	total Volume (CF)	Total Volume (CY)	% of required debris
1311.00		0				
1311.25	0.25	5192.68	649.08	649	24	5%
1311.50	0.25	5381.82	1321.81	1,971	73	
1311.60	0.10	5458.24	542.00	2,513	93	25%
1312.00	0.40	5766.90	2245.03	4,758	176	50%
1312.50	0.50	6158.20	2981.28	7,739	287	
1312.75	0.25	6356.13	1564.29	9,303	345	100%

Project Entrada South
Basin 4

%	Required Volume
100	492
50	246
25	123
5	25

Elevation	depth	Area (sf)	Volume (CF)	total Volume (CF)	Total Volume (CY)	% of required debris
1277.00		0				
1277.25	0.25	3607.07	450.88	451	17	
1277.35	0.10	3666.97	363.70	815	30	5%
1277.50	0.15	3757.37	556.83	1,371	51	
1278.00	0.50	4063.36	1955.18	3,327	123	25%
1278.50	0.50	4376.57	2109.98	5,437	201	
1278.75	0.25	4535.89	1114.06	6,551	243	
1278.85	0.10	4600.13	456.80	7,007	260	50%
1279.50	0.65	5024.77	3128.09	10,136	375	
1280.00	0.50	5359.81	2596.15	12,732	472	
1280.25	0.25	5530.09	1361.24	14,093	522	100%

Project Entrada South
Basin 5

%	Required Volume
100	380
50	190
25	95
5	19

Elevation	depth	Area (sf)	Volume (CF)	total Volume (CF)	Total Volume (CY)	% of required debris
1164.50		0				
1165.00	0.50	1862.39	465.60	466	17	
1165.10	0.10	2306.78	208.46	674	25	5%
1166.00	0.90	5839.28	3665.73	4,340	161	25%
1166.20	0.20	6672.99	1251.23	5,591	207	50%
1167.00	0.80	9936.45	6643.78	12,235	453	100%

Project Entrada South
Basin 6

%	Required Volume
100	1747
50	874
25	437
5	87

Elevation	depth	Area (sf)	Volume (CF)	total Volume (CF)	Total Volume (CY)	% of required debris
1100.00		0				
1101.00	1.00	4751.25	2375.63	2,376	88	5%
1102.00	1.00	6406.87	5579.06	7,955	295	
1102.75	0.75	6805.38	4954.59	12,909	478	25%
1104.25	1.50	8653.97	11594.51	24,504	908	50%
1106.00	1.75	11008.26	17204.45	41,708	1545	
1107.00	1.00	12448.13	11728.20	53,436	1979	100%

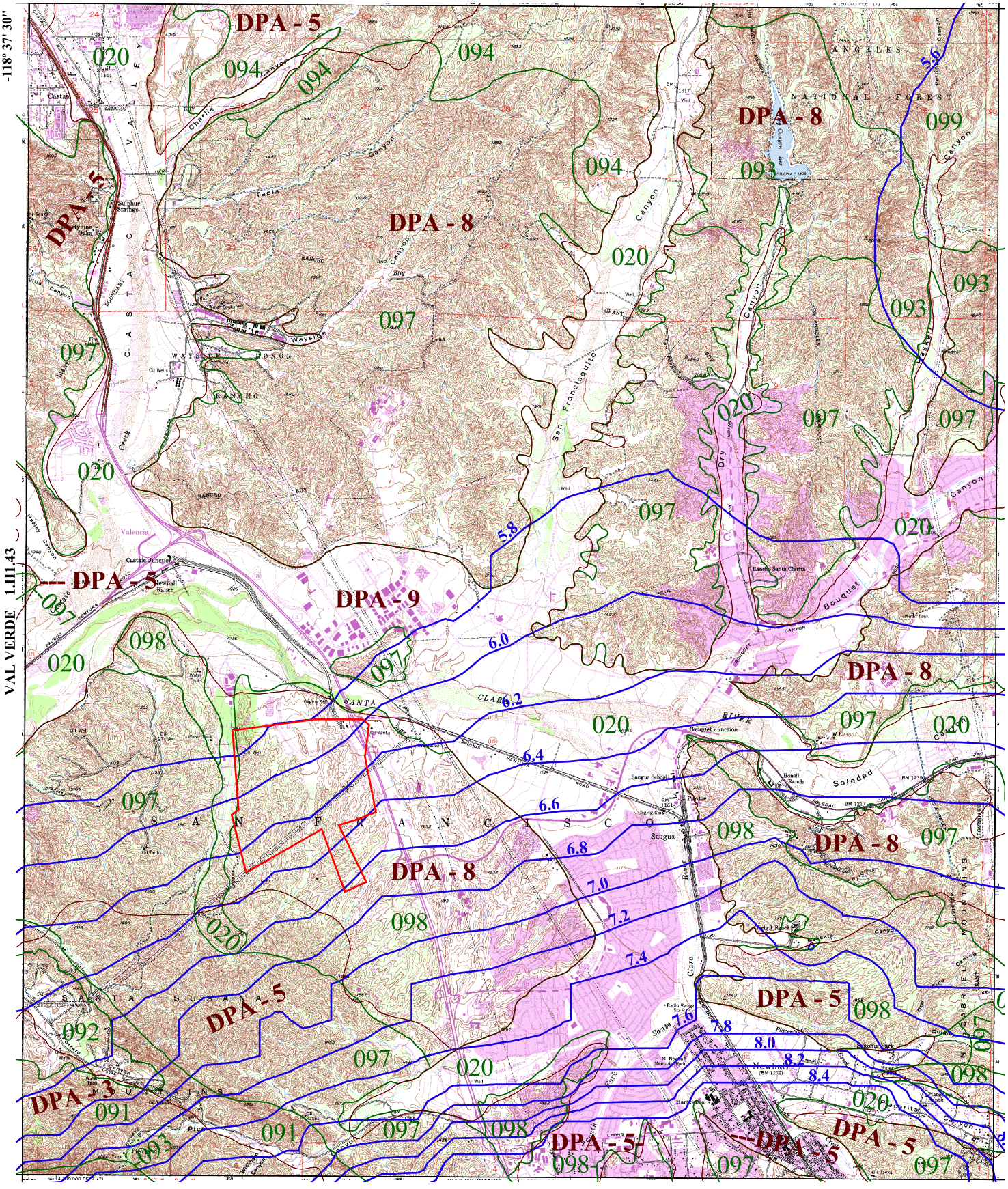
Project Entrada South
Basin 7

%	Required Volume
100	167
50	84
25	42
5	8

Elevation	depth	Area (sf)	Volume (CF)	total Volume (CF)	Total Volume (CY)	% of required debris
1246.00		0				
1246.20	0.20	2913.15	291.32	291	11	5%
1246.50	0.30	3109.73	903.43	1,195	44	25%
1246.75	0.25	3277.48	798.40	1,993	74	
1246.85	0.10	3345.59	331.15	2,324	86	50%
1247.00	0.15	3448.93	509.59	2,834	105	
1247.50	0.50	3802.34	1812.82	4,647	172	100%

Appendix C: Hydrologic References

C-1: 50-Year, 24-Hour Isohyet (LACDPW)


34° 30' 00"
WARM SPRINGS MOUNTAIN 1-H1.53
-118° 37' 30"
VAL VERDE 1.H1.43
MINT CANYON 1-H1.45
-118° 30' 00"
OAT MOUNTAIN 1-H1.35
34° 22' 30"
DPA - 5
DPA - 8
DPA - 9
DPA - 3
020
094
097
098
099
091
092
093
5.6
5.8
6.0
6.2
6.4
6.6
6.8
7.0
7.2
7.4
7.6
7.8
8.0
8.2
8.4
SAN FRANCISCO
SANTA SUSANA MOUNTAINS
CASTAIC VALLEY
ANGELES NATIONAL FOREST
Castaic Junction
Valencia
Newhall Ranch
Saugus
Bouquet Junction
Soledad
Placerita
Newhall
Sulphur Springs
Waysyde
Rancho Santa Clarita
016
SOIL CLASSIFICATION AREA
7.2
INCHES OF RAINFALL
DPA - 6
DEBRIS POTENTIAL AREA
N
S
E
W
1 0 1 2 Miles
25-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.878
10-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.714
N E W H A L L
50-YEAR 24-HOUR ISOHYET
1-H1.44
LOS ANGELES COUNTY
PUBLIC WORKS
Public Service That Works

C-2: Los Angeles County Proportion Impervious Data Table

Proportion Impervious Data

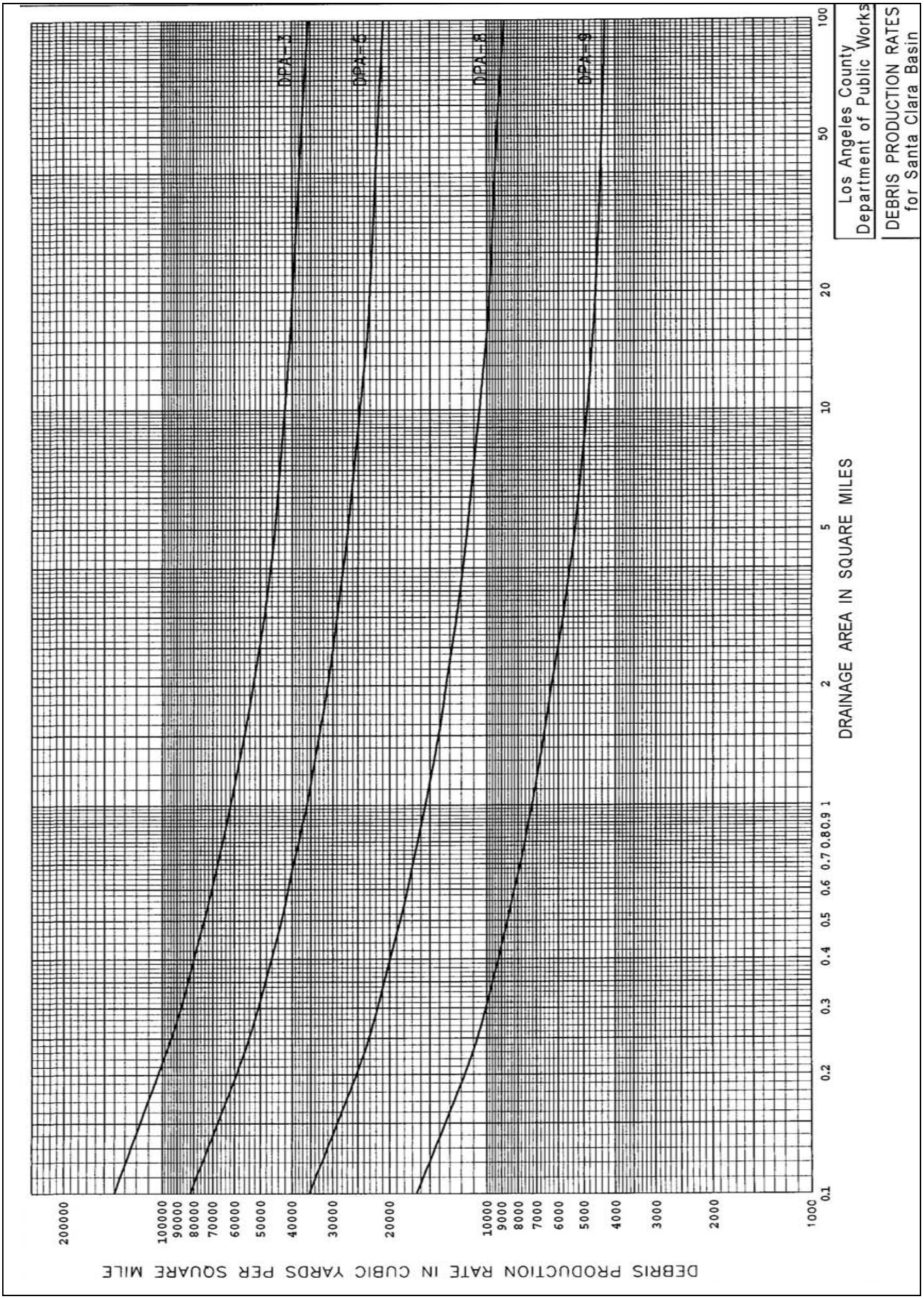
Code	Land Use Description	% Impervious
1111	High-Density Single Family Residential	42
1112	Low-Density Single Family Residential	21
1121	Mixed Multi-Family Residential	74
1122	Duplexes, Triplexes and 2-or 3-Unit Condominiums and Townhouses	55
1123	Low-Rise Apartments, Condominiums, and Townhouses	86
1124	Medium-Rise Apartments and Condominiums	86
1125	High-Rise Apartments and Condominiums	90
1131	Trailer Parks and Mobile Home Courts, High-Density	91
1132	Mobile Home Courts and Subdivisions, Low-Density	42
1140	Mixed Residential	59
1151	Rural Residential, High-Density	15
1152	Rural Residential, Low-Density	10
1211	Low- and Medium-Rise Major Office Use	91
1212	High-Rise Major Office Use	91
1213	Skyscrapers	91
1221	Regional Shopping Center	95
1222	Retail Centers (Non-Strip With Contiguous Interconnected Off-Street	96
1223	Modern Strip Development	96
1224	Older Strip Development	97
1231	Commercial Storage	90
1232	Commercial Recreation	90
1233	Hotels and Motels	96
1234	Attended Pay Public Parking Facilities	91
1241	Government Offices	91
1242	Police and Sheriff Stations	91
1243	Fire Stations	91
1244	Major Medical Health Care Facilities	74
1245	Religious Facilities	82
1246	Other Public Facilities	91
1247	Non-Attended Public Parking Facilities	91
1251	Correctional Facilities	91
1252	Special Care Facilities	74
1253	Other Special Use Facilities	86
1261	Pre-Schools/Day Care Centers	68
1262	Elementary Schools	82
1263	Junior or Intermediate High Schools	82
1264	Senior High Schools	82
1265	Colleges and Universities	47
1266	Trade Schools and Professional Training Facilities	91
1271	Base (Built-up Area)	65
1271.01	Base High-Density Single Family Residential	42
1271.02	Base Duplexes, Triplexes and 2-or 3-Unit Condominiums and T	55

Code	Land Use Description	% Impervious
1271.03	Base Government Offices	91
1271.04	Base Fire Stations	91
1271.05	Base Non-Attended Public Parking Facilities	91
1271.06	Base Air Field	45
1271.07	Base Petroleum Refining and Processing	91
1271.08	Base Mineral Extraction - Oil and Gas	10
1271.09	Base Harbor Facilities	91
1271.10	Base Navigation Aids	47
1271.11	Base Developed Local Parks and Recreation	10
1271.12	Base Vacant Undifferentiated	1
1272	Vacant Area	2
1273	Air Field	45
1274	Former Base (Built-up Area)	65
1275	Former Base Vacant Area	2
1276	Former Base Air Field	91
1311	Manufacturing, Assembly, and Industrial Services	91
1312	Motion Picture and Television Studio Lots	82
1313	Packing Houses and Grain Elevators	96
1314	Research and Development	91
1321	Manufacturing	91
1322	Petroleum Refining and Processing	91
1323	Open Storage	66
1324	Major Metal Processing	91
1325	Chemical Processing	91
1331	Mineral Extraction - Other Than Oil and Gas	10
1332	Mineral Extraction - Oil and Gas	10
1340	Wholesaling and Warehousing	91
1411	Airports	91
1411.01	Airstrip	10
1412	Railroads	15
1412.01	Railroads-Attended Pay Public Parking Facilities	91
1412.02	Railroads-Non-Attended Public Parking Facilities	91
1412.03	Railroads-Manufacturing, Assembly, and Industrial Services	91
1412.04	Railroads-Petroleum Refining and Processing	91
1412.05	Railroads-Open Storage	66
1412.06	Railroads-Truck Terminals	91
1413	Freeways and Major Roads	91
1414	Park-and-Ride Lots	91
1415	Bus Terminals and Yards	91
1416	Truck Terminals	91
1417	Harbor Facilities	91
1418	Navigation Aids	47
1420	Communication Facilities	82
1420.01	Communication Facilities-Antenna	2

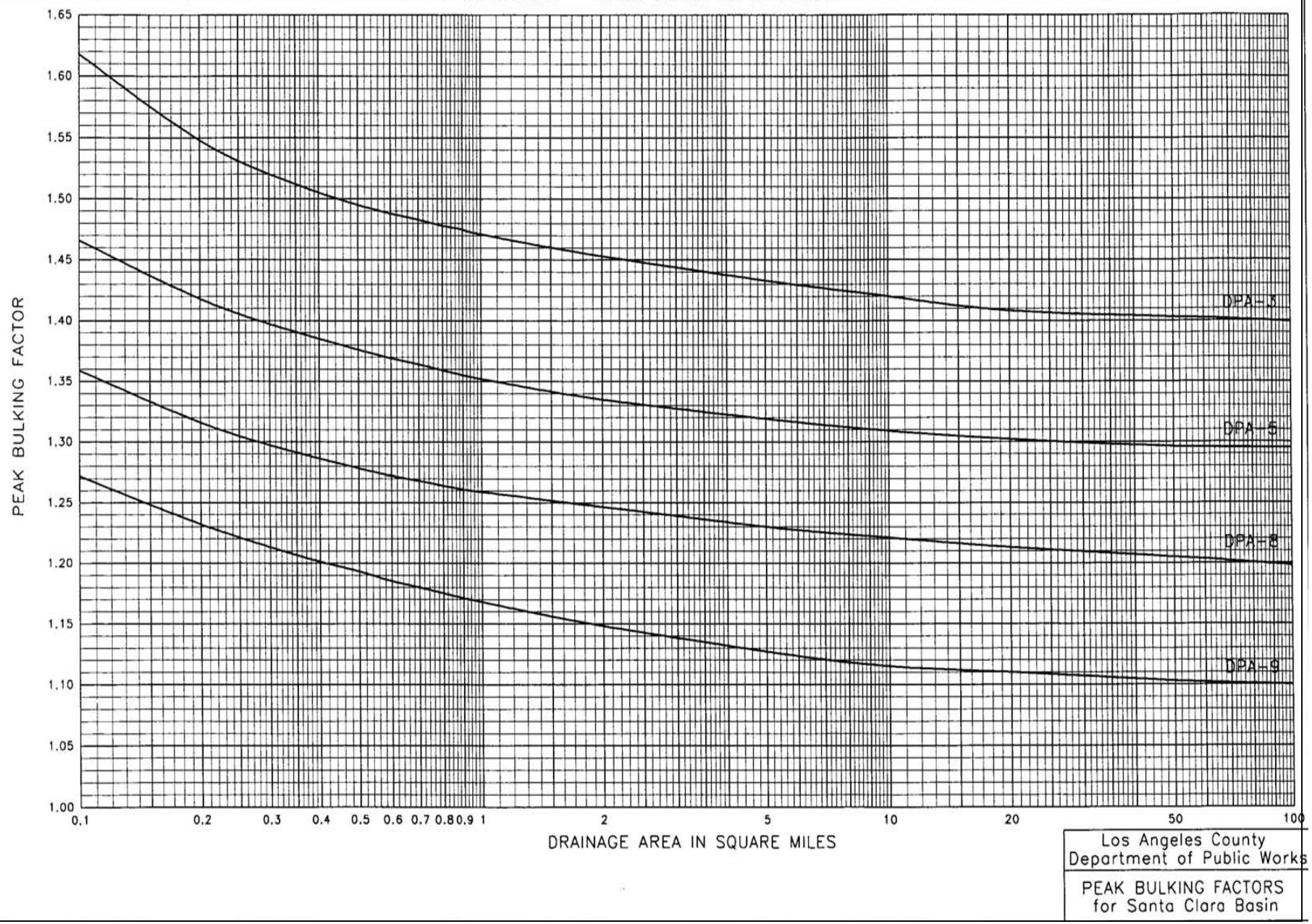
Code	Land Use Description	% Impervious
1431	Electrical Power Facilities	47
1431.01	Electrical Power Facilities-Powerlines (Urban)	2
1431.02	Electrical Power Facilities-Powerlines (Rural)	1
1432	Solid Waste Disposal Facilities	15
1433	Liquid Waste Disposal Facilities	96
1434	Water Storage Facilities	91
1435	Natural Gas and Petroleum Facilities	91
1435.01	Natural Gas and Petroleum Facilities-Manufacturing, Assembly, and In	91
1435.02	Natural Gas and Petroleum Facilities-Petroleum Refining and Processing	91
1435.03	Natural Gas and Petroleum Facilities-Mineral Extraction – Oil and Gas	10
1435.04	Natural Gas and Petroleum Facilities-Vacant Undifferentiated	1
1436	Water Transfer Facilities	96
1437	Improved Flood Waterways and Structures	100
1440	Maintenance Yards	91
1450	Mixed Transportation	90
1460	Mixed Transportation and Utility	91
1460.01	Mixed Utility and Transportation-Improved Flood Waterways and Structures	100
1460.02	Mixed Utility and Transportation-Railroads	15
1460.03	Mixed Utility and Transportation-Freeways and Major Roads	91
1500	Mixed Commercial and Industrial	91
1600	Mixed Urban	89
1700	Under Construction (Use appropriate value)	91
1810	Golf Courses	3
1821	Developed Local Parks and Recreation	10
1822	Undeveloped Local Parks and Recreation	2
1831	Developed Regional Parks and Recreation	2
1832	Undeveloped Regional Parks and Recreation	1
1840	Cemeteries	10
1850	Wildlife Preserves and Sanctuaries	2
1850.01	Wildlife-Commercial Recreation	90
1850.02	Wildlife-Other Special Use Facilities	86
1850.03	Wildlife-Developed Local Parks and Recreation	10
1860	Specimen Gardens and Arboreta	15
1870	Beach Parks	10
1880	Other Open Space and Recreation	10
2110	Irrigated Cropland and Improved Pasture Land	2
2120	Non-Irrigated Cropland and Improved Pasture Land	2
2200	Orchards and Vineyards	2
2300	Nurseries	15
2400	Dairy, Intensive Livestock, and Associated Facilities	42
2500	Poultry Operations	62
2600	Other Agriculture	42
2700	Horse Ranches	42

Code	Land Use Description	% Impervious
3100	Vacant Undifferentiated	1
3200	Abandoned Orchards and Vineyards	2
3300	Vacant With Limited Improvements (Use appropriate value)	42
3400	Beaches (Vacant)	1
4100	Water, Undifferentiated	100
4200	Harbor Water Facilities	100
4300	Marina Water Facilities	100
4400	Water Within a Military Installation	100

C-3: Los Angeles County Debris Production Rates for Santa Clara Basin


DEBRIS PRODUCTION RATE IN CUBIC YARDS PER SQUARE MILE
200000
100000
90000
80000
70000
60000
50000
40000
30000
20000
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
2
5
10
20
50
100
DRAINAGE AREA IN SQUARE MILES
DPA-3
DPA-4
DPA-5
DPA-6
Los Angeles County
Department of Public Works
DEBRIS PRODUCTION RATES
for Santa Clara Basin

C-4: Los Angeles County Peak Bulking Factors for Santa Clara Basin


PEAK BULKING FACTOR
1.65
1.60
1.55
1.50
1.45
1.40
1.35
1.30
1.25
1.20
1.15
1.10
1.05
1.00
DPA-3
DPA-5
DPA-8
DPA-9
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
2
5
10
20
50
100
DRAINAGE AREA IN SQUARE MILES
Los Angeles County
Department of Public Works
PEAK BULKING FACTORS
for Santa Clara Basin

Appendix D: Reference Plans

D-1: Drainage Concept Hydrology Study LID/SUSMP Report
Job No. 0930, By Alliance Land Planning & Engineering, Inc.
Date:12/2010

DRAINAGE CONCEPT
HYDROLOGY STUDY
LID/SUSMP REPORT

County of Los Angeles

Entrada
Tentative Tract No. 53295
Job No. 0930

DRAINAGE CONCEPT/HYDROLOGY STUDY/SUSMP/LID PLAN

APPROVED FOR AREA AND Q ONLY

APPROVED BY: Lizbeth Calderon RCE NO C68828 DATE: 1/27/2011

CHECKED BY: _____ DATE: 1-27-11

LAND DEVELOPMENT DIVISION
LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

Prepared For:
Newhall Land & Farming, Co.
25124 Springfield Ct. Suite 300
Valencia, CA 91355

REGISTERED PROFESSIONAL ENGINEER
CRAIG M. WHITTENEY
C 53929
6-30-12
STATE OF CALIF

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

DECEMBER 2010

DRAINAGE CONCEPT
HYDROLOGY STUDY
LID/SUSMP REPORT

County of Los Angeles

Entrada
Tentative Tract No. 53295
Job No. 0930

Prepared For:
Newhall Land & Farming, Co.
25124 Springfield Ct. Suite 300
Valencia, CA 91355



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

DECEMBER 2010

HYDROLOGY DESIGN CRITERIA

- Storm Event= 25-yr, 50-yr (sump)
- 50-year, 24-hour rainfall depth varies from 6.2" to 5.8"
- Soil Classification Area = 098 and 097
- Debris Production Area = 5 and 8

Time of concentration calculated using County of Los Angeles "T_c" Software. For sub-areas shown with T_c greater than 5 min.

Flow rates calculated using modified rational method (depth method); County of Los Angeles Hydrology software.

Project Overview

The proposed project, Entrada VTTM No. 53295, is a 389 acre portion of the Newhall Ranch Master Plan Development. Entrada consists of many different land uses; commercial, office, park & school sites, condominiums and single family lots. Also part of the Entrada project is the extension of Magic Mountain Parkway from The Old Road to the western project boundary, and a 2,000 ft. extension of Westridge Parkway.

Post-development storm flows from the project site will be consistent with the pre-development flow patterns. All natural areas will pass through debris basins prior to entering the proposed drainage system, to remove all debris. All onsite drainage facilities will be designed and constructed to accommodate upstream areas. There is no flooding anticipated upstream or downstream as a result of the project.

Anticipated runoff pollutants from the project site are consistent with these typically found with single family, condominium and commercial/office developments, oil/grease, sediments, nutrients, metals, trash/debris, organics and bacteria. To mitigate the projects water quality impacts the project will be subject to section 402(P) of the FCWA (Federal Clean Water Act), which governs storm water discharges under the NPDES (National Pollutant Discharge Elimination System) Program. The NPDES Program requires all flood control facilities be in compliance with the Los Angeles County General Permit or under conditions placed upon individual NPDES Permits. All project development will be required to comply with applicable NPDES requirements that are in effect at the time improvements are designed.

There are no adverse post-development conditions anticipated for significant flooding, erosion, sedimentation/debris, nor negative water quality impacts.

ENTRADA SOUTH

DRAINAGE CONCEPT REPORT

EXISTING CONDITION

Program Package Serial Number: 2084
01/08/10 FILE: 201E-A INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 1
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\lasoilx.dat

TENT. TRACT 53295 DRAINAGE CONCEPT - EXIST. CONDITION - BASIN A

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
201	1A	17.7	46.07	17.7	46.07	2	1300.	.08000	.00	.00	0.	298	9	A32	.10
201	2A	33.1	72.06	50.8	114.87	4	100.	.01000	3.75	.00	0.	298	12	A31	.01

BULKING CALCULATION

SAMPLE CALCULATION

Q_{BB} - Q BURNED BULKED Q_B - Q BURNED

DPA B - BULKING FACTOR = 1.36

$Q_{BB} = Q_B \times$ BULKING FACTOR

AREA 1A

Q_B = 46.07 cfs DPA 8 Q_{BB} = 62.66 cfs ADD 16.59 cfs TO All DOWNSTREAM

AREA 2A

Q_B = 72.06 cfs DPA 8 Q_{BB} = 98.00 cfs ADD 25.94 cfs TO All Downstream

Program Package Serial Number: 2084
01/08/10 FILE: 201E-A INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 2
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:
HYDROGRAPH AT POINT 2A
HYDROGRAPH AT 201 2A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.60	100	2.46	200	2.53	300	2.63	400	2.78
500	2.96	600	3.18	700	3.46	800	3.85	900	4.69
1000	7.16	1050	10.48	1100	15.37	1110	19.88	1120	24.17
1130	29.24	1131	30.01	1132	30.61	1133	31.21	1134	31.98
1135	32.61	1136	33.29	1137	34.32	1138	35.37	1139	36.47
1140	37.83	1141	39.55	1142	41.27	1143	42.92	1144	44.63
1145	47.00	1146	49.40	1147	52.00	1148	54.77	1149	62.84
1150	71.31	1151	80.83	1152	91.61	1153	102.69	1154	108.57
1155	112.68	1156	114.87	1157	114.00	1158	111.66	1159	108.26
1160	103.07	1161	91.04	1162	78.37	1163	65.69	1164	52.73
1165	40.61	1166	35.20	1167	31.32	1168	28.27	1169	26.03
1170	24.20	1171	22.67	1172	21.24	1173	20.07	1174	18.97
1175	18.09	1176	17.28	1177	16.65	1178	15.92	1179	15.37
1180	14.82	1181	14.17	1182	13.85	1183	13.39	1184	12.93
1185	12.48	1186	12.32	1187	11.89	1188	11.62	1189	11.21
1190	10.94	1191	10.69	1192	10.44	1193	10.20	1194	9.97
1195	9.74	1196	9.52	1197	9.44	1198	9.06	1199	8.84
1200	8.77	1201	8.56	1202	8.33	1203	8.11	1204	8.03
1205	7.97	1206	7.76	1207	7.57	1208	7.51	1209	7.16
1210	7.10	1211	7.04	1212	6.84	1213	6.79	1214	6.59
1215	6.55	1216	6.36	1217	6.17	1218	6.14	1219	5.97
1220	5.95	1221	5.93	1222	5.89	1223	5.72	1224	5.69
1225	5.50	1226	5.46	1227	5.42	1228	5.23	1229	5.18
1230	5.14	1231	5.12	1232	4.94	1233	4.91	1234	4.75
1235	4.72	1236	4.54	1237	4.52	1238	4.50	1239	4.42
1240	4.39	1241	4.37	1242	4.29	1243	4.27	1244	4.25
1245	4.23	1246	4.21	1247	4.19	1248	4.17	1249	4.15
1250	4.09	1251	4.07	1252	4.06	1253	4.05	1254	3.99
1255	3.98	1256	3.98	1257	3.92	1258	3.90	1259	3.89
1260	3.84	1261	3.83	1262	3.87	1263	3.81	1264	3.80
1265	3.74	1266	3.79	1267	3.73	1268	3.73	1269	3.72
1270	3.71	1271	3.65	1272	3.70	1273	3.64	1274	3.63
1275	3.62	1276	3.57	1277	3.61	1278	3.55	1279	3.55
1280	3.54	1281	3.54	1282	3.48	1283	3.53	1284	3.47
1285	3.46	1286	3.46	1287	3.46	1288	3.46	1289	3.40
1290	3.45	1291	3.44	1292	3.39	1293	3.38	1294	3.37
1295	3.37	1296	3.36	1297	3.35	1298	3.30	1299	3.29
1300	3.28	1310	3.20	1320	3.12	1330	3.03	1340	2.92
1350	2.87	1360	2.80	1370	2.72	1380	2.69	1390	2.61
1400	2.58	1420	2.50	1440	2.44	1460	1.00	1500	1.00

TOTAL VOLUME THIS HYDROGRAPH = 11.98(Ac.Ft)

Basin A

Subarea	Area (Ac)	%imp	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in)	Tc-calculated (min)	Intensity (in/hr)	Cu	Cd
1A	17.7	0.10	98	1550	0.130	6.20	9	2.81	0.83	0.84
2A	33.1	0.01	98	2000	0.070	6.10	12	2.41	0.81	0.81

Program Package Serial Number: 2084
01/08/10 FILE: 201E-B INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 1
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\lasoilx.dat

TENT. TRACT 53295 DRAINAGE CONCEPT - EXIST. CONDITION - BASIN B

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
201	1A	10.6	24.12	10.6	24.12	4	60.	.04000	2.00	.00	0.	298	11	A31	.01
201	2A	.0	.00	10.6	24.12	4	1.	.01000	2.00	.00	0.	298	99	A31	.01

BULKING CALCULATION

SAMPLE CALCULATION

Q_{BB} - Q BURNED BULKED Q_B - Q BURNED

DRAINAGE AREA 8 - BULKING FACTOR = 1.36

$Q_{BB} = Q_B \times$ BULKING FACTOR

AREA 1A

Q_B = 24.12 CFS DRAINAGE AREA 8 Q_{BB} = 32.80 CFS ADD 8.68 cfs TO ALL DOWNSTREAM

Program Package Serial Number: 2084
01/08/10 FILE: 201E-B INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 2
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:
HYDROGRAPH AT POINT 2A
HYDROGRAPH AT 201 2A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	1.00	200	1.00	300	1.00	400	1.00
500	1.00	600	1.00	700	1.00	800	1.00	900	1.00
1000	1.42	1050	2.13	1100	3.13	1110	4.25	1120	5.05
1130	6.14	1131	6.35	1132	6.40	1133	6.52	1134	6.72
1135	6.87	1136	7.02	1137	7.26	1138	7.52	1139	7.78
1140	8.08	1141	8.49	1142	8.85	1143	9.27	1144	9.59
1145	10.08	1146	10.77	1147	11.38	1148	11.91	1149	14.05
1150	16.69	1151	18.94	1152	21.35	1153	23.57	1154	24.12
1155	24.11	1156	23.75	1157	23.06	1158	22.36	1159	21.61
1160	19.18	1161	16.24	1162	13.57	1163	10.65	1164	7.85
1165	6.50	1166	6.02	1167	5.34	1168	5.01	1169	4.66
1170	4.39	1171	4.11	1172	3.92	1173	3.72	1174	3.53
1175	3.38	1176	3.25	1177	3.11	1178	3.03	1179	2.91
1180	2.82	1181	2.71	1182	2.61	1183	2.54	1184	2.46
1185	2.39	1186	2.35	1187	2.29	1188	2.20	1189	2.13
1190	2.09	1191	2.03	1192	2.02	1193	1.95	1194	1.88
1195	1.87	1196	1.83	1197	1.78	1198	1.73	1199	1.68
1200	1.66	1201	1.63	1202	1.57	1203	1.52	1204	1.55
1205	1.53	1206	1.46	1207	1.46	1208	1.42	1209	1.37
1210	1.36	1211	1.32	1212	1.30	1213	1.31	1214	1.27
1215	1.21	1216	1.20	1217	1.17	1218	1.15	1219	1.12
1220	1.13	1221	1.12	1222	1.09	1223	1.07	1224	1.04
1225	1.05	1226	1.01	1227	1.00	1228	1.00	1229	1.00
1230	1.00	1231	1.00	1232	1.00	1233	1.00	1234	1.00
1235	1.00	1236	1.00	1237	1.00	1238	1.00	1239	1.00
1240	1.00	1241	1.00	1242	1.00	1243	1.00	1244	1.00
1245	1.00	1246	1.00	1247	1.00	1248	1.00	1249	1.00
1250	1.00	1251	1.00	1252	1.00	1253	1.00	1254	1.00
1255	1.00	1256	1.00	1257	1.00	1258	1.00	1259	1.00
1260	1.00	1261	1.00	1262	1.00	1263	1.00	1264	1.00
1265	1.00	1266	1.00	1267	1.00	1268	1.00	1269	1.00
1270	1.00	1271	1.00	1272	1.00	1273	1.00	1274	1.00
1275	1.00	1276	1.00	1277	1.00	1278	1.00	1279	1.00
1280	1.00	1281	1.00	1282	1.00	1283	1.00	1284	1.00
1285	1.00	1286	1.00	1287	1.00	1288	1.00	1289	1.00
1290	1.00	1291	1.00	1292	1.00	1293	1.00	1294	1.00
1295	1.00	1296	1.00	1297	1.00	1298	1.00	1299	1.00
1300	1.00	1310	1.00	1320	1.00	1330	1.00	1340	1.00
1350	1.00	1360	1.00	1370	1.00	1380	1.00	1390	1.00
1400	1.00	1420	1.00	1440	1.00	1460	1.00	1500	1.00

TOTAL VOLUME THIS HYDROGRAPH = 3.03(Ac.Ft)

Basin B

Subarea	Area (Ac)	%imp	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in)	Tc-calculated (min)	Intensity (in/hr)	Cu	Cd
1A	10.6	0.01	98	1700	0.100	6.0	11	2.47	0.82	0.82

Program Package Serial Number: 2084
05/04/10 FILE: 201E-C INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 1
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\lasoilx.dat

TENT. TRACT 53295 DRAINAGE CONCEPT - EXIST. CONDITION - BASIN C STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
201	1A	214.4	649.00	214.4	649.00	2	1780.	.05000	.00	.00	0.	98	0	A32	.00
201	2A	33.2	84.00	247.6	692.40	2	600.	.05000	.00	.00	0.	98	0	A32	.00
201	3A	30.2	57.14	277.8	744.80	2	400.	.05000	.00	.00	0.	298	17	A32	.10
201	4A	7.1	21.79	284.9	746.24	2	1300.	.03000	.00	.00	0.	298	6	A31	.01
201	5A	17.9	42.96	302.8	757.11	2	160.	.02000	.00	.00	0.	298	10	A31	.01
201	6B	15.9	36.20	15.9	36.20	2	220.	.07000	.00	.00	0.	298	11	A31	.10
201	7B	10.7	28.41	26.6	64.25	2	1200.	.05000	.00	.00	0.	298	8	A31	.01
201	8B	16.9	40.56	43.5	99.30	2	530.	.05000	.00	.00	0.	298	10	A31	.01

CONFLUENCE Q'S

201 9A TA 1160 QA 753.19 QAB 845.86 QB 92.67 201 9B TB 1158 QB 98.58 QBA 797.95 QA 699.37

201 9AB TAB 1160 QAB 845.86 QA 753.19 QB 92.67

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
201	9AB	43.5	98.58	346.3	845.86	2	1100.	.05000	.00	.00	0.	298	0	A31	.00
201	10A	29.4	73.89	375.7	869.57	4	100.	.01000	7.75	.00	0.	298	9	A31	.01

BULKING CALCULATION

SAMPLE CALCULATION

Q_{BB} - Q BURNED BULKED Q_B - Q BURNED

DPA 8 - BULKING FACTOR = 1.36

$Q_{BB} = Q_B \times$ BULKING FACTOR

AREA 4A

Q_B = 21.79 cfs DPA 8 Q_{BB} = 29.63 cfs ADD 7.84 cfs TO All DOWNSTREAM

AREA 5A

Q_B = 42.96 cfs DPA 8 Q_{BB} = 58.43 cfs ADD 15.47 cfs TO All Downstream

AREA 6B

Q_B = 36.20 cfs DPA 8 Q_{BB} = 49.23 cfs ADD 13.03 cfs TO All Downstream

EA 7B

Q_B = 28.41 cfs DPA 8 Q_{BB} = 38.64 cfs ADD 10.23 cfs TO All Downstream

AREA 8B

Q_B = 40.56 cfs DPA 8 Q_{BB} = 55.16 cfs ADD 14.60 cfs TO All DOWNSTREAM

AREA 10A

Q_B = 73.89 cfs DPA 8 Q_{BB} = 100.47 cfs ADD 26.60 cfs TO All Downstream

Program Package Serial Number: 2084
05/04/10 FILE: 201E-C INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 2
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:
HYDROGRAPH AT POINT 10A
HYDROGRAPH AT 201 10A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.60	100	32.22	200	34.02	300	35.67	400	37.51
500	40.29	600	43.28	700	47.33	800	51.88	900	59.72
1000	77.52	1050	98.39	1100	132.72	1110	149.91	1120	177.12
1130	212.07	1131	215.62	1132	219.01	1133	222.77	1134	226.63
1135	230.40	1136	234.37	1137	238.94	1138	243.77	1139	249.01
1140	254.69	1141	261.61	1142	268.91	1143	277.07	1144	286.10
1145	297.03	1146	308.54	1147	320.79	1148	333.95	1149	354.62
1150	377.26	1151	403.85	1152	435.51	1153	473.33	1154	510.81
1155	555.96	1156	612.43	1157	682.35	1158	755.70	1159	824.75
1160	867.47	1161	869.57	1162	833.34	1163	775.83	1164	704.61
1165	630.44	1166	560.75	1167	498.62	1168	444.48	1169	398.14
1170	358.49	1171	324.90	1172	296.03	1173	271.49	1174	250.24
1175	232.27	1176	217.13	1177	204.65	1178	193.85	1179	184.50
1180	176.16	1181	168.96	1182	162.65	1183	157.02	1184	151.59
1185	146.86	1186	142.69	1187	138.75	1188	135.04	1189	131.58
1190	128.61	1191	125.65	1192	122.81	1193	120.09	1194	117.64
1195	115.10	1196	112.68	1197	110.57	1198	108.37	1199	106.25
1200	104.39	1201	102.46	1202	100.85	1203	99.20	1204	97.84
1205	96.60	1206	95.23	1207	93.96	1208	92.64	1209	90.93
1210	89.60	1211	88.32	1212	87.11	1213	85.81	1214	84.58
1215	83.56	1216	82.55	1217	81.38	1218	80.59	1219	79.45
1220	78.47	1221	77.34	1222	76.45	1223	75.60	1224	74.79
1225	73.86	1226	73.20	1227	72.61	1228	72.07	1229	71.40
1230	71.09	1231	70.42	1232	69.90	1233	69.18	1234	68.58
1235	67.95	1236	67.16	1237	66.45	1238	65.70	1239	64.86
1240	64.12	1241	63.44	1242	62.84	1243	62.32	1244	61.87
1245	61.46	1246	61.06	1247	60.66	1248	60.27	1249	59.89
1250	59.46	1251	59.13	1252	58.82	1253	58.52	1254	58.18
1255	57.91	1256	57.62	1257	57.26	1258	56.94	1259	56.67
1260	56.28	1261	55.98	1262	55.71	1263	55.48	1264	55.28
1265	55.04	1266	54.93	1267	54.68	1268	54.46	1269	54.22
1270	53.96	1271	53.62	1272	53.39	1273	53.01	1274	52.73
1275	52.32	1276	51.97	1277	51.65	1278	51.36	1279	51.02
1280	50.82	1281	50.50	1282	50.26	1283	50.03	1284	49.80
1285	49.60	1286	49.42	1287	49.25	1288	49.10	1289	48.89
1290	48.79	1291	48.62	1292	48.40	1293	48.24	1294	48.10
1295	47.97	1296	47.85	1297	47.75	1298	47.65	1299	47.47
1300	47.33	1310	45.67	1320	44.41	1330	43.42	1340	42.17
1350	40.87	1360	39.32	1370	38.14	1380	37.51	1390	36.88
1400	36.20	1420	34.81	1440	33.93	1460	31.27	1500	30.92

TOTAL VOLUME THIS HYDROGRAPH = 129.15(Ac.Ft)

```
7   201    1A   214.4 411155    649.200  4
8  5   0.       0. 100.      24. 200.      25. 300.      26. 400.      28.
8 10 500.      29. 600.      32. 700.      35. 800.      38. 900.      44.
8 151000.      55.1050.      68.1100.      89.1110.     107.1120.     127.
8 201130.     145.1131.     147.1132.     150.1133.     154.1134.     158.
8 251135.     163.1136.     169.1137.     175.1138.     180.1139.     186.
8 301140.     192.1141.     197.1142.     204.1143.     212.1144.     220.
8 351145.     229.1146.     241.1147.     257.1148.     273.1149.     295.
8 401150.     341.1151.     414.1152.     497.1153.     578.1154.     641.
8 451155.     649.1156.     594.1157.     509.1158.     419.1159.     330.
8 501160.     259.1161.     213.1162.     185.1163.     167.1164.     152.
8 551165.     142.1166.     133.1167.     126.1168.     119.1169.     114.
8 601170.     109.1171.     105.1172.     101.1173.      98.1174.      95.
8 651175.      93.1176.      90.1177.      88.1178.      86.1179.      84.
8 701180.      82.1181.      80.1182.      78.1183.      77.1184.      76.
8 751185.      74.1186.      73.1187.      71.1188.      70.1189.      69.
8 801190.      68.1191.      67.1192.      67.1193.      66.1194.      65.
8 851195.      64.1196.      63.1197.      62.1198.      61.1199.      60.
8 901200.      59.1201.      59.1202.      58.1203.      58.1204.      57.
8 951205.      56.1206.      55.1207.      55.1208.      54.1209.      54.
81001210.      53.1211.      52.1212.      52.1213.      51.1214.      51.
81051215.      51.1216.      51.1217.      51.1218.      51.1219.      50.
81101220.      50.1221.      49.1222.      48.1223.      48.1224.      47.
81151225.      47.1226.      46.1227.      46.1228.      45.1229.      45.
81201230.      45.1231.      45.1232.      45.1233.      45.1234.      44.
81251235.      44.1236.      43.1237.      43.1238.      43.1239.      42.
81301240.      42.1241.      43.1242.      42.1243.      42.1244.      42.
81351245.      41.1246.      41.1247.      40.1248.      40.1249.      40.
81401250.      40.1251.      40.1252.      40.1253.      40.1254.      40.
81451255.      40.1256.      39.1257.      39.1258.      38.1259.      38.
81501260.      38.1261.      38.1262.      38.1263.      38.1264.      38.
81551265.      37.1266.      37.1267.      37.1268.      37.1269.      37.
81601270.      36.1271.      36.1272.      36.1273.      36.1274.      36.
81651275.      36.1276.      36.1277.      36.1278.      35.1279.      35.
81701280.      35.1281.      35.1282.      35.1283.      35.1284.      35.
81751285.      35.1286.      35.1287.      35.1288.      34.1289.      34.
81801290.      34.1291.      33.1292.      33.1293.      33.1294.      33.
81851295.      33.1296.      33.1297.      33.1298.      33.1299.      33.
81901300.      33.1310.      32.1320.      31.1330.      30.1340.      29.
81951350.      28.1360.      28.1370.      27.1380.      27.1390.      26.
82001400.      25.1420.      25.1440.      24.1460.      24.1500.      24.
7   201    2A    33.2 411155     84.200  4
8  5   0.       0. 100.       2. 200.       3. 300.       3. 400.       3.
8 10 500.       4. 600.       4. 700.       4. 800.       5. 900.       5.
8 151000.       7.1050.       9.1100.      12.1110.      14.1120.      17.
8 201130.      19.1131.      20.1132.      20.1133.      21.1134.      21.
8 251135.      22.1136.      23.1137.      23.1138.      24.1139.      25.
8 301140.      26.1141.      27.1142.      28.1143.      29.1144.      30.
8 351145.      31.1146.      33.1147.      35.1148.      37.1149.      41.
8 401150.      48.1151.      56.1152.      65.1153.      76.1154.      83.
8 451155.      84.1156.      81.1157.      74.1158.      64.1159.      53.
8 501160.      44.1161.      37.1162.      32.1163.      27.1164.      24.
8 551165.      21.1166.      20.1167.      18.1168.      17.1169.      16.
8 601170.      15.1171.      15.1172.      14.1173.      14.1174.      13.
8 651175.      13.1176.      12.1177.      12.1178.      12.1179.      11.
8 701180.      11.1181.      11.1182.      10.1183.      10.1184.      10.
8 751185.      10.1186.      10.1187.       9.1188.       9.1189.       9.
8 801190.       9.1191.       9.1192.       9.1193.       8.1194.       8.
8 851195.       8.1196.       8.1197.       8.1198.       8.1199.       8.
8 901200.       8.1201.       7.1202.       7.1203.       7.1204.       7.
8 951205.       7.1206.       7.1207.       7.1208.       7.1209.       7.
81001210.       7.1211.       7.1212.       7.1213.       6.1214.       6.
81051215.       6.1216.       6.1217.       6.1218.       6.1219.       6.
81101220.       6.1221.       6.1222.       6.1223.       6.1224.       6.
81151225.       6.1226.       6.1227.       6.1228.       6.1229.       6.
81201230.       6.1231.       5.1232.       5.1233.       5.1234.       5.
81251235.       5.1236.       5.1237.       5.1238.       5.1239.       5.
81301240.       5.1241.       5.1242.       5.1243.       5.1244.       5.
81351245.       5.1246.       5.1247.       5.1248.       5.1249.       5.
81401250.       5.1251.       5.1252.       5.1253.       5.1254.       5.
81451255.       5.1256.       5.1257.       5.1258.       5.1259.       5.
81501260.       5.1261.       5.1262.       5.1263.       5.1264.       5.
81551265.       5.1266.       4.1267.       4.1268.       4.1269.       4.
81601270.       4.1271.       4.1272.       4.1273.       4.1274.       4.
81651275.       4.1276.       4.1277.       4.1278.       4.1279.       4.
81701280.       4.1281.       4.1282.       4.1283.       4.1284.       4.
81751285.       4.1286.       4.1287.       4.1288.       4.1289.       4.
81801290.       4.1291.       4.1292.       4.1293.       4.1294.       4.
81851295.       4.1296.       4.1297.       4.1298.       4.1299.       4.
81901300.       4.1310.       4.1320.       4.1330.       4.1340.       4.
81951350.       3.1360.       3.1370.       3.1380.       3.1390.       3.
82001400.       3.1420.       3.1440.       3.1460.       2.1500.       2.
```

Basin C

Subarea	Area (Ac)	%imp	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in)	Tc-calculated (min)	Intensity (in/hr)	Cu	Cd
3A	30.0	0.10	98	3160	0.050	6.40	17	2.15	0.80	0.81
4A	7.1	0.01	98	660	0.100	6.2	6	3.40	0.85	0.85
5A	17.9	0.01	98	1300	0.050	6.20	10	2.67	0.82	0.82
6B	15.9	0.10	98	1580	0.063	6.20	11	2.55	0.82	0.83
7B	10.7	0.01	98	980	0.065	6.20	8	2.97	0.84	0.84
8B	16.9	0.01	98	1300	0.050	6.10	10	2.63	0.82	0.82
10A	29.4	0.01	98	1140	0.050	6.10	9	2.76	0.83	0.83

Program Package Serial Number: 2084
01/17/08 FILE: 201E-D INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 1
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\lasoilx.dat

TENT. TRACT 53295 DRAINAGE CONCEPT - EXIST. CONDITION - BASIN D

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM RAIN ZONE	DAY 4 PCT IMPV
201	1A	20.0	43.54	20.0	43.54	4	100.	.01000	2.50	.00	0.	298	12	A31	.01
201	2A	.0	.00	20.0	43.46	4	1.	.01000	2.50	.00	0.	294	99	A31	.00

BURNED CALCULATION

SAMPLE CALCULATION

Q_{BB} - Q BURNED BULKED Q_B - Q BURNED

DPA B - BULKING FACTOR = 1.36

$Q_{BB} = Q_B \times$ BULKING FACTOR

AREA 1A

Q_B: 43.54 CFS DPA 8 Q_{BB} = 59.21 CFS ADD 15.67 cfs TO All DOWNSTREAM

Program Package Serial Number: 2084
01/17/08 FILE: 201E-D INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 2
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:

HYDROGRAPH AT POINT
HYDROGRAPH AT 201 2A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	1.00	200	1.00	300	1.00	400	1.02
500	1.09	600	1.17	700	1.27	800	1.42	900	1.71
1000	2.68	1050	4.01	1100	5.91	1110	7.78	1120	9.40
1130	11.37	1131	11.71	1132	11.97	1133	12.23	1134	12.54
1135	12.83	1136	13.08	1137	13.46	1138	13.91	1139	14.36
1140	14.87	1141	15.54	1142	16.29	1143	16.98	1144	17.66
1145	18.59	1146	19.68	1147	20.73	1148	21.80	1149	24.98
1150	29.48	1151	33.54	1152	37.69	1153	41.54	1154	43.41
1155	43.46	1156	43.34	1157	42.62	1158	41.31	1159	40.00
1160	38.68	1161	35.00	1162	29.77	1163	25.03	1164	20.03
1165	15.11	1166	12.27	1167	11.15	1168	10.04	1169	9.32
1170	8.71	1171	8.20	1172	7.73	1173	7.31	1174	6.93
1175	6.61	1176	6.32	1177	6.09	1178	5.86	1179	5.65
1180	5.47	1181	5.24	1182	5.07	1183	4.94	1184	4.76
1185	4.59	1186	4.50	1187	4.41	1188	4.28	1189	4.14
1190	4.01	1191	3.93	1192	3.84	1193	3.75	1194	3.66
1195	3.57	1196	3.48	1197	3.44	1198	3.35	1199	3.21
1200	3.17	1201	3.13	1202	3.04	1203	2.95	1204	2.91
1205	2.91	1206	2.86	1207	2.77	1208	2.73	1209	2.64
1210	2.55	1211	2.55	1212	2.51	1213	2.46	1214	2.42
1215	2.38	1216	2.33	1217	2.24	1218	2.20	1219	2.15
1220	2.11	1221	2.11	1222	2.11	1223	2.07	1224	2.02
1225	1.98	1226	1.93	1227	1.93	1228	1.89	1229	1.84
1230	1.84	1231	1.84	1232	1.80	1233	1.75	1234	1.71
1235	1.67	1236	1.62	1237	1.58	1238	1.57	1239	1.56
1240	1.54	1241	1.54	1242	1.53	1243	1.51	1244	1.51
1245	1.51	1246	1.51	1247	1.51	1248	1.51	1249	1.51
1250	1.50	1251	1.48	1252	1.48	1253	1.48	1254	1.47
1255	1.45	1256	1.45	1257	1.44	1258	1.42	1259	1.42
1260	1.40	1261	1.39	1262	1.40	1263	1.40	1264	1.39
1265	1.37	1266	1.37	1267	1.37	1268	1.36	1269	1.35
1270	1.35	1271	1.34	1272	1.34	1273	1.34	1274	1.32
1275	1.32	1276	1.31	1277	1.31	1278	1.31	1279	1.29
1280	1.29	1281	1.29	1282	1.28	1283	1.27	1284	1.28
1285	1.26	1286	1.26	1287	1.26	1288	1.26	1289	1.25
1290	1.24	1291	1.26	1292	1.25	1293	1.23	1294	1.23
1295	1.23	1296	1.23	1297	1.23	1298	1.21	1299	1.20
1300	1.20	1310	1.17	1320	1.14	1330	1.11	1340	1.07
1350	1.06	1360	1.03	1370	1.00	1380	1.00	1390	1.00
1400	1.00	1420	1.00	1440	1.00	1460	1.00	1500	1.00

TOTAL VOLUME THIS HYDROGRAPH = 4.57(Ac.Ft)

Basin D

Subarea	Area (Ac)	%imp	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in)	Tc-calculated (min)	Intensity (in/hr)	Cu	Cd
1A	20	0.01	98	1800	0.072	6.10	12	2.41	0.81	0.81

Program Package Serial Number: 2084
01/07/10 FILE: 201E-E INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 1
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\lasoilx.dat

TENT. TRACT 53295 DRAINAGE CONCEPT - EXIST. CONDITION - BASIN E

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM RAIN ZONE	DAY 4 PCT IMPV
201	1A	12.7	37.15	12.7	37.15	2	1700.	.07000	.00	.00	0.	298	7	A32	.10
201	2A	39.1	92.29	51.8	121.23	2	2100.	.04500	.00	.00	0.	298	11	A32	.01
201	3A	49.8	97.02	101.6	204.71	4	100.	.01000	4.50	.00	0.	298	15	A31	.01

BULKING CALCULATION

SAMPLE CALCULATION

Q_{BB} - Q BURNED BULKED Q_B - Q BURNED

DPA 8 - BULKING FACTOR = 1.36

$Q_{BB} = Q_B \times$ BULKING FACTOR

AREA 1A

$Q_B = 37.15$ cfs DPA 8 $Q_{BB} = 50.52$ cfs ADD 13.37 cfs TO All DOWNSTREAM

AREA 2A

$Q_B = 92.29$ cfs DPA 8 $Q_{BB} = 125.51$ cfs ADD 33.22 cfs TO All Downstream

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AREA 3A

$Q_B = 97.02$ cfs DPA 8 $Q_{BB} = 131.95$ cfs ADD 34.93 cfs TO All Downstream

Program Package Serial Number: 2084
01/07/10 FILE: 201E-E INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 2
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:
HYDROGRAPH AT POINT 3A
HYDROGRAPH AT 201 3A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.60	100	4.97	200	5.14	300	5.35	400	5.60
500	5.89	600	6.26	700	6.72	800	7.41	900	9.08
1000	13.92	1050	20.26	1100	29.97	1110	36.31	1120	44.86
1130	54.68	1131	55.89	1132	56.90	1133	58.31	1134	59.94
1135	61.41	1136	62.52	1137	64.04	1138	65.61	1139	67.20
1140	69.06	1141	71.43	1142	73.93	1143	76.70	1144	79.42
1145	83.50	1146	87.56	1147	91.67	1148	95.64	1149	106.49
1150	117.79	1151	129.40	1152	142.41	1153	157.67	1154	167.77
1155	177.98	1156	187.67	1157	195.51	1158	200.94	1159	204.53
1160	204.71	1161	202.52	1162	197.55	1163	189.29	1164	171.69
1165	152.55	1166	132.86	1167	112.56	1168	93.21	1169	82.18
1170	73.58	1171	66.64	1172	60.99	1173	56.38	1174	52.09
1175	48.60	1176	45.50	1177	43.07	1178	40.65	1179	38.59
1180	36.79	1181	34.93	1182	33.54	1183	32.26	1184	30.89
1185	29.78	1186	28.75	1187	27.76	1188	26.81	1189	26.08
1190	25.24	1191	24.61	1192	23.84	1193	23.08	1194	22.52
1195	22.00	1196	21.49	1197	21.00	1198	20.33	1199	19.84
1200	19.55	1201	18.94	1202	18.52	1203	18.10	1204	17.89
1205	17.50	1206	17.10	1207	16.71	1208	16.49	1209	15.94
1210	15.58	1211	15.41	1212	15.05	1213	14.86	1214	14.50
1215	14.16	1216	13.99	1217	13.66	1218	13.51	1219	13.02
1220	12.89	1221	12.59	1222	12.48	1223	12.20	1224	12.27
1225	12.00	1226	11.72	1227	11.63	1228	11.35	1229	11.24
1230	11.14	1231	10.86	1232	10.75	1233	10.46	1234	10.36
1235	10.09	1236	10.00	1237	9.73	1238	9.63	1239	9.42
1240	9.34	1241	9.26	1242	9.12	1243	9.04	1244	8.97
1245	8.84	1246	8.76	1247	8.67	1248	8.60	1249	8.54
1250	8.41	1251	8.36	1252	8.30	1253	8.25	1254	8.14
1255	8.09	1256	8.05	1257	7.95	1258	7.91	1259	7.88
1260	7.78	1261	7.75	1262	7.72	1263	7.63	1264	7.60
1265	7.58	1266	7.55	1267	7.46	1268	7.44	1269	7.41
1270	7.39	1271	7.31	1272	7.35	1273	7.27	1274	7.24
1275	7.22	1276	7.14	1277	7.13	1278	7.11	1279	7.03
1280	7.07	1281	6.99	1282	6.97	1283	6.95	1284	6.94
1285	6.86	1286	6.91	1287	6.83	1288	6.82	1289	6.74
1290	6.80	1291	6.78	1292	6.71	1293	6.70	1294	6.69
1295	6.67	1296	6.66	1297	6.65	1298	6.58	1299	6.56
1300	6.55	1310	6.33	1320	6.22	1330	6.07	1340	5.91
1350	5.80	1360	5.68	1370	5.54	1380	5.47	1390	5.37
1400	5.29	1420	5.12	1440	4.98	1460	2.78	1500	2.78

TOTAL VOLUME THIS HYDROGRAPH = 23.94(Ac.Ft)

Basin E

Subarea	Area (Ac)	%imp	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in)	Tc-calculated (min)	Intensity (in/hr)	Cu	Cd
1A	12.7	0.10	98	800	0.070	6.30	7	3.21	0.85	0.86
2A	39.7	0.01	98	1700	0.070	6.20	11	2.55	0.82	0.82
3A	49.8	0.01	98	2160	0.035	6.10	15	2.17	0.81	0.81

Program Package Serial Number: 2084
05/04/10 FILE: 201E-F INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 1
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\lasoilx.dat
TENT. TRACT 53295 DRAINAGE CONCEPT - EXIST. CONDITION - BASIN F STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
201	1A	35.8	63.87	35.8	63.87	2	100.	.10000	.00	.00	0.	297	16	A32	.01
201	2A	37.4	77.54	73.2	141.09	2	1200.	.06000	.00	.00	0.	297	12	A32	.01
201	3A	42.0	74.93	115.2	213.84	2	300.	.06000	.00	.00	0.	297	16	A32	.01
201	4A	37.6	67.08	152.8	279.62	2	760.	.05000	.00	.00	0.	297	16	A32	.01
201	5A	27.4	56.81	180.2	331.42	2	50.	.05000	.00	.00	0.	297	12	A32	.01
201	6A	37.1	68.64	217.3	397.77	2	820.	.05000	.00	.00	0.	297	15	A32	.01
201	7A	24.9	51.62	242.2	443.07	2	70.	.05000	.00	.00	0.	297	12	A32	.01
201	8B	48.2	95.79	48.2	95.79	2	1570.	.06000	.00	.00	0.	297	13	A32	.01
201	9B	42.4	78.45	90.6	169.13	2	180.	.06000	.00	.00	0.	297	15	A32	.01

CONFLUENCE Q'S

201 10A TA 1159 QA 443.00 QAB 611.41 QB 168.41 201 10B TB 1158 QB 169.05 QBA 610.23 QA 441.18
201 10AB TAB 1159 QAB 611.41 QA 443.00 QB 168.41

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
201	10AB	90.6	169.05	332.8	611.41	2	710.	.05000	.00	.00	0.	297	0	A32	.00
201	11A	33.0	68.42	365.8	670.95	2	920.	.04000	.00	.00	0.	297	12	A32	.01
201	12A	30.2	62.61	396.0	722.34	2	130.	.05000	.00	.00	0.	297	12	A32	.01
201	13A	22.1	45.82	418.1	761.52	2	1320.	.04000	.00	.00	0.	297	12	A32	.01
201	14A	50.0	76.88	468.1	827.08	2	160.	.01000	.00	.00	0.	297	21	A32	.01
201	15C	37.7	64.64	37.7	64.64	2	590.	.05000	.00	.00	0.	220	14	A32	.01
201	16C	24.0	41.15	61.7	105.17	2	300.	.04000	.00	.00	0.	220	14	A32	.01
201	17C	28.7	73.00	90.4	174.31	2	1100.	.06000	.00	.00	0.	98	0	A32	.00
201	18C	37.9	62.66	128.3	232.41	2	800.	.07000	.00	.00	0.	220	15	A32	.01

CONFLUENCE Q'S

201 19A TA 1162 QA 825.99 QAC 1026.79 QC 200.80 201 19C TC 1158 QC 230.14 QCA 960.90 QA 730.75
201 19AC TAC 1161 QAC 1034.13 QA 822.13 QC 212.00

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
201	19AC	128.3	230.14	596.4	1034.13	2	890.	.06000	.00	.00	0.	220	0	A32	.00
201	20A	.0	.00	596.4	1030.71	2	1.	.01000	.00	.00	0.	220	99	A32	.01
201	21A	17.8	34.07	614.2	1059.32	2	1160.	.04000	.00	.00	0.	297	14	A32	.01
201	22A	78.7	112.32	692.9	1158.48	2	600.	.04000	.00	.00	0.	297	21	A30	.01
201	23A	12.1	22.02	705.0	1161.51	2	830.	.05000	.00	.00	0.	220	11	A30	.01
201	24A	36.9	56.24	741.9	1198.47	2	100.	.05000	.00	.00	0.	220	15	A30	.01

BULKING CALCULATION

SAMPLE CALCULATION

Q_{BB} - Q BURNED BULKED Q_B - Q BURNED

DPA 5 - BULKING FACTOR = 1.47 DPA 8 - BULKING FACTOR = 1.36

$Q_{BB} = Q_B \times$ BULKING FACTOR

AREA 1A

Q_B = 63.87 cfs | DPA 5 | Q_{BB} = 93.89 cfs | ADD 30.02 cfs TO All DOWNSTREAM

AREA 2A

Q_B = 77.54 cfs | DPA 5 | Q_{BB} = 113.98 cfs | ADD 36.44 TO All Downstream

---

AREA 3A

Q_B = 74.93 cfs | DPA 5 | Q_{BB} = 110.15 cfs | ADD 35.22 cfs TO All Downstream

---

AREA 4A

Q_B = 67.08 cfs | DPA 5 | Q_{BB} = 98.61 cfs | ADD 31.53 cfs TO All Downstream

---

AREA 5A

Q_B = 56.81 cfs | 60% DPA 5, 40% DPA 8 | Q_{BB} = 81.01 cfs | ADD 24.21 cfs TO All DOWNSTREAM

AREA 6A

Q_B = 68.64 cfs | 80% DPA 5, 20% DPA 8 | Q_{BB} = 99.39 cfs | ADD 30.75 cfs TO All DOWNSTREAM

AREA 7A

Q_B = 51.62 cfs | DPA 8 | Q_{BB} = 70.20 cfs | ADD 18.58 cfs TO All DOWNSTREAM

AREA 8B

Q_B = 95.79 cfs | 70% DPA 5, 30% DPA 8 | Q_{BB} = 137.65 cfs | ADD 41.86 cfs TO All DOWNSTREAM

AREA 9B

Q_B = 78.45 cfs | DPA 8 | Q_{BB} = 106.69 cfs | ADD 28.24 TO All DOWNSTREAM

+ 276.85

AREA 11A Q_B = 68.42 cfs	DPA 8	Q_{BB} = 93.05 cfs	ADD 24.63 cfs TO All DOWNSTREAM
AREA 12A Q_B = 62.61 cfs	DPA 8	Q_{BB} = 85.15 cfs	ADD 22.54 cfs TO All DOWNSTREAM
AREA 13A Q_B = 45.82 cfs	DPA 8	Q_{BB} = 62.32 cfs	ADD 16.50 cfs TO All DOWNSTREAM
AREA 14A Q_B = 76.88 cfs	DPA 8	Q_{BB} = 104.56 cfs	ADD 27.68 cfs TO All DOWNSTREAM
AREA 15C Q_B = 64.64 cfs	30% DPA 5 70% DPA 8	Q_{BB} = 90.04 cfs	ADD 25.40 cfs TO All DOWNSTREAM
AREA 16C Q_B = 41.15 cfs	DPA 8	Q_{BB} = 55.96 cfs	ADD 14.81 cfs TO All DOWNSTREAM
AREA 18C Q_B = 62.66 cfs	DPA 8	Q_{BB} = 85.22 cfs	ADD 22.56 cfs TO All DOWNSTREAM
AREA 21A Q_B = 34.07 cfs	DPA 8	Q_{BB} = 46.34 cfs	ADD 12.27 cfs TO All DOWNSTREAM
AREA 22A Q_B = 112.32 cfs	DPA 8	Q_{BB} = 152.76 cfs	ADD 40.44 cfs TO All DOWNSTREAM
AREA 23A Q_B = 22.02 cfs	DPA 8	Q_{BB} = 29.95 cfs	ADD 7.93 cfs TO All DOWNSTREAM
AREA 24A Q_B = 56.24 cfs	DPA 8	Q_{BB} = 76.49 cfs	ADD 20.25 cfs TO All DOWNSTREAM
			+ 235.01

Σ 10AB = 611.41 cfs + 276.85 cfs = 888.26 cfs

Σ 19AC = 1034.13 cfs + 430.97 cfs = 1,465.10 cfs

COUNTY OF LOS ANGELES
DRAINAGE CONCEPT/
HYDROLOGY STUDY
EXISTING CONDITION
FOR
ENTRADA SOUTH
TENTATIVE TRACT 53295

DRAINAGE CONCEPT/HYDROLOGY STUDY/SUSMP/LID PLAN
APPROVED FOR AREA AND Q ONLY
APPROVED BY: Richard Adler RE: NO 26439 DATE: 11/23/2010
CHECKED BY: _____ DATE: 11/23/2010
LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS
LAND DEVELOPMENT DIVISION

LEGEND

- TRACT BOUNDARY
- PRIMARY BASIN LIMITS
- SUB-AREA BASIN LIMITS
- Tc — TIME OF CONCENTRATION (MIN.)
- A — SUB-AREA IN ACRES
- Q25 — 25 YR. FREQUENCY FLOWRATE
- Q50 — 50 YR. FREQUENCY FLOWRATE
- Q50B — 50 YR. BURNED FREQUENCY FLOWRATE
- Q50BD — 50 YR. BURNED AND BULKED FREQUENCY FLOWRATE
- QCB — Q CATCH BASIN
- ΣA — DEVELOPED AREA — SUMMATION OF AREA IN ACRES
- ΣQ — EXISTING AREA — SUMMATION OF FLOW IN CUBIC FEET PER SEC.
- DRAINAGE AREA DESIGNATION / DRAINAGE AREA IN ACRES
- STORM DRAIN LINE
- FLOW DIRECTION
- CHANNEL FLOW

DESIGN CRITERIA:

STORM EVENT	50 YR. — SUMP & UNDEVELOPED LOCATIONS 25 YR NON-SUMP LOCATIONS
50yr-24hr RAINFALL ISOHYET	5.8" TO 6.2" PER REPORT
SOIL TYPE	100% B & 0% D
DEBRIS PRODUCTION AREA	25% B & 75

LEGAL DESCRIPTION

A PORTION OF THE NORTHWEST QUARTER OF SECTION 2 & THE NORTHEAST QUARTER OF SECTION 3, T4N, R17W, SBM IN THE COUNTY OF LOS ANGELES, STATE OF CALIFORNIA.

NOTES:

1. COMPLY WITH ALL STREET DRAINAGE REQUIREMENTS TO THE SATISFACTION OF THE CITY OF SANTA CLARITA.
2. DEDICATE THE NECESSARY EASEMENTS FOR THE STORM DRAIN SYSTEM TO THE SATISFACTION OF THE CITY OF SANTA CLARITA.
3. PROVIDE VEHICULAR ACCESS TO ALL INLETS AND OUTLETS TO THE SATISFACTION OF THE COUNTY OF LOS ANGELES FLOOD CONTROL DISTRICT.
4. APPROVAL BY THE CITY OF LOS ANGELES DOES NOT CONSTITUTE DETERMINATION THAT THE OFFSITE IMPROVEMENTS ARE REQUIRED WITHIN THE MEANING OF GOVERNMENT CODE SECTION 66462.5.
5. AN OFFSITE DRAINAGE COVENANT FOR ACCEPTANCE OF DRAINAGE (AND DRAINAGE FACILITIES) MAY BE REQUIRED.
6. PLACE A NOTE OF FLOOD HAZARD AND SHOW THE NATURAL DRAINAGE COURSES ON THE FINAL MAP.
7. AN EASEMENT TO THE LOS ANGELES FLOOD CONTROL DISTRICT TO BE GRANTED ON THE FINAL MAP FOR COVERED STORM DRAIN APPURTENANT STRUCTURES AND STORM DRAIN INGRESS AND EGRESS OVER ALL PRIVATE STREETS.
8. A DRAINAGE BENEFIT ASSESSMENT AREA MAY BE REQUIRED FOR THE MAINTENANCE OF THE PROPOSED STORM DRAIN FACILITIES.
9. PROPOSED STORM DRAIN NETWORK TO BE MAINTAINED BY LOS ANGELES COUNTY FLOOD CONTROL DISTRICT UNLESS OTHERWISE NOTED.

ALLIANCE LAND PLANNING & ENGINEERING INC.
2248 FARADAY AVE. CARLSBAD, CA. 92008
TEL: (760) 431-9892 FAX: (760) 431-9892
27368 VIA INDUSTRIA SUITE 200 TEMECULA, CA 92590
TEL: (951) 294-2760 FAX: (951) 254-1928
CIVIL ENGINEERING • LAND PLANNING • HILLSIDE DESIGN • SURVEYING

PLANS PREPARED BY:
ALLIANCE LAND PLANNING & ENGINEERING INC.
2248 FARADAY AVE. CARLSBAD, CA. 92008
(760) 431-9896

PLANS PREPARED UNDER THE DIRECTION OF:
CRAIG A. STEELE R.C.E. 51929 — 9-14-10 DATE

REGISTERED PROFESSIONAL ENGINEER — CRAIG ALAN STEELE — No. 51929 — EXP 6-30-12 — CIVIL — STATE OF CALIFORNIA

PLANS PREPARED FOR:
NEWHALL LAND
23823 WEST VALENCIA BOULEVARD
VALENCIA, CALIFORNIA 91355
TELEPHONE: (661) 255-4000
REPRESENTATIVE : ALEX HERRELL

NO.	DATE	BY	APPR

1	COUNTY OF LOS ANGELES	1 SHEETS

DRAINAGE CONCEPT/
HYDROLOGY STUDY
FOR ENTRADA SOUTH
TENTATIVE TRACT 53295
EXISTING CONDITION

ENTRADA DRAINAGE CONCEPT-EXISTING CONDITION

PLAN PREPARATION DATE: DEC 01 2010

0630_HydrologyCon-ExistCond-Sht1.dwg

ENTRADA SOUTH

DRAINAGE CONCEPT REPORT

DEVELOPED CONDITION

Program Package Serial Number: 2084
08/17/10 FILE: 201D-A INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 1
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\lasoilx.dat
TENT. TRACT 53295 DRAINAGE CONCEPT - DEV. CONDITION - BASIN A

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
201	1A	284.9	*746.00	284.9	746.00	2	410.	.03000	.00	.00	0.	98	0	A27	.00
201	2A	11.6	39.45	296.5	753.19	4	720.	.02000	6.50	.00	0.	298	5	A31	.10
201	3A	5.3	14.98	301.8	751.11	4	75.	.01000	7.25	.00	0.	298	7	A31	.10
201	4B	15.9	37.63	15.9	37.63	4	260.	.04000	2.00	.00	0.	98	10	A31	.80
201	5B	1.5	3.42	17.4	40.86	4	70.	.02000	2.25	.00	0.	98	8	A27	.91
201	6B	2.2	3.64	19.6	44.36	4	350.	.01000	2.75	.00	0.	98	16	A27	.91

* CONFLUENCE Q'S *
* 201 7A TA 1159 QA 748.42 QAB 789.03 QB 40.60 201 7B TB 1156 QB 44.19 QBA 650.82 QA 606.63 *
* 201 7AB TAB 1159 QAB 789.03 QA 748.42 QB 40.60 *

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
201	7AB	19.6	44.19	321.4	789.03	4	400.	.01000	7.50	.00	0.	98	0	A27	.00
201	8C	6.6	20.23	6.6	20.23	4	50.	.01000	2.00	.00	0.	298	6	A31	.10
201	9C	1.9	5.83	8.5	26.06	4	170.	.01000	2.25	.00	0.	298	6	A31	.01
201	10C	.5	1.70	9.0	27.31	4	440.	.01000	2.25	.00	0.	298	5	A31	.01
201	11C	2.0	4.75	11.0	30.91	4	5.	.01000	2.25	.00	0.	98	7	A27	.60
201	12C	1.0	2.57	12.0	33.11	4	350.	.03000	2.00	.00	0.	98	6	A27	.60
201	13C	1.7	4.37	13.7	35.87	4	50.	.04000	2.00	.00	0.	98	6	A27	.60
201	14C	1.7	4.03	15.4	39.69	4	370.	.04000	2.00	.00	0.	98	7	A27	.60
201	15C	7.3	20.63	22.7	58.67	4	110.	.04000	2.25	.00	0.	298	7	A31	.10
201	16C	2.8	5.65	25.5	63.72	4	50.	.04000	2.25	.00	0.	98	10	A27	.60
201	17C	.6	1.70	26.1	64.74	4	240.	.05500	2.25	.00	0.	98	5	A27	.60
201	18C	1.3	3.69	27.4	66.70	4	30.	.03000	2.50	.00	0.	98	5	A27	.60
201	19C	1.8	4.62	29.2	70.58	4	340.	.06000	2.25	.00	0.	98	6	A27	.60
201	20C	8.8	24.87	38.0	93.98	4	550.	.01000	3.50	.00	0.	298	7	A31	.10
201	21C	2.0	4.75	40.0	95.90	4	5.	.04000	2.75	.00	0.	98	7	A27	.60
201	22C	3.3	6.33	43.3	102.07	4	290.	.03500	2.75	.00	0.	98	11	A27	.60
201	23C	3.4	9.29	46.7	108.38	4	290.	.01000	3.75	.00	0.	98	7	A31	.60
201	24C	2.7	7.38	49.4	113.39	4	110.	.04000	2.75	.00	0.	98	7	A31	.60
201	25D	.0	.00	.0	.00	4	1.	.01000	.00	.00	0.	98	99	A27	.00
201	26D	4.1	9.55	4.1	9.55	4	20.	.00500	2.00	.00	0.	98	10	A31	.60
201	27D	2.1	5.12	6.2	14.67	4	40.	.02000	2.00	.00	0.	98	9	A31	.60
201	28D	1.8	4.27	8.0	18.93	4	500.	.07000	2.00	.00	0.	98	7	A27	.60
201	29D	2.1	5.39	10.1	23.91	4	5.	.02000	2.00	.00	0.	98	6	A27	.60
201	30D	1.9	5.40	12.0	28.67	4	50.	.03000	2.00	.00	0.	98	5	A27	.60
201	31D	1.1	3.12	13.1	31.40	4	130.	.03000	2.00	.00	0.	98	5	A27	.60
201	32D	1.2	2.73	14.3	34.05	4	70.	.04000	2.00	.00	0.	98	8	A27	.91
201	33D	.8	1.81	15.1	35.78	4	50.	.03000	2.00	.00	0.	98	7	A27	.01
201	34D	1.4	3.61	16.5	39.28	4	50.	.05500	2.00	.00	0.	98	6	A27	.68
201	35D	1.3	3.09	17.8	42.28	4	270.	.05000	2.00	.00	0.	98	7	A27	.60
201	36D	1.4	4.02	19.2	44.94	4	50.	.06000	2.00	.00	0.	98	5	A27	.80
201	37D	.9	1.95	20.1	46.76	4	80.	.06000	2.00	.00	0.	98	9	A27	.91
201	38E	1.8	4.62	1.8	4.62	4	310.	.07000	2.00	.00	0.	98	6	A27	.60
201	39E	1.7	4.37	3.5	8.96	4	160.	.04000	2.00	.00	0.	98	6	A27	.60

Program Package Serial Number: 2084
08/17/10 FILE: 201D-A INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 2
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\lasoilx.dat
TENT. TRACT 53295 DRAINAGE CONCEPT - DEV. CONDITION - BASIN A

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
201	40E	.9	2.04	4.4	10.93	4	5.	.03000	2.00	.00	0.	98	7	A27	.01
201	41E	1.9	4.88	6.3	15.80	4	60.	.03000	2.00	.00	0.	98	6	A27	.60

CONFLUENCE Q'S

201 42D TD 1155 QD 46.76 QDE 61.68 QE 14.92 201 42E TE 1154 QE 15.77 QED 62.26 QD 46.50
201 42DE TDE 1154 QDE 62.26 QD 46.50 QE 15.77

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
201	42DE	6.3	15.77	26.4	62.26	4	380.	.05500	2.25	.00	0.	98	0	A27	.00
201	43D	8.3	19.67	34.7	81.23	4	40.	.05500	2.50	.00	0.	98	10	A31	.82

CONFLUENCE Q'S

201 44C TC 1157 QC 113.03 QCD 186.52 QD 73.49 201 44D TD 1155 QD 81.18 QDC 186.36 QC 105.18
201 44CD TCD 1156 QCD 190.00 QC 111.02 QD 78.98

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
201	44CD	34.7	81.18	84.1	190.00	4	550.	.04000	3.50	.00	0.	98	0	A27	.00
201	45C	2.6	5.31	86.7	193.43	4	10.	.03000	3.75	.00	0.	98	10	A27	.72
201	46C	1.7	3.53	88.4	196.74	4	30.	.03000	3.75	.00	0.	98	10	A27	.91
201	47C	1.3	2.46	89.7	199.10	4	120.	.02000	4.00	.00	0.	98	12	A27	.91
201	48C	5.4	14.31	95.1	209.16	4	60.	.02000	4.00	.00	0.	98	7	A31	.10

CONFLUENCE Q'S

201 49A TA 1160 QA 782.12 QAC 956.60 QC 174.48 201 49C TC 1157 QC 209.12 QCA 887.57 QA 678.46
201 49AC TAC 1159 QAC 966.18 QA 773.50 QC 192.68

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
201	49AC	95.1	209.12	416.5	966.18	4	430.	.01000	8.00	.00	0.	98	0	A27	.00
201	50A	.0	.00	416.5	959.94	4	1.	.01000	8.00	.00	0.	98	99	A27	.00
201	51F	.0	.00	.0	.00	4	1.	.01000	.00	.00	0.	98	99	A31	.00
201	52F	6.8	17.71	6.8	17.71	4	380.	.04000	2.00	.00	0.	98	8	A31	.80

CONFLUENCE Q'S

201 53A TA 1160 QA 959.92 QAF 969.92 QF 10.00 201 53F TF 1155 QF 17.59 QFA 722.09 QA 704.50
201 53AF TAF 1160 QAF 969.92 QA 959.92 QF 10.00

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
201	53AF	6.8	17.59	423.3	969.92	4	530.	.03000	6.50	.00	0.	98	0	A27	.00
201	54A	3.3	11.22	426.6	962.35	5	30.	.00500	12.00	.00	0.	298	5	A31	.10
201	55A	14.1	34.86	440.7	981.68	5	160.	.00500	12.00	.00	0.	98	9	A31	.80
201	56A	62.1	123.00	502.8	1085.40	5	150.	.00500	12.00	.00	0.	98	0	A27	.00

DEBRIS VOLUME

DPA 8 - 35,000 CY/mi² = 55 CY/Ac

AREA 1A & 2A

1A: UNDEVELOPED OFFSITE AREA= 18.82 AC
2A: ONSITE AREA= 3.5 AC

A_T = 22.32 AC D.V.= 1,228 CY

AREA 8C

8C: OFF-SITE UNDEVELOPED AREA= 6.6 AC.

D.V. = 363 CY

AREA 15C

A = 7.3 AC. D.V. = 402 CY

AREA 20C

A = 8.8 AC D.V. = 484 CY

Program Package Serial Number: 2084
08/17/10 FILE: 201D-A INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 3
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:
HYDROGRAPH AT POINT 56A

HYDROGRAPH AT 201 56A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	1.00	100	49.23	200	51.46	300	53.24	400	56.60
500	59.58	600	64.22	700	69.58	800	76.16	900	85.94
1000	109.18	1050	136.11	1100	181.60	1110	206.22	1120	244.23
1130	288.37	1131	293.50	1132	298.61	1133	302.85	1134	308.34
1135	314.01	1136	319.99	1137	326.57	1138	333.70	1139	341.33
1140	349.74	1141	359.24	1142	370.76	1143	383.24	1144	396.76
1145	411.55	1146	427.51	1147	445.54	1148	464.93	1149	490.88
1150	527.43	1151	571.83	1152	627.54	1153	693.48	1154	762.95
1155	831.17	1156	900.43	1157	965.64	1158	1021.03	1159	1062.76
1160	1085.40	1161	1079.84	1162	1044.16	1163	964.29	1164	856.94
1165	747.45	1166	653.07	1167	570.78	1168	502.42	1169	448.84
1170	404.70	1171	368.09	1172	337.58	1173	311.58	1174	290.49
1175	272.79	1176	257.59	1177	244.53	1178	234.56	1179	224.90
1180	215.99	1181	208.92	1182	201.69	1183	196.31	1184	190.34
1185	185.62	1186	181.29	1187	176.24	1188	172.44	1189	167.87
1190	164.54	1191	161.35	1192	158.28	1193	154.40	1194	151.71
1195	149.16	1196	146.69	1197	143.43	1198	141.29	1199	139.12
1200	137.00	1201	134.02	1202	132.26	1203	130.66	1204	129.17
1205	127.75	1206	126.28	1207	123.82	1208	122.34	1209	120.70
1210	119.12	1211	117.79	1212	116.58	1213	115.38	1214	114.13
1215	111.93	1216	110.84	1217	109.75	1218	108.74	1219	107.74
1220	106.64	1221	105.47	1222	104.38	1223	103.46	1224	101.65
1225	100.88	1226	100.15	1227	99.54	1228	98.97	1229	98.34
1230	97.75	1231	97.14	1232	96.45	1233	95.76	1234	95.08
1235	94.41	1236	93.63	1237	91.78	1238	90.90	1239	89.98
1240	89.13	1241	88.44	1242	87.90	1243	87.47	1244	87.09
1245	86.68	1246	86.22	1247	85.74	1248	85.28	1249	84.86
1250	84.44	1251	84.07	1252	83.78	1253	83.53	1254	83.24
1255	81.89	1256	81.53	1257	81.07	1258	80.60	1259	80.21
1260	79.80	1261	79.35	1262	78.98	1263	78.68	1264	78.48
1265	78.32	1266	78.20	1267	78.03	1268	77.73	1269	77.39
1270	77.02	1271	76.59	1272	76.20	1273	75.82	1274	75.44
1275	75.07	1276	74.64	1277	74.26	1278	73.91	1279	73.57
1280	72.32	1281	72.09	1282	71.80	1283	71.51	1284	71.26
1285	71.06	1286	70.92	1287	70.84	1288	70.73	1289	70.54
1290	70.33	1291	70.10	1292	69.82	1293	69.61	1294	69.51
1295	69.44	1296	69.38	1297	69.30	1298	69.17	1299	68.94
1300	68.64	1310	66.42	1320	64.10	1330	62.67	1340	61.16
1350	59.61	1360	57.81	1370	55.79	1380	55.13	1390	54.22
1400	53.68	1420	52.01	1440	50.66	1460	49.23	1500	49.23

TOTAL VOLUME THIS HYDROGRAPH = 182.48(Ac.Ft)

```
7   201    1A   284.9 441158    746.200  4
8  5   0.      1. 100.     28. 200.     30. 300.     31. 400.     33.
8 10 500.     35. 600.     38. 700.     42. 800.     46. 900.     52.
8 151000.     67.1050.     83.1100.    110.1110.    125.1120.    150.
8 201130.    176.1131.    178.1132.    181.1133.    184.1134.    187.
8 251135.    190.1136.    194.1137.    199.1138.    204.1139.    210.
8 301140.    217.1141.    224.1142.    232.1143.    240.1144.    248.
8 351145.    257.1146.    267.1147.    278.1148.    290.1149.    309.
8 401150.    332.1151.    361.1152.    399.1153.    454.1154.    527.
8 451155.    610.1156.    690.1157.    742.1158.    746.1159.    708.
8 501160.    642.1161.    566.1162.    490.1163.    423.1164.    366.
8 551165.    321.1166.    284.1167.    253.1168.    228.1169.    208.
8 601170.    190.1171.    175.1172.    165.1173.    156.1174.    149.
8 651175.    142.1176.    136.1177.    131.1178.    127.1179.    123.
8 701180.    119.1181.    116.1182.    113.1183.    110.1184.    107.
8 751185.    105.1186.    102.1187.    100.1188.     98.1189.     96.
8 801190.     94.1191.     92.1192.     91.1193.     89.1194.     88.
8 851195.     86.1196.     84.1197.     83.1198.     82.1199.     81.
8 901200.     80.1201.     79.1202.     78.1203.     77.1204.     75.
8 951205.     74.1206.     73.1207.     73.1208.     72.1209.     71.
81001210.     70.1211.     69.1212.     69.1213.     68.1214.     67.
81051215.     66.1216.     65.1217.     64.1218.     64.1219.     63.
81101220.     63.1221.     62.1222.     62.1223.     62.1224.     61.
81151225.     61.1226.     60.1227.     60.1228.     59.1229.     59.
81201230.     58.1231.     58.1232.     57.1233.     56.1234.     55.
81251235.     55.1236.     54.1237.     54.1238.     54.1239.     54.
81301240.     53.1241.     53.1242.     52.1243.     52.1244.     52.
81351245.     51.1246.     51.1247.     51.1248.     51.1249.     51.
81401250.     50.1251.     50.1252.     50.1253.     49.1254.     49.
81451255.     49.1256.     48.1257.     48.1258.     48.1259.     48.
81501260.     48.1261.     48.1262.     48.1263.     47.1264.     47.
81551265.     47.1266.     46.1267.     46.1268.     46.1269.     45.
81601270.     45.1271.     45.1272.     44.1273.     44.1274.     44.
81651275.     44.1276.     44.1277.     43.1278.     43.1279.     43.
81701280.     43.1281.     43.1282.     43.1283.     43.1284.     43.
81751285.     42.1286.     42.1287.     42.1288.     42.1289.     42.
81801290.     42.1291.     42.1292.     42.1293.     42.1294.     41.
81851295.     41.1296.     41.1297.     41.1298.     40.1299.     40.
81901300.     40.1310.     39.1320.     38.1330.     37.1340.     36.
81951350.     34.1360.     33.1370.     33.1380.     32.1390.     32.
82001400.     31.1420.     30.1440.     29.1460.     28.1500.     28.
7   201   56A    62.1 421156    123.200  4
8  5   0.      1. 100.      7. 200.      7. 300.      7. 400.      8.
8 10 500.      8. 600.      9. 700.      9. 800.     10. 900.     11.
8 151000.     14.1050.     17.1100.     23.1110.     27.1120.     31.
8 201130.     36.1131.     37.1132.     38.1133.     38.1134.     39.
8 251135.     40.1136.     41.1137.     42.1138.     43.1139.     44.
8 301140.     45.1141.     46.1142.     48.1143.     50.1144.     52.
8 351145.     54.1146.     56.1147.     59.1148.     62.1149.     67.
8 401150.     76.1151.     86.1152.     97.1153.    108.1154.    117.
8 451155.    121.1156.    123.1157.    122.1158.    119.1159.    115.
8 501160.    109.1161.    101.1162.     93.1163.     85.1164.     74.
8 551165.     64.1166.     56.1167.     48.1168.     41.1169.     37.
8 601170.     34.1171.     32.1172.     30.1173.     28.1174.     27.
8 651175.     26.1176.     25.1177.     24.1178.     24.1179.     23.
8 701180.     22.1181.     22.1182.     21.1183.     21.1184.     20.
8 751185.     20.1186.     20.1187.     19.1188.     19.1189.     18.
8 801190.     18.1191.     18.1192.     18.1193.     17.1194.     17.
8 851195.     17.1196.     17.1197.     16.1198.     16.1199.     16.
8 901200.     16.1201.     15.1202.     15.1203.     15.1204.     15.
8 951205.     15.1206.     15.1207.     14.1208.     14.1209.     14.
81001210.     14.1211.     14.1212.     14.1213.     14.1214.     14.
81051215.     13.1216.     13.1217.     13.1218.     13.1219.     13.
81101220.     13.1221.     13.1222.     13.1223.     13.1224.     12.
81151225.     12.1226.     12.1227.     12.1228.     12.1229.     12.
81201230.     12.1231.     12.1232.     12.1233.     12.1234.     12.
81251235.     12.1236.     12.1237.     11.1238.     11.1239.     11.
81301240.     11.1241.     11.1242.     11.1243.     11.1244.     11.
81351245.     11.1246.     11.1247.     11.1248.     11.1249.     11.
81401250.     11.1251.     11.1252.     11.1253.     11.1254.     11.
81451255.     10.1256.     10.1257.     10.1258.     10.1259.     10.
81501260.     10.1261.     10.1262.     10.1263.     10.1264.     10.
81551265.     10.1266.     10.1267.     10.1268.     10.1269.     10.
81601270.     10.1271.     10.1272.     10.1273.     10.1274.     10.
81651275.     10.1276.     10.1277.     10.1278.     10.1279.     10.
81701280.      9.1281.      9.1282.      9.1283.      9.1284.      9.
81751285.      9.1286.      9.1287.      9.1288.      9.1289.      9.
81801290.      9.1291.      9.1292.      9.1293.      9.1294.      9.
81851295.      9.1296.      9.1297.      9.1298.      9.1299.      9.
```

81901300.	9.1310.	9.1320.	8.1330.	8.1340.	8.
81951350.	8.1360.	8.1370.	7.1380.	7.1390.	7.
82001400.	7.1420.	7.1440.	7.1460.	7.1500.	7.

Basin A

Subarea	Area (Ac)	%imp	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in)	Tc-calculated (min)	Intensity (in/hr)	Cu	Cd
2A	3.5	0.10	98	410	0.030	6.20	5	3.70	0.86	0.86
3A	5.3	0.10	98	650	0.030	6.20	7	3.16	0.84	0.85
4B	15.9	0.80	98	1200	0.020	6.10	11	2.51	0.82	0.88
5B	1.5	0.91	98	840	0.035	5.36	8	2.56	0.82	0.89
6B	2.2	0.91	98	1980	0.020	5.36	16	1.85	0.78	0.89
8C	6.6	0.10	98	710	0.100	6.20	6	3.40	0.85	0.85
9C	1.9	0.01	98	540	0.030	6.20	6	3.40	0.85	0.86
10C	0.5	0.01	98	150	0.020	6.20	5	3.70	0.86	0.86
11C	2.0	0.60	98	490	0.015	5.44	7	2.77	0.83	0.83
12C	1.0	0.60	98	380	0.015	5.44	6	2.98	0.84	0.88
13C	1.7	0.60	98	400	0.017	5.44	6	2.98	0.84	0.88
14C	1.7	0.60	98	610	0.025	5.44	7	2.77	0.83	0.87
15C	7.3	0.10	98	790	0.080	6.20	7	3.16	0.84	0.84
16C	2.8	0.60	98	1140	0.040	5.44	10	2.34	0.81	0.86
17C	0.6	0.60	98	250	0.020	5.44	5	3.25	0.85	0.88
18C	1.3	0.60	98	400	0.030	5.44	5	3.25	0.85	0.88
19C	1.8	0.60	98	530	0.030	5.44	6	2.98	0.84	0.88
20C	8.8	0.10	98	810	0.080	6.20	7	3.16	0.84	0.85
21C	2.0	0.60	98	590	0.035	5.44	7	2.77	0.83	0.87
22C	3.3	0.60	98	1330	0.035	5.44	11	2.24	0.81	0.86
23C	3.4	0.60	98	710	0.040	6.20	7	3.16	0.84	0.88
24C	2.7	0.60	98	680	0.035	6.20	7	3.16	0.84	0.88
26D	4.1	0.60	98	960	0.015	6.20	10	2.67	0.82	0.87
27D	2.1	0.60	98	640	0.006	6.20	9	2.81	0.83	0.87
28D	1.8	0.60	98	500	0.020	5.44	7	2.77	0.83	0.87

Note: Skipped No. 25D

Basin A Continued

Subarea	Area (Ac)	%imp	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in)	Tc-calculated (min)	Intensity (in/hr)	Cu	Cd
29D	2.1	0.60	98	660	0.070	5.44	6	2.98	0.84	0.88
30D	1.9	0.60	98	480	0.070	5.44	5	3.25	0.85	0.88
31D	1.1	0.60	98	270	0.030	5.44	5	3.25	0.85	0.88
32D	1.2	0.91	98	875	0.055	5.44	8	2.60	0.82	0.89
33D	0.8	0.01	98	490	0.013	5.44	7	2.77	0.83	0.83
34D	1.4	0.68	98	460	0.035	5.44	6	2.98	0.84	0.88
35D	1.3	0.60	98	660	0.045	5.44	7	2.77	0.83	0.87
36D	1.4	0.80	98	350	0.020	5.44	5	3.25	0.85	0.89
37D	0.9	0.91	98	1125	0.055	5.44	9	2.46	0.82	0.89
38E	1.8	0.60	98	530	0.050	5.44	6	2.98	0.84	0.88
39E	1.7	0.60	98	550	0.050	5.44	6	2.98	0.84	0.88
40E	0.9	0.01	98	600	0.030	5.44	7	2.77	0.83	0.83
41E	1.9	0.60	98	620	0.055	5.44	6	2.98	0.84	0.88
43D	8.3	0.82	98	1160	0.020	6.10	10	2.63	0.82	0.89
45C	2.6	0.72	98	1300	0.055	5.36	10	2.31	0.81	0.87
46C	1.7	0.91	98	1330	0.055	5.36	10	2.31	0.81	0.89
47C	1.3	0.91	98	1200	0.018	5.36	12	2.12	0.80	0.89
48C	5.4	0.10	98	620	0.020	6.10	7	3.11	0.84	0.85
52F	6.8	0.80	98	840	0.020	6.10	8	2.92	0.83	0.89
54A	3.3	0.10	98	600	0.200	6.10	5	3.64	0.86	0.86
55A	14.1	0.80	98	900	0.020	6.10	9	2.76	0.83	0.89

Note: Skipped No's: 50A, 51F

Program Package Serial Number: 2084
06/16/10 FILE: 930d-b INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 1
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\lasoilx.dat

TENT. TRACT 53295 DRAINAGE CONCEPT - DEV. CONDITION - BASIN B

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
930	1A	28.7	73.00	28.7	73.00	4	480.	.04000	2.50	.00	0.	98	0	A31	.00
930	2A	2.3	7.84	31.0	78.40	4	30.	.03000	2.75	.00	0.	298	5	A31	.01
930	3A	68.3	137.00	99.3	215.29	4	90.	.06000	3.25	.00	0.	98	0	A31	.00
930	4A	2.9	9.51	102.2	221.84	4	410.	.06000	3.50	.00	0.	98	5	A31	.60
930	5B	.0	.00	.0	.00	4	1.	.01000	.00	.00	0.	98	99	A31	.60
930	6B	1.8	5.11	1.8	5.11	4	350.	.05500	2.00	.00	0.	98	5	A27	.60
930	7B	2.5	6.42	4.3	11.25	4	30.	.05500	2.00	.00	0.	98	6	A27	.60
930	8B	1.5	3.56	5.8	14.81	4	640.	.01300	2.00	.00	0.	98	7	A27	.60
930	9B	4.9	11.94	10.7	25.81	4	190.	.02000	2.00	.00	0.	98	9	A31	.60
930	10B	2.0	4.22	12.7	29.70	4	80.	.04000	2.00	.00	0.	98	8	A27	.01

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* CONFLUENCE Q'S *

* 930 11A TA 1155 QA 220.84 QAB 250.19 QB 29.35 930 11B TB 1156 QB 29.68 QBA 249.89 QA 220.21 *

* 930 11AB TAB 1155 QAB 250.19 QA 220.84 QB 29.35 *

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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
930	11AB	12.7	29.68	114.9	250.19	4	230.	.06000	3.50	.00	0.	98	0	A31	.00
930	12A	.0	.00	114.9	249.93	4	1.	.01000	5.00	.00	0.	98	99	A27	.00
930	13A	1.5	2.86	116.4	252.67	4	220.	.02000	4.25	.00	0.	98	10	A27	.01
930	14A	4.0	8.85	120.4	260.84	4	660.	.01900	4.50	.00	0.	98	11	A31	.60
930	15A	467.6	847.00	588.0	1073.98	5	320.	.01000	11.00	.00	0.	98	0	A31	.00
930	16A	2.5	4.14	590.5	1077.68	5	40.	.01000	11.00	.00	0.	98	16	A27	.91
930	17A	.7	1.70	591.2	1078.01	5	60.	.01000	11.00	.00	0.	98	7	A27	.91
930	18A	.0	.00	591.2	1077.60	5	1.	.01000	11.00	.00	0.	98	99	A27	.80
930	19A	1.6	2.89	592.8	1079.79	5	15.	.02000	10.00	.00	0.	98	11	A27	.01
930	20A	3.3	6.29	596.1	1085.67	5	210.	.01000	11.00	.00	0.	98	16	A31	.91
930	21C	1.5	3.10	1.5	3.10	4	120.	.01000	2.00	.00	0.	298	10	A27	.01
930	22C	1.0	2.84	2.5	5.72	4	390.	.08300	2.00	.00	0.	98	5	A27	.60
930	23C	.8	1.81	3.3	7.42	4	120.	.08300	2.00	.00	0.	98	7	A27	.01
930	24C	1.6	3.89	4.9	11.26	4	260.	.01700	2.00	.00	0.	98	7	A27	.91
930	25C	4.4	10.72	9.3	21.69	4	250.	.02000	2.00	.00	0.	98	9	A31	.60

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* CONFLUENCE Q'S *

* 930 26A TA 1160 QA 1083.08 QAC 1097.01 QC 13.93 930 26C TC 1155 QC 21.57 QCA 840.08 QA 818.51 *

* 930 26AC TAC 1160 QAC 1097.01 QA 1083.08 QC 13.93 *

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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
930	26AC	9.3	21.57	605.4	1097.01	4	250.	.02000	7.50	.00	0.	98	0	A31	.00
930	27A	.0	.00	605.4	1094.16	5	1.	.01000	11.00	.00	0.	98	99	A27	.00
930	28A	.0	.00	605.4	1094.16	5	1.	.01000	11.00	.00	0.	98	99	A27	.00
930	29A	2.2	7.28	607.6	1095.70	5	340.	.02500	9.00	.00	0.	98	5	A31	.80
930	30D	2.8	6.53	2.8	6.53	4	140.	.02000	2.00	.00	0.	98	9	A31	.01
930	31D	5.4	11.45	8.2	17.98	4	40.	.02000	2.00	.00	0.	98	12	A31	.60
930	32D	6.3	13.36	14.5	31.31	4	670.	.09000	2.00	.00	0.	98	12	A31	.60

Program Package Serial Number: 2084
06/16/10 FILE: 930d-b INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 2
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\lasoilx.dat

TENT. TRACT 53295 DRAINAGE CONCEPT - DEV. CONDITION - BASIN B

STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
930	33D	2.8	8.10	17.3	38.51	4	90.	.03000	2.00	.00	0.	98	6	A30	.80

* CONFLUENCE Q'S *

* 930 34A TA 1161 QA 1095.55 QAD 1123.10 QD 27.55 930 34D TD 1155 QD 38.34 QDA 838.11 QA 799.77 *

* 930 34AD TAD 1161 QAD 1123.10 QA 1095.55 QD 27.55 *

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
930	34AD	17.3	38.34	624.9	1123.10	4	660.	.06000	6.25	.00	0.	98	0	A31	.00
930	35E	2.6	6.77	2.6	6.77	4	350.	.04000	2.00	.00	0.	98	8	A31	.80
930	36E	2.9	7.55	5.5	14.22	4	510.	.01000	2.00	.00	0.	98	8	A31	.80
930	37E	2.1	3.79	7.6	17.71	4	270.	.01400	2.00	.00	0.	98	11	A27	.01
930	38E	3.7	8.86	11.3	25.92	4	370.	.01000	2.25	.00	0.	98	9	A30	.80
930	39E	1.7	3.69	13.0	28.26	4	10.	.01000	2.25	.00	0.	98	7	A26	.01
930	40E	3.2	6.58	16.2	34.63	4	30.	.02000	2.25	.00	0.	98	12	A30	.65
930	41E	2.0	4.17	18.2	38.73	4	890.	.02000	2.25	.00	0.	98	12	A30	.80
930	42E	11.4	23.78	29.6	60.64	4	60.	.02500	2.50	.00	0.	98	12	A30	.80
930	43E	2.1	3.66	31.7	63.99	4	40.	.20000	2.00	.00	0.	98	11	A26	.10

* CONFLUENCE Q'S *

* 930 44A TA 1161 QA 1121.03 QAE 1178.36 QE 57.32 930 44E TE 1158 QE 63.99 QEA 1086.90 QA 1022.91 *

* 930 44AE TAE 1161 QAE 1178.36 QA 1121.03 QE 57.32 *

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
930	44AE	31.7	63.99	656.6	1178.36	5	10.	.01000	11.00	.00	0.	98	0	A31	.00
930	45A	66.6	119.00	723.2	1285.30	5	200.	.01000	12.00	.00	0.	98	0	A31	.00
930	46A	2.2	4.02	725.4	1287.07	5	5.	.01000	12.00	.00	0.	98	11	A25	.91
930	47A	1.7	3.11	727.1	1289.14	5	590.	.01000	12.00	.00	0.	98	11	A25	.91
930	48A	14.5	35.59	741.6	1294.72	5	900.	.08000	8.00	.00	0.	98	8	A29	.91
930	49F	26.0	52.57	26.0	52.57	2	1220.	.05000	.00	.00	0.	298	12	A29	.01
930	50F	24.4	49.33	50.4	97.95	2	620.	.02000	.00	.00	0.	298	12	A29	.01
930	51F	26.2	58.46	76.6	148.51	4	70.	.02000	3.50	.00	0.	298	10	A29	.01

* CONFLUENCE Q'S *

* 930 52A TA 1162 QA 1293.89 QAF 1412.26 QF 118.37 930 52F TF 1158 QF 148.40 QFA 1286.21 QA 1137.81 *

* 930 52AF TAF 1162 QAF 1412.26 QA 1293.89 QF 118.37 *

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
930	52AF	76.6	148.40	818.2	1412.26	4	3500.	.03500	7.50	.00	0.	98	0	A29	.00
930	53A	109.5	164.00	927.7	1532.94	4	450.	.03000	7.75	.00	0.	20	0	A29	.00
930	54A	8.7	9.91	936.4	1533.31	4	140.	.03000	7.75	.00	0.	20	14	A29	.01

BULKING CALCULATION

SAMPLE CALCULATION

Q_{BB} - Q BURNED BULKED

Q_B - Q BURNED

DPA 8 - BULKING FACTOR = 1.36

$Q_{BB} = Q_B \times$ BULKING FACTOR

AREA 49F

$Q_B = 52.57$ cfs $Q_{BB} = 71.50$ cfs Add 18.93 cfs to All Downstream

AREA 50F

$Q_B = 49.33$ cfs $Q_{BB} = 67.09$ cfs Add 17.76 cfs to All Downstream

DEBRIS Volume

DPA 8 - 35,000 CY/mi² = 55 CY/AC

AREA 51F

A_{Total} = 76.6AC

D.V. = 4,213 CY

Program Package Serial Number: 2084
06/16/10 FILE: 930d-b INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 3
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:
HYDROGRAPH AT POINT 54A
HYDROGRAPH AT 930 54A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.60	100	51.76	200	52.20	300	56.09	400	59.47
500	62.12	600	65.29	700	72.00	800	78.34	900	88.23
1000	110.83	1050	151.00	1100	230.28	1110	260.24	1120	312.57
1130	384.08	1131	391.92	1132	399.53	1133	407.42	1134	415.47
1135	423.76	1136	432.95	1137	442.32	1138	451.51	1139	461.78
1140	472.46	1141	483.97	1142	497.51	1143	511.65	1144	526.09
1145	541.57	1146	559.42	1147	579.34	1148	600.67	1149	627.04
1150	659.63	1151	697.49	1152	742.75	1153	798.83	1154	863.10
1155	935.86	1156	1019.02	1157	1108.96	1158	1200.53	1159	1288.80
1160	1368.00	1161	1435.96	1162	1486.30	1163	1518.12	1164	1533.31
1165	1531.72	1166	1508.38	1167	1464.42	1168	1402.30	1169	1323.58
1170	1234.90	1171	1142.09	1172	1049.33	1173	960.16	1174	877.30
1175	801.96	1176	734.70	1177	675.14	1178	622.26	1179	573.77
1180	529.51	1181	490.10	1182	455.79	1183	424.91	1184	398.09
1185	374.06	1186	352.58	1187	332.75	1188	315.49	1189	300.21
1190	286.28	1191	273.54	1192	262.48	1193	252.68	1194	243.03
1195	234.68	1196	227.24	1197	220.50	1198	214.07	1199	207.91
1200	202.01	1201	196.35	1202	190.94	1203	185.73	1204	180.78
1205	176.06	1206	171.97	1207	167.98	1208	163.68	1209	159.59
1210	156.27	1211	152.78	1212	149.63	1213	147.05	1214	144.46
1215	141.44	1216	138.48	1217	136.08	1218	133.80	1219	131.11
1220	128.45	1221	126.30	1222	124.28	1223	122.35	1224	120.09
1225	117.88	1226	116.26	1227	114.77	1228	113.32	1229	111.89
1230	110.46	1231	109.11	1232	107.43	1233	105.80	1234	104.72
1235	103.77	1236	102.85	1237	101.95	1238	101.04	1239	100.13
1240	99.24	1241	98.39	1242	97.57	1243	96.82	1244	95.69
1245	94.53	1246	93.88	1247	93.35	1248	92.84	1249	92.37
1250	91.92	1251	91.49	1252	91.06	1253	90.61	1254	90.13
1255	89.61	1256	89.08	1257	88.58	1258	88.15	1259	87.77
1260	87.41	1261	87.07	1262	86.71	1263	86.35	1264	85.96
1265	85.14	1266	84.21	1267	83.69	1268	83.28	1269	82.86
1270	82.48	1271	82.13	1272	81.80	1273	81.50	1274	81.19
1275	80.90	1276	80.62	1277	80.34	1278	80.07	1279	79.80
1280	79.53	1281	79.27	1282	79.02	1283	78.78	1284	78.53
1285	78.26	1286	77.96	1287	77.66	1288	77.37	1289	77.07
1290	76.76	1291	76.43	1292	76.09	1293	75.76	1294	75.47
1295	75.22	1296	75.00	1297	74.79	1298	74.58	1299	73.95
1300	73.21	1310	70.55	1320	68.32	1330	66.57	1340	65.13
1350	63.83	1360	62.09	1370	60.98	1380	59.93	1390	58.65
1400	57.36	1420	54.41	1440	52.78	1460	51.74	1500	51.67

TOTAL VOLUME THIS HYDROGRAPH = 219.90(Ac.Ft)

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7   930    1A    28.7 411155    73.200  4
8  5   0.      0. 100.      2. 200.      2. 300.      2. 400.      3.
8 10 500.      3. 600.      3. 700.      3. 800.      4. 900.      4.
8 151000.     5.1050.      7.1100.      9.1110.     12.1120.     14.
8 201130.    16.1131.     17.1132.     17.1133.     17.1134.     18.
8 251135.    19.1136.     19.1137.     20.1138.     20.1139.     21.
8 301140.    22.1141.     23.1142.     23.1143.     24.1144.     25.
8 351145.    27.1146.     28.1147.     30.1148.     32.1149.     36.
8 401150.    41.1151.     49.1152.     58.1153.     68.1154.     73.
8 451155.    73.1156.     69.1157.     61.1158.     51.1159.     42.
8 501160.    35.1161.     29.1162.     24.1163.     20.1164.     18.
8 551165.    16.1166.     15.1167.     14.1168.     14.1169.     13.
8 601170.    12.1171.     12.1172.     11.1173.     11.1174.     10.
8 651175.    10.1176.     10.1177.     10.1178.      9.1179.      9.
8 701180.     9.1181.      9.1182.      8.1183.      8.1184.      8.
8 751185.     8.1186.      8.1187.      8.1188.      7.1189.      7.
8 801190.     7.1191.      7.1192.      7.1193.      7.1194.      7.
8 851195.     6.1196.      6.1197.      6.1198.      6.1199.      6.
8 901200.     6.1201.      6.1202.      6.1203.      6.1204.      6.
8 951205.     6.1206.      6.1207.      5.1208.      5.1209.      5.
81001210.     5.1211.      5.1212.      5.1213.      5.1214.      5.
81051215.     5.1216.      5.1217.      5.1218.      5.1219.      5.
81101220.     5.1221.      5.1222.      5.1223.      5.1224.      5.
81151225.     4.1226.      4.1227.      4.1228.      4.1229.      4.
81201230.     4.1231.      4.1232.      4.1233.      4.1234.      4.
81251235.     4.1236.      4.1237.      4.1238.      4.1239.      4.
81301240.     4.1241.      4.1242.      4.1243.      4.1244.      4.
81351245.     4.1246.      4.1247.      4.1248.      4.1249.      4.
81401250.     4.1251.      4.1252.      4.1253.      4.1254.      4.
81451255.     4.1256.      4.1257.      4.1258.      4.1259.      4.
81501260.     4.1261.      4.1262.      4.1263.      4.1264.      4.
81551265.     4.1266.      4.1267.      4.1268.      4.1269.      4.
81601270.     4.1271.      4.1272.      3.1273.      4.1274.      3.
81651275.     3.1276.      3.1277.      3.1278.      3.1279.      3.
81701280.     3.1281.      3.1282.      3.1283.      3.1284.      3.
81751285.     3.1286.      3.1287.      3.1288.      3.1289.      3.
81801290.     3.1291.      3.1292.      3.1293.      3.1294.      3.
81851295.     3.1296.      3.1297.      3.1298.      3.1299.      3.
81901300.     3.1310.      3.1320.      3.1330.      3.1340.      3.
81951350.     3.1360.      3.1370.      3.1380.      2.1390.      2.
82001400.     2.1420.      2.1440.      2.1460.      2.1500.      2.
7   930    3A    68.3 411155   137.200  4
8  5   0.      1. 100.      3. 200.      3. 300.      4. 400.      4.
8 10 500.      4. 600.      4. 700.      5. 800.      5. 900.      6.
8 151000.     7.1050.     12.1100.     18.1110.     23.1120.     29.
8 201130.    34.1131.     35.1132.     36.1133.     37.1134.     38.
8 251135.    39.1136.     40.1137.     41.1138.     42.1139.     44.
8 301140.    45.1141.     47.1142.     49.1143.     52.1144.     54.
8 351145.    57.1146.     60.1147.     64.1148.     67.1149.     76.
8 401150.    89.1151.    103.1152.    116.1153.    130.1154.    136.
8 451155.   137.1156.    136.1157.    134.1158.    131.1159.    127.
8 501160.   123.1161.    116.1162.    105.1163.     90.1164.     75.
8 551165.    61.1166.     48.1167.     38.1168.     34.1169.     31.
8 601170.    28.1171.     26.1172.     25.1173.     23.1174.     22.
8 651175.    21.1176.     20.1177.     19.1178.     18.1179.     18.
8 701180.    17.1181.     16.1182.     16.1183.     15.1184.     15.
8 751185.    14.1186.     14.1187.     13.1188.     13.1189.     13.
8 801190.    12.1191.     12.1192.     12.1193.     11.1194.     11.
8 851195.    11.1196.     10.1197.     10.1198.     10.1199.     10.
8 901200.     9.1201.      9.1202.      9.1203.      9.1204.      8.
8 951205.     8.1206.      8.1207.      8.1208.      8.1209.      7.
81001210.     7.1211.      7.1212.      7.1213.      7.1214.      7.
81051215.     7.1216.      7.1217.      7.1218.      7.1219.      7.
81101220.     7.1221.      7.1222.      7.1223.      7.1224.      7.
81151225.     6.1226.      6.1227.      6.1228.      6.1229.      6.
81201230.     6.1231.      6.1232.      6.1233.      6.1234.      6.
81251235.     6.1236.      6.1237.      6.1238.      6.1239.      6.
81301240.     6.1241.      6.1242.      6.1243.      6.1244.      6.
81351245.     6.1246.      6.1247.      6.1248.      6.1249.      6.
81401250.     6.1251.      6.1252.      5.1253.      5.1254.      5.
81451255.     5.1256.      5.1257.      5.1258.      5.1259.      5.
81501260.     5.1261.      5.1262.      5.1263.      5.1264.      5.
81551265.     5.1266.      5.1267.      5.1268.      5.1269.      5.
81601270.     5.1271.      5.1272.      5.1273.      5.1274.      5.
81651275.     5.1276.      5.1277.      5.1278.      5.1279.      5.
81701280.     5.1281.      5.1282.      5.1283.      5.1284.      5.
81751285.     5.1286.      5.1287.      5.1288.      5.1289.      5.
81801290.     5.1291.      5.1292.      5.1293.      5.1294.      5.
81851295.     5.1296.      5.1297.      5.1298.      4.1299.      4.
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81901300.      4.1310.      4.1320.      4.1330.      4.1340.      4.
81951350.      4.1360.      4.1370.      4.1380.      4.1390.      4.
82001400.      3.1420.      3.1440.      3.1460.      2.1500.      2.
7   930   15A   467.6 471161    847.200  4
8  5   0.       0. 100.     23. 200.     23. 300.     25. 400.     26.
8 10 500.      27. 600.     29. 700.     32. 800.     35. 900.     40.
8 151000.     49.1050.     72.1100.    115.1110.    134.1120.    166.
8 201130.    205.1131.    209.1132.    213.1133.    218.1134.    222.
8 251135.    227.1136.    232.1137.    238.1138.    243.1139.    249.
8 301140.    256.1141.    264.1142.    272.1143.    281.1144.    291.
8 351145.    302.1146.    315.1147.    328.1148.    343.1149.    364.
8 401150.    392.1151.    426.1152.    468.1153.    518.1154.    573.
8 451155.    632.1156.    691.1157.    747.1158.    793.1159.    827.
8 501160.    845.1161.    847.1162.    834.1163.    806.1164.    765.
8 551165.    715.1166.    663.1167.    610.1168.    558.1169.    510.
8 601170.    465.1171.    421.1172.    381.1173.    343.1174.    308.
8 651175.    278.1176.    252.1177.    230.1178.    212.1179.    196.
8 701180.    183.1181.    171.1182.    161.1183.    152.1184.    144.
8 751185.    137.1186.    131.1187.    125.1188.    120.1189.    116.
8 801190.    112.1191.    108.1192.    104.1193.    101.1194.     98.
8 851195.     94.1196.     92.1197.     89.1198.     86.1199.     84.
8 901200.     81.1201.     79.1202.     77.1203.     75.1204.     73.
8 951205.     71.1206.     69.1207.     68.1208.     66.1209.     65.
81001210.     63.1211.     62.1212.     61.1213.     59.1214.     58.
81051215.     57.1216.     56.1217.     55.1218.     54.1219.     53.
81101220.     52.1221.     51.1222.     50.1223.     49.1224.     49.
81151225.     48.1226.     48.1227.     47.1228.     47.1229.     46.
81201230.     46.1231.     46.1232.     45.1233.     45.1234.     44.
81251235.     44.1236.     44.1237.     43.1238.     43.1239.     43.
81301240.     43.1241.     42.1242.     42.1243.     42.1244.     41.
81351245.     41.1246.     41.1247.     41.1248.     40.1249.     40.
81401250.     40.1251.     40.1252.     40.1253.     39.1254.     39.
81451255.     39.1256.     39.1257.     39.1258.     38.1259.     38.
81501260.     38.1261.     38.1262.     38.1263.     37.1264.     37.
81551265.     37.1266.     37.1267.     37.1268.     36.1269.     36.
81601270.     36.1271.     36.1272.     36.1273.     36.1274.     35.
81651275.     35.1276.     35.1277.     35.1278.     35.1279.     35.
81701280.     35.1281.     34.1282.     34.1283.     34.1284.     34.
81751285.     34.1286.     34.1287.     34.1288.     33.1289.     33.
81801290.     33.1291.     33.1292.     33.1293.     33.1294.     33.
81851295.     33.1296.     32.1297.     32.1298.     32.1299.     32.
81901300.     32.1310.     31.1320.     30.1330.     29.1340.     28.
81951350.     28.1360.     27.1370.     26.1380.     26.1390.     25.
82001400.     25.1420.     24.1440.     23.1460.     23.1500.     23.
7   930   45A    66.6 431157    119.200  4
8  5   0.       0. 100.      3. 200.      3. 300.      4. 400.      4.
8 10 500.       4. 600.      4. 700.      5. 800.      5. 900.      6.
8 151000.      7.1050.     10.1100.     16.1110.     20.1120.     25.
8 201130.     30.1131.     31.1132.     31.1133.     32.1134.     33.
8 251135.     34.1136.     35.1137.     35.1138.     36.1139.     38.
8 301140.     39.1141.     40.1142.     41.1143.     43.1144.     45.
8 351145.     47.1146.     49.1147.     52.1148.     55.1149.     59.
8 401150.     67.1151.     76.1152.     88.1153.    100.1154.    110.
8 451155.    116.1156.    119.1157.    119.1158.    118.1159.    116.
8 501160.    111.1161.    107.1162.    101.1163.     93.1164.     85.
8 551165.     77.1166.     69.1167.     60.1168.     51.1169.     43.
8 601170.     37.1171.     31.1172.     28.1173.     25.1174.     24.
8 651175.     22.1176.     21.1177.     20.1178.     19.1179.     18.
8 701180.     17.1181.     16.1182.     16.1183.     15.1184.     15.
8 751185.     14.1186.     14.1187.     13.1188.     13.1189.     12.
8 801190.     12.1191.     12.1192.     11.1193.     11.1194.     11.
8 851195.     10.1196.     10.1197.     10.1198.      9.1199.      9.
8 901200.      9.1201.      9.1202.      8.1203.      8.1204.      8.
8 951205.      8.1206.      8.1207.      8.1208.      7.1209.      7.
81001210.      7.1211.      7.1212.      7.1213.      7.1214.      7.
81051215.      7.1216.      7.1217.      7.1218.      7.1219.      7.
81101220.      7.1221.      7.1222.      7.1223.      7.1224.      6.
81151225.      6.1226.      6.1227.      6.1228.      6.1229.      6.
81201230.      6.1231.      6.1232.      6.1233.      6.1234.      6.
81251235.      6.1236.      6.1237.      6.1238.      6.1239.      6.
81301240.      6.1241.      6.1242.      6.1243.      6.1244.      6.
81351245.      6.1246.      6.1247.      6.1248.      6.1249.      5.
81401250.      5.1251.      5.1252.      5.1253.      5.1254.      5.
81451255.      5.1256.      5.1257.      5.1258.      5.1259.      5.
81501260.      5.1261.      5.1262.      5.1263.      5.1264.      5.
81551265.      5.1266.      5.1267.      5.1268.      5.1269.      5.
81601270.      5.1271.      5.1272.      5.1273.      5.1274.      5.
81651275.      5.1276.      5.1277.      5.1278.      5.1279.      5.
81701280.      5.1281.      5.1282.      5.1283.      5.1284.      5.
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81751285.      5.1286.      5.1287.      5.1288.      5.1289.      5.
81801290.      5.1291.      5.1292.      5.1293.      5.1294.      5.
81851295.      5.1296.      5.1297.      4.1298.      4.1299.      4.
81901300.      4.1310.      4.1320.      4.1330.      4.1340.      4.
81951350.      4.1360.      4.1370.      4.1380.      4.1390.      4.
82001400.      3.1420.      3.1440.      3.1460.      3.1500.      3.
7   930   53A   109.5 461160    164.200  4
8  5   0.       0. 100.      5. 200.      5. 300.      5. 400.      5.
8 10 500.       6. 600.      6. 700.      7. 800.      7. 900.      8.
8 151000.      12.1050.     17.1100.     25.1110.     30.1120.     36.
8 201130.      45.1131.     46.1132.     47.1133.     48.1134.     49.
8 251135.      50.1136.     52.1137.     53.1138.     54.1139.     56.
8 301140.      57.1141.     59.1142.     62.1143.     64.1144.     66.
8 351145.      68.1146.     72.1147.     75.1148.     78.1149.     85.
8 401150.      95.1151.    104.1152.    115.1153.    128.1154.    137.
8 451155.     144.1156.    152.1157.    158.1158.    162.1159.    164.
8 501160.     164.1161.    164.1162.    158.1163.    150.1164.    143.
8 551165.     134.1166.    124.1167.    117.1168.    111.1169.    104.
8 601170.      97.1171.     89.1172.     81.1173.     73.1174.     66.
8 651175.      59.1176.     53.1177.     48.1178.     45.1179.     41.
8 701180.      38.1181.     36.1182.     34.1183.     32.1184.     30.
8 751185.      29.1186.     27.1187.     26.1188.     25.1189.     24.
8 801190.      23.1191.     22.1192.     22.1193.     21.1194.     20.
8 851195.      20.1196.     19.1197.     19.1198.     18.1199.     18.
8 901200.      17.1201.     17.1202.     16.1203.     16.1204.     15.
8 951205.      15.1206.     15.1207.     15.1208.     14.1209.     14.
81001210.      14.1211.     13.1212.     13.1213.     13.1214.     13.
81051215.      12.1216.     12.1217.     12.1218.     12.1219.     11.
81101220.      11.1221.     11.1222.     11.1223.     11.1224.     10.
81151225.      10.1226.     10.1227.     10.1228.     10.1229.     10.
81201230.      10.1231.     10.1232.      9.1233.      9.1234.      9.
81251235.       9.1236.      9.1237.      9.1238.      9.1239.      9.
81301240.       9.1241.      9.1242.      9.1243.      9.1244.      8.
81351245.       8.1246.      8.1247.      8.1248.      8.1249.      8.
81401250.       8.1251.      8.1252.      8.1253.      8.1254.      8.
81451255.       8.1256.      8.1257.      8.1258.      8.1259.      8.
81501260.       8.1261.      8.1262.      8.1263.      8.1264.      8.
81551265.       7.1266.      7.1267.      7.1268.      7.1269.      7.
81601270.       7.1271.      7.1272.      7.1273.      7.1274.      7.
81651275.       7.1276.      7.1277.      7.1278.      7.1279.      7.
81701280.       7.1281.      7.1282.      7.1283.      7.1284.      7.
81751285.       7.1286.      7.1287.      7.1288.      7.1289.      7.
81801290.       7.1291.      7.1292.      7.1293.      7.1294.      7.
81851295.       7.1296.      7.1297.      7.1298.      7.1299.      6.
81901300.       6.1310.      6.1320.      6.1330.      6.1340.      6.
81951350.       6.1360.      5.1370.      5.1380.      5.1390.      5.
82001400.       5.1420.      5.1440.      5.1460.      5.1500.      5.
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Basin B

Subarea	Area (Ac)	%imp	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in)	Tc-calculated (min)	Intensity (in/hr)	Cu	Cd
2A	2.3	0.01	98	340	0.300	6.20	5	3.70	0.86	0.86
4A	2.9	0.60	98	450	0.030	6.20	5	3.70	0.86	0.88
6B	1.8	0.60	98	390	0.040	5.44	5	3.25	0.85	0.88
7B	2.5	0.60	98	570	0.040	5.44	6	2.98	0.84	0.88
8B	1.5	0.60	98	640	0.040	5.44	7	2.77	0.83	0.87
9B	4.9	0.60	98	910	0.020	6.20	9	2.81	0.83	0.87
10B	2.0	0.01	98	680	0.025	5.44	8	2.60	0.82	0.82
13A	1.5	0.01	98	890	0.025	5.44	10	2.34	0.81	0.81
14A	4.0	0.60	98	1150	0.018	6.20	11	2.55	0.82	0.87
16A	2.5	0.91	98	2100	0.019	5.44	16	1.88	0.78	0.89
17A	0.7	0.91	98	520	0.018	5.36	7	2.73	0.83	0.89
19A	1.6	0.01	98	890	0.015	5.36	11	2.21	0.81	0.81
20A	3.3	0.91	98	2100	0.019	5.44	16	1.88	0.78	0.89
21C	1.5	0.01	98	840	0.015	5.44	10	2.34	0.81	0.81
22C	1.0	0.60	98	410	0.060	5.44	5	3.25	0.85	0.88
23C	0.8	0.01	98	650	0.070	5.36	7	2.73	0.83	0.83
24C	1.6	0.91	98	810	0.075	5.36	7	2.73	0.83	0.89

Skipped Basin No's: 5B, 12A, 18A, 27A, 28A

Basin B Continued

Subarea	Area (Ac)	%imp	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in)	Tc-calculated (min)	Intensity (in/hr)	Cu	Cd
25C	4.4	0.60	98	830	0.018	6.10	9	2.76	0.83	0.87
29A	2.2	0.80	98	360	0.020	6.10	5	3.64	0.86	0.89
30D	2.8	0.01	98	890	0.020	6.10	9	2.76	0.83	0.83
31D	5.4	0.60	98	1290	0.020	6.10	12	2.41	0.81	0.86
32D	6.3	0.60	98	1340	0.020	6.10	12	2.41	0.81	0.86
33D	2.8	0.80	98	460	0.020	6.00	6	3.29	0.85	0.89
35E	2.6	0.80	98	730	0.015	6.10	8	2.92	0.83	0.89
36E	2.9	0.80	98	730	0.015	6.10	8	2.92	0.83	0.89
37E	2.1	0.01	98	850	0.014	5.36	11	2.21	0.81	0.81
38E	3.7	0.80	98	860	0.015	6.00	9	2.72	0.83	0.89
39E	1.7	0.01	98	530	0.030	5.27	7	2.68	0.83	0.83
40E	3.2	0.65	98	1510	0.025	6.00	12	2.37	0.81	0.87
41E	2.0	0.80	98	1530	0.025	6.00	12	2.37	0.81	0.88
42E	11.4	0.80	98	1370	0.020	6.00	12	2.37	0.81	0.88
43E	2.1	0.10	98	1200	0.040	5.27	11	2.17	0.81	0.82
46A	2.2	0.91	98	990	0.015	5.09	11	2.10	0.80	0.89
47A	1.7	0.91	98	1000	0.015	5.09	11	2.10	0.80	0.89
48A	14.5	0.91	98	780	0.020	5.80	8	2.77	0.83	0.89
49F	26.0	0.01	98	1900	0.100	5.80	12	2.29	0.81	0.81
50F	24.4	0.01	98	1820	0.090	5.80	12	2.29	0.81	0.81
51F	26.2	0.01	98	1550	0.100	5.80	10	2.50	0.82	0.82
54A	8.7	0.01	20	1000	0.020	5.80	14	2.13	0.53	0.53

Program Package Serial Number: 2084
08/17/10 FILE: 201D-C INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 1
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\lasoilx.dat
TENT. TRACT 53295 DRAINAGE CONCEPT - DEV. CONDITION - BASIN C

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
201	1A	10.4	26.17	10.4	26.17	4	210.	.05000	2.00	.00	0.	98	8	A30	.80
201	2A	1.3	2.99	11.7	29.16	4	60.	.05000	2.00	.00	0.	98	7	A26	.70
201	3A	2.0	3.90	13.7	33.03	4	10.	.02000	2.00	.00	0.	98	9	A26	.20
201	4A	1.5	3.09	15.2	36.10	4	50.	.02000	2.25	.00	0.	98	9	A26	.75
201	5A	1.1	2.49	16.3	38.53	4	10.	.02000	2.25	.00	0.	98	7	A26	.50
201	6A	2.9	5.08	19.2	43.60	4	70.	.02000	2.25	.00	0.	98	13	A26	.90
201	7A	3.3	6.22	22.5	49.67	4	740.	.05000	2.00	.00	0.	98	11	A26	.80
201	8A	.0	.00	22.5	49.33	4	1.	.03000	2.25	.00	0.	98	99	A26	.00
201	9A	.0	.00	22.5	49.33	4	1.	.03000	2.25	.00	0.	98	99	A26	.00
201	10A	3.2	6.25	25.7	55.32	4	300.	.05000	2.25	.00	0.	98	9	A26	.20
201	11A	1.5	3.00	27.2	58.03	4	30.	.05000	2.25	.00	0.	98	10	A26	.90
201	12B	.9	2.49	.9	2.49	4	10.	.03000	2.00	.00	0.	98	5	A26	.80

CONFLUENCE Q'S

201 13A TA 1156 QA 58.00 QAB 59.54 QB 1.54 201 13B TB 1153 QB 2.47 QBA 50.89 QA 48.41
201 13AB TAB 1156 QAB 59.54 QA 58.00 QB 1.54

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
201	13AB	.9	2.47	28.1	59.54	4	60.	.02000	2.50	.00	0.	98	0	A26	.00
201	14A	1.6	2.98	29.7	62.29	4	20.	.02000	2.50	.00	0.	98	10	A26	.20
201	15A	3.2	6.40	32.9	68.32	4	10.	.02000	2.75	.00	0.	98	10	A26	.90

Program Package Serial Number: 2084
08/17/10 FILE: 201D-C INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 2
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:
HYDROGRAPH AT POINT 15A
HYDROGRAPH AT 201 15A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.60	100	3.55	200	3.67	300	3.81	400	3.96
500	4.15	600	4.39	700	4.69	800	5.10	900	5.69
1000	6.81	1050	8.57	1100	11.17	1110	13.40	1120	15.78
1130	18.30	1131	18.61	1132	18.92	1133	19.25	1134	19.61
1135	19.97	1136	20.40	1137	20.91	1138	21.48	1139	22.18
1140	22.92	1141	23.75	1142	24.58	1143	25.42	1144	26.30
1145	27.46	1146	28.73	1147	30.15	1148	31.74	1149	34.88
1150	39.34	1151	45.01	1152	51.91	1153	59.05	1154	64.16
1155	67.17	1156	68.32	1157	67.85	1158	65.30	1159	60.10
1160	53.26	1161	45.91	1162	38.29	1163	31.43	1164	26.53
1165	23.07	1166	20.45	1167	18.63	1168	17.11	1169	15.98
1170	15.08	1171	14.36	1172	13.76	1173	13.25	1174	12.77
1175	12.36	1176	11.99	1177	11.64	1178	11.30	1179	11.05
1180	10.77	1181	10.51	1182	10.26	1183	10.00	1184	9.82
1185	9.64	1186	9.41	1187	9.22	1188	9.04	1189	8.92
1190	8.82	1191	8.66	1192	8.50	1193	8.38	1194	8.24
1195	8.14	1196	8.03	1197	7.94	1198	7.82	1199	7.68
1200	7.58	1201	7.54	1202	7.44	1203	7.32	1204	7.24
1205	7.12	1206	7.05	1207	6.96	1208	6.92	1209	6.85
1210	6.80	1211	6.75	1212	6.71	1213	6.67	1214	6.59
1215	6.55	1216	6.50	1217	6.43	1218	6.35	1219	6.29
1220	6.24	1221	6.20	1222	6.14	1223	6.10	1224	6.07
1225	6.01	1226	5.97	1227	5.98	1228	5.93	1229	5.90
1230	5.85	1231	5.81	1232	5.78	1233	5.76	1234	5.72
1235	5.72	1236	5.68	1237	5.65	1238	5.64	1239	5.60
1240	5.59	1241	5.54	1242	5.49	1243	5.46	1244	5.44
1245	5.40	1246	5.41	1247	5.38	1248	5.36	1249	5.36
1250	5.32	1251	5.32	1252	5.30	1253	5.25	1254	5.23
1255	5.22	1256	5.18	1257	5.16	1258	5.14	1259	5.11
1260	5.09	1261	5.05	1262	5.04	1263	5.02	1264	5.01
1265	4.99	1266	4.98	1267	4.96	1268	4.95	1269	4.93
1270	4.92	1271	4.91	1272	4.90	1273	4.89	1274	4.89
1275	4.89	1276	4.87	1277	4.86	1278	4.84	1279	4.81
1280	4.80	1281	4.76	1282	4.75	1283	4.73	1284	4.71
1285	4.69	1286	4.68	1287	4.68	1288	4.67	1289	4.64
1290	4.62	1291	4.62	1292	4.61	1293	4.58	1294	4.58
1295	4.59	1296	4.58	1297	4.56	1298	4.55	1299	4.54
1300	4.53	1310	4.41	1320	4.32	1330	4.19	1340	4.13
1350	4.05	1360	3.95	1370	3.88	1380	3.85	1390	3.81
1400	3.75	1420	3.64	1440	3.56	1460	3.25	1500	3.25

TOTAL VOLUME THIS HYDROGRAPH = 11.77(Ac.Ft)

Basin C

Subarea	Area (Ac)	%imp	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in)	Tc-calculated (min)	Intensity (in/hr)	Cu	Cd
1A	10.4	0.80	98	760	0.020	6.0	8	2.87	0.83	0.89
2A	1.3	0.82	98	720	0.055	5.27	7	2.68	0.83	0.89
3A	2.0	0.01	98	590	0.012	5.27	9	2.39	0.81	0.81
4A	1.5	0.91	98	1060	0.060	5.27	9	2.39	0.81	0.89
5A	1.1	0.64	98	720	0.050	5.27	7	2.68	0.83	0.87
6A	2.9	0.91	98	1240	0.012	5.27	13	2.01	0.80	0.89
7A	3.3	0.78	98	900	0.012	5.27	11	2.17	0.81	0.88
10A	3.2	0.01	98	1140	0.080	5.27	10	2.27	0.81	0.81
11A	1.5	0.91	98	1170	0.040	5.27	10	2.27	0.81	0.89
12C	0.9	0.78	98	400	0.040	5.27	5	3.14	0.84	0.89
14A	1.6	0.01	98	980	0.040	5.27	10	2.27	0.81	0.81
15A	3.2	0.91	98	1140	0.040	5.27	10	2.27	0.81	0.89

Skipped: 8A and 9A

Program Package Serial Number: 2084
05/04/10 FILE: 201D-D INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 1
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\lasoilx.dat

TENT. TRACT 53295 DRAINAGE CONCEPT - DEV. CONDITION - BASIN D

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
201	1A	3.1	5.35	3.1	5.35	4	20.	.03000	2.00	.00	0.	98	11	A26	.01
201	2A	.0	.00	3.1	5.35	4	1.	.01000	2.00	.00	0.	98	99	A26	.00
201	3A	.6	1.32	3.7	6.67	4	70.	.03000	2.00	.00	0.	98	8	A26	.91
201	4A	1.3	2.99	5.0	9.65	4	30.	.03000	2.00	.00	0.	98	7	A26	.73
201	5A	2.1	3.57	7.1	13.21	4	80.	.01500	2.00	.00	0.	98	14	A26	.91
201	6A	1.9	3.23	9.0	16.40	4	580.	.03500	2.00	.00	0.	98	14	A26	.91
201	7A	10.7	26.45	19.7	42.15	4	150.	.05000	2.00	.00	0.	98	9	A31	.80
201	8A	1.0	2.17	20.7	44.15	4	610.	.04500	2.00	.00	0.	98	7	A26	.01
201	9A	1.7	3.69	22.4	47.07	4	140.	.04500	2.00	.00	0.	98	7	A26	.01
201	10A	30.2	59.34	52.6	105.92	4	30.	.04000	2.75	.00	0.	98	14	A30	.91
201	11A	2.3	4.20	54.9	110.08	4	40.	.03000	3.00	.00	0.	98	12	A26	.91
201	12A	3.2	5.99	58.1	115.93	4	60.	.01300	3.50	.00	0.	98	11	A26	.73
201	13A	1.1	2.80	59.2	118.26	4	230.	.01300	3.50	.00	0.	98	7	A30	.01
201	14A	1.8	4.25	61.0	121.01	4	100.	.02000	3.25	.00	0.	98	6	A26	.01
201	15A	1.1	3.06	62.1	122.70	4	240.	.03000	3.00	.00	0.	98	5	A26	.91

Program Package Serial Number: 2084
05/04/10 FILE: 201D-D INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 2
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:
HYDROGRAPH AT POINT 15A
HYDROGRAPH AT 201 15A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.60	100	6.71	200	6.95	300	7.26	400	7.61
500	8.04	600	8.57	700	9.25	800	10.14	900	11.49
1000	13.96	1050	17.50	1100	22.66	1110	26.63	1120	31.34
1130	36.22	1131	36.90	1132	37.55	1133	38.28	1134	39.12
1135	39.96	1136	40.75	1137	41.63	1138	42.70	1139	43.88
1140	45.04	1141	46.42	1142	48.09	1143	49.87	1144	51.65
1145	53.75	1146	56.38	1147	59.21	1148	62.03	1149	67.24
1150	75.93	1151	86.30	1152	97.15	1153	108.31	1154	116.80
1155	121.34	1156	122.70	1157	121.79	1158	119.01	1159	114.70
1160	108.53	1161	101.03	1162	93.26	1163	84.62	1164	74.37
1165	64.38	1166	55.69	1167	47.67	1168	41.01	1169	36.68
1170	33.85	1171	31.52	1172	29.71	1173	28.28	1174	27.08
1175	26.02	1176	25.13	1177	24.37	1178	23.60	1179	22.91
1180	22.32	1181	21.77	1182	21.25	1183	20.78	1184	20.32
1185	19.89	1186	19.55	1187	19.17	1188	18.79	1189	18.48
1190	18.15	1191	17.79	1192	17.51	1193	17.29	1194	17.06
1195	16.84	1196	16.59	1197	16.35	1198	16.14	1199	15.95
1200	15.68	1201	15.44	1202	15.22	1203	15.03	1204	14.90
1205	14.76	1206	14.58	1207	14.44	1208	14.33	1209	14.19
1210	14.07	1211	13.93	1212	13.78	1213	13.64	1214	13.53
1215	13.43	1216	13.32	1217	13.19	1218	13.07	1219	12.97
1220	12.86	1221	12.74	1222	12.64	1223	12.52	1224	12.40
1225	12.34	1226	12.27	1227	12.17	1228	12.06	1229	11.97
1230	11.91	1231	11.88	1232	11.82	1233	11.75	1234	11.67
1235	11.63	1236	11.53	1237	11.46	1238	11.35	1239	11.23
1240	11.15	1241	11.11	1242	11.08	1243	11.06	1244	11.01
1245	10.90	1246	10.82	1247	10.79	1248	10.76	1249	10.70
1250	10.65	1251	10.63	1252	10.62	1253	10.60	1254	10.56
1255	10.48	1256	10.40	1257	10.32	1258	10.26	1259	10.25
1260	10.22	1261	10.16	1262	10.11	1263	10.08	1264	10.03
1265	9.95	1266	9.92	1267	9.90	1268	9.86	1269	9.82
1270	9.78	1271	9.76	1272	9.73	1273	9.69	1274	9.66
1275	9.61	1276	9.55	1277	9.53	1278	9.51	1279	9.50
1280	9.49	1281	9.46	1282	9.39	1283	9.33	1284	9.30
1285	9.29	1286	9.26	1287	9.20	1288	9.16	1289	9.14
1290	9.13	1291	9.12	1292	9.11	1293	9.08	1294	9.04
1295	8.99	1296	8.95	1297	8.93	1298	8.92	1299	8.86
1300	8.82	1310	8.62	1320	8.44	1330	8.18	1340	7.95
1350	7.84	1360	7.66	1370	7.44	1380	7.35	1390	7.29
1400	7.15	1420	6.87	1440	6.71	1460	6.60	1500	6.60

TOTAL VOLUME THIS HYDROGRAPH = 23.32(Ac.Ft)

Basin D

Subarea	Area (Ac)	%imp	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in)	Tc-calculated (min)	Intensity (in/hr)	Cu	Cd
1A	3.1	0.01	98	880	0.012	5.27	11	2.17	0.81	0.81
3A	0.6	0.91	98	780	0.050	5.27	8	2.52	0.82	0.89
4A	1.3	0.73	98	710	0.050	5.27	7	2.68	0.83	0.88
5A	2.1	0.91	98	1330	0.012	5.27	14	1.94	0.79	0.89
6A	1.9	0.91	98	1410	0.012	5.27	14	1.94	0.79	0.89
7A	10.7	0.80	98	860	0.020	6.10	9	2.76	0.83	0.89
8A	1.0	0.01	98	600	0.050	5.27	7	2.68	0.83	0.83
9A	1.7	0.01	98	580	0.050	5.27	7	2.68	0.83	0.83
10A	30.2	0.91	98	2000	0.030	5.90	14	2.17	0.81	0.89
11A	2.3	0.91	98	1420	0.043	5.27	12	2.08	0.80	0.89
12A	3.2	0.73	98	1380	0.043	5.27	11	2.17	0.81	0.88
13A	1.1	0.01	98	560	0.015	5.90	7	3.01	0.84	0.84
14A	1.8	0.01	98	460	0.050	5.27	6	2.89	0.83	0.83
15A	1.1	0.91	98	360	0.025	5.27	5	3.14	0.84	0.89

Note: Skipped No's: 2A, 7A

Program Package Serial Number: 2084
01/07/10 FILE: 201D-E INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 1
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\lasoilx.dat

TENT. TRACT 53295 DRAINAGE CONCEPT - DEV. CONDITION - BASIN E

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM RAIN ZONE	DAY 4 PCT IMPV
201	1A	23.1	52.57	23.1	52.57	2	680.	.08000	.00	.00	0.	298	11	A31	.01
201	2A	6.9	21.18	30.0	70.32	2	900.	.03500	.00	.00	0.	298	6	A31	.01
201	3A	11.5	30.53	41.5	94.18	4	280.	.02000	3.00	.00	0.	298	8	A31	.01
201	4A	2.5	8.52	44.0	96.91	4	270.	.02000	3.00	.00	0.	298	5	A31	.01
201	5A	2.9	7.61	46.9	102.90	4	40.	.02000	3.25	.00	0.	98	8	A31	.91

BULKING CALCULATION

SAMPLE CALCULATION

Q_{BB} - Q BURNED BULKED

Q_B - Q BURNED

DPA 8 - BULKING FACTOR = 1.36

$Q_{BB} = Q_B \times$ BULKING FACTOR

AREA 1A

$Q_B = 52.57$ cfs $Q_{BB} = 71.50$ cfs Add 18.93 cfs to All Downstream

AREA 2A

$Q_B = 21.18$ cfs $Q_{BB} = 28.80$ cfs Add 7.62 cfs to All Downstream

DEBRIS VOLUME

DPA 8 - 35,000 CY/sq mi = 55 CY/Ac

AREA 1A, 2A & 3A

1A: OFFSITE AREA = 23.1 AC
2A: OFFSITE AREA = 6.9 AC
3A: ONSITE AREA = 11.5 AC
A_T = 41.5 AC

D.V. = 2283 CY

AREA 4A

A_T = 2.5 AC $A_{UNDEVELOPED}$ = 1.8 AC D.V. = 99 CY

Program Package Serial Number: 2084
01/07/10 FILE: 201D-E INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 2
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:
HYDROGRAPH AT POINT 5A
HYDROGRAPH AT 201 5A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.60	100	2.27	200	2.37	300	2.49	400	2.63
500	2.80	600	3.00	700	3.27	800	3.63	900	4.33
1000	6.48	1050	9.36	1100	13.74	1110	17.03	1120	21.08
1130	25.49	1131	26.05	1132	26.51	1133	27.02	1134	27.67
1135	28.41	1136	29.15	1137	29.99	1138	30.95	1139	31.91
1140	32.92	1141	34.07	1142	35.28	1143	36.58	1144	37.98
1145	39.71	1146	41.79	1147	44.04	1148	46.34	1149	50.55
1150	56.79	1151	64.09	1152	72.43	1153	81.97	1154	90.18
1155	96.30	1156	101.14	1157	102.90	1158	100.84	1159	95.46
1160	88.09	1161	79.54	1162	72.00	1163	66.09	1164	60.87
1165	55.47	1166	50.00	1167	44.56	1168	39.34	1169	34.65
1170	30.68	1171	27.52	1172	25.01	1173	23.02	1174	21.33
1175	19.95	1176	18.78	1177	17.79	1178	16.94	1179	16.18
1180	15.49	1181	14.82	1182	14.25	1183	13.75	1184	13.32
1185	12.86	1186	12.46	1187	12.09	1188	11.73	1189	11.40
1190	11.09	1191	10.80	1192	10.52	1193	10.25	1194	9.98
1195	9.74	1196	9.49	1197	9.28	1198	9.07	1199	8.86
1200	8.66	1201	8.49	1202	8.31	1203	8.13	1204	7.99
1205	7.83	1206	7.70	1207	7.56	1208	7.42	1209	7.25
1210	7.08	1211	6.94	1212	6.82	1213	6.72	1214	6.57
1215	6.44	1216	6.33	1217	6.23	1218	6.14	1219	6.04
1220	5.96	1221	5.83	1222	5.75	1223	5.64	1224	5.56
1225	5.47	1226	5.36	1227	5.30	1228	5.21	1229	5.14
1230	5.07	1231	5.02	1232	4.94	1233	4.85	1234	4.77
1235	4.68	1236	4.61	1237	4.55	1238	4.47	1239	4.42
1240	4.36	1241	4.30	1242	4.26	1243	4.21	1244	4.17
1245	4.13	1246	4.10	1247	4.06	1248	4.04	1249	4.01
1250	3.97	1251	3.94	1252	3.91	1253	3.89	1254	3.86
1255	3.84	1256	3.82	1257	3.78	1258	3.78	1259	3.76
1260	3.74	1261	3.72	1262	3.72	1263	3.69	1264	3.68
1265	3.66	1266	3.64	1267	3.61	1268	3.61	1269	3.57
1270	3.56	1271	3.54	1272	3.53	1273	3.52	1274	3.51
1275	3.50	1276	3.47	1277	3.47	1278	3.44	1279	3.42
1280	3.41	1281	3.40	1282	3.37	1283	3.37	1284	3.36
1285	3.33	1286	3.34	1287	3.33	1288	3.30	1289	3.29
1290	3.30	1291	3.27	1292	3.26	1293	3.25	1294	3.22
1295	3.22	1296	3.21	1297	3.21	1298	3.19	1299	3.18
1300	3.16	1310	3.07	1320	3.00	1330	2.90	1340	2.81
1350	2.75	1360	2.69	1370	2.61	1380	2.56	1390	2.50
1400	2.46	1420	2.38	1440	2.29	1460	1.94	1500	1.94

TOTAL VOLUME THIS HYDROGRAPH = 11.18(Ac.Ft)

Basin E

Subarea	Area (Ac)	%imp	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in)	Tc-calculated (min)	Intensity (in/hr)	Cu	Cd
1A	23.1	0.01	98	1970	.133	6.20	11	2.55	0.82	0.82
2A	6.9	0.01	98	680	.080	6.20	6	3.40	0.85	0.85
3A	11.5	0.01	98	900	0.035	6.20	8	2.97	0.84	0.84
4A	2.5	0.01	98	410	0.30	6.20	5	3.70	0.86	0.86
5A	2.9	0.91	98	700	0.030	5.36	8	2.56	0.82	0.89

Program Package Serial Number: 2084
01/07/10 FILE: 201D-F INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 1
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\lasoilx.dat

TENT. TRACT 53295 DRAINAGE CONCEPT - DEV. CONDITION - BASIN F

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
201	1A	3.9	11.97	3.9	11.97	4	80.	.04000	2.00	.00	0.	298	6	A31	.01
201	2A	.0	.00	3.9	11.97	4	1.	.01000	2.00	.00	0.	98	99	A31	.00

DEBRIS VOLUME

DPA - 35,000 CY/AC = 55 CY/AC

AREA 1A

AREA = 3.9 AC

D.V. = 215 CY

Program Package Serial Number: 2084
01/07/10 FILE: 201D-F INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 2
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:
HYDROGRAPH AT POINT 2A
HYDROGRAPH AT 201 2A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	1.00	200	1.00	300	1.00	400	1.00
500	1.00	600	1.00	700	1.00	800	1.00	900	1.00
1000	1.00	1050	1.00	1100	1.15	1110	1.60	1120	1.88
1130	2.29	1131	2.36	1132	2.39	1133	2.46	1134	2.59
1135	2.70	1136	2.80	1137	2.91	1138	3.05	1139	3.15
1140	3.22	1141	3.38	1142	3.58	1143	3.73	1144	3.86
1145	4.13	1146	4.49	1147	4.74	1148	4.97	1149	6.17
1150	7.84	1151	9.13	1152	10.44	1153	11.75	1154	11.97
1155	10.74	1156	9.03	1157	7.43	1158	5.61	1159	3.87
1160	2.98	1161	2.72	1162	2.35	1163	2.16	1164	1.99
1165	1.85	1166	1.72	1167	1.62	1168	1.53	1169	1.46
1170	1.38	1171	1.33	1172	1.27	1173	1.22	1174	1.16
1175	1.11	1176	1.08	1177	1.04	1178	1.01	1179	1.00
1180	1.00	1181	1.00	1182	1.00	1183	1.00	1184	1.00
1185	1.00	1186	1.00	1187	1.00	1188	1.00	1189	1.00
1190	1.00	1191	1.00	1192	1.00	1193	1.00	1194	1.00
1195	1.00	1196	1.00	1197	1.00	1198	1.00	1199	1.00
1200	1.00	1201	1.00	1202	1.00	1203	1.00	1204	1.00
1205	1.00	1206	1.00	1207	1.00	1208	1.00	1209	1.00
1210	1.00	1211	1.00	1212	1.00	1213	1.00	1214	1.00
1215	1.00	1216	1.00	1217	1.00	1218	1.00	1219	1.00
1220	1.00	1221	1.00	1222	1.00	1223	1.00	1224	1.00
1225	1.00	1226	1.00	1227	1.00	1228	1.00	1229	1.00
1230	1.00	1231	1.00	1232	1.00	1233	1.00	1234	1.00
1235	1.00	1236	1.00	1237	1.00	1238	1.00	1239	1.00
1240	1.00	1241	1.00	1242	1.00	1243	1.00	1244	1.00
1245	1.00	1246	1.00	1247	1.00	1248	1.00	1249	1.00
1250	1.00	1251	1.00	1252	1.00	1253	1.00	1254	1.00
1255	1.00	1256	1.00	1257	1.00	1258	1.00	1259	1.00
1260	1.00	1261	1.00	1262	1.00	1263	1.00	1264	1.00
1265	1.00	1266	1.00	1267	1.00	1268	1.00	1269	1.00
1270	1.00	1271	1.00	1272	1.00	1273	1.00	1274	1.00
1275	1.00	1276	1.00	1277	1.00	1278	1.00	1279	1.00
1280	1.00	1281	1.00	1282	1.00	1283	1.00	1284	1.00
1285	1.00	1286	1.00	1287	1.00	1288	1.00	1289	1.00
1290	1.00	1291	1.00	1292	1.00	1293	1.00	1294	1.00
1295	1.00	1296	1.00	1297	1.00	1298	1.00	1299	1.00
1300	1.00	1310	1.00	1320	1.00	1330	1.00	1340	1.00
1350	1.00	1360	1.00	1370	1.00	1380	1.00	1390	1.00
1400	1.00	1420	1.00	1440	1.00	1460	1.00	1500	1.00

TOTAL VOLUME THIS HYDROGRAPH = 2.22(Ac.Ft)

Basin F

Subarea	Area (Ac)	%imp	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in)	Tc-calculated (min)	Intensity (in/hr)	Cu	Cd
1A	3.9	0.01	98	640	0.100	6.1	6	3.34	0.85	0.85

Program Package Serial Number: 2084
05/07/10 FILE: 201D-G INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\lasoilx.dat

ENTRADA TTM NO. 53295 - DRAINAGE CONCEPT - OFFSITE BASIN G

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
201	1A	35.8	63.87	35.8	63.87	2	100.	.10000	.00	.00	0.	297	16	A32	.01
201	2A	37.4	77.54	73.2	141.09	2	1200.	.06000	.00	.00	0.	297	12	A32	.01
201	3A	12.9	29.65	86.1	167.41	2	580.	.10000	.00	.00	0.	297	10	A32	.01
201	4A	29.1	51.91	115.2	217.51	2	300.	.06000	.00	.00	0.	297	16	A32	.01
201	5A	37.6	67.08	152.8	282.89	2	11.	.05000	.00	.00	0.	297	16	A32	.01
201	6A	27.4	56.81	180.2	336.85	2	50.	.05000	.00	.00	0.	297	12	A32	.01
201	7A	37.1	66.19	217.3	401.96	2	820.	.05000	.00	.00	0.	297	16	A32	.01
201	8A	24.9	51.62	242.2	448.65	2	70.	.05000	.00	.00	0.	297	12	A32	.01
201	9B	21.4	46.56	21.4	46.56	2	490.	.06000	.00	.00	0.	297	11	A32	.01
201	10B	26.8	55.56	48.2	101.66	2	1030.	.06000	.00	.00	0.	297	12	A32	.01
201	11B	12.3	30.27	60.5	126.56	2	540.	.06000	.00	.00	0.	297	8	A31	.01
201	12B	30.1	53.57	90.6	177.77	2	180.	.06000	.00	.00	0.	297	15	A31	.01

CONFLUENCE Q'S

201 13A TA 1158 QA 448.47 QAB 625.39 QB 176.93 201 13B TB 1158 QB 176.93 QBA 625.39 QA 448.47

201 13AB TAB 1158 QAB 625.39 QA 448.47 QB 176.93

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
201	13AB	90.6	176.93	332.8	625.39	2	710.	.05000	.00	.00	0.	297	0	A31	.00
201	14A	33.0	68.42	365.8	684.88	2	920.	.04000	.00	.00	0.	297	12	A32	.01
201	15A	30.2	60.36	396.0	735.09	2	130.	.05000	.00	.00	0.	297	12	A31	.01
201	16A	22.1	44.17	418.1	773.46	2	960.	.04000	.00	.00	0.	297	12	A31	.01
201	17A	37.5	66.73	455.6	828.57	2	200.	.04000	.00	.00	0.	297	15	A31	.01
201	18C	12.0	25.13	12.0	25.13	2	150.	.03000	.00	.00	0.	297	11	A31	.01

CONFLUENCE Q'S

201 19A TA 1161 QA 828.41 QAC 846.82 QC 18.41 201 19C TC 1155 QC 25.13 QCA 631.77 QA 606.64

201 19AC TAC 1161 QAC 846.82 QA 828.41 QC 18.41

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
201	19AC	12.0	25.13	467.6	846.82	4	200.	.01000	7.75	.00	0.	297	0	A31	.00

BULKING CALCULATION

SAMPLE CALCULATION

Q_{BB} - Q BURNED BULKED Q_B - Q BURNED

DPA 5 - BULKING FACTOR = 1.47 DPA 8 - BULKING FACTOR = 1.36

$Q_{BB} = Q_B \times$ BULKING FACTOR

AREA 1A

Q_B = 63.87 CFS DPA 5 Q_{BB} = 93.89 CFS ADD 30.02 cfs TO All DOWNSTREAM

AREA 2A

Q_B = 77.54 cfs DPA 5 Q_{BB} = 113.98 cfs ADD 36.44 cfs TO All Downstream

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AREA 3A

Q_B = 29.65 cfs DPA 5 Q_{BB} = 43.59 cfs ADD 13.94 cfs TO All Downstream

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AREA 4A

Q_B = 51.91 cfs DPA 5 Q_{BB} = 76.31 cfs ADD 24.40 cfs TO All Downstream

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AREA 5A

Q_B = 67.08 cfs 60% DPA 5, 40% DPA 8 Q_{BB} = 95.66 cfs ADD 28.58 cfs TO All DOWNSTREAM

AREA 6A

Q_B = 56.81 cfs 80% DPA 5, 20% DPA 8 Q_{BB} = 82.26 cfs ADD 25.45 cfs TO All DOWNSTREAM

AREA 7A

Q_B = 66.19 CFS DPA 8 Q_{BB} = 90.02 cfs ADD 23.83 cfs TO All DOWNSTREAM

AREA 8A

Q_B = 51.62 cfs 70% DPA 5, 30% DPA 8 Q_{BB} = 74.18 cfs ADD 22.56 cfs TO All DOWNSTREAM

AREA 9B

Q_B = 46.56 cfs DPA 8 Q_{BB} = 63.32 cfs ADD 16.76 cfs TO All DOWNSTREAM

+ 221.98

AREA 10B Q_B = 55.56 cfs	DPA 8	Q_{BB} = 75.56 cfs	ADD 20.00 cfs TO All DOWNSTREAM
AREA 11B Q_B = 30.27 cfs	DPA 8	Q_{BB} = 41.17 cfs	ADD 10.90 cfs TO All DOWNSTREAM
AREA 12B Q_B = 53.57 cfs	DPA 8	Q_{BB} = 72.86 cfs	ADD 19.29 cfs TO All DOWNSTREAM
AREA 14A Q_B = 68.42 cfs	DPA 8	Q_{BB} = 93.05 cfs	ADD 24.63 cfs TO All DOWNSTREAM
AREA 15A Q_B = 60.36 cfs	30% DPA 5 70% DPA 8	Q_{BB} = 84.08 cfs	ADD 23.72 cfs TO All DOWNSTREAM
AREA 16A Q_B = 44.17 cfs	DPA 8	Q_{BB} = 60.07 cfs	ADD 15.90 cfs TO All DOWNSTREAM
EA 17A Q_B 66.73 cfs	DPA 8	Q_{BB} = 90.75 cfs	ADD 24.02 cfs TO All DOWNSTREAM
AREA 18C Q_B = 25.13 cfs	DPA 8	Q_{BB} = 34.18 cfs	ADD 9.05 cfs To All DOWNSTREAM + 147.51

DEBRIS VOLUME

DPA 5 - 46,500 CY/mi² — 0.38 mi²

DPA 8 - 18,000 CY/mi² — 0.57 mi²

DEBRIS VOLUME = 27,930 CY — TOTAL AREA = 6.05 AC.

D.V. = 4.6 CY/AC

AREA 17A

ΣA = 4.676 AC

DV = 21,510 CY

Program Package Serial Number: 2084
05/07/10 FILE: 201D-G INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 2
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:
HYDROGRAPH AT POINT 19AC
HYDROGRAPH AT 201 19A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	22.64	200	23.40	300	24.64	400	25.90
500	27.48	600	29.46	700	31.98	800	35.31	900	40.19
1000	48.85	1050	71.95	1100	114.76	1110	133.84	1120	165.96
1130	204.74	1131	208.97	1132	213.16	1133	217.60	1134	222.39
1135	227.34	1136	232.30	1137	237.52	1138	243.24	1139	249.43
1140	256.23	1141	263.81	1142	272.18	1143	281.35	1144	291.19
1145	302.17	1146	314.62	1147	328.36	1148	343.35	1149	363.72
1150	391.58	1151	425.98	1152	467.76	1153	517.91	1154	573.44
1155	631.77	1156	691.31	1157	746.86	1158	793.48	1159	826.97
1160	844.99	1161	846.82	1162	834.04	1163	806.42	1164	765.39
1165	715.50	1166	663.03	1167	609.60	1168	557.64	1169	509.69
1170	464.89	1171	421.40	1172	380.56	1173	342.68	1174	308.44
1175	278.23	1176	252.23	1177	230.30	1178	211.89	1179	196.48
1180	183.10	1181	171.10	1182	160.87	1183	152.12	1184	144.12
1185	136.97	1186	130.75	1187	125.28	1188	120.22	1189	115.62
1190	111.53	1191	107.79	1192	104.24	1193	100.78	1194	97.53
1195	94.49	1196	91.62	1197	88.87	1198	86.17	1199	83.59
1200	81.24	1201	78.94	1202	76.69	1203	74.60	1204	72.68
1205	70.98	1206	69.41	1207	67.85	1208	66.35	1209	64.87
1210	63.40	1211	62.01	1212	60.66	1213	59.37	1214	58.13
1215	56.89	1216	55.72	1217	54.60	1218	53.55	1219	52.53
1220	51.58	1221	50.74	1222	49.98	1223	49.29	1224	48.70
1225	48.21	1226	47.69	1227	47.21	1228	46.76	1229	46.33
1230	45.94	1231	45.55	1232	45.19	1233	44.84	1234	44.49
1235	44.16	1236	43.82	1237	43.49	1238	43.17	1239	42.86
1240	42.56	1241	42.28	1242	41.98	1243	41.69	1244	41.43
1245	41.15	1246	40.88	1247	40.64	1248	40.43	1249	40.22
1250	40.02	1251	39.81	1252	39.61	1253	39.42	1254	39.20
1255	38.99	1256	38.79	1257	38.58	1258	38.37	1259	38.18
1260	37.97	1261	37.76	1262	37.57	1263	37.37	1264	37.17
1265	37.00	1266	36.83	1267	36.64	1268	36.44	1269	36.27
1270	36.12	1271	35.94	1272	35.79	1273	35.64	1274	35.47
1275	35.32	1276	35.16	1277	34.99	1278	34.84	1279	34.68
1280	34.53	1281	34.39	1282	34.24	1283	34.10	1284	33.96
1285	33.81	1286	33.68	1287	33.55	1288	33.40	1289	33.26
1290	33.14	1291	33.04	1292	32.92	1293	32.79	1294	32.69
1295	32.59	1296	32.48	1297	32.38	1298	32.26	1299	32.14
1300	32.03	1310	30.91	1320	30.00	1330	29.21	1340	28.42
1350	27.67	1360	26.95	1370	26.28	1380	25.75	1390	25.29
1400	24.78	1420	23.82	1440	23.06	1460	22.64	1500	22.64

TOTAL VOLUME THIS HYDROGRAPH = 102.28(Ac.Ft)

Basin G

Subarea	Area (Ac)	%imp	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in)	Tc-calculated (min)	Intensity (in/hr)	Cu	Cd
1A	35.8	0.01	97	2860	0.100	6.40	16	2.21	0.68	0.68
2A	37.4	0.01	97	2120	0.130	6.40	12	2.53	0.70	0.70
3A	12.9	0.01	97	1360	0.100	6.40	10	2.76	0.71	0.71
4A	29.1	0.01	97	2780	0.090	6.40	16	2.21	0.68	0.68
5A	37.6	0.01	97	3000	0.130	6.40	16	2.21	0.68	0.68
6A	27.4	0.01	97	1900	0.085	6.40	12	2.53	0.70	0.70
7A	37.1	0.01	97	2670	0.090	6.40	16	2.21	0.68	0.68
8A	24.9	0.01	97	1730	0.085	6.40	12	2.53	0.70	0.70
9B	21.4	0.01	97	1540	0.090	6.30	11	2.59	0.70	0.71
10B	26.8	0.01	97	1800	0.090	6.30	12	2.49	0.70	0.70
11B	12.3	0.01	97	1050	0.140	6.20	8	2.97	0.72	0.72
12B	30.1	0.01	97	2260	0.065	6.20	15	2.21	0.68	0.68
14A	33.0	0.01	97	1840	0.100	6.30	12	2.49	0.70	0.70
15A	30.2	0.01	97	1900	0.110	6.20	12	2.45	0.69	0.69
16A	22.1	0.01	97	1720	0.100	6.20	12	2.45	0.69	0.69
17A	37.5	0.01	97	2400	0.090	6.10	15	2.17	0.68	0.68
18C	12.0	0.01	97	1525	0.090	6.20	11	2.55	0.70	0.70

Program Package Serial Number: 2084
05/07/10 FILE: 930D-H INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 1
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\lasoilx.dat

ENTRADA TTM NO. 53295 - DRAINAGE CONCEPT - OFFSITE BASIN H

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
930	1A	37.7	78.16	37.7	78.16	1	230.	.12000	.00	.00	0.	297	12	A32	.01
930	2A	30.6	58.56	68.3	136.73	4	200.	.01000	4.00	.00	0.	297	14	A32	.01

BULKING CALCULATION

SAMPLE CALCULATION

Q_{BB} - Q BURNED BULKED Q_B - Q BURNED

DPA 5 - BULKING FACTOR = 1.47 DPA 8 - BULKING FACTOR = 1.36

$Q_{BB} = Q_B \times$ BULKING FACTOR

AREA 1A

$Q_B = 78.16$cfs DPA 8 $Q_{BB} = 106.30$cfs ADD 28.14cfs TO All DOWNSTREAM

AREA 2A

$Q_B = 58.56$cfs DPA 8 $Q_{BB} = 79.64$cfs ADD 21.08cfs TO All DOWNSTREAM

DEBRIS VOLUME

DPA 5 - 82,000 CY/mi² — 0.10 mi²

DPA 8 - 35,000 CY/mi² — 0.10 mi²

DEBRIS VOLUME = 54.68 CY/AC

AREA 2A

ΣA = 68.3 AC

DV = 3,734 CY

Program Package Serial Number: 2084
05/07/10 FILE: 930D-H INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 2
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:
HYDROGRAPH AT POINT 2A
HYDROGRAPH AT 930 2A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.60	100	3.28	200	3.41	300	3.60	400	3.79
500	4.04	600	4.35	700	4.74	800	5.26	900	6.01
1000	7.40	1050	11.68	1100	18.05	1110	23.17	1120	28.51
1130	34.39	1131	35.25	1132	36.24	1133	37.27	1134	38.34
1135	39.19	1136	39.93	1137	41.06	1138	42.41	1139	43.87
1140	45.17	1141	47.05	1142	49.28	1143	51.59	1144	53.73
1145	56.81	1146	60.13	1147	63.50	1148	66.73	1149	76.34
1150	89.35	1151	102.78	1152	116.30	1153	129.71	1154	135.77
1155	136.73	1156	136.13	1157	134.17	1158	131.14	1159	126.96
1160	122.83	1161	115.78	1162	105.50	1163	90.35	1164	75.40
1165	60.71	1166	47.67	1167	37.59	1168	33.51	1169	30.55
1170	28.18	1171	26.43	1172	24.76	1173	23.44	1174	22.16
1175	21.03	1176	20.01	1177	19.05	1178	18.28	1179	17.60
1180	16.94	1181	16.34	1182	15.67	1183	15.21	1184	14.73
1185	14.21	1186	13.68	1187	13.19	1188	12.80	1189	12.51
1190	12.20	1191	11.93	1192	11.56	1193	11.30	1194	10.91
1195	10.58	1196	10.27	1197	10.06	1198	9.85	1199	9.60
1200	9.34	1201	9.09	1202	8.88	1203	8.61	1204	8.31
1205	8.10	1206	7.90	1207	7.72	1208	7.63	1209	7.38
1210	7.22	1211	7.13	1212	7.09	1213	7.02	1214	6.98
1215	6.91	1216	6.90	1217	6.88	1218	6.76	1219	6.73
1220	6.70	1221	6.65	1222	6.62	1223	6.55	1224	6.52
1225	6.44	1226	6.41	1227	6.34	1228	6.31	1229	6.23
1230	6.20	1231	6.15	1232	6.14	1233	6.06	1234	6.02
1235	6.01	1236	5.97	1237	5.94	1238	5.92	1239	5.91
1240	5.86	1241	5.84	1242	5.76	1243	5.73	1244	5.66
1245	5.65	1246	5.65	1247	5.63	1248	5.55	1249	5.55
1250	5.54	1251	5.52	1252	5.45	1253	5.44	1254	5.39
1255	5.37	1256	5.34	1257	5.33	1258	5.33	1259	5.29
1260	5.26	1261	5.24	1262	5.23	1263	5.18	1264	5.16
1265	5.13	1266	5.08	1267	5.08	1268	5.08	1269	5.05
1270	5.03	1271	4.97	1272	4.97	1273	4.97	1274	4.95
1275	4.88	1276	4.87	1277	4.86	1278	4.84	1279	4.79
1280	4.83	1281	4.79	1282	4.83	1283	4.77	1284	4.76
1285	4.76	1286	4.71	1287	4.74	1288	4.69	1289	4.68
1290	4.66	1291	4.66	1292	4.61	1293	4.63	1294	4.58
1295	4.58	1296	4.51	1297	4.53	1298	4.48	1299	4.49
1300	4.48	1310	4.32	1320	4.27	1330	4.12	1340	3.99
1350	3.85	1360	3.81	1370	3.72	1380	3.67	1390	3.58
1400	3.44	1420	3.40	1440	3.28	1460	1.81	1500	1.81

TOTAL VOLUME THIS HYDROGRAPH = 14.95(Ac.Ft)

Basin H

Subarea	Area (Ac)	%imp	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in)	Tc-calculated (min)	Intensity (in/hr)	Cu	Cd
1A	37.7	0.01	97	1820	0.100	6.40	12	2.53	0.70	0.70
2A	30.6	0.01	97	2400	0.120	6.40	14	2.35	0.69	0.69

Program Package Serial Number: 2084
06/16/10 FILE: 930D-I INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 1
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\lasoilx.dat

ENTRADA TTM NO. 53295 - DRAINAGE CONCEPT - OFFSITE BASIN I STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
930	1A	30.1	48.35	30.1	48.35	2	300.	.04000	.00	.00	0.	297	17	A30	.05
930	2B	27.4	52.95	27.4	52.95	2	800.	.08000	.00	.00	0.	297	12	A30	.05
930	3B	9.1	19.50	36.5	71.28	2	300.	.05000	.00	.00	0.	297	10	A30	.05

CONFLUENCE Q'S

930 4A TA 1156 QA 48.29 QAB 118.98 QB 70.69 930 4B TB 1157 QB 71.05 QBA 119.35 QA 48.29
930 4AB TAB 1157 QAB 119.35 QA 48.29 QB 71.05

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
930	4AB	36.5	71.05	66.6	119.35	4	200.	.01000	3.75	.00	0.	297	0	A30	.00

BULKING CALCULATION

SAMPLE CALCULATION

Q_{BB} - Q BURNED BULKED Q_B - Q BURNED

DPA 5 - BULKING FACTOR = 1.47 DPA 8 - BULKING FACTOR = 1.36

$Q_{BB} = Q_B \times$ BULKING FACTOR

AREA 1A

Q_B = 48.35cfs DPA 8 Q_{BB} = 65.76cfs ADD 17.41 cfs TO All DOWNSTREAM

AREA 2B

Q_B = 52.95cfs DPA 8 Q_{BB} = 72.01 cfs ADD 19.06cfs TO All Downstream

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AREA 3B

Q_B = 19.50cfs DPA 8 Q_{BB} = 26.52 cfs ADD 7.02cfs TO All Downstream

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DEBRIS VOLUME

DPA 5 - 82,000 CY/mi² — 0.10 mi²

DPA 8 - 35,000 CY/mi² — 0.10 mi² = 55 CY/AC

AREA 3B

ΣA = 66.6 AC

DV = 3,663 CY

Program Package Serial Number: 2084
06/16/10 FILE: 930D-I INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 2
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:
HYDROGRAPH AT POINT 4AB
HYDROGRAPH AT 930 4A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	3.20	200	3.32	300	3.51	400	3.70
500	3.95	600	4.24	700	4.62	800	5.11	900	5.87
1000	7.10	1050	10.37	1100	16.10	1110	19.75	1120	25.01
1130	30.28	1131	30.88	1132	31.45	1133	32.10	1134	32.87
1135	33.71	1136	34.56	1137	35.45	1138	36.49	1139	37.60
1140	38.72	1141	39.96	1142	41.43	1143	43.11	1144	44.91
1145	46.93	1146	49.42	1147	52.26	1148	55.22	1149	59.49
1150	66.68	1151	76.40	1152	87.59	1153	99.63	1154	110.05
1155	116.37	1156	118.98	1157	119.35	1158	118.32	1159	115.64
1160	111.42	1161	106.60	1162	100.80	1163	93.29	1164	85.09
1165	77.36	1166	69.18	1167	59.98	1168	51.12	1169	43.50
1170	36.92	1171	31.47	1172	27.78	1173	25.49	1174	23.70
1175	22.22	1176	20.95	1177	19.88	1178	18.90	1179	17.99
1180	17.18	1181	16.44	1182	15.77	1183	15.19	1184	14.62
1185	14.07	1186	13.63	1187	13.18	1188	12.75	1189	12.36
1190	11.95	1191	11.54	1192	11.19	1193	10.86	1194	10.53
1195	10.27	1196	10.02	1197	9.74	1198	9.49	1199	9.25
1200	9.00	1201	8.74	1202	8.49	1203	8.24	1204	8.01
1205	7.81	1206	7.65	1207	7.55	1208	7.46	1209	7.38
1210	7.32	1211	7.24	1212	7.17	1213	7.11	1214	7.05
1215	6.99	1216	6.92	1217	6.87	1218	6.82	1219	6.77
1220	6.71	1221	6.65	1222	6.60	1223	6.54	1224	6.47
1225	6.42	1226	6.38	1227	6.32	1228	6.27	1229	6.22
1230	6.17	1231	6.14	1232	6.12	1233	6.08	1234	6.05
1235	6.01	1236	5.98	1237	5.94	1238	5.90	1239	5.85
1240	5.80	1241	5.76	1242	5.72	1243	5.68	1244	5.66
1245	5.63	1246	5.59	1247	5.57	1248	5.54	1249	5.49
1250	5.45	1251	5.43	1252	5.40	1253	5.37	1254	5.36
1255	5.34	1256	5.33	1257	5.30	1258	5.26	1259	5.25
1260	5.22	1261	5.19	1262	5.18	1263	5.16	1264	5.13
1265	5.09	1266	5.07	1267	5.05	1268	5.03	1269	5.00
1270	4.97	1271	4.94	1272	4.93	1273	4.91	1274	4.90
1275	4.88	1276	4.84	1277	4.82	1278	4.80	1279	4.77
1280	4.77	1281	4.76	1282	4.75	1283	4.72	1284	4.69
1285	4.68	1286	4.68	1287	4.66	1288	4.63	1289	4.61
1290	4.58	1291	4.56	1292	4.57	1293	4.56	1294	4.55
1295	4.52	1296	4.50	1297	4.48	1298	4.46	1299	4.45
1300	4.43	1310	4.29	1320	4.19	1330	4.06	1340	3.91
1350	3.84	1360	3.76	1370	3.63	1380	3.55	1390	3.54
1400	3.48	1420	3.29	1440	3.21	1460	3.20	1500	3.20

TOTAL VOLUME THIS HYDROGRAPH = 14.18(Ac.Ft)

Basin I

Subarea	Area (Ac)	%imp	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in)	Tc-calculated (min)	Intensity (in/hr)	Cu	Cd
1A	30.1	0.01	97	2660	0.075	6.10	17	2.05	0.67	0.67
2B	27.4	0.01	97	1750	0.090	6.00	12	2.37	0.69	0.69
3B	9.1	0.01	97	1130	0.050	6.00	10	2.58	0.70	0.70

Program Package Serial Number: 2084
02/13/10 FILE: 930D-J INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 1
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\lasoilx.dat
TENT. TRACT 53295 DRAINAGE CONCEPT - DEV. CONDITION - BASIN J

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
930	1A	24.5	32.03	24.5	32.03	2	1680.	.04000	.00	.00	0.	220	18	A29	.01
930	2A	19.0	22.71	43.5	51.90	2	400.	.02500	.00	.00	0.	220	21	A29	.01
930	3B	32.9	59.63	32.9	59.63	2	1700.	.04000	.00	.00	0.	298	15	A29	.01
930	4B	33.1	64.26	66.0	115.31	2	50.	.02000	.00	.00	0.	298	13	A29	.01

CONFLUENCE Q'S

930 5A TA 1163 QA 51.75 QAB 150.35 QB 98.60
930 5B TB 1158 QB 115.22 QBA 161.61 QA 46.39
930 5AB TAB 1160 QAB 164.21 QA 50.00 QB 114.21

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
930	5AB	66.0	115.22	109.5	164.21	4	540.	.01000	4.25	.00	0.	20	0	A29	.00

DEBRIS Volume

DPA 8 - 35,000 CY/mi² = 55 CY/AC

AREA 1A, 2A, 3B, & 4B

A_{Total} = 109.5 AC

D.V. = 6,023 CY

Program Package Serial Number: 2084
02/13/10 FILE: 930D-J INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 2
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:
HYDROGRAPH AT POINT 5AB
HYDROGRAPH AT 930 5A STORM DAY 4 REDUCTION FACTOR = 1.000

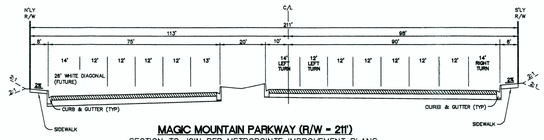
TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	4.58	200	4.76	300	5.02	400	5.29
500	5.62	600	6.05	700	6.59	800	7.31	900	8.35
1000	11.56	1050	16.81	1100	25.13	1110	29.80	1120	36.39
1130	45.05	1131	46.13	1132	47.19	1133	48.42	1134	49.49
1135	50.49	1136	51.56	1137	52.87	1138	54.38	1139	55.90
1140	57.47	1141	59.39	1142	61.55	1143	63.72	1144	65.84
1145	68.49	1146	71.62	1147	74.81	1148	78.19	1149	85.44
1150	94.92	1151	104.35	1152	115.39	1153	127.55	1154	136.92
1155	144.35	1156	151.80	1157	157.53	1158	161.61	1159	163.61
1160	164.21	1161	163.58	1162	158.12	1163	150.35	1164	142.51
1165	133.52	1166	124.12	1167	116.86	1168	110.80	1169	103.79
1170	96.92	1171	88.99	1172	80.66	1173	72.71	1174	65.51
1175	58.91	1176	53.17	1177	48.49	1178	44.51	1179	41.10
1180	38.29	1181	35.79	1182	33.66	1183	31.78	1184	30.09
1185	28.64	1186	27.35	1187	26.18	1188	25.09	1189	24.08
1190	23.26	1191	22.47	1192	21.66	1193	21.00	1194	20.34
1195	19.65	1196	19.18	1197	18.67	1198	18.14	1199	17.65
1200	17.15	1201	16.78	1202	16.39	1203	15.87	1204	15.49
1205	15.24	1206	14.90	1207	14.52	1208	14.24	1209	13.93
1210	13.57	1211	13.32	1212	13.04	1213	12.79	1214	12.55
1215	12.23	1216	12.10	1217	11.93	1218	11.62	1219	11.42
1220	11.28	1221	11.07	1222	10.80	1223	10.63	1224	10.44
1225	10.28	1226	10.19	1227	10.08	1228	9.98	1229	9.81
1230	9.63	1231	9.51	1232	9.39	1233	9.29	1234	9.21
1235	9.13	1236	9.05	1237	8.98	1238	8.88	1239	8.77
1240	8.69	1241	8.63	1242	8.55	1243	8.51	1244	8.49
1245	8.41	1246	8.35	1247	8.29	1248	8.22	1249	8.18
1250	8.11	1251	8.08	1252	8.05	1253	7.99	1254	7.94
1255	7.91	1256	7.87	1257	7.81	1258	7.78	1259	7.72
1260	7.70	1261	7.67	1262	7.58	1263	7.56	1264	7.53
1265	7.47	1266	7.45	1267	7.42	1268	7.37	1269	7.35
1270	7.32	1271	7.27	1272	7.24	1273	7.22	1274	7.19
1275	7.17	1276	7.12	1277	7.08	1278	7.05	1279	7.03
1280	7.01	1281	6.99	1282	6.95	1283	6.90	1284	6.89
1285	6.87	1286	6.82	1287	6.78	1288	6.76	1289	6.74
1290	6.72	1291	6.70	1292	6.65	1293	6.60	1294	6.59
1295	6.57	1296	6.54	1297	6.52	1298	6.50	1299	6.49
1300	6.47	1310	6.28	1320	6.10	1330	5.92	1340	5.71
1350	5.57	1360	5.43	1370	5.33	1380	5.21	1390	5.06
1400	5.00	1420	4.81	1440	4.61	1460	4.58	1500	4.58

TOTAL VOLUME THIS HYDROGRAPH = 21.63(Ac.Ft)

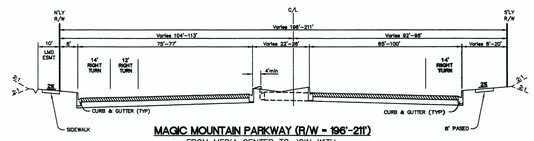
Basin J

Subarea	Area (Ac)	%imp	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in)	Tc-calculated (min)	Intensity (in/hr)	Cu	Cd
1A	24.5	0.01	20	1760	0.050	5.80	18	1.90	0.50	0.50
2A	19.0	0.01	20	2040	0.040	5.80	21	1.76	0.48	0.48
3B	32.9	0.01	98	2330	0.060	5.80	15	2.06	0.80	0.80
4B	33.1	0.01	98	1750	0.040	5.80	13	2.21	0.81	0.81

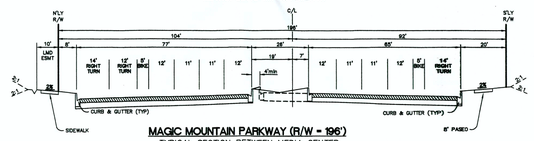
DRAINAGE CONCEPT/HYDROLOGY STUDY
ENTRADA
TENTATIVE TRACT 53295



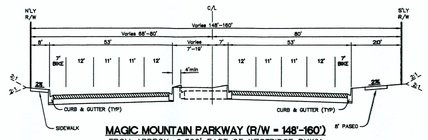
MAGIC MOUNTAIN PARKWAY (R/W = 211')
SECTION TO JOIN PER METROPOINTE IMPROVEMENT PLANS
APPROXIMATELY 300 FT WEST OF THE OLD ROAD



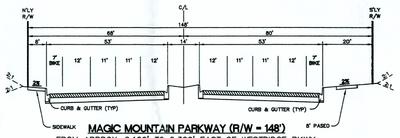
MAGIC MOUNTAIN PARKWAY (R/W = 196'-211')
FROM MEDIA CENTER TO JOIN WITH
METROPOINTE IMPROVEMENTS



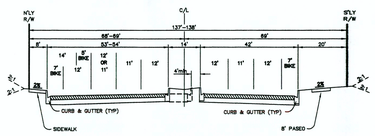
MAGIC MOUNTAIN PARKWAY (R/W = 196')
TYPICAL SECTION BETWEEN MEDIA CENTER
AND THEME PARK ENTRANCE



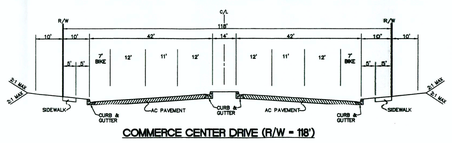
MAGIC MOUNTAIN PARKWAY (R/W = 148'-160')
FROM APPROX. 2,300' EAST OF WESTRIDGE PKWY
TO THE THEME PARK ENTRANCE



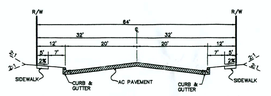
MAGIC MOUNTAIN PARKWAY (R/W = 148')
FROM APPROX. 2,100' TO 2,300' EAST OF WESTRIDGE PKWY



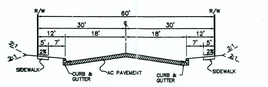
MAGIC MOUNTAIN PARKWAY (R/W = 137'-138')
FROM APPROX. 1,300' TO 2,100' EAST OF WESTRIDGE PKWY



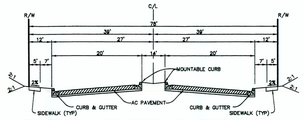
COMMERCE CENTER DRIVE (R/W = 118')



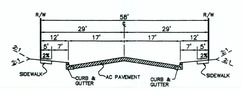
PUBLIC STREET - RESIDENTIAL COLLECTOR (R/W = 64')
WITH PARALLEL PARKING
"A" STREET



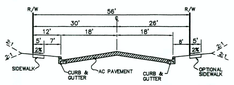
PRIVATE DRIVE-RESIDENTIAL COLLECTOR (R/W = 60')
WITH PARALLEL PARKING
"D" DRIVE, "I" DRIVE, "J" DRIVE, "K" DRIVE, "L" DRIVE,
"M" DRIVE, "O" DRIVE, "P" DRIVE, "U" DRIVE, "V" DRIVE



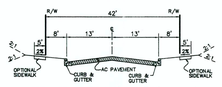
PRIVATE DRIVE - RESIDENTIAL COLLECTOR (R/W = 78')
NO PARKING
"B" DRIVE



PRIVATE DRIVE-LOCAL CUL DE SAC (R/W = 58')
WITH PARALLEL PARKING
"E" DRIVE, "F" DRIVE, "G" DRIVE, "H" DRIVE, "M" DRIVE, "N" DRIVE,
"Q" DRIVE, "R" DRIVE, "S" DRIVE, "T" DRIVE, "W" DRIVE



PRIVATE DRIVE-RESIDENTIAL COLLECTOR (R/W = 56')
WITH PARALLEL PARKING
"C" DRIVE

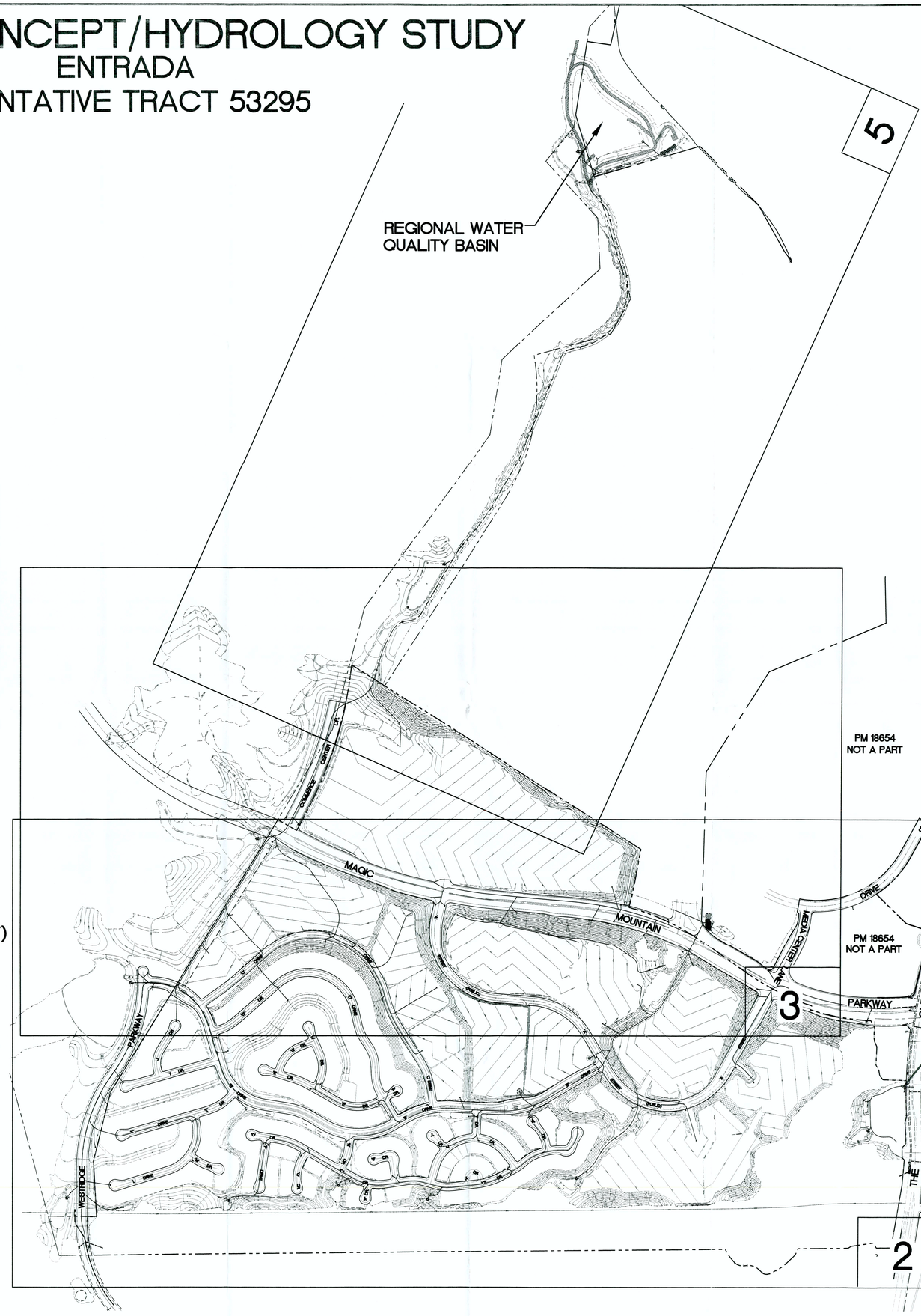


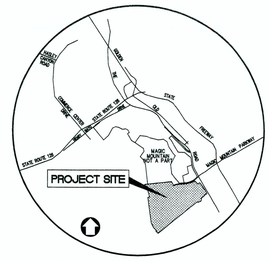
PRIVATE DRIVE-LOCAL (R/W = 42')
NO PARKING
"X" DRIVE

SEE SHEET 4 (OFFSITE HYDROLOGY)

DRAINAGE CONCEPT/HYDROLOGY STUDY/SUSMP/LID PLAN
APPROVED FOR AREA AND Q ONLY
APPROVED BY: [signature] DATE: 12/7/2011
CHECKED BY: [signature] DATE: 12/7/2011
LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

REGIONAL WATER QUALITY BASIN





VICINITY MAP
NOT TO SCALE
TG 4459-J7
TG 4459-H1

ALLIANCE LAND PLANNING & ENGINEERING INC.	PLANS PREPARED BY: ALLIANCE LAND PLANNING & ENGINEERING INC. 2248 FARADAY AVE. CARLSBAD, CA. 92008 (760) 431-9896 PLANS PREPARED UNDER THE DIRECTION OF: CRAIG WHITTEKER R.C.E. 51929 DATE 12-2-10	REGISTERED PROFESSIONAL ENGINEER CRAIG W. WHITTEKER No. 51929 EXP. 6-30-12 CIVIL STATE OF CALIFORNIA	PLANS PREPARED FOR: NEWHALL LAND, 23823 WEST VALENCIA BOULEVARD, VALENCIA, CALIFORNIA 91355, TELEPHONE: (661) 255-4000, REPRESENTATIVE : ALEX HERRELL

LEGAL DESCRIPTION:
THAT PORTION OF RANCHO SAN FRANCISCO, IN THE COUNTY OF LOS ANGELES, STATE OF CALIFORNIA, AS SHOWN ON MAP RECORDED IN BOOK 1 PAGES 521 PAGES 522 OF PATENTS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

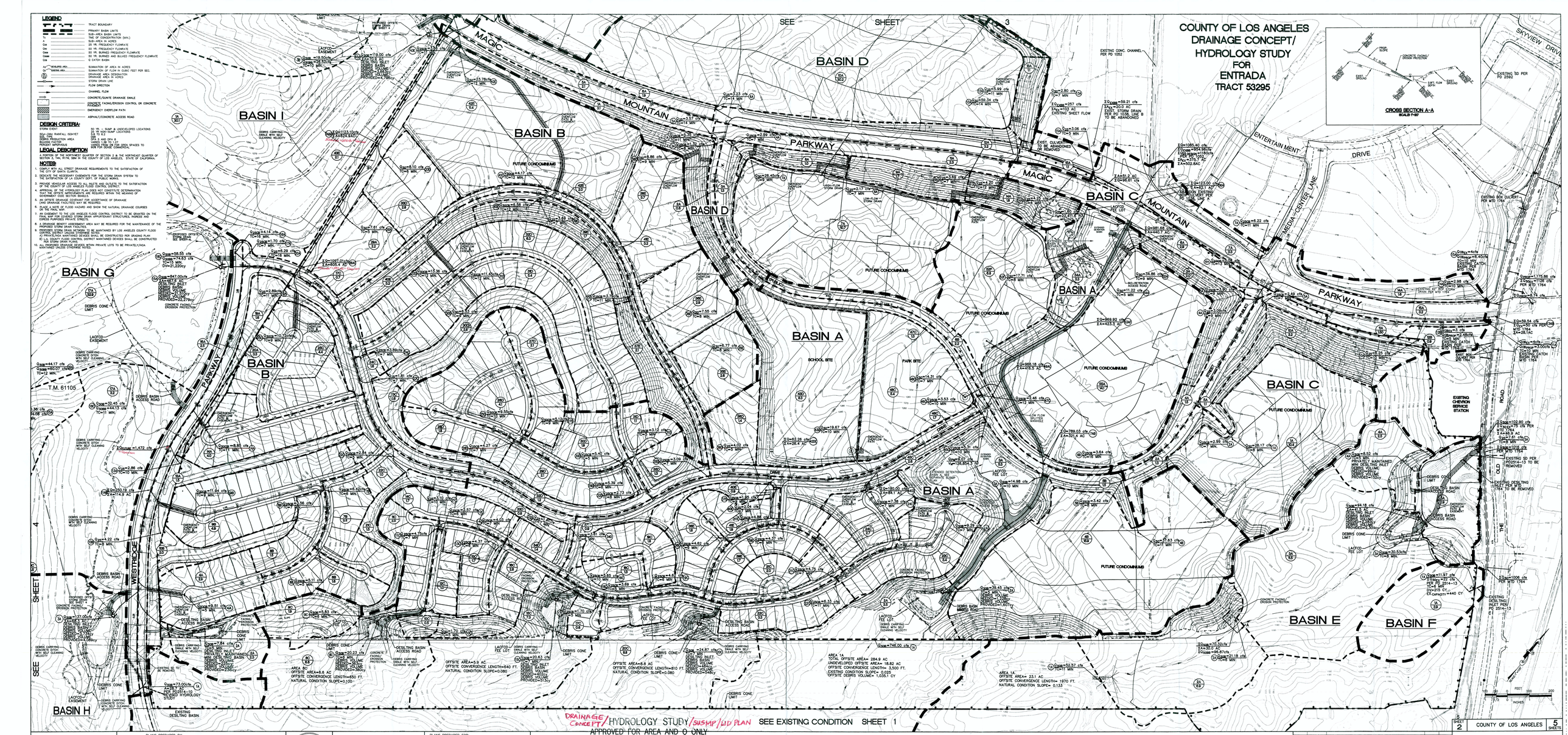
NO.	DATE	REVISIONS	BY	APPR

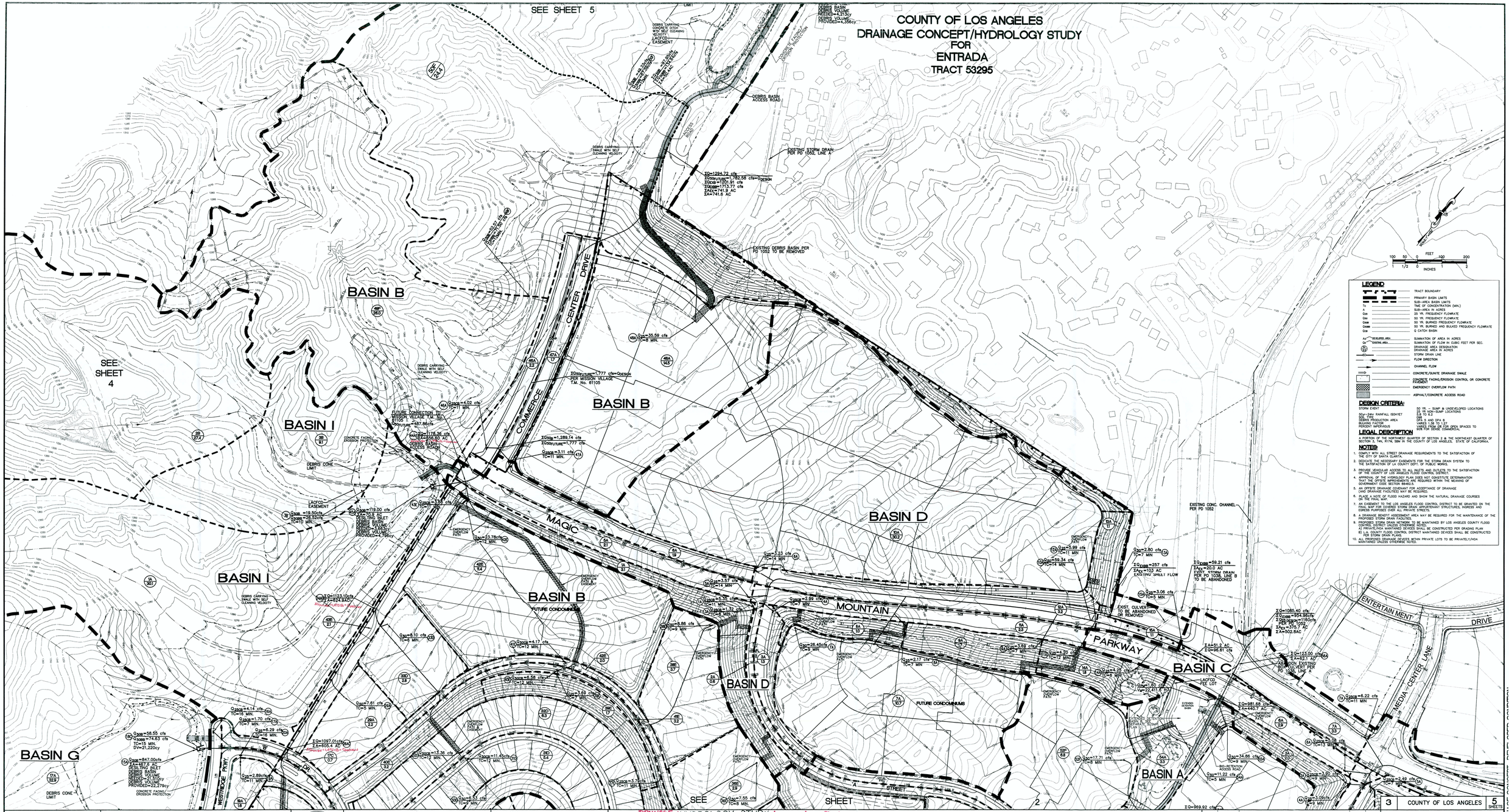
SHEET 1 | COUNTY OF LOS ANGELES | 5 SHEETS

DRAINAGE CONCEPT/HYDROLOGY/ SUSMP FOR ENTRADA TENTATIVE TRACT 53295
COUNTY CASE NO. _____
LOCATED IN THE UNINCORPORATED AREA OF THE COUNTY OF LOS ANGELES STATE OF CALIFORNIA

DEC 01 2010

I:\CAD\0201\HYDROLOGY\HYDRO-SHT-01.dwg


COUNTY OF LOS ANGELES
DRAINAGE CONCEPT/
HYDROLOGY STUDY
FOR
ENTRADA
TRACT 53295
LEGEND
TRACT BOUNDARY
PRIMARY BASIN LIMITS
SUB-AREA BASIN LIMITS
TIME OF CONCENTRATION (MIN.)
SUB-AREA IN ACRES
25 YR. FREQUENCY FLOWRATE
50 YR. FREQUENCY FLOWRATE
50 YR. BURNED FREQUENCY FLOWRATE
50 YR. BURNED AND BULKED FREQUENCY FLOWRATE
Q CATCH BASIN
SUMMATION OF AREA IN ACRES
SUMMATION OF FLOW IN CUBIC FEET PER SEC.
DRAINAGE AREA DESIGNATION
DRAINAGE AREA IN ACRES
STORM DRAIN LINE
FLOW DIRECTION
CHANNEL FLOW
CONCRETE/GUNITE DRAINAGE SWALE
CONCRETE FACING/EROSION CONTROL OR CONCRETE LINING
EMERGENCY OVERFLOW PATH
ASPHALT/CONCRETE ACCESS ROAD
DESIGN CRITERIA
STORM EVENT
50 YR. = SUMP & UNDEVELOPED LOCATIONS
25 YR. = ALL OTHER LOCATIONS
100-YEAR RAINFALL ISOHYET
DEBRIS PRODUCTION AREA
BULKING FACTOR
BULKING METHODOLOGY
PARKING REQUIRED
LEGAL DESCRIPTION
A PORTION OF THE NORTHWEST QUARTER OF SECTION 3 & THE NORTHEAST QUARTER OF SECTION 3, TWL 1STN, SBM IN THE COUNTY OF LOS ANGELES, STATE OF CALIFORNIA
NOTES:
1. COMPLY WITH ALL STREET DRAINAGE REQUIREMENTS TO THE SATISFACTION OF THE CITY OF SANTA CLARITA.
2. PROVIDE ALL NECESSARY EASEMENTS FOR THE STORM DRAIN SYSTEM TO THE SATISFACTION OF LA COUNTY DEPT. OF PUBLIC WORKS.
3. PROVIDE VEHICULAR ACCESS TO ALL INLETS AND OUTLETS TO THE SATISFACTION OF THE COUNTY OF LOS ANGELES FLOOD CONTROL DISTRICT.
4. APPROVAL OF THE HYDROLOGY PLAN DOES NOT CONSTITUTE DETERMINATION THAT THE FLOOD HAZARD AREAS ARE REQUIRED WITHIN THE MEANING OF SECTION 8102.0 OF THE BUILDING CODE.
5. AN OFFSITE DRAINAGE COVENANT FOR ACCEPTANCE OF DRAINAGE AND DRAINAGE FACILITIES MAY BE REQUIRED.
6. PLACE A NOTE OF FLOOD HAZARD AND SHOW THE NATURAL DRAINAGE COURSES ON THE FINAL MAP.
7. AN EASEMENT TO THE LOS ANGELES FLOOD CONTROL DISTRICT TO BE GRANTED ON THE FINAL MAP FOR ALL DRAINAGE FACILITIES WITHIN PERMANENT STRUCTURES, PUBLIC AND CERTAIN PURPOSES PRIVATE STREETS.
8. A DRAINAGE BENEFIT ASSESSMENT AREA MAY BE REQUIRED FOR THE MAINTENANCE OF THE PROPOSED STORM DRAIN FACILITIES.
9. DRAINAGE DEVICES SHALL BE MAINTAINED BY LOS ANGELES COUNTY FLOOD CONTROL DISTRICT, EXCEPTING THE FOLLOWING:
A) PRIVATELY MAINTAINED DEVICES SHALL BE CONSTRUCTED PER GRADING PLAN
B) L.A. COUNTY FLOOD CONTROL DISTRICT MAINTAINED DEVICES SHALL BE CONSTRUCTED PER STORM DRAIN PLAN
10. ALL PROPOSED PUBLIC DRAINAGE DEVICES WITHIN PRIVATE LOTS TO BE PRIVATELY/HOA MAINTAINED UNLESS OTHERWISE NOTED.
SEE SHEET 3
SEE SHEET 4
SEE SHEET 2
BASIN A
BASIN B
BASIN C
BASIN D
BASIN E
BASIN F
BASIN G
BASIN H
BASIN I
MAGIC MOUNTAIN PARKWAY
WESTRIDGE PARKWAY
ENTERTAIN MENT DRIVE
MEDIA CENTER LANE
SKYVIEW DRIVE
OLD ROAD
THE TRAIL
FUTURE CONDOMINIUMS
SCHOOL SITE
PARK SITE
EXISTING CHEVRON SERVICE STATION
EXISTING CONVC. CHANNEL PER PD 1052
EXISTING SD PER PD 2592
EXISTING BOX CULVERT PER MTD 1764
EXISTING SD PER PD2514-13 TO BE REMOVED
EXISTING DESILTING INLET PER PD 2514-13
EXIST. CULVERT TO BE ABANDONED OR REMOVED
CROSS SECTION A-A
SCALE: 1"=50'
T.M. 61105
LACFCD EASEMENT
LACFCD FEE LOT
DEBRIS CONE LIMIT
DEBRIS BASIN ACCESS ROAD
EXISTING BASIN ACCESS ROAD
DEBRIS CARRYING CONCRETE DITCH WITH SELF CLEANING VELOCITY
DEBRIS CARRYING SWALE WITH SELF CLEANING VELOCITY
CONCRETE FACING/ EROSION PROTECTION
EMERGENCY OVERFLOW PATH
EXISTING BASIN
DRAINAGE CONCEPT/HYDROLOGY STUDY/SUSMP/LID PLAN SEE EXISTING CONDITION SHEET 1
APPROVED FOR AREA AND Q ONLY
APPROVED BY: _____ RCE NO 51929 DATE: 12/15/10
CHECKED BY: _____ DATE: 12/15/10
LAND DEVELOPMENT DIVISION
LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS
ALLIANCE
LAND PLANNING & ENGINEERING
2248 FARADAY AVE. CARLSBAD, CA. 92008
(760) 431-9885
PLANS PREPARED BY:
ALLIANCE LAND PLANNING & ENGINEERING INC.
2248 FARADAY AVE. CARLSBAD, CA. 92008
(760) 431-9885
PLANS PREPARED UNDER THE DIRECTION OF:
12-2-10
DAVID J. WHITTAKER R.C.E. 51929 DATE
PLANS PREPARED FOR:
NEWHALL LAND
23823 WEST VALENCIA BOULEVARD
VALENCIA, CALIFORNIA 91355
TELEPHONE: (661) 255-4000
REPRESENTATIVE: ALEX HERRELL
SHEET 2
COUNTY OF LOS ANGELES
5 SHEETS
DRAINAGE CONCEPT/
HYDROLOGY STUDY
FOR ENTRADA
TENTATIVE TRACT 53295
DEVELOPED CONDITION
NO. DATE BY APPR
FILM RECORDING DATE
DEC 01 2010



ALLIANCE LAND PLANNING & ENGINEERING
2248 FARADAY AVE. CARLSBAD, CA 92008 TEL: (760) 431-9896 FAX: (760) 431-9860
27433 TOURNEY ROAD SUITE 200 VALENCIA, CA 91355 TEL: (661) 294-2765 FAX: (661) 254-1928
CIVIL ENGINEERING • LAND PLANNING • NILSOC DESIGN • SURVEYING

PLANS PREPARED BY:
ALLIANCE LAND PLANNING & ENGINEERING INC.
2248 FARADAY AVE. CARLSBAD, CA. 92008
(760) 431-9896

PLANS PREPARED UNDER THE DIRECTION OF:
CRAIG W. WESTMOR R.C.E. 51929 — 12-2-10 DATE

REGISTERED PROFESSIONAL ENGINEER CRAIG WESTMOR No. 51929 EXP. 6-30-11 CIVIL STATE OF CALIFORNIA

PLANS PREPARED FOR:
NEWHALL LAND
23823 WEST VALENCIA BOULEVARD
VALENCIA, CALIFORNIA 91355
TELEPHONE: (661) 255-4500
REPRESENTATIVE: ALEX HERRELL

DRAINAGE CONCEPT / HYDROLOGY STUDY / SUSMP / LID PLAN
APPROVED FOR AREA AND Q ONLY
APPROVED BY: [signature] RCE NO. 51929 DATE: 11/29/11
CHECKED BY: [signature] DATE: 11/29/11
LAND DEVELOPMENT DIVISION
LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

NO.	DATE	BY	APPR

DRAINAGE CONCEPT/ HYDROLOGY STUDY FOR ENTRADA TENTATIVE TRACT 53295 DEVELOPED CONDITION

COUNTY OF LOS ANGELES | 5 SHEETS

PLAN PREPARATION DATE: DEC 01 2010

\\CAD\2630\HYDROLOGY\2630-HYDRO-SHT-03.dwg

COUNTY OF LOS ANGELES
DRAINAGE CONCEPT/
HYDROLOGY STUDY
ENTRADA
TENTATIVE TRACT 53295

BASIN G

BASIN H

BASIN I

TRACT 45433

DEBRIS PRODUCTION BOUNDARY

DPA 8

DPA 5

ONSITE STORM DRAIN
SEE SHEET 2

ONSITE STORM DRAIN
SEE SHEET 2

SEE SHEET 3

SEE SHEET 5

EXISTING STORM DRAIN PER PD 2514-10

LACFCD EASEMENT

DEBRIS CONE LIMIT

CONCRETE FACING/ EROSION PROTECTION

PARKWAY

MORAN

LEGEND

- TRACT BOUNDARY
- PRIMARY BASIN LIMITS
- SUB-AREA BASIN LIMITS
- Tc — TIME OF CONCENTRATION (MIN.)
- A — SUB-AREA IN ACRES
- Q25 — 25 YR. FREQUENCY FLOWRATE
- Q50 — 50 YR. FREQUENCY FLOWRATE
- Q50B — 50 YR. BURNED FREQUENCY FLOWRATE
- Q50BB — 50 YR. BURNED AND BULKED FREQUENCY FLOWRATE
- Q25 — Q CATCH BASIN
- ΣA — DEVELOPED AREA — SUMMATION OF AREA IN ACRES
- ΣQ — SUBTRIB. AREA — SUMMATION OF FLOW IN CUBIC FEET PER SEC.
- DRAINAGE AREA DESIGNATION
- DRAINAGE AREA IN ACRES
- STORM DRAIN LINE
- FLOW DIRECTION
- CHANNEL FLOW
- CONCRETE/GUNITE DRAINAGE SWALE

DESIGN CRITERIA:

STORM EVENT	50 YR. — SUMP & UNDEVELOPED LOCATIONS 25 YR. NON-SUMP LOCATIONS
50 yr-24hr RAINFALL ISOHYET	6.0" TO 6.5"
SOIL TYPE	008 & 009
DEBRIS PRODUCTION AREA	DPA 8 & 5

LEGAL DESCRIPTION

NOTES:

1. COMPLY WITH ALL STREET DRAINAGE REQUIREMENTS TO THE SATISFACTION OF THE CITY OF SANTA CLARITA.
2. DEDICATE THE NECESSARY EASEMENTS FOR THE STORM DRAIN SYSTEM TO THE SATISFACTION OF THE CITY OF SANTA CLARITA.
3. PROVIDE VEHICULAR ACCESS TO ALL INLETS AND OUTLETS TO THE SATISFACTION OF THE COUNTY OF LOS ANGELES FLOOD CONTROL DISTRICT.
4. APPROVAL OF THIS CONCEPT PLAN DOES NOT CONSTITUTE DETERMINATION THAT THE OFFSITE IMPROVEMENTS ARE REQUIRED WITHIN THE MEANING OF GOVERNMENT CODE SECTION 66462.5.
5. AN OFFSITE DRAINAGE COVENANT FOR ACCEPTANCE OF DRAINAGE (AND DRAINAGE FACILITIES) MAY BE REQUIRED.
6. PLACE A NOTE OF FLOOD HAZARD AND SHOW THE NATURAL DRAINAGE COURSES ON THE FINAL MAP.
7. AN EASEMENT TO THE LOS ANGELES FLOOD CONTROL DISTRICT TO BE GRANTED ON THE FINAL MAP FOR COVERED STORM DRAIN APPURTENANT STRUCTURES AND STORM DRAIN INGRESS AND EGRESS OVER ALL PRIVATE STREETS.
8. A DRAINAGE BENEFIT ASSESSMENT AREA MAY BE REQUIRED FOR THE MAINTENANCE OF THE PROPOSED STORM DRAIN FACILITIES.
9. PROPOSED STORM DRAIN NETWORK TO BE MAINTAINED BY LOS ANGELES COUNTY FLOOD CONTROL DISTRICT UNLESS OTHERWISE NOTED.

ALLIANCE
LAND PLANNING & ENGINEERING INC.
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FAX:(760) 431-8802
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SUITE 250
VALENCIA, CA. 91355
TEL: (661) 799-2780
FAX: (661) 254-1929
CIVIL ENGINEERING • LAND PLANNING • HILLSIDE DESIGN • SURVEYING

PLANS PREPARED BY:
ALLIANCE LAND PLANNING & ENGINEERING INC.
2248 FARDAY AVE.
(760) 431-9896

PLANS PREPARED UNDER THE DIRECTION OF:
CRAIG M. WHITTAKER R.C.E. 51929 — DATE 12-2-10

REGISTERED PROFESSIONAL ENGINEER — CRAIG M. WHITTAKER — No. 51929 — EXP 6-30-12 — CIVIL — STATE OF CALIFORNIA

DRAINAGE CONCEPT/ HYDROLOGY STUDY/ SUSMP/ LID PLAN

APPROVED FOR AREA AND Q ONLY

APPROVED BY: [signature] RCE NO 46838 DATE: 1/27/2011

CHECKED BY: [signature] DATE: 1/27/2011

LAND DEVELOPMENT DIVISION
LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

PLANS PREPARED FOR:
NEWHALL LAND
23823 WEST VALENCIA BOULEVARD
VALENCIA, CALIFORNIA 91355
TELEPHONE: (661) 255-4000
REPRESENTATIVE : ALEX HERRELL

NO.	DATE	BY	APPR

4 | COUNTY OF LOS ANGELES | 5 SHEETS

DRAINAGE CONCEPT/
HYDROLOGY STUDY
FOR ENTRADA
TENTATIVE TRACT 53295
DEVELOPED CONDITION

ENTRADA DRAINAGE CONCEPT - DEVELOPED CONDITION

RECEIVED
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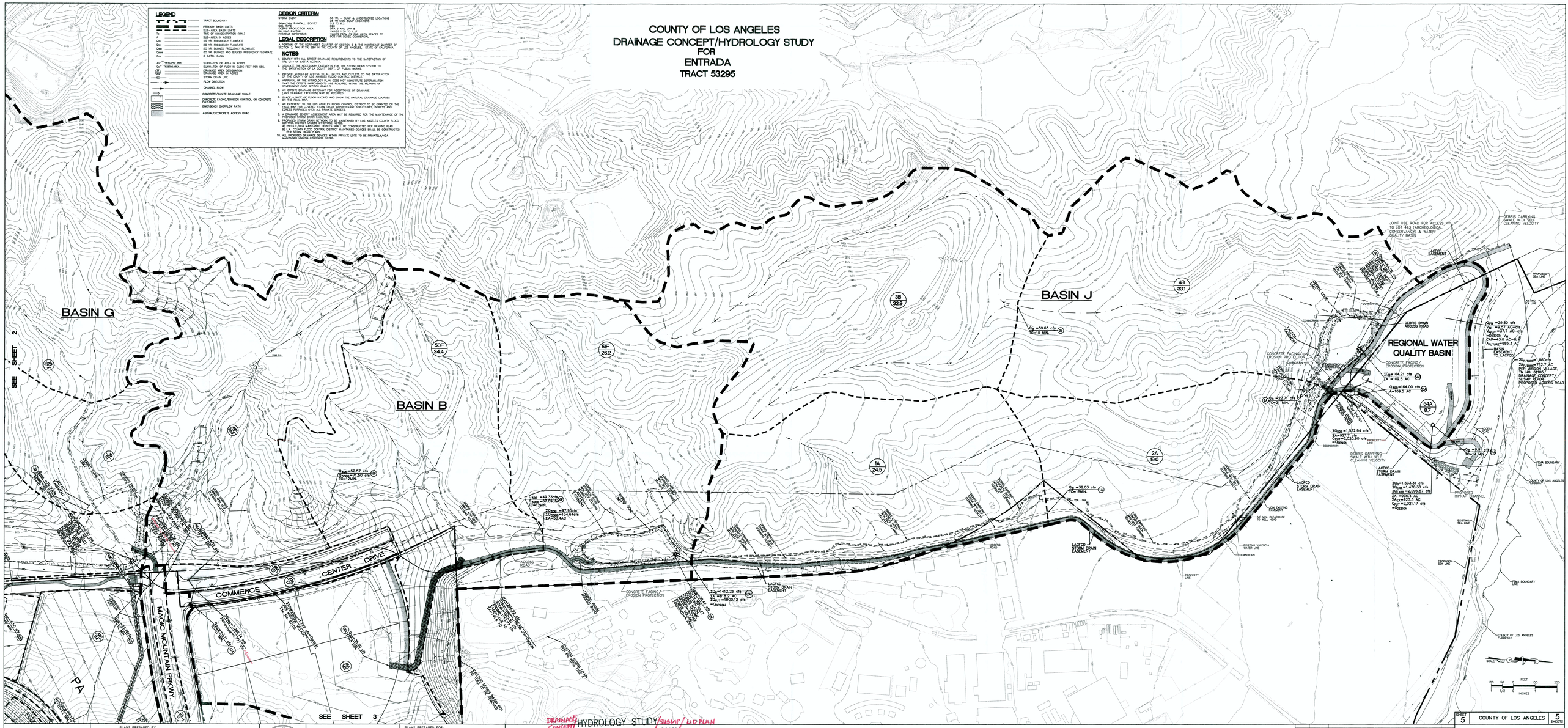
0830/HYDROLOGY/0830-HYDRO-SHT-04.DWG


COUNTY OF LOS ANGELES
DRAINAGE CONCEPT/HYDROLOGY STUDY
FOR
ENTRADA
TRACT 53295
LEGEND
TRACT BOUNDARY
PRIMARY BASIN LIMITS
SUB-AREA BASIN LIMITS
TIME OF CONCENTRATION (MIN.)
25 YR. FREQUENCY FLOWRATE
25 YR. FREQUENCY FLOWRATE
50 YR. FREQUENCY FLOWRATE
50 YR. BURNED FREQUENCY FLOWRATE
50 YR. BURNED AND BULKED FREQUENCY FLOWRATE
Q CATCH BASIN
SUMNATION OF AREA IN ACRES
SUMNATION OF FLOW IN CUBIC FEET PER SEC.
DRAINAGE AREA DESIGNATION
DRAINAGE AREA IN ACRES
STORM DRAIN LINE
FLOW DIRECTION
CHANNEL FLOW
CONCRETE/GUNITE DRAINAGE SWALE
CONCRETE FACING/EROSION CONTROL OR CONCRETE PAVEMENT
EMERGENCY OVERFLOW PATH
ASPHALT/CONCRETE ACCESS ROAD
DESIGN CRITERIA:
STORM EVENT
50 YR. — SUMP & UNDEVELOPED LOCATIONS
25 YR. — ALL NON-SUMP LOCATIONS
50yr-24hr RAINFALL ISOHYET
2.5 TO 4.0
SOIL TYPE
D
RUNOFF PRODUCTION AREA
DPA 5 AND DPA B
BULKING FACTOR
VARIES 1.38 TO 1.27
PERVIOUS / IMPERVIOUS
VARIES FROM 35 FOR OPEN SPACES TO 90/10 FOR DENSE CONDITIONS
LEGAL DESCRIPTION
A PORTION OF THE NORTHWEST QUARTER OF SECTION 2 & THE NORTHEAST QUARTER OF SECTION 3, T4N, R17W, SBM IN THE COUNTY OF LOS ANGELES, STATE OF CALIFORNIA.
NOTES:
1. COMPLY WITH ALL STREET DRAINAGE REQUIREMENTS TO THE SATISFACTION OF THE CITY OF SANTA CLARITA.
2. DEDICATE THE NECESSARY EASEMENTS FOR THE STORM DRAIN SYSTEM TO THE SATISFACTION OF LA COUNTY DEPT. OF PUBLIC WORKS.
3. PROVIDE 20X20-AR ACCESS TO ALL INLETS AND OUTLETS TO THE SATISFACTION OF LA COUNTY DEPT. OF PUBLIC WORKS FOR MAINTENANCE.
4. GRADING OUTSIDE THE HORSHOED IS DOES NOT CONSTITUTE DETERMINATION THAT NO OFFSITE IMPROVEMENTS ARE REQUIRED WITHIN THE MEANING OF GOVERNMENT CODE SECTION 66462.5.
5. AN OFFSITE DRAINAGE COVENANT FOR ACCEPTANCE OF DRAINAGE CONCENTRATED ONTO ADJACENT PROPERTIES MAY BE REQUIRED.
6. PLACE A NOTE OF FLOOD HAZARD AND SHOW THE NATURAL DRAINAGE COURSES ON THE FINAL MAP.
7. AN EASEMENT TO THE LOS ANGELES FLOOD CONTROL DISTRICT TO BE GRANTED ON THE FINAL MAP FOR ACCESS TO ALL DRAINAGE APPURTENANT STRUCTURES, INLETS AND LINES PURSUED OVER ALL PRIVATE STREETS.
8. A DRAINAGE BENEFIT ASSESSMENT AREA MAY BE REQUIRED FOR THE MAINTENANCE OF THE PROPOSED STORM DRAIN FACILITIES.
9. PROPOSED STORM DRAIN NETWORK TO BE MAINTAINED BY LOS ANGELES COUNTY FLOOD CONTROL DISTRICT EXCEPT AS NOTED BELOW:
A) PRIVATELY MAINTAINED DEVICES SHALL BE CONSTRUCTED PER GRADING PLAN
B) L.A. COUNTY FLOOD CONTROL DISTRICT MAINTAINED DEVICES SHALL BE CONSTRUCTED PER STORM DRAIN PLANS.
10. ALL DRAINAGE FACILITIES LOCATED WITHIN PRIVATE LOTS TO BE PRIVATELY/HOA MAINTAINED UNLESS OTHERWISE NOTED.
BASIN G
BASIN B
BASIN J
SEE SHEET 2
SEE SHEET 3
COMMERCE CENTER DRIVE
MAGIC MOUNTAIN PKWY.
REGIONAL WATER QUALITY BASIN
JOINT USE ROAD FOR ACCESS TO LOT 443 (ARCHEOLOGICAL CONSERVANCY) & WATER QUALITY BASIN
DEBRIS CARRYING SWALE WITH SELF CLEANING VELOCITY
DEBRIS BASIN ACCESS ROAD
CONCRETE FACING/ EROSION PROTECTION
LACFCD STORM DRAIN EASEMENT
EXISTING SEA LINE
PROPOSED SEA LINE
EXISTING VALENCIA WATER LINE
PROPERTY LINE
ITEM BOUNDARY LINE
COUNTY OF LOS ANGELES FLOODWAY
PROPOSED RIPRAP CHANNEL
ACCESS ROAD
50' MIN. CLEARANCE TO WELL HEAD
ADJ. EXISTING PAVEMENT
SCALE: 1"=100'
FEET
INCHES
PLANS PREPARED BY:
ALLIANCE LAND PLANNING & ENGINEERING INC.
2248 FARADAY AVE. CARLSBAD, CA. 92008
(760) 431-9696
PLANS PREPARED UNDER THE DIRECTION OF:
CRAIG W. WHITTAKER R.C.E. 51929
12-2-10
DATE
REGISTERED PROFESSIONAL ENGINEER
CRAIG W. WHITTAKER
No. 51929
EXP. 6-30-12
CIVIL
STATE OF CALIFORNIA
PLANS PREPARED FOR:
NEWHALL LAND
23823 WEST VALENCIA BOULEVARD
VALENCIA, CALIFORNIA 91355
TELEPHONE: (661) 255-4000
REPRESENTATIVE : ALEX HERRELL
DRAINAGE CONCEPT/HYDROLOGY STUDY/SUSMP/LID PLAN
APPROVED FOR AREA AND Q ONLY
APPROVED BY: _____ RCE NO. 46826 DATE: 12/21/2010
CHECKED BY: _____ DATE: 12/21/2010
LAND DEVELOPMENT DIVISION
LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS
SHEET 5
COUNTY OF LOS ANGELES
5 SHEETS
DRAINAGE CONCEPT/
HYDROLOGY STUDY
FOR ENTRADA
TENTATIVE TRACT 53295
DEVELOPED CONDITION
NO. DATE BY APP.
FOR PRELIMINARY USE ONLY
DEC 01 2010

ENTRADA SOUTH

DRAINAGE CONCEPT REPORT

DEBRIS BASIN CAPACITY CALCULATIONS

ALLIANCE LAND PLANNING AND ENGINEERING

EARTHWORK VOLUMES

JOB NAME: Entrada Drainage Basin A, Subarea 8C
JOB NO. : 930
BY: Jason
DATE: 2/12/2010

SCALE: 1"= 60'
AREA LABEL: A
UNIT FACTOR: 66.67
CUT OR FILL: FILL

ELEVATION/ STATION	PLANIM. READING "INCHES"	SUM "INCHES"	INTERVAL "FEET"	FACTOR	QUANTITY "CY"
1335	0.00				
		0.8	1	66.67	53
1336	0.80				
		1.8	1	66.67	120
1337	1.00				
		2.05	1	66.67	137
1338	1.05				
		1.05	1	66.67	70
1339	0.00				
		0	1	66.67	0
1340	0.00				
		0	1	66.67	0
1341	0.00				
		0	1	66.67	0
1342	0.00				
		0	1	66.67	0
1343	0.00				
		0	1	66.67	0
1344	0.00				
		0	1	66.67	0
1345	0.00				
		0	1	66.67	0
1346	0.00				
		0	1	66.67	0
1347	0.00				
		0	0	66.67	0
		0	0	66.67	0
		0	0	66.67	0
		0	0	66.67	0
		0	0	66.67	0
		0	0	66.67	0
		0	0	66.67	0
		0	0	66.67	0
		0	0	66.67	0
		0	0	66.67	0
		CUBIC	YARDS		380

ALLIANCE LAND PLANNING AND ENGINEERING

EARTHWORK VOLUMES

JOB NAME: Entrada Drainage Basin A, Subarea 15C
JOB NO. : 930
BY: Jason
DATE: 2/19/2010

SCALE: 1"= 60'
AREA LABEL: A
UNIT FACTOR: 66.67
CUT OR FILL: FILL

ELEVATION/ STATION	PLANIM. READING "INCHES"	SUM "INCHES"	INTERVAL "FEET"	FACTOR	QUANTITY "CY"
1304	0.00				
		1.634	1	66.67	109
1305	1.63				
		3.847	1	66.67	256
1306	2.21				
		2.213	1	66.67	148
1307	0.00				
		0	1	66.67	0
1308	0.00				
		0	1	66.67	0
1309	0.00				
		0	1	66.67	0
1310	0.00				
		0	1	66.67	0
1311	0.00				
		0	1	66.67	0
1312	0.00				
		0	1	66.67	0
1313	0.00				
		0	1	66.67	0
1314	0.00				
		0	1	66.67	0
1315	0.00				
		0	1	66.67	0
1316	0.00				
		0	0	66.67	0
		0	0	66.67	0
		0	0	66.67	0
		0	0	66.67	0
		0	0	66.67	0
		0	0	66.67	0
		0	0	66.67	0
		0	0	66.67	0
		0	0	66.67	0
		0	0	66.67	0
		CUBIC	YARDS		513

ALLIANCE LAND PLANNING AND ENGINEERING

EARTHWORK VOLUMES

JOB NAME: Entrada Drainage Basin A, Subarea 20C
JOB NO. : 930
BY: Jason
DATE: 11/11/2009

SCALE: 1"= 60'
AREA LABEL: A
UNIT FACTOR: 66.67
CUT OR FILL: FILL

ELEVATION/ STATION	PLANIM. READING "INCHES"	SUM "INCHES"	INTERVAL "FEET"	FACTOR	QUANTITY "CY"
1269	0.00				
		0.26	1	66.67	17
1270	0.26				
		0.68	1	66.67	45
1271	0.42				
		1.03	1	66.67	69
1272	0.61				
		1.53	1	66.67	102
1273	0.92				
		2.12	1	66.67	141
1274	1.20				
		2.53	1	66.67	84
1274.5	1.33				
		1.33	1	66.67	89
1275.5	0.00				
		0	1	66.67	0
1276.5	0.00				
		0	1	66.67	0
1277.5	0.00				
		0	1	66.67	0
1278.5	0.00				
		0	1	66.67	0
1279.5	0.00				
		0	1	66.67	0
1280.5	0.00				
		0	0	66.67	0
		0	0	66.67	0
		0	0	66.67	0
		0	0	66.67	0
		0	0	66.67	0
		0	0	66.67	0
		0	0	66.67	0
		0	0	66.67	0
		0	0	66.67	0
		0	0	66.67	0
		CUBIC	YARDS		548

ALLIANCE LAND PLANNING AND ENGINEERING

EARTHWORK VOLUMES

JOB NAME: Entrada Drainage Basin B, Subarea 2A
JOB NO. : 930
BY: Jason
DATE: 5/6/2010

SCALE: 1"= 60'
AREA LABEL: A
UNIT FACTOR: 66.67
CUT OR FILL: FILL

ELEVATION/ STATION	PLANIM. READING "INCHES"	SUM "INCHES"	INTERVAL "FEET"	FACTOR	QUANTITY "CY"
1339	0.00				
		0.8	1	66.67	53
1340	0.80				
		1.77	1	66.67	118
1341	0.97				
		0.97	1	66.67	65
1342	0.00				
		0	1	66.67	0
1343	0.00				
		0	1	66.67	0
1344	0.00				
		0	1	66.67	0
1345	0.00				
		0	1	66.67	0
1346	0.00				
		0	1	66.67	0
1347	0.00				
		0	1	66.67	0
1348	0.00				
		0	1	66.67	0
1349	0.00				
		0	1	66.67	0
1350	0.00				
		0	1	66.67	0
1351	0.00				
		0	1	66.67	0
1352					
		0	0	66.67	0
		0	0	66.67	0
		0	0	66.67	0
		0	0	66.67	0
		0	0	66.67	0
		0	0	66.67	0
		0	0	66.67	0
		0	0	66.67	0
		0	0	66.67	0
		0	0	66.67	0
		0	0	66.67	0
		CUBIC	YARDS		236

ALLIANCE LAND PLANNING AND ENGINEERING

EARTHWORK VOLUMES

JOB NAME: Entrada Drainage Basin B, Subarea 51F
JOB NO. : 930
BY: Jason
DATE: 2/19/2010

SCALE: 1"= 40'
AREA LABEL: A
UNIT FACTOR: 29.63
CUT OR FILL: FILL

ELEVATION/ STATION	PLANIM. READING "INCHES"	SUM "INCHES"	INTERVAL "FEET"	FACTOR	QUANTITY "CY"
1125	0.00				
		5.512	1	29.63	163
1126	5.51				
		19.692	1	29.63	583
1127	14.18				
		37.15	1	29.63	1101
1128	22.97				
		53.82	1	29.63	1595
1129	30.85				
		30.85	1	29.63	914
1130	0.00				
		0	1	29.63	0
1131	0.00				
		0	1	29.63	0
1132	0.00				
		0	1	29.63	0
1133	0.00				
		0	1	29.63	0
1134	0.00				
		0	1	29.63	0
1135	0.00				
		0	1	29.63	0
1136	0.00				
		0	1	29.63	0
1137	0.00				
		0	1	29.63	0
1138					
		0	0	29.63	0
		0	0	29.63	0
		0	0	29.63	0
		0	0	29.63	0
		0	0	29.63	0
		0	0	29.63	0
		0	0	29.63	0
		0	0	29.63	0
		0	0	29.63	0
		0	0	29.63	0
		CUBIC	YARDS		4356

ALLIANCE LAND PLANNING AND ENGINEERING

EARTHWORK VOLUMES

JOB NAME: Entrada Drainage Basin E, Subarea 3A
JOB NO. : 930
BY: Jason
DATE: 11/11/2009

SCALE: 1"= 40'
AREA LABEL: A
UNIT FACTOR: 29.63
CUT OR FILL: FILL

ELEVATION/ STATION	PLANIM. READING "INCHES"	SUM "INCHES"	INTERVAL "FEET"	FACTOR	QUANTITY "CY"
1108	0.00				
		3.31	1	29.63	98
1109	3.31				
		8.94	1	29.63	265
1110	5.63				
		12.06	1	29.63	357
1111	6.43				
		13.48	1	29.63	399
1112	7.05				
		14.99	1	29.63	444
1113	7.94				
		16.55	1	29.63	490
1114	8.61				
		8.61	1	29.63	255
1115	0.00				
		0	1	29.63	0
1116	0.00				
		0	1	29.63	0
1117	0.00				
		0	1	29.63	0
1118	0.00				
		0	1	29.63	0
1119	0.00				
		0	1	29.63	0
1120	0.00				
		0	0	29.63	0
		0	0	29.63	0
		0	0	29.63	0
		0	0	29.63	0
		0	0	29.63	0
		0	0	29.63	0
		0	0	29.63	0
		0	0	29.63	0
		0	0	29.63	0
		0	0	29.63	0
		CUBIC	YARDS		2309

ALLIANCE LAND PLANNING AND ENGINEERING

EARTHWORK VOLUMES

JOB NAME: Entrada Drainage Basin E, Subarea 4A
JOB NO. : 930
BY: Jason
DATE: 11/11/2009

SCALE: 1"= 40'
AREA LABEL: A
UNIT FACTOR: 29.63
CUT OR FILL: FILL

ELEVATION/ STATION	PLANIM. READING "INCHES"	SUM "INCHES"	INTERVAL "FEET"	FACTOR	QUANTITY "CY"
1107	0.00				
		1.58	1	29.63	47
1108	1.58				
		3.42	1	29.63	51
1108.5	1.84				
		1.84	1	29.63	55
1109.5	0.00				
		0	1	29.63	0
1110.5	0.00				
		0	1	29.63	0
1111.5	0.00				
		0	1	29.63	0
1112.5	0.00				
		0	1	29.63	0
1113.5	0.00				
		0	1	29.63	0
1114.5	0.00				
		0	1	29.63	0
1115.5	0.00				
		0	1	29.63	0
1116.5	0.00				
		0	1	29.63	0
1117.5	0.00				
		0	1	29.63	0
1118.5	0.00				
		0	0	29.63	0
		0	0	29.63	0
		0	0	29.63	0
		0	0	29.63	0
		0	0	29.63	0
		0	0	29.63	0
		0	0	29.63	0
		0	0	29.63	0
		0	0	29.63	0
		0	0	29.63	0
		CUBIC	YARDS		152

ALLIANCE LAND PLANNING AND ENGINEERING

EARTHWORK VOLUMES

JOB NAME: Entrada Drainage Basin G, Subarea 17A
JOB NO. : 930
BY: Jason
DATE: 5/7/2010

SCALE: 1"= 60'
AREA LABEL: A
UNIT FACTOR: 66.67
CUT OR FILL: FILL

ELEVATION/ STATION	PLANIM. READING "INCHES"	SUM "INCHES"	INTERVAL "FEET"	FACTOR	QUANTITY "CY"
1270	0.00				
		4	1	66.67	267
1271	4.00				
		19.93	1	66.67	1329
1272	15.93				
		48.35	1	66.67	3223
1273	32.42				
		80.87	1	66.67	5391
1274	48.45				
		114.74	1	66.67	7649
1275	66.29				
		66.29	1	66.67	4419
1276	0.00				
		0	1	66.67	0
1277	0.00				
		0	1	66.67	0
1278	0.00				
		0	1	66.67	0
1279	0.00				
		0	1	66.67	0
1280	0.00				
		0	1	66.67	0
1281	0.00				
		0	1	66.67	0
1282	0.00				
		0	0	66.67	0
		0	0	66.67	0
		0	0	66.67	0
		0	0	66.67	0
		0	0	66.67	0
		0	0	66.67	0
		0	0	66.67	0
		0	0	66.67	0
		0	0	66.67	0
		CUBIC	YARDS		22279

ALLIANCE LAND PLANNING AND ENGINEERING

EARTHWORK VOLUMES

JOB NAME: Entrada Drainage Basin H, Subarea 2A
JOB NO. : 930
BY: Jason
DATE: 2/19/2010

SCALE: 1"= 40'
AREA LABEL: A
UNIT FACTOR: 29.63
CUT OR FILL: FILL

ELEVATION/ STATION	PLANIM. READING "INCHES"	SUM "INCHES"	INTERVAL "FEET"	FACTOR	QUANTITY "CY"
1328	0.00				
		4.93	1	29.63	146
1329	4.93				
		18.23	1	29.63	540
1330	13.30				
		28.09	1	29.63	832
1331	14.79				
		30.88	1	29.63	915
1332	16.09				
		35.98	1	29.63	1066
1333	19.89				
		19.89	1	29.63	589
1334	0.00				
		0	1	29.63	0
1335	0.00				
		0	1	29.63	0
1336	0.00				
		0	1	29.63	0
1337	0.00				
		0	1	29.63	0
1338	0.00				
		0	1	29.63	0
1339	0.00				
		0	1	29.63	0
1340	0.00				
		0	0	29.63	0
		0	0	29.63	0
		0	0	29.63	0
		0	0	29.63	0
		0	0	29.63	0
		0	0	29.63	0
		0	0	29.63	0
		0	0	29.63	0
		0	0	29.63	0
		0	0	29.63	0
		0	0	29.63	0
		CUBIC	YARDS		4089

ALLIANCE LAND PLANNING AND ENGINEERING

EARTHWORK VOLUMES

JOB NAME: Entrada Drainage Basin I, Subarea 1A
JOB NO. : 930
BY: Jason
DATE: 5/10/2010

SCALE: 1"= 100'
AREA LABEL: A
UNIT FACTOR: 185.19
CUT OR FILL: FILL

ELEVATION/ STATION	PLANIM. READING "INCHES"	SUM "INCHES"	INTERVAL "FEET"	FACTOR	QUANTITY "CY"
1230	0.00				
		1.31	1	185.19	243
1231	1.31				
		5.35	1	185.19	991
1232	4.04				
		11.64	1	185.19	2156
1233	7.60				
		7.6	1	185.19	1407
1234	0.00				
		0	1	185.19	0
1235	0.00				
		0	1	185.19	0
1236	0.00				
		0	1	185.19	0
1237	0.00				
		0	1	185.19	0
1238	0.00				
		0	1	185.19	0
1239	0.00				
		0	1	185.19	0
1240	0.00				
		0	1	185.19	0
1241	0.00				
		0	1	185.19	0
1242	0.00				
		0	0	185.19	0
		0	0	185.19	0
		0	0	185.19	0
		0	0	185.19	0
		0	0	185.19	0
		0	0	185.19	0
		0	0	185.19	0
		0	0	185.19	0
		0	0	185.19	0
		0	0	185.19	0
		CUBIC	YARDS		4796

ALLIANCE LAND PLANNING AND ENGINEERING

EARTHWORK VOLUMES

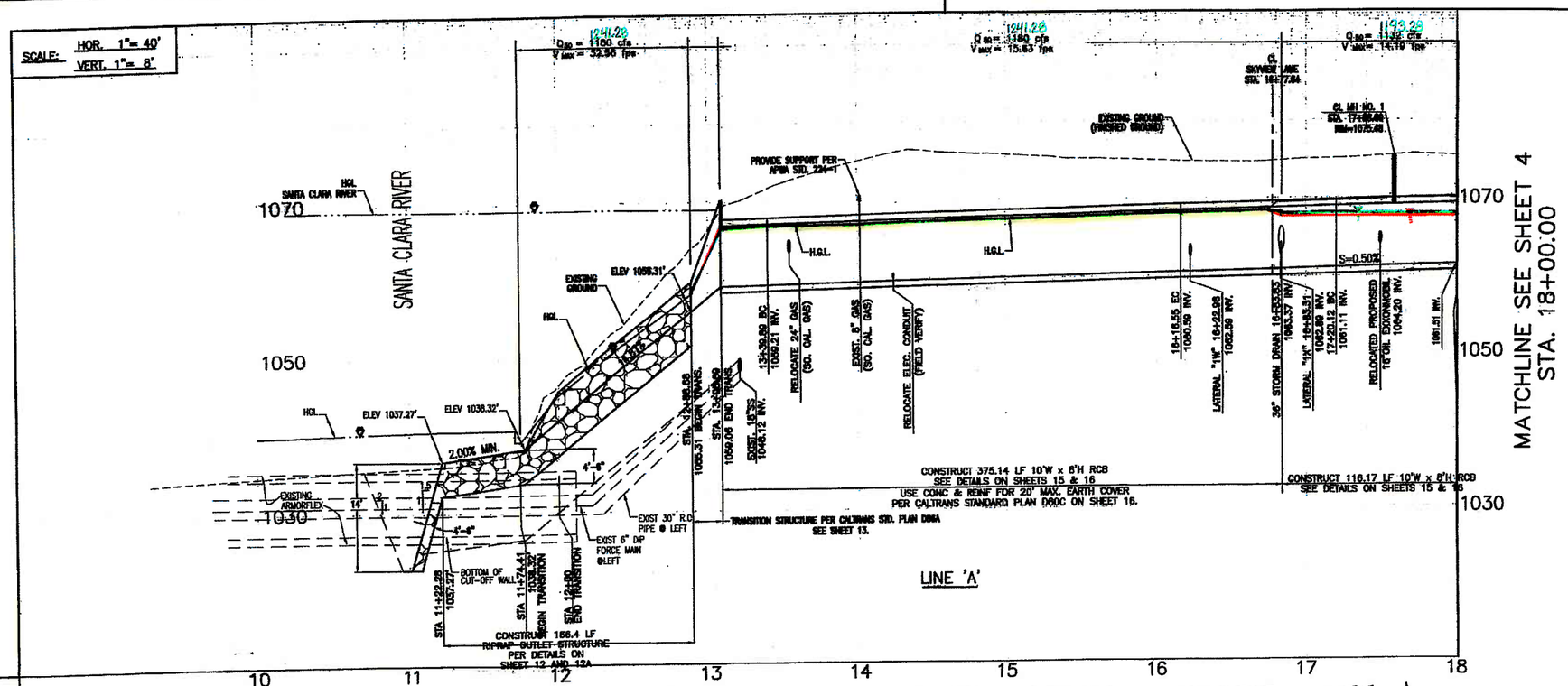
JOB NAME: Entrada Drainage Basin J, Subarea 4B
JOB NO. : 930
BY: Jason
DATE: 1/15/2010

SCALE: 1"= 100'
AREA LABEL: 4B
UNIT FACTOR: 185.19
CUT OR FILL: FILL

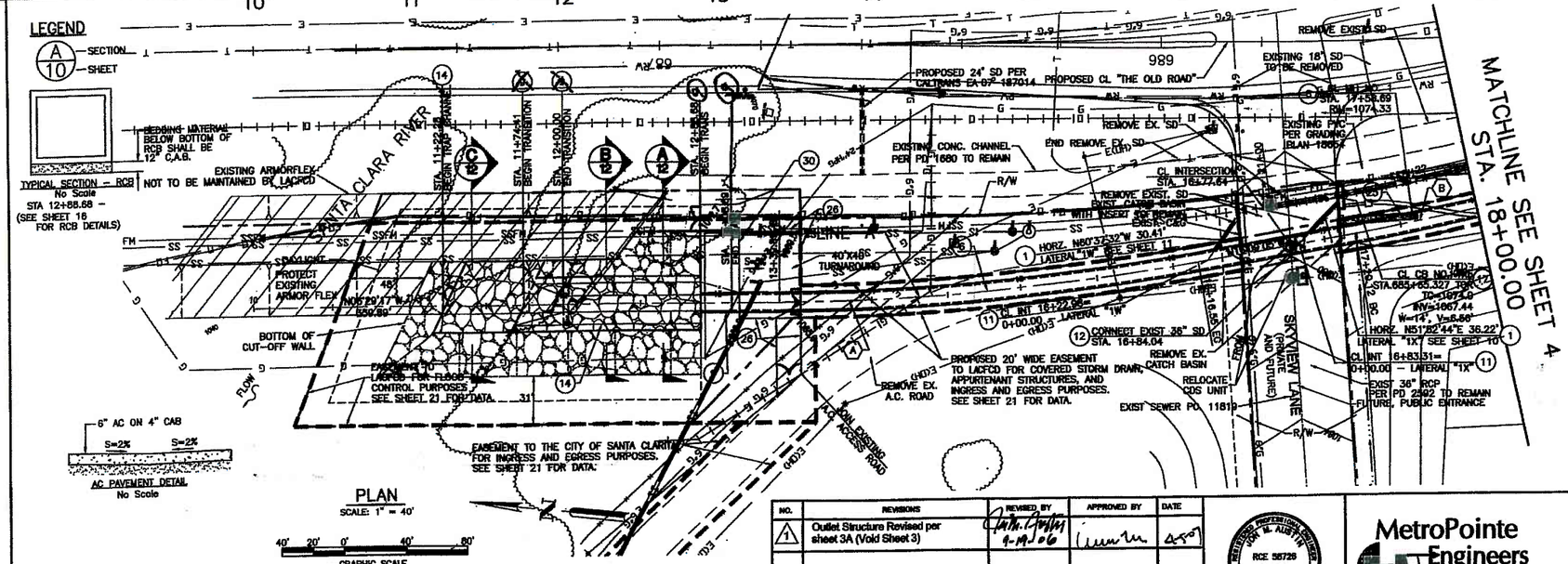
ELEVATION/ STATION	PLANIM. READING "INCHES"	SUM "INCHES"	INTERVAL "FEET"	FACTOR	QUANTITY "CY"
1041	0.00				
		2.51	1	185.19	465
1042	2.51				
		6.09	1	185.19	1128
1043	3.58				
		7.4	1	185.19	1370
1044	3.82				
		8.064	1	185.19	1493
1045	4.24				
		9.554	1	185.19	885
1045.5	5.31				
		5.31	1	185.19	983
1046.5	0.00				
		0	1	185.19	0
1047.5	0.00				
		0	1	185.19	0
1048.5	0.00				
		0	1	185.19	0
1049.5	0.00				
		0	1	185.19	0
1050.5	0.00				
		0	1	185.19	0
1051.5	0.00				
		0	1	185.19	0
1052.5	0.00				
		0	0	185.19	0
		0	0	185.19	0
		0	0	185.19	0
		0	0	185.19	0
		0	0	185.19	0
		0	0	185.19	0
		0	0	185.19	0
		0	0	185.19	0
		0	0	185.19	0
		0	0	185.19	0
		CUBIC	YARDS		6324

SECTION 5A
Existing Condition
Hydraulic Exhibits

SCALE: HOR. 1"= 40'
VERT. 1"= 8'



LEGEND
PROPOSED HGL
EXISTING HGL
EXISTING HGL



Curve Data				
CURVE	RADIUS	LENGTH	TANGENT	DELTA
A	1640.36'	276.67'	138.67'	09°39'48"
B	1640.36'	263.28'	131.92'	09°11'46"

APPROVED FOR CONSTRUCTION BY:
ROBERT W. BEHMAN, P.E., L.S.
DIRECTOR OF PUBLIC WORKS
CITY OF SANTA CLARITA
4-5-07
DATE

NO.	REVISIONS	REVISED BY	APPROVED BY	DATE
1	Outlet Structure Revised per sheet 3A (Void Sheet 3)			4-5-07

REGISTERED PROFESSIONAL ENGINEER
JOHN M. AUSTIN
RCE 58728
Exp. 03/31/07
CIVIL
STATE OF CALIFORNIA
PROJECT ENGINEER
9/19/06
DATE

MetroPointe Engineers
3555 Harbor Gateway South, Suite A
Costa Mesa, CA 92626
(714) 438-1095

CONSTRUCTION NOTES

1. CONSTRUCT 18" RCP (D-LOAD PER PROFILE)
6. CONSTRUCT 10' x 8' RCB PER CALTRANS STD D80A ON SHEET 16.
8. CONSTRUCT MANHOLE CONCRETE BOX STORM DRAIN PER APWA STD 323-1.
9. CONSTRUCT TRANSITION STRUCTURE PER CALTRANS DETAIL D86A ON SHEET 20.
11. CONSTRUCT JUNCTION STRUCTURE PIPE TO RCB INLET < 30" PER APWA STD 334-1.
12. CONSTRUCT JUNCTION STRUCTURE PIPE TO RCB INLET > 30" PER APWA STD STD 333-1.
14. CONSTRUCT RIPRAP OUTLET STRUCTURE PER DETAIL 2 ON SHEET 12A.
17. MODIFIED CURB OPENING CATCH BASIN PER APWA STD. 300-2 B=3'-8", Wupstream 2'-6". (W6V PER PLAN). LOCAL DEPRESSION PER APWA STD. 313-1, CASE E. SEE STREET PLANS. INSTALL OCEAN-PRO CATCH BASIN INSERT, 3 DEBRIS GATES, 5 FILTER TRAYS, AND 10 POLLUTANT FILTERS.
25. CONSTRUCT 4' WIDE, 4" THICK PCC PEDESTRIAN ACCESS TO MANHOLE PER DETAIL 3 ON SHEET 12. CONSTRUCT MINIMUM 5'X5' CONCRETE PAD AROUND MANHOLE LID.
26. CONSTRUCT CHAIN LINK FENCE AND GATE PER APWA STD. 600-2.
27. CONSTRUCT 16' WIDE DRIVEWAY APPROACH PER APWA STD. 110-1, TYPE A. W=16', X=3', Y=4'. DRIVEWAY SHALL BE 6" THICK PCC.
30. CONSTRUCT 6" THICK A.C. ACCESS ROAD PER SECTION HEREIN.

STORM DRAIN PLANS IN
CITY OF SANTA CLARITA MTD. No. 1764

CITY OF SANTA CLARITA

STORM DRAIN PLAN AND PROFILE
MTD NO. 1764
SYSTEM A
FROM STA. 10+00 TO STA. 18+00

DWG | SHEET 3A OF 21

SCALE: HOR. 1"= 40'
VERT. 1"= 8'

MATCHLINE SEE SHEET 3 STA. 18+00.00

MATCHLINE SEE SHEET 5 STA. 28+00.00

1090
1070
1050

1193.28 Q 50= 1132 cfs V max= 24.18 fps

1193.28 Q 50= 1132 cfs V max= 26.94 fps

1193.28 Q 50= 1132 cfs V max= 28.51 fps

1193.28 Q 50= 1132 cfs V max= 28.27 fps

1187.28 Q 50= 1132 cfs V max= 27.24 fps

EXISTING GROUND

FINISHED GROUND

Cl. MH NO. 2 STA. 21+80.43 GB RIM=1078.27

Cl. MH NO. 3 STA. 24+85.06 RIM=1082.93

Cl. MH NO. 4 STA. 27+75.00 RIM=1090.84

H.G.L.

S=0.50%

S=1.09%

S=2.76%

19+53.40 EQ. ⊕1062.43 INV.

20+43.47 BC ⊕1062.75 INV.

21+80.43 GB ⊕1063.41 INV.

LATERAL "1T" 21+82.40 1065.51 INV.

LATERAL "1S" 22+14.82 1065.78 INV.

22+38.79 RCD ⊕1064.03 INV.

LATERAL "1H" 23+79.72 1067.33 INV.

LATERAL "1H" 24+37.85 1067.55 INV.

24+86.22 ⊕1066.75 INV.

24+86.06 ⊕1066.88 INV.

LATERAL "1P" 25+30.57 1067.10 INV.

LATERAL "1P" 26+71.71 1070.87 INV.

SUMP, GRATED SURFACE

27+75.00 ⊕1090.84 INV.

⊕1075.59 INV.

CONSTRUCT 656.22 LF 10'W x 8'H RCB SEE DETAIL ON SHEETS 15 & 16

CONSTRUCT 656.22 LF 10'W x 8'H RCB SEE DETAIL ON SHEETS 15 & 16

CONSTRUCT 45.31 LF 10'W x 7'H RCB SEE DETAIL ON SHEET 14

TRANS 10'W x 8'H RCB TO 10'W x 7'H RCB

CONSTRUCT 215.78 LF 10'W x 7'H RCB SEE DETAIL ON SHEETS 15 & 16

CONSTRUCT 45.87 LF 10'W x 7'H RCB SEE DETAIL ON SHEETS 15 & 16

LINE 'A' ⚠2

⊕ ALL RCB INVERT ELEVATIONS TO BE 1" HIGHER THAN DESIGN INVERT ELEVATIONS

18 19 20 21 22 23 24 25 26 27 28

PROP. STORM DRAIN PER CALTRANS EA 07-187014

R/W

DRIVEWAY

Cl. C.B. NO. 1Sb ST. STA. 684+17.652 TC=1076.61, INV.=1070.03 W=7', V=6.56'

EXIST. CONC. CHANNEL TO BE REMOVED

Cl. C.B. 1Rb ST. STA. 683+20.00 TC=1081.25, INV.=1080.91 W=7', V=8.56'

⚠2 Cl. INT LACSD 6" SSFM 0+57.22 – LATERAL "1S" PROVIDE PIPE SUPPORT PER LACSD STD PLAN S-8-217. PROVIDE MINIMUM 8" CLEARANCE FROM BOTTOM OF 6" SSFM TO TOP OF 24" RCP.

HORZ. N71°45'04"E, 107.86' LATERAL "1S" SEE SHEET 10

6"SSFM

EXISTING 6" SSFM

CL THE OLD ROAD

684+41.146 THE OLD ROAD= 10+00.00

EXIST. CONC. CHANNEL TO BE REMOVED

Cl. INT 22+00.49= 0+00.00 – LATERAL "1T"

Cl. INT 22+14.82= 0+00.00 – LATERAL "1S"

Cl. INT 23+79.72= 0+00.00 – LATERAL "1H"

Cl. INT 24+37.85= 0+00.00 – LATERAL "1R"

Cl. INT 25+30.57= 0+00.00 – LATERAL "1Q"

Cl. INT 26+71.71= 0+00.00 – LATERAL "1P"

STA. 24+86.06 END TRANS.

STA. 24+86.22 BEGIN TRANS.

Cl. MH NO. 3 STA. 24+85.06 RIM=1082.93

AT "1R" SEE SHEET 10A

19+53.40 EQ.

20+43.47 BC

22+38.79 RCD

N25°20'5"W

LINE 'A'

R/W

Cl. CB NO. 1Tc ST. STA. 684+21.317 TC=1078.89, INV.=1067.91 W=14', V=10.98'

HORZ. N71°56'35"E, 4.01' LATERAL "1T" SEE SHEET 10A

HORZ. N72°06'17"E, 13.12' LATERAL "1T" SEE SHEET 10

ST. STA. 684+21.074 TC=1079.02, INV.=1070.79 NOT TO BE MAINTAINED BY LACFCD

RETAINING WALL SEE SEPARATE PLAN

SEE GRADING PLAN

HORZ. N66°04'48"E, 24.70' LATERAL "1Q" SEE SHEET 11

HORZ. N66°04'48"E, 4.00' LATERAL "1Q" SEE SHEET 11

Cl. C.B. NO. 10b ST. STA. 683+20.508 TC=1084.78, INV.=1076.56 W=7', V=8.22'

ST. STA. 683+20.980 TG=1084.77, INV.=1081.18

HORZ. N78°04'11"E, 61.87' LATERAL "1P" SEE SHEET 10

Cl. C.B. NO. 1Pb ST. STA. 682+55.033 TC=1088.97, INV.=1081.82 W=10', V=7.22'

HORZ. N63°18'07"E, 85.65' LATERAL "1P" SEE SHEET 10

ST. STA. 92+11.325 MMP TC=1089.15, INV.=1082.21 W=7', V=6.89'

PROPOSED 24" VCP SEWER (BY OTHERS)

EXIST. TERRACE DRAIN

CONTINUE BRIDGE DETAIL B-2, STD. PLAN 80-3 TO OUTLET STRUCTURE, REFERENCE SHEET 20. IN UNPAVED AREAS.

PROPOSED 28' WIDE EASEMENT TO LACFCD FOR COVERED STORM DRAIN, APPURTENANT STRUCTURES, AND INGRESS AND EGRESS PURPOSES. SEE SHEET 21 FOR DATA

CONSTRUCTION NOTES

1. CONSTRUCT 18" RCP (D-LOAD PER PROFILE)
2. CONSTRUCT 24" RCP (D-LOAD PER PROFILE)
6. CONSTRUCT 10' x 8' RCB PER CALTRANS STD D80A ON SHEET 16.
7. CONSTRUCT 10' x 7' RCB PER CALTRANS STD D80A ON SHEET 16.
8. CONSTRUCT MANHOLE CONCRETE BOX STORM DRAIN PER APWA STD 323-1.
10. CONSTRUCT TRANSITION STRUCTURE SINGLE RCB TO SINGLE RCB PER APWA STD 341-1.
11. CONSTRUCT JUNCTION STRUCTURE PIPE TO RCB INLET < 30" PER APWA STD 334-1.
17. MODIFIED CURB OPENING CATCH BASIN PER APWA STD. 300-2. B=3'-6", Wupstream ≥ 2'-6". (W=V PER PLAN). LOCAL DEPRESSION PER APWA STD. 313-1, CASE E. SEE STREET PLANS. INSTALL OCEAN-PRO CATCH BASIN INSERT. DEBRIS GATES, FILTER TRAYS, AND POLLUTANT FILTERS PER SCHEDULE ON SHEET 2.
18. GRATING CATCH BASIN PER STREET PLANS. NOT TO BE MAINTAINED BY LACFCD.
19. 24" DIA. PERFORATED CMP RISER WITH ASPHALT APRON PER GRADING PLAN. NOT TO BE MAINTAINED BY LACFCD.
28. 12" DIA. PVC, SCH 40 PIPE PER GRADING PLAN. NOT TO BE MAINTAINED BY LACFCD.

PLAN
SCALE: 1" = 40'
40' 20' 0' 40' 80'

GRADING 30-02

APPROVED FOR CONSTRUCTION BY:

ROBERT G. MEDMAN, P.E., L.S. DIRECTOR OF PUBLIC WORKS CITY OF SANTA CLARITA

DATE

Curve Data				
CURVE	RADIUS	LENGTH	TANGENT	DELTA
B	1640.36'	263.28'	131.93'	09°11'46"
C	1640.36'	193.32'	98.77'	06°45'08"
D	3636.48'	1612.61'	819.78'	25°24'29"

NO.	REVISIONS	REVISED BY	APPROVED BY	DATE
⚠1	LACSD 24" VCP SEWER CROSSING	6/23/17		9-17-18
⚠2	OLD ROAD SUPERELEVATION REVISION, SEE CALTRANS PLAN SET SHEET P-8. RELOCATED LATERAL "1R"	6/23/17		9-17-18

REGISTERED PROFESSIONAL ENGINEER JASON M. AUSTIN RCE 56726 Exp. 03/31/10 CIVIL STATE OF CALIFORNIA

PROJECT ENGINEER DATE 6/29/18

MetroPointe Engineers
3555 Harbor Gateway South, Suite A
Costa Mesa, CA 92626
(714) 438-1095

"PF837570"

STORM DRAIN PLANS IN CITY OF SANTA CLARITA MTD. No. 1764

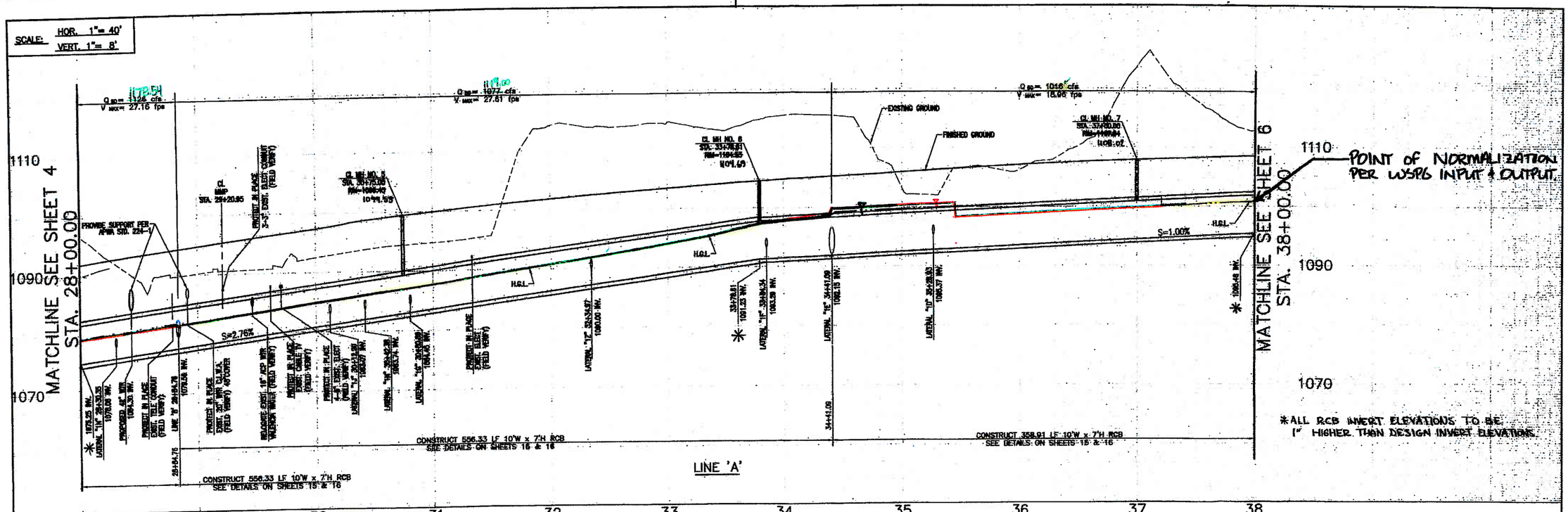
CITY OF SANTA CLARITA

STORM DRAIN PLAN AND PROFILE
MTD NO. 1764
SYSTEM A
FROM STA. 18+00 TO STA. 28+00

DWG

SHEET 4A OF 21

SCALE: HOR. 1"= 40'
VERT. 1"= 8'



CONSTRUCTION NOTES

1. CONSTRUCT 18" RCP (D-LOAD PER PROFILE)
5. CONSTRUCT 54" RCP (D-LOAD PER PROFILE)
7. CONSTRUCT 10' x 7' RCB PER CALTRANS STD D80A ON SHEET 16.
8. CONSTRUCT MANHOLE CONCRETE BOX STORM DRAIN PER APWA STD 323-1.
11. CONSTRUCT JUNCTION STRUCTURE PIPE TO RCB INLET < 30" PER APWA STD 334-1.
12. CONSTRUCT JUNCTION STRUCTURE PIPE TO RCB INLET > 30" PER APWA STD 333-1.
17. MODIFIED CURB OPENING CATCH BASIN PER APWA STD. 300-2. B=3'-8", Vupstream ≥ 2'-6". (WxV PER PLAN). LOCAL DEPRESSION PER APWA STD. 313-1, CASE E. SEE STREET PLANS. INSTALL OCEAN-PRO CATCH BASIN INSERT. DEBRIS GATES, FILTER TRAYS, AND POLLUTANT FILTERS PER SCHEDULE ON SHEET 2.
19. 24" DIA. PERFORATED CMP RISER WITH ASPHALT APRON PER GRADING PLAN. NOT TO BE MAINTAINED BY LACFCD.
22. CONSTRUCT MANHOLE PIPE TO PIPE PER APWA STD. 320-1.
31. CURBSIDE GRATING CATCH BASIN PER CHEVRON GRADING PLANS. NOT TO BE MAINTAINED BY LACFCD.

PF534686

Curve Data				
CURVE	RADIUS	LENGTH	TANGENT	DELTA
D	3636.46'	1612.61'	819.78'	25°24'29"
E	22.50'	15.46'	8.05'	39°22'14"

PLAN
SCALE: 1" = 40'

GRAPHIC SCALE

APPROVED FOR CONSTRUCTION BY:
ROBERT B. NEWMAN, P.E. L.S.
DIRECTOR OF PUBLIC WORKS
CITY OF SANTA CLARITA
For RGN 6-7-06
DATE

NO.	REVISIONS	REVISED BY	APPROVED BY	DATE
1	LACSD 24"VCP SEWER CROSSING	8/29/07		9-12-07

REGISTERED PROFESSIONAL ENGINEER
JOHN M. AUSTIN
RCE 58726
Exp. 03/31/07
CIVIL
STATE OF CALIFORNIA
PROJECT ENGINEER 5-31-06 DATE

MetroPointe Engineers
3555 Harbor Gateway South, Suite A
Costa Mesa, CA 92626
(714) 438-1095

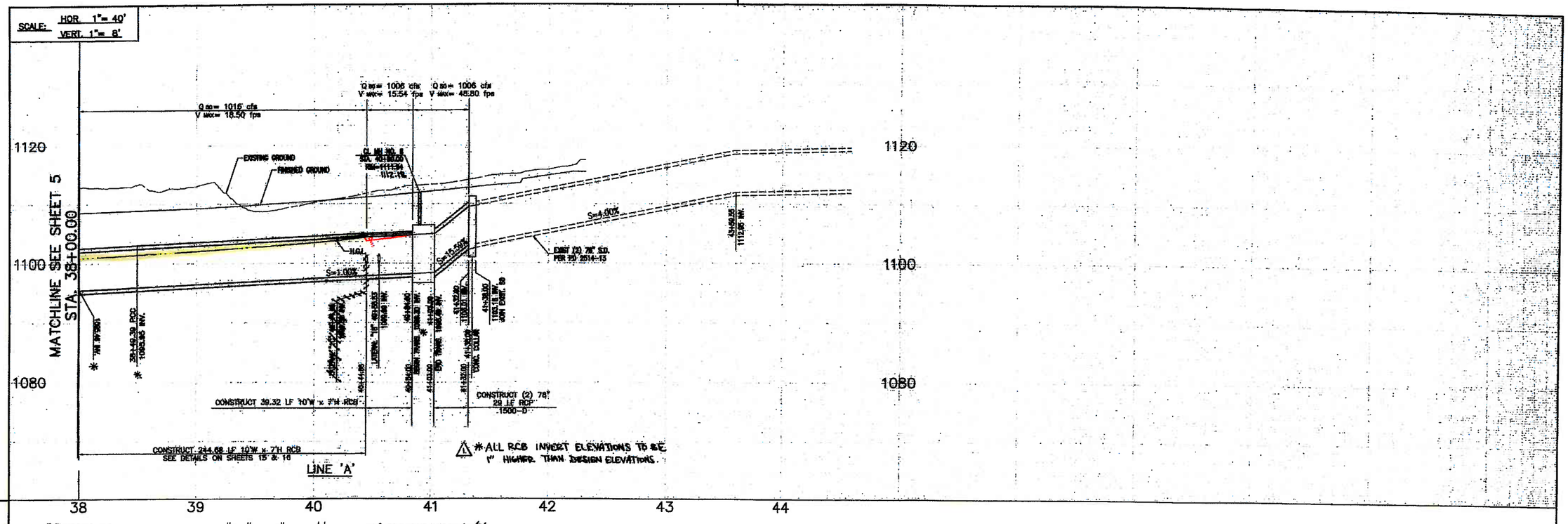
STORM DRAIN PLANS IN
CITY OF SANTA CLARITA MTD. No. 1764

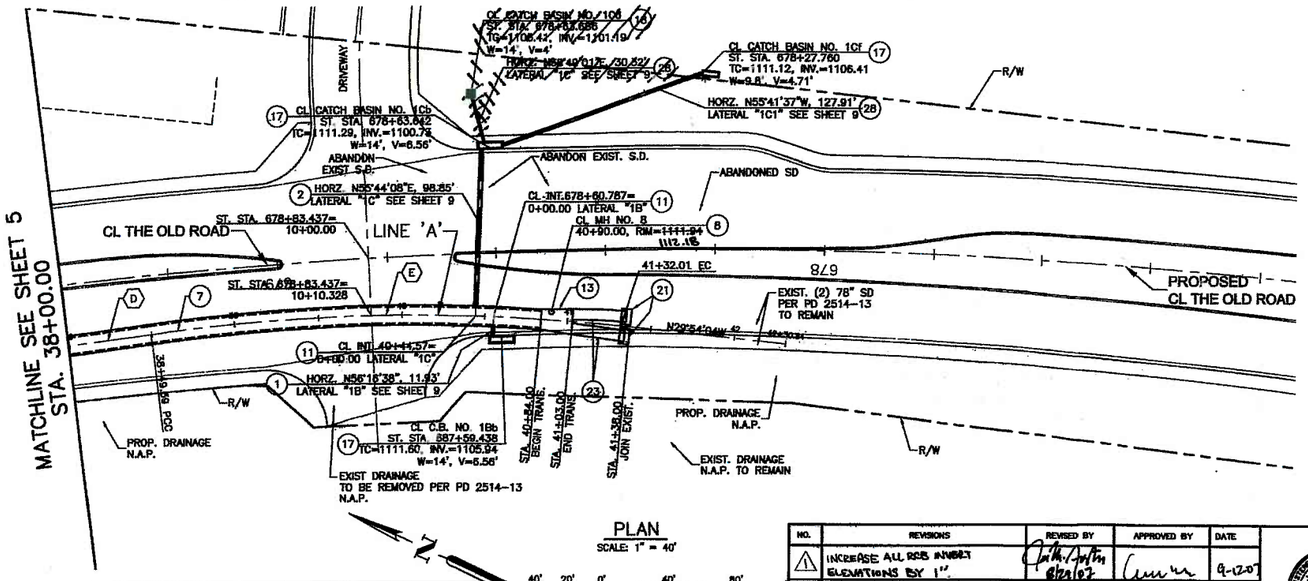
CITY OF SANTA CLARITA

STORM DRAIN PLAN AND PROFILE
MTD NO. 1764
SYSTEM A
FROM STA. 28+00 TO STA. 38+00

DWG | SHEET 5 OF 21

SCALE: HOR. 1"= 40'
VERT. 1"= 8'





CONSTRUCTION NOTES

1. CONSTRUCT 18" RCP (D-LOAD PER PROFILE)
2. CONSTRUCT 24" RCP (D-LOAD PER PROFILE)
7. CONSTRUCT 10' x 7' RCB PER CALTRANS STD D80A ON SHEET 16.
11. CONSTRUCT JUNCTION STRUCTURE PIPE TO RCB INLET < 30° PER APWA STD 334-1.
13. CONSTRUCT TRANSITION STRUCTURE DOUBLE RCP TO SINGLE RCB PER MODIFIED APWA STD 342-1 & 343-1 PER DETAIL 1 SHEET 12.
17. MODIFIED CURB OPENING CATCH BASIN PER APWA STD. 300-2. B=3'-8", Wupstream 2.2'-8". (W=V PER PLAN). LOCAL DEPRESSION PER APWA STD. 313-1, CASE E. SEE STREET PLANS. INSTALL OCEAN-PRO CATCH BASIN INSERT. DEBRIS GATES, FILTER TRAYS, AND POLLUTANT FILTERS PER SCHEDULE ON SHEET 2.
18. GRATING CATCH BASIN PER STREET PLANS. NOT TO BE MAINTAINED BY LACFCD.
21. CONSTRUCT CONCRETE COLLAR FOR RCP PER APWA STD. 380-2.
23. CONSTRUCT 78" RCP (D-LOAD PER PROFILE)
28. 12" PVC, SCH40 PER GRADING PLANS. NOT TO BE MAINTAINED BY LACFCD.

"PF534686"

PLAN
SCALE: 1" = 40'
40' 20' 0' 40' 80'
GRAPHIC SCALE

Curve Data				
CURVE	RADIUS	LENGTH	TANGENT	DELTA
D	3636.48'	1612.61'	819.78'	25°24'29"
E	1148.25'	282.61'	142.02'	14°06'07"

APPROVED FOR CONSTRUCTION BY:

ROBERT C. NEWMAN, P.E., L.S.
DIRECTOR OF PUBLIC WORKS
CITY OF SANTA CLARITA
DATE 6-7-06

NO.	REVISIONS	REVISED BY	APPROVED BY	DATE
1	INCREASE ALL RCB INVERT ELEVATIONS BY 1'.			9-12-07

REGISTERED PROFESSIONAL ENGINEER
JON M. AUSTIN
RCE 58726
Exp. 03/31/07
CIVIL
STATE OF CALIFORNIA
PROJECT ENGINEER 5-31-06 DATE

MetroPointe Engineers
3555 Harbor Gateway South, Suite A
Costa Mesa, CA 92626
(714) 438-1095

STORM DRAIN PLANS IN
CITY OF SANTA CLARITA MTD. No. 1764
CITY OF SANTA CLARITA

STORM DRAIN PLAN AND PROFILE
MTD NO. 1764
SYSTEM A
FROM STA. 38+00 TO 41+38.00

DWG | SHEET 6 OF 21

Section 5

Existing Condition Hydraulics

MTD 1764

EXISTING CONDITION

HYDRAULICS

```
T1 MTD NO. 1764 HYDRAULICS                                              0
T2 LINE A
T3 FILE: MTD-1764-LINEA.WSW

SO   1286.6801055.310  1                                  1062.310
R    1308.6901059.060  1       .013                                    .000    .000 0
R    1339.8901059.210  1       .013                                    .000    .000 0
R    1616.5501060.590  1       .013                                   9.500    .000 0
R    1681.8301060.920  1       .013                                    .000    .000 0
JX   1683.8301060.930  1  2    .013     48.00          1062.890      90.000    .000 0
R    1720.1201061.110  1       .013                                    .000    .000 0
R    1800.0001061.510  1       .013                                   2.000    .000 0
R    1983.4001062.430  1       .013                                   7.000    .000 0
R    2043.4701062.730  1       .013                                    .000    .000 0
R    2180.4301063.410  1       .013                                   6.000    .000 0
R    2236.7901064.030  1       .013                                   1.000    .000 0
R    2486.2201066.750  1       .013                                   4.000    .000 0
TS   2496.0601066.850  3       .013                                    .000    .000 0
R    2749.0601073.840  3       .013                                   4.000    .000 0
JX   2751.0601073.890  3  4    .013      6.00          1075.870      90.000    .000 0
R    2800.0001075.250  3       .013                                   1.000    .000 0
R    2882.7601077.530  3       .013                                   1.300    .000 0
JX   2884.7601077.590  3  5    .013     49.00          1076.560      40.000    .000 0
R    3378.6101091.230  3       .013                                   7.800    .000 0
R    3439.0901092.130  3       .013                                   1.000    .000 0
JX   3441.0901092.150  3  6    .013    103.00          1092.650      30.000    .000 0
R    3800.0001095.460  3       .013                                    .000    .000 0
R    3849.3901095.950  3       .013                                    .800    .000 0
R    4042.6801097.890  3       .013                                  12.000    .000 0
JX   4044.6801097.910  3  4    .013     10.00          1099.910      90.000    .000 0
R    4084.0001098.300  3       .013                                   2.000    .000 0
SH   4084.0001098.300  3       .013                                    .000    .000 0

CD   1  3   0    .000   8.000   10.000  .000  .000   .00
CD   2  4   1    .000   3.000     .000  .000  .000   .00
CD   3  3   0    .000   7.000   10.000  .000  .000   .00
CD   4  4   1    .000   2.000     .000  .000  .000   .00
CD   5  4   1    .000   3.500     .000  .000  .000   .00
CD   6  4   1    .000   4.500     .000  .000  .000   .00
CD   7  4   1    .000   1.500     .000  .000  .000   .00
Q          1006.000   .0
```

FILE: MTD-1764-LINEA-EX.WSW W S P G W - CIVILDESIGN Version 14.06 PAGE 1
Program Package Serial Number: 1488
WATER SURFACE PROFILE LISTING Date: 8-17-2010 Time: 1:46:15
MTD NO. 1764 HYDRAULICS 0
LINE A
FILE: MTD-1764-LINEA.WSW

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1286.680	1055.310	4.714	1060.024	1222.00	25.92	10.44	1070.46	.00	7.74	10.00	8.000	10.000	.00	0 .0
1.595	.1704					.0155	.02	4.71	2.10	2.03	.013	.00	.00	BOX
1288.275	1055.582	4.788	1060.370	1222.00	25.52	10.11	1070.48	.00	7.74	10.00	8.000	10.000	.00	0 .0
4.392	.1704					.0142	.06	4.79	2.06	2.03	.013	.00	.00	BOX
1292.667	1056.330	5.022	1061.352	1222.00	24.33	9.20	1070.55	.00	7.74	10.00	8.000	10.000	.00	0 .0
3.743	.1704					.0125	.05	5.02	1.91	2.03	.013	.00	.00	BOX
1296.410	1056.968	5.267	1062.235	1222.00	23.20	8.36	1070.59	.00	7.74	10.00	8.000	10.000	.00	0 .0
3.156	.1704					.0110	.03	5.27	1.78	2.03	.013	.00	.00	BOX
1299.566	1057.505	5.524	1063.029	1222.00	22.12	7.60	1070.63	.00	7.74	10.00	8.000	10.000	.00	0 .0
2.622	.1704					.0097	.03	5.52	1.66	2.03	.013	.00	.00	BOX
1302.188	1057.952	5.793	1063.746	1222.00	21.09	6.91	1070.65	.00	7.74	10.00	8.000	10.000	.00	0 .0
2.134	.1704					.0086	.02	5.79	1.54	2.03	.013	.00	.00	BOX
1304.322	1058.316	6.076	1064.392	1222.00	20.11	6.28	1070.67	.00	7.74	10.00	8.000	10.000	.00	0 .0
1.685	.1704					.0076	.01	6.08	1.44	2.03	.013	.00	.00	BOX
1306.008	1058.603	6.373	1064.976	1222.00	19.18	5.71	1070.69	.00	7.74	10.00	8.000	10.000	.00	0 .0
1.271	.1704					.0067	.01	6.37	1.34	2.03	.013	.00	.00	BOX
1307.279	1058.820	6.684	1065.503	1222.00	18.28	5.19	1070.69	.00	7.74	10.00	8.000	10.000	.00	0 .0
.886	.1704					.0059	.01	6.68	1.25	2.03	.013	.00	.00	BOX

FILE: MTD-1764-LINEA-EX.WSW W S P G W - CIVILDESIGN Version 14.06 PAGE 2
Program Package Serial Number: 1488
WATER SURFACE PROFILE LISTING Date: 8-17-2010 Time: 1:46:15
MTD NO. 1764 HYDRAULICS 0
LINE A
FILE: MTD-1764-LINEA.WSW

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1308.164	1058.970	7.010	1065.981	1222.00	17.43	4.72	1070.70	.00	7.74	10.00	8.000	10.000	.00	0 .0
.526	.1704					.0053	.00	7.01	1.16	2.03	.013	.00	.00	BOX
1308.690	1059.060	7.352	1066.412	1222.00	16.62	4.29	1070.70	.00	7.74	10.00	8.000	10.000	.00	0 .0
31.200	.0048					.0050	.15	7.35	1.08	7.43	.013	.00	.00	BOX
---------- WARNING - Flow depth near top of box conduit ----------														
1339.890	1059.210	7.324	1066.534	1222.00	16.69	4.32	1070.86	.05	7.74	10.00	8.000	10.000	.00	0 .0
38.411	.0050					.0050	.19	7.38	1.09	7.32	.013	.00	.00	BOX
---------- WARNING - Flow depth near top of box conduit ----------														
1378.301	1059.402	7.324	1066.725	1222.00	16.69	4.32	1071.05	.05	7.74	10.00	8.000	10.000	.00	0 .0
238.249	.0050					.0051	1.22	7.38	1.09	7.32	.013	.00	.00	BOX
---------- WARNING - Flow depth near top of box conduit ----------														
1616.550	1060.590	7.192	1067.782	1222.00	16.99	4.48	1072.26	.00	7.74	10.00	8.000	10.000	.00	0 .0
65.280	.0051					.0053	.34	7.19	1.12	7.28	.013	.00	.00	BOX
1681.830	1060.920	7.138	1068.058	1222.00	17.12	4.55	1072.61	.00	7.74	10.00	8.000	10.000	.00	0 .0
JUNCT STR	.0050					.0065	.01	7.14	1.13		.013	.00	.00	BOX

Program Package Serial Number: 1488

WATER SURFACE PROFILE LISTING Date: 8-17-2010 Time: 1:46:15

MTD NO. 1764 HYDRAULICS

LINE A 0

FILE: MTD-1764-LINEA.WSW

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1683.830	1060.930	5.981	1066.911	1174.00	19.63	5.98	1072.89	.00	7.54	10.00	8.000	10.000	.00	0 .0
36.290	.0050					.0079	.29	5.98	1.41	7.11	.013	.00	.00	BOX
1720.120	1061.110	5.878	1066.988	1174.00	19.97	6.19	1073.18	.05	7.54	10.00	8.000	10.000	.00	0 .0
79.880	.0050					.0086	.68	5.93	1.45	7.09	.013	.00	.00	BOX
1800.000	1061.510	5.649	1067.159	1174.00	20.78	6.71	1073.87	.09	7.54	10.00	8.000	10.000	.00	0 .0
13.390	.0050					.0091	.12	5.74	1.54	7.08	.013	.00	.00	BOX

1813.390	1061.577	5.610	1067.187	1174.00	20.93	6.80	1073.99	.09	7.54	10.00	8.000	10.000	.00	0 .0
87.913	.0050					.0098	.86	5.70	1.56	7.08	.013	.00	.00	BOX
1901.303	1062.018	5.349	1067.367	1174.00	21.95	7.48	1074.85	.10	7.54	10.00	8.000	10.000	.00	0 .0
82.097	.0050					.0111	.91	5.45	1.67	7.08	.013	.00	.00	BOX
1983.400	1062.430	5.100	1067.530	1174.00	23.02	8.23	1075.76	.00	7.54	10.00	8.000	10.000	.00	0 .0
60.070	.0050					.0124	.75	5.10	1.80	7.09	.013	.00	.00	BOX
2043.470	1062.730	4.915	1067.645	1174.00	23.88	8.86	1076.50	.14	7.54	10.00	8.000	10.000	.00	0 .0
66.842	.0050					.0138	.92	5.05	1.90	7.11	.013	.00	.00	BOX
2110.312	1063.062	4.707	1067.769	1174.00	24.94	9.66	1077.43	.15	7.54	10.00	8.000	10.000	.00	0 .0
70.118	.0050					.0156	1.09	4.86	2.03	7.11	.013	.00	.00	BOX
2180.430	1063.410	4.488	1067.898	1174.00	26.16	10.62	1078.52	.07	7.54	10.00	8.000	10.000	.00	0 .0
56.360	.0110					.0171	.96	4.55	2.18	5.24	.013	.00	.00	BOX

Program Package Serial Number: 1488

WATER SURFACE PROFILE LISTING Date: 8-17-2010 Time: 1:46:15

MTD NO. 1764 HYDRAULICS

LINE A

FILE: MTD-1764-LINEA.WSW

0

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
2236.790	1064.030	4.400	1068.430	1174.00	26.68	11.06	1079.49	.06	7.54	10.00	8.000	10.000	.00	0 .0
50.118	.0109					.0180	.90	4.46	2.24	5.25	.013	.00	.00	BOX
2286.908	1064.577	4.314	1068.891	1174.00	27.21	11.50	1080.39	.06	7.54	10.00	8.000	10.000	.00	0 .0
106.961	.0109					.0198	2.12	4.38	2.31	5.25	.013	.00	.00	BOX
2393.869	1065.743	4.113	1069.856	1174.00	28.54	12.65	1082.51	.07	7.54	10.00	8.000	10.000	.00	0 .0
92.351	.0109					.0225	2.08	4.18	2.48	5.25	.013	.00	.00	BOX
2486.220	1066.750	3.922	1070.672	1174.00	29.93	13.91	1084.59	.00	7.54	10.00	8.000	10.000	.00	0 .0
TRANS STR	.0102					.0242	.24	3.92	2.66		.013	.00	.00	BOX
2496.060	1066.850	3.893	1070.742	1174.00	30.16	14.13	1084.87	.08	7.00	10.00	7.000	10.000	.00	0 .0
32.106	.0276					.0244	.78	3.97	2.69	3.73	.013	.00	.00	BOX
2528.167	1067.737	3.909	1071.646	1174.00	30.03	14.00	1085.65	.08	7.00	10.00	7.000	10.000	.00	0 .0

220.894	.0276					.0227	5.02	3.99	2.68	3.73	.013	.00	.00	BOX		
2749.060	1073.840	4.100	1077.940	1174.00	28.63	12.73	1090.67	.00	7.00	10.00	7.000	10.000	.00	0	.0	
JUNCT STR	.0250					.0215	.04	4.19	2.49		.013	.00	.00	BOX		
2751.060	1073.890	4.053	1077.943	1168.00	28.81	12.89	1090.84	.09	7.00	10.00	7.000	10.000	.00	0	.0	
48.940	.0278					.0213	1.04	4.15	2.52	3.70	.013	.00	.00	BOX		
2800.000	1075.250	4.115	1079.365	1168.00	28.39	12.51	1091.88	.07	7.00	10.00	7.000	10.000	.00	0	.0	
82.760	.0275					.0200	1.65	4.18	2.47	3.72	.013	.00	.00	BOX		

Program Package Serial Number: 1488

WATER SURFACE PROFILE LISTING Date: 8-17-2010 Time: 1:46:15

MTD NO. 1764 HYDRAULICS

LINE A 0

FILE: MTD-1764-LINEA.WSW

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
2882.760	1077.530	4.244	1081.774	1168.00	27.52	11.76	1093.53	.00	7.00	10.00	7.000	10.000	.00	0 .0
JUNCT STR	.0300					.0209	.04	4.31	2.35		.013	.00	.00	BOX
2884.760	1077.590	3.870	1081.460	1119.00	28.91	12.98	1094.44	.07	7.00	10.00	7.000	10.000	.00	0 .0
135.469	.0276					.0214	2.91	3.94	2.59	3.60	.013	.00	.00	BOX
3020.229	1081.332	4.027	1085.358	1119.00	27.79	11.99	1097.35	.07	7.00	10.00	7.000	10.000	.00	0 .0
104.224	.0276					.0190	1.98	4.09	2.44	3.60	.013	.00	.00	BOX
3124.453	1084.210	4.223	1088.433	1119.00	26.50	10.90	1099.34	.06	7.00	10.00	7.000	10.000	.00	0 .0
72.065	.0276					.0167	1.21	4.28	2.27	3.60	.013	.00	.00	BOX
3196.518	1086.201	4.429	1090.630	1119.00	25.26	9.91	1100.54	.05	7.00	10.00	7.000	10.000	.00	0 .0
53.015	.0276					.0147	.78	4.48	2.12	3.60	.013	.00	.00	BOX
3249.533	1087.665	4.645	1092.310	1119.00	24.09	9.01	1101.32	.05	7.00	10.00	7.000	10.000	.00	0 .0
40.331	.0276					.0129	.52	4.70	1.97	3.60	.013	.00	.00	BOX
3289.864	1088.779	4.872	1093.651	1119.00	22.97	8.19	1101.84	.05	7.00	10.00	7.000	10.000	.00	0 .0
31.217	.0276					.0114	.36	4.92	1.83	3.60	.013	.00	.00	BOX
3321.080	1089.641	5.110	1094.751	1119.00	21.90	7.45	1102.20	.04	7.00	10.00	7.000	10.000	.00	0 .0

24.303	.0276					.0100	.24	5.15	1.71	3.60	.013	.00	.00	BOX		
3345.384	1090.312	5.359	1095.672	1119.00	20.88	6.77	1102.44	.04	7.00	10.00	7.000	10.000	.00	0	.0	
18.842	.0276					.0088	.17	5.40	1.59	3.60	.013	.00	.00	BOX		

Program Package Serial Number: 1488

WATER SURFACE PROFILE LISTING Date: 8-17-2010 Time: 1:46:15

MTD NO. 1764 HYDRAULICS

0

LINE A

FILE: MTD-1764-LINEA.WSW

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
3364.225	1090.833	5.621	1096.454	1119.00	19.91	6.15	1102.61	.03	7.00	10.00	7.000	10.000	.00	0 .0
14.385	.0276					.0078	.11	5.65	1.48	3.60	.013	.00	.00	BOX
3378.610	1091.230	5.895	1097.125	1119.00	18.98	5.59	1102.72	.03	7.00	10.00	7.000	10.000	.00	0 .0
17.919	.0149					.0071	.13	5.93	1.38	4.51	.013	.00	.00	BOX
3396.530	1091.497	6.067	1097.563	1119.00	18.45	5.28	1102.85	.03	7.00	10.00	7.000	10.000	.00	0 .0
21.697	.0149					.0064	.14	6.10	1.32	4.51	.013	.00	.00	BOX
3418.227	1091.820	6.363	1098.182	1119.00	17.59	4.80	1102.98	.03	7.00	10.00	7.000	10.000	.00	0 .0
13.657	.0149					.0057	.08	6.39	1.23	4.51	.013	.00	.00	BOX
---------- WARNING - Flow depth near top of box conduit ----------														
3431.884	1092.023	6.673	1098.696	1119.00	16.77	4.37	1103.06	.03	7.00	10.00	7.000	10.000	.00	0 .0
7.206	.0149					.0064	.05	6.70	1.14	4.51	.013	.00	.00	BOX
---------- WARNING - Flow depth near top of box conduit ----------														
3439.090	1092.130	7.000	1099.130	1119.00	15.99	3.97	1103.10	.00	7.00	10.00	7.000	10.000	.00	0 .0
JUNCT STR	.0100					.0062	.01	7.00	1.06		.013	.00	.00	BOX
3441.090	1092.150	8.091	1100.241	1016.00	14.51	3.27	1103.51	.00	6.85	10.00	7.000	10.000	.00	0 .0
104.740	.0092					.0062	.64	8.09	.97	5.02	.013	.00	.00	BOX

Program Package Serial Number: 1488

WATER SURFACE PROFILE LISTING Date: 8-17-2010 Time: 1:46:15

MTD NO. 1764 HYDRAULICS

0

LINE A

FILE: MTD-1764-LINEA.WSW

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip

L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
3545.830	1093.116	7.770	1100.885	1016.00	14.51	3.27	1104.16	.00	6.85	10.00	7.000	10.000	.00	0 .0
HYDRAULIC JUMP														
3545.830	1093.116	5.123	1098.239	1016.00	19.83	6.11	1104.35	.00	6.85	10.00	7.000	10.000	.00	0 .0
254.170	.0092					.0084	2.15	5.12	1.54	5.02	.013	.00	.00	BOX
3800.000	1095.460	5.254	1100.714	1016.00	19.34	5.81	1106.52	.03	6.85	10.00	7.000	10.000	.00	0 .0
49.390	.0099					.0080	.40	5.29	1.49	4.88	.013	.00	.00	BOX
3849.390	1095.950	5.336	1101.286	1016.00	19.04	5.63	1106.92	.12	6.85	10.00	7.000	10.000	.00	0 .0
65.571	.0100					.0075	.49	5.46	1.45	4.86	.013	.00	.00	BOX
3914.961	1096.608	5.496	1102.104	1016.00	18.49	5.31	1107.41	.12	6.85	10.00	7.000	10.000	.00	0 .0
66.610	.0100					.0068	.45	5.61	1.39	4.86	.013	.00	.00	BOX
3981.571	1097.277	5.764	1103.041	1016.00	17.63	4.82	1107.86	.10	6.85	10.00	7.000	10.000	.00	0 .0
39.149	.0100					.0060	.24	5.87	1.29	4.86	.013	.00	.00	BOX
4020.720	1097.670	6.046	1103.715	1016.00	16.81	4.39	1108.10	.10	6.85	10.00	7.000	10.000	.00	0 .0
21.960	.0100					.0053	.12	6.14	1.20	4.86	.013	.00	.00	BOX
4042.680	1097.890	6.341	1104.231	1016.00	16.02	3.99	1108.22	.00	6.85	10.00	7.000	10.000	.00	0 .0
JUNCT STR	.0100					.0054	.01	6.41	1.12		.013	.00	.00	BOX

---------- WARNING - Flow depth near top of box conduit ----------

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
4044.680	1097.910	5.957	1103.867	1006.00	16.89	4.43	1108.30	.08	6.80	10.00	7.000	10.000	.00	0 .0
20.602	.0099					.0055	.11	6.04	1.22	4.85	.013	.00	.00	BOX
4065.282	1098.114	6.181	1104.295	1006.00	16.28	4.11	1108.41	.07	6.80	10.00	7.000	10.000	.00	0 .0
14.478	.0099					.0049	.07	6.25	1.15	4.85	.013	.00	.00	BOX
4079.760	1098.258	6.482	1104.740	1006.00	15.52	3.74	1108.48	.07	6.80	10.00	7.000	10.000	.00	0 .0

4.240	.0099				.0044	.02	6.55	1.07	4.85	.013		.00	.00	BOX	
		---------- WARNING - Flow depth near top of box conduit ----------													
4084.000	1098.300	6.800	1105.100	1006.00	14.79	3.40	1108.50	.06	6.80	10.00	7.000	10.000	.00	0	.0

MTD 1764
PROPOSED CONDITION HYDRAULICS

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T1 MTD NO. 1764 HYDRAULICS                                                0
T2 LINE A
T3 FILE: MTD-1764-LINEA.WSW

SO   1286.6801055.310  1                                  1062.310
R    1308.6901059.060  1       .013                                  .000    .000 0
R    1339.8901059.210  1       .013                                  .000    .000 0
R    1616.5501060.590  1       .013                                 9.500    .000 0
R    1681.8301060.920  1       .013                                  .000    .000 0
JX   1683.8301060.930  1  2    .013     48.00          1062.890     90.000    .000 0
R    1720.1201061.110  1       .013                                  .000    .000 0
R    1800.0001061.510  1       .013                                 2.000    .000 0
R    1983.4001062.430  1       .013                                 7.000    .000 0
R    2043.4701062.730  1       .013                                  .000    .000 0
R    2180.4301063.410  1       .013                                 6.000    .000 0
R    2236.7901064.030  1       .013                                 1.000    .000 0
R    2486.2201066.750  1       .013                                 4.000    .000 0
TS   2496.0601066.850  3       .013                                  .000    .000 0
R    2749.0601073.840  3       .013                                 4.000    .000 0
JX   2751.0601073.890  3  4    .013      6.00          1076.390     90.000    .000 0
R    2800.0001075.250  3       .013                                 1.000    .000 0
R    2828.2901076.030  3       .013                                 0.300    .000 0
JX   2830.2901076.090  3  7    .013      8.74          1075.870     90.000    .000 0
R    2882.7601077.530  3       .013                                 1.000    .000 0
JX   2884.7601077.590  3  5    .013     59.54          1079.560     40.000    .000 0
R    3378.6101091.230  3       .013                                 7.800    .000 0
R    3439.0901092.130  3       .013                                 1.000    .000 0
JX   3441.0901092.150  3  6    .013    103.00          1092.650     30.000    .000 0
R    3800.0001095.460  3       .013                                  .000    .000 0
R    3849.3901095.950  3       .013                                  .800    .000 0
R    4042.6801097.890  3       .013                                12.000    .000 0
JX   4044.6801097.910  3  4    .013     10.00          1099.910     90.000    .000 0
R    4084.0001098.300  3       .013                                 2.000    .000 0
SH   4084.0001098.300  3       .013                  1105.500        .000    .000 0

CD   1  3   0    .000   8.000   10.000  .000  .000   .00
CD   2  4   1    .000   3.000     .000  .000  .000   .00
CD   3  3   0    .000   7.000   10.000  .000  .000   .00
CD   4  4   1    .000   2.000     .000  .000  .000   .00
CD   5  4   1    .000   3.500     .000  .000  .000   .00
CD   6  4   1    .000   4.500     .000  .000  .000   .00
CD   7  4   1    .000   1.500     .000  .000  .000   .00
Q          1006.000   .0
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FILE: MTD-1764-LINEA.WSW W S P G W - CIVILDESIGN Version 14.06 PAGE 1

Program Package Serial Number: 1488

WATER SURFACE PROFILE LISTING Date: 8-17-2010 Time: 2:25:59

MTD NO. 1764 HYDRAULICS

LINE A 0

FILE: MTD-1764-LINEA.WSW

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
1286.680	1055.310	4.775	1060.085	1241.28	26.00	10.50	1070.58	.00	7.82	10.00	8.000	10.000	.00	0 .0
1.561	.1704					.0154	.02	4.77	2.10	2.05	.013	.00	.00	BOX
1288.241	1055.576	4.848	1060.424	1241.28	25.60	10.18	1070.60	.00	7.82	10.00	8.000	10.000	.00	0 .0
4.411	.1704					.0142	.06	4.85	2.05	2.05	.013	.00	.00	BOX
1292.651	1056.328	5.084	1061.412	1241.28	24.41	9.25	1070.67	.00	7.82	10.00	8.000	10.000	.00	0 .0
3.757	.1704					.0125	.05	5.08	1.91	2.05	.013	.00	.00	BOX
1296.408	1056.968	5.333	1062.300	1241.28	23.28	8.41	1070.71	.00	7.82	10.00	8.000	10.000	.00	0 .0
3.166	.1704					.0110	.03	5.33	1.78	2.05	.013	.00	.00	BOX
1299.575	1057.507	5.593	1063.100	1241.28	22.19	7.65	1070.75	.00	7.82	10.00	8.000	10.000	.00	0 .0
2.629	.1704					.0097	.03	5.59	1.65	2.05	.013	.00	.00	BOX
1302.204	1057.955	5.866	1063.821	1241.28	21.16	6.95	1070.77	.00	7.82	10.00	8.000	10.000	.00	0 .0
2.137	.1704					.0086	.02	5.87	1.54	2.05	.013	.00	.00	BOX
1304.341	1058.319	6.152	1064.471	1241.28	20.18	6.32	1070.79	.00	7.82	10.00	8.000	10.000	.00	0 .0
1.685	.1704					.0076	.01	6.15	1.43	2.05	.013	.00	.00	BOX
1306.026	1058.606	6.452	1065.059	1241.28	19.24	5.75	1070.81	.00	7.82	10.00	8.000	10.000	.00	0 .0
1.268	.1704					.0067	.01	6.45	1.33	2.05	.013	.00	.00	BOX
1307.294	1058.822	6.767	1065.590	1241.28	18.34	5.22	1070.81	.00	7.82	10.00	8.000	10.000	.00	0 .0
.879	.1704					.0059	.01	6.77	1.24	2.05	.013	.00	.00	BOX

FILE: MTD-1764-LINEA.WSW W S P G W - CIVILDESIGN Version 14.06 PAGE 2

Program Package Serial Number: 1488

WATER SURFACE PROFILE LISTING Date: 8-17-2010 Time: 2:25:59

MTD NO. 1764 HYDRAULICS

LINE A 0

FILE: MTD-1764-LINEA.WSW

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT) / SE Dpth	Water Elev / Froude N	Q (CFS) / Norm Dp	Vel (FPS) / "N"	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / X-Fall	Critical Depth / ZR	Flow Top Width / Type Ch	Height/Dia.-FT / No Prs/Pip	Base Wt or I.D. /	ZL /
1308.173	1058.972	7.098	1066.070	1241.28	17.49	4.75	1070.82	.00	7.82	10.00	8.000	10.000	.00
.517	.1704					.0053	.00	7.10	1.16	2.05	.013	.00	.00
1308.690	1059.060	7.444	1066.504	1241.28	16.67	4.32	1070.82	.00	7.82	10.00	8.000	10.000	.00
31.200	.0048					.0050	.15	7.44	1.08	7.52	.013	.00	.00
		WARNING - Flow depth near top of box conduit											
1339.890	1059.210	7.414	1066.624	1241.28	16.74	4.35	1070.98	.05	7.82	10.00	8.000	10.000	.00
40.600	.0050					.0050	.20	7.47	1.08	7.41	.013	.00	.00
		WARNING - Flow depth near top of box conduit											
1380.490	1059.412	7.414	1066.827	1241.28	16.74	4.35	1071.18	.05	7.82	10.00	8.000	10.000	.00
236.060	.0050					.0051	1.21	7.47	1.08	7.41	.013	.00	.00
		WARNING - Flow depth near top of box conduit											
1616.550	1060.590	7.271	1067.861	1241.28	17.07	4.52	1072.39	.00	7.82	10.00	8.000	10.000	.00
65.280	.0051					.0053	.35	7.27	1.12	7.37	.013	.00	.00
		WARNING - Flow depth near top of box conduit											

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT) / SE Dpth	Water Elev / Froude N	Q (CFS) / Norm Dp	Vel (FPS) / "N"	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / X-Fall	Critical Depth / ZR	Flow Top Width / Type Ch	Height/Dia.-FT / No Prs/Pip	Base Wt or I.D. /	ZL /
1681.830	1060.920	7.211	1068.131	1241.28	17.21	4.60	1072.73	.00	7.82	10.00	8.000	10.000	.00
JUNCT STR	.0050					.0066	.01	7.21	1.13		.013	.00	.00
		WARNING - Flow depth near top of box conduit											
1683.830	1060.930	6.055	1066.985	1193.28	19.71	6.03	1073.02	.00	7.62	10.00	8.000	10.000	.00
36.290	.0050					.0079	.29	6.05	1.41	7.20	.013	.00	.00
1720.120	1061.110	5.951	1067.061	1193.28	20.05	6.24	1073.30	.05	7.62	10.00	8.000	10.000	.00
79.880	.0050					.0086	.68	6.01	1.45	7.18	.013	.00	.00
1800.000	1061.510	5.720	1067.230	1193.28	20.86	6.76	1073.99	.09	7.62	10.00	8.000	10.000	.00

12.278	.0050					.0091	.11	5.81	1.54	7.17	.013	.00	.00	BOX				
1812.278	1061.572	5.684	1067.256	1193.28	20.99	6.84	1074.10	.09	7.62	10.00	8.000	10.000	.00	0	.0			
88.455	.0050					.0098	.86	5.78	1.55	7.17	.013	.00	.00	BOX				
1900.733	1062.015	5.420	1067.435	1193.28	22.02	7.53	1074.96	.10	7.62	10.00	8.000	10.000	.00	0	.0			
82.667	.0050					.0111	.92	5.52	1.67	7.17	.013	.00	.00	BOX				
1983.400	1062.430	5.167	1067.597	1193.28	23.09	8.28	1075.88	.00	7.62	10.00	8.000	10.000	.00	0	.0			
60.070	.0050					.0124	.74	5.17	1.79	7.19	.013	.00	.00	BOX				
2043.470	1062.730	4.982	1067.712	1193.28	23.95	8.91	1076.62	.14	7.62	10.00	8.000	10.000	.00	0	.0			
66.171	.0050					.0138	.91	5.12	1.89	7.20	.013	.00	.00	BOX				

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
2109.641	1063.059	4.775	1067.833	1193.28	24.99	9.70	1077.53	.15	7.62	10.00	8.000	10.000	.00	0	.0			
70.789	.0050					.0155	1.10	4.92	2.02	7.20	.013	.00	.00	BOX				
2180.430	1063.410	4.552	1067.963	1193.28	26.21	10.67	1078.63	.07	7.62	10.00	8.000	10.000	.00	0	.0			
56.360	.0110					.0170	.96	4.62	2.16	5.30	.013	.00	.00	BOX				
2236.790	1064.030	4.464	1068.494	1193.28	26.73	11.10	1079.59	.06	7.62	10.00	8.000	10.000	.00	0	.0			
45.529	.0109					.0178	.81	4.53	2.23	5.32	.013	.00	.00	BOX				
2282.319	1064.526	4.386	1068.913	1193.28	27.20	11.49	1080.40	.06	7.62	10.00	8.000	10.000	.00	0	.0			
109.558	.0109					.0195	2.14	4.45	2.29	5.32	.013	.00	.00	BOX				
2391.877	1065.721	4.182	1069.903	1193.28	28.53	12.64	1082.54	.07	7.62	10.00	8.000	10.000	.00	0	.0			
94.343	.0109					.0222	2.10	4.25	2.46	5.32	.013	.00	.00	BOX				
2486.220	1066.750	3.988	1070.738	1193.28	29.92	13.90	1084.64	.00	7.62	10.00	8.000	10.000	.00	0	.0			
TRANS STR	.0102					.0239	.24	3.99	2.64		.013	.00	.00	BOX				
2496.060	1066.850	3.958	1070.808	1193.28	30.15	14.11	1084.92	.08	7.00	10.00	7.000	10.000	.00	0	.0			
59.240	.0276					.0239	1.41	4.04	2.67	3.77	.013	.00	.00	BOX				

2555.300	1068.487	3.995	1072.481	1193.28	29.87	13.86	1086.34	.08	7.00	10.00	7.000	10.000	.00	0 .0
193.760	.0276					.0221	4.29	4.07	2.63	3.77	.013	.00	.00	BOX
2749.060	1073.840	4.190	1078.030	1193.28	28.48	12.60	1090.63	.00	7.00	10.00	7.000	10.000	.00	0 .0
JUNCT STR	.0250					.0209	.04	4.28	2.45		.013	.00	.00	BOX

Program Package Serial Number: 1488

WATER SURFACE PROFILE LISTING Date: 8-17-2010 Time: 2:25:59

MTD NO. 1764 HYDRAULICS 0

LINE A

FILE: MTD-1764-LINEA.WSW

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT) /	Water Elev /	Q (CFS) /	Vel (FPS) /	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
2751.060	1073.890	4.143	1078.033	1187.28	28.66	12.75	1090.78	.09	7.00	10.00	7.000	10.000	.00	0 .0
48.940	.0278					.0207	1.01	4.23	2.48	3.75	.013	.00	.00	BOX
2800.000	1075.250	4.213	1079.463	1187.28	28.18	12.33	1091.80	.05	7.00	10.00	7.000	10.000	.00	0 .0
28.290	.0276					.0199	.56	4.26	2.42	3.76	.013	.00	.00	BOX
2828.290	1076.030	4.258	1080.288	1187.28	27.88	12.07	1092.36	.00	7.00	10.00	7.000	10.000	.00	0 .0
JUNCT STR	.0300					.0199	.04	4.34	2.38		.013	.00	.00	BOX
2830.290	1076.090	4.194	1080.284	1178.54	28.10	12.26	1092.55	.08	7.00	10.00	7.000	10.000	.00	0 .0
52.470	.0274					.0196	1.03	4.28	2.42	3.75	.013	.00	.00	BOX
2882.760	1077.530	4.282	1081.812	1178.54	27.52	11.76	1093.58	.00	7.00	10.00	7.000	10.000	.00	0 .0
JUNCT STR	.0300					.0208	.04	4.35	2.34		.013	.00	.00	BOX
2884.760	1077.590	3.870	1081.460	1119.00	28.91	12.98	1094.44	.07	7.00	10.00	7.000	10.000	.00	0 .0
135.469	.0276					.0214	2.91	3.94	2.59	3.60	.013	.00	.00	BOX
3020.229	1081.332	4.027	1085.358	1119.00	27.79	11.99	1097.35	.07	7.00	10.00	7.000	10.000	.00	0 .0
104.224	.0276					.0190	1.98	4.09	2.44	3.60	.013	.00	.00	BOX
3124.453	1084.210	4.223	1088.433	1119.00	26.50	10.90	1099.34	.06	7.00	10.00	7.000	10.000	.00	0 .0
72.065	.0276					.0167	1.21	4.28	2.27	3.60	.013	.00	.00	BOX
3196.518	1086.201	4.429	1090.630	1119.00	25.26	9.91	1100.54	.05	7.00	10.00	7.000	10.000	.00	0 .0
53.015	.0276					.0147	.78	4.48	2.12	3.60	.013	.00	.00	BOX

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
3249.533	1087.665	4.645	1092.310	1119.00	24.09	9.01	1101.32	.05	7.00	10.00	7.000	10.000	.00	0 .0
40.331	.0276					.0129	.52	4.70	1.97	3.60	.013	.00	.00	BOX
3289.864	1088.779	4.872	1093.651	1119.00	22.97	8.19	1101.84	.05	7.00	10.00	7.000	10.000	.00	0 .0
31.217	.0276					.0114	.36	4.92	1.83	3.60	.013	.00	.00	BOX
3321.080	1089.641	5.110	1094.751	1119.00	21.90	7.45	1102.20	.04	7.00	10.00	7.000	10.000	.00	0 .0
24.303	.0276					.0100	.24	5.15	1.71	3.60	.013	.00	.00	BOX
3345.384	1090.312	5.359	1095.672	1119.00	20.88	6.77	1102.44	.04	7.00	10.00	7.000	10.000	.00	0 .0
18.842	.0276					.0088	.17	5.40	1.59	3.60	.013	.00	.00	BOX
3364.225	1090.833	5.621	1096.454	1119.00	19.91	6.15	1102.61	.03	7.00	10.00	7.000	10.000	.00	0 .0
14.385	.0276					.0078	.11	5.65	1.48	3.60	.013	.00	.00	BOX
3378.610	1091.230	5.895	1097.125	1119.00	18.98	5.59	1102.72	.03	7.00	10.00	7.000	10.000	.00	0 .0
17.919	.0149					.0071	.13	5.93	1.38	4.51	.013	.00	.00	BOX
3396.530	1091.497	6.067	1097.563	1119.00	18.45	5.28	1102.85	.03	7.00	10.00	7.000	10.000	.00	0 .0
21.697	.0149					.0064	.14	6.10	1.32	4.51	.013	.00	.00	BOX
3418.227	1091.820	6.363	1098.182	1119.00	17.59	4.80	1102.98	.03	7.00	10.00	7.000	10.000	.00	0 .0
13.657	.0149					.0057	.08	6.39	1.23	4.51	.013	.00	.00	BOX

---------- WARNING - Flow depth near top of box conduit ----------

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch

3431.884	1092.023	6.673	1098.696	1119.00	16.77	4.37	1103.06	.03	7.00	10.00	7.000	10.000	.00	0	.0
7.206	.0149					.0064	.05	6.70	1.14	4.51	.013	.00	.00	BOX	

---------- WARNING - Flow depth near top of box conduit ----------

3439.090	1092.130	7.000	1099.130	1119.00	15.99	3.97	1103.10	.00	7.00	10.00	7.000	10.000	.00	0	.0
JUNCT STR	.0100					.0062	.01	7.00	1.06		.013	.00	.00	BOX	
3441.090	1092.150	8.091	1100.241	1016.00	14.51	3.27	1103.51	.00	6.85	10.00	7.000	10.000	.00	0	.0
104.740	.0092					.0062	.64	8.09	.97	5.02	.013	.00	.00	BOX	
3545.830	1093.116	7.770	1100.885	1016.00	14.51	3.27	1104.16	.00	6.85	10.00	7.000	10.000	.00	0	.0
HYDRAULIC JUMP															
3545.830	1093.116	5.123	1098.239	1016.00	19.83	6.11	1104.35	.00	6.85	10.00	7.000	10.000	.00	0	.0
254.170	.0092					.0084	2.15	5.12	1.54	5.02	.013	.00	.00	BOX	
3800.000	1095.460	5.254	1100.714	1016.00	19.34	5.81	1106.52	.03	6.85	10.00	7.000	10.000	.00	0	.0
49.390	.0099					.0080	.40	5.29	1.49	4.88	.013	.00	.00	BOX	
3849.390	1095.950	5.336	1101.286	1016.00	19.04	5.63	1106.92	.12	6.85	10.00	7.000	10.000	.00	0	.0
65.571	.0100					.0075	.49	5.46	1.45	4.86	.013	.00	.00	BOX	
3914.961	1096.608	5.496	1102.104	1016.00	18.49	5.31	1107.41	.12	6.85	10.00	7.000	10.000	.00	0	.0
66.610	.0100					.0068	.45	5.61	1.39	4.86	.013	.00	.00	BOX	

Program Package Serial Number: 1488

WATER SURFACE PROFILE LISTING Date: 8-17-2010 Time: 2:25:59

MTD NO. 1764 HYDRAULICS 0

LINE A

FILE: MTD-1764-LINEA.WSW

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
3981.571	1097.277	5.764	1103.041	1016.00	17.63	4.82	1107.86	.10	6.85	10.00	7.000	10.000	.00	0 .0
39.149	.0100					.0060	.24	5.87	1.29	4.86	.013	.00	.00	BOX
4020.720	1097.670	6.046	1103.715	1016.00	16.81	4.39	1108.10	.10	6.85	10.00	7.000	10.000	.00	0 .0
21.960	.0100					.0053	.12	6.14	1.20	4.86	.013	.00	.00	BOX
4042.680	1097.890	6.341	1104.231	1016.00	16.02	3.99	1108.22	.00	6.85	10.00	7.000	10.000	.00	0 .0
JUNCT STR	.0100					.0054	.01	6.41	1.12		.013	.00	.00	BOX

---------- WARNING - Flow depth near top of box conduit ----------

4044.680	1097.910	5.957	1103.867	1006.00	16.89	4.43	1108.30	.08	6.80	10.00	7.000	10.000	.00	0 .0
20.602	.0099					.0055	.11	6.04	1.22	4.85	.013	.00	.00	BOX
4065.282	1098.114	6.181	1104.295	1006.00	16.28	4.11	1108.41	.07	6.80	10.00	7.000	10.000	.00	0 .0
14.478	.0099					.0049	.07	6.25	1.15	4.85	.013	.00	.00	BOX
4079.760	1098.258	6.482	1104.740	1006.00	15.52	3.74	1108.48	.07	6.80	10.00	7.000	10.000	.00	0 .0
4.240	.0099					.0044	.02	6.55	1.07	4.85	.013	.00	.00	BOX

---------- WARNING - Flow depth near top of box conduit ----------

4084.000	1098.300	6.800	1105.100	1006.00	14.79	3.40	1108.50	.06	6.80	10.00	7.000	10.000	.00	0 .0



016 SOIL CLASSIFICATION AREA

7.2 INCHES OF RAINFALL

DPA - 6 DEBRIS POTENTIAL AREA

1 0 1 2 Miles

25-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.878
10-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.714

NEWHALL 1-H1.44
50-YEAR 24-HOUR ISOHYET

LOS ANGELES COUNTY PUBLIC WORKS Public Service That Works

PEAK BULKING FACTOR

1.65
1.60
1.55
1.50
1.47
1.45
1.40
1.36
1.35
1.30
1.27
1.25
1.20
1.15
1.10
1.05
1.00

DPA-3
DPA-5
DPA-8
DPA-9

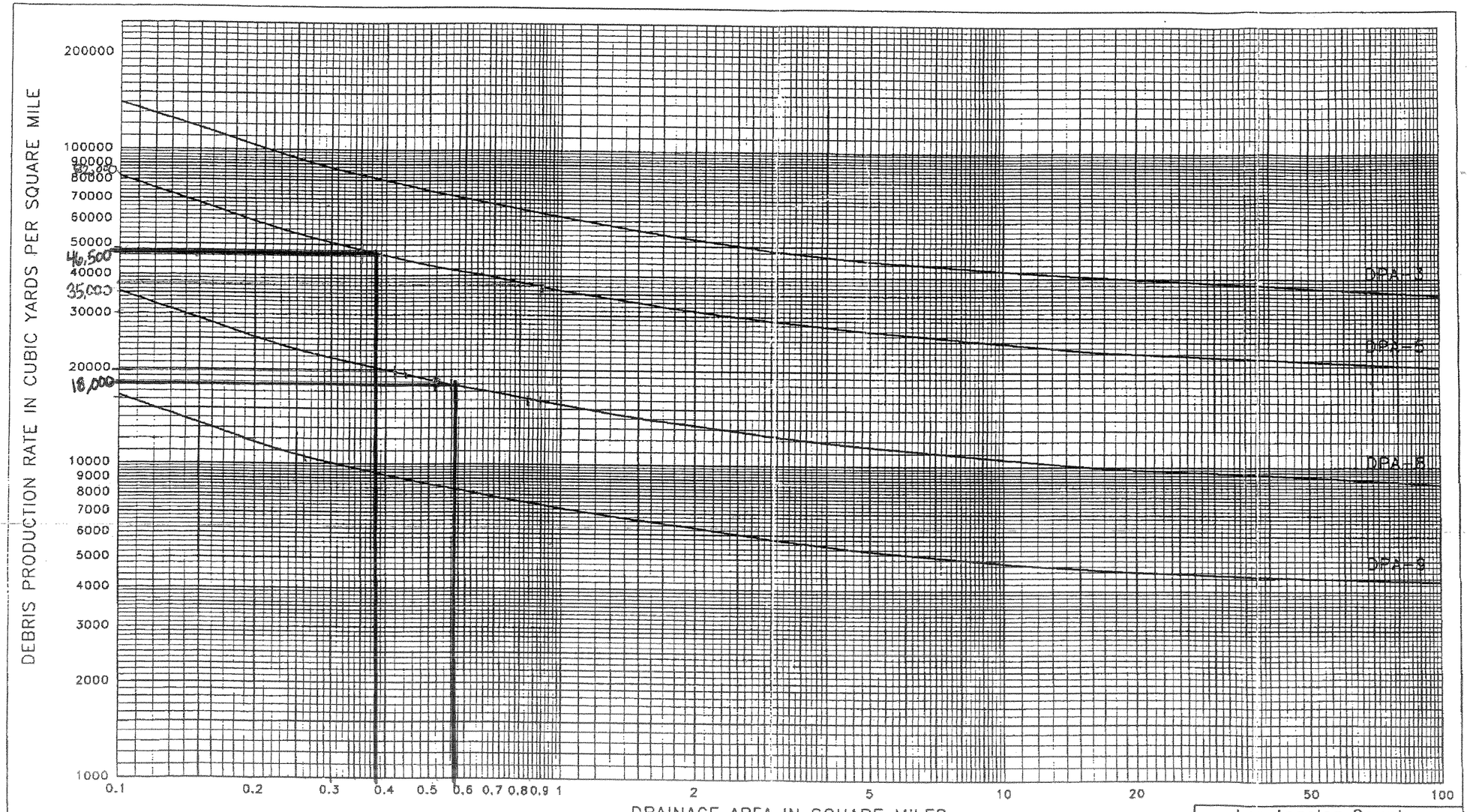
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1 2 5 10 20 50 100

DRAINAGE AREA IN SQUARE MILES

Los Angeles County
Department of Public Works

PEAK BULKING FACTORS
for Santa Clara Basin

2.SPG



Los Angeles County
Department of Public Works

DEBRIS PRODUCTION RATES
for Santa Clara Basin

LID/SUSMP REPORT

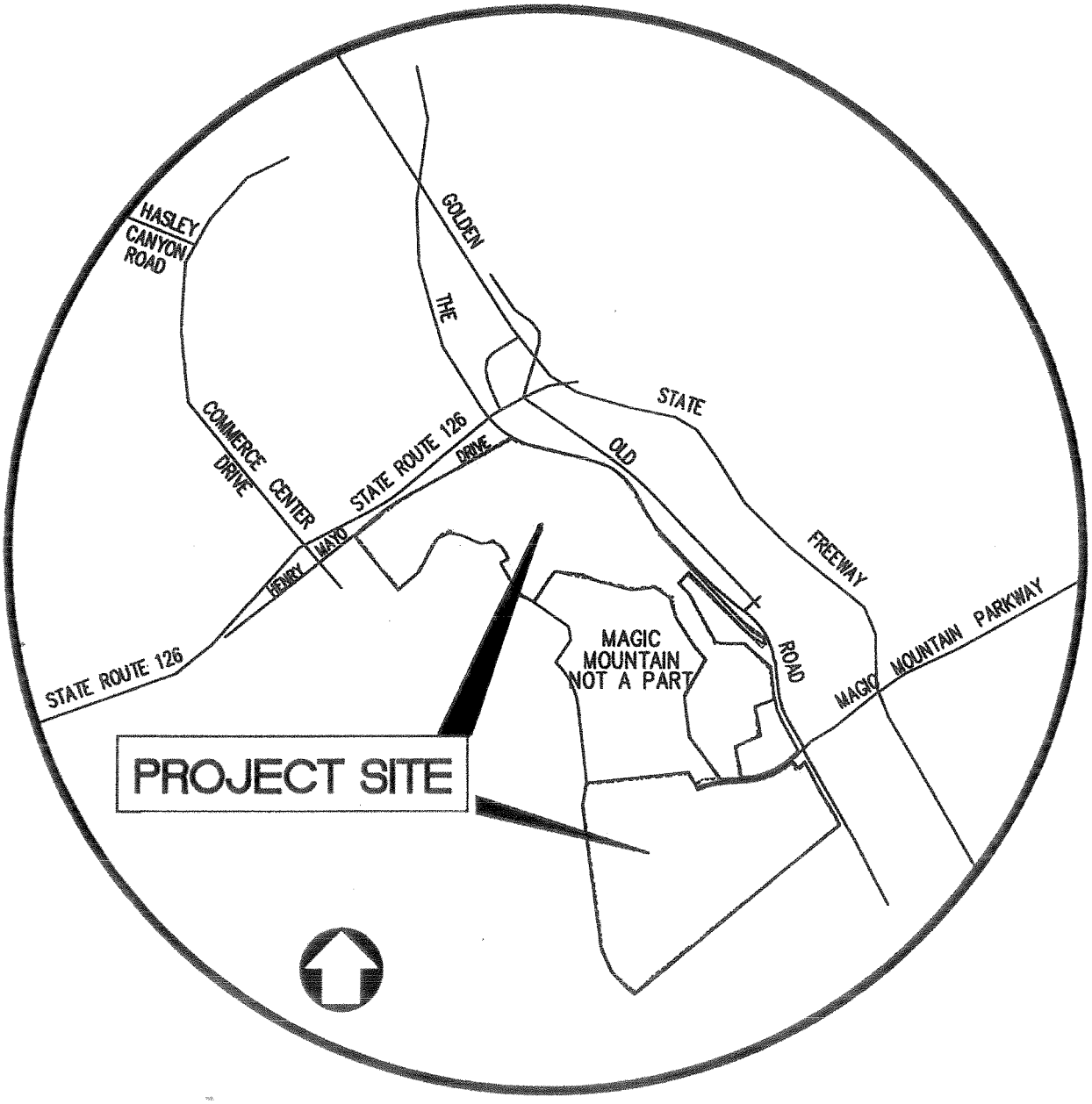
for

ENTRADA
COUNTY FOR LOS ANGELES
Tentative Tract No. 53295
Job No. 0930

Prepared For:
Newhall Land & Farming, Co.
25124 Springfield Ct. Suite 300
Valencia, CA 91355

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

MAY 2010



VICINITY MAP

NOT TO SCALE

Geosyntec consultants

475 14th Street, Suite 400
Oakland, California 94612
PH 510.836.3034
FAX 510.836.3036
www.geosyntec.com

Memorandum

Date:	1 December 2010
To:	Jason Vroom, Alliance Land Planning and Engineering
Copy to:	Miles Helfrich, Newhall Land
From:	Lisa Austin, Aaron Poresky, and Kelly Havens, Geosyntec Consultants
Subject:	Entrada - Evaluation of Stormwater Treatment Control BMP Sizing and Equivalency with Los Angeles County Low Impact Development Standards

---

The purpose of this memorandum is to verify that the treatment control BMPs for the Entrada Project (the Project) shown on the *WQMP Map for Portion of Tentative Tract 53295 (WQMP Map)* and *LID Infiltration Exhibit for Tentative Tract 53295 (LID Infiltration Exhibit)*, both prepared by Alliance Land Planning and Engineering (dated September 2010 and received by Geosyntec for final review on December 1, 2010) are sized in compliance with the requirements of the Los Angeles County Department of Public Works' (LACDPW) *Development Planning for Storm Water Management, A Manual for the Standard Urban Stormwater Mitigation Plan* (SUSMP) (September 2002) and to verify consistency with the *Newhall Ranch Sub-Regional Stormwater Mitigation Plan (*NRSSMP*)* (Geosyntec Consultants, 2008). This memorandum also demonstrates that the performance of the Project's BMPs is equivalent to the performance of BMPs sized per the *Los Angeles County LID Standards Manual* (Los Angeles County, 2009).

SUMMARY OF FINDINGS

The treatment control BMPs shown on the *WQMP Map* and *LID Infiltration Exhibit* are sized sufficiently to meet SUSMP and NRSSMP sizing criteria.

The average annual stormwater runoff volume reductions achieved by the BMPs depicted on *WQMP Map* and *LID Infiltration Exhibit* are equivalent to the LID performance standard as computed per the method described in Attachment A (*Addendum to the Newhall Ranch Specific Plan Sub-Regional Stormwater Mitigation Plan* (SRPA) (Geosyntec Consultants, 2010)). Therefore, the performance of the Project's BMPs is deemed to be equivalent to the requirements and intent of the *LID Standards Manual*, and no further commitments are required above those which are currently included on the referenced exhibits.

TREATMENT CONTROL BMPS

The stormwater treatment control BMPs for the Project will consist of extended detention basins (EDBs), on-site biofiltration, and media filtration. EDBs for the Project will include two on-site basins (A and B), which will provide treatment for a portion of the Project's developed area and a small portion of off-site area tributary to the developed area. The western portion of the Project will drain to a regional EDB proposed as part of the Mission Village Project (Regional Basin D). Regional Basin D will also provide treatment for portions of the Mission Village and Legacy Village Projects, as well as limited portions of the existing developed areas to the south of the Project. This basin is designed for the ultimate condition in which Mission Village and Legacy Village are developed. Biofiltration BMPs, including bioretention areas, vegetated swales, or equivalent, will be distributed throughout the project to treat multi-family, commercial, and park pads that are not tributary to the EDBs. Media filtration BMPs, which are anticipated to be located within catch basins or vaults, will be used to treat portions of the major roads running through the Project.

The applicable sizing criterion for the Project's EDBs, established in the NRSSMP, is capture and treatment of 80 percent of the average annual runoff volume. This sizing criterion utilizes historical rainfall data with continuous simulation modeling and is consistent with volume-based sizing criterion #2 from the SUSMP Manual. Project biofiltration BMPs will also be designed to capture and treat 80 percent of the average annual runoff volume, consistent with SUSMP volume-based sizing criterion #2.

The applicable sizing criterion for the Project media filtration BMPs (assumed to be flow-based BMPs), established in the NRSSMP, is the full capture of runoff resulting from 0.3 inches per hour rainfall intensity. This sizing criterion was developed using Project-specific rainfall to result in approximately 80 percent capture of average annual runoff volume, which is consistent with flow-based sizing criterion #3 from the SUSMP Manual.

VERIFICATION OF BMP SIZING

Sizing calculations have been performed to verify that the treatment control BMPs shown on the *WQMP Map* and *LID Infiltration Exhibit* are adequately sized to meet the applicable sizing criteria.

For the proposed EDBs, the EPA Stormwater Management Model (SWMM) was used to conduct continuous simulation modeling to confirm BMP sizing. Models were developed based on catchment delineations and land uses from spatial files received from Alliance, which correspond to the *WQMP Map*, along with NCRS and LA County soil map spatial files. The spatial files were intersected to provide catchment acreages, imperviousness, and soil parameters for the tributary drainage areas. This information, along with a 40 year precipitation record from

the nearby NCDC Newhall rain gauge (station number 046162), was inputted into SWMM to calculate a 40 year timeseries of runoff to the basins.

The resultant runoff timeseries from tributary areas were routed into respective BMP models, which were represented by stage storage discharge (SSD) curves. An explanation of how the SSDs in the model correspond to the actual extended detention basin geometry is included in Attachment C. The SSDs were iteratively modified to represent different facility volumes until a volume was found that resulted in 80 percent capture of the total runoff produced from the tributary drainage area for the entire rainfall record. This volume was then increased by 5 percent to allow for sediment storage and represents the NRSSMP design volume. Infiltration rates under the basin were determined based on soil types and characteristics below the proposed basins. See Attachment B for an explanation of how evaporation and infiltration rates were derived for basin simulations. Based on a comparison of the required NRSSMP design volumes obtained from model simulations to the volumes shown on the *WQMP Map*, the provided volumes of EDBs A and B are sufficient to achieve equal to or greater than 80 percent average annual capture. Model output files are included in Attachment C.

For the purpose of modeling the capture of runoff from the area of Entrada that is tributary to Regional Basin D, design drawings from the Legacy Village Project (*Drainage Concept Study for Tentative Tract 61996,* Hunsaker and Associates, December 2010) and the Mission Village Project (*Drainage Concept/SUSMP for Mission Village VTTM 61105,* Psomas, February 2010) were used. Model calculations were conducted as described above to yield the required NRSSMP design volume for Regional Basin D under the ultimate condition. Based on comparison of required NRSSMP design volumes to volumes shown on the *WQMP Map*, the provided volume of Regional Basin D is adequate to achieve 80 percent capture of the average annual runoff volume from all tributary area in the ultimate condition. Model output files are included in Attachment C.

The EDBs for the Project are listed in Table 1 along with the tributary area, SUSMP minimum mitigation volume, NRSSMP required volume (to achieve 80 percent average annual capture efficiency), and the volume of the basin provided on the Entrada *WQMP Map.*

Table 1: Catchment Parameters and Basin Sizing Results

BMP ID	Tributary Area[1] (acres)	Impervious Fraction of Catchment[2]	Minimum SUSMP Mitigation Volume Required (0.75 inches) (ac-ft)[3]	NRSSMP Volume Required, (ac-ft)[4]	Basin Volume Provided (ac-ft)[5]
Basin A	90.3	45%	2.9	6.0	6.7
Basin B	14.0	69%	0.51	1.2	1.5
Regional Basin D	738[1]	45%	37.7	41.5	43.0

[1]Tributary area of Regional Basin D includes future conditions of Mission Village and Legacy Village Projects based on most recent available designs.
[2]Imperviousness based on area weighted average of land use-based values. Values are consistent with (or more conservative than) Los Angeles County Hydrology Manual recommended values.
[3]Basin sizing for the volume of runoff produced from a 0.75 inch storm event based on SUSMP Manual Appendix A runoff calculations. SUSMP Basins A and B volumes provided per the Entrada VTTM No. 53295 (*WQMP Map for Portion of Tentative Tract 53295*, Alliance Land Planning and Engineering, September 2010). Regional Basin D SUSMP Volume taken from *Drainage Concept/SUSMP for: Mission Village VTTM 61105* (Psomas, February 2010).
[4]NRSSMP required volumes are based on volume required to capture and treat 80 percent of annual average runoff volume. Basin volumes include 5 percent allowance for sediment storage.
[5]Basin volume provided per the Entrada VTTM No. 53295 (*WQMP Map for Portion of Tentative Tract 53295*, Alliance Land Planning and Engineering, September 2010).

As shown in Table 1, the provided EDB volume is greater than the minimum SUSMP volume and the NRSSMP required basin volume for all basins. Therefore, the proposed extended detention basins are in conformance with both the SUSMP and NRSSMP sizing criteria.

Regional Basin D will receive runoff from somewhat greater tributary area in the interim condition (i.e. without Legacy Village and Mission Village constructed), however the watershed will contain substantially less impervious area in this condition than in the ultimate condition. Because impervious area is the most important parameter for BMP sizing, the ultimate condition is the controlling design condition. Table 2 provides standard SUSMP calculations demonstrating that the ultimate condition is more conservative for basin sizing than the interim condition.

Table 2: Comparison of Interim and Ultimate Sizing Conditions for Regional Basin D

Condition	Tributary Area, ac	% Imp	Cu	Cd[1]	SUSMP (0.75 inch) Design Volume, ac-ft
Interim	818	10.9%	0.1	0.187	9.6
Ultimate	738	45%	0.1	0.46	21.2

Cd = Cu × (1-Imp) + 0.9 × Imp, where Imp is the impervious fraction and varies from 0 to 1.
SUSMP Volume = Cd × Area × 0.75 inches × 1 ft/12 inches

Based on the results contained in Table 2, the ultimate condition is much more conservative (more than twice as much required volume) than the interim condition. The NRSSMP required volumes parallel the trends in the SUSMP volumes, although the absolute volume would be greater in magnitude for both conditions. The ultimate condition is more conservative for both the SUSMP and the NRSSMP BMP sizing requirements. This is the condition for which Regional Basin D was sized, therefore the proposed basin volume is in conformance with both the SUSMP and NRSSMP sizing criteria for both the interim and ultimate conditions.

A portion of one multi-family pad (Basin Z) is proposed to be treated on-site in a biofiltration BMP with discharge infiltrated in a dry well or series of dry wells. A SWMM model was used to confirm the sizing of the biofiltration BMP to achieve 80 percent average annual capture of treated water, as shown in Table 3. Average annual runoff volume and BMP performance was determined using the SWMM model methodology described above with SSD curves representative of the biofiltration system. An explanation of the biofiltration model SSD curve is included in Attachment C; SWMM model output files are also included in Attachment C.

Table 3: Biofiltration Basin Z Catchment Parameters and Sizing Results

Tributary Area (acres)	Impervious Fraction of Catchment[1]	NRSSMP Volume Required[2], (ft^3)	Basin Volume Provided[3] (ft^3)	Required Drywell Flowrate to Infiltrate Captured Volume[4] (cfs)	Dry Well Flowrate[5] Provided (cfs)
7.6	80%	16,900	16,900	0.45	0.45

[1] Imperviousness estimated by Alliance based on knowledge of product type. This value is consistent with the Los Angeles County Hydrology Manual recommended range of values.
[2] BMP is sized to capture and treat 80 percent of annual average runoff volume. Basin volume includes 5 percent allowance for sediment storage.
[3] Basin volume provided per the Entrada VTTM No. 53295 (*LID Infiltration Exhibit for Tentative Tract 53295*, Alliance Land Planning and Engineering, September 2010).
[4] Treated discharges from Biofiltration Basin Z will be infiltrated in drywells.
[5] Provided flowrate as specified on *LID Infiltration Exhibit for Tentative Tract 53295*, Alliance Land Planning and Engineering, September 2010. Drywell design to achieve required flowrate is to be developed as part of the final improvement plans.

The volume provided for Biofiltration Basin Z, as shown in Table 3, is sufficient to achieve 80 percent average annual capture of stormwater runoff, therefore the proposed basin volume is in conformance with both the SUSMP and NRSSMP sizing criteria. A drywell system will be designed by the project engineer with the final improvement plans to meet the infiltration flowrate requirement listed in Table 3 such that all treated water will be infiltrated.

On-site biofiltration BMPs are proposed for some multi-family, commercial, and park pads. The location, type, and design of these facilities have not been identified at this time; however, the sizing requirements for bioretention areas with underdrains (one possible type of biofiltration

BMP) are provided on the *WQMP Map*. Required sizing of these BMPs was determined using generic land-use specific runoff and routing models for each land use type proposed to be treated by biofiltration BMPs, including commercial, multi-family, and park land uses. The simulated runoff flow timeseries from each land use type was routed through bioretention areas with underdrains, which were iteratively sized to achieve 80 percent capture. These BMPs were assumed with have a maximum ponding depth of 1.5 feet. Required NRSSMP bioretention sizes are expressed as the area of bioretention with underdrains required per area of land use. These sizing factors were multiplied by the land use acreages on each pad to yield a total bioretention area requirement for each pad. The required bioretention areas for each pad are included in Table 4 below.

Table 4: Required Bioretention Areas for Pads Treated On-site

Pad ID	Land Use	Acreage	%Imp[1]	Required Sizing Factor (bioretention as fraction of drain area)[2]	Required Bioretention Area[2], sq-ft	Provided Bioretention Area[3], sq-ft
Basin C	Park	5.4	10%	0.027	6,420	6,420
Basin E	Commercial	30.2	91%	0.036	46,960	46,960
Basin F	MF-Condos	6.8	80%	0.034	9,950	9,950
Basin P	MF-Condos	15.8	80%	0.034	23,130	23,130
Basin W	MF-Condos	6.5	80%	0.034	9,510	9,510
Basin X	MF-Condos	10.4	80%	0.034	15,220	15,220
Basin Y	Commercial	3.4	91%	0.036	5,290	5,290

[1] These values are consistent with the Los Angeles County Hydrology Manual recommended range of imperviousness values by land use.
[2] Required surface area per acre is based on 18 inch basin ponding depth. Bioretention is sized to capture and treat 80 percent of annual average runoff volume. Basin ratios include 5 percent allowance for sediment storage.
[3] Bioretention area provided per the Entrada VTTM No. 53295 (*WQMP Map for Portion of Tentative Tract 53295*, Alliance Land Planning and Engineering, September 2010). The area provided assumes 1.5 ft maximum ponding depth and should be measured at mid depth (0.75 ft) of the facilities to account for the effects of side slopes.

A commitment is made on the *WQMP Map* to provide bioretention areas meeting the sizing requirements contained in Table 4 or to provide equivalent biofiltration BMPs substituted with final improvement plans and demonstrated to capture and treat 80 percent of the average annual runoff volume and provide equivalent average annual volume reduction. Therefore the proposed system for management of stormwater from these pads is in conformance with both the SUSMP and NRSSMP sizing criteria.

Media filtration BMPs will treat portions of major roadways throughout the project. Table 5 provides the SUSMP design flow rate, NRSSMP required design flow rate, and the provided design flowrate for the media filtration BMPs.

Table 5: Catchment Parameters and Media Filtration BMP Sizing Requirements

Tributary Area ID	Tributary Area (acres)[1]	Impervious Fraction of Catchment[1]	SUSMP Qpm (cfs)[2]	NRSSMP Required Design Flow Rate (cfs)[3]	Provided Design Qpm (cfs)[4]
Basin G	0.6	88%	0.10	0.14	0.14
Basin H	1.3	63%	0.17	0.24	0.24
Basin I	1.9	79%	0.27	0.42	0.42
Basin J	2.1	80%	0.30	0.47	0.47
Basin K	2.3	80%	0.33	0.51	0.51
Basin L	3.2	68%	0.46	0.62	0.62
Basin M	2.9	91%	0.46	0.72	0.72
Basin N	1.1	88%	0.18	0.27	0.27
Basin O	3.3	91%	0.48	0.82	0.82
Basin R	2.2	87%	0.32	0.53	0.53
Basin S	1.5	86%	0.20	0.35	0.35
Basin T	1.3	83%	0.17	0.30	0.30
Basin U	1.5	46%	0.24	0.21	0.24
Basin V	1.1	52%	0.11	0.17	0.17
Basin AA	0.9	78%	0.15	0.20	0.20
Basin BB	1.5	91%	0.24	0.37	0.37
Basin CC	3.2	91%	0.52	0.79	0.79
Basin DD	0.6	91%	0.11	0.15	0.15
Basin EE	0.5	91%	0.09	0.12	0.12

[1] Area and imperviousness based on spatial analysis of drainage areas imported from WQMP CAD files and proposed land uses.
[2] Flowrates ("Q_{pm}") as shown on Entrada VTTM No. 53295 (*WQMP Map for Portion of Tentative Tract 53295*, Alliance Land Planning and Engineering, September 2010), calculated per SUSMP Appendix A methodology.
[3] Design flow based on an intensity of 0.3 in/hr per NRSSMP performance criteria.
[4] Selected design flow rate shown as "Design Q_{pm}" on Entrada VTTM No. 53295 (*WQMP Map for Portion of Tentative Tract 53295*, Alliance Land Planning and Engineering, September 2010).

As shown in Table 5, media filtration BMPs have been sized using the more conservative NRSSMP design flow rate, thus their use is in conformance with both SUSMP and NRSSMP sizing criteria.

LID EQUIVALENCY

Los Angeles County's *LID Standards Manual* (Los Angeles County, 2009) outlines stormwater runoff quantity and quality control development principles, technologies, and design standards for achieving the LID Standards of the Los Angeles County LID Ordinance (Los Angeles County, 2008). An analysis was performed to demonstrate that the LID and treatment control BMPs included in the Project would provide equivalent or greater volume reductions on an average annual basis to that which would be achieved by BMPs designed per the specific requirements of the Los Angeles County *LID Standards Manual* (Los Angeles County, 2009). A detailed description of the analysis methodology for evaluating equivalency to the LID Standards Manual is provided in the SRPA, included as Attachment A.

To demonstrate LID equivalency, a two tiered analysis was conducted. The first tier of the analysis divided the Project area into open space areas, areas where infiltration is likely feasible, and areas where infiltration is likely infeasible, based on infiltration feasibility criteria specified by the *LID Standards Manual.* Infiltration infeasibility screening was conducted by R.T. Frankian and Associates (RTF&A, 2010b) based on these criteria. For off-site improvements within the Mission Village Project boundary, infiltration feasibility was based on the Mission Village infiltration feasibility screening, also prepared by R.T. Frankian and Associates (RTF&A, 2010a). See Figure 1 for an illustration of Tier One infiltration feasibility screening results.

The Tier Two analysis involved:

1) Calculation of the volume reduction that would be achieved by well designed BMPs per the specific requirements of the *LID Standards Manual*, with consideration for the infiltration feasibility screening conducted in the Tier One analysis.
2) Calculation of the volume reductions achieved by the Project's BMPs.
3) Comparing these values.

Table 6 provides the assumptions and calculations used to estimate the volume reduction that would be achieved by well designed BMPs per the specific requirements of the *LID Standards Manual* (i.e., the *LID Standards Manual* performance standard).

Table 6: LID Standards Manual Performance Standard

Feasibility Category	Open Space[1]	Infiltration Feasible[2]	Infiltration Infeasible[2]	Total
Total Area, ac	211	23	245	
Composite Imperviousness[3]		73%	77%	
Average Annual Runoff Volume[4], ac-ft		24	263	
Average Annual Capture Efficiency of BMPs Designed per LID Standards Manual[5]		48%	48%	
Average Annual Volume Reduction of Captured Water in Vegetated BMPs[6]		100%	20%	
LID Standards Manual Performance Standard Volume Reduction, ac-ft/yr		11.4	25.2	36.6

[1] Includes water quality basins as open space (does not include parks).
[2] Per infiltration feasibility screening prepared by R.T. Frankian and Associates (2010a, 2010b).
[3] Composite imperviousness based on distribution of developed land uses within each analysis area.
[4] Calculated using the rational method with the average annual rainfall at the Project site.
[5] Capture efficiency estimated through continuous simulation modeling of 40 years of precipitation, runoff, and routing for a hypothetical volume-based BMP sized per the *LID Standards Manual.*
[6] Assumed volume reductions in vegetated BMPs are discussed in the SRPA (include as Attachment A).

The volume reductions achieved by Project BMPs are provided in Table 7. The following types of volume reductions are included:

- Incidental volume reduction in EDB A and B.
- Volume infiltrated in Biofiltration Basin Z and associated drywell(s).
- Incidental volume reduction achieved in biofiltration BMPs on the multi-family, commercial, and park pads.

EDBs are designed to treat and release stormwater, and they are also anticipated to provide significant incidental infiltration. Volume reductions in EDBs A and B were estimated with the SWMM modeling approach described above. These models considered volume reductions resulting from infiltration and evaporation of ponded water. The models also partially accounted for volume reductions resulting from soaking and drying of amended soils below the basins. Evaporation and infiltration rates used in these simulations are described in Attachment B.

While Regional Basin D will likely achieve some incidental volume reduction as a result of soil soaking and drying, volume reductions were not accounted for in this basin because of the shallow groundwater conditions under the basin which will likely limit overall infiltration.

Biofiltration Basin Z is located over alluvial soils and will be designed such that all treated water will be routed to dry well(s) and infiltrated. Therefore, the volume reduction in this basin is equal to the volume of runoff captured by the basin (80 percent of average annual runoff volume).

The other on-site biofiltration BMPs will be designed to treat and release water back to the storm drain, and are expected to provide incidental volume reduction as a result of infiltration and evapotranspiration. Volume reductions in biofiltration BMPs were estimated to be 20 percent of captured water based on a review of biofiltration BMP monitoring data contained in the International BMP Database (see SRPA included as Attachment A). The validity of this assumption is supported by modeling results (see Attachment C).

Table 7: Volume Reductions Achieved by Project

Volume Reduction Category	Infiltration Only BMPs	Treat and Release BMPs Achieving Incidental Infiltration	Total
Volume Reduction Achieved in Extended Detention Basins, ac-ft/yr[1]			
Extended Detention Basin A		13.7	13.7
Extended Detention Basin B		4.8	4.8
Regional Basin D (Mission Village)[2]		0	0
Volume Reduction Calculations for Areas Draining to On-site BMPs[3]			
Areas Treated with On-site Biofiltration BMPs, ac	7.6	78.5	
Composite Imperviousness of Areas Treated with On-site Biofiltration BMPs	80%	80%	
Total Runoff Volume from Areas Treated with On-site Biofiltration BMPs , ac-ft/yr	8	87	
NRSSMP Capture Efficiency	80%	80%	
Volume Reduction of Captured Water in On-site Biofiltration BMPs	100%	20%	
Volume Reduction from Areas Treated with On-site Biofiltration BMPs, ac-ft/yr	6.7	13.9	20.6
Average Annual Volume Reduction Achieved, ac-ft/yr[4]	6.7	32.4	**39.1**
LID Standards Manual Performance Standard Volume Reduction, ac-ft/yr (from Table 6)			**36.6**
Surplus Volume Reduction[5]**, ac-ft/yr**			**2.5**

[1]Achieved volume reduction determined from SWMM simulations of extended detention basins.
[2]Volume reductions achieved in regional Basin D have not been considered in this analysis. While Regional Basin D will likely achieve some volume reductions, these losses are expected to be limited by shallow groundwater.
[3]Achieved volume reduction based on 80 percent capture efficiency for all biofiltration BMPs. Infiltration Only BMPs (Basin Z) will infiltrate or evapotranspire 100 percent of captured runoff. Remaining biofiltration BMPs are assumed to infiltrate or evapotranspire 20 percent of captured water.
[4]Sum of volume reductions from extended detention basins and volume reduction from areas with on-site biofiltration BMPs.
[5]Positive surplus volume indicated volume reduction achieved by Project BMPs greater than *LID Standards Manual* performance standard.

Based on this analysis, the Project LID and treatment control BMPs result in greater average annual volume reduction to that which would be achieved by BMPs designed per the requirements of the *LID Standards Manual*, thus are deemed to be equivalent to the intent and requirements of the *LID Standards Manual*.

REFERENCES

Alliance Land Planning and Engineering, 2010. *LID Infiltration Exhibit for Portion of Tentative Tract 53295*, September 2010. Received from Alliance for final review on December 1, 2010.

Geosyntec, 2008. Newhall Ranch Sub-Regional Stormwater Mitigation Plan.

Hunsaker and Associates, 2010. Drainage Concept Study for Tentative Tract 61996, December 2010.

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Los Angeles County, 2008. Low Impact Development Standards Ordinance (Ordinance No. 2008-0063).

Los Angeles County, 2009. County of Los Angeles Low Impact Development Standards Manual, January, 2009.

Psomas, 2010. Drainage Concept/SUSMP for Mission Village VTTM 61105, February 2010.

RTF&A, 2010a. Geotechnical Evaluation of Infiltration Vesting Tentative Tract Map No. 61105, Mission Village (plus attached map and shapefile). January 28, 2010.

RTF&A, 2010b. Geotechnical Evaluation of Infiltration Vesting Tentative Tract Map No. 53295, Entrada (plus attached map and shapefile). February 10, 2010.

Attachment A

Addendum to the Newhall Ranch Specific Plan Sub-Regional Stormwater Mitigation Plan (SRPA)

December 29, 2010

TO: Anthony Nyivih
Land Development Division

Attention Amir Ibrahim

FROM: Gary Hildebrand
Watershed Management Division

REVIEW OF NEWHALL RANCH SUB-REGIONAL STORMWATER MITIGATION PLAN ADDENDUM TO THE NEWHALL RANCH SPECIFIC PLAN DATED NOVEMBER 20, 2010 SUB-REGIONAL STORMWATER MITIGATION PLAN

As you requested, the subject plan has been reviewed and is approved.

We agreed to review this addendum since we participated in the review of the original plan. We participated at that time because Watershed Management Division was intently involved in the development of the Low-Impact Development (LID) Ordinance and Manual.

However, with the LID Ordinance adopted and the Manual complete, Land Development Division is now responsible for LID implementation. We expect that Land Development Division will independently handle the review of these projects in the future.

If you have any questions, please call Menerva Ariki at Extension 4316.

BD:jtz
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Placeholder for Approved Newhall Ranch Sub-Regional Plan Addendum

Attachment B

Evaporation and Infiltration Rates

Introduction

USEPA Stormwater Management Model (SWMM) Version 4 was used to model the project extended detention basins proposed by the Entrada Project and estimate the volume reductions resulting from infiltration and evaporation of ponded water in the basins. The following sections describe the source of the parameter estimates for evaporation and infiltration for the basins.

Evaporation Rates

Evaporation rates were based on monthly normal reference evapotranspiration (ETo) rates provided by the California Department of Water Resources California Irrigation Management Information System (CIMIS, http://www.cimis.water.ca.gov/cimis/images/etomap.jpg). The Project is located in Zone 14. Reference ET values for zone 14 are reproduced in Table B-1.

Table B-1: Evaporation Parameters for SWMM Model (from CA ET map)

Month	Reference ET Rates			60% of Reference	
	inch / day	days / month	inch / month	inch / day	inch / month
January	0.05	31	1.55	0.03	0.93
February	0.08	28	2.24	0.048	1.34
March	0.12	31	3.72	0.072	2.23
April	0.17	30	5.1	0.102	3.06
May	0.22	31	6.82	0.132	4.09
June	0.26	30	7.8	0.156	4.68
July	0.28	31	8.68	0.168	5.21
August	0.25	31	7.75	0.15	4.65
September	0.19	30	5.7	0.114	3.42
October	0.13	31	4.03	0.078	2.42
November	0.07	30	2.1	0.042	1.26
December	0.05	31	1.55	0.03	0.93
Total (year)		*365*	*57.04*		*34.22*

ET includes both evaporation and transpiration, however only evaporation from the free water surface (i.e., "lake" or "pond" evaporation) is simulated in the model. To estimate lake evaporation from ETo data, the data were first converted to "pan evaporation" (i.e., the evaporation that would occur from a small pan of water) by dividing by a "pan coefficient." Typical pan coefficients (ratio of ET to pan evaporation) range from 0.6 to 0.85 (FAO-24, Doorenbos and Pruitt, 1977) indicating that pan evaporation is higher than ETo. The pan evaporation is then converted to a "lake evaporation" estimate by multiplying by a "lake coefficient." Typical lake (or pond) coefficients (ratio of lake evaporation to pan evaporation) are in the range of 0.75 (Linacre, 2002) indicating that less evaporation is expected from lakes and ponds than from pans. These factors combine to yield a multiplier near 1.0, indicating that lake/pond evaporation will be similar to ETo. For modeling, a multiplier of 0.6 was applied to

the reference ET values to include a factor of safety in these estimates. This assumption is believed to result in somewhat lower evaporation that would actually be expected to occur from EDBs, therefore somewhat underestimates volume losses. It is also noted that evapotranspiration from the amended soil layer and root zone in the bottom and sides of the basin (i.e., the "ET sponge") is not simulated by the model, also resulting in underestimates of volume reduction achieved in the EDBs.

Infiltration Rates

Infiltration rates under EDBs were determined by intersecting EDB outlines with available soil maps in a geographic information system (GIS) and estimating infiltration characteristics based on values provided with these data sources and a literature review. Because of the high variability in soil infiltration rate estimates and the relatively coarse resolution of these datasets, this "preponderance of evidence" approach is believed to be more reliable that selecting a value from a single source.

Soil maps used for this analysis included:

- Natural Resources Conservation Service (NRCS) Soil Survey Number CA675: Antelope Valley Area, California.
- Los Angeles County Soil Layer
- Infiltration screening map prepared by RT Frankian and Associates for the Project, characterizing areas as less than or greater than 0.5 in/hr.

The NRCS soil survey was used because of its relatively fine resolution of Map Unit boundaries compared to the Los Angeles County survey. Infiltration rates were derived for each NRCS Map Unit based on infiltration rate provided by the Soil Survey and the designations of hydrologic soil group (HSG) (e.g., A, B, C, and D) provided by the Soil Survey. The Soil Survey provides a wide range of infiltration rates for each map unit. The lower end of this range was selected for the purposes of modeling to result in a lower (i.e., more conservative) estimate of volume reduction and to represent ultimate conditions with some compaction and siltation. In addition, the HSG provided by the Soil Survey was used to look up infiltration rates from a literature source specifically applicable to the SWMM model[1] and this value was averaged with the low range of infiltration rate provided by the NRCS Soil Survey.

The LA County Soil Map was used because of its local applicability and consistency with the LACDPW hydrologic modeling framework. Inspection of the soil runoff curves yielded an estimate of the saturated infiltration rate of each soil type. This method of interpreting soil maps

[1] James and James, 2000, *Hydrology: Guide to the Rain, Temperature, and Runoff Modules of EPA SWMM4.*

was suggested and guided by LACDPW as part of the development of the Structural BMP Prioritization and Analysis Tool (SBPAT) project in 2008[2].

The NRCS Soil Survey and LA County Soil Layer were intersected with the outline of each EDB the three estimates of infiltration rate were averaged to yield the model input infiltration rate for each basin. Area-weighted averages were used where a basin intersected multiple soil units. The modeled infiltration rates, NRCS soil group and type designations, and LA County designations for each basin are contained in Table B-2 below.

Table B-2: Infiltration Rates Under EDBs Assumed for Modeling

Basin	NRCS Soil Map Unit	Soil Group	LA County Soil Type	Area (Acres)	Fraction of Total Area	Resultant Infiltration Rate (in/hr)	Modeled Infiltration Rate with 25% reduction (in/hr)
EDB A	MgB	A/B	098	1.50	78.4%	0.33	0.25
	CmF	C	098	0.42	21.7%		
EDB B	MgB	A/B	098	0.55	66.0%	0.31	0.23
	CmF	C	098	0.29	34.0%		

Compaction and long term siltation were accounted for in these estimates. In addition to selecting data sources that specifically represent soils with long term compaction and siltation, an additional reduction of 25 percent was applied to the calculated infiltration rates prior to modeling. Because these BMPs are not designed to infiltrate as their only discharge, and because they do not pose a safety risk if they infiltrate at somewhat less than their design rate, a greater factor of safety is not recommended for this calculation.

Based on the geotechnical evaluation of infiltration feasibility conducted by RT Frankian and Associates (RTFA, 2010), basins A and B are underlain primarily by geologic formations characterized as having an infiltration rate greater than 0.5 inches per hour. This provides site-specific support for estimated infiltration rates and indicates that the modeled infiltration rates of 0.25 in/hr and 0.23 in/hr are appropriately conservative for estimating volume reduction from the extended detention basins.

Volume Reduction Cross Check in Superpad Bioretention Areas

Volume reduction estimates used in equivalency calculations for bioretention areas are based on empirical analysis of data from the International BMP Database (See Attachment A). This is the most appropriate source of volume reductions prior to design of facilities. An appropriate factor of safety is applied to empirical estimates to allow for a variety of vegetated BMPs capable of achieving volume reductions equivalent to or better than the assumed volume reduction.

[2] Technical guidance and review of this methodology was provided by Ben Willardson, LACDPW.

However, volume reductions in prototypical bioretention areas were also estimated using SWMM to confirm the reasonableness of the empirically-based assumptions for the local climate and soil conditions. Volume reductions in prototypical bioretention areas were estimated by simulating evapotranspiration of standing water and infiltration of water from the drain rock layer assumed to be constructed below the underdrain elevation.

Evaporation rates were simulated as described above.

Underlying infiltration rates were estimated for each superpad based on the method described above. The superpad with the lowest infiltration rates was assumed for modeling. The modeled infiltration rates, NRCS soil group and type designations, and LA County designations for the worst case superpad are contained in Table B-3 below.

Table B-3: Infiltration Rates Under Worst Case Superpad Assumed for Modeling

Basin	NRCS Soil Map Unit	Soil Group	LA County Soil Type	Area (Acres)	Fraction of Total Area	Resultant Infiltration Rate (in/hr)	Modeled Infiltration Rate with 25% reduction (in/hr)
Worst Case Superpad (Basin C)	CmF	C	098	5.4	100%	0.19	0.14

SWMM modeling results (Attachment C) yield volume reduction of captured water ranged from 23 to 42 percent depending on the imperviousness of the tributary area. This is greater than the assumed 20 percent volume reduction of captured flow based on analysis of the BMP Database. The modeling framework did not account for lateral percolation nor fully account for soil soaking and drying, therefore modeled volume reductions are likely biased somewhat low.

Cited References

Doorenbos J, Pruitt WO, 1977. Guidelines for prediction of crop water requirements. FAO Irrig. and Drain. Paper No. 24 (revised), Rome

James and James, 2000, *Hydrology: Guide to the Rain, Temperature, and Runoff Modules of EPA SWMM4.*

Linacre, E., 2002. Ratio of lake to pan evaporation rates. http://www-das.uwyo.edu/~geerts/cwx/notes/chap04/eoep.html

Los Angeles County Department of Public Works. Los Angeles County Soils Map GIS Shapefile, CA State Plane Coordinate System, NAD83, Zone V, US Survey Feet. Obtained from LACDPW in 2008; date of creation not known.

National Resource Conservation Service (USDA), 2008. Los Angeles County, CA Soil Survey Spatial and Tabular Data GIS Shapefile, CA State Plane Coordinate System, NAD83, Zone V, US Survey Feet.

RTFA, 2010. Geotechnical Evaluation of Infiltration Vesting Tentative Tract Map No. 53295, Entrada (plus attached map and shapefile). February 10, 2010.

Attachment C

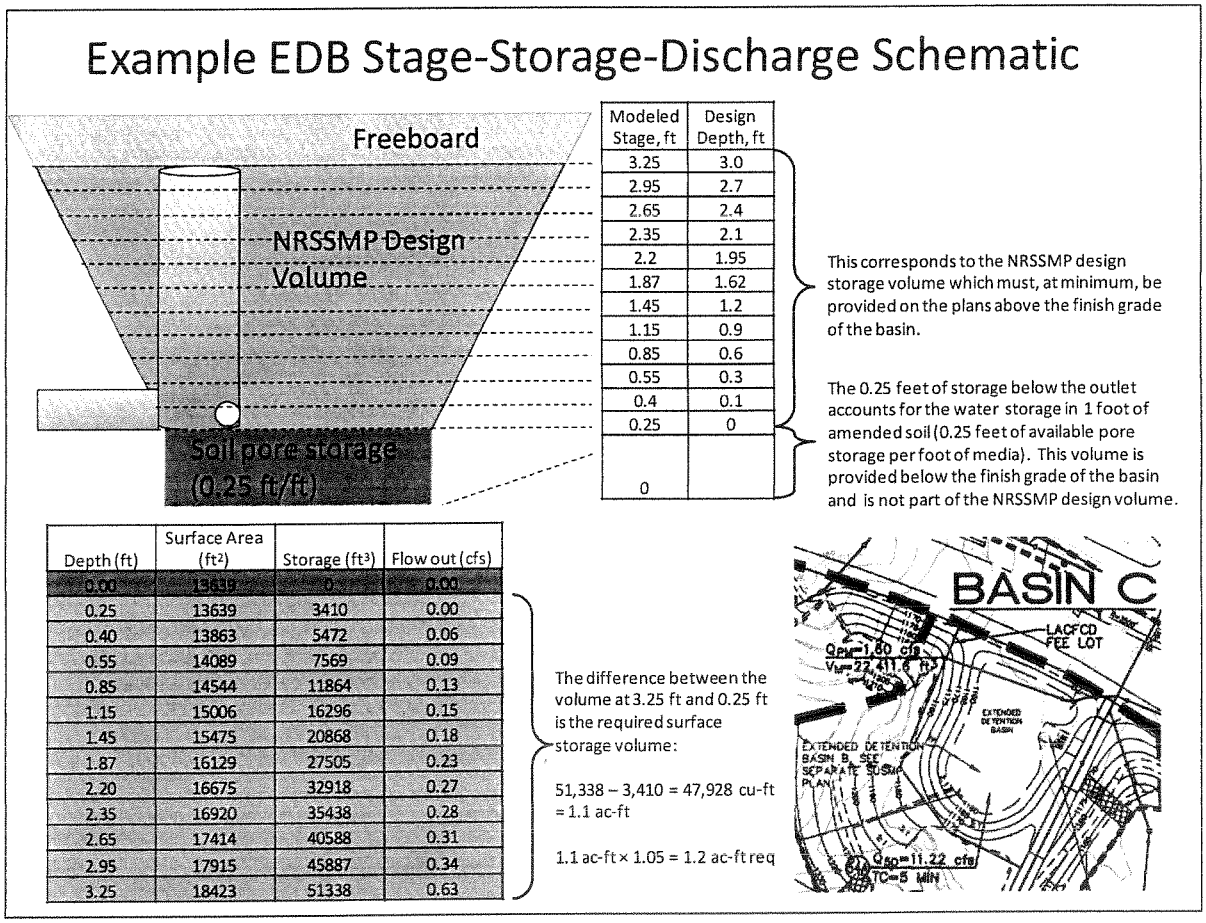
1. Stage-Storage-Discharge Table Schematics
2. Model Output from SWMM Sizing Simulations
    - Extended Detention Basin A
    - Extended Detention Basin B
    - Regional Extended Detention Basin D
    - Biofiltration Basin Z
    - Generic Biofiltration Model: Commercial Land Use
    - Generic Biofiltration Model: Multi-Family Land Use
    - Generic Biofiltration Model: Park Land Use

1. Storage-Area-Discharge Table Schematics

The following schematics illustrate how the stage-area-storage-discharge (SSD) tables used to represent BMPs in the SWMM Storage-Treatment Block are linked to BMP design attributes.

Extended Detention Basin (EDB) SSD Schematic

The EDB SSD tables were used to model EDB A, EDB B, and Regional Basin D. The schematic below demonstrates how the SSD table is related to the physical design attributes of the EDB. The example below is for Basin B.



An explanation of each column in the table is below:

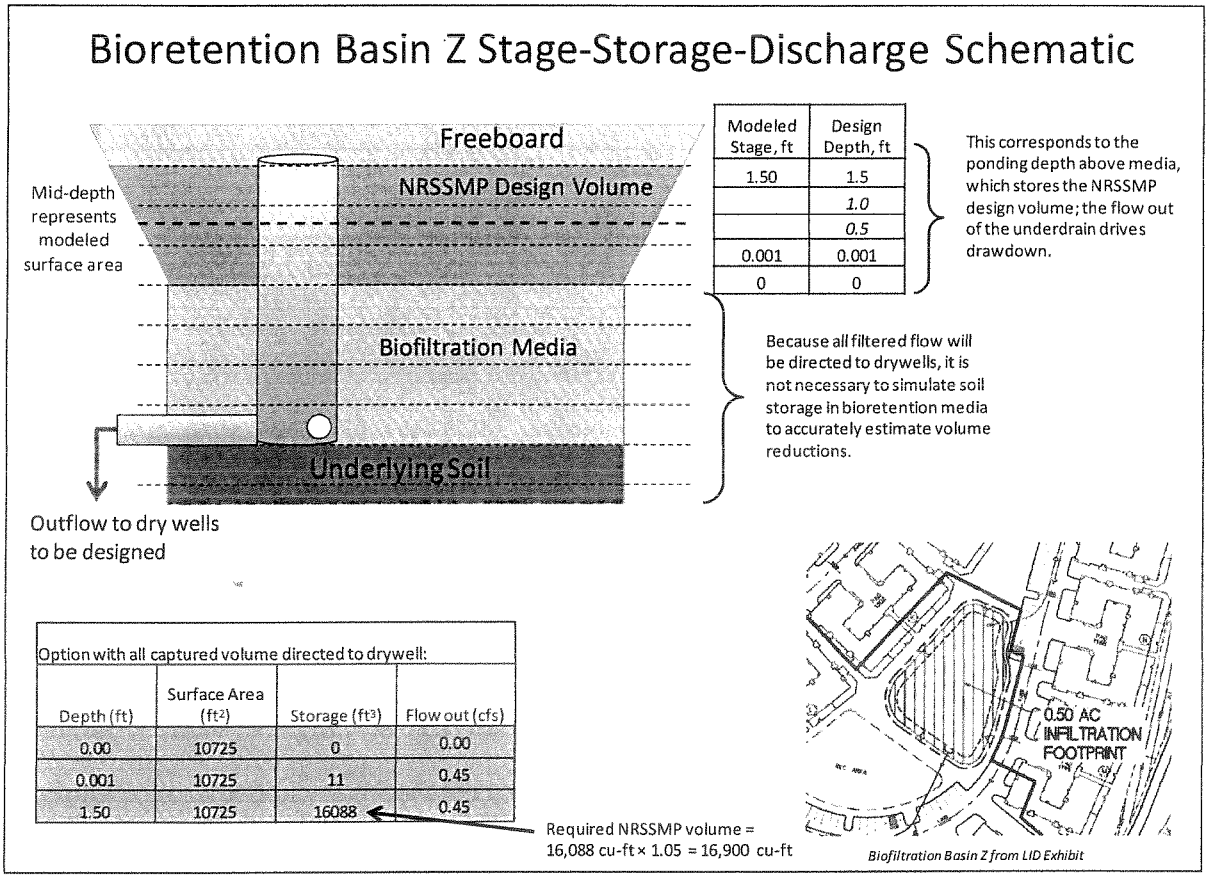
- The "depth" column in the table corresponds to the basin stage. The depth is measured as distance from the bottom of the basin to the stage (the greater the stage, the closer the stage is to the pond surface).
- The "surface area" column corresponds to the surface area of the water in the basin at that particular stage (if the basin was full to that stage). This varies, getting larger with

progressive stages, due to Basin side slopes, which give the basin the trapezoidal cross-section shown above.

- The "storage" column corresponds to the volume of water at that stage (assuming the basin was full to that stage).
- The "flow out" column corresponds to the flow out of the basin outlet structure. Volume stored at a stages with zero "flow out" (for example, below 0.25 feet in the example above) is lost only to infiltration and evaporation. Flow through the outlet is considered treated. When the basin exceeds the highest stage in the table, the overflow is tracked as "bypass". At the end of each simulation, a check is done to ensure that bypass does not constitute more than 20 percent of the total inflow to the basin. This confirms that the simulated basin is sized adequately.

Biofiltration Basin Z Stage Area Discharge Schematic

The Biofiltration Basin Z SSD table was used to model the infiltrating Biofiltration facility proposed for the Basin Z drainage area. The schematic below demonstrates how the SSD table is related to the physical design attributes of the Biofiltration basin.



- The "depth" column in the table corresponds to the depth of ponding above the biofiltration media surface.

- The "surface area" column corresponds to the surface area of the water in the basin. The surface area was modeled as constant throughout the ponding depth, even though the surface area will change with ponding depth due to side slopes. This simplification does not have important sensitivity for relatively shallow basins. For evaluating conformance, the surface area of the basin at mid ponding depth (i.e. 0.75 ft) should be compared to the modeled surface area.

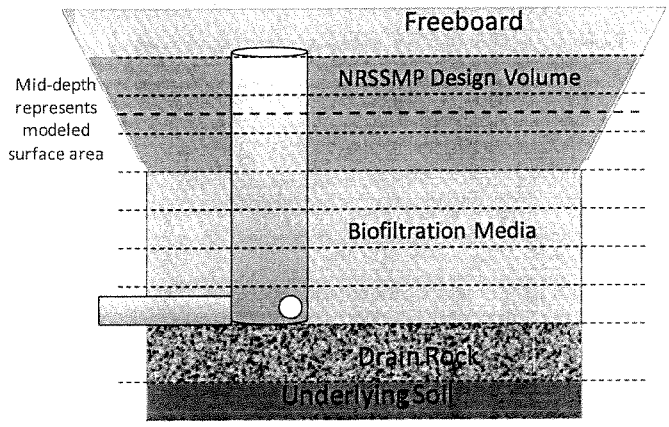
- The "storage" column corresponds to the volume of water at the ponding depth (assuming the basin was full to that stage).

- The "flow out" column corresponds to the flowrate filtered through the amended media. While ponding of water will increase flowrate somewhat, this affect was not considered and has the effect of making the model simulations more conservative for sizing calculations. All captured volume was assumed to flow to the drywell (i.e. no infiltration under the basin was assumed). When the basin exceeds the highest stage in the table, the overflow is tracked as "bypass". At the end of each simulation, a check is done to ensure that bypass does not constitute more than 20 percent of the total inflow to the basin. This confirms that the simulated basin is sized adequately.

Unit Sizing Simulations of Biofiltration Area - Stage Area Discharge Schematic

A generic set of bioretention SSD tables was used to model bioretention to determine the sizing factors (percent of area) needed for 80 percent capture of the runoff produced from an acre of a specific land use. Land uses modeled included Commercial, Multi-Family, and Park. The schematic below demonstrates how the SSD table is related to the physical attributes of the generic bioretention basins.

Generic Bioretention Stage-Storage-Discharge Schematic for Unit Sizing Factor Simulations



Modeled Stage, ft	Design Depth, ft
1.75	1.5
	1.0
	0.5
0.251	0.001
	0
	0.5
0.25	*1.0*
	1.5
0	2.0

This corresponds to the ponding depth above media, which stores the NRSSMP design volume; once storage in the media is 'full', the flow through the underdrain drives drawdown.

There is assumed to be 0.25-ft of equivalent water storage in the biofiltration media and drain rock that is available to accept water before water exits via underdrain. This volume is lost to infiltration and evaporation only.

2 ft min media × 0.25 ft/ft + 0.5 ft min drain rock × 0.3 ft/ft = 0.65 ft

Therefore 0.25 ft is conservative.

Italics correspond to actual facility stage that is not directly expressed in modeled stages

Option with discharge to underdrain and infiltration:

Depth (ft)	Surface Area (ft²)	Storage (ft³)	Flow out (cfs)	
0.00	1400	0	0.00	→ DATUM (bottom of facility)
0.25	1400	350	0.00	→ Storage within media and drain rock lost to evaporation and infiltration below underdrains (no surface discharge)
0.251	1400	351	0.06	Simulates drawdown of NRSSMP design volume from ponded surface (1.5 ft); driven by flow through media and out underdrain
1.75	1400	2450	0.06	

- The "depth" column in the table corresponds to: 1) the depth of ponding above the basin and 2) the effective depth of storage within the biofiltration media, depending on stage. The bright blue stages correspond to depth of ponding above the media, while the light green stage corresponds to effective depth within the media.

- The "surface area" column corresponds to the surface area of the water in the basin. The surface area was modeled as constant throughout the ponding depth, even though the surface area will change with ponding depth due to side slopes. This simplification does not have important sensitivity for relatively shallow basins. For evaluating conformance, the surface area of the basin should be measured at mid ponding depth (i.e. 0.75 ft).

- The "storage" column corresponds to the volume of water at the ponding depth (assuming the basin was full to that stage).

- The "flow out" column corresponds to the flow out of the basin through the underdrain. Water retained in the media drain rock is discharged to evaporation and infiltration. When the basin exceeds the highest stage in the table, the overflow is tracked as "bypass". At the end of each simulation, a check is done to ensure that bypass does not constitute more than 20 percent of the total inflow to the basin. This confirms that the simulated basin is sized adequately.

Extended Detention Basin A

SWMM RUNOFF Module Output File

1

```
**************************************************
*    U.S. Environmental Protection Agency        *
*    Storm Water Management Model  (SWMM)        *
*                 Version 4.4H                   *
*                                                *
*                CDM/OSU Beta                    *
*          Release Date - July 1, 2003           *
*   Camp Dresser & McKee and Oregon St. Univ.    *
*           Chuck Moore and Wayne Huber          *
*   Compiled using Compaq Visual Fortran v.6.6   *
**************************************************

                  Developed by

**************************************************
*              Metcalf & Eddy, Inc.              *
*             University of Florida              *
*         Water Resources Engineers, Inc.        *
*        (Now Camp Dresser & McKee, Inc.)        *
*                September 1970                  *
**************************************************

          Version 4.3 (outdated) is
         Distributed and Maintained by

**************************************************
*      U.S. Environmental Protection Agency      *
* Center for Exposure Assessment Modeling (CEAM)*
*    Athens Environmental Research Laboratory    *
*             960 College Station Road           *
*             Athens, GA    30605-2720           *
**************************************************

**************************************************
*     This is an updated release of SWMM4.4h,    *
*     no longer formally supported by the EPA.   *
*     If problems occur executing this model     *
*     contact Wayne Huber at Oregon State. U.,   *
*     wayne.huber@orst.edu,                      *
*     or Robert Dickinson at Camp Dresser &      *
*     McKee, DickinsonRE@CDM.COM.                *
*     The EPA-supported version is SWMMM5 at:    *
*   http://www.epa.gov/ednnrmrl/swmm/index.htm   *
**************************************************

**************************************************
*  This is an implementation of EPA SWMM 4.4H    *
*  "Nature is full of infinite causes which      *
```

```
*   have never occurred in experience" da Vinci *
*************************************************


##########################################
#        File names by SWMM Block        #
#         JIN  -> Input to a Block       #
#        JOUT  -> Output from a Block    #
##########################################

   JIN for Block #     1 File #    0  JIN.UF
  JOUT for Block #     1 File #    9  RN0.int

##########################################
# Scratch file names for this simulation. #
##########################################

NSCRAT #     1 File #    1  NEWHALL_PATCHED_20091119.INT
NSCRAT #     2 File #    2  SCRT2.UF
NSCRAT #     3 File #    3  SCRT3.UF
NSCRAT #     4 File #   10  SCRT4.UF
NSCRAT #     5 File #   11  SCRT5.UF
NSCRAT #     6 File #   12  SCRT6.UF
NSCRAT #     7 File #   13  SCRT7.UF
NSCRAT #     8 File #   14  SCRT8.UF
NSCRAT #     9 File #   15  SCRT9.UF

************************************************
*    Parameter Values on the Tapes Common Block   *
************************************************

 Number of Subcatchments in the Runoff Block (NW)..... 2000
 Number of Channel/Pipes in the Runoff Block (NG)..... 2000
 Number of Connections to Runoff Channels/Inlets (NCP).    6
 Number of Water Quality Constituents (MQUAL).........   20
 Number of Runoff Land Uses per Subcatchment (NLU).....   20
 Number of Groundwater Plot/prints in Runoff (NGW).....  500
 Number of Interface Locations for all Blocks (NIE).... 2000
 Number of Elements in the Transport Block (NET)....... 2000
 Number of Storage Junctions in Transport (NTSE).......  500
 Number of Transport interface input locations (NTHI).. 2000
 Number of Transport interface output locations (NTHO). 2000
 Number of Transport input locations on R lines (NTHR).   80
 Number of Transport printed output locations (NTOA)... 2000
 Number of Tabular Flow Splitters in Transport (NTSP).. 1000
 Number of Elements in the Extran Block (NEE)......... 4000
 Number of Pumps in Extran (NEP)...................... 1000
 Number of Orifices in Extran (NEO)....................  200
```

```
 Number of Tide Gates/Free Outfalls in Extran (NTG).... 1000
 Number of Extran Weirs (NEW)..........................  400
 Number of Extran Printout Locations (NPO).............  150
 Number of Tide Elements in Extran (NTE)...............   50
 Number of Natural Channels (NNC)...................... 1200
 Number of Storage Junctions in Extran (NVSE).......... 2000
 Number of Time History Data Points in Extran (NTVAL)..  500
 Number of Data Points for Variable Storage Elements
   in the Extran Block (NVST)..........................  200
 Number of Input Hydrographs in Extran (NEH)...........  500
 Number of Allowable Channel Connections to
   Junctions in the Extran Block (NCHN)................   15
 Number Rain Gages in Rain and Runoff (MAXRG)..........  200
 Number PRATE/VRATE Points for Extran Pump
   Input (MAXPRA)......................................   10
 Number of Variable Orifices in Extran (NVORF).........   50
 Number of Variable Orifice Data Points (NVOTIM).......   50
 Number of Allowable Precip. Values/yr in Rain (LIMRN). 5000
 Number of Storm Events for Rain Analysis (LSTORM).....20000
 Number of Plugs for Plug-flow in S/T (NPLUG)..........40000
 Number Conduits for Extran Results to ASCII
   File (MXFLOW).......................................  400


##################################################
# Entry made to the Runoff Block, last updated by #
# Oregon State University, and Camp, Dresser and  #
# McKee, Inc., July 2003.                         #
##################################################
# "And wherever water goes, amoebae go along for  #
#  the ride"                    Tom Robbins       #
##################################################


                % Capture Analysis

                EntradaBasin A


Snowmelt parameter - ISNOW.....................          0

Number of rain gages - NRGAG...................          0

Green-Ampt infiltration equation used - INFILM...        1
```

```
Quality is not simulated - KWALTY.....................          0
Read evaporation data on line(s) F1 (F2) - IVAP..                2
Hour of day at start of storm - NHR.....................         0
Minute of hour at start of storm - NMN..................         0
Time TZERO at start of storm (hours)....................     0.000
Use U.S. Customary units for most I/O - METRIC...                0
Runoff input print control...                                    0
Runoff graph plot control....                                    1
Runoff output print control..                                    0
Print headers every 50 lines - NOHEAD (0=yes, 1=no)              1
Print land use load percentages -LANDUPR (0=no, 1=yes)           0
Limit number of groundwater convergence messages to     50 (if simulated)
Month, day, year of start of storm is:              10/ 1/1968
Wet time step length (seconds).......                    900.
Dry time step length (seconds).......                  14400.
Wet/Dry time step length (seconds)...                    900.
Simulation length is......                        20081001.0 Yr/Mo/Dy
Percent of impervious area with zero detention depth     25.0

*********************************************************
*   Processed Precipitation will be read on NSCRAT(1)   *
*********************************************************

  ##############################
  #        Data Group F1       #
  # Evaporation Rate (in/month)#
  ##############################

 JAN.   FEB.   MAR.   APR.   MAY    JUN.   JUL.   AUG.   SEP.   OCT.   NOV.   DEC.
 ----   ----   ----   ----   ----   ----   ----   ----   ----   ----   ----   ----
```

0.93 1.34 2.23 3.06 4.09 4.68 5.21 4.65 3.42 2.42 1.26 0.93

1

****
* C H A N N E L A N D P I P E D A T A *
****

Input Sequen Number	NAMEG: Channel ID #	Drains to NGTO:	Channel Type	Width (ft)	Length (ft)	Invert Slope (ft/ft)	L Side Slope (ft/ft)	R Side Slope (ft/ft)	Intial Depth (ft)	Max Depth (ft)	Mann-ings "N"	Full Flow (cfs)	Infilt Rate (in/hr)
1	101	100	Dummy	0.0	0.0	0.0000	0.0000	0.0000	0.0	0.0	0.0000		
0.00E+00	0.00												
2	102	100	Dummy	0.0	0.0	0.0000	0.0000	0.0000	0.0	0.0	0.0000		
0.00E+00	0.00												

1

****
* S U B C A T C H M E N T D A T A *
****

NOTE. SEE LATER TABLE FOR OPTIONAL SUBCATCHMENT PARAMETERS

SUBCATCH-MENT NO.	CHANNEL OR INLET	WIDTH PRINT (FT)	AREA (AC)	PERCENT IMPERV.	SLOPE (FT/FT)	RESISTANCE FACTOR IMPERV.	RESISTANCE FACTOR PERV.	DEPRES. STORAGE(IN) IMPERV.	DEPRES. STORAGE(IN) PERV.	GREEN-AMPT INFIL PARAMS SUCTION (IN)	GREEN-AMPT INFIL PARAMS HYD.CON (IN/HR)	GAGE IMD	PRINT NO.	PRINT WB
1 A-AB	101	558.00	3.20	54.06	0.0500	0.012	0.250	0.020	0.060	8.00	0.280	0.320	1	0
2 A-C	101	15176.00	87.10	44.98	0.0500	0.012	0.250	0.020	0.060	8.00	0.150	0.290	1	0

TOTAL NUMBER OF SUBCATCHMENTS... 2
TOTAL TRIBUTARY AREA (ACRES).... 90.30
IMPERVIOUS AREA (ACRES)..... 40.91
PERVIOUS AREA (ACRES)..... 49.39
TOTAL WIDTH (FEET)..... 15734.00
PERCENT IMPERVIOUSNESS..... 45.30

1

****

```
*    Arrangement of Subcatchments and Channel/Pipes     *
*********************************************************
* See second subcatchment output table for connectivity *
* of subcatchment to subcatchment flows.                *
*********************************************************


   Channel
   or Pipe
101            No Tributary Channel/Pipes
               Tributary Subareas........ A-AB       A-C
102            No Tributary Channel/Pipes
               No Tributary Subareas.....


    INLET
100            Tributary Channel/Pipes... 101        102
               No Tributary Subareas.....

*********************************************************
* Hydrographs will be stored for the following   1 INLETS *
*********************************************************
100


************************************************
*  Quality simulation not included in this run *
************************************************



    ************************
    *    DATA GROUP M1     *
    ************************


TOTAL NUMBER OF PRINTED GUTTERS/INLETS...NPRNT..        1
NUMBER OF TIME STEPS BETWEEN PRINTINGS..INTERV..        0
STARTING AND STOPPING PRINTOUT DATES.............       0        0


    ************************
    *    DATA GROUP M3     *
    ************************

CHANNEL/INLET PRINT DATA GROUPS......100
```

```
    **********************
    *    DATA GROUP M8     *
    **********************

STORM EVENT TRACKING.....
    Storm event data file =    Sm0.out


End of preliminary input data and data echo.

*************************************************
*  Precipitation Interface File Summary         *
*  Number of precipitation station....      1   *
*************************************************

Location Station Number
-------- --------------
       1.             0

***********************************************
*      End of time step DO-loop in Runoff     *
***********************************************

Final Date (Mo/Day/Year)   =                10/ 1/2008
Total number of time steps =                    115989
Final Julian Date  =                           2008275
Final time of day  =                            86398. seconds.
Final time of day  =                             24.00   hours.
Final running time =                         350664.0000   hours.
Final running time =                          14611.0000    days.

***********************************************
*     Extrapolation Summary for Watersheds    *
* # Steps ==> Total Number of Extrapolated Steps *
* # Calls ==> Total Number of OVERLND Calls    *
***********************************************

  Subcatch   # Steps   # Calls  Subcatch   # Steps   # Calls  Subcatch   # Steps   # Calls
  --------   -------   -------  --------   -------   -------  --------   -------   -------
A-AB          667025     57655A-C           667666     58062

***********************************************
*     Extrapolation Summary for Channel/Pipes *
* # Steps ==> Total Number of Extrapolated Steps *
```

```
* # Calls ==> Total Number of GUTNR Calls        *
************************************************

 Chan/Pipe   # Steps   # Calls Chan/Pipe   # Steps   # Calls Chan/Pipe   # Steps   # Calls
  --------   -------   ------- --------   -------   ------- --------   -------   -------
101                0         0102               0         0
1
 ********************************************
 *       Continuity Check for Surface Water   *
 ********************************************

                                                                 Inches over
                                                  cubic feet     Total Basin
 Total Precipitation (Rain plus Snow)             2.402890E+08     733.060
 Total Irrigation                                 0.000000E+00       0.000
 Total Infiltration                               1.142070E+08     348.416
 Total Evaporation                                6.767983E+06      20.647
 Surface Runoff from Watersheds                   1.203443E+08     367.140
 Total Water remaining in Surface Storage         0.000000E+00       0.000
 Infiltration over the Pervious Area...           1.142070E+08     636.979
                    --------
 Infiltration + Evaporation +
 Surface Runoff + Snow removal +
 Water remaining in Surface Storage +
 Water remaining in Snow Cover.....               2.413193E+08     736.203
 Total Precipitation + Initial Storage +
 Total Irrigation.....................            2.402890E+08     733.060


 The error in continuity is calculated as
 ****************************************
 * Precipitation + Initial Snow Cover  *
 *      - Infiltration -               *
 *Evaporation - Snow removal -         *
 *Surface Runoff from Watersheds -     *
 *Water in Surface Storage -           *
 *Water remaining in Snow Cover        *
 *-------------------------------------*
 * Precipitation + Initial Snow Cover  *
 ****************************************
 Error.................................      -0.429 Percent


 ********************************************
 *       Continuity Check for Channel/Pipes   *
 ********************************************

                                                                 Inches over
                                                  cubic feet     Total Basin
 Initial Channel/Pipe Storage.............        0.000000E+00       0.000
```

Final Channel/Pipe Storage.....	0.000000E+00	0.000
Surface Runoff from Watersheds.....	1.203443E+08	367.140
Groundwater Subsurface Inflow.....	0.000000E+00	0.000
Evaporation Loss from Channels.....	0.000000E+00	0.000
Infiltration Loss from Channels.....	0.000000E+00	0.000
Channel/Pipe/Inlet Outflow.....	0.120344E+09	367.140
Initial Storage + Inflow.....	1.203443E+08	367.140
Final Storage + Outflow.....	1.203443E+08	367.140

```
*******************************************
* Final Storage + Outflow + Evaporation  - *
* Watershed Runoff - Groundwater Inflow  - *
*     Initial Channel/Pipe Storage         *
*     ---------------------------------    *
*  Final Storage + Outflow  + Evaporation  *
*******************************************
```

Error..... 0.000 Percent

1

SUMMARY STATISTICS FOR SUBCATCHMENTS

SUBCATCHMENT	AREA				PERVIOUS AREA			IMPERVIOUS AREA		TOTAL	
	GUTTER			TOTAL SIMULATED	TOTAL RUNOFF	TOTAL	PEAK RUNOFF	PEAK RUNOFF	PEAK RUNOFF	PEAK RUNOFF	PEAK RUNOFF
UNIT SUBCATCHMENT NO.	OR INLET NO.	AREA (AC)	PERCENT IMPER.	RAINFALL (IN)	DEPTH (IN)	LOSSES (IN)	RATE (CFS)	DEPTH (IN)	RATE (CFS)	DEPTH (IN)	RATE (CFS)
A-AB 101		3.20	54.1	733.64	31.035	702.649	1.698	707.391	2.491	396.673	4.189
1.309											
A-C 101		87.10	45.0	733.64	87.083	646.876	61.588	707.288	56.412	366.051	118.000
1.355											

*** NOTE *** IMPERVIOUS AREA STATISTICS AGGREGATE IMPERVIOUS AREAS WITH AND WITHOUT DEPRESSION STORAGE

SUMMARY STATISTICS FOR CHANNEL/PIPES

MAXIMUM SURCHARGE CHANNEL VOLUME NUMBER (AC-FT)	RATIO OF FULL FLOW MAX. TO FULL FLOW (CFS)	RATIO OF FULL VELOCITY TO FULL DEPTH (FPS)	FULL DEPTH (FT)	MAXIMUM COMPUTED INFLOW (CFS)	MAXIMUM COMPUTED OUTFLOW (CFS)	MAXIMUM COMPUTED DEPTH (FT)	MAXIMUM COMPUTED VELOCITY (FPS)	TIME OF OCCURRENCE DAY	TIME OF OCCURRENCE HR.	LENGTH OF SURCHARGE (HOUR)
102				0.00				1/ 0/1900	0.00	
101				122.19				2/ 7/1998	20.00	
100				122.19				2/ 7/1998	20.00	

TOTAL NUMBER OF CHANNELS/PIPES = 3

*** NOTE *** THE MAXIMUM FLOWS AND DEPTHS ARE CALCULATED AT THE END OF THE TIME INTERVAL
1

****
* Summary of quantity results (flow in cfs) *
****

% Capture Analysis
EntradaBasin A

Date Mo/Da/Year	Time Hr:Min	Chan/Inlt 100 Flow Cfs
Flow wt'd means.....		0.0953
Flow wt'd std-devs...		1.2004
Maximum value.....		122.1891
Minimum value.....		0.0000
Total loads.....		1.2034E+08 Cubic-ft

===> Runoff simulation ended normally.

===> SWMM 4.4H simulation ended normally.
Always check output file for possible warning messages.

===> Your input file was named : EntradaBasinA_RN0.in
===> Your output file was named: EntradaBasinA_RN0.out

```
************************************************************
*       SWMM 4.4H   Simulation Date and Time Summary       *
************************************************************
* Starting Date... August     24, 2010                      *
*          Time...          10:44:56.346                     *
*   Ending Date... August     24, 2010                      *
*          Time...          10:45: 4.600                     *
*  Elapsed Time...               0.138 minutes.             *
*  Elapsed Time...               8.254 seconds.             *
************************************************************
```

Extended Detention Basin A

SWMM STORAGE Module Output File

Interpretation of Stage Storage Discharge Table from Storage Treatment Output File
Basin A

DEPTH, FT	*SURFACE AREA, SQ-FT*	*STORAGE, CU-FT*	*OUTFLOW, CFS*	*RESIDUAL FLOW, CFS*	*Explanation*
0.00E+00	3.39E+04	0.00E+00	0.00E+00	0.00E+00	Depth 0 to 0.25 ft = Pore storage (not part of NRSSMP required volume)
2.50E-01	3.39E+04	8.48E+03	0.00E+00	0.00E+00	
5.50E-01	3.46E+04	1.88E+04	4.20E-01	0.00E+00	Depth 0.25 to 6.25 feet = active surface storage, part of NRSSMP Required Volume (Basin Depth = 6 feet on plans)
8.50E-01	3.53E+04	2.93E+04	6.00E-01	0.00E+00	
1.45E+00	3.68E+04	5.09E+04	8.40E-01	0.00E+00	
2.05E+00	3.83E+04	7.34E+04	1.03E+00	0.00E+00	
2.65E+00	3.98E+04	9.68E+04	1.19E+00	0.00E+00	
3.53E+00	4.20E+04	1.33E+05	1.44E+00	0.00E+00	
4.15E+00	4.36E+04	1.59E+05	1.61E+00	0.00E+00	
4.45E+00	4.44E+04	1.73E+05	1.68E+00	0.00E+00	
5.05E+00	4.60E+04	2.00E+05	1.81E+00	0.00E+00	
5.65E+00	4.76E+04	2.28E+05	1.94E+00	0.00E+00	
6.25E+00	4.93E+04	2.57E+05	3.60E+00	0.00E+00	

NRSSMP Design Volume = [(Volume @ 6.25 ft) - (Volume @ 0.25 ft)] × 1.05

NRSSMP Design Volume = (2.57E+5 - 8.48E+3)× 1.05 = 2.48E+5 cu-ft × 1.05 = 5.7 ac-ft × 1.05 = 6.0 ac-ft

Modeled surface area at mid depth of surface storage (DEPTH = 3.25 ft) = 41,274 sq-ft (by linear interpolation from table)

1

```
************************************************
*    U.S. Environmental Protection Agency      *
*    Storm Water Management Model  (SWMM)      *
*                Version 4.4H                  *
*                                              *
*               CDM/OSU Beta                   *
*         Release Date - July 1, 2003          *
*   Camp Dresser & McKee and Oregon St. Univ.  *
*         Chuck Moore and Wayne Huber          *
*   Compiled using Compaq Visual Fortran v.6.6 *
************************************************

                Developed by

************************************************
*             Metcalf & Eddy, Inc.             *
*           University of Florida              *
*       Water Resources Engineers, Inc.        *
*      (Now Camp Dresser & McKee, Inc.)        *
*               September 1970                 *
************************************************

         Version 4.3 (outdated) is
        Distributed and Maintained by

************************************************
*      U.S. Environmental Protection Agency    *
* Center for Exposure Assessment Modeling (CEAM)*
*    Athens Environmental Research Laboratory  *
*            960 College Station Road          *
*            Athens, GA    30605-2720          *
************************************************

************************************************
*     This is an updated release of SWMM4.4h,  *
*     no longer formally supported by the EPA. *
*     If problems occur executing this model   *
*     contact Wayne Huber at Oregon State. U., *
*     wayne.huber@orst.edu,                    *
*     or Robert Dickinson at Camp Dresser &    *
*     McKee, DickinsonRE@CDM.COM.              *
*     The EPA-supported version is SWMM5 at:   *
*   http://www.epa.gov/ednnrmrl/swmm/index.htm *
************************************************
```

```
          ************************************************
          *  This is an implementation of EPA SWMM 4.4H   *
          *  "Nature is full of infinite causes which     *
          *   have never occurred in experience" da Vinci *
          ************************************************


##########################################
#        File names by SWMM Block        #
#         JIN  -> Input to a Block       #
#        JOUT  -> Output from a Block    #
##########################################

   JIN for Block #     1 File #    8  RN0.int
  JOUT for Block #     1 File #    9  JOT.UF

##########################################
# Scratch file names for this simulation. #
##########################################

NSCRAT #     1 File #    1  SCRT1.UF
NSCRAT #     2 File #    2  SCRT2.UF
NSCRAT #     3 File #    3  SCRT3.UF
NSCRAT #     4 File #   10  SCRT4.UF
NSCRAT #     5 File #   11  SCRT5.UF
NSCRAT #     6 File #   12  SCRT6.UF
NSCRAT #     7 File #   13  SCRT7.UF

************************************************
*    Parameter Values on the Tapes Common Block   *
************************************************

 Number of Subcatchments in the Runoff Block (NW)..... 2000
 Number of Channel/Pipes in the Runoff Block (NG)..... 2000
 Number of Connections to Runoff Channels/Inlets (NCP).    6
 Number of Water Quality Constituents (MQUAL).........   20
 Number of Runoff Land Uses per Subcatchment (NLU).....   20
 Number of Groundwater Plot/prints in Runoff (NGW).....  500
 Number of Interface Locations for all Blocks (NIE).... 2000
 Number of Elements in the Transport Block (NET)....... 2000
 Number of Storage Junctions in Transport (NTSE).......  500
 Number of Transport interface input locations (NTHI).. 2000
 Number of Transport interface output locations (NTHO). 2000
```

```
Number of Transport input locations on R lines (NTHR).   80
Number of Transport printed output locations (NTOA)... 2000
Number of Tabular Flow Splitters in Transport (NTSP).. 1000
Number of Elements in the Extran Block (NEE)......... 4000
Number of Pumps in Extran (NEP)...................... 1000
Number of Orifices in Extran (NEO)....................  200
Number of Tide Gates/Free Outfalls in Extran (NTG).... 1000
Number of Extran Weirs (NEW)..........................  400
Number of Extran Printout Locations (NPO).............  150
Number of Tide Elements in Extran (NTE)...............   50
Number of Natural Channels (NNC)...................... 1200
Number of Storage Junctions in Extran (NVSE)......... 2000
Number of Time History Data Points in Extran (NTVAL)..  500
Number of Data Points for Variable Storage Elements
  in the Extran Block (NVST)..........................  200
Number of Input Hydrographs in Extran (NEH)...........  500
Number of Allowable Channel Connections to
  Junctions in the Extran Block (NCHN)................   15
Number Rain Gages in Rain and Runoff (MAXRG).........  200
Number PRATE/VRATE Points for Extran Pump
  Input (MAXPRA)......................................   10
Number of Variable Orifices in Extran (NVORF).........   50
Number of Variable Orifice Data Points (NVOTIM).......   50
Number of Allowable Precip. Values/yr in Rain (LIMRN). 5000
Number of Storm Events for Rain Analysis (LSTORM).....20000
Number of Plugs for Plug-flow in S/T (NPLUG).........40000
Number Conduits for Extran Results to ASCII
  File (MXFLOW).......................................  400


##########################################
# Entry made to Storage/Treatment Block.  #
# Storage/Treatment model written by the  #
# University of Florida, June 1981.       #
# Last updated July 1995 at Oregon St. U. #
##########################################

VALUE OF NOTAPE           :         0

INPUT DATA SOURCE         :  EXTERNAL FILE

EXTERNAL ELEMENT NUMBER   :  100
```

```
NUMBER OF TIME STEPS      :   1402560

TIME STEP SIZE,SECONDS    :     900.0

NUMBER OF S/T UNITS       :         1

COST MODEL USED?          :        NO

STARTING DATE             :    10/ 1/1968

STARTING JULIAN DATE      :   1968275

STARTING TIME             :    0:  0:  0

SIMULATION DURATION, HOURS:350640.000

ENDING JULIAN DATE        :   2008275

ENDING TIME OF DAY        :     0.000 HOURS

PRINT TOTAL SIMULATION SUMMARY ONLY (ISUM = 0)

IDET = 0. NO DETAILED (TIME STEP) PRINT-OUTS.

NO OUTPUT FOR AVERAGE DETENTION TIME RESULTS


##########################################
# Header information from interface file: #
##########################################

Title from first computational block:
% Capture Analysis
EntradaBasin A

Title from immediately preceding computational block:
% Capture Analysis
EntradaBasin A

Name of preceding block:.............Runoff Block
Initial Julian date (IDATEZ)..................... 1968275
Initial time of day in seconds (TZERO).....          0.0
No. transfered input locations.................          1
```

No. transfered pollutants..... 0
Size of total catchment area (acres)..... 90.30
ID numbers (JCE=0) or alphanumeric (JCE=1)..... 1

##
Element numbers of interface inlet locations:
##
100

Conversion factor to cfs for flow units
on interface file. Multiply by: 1.00000

INPUT/OUTPUT UNITS : U.S. CUSTOMARY

TRIBUTARY AREA, ACRES : 90.3

NUMBER OF POLLUTANTS : 0

MONTHLY EVAPORATION RATES, IN/DAY

JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
0.030	0.048	0.072	0.102	0.132	0.156	0.168	0.150	0.114	0.078	0.042	0.030

BASIN INFILTRATION RATE FOR UNIT 1 IN (IN/HR) = 0.2500
1

UNIT CHARACTERISTICS

****
UNIT # 1 CHARACTERISTICS
****

GENERAL UNIT DESCRIPTION :

NAME : MV Basin A
IDENT : 1
TYPE OF UNIT : DETENTION
MAX. ALLOWABLE INFLOW, CFS: 0.1000E+05

FLOW DIRECTIONS:
BYPASS TO UNIT # 100
TREATED OUTFLOW TO UNIT # 100
RESIDUALS TO UNIT # 100

===> NOTE: UNIT 100 IS THE NEXT BLOCK AND UNIT 200 IS ULTIMATE DISPOSAL.

DETENTION UNIT CHARACTERISTICS:

RESIDUALS DRAW-OFF SCHEME: NEVER DRAWN OFF

DEPTH-AREA-STORAGE-FLOW RELATIONSHIPS :

DEPTH, FT	SURFACE AREA, SQ FT	STORAGE, CU FT	TREATED OUTFLOW, CFS	RESIDUAL FLOW, CFS
0.0000E+00	3.3918E+04	0.0000E+00	0.0000E+00	0.0000E+00
2.5000E-01	3.3918E+04	8.4795E+03	0.0000E+00	0.0000E+00
5.5000E-01	3.4624E+04	1.8761E+04	4.2000E-01	0.0000E+00
8.5000E-01	3.5337E+04	2.9255E+04	6.0000E-01	0.0000E+00
1.4500E+00	3.6782E+04	5.0891E+04	8.4000E-01	0.0000E+00
2.0500E+00	3.8254E+04	7.3401E+04	1.0300E+00	0.0000E+00
2.6500E+00	3.9751E+04	9.6803E+04	1.1900E+00	0.0000E+00
3.5300E+00	4.1985E+04	1.3277E+05	1.4400E+00	0.0000E+00
4.1500E+00	4.3607E+04	1.5930E+05	1.6100E+00	0.0000E+00
4.4500E+00	4.4398E+04	1.7250E+05	1.6800E+00	0.0000E+00
5.0500E+00	4.5999E+04	1.9962E+05	1.8100E+00	0.0000E+00
5.6500E+00	4.7625E+04	2.2771E+05	1.9400E+00	0.0000E+00
6.2500E+00	4.9278E+04	2.5678E+05	3.6000E+00	0.0000E+00

INITIAL CONDITIONS:

VOLUME, CU FT : 0.0000E+00

****
* NOTE: IF THERE IS ONLY ONE UNIT THE PLANT *
* PERFORMANCE SUMMARY WILL NOT BE PRINTED. *
****

Note !! UNIT 1 HAS EXCEEDED THE MAXIMUM STORAGE VOLUME ON 1/19/1969 AT 17: 0

The excess has been bypassed and is included in BYPASS volume. Further messages will be suppressed. But summaries of number of all volume-bypass time steps and number of days with volume-bypasses will be printed.

1

```
**************************************
*    ENTIRE SIMULATION UNIT SUMMARIES *
**************************************
 OCT  1, 1968,  0 0: 0 TO  OCT  1, 2008,  0 0: 0.
```

UNIT	PARAMETER	VOLUME CU FT
1	INFLOW,TOTAL	1.2022E+08
	INFLOW,NET	9.6117E+07
	BYPASS	2.4106E+07
	TREATED OUTFLOW	7.2285E+07
	RESIDUAL FLOW	0.0000E+00
	REMAINING	0.0000E+00
	EVAPORATION	2.2053E+05
	INFILTRATION	2.3674E+07
	NO. VOL. BYPASSES	2202
	NO. VOL. BYPASS DAYS	130
	INITIAL COND.	0.0000E+00
	PERCENT ERROR	-0.0506

```
===> Storage/Treatment simulation ended normally.

===> SWMM 4.4H   simulation ended normally.
     Always check output file for possible warning messages.

===> Your input file was named : EntradaBasinA_St0.in
===> Your output file was named: EntradaBasinA_St0.out

*****************************************************
*       SWMM 4.4H   Simulation Date and Time Summary  *
*****************************************************
* Starting Date... August     24, 2010                *
*          Time...          10:45:41.884               *
*   Ending Date... August     24, 2010                *
*          Time...          10:46:44.665               *
*  Elapsed Time...               1.046 minutes.       *
*  Elapsed Time...              62.783 seconds.       *
```

****

Extended Detention Basin B

SWMM RUNOFF Module Output File

1

```
**************************************************
*    U.S. Environmental Protection Agency        *
*    Storm Water Management Model  (SWMM)        *
*                Version 4.4H                    *
*                                                *
*               CDM/OSU Beta                     *
*         Release Date - July 1, 2003            *
*   Camp Dresser & McKee and Oregon St. Univ.    *
*          Chuck Moore and Wayne Huber           *
*   Compiled using Compaq Visual Fortran v.6.6   *
**************************************************

                Developed by

**************************************************
*             Metcalf & Eddy, Inc.               *
*            University of Florida               *
*       Water Resources Engineers, Inc.          *
*      (Now Camp Dresser & McKee, Inc.)          *
*               September 1970                   *
**************************************************

        Version 4.3 (outdated) is
       Distributed and Maintained by

**************************************************
*      U.S. Environmental Protection Agency      *
* Center for Exposure Assessment Modeling (CEAM)*
*    Athens Environmental Research Laboratory    *
*            960 College Station Road            *
*            Athens, GA    30605-2720            *
**************************************************

**************************************************
*     This is an updated release of SWMM4.4h,    *
*     no longer formally supported by the EPA.   *
*     If problems occur executing this model     *
*     contact Wayne Huber at Oregon State. U.,   *
*     wayne.huber@orst.edu,                      *
*     or Robert Dickinson at Camp Dresser &      *
*     McKee, DickinsonRE@CDM.COM.                *
*     The EPA-supported version is SWMM5 at:     *
*   http://www.epa.gov/ednnrmrl/swmm/index.htm   *
**************************************************

**************************************************
*  This is an implementation of EPA SWMM 4.4H    *
*  "Nature is full of infinite causes which      *
```

```
*   have never occurred in experience" da Vinci *
*************************************************


########################################
#        File names by SWMM Block      #
#         JIN  -> Input to a Block     #
#        JOUT  -> Output from a Block  #
########################################

   JIN for Block #     1 File #    0  JIN.UF
  JOUT for Block #     1 File #    9  RN0.int

########################################
# Scratch file names for this simulation. #
########################################

NSCRAT #     1 File #    1  NEWHALL_PATCHED_20091119.INT
NSCRAT #     2 File #    2  SCRT2.UF
NSCRAT #     3 File #    3  SCRT3.UF
NSCRAT #     4 File #   10  SCRT4.UF
NSCRAT #     5 File #   11  SCRT5.UF
NSCRAT #     6 File #   12  SCRT6.UF
NSCRAT #     7 File #   13  SCRT7.UF
NSCRAT #     8 File #   14  SCRT8.UF
NSCRAT #     9 File #   15  SCRT9.UF

************************************************
*    Parameter Values on the Tapes Common Block   *
************************************************

 Number of Subcatchments in the Runoff Block (NW)..... 2000
 Number of Channel/Pipes in the Runoff Block (NG)..... 2000
 Number of Connections to Runoff Channels/Inlets (NCP).    6
 Number of Water Quality Constituents (MQUAL).........   20
 Number of Runoff Land Uses per Subcatchment (NLU).....   20
 Number of Groundwater Plot/prints in Runoff (NGW).....  500
 Number of Interface Locations for all Blocks (NIE).... 2000
 Number of Elements in the Transport Block (NET)....... 2000
 Number of Storage Junctions in Transport (NTSE).......  500
 Number of Transport interface input locations (NTHI).. 2000
 Number of Transport interface output locations (NTHO). 2000
 Number of Transport input locations on R lines (NTHR).   80
 Number of Transport printed output locations (NTOA)... 2000
 Number of Tabular Flow Splitters in Transport (NTSP).. 1000
 Number of Elements in the Extran Block (NEE)......... 4000
 Number of Pumps in Extran (NEP)...................... 1000
 Number of Orifices in Extran (NEO)....................  200
```

```
 Number of Tide Gates/Free Outfalls in Extran (NTG).... 1000
 Number of Extran Weirs (NEW).........................  400
 Number of Extran Printout Locations (NPO).............  150
 Number of Tide Elements in Extran (NTE)...............   50
 Number of Natural Channels (NNC)...................... 1200
 Number of Storage Junctions in Extran (NVSE).......... 2000
 Number of Time History Data Points in Extran (NTVAL)..  500
 Number of Data Points for Variable Storage Elements
   in the Extran Block (NVST)..........................  200
 Number of Input Hydrographs in Extran (NEH)...........  500
 Number of Allowable Channel Connections to
   Junctions in the Extran Block (NCHN)................   15
 Number Rain Gages in Rain and Runoff (MAXRG)..........  200
 Number PRATE/VRATE Points for Extran Pump
   Input (MAXPRA)......................................   10
 Number of Variable Orifices in Extran (NVORF).........   50
 Number of Variable Orifice Data Points (NVOTIM).......   50
 Number of Allowable Precip. Values/yr in Rain (LIMRN). 5000
 Number of Storm Events for Rain Analysis (LSTORM).....20000
 Number of Plugs for Plug-flow in S/T (NPLUG).........40000
 Number Conduits for Extran Results to ASCII
   File (MXFLOW).......................................  400


##################################################
# Entry made to the Runoff Block, last updated by #
# Oregon State University, and Camp, Dresser and  #
# McKee, Inc., July 2003.                         #
##################################################
# "And wherever water goes, amoebae go along for  #
#  the ride"                    Tom Robbins       #
##################################################


                % Capture Analysis

                EntradaBasin B


Snowmelt parameter - ISNOW.....................          0

Number of rain gages - NRGAG...................          0

Green-Ampt infiltration equation used - INFILM...        1
```

Quality is not simulated - KWALTY.....	0
Read evaporation data on line(s) F1 (F2) - IVAP..	2
Hour of day at start of storm - NHR.....	0
Minute of hour at start of storm - NMN.....	0
Time TZERO at start of storm (hours).....	0.000
Use U.S. Customary units for most I/O - METRIC...	0
Runoff input print control...	0
Runoff graph plot control....	1
Runoff output print control..	0
Print headers every 50 lines - NOHEAD (0=yes, 1=no)	1
Print land use load percentages -LANDUPR (0=no, 1=yes)	0
Limit number of groundwater convergence messages to	50 (if simulated)
Month, day, year of start of storm is:	10/ 1/1968
Wet time step length (seconds).....	900.
Dry time step length (seconds).....	14400.
Wet/Dry time step length (seconds)...	900.
Simulation length is.....	20081001.0 Yr/Mo/Dy
Percent of impervious area with zero detention depth	25.0

****
* Processed Precipitation will be read on NSCRAT(1) *
****

##############################
Data Group F1
Evaporation Rate (in/month)#
##############################

JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.

0.93 1.34 2.23 3.06 4.09 4.68 5.21 4.65 3.42 2.42 1.26 0.93

1

****
* C H A N N E L A N D P I P E D A T A *
****

Input Sequen Number	NAMEG: Channel ID #	Drains to NGTO:	Channel Type	Width (ft)	Length (ft)	Invert Slope (ft/ft)	L Side Slope (ft/ft)	R Side Slope (ft/ft)	Intial Depth (ft)	Max Depth (ft)	Mann- ings "N"	Full Flow (cfs)	Infilt Rate (in/hr)
1	201	200	Dummy	0.0	0.0	0.0000	0.0000	0.0000	0.0	0.0	0.0000	0.00E+00	0.00
2	202	200	Dummy	0.0	0.0	0.0000	0.0000	0.0000	0.0	0.0	0.0000	0.00E+00	0.00

1

****
* S U B C A T C H M E N T D A T A *
****

NOTE. SEE LATER TABLE FOR OPTIONAL SUBCATCHMENT PARAMETERS

SUBCATCH- MENT NO.	CHANNEL OR INLET	WIDTH PRINT (FT)	AREA (AC)	PERCENT IMPERV.	SLOPE (FT/FT)	RESISTANCE FACTOR IMPERV.	RESISTANCE FACTOR PERV.	DEPRES. STORAGE(IN) IMPERV.	DEPRES. STORAGE(IN) PERV.	GREEN-AMPT INFIL PARAMS SUCTION (IN)	GREEN-AMPT INFIL PARAMS HYD.CON (IN/HR)	GAGE IMD	PRINT NO.	WB
1 B-AB	201	159.00	0.91	47.42	0.0500	0.012	0.250	0.020	0.060	8.00	0.280	0.320	1	0
2 B-C	201	2281.00	13.09	69.99	0.0500	0.012	0.250	0.020	0.060	8.00	0.150	0.290	1	0

TOTAL NUMBER OF SUBCATCHMENTS... 2
TOTAL TRIBUTARY AREA (ACRES).... 14.00
IMPERVIOUS AREA (ACRES)..... 9.59
PERVIOUS AREA (ACRES)..... 4.41
TOTAL WIDTH (FEET)..... 2440.00
PERCENT IMPERVIOUSNESS..... 68.52

1

****

```
*    Arrangement of Subcatchments and Channel/Pipes     *
*********************************************************
* See second subcatchment output table for connectivity *
* of subcatchment to subcatchment flows.                *
*********************************************************


   Channel
   or Pipe
201            No Tributary Channel/Pipes
               Tributary Subareas........ B-AB       B-C
202            No Tributary Channel/Pipes
               No Tributary Subareas.....


    INLET
200            Tributary Channel/Pipes... 201        202
               No Tributary Subareas.....


*********************************************************
* Hydrographs will be stored for the following   1 INLETS *
*********************************************************
200


***********************************************
*  Quality simulation not included in this run *
***********************************************


    ************************
    *    DATA GROUP M1     *
    ************************


TOTAL NUMBER OF PRINTED GUTTERS/INLETS...NPRNT..        1
NUMBER OF TIME STEPS BETWEEN PRINTINGS..INTERV..        0
STARTING AND STOPPING PRINTOUT DATES.....               0        0


    ************************
    *    DATA GROUP M3     *
    ************************

CHANNEL/INLET PRINT DATA GROUPS......200
```

```
    **********************
    *    DATA GROUP M8     *
    **********************

STORM EVENT TRACKING.....
    Storm event data file =    Sm0.out


End of preliminary input data and data echo.


*************************************************
*  Precipitation Interface File Summary         *
*  Number of precipitation station....      1   *
*************************************************

Location Station Number
-------- --------------
       1.             0


***********************************************
*      End of time step DO-loop in Runoff     *
***********************************************

Final Date (Mo/Day/Year)   =                  10/ 2/2008
Total number of time steps =                      117046
Final Julian Date  =                             2008276
Final time of day  =                                  0. seconds.
Final time of day  =                                0.00   hours.
Final running time =                           350664.0000   hours.
Final running time =                            14611.0000    days.

***********************************************
*     Extrapolation Summary for Watersheds    *
* # Steps ==> Total Number of Extrapolated Steps *
* # Calls ==> Total Number of OVERLND Calls    *
***********************************************

  Subcatch   # Steps   # Calls  Subcatch   # Steps   # Calls  Subcatch   # Steps   # Calls
  --------   -------   -------  --------   -------   -------  --------   -------   -------
B-AB          672625     56147B-C           694356     62032

***********************************************
*     Extrapolation Summary for Channel/Pipes *
* # Steps ==> Total Number of Extrapolated Steps *
```

```
* # Calls ==> Total Number of GUTNR Calls          *
*************************************************
```

Chan/Pipe	# Steps	# Calls	Chan/Pipe	# Steps	# Calls	Chan/Pipe	# Steps	# Calls
201	0	0202		0	0			

1

```
*********************************************
*       Continuity Check for Surface Water  *
*********************************************
```

	cubic feet	Inches over Total Basin
Total Precipitation (Rain plus Snow)	3.723378E+07	732.660
Total Irrigation	0.000000E+00	0.000
Total Infiltration	1.021089E+07	200.923
Total Evaporation	1.306903E+06	25.716
Surface Runoff from Watersheds	2.596444E+07	510.910
Total Water remaining in Surface Storage	0.000000E+00	0.000
Infiltration over the Pervious Area...	1.021089E+07	638.315
Infiltration + Evaporation + Surface Runoff + Snow removal + Water remaining in Surface Storage + Water remaining in Snow Cover.....	3.748224E+07	737.549
Total Precipitation + Initial Storage + Total Irrigation.....	3.723378E+07	732.660

The error in continuity is calculated as

```
**************************************
* Precipitation + Initial Snow Cover  *
*      - Infiltration -               *
*Evaporation - Snow removal -         *
*Surface Runoff from Watersheds -     *
*Water in Surface Storage -           *
*Water remaining in Snow Cover        *
*-------------------------------------*
* Precipitation + Initial Snow Cover  *
**************************************
```

Error..... -0.667 Percent

```
*********************************************
*       Continuity Check for Channel/Pipes  *
*********************************************
```

	cubic feet	Inches over Total Basin
Initial Channel/Pipe Storage.....	0.000000E+00	0.000

Final Channel/Pipe Storage.....	0.000000E+00	0.000
Surface Runoff from Watersheds.....	2.596444E+07	510.910
Groundwater Subsurface Inflow.....	0.000000E+00	0.000
Evaporation Loss from Channels.....	0.000000E+00	0.000
Infiltration Loss from Channels.....	0.000000E+00	0.000
Channel/Pipe/Inlet Outflow.....	0.259644E+08	510.910
Initial Storage + Inflow.....	2.596444E+07	510.910
Final Storage + Outflow.....	2.596444E+07	510.910

```
*******************************************
* Final Storage + Outflow + Evaporation  - *
* Watershed Runoff - Groundwater Inflow  - *
*     Initial Channel/Pipe Storage         *
*     ---------------------------------    *
*  Final Storage + Outflow  + Evaporation  *
*******************************************
```

Error..... 0.000 Percent

1

SUMMARY STATISTICS FOR SUBCATCHMENTS

SUBCATCHMENT	AREA				PERVIOUS AREA			IMPERVIOUS AREA		TOTAL	
	GUTTER			TOTAL SIMULATED	TOTAL RUNOFF	TOTAL	PEAK RUNOFF	PEAK RUNOFF	PEAK RUNOFF	PEAK RUNOFF	PEAK RUNOFF
SUBCATCHMENT NO.	OR INLET NO.	AREA (AC)	PERCENT IMPER.	RAINFALL (IN)	DEPTH (IN)	LOSSES (IN)	RATE (CFS)	DEPTH (IN)	RATE (CFS)	DEPTH (IN)	RATE (CFS)
B-AB 201		0.91	47.4	733.64	30.619	702.610	0.552	706.987	0.621	351.352	
1.173 1.289											
B-C 201		13.09	70.0	733.64	90.583	643.396	5.061	706.979	13.192	521.999	
18.253 1.394											

*** NOTE *** IMPERVIOUS AREA STATISTICS AGGREGATE IMPERVIOUS AREAS WITH AND WITHOUT DEPRESSION STORAGE

SUMMARY STATISTICS FOR CHANNEL/PIPES

MAXIMUM CHANNEL VOLUME NUMBER	RATIO OF FULL SURCHARGE MAX. TO FULL FLOW (AC-FT)	RATIO OF FULL MAX. DEPTH TO FULL DEPTH	FULL DEPTH (FT)	MAXIMUM COMPUTED INFLOW (CFS)	MAXIMUM COMPUTED OUTFLOW (CFS)	MAXIMUM COMPUTED DEPTH (FT)	MAXIMUM COMPUTED VELOCITY (FPS)	TIME OF OCCURRENCE DAY	TIME OF OCCURRENCE HR.	LENGTH OF SURCHARGE (HOUR)
202				0.00				1/	0/1900	0.00
201				19.43				2/	7/1998	20.00
200				19.43				2/	7/1998	20.00

TOTAL NUMBER OF CHANNELS/PIPES = 3

*** NOTE *** THE MAXIMUM FLOWS AND DEPTHS ARE CALCULATED AT THE END OF THE TIME INTERVAL
1

****
* Summary of quantity results (flow in cfs) *
****

% Capture Analysis
EntradaBasin B

Date Mo/Da/Year	Time Hr:Min	Chan/Inlt 200 Flow cfs
Flow wt'd means.....		0.0206
Flow wt'd std-devs...		0.2353
Maximum value.....		19.4264
Minimum value.....		0.0000
Total loads.....		2.5965E+07 Cubic-ft

===> Runoff simulation ended normally.

===> SWMM 4.4H simulation ended normally.
Always check output file for possible warning messages.

===> Your input file was named : EntradaBasinB_RN0.in
===> Your output file was named: EntradaBasinB_RN0.out

```
************************************************************
*       SWMM 4.4H   Simulation Date and Time Summary       *
************************************************************
* Starting Date... August     24, 2010                      *
*          Time...          10:52: 0.886                    *
*   Ending Date... August     24, 2010                      *
*          Time...          10:52:10.169                    *
*  Elapsed Time...               0.155 minutes.            *
*  Elapsed Time...               9.284 seconds.            *
************************************************************
```

1

```
**************************************************
*    U.S. Environmental Protection Agency        *
*    Storm Water Management Model  (SWMM)        *
*                 Version 4.4H                   *
*                                                *
*                CDM/OSU Beta                    *
*          Release Date - July 1, 2003           *
*   Camp Dresser & McKee and Oregon St. Univ.    *
*          Chuck Moore and Wayne Huber           *
*   Compiled using Compaq Visual Fortran v.6.6   *
**************************************************

                Developed by

**************************************************
*             Metcalf & Eddy, Inc.               *
*            University of Florida               *
*       Water Resources Engineers, Inc.          *
*      (Now Camp Dresser & McKee, Inc.)          *
*                September 1970                  *
**************************************************

         Version 4.3 (outdated) is
        Distributed and Maintained by

**************************************************
*      U.S. Environmental Protection Agency      *
* Center for Exposure Assessment Modeling (CEAM)*
*    Athens Environmental Research Laboratory    *
*            960 College Station Road            *
*            Athens, GA    30605-2720            *
**************************************************

**************************************************
*     This is an updated release of SWMM4.4h,    *
*     no longer formally supported by the EPA.   *
*     If problems occur executing this model     *
*     contact Wayne Huber at Oregon State. U.,   *
*     wayne.huber@orst.edu,                      *
*     or Robert Dickinson at Camp Dresser &      *
*     McKee, DickinsonRE@CDM.COM.                *
*     The EPA-supported version is SWMM5 at:     *
*   http://www.epa.gov/ednnrmrl/swmm/index.htm   *
**************************************************
```

Extended Detention Basin B

SWMM STORAGE Module Output File

Interpretation of Stage Storage Discharge Table from Storage Treatment Output File
Basin B

DEPTH, FT	*SURFACE AREA, SQ-FT*	*STORAGE, CU-FT*	*OUTFLOW, CFS*	*RESIDUAL FLOW, CFS*	*Explanation*
0.00E+00	1.36E+04	0.00E+00	0.00E+00	0.00E+00	Depth 0 to 0.25 ft = Pore storage (not part of NRSSMP required volume)
2.50E-01	1.36E+04	3.41E+03	0.00E+00	0.00E+00	
4.00E-01	1.39E+04	5.47E+03	6.00E-02	0.00E+00	Depth 0.25 to 3.25 feet = active surface storage, part of NRSSMP Required Volume (Basin Depth = 3 feet on plans)
5.50E-01	1.41E+04	7.57E+03	9.00E-02	0.00E+00	
8.50E-01	1.45E+04	1.19E+04	1.30E-01	0.00E+00	
1.15E+00	1.50E+04	1.63E+04	1.50E-01	0.00E+00	
1.45E+00	1.55E+04	2.09E+04	1.80E-01	0.00E+00	
1.87E+00	1.61E+04	2.75E+04	2.30E-01	0.00E+00	
2.20E+00	1.67E+04	3.29E+04	2.70E-01	0.00E+00	
2.35E+00	1.69E+04	3.54E+04	2.80E-01	0.00E+00	
2.65E+00	1.74E+04	4.06E+04	3.10E-01	0.00E+00	
2.95E+00	1.79E+04	4.59E+04	3.40E-01	0.00E+00	
3.25E+00	1.84E+04	5.13E+04	6.30E-01	0.00E+00	

NRSSMP Design Volume = [(Volume @ 3.25 ft) - (Volume @ 0.25 ft)] × 1.05

NRSSMP Design Volume = (5.13E+4 - 3.41E+3)× 1.05 = 4.79E+4 cu-ft × 1.05 = 1.1 ac-ft × 1.05 = 1.2 ac-ft

Modeled surface area at mid depth of surface storage (DEPTH = 1.75 ft) = 15,942 sq-ft (by linear interpolation from table)

```
          ************************************************
          *  This is an implementation of EPA SWMM 4.4H   *
          *  "Nature is full of infinite causes which     *
          *   have never occurred in experience" da Vinci *
          ************************************************


##########################################
#        File names by SWMM Block        #
#         JIN  -> Input to a Block       #
#        JOUT  -> Output from a Block    #
##########################################

   JIN for Block #     1 File #    8  RN0.int
  JOUT for Block #     1 File #    9  JOT.UF

##########################################
# Scratch file names for this simulation. #
##########################################

NSCRAT #     1 File #    1  SCRT1.UF
NSCRAT #     2 File #    2  SCRT2.UF
NSCRAT #     3 File #    3  SCRT3.UF
NSCRAT #     4 File #   10  SCRT4.UF
NSCRAT #     5 File #   11  SCRT5.UF
NSCRAT #     6 File #   12  SCRT6.UF
NSCRAT #     7 File #   13  SCRT7.UF

************************************************
*    Parameter Values on the Tapes Common Block   *
************************************************

 Number of Subcatchments in the Runoff Block (NW)..... 2000
 Number of Channel/Pipes in the Runoff Block (NG)..... 2000
 Number of Connections to Runoff Channels/Inlets (NCP).    6
 Number of Water Quality Constituents (MQUAL).........   20
 Number of Runoff Land Uses per Subcatchment (NLU).....   20
 Number of Groundwater Plot/prints in Runoff (NGW).....  500
 Number of Interface Locations for all Blocks (NIE).... 2000
 Number of Elements in the Transport Block (NET)....... 2000
 Number of Storage Junctions in Transport (NTSE).......  500
 Number of Transport interface input locations (NTHI).. 2000
 Number of Transport interface output locations (NTHO). 2000
```

```
Number of Transport input locations on R lines (NTHR).    80
Number of Transport printed output locations (NTOA)... 2000
Number of Tabular Flow Splitters in Transport (NTSP).. 1000
Number of Elements in the Extran Block (NEE)..........  4000
Number of Pumps in Extran (NEP)....................... 1000
Number of Orifices in Extran (NEO).....................  200
Number of Tide Gates/Free Outfalls in Extran (NTG).... 1000
Number of Extran Weirs (NEW)...........................  400
Number of Extran Printout Locations (NPO).............  150
Number of Tide Elements in Extran (NTE)...............   50
Number of Natural Channels (NNC)....................... 1200
Number of Storage Junctions in Extran (NVSE).......... 2000
Number of Time History Data Points in Extran (NTVAL)..  500
Number of Data Points for Variable Storage Elements
  in the Extran Block (NVST)...........................  200
Number of Input Hydrographs in Extran (NEH)...........  500
Number of Allowable Channel Connections to
  Junctions in the Extran Block (NCHN)................   15
Number Rain Gages in Rain and Runoff (MAXRG)..........  200
Number PRATE/VRATE Points for Extran Pump
  Input (MAXPRA).......................................   10
Number of Variable Orifices in Extran (NVORF).........   50
Number of Variable Orifice Data Points (NVOTIM).......   50
Number of Allowable Precip. Values/yr in Rain (LIMRN). 5000
Number of Storm Events for Rain Analysis (LSTORM).....20000
Number of Plugs for Plug-flow in S/T (NPLUG)..........40000
Number Conduits for Extran Results to ASCII
  File (MXFLOW)........................................  400


##########################################
# Entry made to Storage/Treatment Block.  #
# Storage/Treatment model written by the  #
# University of Florida, June 1981.       #
# Last updated July 1995 at Oregon St. U. #
##########################################

VALUE OF NOTAPE           :         0

INPUT DATA SOURCE         :  EXTERNAL FILE

EXTERNAL ELEMENT NUMBER   :  200
```

```
NUMBER OF TIME STEPS      :   1402560

TIME STEP SIZE,SECONDS    :     900.0

NUMBER OF S/T UNITS       :         1

COST MODEL USED?          :        NO

STARTING DATE             :    10/ 1/1968

STARTING JULIAN DATE      :   1968275

STARTING TIME             :    0:  0:  0

SIMULATION DURATION, HOURS:350640.000

ENDING JULIAN DATE        :   2008275

ENDING TIME OF DAY        :     0.000 HOURS

PRINT TOTAL SIMULATION SUMMARY ONLY (ISUM = 0)

IDET = 0. NO DETAILED (TIME STEP) PRINT-OUTS.

NO OUTPUT FOR AVERAGE DETENTION TIME RESULTS


##########################################
# Header information from interface file: #
##########################################

Title from first computational block:
% Capture Analysis
EntradaBasin B

Title from immediately preceding computational block:
% Capture Analysis
EntradaBasin B

Name of preceding block:.............Runoff Block
Initial Julian date (IDATEZ)..................... 1968275
Initial time of day in seconds (TZERO).....      0.0
No. transfered input locations.....                1
```

No. transfered pollutants..... 0
Size of total catchment area (acres)..... 14.00
ID numbers (JCE=0) or alphanumeric (JCE=1)..... 1

##
Element numbers of interface inlet locations:
##
200

Conversion factor to cfs for flow units
on interface file. Multiply by: 1.00000

INPUT/OUTPUT UNITS : U.S. CUSTOMARY

TRIBUTARY AREA, ACRES : 14.0

NUMBER OF POLLUTANTS : 0

MONTHLY EVAPORATION RATES, IN/DAY

JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
0.030	0.048	0.072	0.102	0.132	0.156	0.168	0.150	0.114	0.078	0.042	0.030

BASIN INFILTRATION RATE FOR UNIT 1 IN (IN/HR) = 0.2300
1

UNIT CHARACTERISTICS

****
UNIT # 1 CHARACTERISTICS
****

GENERAL UNIT DESCRIPTION :

NAME : Entrada Basin B
IDENT : 1
TYPE OF UNIT : DETENTION
MAX. ALLOWABLE INFLOW, CFS: 0.1000E+05

FLOW DIRECTIONS:
BYPASS TO UNIT # 100
TREATED OUTFLOW TO UNIT # 100
RESIDUALS TO UNIT # 100

===> NOTE: UNIT 100 IS THE NEXT BLOCK AND UNIT 200 IS ULTIMATE DISPOSAL.

DETENTION UNIT CHARACTERISTICS:

RESIDUALS DRAW-OFF SCHEME: NEVER DRAWN OFF

DEPTH-AREA-STORAGE-FLOW RELATIONSHIPS :

DEPTH, FT	SURFACE AREA, SQ FT	STORAGE, CU FT	TREATED OUTFLOW, CFS	RESIDUAL FLOW, CFS
0.0000E+00	1.3639E+04	0.0000E+00	0.0000E+00	0.0000E+00
2.5000E-01	1.3639E+04	3.4098E+03	0.0000E+00	0.0000E+00
4.0000E-01	1.3863E+04	5.4724E+03	6.0000E-02	0.0000E+00
5.5000E-01	1.4089E+04	7.5688E+03	9.0000E-02	0.0000E+00
8.5000E-01	1.4544E+04	1.1864E+04	1.3000E-01	0.0000E+00
1.1500E+00	1.5006E+04	1.6296E+04	1.5000E-01	0.0000E+00
1.4500E+00	1.5475E+04	2.0868E+04	1.8000E-01	0.0000E+00
1.8700E+00	1.6129E+04	2.7505E+04	2.3000E-01	0.0000E+00
2.2000E+00	1.6675E+04	3.2918E+04	2.7000E-01	0.0000E+00
2.3500E+00	1.6920E+04	3.5438E+04	2.8000E-01	0.0000E+00
2.6500E+00	1.7414E+04	4.0588E+04	3.1000E-01	0.0000E+00
2.9500E+00	1.7915E+04	4.5887E+04	3.4000E-01	0.0000E+00
3.2500E+00	1.8423E+04	5.1338E+04	6.3000E-01	0.0000E+00

INITIAL CONDITIONS:

VOLUME, CU FT : 0.0000E+00

****
* NOTE: IF THERE IS ONLY ONE UNIT THE PLANT *
* PERFORMANCE SUMMARY WILL NOT BE PRINTED. *
****

Note !! UNIT 1 HAS EXCEEDED THE MAXIMUM STORAGE VOLUME ON 1/19/1969 AT 16:15

The excess has been bypassed and is included in BYPASS volume. Further messages will be suppressed. But summaries of number of all volume-bypass time steps and number of days with volume-bypasses will be printed.

1

```
**************************************
*    ENTIRE SIMULATION UNIT SUMMARIES *
**************************************
 OCT  1, 1968,  0 0: 0 TO  OCT  1, 2008,  0 0: 0.
```

UNIT	PARAMETER	VOLUME CU FT
1	INFLOW,TOTAL	2.5944E+07
	INFLOW,NET	2.0898E+07
	BYPASS	5.0461E+06
	TREATED OUTFLOW	1.2530E+07
	RESIDUAL FLOW	0.0000E+00
	REMAINING	0.0000E+00
	EVAPORATION	8.2906E+04
	INFILTRATION	8.3043E+06
	NO. VOL. BYPASSES	2807
	NO. VOL. BYPASS DAYS	162
	INITIAL COND.	0.0000E+00
	PERCENT ERROR	-0.0740

```
===> Storage/Treatment simulation ended normally.

===> SWMM 4.4H   simulation ended normally.
     Always check output file for possible warning messages.

===> Your input file was named : EntradaBasinB_St0.in
===> Your output file was named: EntradaBasinB_St0.out

*****************************************************
*       SWMM 4.4H   Simulation Date and Time Summary  *
*****************************************************
* Starting Date... August     24, 2010                *
*          Time...          11: 0:25.891               *
*   Ending Date... August     24, 2010                *
*          Time...          11: 1:23.223               *
*  Elapsed Time...               0.956 minutes.       *
*  Elapsed Time...              57.330 seconds.       *
```

****

Regional Extended Detention Basin D

SWMM RUNOFF Module Output File

1

```
***************************************************
*    U.S. Environmental Protection Agency         *
*    Storm Water Management Model  (SWMM)         *
*                 Version 4.4H                    *
*                                                 *
*                CDM/OSU Beta                     *
*          Release Date - July 1, 2003            *
*   Camp Dresser & McKee and Oregon St. Univ.     *
*          Chuck Moore and Wayne Huber            *
*   Compiled using Compaq Visual Fortran v.6.6    *
***************************************************

                 Developed by

***************************************************
*             Metcalf & Eddy, Inc.                *
*            University of Florida                *
*       Water Resources Engineers, Inc.           *
*      (Now Camp Dresser & McKee, Inc.)           *
*                September 1970                   *
***************************************************

         Version 4.3 (outdated) is
        Distributed and Maintained by

***************************************************
*      U.S. Environmental Protection Agency       *
* Center for Exposure Assessment Modeling (CEAM)  *
*    Athens Environmental Research Laboratory     *
*             960 College Station Road            *
*             Athens, GA    30605-2720            *
***************************************************

***************************************************
*     This is an updated release of SWMM4.4h,     *
*     no longer formally supported by the EPA.    *
*     If problems occur executing this model      *
*     contact Wayne Huber at Oregon State. U.,    *
*     wayne.huber@orst.edu,                       *
*     or Robert Dickinson at Camp Dresser &       *
*     McKee, DickinsonRE@CDM.COM.                 *
*     The EPA-supported version is SWMM5 at:      *
*   http://www.epa.gov/ednnrmrl/swmm/index.htm    *
***************************************************
```

```
          ************************************************
          *  This is an implementation of EPA SWMM 4.4H  *
          *  "Nature is full of infinite causes which    *
          *   have never occurred in experience" da Vinci *
          ************************************************


##########################################
#        File names by SWMM Block        #
#         JIN  -> Input to a Block       #
#        JOUT  -> Output from a Block    #
##########################################

   JIN for Block #     1 File #    0  JIN.UF
  JOUT for Block #     1 File #    9  RN0.int

##########################################
# Scratch file names for this simulation. #
##########################################

NSCRAT #     1 File #    1  NEWHALL_PATCHED_20091119.INT
NSCRAT #     2 File #    2  SCRT2.UF
NSCRAT #     3 File #    3  SCRT3.UF
NSCRAT #     4 File #   10  SCRT4.UF
NSCRAT #     5 File #   11  SCRT5.UF
NSCRAT #     6 File #   12  SCRT6.UF
NSCRAT #     7 File #   13  SCRT7.UF
NSCRAT #     8 File #   14  SCRT8.UF
NSCRAT #     9 File #   15  SCRT9.UF

************************************************
*    Parameter Values on the Tapes Common Block   *
************************************************

 Number of Subcatchments in the Runoff Block (NW)..... 2000
 Number of Channel/Pipes in the Runoff Block (NG)..... 2000
 Number of Connections to Runoff Channels/Inlets (NCP).    6
 Number of Water Quality Constituents (MQUAL).........   20
 Number of Runoff Land Uses per Subcatchment (NLU).....   20
 Number of Groundwater Plot/prints in Runoff (NGW).....  500
 Number of Interface Locations for all Blocks (NIE).... 2000
 Number of Elements in the Transport Block (NET)....... 2000
 Number of Storage Junctions in Transport (NTSE).......  500
```

```
 Number of Transport interface input locations (NTHI).. 2000
 Number of Transport interface output locations (NTHO). 2000
 Number of Transport input locations on R lines (NTHR).   80
 Number of Transport printed output locations (NTOA)... 2000
 Number of Tabular Flow Splitters in Transport (NTSP).. 1000
 Number of Elements in the Extran Block (NEE)..... 4000
 Number of Pumps in Extran (NEP)..... 1000
 Number of Orifices in Extran (NEO).....  200
 Number of Tide Gates/Free Outfalls in Extran (NTG).... 1000
 Number of Extran Weirs (NEW).....  400
 Number of Extran Printout Locations (NPO).....  150
 Number of Tide Elements in Extran (NTE).....   50
 Number of Natural Channels (NNC)..... 1200
 Number of Storage Junctions in Extran (NVSE)..... 2000
 Number of Time History Data Points in Extran (NTVAL)..  500
 Number of Data Points for Variable Storage Elements
   in the Extran Block (NVST).....  200
 Number of Input Hydrographs in Extran (NEH).....  500
 Number of Allowable Channel Connections to
   Junctions in the Extran Block (NCHN).....   15
 Number Rain Gages in Rain and Runoff (MAXRG).....  200
 Number PRATE/VRATE Points for Extran Pump
   Input (MAXPRA).....   10
 Number of Variable Orifices in Extran (NVORF).....   50
 Number of Variable Orifice Data Points (NVOTIM).....   50
 Number of Allowable Precip. Values/yr in Rain (LIMRN). 5000
 Number of Storm Events for Rain Analysis (LSTORM).....20000
 Number of Plugs for Plug-flow in S/T (NPLUG).....40000
 Number Conduits for Extran Results to ASCII
   File (MXFLOW).....  400


##################################################
# Entry made to the Runoff Block, last updated by #
# Oregon State University, and Camp, Dresser and  #
# McKee, Inc., July 2003.                         #
##################################################
# "And wherever water goes, amoebae go along for  #
#  the ride"                    Tom Robbins       #
##################################################
```

% Capture Analysis

Mission Village Basin D

Snowmelt parameter - ISNOW.....	0
Number of rain gages - NRGAG.....	0
Green-Ampt infiltration equation used - INFILM...	1
Quality is not simulated - KWALTY.....	0
Read evaporation data on line(s) F1 (F2) - IVAP..	2
Hour of day at start of storm - NHR.....	0
Minute of hour at start of storm - NMN.....	0
Time TZERO at start of storm (hours).....	0.000
Use U.S. Customary units for most I/O - METRIC...	0
Runoff input print control...	0
Runoff graph plot control....	1
Runoff output print control..	0
Print headers every 50 lines - NOHEAD (0=yes, 1=no)	1
Print land use load percentages -LANDUPR (0=no, 1=yes)	0
Limit number of groundwater convergence messages to	50 (if simulated)
Month, day, year of start of storm is:	10/ 1/1968
Wet time step length (seconds).....	900.
Dry time step length (seconds).....	14400.
Wet/Dry time step length (seconds)...	900.

Simulation length is..... 20081001.0 Yr/Mo/Dy

Percent of impervious area with zero detention depth 25.0

****
* Processed Precipitation will be read on NSCRAT(1) *
****

##############################
Data Group F1
Evaporation Rate (in/month)#
##############################

JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.
0.93	1.34	2.23	3.06	4.09	4.68	5.21	4.65	3.42	2.42	1.26	0.93

1

****
* C H A N N E L A N D P I P E D A T A *
****

Input Sequen Number	NAMEG: Channel ID #	Drains to NGTO:	Channel Type	Width (ft)	Length (ft)	Invert Slope (ft/ft)	L Side Slope (ft/ft)	R Side Slope (ft/ft)	Intial Depth (ft)	Max Depth (ft)	Mann- ings "N"	Full Flow (cfs)	Infilt Rate (in/hr)
1	401	420	Dummy	0.0	0.0	0.0000	0.0000	0.0000	0.0	0.0	0.0000	0.00E+00	0.00
2	402	420	Dummy	0.0	0.0	0.0000	0.0000	0.0000	0.0	0.0	0.0000	0.00E+00	0.00
3	403	420	Dummy	0.0	0.0	0.0000	0.0000	0.0000	0.0	0.0	0.0000	0.00E+00	0.00
4	404	420	Dummy	0.0	0.0	0.0000	0.0000	0.0000	0.0	0.0	0.0000	0.00E+00	0.00
5	405	420	Dummy	0.0	0.0	0.0000	0.0000	0.0000	0.0	0.0	0.0000	0.00E+00	0.00
6	406	430	Dummy	0.0	0.0	0.0000	0.0000	0.0000	0.0	0.0	0.0000	0.00E+00	0.00
7	407	430	Dummy	0.0	0.0	0.0000	0.0000	0.0000	0.0	0.0	0.0000	0.00E+00	0.00

0.00												
8	408	430	Dummy	0.0	0.0	0.0000	0.0000	0.0000	0.0	0.0	0.0000	0.00E+00
0.00												
9	409	430	Dummy	0.0	0.0	0.0000	0.0000	0.0000	0.0	0.0	0.0000	0.00E+00
0.00												
10	410	430	Dummy	0.0	0.0	0.0000	0.0000	0.0000	0.0	0.0	0.0000	0.00E+00
0.00												
11	411	440	Dummy	0.0	0.0	0.0000	0.0000	0.0000	0.0	0.0	0.0000	0.00E+00
0.00												
12	412	440	Dummy	0.0	0.0	0.0000	0.0000	0.0000	0.0	0.0	0.0000	0.00E+00
0.00												
13	413	440	Dummy	0.0	0.0	0.0000	0.0000	0.0000	0.0	0.0	0.0000	0.00E+00
0.00												
14	414	440	Dummy	0.0	0.0	0.0000	0.0000	0.0000	0.0	0.0	0.0000	0.00E+00
0.00												
15	420	400	Dummy	0.0	0.0	0.0000	0.0000	0.0000	0.0	0.0	0.0000	0.00E+00
0.00												
16	430	400	Dummy	0.0	0.0	0.0000	0.0000	0.0000	0.0	0.0	0.0000	0.00E+00
0.00												
17	440	400	Dummy	0.0	0.0	0.0000	0.0000	0.0000	0.0	0.0	0.0000	0.00E+00
0.00												
1												

****
* S U B C A T C H M E N T D A T A *
****

NOTE. SEE LATER TABLE FOR OPTIONAL SUBCATCHMENT PARAMETERS

	SUBCATCH-	CHANNEL		WIDTH	AREA	PERCENT	SLOPE	RESISTANCE	FACTOR	DEPRES. STORAGE(IN)		
GREEN-AMPT INFIL PARAMS	MENT NO.	OR INLET	GAGE	PRINT								
SUCTION HYD.CON		IMD	NO.	WB								(IN)
(IN/HR)												
1	DMV-AB	401		7234.00	41.52	54.10	0.0500	0.012	0.250	0.020	0.060	8.00
0.280	0.320		1	0								
2	DMV-C	402		22712.00	130.35	46.83	0.0500	0.012	0.250	0.020	0.060	8.00
0.160	0.290		1	0								
3	DLN-AB	403		3.00	0.03	1.00	0.0500	0.012	0.250	0.020	0.060	8.00
0.390	0.320		1	0								
4	DLN-C	404		1520.00	17.44	1.00	0.0500	0.012	0.250	0.020	0.060	8.00
0.210	0.290		1	0								

5 DLN-CB	405		3437.00	39.45	1.00	0.0500	0.012	0.250	0.020	0.060	8.00
0.290	0.300	1	0								
6 DL-AB	406		1410.00	8.09	64.04	0.0500	0.012	0.250	0.020	0.060	8.00
0.290	0.320	1	0								
7 DL-C	407		14368.00	82.46	35.13	0.0500	0.012	0.250	0.020	0.060	8.00
0.160	0.290	1	0								
8 DL-CB	408		41299.00	237.02	45.80	0.0500	0.012	0.250	0.020	0.060	8.00
0.220	0.300	1	0								
9 DE-AB	409		3608.00	20.71	71.21	0.0500	0.012	0.250	0.020	0.060	8.00
0.280	0.320	1	0								
10 DE-C	410		14055.00	80.67	54.69	0.0500	0.012	0.250	0.020	0.060	8.00
0.150	0.290	1	0								
11 DHS-AB	411		480.00	2.76	60.00	0.0500	0.012	0.250	0.020	0.060	8.00
0.280	0.320	1	0								
12 DHS-C	412		8855.00	50.82	60.00	0.0500	0.012	0.250	0.020	0.060	8.00
0.150	0.290	1	0								
13 DSFD-AB	413		811.00	4.65	42.00	0.0500	0.012	0.250	0.020	0.060	8.00
0.280	0.320	1	0								
14 DSFD-C	414		3847.00	22.08	42.00	0.0500	0.012	0.250	0.020	0.060	8.00
0.150	0.290	1	0								

TOTAL NUMBER OF SUBCATCHMENTS...	14
TOTAL TRIBUTARY AREA (ACRES)....	738.05
IMPERVIOUS AREA (ACRES).....	329.02
PERVIOUS AREA (ACRES).....	409.03
TOTAL WIDTH (FEET).....	123639.00
PERCENT IMPERVIOUSNESS.....	44.58

1

```
**********************************************************
*    Arrangement of Subcatchments and Channel/Pipes      *
**********************************************************
* See second subcatchment output table for connectivity *
* of subcatchment to subcatchment flows.                 *
**********************************************************
```

Channel or Pipe		
401	No Tributary Channel/Pipes	
	Tributary Subareas.....	DMV-AB
402	No Tributary Channel/Pipes	
	Tributary Subareas.....	DMV-C
403	No Tributary Channel/Pipes	

```
                Tributary Subareas........ DLN-AB
404             No Tributary Channel/Pipes
                Tributary Subareas........ DLN-C
405             No Tributary Channel/Pipes
                Tributary Subareas........ DLN-CB
406             No Tributary Channel/Pipes
                Tributary Subareas........ DL-AB
407             No Tributary Channel/Pipes
                Tributary Subareas........ DL-C
408             No Tributary Channel/Pipes
                Tributary Subareas........ DL-CB
409             No Tributary Channel/Pipes
                Tributary Subareas........ DE-AB
410             No Tributary Channel/Pipes
                Tributary Subareas........ DE-C
411             No Tributary Channel/Pipes
                Tributary Subareas........ DHS-AB
412             No Tributary Channel/Pipes
                Tributary Subareas........ DHS-C
413             No Tributary Channel/Pipes
                Tributary Subareas........ DSFD-AB
414             No Tributary Channel/Pipes
                Tributary Subareas........ DSFD-C
420             Tributary Channel/Pipes... 401       402       403       404       405
                No Tributary Subareas.....
430             Tributary Channel/Pipes... 406       407       408       409       410
                No Tributary Subareas.....
440             Tributary Channel/Pipes... 411       412       413       414
                No Tributary Subareas.....


   INLET
400             Tributary Channel/Pipes... 420       430       440
                No Tributary Subareas.....

************************************************************
* Hydrographs will be stored for the following   1 INLETS *
************************************************************
400

************************************************
*  Quality simulation not included in this run *
```

****

****
* DATA GROUP M1 *
****

TOTAL NUMBER OF PRINTED GUTTERS/INLETS...NPRNT.. 1
NUMBER OF TIME STEPS BETWEEN PRINTINGS..INTERV.. 0
STARTING AND STOPPING PRINTOUT DATES..... 0 0

****
* DATA GROUP M3 *
****

CHANNEL/INLET PRINT DATA GROUPS.....400

****
* DATA GROUP M8 *
****

STORM EVENT TRACKING.....
  Storm event data file = Sm0.out

End of preliminary input data and data echo.

****
* Precipitation Interface File Summary *
* Number of precipitation station.... 1 *
****

Location	Station Number
1.	0

****

```
*      End of time step DO-loop in Runoff      *
************************************************

Final Date (Mo/Day/Year)    =                  10/ 2/2008
Total number of time steps =                      117076
Final Julian Date  =                             2008276
Final time of day  =                                  1. seconds.
Final time of day  =                                0.00   hours.
Final running time =                           350664.0000   hours.
Final running time =                            14611.0000    days.

************************************************
*     Extrapolation Summary for Watersheds     *
* # Steps ==> Total Number of Extrapolated Steps *
* # Calls ==> Total Number of OVERLND Calls     *
************************************************
```

Subcatch	# Steps	# Calls	Subcatch	# Steps	# Calls	Subcatch	# Steps	# Calls
DMV-AB	652254	57678	DMV-C	684296	57828	DLN-AB	671115	46209
DLN-C	689503	47905	DLN-CB	652434	46762	DL-AB	651451	58421
DL-C	674927	56265	DL-CB	669920	56712	DE-AB	664409	60203
DE-C	678046	59774	DHS-AB	668973	58239	DHS-C	686666	60190
DSFD-AB	657719	55517	DSFD-C	677552	57556			

```
************************************************
*     Extrapolation Summary for Channel/Pipes  *
* # Steps ==> Total Number of Extrapolated Steps *
* # Calls ==> Total Number of GUTNR Calls       *
************************************************
```

Chan/Pipe	# Steps	# Calls	Chan/Pipe	# Steps	# Calls	Chan/Pipe	# Steps	# Calls
401	0	0402		0	0403		0	0
404	0	0405		0	0406		0	0
407	0	0408		0	0409		0	0
410	0	0411		0	0412		0	0
413	0	0414		0	0420		0	0
430	0	0440		0	0			

```
1
*********************************************
*      Continuity Check for Surface Water   *
*********************************************
                                                    Inches over
```

MVBasinD_RN0.out

	cubic feet	Total Basin
Total Precipitation (Rain plus Snow)	1.962885E+09	732.660
Total Irrigation	0.000000E+00	0.000
Total Infiltration	9.801866E+08	365.861
Total Evaporation	5.491680E+07	20.498
Surface Runoff from Watersheds	9.360535E+08	349.388
Total Water remaining in Surface Storage	0.000000E+00	0.000
Infiltration over the Pervious Area...	9.801866E+08	660.155
Infiltration + Evaporation + Surface Runoff + Snow removal + Water remaining in Surface Storage + Water remaining in Snow Cover.....	1.971157E+09	735.747
Total Precipitation + Initial Storage + Total Irrigation.....	1.962885E+09	732.660

The error in continuity is calculated as

```
*************************************
* Precipitation + Initial Snow Cover  *
*      - Infiltration -               *
*Evaporation - Snow removal -         *
*Surface Runoff from Watersheds -     *
*Water in Surface Storage -           *
*Water remaining in Snow Cover        *
*-----------------------------------*
* Precipitation + Initial Snow Cover  *
*************************************
```

Error..... -0.421 Percent

```
*********************************************
*       Continuity Check for Channel/Pipes  *
*********************************************
```

	cubic feet	Inches over Total Basin
Initial Channel/Pipe Storage.....	0.000000E+00	0.000
Final Channel/Pipe Storage.....	0.000000E+00	0.000
Surface Runoff from Watersheds.....	9.360535E+08	349.388
Groundwater Subsurface Inflow.....	0.000000E+00	0.000
Evaporation Loss from Channels.....	0.000000E+00	0.000
Infiltration Loss from Channels.....	0.000000E+00	0.000
Channel/Pipe/Inlet Outflow.....	0.936054E+09	349.388
Initial Storage + Inflow.....	9.360535E+08	349.388

```
 Final Storage + Outflow.....                    9.360535E+08    349.388
 ******************************************
 * Final Storage + Outflow + Evaporation  - *
 * Watershed Runoff - Groundwater Inflow  - *
 *     Initial Channel/Pipe Storage         *
 *     ---------------------------------    *
 *  Final Storage + Outflow  + Evaporation  *
 ******************************************
 Error.....                                      0.000 Percent
1
```

SUMMARY STATISTICS FOR SUBCATCHMENTS

SUBCATCHMENT NO.	GUTTER OR INLET NO.	AREA (AC)	PERCENT IMPER.	TOTAL SIMULATED RAINFALL (IN)	PERVIOUS AREA TOTAL RUNOFF DEPTH (IN)	PERVIOUS AREA TOTAL LOSSES (IN)	PERVIOUS AREA PEAK RUNOFF RATE (CFS)	IMPERVIOUS AREA PEAK RUNOFF DEPTH (IN)	IMPERVIOUS AREA PEAK RUNOFF RATE (CFS)	TOTAL SUBCATCHMENT PEAK RUNOFF DEPTH (IN)	TOTAL SUBCATCHMENT PEAK RUNOFF RATE (CFS)	UNIT AREA RUNOFF (IN/HR)
DMV-AB	401	41.52	54.1	733.64	31.046	702.252	22.013	707.031	32.344	396.754	54.356	1.309
DMV-C	402	130.35	46.8	733.64	80.401	653.130	88.395	706.972	87.896	373.824	176.291	1.352
DLN-AB	403	0.03	1.0	733.64	11.318	721.491	0.028	707.830	0.000	18.284	0.028	0.938
DLN-C	404	17.44	1.0	733.64	47.468	685.503	19.502	707.085	0.271	54.065	19.773	1.134
DLN-CB	405	39.45	1.0	733.64	23.687	709.194	40.291	707.075	0.613	30.521	40.905	1.037
DL-AB	406	8.09	64.0	733.64	29.211	704.152	3.335	707.040	7.460	463.293	10.795	1.334
DL-C	407	82.46	35.1	733.64	79.039	654.396	68.063	706.624	41.711	299.509	109.774	1.331
DL-CB	408	237.02	45.8	733.64	51.258	682.097	155.978	706.960	156.309	351.569	312.287	

1.318											
DE-AB	409	20.71	71.2	733.64	32.406	701.132	6.900	706.965	21.235	512.760	28.135
1.359											
DE-C	410	80.67	54.7	733.64	88.300	645.370	47.040	707.020	63.526	426.678	110.566
1.371											
DHS-AB	411	2.76	60.0	733.64	31.463	701.895	1.276	707.038	2.384	436.808	3.661
1.326											
DHS-C	412	50.82	60.0	733.64	89.023	644.714	26.175	707.043	43.906	459.835	70.080
1.379											
DSFD-AB	413	4.65	42.0	733.64	30.287	702.894	3.107	706.865	2.812	314.450	5.919
1.273											
DSFD-C	414	22.08	42.0	733.64	86.759	646.790	16.449	706.858	13.353	347.201	29.803
1.350											

*** NOTE *** IMPERVIOUS AREA STATISTICS AGGREGATE IMPERVIOUS AREAS WITH AND WITHOUT DEPRESSION STORAGE

SUMMARY STATISTICS FOR CHANNEL/PIPES

RATIO OF MAX. TO FULL FLOW	RATIO OF MAX. DEPTH TO FULL DEPTH	CHANNEL NUMBER	FULL FLOW (CFS)	FULL VELOCITY (FPS)	FULL DEPTH (FT)	MAXIMUM COMPUTED INFLOW (CFS)	MAXIMUM COMPUTED OUTFLOW (CFS)	MAXIMUM COMPUTED DEPTH (FT)	MAXIMUM COMPUTED VELOCITY (FPS)	TIME OF OCCURRENCE DAY	TIME OF OCCURRENCE HR.	LENGTH OF SURCHARGE (HOUR)	MAXIMUM SURCHARGE VOLUME (AC-FT)
		414				29.80				2/ 7/1998	20.00		
		413				5.92				2/ 7/1998	20.00		
		412				70.08				2/ 7/1998	20.00		
		411				3.66				2/ 7/1998	20.00		
		410				110.57				2/ 7/1998	20.00		
		409				28.14				2/ 7/1998	20.00		
		408				312.29				2/ 7/1998	20.00		
		407				109.77				2/ 7/1998	20.00		
		406				10.80				2/ 7/1998	20.00		
		405				40.86				2/ 7/1998	20.00		
		404				19.75				2/ 7/1998	20.00		
		403				0.03				2/ 7/1998	20.00		
		402				176.29				2/ 7/1998	20.00		

401	54.36	2/ 7/1998 20.00
440	109.46	2/ 7/1998 20.00
430	571.56	2/ 7/1998 20.00
420	291.29	2/ 7/1998 20.00
400	972.31	2/ 7/1998 20.00

TOTAL NUMBER OF CHANNELS/PIPES = 18

*** NOTE *** THE MAXIMUM FLOWS AND DEPTHS ARE CALCULATED AT THE END OF THE TIME INTERVAL

1

****
* Summary of quantity results (flow in cfs) *
****

% Capture Analysis
Mission Village Basin D

	Chan/Inlt 400
Date Mo/Da/Year	Time Hr:Min
	Flow Cfs
Flow wt'd means.....	0.7415
Flow wt'd std-devs...	9.1583
Maximum value.....	972.3074
Minimum value.....	0.0000
Total loads.....	9.3603E+08 Cubic-ft

===> Runoff simulation ended normally.

===> SWMM 4.4H simulation ended normally.
Always check output file for possible warning messages.

===> Your input file was named : MVBasinD_RN0.in
===> Your output file was named: MVBasinD_RN0.out

****
* SWMM 4.4H Simulation Date and Time Summary *
****
* Starting Date... August 24, 2010 *
* Time... 16:56:13.101 *

```
*   Ending Date... August     24, 2010                  *
*          Time...          16:56:31.882                *
*  Elapsed Time...               0.313 minutes.        *
*  Elapsed Time...              18.781 seconds.        *
************************************************************
```

Regional Extended Detention Basin D

SWMM STORAGE Module Output File

Interpretation of Stage Storage Discharge Table from Storage Treatment Output File
Regional Basin D

DEPTH, FT	*SURFACE AREA, SQ-FT*	*STORAGE, CU-FT*	*OUTFLOW, CFS*	*RESIDUAL FLOW, CFS*	*Explanation*
0.00E+00	1.16E+05	0.00E+00	0.00E+00	0.00E+00	Depth 0 to 12 feet = active surface storage, part of NRSSMP Required Volume (Basin Depth = 12 feet on plans; no pore storage accounted for in modeling)
6.00E-01	1.18E+05	7.02E+04	3.73E+00	0.00E+00	
1.20E+00	1.21E+05	1.42E+05	5.28E+00	0.00E+00	
2.40E+00	1.26E+05	2.90E+05	7.47E+00	0.00E+00	
3.60E+00	1.32E+05	4.45E+05	9.15E+00	0.00E+00	
4.80E+00	1.37E+05	6.07E+05	1.06E+01	0.00E+00	
6.59E+00	1.46E+05	8.60E+05	1.24E+01	0.00E+00	
7.80E+00	1.52E+05	1.04E+06	1.35E+01	0.00E+00	
8.40E+00	1.55E+05	1.13E+06	1.40E+01	0.00E+00	
9.60E+00	1.61E+05	1.32E+06	1.49E+01	0.00E+00	
1.08E+01	1.67E+05	1.52E+06	1.58E+01	0.00E+00	
1.20E+01	1.73E+05	1.72E+06	3.25E+01	0.00E+00	

NRSSMP Design Volume = [(Volume @ 12 ft) - (Volume @ 0 ft)] × 1.05

NRSSMP Design Volume = (1.72E+6 - 0)× 1.05 = 39.5 ac-ft × 1.05 = 41.5 ac-ft

1

```
************************************************
*    U.S. Environmental Protection Agency      *
*    Storm Water Management Model  (SWMM)      *
*                Version 4.4H                  *
*                                              *
*                CDM/OSU Beta                  *
*          Release Date - July 1, 2003         *
*   Camp Dresser & McKee and Oregon St. Univ.  *
*          Chuck Moore and Wayne Huber         *
*   Compiled using Compaq Visual Fortran v.6.6 *
************************************************

                Developed by

************************************************
*              Metcalf & Eddy, Inc.            *
*             University of Florida            *
*         Water Resources Engineers, Inc.      *
*        (Now Camp Dresser & McKee, Inc.)      *
*                September 1970                *
************************************************

         Version 4.3 (outdated) is
        Distributed and Maintained by

************************************************
*      U.S. Environmental Protection Agency    *
* Center for Exposure Assessment Modeling (CEAM)*
*    Athens Environmental Research Laboratory  *
*             960 College Station Road         *
*             Athens, GA    30605-2720         *
************************************************

************************************************
*     This is an updated release of SWMM4.4h,  *
*     no longer formally supported by the EPA. *
*     If problems occur executing this model   *
*     contact Wayne Huber at Oregon State. U., *
*     wayne.huber@orst.edu,                    *
*     or Robert Dickinson at Camp Dresser &    *
*     McKee, DickinsonRE@CDM.COM.              *
*     The EPA-supported version is SWMM5 at:   *
*   http://www.epa.gov/ednnrmrl/swmm/index.htm *
************************************************

************************************************
*  This is an implementation of EPA SWMM 4.4H  *
*  "Nature is full of infinite causes which    *
```

```
*   have never occurred in experience" da Vinci *
************************************************


##########################################
#        File names by SWMM Block        #
#         JIN  -> Input to a Block       #
#        JOUT  -> Output from a Block    #
##########################################

   JIN for Block #     1 File #    8  RN0.int
  JOUT for Block #     1 File #    9  JOT.UF

##########################################
# Scratch file names for this simulation. #
##########################################

NSCRAT #     1 File #    1  SCRT1.UF
NSCRAT #     2 File #    2  SCRT2.UF
NSCRAT #     3 File #    3  SCRT3.UF
NSCRAT #     4 File #   10  SCRT4.UF
NSCRAT #     5 File #   11  SCRT5.UF
NSCRAT #     6 File #   12  SCRT6.UF
NSCRAT #     7 File #   13  SCRT7.UF

************************************************
*    Parameter Values on the Tapes Common Block   *
************************************************

 Number of Subcatchments in the Runoff Block (NW)..... 2000
 Number of Channel/Pipes in the Runoff Block (NG)..... 2000
 Number of Connections to Runoff Channels/Inlets (NCP).    6
 Number of Water Quality Constituents (MQUAL).........   20
 Number of Runoff Land Uses per Subcatchment (NLU).....   20
 Number of Groundwater Plot/prints in Runoff (NGW).....  500
 Number of Interface Locations for all Blocks (NIE).... 2000
 Number of Elements in the Transport Block (NET)....... 2000
 Number of Storage Junctions in Transport (NTSE).......  500
 Number of Transport interface input locations (NTHI).. 2000
 Number of Transport interface output locations (NTHO). 2000
 Number of Transport input locations on R lines (NTHR).   80
 Number of Transport printed output locations (NTOA)... 2000
 Number of Tabular Flow Splitters in Transport (NTSP).. 1000
 Number of Elements in the Extran Block (NEE)......... 4000
 Number of Pumps in Extran (NEP)...................... 1000
 Number of Orifices in Extran (NEO)....................  200
 Number of Tide Gates/Free Outfalls in Extran (NTG).... 1000
 Number of Extran Weirs (NEW)..........................  400
```

```
Number of Extran Printout Locations (NPO).............  150
Number of Tide Elements in Extran (NTE)...............   50
Number of Natural Channels (NNC)...................... 1200
Number of Storage Junctions in Extran (NVSE).......... 2000
Number of Time History Data Points in Extran (NTVAL)..  500
Number of Data Points for Variable Storage Elements
  in the Extran Block (NVST)..........................  200
Number of Input Hydrographs in Extran (NEH)...........  500
Number of Allowable Channel Connections to
  Junctions in the Extran Block (NCHN)................   15
Number Rain Gages in Rain and Runoff (MAXRG)..........  200
Number PRATE/VRATE Points for Extran Pump
  Input (MAXPRA)......................................   10
Number of Variable Orifices in Extran (NVORF).........   50
Number of Variable Orifice Data Points (NVOTIM).......   50
Number of Allowable Precip. Values/yr in Rain (LIMRN). 5000
Number of Storm Events for Rain Analysis (LSTORM).....20000
Number of Plugs for Plug-flow in S/T (NPLUG)..........40000
Number Conduits for Extran Results to ASCII
  File (MXFLOW).......................................  400


##########################################
# Entry made to Storage/Treatment Block.  #
# Storage/Treatment model written by the  #
# University of Florida, June 1981.       #
# Last updated July 1995 at Oregon St. U. #
##########################################

VALUE OF NOTAPE           :         0

INPUT DATA SOURCE         :  EXTERNAL FILE

EXTERNAL ELEMENT NUMBER   :  400

NUMBER OF TIME STEPS      :   1402560

TIME STEP SIZE,SECONDS    :     900.0

NUMBER OF S/T UNITS       :         1

COST MODEL USED?          :        NO

STARTING DATE             :    10/ 1/1968

STARTING JULIAN DATE      :   1968275
```

```
STARTING TIME              :    0:  0:  0

SIMULATION DURATION, HOURS:350640.000

ENDING JULIAN DATE         :   2008275

ENDING TIME OF DAY         :     0.000 HOURS

PRINT TOTAL SIMULATION SUMMARY ONLY (ISUM = 0)

IDET = 0. NO DETAILED (TIME STEP) PRINT-OUTS.

NO OUTPUT FOR AVERAGE DETENTION TIME RESULTS


##########################################
# Header information from interface file: #
##########################################

Title from first computational block:
% Capture Analysis
Mission Village Basin D

Title from immediately preceding computational block:
% Capture Analysis
Mission Village Basin D

Name of preceding block:.............Runoff Block
Initial Julian date (IDATEZ)..................... 1968275
Initial time of day in seconds (TZERO).....          0.0
No. transfered input locations.....                    1
No. transfered pollutants.....                         0
Size of total catchment area (acres).....          738.05
ID numbers (JCE=0) or alphanumeric (JCE=1).....        1

################################################
# Element numbers of interface inlet locations: #
################################################
400

Conversion factor to cfs for flow units
on interface file.  Multiply by:     1.00000


INPUT/OUTPUT UNITS         :   U.S. CUSTOMARY

TRIBUTARY AREA, ACRES      :     738.1
```

NUMBER OF POLLUTANTS : 0

MONTHLY EVAPORATION RATES, IN/DAY

JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
0.030	0.048	0.072	0.102	0.132	0.156	0.168	0.150	0.114	0.078	0.042	0.030

BASIN INFILTRATION RATE FOR UNIT 1 IN (IN/HR) = 0.0000
1

UNIT CHARACTERISTICS

****
UNIT # 1 CHARACTERISTICS
****

GENERAL UNIT DESCRIPTION :

NAME : MV Basin D
IDENT : 1
TYPE OF UNIT : DETENTION
MAX. ALLOWABLE INFLOW, CFS: 0.1000E+05

FLOW DIRECTIONS:
BYPASS TO UNIT # 200
TREATED OUTFLOW TO UNIT # 200
RESIDUALS TO UNIT # 200

===> NOTE: UNIT 100 IS THE NEXT BLOCK AND UNIT 200 IS ULTIMATE DISPOSAL.

DETENTION UNIT CHARACTERISTICS:

RESIDUALS DRAW-OFF SCHEME: NEVER DRAWN OFF

DEPTH-AREA-STORAGE-FLOW RELATIONSHIPS :

DEPTH, FT	SURFACE AREA, SQ FT	STORAGE, CU FT	TREATED OUTFLOW, CFS	RESIDUAL FLOW, CFS
0.0000E+00	1.1568E+05	0.0000E+00	0.0000E+00	0.0000E+00
6.0000E-01	1.1829E+05	7.0192E+04	3.7300E+00	0.0000E+00

1.2000E+00	1.2093E+05	1.4196E+05	5.2800E+00	0.0000E+00
2.4000E+00	1.2628E+05	2.9028E+05	7.4700E+00	0.0000E+00
3.6000E+00	1.3173E+05	4.4509E+05	9.1500E+00	0.0000E+00
4.8000E+00	1.3729E+05	6.0650E+05	1.0560E+01	0.0000E+00
6.5900E+00	1.4579E+05	8.5985E+05	1.2380E+01	0.0000E+00
7.8000E+00	1.5164E+05	1.0398E+06	1.3470E+01	0.0000E+00
8.4000E+00	1.5458E+05	1.1317E+06	1.3970E+01	0.0000E+00
9.6000E+00	1.6056E+05	1.3207E+06	1.4940E+01	0.0000E+00
1.0800E+01	1.6663E+05	1.5171E+06	1.5840E+01	0.0000E+00
1.2000E+01	1.7281E+05	1.7207E+06	3.2460E+01	0.0000E+00

INITIAL CONDITIONS:

VOLUME, CU FT : 0.0000E+00

```
**************************************************
* NOTE: IF THERE IS ONLY ONE UNIT THE PLANT      *
*       PERFORMANCE SUMMARY WILL NOT BE PRINTED. *
**************************************************
```

Note !! UNIT 1 HAS EXCEEDED THE MAXIMUM STORAGE VOLUME ON 1/19/1969 AT 16:30
The excess has been bypassed and is included in BYPASS volume. Further
messages will be suppressed. But summaries of number of all volume-bypass
time steps and number of days with volume-bypasses will be printed.

1

```
**************************************
*    ENTIRE SIMULATION UNIT SUMMARIES *
**************************************
```

OCT 1, 1968, 0 0: 0 TO OCT 1, 2008, 0 0: 0.

UNIT	PARAMETER	VOLUME CU FT
1	INFLOW,TOTAL	9.3531E+08
	INFLOW,NET	7.4544E+08
	BYPASS	1.8988E+08
	TREATED OUTFLOW	7.4430E+08
	RESIDUAL FLOW	0.0000E+00
	REMAINING	0.0000E+00
	EVAPORATION	1.0491E+06
	INFILTRATION	0.0000E+00
	NO. VOL. BYPASSES	2481
	NO. VOL. BYPASS DAYS	156
	INITIAL COND.	0.0000E+00

```
     PERCENT ERROR         0.0084

===> Storage/Treatment simulation ended normally.

===> SWMM 4.4H   simulation ended normally.
     Always check output file for possible warning messages.

===> Your input file was named : MVBasinD_St0.in
===> Your output file was named: MVBasinD_St0.out

************************************************
*       SWMM 4.4H   Simulation Date and Time Summary  *
************************************************
* Starting Date... August     24, 2010                 *
*          Time...          16:58:11.696               *
*   Ending Date... August     24, 2010                 *
*          Time...          16:59:15.899               *
*  Elapsed Time...               1.070 minutes.       *
*  Elapsed Time...              64.201 seconds.       *
************************************************
```

Biofiltration Basin Z

SWMM RUNOFF Module Output File

1

```
**************************************************
*    U.S. Environmental Protection Agency        *
*    Storm Water Management Model  (SWMM)        *
*                 Version 4.4H                   *
*                                                *
*                CDM/OSU Beta                    *
*          Release Date - July 1, 2003           *
*   Camp Dresser & McKee and Oregon St. Univ.    *
*           Chuck Moore and Wayne Huber          *
*   Compiled using Compaq Visual Fortran v.6.6   *
**************************************************

                  Developed by

**************************************************
*              Metcalf & Eddy, Inc.              *
*             University of Florida              *
*        Water Resources Engineers, Inc.         *
*       (Now Camp Dresser & McKee, Inc.)         *
*                September 1970                  *
**************************************************

         Version 4.3 (outdated) is
        Distributed and Maintained by

**************************************************
*      U.S. Environmental Protection Agency      *
* Center for Exposure Assessment Modeling (CEAM)*
*    Athens Environmental Research Laboratory    *
*             960 College Station Road           *
*             Athens, GA    30605-2720           *
**************************************************

**************************************************
*     This is an updated release of SWMM4.4h,    *
*     no longer formally supported by the EPA.   *
*     If problems occur executing this model     *
*     contact Wayne Huber at Oregon State. U.,   *
*     wayne.huber@orst.edu,                      *
*     or Robert Dickinson at Camp Dresser &      *
*     McKee, DickinsonRE@CDM.COM.                *
*     The EPA-supported version is SWMMM5 at:    *
*   http://www.epa.gov/ednnrmrl/swmm/index.htm   *
**************************************************

**************************************************
*  This is an implementation of EPA SWMM 4.4H    *
*  "Nature is full of infinite causes which      *
```

```
*   have never occurred in experience" da Vinci *
**************************************************


########################################
#        File names by SWMM Block      #
#         JIN  -> Input to a Block     #
#        JOUT  -> Output from a Block  #
########################################

   JIN for Block #     1 File #    0  JIN.UF
  JOUT for Block #     1 File #    9  RN0.int

########################################
# Scratch file names for this simulation. #
########################################

NSCRAT #     1 File #    1  NEWHALL_PATCHED_20091119.INT
NSCRAT #     2 File #    2  SCRT2.UF
NSCRAT #     3 File #    3  SCRT3.UF
NSCRAT #     4 File #   10  SCRT4.UF
NSCRAT #     5 File #   11  SCRT5.UF
NSCRAT #     6 File #   12  SCRT6.UF
NSCRAT #     7 File #   13  SCRT7.UF
NSCRAT #     8 File #   14  SCRT8.UF
NSCRAT #     9 File #   15  SCRT9.UF

**************************************************
*    Parameter Values on the Tapes Common Block   *
**************************************************

 Number of Subcatchments in the Runoff Block (NW)..... 2000
 Number of Channel/Pipes in the Runoff Block (NG)..... 2000
 Number of Connections to Runoff Channels/Inlets (NCP).    6
 Number of Water Quality Constituents (MQUAL).........   20
 Number of Runoff Land Uses per Subcatchment (NLU).....   20
 Number of Groundwater Plot/prints in Runoff (NGW).....  500
 Number of Interface Locations for all Blocks (NIE).... 2000
 Number of Elements in the Transport Block (NET)....... 2000
 Number of Storage Junctions in Transport (NTSE).......  500
 Number of Transport interface input locations (NTHI).. 2000
 Number of Transport interface output locations (NTHO). 2000
 Number of Transport input locations on R lines (NTHR).   80
 Number of Transport printed output locations (NTOA)... 2000
 Number of Tabular Flow Splitters in Transport (NTSP).. 1000
 Number of Elements in the Extran Block (NEE)......... 4000
 Number of Pumps in Extran (NEP)...................... 1000
 Number of Orifices in Extran (NEO)....................  200
```

```
 Number of Tide Gates/Free Outfalls in Extran (NTG).... 1000
 Number of Extran Weirs (NEW).........................  400
 Number of Extran Printout Locations (NPO).............  150
 Number of Tide Elements in Extran (NTE)...............   50
 Number of Natural Channels (NNC)...................... 1200
 Number of Storage Junctions in Extran (NVSE).......... 2000
 Number of Time History Data Points in Extran (NTVAL)..  500
 Number of Data Points for Variable Storage Elements
   in the Extran Block (NVST)..........................  200
 Number of Input Hydrographs in Extran (NEH)...........  500
 Number of Allowable Channel Connections to
   Junctions in the Extran Block (NCHN)................   15
 Number Rain Gages in Rain and Runoff (MAXRG)..........  200
 Number PRATE/VRATE Points for Extran Pump
   Input (MAXPRA)......................................   10
 Number of Variable Orifices in Extran (NVORF).........   50
 Number of Variable Orifice Data Points (NVOTIM).......   50
 Number of Allowable Precip. Values/yr in Rain (LIMRN). 5000
 Number of Storm Events for Rain Analysis (LSTORM).....20000
 Number of Plugs for Plug-flow in S/T (NPLUG).........40000
 Number Conduits for Extran Results to ASCII
   File (MXFLOW).......................................  400


##################################################
# Entry made to the Runoff Block, last updated by #
# Oregon State University, and Camp, Dresser and  #
# McKee, Inc., July 2003.                         #
##################################################
# "And wherever water goes, amoebae go along for  #
#  the ride"                    Tom Robbins       #
##################################################


                % Capture Analysis

                Entrada Bioretention


Snowmelt parameter - ISNOW.....................          0

Number of rain gages - NRGAG...................          0

Green-Ampt infiltration equation used - INFILM...        1
```

```
Quality is not simulated - KWALTY.....................          0
Read evaporation data on line(s) F1 (F2) - IVAP..              2
Hour of day at start of storm - NHR.....................       0
Minute of hour at start of storm - NMN..................       0
Time TZERO at start of storm (hours)....................   0.000
Use U.S. Customary units for most I/O - METRIC...              0
Runoff input print control...                                  0
Runoff graph plot control....                                  1
Runoff output print control..                                  0
Print headers every 50 lines - NOHEAD (0=yes, 1=no)            1
Print land use load percentages -LANDUPR (0=no, 1=yes)         0
Limit number of groundwater convergence messages to       50 (if simulated)
Month, day, year of start of storm is:                 10/ 1/1968
Wet time step length (seconds).......                      900.
Dry time step length (seconds).......                    14400.
Wet/Dry time step length (seconds)...                      900.
Simulation length is......                          20081001.0 Yr/Mo/Dy
Percent of impervious area with zero detention depth      25.0

*********************************************************
*   Processed Precipitation will be read on NSCRAT(1)   *
*********************************************************

  ##############################
  #        Data Group F1       #
  # Evaporation Rate (in/month)#
  ##############################

 JAN.   FEB.   MAR.   APR.   MAY    JUN.   JUL.   AUG.   SEP.   OCT.   NOV.   DEC.
 ----   ----   ----   ----   ----   ----   ----   ----   ----   ----   ----   ----
```

0.93 1.34 2.23 3.06 4.09 4.68 5.21 4.65 3.42 2.42 1.26 0.93

1

****
* CHANNEL AND PIPE DATA *
****

Input Sequen Number	NAMEG: Channel ID #	Drains to NGTO:	Channel Type	Width (ft)	Length (ft)	Invert Slope (ft/ft)	L Side Slope (ft/ft)	R Side Slope (ft/ft)	Intial Depth (ft)	Max Depth (ft)	Mann-ings "N"	Full Flow (cfs)	Infilt Rate (in/hr)
1	101	100	Dummy	0.0	0.0	0.0000	0.0000	0.0000	0.0	0.0	0.0000	0.00E+00	0.00
2	102	100	Dummy	0.0	0.0	0.0000	0.0000	0.0000	0.0	0.0	0.0000	0.00E+00	0.00

1

****
* SUBCATCHMENT DATA *
****

NOTE. SEE LATER TABLE FOR OPTIONAL SUBCATCHMENT PARAMETERS

SUBCATCH-MENT NO.	CHANNEL OR INLET	GAGE PRINT	WIDTH (FT)	AREA (AC)	PERCENT IMPERV.	SLOPE (FT/FT)	RESISTANCE FACTOR IMPERV.	RESISTANCE FACTOR PERV.	DEPRES. STORAGE(IN) IMPERV.	DEPRES. STORAGE(IN) PERV.	GREEN-AMPT INFIL PARAMS SUCTION (IN)	GREEN-AMPT INFIL PARAMS HYD.CON (IN/HR)
1 Bio-AB	101	957.00	5.49	80.00	0.0500	0.012	0.250	0.020	0.060	8.00	0.280	
2 Bio-C	102	367.00	2.11	80.00	0.0500	0.012	0.250	0.020	0.060	8.00	0.150	

IMD NO. WB: 0.320 1 0 (Bio-AB); 0.290 1 0 (Bio-C)

TOTAL NUMBER OF SUBCATCHMENTS...	2
TOTAL TRIBUTARY AREA (ACRES)....	7.60
IMPERVIOUS AREA (ACRES).....	6.08
PERVIOUS AREA (ACRES).....	1.52
TOTAL WIDTH (FEET).....	1324.00
PERCENT IMPERVIOUSNESS.....	80.00

1

****

```
*    Arrangement of Subcatchments and Channel/Pipes     *
*********************************************************
* See second subcatchment output table for connectivity *
* of subcatchment to subcatchment flows.                *
*********************************************************


   Channel
   or Pipe
101            No Tributary Channel/Pipes
               Tributary Subareas........ Bio-AB
102            No Tributary Channel/Pipes
               Tributary Subareas........ Bio-C


    INLET
100            Tributary Channel/Pipes... 101        102
               No Tributary Subareas.....


************************************************************
* Hydrographs will be stored for the following   1 INLETS *
************************************************************
100


*********************************************
*  Quality simulation not included in this run *
*********************************************



    ***********************
    *    DATA GROUP M1    *
    ***********************


TOTAL NUMBER OF PRINTED GUTTERS/INLETS...NPRNT..        1
NUMBER OF TIME STEPS BETWEEN PRINTINGS..INTERV..        0
STARTING AND STOPPING PRINTOUT DATES.....               0         0


    ***********************
    *    DATA GROUP M3    *
    ***********************

CHANNEL/INLET PRINT DATA GROUPS......101
```

```
    **********************
    *    DATA GROUP M8     *
    **********************

STORM EVENT TRACKING.....
    Storm event data file =    Sm0.out


End of preliminary input data and data echo.

*************************************************
*  Precipitation Interface File Summary         *
*  Number of precipitation station....      1   *
*************************************************

Location Station Number
-------- --------------
       1.             0

***********************************************
*      End of time step DO-loop in Runoff     *
***********************************************

Final Date (Mo/Day/Year)   =                  10/ 2/2008
Total number of time steps =                      117489
Final Julian Date  =                             2008276
Final time of day  =                                  1. seconds.
Final time of day  =                               0.00   hours.
Final running time =                          350664.0000   hours.
Final running time =                           14611.0000    days.

***********************************************
*     Extrapolation Summary for Watersheds    *
* # Steps ==> Total Number of Extrapolated Steps *
* # Calls ==> Total Number of OVERLND Calls    *
***********************************************

  Subcatch   # Steps   # Calls  Subcatch   # Steps   # Calls  Subcatch   # Steps   # Calls
  --------   -------   -------  --------   -------   -------  --------   -------   -------
Bio-AB        649684     61080Bio-C         663506     62894

***********************************************
*     Extrapolation Summary for Channel/Pipes *
* # Steps ==> Total Number of Extrapolated Steps *
```

```
* # Calls ==> Total Number of GUTNR Calls          *
**************************************************

 Chan/Pipe   # Steps   # Calls Chan/Pipe   # Steps   # Calls Chan/Pipe   # Steps   # Calls
 ---------   -------   ------- ---------   -------   ------- ---------   -------   -------
101                0         0102                0         0
1
 ***********************************************
 *       Continuity Check for Surface Water    *
 ***********************************************
                                                                 Inches over
                                                  cubic feet     Total Basin
 Total Precipitation (Rain plus Snow)           2.021428E+07      732.720
 Total Irrigation                               0.000000E+00        0.000
 Total Infiltration                             3.712073E+06      134.554
 Total Evaporation                              7.798877E+05       28.269
 Surface Runoff from Watersheds                 1.587581E+07      575.461
 Total Water remaining in Surface Storage       0.000000E+00        0.000
 Infiltration over the Pervious Area...         3.712073E+06      672.770
                  --------
 Infiltration + Evaporation +
 Surface Runoff + Snow removal +
 Water remaining in Surface Storage +
 Water remaining in Snow Cover.....             2.036777E+07      738.284
 Total Precipitation + Initial Storage +
 Total Irrigation.....                          2.021428E+07      732.720


 The error in continuity is calculated as
 ****************************************
 * Precipitation + Initial Snow Cover  *
 *      - Infiltration -               *
 *Evaporation - Snow removal -         *
 *Surface Runoff from Watersheds -     *
 *Water in Surface Storage -           *
 *Water remaining in Snow Cover        *
 *-------------------------------------*
 * Precipitation + Initial Snow Cover  *
 ****************************************
 Error.................................      -0.759 Percent


 ***********************************************
 *       Continuity Check for Channel/Pipes    *
 ***********************************************
                                                                 Inches over
                                                  cubic feet     Total Basin
 Initial Channel/Pipe Storage.............      0.000000E+00        0.000
```

Final Channel/Pipe Storage.....	0.000000E+00	0.000
Surface Runoff from Watersheds.....	1.587581E+07	575.461
Groundwater Subsurface Inflow.....	0.000000E+00	0.000
Evaporation Loss from Channels.....	0.000000E+00	0.000
Infiltration Loss from Channels.....	0.000000E+00	0.000
Channel/Pipe/Inlet Outflow.....	0.158758E+08	575.461
Initial Storage + Inflow.....	1.587581E+07	575.461
Final Storage + Outflow.....	1.587581E+07	575.461

```
*****************************************
* Final Storage + Outflow + Evaporation  - *
* Watershed Runoff - Groundwater Inflow  - *
*     Initial Channel/Pipe Storage         *
*     ---------------------------------    *
*  Final Storage + Outflow  + Evaporation  *
*****************************************
```

Error..... 0.000 Percent

1

SUMMARY STATISTICS FOR SUBCATCHMENTS

SUBCATCHMENT	GUTTER OR INLET NO.	AREA (AC)	PERCENT IMPER.	TOTAL SIMULATED RAINFALL (IN)	PERVIOUS AREA TOTAL RUNOFF DEPTH (IN)	PERVIOUS AREA TOTAL LOSSES (IN)	PERVIOUS AREA PEAK RUNOFF RATE (CFS)	IMPERVIOUS AREA RUNOFF DEPTH (IN)	IMPERVIOUS AREA PEAK RUNOFF RATE (CFS)	TOTAL RUNOFF DEPTH (IN)	TOTAL PEAK RUNOFF RATE (CFS)	PEAK UNIT RUNOFF (IN/HR)
Bio-AB	101	5.49	80.0	733.64	33.327	700.444	1.271	706.886	6.324	572.174	7.595	1.383
Bio-C	102	2.11	80.0	733.64	92.489	641.884	0.544	706.882	2.431	584.003	2.974	1.410

*** NOTE *** IMPERVIOUS AREA STATISTICS AGGREGATE IMPERVIOUS AREAS WITH AND WITHOUT DEPRESSION STORAGE

SUMMARY STATISTICS FOR CHANNEL/PIPES

MAXIMUM SURCHARGE VOLUME (AC-FT)	RATIO OF FULL CHANNEL FLOW NUMBER	RATIO OF FULL MAX. TO FULL FLOW (CFS)	MAX. DEPTH TO FULL VELOCITY (FPS)	FULL DEPTH (FT)	MAXIMUM COMPUTED INFLOW (CFS)	MAXIMUM COMPUTED OUTFLOW (CFS)	MAXIMUM COMPUTED DEPTH (FT)	MAXIMUM COMPUTED VELOCITY (FPS)	TIME OF OCCURRENCE DAY	HR.	LENGTH OF SURCHARGE (HOUR)
	102				2.97				2/ 7/1998	20.00	
	101				7.60				2/ 7/1998	20.00	
	100				10.57				2/ 7/1998	20.00	

TOTAL NUMBER OF CHANNELS/PIPES = 3

*** NOTE *** THE MAXIMUM FLOWS AND DEPTHS ARE CALCULATED AT THE END OF THE TIME INTERVAL
1

****
* Summary of quantity results (flow in cfs) *
****

% Capture Analysis
Entrada Bioretention

Date Mo/Da/Year	Time Hr:Min	Chan/Inlt 101 Flow Cfs
Flow wt'd means.....		0.0090
Flow wt'd std-devs...		0.0992
Maximum value.....		7.5950
Minimum value.....		0.0000
Total loads.....		1.1402E+07 Cubic-ft

===> Runoff simulation ended normally.

===> SWMM 4.4H simulation ended normally.
Always check output file for possible warning messages.

===> Your input file was named : Bioretention_RN0.in
===> Your output file was named: Bioretention_RN0.out

```
************************************************************
*       SWMM 4.4H   Simulation Date and Time Summary       *
************************************************************
* Starting Date... May        11, 2010                     *
*          Time...          11:41:10.271                    *
*   Ending Date... May        11, 2010                     *
*          Time...          11:41:19.475                    *
*  Elapsed Time...              0.153 minutes.             *
*  Elapsed Time...              9.204 seconds.             *
************************************************************
```

Biofiltration Basin Z

SWMM STORAGE Module Output File

1

```
************************************************
*    U.S. Environmental Protection Agency      *
*    Storm Water Management Model  (SWMM)      *
*                 Version 4.4H                 *
*                                              *
*                CDM/OSU Beta                  *
*          Release Date - July 1, 2003         *
*   Camp Dresser & McKee and Oregon St. Univ.  *
*         Chuck Moore and Wayne Huber          *
*   Compiled using Compaq Visual Fortran v.6.6 *
************************************************

                 Developed by

************************************************
*             Metcalf & Eddy, Inc.             *
*            University of Florida             *
*       Water Resources Engineers, Inc.        *
*      (Now Camp Dresser & McKee, Inc.)        *
*                 September 1970               *
************************************************

         Version 4.3 (outdated) is
        Distributed and Maintained by

************************************************
*      U.S. Environmental Protection Agency    *
* Center for Exposure Assessment Modeling (CEAM)*
*    Athens Environmental Research Laboratory  *
*             960 College Station Road         *
*             Athens, GA    30605-2720         *
************************************************

************************************************
*     This is an updated release of SWMM4.4h,  *
*     no longer formally supported by the EPA. *
*     If problems occur executing this model   *
*     contact Wayne Huber at Oregon State. U.,  *
*     wayne.huber@orst.edu,                    *
*     or Robert Dickinson at Camp Dresser &    *
*     McKee, DickinsonRE@CDM.COM.              *
*     The EPA-supported version is SWMM5 at:   *
*   http://www.epa.gov/ednnrmrl/swmm/index.htm *
************************************************
```

```
          ************************************************
          *  This is an implementation of EPA SWMM 4.4H   *
          *  "Nature is full of infinite causes which     *
          *   have never occurred in experience" da Vinci *
          ************************************************


##########################################
#        File names by SWMM Block        #
#         JIN  -> Input to a Block       #
#        JOUT  -> Output from a Block    #
##########################################

   JIN for Block #     1 File #    8  RN0.int
  JOUT for Block #     1 File #    9  JOT.UF

##########################################
# Scratch file names for this simulation. #
##########################################

NSCRAT #     1 File #    1  SCRT1.UF
NSCRAT #     2 File #    2  SCRT2.UF
NSCRAT #     3 File #    3  SCRT3.UF
NSCRAT #     4 File #   10  SCRT4.UF
NSCRAT #     5 File #   11  SCRT5.UF
NSCRAT #     6 File #   12  SCRT6.UF
NSCRAT #     7 File #   13  SCRT7.UF

************************************************
*    Parameter Values on the Tapes Common Block   *
************************************************

 Number of Subcatchments in the Runoff Block (NW)..... 2000
 Number of Channel/Pipes in the Runoff Block (NG)..... 2000
 Number of Connections to Runoff Channels/Inlets (NCP).    6
 Number of Water Quality Constituents (MQUAL).........   20
 Number of Runoff Land Uses per Subcatchment (NLU).....   20
 Number of Groundwater Plot/prints in Runoff (NGW).....  500
 Number of Interface Locations for all Blocks (NIE).... 2000
 Number of Elements in the Transport Block (NET)....... 2000
 Number of Storage Junctions in Transport (NTSE).......  500
 Number of Transport interface input locations (NTHI).. 2000
 Number of Transport interface output locations (NTHO). 2000
```

```
Number of Transport input locations on R lines (NTHR).    80
Number of Transport printed output locations (NTOA)... 2000
Number of Tabular Flow Splitters in Transport (NTSP).. 1000
Number of Elements in the Extran Block (NEE)..........4000
Number of Pumps in Extran (NEP)....................... 1000
Number of Orifices in Extran (NEO).....................  200
Number of Tide Gates/Free Outfalls in Extran (NTG).... 1000
Number of Extran Weirs (NEW)...........................  400
Number of Extran Printout Locations (NPO).............  150
Number of Tide Elements in Extran (NTE)...............   50
Number of Natural Channels (NNC)....................... 1200
Number of Storage Junctions in Extran (NVSE).......... 2000
Number of Time History Data Points in Extran (NTVAL)..  500
Number of Data Points for Variable Storage Elements
  in the Extran Block (NVST)...........................  200
Number of Input Hydrographs in Extran (NEH)...........  500
Number of Allowable Channel Connections to
  Junctions in the Extran Block (NCHN)................   15
Number Rain Gages in Rain and Runoff (MAXRG).........  200
Number PRATE/VRATE Points for Extran Pump
  Input (MAXPRA).......................................   10
Number of Variable Orifices in Extran (NVORF).........   50
Number of Variable Orifice Data Points (NVOTIM).......   50
Number of Allowable Precip. Values/yr in Rain (LIMRN). 5000
Number of Storm Events for Rain Analysis (LSTORM).....20000
Number of Plugs for Plug-flow in S/T (NPLUG).........40000
Number Conduits for Extran Results to ASCII
  File (MXFLOW)........................................  400


##########################################
# Entry made to Storage/Treatment Block.  #
# Storage/Treatment model written by the  #
# University of Florida, June 1981.       #
# Last updated July 1995 at Oregon St. U. #
##########################################

VALUE OF NOTAPE            :         0

INPUT DATA SOURCE          :  EXTERNAL FILE

EXTERNAL ELEMENT NUMBER    :  100
```

```
NUMBER OF TIME STEPS      :   1402560

TIME STEP SIZE,SECONDS    :     900.0

NUMBER OF S/T UNITS       :         1

COST MODEL USED?          :        NO

STARTING DATE             :    10/ 1/1968

STARTING JULIAN DATE      :   1968275

STARTING TIME             :    0:  0:  0

SIMULATION DURATION, HOURS:350640.000

ENDING JULIAN DATE        :   2008275

ENDING TIME OF DAY        :     0.000 HOURS

PRINT TOTAL SIMULATION SUMMARY ONLY (ISUM = 0)

IDET = 0. NO DETAILED (TIME STEP) PRINT-OUTS.

NO OUTPUT FOR AVERAGE DETENTION TIME RESULTS


##########################################
# Header information from interface file: #
##########################################

Title from first computational block:
% Capture Analysis
Entrada Bioretention

Title from immediately preceding computational block:
% Capture Analysis
Entrada Bioretention

Name of preceding block:.............Runoff Block
Initial Julian date (IDATEZ)..................... 1968275
Initial time of day in seconds (TZERO).....     0.0
No. transfered input locations.....               1
```

No. transfered pollutants..... 0
Size of total catchment area (acres)..... 7.60
ID numbers (JCE=0) or alphanumeric (JCE=1)..... 1

```
################################################
# Element numbers of interface inlet locations: #
################################################
100
```

Conversion factor to cfs for flow units
on interface file. Multiply by: 1.00000

INPUT/OUTPUT UNITS : U.S. CUSTOMARY

TRIBUTARY AREA, ACRES : 7.6

NUMBER OF POLLUTANTS : 0

MONTHLY EVAPORATION RATES, IN/DAY

JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
0.030	0.048	0.072	0.102	0.132	0.156	0.168	0.150	0.114	0.078	0.042	0.030

BASIN INFILTRATION RATE FOR UNIT 1 IN (IN/HR) = 0.0000
1

UNIT CHARACTERISTICS

```
************************
UNIT #  1 CHARACTERISTICS
************************
```

GENERAL UNIT DESCRIPTION :

NAME : Bioretention
IDENT : 1
TYPE OF UNIT : DETENTION
MAX. ALLOWABLE INFLOW, CFS: 0.1000E+05

```
FLOW DIRECTIONS:
BYPASS TO UNIT #           100
TREATED OUTFLOW TO UNIT # 100
RESIDUALS TO UNIT #        100

===> NOTE: UNIT 100 IS THE NEXT BLOCK AND UNIT 200 IS ULTIMATE DISPOSAL.


DETENTION UNIT CHARACTERISTICS:

RESIDUALS DRAW-OFF SCHEME: NEVER DRAWN OFF

DEPTH-AREA-STORAGE-FLOW RELATIONSHIPS :

  DEPTH,        SURFACE        STORAGE,       TREATED        RESIDUAL
    FT       AREA, SQ FT       CU FT       OUTFLOW, CFS    FLOW, CFS
0.0000E+00    1.0725E+04    0.0000E+00     0.0000E+00     0.0000E+00
1.0000E-03    1.0725E+04    1.0725E+01     4.4700E-01     0.0000E+00
1.5000E+00    1.0725E+04    1.6088E+04     4.4700E-01     0.0000E+00

INITIAL CONDITIONS:

VOLUME, CU FT      : 0.0000E+00


**************************************************
* NOTE: IF THERE IS ONLY ONE UNIT THE PLANT      *
*       PERFORMANCE SUMMARY WILL NOT BE PRINTED. *
**************************************************


Note !! UNIT 1 HAS EXCEEDED THE MAXIMUM STORAGE VOLUME ON  1/19/1969 AT 16:45
The excess has been bypassed and is included in BYPASS volume.  Further
messages will be suppressed.  But summaries of number of all volume-bypass
time steps and number of days with volume-bypasses will be printed.
1
**************************************
*    ENTIRE SIMULATION UNIT SUMMARIES *
**************************************
 OCT  1, 1968,  0 0: 0 TO  OCT  1, 2008,  0 0: 0.
```

UNIT	PARAMETER	VOLUME CU FT
1	INFLOW,TOTAL	1.5861E+07
	INFLOW,NET	1.2688E+07
	BYPASS	3.1725E+06
	TREATED OUTFLOW	1.2670E+07
	RESIDUAL FLOW	0.0000E+00
	REMAINING	0.0000E+00
	EVAPORATION	1.6974E+04
	INFILTRATION	0.0000E+00
	NO. VOL. BYPASSES	3091
	NO. VOL. BYPASS DAYS	193
	INITIAL COND.	0.0000E+00
	PERCENT ERROR	0.0095

===> Storage/Treatment simulation ended normally.

===> SWMM 4.4H simulation ended normally.
Always check output file for possible warning messages.

===> Your input file was named : Bioretention_St0.in
===> Your output file was named: Bioretention_St0.out

```
**********************************************************
*       SWMM 4.4H   Simulation Date and Time Summary     *
**********************************************************
* Starting Date... May        11, 2010                   *
*          Time...          12:40:43.362                  *
*   Ending Date... May        11, 2010                   *
*          Time...          12:41:50.254                  *
*  Elapsed Time...               1.115 minutes.          *
*  Elapsed Time...              66.893 seconds.          *
**********************************************************
```

Generic Biofiltration Model: Commercial Land Use

SWMM RUNOFF Module Output File

1

```
**************************************************
*    U.S. Environmental Protection Agency        *
*    Storm Water Management Model  (SWMM)        *
*                 Version 4.4H                   *
*                                                *
*                CDM/OSU Beta                    *
*          Release Date - July 1, 2003           *
*   Camp Dresser & McKee and Oregon St. Univ.    *
*          Chuck Moore and Wayne Huber           *
*   Compiled using Compaq Visual Fortran v.6.6   *
**************************************************

                 Developed by

**************************************************
*             Metcalf & Eddy, Inc.               *
*            University of Florida               *
*       Water Resources Engineers, Inc.          *
*      (Now Camp Dresser & McKee, Inc.)          *
*                September 1970                  *
**************************************************

        Version 4.3 (outdated) is
       Distributed and Maintained by

**************************************************
*      U.S. Environmental Protection Agency      *
* Center for Exposure Assessment Modeling (CEAM)*
*    Athens Environmental Research Laboratory    *
*            960 College Station Road            *
*            Athens, GA    30605-2720            *
**************************************************

**************************************************
*     This is an updated release of SWMM4.4h,    *
*     no longer formally supported by the EPA.   *
*     If problems occur executing this model     *
*     contact Wayne Huber at Oregon State. U.,   *
*     wayne.huber@orst.edu,                      *
*     or Robert Dickinson at Camp Dresser &      *
*     McKee, DickinsonRE@CDM.COM.                *
*     The EPA-supported version is SWMM5 at:     *
*   http://www.epa.gov/ednnrmrl/swmm/index.htm   *
**************************************************
```

```
          ************************************************
          *  This is an implementation of EPA SWMM 4.4H  *
          *  "Nature is full of infinite causes which    *
          *   have never occurred in experience" da Vinci *
          ************************************************


##########################################
#        File names by SWMM Block        #
#         JIN  -> Input to a Block       #
#        JOUT  -> Output from a Block    #
##########################################

   JIN for Block #     1 File #    0  JIN.UF
  JOUT for Block #     1 File #    9  RN0.int

##########################################
# Scratch file names for this simulation. #
##########################################

NSCRAT #     1 File #    1  NEWHALL_PATCHED_20091119.INT
NSCRAT #     2 File #    2  SCRT2.UF
NSCRAT #     3 File #    3  SCRT3.UF
NSCRAT #     4 File #   10  SCRT4.UF
NSCRAT #     5 File #   11  SCRT5.UF
NSCRAT #     6 File #   12  SCRT6.UF
NSCRAT #     7 File #   13  SCRT7.UF
NSCRAT #     8 File #   14  SCRT8.UF
NSCRAT #     9 File #   15  SCRT9.UF

************************************************
*    Parameter Values on the Tapes Common Block   *
************************************************

 Number of Subcatchments in the Runoff Block (NW)..... 2000
 Number of Channel/Pipes in the Runoff Block (NG)..... 2000
 Number of Connections to Runoff Channels/Inlets (NCP).    6
 Number of Water Quality Constituents (MQUAL).....      20
 Number of Runoff Land Uses per Subcatchment (NLU).....  20
 Number of Groundwater Plot/prints in Runoff (NGW).....  500
 Number of Interface Locations for all Blocks (NIE).... 2000
 Number of Elements in the Transport Block (NET)....... 2000
 Number of Storage Junctions in Transport (NTSE).......  500
```

```
 Number of Transport interface input locations (NTHI).. 2000
 Number of Transport interface output locations (NTHO). 2000
 Number of Transport input locations on R lines (NTHR).   80
 Number of Transport printed output locations (NTOA)... 2000
 Number of Tabular Flow Splitters in Transport (NTSP).. 1000
 Number of Elements in the Extran Block (NEE)..... 4000
 Number of Pumps in Extran (NEP)..... 1000
 Number of Orifices in Extran (NEO).....  200
 Number of Tide Gates/Free Outfalls in Extran (NTG).... 1000
 Number of Extran Weirs (NEW).....  400
 Number of Extran Printout Locations (NPO).....  150
 Number of Tide Elements in Extran (NTE).....   50
 Number of Natural Channels (NNC)..... 1200
 Number of Storage Junctions in Extran (NVSE)..... 2000
 Number of Time History Data Points in Extran (NTVAL)..  500
 Number of Data Points for Variable Storage Elements
   in the Extran Block (NVST).....  200
 Number of Input Hydrographs in Extran (NEH).....  500
 Number of Allowable Channel Connections to
   Junctions in the Extran Block (NCHN).....   15
 Number Rain Gages in Rain and Runoff (MAXRG).....  200
 Number PRATE/VRATE Points for Extran Pump
   Input (MAXPRA).....   10
 Number of Variable Orifices in Extran (NVORF).....   50
 Number of Variable Orifice Data Points (NVOTIM).....   50
 Number of Allowable Precip. Values/yr in Rain (LIMRN). 5000
 Number of Storm Events for Rain Analysis (LSTORM).....20000
 Number of Plugs for Plug-flow in S/T (NPLUG).....40000
 Number Conduits for Extran Results to ASCII
   File (MXFLOW).....  400


##################################################
# Entry made to the Runoff Block, last updated by #
# Oregon State University, and Camp, Dresser and  #
# McKee, Inc., July 2003.                         #
##################################################
# "And wherever water goes, amoebae go along for  #
#  the ride"                    Tom Robbins       #
##################################################
```

% Capture Analysis

Bioretention Unit Area- Comm

Snowmelt parameter - ISNOW.....	0
Number of rain gages - NRGAG.....	0
Green-Ampt infiltration equation used - INFILM...	1
Quality is not simulated - KWALTY.....	0
Read evaporation data on line(s) F1 (F2) - IVAP..	2
Hour of day at start of storm - NHR.....	0
Minute of hour at start of storm - NMN.....	0
Time TZERO at start of storm (hours).....	0.000
Use U.S. Customary units for most I/O - METRIC...	0
Runoff input print control...	0
Runoff graph plot control....	1
Runoff output print control..	0
Print headers every 50 lines - NOHEAD (0=yes, 1=no)	1
Print land use load percentages -LANDUPR (0=no, 1=yes)	0
Limit number of groundwater convergence messages to	50 (if simulated)
Month, day, year of start of storm is:	10/ 1/1968
Wet time step length (seconds).....	900.
Dry time step length (seconds).....	14400.
Wet/Dry time step length (seconds)...	900.

Simulation length is..... 20081001.0 Yr/Mo/Dy

Percent of impervious area with zero detention depth 25.0

****
* Processed Precipitation will be read on NSCRAT(1) *
****

##############################
Data Group F1
Evaporation Rate (in/month)#
##############################

JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.
0.93	1.34	2.23	3.06	4.09	4.68	5.21	4.65	3.42	2.42	1.26	0.93

1

****
* C H A N N E L A N D P I P E D A T A *
****

Input Sequen Number	NAMEG: Channel ID #	Drains to NGTO:	Channel Type	Width (ft)	Length (ft)	Invert Slope (ft/ft)	L Side Slope (ft/ft)	R Side Slope (ft/ft)	Intial Depth (ft)	Max Depth (ft)	Mann- ings "N"	Full Flow (cfs)	Infilt Rate (in/hr)
1	201	200	Dummy	0.0	0.0	0.0000	0.0000	0.0000	0.0	0.0	0.0000	0.00E+00	0.00

1

****
* S U B C A T C H M E N T D A T A *
****

NOTE. SEE LATER TABLE FOR OPTIONAL SUBCATCHMENT PARAMETERS

SUBCATCH- MENT NO.	CHANNEL OR INLET	GAGE PRINT	WIDTH (FT)	AREA (AC)	PERCENT IMPERV.	SLOPE (FT/FT)	RESISTANCE FACTOR IMPERV.	RESISTANCE FACTOR PERV.	DEPRES. STORAGE(IN) IMPERV.	DEPRES. STORAGE(IN) PERV.	GREEN-AMPT INFIL PARAMS SUCTION	GREEN-AMPT INFIL PARAMS HYD.CON	GREEN-AMPT INFIL PARAMS IMD
NO.	WB												

```
  (IN/HR)                                                                                                                (IN)
  ---  --------    -------- --------- --------  -----    -------     -------  --------     ------     ------      ----
-------  -------  ------  ----
   1 Comm        201           174.00     1.00  91.00     0.0500       0.012      0.250      0.020      0.060      8.00
 0.140    0.290        1     0

 TOTAL NUMBER OF SUBCATCHMENTS...                1
 TOTAL TRIBUTARY AREA (ACRES)....             1.00
 IMPERVIOUS AREA (ACRES).........             0.91
 PERVIOUS AREA (ACRES)...........             0.09
 TOTAL WIDTH (FEET)..............           174.00
 PERCENT IMPERVIOUSNESS..........            91.00

1
 ************************************************************
 *    Arrangement of Subcatchments and Channel/Pipes        *
 ************************************************************
 * See second subcatchment output table for connectivity *
 * of subcatchment to subcatchment flows.                 *
 ************************************************************


    Channel
    or Pipe
 201            No Tributary Channel/Pipes
                Tributary Subareas........ Comm


     INLET
 200            Tributary Channel/Pipes... 201
                No Tributary Subareas.....


 ************************************************************
 * Hydrographs will be stored for the following   1 INLETS *
 ************************************************************
 200


 ************************************************
 *  Quality simulation not included in this run *
 ************************************************
```

```
    ************************
    *    DATA GROUP M1     *
    ************************


TOTAL NUMBER OF PRINTED GUTTERS/INLETS...NPRNT..        1
NUMBER OF TIME STEPS BETWEEN PRINTINGS..INTERV..        0
STARTING AND STOPPING PRINTOUT DATES.............       0         0


    ************************
    *    DATA GROUP M3     *
    ************************

CHANNEL/INLET PRINT DATA GROUPS......201


    ************************
    *    DATA GROUP M8     *
    ************************

STORM EVENT TRACKING.....
    Storm event data file =     Sm0.out


End of preliminary input data and data echo.

*****************************************************
*  Precipitation Interface File Summary             *
*  Number of precipitation station....        1     *
*****************************************************

Location Station Number
-------- --------------
       1.             0

*************************************************
*      End of time step DO-loop in Runoff       *
*************************************************
```

```
 Final Date (Mo/Day/Year)    =                  10/ 1/2008
 Total number of time steps =                      118056
 Final Julian Date  =                             2008275
 Final time of day  =                               86400. seconds.
 Final time of day  =                                24.00   hours.
 Final running time =                           350664.0000   hours.
 Final running time =                            14611.0000    days.

 ************************************************
 *     Extrapolation Summary for Watersheds     *
 * # Steps ==> Total Number of Extrapolated Steps *
 * # Calls ==> Total Number of OVERLND Calls    *
 ************************************************

  Subcatch   # Steps   # Calls  Subcatch   # Steps   # Calls  Subcatch   # Steps   # Calls
  --------   -------   -------  --------   -------   -------  --------   -------   -------
Comm           666466     64330

 ************************************************
 *     Extrapolation Summary for Channel/Pipes  *
 * # Steps ==> Total Number of Extrapolated Steps *
 * # Calls ==> Total Number of GUTNR Calls      *
 ************************************************

 Chan/Pipe   # Steps   # Calls Chan/Pipe   # Steps   # Calls Chan/Pipe   # Steps   # Calls
  --------   -------   ------- --------   -------   ------- --------   -------   -------
201                0         0
1
 ********************************************
 *       Continuity Check for Surface Water   *
 ********************************************

                                                                  Inches over
                                                  cubic feet      Total Basin
 Total Precipitation (Rain plus Snow)          2.660137E+06       732.820
 Total Irrigation                              0.000000E+00         0.000
 Total Infiltration                            2.026227E+05        55.819
 Total Evaporation                             1.118766E+05        30.820
 Surface Runoff from Watersheds                2.368515E+06       652.483
 Total Water remaining in Surface Storage      0.000000E+00         0.000
 Infiltration over the Pervious Area...        2.026227E+05       620.211
                        --------
 Infiltration + Evaporation +
 Surface Runoff + Snow removal +
```

Water remaining in Surface Storage + Water remaining in Snow Cover.....	2.683014E+06	739.122
Total Precipitation + Initial Storage + Total Irrigation.....	2.660136E+06	732.820

The error in continuity is calculated as

```
*************************************
* Precipitation + Initial Snow Cover  *
*      - Infiltration -               *
*Evaporation - Snow removal -         *
*Surface Runoff from Watersheds -     *
*Water in Surface Storage -           *
*Water remaining in Snow Cover        *
*-----------------------------------*
* Precipitation + Initial Snow Cover  *
*************************************
```

Error..... -0.860 Percent

```
*********************************************
*       Continuity Check for Channel/Pipes  *
*********************************************
```

	cubic feet	Inches over Total Basin
Initial Channel/Pipe Storage.....	0.000000E+00	0.000
Final Channel/Pipe Storage.....	0.000000E+00	0.000
Surface Runoff from Watersheds.....	2.368515E+06	652.483
Groundwater Subsurface Inflow.....	0.000000E+00	0.000
Evaporation Loss from Channels.....	0.000000E+00	0.000
Infiltration Loss from Channels.....	0.000000E+00	0.000
Channel/Pipe/Inlet Outflow.....	0.236851E+07	652.483
Initial Storage + Inflow.....	2.368515E+06	652.483
Final Storage + Outflow.....	2.368515E+06	652.483

```
*****************************************
* Final Storage + Outflow + Evaporation  - *
* Watershed Runoff - Groundwater Inflow  - *
*     Initial Channel/Pipe Storage         *
*     ---------------------------------    *
*  Final Storage + Outflow  + Evaporation  *
*****************************************
```

Error..... 0.000 Percent

1

SUMMARY STATISTICS FOR SUBCATCHMENTS

SUBCATCHMENT NO.	GUTTER OR INLET NO.	AREA (AC)	PERCENT IMPER.	TOTAL SIMULATED RAINFALL (IN)	PERVIOUS AREA TOTAL RUNOFF DEPTH (IN)	PERVIOUS AREA TOTAL LOSSES (IN)	PERVIOUS AREA PEAK RUNOFF RATE (CFS)	IMPERVIOUS AREA RUNOFF DEPTH (IN)	IMPERVIOUS AREA PEAK RUNOFF RATE (CFS)	TOTAL SUBCATCHMENT RUNOFF DEPTH (IN)	TOTAL SUBCATCHMENT PEAK RUNOFF RATE (CFS)	UNIT PEAK RUNOFF (IN/HR)
Comm	201	1.00	91.0	733.64	103.695	631.745	0.114	706.766	1.310	652.489	1.424	1.424

*** NOTE *** IMPERVIOUS AREA STATISTICS AGGREGATE IMPERVIOUS AREAS WITH AND WITHOUT DEPRESSION STORAGE

SUMMARY STATISTICS FOR CHANNEL/PIPES

CHANNEL NUMBER	FULL FLOW (CFS)	FULL VELOCITY (FPS)	FULL DEPTH (FT)	MAXIMUM COMPUTED INFLOW (CFS)	MAXIMUM COMPUTED OUTFLOW (CFS)	MAXIMUM COMPUTED DEPTH (FT)	MAXIMUM COMPUTED VELOCITY (FPS)	TIME OF OCCURRENCE DAY	TIME OF OCCURRENCE HR.	LENGTH OF SURCHARGE (HOUR)	MAXIMUM SURCHARGE VOLUME (AC-FT)	RATIO OF MAX. FLOW TO FULL FLOW	RATIO OF MAX. DEPTH TO FULL DEPTH
201				1.42				2/ 7/1998	20.00				
200				1.42				2/ 7/1998	20.00				

TOTAL NUMBER OF CHANNELS/PIPES = 2

*** NOTE *** THE MAXIMUM FLOWS AND DEPTHS ARE CALCULATED AT THE END OF THE TIME INTERVAL

1

```
 ********************************************
 *  Summary of quantity results (flow in cfs) *
 ********************************************

    % Capture Analysis
    Bioretention Unit Area- Comm

                         Chan/Inlt
                         201
      Date      Time          Flow
  Mo/Da/Year  Hr:Min           Cfs
  ----------  ------         ----

Flow wt'd means.....       0.0019
Flow wt'd std-devs...      0.0205
Maximum value........      1.4239
Minimum value........      0.0000
Total loads..........  2.3685E+06
                         Cubic-ft

 ===> Runoff simulation ended normally.

 ===> SWMM 4.4H   simulation ended normally.
      Always check output file for possible warning messages.

 ===> Your input file was named : Comm_RN0.in
 ===> Your output file was named: Comm_RN0.out

 ********************************************************
 *       SWMM 4.4H   Simulation Date and Time Summary   *
 ********************************************************
 * Starting Date... August     20, 2010                 *
 *          Time...          13:15:30.541               *
 *   Ending Date... August     20, 2010                 *
 *          Time...          13:15:39. 73               *
 *  Elapsed Time...               0.142 minutes.        *
 *  Elapsed Time...               8.534 seconds.        *
 ********************************************************
```

Generic Biofiltration Model: Commercial Land Use

SWMM STORAGE Module Output File

1

```
**************************************************
*    U.S. Environmental Protection Agency        *
*    Storm Water Management Model  (SWMM)        *
*                 Version 4.4H                   *
*                                                *
*                CDM/OSU Beta                    *
*          Release Date - July 1, 2003           *
*   Camp Dresser & McKee and Oregon St. Univ.    *
*          Chuck Moore and Wayne Huber           *
*   Compiled using Compaq Visual Fortran v.6.6   *
**************************************************

                Developed by

**************************************************
*             Metcalf & Eddy, Inc.               *
*            University of Florida               *
*       Water Resources Engineers, Inc.          *
*      (Now Camp Dresser & McKee, Inc.)          *
*                September 1970                  *
**************************************************

        Version 4.3 (outdated) is
       Distributed and Maintained by

**************************************************
*      U.S. Environmental Protection Agency      *
* Center for Exposure Assessment Modeling (CEAM)*
*    Athens Environmental Research Laboratory    *
*            960 College Station Road            *
*            Athens, GA    30605-2720            *
**************************************************

**************************************************
*     This is an updated release of SWMM4.4h,    *
*     no longer formally supported by the EPA.   *
*     If problems occur executing this model     *
*     contact Wayne Huber at Oregon State. U.,   *
*     wayne.huber@orst.edu,                      *
*     or Robert Dickinson at Camp Dresser &      *
*     McKee, DickinsonRE@CDM.COM.                *
*     The EPA-supported version is SWMM5 at:     *
*   http://www.epa.gov/ednnrmrl/swmm/index.htm   *
**************************************************
```

```
          ************************************************
          *  This is an implementation of EPA SWMM 4.4H   *
          *  "Nature is full of infinite causes which     *
          *   have never occurred in experience" da Vinci *
          ************************************************


##########################################
#        File names by SWMM Block        #
#         JIN  -> Input to a Block       #
#        JOUT  -> Output from a Block    #
##########################################

   JIN for Block #     1 File #    8  RN0.int
  JOUT for Block #     1 File #    9  JOT.UF

##########################################
# Scratch file names for this simulation. #
##########################################

NSCRAT #     1 File #    1  SCRT1.UF
NSCRAT #     2 File #    2  SCRT2.UF
NSCRAT #     3 File #    3  SCRT3.UF
NSCRAT #     4 File #   10  SCRT4.UF
NSCRAT #     5 File #   11  SCRT5.UF
NSCRAT #     6 File #   12  SCRT6.UF
NSCRAT #     7 File #   13  SCRT7.UF

************************************************
*    Parameter Values on the Tapes Common Block   *
************************************************

 Number of Subcatchments in the Runoff Block (NW)..... 2000
 Number of Channel/Pipes in the Runoff Block (NG)..... 2000
 Number of Connections to Runoff Channels/Inlets (NCP).    6
 Number of Water Quality Constituents (MQUAL).........   20
 Number of Runoff Land Uses per Subcatchment (NLU).....   20
 Number of Groundwater Plot/prints in Runoff (NGW).....  500
 Number of Interface Locations for all Blocks (NIE).... 2000
 Number of Elements in the Transport Block (NET)....... 2000
 Number of Storage Junctions in Transport (NTSE).......  500
 Number of Transport interface input locations (NTHI).. 2000
 Number of Transport interface output locations (NTHO). 2000
```

```
 Number of Transport input locations on R lines (NTHR).   80
 Number of Transport printed output locations (NTOA)... 2000
 Number of Tabular Flow Splitters in Transport (NTSP).. 1000
 Number of Elements in the Extran Block (NEE)..........4000
 Number of Pumps in Extran (NEP)....................... 1000
 Number of Orifices in Extran (NEO).....................  200
 Number of Tide Gates/Free Outfalls in Extran (NTG).... 1000
 Number of Extran Weirs (NEW)...........................  400
 Number of Extran Printout Locations (NPO).............  150
 Number of Tide Elements in Extran (NTE)...............   50
 Number of Natural Channels (NNC)....................... 1200
 Number of Storage Junctions in Extran (NVSE).......... 2000
 Number of Time History Data Points in Extran (NTVAL)..  500
 Number of Data Points for Variable Storage Elements
   in the Extran Block (NVST)...........................  200
 Number of Input Hydrographs in Extran (NEH)...........  500
 Number of Allowable Channel Connections to
   Junctions in the Extran Block (NCHN)................   15
 Number Rain Gages in Rain and Runoff (MAXRG)..........  200
 Number PRATE/VRATE Points for Extran Pump
   Input (MAXPRA).......................................   10
 Number of Variable Orifices in Extran (NVORF).........   50
 Number of Variable Orifice Data Points (NVOTIM).......   50
 Number of Allowable Precip. Values/yr in Rain (LIMRN). 5000
 Number of Storm Events for Rain Analysis (LSTORM).....20000
 Number of Plugs for Plug-flow in S/T (NPLUG)..........40000
 Number Conduits for Extran Results to ASCII
   File (MXFLOW)........................................  400


##########################################
# Entry made to Storage/Treatment Block.  #
# Storage/Treatment model written by the  #
# University of Florida, June 1981.       #
# Last updated July 1995 at Oregon St. U. #
##########################################

VALUE OF NOTAPE            :         0

INPUT DATA SOURCE          :  EXTERNAL FILE

EXTERNAL ELEMENT NUMBER    :  200
```

```
NUMBER OF TIME STEPS      :   1402560

TIME STEP SIZE,SECONDS    :     900.0

NUMBER OF S/T UNITS       :         1

COST MODEL USED?          :        NO

STARTING DATE             :    10/ 1/1968

STARTING JULIAN DATE      :   1968275

STARTING TIME             :    0:  0:  0

SIMULATION DURATION, HOURS:350640.000

ENDING JULIAN DATE        :   2008275

ENDING TIME OF DAY        :     0.000 HOURS

PRINT TOTAL SIMULATION SUMMARY ONLY (ISUM = 0)

IDET = 0. NO DETAILED (TIME STEP) PRINT-OUTS.

NO OUTPUT FOR AVERAGE DETENTION TIME RESULTS


##########################################
# Header information from interface file: #
##########################################

Title from first computational block:
% Capture Analysis
Bioretention Unit Area- Comm

Title from immediately preceding computational block:
% Capture Analysis
Bioretention Unit Area- Comm

Name of preceding block:.............Runoff Block
Initial Julian date (IDATEZ)..................... 1968275
Initial time of day in seconds (TZERO).....          0.0
No. transfered input locations.................          1
```

No. transfered pollutants..... 0
Size of total catchment area (acres)..... 1.00
ID numbers (JCE=0) or alphanumeric (JCE=1)..... 1

##
Element numbers of interface inlet locations:
##
200

Conversion factor to cfs for flow units
on interface file. Multiply by: 1.00000

INPUT/OUTPUT UNITS : U.S. CUSTOMARY

TRIBUTARY AREA, ACRES : 1.0

NUMBER OF POLLUTANTS : 0

MONTHLY EVAPORATION RATES, IN/DAY

JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
0.030	0.048	0.072	0.102	0.132	0.156	0.168	0.150	0.114	0.078	0.042	0.030

BASIN INFILTRATION RATE FOR UNIT 1 IN (IN/HR) = 0.1400
1

UNIT CHARACTERISTICS

****
UNIT # 1 CHARACTERISTICS
****

GENERAL UNIT DESCRIPTION :

NAME : Commercial
IDENT : 1
TYPE OF UNIT : DETENTION
MAX. ALLOWABLE INFLOW, CFS: 0.1000E+05

FLOW DIRECTIONS:
BYPASS TO UNIT # 100
TREATED OUTFLOW TO UNIT # 100
RESIDUALS TO UNIT # 100

===> NOTE: UNIT 100 IS THE NEXT BLOCK AND UNIT 200 IS ULTIMATE DISPOSAL.

DETENTION UNIT CHARACTERISTICS:

RESIDUALS DRAW-OFF SCHEME: NEVER DRAWN OFF

DEPTH-AREA-STORAGE-FLOW RELATIONSHIPS :

DEPTH, FT	SURFACE AREA, SQ FT	STORAGE, CU FT	TREATED OUTFLOW, CFS	RESIDUAL FLOW, CFS
0.0000E+00	1.5000E+03	0.0000E+00	0.0000E+00	0.0000E+00
2.5000E-01	1.5000E+03	3.7500E+02	0.0000E+00	0.0000E+00
2.5100E-01	1.5000E+03	3.7650E+02	6.3000E-02	0.0000E+00
1.7500E+00	1.5000E+03	2.6250E+03	6.3000E-02	0.0000E+00

INITIAL CONDITIONS:

VOLUME, CU FT : 0.0000E+00

****
* NOTE: IF THERE IS ONLY ONE UNIT THE PLANT *
* PERFORMANCE SUMMARY WILL NOT BE PRINTED. *
****

Note !! UNIT 1 HAS EXCEEDED THE MAXIMUM STORAGE VOLUME ON 1/19/1969 AT 16:30
The excess has been bypassed and is included in BYPASS volume. Further
messages will be suppressed. But summaries of number of all volume-bypass
time steps and number of days with volume-bypasses will be printed.
1
****
* ENTIRE SIMULATION UNIT SUMMARIES *
****
OCT 1, 1968, 0 0: 0 TO OCT 1, 2008, 0 0: 0.

UNIT	PARAMETER	VOLUME CU FT
1	INFLOW,TOTAL	2.3662E+06
	INFLOW,NET	1.8938E+06
	BYPASS	4.7244E+05
	TREATED OUTFLOW	1.4545E+06
	RESIDUAL FLOW	0.0000E+00
	REMAINING	0.0000E+00
	EVAPORATION	7.3355E+03
	INFILTRATION	4.3318E+05
	NO. VOL. BYPASSES	3161
	NO. VOL. BYPASS DAYS	193
	INITIAL COND.	0.0000E+00
	PERCENT ERROR	-0.0532

===> Storage/Treatment simulation ended normally.

===> SWMM 4.4H simulation ended normally.
Always check output file for possible warning messages.

===> Your input file was named : Comm_St0.in
===> Your output file was named: Comm_St0.out

```
**********************************************************
*       SWMM 4.4H   Simulation Date and Time Summary     *
**********************************************************
* Starting Date... August     20, 2010                   *
*          Time...          13:19:32.415                 *
*   Ending Date... August     20, 2010                   *
*          Time...          13:20:43.867                 *
*  Elapsed Time...               1.191 minutes.          *
*  Elapsed Time...              71.453 seconds.          *
**********************************************************
```

Generic Biofiltration Model: Multi-Family Land Use

SWMM RUNOFF Module Output File

1

```
**************************************************
*    U.S. Environmental Protection Agency        *
*    Storm Water Management Model  (SWMM)        *
*                 Version 4.4H                   *
*                                                *
*               CDM/OSU Beta                     *
*         Release Date - July 1, 2003            *
*   Camp Dresser & McKee and Oregon St. Univ.    *
*          Chuck Moore and Wayne Huber           *
*   Compiled using Compaq Visual Fortran v.6.6   *
**************************************************

                  Developed by

**************************************************
*             Metcalf & Eddy, Inc.               *
*            University of Florida               *
*       Water Resources Engineers, Inc.          *
*      (Now Camp Dresser & McKee, Inc.)          *
*               September 1970                   *
**************************************************

         Version 4.3 (outdated) is
        Distributed and Maintained by

**************************************************
*      U.S. Environmental Protection Agency      *
* Center for Exposure Assessment Modeling (CEAM)*
*    Athens Environmental Research Laboratory    *
*            960 College Station Road            *
*            Athens, GA    30605-2720            *
**************************************************

**************************************************
*     This is an updated release of SWMM4.4h,    *
*     no longer formally supported by the EPA.   *
*     If problems occur executing this model     *
*     contact Wayne Huber at Oregon State. U.,   *
*     wayne.huber@orst.edu,                      *
*     or Robert Dickinson at Camp Dresser &      *
*     McKee, DickinsonRE@CDM.COM.                *
*     The EPA-supported version is SWMMM5 at:    *
*   http://www.epa.gov/ednnrmrl/swmm/index.htm   *
**************************************************

**************************************************
*  This is an implementation of EPA SWMM 4.4H    *
*  "Nature is full of infinite causes which      *
```

```
*   have never occurred in experience" da Vinci *
**************************************************


##########################################
#        File names by SWMM Block        #
#         JIN  -> Input to a Block       #
#        JOUT  -> Output from a Block    #
##########################################

   JIN for Block #     1 File #    0  JIN.UF
  JOUT for Block #     1 File #    9  RN0.int

##########################################
# Scratch file names for this simulation. #
##########################################

NSCRAT #     1 File #    1  NEWHALL_PATCHED_20091119.INT
NSCRAT #     2 File #    2  SCRT2.UF
NSCRAT #     3 File #    3  SCRT3.UF
NSCRAT #     4 File #   10  SCRT4.UF
NSCRAT #     5 File #   11  SCRT5.UF
NSCRAT #     6 File #   12  SCRT6.UF
NSCRAT #     7 File #   13  SCRT7.UF
NSCRAT #     8 File #   14  SCRT8.UF
NSCRAT #     9 File #   15  SCRT9.UF

**************************************************
*    Parameter Values on the Tapes Common Block   *
**************************************************

 Number of Subcatchments in the Runoff Block (NW)..... 2000
 Number of Channel/Pipes in the Runoff Block (NG)..... 2000
 Number of Connections to Runoff Channels/Inlets (NCP).    6
 Number of Water Quality Constituents (MQUAL).........   20
 Number of Runoff Land Uses per Subcatchment (NLU).....   20
 Number of Groundwater Plot/prints in Runoff (NGW).....  500
 Number of Interface Locations for all Blocks (NIE).... 2000
 Number of Elements in the Transport Block (NET)....... 2000
 Number of Storage Junctions in Transport (NTSE).......  500
 Number of Transport interface input locations (NTHI).. 2000
 Number of Transport interface output locations (NTHO). 2000
 Number of Transport input locations on R lines (NTHR).   80
 Number of Transport printed output locations (NTOA)... 2000
 Number of Tabular Flow Splitters in Transport (NTSP).. 1000
 Number of Elements in the Extran Block (NEE)......... 4000
 Number of Pumps in Extran (NEP)...................... 1000
 Number of Orifices in Extran (NEO)....................  200
```

```
 Number of Tide Gates/Free Outfalls in Extran (NTG).... 1000
 Number of Extran Weirs (NEW).........................  400
 Number of Extran Printout Locations (NPO)............  150
 Number of Tide Elements in Extran (NTE).............   50
 Number of Natural Channels (NNC)..................... 1200
 Number of Storage Junctions in Extran (NVSE)......... 2000
 Number of Time History Data Points in Extran (NTVAL)..  500
 Number of Data Points for Variable Storage Elements
   in the Extran Block (NVST)..........................  200
 Number of Input Hydrographs in Extran (NEH)..........  500
 Number of Allowable Channel Connections to
   Junctions in the Extran Block (NCHN)...............   15
 Number Rain Gages in Rain and Runoff (MAXRG).........  200
 Number PRATE/VRATE Points for Extran Pump
   Input (MAXPRA)......................................   10
 Number of Variable Orifices in Extran (NVORF).........   50
 Number of Variable Orifice Data Points (NVOTIM).......   50
 Number of Allowable Precip. Values/yr in Rain (LIMRN). 5000
 Number of Storm Events for Rain Analysis (LSTORM).....20000
 Number of Plugs for Plug-flow in S/T (NPLUG).........40000
 Number Conduits for Extran Results to ASCII
   File (MXFLOW).......................................  400


##################################################
# Entry made to the Runoff Block, last updated by #
# Oregon State University, and Camp, Dresser and  #
# McKee, Inc., July 2003.                         #
##################################################
# "And wherever water goes, amoebae go along for  #
#  the ride"                      Tom Robbins     #
##################################################


                % Capture Analysis

                Bioretention Unit Area


Snowmelt parameter - ISNOW.....................          0

Number of rain gages - NRGAG...................          0

Green-Ampt infiltration equation used - INFILM...        1
```

```
Quality is not simulated - KWALTY.................          0
Read evaporation data on line(s) F1 (F2) - IVAP..          2
Hour of day at start of storm - NHR..............          0
Minute of hour at start of storm - NMN...........          0
Time TZERO at start of storm (hours).............      0.000
Use U.S. Customary units for most I/O - METRIC...          0
Runoff input print control...                              0
Runoff graph plot control....                              1
Runoff output print control..                              0
Print headers every 50 lines - NOHEAD (0=yes, 1=no)        1
Print land use load percentages -LANDUPR (0=no, 1=yes)     0
Limit number of groundwater convergence messages to    50 (if simulated)
Month, day, year of start of storm is:             10/ 1/1968
Wet time step length (seconds).......                   900.
Dry time step length (seconds).......                 14400.
Wet/Dry time step length (seconds)...                   900.
Simulation length is......                       20081001.0 Yr/Mo/Dy
Percent of impervious area with zero detention depth    25.0

*********************************************************
*   Processed Precipitation will be read on NSCRAT(1)   *
*********************************************************

  ##############################
  #        Data Group F1       #
  # Evaporation Rate (in/month)#
  ##############################

 JAN.   FEB.   MAR.   APR.   MAY    JUN.   JUL.   AUG.   SEP.   OCT.   NOV.   DEC.
 ----   ----   ----   ----   ----   ----   ----   ----   ----   ----   ----   ----
```

0.93 1.34 2.23 3.06 4.09 4.68 5.21 4.65 3.42 2.42 1.26 0.93

1

```
 ************************************************************
 *         C H A N N E L  A N D  P I P E  D A T A            *
 ************************************************************
```

Input Sequen Number	NAMEG: Channel ID #	Drains to NGTO:	Channel Type	Width (ft)	Length (ft)	Invert Slope (ft/ft)	L Side Slope (ft/ft)	R Side Slope (ft/ft)	Intial Depth (ft)	Max Depth (ft)	Mann-ings "N"	Full Flow (cfs)	Infilt Rate (in/hr)
1	101	100	Dummy	0.0	0.0	0.0000	0.0000	0.0000	0.0	0.0	0.0000	0.00E+00	0.00

1

```
  ***************************************************
  *          S U B C A T C H M E N T  D A T A        *
  ***************************************************
```

NOTE. SEE LATER TABLE FOR OPTIONAL SUBCATCHMENT PARAMETERS

SUBCATCH-MENT NO.	CHANNEL OR INLET	WIDTH PRINT (FT)	AREA (AC)	PERCENT IMPERV.	SLOPE (FT/FT)	RESISTANCE FACTOR IMPERV.	RESISTANCE FACTOR PERV.	DEPRES. STORAGE(IN) IMPERV.	DEPRES. STORAGE(IN) PERV.	GREEN-AMPT INFIL PARAMS SUCTION (IN)	GREEN-AMPT INFIL PARAMS HYD.CON (IN/HR)	GAGE IMD	NO.	WB
1 MF	101	174.00	1.00	80.00	0.0500	0.012	0.250	0.020	0.060	8.00	0.140	0.290	1	0

```
 TOTAL NUMBER OF SUBCATCHMENTS...              1
 TOTAL TRIBUTARY AREA (ACRES)....           1.00
 IMPERVIOUS AREA (ACRES).........           0.80
 PERVIOUS AREA (ACRES)...........           0.20
 TOTAL WIDTH (FEET)..............         174.00
 PERCENT IMPERVIOUSNESS..........          80.00
```

1

```
 ************************************************************
 *    Arrangement of Subcatchments and Channel/Pipes        *
 ************************************************************
 * See second subcatchment output table for connectivity    *
 * of subcatchment to subcatchment flows.                   *
```

****

Channel
or Pipe
101 No Tributary Channel/Pipes
Tributary Subareas..... MF

INLET
100 Tributary Channel/Pipes... 101
No Tributary Subareas.....

****
* Hydrographs will be stored for the following 1 INLETS *
****
100

****
* Quality simulation not included in this run *
****

****
* DATA GROUP M1 *
****

TOTAL NUMBER OF PRINTED GUTTERS/INLETS...NPRNT.. 1
NUMBER OF TIME STEPS BETWEEN PRINTINGS..INTERV.. 0
STARTING AND STOPPING PRINTOUT DATES..... 0 0

****
* DATA GROUP M3 *
****

CHANNEL/INLET PRINT DATA GROUPS.....101

****
* DATA GROUP M8 *
****

STORM EVENT TRACKING.....

Storm event data file = Sm0.out

End of preliminary input data and data echo.

```
************************************************
*  Precipitation Interface File Summary        *
*  Number of precipitation station....      1  *
************************************************
```

Location	Station Number
1.	0

```
************************************************
*      End of time step DO-loop in Runoff      *
************************************************
```

Final Date (Mo/Day/Year) =	10/ 2/2008	
Total number of time steps =	117486	
Final Julian Date =	2008276	
Final time of day =	1.	seconds.
Final time of day =	0.00	hours.
Final running time =	350664.0000	hours.
Final running time =	14611.0000	days.

```
************************************************
*     Extrapolation Summary for Watersheds     *
* # Steps ==> Total Number of Extrapolated Steps *
* # Calls ==> Total Number of OVERLND Calls     *
************************************************
```

Subcatch	# Steps	# Calls	Subcatch	# Steps	# Calls	Subcatch	# Steps	# Calls
MF	667217	63147						

```
************************************************
*     Extrapolation Summary for Channel/Pipes  *
* # Steps ==> Total Number of Extrapolated Steps *
* # Calls ==> Total Number of GUTNR Calls       *
************************************************
```

Chan/Pipe	# Steps	# Calls	Chan/Pipe	# Steps	# Calls	Chan/Pipe	# Steps	# Calls
101	0	0						

1

```
*********************************************
*       Continuity Check for Surface Water   *
*********************************************
```

	cubic feet	Inches over Total Basin
Total Precipitation (Rain plus Snow)	2.659774E+06	732.720
Total Irrigation	0.000000E+00	0.000
Total Infiltration	4.517356E+05	124.445
Total Evaporation	1.027156E+05	28.296
Surface Runoff from Watersheds	2.125904E+06	585.648
Total Water remaining in Surface Storage	0.000000E+00	0.000
Infiltration over the Pervious Area...	4.517356E+05	622.225
Infiltration + Evaporation + Surface Runoff + Snow removal + Water remaining in Surface Storage + Water remaining in Snow Cover.....	2.680355E+06	738.390
Total Precipitation + Initial Storage + Total Irrigation.....	2.659774E+06	732.720

The error in continuity is calculated as

```
*************************************
* Precipitation + Initial Snow Cover  *
*      - Infiltration -               *
*Evaporation - Snow removal -         *
*Surface Runoff from Watersheds -     *
*Water in Surface Storage -           *
*Water remaining in Snow Cover        *
*-----------------------------------*
* Precipitation + Initial Snow Cover  *
*************************************
```

Error..... -0.774 Percent

```
*********************************************
*       Continuity Check for Channel/Pipes   *
*********************************************
```

	cubic feet	Inches over Total Basin
Initial Channel/Pipe Storage.....	0.000000E+00	0.000
Final Channel/Pipe Storage.....	0.000000E+00	0.000
Surface Runoff from Watersheds.....	2.125904E+06	585.648
Groundwater Subsurface Inflow.....	0.000000E+00	0.000
Evaporation Loss from Channels.....	0.000000E+00	0.000
Infiltration Loss from Channels.....	0.000000E+00	0.000
Channel/Pipe/Inlet Outflow.....	0.212590E+07	585.648

Initial Storage + Inflow.....	2.125904E+06	585.648
Final Storage + Outflow.....	2.125904E+06	585.648

```
*****************************************
* Final Storage + Outflow + Evaporation  - *
* Watershed Runoff - Groundwater Inflow  - *
*     Initial Channel/Pipe Storage         *
*     ---------------------------------    *
*  Final Storage + Outflow  + Evaporation  *
*****************************************
```

Error..... 0.000 Percent

1

SUMMARY STATISTICS FOR SUBCATCHMENTS

SUBCATCHMENT	AREA			PERVIOUS AREA			IMPERVIOUS AREA			TOTAL	
UNIT SUBCATCHMENT NO.	GUTTER OR INLET NO.	AREA (AC)	PERCENT IMPER.	TOTAL SIMULATED RAINFALL (IN)	TOTAL RUNOFF DEPTH (IN)	TOTAL LOSSES (IN)	PEAK RUNOFF RATE (CFS)	PEAK RUNOFF DEPTH (IN)	PEAK RUNOFF RATE (CFS)	PEAK RUNOFF DEPTH (IN)	PEAK RUNOFF RATE (CFS)
MF 101		1.00	80.0	733.64	100.704	633.769	0.252	706.878	1.152	585.643	1.404
1.404											

*** NOTE *** IMPERVIOUS AREA STATISTICS AGGREGATE IMPERVIOUS AREAS WITH AND WITHOUT DEPRESSION STORAGE

SUMMARY STATISTICS FOR CHANNEL/PIPES

CHANNEL NUMBER	MAXIMUM RATIO OF FULL FLOW (CFS)	RATIO OF MAX. TO FULL VELOCITY	FULL DEPTH (FT)	MAXIMUM COMPUTED INFLOW (CFS)	MAXIMUM COMPUTED OUTFLOW (CFS)	MAXIMUM COMPUTED DEPTH (FT)	MAXIMUM COMPUTED VELOCITY (FPS)	TIME OF OCCURRENCE DAY	TIME OF OCCURRENCE HR.	LENGTH OF SURCHARGE (HOUR)	MAXIMUM SURCHARGE VOLUME FULL

```
(AC-FT)     FLOW        DEPTH
   -------- ----------------------   ----------------------------------------------
---------------------- ------------------
 101                                        1.40                                2/ 7/1998 20.00
 100                                        1.40                                2/ 7/1998 20.00

                                                  TOTAL NUMBER OF CHANNELS/PIPES =    2

  *** NOTE ***  THE MAXIMUM FLOWS AND DEPTHS ARE CALCULATED AT THE END OF THE TIME INTERVAL
1
 ********************************************
 *  Summary of quantity results (flow in cfs) *
 ********************************************

    % Capture Analysis
    Bioretention Unit Area


                        Chan/Inlt
                        101
      Date      Time          Flow
  Mo/Da/Year  Hr:Min          Cfs
   ----------  ------         ----

Flow wt'd means......       0.0017
Flow wt'd std-devs...       0.0188
Maximum value........       1.4042
Minimum value........       0.0000
Total loads..........   2.1259E+06
                        Cubic-ft

 ===> Runoff simulation ended normally.

 ===> SWMM 4.4H   simulation ended normally.
      Always check output file for possible warning messages.

 ===> Your input file was named : MultiFam_RN0.in
 ===> Your output file was named: MultiFam_RN0.out

 ******************************************************
 *       SWMM 4.4H   Simulation Date and Time Summary  *
 ******************************************************
 * Starting Date... August     19, 2010                *
 *          Time...          17:55:48.471               *
 *   Ending Date... August     19, 2010                *
 *          Time...          17:55:57.596               *
 *  Elapsed Time...               0.152 minutes.       *
 *  Elapsed Time...               9.127 seconds.       *
```

****

Generic Biofiltration Model: Multi-Family Land Use

SWMM STORAGE Module Output File

1

```
**************************************************
*    U.S. Environmental Protection Agency        *
*    Storm Water Management Model  (SWMM)        *
*                 Version 4.4H                   *
*                                                *
*                CDM/OSU Beta                    *
*          Release Date - July 1, 2003           *
*   Camp Dresser & McKee and Oregon St. Univ.    *
*          Chuck Moore and Wayne Huber           *
*   Compiled using Compaq Visual Fortran v.6.6   *
**************************************************

                Developed by

**************************************************
*             Metcalf & Eddy, Inc.               *
*            University of Florida               *
*       Water Resources Engineers, Inc.          *
*      (Now Camp Dresser & McKee, Inc.)          *
*                September 1970                  *
**************************************************

         Version 4.3 (outdated) is
        Distributed and Maintained by

**************************************************
*      U.S. Environmental Protection Agency      *
* Center for Exposure Assessment Modeling (CEAM)*
*    Athens Environmental Research Laboratory    *
*            960 College Station Road            *
*            Athens, GA    30605-2720            *
**************************************************

**************************************************
*     This is an updated release of SWMM4.4h,    *
*     no longer formally supported by the EPA.   *
*     If problems occur executing this model     *
*     contact Wayne Huber at Oregon State. U.,   *
*     wayne.huber@orst.edu,                      *
*     or Robert Dickinson at Camp Dresser &      *
*     McKee, DickinsonRE@CDM.COM.                *
*     The EPA-supported version is SWMM5 at:     *
*   http://www.epa.gov/ednnrmrl/swmm/index.htm   *
**************************************************
```

```
          ************************************************
          *  This is an implementation of EPA SWMM 4.4H  *
          *  "Nature is full of infinite causes which    *
          *   have never occurred in experience" da Vinci *
          ************************************************


##########################################
#        File names by SWMM Block        #
#         JIN  -> Input to a Block       #
#        JOUT  -> Output from a Block    #
##########################################

   JIN for Block #     1 File #    8  RN0.int
  JOUT for Block #     1 File #    9  JOT.UF

##########################################
# Scratch file names for this simulation. #
##########################################

NSCRAT #     1 File #    1  SCRT1.UF
NSCRAT #     2 File #    2  SCRT2.UF
NSCRAT #     3 File #    3  SCRT3.UF
NSCRAT #     4 File #   10  SCRT4.UF
NSCRAT #     5 File #   11  SCRT5.UF
NSCRAT #     6 File #   12  SCRT6.UF
NSCRAT #     7 File #   13  SCRT7.UF

************************************************
*    Parameter Values on the Tapes Common Block   *
************************************************

 Number of Subcatchments in the Runoff Block (NW)..... 2000
 Number of Channel/Pipes in the Runoff Block (NG)..... 2000
 Number of Connections to Runoff Channels/Inlets (NCP).    6
 Number of Water Quality Constituents (MQUAL).........   20
 Number of Runoff Land Uses per Subcatchment (NLU).....   20
 Number of Groundwater Plot/prints in Runoff (NGW).....  500
 Number of Interface Locations for all Blocks (NIE).... 2000
 Number of Elements in the Transport Block (NET)....... 2000
 Number of Storage Junctions in Transport (NTSE)........  500
 Number of Transport interface input locations (NTHI).. 2000
 Number of Transport interface output locations (NTHO). 2000
```

```
 Number of Transport input locations on R lines (NTHR).    80
 Number of Transport printed output locations (NTOA)... 2000
 Number of Tabular Flow Splitters in Transport (NTSP).. 1000
 Number of Elements in the Extran Block (NEE)..........4000
 Number of Pumps in Extran (NEP)....................... 1000
 Number of Orifices in Extran (NEO)....................  200
 Number of Tide Gates/Free Outfalls in Extran (NTG).... 1000
 Number of Extran Weirs (NEW)..........................  400
 Number of Extran Printout Locations (NPO).............  150
 Number of Tide Elements in Extran (NTE)...............   50
 Number of Natural Channels (NNC)...................... 1200
 Number of Storage Junctions in Extran (NVSE).......... 2000
 Number of Time History Data Points in Extran (NTVAL)..  500
 Number of Data Points for Variable Storage Elements
   in the Extran Block (NVST)..........................  200
 Number of Input Hydrographs in Extran (NEH)...........  500
 Number of Allowable Channel Connections to
   Junctions in the Extran Block (NCHN)................   15
 Number Rain Gages in Rain and Runoff (MAXRG)..........  200
 Number PRATE/VRATE Points for Extran Pump
   Input (MAXPRA)......................................   10
 Number of Variable Orifices in Extran (NVORF).........   50
 Number of Variable Orifice Data Points (NVOTIM).......   50
 Number of Allowable Precip. Values/yr in Rain (LIMRN). 5000
 Number of Storm Events for Rain Analysis (LSTORM).....20000
 Number of Plugs for Plug-flow in S/T (NPLUG).........40000
 Number Conduits for Extran Results to ASCII
   File (MXFLOW).......................................  400


##########################################
# Entry made to Storage/Treatment Block.  #
# Storage/Treatment model written by the  #
# University of Florida, June 1981.       #
# Last updated July 1995 at Oregon St. U. #
##########################################

VALUE OF NOTAPE           :         0

INPUT DATA SOURCE         :  EXTERNAL FILE

EXTERNAL ELEMENT NUMBER   :  100
```

```
NUMBER OF TIME STEPS      :   1402560

TIME STEP SIZE,SECONDS    :     900.0

NUMBER OF S/T UNITS       :         1

COST MODEL USED?          :        NO

STARTING DATE             :    10/ 1/1968

STARTING JULIAN DATE      :   1968275

STARTING TIME             :    0:  0:  0

SIMULATION DURATION, HOURS:350640.000

ENDING JULIAN DATE        :   2008275

ENDING TIME OF DAY        :     0.000 HOURS

PRINT TOTAL SIMULATION SUMMARY ONLY (ISUM = 0)

IDET = 0. NO DETAILED (TIME STEP) PRINT-OUTS.

NO OUTPUT FOR AVERAGE DETENTION TIME RESULTS


##########################################
# Header information from interface file: #
##########################################

Title from first computational block:
% Capture Analysis
Bioretention Unit Area

Title from immediately preceding computational block:
% Capture Analysis
Bioretention Unit Area

Name of preceding block:.............Runoff Block
Initial Julian date (IDATEZ)..................... 1968275
Initial time of day in seconds (TZERO).....          0.0
No. transfered input locations.................          1
```

No. transfered pollutants..... 0
Size of total catchment area (acres)..... 1.00
ID numbers (JCE=0) or alphanumeric (JCE=1)..... 1

##
Element numbers of interface inlet locations:
##
100

Conversion factor to cfs for flow units
on interface file. Multiply by: 1.00000

INPUT/OUTPUT UNITS : U.S. CUSTOMARY

TRIBUTARY AREA, ACRES : 1.0

NUMBER OF POLLUTANTS : 0

MONTHLY EVAPORATION RATES, IN/DAY

JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
0.030	0.048	0.072	0.102	0.132	0.156	0.168	0.150	0.114	0.078	0.042	0.030

BASIN INFILTRATION RATE FOR UNIT 1 IN (IN/HR) = 0.1400
1

UNIT CHARACTERISTICS

****
UNIT # 1 CHARACTERISTICS
****

GENERAL UNIT DESCRIPTION :

NAME : MultiFamily
IDENT : 1
TYPE OF UNIT : DETENTION
MAX. ALLOWABLE INFLOW, CFS: 0.1000E+05

FLOW DIRECTIONS:
BYPASS TO UNIT # 100
TREATED OUTFLOW TO UNIT # 100
RESIDUALS TO UNIT # 100

===> NOTE: UNIT 100 IS THE NEXT BLOCK AND UNIT 200 IS ULTIMATE DISPOSAL.

DETENTION UNIT CHARACTERISTICS:

RESIDUALS DRAW-OFF SCHEME: NEVER DRAWN OFF

DEPTH-AREA-STORAGE-FLOW RELATIONSHIPS :

DEPTH, FT	SURFACE AREA, SQ FT	STORAGE, CU FT	TREATED OUTFLOW, CFS	RESIDUAL FLOW, CFS
0.0000E+00	1.4000E+03	0.0000E+00	0.0000E+00	0.0000E+00
2.5000E-01	1.4000E+03	3.5000E+02	0.0000E+00	0.0000E+00
2.5100E-01	1.4000E+03	3.5140E+02	5.8000E-02	0.0000E+00
1.7500E+00	1.4000E+03	2.4500E+03	5.8000E-02	0.0000E+00

INITIAL CONDITIONS:

VOLUME, CU FT : 0.0000E+00

****
* NOTE: IF THERE IS ONLY ONE UNIT THE PLANT *
* PERFORMANCE SUMMARY WILL NOT BE PRINTED. *
****

Note !! UNIT 1 HAS EXCEEDED THE MAXIMUM STORAGE VOLUME ON 1/19/1969 AT 16:45
The excess has been bypassed and is included in BYPASS volume. Further
messages will be suppressed. But summaries of number of all volume-bypass
time steps and number of days with volume-bypasses will be printed.
1
****
* ENTIRE SIMULATION UNIT SUMMARIES *
****
OCT 1, 1968, 0 0: 0 TO OCT 1, 2008, 0 0: 0.

UNIT	PARAMETER	VOLUME CU FT
1	INFLOW,TOTAL	2.1240E+06
	INFLOW,NET	1.7046E+06
	BYPASS	4.1947E+05
	TREATED OUTFLOW	1.2997E+06
	RESIDUAL FLOW	0.0000E+00
	REMAINING	0.0000E+00
	EVAPORATION	6.7456E+03
	INFILTRATION	3.9944E+05
	NO. VOL. BYPASSES	2935
	NO. VOL. BYPASS DAYS	184
	INITIAL COND.	0.0000E+00
	PERCENT ERROR	-0.0622

===> Storage/Treatment simulation ended normally.

===> SWMM 4.4H simulation ended normally.
Always check output file for possible warning messages.

===> Your input file was named : MultiFam_St0.in
===> Your output file was named: MultiFam_St0.out

```
**********************************************************
*       SWMM 4.4H   Simulation Date and Time Summary     *
**********************************************************
* Starting Date... August     20, 2010                   *
*          Time...          13:11:37.902                 *
*   Ending Date... August     20, 2010                   *
*          Time...          13:12:43.121                 *
*  Elapsed Time...               1.087 minutes.          *
*  Elapsed Time...              65.219 seconds.          *
**********************************************************
```

Generic Biofiltration Model: Park Land Use

SWMM RUNOFF Module Output File

```
1
**************************************************
*    U.S. Environmental Protection Agency        *
*    Storm Water Management Model  (SWMM)        *
*                 Version 4.4H                   *
*                                                *
*                CDM/OSU Beta                    *
*          Release Date - July 1, 2003           *
*   Camp Dresser & McKee and Oregon St. Univ.    *
*           Chuck Moore and Wayne Huber          *
*   Compiled using Compaq Visual Fortran v.6.6   *
**************************************************

                  Developed by

**************************************************
*              Metcalf & Eddy, Inc.              *
*             University of Florida              *
*         Water Resources Engineers, Inc.        *
*        (Now Camp Dresser & McKee, Inc.)        *
*                September 1970                  *
**************************************************

          Version 4.3 (outdated) is
         Distributed and Maintained by

**************************************************
*      U.S. Environmental Protection Agency      *
* Center for Exposure Assessment Modeling (CEAM)*
*    Athens Environmental Research Laboratory    *
*             960 College Station Road           *
*             Athens, GA    30605-2720           *
**************************************************

**************************************************
*     This is an updated release of SWMM4.4h,    *
*     no longer formally supported by the EPA.   *
*     If problems occur executing this model     *
*     contact Wayne Huber at Oregon State. U.,   *
*     wayne.huber@orst.edu,                      *
*     or Robert Dickinson at Camp Dresser &      *
*     McKee, DickinsonRE@CDM.COM.                *
*     The EPA-supported version is SWMMM5 at:    *
*   http://www.epa.gov/ednnrmrl/swmm/index.htm   *
**************************************************

**************************************************
*  This is an implementation of EPA SWMM 4.4H    *
*  "Nature is full of infinite causes which      *
```

```
*   have never occurred in experience" da Vinci *
**************************************************


##########################################
#        File names by SWMM Block        #
#         JIN  -> Input to a Block       #
#        JOUT  -> Output from a Block    #
##########################################

   JIN for Block #     1 File #    0  JIN.UF
  JOUT for Block #     1 File #    9  RN0.int

##########################################
# Scratch file names for this simulation. #
##########################################

NSCRAT #     1 File #    1  NEWHALL_PATCHED_20091119.INT
NSCRAT #     2 File #    2  SCRT2.UF
NSCRAT #     3 File #    3  SCRT3.UF
NSCRAT #     4 File #   10  SCRT4.UF
NSCRAT #     5 File #   11  SCRT5.UF
NSCRAT #     6 File #   12  SCRT6.UF
NSCRAT #     7 File #   13  SCRT7.UF
NSCRAT #     8 File #   14  SCRT8.UF
NSCRAT #     9 File #   15  SCRT9.UF

**************************************************
*    Parameter Values on the Tapes Common Block   *
**************************************************

 Number of Subcatchments in the Runoff Block (NW)..... 2000
 Number of Channel/Pipes in the Runoff Block (NG)..... 2000
 Number of Connections to Runoff Channels/Inlets (NCP).    6
 Number of Water Quality Constituents (MQUAL).........   20
 Number of Runoff Land Uses per Subcatchment (NLU).....   20
 Number of Groundwater Plot/prints in Runoff (NGW).....  500
 Number of Interface Locations for all Blocks (NIE).... 2000
 Number of Elements in the Transport Block (NET)....... 2000
 Number of Storage Junctions in Transport (NTSE).......  500
 Number of Transport interface input locations (NTHI).. 2000
 Number of Transport interface output locations (NTHO). 2000
 Number of Transport input locations on R lines (NTHR).   80
 Number of Transport printed output locations (NTOA)... 2000
 Number of Tabular Flow Splitters in Transport (NTSP).. 1000
 Number of Elements in the Extran Block (NEE)......... 4000
 Number of Pumps in Extran (NEP)...................... 1000
 Number of Orifices in Extran (NEO)....................  200
```

```
Number of Tide Gates/Free Outfalls in Extran (NTG).... 1000
Number of Extran Weirs (NEW)..........................  400
Number of Extran Printout Locations (NPO).............  150
Number of Tide Elements in Extran (NTE)...............   50
Number of Natural Channels (NNC)...................... 1200
Number of Storage Junctions in Extran (NVSE).......... 2000
Number of Time History Data Points in Extran (NTVAL)..  500
Number of Data Points for Variable Storage Elements
  in the Extran Block (NVST)..........................  200
Number of Input Hydrographs in Extran (NEH)...........  500
Number of Allowable Channel Connections to
  Junctions in the Extran Block (NCHN)................   15
Number Rain Gages in Rain and Runoff (MAXRG)..........  200
Number PRATE/VRATE Points for Extran Pump
  Input (MAXPRA)......................................   10
Number of Variable Orifices in Extran (NVORF).........   50
Number of Variable Orifice Data Points (NVOTIM).......   50
Number of Allowable Precip. Values/yr in Rain (LIMRN). 5000
Number of Storm Events for Rain Analysis (LSTORM).....20000
Number of Plugs for Plug-flow in S/T (NPLUG)..........40000
Number Conduits for Extran Results to ASCII
  File (MXFLOW).......................................  400
```

```
##################################################
# Entry made to the Runoff Block, last updated by #
# Oregon State University, and Camp, Dresser and  #
# McKee, Inc., July 2003.                         #
##################################################
# "And wherever water goes, amoebae go along for  #
#  the ride"                    Tom Robbins       #
##################################################
```

% Capture Analysis

Bioretention Unit Area- Park

```
Snowmelt parameter - ISNOW.....................          0

Number of rain gages - NRGAG...................          0

Green-Ampt infiltration equation used - INFILM...        1
```

```
Quality is not simulated - KWALTY.....................          0
Read evaporation data on line(s) F1 (F2) - IVAP..                2
Hour of day at start of storm - NHR.....................         0
Minute of hour at start of storm - NMN..................         0
Time TZERO at start of storm (hours)....................     0.000
Use U.S. Customary units for most I/O - METRIC...                0
Runoff input print control...                                    0
Runoff graph plot control....                                    1
Runoff output print control..                                    0
Print headers every 50 lines - NOHEAD (0=yes, 1=no)              1
Print land use load percentages -LANDUPR (0=no, 1=yes)           0
Limit number of groundwater convergence messages to     50 (if simulated)
Month, day, year of start of storm is:              10/ 1/1968
Wet time step length (seconds).......                    900.
Dry time step length (seconds).......                  14400.
Wet/Dry time step length (seconds)...                    900.
Simulation length is......                        20081001.0 Yr/Mo/Dy
Percent of impervious area with zero detention depth     25.0

*********************************************************
*   Processed Precipitation will be read on NSCRAT(1)   *
*********************************************************

  ##############################
  #        Data Group F1       #
  # Evaporation Rate (in/month)#
  ##############################

 JAN.   FEB.   MAR.   APR.   MAY    JUN.   JUL.   AUG.   SEP.   OCT.   NOV.   DEC.
 ----   ----   ----   ----   ----   ----   ----   ----   ----   ----   ----   ----
```

0.93 1.34 2.23 3.06 4.09 4.68 5.21 4.65 3.42 2.42 1.26 0.93

1

****
* CHANNEL AND PIPE DATA *
****

Input Sequen Number	NAMEG: Channel ID #	Drains to NGTO:	Channel Type	Width (ft)	Length (ft)	Invert Slope (ft/ft)	L Side Slope (ft/ft)	R Side Slope (ft/ft)	Intial Depth (ft)	Max Depth (ft)	Mann-ings "N"	Full Flow (cfs)	Infilt Rate (in/hr)
1	301	300	Dummy	0.0	0.0	0.0000	0.0000	0.0000	0.0	0.0	0.0000	0.00E+00	0.00

1

****
* SUBCATCHMENT DATA *
****

NOTE. SEE LATER TABLE FOR OPTIONAL SUBCATCHMENT PARAMETERS

SUBCATCH-MENT NO.	CHANNEL PARAMS OR INLET	GAGE	WIDTH PRINT (FT)	AREA (AC)	PERCENT IMPERV.	SLOPE (FT/FT)	RESISTANCE FACTOR IMPERV.	RESISTANCE FACTOR PERV.	DEPRES. STORAGE(IN) IMPERV.	DEPRES. STORAGE(IN) PERV.	GREEN-AMPT INFIL SUCTION (IN)	GREEN-AMPT INFIL HYD.CON (IN/HR)
1 Park	301		174.00	1.00	10.00	0.0500	0.012	0.250	0.020	0.060	8.00	0.140

IMD	NO.	WB
0.290	1	0

TOTAL NUMBER OF SUBCATCHMENTS...	1
TOTAL TRIBUTARY AREA (ACRES)....	1.00
IMPERVIOUS AREA (ACRES).....	0.10
PERVIOUS AREA (ACRES).....	0.90
TOTAL WIDTH (FEET).....	174.00
PERCENT IMPERVIOUSNESS.....	10.00

1

****
* Arrangement of Subcatchments and Channel/Pipes *
****
* See second subcatchment output table for connectivity *
* of subcatchment to subcatchment flows. *

****

Channel
or Pipe
301 No Tributary Channel/Pipes
Tributary Subareas..... Park

INLET
300 Tributary Channel/Pipes... 301
No Tributary Subareas.....

****
* Hydrographs will be stored for the following 1 INLETS *
****
300

****
* Quality simulation not included in this run *
****

****
* DATA GROUP M1 *
****

TOTAL NUMBER OF PRINTED GUTTERS/INLETS...NPRNT.. 1
NUMBER OF TIME STEPS BETWEEN PRINTINGS..INTERV.. 0
STARTING AND STOPPING PRINTOUT DATES..... 0 0

****
* DATA GROUP M3 *
****

CHANNEL/INLET PRINT DATA GROUPS.....301

****
* DATA GROUP M8 *
****

STORM EVENT TRACKING.....

Storm event data file = Sm0.out

End of preliminary input data and data echo.

```
************************************************
*  Precipitation Interface File Summary        *
*  Number of precipitation station....      1  *
************************************************
```

Location	Station Number
1.	0

```
************************************************
*      End of time step DO-loop in Runoff      *
************************************************
```

Final Date (Mo/Day/Year) =	10/ 1/2008	
Total number of time steps =	112245	
Final Julian Date =	2008275	
Final time of day =	86399.	seconds.
Final time of day =	24.00	hours.
Final running time =	350664.0000	hours.
Final running time =	14611.0000	days.

```
************************************************
*     Extrapolation Summary for Watersheds     *
* # Steps ==> Total Number of Extrapolated Steps *
* # Calls ==> Total Number of OVERLND Calls     *
************************************************
```

Subcatch	# Steps	# Calls	Subcatch	# Steps	# Calls	Subcatch	# Steps	# Calls
Park	661667	50677						

```
************************************************
*     Extrapolation Summary for Channel/Pipes  *
* # Steps ==> Total Number of Extrapolated Steps *
* # Calls ==> Total Number of GUTNR Calls       *
************************************************
```

Chan/Pipe	# Steps	# Calls	Chan/Pipe	# Steps	# Calls	Chan/Pipe	# Steps	# Calls
301	0	0						

1

```
*********************************************
*       Continuity Check for Surface Water   *
*********************************************
```

	cubic feet	Inches over Total Basin
Total Precipitation (Rain plus Snow)	2.662678E+06	733.520
Total Irrigation	0.000000E+00	0.000
Total Infiltration	2.060187E+06	567.545
Total Evaporation	4.992052E+04	13.752
Surface Runoff from Watersheds	5.555276E+05	153.038
Total Water remaining in Surface Storage	0.000000E+00	0.000
Infiltration over the Pervious Area...	2.060187E+06	630.605
Infiltration + Evaporation + Surface Runoff + Snow removal + Water remaining in Surface Storage + Water remaining in Snow Cover.....	2.665636E+06	734.335
Total Precipitation + Initial Storage + Total Irrigation.....	2.662678E+06	733.520

The error in continuity is calculated as

```
*************************************
* Precipitation + Initial Snow Cover  *
*      - Infiltration -               *
*Evaporation - Snow removal -         *
*Surface Runoff from Watersheds -     *
*Water in Surface Storage -           *
*Water remaining in Snow Cover        *
*-----------------------------------*
* Precipitation + Initial Snow Cover  *
*************************************
```

Error..... -0.111 Percent

```
*********************************************
*       Continuity Check for Channel/Pipes   *
*********************************************
```

	cubic feet	Inches over Total Basin
Initial Channel/Pipe Storage.....	0.000000E+00	0.000
Final Channel/Pipe Storage.....	0.000000E+00	0.000
Surface Runoff from Watersheds.....	5.555276E+05	153.038
Groundwater Subsurface Inflow.....	0.000000E+00	0.000
Evaporation Loss from Channels.....	0.000000E+00	0.000
Infiltration Loss from Channels.....	0.000000E+00	0.000
Channel/Pipe/Inlet Outflow.....	0.555528E+06	153.038

Initial Storage + Inflow.....	5.555276E+05	153.038
Final Storage + Outflow.....	5.555276E+05	153.038

```
*******************************************
* Final Storage + Outflow + Evaporation  - *
* Watershed Runoff - Groundwater Inflow  - *
*     Initial Channel/Pipe Storage         *
*     ---------------------------------    *
*  Final Storage + Outflow  + Evaporation  *
*******************************************
```

Error..... 0. 00 Percent

1

SUMMARY STATISTICS FOR SUBCATCHMENTS

SUBCATCHMENT	GUTTER OR INLET NO.	AREA (AC)	PERCENT IMPER.	TOTAL SIMULATED RAINFALL (IN)	PERVIOUS AREA TOTAL RUNOFF DEPTH (IN)	PERVIOUS AREA TOTAL LOSSES (IN)	PERVIOUS AREA PEAK RUNOFF RATE (CFS)	IMPERVIOUS AREA PEAK RUNOFF DEPTH (IN)	IMPERVIOUS AREA PEAK RUNOFF RATE (CFS)	TOTAL PEAK RUNOFF DEPTH (IN)	TOTAL PEAK RUNOFF RATE (CFS)	PEAK UNIT RUNOFF (IN/HR)
Park	301	1.00	10.0	733.64	91.712	642.512	1.119	704.967	0.146	153.038	1.264	1.264

*** NOTE *** IMPERVIOUS AREA STATISTICS AGGREGATE IMPERVIOUS AREAS WITH AND WITHOUT DEPRESSION STORAGE

SUMMARY STATISTICS FOR CHANNEL/PIPES

CHANNEL NUMBER	MAXIMUM SURCHARGE VOLUME	RATIO OF FULL FLOW TO FULL (CFS)	RATIO OF MAX. VELOCITY TO FULL (FPS)	FULL DEPTH (FT)	MAXIMUM COMPUTED INFLOW (CFS)	MAXIMUM COMPUTED OUTFLOW (CFS)	MAXIMUM COMPUTED DEPTH (FT)	MAXIMUM COMPUTED VELOCITY (FPS)	TIME OF OCCURRENCE DAY	TIME OF OCCURRENCE HR.	LENGTH OF SURCHARGE (HOUR)

(AC-FT) FLOW DEPTH

301	1.26		2/ 7/1998 20.00
300	1.26		2/ 7/1998 20.00

TOTAL NUMBER OF CHANNELS/PIPES = 2

*** NOTE *** THE MAXIMUM FLOWS AND DEPTHS ARE CALCULATED AT THE END OF THE TIME INTERVAL

1

****
* Summary of quantity results (flow in cfs) *
****

% Capture Analysis
Bioretention Unit Area- Park

	Chan/Inlt 301
Date Mo/Da/Year	Time Hr:Min	Flow Cfs
Flow wt'd means.....		0.0004
Flow wt'd std-devs...		0.0091
Maximum value.....		1.2626
Minimum value.....		0.0000
Total loads.....		5.5555E+05 Cubic-ft

===> Runoff simulation ended normally.

===> SWMM 4.4H simulation ended normally.
Always check output file for possible warning messages.

===> Your input file was named : Park_RN0.in
===> Your output file was named: Park_RN0.out

****
* SWMM 4.4H Simulation Date and Time Summary *
****
* Starting Date... August 20, 2010 *
* Time... 13:25:35.975 *
* Ending Date... August 20, 2010 *
* Time... 13:25:45.334 *
* Elapsed Time... 0.156 minutes. *
* Elapsed Time... 9.358 seconds. *

****

Generic Biofiltration Model: Park Land Use

SWMM STORAGE Module Output File

1

```
************************************************
*    U.S. Environmental Protection Agency      *
*    Storm Water Management Model  (SWMM)      *
*                 Version 4.4H                 *
*                                              *
*                CDM/OSU Beta                  *
*          Release Date - July 1, 2003         *
*   Camp Dresser & McKee and Oregon St. Univ.  *
*         Chuck Moore and Wayne Huber          *
*   Compiled using Compaq Visual Fortran v.6.6 *
************************************************

                 Developed by

************************************************
*             Metcalf & Eddy, Inc.             *
*            University of Florida             *
*       Water Resources Engineers, Inc.        *
*      (Now Camp Dresser & McKee, Inc.)        *
*               September 1970                 *
************************************************

         Version 4.3 (outdated) is
        Distributed and Maintained by

************************************************
*      U.S. Environmental Protection Agency    *
* Center for Exposure Assessment Modeling (CEAM)*
*    Athens Environmental Research Laboratory  *
*             960 College Station Road         *
*             Athens, GA    30605-2720         *
************************************************

************************************************
*     This is an updated release of SWMM4.4h,  *
*     no longer formally supported by the EPA. *
*     If problems occur executing this model   *
*     contact Wayne Huber at Oregon State. U.,  *
*     wayne.huber@orst.edu,                    *
*     or Robert Dickinson at Camp Dresser &    *
*     McKee, DickinsonRE@CDM.COM.              *
*     The EPA-supported version is SWMM5 at:   *
*   http://www.epa.gov/ednnrmrl/swmm/index.htm *
************************************************
```

```
          ************************************************
          *  This is an implementation of EPA SWMM 4.4H  *
          *  "Nature is full of infinite causes which    *
          *   have never occurred in experience" da Vinci *
          ************************************************


##########################################
#        File names by SWMM Block        #
#         JIN  -> Input to a Block       #
#        JOUT  -> Output from a Block    #
##########################################

   JIN for Block #     1 File #    8  RN0.int
  JOUT for Block #     1 File #    9  JOT.UF

##########################################
# Scratch file names for this simulation. #
##########################################

NSCRAT #     1 File #    1  SCRT1.UF
NSCRAT #     2 File #    2  SCRT2.UF
NSCRAT #     3 File #    3  SCRT3.UF
NSCRAT #     4 File #   10  SCRT4.UF
NSCRAT #     5 File #   11  SCRT5.UF
NSCRAT #     6 File #   12  SCRT6.UF
NSCRAT #     7 File #   13  SCRT7.UF

************************************************
*    Parameter Values on the Tapes Common Block   *
************************************************

 Number of Subcatchments in the Runoff Block (NW)..... 2000
 Number of Channel/Pipes in the Runoff Block (NG)..... 2000
 Number of Connections to Runoff Channels/Inlets (NCP).    6
 Number of Water Quality Constituents (MQUAL).........   20
 Number of Runoff Land Uses per Subcatchment (NLU).....   20
 Number of Groundwater Plot/prints in Runoff (NGW).....  500
 Number of Interface Locations for all Blocks (NIE).... 2000
 Number of Elements in the Transport Block (NET)....... 2000
 Number of Storage Junctions in Transport (NTSE).......  500
 Number of Transport interface input locations (NTHI).. 2000
 Number of Transport interface output locations (NTHO). 2000
```

```
 Number of Transport input locations on R lines (NTHR).   80
 Number of Transport printed output locations (NTOA)... 2000
 Number of Tabular Flow Splitters in Transport (NTSP).. 1000
 Number of Elements in the Extran Block (NEE)..........4000
 Number of Pumps in Extran (NEP)....................... 1000
 Number of Orifices in Extran (NEO).....................  200
 Number of Tide Gates/Free Outfalls in Extran (NTG).... 1000
 Number of Extran Weirs (NEW)...........................  400
 Number of Extran Printout Locations (NPO).............  150
 Number of Tide Elements in Extran (NTE)...............   50
 Number of Natural Channels (NNC)....................... 1200
 Number of Storage Junctions in Extran (NVSE).......... 2000
 Number of Time History Data Points in Extran (NTVAL)..  500
 Number of Data Points for Variable Storage Elements
   in the Extran Block (NVST)...........................  200
 Number of Input Hydrographs in Extran (NEH)...........  500
 Number of Allowable Channel Connections to
   Junctions in the Extran Block (NCHN)................   15
 Number Rain Gages in Rain and Runoff (MAXRG)..........  200
 Number PRATE/VRATE Points for Extran Pump
   Input (MAXPRA).....................................    10
 Number of Variable Orifices in Extran (NVORF).........   50
 Number of Variable Orifice Data Points (NVOTIM).......   50
 Number of Allowable Precip. Values/yr in Rain (LIMRN). 5000
 Number of Storm Events for Rain Analysis (LSTORM).....20000
 Number of Plugs for Plug-flow in S/T (NPLUG)..........40000
 Number Conduits for Extran Results to ASCII
   File (MXFLOW)....................................... 400


##########################################
# Entry made to Storage/Treatment Block.  #
# Storage/Treatment model written by the  #
# University of Florida, June 1981.       #
# Last updated July 1995 at Oregon St. U. #
##########################################

VALUE OF NOTAPE           :         0

INPUT DATA SOURCE         :  EXTERNAL FILE

EXTERNAL ELEMENT NUMBER   :  300
```

```
NUMBER OF TIME STEPS      :   1402560

TIME STEP SIZE,SECONDS    :     900.0

NUMBER OF S/T UNITS       :         1

COST MODEL USED?          :        NO

STARTING DATE             :    10/ 1/1968

STARTING JULIAN DATE      :   1968275

STARTING TIME             :    0:  0:  0

SIMULATION DURATION, HOURS:350640.000

ENDING JULIAN DATE        :   2008275

ENDING TIME OF DAY        :     0.000 HOURS

PRINT TOTAL SIMULATION SUMMARY ONLY (ISUM = 0)

IDET = 0. NO DETAILED (TIME STEP) PRINT-OUTS.

NO OUTPUT FOR AVERAGE DETENTION TIME RESULTS


##########################################
# Header information from interface file: #
##########################################

Title from first computational block:
% Capture Analysis
Bioretention Unit Area- Park

Title from immediately preceding computational block:
% Capture Analysis
Bioretention Unit Area- Park

Name of preceding block:.............Runoff Block
Initial Julian date (IDATEZ)..................... 1968275
Initial time of day in seconds (TZERO)...........     0.0
No. transfered input locations..................       1
```

No. transfered pollutants..... 0
Size of total catchment area (acres)..... 1.00
ID numbers (JCE=0) or alphanumeric (JCE=1)..... 1

##
Element numbers of interface inlet locations:
##
300

Conversion factor to cfs for flow units
on interface file. Multiply by: 1.00000

INPUT/OUTPUT UNITS : U.S. CUSTOMARY

TRIBUTARY AREA, ACRES : 1.0

NUMBER OF POLLUTANTS : 0

MONTHLY EVAPORATION RATES, IN/DAY

JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
0.030	0.048	0.072	0.102	0.132	0.156	0.168	0.150	0.114	0.078	0.042	0.030

BASIN INFILTRATION RATE FOR UNIT 1 IN (IN/HR) = 0.1400
1

UNIT CHARACTERISTICS

****
UNIT # 1 CHARACTERISTICS
****

GENERAL UNIT DESCRIPTION :

NAME : Park
IDENT : 1
TYPE OF UNIT : DETENTION
MAX. ALLOWABLE INFLOW, CFS: 0.1000E+05

FLOW DIRECTIONS:
BYPASS TO UNIT # 100
TREATED OUTFLOW TO UNIT # 100
RESIDUALS TO UNIT # 100

===> NOTE: UNIT 100 IS THE NEXT BLOCK AND UNIT 200 IS ULTIMATE DISPOSAL.

DETENTION UNIT CHARACTERISTICS:

RESIDUALS DRAW-OFF SCHEME: NEVER DRAWN OFF

DEPTH-AREA-STORAGE-FLOW RELATIONSHIPS :

DEPTH, FT	SURFACE AREA, SQ FT	STORAGE, CU FT	TREATED OUTFLOW, CFS	RESIDUAL FLOW, CFS
0.0000E+00	1.1500E+03	0.0000E+00	0.0000E+00	0.0000E+00
2.5000E-01	1.1500E+03	2.8750E+02	0.0000E+00	0.0000E+00
2.5100E-01	1.1500E+03	2.8865E+02	4.8000E-02	0.0000E+00
1.7500E+00	1.1500E+03	2.0125E+03	4.8000E-02	0.0000E+00

INITIAL CONDITIONS:

VOLUME, CU FT : 0.0000E+00

****
* NOTE: IF THERE IS ONLY ONE UNIT THE PLANT *
* PERFORMANCE SUMMARY WILL NOT BE PRINTED. *
****

Note !! UNIT 1 HAS EXCEEDED THE MAXIMUM STORAGE VOLUME ON 1/21/1969 AT 4:15
The excess has been bypassed and is included in BYPASS volume. Further
messages will be suppressed. But summaries of number of all volume-bypass
time steps and number of days with volume-bypasses will be printed.
1
****
* ENTIRE SIMULATION UNIT SUMMARIES *
****
OCT 1, 1968, 0 0: 0 TO OCT 1, 2008, 0 0: 0.

UNIT	PARAMETER	VOLUME CU FT
1	INFLOW,TOTAL	5.5540E+05
	INFLOW,NET	4.4605E+05
	BYPASS	1.0935E+05
	TREATED OUTFLOW	2.6253E+05
	RESIDUAL FLOW	0.0000E+00
	REMAINING	0.0000E+00
	EVAPORATION	2.8313E+03
	INFILTRATION	1.8106E+05
	NO. VOL. BYPASSES	581
	NO. VOL. BYPASS DAYS	48
	INITIAL COND.	0.0000E+00
	PERCENT ERROR	-0.0661

===> Storage/Treatment simulation ended normally.

===> SWMM 4.4H simulation ended normally.
Always check output file for possible warning messages.

===> Your input file was named : Park_St0.in
===> Your output file was named: Park_St0.out

```
**********************************************************
*       SWMM 4.4H   Simulation Date and Time Summary     *
**********************************************************
* Starting Date... August     20, 2010                   *
*          Time...          13:30: 3.786                 *
*   Ending Date... August     20, 2010                   *
*          Time...          13:31: 9.801                 *
*  Elapsed Time...               1.100 minutes.          *
*  Elapsed Time...              66.014 seconds.          *
**********************************************************
```

SECTION 8

MITIGATED

FLOW CALCS

APPENDIX A

ENTRADA SOUTH

MITIGATED FLOW CALCULATIONS

TABLE 1

INTENSITY - DURATION DATA FOR 0.75-INCHES OF RAINFALL
FOR ALL RAINFALL ZONES

Duration, T_c (min)	Rainfall Intensity, I_x (in/hr)
5	0.447
6	0.411
7	0.382
8	0.359
9	0.339
10	0.323
11	0.309
12	0.297
13	0.286
14	0.276
15	0.267
16	0.259
17	0.252
18	0.245
19	0.239
20	0.233
21	0.228
22	0.223
23	0.218
24	0.214
25	0.210
26	0.206
27	0.203
28	0.199
29	0.196
30	0.193

BASIN: A

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

PROVIDE PROPOSED PROJECT CHARACTERISTICS

A_{TOTAL}	818.00	Acres
Type of Development	Undeveloped/Residentia	
Predominate Soil Type #	98	
% of Project Impervious	10.9	
% of Project Pervious	8.1	
% of Project Contributing Undeveloped Area	80.97	
A_I	89.16	Acres
A_P	66.50	Acres
A_U	662.33	Acres

BASIN: A

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

DETERMINING THE PEAK MITIGATED FLOW RATE (Q_{PM}):

In order to determine the peak mitigated flow rate (Q_{PM}) from the new development, use the Los Angles County Department of Public Works *Hydrology Manual*. Use the Modified Rational Method for calculating the peak mitigation QPM for compliance with the Standard Urban Stormwater Mitigation Plan (SUSMP). Use attached **Table 1** for all maximum intensity (Ix) values used.

By trial and error, determine the time of concentration (T_C), as shown below:

CALCULATION STEPS:

1. Assume an initial T_C value between 5 and 30 minutes.

T_C 30 minutes

2. Using Table 1, look up the assumed T_C value and select the corresponding Ix intensity in inches/hour.

Ix 0.193 inches/hour

3. Determine the value for the Undeveloped Runoff Coefficient, C_U, using the runoff coefficient curve corresponding to the predominand soil type.

C_U 0.10

4. Calculate the Developed Runoff Coefficient, $C_D = (0.9 * Imp.) + [(1.0 - Imp.) * C_U]$

C_D 0.19

5. Calculate the value for $C_D * Ix$

$C_D * Ix$ 0.0361

Length = 6000
Slope = 0.01

6. Calculate the time of concentration, $T_C = 10^{-0.507} * (C_D * Ix)^{-0.519} * Length^{0.483} * Slope^{-0.135}$

Calculated T_C 216.93 minutes

7. Calculate the difference between the initially assumed T_C and the calculated T_C, if the difference is greater than 0.5 minutes, use the calculated T_C as the assumed initial T_C in the second iteration. If the T_C value is within 0.5 minutes, round the acceptable T_C value to the nearest minute.

BASIN: A

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

TABLE FOR ITERATIONS

Iteration No.	Initial T_C (min)	I_X (in/hr)	C_U	C_D	$C_D * I_X$ (in/hr)	Calculated T_C (min)	Difference (min)
1	30	0.193	0.10	0.19	0.03613	216.9	-187
2							
3							
4							
5							
6							
7							
8							
9							
10							

Acceptable T_C value 30 minutes

8. Calculate the Peak Mitigation Flow Rate,
$Q_{PM} = C_D * I_X * A_{Total}$ * (1.008333 ft³-hour/acre-inches-seconds)

Q_{PM} 29.80 cfs

In order to determine the volume (V_M) of stormwater runoff to be mitigated from the new development, use the following equation:

$V_M = (2{,}722.5 \text{ ft}^3 / \text{acre}) * [(A_I) (0.9) + (A_P + A_U)(C_U)]$

V_M 416895.3 ft³

BASIN: B AND Q

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

PROVIDE PROPOSED PROJECT CHARACTERISTICS

A_{TOTAL}	90.30	Acres
Type of Development	SINGLE FAMILY	
Predominate Soil Type #	98	
% of Project Impervious	52.0	
% of Project Pervious	48.0	
% of Project Contributing Undeveloped Area	0.00	
A_I	46.96	Acres
A_P	43.34	Acres
A_U	0.00	Acres

BASIN: B AND Q

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

DETERMINING THE PEAK MITIGATED FLOW RATE (Q_{PM}):

In order to determine the peak mitigated flow rate (Q_{PM}) from the new development, use the Los Angles County Department of Public Works *Hydrology Manual*. Use the Modified Rational Method for calculating the peak mitigation QPM for compliance with the Standard Urban Stormwater Mitigation Plan (SUSMP). Use attached **Table 1** for all maximum intensity (I_X) values used.

By trial and error, determine the time of concentration (T_C), as shown below:

CALCULATION STEPS:

1. Assume an initial T_C value between 5 and 30 minutes.

T_C 30 minutes

2. Using Table 1, look up the assumed T_C value and select the corresponding I_X intensity in inches/hour.

I_X 0.193 inches/hour

3. Determine the value for the Undeveloped Runoff Coefficient, C_U, using the runoff coefficient curve corresponding to the predominand soil type.

C_U 0.10

4. Calculate the Developed Runoff Coefficient, $C_D = (0.9 * Imp.) + [(1.0 - Imp.) * C_U]$

C_D 0.52

5. Calculate the value for $C_D * I_X$

$C_D * I_X$ 0.0996

Length = 4300
Slope = 0.065

6. Calculate the time of concentration, $T_C = 10^{-0.507} * (C_D * I_X)^{-0.519} * Length^{0.483} * Slope^{-0.135}$

Calculated T_C 84.75 minutes

7. Calculate the difference between the initially assumed T_C and the calculated T_C, if the difference is greater than 0.5 minutes, use the calculated T_C as the assumed initial T_C in the second iteration. If the T_C value is within 0.5 minutes, round the acceptable T_C value to the nearest minute.

BASIN: B AND Q

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

TABLE FOR ITERATIONS

Iteration No.	Initial T_C (min)	I_X (in/hr)	C_U	C_D	$C_D * I_X$ (in/hr)	Calculated T_C (min)	Difference (min)
1	30	0.193	0.10	0.52	0.099588	84.8	-55
2							
3							
4							
5							
6							
7							
8							
9							
10							

Acceptable T_C value 30 minutes

8. Calculate the Peak Mitigation Flow Rate,
$Q_{PM} = C_D * I_X * A_{Total} * (1.008333\ ft^3\text{-hour/acre-inches-seconds})$

Q_{PM} 9.07 cfs

In order to determine the volume (V_M) of stormwater runoff to be mitigated from the new development, use the following equation:

$V_M = (2{,}722.5\ ft^3 / acre) * [(A_I)(0.9) + (A_P + A_U)(C_U)]$

V_M 126854.3 ft^3

BASIN: C

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

PROVIDE PROPOSED PROJECT CHARACTERISTICS

A_{TOTAL}	5.40	Acres
Type of Development	PARK SITE	
Predominate Soil Type #	98	
% of Project Impervious	10.0	
% of Project Pervious	90.0	
% of Project Contributing Undeveloped Area	0.00	
A_I	0.54	Acres
A_P	4.86	Acres
A_U	0.00	Acres

BASIN: C

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

DETERMINING THE PEAK MITIGATED FLOW RATE (Q_{PM}):

In order to determine the peak mitigated flow rate (Q_{PM}) from the new development, use the Los Angles County Department of Public Works *Hydrology Manual*. Use the Modified Rational Method for calculating the peak mitigation QPM for compliance with the Standard Urban Stormwater Mitigation Plan (SUSMP). Use attached **Table 1** for all maximum intensity (I_X) values used.

By trial and error, determine the time of concentration (T_C), as shown below:

CALCULATION STEPS:

1. Assume an initial T_C value between 5 and 30 minutes.

T_C 30 minutes

2. Using Table 1, look up the assumed T_C value and select the corresponding I_X intensity in inches/hour.

I_X 0.193 inches/hour

3. Determine the value for the Undeveloped Runoff Coefficient, C_U, using the runoff coefficient curve corresponding to the predominand soil type.

C_U 0.10

4. Calculate the Developed Runoff Coefficient, $C_D = (0.9 * Imp.) + [(1.0 - Imp.) * C_U]$

C_D 0.18

5. Calculate the value for $C_D * I_X$

$C_D * I_X$ 0.0347

Length = 620
Slope = 0.02

6. Calculate the time of concentration, $T_C = 10^{-0.507} * (C_D * I_X)^{-0.519} * Length^{0.483} * Slope^{-0.135}$

Calculated T_C 67.36 minutes

7. Calculate the difference between the initially assumed T_C and the calculated T_C, if the difference is greater than 0.5 minutes, use the calculated T_C as the assumed initial T_C in the second iteration. If the T_C value is within 0.5 minutes, round the acceptable T_C value to the nearest minute.

BASIN: C

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

TABLE FOR ITERATIONS

Iteration No.	Initial T_C (min)	I_X (in/hr)	C_U	C_D	$C_D * I_X$ (in/hr)	Calculated T_C (min)	Difference (min)
1	30	0.193	0.10	0.18	0.03474	67.4	-37
2							
3							
4							
5							
6							
7							
8							
9							
10							

Acceptable T_C value 30 minutes

8. Calculate the Peak Mitigation Flow Rate,
$Q_{PM} = C_D * I_X * A_{Total} * (1.008333\ ft^3\text{-hour/acre-inches-seconds})$

Q_{PM} 0.19 cfs

In order to determine the volume (V_M) of stormwater runoff to be mitigated from the new development, use the following equation:

$V_M = (2{,}722.5\ ft^3 / acre) * [(A_I)(0.9) + (A_P + A_U)(C_U)]$

V_M 2646.3 ft^3

BASIN: D

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

PROVIDE PROPOSED PROJECT CHARACTERISTICS

A_{TOTAL}	14.00	Acres
Type of Development	Multi-Family/Open	
Predominate Soil Type #	98	
% of Project Impervious	61.0	
% of Project Pervious	32.0	
% of Project Contributing Undeveloped Area	7.00	
A_I	8.54	Acres
A_P	4.48	Acres
A_U	0.98	Acres

BASIN: D

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

DETERMINING THE PEAK MITIGATED FLOW RATE (Q_{PM}):

In order to determine the peak mitigated flow rate (Q_{PM}) from the new development, use the Los Angles County Department of Public Works *Hydrology Manual*. Use the Modified Rational Method for calculating the peak mitigation QPM for compliance with the Standard Urban Stormwater Mitigation Plan (SUSMP). Use attached **Table 1** for all maximum intensity (I_X) values used.

By trial and error, determine the time of concentration (T_C), as shown below:

CALCULATION STEPS:

1. Assume an initial T_C value between 5 and 30 minutes.

T_C 30 minutes

2. Using Table 1, look up the assumed T_C value and select the corresponding I_X intensity in inches/hour.

I_X 0.193 inches/hour

3. Determine the value for the Undeveloped Runoff Coefficient, C_U, using the runoff coefficient curve corresponding to the predominand soil type.

C_U 0.10

4. Calculate the Developed Runoff Coefficient, $C_D = (0.9 * Imp.) + [(1.0 - Imp.) * C_U]$

C_D 0.59

5. Calculate the value for $C_D * I_X$

$C_D * I_X$ 0.1135

Length = 1700
Slope = 0.04

6. Calculate the time of concentration, $T_C = 10^{-0.507} * (C_D * I_X)^{-0.519} * Length^{0.483} * Slope^{-0.135}$

Calculated T_C 54.02 minutes

7. Calculate the difference between the initially assumed T_C and the calculated T_C, if the difference is greater than 0.5 minutes, use the calculated T_C as the assumed initial T_C in the second iteration. If the T_C value is within 0.5 minutes, round the acceptable T_C value to the nearest minute.

BASIN: D

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

TABLE FOR ITERATIONS

Iteration No.	Initial T_C (min)	I_X (in/hr)	C_U	C_D	C_D*I_X (in/hr)	Calculated T_C (min)	Difference (min)
1	30	0.193	0.10	0.59	0.113484	54.0	-24
2							
3							
4							
5							
6							
7							
8							
9							
10							

Acceptable T_C value 30 minutes

8. Calculate the Peak Mitigation Flow Rate,
$Q_{PM} = C_D * I_X * A_{Total} * (1.008333\ ft^3\text{-hour/acre-inches-seconds})$

Q_{PM} 1.60 cfs

In order to determine the volume (V_M) of stormwater runoff to be mitigated from the new development, use the following equation:

$V_M = (2{,}722.5\ ft^3 / acre) * [(A_I) (0.9) + (A_P + A_U)(C_U)]$

V_M 22411.6 ft^3

BASIN: E

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

PROVIDE PROPOSED PROJECT CHARACTERISTICS

A_{TOTAL}	30.20	Acres
Type of Development	COMMERCIAL	
Predominate Soil Type #	98	
% of Project Impervious	91.0	
% of Project Pervious	9.0	
% of Project Contributing Undeveloped Area	0.00	
A_I	27.48	Acres
A_P	2.72	Acres
A_U	0.00	Acres

BASIN: E

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

DETERMINING THE PEAK MITIGATED FLOW RATE (Q_{PM}):

In order to determine the peak mitigated flow rate (Q_{PM}) from the new development, use the Los Angles County Department of Public Works *Hydrology Manual*. Use the Modified Rational Method for calculating the peak mitigation QPM for compliance with the Standard Urban Stormwater Mitigation Plan (SUSMP). Use attached **Table 1** for all maximum intensity (I_X) values used.

By trial and error, determine the time of concentration (T_C), as shown below:

CALCULATION STEPS:

1. Assume an initial T_C value between 5 and 30 minutes.

T_C 30 minutes

2. Using Table 1, look up the assumed T_C value and select the corresponding I_X intensity in inches/hour.

I_X 0.193 inches/hour

3. Determine the value for the Undeveloped Runoff Coefficient, C_U, using the runoff coefficient curve corresponding to the predominand soil type.

C_U 0.10

4. Calculate the Developed Runoff Coefficient, $C_D = (0.9 * Imp.) + [(1.0 - Imp.) * C_U]$

C_D 0.83

5. Calculate the value for $C_D * I_X$

$C_D * I_X$ 0.1598

Length = 2000
Slope = 0.03

6. Calculate the time of concentration, $T_C = 10^{-0.507} * (C_D * I_X)^{-0.519} * Length^{0.483} * Slope^{-0.135}$

Calculated T_C 50.85 minutes

7. Calculate the difference between the initially assumed T_C and the calculated T_C, if the difference is greater than 0.5 minutes, use the calculated T_C as the assumed initial T_C in the second iteration. If the T_C value is within 0.5 minutes, round the acceptable T_C value to the nearest minute.

BASIN: E

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

TABLE FOR ITERATIONS

Iteration No.	Initial T_C (min)	I_X (in/hr)	C_U	C_D	$C_D * I_X$ (in/hr)	Calculated T_C (min)	Difference (min)
1	30	0.193	0.10	0.83	0.159804	50.9	-21
2							
3							
4							
5							
6							
7							
8							
9							
10							

Acceptable T_C value 30 minutes

8. Calculate the Peak Mitigation Flow Rate,
$Q_{PM} = C_D * I_X * A_{Total} * (1.008333\ ft^3\text{-hour/acre-inches-seconds})$

Q_{PM} 4.87 cfs

In order to determine the volume (V_M) of stormwater runoff to be mitigated from the new development, use the following equation:

$V_M = (2{,}722.5\ ft^3 / acre) * [(A_I)(0.9) + (A_P + A_U)(C_U)]$

V_M 68077.7 ft^3

BASIN: F

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

PROVIDE PROPOSED PROJECT CHARACTERISTICS

A_{TOTAL}	6.80	Acres
Type of Development	Multi-Family	
Predominate Soil Type #	98	
% of Project Impervious	80.0	
% of Project Pervious	20.0	
% of Project Contributing Undeveloped Area	0.00	
A_I	5.44	Acres
A_P	1.36	Acres
A_U	0.00	Acres

BASIN: F

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

DETERMINING THE PEAK MITIGATED FLOW RATE (Q_{PM}):

In order to determine the peak mitigated flow rate (Q_{PM}) from the new development, use the Los Angles County Department of Public Works *Hydrology Manual*. Use the Modified Rational Method for calculating the peak mitigation QPM for compliance with the Standard Urban Stormwater Mitigation Plan (SUSMP). Use attached **Table 1** for all maximum intensity (I_X) values used.

By trial and error, determine the time of concentration (T_C), as shown below:

CALCULATION STEPS:

1. Assume an initial T_C value between 5 and 30 minutes.

T_C 30 minutes

2. Using Table 1, look up the assumed T_C value and select the corresponding I_X intensity in inches/hour.

I_X 0.193 inches/hour

3. Determine the value for the Undeveloped Runoff Coefficient, C_U, using the runoff coefficient curve corresponding to the predominand soil type.

C_U 0.10

4. Calculate the Developed Runoff Coefficient, $C_D = (0.9 * Imp.) + [(1.0 - Imp.) * C_U]$

C_D 0.74

5. Calculate the value for $C_D * I_X$

$C_D * I_X$ 0.1428

Length = 840
Slope = 0.02

6. Calculate the time of concentration, $T_C = 10^{-0.507} * (C_D * I_X)^{-0.519} * Length^{0.483} * Slope^{-0.135}$

Calculated T_C 37.45 minutes

7. Calculate the difference between the initially assumed T_C and the calculated T_C, if the difference is greater than 0.5 minutes, use the calculated T_C as the assumed initial T_C in the second iteration. If the T_C value is within 0.5 minutes, round the acceptable T_C value to the nearest minute.

BASIN: F

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

TABLE FOR ITERATIONS

Iteration No.	Initial T_C (min)	I_X (in/hr)	C_U	C_D	$C_D * I_X$ (in/hr)	Calculated T_C (min)	Difference (min)
1	30	0.193	0.10	0.74	0.14282	37.5	-7
2							
3							
4							
5							
6							
7							
8							
9							
10							

Acceptable T_C value 30 minutes

8. Calculate the Peak Mitigation Flow Rate,
$Q_{PM} = C_D * I_X * A_{Total} * (1.008333\ ft^3\text{-hour/acre-inches-seconds})$

Q_{PM} 0.98 cfs

In order to determine the volume (V_M) of stormwater runoff to be mitigated from the new development, use the following equation:

$V_M = (2{,}722.5\ ft^3 / acre) * [(A_I)(0.9) + (A_P + A_U)(C_U)]$

V_M 13699.6 ft^3

BASIN: G

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

PROVIDE PROPOSED PROJECT CHARACTERISTICS

A_{TOTAL}	0.60	Acres
Type of Development	Roadway	
Predominate Soil Type #	98	
% of Project Impervious	90.0	
% of Project Pervious	10.0	
% of Project Contributing Undeveloped Area	0.00	
A_I	0.54	Acres
A_P	0.06	Acres
A_U	0.00	Acres

BASIN: G

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

DETERMINING THE PEAK MITIGATED FLOW RATE (Q_{PM}):

In order to determine the peak mitigated flow rate (Q_{PM}) from the new development, use the Los Angles County Department of Public Works *Hydrology Manual*. Use the Modified Rational Method for calculating the peak mitigation QPM for compliance with the Standard Urban Stormwater Mitigation Plan (SUSMP). Use attached **Table 1** for all maximum intensity (I_X) values used.

By trial and error, determine the time of concentration (T_C), as shown below:

CALCULATION STEPS:

1. Assume an initial T_C value between 5 and 30 minutes.

T_C 30 minutes

2. Using Table 1, look up the assumed T_C value and select the corresponding I_X intensity in inches/hour.

I_X 0.193 inches/hour

3. Determine the value for the Undeveloped Runoff Coefficient, C_U, using the runoff coefficient curve corresponding to the predominand soil type.

C_U 0.10

4. Calculate the Developed Runoff Coefficient, $C_D = (0.9 * Imp.) + [(1.0 - Imp.) * C_U]$

C_D 0.82

5. Calculate the value for $C_D * I_X$

$C_D * I_X$ 0.1583

Length = 780
Slope = 0.05

6. Calculate the time of concentration, $T_C = 10^{-0.507} * (C_D * I_X)^{-0.519} * Length^{0.483} * Slope^{-0.135}$

Calculated T_C 30.27 minutes

7. Calculate the difference between the initially assumed T_C and the calculated T_C, if the difference is greater than 0.5 minutes, use the calculated T_C as the assumed initial T_C in the second iteration. If the T_C value is within 0.5 minutes, round the acceptable T_C value to the nearest minute.

BASIN: G

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

TABLE FOR ITERATIONS

Iteration No.	Initial T_C (min)	I_X (in/hr)	C_U	C_D	$C_D * I_X$ (in/hr)	Calculated T_C (min)	Difference (min)
1	30	0.193	0.10	0.82	0.15826	30.3	0
2							
3							
4							
5							
6							
7							
8							
9							
10							

Acceptable T_C value 30 minutes

8. Calculate the Peak Mitigation Flow Rate,
$Q_{PM} = C_D * I_X * A_{Total} * (1.008333\ ft^3\text{-hour/acre-inches-seconds})$

Q_{PM} 0.10 cfs

In order to determine the volume (V_M) of stormwater runoff to be mitigated from the new development, use the following equation:

$V_M = (2{,}722.5\ ft^3 / acre) * [(A_I) (0.9) + (A_P + A_U)(C_U)]$

V_M 1339.5 ft^3

BASIN: H

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

PROVIDE PROPOSED PROJECT CHARACTERISTICS

A_{TOTAL}	1.30	Acres
Type of Development	Roadway	
Predominate Soil Type #	98	
% of Project Impervious	70.0	
% of Project Pervious	30.0	
% of Project Contributing Undeveloped Area	0.00	
A_I	0.91	Acres
A_P	0.39	Acres
A_U	0.00	Acres

BASIN: H

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

DETERMINING THE PEAK MITIGATED FLOW RATE (Q_{PM}):

In order to determine the peak mitigated flow rate (Q_{PM}) from the new development, use the Los Angles County Department of Public Works *Hydrology Manual*. Use the Modified Rational Method for calculating the peak mitigation QPM for compliance with the Standard Urban Stormwater Mitigation Plan (SUSMP). Use attached **Table 1** for all maximum intensity (Ix) values used.

By trial and error, determine the time of concentration (T_C), as shown below:

CALCULATION STEPS:

1. Assume an initial T_C value between 5 and 30 minutes.

T_C 30 minutes

2. Using Table 1, look up the assumed T_C value and select the corresponding Ix intensity in inches/hour.

Ix 0.193 inches/hour

3. Determine the value for the Undeveloped Runoff Coefficient, C_U, using the runoff coefficient curve corresponding to the predominand soil type.

C_U 0.10

4. Calculate the Developed Runoff Coefficient, $C_D = (0.9 * Imp.) + [(1.0 - Imp.) * C_U]$

C_D 0.66

5. Calculate the value for $C_D * Ix$

$C_D * Ix$ 0.1274

Length = 710
Slope = 0.05

6. Calculate the time of concentration, $T_C = 10^{-0.507} * (C_D * Ix)^{-0.519} * Length^{0.483} * Slope^{-0.135}$

Calculated T_C 32.38 minutes

7. Calculate the difference between the initially assumed T_C and the calculated T_C, if the difference is greater than 0.5 minutes, use the calculated T_C as the assumed initial T_C in the second iteration. If the T_C value is within 0.5 minutes, round the acceptable T_C value to the nearest minute.

BASIN: H

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

TABLE FOR ITERATIONS

Iteration No.	Initial T_C (min)	I_X (in/hr)	C_U	C_D	$C_D * I_X$ (in/hr)	Calculated T_C (min)	Difference (min)
1	30	0.193	0.10	0.66	0.12738	32.4	-2
2							
3							
4							
5							
6							
7							
8							
9							
10							

Acceptable T_C value 30 minutes

8. Calculate the Peak Mitigation Flow Rate,
$Q_{PM} = C_D * I_X * A_{Total}$ * (1.008333 ft³-hour/acre-inches-seconds)

Q_{PM} 0.17 cfs

In order to determine the volume (V_M) of stormwater runoff to be mitigated from the new development, use the following equation:

$V_M = (2{,}722.5 \text{ ft}^3 / \text{acre}) * [(A_I) (0.9) + (A_P + A_U)(C_U)]$

V_M 2335.9 ft³

BASIN: I

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

PROVIDE PROPOSED PROJECT CHARACTERISTICS

A_{TOTAL}	1.90	Acres
Type of Development	Roadway	
Predominate Soil Type #	98	
% of Project Impervious	80.0	
% of Project Pervious	20.0	
% of Project Contributing Undeveloped Area	0.00	
A_I	1.52	Acres
A_P	0.38	Acres
A_U	0.00	Acres

BASIN: I

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

DETERMINING THE PEAK MITIGATED FLOW RATE (Q_{PM}):

In order to determine the peak mitigated flow rate (Q_{PM}) from the new development, use the Los Angles County Department of Public Works *Hydrology Manual*. Use the Modified Rational Method for calculating the peak mitigation QPM for compliance with the Standard Urban Stormwater Mitigation Plan (SUSMP). Use attached **Table 1** for all maximum intensity (Ix) values used.

By trial and error, determine the time of concentration (T_C), as shown below:

CALCULATION STEPS:

1. Assume an initial T_C value between 5 and 30 minutes.

T_C 30 minutes

2. Using Table 1, look up the assumed T_C value and select the corresponding Ix intensity in inches/hour.

Ix 0.193 inches/hour

3. Determine the value for the Undeveloped Runoff Coefficient, C_U, using the runoff coefficient curve corresponding to the predominand soil type.

C_U 0.10

4. Calculate the Developed Runoff Coefficient, $C_D = (0.9 * Imp.) + [(1.0 - Imp.) * C_U]$

C_D 0.74

5. Calculate the value for $C_D * Ix$

$C_D * Ix$ 0.1428

Length = 1410
Slope = 0.012

6. Calculate the time of concentration, $T_C = 10^{-0.507} * (C_D * Ix)^{-0.519} * Length^{0.483} * Slope^{-0.135}$

Calculated T_C 51.53 minutes

7. Calculate the difference between the initially assumed T_C and the calculated T_C, if the difference is greater than 0.5 minutes, use the calculated T_C as the assumed initial T_C in the second iteration. If the T_C value is within 0.5 minutes, round the acceptable T_C value to the nearest minute.

BASIN: I

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

TABLE FOR ITERATIONS

Iteration No.	Initial T_C (min)	I_X (in/hr)	C_U	C_D	$C_D * I_X$ (in/hr)	Calculated T_C (min)	Difference (min)
1	30	0.193	0.10	0.74	0.14282	51.5	-22
2							
3							
4							
5							
6							
7							
8							
9							
10							

Acceptable T_C value 30 minutes

8. Calculate the Peak Mitigation Flow Rate,
$Q_{PM} = C_D * I_X * A_{Total} * (1.008333\ ft^3\text{-hour/acre-inches-seconds})$

Q_{PM} 0.27 cfs

In order to determine the volume (V_M) of stormwater runoff to be mitigated from the new development, use the following equation:

$V_M = (2{,}722.5\ ft^3 / acre) * [(A_I)(0.9) + (A_P + A_U)(C_U)]$

V_M 3827.8 ft^3

BASIN: J

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

PROVIDE PROPOSED PROJECT CHARACTERISTICS

A_{TOTAL}	2.10	Acres
Type of Development	Roadway	
Predominate Soil Type #	98	
% of Project Impervious	80.0	
% of Project Pervious	20.0	
% of Project Contributing Undeveloped Area	0.00	
A_I	1.68	Acres
A_P	0.42	Acres
A_U	0.00	Acres

BASIN: J

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

DETERMINING THE PEAK MITIGATED FLOW RATE (Q_{PM}):

In order to determine the peak mitigated flow rate (Q_{PM}) from the new development, use the Los Angles County Department of Public Works *Hydrology Manual*. Use the Modified Rational Method for calculating the peak mitigation QPM for compliance with the Standard Urban Stormwater Mitigation Plan (SUSMP). Use attached **Table 1** for all maximum intensity (Ix) values used.

By trial and error, determine the time of concentration (T_C), as shown below:

CALCULATION STEPS:

1. Assume an initial T_C value between 5 and 30 minutes.

T_C 30 minutes

2. Using Table 1, look up the assumed T_C value and select the corresponding Ix intensity in inches/hour.

Ix 0.193 inches/hour

3. Determine the value for the Undeveloped Runoff Coefficient, C_U, using the runoff coefficient curve corresponding to the predominand soil type.

C_U 0.10

4. Calculate the Developed Runoff Coefficient, $C_D = (0.9 * Imp.) + [(1.0 - Imp.) * C_U]$

C_D 0.74

5. Calculate the value for $C_D * Ix$

$C_D * Ix$ 0.1428

Length = 1330
Slope = 0.012

6. Calculate the time of concentration, $T_C = 10^{-0.507} * (C_D * Ix)^{-0.519} * Length^{0.483} * Slope^{-0.135}$

Calculated T_C 50.10 minutes

7. Calculate the difference between the initially assumed T_C and the calculated T_C, if the difference is greater than 0.5 minutes, use the calculated T_C as the assumed initial T_C in the second iteration. If the T_C value is within 0.5 minutes, round the acceptable T_C value to the nearest minute.

BASIN: J

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

TABLE FOR ITERATIONS

Iteration No.	Initial T_C (min)	I_X (in/hr)	C_U	C_D	$C_D * I_X$ (in/hr)	Calculated T_C (min)	Difference (min)
1	30	0.193	0.10	0.74	0.14282	50.1	-20
2							
3							
4							
5							
6							
7							
8							
9							
10							

Acceptable T_C value 30 minutes

8. Calculate the Peak Mitigation Flow Rate,
$Q_{PM} = C_D * I_X * A_{Total} * (1.008333\ ft^3\text{-hour/acre-inches-seconds})$

Q_{PM} 0.30 cfs

In order to determine the volume (V_M) of stormwater runoff to be mitigated from the new development, use the following equation:

$V_M = (2{,}722.5\ ft^3 / acre) * [(A_I)(0.9) + (A_P + A_U)(C_U)]$

V_M 4230.8 ft^3

BASIN: K

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

PROVIDE PROPOSED PROJECT CHARACTERISTICS

A_{TOTAL}	2.30	Acres
Type of Development	Roadway	
Predominate Soil Type #	98	
% of Project Impervious	80.0	
% of Project Pervious	20.0	
% of Project Contributing Undeveloped Area	0.00	
A_I	1.84	Acres
A_P	0.46	Acres
A_U	0.00	Acres

BASIN: K

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

DETERMINING THE PEAK MITIGATED FLOW RATE (Q_{PM}):

In order to determine the peak mitigated flow rate (Q_{PM}) from the new development, use the Los Angles County Department of Public Works *Hydrology Manual*. Use the Modified Rational Method for calculating the peak mitigation QPM for compliance with the Standard Urban Stormwater Mitigation Plan (SUSMP). Use attached **Table 1** for all maximum intensity (I_X) values used.

By trial and error, determine the time of concentration (T_C), as shown below:

CALCULATION STEPS:

1. Assume an initial T_C value between 5 and 30 minutes.

T_C 30 minutes

2. Using Table 1, look up the assumed T_C value and select the corresponding I_X intensity in inches/hour.

I_X 0.193 inches/hour

3. Determine the value for the Undeveloped Runoff Coefficient, C_U, using the runoff coefficient curve corresponding to the predominand soil type.

C_U 0.10

4. Calculate the Developed Runoff Coefficient, $C_D = (0.9 * Imp.) + [(1.0 - Imp.) * C_U]$

C_D 0.74

5. Calculate the value for $C_D * I_X$

$C_D * I_X$ 0.1428

Length = 1420
Slope = 0.043

6. Calculate the time of concentration, $T_C = 10^{-0.507} * (C_D * I_X)^{-0.519} * Length^{0.483} * Slope^{-0.135}$

Calculated T_C 43.52 minutes

7. Calculate the difference between the initially assumed T_C and the calculated T_C, if the difference is greater than 0.5 minutes, use the calculated T_C as the assumed initial T_C in the second iteration. If the T_C value is within 0.5 minutes, round the acceptable T_C value to the nearest minute.

BASIN: K

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

TABLE FOR ITERATIONS

Iteration No.	Initial T_C (min)	I_X (in/hr)	C_U	C_D	$C_D * I_X$ (in/hr)	Calculated T_C (min)	Difference (min)
1	30	0.193	0.10	0.74	0.14282	43.5	-14
2							
3							
4							
5							
6							
7							
8							
9							
10							

Acceptable T_C value 30 minutes

8. Calculate the Peak Mitigation Flow Rate,
$Q_{PM} = C_D * I_X * A_{Total} * (1.008333\ ft^3\text{-hour/acre-inches-seconds})$

Q_{PM} 0.33 cfs

In order to determine the volume (V_M) of stormwater runoff to be mitigated from the new development, use the following equation:

$V_M = (2{,}722.5\ ft^3 / acre) * [(A_I) (0.9) + (A_P + A_U)(C_U)]$

V_M 4633.7 ft^3

BASIN: L

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

PROVIDE PROPOSED PROJECT CHARACTERISTICS

A_{TOTAL}	3.20	Acres
Type of Development	Roadway	
Predominate Soil Type #	98	
% of Project Impervious	80.0	
% of Project Pervious	20.0	
% of Project Contributing Undeveloped Area	0.00	
A_I	2.56	Acres
A_P	0.64	Acres
A_U	0.00	Acres

BASIN: L

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

DETERMINING THE PEAK MITIGATED FLOW RATE (Q_{PM}):

In order to determine the peak mitigated flow rate (Q_{PM}) from the new development, use the Los Angles County Department of Public Works *Hydrology Manual*. Use the Modified Rational Method for calculating the peak mitigation QPM for compliance with the Standard Urban Stormwater Mitigation Plan (SUSMP). Use attached **Table 1** for all maximum intensity (Ix) values used.

By trial and error, determine the time of concentration (T_C), as shown below:

CALCULATION STEPS:

1. Assume an initial T_C value between 5 and 30 minutes.

T_C 30 minutes

2. Using Table 1, look up the assumed T_C value and select the corresponding Ix intensity in inches/hour.

Ix 0.193 inches/hour

3. Determine the value for the Undeveloped Runoff Coefficient, C_U, using the runoff coefficient curve corresponding to the predominand soil type.

C_U 0.10

4. Calculate the Developed Runoff Coefficient, $C_D = (0.9 * Imp.) + [(1.0 - Imp.) * C_U]$

C_D 0.74

5. Calculate the value for $C_D * Ix$

$C_D * Ix$ 0.1428

Length = 1380
Slope = 0.043

6. Calculate the time of concentration, $T_C = 10^{-0.507} * (C_D * Ix)^{-0.519} * Length^{0.483} * Slope^{-0.135}$

Calculated T_C 42.92 minutes

7. Calculate the difference between the initially assumed T_C and the calculated T_C, if the difference is greater than 0.5 minutes, use the calculated T_C as the assumed initial T_C in the second iteration. If the T_C value is within 0.5 minutes, round the acceptable T_C value to the nearest minute.

BASIN: L

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

TABLE FOR ITERATIONS

Iteration No.	Initial T_C (min)	I_X (in/hr)	C_U	C_D	$C_D * I_X$ (in/hr)	Calculated T_C (min)	Difference (min)
1	30	0.193	0.10	0.74	0.14282	42.9	-13
2							
3							
4							
5							
6							
7							
8							
9							
10							

Acceptable T_C value 30 minutes

8. Calculate the Peak Mitigation Flow Rate,
$Q_{PM} = C_D * I_X * A_{Total} * (1.008333\ ft^3\text{-hour/acre-inches-seconds})$

Q_{PM} 0.46 cfs

In order to determine the volume (V_M) of stormwater runoff to be mitigated from the new development, use the following equation:

$V_M = (2{,}722.5\ ft^3 / acre) * [(A_I)(0.9) + (A_P + A_U)(C_U)]$

V_M 6446.9 ft^3

BASIN: M

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

PROVIDE PROPOSED PROJECT CHARACTERISTICS

A_{TOTAL}	2.90	Acres
Type of Development	Roadway	
Predominate Soil Type #	98	
% of Project Impervious	90.0	
% of Project Pervious	10.0	
% of Project Contributing Undeveloped Area	0.00	
A_I	2.61	Acres
A_P	0.29	Acres
A_U	0.00	Acres

BASIN: M

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

DETERMINING THE PEAK MITIGATED FLOW RATE (Q_{PM}):

In order to determine the peak mitigated flow rate (Q_{PM}) from the new development, use the Los Angles County Department of Public Works *Hydrology Manual*. Use the Modified Rational Method for calculating the peak mitigation QPM for compliance with the Standard Urban Stormwater Mitigation Plan (SUSMP). Use attached **Table 1** for all maximum intensity (I_X) values used.

By trial and error, determine the time of concentration (T_C), as shown below:

CALCULATION STEPS:

1. Assume an initial T_C value between 5 and 30 minutes.

T_C 30 minutes

2. Using Table 1, look up the assumed T_C value and select the corresponding I_X intensity in inches/hour.

I_X 0.193 inches/hour

3. Determine the value for the Undeveloped Runoff Coefficient, C_U, using the runoff coefficient curve corresponding to the predominand soil type.

C_U 0.10

4. Calculate the Developed Runoff Coefficient, $C_D = (0.9 * Imp.) + [(1.0 - Imp.) * C_U]$

C_D 0.82

5. Calculate the value for $C_D * I_X$

$C_D * I_X$ 0.1583

Length = 1240
Slope = 0.012

6. Calculate the time of concentration, $T_C = 10^{-0.507} * (C_D * I_X)^{-0.519} * Length^{0.483} * Slope^{-0.135}$

Calculated T_C 45.92 minutes

7. Calculate the difference between the initially assumed T_C and the calculated T_C, if the difference is greater than 0.5 minutes, use the calculated T_C as the assumed initial T_C in the second iteration. If the T_C value is within 0.5 minutes, round the acceptable T_C value to the nearest minute.

BASIN: M

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

TABLE FOR ITERATIONS

Iteration No.	Initial T_C (min)	I_X (in/hr)	C_U	C_D	$C_D * I_X$ (in/hr)	Calculated T_C (min)	Difference (min)
1	30	0.193	0.10	0.82	0.15826	45.9	-16
2							
3							
4							
5							
6							
7							
8							
9							
10							

Acceptable T_C value 30 minutes

8. Calculate the Peak Mitigation Flow Rate,
$Q_{PM} = C_D * I_X * A_{Total}$ * (1.008333 ft³-hour/acre-inches-seconds)

Q_{PM} 0.46 cfs

In order to determine the volume (V_M) of stormwater runoff to be mitigated from the new development, use the following equation:

$V_M = (2{,}722.5 \text{ ft}^3 / \text{acre}) * [(A_I) (0.9) + (A_P + A_U)(C_U)]$

V_M 6474.1 ft³

BASIN: N

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

PROVIDE PROPOSED PROJECT CHARACTERISTICS

A_{TOTAL}	1.10	Acres
Type of Development	Roadway	
Predominate Soil Type #	98	
% of Project Impervious	80.0	
% of Project Pervious	20.0	
% of Project Contributing Undeveloped Area	0.00	
A_I	0.88	Acres
A_P	0.22	Acres
A_U	0.00	Acres

BASIN: N

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

DETERMINING THE PEAK MITIGATED FLOW RATE (Q_{PM}):

In order to determine the peak mitigated flow rate (Q_{PM}) from the new development, use the Los Angles County Department of Public Works *Hydrology Manual*. Use the Modified Rational Method for calculating the peak mitigation QPM for compliance with the Standard Urban Stormwater Mitigation Plan (SUSMP). Use attached **Table 1** for all maximum intensity (Ix) values used.

By trial and error, determine the time of concentration (T_C), as shown below:

CALCULATION STEPS:

1. Assume an initial T_C value between 5 and 30 minutes.

T_C 23 minutes

2. Using Table 1, look up the assumed T_C value and select the corresponding Ix intensity in inches/hour.

Ix 0.218 inches/hour

3. Determine the value for the Undeveloped Runoff Coefficient, C_U, using the runoff coefficient curve corresponding to the predominand soil type.

C_U 0.10

4. Calculate the Developed Runoff Coefficient, $C_D = (0.9 * Imp.) + [(1.0 - Imp.) * C_U]$

C_D 0.74

5. Calculate the value for $C_D * Ix$

$C_D * Ix$ 0.1613

Length = 360
Slope = 0.025

6. Calculate the time of concentration, $T_C = 10^{-0.507} * (C_D * Ix)^{-0.519} * Length^{0.483} * Slope^{-0.135}$

Calculated T_C 22.66 minutes

7. Calculate the difference between the initially assumed T_C and the calculated T_C, if the difference is greater than 0.5 minutes, use the calculated T_C as the assumed initial T_C in the second iteration. If the T_C value is within 0.5 minutes, round the acceptable T_C value to the nearest minute.

BASIN: N

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

TABLE FOR ITERATIONS

Iteration No.	Initial T_C (min)	I_X (in/hr)	C_U	C_D	$C_D * I_X$ (in/hr)	Calculated T_C (min)	Difference (min)
1	23	0.218	0.10	0.74	0.16132	22.7	0
2							
3							
4							
5							
6							
7							
8							
9							
10							

Acceptable T_C value 23 minutes

8. Calculate the Peak Mitigation Flow Rate,
$Q_{PM} = C_D * I_X * A_{Total}$ * (1.008333 ft³-hour/acre-inches-seconds)

Q_{PM} 0.18 cfs

In order to determine the volume (V_M) of stormwater runoff to be mitigated from the new development, use the following equation:

$V_M = (2{,}722.5 \text{ ft}^3 / \text{acre}) * [(A_I) (0.9) + (A_P + A_U)(C_U)]$

V_M 2216.1 ft³

BASIN: O

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

PROVIDE PROPOSED PROJECT CHARACTERISTICS

A_{TOTAL}	3.30	Acres
Type of Development	Roadway	
Predominate Soil Type #	98	
% of Project Impervious	80.0	
% of Project Pervious	20.0	
% of Project Contributing Undeveloped Area	0.00	
A_I	2.64	Acres
A_P	0.66	Acres
A_U	0.00	Acres

BASIN: O

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

DETERMINING THE PEAK MITIGATED FLOW RATE (Q_{PM}):

In order to determine the peak mitigated flow rate (Q_{PM}) from the new development, use the Los Angles County Department of Public Works *Hydrology Manual*. Use the Modified Rational Method for calculating the peak mitigation QPM for compliance with the Standard Urban Stormwater Mitigation Plan (SUSMP). Use attached **Table 1** for all maximum intensity (I_X) values used.

By trial and error, determine the time of concentration (T_C), as shown below:

CALCULATION STEPS:

1. Assume an initial T_C value between 5 and 30 minutes.

T_C 30 minutes

2. Using Table 1, look up the assumed T_C value and select the corresponding I_X intensity in inches/hour.

I_X 0.193 inches/hour

3. Determine the value for the Undeveloped Runoff Coefficient, C_U, using the runoff coefficient curve corresponding to the predominand soil type.

C_U 0.10

4. Calculate the Developed Runoff Coefficient, $C_D = (0.9 * Imp.) + [(1.0 - Imp.) * C_U]$

C_D 0.74

5. Calculate the value for $C_D * I_X$

$C_D * I_X$ 0.1428

Length = 900
Slope = 0.012

6. Calculate the time of concentration, $T_C = 10^{-0.507} * (C_D * I_X)^{-0.519} * \text{Length}^{0.483} * \text{Slope}^{-0.135}$

Calculated T_C 41.48 minutes

7. Calculate the difference between the initially assumed T_C and the calculated T_C, if the difference is greater than 0.5 minutes, use the calculated T_C as the assumed initial T_C in the second iteration. If the T_C value is within 0.5 minutes, round the acceptable T_C value to the nearest minute.

BASIN: O

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

TABLE FOR ITERATIONS

Iteration No.	Initial T_C (min)	I_X (in/hr)	C_U	C_D	$C_D * I_X$ (in/hr)	Calculated T_C (min)	Difference (min)
1	30	0.193	0.10	0.74	0.14282	41.5	-11
2							
3							
4							
5							
6							
7							
8							
9							
10							

Acceptable T_C value 30 minutes

8. Calculate the Peak Mitigation Flow Rate,
$Q_{PM} = C_D * I_X * A_{Total} * (1.008333\ ft^3\text{-hour/acre-inches-seconds})$

Q_{PM} 0.48 cfs

In order to determine the volume (V_M) of stormwater runoff to be mitigated from the new development, use the following equation:

$V_M = (2{,}722.5\ ft^3 / acre) * [(A_I)(0.9) + (A_P + A_U)(C_U)]$

V_M 6648.3 ft^3

BASIN: P

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

PROVIDE PROPOSED PROJECT CHARACTERISTICS

A_{TOTAL}	15.80	Acres
Type of Development	Condominium	
Predominate Soil Type #	98	
% of Project Impervious	80.0	
% of Project Pervious	20.0	
% of Project Contributing Undeveloped Area	0.00	
A_I	12.64	Acres
A_P	3.16	Acres
A_U	0.00	Acres

BASIN: P

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

DETERMINING THE PEAK MITIGATED FLOW RATE (Q_{PM}):

In order to determine the peak mitigated flow rate (Q_{PM}) from the new development, use the Los Angles County Department of Public Works *Hydrology Manual*. Use the Modified Rational Method for calculating the peak mitigation QPM for compliance with the Standard Urban Stormwater Mitigation Plan (SUSMP). Use attached **Table 1** for all maximum intensity (I_X) values used.

By trial and error, determine the time of concentration (T_C), as shown below:

CALCULATION STEPS:

1. Assume an initial T_C value between 5 and 30 minutes.

T_C 30 minutes

2. Using Table 1, look up the assumed T_C value and select the corresponding I_X intensity in inches/hour.

I_X 0.193 inches/hour

3. Determine the value for the Undeveloped Runoff Coefficient, C_U, using the runoff coefficient curve corresponding to the predominand soil type.

C_U 0.10

4. Calculate the Developed Runoff Coefficient, $C_D = (0.9 * Imp.) + [(1.0 - Imp.) * C_U]$

C_D 0.74

5. Calculate the value for $C_D * I_X$

$C_D * I_X$ 0.1428

Length = 760
Slope = 0.02

6. Calculate the time of concentration, $T_C = 10^{-0.507} * (C_D * I_X)^{-0.519} * \text{Length}^{0.483} * \text{Slope}^{-0.135}$

Calculated T_C 35.68 minutes

7. Calculate the difference between the initially assumed T_C and the calculated T_C, if the difference is greater than 0.5 minutes, use the calculated T_C as the assumed initial T_C in the second iteration. If the T_C value is within 0.5 minutes, round the acceptable T_C value to the nearest minute.

BASIN: P

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

TABLE FOR ITERATIONS

Iteration No.	Initial T_C (min)	I_X (in/hr)	C_U	C_D	$C_D * I_X$ (in/hr)	Calculated T_C (min)	Difference (min)
1	30	0.193	0.10	0.74	0.14282	35.7	-6
2							
3							
4							
5							
6							
7							
8							
9							
10							

Acceptable T_C value 30 minutes

8. Calculate the Peak Mitigation Flow Rate,
$Q_{PM} = C_D * I_X * A_{Total} * (1.008333\ ft^3\text{-hour/acre-inches-seconds})$

Q_{PM} 2.28 cfs

In order to determine the volume (V_M) of stormwater runoff to be mitigated from the new development, use the following equation:

$V_M = (2{,}722.5\ ft^3 / acre) * [(A_I)(0.9) + (A_P + A_U)(C_U)]$

V_M 31831.5 ft^3

BASIN Q

COMBINED WITH BASIN B

SEE BASIN B FOR CALCULATIONS

BASIN: R

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

PROVIDE PROPOSED PROJECT CHARACTERISTICS

A_{TOTAL}	2.20	Acres
Type of Development	Roadway	
Predominate Soil Type #	98	
% of Project Impervious	80.0	
% of Project Pervious	20.0	
% of Project Contributing Undeveloped Area	0.00	
A_I	1.76	Acres
A_P	0.44	Acres
A_U	0.00	Acres

BASIN: R

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

DETERMINING THE PEAK MITIGATED FLOW RATE (Q_{PM}):

In order to determine the peak mitigated flow rate (Q_{PM}) from the new development, use the Los Angles County Department of Public Works *Hydrology Manual*. Use the Modified Rational Method for calculating the peak mitigation QPM for compliance with the Standard Urban Stormwater Mitigation Plan (SUSMP). Use attached **Table 1** for all maximum intensity (I_X) values used.

By trial and error, determine the time of concentration (T_C), as shown below:

CALCULATION STEPS:

1. Assume an initial T_C value between 5 and 30 minutes.

T_C 30 minutes

2. Using Table 1, look up the assumed T_C value and select the corresponding I_X intensity in inches/hour.

I_X 0.193 inches/hour

3. Determine the value for the Undeveloped Runoff Coefficient, C_U, using the runoff coefficient curve corresponding to the predominand soil type.

C_U 0.10

4. Calculate the Developed Runoff Coefficient, $C_D = (0.9 * Imp.) + [(1.0 - Imp.) * C_U]$

C_D 0.74

5. Calculate the value for $C_D * I_X$

$C_D * I_X$ 0.1428

Length = 1980
Slope = 0.02

6. Calculate the time of concentration, $T_C = 10^{-0.507} * (C_D * I_X)^{-0.519} * Length^{0.483} * Slope^{-0.135}$

Calculated T_C 56.66 minutes

7. Calculate the difference between the initially assumed T_C and the calculated T_C, if the difference is greater than 0.5 minutes, use the calculated T_C as the assumed initial T_C in the second iteration. If the T_C value is within 0.5 minutes, round the acceptable T_C value to the nearest minute.

BASIN: R

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

TABLE FOR ITERATIONS

Iteration No.	Initial T_C (min)	I_X (in/hr)	C_U	C_D	$C_D * I_X$ (in/hr)	Calculated T_C (min)	Difference (min)
1	30	0.193	0.10	0.74	0.14282	56.7	-27
2							
3							
4							
5							
6							
7							
8							
9							
10							

Acceptable T_C value 30 minutes

8. Calculate the Peak Mitigation Flow Rate,
$Q_{PM} = C_D * I_X * A_{Total} * (1.008333\ ft^3\text{-hour/acre-inches-seconds})$

Q_{PM} 0.32 cfs

In order to determine the volume (V_M) of stormwater runoff to be mitigated from the new development, use the following equation:

$V_M = (2{,}722.5\ ft^3 / acre) * [(A_I)(0.9) + (A_P + A_U)(C_U)]$

V_M 4432.2 ft^3

BASIN: S

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

PROVIDE PROPOSED PROJECT CHARACTERISTICS

A_{TOTAL}	1.50	Acres
Type of Development	Roadway	
Predominate Soil Type #	98	
% of Project Impervious	75.0	
% of Project Pervious	25.0	
% of Project Contributing Undeveloped Area	0.00	
A_I	1.13	Acres
A_P	0.38	Acres
A_U	0.00	Acres

BASIN: S

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

DETERMINING THE PEAK MITIGATED FLOW RATE (Q_{PM}):

In order to determine the peak mitigated flow rate (Q_{PM}) from the new development, use the Los Angles County Department of Public Works *Hydrology Manual*. Use the Modified Rational Method for calculating the peak mitigation QPM for compliance with the Standard Urban Stormwater Mitigation Plan (SUSMP). Use attached **Table 1** for all maximum intensity (I_X) values used.

By trial and error, determine the time of concentration (T_C), as shown below:

CALCULATION STEPS:

1. Assume an initial T_C value between 5 and 30 minutes.

T_C 30 minutes

2. Using Table 1, look up the assumed T_C value and select the corresponding I_X intensity in inches/hour.

I_X 0.193 inches/hour

3. Determine the value for the Undeveloped Runoff Coefficient, C_U, using the runoff coefficient curve corresponding to the predominand soil type.

C_U 0.10

4. Calculate the Developed Runoff Coefficient, $C_D = (0.9 * Imp.) + [(1.0 - Imp.) * C_U]$

C_D 0.70

5. Calculate the value for $C_D * I_X$

$C_D * I_X$ 0.1351

Length = 840
Slope = 0.035

6. Calculate the time of concentration, $T_C = 10^{-0.507} * (C_D * I_X)^{-0.519} * Length^{0.483} * Slope^{-0.135}$

Calculated T_C 35.74 minutes

7. Calculate the difference between the initially assumed T_C and the calculated T_C, if the difference is greater than 0.5 minutes, use the calculated T_C as the assumed initial T_C in the second iteration. If the T_C value is within 0.5 minutes, round the acceptable T_C value to the nearest minute.

BASIN: S

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

TABLE FOR ITERATIONS

Iteration No.	Initial T_C (min)	I_X (in/hr)	C_U	C_D	$C_D * I_X$ (in/hr)	Calculated T_C (min)	Difference (min)
1	30	0.193	0.10	0.70	0.1351	35.7	-6
2							
3							
4							
5							
6							
7							
8							
9							
10							

Acceptable T_C value 30 minutes

8. Calculate the Peak Mitigation Flow Rate,
$Q_{PM} = C_D * I_X * A_{Total}$ * (1.008333 ft³-hour/acre-inches-seconds)

Q_{PM} 0.20 cfs

In order to determine the volume (V_M) of stormwater runoff to be mitigated from the new development, use the following equation:

$V_M = (2{,}722.5 \text{ ft}^3 / \text{acre}) * [(A_I) (0.9) + (A_P + A_U)(C_U)]$

V_M 2858.6 ft³

BASIN: T

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

PROVIDE PROPOSED PROJECT CHARACTERISTICS

A_{TOTAL}	1.30	Acres
Type of Development	Roadway	
Predominate Soil Type #	98	
% of Project Impervious	70.0	
% of Project Pervious	30.0	
% of Project Contributing Undeveloped Area	0.00	
A_I	0.91	Acres
A_P	0.39	Acres
A_U	0.00	Acres

BASIN: T

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

DETERMINING THE PEAK MITIGATED FLOW RATE (Q_{PM}):

In order to determine the peak mitigated flow rate (Q_{PM}) from the new development, use the Los Angles County Department of Public Works *Hydrology Manual*. Use the Modified Rational Method for calculating the peak mitigation QPM for compliance with the Standard Urban Stormwater Mitigation Plan (SUSMP). Use attached **Table 1** for all maximum intensity (I_X) values used.

By trial and error, determine the time of concentration (T_C), as shown below:

CALCULATION STEPS:

1. Assume an initial T_C value between 5 and 30 minutes.

T_C 30 minutes

2. Using Table 1, look up the assumed T_C value and select the corresponding I_X intensity in inches/hour.

I_X 0.193 inches/hour

3. Determine the value for the Undeveloped Runoff Coefficient, C_U, using the runoff coefficient curve corresponding to the predominand soil type.

C_U 0.10

4. Calculate the Developed Runoff Coefficient, $C_D = (0.9 * Imp.) + [(1.0 - Imp.) * C_U]$

C_D 0.66

5. Calculate the value for $C_D * I_X$

$C_D * I_X$ 0.1274

Length = 720
Slope = 0.055

6. Calculate the time of concentration, $T_C = 10^{-0.507} * (C_D * I_X)^{-0.519} * Length^{0.483} * Slope^{-0.135}$

Calculated T_C 32.18 minutes

7. Calculate the difference between the initially assumed T_C and the calculated T_C, if the difference is greater than 0.5 minutes, use the calculated T_C as the assumed initial T_C in the second iteration. If the T_C value is within 0.5 minutes, round the acceptable T_C value to the nearest minute.

BASIN: T

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

TABLE FOR ITERATIONS

Iteration No.	Initial T_C (min)	I_X (in/hr)	C_U	C_D	$C_D * I_X$ (in/hr)	Calculated T_C (min)	Difference (min)
1	30	0.193	0.10	0.66	0.12738	32.2	-2
2							
3							
4							
5							
6							
7							
8							
9							
10							

Acceptable T_C value 30 minutes

8. Calculate the Peak Mitigation Flow Rate,
$Q_{PM} = C_D * I_X * A_{Total}$ * (1.008333 ft³-hour/acre-inches-seconds)

Q_{PM} 0.17 cfs

In order to determine the volume (V_M) of stormwater runoff to be mitigated from the new development, use the following equation:

$V_M = (2{,}722.5 \text{ ft}^3 / \text{acre}) * [(A_I) (0.9) + (A_P + A_U)(C_U)]$

V_M 2335.9 ft³

BASIN: U

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

PROVIDE PROPOSED PROJECT CHARACTERISTICS

A_{TOTAL}	1.50	Acres
Type of Development	Roadway	
Predominate Soil Type #	98	
% of Project Impervious	90.0	
% of Project Pervious	10.0	
% of Project Contributing Undeveloped Area	0.00	
A_I	1.35	Acres
A_P	0.15	Acres
A_U	0.00	Acres

BASIN: U

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

DETERMINING THE PEAK MITIGATED FLOW RATE (Q_{PM}):

In order to determine the peak mitigated flow rate (Q_{PM}) from the new development, use the Los Angles County Department of Public Works *Hydrology Manual*. Use the Modified Rational Method for calculating the peak mitigation QPM for compliance with the Standard Urban Stormwater Mitigation Plan (SUSMP). Use attached **Table 1** for all maximum intensity (I_X) values used.

By trial and error, determine the time of concentration (T_C), as shown below:

CALCULATION STEPS:

1. Assume an initial T_C value between 5 and 30 minutes.

T_C 30 minutes

2. Using Table 1, look up the assumed T_C value and select the corresponding I_X intensity in inches/hour.

I_X 0.193 inches/hour

3. Determine the value for the Undeveloped Runoff Coefficient, C_U, using the runoff coefficient curve corresponding to the predominand soil type.

C_U 0.10

4. Calculate the Developed Runoff Coefficient, $C_D = (0.9 * Imp.) + [(1.0 - Imp.) * C_U]$

C_D 0.82

5. Calculate the value for $C_D * I_X$

$C_D * I_X$ 0.1583

Length = 1170
Slope = 0.04

6. Calculate the time of concentration, $T_C = 10^{-0.507} * (C_D * I_X)^{-0.519} * Length^{0.483} * Slope^{-0.135}$

Calculated T_C 37.95 minutes

7. Calculate the difference between the initially assumed T_C and the calculated T_C, if the difference is greater than 0.5 minutes, use the calculated T_C as the assumed initial T_C in the second iteration. If the T_C value is within 0.5 minutes, round the acceptable T_C value to the nearest minute.

BASIN: U

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

TABLE FOR ITERATIONS

Iteration No.	Initial T_C (min)	I_X (in/hr)	C_U	C_D	$C_D * I_X$ (in/hr)	Calculated T_C (min)	Difference (min)
1	30	0.193	0.10	0.82	0.15826	37.9	-8
2							
3							
4							
5							
6							
7							
8							
9							
10							

Acceptable T_C value 30 minutes

8. Calculate the Peak Mitigation Flow Rate,
$Q_{PM} = C_D * I_X * A_{Total} * (1.008333\ ft^3\text{-hour/acre-inches-seconds})$

Q_{PM} 0.24 cfs

In order to determine the volume (V_M) of stormwater runoff to be mitigated from the new development, use the following equation:

$V_M = (2{,}722.5\ ft^3 / acre) * [(A_I)(0.9) + (A_P + A_U)(C_U)]$

V_M 3348.7 ft^3

BASIN: V

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

PROVIDE PROPOSED PROJECT CHARACTERISTICS

A_{TOTAL}	1.10	Acres
Type of Development	Roadway	
Predominate Soil Type #	98	
% of Project Impervious	50.0	
% of Project Pervious	50.0	
% of Project Contributing Undeveloped Area	0.00	
A_I	0.55	Acres
A_P	0.55	Acres
A_U	0.00	Acres

BASIN: V

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

DETERMINING THE PEAK MITIGATED FLOW RATE (Q_{PM}):

In order to determine the peak mitigated flow rate (Q_{PM}) from the new development, use the Los Angles County Department of Public Works *Hydrology Manual*. Use the Modified Rational Method for calculating the peak mitigation QPM for compliance with the Standard Urban Stormwater Mitigation Plan (SUSMP). Use attached **Table 1** for all maximum intensity (I_X) values used.

By trial and error, determine the time of concentration (T_C), as shown below:

CALCULATION STEPS:

1. Assume an initial T_C value between 5 and 30 minutes.

T_C 30 minutes

2. Using Table 1, look up the assumed T_C value and select the corresponding I_X intensity in inches/hour.

I_X 0.193 inches/hour

3. Determine the value for the Undeveloped Runoff Coefficient, C_U, using the runoff coefficient curve corresponding to the predominand soil type.

C_U 0.10

4. Calculate the Developed Runoff Coefficient, $C_D = (0.9 * Imp.) + [(1.0 - Imp.) * C_U]$

C_D 0.50

5. Calculate the value for $C_D * I_X$

$C_D * I_X$ 0.0965

Length = 720
Slope = 0.05

6. Calculate the time of concentration, $T_C = 10^{-0.507} * (C_D * I_X)^{-0.519} * Length^{0.483} * Slope^{-0.135}$

Calculated T_C 37.65 minutes

7. Calculate the difference between the initially assumed T_C and the calculated T_C, if the difference is greater than 0.5 minutes, use the calculated T_C as the assumed initial T_C in the second iteration. If the T_C value is within 0.5 minutes, round the acceptable T_C value to the nearest minute.

BASIN: V

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

TABLE FOR ITERATIONS

Iteration No.	Initial T_C (min)	I_X (in/hr)	C_U	C_D	$C_D * I_X$ (in/hr)	Calculated T_C (min)	Difference (min)
1	30	0.193	0.10	0.50	0.0965	37.6	-8
2							
3							
4							
5							
6							
7							
8							
9							
10							

Acceptable T_C value 30 minutes

8. Calculate the Peak Mitigation Flow Rate,
$Q_{PM} = C_D * I_X * A_{Total}$ * (1.008333 ft³-hour/acre-inches-seconds)

Q_{PM} 0.11 cfs

In order to determine the volume (V_M) of stormwater runoff to be mitigated from the new development, use the following equation:

$V_M = (2{,}722.5 \text{ ft}^3 / \text{acre}) * [(A_I) (0.9) + (A_P + A_U)(C_U)]$

V_M 1497.4 ft³

BASIN: W

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

PROVIDE PROPOSED PROJECT CHARACTERISTICS

A_{TOTAL}	6.50	Acres
Type of Development	Condominium	
Predominate Soil Type #	98	
% of Project Impervious	80.0	
% of Project Pervious	20.0	
% of Project Contributing Undeveloped Area	0.00	
A_I	5.20	Acres
A_P	1.30	Acres
A_U	0.00	Acres

BASIN: W

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

DETERMINING THE PEAK MITIGATED FLOW RATE (Q_{PM}):

In order to determine the peak mitigated flow rate (Q_{PM}) from the new development, use the Los Angles County Department of Public Works *Hydrology Manual*. Use the Modified Rational Method for calculating the peak mitigation QPM for compliance with the Standard Urban Stormwater Mitigation Plan (SUSMP). Use attached **Table 1** for all maximum intensity (I_X) values used.

By trial and error, determine the time of concentration (T_C), as shown below:

CALCULATION STEPS:

1. Assume an initial T_C value between 5 and 30 minutes.

T_C 29 minutes

2. Using Table 1, look up the assumed T_C value and select the corresponding I_X intensity in inches/hour.

I_X 0.196 inches/hour

3. Determine the value for the Undeveloped Runoff Coefficient, C_U, using the runoff coefficient curve corresponding to the predominand soil type.

C_U 0.10

4. Calculate the Developed Runoff Coefficient, $C_D = (0.9 * Imp.) + [(1.0 - Imp.) * C_U]$

C_D 0.74

5. Calculate the value for $C_D * I_X$

$C_D * I_X$ 0.1450

Length = 490
Slope = 0.02

6. Calculate the time of concentration, $T_C = 10^{-0.507} * (C_D * I_X)^{-0.519} * Length^{0.483} * Slope^{-0.135}$

Calculated T_C 28.64 minutes

7. Calculate the difference between the initially assumed T_C and the calculated T_C, if the difference is greater than 0.5 minutes, use the calculated T_C as the assumed initial T_C in the second iteration. If the T_C value is within 0.5 minutes, round the acceptable T_C value to the nearest minute.

BASIN: W

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

TABLE FOR ITERATIONS

Iteration No.	Initial T_C (min)	I_X (in/hr)	C_U	C_D	$C_D * I_X$ (in/hr)	Calculated T_C (min)	Difference (min)
1	29	0.196	0.10	0.74	0.14504	28.6	0
2							
3							
4							
5							
6							
7							
8							
9							
10							

Acceptable T_C value 29 minutes

8. Calculate the Peak Mitigation Flow Rate,
$Q_{PM} = C_D * I_X * A_{Total} * (1.008333\ ft^3\text{-hour/acre-inches-seconds})$

Q_{PM} 0.95 cfs

In order to determine the volume (V_M) of stormwater runoff to be mitigated from the new development, use the following equation:

$V_M = (2{,}722.5\ ft^3 / acre) * [(A_I)(0.9) + (A_P + A_U)(C_U)]$

V_M 13095.2 ft^3

BASIN: X

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

DETERMINING THE PEAK MITIGATED FLOW RATE (Q_{PM}):

In order to determine the peak mitigated flow rate (Q_{PM}) from the new development, use the Los Angles County Department of Public Works *Hydrology Manual*. Use the Modified Rational Method for calculating the peak mitigation QPM for compliance with the Standard Urban Stormwater Mitigation Plan (SUSMP). Use attached **Table 1** for all maximum intensity (Ix) values used.

By trial and error, determine the time of concentration (T_C), as shown below:

CALCULATION STEPS:

1. Assume an initial T_C value between 5 and 30 minutes.

T_C 30 minutes

2. Using Table 1, look up the assumed T_C value and select the corresponding Ix intensity in inches/hour.

Ix 0.193 inches/hour

3. Determine the value for the Undeveloped Runoff Coefficient, C_U, using the runoff coefficient curve corresponding to the predominand soil type.

C_U 0.10

4. Calculate the Developed Runoff Coefficient, $C_D = (0.9 * Imp.) + [(1.0 - Imp.) * C_U]$

C_D 0.74

5. Calculate the value for $C_D * I_x$

$C_D * I_x$ 0.1428

Length = 760
Slope = 0.02

6. Calculate the time of concentration, $T_C = 10^{-0.507} * (C_D * I_x)^{-0.519} * Length^{0.483} * Slope^{-0.135}$

Calculated T_C 35.68 minutes

7. Calculate the difference between the initially assumed T_C and the calculated T_C, if the difference is greater than 0.5 minutes, use the calculated T_C as the assumed initial T_C in the second iteration. If the T_C value is within 0.5 minutes, round the acceptable T_C value to the nearest minute.

BASIN: X

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

TABLE FOR ITERATIONS

Iteration No.	Initial T_C (min)	I_X (in/hr)	C_U	C_D	$C_D * I_X$ (in/hr)	Calculated T_C (min)	Difference (min)
1	30	0.193	0.10	0.74	0.14282	35.7	-6
2							
3							
4							
5							
6							
7							
8							
9							
10							

Acceptable T_C value 30 minutes

8. Calculate the Peak Mitigation Flow Rate,
$Q_{PM} = C_D * I_X * A_{Total} * (1.008333\ ft^3\text{-hour/acre-inches-seconds})$

Q_{PM} 1.50 cfs

In order to determine the volume (V_M) of stormwater runoff to be mitigated from the new development, use the following equation:

$V_M = (2{,}722.5\ ft^3 / acre) * [(A_I)(0.9) + (A_P + A_U)(C_U)]$

V_M 20952.4 ft^3

BASIN: Y

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

PROVIDE PROPOSED PROJECT CHARACTERISTICS

A_{TOTAL}	3.40	Acres
Type of Development	Commercial	
Predominate Soil Type #	98	
% of Project Impervious	90.0	
% of Project Pervious	10.0	
% of Project Contributing Undeveloped Area	0.00	
A_I	3.06	Acres
A_P	0.34	Acres
A_U	0.00	Acres

BASIN: Y

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

DETERMINING THE PEAK MITIGATED FLOW RATE (Q_{PM}):

In order to determine the peak mitigated flow rate (Q_{PM}) from the new development, use the Los Angles County Department of Public Works *Hydrology Manual*. Use the Modified Rational Method for calculating the peak mitigation QPM for compliance with the Standard Urban Stormwater Mitigation Plan (SUSMP). Use attached **Table 1** for all maximum intensity (I_X) values used.

By trial and error, determine the time of concentration (T_C), as shown below:

CALCULATION STEPS:

1. Assume an initial T_C value between 5 and 30 minutes.

T_C 30 minutes

2. Using Table 1, look up the assumed T_C value and select the corresponding I_X intensity in inches/hour.

I_X 0.193 inches/hour

3. Determine the value for the Undeveloped Runoff Coefficient, C_U, using the runoff coefficient curve corresponding to the predominand soil type.

C_U 0.10

4. Calculate the Developed Runoff Coefficient, $C_D = (0.9 * Imp.) + [(1.0 - Imp.) * C_U]$

C_D 0.82

5. Calculate the value for $C_D * I_X$

Length = 700
Slope = 0.02

$C_D * I_X$ 0.1583

6. Calculate the time of concentration, $T_C = 10^{-0.507} * (C_D * I_X)^{-0.519} * Length^{0.483} * Slope^{-0.135}$

Calculated T_C 32.51 minutes

7. Calculate the difference between the initially assumed T_C and the calculated T_C, if the difference is greater than 0.5 minutes, use the calculated T_C as the assumed initial T_C in the second iteration. If the T_C value is within 0.5 minutes, round the acceptable T_C value to the nearest minute.

BASIN: Y

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

TABLE FOR ITERATIONS

Iteration No.	Initial T_C (min)	I_X (in/hr)	C_U	C_D	$C_D * I_X$ (in/hr)	Calculated T_C (min)	Difference (min)
1	30	0.193	0.10	0.82	0.15826	32.5	-3
2							
3							
4							
5							
6							
7							
8							
9							
10							

Acceptable T_C value 30 minutes

8. Calculate the Peak Mitigation Flow Rate,
$Q_{PM} = C_D * I_X * A_{Total} * (1.008333\ ft^3\text{-hour/acre-inches-seconds})$

Q_{PM} 0.54 cfs

In order to determine the volume (V_M) of stormwater runoff to be mitigated from the new development, use the following equation:

$V_M = (2{,}722.5\ ft^3 / acre) * [(A_I) (0.9) + (A_P + A_U)(C_U)]$

V_M 7590.3 ft^3

BASIN: Z

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

PROVIDE PROPOSED PROJECT CHARACTERISTICS

A_{TOTAL}	7.60	Acres
Type of Development	Condominium	
Predominate Soil Type #	98	
% of Project Impervious	80.0	
% of Project Pervious	20.0	
% of Project Contributing Undeveloped Area	0.00	
A_I	6.08	Acres
A_P	1.52	Acres
A_U	0.00	Acres

BASIN: Z

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

DETERMINING THE PEAK MITIGATED FLOW RATE (Q_{PM}):

In order to determine the peak mitigated flow rate (Q_{PM}) from the new development, use the Los Angles County Department of Public Works *Hydrology Manual*. Use the Modified Rational Method for calculating the peak mitigation QPM for compliance with the Standard Urban Stormwater Mitigation Plan (SUSMP). Use attached **Table 1** for all maximum intensity (I_X) values used.

By trial and error, determine the time of concentration (T_C), as shown below:

CALCULATION STEPS:

1. Assume an initial T_C value between 5 and 30 minutes.

T_C 29 minutes

2. Using Table 1, look up the assumed T_C value and select the corresponding I_X intensity in inches/hour.

I_X 0.196 inches/hour

3. Determine the value for the Undeveloped Runoff Coefficient, C_U, using the runoff coefficient curve corresponding to the predominand soil type.

C_U 0.10

4. Calculate the Developed Runoff Coefficient, $C_D = (0.9 * Imp.) + [(1.0 - Imp.) * C_U]$

C_D 0.74

5. Calculate the value for $C_D * I_X$

$C_D * I_X$ 0.1450

Length = 510
Slope = 0.02

6. Calculate the time of concentration, $T_C = 10^{-0.507} * (C_D * I_X)^{-0.519} * Length^{0.483} * Slope^{-0.135}$

Calculated T_C 29.19 minutes

7. Calculate the difference between the initially assumed T_C and the calculated T_C, if the difference is greater than 0.5 minutes, use the calculated T_C as the assumed initial T_C in the second iteration. If the T_C value is within 0.5 minutes, round the acceptable T_C value to the nearest minute.

BASIN: Z

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

TABLE FOR ITERATIONS

Iteration No.	Initial T_C (min)	I_X (in/hr)	C_U	C_D	C_D*I_X (in/hr)	Calculated T_C (min)	Difference (min)
1	29	0.196	0.10	0.74	0.14504	29.2	0
2							
3							
4							
5							
6							
7							
8							
9							
10							

Acceptable T_C value 29 minutes

8. Calculate the Peak Mitigation Flow Rate,
$Q_{PM} = C_D * I_X * A_{Total} * (1.008333\ ft^3\text{-hour/acre-inches-seconds})$

Q_{PM} 1.11 cfs

In order to determine the volume (V_M) of stormwater runoff to be mitigated from the new development, use the following equation:

$V_M = (2{,}722.5\ ft^3 / acre) * [(A_I)(0.9) + (A_P + A_U)(C_U)]$

V_M 15311.3 ft^3

BASIN: AA

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

PROVIDE PROPOSED PROJECT CHARACTERISTICS

A_{TOTAL}	0.90	Acres
Type of Development	ROADWAY	
Predominate Soil Type #	98	
% of Project Impervious	78.0	
% of Project Pervious	22.0	
% of Project Contributing Undeveloped Area	0.00	
A_I	0.70	Acres
A_P	0.20	Acres
A_U	0.00	Acres

BASIN: AA

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

DETERMINING THE PEAK MITIGATED FLOW RATE (Q_{PM}):

In order to determine the peak mitigated flow rate (Q_{PM}) from the new development, use the Los Angles County Department of Public Works *Hydrology Manual*. Use the Modified Rational Method for calculating the peak mitigation QPM for compliance with the Standard Urban Stormwater Mitigation Plan (SUSMP). Use attached **Table 1** for all maximum intensity (I_X) values used.

By trial and error, determine the time of concentration (T_C), as shown below:

CALCULATION STEPS:

1. Assume an initial T_C value between 5 and 30 minutes.

T_C 22 minutes

2. Using Table 1, look up the assumed T_C value and select the corresponding I_X intensity in inches/hour.

I_X 0.223 inches/hour

3. Determine the value for the Undeveloped Runoff Coefficient, C_U, using the runoff coefficient curve corresponding to the predominand soil type.

C_U 0.10

4. Calculate the Developed Runoff Coefficient, $C_D = (0.9 * Imp.) + [(1.0 - Imp.) * C_U]$

C_D 0.72

5. Calculate the value for $C_D * I_X$

$C_D * I_X$ 0.1615

Length = 400
Slope = 0.04

6. Calculate the time of concentration, $T_C = 10^{-0.507} * (C_D * I_X)^{-0.519} * Length^{0.483} * Slope^{-0.135}$

Calculated T_C 22.36 minutes

7. Calculate the difference between the initially assumed T_C and the calculated T_C, if the difference is greater than 0.5 minutes, use the calculated T_C as the assumed initial T_C in the second iteration. If the T_C value is within 0.5 minutes, round the acceptable T_C value to the nearest minute.

BASIN: AA

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

TABLE FOR ITERATIONS

Iteration No.	Initial T_C (min)	I_X (in/hr)	C_U	C_D	$C_D * I_X$ (in/hr)	Calculated T_C (min)	Difference (min)
1	22	0.223	0.10	0.72	0.161452	22.4	0
2							
3							
4							
5							
6							
7							
8							
9							
10							

Acceptable T_C value 22 minutes

8. Calculate the Peak Mitigation Flow Rate,
$Q_{PM} = C_D * I_X * A_{Total} * (1.008333\ ft^3\text{-hour/acre-inches-seconds})$

Q_{PM} 0.15 cfs

In order to determine the volume (V_M) of stormwater runoff to be mitigated from the new development, use the following equation:

$V_M = (2{,}722.5\ ft^3 / acre) * [(A_I)(0.9) + (A_P + A_U)(C_U)]$

V_M 1774.0 ft^3

BASIN: BB

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

PROVIDE PROPOSED PROJECT CHARACTERISTICS

A_{TOTAL}	1.50	Acres
Type of Development	ROADWAY	
Predominate Soil Type #	98	
% of Project Impervious	91.0	
% of Project Pervious	9.0	
% of Project Contributing Undeveloped Area	0.00	
A_I	1.37	Acres
A_P	0.14	Acres
A_U	0.00	Acres

BASIN: BB

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

DETERMINING THE PEAK MITIGATED FLOW RATE (Q_{PM}):

In order to determine the peak mitigated flow rate (Q_{PM}) from the new development, use the Los Angles County Department of Public Works *Hydrology Manual*. Use the Modified Rational Method for calculating the peak mitigation QPM for compliance with the Standard Urban Stormwater Mitigation Plan (SUSMP). Use attached **Table 1** for all maximum intensity (I_X) values used.

By trial and error, determine the time of concentration (T_C), as shown below:

CALCULATION STEPS:

1. Assume an initial T_C value between 5 and 30 minutes.

T_C 30 minutes

2. Using Table 1, look up the assumed T_C value and select the corresponding I_X intensity in inches/hour.

I_X 0.193 inches/hour

3. Determine the value for the Undeveloped Runoff Coefficient, C_U, using the runoff coefficient curve corresponding to the predominand soil type.

C_U 0.10

4. Calculate the Developed Runoff Coefficient, $C_D = (0.9 * Imp.) + [(1.0 - Imp.) * C_U]$

C_D 0.83

5. Calculate the value for $C_D * I_X$

$C_D * I_X$ 0.1598

Length = 1170
Slope = 0.04

6. Calculate the time of concentration, $T_C = 10^{-0.507} * (C_D * I_X)^{-0.519} * \text{Length}^{0.483} * \text{Slope}^{-0.135}$

Calculated T_C 37.76 minutes

7. Calculate the difference between the initially assumed T_C and the calculated T_C, if the difference is greater than 0.5 minutes, use the calculated T_C as the assumed initial T_C in the second iteration. If the T_C value is within 0.5 minutes, round the acceptable T_C value to the nearest minute.

BASIN: BB

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

TABLE FOR ITERATIONS

Iteration No.	Initial T_C (min)	I_X (in/hr)	C_U	C_D	$C_D * I_X$ (in/hr)	Calculated T_C (min)	Difference (min)
1	30	0.193	0.10	0.83	0.159804	37.8	-8
2							
3							
4							
5							
6							
7							
8							
9							
10							

Acceptable T_C value 30 minutes

8. Calculate the Peak Mitigation Flow Rate,
$Q_{PM} = C_D * I_X * A_{Total}$ * (1.008333 ft³-hour/acre-inches-seconds)

Q_{PM} 0.24 cfs

In order to determine the volume (V_M) of stormwater runoff to be mitigated from the new development, use the following equation:

$V_M = (2{,}722.5 \text{ ft}^3 / \text{acre}) * [(A_I) (0.9) + (A_P + A_U)(C_U)]$

V_M 3381.3 ft³

BASIN: CC

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

PROVIDE PROPOSED PROJECT CHARACTERISTICS

A_{TOTAL}	3.20	Acres
Type of Development	ROADWAY	
Predominate Soil Type #	98	
% of Project Impervious	91.0	
% of Project Pervious	9.0	
% of Project Contributing Undeveloped Area	0.00	
A_I	2.91	Acres
A_P	0.29	Acres
A_U	0.00	Acres

BASIN: CC

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

DETERMINING THE PEAK MITIGATED FLOW RATE (Q_{PM}):

In order to determine the peak mitigated flow rate (Q_{PM}) from the new development, use the Los Angles County Department of Public Works *Hydrology Manual*. Use the Modified Rational Method for calculating the peak mitigation QPM for compliance with the Standard Urban Stormwater Mitigation Plan (SUSMP). Use attached **Table 1** for all maximum intensity (I_X) values used.

By trial and error, determine the time of concentration (T_C), as shown below:

CALCULATION STEPS:

1. Assume an initial T_C value between 5 and 30 minutes.

T_C 30 minutes

2. Using Table 1, look up the assumed T_C value and select the corresponding I_X intensity in inches/hour.

I_X 0.193 inches/hour

3. Determine the value for the Undeveloped Runoff Coefficient, C_U, using the runoff coefficient curve corresponding to the predominand soil type.

C_U 0.10

4. Calculate the Developed Runoff Coefficient, $C_D = (0.9 * Imp.) + [(1.0 - Imp.) * C_U]$

C_D 0.83

5. Calculate the value for $C_D * I_X$

Length = 1140
Slope = 0.04

$C_D * I_X$ 0.1598

6. Calculate the time of concentration, $T_C = 10^{-0.507} * (C_D * I_X)^{-0.519} * Length^{0.483} * Slope^{-0.135}$

Calculated T_C 37.29 minutes

7. Calculate the difference between the initially assumed T_C and the calculated T_C, if the difference is greater than 0.5 minutes, use the calculated T_C as the assumed initial T_C in the second iteration. If the T_C value is within 0.5 minutes, round the acceptable T_C value to the nearest minute.

BASIN: CC

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

TABLE FOR ITERATIONS

Iteration No.	Initial T_C (min)	I_X (in/hr)	C_U	C_D	$C_D * I_X$ (in/hr)	Calculated T_C (min)	Difference (min)
1	30	0.193	0.10	0.83	0.159804	37.3	-7
2							
3							
4							
5							
6							
7							
8							
9							
10							

Acceptable T_C value 30 minutes

8. Calculate the Peak Mitigation Flow Rate,
$Q_{PM} = C_D * I_X * A_{Total}$ * (1.008333 ft³-hour/acre-inches-seconds)

Q_{PM} 0.52 cfs

In order to determine the volume (V_M) of stormwater runoff to be mitigated from the new development, use the following equation:

$V_M = (2{,}722.5 \text{ ft}^3 / \text{acre}) * [(A_I) (0.9) + (A_P + A_U)(C_U)]$

V_M 7213.5 ft³

BASIN: DD

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

PROVIDE PROPOSED PROJECT CHARACTERISTICS

A_{TOTAL}	0.60	Acres
Type of Development	ROADWAY	
Predominate Soil Type #	98	
% of Project Impervious	90.0	
% of Project Pervious	10.0	
% of Project Contributing Undeveloped Area	0.00	
A_I	0.54	Acres
A_P	0.06	Acres
A_U	0.00	Acres

BASIN: DD

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

DETERMINING THE PEAK MITIGATED FLOW RATE (Q_{PM}):

In order to determine the peak mitigated flow rate (Q_{PM}) from the new development, use the Los Angles County Department of Public Works *Hydrology Manual*. Use the Modified Rational Method for calculating the peak mitigation QPM for compliance with the Standard Urban Stormwater Mitigation Plan (SUSMP). Use attached **Table 1** for all maximum intensity (Ix) values used.

By trial and error, determine the time of concentration (T_C), as shown below:

CALCULATION STEPS:

1. Assume an initial T_C value between 5 and 30 minutes.

T_C 24 minutes

2. Using Table 1, look up the assumed T_C value and select the corresponding Ix intensity in inches/hour.

Ix 0.214 inches/hour

3. Determine the value for the Undeveloped Runoff Coefficient, C_U, using the runoff coefficient curve corresponding to the predominand soil type.

C_U 0.10

4. Calculate the Developed Runoff Coefficient, $C_D = (0.9 * Imp.) + [(1.0 - Imp.) * C_U]$

C_D 0.82

5. Calculate the value for $C_D * Ix$

$C_D * Ix$ 0.1755

Length = 380
Slope = 0.013

6. Calculate the time of concentration, $T_C = 10^{-0.507} * (C_D * Ix)^{-0.519} * Length^{0.483} * Slope^{-0.135}$

Calculated T_C 24.32 minutes

7. Calculate the difference between the initially assumed T_C and the calculated T_C, if the difference is greater than 0.5 minutes, use the calculated T_C as the assumed initial T_C in the second iteration. If the T_C value is within 0.5 minutes, round the acceptable T_C value to the nearest minute.

BASIN: DD

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

TABLE FOR ITERATIONS

Iteration No.	Initial T_C (min)	I_X (in/hr)	C_U	C_D	$C_D * I_X$ (in/hr)	Calculated T_C (min)	Difference (min)
1	24	0.214	0.10	0.82	0.17548	24.3	0
2							
3							
4							
5							
6							
7							
8							
9							
10							

Acceptable T_C value 24 minutes

8. Calculate the Peak Mitigation Flow Rate,
$Q_{PM} = C_D * I_X * A_{Total} * (1.008333\ ft^3\text{-hour/acre-inches-seconds})$

Q_{PM} 0.11 cfs

In order to determine the volume (V_M) of stormwater runoff to be mitigated from the new development, use the following equation:

$V_M = (2{,}722.5\ ft^3 / acre) * [(A_I)(0.9) + (A_P + A_U)(C_U)]$

V_M 1339.5 ft^3

BASIN: EE

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

PROVIDE PROPOSED PROJECT CHARACTERISTICS

A_{TOTAL}	0.50	Acres
Type of Development	ROADWAY	
Predominate Soil Type #	98	
% of Project Impervious	90.0	
% of Project Pervious	10.0	
% of Project Contributing Undeveloped Area	0.00	
A_I	0.45	Acres
A_P	0.05	Acres
A_U	0.00	Acres

BASIN: EE

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

DETERMINING THE PEAK MITIGATED FLOW RATE (Q_{PM}):

In order to determine the peak mitigated flow rate (Q_{PM}) from the new development, use the Los Angles County Department of Public Works *Hydrology Manual*. Use the Modified Rational Method for calculating the peak mitigation QPM for compliance with the Standard Urban Stormwater Mitigation Plan (SUSMP). Use attached **Table 1** for all maximum intensity (Ix) values used.

By trial and error, determine the time of concentration (T_C), as shown below:

CALCULATION STEPS:

1. Assume an initial T_C value between 5 and 30 minutes.

T_C 24 minutes

2. Using Table 1, look up the assumed T_C value and select the corresponding Ix intensity in inches/hour.

Ix 0.214 inches/hour

3. Determine the value for the Undeveloped Runoff Coefficient, C_U, using the runoff coefficient curve corresponding to the predominand soil type.

C_U 0.10

4. Calculate the Developed Runoff Coefficient, $C_D = (0.9 * Imp.) + [(1.0 - Imp.) * C_U]$

C_D 0.82

5. Calculate the value for $C_D * Ix$

$C_D * Ix$ 0.1755

Length = 380
Slope = 0.013

6. Calculate the time of concentration, $T_C = 10^{-0.507} * (C_D * Ix)^{-0.519} * Length^{0.483} * Slope^{-0.135}$

Calculated T_C 24.32 minutes

7. Calculate the difference between the initially assumed T_C and the calculated T_C, if the difference is greater than 0.5 minutes, use the calculated T_C as the assumed initial T_C in the second iteration. If the T_C value is within 0.5 minutes, round the acceptable T_C value to the nearest minute.

BASIN: EE

APPENDIX A VOLUME & FLOW RATE CALCULATIONS

TABLE FOR ITERATIONS

Iteration No.	Initial T_C (min)	I_X (in/hr)	C_U	C_D	$C_D * I_X$ (in/hr)	Calculated T_C (min)	Difference (min)
1	24	0.214	0.10	0.82	0.17548	24.3	0
2							
3							
4							
5							
6							
7							
8							
9							
10							

Acceptable T_C value 24 minutes

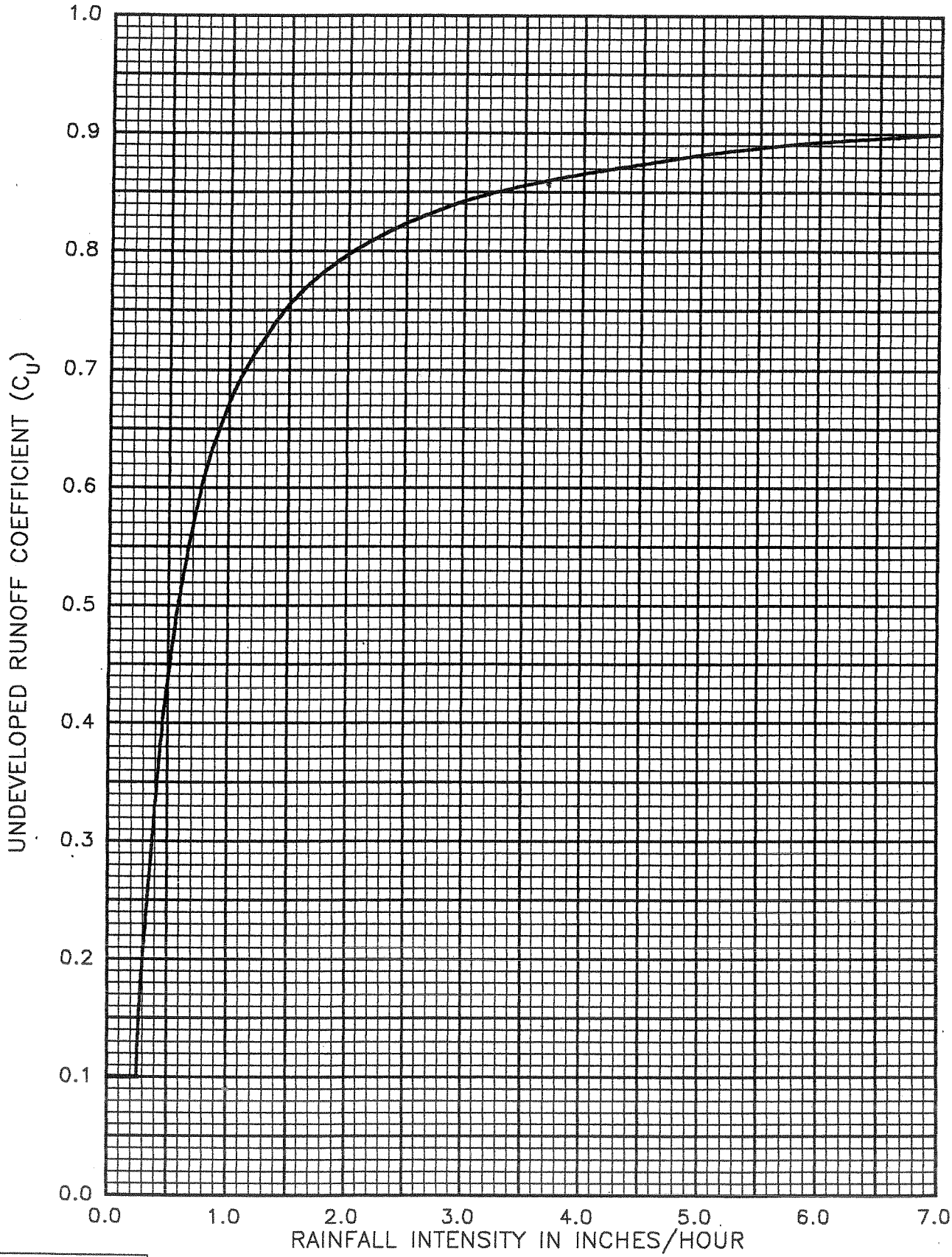
8. Calculate the Peak Mitigation Flow Rate,
$Q_{PM} = C_D * I_X * A_{Total}$ * (1.008333 ft³-hour/acre-inches-seconds)

Q_{PM} 0.09 cfs

In order to determine the volume (V_M) of stormwater runoff to be mitigated from the new development, use the following equation:

$V_M = (2{,}722.5 \text{ ft}^3 / \text{acre}) * [(A_I) (0.9) + (A_P + A_U)(C_U)]$

V_M 1116.2 ft³



Equation:

$C_D = (0.9 * IMP) + (1.0 - IMP)\ C_U$

Where: C_D = Developed runoff coefficient.
IMP = Proportion impervious.
C_U = Undeveloped runoff coefficient.

Los Angeles County
Department of Public Works

RUNOFF COEFFICIENT CURVE

SOIL TYPE NO. 098

MAGIC MOUNTAIN PARKWAY

EMERGENCY OVERFLOW PATH

EXTENDED DETENTION BASIN

BIO-RETENTION ACCESS ROAD

BIO-BASIN

EMERGENCY OVERFLOW PATH

6± HIGH RET. WALL

(PUBLIC)

STREET

PARK SITE

REC. AREA

PARKING STRUCTURE

0.50 AC INFILTRATION FOOTPRINT

AREA=7.6 AC.

V_M =15,311.3 ft^3

DESIGN V_M=16,900 ft^3

SEE BIO-RETENTION /INFILTRATION BASIN NOTE 6

SCALE 1"=60'

FEET 0 60 120

INCHES 0 1 2

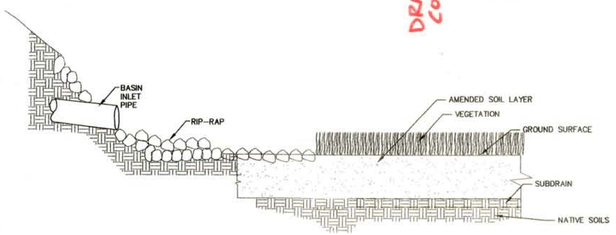
DRAINAGE CONCEPT/HYDROLOGY STUDY/SUSMP/LID PLAN APPROVED FOR AREA AND Q ONLY

APPROVED BY: Adolfo Gallardo DATE: 1/27/2011

CHECKED BY: DATE: 1/27/2011

LAND DEVELOPMENT DIVISION

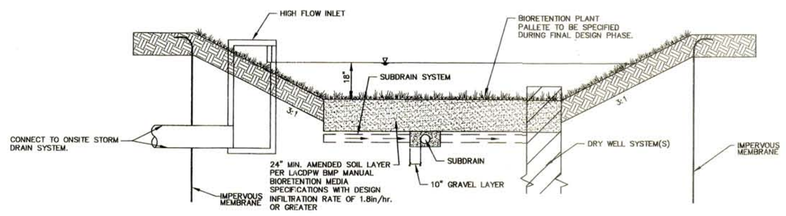
LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS



OUTLET DETAIL
(NOT TO SCALE)

OUTLET NOTES:

1. RIP-RAP USED SHALL CONSIST OF WELL GRADED STONE CONSISTING OF A MIXTURE OF ROCK SIZES.
2. UNDERDRAINS/SUBDRAINS MUST BE MADE OF SLOTTED, POLYVINYL CHLORIDE(PVC) PIPE CONFORMING TO ASTM STD. D3034, CORRUGATED HIGH DENSITY POLYETHYLENE (HDPE) PIPE CONFORMING TO AASHTO 252 M OR EQUIVALENT



BIO-RETENTION/INFILTRATION BASIN SECTION
(NOT TO SCALE)

BIO-RETENTION /INFILTRATION BASIN NOTES:

1. BASIN TO BE INSTALLED ON MINIMALLY COMPACTED SOIL, AS FEASIBLE.
2. BASIN TO HAVE UNDERDRAIN SYSTEM DESIGNED PER THE REQUIREMENTS OF THE LACDPW BMP MANUAL WITH CONFIGURATION AND SPACING TO ELIMINATE STANDING WATER FROM ALL PARTS OF THE BASIN.
3. UNDERDRAIN SYSTEM MUST CONNECT TO DRY WELL SYSTEM(S) FOR INFILTRATION.
4. BASIN MAXIMUM PONDING DEPTH OF 18".
5. DRY WELL SYSTEM(S) AND SOIL UNDER BASIN TO BE DESIGNED TO INFILTRATE AT A RATE OF 270 GPM, ASSUMING 7.6 AC OF MULTIFAMILY LAND USE TRIBUTARY.
6. BASIN TO BE DESIGNED TO HOLD AT LEAST 16,900 FT^{3}ABOVE AMENDED SOIL LAYER OR OTHER VOLUME DETERMINED TO ACHIEVE 80% AVERAGE ANNUAL CAPTURE EFFICIENCY ASSUMING 7.6 AC OF MULTI-FAMILY LAND USE TRIBUTARY.
7. THE TOTAL DRY WELL DISCHARGE MUST BE AT LEAST 0.45 cfs.

DEC 01 2010

SEP 15 2010

ALLIANCE LAND PLANNING & ENGINEERING INC.
2248 FARADAY AVE. CARLSBAD, CA 92008 TEL: (760) 431-9896 FAX: (760) 431-8802
27433 TOURNEY ROAD SUITE 250 VALENCIA, CA 91355 TEL: (661) 799-2760 FAX: (661) 254-1929
CIVIL ENGINEERING • LAND PLANNING • HILLSIDE DESIGN • SURVEYING

PLANS PREPARED BY:
ALLIANCE LAND PLANNING & ENGINEERING INC.
2248 FARADAY AVE.
(760) 431-9896

PLANS PREPARED UNDER THE DIRECTION OF:
CRAIG M. WHITTAKER - R.C.E. 51929 — 5-26-10 DATE

REGISTERED PROFESSIONAL ENGINEER — CRAIG M. WHITTAKER — NO. 51929 EXP. 6-30-12 — CIVIL — STATE OF CALIFORNIA

PLANS PREPARED FOR:
NEWHALL LAND
23823 WEST VALENCIA BOULEVARD
VALENCIA, CALIFORNIA 91355
TELEPHONE: (661) 255-4000
REPRESENTATIVE : ALEX HERRELL

NO.	DATE		BY	APPR

1 | COUNTY OF LOS ANGELES | 1 SHEETS

ENTRADA
LID INFILTRATION EXHIBIT
TENTATIVE TRACT 53295

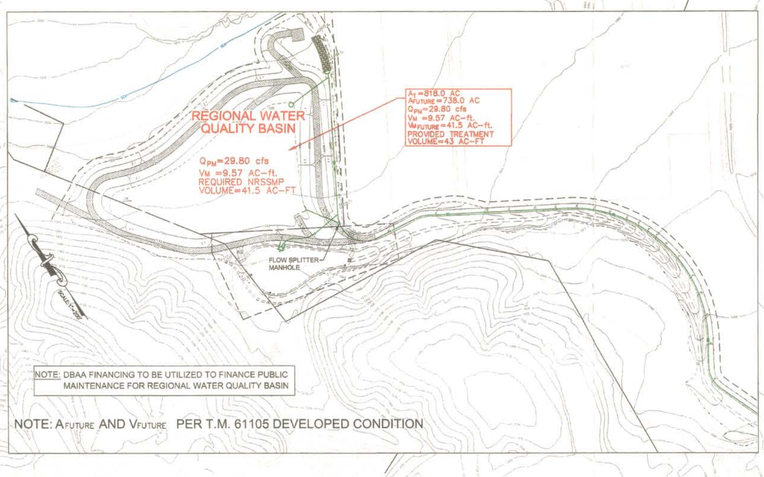
I:\CAD\0930\EXHIBITS\ENTRADA LID Exhibit.dwg

ENTRADA-SOUTH

LID/SUSMP/WATER QUALITY MAINTENANCE MAP PLAN
PORTION OF TENTATIVE TRACT 53295

LEGEND

- BIO-RETENTION: –WHOLE AREA NEEDS TO BE SLOPE < 1%
  – MUST HAVE SUB-DRAIN
- BIO-SWALE: –WHOLE SWALE NEEDS TO BE > 2%
  IF SLOPE < 2% REQUIRES SUBDRAIN
  –100 FT. MIN. LENGTH
- PROPOSED STORM DRAIN
- FLOW AREAS BOUNDARIES
- FLOW DIRECTION



DRAINAGE CONCEPT/HYDROLOGY STUDY/SUSMP/LID PLAN
APPROVED FOR AREA AND Q ONLY
APPROVED BY: Joseph Cabrera RCE NO. C68328 DATE: 11/01/2011
CHECKED BY: DATE:
LAND DEVELOPMENT DIVISION
LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

OFFSITE UNDEVELOPED-NORTH
AREA=65.7 AC.

STORM DRAIN ACCESS ROAD

Q_{PM}=28.94 cfs
DESIGN Q_{PM}=?
DESIGN LID V_M=
V_M =404,839.4 ft³

A_T=745.9 AC TO REGIONAL WATER QUALITY BASIN.

BASIN A_{TOTAL}=745.9 AC

BASIN A2
AREA=18.4 AC.

BASIN I
AREA=1.9 AC.

MEDIA FILTRATION DESIGN Q_{PM}=0.42 cfs
Q_{PM}=0.27 cfs
V_M =3,827.8 ft³

MEDIA FILTRATION DESIGN Q_{PM}=0.47 cfs
Q_{PM}=0.30 cfs
V_M =4,230.8 ft³

BASIN E
AREA=30.2 AC
Q_{PM}=4.87 cfs
V_M =68,077.2 ft³
REQUIRED NRSSMP BIORETENTION AREA=46,060 ft² OR EQUIVALENT TREATMENT. SEE NOTES 1,2, AND 3)

BASIN L
AREA=3.2 AC.

BASIN J
AREA=2.1 AC.

MEDIA FILTRATION DESIGN Q_{PM}=0.14 cfs
Q_{PM}=0.10 cfs
V_M =1,339.5 ft³

MEDIA FILTRATION DESIGN Q_{PM}=0.24 cfs
Q_{PM}=0.17 cfs
V_M =2,339.9 ft³

BASIN A1
AREA=82.0 AC.

BASIN G
AREA=0.6 AC.

BASIN K
AREA=2.3 AC.

BASIN H
AREA=1.3 AC.

BASIN D1
AREA=10.7 AC.

MEDIA FILTRATION DESIGN Q_{PM}=0.51 cfs
Q_{PM}=0.33 cfs
V_M =4,633.7 ft³

MULTI-FAMILY SITE

BASIN N
AREA=1.4 AC.

BASIN D TOTAL EXTENDED DETENTION BASIN D
10 ft. DEEP=22,400 ft² AT MID-DEPTH (1.5ft.)
67,200 ft³ TREATMENT VOLUME
A_T=14.0 AC
Q_{PM}=1.60 cfs
V_M =22,411.6 ft³

MEDIA FILTRATION DESIGN Q_{PM}=0.62 cfs
Q_{PM}=0.46 cfs
V_M =6,446.9 ft³

MEDIA FILTRATION DESIGN Q_{PM}=0.27 cfs
Q_{PM}=0.19 cfs
V_M =2,816.1 ft³

MEDIA FILTRATION DESIGN Q_{PM}=0.12 cfs
Q_{PM}=0.09 cfs
V_M =1,118.2 ft³

BASIN EE
AREA=0.5 AC.

MEDIA FILTRATION DESIGN Q_{PM}=0.72 cfs
Q_{PM}=0.46 cfs
V_M =6,474.1 ft³

MEDIA FILTRATION DESIGN Q_{PM}=0.15 cfs
Q_{PM}=0.11 cfs
V_M =1,339.5 ft³

BASIN DD
AREA=0.8 AC.

MEDIA FILTRATION DESIGN Q_{PM}=0.82 cfs
Q_{PM}=0.43 cfs
V_M =6,646.3 ft³

MEDIA FILTRATION DESIGN Q_{PM}=0.17 cfs
Q_{PM}=0.11 cfs
V_M =1,497.4 ft

BASIN CC
AREA=3.2 AC.

MEDIA FILTRATION DESIGN Q_{PM}=0.78 cfs
Q_{PM}=0.52 cfs
V_M =7,213.5 ft³

BASIN O
AREA=0.9 AC.

BASIN M
AREA=1.4 AC.

BASIN F
AREA=6.8 AC.
Q_{PM}=0.98 cfs
V_M =13,899.8 ft³
REQUIRED NRSSMP BIORETENTION AREA=8,950 ft² (OR EQUIVALENT TREATMENT SEE NOTES 1,2, AND 3)

BASIN D2
AREA=3.3 AC.

BASIN W
AREA=6.5 AC.
Q_{PM}=0.95 cfs
V_M =13,095.2 ft³
REQUIRED NRSSMP BIORETENTION AREA=8,510 ft²
(OR EQUIVALENT TREATMENT SEE NOTES 1,2, AND 3)

BASIN D_{TOTAL}=14.0 AC
Q_{PM}=1.60 cfs
V_M =22,411.6 ft³
REQUIRED NRSSMP VOLUME=52,272 ft³

BASIN U
AREA=1.4 AC.

BASIN Y
AREA=1.1 AC.

BASIN BB
AREA=1.3 AC.

BASIN AA
AREA=0.9 AC.

MEDIA FILTRATION DESIGN Q_{PM}=0.37 cfs
Q_{PM}=0.24 cfs
V_M =3,381.3 ft³

MEDIA FILTRATION DESIGN Q_{PM}=0.32 cfs
Q_{PM}=0.19 cfs
V_M =1,774.0 ft³

BASIN C
AREA=8.4 AC.
Q_{PM}=0.19 cfs
V_M =2,646.3 ft³
REQUIRED NRSSMP BIORETENTION AREA=8,420 ft²
(OR EQUIVALENT TREATMENT SEE NOTES 1,2, AND 3)

BASIN Q
AREA=1.3 AC.

BASIN Z
AREA=7.6 AC.
Q_{PM}=1.11 cfs
DESIGN V_M=16,900 ft³
V_M=15,311.3 ft³

BASIN R
AREA=2.2 AC.

MEDIA FILTRATION DESIGN Q_{PM}=0.24 cfs
Q_{PM}=0.24 cfs
V_M =3,348.2 ft³

MEDIA FILTRATION DESIGN Q_{PM}=0.30 cfs
Q_{PM}=0.17 cfs
V_M =2,339.9 ft³

BASIN Y
AREA=3.4 AC.
Q_{PM}=0.54 cfs
V_M =7,590.3 ft³
REQUIRED NRSSMP BIORETENTION AREA=5,290ft²
(OR EQUIVALENT TREATMENT SEE NOTES 1,2, AND 3)

BASIN S
AREA=1.5 AC.

BASIN P
AREA=15.8 AC.
Q_{PM}=2.28 cfs
V_M =31,831.5 ft³
REQUIRED NRSSMP BIORETENTION AREA=23,130ft²
(OR EQUIVALENT TREATMENT SEE NOTES 1,2, AND 3)

BASIN T
AREA=1.3 AC.

MEDIA FILTRATION DESIGN Q_{PM}=0.53 cfs
Q_{PM}=0.32 cfs
V_M =4,432.2 ft³

MEDIA FILTRATION DESIGN Q_{PM}=0.35 cfs
Q_{PM}=0.20 cfs
V_M =2,858.4 ft³

BASIN X
AREA=10.4 AC.
Q_{PM}=1.50 cfs
V_M =20,852.4 ft³
REQUIRED NRSSMP BIORETENTION AREA=15,220ft²
(OR EQUIVALENT TREATMENT SEE NOTES 1,2, AND 3)

BASIN B
AREA=60.3 AC.
Q_{PM}=9.07 cfs
V_M =126,854.3 ft³
REQUIRED NRSSMP VOLUME=291,800 ft³

BASIN B AND BASIN D EXTENDED DETENTION BASIN A
8.0 ft. DEEP=48,600 ft² AT MID-DEPTH (4.0ft.)
291,800 ft³ TREATMENT VOLUME AT=60.3 AC.
Q_{PM}=9.07 cfs
V_M =126,854.3 ft³

ON-SITE STORMWATER TREATMENT TO BE USED TO THE SATISFACTION OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS AND TO MEET THE REQUIREMENTS OF THE NRSP SUB-REGIONAL SWMP. TO BE PRIVATELY MAINTAINED.

OFFSITE UNDEVELOPED WEST
AREA = 602.5 AC.

OFFSITE -SOUTH
AREA=28.7 AC.

T.M. 61105

COMMERCIAL
CONDOMINIUM SITE
SINGLE FAMILY HOMES
MULTI-FAMILY SITE
SCHOOL SITE
PARK SITE
ACCESS ROAD
FLOW SPLITTER MANHOLE
MACRO
MOUNTAIN
PARKWAY
SKYVIEW DRIVE
ENTERTAINMENT
WESTRIDGE
OLD
FREEWAY
INTERSTATE
PUBLIC

NOTE: SEE ENTRADA LID INFILTRATION EXHIBIT FOR LID INFILTRATION FOR BASIN Z

NOTE: DBAA FINANCING TO BE UTILIZED TO FINANCE MAINTENANCE FOR MEDIA FILTRATIONS DEVICES AND EXTENDED DETENTION BASINS

NOTE: DESIGN Qpm AND DESIGN Vm ARE PER NEWHALL RANCH SUB-REGIONAL STORMWATER MITIGATION PLAN SIZING CRITERIA. Qpm AND Vm ARE CALCULATED PER SUSMP APPENDIX A METHODS. ALL BMP's ARE SIZED TO TREAT THE DESIGN Qpm/Vm OR Qpm/Vm, WHICHEVER VALUE IS GREATER.

NRSSMP TREATMENT NOTES

1. STORMWATER TO BE DESIGNED AND PLACED WITHIN THE BASIN WITH FINAL IMPROVEMENT PLANS TO SATISFY LOS ANGELES COUNTY DEPT. OF PUBLIC WORKS AND TO MEET THE REQUIREMENTS OF NEWHALL RANCH SUB-REGIONAL STORMWATER MITIGATION PLAN (NRSSMP) (80 PERCENT CAPTURE OF ANNUAL RUNOFF) FOR ALL DEVELOPED AREAS WITHIN BASIN.
2. EQUIVALENT BIOFILTRATION BMP'S MAY BE SUBSTITUTED WITH IMPROVEMENT PLANS, IF EQUIVALENT BIOFILTRATION BMP'S ARE USED, CALCULATIONS SHALL BE PROVIDED WITH FINAL IMPROVEMENT PLANS TO DEMONSTRATE CAPTURE AND TREATMENT OF 80 PERCENT OF THE AVERAGE ANNUAL RUNOFF VOLUME AND EQUIVALENT AVERAGE ANNUAL VOLUME REDUCTION.
3. REQUIRED SURFACE AREA IS BASED ON 18 INCH PONDING DEPTH. BIO RETENTION SURFACE AREA SHALL BE MEASURED ALONG THE CONTOUR OF THE SIDE SLOPE OF THE BIO RETENTION AREA MIDWAY BETWEEN THE TOE OF THE SLOPE AND THE DESIGN WATER SURFACE ELEVATION CORRESPONDING TO A DEPTH OF 9 INCHES. CALCULATIONS MAY BE SUBMITTED WITH FINAL IMPROVEMENT PLANS TO JUSTIFY OTHER METHODS OF AREA CALCULATION OR SUPPORT OTHER SIZING FACTORS (SEE NOTE 2)

SCALE: 1"=200'

FEET
200 100 0 200 400
INCHES
1 1/2 0 1 2

ALLIANCE LAND PLANNING & ENGINEERING INC.
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PLANS PREPARED BY:
ALLIANCE LAND PLANNING & ENGINEERING INC.
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(760) 431-9896

PLANS PREPARED UNDER THE DIRECTION OF:
CRAIG M. WHITTAKER R.C.E. 51929 DATE 9-14-10

REGISTERED PROFESSIONAL ENGINEER CRAIG M. WHITTAKER NO. 51929 EXP. 6-30-12 CIVIL STATE OF CALIFORNIA

PLANS PREPARED FOR:
NEWHALL LAND
23823 WEST VALENCIA BOULEVARD
VALENCIA, CALIFORNIA 91355
TELEPHONE: (661) 255-4000
REPRESENTATIVE : ALEX HERRELL

NO.	DATE	BY	APPR

1 | COUNTY OF LOS ANGELES | 1 SHEETS

LID/SUSMP/WATER QUALITY MAINTENANCE PLAN MAP FOR ENTRADA-SOUTH TENTATIVE TRACT 53295

PLAN PREPARATION DATE: DEC 01 2010

0930/HYDROLOGY/0930-WQMP.dwg

HYDROLOGICAL ANALYSIS

FOR

WESTRIDGE AT VALENCIA
TRACT 45433
PD 2514-04

HYDROLOGY CALCULATIONS – FLOW REDUCTION

JOB NO. 93004

PREPARED FOR:
NEWHALL LAND
25124 SPRINGFIELD COURT. SUITE 300
VALENCIA, CA 91355
(661) 255-4000

PREPARED BY:
ALLIANCE LAND PLANNING AND ENGINEERING
2248 FARADAY AVENUE
CARLSBAD, CA 92008
(760) 431-9896

FEBRUARY 2010

Program Package Serial Number: 2084
04/22/10 FILE: 4E04-A INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 1
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

Version 11, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\lasoilx.dat

WESTRIDGE PD 2514-04 DEVELOPED CONDITION - FLOW REDUCTION STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
3004	1A	183.0	627.63	183.0	627.63	4	720.	.02300	6.50	.00	0.	98	5	A32	.89
3004	2A	.0	.00	183.0	594.42	4	1.	.01000	6.50	.00	0.	98	99	A29	.00
3004	3A	1.5	3.83	184.5	598.22	4	21.	.02620	6.50	.00	0.	98	7	A29	.60
3004	4A	1.0	2.79	185.5	600.82	4	420.	.02430	6.50	.00	0.	98	6	A29	.80
3004	5A	1.2	3.08	186.7	596.73	4	43.	.02240	6.50	.00	0.	98	7	A29	.70
3004	6A	1.0	2.79	187.7	598.18	4	591.	.05200	6.50	.00	0.	98	6	A29	.80
3004	7B	.8	2.22	.8	2.22	4	30.	.16000	2.00	.00	0.	98	6	A29	.70
3004	8B	.5	1.40	1.3	3.63	4	524.	.04565	2.00	.00	0.	98	6	A29	.90
3004	9B	1.3	4.46	2.6	7.52	4	34.	.04000	2.00	.00	0.	98	5	A33	.10
3004	10B	1.3	3.34	3.9	10.78	4	1.	.04288	3.50	.00	0.	98	7	A29	.70
3004	11B	.5	1.40	4.4	12.18	4	342.	.04288	3.50	.00	0.	98	6	A29	.90
3004	12C	.0	.00	.0	.00	4	1.	.01000	.00	.00	0.	98	99	A29	.00
3004	13C	.0	.00	.0	.00	4	1.	.01000	.00	.00	0.	98	99	A29	.00
3004	14B	.0	.00	4.4	12.05	4	1.	.03000	2.00	.00	0.	98	99	A29	.00
3004	15B	.6	1.86	5.0	13.70	4	17.	.01100	3.50	.00	0.	98	5	A29	.90
3004	16B	.8	2.46	5.8	15.86	4	44.	.01100	3.50	.00	0.	98	5	A29	.70
3004	17B	1.1	2.85	6.9	18.66	4	1.	.01140	4.50	.00	0.	98	7	A29	.80
3004	18B	1.5	3.60	8.4	22.25	4	107.	.01140	4.50	.00	0.	98	8	A29	.60
3004	19B	.0	.00	8.4	22.13	4	1.	.01000	4.50	.00	0.	98	99	A29	.00
3004	20B	14.4	31.27	22.8	53.39	4	166.	.01000	4.50	.00	0.	98	10	A29	.60
3004	21B	2.4	6.13	25.2	58.99	4	19.	.01000	4.50	.00	0.	98	7	A29	.60
3004	22B	1.5	3.91	26.7	62.83	4	337.	.02925	4.50	.00	0.	98	7	A29	.90

****

CONFLUENCE Q'S

3004 23A TA 1155 QA 586.44 QAB 649.24 QB 62.80 3004 23B TB 1155 QB 62.80 QBA 649.24 QA 586.44

3004 23AB TAB 1155 QAB 649.24 QA 586.44 QB 62.80

****

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
3004	23AB	26.7	62.80	214.4	649.24	4	320.	.05147	6.50	.00	0.	98	0	A29	.00

PD 2514-04

Subarea	Area (Ac)	%imp	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in)	Tc-calculated (min)	Intensity (in/hr)	Cu	Cd
3A	1.5	0.60	98	610	0.035	5.71	7	2.91	0.83	0.87
4A	1.0	0.80	98	500	0.035	5.71	6	3.13	0.84	0.89
5A	1.2	0.70	98	560	0.025	5.71	7	2.91	0.83	0.88
6A	1.0	0.80	98	540	0.025	5.71	6	3.13	0.84	0.89
7B	0.8	0.70	98	530	0.026	5.71	6	3.13	0.84	0.88
8B	0.5	0.90	98	530	0.026	5.71	6	3.13	0.84	0.89
9B	1.3	0.10	98	370	0.015	6.5	5	3.88	0.86	0.86
10B	1.3	0.70	98	680	0.050	5.71	7	2.91	0.83	0.88
11B	0.5	0.90	98	520	0.050	5.71	6	3.13	0.84	0.89
15B	0.6	0.90	98	440	0.050	6.5	5	3.88	0.86	0.90
16B	0.8	0.70	98	375	0.050	6.5	5	3.88	0.86	0.89
17B	1.1	0.80	98	750	0.035	5.71	7	2.91	0.83	0.89
18B	1.5	0.60	98	760	0.035	5.71	8	2.73	0.83	0.87
20B	14.4	0.60	98	1120	0.015	6.5	10	2.80	0.83	0.87
21B	2.4	0.60	98	790	0.044	6.5	7	3.31	0.85	0.88
22B	1.5	0.90	98	790	0.044	6.5	7	3.31	0.85	0.90

COUNTY OF LOS ANGELES
LAND DEVELOPMENT DIVISION
SUBDIVISION PLAN CHECKING SECTION - DRAINAGE AND GRADING UNIT

TO: Alliance

July 12, 2001

Attention Craig Whitteker

REVIEW OF REVISED HYDROLOGY STUDY

TRACT NO. 2514-04 ~~45422-04~~
SUBMITTAL DATE Santa Clarita

We have reviewed your revised hydrology study/flood hazard calculations.

(X) The revised hydrology study has been approved for Area and Q only.

( ) The flood hazard calculations submitted with your hydrology study are approved.

( ) Refer to comments below:

COMMENTS:

REVIEWED BY M. H. Kajbaf DATE 7/12/01
MO HOSSEIN KAJBAF - (626) 458-4921

8HYD REVISED HYDROLOGY STUDY
P:\LDPUB\SUBDIVSN\PLANCHK\MTD1601HYD
07/11/01

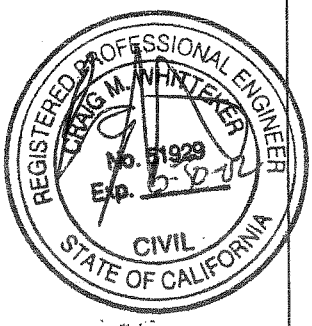
Hydrological Analysis

for

Westridge at Valencia
Tract 45433
PD 2514-04
Hydrology Calculations
Delta No. 1 Revision
Job No. 93004

HYDROLOGY STUDY
APPROVED FOR AREA AND Q ONLY
APPROVED BY: RCE NO. 45854 DATE: 7/12/01
CHECKED BY: DATE:
LAND DEVELOPMENT DIVISION
LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

Prepared for:
Valencia Company
28323 Valencia Boulevard
Valencia, CA 91355
(661) 255-4000



Prepared by:
Alliance Land Planning & Engineering
5962 Laplace Court, Suite 130
Carlsbad, CA 92008
(760) 431-9896

MAY 2001

HYDROLOGY DESIGN CRITERIA

- Storm Event = 50 years onsite, offsite and sump condition
- Rainfall Zone = L
- Soil Classification Area = 098
- Debris Potential Area = 8

Time of concentration calculated using County of Los Angeles "T_C" Software.

Flowrates calculated using modified rational method; County of Los Angeles "MORA" software.

Burned Flowrate = $AI(1-K) + KQ_{50}$

A = area in acres
I = rainfall intensity
K = burn factor per Appendix G-2

Bulked Flowrate = Q_{50} x Bulking Factor

Using chart P-5 and assuming the smallest basin:
BF = 1.28

Debris Volume = 50 c.y./acre

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT

MODIFIED RATIONAL METHOD HYDROLOGY

WESTRIDGE - PD 2514-04 - DEVELOPED CONDITION STORM DAY 4

LOCATION		SUBAREA AREA	SUBAREA Q	TOTAL AREA	TOTAL Q	CONV TYPE	CONV LNGTH	CONV SLOPE	CONV SIZE	CONV Z	CONTROL Q	SOIL NAME	TC	RAIN ZONE	PCT IMPV
93004	1A	0.	0.	0.	0.	2	1.	0.01000	0.00	0.00	0.	98	99	L50	0.10
93004	2A	0.	0.	0.	0.	4	1.	0.03500	0.00	0.00	0.	98	99	L50	0.90
93004	3A	2.	11.	2.	11.	4	20.	0.03500	2.00	0.00	0.	98	5	L50	0.60
93004	4A	1.	5.	3.	16.	4	430.	0.03500	2.00	0.00	0.	98	5	L50	0.80
93004	5A	1.	5.	4.	21.	4	40.	0.03500	2.00	0.00	0.	98	5	L50	0.70
93004	6A	1.	5.	5.	26.	4	700.	0.03500	2.00	0.00	0.	98	5	L50	0.80
93004	7B	1.	5.	1.	5.	4	40.	0.02600	2.00	0.00	0.	98	5	L50	0.70
93004	8B	1.	6.	2.	11.	4	520.	0.04000	2.00	0.00	0.	98	5	L50	0.90
93004	9B	1.	5.	3.	15.	2	50.	0.03600	0.00	0.00	0.	98	5	L50	0.10
93004	10B	1.	5.	4.	20.	4	5.	0.04000	2.00	0.00	0.	98	5	L50	0.70
93004	11B	1.	6.	5.	26.	4	350.	0.04000	2.00	0.00	0.	98	5	L50	0.90
93004	12C	15.	71.	15.	71.	4	1020.	0.01000	3.00	0.00	0.	98	6	L50	0.50

****

* CONFLUENCE Q'S *

* 93004 13B TB 1155 QB 25. QBC 86. QC 61. 93004 13C TC 1157 QC 66. QCB 85. QB 18. *

* 93004 13BC TBC 1156 QBC 89. QB 23. QC 66. *

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LOCATION		SUBAREA AREA	SUBAREA Q	TOTAL AREA	TOTAL Q	CONV TYPE	CONV LNGTH	CONV SLOPE	CONV SIZE	CONV Z	CONTROL Q	SOIL NAME	TC	RAIN ZONE	PCT IMPV
93004	13BC	15.	66.	20.	89.	4	350.	0.04000	2.75	0.00	0.	98	0	L50	0.00
93004	14B	0.	0.	20.	87.	4	1.	0.01000	3.25	0.00	0.	98	99	L50	0.10
93004	15B	1.	6.	21.	91.	4	20.	0.04000	2.75	0.00	0.	98	5	L50	0.90
93004	16B	1.	5.	22.	95.	4	50.	0.04000	2.75	0.00	0.	98	5	L50	0.70
93004	17B	1.	5.	23.	98.	4	60.	0.04000	2.75	0.00	0.	98	5	L50	0.80
93004	18B	2.	11.	25.	105.	4	500.	0.04000	2.75	0.00	0.	98	5	L50	0.60
93004	19B	0.	0.	25.	103.	4	1.	0.01000	3.50	0.00	0.	98	99	L50	0.10
93004	20B	2.	11.	27.	110.	4	20.	0.08000	2.50	0.00	0.	98	5	L50	0.60
93004	21B	2.	11.	29.	118.	4	20.	0.08000	2.50	0.00	0.	98	5	L50	0.90
93004	22B	14.	67.	43.	177.	4	70.	0.03000	3.50	0.00	0.	98	6	L50	0.60

****

* CONFLUENCE Q'S *

* 93004 23A TA 1155 QA 25. QAB 202. QB 177. 93004 23B TB 1155 QB 177. QBA 202. QA 25. *

* 93004 23AB TAB 1155 QAB 202. QA 25. QB 177. *

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LOCATION		SUBAREA AREA	SUBAREA Q	TOTAL AREA	TOTAL Q	CONV TYPE	CONV LNGTH	CONV SLOPE	CONV SIZE	CONV Z	CONTROL Q	SOIL NAME	TC	RAIN ZONE	PCT IMPV
93004	23AB	43.	177.	48.	202.	4	10.	0.01000	4.50	0.00	0.	98	0	L50	0.00

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT
MODIFIED RATIONAL METHOD HYDROLOGY

HYDROGRAPH AT POINT 23AB

HYDROGRAPH AT 93004 23A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	0.	100	2.	200	4.	300	6.	400	8.
500	10.	600	14.	700	17.	800	22.	900	25.
1000	29.	1050	35.	1100	35.	1110	36.	1120	40.
1130	44.	1131	45.	1132	46.	1133	47.	1134	48.
1135	49.	1136	51.	1137	52.	1138	53.	1139	55.
1140	56.	1141	58.	1142	60.	1143	61.	1144	63.
1145	64.	1146	66.	1147	68.	1148	70.	1149	77.
1150	88.	1151	108.	1152	144.	1153	173.	1154	192.
1155	202.	1156	200.	1157	180.	1158	146.	1159	120.
1160	100.	1161	83.	1162	69.	1163	59.	1164	52.
1165	48.	1166	45.	1167	43.	1168	42.	1169	42.
1170	41.	1171	40.	1172	40.	1173	39.	1174	38.
1175	37.	1176	36.	1177	35.	1178	35.	1179	34.
1180	34.	1181	34.	1182	33.	1183	33.	1184	33.
1185	33.	1186	33.	1187	33.	1188	33.	1189	33.
1190	33.	1191	33.	1192	32.	1193	32.	1194	31.
1195	31.	1196	31.	1197	30.	1198	30.	1199	30.
1200	30.	1201	29.	1202	29.	1203	29.	1204	29.
1205	29.	1206	29.	1207	29.	1208	29.	1209	29.
1210	29.	1211	29.	1212	29.	1213	28.	1214	28.
1215	27.	1216	26.	1217	26.	1218	26.	1219	25.
1220	25.	1221	25.	1222	25.	1223	25.	1224	25.
1225	25.	1226	25.	1227	25.	1228	25.	1229	25.
1230	25.	1231	25.	1232	24.	1233	24.	1234	24.
1235	24.	1236	23.	1237	23.	1238	23.	1239	23.
1240	23.	1241	23.	1242	23.	1243	22.	1244	22.
1245	22.	1246	22.	1247	22.	1248	22.	1249	22.
1250	22.	1251	22.	1252	22.	1253	22.	1254	22.
1255	22.	1256	22.	1257	22.	1258	22.	1259	22.
1260	22.	1261	22.	1262	22.	1263	21.	1264	21.
1265	20.	1266	19.	1267	19.	1268	19.	1269	18.
1270	18.	1271	18.	1272	17.	1273	17.	1274	17.
1275	17.	1276	17.	1277	17.	1278	17.	1279	17.
1280	17.	1281	17.	1282	17.	1283	17.	1284	17.
1285	17.	1286	17.	1287	17.	1288	17.	1289	17.
1290	17.	1291	17.	1292	17.	1293	17.	1294	17.
1295	17.	1296	17.	1297	17.	1298	17.	1299	17.
1300	17.	1310	14.	1320	12.	1330	12.	1340	12.
1350	8.	1360	6.	1370	6.	1380	6.	1390	6.
1400	6.	1420	4.	1440	3.	1460	2.	1500	2.

Total Runoff = 33.713 Acre-Ft.
Peak Q = 202 CFS
Time to Peak Q = 1155 Minutes

WESTRIDGE P.D. 2514-04 HYDROLOGY
BASIN A
DEVELOPED CONDITION

Subarea No. B 22
TIME OF CONCENTRATION = 12. MINUTES **********
Rainfall : Zone = L Frequency = 50 Years
Subarea Area = 14. Acres
Outlet Q = 56. cfs

Travel Time:

Reach No.	Reach Time
Land	9.8
1- 1	2.4
Total	12.2

WESTRIDGE P.D. 2514-04 HYDROLOGY
BASIN A
DEVELOPED CONDITION
Input Data:

Rainfall Frequency Zone	(yrs.)	Time of Concentration (min) Assumed	Calculated	Max.Conv Code
L	50	10.	12	0

Component Area Data:

Reach No.	Convey. Type	Strt No.	Junct No.	Soil No.	Prop. Imp.	Map Slope	Area (ac)	Elev. (ft.) Top	Bottom	Ext. Q (cfs)	Fixed Size	Fix S	Fix X
1- 1	Nat.Val	0	0- 0	98	.100	.034	13.0	1403.8	1377.0	.0	.00	0	0

Code Definitions:
****
Maximum Conveyance Code: 0=no limits
1=street flow maximum at property line
2=pipe maximum size at 8 feet
3=both 1 and 2 apply
Fix=fixed value code: S=size : 0=fixed size is a minimum drain size
1=fixed size is the exact drain size
X=ext.Q: 0=External Q varies with frequency.
1=External Q is constant with frequency change.
ct No.: Street Cross-Section No. - See Street-Cross-Section Data list.
ict No.: Reach No. junctioning with top of this reach.

Lot or Overland Flow Data:

Length (ft.)	Elevation (ft) Top	Bottom	Slope	Manning's N	Soil No.	Proportion Impervious
200.0	1406.5	1403.8	.013	.060	98	.100

WESTRIDGE P.D. 2514-04 HYDROLOGY
BASIN A
DEVELOPED CONDITION

Reach Data:

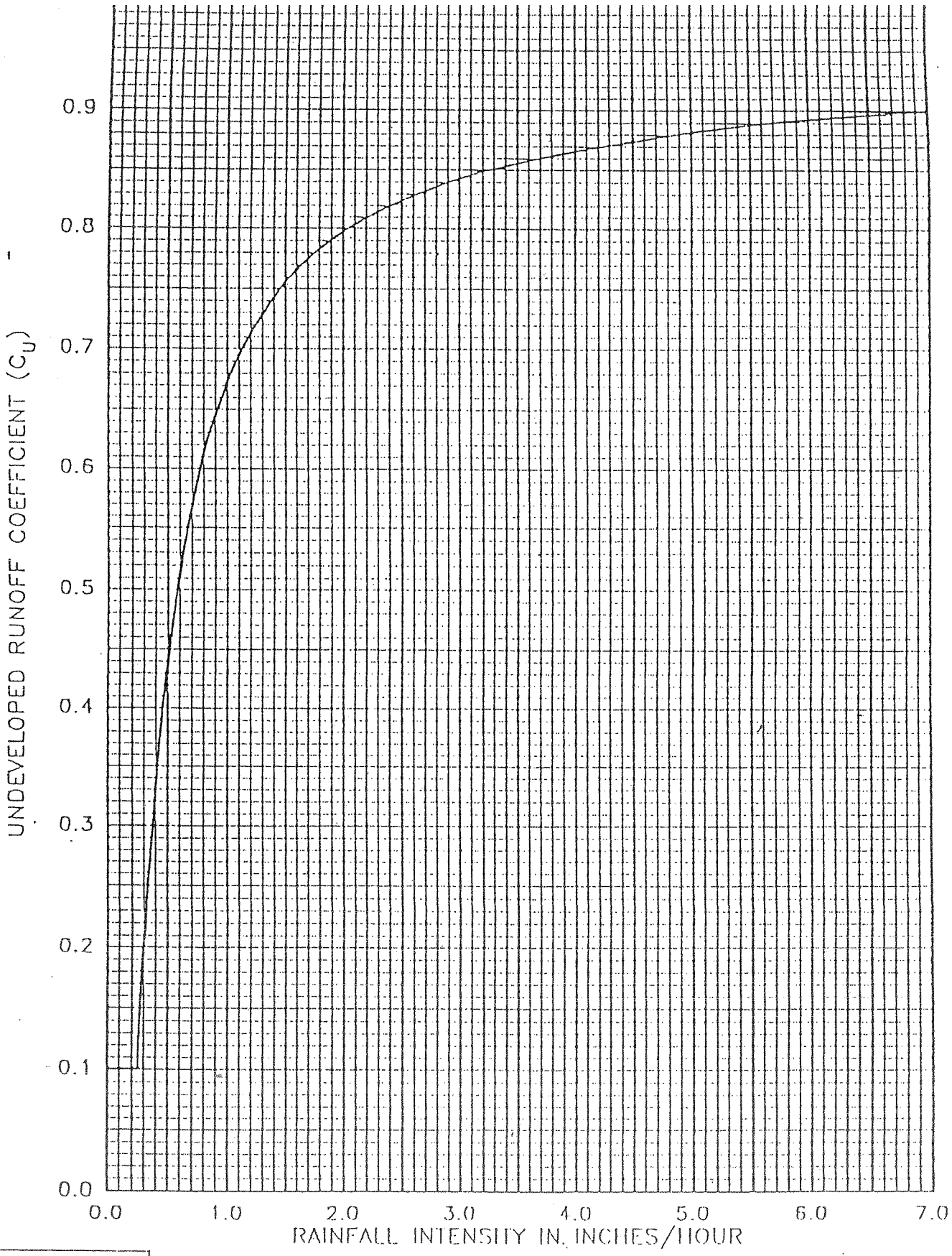
Reach No.	Conveyance Type	(ft) Depth	Width	Z Hor	Vert	Length (ft)	Effect. Slope	Area (ac.) at top	Q (cfs) at top
1- 1	Nat.Val	.00	.0	.00	.00	780.0	.0344	1.3	18.9
Outlet								14.3	56.3

Street Cross-Section Data:

Section No.	Depth (feet) No.: 1	2	3	4	Curb Height	Horiz. Distance Curb-Prop. Line	Width (ft.)
1	.130	.320	.050	.200	.500	10.	36.

Depth No. 1 = Gutter.
Depth No. 2 = Gutter to Crown.
Depth No. 3 = Crown to Curb.
Depth No. 4 = Curb to Property Line.

Input Data File W4D22B.INP
Output Data File
Runoff Coefficient Data File RUNCOEF.DAT



Equation:

$C_D = (0.9 * IMP) + (1.0 - IMP)\ C_U$

Where:
C_D = Developed runoff coefficient.
IMP = Proportion impervious.
C_U = Undeveloped runoff coefficient.

Los Angeles County
Department of Public Works

RUNOFF COEFFICIENT CURVE

SOIL TYPE NO. 098

NS098.SPC

Burn Factor

Rainfall Intensity (in/hr)	Burn Factor K	Rainfall Intensity (in/hr)	Burn Factor K	Rainfall Intensity (in/hr)	Burn Factor K
.1	.856	3.5	.596	6.8	.557
.2	.798	3.6	.594	6.9	.556
.3	.765	3.7	.592	7.0	.555
.4	.743	3.8	.591	7.1	.554
.5	.727	3.9	.589	7.2	.554
.6	.713	4.0	.588	7.3	.553
.7	.702	4.1	.586	7.4	.552
.8	.693	4.2	.585	7.5	.551
.9	.684	4.3	.583	7.6	.550
1.0	.677	4.4	.582	7.7	.550
1.1	.670	4.5	.581	7.8	.549
1.2	.665	4.6	.579	7.9	.548
1.3	.659	4.7	.578	8.0	.548
1.4	.654	4.8	.577	8.1	.547
1.5	.650	4.9	.576	8.2	.546
1.6	.645	5.0	.575	8.3	.546
1.7	.641	5.1	.573	8.4	.545
1.8	.638	5.2	.572	8.5	.544
1.9	.634	5.3	.571	8.6	.544
2.0	.631	5.4	.570	8.7	.543
2.1	.628	5.5	.569	8.8	.542
2.2	.625	5.6	.568	8.9	.542
2.3	.622	5.7	.567	9.0	.541
2.4	.619	5.8	.566	9.1	.540
2.5	.617	5.9	.565	9.2	.540
2.6	.614	6.0	.564	9.3	.539
2.7	.612	6.1	.563	9.4	.539
2.8	.610	6.2	.562	9.5	.538
2.9	.607	6.3	.561	9.6	.538
3.0	.605	6.4	.560	9.7	.537
3.1	.603	6.5	.559	9.8	.536
3.2	.601	6.6	.558	9.9	.536
3.3	.599	6.7	.558	10.0	.535
3.4	.598				

BURN.TAB

Equation:

$$K = 0.677 * I^{-0.102}$$

Where:

K = The Ratio of Burned to Unburned Infiltration Rates (Burn Factor).
I = The Rainfall Intensity (in/hr).

Los Angeles County
Department of Public Works

BURN FACTOR

STANDARD VALUES TABLES

Overland Manning's N Values

Type of Development	N
Industrial-Commercial	0.014
Residential	0.040
Rural	0.060

Standard Lot Values

Type of Development	Lot Length	Lot Slope Range
Industrial-Commercial	200	0.005-0.02
Residential	100	0.01 -0.05
Rural	200	0.05 -1.00

STANDARD RANGE OF PROPORTION IMPERVIOUS

Type of Development	Proportion Impervious
Single-Family	0.21-0.45
Multi-Family	0.40-0.80
Commercial	0.48-0.92
Industrial	0.60-0.92
Institutional	0.70-0.90

Average Values for Metropolitan Los Angeles County are:
Single-Family=0.42 Multi-Family=0.68 Commercial=0.92
Industrial=0.91 Institutional=0.68
For more detail, see the separate Proportion Impervious Table.

Los Angeles County
Department of Public Works

STANDARD VALUES
TABLES

PROPORTION IMPERVIOUS

Residential

Single-Family	0.418
Two-Unit	0.418
Three-Unit	0.682
Four-Unit	0.819
Five-Unit	0.855

Commercial

Stores, Office Buildings, Manufacturing Outlets	0.909
Shopping Centers (Regional), Restaurants, Service Shops, Auto Equipment, Parking Lots	0.946
Shopping Centers (Neighborhood), Motels, Hotels, Kennels, Professional Buildings, Banks, Service Stations	0.958
Supermarkets	0.976
Department Stores	0.985

Industrial

Mineral Processing	0.473
Open Storage	0.655
Motion Picture, Radio, Television	0.819
Manufacturing, Warehousing, Storage, Parking	0.909
Food Processing Plants, Lumber Yards	0.958

Institutional Property

Colleges, Universities	0.473
Homes for the Aged	0.682
Hospitals, Cemeteries, Mausoleums, Mortuaries	0.744
Churches, Schools	0.819

Los Angeles County
Department of Public Works

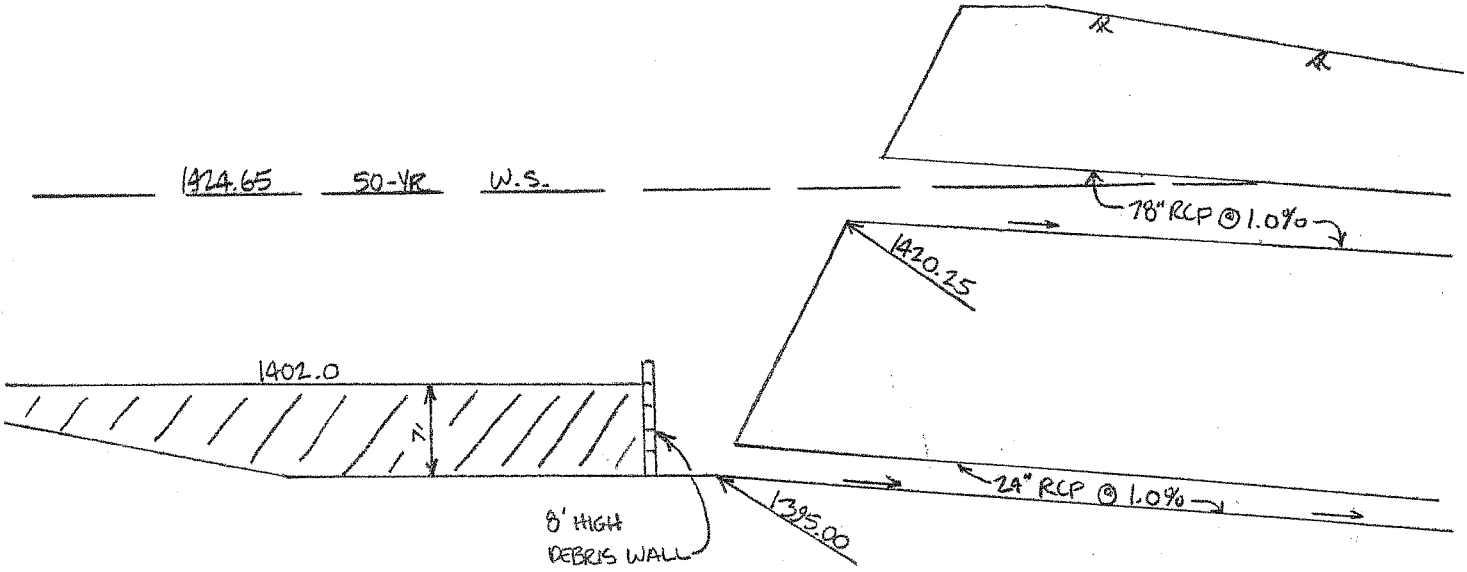
PROPORTION
IMPERVIOUS

DETENTION BASIN CALCULATIONS

INFLOW: 493 CFS

OUTFLOW: 71 CFS IN 24" LOW FLOW PIPE

WESTRIDGE
TRACT 45433
PD 2514-04
ALP&E
5/20/01



DEBRIS CALC.

TOTAL D.V. = 6,730 CY

AREA OF BOTTOM = 26,000 SF

HT. OF DEBRIS = $\frac{6{,}730\ (27)}{26{,}000} = 6.99'$

W.S. CALC

493 CFS INFLOW - 71 CFS OUTFLOW = 422 CFS INTO 78" PIPE

422 CFS
n = 0.013
S = 1.0%
78" DIA

$H_W = 68\% \rightarrow 0.68(6.5') = 4.4'$

$4.4' + 1420.25 = \underline{1424.65\ W.S.}$

STORAGE OUTFLOW TABLE

24" RCP AREA = 3.14 SF

Q	V	S_F	H_F	H_V	H_T	W.S	VOL (AC-FT)
Ø	Ø	Ø	Ø	Ø	Ø	Ø	Ø
10	3.2	0.0019	0.2	0.2	0.4	1402.4	0.2
25	8.0	0.0122	1.2	1.0	2.4	1404.4	1.4
40	12.7	0.0313	3.1	2.5	6.1	1408.1	4.8
60	19.1	0.0700	7.0	5.6	13.7	1415.7	15.1
80	25.5	0.1253	12.5	10.1	24.6	1426.6	41.8
100	31.8	0.1958	19.6	15.7	38.4	1440.4	103.7

$S_F = \left(\frac{Q}{K}\right)^2$ $K = 226$ LACFCD MANUAL FIG. G-3

$H_F = S_F(L)$ $L = 100'$

$H_V = \frac{V^2}{2g}$

$V = \frac{Q}{A}$

$H_T = H_F + 1.2(H_V)$

W.S. = 1402.0 + H_T

WESTRIDGE - TRACT 45433
PD 2514-04
OFFSITE DETENTION BASIN

Basin Rating Table:

Elevation (ft.)	Storage (Ac.ft.)	Outflow (cfs)	Elevation (ft.)	Storage (Ac.ft.)	Outflow (cfs)
1402.00	.00	.00	1415.70	15.10	60.00
1402.40	.20	10.00	1426.60	41.80	80.00
1404.40	1.40	25.00	1440.40	103.70	100.00
1408.10	4.80	40.00			

Location: 11B 0

Area: 199. Acres.

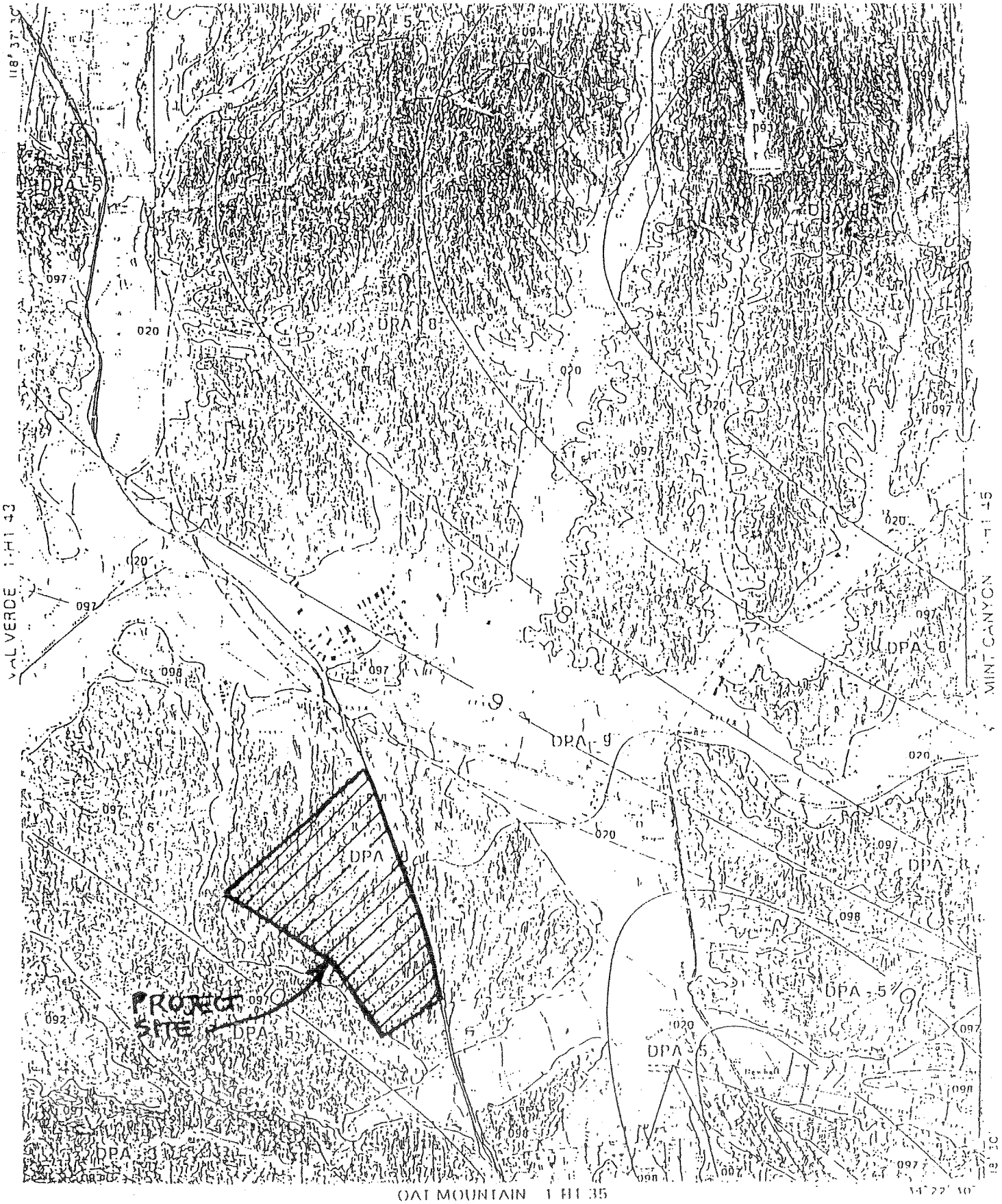
Inflow Peak Data:

Q = 493. cfs at Point No. 44 at Time 1158 Minutes on Day 4
Number of Points in the Hydrograph = 200

Outflow Peak Data:

Q = 71. cfs at Point No. 109 at Time 1223 Minutes.

Input Data Set = 51404 .BRT
Output Data Set =
Hydrograph Data Set = 51404 .HYD



LEGEND

——— SOIL CLASSIFICATION AREA

····· DEBRIS POTENTIAL AREA

- - 12 - - 50 YEAR ISOLYET (MAX 24 HOUR AMOUNT)

LACDPW

NEWHALL 1988

hydrologic map

WESTRIDGE - TRACT 45433
PD 2514-04
OFFSITE DETENTION BASIN

Hydrograph Data:

Time (min.)	Input Q (cfs)	Output Q (cfs)	Time (min.)	Input Q (cfs)	Output Q (cfs)
.00	.00	.00	1165.00	336.00	67.84
100.00	2.00	.00	1166.00	308.00	68.10
200.00	3.00	3.87	1167.00	284.00	68.34
300.00	6.00	4.84	1168.00	264.00	68.55
400.00	9.00	8.96	1169.00	247.00	68.74
500.00	13.00	11.27	1170.00	232.00	68.92
600.00	23.00	17.50	1171.00	219.00	69.08
700.00	34.00	26.35	1172.00	206.00	69.23
800.00	49.00	33.41	1173.00	195.00	69.36
900.00	62.00	41.88	1174.00	185.00	69.49
1000.00	76.00	48.27	1175.00	175.00	69.60
1050.00	96.00	53.00	1176.00	167.00	69.71
1100.00	100.00	58.64	1177.00	158.00	69.80
1110.00	102.00	59.76	1178.00	151.00	69.89
1120.00	111.00	60.39	1179.00	145.00	69.97
1130.00	124.00	60.97	1180.00	139.00	70.05
1131.00	126.00	61.04	1181.00	133.00	70.11
1132.00	128.00	61.11	1182.00	128.00	70.18
1133.00	130.00	61.18	1183.00	124.00	70.23
1134.00	132.00	61.25	1184.00	120.00	70.29
1135.00	135.00	61.32	1185.00	117.00	70.34
1136.00	138.00	61.40	1186.00	114.00	70.38
1137.00	141.00	61.48	1187.00	111.00	70.43
1138.00	144.00	61.57	1188.00	108.00	70.47
1139.00	147.00	61.65	1189.00	106.00	70.50
1140.00	150.00	61.74	1190.00	105.00	70.54
1141.00	155.00	61.84	1191.00	103.00	70.58
1142.00	159.00	61.93	1192.00	101.00	70.61
1143.00	163.00	62.04	1193.00	99.00	70.64
1144.00	168.00	62.14	1194.00	98.00	70.67
1145.00	172.00	62.25	1195.00	96.00	70.69
1146.00	177.00	62.37	1196.00	94.00	70.72
1147.00	183.00	62.49	1197.00	93.00	70.74
1148.00	190.00	62.62	1198.00	92.00	70.76
1149.00	202.00	62.76	1199.00	91.00	70.79
1150.00	218.00	62.91	1200.00	90.00	70.81
1151.00	248.00	63.08	1201.00	89.00	70.83
1152.00	300.00	63.30	1202.00	88.00	70.84
1153.00	339.00	63.56	1203.00	87.00	70.86
1154.00	379.00	63.87	1204.00	86.00	70.88
1155.00	412.00	64.21	1205.00	85.00	70.89
1156.00	435.00	64.58	1206.00	84.00	70.91
1157.00	453.00	64.97	1207.00	84.00	70.92
1158.00	493.00	65.39	1208.00	83.00	70.93
1159.00	432.00	65.80	1209.00	83.00	70.95
1160.00	422.00	66.18	1210.00	82.00	70.96
1161.00	413.00	66.54	1211.00	82.00	70.97
1162.00	403.00	66.89	1212.00	81.00	70.98

WESTRIDGE - TRACT 45433
PD 2514-04
OFFSITE DETENTION BASIN

Hydrograph Data:

Time (min.)	Input Q (cfs)	Output Q (cfs)	Time (min.)	Input Q (cfs)	Output Q (cfs)
1215.00	78.00	71.01	1265.00	52.00	70.57
1216.00	77.00	71.01	1266.00	51.00	70.55
1217.00	76.00	71.02	1267.00	50.00	70.53
1218.00	75.00	71.02	1268.00	49.00	70.51
1219.00	74.00	71.03	1269.00	48.00	70.49
1220.00	73.00	71.03	1270.00	47.00	70.46
1221.00	72.00	71.03	1271.00	47.00	70.44
1222.00	72.00	71.03	1272.00	46.00	70.41
1223.00	71.00	71.03	1273.00	45.00	70.39
1224.00	70.00	71.03	1274.00	44.00	70.36
1225.00	69.00	71.03	1275.00	44.00	70.34
1226.00	69.00	71.03	1276.00	43.00	70.31
1227.00	68.00	71.03	1277.00	43.00	70.28
1228.00	68.00	71.02	1278.00	42.00	70.25
1229.00	67.00	71.02	1279.00	42.00	70.22
1230.00	67.00	71.01	1280.00	41.00	70.19
1231.00	66.00	71.01	1281.00	41.00	70.16
1232.00	66.00	71.00	1282.00	41.00	70.13
1233.00	65.00	71.00	1283.00	40.00	70.10
1234.00	65.00	70.99	1284.00	40.00	70.07
1235.00	64.00	70.99	1285.00	40.00	70.04
1236.00	63.00	70.98	1286.00	39.00	70.01
1237.00	62.00	70.97	1287.00	39.00	69.98
1238.00	62.00	70.96	1288.00	39.00	69.94
1239.00	61.00	70.95	1289.00	39.00	69.91
1240.00	61.00	70.94	1290.00	38.00	69.88
1241.00	60.00	70.93	1291.00	38.00	69.85
1242.00	60.00	70.92	1292.00	38.00	69.81
1243.00	59.00	70.91	1293.00	38.00	69.78
1244.00	59.00	70.89	1294.00	37.00	69.75
1245.00	58.00	70.88	1295.00	37.00	69.71
1246.00	58.00	70.87	1296.00	37.00	69.68
1247.00	58.00	70.85	1297.00	37.00	69.65
1248.00	57.00	70.84	1298.00	37.00	69.61
1249.00	57.00	70.83	1299.00	37.00	69.58
1250.00	57.00	70.81	1300.00	37.00	69.55
1251.00	57.00	70.80	1310.00	30.00	69.18
1252.00	56.00	70.78	1320.00	25.00	68.75
1253.00	56.00	70.77	1330.00	22.00	68.28
1254.00	56.00	70.75	1340.00	21.00	67.80
1255.00	56.00	70.74	1350.00	15.00	67.29
1256.00	56.00	70.72	1360.00	11.00	66.73
1257.00	56.00	70.71	1370.00	9.00	66.15
1258.00	55.00	70.69	1380.00	8.00	65.56
1259.00	55.00	70.68	1390.00	8.00	64.97
1260.00	55.00	70.66	1400.00	7.00	64.38
1261.00	55.00	70.64	1420.00	5.00	63.19
1262.00	54.00	70.63	1440.00	4.00	61.99

1163.00	389.00	67.23	1213.00	80.00	70.99
1164.00	366.00	67.55	1214.00	79.00	71.00

1263.00	53.00	70.61	1460.00	3.00	60.79
1264.00	53.00	70.59	1500.00	2.00	56.07

WESTRIDGE - BASIN I - DEVELOPED CONDITION STORM DAY 4

LOCATION		SUBAREA AREA	SUBAREA Q	TOTAL AREA	TOTAL Q	CONV TYPE	CONV LNGTH	CONV SLOPE	CONV SIZE	CONV Z	CONTROL Q	SOIL NAME	TC	RAIN ZONE	PCT IMPV
93004	1B	19.	71.	19.	71.	1	1000.	0.07000	0.00	0.00	0.	97	7	L50	0.10
93004	2B	24.	98.	43.	139.	1	1150.	0.06500	0.00	0.00	0.	97	6	L50	0.10
93004	3B	26.	97.	69.	197.	1	1050.	0.04800	0.00	0.00	0.	97	7	L50	0.10
93004	4B	32.	101.	101.	260.	0	0.	0.00000	0.00	0.00	0.	97	9	L50	0.10
93004	5C	14.	57.	14.	57.	0	0.	0.00000	0.00	0.00	0.	97	6	L50	0.10

****

CONFLUENCE Q'S

93004 6B TB 1159 QB 260. QBC 272. QC 13. 93004 6C TC 1154 QC 57. QCB 252. QB 194.

93004 6BC TBC 1157 QBC 284. QB 247. QC 37.

****

LOCATION		SUBAREA AREA	SUBAREA Q	TOTAL AREA	TOTAL Q	CONV TYPE	CONV LNGTH	CONV SLOPE	CONV SIZE	CONV Z	CONTROL Q	SOIL NAME	TC	RAIN ZONE	PCT IMPV
93004	6BC	14.	57.	115.	284.	2	1700.	0.03200	0.00	0.00	0.	97	0	L50	0.00
93004	7B	34.	105.	149.	363.	0	0.	0.00000	0.00	0.00	0.	98	11	L50	0.10
93004	8D	17.	70.	17.	70.	0	0.	0.00000	0.00	0.00	0.	98	7	L50	0.10
93004	9D	0.	0.	17.	70.	0	0.	0.00000	0.00	0.00	0.	98	99	L50	0.00

****

CONFLUENCE Q'S

93004 10B TB 1159 QB 363. QBD 388. QD 25. 93004 10D TD 1154 QD 70. QDB 329. QB 259.

93004 10BD TBD 1158 QBD 398. QB 353. QD 45.

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LOCATION		SUBAREA AREA	SUBAREA Q	TOTAL AREA	TOTAL Q	CONV TYPE	CONV LNGTH	CONV SLOPE	CONV SIZE	CONV Z	CONTROL Q	SOIL NAME	TC	RAIN ZONE	PCT IMPV
93004	10BD	17.	70.	166.	398.	2	1400.	0.03900	0.00	0.00	0.	98	0	L50	0.00
93004	11B	32.	132.	198.	454.	4	1400.	0.05000	4.50	0.00	0.	98	7	L50	0.10
93004	12C	5.	26.	5.	26.	4	900.	0.03500	2.00	0.00	0.	98	5	L50	0.42
93004	13C	20.	86.	25.	109.	4	700.	0.03500	3.00	0.00	0.	98	7	L50	0.42
93004	14C	5.	26.	30.	131.	0	0.	0.00000	0.00	0.00	0.	98	5	L50	0.42
93004	15BC	30.	131.	228.	537.	4	900.	0.07000	4.50	0.00	0.	98	0	L50	0.00
93004	16B	6.	31.	234.	542.	4	650.	0.07500	4.50	0.00	0.	98	5	L50	0.42
93004	17D	29.	140.	29.	140.	2	2300.	0.03300	0.00	0.00	0.	98	6	L50	0.60
93004	18D	40.	132.	69.	229.	0	0.	0.00000	0.00	0.00	0.	98	10	L50	0.10

****

CONFLUENCE Q'S

93004 19B TB 1159 QB 540. QBD 764. QD 225. 93004 19D TD 1158 QD 229. QDB 768. QB 539.

93004 19BD TBD 1158 QBD 768. QB 539. QD 229.

****

LOCATION		SUBAREA AREA	SUBAREA Q	TOTAL AREA	TOTAL Q	CONV TYPE	CONV LNGTH	CONV SLOPE	CONV SIZE	CONV Z	CONTROL Q	SOIL NAME	TC	RAIN ZONE	PCT IMPV
93004	19BD	69.	229.	303.	768.	0	0.	0.00000	0.00	0.00	0.	98	0	L50	0.00

11B

$Q_B = 454/198 = 2.29 \rightarrow I = 2.8$, $K = 0.610$

$Q_B = 198(2.8)(1-0.610) + 0.610(454) = 493$ CFS

ADD 39 CFS TO ALL DOWNSTREAM

Q_{BB} = N/A DEBRIS BASIN

D.V. = 34 CY/AC (198 AC) = 6,732 CY

18D 50% GOLF COURSE

$Q_B = 1.08(132)\,20/40 + 1.0(132)\,20/40 = 137$ CFS

ADD 5 CFS TO ALL DOWNSTREAM

$Q_{BB} = 1.36(71\text{ CFS}) + 66\text{ CFS} = 163$ CFS

ADD 26 CFS TO ALL DOWNSTREAM

D.V. = 20 AC (55 CY/AC) = 1100 CY

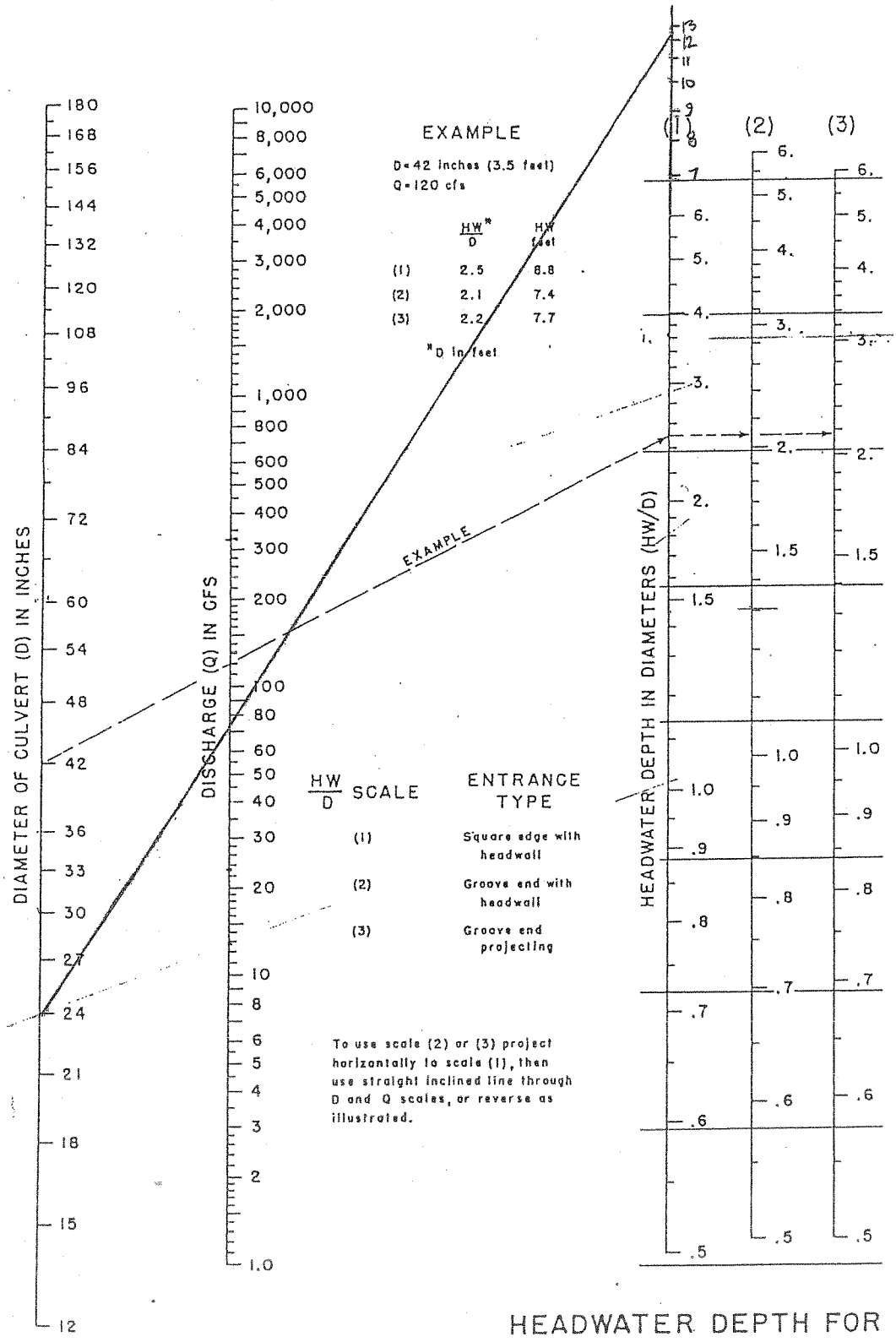
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT
MODIFIED RATIONAL METHOD HYDROLOGY

HYDROGRAPH AT POINT 11B

HYDROGRAPH AT 93004 11B STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	0.	100	2.	200	3.	300	6.	400	9.
500	13.	600	23.	700	34.	800	49.	900	62.
1000	76.	1050	96.	1100	100.	1110	102.	1120	111.
1130	124.	1131	126.	1132	128.	1133	130.	1134	132.
1135	135.	1136	138.	1137	141.	1138	144.	1139	147.
1140	150.	1141	155.	1142	159.	1143	163.	1144	168.
1145	172.	1146	177.	1147	183.	1148	190.	1149	202.
1150	218.	1151	248.	1152	300.	1153	339.	1154	379.
1155	412.	1156	435.	1157	453.	1158	454.	1159	432.
1160	422.	1161	413.	1162	403.	1163	389.	1164	366.
1165	336.	1166	308.	1167	284.	1168	264.	1169	247.
1170	232.	1171	219.	1172	206.	1173	195.	1174	185.
1175	175.	1176	167.	1177	158.	1178	151.	1179	145.
1180	139.	1181	133.	1182	128.	1183	124.	1184	120.
1185	117.	1186	114.	1187	111.	1188	108.	1189	106.
1190	105.	1191	103.	1192	101.	1193	99.	1194	98.
1195	96.	1196	94.	1197	93.	1198	92.	1199	91.
1200	90.	1201	89.	1202	88.	1203	87.	1204	86.
1205	85.	1206	84.	1207	84.	1208	83.	1209	83.
1210	82.	1211	82.	1212	81.	1213	80.	1214	79.
1215	78.	1216	77.	1217	76.	1218	75.	1219	74.
1220	73.	1221	72.	1222	72.	1223	71.	1224	70.
1225	69.	1226	69.	1227	68.	1228	68.	1229	67.
1230	67.	1231	66.	1232	66.	1233	65.	1234	65.
1235	64.	1236	63.	1237	62.	1238	62.	1239	61.
1240	61.	1241	60.	1242	60.	1243	59.	1244	59.
1245	58.	1246	58.	1247	58.	1248	57.	1249	57.
1250	57.	1251	57.	1252	56.	1253	56.	1254	56.
1255	56.	1256	56.	1257	56.	1258	55.	1259	55.
1260	55.	1261	55.	1262	54.	1263	53.	1264	53.
1265	52.	1266	51.	1267	50.	1268	49.	1269	48.
1270	47.	1271	47.	1272	46.	1273	45.	1274	44.
1275	44.	1276	43.	1277	43.	1278	42.	1279	42.
1280	41.	1281	41.	1282	41.	1283	40.	1284	40.
1285	40.	1286	39.	1287	39.	1288	39.	1289	39.
1290	38.	1291	38.	1292	38.	1293	38.	1294	37.
1295	37.	1296	37.	1297	37.	1298	37.	1299	37.
1300	37.	1310	30.	1320	25.	1330	22.	1340	21.
1350	15.	1360	11.	1370	9.	1380	8.	1390	8.
1400	7.	1420	5.	1440	4.	1460	3.	1500	2.

Total Runoff = 80.487 Acre-Ft.
Peak Q = 454 CFS + 39 CFS BURN = 493 CFS
Time to Peak Q = 1158 Minutes



HEADWATER DEPTH FOR CONCRETE PIPE CULVERTS WITH INLET CONTROL

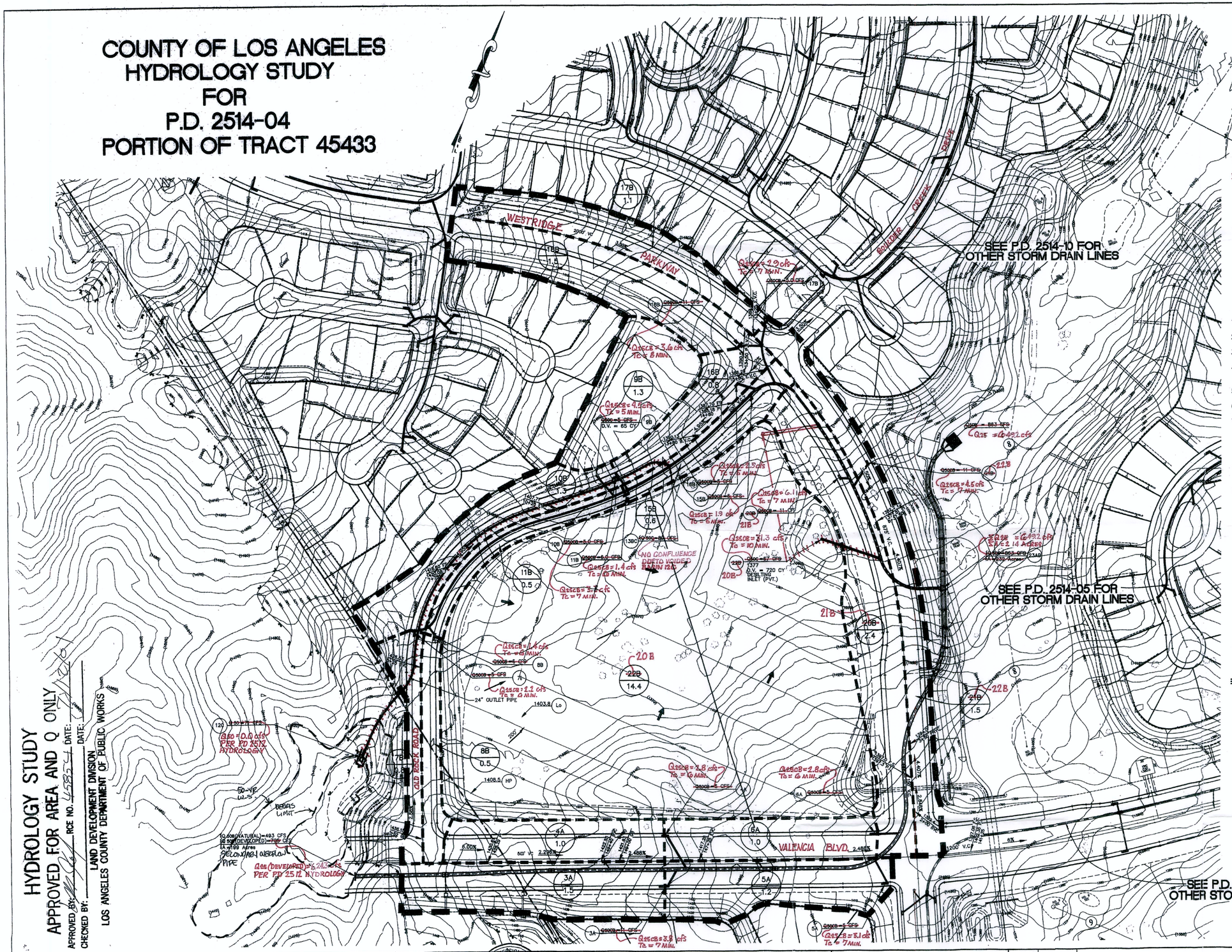
BUREAU OF PUBLIC ROADS JAN. 1963

$H_W = 1420.25 - 1395.00 = 25.25'$

$D = 24''$

$H_W/D = 25.25'/2.0' = 12.6 \longrightarrow Q = 71$ CFS

COUNTY OF LOS ANGELES
HYDROLOGY STUDY
FOR
P.D. 2514-04
PORTION OF TRACT 45433



UPDATED HYDROLOGIC DESIGN CRITERIA

STORM EVENT 50 YR - SUMP LOCATIONS
25YR - NON SUMP LOCATIONS
50 YR. - 24 HR. RAINFALL ISOHYET 6.5
SOIL TYPE 02B
DEBRIS PRODUCTION AREA DPA B
DEBRIS VOLUME 50 c.y./ACRE

DESIGN CRITERIA:

~~STORM EVENT~~	~~50 YR.~~
~~RAINFALL ZONE~~	~~4~~
~~SOIL TYPE~~	~~09B~~
~~DEBRIS PRODUCTION AREA~~	~~DPA B~~

LEGAL DESCRIPTION

A PORTION OF THE RANCHO SAN FRANCISCO AS SHOWN ON MAP RECORDED IN BOOK 1, PAGES 521 AND 522 OF PATENTS, IN THE CITY OF SANTA CLARITA IN THE RECORDS OF LOS ANGELES COUNTY, STATE OF CALIFORNIA.

NOTES:

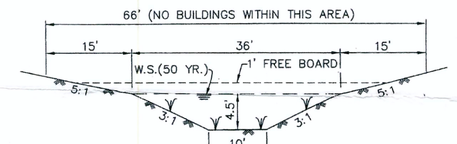
1. COMPLY WITH ALL STREET DRAINAGE REQUIREMENTS TO THE SATISFACTION OF THE CITY OF SANTA CLARITA.
2. DEDICATE THE NECESSARY EASEMENTS FOR THE STORM DRAIN SYSTEM TO THE SATISFACTION OF THE CITY OF SANTA CLARITA.
3. PROVIDE VEHICULAR ACCESS TO ALL INLETS AND OUTLETS TO THE SATISFACTION OF THE CITY OF SANTA CLARITA.
4. APPROVAL OF THE DRAINAGE CONCEPT DOES NOT CONSTITUTE DETERMINATION THAT THE OFFSITE IMPROVEMENTS ARE REQUIRED WITHIN THE MEANING OF GOVERNMENT CODE SECTION 66462.5.
5. AN OFFSITE DRAINAGE COVENANT FOR ACCEPTANCE OF DRAINAGE (AND DRAINAGE FACILITIES) MAY BE REQUIRED.
6. PLACE A NOTE OF FLOOD HAZARD AND SHOW THE NATURAL DRAINAGE COURSES ON THE FINAL MAP.
7. AN EASEMENT TO THE CITY OF SANTA CLARITA TO BE GRANTED ON THE FINAL MAP FOR STORM DRAIN INGRESS AND EGRESS AND MAINTENANCE OVER ALL PRIVATE STREETS.

NOTES:

1. MAINTENANCE AGREEMENT AND INDEMNIFICATION DOCUMENTS FOR SURFACE DRAINAGE ACROSS GOLF COURSE TO BE PROVIDED TO LACDPW PRIOR TO PUBLIC STORM DRAIN TRANSFER FOR MAINTENANCE.
2. FLOOD HAZARD RESTRICTION EASEMENT TO BE GRANTED TO LACDPW PER FINAL MAP.

LEGEND

——— ———	PRIMARY BASIN LIMITS
- - - - -	SUB-AREA BASIN LIMITS
Tc	TIME OF CONCENTRATION (MIN.)
A	SUB-AREA IN ACRES
Q25	25 YR. FREQUENCY FLOWRATE
Q50	50 YR. FREQUENCY FLOWRATE
Q50B	50 YR. BURNED FREQUENCY FLOWRATE
Q50BB	50 YR. BURNED AND BULKED FREQUENCY FLOWRATE
QCB	Q CATCH BASIN
(HP)	HIGH POINT ELEVATION OF SUB-AREA
(Lo)	ELEVATION AT OVERLAND LOCATION
ΣAo DEVELOPED AREA	SUMMATION OF AREA IN ACRES
ΣQe EXISTING AREA	SUMMATION OF FLOW IN CUBIC FEET PER SEC.
3A / 5.5	DRAINAGE AREA DESIGNATION / DRAINAGE AREA IN ACRES
═══	STORM DRAIN LINE
D.V.	DEBRIS VOLUME (C.Y.)
*	PUBLIC OR PRIVATE STUB. SIZE AND MAINTENANCE RESPONSIBILITY TO BE DETERMINED BY CITY DURING FINE GRADING PLAN PROCESSING.
→	FLOW DIRECTION
➡	SHEET FLOW DIRECTION



SECTION "A-A"
EARTHEN CHANNEL
WITHIN GOLF COURSE (HOLES 7-8)
NOT TO SCALE

VICINITY MAP
NO SCALE

HYDROLOGY STUDY APPROVED FOR AREA AND Q ONLY
APPROVED BY: _____ RCE NO. 45433 DATE: 7/12/01
CHECKED BY: _____ DATE:
LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS
LAND DEVELOPMENT DIVISION

ALLIANCE
LAND PLANNING & ENGINEERING INC.
5962 LAPLACE COURT
SUITE 130
CARLSBAD, CA 92008
TEL: (760) 431-9896
CIVIL ENGINEERING • LAND PLANNING • HILLSIDE DESIGN • SURVEYING

PLANS PREPARED BY:
ALLIANCE LAND PLANNING & ENGINEERING INC.
5962 LAPLACE COURT, SUITE 130
(760) 431-9896

PLANS PREPARED UNDER THE DIRECTION OF:
CRAIG M. WHITTEKER R.C.E. 51929 — DATE 5-20-01

REGISTERED PROFESSIONAL ENGINEER CRAIG M. WHITTEKER No. 51929 Exp 6-30-02 CIVIL STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER CRAIG M. WHITTEKER NO. 51929 EXP 6-30-02 CIVIL STATE OF CALIFORNIA

PLANS PREPARED FOR:
VALENCIA COMPANY
23823 VALENCIA BOULEVARD
VALENCIA, CA 91355
(805)255-4000

NO.	DATE		BY	APPR

SHEET 1 | COUNTY OF LOS ANGELES | 1 SHEETS

HYDROLOGY STUDY
FOR
P.D. 2514-04
TRACT 45433

JUL 12 2001

PLAN PREPARATION DATE:

P.D. 2514-04 - HYDROLOGY STUDY

HYDROLOGICAL ANALYSIS

FOR

WESTRIDGE AT VALENCIA
TRACT 45433
PD 2514-10

HYDROLOGY CALCULATIONS – FLOW REDUCTION

JOB NO. 93004

PREPARED FOR:
NEWHALL LAND
25124 SPRINGFIELD COURT. SUITE 300
VALENCIA, CA 91355
(661) 255-4000

PREPARED BY:
ALLIANCE LAND PLANNING AND ENGINEERING
2248 FARADAY AVENUE
CARLSBAD, CA 92008
(760) 431-9896

FEBRUARY 2010

Program Package Serial Number: 2084
04/21/10 FILE: 4E10-A INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 1
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

Version 11, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\lasoilx.dat

WESTRIDGE PD 2514-10 BASIN A DEV. CONDITION - FLOW REDUCTION

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
3004	1A	1.0	3.07	1.0	3.07	4	62.	.05400	2.00	.00	0.	98	5	A29	.70
3004	2A	1.4	3.89	2.4	6.90	4	184.	.02804	2.00	.00	0.	98	6	A29	.70
3004	3A	1.0	3.07	3.4	9.60	4	32.	.02260	3.00	.00	0.	98	5	A29	.70
3004	4A	2.6	7.22	6.0	16.74	4	40.	.02260	3.00	.00	0.	98	6	A29	.70
3004	5A	.0	.00	6.0	16.74	4	1.	.01000	2.00	.00	0.	98	99	A29	.00
3004	6A	1.0	2.78	7.0	19.51	4	164.	.02260	3.00	.00	0.	98	6	A29	.70
3004	7A	.0	.00	7.0	19.47	4	1.	.01000	2.00	.00	0.	98	99	A29	.00
3004	8B	1.7	4.72	1.7	4.72	4	28.	.12320	2.00	.00	0.	98	6	A29	.70
3004	9B	.6	1.84	2.3	6.54	4	212.	.04790	2.00	.00	0.	98	5	A29	.70
3004	10B	.7	2.15	3.0	8.36	4	15.	.04790	2.00	.00	0.	98	5	A29	.70
3004	11B	1.7	4.72	4.7	13.04	4	45.	.07370	2.00	.00	0.	98	6	A29	.70
3004	12B	1.1	3.05	5.8	16.08	4	1.	.03820	2.50	.00	0.	98	6	A29	.70
3004	13B	1.3	3.61	7.1	19.69	4	1.	.03820	2.50	.00	0.	98	6	A29	.70
3004	14B	1.8	4.97	8.9	24.66	4	1.	.03820	2.50	.00	0.	98	6	A29	.60
3004	15B	.0	.00	8.9	24.66	4	1.	.01000	2.25	.00	0.	98	99	A29	.00
3004	16B	1.4	3.89	10.3	28.55	4	160.	.03820	2.50	.00	0.	98	6	A29	.70
3004	17B	.3	.93	10.6	29.36	4	23.	.03820	2.50	.00	0.	98	5	A29	.90
3004	18B	.3	.93	10.9	30.17	4	77.	.03820	2.50	.00	0.	98	5	A29	.90

CONFLUENCE Q'S

3004 19A TA 1154 QA 19.47 QAB 49.59 QB 30.12 3004 19B TB 1154 QB 30.12 QBA 49.59 QA 19.47
3004 19AB TAB 1154 QAB 49.59 QA 19.47 QB 30.12

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
3004	19AB	10.9	30.12	17.9	49.59	4	396.	.01260	3.50	.00	0.	98	0	A29	.00
3004	20A	1.2	3.37	19.1	51.34	4	1.	.03450	3.50	.00	0.	98	6	A29	.90
3004	21A	.9	2.78	20.0	53.43	4	101.	.03450	3.50	.00	0.	98	5	A29	.80
3004	22A	1.7	5.20	21.7	57.27	4	152.	.03450	3.50	.00	0.	98	5	A29	.60
3004	23A	.4	1.19	22.1	58.11	4	137.	.03450	3.50	.00	0.	98	5	A29	.10
3004	24A	.0	.00	22.1	58.03	4	1.	.01000	3.00	.00	0.	98	99	A29	.00
3004	25A	1.1	3.42	23.2	60.60	4	1.	.05320	3.50	.00	0.	98	5	A29	.90
3004	26A	.7	2.14	23.9	62.19	4	31.	.05320	3.50	.00	0.	98	5	A29	.60
3004	27A	.6	1.79	24.5	63.47	4	244.	.05590	3.50	.00	0.	98	5	A29	.10
3004	28A	.5	1.55	25.0	64.53	4	27.	.05590	3.50	.00	0.	98	5	A29	.80
3004	29A	.8	2.47	25.8	66.36	4	1.	.25620	3.50	.00	0.	98	5	A29	.80
3004	30A	2.9	8.69	28.7	72.76	4	214.	.25620	3.50	.00	0.	98	5	A29	.20

PD 2514-10 Basin A

Subarea	Area (Ac)	%imp	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in)	Tc-calculated (min)	Intensity (in/hr)	Cu	Cd
1A	1.0	0.70	98	350	0.020	5.71	5	3.41	0.85	0.89
2A	1.4	0.70	98	400	0.020	5.71	6	3.13	0.84	0.88
3A	1.0	0.70	98	380	0.023	5.71	5	3.41	0.85	0.89
4A	2.6	0.70	98	460	0.023	5.71	6	3.13	0.84	0.88
6A	1.0	0.70	98	420	0.025	5.71	6	3.13	0.84	0.88
8B	1.7	0.70	98	450	0.020	5.71	6	3.13	0.84	0.88
9B	0.6	0.70	98	300	0.030	5.71	5	3.41	0.85	0.89
10B	0.7	0.70	98	280	0.055	5.71	5	3.41	0.85	0.89
11B	1.7	0.70	98	520	0.035	5.71	6	3.13	0.84	0.88
12B	1.1	0.70	98	470	0.020	5.71	6	3.13	0.84	0.88
13B	1.3	0.70	98	450	0.020	5.71	6	3.13	0.84	0.88
14B	1.8	0.60	98	500	0.020	5.71	6	3.13	0.84	0.88
16B	1.4	0.70	98	470	0.020	5.71	6	3.13	0.84	0.88
17B	0.3	0.90	98	170	0.055	5.71	5	3.41	0.85	0.90
18B	0.3	0.90	98	170	0.055	5.71	5	3.41	0.85	0.90
20A	1.2	0.90	98	620	0.045	5.71	6	3.13	0.84	0.89
21A	0.9	0.80	98	440	0.045	5.71	5	3.41	0.85	0.89
22A	1.7	0.60	98	360	0.020	5.71	5	3.41	0.85	0.88
23A	0.4	0.10	98	240	0.015	5.71	5	3.41	0.85	0.86
25A	1.1	0.90	98	340	0.080	5.71	5	3.41	0.85	0.90
26A	0.7	0.60	98	390	0.080	5.71	5	3.41	0.85	0.88
27A	0.6	0.10	98	160	0.020	5.71	5	3.41	0.85	0.86
28A	0.5	0.80	98	530	0.080	5.71	5	3.41	0.85	0.89
29A	0.8	0.80	98	460	0.080	5.71	5	3.41	0.85	0.89
30A	2.9	0.20	98	500	0.174	5.71	5	3.41	0.85	0.86

```
 Program Package Serial Number:  2084
04/22/10    FILE: 4E10-B    INPUT DATA: English Units  RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units      PAGE 1
                                LOS ANGELES COUNTY FLOOD CONTROL DISTRICT                          PROG F0601M

   Version 11, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50  SOIL DATA FILE: C:\civild\lasoilx.dat

   WESTRIDGE PD 2514-10 BASIN B DEV. CONDITION - FLOW REDUCTION                                                    STORM DAY 4
                SUBAREA   SUBAREA     TOTAL    TOTAL  CONV    CONV       CONV      CONV      CONV  CONTROL SOIL       RAIN  PCT
   LOCATION     AREA(AC)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft)  SLOPE     SIZE(Ft)  Z     Q(CFS)  NAME  TC  ZONE  IMPV
   3004   1A      1.0      3.09        1.0      3.09    4       51.   .07193      2.00     .00       0.    98    5   A29   .80
   3004   2A      1.0      2.78        2.0      5.82    4       62.   .01390      2.00     .00       0.    98    6   A29   .70
   3004   3A       .7      2.15        2.7      7.83    4        1.   .01410      2.00     .00       0.    98    5   A29   .70
   3004   4A       .8      2.46        3.5     10.29    4      171.   .01410      2.00     .00       0.    98    5   A29   .70
   3004   5A       .6      1.84        4.1     11.60    4       53.   .04371      2.00     .00       0.    98    5   A29   .70
   3004   6A       .9      2.77        5.0     14.11    4        1.   .05830      2.00     .00       0.    98    5   A29   .70
   3004   7A       .8      2.46        5.8     16.56    4        1.   .05830      2.00     .00       0.    98    5   A29   .70
   3004   8A       .8      2.22        6.6     18.78    4      221.   .05830      2.00     .00       0.    98    6   A29   .70
   3004   9A       .2       .62        6.8     19.05    4       14.   .05830      2.00     .00       0.    98    5   A29   .90
   3004   10A      .2       .62        7.0     19.59    4      261.   .05190      2.00     .00       0.    98    5   A29   .90
   3004   11A      .0       .00        7.0     19.47    4        1.   .01000      2.00     .00       0.    98   99   A29   .00
   3004   12A      .9      2.77        7.9     21.91    4       52.   .11150      2.00     .00       0.    98    5   A29   .70
   3004   13A      .0       .00        7.9     21.88    4        1.   .01000      2.00     .00       0.    98   99   A29   .00
   3004   14B     1.4      4.28        1.4      4.28    4       34.   .13062      2.00     .00       0.    98    5   A29   .60
   3004   15B     1.0      3.07        2.4      7.32    4      256.   .01900      2.00     .00       0.    98    5   A29   .70
   3004   16B      .9      2.77        3.3      9.42    4        1.   .01717      2.00     .00       0.    98    5   A29   .70
   3004   17B      .9      2.77        4.2     12.18    4      280.   .01717      2.00     .00       0.    98    5   A29   .70
   3004   18B      .9      2.50        5.1     14.37    4        1.   .03500      3.00     .00       0.    98    6   A29   .70
   3004   19B      .8      2.46        5.9     16.54    4       45.   .03500      3.00     .00       0.    98    5   A29   .70
   3004   20B      .0       .00        5.9     16.52    4        1.   .01000      2.00     .00       0.    98   99   A29   .00
*****************************************************************************************************************************
*                                                        CONFLUENCE Q'S                                                       *
*   3004   21A  TA 1154 QA    21.88 QAB    38.39 QB     16.52     3004   21B  TB 1154 QB    16.52 QBA    38.39 QA    21.88   *
*                              3004   21AB TAB 1154 QAB    38.39 QA    21.88 QB    16.52                                    *
*****************************************************************************************************************************
                SUBAREA   SUBAREA     TOTAL    TOTAL  CONV    CONV       CONV      CONV      CONV  CONTROL SOIL       RAIN  PCT
   LOCATION     AREA(AC)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft)  SLOPE     SIZE(Ft)  Z     Q(CFS)  NAME  TC  ZONE  IMPV
   3004   21AB    5.9     16.52       13.8     38.39    4      248.   .02960      3.00     .00       0.    98    0   A29   .00
   3004   22A     1.9      5.27       15.7     42.93    4       18.   .02710      3.50     .00       0.    98    6   A29   .70
   3004   23A      .9      2.77       16.6     45.31    4       53.   .02710      3.50     .00       0.    98    5   A29   .70
   3004   24A      .8      2.46       17.4     47.33    4        1.   .02710      3.50     .00       0.    98    5   A29   .70
   3004   25A      .6      1.84       18.0     48.95    4      314.   .02710      3.50     .00       0.    98    5   A29   .70
   3004   26A      .0       .00       18.0     48.20    4        1.   .01000      2.75     .00       0.    98   99   A29   .00
   3004   27A      .9      2.77       18.9     50.27    4        1.   .03120      3.50     .00       0.    98    5   A29   .70
   3004   28A      .9      2.77       19.8     52.34    4      167.   .03120      3.50     .00       0.    98    5   A29   .70
   3004   29A      .3       .92       20.1     53.02    4      140.   .03120      3.50     .00       0.    98    5   A29   .70
   3004   30A     1.0      3.07       21.1     55.23    4      174.   .01970      3.50     .00       0.    98    5   A29   .70
   3004   31A     1.0      2.78       22.1     57.38    4       41.   .01730      3.50     .00       0.    98    6   A29   .70
   3004   32A      .9      2.77       23.0     59.36    4      165.   .03020      3.50     .00       0.    98    5   A29   .70
   3004   33A     1.1      3.07       24.1     61.65    4      135.   .05176      3.50     .00       0.    98    6   A29   .80
   3004   34A     2.5      8.75       26.6     67.85    4      214.   .18480      4.00     .00       0.    98    5   A33   .60
   3004   35A     1.2      3.08       27.8     70.63    4       44.   .03000      4.00     .00       0.    98    7   A29   .70
   3004   36C     1.0      3.07        1.0      3.07    4       41.   .18000      2.00     .00       0.    98    5   A29   .70
   3004   37C      .5      1.54        1.5      4.58    4        1.   .09270      2.00     .00       0.    98    5   A29   .70
   3004   38C      .4      1.24        1.9      5.82    4      210.   .09270      2.00     .00       0.    98    5   A29   .80
   3004   39C      .7      2.15        2.6      7.72    4       13.   .06600      2.00     .00       0.    98    5   A29   .70
```

Program Package Serial Number: 2084
04/22/10 FILE: 4E10-B INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 2
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

Version 11, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\lasoilx.dat

WESTRIDGE PD 2514-10 BASIN B DEV. CONDITION - FLOW REDUCTION STORM DAY 4

LOCATION		SUBAREA AREA(AC)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
3004	40C	.5	1.55	3.1	9.24	4	166.	.06600	2.00	.00	0.	98	5	A29	.80
3004	41C	.5	1.53	3.6	10.45	4	1.	.04350	2.00	.00	0.	98	5	A29	.60
3004	42A	.0	.00	27.8	70.46	4	1.	.01000	2.00	.00	0.	98	99	A29	.00
3004	43C	.4	1.23	4.0	11.68	4	92.	.04350	2.00	.00	0.	98	5	A29	.70

****

* CONFLUENCE Q'S *

* 3004 44A TA 1155 QA 70.46 QAC 80.67 QC 10.21 3004 44C TC 1154 QC 11.55 QCA 79.10 QA 67.55 *

* 3004 44AC TAC 1155 QAC 80.67 QA 70.46 QC 10.21 *

****

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
3004	44AC	4.0	11.55	31.8	80.67	4	60.	.05020	4.00	.00	0.	98	0	A29	.00
3004	45A	1.4	4.90	33.2	84.27	4	305.	.16738	4.00	.00	0.	98	5	A33	.60

PD 2514-10 BASIN B

Subarea	Area (Ac)	%imp	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in)	Tc-calculated (min)	Intensity (in/hr)	Cu	Cd
1C	1.0	0.80	98	350	0.013	5.71	5	3.41	0.85	0.89
2C	1.0	0.70	98	400	0.013	5.71	6	3.13	0.84	0.88
3C	0.7	0.70	98	240	0.020	5.71	5	3.41	0.85	0.89
4C	0.8	0.70	98	390	0.020	5.71	5	3.41	0.85	0.89
5C	0.6	0.70	98	270	0.013	5.71	5	3.41	0.85	0.89
6C	0.9	0.70	98	320	0.020	5.71	5	3.41	0.85	0.89
7C	0.8	0.70	98	230	0.020	5.71	5	3.41	0.85	0.89
8C	0.8	0.70	98	420	0.013	5.71	6	3.13	0.84	0.88
9C	0.2	0.90	98	210	0.023	5.71	5	3.41	0.85	0.90
10C	0.2	0.90	98	210	0.023	5.71	5	3.41	0.85	0.90
12C	0.9	0.70	98	390	0.080	5.71	5	3.41	0.85	0.89
14D	1.4	0.60	98	410	0.024	5.71	5	3.41	0.85	0.88
15D	1.0	0.70	98	310	0.024	5.71	5	3.41	0.85	0.89
16D	0.9	0.70	98	390	0.024	5.71	5	3.41	0.85	0.89
17D	0.9	0.70	98	350	0.024	5.71	5	3.41	0.85	0.89
18D	0.9	0.70	98	470	0.024	5.71	6	3.13	0.84	0.88
19D	0.8	0.70	98	400	0.024	5.71	5	3.41	0.85	0.89
22C	1.9	0.70	98	660	0.080	5.71	6	3.13	0.84	0.88
23C	0.9	0.70	98	370	0.080	5.71	5	3.41	0.85	0.89
24C	0.8	0.70	98	220	0.020	5.71	5	3.41	0.85	0.89
25C	0.6	0.70	98	220	0.020	5.71	5	3.41	0.85	0.89
27C	0.9	0.70	98	360	0.025	5.71	5	3.41	0.85	0.89
28C	0.9	0.70	98	350	0.025	5.71	5	3.41	0.85	0.89
29C	0.3	0.70	98	280	0.023	5.71	5	3.41	0.85	0.89
30C	1.0	0.70	98	400	0.022	5.71	5	3.41	0.85	0.89
31C	1.0	0.70	98	410	0.022	5.71	6	3.13	0.84	0.88
32C	0.9	0.70	98	390	0.022	5.71	5	3.41	0.85	0.89
33C	1.1	0.80	98	420	0.022	5.71	6	3.13	0.84	0.89
34C	2.5	0.60	98	340	0.020	6.5	5	3.88	0.86	0.88

PD 2514-10 Basin B - CONT.

Subarea	Area (Ac)	%imp	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in)	Tc-calculated (min)	Intensity (in/hr)	Cu	Cd
35C	1.2	0.80	98	580	0.020	5.71	7	2.91	0.83	0.89
36E	1.0	0.70	98	330	0.030	5.71	5	3.41	0.85	0.89
37E	0.5	0.70	98	270	0.100	5.71	5	3.41	0.85	0.89
38E	0.4	0.80	98	330	0.080	5.71	5	3.41	0.85	0.89
39E	0.7	0.70	98	360	0.100	5.71	5	3.41	0.85	0.89
40E	0.5	0.80	98	300	0.100	5.71	5	3.41	0.85	0.89
41E	0.5	0.60	98	300	0.050	5.71	5	3.41	0.85	0.88
43E	0.4	0.70	98	250	0.050	5.71	5	3.41	0.85	0.89
45C	1.4	0.60	98	240	0.020	6.5	5	3.88	0.86	0.88

DEPARTMENT OF PUBLIC WORKS
LAND DEVELOPMENT DIVISION
SUBDIVISION PLAN CHECKING SECTION - DRAINAGE UNIT

TO: Alliance Land Planning and Engineering

DATE 11/04/2000

Attention Craig Whitteker

REVIEW OF HYDROLOGY STUDY

PD NO. 2514-10
TR NO. 45433
SUBMITTAL DATE 09/25/2000

We have reviewed your hydrology study/flood hazard calculations.

(X) The hydrology study has been approved for Area and Q only.

( ) The flood hazard calculations submitted with your hydrology study are approved.

( ) Refer to comments below:

COMMENTS:

REVIEWED BY: _____ DATE 11/4/00
MO KAJBAF - (626) 458-4921

8HYD REVISED HYDROLOGY STUDY
P:\LDPUB\SUBDIVSN\PLANCHK\2514-10-8HYDAPPR
11/06/2000

Hydrological Analysis

for

Westridge at Valencia
Tract 45433
PD 2514-10
Hydrology Calculations

Job No.93004

HYDROLOGY STUDY
APPROVED FOR AREA AND Q ONLY

APPROVED BY: [signature] RCE NO. 45954 DATE: 11/4/00

CHECKED BY: [signature] DATE: 11/3/00

LAND DEVELOPMENT DIVISION
LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

RECEIVED
SEP 25 2000
PROCESSING CENTER
LAND DEVELOPMENT

REGISTERED PROFESSIONAL ENGINEER
CRAIG M. WHITE
No. 51929
Exp. 6-30-02
CIVIL
STATE OF CALIFORNIA

Prepared for:
Valencia Company
23823 Valencia Blvd.
Valencia, CA 91355
(805) 255-4000

Prepared by:
Alliance Land Planning & Engineering, Inc.
5962 Laplace Court, Suite 130
Carlsbad, CA 92008
(760) 431- 9896

August 2000

HYDROLOGY DESIGN CRITERIA

- Storm Event = 50 years onsite, offsite and sump condition
- Rainfall Zone = L
- Soil Classification Area = 098
- Debris Potential Area = 8

Time of concentration calculated using County of Los Angeles "T_C" Software.

Flowrates calculated using modified rational method; County of Los Angeles "MORA" software.

WESTRIDGE - PD 2514-10 - BASIN A STORM DAY 4

LOCATION		SUBAREA AREA	SUBAREA Q	TOTAL AREA	TOTAL Q	CONV TYPE	CONV LNGTH	CONV SLOPE	CONV SIZE	CONV Z	CONTROL Q	SOIL NAME	TC	RAIN ZONE	PCT IMPV
93004	1A	1.	5.	1.	5.	4	40.	0.02000	2.00	0.00	0.	98	5	L50	0.70
93004	2A	1.	5.	2.	11.	4	290.	0.03000	2.00	0.00	0.	98	5	L50	0.70
93004	3A	1.	5.	3.	16.	4	40.	0.03000	2.00	0.00	0.	98	5	L50	0.70
93004	4A	3.	16.	6.	31.	4	50.	0.03000	2.00	0.00	0.	98	5	L50	0.70
93004	5A	0.	0.	6.	31.	4	1.	0.04000	2.00	0.00	0.	98	99	L50	0.70
93004	6A	1.	5.	7.	37.	4	180.	0.04000	2.00	0.00	0.	98	5	L50	0.70
93004	7B	0.	0.	0.	0.	4	1.	0.04000	0.00	0.00	0.	98	99	L50	0.70
93004	8B	2.	11.	2.	11.	4	30.	0.06000	2.00	0.00	0.	98	5	L50	0.70
93004	9B	1.	5.	3.	16.	4	210.	0.06000	2.00	0.00	0.	98	5	L50	0.70
93004	10B	1.	5.	4.	21.	4	15.	0.06000	2.00	0.00	0.	98	5	L50	0.70
93004	11B	2.	11.	6.	32.	4	40.	0.06000	2.00	0.00	0.	98	5	L50	0.70
93004	12B	1.	5.	7.	37.	4	50.	0.06000	2.00	0.00	0.	98	5	L50	0.70
93004	13B	1.	5.	8.	42.	4	30.	0.06000	2.00	0.00	0.	98	5	L50	0.70
93004	14B	2.	11.	10.	53.	4	40.	0.06000	2.00	0.00	0.	98	5	L50	0.60
93004	15B	0.	0.	10.	53.	4	1.	0.06000	2.00	0.00	0.	98	99	L50	0.70
93004	16B	2.	11.	12.	63.	4	150.	0.06000	2.25	0.00	0.	98	5	L50	0.70
93004	17B	1.	6.	13.	68.	4	20.	0.06000	2.25	0.00	0.	98	5	L50	0.90
93004	18B	1.	6.	14.	74.	4	90.	0.06000	2.25	0.00	0.	98	5	L50	0.90
93004	19B	0.	0.	14.	73.	4	1.	0.04000	2.50	0.00	0.	98	99	L50	0.70

CONFLUENCE Q'S

93004 20A TA 1154 QA 37. QAB 110. QB 73. 93004 20B TB 1154 QB 73. QBA 110. QA 37.

93004 20AB TAB 1154 QAB 110. QA 37. QB 73.

LOCATION		SUBAREA AREA	SUBAREA Q	TOTAL AREA	TOTAL Q	CONV TYPE	CONV LNGTH	CONV SLOPE	CONV SIZE	CONV Z	CONTROL Q	SOIL NAME	TC	RAIN ZONE	PCT IMPV
93004	20AB	14.	73.	21.	110.	4	290.	0.06000	2.75	0.00	0.	98	0	L50	0.00
93004	21A	1.	6.	22.	115.	4	10.	0.06000	2.75	0.00	0.	98	5	L50	0.90
93004	22A	1.	5.	23.	120.	4	140.	0.04000	3.00	0.00	0.	98	5	L50	0.80
93004	23A	2.	11.	25.	129.	4	150.	0.04000	3.00	0.00	0.	98	5	L50	0.60
93004	24A	1.	5.	26.	132.	4	140.	0.04000	3.00	0.00	0.	98	5	L50	0.10
93004	25A	1.	6.	27.	137.	4	10.	0.04000	3.00	0.00	0.	98	5	L50	0.90
93004	26A	1.	5.	28.	142.	4	40.	0.04000	3.00	0.00	0.	98	5	L50	0.80
93004	27A	1.	5.	29.	146.	4	370.	0.04000	3.25	0.00	0.	98	5	L50	0.60
93004	28A	1.	5.	30.	150.	4	10.	0.06000	3.00	0.00	0.	98	5	L50	0.80
93004	29A	1.	5.	31.	155.	4	250.	0.10000	2.75	0.00	0.	98	5	L50	0.80

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT
MODIFIED RATIONAL METHOD HYDROLOGY

HYDROGRAPH AT POINT 29A

HYDROGRAPH AT 93004 29A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	0.	100	2.	200	3.	300	4.	400	6.
500	7.	600	10.	700	12.	800	15.	900	17.
1000	20.	1050	24.	1100	23.	1110	24.	1120	27.
1130	30.	1131	30.	1132	31.	1133	31.	1134	32.
1135	33.	1136	34.	1137	35.	1138	36.	1139	37.
1140	38.	1141	39.	1142	40.	1143	41.	1144	42.
1145	43.	1146	44.	1147	45.	1148	47.	1149	51.
1150	57.	1151	70.	1152	95.	1153	124.	1154	147.
1155	155.	1156	148.	1157	124.	1158	92.	1159	65.
1160	48.	1161	38.	1162	33.	1163	31.	1164	30.
1165	29.	1166	28.	1167	28.	1168	27.	1169	27.
1170	27.	1171	27.	1172	27.	1173	26.	1174	25.
1175	24.	1176	24.	1177	23.	1178	23.	1179	23.
1180	22.	1181	22.	1182	22.	1183	22.	1184	22.
1185	22.	1186	22.	1187	22.	1188	22.	1189	22.
1190	22.	1191	22.	1192	22.	1193	22.	1194	21.
1195	21.	1196	20.	1197	20.	1198	20.	1199	20.
1200	20.	1201	20.	1202	20.	1203	20.	1204	20.
1205	20.	1206	20.	1207	20.	1208	20.	1209	20.
1210	20.	1211	20.	1212	19.	1213	19.	1214	19.
1215	18.	1216	18.	1217	17.	1218	17.	1219	17.
1220	17.	1221	17.	1222	17.	1223	17.	1224	17.
1225	17.	1226	17.	1227	17.	1228	17.	1229	17.
1230	17.	1231	17.	1232	17.	1233	17.	1234	16.
1235	16.	1236	16.	1237	16.	1238	15.	1239	15.
1240	15.	1241	15.	1242	15.	1243	15.	1244	15.
1245	15.	1246	15.	1247	15.	1248	15.	1249	15.
1250	15.	1251	15.	1252	15.	1253	15.	1254	15.
1255	15.	1256	15.	1257	15.	1258	15.	1259	15.
1260	15.	1261	15.	1262	15.	1263	15.	1264	14.
1265	14.	1266	13.	1267	13.	1268	12.	1269	12.
1270	12.	1271	12.	1272	12.	1273	12.	1274	12.
1275	12.	1276	12.	1277	12.	1278	12.	1279	12.
1280	12.	1281	12.	1282	12.	1283	12.	1284	12.
1285	12.	1286	12.	1287	12.	1288	12.	1289	12.
1290	12.	1291	12.	1292	12.	1293	12.	1294	12.
1295	12.	1296	12.	1297	12.	1298	12.	1299	12.
1300	12.	1310	10.	1320	8.	1330	9.	1340	8.
1350	6.	1360	4.	1370	4.	1380	4.	1390	4.
1400	4.	1420	3.	1440	2.	1460	2.	1500	2.

Total Runoff = 23.249 Acre-Ft.
Peak Q = 155 CFS
Time to Peak Q = 1155 Minutes

0.D Revised Q

$Q = 5.6 \cdot A$ $A = 1.7$ Ac.

$Q = 9.5$ cfs

more $Q = 11$ cfs for $A = 2$ Ac

subtract 1.5 cfs From All Downstream

'B Revised Q

$Q = 5.6 \cdot (0.6)$ $A = 0.6$ Ac

$Q = 3.5$ cfs

subtract 1.5 cfs From All Downstream

10B Revised Q

$Q = 5.6 \cdot (0.7)$ $A = 0.7$ Ac

$Q = 4.0$ cfs

subtract 1 cfs From All Downstrea

'1B Revised Q

$Q = 5.6 \cdot (1.7)$ $A = 1.7$ Ac

$Q = 9.5$ cfs

subtract 1.5 cfs From All Downstream

'B Revised Q

$Q = 5.6 \cdot (0.3)$ $A = 0.3$ Ac

$Q = 2$ cfs

subtract 4 cfs From All Downstream

18B Revised Q

$Q = 5.6 \cdot A$ $A = 0.3$ Ac.

$Q = 2.0$ cfs

more $Q = 6$ cfs for $A = 1$ Ac

subtract 4 cfs From All Downstream

3A Revised Q

$Q = 5.6 \cdot (1.7)$ $A = 1.7$ Ac

$Q = 9.5$ cfs

subtract 1.5 cfs From All Downstream

24A Revised Q

$Q = 5.6 \cdot (0.4)$ $A = 0.4$ Ac

$Q = 2.0$ cfs

subtract 3 cfs From All Downstrea

?A Revised Q

$Q = 5.6 \cdot (0.7)$ $A = 0.7$ Ac

$Q = 4$ cfs

subtract 1 cfs From All Downstream

?7A Revised Q

$Q = 5.6 \cdot (0.6)$ $A = 0.6$ Ac

$Q = 3.5$ cfs

subtract 1.5 cfs From All Downstream

'4 A Revised Q

$Q = 5.6 \cdot A$ $A = 0.5$ Ac.

$= 3$ cfs

more $Q = 5$ cfs for $A = 1$ Ac

subtract 2 cfs from All Downstream

$Q_{Total} = 155\ cfs - 9.5 - 11\ cfs - 2\ cfs$

$Q_{Total} = 132.5\ cfs$

WESTRIDGE - PD 2514-10 - BASIN B STORM DAY 4

LOCATION		SUBAREA AREA	SUBAREA Q	TOTAL AREA	TOTAL Q	CONV TYPE	CONV LNGTH	CONV SLOPE	CONV SIZE	CONV Z	CONTROL Q	SOIL NAME	TC	RAIN ZONE	PCT IMPV
93004	1C	1.	5.	1.	5.	4	50.	0.02000	2.00	0.00	0.	98	5	L50	0.80
93004	2C	1.	5.	2.	11.	4	60.	0.02000	2.00	0.00	0.	98	5	L50	0.70
93004	3C	1.	5.	3.	16.	4	20.	0.04000	2.00	0.00	0.	98	5	L50	0.70
93004	4C	1.	5.	4.	21.	4	200.	0.02000	2.00	0.00	0.	98	5	L50	0.70
93004	5C	1.	5.	5.	26.	4	50.	0.02000	2.00	0.00	0.	98	5	L50	0.70
93004	6C	1.	5.	6.	32.	4	20.	0.04000	2.00	0.00	0.	98	5	L50	0.70
93004	7C	1.	5.	7.	37.	4	50.	0.02000	2.25	0.00	0.	98	5	L50	0.70
93004	8C	1.	5.	8.	42.	4	200.	0.02000	2.25	0.00	0.	98	5	L50	0.70
93004	9C	1.	6.	9.	47.	4	10.	0.02000	2.25	0.00	0.	98	5	L50	0.90
93004	10C	1.	6.	10.	52.	4	260.	0.07000	2.00	0.00	0.	98	5	L50	0.90
93004	11C	0.	0.	10.	51.	4	1.	0.07000	2.00	0.00	0.	98	99	L50	0.70
93004	12C	1.	5.	11.	56.	4	60.	0.07000	2.00	0.00	0.	98	5	L50	0.70
93004	13C	0.	0.	11.	56.	4	1.	0.04000	2.25	0.00	0.	98	99	L50	0.70
93004	14D	2.	11.	2.	11.	4	40.	0.03000	2.00	0.00	0.	98	5	L50	0.60
93004	15D	1.	5.	3.	16.	4	250.	0.03000	2.00	0.00	0.	98	5	L50	0.70
93004	16D	1.	5.	4.	21.	4	15.	0.03000	2.00	0.00	0.	98	5	L50	0.70
93004	17D	1.	5.	5.	26.	4	290.	0.03000	2.00	0.00	0.	98	5	L50	0.70
93004	18D	1.	5.	6.	31.	4	10.	0.03000	2.00	0.00	0.	98	5	L50	0.70
93004	19D	1.	5.	7.	36.	4	50.	0.03000	2.00	0.00	0.	98	5	L50	0.70
93004	20D	0.	0.	7.	36.	4	1.	0.04000	2.00	0.00	0.	98	99	L50	0.70

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* CONFLUENCE Q'S *

* 93004 21C TC 1155 QC 56. QCD 91. QD 35. 93004 21D TD 1154 QD 36. QDC 92. QC 56. *

* 93004 21CD TCD 1154 QCD 92. QC 56. QD 36. *

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LOCATION		SUBAREA AREA	SUBAREA Q	TOTAL AREA	TOTAL Q	CONV TYPE	CONV LNGTH	CONV SLOPE	CONV SIZE	CONV Z	CONTROL Q	SOIL NAME	TC	RAIN ZONE	PCT IMPV
93004	21CD	7.	36.	18.	92.	4	250.	0.07000	2.50	0.00	0.	98	0	L50	0.00
93004	22C	2.	11.	20.	101.	4	20.	0.07000	2.50	0.00	0.	98	5	L50	0.70
93004	23C	1.	5.	21.	105.	4	50.	0.03000	3.00	0.00	0.	98	5	L50	0.70
93004	24C	1.	5.	22.	110.	4	30.	0.04000	2.75	0.00	0.	98	5	L50	0.70
93004	25C	1.	5.	23.	115.	4	330.	0.03000	3.00	0.00	0.	98	5	L50	0.70
93004	26C	0.	0.	23.	114.	4	1.	0.04000	3.00	0.00	0.	98	99	L50	0.70
93004	27C	1.	5.	24.	119.	4	30.	0.03000	3.00	0.00	0.	98	5	L50	0.70
93004	28C	1.	5.	25.	123.	4	140.	0.03000	3.00	0.00	0.	98	5	L50	0.70
93004	29C	1.	5.	26.	127.	4	120.	0.03000	3.25	0.00	0.	98	5	L50	0.70
93004	30C	1.	5.	27.	130.	4	220.	0.03000	3.25	0.00	0.	98	5	L50	0.70
93004	31C	1.	5.	28.	133.	4	30.	0.03000	3.25	0.00	0.	98	5	L50	0.70
93004	32C	1.	5.	29.	137.	4	190.	0.03000	3.25	0.00	0.	98	5	L50	0.70
93004	33C	1.	5.	30.	140.	4	130.	0.10000	2.75	0.00	0.	98	5	L50	0.80
93004	34C	3.	16.	33.	151.	4	280.	0.20000	2.50	0.00	0.	98	5	L50	0.60
93004	35E	0.	0.	0.	0.	4	1.	0.01000	0.00	0.00	0.	98	99	L50	0.70
93004	36E	1.	5.	1.	5.	4	150.	0.10000	2.00	0.00	0.	98	5	L50	0.70
93004	37E	1.	5.	2.	11.	4	20.	0.10000	2.00	0.00	0.	98	5	L50	0.70
93004	38E	1.	5.	3.	16.	4	220.	0.10000	2.00	0.00	0.	98	5	L50	0.80
93004	39E	1.	5.	4.	21.	4	220.	0.10000	2.00	0.00	0.	98	5	L50	0.70

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT
MODIFIED RATIONAL METHOD HYDROLOGY

WESTRIDGE - PD 2514-10 - BASIN B STORM DAY 4

LOCATION		SUBAREA AREA	SUBAREA Q	TOTAL AREA	TOTAL Q	CONV TYPE	CONV LNGTH	CONV SLOPE	CONV SIZE	CONV Z	CONTROL Q	SOIL NAME	TC	RAIN ZONE	PCT IMPV
93004	40E	1.	5.	5.	26.	4	180.	0.10000	2.00	0.00	0.	98	5	L50	0.80
93004	41E	1.	5.	6.	31.	4	10.	0.10000	2.00	0.00	0.	98	5	L50	0.60
93004	42E	1.	5.	7.	37.	4	240.	0.06000	2.00	0.00	0.	98	5	L50	0.80
93004	43E	1.	5.	8.	42.	4	90.	0.10000	2.00	0.00	0.	98	5	L50	0.70
93004	44CE	8.	42.	41.	190.	4	80.	0.10000	3.00	0.00	0.	98	0	L50	0.00
93004	45C	2.	11.	43.	199.	4	550.	0.09000	3.00	0.00	0.	98	5	L50	0.60

5C Revised Q

$Q = 5.6 \cdot A$ $A = 0.6$ Ac.

$Q = 3.5$ cfs

more $Q = 5$ cfs for $A = 1$ Ac

subtract 1.5 cfs From All Downstream

: Revised Q

$Q = 5.6 \cdot (0.2)$ $A = 0.2$ Ac

$Q = 1$ cfs

subtract 5 cfs From All Downstream

10C Revised Q

$= 5.6 \cdot (0.2)$ $A = 0.2$ Ac

$= 1$ cfs

subtract 5 cfs From All Downstrea

4D Revised Q

$Q = 5.6 \cdot (1.4)$ $A = 1.4$ Ac

$Q = 8$ cfs

subtract 3 cfs From All Downstream

C Revised Q

$= 5.6 \cdot (0.6)$ $A = 0.6$ Ac

$Q = 3.5$ cfs

subtract 1.5 cfs From All Downstream

47C Revised Q

$Q = 5.6 \cdot A$ $A = 0.3$ Ac.

$Q = 1.5$ cfs

more $Q = 5$ cfs for $A = 1$ Ac

subtract 3.5 cfs From All Downstream

37E Revised Q

$Q = 5.6 \cdot (0.5)$ $A = 0.5$ Ac

$Q = 3$ cfs

subtract 2 cfs From All Downstream

38E Revised Q

$Q = 5.6 \cdot (0.4)$ $A = 0.4$ Ac

$Q = 2$ cfs

subtract 3 cfs From All Downstrea

39E Revised Q

$Q = 5.6 \cdot (0.7)$ $A = 0.7$ Ac

$Q = 4$ cfs

subtract 1 cfs From All Downstream

50E Revised Q

$Q = 5.6 \cdot (0.5)$ $A = 0.5$ Ac

$Q = 3$ cfs

subtract 2 cfs From All Downstream

4IE Revised Q

$Q = 5.6 \cdot A$ $A = 0.5$ Ac.

$= 3$ cfs

more $Q = 5$ cfs for $A = 1$ Ac

subtract 2 cfs From All Downstream

3E Revised Q

$) = 5.6 \cdot (0.4)$ $A = 0.4$ Ac

$= 2$ cfs

subtract 3 cfs From All Downstream

5C Revised Q

$= 5.6 \cdot (1.4)$ $A = 1.4$ Ac

$= 8$ cfs

subtract 3 cfs From All Downstream

$Q_{Total} = 199$ cfs $- 16$ cfs $- 11.5$ cfs $- 8$ cfs

$Q_{Total} = 163.5$ cfs

Overland Manning's N Values

Type of Development	N
Industrial-Commercial	0.014
Residential	0.040
Rural	0.060

Standard Lot Values

Type of Development	Lot Length	Lot Slope Range
Industrial-Commercial	200	0.005-0.02
Residential	100	0.01 -0.05
Rural	200	0.05 -1.00

STANDARD RANGE OF PROPORTION IMPERVIOUS

Type of Development	Proportion Impervious
Single-Family	0.21-0.45
Multi-Family	0.40-0.80
Commercial	0.48-0.92
Industrial	0.60-0.92
Institutional	0.70-0.90

Average Values for Metropolitan Los Angeles County are:
Single-Family=0.42 Multi-Family=0.68 Commercial=0.92
Industrial=0.91 Institutional=0.68
For more detail, see the separate Proportion Impervious Table.

Los Angeles County
Department of Public Works

STANDARD VALUES
TABLES

PROPORTION IMPERVIOUS

Residential

Single-Family	0.418
Two-Unit	0.418
Three-Unit	0.682
Four-Unit	0.819
Five-Unit	0.855

Commercial

Stores, Office Buildings, Manufacturing Outlets	0.909
Shopping Centers (Regional), Restaurants, Service Shops, Auto Equipment, Parking Lots	0.946
Shopping Centers (Neighborhood), Motels, Hotels, Kennels, Professional Buildings, Banks, Service Stations	0.958
Supermarkets	0.976
Department Stores	0.985

Industrial

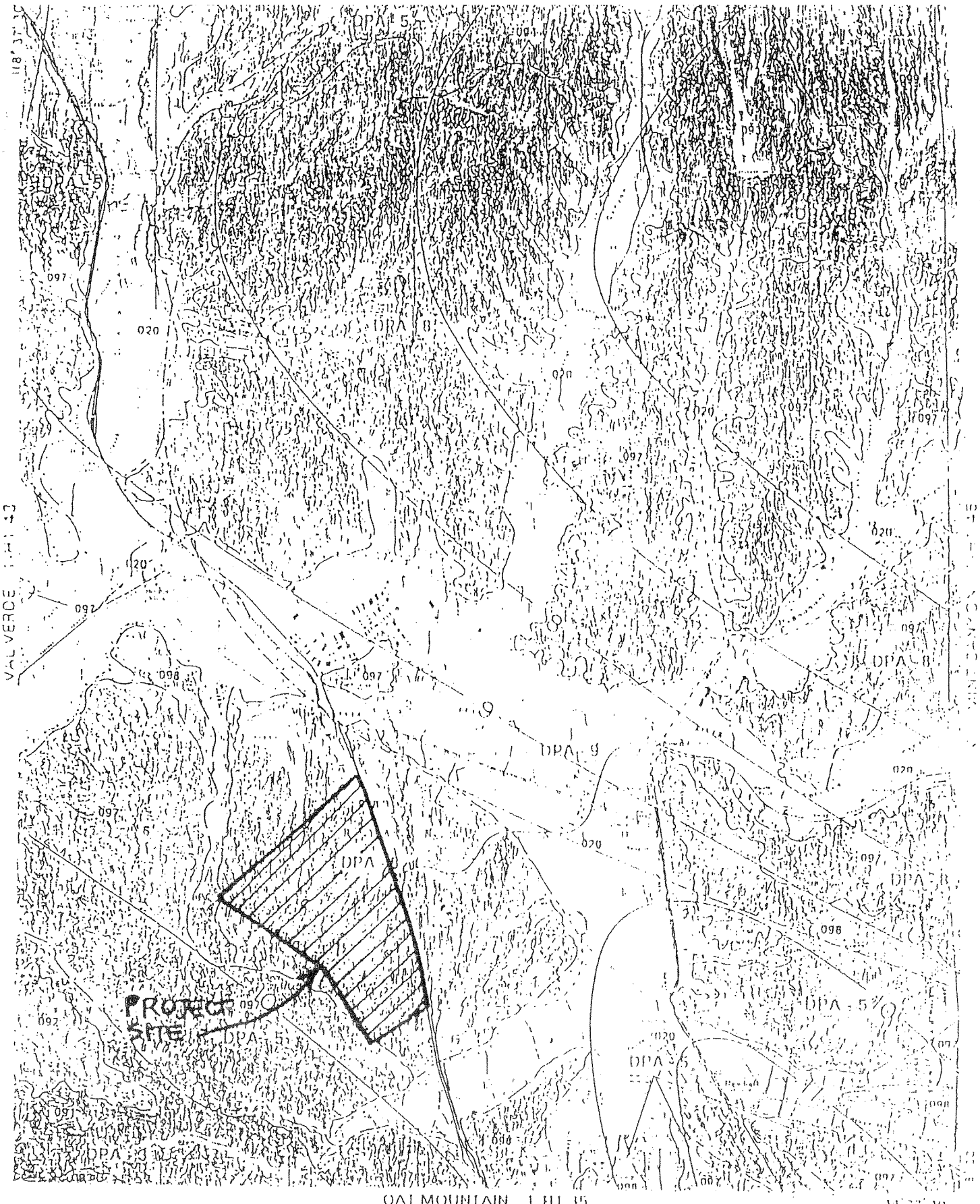
Mineral Processing	0.473
Open Storage	0.655
Motion Picture, Radio, Television	0.819
Manufacturing, Warehousing, Storage, Parking	0.909
Food Processing Plants, Lumber Yards	0.958

Institutional Property

Colleges, Universities	0.473
Homes for the Aged	0.682
Hospitals, Cemeteries, Mausoleums, Mortuaries	0.744
Churches, Schools	0.819

Los Angeles County
Department of Public Works

PROPORTION
IMPERVIOUS


DPA 5
DPA 8
DPA 9
DPA
PROJECT SITE
VALVERDE
OAT MOUNTAIN
SOIL CLASSIFICATION AREA
DEBRIS POTENTIAL AREA
LACDPW

COUNTY OF LOS ANGELES
HYDROLOGY STUDY
PD 2514-10
PORTION OF TRACT 45433

UPDATED HYDROLOGIC DESIGN CRITERIA

STORM EVENT	50 YR.- SUMP LOCATIONS 25 YR.- NON SUMP LOCATIONS
50 YR.- 24 HR. RAINFALL ISOHYET	6.5
SOIL TYPE	D&B
DEBRIS PRODUCTION AREA	DPA 8
DEBRIS VOLUME	50 C.Y./ACRE

LEGEND

	PRIMARY BASIN LIMITS
	SUB-AREA BASIN LIMITS
Tc	TIME OF CONCENTRATION (MIN.)
A	SUB-AREA IN ACRES
Q25	25 YR. FREQUENCY FLOWRATE
Q50	50 YR. FREQUENCY FLOWRATE
Q50B	50 YR. BURNED FREQUENCY FLOWRATE
Q50BB	50 YR. BURNED AND BULKED FREQUENCY FLOWRATE
QCB	Q CATCH BASIN
HP	HIGH POINT ELEVATION OF SUB-AREA
EL	ELEVATION AT OVERLAND LOCATION
AD (DEVELOPED AREA)	SUMMATION OF AREA IN ACRES
QC (EXISTING AREA)	SUMMATION OF FLOW IN CUBIC FEET PER SEC.
30 / 0.7	DRAINAGE AREA DESIGNATION DRAINAGE AREA IN ACRES
	STORM DRAIN LINE
*	PUBLIC OR PRIVATE STUB, SIZE AND MAINTENANCE RESPONSIBILITY TO BE DETERMINED BY CITY DURING FINE GRADING PLAN PROCESSING.
	FLOW DIRECTION

DESIGN CRITERIA:

STORM EVENT	50 YR.
RAINFALL ZONE	5
SOIL TYPE	D&B
DEBRIS PRODUCTION AREA	DPA-8

LEGAL DESCRIPTION

A PORTION OF THE RANCHO SAN FRANCISCO AS SHOWN ON MAP RECORDED IN BOOK 1, PAGES 521 AND 522 OF PATENTS, IN THE CITY OF SANTA CLARITA IN THE RECORDS OF LOS ANGELES COUNTY, STATE OF CALIFORNIA.

NOTES:

1. COMPLY WITH ALL STREET DRAINAGE REQUIREMENTS TO THE SATISFACTION OF THE CITY OF SANTA CLARITA.
2. DEDICATE THE NECESSARY EASEMENTS FOR THE STORM DRAIN SYSTEM TO THE SATISFACTION OF THE CITY OF SANTA CLARITA.
3. PROVIDE ENCLOSED ACCESS TO ALL INLETS AND OUTLETS TO THE SATISFACTION OF THE CITY OF SANTA CLARITA.
4. APPROVAL OF THE DRAINAGE CONCEPT DOES NOT CONSTITUTE DETERMINATION THAT THE OFFSITE IMPROVEMENTS ARE REQUIRED WITHIN THE MEANING OF GOVERNMENT CODE SECTION 66462.5.
5. AN OFFSITE DRAINAGE COVENANT FOR ACCEPTANCE OF DRAINAGE (AND DRAINAGE FACILITIES) MAY BE REQUIRED.
6. PLACE A NOTE OF FLOOD HAZARD AND SHOW THE NATURAL DRAINAGE COURSES ON THE FINAL MAP.
7. AN EASEMENT TO THE CITY OF SANTA CLARITA TO BE GRANTED ON THE FINAL MAP FOR STORM DRAIN INGRESS AND EGRESS AND MAINTENANCE OVER ALL PRIVATE STREETS.

PER APPROVED P.D. 2512 EXHIBIT A HYDROLOGY MAP

Q_{100} = 285 CFS
- 16 CFS AREA F-2
- 59 CFS AREA F-5
- 18 CFS AREA F-7

ADJ. Q_{100} = 201 CFS

BASIN A

BASIN B

VICINITY MAP
NO SCALE

HYDROLOGY STUDY
APPROVED FOR AREA AND Q ONLY
APPROVED BY: _____ DATE: 11/4/00
CHECKED BY: _____ DATE: 11/2/00
LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS
LAND DEVELOPMENT DIVISION

SEP 8 2 2000

SHEET		
1	COUNTY OF LOS ANGELES	1 SHEET

ALLIANCE LAND PLANNING & ENGINEERING INC.
23823 LAPLACE COURT, SUITE 130
VALENCIA, CA 91355
(661) 259-1055 FAX: (661) 259-1056

PLANS PREPARED BY:
ALLIANCE LAND PLANNING & ENGINEERING INC.
23823 LAPLACE COURT, SUITE 130
(760) 431-9896

PLANS PREPARED UNDER THE DIRECTION OF:
CRAIG W. WHITAKER, R.C.E. 51929 — DATE 3-22-00

PLANS PREPARED FOR:
VALENCIA COMPANY
23823 VALENCIA BOULEVARD
VALENCIA, CA. 91355
(805)255-4000

NO.	DATE	BY	APP'D

HYDROLOGY STUDY FOR P.D. 2514-10 TRACT 45433

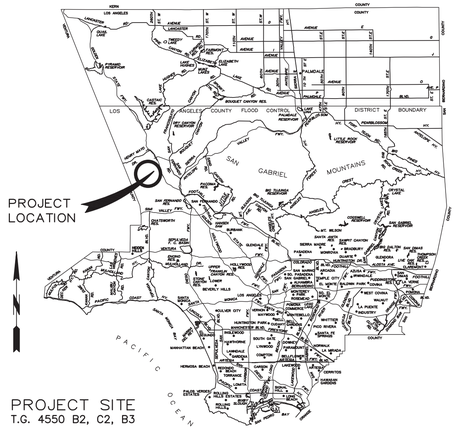
D-2: PD 2637

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS

EIMP2014000049

PRIVATE DRAIN NO 2637

DS 542

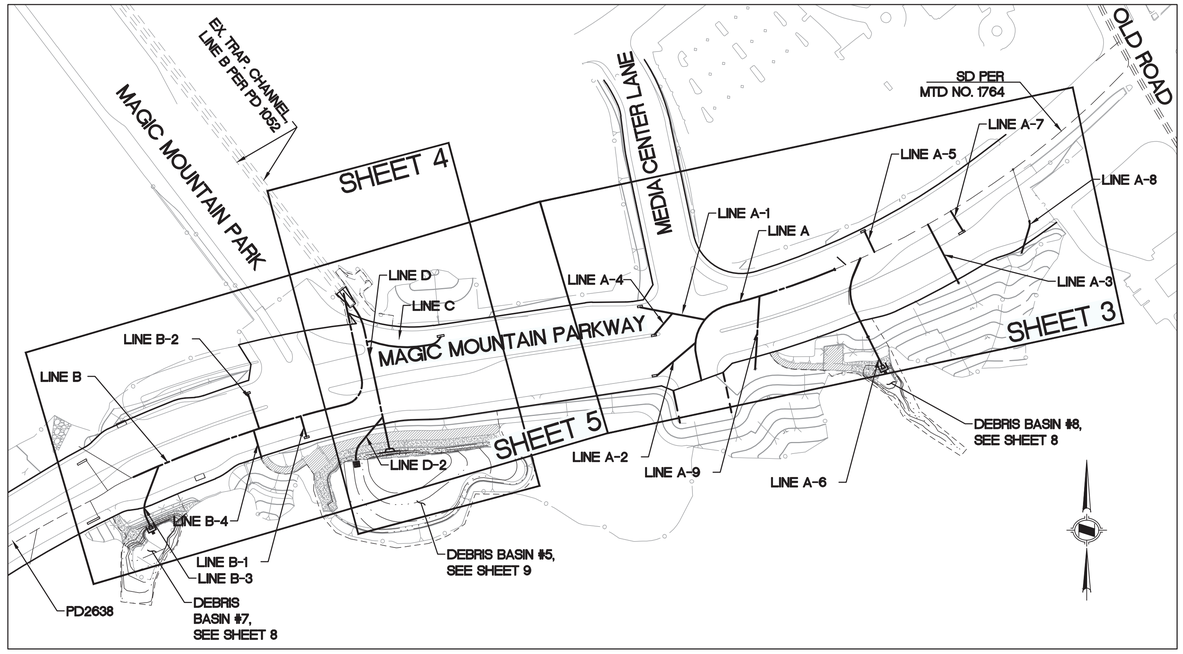


PROJECT SITE
T.G. 4550 B2, C2, B3

LOCATION MAP

CONSTRUCTION NOTES:

1. CONSTRUCT 18" RCP (D-LOAD PER PROFILE)
2. CONSTRUCT 24" RCP (D-LOAD PER PROFILE)
5. CONSTRUCT 42" RCP (D-LOAD PER PROFILE)
6. CONSTRUCT DOUBLE REINFORCED CONCRETE BOX CULVERT PER S.P.P.W.C. 390-1. USE 6'W X 4'H REINFORCED CONCRETE BASE FOR STRUCTURE STEEL, SEE NOTES ON SHEET 4.
7. CONSTRUCT JUNCTION STRUCTURE PIPE TO PIPE PER SPPWC STD. 331-3.
8. CONSTRUCT MANHOLE PIPE TO PIPE PER SPPWC STD. 322-2.
9. CONSTRUCT CURB OPENING CATCH BASIN PER SPPWC STD. 300-3 AND LOCAL DEPRESSION PER SPPWC STANDARD PLAN 313-3, PER STREET PLAN. INSTALL AUTOMATIC RETRACTABLE SCREEN (ARS) AND CONNECTOR PIPE SCREEN PER DETAIL SHEET 12.
10. CONSTRUCT JUNCTION STRUCTURE PIPE TO RCB PER SPPWC 333-2
10a. CONSTRUCT MODIFIED JUNCTION STRUCTURE PIPE TO RCB PER SPPWC 333-2, SEE SHEET 16 AND 17 FOR DETAIL.
11. CONSTRUCT 54" RCP (D-LOAD PER PROFILE)
12. CONSTRUCT CONCRETE COLLAR FOR RCP PER SPPWC STD. 380-4.
13. CONSTRUCT DESILTING INLET PER DETAIL ON SHEET NO. 8
14. CONSTRUCT 12' WIDE 6" CONCRETE ACCESS ROAD OVER 4" CRUSHED AGGREGATE BASE PER DETAIL 14 ON SHEET 8
15. CONSTRUCT CONC. FACING/SLOPE PROTECTION PER DETAIL ON SHEET 8
16. CONSTRUCT CHAIN LINK FENCE PER SPPWC STD. PLAN NO 600-3.
17. CONSTRUCT DOUBLE DRIVE GATE PER SPPWC STD. PLAN NO 600-3 (W=12' PER LEAF)
18. CONSTRUCT CUT OFF WALL PER DETAIL ON SHEET 8
19. CONSTRUCT ELEVATED INLET PER DETAIL ON SHEET 10
20. CONSTRUCT MODIFIED TRANSITION STRUCTURE PER CALTRANS DETAIL D86A, SEE DETAIL 20 ON SHEET 11.
21. CONSTRUCT MANHOLE CONCRETE BOX STORM DRAIN PER SPPWC STD 323-2
22. CONSTRUCT TRANSITION STRUCTURE PIPE PER SPPWC STD. 340-2.
23. PROVIDE RUBBER GASKET JOINTS ON BOTH SIDES OF CUT/FILL TRANSITION (3 JOINTS MIN. EACH SIDE OR 24' MINIMUM EACH SIDE)
25. CONSTRUCT JUNCTION STRUCTURE PIPE TO PIPE PER SPPWC STD. 332-3.
28. CONSTRUCT BRICK AND MOTOR PLUG
29. CONSTRUCT CLEANOUT PER DETAIL 29 ON SHEET 11
32. CONSTRUCT RIP-RAP APRON PER DETAIL 32 ON SHEET 11
33. CONSTRUCT MANHOLE PIPE TO PIPE PER SPPWC STD. 320-2.
34. CONSTRUCT VARIABLE WIDTH 3" ASPHALT CONCRETE OVER 4" CRUSHED AGGREGATE BASE PER DETAIL ON SHEET 11
35. CONSTRUCT BACKFILL STABILIZER PER SPPWC STD. 221-2
36. INSTALL SLOPE PROTECTION BARRIER PER SPPWC STD. 360-2, USE 2(TWO) 4'(H) X 6(W), AND MODIFIED TO 3.5'(H) X 6'(W)
37. INSTALL DEBRIS DAMS AND OUTLET WORKS PER LOS ANGELES COUNTY PUBLIC WORKS STANDARD PLAN #3097-0
38. CONSTRUCT CONCRETE BLANKET PER SPPWC 225-2



KEY MAP
1" = 150'

"PD 2637 IS NOT ELIGIBLE FOR TRANSFER TO THE FLOOD CONTROL DISTRICT FOR MAINTENANCE UNTIL PD 1052 IS TRANSFERRED"

"PD 2637 SHALL TRANSFER TO LOS ANGELES COUNTY FLOOD CONTROL DISTRICT FOR MAINTENANCE CONCURRENTLY WITH WQ 061105-01A TRANSFERRING TO LOS ANGELES COUNTY FOR MAINTENANCE"

"PD 2637 MUST BE CONSTRUCTED BEFORE OR CONCURRENT WITH PD 2638"



CATCH BASIN STENCIL DETAIL
NTS

THIS DETAIL SHOULD APPEAR ON TOP OF ALL THE CATCH BASIN

ALL CATCH BASINS AND INLETS THAT DISCHARGE INTO AND EXISTING OR PROPOSED STORM DRAIN MUST BE STENCILED TO DISCOURAGE ILLEGAL DUMPING OF POLLUTANTS. THIS STENCIL SHALL HAVE A MINIMUM DIAMETER OF 30 INCHES

PRIVATE ENGINEERS NOTICE TO CONTRACTOR

THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITIES PIPES OR STRUCTURES SHOWN ON THE THSES PLANS ARE OBTAINED BY A SEARCH OF THE AVAILABLE RECORDS. TO THE BEST OF OUR KNOWLEDGE, THERE ARE NO EXISTING UTILITIES EXCEPT AS SHOWN ON THIS MAP. THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT THE UTILITY LINES AND ANY OTHER LINES NOT OF RECORD OR SHOWN ON THIS DRAWING.

JASON H. FUKUMITSU — 08/10/2018 DATE





APPROVED MARK PESTRELLA, DIRECTOR OF PUBLIC WORKS
BY ASSISTANT DIVISION ENGINEER 8/14/2018 DATE

RECOMMENDED LAND DEVELOPMENT DIVISION
BY STORM DRAIN SECTION 8/14/2018 DATE

SUBMITTED
BY STORM DRAIN SECTION 08/13/2018 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
1	ADDED STRUCTURE PLANS AND DETAIL PER STRUCTURE REVIEW, REMOVING " NOT A PART OF THIS APPROVAL"			11/15/18
2	REVISED LINE A4 PER RELOCATED CATCH BASIN			5/28/19



8/10/18
JASON H. FUKUMITSU DATE

INDEX TO PROJECT DRAWINGS

SHEET NO.	DESCRIPTION
1	TITLE SHEET/DETAILS
2	GENERAL NOTES/HYDRAULIC ELEMENTS
3	STORM DRAIN PLAN & PROFILE – LINE "A" & LINE "A-6"
4	STORM DRAIN PLAN & PROFILE – LINE "D" & LINE "D-2"
5	STORM DRAIN PLAN & PROFILE – LINE "B" & LINE "C"
6	LATERAL PROFILES A-1, A-2, A-3, A-4, A-5, A-7, A-8 AND A-9
7	LATERAL PROFILES B-1, B-2, B-3, B-4
8	DESILTING INLET #7 AND #8, AND DESILTING INLET DETAILS
9	BASIN # 5
10	ELEVATED INLET DETAILS
11	STORM DRAIN DETAILS
12	STORM DRAIN DETAILS
13	CSP DETAIL
14	EASEMENT SHEET
15	STRUCTURAL NOTES
16	STRUCTURAL DETAILS
17	STRUCTURAL DETAILS

INDEX TO STANDARD DRAWINGS

LOS ANGELES COUNTY DEPT. OF PUBLIC WORKS

DWG. NO.	DESCRIPTION
3080-2	PIPE BEDDING
3097-0	DEBRIS DAMS AND BASINS OUTLET WORKS
6008-1	SAFETY REQUIREMENTS FOR OPEN EXCAVATIONS

STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION

STD. PLAN	TITLE
300-3	CURB OPENING CATCH BASIN
313-3	LOCAL DEPRESSIONS AT CATCH BASINS
320-2	MANHOLE PIPE-TO-PIPE MAIN (36" OR LARGER)
322-2	MANHOLE PIPE-TO-PIPE MAIN (LARGE SIDE INLET)
323-2	MANHOLE CONCRETE BOX
331-3	JUNCTION STRUCTURE-PIPE TO PIPE INLET ID D 600 mm (24") OR OD > 1/2 MAIN LINE
332-3	JUNCTION STRUCTURE-PIPE TO PIPE
333-2	JUNCTION STRUCTURE-PIPE TO RCB
334-2	JUNCTION STRUCTURE-PIPE TO PIPE
340-2	TRANSITION STRUCTURE-PIPE TO PIPE
360-2	SLOPE PROTECTION BARRIER
361-2	TRASH RACK (INCLINED)
380-4	CONCRETE COLLAR
390-1	PRECAST REINFORCED CONCRETE BOX
600-3	CHAIN LINK FENCE AND GATES

CALIFORNIA DEPARTMENT OF TRANSPORTATION

STD. PLAN	TITLE
D86A	PIPE HEADWALLS

PIPE LENGTH CHART

2

SIZE	LENGTH
18"	~~420'~~ 431'
24"	645'
42"	900'
54"	690'
6'WX3.5'H BOX	305'
TOTAL	~~2,960'~~ 2971'

PRIOR TO ORDERING PIPES, CONTACT GEOTECHNICAL AND MATERIALS ENGINEERING AT (626)458-1707 TO SCHEDULE A D-LOAD INSPECTION. INSPECTION FEES PAYABLE AT THE LAND DEVELOPMENT DIVISION PUBLIC COUNTER WILL BE REQUIRED

NEWHALL QUAD (2009) NAVD 88

BENCH MARK: LACDPW L 5402
RND HD SPK IN LOWER OF TWO CONC HDWLS @ N END 24' W/O C/L THE OLD RD (W RDWY) & 0.6MI S/O HENRY MAYO DR @ MI MKR #6.25

ELEV. 1031.831 FEET **ADJUSTMENT** 2009

SURVEYOR'S NOTE: TOPO & DESIGN ELEV ARE BASED ON 1995 ADJUSTMENT. TO ACQUIRE 2009 ADJUSTMENT ELEV, SUBTRACT 0.120 FT FROM ALL ELEVATIONS DEPICTED ON THESE PLANS.

STORM DRAIN PLANS IN
DS 542 P.D. No. 2637
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
26074 Avenue Hall, Suite 23 ▪ Valencia, CA 91355 ▪ PH: (661) 294-2211 ▪ FX: (661) 294-9890

DWG SHEET 1 OF 17

P.D. No. 2637

DDN No. 43-F551

G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2637\HMV102-01 - Sheet 1.dwg Plotted On Jul 18, 2018 - 2:12pm by wallanl

GENERAL NOTES

1. A permit shall be obtained and a deposit paid to the Department of Public Works at the Permit Counter, 900 South Fremont Avenue 3rd Floor, Alhambra at least 72 hours prior to starting work under this contract. Copies of all other required permits, such as Flood Control District and Road Excavation, must be filed with the permit application.

2. Approval of this plan by the County of Los Angeles does not constitute a representation as to the accuracy of the location, or the existence or nonexistence of any underground utility, pipe or structure within the limits of this project. This note applies to all sheets.

3. All work shall be in accordance with the latest adopted edition of the "Standard Specifications for Public Works Construction, " including supplements and shall be prosecuted only in the presence of the Director of Public Works.

4. The contractor's attention is directed to Section 7-10.4.1 of the Standard Specifications for Public Works Construction in regard to safety orders and shall conform to the "Minimum Public Safety Requirements" as shown on Los Angeles County Department of Public Works Standard Plan 6008.

5. Elevations are in feet above U.S.C. & G.S. Mean Sea Level Datum of 1929, unless otherwise indicated.

6. No concrete shall be placed until the forms and reinforcing steel have been placed, inspectedand approved.

7. All structural concrete shall be portland cement concrete with an ultimate 28 day compressive strength of 4000 p.s.i unless otherwise noted.

8. Transverse reinforcement and transverse joints shall be placed at right angles (or radial) to the conduit center line except as otherwise shown on the drawings.

9. All steel adjacent to face of concrete shall have 2-1/2-inch clearance unless otherwise specified.

10. Reinforcement shall be deformed bars of intermediate grade steel per A.S.T.M. A-615-Grade 60.

11. All bar bends and hooks shall conform to the American Concrete Institute "Manual of Standard Practice."

12. Dimensions from face of concrete to steel are to center line of steel unless otherwise noted.

13. All steel that is to be continuous shall have a minimum lap of 30 bar diameters or 18 inches whichever is greater.

14. All construction joints in the footing of slabs and walls shall be in the same plane. No staggering of joints will be permitted.

15. All exposed edges shall be finished with a ¾ inch chamfer.

16. Unless otherwise shown, concrete dimensions shall be measured vertically or horizontally and parallel or at right angles (or radial) to the center line of construction.

17. Concrete backfill is required when the pipe has less than one foot of cover. The concrete backfill shall consist of 1:3:5 mix, portland cement concrete poured from wall to wall of trench and from bottom of trench to a minimum of 4 inches over the top of the pipe.

18. All pipes shall be placed in a trench in natural ground and/or compacted fill. The ground level before the trenching shall be at least 3 feet above the top of the pipe elevation, or at finish surface elevation, whichever is less.

19. All backfill dry fills outside of street right of way shall be compacted to a minimum relative compaction of 90 percent of maximum density as determined by ASTM Soil Compaction Test D 1557-91 Method "D" unless otherwise specified. This shall be certified by a soils engineer. This certification shall be submitted to the Director of Public Works prior to acceptance of the work by the County.

20. All backfill dry fills outside of street right of way shall be compacted to a minimum relative compaction of 90 percent of maximum density as determined by ASTM Soil Compaction Test D 1557-91 Method "D" unless otherwise specified. This shall be certified by a soils engineer. This certification shall be submitted to the County Engineer prior to acceptance of the work by the County.

21. Pipe bedding shall be:

In accordance with Los Angeles County Department of Public Works Standard Plan No. 3092 unless otherwise noted.

OR

According to Standard Plan No. 3080, Case III, except bell and spigot pipe which shall be Case II bedding, unless otherwise shown. "W" values shall be as specified on Standard Plan No. 3080 for Case III bedding, Notes 3 (a), 3 (b), and 3 (c). If the "W" value at the top of the pipe is exceeded, the bedding shall be modified, and/or pipe of additional strength shall be provided. The proposed modification shall be approved by the Department of Public Works.

22. Pipe shall be embedded 5 inches into all structures including inlet and outlet headwalls, unless otherwise specified.

23. The minimum concrete cover for reinforcement in precast concrete pipe shall be 1 inch in pipe having a wall thickness of 2 1/2 inches or greater and 3/4 inch in pipe having a wall thickness of less than 2 1/2 inches.

24. All catch basins within the dedicated street right of way shall be constructed per the street plans.

25. All references on this plan to the County Engineer, Road Department, or Flood Control District shall apply to the appropriate elements of the Department of Public Works.

26. Existing utilities shall be maintained in place by the contractor, unless otherwise noted.

27. Where the utilities are indicated on the Drawings to be supported, said supports shall be in accordance with Standard Plans for Public Works Construction No. 224, unless otherwise indicated.

28. Manholes shall use the Standard Plans for Public Works Construction No. 630 for the "Frame and Cover" and No. 635 for the "Standard Drop Step."

29. This water quality system will not be field accepted until the streets have been paved, manholes brought to grade and the system cleaned to satisfaction of the Director of Public Works.

30. The Soils Engineer on record shall inspect and approve the foundation Excavations before steel or concrete is placed.

31. Maintenance covers constructed per S.P.P.W.C standard plans 630, 631, 632, and 633 shall be cast with the letters "L.A.C.D.P.W." The letters shall be 1 inch in height and placed below the letter "D" in the center of the cover.

32. Maintenance covers constructed per S.P.P.W.C standard plan 312 shall be cast with the letters "L.A.C.D.P.W." The letters shall be 1 inch in height and placed below the letter "D" in the center of the cover.

33. All above ground facilities shall be stamped with the WQ Plan Number. The lettering should be 4" black text on a yellow background.

STORMWATER POLLUTION CONTROL REQUIREMENTS FOR STORM DRAIN CONSTRUCTION

A. NOTES:

1. Every effort should be made to eliminate the discharge of non-storm water from the project site at all times.

2. Eroded sediments and other pollutants must be retained on site and may not be transported from the site via sheet flow, swales, area drains, natural drainage courses, or wind.

3. Stockpiles of earth and other construction related materials must be protected from being transported from the site by the forces of wind or water.

4. Fuels, oils, solvents, and other toxic materials must be stored in accordance with their listing and are not to contaminate the soil and surface waters. All approved storage containers are to be protected from the weather. Spills must be cleaned up immediately and disposed of in a proper manner. Spills may not be washed into the drainage system.

5. Excess or waste concrete may not be washed into the public way or any other drainage system. Provisions shall be made to retain concrete wastes on site until they can be disposed of as solid waste.

6. Trash and construction-related solid wastes must be deposited into a covered receptacle to prevent contamination of rainwater and dispersal by wind.

7. Sediments and other materials may not be tracked from the site by vehicle traffic. The construction entrance roadways must be stabilized so as to inhibit sediments from being deposited into the public way. Accidental depositions must be swept up immediately and may not be washed down by rain or other means.

8. Any slopes with disturbed soils or denuded of vegetation must be stabilized so as to inhibit erosion by wind and water.

B. The following BMPs as outlined in, but not limited to, the latest edition of the California BMP Handbook (Construction) or Cal Trans Storm Water Quality Handbooks (Construction Site BMP Manual), may apply during the construction for this project (additional measures may be required if deemed appropriate by the project engineer or the building official).

EROSION CONTROL

EC1 - SCHEDULING
EC2 - PRESERVATION OF EXISTING VEGETATION
EC3 - HYDRAULIC MULCH
EC4 - HYDROSEEDING
EC5 - SOIL BINDERS
EC6 - STRAW MULCH
EC7 - GEOTEXTILES & MATS
EC8 - WOOD MULCHING
EC9 - EARTH DIKES AND DRAINAGE SWALES
EC10 - VELOCITY DISSIPATION DEVICES
EC11 - SLOPE DRAINS
EC12 - STREAMBANK STABILIZATION
EC13 - RESERVED
EC14 - COMPOST BLANKETS
EC15 - SOIL PREPARATIONIROUGHENING
EC16 - NON-VEGETATED STABILIZATION

NON-STORMWATER MANAGEMENT

NS1 - WATER CONSERVATION PRACTICES
NS2 - DEWATERING OPERATIONS
NS3 - PAVING AND GRINDING OPERATIONS
NS4 - TEMPORARY STREAM CROSSING
NS5 - CLEAR WATER DIVERSION
NS6 - ILLICIT CONNECTION/DISCHARGE
NS7 - POTABLE WATER/IRRIGATION
NS8 - VEHICLE AND EQUIPMENT CLEANING
NS9 - VEHICLE AND EQUIPMENT FUELING
NS10 - VEHICLE AND EQUIPMENT MAINTENANCE
NS11 - PILE DRIVING OPERATIONS
NS12 - CONCRETE CURING
NS13 - CONCRETE FINISHING
NS14 - MATERIAL AND EQUIPMENT USE
NS15 - DEMOLITION ADJACENT TO WATER
NS16 - TEMPORARY BATCH PLANTS

TEMPORARY SEDIMENT CONTROL

SE1 - SILT FENCE
SE2 - SEDIMENT BASIN
SE3 - SEDIMENT TRAP
SE4 - CHECK DAM
SE5 - FIBER ROLLS
SE6 - GRAVEL BAG BERM
SE7 - STREET SWEEPING AND VACUUMING
SE8 - SANDBAG BARRIER
SE9 - STRAW BALE BARRIER
SE10 - STORM DRAIN INLET PROTECTION
SE11 - ACTIVE TREATMENT SYSTEMS
SE12 - TEMPORARY SILT DIKE
SE13 - COMPOST SOCKS & BERMS
SE14 - BIOFILTER BAGS

WASTE MANAGEMENT & MATERIAL POLLUTION CONTROL

WM1 - MATERIAL DELIVERY AND STORAGE
WM2 - MATERIAL USE
WM3 - STOCKPILE MANAGEMENT
WM4 - SPILL PREVENTION AND CONTROL
WM5 - SOLID WASTE MANAGEMENT
WM6 - HAZARDOUS WASTE MANAGEMENT
WM7 - CONTAMINATION SOIL MANAGEMENT
WM8 - CONCRETE WASTE MANAGEMENT
WM9 - SANITARY/SEPTIC WASTE MANAGEMENT
WM10 - LIQUID WASTE MANAGEMENT

WIND EROSION CONTROL

WE1 - WIND EROSION CONTROL

EQUIPMENT TRACKING CONTROL

TC1 - STABILIZED CONSTRUCTION ENTRANCE EXIT
TC2 - STABILIZED CONSTRUCTION ROADWAY
TC3 - ENTRANCE/OUTLET TIRE WASH

NO DUMPING · THIS DRAINS TO OCEAN ·

CATCH BASIN STENCIL DETAIL

ALL CATCH BASINS AND INLETS THAT DISCHARGE INTO AN EXISTING OR PROPOSED STORM DRAIN MUST BE STENCILED TO DISCOURAGE ILLEGAL DUMPING OF POLLUTANTS. THIS STENCIL SHALL HAVE A MINIMUM DIAMETER OF 30 INCHES.

HYDRAULIC ELEMENTS

LINE	PIPE FROM STA.	REACH TO STA.	Q (CFS)	SIZE	Vmax (FPS)	REMARKS
"A"	0+00.00	3+29.92	56.2	42"	21.4	1
	3+29.92	4+86.81	55.6	42"	19.8	
	4+86.81	5+42.47	53.5	42"	19.4	
	5+42.47	6+68.76	52.5	42"	19.5	
	6+68.76	7+01.56	51.0	42"	19.00	
	7+01.56	9+26.95	51.0	42"	18.8	
	9+26.95	10+53.74	49.9	42"	16.9	
	10+53.74	11+06.90	43.8	42"	12.6	
	11+06.90	11+87.21	38.6	42"	14.7	
"B"	08+54.69	11+85.49	216.6	54"	14.2	
	11+85.49	12+76.54	213.9	54"	13.5	
	12+76.54	12+88.54	212.5	54"	13.4	
	12+88.54	15+01.56	212.0	54"	13.3	
	15+01.56	15+55.98	171.8	54"	10.8	
"C"	10+12.42	11+63.89	3.6	24"	3.4	
"D-2"	10+04.00	10+20.38		42"		
"A-1"	10+03.78	10+69.39	5.8	24"	7.4	
	10+69.39	11+39.54	3.5	24"	8.9	
"A-2"	10+06.35	11+09.54	5.2	18"	12.7	
"A-3"	10+03.75	11+38.71	3.0	24"	10.5	
2 "A-4"	~~10+02.57~~ 10+02.65	~~10+58.30~~ 10+68.48	2.3	18"	~~10.0~~ 8.37	
"A-5"	10+02.87	10+47.93	4.1	18"	6.7	
"A-6"	10+00.00	11+75.97	20.3	42"	23.5	1
	11+75.97	12+42.03	20.3	42"	24.7	1
"A-7"	10+02.80	10+48.82	5.5	18"	13.2	
"A-8"	10+02.00	11+13.38	1.7	18"	10.2	
	11+13.38	11+66.66	1.7	18"	10.7	
"A-9"	10+04.64	11+52.83	2.5	24"	8.9	
"B-1"	10+04.07	10+44.50	2.3	18"	1.5	
"B-2"	10+04.09	10+76.49	1.7	24"	0.8	
"B-3"	10+07.38	11+32.33	40.2	42"	4.2	
"B-4"	10+04.17	10+59.79	0.9	18"	0.3	
"D" RCB	07+00.00	09+86.18	1,121.9	6'Wx3.5'H	26.8	1
	09+86.18	10+00.00	949.2	6'Wx3.5'H	24.5	1
	10+00.00	10+66.14	949.2	6'Wx3.5'H	26.2	1
	10+66.14	12+44.19	945.9	6'Wx3.5'H	29.2	1
	12+44.19	13+03.40	945.9	6'Wx3.5'H	30.7	2
	13+03.40	13+11.63	945.9	6'Wx3.5'H	21.8	1

REMARKS

1 ADD AN ADDITIONAL 0.5" OF CONCRETE COVER OVER THE INVERT STEEL FOR V > 20 FPS.

2 ADD AN ADDITIONAL 1.0" OF CONCRETE COVER OVER THE INVERT STEEL FOR V > 30 FPS.

3 ADD VELOCITY CONTROL RINGS FOR V > 40 FPS.

4 NOT TO BE MAINTAINED BY LACFCD

REGISTERED PROFESSIONAL ENGINEER · VINCENT PING-KUEN IP · No. 2522 · Exp. 6-30 · GEOTECHNICAL · STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST · ANDREW A. PRICE · No. 1705 · STATE OF CALIFORNIA

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	REVISED LINE A4 PER RELOCATED CATCH BASIN			5/28/19

REVIEWED LAND DEVELOPMENT DIVISION
BY _____ STORM DRAIN SECTION 08/13/2018 DATE

REGISTERED PROFESSIONAL ENGINEER · JASON H. FUKUMITSU · No. 40695 · CIVIL · STATE OF CALIFORNIA
8/10/18
JASON H. FUKUMITSU DATE

STORM DRAIN PLANS IN
DS 542 P.D. No. 2637
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
26074 Avenue Hall, Suite 23 ▪ Valencia, CA 91355 ▪ PH: (661) 294-2211 ▪ FX: (661) 294-9890

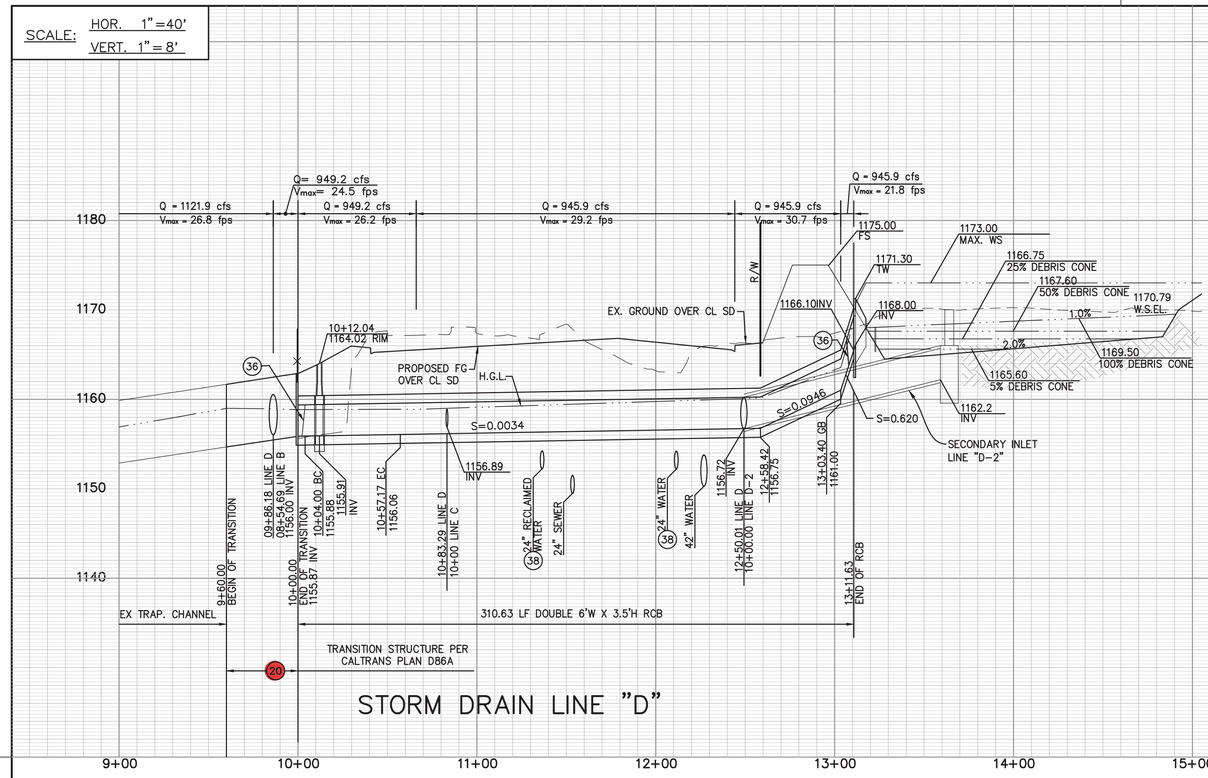
DWG | SHEET 2 OF 17

P.D. No. 2637

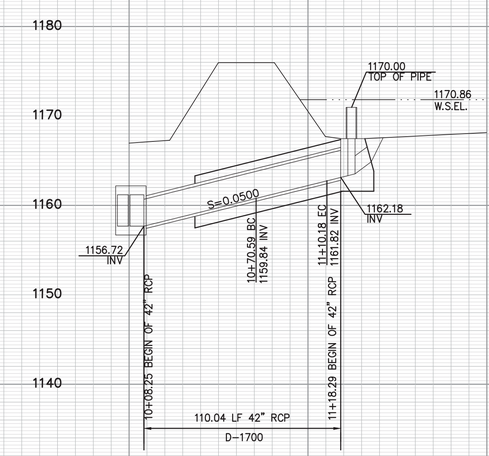
DDN No. 43-F551

G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2637\HW102-02 -Sheet 2.dwg Plotted On Jul 18, 2018 - 2:06pm by wolioni

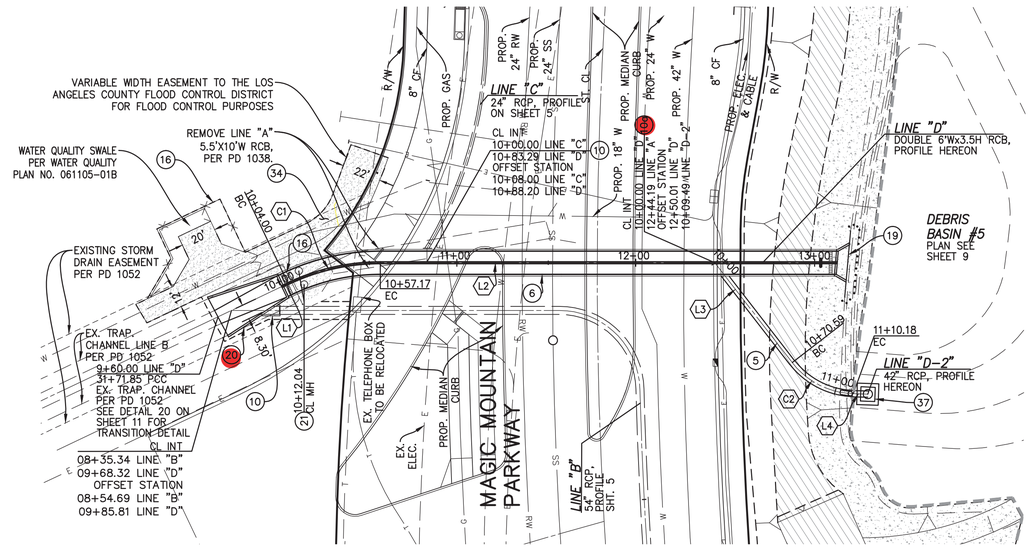
SCALE: HOR. 1"=40'
VERT. 1"=8'



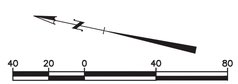
STORM DRAIN LINE "D"



LINE "D-2" SECONDARY INLET



STORM DRAIN LINE "D"



OUTLET STRUCTURE											INLET STRUCTURE					
A	B	D	H	W	L	M	N	a	ANGLE	H	a	L	M	N	ANGLE
1'	9"	6"	7'	12'-7"	40'	N/A	N/A	1161.67'	4°	6'	1169.0'	5.8'	7.09'	N/A	30°

Not a part of this approval

Line Table		
Line #	Length	Bearing
L1	4.00'	N37° 19' 36"W
L2	255.47'	N11° 56' 18"W
L3	70.59'	N40° 16' 26"E
L4	8.12'	N10° 07' 55"W

Curve Table				
Curve #	Length	Radius	Delta	Tangent
C1	53.17'	120.00'	025°23'18"	27.03'
C2	39.59'	45.00'	050°24'21"	21.18'

CONSTRUCT MODIFIED JUNCTION STRUCTURE AT WING WALL WITH PARAPET

JUNCTION STRUCTURE TABLE						
LINE #	A	B	C	D	EL S	EL R
D-2	52'13'	36"	3.13'	72"	1156.72	1156.72

REGISTERED PROFESSIONAL ENGINEER JASON R. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRICE No. 1705 STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-HEN No. 2592 Exp. 6/30 GEOTECHNICAL STATE OF CALIFORNIA

CONSTRUCTION NOTES:

1
(5) CONSTRUCT 42" RCP TO LOAD PER PROFILE)
6'W x 3.5' H
(6) CONSTRUCT DOUBLE REINFORCED CONCRETE BOX CULVERT PER S.P.P.W.C. 390-1. USE 6'W X 4'H REINFORCED CONCRETE BASE FOR STRUCTURE STEEL, SEE NOTES HEREON.
(10) CONSTRUCT JUNCTION STRUCTURE PIPE TO RCB PER SPPWC 333-2
(10a) CONSTRUCT MODIFIED JUNCTION STRUCTURE PIPE TO RCB PER SPPWC 333-2, SEE SHEET 16 AND 17 FOR DETAIL.
(16) CONSTRUCT CHAIN LINK FENCE PER SPPWC STD. PLAN NO 600-3
(19) CONSTRUCT ELEVATED INLET PER DETAIL ON SHEET 10
(20) CONSTRUCT MODIFIED TRANSITION STRUCTURE PER CALTRANS DETAIL D86A, SEE DETAIL 20 ON SHEET 11
(21) CONSTRUCT MANHOLE CONCRETE BOX STORM DRAIN PER SPPWC STD 323-2
(34) CONSTRUCT VARIABLE WIDTH 3" ASPHALT CONCRETE OVER 4" CRUSHED AGGREGATE BASE PER DETAIL ON SHEET 11
(36) INSTALL SLOPE PROTECTION BARRIER PER SPPWC STD. 360-2, USE 2(TWO) 4'(H) X6'(W) AND MODIFIED TO 3.5'(H) X 6'(W)
(37) INSTALL DEBRIS DAMS AND OUTLET WORKS PER LOS ANGELES COUNTY PUBLIC WORKS STANDARD PLAN #3097-0
(38) CONSTRUCT CONCRETE BLANKET PER SPPWC 225-2

STANDARD 390-1 PRECAST REINFORCED CONCRETE BOX NOTES:

1. THE FOLLOWING NOTES REFER TO KEY DETAILS IN THE STANDARD PLAN. THESE NOTES ARE NOT ALL ENCOMPASSING. THE CONTRACTOR SHOULD REVIEW THE STANDARD PLAN IN ITS ENTIRETY.
2. MULTIPLE CELL INSTALLATION PER TYPICAL SECTION DETAIL ON SHEET 6
3. EXCAVATION AND BACKFILL PER DETAIL 2 ON SHEET 8
4. CRUVES CONSTRUCTED PER PRECAST REINFOCED CONCRETE BOX BEVELS DETAIL ON SHEET 11
5. VELOCITY REQUIRES 2.5" STEEL COVER PER NOTE 2 ON SHEET 13

REVIEWED LAND DEVELOPMENT DIVISION
BY _____ 08/13/2018
STORM DRAIN SECTION DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
1	ADD INLET AND OUTLET STRUCTURE DIMENSION AND			11/15/18
	REVISE CONSTRUCTION NOTE PER STRUCTURAL REVIEW. REMOVING NOT A PART OF THIS APPROVAL			

REGISTERED PROFESSIONAL ENGINEER JASON R. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
8/10/18
JASON H. FUKUMITSU DATE

STORM DRAIN PLANS IN
DS 542 P.D. No. 2637
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
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DWG | SHEET 4 OF 17

P.D. No. 2637

DDN No. 43-F551

G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2637\HW102-04 - Sheet 4.dwg Plotted On Jul 25, 2018-1:13pm by wsilani

SCALE: HOR. 1"=40'
VERT. 1"=8'

P.D. No. 2637

DDN No. 43-F551

STORM DRAIN LINE "A"

STORM DRAIN LINE "A-6"

MAGIC MOUNTAIN PARKWAY

STORM DRAIN LINE "A"

MAGIC MOUNTAIN PARKWAY

STORM DRAIN LINE "A-6"

MEDIA CENTER LANE

CONSTRUCTION NOTES:

1. CONSTRUCT 18" RCP (D-LOAD PER PROFILE)
2. CONSTRUCT 24" RCP (D-LOAD PER PROFILE)
5. CONSTRUCT 42" RCP (D-LOAD PER PROFILE)
7. CONSTRUCT JUNCTION STRUCTURE PIPE TO PIPE PER SPPWC STD. 331-3.
8. CONSTRUCT MANHOLE PIPE TO PIPE PER SPPWC STD. 322-2.
9. CONSTRUCT CURB OPENING CATCH BASIN PER SPPWC STD. 300-3 AND LOCAL DEPRESSION PER SPPWC STANDARD PLAN 313-3, PER STREET PLAN. INSTALL AUTOMATIC RETRACTABLE SCREEN (ARS) AND CONNECTOR PIPE SCREEN PER DETAIL SHEET 12.
12. CONSTRUCT CONCRETE COLLAR FOR RCP PER SPPWC STD. 380-4.
23. PROVIDE RUBBER GASKET JOINTS ON BOTH SIDES OF CUT/FILL TRANSITION (3 JOINTS MIN. EACH SIDE OR 24' MIN EACH SIDE)
28. CONSTRUCT BRICK AND MOTOR PLUG
29. CONSTRUCT CLEANOUT PER DETAIL 29 ON SHEET 11
33. CONSTRUCT MANHOLE PIPE TO PIPE PER SPPWC STD. 320-2.
35. CONSTRUCT BACKFILL STABILIZER PER SPPWC STD. 221-2
38. CONSTRUCT CONCRETE BLANKET PER SPPWC 225-2

GRAPHIC SCALE: 1" = 40'

JUNCTION STRUCTURE TABLE

LINE #	A	B	C	D	EL S	EL R
A-1	65°35'	24"	2.26'	42"	1137.64	1137.75
A-2	44°11'	18"	3.22'	42"	1140.30	1140.70
A-3	90°00'	24"	2.00'	42"	1112.80	1113.02
A-4	60°30'	18"	1.50'	24"	1140.88	1140.95
A-5	90°00'	18"	1.12'	42"	1119.93	1119.99
A-7	90°00'	18"	2.00'	42"	1109.78	1110.12
A-9	69°46'	24"	2.00'	42"	1132.07	1132.20

Line Table

Line #	Length	Bearing
L1	53.17'	N11° 52' 12"W
L2	138.13'	N79° 21' 38"W
L3	105.89'	N49° 35' 06"E
L4	138.71'	N27° 44' 55"W
L5	47.93'	S25° 33' 05"E
L6	~~57.16'~~ 12.30'	N40° 12' 41"E

Line Table

Line #	Length	Bearing
L7	55.61'	N16° 51' 31"E
L8	36.29'	N22° 34' 09"E
L9	128.77'	N26° 25' 37"W
L10	48.82'	N31° 11' 51"W
L11	152.83'	N03° 31' 53"E

Curve Table

Curve #	Length	Radius	Delta	Tangent
C1	237.23'	1754.99'	007°44'42"	118.80'
C2	137.20'	90.00'	087°20'34"	85.92'
C3	13.52'	22.50'	034°25'01"	6.97'
C4	76.96'	90.00'	048°59'46"	41.01'
C5	15.27'	90.00'	09°43'17"	7.65'

Line Table

Line #	Length	Bearing
L12	40.91'	N 49°55'59" E

REVIEWED LAND DEVELOPMENT DIVISION
BY _____ STORM DRAIN SECTION
08/13/2018 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	REVISED LINE A4 PER RELOCATED CATCH BASIN			5/28/19

ANDREW A. PRIDE, No. 1209, CERTIFIED ENGINEERING GEOLOGIST, STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER, VINCENT PING-HOU LIU, No. 2622, exp. 2/20, GEOTECHNICAL, STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER, JASON R. FUKUMITSU, No. 40695, CIVIL, STATE OF CALIFORNIA
8/10/18
JASON H. FUKUMITSU DATE

STORM DRAIN PLANS IN
DS 542 P.D. No. 2637
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
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DWG

SHEET 3 OF 17

G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2637\HW102-03 - Sheet 3.dwg Plotted On Jun 27, 2018--5:35pm by dinar

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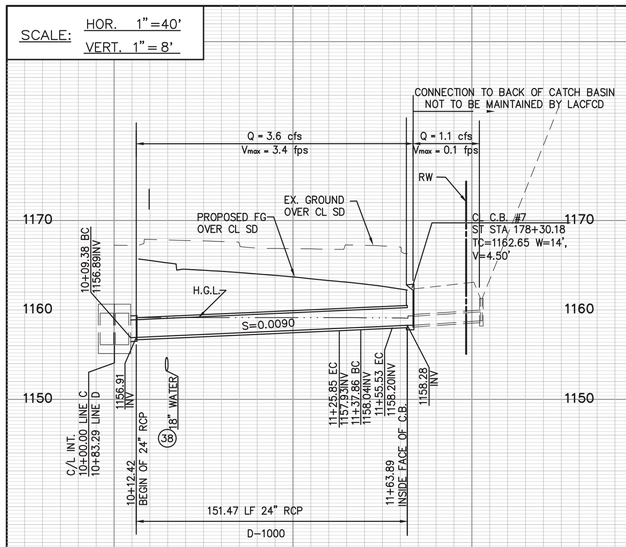
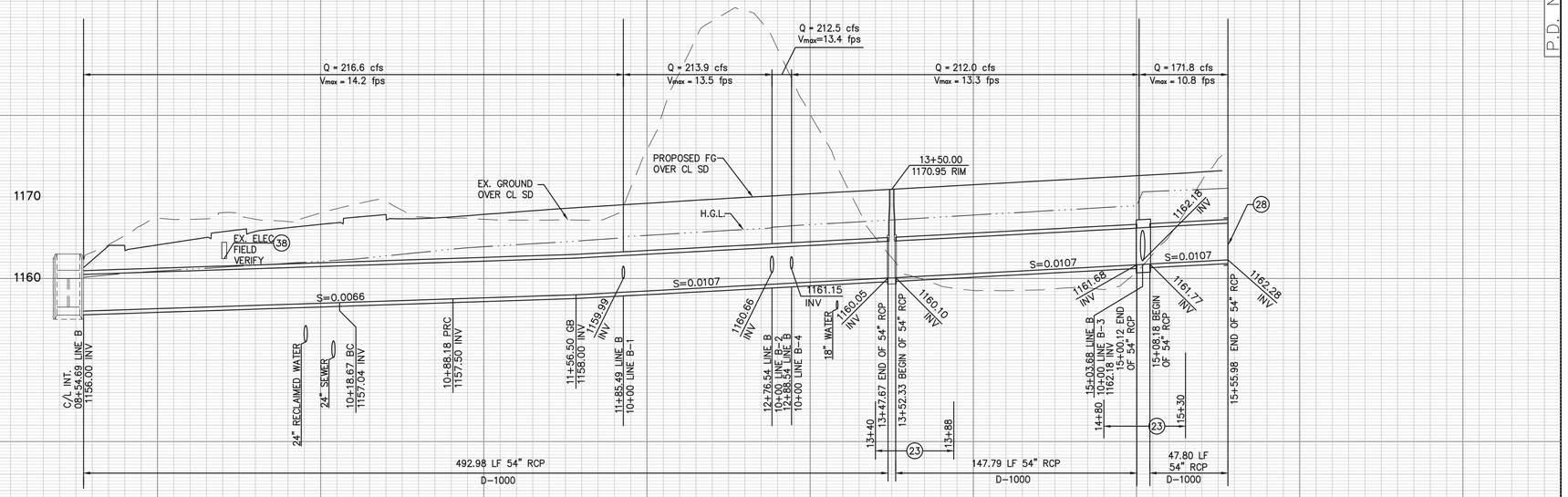
VERT. 1"=8'



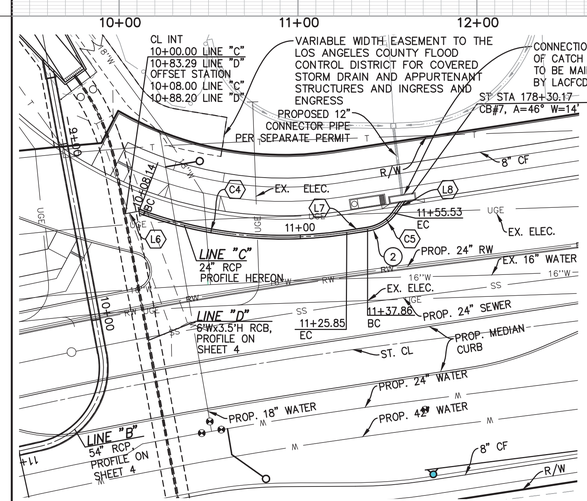
STORM DRAIN "C"



STORM DRAIN LINE "B"

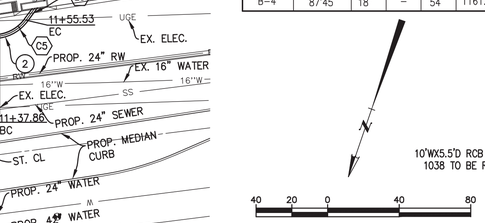
P.D. No. 2637

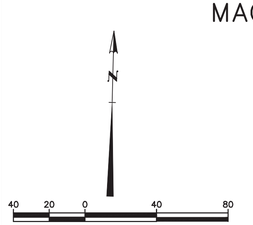
DDN No. 43-F551



MAGIC MOUNTAIN PARKWAY
STORM DRAIN "C"

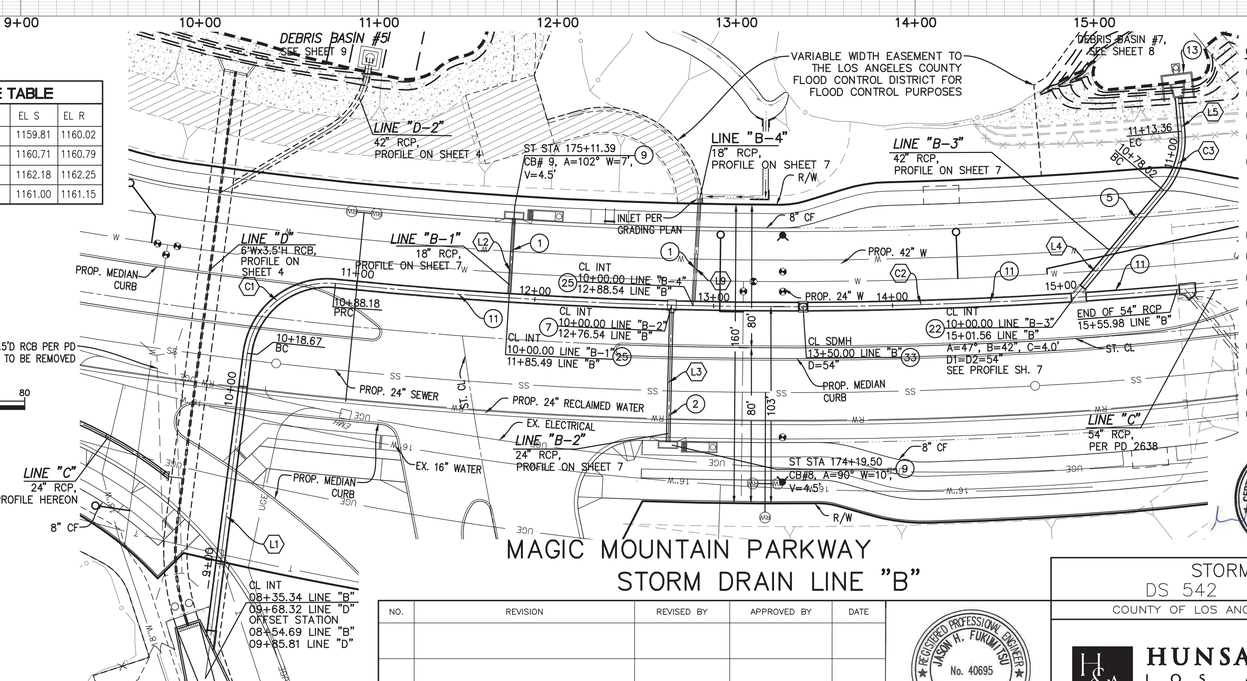
JUNCTION STRUCTURE TABLE						
LINE #	A	B	C	D	EL S	EL R
B-1	90°00'	18"	–	54"	1159.81	1160.02
B-2	90°00'	24"	1.75'	54"	1160.71	1160.79
B-3	46°35'	42"	3.98'	54"	1162.18	1162.25
B-4	87°45'	18"	–	54"	1161.00	1161.15





Curve Table				
Curve #	Length	Radius	Delta	Tangent
C1	69.51	45.00	088°29'58"	43.84
C2	361.61	2477.00	007°19'25"	158.52
C3	35.34	45.00	045°00'00"	18.64
C4	117.71	232.00	029°04'11"	60.15
C5	17.67	22.50	045°00'00"	9.32

Line Table		
Line #	Length	Bearing
L1	183.34'	N11° 56' 19"W
L2	37.50'	N15° 41' 22"W
L3	76.49'	N17° 47' 43"W
L4	78.02	N20° 25' 05"E
L5	18.97	N24° 34' 55"W
L6	7.64	N78° 03' 42"E
L7	12.01	S79° 55' 59"W
L8	8.36	S34° 55' 59"W
L9	59.79	N15° 49' 00"E



MAGIC MOUNTAIN PARKWAY
STORM DRAIN LINE "B"

CONSTRUCTION NOTES:

1. CONSTRUCT 18" RCP (D-LOAD PER PROFILE)
2. CONSTRUCT 24" RCP (D-LOAD PER PROFILE)
5. CONSTRUCT 42" RCP (D-LOAD PER PROFILE)
7. CONSTRUCT JUNCTION STRUCTURE PIPE TO PIPE PER SPPWC STD. 331-3.
9. CONSTRUCT CURB OPENING CATCH BASIN PER SPPWC STD. 300-3 AND LOCAL DEPRESSION PER SPPWC STANDARD PLAN 313-3, PER STREET PLAN. INSTALL AUTOMATIC RETRACTABLE SCREEN (ARS) AND CONNECTOR PIPE SCREEN PER DETAIL SHEET 12.
11. CONSTRUCT 54" RCP (D-LOAD PER PROFILE)
13. CONSTRUCT DESILTING INLET PER DETAIL ON SHEET NO. 8
22. CONSTRUCT TRANSITION STRUCTURE PIPE PER SPPWC STD. 340-2.
23. PROVIDE RUBBER GASKET JOINTS ON BOTH SIDES OF CUT/FILL TRANSITION (3 JOINTS MIN. EACH SIDE OR 24" MIN EACH SIDE)
25. CONSTRUCT JUNCTION STRUCTURE PIPE TO PIPE PER SPPWC STD. 332-3.
28. CONSTRUCT BRICK AND MOTOR PLUG
33. CONSTRUCT MANHOLE PIPE TO PIPE PER SPPWC STD. 320-2.
38. CONSTRUCT CONCRETE BLANKET PER SPPWC 225-2

CERTIFIED ENGINEERING GEOLOGIST
ANDREW A. PRICE
No. 1705
STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER
VINCENT PING-HUEN TSO
No. 26222
CIVIL
STATE OF CALIFORNIA

REVIEWED LAND DEVELOPMENT DIVISION
BY _____ 08/13/2018
STORM DRAIN SECTION DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE

REGISTERED PROFESSIONAL ENGINEER
JASON H. FUKUMITSU
No. 40695
CIVIL
STATE OF CALIFORNIA
8/10/18
JASON H. FUKUMITSU DATE

STORM DRAIN PLANS IN
DS 542 P.D. No. 2637
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
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PLANNING ▪ ENGINEERING ▪ SURVEYING
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DWG | SHEET 5 OF 17

G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2637\HW102-05 - Sheet 5.dwg Plotted On Jul 18, 2018 - 2:11pm by wallonl

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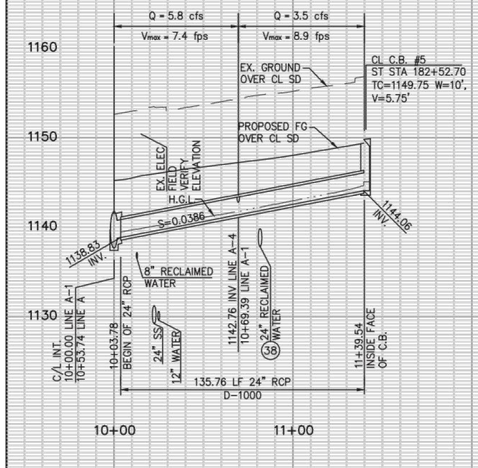
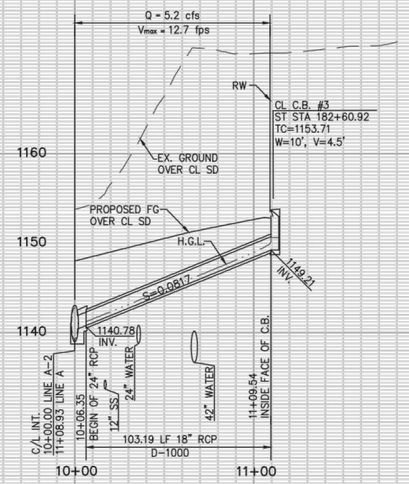
VERT. 1"=8'



STORM DRAIN LINE "A-1"



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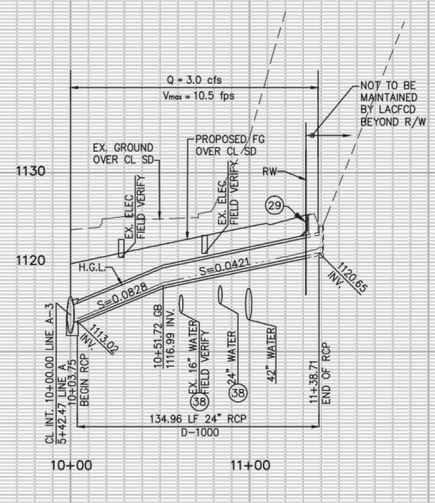

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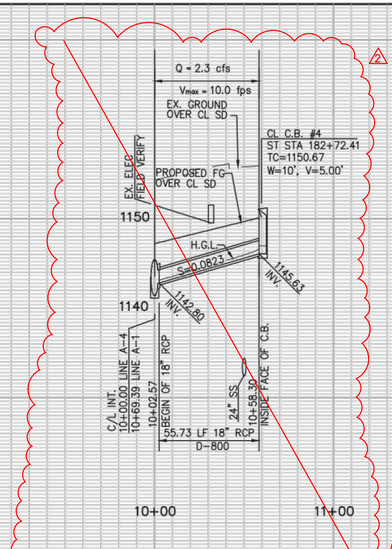
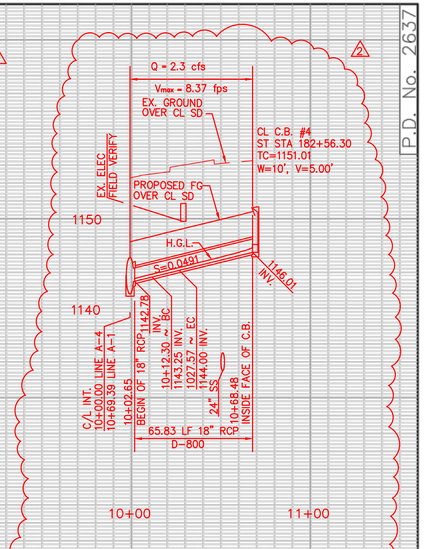
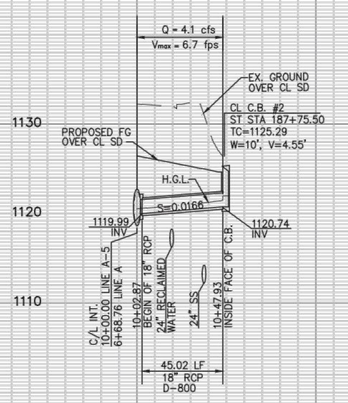


STORM DRAIN LINE "A-4"

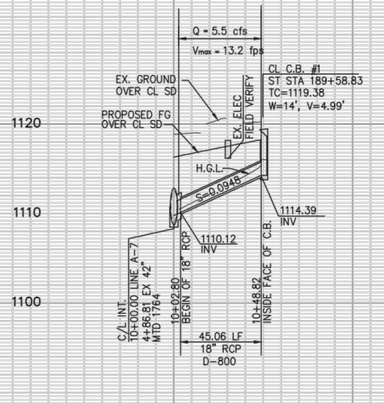


STORM DRAIN LINE "A-4"

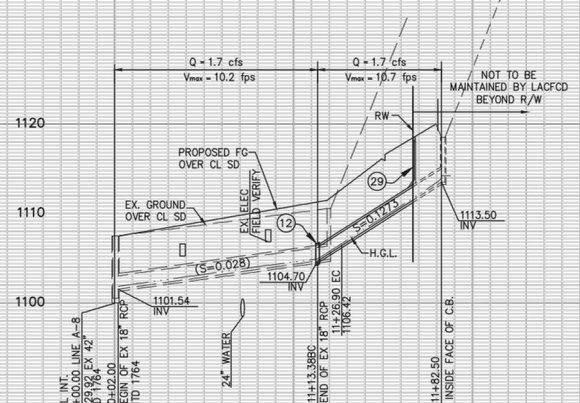
P.D. No. 2637



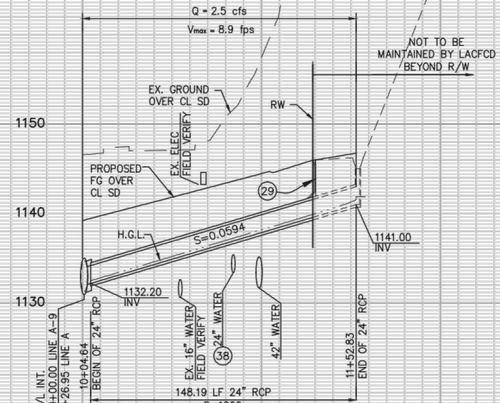
STORM DRAIN LINE "A-5"



STORM DRAIN LINE "A-7"



STORM DRAIN LINE "A-8"



STORM DRAIN LINE "A-9"

DDN No. 43-F551

CONSTRUCTION NOTES:

(12) CONSTRUCT CONCRETE COLLAR FOR RCP PER SPPWC STD. 380-4
(29) CONSTRUCT CLEANOUT PER DETAIL 29 ON SHEET 11
(38) CONSTRUCT CONCRETE BLANKET PER SPPWC 225-2

CERTIFIED ENGINEERING GEOLOGIST — ANDREW A. PRIDE No. 1705 — STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER — VINCENT PING-XUEN TI No. 2522 Exp. 6-30-20 — GEOTECHNICAL — STATE OF CALIFORNIA

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	REVISED LINE A4 PER RELOCATED CATCH BASIN			5/28/19

REVIEWED LAND DEVELOPMENT DIVISION
BY _____ STORM DRAIN SECTION
08/13/2018 DATE

REGISTERED PROFESSIONAL ENGINEER — JASON H. FUKUMITSU No. 40695 CIVIL — STATE OF CALIFORNIA
8/10/18 DATE
JASON H. FUKUMITSU

STORM DRAIN PLANS IN
DS 542 P.D. No. 2637
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

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DWG | SHEET 6 OF 17

G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2637\HM\102-06 - Sheet 6.dwg Plotted On May 21, 2018-8:34pm by jomgs

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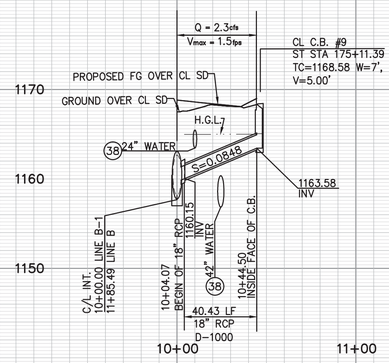
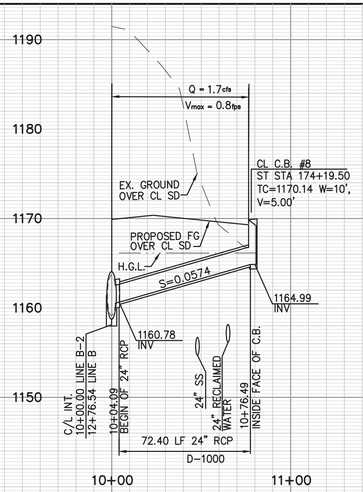
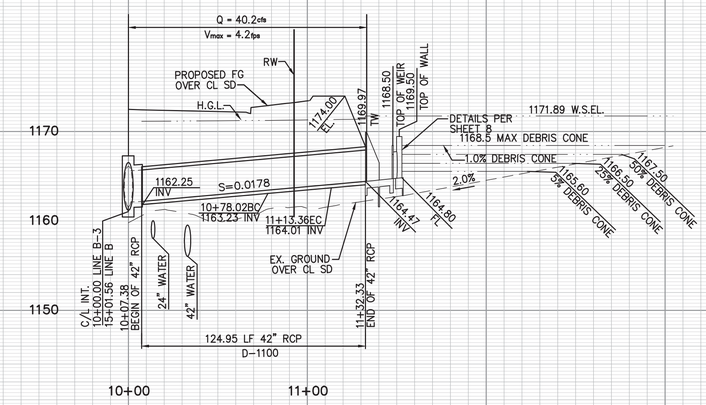


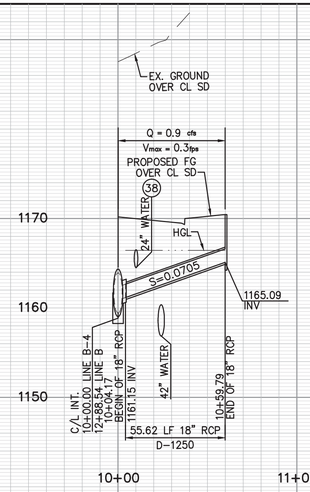
STORM DRAIN LINE "B-1"



STORM DRAIN LINE "B-2"



STORM DRAIN LINE "B-3"



STORM DRAIN LINE "B-4"

P.D. No. 2637

DDN No. 43-F551





CONSTRUCTION NOTES:

(38) CONSTRUCT CONCRETE BLANKET PER SPPWC 225-2

REVIEWED LAND DEVELOPMENT DIVISION
BY _____ STORM DRAIN SECTION
08/13/2018 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE



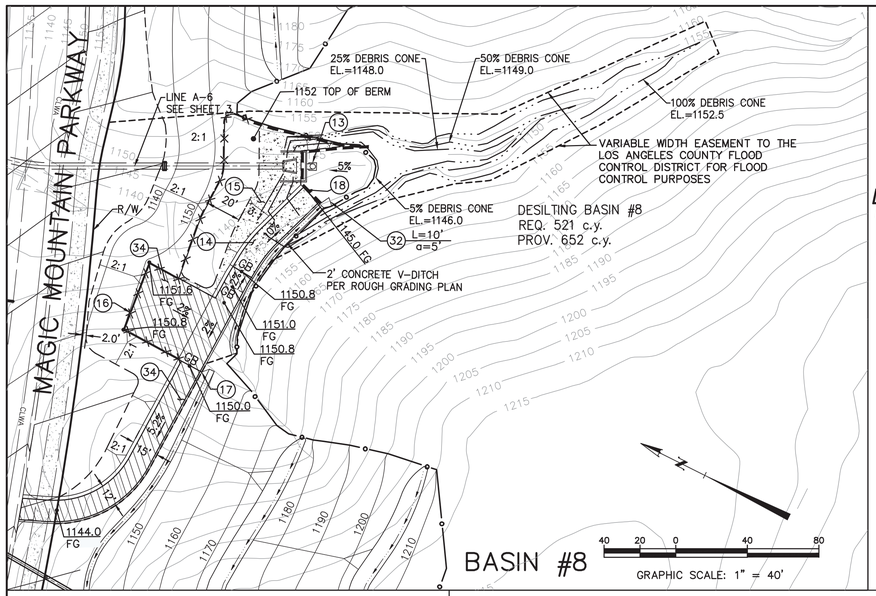
8/10/18
JASON H. FUKUMITSU DATE

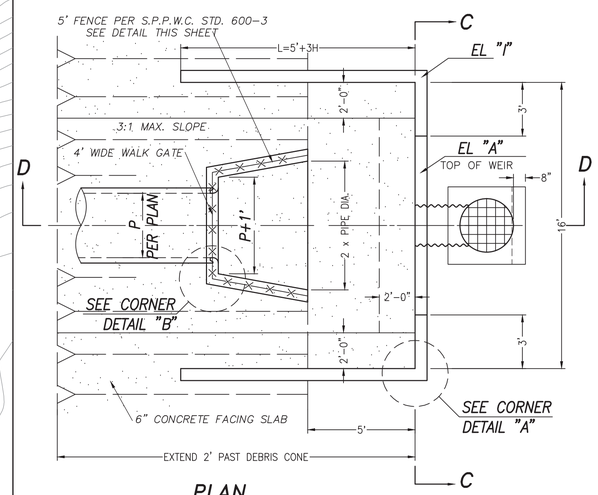
STORM DRAIN PLANS IN
DS 542 P.D. No. 2637
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

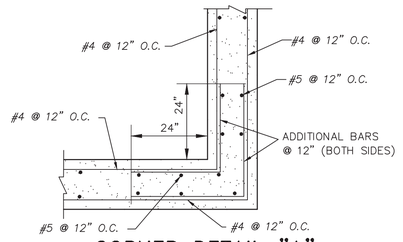
HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
26074 Avenue Hall, Suite 23 ▪ Valencia, CA 91355 ▪ PH: (661) 294-2211 ▪ FX: (661) 294-9890

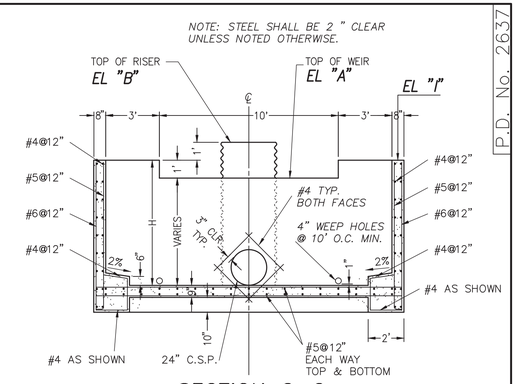
DWG | SHEET 7 OF 17

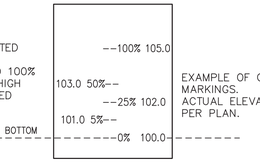
G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2637\HW102-07 - Sheet 7.dwg Plotted On May 21, 2018 - 6:34pm by jongs

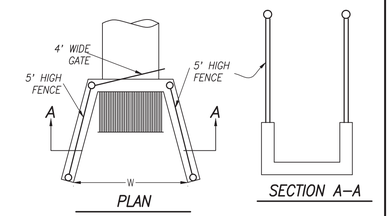


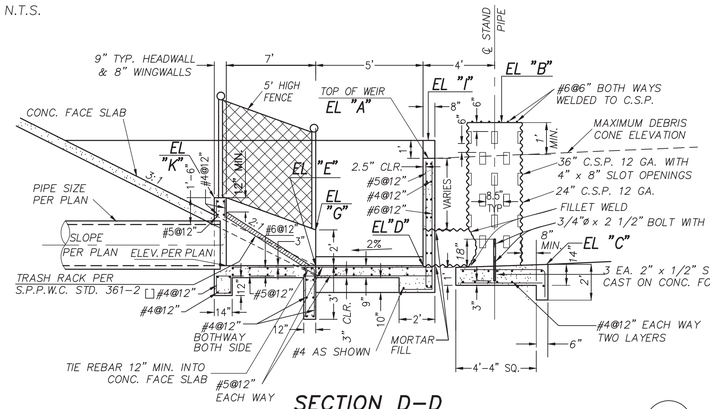


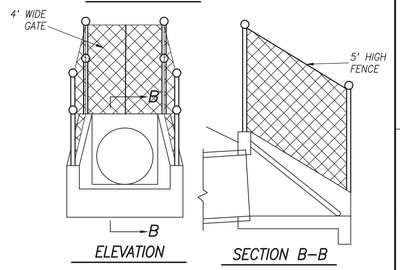


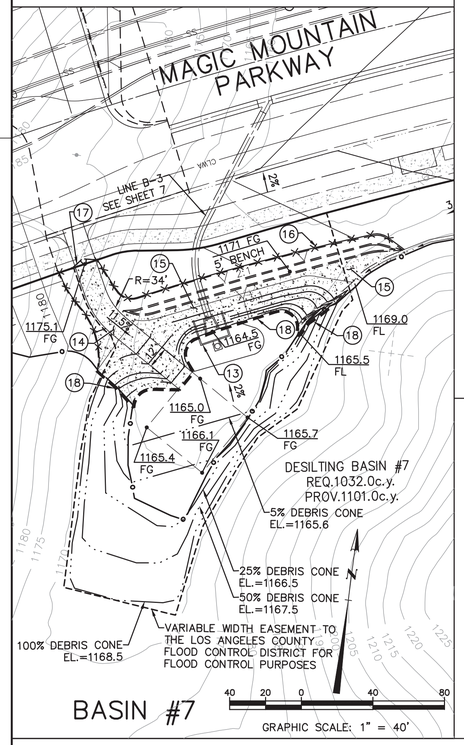


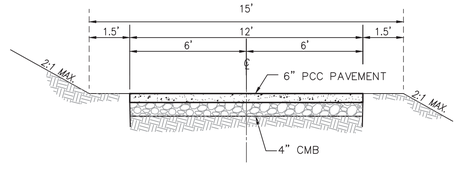






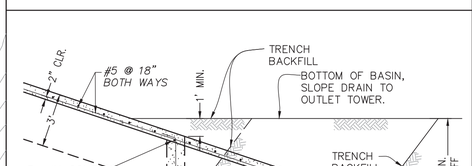




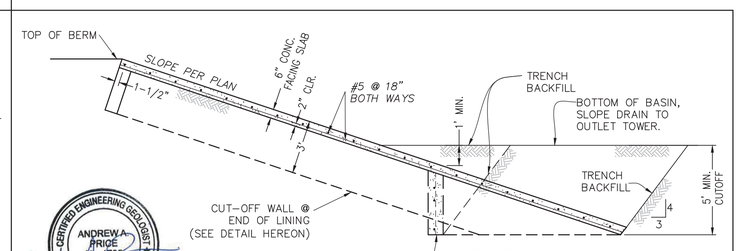


*BRUSHED SURFACE IS REQUIRED FOR ACCESS ROAD WHEN RAMP EXCEEDS 10% IN SLOPE

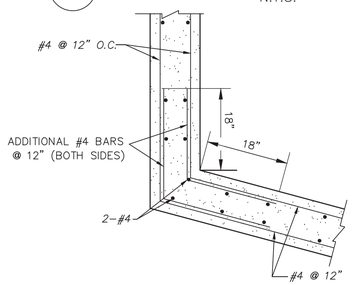
14 CONCRETE ACCESS ROAD
N.T.S.



18 CUTOFF WALL DETAIL
N.T.S.



15 CONCRETE FACING/SLOPE PROTECTION
N.T.S.



13 DESILTING INLET DETAILS
N.T.S.

CONSTRUCTION NOTES:

13. CONSTRUCT DESILTING INLET PER DETAIL 13 HEREON
14. CONSTRUCT 12' WIDE 6" CONCRETE ACCESS ROAD OVER 4" CRUSHED AGGREGATE BASE PER DETAIL 14 HEREON
15. CONSTRUCT CONC. FACING/SLOPE PROTECTION PER DETAIL 15 HEREON
16. CONSTRUCT CHAIN LINK FENCE PER SPPWC STD. PLAN NO 600-3.
17. CONSTRUCT DOUBLE DRIVE GATE PER SPPWC STD. PLAN NO 600-3 (W=12' PER LEAF)
18. CONSTRUCT CUT OFF WALL PER DETAIL 18 HEREON
32. CONSTRUCT RIP-RAP APRON PER DETAIL 32 ON SHEET 11
34. CONSTRUCT VARIABLE WIDTH 3" ASPHALT CONCRETE OVER 4" CRUSHED AGGREGATE BASE PER DETAIL ON SHEET 11.

DESILTING INLET STRUCTURE

		ELEVATIONS								LENGTH	
SHT. NO.	LINE	A	B	C	D	E	I	G	K	P	W
3	A-6	1149.00	1151.00	1145.37	1145.15	1145.00	1150.00	1147.05	1149.30	3.5'	7'
7	B-3	1168.50	1170.50	1164.80	1164.60	1164.50	1169.50	1166.50	1169.97	3.5'	7'

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRIOE No. 1705 STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER ROBERT PING ADENT No. 2522 Exp. 12/20 GEOTECHNICAL STATE OF CALIFORNIA

REVIEWED LAND DEVELOPMENT DIVISION
BY _____ STORM DRAIN SECTION
08/13/2018 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
8/10/18
JASON H. FUKUMITSU DATE

STORM DRAIN PLANS IN
DS 542 P.D. No. 2637
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
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DWG | SHEET 8 OF 17

P.D. No. 2637

DDN No. 43-F551

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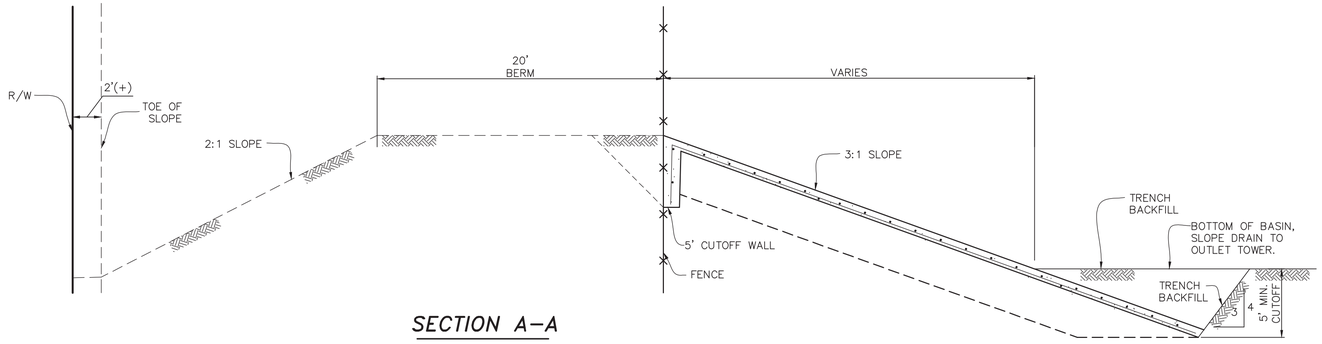
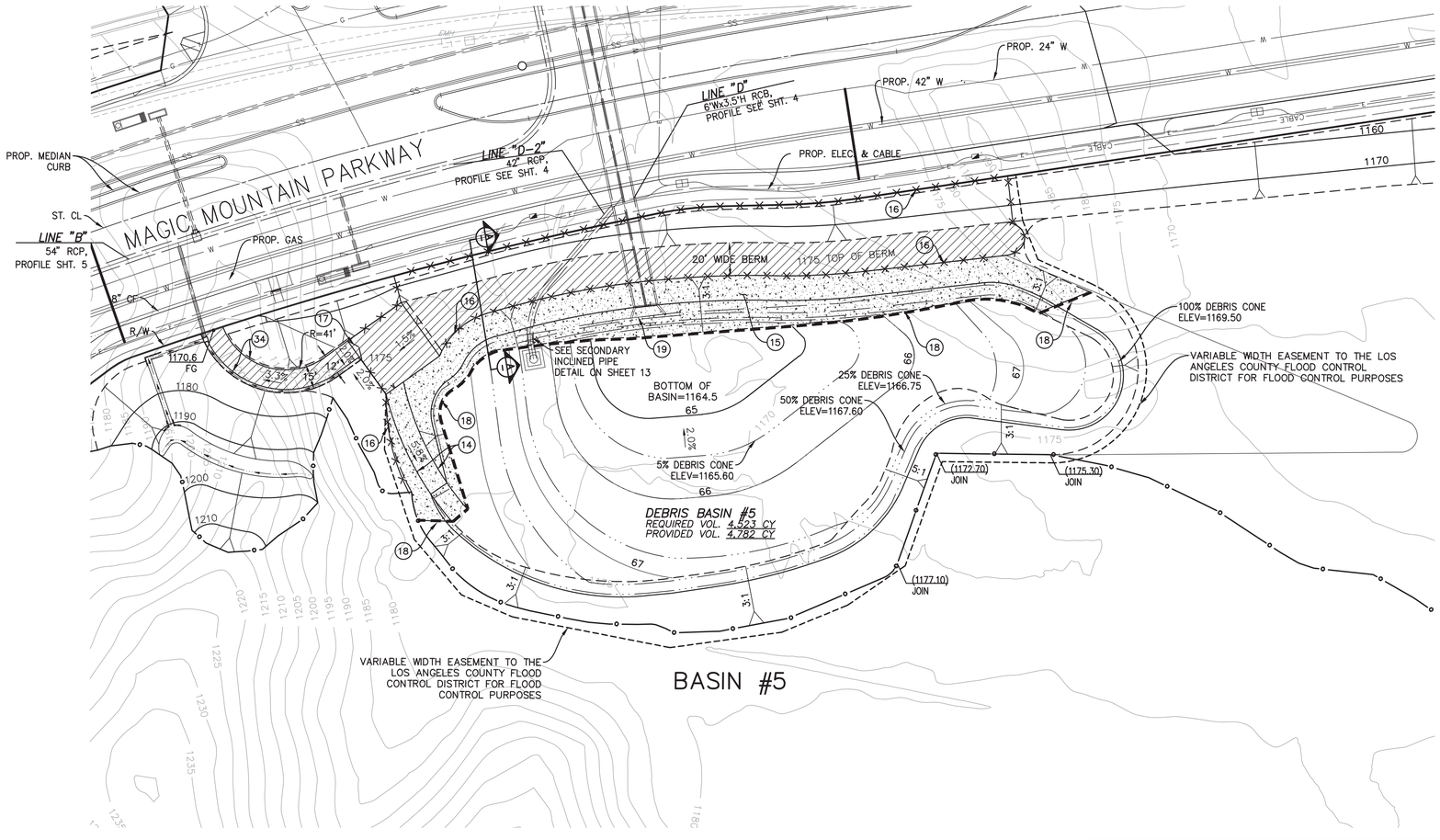


SECTION A–A

N.T.S.



BASIN #5

CONSTRUCTION NOTES:

(14) CONSTRUCT 12' WIDE 6" CONCRETE ACCESS ROAD OVER 4" CRUSHED AGGREGATE BASE PER DETAIL 14 ON SHEET 8

(15) CONSTRUCT CONC. FACING/SLOPE PROTECTION PER DETAIL ON SHEET 8

(16) CONSTRUCT CHAIN LINK FENCE PER SPPWC STD. PLAN NO 600-3.

(17) CONSTRUCT DOUBLE DRIVE GATE PER SPPWC STD. PLAN NO 600-3 (W=12' PER LEAF)

(18) CONSTRUCT CUT OFF WALL PER DETAIL ON SHEET 8

(19) CONSTRUCT ELEVATED INLET PER DETAIL ON SHEET 10

(34) CONSTRUCT VARIABLE WIDTH 3" ASPHALT CONCRETE OVER 4" CRUSHED AGGREGATE BASE PER DETAIL ON SHEET 11

N

40 20 0 40 80

GRAPHIC SCALE: 1" = 40'

CERTIFIED ENGINEERING GEOLOGIST
ANDREW A. PRICE
No. 1705
STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER
VINCENT PING-KUEI LO
No. 2522
Exp. 9/30
GEOTECHNICAL
STATE OF CALIFORNIA

NO.	REVISION	REVISED BY	APPROVED BY	DATE

REVIEWED LAND DEVELOPMENT DIVISION

BY _____ 08/13/2018
STORM DRAIN SECTION DATE

REGISTERED PROFESSIONAL ENGINEER
JASON H. FUKUMITSU
No. 40695
CIVIL
STATE OF CALIFORNIA

8/10/18
JASON H. FUKUMITSU DATE

STORM DRAIN PLANS IN
DS 542 P.D. No. 2637

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DWG

SHEET 9 OF 17

P.D. No. 2637

DDN No. 43-F551

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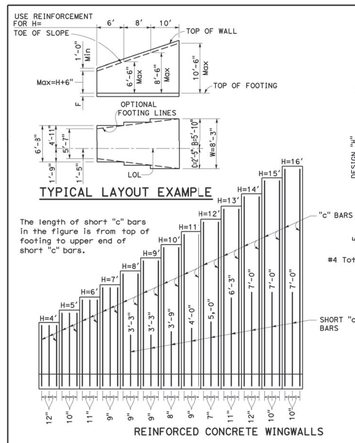
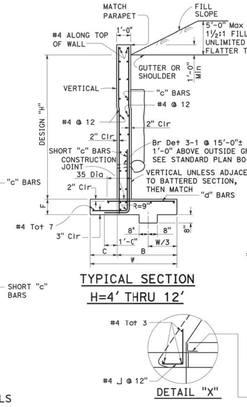
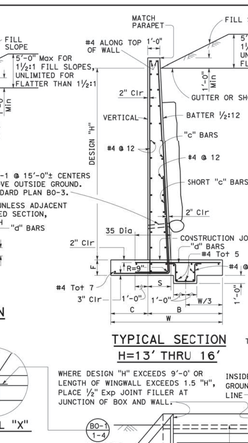


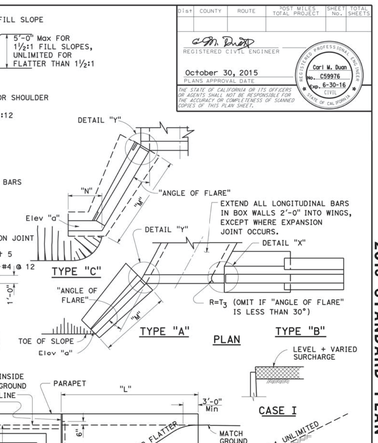
TYPICAL LAYOUT EXAMPLE



TYPICAL SECTION H=4' THRU 12'



TYPICAL SECTION H=13' THRU 16'



DETAIL "X"



END ELEVATION STRAIGHT WINGWALLS

DETAIL OF DESIGN LOADING CASES

"H"	4'	5'	6'	7'	8'	9'	10'	11'	12'	13'	14'	15'	16'
W	5'-7"	6'-2"	6'-8"	7'-1"	7'-6"	7'-10"	8'-3"	8'-8"	9'-2"	9'-7"	10'-2"	10'-6"	11'-1"
C	1'-5"	1'-7"	1'-9"	1'-11"	2'-1"	2'-3"	2'-5"	2'-8"	2'-10"	3'-1"	3'-4"	3'-6"	3'-8"
B	4'-2"	4'-7"	4'-11"	5'-2"	5'-5"	5'-7"	5'-10"	6'-0"	6'-4"	6'-5"	6'-10"	7'-0"	7'-5"
F	1'-2"	1'-2"	1'-2"	1'-2"	1'-2"	1'-2"	1'-2"	1'-3"	1'-5"	1'-5"	1'-6"	1'-6"	1'-8"
BATTER	← None →								½:12				
S	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-6½"	1'-7"	1'-7½"	1'-8"
"c" BARS	#4@12	#4@10	#5@11	#5@9	#6@9	#7@9	#7@8	#8@9	#7@7	#8@11	#9@12	#10@10	#10@10
"d" BARS	#5@12	#5@10	#6@11	#6@9	#6@9	#6@9	#6@8	#7@9	#6@7	#7@11	#8@12	#8@10	#9@10
* Conc CY/LF	0.46	0.52	0.58	0.64	0.69	0.74	0.80	0.88	1.00	1.25	1.37	1.45	1.61
* Reinf LB/LF	26	32	41	50	59	70	81	95	102	99	120	156	171
** CASE I (a) (kef), B' (ft)	3.75,2.24	3.66,2.69	3.59,3.11	3.56,3.49	3.52,3.89	3.52,4.21	3.69,4.46	3.71,4.77	3.89,5.17	3.92,5.61	3.92,6.18	4.04,6.40	4.13,6.95
** CASE II (a) (kef), B' (ft)	1.16,5.58	1.33,6.13	1.51,6.55	1.69,6.86	1.88,7.16	2.08,7.33	2.29,7.60	2.50,7.86	2.77,8.14	2.97,8.47	3.18,8.93	3.41,9.05	3.70,9.43
** CASE III (a) (kef), B' (ft)	1.26,5.46	1.36,5.97	1.49,6.31	1.64,6.66	1.79,6.93	1.95,7.08	2.11,7.33	2.28,7.55	2.50,7.84	2.66,8.12	2.81,8.59	3.00,8.69	3.22,9.10

B'=B-(2) eccentricity, B' is the effective footing width.
* Quantities include 1'-0" extension above the design "H" limit.
** Soil bearing pressure shown in the table is the equivalent uniform pressure per AASHTO LRFD - 11.6.3.2

NOTES:

Unit Stresses: f'c=3,600 psi, fy=60,000 psi
Earth density: 120 pcf
Equivalent fluid pressure: 36 pcf
Elevations, length and angle of flare of wings may be varied by the Engineer to suit conditions encountered in the field.
Dimensions "H","L","M","N", Elevation "a" and "Angle of flare" (as applicable) are shown on the plans.
Wall height may be exceeded by 6" before going to next greater "H".
Eliminate cutoff wall if adjacent channel is paved and skew is 20° maximum.
For wall offset values, see Standard Plan B3-5.



DETAIL "Y"



SECTION B-B

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

BOX CULVERT WINGWALLS TYPES A, B AND C

NO SCALE

D84

2015 STANDARD PLAN D84

DESIGN NOTES:

Specifications:
AASHTO LRFD Bridge Design Specifications, 4th Edition with California Amendments.

Earth load:
140 pcf Vert, 42 pcf Horiz
140 pcf Vert, 140 pcf Horiz

Unit stresses:
f'c = 5.0 ksi
fy = 65.0 ksi for weld wire fabric
n = 7

Shear:
Based on
$V_n = (2.14\sqrt{f'_c}+4600\ \frac{A_s}{bd}\frac{V_u d_e}{M_u}) b_v d_e \le 4.0\sqrt{f'_c} b_v d_e$ (Pounds)
V_n shall not be less than $3.00\sqrt{f'_c} b_v d_e$
for frame members and $2.5\sqrt{f'_c} b_v d_e$
for simply supported members.

Exclusion:
Axial loading on the members has not been considered.

GENERAL NOTES:

Designation:
Standard single or multiple precast box culverts are shown on the plans as span times height with maximum cover over roof thusi 8' x 5' RCB with 10'-0" or double 10' x 5' RCB with 20'-0", followed by alternatives.

Alternatives:
Single cell:
Standard dimensions of AASHTO Material Specification 'M259' or 'M273'.
Multiple cell:
Constructed by placing single cells adjacent to each other. Inlet and outlet ends of culvert will be rounded unless square ends are designated. Parapet will be shown unless designated in plans. Such designation may be different for inlet and outlet ends.

Limitations:
Where the overfill is less than 12", Precast RCB culverts are not to be used. Precast RCB culverts are not to be used in siphon or pressurized installations unless appropriate 'watertight' jointing is provided.

Special reinforcement coverage:
Precast RCB culvert standard plans are not to be used in a corrosive environment or where there is a severe abrasive flow condition or freeze-thaw locations.

Special design:
Required for culvert with different conditions, loads or design bearing pressures greater than those given on these plans. Required for culverts where end details need higher skew angles, higher parapets or barrier sections.

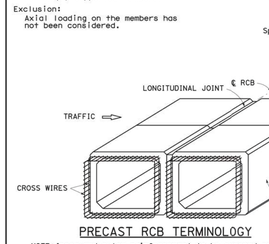
CONSTRUCTION NOTES:

Cutoff walls:
4'-0" Cutoff walls are to be provided at inlet and/or outlet unless channel is lined and unless otherwise shown. These walls are to be extended if scour conditions warrant. See Standard Plans D84, D85 and D86A.

Wingwalls:
Wingwalls shall be cast-in-place and shall conform to standard plan details for box culvert wingwalls. See Standard Plans D84, D85 and D86A.

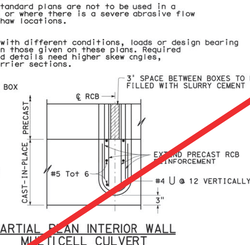
Earthwork:
See Standard Plan A62G.

Construction loads:
Strutting may be required near temporary ends. For construction loads on culverts, See Standard Plan D88.



PRECAST RCB TERMINOLOGY

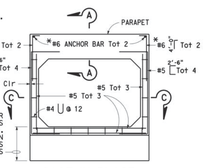
NOTE: Inner and outer reinforcement to be exposed as required to tie to cast-in-place construction. A minimum of two cross wires shall be exposed on all sides.



PARTIAL PLAN INTERIOR WALL MULTICELL CULVERT

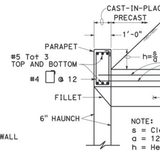
PARAPET "P" BARS			
SPAN \ SKEW ANGLE	0° TO 15°	16° TO 30°	31° TO 45°
4'-0"	#5	#5	#5
5'-0"	#5	#5	#6
6'-0"	#6	#6	#6
7'-0"	#7	#7	#7
8'-0"	#7	#7	#8
10'-0"	#8	#8	#9
12'-0"	#9	#9	#10

BARRIER PARAPET REINFORCEMENT

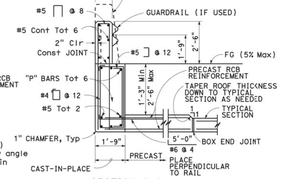


CAST-IN-PLACE END ELEVATION

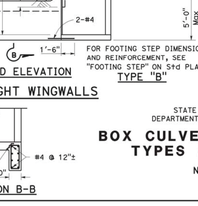
* Reinforcing required for barrier parapet application only.



SECTION A-A (Standard Height Parapet)

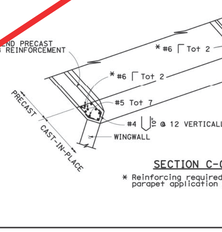


SECTION A-A (Barrier Parapet)



PARTIAL PLAN VIEW

For illustrative purposes only. For correct skew direction see plans.



SECTION C-C

* Reinforcing required for barrier parapet application only.

TYPICAL CULVERT END DETAILS

For wall and invert reinforcement not shown, See "End Elevation" detail.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

PRECAST REINFORCED CONCRETE BOX CULVERT MISCELLANEOUS DETAILS

NO SCALE

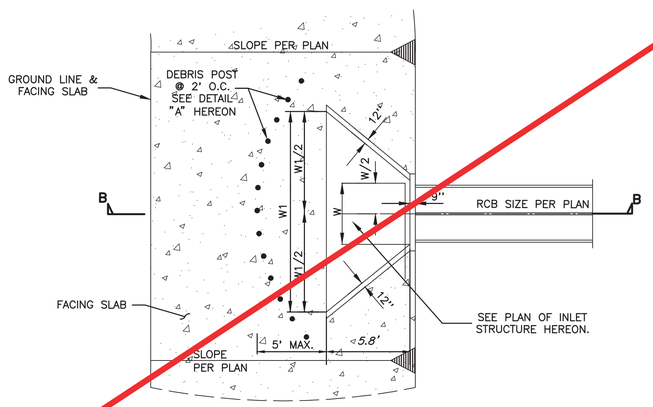
D83B

2015 STANDARD PLAN D83B

P.D. No. 2637

DDN No. 43-F551

VOID 1



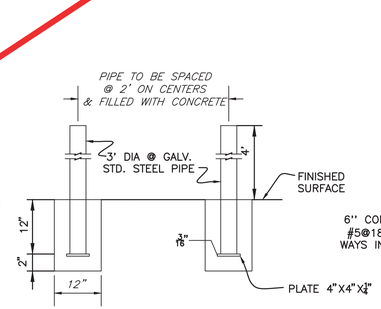
PLAN OF ELEVATED INLET

	W	W2	H	L
LINE B	13.00'	36.00'	5.20'	5.80'

DIMENSIONS TABLE

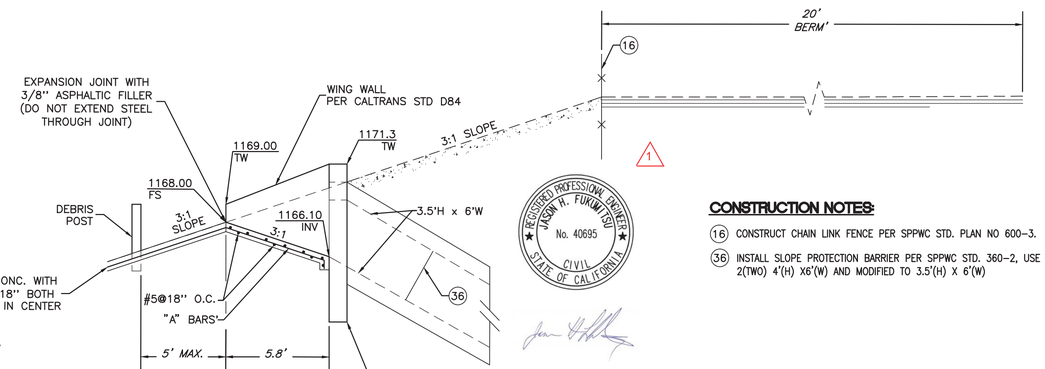
19 PLAN OF ELEVATED INLET STRUCTURE

N.T.S.



DETAIL "A"

N.T.S.



SECTION B-B (INLET STRUCTURE DETAIL)

N.T.S.

CONSTRUCTION NOTES:

16 CONSTRUCT CHAIN LINK FENCE PER SPPWC STD. PLAN NO 600-3.

36 INSTALL SLOPE PROTECTION BARRIER PER SPPWC STD. 360-2, USE 2(TWO) 4'(H) X6'(W) AND MODIFIED TO 3.5'(H) X 6'(W)

REVIEWED LAND DEVELOPMENT DIVISION
BY _____ STORM DRAIN SECTION
08/13/2018 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
1	VOID SHEET 10 SEE SHEET 10A FOR REVISION			11/15/18

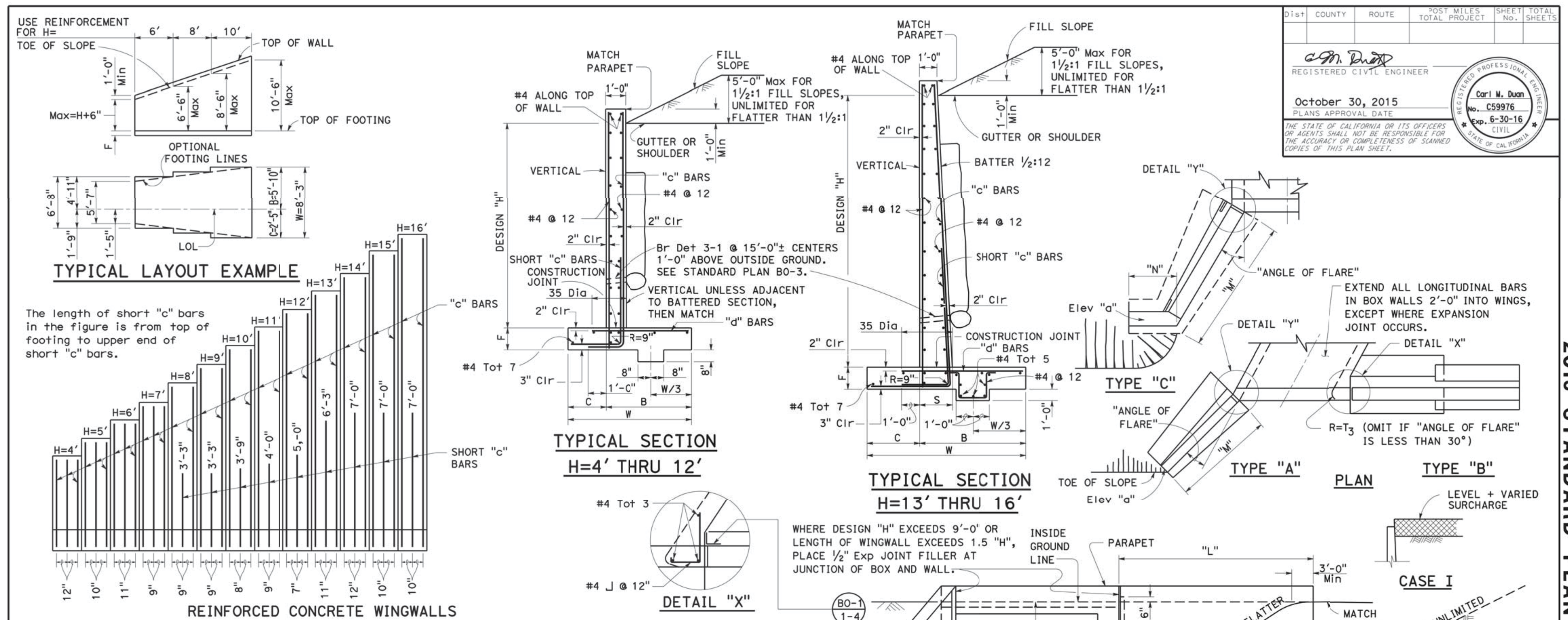
REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
8/10/18
JASON H. FUKUMITSU DATE

STORM DRAIN PLANS IN
DS 542 P.D. No. 2637
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
26074 Avenue Hall, Suite 23 ▪ Valencia, CA 91355 ▪ PH: (661) 294-2211 ▪ FX: (661) 294-9890

DWG | SHEET 10 OF 17

G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2637\HMW102-10 - Sheet 10.dwg Plotted On Jul 18, 2018 - 3:44pm by wallonl

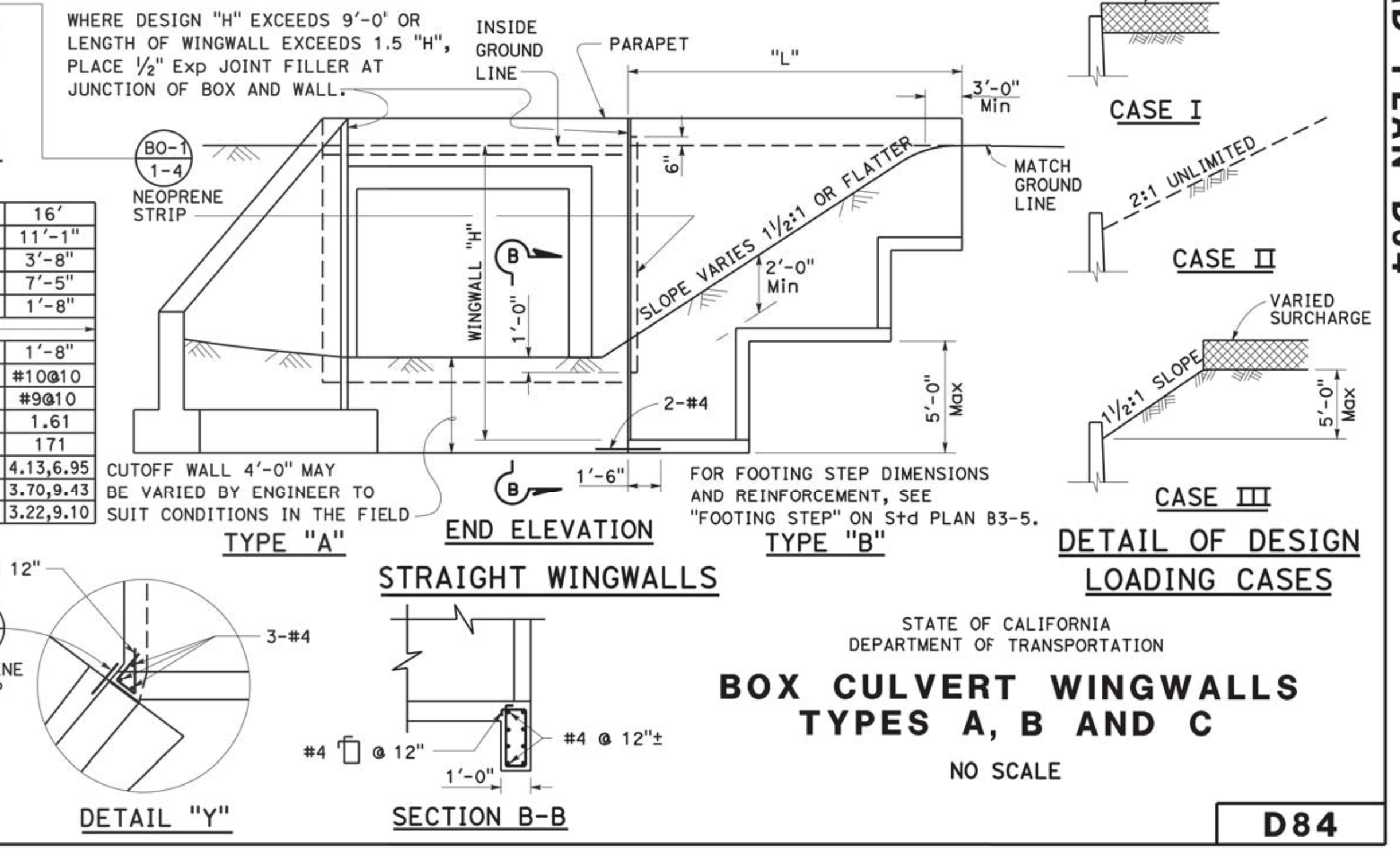


"H"	4'	5'	6'	7'	8'	9'	10'	11'	12'	13'	14'	15'	16'
W	5'-7"	6'-2"	6'-8"	7'-1"	7'-6"	7'-10"	8'-3"	8'-8"	9'-2"	9'-7"	10'-2"	10'-6"	11'-1"
C	1'-5"	1'-7"	1'-9"	1'-11"	2'-1"	2'-3"	2'-5"	2'-8"	2'-10"	3'-1"	3'-4"	3'-6"	3'-8"
B	4'-2"	4'-7"	4'-11"	5'-2"	5'-5"	5'-7"	5'-10"	6'-0"	6'-4"	6'-6"	6'-10"	7'-0"	7'-5"
F	1'-2"	1'-2"	1'-2"	1'-2"	1'-2"	1'-2"	1'-2"	1'-3"	1'-5"	1'-5"	1'-6"	1'-6"	1'-8"
BATTER	None									½:12			
S	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-6½"	1'-7"	1'-7½"	1'-8"
"c" BARS	#4@12	#4@10	#5@11	#5@9	#6@9	#7@9	#7@8	#8@9	#7@7	#8@11	#9@12	#10@10	#10@10
"d" BARS	#5@12	#5@10	#6@11	#6@9	#6@9	#6@9	#6@8	#7@9	#6@7	#7@11	#8@12	#8@10	#9@10
* Conc CY/LF	0.46	0.52	0.58	0.64	0.69	0.74	0.80	0.88	1.00	1.25	1.37	1.45	1.61
* Reinf LB/LF	26	32	41	50	59	70	81	95	102	99	120	156	171
** CASE I qu (ksf), B' (ft)	3.75,2.24	3.66,2.69	3.59,3.11	3.56,3.49	3.52,3.89	3.52,4.21	3.69,4.46	3.77,4.77	3.89,5.17	3.92,5.61	3.92,6.18	4.04,6.40	4.13,6.95
** CASE II qu (ksf), B' (ft)	1.16,5.58	1.33,6.13	1.51,6.55	1.69,6.86	1.88,7.16	2.08,7.33	2.29,7.60	2.50,7.86	2.77,8.14	2.97,8.47	3.18,8.93	3.41,9.05	3.70,9.43
** CASE III qu (ksf), B' (ft)	1.26,5.46	1.36,5.97	1.49,6.37	1.64,6.66	1.79,6.93	1.95,7.08	2.11,7.33	2.28,7.55	2.50,7.84	2.66,8.12	2.81,8.59	3.00,8.69	3.22,9.10

B'=B-(2) eccentricity, B' is the effective footing width.
* Quantities include 1'-0" extension above the design "H" limit.
** Soil bearing pressure shown in the table is the equivalent uniform pressure per AASHTO LRFD - 11.6.3.2

NOTES:

Unit Stresses: f'c=3,600 psi, fy=60,000 psi
Earth density: 120 pcf
Equivalent fluid pressure: 36 pcf
Elevations, length and angle of flare of wings may be varied by the Engineer to suit conditions encountered in the field.
Dimensions "H","L","M","N", Elevation "a" and "Angle of flare" (as applicable) are shown on the plans.
Wall height may be exceeded by 6" before going to next greater "H".
Eliminate cutoff wall if adjacent channel is paved and skew is 20° maximum.
For wall offset values, see Standard Plan B3-5.



October 30, 2015
PLANS APPROVAL DATE
REGISTERED CIVIL ENGINEER
Carl M. Duan No. C59976 Exp. 6-30-16 CIVIL
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

2015 STANDARD PLAN D84

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

BOX CULVERT WINGWALLS TYPES A, B AND C

NO SCALE

D84

DESIGN NOTES:

Specifications:
AASHTO LRFD Bridge Design Specifications, 4th Edition with California Amendments.

Earth load:
Earth pressures for two conditions:
140 pcf Vert, 42 pcf Horiz
140 pcf Vert, 140 pcf Horiz

Unit stresses:
f'c = 5.0 ksi
fy = 65.0 ksi for weld wire fabric
n = 7

Shear:
Based on
$V_c = \{2.14\sqrt{f'_c}+4600 \frac{A_s}{bd_e}\frac{V_u d_e}{M_u}\} b.d_e \leq 4.0\sqrt{f'_c} b.d_e$ (Pounds)
V_c shall not be less than $3.00\sqrt{f'_c} b.d_e$ for frame members and $2.5\sqrt{f'_c} b.d_e$ for simply supported members.

Exclusion:
Axial loading on the members has not been considered.

GENERAL NOTES:

Designation:
Standard single or multiple precast box culverts are shown on the plans as span times height with maximum cover over roof thus: 8' x 5' RCB with 10'-0" or double 10' x 5' RCB with 20'-0", followed by alternatives.

Alternatives:
Single cell:
Standard dimensions of AASHTO Material Specification 'M259' or 'M273'.
Multiple cell:
Constructed by placing single cells adjacent to each other. Inlet and outlet ends of culvert will be rounded unless square ends are designated. Parapet will be shown unless designated in plans. Such designation may be different for inlet and outlet ends.

Limitations:
Where the overfill is less than 12", Precast RCB culverts are not to be used. Precast RCB culverts are not to be used in siphon or pressurized installations unless appropriate "watertight" jointing is provided.

Special reinforcement coverage:
Precast RCB culvert standard plans are not to be used in a corrosive environment or where there is a severe abrasive flow condition or freeze-thaw locations.

Special design:
Required for culvert with different conditions, loads or design bearing pressures greater than those given on these plans. Required for culverts where end details need higher skew angles, higher parapets or barrier sections.

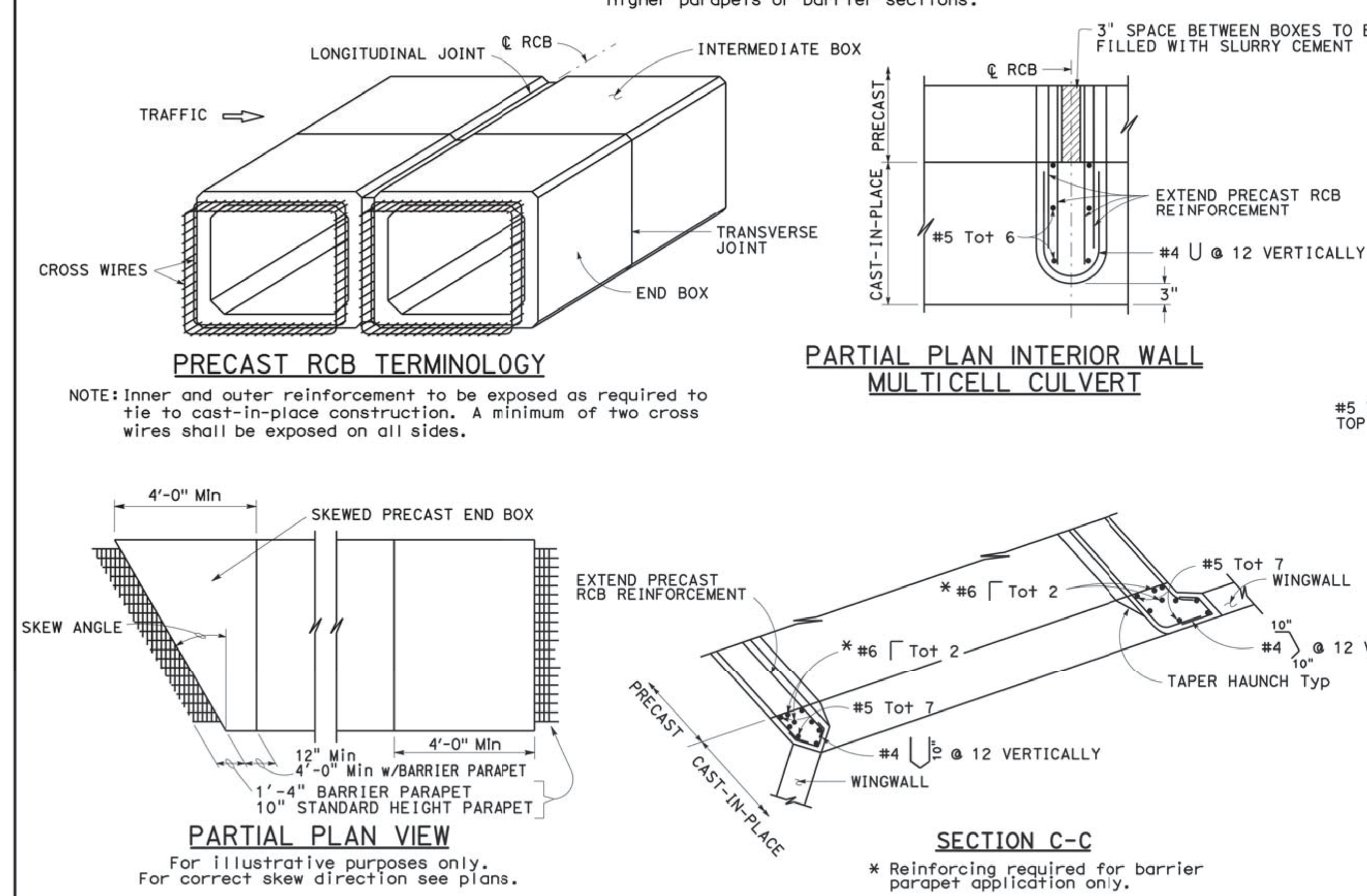
CONSTRUCTION NOTES:

Cutoff walls:
4'-0" Cutoff walls are to be provided at inlet and/or outlet unless channel is lined and unless otherwise shown. These walls are to be extended if scour conditions warrant. See Standard Plans D84, D85 and D86A.

Wingwalls:
Wingwalls shall be cast-in-place and shall conform to standard plan details for box culvert wingwalls. See Standard Plans D84, D85 and D86A.

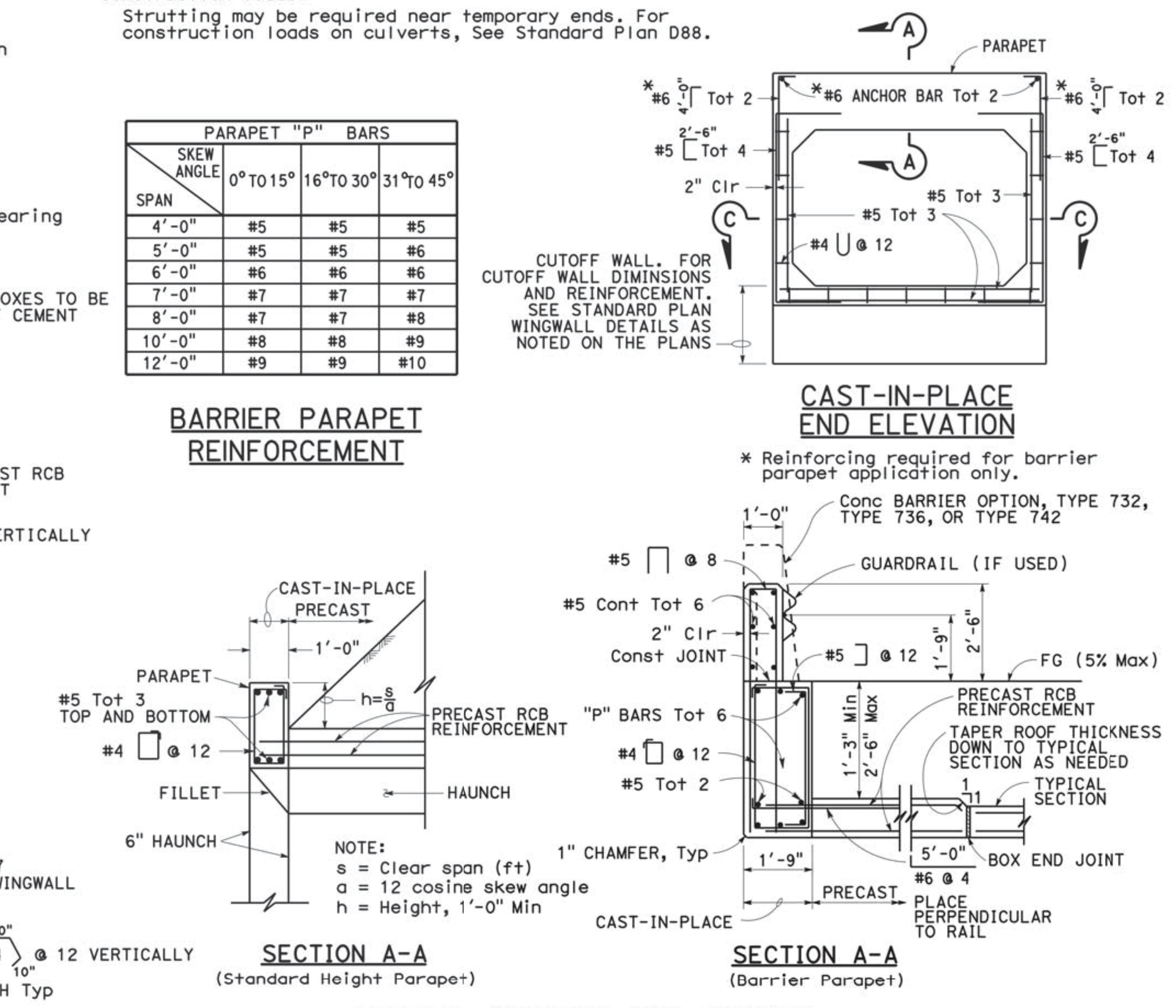
Earthwork:
See Standard Plan A62G.

Construction loads:
Strutting may be required near temporary ends. For construction loads on culverts, See Standard Plan D88.



PARAPET "P" BARS			
SPAN \ SKEW ANGLE	0° TO 15°	16° TO 30°	31° TO 45°
4'-0"	#5	#5	#5
5'-0"	#5	#5	#6
6'-0"	#6	#6	#6
7'-0"	#7	#7	#7
8'-0"	#7	#7	#8
10'-0"	#8	#8	#9
12'-0"	#9	#9	#10

BARRIER PARAPET REINFORCEMENT



TYPICAL CULVERT END DETAILS

For wall and invert reinforcement not shown, See "End Elevation" detail.

October 30, 2015
PLANS APPROVAL DATE
REGISTERED CIVIL ENGINEER
Carl M. Duan No. C59976 Exp. 6-30-16 CIVIL
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

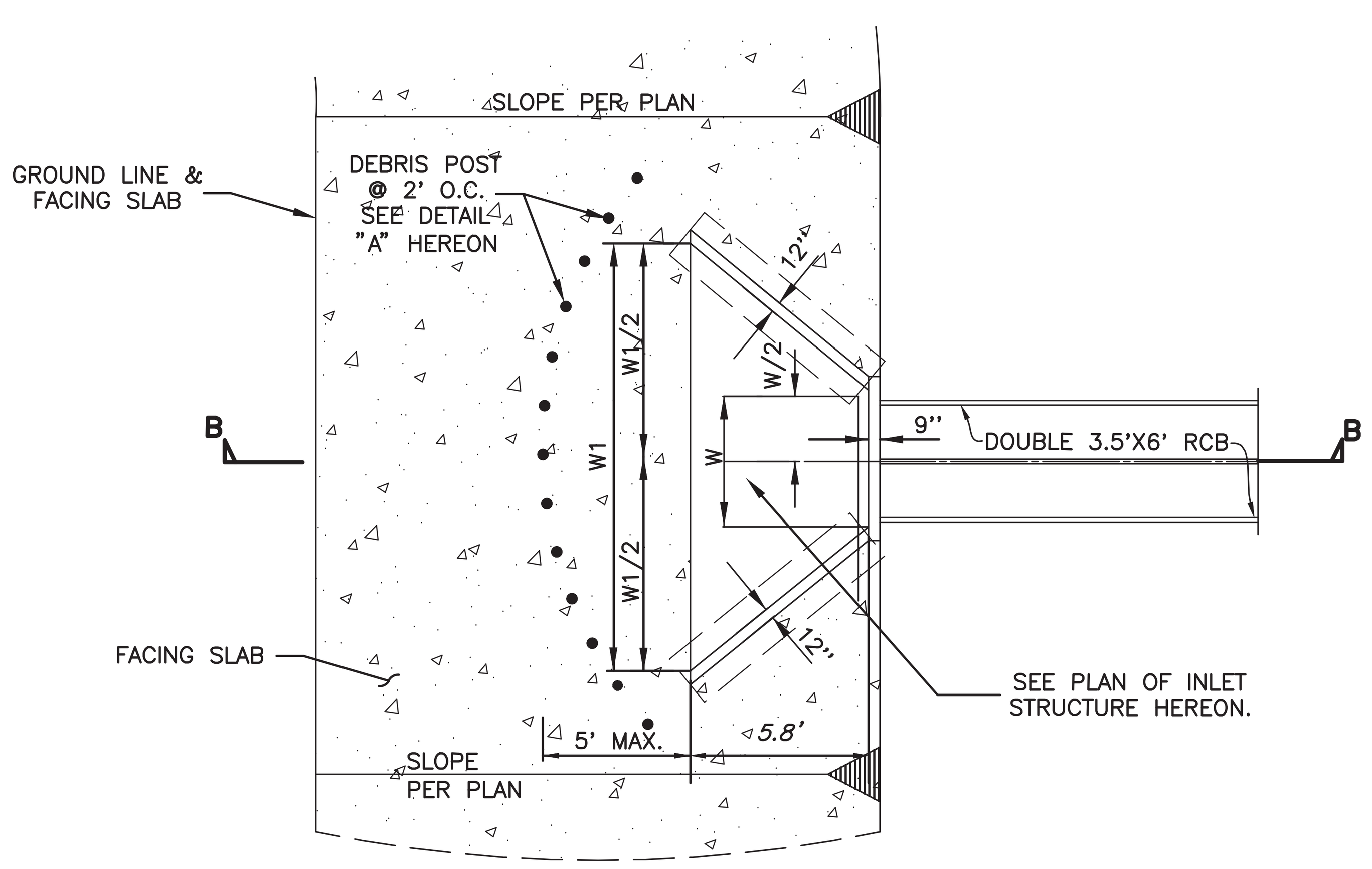
2015 STANDARD PLAN D83B

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

PRECAST REINFORCED CONCRETE BOX CULVERT MISCELLANEOUS DETAILS

NO SCALE

D83B



PLAN OF ELEVATED INLET

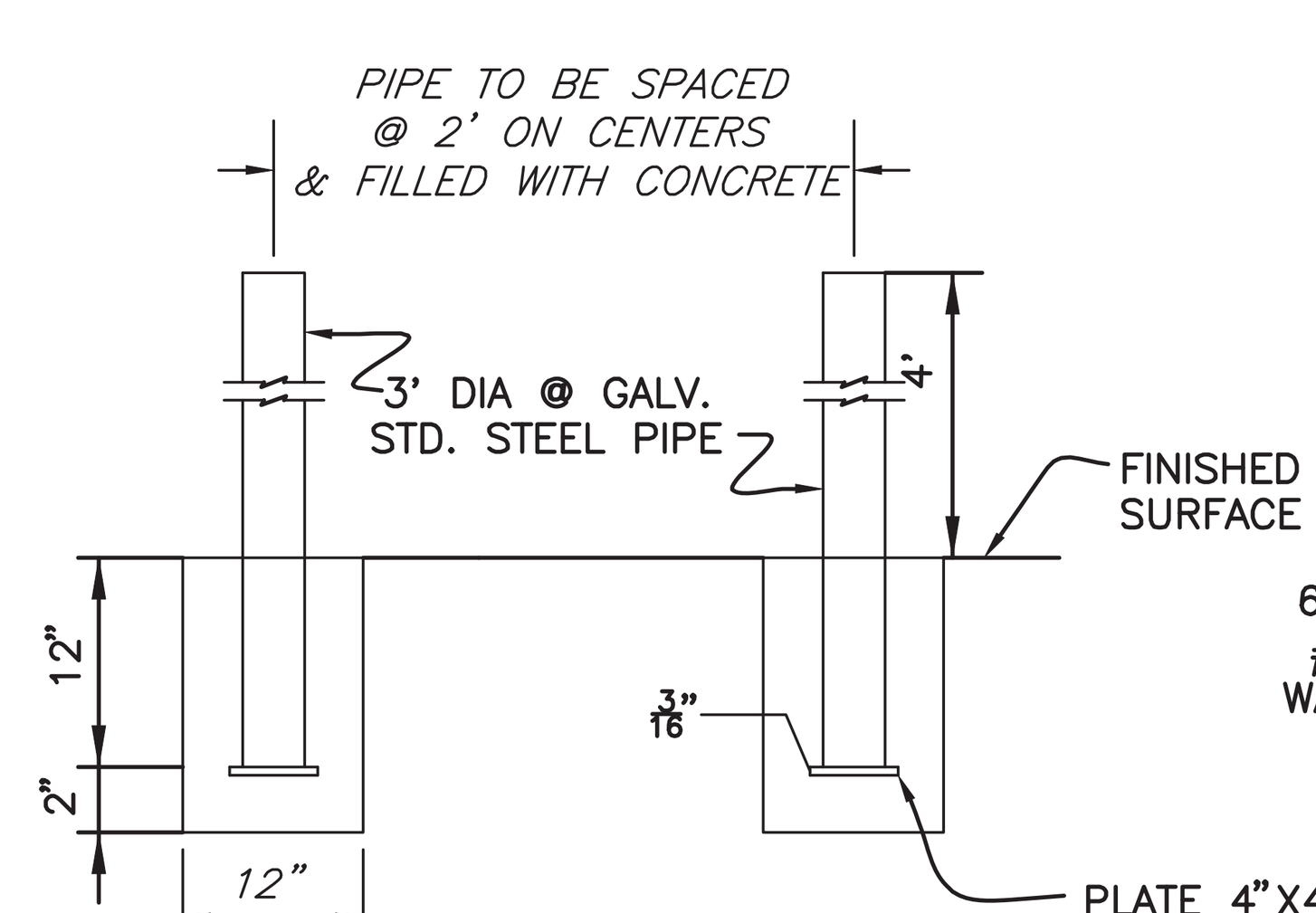
DIMENSIONS TABLE

	W	W2	H	L
LINE D	13.00'	36.00'	5.20'	5.80'

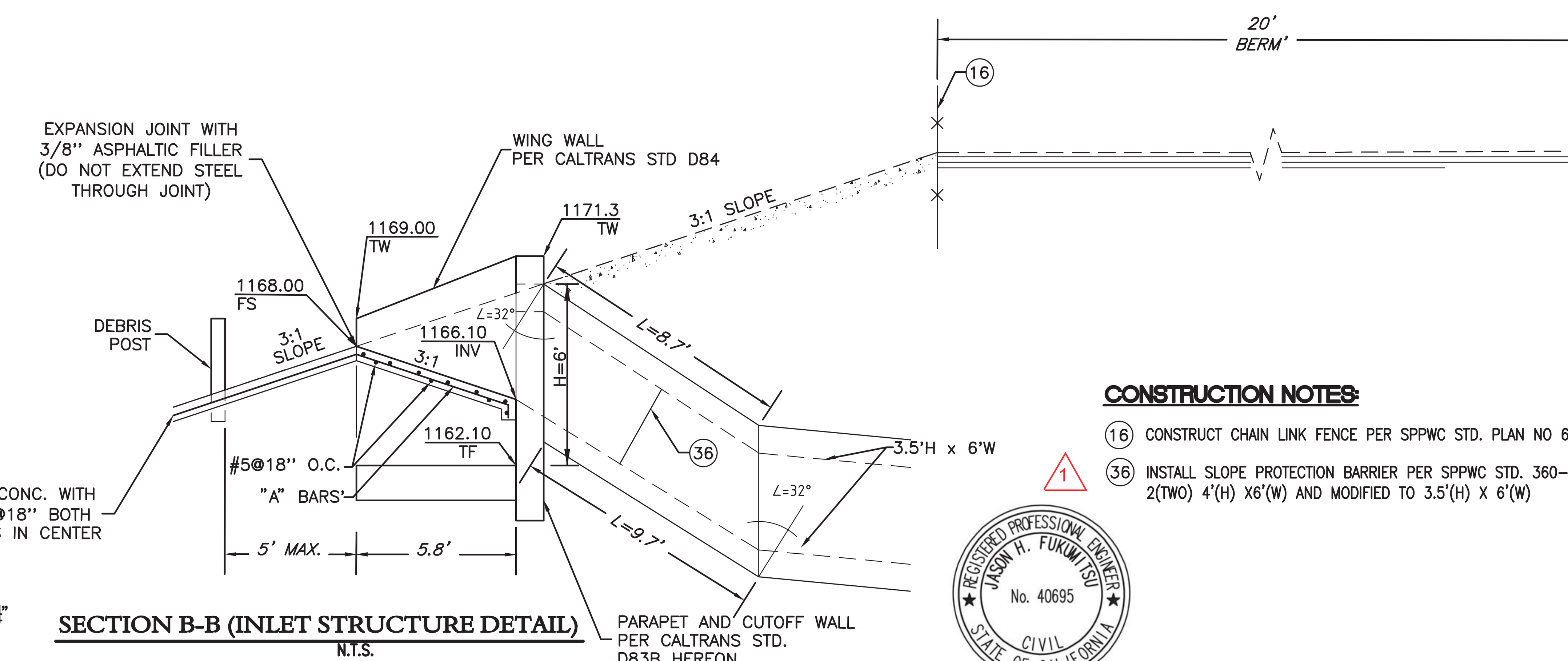
(19) *PLAN OF ELEVATED INLET STRUCTURE*

N.T.S.

N.T.S.



DETAIL "A"
N.T.S.



SECTION B-B (INLET STRUCTURE DETAIL)
N.T.S.

CONSTRUCTION NOTES:

(16) CONSTRUCT CHAIN LINK FENCE PER SPPWC STD. PLAN NO 600-3.

(36) INSTALL SLOPE PROTECTION BARRIER PER SPPWC STD. 360-2, USE 2(TWO) 4'(H) X6'(W) AND MODIFIED TO 3.5'(H) X 6'(W)

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

NO.	REVISION	REVISED BY	APPROVED BY	DATE
1	ADDED SHEET PER STRUCTUAL REVIEW			11/15/18

REVIEWED LAND DEVELOPMENT DIVISION
BY ______________________
STORM DRAIN SECTION DATE

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
JASON H. FUKUMITSU 10/23/18 DATE

STORM DRAIN PLANS IN
DS 542 P.D. No. 2637
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

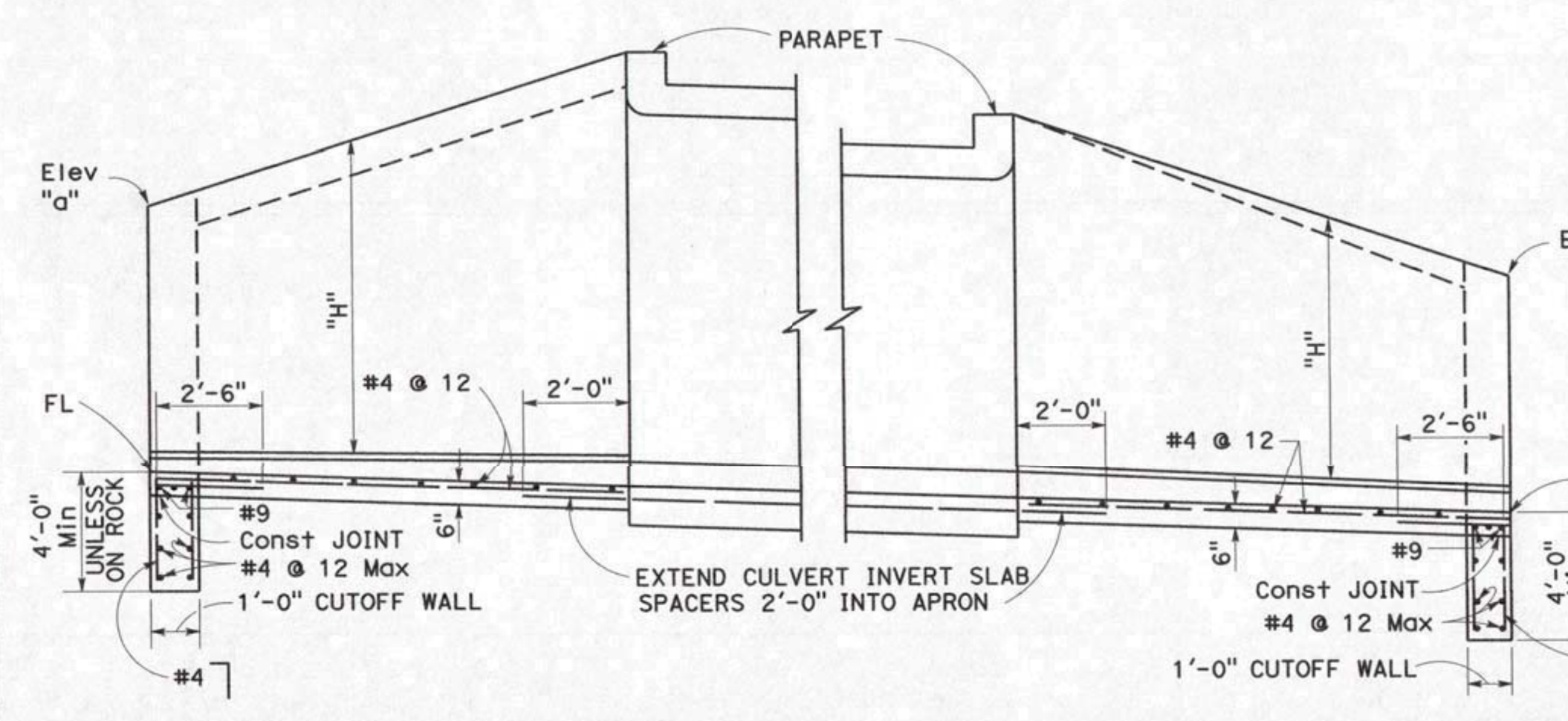
HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
26074 Avenue Hall, Suite 23 ▪ Valencia, CA 91355 ▪ PH: (661) 294-2211 ▪ FX: (661) 294-9890

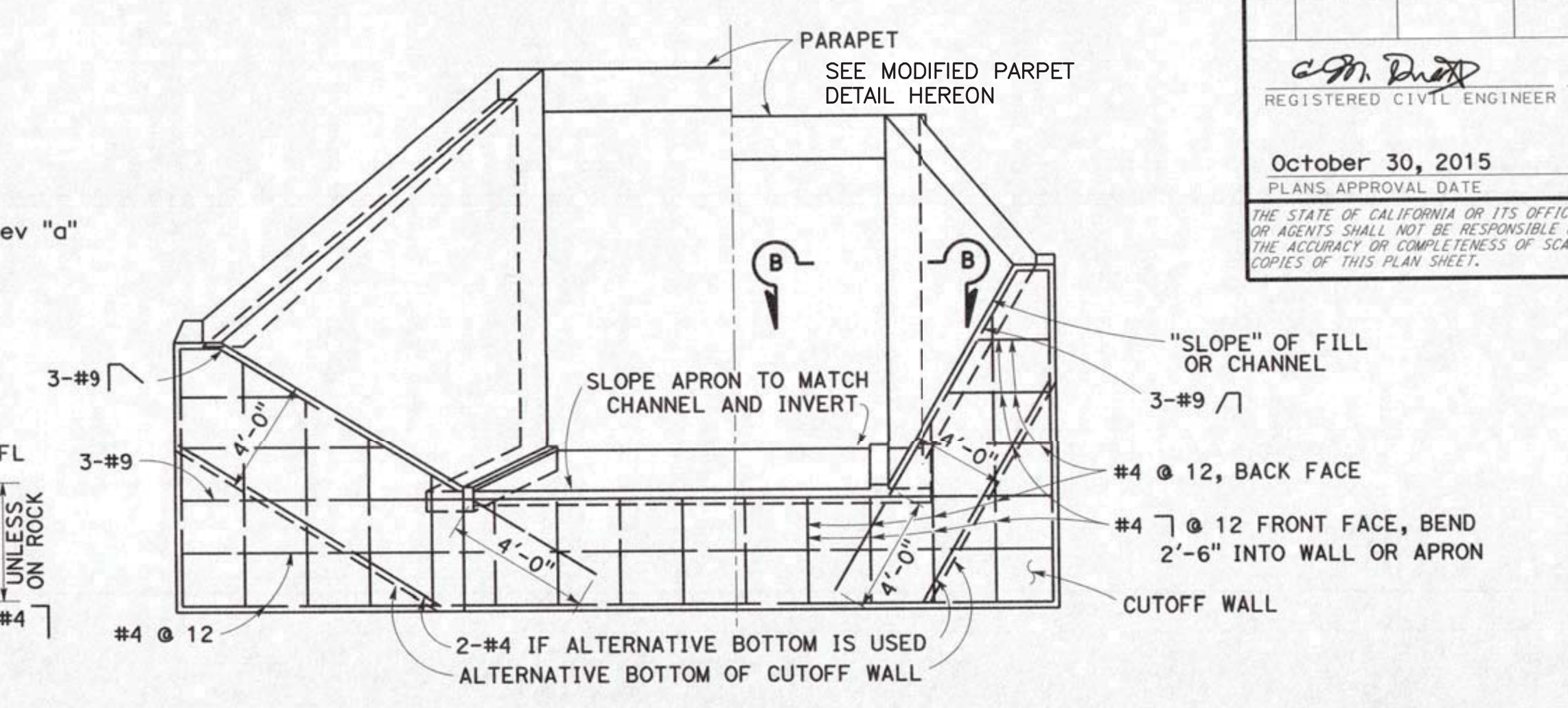
DWG
SHEET 10A OF 17

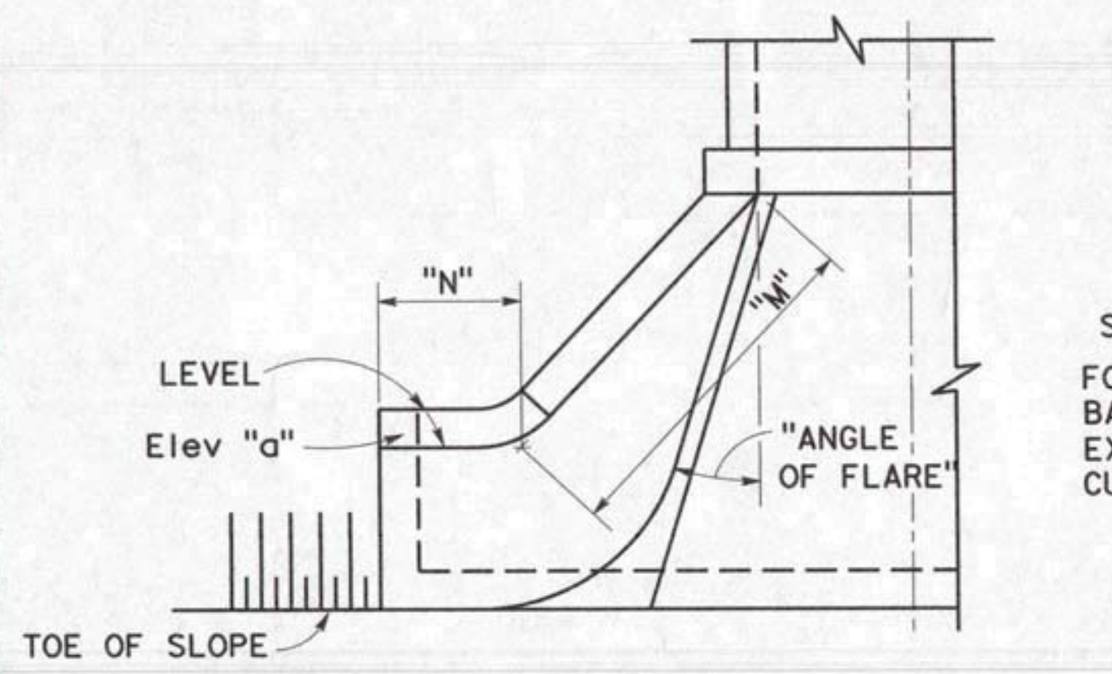
P.D. No. 2637

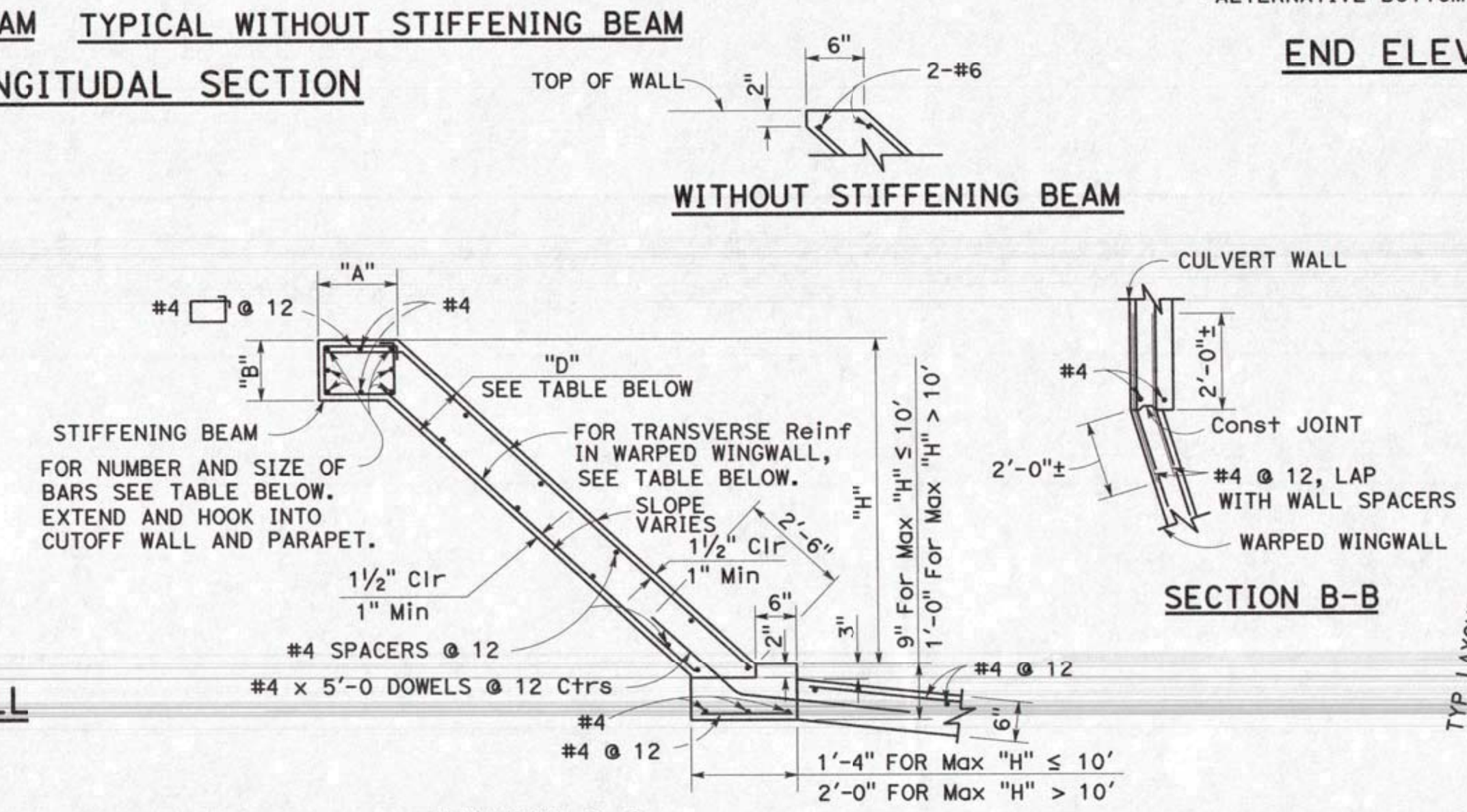
G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2637\HMV102-10A – Sheet 10.dwg Plotted On Oct 04, 2018-10:46am by danielv

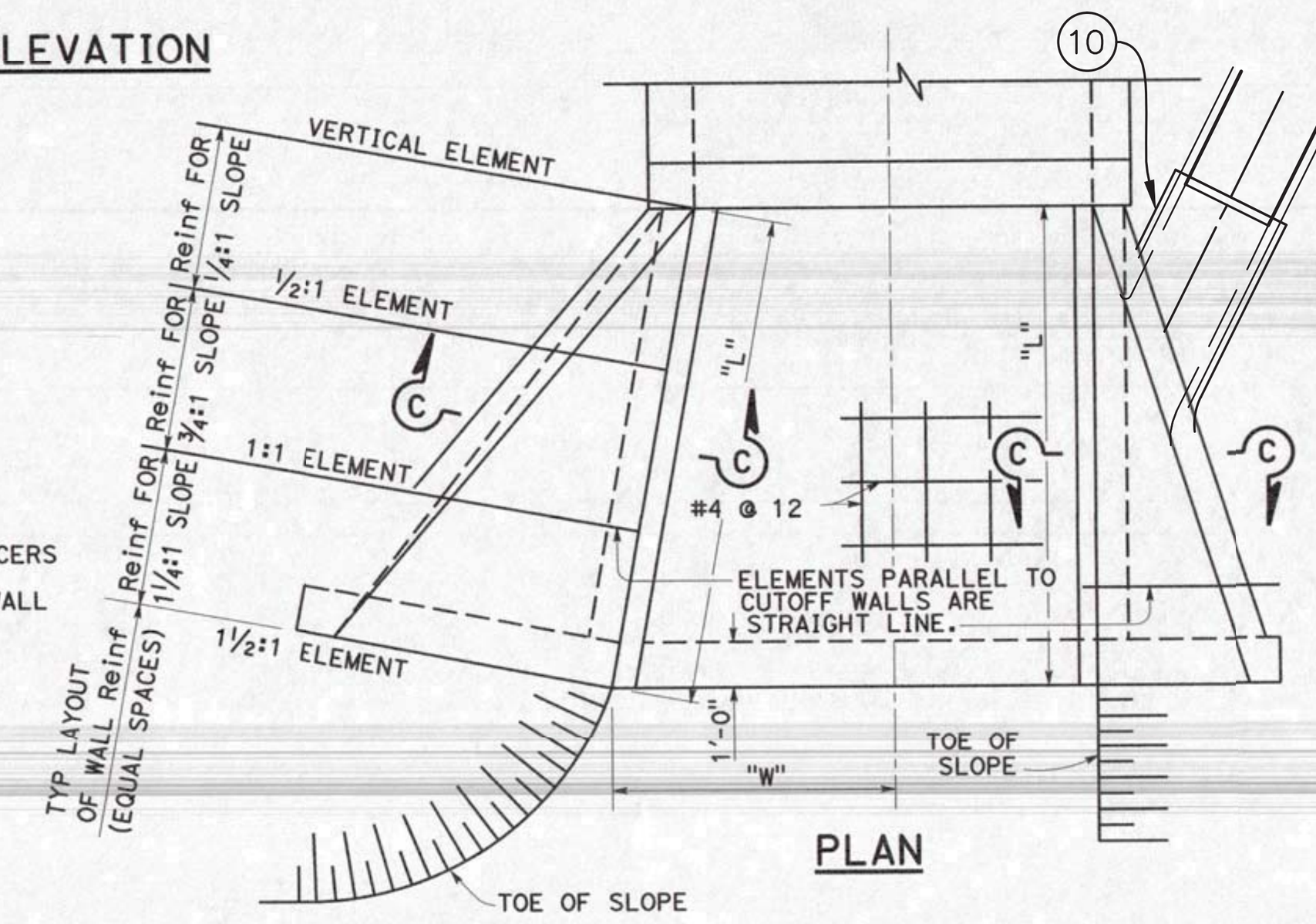
2015 STANDARD PLAN D86A











Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER

October 30, 2015

PLANS APPROVAL DATE

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REGISTERED PROFESSIONAL ENGINEER Carl W. Duan No. C59976 Exp. 6-30-15 CIVIL STATE OF CALIFORNIA

WARPED WINGWALLS

WALL DIMENSIONS AND REINFORCING

ELEMENT SLOPE	"H"	8' OR LESS	10'	12'	14'	16'	18'	20'
¼:1	FRONT FACE Reinf	#4 @ 12	#4 @ 7	#5 @ 7	#5 @ 5	#6 @ 6	#7 @ 7	#7 @ 6
	REAR FACE Reinf	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12
¾:1	FRONT FACE Reinf	#4 @ 12	#4 @ 12	#4 @ 8	#4 @ 8	#4 @ 8	#4 @ 6	#4 @ 6
	REAR FACE Reinf	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 10	#4 @ 7	#4 @ 6	#5 @ 8
1¼:1	FRONT FACE Reinf	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12
	REAR FACE Reinf	#4 @ 8	#4 @ 8	#4 @ 5	#5 @ 6	#6 @ 7	#6 @ 6	#7 @ 6
"D" AT CUTOFF WALL		6"	6"	6"	7½"	8"	9½"	11"
"D" AT CULVERT		6"	6"	6"	8"	9½"	11"	1'-1"

STIFFENING BEAM DIMENSIONS AND REINFORCING

"H" Max \ "L" Max	12'	14'	16'	18'	20'	25'	30'	35'	40'
6'	NO BEAM. PLACE 2-#6 IN EACH FACE ALONG TOP OF WALL.								
8'				"A"= 1'-0"					
10'			"B"= 9"			"A"= 1'-6"			
12'								"A"= 1'-10"	
14'	TOTAL 6-#6			"B"= 1'-0"			"B"= 1'-3"		"A"= 2'-2"
16'									"B"= 1'-6"
18'			TOTAL 6-#7			TOTAL 8-#8			
20'								TOTAL 8-#9	

NOTES: Walls designed for 2'-0" surcharge; earth density = 120 pcf; equivalent fluid pressure = 36 pcf.
Vary "D" of warped wall uniformly from that at cutoff wall to that at culvert, for maximum "H" > 12'-0".
Where abrasion is anticipated increase apron thickness to 7" minimum to provide 2" minimum reinforcement coverage.
Dimensions "L", "W", "H", "M", "N", Elevation "a", " Angle of flare", and end "Slope" (as applicable) are shown on the plans.

CONSTRUCTION NOTES:

(10) CONSTRUCT JUNCTION STRUCTURE PIPE TO RCB PER SPPWC 333-2

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

BOX CULVERT WARPED WINGWALLS

NO SCALE

D86A

196

193

2015 STANDARD PLAN D83B MODIFIED

DESIGN NOTES:

Specifications:
AASHTO LRFD Bridge Design Specifications, 4th Edition with California Amendments.

Earth load:
Earth pressures for two conditions:
140 pcf Vert, 42 pcf Horiz
140 pcf Vert, 140 pcf Horiz

Unit stresses:
f'c = 5.0 ksi
fy = 65.0 ksi for weld wire fabric
n = 7

Shear:
Based on
$V_c = \{2.14\sqrt{f'_c}+4600\,\frac{A_s}{bd_e}\,\frac{V_u d_e}{M_u}\}\,b.d_e \leq 4.0\sqrt{f'_c}\,b.d_e$ (Pounds)
V_c shall not be less than $3.00\sqrt{f'_c}\,b.d_e$
for frame members and $2.5\sqrt{f'_c}\,b.d_e$
for simply supported members.

Exclusion:
Axial loading on the members has not been considered.

GENERAL NOTES:

Designation:
Standard single or multiple precast box culverts are shown on the plans as span times height with maximum cover over roof thus: 8' x 5' RCB with 10'-0" or double 10' x 5' RCB with 20'-0", followed by alternatives.

Alternatives:
Single cell:
Standard dimensions of AASHTO Material Specification 'M259' or 'M273'.
Multiple cell:
Constructed by placing single cells adjacent to each other. Inlet and outlet ends of culvert will be rounded unless square ends are designated. Parapet will be shown unless designated in plans. Such designation may be different for inlet and outlet ends.

Limitations:
Where the overfill is less than 12", Precast RCB culverts are not to be used. Precast RCB culverts are not to be used in siphon or pressurized installations unless appropriate "watertight" jointing is provided.

Special reinforcement coverage:
Precast RCB culvert standard plans are not to be used in a corrosive environment or where there is a severe abrasive flow condition or freeze-thaw locations.

Special design:
Required for culvert with different conditions, loads or design bearing pressures greater than those given on these plans. Required for culverts where end details need higher skew angles, higher parapets or barrier sections.

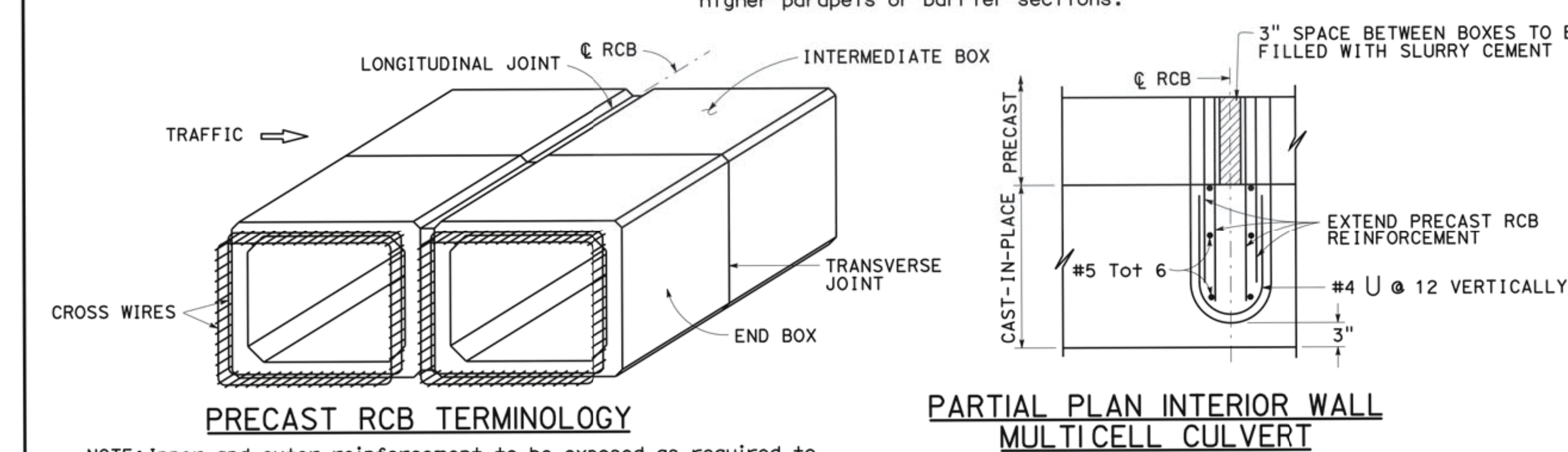
CONSTRUCTION NOTES:

Cutoff walls:
4'-0" Cutoff walls are to be provided at inlet and/or outlet unless channel is lined and unless otherwise shown. These walls are to be extended if scour conditions warrant. See Standard Plans D84, D85 and D86A.

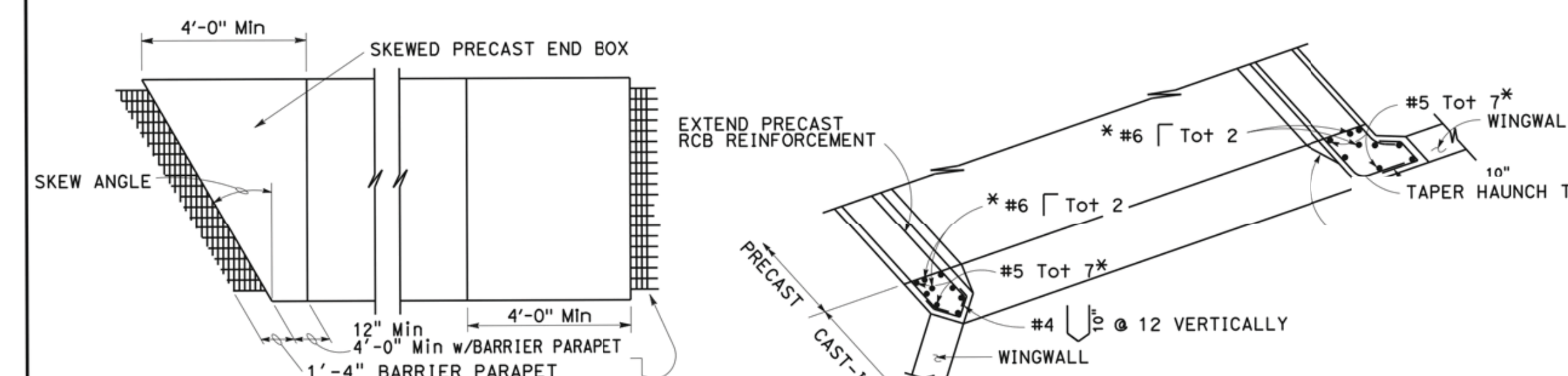
Wingwalls:
Wingwalls shall be cast-in-place and shall conform to standard plan details for box culvert wingwalls. See Standard Plans D84, D85 and D86A.

Earthwork:
See Standard Plan A62G.

Construction loads:
Strutting may be required near temporary ends. For construction loads on culverts, See Standard Plan D88.



NOTE: Inner and outer reinforcement to be exposed as required to tie to cast-in-place construction. A minimum of two cross wires shall be exposed on all sides.



For illustrative purposes only.
For correct skew direction see plans.

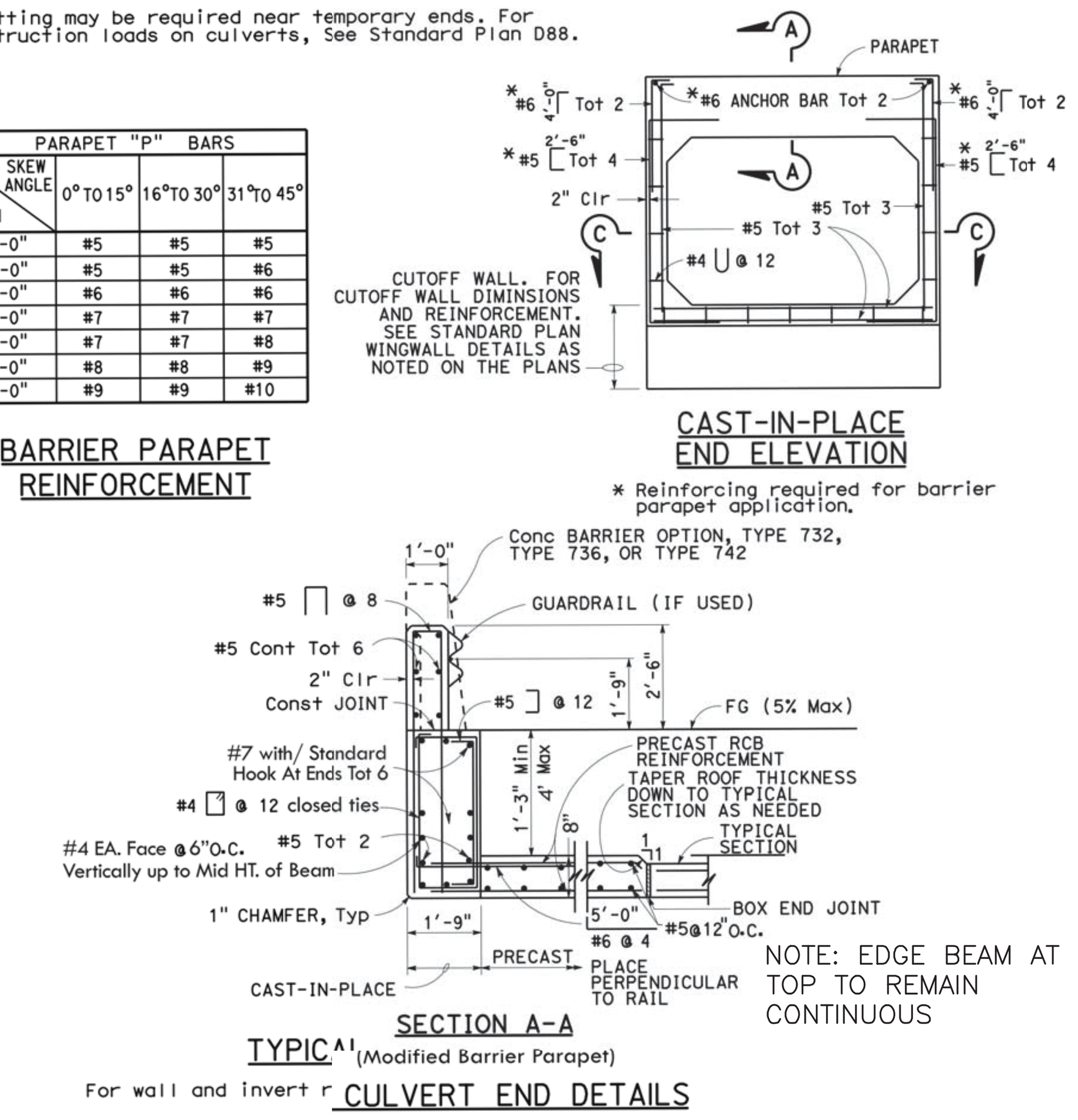
* Reinforcing required to rem std. hook at top of parapet closed ties above RCB

ain continuous w/ with #3@6"o.c.

BARRIER PARAPET "P" BARS

SPAN \ SKEW ANGLE	0° TO 15°	16° TO 30°	31° TO 45°
4'-0"	#5	#5	#5
5'-0"	#5	#5	#6
6'-0"	#6	#6	#6
7'-0"	#7	#7	#7
8'-0"	#7	#7	#8
10'-0"	#8	#8	#9
12'-0"	#9	#9	#10

BARRIER PARAPET REINFORCEMENT



NOTE: EDGE BEAM AT TOP TO REMAIN CONTINUOUS

For wall and invert r CULVERT END DETAILS

forcement not shown, See "End Elevation" detail.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

PRECAST REINFORCED CONCRETE BOX CULVERT MISCELLANEOUS DETAILS MODIFIED

NO SCALE

D83B

P.D. No. 2637

DDN No. 43-F551

WARPED WINGWWALL

		DIMENSIONS			LENGTH			ANGLE
SHT. NO.	LINE	A	B	D	H	L	W	∠
4	D	1'-0"	9"	6"	7'-0"	40'-0"	11'-6"	-4°

~~MODIFIED TRANSITION STRUCTURE WITH JUNCTION STRUCTURE AT WING WALL~~

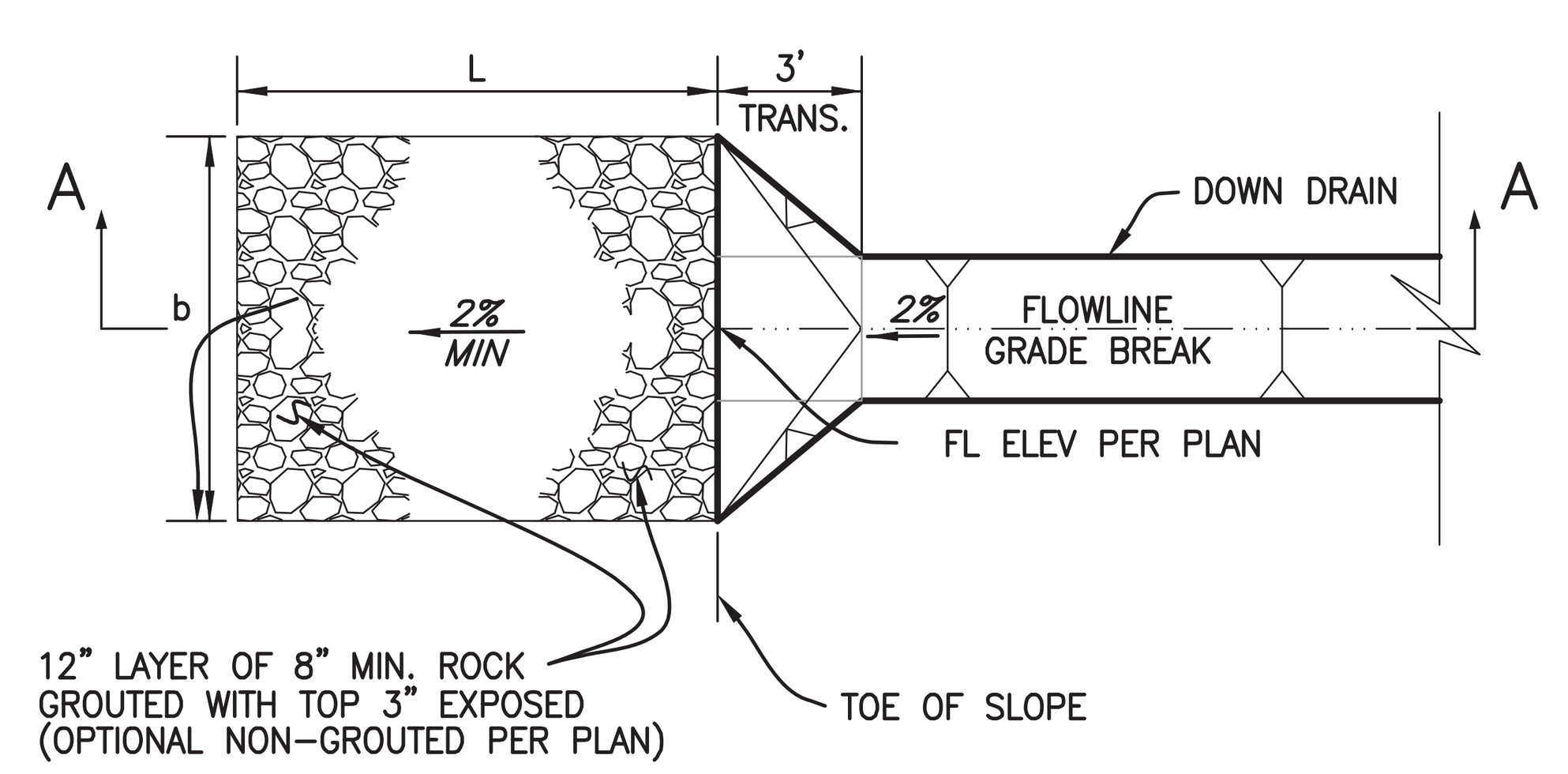
(20)

N.T.S.

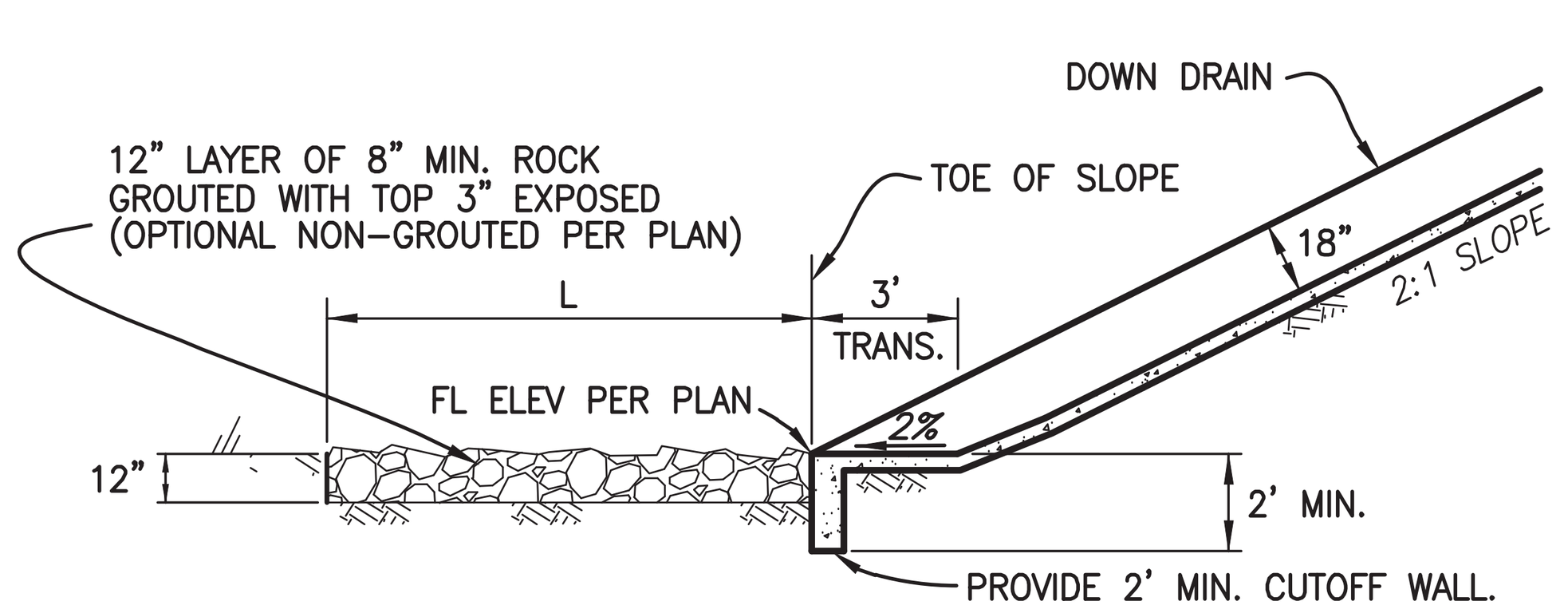
Not a part of the approval

△1 MODIFIED JUNCTION STRUCTURE AT WING WALL WITH PARAPET

△1



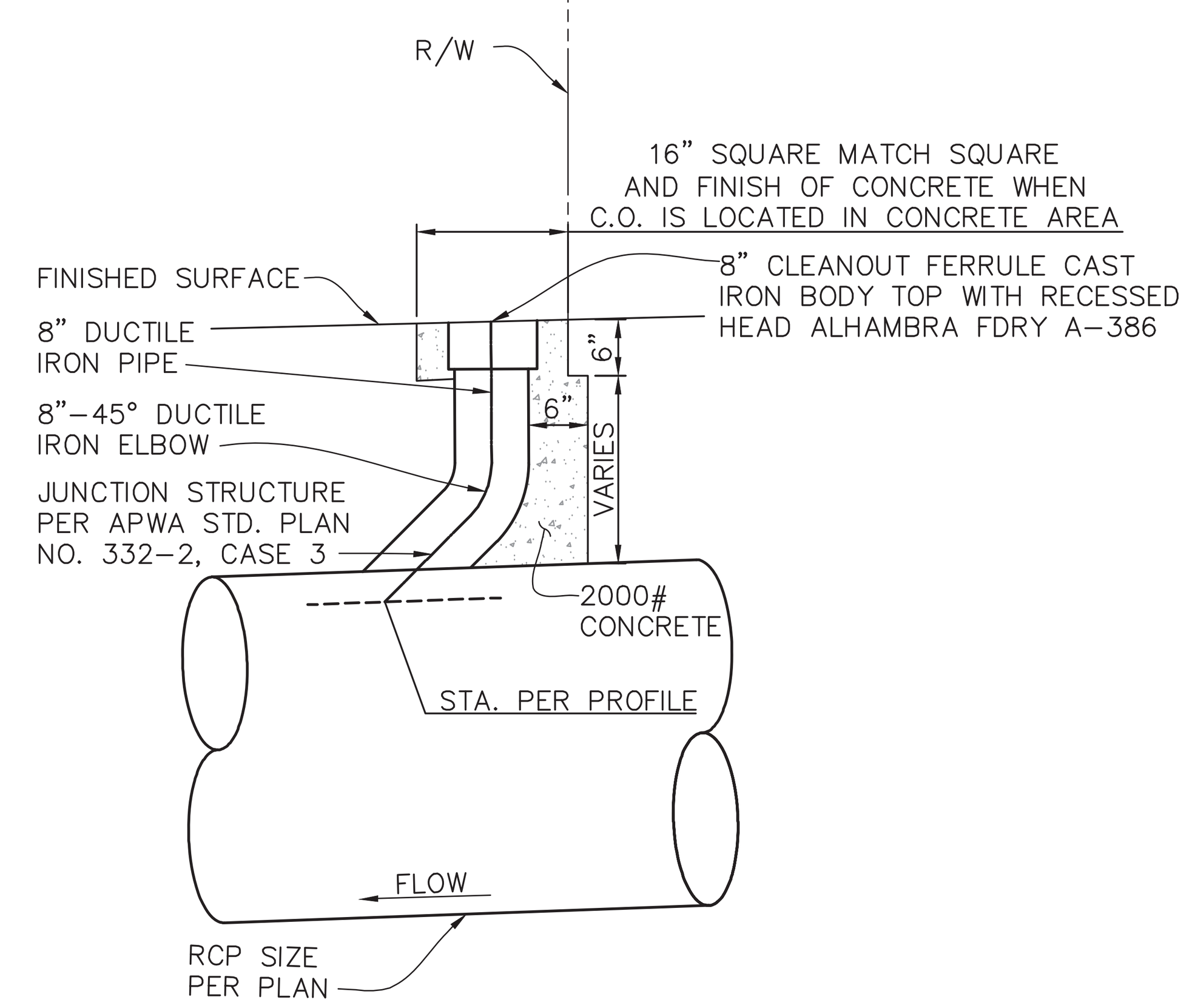
DOWNDRAIN TO RIPRAP APRON



SECTION A-A

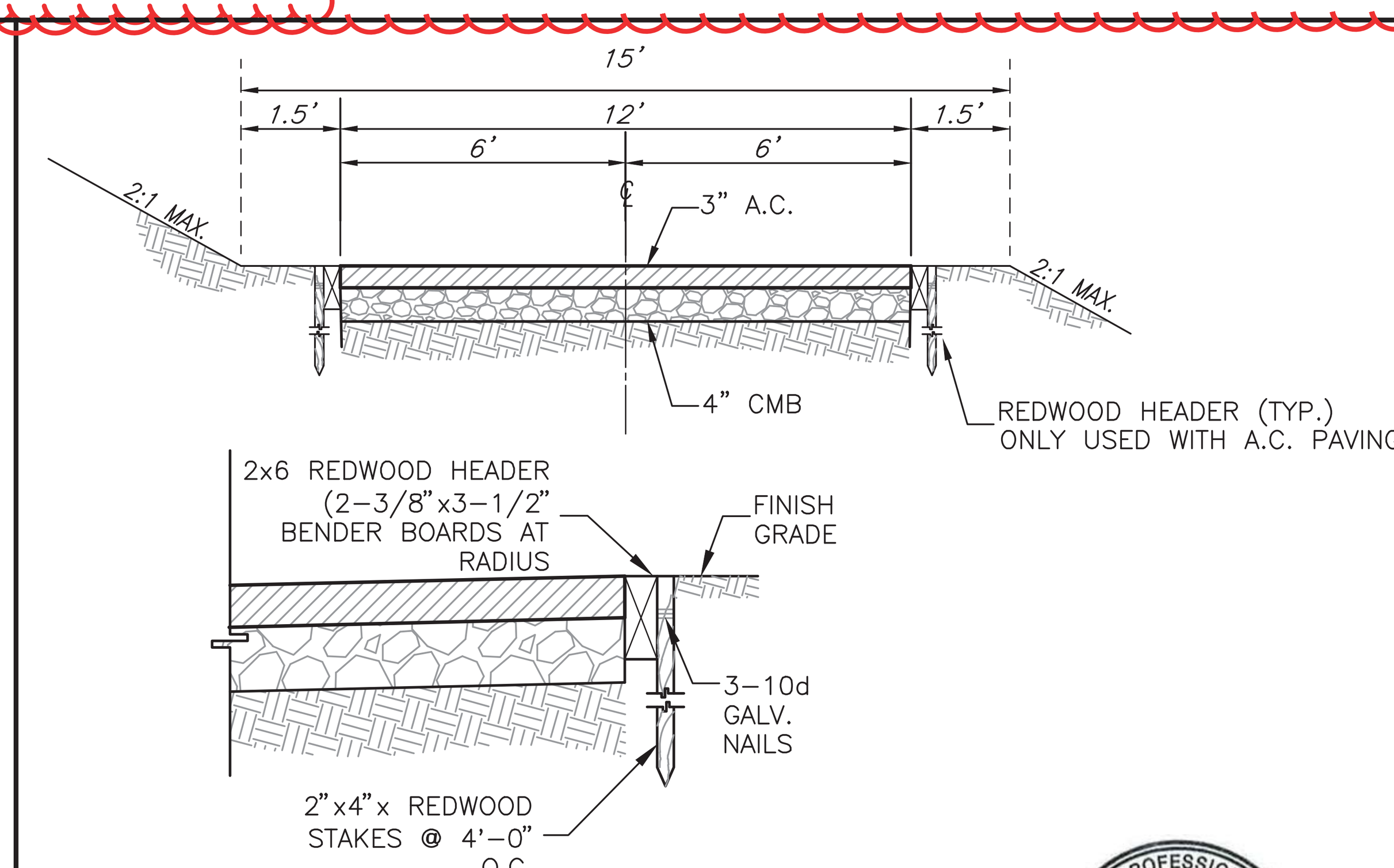
(32) *RIP-RAP APRON*

N.T.S.



(29) *CLEANOUT*

N.T.S.



REDWOOD HEADER

N.T.S.

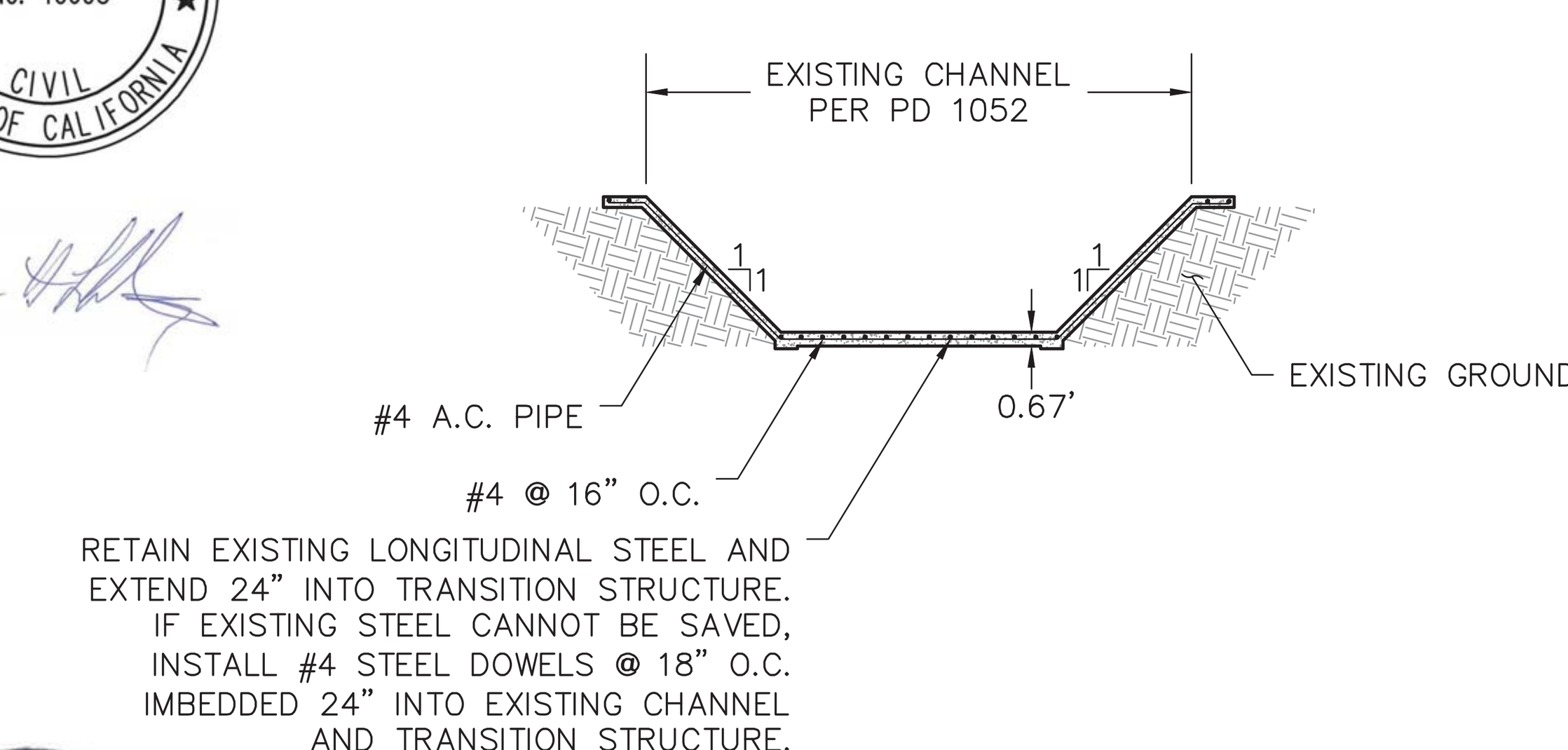
(34) *A.C. ACCESS ROAD*

N.T.S.

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-KUEN IP No. 2522 Exp. 03/20 GEOTECHNICAL STATE OF CALIFORNIA

△1

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA



EXISTING CHANNEL TRANSITION

N.T.S.

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRICE No. 1705 STATE OF CALIFORNIA

REVIEWED LAND DEVELOPMENT DIVISION

BY STORM DRAIN SECTION 08/13/2018 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
△1	REVISED DETAIL NAME, REMOVING NOT A PART OF THE APPROVAL			11/15/18

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

8/10/18

JASON H. FUKUMITSU DATE

STORM DRAIN PLANS IN
DS 542 P.D. No. 2637

COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

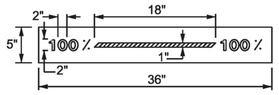
HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
26074 Avenue Hall, Suite 23 ▪ Valencia, CA 91355 ▪ PH: (661) 294-2211 ▪ FX: (661) 294-9890

DWG | SHEET 11 OF 17

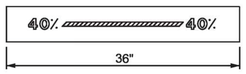
G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2637\HMV102-11 – Sheet 11.dwg Plotted On Jul 18, 2018–1:27pm by wailanl

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS

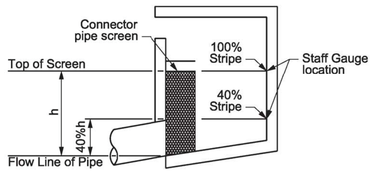
APPENDIX A-2: STAFF GAUGE



100% STRIPE
(Red Stripe and Numbers on White Background)



40% STRIPE
(Red Stripe and Numbers on White Background)



EXAMPLE LAYOUT

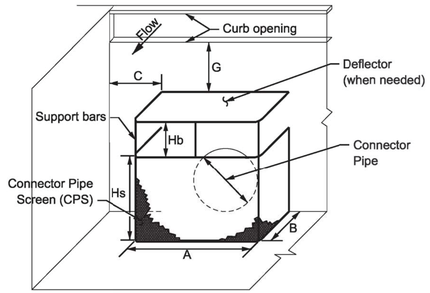
"THE PAINT TYPE AND SPECIFICATIONS MUST BE SUBMITTED TO THE DISTRICT FOR REVIEW AND APPROVAL PRIOR TO USE."

1. The Contractor shall paint a staff gauge as shown on an externally visible interior wall of each catch basin.
2. The Contractor shall paint red stripes and numbers on white background labeling 40% and 100% screen height as shown above.
3. Surfaces must be clean, dry and free from all contaminants including rust that may impair adhesion.

Revised 07/21/2010

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS

APPENDIX A-1: CPS CONFIGURATION



CATCH BASIN INTERIOR VIEW
(Not to scale)

CPS Length	L = A + 2B
CPS Height	Hs
Bypass Height	Hb
Minimum Wall Clearance	C = 4 inches
Minimum Interior Spacing	B = 10 inches
Minimum Distance from Street Flow Line	G

NOTES

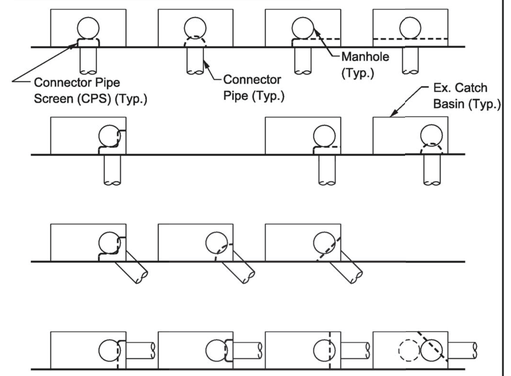
1. The CPS shown above is for illustrative purposes only. The catch basin connector pipe location and the shape and design of the CPS may deviate from the above example.
2. For L, Hs, Hb, and G values see attached CPS sizing Table 1.

Revised 07/21/2010

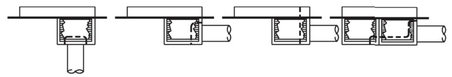
COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS

APPENDIX A-3: EXAMPLE CPS LAYOUTS

CURB OPENING CATCH BASINS (TYPES 300, 306)



CURB OPENING CATCH BASINS WITH GRATES (TYPES 301, 302)



NOTES: 1. The CPS configurations shown above are for illustrative purposes only. This is not a comprehensive list.

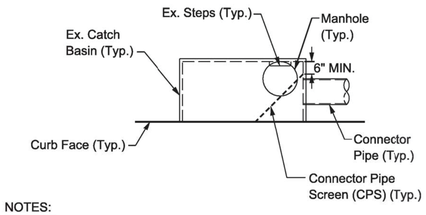
2. When the CPS unit enchoaches more than 4 inches into the manhole opening, the Contractor shall install a Removable CPS unit per Attachment A, CPS Requirements, item 8.

Revised 07/21/2010

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS

APPENDIX A-3: EXAMPLE CPS LAYOUTS (CONT.)

CURB OPENING CATCH BASINS (TYPES 300)



NOTES:

3. The CPS configurations shown above are for illustrative purposes only. This is not a comprehensive list.

Revised 09/09/2010

TABLE 1
CPS SIZING TABLE FOR CBs IN NON-SUMP CONDITIONS WITH NO ARS

*V-depth (ft)	CB Width (ft)	Bypass Height H_b (in)	Screen Height H_s (in)	Screen Length L (ft)	G (in)
3.0	3.5	8	14	3.0	6
	7			4.0	
	10			5.0	
	14			6.0	
	21			8.0	
	28			9.0	
3.5	3.5	10	16	3.0	8
	7			4.0	
	10			5.0	
	14			6.0	
	21			8.0	
	28			9.0	
4.0	3.5	12	20	3.0	8
	7			4.0	
	10			5.0	
	14			6.0	
	21			7.0	
	28			8.0	
4.5 or greater	3.5	12	22	3.0	10 or greater
	7			4.0	
	10			5.0	
	14			6.0	
	21			7.0	
	28			8.0	

* for CBs with v-depth less than 3 feet, contact the District for H_b, H_s, L, and G values.

REVIEWED LAND DEVELOPMENT DIVISION
BY _____ 08/13/2018
STORM DRAIN SECTION DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE

REGISTERED PROFESSIONAL ENGINEER
JASON H. FUKUMITSU
No. 40695
CIVIL
STATE OF CALIFORNIA
8/10/18
JASON H. FUKUMITSU DATE

STORM DRAIN PLANS IN
DS 542 P.D. No. 2637
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
26074 Avenue Hall, Suite 23 ▪ Valencia, CA 91355 ▪ PH: (661) 294-2211 ▪ FX: (661) 294-9890

DWG | SHEET 12 OF 17

P.D. No. 2637

DDN No. 43-F551

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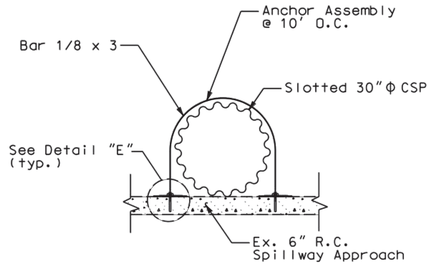
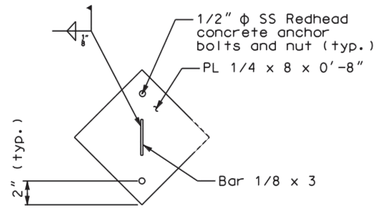
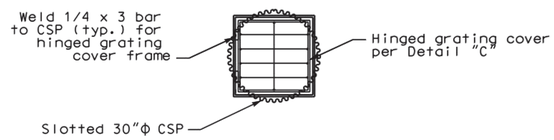


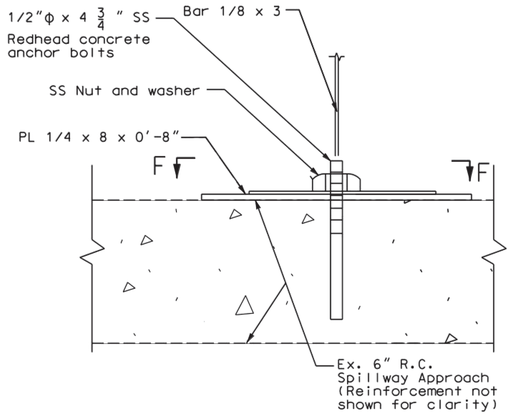
Section D-D
Scale: 1/2" = 1'-0"



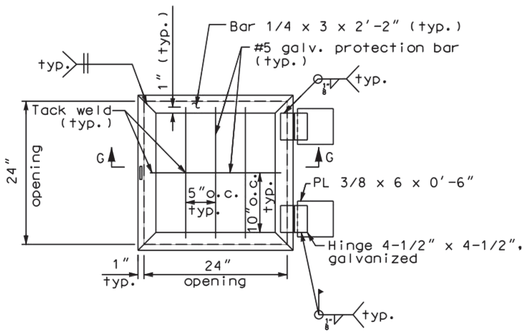
Section F-F
Scale: 2" = 1'-0"



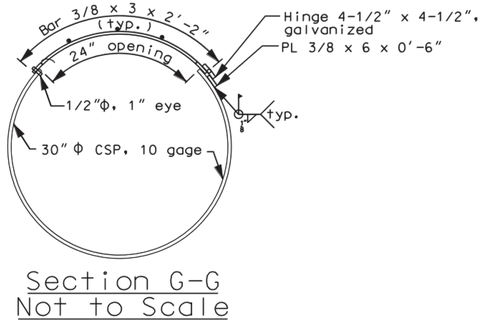
Detail "B"
Scale: 1/2" = 1'-0"



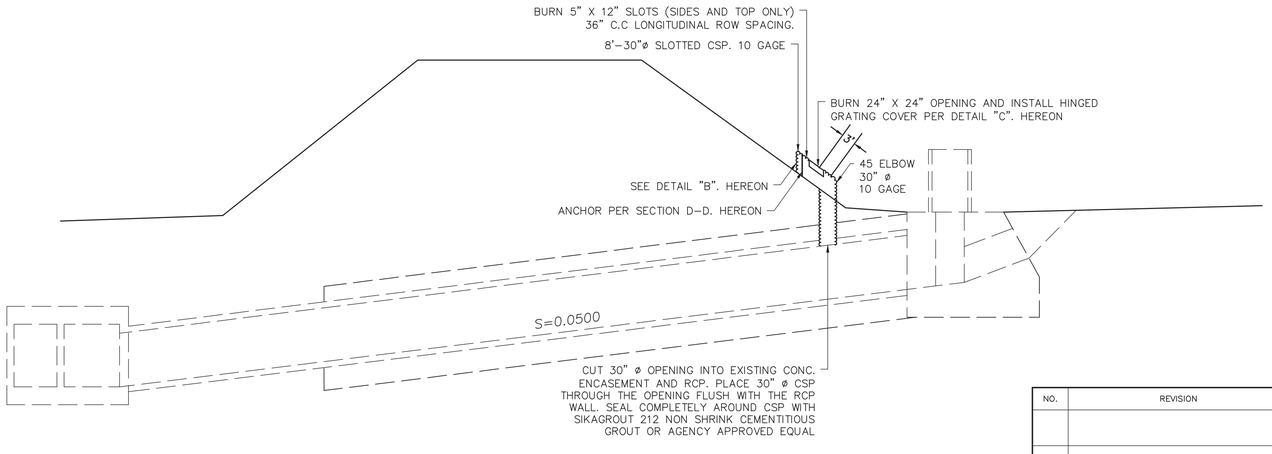
Detail "E"
Scale: 4"=1'-0"



Detail "C"
Scale: 1" = 1'-0"



Section G-G
Not to Scale



SECONDARY INCLINED PIPE DETAIL

N.T.S.

STRUCTURAL NOTES

1. EXPOSED EDGES OF CONCRETE MEMBERS SHALL BE ROUNDED OR BEVELED.
2. REINFORCING STEEL SHALL BE IN ACCORDANCE WITH ASTM A 615, GRADE 60.
3. STRUCTURAL STEEL SHALL BE IN ACCORDANCE WITH ASTM A 36.
4. BOLTS SHALL BE IN ACCORDANCE WITH ASTM A 325.

GENERAL NOTES

1. ALL HARDWARE TO BE GALVANIZED BEFORE FABRICATION.
   TORCHED AREAS WILL BE APPLIED WITH POST FABRICATED GALVANIZATION.
2. FMD SHALL VERIFY ALL LIMITING FIELD
   DIMENSIONS BEFORE ORDERING OR FABRICATING MATERIAL
3. CONNECT CSP SECTIONS WITH STANDARD BAND COUPLER

CONCRETE REMOVAL NOTES

1. MAKE A 1 1/2" SAWCUT ON THE EXPOSED FACES OF THE CONCRETE AT THE REMOVAL LIMITS.
2. AFTER MAKING SAWCUTS, THE CONCRETE SHALL BE REMOVED WITH HAND-HELD EQUIPMENT
3. CARE SHALL BE EXERCISED IN SAWING AT THE REMOVAL LIMITS SO AS NOT TO DAMAGE OR CUT THE REINFORCEMENT IN THE EXISTING CONCRETE.
4. CARE SHALL BE EXERCISED SO THAT DRILLING AND INSTALLING OF ANCHORS BOLTS INTO THE SPILLWAY APPROACH CONCRETE SLAB WILL NOT DAMAGE THE EXISTING STEEL REINFORCEMENT.

REFRENCE

AS BUILT DRAWING	CORPS. OF ENG. DRAWING DWG NO. 205/43-49

NO.	REVISION	REVISED BY	APPROVED BY	DATE

REVIEWED LAND DEVELOPMENT DIVISION
BY _____ 08/13/2018
STORM DRAIN SECTION DATE

JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
8/10/18
JASON H. FUKUMITSU DATE

STORM DRAIN PLANS IN
DS 542 P.D. No. 2637
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

H&A HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
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DWG | SHEET 13 OF 17

P.D. No. 2637

DDN No. 43-F551

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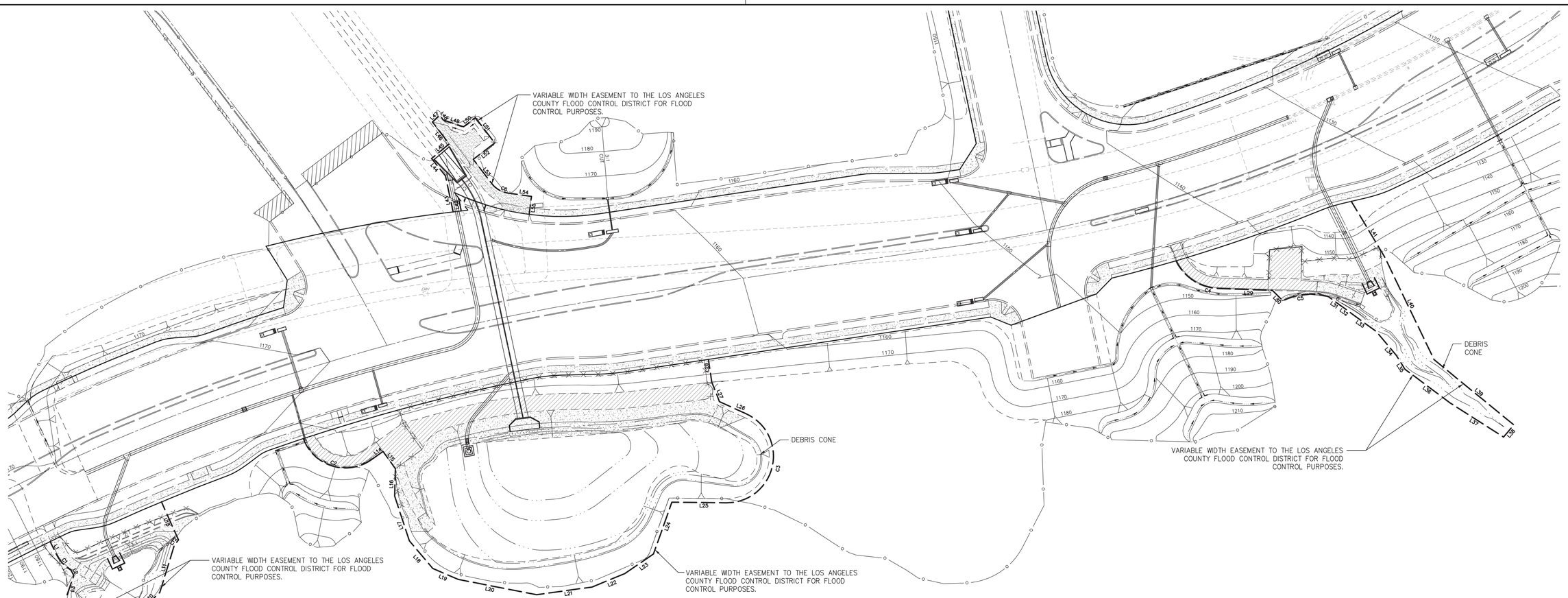

Line Table		
Line #	Length	Bearing
L1	17.29'	S26°18'38"E
L2	7.34'	S28°05'29"E
L3	32.05'	S19°25'18"W
L4	29.95'	S02°28'17"W
L5	76.33'	S00°18'37"E
L6	64.23'	S83°23'10"E
L7	52.64'	N09°49'17"E
L8	38.38'	N23°28'43"E
L9	19.36'	N26°33'36"E
L10	27.24'	N46°43'15"E
L11	60.59'	N17°11'04"E
L12	8.21'	N37°40'00"E
L13	50.88'	N24°07'57"W
L14	15.96'	N54°21'14"E
L15	26.00'	S35°39'24"E
L16	33.58'	S01°36'13"W
L17	57.59'	S18°19'15"E
L18	44.29'	S40°20'11"E
L19	33.81'	S66°38'41"E
L20	97.68'	S78°58'08"E

Line Table		
Line #	Length	Bearing
L21	68.46'	N82°07'46"E
L22	43.37'	N67°43'59"E
L23	42.52'	N55°37'54"E
L24	67.21'	N19°33'47"E
L25	66.60'	S89°20'33"E
L26	35.83'	N65°34'24"W
L27	25.51'	N21°24'26"W
L28	28.12'	N08°31'56"W
L29	65.50'	N88°01'15"W
L30	17.96'	N44°59'39"W
L31	18.31'	N53°55'16"W
L32	18.31'	N53°55'16"W
L33	36.62'	N53°55'16"W
L34	37.82'	N40°04'32"W
L35	20.11'	N31°50'57"W
L36	69.19'	N53°17'53"W
L37	77.17'	N57°28'03"W
L38	19.53'	S40°38'58"W
L39	126.05'	S50°45'56"E
L40	140.01'	S25°43'37"E

Line Table		
Line #	Length	Bearing
L41	78.71'	S31°00'05"E
L42	16.16'	N11°56'19"W
L43	44.89'	N11°56'19"W
L44	27.29'	N38°46'58"W
L45	28.06'	N50°25'21"E
L46	26.62'	N37°19'16"W
L47	12.10'	N47°22'09"E
L48	7.04'	S37°19'37"E
L49	26.17'	S71°21'04"E
L50	18.31'	N52°39'02"E
L51	39.01'	S37°20'58"E
L52	33.00'	S52°40'26"W
L53	37.41'	S37°20'58"E
L54	29.08'	S81°58'56"E
L55	22.13'	S07°25'10"W

Curve Table				
Curve #	Length	Radius	Delta	Tangent
C1	26.85'	47.00'	032°43'52"	13.80'
C2	102.22'	55.00'	106°29'28"	73.64'
C3	155.42'	57.00'	156°13'51"	270.85'
C4	65.83'	60.00'	062°51'38"	36.67'
C5	56.83'	77.17'	042°11'32"	29.77'
C6	23.37'	30.00'	044°37'57"	12.31'

*NOTE: ACCESS ROAD AND STORM DRAIN EASEMENTS TO LACFCD TOTAL AREA = 155,203 S.F.

N

60' 30' 0 60' 120'

GRAPHIC SCALE: 1" = 60'

REVIEWED LAND DEVELOPMENT DIVISION

BY _____ 08/13/2018

STORM DRAIN SECTION — DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE

REGISTERED PROFESSIONAL ENGINEER — JASON H. FUKUMITSU — No. 40695 — CIVIL — STATE OF CALIFORNIA

8/10/18

JASON H. FUKUMITSU — DATE

STORM DRAIN PLANS IN
DS 542 P.D. No. 2637

COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

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DWG

SHEET 14 OF 17

P.D. No. 2637

DDN No. 43-F551

G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2637\HMV102-14 – Sheet 14.dwg Plotted On May 21, 2018 - 6:55pm by jongs

FOUNDATION NOTES:

1. FOUNDATION DESIGN IS BASED ON THE SOIL INVESTIGATION REPORT BY:
   LEIGHTON AND ASSOC. INC.
   DATE: DECEMBER 11, 2017
   PROJECT NO.: 11688.006
2. FOOTINGS ARE DESIGNED FOR A BEARING PRESSURE OF 3000 PSF AND RETAINING SRTRUCTURES AS FOLLOWS:

Condition	Level Backfill	2:1 Back Slope
Active (K_a)	0.28	0.44
At-Rest (K_o)	0.44	0.68
Passive (K_p)	3.25	
Coefficient of Friction	0.35	
Unit Weight (pcf)	120	

3. THE CONTRACTOR SHALL SUBMIT TO THE CITY OR COUNTY FOUNDATION EXCAVATIONS AND RECOMPACTION REPORTS PRIOR TO PLACING ANY STRUCTURAL AND NON-STRUCTURAL CONCRETE AND REBAR AT THE SUBJECT AREAS.
4. CONTRACTOR SHALL PROVIDE FOR DE-WATERING OF EXCAVATIONS FROM EITHER SURFACE WATER, GROUND WATER OR SEEPAGE.
5. FOOTING AND UTILITY TRENCH BACK FILL WITHIN BUILDING AREA SHALL BE MECHANICALLY COMPACTED IN LAYERS. FLOODING WILL NOT BE PERMITTED.
6. ALL FOOTINGS SHALL BE FOUNDED IN UNDISTURBED NATURAL SOIL PER CODE.
7. IF SOIL IS FOUND TO BE EXPANSIVE, THE FOOTINGS MUST MEET THE FOLLOWING MINIMUM REQUIREMENTS.
   A. DEPTH OF FOOTINGS BELOW THE NATURAL AND FINISH GRADES SHALL NOT BE LESS THAN 27 INCHES FOR EXTERIOR AND 18 INCHES FOR INTERIOR FOOTINGS.
   B. EXTERIOR WALLS AND INTERIOR BEARING WALLS SHALL BE SUPPORTED ON CONTINUOUS FOOTINGS.
   C. FOOTINGS SHALL BE REINFORCED WITH MINIMUM (4) #4 DEFORMED REINFORCING BARS. TWO BARS SHALL BE PLACED 4 INCHES OF THE BOTTOM OF THE FOOTING AND TWO BARS WITHIN 4 INCHES OF THE TOP OF THE FOOTINGS.
   D. THE SOIL BELOW AN INTERIOR CONCRETE SLAB SHALL BE SATURATED WITH MOISTURE TO A DEPTH OF 18 INCHES PRIOR TO PLACING THE CONCRETE.
9. IN THE EVENT EXCAVATIONS REVEAL UNFAVORABLE CONDITIONS, THE SERVICES OF A SOILS ENGINEER AND/OR GEOLOGIST MAY BE REQUIRED.
10. EXCAVATION FOR ANY PURPOSE SHALL NOT REMOVE LATERAL SUPPORT FROM ANY FOUNDATION WITHOUT FIRST UNDERPINNING OR PROTECTING THE FOUNDATION AGAINST SETTLEMENT OR LATERAL TRANSLATION.
11. THE EXCAVATION OUTSIDE THE FOUNDATION SHALL BE BACKFILLED WITH SOIL THAT IS FREE OF ORGANIC MATERIAL, CONSTRUCTION DEBRIS, COBBLES AND BOULDERS OR WITH A CONTROLLED LOW-STRENGTH MATERIAL (CLSM). THE BACKFILL SHALL BE PLACED IN LIFTS AND COMPACTED IN A MANOR THAT DOES NOT DAMAGE THE FOUNDATION OR THE WATERPROOFING OR DAMPPROOFING MATERIAL.
    EXCEPTION: CLSM NEED NOT BE COMPACTED.
12. THE GROUND IMMEDIATELY ADJACENT TO THE FOUNDATION SHALL BE SLOPED AWAY FROM THE BUILDING AT A SLOPE OF NOT LESS THAN ONE UNIT VERTICAL IN 20 UNITS HORIZONTAL (5-PERCENT SLOPE) FOR A MINIMUM DISTANCE OF 10 FEET (3048 MM) MEASURED PERPENDICULAR TO THE FACE OF THE WALL. IF PHYSICAL OBSTRUCTIONS OR LOT LINES PROHIBIT 10 FEET (3048 MM) OF HORIZONTAL DISTANCE, A 5-PERCENT SLOPE SHALL BE PROVIDED TO AN APPROVED ALTERNATIVE METHOD OF DIVERTING WATER AWAY FROM FOUNDATION. SWALES USED FOR THIS PURPOSE SHALL BE SLOPED A MINIMUM OF 2 PERCENT WHERE LOCATED WITHIN 10 FEET (3048 MM) OF THE BUILDING FOUNDATION. IMPERVIOUS SURFACES WITHIN 10 FEET (3048 MM) OF THE BUILDING FOUNDATION SHALL BE SLOPED A MINIMUM OF 2 PERCENT AWAY FROM THE BUILDING.
    EXCEPTION: WHERE CLIMATIC OR SOIL CONDITIONS WARRANT, THE SLOPE OF THE GROUND AWAY FROM THE BUILDING FOUNDATION SHALL BE PERMITTED TO BE REDUCED TO NOT LESS THAN ONE UNIT VERTICAL IN 48 UNITS HORIZONTAL (2-PERCENT SLOPE).
    THE PROCEDURE USED TO ESTABLISH THE FINAL GROUND LEVEL ADJACENT TO THE FOUNDATION SHALL ACCOUNT FOR ADDITIONAL SETTLEMENT OF THE BACKFILL.

ABBREVIATIONS

AB	ANCHOR BOLT	FH	FULL HEIGHT	R&R	REMOVE & REPLACE
ABV	ABOVE	FN	FIELD NAILING	SCHED	SCHEDULE
ADDL	ADDITIONAL	FL	FLOOR	SF	SQUARE FOOT
ADHES	ADHESIVE	FS	FAR SIDE	SHT	SHEET
ALT	ALTERNATE	FDN	FOUNDATION	SIM	SIMILAR
ARCH	ARCHITECT, ARCHITECTURAL	FOC	FACE OF CONCRETE	SN	SOLE ℄ NAILING
BTWN	BETWEEN	FOS	FACE OF STUD	SPEC	SPECIFICATION
BLW	BELOW	FT	FOOT, FEET	SQ	SQUARE
BLDG	BUILDING	FTG	FOOTING	STD	STANDARD
BLKG	BLOCKING	GA	GAGE	STL	STEEL
BM	BEAM	GALV	GALVANIZED	STRUCT	STRUCTURAL
BN	BOUNDARY NAILING	GND	GROUND	SYM	SYMMETRICAL
BOT	BOTTOM	GRD	GRADE	THK	THICK
BS	BOTH SIDES	GT	GIRDER TRUSS	THRD	THREADED
BSMT	BASEMENT	HT	HEIGHT	T&B	TOP & BOTTOM
CF	CUBIC FOOT	HORIZ	HORIZONTAL	TN	TOE NAIL
CJ	CONTROL JOINT, CEILING JOIST	HS	HIGH STRENGTH	TOF	TOP OF FOOTING
CLG	CEILING	INFO	INFORMATION	TOS	TOP OF STEEL
CLR	CLEAR	INT	INTERIOR	TL	TOP OF LEDGER
CMU	CONCRETE MASONRY UNIT	JT	JACK TRUSS	TOW	TOP OF WALL
CNTRSNK	COUNTERSINK/COUNTERSUNK	KP	KING POST	TRANSV	TRANSVERSE
COL	COLUMN	KSI	KIPS PER SQUARE INCH	TS	TUBE STEEL
CONC	CONCRETE	LBS	POUNDS	TYP	TYPICAL
CONN	CONNECTION	LG	LONG	UNO	UNLESS NOTED OTHERWISE
CONST	CONSTRUCTION	LOC'S	LOCATIONS	VERT	VERTICAL
CONT	CONTINUOUS	LONG	LONGITUDINAL	WF	WIDE FLANGE BEAM
CONTR	CONTRACTOR	LT WT	LIGHT WEIGHT	W/	WITH
CVR	COVER	MAX	MAXIMUM	W/O	WITHOUT
DIA	DIAMETER	MB	MACHINE BOLT	WT	WEIGHT
DIR	DIRECTION	MD	METAL DECK	WP	WORKING POINT
D.O.	DO OVER	MECH	MECHANICAL	WWF	WELDED WIRE FABRIC
DSA	DEPARTMENT OF STATE ARCHITECTS	MANUF	MANUFACTURER	WWO	WALL W/ OPENING AND/OR PERFORATED S.W.
DWG	DRAWING	MIN	MINIMUM		
(E)	EXISTING	MISC	MISCELLANEOUS		
EA	EACH	MTL	METAL		
EF	EACH FACE	(N)	NEW		
ELEC	ELECTRICAL	NS	NEAR SIDE, NELSON STUD		
EL	ELEVATION	NW	NORMAL WEIGHT		
EN	EDGE NAILING	OC	ON CENTER		
ENGR	ENGINEER	OH	OPPOSITE HAND		
ES	EDGE SCREW	OPP	OPPOSITE		
EXP JT	EXPANSION JOINT	PSF	POUNDS PER SQUARE FOOT		
EQ	EQUAL	PSI	POUNDS PER SQUARE INCH		
EXT	EXTERIOR	PT	PLATE TRUSS		
FF	FINISHED FLOOR	REINF	REINFORCEMENT		
FG	FINISHED GRADE	REQ	REQUIRE		

SYMBOLS

∠	ANGLE
@	AT
℄	CENTERLINE
ℙ	PLATE / PROPERTY LINE
#	POUNDS
ø	DIAMETER
⊥	PERPENDICULAR
//	PARALLEL

REINFORCED CONCRETE NOTES CONT.:

27. MAXIMUM CHLORIDE ION CONTENT FOR CORROSION PROTECTION OF REINFORCEMENT:

TYPE OF MEMBER	MAXIMUM WATER SOLUBLE CHLORIDE ION (Cl⁻) IN CONCRETE, PERCENT BY WEIGHT OF CEMENT
PRESTRESSED CONCRETE	0.06
REINFORCED CONCRETE EXPOSED TO CHLORIDE IN SERVICE	0.15
REINFORCED CONCRETE THAT WILL BE DRY OR PROTECTED FROM MOISTURE IN SERVICE	1.00
OTHER REINFORCED CONCRETE CONSTRUCTION	0.30

28. TOLERANCE FOR LONGITUDINAL LOCATION OF BEND AND ENDS OF REINFORCEMENT SHALL BE ± 2 IN., EXCEPT THE TOLERANCE SHALL BE ± ½ IN. AT THE DISCONTINUOUS ENDS OF BRACKETS AND CORBELS, AND ± 1 IN. AT THE DISCONTINUOUS ENDS OF OTHER MEMBERS.
29. REINFORCEMENT RESISTING EARTHQUAKE-INDUCED FLEXURAL AND AXIAL FORCES IN FRAME MEMBERS AND IN STRUCTURAL WALL BOUNDARY ELEMENTS SHALL COMPLY WITH ASTM A 706. ASTM A 615 GRADES 40 AND 60 REINFORCEMENT SHALL BE PERMITTED IN THESE MEMBERS IF:
    A. THE ACTUAL YIELD STRENGTH BASED ON MILL TESTS DOES NOT EXCEED f_y BY MORE THAN 18,000 PSI (RETESTS SHALL NOT EXCEED THIS VALUE BY MORE THAN AN ADDITIONAL 3000 PSI): AND
    B. THE RATION OF THE ACTUAL TENSILE STRENGTH TO THE ACTUAL YIELD STRENGTH IS NOT LESS THAN 1.25.THE VALUE OF f_y FOR TRANSVERSE REINFORCEMENT INCLUDING SPIRAL REINFORCEMENT SHALL NOT EXCEED 60,000 PSI.
30. CONCRETE FLOOR FLATNESS SHALL BE A MINIMUM OF ¾" : 10 FT. TYP. U.N.O.
31. WHERE CORROSION-RESISTANT REINFORCEMENT (CRR) IS SPECIFIED, USE MMFX2 REBAR ASTM A1035 GRADES 690 AND 830.
32. WELDING OF ELECTRICAL CONDUCTORS TO REINFORCING STEEL IS PROHIBITED WITHOUT THE APPROVAL OF THE ENGINEER OF RECORD.
33. PERFORMANCE OF SHOTCRETE SHALL BE PER ACI 506.2 SPECIFICATIONS.
34. ACI 318 TABLE 26.4.1.1.1(a) – SPECIFICATIONS FOR CEMENTITIOUS MATERIALS

CEMENTITIOUS MATERIALS	SPECIFICATION
PORTLAND CEMENT	ASTM C150
BLENDED HYDRAULIC CEMENTS	ASTM C595, EXCLUDING TYPE IS (≥70) AND TYPE IT (S≥70)
EXPANSIVE HYDRAULIC CEMENTS	ASTM C845
HYDRAULIC CEMENT	ASTM C1157
FLY ASH AND NATURAL POZZOLAN	ASTM C618
SLAG CEMENT	ASTM C989
SILICA FUME	ASTM C1240

35. AGGREGATES – COMPLIANCE REQUIREMENTS;
    A. AGGREGATES SHALL CONFORM TO (1) OR (2):
        1. NORMALWEIGHT AGGREGATE: ASTM C33.
        2. LIGHTWEIGHT AGGREGATE: ASTM C330
    B. AGGREGATES NOT CONFORMING TO ASTM C33 OR ASTM C330 ARE PERMITTED IF THEY HAVE BEEN SHOWN BY TEST OF ACTUAL SERVICE TO PRODUCE CONCRETE OF ADEQUATE STRENGTH AND DURABILITY AND ARE APPROVED BY THE BUILDING OFFICIAL.
    C. MAXIMUM AGGREGATE SIZE ⅜" MAX.
36. WATER – COMPLIANCE REQUIREMENTS:
    A. MIXING WATER SHALL CONFORM TO ASTM C1602.
    B. MIXING WATER, INCLUDING THAT PORTION OF MIXING WATER CONTRIBUTED IN THE FORM OF FREE MOISTURE ON AGGREGATES, SHALL NOT CONTAIN DELETERIOUS AMOUNTS OF CHLORIDE ION WHEN USED FOR PRESTRESSED CONCRETE, FOR CONCRETE THAT WILL CONTAIN ALUMINUM EMBEDMENTS, OR FOR CONCRETE CAST AGAINST STAY-IN-PLACE GALVANIZED STEEL FORMS.
37. ADMIXTURES – COMPLIANCE REQUIREMENTS:
    A. ADMIXTURES SHALL CONFORM TO (1) THROUGH (4):
        1. WATER REDUCTION AND SETTING TIME MODIFICATION: ASTM C494.
        2. PRODUCING FLOWING CONCRETE: ASTM C1017.
        3. AIR ENTRAINMENT: ASTM C260.
        4. INHIBITING CHLORIDE-INDUCED CORROSION: ASTM C1582.
    B. ADMIXTURES THAT DO NOT CONFORM TO THESE SPECIFICATIONS SHALL BE SUBJECT TO PRIOR REVIEW BY THE LICENSED DESIGN PROFESSIONAL.
    C. CALCIUM CHLORIDE OR ADMIXTURES CONTAINING CHLORIDE FROM SOURCES OTHER THAN IMPURITIES IN ADMIXTURE INGREDIENTS SHALL NOT BE USED IN PRESTRESSED CONCRETE, IN CONCRETE CONTAINING EMBEDDED ALUMINUM, OR IN CONCRETE CAST AGAINST STAY-IN-PLACE GALVANIZED STEEL FORMS.
    D. ADMIXTURES USED IN CONCRETE CONTAINING EXPANSIVE CEMENTS CONFORMING TO ASTM C845 SHALL BE COMPATIBLE WITH THE CEMENT AND PRODUCE NO DELETERIOUS EFFECTS.
38. STEEL FIBER REINFORCEMENT – COMPLIANCE REQUIREMENTS:
    A. STEEL FIBER REINFORCEMENT USED FOR SHEAR RESISTANCE SHALL SATISFY (1) AND (2):
        1. BE DEFORMED AND CONFORM TO ASTM A820.
        2. HAVE A LENGTH-TO-DIAMETER RATIO OF AT LEAST 50 AND NOT EXCEEDING 100.

1

REGISTERED PROFESSIONAL ENGINEER
JASON H. FURUKAWA
No. 40695
CIVIL
STATE OF CALIFORNIA

REINFORCED CONCRETE NOTES:

1. CONCRETE MIXES SHALL BE DESIGNED BY A RECOGNIZED TESTING LABORATORY AND COPIES OF THE DESIGN SHALL BE SENT TO THE ARCHITECT AND THE ENGINEER. COMPRESSIVE STRENGTH TEST REPORTS SHALL BE SUBMITTED TO THE BUILDING DEPARTMENT AND THE ARCHITECT. ALL CONCRETE EXCEPT FOUNDATION CONCRETE SHALL CONTAIN POLYMER BASED WATER REDUCING ADMIXTURE.
2. ALL REINFORCING BARS, ANCHOR BOLTS, PRE STRESSING TENDONS, AND ALL OTHER CONCRETE INSERTS SHALL BE WELL SECURED IN POSITION PRIOR TO PLACING CONCRETE.
3. THE MAXIMUM SLUMP SHALL NOT EXCEED 4" +/- 1" FOR FOOTINGS, SLABS ON EARTH, AND MASS CONCRETE, AND 5" +/- 1" FOR OTHER CONCRETE. SLUMP MAY BE INCREASED WHEN CHEMICAL ADMIXTURES ARE USED, PROVIDED THAT ADMIXTURE-TREATED CONCRETE HAS THE SAME OR LOWER WATER: CEMENT OR WATER: CEMENTITIOUS MATERIAL RATIO℄ (ACI 211 TABLE 6.3.1)
4. MINIMUM COMPRESSIVE STRENGTH:
   PROVIDE CONCRETE WITH THE FOLLOWING MINIMUM COMPRESSIVE STRENGTH (f'_c) AT 28 DAYS UNLESS NOTED OTHERWISE (MINIMUM 5 SACKS OF CEMENT PER CUBIC YARD) (MAXIMUM WATER/CEMENT RATIO BY WEIGHT SHALL BE .45):
   A. ALL.....5000 P.S.I. (HARDROCK)
6. THE COMPRESSIVE STRENGTH OF EXTERIOR SLABS AND FLAT WORK SHALL BE INCREASED FOR MODERATE AND SEVERE WEATHERING EXPOSURE PER TABLE 1904.2.2 OF THE CBC.
7. ALL STRUCTURAL CONCRETE IS TO BE REINFORCED.
8. CONTRACTOR SHALL SUBMIT SLAB CONSTRUCTION JOINT LAYOUT DRAWINGS TO THE ARCHITECT AND ENGINEER FOR REVIEW. THE MAXIMUM SPACING OF CONTROL JOINTS IN SLAB ON GRADE EACH WAY SHALL BE 30X THE SLAB THICKNESS BEFORE 7 DAYS OF CURING. SLABS REQUIRE AT LEAST 7 DAYS CURING (14 DAYS WHERE FLY ASH OR POZOLAN IS USED), AND THE ENVIRONMENT (HUMIDITY AND TEMPERATURE) OF ROOM SHALL BE ACCLIMATED TO LONG TERM CLIMATE CONDITIONS PRIOR TO INSTALLATION OF FLOORING. THE SLAB TEMPERATURE SHALL BE WITHIN 5 DEGREES OF DEW POINT DURING CURING. NO CURING COMPOUND SHALL BE USED, ONLY WET CURED. MOISTURE AND HUMIDITY TESTING SHALL BE PERTORMED BY AN INDEPENDENT TESTING LABORATORY HIRED BY THE OWNER, AND TESTS RESULTS SHALL BE SUBMITTED TO THE ARCHITECT FOR APPROVAL PRIOR TO INSTALLATION OF FLOORING.
9. PROJECTING CORNERS OF BEAMS, COLUMNS, WALLS, ETC.. SHALL BE FORMED WITH A 3/4" CHAMFER UNLESS DETAILED OTHERWISE.
10. IF EXPOSURE TO SULFATES, OR SPECIAL EXPOSURE CONDITIONS OCCUR, THE CONCRETE STRENGTH, WATER CEMENT RATIOS, AND OTHER PROPERTIES OF THE CONCRETE MIX SHALL BE IN ACCORDANCE WITH ACI 318 SECTION 4.3. VERIFY WITH SOILS REPORT FOR CORROSIVE CHEMICALS IN THE SOILS.
11. DO NOT POUR CONCRETE WHEN THE TEMPERATURE EXCEEDS 90°F OR 80°F WHEN THE WIND EXCEEDS 12MPH. START CURING AS SOON AS HARD TRAWLING IS DONE. ALL CURING SHALL BE WET CURING BY USING BURLAP FOR A MINIMUM OF 7 DAYS. BURLAP MUST BE PLACED WITHIN 2 HOURS OF POURING (NO SPRAY CURING). WHEN WIND, TEMPERATURE AND HUMIDITY CONDITIONS CAUSE EARLY DISAPPEARANCE OF BLEED WATER, STEPS SHALL BE TAKEN TO USE A FOG SPRAY. CURING SHALL COMMENCE IMMEDIATELY AFTER FINISHING TRAWLING.
12. WHERE AIR ENTRAINED CONCRETE IS SPECIFIED, THE VOLUME OF AIR IN THE MORTAR FRACTION OF CONCRETE MIX DESIGN SHALL BE 9% ±1%.
13. ALL REINFORCING STEEL SHALL CONFORM TO THE REQUIREMENTS OF ASTM A-615 GRADE 60 FOR NO.5 AND LARGER, ASTM A-615 GRADE 60 FOR NO.4 AND SMALLER. AT GRADE BEAMS & CONCRETE FRAMES ALL REINF. SHALL CONFORM TO ASTM A706 REBAR. U.N.O.
14. ALL REINFORCING BAR BEND'S SHALL BE MADE COLD.
15. REINFORCING STEEL SHALL BE SPLICED WITH CLASS B SPLICES UNLESS NOTED OTHERWISE ON THE DRAWINGS.
16. LOW HYDROGEN ELECTRODES SHALL BE USED WHEREVER REINFORCING STEEL IS WELDED. BARS SHALL BE A706 GRD. 60 MIN. FOR WELD ABILITY.
17. AT THE TIME CONCRETE IS PLACED, REINFORCEMENT SHALL BE FREE FROM MUD, OIL, OR OTHER NONMETALLIC COATINGS THAT DECREASE BOND. WHERE SPECIFIED IN THE DETAILS, EPOXY-COATING OF STEEL REINFORCEMENT IN ACCORDANCE WITH ACI STANDARDS. EXCEPT FOR PRESTRESSING STEEL, STEEL REINFORCEMENT WITH RUST, MILL SCALE, OR A COMBINATION OF BOTH SHALL BE CONSIDERED SATISFACTORY, PROVIDED THE MINIMUM DIMENSIONS (INCLUDING HEIGHT OF DEFORMATIONS) AND WEIGHT OF A HAND-WIRE-BRUSHED TEST SPECIMEN COMPLY WITH APPLICABLE ASTM SPECIFICATIONS.
18. THE MINIMUM CLEAR SPACING BETWEEN PARALLEL BARS IN A LAYER SHALL BE ⌀ BUT NOT LESS THAN 1 IN. WHERE PARALLEL REINFORCEMENT IS PLACED IN TWO OR MORE LAYERS, BARS IN THE UPPER LAYERS SHALL BE PLACED DIRECTLY ABOVE BARS IN THE BOTTOM LAYER WITH CLEAR DISTANCE BETWEEN LAYERS NOT LESS THAN 1 IN. 21. CLEAR DISTANCE LIMITATION BETWEEN BARS SHALL APPLY ALSO TO THE CLEAR DISTANCE BETWEEN A CONTACT LAP SPLICE AND ADJACENT SPLICES OR BARS.
19. IN SPIRALLY REINFORCED OR TIED REINFORCED COMPRESSION MEMBERS, CLEAR DISTANCE BETWEEN LONGITUDINAL BARS SHALL BE NOT LESS THAN 1.5⌀ NOR LESS THAN 1½ IN.
20. IN WALLS AND SLABS OTHER THAN CONCRETE JOIST CONSTRUCTION, PRIMARY FLEXURAL REINFORCEMENT SHALL NOT BE SPACED FARTHER APART THAN THREE TIMES THE WALL OR SLAB THICKNESS, NOR FARTHER APART THAN 18 IN.
21. WHERE CONCRETE MUST BE INSTALLED AND CURED IN COLD WEATHER, THE GENERAL REQUIREMENTS AND SPECIFICATIONS OF ASTM STD C-31 SHALL BE IMPLEMENTED.
22. CAST-IN-PLACE CONCRETE (NON-PRESTRESSED)
    THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCEMENT (CONTRACTOR TO FULLY COORDINATE WITH CLEAR COVER REQUIREMENTS PER SPPWC 333-2 & 390-1.):
    A. CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH.....3" MIN.
    B. CONCRETE EXPOSED TO EARTH OR WEATHER:
        - NO.6 THROUGH NO.18 BARS.....2" MIN.
        - NO.5 BAR, W31 OR D31 WIRE, AND SMALLER.....1½" MIN.
    C. CONCRETE NOT EXPOSED TO WEATHER OR IN CONTACT WITH GROUND:
        SLABS, WALLS, JOISTS:
        - NO.14 AND NO.18 BARS.....1½" MIN.
        - NO.11 BAR AND SMALLER.....¾" MIN.
        BEAMS, COLUMNS:
        - PRIMARY REINFORCEMENT, TIES, STIRRUPS, SPIRALS.....1½" MIN.
        SHELLS, FOLDED PLATE MEMBERS:
        - NO.6 BAR AND LARGER.....¾" MIN.
        - NO.5 BAR, W31 OR D31 WIRE, AND SMALLER.....½" MIN.
23. BUNDLED BARS:
    FOR BUNDLED BARS, MINIMUM CONCRETE COVER SHALL BE EQUAL TO THE EQUIVALENT DIAMETER OF THE BUNDLE, BUT NEED NOT TO BE GREATER THAN 2 IN.; EXCEPT FOR CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH, WHERE MINIMUM COVER SHALL BE 3 IN. GROUPS OF PARALLEL REINFORCING BARS BUNDLED IN CONTACT TO ACT AS A UNIT SHALL BE LIMITED TO FOUR IN ANY ONE BUNDLE. BUNDLED BARS SHALL BE ENCLOSED WITHIN STIRRUPS OR TIES. BARS LARGER THAN NO. 11 SHALL NOT BE BUNDLED IN BEAMS. INDIVIDUAL BARS WITHIN A BUNDLE TERMINATED WITHIN THE SPAN OF FLEXURAL MEMBERS SHALL TERMINATE AT DIFFERENT POINTS WITH AT LEAST 40⌀ STAGGER.
24. CORROSIVE ENVIRONMENTS:
    IN CORROSIVE ENVIRONMENTS OR OTHER SEVERE EXPOSURE CONDITIONS, AMOUNT OF CONCRETE PROTECTION SHALL BE SUITABLY INCREASED, AND DENSENESS AND NONPOROSITY OF PROTECTING CONCRETE SHALL BE CONSIDERED, OR OTHER PROTECTION SHALL BE PROVIDED. "COVER" WHERE NOTED ON PLANS AND DETAILS IS NOT A MINIMUM, UNLESS NOTED AS "MIN." THE COVER SHALL BE AS NOTED WITH TOLERANCE.
25. MINIMUM DIAMETER OF BEND:

MINIMUM DIAMETERS OF BEND	
BAR SIZE	MINIMUM DIAMETER
NO.3 THROUGH NO.8	6ds
NO.9, NO.10, AND NO.11	8ds
NO.14 AND NO.18	10ds

26. TOLERANCE FOR d AND MINIMUM CONCRETE COVER IN FLEXURAL MEMBERS, WALLS, AND COMPRESSION MEMBERS SHALL BE AS FOLLOWS:

	TOLERANCE ON d	TOLERANCE ON MINIMUM CONCRETE COVER
d ≤ 8 IN.	±⅜ IN.	-⅜ IN.
d > 8 IN.	±½ IN.	-½ IN.

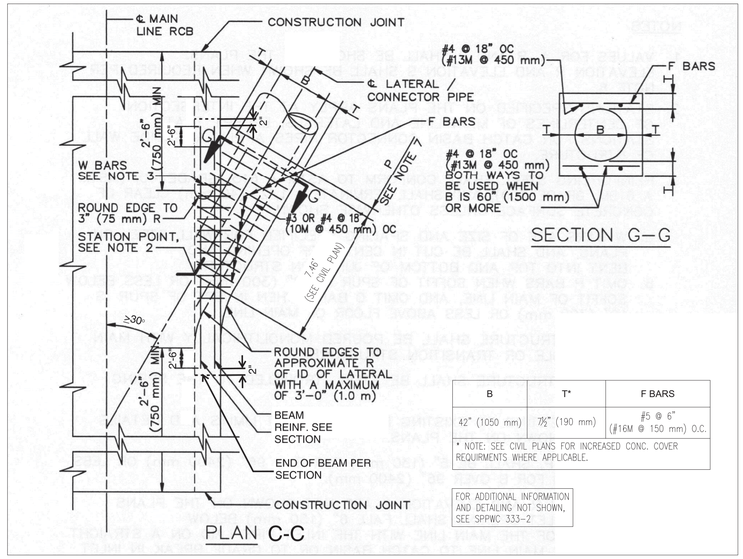
EXCEPT THAT TOLERANCE FOR THE CLEAR DISTANCE TO FORMED SOFFITS SHALL BE MINUS ¼ IN. AND TOLERANCE FOR COVER SHALL NOT EXCEED MINUS ⅓ THE MINIMUM CONCRETE COVER REQUIRED IN THE DESIGN DRAWINGS AND SPECIFICATIONS.

GENERAL STRUCTURAL NOTES:

1. THIS DOCUMENT IS AN INSTRUMENT OF PROFESSIONAL SERVICE PREPARED BY RGSE INC. ALTERATION OF THIS DOCUMENT BY ANY PARTY OTHER THAN RGSE INC. IS A VIOLATION OF LAW THAT WILL BE PROSECUTED TO ITS FULLEST EXTENT.
2. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS & CONDITIONS AT THE JOB SITE PRIOR TO STARTING CONSTRUCTION AND THE ARCHITECT/ENGINEER SHALL BE NOTIFIED OF ANY DISCREPANCIES OR INCONSISTENCIES.
3. AT ANY DISCREPANCIES OR CONFLICTS BETWEEN PLAN AND ELEVATION DIMENSIONS SHOWN ON THE ARCHITECTURAL DRAWINGS AND THE STRUCTURAL DRAWINGS, THE ARCHITECTURAL DIMENSIONS SHALL GOVERN. IF ANY OF THESE DIMENSIONS DIFFER BY MORE THAN 5%, THE ENGINEER SHALL BE NOTIFIED OF THE CONFLICT, AND THE CONTRACTOR SHALL WAIT FOR INSTRUCTIONS.
4. ALL PHASES OF WORK SHALL CONFORM TO THE MINIMUM STANDARDS OF THE LATEST LOCALLY ADOPTED CODE AND ALL RELEASED ADDENDUMS.
5. THE CONTRACT CONSTRUCTION DRAWINGS AND SPECIFICATIONS REPRESENT THE FINISHED STRUCTURE, UNLESS OTHERWISE NOTED, THEY DO NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE ALL MEASURES NECESSARY TO PROTECT THE STRUCTURE, WORKMEN, AND OTHER PERSONS DURING CONSTRUCTION. SUCH MEASURES SHALL INCLUDE, BUT NOT LIMITED TO: BRACING, ALL SHORING, FORMS, AND SCAFFOLDING.
6. OPENINGS, POCKETS, ETC. SHALL NOT BE PLACED IN SLABS BEAMS, COLUMNS, WALLS, ETC., UNLESS SPECIFICALLY DETAILED ON THE STRUCTURAL DRAWINGS.
7. ALL ASTM SPECIFICATIONS NOTED ON THESE DRAWINGS SHALL BE OF THE LATEST REVISION.
8. IN THE EVENT THAT CERTAIN FEATURES OF CONSTRUCTION ARE NOT FULLY SHOWN ON THE DRAWINGS OR CALLED FOR IN THE NOTES OR SPECIFICATIONS. NOTIFY THE ARCHITECT/ENGINEER IMMEDIATELY & WAIT FOR INSTRUCTIONS.
9. COST OF ADDITIONAL DESIGN WORK NECESSITATED BY SELECTION OF AN OPTION OR DUE TO ERRORS OR OMISSIONS IN CONSTRUCTION, SHALL BE BORN BY THE CONTRACTOR.
10. WHERE DESIGN AND DETAILS OF PLATE GIRDERS, TRUSSES, ETC., IS TO BE PROVIDED BY FABRICATOR, CONTRACTOR SHALL SUBMIT CALCULATIONS PREPARED BY A CIVIL OR STRUCTURAL ENGINEER, TO THE ENGINEER AND TO THE BUILDING DEPARTMENT FOR REVIEW PRIOR TO FABRICATION.
11. UNLESS AN ITEM ON THE PLANS OR DETAILS IS SPECIFICALLY MARKED AS AN EXISTING ITEM, THE CONTRACTOR IS TO ASSUME THAT IT IS NEW, AND INCLUDE IT IN THE CONSTRUCTION BUDGET.
12. WHERE SOIL REPORT IS CITED, ITS REQUIREMENTS ADOPTED HEREIN.
13. ALL MANUFACTURED PRODUCTS MUST BE INSTALLED PER MANUFACTURER'S RECOMMENDATION.
14. WHILE EVERY REASONABLE EFFORT HAS BEEN MADE TO PROVIDE A BUILDABLE SET ON CONTRACT DOCUMENTS WITH MINIMAL ERRORS OR OMISSIONS, THE CONTRACTOR ACKNOWLEDGES AND UNDERSTANDS THAT THE CONTRACT DOCUMENTS MAY REPRESENT IMPERFECT DATA AND MAY CONTAIN ERRORS, OMISSIONS, CONFLICTS, INCONSISTENCIES, CODE VIOLATIONS AND IMPROPER USE OF MATERIALS. SUCH DEFICIENCIES WILL BE CORRECTED BY THE ARCHITECT OR HIS CONSULTANTS WHEN IDENTIFIED. THE CONTRACTOR AGREES TO CAREFULLY STUDY AND COMPARE THE INDIVIDUAL CONTRACT DOCUMENTS AND REPORT AT ONCE IN WRITING TO THE ARCHITECT ANY DEFICIENCIES THE CONTRACTOR MAY DISCOVER. THE CONTRACTOR FURTHER AGREES TO REQUIRE EACH SUBCONTRACTOR TO LIKEWISE STUDY THE DOCUMENTS AND TO REPORT AT ONCE ANY DEFICIENCIES DISCOVERED. THE CONSULTANT AND ARCHITECT, TOGETHER WITH CONTRACTOR SHALL RESOLVE ALL REPORTED DEFICIENCIES PRIOR TO STARTING ANY WORK. ANY QUESTIONABLE WORK PERFORMED PRIOR TO RESOLUTION OF CONFLICTS OR ERRORS OR FURTHER CLARIFICATION FROM THE ARCHITECT WILL BE DONE AT THE CONTRACTOR'S RISK.
15. OPTIONS, IF PROVIDED HEREIN, ARE FOR CONTRACTOR'S CONVENIENCE. HE SHALL BE RESPONSIBLE FOR ALL CHANGES NECESSARY, SHALL COORDINATE ALL DETAILS, AND SHALL OBTAIN ALL REQUIRED APPROVALS.
16. ANY MECHANICAL AND ELECTRICAL EQUIPMENT, STORAGE RACKS, SAFES, AND ANY OBJECT EXPECTED TO BE IN THE BUILDING THAT HAS AN OPERATIONAL WEIGHT (FULLY LOADED) GREATER THEN 400 LB. FLOOR OR ROOF MOUNTED, OR GREATER THEN 200 LB. SUSPENDED FROM A FLOOR, CEILING OR WALL SHALL BE SHOWN ON THESE DRAWINGS. IF THEY ARE NOT SHOWN ON THESE DRAWINGS, THEY SHALL BE BROUGHT TO THE ATTENTION OF THE STRUCTURAL ENGINEER, AND A CUT SHEET FOR THE SPECIFIC ITEM SHALL BE MADE AVAILABLE.
17. CONSTRUCTION WASTE REDUCTION, DISPOSAL AND RECYCLING SHALL BE IN CONFORMANCE WITH THE REQUIREMENTS OF THE LATEST ADOPTED CALIFORNIA GREEN BUILDING CODE.
18. CONTRACTOR IS TO VERIFY THAT NO EXISTING STEEL REINFORCING, OR TENSION CABLES ARE DAMAGED WHEN INSTALLING POST INSTALLED WEDGE OR CHEMICAL ANCHORS. MECHANICAL ANCHORS ARE ONLY APPROVED FOR INTERIOR DRY USE, OTHERWISE CHEMICAL ANCHORS MUST BE USED.

SPECIAL INSPECTIONS:

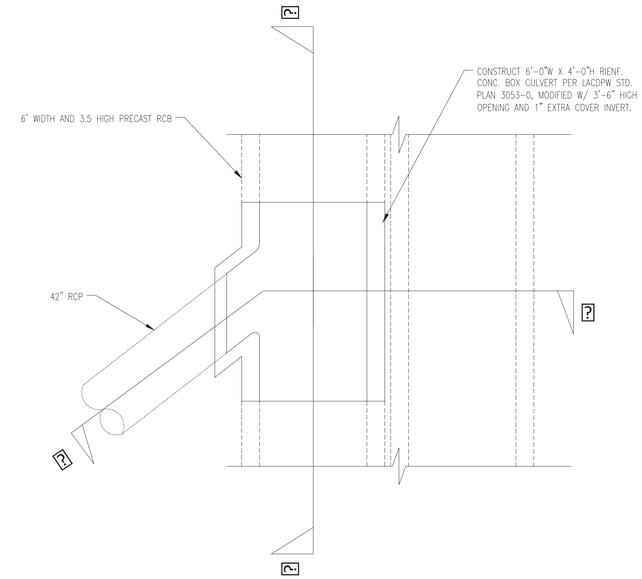
1. SPECIAL INSPECTION U.N.O. BY A REGISTERED DEPUTY INSPECTOR APPROVED BY THE ARCHITECT AND/OR ENGINEER AND THE BUILDING DEPARTMENT SHALL BE EMPLOYED BY THE OWNER FOR THE FOLLOWING TYPES OF WORK:
   A. FOUNDATION CONCRETE INVOLVING CONCRETE STRENGTH GREATER THAN 2500 P.S.I.
   B. SEE C.B.C. VOL.II, SECTION 1704 FOR ADDITIONAL REQUIREMENTS. DEPUTY INSPECTION MAY BE WAIVED FOR WORK THAT IS MINOR IN NATURE AS INTERPRETED BY THE BUILDING OFFICIAL.
2. THE SPECIAL INSPECTOR SHALL BE A QUALIFIED PERSON WHO SHALL DEMONSTRATE COMPETENCE, TO THE SATISFACTION OF THE BUILDING OFFICIAL, FOR INSPECTION OF THE PARTICULAR TYPE OF CONSTRUCTION OR OPERATION REQUIRING SPECIAL INSPECTION. THE SPECIAL INSPECTOR SHALL OBSERVE THE WORK ASSIGNED FOR CONFORMANCE TO THE APPROVED DESIGN DRAWINGS AND SPECIFICATIONS. THE SPECIAL INSPECTOR SHALL FURNISH INSPECTION REPORTS TO THE BUILDING OFFICIAL, THE ENGINEER OR ARCHITECT OF RECORD, AND OTHER DESIGNATED PERSONS. ALL DISCREPANCIES SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE CONTRACTOR FOR CORRECTION, THEN, IF UNCORRECTED, TO THE PROPER DESIGN AUTH



B	T*	F BARS
42" (1050 mm)	7½" (190 mm)	#5 @ 6" (#16M @ 150 mm) O.C.

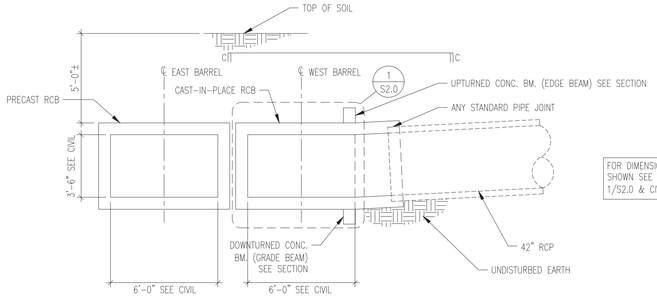
* NOTE: SEE CIVIL PLANS FOR INCREASED CONC. COVER REQUIRMENTS WHERE APPLICABLE.

FOR ADDITIONAL INFORMATION AND DETAILING NOT SHOWN, SEE SPPWC 333-2

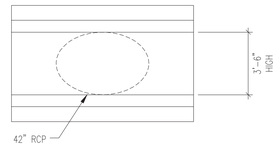


PLAN VIEW

SCALE: 1/4"=1'-0"



FOR DIMENSIONS NOT SHOWN SEE DETAIL 1/S2.0 & CIVIL PLANS



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SECTIONS

SCALE: 1/4"=1'-0"

1

REGISTERED PROFESSIONAL ENGINEER JASON R. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

REVIEWED LAND DEVELOPMENT DIVISION

BY _____ STORM DRAIN SECTION

11/15/18 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
1	ADD STRUCTURAL SHEETS			11/15/18

REGISTERED PROFESSIONAL ENGINEER JASON GARCIA No. 45[illegible] STRUCTURAL STATE OF CALIFORNIA

10/23/18 DATE

STORM DRAIN PLANS IN
DS 542 P.D. No. 2637
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

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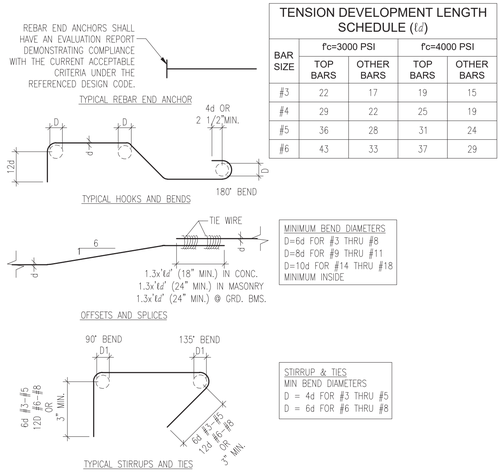
RGSE INC PROJECT #18078

DWG S1.0

SHEET 16 OF 17

10/3/2018 5:30:10 PM



TENSION DEVELOPMENT LENGTH SCHEDULE (ℓd)				
BAR SIZE	f'c=3000 PSI		f'c=4000 PSI	
	TOP BARS	OTHER BARS	TOP BARS	OTHER BARS
#3	22	17	19	15
#4	29	22	25	19
#5	36	28	31	24
#6	43	33	37	29

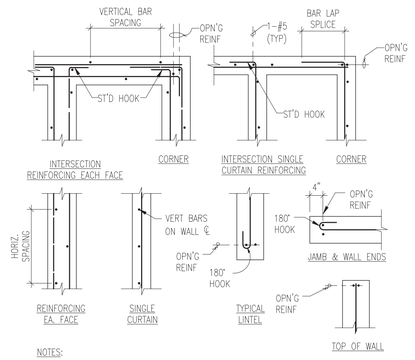
MINIMUM BEND DIAMETERS
D=6d FOR #3 THRU #8
D=8d FOR #9 THRU #11
D=10d FOR #14 THRU #18
MINIMUM INSIDE

STIRRUP & TIES
MIN BEND DIAMETERS
D = 4d FOR #3 THRU #5
D = 6d FOR #6 THRU #8

-	SCALE: 1"=1'-0"	5

REINFORCING DETAIL

SCALE: 1"=1'-0" | 3



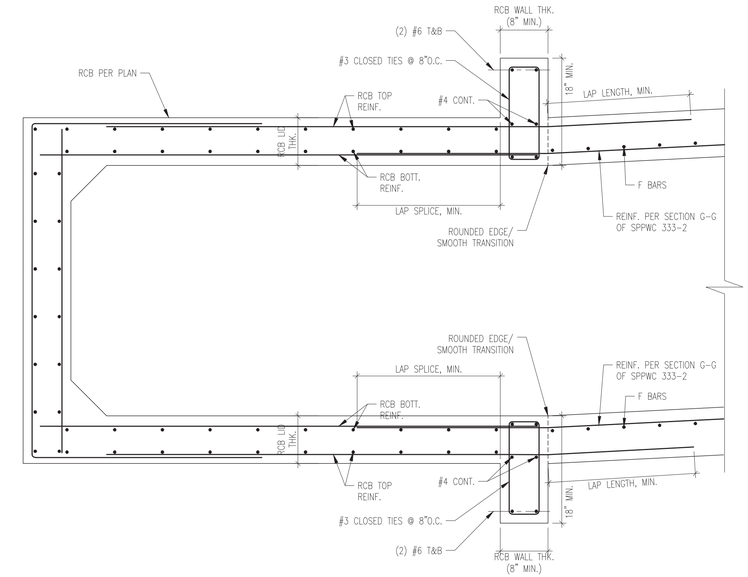
NOTES:

1. REFER TO TYPICAL CONC. WALL REINFORCING SCHEDULE.
2. AT DOUBLE CURTAIN REINFORCING STAGGER VERTICAL AND HORIZONTAL BARS. PLACE VERTICAL REBAR AS CLOSE TO CONC. SURFACE AS THE MINIMUM CLEARANCES WILL PERMIT

-	SCALE: 1"=1'-0"	6

TYPICAL CONC. WALL DETAIL

SCALE: 1"=1'-0" | 4



NOTE:
SEE PLAN C-C FOR EXTENT

FOR ADDITIONAL INFORMATION AND DETAILING NOT SHOWN, SEE LACDPW STD. PLAN 3053-0.

-	SCALE: 1"=1'-0"	2

SECTION AT UPTURNED BM.

SCALE: 1"=1'-0" | 1

1

REGISTERED PROFESSIONAL ENGINEER
JASON H. FUKUMITSU
No. 40695
CIVIL
STATE OF CALIFORNIA

REVIEWED LAND DEVELOPMENT DIVISION
BY _____ 11/15/18
STORM DRAIN SECTION DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
1	ADD STRUCTURAL SHEETS			11/15/18

REGISTERED PROFESSIONAL ENGINEER
AARON GARCIA
No. 45855
STRUCTURAL
STATE OF CALIFORNIA
10/23/18
DATE

STORM DRAIN PLANS IN
DS 542 P.D. No. 2637
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

RGSE inc. Structural
2720 Cochran St. Suite 8B
Simi Valley, CA 93065
P: 805.522.3379
F: 805.378.7137
info@rgseinc.com
www.rgseinc.com

RGSE INC PROJECT #18078

DWG S2.0

1

SHEET 17 OF 17

10/3/2018 5:30:11 PM

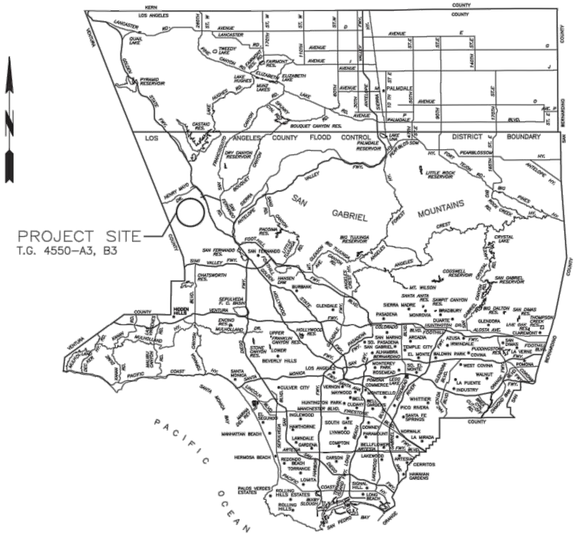
D-3: PD 2638

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS

EIMP2014000239

PRIVATE DRAIN NO 2638

TRACT NO 61105–01



LOCATION MAP

INDEX TO PROJECT DRAWINGS

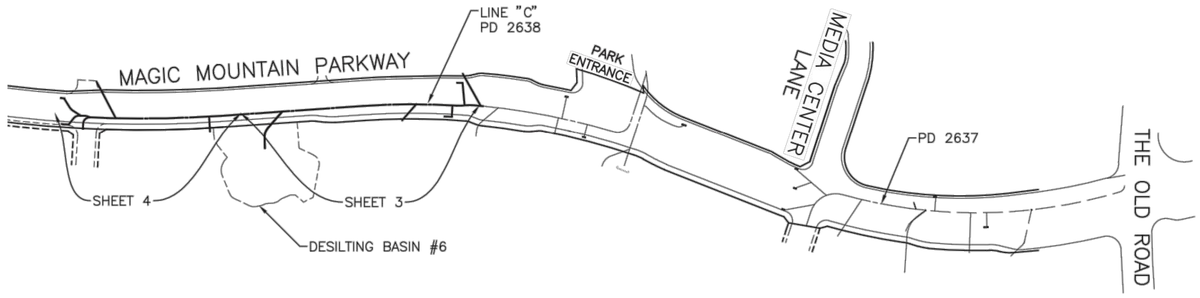
SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	GENERAL NOTES, WATER QUALITY NOTES, AND HYDRAULIC ELEMENTS
3	STORM DRAIN PLAN AND PROFILE – LINE "C" FROM STA. 15+55.98 TO 24+00.00
4	STORM DRAIN PLAN AND PROFILE – LINE "C" FROM STA. 24+00.00 TO 29+76.57
5	DETAILS
6	CATCH BASIN LATERAL PROFILES
7	STORM DRAIN EASEMENTS
8	DESILTING BASIN # 6 PLAN
9	DESILTING BASIN DETAILS

PD 2638 IS NOT ELIGIBLE FOR TRANSFER TO THE FLOOD CONTROL DISTRICT FOR MAINTENANCE UNTIL PD 2637 IS TRANSFERRED

PD 2638 MUST BE CONSTRUCTED AFTER OR CONCURRENT WITH PD 2637

WQ 061105–01B IS NOT ELIGIBLE FOR TRANSFER TO THE FLOOD CONTROL DISTRICT FOR MAINTENANCE UNTIL PD 2638 IS TRANSFERRED

PD 2638 MUST BE CONSTRUCTED BEFORE OF CONCURRENT WITH WQ 061105–01B



NORTH

KEY MAP

SCALE: 1"=250'

CONSTRUCTION NOTES:

(1) INSTALL 18" R.C.P. (SEE PROFILE FOR D–LOAD)
(3) INSTALL 30" R.C.P. (SEE PROFILE FOR D–LOAD)
(5) INSTALL 42" R.C.P. (SEE PROFILE FOR D–LOAD)
(7) INSTALL 54" R.C.P. (SEE PROFILE FOR D–LOAD)
(13) CONSTRUCT DESILTING INLET PER DETAILS ON SHEET 9.
(14) CONSTRUCT 6" THICK CONC. ACCESS ROAD OVER 4" CRUSHED AGGREGATE BASE PER DETAIL ON SHEET 9 (WIDTH PER PLAN)
(15) CONSTRUCT CONC. FACING/SLOPE PROTECTION PER DETAILS ON SHEET 9
(16) CONSTRUCT CHAIN LINK FENCE PER S.P.P.W.C. STD. PLAN NO 600–3 (H=5')
(17) INSTALL DOUBLE DRIVE GATE PER S.P.P.W.C. STD. PLAN NO 600–3 (W=12' PER LEAF)
(18) CONSTRUCT CUTOFF WALL PER DETAIL 18 ON SHEET 9
(20) CONSTRUCT M.H. PER S.P.P.W.C. STD. PLAN 320–2
(21) CONSTRUCT M.H. PER S.P.P.W.C. STD. PLAN 321–2
(22) CONSTRUCT M.H. PER S.P.P.W.C. STD. PLAN 322–2
(24) CONSTRUCT MODIFIED CURB OPENING CATCH BASIN PER S.P.P.W.C. STD. PLAN NO. 300–3 LD PER S.P.P.W.C. 313–3 CASE E, H=2"(TYP.)
(26) CONSTRUCT T.S. PER S.P.P.W.C. STD. PLAN 340–2
(29) CONSTRUCT CLEANOUT PER DETAIL 29 ON SHEET 5
(32) CONSTRUCT J.S. PER S.P.P.W.C. STD. PLAN 332–2
(37) CONSTRUCT 8" BRICK AND MORTAR PLUG

INDEX TO STANDARD DRAWINGS

LOS ANGELES COUNTY DEPT. OF PUBLIC WORKS

STD. PLAN	TITLE
2032–2	CRADLING AND ENCASEMENT
3080–2	PIPE BEDDING
6008–1	MINIMUM PUBLIC SAFETY REQUIREMENTS FOR OPEN EXCAVATIONS

STANDARD PLANS FOR PUBLIC WORK CONSTRUCTION

STD. PLAN	TITLE
300–3	CURB OPENING CATCH BASIN
313–3	LOCAL DEPRESSIONS AT CATCH BASINS
320–2	MANHOLE – PIPE TO PIPE (36" OR LARGE)
321–2	MANHOLE – PIPE TO PIPE (33" OR SMALLER)
322–2	MANHOLE – PIPE TO PIPE (LARGE INSIDE INLET)
332–2	JUNCTION STRUCTURE – PIPE TO PIPE (ID < 24")
340–2	TRANSITION STRUCTURE – PIPE TO PIPE
600–3	CHAIN LINK FENCE AND GATES

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-KUEN IP No. 2522 Exp. 6/30 GEOTECHNICAL STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRICE No. 1205 STATE OF CALIFORNIA

NO DUMPING THIS DRAINS TO OCEAN

CATCH BASIN STENCIL DETAIL

NTS

THIS DETAIL SHOULD APPEAR ON TOP OF ALL CATCH BASINS

ALL CATCH BASINS AND INLETS THAT DISCHARGE INTO AN EXISTING OR PROPOSED STORM DRAIN MUST BE STENCILED TO DISCOURAGE ILLEGAL DUMPING OFPOLLUTANTS. THIS STENCIL SHALL HAVE A MINIMUM DIAMETER OF 30 INCHES.

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

1

BENCH MARK: NEWHALL QUAD (2009) NAVD88
LADPW L 5210
DPW BM TAG IN E CB 3' N/O END @ SE COR RYE CYN RD & THE OLD ROAD 85' S & 55' E/O C/L INT.

ELEV. 1061.448 FEET **ADJUSTMENT** 2009

APPROVED MARK PESTRELLA, DIRECTOR OF PUBLIC WORKS		
BY ASSISTANT DIVISION ENGINEER	8/20/2018 DATE	
RECOMMENDED LAND DEVELOPMENT DIVISION		
BY STORM DRAIN SECTION	8/20/2018 DATE	
SUBMITTED		
BY STORM DRAIN SECTION	08/20/18 DATE	

NO.	REVISION	REVISED BY	APPROVED BY	DATE
1	REVISED MAINTENANCE RESPONSIBILITY NOTE ON LINES C.3, C.5 AND C.6			12/21/20

PRIVATE ENGINEERS NOTICE TO CONTRACTORS

The existence and location of any underground utility pipes or structures shown on these plans are obtained by a search of the available records. To the best of our knowledge, there are no existing utilities except as shown on this map. The contractor is required to take due precautionary measures to protect the utility lines shown and any other lines not of record or shown on this drawing.

JASON H. FUKUMITSU — 08-16-2018 DATE

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA 8-16-18

JASON H. FUKUMITSU DATE

STORM DRAIN PLANS IN
TRACT No. 61105–1 P.D. No. 2638
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
26074 Avenue Hall, Suite 23 ▪ Valencia, CA 91355 ▪ PH: (661) 294-2211 ▪ FX: (661) 294-9890

DWG SHEET 1 OF 9

FOR PLAN CHECK ONLY

DDN 43-F552

G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2638\HM0077-01_TitleSheet.dwg Plotted on May 23, 2018–9:02am by jpithuoy

GENERAL NOTES:

1. A PERMIT SHALL BE OBTAINED AND A DEPOSIT PAID TO THE DEPARTMENT OF PUBLIC WORKS AT THE PERMIT COUNTER, 900 SOUTH FREMONT AVENUE 3RD FLOOR, ALHAMBRA, AT LEAST 72 HOURS PRIOR TO STARTING WORK UNDER THIS CONTRACT. ALL OTHER REQUIRED PERMITS, SUCH AS ROAD EXCAVATION PERMITS, MUST BE OBTAINED PRIOR TO STARTING WORK.
2. THE CONTRACTOR SHALL CONTACT THE DISTRICT OFFICE LISTED ON THE "APPLICATION FOR STORM DRAIN CONSTRUCTION INSPECTION FORM I" TO ARRANGE FOR AN ACCEPTABLE CONSTRUCTION START DATE.
3. APPROVAL OF THIS PLAN BY THE COUNTY OF LOS ANGELES DOES NOT CONSTITUTE A REPRESENTATION AS TO THE ACCURACY OF THE LOCATION, OR THE EXISTENCE OR NONEXISTENCE OF ANY UNDERGROUND UTILITY, PIPE OR STRUCTURE WITHIN THE LIMITS OF THIS PROJECT. THIS NOTE APPLIES TO ALL SHEETS.
4. ALL WORK SHALL BE IN ACCORDANCE WITH THE LATEST ADOPTED EDITION OF THE "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION," INCLUDING SUPPLEMENTS AND SHALL BE PROSECUTED ONLY IN THE PRESENCE OF THE DIRECTOR OF PUBLIC WORKS.
5. THE CONTRACTOR'S ATTENTION IS DIRECTED TO SECTION 7-10.4.1 OF THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION IN REGARD TO SAFETY ORDERS AND SHALL CONFORM TO THE "MINIMUM PUBLIC SAFETY REQUIREMENTS" AS SHOWN ON LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS STANDARD PLAN 6008.
6. ELEVATIONS ARE IN FEET ABOVE U.S.C. & G.S. MEAN SEA LEVEL DATUM OF 1929, UNLESS OTHERWISE INDICATED.
7. NO CONCRETE SHALL BE PLACED UNTIL THE FORMS AND REINFORCING STEEL HAVE BEEN PLACED, INSPECTED AND APPROVED.
8. ALL STRUCTURAL CONCRETE SHALL BE PORTLAND CEMENT CONCRETE WITH AN ULTIMATE 28 DAY COMPRESSIVE STRENGTH OF 4000 P.S.I. UNLESS OTHERWISE NOTED.
9. TRANSVERSE REINFORCEMENT AND TRANSVERSE JOINTS SHALL BE PLACED AT RIGHT ANGLES (OR RADIAL) TO THE CONDUIT CENTERLINE EXCEPT AS OTHERWISE SHOWN ON THE DRAWINGS.
10. ALL STEEL ADJACENT TO FACE OF CONCRETE SHALL HAVE 2-1/2 INCH CLEARANCE UNLESS OTHERWISE SPECIFIED.
11. REINFORCEMENT SHALL BE DEFORMED BARS OF INTERMEDIATE GRADE STEEL PER A.S.T.M. A-615-GRADE 60.
12. ALL BAR BENDS AND HOOKS SHALL CONFORM TO THE AMERICAN CONCRETE INSTITUTE "MANUAL OF STANDARD PRACTICE."
13. DIMENSIONS FROM FACE OF CONCRETE TO STEEL ARE TO CENTER LINE OF STEEL UNLESS OTHERWISE NOTED.
14. ALL STEEL THAT IS TO BE CONTINUOUS SHALL HAVE A MINIMUM LAP OF 30 BAR DIAMETERS OR 18 INCHES WHICHEVER IS GREATER.
15. ALL CONSTRUCTION JOINTS IN THE FOOTING OF SLABS AND WALLS SHALL BE IN THE SAME PLANE. NO STAGGERING OF JOINTS WILL BE PERMITTED.
16. ALL EXPOSED EDGES SHALL BE FINISHED WITH A 3/4 INCH CHAMFER.
17. UNLESS OTHERWISE SHOWN, CONCRETE DIMENSIONS SHALL BE MEASURED VERTICALLY OR HORIZONTALLY AND PARALLEL OR AT RIGHT ANGLES (OR RADIAL) TO THE CENTER LINE OF CONSTRUCTION.
18. CONCRETE BACKFILL IS REQUIRED WHEN THE PIPE HAS LESS THAN ONE FOOT OF COVER. THE CONCRETE BACKFILL SHALL CONSIST OF 1:3:5 MIX, PORTLAND CEMENT CONCRETE POURED FROM WALL TO WALL OF TRENCH AND FROM BOTTOM OF TRENCH TO A MINIMUM OF 4 INCHES OVER THE TOP OF THE PIPE.
19. ALL PIPES SHALL BE PLACED IN TRENCH IN NATURAL GROUND AND/OR COMPACTED FILL. THE GROUND LEVEL BEFORE THE TRENCHING SHALL BE AT LEAST 3 FEET ABOVE THE TOP OF THE PIPE ELEVATION, OR AT FINISH SURFACE ELEVATION, WHICHEVER IS LESS.
20. ALL BACKFILL AND FILLS OUTSIDE OF STREET RIGHT-OF-WAY SHALL BE COMPACTED TO MIN. 90 PERCENT OF MAXIMUM DENSITY AS DETERMINED BY A.S.T.M. SOIL COMPACTION TEST D 1557-91 METHOD "D" UNLESS OTHERWISE SPECIFIED. THIS SHALL BE CERTIFIED BY A GEOTECHNICAL ENGINEER. THIS CERTIFICATION SHALL BE SUBMITTED TO THE CITY ENGINEER PRIOR TO ACCEPTANCE OF THE WORK BY THE COUNTY.
21. ALL BACKFILL AND FILLS WITHIN STREET RIGHT-OF-WAY SHALL BE COMPACTED IN ACCORDANCE WITH SECTION 306-1.3.4 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED AND INSPECTED BY THE CITY. CONTRACTOR SHALL NOTIFY THE INSPECTOR AT LEAST 24 HOURS IN ADVANCE FOR SOIL TESTING AS REQUIRED BY THE INSPECTOR.
22. PIPE BEDDING SHALL BE:

    IN ACCORDANCE WITH THE COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS STANDARD PLAN NO. 3092 UNLESS OTHERWISE NOTED.

    OR

    ACCORDING TO STANDARD PLAN NO. 3080-0, CASE 3, EXCEPT BELL AND SPIGOT PIPE WHICH SHALL BE CASE 2 BEDDING, UNLESS OTHERWISE SHOWN. "W" VALUES SHALL BE AS SPECIFIED ON STANDARD PLAN 3080-0 FOR CASE 3 BEDDING, NOTES 3 (A), 3 (B), AND 3 (C). IF THE "W" VALUE AT THE TOP OF THE PIPE IS EXCEEDED, THE BEDDING SHALL BE MODIFIED, AND/OR PIPE OF ADDITIONAL STRENGTH SHALL BE PROVIDED. THE PROPOSED MODIFICATION SHALL BE APPROVED BY THE DEPARTMENT.
23. PIPE SHALL BE EMBEDDED 5 INCHES INTO ALL STRUCTURES INCLUDING INLET AND OUTLET HEADWALLS, UNLESS OTHERWISE SPECIFIED.
24. UNLESS OTHERWISE SPECIFIED IN THE PROFILE ON THESE PLANS, THE PIPE SHALL BE MANUFACTURED WITH A MINIMUM CONCRETE COVER OVER THE STEEL IN THE INVERT OF 0.75 INCHES FOR RCP UP TO 96 INCHES IN DIAMETER AND 1.25 INCHES FOR PIPE GREATER THAN 96 INCHES IN DIAMETER.
25. ALL CATCH BASINS WITHIN THE DEDICATED STREET RIGHT-OF-WAY SHALL BE CONSTRUCTED PER THE STREET PLANS.
26. THE CONTRACTOR SHALL PROVIDE TO THE SATISFACTION OF THE CITY ENGINEER AND THE DIRECTOR OF PUBLIC WORKS A DRAINAGE SYSTEM FOR CONTRIBUTARY FLOWS TO BE OPERABLE AT ALL TIMES UNTIL THIS STORM DRAIN SYSTEM IS ACCEPTED FOR MAINTENANCE. THE DESIGN OF THE DRAINAGE SYSTEM MUST BE PREPARED UNDER THE DIRECTION OF A CIVIL ENGINEER.

GENERAL NOTES (Cont'd)

27. ALL REFERENCES ON THIS PLAN TO THE COUNTY ENGINEER, ROAD DEPARTMENT, OR FLOOD CONTROL DISTRICT SHALL APPLY TO THE APPROPRIATE ELEMENTS OF THE DEPARTMENT OF PUBLIC WORKS.
28. EXISTING UTILITIES SHALL BE MAINTAINED IN PLACE BY THE CONTRACTOR, UNLESS OTHERWISE NOTED.
29. UNLESS OTHERWISE INDICATED CROSSING UTILITIES ARE TO BE SUPPORTED IN ACCORDANCE WITH STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION NO. 224-2
30. ALL OPENINGS RESULTING FROM THE CUTTING OR PARTIAL REMOVAL OF EXISTING CULVERTS, PIPES OR SIMILAR STRUCTURES SHALL BE SEALED WITH 8 INCHES OF BRICK AND MORTAR OR 6 INCHES OF CONCRETE, UNLESS OTHERWISE SHOWN.
31. MANHOLES SHALL USE THE STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION 630-2 FOR THE "FRAME AND COVER" AND 635-2 FOR THE "STANDARD DROP STEP."
32. THIS STORM DRAIN WILL NOT BE FIELD ACCEPTED FOR MAINTENANCE UNTIL THE STREETS HAVE BEEN PAVED, MANHOLES BROUGHT TO GRADE AND THE SYSTEM CLEANED TO THE SATISFACTION OF THE DIRECTOR OF PUBLIC WORKS.
33. AN NPDES PERMIT FROM THE REGIONAL WATER QUALITY CONTROL BOARD IS REQUIRED BEFORE ANY DISCHARGE OF NON-STORM WATER INTO THE STORM DRAIN IS ALLOWED.
34. THE LATEST REVISED STANDARD PLAN OR DRAWING SHALL BE USED UNLESS OTHERWISE NOTED.
35. THE SOILS ENGINEER OF RECORD SHALL INSPECT AND APPROVE THE FOUNDATION EXCAVATIONS BEFORE STEEL OR CONCRETE IS PLACED.
36. STORM DRAIN MANHOLE COVERS CONSTRUCTED PER S.P.P.W.C. STANDARD PLANS 630, 631, 632 AND 633 SHALL BE CAST WITH THE LETTERS "L.A.C.F.C.D.". THE LETTERS SHALL BE 1 INCH IN HEIGHT AND PLACED BELOW THE LETTER "D" IN THE CENTER OF THE COVER.
37. STORM DRAIN MANHOLE COVERS CONSTRUCTED PER S.P.P.W.C. STANDARD PLANS 312 SHALL BE CAST WITH THE LETTERS "L.A.C.F.C.D.". THE LETTERS SHALL BE 1 INCH IN HEIGHT AND PLACED BELOW THE LETTER "D" IN THE CENTER OF THE COVER.
38. ALL ABOVE GROUND FACILITIES SHALL BE STAMPED WITH THE DRAIN AND LINE NAME. THE LETTERING SHOULD BE 4" BLACK TEXT ON A YELLOW BACKGROUND.
39. EVERY 100 FEET STATIONS SHALL BE LABELED ON THE INSIDE OF ALL STORM DRAINS AND WALL OF OPEN CHANNELS. THE LETTERING SHOULD BE 4" BLACK TEXT ON A YELLOW BACKGROUND AND SHOULD BE PLACED IN THE SOFFIT OF PIPES AND THE TOP 2 FEET OF A CHANNEL WALL.
40. FOR ALL DEBRIS BASINS, THE 0%, 5% AND 25% DEBRIS CONE ELEVATIONS SHALL BE LABELED ON THE CONCRETE FACING SLAB AND THE STAND PIPE.
41. PRIOR TO ORDERING PIPES, CONTACT GEOTECHNICAL & MATERIALS DIVISION AT (626) 458-1707 TO SCHEDULE FOR D-LOAD INSPECTION. FEES PAYABLE AT LAND DEVELOPMENT DIVISION PUBLIC COUNTER WILL BE REQUIRED.

STORMWATER POLLUTION CONTROL REQUIREMENTS FOR STORM DRAIN CONSTRUCTION

A. NOTES:

1. EVERY EFFORT SHOULD BE MADE TO ELIMINATE THE DISCHARGE OF NON-STORM WATER FROM THE PROJECT SITE AT ALL TIMES.
2. ERODED SEDIMENTS AND OTHER POLLUTANTS MUST BE RETAINED ON SITE AND MAY NOT BE TRANSPORTED FROM THE SITE VIA SHEETFLOW, SWALES, AREA DRAINS, NATURAL DRAINAGE COURSES, OR WIND.
3. STOCKPILES OF EARTH AND OTHER CONSTRUCTION RELATED MATERIALS MUST BE PROTECTED FROM BEING TRANSPORTED FROM THE SITE BY THE FORCES OF WIND OR WATER.
4. FUELS, OILS, SOLVENTS, AND OTHER TOXIC MATERIALS MUST BE STORED IN ACCORDANCE WITH THEIR LISTING AND ARE NOT TO CONTAMINATE THE SOIL AND SURFACE WATERS. ALL APPROVED STORAGE CONTAINERS ARE TO BE PROTECTED FROM THE WEATHER. SPILLS MUST BE CLEANED UP IMMEDIATELY AND DISPOSED OF IN A PROPER MANNER. SPILLS MAY NOT BE WASHED INTO THE DRAINAGE SYSTEM.
5. EXCESS OR WASTE CONCRETE MAY NOT BE WASHED INTO THE PUBLIC WAY OR ANY OTHER DRAINAGE SYSTEM. PROVISIONS SHALL BE MADE TO RETAIN CONCRETE WASTES ON SITE UNTIL THEY CAN BE DISPOSED OF AS SOLID WASTE.
6. TRASH AND CONSTRUCTION RELATED SOLID WASTES MUST BE DEPOSITED INTO A COVERED RECEPTACLE TO PREVENT CONTAMINATION OF RAINWATER AND DISPERSAL BY WIND.
7. SEDIMENTS AND OTHER MATERIALS MAY NOT BE TRACKED FROM THE SITE BY VEHICLE TRAFFIC. THE CONSTRUCTION ENTRANCE ROADWAYS MUST BE STABILIZED SO AS TO INHIBIT SEDIMENTS FROM BEING DEPOSITED INTO THE PUBLIC WAY. ACCIDENTAL DEPOSITIONS MUST BE SWEPT UP IMMEDIATELY AND MAY NOT BE WASHED DOWN BY RAIN OR OTHER MEANS.
8. ANY SLOPES WITH DISTURBED SOILS OR DENUDED OF VEGETATION MUST BE STABILIZED SO AS TO INHIBIT EROSION BY WIND AND WATER.

B. THE FOLLOWING BMPs AS OUTLINED IN, BUT NOT LIMITED TO, THE LATEST EDITION OF THE CALIFORNIA BMP HANDBOOK (CONSTRUCTION) OR CALTRANS STORMWATER QUALITY HANDBOOKS (CONSTRUCTION SITE BMP MANUAL), MAY APPLY DURING THE CONSTRUCTION OF THIS PROJECT (ADDITIONAL MEASURES MAY BE REQUIRED IF DEEMED APPROPRIATE BY THE PROJECT ENGINEER OR THE BUILDING OFFICIAL):

EROSION CONTROL

EC1 - SCHEDULING
EC2 - PRESERVATION OF EXISTING VEGETATION
EC3 - HYDRAULIC MULCH
EC4 - HYDROSEEDING
EC5 - SOIL BINDERS
EC6 - STRAW MULCH
EC7 - GEOTEXTILES & MATS
EC8 - WOOD MULCHING
EC9 - EARTH DIKES & DRAINAGE SWALES
EC10 - VELOCITY DISSIPATION DEVICES
EC11 - SLOPE DRAINS
EC12 - STREAMBANK STABILIZATION
EC13 - RESERVED
EC14 - COMPOST BLANKETS
EC15 - SOIL PREPARATION/ROUGHENING
EC16 - NON-VEGETATED STABILIZATION

TEMPORARY SEDIMENT CONTROL

SE1 - SILT FENCE
SE2 - SEDIMENT BASIN
SE3 - SEDIMENT TRAP
SE4 - CHECK DAM
SE5 - FIBER ROLLS
SE6 - GRAVEL BAG BERM
SE7 - STREET SWEEPING AND VACUUMING
SE8 - SAND BAG BARRIER
SE9 - STRAW BALE BARRIERS
SE10 - STORM DRAIN INLET PROTECTION
SE11 - ACTIVE TREATMENT SYSTEMS
SE12 - TEMPORARY SILT DIKE
SE13 - COMPOST SOCKS & BERMS
SE14 - BIOFILTER BAGS

WIND EROSION CONTROL

WE1 - WIND EROSION CONTROL

EQUIPMENT TRACKING CONTROL

TC1 - STABILIZED CONSTRUCTION ENTRANCE/EXIT
TC2 - STABILIZATION CONSTRUCTION ROADWAY
TC3 - ENTRANCE/OUTLET TIRE WASH

NON-STORMWATER MANAGEMENT

NS1 - WATER CONSERVATION PRACTICES
NS2 - DEWATERING OPERATIONS
NS3 - PAVING AND GRINDING OPERATIONS
NS4 - TEMPORARY STREAM CROSSING
NS5 - CLEAR WATER DIVERSION
NS6 - ILLICIT CONNECTION/DISCHARGE
NS7 - POTABLE WATER/IRRIGATION
NS8 - VEHICLE AND EQUIPMENT CLEANING
NS9 - VEHICLE AND EQUIPMENT FUELING
NS10 - VEHICLE AND EQUIPMENT MAINTENANCE
NS11 - PILE DRIVING OPERATIONS
NS12 - CONCRETE CURING
NS13 - CONCRETE FINISHING
NS14 - MATERIAL AND EQUIPMENT USE
NS15 - DEMOLITION ADJACENT TO WATER
NS16 - TEMPORARY BATCH PLANTS

WASTE MANAGEMENT AND MATERIAL POLUTION CONTROL

WM-1 - MATERIAL DELIVERY AND STORAGE
WM-2 - MATERIAL USE
WM-3 - STOCKPILE MANAGEMENT
WM-4 - SPILL PREVENTION AND CONTROL
WM-5 - SOLID WASTE MANAGEMENT
WM-6 - HAZARDOUS WASTE MANAGEMENT
WM-7 - CONTAMINATION SOIL MANAGEMENT
WM-8 - CONCRETE WASTE MANAGEMENT
WM-9 - SANITARY/SEPTIC WASTE MANAGEMENT
WM-10 - LIQUID WASTE MANAGEMENT

HYDRAULIC ELEMENTS

LINE	PIPE FROM STA.	REACH TO STA.	Q (CFS)	DIA	Vmax (FPS)	REMARKS
"C"	15+55	15+61	171.8	54"	10.8	
	15+61	16+50	171.8	54"	10.8	
	16+50	16+83	166.7	54"	10.5	
	16+83	17+91	157.5	54"	9.9	
	17+91	22+63	156.6	54"	22.8	1
	22+63	24+00	48.3	42"	17.3	
	24+00	25+14	48.3	42"	16.6	
	25+14	26+03	48.3	42"	18.2	
	26+03	28+41	48.3	30"	16.0	
	28+41	29+34	48.3	30"	14.4	
	29+34	29+83	30.8	30"	9.7	
"C.1"	10+00	10+77	6.9	18"	3.9	
"C.2"	10+00	10+39	9.2	18"	5.2	
"C.3"	10+00	10+68	0.9	18"	0.5	
"C.4"	10+00	11+51	136.3	42"	31.1	2
"C.5"	10+00	10+43	0.2	18"	5.3	
"C.6"	10+00	11+19	0.5	18"	5.1	
"C.7"	10+00	10+34	17.5	18"	15.8	
"C.7"	10+34	10+86	13.8	18"	15.6	
"C.7.1"	10+00	10+84	3.7	18"	10.1	
"C.8"	10+00	11+20	59.3	42"	6.2	

REMARKS

1 ADD AN ADDITIONAL 0.5" OF CONCRETE COVER OVER THE INVERT STEEL FOR V > 20 FPS.

2 ADD AN ADDITIONAL 1.0" OF CONCRETE COVER OVER THE INVERT STEEL FOR V > 30 FPS.

PIPE LENGTHS CHART:

PIPE SIZE	TOTAL LENGTHS
18"	485'
30"	372'
42"	590'
54"	680'

TOTAL SQ. FT. OF EASEMENT ACQUIRED = 82,054 SQ.FT.

FOR PLAN CHECK ONLY

DDN 43-F552

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-KUEN IP No. 2522 Exp. 09/20 GEOTECHNICAL STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRICE No. 1709 STATE OF CALIFORNIA

REVIEWED LAND DEVELOPMENT DIVISION
BY _____ STORM DRAIN SECTION
08/20/18 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
JASON H. FUKUMITSU 8-16-18 DATE

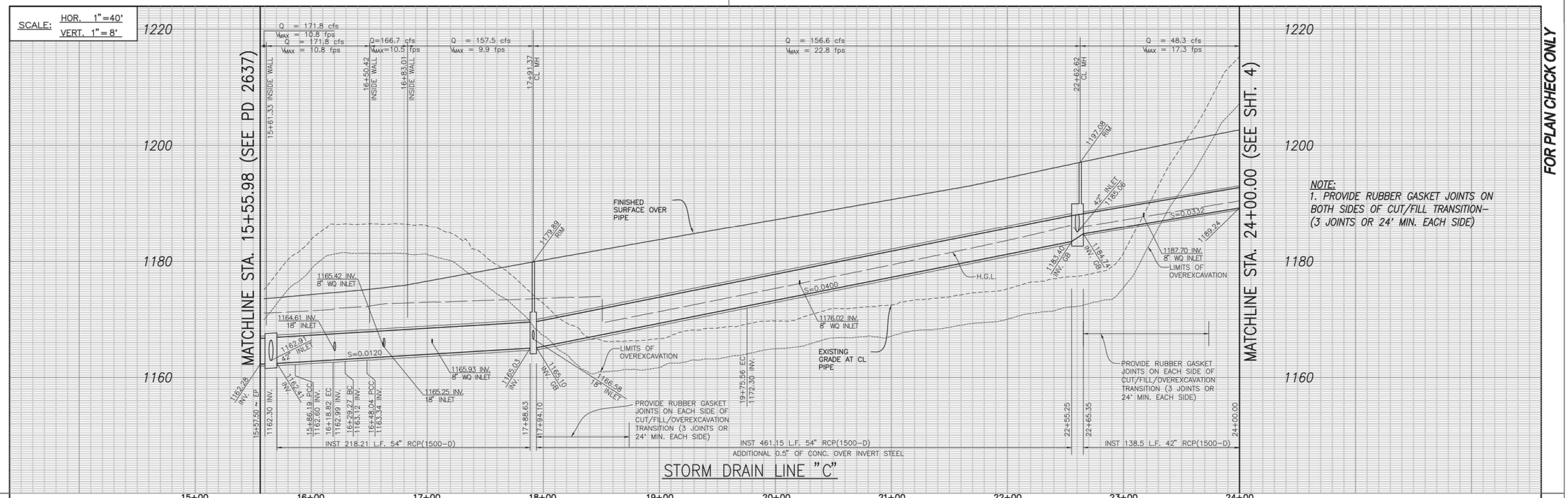
STORM DRAIN PLANS IN
TRACT No. 61105-1 P.D. No. 2638
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
26074 Avenue Hall, Suite 23 ▪ Valencia, CA 91355 ▪ PH: (661) 294-2211 ▪ FX: (661) 294-9890

DWG

G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2638\UM077-02_Notes.dwg Plotted on May 23, 2018 - 10:00am by joshuay

SCALE: HOR. 1"=40'
VERT. 1"=8'

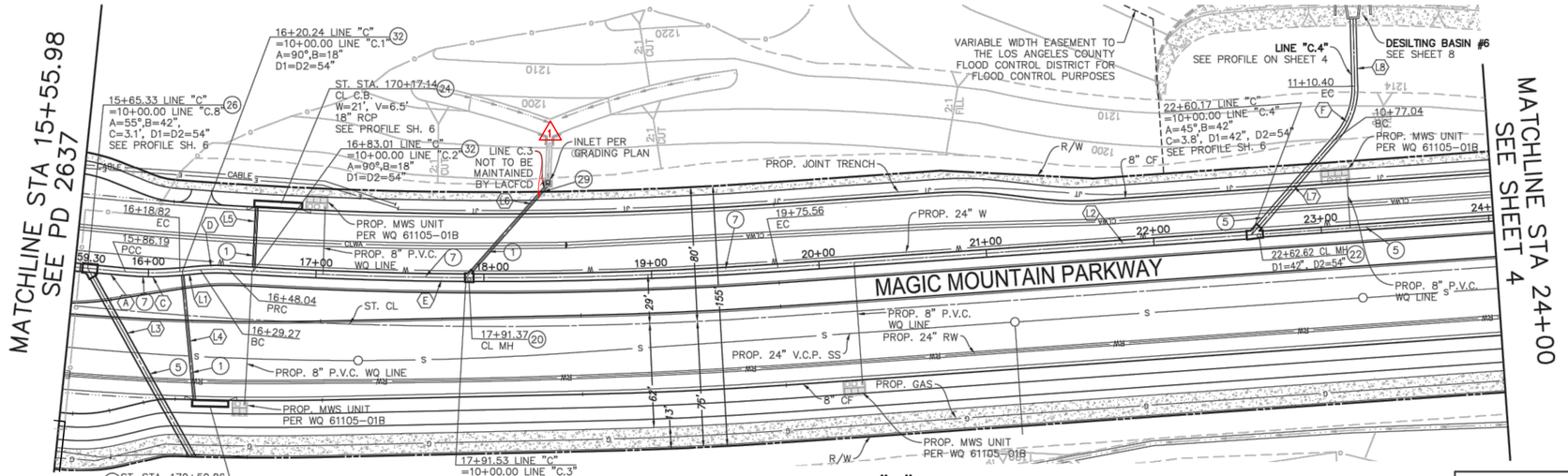


STORM DRAIN LINE "C"

NOTE:
1. PROVIDE RUBBER GASKET JOINTS ON BOTH SIDES OF CUT/FILL TRANSITION– (3 JOINTS OR 24' MIN. EACH SIDE)

FOR PLAN CHECK ONLY

DDN 43-F552



STORM DRAIN LINE "C"

SD LINE "C" LINE TABLE		
LINE	LENGTH	BEARING
L1	10.46'	N54°39'21"E
L2	428.44'	N56°01'25"E
L3	120.20'	S59°05'27"E
L4	77.14'	N35°20'39"W
L5	38.51'	N27°11'34"W
L6	68.78'	S11°27'02"W
L7	77.04'	S11°01'25"W
L8	40.16'	S31°27'00"E

SD LINE "C" CURVE TABLE				
LINE	DELTA	RADIUS	LENGTH	TANGENT
A	00°41'56"	2477.00'	30.21'	5.11'
C	10°23'08"	180.00'	32.63'	16.36'
D	08°57'43"	120.00'	18.77'	9.40'
E	07°35'39"	2471.00'	327.51'	164.00'
F	42°28'26"	45.00'	33.36'	17.49'

CONSTRUCTION NOTES:

1. INSTALL 18" R.C.P. (SEE PROFILE FOR D-LOAD)
5. INSTALL 42" R.C.P. (SEE PROFILE FOR D-LOAD)
7. INSTALL 54" R.C.P. (SEE PROFILE FOR D-LOAD)
20. CONSTRUCT M.H. PER S.P.P.W.C. STD. PLAN 320-2
22. CONSTRUCT M.H. PER S.P.P.W.C. STD. PLAN 322-2
24. CONSTRUCT MODIFIED CURB OPENING CATCH BASIN PER S.P.P.W.C. STD. PLAN NO. 300-3 LD PER S.P.P.W.C. 313-3 CASE E, H=2'(TYP.)
26. CONSTRUCT T.S. PER S.P.P.W.C. STD. PLAN 340-2
29. CONSTRUCT CLEANOUT PER DETAIL 29 ON SHEET 5
32. CONSTRUCT J.S. PER S.P.P.W.C. STD. PLAN 332-2

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-KUEN TO No. 2522 Exp. 6/30 GEOTECHNICAL STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRICE No. 1209 STATE OF CALIFORNIA

REVIEWED LAND DEVELOPMENT DIVISION
BY STORM DRAIN SECTION 08/20/18 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
1	REVISED MAINTENANCE RESPONSIBILITY NOTE ON LINE C.3			12/21/20

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
JASON H. FUKUMITSU DATE 8-16-18

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

STORM DRAIN PLANS IN
TRACT No. 61105-1 P.D. No. 2638
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
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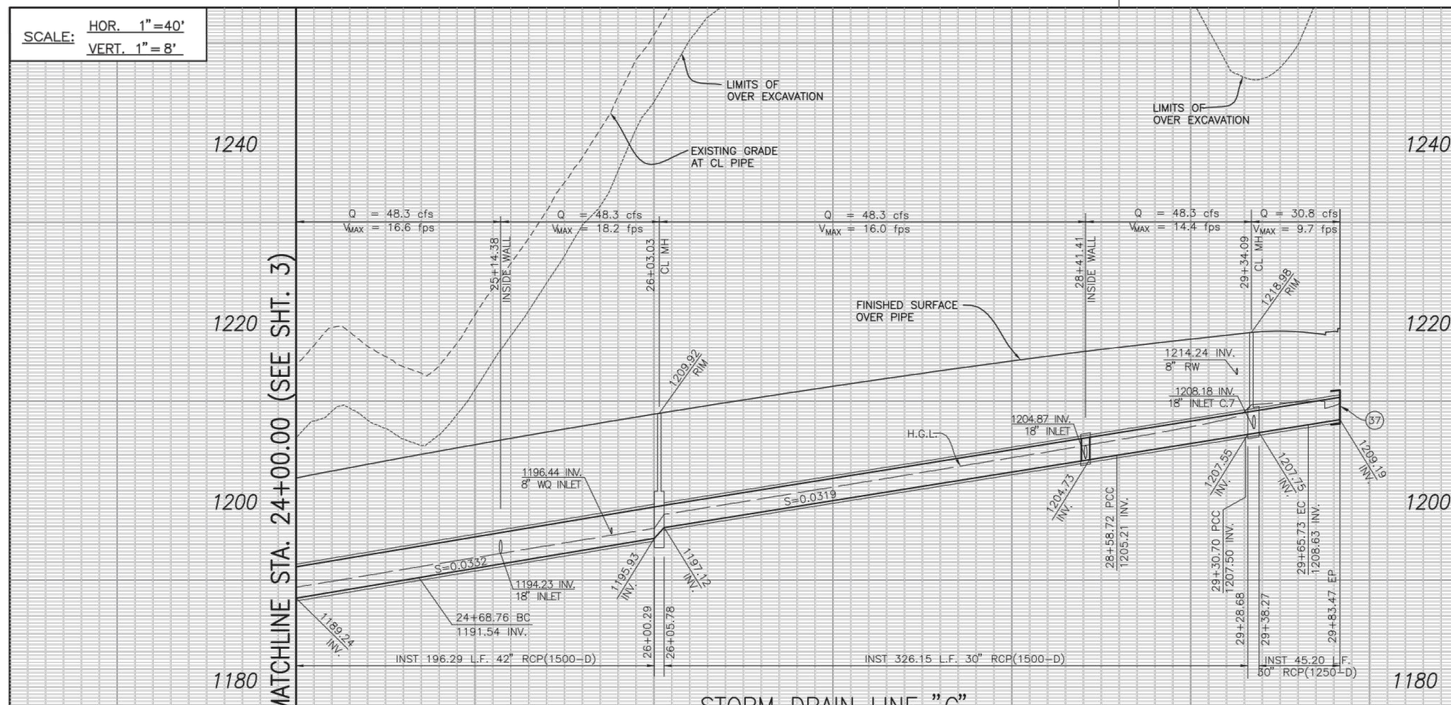
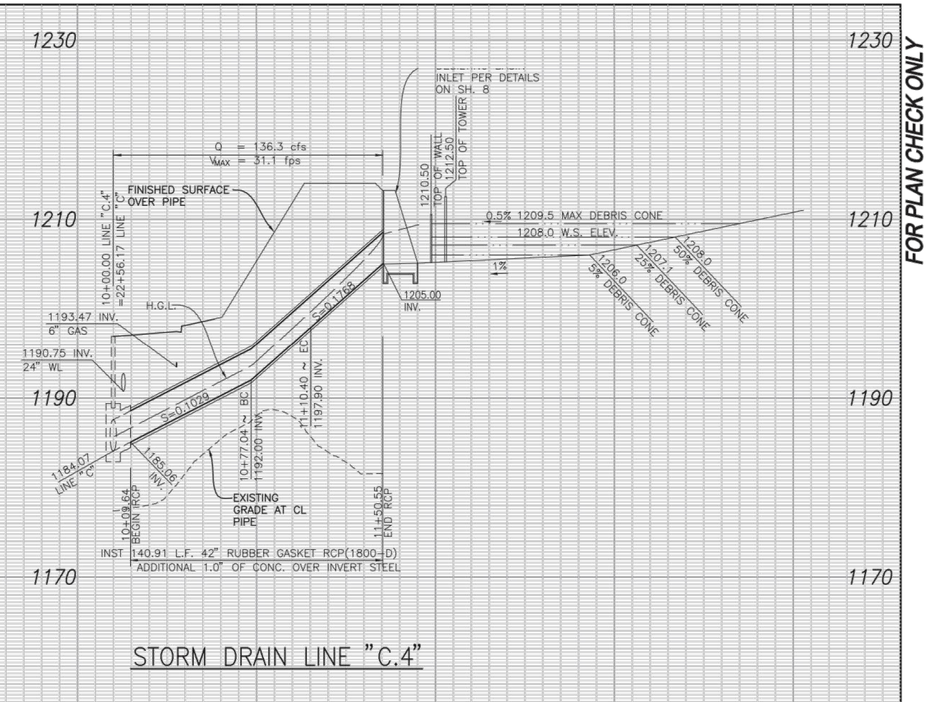
DWG | SHEET 3 OF 9

SCALE: HOR. 1"=40'
VERT. 1"=8'



STORM DRAIN LINE "C"

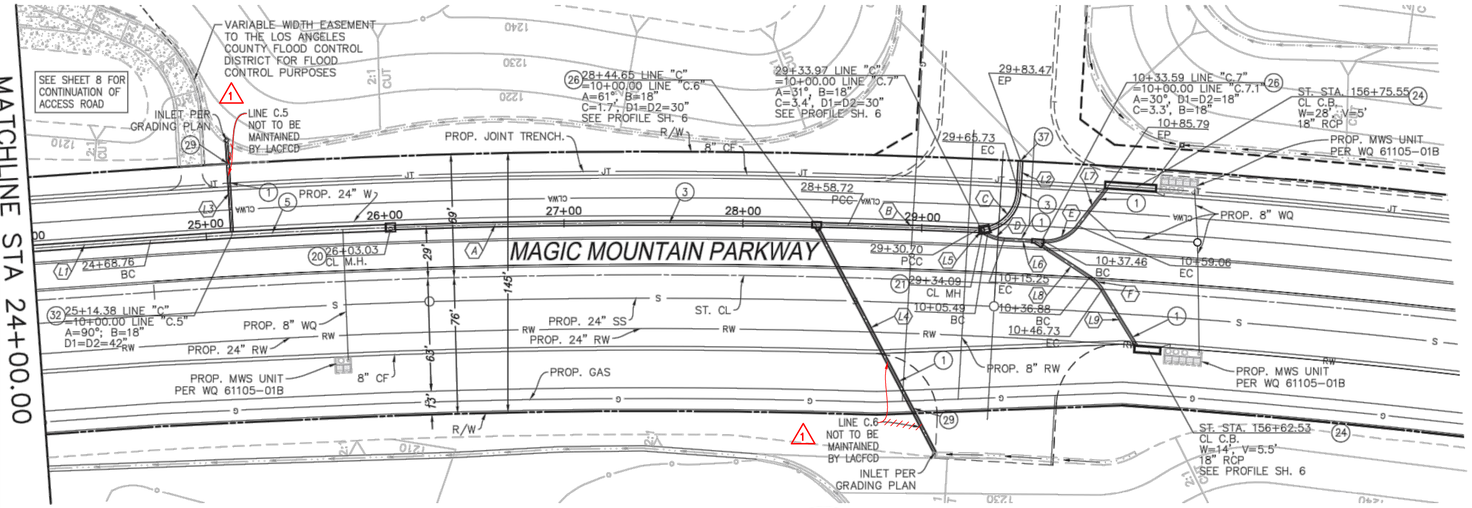


STORM DRAIN LINE "C.4"

FOR PLAN CHECK ONLY

DDN 43-F552

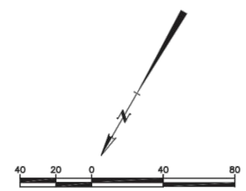
MATCHLINE STA 24+00.00 SEE SHEET 3



STORM DRAIN LINE "C"

CONSTRUCTION NOTES:

1. INSTALL 18" R.C.P. (SEE PROFILE FOR D-LOAD)
3. INSTALL 30" R.C.P. (SEE PROFILE FOR D-LOAD)
5. INSTALL 42" R.C.P. (SEE PROFILE FOR D-LOAD)
20. CONSTRUCT M.H. PER S.P.P.W.C. STD. PLAN 320-2
21. CONSTRUCT M.H. PER S.P.P.W.C. STD. PLAN 321-2
24. CONSTRUCT MODIFIED CURB OPENING CATCH BASIN PER S.P.P.W.C. STD. PLAN NO. 300-3
26. CONSTRUCT T.S. PER S.P.P.W.C. STD. PLAN 340-2
29. CONSTRUCT CLEANOUT PER DETAIL 29 ON SHEET 5
32. CONSTRUCT J.S. PER S.P.P.W.C. STD. PLAN 332-2
37. CONSTRUCT 8" BRICK AND MORTAR PLUG



GRAPHIC SCALE: 1" = 40'

SD LINE "C" LINE TABLE		
LINE	LENGTH	BEARING
L1	64.76'	N56°01'25"E
L2	17.74'	N26°37'46"W
L3	52.15'	N33°191'39"W
L4	143.33'	S57°39'51"E
L5	5.49'	S87°39'58"W
L6	22.21'	S62°49'18"W
L7	26.73'	S07°48'38"W
L8	36.99'	S61°37'45"E
L9	36.88'	S86°42'51"E

SD LINE "C" CURVE TABLE				
LINE	DELTA	RADIUS	LENGTH	TANGENT
A	05°32'42"	4029.46'	389.96'	195.13'
B	01°01'24"	4029.46'	71.98'	35.99'
C	89°13'18"	22.50'	35.04'	22.20'
D	24°50'39"	22.50'	9.76'	4.96'
E	55°00'40"	22.50'	21.60'	11.72'
F	25°05'06"	22.50'	9.85'	5.01'

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-KUEN P. No. 2522 Exp. 9/20 GEOTECHNICAL STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRICE No. 1705 STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

1

NO.	REVISION	REVISED BY	APPROVED BY	DATE
1	ADDED MAINTENANCE RESPONSIBILITY NOTE			12/21/20

REVIEWED LAND DEVELOPMENT DIVISION
BY _____ STORM DRAIN SECTION
08/20/18 DATE

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
8-16-18
JASON H. FUKUMITSU DATE

STORM DRAIN PLANS IN
TRACT No. 61105-1 P.D. No. 2638
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
26074 Avenue Hall, Suite 23 ▪ Valencia, CA 91355 ▪ PH: (661) 294-2211 ▪ FX: (661) 294-9890

DWG | SHEET 4 OF 9

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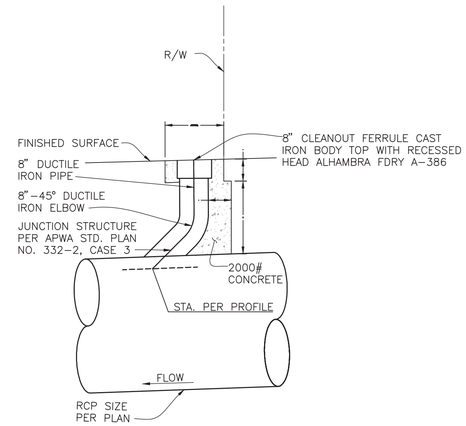

29 **CLEANOUT**
N.T.S.

FOR PLAN CHECK ONLY

DDN 43-F552

REVIEWED LAND DEVELOPMENT DIVISION
BY _____ 08/20/18
STORM DRAIN SECTION DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE

REGISTERED PROFESSIONAL ENGINEER
JASON H. FUKUMITSU
No. 40695
CIVIL
STATE OF CALIFORNIA

JASON H. FUKUMITSU 8-16-18 DATE

STORM DRAIN PLANS IN
TRACT No. 61105-1 P.D. No. 2638
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
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DWG

SHEET 5 OF 9

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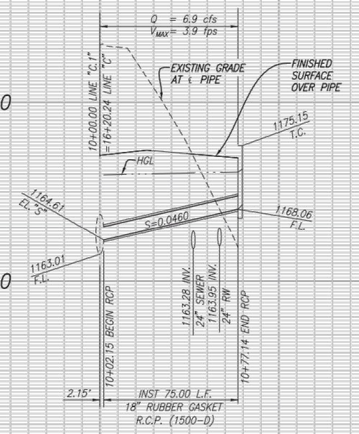
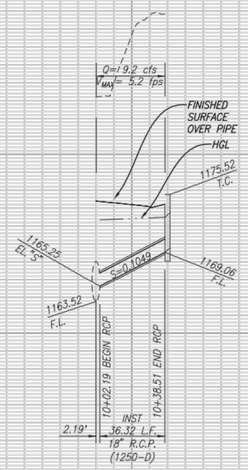
SCALE: HOR. 1"=40'
VERT. 1"=8'



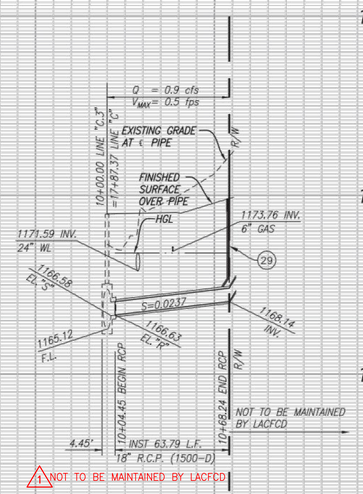
SD LINE "C.1"

SEE SHEET 3 FOR PLAN VIEW



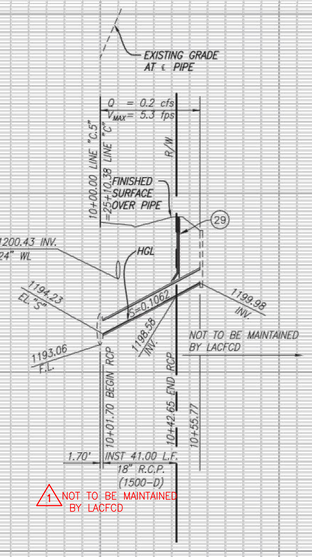
SD LINE "C.2"

SEE SHEET 3 FOR PLAN VIEW



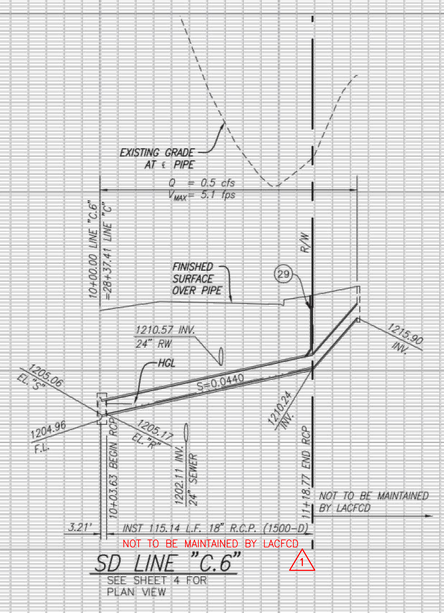
SD LINE "C.3"

SEE SHEET 3 FOR PLAN VIEW



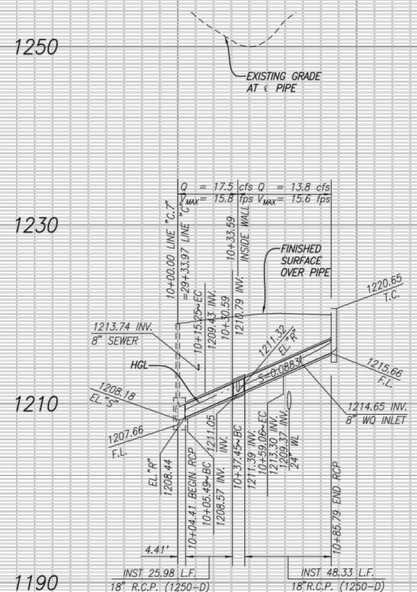
SD LINE "C.5"

SEE SHEET 4 FOR PLAN VIEW



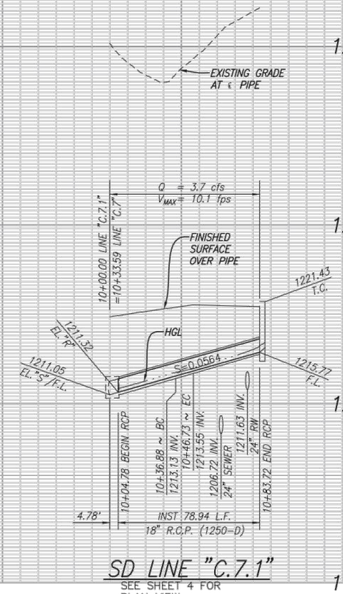
SD LINE "C.6"

SEE SHEET 4 FOR PLAN VIEW



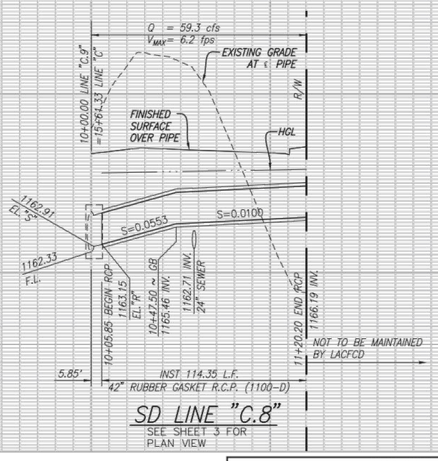
SD LINE "C.7"

SEE SHEET 4 FOR PLAN VIEW



SD LINE "C.7.1"

SEE SHEET 4 FOR PLAN VIEW



SD LINE "C.8"

SEE SHEET 3 FOR PLAN VIEW

FOR PLAN CHECK ONLY

DDN 43-F552

CONSTRUCTION NOTES:

(29) CONSTRUCT CLEANOUT PER DETAIL 29 ON SHEET 5

(37) CONSTRUCT 8" BRICK AND MORTAR PLUG

REGISTERED PROFESSIONAL ENGINEER — VINCENT PING-KUEN TO — No. 2522 — Exp. 6-30-20 — GEOTECHNICAL — STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST — ANDREW A. PRICE — No. 1705 — STATE OF CALIFORNIA

REVIEWED LAND DEVELOPMENT DIVISION
BY _____ STORM DRAIN SECTION
08/20/18 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
1	ADDED MAINTENANCE RESPONSIBILITIES			12/21/20

REGISTERED PROFESSIONAL ENGINEER — JASON H. FUKUMITSU — No. 40695 — CIVIL — STATE OF CALIFORNIA
JASON H. FUKUMITSU B-16-18 DATE

STORM DRAIN PLANS IN
TRACT No. 61105-1 P.D. No. 2638
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
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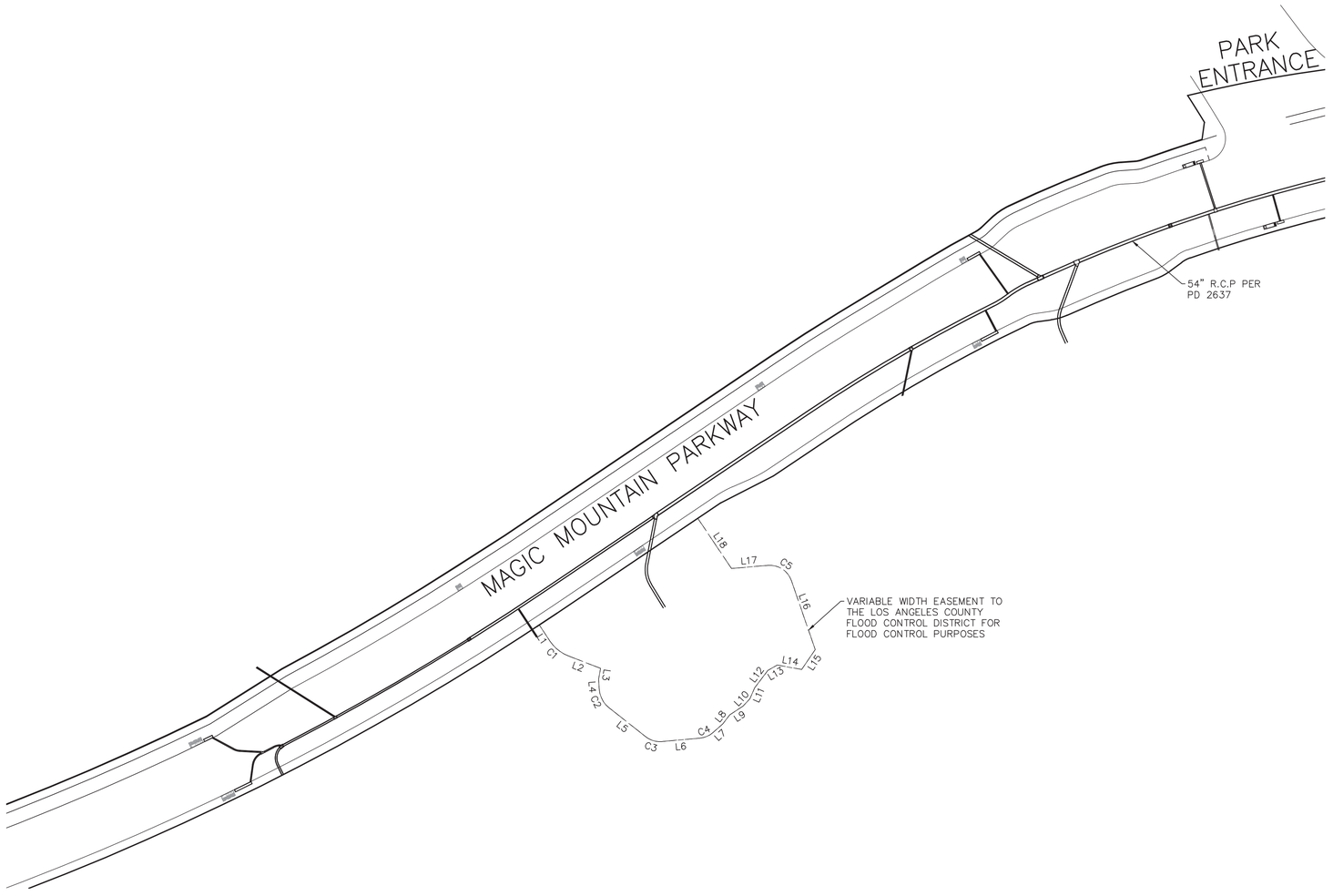
DWG

SHEET 6 OF 9

G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2638\WM0077-06_SD Profile.dwg Plotted on May 23, 2018--10:12am by jpatoury



EASEMENT LINE TABLE		
LINE	LENGTH	BEARING
L1	29.54'	N33° 28' 13"W
L2	52.78'	N68° 50' 01"W
L3	17.01'	N09° 41' 07"E
L4	15.29'	N03° 57' 32"W
L5	71.40'	N51° 45' 09"W
L6	58.71'	S84° 59' 18"W
L7	19.79'	S48° 33' 52"W
L8	17.57'	S37° 35' 59"W
L9	24.65'	S56° 39' 16"W
L10	15.37'	S42° 55' 23"W
L11	18.19'	S23° 34' 05"W
L12	33.64'	S37° 08' 04"E
L13	16.66'	S60° 17' 12"E
L14	37.94'	N79° 43' 55"E
L15	36.93'	S34° 30' 24"E
L16	112.11'	S19° 05' 38"W
L17	55.96'	N85° 04' 12"W
L18	92.78'	S33° 58' 35"W

EASEMENT CURVE TABLE				
CURVE	LENGTH	RADIUS	DELTA	TANGENT
C1	37.03'	60.00'	35°21'48"	19.13'
C2	33.37'	40.00'	47°47'37"	17.72'
C3	26.43'	35.00'	43°15'33"	13.88'
C4	22.25'	35.00'	36°25'26"	11.52'
C5	46.33'	35.00'	75°50'10"	27.26'

N

100 50 0 100 200

GRAPHIC SCALE: 1" = 100'

REVIEWED LAND DEVELOPMENT DIVISION

BY _____ 08/20/18

STORM DRAIN SECTION DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE

REGISTERED PROFESSIONAL ENGINEER
JASON H. FUKUMITSU
No. 40695
CIVIL
STATE OF CALIFORNIA

JASON H. FUKUMITSU 8-16-18 DATE

STORM DRAIN PLANS IN
TRACT No. 61105-1 P.D. No. 2638
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
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26074 Avenue Hall, Suite 23 ▪ Valencia, CA 91355 ▪ PH: (661) 294-2211 ▪ FX: (661) 294-9890

DWG

SHEET 7 OF 9

FOR PLAN CHECK ONLY

DDN 43-F552

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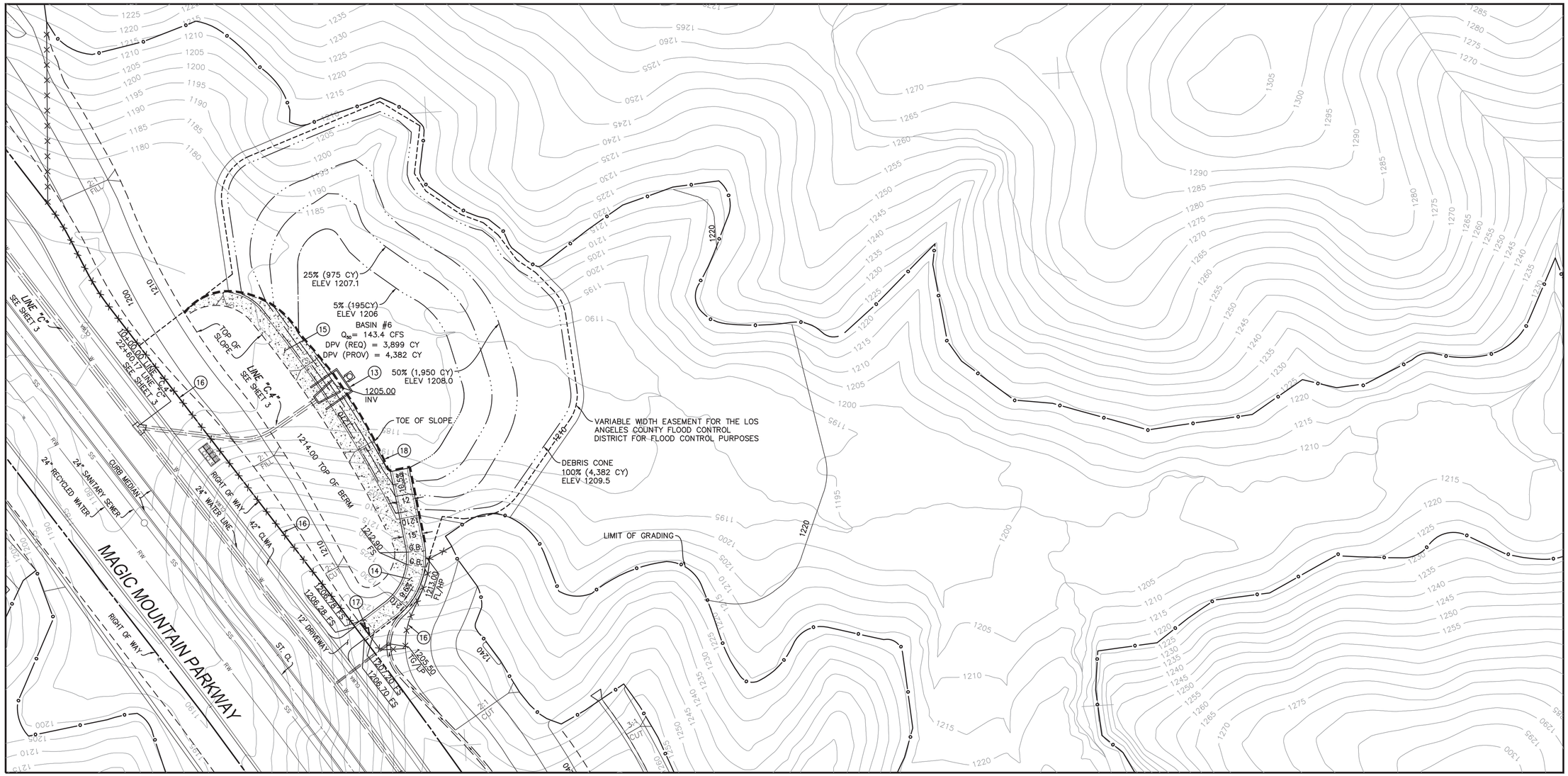
FOR PLAN CHECK ONLY

DDN 43-F552



DESILTING BASIN #6

SEE SHEET 3

NOTES:

1. SEE GRADING PLANS FOR GRADING DETAILS OF BASIN.

CONSTRUCTION NOTES:

(13) CONSTRUCT DESILTING INLET PER DETAILS ON SHEET 9

(14) CONSTRUCT 6" THICK CONC. ACCESS ROAD OVER 4" CRUSHED AGGREGATE BASE PER DETAIL ON SHEET 9 (WIDTH PER PLAN)

(15) CONSTRUCT CONC. FACING/SLOPE PROTECTION PER DETAILS ON SHEET 9

(16) CONSTRUCT CHAIN LINK FENCE PER S.P.P.W.C. STD. PLAN NO 600-3 (H=5')

(17) INSTALL DOUBLE DRIVE GATE PER S.P.P.W.C. STD. PLAN NO 600-3 (W=12' PER LEAF)

(18) CONSTRUCT CUTOFF WALL PER DETAIL 18 ON SHEET 9

N

40 20 0 40 80

GRAPHIC SCALE: 1" = 40'

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-NUEN LI No. 2522 Exp. 6/30 GEOTECHNICAL STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRICE No. 1709 STATE OF CALIFORNIA

REVIEWED LAND DEVELOPMENT DIVISION

BY _____ STORM DRAIN SECTION

08/20/18 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE

REGISTERED PROFESSIONAL ENGINEER JASON R. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

JASON H. FUKUMITSU 8-16-18 DATE

STORM DRAIN PLANS IN
TRACT No. 61105-1 P.D. No. 2638
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
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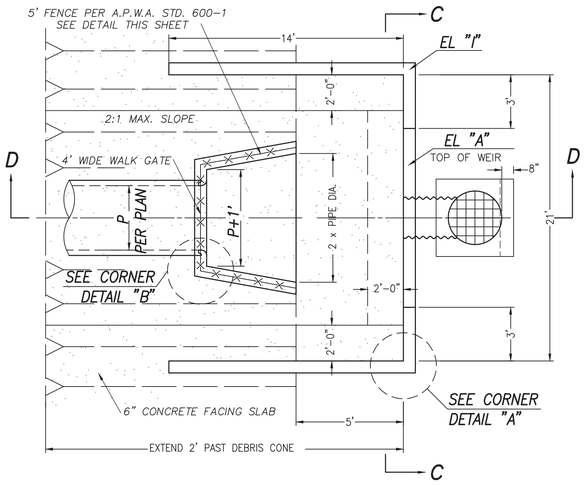
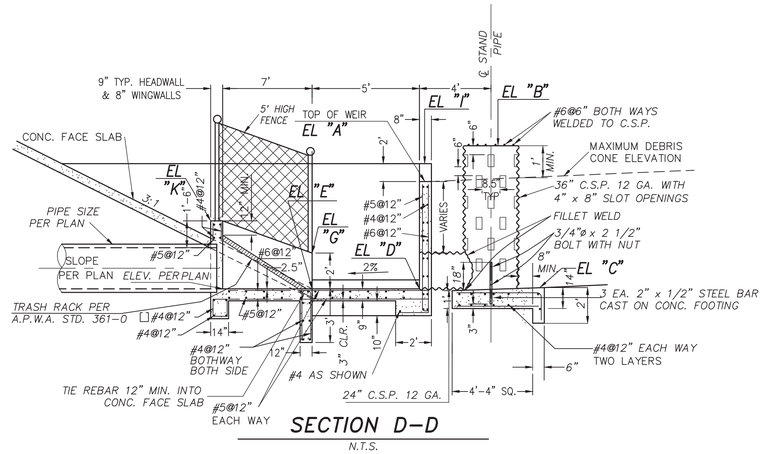
DWG

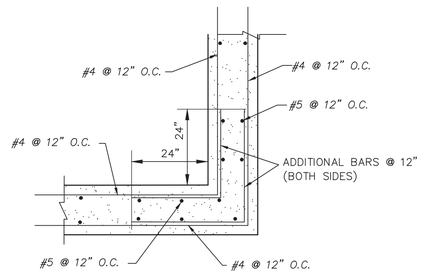


PLAN



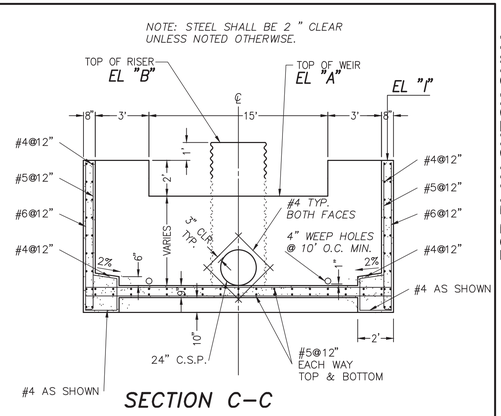
SECTION D-D

N.T.S.



CORNER DETAIL "A"

N.T.S.



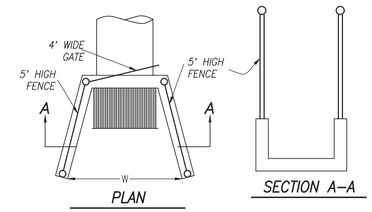
SECTION C-C

DESILTING INLET STRUCTURE

		ELEVATIONS					
SHT. NO.	LINE	A	B	C	D	E	I
4	C-4	1209.50	1212.50	1205.50	1205.25	1205.15	1211.50

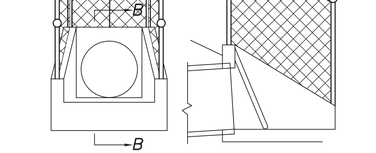
13 DESILTING INLET DETAILS

N.T.S.



PLAN

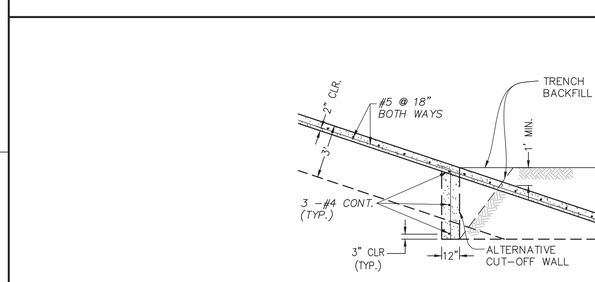
SECTION A-A



ELEVATION

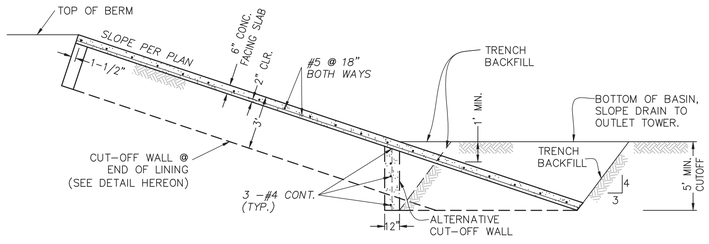
SECTION B-B

CHAIN LINK FENCE, GATE
NOT TO SCALE



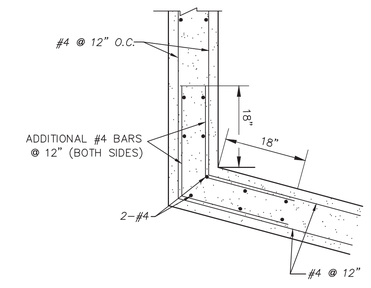
18 CUTOFF WALL DETAIL

N.T.S.



15 CONCRETE FACING SLAB

N.T.S.

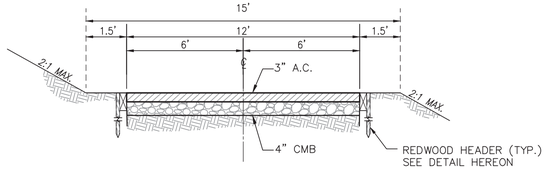


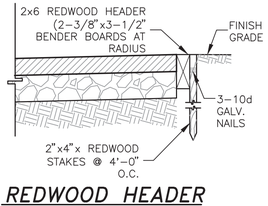
CORNER DETAIL "B"

N.T.S.

GEOTECHNICAL NOTES:

1. ALL RECOMMENDED MITIGATION MEASURES, PER THE GEOTECHNICAL ENGINEER.
2. THE SOIL ENGINEER OF RECORD SHALL INSPECT AND APPROVE THE FOUNDATION EXCAVATIONS BEFORE STEEL OR CONCRETE IS PLACED.





REDWOOD HEADER

N.T.S.

14 A.C. ACCESS ROAD

N.T.S.

REVIEWED LAND DEVELOPMENT DIVISION

BY _____ 08/20/18

STORM DRAIN SECTION — DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE

REGISTERED PROFESSIONAL ENGINEER
JASON H. FUKUMITSU
No. 40695
CIVIL
STATE OF CALIFORNIA

8-16-18

JASON H. FUKUMITSU — DATE

STORM DRAIN PLANS IN
TRACT No. 61105-1 P.D. No. 2638
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
26074 Avenue Hall, Suite 23 ▪ Valencia, CA 91355 ▪ PH: (661) 294-2211 ▪ FX: (661) 294-9890

DWG

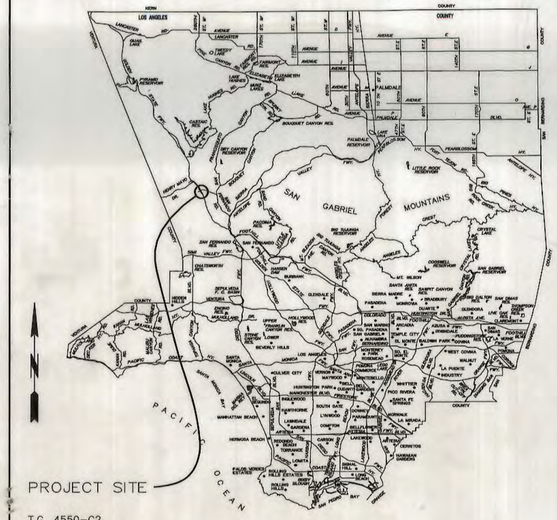
SHEET 9 OF 9

FOR PLAN CHECK ONLY

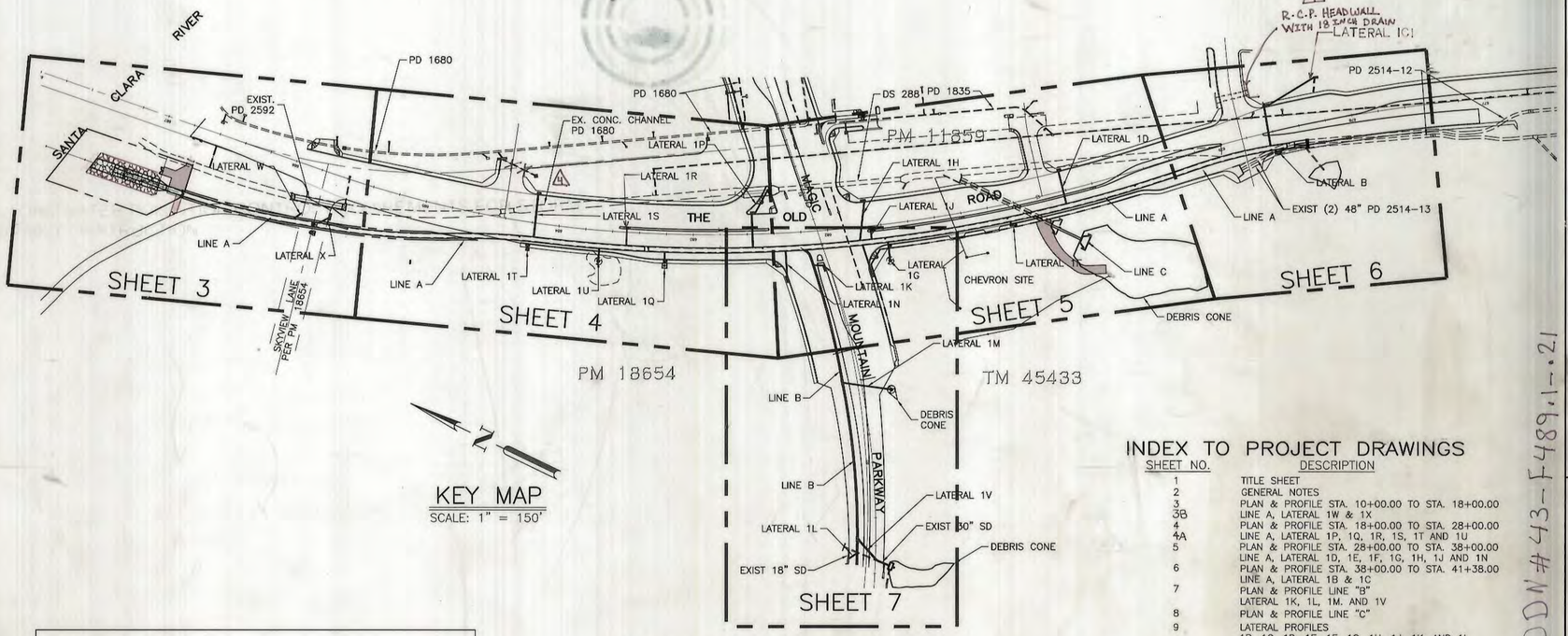
DDN 43-F552

D-4: MTD 1764

CITY OF SANTA CLARITA
MTD NO. 1764



LOCATION MAP
N.T.S.



KEY MAP
SCALE: 1" = 150'

INDEX TO PROJECT DRAWINGS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	GENERAL NOTES
3	PLAN & PROFILE STA. 10+00.00 TO STA. 18+00.00
3B	LINE A, LATERAL 1W & 1X
4	PLAN & PROFILE STA. 18+00.00 TO STA. 28+00.00
4A	LINE A, LATERAL 1P, 1Q, 1R, 1S, 1T AND 1U
5	PLAN & PROFILE STA. 28+00.00 TO STA. 38+00.00
	LINE A, LATERAL 1D, 1E, 1F, 1G, 1H, 1J AND 1N
6	PLAN & PROFILE STA. 38+00.00 TO STA. 41+38.00
	LINE A, LATERAL 1B & 1C
7	PLAN & PROFILE LINE "B"
	LATERAL 1K, 1L, 1M. AND 1V
8	PLAN & PROFILE LINE "C"
9	LATERAL PROFILES
	1B, 1C, 1D, 1E, 1F, 1G, 1H, 1J, 1K, AND 1L
10	LATERAL PROFILES
10A	1M, 1N, 1P, 1Q, 1R, 1S, 1T, 1U, AND 1V
11	LATERAL PROFILES
	1M, 1N, 1P, 1Q, 1R, 1S, 1T, 1U, AND 1V
12	RIPRAP OUTLET STRUCTURE, CMP RISER, AND STORM DRAIN
12B	TRANSITION DETAILS.
13	DESILTING INLET STRUCTURE
14	DESILTING INLET STRUCTURE
15	CALTRANS CAST-IN-PLACE RCB STD. D80A
16	CALTRANS CAST-IN-PLACE RCB STD. D80C
17	CALTRANS CAST-IN-PLACE DOUBLE RCB STD. D81A
18	CALTRANS CAST-IN-PLACE DOUBLE RCB STD. D81C
19	CALTRANS CAST-IN-PLACE RCB MISC. DETAILS STD. D82
20	CALTRANS BOX CULVERT WARPED WINGWALLS STD. D86A
21	EASEMENT EXHIBIT

INDEX TO STANDARD DRAWINGS

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

DWG. NO.	DESCRIPTION
3080-2, CASE 6	PIPE BEDDING
6008-1	SAFETY REQUIREMENTS FOR OPEN EXCAVATIONS

AMERICAN PUBLIC WORKS ASSOCIATION

STD. PLAN	TITLE
224-1	SUPPORT FOR CONDUITS ACROSS TRENCHES
320-1	MANHOLE
321-1	MANHOLE
323-1	MANHOLE
322-1	MANHOLE
300-2	CURB OPENING CATCH BASIN
324-1	STANDARD MANHOLE SHAFT
630-2	MANHOLE FRAME AND COVER
635-2	STEEL STEP
309-1	CATCH BASIN REINFORCEMENT
308-1	MONOLITHIC CATCH BASIN CONNECTION
310-1	CATCH BASIN FACE PLATE ASSEMBLY AND PROTECTION BAR
311-1	FRAME AND GRATING FOR CATCH BASIN
313-1	LOCAL DEPRESSION AT CATCH BASIN
340-1	TRANSITION STRUCTURE
342-1	TRANSITION STRUCTURE
331-2	JUNCTION STRUCTURE
332-1	JUNCTION STRUCTURE
380-2	CONCRETE COLLAR
600-1	CHAIN LINK FENCE
361-0	INCLINED TRASH RACK
221-1	PIPE ANCHORS
383-1	VELOCITY CONTROL RING
341-1	TRANSITION STRUCTURE
334-1	JUCTION STRUCTURE
333-1	JUCTION STRUCTURE
343-1	TRANSITION STRUCTURE

CALTRANS STANDARD PLAN

D80A	CAST-IN-PLACE RCB
D80C	CAST-IN-PLACE RCB
D82	CAST-IN-PLACE RCB MISC. DETAILS
D81A	CAST-IN-PLACE DOUBLE RCB
D81C	CAST-IN-PLACE DOUBLE RCB
D86A	BOX CULVERT WARPED WINGWALLS

NOTE:
MTD 1764 MUST BE CONSTRUCTED CONCURRENTLY WITH OR AFTER PD 2592

As of 7-31-2013
AS BUILT

RIPRAP NOTES

1. ROCKS FOR GROUTED RIPRAP SHALL BE GOOD QUALITY BROKEN CONCRETE AND/OR RIVER RUN ROCK. THE SMALLEST DIMENSIONS SHALL EXCEED 6 INCHES AND THE LARGEST DIMENSION SHALL NOT EXCEED 24 INCHES. THE LARGEST DIMENSION SHALL NOT EXCEED 4 TIMES THE SMALLEST DIMENSION.
2. THERE SHALL BE A GROUT BED OF AT LEAST 2 INCHES BENEATH THE FIRST LAYER OF ROCKS. ALL THE VOIDS BETWEEN THE ROCKS SHALL BE FILLED WITH GROUT. MAXIMUM SPACING BETWEEN ROCKS SHALL BE 2 INCHES.
3. SURFACE ROCKS SHALL BE IMBEDED FROM 1/2 TO 2/3 OF THEIR MAXIMUM DIMENSION.

NOTE: CONCRETE MAY BE SUBSTITUTED FOR GROUT.

GEOTECHNICAL ENGINEER

These Plans Have Been Reviewed By and Conform to Recommendations of Reports Dated 6/21/05. 3/20/06, and 3/29/06.

Prepared By Arroyo Geotechnical

REGISTERED PROFESSIONAL ENGINEER ROSS KHIABANI No. 2202 Exp. 6-30-06 GEOTECHNICAL STATE OF CALIFORNIA

Ross Khiabani, PE, GE — DATE 6/6/06
Project Geotechnical Engineer

PRIVATE ENGINEERS NOTICE TO CONTRACTORS

THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITY PIPES OR STRUCTURES SHOWN ON THESE PLANS ARE OBTAINED BY A SEARCH OF THE AVAILABLE RECORDS. TO THE BEST OF OUR KNOWLEDGE, THERE ARE NO EXISTING UTILITIES EXCEPT AS SHOWN ON THIS MAP. THE CONTRACTOR IS REQUIRED TO TAKE PRECAUTIONARY MEASURES TO PROTECT THE UTILITY LINES SHOWN AND ANY OTHER LINES NOT OF RECORD OR SHOWN ON THIS DRAWING.

Jon M. Austin — 5-31-06
RCE SIGNATURE — DATE

APPROVED FOR CONSTRUCTION BY:

for RCE 6-7-06
ROBERT G. NEWMAN, P.E., L.S. — DATE
DIRECTOR OF PUBLIC WORKS
CITY OF SANTA CLARITA

NO.	REVISIONS	REVISED BY	APPROVED BY	DATE
1	OUTLET STRUCTURE REVISED PER SHEETS 3A AND 12A.	Jon M. Austin 9/19/06		9-5-07
2	LACSD 24" VCP SEWER CROSSING	Jon M. Austin 8/29/07		9-12-07
3	REVISIONS DUE TO REVISED F.S.	Jon M. Austin 8/29/07		9-12-07
4	REVISED KEY MAP	Jon T-O 2/22/10		2-23-10

REGISTERED PROFESSIONAL ENGINEER JOHN M. AUSTIN RCE 58726 Exp. 03/31/07 CIVIL STATE OF CALIFORNIA

Jon M. Austin 5-31-06
PROJECT ENGINEER — DATE

MetroPointe Engineers
3555 Harbor Gateway South, Suite
Costa Mesa, CA 92626
(714) 438-1095

STORM DRAIN PLANS IN
CITY OF SANTA CLARITA — MTD. No. 1764
CITY OF SANTA CLARITA

STORM DRAIN PLAN AND PROFILE

TITLE SHEET
MTD NO. 1764

DWG | SHEET 1 OF 21

DO'N #43-1489.1-21

DRAWING NUMBER
Storm Drain - MTD 1764
Sheet 1 of 21
01986
10/25/11
REVISED BY PART NUMBER 6502
NUMBER
REVISED BY PART NUMBER 6502

DRAWING NUMBER
Storm Drain - MTD 1764
Sheet 2 of 21
01986
10/25/11

GENERAL NOTES

1. A permit shall be obtained and all fees and deposits for construction inspection shall be paid to the Department of Public Works at the Permit Counter, 900 South Fremont Avenue, 8th Floor, prior to starting work under this contract. Also, all other required permits, such as Road Excavation Permits, must be obtained prior to starting work.

2. The contractor shall contact the District Office listed on the "Application for Storm Drain Construction Inspection Form I" to arrange for an acceptable construction start date.

3. Approval of this plan by the County of Los Angeles does not constitute a representation to the accuracy of the location, or the existence or nonexistence of any underground utility, pipe or structure within the limits of this project. This note applies to all sheets.

4. All work shall be in accordance with the latest adopted edition of the "Standard Specifications for Public Works Construction," including supplements, and shall be prosecuted only in the presence of the Director of Public Works/City Engineer.

5. The contractor's attention is directed to Section 7–10.4.1 of the Standard Specifications for Public Works Construction in regard to safety orders.

6. Elevations are in feet above U.S.C. & G.S. Mean Sea Level Datum of 1929, unless otherwise indicated.

7. No concrete shall be placed until the forms and reinforcing steel have been placed, inspected and approved.

8. All structural concrete shall be Type II Portland cement concrete with an ultimate 28 day compressive strength of 4000 psi unless otherwise noted.

9. Transverse reinforcement and transverse joints shall be placed at right angles (or radial) to the conduit centerline except as otherwise shown on the drawings.

10. All steel adjacent to face of concrete shall have a 2–1/2–inch clearance unless otherwise specified.

11. Reinforcement shall be deformed bars of intermediate grade steel, per ASTM A–615–Grade 60.

12. All bar bends and hooks shall conform to the American Concrete Institute "Manual of Standard practice."

13. Dimensions from face of concrete to steel are to centerline of steel unless otherwise noted.

14. All steel that is to be continuous shall have a minimum lap of 30 bar diameters or 18 inches, whichever is greater.

15. All construction joints in the footing or slabs and walls shall be in the same plane. No staggering of joints will be permitted.

16. All exposed edges shall be finished with a 3/4–inch chamfer.

17. Unless otherwise shown, concrete dimensions shall be measured vertically or horizontally and parallel or at right angles (or radial) to the center line of construction.

18. Concrete backfill is required when the pipe has less than one foot of cover. The concrete backfill shall consist of 1:3:5 mix, Portland cement concrete poured from wall to wall of trench and from bottom of trench to a minimum of 4 inches over the top of the pipe.

19. All pipes shall be placed in trench in natural ground and/or compacted fill. The ground level before the trenching shall be at least 3 feet above the top of the pipe elevation, or at finish surface elevation, whichever is less.

20. All backfill and fills outside of street right of way shall be compacted to 90 percent of maximum density as determined by ASTM Soil Compaction Test D 1557–78 Method "D" unless otherwise specified. This shall be certified by a geotechnical engineer. This certification shall be submitted to the City Engineer prior to acceptance of the work by the County.

21. All backfill and fills within street rights of way shall be compacted in accordance with City requirements unless otherwise noted and inspected by the City. The soil compaction shall be certified by a geotechnical engineer.

22. Pipe bedding shall be:

In accordance with Los Angeles County Department of Public Works Standard Plan No. 3092 unless otherwise noted.

23. Pipe shall be embedded 5 inches into all structures including inlet and head walls, unless otherwise specified.

24. "Unless otherwise specified in the profile on these plans, the pipe shall be manufactured with a minimum concrete cover over the steel in the invert of 0.75 inches for RCP up to 96 inches in diameter and 1.25 inches for pipe greater than 96 inches in diameter."

25. All catch basins within the dedicated street right of way shall be constructed per Standard Plans for Public Works Construction.

26. The contractor shall provide to the satisfaction of the City Engineer and the Director of Public Works a drainage system for contributory flows to be operable at all times until this storm drain system is accepted for maintenance. The design of the drainage system must be prepared under the direction of a Civil Engineer.

27. All references on this plan to the County Engineer, Road Department, or Flood Control District shall apply to the appropriate elements of the Department of Public Works.

28. Existing utilities shall be maintained in place by the contractor, unless otherwise noted.

29. Where the utilities are indicated on the Drawings to be supported, said supports shall be in accordance with Standard Plans for Public Works Construction No. 224 unless otherwise indicated.

30. All openings resulting from the cutting or partial removal of existing culverts, pipes or similar structures shall be sealed with 8 inches of Brick and Mortar or 6 inches of concrete, unless otherwise shown.

31. Manholes shall use the Standard Plans for Public Works Construction No. 630 for the "Frame and Cover" and No. 635 for the "Standard Drop Step."

32. This storm drain will not be field accepted until the streets have been paved, manholes brought to grade, and the system cleaned to the satisfaction of the Director of Public Works.

33. A NPDES Permit from the Regional Water Quality Control Board is required before any discharge of non–storm water into the storm drain is allowed.

34. The latest revised standard plan or drawing shall be used unless otherwise noted.

LEGEND

(A / 10) — SECTION — SHEET

STORMWATER POLLUTION CONTROL REQUIREMENTS FOR STORM DRAIN CONSTRUCTION

A. NOTES:

1. Eroded sediments and other pollutants must be retained on site and may not be transported from the site via sheet flow, swales, area drains, natural drainage courses, or wind.

2. Stockpiles of earth and other construction related materials must be protected from being transported from the site by the forces of wind or water.

3. Fuels, oils, solvents, and other toxic materials must be stored in accordance with their listing and are not to contaminate the soil and surface waters. All approved storage containers are to be protected from the weather. Spills must be cleaned up immediately and disposed of in a proper manner. Spills may not be washed into the drainage system.

4. Excess or waste concrete may not be washed into the public way or any other drainage system. Provisions shall be made to retain concrete wastes on site until they can be disposed of as solid waste.

5. Trash and construction–related solid wastes must be deposited into a covered receptacle to prevent contamination of rainwater and dispersal by wind.

6. Sediments and other materials may not be tracked from the site by vehicle traffic. The construction entrance roadways must be stabilized so as to inhibit sediments from being deposited into the public way. Accidental depositions must be swept up immediately and may not be washed down by rain or other means.

7. Any slopes with disturbed soils or denuded of vegetation must be stabilized so as to inhibit erosion by wind and water.

B. The following BMPs as outlined in, but not limited to, the Best Management Practice Handbook, California Stormwater Quality Task Force, Sacramento, California 2003, or the latest revised edition, may apply during construction (additional measures may be required if deemed appropriate by inspector):

EC-1 SCHEDULING
EC-10 VELOCITY DISSIPATION DEVICES
EC-11 SLOPE DRAINS
EC-12 STREAMBANK STABILIZATION
EC-13 POLYACRYLAMIDE
EC-2 PRESERVATION OF EXISTING VEGETATION
EC-3 HYDRAULIC MULCH
EC-4 HYDROSEEDING
EC-5 SOIL BINDERS
EC-6 STRAW MULCH
EC-7 GEOTEXTILES AND MATS
EC-8 WOOD MULCHING
EC-9 EARTH DIKES AND DRAINAGE SWALES
SE-1 SILT FENCE
SE-10 STORM DRAIN INLET PROTECTION
SE-11 CHEMICAL TREATMENT
SE-2 SEDIMENT BASIN
SE-3 SEDIMENT TRAP
SE-4 CHECK DAMS
SE-5 FIBER ROLLS
SE-6 GRAVEL BAG BERM
SE-7 STREET SWEEPING AND VACUUMING
SE-8 SANDBAG BARRIER
SE-9 STRAW BALE BARRIER
TR-1 STABILIZED CONSTRUCTION ENTRANCE/EXIT
TR-2 STABILIZED CONSTRUCTION ROADWAY
TR-3 ENTRANCE/OUTLET TIRE WASH

WE-1 WIND EROSION CONTROL
NS-1 WATER CONSERVATION PRACTICES
NS-10 VEHICLE & EQUIPMENT MAINTENANCE
NS-11 PILE DRIVING OPERATIONS
NS-12 CONCRETE CURING
NS-13 CONCRETE FINISHING
NS-14 MATERIAL OVER WATER
NS-15 DEMOLTION ADJACENT TO WATER
NS-16 TEMPORARY BATCH PLANTS
NS-2 DEWATERING OPERATIONS
NS-3 PAVING AND GRINDING OPERATIONS
NS-4 TEMPORARY STREAM CROSSING
NS-5 CLEAR WATER DIVERSION
NS-6 ILLICIT CONNECTION/DISCHARGE
NS-7 POTABLE WATER/IRRIGATION
NS-8 VEHICLE AND EQUIPMENT CLEANING
NS-9 VEHICLE AND EQUIPMENT FUELING
WM-1 MATERIAL DELIVERY AND STORAGE
WM-10 LIQUID WASTE MANAGEMENT
WM-2 MATERIAL USE
WM-3 STOCKPILE MANAGEMENT
WM-4 SPILL PREVENTION AND CONTROL
WM-5 SOLID WASTE MANAGEMENT
WM-6 HAZARDOUS WASTE MANAGEMENT
WM-7 CONTAMINATED SOIL MANGEMENT
WM-8 CONCRETE WASTE MANAGEMENT
WM-9 SANITARY/SEPTIC WASTE MANAGEMENT

OCEAN–Pro CATCH BASIN INSERT SCHEDULE

Catch Basin width	3.5'	7'	10'	14'	21'	28'
OCEAN–Pro Debris Gate	1	2	2	3	5	6
Pollutant Filters	3	5	5	10	14	18
Filter Tray	2	3	3	5	7	9



CATCH BASIN STENCILING

"NO DUMPING, DRAINS TO OCEAN" STENCIL TO BE PLACED ON ALL CATCH BASINS/INLETS.

AS OF 7-31-2013
AS BUILT

HYDRAULIC ELEMENTS

50 YR. FREQUENCY

LINE	PIPE FROM STA.	REACH TO STA.	Q (CFS)	SECTION	VELOCITY (FPS)	REMARKS
A	11+22.28	11+74.41	1180	Trap. Channel	32.56	*
A	12+00.00	12+88.68	1180	Trap. Channel	31.88	
A	13+08.69	16+83.83	1180	10'Wx8'H RCB	15.63	
A	16+83.83	18+00.00	1132	10'Wx8'H RCB	14.19	***
A	18+00.00	21+92.40	1132	10'Wx8'H RCB	24.18	***
A	21+92.40	24+86.22	1132	10'Wx8'H RCB	26.94	***
A	24+90.06	27+51.13	1132	10'Wx7'H RCB	28.51	***
A	27+51.13	28+00.00	1126	10'Wx7'H RCB	27.24	***
A	28+00.00	28+84.76	1126	10'Wx7'H RCB	27.16	***
A	28+84.76	34+41.09	1077	10'Wx7'H RCB	27.61	***
A	34+41.09	38+00.00	1016	10'Wx7'H RCB	18.96	
A	38+00.00	40+44.68	1016	10'Wx7'H RCB	18.50	
A	40+44.68	40+84.00	1006	10'Wx7'H RCB	15.54	
B	0+05.00	0+37.62	50	42" RCP	19.70	
B	0+37.62	03+27.54	47	42" RCP	20.41	
B	03+32.33	06+96.13	42	42" RCP	18.38	
B	07+00.91	07+59.62	3	42" RCP	9.11	
C	0+05.00	1+20.26	75	54" RCP	6.37	
D	10+00.00	14+15.00	6	30" PVC	10.7	
D	14+36.00	14+59.90	12	30" PVC	13.1	
LATERAL 1B	0+05.00	0+11.27	4	18" RCP	15.7	
LATERAL 1C	0+05.00	0+93.00	8	18" RCP	4.5	
LATERAL 1C	0+97.48	1+24.48	5	18" RCP	2.8	**
LATERAL 1C1	0+97.48	2+36.68	3	18" RCP	7.9	**
LATERAL 1D	0+05.00	0+80.00	2	18" RCP	7.5	
LATERAL 1F	0+05.00	0+11.00	3	18" RCP	12.60	
LATERAL 1G	0+05.00	0+12.00	3	18" RCP	17.9	
LATERAL 1G	0+14.00	0+49.62	1	18" RCP	1.0	
LATERAL 1H	0+05.00	0+11.00	4	18" RCP	17.4	
LATERAL 1J	0+05.00	0+99.00	1	18" RCP	1.0	
LATERAL 1K	0+01.75	0+20.57	4	18" RCP	19.4	
LATERAL 1L	0+02.67	0+23.53	6	18" RCP	13.9	
LATERAL 1M	0+02.00	01+19.67	5	18" RCP	9.4	**
LATERAL 1N	0+05.00	0+56.00	4	18" RCP	15.4	
LATERAL 1P	0+05.00	0+85.00	2	24" RCP	1.1	
LATERAL 1P	0+88.00	01+53.95	1	24" RCP	0.6	
LATERAL 1Q	0+05.00	0+20.00	6	18" RCP	12.0	
LATERAL 1Q	0+23.00	0+27.00	1	12" PVC	1.7	**
LATERAL 1R	0+05.00	0+45.00	1	18" RCP	9.7	
LATERAL 1S	0+05.00	1+07.00	3	24" RCP	8.4	
LATERAL 1T	0+05.00	0+13.00	4	18" RCP	2.3	
LATERAL 1T	0+18.00	0+45.00	1	12" PVC	9.4	**
LATERAL 1U	0+05.00	0+35.55	1	24" RCP	0.6	
LATERAL 1V	0+03.66	0+78.24	36	30" RCP	22.6	
LATERAL 1V	0+83.02	1+01.02	24	30" RCP	20.2	
LATERAL 1W	0+05.00	0+24.80	2	18" RCP	14.5	
LATERAL 1X	0+05.00	0+32.65	3	18" RCP	12.5	
LATERAL 1Y	0+05.00	0+68.99	3	18" RCP	12.5	
LATERAL 1Z	0+05.00	0+23.29	2	18" RCP	27.2	

* Discharges into a Natural Drainage Course (Santa Clara River) *** Steel clearance=3.5", Concrete mix=680–B–5,000
** Not to be maintained by LACFCD

CONSTRUCTION NOTES

(1) CONSTRUCT 18" RCP (D–LOAD PER PROFILE)
(2) CONSTRUCT 24" RCP (D–LOAD PER PROFILE)
(3) CONSTRUCT 36" RCP (D–LOAD PER PROFILE)
(4) CONSTRUCT 42" RCP (D–LOAD PER PROFILE)
(5) CONSTRUCT 54" RCP (D–LOAD PER PROFILE)
(6) CONSTRUCT 10' x 8' RCB PER CALTRANS STD D80A ON SHEET 16.
(7) CONSTRUCT 10' x 7' RCB PER CALTRANS STD D80A ON SHEET 16.
(8) CONSTRUCT MANHOLE CONCRETE BOX STORM DRAIN PER APWA STD 323–1.
(9) CONSTRUCT TRANSITION STRUCTURE PER CALTRANS DETAIL D86A ON SHEET 20.
(10) CONSTRUCT TRANSITION STRUCTURE SINGLE RCB TO SINGLE RCB PER APWA STD 341–1.
(11) CONSTRUCT JUNCTION STRUCTURE PIPE TO RCB INLET < 30" PER APWA STD 334–1.
(12) CONSTRUCT JUNCTION STRUCTURE PIPE TO RCB INLET > 30" PER APWA STD 333–1.
(13) CONSTRUCT TRANSITION STRUCTURE DOUBLE RCP TO SINGLE RCB PER MODIFIED APWA STD 342–1 & 343–1 PER DETAIL 1 SHEET 12.
(14) CONSTRUCT RIPRAP OUTLET STRUCTURE PER DETAIL 2 ON SHEET 12.
(15) CONSTRUCT CONCRETE BULKHEAD PER DETAIL 4 ON SHEET 12.
(16) CONSTRUCT JUNCTION STRUCTURE PIPE TO PIPE PER APWA STD. 332–1.
(17) MODIFIED CURB OPENING CATCH BASIN PER APWA STD. 300–2 B=3'–8", Vupstream ≥2'–6". (WxV PER PLAN). LOCAL DEPRESSION PER APWA STD. 313–1, CASE E. SEE STREET PLANS. INSTALL OCEAN–PRO CATCH BASIN INSERT. DEBRIS GATES, FILTER TRAY, AND POLLUTANT FILTERS PER SCHEDULE ON SHEET 2.
(18) GRATING CATCH BASIN PER STREET PLANS. NOT TO BE MAINTAINED BY LACFCD.
(19) 24" DIA. PERFORATED CMP RISER WITH ASPHALT APRON PER GRADING PLANS.
(20) CONSTRUCT DESILTING INLET STRUCTURE PER DETAIL H ON SHEETS 13 & 14.
(21) CONSTRUCT CONCRETE COLLAR FOR RCP PER APWA STD. 380–2.
(22) CONSTRUCT MANHOLE PIPE TO PIPE PER APWA STD. 320–1.
(23) CONSTRUCT 78" RCP (D–LOAD PER PROFILE)
(24) CONSTRUCT 30" RCP (D–LOAD PER PROFILE)
(25) CONSTRUCT 4' WIDE, 4" THICK PCC PEDESTRIAN ACCESS TO MANHOLE PER DETAIL 3, SHEET 12.
(26) CONSTRUCT CHAIN LINK FENCE AND GATE PER APWA STD. 600–2.
(27) CONSTRUCT 16' WIDE DRIVEWAY APPROACH PER APWA 110–1, TYPE A. W=16', X=3', Y=4'. DRIVEWAY SHALL BE 6" THICK PCC.
(28) 12" PVC, SCH40 PER GRADING PLANS. NOT TO BE MAINTAINED BY LACFCD.
(29) CONSTRUCT MANHOLE PIPE TO PIPE PER APWA STD. 322–1.
(30) CONSTRUCT 6" THICK PCC ACCESS ROAD.
(31) CURBSIDE GRATING CATCH BASIN PER CHEVRON GRADING PLANS. NOT TO BE MAINTAINED BY LACFCD.
(32) △1 CONSTRUCT JUNCTION STRUCTURE PIPE TO PIPE PER APWA STD. 331-2.

APPROVED FOR CONSTRUCTION BY:
ROBERT G. NEWMAN, P.E., L.S. FOR RGN 6-7-00
DIRECTOR OF PUBLIC WORKS
CITY OF SANTA CLARITA
DATE

NO.	REVISIONS	REVISED BY	APPROVED BY	DATE
△1	REVISED CONSTRUCTION NOTES	8/29/07		9-12-07

REGISTERED PROFESSIONAL ENGINEER JON M. AUSTIN RCE 58726 Exp. 03/31/07 CIVIL STATE OF CALIFORNIA
PROJECT ENGINEER 5-31-06 DATE

MetroPointe Engineers
3555 Harbor Gateway South, Suite A
Costa Mesa, CA 92626
(714) 438-1095

STORM DRAIN PLANS IN
CITY OF SANTA CLARITA MTD No. 1764

CITY OF SANTA CLARITA

STORM DRAIN PLAN AND PROFILE
MTD NO. 1764
NOTES

DWG | SHEET 2 OF 21

SCALE: HOR. 1"= 40'
VERT. 1"= 8'

Q_{50} = 1180 cfs
V_{MAX} = 32.56 fps

Q_{50} = 1160 cfs
V_{MAX} = 15.63 fps

Q_{50} = 1132 cfs
V_{MAX} = 14.19 fps

SANTA CLARA RIVER

CL SKYVIEW LANE STA. 16+77.64

CL MH NO. 1 STA. 17+58.69 RIM=1075.48

EXISTING GROUND (FINISHED GROUND)

PROVIDE SUPPORT PER APWA STD. 224-1

H.G.L.

EXISTING GROUND

HGL

FLOW LINE

14.31%

1.00% MIN.

5'-6"

14'

4'-6"

2:1

1:1

STA. 11+24.41 1037.82 FL. TOP OF RIPRAP

STA. 11+74.41 BEGIN TRANSITION 1038.32 FL. TOP OF RIPRAP

STA. 12+00 END TRANSITION

CONSTRUCT 166.4 LF RIPRAP OUTLET STRUCTURE PER DETAILS ON SHEET 12

STA. 12+88.68 1055.31 INV. BEGIN TRANS.

STA. 13+08.68 1059.06 END TRANS.

EXIST. 18"SS 1048.12 INV.

13+39.89 BC 1059.21 INV.

RELOCATE 24" GAS (SO. CAL GAS)

EXIST. 8" GAS (SO. CAL GAS)

RELOCATE ELEC. CONDUIT (FIELD VERIFY)

16+16.55 EC 1060.59 INV.

LATERAL "1W" 16+22.98 1062.59 INV.

36" STORM DRAIN 16+83.83 1063.37 INV.

LATERAL "1X" 16+83.31 1062.89 INV.

17+20.12 BC 1061.11 INV.

RELOCATED PROPOSED 16"OIL EXXONMOBIL 1064.20 INV.

1061.51 INV.

S=0.50%

CONSTRUCT 375.14 LF 10'W x 8'H RCB
SEE DETAILS ON SHEETS 15 & 16
USE CONC & REINF FOR 20' MAX. EARTH COVER
PER CALTRANS STANDARD PLAN D80C ON SHEET 16.

CONSTRUCT 116.17 LF 10'W x 8'H RCB
SEE DETAILS ON SHEETS 15 & 16

TRANSITION STRUCTURE PER CALTRANS STD. PLAN D86A
SEE SHEET 13.

LINE 'A'

MATCHLINE SEE SHEET 4
STA. 18+00.00

1070
1050
1030

10 11 12 13 14 15 16 17 18

NJ OF 7-31-2013
AS BUILT

LEGEND

A — SECTION
10 — SHEET

PROPOSED 24" SD PER CALTRANS EA 07-187014

PROPOSED CL "THE OLD ROAD"

REMOVE EXIST. SD

EXISTING 18" SD TO BE REMOVED

8 CL MH NO. 1 STA. 17+58.69 RIM=1074.33

EXISTING PVC PER GRADING PLAN 1865-4

REMOVE EX. SD

END REMOVE EX. SD

EXISTING CONC. CHANNEL PER PD 1680 TO REMAIN

R/W

CL INTERSECTION STA. 16+77.64

REMOVE EXIST. SD

EXIST. CATCH BASIN WITH INSERT TO REMAIN

EXIST. C&G

HORZ. N60°37'32"W 30.41'
LATERAL "1W" SEE SHEET 11

N16°09'05"W

CL CB NO. 1X5 STA.685+65.327 TOR=1074.0 INV=1067.44 W=14', V=6.56'

HORZ. N51°52'44"E 36.22'
LATERAL "1X" SEE SHEET 10

CL INT 16+83.31= 0+00.00 — LATERAL "1X"

EXIST 36" RCP PER PD 2592 TO REMAIN FUTURE, PUBLIC ENTRANCE

SKYVIEW LANE (PUBLIC ROAD)

CL INT 16+22.98= 0+00.00 — LATERAL "1W"

CONNECT EXIST 36" SD STA. 16+84.04

REMOVE EX. CATCH BASIN

RELOCATE CDS UNIT

EXIST SEWER PC. 11819

PROPOSED 20' WIDE EASEMENT TO LACFCD FOR COVERED STORM DRAIN, APPURTENANT STRUCTURES, AND INGRESS AND EGRESS PURPOSES. SEE SHEET 21 FOR DATA.

REMOVE EX. A.C. ROAD

JOIN EXISTING A.C. ACCESS ROAD

EASEMENT TO THE CITY OF SANTA CLARITA FOR INGRESS AND EGRESS PURPOSES. SEE SHEET 21 FOR DATA.

EASEMENT TO LACFCD FOR FLOOD CONTROL PURPOSES SEE SHEET 21 FOR DATA.

BEDDING MATERIAL BELOW BOTTOM OF RCB SHALL BE 12" C.A.B.

TYPICAL SECTION — RCB
No Scale
STA 12+88.68 — (SEE SHEET 16 FOR RCB DETAILS)

BOTTOM OF CUT-OFF WALL

FLOW

DAYLIGHT

50'

N06°29'17"W 339.86'

6" AC ON 4" CAB

S=2% S=2%

AC PAVEMENT DETAIL
No Scale

PLAN
SCALE: 1" = 40'

40' 20' 0 40' 80'
GRAPHIC SCALE

CONSTRUCTION NOTES

1. CONSTRUCT 18" RCP (D-LOAD PER PROFILE)
6. CONSTRUCT 10' x 8' RCB PER CALTRANS STD D80A ON SHEET 16.
8. CONSTRUCT MANHOLE CONCRETE BOX STORM DRAIN PER APWA STD 323-1.
9. CONSTRUCT TRANSITION STRUCTURE PER CALTRANS DETAIL D86A ON SHEET 20.
11. CONSTRUCT JUNCTION STRUCTURE PIPE TO RCB INLET < 30" PER APWA STD 334-1.
12. CONSTRUCT JUNCTION STRUCTURE PIPE TO RCB INLET > 30" PER APWA STD 333-1.
14. CONSTRUCT RIPRAP OUTLET STRUCTURE PER DETAIL 2 ON SHEET 12.
17. MODIFIED CURB OPENING CATCH BASIN PER APWA STD. 300-2 B=3'-8", Upstream 2'-6". (WxV PER PLAN). LOCAL DEPRESSION PER APWA STD. 313-1, CASE E. SEE STREET PLANS. INSTALL OCEAN-PRO CATCH BASIN INSERT, 3 DEBRIS GATES, 5 FILTER TRAYS, AND 10 POLLUTANT FILTERS.
25. CONSTRUCT 4' WIDE, 4" THICK PCC PEDESTRIAN ACCESS TO MANHOLE PER DETAIL 3 ON SHEET 12. CONSTRUCT MINIMUM 5'X5' CONCRETE PAD AROUND MANHOLE LID.
26. CONSTRUCT CHAIN LINK FENCE AND GATE PER APWA STD. 600-2.
27. CONSTRUCT 16' WIDE DRIVEWAY APPROACH PER APWA STD. 110-1, TYPE A. W=16', X=3', Y=4'. DRIVEWAY SHALL BE 6" THICK PCC.
30. CONSTRUCT 6" THICK A.C. ACCESS ROAD PER SECTION HEREIN.

Curve Data				
CURVE	RADIUS	LENGTH	TANGENT	DELTA
A	1640.36'	276.67'	138.67'	09°39'48"
B	1640.36'	263.28'	131.92'	09°11'46"

APPROVED FOR CONSTRUCTION BY:

ROBERT G. NEWMAN, P.E., L.S.
DIRECTOR OF PUBLIC WORKS
CITY OF SANTA CLARITA

DATE 6-7-06

NO.	REVISIONS	REVISED BY	APPROVED BY	DATE
1	OUTLET STRUCTURE REVISED PER SHEET 3A. (VOID SHEET 3)	9/19/06		4-5-07

REGISTERED PROFESSIONAL ENGINEER — JON M. AUSTIN — RCE 58726 — Exp. 03/31/07 — CIVIL — STATE OF CALIFORNIA

PROJECT ENGINEER 4/4/06 DATE

MetroPointe Engineers
3555 Harbor Gateway South, Suite A
Costa Mesa, CA 92626
(714) 438-1095

STORM DRAIN PLANS IN
CITY OF SANTA CLARITA MTD.. No. 1764
CITY OF SANTA CLARITA

STORM DRAIN PLAN AND PROFILE
MTD NO. 1764
SYSTEM A
FROM STA. 10+00 TO STA. 18+00

DWG | SHEET 3 OF 21

DRAWING NUMBER
Storm Drain - MTD 1764
Sheet 3 of 21
01986
10/25/11

SCALE: HOR. 1"= 40'
VERT. 1"= 8'

Q_{50} = 1180 cfs
V_{MAX} = 32.56 fps

Q_{50} = 1180 cfs
V_{MAX} = 15.63 fps

Q_{50} = 1132 cfs
V_{MAX} = 14.19 fps

CL SKYVIEW LANE
STA. 16+77.64

CL MH NO. 1
STA. 17+58.69
RIM=1075.48

EXISTING GROUND
(FINISHED GROUND)

PROVIDE SUPPORT PER APWA STD. 224-1

HGL
SANTA CLARA RIVER

SANTA CLARA RIVER

1070

1050

1030

EXISTING GROUND

ELEV 1055.31'

HGL

H.G.L.

H.G.L.

S=0.50%

HGL

ELEV 1037.27'

ELEV 1038.32'

2.00% MIN.

EXISTING ARMORFLEX

14'

2

1

1.5

4'-6"

4'-6"

STA. 12+88.68
1055.31 BEGIN TRANS.

STA. 13+08.69
1059.06 END TRANS.

13+39.89 BC
1059.21' INV.

EXIST. 18"SS
1048.12' INV.

RELOCATE 24" GAS
(SO. CAL. GAS)

EXIST. 8" GAS
(SO. CAL. GAS)

RELOCATE ELEC. CONDUIT
(FIELD VERIFY)

16+16.55 EC
1060.59 INV.

LATERAL "1W" 16+22.98
1062.59 INV.

36" STORM DRAIN 16+83.83
1063.37 INV.

LATERAL "1X" 16+83.31
1062.89 INV.

17+03.11 BC
1061.11 INV.

RELOCATED PROPOSED
18"OIL EXXONMOBIL
1064.20 INV.

1061.51 INV.

EXIST 30" R.C. PIPE @ LEFT

TRANSITION STRUCTURE PER CALTRANS STD. PLAN D86A
SEE SHEET 13.

EXIST 6" DIP FORCE MAIN @LEFT

CONSTRUCT 375.14 LF 10'W x 8'H RCB
SEE DETAILS ON SHEETS 15 & 16
USE CONC & REINF FOR 20' MAX. EARTH COVER
PER CALTRANS STANDARD PLAN D80C ON SHEET 16.

CONSTRUCT 116.17 LF 10'W x 8'H RCB
SEE DETAILS ON SHEETS 15 & 16

LINE 'A'

STA 11+22.28
1037.27

BOTTOM OF CUT-OFF WALL

STA 11+74.41
1038.32'
BEGIN TRANSITION

STA 12+00
END TRANSITION

CONSTRUCT 166.4 LF
RIPRAP OUTLET STRUCTURE
PER DETAILS ON
SHEET 12 AND 12A

MATCHLINE SEE SHEET 4
STA. 18+00.00

AS BUILT
As of 7-31-2013

10 11 12 13 14 15 16 17 18

LEGEND

A/10 — SECTION / SHEET

BEDDING MATERIAL BELOW BOTTOM OF RCB SHALL BE 12" C.A.B.

TYPICAL SECTION – RCB
No Scale
STA 12+88.68 –
(SEE SHEET 16 FOR RCB DETAILS)

EXISTING ARMORFLEX NOT TO BE MAINTAINED BY LACFCD

SAYLIGHT PROTECT EXISTING ARMOR FLEX

6" AC ON 4" CAB
S=2% S=2%
AC PAVEMENT DETAIL
No Scale

PLAN
SCALE: 1" = 40'
40' 20' 0' 40' 80'
GRAPHIC SCALE

SANTA CLARA RIVER

STA 11+22.28 BEGIN TRAP CHANNEL

STA 11+74.41 BEGIN TRANSITION

STA 12+00.00 END TRANSITION

STA 12+88.68 BEGIN TRANS.

C/12 B/12 A/12

EXISTING CONC. CHANNEL PER PD-1680 TO REMAIN

PROPOSED 24" SD PER CALTRANS EA 07-187014

PROPOSED CL "THE OLD ROAD"

REMOVE EXIST SD

EXISTING 18" SD TO BE REMOVED

REMOVE EX. SD

END REMOVE EX. SD

CL MH NO. 2
STA. 17+56.69
RIM=1074.33

EXISTING PVC PER GRADING PLAN-18654

CL INTERSECTION
STA. 16+77.64

REMOVE EXIST. SD
EXIST CATCH BASIN
TO BE REMOVED
EXISTING C&G

CB WITH INSERT TO REMAIN

HORZ. N60°37'32"W 30.41'

HORZ. N51°52'44"E 36.22'

CL CB NO.10RX5
STA.685+65.327 TOR
TC=1074.0
INV=1067.44
W=14', V=5.56'

LATERAL "1X" SEE SHEET 10

CL INT 16+83.31=
0+00.00 – LATERAL "1X"

EXIST 36" RCP
PER PD 2592 TO REMAIN
FUTURE, PUBLIC ENTRANCE

SKYVIEW LANE
(PRIVATE AND FUTURE)

MATCHLINE SEE SHEET 4
STA. 18+00.00

40'X40' TURNAROUND

HORZ. N60°37'32"W 30.41'

LATERAL "1W" SEE SHEET 11

CL INT 16+22.98=
0+00.00 = LATERAL "1W"

CONNECT EXIST 36" SD
STA. 16+84.04

REMOVE EX. CATCH BASIN

RELOCATE CDS UNIT

EXIST SEWER PC 11819

N06°29'17"W 339.89'

BOTTOM OF CUT-OFF WALL

EASEMENT TO LACFCD FOR FLOOD CONTROL PURPOSES
SEE SHEET 21 FOR DATA.

EASEMENT TO THE CITY OF SANTA CLARITA FOR INGRESS AND EGRESS PURPOSES.
SEE SHEET 21 FOR DATA.

PROPOSED 20' WIDE EASEMENT TO LACFCD FOR COVERED STORM DRAIN, APPURTENANT STRUCTURES, AND INGRESS AND EGRESS PURPOSES.
SEE SHEET 21 FOR DATA.

REMOVE EX. A.C. ROAD

JOIN EXISTING A.C. ACCESS ROAD

FLOW

FM

SSFM

SS

CONSTRUCTION NOTES

1. CONSTRUCT 18" RCP (D-LOAD PER PROFILE)
6. CONSTRUCT 10' x 8' RCB PER CALTRANS STD D80A ON SHEET 16.
8. CONSTRUCT MANHOLE CONCRETE BOX STORM DRAIN PER APWA STD 323-1.
9. CONSTRUCT TRANSITION STRUCTURE PER CALTRANS DETAIL D86A ON SHEET 20.
11. CONSTRUCT JUNCTION STRUCTURE PIPE TO RCB INLET < 30" PER APWA STD 334-1.
12. CONSTRUCT JUNCTION STRUCTURE PIPE TO RCB INLET > 30" PER APWA STD STD 333-1.
14. CONSTRUCT RIPRAP OUTLET STRUCTURE PER DETAIL 2 ON SHEET 12A.
17. MODIFIED CURB OPENING CATCH BASIN PER APWA STD. 300-2 B=3'-8", Vupstream 2'-6". (WxV PER PLAN). LOCAL DEPRESSION PER APWA STD. 313-1, CASE E. SEE STREET PLANS. INSTALL OCEAN-PRO CATCH BASIN INSERT, 3 DEBRIS GATES, 5 FILTER TRAYS, AND 10 POLLUTANT FILTERS.
25. CONSTRUCT 4' WIDE, 4" THICK PCC PEDESTRIAN ACCESS TO MANHOLE PER DETAIL 3 ON SHEET 12. CONSTRUCT MINIMUM 5'X5' CONCRETE PAD AROUND MANHOLE LID.
26. CONSTRUCT CHAIN LINK FENCE AND GATE PER APWA STD. 600-2.
27. CONSTRUCT 16' WIDE DRIVEWAY APPROACH PER APWA STD. 110-1, TYPE A. W=16', X=3', Y=4'. DRIVEWAY SHALL BE 6" THICK PCC.
30. CONSTRUCT 6" THICK A.C. ACCESS ROAD PER SECTION HEREIN.

Curve Data				
CURVE	RADIUS	LENGTH	TANGENT	DELTA
A	1640.36'	276.67'	138.67'	09°39'48"
B	1640.36'	263.28'	131.92'	09°11'46"

APPROVED FOR CONSTRUCTION BY:

ROBERT C. NORMAN, P.E., L.S.
DIRECTOR OF PUBLIC WORKS
CITY OF SANTA CLARITA

DATE 4-5-07

NO.	REVISIONS	REVISED BY	APPROVED BY	DATE
1	Outlet Structure Revised per sheet 3A (Void Sheet 3)	9-19-06		4-5-07

REGISTERED PROFESSIONAL ENGINEER
JON M. AUSTIN
RCE 58726
Exp. 03/31/07
CIVIL
STATE OF CALIFORNIA

PROJECT ENGINEER 9/19/06 DATE

MetroPointe Engineers
3555 Harbor Gateway South, Suite A
Costa Mesa, CA 92626
(714) 438-1095

STORM DRAIN PLANS IN
CITY OF SANTA CLARITA MTD. No. 1764

CITY OF SANTA CLARITA

STORM DRAIN PLAN AND PROFILE
MTD NO. 1764
SYSTEM A
FROM STA. 10+00 TO STA. 18+00

DWG | SHEET 3A OF 21

DRAWING

DRAWING NUMBER

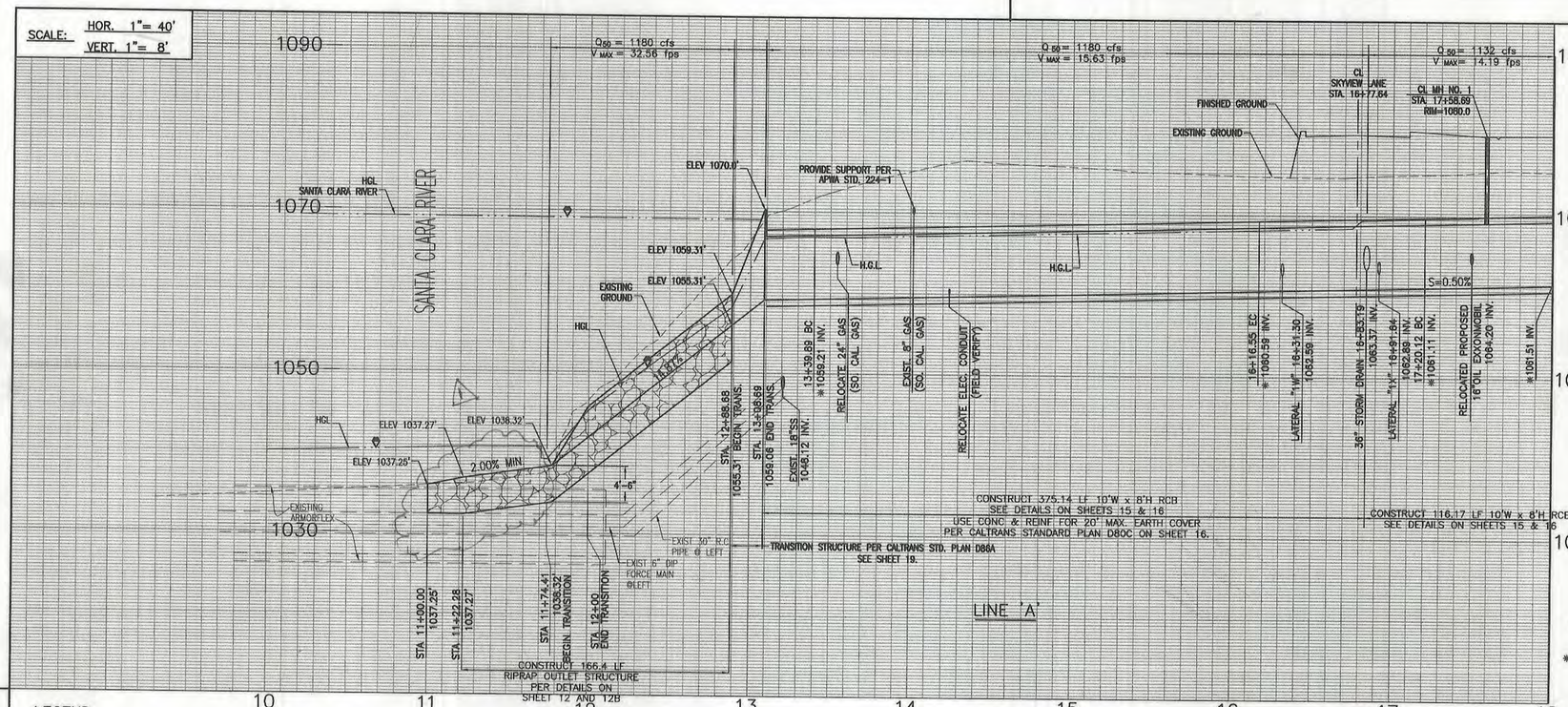
Storm Drain - MTD 1764
Sheet 3A of 21
3A

01986

10/25/11

NUMBER

SCALE: HOR. 1"= 40'
VERT. 1"= 8'



MATCHLINE SEE SHEET 4
STA. 18+00.00

AS OF 7-31-2013
AS BUILT

* ALL RCB INVERT ELEVATIONS TO BE 1" HIGHER THAN DESIGN INVERT.

** NOT TO BE MAINTAINED BY LACFCD.

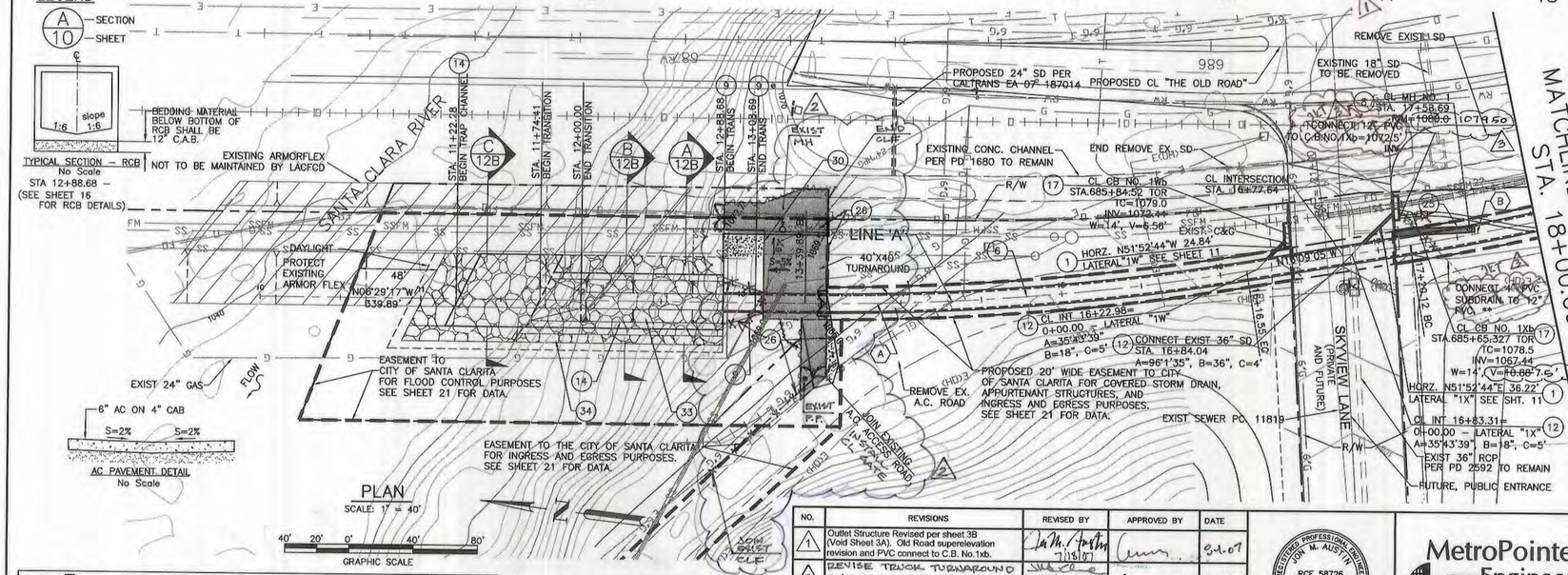
CONSTRUCTION NOTES

1. CONSTRUCT 18" RCP (D-LOAD PER PROFILE)
6. CONSTRUCT 10' x 8' RCB PER CALTRANS STD D80A ON SHEET 16.
8. CONSTRUCT MANHOLE CONCRETE BOX STORM DRAIN PER APWA STD 323-1.
9. CONSTRUCT TRANSITION STRUCTURE PER CALTRANS DETAIL D86A ON SHEET 20.
11. CONSTRUCT JUNCTION STRUCTURE PIPE TO RCB INLET < 30" PER APWA STD 334-1.
12. CONSTRUCT JUNCTION STRUCTURE PIPE TO RCB INLET > 30" PER APWA STD STD 333-1.
14. CONSTRUCT RIPRAP OUTLET STRUCTURE PER DETAIL 2 ON SHEET 12A.
17. MODIFIED CURB OPENING CATCH BASIN PER APWA STD. 300-2 MINIMUM B=3'-8", MINIMUM Vupstream 2'-6". (WxV PER PLAN). LOCAL DEPRESSION PER APWA STD. 313-1, CASE E. SEE STREET PLANS. INSTALL OCEAN-PRO CATCH BASIN INSERT, 3 DEBRIS GATES, 5 FILTER TRAYS, AND 10 POLLUTANT FILTERS.
25. CONSTRUCT 4' WIDE, 4" THICK PCC PEDESTRIAN ACCESS TO MANHOLE PER DETAIL 3 ON SHEET 12. CONSTRUCT MINIMUM 5'X5' CONCRETE PAD AROUND MANHOLE LID.
26. CONSTRUCT CHAIN LINK FENCE AND GATE PER APWA STD. 600-2.
27. CONSTRUCT 16' WIDE DRIVEWAY APPROACH PER APWA STD. 110-1, TYPE A. W=16', X=3', Y=4'. DRIVEWAY SHALL BE 6" THICK PCC.
30. CONSTRUCT 6" THICK A.C. ACCESS ROAD PER SECTION HEREIN.
33. CONSTRUCT 1-TON GROUTED RIPRAP PAD PER DETAIL ON SHEET 12B.
34. CONSTRUCT 1-TON UN-GROUTED RIPRAP PAD PER DETAIL ON SHEET 12B.

LEGEND

A/10 — SECTION / SHEET

TYPICAL SECTION — RCB (No Scale)
STA 12+88.68 — (SEE SHEET 16 FOR RCB DETAILS)
BEDDING MATERIAL BELOW BOTTOM OF RCB SHALL BE 12" C.A.B.
slope 1:6 slope 1:6
EXISTING ARMORFLEX NOT TO BE MAINTAINED BY LACFCD



PLAN
SCALE: 1" = 40'
40' 20' 0' 40' 80'
GRAPHIC SCALE

Curve Data				
CURVE	RADIUS	LENGTH	TANGENT	DELTA
A	1640.36'	276.67'	138.67'	09°39'48"
B	1640.36'	263.28'	131.92'	09°11'46"

APPROVED FOR CONSTRUCTION BY:
ROBERT G. NEWMAN, P.E., L.S.
DIRECTOR OF PUBLIC WORKS
CITY OF SANTA CLARITA
for RGN 7-26-07
DATE

NO.	REVISIONS	REVISED BY	APPROVED BY	DATE
1	Outlet Structure Revised per sheet 3B (Void Sheet 3A). Old Road superelevation revision and PVC connect to C.B. No.1xb.	7/18/07		8-1-07
2	REVISE TRUCK TURNAROUND AND ADJACENT FENCING.	9/8/2009		9-25-09
3	AS-BUILT REVISIONS FROM INSPECTOR FIELD NOTES	1/19/2010		2-23-10

REGISTERED PROFESSIONAL ENGINEER JUAN M. AUSTIN RCE 58726 Exp. 03/31/09 CIVIL STATE OF CALIFORNIA
PROJECT ENGINEER 7/18/07 DATE

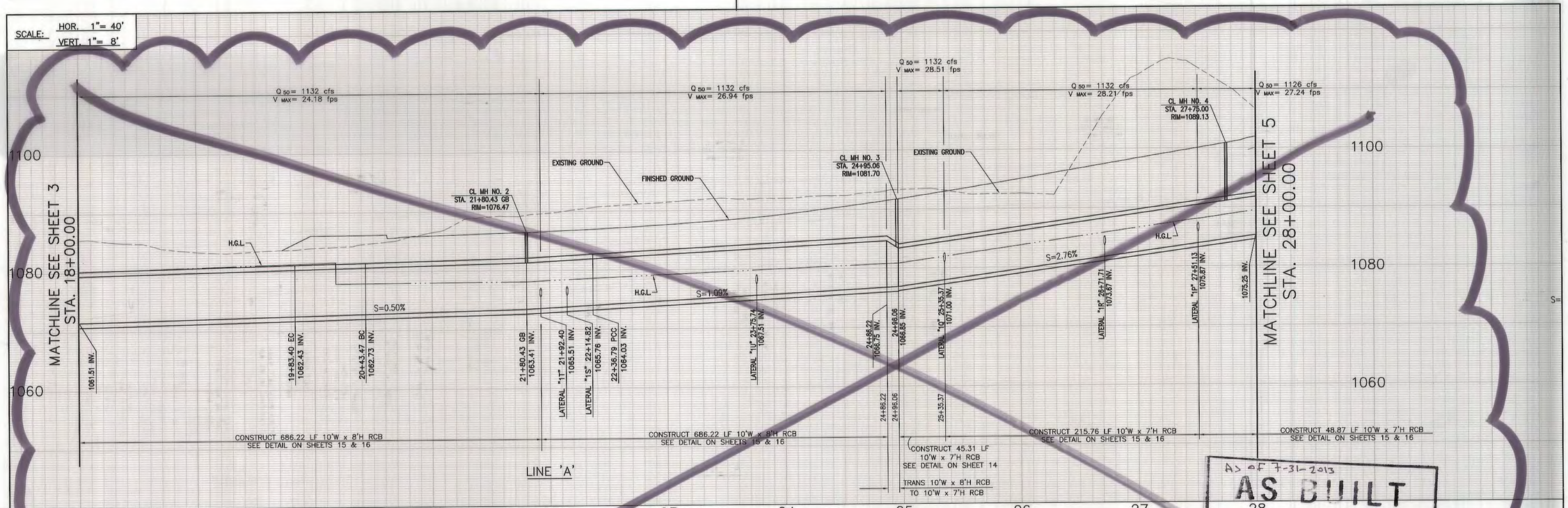
MetroPointe Engineers
3555 Harbor Gateway South, Suite A
Costa Mesa, CA 92626
(714) 438-1095

STORM DRAIN PLANS IN
CITY OF SANTA CLARITA MTD. No. 1764
CITY OF SANTA CLARITA
STORM DRAIN PLAN AND PROFILE
MTD NO. 1764
SYSTEM A
FROM STA. 10+00 TO STA. 18+00
DWG SHEET 3B OF 21

REGISTERED PROFESSIONAL ENGINEER JEFFREY D. MCCLURE NO. C30059 10/30/2010 CIVIL STATE OF CALIFORNIA

DRAWING
SAFCO PRODUCTS • NEW HOPE, MINNESOTA 763/533-4141 REORDER BY PART NUMBER 6582
DRAWING NUMBER
SAFCO PRODUCTS • NEW HOPE, MINNESOTA 763/533-4141 REORDER BY PART NUMBER 6582
NUMBER
SAFCO PRODUCTS • NEW HOPE, MINNESOTA 763/533-4141 REORDER BY PART NUMBER 6582
01986
Storm Drain - MTD 1764
Sheet 3B of 21
10/29/11

SCALE: HOR. 1"= 40'
VERT. 1"= 8'



AS of 7-31-2013
AS BUILT

CONSTRUCTION NOTES

1. CONSTRUCT 18" RCP (D-LOAD PER PROFILE)
2. CONSTRUCT 24" RCP (D-LOAD PER PROFILE)
6. CONSTRUCT 10' x 8' RCB PER CALTRANS STD D80A ON SHEET 16.
7. CONSTRUCT 10' x 7' RCB PER CALTRANS STD D80A ON SHEET 16.
8. CONSTRUCT MANHOLE CONCRETE BOX STORM DRAIN PER APWA STD 323-1.
10. CONSTRUCT TRANSITION STRUCTURE SINGLE RCB TO SINGLE RCB PER APWA STD 341-1.
11. CONSTRUCT JUNCTION STRUCTURE PIPE TO RCB INLET < 30" PER APWA STD 334-1.
17. MODIFIED CURB OPENING CATCH BASIN PER APWA STD. 300-2. B=3'-8", Vupstream ≥ 2'-6", (VIEW PER PLAN). LOCAL DEPRESSION PER APWA STD. 313-1, CASE E. SEE STREET PLANS. INSTALL OCEAN-PRO CATCH BASIN INSERT. DEBRIS GATES, FILTER TRAYS, AND POLLUTANT FILTERS PER SCHEDULE ON SHEET 2.
18. GRATING CATCH BASIN PER STREET PLANS. NOT TO BE MAINTAINED BY LACFCD.
19. 24" DIA. PERFORATED CMP RISER WITH ASPHALT APRON PER GRADING PLAN. NOT TO BE MAINTAINED BY LACFCD.
28. 12" DIA. PVC, SCH40 PIPE PER GRADING PLAN. NOT TO BE MAINTAINED BY LACFCD.

PLAN
SCALE: 1" = 40'
GRAPHIC SCALE
40' 20' 0' 40' 80'

Curve Data				
CURVE	RADIUS	LENGTH	TANGENT	DELTA
B	1640.36'	263.28'	131.93'	09°11'46"
C	1640.36'	193.32'	96.77'	06°45'08"
D	3636.48'	1612.61'	819.78'	25°24'29"

APPROVED FOR CONSTRUCTION BY:
ROBERT G. NEWMAN, P.E. L.S.
DIRECTOR OF PUBLIC WORKS
CITY OF SANTA CLARITA
DATE 6-7-06

NO.	REVISIONS	REVISED BY	APPROVED BY	DATE
1	OLD FINISHED GROUND REVISED PER SHEET 4A. (VOID SHEET 4)	8/29/07		9-12-07

REGISTERED PROFESSIONAL ENGINEER
JOHN M. AUSTIN
RCE 58726
Exp. 03/31/07
CIVIL
STATE OF CALIFORNIA
PROJECT ENGINEER 5/31/07 DATE

MetroPointe Engineers
3555 Harbor Gateway South, Suite A
Costa Mesa, CA 92626
(714) 438-1095

STORM DRAIN PLANS IN
CITY OF SANTA CLARITA MTD. No. 1764
CITY OF SANTA CLARITA
STORM DRAIN PLAN AND PROFILE
MTD NO. 1764
SYSTEM A
FROM STA. 18+00 TO STA. 28+00
DWG SHEET 4 OF 21

DRAWING NUMBER
SAFCO PRODUCTS • NEW HOPE, MINNESOTA
REORDER BY PART NUMBER 8582
Storm Drain - MTD 1764
Sheet 4 of 21
10/25/11
01986
NUMBER
SAFCO PRODUCTS NEW HOPE, MINNESOTA NUMBER 03581

SCALE: HOR. 1"= 40'
VERT. 1"= 8'

Q 50= 1132 cfs
V MAX= 24.18 fps

Q 50= 1132 cfs
V MAX= 26.94 fps

Q 50= 1132 cfs
V MAX= 28.51 fps

Q 50= 1132 cfs
V MAX= 28.21 fps

Q 50= 1126 cfs
V MAX= 27.24 fps

1090
1070
1050

MATCHLINE SEE SHEET 3
STA. 18+00.00

MATCHLINE SEE SHEET 5
STA. 28+00.00

EXISTING GROUND
FINISHED GROUND
H.G.L.

CL MH NO. 2
STA. 21+80.43 GB
RIM=1078.27

CL MH NO. 3
STA. 24+95.06
RIM=1082.93

CL MH NO. 4
STA. 27+75.00
RIM=1091.10

S=0.50%
S=1.09%
S=2.76%

*1061.51 INV.
19+83.40 EC * 1062.43 INV.
20+43.47 BC * 1062.73 INV.
21+80.43 GB * 1063.41 INV.
LATERAL "1T" 21+92.40 1065.51 INV.
LATERAL "1S" 22+14.82 1065.76 INV.
22+36.79 PCC * 1064.03 INV.
LATERAL "1U" 23+75.74 1067.31 INV.
LATERAL "1R" 24+37.85 1067.55 INV.
24+86.22 1066.75 INV.
24+96.08 1066.85 INV. *
LATERAL "1Q" 25+35.37 1071.00 INV.
LATERAL "1P" 26+71.71 1073.67 INV.
SLURRY BACKFILL SUPPORT
27+92.05 SCHEDULE 1080.74 INV.
PROPOSED 24" RCP
* 1075.25 INV.

CONSTRUCT 686.22 LF 10'W x 8'H RCB
SEE DETAIL ON SHEETS 15 & 16

CONSTRUCT 686.22 LF 10'W x 8'H RCB
SEE DETAIL ON SHEETS 15 & 16

LINE 'A' 2

CONSTRUCT ~~45.31~~ 39.31 LF
10'W x 7'H RCB
SEE DETAIL ON SHEET 14

TRANS 10'W x 8'H RCB
TO 10'W x 7'H RCB

CONSTRUCT 215.76 LF 10'W x 7'H RCB
SEE DETAIL ON SHEETS 15 & 16

CONSTRUCT 48.87 LF 10'W x 7'H RCB
SEE DETAIL ON SHEETS 15 & 16

* ALL RCB INVERT ELEVATIONS TO BE 1' HIGHER THAN DESIGN INVERT ELEVATIONS

AS OF 7-31-2013
AS BUILT

18 19 20 21 22 23 24 25 26 27 28

TYPE 30S-Z INLET
684+21.7±, 110.2'± RT
TG= 1075.8±, V=4'±
NOT TO BE MAINTAINED BY LACFCD

PROP. STORM DRAIN PER CALTRANS EA 07-187014

24"W 600mm RCP 36'± @ 4.5%±

CL C.B. NO. 1Sb
ST. STA. 684+17.652
TC=1076.61, INV.=1070.03
W=7', V=6.56'

EXIST. CONC. CHANNEL TO BE REMOVED

2 CL INT LACSD 6" SSFM
0+57.22 – LATERAL "1S"
PROVIDE PIPE SUPPORT PER LACSD STD PLAN S-a-217.
PROVIDE MINIMUM 8" CLEARANCE FROM BOTTOM OF 6" SSFM TO TOP OF 24" RCP.

684+41.146 THE OLD ROAD= 10+00.00

EXISTING 6" SSFM

6"SSFM

CL THE OLD ROAD

CL INT 22+00.49=
0+00.00 – LATERAL "1L"

CL INT 22+14.82=
0+00.00 – LATERAL "1S"

CL INT 23+75.74=
0+00.00–LATERAL "1U"

CL INT 24+37.85=
0+00.00 – LATERAL "1R"

CL INT 25+35.37=
0+00.00–LATERAL "1Q"

CL INT 27+51.06=
0+00.00 – LATERAL "1P"

HORZ. N71°45'04"E, 107.86'
LATERAL "1S" SEE SHEET 10

HORZ. N72°06'17"E, 13.12'
LATERAL "1T" SEE SHEET 10

ST. STA. 684+21.074
TG=1079.02, INV.=1070.79
NOT TO BE MAINTAINED BY LACFCD

RETAINING WALL
SEE SEPARATE PLAN

SEE GRADING PLAN

CL C.B. NO. 1Rb
ST. STA. 683+50.00
TC=1081.25, INV.=1080.91
W=7', V=6.56'

STA. 24+96.06
END TRANS.

CL MH NO. 3
STA 24+95.06
RIM=1082.93

HORZ. N66°04'48"E, 24.70'
LATERAL "1Q" SEE SHEET 11

HORZ. N66°04'48"E, 4.00'
LATERAL "1Q" SEE SHEET 11

CL C.B. NO. 1Qb
ST. STA. 683+20.508
TC=1084.78, INV.=1076.56
W=7', V=8.22'

ST. STA. 683+20.960
TG=1084.77, INV.=1081.18

ST. STA. 92+11.325 MMP
TC=1089.15, INV.=1082.21
W=7', V=6.89'

HORZ. N78°04'11"E, 61.87'
LATERAL "1P" SEE SHEET 10

CL C.B. NO. 1Pb
ST. STA. 682+55.033=
TC=1088.97, INV.=1081.87
W=10', V=7.22'

HORZ. N63°18'07"E, 85.65'
LATERAL "1P" SEE SHEET 10

CL MH NO. 4
STA. 27+75.00
RIM=1090.84
1071.10

STA. 24+86.22
BEGIN TRANS.

R/W
CL INT 27+51.06=
0+00.00 – LATERAL "1P"

PROPOSED 24" VCP SEWER (BY OTHERS)

EXIST. TERRACE DRAIN

78'
147'
37'
68'

EXIST. CONC. CHANNEL TO BE REMOVED

589

19+83.40 EC

20+43.47 BC

N25°20'5"W

499

22+36.79 PRC

LINE 'A'

R/W

CONTINUE BRIDGE DETAIL B-2, STD. PLAN 80-3 TO OUTLET STRUCTURE, REFERENCE SHEET 20. IN UNPAVED AREAS.

PROPOSED 20' WIDE EASEMENT TO LACFCD FOR COVERED STORM DRAIN, APPURTENANT STRUCTURES, AND INGRESS AND EGRESS PURPOSES. SEE SHEET 21 FOR DATA

CL MH NO. 2
STA. 21+80.43
RIM=1078.27

CL CB NO. 1Tc
ST. STA. 684+21.317
TC=1078.89, INV.=1067.91
W=14', V=10.98'

HORZ. N71°56'35"E, 4.01'
LATERAL "1T" SEE SHEET 10A

CONSTRUCTION NOTES

1. CONSTRUCT 18" RCP (D-LOAD PER PROFILE)
2. CONSTRUCT 24" RCP (D-LOAD PER PROFILE)
6. CONSTRUCT 10' x 8' RCB PER CALTRANS STD D80A ON SHEET 16.
7. CONSTRUCT 10' x 7' RCB PER CALTRANS STD D80A ON SHEET 16.
8. CONSTRUCT MANHOLE CONCRETE BOX STORM DRAIN PER APWA STD 323-1.
10. CONSTRUCT TRANSITION STRUCTURE SINGLE RCB TO SINGLE RCB PER APWA STD 341-1.
11. CONSTRUCT JUNCTION STRUCTURE PIPE TO RCB INLET < 30" PER APWA STD 334-1.
17. MODIFIED CURB OPENING CATCH BASIN PER APWA STD. 300-2. B=3'-8", Upstream ≥ 2'-6". (WxV PER PLAN). LOCAL DEPRESSION PER APWA STD. 313-1, CASE E. SEE STREET PLANS. INSTALL OCEAN-PRO CATCH BASIN INSERT, DEBRIS GATES, FILTER TRAYS, AND POLLUTANT FILTERS PER SCHEDULE ON SHEET 2.
18. GRATING CATCH BASIN PER STREET PLANS. NOT TO BE MAINTAINED BY LACFCD.
19. 24" DIA. PERFORATED CMP RISER WITH ASPHALT APRON PER GRADING PLAN. NOT TO BE MAINTAINED BY LACFCD.
28. 12" DIA. PVC, SCH40 PIPE PER GRADING PLAN. NOT TO BE MAINTAINED BY LACFCD.

PLAN
SCALE: 1" = 40'

40' 20' 0' 40' 80'
GRAPHIC SCALE

APPROVED FOR CONSTRUCTION BY:

ROBERT G. NEWMAN, P.E., L.S.
DIRECTOR OF PUBLIC WORKS
CITY OF SANTA CLARITA
DATE

Curve Data				
CURVE	RADIUS	LENGTH	TANGENT	DELTA
B	1640.36'	263.28'	131.93'	09°11'46"
C	1640.36'	193.32'	96.77'	06°45'08"
D	3636.48'	1612.61'	819.78'	25°24'29"

NO.	REVISIONS	REVISED BY	APPROVED BY	DATE
1	LACSD 24" VCP SEWER CROSSING	8/29/07		9.17.08
2	OLD ROAD SUPERELEVATION REVISION, SEE CALTRANS PLAN SET SHEET P-8. RELOCATED LATERAL "1R"	8/29/07		9.17.08
3	AS-BUILT REVISION FROM INSPECTOR FIELD NOTES	JMcEnroe 1/19/2010		2.22.10

REGISTERED PROFESSIONAL ENGINEER
JON M. AUSTIN
RCE 58726
Exp. 03/31/10
CIVIL
STATE OF CALIFORNIA

PROJECT ENGINEER 8/29/07 DATE

MetroPointe Engineers
3555 Harbor Gateway South, Suite A
Costa Mesa, CA 92626
(714) 438-1095

STORM DRAIN PLANS IN
CITY OF SANTA CLARITA MTD. No. 1764

CITY OF SANTA CLARITA

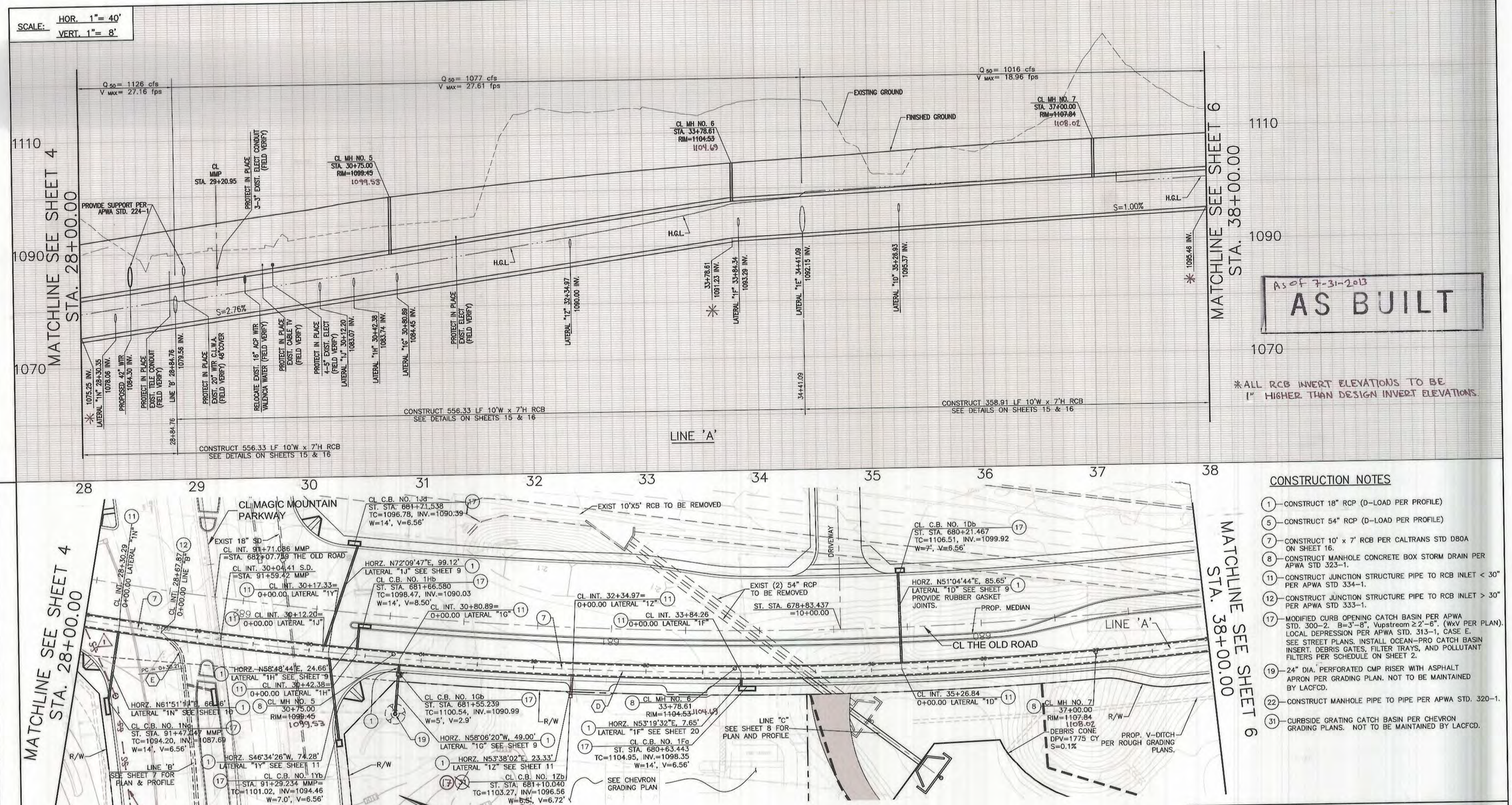
STORM DRAIN PLAN AND PROFILE
MTD NO. 1764
SYSTEM A
FROM STA. 18+00 TO STA. 28+00

DWG | SHEET 4A OF 21

Storm Drain - MTD 1764
Sheet 4A of 21
10/25/11
01986

DRAWING
DRAWING NUMBER
NUMBER
SAFCO PRODUCTS • NEW HOPE, MINNESOTA
REORDER BY PART NUMBER 6552

SCALE: HOR. 1"= 40'
VERT. 1"= 8'



Curve Data				
CURVE	RADIUS	LENGTH	TANGENT	DELTA
D	3636.46'	1612.61'	819.78'	25°24'29"
E	22.50'	15.46'	8.05'	39°22'14"

PLAN
SCALE: 1" = 40'
40' 20' 0' 40' 80'
GRAPHIC SCALE

APPROVED FOR CONSTRUCTION BY:
ROBERT G. NEWMAN, P.E., L.S.
DIRECTOR OF PUBLIC WORKS
CITY OF SANTA CLARITA
DATE 6-7-06

NO.	REVISIONS	REVISED BY	APPROVED BY	DATE
1	LACSD 24"VCP SEWER CROSSING	8/29/07		9-12-07

REGISTERED PROFESSIONAL ENGINEER JON M. AUSTIN RCE 58726 Exp. 03/31/07 CIVIL STATE OF CALIFORNIA
PROJECT ENGINEER 5-31-06 DATE

MetroPointe Engineers
3555 Harbor Gateway South, Suite A
Costa Mesa, CA 92626
(714) 438-1095

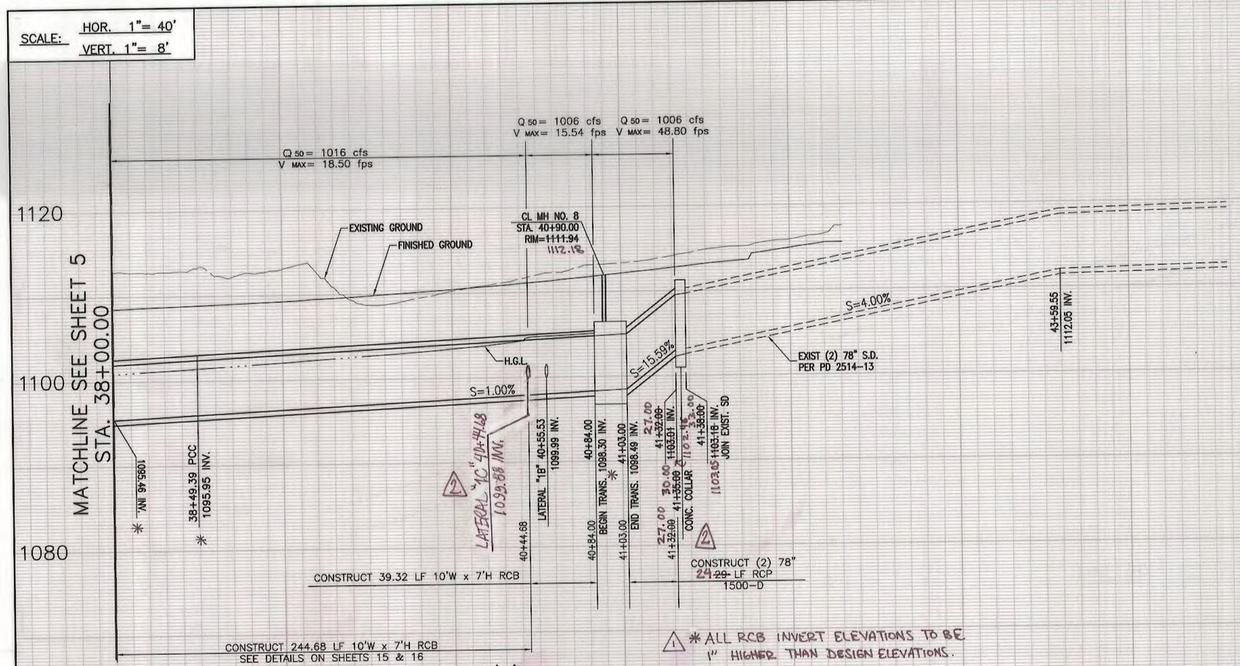
STORM DRAIN PLANS IN CITY OF SANTA CLARITA MTD. No. 1764
CITY OF SANTA CLARITA
STORM DRAIN PLAN AND PROFILE
MTD NO. 1764
SYSTEM A
FROM STA. 28+00 TO STA. 38+00
DWG SHEET 5 OF 21

CONSTRUCTION NOTES

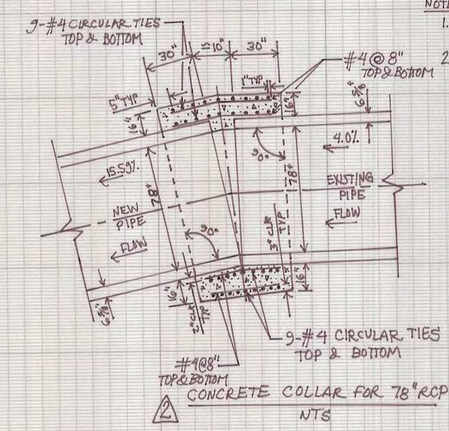
1. CONSTRUCT 18" RCP (D-LOAD PER PROFILE)
5. CONSTRUCT 54" RCP (D-LOAD PER PROFILE)
7. CONSTRUCT 10' x 7' RCB PER CALTRANS STD D80A ON SHEET 16.
8. CONSTRUCT MANHOLE CONCRETE BOX STORM DRAIN PER APWA STD 323-1.
11. CONSTRUCT JUNCTION STRUCTURE PIPE TO RCB INLET < 30" PER APWA STD 334-1.
12. CONSTRUCT JUNCTION STRUCTURE PIPE TO RCB INLET > 30" PER APWA STD 333-1.
17. MODIFIED CURB OPENING CATCH BASIN PER APWA STD. 300-2. B=3'-8", Vupstream ≥ 2'-6". (WxV PER PLAN). LOCAL DEPRESSION PER APWA STD. 313-1, CASE E. SEE STREET PLANS. INSTALL OCEAN-PRO CATCH BASIN INSERT. DEBRIS GATES, FILTER TRAYS, AND POLLUTANT FILTERS PER SCHEDULE ON SHEET 2.
19. 24" DIA. PERFORATED CMP RISER WITH ASPHALT APRON PER GRADING PLAN. NOT TO BE MAINTAINED BY LACFCD.
22. CONSTRUCT MANHOLE PIPE TO PIPE PER APWA STD. 320-1.
31. CURBSIDE GRATING CATCH BASIN PER CHEVRON GRADING PLANS. NOT TO BE MAINTAINED BY LACFCD.

DRAWING NUMBER
Storm Drain - MTD 1764
Sheet 5 of 21
01986
10/25/11

SCALE: HOR. 1"= 40'
VERT. 1"= 8'

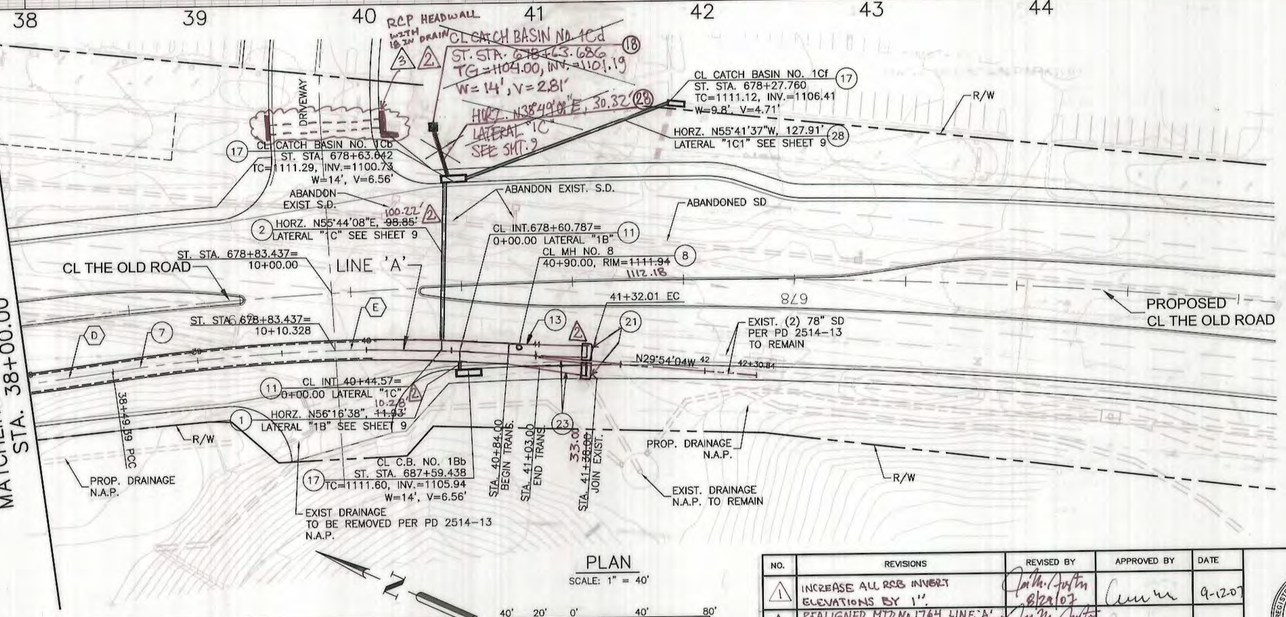


1 * ALL RCB INVERT ELEVATIONS TO BE 1' HIGHER THAN DESIGN ELEVATIONS.



2 CONCRETE COLLAR FOR 78" RCP
NTS

NOTES:
1. REINFORCEMENT SHALL CONFORM TO ASTM A 615 GRADE 40.
2. CONCRETE: 560-C-3250



PLAN
SCALE: 1" = 40'
40' 20' 0' 40' 80'
GRAPHIC SCALE

Curve Data				
CURVE	RADIUS	LENGTH	TANGENT	DELTA
D	3636.48'	1612.61'	819.78'	25°24'29"
E	~~1148.25'~~	~~282.61'~~	~~142.02'~~	~~14°06'07"~~
2	1000.00'	245.81'	123.53'	14°05'02"

APPROVED FOR CONSTRUCTION BY:
MH [signature] FOR RGN 6-7-06
ROBERT G. NEWMAN, P.E., L.S.
DIRECTOR OF PUBLIC WORKS
CITY OF SANTA CLARITA
DATE

NO.	REVISIONS	REVISED BY	APPROVED BY	DATE
1	INCREASE ALL RCB INVERT ELEVATIONS BY 1'.	[signature] 8/22/07	[signature]	9-12-07
2	REALIGNED MTD No. 1764 LINE 'A' TO MEET FIELD VERIFIED EXIST. 2-78" CONCRETE COLLAR. DETAIL FOR 78" RCP	[signature] 11-6-07	[signature]	11-8-07
3	AS-BUILT REVISION. LAT 1C EXT. NOT CONSTRUCTED.	[signature]	[signature]	2-23-10

REGISTERED PROFESSIONAL ENGINEER
JON M. AUSTIN
RCE 58726
Exp. 03/31/07
CIVIL
STATE OF CALIFORNIA
[signature] 5-31-06
PROJECT ENGINEER DATE

As of 7-31-2013
AS BUILT

CONSTRUCTION NOTES

1. CONSTRUCT 18" RCP (D-LOAD PER PROFILE)
2. CONSTRUCT 24" RCP (D-LOAD PER PROFILE)
7. CONSTRUCT 10' x 7' RCB PER CALTRANS STD D80A ON SHEET 16.
11. CONSTRUCT JUNCTION STRUCTURE PIPE TO RCB INLET < 30" PER APWA STD 334-1.
13. CONSTRUCT TRANSITION STRUCTURE DOUBLE RCP TO SINGLE RCB PER MODIFIED APWA STD 342-1 & 343-1 PER DETAIL 1 SHEET 12.
17. MODIFIED CURB OPENING CATCH BASIN PER APWA STD. 300-2, B=3'-8", Vupstream ≥ 2'-6". (WxV PER PLAN). LOCAL DEPRESSION PER APWA STD. 313-1, CASE E. SEE STREET PLANS. INSTALL OCEAN-PRO CATCH BASIN INSERT. DEBRIS GATES, FILTER TRAYS, AND POLLUTANT FILTERS PER SCHEDULE ON SHEET 2.
18. GRATING CATCH BASIN PER STREET PLANS. NOT TO BE MAINTAINED BY LACFCD.
21. CONSTRUCT CONCRETE COLLAR FOR RCP PER APWA ~~STD. 380-2:~~ DETAIL HEREON. 2
23. CONSTRUCT 78" RCP (D-LOAD PER PROFILE)
28. 12" PVC, SCH40 PER GRADING PLANS. NOT TO BE MAINTAINED BY LACFCD.

MetroPointe Engineers
3555 Harbor Gateway South, Suite A
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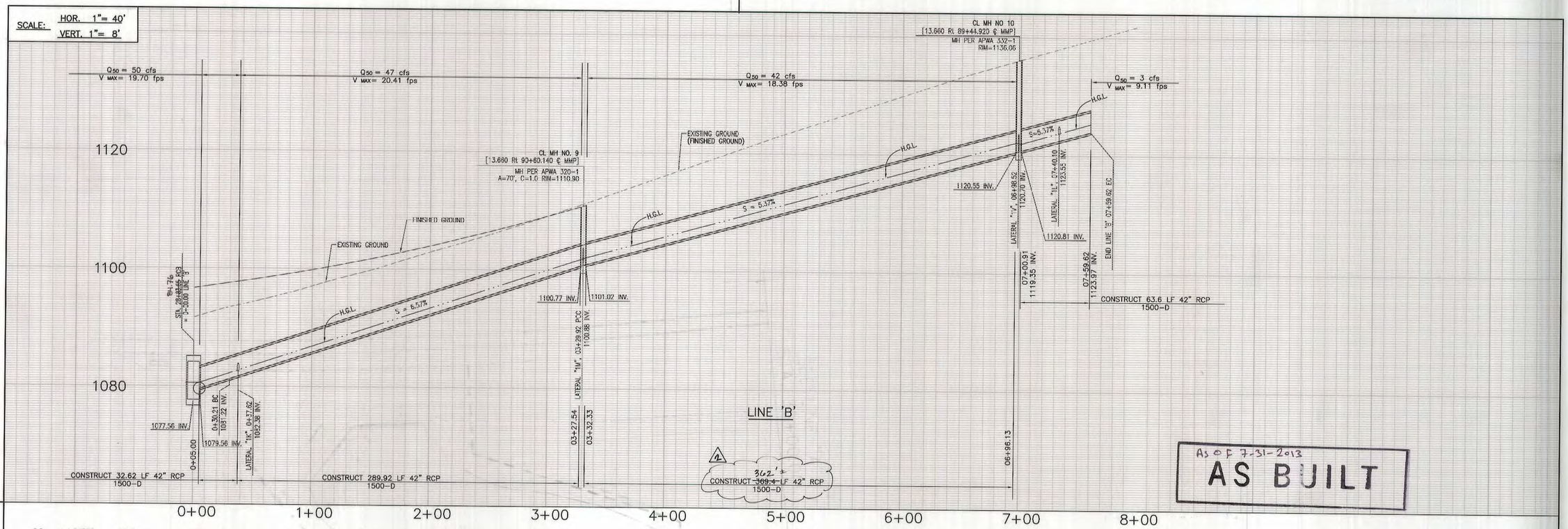
STORM DRAIN PLANS IN
CITY OF SANTA CLARITA MTD. No. 1764
CITY OF SANTA CLARITA

STORM DRAIN PLAN AND PROFILE
MTD NO. 1764
SYSTEM A
FROM STA. 38+00 TO 41+38.00

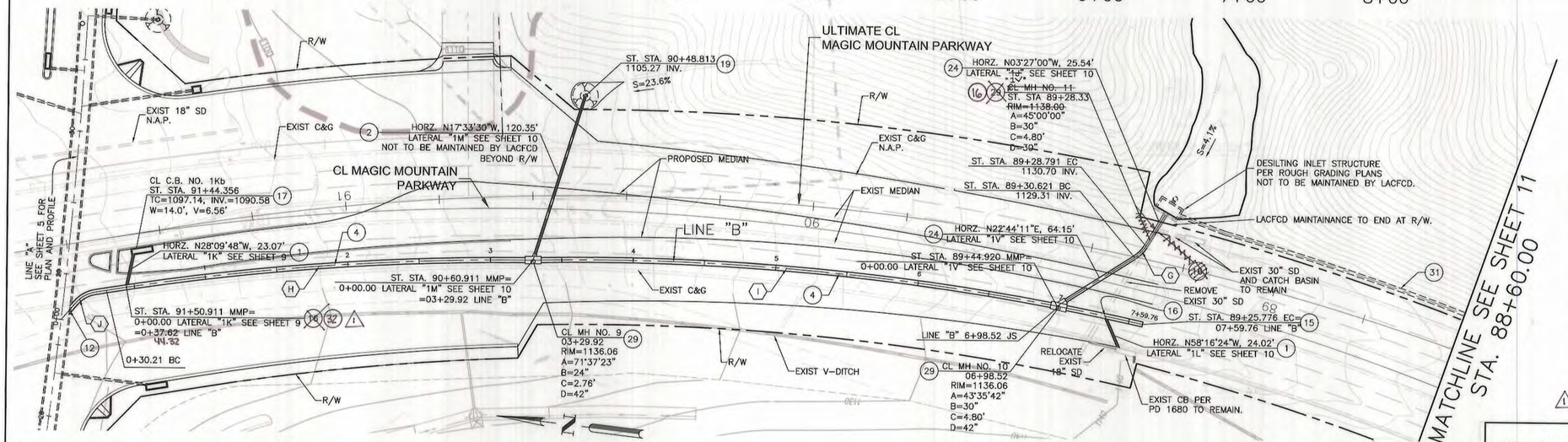
DWG | SHEET 6 OF 21

DRAWING NUMBER
SAFCO PRODUCTS • NEW HOPE, MINNESOTA
REORDER BY PART NUMBER 6502
Storm Drain - MTD 1764
Sheet 6 of 21
01986
NUMBER

SCALE: HOR. 1"= 40'
VERT. 1"= 8'



AS OF 7-31-2013
AS BUILT



CONSTRUCTION NOTES

1. CONSTRUCT 18" RCP (D-LOAD PER PROFILE)
2. CONSTRUCT 24" RCP (D-LOAD PER PROFILE)
4. CONSTRUCT 42" RCP (D-LOAD PER PROFILE)
12. CONSTRUCT JUNCTION STRUCTURE PIPE TO RCB INLET > 30" PER APWA STD 333-1.
15. CONSTRUCT CONCRETE BULKHEAD PER DETAIL 4 ON SHEET 12.
16. CONSTRUCT JUNCTION STRUCTURE PIPE TO PIPE PER APWA STD. 332-1.
17. MODIFIED CURB OPENING CATCH BASIN PER APWA STD. 300-2. B=3'-8", Vupstream 2'-6". (WxV PER PLAN). LOCAL DEPRESSION PER APWA STD. 313-1, CASE E. SEE STREET PLANS. INSTALL OCEAN-PRO CATCH BASIN INSERT, DEBRIS GATES, FILTER TRAYS, AND POLLUTANT FILTERS PER SCHEDULE ON SHEET 2.
19. 24" DIA. PERFORATED CMP RISER WITH ASPHALT APRON PER GRADING PLAN. NOT TO ME MAINTAINED BY LACFCD.
20. DESILTING INLET STRUCTURE PER GRADING PLANS.
24. CONSTRUCT 30" RCP (D-LOAD PER PROFILE)
29. CONSTRUCT MANHOLE PIPE TO PIPE PER APWA STD. 322-1.
31. 30" PVC, SCH40 PER GRADING PLANS. NOT TO BE MAINTAINED BY LACFCD.
1 32. CONSTRUCT JUNCTION STRUCTURE PIPE TO PIPE PER APWA STD. 331-2.

Curve Data

CURVE	RADIUS	LENGTH	TANGENT	DELTA
G	25.00'	11.330'	5.764'	25°58'01"
H	1764.00'	299.715'	150.219'	09°44'06"
I	1754.929'	429.836'	215.999'	14°02'01"
J	22.50'	15.46'	8.05'	39°22'14"
K	11.25'	5.63'	2.87'	28°39'21"
L	1830.24'	414.77'	208.28'	12°59'04"

PLAN
SCALE: 1" = 40'
40' 20' 0' 40' 80'
GRAPHIC SCALE

APPROVED FOR CONSTRUCTION BY:
ROBERT G. NEWMAN, P.E., L.S.
DIRECTOR OF PUBLIC WORKS
CITY OF SANTA CLARITA
DATE 6-7-06

NO.	REVISIONS	REVISED BY	APPROVED BY	DATE
1	REVISED JUNCTION STRUCTURE	8/29/07		9-12-07
2	AS-BUILT REVISION FROM INSPECTOR FIELD NOTES	1/20/2010		2-22-10

REGISTERED PROFESSIONAL ENGINEER JON M. AUSTIN RCE 58726 Exp. 03/31/07 CIVIL STATE OF CALIFORNIA
PROJECT ENGINEER 5-31-06 DATE

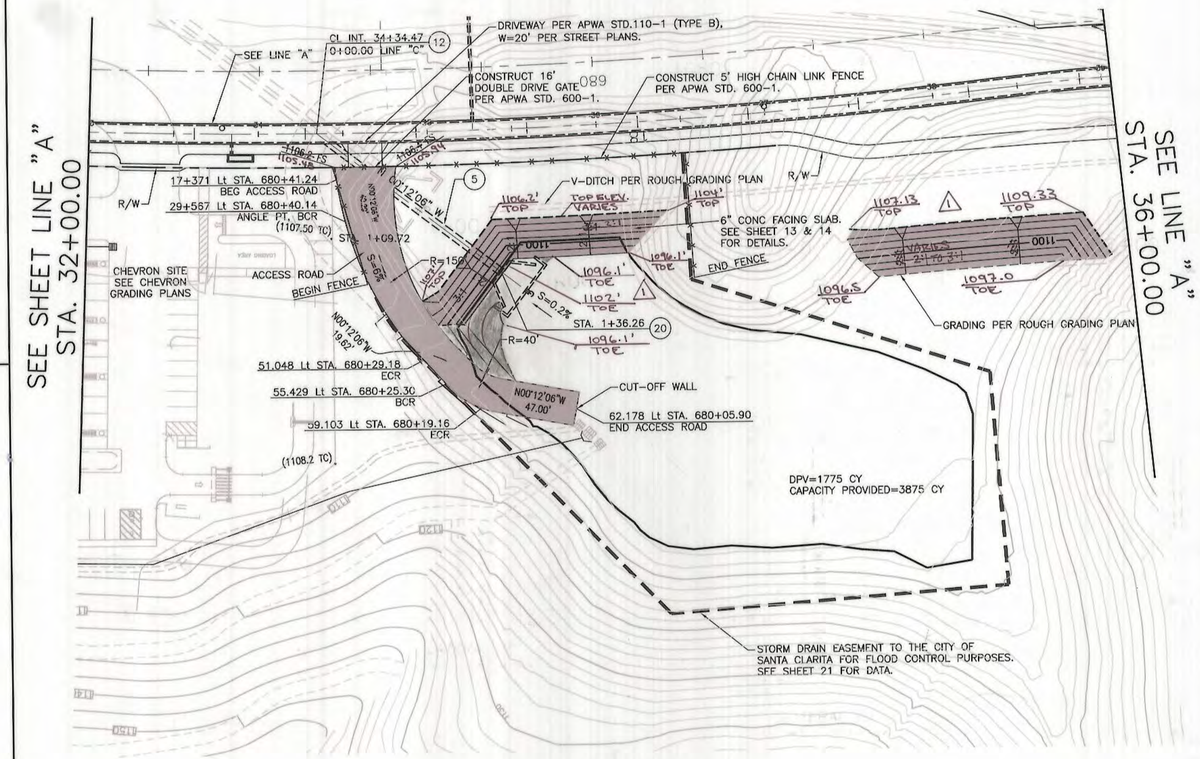
MetroPointe Engineers
3555 Harbor Gateway South, Suite A
Costa Mesa, CA 92626
(714) 438-1095

STORM DRAIN PLANS IN
CITY OF SANTA CLARITA MTD. No. 1764
CITY OF SANTA CLARITA
STORM DRAIN PLAN AND PROFILE
MTD NO. 1764
SYSTEM "B"

DWG | SHEET 7 OF 21

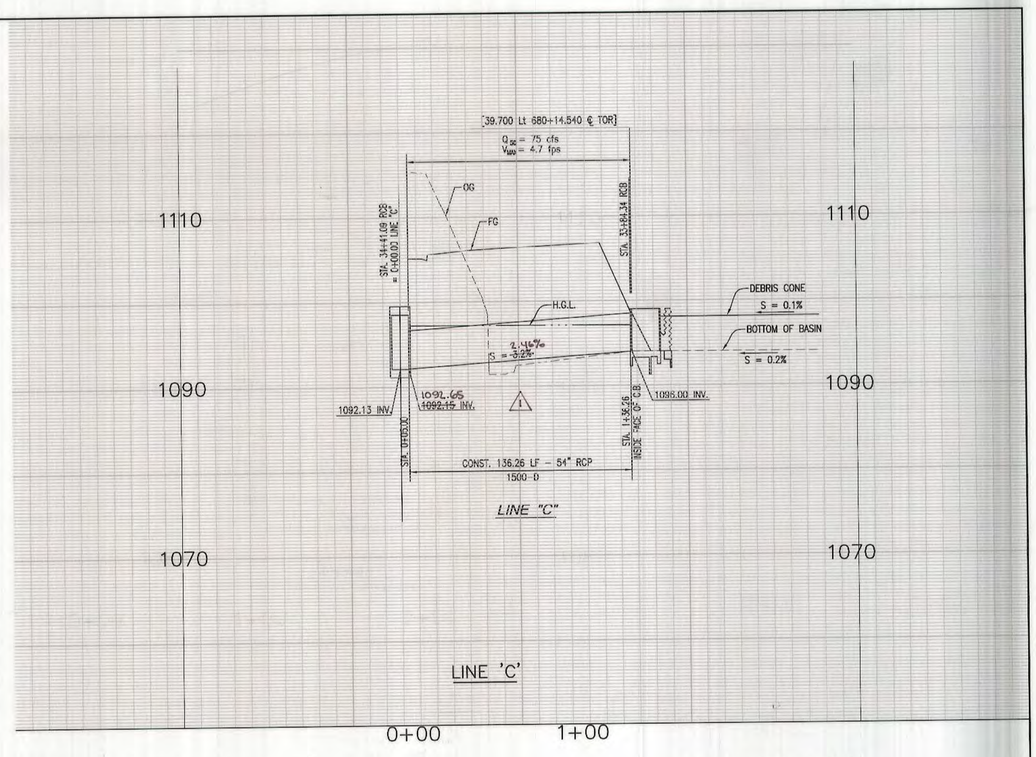
DRAWING
DRAWING NUMBER
SAFCO PRODUCTS • NEW HOPE, MINNESOTA
REORDER BY PART NUMBER 6002
Storm Drain - MTD 1764
Sheet 7 of 21
01986
NUMBER

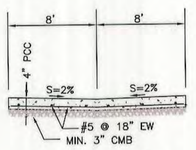
SCALE: HOR. 1"= 40'
VERT. 1"= 8'



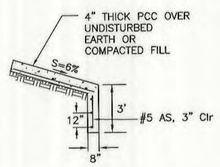
PLAN
SCALE: 1" = 40'

GRAPHIC SCALE 40' 20' 0' 40' 80'





ACCESS ROAD DETAIL
NO SCALE



ACCESS ROAD CUT-OFF WALL
NO SCALE

CONSTRUCTION NOTES

(5) — CONSTRUCT 54" RCP (D-LOAD PER PROFILE)
(12) — CONSTRUCT JUNCTION STRUCTURE PIPE TO RCB INLET > 30" PER APWA STD 333-1.
(20) — CONSTRUCT DESILTING INLET STRUCTURE PER DETAIL H ON SHEETS 13 & 14.

AS OF 7-31-2013
AS BUILT

Curve Data				
CURVE	RADIUS	LENGTH	TANGENT	DELTA
D	3636.46'	1612.61'	819.78'	25°24'29"
E	22.50'	15.46'	8.05'	39°22'14"

APPROVED FOR CONSTRUCTION BY:

ROBERT G. NEWMAN, P.E., L.S.
DIRECTOR OF PUBLIC WORKS
CITY OF SANTA CLARITA
DATE 6-7-06

NO.	REVISIONS	REVISED BY	APPROVED BY	DATE
1	CORRECTIONS DUE TO FIELD VERIFIED ELEVATIONS.	8/22/07		9-17-07

REGISTERED PROFESSIONAL ENGINEER JON M. AUSTIN RCE 58726 Exp. 03/31/07 CIVIL STATE OF CALIFORNIA

PROJECT ENGINEER 5-31-06 DATE

MetroPointe Engineers
3555 Harbor Gateway South, Suite A
Costa Mesa, CA 92626
(714) 438-1095

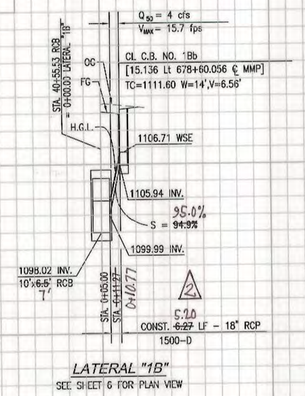
STORM DRAIN PLANS IN CITY OF SANTA CLARITA MTD. No. 1764
CITY OF SANTA CLARITA

STORM DRAIN PLAN AND PROFILE
MTD NO. 1764
SYSTEM C
FROM STA. 00+00 TO STA. 00+00

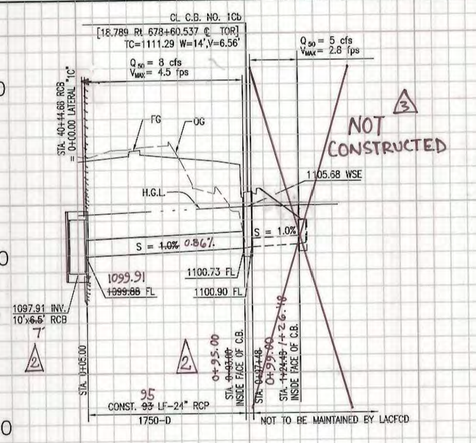
DWG | SHEET 8 OF 21

DRAWING NUMBER
SAFCO PRODUCTS • NEW HOPE, MINNESOTA
REORDER BY PART NUMBER 6562
Storm Drain - MTD 1764
Sheet 8 of 21
01986
10/25/11
NUMBER

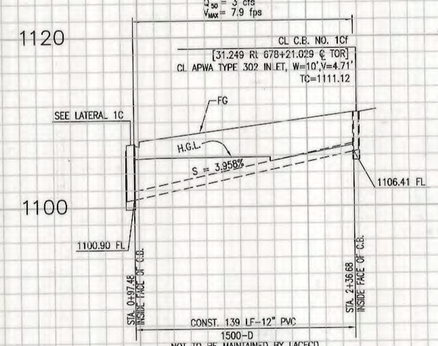
SCALE: HOR. 1"= 40'
VERT. 1"= 8'



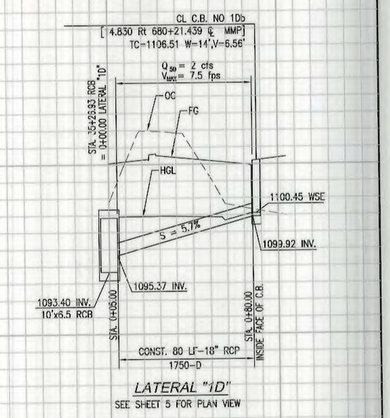
LATERAL "1B"
SEE SHEET 6 FOR PLAN VIEW



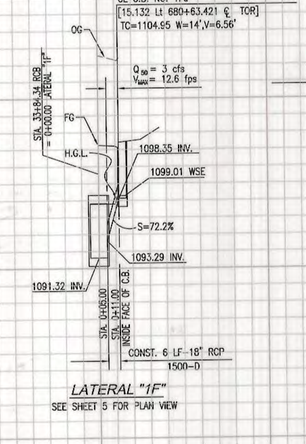
LATERAL "1C"
SEE SHEET 6 FOR PLAN VIEW



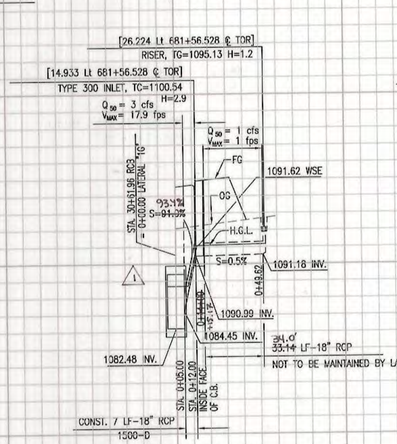
LATERAL "1C1"
SEE SHEET 6 FOR PLAN VIEW



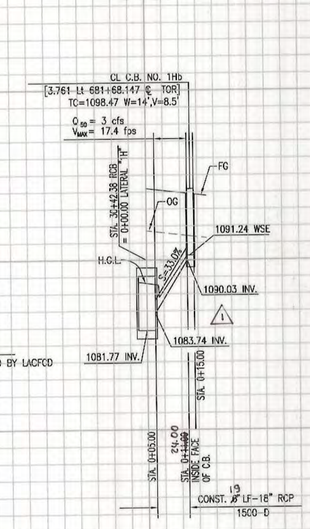
LATERAL "1D"
SEE SHEET 5 FOR PLAN VIEW



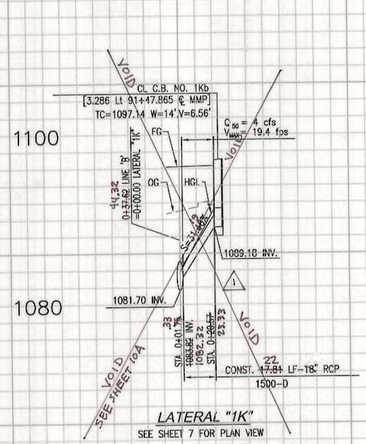
LATERAL "1F"
SEE SHEET 5 FOR PLAN VIEW



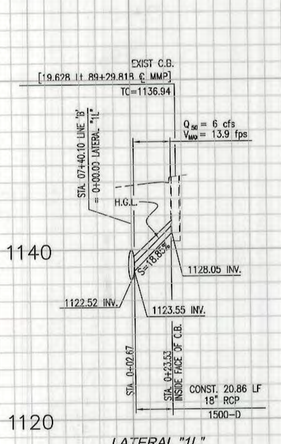
LATERAL "1G"
SEE SHEET 5 FOR PLAN VIEW



LATERAL "1H"
SEE SHEET 5 FOR PLAN VIEW



LATERAL "1K"
SEE SHEET 7 FOR PLAN VIEW



LATERAL "1L"
SEE SHEET 7 FOR PLAN VIEW

As of 7-31-2013
AS BUILT

APPROVED FOR CONSTRUCTION BY:

ROBERT G. NEWMAN, P.E., L.S.
DIRECTOR OF PUBLIC WORKS
CITY OF SANTA CLARITA

6-7-06
DATE

NO.	REVISIONS	REVISED BY	APPROVED BY	DATE
1	REVISED LATERALS	6/29/07		9-12-07
2	REALIGNED MTD NO.1764 TO MEET FIELD VERIFIED LOCATIONS OF 2-78" RCPS.	11-6-07		11-9-07
3	REVISED LAT "1C" - BACK OF CONNECTION - NOT CONSTRUCTED	2/22/10		2-23-10

JON M. AUSTIN
RCE 58726
Exp. 03/31/07
CIVIL
STATE OF CALIFORNIA

Jon M. Austin 5-31-06
PROJECT ENGINEER DATE

MetroPointe Engineers
3555 Harbor Gateway South, Suite A
Costa Mesa, CA 92626
(714) 438-1095

STORM DRAIN PLANS IN
CITY OF SANTA CLARITA MTD NO. 1764

CITY OF SANTA CLARITA

STORM DRAIN PLAN AND PROFILE

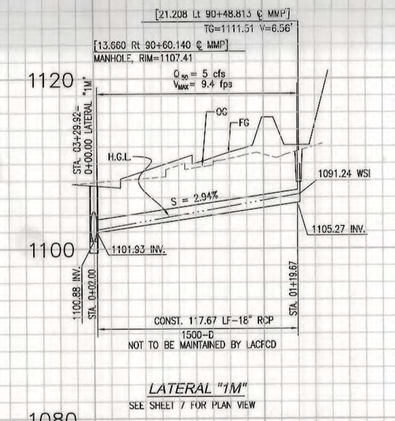
MTD NO. 1764

LATERALS

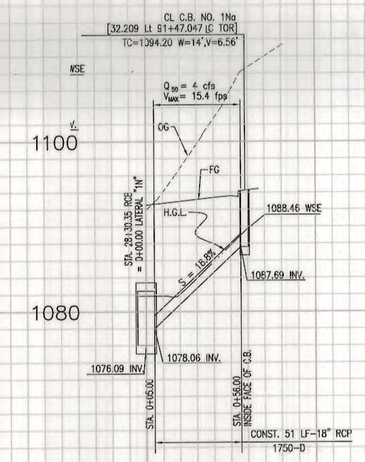
DWG | SHEET 9 OF 21

DRAWING
DRAWING NUMBER
NUMBER
BAFCO PRODUCTS • NEW HOPE, MINNESOTA
REORDER BY PART NUMBER 6552
Storm Drain - MTD 1764
Sheet 9 of 21
01986
10/25/11

SCALE: HOR. 1"= 40'
VERT. 1"= 8'

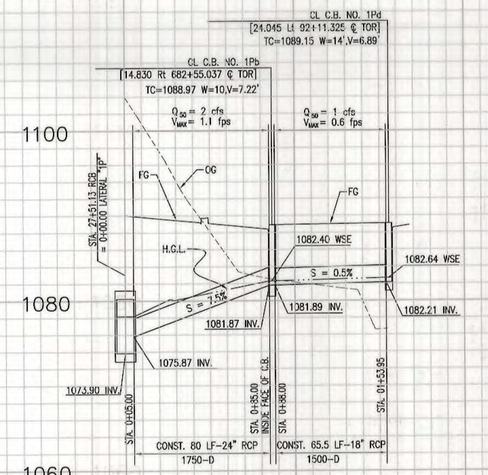


LATERAL "1M"
SEE SHEET 7 FOR PLAN VIEW



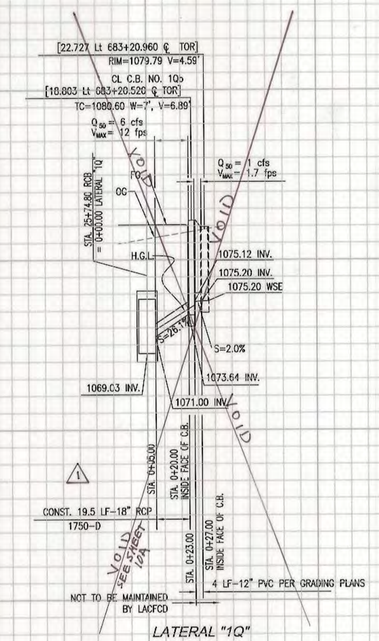
LATERAL "1N"
SEE SHEET 5 FOR PLAN VIEW

0+00 1+00



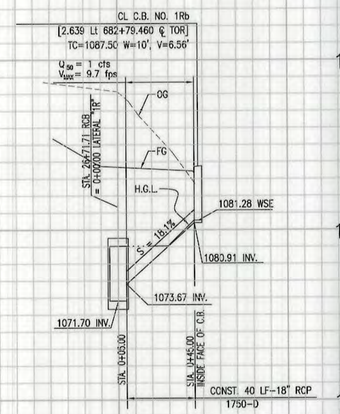
LATERAL "1P"
SEE SHEET 4 FOR PLAN VIEW

0+00 1+00



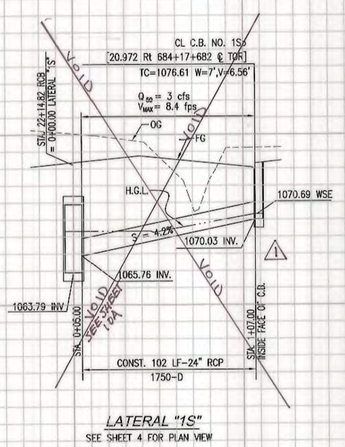
LATERAL "1Q"

0+00 1+00



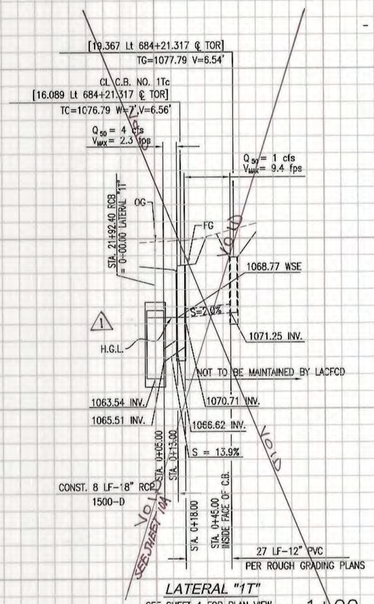
LATERAL "1R"
SEE SHEET 4 FOR PLAN VIEW

0+00 1+00



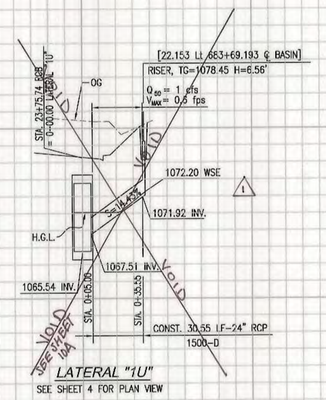
LATERAL "1S"
SEE SHEET 4 FOR PLAN VIEW

0+00 1+00



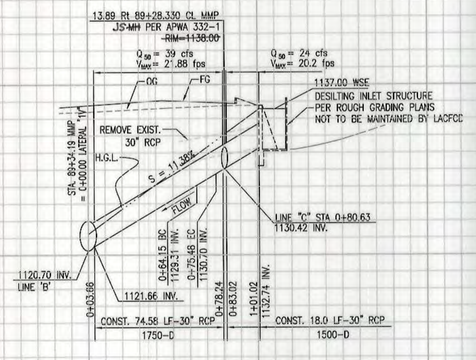
LATERAL "1T"
SEE SHEET 4 FOR PLAN VIEW

0+00 1+00



LATERAL "1U"
SEE SHEET 4 FOR PLAN VIEW

0+00 1+00



LATERAL "1V"

0+00 1+00

AS OF 7-31-2013
AS BUILT

APPROVED FOR CONSTRUCTION BY:

ROBERT G. NEWMAN, P.E., L.S.
DIRECTOR OF PUBLIC WORKS
CITY OF SANTA CLARITA

DATE 6-7-06

NO.	REVISIONS	REVISED BY	APPROVED BY	DATE
1	REVISED LATERALS	8/29/07		9-12-07

REGISTERED PROFESSIONAL ENGINEER
JON M. AUSTIN
RCE 58726
Exp. 03/31/07
CIVIL
STATE OF CALIFORNIA

PROJECT ENGINEER 5-31-06 DATE

MetroPointe Engineers
3555 Harbor Gateway South, Suite A
Costa Mesa, CA 92626
(714) 438-1095

STORM DRAIN PLANS IN
CITY OF SANTA CLARITA MTD NO. 1764

CITY OF SANTA CLARITA

STORM DRAIN PLAN AND PROFILE

MTD NO. 1764

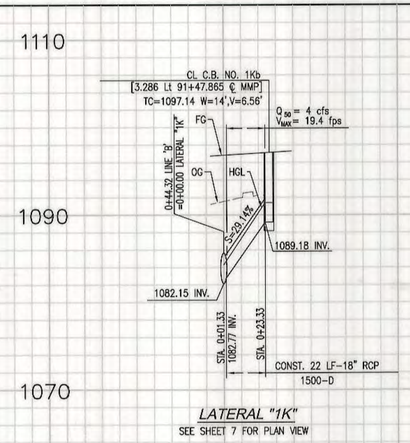
LATERALS

DWG

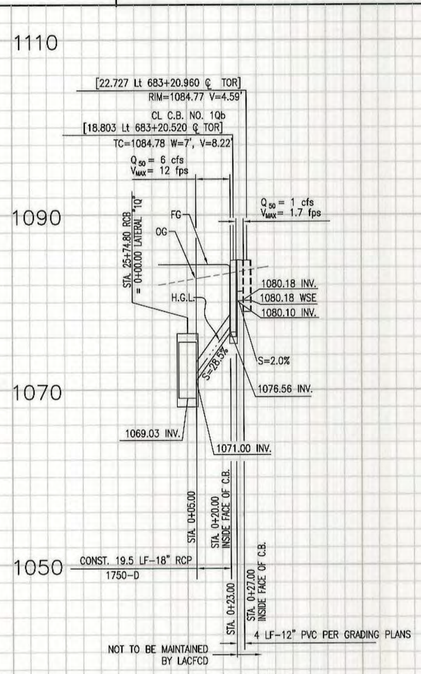
SHEET 10 OF 21

DRAWING NUMBER
SAFCO PRODUCTS • NEW HOPE, MINNESOTA
REORDER BY PART NUMBER 8582
Storm Drain - MTD 1764
Sheet 10 of 21
01986
10/25/11
NUMBER
NEW HOPE, MINNESOTA
IT NUMBER 8582

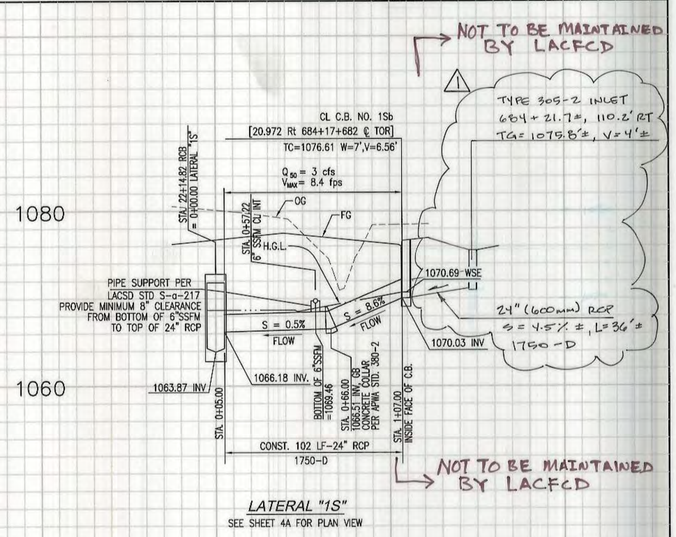
SCALE: HOR. 1"= 40'
VERT. 1"= 8'



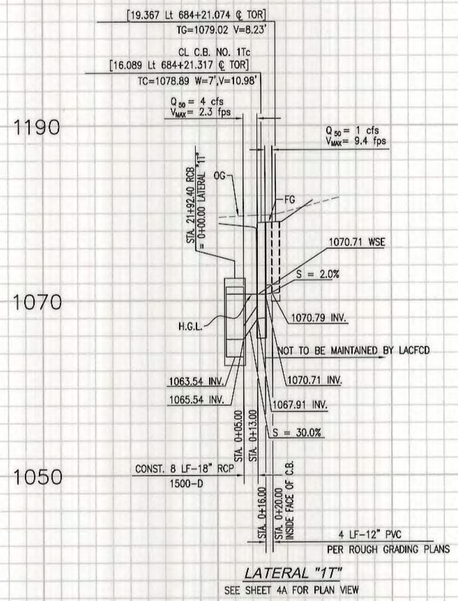
LATERAL "1K"
SEE SHEET 7 FOR PLAN VIEW



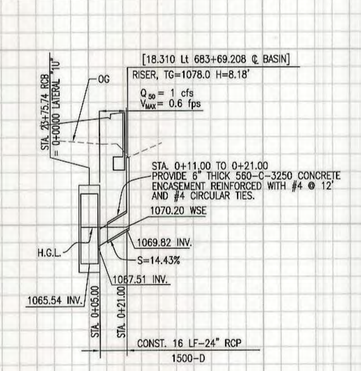
LATERAL "1Q"
SEE SHEET 4A FOR PLAN VIEW



LATERAL "1S"
SEE SHEET 4A FOR PLAN VIEW



LATERAL "1T"
SEE SHEET 4A FOR PLAN VIEW



LATERAL "1U"
SEE SHEET 4A FOR PLAN VIEW

AS of 7-31-2013
AS BUILT

NO.	REVISIONS	REVISED BY	APPROVED BY	DATE
1	AS-BUILT REVISION FROM INSPECTOR FIELD NOTES	McClure 1/19/2010		2.23.10

APPROVED FOR CONSTRUCTION BY:
ROBERT G. NEWMAN, P.E., L.S.
DIRECTOR OF PUBLIC WORKS
CITY OF SANTA CLARITA
DATE

REGISTERED PROFESSIONAL ENGINEER
JON M. AUSTIN
RCE 58726
Exp. 03/31/10
CIVIL
STATE OF CALIFORNIA
PROJECT ENGINEER
DATE 8/23/07

MetroPointe Engineers
3555 Harbor Gateway South, Suite A
Costa Mesa, CA 92626
(714) 438-1095

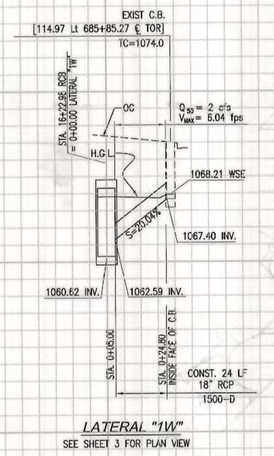
STORM DRAIN PLANS IN
CITY OF SANTA CLARITA MTD NO. 1764
CITY OF SANTA CLARITA

STORM DRAIN PLAN AND PROFILE
MTD NO. 1764
LATERALS

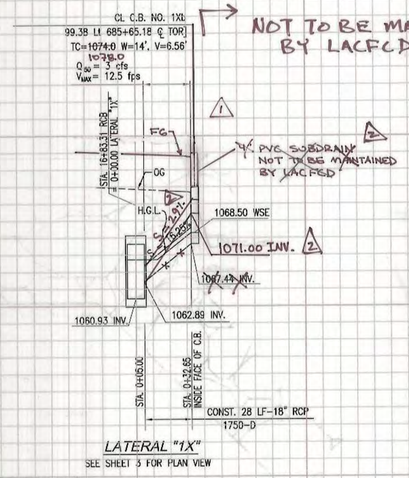
DWG | SHEET 10A OF 21

DRAWING
DRAWING NUMBER
NUMBER
Storm Drain - MTD 1764
Sheet 10A of 21
10/25/11
01986

SCALE: HOR. 1"= 40'
VERT. 1"= 8'



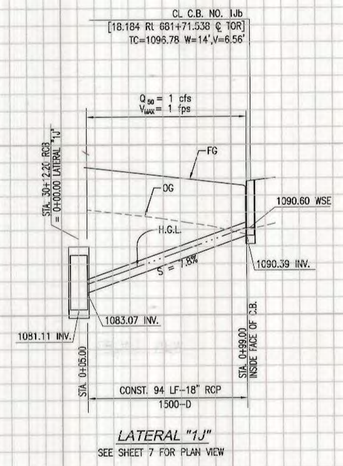
LATERAL "1W"
SEE SHEET 3 FOR PLAN VIEW



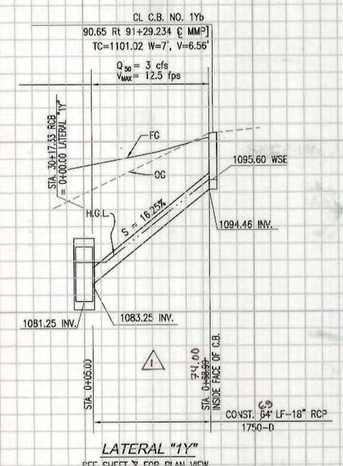
NOT TO BE MAINTAINED BY LACFCD

1. 4" PVC SUBDRAIN NOT TO BE MAINTAINED BY LACFCD

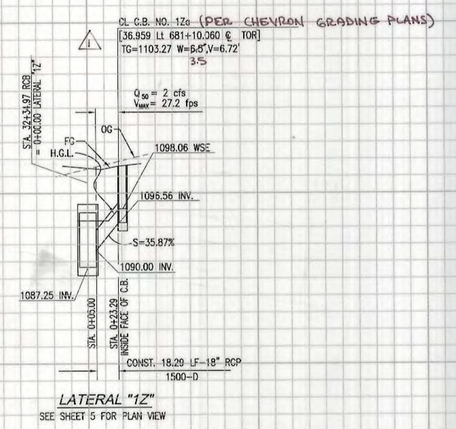
LATERAL "1X"
SEE SHEET 3 FOR PLAN VIEW



LATERAL "1J"
SEE SHEET 7 FOR PLAN VIEW



LATERAL "1Y"
SEE SHEET 5 FOR PLAN VIEW



LATERAL "1Z"
SEE SHEET 5 FOR PLAN VIEW

AS BUILT
As of 7-31-2013

NO.	REVISIONS	REVISED BY	APPROVED BY	DATE
1	REVISED LATERALS	8/29/07		9-12-07
2	REVISED LAT "1X"	2/22/10		2-23-10

APPROVED FOR CONSTRUCTION BY:
ROBERT G. NEWMAN, P.E., L.S.
DIRECTOR OF PUBLIC WORKS
CITY OF SANTA CLARITA
DATE 6-7-00

REGISTERED PROFESSIONAL ENGINEER
JON M. AUSTIN
RCE 58726
Exp. 03/31/07
CIVIL
STATE OF CALIFORNIA
PROJECT ENGINEER 5-31-06
DATE

MetroPointe Engineers
3555 Harbor Gateway South, Suite A
Costa Mesa, CA 92626
(714) 438-1095

STORM DRAIN PLANS IN
CITY OF SANTA CLARITA MTD NO. 1764

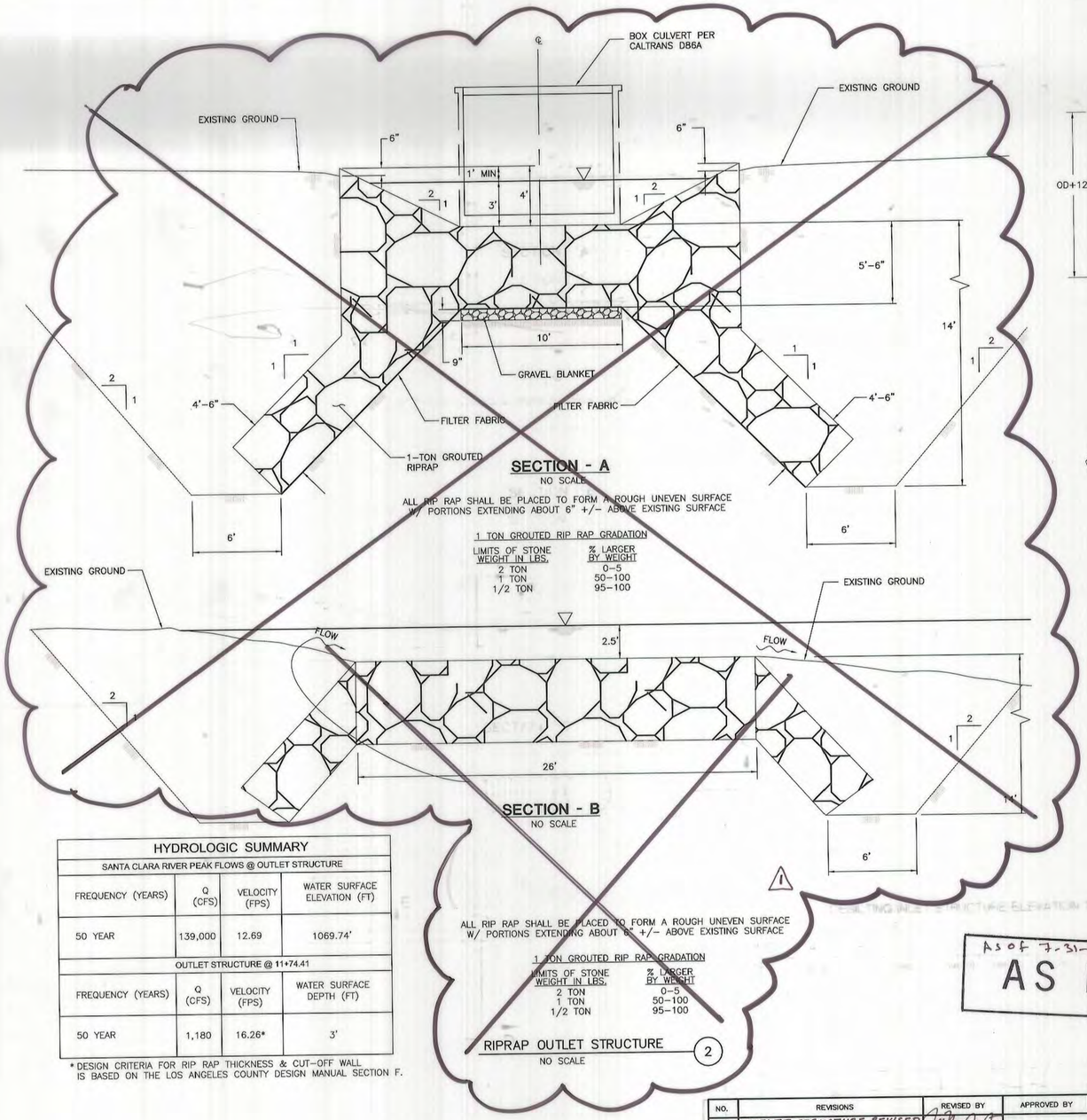
CITY OF SANTA CLARITA

STORM DRAIN PLAN AND PROFILE
MTD NO. 1764
LATERALS

DWG | SHEET 11 OF 21

DRAWING NUMBER
SAFCO PRODUCTS • NEW HOPE, MINNESOTA
REORDER BY PART NUMBER 6552

Storm Drain - MTD 1764
Sheet 11 of 21
10/25/11
01986



SECTION - A

NO SCALE

ALL RIP RAP SHALL BE PLACED TO FORM A ROUGH UNEVEN SURFACE W/ PORTIONS EXTENDING ABOUT 6" +/- ABOVE EXISTING SURFACE

1 TON GROUTED RIP RAP GRADATION

LIMITS OF STONE WEIGHT IN LBS.	% LARGER BY WEIGHT
2 TON	0-5
1 TON	50-100
1/2 TON	95-100

SECTION - B

NO SCALE

ALL RIP RAP SHALL BE PLACED TO FORM A ROUGH UNEVEN SURFACE W/ PORTIONS EXTENDING ABOUT 6" +/- ABOVE EXISTING SURFACE

1 TON GROUTED RIP RAP GRADATION

LIMITS OF STONE WEIGHT IN LBS.	% LARGER BY WEIGHT
2 TON	0-5
1 TON	50-100
1/2 TON	95-100

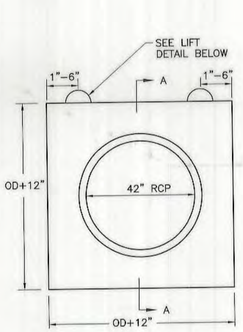
RIPRAP OUTLET STRUCTURE (2)

NO SCALE

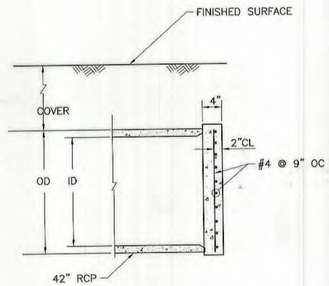
HYDROLOGIC SUMMARY

SANTA CLARA RIVER PEAK FLOWS @ OUTLET STRUCTURE			
FREQUENCY (YEARS)	Q (CFS)	VELOCITY (FPS)	WATER SURFACE ELEVATION (FT)
50 YEAR	139,000	12.69	1069.74'
OUTLET STRUCTURE @ 11+74.41			
FREQUENCY (YEARS)	Q (CFS)	VELOCITY (FPS)	WATER SURFACE DEPTH (FT)
50 YEAR	1,180	16.26*	3'

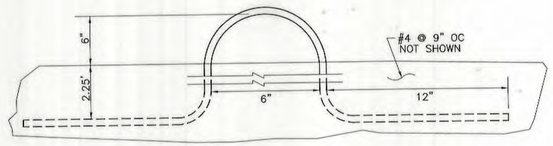
* DESIGN CRITERIA FOR RIP RAP THICKNESS & CUT-OFF WALL IS BASED ON THE LOS ANGELES COUNTY DESIGN MANUAL SECTION F.



FRONT VIEW



SECTION A-A

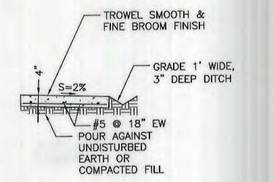


LIFT DETAIL

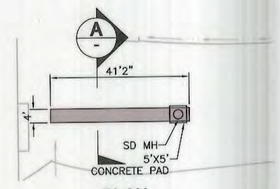
NOTES: 1. ALL REINFORCING STEEL SHALL BE CENTERED IN BULKHEAD. HORIZONTAL #4 BARS SHALL BE PLACED TOWARDS OUTSIDE FACE OF BULKHEAD PER DETAIL.
2. CONCRETE SHALL BE CLASS 520-C-2500 PER SECTION 201 STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, CURED WITH TYPE 1-D CURING COMPOUND.
3. LIFTS SHALL BE WOVEN STEEL CABLE WITH MINIMUM 4" DIAMETER. WEAVE CABLE THROUGH HORIZONTAL #4 BARS. COAT EXPOSED PORTION OF CABLE WITH BITUMINOUS PAINT PRIOR TO BACKFILLING TRENCH.

CONCRETE BULKHEAD (4)

NO SCALE



SECTION A-A

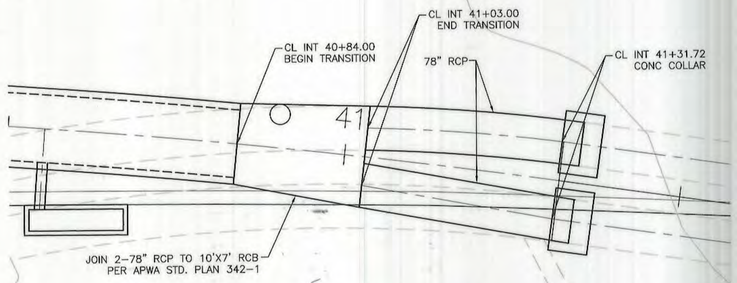


PLAN

NOTES: 1. WEAKENED PLANE JOINTS SHALL BE INSTALLED AT A MAXIMUM SPACING OF 10 FT ON CENTER.
2. CONCRETE SHALL BE CLASS 520-C-2500 PER SECTION 201 STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, CURED WITH TYPE 1-D CURING COMPOUND.

CONCRETE ACCESS WALKWAY (3)

SCALE: 1:20



CONSTRUCTION NOTES:

1. CONCRETE THICKNESS SHALL BE OF DOUBLE RCB PER CALTRANS STD. PLAN D80C AND D81 SEE SHEETS 16 AND 17.
SNAP - 7'
HEIGHT = 7'

STORM DRAIN TRANSITION (1)

SCALE: 1:20

As of 7-31-2013
AS BUILT

NO.	REVISIONS	REVISED BY	APPROVED BY	DATE
1	OUTLET STRUCTURE REVISED PER SHEET 12A. (VOID DETAIL 2)	9-19-06		2-50

APPROVED FOR CONSTRUCTION BY:

ROBERT G. NEWMAN, P.E., L.S.
DIRECTOR OF PUBLIC WORKS
CITY OF SANTA CLARITA

FOR RGN 6-7-06
DATE

REGISTERED PROFESSIONAL ENGINEER JON M. AUSTIN RCE 58726 Exp. 03/31/07 CIVIL STATE OF CALIFORNIA

PROJECT ENGINEER 5-31-06
DATE

MetroPointe Engineers
3555 Harbor Gateway South, Suite A
Costa Mesa, CA 92626
(714) 438-1095

STORM DRAIN PLANS IN
CITY OF SANTA CLARITA MTD. No. 1764
CITY OF SANTA CLARITA

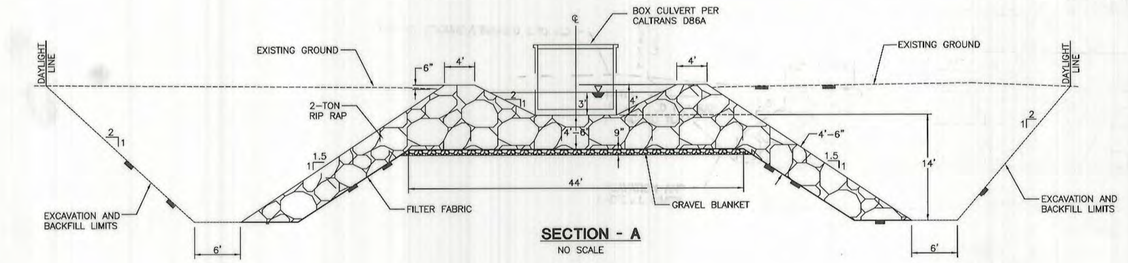
STORM DRAIN PLAN AND PROFILE
MTD NO. 1764
DETAILS

DWG | SHEET 12 OF 21

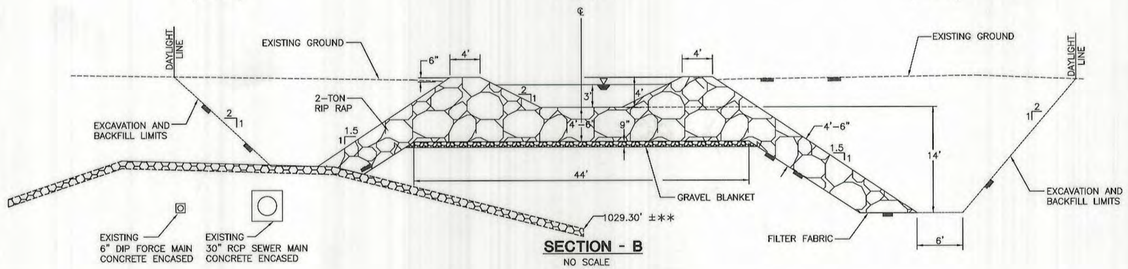
DRAWING NUMBER
SAFCO PRODUCTS • NEW HOPE, MINNESOTA
REORDER BY PART NUMBER 6552

NUMBER
SAFCO PRODUCTS • NEW HOPE, MINNESOTA
REORDER BY PART NUMBER 6552

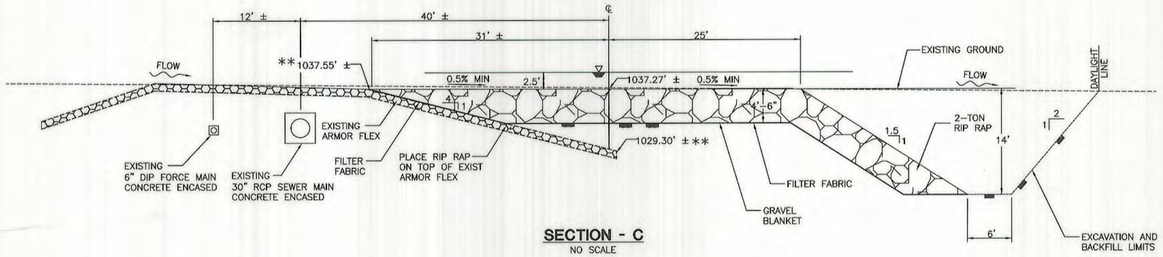
Storm Drain - MTD 1764
Sheet 12 of 21
10/25/11
01986



SECTION - A
NO SCALE



SECTION - B
NO SCALE



SECTION - C
NO SCALE

ALL GROUTED RIP RAP SHALL BE PLACED TO FORM A ROUGH UNEVEN SURFACE
W/ PORTIONS EXTENDING ABOUT 6" +/- ABOVE EXISTING SURFACE

RIPRAP OUTLET STRUCTURE (2)
NO SCALE

AS BUILT

NO.	REVISIONS	REVISED BY	APPROVED BY	DATE
1	Outlet Structure Revised per sheet 12A.	9-19-06		4-5-07

APPROVED FOR CONSTRUCTION BY:
ROBERT G. NEWMAN, P.E., L.S.
DIRECTOR OF PUBLIC WORKS
CITY OF SANTA CLARITA
DATE 4-5-07

REGISTERED PROFESSIONAL ENGINEER
JON M. AUSTIN
RCE 58726
Exp. 03/31/07
CIVIL
STATE OF CALIFORNIA
PROJECT ENGINEER 9-19-06 DATE

MetroPointe Engineers
3555 Harbor Gateway South, Suite A
Costa Mesa, CA 92626
(714) 438-1095

STORM DRAIN PLANS IN
CITY OF SANTA CLARITA MTD. No. 1764
CITY OF SANTA CLARITA

STORM DRAIN PLAN AND PROFILE
MTD NO. 1764
DETAILS

DWG | SHEET 12A OF 21

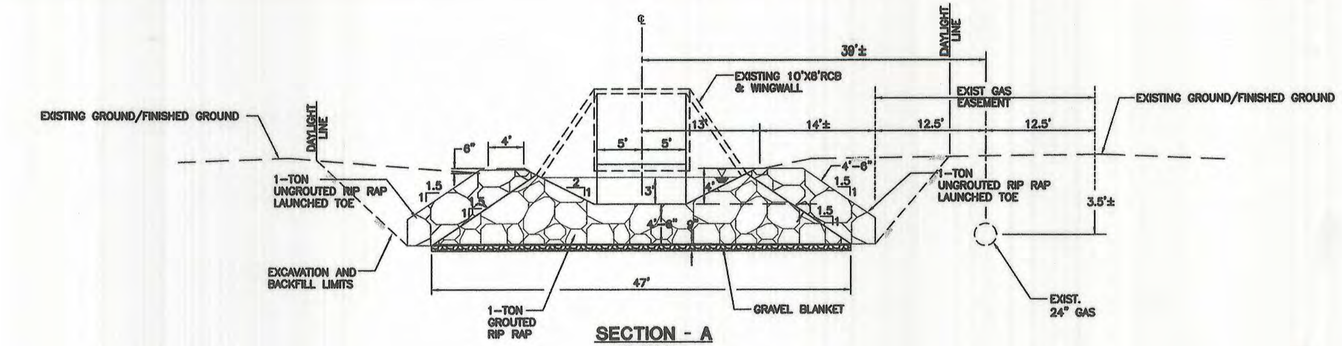
DRAWING

DRAWING NUMBER

Storm Drain - MTD 1764
Sheet 12A of 21

01986

10/25/11



SECTION - A
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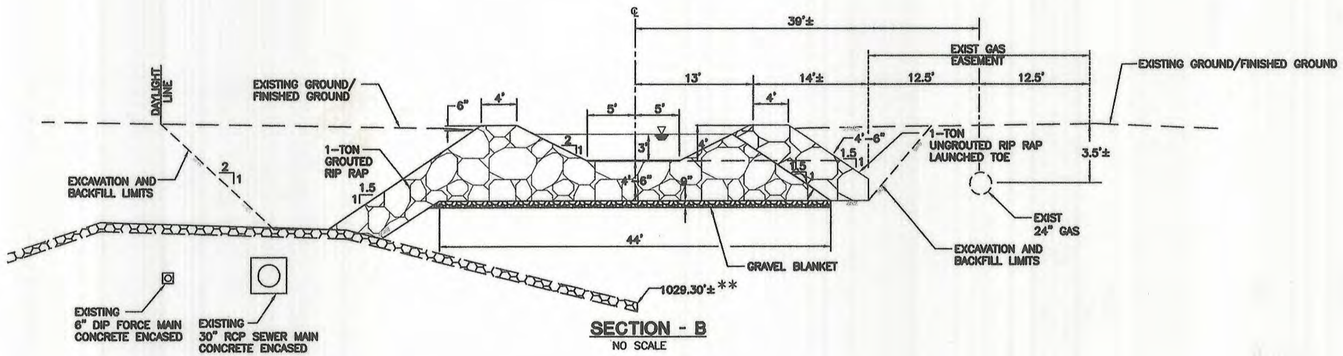

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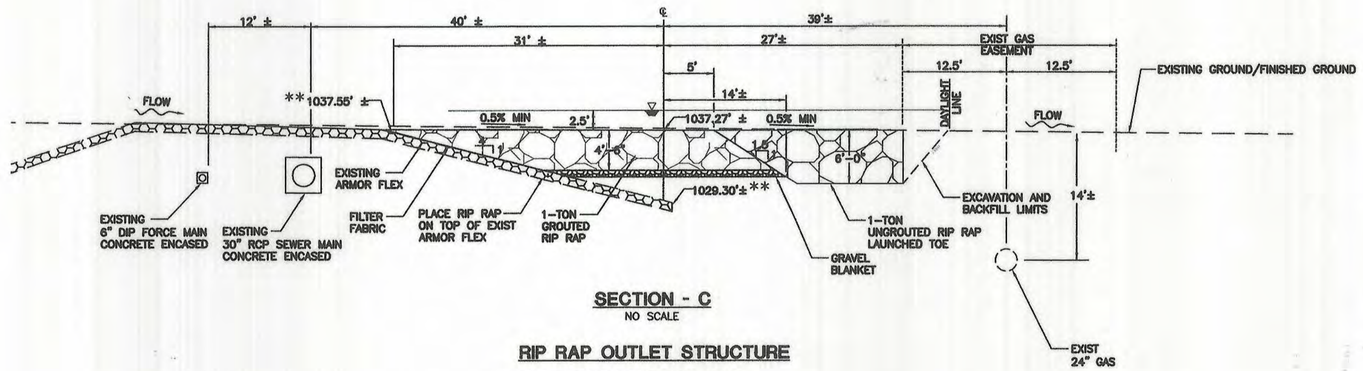


SECTION - C
NO SCALE

RIP RAP OUTLET STRUCTURE

**CONTRACTOR TO VERIFY HORIZONTAL AND VERTICAL ELEVATION PRIOR TO CONSTRUCTION.

ALL GROUTED RIP RAP SHALL BE PLACED TO FORM A ROUGH UNEVEN SURFACE W/ PORTIONS EXTENDING ABOUT 6" +/- ABOVE EXISTING SURFACE

1 TON GROUTED AND UNGROUTED RIP RAP GRADATION

LIMITS OF STONE WEIGHT IN LBS.	% LARGER BY WEIGHT
2 TON	0–5
1 TON	50–100
1/2 TON	95–100

NO.	REVISIONS	REVISED BY	APPROVED BY	DATE
1	OUTLET STRUCTURE REVISED PER SHEET 12B (VOID SHEET 12A)	7/19/07	for RGN	7-26-07

APPROVED FOR CONSTRUCTION BY:

for RGN 7-26-07
ROBERT G. NEWMAN, P.E., L.S. — DATE
DIRECTOR OF PUBLIC WORKS
CITY OF SANTA CLARITA

REGISTERED PROFESSIONAL ENGINEER — KENNETH C. TALANIAN — RCE 56185 — Exp. 12/31/08 — CIVIL ENGINEER — STATE OF CALIFORNIA

6/27/07
PROJECT ENGINEER — DATE

WILLDAN
Serving Public Agencies
2401 EAST KATELLA AVENUE, SUITE 450, ANAHEIM CA 92806
PHONE (714) 978-8200 FAX (714) 978-8299

STORM DRAIN PLANS IN
CITY OF SANTA CLARITA MTD. No. 1764

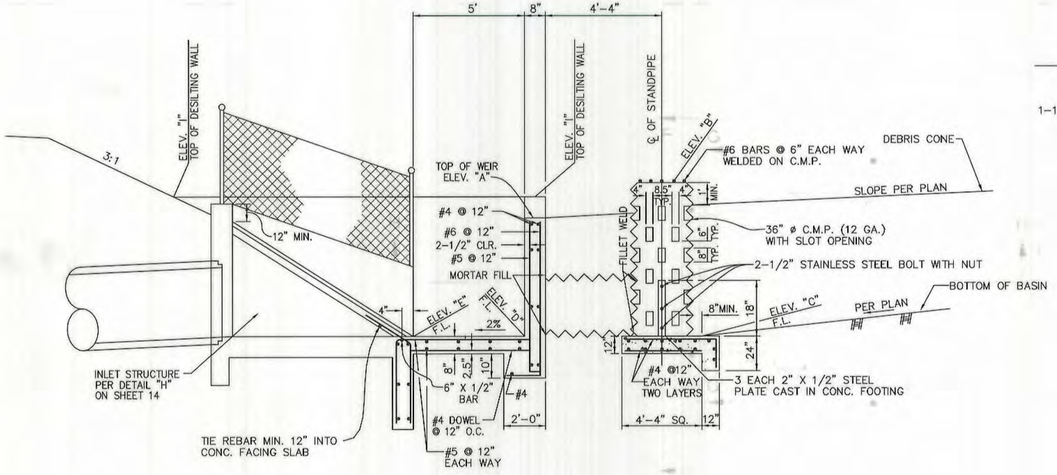
CITY OF SANTA CLARITA

STORM DRAIN PLAN AND PROFILE
MTD NO. 1764
DETAILS

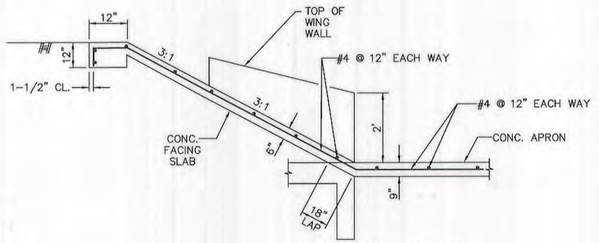
DWG | SHEET 12B OF 21

As of 7-31-2013
AS BUILT

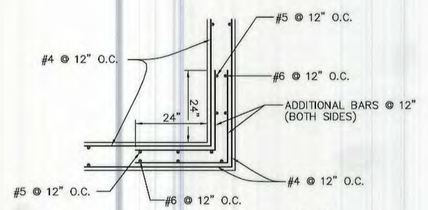
DRAWING NUMBER
SAFCO PRODUCTS • NEW HOPE, MINNESOTA
REORDER BY PART NUMBER 6502
Storm Drain - MTD 1764
Sheet 12B of 21
01986
10/25/11
NUMBER



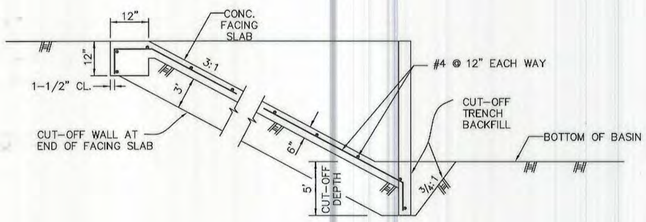
SECTION C-C
N.T.S.



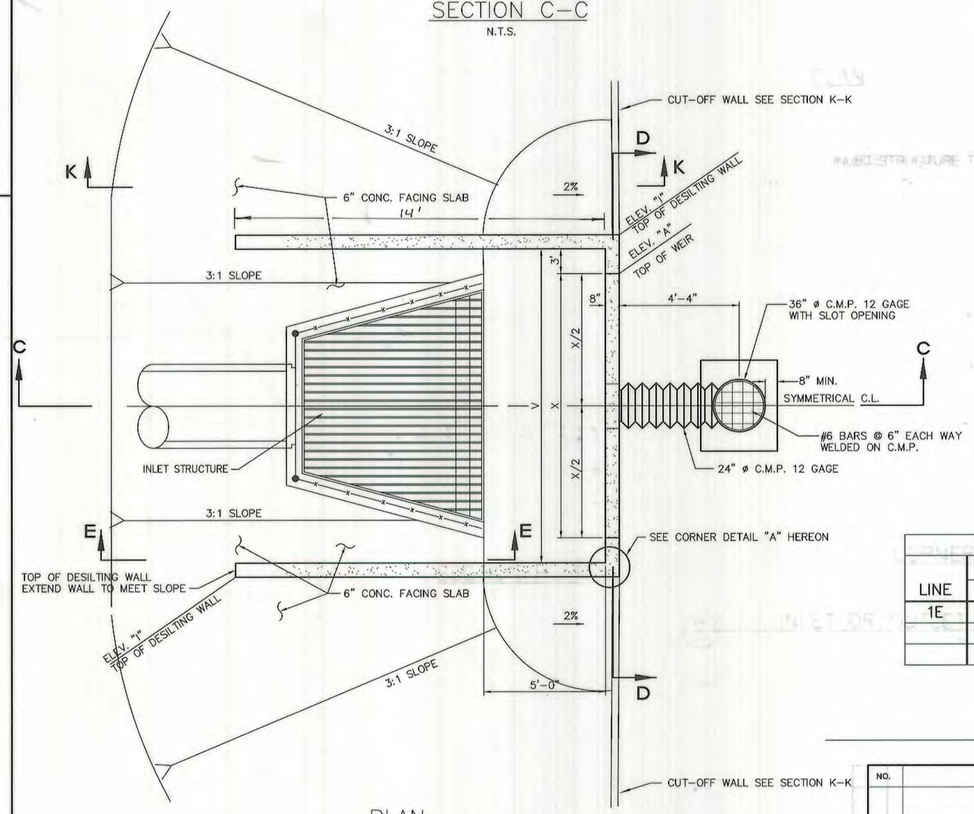
SECTION E-E
N.T.S.



CORNER DETAIL "A"
N.T.S.

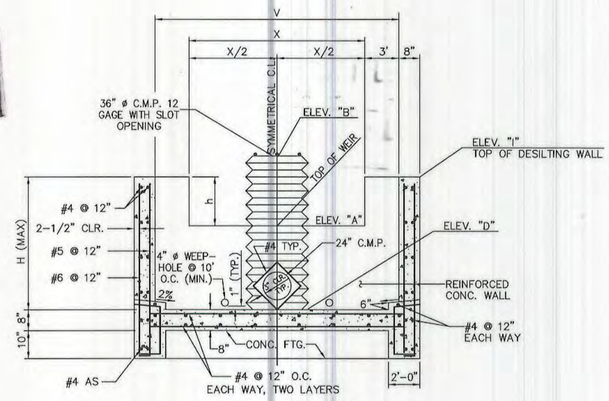


SECTION K-K (FACING SLAB)
N.T.S.



PLAN
N.T.S.

DESILTING INLET STRUCTURE ELEVATION TABLE										
	ELEV									
LINE	A	B	C	D	E	I	X	h	H	V
1E	1100.00	1101.00	1095.50	1096.10	1096.00	1101.00	30.00'	1.00	4.90	36.0



SECTION D-D
N.T.S.

DESILTING INLET DETAIL
N.T.S.

H

AS BUILT
As of 7-31-2013

APPROVED FOR CONSTRUCTION BY:
ROBERT G. NEWMAN, P.E., L.S.
DIRECTOR OF PUBLIC WORKS
CITY OF SANTA CLARITA
DATE 6-7-06

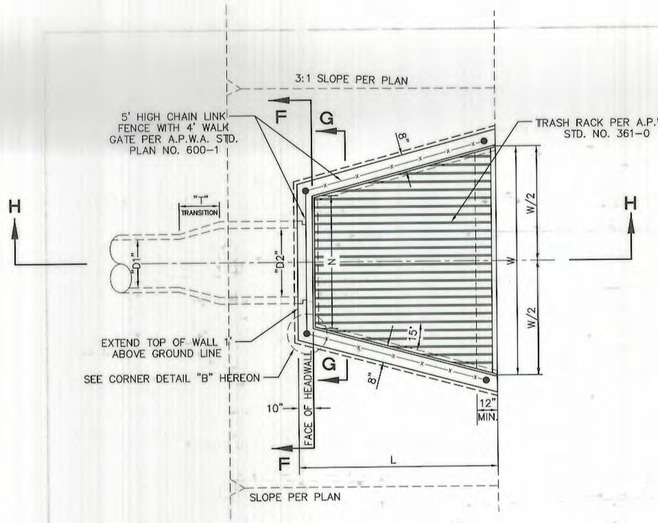
NO.	REVISIONS	REVISED BY	APPROVED BY	DATE

REGISTERED PROFESSIONAL ENGINEER JON M. AUSTIN RCE 58726 Exp. 03/31/07 CIVIL STATE OF CALIFORNIA
PROJECT ENGINEER 5-31-06 DATE

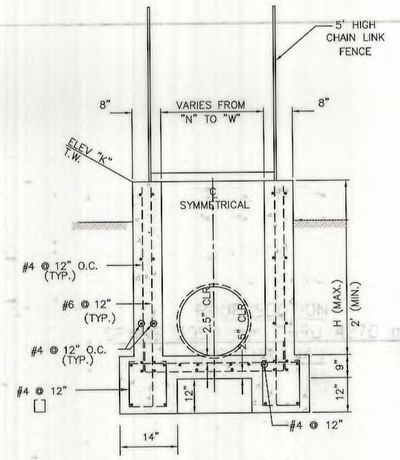
MetroPointe Engineers
3555 Harbor Gateway South, Suite A
Costa Mesa, CA 92626
(714) 438-1095

STORM DRAIN PLANS IN
CITY OF SANTA CLARITA MTD. No. 1764
CITY OF SANTA CLARITA
STORM DRAIN PLAN AND PROFILE
MTD NO. 1764
DETAILS
DWG
SHEET 13 OF 21

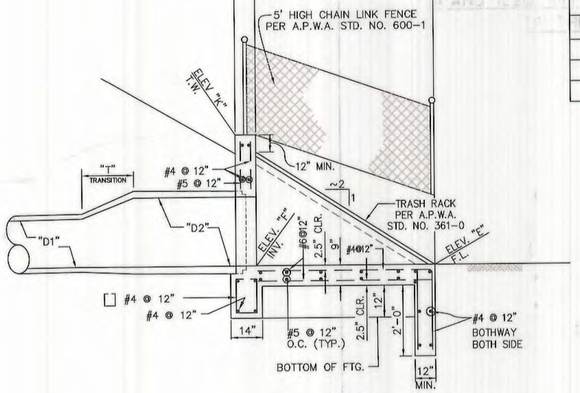
DRAWING
DRAWING NUMBER
NUMBER
Storm Drain - MTD 1764
Sheet 13 of 21
01886
10-25-11



PLAN
N.T.S.

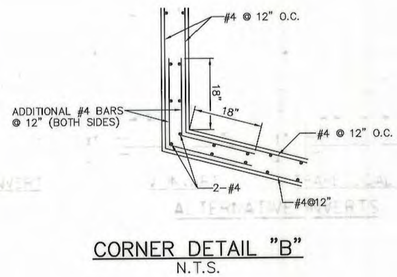


SECTION G-G
N.T.S.



SECTION H-H
N.T.S.

INLET STRUCTURE TABLE										
LINE	ELEV "E"	ELEV "F"	ELEV "K"	D1	D2	W	L	H	N	T
1E	1096.10	1096.00	1103.00	54"	54"	25'	12'	4.9'	10.5'	–



CORNER DETAIL "B"
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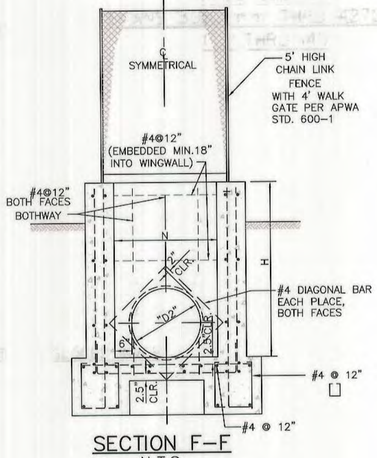


SECTION F-F
N.T.S.

H INLET OR OUTLET STRUCTURE DETAIL
N.T.S.

As of 7-31-2013
AS BUILT

NO.	REVISIONS	REVISED BY	APPROVED BY	DATE

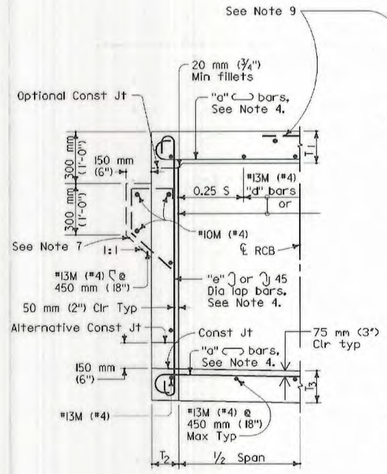
APPROVED FOR CONSTRUCTION BY:
ROBERT G. NEWMAN, P.E., L.S.
DIRECTOR OF PUBLIC WORKS
CITY OF SANTA CLARITA
DATE

REGISTERED PROFESSIONAL ENGINEER JON M. AUSTIN RCE 58726 Exp. 03/31/07 CIVIL STATE OF CALIFORNIA
PROJECT ENGINEER 5-31-06 DATE

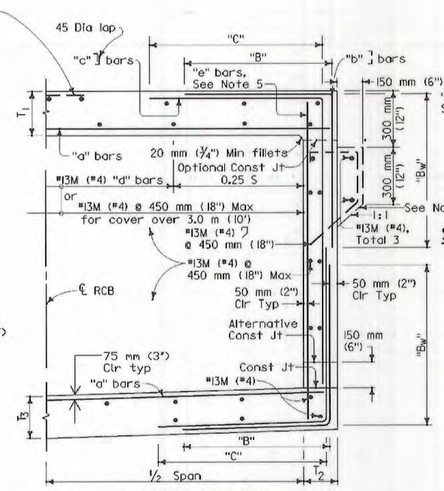
MetroPointe Engineers
3555 Harbor Gateway South, Suite A
Costa Mesa, CA 92626
(714) 438-1095

STORM DRAIN PLANS IN CITY OF SANTA CLARITA MTD. No. 1764
CITY OF SANTA CLARITA
STORM DRAIN PLAN AND PROFILE
MTD NO. 1764
DETAILS
DWG
SHEET 14 OF 21

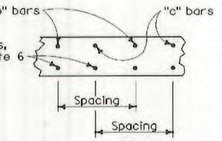
DRAWING NUMBER
BARCO PRODUCTS • NEW HOPE, MINNESOTA
REORDER BY PART NUMBER 6552
Storm Drain - MTD 1764
Sheet 14 of 21
01986
10/25/11
NUMBER
NEW HOPE, MINNESOTA
PART NUMBER 6552



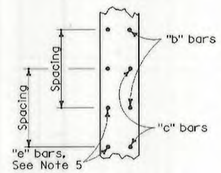
TYPICAL SECTION
SPANS 1220 mm THRU 2440 mm
(4' THRU 8')



TYPICAL SECTION
SPANS 3050 mm THRU 4270 mm
(10' THRU 14')



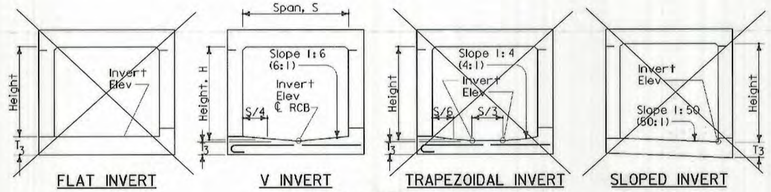
ROOF SECTION
SPANS 3050 mm THRU 4270 mm
(10' THRU 14')
(invert similar)



WALL SECTION
SPANS 3050 mm THRU 4270 mm
(10' THRU 14')

NOTES

1. For boxes with span or height less than any of those shown in table, use next greater size box concrete dimensions and reinforcement. Make necessary changes in bar lengths and quantities.
2. Quantities are approximate and for design purposes only.
3. For boxes with span or height or cover greater than those shown in tables, a special design is required.
4. It is permissable to eliminate the 180° hooks on every other bar.
5. "e" bars are at half spacing, spans 3050 mm - 4270 mm (10' - 14') only.
6. "a" bars are at half spacing, spans 3050 mm - 4270 mm (10' - 14') only.
7. Provide paving notch when top is exposed and when pavement is portland cement concrete, and adjust quantities.
8. For design and details not shown, see Standard Plan D82.
9. For exposed top, provide #13M (#4) @ 450 mm (18") each way, 600 mm (2') lap "c" cars of full span and adjust.



FLAT INVERT V INVERT TRAPEZOIDAL INVERT SLOPED INVERT

ALTERNATIVE INVERTS

LINE	STA	TO STA	RC BOX SIZE	TOP OF INVERT SLAB REQUIREMENTS
A	13+08.69	16+83.83	10'W x 8'H	CONCRETE MIX = 610-B-4,000
A	16+83.83	24+86.22	10'W x 8'H	STEEL CLEARANCE=3.5", CONCRETE MIX=680-B-5,000
A	24+86.22	24+96.06	TRANSITION	TRANSITION 10'WX8'H TO 10'WX7'H RCB STEEL CLEARANCE=3.5", CONCRETE MIX=680-B-5,000
A	24+96.06	34+41.09	10'W x 7'H	STEEL CLEARANCE=3.5", CONCRETE MIX=680-B-5,000
A	34+41.09	40+84.00	10'W x 7'H	CONCRETE MIX = 610-B-4,000

APPROVED FOR CONSTRUCTION BY:

ROBERT G. NEWMAN, P.E., L.S.
DIRECTOR OF PUBLIC WORKS
CITY OF SANTA CLARITA

DATE 6-7-06

NO.	REVISIONS	REVISED BY	APPROVED BY	DATE

REGISTERED PROFESSIONAL ENGINEER
JON M. AUSTIN
RCE 58726
Exp. 03/31/07
CIVIL
STATE OF CALIFORNIA

PROJECT ENGINEER 5-31-06 DATE

MetroPointe Engineers
3555 Harbor Gateway South, Suite A
Costa Mesa, CA 92626
(714) 438-1095

STORM DRAIN PLANS IN
CITY OF SANTA CLARITA MTD. No. 1764

CITY OF SANTA CLARITA

STORM DRAIN PLAN AND PROFILE
MTD NO. 1764
CALTRANS STANDARD PLAN
D80A

DWG | SHEET 15 OF 21

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET TOTAL NO. SHEETS

Paul Cotter
REGISTERED CIVIL ENGINEER

July 1, 2002
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Paul Cotter
No. C34509
Exp. 9-30-03
CIVIL
STATE OF CALIFORNIA

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Caltrans now has a web site! To get to the web site, go to: http://www.dot.ca.gov

AS OF 7-31-2013
AS BUILT

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
CAST-IN-PLACE
REINFORCED CONCRETE
SINGLE BOX CULVERT

These "Standard Plans for Construction of Local Streets and Roads" contain units in two systems of measurement: International System of Units (SI or "metric") and United States Standard Measures shown in the parentheses ( ). The measurements expressed in the two systems are not necessarily equal or interchangeable. See the "Foreword" at the beginning of this publication.

NO SCALE

D80A

2002 DUAL UNITS STD PLAN D80A

DRAWING NUMBER

Storm Drain - MTD 1764
Sheet 15 of 21

01986

10/25/11

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

Paul Cotter
REGISTERED CIVIL ENGINEER

July 1, 2002
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Paul Cotter — No. C34509 — REG. 9-30-03 — CIVIL — STATE OF CALIFORNIA

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SPAN			3050 mm (10')											
HEIGHT			1520 mm (5')		1830 mm (6')		2135 mm (7')		2440 mm (8')		2745 mm (9')		3050 mm (10')	
Maximum Earth Cover			3.0 m (10')	6.0 m (20')	3.0 m (10')	6.0 m (20')	3.0 m (10')	6.0 m (20')	3.0 m (10')	6.0 m (20')	3.0 m (10')	6.0 m (20')	3.0 m (10')	6.0 m (20')
Conc	Roof	T_1	205 mm (8")	270 mm (10½")	205 mm (8")	270 mm (10½")	205 mm (8")	270 mm (10½")	205 mm (8")	270 mm (10½")	205 mm (8")	290 mm (11½")	215 mm (9½")	320 mm (12½")
	Walls	T_2	205 mm (8")	205 mm (8")	205 mm (8")	230 mm (9")	205 mm (8")	230 mm (9")	205 mm (8")	255 mm (10")	215 mm (8½")	290 mm (11½")	240 mm (9½")	320 mm (12½")
	Invert	T_3	205 mm (8")	280 mm (11")	205 mm (8")	280 mm (11")	205 mm (8")	280 mm (11")	205 mm (8")	280 mm (11")	205 mm (8")	280 mm (11")	215 mm (8½")	280 mm (11")
Reinf	Spacing		325 mm (13")	300 mm (12")	300 mm (12")	300 mm (12")	275 mm (11")	275 mm (11")	250 mm (10")	275 mm (11")	275 mm (11")	250 mm (10")	275 mm (11")	250 mm (10")
	** "a"	Size Bar #	19M (#6)	22M (#7)	19M (#6)	22M (#7)	19M (#6)	22M (#7)	19M (#6)	22M (#7)	19M (#6)	19M (#6)	19M (#6)	19M (#6)
		Size Bar #	19M (#6)	22M (#7)	19M (#6)	22M (#7)	19M (#6)	22M (#7)	19M (#6)	22M (#7)	19M (#6)	19M (#6)	22M (#7)	22M (#7)
	"b"	Dimension "B"	900 mm (2'-11")	900 mm (2'-11")	900 mm (2'-11")	925 mm (3'-0")	900 mm (2'-11")	1150 mm (3'-9")	900 mm (2'-11")	1150 mm (3'-9")	900 mm (2'-11")	1150 mm (3'-9")	900 mm (2'-11")	1150 mm (3'-9")
		Dimension "B_W"	1475 mm (4'-10")	1525 mm (5'-0")	1475 mm (4'-10")	1525 mm (5'-0")	1475 mm (4'-10")	1525 mm (5'-0")	1475 mm (4'-10")	1525 mm (5'-0")	1475 mm (4'-10")	1525 mm (5'-0")	1400 mm (4'-7")	1400 mm (4'-7")
	"c"	Size Bar #	19M (#6)	22M (#7)	19M (#6)	22M (#7)	19M (#6)	22M (#7)	19M (#6)	22M (#7)	22M (#7)	22M (#7)	22M (#7)	22M (#7)
		Dimension "C"	1025 mm (3'-4")	1025 mm (3'-4")	2250 mm (7'-4")	1425 mm (4'-8")	2325 mm (7'-7")	1425 mm (4'-8")	2500 mm (8'-2")	1425 mm (4'-8")	2325 mm (7'-7")	1425 mm (4'-8")	2325 mm (7'-7")	1425 mm (4'-8")
	* "e"	Size Bar #	13M (#4)	13M (#4)	13M (#4)	13M (#4)	13M (#4)	13M (#4)	13M (#4)	13M (#4)	13M (#4)	13M (#4)	16M (#5)	16M (#5)
Quantities	Concrete		2.01 m³/m (21.6 CF/LF)	2.50 m³/m (26.8 CF/LF)	2.14 m³/m (23.0 CF/LF)	2.74 m³/m (29.5 CF/LF)	2.26 m³/m (24.3 CF/LF)	2.88 m³/m (31.0 CF/LF)	2.38 m³/m (25.6 CF/LF)	3.17 m³/m (34.1CF/LF)	2.58 m³/m (27.8 CF/LF)	3.50 m³/m (37.7 CF/LF)	2.98 m³/m (32.1CF/LF)	3.93 m³/m (42.3 CF/LF)
	Reinforcement		284 kg/m (191 LB/LF)	397 kg/m (267 LB/LF)	347 kg/m (233 LB/LF)	424 kg/m (285 LB/LF)	387 kg/m (260 LB/LF)	484 kg/m (325 LB/LF)	446 kg/m (300 LB/LF)	504 kg/m (339 LB/LF)	467 kg/m (314 LB/LF)	487 kg/m (327 LB/LF)	536 kg/m (360 LB/LF)	555 kg/m (373 LB/LF)

SPAN			3660 mm (12')											
HEIGHT			1830 mm (6')		2135 mm (7')		2440 mm (8')		2745 mm (9')		3050 mm (10')		3350 mm (11')	
Maximum Earth Cover			3.0 m (10')	6.0 m (20')	3.0 m (10')	6.0 m (20')	3.0 m (10')	6.0 m (20')	3.0 m (10')	6.0 m (20')	3.0 m (10')	6.0 m (20')	3.0 m (10')	6.0 m (20')
Conc	Roof	T_1	215 mm (8½")	305 mm (12 ")	215 mm (8½")	305 mm (12 ")	215 mm (8½")	305 mm (12")	215 mm (8½")	305 mm (12")	215 mm (8½")	305 mm (12")	240 mm (9½")	305 mm (12")
	Walls	T_2	205 mm (8")	255 mm (10")	215 mm (8½")	270 mm (10½")	215 mm (8½")	270 mm (10½")	215 mm (8½")	290 mm (11½")	230 mm (9")	320 mm (12½")	270 mm (10½")	345 mm (13½")
	Invert	T_3	215 mm (8½")	320 mm (12½")	230 mm (9")	320 mm (12½")	230 mm (9")	320 mm (12½")	230 mm (9")	320 mm (12½")	230 mm (9")	320 mm (12½")	240 mm (9½")	330 mm (13")
Reinf	Spacing		225 mm (9")	250 mm (10")	225 mm (9")	250 mm (10")	225 mm (9")	250 mm (10")	200 mm (8")	250 mm (10")	200 mm (8")	250 mm (10")	250 mm (10")	225 mm (9")
	** "a"	Size Bar #	19M (#6)	22M (#7)	19M (#6)	22M (#7)	19M (#6)	22M (#7)	19M (#6)	22M (#7)	19M (#6)	22M (#7)	19M (#6)	19M (#6)
		Size Bar #	19M (#6)	22M (#7)	19M (#6)	22M (#7)	19M (#6)	22M (#7)	19M (#6)	22M (#7)	19M (#6)	22M (#7)	22M (#7)	22M (#7)
	"b"	Dimension "B"	950 mm (3'-1")	975 mm (3'-2")	1150 mm (3'-9")	1150 mm (3'-9")	1150 mm (3'-9")	1150 mm (3'-9")	1100 mm (3'-7")	1150 mm (3'-9")	1100 mm (3'-7")	1325 mm (4'-4")	1100 mm (3'-7")	1325 mm (4'-4")
		Dimension "B_W"	1850 mm (6'-0")	1800 mm (5'-10")	1900 mm (6'-2")	2025 mm (6'-7")	1900 mm (6'-2")	2025 mm (6'-7")	1500 mm (4'-1")	1500 mm (4'-11")	1500 mm (4'-11")	1500 mm (4'-11")	1500 mm (4'-11")	1325 mm (4'-4")
	"c"	Size Bar #	19M (#6)	22M (#7)	19M (#6)	22M (#7)	19M (#6)	22M (#7)	19M (#6)	22M (#7)	19M (#6)	22M (#7)	22M (#7)	22M (#7)
		Dimension "C"	1325 mm (4'-4")	1100 mm (3'-7")	2475 mm (8'-1")	1700 mm (5'-7")	2475 mm (8'-1")	1700 mm (5'-7")	2475 mm (8'-1")	1700 mm (5'-7")	2475 mm (8'-1")	1700 mm (5'-7")	2475 mm (8'-1")	1700 mm (5'-7")
	* "e"	Size Bar #	13M (#4)	13M (#4)	13M (#4)	13M (#4)	13M (#4)	13M (#4)	13M (#4)	13M (#4)	13M (#4)	13M (#4)	16M (#5)	16M (#5)
Quantities	Concrete		2.49 m³/m (26.8 CF/LF)	3.50 m³/m (37.7 CF/LF)	2.72 m³/m (29.3 CF/LF)	3.73 m³/m (40.1CF/LF)	2.81 m³/m (30.3 CF/LF)	3.89 m³/m (41.9 CF/LF)	3.00 m³/m (32.2 CF/LF)	4.22 m³/m (45.4 CF/LF)	3.21 m³/m (34.5 CF/LF)	4.63 m³/m (49.8 CF/LF)	3.78 m³/m (40.7 CF/LF)	5.04 m³/m (54.2 CF/LF)
	Reinforcement		439 kg/m (295 LB/LF)	539 kg/m (362 LB/LF)	525 kg/m (353 LB/LF)	609 kg/m (409 LB/LF)	543 kg/m (365 LB/LF)	625 kg/m (420 LB/LF)	598 Kg/m (402 LB/LF)	615 kg/m (413 LB/LF)	618 kg/m (415 LB/LF)	631 kg/m (424 LB/LF)	655 kg/m (440 LB/LF)	701 kg/m (471 LB/LF)

SPAN			3660 mm (12')	
HEIGHT			3.0 m (10')	6.0 m (20')
Maximum Earth Cover			240 mm (9½")	305 mm (12")
Conc	Roof	T_1	290 mm (11½")	380 mm (15")
	Walls	T_2	255 mm (10")	330 mm (13")
	Invert	T_3	225 mm (9")	225 mm (9")
Reinf	Spacing		225 mm (9")	200 mm (8")
	** "a"	Size Bar #	19M (#6)	19M (#6)
		Size Bar #	19M (#6)	22M (#7)
	"b"	Dimension "B"	1325 mm (4'-4")	1325 mm (4'-4")
		Dimension "B_W"	1325 mm (4'-4")	1325 mm (4'-4")
	"c"	Size Bar #	22M (#7)	22M (#7)
		Dimension "C"	2475 mm (8'-1")	1700 mm (5'-7")
	* "e"	Size Bar #	16M (#5)	16M (#5)
Quantities	Concrete		4.22 m³/m (45.4 CF/LF)	5.56 m³/m (59.9 CF/LF)
	Reinforcement		696 kg/m (468 LB/LF)	795 kg/m (534 LB/LF)

* See Note 5, on Standard Plan D80A.
** See Note 6, on Standard Plan D80A.

As of 7-31-2013
AS BUILT

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
CAST-IN-PLACE REINFORCED CONCRETE SINGLE BOX CULVERT

These "Standard Plans for Construction of Local Streets and Roads" contain units in two systems of measurement: International System of Units (SI or "metric") and United States Standard Measures shown in the parentheses ( ). The measurements expressed in the two systems are not necessarily equal or interchangeable. See the "Foreword" at the beginning of this publication.

NO SCALE

D80C

2002 DUAL UNITS STD PLAN D80C

LINE	STA	TO STA	RC BOX SIZE	CONC & REINF REQUIREMENTS
A	13+08.69	16+83.83	10'W x 8'H	USE 6m (20') MAX EARTH COVER CRITERIA

APPROVED FOR CONSTRUCTION BY:

ROBERT G. NEWMAN, P.E., L.S.
DIRECTOR OF PUBLIC WORKS
CITY OF SANTA CLARITA

DATE 6-7-06

NO.	REVISIONS	REVISED BY	APPROVED BY	DATE

REGISTERED PROFESSIONAL ENGINEER — JON M. AUSTIN — RCE 58726 — Exp. 03/31/07 — CIVIL — STATE OF CALIFORNIA

PROJECT ENGINEER 5-31-06 DATE

MetroPointe Engineers
3555 Harbor Gateway South, Suite A
Costa Mesa, CA 92626
(714) 438-1095

STORM DRAIN PLANS IN
CITY OF SANTA CLARITA MTD. No. 1764

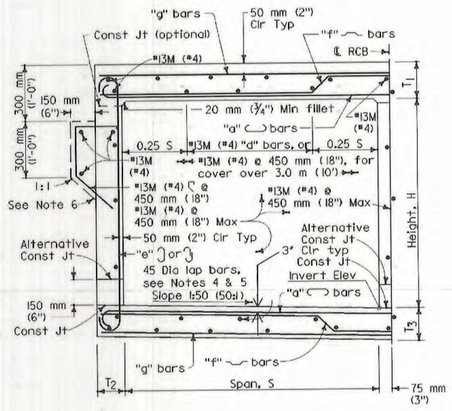
CITY OF SANTA CLARITA

STORM DRAIN PLAN AND PROFILE
MTD NO. 1764
CALTRANS STANDARD PLAN
D80C

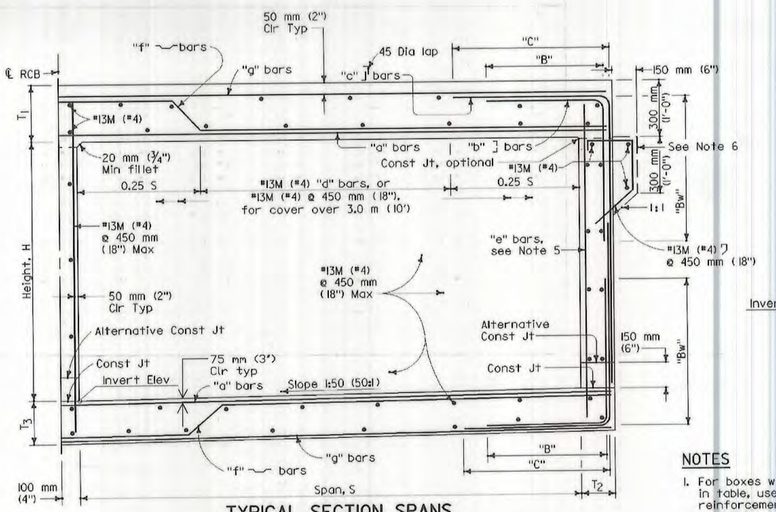
DWG

SHEET 16 OF 21

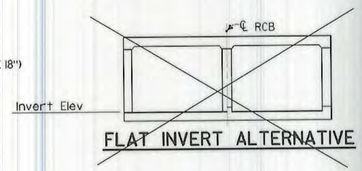
DRAWING NUMBER
BAYCO PRODUCTS • NEW HOPE, MINNESOTA
REORDER BY PART NUMBER 6552
NUMBER
Storm Drain - MTD 1764
Sheet 16 of 21
01986
10/15/11



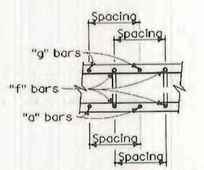
TYPICAL SECTION SPANS
1220 mm THRU 2440 mm
(4' THRU 8')



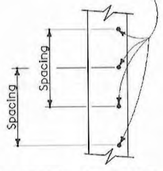
TYPICAL SECTION SPANS
3050 mm THRU 4270 mm
(10' THRU 14')



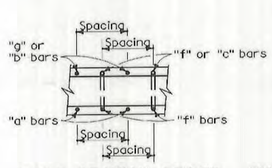
FLAT INVERT ALTERNATIVE



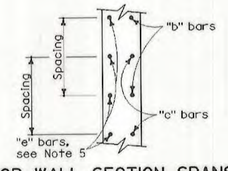
ROOF SECTION SPANS
1220 mm THRU 2440 mm
(4' THRU 8')
Invert Similar



EXTERIOR WALL SECTION SPANS
1220 mm THRU 2440 mm
(4' THRU 8')



ROOF SECTION SPANS
3050 mm THRU 4270 mm
(10' THRU 14')
Invert Similar



EXTERIOR WALL SECTION SPANS
3050 mm THRU 4270 mm
(10' THRU 14')

AS of 7-31-2013
AS BUILT

"d" bars, for earth covers up to and including 3.0 m (10')								
Span	1220 mm (4')	1520 mm (5')	1830 mm (6')	2135 mm (7')	2440 mm (8')	3050 mm (10')	3660 mm (12')	4270 mm (14')
Number	5	6	8	10	13	14	16	19

NOTES

1. For boxes with span or height less than any of those shown in table, use next greater size box concrete dimensions and reinforcement. Make necessary changes in bar lengths and quantities.
2. For boxes with span or height or cover greater than those shown in tables, a special design is required.
3. Quantities are approximate and for design purposes only.
4. It is permissable to eliminate the 180° hooks on every other "e" bar.
5. "e" bars are at half spacing.
6. Provide paving notch when top is exposed and when pavement is portland cement concrete, and adjust quantities.
7. For design and details not shown, see Standard Plan D82.
8. This plan sheet may be used for multiple cell culverts by making necessary adjustments.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

CAST-IN-PLACE REINFORCED CONCRETE DOUBLE BOX CULVERT

These "Standard Plans for Construction of Local Streets and Roads" contain units in two systems of measurement: International System of Units (SI or "metric") and United States Standard Measures shown in the parentheses ( ). The measurements expressed in the two systems are not necessarily equal or interchangeable. See the "Foreword" at the beginning of this publication.

NO SCALE

D81A

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

Paul Cotter
REGISTERED CIVIL ENGINEER

July 1, 2002
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Paul Cotter
C34509
Exp. 9-30-03
CIVIL
STATE OF CALIFORNIA

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2002 DUAL UNITS STD PLAN D81A

LINE	STA	TO STA	RC BOX SIZE	COMMENT
A	40+84.00	41+03.00	10'W x 7'H	CONCRETE THICKNESS PER CALTRANS STD. PLAN D81A

NO.	REVISIONS	REVISED BY	APPROVED BY	DATE

APPROVED FOR CONSTRUCTION BY:
ROBERT Q. NEWMAN, P.E., L.S.
DIRECTOR OF PUBLIC WORKS
CITY OF SANTA CLARITA
DATE 6-7-04

REGISTERED PROFESSIONAL ENGINEER
JON M. AUSTIN
RCE 58726
Exp. 03/31/07
CIVIL
STATE OF CALIFORNIA
PROJECT ENGINEER 5-31-06 DATE

MetroPointe Engineers
3555 Harbor Gateway South, Suite A
Costa Mesa, CA 92626
(714) 438-1095

STORM DRAIN PLANS IN
CITY OF SANTA CLARITA MTD. No. 1764
CITY OF SANTA CLARITA
STORM DRAIN PLAN AND PROFILE
MTD NO. 1764
CALTRANS STANDARD PLAN
D81A

DWG | SHEET 17 OF 21

DRAWING NUMBER
SAFCO PRODUCTS • NEW HOPE, MINNESOTA
REORDER BY PART NUMBER 6562
Storm Drain - MTD 1764
Sheet 17 of 21
10/25/11
01986
NUMBER

SPAN			3050 mm (10')											
HEIGHT			1520 mm (5')		1830 mm (6')		2135 mm (7')		2440 mm (8')		2745 mm (9')		3050 mm (10')	
Maximum Earth Cover			3.0 m (10')	6.0 m (20')	3.0 m (10')	6.0 m (20')	3.0 m (10')	6.0 m (20')	3.0 m (10')	6.0 m (20')	3.0 m (10')	6.0 m (20')	3.0 m (10')	6.0 m (20')
Conc	Roof	T_1	230 mm (9")	320 mm (12½")	230 mm (9")	320 mm (12½")	230 mm (9")	320 mm (12½")	230 mm (9")	320 mm (12½")	240 mm (9½")	320 mm (12½")	240 mm (9½")	320 mm (12½")
	Walls	T_2	205 mm (8")	205 mm (8")	205 mm (8")	215 mm (8½")	205 mm (8")	240 mm (9½")	205 mm (8")	270 mm (10½")	215 mm (8½")	290 mm (11½")	240 mm (9½")	320 mm (12½")
	Invert	T_3	230 mm (9")	320 mm (12½")	230 mm (9")	320 mm (12½")	230 mm (9")	320 mm (12½")	230 mm (9")	320 mm (12½")	230 mm (9")	320 mm (12½")	230 mm (9")	320 mm (12½")
Reinf	Spacing		275 mm (11")	190 mm (7½")	265 mm (10½")	190 mm (7½")	250 mm (10")	200 mm (8")	250 mm (10")	200 mm (8")	265 mm (10½")	200 mm (8")	265 mm (10½")	215 mm (8½")
	"a"	Size Bar #	22M (#7)	22M (#7)	22M (#7)	22M (#7)	22M (#7)	22M (#7)	22M (#7)	22M (#7)	22M (#7)	22M (#7)	22M (#7)	22M (#7)
	"f"	Size Bar #	22M (#7)	16M (#5)	19M (#6)	16M (#5)	19M (#6)	16M (#5)	19M (#6)	16M (#5)	19M (#6)	16M (#5)	19M (#6)	16M (#5)
	"d"	Size Bar #	13M (#4)	13M (#4)	13M (#4)	13M (#4)	13M (#4)	13M (#4)	13M (#4)	13M (#4)	13M (#4)	13M (#4)	13M (#4)	13M (#4)
		Size Bar #	16M (#5)	16M (#5)	13M (#4)	16M (#5)	16M (#5)	16M (#5)	19M (#6)	16M (#5)	19M (#6)	19M (#6)	19M (#6)	19M (#6)
	"b"	Dim "B"	1550 mm (1'-9")	800 mm (2'-7")	625 mm (2'-0")	850 mm (2'-9")	700 mm (2'-3")	850 mm (2'-9")	800 mm (2'-7")	950 mm (3'-1")	800 mm (2'-7")	950 mm (3'-1")	800 mm (2'-7")	950 mm (3'-1")
		Dim "Bw"	1225 mm (4'-0")	1500 mm (4'-11")	1225 mm (4'-0")	1500 mm (4'-11")	1225 mm (4'-0")	1500 mm (4'-11")	1225 mm (4'-0")	1500 mm (4'-11")	1225 mm (4'-0")	1500 mm (4'-11")	1225 mm (4'-0")	1500 mm (4'-11")
		Size Bar #	16M (#5)	16M (#5)	19M (#6)	19M (#6)	19M (#6)	19M (#6)	19M (#6)	19M (#6)	22M (#7)	19M (#6)	22M (#7)	19M (#6)
	"c"	Dim "C"	950 mm (3'-1")	850 mm (2'-9")	1150 mm (3'-9")	1000 mm (3'-3")	1375 mm (4'-6")	1300 mm (4'-3")	1675 mm (5'-6")	1375 mm (4'-6")	1850 mm (6'-0")	1450 mm (4'-9")	1850 mm (6'-0")	1450 mm (4'-9")
	"e"	Size Bar #	13M (#4)	13M (#4)	13M (#4)	13M (#4)	13M (#4)	13M (#4)	13M (#4)	13M (#4)	13M (#4)	13M (#4)	16M (#5)	16M (#5)
Quantities	Concrete		3.97 m³/m (42.7 CF/LF)	5.17 m³/m (55.6 CF/LF)	4.15 m³/m (44.7 CF/LF)	5.41 m³/m (58.2 CF/LF)	4.34 m³/m (46.7 CF/LF)	5.74 m³/m (61.8 CF/LF)	4.52 m³/m (48.7 CF/LF)	6.09 m³/m (65.6 CF/LF)	4.88 m³/m (52.5 CF/LF)	6.50 m³/m (70.0 CF/LF)	5.23 m³/m (56.3 CF/LF)	6.92 m³/m (74.5 CF/LF)
	Reinforcement		551 kg/m (370 LB/LF)	676 kg/m (454 LB/LF)	567 kg/m (381 LB/LF)	735 kg/m (494 LB/LF)	622 kg/m (418 LB/LF)	735 kg/m (494 LB/LF)	684 kg/m (460 LB/LF)	759 kg/m (510 LB/LF)	723 kg/m (486 LB/LF)	818 kg/m (550 LB/LF)	771 kg/m (518 LB/LF)	845 kg/m (568 LB/LF)

SPAN			3660 mm (12')													
HEIGHT			1830 mm (6')		2135 mm (7')		2440 mm (8')		2745 mm (9')		3050 mm (10')		3350 mm (11')		3660 mm (12')	
Maximum Earth Cover			3.0 m (10')	6.0 m (20')	3.0 m (10')	6.0 m (20')	3.0 m (10')	6.0 m (20')	3.0 m (10')	6.0 m (20')	3.0 m (10')	6.0 m (20')	3.0 m (10')	6.0 m (20')	3.0 m (10')	6.0 m (20')
Conc	Roof	T_1	255 mm (10")	370 mm (14½")	255 mm (10")	370 mm (14½")	255 mm (10")	370 mm (14½")	255 mm (10")	370 mm (14½")	255 mm (10")	370 mm (14½")	255 mm (10")	370 mm (14½")	255 mm (10")	370 mm (14½")
	Walls	T_2	205 mm (8")	215 mm (8½")	205 mm (8")	230 mm (9")	215 mm (8½")	270 mm (10½")	230 mm (9")	290 mm (11½")	240 mm (9½")	320 mm (12½")	255 mm (10")	355 mm (14")	280 mm (11")	380 mm (15")
	Invert	T_3	255 mm (10")	380 mm (15")	255 mm (10")	380 mm (15")	255 mm (10")	380 mm (15")	255 mm (10")	380 mm (15")	255 mm (10")	380 mm (15")	255 mm (10")	380 mm (15")	255 mm (10")	380 mm (15")
Reinf	Spacing		225 mm (9")	200 mm (8")	225 mm (9")	200 mm (8")	200 mm (8")	190 mm (7½")	200 mm (8")	190 mm (7½")	215 mm (8½")	190 mm (7½")	215 mm (8½")	200 mm (8")	215 mm (8½")	200 mm (8")
	"a"	Size Bar #	22M (#7)	22M (#7)	22M (#7)	22M (#7)	22M (#7)	22M (#7)	22M (#7)	22M (#7)	22M (#7)	22M (#7)	22M (#7)	22M (#7)	22M (#7)	22M (#7)
	"f"	Size Bar #	22M (#7)	22M (#7)	22M (#7)	22M (#7)	19M (#6)	19M (#6)	19M (#6)	19M (#6)	19M (#6)	19M (#6)	19M (#6)	19M (#6)	19M (#6)	19M (#6)
	"d"	Size Bar #	13M (#4)	13M (#4)	13M (#4)	13M (#4)	13M (#4)	13M (#4)	13M (#4)	13M (#4)	13M (#4)	13M (#4)	13M (#4)	13M (#4)	13M (#4)	13M (#4)
		Size Bar #	16M (#5)	16M (#5)	16M (#5)	19M (#6)	16M (#5)	19M (#6)	16M (#5)	19M (#6)	19M (#6)	19M (#6)	16M (#5)	19M (#6)	19M (#6)	19M (#6)
	"b"	Dim "B"	800 mm (2'-7")	950 mm (3'-1")	925 mm (3'-0")	975 mm (3'-2")	1075 mm (3'-6")	975 mm (3'-2")	1075 mm (3'-6")	1025 mm (3'-4")	1150 mm (3'-9")	1025 mm (3'-4")	1150 mm (3'-9")	1025 mm (3'-4")	1150 mm (3'-9")	1025 mm (3'-4")
		Dim "Bw"	1250 mm (4'-1")	975 mm (3'-2")	1250 mm (4'-1")	1025 mm (3'-4")	1250 mm (4'-1")	1025 mm (3'-4")	1250 mm (4'-1")	1100 mm (3'-7")	1150 mm (3'-9")	1100 mm (3'-7")	1150 mm (3'-9")	1100 mm (3'-7")	1100 mm (3'-7")	1100 mm (3'-7")
		Size Bar #	19M (#6)	19M (#6)	19M (#6)	19M (#6)	19M (#6)	19M (#6)	19M (#6)	19M (#6)	19M (#6)	19M (#6)	22M (#7)	22M (#7)	22M (#7)	22M (#7)
	"c"	Dim "C"	1175 mm (3'-10")	1100 mm (3'-7")	1375 mm (4'-6")	1325 mm (4'-4")	1700 mm (5'-7")	1525 mm (5'-0")	2000 mm (6'-6")	1575 mm (5'-2")	2200 mm (7'-2")	1625 mm (5'-4")	2275 mm (7'-5")	1700 mm (5'-7")	2275 mm (7'-5")	1700 mm (5'-7")
	"e"	Size Bar #	13M (#4)	13M (#4)	13M (#4)	13M (#4)	13M (#4)	13M (#4)	13M (#4)	13M (#4)	13M (#4)	13M (#4)	16M (#5)	16M (#5)	16M (#5)	16M (#5)
Quantities	Concrete		5.11 m³/m (55.0 CF/LF)	7.09 m³/m (76.3 CF/LF)	5.30 m³/m (57.0 CF/LF)	7.35 m³/m (79.1 CF/LF)	5.56 m³/m (59.8 CF/LF)	7.79 m³/m (83.8 CF/LF)	5.82 m³/m (62.7 CF/LF)	8.18 m³/m (88.1 CF/LF)	6.12 m³/m (65.9 CF/LF)	8.61 m³/m (92.7 CF/LF)	6.42 m³/m (69.1 CF/LF)	9.18 m³/m (98.8 CF/LF)	6.85 m³/m (73.7 CF/LF)	9.66 m³/m (104.0 CF/LF)
	Reinforcement		808 kg/m (543 LB/LF)	899 kg/m (604 LB/LF)	838 kg/m (563 LB/LF)	961 kg/m (646 LB/LF)	892 kg/m (600 LB/LF)	987 kg/m (663 LB/LF)	914 kg/m (614 LB/LF)	1024 kg/m (688 LB/LF)	933 kg/m (627 LB/LF)	1028 kg/m (691 LB/LF)	1043 kg/m (701 LB/LF)	1115 kg/m (749 LB/LF)	1091 kg/m (733 LB/LF)	1137 kg/m (764 LB/LF)

* See Note 5, on Standard Plan D81A

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

Paul Cotter
REGISTERED CIVIL ENGINEER

July 1, 2002
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Paul Cotter No. C34509 Exp. 9-30-03 CIVIL STATE OF CALIFORNIA

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2002 DUAL UNITS STD PLAN D81C

123

As of 7-31-2013
AS BUILT

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
CAST-IN-PLACE REINFORCED CONCRETE DOUBLE BOX CULVERT

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NO SCALE

D81C

NO.	REVISIONS	REVISED BY	APPROVED BY	DATE

APPROVED FOR CONSTRUCTION BY:

ROBERT G. NEWMAN, P.E., L.S.
DIRECTOR OF PUBLIC WORKS
CITY OF SANTA CLARITA

DATE 6-7-06

REGISTERED PROFESSIONAL ENGINEER JON M. AUSTIN RCE 58726 Exp. 03/31/07 CIVIL STATE OF CALIFORNIA

PROJECT ENGINEER 5-31-06 DATE

MetroPointe Engineers
3555 Harbor Gateway South, Suite A
Costa Mesa, CA 92626
(714) 438-1095

STORM DRAIN PLANS IN
CITY OF SANTA CLARITA MTD. No. 1764

CITY OF SANTA CLARITA

STORM DRAIN PLAN AND PROFILE
MTD NO. 1764
CALTRANS STANDARD PLAN
D81C

DWG | SHEET 18 OF 21

DRAWING NUMBER

SAFCO PRODUCTS • NEW HOPE, MINNESOTA
REORDER BY PART NUMBER 8550

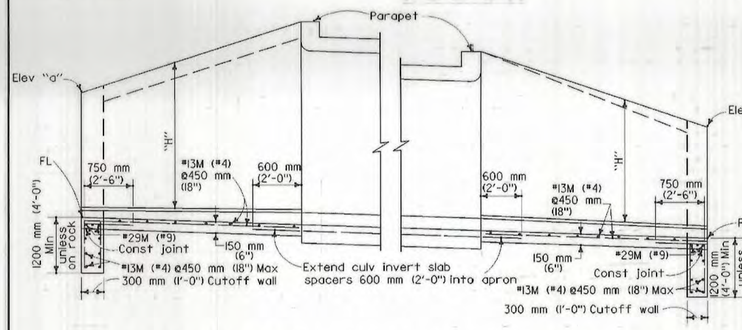
Storm Drain - MTD 1764
Sheet 18 of 21

10/25/11

01886

NUMBER

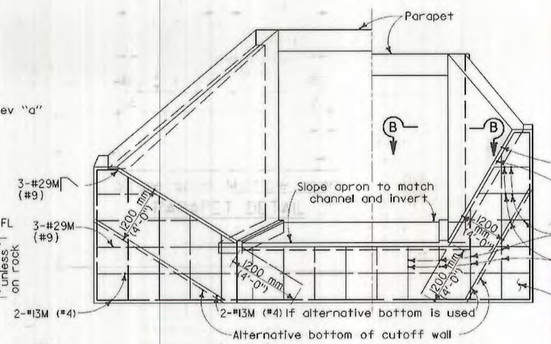
SAFCO PRODUCTS • NEW HOPE, MINNESOTA
REORDER BY PART NUMBER 8550



TYPICAL WITH STIFFENING BEAM

TYPICAL WITHOUT STIFFENING BEAM

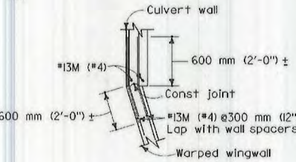
PART LONGITUDAL SECTION



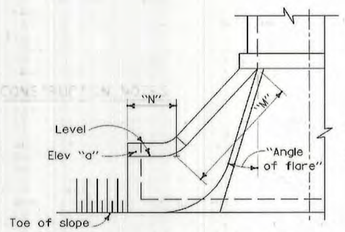
END ELEVATION



WITHOUT STIFFENING BEAM

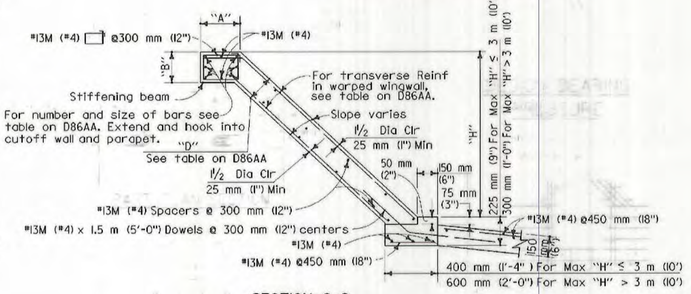


SECTION B-B



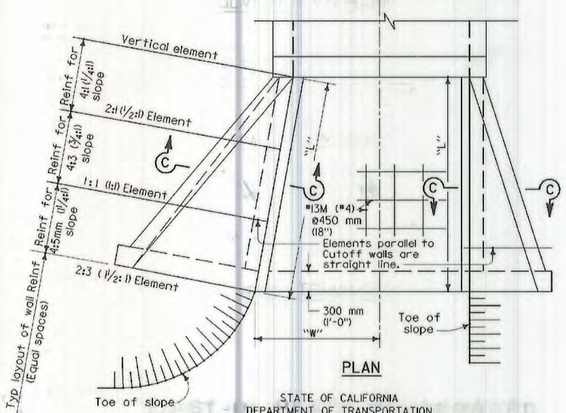
ALTERNATIVE WARPED WINGWALL

Use where additional protection to toe of embankment is required.



SECTION C-C

Where abrasion is anticipated increase apron thickness to 175 mm (7") minimum to provide 50 mm (2") minimum reinforcement coverage.



PLAN

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

BOX CULVERT WARPED WINGWALLS

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NO SCALE

D86A

2002 DUAL UNITS STD PLAN D86A

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

Paul Cotter
REGISTERED CIVIL ENGINEER

July 1, 2002
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Paul Cotter — No. C34509 — Exp. 9-30-03 CIVIL — STATE OF CALIFORNIA

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CITY OF SANTA CLARITA
DATE 6-7-06

REGISTERED PROFESSIONAL ENGINEER — JON M. AUSTIN — RCE 58726 — Exp. 03/31/07 CIVIL — STATE OF CALIFORNIA
PROJECT ENGINEER DATE 5-31-06

MetroPointe Engineers
3555 Harbor Gateway South, Suite A
Costa Mesa, CA 92626
(714) 438-1095

STORM DRAIN PLANS IN CITY OF SANTA CLARITA MTD. No. 1764

CITY OF SANTA CLARITA

STORM DRAIN PLAN AND PROFILE
MTD NO. 1764
CALTRANS STANDARD PLAN
D86A

DWG | SHEET 19 OF 21

128

DRAWING NUMBER
SMED PRODUCTS • NEW HOPE, MINNESOTA
REORDER BY PART NUMBER 6552
Storm Drain - MTD 1764 10/25/11
Sheet 19 of 21
01986
REORDER BY PART NUMBER 6552
NUMBER
REV HOPE, MINNESOTA
T NUMBER 6552

DRAWING NUMBER
SAFCO PRODUCTS • NEW HOPE, MINNESOTA
Storm Drain - MTD 1764 (01/25/11)
Sheet 20 of 21
01866
NUMBER

DESIGN NOTES

Specifications:
Design:
Bridge Design Specification (1983 AASHTO Specifications with revisions by Caltrans)
Load Factors: 1.5 D + 1.5 E + 2.5 (L + I)
Where D=Dead Load
E=Earth Load
L=Live Load
I=Impact
Capacity reduction factor is included.

Loading:
Live load:
HS20-44 truck
Apply impact only to the roof slab.

Earth Cover	Impact (%)
Up to 300 mm (1.0')	30
301mm to 600 mm (1.1' to 2.0')	20
601mm to 900 mm (2.1' to 3.0')	10
Over 900 mm (3.0')	0

No surcharge on walls due to live load.
Earth load:
Earth pressures for two conditions:
22.0 kPa/m (140 lbs/CF) vertical, 6.6 kPa/m (42 lbs/CF) horizontal.
22.0 kPa/m (140 lbs/CF) vertical, 22.0 kPa/m (140 lbs/CF) horizontal.

Unit stresses:
f'_c = 25 MPa (3600 psi)
f_y = 400 MPa (60,000 psi)

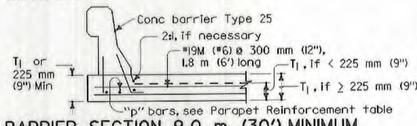
Distribution "d" bars:
Up to and including 3.0 m (10') cover
Expressed as a percent of main positive reinforcement required: $\frac{100}{0.0572\sqrt{S}}$, $\left(\frac{100}{\sqrt{S}}\right)$ Max 50%.
Over 3.0 m (10') cover
#13M (#4) @ 450 mm (18") maximum.

Shear:
maximum allowable shear, $v_c = 0.29\sqrt{f'_c}$, MPa, ($v_c = \sqrt{3.5 f'_c}$, psi)

Exclusions:
Compressive reinforcement and negative-moment reduction (for continuity) do not apply.
Axial loading on members has not been considered.

CONSTRUCTION NOTES

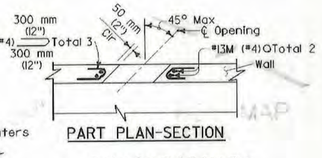
Construction loads:
Strutting required as shown on Standard Plan D88. Strutting may be required on culvert extensions when existing parapet is removed.
Expansion joints:
Invert:
No expansion joints shall be permitted.
Roof and Walls:
When cover is less than span length-
Place 13 mm (½") expansion joint filler at 9 m (30') ± centers outside the paved roadway lanes and place Bridge Detail 3-2, Standard Plan B0-3, at 9 m (30') centers under paved roadway lanes.
When cover is more than span length-
Place 13 mm (½") expansion joint filler at 9 m (30') ± centers and additional 13 mm (½") expansion joints at locations of change in foundation character, as directed by the Engineer.
Construction joints:
Temporary joints may be permitted if normal (or radial) to ℄ of RCB. Otherwise, the contractor is to submit a proposal for consideration.
Cutoff walls:
1.2 m (4') cutoff walls are to be provided at inlet and/or outlet unless adjacent channel is lined and unless otherwise shown. These walls are to be extended if scour conditions warrant.
Earthwork:
See Standard Plan A62E.
Backfill:
See Standard Specifications, except that the difference in level of backfill (against outside walls) shall not exceed 600 mm (2').



BARRIER SECTION 9.0 m (30') MINIMUM

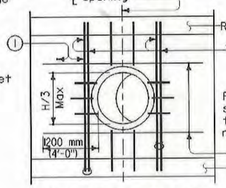
GENERAL NOTES

Designation:
Standard single or multiple box culverts are shown on plans as span times height with maximum cover over roof thus: 2440 mm x 1520 mm (8' X 5') RCB with 3 m (10') or DBL 3050 mm x 1520 mm (10' x 5') RCB with 6 m (20'), followed by alternatives.
Alternatives:
Single cell: invert will be sloped unless "trapezoidal invert", "flat invert" or "V invert" is included in designation
Multiple cell: invert will be vee unless "flat invert" is specified. Ends of culvert will be rounded unless "square ends" are designated. Parapets will be as shown unless designated in plans. Such designations may be different for inlet and outlet ends.
Quantities:
Quantities are for the sloped or vee invert and do not include "d" bars, nor splices in longitudinal bars, nor temperature reinforcement for exposed roof, nor concrete or reinforcement for parapets, cutoff walls or paving notches.
Reinforcement placement:
Main reinforcement is to be placed transverse or, for curved culverts, radial. When radial, reinforcing spacing of the "a", "f" and "g" bars is measured along the centerline. Stagger splices not shown. Hooks may be rotated or tilted, as necessary, for clearance.
Special reinforcement coverage:
Box standard plans are not to be used for culverts in a corrosive environment or where there is a severe abrasive flow condition or in freeze-thaw locations.
Special design:
Required for culverts with conditions, loads, design bearing pressures or sizes greater than those given on this plan or Standard Plans D80 & D81. Also required for multiple cell culverts with unequal spans. For culverts with railroad loading, see the current AREA design specification.
3 or more cells:
For culverts with more than two cells, use dimensions and reinforcement for the standard "double box culvert" and adjust quantities accordingly.



PART PLAN-SECTION

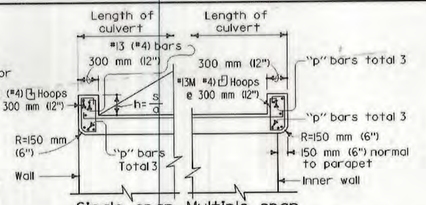
Bridge Detail 3-2 Std Plan B0-3, no expansion joint within 1.2 m (4') of ℄ opening



LONGITUDINAL SECTION
UTILITY OPENING-WALL
H= Height of box

For spans > 2440 mm (8') spread "b" & "c" bar tails or cut, as necessary, to fit.

① Adjacent to each side of the opening, place additional bars aquivalent to half the interrupted main reinforcement.



Single span Multiple span

PARAPET DETAIL

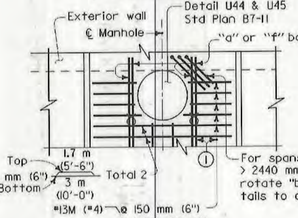
s = Clear span (mm)
a = 12 cosine skew angle

Parapet "p" bars			
Span \ Skew Angle	0° TO 15°	16° TO 30°	31° TO 45°
1220 mm (4')	#13M (#4)	#13M (#4)	#13M (#4)
1830 mm (6')	#13M (#4)	#13M (#4)	#16M (#5)
2440 mm (8')	#13M (#4)	#16M (#5)	#19M (#6)
3050 mm (10')	#16M (#5)	#19M (#6)	#22M (#7)
3660 mm (12')	#19M (#6)	#22M (#7)	#25M (#8)
4270 mm (14')	#22M (#7)	#25M (#8)	#29M (#9)

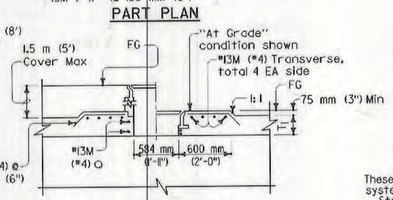
PARAPET REINFORCEMENT

Height \ Cover	3 m (10')	6 m (20')
1830 mm (6')	95 kPa (1.0 TSF)	150 kPa (1.6 TSF)
2440 mm (8')	105 kPa (1.1 TSF)	160 kPa (1.7 TSF)
3050 mm (10')	115 kPa (1.2 TSF)	170 kPa (1.8 TSF)
3660 mm (12')	125 kPa (1.3 TSF)	180 kPa (1.9 TSF)
4270 mm (14')	135 kPa (1.4 TSF)	190 kPa (2.0 TSF)

DESIGN BEARING PRESSURE



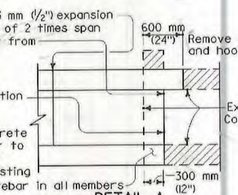
PART PLAN



PART LONGITUDINAL SECTION

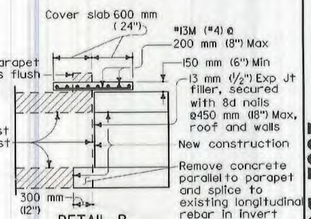
MANHOLE

Place a 13 mm (½") expansion Jt. a max of 2 times span or height from



DETAIL A

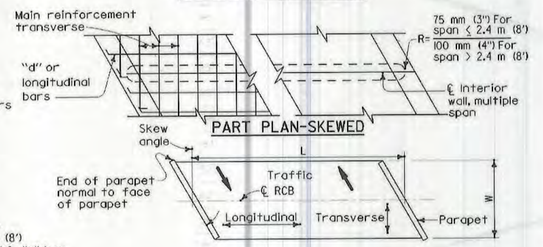
(20° maximun skew as shown. If existing longitudinal and transverse reinforcing bars in top slab are lap spliced with new longitudinal and transverse reinforcing bars, the 20° skew may be exceeded. Lap splicing may require removal of top slab in excess of 600 mm (24") shown.



DETAIL B

(Single cell only, no skew allowed, 300 mm (12") minimum cover.)

CULVERT EXTENSION



RCB TERMINOLOGY

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

CAST-IN-PLACE REINFORCED CONCRETE CULVERT MISCELLANEOUS DETAILS

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NO SCALE

D82

THIS STANDARD PLAN D82 INCLUDES CHANGES THAT WERE INCORPORATED IN REVISED STANDARD PLAN RSP D82, DATED OCTOBER 26, 2000, AND ISSUED AS A PART OF ERRATUM NO. 99-1 FOR THE 1999 METRIC STANDARD PLANS.

2002 DUAL UNITS STD PLAN D82

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

Paul Cotter
REGISTERED CIVIL ENGINEER
July 1, 2002
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AS BUILT

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ROBERT G. NEWMAN, P.E., L.S.
DIRECTOR OF PUBLIC WORKS
CITY OF SANTA CLARITA
DATE 6-7-06

REGISTERED PROFESSIONAL ENGINEER — JOHN M. AUSTIN — RCE 58726 — Exp. 03/31/07 — CIVIL — STATE OF CALIFORNIA
PROJECT ENGINEER — DATE 5-31-06

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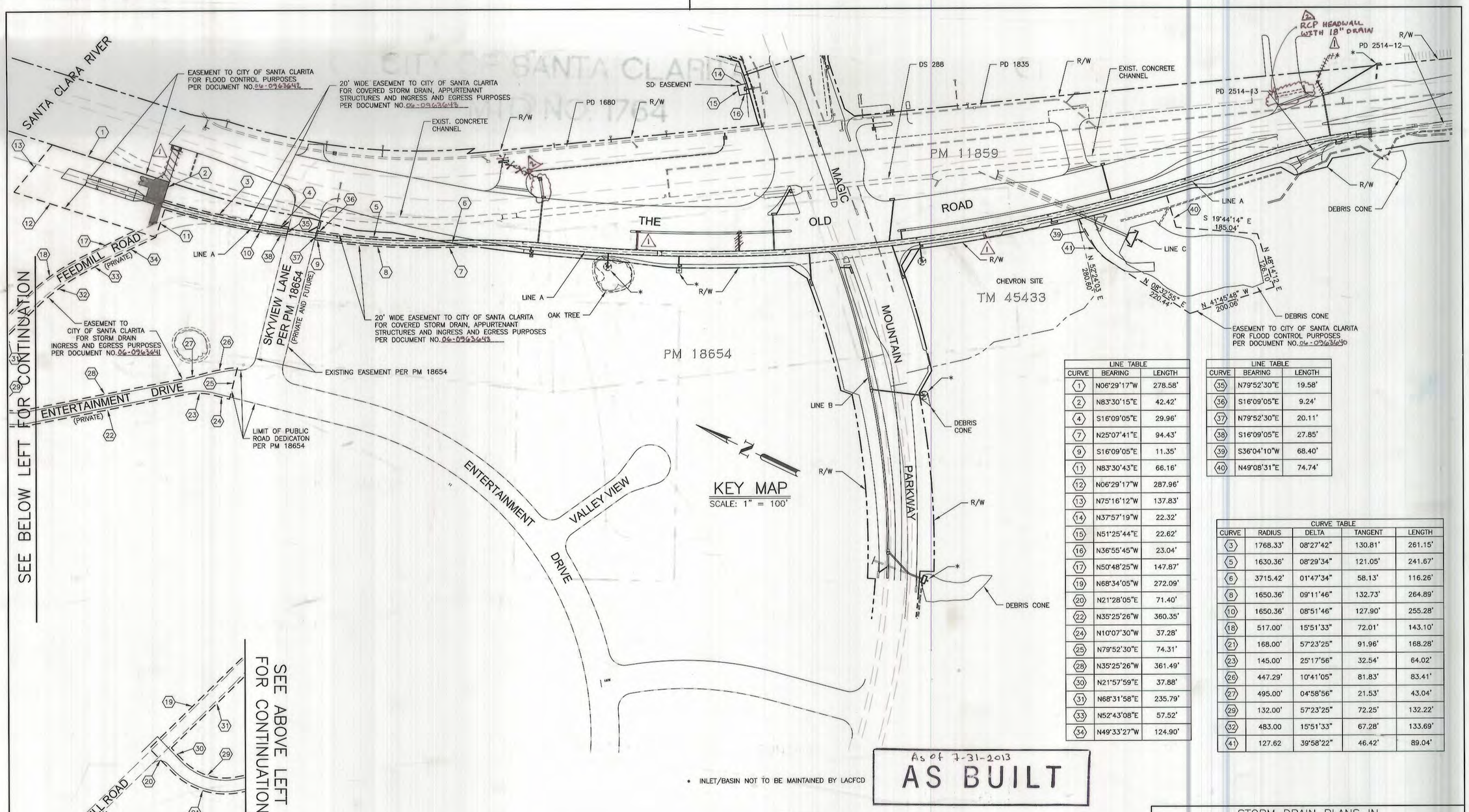
STORM DRAIN PLANS IN CITY OF SANTA CLARITA MTD. No. 1764
CITY OF SANTA CLARITA
STORM DRAIN PLAN AND PROFILE
MTD NO. 1764
CALTRANS STANDARD PLAN
D82

DWG | SHEET 18 OF 21
20



LINE TABLE		
CURVE	BEARING	LENGTH
1	N06°29'17"W	278.58'
2	N83°30'15"E	42.42'
4	S16°09'05"E	29.96'
7	N25°07'41"E	94.43'
9	S16°09'05"E	11.35'
11	N83°30'43"E	66.16'
12	N06°29'17"W	287.96'
13	N75°16'12"W	137.83'
14	N37°57'19"W	22.32'
15	N51°25'44"E	22.62'
16	N36°55'45"W	23.04'
17	N50°48'25"W	147.87'
19	N68°34'05"W	272.09'
20	N21°28'05"E	71.40'
22	N35°25'26"W	360.35'
24	N10°07'30"W	37.28'
25	N79°52'30"E	74.31'
28	N35°25'26"W	361.49'
30	N21°57'59"E	37.88'
31	N68°31'58"E	235.79'
33	N52°43'08"E	57.52'
34	N49°33'27"W	124.90'

LINE TABLE		
CURVE	BEARING	LENGTH
35	N79°52'30"E	19.58'
36	S16°09'05"E	9.24'
37	N79°52'30"E	20.11'
38	S16°09'05"E	27.85'
39	S36°04'10"W	68.40'
40	N49°08'31"E	74.74'

CURVE TABLE				
CURVE	RADIUS	DELTA	TANGENT	LENGTH
3	1768.33'	08°27'42"	130.81'	261.15'
5	1630.36'	08°29'34"	121.05'	241.67'
6	3715.42'	01°47'34"	58.13'	116.26'
8	1650.36'	09°11'46"	132.73'	264.89'
10	1650.36'	08°51'46"	127.90'	255.28'
18	517.00'	15°51'33"	72.01'	143.10'
21	168.00'	57°23'25"	91.96'	168.28'
23	145.00'	25°17'56"	32.54'	64.02'
26	447.29'	10°41'05"	81.83'	83.41'
27	495.00'	04°58'56"	21.53'	43.04'
29	132.00'	57°23'25"	72.25'	132.22'
32	483.00	15°51'33"	67.28'	133.69'
41	127.62	39°58'22"	46.42'	89.04'

As of 7-31-2013
AS BUILT

NO.	REVISIONS	REVISED BY	APPROVED BY	DATE
1	UPDATED LATERALS AND TURNAROUND	8/22/07		9-17-07
2	UPDATED LATERALS	2/22/10		2-23-10

APPROVED FOR CONSTRUCTION BY:
ROBERT G. NEWMAN, P.E., L.S.
DIRECTOR OF PUBLIC WORKS
CITY OF SANTA CLARITA
DATE 6-7-06

REGISTERED PROFESSIONAL ENGINEER
JON M. AUSTIN
RCE 58726
Exp. 03/31/07
CIVIL
STATE OF CALIFORNIA
PROJECT ENGINEER
DATE 5-31-06

MetroPointe Engineers
3555 Harbor Gateway South, Suite A
Costa Mesa, CA 92626
(714) 438-1095

STORM DRAIN PLANS IN
CITY OF SANTA CLARITA MTD. No. 1764

CITY OF SANTA CLARITA

STORM DRAIN PLAN AND PROFILE

EASEMENT EXHIBIT

DWG

SHEET 21 OF 21

DRAWING NUMBER
Storm Drain - MTD 1764
Sheet 21 of 21
01986
10/25/11
NUMBER

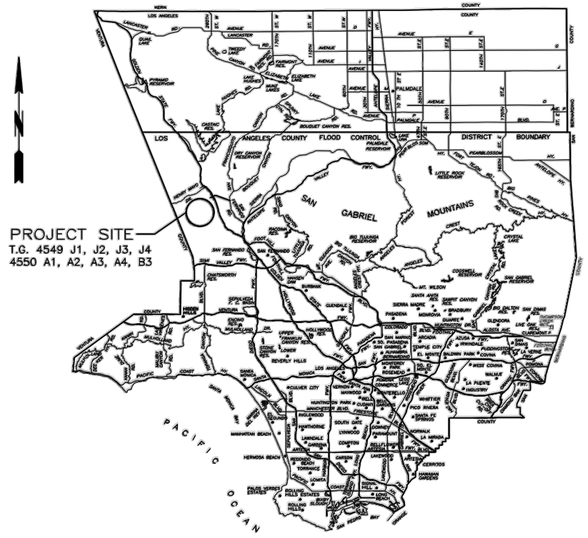
D-5: PD 2640

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS

EIMP2014000164

PRIVATE DRAIN NO 2640

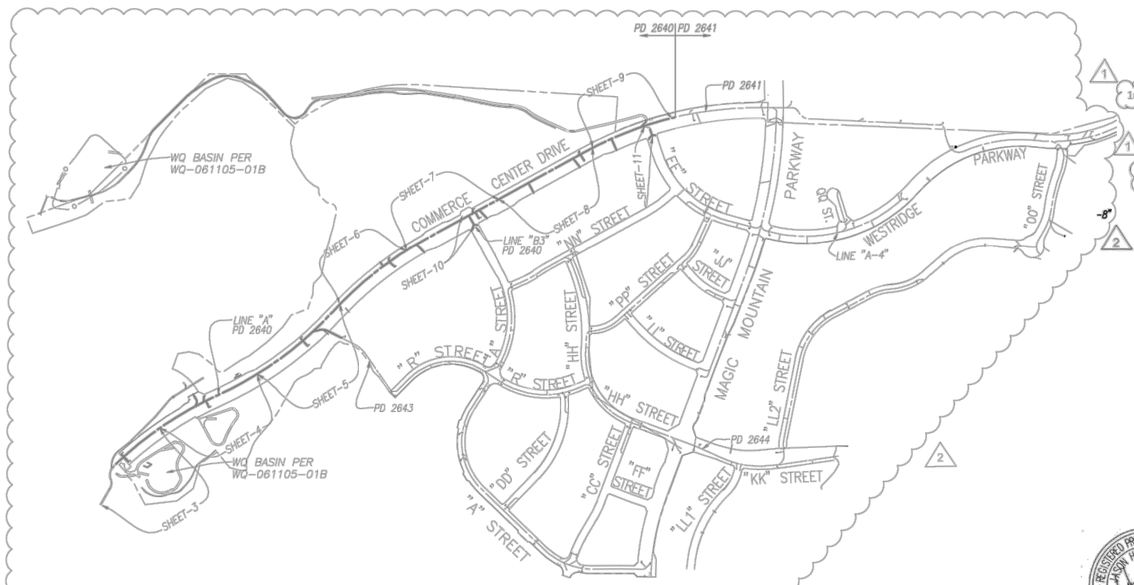
TRACT NO 61105-01



LOCATION MAP

INDEX TO PROJECT DRAWINGS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	GENERAL NOTES, WATER QUALITY NOTES, AND HYDRAULIC ELEMENTS
3	STORM DRAIN PLAN AND PROFILE – LINE "A" FROM STA. 13+71.06 TO 18+50.00
4	STORM DRAIN PLAN AND PROFILE – LINE "A" FROM STA. 18+50.00 TO 28+00.00
5	STORM DRAIN PLAN AND PROFILE – LINE "A" FROM STA. 28+00.00 TO 37+00.00
6	STORM DRAIN PLAN AND PROFILE – LINE "A" FROM STA. 37+00.00 TO 44+00.00
7	STORM DRAIN PLAN AND PROFILE – LINE "A" FROM STA. 44+00.00 TO 53+00.00
8	STORM DRAIN PLAN AND PROFILE – LINE "A" FROM STA. 53+00.00 TO 61+88.30
9	STORM DRAIN PLAN AND PROFILE – LINE "A" FROM STA. 61+88.30 TO 69+02.33
10	STORM DRAIN PLAN AND PROFILE – LINE "A-5" FROM STA. 10+38.90 TO 11+25.02
11	STORM DRAIN PLAN AND PROFILE – LINE "A-6" FROM STA. 43+00.53 TO 51+67.01
12	DETAILS
13	CATCH BASIN LATERAL PROFILES
14	CATCH BASIN LATERAL PROFILES
15	CATCH BASIN LATERAL PROFILES
16	STORM DRAIN EASEMENTS
17	STRUCTURE DETAIL NOTES
18	STRUCTURE DETAILS
19	STRUCTURE DETAILS
20	STORM DRAIN PLAN AND PROFILE - LINE "B" FROM STA. 31+42.67 TO 34+94.38
21	STRUCTURE DETAILS
22	STRUCTURE DETAILS



KEY MAP

SCALE: 1"=600'

CONSTRUCTION NOTES:

1. INSTALL 18" R.C.P. (SEE PROFILE FOR D-LOAD)
2. INSTALL 24" R.C.P. (SEE PROFILE FOR D-LOAD)
3. INSTALL 30" R.C.P. (SEE PROFILE FOR D-LOAD)
4. INSTALL 36" R.C.P. (SEE PROFILE FOR D-LOAD)
10. INSTALL 114" R.C.P. (SEE PROFILE FOR D-LOAD)
20. CONSTRUCT M.H. PER S.P.P.W.C. STD. PLAN 320-2
20a. CONSTRUCT MODIFIED M.H. PER S.P.P.W.C. STD. PLAN 320-2; SEE DETAILS ON SHEET 18 AND 19
21. CONSTRUCT M.H. PER S.P.P.W.C. STD. PLAN 321-2
22. CONSTRUCT M.H. PER S.P.P.W.C.. STD. PLAN 322-2
22a. CONSTRUCT MODIFIED M.H. PER S.P.P.W.C. STD. PLAN 322-2; SEE DETAIL ON SHEET 12
22b. CONSTRUCT MODIFIED M.H. PER S.P.P.W.C. STD. PLAN 322-2; SEE DETAILS ON SHEET 18 AND 19
24. CONSTRUCT CURB OPENING CATCH BASIN PER S.P.P.W.C., STD. PLAN NO. 300-3
MODIFIED CATCH BASIN PER DETAIL ON SHEET 21 AND SHEET 22 (2)
26. CONSTRUCT T.S. PER S.P.P.W.C. STD. PLAN 340-2
31. CONSTRUCT J.S. PER S.P.P.W.C. STD. PLAN 331-3
32. CONSTRUCT J.S. PER S.P.P.W.C. STD. PLAN 332-2
37. CONSTRUCT CLEANOUT PER DETAIL 37 ON SHEET 12
38. CONSTRUCT MANHOLE SAFETY LEDGE PER S.P.P.W.C. STD. PLAN 330-2
62. CONSTRUCT VELOCITY CONTROL RINGS PER S.P.P.W.C. STD. PLAN 383-2; H=3" SPACING SEE PLAN
70. CONSTRUCT PIPE ANCHOR AND BACKFILL STABILIZER PER S.P.P.W.C. STD. PLAN 221-2
73. CONSTRUCT CONCRETE BLANKET PER S.P.P.W.C. STD. PLAN 225-2
74. CONSTRUCT PIPE CULVERT HEADWALL PER CALTRANS DETAIL D86B
80. CONSTRUCT CONCRETE COLLAR PER S.P.P.W.C. STD. PLAN 380-4
81. CONSTRUCT 8" BRICK AND MORTAR PLUG
(1) INSTALL 72" R.C.P. (SEE PROFILE FOR D-LOAD)
(5) INSTALL 84" R.C.P. (SEE PROFILE FOR D-LOAD)

INDEX TO STANDARD DRAWINGS

CALIFORNIA DEPARTMENT OF TRANSPORTATION

STD. PLAN	TITLE
D86B	PIPE HEADWALLS

LOS ANGELES COUNTY DEPT. OF PUBLIC WORKS

STD. PLAN	TITLE
2032-2	CRADLING AND ENCASEMENT
3080-2	PIPE BEDDING
6008-1	MINIMUM PUBLIC SAFETY REQUIREMENTS FOR OPEN EXCAVATIONS

STANDARD PLANS FOR PUBLIC WORK CONSTRUCTION

STD. PLAN	TITLE
221-2	PIPE ANCHORS AND BACKFILL STABILIZERS
225-2	CONCRETE BLANKET
300-3	CURB OPENING CATCH BASIN
313-3	LOCAL DEPRESSIONS AT CATCH BASINS
320-2	MANHOLE – PIPE TO PIPE (36" OR LARGE)
321-2	MANHOLE – PIPE TO PIPE (33" OR SMALL)
322-2	MANHOLE – PIPE TO PIPE (LARGE INSIDE INLET)
330-2	MANHOLE SHAFT SAFETY LEDGE
331-3	JUNCTION STRUCTURE – PIPE TO PIPE
332-2	JUNCTION STRUCTURE – PIPE TO PIPE (ID < 24")
340-2	TRANSITION STRUCTURE – PIPE TO PIPE
380-4	CONCRETE COLLAR
383-2	VELOCITY CONTROL RINGS



CATCH BASIN STENCIL DETAIL

NTS

THIS DETAIL SHOULD APPEAR ON TOP OF ALL CATCH BASINS

ALL CATCH BASINS AND INLETS THAT DISCHARGE INTO AN EXISTING OR PROPOSED STORM DRAIN MUST BE STENCILED TO DISCOURAGE ILLEGAL DUMPING OFPOLLUTANTS. THIS STENCIL SHALL HAVE A MINIMUM DIAMETER OF 30 INCHES.

BENCH MARK: NEWHALL QUAD (2009) NAVD88
LADPW L 5210
DPW BM TAG IN E CB 3' N/O END @ SE COR RYE CYN RD & THE OLD ROAD 85' S & 55' E/O C/L INT.

ELEV. 1061.448 FEET ADJUSTMENT 2009

APPROVED MARK PESTRELLA, DIRECTOR OF PUBLIC WORKS	
BY ASSISTANT DIVISION ENGINEER	7/31/2018 DATE
RECOMMENDED LAND DEVELOPMENT DIVISION	
BY STORM DRAIN SECTION	7/31/2018 DATE
SUBMITTED	
BY STORM DRAIN SECTION	7/31/2018 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
1	ADD NOTES FOR 84" R.C.P., REVISED TOTAL SHEET NUMBER, ADD LINE TO INDEX.		MD.	9/20/2018
2	ADDED STRUCTURAL DETAIL SHEETS 21 AND 22. REVISED CONSTRUCTION NOTE 24.	No. 40695	MD.	06/11/2019
	REVISED TOTAL SHEET NUMBER. REVISE HYDRAULIC ELEMENTS REVISE AND ADD LATERALS			
3	REVISED LINE A-5 REVISED THE KEY MAP REVISED LATERALS PER BUILDER SITE, EXTENDED LATERALS TO TOP OF SLOPE		MD.	11/09/2020

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

JASON H. FUKUMITSU DATE 7-20-18

PRIVATE ENGINEERS NOTICE TO CONTRACTORS

The existence and location of any underground utility pipes or structures shown on these plans are obtained by a search of the available records. To the best of our knowledge, there are no existing utilities except as shown on this map. The contractor is required to take due precautionary measures to protect the utility lines shown and any other lines not of record or shown on this drawing.

RCE SIGNATURE 7-20-18 DATE

STORM DRAIN PLANS IN
TRACT No. 61105-1 P.D. No. 2640
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
26074 Avenue Hall, Suite 23 ▪ Valencia, CA 91355 ▪ PH (661) 294-2211 ▪ FX (661) 294-9930

DWG SHEET 1 OF 19 22

G:\Newhall Ranch\61105 Mission Village\61105-01\Submit\PD 2640\WM081-01_Title Sheet.dwg Plotted on Jul 19, 2018 - 1:21pm by conness

GENERAL NOTES:

1. A PERMIT SHALL BE OBTAINED AND A DEPOSIT PAID TO THE DEPARTMENT OF PUBLIC WORKS AT THE PERMIT COUNTER, 900 SOUTH FREMONT AVENUE 3RD FLOOR, ALHAMBRA, AT LEAST 72 HOURS PRIOR TO STARTING WORK UNDER THIS CONTRACT. ALL OTHER REQUIRED PERMITS, SUCH AS ROAD EXCAVATION PERMITS, MUST BE OBTAINED PRIOR TO STARTING WORK.
2. WHEN WORK IS WITHIN A CONTRACT CITY, CONTRACTOR MUST CONTACT THE DIRECTOR OF PUBLIC WORKS OF THAT CITY TO DETERMINE THE LOCATION TO PAY THE INSPECTION DEPOSIT.
3. THE CONTRACTOR SHALL CONTACT THE DISTRICT OFFICE LISTED ON THE "APPLICATION FOR STORM DRAIN CONSTRUCTION INSPECTION FORM I" TO ARRANGE FOR AN ACCEPTABLE CONSTRUCTION START DATE.
4. APPROVAL OF THIS PLAN BY THE COUNTY OF LOS ANGELES DOES NOT CONSTITUTE A REPRESENTATION AS TO THE ACCURACY OF THE LOCATION, OR THE EXISTENCE OR NONEXISTENCE OF ANY UNDERGROUND UTILITY, PIPE OR STRUCTURE WITHIN THE LIMITS OF THIS PROJECT. THIS NOTE APPLIES TO ALL SHEETS.
5. ALL WORK SHALL BE IN ACCORDANCE WITH THE LATEST ADOPTED EDITION OF THE "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION," INCLUDING SUPPLEMENTS AND SHALL BE PROSECUTED ONLY IN THE PRESENCE OF THE DIRECTOR OF PUBLIC WORKS/CITY ENGINEER.
6. THE CONTRACTOR'S ATTENTION IS DIRECTED TO SECTION 7–10.4.1 OF THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION IN REGARD TO SAFETY ORDERS AND SHALL CONFORM TO THE "MINIMUM PUBLIC SAFETY REQUIREMENTS" AS SHOWN ON LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS STANDARD PLAN 6008.
7. ELEVATIONS ARE IN FEET ABOVE U.S.C. & G.S. MEAN SEA LEVEL DATUM OF 1929, UNLESS OTHERWISE INDICATED.
8. NO CONCRETE SHALL BE PLACED UNTIL THE FORMS AND REINFORCING STEEL HAVE BEEN PLACED, INSPECTED AND APPROVED.
9. ALL STRUCTURAL CONCRETE SHALL BE PORTLAND CEMENT CONCRETE WITH AN ULTIMATE 28 DAY COMPRESSIVE STRENGTH OF 4000 P.S.I. UNLESS OTHERWISE NOTED.
10. TRANSVERSE REINFORCEMENT AND TRANSVERSE JOINTS SHALL BE PLACED AT RIGHT ANGLES (OR RADIAL) TO THE CONDUIT CENTERLINE EXCEPT AS OTHERWISE SHOWN ON THE DRAWINGS.
11. ALL STEEL ADJACENT TO FACE OF CONCRETE SHALL HAVE 2–1/2 INCH CLEARANCE UNLESS OTHERWISE SPECIFIED.
12. REINFORCEMENT SHALL BE DEFORMED BARS OF INTERMEDIATE GRADE STEEL PER A.S.T.M. A–615–GRADE 60.
13. ALL BAR BENDS AND HOOKS SHALL CONFORM TO THE AMERICAN CONCRETE INSTITUTE "MANUAL OF STANDARD PRACTICE."
14. DIMENSIONS FROM FACE OF CONCRETE TO STEEL ARE TO CENTER LINE OF STEEL UNLESS OTHERWISE NOTED.
15. ALL STEEL THAT IS TO BE CONTINUOUS SHALL HAVE A MINIMUM LAP OF 30 BAR DIAMETERS OR 18 INCHES WHICHEVER IS GREATER.
16. ALL CONSTRUCTION JOINTS IN THE FOOTING OF SLABS AND WALLS SHALL BE IN THE SAME PLANE. NO STAGGERING OF JOINTS WILL BE PERMITTED.
17. ALL EXPOSED EDGES SHALL BE FINISHED WITH A 3/4 INCH CHAMFER.
18. UNLESS OTHERWISE SHOWN, CONCRETE DIMENSIONS SHALL BE MEASURED VERTICALLY OR HORIZONTALLY AND PARALLEL OR AT RIGHT ANGLES (OR RADIAL) TO THE CENTER LINE OF CONSTRUCTION.
19. CONCRETE BACKFILL IS REQUIRED WHEN THE PIPE HAS LESS THAN ONE FOOT OF COVER. THE CONCRETE BACKFILL SHALL CONSIST OF 1:3:5 MIX, PORTLAND CEMENT CONCRETE POURED FROM WALL TO WALL OF TRENCH AND FROM BOTTOM OF TRENCH TO A MINIMUM OF 4 INCHES OVER THE TOP OF THE PIPE.
20. ALL PIPES SHALL BE PLACED IN TRENCH IN NATURAL GROUND AND/OR COMPACTED FILL. THE GROUND LEVEL BEFORE THE TRENCHING SHALL BE AT LEAST 3 FEET ABOVE THE TOP OF THE PIPE ELEVATION, OR AT FINISH SURFACE ELEVATION, WHICHEVER IS LESS.
21. ALL BACKFILL AND FILLS OUTSIDE OF STREET RIGHT–OF–WAY SHALL BE COMPACTED TO MIN. 90 PERCENT OF MAXIMUM DENSITY AS DETERMINED BY A.S.T.M. SOIL COMPACTION TEST D 1557–91 METHOD "D" UNLESS OTHERWISE SPECIFIED. THIS SHALL BE CERTIFIED BY A GEOTECHNICAL ENGINEER. THIS CERTIFICATION SHALL BE SUBMITTED TO THE CITY ENGINEER PRIOR TO ACCEPTANCE OF THE WORK BY THE COUNTY.
22. ALL BACKFILL AND FILLS WITHIN STREET RIGHT–OF–WAY SHALL BE COMPACTED IN ACCORDANCE WITH SECTION 306–1.3.4 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED AND INSPECTED BY THE CITY. CONTRACTOR SHALL NOTIFY THE INSPECTOR AT LEAST 24 HOURS IN ADVANCE FOR SOIL TESTING AS REQUIRED BY THE INSPECTOR.
23. PIPE BEDDING SHALL BE:

    IN ACCORDANCE WITH THE COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS STANDARD PLAN NO. 3092 UNLESS OTHERWISE NOTED.

    ACCORDING TO STANDARD PLAN NO. 3080–0, CASE 3, EXCEPT BELL AND SPIGOT PIPE WHICH SHALL BE CASE 2 BEDDING, UNLESS OTHERWISE SHOWN. "W" VALUES SHALL BE AS SPECIFIED ON STANDARD PLAN 3080–0 FOR CASE 3 BEDDING, NOTES 3 (A), 3 (B), AND 3 (C). IF THE "W" VALUE AT THE TOP OF THE PIPE IS EXCEEDED, THE BEDDING SHALL BE MODIFIED, AND/OR PIPE OF ADDITIONAL STRENGTH SHALL BE PROVIDED. THE PROPOSED MODIFICATION SHALL BE APPROVED BY THE DEPARTMENT.
24. PIPE SHALL BE EMBEDDED 5 INCHES INTO ALL STRUCTURES INCLUDING INLET AND OUTLET HEADWALLS, UNLESS OTHERWISE SPECIFIED.
25. THE MINIMUM CONCRETE COVER FOR REINFORCEMENT IN PRECAST CONCRETE PIPE SHALL BE 1 INCH IN PIPE HAVING A WALL THICKNESS OF 2 1/2 INCHES OR GREATER AND 3/4 INCH IN PIPE HAVING A WALL THICKNESS OF LESS THAN 2 1/2 INCHES.
26. ALL CATCH BASINS WITHIN THE DEDICATED STREET RIGHT–OF–WAY SHALL BE CONSTRUCTED PER THE STREET PLANS.
27. THE CONTRACTOR SHALL PROVIDE TO THE SATISFACTION OF THE CITY ENGINEER AND THE DIRECTOR OF PUBLIC WORKS A DRAINAGE SYSTEM FOR CONTRIBUTARY FLOWS TO BE OPERABLE AT ALL TIMES UNTIL THIS STORM DRAIN SYSTEM IS ACCEPTED FOR MAINTENANCE. THE DESIGN OF THE DRAINAGE SYSTEM MUST BE PREPARED UNDER THE DIRECTION OF A CIVIL ENGINEER.

GENERAL NOTES (Cont'd)

28. ALL REFERENCES ON THIS PLAN TO THE COUNTY ENGINEER, ROAD DEPARTMENT, OR FLOOD CONTROL DISTRICT SHALL APPLY TO THE APPROPRIATE ELEMENTS OF THE DEPARTMENT OF PUBLIC WORKS.
29. EXISTING UTILITIES SHALL BE MAINTAINED IN PLACE BY THE CONTRACTOR, UNLESS OTHERWISE NOTED.
30. UNLESS OTHERWISE INDICATED CROSSING UTILITIES ARE TO BE SUPPORTED IN ACCORDANCE WITH STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION NO. 224–2
31. ALL OPENINGS RESULTING FROM THE CUTTING OR PARTIAL REMOVAL OF EXISTING CULVERTS, PIPES OR SIMILAR STRUCTURES SHALL BE SEALED WITH 8 INCHES OF BRICK AND MORTAR OR 6 INCHES OF CONCRETE, UNLESS OTHERWISE SHOWN.
32. MANHOLES SHALL USE THE STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION 630–2 FOR THE "FRAME AND COVER" AND 635–2 FOR THE "STANDARD DROP STEP."
33. THIS STORM DRAIN WILL NOT BE FIELD ACCEPTED FOR MAINTENANCE UNTIL THE STREETS HAVE BEEN PAVED, MANHOLES BROUGHT TO GRADE AND THE SYSTEM CLEANED TO THE SATISFACTION OF THE DIRECTOR OF PUBLIC WORKS.
34. AN NPDES PERMIT FROM THE REGIONAL WATER QUALITY CONTROL BOARD IS REQUIRED BEFORE ANY DISCHARGE OF NON–STORM WATER INTO THE STORM DRAIN IS ALLOWED.
35. THE LATEST REVISED STANDARD PLAN OR DRAWING SHALL BE USED UNLESS OTHERWISE NOTED.
36. THE SOILS ENGINEER OF RECORD SHALL INSPECT AND APPROVE THE FOUNDATION EXCAVATIONS BEFORE STEEL OR CONCRETE IS PLACED.
37. STORM DRAIN MANHOLE COVERS CONSTRUCTED PER S.P.P.W.C. STANDARD PLANS 630, 631, 632 AND 633 SHALL BE CAST WITH THE LETTERS "L.A.C.F.C.D.". THE LETTERS SHALL BE 1 INCH IN HEIGHT AND PLACED BELOW THE LETTER "D" IN THE CENTER OF THE COVER.
38. STORM DRAIN MANHOLE COVERS CONSTRUCTED PER S.P.P.W.C. STANDARD PLANS 312 SHALL BE CAST WITH THE LETTERS "L.A.C.F.C.D.". THE LETTERS SHALL BE 1 INCH IN HEIGHT AND PLACED BELOW THE LETTER "D" IN THE CENTER OF THE COVER.
39. ALL ABOVE GROUND FACILITIES SHALL BE STAMPED WITH THE DRAIN AND LINE NAME. THE LETTERING SHOULD BE 4" BLACK TEXT ON A YELLOW BACKGROUND.
40. EVERY 100 FEET STATIONS SHALL BE LABELED ON THE INSIDE OF ALL STORM DRAINS AND WALL OF OPEN CHANNELS. THE LETTERING SHOULD BE 4" BLACK TEXT ON A YELLOW BACKGROUND AND SHOULD BE PLACED IN THE SOFFIT OF PIPES AND THE TOP 2 FEET OF A CHANNEL WALL.
41. FOR ALL DEBRIS BASINS, THE 0%, 5% AND 25% DEBRIS CONE ELEVATIONS SHALL BE LABELED ON THE CONCRETE FACING SLAB AND THE STAND PIPE.
42. PRIOR TO ORDERING PIPES, CONTACT GEOTECHNICAL & MATERIALS DIVISION AT (626) 458–1707 TO SCHEDULE FOR D–LOAD INSPECTION. FEES PAYABLE AT LAND DEVELOPMENT DIVISION PUBLIC COUNTER WILL BE REQUIRED.

VOID

STORMWATER POLLUTION CONTROL REQUIREMENTS FOR STORM DRAIN CONSTRUCTION

A. NOTES:

1. EVERY EFFORT SHOULD BE MADE TO ELIMINATE THE DISCHARGE OF NON–STORM WATER FROM THE PROJECT SITE AT ALL TIME.
2. ERODED SEDIMENTS AND OTHER POLLUTANTS MUST BE RETAINED ON SITE AND MAY NOT BE TRANSPORTED FROM THE SITE VIA SHEETFLOW, SWALES, AREA DRAINS, NATURAL DRAINAGE COURSES OR WIND.
3. STOCKPILES OF EARTH AND OTHER CONSTRUCTION RELATED MATERIALS MUST BE PROTECTED FROM BEING TRANSPORTED FROM THE SITE BY THE FORCES OF WIND OR WATER.
4. FUELS, OILS, SOLVENTS, AND OTHER TOXIC MATERIALS MUST BE STORED IN ACCORDANCE WITH THEIR LISTING AND ARE NOT TO CONTAMINATE THE SOIL AND SURFACE WATERS. ALL APPROVED STORAGE CONTAINERS ARE TO BE PROTECTED FROM THE WEATHER. SPILLS MUST BE CLEANED UP IMMEDIATELY AND DISPOSED OF IN A PROPER MANNER. SPILLS MAY NOT BE WASHED INTO THE DRAINAGE SYSTEM.
5. EXCESS OR WASTE CONCRETE MAY NOT BE WASHED INTO THE PUBLIC WAY OR ANY OTHER DRAINAGE SYSTEM. PROVISIONS SHALL BE MADE TO RETAIN CONCRETE WASTES ON SITE UNTIL THEY CAN BE DISPOSED OF AS SOLID WASTE.
6. TRASH AND CONSTRUCTION RELATED SOLID WASTES MUST BE DEPOSITED INTO A COVERED RECEPTACLE TO PREVENT CONTAMINATION OF RAINWATER AND DISPERSAL BY WIND.
7. SEDIMENTS AND OTHER MATERIALS MAY NOT BE TRACKED FROM THE SITE BY VEHICLE TRAFFIC. THE CONSTRUCTION ENTRANCE ROADWAYS MUST BE STABILIZED SO AS TO INHIBIT SEDIMENTS FROM BEING DEPOSITED INTO THE PUBLIC WAY. ACCIDENTAL DEPOSITIONS MUST BE SWEPT UP IMMEDIATELY AND MAY NOT BE WASHED DOWN BY RAIN OR OTHER MEANS.
8. ANY SLOPES WITH DISTURBED SOILS OR DENUDED OF VEGETATION MUST BE STABILIZED SO AS TO INHIBIT EROSION BY WIND AND WATER.

B. THE FOLLOWING BMPs AS OUTLINED IN, BUT NOT LIMITED TO, THE LATEST EDITION OF THE <u>CALIFORNIA BMP HANDBOOK (CONSTRUCTION) OR CALTRANS STORMWATER QUALITY HANDBOOKS (CONSTRUCTION SITE BMP MANUAL)</u>, MAY APPLY DURING THE CONSTRUCTION OF THIS PROJECT (ADDITIONAL MEASURES MAY BE REQUIRED IF DEEMED APPROPRIATE BY THE PROJECT ENGINEER OR THE BUILDING OFFICIAL):

EROSION CONTROL
EC1 – SCHEDULING
EC2 – PRESERVATION OF EXISTING VEGETATION
EC3 – HYDRAULIC MULCH
EC4 – HYDROSEEDING
EC5 – SOIL BINDERS
EC6 – STRAW MULCH
EC7 – GEOTEXTILES & MATS
EC8 – WOOD MULCHING
EC9 – EARTH DIKES & DRAINAGE SWALES
EC10 – VELOCITY DISSIPATION DEVICES
EC11 – SLOPE DRAINS
EC12 – STREAMBANK STABILIZATION
EC13 – RESERVED
EC14 – COMPOST BLANKETS
EC15 – SOIL PREPARATION/ROUGHENING
EC16 – NON–VEGETATED STABILIZATION

TEMPORARY SEDIMENT CONTROL
SE1 – SILT FENCE
SE2 – SEDIMENT BASIN
SE3 – SEDIMENT TRAP
SE4 – CHECK DAM
SE5 – FIBER ROLLS
SE6 – GRAVEL BAG BERM
SE7 – STREET SWEEPING AND VACUUMING
SE8 – SAND BAG BARRIER
SE9 – STRAW BALE BARRIERS
SE10 – STORM DRAIN INLET PROTECTION
SE11 – ACTIVE TREATMENT SYSTEMS
SE12 – TEMPORARY SILT DIKE
SE13 – COMPOST SOCKS & BERMS
SE14 – BIOFILTER BAGS

WIND EROSION CONTROL
WE1 – WIND EROSION CONTROL

EQUIPMENT TRACKING CONTROL
TC1 – STABILIZED CONSTRUCTION ENTRANCE/EXIT
TC2 – STABILIZATION CONSTRUCTION ROADWAY
TC3 – ENTRANCE/OUTLET TIRE WASH

NON–STORMWATER MANAGEMENT
NS1 – WATER CONSERVATION PRACTICES
NS2 – DEWATERING OPERATIONS
NS3 – PAVING AND GRINDING OPERATIONS
NS4 – TEMPORARY STREAM CROSSING
NS5 – CLEAR WATER DIVERSION
NS6 – ILLICIT CONNECTION/DISCHARGE
NS7 – POTABLE WATER/IRRIGATION
NS8 – VEHICLE AND EQUIPMENT CLEANING
NS9 – VEHICLE AND EQUIPMENT FUELING
NS10 – VEHICLE AND EQUIPMENT MAINTENANCE
NS11 – PILE DRIVING OPERATIONS
NS12 – CONCRETE CURING
NS13 – CONCRETE FINISHING
NS14 – MATERIAL AND EQUIPMENT USE
NS15 – DEMOLITION ADJACENT TO WATER
NS16 – TEMPORARY BATCH PLANTS

WASTE MANAGEMENT AND MATERIAL POLUTION CONTROL
WM–1 – MATERIAL DELIVERY AND STORAGE
WM–2 – MATERIAL USE
WM–3 – STOCKPILE MANAGEMENT
WM–4 – SPILL PREVENTION AND CONTROL
WM–5 – SOLID WASTE MANAGEMENT
WM–6 – HAZARDOUS WASTE MANAGEMENT
WM–7 – CONTAMINATION SOIL MANAGEMENT
WM–8 – CONCRETE WASTE MANAGEMENT
WM–9 – SANITARY/SEPTIC WASTE MANAGEMENT
WM–10 – LIQUID WASTE MANAGEMENT

HYDRAULIC ELEMENTS

LINE	PIPE REACH FROM STA.	TO STA.	Q (CFS)	DIA	Vmax (FPS)	REMARKS
"A"	13+71.06	14+64.35	2143.9	114"	31.9	2,3
	14+64.35	18+50.00	2091.3	114"	35.3	2,3
	18+50.00	22+03.37	2041.3	114"	31.6	2,3
	22+03.37	22+96.74	2001.3	114"	32.8	2,3
	22+96.74	28+00.00	1993.6	114"	36.8	2,3
	28+00.00	33+89.00	1980.6	114"	36.8	2,3
	33+89.00	37+00.00	1518.8	114"	39.1	2,3
	37+00.00	42+43.06	1518.8	114"	39.1	2,3
	42+43.06	66+73.09	1512.4	114"	25.0	1
	66+73.09	69+02.33	1476.4	114"	20.8	1
"A–2"	10+16.12	11+20.25	90.0	36"	12.7	
"A–5"	10+43.14	11+25.02	1.7	24"	19.0	
"A–6"	43+00.53	44+07.79	3.1	24"	15.0	
	44+07.79	47+00.30	2.1	24"	6.2	
	47+00.30	51+67.01	1.1	24"	6.6	
"A.13"	10+04.72	10+58.29	4.2	18"	9.0	
"A.14"	10+04.75	10+27.24	3.5	18"	12.5	
"A.15"	10+08.00	10+47.02	3.1	24"	16.4	
"A.16"	10+04.72	10+58.25	3.3	18"	15.6	
"A.17"	10+04.84	10+27.75	4.1	18"	15.3	
"A.18"	10+04.69	10+58.25	3.5	18"	13.6	
"A.19"	10+06.33	10+35.75	48.7	30"	9.9	
"A.20"	10+08.34	10+32.12	3.4	18"	18.4	
"A.21"	10+07.23	10+60.36	4.7	18"	15.3	
"A.22"	10+06.79	10+81.11	26.7	24"	22.2	1
"A.23"	10+02.97	10+32.12	4.5	18"	30.1	2
"A.24"	10+04.55	10+58.25	4.9	18"	23.0	1
"A.25"	10+07.60	10+80.78	1.3	36"	12.3	
"A.26"	10+07.01	10+79.33	2.0	30"	14.9	
"A.27"	10+02.16	10+32.04	1.0	18"	23.8	1
"A.28"	10+04.50	10+58.25	0.5	18"	12.0	
"A.29"	10+06.33	10+90.25	20.0	30"	27.3	1
"A.30"	10+16.30	10+64.84	36.0	30"	7.4	
"A5.1"	10+01.00	10+39.28	0.6	18"	12.4	
"A5.2"	10+00.80	10+24.25	1.1	18"	10.8	
"A6.1"	10+03.22	10+26.40	0.5	18"	6.5	
"A6.2"	10+02.60	10+15.27	0.5	18"	9.8	
"A6.3"	10+04.27	10+36.37	1.0	18"	8.2	
"B"	31+63.04	32+28.25	606.8	84"	38.2	2
	32+28.25	32+91.26	606.8	84"	38.2	2,3
	32+91.26	34+30.00	606.8	84"	37.3	2,3
	34+30.00	34+76.05	606.8	84"	37.3	2
	34+76.05	34+94.38	570.2	84"	23.0	
"B.7"	10+00.00	10+21.21	22.0	30"		4

PIPE LENGTHS CHART:

PIPE SIZE	TOTAL LENGTHS
18"	612'
24"	1,044'
30"	~~187'~~ 201'
36"	194'
114"	5,412'
TOTAL	~~7,481'~~ 7,814'

TOTAL SQ. FT. OF EASEMENT AQCUIRED = ~~9,123~~ SQ.FT. 15,504

PIPE SIZE	TOTAL LENGHTS
84"	126'
72"	193'

1 ADD AN ADDITIONAL 0.5" OF CONCRETE COVER OVER THE INVERT STEEL FOR V > 20 FPS.

2 ADD AN ADDITIONAL 1.0" OF CONCRETE COVER OVER THE INVERT STEEL FOR V > 30 FPS.

3 ADD VELOCITY CONTROL RINGS FOR V > 40 FPS.

4 NOT TO BE MAINTAINED BY LACFCD

FOR PLAN CHECK ONLY

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

REVIEWED LAND DEVELOPMENT DIVISION
BY M.D. Esfandi STORM DRAIN SECTION 7/31/2018 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
1	ADD LINE B AND LAT. B.7 TO ELEMENTS, REVISED TOTAL SHEET NUMBER, REVISE PIPE LENGHTS AND SQ. FT OF EASEMENTS.	(signature)	MD. Esfand	9/20/2018
2	VOIDED SHEET 2 AND REPLACED WITH SHEET 2A	(signature) No.40695	MD. Esfand	06/11/2019

JASON H. FUKUMITSU 7-20-18 DATE

STORM DRAIN PLANS IN
TRACT No. 61105–1 P.D. No. 2640
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
26074 Avenue Hall, Suite 23 ▪ Valencia, CA 91355 ▪ PH: (661) 294-2211 ▪ FX: (661) 294-9890

DWG | SHEET 2 OF ~~19~~ 20

G:\Newhall Ranch\61105 Mission Village\61105–01\Storm\PD 2640\HMV081–02_Notes.dwg Plotted on Jul 19, 2018–1:21pm by ransess

DDN# 43-F546-.1-.19

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GENERAL NOTES:

1. A PERMIT SHALL BE OBTAINED AND A DEPOSIT PAID TO THE DEPARTMENT OF PUBLIC WORKS AT THE PERMIT COUNTER, 900 SOUTH FREMONT AVENUE 3RD FLOOR, ALHAMBRA, AT LEAST 72 HOURS PRIOR TO STARTING WORK UNDER THIS CONTRACT. ALL OTHER REQUIRED PERMITS, SUCH AS ROAD EXCAVATION PERMITS, MUST BE OBTAINED PRIOR TO STARTING WORK.
2. WHEN WORK IS WITHIN A CONTRACT CITY, CONTRACTOR MUST CONTACT THE DIRECTOR OF PUBLIC WORKS OF THAT CITY TO DETERMINE THE LOCATION TO PAY THE INSPECTION DEPOSIT.
3. THE CONTRACTOR SHALL CONTACT THE DISTRICT OFFICE LISTED ON THE "APPLICATION FOR STORM DRAIN CONSTRUCTION INSPECTION FORM I" TO ARRANGE FOR AN ACCEPTABLE CONSTRUCTION START DATE.
4. APPROVAL OF THIS PLAN BY THE COUNTY OF LOS ANGELES DOES NOT CONSTITUTE A REPRESENTATION AS TO THE ACCURACY OF THE LOCATION, OR THE EXISTENCE OR NONEXISTENCE OF ANY UNDERGROUND UTILITY, PIPE OR STRUCTURE WITHIN THE LIMITS OF THIS PROJECT. THIS NOTE APPLIES TO ALL SHEETS.
5. ALL WORK SHALL BE IN ACCORDANCE WITH THE LATEST ADOPTED EDITION OF THE "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION," INCLUDING SUPPLEMENTS AND SHALL BE PROSECUTED ONLY IN THE PRESENCE OF THE DIRECTOR OF PUBLIC WORKS/CITY ENGINEER.
6. THE CONTRACTOR'S ATTENTION IS DIRECTED TO SECTION 7-10.4.1 OF THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION IN REGARD TO SAFETY ORDERS AND SHALL CONFORM TO THE "MINIMUM PUBLIC SAFETY REQUIREMENTS" AS SHOWN ON LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS STANDARD PLAN 6008.
7. ELEVATIONS ARE IN FEET ABOVE U.S.C. & G.S. MEAN SEA LEVEL DATUM OF 1929, UNLESS OTHERWISE INDICATED.
8. NO CONCRETE SHALL BE PLACED UNTIL THE FORMS AND REINFORCING STEEL HAVE BEEN PLACED, INSPECTED AND APPROVED.
9. ALL STRUCTURAL CONCRETE SHALL BE PORTLAND CEMENT CONCRETE WITH AN ULTIMATE 28 DAY COMPRESSIVE STRENGTH OF 4000 P.S.I. UNLESS OTHERWISE NOTED.
10. TRANSVERSE REINFORCEMENT AND TRANSVERSE JOINTS SHALL BE PLACED AT RIGHT ANGLES (OR RADIAL) TO THE CONDUIT CENTERLINE EXCEPT AS OTHERWISE SHOWN ON THE DRAWINGS.
11. ALL STEEL ADJACENT TO FACE OF CONCRETE SHALL HAVE 2-1/2 INCH CLEARANCE UNLESS OTHERWISE SPECIFIED.
12. REINFORCEMENT SHALL BE DEFORMED BARS OF INTERMEDIATE GRADE STEEL PER A.S.T.M. A-615-GRADE 60.
13. ALL BAR BENDS AND HOOKS SHALL CONFORM TO THE AMERICAN CONCRETE INSTITUTE "MANUAL OF STANDARD PRACTICE."
14. DIMENSIONS FROM FACE OF CONCRETE TO STEEL ARE TO CENTER LINE OF STEEL UNLESS OTHERWISE NOTED.
15. ALL STEEL THAT IS TO BE CONTINUOUS SHALL HAVE A MINIMUM LAP OF 30 BAR DIAMETERS OR 18 INCHES WHICHEVER IS GREATER.
16. ALL CONSTRUCTION JOINTS IN THE FOOTING OF SLABS AND WALLS SHALL BE IN THE SAME PLANE. NO STAGGERING OF JOINTS WILL BE PERMITTED.
17. ALL EXPOSED EDGES SHALL BE FINISHED WITH A 3/4 INCH CHAMFER.
18. UNLESS OTHERWISE SHOWN, CONCRETE DIMENSIONS SHALL BE MEASURED VERTICALLY OR HORIZONTALLY AND PARALLEL OR AT RIGHT ANGLES (OR RADIAL) TO THE CENTER LINE OF CONSTRUCTION.
19. CONCRETE BACKFILL IS REQUIRED WHEN THE PIPE HAS LESS THAN ONE FOOT OF COVER. THE CONCRETE BACKFILL SHALL CONSIST OF 1:3:5 MIX, PORTLAND CEMENT CONCRETE POURED FROM WALL TO WALL OF TRENCH AND FROM BOTTOM OF TRENCH TO A MINIMUM OF 4 INCHES OVER THE TOP OF THE PIPE.
20. ALL PIPES SHALL BE PLACED IN TRENCH IN NATURAL GROUND AND/OR COMPACTED FILL. THE GROUND LEVEL BEFORE THE TRENCHING SHALL BE AT LEAST 3 FEET ABOVE THE TOP OF THE PIPE ELEVATION, OR AT FINISH SURFACE ELEVATION, WHICHEVER IS LESS.
21. ALL BACKFILL AND FILLS OUTSIDE OF STREET RIGHT-OF-WAY SHALL BE COMPACTED TO MIN. 90 PERCENT OF MAXIMUM DENSITY AS DETERMINED BY A.S.T.M. SOIL COMPACTION TEST D 1557-91 METHOD "D" UNLESS OTHERWISE SPECIFIED. THIS SHALL BE CERTIFIED BY A GEOTECHNICAL ENGINEER. THIS CERTIFICATION SHALL BE SUBMITTED TO THE CITY ENGINEER PRIOR TO ACCEPTANCE OF THE WORK BY THE COUNTY.
22. ALL BACKFILL AND FILLS WITHIN STREET RIGHT-OF-WAY SHALL BE COMPACTED IN ACCORDANCE WITH SECTION 306-1.3.4 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED AND INSPECTED BY THE CITY. CONTRACTOR SHALL NOTIFY THE INSPECTOR AT LEAST 24 HOURS IN ADVANCE FOR SOIL TESTING AS REQUIRED BY THE INSPECTOR.
23. PIPE BEDDING SHALL BE:

    IN ACCORDANCE WITH THE COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS STANDARD PLAN NO. 3092 UNLESS OTHERWISE NOTED.

    ACCORDING TO STANDARD PLAN NO. 3080-0, CASE 3, EXCEPT BELL AND SPIGOT PIPE WHICH SHALL BE CASE 2 BEDDING, UNLESS OTHERWISE SHOWN. "W" VALUES SHALL BE AS SPECIFIED ON STANDARD PLAN 3080-0 FOR CASE 3 BEDDING, NOTES 3 (A), 3 (B), AND 3 (C). IF THE "W" VALUE AT THE TOP OF THE PIPE IS EXCEEDED, THE BEDDING SHALL BE MODIFIED, AND/OR PIPE OF ADDITIONAL STRENGTH SHALL BE PROVIDED. THE PROPOSED MODIFICATION SHALL BE APPROVED BY THE DEPARTMENT.
24. PIPE SHALL BE EMBEDDED 5 INCHES INTO ALL STRUCTURES INCLUDING INLET AND OUTLET HEADWALLS, UNLESS OTHERWISE SPECIFIED.
25. THE MINIMUM CONCRETE COVER FOR REINFORCEMENT IN PRECAST CONCRETE PIPE SHALL BE 1 INCH IN PIPE HAVING A WALL THICKNESS OF 2 1/2 INCHES OR GREATER AND 3/4 INCH IN PIPE HAVING A WALL THICKNESS OF LESS THAN 2 1/2 INCHES.
26. ALL CATCH BASINS WITHIN THE DEDICATED STREET RIGHT-OF-WAY SHALL BE CONSTRUCTED PER THE STREET PLANS.
27. THE CONTRACTOR SHALL PROVIDE TO THE SATISFACTION OF THE CITY ENGINEER AND THE DIRECTOR OF PUBLIC WORKS A DRAINAGE SYSTEM FOR CONTRIBUTARY FLOWS TO BE OPERABLE AT ALL TIMES UNTIL THIS STORM DRAIN SYSTEM IS ACCEPTED FOR MAINTENANCE. THE DESIGN OF THE DRAINAGE SYSTEM MUST BE PREPARED UNDER THE DIRECTION OF A CIVIL ENGINEER.

GENERAL NOTES (Cont'd)

28. ALL REFERENCES ON THIS PLAN TO THE COUNTY ENGINEER, ROAD DEPARTMENT, OR FLOOD CONTROL DISTRICT SHALL APPLY TO THE APPROPRIATE ELEMENTS OF THE DEPARTMENT OF PUBLIC WORKS.
29. EXISTING UTILITIES SHALL BE MAINTAINED IN PLACE BY THE CONTRACTOR, UNLESS OTHERWISE NOTED.
30. UNLESS OTHERWISE INDICATED CROSSING UTILITIES ARE TO BE SUPPORTED IN ACCORDANCE WITH STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION NO. 224-2
31. ALL OPENINGS RESULTING FROM THE CUTTING OR PARTIAL REMOVAL OF EXISTING CULVERTS, PIPES OR SIMILAR STRUCTURES SHALL BE SEALED WITH 8 INCHES OF BRICK AND MORTAR OR 6 INCHES OF CONCRETE, UNLESS OTHERWISE SHOWN.
32. MANHOLES SHALL USE THE STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION 630-2 FOR THE "FRAME AND COVER" AND 635-2 FOR THE "STANDARD DROP STEP."
33. THIS STORM DRAIN WILL NOT BE FIELD ACCEPTED FOR MAINTENANCE UNTIL THE STREETS HAVE BEEN PAVED, MANHOLES BROUGHT TO GRADE AND THE SYSTEM CLEANED TO THE SATISFACTION OF THE DIRECTOR OF PUBLIC WORKS.
34. AN NPDES PERMIT FROM THE REGIONAL WATER QUALITY CONTROL BOARD IS REQUIRED BEFORE ANY DISCHARGE OF NON-STORM WATER INTO THE STORM DRAIN IS ALLOWED.
35. THE LATEST REVISED STANDARD PLAN OR DRAWING SHALL BE USED UNLESS OTHERWISE NOTED.
36. THE SOILS ENGINEER OF RECORD SHALL INSPECT AND APPROVE THE FOUNDATION EXCAVATIONS BEFORE STEEL OR CONCRETE IS PLACED.
37. STORM DRAIN MANHOLE COVERS CONSTRUCTED PER S.P.P.W.C. STANDARD PLANS 630, 631, 632 AND 633 SHALL BE CAST WITH THE LETTERS "L.A.C.F.C.D.". THE LETTERS SHALL BE 1 INCH IN HEIGHT AND PLACED BELOW THE LETTER "D" IN THE CENTER OF THE COVER.
38. STORM DRAIN MANHOLE COVERS CONSTRUCTED PER S.P.P.W.C. STANDARD PLANS 312 SHALL BE CAST WITH THE LETTERS "L.A.C.F.C.D.". THE LETTERS SHALL BE 1 INCH IN HEIGHT AND PLACED BELOW THE LETTER "D" IN THE CENTER OF THE COVER.
39. ALL ABOVE GROUND FACILITIES SHALL BE STAMPED WITH THE DRAIN AND LINE NAME. THE LETTERING SHOULD BE 4" BLACK TEXT ON A YELLOW BACKGROUND.
40. EVERY 100 FEET STATIONS SHALL BE LABELED ON THE INSIDE OF ALL STORM DRAINS AND WALL OF OPEN CHANNELS. THE LETTERING SHOULD BE 4" BLACK TEXT ON A YELLOW BACKGROUND AND SHOULD BE PLACED IN THE SOFFIT OF PIPES AND THE TOP 2 FEET OF A CHANNEL WALL.
41. FOR ALL DEBRIS BASINS, THE 0%, 5% AND 25% DEBRIS CONE ELEVATIONS SHALL BE LABELED ON THE CONCRETE FACING SLAB AND THE STAND PIPE.
42. PRIOR TO ORDERING PIPES, CONTACT GEOTECHNICAL & MATERIALS DIVISION AT (626) 458-1707 TO SCHEDULE FOR D-LOAD INSPECTION. FEES PAYABLE AT LAND DEVELOPMENT DIVISION PUBLIC COUNTER WILL BE REQUIRED.

STORMWATER POLLUTION CONTROL REQUIREMENTS FOR STORM DRAIN CONSTRUCTION

A. NOTES:

1. EVERY EFFORT SHOULD BE MADE TO ELIMINATE THE DISCHARGE OF NON-STORM WATER FROM THE PROJECT SITE AT ALL TIME.
2. ERODED SEDIMENTS AND OTHER POLLUTANTS MUST BE RETAINED ON SITE AND MAY NOT BE TRANSPORTED FROM THE SITE VIA SHEETFLOW, SWALES, AREA DRAINS, NATURAL DRAINAGE COURSES OR WIND.
3. STOCKPILES OF EARTH AND OTHER CONSTRUCTION RELATED MATERIALS MUST BE PROTECTED FROM BEING TRANSPORTED FROM THE SITE BY THE FORCES OF WIND OR WATER.
4. FUELS, OILS, SOLVENTS, AND OTHER TOXIC MATERIALS MUST BE STORED IN ACCORDANCE WITH THEIR LISTING AND ARE NOT TO CONTAMINATE THE SOIL AND SURFACE WATERS. ALL APPROVED STORAGE CONTAINERS ARE TO BE PROTECTED FROM THE WEATHER. SPILLS MUST BE CLEANED UP IMMEDIATELY AND DISPOSED OF IN A PROPER MANNER. SPILLS MAY NOT BE WASHED INTO THE DRAINAGE SYSTEM.
5. EXCESS OR WASTE CONCRETE MAY NOT BE WASHED INTO THE PUBLIC WAY OR ANY OTHER DRAINAGE SYSTEM. PROVISIONS SHALL BE MADE TO RETAIN CONCRETE WASTES ON SITE UNTIL THEY CAN BE DISPOSED OF AS SOLID WASTE.
6. TRASH AND CONSTRUCTION RELATED SOLID WASTES MUST BE DEPOSITED INTO A COVERED RECEPTACLE TO PREVENT CONTAMINATION OF RAINWATER AND DISPERSAL BY WIND.
7. SEDIMENTS AND OTHER MATERIALS MAY NOT BE TRACKED FROM THE SITE BY VEHICLE TRAFFIC. THE CONSTRUCTION ENTRANCE ROADWAYS MUST BE STABILIZED SO AS TO INHIBIT SEDIMENTS FROM BEING DEPOSITED INTO THE PUBLIC WAY. ACCIDENTAL DEPOSITIONS MUST BE SWEPT UP IMMEDIATELY AND MAY NOT BE WASHED DOWN BY RAIN OR OTHER MEANS.
8. ANY SLOPES WITH DISTURBED SOILS OR DENUDED OF VEGETATION MUST BE STABILIZED SO AS TO INHIBIT EROSION BY WIND AND WATER.

B. THE FOLLOWING BMPs AS OUTLINED IN, BUT NOT LIMITED TO, THE LATEST EDITION OF THE CALIFORNIA BMP HANDBOOK (CONSTRUCTION) OR CALTRANS STORMWATER QUALITY HANDBOOKS (CONSTRUCTION SITE BMP MANUAL) MAY APPLY DURING THE CONSTRUCTION OF THIS PROJECT (ADDITIONAL MEASURES MAY BE REQUIRED IF DEEMED APPROPRIATE BY THE PROJECT ENGINEER OR THE BUILDING OFFICIAL):

EROSION CONTROL
- EC1 – SCHEDULING
- EC2 – PRESERVATION OF EXISTING VEGETATION
- EC3 – HYDRAULIC MULCH
- EC4 – HYDROSEEDING
- EC5 – SOIL BINDERS
- EC6 – STRAW MULCH
- EC7 – GEOTEXTILES & MATS
- EC8 – WOOD MULCHING
- EC9 – EARTH DIKES & DRAINAGE SWALES
- EC10 – VELOCITY DISSIPATION DEVICES
- EC11 – SLOPE DRAINS
- EC12 – STREAMBANK STABILIZATION
- EC13 – RESERVED
- EC14 – COMPOST BLANKETS
- EC15 – SOIL PREPARATION/ROUGHENING
- EC16 – NON-VEGETATED STABILIZATION

TEMPORARY SEDIMENT CONTROL
- SE1 – SILT FENCE
- SE2 – SEDIMENT BASIN
- SE3 – SEDIMENT TRAP
- SE4 – CHECK DAM
- SE5 – FIBER ROLLS
- SE6 – GRAVEL BAG BERM
- SE7 – STREET SWEEPING AND VACUUMING
- SE8 – SAND BAG BARRIER
- SE9 – STRAW BALE BARRIERS
- SE10 – STORM DRAIN INLET PROTECTION
- SE11 – ACTIVE TREATMENT SYSTEMS
- SE12 – TEMPORARY SILT DIKE
- SE13 – COMPOST SOCKS & BERMS
- SE14 – BIOFILTER BAGS

WIND EROSION CONTROL
- WE1 – WIND EROSION CONTROL

EQUIPMENT TRACKING CONTROL
- TC1 – STABILIZED CONSTRUCTION ENTRANCE/EXIT
- TC2 – STABILIZATION CONSTRUCTION ROADWAY
- TC3 – ENTRANCE/OUTLET TIRE WASH

NON-STORMWATER MANAGEMENT
- NS1 – WATER CONSERVATION PRACTICES
- NS2 – DEWATERING OPERATIONS
- NS3 – PAVING AND GRINDING OPERATIONS
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- NS10 – VEHICLE AND EQUIPMENT MAINTENANCE
- NS11 – PILE DRIVING OPERATIONS
- NS12 – CONCRETE CURING
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HYDRAULIC ELEMENTS

LINE	PIPE FROM STA.	REACH TO STA.	Q (CFS)	DIA	Vmax (FPS)	REMARKS
"A"	13+71.06	14+64.35	2038.8	114"	34.5	2,3
	14+64.35	18+50.00	2035.3	114"	35.3	2,3
	18+50.00	22+03.37	2035.3	114"	35.3	2,3
	22+03.37	22+96.74	1945.3	114"	36.8	2,3
	22+96.74	28+00.00	1933.2	114"	39.2	2,3
	28+00.00	33+89.00	1933.2	114"	35.1	2,3
	33+89.00	37+00.00	1557.6	114"	39.2	2,3
	37+00.00	42+43.06	1557.6	114"	39.2	2,3
	42+43.06	66+73.09	1557.6	114"	25.0	1
	66+73.09	69+02.33	1521.6	114"	21.5	1
"A-2"	10+16.12	11+20.25	90.0	36"	12.7	
"A-5"	10+43.14	11+25.02	1.7	24"	19.0	
"A-6"	10+11.75	11+24.30	2.2	24"	13.4	
"A.13"	10+04.72	10+58.29	4.2	18"	9.0	
"A.14"	10+04.75	10+27.74	3.5	18"	12.5	
"A.15"	10+08.00	10+47.02	3.1	24"	16.4	
"A.16"	10+04.72	10+58.25	3.3	18"	15.6	
"A.17"	10+04.84	10+27.75	4.1	18"	15.3	
"A.18"	10+04.69	10+58.25	3.5	18"	13.6	
"A.19"	10+06.33	10+35.75	48.7	30"	9.9	
"A.20"	10+08.34	10+32.12	3.4	18"	18.4	
"A.21"	10+07.23	10+60.36	4.7	18"	15.3	
"A.22"	10+06.79	10+81.11	26.7	24"	22.2	1
"A.23"	10+02.97	10+32.12	4.5	18"	30.1	2
"A.24"	10+04.55	10+58.25	4.9	18"	23.0	1
"A.25"	10+07.60	10+80.78	16.3	36"	25.8	1
"A.26"	10+07.01	10+79.33	8.8	30"	23.1	1
"A.27"	10+02.16	10+32.04	1.0	18"	23.8	1
"A.28"	10+04.50	10+58.25	0.5	18"	12.0	
"A.29"	10+06.33	10+90.25	9.0	30"	22.0	1
"A.30"	10+16.30	10+64.84	36.0	30"	7.4	
"A.31"	10+04.75	10+92.25	9.5	24"	23.5	1
"A5.1"	10+01.00	10+39.28	0.6	18"	12.4	
"A5.2"	10+00.80	10+24.25	1.1	18"	10.8	
"A6.1"	10+03.22	10+40.21	1.1	18"	6.7	
"A6.2"	10+02.64	10+26.19	1.1	18"	7.3	
"A6.3"	10+04.27	10+36.37	1.0	18"	8.2	
"B"	31+63.04	32+28.25	634.2	84"	38.3	2
	32+28.25	32+91.26	634.2	84"	38.3	2,3
	32+91.26	34+01.64	634.2	84"	37.0	2,3
	34+01.64	34+30.00	577.9	84"	28.6	2,3
	34+30.00	34+76.05	577.9	84"	18.8	
	34+76.05	34+94.38	577.9	84"	18.8	
"B.7"	10+00.00	10+31.21	61.6	30"	12.9	4

PIPE LENGTHS CHART:

PIPE SIZE	TOTAL LENGTHS
18"	612'
24"	1,044'
30"	201'
36"	194'
114"	5,412'
TOTAL	7,814'

TOTAL SQ. FT. OF EASEMENT AQCUIRED = 9,123 SQ.FT.

PIPE SIZE	TOTAL LENGTHS
84"	126'
72"	193'

1 ADD AN ADDITIONAL 0.5" OF CONCRETE COVER OVER THE INVERT STEEL FOR V > 20 FPS.

2 ADD AN ADDITIONAL 1.0" OF CONCRETE COVER OVER THE INVERT STEEL FOR V > 30 FPS.

3 ADD VELOCITY CONTROL RINGS FOR V > 40 FPS.

4 NOT TO BE MAINTAINED BY LACFCD

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

2

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	ADDED SHEET 2A REVISED HYDRAULIC TABLE	No.40695	MD.	06/11/2019

REVIEWED LAND DEVELOPMENT DIVISION

BY _____ STORM DRAIN SECTION DATE

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

5/1/2019
JASON H. FUKUMITSU DATE

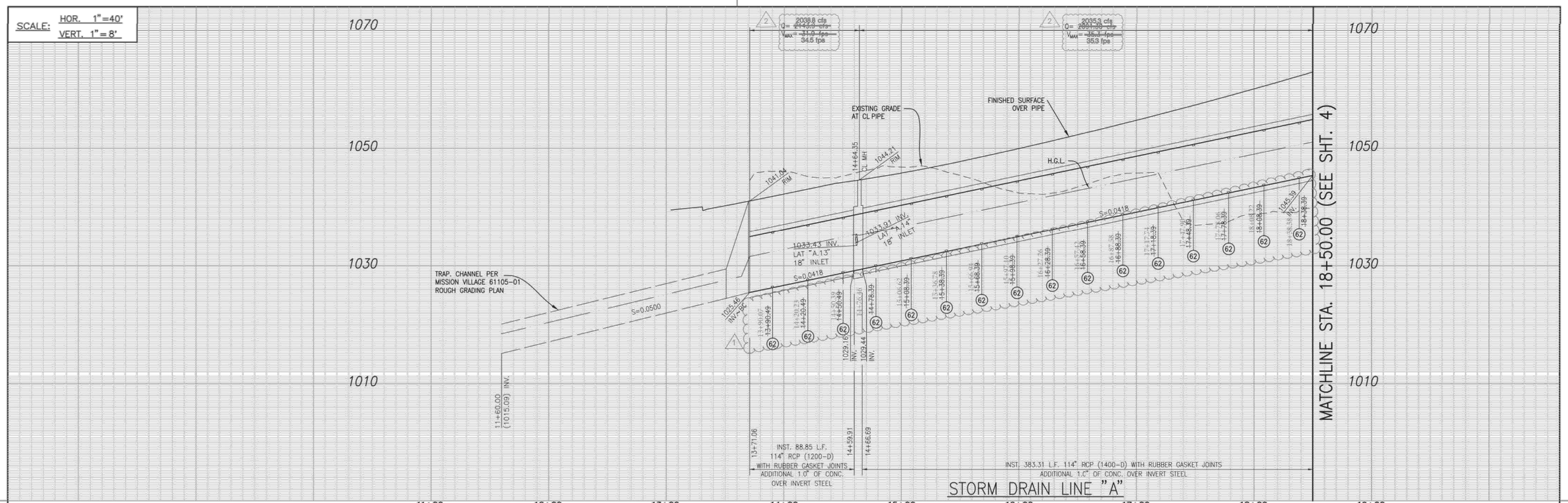
STORM DRAIN PLANS IN
TRACT No. 61105-1 P.D. No. 2640
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
26074 Avenue Hall, Suite 23 ▪ Valencia, CA 91355 ▪ PH: (661) 294-2211 ▪ FX: (661) 294-9890

DWG

G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2640\HW\081-02_Notes_REV.dwg Plotted on Apr 29, 2019-2:44pm by hdolya

SCALE: HOR. 1"=40'
VERT. 1"=8'



STORM DRAIN LINE "A"

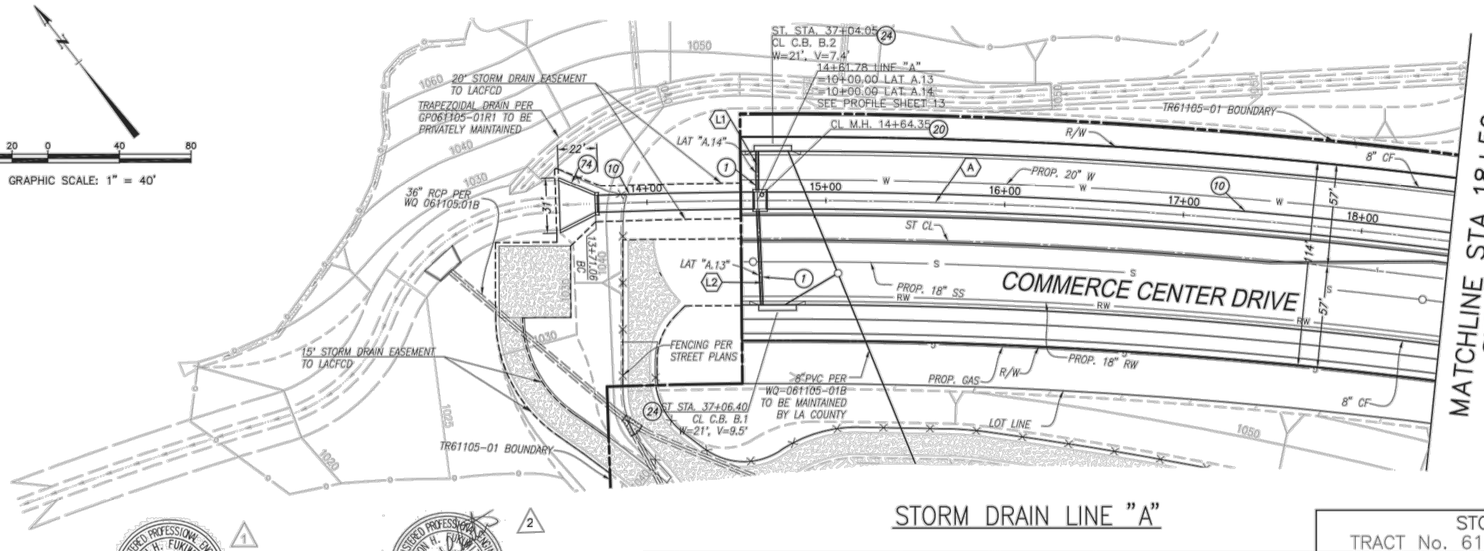
CONSTRUCTION NOTES:

(1) INSTALL 18" R.C.P. (SEE PROFILE FOR D-LOAD)
(10) INSTALL 114" R.C.P. (SEE PROFILE FOR D-LOAD)
(20) CONSTRUCT M.H. PER S.P.P.W.C. STD. PLAN 320-2
(24) CONSTRUCT CURB OPENING CATCH BASIN PER S.P.P.W.C. STD. PLAN NO. 300-3 MODIFIED CATCH BASIN PER DETAIL ON SHEET 21 AND SHEET 22 (2)
(62) CONSTRUCT VELOCITY CONTROL RINGS PER S.P.P.W.C. STD. PLAN 383-2; H=3" @ 30" O.C.
(74) CONSTRUCT PIPE CULVERT HEADWALL PER CALTRANS DETAIL D86B

SD LINE "A" CURVE TABLE				
LINE	DELTA	RADIUS	LENGTH	TANGENT
(A)	09°04'58"	3021.25'	478.94'	239.98'

SD LINE "A" LINE TABLE		
LINE	LENGTH	BEARING
(L1)	27.74'	S37°51'24"W
(L2)	58.29'	N35°48'06"W

GRAPHIC SCALE: 1" = 40'



STORM DRAIN LINE "A"

NO.	REVISION	REVISED BY	APPROVED BY	DATE
1	REVISED TOTAL SHEET NUMBER, UPDATE VELOCITY CONTROL RING PER AS-BUILT		MD.	9/20/2018
2	ADDED STRUCTURAL DETAIL SHEETS 21 AND 22. REVISED CONSTRUCTION NOTE 24.	JASON H. FUKUMITSU No.40695	MD.	06/11/2019
	REVISED TOTAL SHEET NUMBER. REVISED HYDRAULIC ELEMENTS			

REVIEWED LAND DEVELOPMENT DIVISION
BY M D Ebrahimi 7/31/2018
STORM DRAIN SECTION DATE

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
JASON H. FUKUMITSU DATE 7-20-18

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRICE No. 1209 STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-KUEN CHIOU No. 2592 Exp. 6-30-20 STATE OF CALIFORNIA

STORM DRAIN PLANS IN
TRACT No. 61105-1 P.D. No. 2640
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

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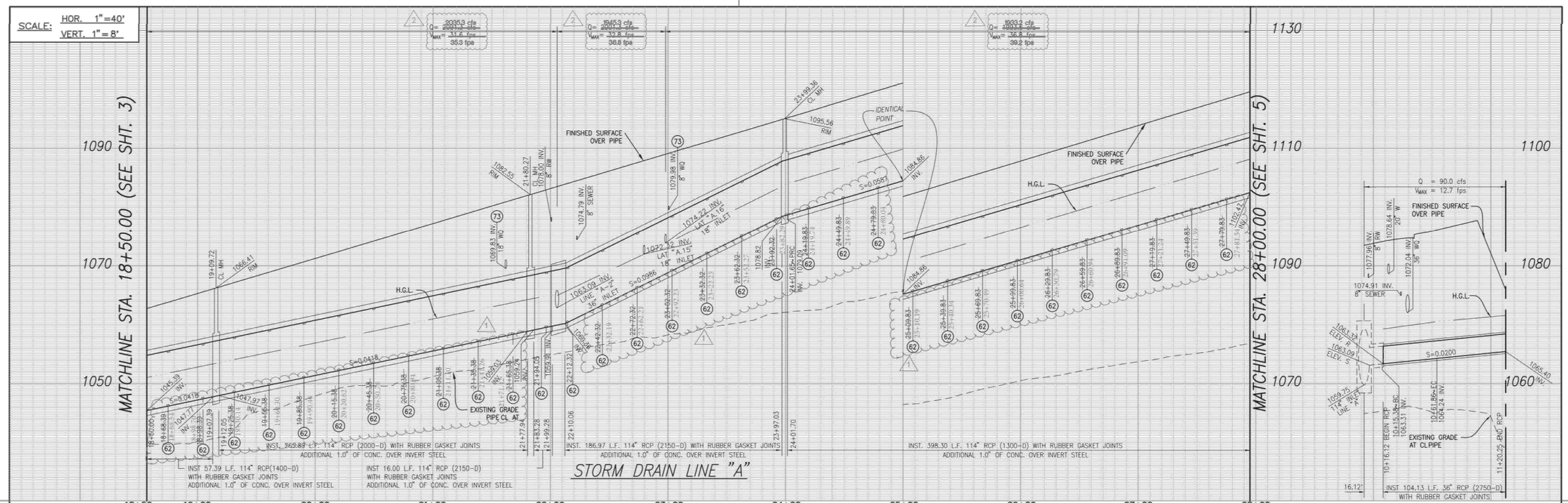
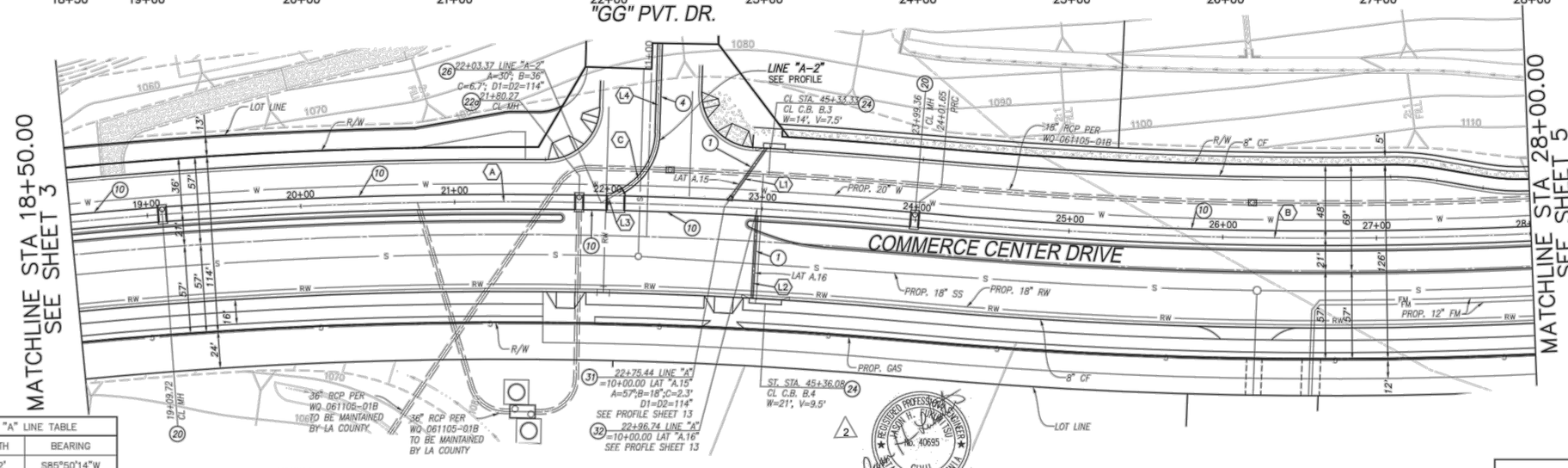
DWG
SHEET 3 OF 19 20 22

DDN# 43-F546-1-19

G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2640\MM1081-03_SD Plan1.dwg Plotted on Jul 19, 2019--1:35pm by ramness

SCALE: HOR. 1"=40'
VERT. 1"=8'





STORM DRAIN LINE "A–2"

CONSTRUCTION NOTES:

1. INSTALL 18" R.C.P. (SEE PROFILE FOR D-LOAD)
4. INSTALL 36" R.C.P. (SEE PROFILE FOR D-LOAD)
10. INSTALL 114" RCP (SEE PROFILE FOR D-LOAD)
20. CONSTRUCT M.H. PER S.P.P.W.C. STD. PLAN 320-2
22◇. CONSTRUCT MODIFIED M.H. SEE SHT.12 FOR DETAIL
24. CONSTRUCT CURB OPENING CATCH BASIN PER S.P.P.W.C. STD. PLAN NO. 300-3 MODIFIED CATCH BASIN PER DETAIL ON SHEET 21 AND SHEET 22 △2
26. CONSTRUCT T.S. PER S.P.P.W.C. STD. PLAN 340-2
31. CONSTRUCT J.S. PER S.P.P.W.C. STD. PLAN 331-3
32. CONSTRUCT J.S. PER S.P.P.W.C. STD. PLAN 332-2
62. CONSTRUCT VELOCITY CONTROL RINGS PER S.P.P.W.C. STD. PLAN 383-2; H=3" 30" O.C.
73. CONSTRUCT CONCRETE BLANKET PER S.P.P.W.C. STD. PLAN 225-2

SD LINE "A" LINE TABLE		
LINE	LENGTH	BEARING
L1	47.02'	S85°50'14"W
L2	58.25'	N53°51'55"E
L3	15.38'	N68°29'28"W
L4	58.40'	N52°20'18"E

SD LINE "A" CURVE TABLE				
LINE	DELTA	RADIUS	LENGTH	TANGENT
A	10°27'42"	3021.25'	551.65'	276.59'
B	07°39'29"	2978.75'	398.35'	199.47'
C	59°10'14"	45.00'	46.47'	25.55'

REVIEWED LAND DEVELOPMENT DIVISION
BY M D Eslick 7/31/2018
STORM DRAIN SECTION DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
△1	REVISED TOTAL SHEET NUMBER, UPDATE VELOCITY CONTROL RING PER AS-BUILT		MD. Eslick	9/20/2018
△2	ADDED STRUCTURAL DETAIL SHEETS 21 AND 22. REVISED CONSTRUCTION NOTE 24.	Jason H. Fukumitsu No.40695	MD. Eslick	06/11/2019
	REVISED TOTAL SHEET NUMBER. REVISED HYDRAULIC ELEMENTS			

JASON H. FUKUMITSU DATE 7-20-18

STORM DRAIN PLANS IN
TRACT No. 61105-1 P.D. No. 2640
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
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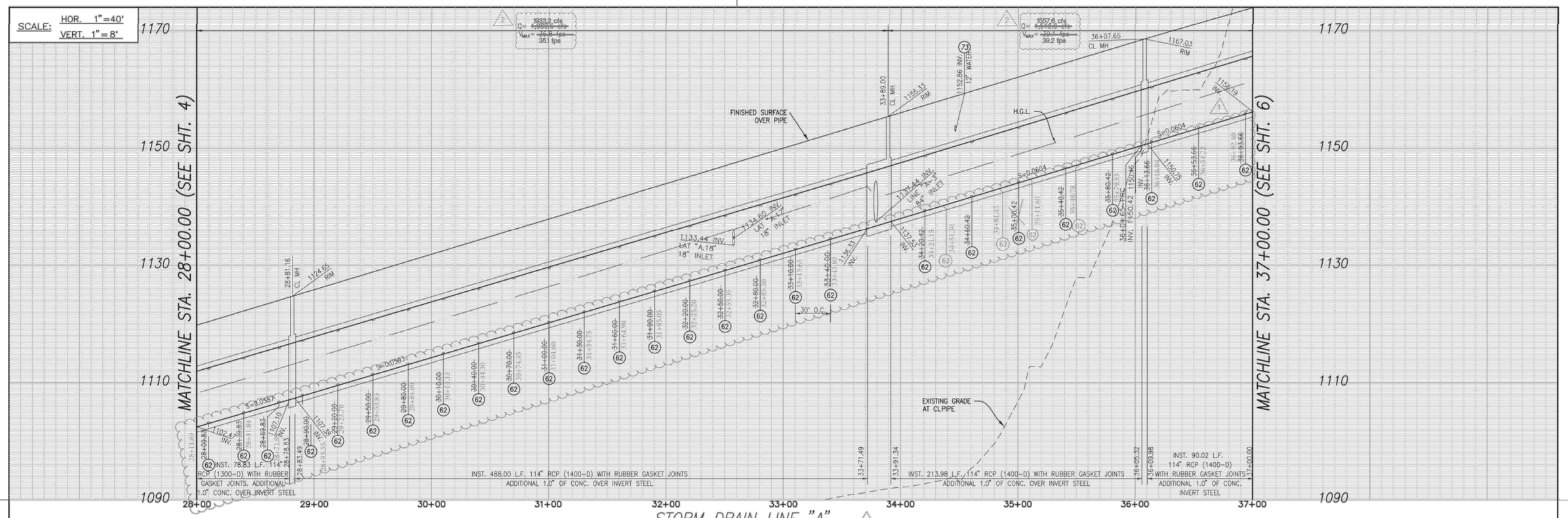
26074 Avenue Hall, Suite 23 ▪ Valencia, CA 91355 ▪ PH: (661) 294-2211 ▪ FX: (661) 294-9890

DWG SHEET 4 OF 19 20 22

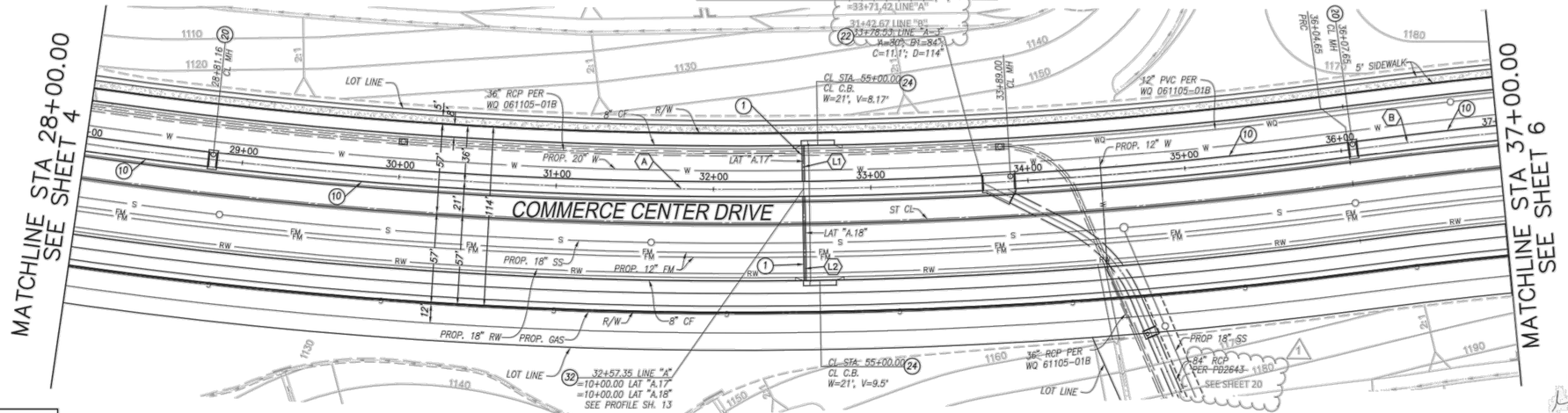
DDN# 43-F546-1-19

G:\Ventura\ Ranch\61105 Mission Village\61105-01\Storm\PP 2640\VAK\061--04_SD Plan2.dwg Plotted on Jul 19, 2018--1:45pm by ronsess

SCALE: HOR. 1"=40'
VERT. 1"=8'



STORM DRAIN LINE "A"



STORM DRAIN LINE "A"

SD LINE "A" LINE TABLE		
LINE	LENGTH	BEARING
L1	27.75'	S39°13'18"W
L2	58.25'	S39°02'24"W

SD LINE "A" CURVE TABLE				
LINE	DELTA	RADIUS	LENGTH	TANGENT
A	15°28'38"	2978.75'	804.65'	404.79'
B	01°48'30"	3021.25'	95.35'	47.68'

GRAPHIC SCALE: 1" = 40'

REVIEWED LAND DEVELOPMENT DIVISION
BY _____ STORM DRAIN SECTION 7/31/2018 DATE

CONSTRUCTION NOTES:

1. INSTALL 18" R.C.P. (SEE PROFILE FOR D-LOAD)
10. INSTALL 114" RCP (SEE PROFILE FOR D-LOAD)
20. CONSTRUCT M.H. PER S.P.P.W.C. STD. PLAN 320-2
22. CONSTRUCT M.H. PER S.P.P.W.C. STD. PLAN 322-2
24. CONSTRUCT CURB OPENING CATCH BASIN PER S.P.P.W.C. STD. PLAN NO. 300-3 MODIFIED CATCH BASIN PER DETAIL ON SHEET 21 AND SHEET 22
32. CONSTRUCT J.S. PER S.P.P.W.C. STD. PLAN 332-2
62. CONSTRUCT VELOCITY CONTROL RINGS PER S.P.P.W.C. STD. PLAN 383-2., H=3.0" SPACING SEE PROFILE
73. CONSTRUCT CONCRETE BLANKET PROTECTION PER S.P.P.W.C. STD. PLAN 225-2.

NO.	REVISION	REVISED BY	APPROVED BY	DATE
1	ADD JUNCTION INFO. FOR LINE B,CHANGE CALL OUT FOR LINE B, REVISED TOTAL SHEET NUMBER, UPDATE VELOCITY CONTROL RING STATION PER AS-BUILT		RD. Copland	9/20/2018
2	ADDED STRUCTURAL DETAIL SHEETS 21 AND 22. REVISED CONSTRUCTION NOTE 24. REVISED TOTAL SHEET NUMBER. REVISED HYDRAULIC ELEMENTS	Jason H. Fukumitsu No.40695	RD. Copland	06/11/2019

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

JASON H. FUKUMITSU DATE 7-20-18

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRICE No. 1209 STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER VINCENT PING AU-YEUNG No. 2522 Exp. 6-30-20 GEOTECHNICAL STATE OF CALIFORNIA

STORM DRAIN PLANS IN
TRACT No. 61105-1 P.D. No. 2640
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

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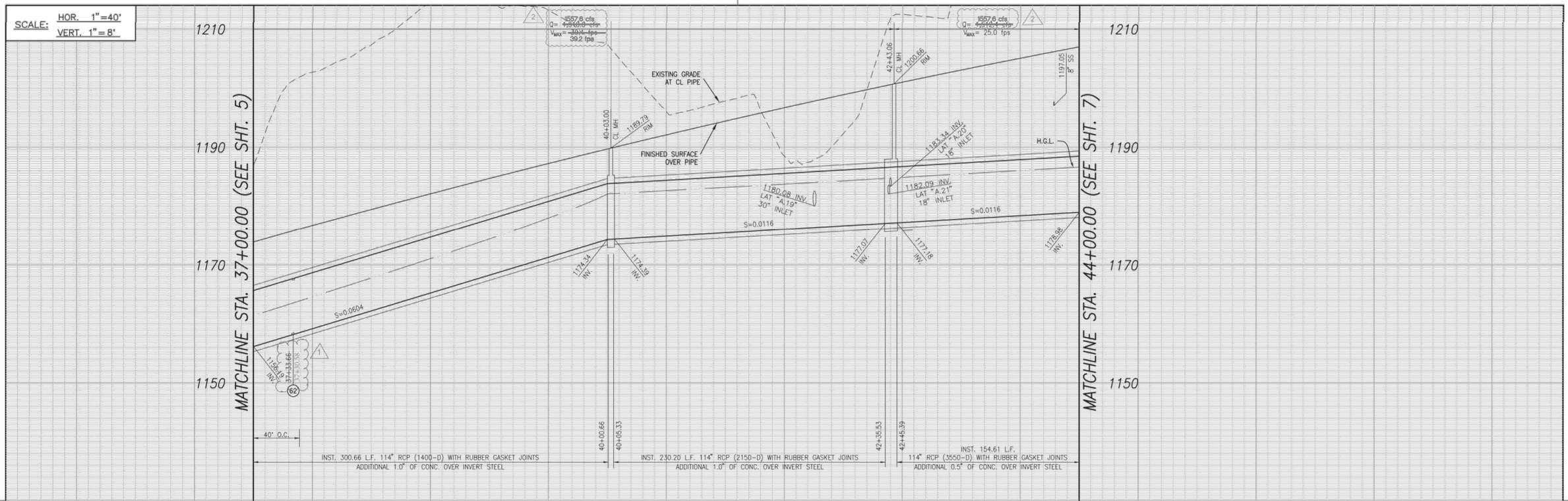
DWG | SHEET 5 OF 19 28 22

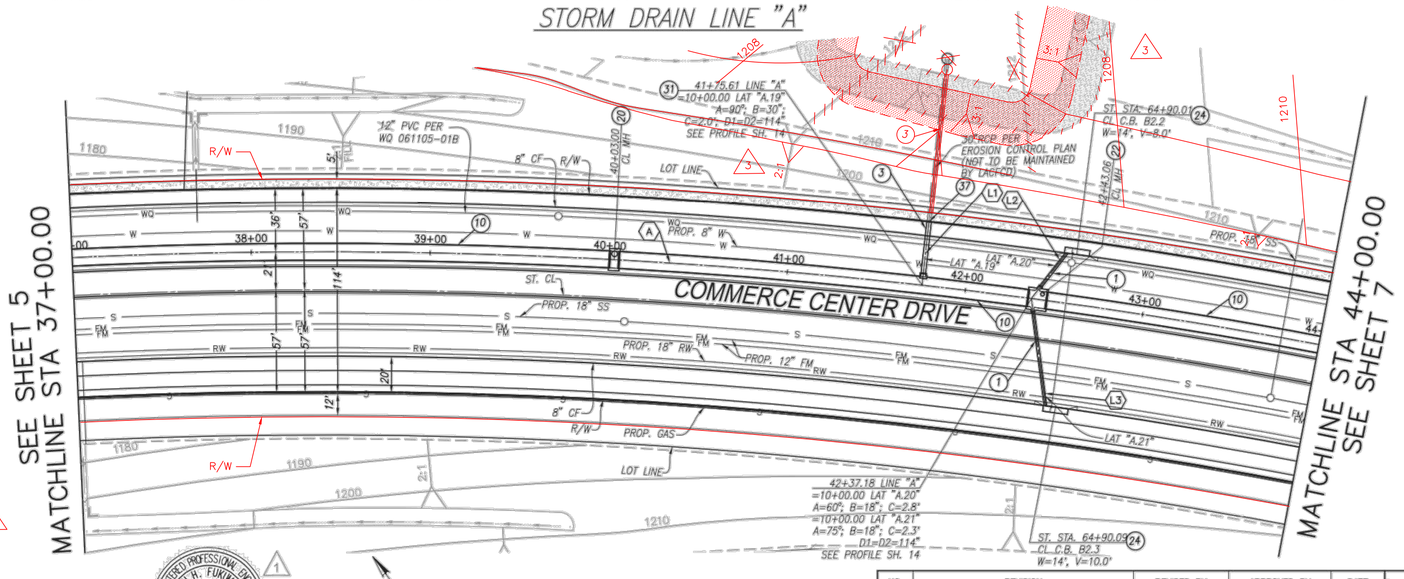
DDN# 43-F546-1-19

G:\Newhall Ranch\VB1105 Mission Village\61105-01\Storm\PD 2640\VM41081-05_SD Plan3.dwg Plotted on Jul 19, 2018--2:04pm by rosteros

SCALE: HOR. 1"=40'
VERT. 1"=8'



STORM DRAIN LINE "A"



STORM DRAIN LINE "A"

GRAPHIC SCALE: 1" = 40'

SD LINE "A" LINE TABLE		
LINE	LENGTH	BEARING
L1	67.07' 35.75'	S43°22'08"W
L2	32.12'	S75°55'11"W
L3	60.36'	N29°29'26"W

SD LINE "A" CURVE TABLE				
LINE	DELTA	RADIUS	LENGTH	TANGENT
A	13°16'30"	3021.25'	700.00'	351.57'

3 REVISED HYDRAULIC ELEMENTS EXTENDED SD. LAT. 19 5' BEYOND SLOPE

REVIEWED LAND DEVELOPMENT DIVISION
BY M. D. Esparza STORM DRAIN SECTION
7/31/2018 DATE

CONSTRUCTION NOTES

1. INSTALL 18" R.C.P. (SEE PROFILE FOR D-LOAD)
3. INSTALL 30" R.C.P. (SEE PROFILE FOR D-LOAD)
10. INSTALL 114" RCP (SEE PROFILE FOR D-LOAD)
20. CONSTRUCT M.H. PER S.P.P.W.C. STD. PLAN 320-2
22. CONSTRUCT M.H. PER S.P.P.W.C. STD. PLAN 322-2
24. CONSTRUCT CURB OPENING CATCH BASIN PER S.P.P.W.C. STD. PLAN NO. 300-3 MODIFIED CATCH BASIN PER DETAIL ON SHEET 21 AND SHEET 22
31. CONSTRUCT R.S. PER S.P.P.W.C. STD. PLAN 331-3
37. CONSTRUCT CLEANOUT PER DETAIL 37 ON SHEET 12
62. CONSTRUCT VELOCITY CONTROL RINGS PER S.P.P.W.C. STD PLAN 383-2; H=3" SPACING SEE PROFILE

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRICE No. 1208 STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-KUEN IP No. 2522 Exp. 6/30 REGISTERED TECHNICAL STATE OF CALIFORNIA

NO.	REVISION	REVISED BY	APPROVED BY	DATE
1	REVISED TOTAL SHEET NUMBER, UPDATE VELOCITY CONTROL RING STATION PER AS-BUILT		M.D.	9/20/2018
			M.D.	11/09/2020
2	ADDED STRUCTURAL DETAIL SHEETS 21 AND 22. REVISED CONSTRUCTION NOTE 24.	No.40695	M.D.	08/11/2019
	REVISED TOTAL SHEET NUMBER. REVISED HYDRAULIC ELEMENTS			

JASON H. FUKUMITSU DATE 7-20-18

STORM DRAIN PLANS IN
TRACT No. 61105-1 P.D. No. 2640
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
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DWG | SHEET 6 OF 19 20 22

DDN# 43-F546-1-19

G:\Vikwell Ranch\61105 Mission Village\61105-01\Storm\PD 2640\VAV061~06_SD Plan4.dwg Plotted on Jul 19, 2018--2:17pm by ronsess

SCALE: HOR. 1"=40'
VERT. 1"=8'

Q= 1557.6 cfs
V_{MAX}= 25.0 fps

EXISTING GRADE AT CL PIPE

FINISHED SURFACE OVER PIPE

1221.02 INV. 8" WQ

218.24 INV. 18" RW

1220.15 INV. 16" WATER

1229.36 RIM 52+12.65 CL MH

47+23.99 CL MH

1217.83 RIM

38

1201.77 LEDGE EL

1210.37 LEDGE EL

H.G.L.

1194.97 INV. LAT "A.25" 18" INLET

1192.82 INV. LINE "A-5" 24" INLET

1192.92 INV. LAT "A.24" 18" INLET

1191.99 INV. LAT "A.25" 36" INLET

1184.77 INV. LAT "A.22" 24" INLET

S=0.0116

1178.89 INV.

45+88.90=EC INV. 1181.17

1182.72 INV.

1182.77 INV.

47+21.66

47+26.32

1188.40 INV.

1188.45 INV.

1189.44 INV.

52+10.32

52+14.98

INST 321.66 L.F. 114" RCP (3550-D) WITH RUBBER GASKET JOINTS
ADDITIONAL 0.5" OF CONC. COVER OVER INVERT STEEL

INST. 484.00 L.F. 114" RCP (4250-D) WITH RUBBER GASKET JOINTS
ADDITIONAL 0.5" OF CONC. OVER INVERT STEEL

INST. 85.02 L.F.
114" RCP (4400-D)
WITH RUBBER GASKET JOINTS
ADDITIONAL 0.5" OF CONC.
OVER INVERT STEEL

1260 / 1240 / 1200 / 1180

MATCHLINE STA. 44+00.00 (SEE SHT. 6)

MATCHLINE STA. 53+00.00 (SEE SHT. 8)

44+00 45+00 46+00 47+00 48+00 49+00 50+00 51+00 52+00 53+00

MATCHLINE STA 44+00.00
SEE SHEET 6

MATCHLINE STA 53+00
SEE SHEET 8

45+10.27 LINE "A"
=10+00.00 LAT "A.22"
A=75°; B=24"; C=2.5'
D=114"
SEE PROFILE SH. 14

LAT "A.22" NOT TO BE MAINTAINED BY LACFCD

12" PVC PER WQ 061105-01B

LOT LINE

SIDEWALK

50+74.14 LINE "A"
=10+00.00 LAT "A.24"
SEE PROFILE SH. 14

50+48.74 LINE "A"
=10+00.00 LAT "A.23"
SEE PROFILE SH. 14

50+12.39 LINE "A"
=10+38.90 LINE "A-5"

51+10.18 LINE "A"
=10+00.00 LAT "A.25"
A=76°; B=36"
C=2.7'; D1=114"
SEE PROFILE SH. 14

ST. STA. 73+02.61
CL C.B. B2.7
W=21', V=7.5'

LAT "A.25" NOT TO BE MAINTAINED BY LACFCD

PROP. 8" SS

PROP. 20" W

PROP. JOINT TRENCH

COMMERCE CENTER DRIVE

PROP. 12" FM

PROP. 18" RW

PROP. GAS

LAT "A.23"

LAT "A.24"

LAT "A.25"

PROP. 8" RW

8" CF

LINE "A-5" 24" RCP SEE SHEET 10

ST. STA. 73+12.61
CL C.B. B2.6
W=21', V=9.0'

36" RCP PER EROSION CONTROL PLAN (NOT TO BE MAINTAINED BY LACFCD)

CONSTRUCTION NOTES:

1. INSTALL 18" R.C.P. (SEE PROFILE FOR D-LOAD)
2. INSTALL 24" R.C.P. (SEE PROFILE FOR D-LOAD)
4. INSTALL 36" R.C.P. (SEE PROFILE FOR D-LOAD)
10. INSTALL 114" RCP (SEE PROFILE FOR D-LOAD)
20. CONSTRUCT M.H. PER S.P.P.W.C. STD. PLAN 320-2
20a. CONSTRUCT M.H. PER S.P.P.W.C. STD. PLAN 320-2; SEE DETAILS ON SHEETS 18 AND 19
24. CONSTRUCT CURB OPENING CATCH BASIN PER S.P.P.W.C. STD. PLAN NO. 300-3 MODIFIED CATCH BASIN PER DETAIL ON SHEET 21 AND SHEET 22 (2)
31. CONSTRUCT J.S. PER S.P.P.W.C. STD. PLAN 331-3
32. CONSTRUCT J.S. PER S.P.P.W.C. STD. PLAN 332-2
37. CONSTRUCT CLEANOUT PER DETAIL 37 ON SHEET 12
38. CONSTRUCT MANHOLE SAFETY LEDGE PER S.P.P.W.C. STD. PLAN 330-2

SD LINE "A" LINE TABLE		
LINE	LENGTH	BEARING
L1	~~711.19'~~ 95.64' ~~81.11'~~	S38°47'36"E
L2	32.12'	N34°39'44"E
L3	70.25'	S81°18'54"W
L4	~~95.24'~~ ~~80.78'~~	S51°12'24"W
L5		N36°49'11"E

SD LINE "A" CURVE TABLE				
LINE	DELTA	RADIUS	LENGTH	TANGENT
A	03°34'56"	3021.25'	188.90'	94.48'

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRIDE No. 1705 STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER VINCENT PING XUE No. 2622 Exp. 6/30/20 GEOTECHNICAL STATE OF CALIFORNIA

GRAPHIC SCALE: 1" = 40'

REVIEWED LAND DEVELOPMENT DIVISION
BY M.D. Engineering Section 7/31/2018 DATE

STORM DRAIN LINE "A"

3 EXTENDED SD LAT. A.22 AND LAT. A.25 TO TOP OF SLOPE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
1	REVISED TOTAL SHEET NUMBER		M.D. Engineering	9/20/2018
2	ADDED STRUCTURAL DETAIL SHEETS 21 AND 22. REVISED CONSTRUCTION NOTE 24.	Jason H. Fukumitsu No.40695	M.D. Engineering	06/11/2019
	REVISED TOTAL SHEET NUMBER. REVISED HYDRAULIC ELEMENTS ADDED LATERAL A.31 ADDED LINE DATA			

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

JASON H. FUKUMITSU DATE 7-20-18

STORM DRAIN PLANS IN
TRACT No. 61105-1 P.D. No. 2640
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
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DWG

SHEET 7 OF 19 20 22

DDN# 43-F546-.1-.19

C:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2640\HM1081-07_SD Plan5.dwg Plotted on Jul 19, 2018--2:33pm by ronsess

SCALE: HOR. 1"=40'
VERT. 1"=8'

MATCHLINE STA. 53+00 (SEE SHT. 7)

MATCHLINE STA. 61+88.30 (SEE SHT. 9)

Q= 1557.8 cfs
V_{MAX}= 25.0 fps

FINISHED SURFACE OVER PIPE

57+01.31 CL MH

1236.06 RIM

1241.82 RIM 61+85.97

1217.73 LEDGE EL

EXISTING GRADE AT CLPIPE

H.G.L.

1222.23 LEDGE EL

1202.82 INV. LAT "A.26" 30" INLET

1204.79 INV. LAT "A.28" 18" INLET

1207.20 INV. LAT "A.27" 18" INLET

1196.46 INV. LAT "A.31" 24" INLET

1198.44 INV.

1194.98 INV. 56+98.98

57+03.64 INV. 1194.13

61+17.48 BC INV. 1198.94

1199.71 INV. 61+83.64

S=0.0116

S=0.0116

INST 398.98 L.F. 114" RCP (4400-D) WITH RUBBER GASKET JOINTS
ADDITIONAL 0.5" OF CONC. COVER OVER INVERT STEEL

INST 480.00 L.F. 114" RCP (4400-D) WITH RUBBER GASKET JOINTS
ADDITIONAL 0.5" OF CONC. COVER OVER INVERT STEEL

53+00 54+00 55+00 56+00 57+00 58+00 59+00 60+00 61+00 62+00

1260 1240 1220 1200

Q = 9.5 cfs
V_{MAX} = 23.5 fps

10+00.00 LAT "A.31" =55+80.97 LINE "A"

FINISHED SURFACE OVER PIPE

1228.35 INV. 8" RW

1227.44 INV. 18" RW

1225.87 INV. 12" FM

1221.23 INV. 8" SS

1223.75 INV.

1231.76 INV.

S=0.0116

1235 1240

1215 1220

1195 1200

11+13.80 END RCP

10+92.25 END RCP

1196.97 R.S.S.

1191.71 F.I.

10+04.25 BEGIN RCP

INST 21.63' L.F. 24" RCP (5750-D)

EXISTING GRADE AT ℄ PIPE

INST. 87.50 L.F. 24" R.C.P. (5750-D)

4.75'

ADDITIONAL 0.5" OF CONC. COVER OVER INVERT STEEL WITH RUBBBER GASKET

3 NOT TO BE MAINTAINED BY LACFCD

SD LAT "A.31"

STORM DRAIN LINE "A"

55+80.97 LINE "A" =10+00.00 LAT "A.31" SEE PROFILE HEREON

8" PVC PER WQ 061105-01B 8" CF

LOT LINE

60+07.80 LINE "A" =10+00.00 LAT "A.26" SEE PROFILE SH. 14

60+79.53 LINE "A" =10+00.00 LAT "A.28" SEE PROFILE SH. 15

ST. STA. 83+10.00 CL C.B. B2.11 W=7' V=7.5'

ST. STA. 83+10.00 CL C.B. B2.10 W=7' V=9.0'

83+11.50

61+17.48 BC

61+85.97 CL MH

60+63.51 LINE "A" =10+00.00 LAT "A.27" SEE PROFILE SH.15

R/W

5.0%

5.2%

1220.5 FL/HP

1220

1230

1240

1246

1248

24" RCP PER EROSION CONTROL PLAN (NOT TO BE MAINTAINED BY LACFCD)

RCP PER EROSION CONTROL PLAN (NOT TO BE MAINTAINED BY LACFCD)

PROP. 20" W

PROP. 8" RW

PROP. 18" RW

PROP. 12" FM

PROP. GAS

8" CF

ST CL

LAT "A.31"

LAT "A.26" NOT TO BE MAINTAINED BY LACFCD

LAT "A.27"

LAT "A.28"

8" PVC PER WQ 061105-01B

COMMERCE CENTER DRIVE

MATCHLINE STA 53+00.00 SEE SHEET 7

MATCHLINE STA 61+88.30 SEE SHEET 9

SD LINE "A" LINE TABLE		
LINE	LENGTH	BEARING
L5	92.25'	S51°12'24"W

SD LINE "A" LINE TABLE		
LINE	LENGTH	BEARING
L1	~~317.45'~~ 93.52' ~~72.43'~~	S38°47'36"E
L2	32.04'	S41°44'31"W
L3	70.25'	S81°12'24"W
L4		N51°12'24"E

SD LINE "A" CURVE TABLE				
LINE	DELTA	RADIUS	LENGTH	TANGENT
A	01°20'35"	3021.25'	70.82'	35.41'

GRAPHIC SCALE: 1" = 40'

REVIEWED LAND DEVELOPMENT DIVISION
BY M. D. Espinoza 7/31/2018
STORM DRAIN SECTION DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
1	REVISED TOTAL SHEET NUMBER, UPDATED CATCH BASIN STATIONS AND WIDTHS.		M.D. Espinoza	9/20/2018
2	ADDED STRUCTURAL DETAIL SHEETS 21 AND 22. REVISED CONSTRUCTION NOTE 24.	Jason H. Fukumitsu No.40695	M.D. Espinoza	06/11/2019
	REVISED TOTAL SHEET NUMBER. REVISED HYDRAULIC ELEMENTS ADDED LATERAL A.31			
3	EXTENDED SD LAT. A.26 TO TOP OF SLOPE AND ADD MAINTENANCE RESPONSIBILITY		M.D. Espinoza	11/09/2020

JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA 7-20-18
JASON H. FUKUMITSU DATE

CONSTRUCTION NOTES:

1. INSTALL 18" R.C.P. (SEE PROFILE FOR D-LOAD)
3. INSTALL 30" R.C.P. (SEE PROFILE FOR D-LOAD)
10. INSTALL 114" R.C.P. (SEE PROFILE FOR D-LOAD)
20. CONSTRUCT M.H. PER S.P.P.W.C. STD. PLAN 320-2 SEE DETAILS ON SHEETS 18 AND 19
24. CONSTRUCT CURB OPENING CATCH BASIN PER S.P.P.W.C. STD. PLAN NO. 300-3 MODIFIED CATCH BASIN PER DETAIL ON SHEET 21 AND SHEET 32
32. CONSTRUCT G.S. PER S.P.P.W.C. STD. PLAN 332-2
37. CONSTRUCT CLEANOUT PER DETAIL ON SHEET 12
38. CONSTRUT MANHOLE SAFETY LEDGE PER S.P.P.W.C. STD. PLAN 330-2
2. INSTALL 24" R.C.P. (SEE PROFILE FOR D-LOAD)

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRICE No. 1709 STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-XIEN No. 2592 Exp. 2-29-20 GEOTECHNICAL STATE OF CALIFORNIA

STORM DRAIN PLANS IN
TRACT No. 61105-1 P.D. No. 2640
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
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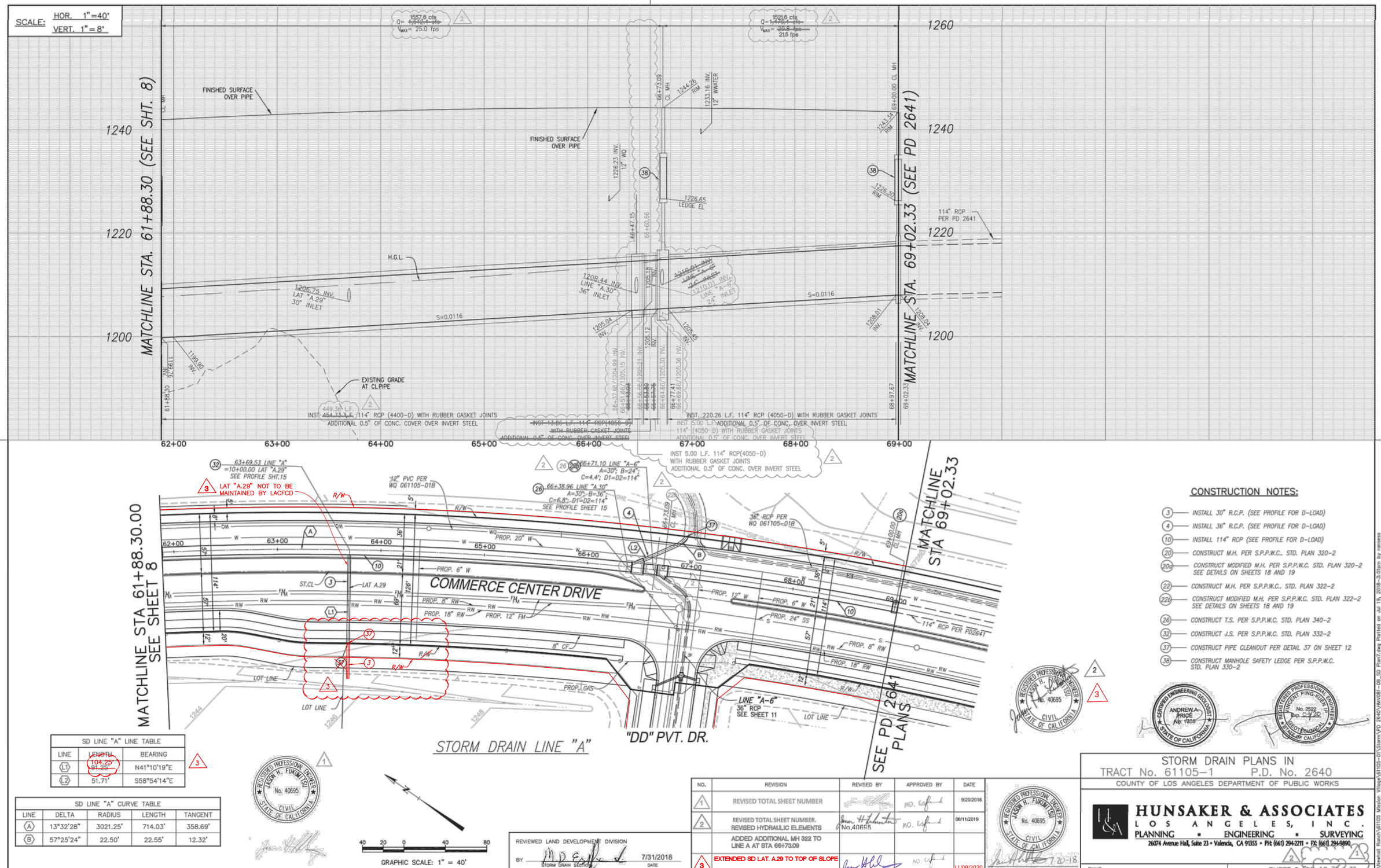
DWG | SHEET 8 OF ~~19~~ 22

DDN# 43-F546-1-1-19

G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2640\HW\061-08_SD Plan6.dwg Plotted on Jul 19, 2018--2:46pm by rsnares

SCALE: HOR. 1"=40'
VERT. 1"=8'



CONSTRUCTION NOTES:

(3) INSTALL 30" R.C.P. (SEE PROFILE FOR D-LOAD)
(4) INSTALL 36" R.C.P. (SEE PROFILE FOR D-LOAD)
(10) INSTALL 114" RCP (SEE PROFILE FOR D-LOAD)
(20) CONSTRUCT M.H. PER S.P.P.W.C.. STD. PLAN 320-2
(20a) CONSTRUCT MODIFIED M.H. PER S.P.P.W.C. STD. PLAN 320-2 SEE DETAILS ON SHEETS 18 AND 19
(22) CONSTRUCT M.H. PER S.P.P.W.C.. STD. PLAN 322-2
(22a) CONSTRUCT MODIFIED M.H. PER S.P.P.W.C. STD. PLAN 322-2 SEE DETAILS ON SHEETS 18 AND 19
(26) CONSTRUCT T.S. PER S.P.P.W.C. STD. PLAN 340-2
(32) CONSTRUCT J.S. PER S.P.P.W.C. STD. PLAN 332-2
(37) CONSTRUCT PIPE CLEANOUT PER DETAIL 37 ON SHEET 12
(38) CONSTRUCT MANHOLE SAFETY LEDGE PER S.P.P.W.C. STD. PLAN 330-2

SD LINE "A" LINE TABLE		
LINE	LENGTH	BEARING
L1	~~104.25'~~ 91.25'	N41°10'19"E
L2	51.71'	S58°54'14"E

SD LINE "A" CURVE TABLE				
LINE	DELTA	RADIUS	LENGTH	TANGENT
A	13°32'28"	3021.25'	714.03'	358.69'
B	57°25'24"	22.50'	22.55'	12.32'

GRAPHIC SCALE: 1" = 40'

REVIEWED LAND DEVELOPMENT DIVISION
BY STORM DRAIN SECTION 7/31/2018 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
1	REVISED TOTAL SHEET NUMBER		M.D. Esfandiari	9/20/2018
2	REVISED TOTAL SHEET NUMBER. REVISED HYDRAULIC ELEMENTS	Jason H. Fukumitsu No.40695	M.D. Esfandiari	06/11/2019
	ADDED ADDITIONAL MH 322 TO LINE A AT STA 66+73.09			
3	EXTENDED SD LAT. A.29 TO TOP OF SLOPE	Jason H. Fukumitsu	M.D. Esfandiari	11/09/2020

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
7-20-18
JASON H. FUKUMITSU DATE

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRIDE No. 1705 STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-XUEN IP No. 2522 Exp. 2-21-20 PROFESSIONAL ENGINEER STATE OF CALIFORNIA

STORM DRAIN PLANS IN
TRACT No. 61105-1 P.D. No. 2640
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

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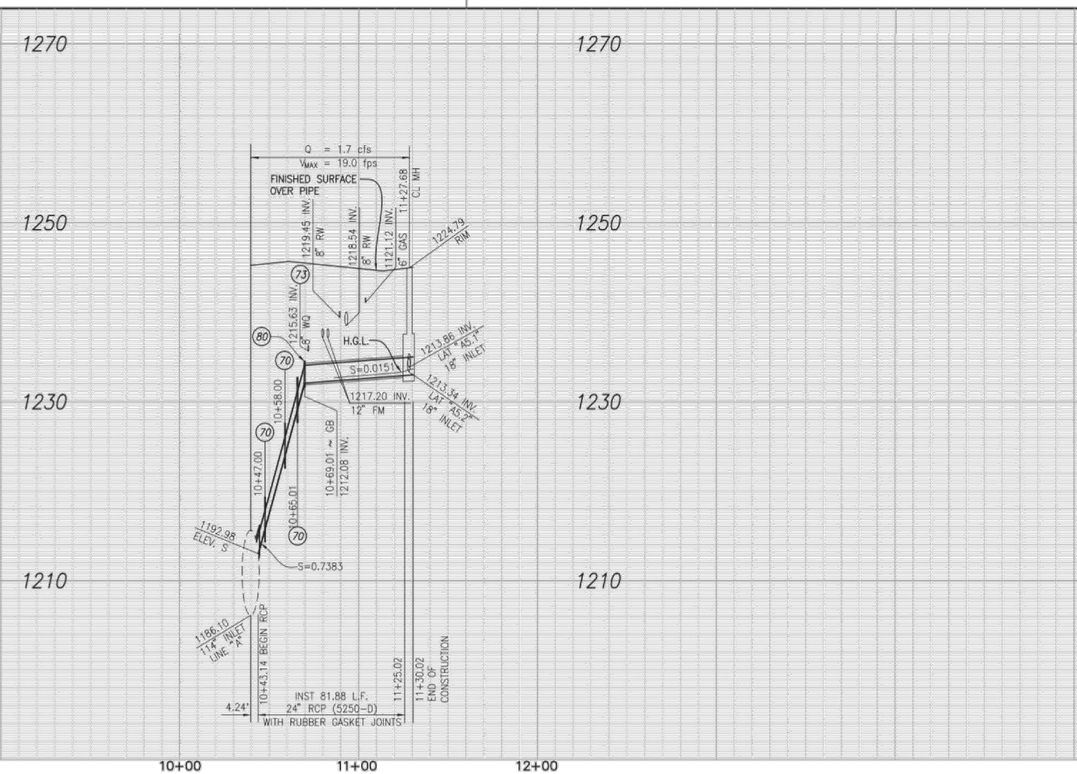
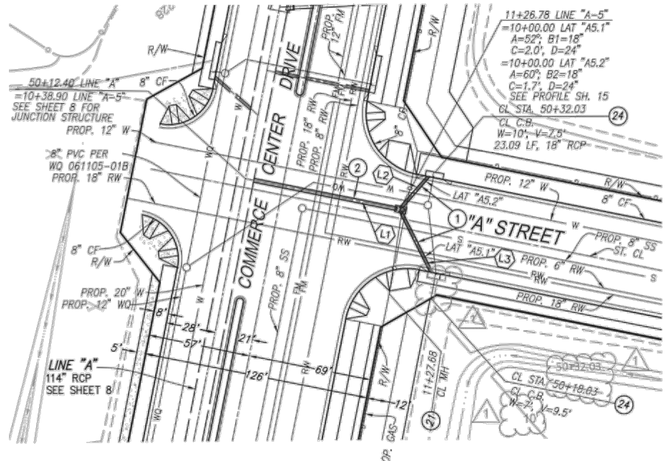
DWG | SHEET 9 OF ~~19~~ 20 22

G:\Newhall Ranch\061105 Mission Village\061105-01\Storm\VPD 2640\HM061-09_SD Plan7.dwg Plotted on Jul 19, 2018--3:09pm by rsnsess

DDN# 43-F546-1-6-1-19

SCALE: HOR. 1"=40'
VERT. 1"=8'





CONSTRUCTION NOTES

1. INSTALL 18" R.C.P. (SEE PROFILE FOR D-LOAD)
2. INSTALL 24" R.C.P. (SEE PROFILE FOR D-LOAD)
21. CONSTRUCT M.H. PER S.P.P.W.C. STD. PLAN 321-2
24. CONSTRUCT CURB OPENING CATCH BASIN PER S.P.P.W.C. STD. PLAN NO. 300-3 MODIFIED CATCH BASIN PER DETAIL ON SHEET 21 AND SHEET 22 (2)
70. CONSTRUCT PIPE ANCHOR AND BACKFILL STABILIZER PER S.P.P.W.C. STD. PLAN 221-2
73. CONSTRUCT CONCRETE BLANKET PER S.P.P.W.C. STD. PLAN 225-2
80. CONSTRUCT CONCRETE COLLAR PER S.P.P.W.C. STD. PLAN 380-4

SD LINE "A-5" LINE TABLE		
LINE	LENGTH	BEARING
L1	90.78'	N51°12'24"E
L2	24.25'	N08°47'36"W
L3	39.28'	N76°41'00"W

GRAPHIC SCALE: 1" = 40'

REVIEWED LAND DEVELOPMENT DIVISION
BY M.D. STORM DRAIN SECTION 7/31/2018 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
1	REVISED TOTAL SHEET NUMBER, UPDATED CATCH BASIN STATION AND WIDTH		M.D.	9/20/2018
2	ADDED STRUCTURAL DETAIL SHEETS 21 AND 22. REVISED CONSTRUCTION NOTE 24.	No.40695	M.D.	06/11/2019
	REVISED TOTAL SHEET NUMBER.			

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
JASON H. FUKUMITSU DATE 7-20-18

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRICE No. 1709 STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-KUEN IP No. 2522 Exp. 6-30-20 GEOTECHNICAL STATE OF CALIFORNIA

STORM DRAIN PLANS IN
TRACT No. 61105-1 P.D. No. 2640
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

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DWG | SHEET 10 OF 19 20 22

DDN# 43-F546-1-19

G:\Vistatul Ranch\61105 Mission Village\61105-01\Storm\FD 2640\VM\061105-10_SD Plan5.dwg Plotted on Jul 19, 2018 - 3:10pm by rondass

SCALE: HOR. 1"=40'
VERT. 1"=8'

MATCHLINE STA. 42+86.62 (SEE SHT. 10)

Q = 3.1 cfs
V_{MAX} = 15.0 fps

Q = 2.1 cfs
V_{MAX} = 6.2 fps

Q = 1.1 cfs
V_{MAX} = 6.6 fps

EXISTING GRADE AT CL PIPE

FINISHED SURFACE OVER PIPE

H.G.L.

1238.25 INV. 8" RW
1237.36 INV. 18" RW
1243.17 RIM
44+07.79 CL MH
1240.02 INV. 12" GAS
1228.89 INV. 24" SEWER
1231.33 INV. LAT "A6.1" 18" INLET
1231.23 INV. LAT "A6.2" 8" INLET
1230.68 INV. 18"
1230.87 BC
44+17.00 ~ EC
1231.05 INV.
S=0.1859
S=0.0262
1238.35 INV. LAT "A6.3" 8" INLET
1238.49 INV.
1238.71 INV.
1230.31 8" SEWER
MAX. OVEREXCAVATION
47+00.30 CL MH
1248.88 RIM
49+93.14 CL MH
1257.61 RIM
1254.16 INV. 12" WATER
1253.30 INV. 8" RW
1260.91 T.C.
1252.91 F.L.
S=0.0505
S=0.0196
1244.14 INV.
1244.23 INV.
51+23.24 ~ PRC
1250.20 INV.
51+40.28 ~ EC
1251.58 INV.

1211.71 ELEV. R
1210.01 ELEV. S
1205.38 114" INLET LINE "A"
43+00.53 BC
43+19.04 ~ BC
1215.15 INV.
43+42.82 ~ EC
1219.57 INV.
44+02.59
44+10.11
46+95.98
47+02.14
49+90.30
49+94.97
51+67.01

INST 102.06 L.F. 24" RCP (4000-D) WITH RUBBER GASKET JOINTS
INST 285.37 L.F. 24" RCP(1500-D) WITH RUBBER GASKET JOINTS
INST 288.17 L.F. 24" RCP (1750-D) WITH RUBBER GASKET JOINTS
INST 172.04 L.F. 24" RCP (1750-D) WITH RUBBER GASKET JOINTS

VOID

FOR PLAN CHECK ONLY

44+00 45+00 46+00 47+00 48+00 49+00 50+00 51+00 52+00

1280 1260 1240 1220

CONSTRUCTION NOTES:

1. INSTALL 18" R.C.P. (SEE PROFILE FOR D-LOAD)
2. INSTALL 24" R.C.P. (SEE PROFILE FOR D-LOAD)
21. CONSTRUCT M.H. PER S.P.P.W.C. STD. PLAN 321-2
24. CONSTRUCT CURB OPENING CATCH BASIN PER S.P.P.W.C. STD. PLAN NO. 300-3

10+82.51 CL STA. ~~10+92.96~~
CL C.B. W=7', V=8.0', 10'

13+98.22 CL STA. ~~13+97.25~~
CL C.B. W=7', V=8.0', 10'

18+30.90 CL STA. ~~18+29.43~~
CL C.B. W=7', V=8.0', 10'

10+94.55 CL STA. ~~11+05.44~~
CL C.B. W=7', V=8.0', 10'

44+05.00 LINE "A-6"
=10+00.00 LAT "A6.1"
A=61° B1=18"
C=1.7', D=24"
=10+00.00 LAT "A6.2"
A=80° B2=18"
C=1.2', D=24"
SEE PROFILE SH. 15

46+97.29 LINE "A-6"
=10+00.00 LAT "A6.3"
A=44° B1=18"
C=2.5', D=24"
SEE PROFILE SH. 15

66+63.767 LINE "A"
=42+86.62 LINE "A-6"

LOT LINE
6" CF
PROP. 12" W
PROP. 8" RW
PROP. 8" SS
PROP. 18" RW
PROP. 12" TM
ST. CL.
R/W
"DD" PRIVATE DRIVE
"EE" PRIVATE DRIVE
12" PVC PER WQ 061105-01B

STORM DRAIN LINE "A-6"

SD LINE "A-6" LINE TABLE		
LINE	LENGTH	BEARING
L1	32.42'	N01°39'53"E
L2	74.18'	N62°18'20"E
L3	15.25'	S17°21'51"E
L4	26.48'	N57°15'60"W
L5	36.37'	S31°34'56"W
L6	26.73'	N52°22'53"E

SD LINE "A-6" CURVE TABLE				
LINE	DELTA	RADIUS	LENGTH	TANGENT
A	60°33'26"	22.50'	23.78'	13.14'
B	33°34'51"	1205.00'	706.24'	363.59'
C	43°22'29"	22.50'	17.03'	8.95'

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRICE No. 1705 STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-KUEN TE No. 2522 Exp. 9-30-20 GEOTECHNICAL STATE OF CALIFORNIA

REVIEWED LAND DEVELOPMENT DIVISION
BY M.D. STORM DRAIN SECTION 7/31/2018 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
1	REVISED TOTAL SHEET NUMBER, UPDATED CATCH BASIN STATION AND WIDTH.		M.D.	9/20/2018
2	VOIDED SHEET 11 AND REPLACED WITH SHEET 11A	Jason H. Fukumitsu No.40695	M.D.	06/11/2019

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
7-20-18
JASON H. FUKUMITSU DATE

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

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

STORM DRAIN PLANS IN
TRACT No. 61105-1 P.D. No. 2640
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
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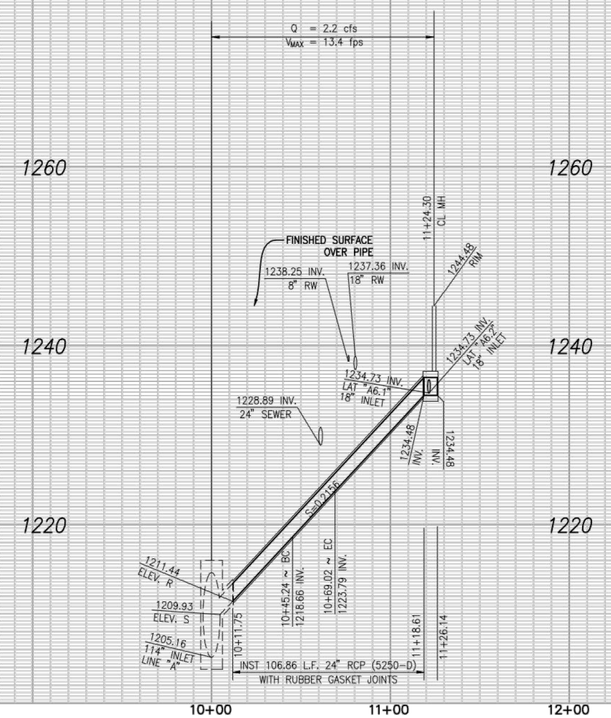
DWG

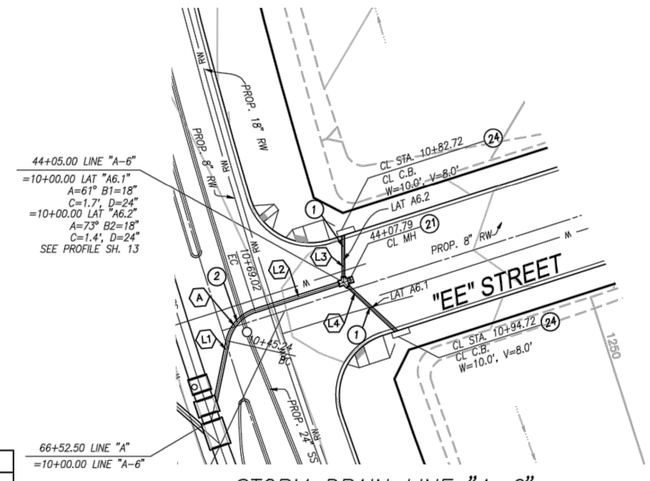
SHEET 11 OF ~~19~~ 20

DDN# 43-F546-1-19

G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2640\VM\081-11_SD Plan5.dwg Plotted on Jul 19, 2018--3:18pm by ronness

SCALE: HOR. 1"=40'
VERT. 1"=8'





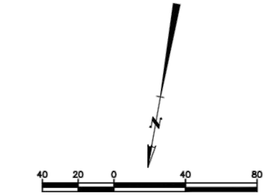
STORM DRAIN LINE "A-6"

SD LINE "A-6" LINE TABLE		
LINE	LENGTH	BEARING
L1	45.24'	N01°39'53"E
L2	57.12'	N62°13'19"E
L3	26.19'	S10°28'21"E
L4	40.21'	N57°16'00"W

SD LINE "A-6" CURVE TABLE				
LINE	DELTA	RADIUS	LENGTH	TANGENT
A	60°33'28"	22.50'	23.78'	13.14'

CONSTRUCTION NOTES:

1. INSTALL 18" R.C.P. (SEE PROFILE FOR D-LOAD)
2. INSTALL 24" R.C.P. (SEE PROFILE FOR D-LOAD)
21. CONSTRUCT M.H. PER S.P.P.W.C. STD. PLAN 321-2
24. CONSTRUCT CURB OPENING CATCH BASIN PER S.P.P.W.C. STD. PLAN NO. 300-3 MODIFIED CATCH BASIN PER DETAIL ON SHEET 21 AND SHEET 22



GRAPHIC SCALE: 1" = 40'

REVIEWED LAND DEVELOPMENT DIVISION

BY _____
STORM DRAIN SECTION DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	REVISED LINE A-6 ADDED SHEET 11A	Jason H. Fukumitsu No.40695	MO. Cert'd	06/11/2019

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

Jason H. Fukumitsu 5/1/2019
JASON H. FUKUMITSU DATE

STORM DRAIN PLANS IN
TRACT No. 61105-1 P.D. No. 2640
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

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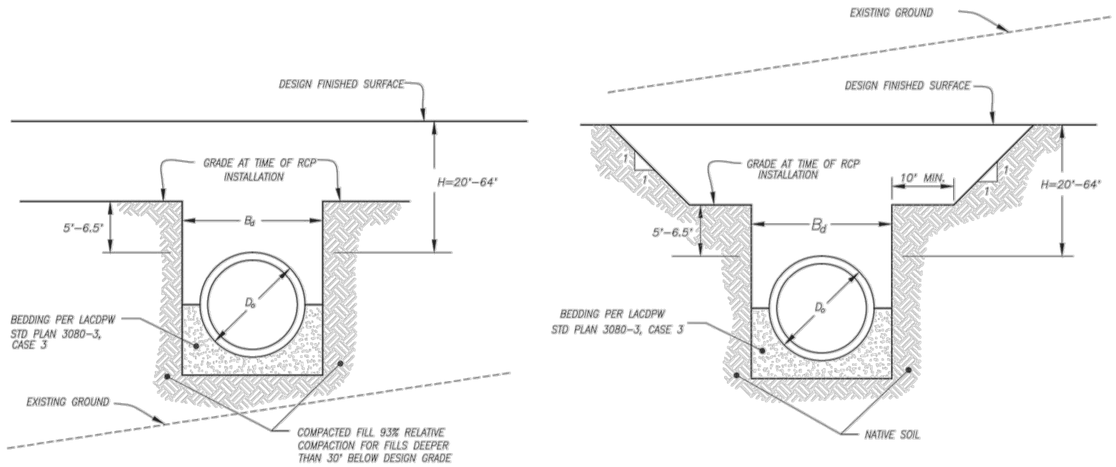
DWG

G:\Vikenhall Ranch\61105 Mission Village\61105-01\Storm\PD 2640\HW\061-11_SD Plan(8_REV).dwg Plotted on Apr 30, 2019-3:27pm by heidye

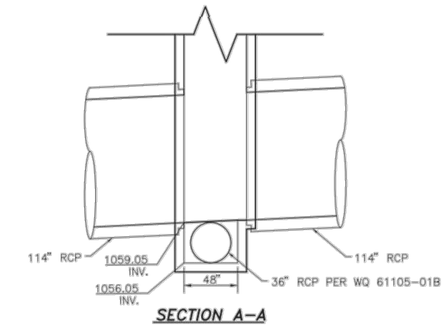


FILL AREAS

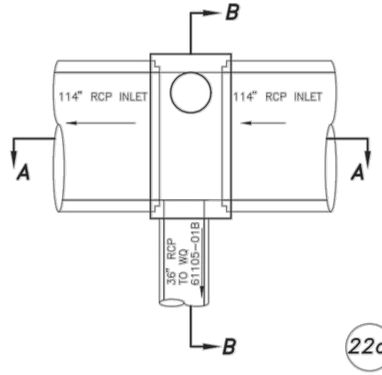
CUT AREAS

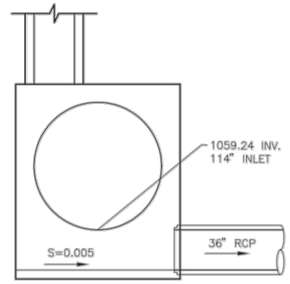
DETAIL FOR RCP INSTALLATION WHERE DEPTH OF COVER IS MORE THAN 20 FEET

N.T.S.



SECTION A–A



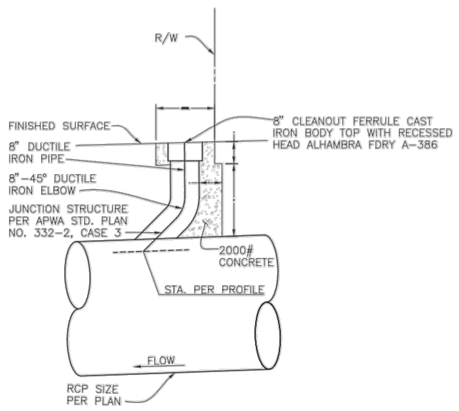


SECTION B–B

DETAIL– MODIFIED MANHOLE STANDARD PLAN No. 322–2 (MH AT LINE "A" STA 21+80.27)

22a

N.T.S.



37 CLEANOUT

N.T.S.

REVIEWED LAND DEVELOPMENT DIVISION

BY _____ STORM DRAIN SECTION 7/31/2018 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
1	REVISED TOTAL SHEET NUMBER		M.D. Esq.	9/20/2018
2	REVISED TOTAL SHEET NUMBER.	Jason H. Fukumitsu No.40695	M.D. Esq.	06/11/2019

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

7-20-18

JASON H. FUKUMITSU DATE

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRICE No. 1209 STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER VINCENT PING AUDIT No. 2522 Exp. 6-30-20 GEOTECHNICAL STATE OF CALIFORNIA

STORM DRAIN PLANS IN
TRACT No. 61105–1 P.D. No. 2640
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
26074 Avenue Hall, Suite 23 ▪ Valencia, CA 91355 ▪ PH: (661) 294-2211 ▪ FX: (661) 294-9890

DWG

SHEET 12 OF 19 20 22

DDN# 43-F546-1-19

G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2640\HM0081-12_Detail.dwg Plotted on Jul 19, 2018–3:18pm by ranseas

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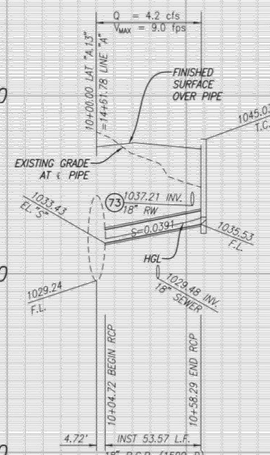
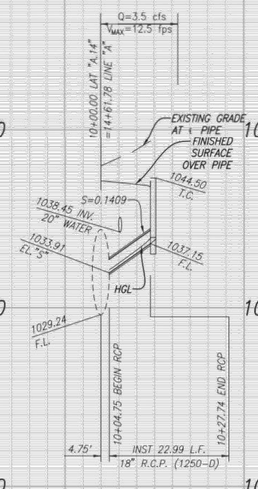
VERT. 1"=8'



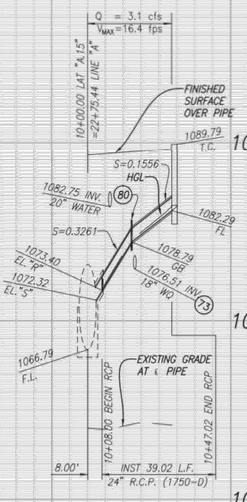
SD LAT "A.13"

SEE SHEET 3 FOR PLAN VIEW



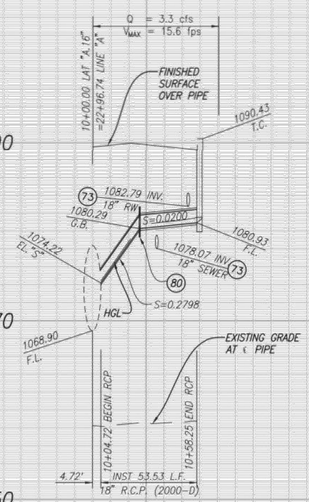
SD LINE "A.14"

SEE SHEET 3 FOR PLAN VIEW



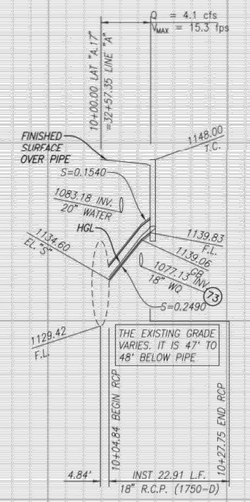
SD LINE "A.15"

SEE SHEET 4 FOR PLAN VIEW



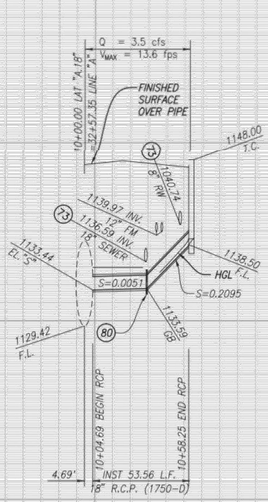
SD LAT "A.16"

SEE SHEET 4 FOR PLAN VIEW



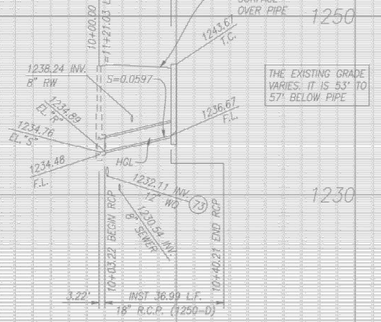
SD LAT "A.17"

SEE SHEET 5 FOR PLAN VIEW



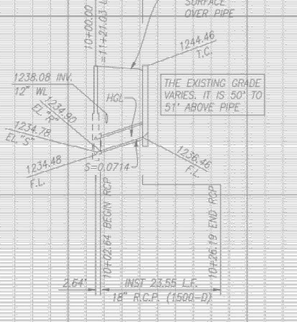
SD LAT "A.18"

SEE SHEET 5 FOR PLAN VIEW



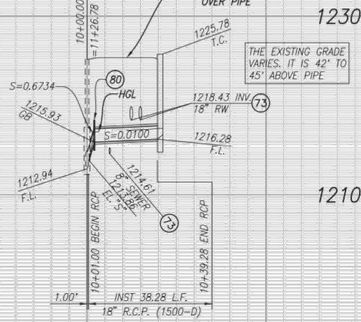
SD LAT "A6.1"

SEE SHEET 11 FOR PLAN VIEW



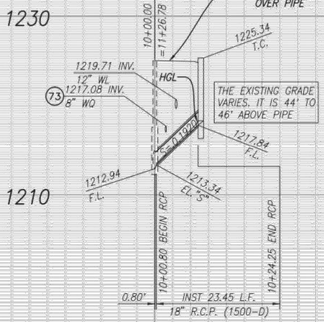
SD LAT "A6.2"

SEE SHEET 11 FOR PLAN VIEW



SD LAT "A5.1"

SEE SHEET 10 FOR PLAN VIEW



SD LAT "A5.2"

SEE SHEET 10 FOR PLAN VIEW

ALL PIPES REQUIRE RUBBER GASKET JOINTS

CONSTRUCTION NOTES:

(73) CONSTRUCT CONCRETE BLANKET PER S.P.P.W.C. STD. PLAN 225-2

(80) CONSTRUCT CONCRETE COLLAR PER S.P.P.W.C. STD. PLAN 380-4

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRICE No. 1209 STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-KUEN LI No. 2522 Exp. 6-30 GEOTECHNICAL STATE OF CALIFORNIA

40 20 0 40 80

GRAPHIC SCALE: 1" = 40'

REVIEWED LAND DEVELOPMENT DIVISION

BY _____ STORM DRAIN SECTION 7/31/2018 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
1	REVISED TOTAL SHEET NUMBER		AD.	9/20/2018
2	REVISED TOTAL SHEET NUMBER. ADD LATERALS A6.1 AND A6.2	No.40695	AD.	06/11/2019

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

JASON H. FUKUMITSU 7-20-18 DATE

STORM DRAIN PLANS IN
TRACT No. 61105-1 P.D. No. 2640
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
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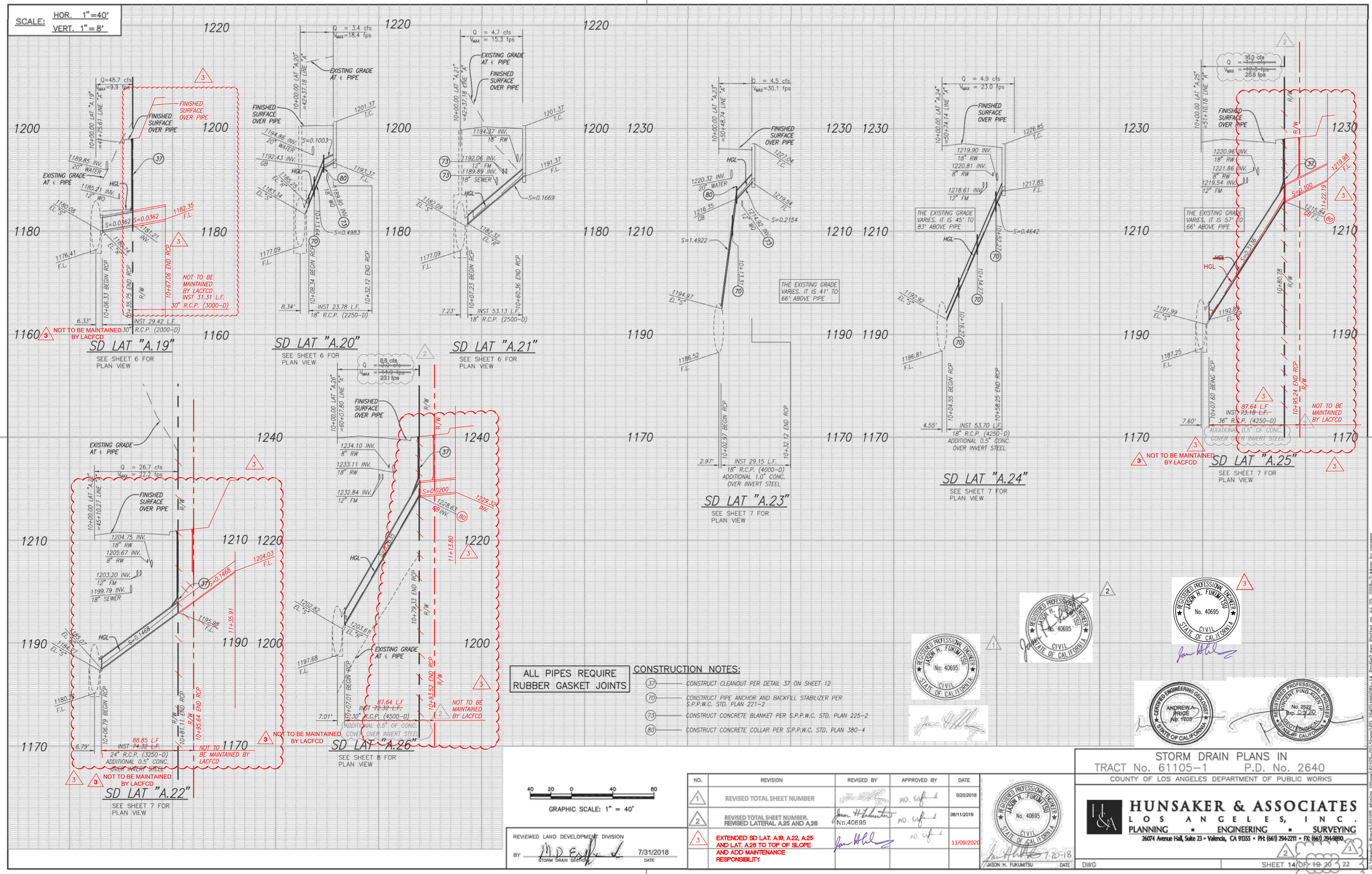
G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2640\HM\081-13_Profile1.dwg Plotted on Jul 20, 2018 - 2:45pm by ronsess

SCALE: HOR. 1"=40'
VERT. 1"=8'



ALL PIPES REQUIRE RUBBER GASKET JOINTS

CONSTRUCTION NOTES:

(37) CONSTRUCT CLEANOUT PER DETAIL 37 ON SHEET 12

(70) CONSTRUCT PIPE ANCHOR AND BACKFILL STABILIZER PER S.P.P.W.C. STD. PLAN 221-2

(73) CONSTRUCT CONCRETE BLANKET PER S.P.P.W.C. STD. PLAN 225-2

(80) CONSTRUCT CONCRETE COLLAR PER S.P.P.W.C. STD. PLAN 380-4

GRAPHIC SCALE: 1" = 40'

REVIEWED LAND DEVELOPMENT DIVISION

BY M D E STORM DRAIN SECTION 7/31/2018 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
1	REVISED TOTAL SHEET NUMBER		MD. Eff'd	9/20/2018
2	REVISED TOTAL SHEET NUMBER, REVISED LATERAL A.25 AND A.26	Jason H Fukumitsu No.40695	MD. Eff'd	06/11/2019
3	EXTENDED SD LAT. A.19, A.22, A.25 AND LAT. A.26 TO TOP OF SLOPE AND ADD MAINTENANCE RESPONSIBILITY		MD. Eff'd	11/09/2020

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

JASON H. FUKUMITSU 7-20-18 DATE

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRICE No. 1705 STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-KUEN IP No. 2522 Exp. 6-30 GEOTECHNICAL STATE OF CALIFORNIA

STORM DRAIN PLANS IN
TRACT No. 61105-1 P.D. No. 2640
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

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DWG

SHEET 14 OF 19 20 22

DDN# 43-F546-1-19

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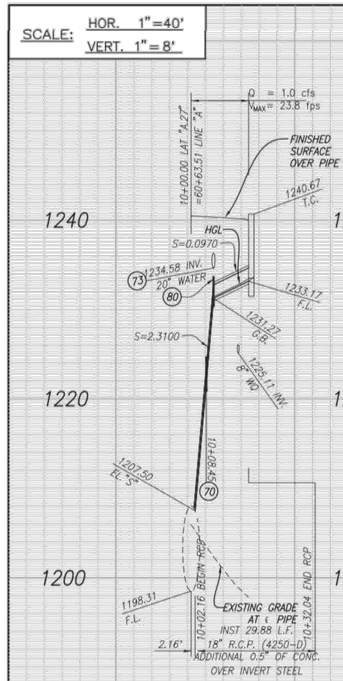
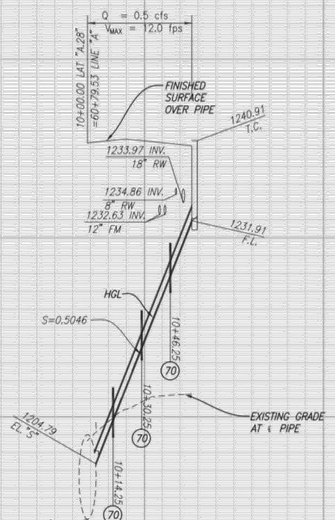


SD LAT "A.27"
SEE SHEET 8 FOR PLAN VIEW



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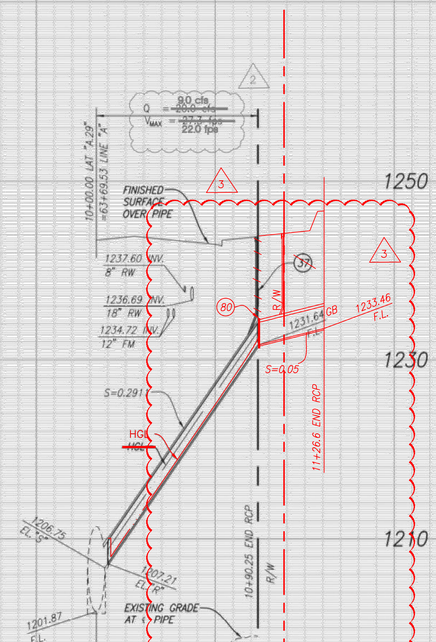
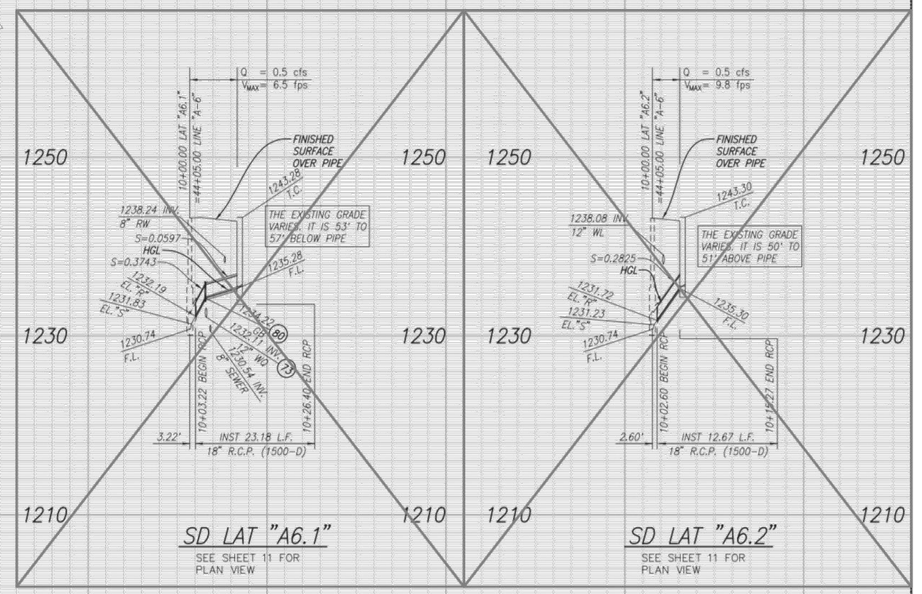
SEE SHEET 8 FOR PLAN VIEW



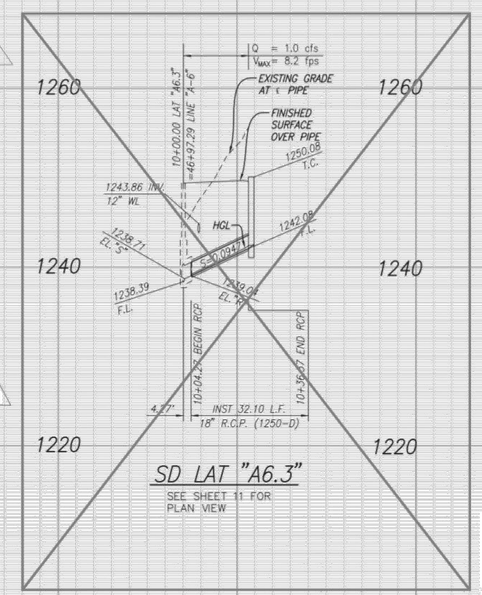
NOT TO BE MAINTAINED BY LACFCD

SD LAT "A.29"
SEE SHEET 9 FOR PLAN VIEW

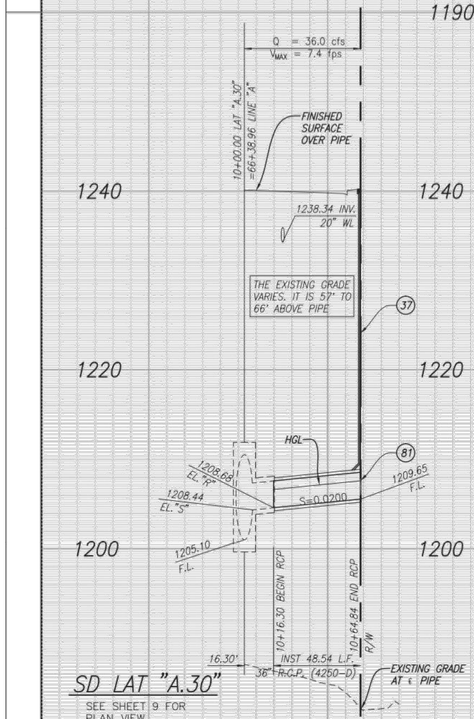


SD LAT "A6.1"
SEE SHEET 11 FOR PLAN VIEW

SD LAT "A6.2"
SEE SHEET 11 FOR PLAN VIEW



SD LAT "A6.3"
SEE SHEET 11 FOR PLAN VIEW



SD LAT "A.30"
SEE SHEET 9 FOR PLAN VIEW

ALL PIPES REQUIRE RUBBER GASKET JOINTS

CONSTRUCTION NOTES:

37 CONSTRUCT CLEANOUT PER DETAIL 37 ON SHEET 12

70 CONSTRUCT PIPE ANCHOR AND BACKFILL STABILIZER PER S.P.P.W.C. STD. PLAN 221-2

73 CONSTRUCT CONCRETE BLANKET PER S.P.P.W.C. STD. PLAN 225-2

80 CONSTRUCT CONCRETE COLLAR PER S.P.P.W.C. STD. PLAN 380-4

81 CONSTRUCT 8" BRICK AND MORTAR PLUG

GRAPHIC SCALE: 1" = 40'

REVIEWED LAND DEVELOPMENT DIVISION
BY M. D. Espinoza 7/31/2018
STORM DRAIN SECTION DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
1	REVISED TOTAL SHEET NUMBER		MO.	9/20/2018
2	REVISED TOTAL SHEET NUMBER. REMOVE LATERALS A6.1 AND A6.2	No.40695	MO.	06/11/2019
3	EXTENDED SD LAT. A29 TO NEW R/W ADD MAINTENANCE RESPONSIBILITY		MO.	11/09/2020

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
JASON H. FUKUMITSU DATE 7-20-18

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRICE No. 1709 STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-KUEN IP No. 2522 Exp. 9-30-20 GEOTECHNICAL STATE OF CALIFORNIA

STORM DRAIN PLANS IN
TRACT No. 61105-1 P.D. No. 2640
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
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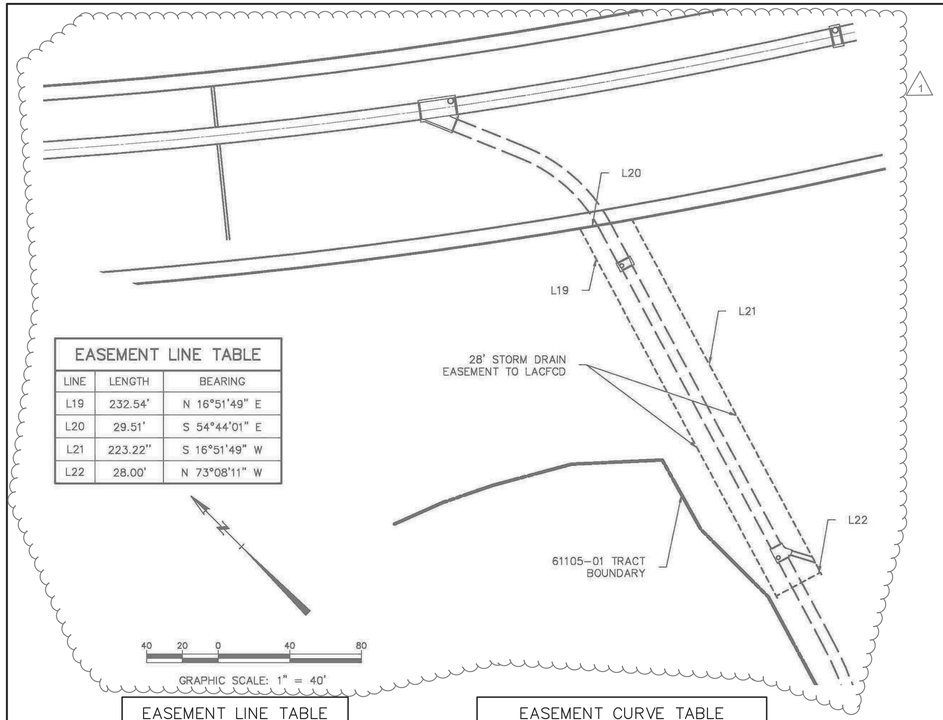
26074 Avenue Hall, Suite 23 ▪ Valencia, CA 91355 ▪ PH: (661) 294-2211 ▪ FX: (661) 294-8990

DWG

SHEET 15 OF 19 20 22

G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2640\HM61B1-15_Profile3.dwg Plotted on Jul 20, 2018 - 2:44pm by ranness

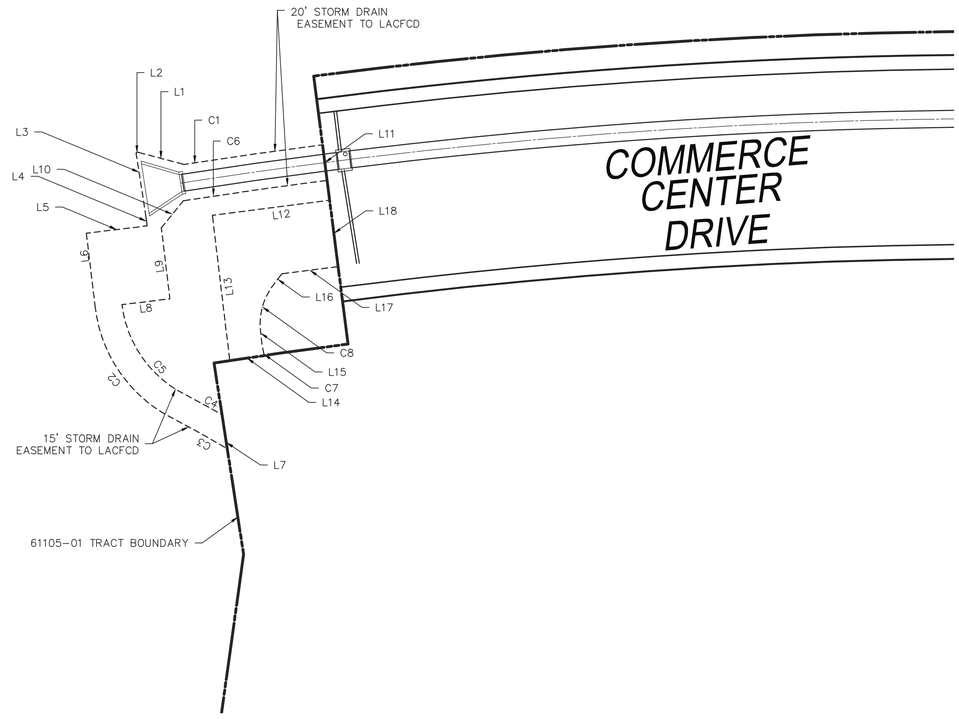
DDN# 43-F546-1-19

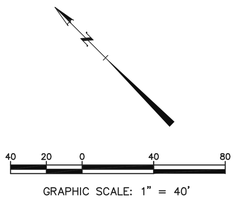


EASEMENT LINE TABLE		
LINE	LENGTH	BEARING
L19	232.54'	N 16°51'49" E
L20	29.51'	S 54°44'01" E
L21	223.22"	S 16°51'49" W
L22	28.00'	N 73°08'11" W

EASEMENT LINE TABLE		
LINE	LENGTH	BEARING
L1	26.81'	S 30°14'15" E
L2	1.01'	S 73°42'38" E
L3	35.85'	S 36°10'59" W
L4	5.32'	S 38°06'45" W
L5	34.22'	N 51°53'15" W
L6	42.00'	S 38°06'45" W
L7	19.30'	S 36°11'52" W
L8	27.00'	N 51°53'15" W
L9	40.00'	S 38°06'45" W
L10	19.49'	N 84°10'15" E
L11	20.00'	N 37°40'50" E
L12	66.05'	N 52°19'13" W
L13	81.77'	N 38°10'20" E
L14	19.42'	N 53°26'18" W
L15	7.76'	S 38°09'10" W
L16	7.62'	S 82°40'47" W
L17	31.70'	S 52°19'13" E
L18	37.36'	N 37°40'47" E

EASEMENT CURVE TABLE				
CURVE	LENGTH	RADIUS	DELTA	TANGENT
C1	78.15'	3031.25'	01°28'38"	39.08'
C2	77.86'	80.05'	55°43'38"	42.32'
C3	35.60'	606.59'	03°21'45"	17.80'
C4	24.19'	621.59'	02°13'48"	12.10'
C5	63.27'	65.05'	55°43'38"	34.39'
C6	81.14'	3011.25'	01°32'38"	40.57'
C7	5.73'	40.00'	08°12'37"	2.87'
C8	27.98'	36.00'	44°31'36"	14.74'





1

REGISTERED PROFESSIONAL ENGINEER
JASON H. FUKUMITSU
No. 40695
CIVIL
STATE OF CALIFORNIA

2

REGISTERED PROFESSIONAL ENGINEER
JASON H. FUKUMITSU
No. 40695
CIVIL
STATE OF CALIFORNIA

REVIEWED LAND DEVELOPMENT DIVISION

BY M.D. Espinoza 7/31/2018

STORM DRAIN SECTION DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
1	Added easement for Line B and revise sheet number		M.D. Espinoza	9/20/2018
2	REVISED TOTAL SHEET NUMBER.	Jason H. Fukumitsu No.40695	M.D. Espinoza	06/11/2019

REGISTERED PROFESSIONAL ENGINEER
JASON H. FUKUMITSU
No. 40695
CIVIL
STATE OF CALIFORNIA

JASON H. FUKUMITSU 7-20-18 DATE

STORM DRAIN PLANS IN
TRACT No. 61105-1 P.D. No. 2640

COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
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DWG

SHEET 16 OF 19 20 22

DDN# 43-F546-1-19

G:\Vineyard Ranch\61105 Mission Village\61105-01\Storm\PD 2640\HMV081-16_SD Easement Map.dwg Plotted on Jul 19, 2018--3:33pm by ranseas

FOUNDATION NOTES:

1. BUILDING CODE MINIMUM RECOMMENDATION IS USED IN THIS PROJECT 1806.2 CLASS 5 MATERIAL.
2. FOOTINGS ARE DESIGNED FOR A BEARING PRESSURE OF 1500 PSF AND EXPANSION INDEX 21–50.3. WHERE SLAB–ON–GRADE OCCURS, EXISTING LOOSE SURFACE SOILS AND FILL PLACED WITHIN THE SLAB AREA SHALL BE RECOMPACTED TO A MINIMUM OF 90 PERCENT RELATIVE COMPACTION.
4. THE CONTRACTOR SHALL SUBMIT TO THE CITY OR COUNTY FOUNDATION EXCAVATIONS AND RECOMPACTION REPORTS PRIOR TO PLACING ANY STRUCTURAL AND NON–STRUCTURAL CONCRETE AND REBAR AT THE SUBJECT AREAS.
5. CONTRACTOR SHALL PROVIDE FOR DE–WATERING OF EXCAVATIONS FROM EITHER SURFACE WATER, GROUND WATER OR SEEPAGE.
6. FOOTING AND UTILITY TRENCH BACK FILL WITHIN BUILDING AREA SHALL BE MECHANICALLY COMPACTED IN LAYERS. FLOODING WILL NOT BE PERMITTED.
7. ALL FOOTINGS SHALL BE FOUNDED IN UNDISTURBED NATURAL SOIL PER CODE.
8. IF SOIL IS FOUND TO BE EXPANSIVE, THE FOOTINGS MUST MEET THE FOLLOWING MINIMUM REQUIREMENTS.
   A. DEPTH OF FOOTINGS BELOW THE NATURAL AND FINISH GRADES SHALL NOT BE LESS THAN 27 INCHES FOR EXTERIOR AND 18 INCHES FOR INTERIOR FOOTINGS.
   B. EXTERIOR WALLS AND INTERIOR BEARING WALLS SHALL BE SUPPORTED ON CONTINUOUS FOOTINGS.
   C. FOOTINGS SHALL BE REINFORCED WITH MINIMUM (4) #4 DEFORMED REINFORCING BARS. TWO BARS SHALL BE PLACED 4 INCHES OF THE BOTTOM OF THE FOOTING AND TWO BARS WITHIN 4 INCHES OF THE TOP OF THE FOOTINGS.
   D. THE SOIL BELOW AN INTERIOR CONCRETE SLAB SHALL BE SATURATED WITH MOISTURE TO A DEPTH OF 18 INCHES PRIOR TO PLACING THE CONCRETE.
9. IN THE EVENT EXCAVATIONS REVEAL UNFAVORABLE CONDITIONS, THE SERVICES OF A SOILS ENGINEER AND/OR GEOLOGIST MAY BE REQUIRED.
10. CONTRACTOR FOR ANY PURPOSE SHALL NOT REMOVE LATERAL SUPPORT FROM ANY FOUNDATION WITHOUT FIRST UNDERPINNING OR PROTECTING THE FOUNDATION AGAINST SETTLEMENT OR LATERAL TRANSLATION.
11. THE EXCAVATION OUTSIDE THE FOUNDATION SHALL BE BACKFILLED WITH SOIL THAT IS FREE OF ORGANIC MATERIAL, CONSTRUCTION DEBRIS, COBBLES AND BOULDERS OR WITH A CONTROLLED LOW–STRENGTH MATERIAL (CLSM). THE BACKFILL SHALL BE PLACED IN LIFTS AND COMPACTED IN A MANOR THAT DOES NOT DAMAGE THE FOUNDATION OR THE WATERPROOFING OR DAMPPROOFING MATERIAL.
    EXCEPTION: CLSM NEED NOT BE COMPACTED.
12. THE GROUND IMMEDIATELY ADJACENT TO THE FOUNDATION SHALL BE SLOPED AWAY FROM THE BUILDING AT A SLOPE OF NOT LESS THAN ONE UNIT VERTICAL IN 20 UNITS HORIZONTAL (5–PERCENT SLOPE) FOR A MINIMUM DISTANCE OF 10 FEET (3048 MM) MEASURED PERPENDICULAR TO THE FACE OF THE WALL. IF PHYSICAL OBSTRUCTIONS OR LOT LINES PROHIBIT 10 FEET (3048 MM) OF HORIZONTAL DISTANCE, A 5–PERCENT SLOPE SHALL BE PROVIDED TO AN APPROVED ALTERNATIVE METHOD OF DIVERTING WATER AWAY FROM FOUNDATION. SWALES USED FOR THIS PURPOSE SHALL BE SLOPED A MINIMUM OF 2 PERCENT WHERE LOCATED WITHIN 10 FEET (3048 MM) OF THE BUILDING FOUNDATION. IMPERVIOUS SURFACES WITHIN 10 FEET (3048 MM) OF THE BUILDING FOUNDATION SHALL BE SLOPED A MINIMUM OF 2 PERCENT AWAY FROM THE BUILDING.
    EXCEPTION: WHERE CLIMATIC OR SOIL CONDITIONS WARRANT, THE SLOPE OF THE GROUND AWAY FROM THE BUILDING FOUNDATION SHALL BE PERMITTED TO BE REDUCED TO NOT LESS THAN ONE UNIT VERTICAL IN 48 UNITS HORIZONTAL (2–PERCENT SLOPE).
    THE PROCEDURE USED TO ESTABLISH THE FINAL GROUND LEVEL ADJACENT TO THE FOUNDATION SHALL ACCOUNT FOR ADDITIONAL SETTLEMENT OF THE BACKFILL.

ABBREVIATIONS

AB	ANCHOR BOLT	FH	FULL HEIGHT	R&R	REMOVE & REPLACE
ABV	ABOVE	FN	FIELD NAILING	SCHED	SCHEDULE
ADDL	ADDITIONAL	FL	FLOOR	SF	SQUARE FOOT
ADHES	ADHESIVE	FS	FAR SIDE	SHT	SHEET
ALT	ALTERNATE	FDN	FOUNDATION	SIM	SIMILAR
ARCH	ARCHITECT, ARCHITECTURAL	FOC	FACE OF CONCRETE	SN	SOLE ₹ NAILING
BTWN	BETWEEN	FOS	FACE OF STUD	SPEC	SPECIFICATION
BLW	BELOW	FT	FOOT, FEET	SQ	SQUARE
BLDG	BUILDING	FTG	FOOTING	STD	STANDARD
BLKG	BLOCKING	GA	GAGE	STL	STEEL
BM	BEAM	GALV	GALVANIZED	STRUCT	STRUCTURAL
BN	BOUNDARY NAILING	GND	GROUND	SYM	SYMMETRICAL
BOT	BOTTOM	GRD	GRADE	THK	THICK
BS	BOTH SIDES	GT	GIRDER TRUSS	THRD	THREADED
BSMT	BASEMENT	HT	HEIGHT	T&B	TOP & BOTTOM
CF	CUBIC FOOT	HORIZ	HORIZONTAL	TN	TOE NAIL
CJ	CONTROL JOINT, CEILING JOIST	HS	HIGH STRENGTH	TOF	TOP OF FOOTING
CLG	CEILING	INFO	INFORMATION	TOS	TOP OF STEEL
CLR	CLEAR	INT	INTERIOR	TL	TOP OF LEDGER
CMU	CONCRETE MASONRY UNIT	JT	JACK TRUSS	TOW	TOP OF WALL
CNTRSNK	COUNTERSINK/COUNTERSUNK	KP	KING POST	TRANSV	TRANSVERSE
COL	COLUMN	KSI	KIPS PER SQUARE INCH	TS	TUBE STEEL
CONC	CONCRETE	LBS	POUNDS	TYP	TYPICAL
CONN	CONNECTION	LG	LONG	UNO	UNLESS NOTED OTHERWISE
CONST	CONSTRUCTION	LOC'S	LOCATIONS	VERT	VERTICAL
CONT	CONTINUOUS	LONG	LONGITUDINAL	WF	WIDE FLANGE BEAM
CONTR	CONTRACTOR	LT WT	LIGHT WEIGHT	W/	WITH
CVR	COVER	MAX	MAXIMUM	W/O	WITHOUT
DIA	DIAMETER	MB	MACHINE BOLT	WT	WEIGHT
DIR	DIRECTION	MD	METAL DECK	WP	WORKING POINT
D.O.	DO OVER	MECH	MECHANICAL	WWF	WELDED WIRE FABRIC
DSA	DEPARTMENT OF STATE ARCHITECTS	MANUF	MANUFACTURER	WWO	WALL W/ OPENING AND/OR PERFORATED S.W.
DWG	DRAWING	MIN	MINIMUM		
(E)	EXISTING	MISC	MISCELLANEOUS		
EA	EACH	MTL	METAL		
EF	EACH FACE	(N)	NEW		
ELEC	ELECTRICAL	NS	NEAR SIDE, NELSON STUD		
EL	ELEVATION	NW	NORMAL WEIGHT		
EN	EDGE NAILING	OC	ON CENTER		
ENGR	ENGINEER	OH	OPPOSITE HAND		
ES	EDGE SCREW	OPP	OPPOSITE		
EXP JT	EXPANSION JOINT	PSF	POUNDS PER SQUARE FOOT		
EQ	EQUAL	PSI	POUNDS PER SQUARE INCH		
EXT	EXTERIOR	PT	PLATE TRUSS		
FF	FINISHED FLOOR	REINF	REINFORCEMENT		
FG	FINISHED GRADE	REQ	REQUIRE		

SYMBOLS

∠	ANGLE
@	AT
℄	CENTERLINE
ℙ	PLATE / PROPERTY LINE
#	POUNDS
ø	DIAMETER
⊥	PERPENDICULAR
//	PARALLEL

REINFORCED CONCRETE NOTES CONT.:

26. TOLERANCE FOR d AND MINIMUM CONCRETE COVER IN FLEXURAL MEMBERS, WALLS, AND COMPRESSION MEMBERS SHALL BE AS FOLLOWS:

	TOLERANCE ON d	TOLERANCE ON MINIMUM CONCRETE COVER
d ≤ 8 IN.	±⅜ IN.	–⅜ IN.
d > 8 IN.	±½ IN.	–½ IN.

EXCEPT THAT TOLERANCE FOR THE CLEAR DISTANCE TO FORMED SOFFITS SHALL BE MINUS ¼ IN. AND TOLERANCE FOR COVER SHALL NOT EXCEED MINUS ⅓ THE MINIMUM CONCRETE COVER REQUIRED IN THE DESIGN DRAWINGS AND SPECIFICATIONS.

27. MAXIMUM CHLORIDE ION CONTENT FOR CORROSION PROTECTION OF REINFORCEMENT:

TYPE OF MEMBER	MAXIMUM WATER SOLUBLE CHLORIDE ION (Cl⁻) IN CONCRETE, PERCENT BY WEIGHT OF CEMENT
PRESTRESSED CONCRETE	0.06
REINFORCED CONCRETE EXPOSED TO CHLORIDE IN SERVICE	0.15
REINFORCED CONCRETE THAT WILL BE DRY OR PROTECTED FROM MOISTURE IN SERVICE	1.00
OTHER REINFORCED CONCRETE CONSTRUCTION	0.30

28. TOLERANCE FOR LONGITUDINAL LOCATION OF BEND AND ENDS OF REINFORCEMENT SHALL BE ± 2 IN., EXCEPT THE TOLERANCE SHALL BE ± ½ IN. AT THE DISCONTINUOUS ENDS OF BRACKETS AND CORBELS, AND ± 1 IN. AT THE DISCONTINUOUS ENDS OF OTHER MEMBERS.
29. REINFORCEMENT RESISTING EARTHQUAKE–INDUCED FLEXURAL AND AXIAL FORCES IN FRAME MEMBERS AND IN STRUCTURAL WALL BOUNDARY ELEMENTS SHALL COMPLY WITH ASTM A 706. ASTM A 615 GRADE 60 REINFORCEMENT SHALL BE PERMITTED IN THESE MEMBERS IF:
    A. THE ACTUAL YIELD STRENGTH BASED ON MILL TESTS DOES NOT EXCEED f_y BY MORE THAN 18,000 PSI (RETESTS SHALL NOT EXCEED THIS VALUE BY MORE THAN AN ADDITIONAL 3000 PSI): AND
    B. THE RATION OF THE ACTUAL TENSILE STRENGTH TO THE ACTUAL YIELD STRENGTH IS NOT LESS THAN 1.25,THE VALUE OF f_y FOR TRANSVERSE REINFORCEMENT INCLUDING SPIRAL REINFORCEMENT SHALL NOT EXCEED 60,000 PSI.
30. CONCRETE FLOOR FLATNESS SHALL BE A MINIMUM OF ⅜" : 10 FT. TYP. U.N.O.
31. WHERE CORROSION–RESISTANT REINFORCEMENT (CRR) IS SPECIFIED, USE MMFX2 REBAR ASTM A1035 GRADES 690 AND 830.
32. WELDING OF ELECTRICAL CONDUCTORS TO REINFORCING STEEL IS PROHIBITED WITHOUT THE APPROVAL OF THE ENGINEER OF RECORD.
33. PERFORMANCE OF SHOTCRETE SHALL BE PER ACI 506.2 SPECIFICATIONS.
34. ACI 318 TABLE 26.4.1.1.1(a) – SPECIFICATIONS FOR CEMENTITIOUS MATERIALS

CEMENTITIOUS MATERIALS	SPECIFICATION
PORTLAND CEMENT	ASTM C150
BLENDED HYDRAULIC CEMENTS	ASTM C595, EXCLUDING TYPE IS (≥70) AND TYPE IT (S≥70)
EXPANSIVE HYDRAULIC CEMENTS	ASTM C845
HYDRAULIC CEMENT	ASTM C1157
FLY ASH AND NATURAL POZZOLAN	ASTM C618
SLAG CEMENT	ASTM C989
SILICA FUME	ASTM C1240

35. AGGREGATES – COMPLIANCE REQUIREMENTS:
    A. AGGREGATES SHALL CONFORM TO (1) OR (2):
        1. NORMALWEIGHT AGGREGATE: ASTM C33.
        2. LIGHTWEIGHT AGGREGATE: ASTM C330
    B. AGGREGATES NOT CONFORMING TO ASTM C33 OR ASTM C330 ARE PERMITTED IF THEY HAVE BEEN SHOWN BY TEST OF ACTUAL SERVICE TO PRODUCE CONCRETE OF ADEQUATE STRENGTH AND DURABILITY AND ARE APPROVED BY THE BUILDING OFFICIAL.
    C. MAXIMUM AGGREGATE SIZE:
        1. FOOTINGS.....1" MAX.
        2. SLAB ON GRADE, GRADE BEAMS.....¾" MAX.
        3. ELEVATED STRUCT. SLABS, BEAMS, FRAMED COLUMNS.....⅜" MAX.
        4. REMAINDER.....¾" MAX.
36. WATER – COMPLIANCE REQUIREMENTS:
    A. MIXING WATER SHALL CONFORM TO ASTM C1602.
    B. MIXING WATER, INCLUDING THAT PORTION OF MIXING WATER CONTRIBUTED IN THE FORM OF FREE MOISTURE ON AGGREGATES, SHALL NOT CONTAIN DELETERIOUS AMOUNTS OF CHLORIDE ION WHEN USED FOR PRESTRESSED CONCRETE, FOR CONCRETE THAT WILL CONTAIN ALUMINUM EMBEDMENTS, OR FOR CONCRETE CAST AGAINST STAY–IN–PLACE GALVANIZED STEEL FORMS.
37. ADMIXTURES – COMPLIANCE REQUIREMENTS:
    A. ADMIXTURES SHALL CONFORM TO (1) THROUGH (4):
        1. WATER REDUCTION AND SETTING TIME MODIFICATION: ASTM C494.
        2. PRODUCING FLOWING CONCRETE: ASTM C1017.
        3. AIR ENTRAINMENT: ASTM C260.
        4. INHIBITING CHLORIDE–INDUCED CORROSION: ASTM C1582.
    B. ADMIXTURES THAT DO NOT CONFORM TO THESE SPECIFICATIONS SHALL BE SUBJECT TO PRIOR REVIEW BY THE LICENSED DESIGN PROFESSIONAL.
    C. CALCIUM CHLORIDE OR ADMIXTURES CONTAINING CHLORIDE FROM SOURCES OTHER THAN IMPURITIES IN ADMIXTURE INGREDIENTS SHALL NOT BE USED IN PRESTRESSED CONCRETE, IN CONCRETE CONTAINING EMBEDDED ALUMINUM, OR IN CONCRETE CAST AGAINST STAY–IN–PLACE GALVANIZED STEEL FORMS.
    D. ADMIXTURES USED IN CONCRETE CONTAINING EXPANSIVE CEMENTS CONFORMING TO ASTM C845 SHALL BE COMPATIBLE WITH THE CEMENT AND PRODUCE NO DELETERIOUS EFFECTS.
38. STEEL FIBER REINFORCEMENT – COMPLIANCE REQUIREMENTS:
    A. STEEL FIBER REINFORCEMENT USED FOR SHEAR RESISTANCE SHALL SATISFY (1) AND (2):
        1. BE DEFORMED AND CONFORM TO ASTM A820.
        2. HAVE A LENGTH–TO–DIAMETER RATIO OF AT LEAST 50 AND NOT EXCEEDING 100.

REINFORCED CONCRETE NOTES:

1. CONCRETE MIXES SHALL BE DESIGNED BY A RECOGNIZED TESTING LABORATORY AND COPIES OF THE DESIGN SHALL BE SENT TO THE ARCHITECT AND THE ENGINEER. COMPRESSIVE STRENGTH TEST REPORTS SHALL BE SUBMITTED TO THE BUILDING DEPARTMENT AND THE ARCHITECT. ALL CONCRETE EXCEPT FOUNDATION CONCRETE SHALL CONTAIN POLYMER BASED WATER REDUCING ADMIXTURE.
2. PORTLAND CEMENT SHALL CONFORM TO ASTM C–150. TYPE II. AGGREGATE FOR STONE CONCRETE SHALL CONFORM TO ASTM C–33. NON–REACTIVE AGGREGATE FOR LIGHTWEIGHT CONCRETE SHALL CONFORM ASTM C–330.
3. ALL REINFORCING BARS, ANCHOR BOLTS, PRE STRESSING TENDONS, AND ALL OTHER CONCRETE INSERTS SHALL BE WELL SECURED IN POSITION PRIOR TO PLACING CONCRETE.
4. THE MAXIMUM SLUMP SHALL NOT EXCEED 4" +/– 1" FOR FOOTINGS, SLABS ON EARTH, AND MASS CONCRETE, AND 5" +/– 1" FOR OTHER CONCRETE. SLUMP MAY BE INCREASED WHEN CHEMICAL ADMIXTURES ARE USED, PROVIDED THAT ADMIXTURE–TREATED CONCRETE HAS THE SAME OR LOWER WATER: CEMENT OR WATER: CEMENTITIOUS MATERIAL RATIO. (ACI 211 TABLE 6.3.1)
5. MINIMUM COMPRESSIVE STRENGTH:
   PROVIDE CONCRETE WITH THE FOLLOWING MINIMUM COMPRESSIVE STRENGTH (f'_c) AT 28 DAYS UNLESS NOTED OTHERWISE (MINIMUM 5 SACKS OF CEMENT PER CUBIC YARD) (MAXIMUM WATER/CEMENT RATIO BY WEIGHT SHALL BE .65 FOR BALANCE):
   A. STRUCTURAL SLABS..... 3000 P.S.I.*(HARDROCK)
   B. COLUMNS..... 3000 P.S.I.*(HARDROCK)
   C. BEAMS..... 3000 P.S.I.*(HARDROCK)
   * 2500 PSI STRENGTH USED FOR DESIGN, SPECIAL INSPECTION NOT REQUIRED.
6. THE COMPRESSIVE STRENGTH OF EXTERIOR SLABS AND FLAT WORK SHALL BE INCREASED FOR MODERATE AND SEVERE WEATHERING EXPOSURE PER TABLE 1904.2.2 OF THE CBC.
7. ALL STRUCTURAL CONCRETE IS TO BE REINFORCED.
8. CONTRACTOR SHALL SUBMIT SLAB CONSTRUCTION JOINT LAYOUT DRAWINGS TO THE ARCHITECT AND ENGINEER FOR REVIEW. THE MAXIMUM SPACING OF CONTROL JOINTS IN SLAB ON GRADE EACH WAY SHALL BE 30X THE SLAB THICKNESS BEFORE 7 DAYS OF CURING. SLABS REQUIRE AT LEAST 7 DAYS CURING (14 DAYS WHERE FLY ASH OR POZOLAN IS USED), AND THE ENVIRONMENT (HUMIDITY AND TEMPERATURE) OF ROOM SHALL BE ACCLIMATED TO LONG TERM CLIMATE CONDITIONS PRIOR TO INSTALLATION OF FLOORING. THE SLAB TEMPERATURE SHALL BE WITHIN 5 DEGREES OF DEW POINT DURING CURING. NO CURING COMPOUND SHALL BE USED, ONLY WET CURED. MOISTURE AND HUMIDITY TESTING SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY HIRED BY THE OWNER, AND TESTS RESULTS SHALL BE SUBMITTED TO THE ARCHITECT FOR APPROVAL PRIOR TO INSTALLATION OF FLOORING.
9. PROJECTING CORNERS OF BEAMS, COLUMNS, WALLS, ETC.. SHALL BE FORMED WITH A 3/4" CHAMFER UNLESS DETAILED OTHERWISE.
10. IF EXPOSURE TO SULFATES, OR SPECIAL EXPOSURE CONDITIONS OCCUR, THE CONCRETE STRENGTH, WATER CEMENT RATIOS, AND OTHER PROPERTIES OF THE CONCRETE MIX SHALL BE IN ACCORDANCE WITH ACI 318 SECTION 4.3. VERIFY WITH SOILS REPORT FOR CURING IN THE SOILS.
11. DO NOT POUR CONCRETE WHEN THE TEMPERATURE EXCEEDS 90°F OR 80°F WHEN THE WIND EXCEEDS 12MPH. START CURING AS SOON AS HARD TRAWLING IS DONE. ALL CURING SHALL BE WET CURING BY USING BURLAP FOR A MINIMUM OF 7 DAYS. BURLAP MUST BE PLACED WITHIN 2 HOURS OF POURING (NO SPRAY CURING). WHEN WIND, TEMPERATURE AND HUMIDITY CONDITIONS CAUSE EARLY DISAPPEARANCE OF BLEED WATER, STEPS SHALL BE TAKEN TO USE A FOG SPRAY. CURING SHALL COMMENCE IMMEDIATELY AFTER FINISHING TRAWLING.
12. WHERE AIR ENTRAINED CONCRETE IS SPECIFIED, THE VOLUME OF AIR IN THE MORTAR FRACTION OF CONCRETE MIX DESIGN SHALL BE 9% ±1%.
13. ALL REINFORCING STEEL SHALL CONFORM TO THE REQUIREMENTS OF ASTM A–615 GRADE 60 FOR NO.5 AND LARGER, ASTM A–615 GRADE 40 FOR NO.4 AND SMALLER. AT GRADE BEAMS & CONCRETE FRAMES ALL REINF. SHALL CONFORM TO ASTM A706 REBAR. U.N.O.
14. ALL REINFORCING BAR BENDS SHALL BE MADE COLD.
15. REINFORCING STEEL SHALL BE SPLICED WITH CLASS B SPLICES UNLESS NOTED OTHERWISE ON THE DRAWINGS.
16. LOW HYDROGEN ELECTRODES SHALL BE USED WHEREVER REINFORCING STEEL IS WELDED. BARS SHALL BE A706 GRD. 60 MIN. FOR WELD ABILITY.
17. AT THE TIME CONCRETE IS PLACED, REINFORCEMENT SHALL BE FREE FROM MUD, OIL, OR OTHER NONMETALLIC COATINGS THAT DECREASE BOND. WHERE SPECIFIED IN THE DETAILS, EPOXY–COATING OF STEEL REINFORCEMENT IN ACCORDANCE WITH ACI STANDARDS. EXCEPT FOR PRESTRESSING STEEL, STEEL REINFORCEMENT WITH RUST, MILL SCALE, OR A COMBINATION OF BOTH SHALL BE CONSIDERED SATISFACTORY, PROVIDED THE MINIMUM DIMENSIONS (INCLUDING HEIGHT OF DEFORMATIONS) AND WEIGHT OF A HAND–WIRE–BRUSHED TEST SPECIMEN COMPLY WITH APPLICABLE ASTM SPECIFICATIONS.
18. THE MINIMUM CLEAR SPACING BETWEEN PARALLEL BARS IN A LAYER SHALL BE d_b BUT NOT LESS THAN 1 IN. WHERE PARALLEL REINFORCEMENT IS PLACED IN TWO OR MORE LAYERS, BARS IN THE UPPER LAYERS SHALL BE PLACED DIRECTLY ABOVE BARS IN THE BOTTOM LAYER WITH CLEAR DISTANCE BETWEEN LAYERS NOT LESS THAN 1 IN. 21. CLEAR DISTANCE LIMITATION BETWEEN BARS SHALL APPLY ALSO TO THE CLEAR DISTANCE BETWEEN A CONTACT LAP SPLICE AND ADJACENT SPLICES OR BARS.
19. IN SPIRALLY REINFORCED OR TIED REINFORCED COMPRESSION MEMBERS, CLEAR DISTANCE BETWEEN LONGITUDINAL BARS SHALL BE NOT LESS THAN 1.5d_b NOR LESS THAN 1½ IN.
20. IN WALLS AND SLABS OTHER THAN CONCRETE JOIST CONSTRUCTION, PRIMARY FLEXURAL REINFORCEMENT SHALL NOT BE SPACED FARTHER APART THAN THREE TIMES THE WALL OR SLAB THICKNESS, NOR FARTHER APART THAN 18 IN.
21. WHERE CONCRETE MUST BE INSTALLED AND CURED IN COLD WEATHER, THE GENERAL REQUIREMENTS AND SPECIFICATIONS OF ASTM STD C–31 SHALL BE IMPLEMENTED.
22. CAST–IN–PLACE CONCRETE (NON–PRESTRESSED)
    THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCEMENT:
    A. CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EART.....3" MIN.
    B. CONCRETE EXPOSED TO EARTH OR WEATHER:
        - NO.6 THROUGH NO.18 BARS.....2" MIN.
        - NO.5 BAR, W31 OR D31 WIRE, AND SMALLER.....1½" MIN.
    C. CONCRETE NOT EXPOSED TO WEATHER OR IN CONTACT WITH GROUND:
       SLABS, WALLS, JOISTS:
        - NO.14 AND NO.18 BARS.....1½" MIN.
        - NO.11 BAR AND SMALLER.....¾" MIN.

       BEAMS, COLUMNS:
        - PRIMARY REINFORCEMENT, TIES, STIRRUPS, SPIRALS.....1½" MIN.

       SHELLS, FOLDED PLATE MEMBERS:
        - NO.6 BAR AND LARGER.....¾" MIN.
        - NO.5 BAR, W31 OR D31 WIRE, AND SMALLER.....½" MIN.
23. BUNDLED BARS:
    FOR BUNDLED BARS, MINIMUM CONCRETE COVER SHALL BE EQUAL TO THE EQUIVALENT DIAMETER OF THE BUNDLE, BUT NEED NOT TO BE GREATER THAN 2 IN.; EXCEPT FOR CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH, WHERE MINIMUM COVER SHALL BE 3 IN. GROUPS OF PARALLEL REINFORCING BARS BUNDLED IN CONTACT TO ACT AS A UNIT SHALL BE LIMITED TO FOUR IN ANY ONE BUNDLE. BUNDLED BARS SHALL BE ENCLOSED WITHIN STIRRUPS OR TIES. BARS LARGER THAN NO. 11 SHALL NOT BE BUNDLED IN BEAMS. INDIVIDUAL BARS WITHIN A BUNDLE TERMINATED WITHIN THE SPAN OF FLEXURAL MEMBERS SHALL TERMINATE AT DIFFERENT POINTS WITH AT LEAST 40d_b STAGGER.
24. CORROSIVE ENVIRONMENTS:
    IN CORROSIVE ENVIRONMENTS OR OTHER SEVERE EXPOSURE CONDITIONS, AMOUNT OF CONCRETE PROTECTION SHALL BE SUITABLY INCREASED, AND DENSENESS AND NONPOROSITY OF PROTECTING CONCRETE SHALL BE CONSIDERED, OR OTHER PROTECTION SHALL BE PROVIDED. "COVER" WHERE NOTED ON PLANS AND DETAILS IS NOT A MINIMUM, UNLESS NOTED AS "MIN." THE COVER SHALL BE AS NOTED WITH TOLERANCE.
25. MINIMUM DIAMETER OF BEND:

MINIMUM DIAMETERS OF BEND	
BAR SIZE	MINIMUM DIAMETER
NO.3 THROUGH NO.8	6d_b
NO.9, NO.10, AND NO.11	8d_b
NO.14 AND NO.18	10d_b

GENERAL STRUCTURAL NOTES:

1. THIS DOCUMENT IS AN INSTRUMENT OF PROFESSIONAL SERVICE PREPARED BY ROSE INC. ALTERATION OF THIS DOCUMENT BY ANY PARTY OTHER THAN ROSE INC. IS A VIOLATION OF LAW THAT WILL BE PROSECUTED TO ITS FULLEST EXTENT.
2. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS & CONDITIONS AT THE JOB SITE PRIOR TO STARTING CONSTRUCTION AND THE ARCHITECT/ENGINEER SHALL BE NOTIFIED OF ANY DISCREPANCIES OR INCONSISTENCIES.
3. AT ANY DISCREPANCIES OR CONFLICTS BETWEEN PLAN AND ELEVATION DIMENSIONS SHOWN ON THE ARCHITECTURAL DRAWINGS AND THE STRUCTURAL DRAWINGS, THE ARCHITECTURAL DIMENSIONS SHALL GOVERN. IF ANY OF THESE DIMENSIONS DIFFER BY MORE THAN 5%, THE ENGINEER SHALL BE NOTIFIED OF THE CONFLICT, AND THE CONTRACTOR SHALL WAIT FOR INSTRUCTIONS.
4. THE CONTRACT CONSTRUCTION DRAWINGS AND SPECIFICATIONS REPRESENT THE FINISHED STRUCTURE. UNLESS OTHERWISE NOTED, THEY DO NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE ALL MEASURES NECESSARY TO PROTECT THE STRUCTURE, WORKMEN, AND OTHER PERSONS DURING CONSTRUCTION. SUCH MEASURES SHALL INCLUDE, BUT NOT LIMITED TO: BRACING, ALL SHORING, FORMS, AND SCAFFOLDING.
5. OPENINGS, POCKETS, ETC. SHALL NOT BE PLACED IN SLABS BEAMS, COLUMNS, WALLS, ETC., UNLESS SPECIFICALLY DETAILED ON THE STRUCTURAL DRAWINGS.
6. ALL ASTM SPECIFICATIONS NOTED ON THESE DRAWINGS SHALL BE OF THE LATEST REVISION.
7. IN THE EVENT THAT CERTAIN FEATURES OF CONSTRUCTION ARE NOT FULLY SHOWN ON THE DRAWINGS OR CALLED FOR IN THE NOTES OR SPECIFICATIONS. NOTIFY THE ARCHITECT/ENGINEER IMMEDIATELY & WAIT FOR INSTRUCTIONS.
8. COST OF ADDITIONAL DESIGN WORK NECESSITATED BY SELECTION OF AN OPTION NOT DUE TO ERRORS OR OMISSIONS IN CONSTRUCTION, SHALL BE BORN BY THE CONTRACTOR.
9. WHERE DESIGN AND DETAILS OF PLATE GIRDERS, TRUSSES, ETC., IS TO BE PROVIDED BY FABRICATOR, CONTRACTOR SHALL SUBMIT CALCULATIONS PREPARED BY A CIVIL OR STRUCTURAL ENGINEER, TO THE ENGINEER AND TO THE BUILDING DEPARTMENT FOR REVIEW PRIOR TO FABRICATION.
10. UNLESS AN ITEM ON THE PLANS OR DETAILS IS SPECIFICALLY MARKED AS AN EXISTING ITEM, THE CONTRACTOR IS TO ASSUME THAT IT IS NEW, AND INCLUDE IT IN THE CONSTRUCTION BUDGET.
11. WHERE SOIL REPORT IS CITED, ITS REQUIREMENTS ADOPTED HEREIN.
12. ALL MANUFACTURED PRODUCTS MUST BE INSTALLED PER MANUFACTURER'S RECOMMENDATION.
13. WHILE EVERY REASONABLE EFFORT HAS BEEN MADE TO PROVIDE A BUILDABLE SET ON CONTRACT DOCUMENTS WITH MINIMAL ERRORS OR OMISSIONS, THE CONTRACTOR ACKNOWLEDGES AND UNDERSTANDS THAT THE CONTRACT DOCUMENTS MAY REPRESENT IMPERFECT DATA AND MAY CONTAIN ERRORS, OMISSIONS, CONFLICTS, INCONSISTENCIES, CODE VIOLATIONS AND IMPROPER USE OF MATERIALS. SUCH DEFICIENCIES WILL BE CORRECTED BY THE ARCHITECT OR HIS CONSULTANTS WHEN IDENTIFIED. THE CONTRACTOR AGREES TO CAREFULLY STUDY AND COMPARE THE INDIVIDUAL CONTRACT DOCUMENTS AND REPORT AT ONCE IN WRITING TO THE ARCHITECT ANY DEFICIENCIES THE CONTRACTOR MAY DISCOVER. THE CONTRACTOR FURTHER AGREES TO REQUIRE EACH SUBCONTRACTOR TO LIKEWISE STUDY THE DOCUMENTS AND TO REPORT AT ONCE ANY DEFICIENCIES DISCOVERED. THE CONSULTANT AND ARCHITECT, TOGETHER WITH CONTRACTOR SHALL RESOLVE ALL REPORTED DEFICIENCIES PRIOR TO STARTING ANY WORK. ANY QUESTIONABLE WORK PERFORMED PRIOR TO RESOLUTION OF CONFLICTS OR ERRORS OR FURTHER CLARIFICATION FROM THE ARCHITECT WILL BE DONE AT THE CONTRACTOR'S RISK.
14. OPTIONS, IF PROVIDED HEREIN, ARE FOR CONTRACTOR'S CONVENIENCE. HE SHALL BE RESPONSIBLE FOR ALL CHANGES NECESSARY, SHALL COORDINATE ALL DETAILS, AND SHALL OBTAIN ALL REQUIRED APPROVALS.
15. ANY MECHANICAL AND ELECTRICAL EQUIPMENT, STORAGE RACKS, SAFES, AND ANY OBJECT EXPECTED TO BE IN THE BUILDING THAT HAS AN OPERATIONAL WEIGHT (FULLY LOADED) GREATER THEN 400 LB. FLOOR OR ROOF MOUNTED, OR GREATER THEN 200 LB. SUSPENDED FROM A FLOOR, CEILING OR WALL SHALL BE SHOWN ON THESE DRAWINGS. IF THEY ARE NOT SHOWN ON THESE DRAWINGS, THEY SHALL BE BROUGHT TO THE ATTENTION OF THE STRUCTURAL ENGINEER, AND A CUT SHEET FOR THE SPECIFIC ITEM SHALL BE MADE AVAILABLE.
16. CONSTRUCTION WASTE REDUCTION, DISPOSAL AND RECYCLING SHALL BE IN CONFORMANCE WITH THE REQUIREMENTS OF THE LATEST ADOPTED CALIFORNIA GREEN BUILDING CODE.
17. CONTRACTOR IS TO VERIFY THAT NO EXISTING STEEL REINFORCING, OR TENSION CABLES ARE DAMAGED WHEN INSTALLING POST INSTALLED WEDGE OR CHEMICAL ANCHORS. MECHANICAL ANCHORS ARE ONLY APPROVED FOR INTERIOR DRY USE, OTHERWISE CHEMICAL ANCHORS MUST BE USED.

SPECIAL INSPECTIONS:

1. SPECIAL INSPECTION U.N.O. BY A REGISTERED DEPUTY INSPECTOR APPROVED BY THE ARCHITECT AND/OR ENGINEER AND THE BUILDING DEPARTMENT SHALL BE EMPLOYED BY THE OWNER FOR THE FOLLOWING TYPES OF WORK:
   A. SEE C.B.C. VOL.II, SECTION 1704 FOR ADDITIONAL REQUIREMENTS. DEPUTY INSPECTION MAY BE WAVED FOR WORK THAT IS MINOR IN NATURE AS INTERPRETED BY THE BUILDING OFFICIAL.
2. THE SPECIAL INSPECTOR SHALL BE A QUALIFIED PERSON WHO SHALL DEMONSTRATE COMPETENCE, TO THE SATISFACTION OF THE BUILDING OFFICIAL, FOR INSPECTION OF THE PARTICULAR TYPE OF CONSTRUCTION OR OPERATION REQUIRING SPECIAL INSPECTION. THE SPECIAL INSPECTOR SHALL OBSERVE THE WORK ASSIGNED FOR CONFORMANCE TO THE APPROVED DESIGN DRAWINGS AND SPECIFICATIONS. THE SPECIAL INSPECTOR SHALL FURNISH INSPECTION REPORTS TO THE BUILDING OFFICIAL, THE ENGINEER OR ARCHITECT OF RECORD, AND OTHER DESIGNATED PERSONS. ALL DISCREPANCIES SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE CONTRACTOR FOR C

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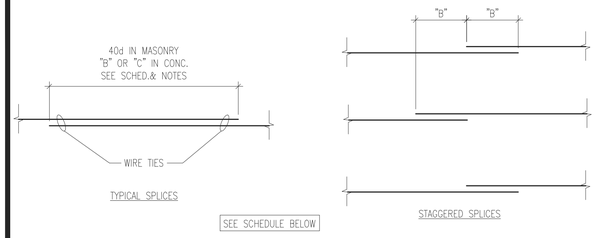
SCALE: 1"=1'-0"

7



SEE SCHEDULE BELOW

SCHED. OF MIN. SPLICE LENGTH "B" FOR ACI CLASS B LAP SPLICE		
BAR SIZE	3,000 PSI	4,000 PSI
#4	24"	24"
#5	24"	24"
#6	25"	24"
#7	34"	30"
#8	45"	39"
#9	57"	49"
#10	72"	63"
#11	89"	77"

NOTE

1. FOR TOP BARS USE SPLICE LENGTH SHOWN ABOVE X 1.3.
2. d=NORMAL DIAMETER OF SPLICE BAR.
3. SPLICES OF REPETITIVE REINF. IN CONC. SHALL BE STAGGERED PER ACI CLASS B SPLICES AS SHOWN ABOVE.
4. FOR NON-REPETITIVE REINF. IN CONC. OR WHERE SPLICES CAN NOT BE STAGGERED, USE ACI CLASS C SPLICES.
5. SPLICES SHALL BE MADE AWAY FROM POINTS OF MAX. STRESS OR AT LOCATIONS SHOWN ON THE DWG'S.
6. NO LAP SHALL BE LESS THAN TWO FEET.

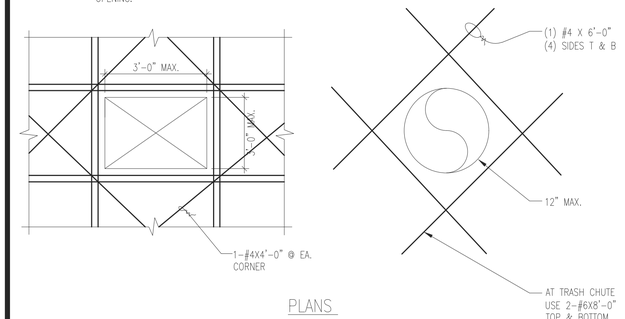
TYPICAL REINFORCING SPLICES

SCALE: 1"=1'-0"

5

NOTE

1. SCHEDULED REINF. NOT SHOWN FOR CLARITY.
2. SEE SLAB SCHEDULE FOR REINFORCING.
3. DO NOT CUT BARS UNLESS ABSOLUTELY NECESSARY.
4. REPLACE EA. INTERRUPTED BAR W/(2) BARS OF THE SAME SIZE & LENGTH, ONE ON EA. SIDE OF OPENING.



PLANS

TYP. REINFORCING SLAB AT OPNG.

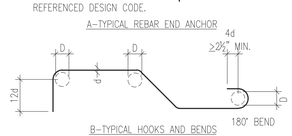
SCALE: 1"=1'-0"

3

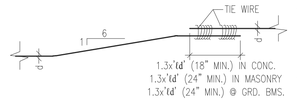
REBAR END ANCHORS SHALL HAVE AN EVALUATION REPORT DEMONSTRATING COMPLIANCE WITH THE CURRENT ACCEPTABLE CRITERIA UNDER THE REFERENCED DESIGN CODE.

TENSION DEVELOPMENT LENGTH SCHEDULE (ld)				
BAR SIZE	f'c=3000 PSI		f'c=4000 PSI	
	TOP BARS	OTHER BARS	TOP BARS	OTHER BARS
#3	22	17	19	15
#4	29	22	25	19
#5	36	28	31	24
#6	43	33	37	29
#7	63	48	54	44
#8	72	55	62	55

A-TYPICAL REBAR END ANCHOR

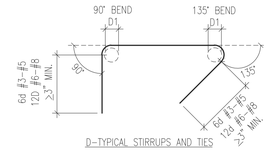


B-TYPICAL HOOKS AND BENDS



MINIMUM BEND DIAMETERS
D=6d FOR #3 THRU #8
D=8d FOR #9 THRU #11
D=10d FOR #14 THRU #18
MINIMUM INSIDE

C-OFFSETS AND SPLICES



D-TYPICAL STIRRUPS AND TIES

STIRRUP & TIES
MIN BEND DIAMETERS
D = 4d FOR #3 THRU #5
D = 6d FOR #6 THRU #8

NOTE:
135° BENDS REQUIRED @ ROUND HOOP TIES SPLICES.

REINFORCING DETAIL

SCALE: 1"=1'-0"

1

DDN# 43-F546-1-19

-

SCALE: 1"=1'-0"

8

-

SCALE: 1"=1'-0"

6

-

SCALE: 1"=1'-0"

4

-

SCALE: 1"=1'-0"

2

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RGSE INC. JOB# 18118

APPROVED MARK PESTRELLA, DIRECTOR OF PUBLIC WORKS

BY _____ ASSISTANT DIVISION ENGINEER DATE

RECOMMENDED LAND DEVELOPMENT DIVISION

BY _____ STORM DRAIN SECTION DATE

SUBMITTED

BY M.D. Espinoza STORM DRAIN SECTION 7/31/2018 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
1	PC CORRECTIONS			07/16/18
2	REVISED TOTAL SHEET NUMBER		M.D. Espinoza	9/20/2018
3	REVISED TOTAL NUMBER OF SHEETS	No.40695	M.D. Espinoza	06/11/2019

REGISTERED PROFESSIONAL ENGINEER JASON GARCIA No. 45955 STRUCTURAL STATE OF CALIFORNIA

DATE 6/18/18

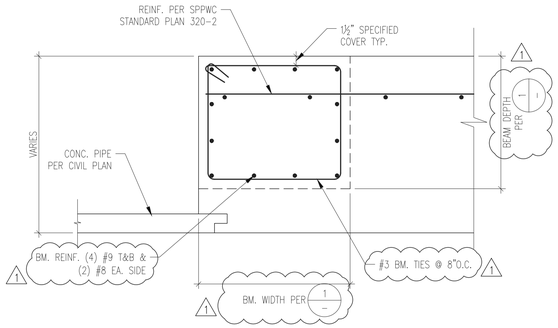
STORM DRAIN PLANS IN
TRACT No. 61105-1 P.D. No. 2640
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
26074 Avenue Hall, Suite 23 ▪ Valencia, CA 91355 ▪ PH: (661) 294-2211 ▪ FX: (661) 294-9890

DWG

SHEET 18 OF ~~19~~ 20 ~~22~~

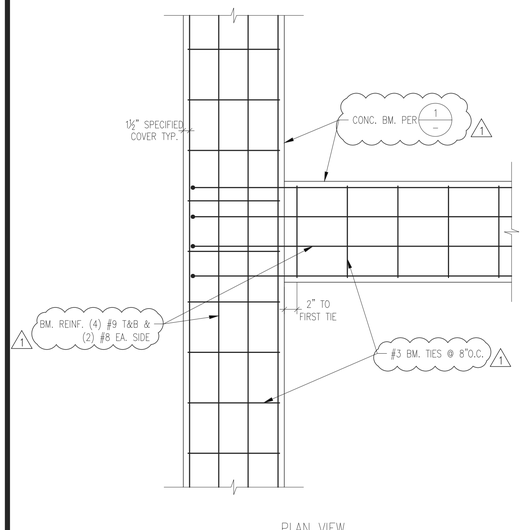
7/17/2018 5:16:09 PM



-	SCALE: 1"=1'-0"	7

CONC. BEAM SECTION

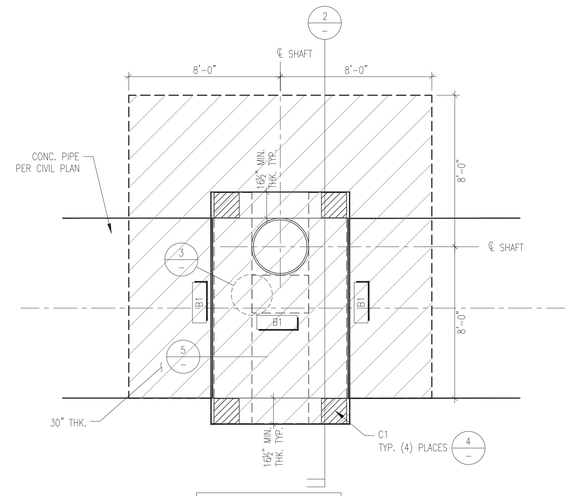
SCALE: 1"=1'-0" | 5



PLAN VIEW

CONC. REINF. @ INTERSECTION OF BMS.

SCALE: 1"=1'-0" | 3



NOTE:
FOR INFO NOT SHOWN SEE (SPPWC) STANDARD PLAN 320-2

LEGEND:

B1 = 24" SQ. CONC. BM. W/ (4) #9 T&B & (2) #8 EA. SIDE W/ #3 TIE @ 8"O.C.

C1 = 16" SQ. MIN. CONC. COL. W/ (8) #6 VERT. & #3 TIES @ 6"O.C.

MANHOLE PIPE PLAN

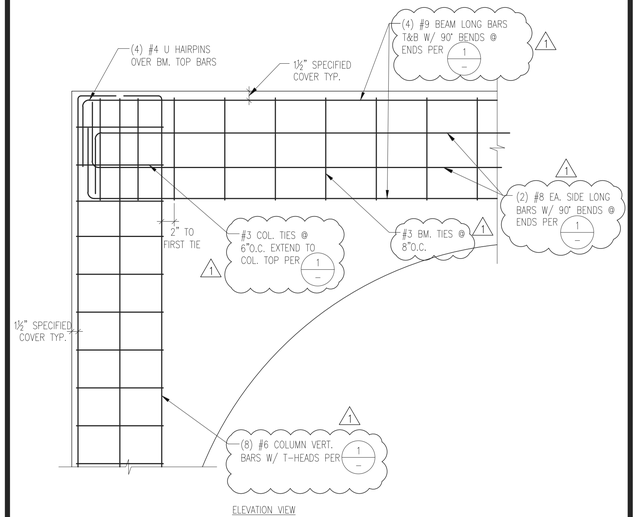
SCALE: 1/4"=1'-0" | 1

-	SCALE: 1"=1'-0"	8

-	SCALE: 1"=1'-0"	6

BM. - COL. CORNER JOINT

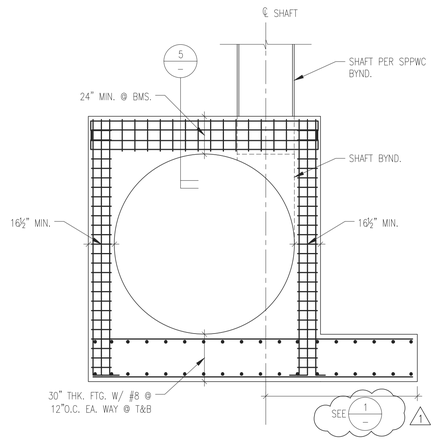
SCALE: 1"=1'-0" | 4



ELEVATION VIEW

SECTION

SCALE: 1/4"=1'-0" | 2



-	SCALE: 1"=1'-0"	8

-	SCALE: 1"=1'-0"	6

BM. - COL. CORNER JOINT	SCALE: 1"=1'-0"	4

SECTION	SCALE: 1/4"=1'-0"	2

DDN# 43-F546-1-19

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RGSE INC. JOB# 18118

APPROVED MARK PESTRELLA, DIRECTOR OF PUBLIC WORKS
BY ASSISTANT DIVISION ENGINEER DATE

RECOMMENDED LAND DEVELOPMENT DIVISION
BY STORM DRAIN SECTION DATE

SUBMITTED
BY M.D. Esquivel 7/31/2018
STORM DRAIN SECTION DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
1	PC CORRECTIONS			07/16/18
2	REVISED TOTAL SHEET NUMBER		M.D. Esq	9/20/2018
3	REVISED TOTAL NUMBER OF SHEETS	No.40695	M.D. Esq	06/11/2019

REGISTERED PROFESSIONAL ENGINEER JASON GARCIA No. 45915 STRUCTURAL STATE OF CALIFORNIA

DATE 6/18/18

STORM DRAIN PLANS IN
TRACT No. 61105-1 P.D. No. 2640
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

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SHEET 19 OF ~~19~~ 20 22

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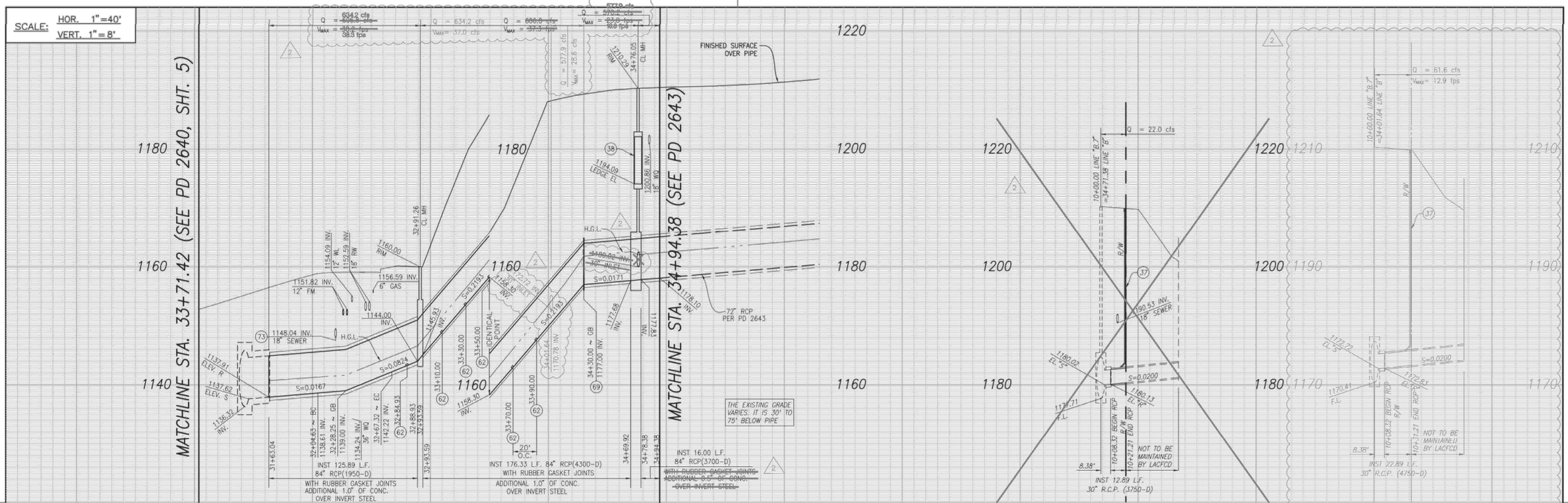
SCALE: HOR. 1"=40'
VERT. 1"=8'



CONSTRUCTION NOTES

(3) INSTALL 30" R.C.P. (SEE PROFILE FOR D-LOAD)

(6) INSTALL 84" R.C.P. (SEE PROFILE FOR D-LOAD)

(20) CONSTRUCT M.H. PER S.P.P.W.C. STD. PLAN 320-2

(37) CONSTRUCT CLEANOUT PER DETAIL 37 ON SHEET 14

(38) CONSTRUCT MANHOLE SAFETY LEDGE PER S.P.P.W.C. STD. PLAN 330-2

(62) CONSTRUCT VELOCITY CONTROL RINGS PER S.P.P.W.C. STD. PLAN 383-2; H=3"

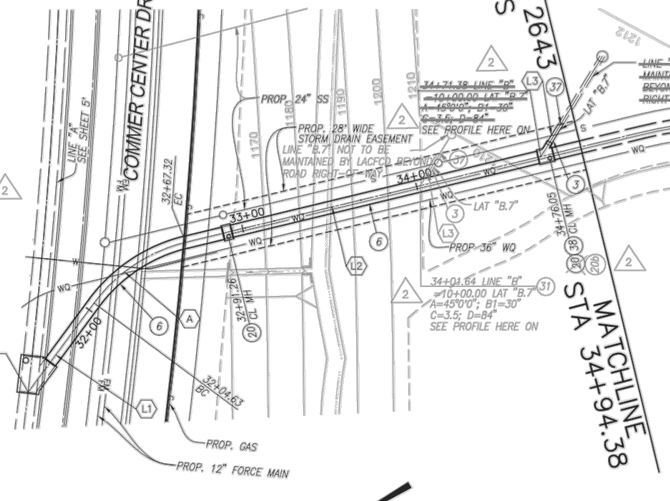
(73) CONSTRUCT CONCRETE BLANKET PER S.P.P.W.C. 225-2

(80) CONSTRUCT CONCRETE COLLAR PER S.P.P.W.C. STD. PLAN 380-4

(208) CONSTRUCT MODIFIED M.H. PER S.P.P.W.C. STD. PLAN 322-2; SEE DETAILS ON SHEET 18 AND 19

(31) CONSTRUCT J.S. PER S.P.P.W.C. STD. PLAN 331-3

STORM DRAIN LINE "B"

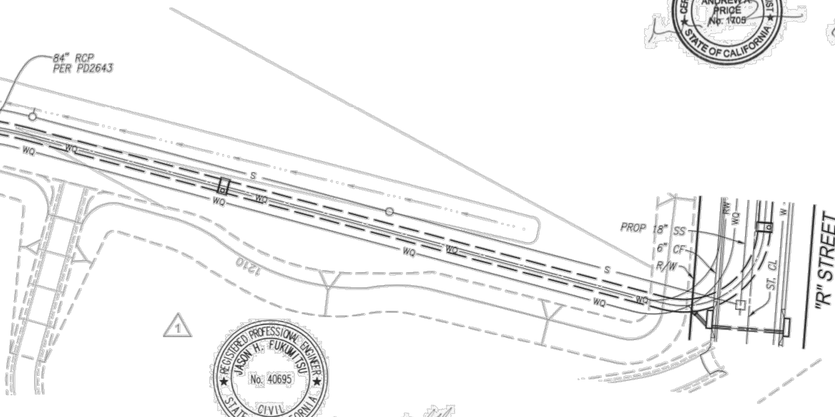


SD LINE "B" LINE TABLE		
LINE	LENGTH	BEARING
L1	61.96'	S23°02'35"E
L2	227.06'	N16°51'49"E
L3	21.21'	N28°08'11"W
L3	31.21'	N28°08'11"W

LINE "B" CURVE TABLE			
DELTA	RADIUS	LENGTH	TANGENT
A 39°54'25"	90.00'	62.69'	32.67'

GRAPHIC SCALE: 1" = 40'

STORM DRAIN LAT "B.7"



STORM DRAIN LAT "B.7"

REVIEWED LAND DEVELOPMENT DIVISION

BY _____ STORM DRAIN SECTION DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
1	Added 84" RCP Line B for grading purposes			
2	REVISED TOTAL SHEET NUMBER. REVISED LATERAL LOCATION AND LATERAL DESIGN REVISED HYDRAULIC ELEMENTS REVISED LATERAL B.7	Jason H. Fukumitsu No.40695	M.D. Esplana	06/11/2019

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

JASON H. FUKUMITSU DATE: 8-16-19

STORM DRAIN PLANS IN
TRACT No. 61105-1 P.D. No. 2640
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

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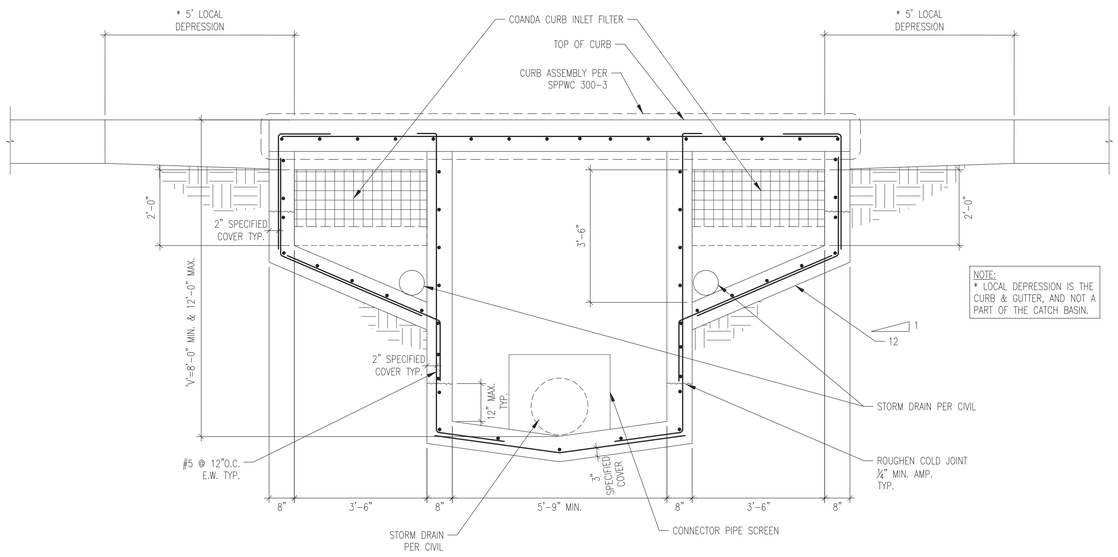
SHEET 20 OF 20 22

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRIDE No. 1109 STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-KUEN IP No. 25221 CIVIL STATE OF CALIFORNIA

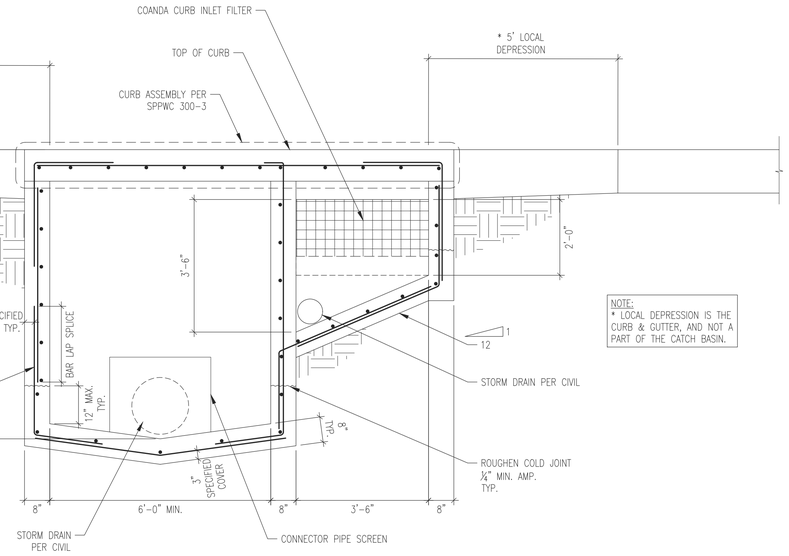
REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

G:\Viewhall Ranch\61105 Mission Village\61105-01\Storm\PD 2640\HW1081-20_SD Plan 20.dwg Plotted on Aug 31, 2018--4:52pm by dmar



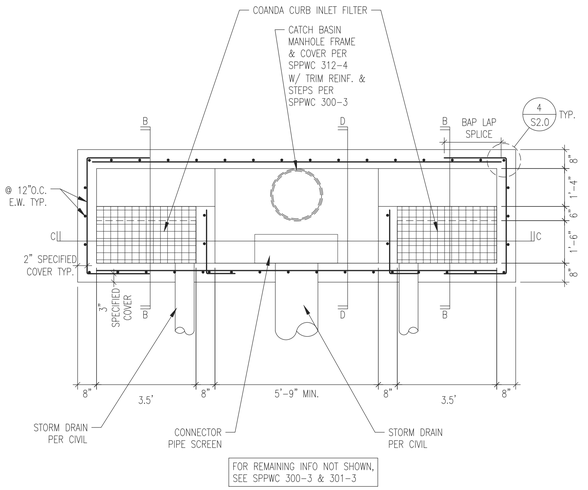
SECTION C-C

SCALE: 1/2"=1'-0" | 5



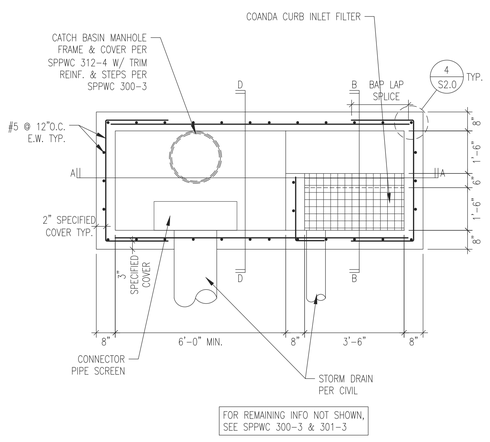
SECTION A-A

SCALE: 1/2"=1'-0" | 1



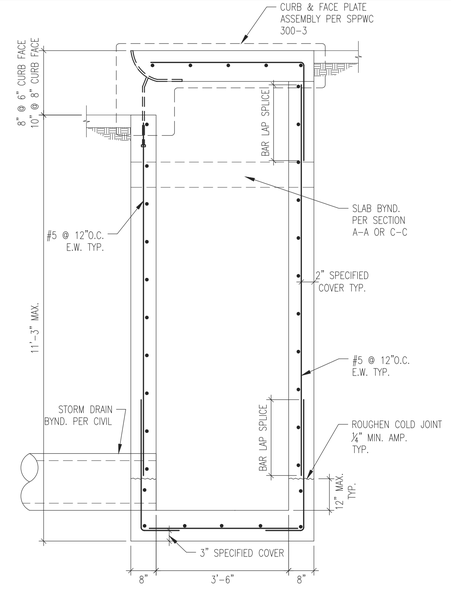
PLAN VIEW (SUMP CONDITION)

SCALE: 3/8"=1'-0" | 8



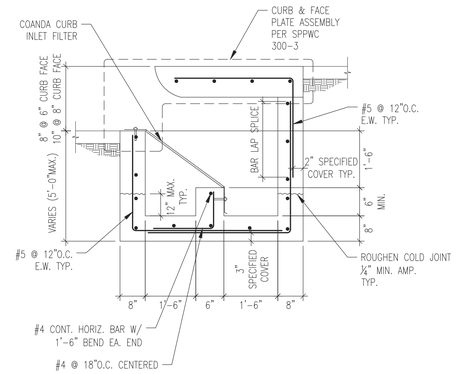
PLAN VIEW (BY-PASS CONDITION)

SCALE: 3/8"=1'-0" | 6



SECTION D-D

SCALE: 1/2"=1'-0" | 4



SECTION B-B

SCALE: 1/2"=1'-0" | 2

REGISTERED PROFESSIONAL ENGINEER JASON H. FUNG No. 40695 CIVIL STATE OF CALIFORNIA

2

SUBMITTED

BY _____

STORM DRAIN SECTION DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	ADDED SHEET	No.40695	MD. Esfandi	06/11/2019

REGISTERED PROFESSIONAL ENGINEER JASON GARCIA No.45495 STRUCTURAL STATE OF CALIFORNIA

DATE 6/18/18

STORM DRAIN PLANS IN
TRACT No. 61105-1 P.D. No. 2640
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

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2720 Cochran St. Suite 8B
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www.rgseinc.com
info@rgseinc.com

RGSE INC.
JOB# 18118B

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SHEET 21 OF 22

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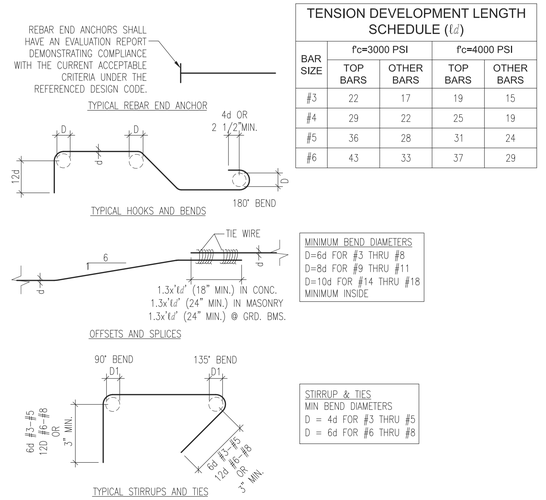
SCALE: 1"=1'-0" | 7

-

SCALE: 1"=1'-0" | 8

-

SCALE: 1"=1'-0" | 5



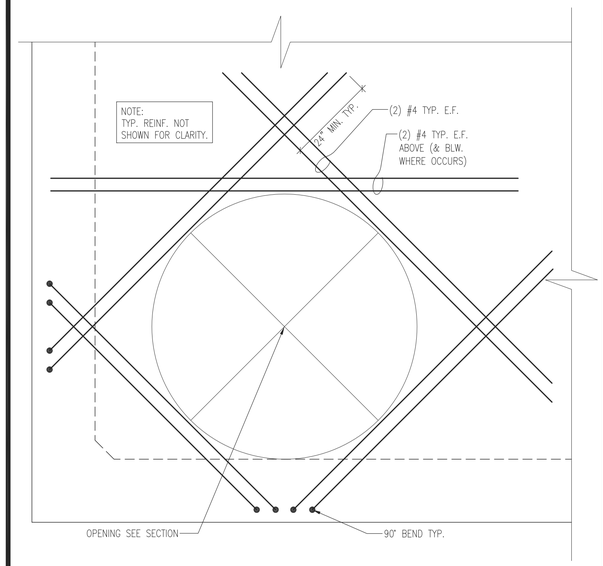
TENSION DEVELOPMENT LENGTH SCHEDULE (ℓd)				
BAR SIZE	f'c=3000 PSI		f'c=4000 PSI	
	TOP BARS	OTHER BARS	TOP BARS	OTHER BARS
#3	22	17	19	15
#4	29	22	25	19
#5	36	28	31	24
#6	43	33	37	29

MINIMUM BEND DIAMETERS
D=6d FOR #3 THRU #8
D=8d FOR #9 THRU #11
D=10d FOR #14 THRU #18
MINIMUM INSIDE

STIRRUP & TIES
MIN BEND DIAMETERS
D = 4d FOR #3 THRU #5
D = 6d FOR #6 THRU #8

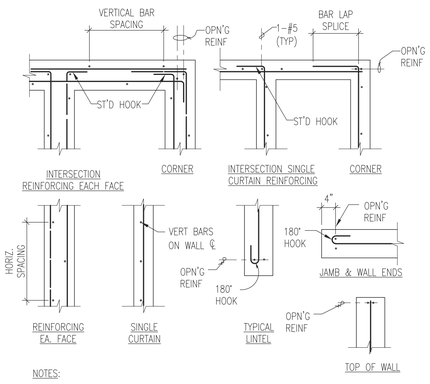
REINFORCING DETAIL

SCALE: 1"=1'-0" | 3



REINF. AT OPENING

SCALE: 1"=1'-0" | 1



NOTES:

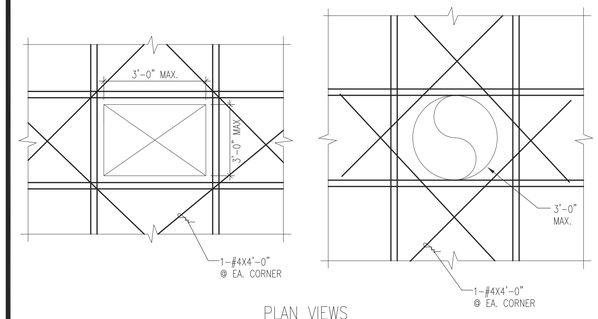
1. REFER TO TYPICAL CONC. WALL REINFORCING SCHEDULE.
2. AT DOUBLE CURTAIN REINFORCING STAGGER VERTICAL AND HORIZONTAL BARS. PLACE VERTICAL REBAR AS CLOSE TO CONC. SURFACE AS THE MINIMUM CLEARANCES WILL PERMIT

TYPICAL CONC. WALL DETAIL

SCALE: 1"=1'-0" | 4

NOTE

1. SCHEDULED REINF. NOT SHOWN FOR CLARITY.
2. SEE SLAB SCHEDULE FOR REINFORCING.
3. DO NOT CUT BARS UNLESS ABSOLUTELY NECESSARY.
4. REPLACE EA. INTERRUPTED BAR W/(2) BARS OF THE SAME SIZE & LENGTH, ONE ON EA. SIDE OF OPENING.



PLAN VIEWS

REINFORCING SLAB AT OPNG.

SCALE: 1"=1'-0" | 2

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUTSU No. 40695 CIVIL STATE OF CALIFORNIA

SUBMITTED

BY _____ STORM DRAIN SECTION DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	ADDED SHEET	No.40695		06/11/2019

REGISTERED PROFESSIONAL ENGINEER JASON GARCIA No. 45995 STRUCTURAL STATE OF CALIFORNIA

DATE 6/18/18

STORM DRAIN PLANS IN
TRACT No. 61105-1 P.D. No. 2640

COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

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Structural Engineers
2720 Cochran St. Suite 8B
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P: 805.522.3379
www.rgseinc.com
info@rgseinc.com

RGSE INC.
JOB# 18118B

DWG

SHEET 22 OF 22

D-6: PD 2641

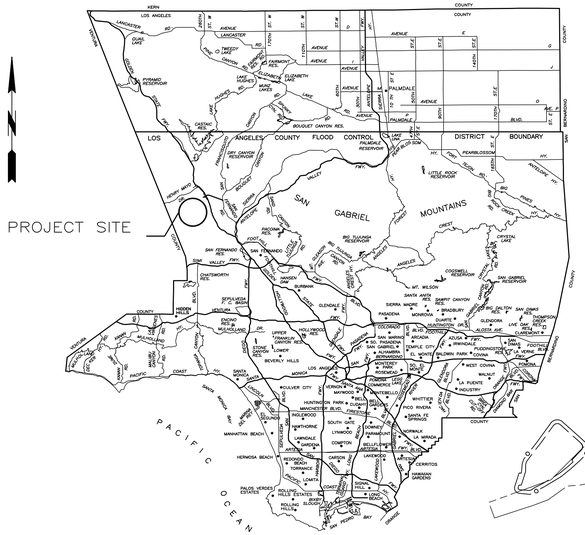
COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS

EIMP2014000167

PRIVATE DRAIN NO 2641

TRACT NO 61105–01

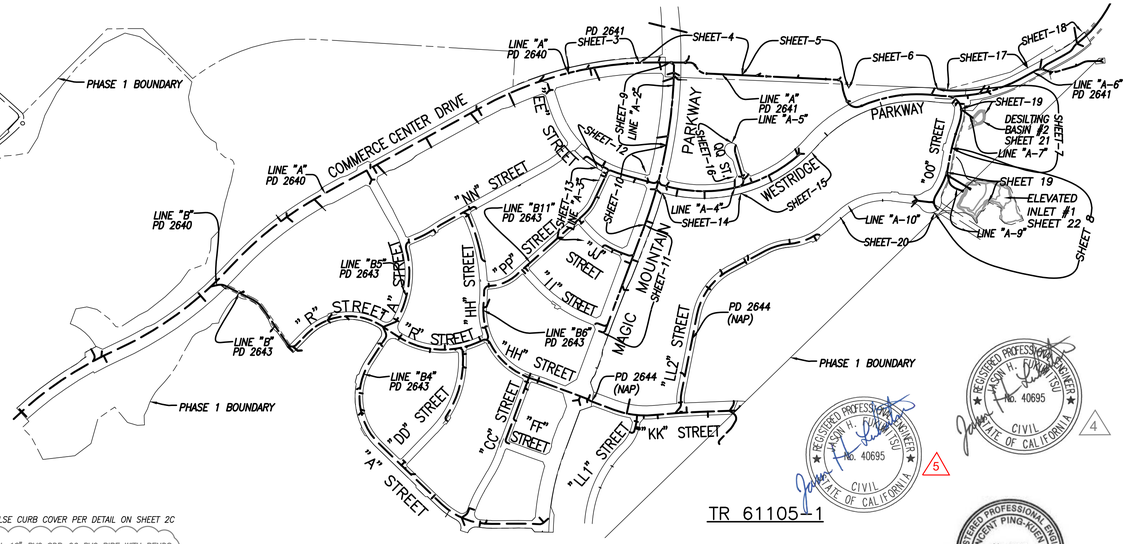
FOR PLAN CHECK ONLY



LOCATION MAP

CONSTRUCTION NOTES:

1. INSTALL 18" R.C.P. (SEE PROFILE FOR D–LOAD)
2. INSTALL 24" R.C.P. (SEE PROFILE FOR D–LOAD)
3. INSTALL 30" R.C.P. (SEE PROFILE FOR D–LOAD)
4. INSTALL 36" R.C.P. (SEE PROFILE FOR D–LOAD)
5. INSTALL 42" R.C.P. (SEE PROFILE FOR D–LOAD)
6. INSTALL 48" R.C.P. (SEE PROFILE FOR D–LOAD)
7. INSTALL 54" R.C.P. (SEE PROFILE FOR D–LOAD)
8. INSTALL 60" R.C.P. (SEE PROFILE FOR D–LOAD)
9. INSTALL 96" R.C.P. (SEE PROFILE FOR D–LOAD)
10. INSTALL 114" R.C.P. (SEE PROFILE FOR D–LOAD)
13. CONSTRUCT DESILTING INLET PER DETAILS ON SHEET 21
14. CONSTRUCT 6" THICK CONC. ACCESS ROAD OVER 4" CRUSHED MISCELLANEOUS BASE PER DETAILS HEREON (WIDTH PER PLAN)
15. CONSTRUCT CONC. FACING/SLOPE PROTECTION PER DETAILS ON SHEET 21
16. CONSTRUCT M.H. PER S.P.P.W.C. STD. PLAN 321–2
16a. CONSTRUCT MODIFIED M.H. PER S.P.P.W.C. STD. PLAN 321–2 PER DETAIL ON SHEET 33
17. CONSTRUCT M.H. PER S.P.P.W.C. STD. PLAN 320–2
17a. CONSTRUCT MODIFIED M.H. PER S.P.P.W.C. STD. PLAN 320–2 PER DETAILS ON SHEETS 36 AND 37
17b. CONSTRUCT MODIFIED M.H. PER S.P.P.W.C. STD. PLAN 320–2 PER DETAILS ON SHEET 33
18. CONSTRUCT M.H. PER S.P.P.W.C.. STD. PLAN 322–2
18a. CONSTRUCT MODIFIED M.H. PER S.P.P.W.C. STD. PLAN NO. 322–2 PER DETAILS ON SHEETS 36 AND 37
19. CONSTRUCT OUTLET TOWER PIPE PER PROFILE ON SHEET 23
21. CONSTRUCT CURB OPENING CATCH BASIN PER S.P.P.W.C. STD. PLAN NO. 300–3 MODIFIED CATCH BASIN PER DETAIL ON SHEET 38 AND SHEET 39 (2)
26. CONSTRUCT T.S. PER S.P.P.W.C. STD. PLAN 340–2
29. CONSTRUCT J.S. PER S.P.P.W.C. STD. PLAN 331–3
30. CONSTRUCT J.S. PER S.P.P.W.C. STD. PLAN 332–2
34. CONSTRUCT 3" ASPHALT CONCRETE OVER 4" CRUSHED MISCELLANEOUS BASE PER DETAIL ON SHEET 22 (WIDTH PER PLAN)
37. CONSTRUCT CLEANOUT PER DETAIL 37 ON SHEET 25
38. CONSTRUCT MANHOLE SAFETY LEDGE PER S.P.P.W.C. STD. PLAN 330–2
67. INSTALL 84" R.C.P. (SEE PROFILE FOR D–LOAD)
68. INSTALL 102" R.C.P. (SEE PROFILE FOR D–LOAD)
69. CONSTRUCT CONCRETE COLLAR PER S.P.P.W.C. STD. PLAN 380–4
70. CONSTRUCT PIPE ANCHOR AND BACKFILL STABILIZER PER S.P.P.W.C. STD. PLAN 221–2
73. CONSTRUCT CONCRETE BLANKET PER S.P.P.W.C. 225–2
83. CONSTRUCT CHAIN LINK FENCE PER S.P.P.W.C. ST.D PLAN NO 600–3
84. CONSTRUCT DOUBLE DRIVE GATE PER S.P.P.W.C. STD. PLAN NO 600–3 (W=12' PER LEAF)
85. CONSTRUCT CUT OF WALL PER DETAIL ON SHEET 21
87. CONSTRUCT SLOPE PROTECTION BARRIER PER S.P.P.W.C. STD. PLAN 360–2
88. CONSTRUCT HEADWALL PER CALTRANS STANDARD D90 (SHEET 25)
89. INSTALL INCLINED TRASH RACK PER S.P.P.W.C. 361–2
90. CONSTRUCT BRICK AND MORTAR PLUG
92. INSTALL 8" FALSE CURB COVER PER DETAIL ON SHEET 2C
93. INSTALL 12" PVC SDR–26 PVC PIPE WITH BENDS AND FITTINGS AS REQUIRED (4)
91. CONSTRUCT CURB OPENING CATCH BASIN PER S.P.P.W.C. STD. PLAN NO. 300–3 (2)



TR 61105–1













CATCH BASIN STENCIL DETAIL

NTS

THIS DETAIL SHOULD APPEAR ON TOP OF ALL CATCH BASINS

ALL CATCH BASINS AND INLETS THAT DISCHARGE INTO AN EXISTING OR PROPOSED STORM DRAIN MUST BE STENCILED TO DISCOURAGE ILLEGAL DUMPING OFPOLLUTANTS. THIS STENCIL SHALL HAVE A MINIMUM DIAMETER OF 30 INCHES.

INDEX TO STANDARD DRAWINGS

LOS ANGELES COUNTY DEPT. OF PUBLIC WORKS

STD. PLAN	TITLE
2032–2	CRADLING AND ENCASEMENT
3080–2	PIPE BEDDING
6008–1	MINIMUM PUBLIC SAFETY REQUIREMENTS FOR OPEN EXCAVATIONS

STANDARD PLANS FOR PUBLIC WORK CONSTRUCTION

STD. PLAN	TITLE
221–2	PIPE ANCHORS AND BACKFILL STABILIZERS
225–2	CONCRETE BLANKET
300–3	CURB OPENING CATCH BASIN
313–3	LOCAL DEPRESSIONS AT CATCH BASINS
320–2	MANHOLE – PIPE TO PIPE (36" OR LARGE)
321–2	MANHOLE – PIPE TO PIPE (33" OR SMALL)
322–2	MANHOLE – PIPE TO PIPE (LARGE INSIDE INLET)
330–2	MANHOLE SHAFT SAFETY LEDGE
331–3	JUNCTION STRUCTURE – PIPE TO PIPE
332–2	JUNCTION STRUCTURE – PIPE TO PIPE (ID < 24")
340–2	TRANSITION STRUCTURE – PIPE TO PIPE
360–2	SLOPE PROTECTION BARRIER
361–2	TRASH RACK (INCLINED)
380–4	CONCRETE COLLAR
600–3	CHAIN LINK FENCE AND GATES

CALIFORNIA DEPARTMENT OF TRANSPORTATION

STD. PLAN	TITLE
A73A	OBJECT MARKERS
D90	PIPE HEADWALLS

KEY MAP

SCALE: 1"=600'

INDEX TO PROJECT DRAWINGS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2A	GENERAL NOTES
2C	HYDRAULIC ELEMENTS
3	STORM DRAIN PLAN AND PROFILE – LINE "A" FROM STA. 69+02.33 TO 75+00.00
4	STORM DRAIN PLAN AND PROFILE – LINE "A" FROM STA. 75+00.00 TO 84+00.00
5	STORM DRAIN PLAN AND PROFILE – LINE "A" FROM STA. 84+00.00 TO 93+00.00
6	STORM DRAIN PLAN AND PROFILE – LINE "A" FROM STA. 93+00.00 TO 102+00.00
7A	STORM DRAIN PLAN AND PROFILE – LINE "A" FROM STA. 102+00.00 TO 108+00.00
8A	STORM DRAIN PLAN AND PROFILE – LINE "A" FROM STA. 108+00.00 TO 113+49.38
9	STORM DRAIN PLAN AND PROFILE – LINE "A2" FROM STA. 09+89.50 TO 17+00.00
10	STORM DRAIN PLAN AND PROFILE – LINE "A2" FROM STA. 17+00.00 TO 24+00.00
11A	STORM DRAIN PLAN AND PROFILE – LINE "A2" FROM STA. 24+00.00 TO 34+01.95
12A	STORM DRAIN PLAN AND PROFILE – LINE "A3" FROM STA. 10+00.00 TO 15+00.00 – LINE "A12" FROM STA. 10+02.29 TO 12+53.16
13A	STORM DRAIN PLAN AND PROFILE – LINE "A3" FROM STA. 15+00.00 TO 19+60.79
14	STORM DRAIN PLAN AND PROFILE – LINE "A4" FROM STA. 09+93.12 TO 17+03.65
15	STORM DRAIN PLAN AND PROFILE – LINE "A4" FROM STA. 17+03.65 TO 22+90.40
16A	STORM DRAIN PLAN AND PROFILE – LINE "A5" FROM STA. 10+00.00 TO 13+63.48
17	STORM DRAIN PLAN AND PROFILE – LINE "A6" FROM STA. 10+00.00 TO 17+00.00
18	STORM DRAIN PLAN AND PROFILE – LINE "A6" FROM STA. 17+00.00 TO 23+08.35 – LINE "A6.7" FROM STA. 10+00.00 TO 13+63.43
19A	STORM DRAIN PLAN AND PROFILE LINE "A7" FROM STA. 10+00.00 TO 11+20.31 – LINE "A9" FROM STA. 10+00.00 TO 12+17.71
20A	STORM DRAIN PLAN AND PROFILE – LINE "A10" FROM STA. 10+00.00 TO 11+85.11 – LINE "A11" FROM STA. 10+03.53 TO 12+84.02
21A'B	DEBRIS BASIN
22A	DEBRIS BASIN
23	DETAILS
24	DETAILS
25	DETAILS
26	CATCH BASIN LATERAL PROFILES
27	CATCH BASIN LATERAL PROFILES
28A	CATCH BASIN LATERAL PROFILES
29	CATCH BASIN LATERAL PROFILES
30	CATCH BASIN LATERAL PROFILES
31A	CATCH BASIN LATERAL PROFILES
32	CATCH BASIN LATERAL PROFILES
33	DETAILS
34AB	STORM DRAIN EASEMENTS
35	STRUCUTRE NOTES
36	STRUCTURE DETAIL
37	STRUCTURE DETAILS
38	STRUCTURE DETAILS
39	STRUCTURE DETAILS

PD 2641 IS NOT ELIGIBLE FOR TRANSFER TO THE FLOOD CONTROL DISTRICT FOR MAINTENANCE UNTIL PD 2640 IS TRANSFERRED

PD 2640 MUST BE CONSTRUCTED BEFORE OR CONCURRENT WITH PD 2641

BENCH MARK: NEWHALL QUAD (2009) NAVD88
LADPW L 5210
DPW BM TAG IN E CB 3' N/O END @ SE COR RYE CYN RD & THE OLD ROAD 85' S & 55' E/O C/L INT.

ELEV. 1061.448 FEET **ADJUSTMENT** 2009

SURVEYOR'S NOTE: TOPO & DESIGN ELEV ARE BASED ON 1995 ADJUSTMENT. TO ACQUIRE 2009 ADJUSTMENT ELEV, SUBTRACT 0.120 FT FROM ALL ELEVATIONS DEPICTED ON THESE PLANS.

PRIVATE ENGINEERS NOTICE TO CONTRACTORS

The existence and location of any underground utility pipes or structures shown on these plans are obtained by a search of the available records. To the best of our knowledge, there are no existing utilities except as shown on this map. The contractor is required to take due precautionary measures to protect the utility lines shown and any other lines not of record or shown on this drawing.

JASON H. FUKUMITSU — 8/29/2018 DATE

APPROVED	MARK PESTRELLA, DIRECTOR OF PUBLIC WORKS	
BY	ASSISTANT DIVISION ENGINEER	10/9/2018 DATE
RECOMMENDED	LAND DEVELOPMENT DIVISION	
BY	STORM DRAIN SECTION	10/04/2018 DATE
SUBMITTED		
BY	STORM DRAIN SECTION	10/04/2018 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
1	REMOVED CONDITION BULK FLOW DRAIN WILL BE CONSTRUCTED AS PART OF ROUGH GRADING PLAN			11/7/18
2	ADDED STRUCTURAL DETAIL SHEETS 38 AND 39 ADDED CONSTRUCTION NOTE 91 REVISED CONSTRUCTION NOTE 21		AVM	8/14/19
	REVISE TOTAL NUMBER OF SHEETS REVISE HYDRAULIC ELEMENTS REVISE AND ADD LATERAL 8/MAINLINE			
	REVISED "00" PRIVATE DRIVE			
3	REVISE HYDRAULIC ELEMENTS REVISE AND ADD LATERALS/MAINLINE REVISED "00" PRIVATE DRIVE		MD. Esq.	3/15/2021
4	REVISE LAT A4.2, A.8 AND LINE A10, ADDED LAT A10–2, REVISED DEBRIS BASIN 2 AND ADDED EASEMENT SHEET		MD. Esq.	9/28/2021
5	ADDED LAT D AND LAT D1, UPDATED HYDRAULICS FOR LINE A			01/18/2022



8/29/18 DATE

JASON H. FUKUMITSU

STORM DRAIN PLANS IN
TRACT No. 61105–1 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
26074 Avenue Hall, Suite 23 Valencia, CA 91355▪ PH: (661) 294-2211 FX: (661) 294-9890

DWG | SHEET 1 OF ~~37~~ 39

Dwg No. 43-F553.1–38

G:\Newhall Ranch\61105 Mission Village\61105–01\Storm\PD 2641\MWD80–01_TitleSheet–REV4.dwg Plotted on Sep 21, 2021–8:34am by amonobb

GENERAL NOTES:

1. A PERMIT SHALL BE OBTAINED AND ALL FEES AND DEPOSITS FOR CONSTRUCTION INSPECTION SHALL BE PAID TO THE DEPARTMENT OF PUBLIC WORKS AT THE PERMIT COUNTER, 900 SOUTH FREMONT AVENUE 3RD FLOOR, ALHAMBRA, PRIOR TO STARTING WORK UNDER THIS CONTRACT. ALL OTHER REQUIRED PERMITS, SUCH AS ROAD EXCAVATION PERMITS, MUST BE OBTAINED PRIOR TO STARTING WORK.
2. WHEN WORK IS WITHIN A CONTRACT CITY, CONTRACTOR MUST CONTACT THE DIRECTOR OF PUBLIC WORKS OF THAT CITY TO DETERMINE THE LOCATION TO PAY THE INSPECTION DEPOSIT.
3. THE CONTRACTOR SHALL CONTACT THE DISTRICT OFFICE LISTED ON THE "APPLICATION FOR STORM DRAIN CONSTRUCTION INSPECTION FORM I" TO ARRANGE FOR AN ACCEPTABLE CONSTRUCTION START DATE.
4. APPROVAL OF THIS PLAN BY THE COUNTY OF LOS ANGELES DOES NOT CONSTITUTE A REPRESENTATION AS TO THE ACCURACY OF THE LOCATION, OR THE EXISTENCE OR NONEXISTENCE OF ANY UNDERGROUND UTILITY, PIPE OR STRUCTURE WITHIN THE LIMITS OF THIS PROJECT. THIS NOTE APPLIES TO ALL SHEETS.
5. ALL WORK SHALL BE IN ACCORDANCE WITH THE LATEST ADOPTED EDITION OF THE "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION," INCLUDING SUPPLEMENTS AND SHALL BE PROSECUTED ONLY IN THE PRESENCE OF THE DIRECTOR OF PUBLIC WORKS/CITY ENGINEER.
6. THE CONTRACTOR'S ATTENTION IS DIRECTED TO SECTION 7-10.4.1 OF THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION IN REGARD TO SAFETY ORDERS AND SHALL CONFORM TO THE "MINIMUM PUBLIC SAFETY REQUIREMENTS" AS SHOWN ON LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS STANDARD PLAN 6008.
7. ELEVATIONS ARE IN FEET ABOVE U.S.C. & G.S. MEAN SEA LEVEL DATUM OF 1929, UNLESS OTHERWISE INDICATED.
8. NO CONCRETE SHALL BE PLACED UNTIL THE FORMS AND REINFORCING STEEL HAVE BEEN PLACED, INSPECTED AND APPROVED.
9. ALL STRUCTURAL CONCRETE SHALL BE PORTLAND CEMENT CONCRETE WITH AN ULTIMATE 28 DAY COMPRESSIVE STRENGTH OF 4000 P.S.I. UNLESS OTHERWISE NOTED.
10. TRANSVERSE REINFORCEMENT AND TRANSVERSE JOINTS SHALL BE PLACED AT RIGHT ANGLES (OR RADIAL) TO THE CONDUIT CENTERLINE EXCEPT AS OTHERWISE SHOWN ON THE DRAWINGS.
11. ALL STEEL ADJACENT TO FACE OF CONCRETE SHALL HAVE 2-1/2 INCH CLEARANCE UNLESS OTHERWISE SPECIFIED.
12. REINFORCEMENT SHALL BE DEFORMED BARS OF INTERMEDIATE GRADE STEEL PER A.S.T.M. A-615-GRADE 60.
13. ALL BAR BENDS AND HOOKS SHALL CONFORM TO THE AMERICAN CONCRETE INSTITUTE "MANUAL OF STANDARD PRACTICE."
14. DIMENSIONS FROM FACE OF CONCRETE TO STEEL ARE TO CENTER LINE OF STEEL UNLESS OTHERWISE NOTED.
15. ALL STEEL THAT IS TO BE CONTINUOUS SHALL HAVE A MINIMUM LAP OF 30 BAR DIAMETERS OR 18 INCHES WHICHEVER IS GREATER.
16. ALL CONSTRUCTION JOINTS IN THE FOOTING OF SLABS AND WALLS SHALL BE IN THE SAME PLANE. NO STAGGERING OF JOINTS WILL BE PERMITTED.
17. ALL EXPOSED EDGES SHALL BE FINISHED WITH A 3/4 INCH CHAMFER.
18. UNLESS OTHERWISE SHOWN, CONCRETE DIMENSIONS SHALL BE MEASURED VERTICALLY OR HORIZONTALLY AND PARALLEL OR AT RIGHT ANGLES (OR RADIAL) TO THE CENTER LINE OF CONSTRUCTION.
19. CONCRETE BACKFILL IS REQUIRED WHEN THE PIPE HAS LESS THAN ONE FOOT OF COVER. THE CONCRETE BACKFILL SHALL CONSIST OF 1:3:5 MIX, PORTLAND CEMENT CONCRETE POURED FROM WALL TO WALL OF TRENCH AND FROM BOTTOM OF TRENCH TO A MINIMUM OF 4 INCHES OVER THE TOP OF THE PIPE.
20. ALL PIPES SHALL BE PLACED IN TRENCH IN NATURAL GROUND AND/OR COMPACTED FILL. THE GROUND LEVEL BEFORE THE TRENCHING SHALL BE AT LEAST 3 FEET ABOVE THE TOP OF THE PIPE ELEVATION, OR AT FINISH SURFACE ELEVATION, WHICHEVER IS LESS.
21. ALL BACKFILL AND FILLS OUTSIDE OF STREET RIGHT-OF-WAY SHALL BE COMPACTED TO MIN. 90 PERCENT OF MAXIMUM DENSITY AS DETERMINED BY A.S.T.M. SOIL COMPACTION TEST D 1557-91 METHOD "D" UNLESS OTHERWISE SPECIFIED. THIS SHALL BE CERTIFIED BY A GEOTECHNICAL ENGINEER. THIS CERTIFICATION SHALL BE SUBMITTED TO THE COUNTY ENGINEER PRIOR TO ACCEPTANCE OF THE WORK BY THE COUNTY.
22. ALL BACKFILL AND FILLS WITHIN STREET RIGHT-OF-WAY SHALL BE COMPACTED IN ACCORDANCE WITH SECTION 306-1.3.4 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED AND INSPECTED BY THE COUNTY. CONTRACTOR SHALL NOTIFY THE INSPECTOR AT LEAST 24 HOURS IN ADVANCE FOR SOIL TESTING AS REQUIRED BY THE INSPECTOR.
23. PIPE BEDDING SHALL BE:

    IN ACCORDANCE WITH THE COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS STANDARD PLAN NO. 3092 UNLESS OTHERWISE NOTED.

    ACCORDING TO STANDARD PLAN NO. 3080-0, CASE 3, EXCEPT BELL AND SPIGOT PIPE WHICH SHALL BE CASE 2 BEDDING, UNLESS OTHERWISE SHOWN. "W" VALUES SHALL BE AS SPECIFIED ON STANDARD PLAN 3080-0 FOR CASE 3 BEDDING, NOTES 3 (A), 3 (B), AND 3 (C). IF THE "W" VALUE AT THE TOP OF THE PIPE IS EXCEEDED, THE BEDDING SHALL BE MODIFIED, AND/OR PIPE OF ADDITIONAL STRENGTH SHALL BE PROVIDED. THE PROPOSED MODIFICATION SHALL BE APPROVED BY THE DEPARTMENT OF PUBLIC WORKS.
24. PIPE SHALL BE EMBEDDED 5 INCHES INTO ALL STRUCTURES INCLUDING INLET AND OUTLET HEADWALLS, UNLESS OTHERWISE SPECIFIED.
25. THE MINIMUM CONCRETE COVER FOR REINFORCEMENT IN PRECAST CONCRETE PIPE SHALL BE 1 INCH IN PIPE HAVING A WALL THICKNESS OF 2 1/2 INCHES OR GREATER AND 3/4 INCH IN PIPE HAVING A WALL THICKNESS OF LESS THAN 2 1/2 INCHES.
26. ALL CATCH BASINS WITHIN THE DEDICATED STREET RIGHT-OF-WAY SHALL BE CONSTRUCTED PER THE STREET PLANS.
27. THE CONTRACTOR SHALL PROVIDE TO THE SATISFACTION OF THE DIRECTOR OF PUBLIC WORKS A DRAINAGE SYSTEM FOR OPERABLE AT ALL TIMES UNTIL THIS STORM DRAIN SYSTEM IS ACCEPTED FOR MAINTENANCE. THE DESIGN OF THE DRAINAGE SYSTEM MUST BE PREPARED UNDER THE DIRECTION OF A CIVIL ENGINEER.

GENERAL NOTES (Cont'd)

28. ALL REFERENCES ON THIS PLAN TO THE COUNTY ENGINEER, ROAD DEPARTMENT, OR FLOOD CONTROL DISTRICT SHALL APPLY TO THE APPROPRIATE ELEMENTS OF THE DEPARTMENT OF PUBLIC WORKS.
29. EXISTING UTILITIES SHALL BE MAINTAINED IN PLACE BY THE CONTRACTOR, UNLESS OTHERWISE NOTED.
30. UNLESS OTHERWISE INDICATED CROSSING UTILITIES ARE TO BE SUPPORTED IN ACCORDANCE WITH STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION NO. 224-2
31. ALL OPENINGS RESULTING FROM THE CUTTING OR PARTIAL REMOVAL OF EXISTING CULVERTS, PIPES OR SIMILAR STRUCTURES SHALL BE SEALED WITH 8 INCHES OF BRICK AND MORTAR OR 6 INCHES OF CONCRETE, UNLESS OTHERWISE SHOWN.
32. MANHOLES SHALL USE THE STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION 630-2 FOR THE "FRAME AND COVER" AND 635-2 FOR THE "STANDARD DROP STEP."
33. THIS STORM DRAIN WILL NOT BE FIELD ACCEPTED FOR MAINTENANCE UNTIL THE STREETS HAVE BEEN PAVED, MANHOLES BROUGHT TO GRADE AND THE SYSTEM CLEANED TO THE SATISFACTION OF THE DIRECTOR OF PUBLIC WORKS.
34. AN NPDES PERMIT FROM THE REGIONAL WATER QUALITY CONTROL BOARD IS REQUIRED BEFORE ANY DISCHARGE OF NON-STORM WATER INTO THE STORM DRAIN IS ALLOWED.
35. THE LATEST REVISED STANDARD PLAN OR DRAWING SHALL BE USED UNLESS OTHERWISE NOTED.
36. THE SOILS ENGINEER OF RECORD SHALL INSPECT AND APPROVE THE FOUNDATION EXCAVATIONS BEFORE STEEL OR CONCRETE IS PLACED.
37. STORM DRAIN MANHOLE COVERS CONSTRUCTED PER S.P.P.W.C. STANDARD PLANS 630, 631, 632 AND 633 SHALL BE CAST WITH THE LETTERS "L.A.C.F.C.D.". THE LETTERS SHALL BE 1 INCH IN HEIGHT AND PLACED BELOW THE LETTER "D" IN THE CENTER OF THE COVER.
38. STORM DRAIN MANHOLE COVERS CONSTRUCTED PER S.P.P.W.C. STANDARD PLANS 312 SHALL BE CAST WITH THE LETTERS "L.A.C.F.C.D.". THE LETTERS SHALL BE 1 INCH IN HEIGHT AND PLACED BELOW THE LETTER "D" IN THE CENTER OF THE COVER.
39. ALL ABOVE GROUND FACILITIES SHALL BE STAMPED WITH THE DRAIN AND LINE NAME. THE LETTERING SHOULD BE 4" BLACK TEXT ON A YELLOW BACKGROUND.
40. EVERY 100 FEET STATIONS SHALL BE LABELED ON THE INSIDE OF ALL STORM DRAINS AND WALL OF OPEN CHANNELS. THE LETTERING SHOULD BE 4" BLACK TEXT ON A YELLOW BACKGROUND AND SHOULD BE PLACED IN THE SOFFIT OF PIPES AND THE TOP 2 FEET OF A CHANNEL WALL.
41. FOR ALL DEBRIS BASINS, THE 0%, 5% AND 25% DEBRIS CONE ELEVATIONS SHALL BE LABELED ON THE CONCRETE FACING SLAB AND THE STAND PIPE.
42. PRIOR TO ORDERING PIPES, CONTACT GEOTECHNICAL & MATERIALS DIVISION AT (626) 458-1707 TO SCHEDULE FOR D-LOAD INSPECTION. FEES PAYABLE AT LAND DEVELOPMENT DIVISION PUBLIC COUNTER WILL BE REQUIRED.

STORMWATER POLLUTION CONTROL REQUIREMENTS FOR STORM DRAIN CONSTRUCTION

A. NOTES:

1. ERODED SEDIMENTS AND OTHER POLLUTANTS MUST BE RETAINED ON SITE AND MAY NOT BE TRANSPORTED FROM THE SITE VIA SHEETFLOW, SWALES, AREA DRAINS, NATURAL DRAINAGE COURSES OR WIND.
2. STOCKPILES OF EARTH AND OTHER CONSTRUCTION RELATED MATERIALS MUST BE PROTECTED FROM BEING TRANSPORTED FROM THE SITE BY THE FORCES OF WIND OR WATER.
3. FUELS, OILS, SOLVENTS, AND OTHER TOXIC MATERIALS MUST BE STORED IN ACCORDANCE WITH THEIR LISTING AND ARE NOT TO CONTAMINATE THE SOIL AND SURFACE WATERS. ALL APPROVED STORAGE CONTAINERS ARE TO BE PROTECTED FROM THE WEATHER. SPILLS MUST BE CLEANED UP IMMEDIATELY AND DISPOSED OF IN A PROPER MANNER. SPILLS MAY NOT BE WASHED INTO THE DRAINAGE SYSTEM.
4. EXCESS OR WASTE CONCRETE MAY NOT BE WASHED INTO THE PUBLIC WAY OR ANY OTHER DRAINAGE SYSTEM. PROVISIONS SHALL BE MADE TO RETAIN CONCRETE WASTES ON SITE UNTIL THEY CAN BE DISPOSED OF AS SOLID WASTE.
5. TRASH AND CONSTRUCTION RELATED SOLID WASTES MUST BE DEPOSITED INTO A COVERED RECEPTACLE TO PREVENT CONTAMINATION OF RAINWATER AND DISPERSAL BY WIND.
6. SEDIMENTS AND OTHER MATERIALS MAY NOT BE TRACKED FROM THE SITE BY VEHICLE TRAFFIC. THE CONSTRUCTION ENTRANCE ROADWAYS MUST BE STABILIZED SO AS TO INHIBIT SEDIMENTS FROM BEING DEPOSITED INTO THE PUBLIC WAY. ACCIDENTAL DEPOSITIONS MUST BE SWEPT UP IMMEDIATELY AND MAY NOT BE WASHED DOWN BY RAIN OR OTHER MEANS.
7. ANY SLOPES WITH DISTURBED SOILS OR DENUDED OF VEGETATION MUST BE STABILIZED SO AS TO INHIBIT EROSION BY WIND AND WATER.

B. THE FOLLOWING BMPs AS OUTLINED IN, BUT NOT LIMITED TO, THE LATEST EDITION OF THE CALIFORNIA BMP HANDBOOK (CONSTRUCTION) OR CALTRANS STORMWATER QUALITY HANDBOOKS (CONSTRUCTION SITE BMP MANUAL). MAY APPLY DURING THE CONSTRUCTION OF THIS PROJECT (ADDITIONAL MEASURES MAY BE REQUIRED IF DEEMED APPROPRIATE BY THE PROJECT ENGINEER OR THE BUILDING OFFICIAL):

EROSION CONTROL

EC1 – SCHEDULING
EC2 – PRESERVATION OF EXISTING VEGETATION
EC3 – HYDRAULIC MULCH
EC4 – HYDROSEEDING
EC5 – SOIL BINDERS
EC6 – STRAW MULCH
EC7 – GEOTEXTILES & MATS
EC8 – WOOD MULCHING
EC9 – EARTH DIKES & DRAINAGE SWALES
EC10 – VELOCITY DISSIPATION DEVICES
EC11 – SLOPE DRAINS
EC12 – STREAMBANK STABILIZATION
EC13 – RESERVED
EC14 – COMPOST BLANKETS
EC15 – SOIL PREPARATION/ROUGHENING
EC16 – NON-VEGETATED STABILIZATION

TEMPORARY SEDIMENT CONTROL

SE1 – SILT FENCE
SE2 – SEDIMENT BASIN
SE3 – SEDIMENT TRAP
SE4 – CHECK DAM
SE5 – FIBER ROLLS
SE6 – GRAVEL BAG BERM
SE7 – STREET SWEEPING AND VACUUMING
SE8 – SAND BAG BARRIER
SE9 – STRAW BALE BARRIERS
SE10 – STORM DRAIN INLET PROTECTION
SE11 – ACTIVE TREATMENT SYSTEMS
SE12 – TEMPORARY SILT DIKE
SE13 – COMPOST SOCKS & BERMS
SE14 – BIOFILTER BAGS

WIND EROSION CONTROL

WE1 – WIND EROSION CONTROL

EQUIPMENT TRACKING CONTROL

TC1 – STABILIZED CONSTRUCTION ENTRANCE/EXIT
TC2 – STABILIZATION CONSTRUCTION ROADWAY
TC3 – ENTRANCE/OUTLET TIRE WASH

NON-STORMWATER MANAGEMENT

NS1 – WATER CONSERVATION PRACTICES
NS2 – DEWATERING OPERATIONS
NS3 – PAVING AND GRINDING OPERATIONS
NS4 – TEMPORARY STREAM CROSSING
NS5 – CLEAR WATER DIVERSION
NS6 – ILLICIT CONNECTION/DISCHARGE
NS7 – POTABLE WATER/IRRIGATION
NS8 – VEHICLE AND EQUIPMENT CLEANING
NS9 – VEHICLE AND EQUIPMENT FUELING
NS10 – VEHICLE AND EQUIPMENT MAINTENANCE
NS11 – PILE DRIVING OPERATIONS
NS12 – CONCRETE CURING
NS13 – CONCRETE FINISHING
NS14 – MATERIAL AND EQUIPMENT USE
NS15 – DEMOLITION ADJACENT TO WATER
NS16 – TEMPORARY BATCH PLANTS

WASTE MANAGEMENT AND MATERIAL POLUTION CONTROL

WM-1 – MATERIAL DELIVERY AND STORAGE
WM-2 – MATERIAL USE
WM-3 – STOCKPILE MANAGEMENT
WM-4 – SPILL PREVENTION AND CONTROL
WM-5 – SOLID WASTE MANAGEMENT
WM-6 – HAZARDOUS WASTE MANAGEMENT
WM-7 – CONTAMINATION SOIL MANAGEMENT
WM-8 – CONCRETE WASTE MANAGEMENT
WM-9 – SANITARY/SEPTIC WASTE MANAGEMENT
WM-10 – LIQUID WASTE MANAGEMENT

P.D. NO. 2641

Dwg No. 43-F553.1-.38

REGISTERED PROFESSIONAL ENGINEER — VINCENT PING-KUEN IP — No. 2522 — Exp. 03/20 — GEOTECHNICAL — STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST — ANDREW A. PRICE — No. 1705 — STATE OF CALIFORNIA

REVIEWED LAND DEVELOPMENT DIVISION
BY [signature] STORM DRAIN SECTION — 10/04/2018 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE

REGISTERED PROFESSIONAL ENGINEER — JASON H. FUKUMITSU — No. 40695 — CIVIL — STATE OF CALIFORNIA
[signature] 8/29/18
JASON H. FUKUMITSU — DATE

STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
26074 Avenue Hall, Suite 23 ▪ Valencia, CA 91355 ▪ PH: (661) 294-2211 ▪ FX: (661) 294-9890

DWG — SHEET 2A OF 37

G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2641\HMV080-02_Notes.dwg Plotted on Jun 15, 2018-6:02pm by joshuay

HYDRAULIC ELEMENTS

LINE	PIPE FROM STA.	REACH TO STA.	Q_{50}	DIA	Vmax (FPS)	REMARKS
"A"	69+00.00	70+59.87	1476.4	114"	20.8	1
	70+59.87	70+83.93	1476.4	114"	20.8	1
	70+83.93	71+16.85	1476.4	114"	20.8	1
	71+16.85	73+96.85	1476.4	114"	20.8	1
	73+96.85	75+00.00	1476.4	114"	20.8	1
	75+00.00	76+61.16	1476.4	114"	20.8	1
	76+61.16	76+69.44	1476.4	114"	20.8	1
	76+69.44	77+72.66	1476.4	114"	20.8	1
	77+72.66	78+84.62	1335.6	96"	35.8	2
	78+84.62	81+00.00	1335.6	96"	35.8	2
	81+00.00	84+00.00	1335.6	96"	35.8	2
	84+00.00	85+20.74	1335.6	96"	35.8	2
	85+20.74	86+00.00	1303.1	96"	30.3	2
	86+00.00	88+64.77	1303.1	102"	30.3	2
	88+64.77	91+00.00	1295.6	102"	29.4	1
	91+00.00	92+06.06	1295.6	102"	29.4	1
	92+06.06	93+00.00	1269.6	102"	27.0	1
	93+00.00	94+04.87	1269.6	102"	27.0	1
	94+04.87	95+50.00	1186.1	102"	20.9	1
	95+50.00	99+00.00	1186.1	102"	20.9	1
	99+00.00	101+47.22	1186.1	102"	20.9	1
	101+47.22	102+00.00	1186.1	102"	28.0	1
	102+00.00	103+31.30	1186.1	102"	20.9	1
	103+31.30	103+56.56	983.9	102"	17.3	
	103+56.56	103+86.23	983.9	102"	17.3	
	103+86.23	104+12.09	983.9	102"	17.3	
	104+12.09	104+24.90	983.9	102"	17.3	
	104+24.90	104+62.25	983.9	102"	17.3	
	104+62.25	107+20.97	969.2	102"	17.1	
	107+20.97	108+00.00	965.1	102"	17.0	
	108+00.00	110+58.62	965.1	102"	17.0	
	110+58.62	113+49.87	935.5	96"	18.6	
	113+49.87	114+14.51	900.0	96"	17.9	
"A2"	09+89.50	10+90.74	99.5	48"	7.9	
	10+90.74	11+16.43	96.5	48"	7.7	
	11+16.43	11+33.99	90.9	48"	7.2	
	11+33.99	16+25.02	84.2	48"	6.7	
	16+25.02	17+00.00	84.2	48"	6.7	
	17+00.00	20+09.41	84.2	48"	6.7	
	20+09.41	20+86.06	23.8	36"	3.4	
	20+86.06	24+00.00	18.6	36"	10.1	
	24+00.00	24+44.41	18.6	36"	10.1	
	24+44.41	28+18.75	18.6	36"	10.1	
	28+18.75	29+11.63	17.6	36"	8.3	
	29+11.63	29+35.66	8.8	36"	6.9	
"A3"	10+05.90	10+83.25	16.7	30"	3.4	
	10+83.25	11+01.81	11.5	30"	2.3	
	11+01.81	13+49.93	10.2	30"	8.6	
	13+49.93	15+00.00	10.2	30"	8.6	
	15+00.00	15+17.64	10.2	30"	8.6	
	15+17.64	15+31.59	9.8	30"	7.1	
	15+31.59	15+85.07	9.2	30"	8.2	
	15+85.07	18+44.03	6.7	24"	8.9	
	18+44.03	19+82.20	2.8	24"	6.0	

HYDRAULIC ELEMENTS

LINE	PIPE FROM STA.	REACH TO STA.	Q_{50}	DIA	Vmax (FPS)	REMARKS
"A4"	09+93.12	10+80.50	44.9	36"	6.4	
	10+80.50	14+00.00	27.6	36"	12.0	
	14+00.00	16+61.72	27.6	36"	12.0	
	16+61.72	17+03.65	25.2	36"	11.2	
	17+03.65	17+15.33	25.2	24"	11.2	
	17+15.33	18+13.00	15.8	24"	11.6	
	18+13.00	20+00.00	14.8	24"	11.7	
	20+00.00	22+39.69	14.8	24"	11.7	
	22+39.69	22+62.97	14.5	24"	6.3	
	22+62.97	22+74.55	4.5	24"	1.6	
	22+74.55	22+88.57	4.5	24"	1.6	
"A5"	10+00.00	10+62.25	19.2	30"	7.2	
	10+62.25	10+91.56	5.2	30"	1.2	
	10+91.56	13+00.00	4.40	30"	7.2	
	13+00.00	14+57.01	4.40	30"	7.2	
"A6"	10+00.00	11+16.15	372.1	60"	39.2	2
	11+16.15	11+19.75	371.3	60"	37.6	2
	11+19.75	12+35.72	370.3	60"	37.6	2
	12+35.72	13+00.00	370.2	60"	33.1	2
	13+00.00	13+08.55	367.6	60"	32.2	2
	13+08.55	15+00.00	364.3	60"	32.5	2
	15+00.00	17+00.00	364.3	60"	27.6	1
	17+00.00	18+05.93	364.3	60"	27.6	1
	18+05.93	23+08.35	207.4	60"	10.6	
"A7"	10+00.00	11+20.31	49.4	42"	27.6	1
"A8"	10+00.00	13+11.42	1.8	24"	9.8	
"A9"	10+00.00	11+75.54	574.8	84"	19.7	1
"A9–B"	10+03.09	11+96.76		42"		
"A10"	10+00.00	12+65.10	24.8	30"	18.5	
	12+65.10	12+89.15	22.4	30"	15.2	
	12+89.15	15+52.81	22.2	30"	13.0	
	15+52.81	15+63.63	21.9	30"	10.6	
	15+63.63	15+91.04	21.6	30"	10.2	
	15+91.04	18+00.00	13.9	30"	11.4	
	18+00.00	18+56.65	13.9	30"	11.4	

HYDRAULIC ELEMENTS

LATERALS	PIPE FROM STA.	REACH TO STA.	Q	DIA	Vmax (FPS)	REMARKS
"A.1"	10+00.00	10+83.90	1.3	18"	14.2	
"A.2"	10+00.00	10+80.69	0.5	36"	0.1	
"A.3"	10+00.00	10+35.34	0.5	18"	12.7	
"A.4"	10+00.00	10+28.85	0.2	18"	4.9	
"A.5"	10+00.00	10+68.36	0.3	18"	4.6	
"A.6"	10+00.00	10+50.27	10.0	24"	3.2	
"A.7"	10+00.00	10+25.74	20.2	24"	6.4	
"A.8"	10+00.00	10+20.42	3.3	18"	21.0	1
"A.9"	10+00.00	10+26.90	3.6	18"	21.9	1
"A.10"	10+00.00	10+30.50	13.9	36"	7.9	
"A.11"	10+00.00	10+39.00	0.5	18"	13.2	
"A.12"	10+00.00	10+13.86	0.5	18"	17.0	
"A.13"	10+00.00	10+63.69	66.0	42"	12.3	
"A.14"	10+00.00	10+42.00	36.0	36"	5.1	
"A.15"	10+00.00	10+22.39	8.0	24"	2.6	
"A.16"	10+00.00	10+32.34	25.0	30"	5.1	
"A.17"	10+00.00	10+27.45	82.0	48"	6.5	
"A2.1"	10+00.00	10+55.43	4.0	18"	2.3	
"A2.2"	10+00.00	10+49.26	3.7	18"	2.1	
"A2.3"	10+00.00	10+66.28	13.9	24"	4.4	
"A2.4"	10+00.00	10+78.03	0.3	24"	0.1	
"A2.5"	10+00.00	10+76.64	0.5	24"	0.2	
"A2.6"	10+00.00	10+46.27	2.5	18"	16.1	
"A2.7"	10+00.00	10+49.39	2.7	18"	17.6	
"A2.8"	10+00.00	10+52.02	1.0	24"	11.0	
"A2.9"	10+00.00	10+53.99	8.3	24"	9.1	
	10+53.99	11+01.40	5.1	24"	8.8	
"A2.10"	10+00.00	10+34.13	3.3	18"	18.4	
"A2.11"	10+00.00	10+48.20	0.4	24"	8.5	
"A2.12"	10+00.00	10+42.33	14.1	18"	23.3	1
"A2.13"	10+00.00	10+53.00	0.5	18"	9.4	
"A2.14"	10+00.00	10+48.34	0.5	18"	9.6	
"A3.1"	10+00.00	10+65.87	5.3	24"	1.7	
"A3.2"	10+00.00	10+16.82	0.5	18"	13.4	
"A3.3"	10+00.00	10+28.89	0.8	18"	12.0	
"A3.4"	10+00.00	10+55.35	2.5	18"	14.0	
"A3.5"	10+00.00	10+40.17	1.0	24"	4.3	
"A3.6"	10+00.00	10+40.41	1.5	24"	4.5	
"A3.7"	10+00.00	10+19.17	14.1	18"	23.5	1
"A3.8"	10+00.00	10+28.87	3.3	24"	6.2	

HYDRAULIC ELEMENTS

LATERALS	PIPE FROM STA.	REACH TO STA.	Q	DIA	Vmax (FPS)	REMARKS
"A4.1"	10+00.00	10+30.35	15.5	18"	24.6	1
"A4.2"	10+00.00	10+39.83	1.8	18"	14.7	
"A4.3"	10+00.00	10+48.49	2.4	24"	6.0	
"A4.4"	10+00.00	10+39.55	1.0	18"	12.7	
"A4.5"	10+00.00	10+86.58	0.3	18"	5.7	
"A4.6"	10+00.00	10+67.72	15.0	24"	9.6	
"A4.7"	10+00.00	10+53.47	2.4	18"	12.5	
"A4.8"	10+00.00	10+29.23	2.1	18"	15.6	
"A4.9"	10+00.00	10+60.63	1.0	18"	10.4	
"A4.10"	10+00.00	10+35.80	1.0	18"	11.1	
"A4.11"	10+00.00	10+34.00	1.0	18"	11.8	
"A5.1"	10+00.00	10+43.29	18.4	24"	9.9	
"A5.2"	10+00.00	10+21.47	0.4	24"	10.2	
"A5.3"	10+00.00	10+30.20	2.4	24"	16.7	
"A5.4"	10+00.00	10+53.88	12.0	30"	18.1	
"A6.1"	10+00.00	10+40.31	0.8	18"	12.4	
"A6.2"	10+00.00	10+27.00	1.0	18"	15.0	
"A6.3"	10+00.00	10+29.95	3.3	18"	14.8	
"A6.4"	10+00.00	10+47.55	2.6	18"	18.7	
"A6.6"	10+00.00	10+70.63	12.0	24"	9.1	
"A6.7"	10+00.00	13+63.43	145.5	42"	28.9	1
"A6.8"	10+00.00	10+69.08	12.0	42"	1.3	
"A8.1"	10+00.00	10+64.67	0.8	18"	4.3	
"A10.1"	10+00.00	10+48.56	1.3	18"	10.7	
"A10.2"	10+00.00	10+25.96	0.2	18"	7.3	
"A10.3"	10+00.00	10+20.64	0.3	18"	10.1	
"A10.4"	10+00.00	10+08.29	0.3	18"	13.8	
"A10.5"	10+00.00	10+60.80	12.9	30"	8.4	
	10+60.80	10+75.24	12.9	30"	7.7	
"A10.6"	10+00.00	10+22.10	1.0	18"	17.0	
"A10.7"	10+00.00	10+11.90	1.0	18"	15.0	
"A10.8"	10+00.00	10+39.47	6.0	24"	7.3	
"A10.9"	10+00.00	10+27.52	6.0	24"	7.0	

P.D. NO. 2641

PIPE LENGTHS CHART:

PIPE SIZE	TOTAL LENGTHS
18"	1380'
24"	2229'
30"	1925'
36"	1705'
42"	780'
48"	987'
60"	1263'
84"	151'
96"	1155'
102"	2355'
114"	792'
TOTAL	14,722'

TOTAL SQ. FT. OF EASEMENT ACQUIRED = 198,562 SQ.FT.

1 ADD AN ADDITIONAL 0.5" OF CONCRETE COVER OVER THE INVERT STEEL FOR V > 20 FPS.

2 ADD AN ADDITIONAL 1.0" OF CONCRETE COVER OVER THE INVERT STEEL FOR V > 30 FPS.

VOID

Dwg No. 43-F553.1-.38

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-NUEN No. 2522 Exp. 07/20 GEOTECHNICAL STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST ANDREW A PRICE No. 1908 STATE OF CALIFORNIA

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	VOIDED SHEET AND REPLACED WITH NEW SHEET			8/14/19

REVIEWED LAND DEVELOPMENT DIVISION

BY _____ STORM DRAIN SECTION 10/04/2018 DATE

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

JASON H. FUKUMITSU 8/29/18 DATE

STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
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DWG

SHEET 28 OF 37

G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2641\HMV080-02B_Table.dwg Plotted on Jun 26, 2018-2:35pm by ronsess

P.D. NO. 2641

FOR PLAN CHECK ONLY

HYDRAULIC ELEMENTS

LINE	PIPE FROM STA.	REACH TO STA.	Q_{50}	DIA	Vmax (FPS)	REMARKS
"A"	69+02.33	75+00.00	1485.6	114"	21.0	1
	75+00.00	77+72.66	1485.6	114"	21.0	1
	77+72.66	81+00.00	1306.2	96"	35.5	2
	81+00.00	84+00.00	1306.2	96"	30.9	2
	84+00.00	85+20.74	1306.2	96"	30.8	2
	85+20.74	86+00.00	1273.7	96"	30.2	2
	86+00.00	88+64.77	1273.7	102"	30.2	2
	88+64.77	91+00.00	1266.2	102"	29.2	1
	91+00.00	92+06.06	1266.2	102"	27.3	1
	92+06.06	93+00.00	1240.7	102"	26.8	1
	93+00.00	94+04.87	1240.7	102"	26.8	1
	94+04.87	95+50.00	1157.2	102"	20.4	1
	95+50.00	102+00.00	1157.2	102"	20.4	1
	~~102+00.00~~	~~103+31.30~~	~~1157.2~~	~~102"~~	~~20.4~~	~~1~~
	103+31.30	104+61.91	~~929.8~~ 939.5	102"	~~16.4~~ 16.6	
	104+61.91	~~108+00.00~~ 107+34.51	~~914.9~~ 924.6	102"	~~16.1~~ 16.3	
	~~108+00.00~~ 107+34.51	110+17.53	914.9	102"	16.1	
	110+17.53	113+49.38	900.0	96"	17.9	
"A2"	9+89.50	10+90.74	182.3	48"	14.5	
	10+90.74	11+16.43	182.3	48"	14.5	
	11+16.43	11+33.99	144.5	48"	11.5	
	11+33.99	16+25.02	119.3	48"	9.5	
	16+25.02	17+00.00	119.3	48"	9.5	
	17+00.00	20+09.41	119.3	48"	9.5	
	20+09.41	20+86.06	44.1	36"	6.2	
	20+86.06	24+00.00	44.1	36"	6.2	
	24+00.00	29+35.66	44.1	36"	6.2	
	29+35.66	32+92.65	44.1	36"	19.8	
	32+92.65	34+01.95	44.1	36"	20.7	1
"A3"	10+09.62	12+05.51	32.3	30"	6.6	
	12+05.51	14+45.22	32.3	30"	4.7	
	14+45.22	15+05.90	15.4	30"	3.1	
	15+05.90	16+86.57	15.4	24"	4.9	
	16+86.57	19+60.79	15.4	24"	4.9	
"A12"	10+02.29	12+53.16	7.8	24"	8.5	

5

HYDRAULIC ELEMENTS

LINE	PIPE FROM STA.	REACH TO STA.	Q_{50}	DIA	Vmax (FPS)	REMARKS
"A4"	09+93.12	10+80.50	44.9	36"	6.4	
	10+80.50	14+00.00	27.6	36"	3.9	
	14+00.00	16+61.72	27.6	36"	3.9	
	16+61.72	17+03.65	25.2	36"	11.6	
	17+03.65	17+15.33	25.2	24"	11.6	
	17+15.33	18+13.00	15.8	24"	11.7	
	18+13.00	20+00.00	14.8	24"	11.7	
	20+00.00	22+39.69	14.8	24"	11.7	
	22+39.69	22+62.97	14.5	24"	6.3	
	22+62.97	22+74.55	4.5	24"	1.6	
	22+74.55	22+88.57	4.5	24"	1.6	
"A5"	10+00.00	10+62.25	19.2	30"	7.2	
	10+62.25	10+91.56	5.2	30"	1.2	
	10+91.56	12+95.80	4.40	30"	10.8	
	12+95.80	13+63.48	4.40	24"	9.9	
"A6"	10+00.00	11+16.15	372.1	60"	39.2	2
	11+16.15	11+19.75	371.3	60"	37.6	2
	11+19.75	12+35.72	370.3	60"	37.6	2
	12+35.72	13+00.00	370.2	60"	33.1	2
	13+00.00	13+08.55	367.6	60"	32.2	2
	13+08.55	15+00.00	364.3	60"	32.5	2
	15+00.00	17+00.00	364.3	60"	27.6	1
	17+00.00	18+05.93	364.3	60"	27.6	1
	18+05.93	23+08.35	207.4	60"	10.6	
"A7"	10+00.00	11+20.31	56.8	42"	29.1	1
"A9"	10+00.00	12+17.71	584.2	84"	27.9	1
"A9-B"	10+00.00	12+11.98				
"A10"	10+00.00	11+37.22	8.8	24"	~~15.4~~	18.1
	11+37.22	11+85.11	7.3	24"	~~16.4~~	16.6
"A11"	10+00.00	12+84.02	11.9	24"	12.9	

4

HYDRAULIC ELEMENTS

LATERALS	PIPE FROM STA.	REACH TO STA.	Q	DIA	Vmax (FPS)	REMARKS
"A.1"	10+00.00	10+58.26	1.3	18"	14.2	
"A.2"	10+00.00	~~10+95.14~~ 11+18.29	0.5	36"	0.1	
"A.3"	10+00.00	10+35.34	0.5	18"	12.7	
"A.4"	10+00.00	10+43.63	0.2	18"	4.9	
"A.5"	10+00.00	10+60.21	0.3	18"	4.6	
"A.6"	10+00.00	10+59.88	10.0	24"	3.2	
"A.7"	10+00.00	10+40.73	~~20.2~~ 0	24"	~~6.4~~ 0	
~~"A.8"~~	~~10+00.00~~	~~10+20.42~~ 10+44.51	~~3.3~~	~~18"~~	~~21.0~~ 20.6	1
"A.9"	10+00.00	~~10+26.90~~ 10+31.40	3.6	18"	~~21.9~~ 21.6	1
"A.10"	10+00.00	10+30.50	13.9	36"	7.9	
"A.13"	10+00.00	10+63.69	66.0	42"	12.3	
"A.14"	10+00.00	10+42.00	36.0	36"	5.1	
"A.15"	10+00.00	10+22.39	8.0	24"	2.6	
"A.16"	10+00.00	10+32.34	25.0	30"	5.1	
"A.17"	10+00.00	10+27.45	82.0	48"	6.5	
"A2.1"	10+00.00	10+55.45	4.0	18"	2.3	
"A2.2"	10+00.00	10+49.26	3.7	18"	2.1	
"A2.3"	10+00.00	10+71.28	13.9	24"	4.4	
"A2.4"	10+00.00	10+93.02	0.3	24"	0.1	
"A2.5"	10+00.00	10+91.35	0.5	24"	0.2	
"A2.6"	10+00.00	10+46.27	2.5	18"	16.1	
"A2.7"	10+00.00	10+49.39	2.7	18"	17.6	
"A2.8"	10+00.00	10+48.00	1.0	24"	11.5	
"A2.9"	10+00.00	11+10.14	3.3	18"	16.6	
"A2.12"	10+00.00	10+42.33	14.1	18"	23.3	1
"A2.13"	10+00.00	10+58.00	0.5	18"	9.4	
"A2.14"	10+00.00	10+53.34	0.5	18"	9.6	
"A3.1"	10+00.00	10+38.17	5.2	24"	1.7	
"A3.2"	10+00.00	10+16.17	2.1	18"	1.2	
"A3.3"	10+00.00	10+30.02	1.8	18"	1.0	
"A3.4"	10+00.00	~~10+20.00~~ 10+26.00	1.3	18"	0.7	
"A3.5"	10+00.00	10+38.00	7.7	24"	2.5	
"A3.6"	10+00.00	10+26.00	5.2	24"	1.7	
"A3.7"	10+00.00	10+20.00	0.4	18"	8.7	
"A3.8"	10+00.00	10+08.00	0.4	18"	10.6	
"A3.9"	10+00.00	10+51.23	0.4	18"	6.6	
"A.8"	10+00.00	10+36.58	3.3	18"	20.1	1

5 4 3 4

HYDRAULIC ELEMENTS

LATERALS	PIPE FROM STA.	REACH TO STA.	Q	DIA	Vmax (FPS)	REMARKS
"A4.1"	10+00.00	10+30.35	15.5	18"	24.6	1
"A4.2"	10+00.00	10+39.83	1.8	18"	~~14.7~~	16.8
"A4.3"	10+00.00	10+65.43	2.4	24"	6.0	
"A4.4"	10+00.00	10+39.55	1.0	18"	12.7	
"A4.6"	10+00.00	10+59.01	15.0	24"	9.4	
"A4.7"	10+00.00	10+53.47	3.2 ~~2.4~~	18"	~~12.5~~	13.5
"A4.8"	10+00.00	10+32.81	2.1	18"	15.6	
"A4.9"	10+00.00	10+60.63	1.0	18"	1.0	
"A4.10"	10+00.00	10+59.80	1.0	18"	11.0	
"A4.11"	10+00.00	10+58.00	1.0	18"	11.8	
"A5.1"	10+00.00	10+63.38	18.4	24"	9.9	
"A5.2"	10+00.00	10+21.47	0.4	24"	10.2	
"A5.3"	10+00.00	10+30.20	2.4	24"	16.7	
"A6.1"	10+00.00	10+40.31	0.8	18"	12.4	
"A6.2"	10+00.00	10+24.37	1.0	18"	15.0	
"A6.3"	10+00.00	10+29.95	3.3	18"	14.8	
"A6.4"	10+00.00	10+47.55	2.6	18"	18.7	
"A6.6"	10+00.00	10+70.53	12.0	24"	9.1	
"A6.7"	10+00.00	13+68.43	145.5	42"	28.9	1
"A6.8"	10+05.63	10+75.41	12.0	42"	1.3	
"A10.1"	10+00.00	10+44.01	1.5	18"	12.0	
"A11-1"	10+00.00	10+14.00	1.0	18"	15.2	
"A11-2"	10+00.00	10+26.00	10.9	24"	8.2	
"A12-1"	10+00.00	10+08.00	1.8	18"	9.4	
"A12-2"	10+00.00	10+35.02	4.0	24"	7.2	
"D"	10+00.00	10+30.55	28.0	18"	36.4	2
	10+30.55	11+01.47	28.0	24"	9.3	
"D1"	10+00.00	10+10.98	0.6	18"	7.0	

4 5

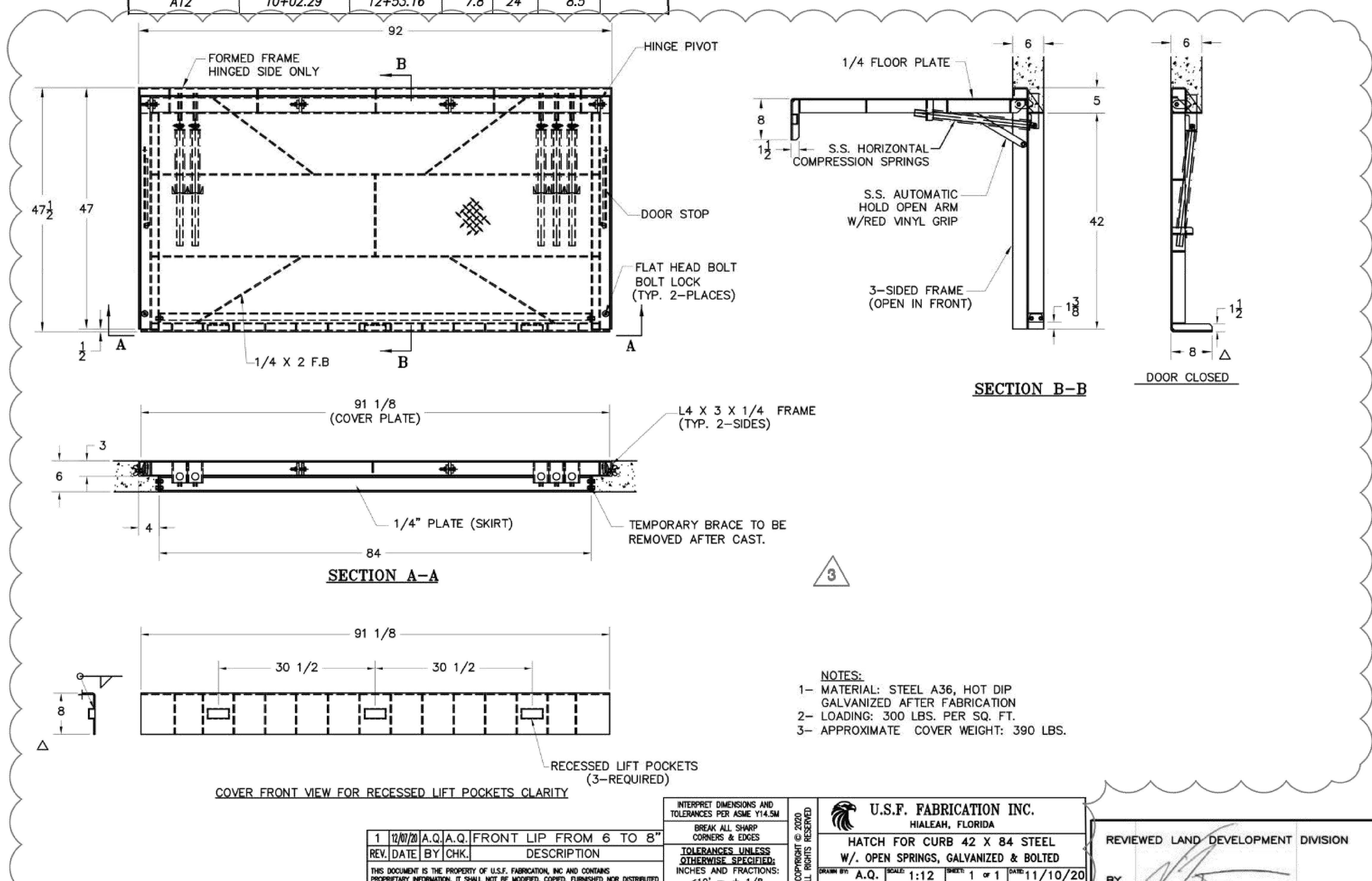
PIPE LENGTHS CHART:

PIPE SIZE	TOTAL LENGTHS
18"	1351'
24"	2535'
30"	768'
36"	2177'
42"	802'
48"	986'
60"	1263'
84"	200'
96"	1138'
102"	2335'
114"	854'
TOTAL	14,409

TOTAL SQ. FT. OF EASEMENT ACQUIRED = 198,562 SQ.FT.

1 ADD AN ADDITIONAL 0.5" OF CONCRETE COVER OVER THE INVERT STEEL FOR V > 20 FPS.

2 ADD AN ADDITIONAL 1.0" OF CONCRETE COVER OVER THE INVERT STEEL FOR V > 30 FPS.



REVIEWED LAND DEVELOPMENT DIVISION

BY STORM DRAIN SECTION 8/14/19 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	REPLACEMENT FOR SHEET 2B			8/14/19
3	UPDATE HYDRAULIC TABLE AND ADD FALSE CURB COVER DETAIL			3/15/2021
4	UPDATE HYDRAULIC TABLE			9/28/2021
5	UPDATE HYDRAULIC TABLES			01/18/2022

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

JASON H. FUKUMITSU 5/14/2019 DATE

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-KUEN IP No. 2522 Exp. GEOTECHNICAL STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRICE No. 1705 STATE OF CALIFORNIA

STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641

COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

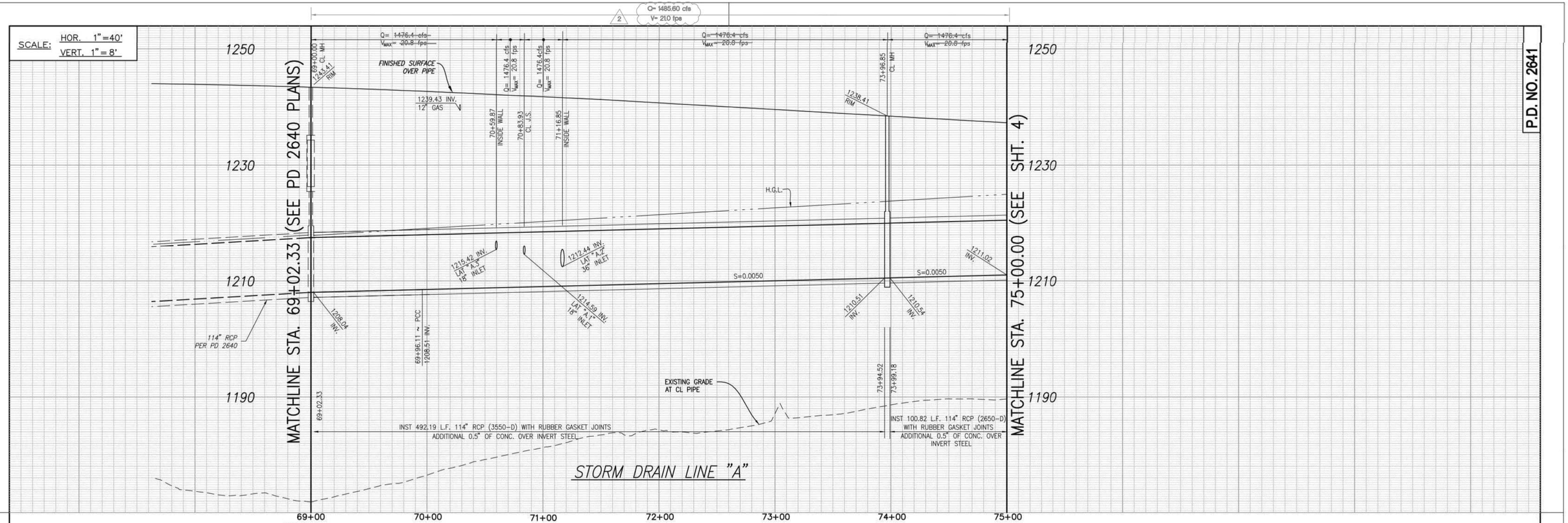
HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
26074 Avenue Hall, Suite 23 • Valencia, CA 91355 • PH: (661) 294-2211 • FX: (661) 294-9890

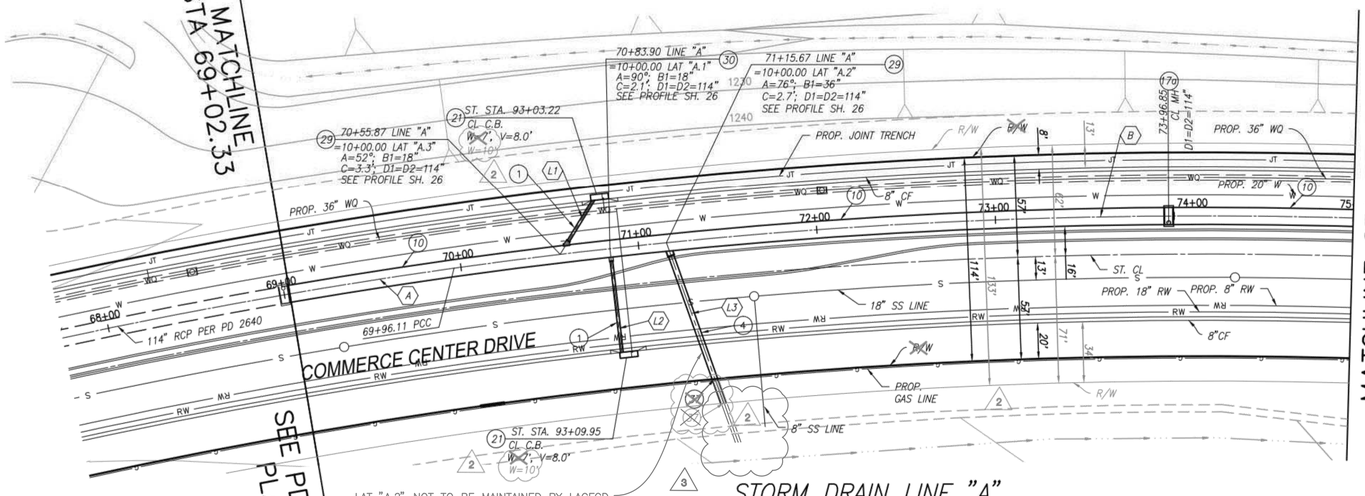
DWG | SHEET 2C OF 39

Dwg No. 43-F553.1-.38

G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2641\HMV080-02B_Table-REV4.dwg Plotted on Jul 29, 2021-9:59am by sijinw

SCALE: HOR. 1"=40'
VERT. 1"=8'





SD LINE "A" LINE TABLE		
LINE	LENGTH	BEARING
L1	35.34'	N72°31'08"W
L2	58.26'	N69°10'43"E
L3	~~80.69'~~ 95.14' △2	N56°12'40"E

LINE "A" CURVE TABLE			
DELTA	RADIUS	LENGTH	TANGENT
(A) 01°49'22"	3021.25'	96.11'	48.06'
(B) 09°33'21"	3021.25'	503.89'	252.53'

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

REVIEWED LAND DEVELOPMENT DIVISION
BY Ken Mc 10/04/2018
STORM DRAIN SECTION DATE

CONSTRUCTION NOTES

1. INSTALL 18" R.C.P (SEE PROFILE FOR D- LOAD)
4. INSTALL 36" R.C.P (SEE PROFILE FOR D- LOAD)
10. INSTALL 114" R.C.P (SEE PROFILE FOR D- LOAD)
17a. CONSTRUCT MODIFIED M.H. PER S.P.P.W.C.. STD. PLAN 320-2, PER DETAILS ON SHEETS 36 AND 37
21. CONSTRUCT CURB OPENING CATCH BASIN PER S.P.P.W.C. STD. PLAN NO. 300-3 △2 MODIFIED CATCH BASIN PER DETAIL ON SHEET 38 AND SHEET 39
29. CONSTRUCT J.S. PER S.P.P.W.C. STD. PLAN 331-3
30. CONSTRUCT J.S. PER S.P.P.W.C. STD. PLAN 332-2
37. CONSTRUCT CLEANOUT PER DETAIL 37 ON SHEET 25

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA △3

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-KUN IP No. 2522 Exp. 6-30-20 GEOTECHNICAL STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRICE No. 1709 STATE OF CALIFORNIA

△2 REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

NO.	REVISION	REVISED BY	APPROVED BY	DATE
△2	ADDED STRUCTURAL DETAIL SHEETS 38 AND 39. ADDED CONSTRUCTION NOTE 91.REVISED CONSTRUCTION NOTE 21.	Jason H Fukumitsu		8/14/19
	REVISED TOTAL SHEET NUMBER. REVISE HYDRAULIC ELEMENTS REVISE AND ADD LATERALS/MAINLINE			
	REVISED "00" PRIVATE DRIVE			
△3	EXTENDED LAT. A.2 - 5' BEYOND R/W AND ADD MAINTENANCE RESPONSIBILITY NOTE	Jason H Fukumitsu	MD. Ref. 1	3/15/2021

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
JASON H. FUKUMITSU 8/29/18 DATE

STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
26074 Avenue Hall, Suite 23 ▪ Valencia, CA 91355 ▪ PH: (661) 294-2211 ▪ FX: (661) 294-9890

△2

DWG | SHEET 3 OF 27 39

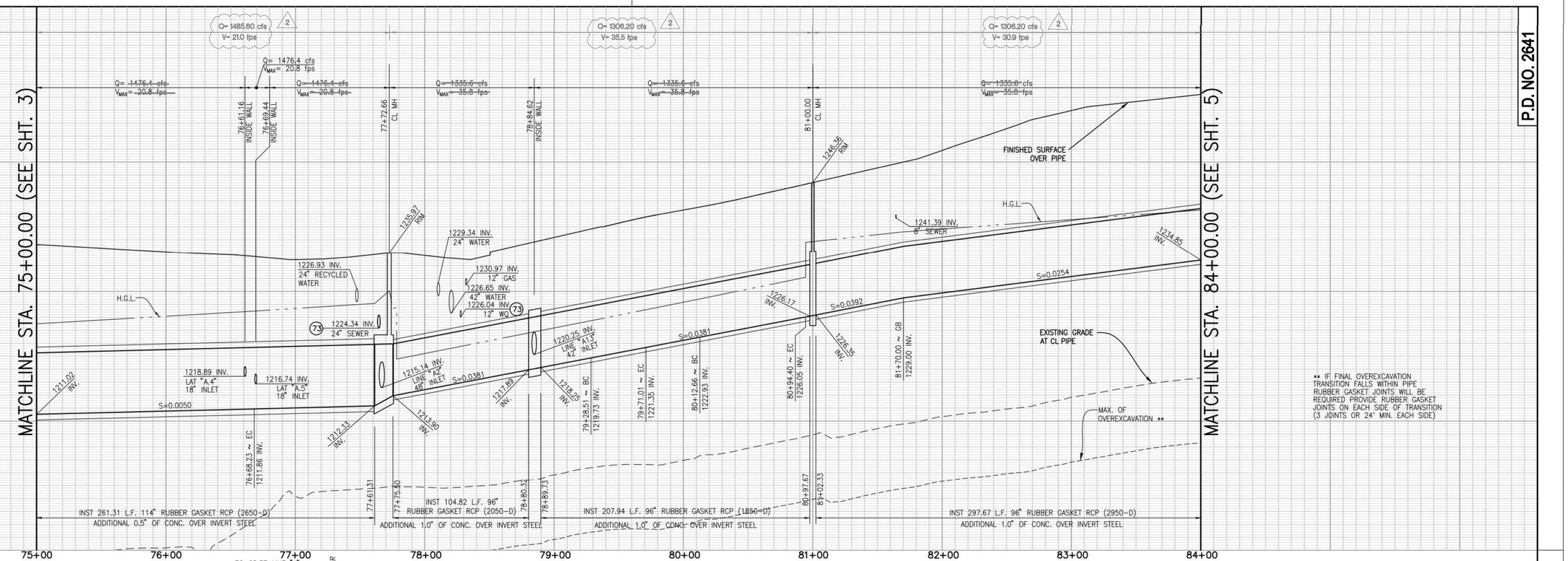
P.D. NO. 2641

Dwg No. 43-F553.1-38

G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2641\NM\085-03_SD_Plan.dwg Plotted on Aug 23, 2018-4:27pm by joshuay

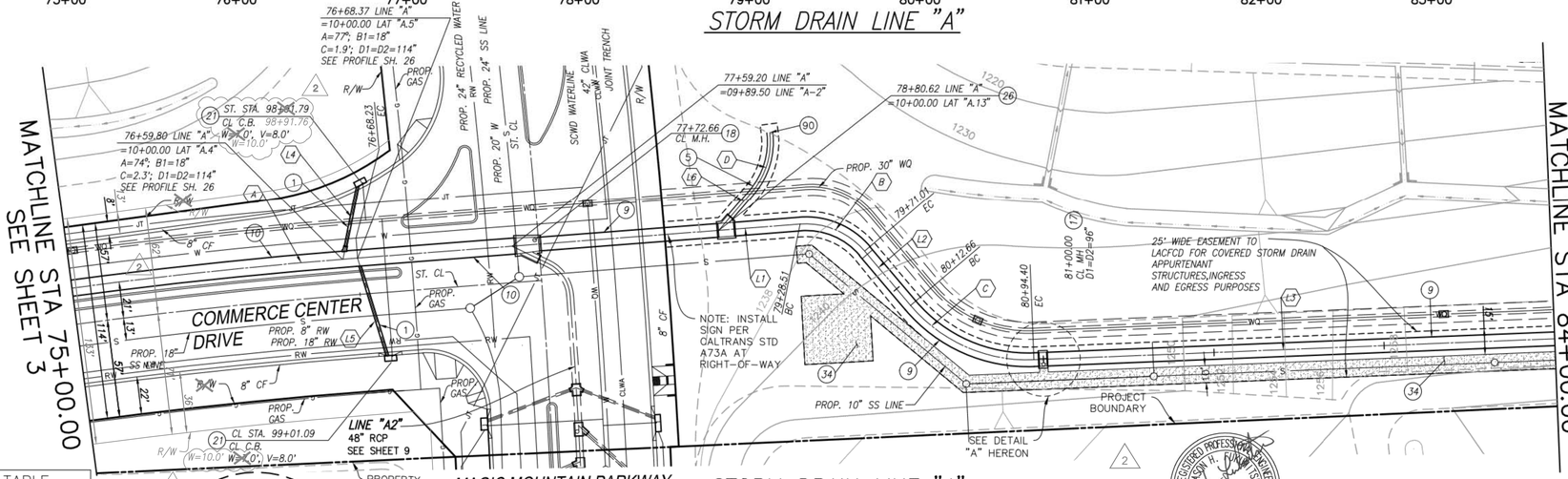
SCALE: HOR. 1"=40'
VERT. 1"=8'

P.D. NO. 2641



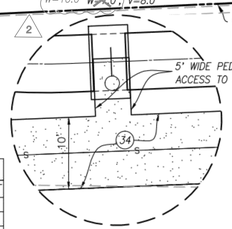
** IF FINAL OVEREXCAVATION TRANSITION FALLS WITHIN PIPE RUBBER GASKET JOINTS WILL BE REQUIRED PROVIDE RUBBER GASKET JOINTS ON EACH SIDE OF TRANSITION (3 JOINTS OR 24" MIN. EACH SIDE)

STORM DRAIN LINE "A"



SD LINE "A" LINE TABLE		
LINE	LENGTH	BEARING
(L1)	260.28'	S09°23'04"E
(L2)	41.65'	S44°43'48"W
(L3)	305.60'	S07°18'15"E
(L4)	43.63'	S83°37'10"E
(L5)	60.21'	S67°59'26"W
(L6)	29.83'	S54°23'04"E

LINE "A" CURVE TABLE				
	DELTA	RADIUS	LENGTH	TANGENT
(A)	31°14'48"	3016.00'	168.23'	85.48'
(B)	54°06'42"	45.00'	42.50'	22.99'
(C)	52°02'03"	90.00'	81.74'	43.93'
(D)	47°50'04"	45.00'	37.57'	19.96'



DETAIL "A"
N.T.S

GRAPHIC SCALE: 1" = 40'

REVIEWED LAND DEVELOPMENT DIVISION
BY Steve Mig 10/04/2018
STORM DRAIN SECTION DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	ADDED STRUCTURAL DETAIL SHEETS 38 AND 39. ADDED CONSTRUCTION NOTE 91.REVISED CONSTRUCTION NOTE 21.	Jason H Fukumitsu		8/14/19
	REVISED TOTAL SHEET NUMBER. REVISE HYDRAULIC ELEMENTS REVISE AND ADD LATERAL B/MAINLINE			
	REVISED "00" PRIVATE DRIVE			

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
8/29/18
JASON H. FUKUMITSU DATE

1 — INSTALL 18" R.C.P. (SEE PROFILE FOR D-LOAD)
5 — INSTALL 42" R.C.P. (SEE PROFILE FOR D-LOAD)
9 — INSTALL 96" R.C.P. (SEE PROFILE FOR D-LOAD)
10 — INSTALL 114" R.C.P. (SEE PROFILE FOR D-LOAD)
17 — CONST. M.H. PER S.P.P.W.C. STD. PLAN NO. 320-2
18 — CONSTRUCT M.H. PER S.P.P.W.C.. STD. PLAN 322-2
21 — CONSTRUCT CURB OPENING CATCH BASIN PER S.P.P.W.C. STD. PLAN NO. 300-3
2 — MODIFIED CATCH BASIN PER DETAIL ON SHEET 38 AND SHEET 39
26 — CONSTRUCT T.S. PER S.P.P.W.C. STD. PLAN 340-2
30 — CONSTRUCT J.S. PER S.P.P.W.C. STD. PLAN 332-2
34 — CONSTRUCT 3" ASPHALT CONCRETE OVER 4" CRUSHED MISCELLANEOUS BASE PER DETAIL ON SHEET 22 (WIDTH PER PLAN)
73 — CONSTRUCT CONCRETE BLANKET PER S.P.P.W.C. 225-2
90 — CONSTRUCT BRICK AND MORTAR PLUG

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-KUEN IP No. 2522 Exp. 6-30-20 GEOTECHNICAL STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRICE No. 1209 STATE OF CALIFORNIA

Dwg No. 43-F553.1-38

STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
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DWG | SHEET 4 OF 37 39

G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2641\HW1085-04_SD_Plan.dwg Plotted on Jul 06, 2018 - 3:35pm by wdilani

SCALE: HOR. 1"=40'
VERT. 1"=8'

P.D. NO. 2641

MATCHLINE STA. 84+00.00 (SEE SHT. 4)

MATCHLINE STA. 93+00.00 (SEE SHT. 6)

Q= 1306.20 cfs
Q= ~~1335.6~~ cfs
V_{MAX}= ~~35.6~~ fps
V= 30.8 fps

Q= 1273.70 cfs
Q= ~~1303.10~~ cfs
V_{MAX}= ~~30.3~~ fps
V= 30.2 fps

Q= 1273.70 cfs
Q= ~~1303.10~~ cfs
V_{MAX}= ~~30.3~~ fps
V= 30.2 fps

Q= 1268.20 cfs
Q= ~~1295.6~~ cfs
V_{MAX}= ~~29.4~~ fps
V= 29.2 fps

Q= 1268.20 cfs
Q= ~~1295.6~~ cfs
V_{MAX}= ~~29.4~~ fps
V= 27.9 fps

Q= 1240.70 cfs
Q= ~~1269.60~~ cfs
V_{MAX}= ~~27.0~~ fps
V= 26.8 fps

85+20.74 INSIDE WALL

86+00.00 CL MH 1269.41 RIM

88+64.77 INSIDE WALL

FINISHED SURFACE OVER PIPE

91+00.00 CL MH 1279.45 RIM

92+06.06 INSIDE WALL

8" SEWER 1268.59 INV.

1260.10 INV. 8" SEWER

1252.20 INV. 8" SEWER

1249.38 INV. LINE "A15" 24" INLET

1256.97 INV. LINE "A16" 30" INLET

1256.13 INV.

S=0.0230

S=0.0231

H.G.L.

1234.85 INV.

S=0.0258

1240.40 INV. LINE "A14" 36" INLET

1239.88 INV.

1240.00 INV.

EXISTING GRADE AT CL PIPE

1251.45 INV.

1251.56 INV.

1253.90 INV.

1254.05 INV.

91+94.98 ~ BC 1253.70 INV.

92+58.74 ~ PRC 1255.17 INV.

MAX. OF OVEREXCAVATION**

85+97.67

86+02.33

90+97.67

91+02.33

91+03.68

92+10.21

INST 197.67 L.F. 96" RUBBER GASKET RCP (2950-D)
ADDITIONAL 1.0" OF CONC. OVER INVERT STEEL

INST 495.34 L.F. 102" RUBBER GASKET RCP (2950-D)
ADDITIONAL 1.0" OF CONC. OVER INVERT STEEL

INST 101.35 L.F. 102" RUBBER GASKET RCP (2850-D)
ADDITIONAL 0.5" OF CONCRETE OVER INVERT STEEL

INST 89.79 L.F. 102" RUBBER GASKET RCP (2850-D)
ADDITIONAL 0.5" OF CONCRETE OVER INVERT STEEL

** IF FINAL OVEREXCAVATION TRANSITION FALLS WITHIN PIPE RUBBER GASKET JOINTS WILL BE REQUIRED PROVIDE RUBBER GASKET JOINTS ON EACH SIDE OF TRANSITION (3 JOINTS OR 24' MIN. EACH SIDE)

STORM DRAIN LINE "A"

84+00 85+00 86+00 87+00 88+00 89+00 90+00 91+00 92+00 93+00

SEE SHEET 4
MATCHLINE STA 84+00.00

30 88+63.68 LINE "A" =10+00.00 LAT. "A.15" A=76°; B=24" D=102" SEE PROFILE SH. 32

29 85+17.81 LINE "A" =10+00.00 LAT. "A.14"

20 92+00.02 LINE "A" =10+00.00 LAT. "A.16"

PROP. 36" WQ

PROP. 30" WQ

SEE DETAIL "A" HEREON

PROP. 10" SS LINE

PROJECT BOUNDARY

25' WIDE EASEMENT TO LACFCD FOR COVERED STORM DRAIN APPURTENANT STRUCTURES, INGRESS AND EGRESS PURPOSES

91+94.99 BC

92+58.74 PRC

LOT LINE

MATCHLINE STA 93+00.00
SEE SHEET 6

2 INSTALL 24" R.C.P. (SEE PROFILE FOR D-LOAD)
3 INSTALL 30" R.C.P. (SEE PROFILE FOR D-LOAD)
9 INSTALL 96" R.C.P. (SEE PROFILE FOR D-LOAD)
17 CONST. M.H. PER S.P.P.W.C. STD. PLAN NO. 320-2
17a CONSTRUCT MODIFIED M.H. PER S.P.P.W.C. STD. PLAN 320-2, PER DETAILS ON SHEETS 36 AND 37
26 CONSTRUCT T.S. PER S.P.P.W.C. STD. PLAN 340-2
29 CONSTRUCT J.S. PER S.P.P.W.C. STD. PLAN 331-3
30 CONSTRUCT J.S. PER S.P.P.W.C. STD. PLAN 332-2
34 CONSTRUCT 3" ASPHALT CONCRETE OVER 4" CRUSHED MISCELLANEOUS BASE PER DETAIL ON SHEET 22 (WIDTH PER PLAN)
68 INSTALL 102" R.C.P. (SEE PROFILE FOR D-LOAD)
90 CONSTRUCT BRICK AND MORTAR PLUG

SD LINE "A" LINE TABLE		
LINE	LENGTH	BEARING
L1	794.98'	S07°18'15"E
L2	37.83'	S37°18'15"E
L3	22.49'	S82°52'01"W
L4	11.24'	N30°55'18"W

LINE "A" CURVE TABLE				
	DELTA	RADIUS	LENGTH	TANGENT
A	81°10'35"	45.00'	63.76'	38.55'
B	05°25'22"	436.00'	41.26'	20.65'
C	10°37'28"	22.50'	4.17'	2.09'
D	53°43'22"	22.50'	21.10'	11.40'

5' WIDE PEDESTRIAN ACCESS TO MH (TYP.)

DETAIL "A"
N.T.S

GRAPHIC SCALE: 1" = 40'

REVIEWED LAND DEVELOPMENT DIVISION
BY STORM DRAIN SECTION 10/04/2018 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	REVISED TOTAL SHEET NUMBER. REVISE HYDRAULIC ELEMENTS			8/14/19
3	ADDED CONSTRUCTION NOTE AND LABELS			3/15/2021

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
8/29/18 DATE

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-KUEN IP No. 2522 Exp. 2-29-20 GEOTECHNICAL STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRICE No. 1205 STATE OF CALIFORNIA

Dwg No. 43-F553.1-38

STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

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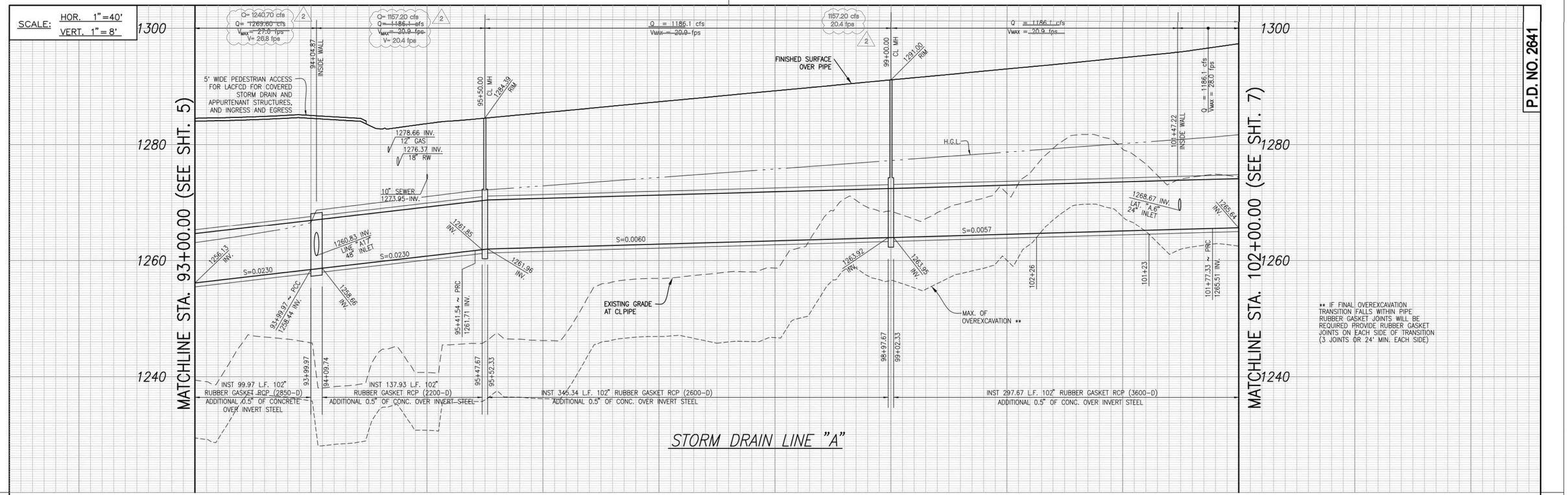
DWG | SHEET 5 OF 37 39

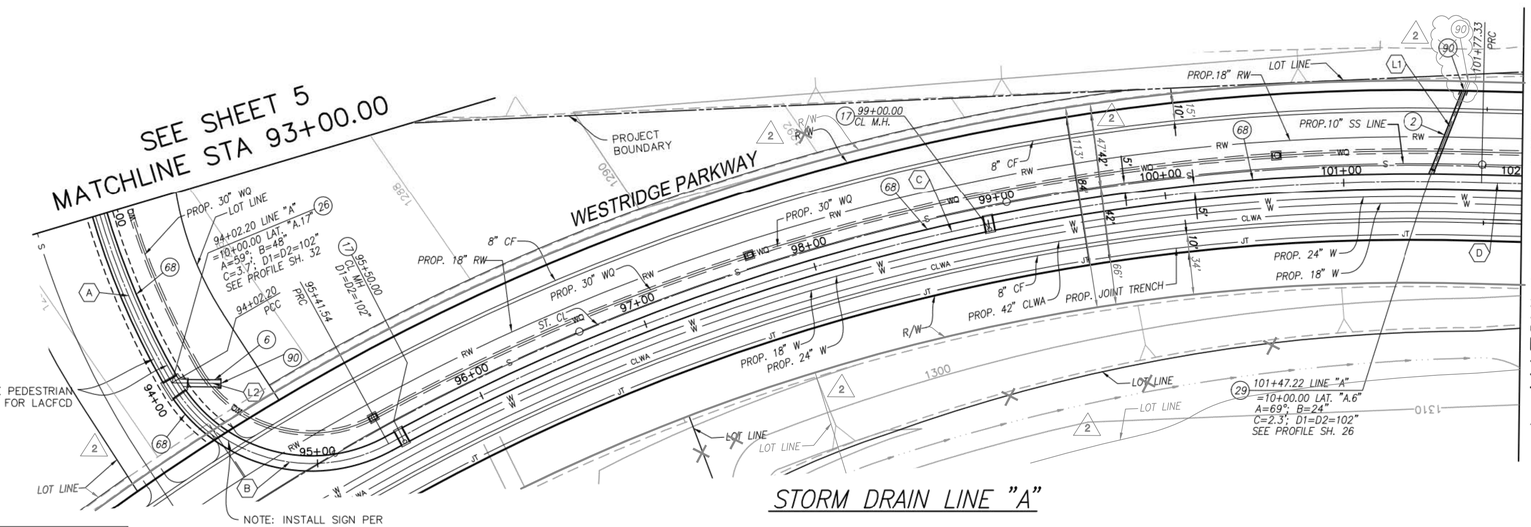
G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2641\WM108C-05_SD_Plan.dwg Plotted on Jul 06, 2018-3:46pm by wallani

SCALE: HOR. 1"=40'
VERT. 1"=8'

P.D. NO. 2641



** IF FINAL OVEREXCAVATION TRANSITION FALLS WITHIN PIPE RUBBER GASKET JOINTS WILL BE REQUIRED. PROVIDE RUBBER GASKET JOINTS ON EACH SIDE OF TRANSITION (3 JOINTS OR 24" MIN. EACH SIDE)



CONSTRUCTION NOTES

(2) INSTALL 24" R.C.P. (SEE PROFILE FOR D-LOAD)
(6) INSTALL 48" R.C.P. (SEE PROFILE FOR D-LOAD)
(17) CONST. M.H. PER S.P.P.W.C. STD. PLAN NO. 320-2
(26) CONSTRUCT T.S. PER S.P.P.W.C. STD. PLAN 340-2
(29) CONSTRUCT J.S. PER S.P.P.W.C. STD. PLAN 331-3
(68) INSTALL 102" R.C.P. (SEE PROFILE FOR D-LOAD)
(90) CONSTRUCT BRICK AND MORTAR PLUG

SD LINE "A" LINE TABLE		
LINE	LENGTH	BEARING
(L1)	~~54.56'~~ 59.89'	S73°25'35"E
(L2)	27.45'	N04°17'30"W

LINE "A" CURVE TABLE				
	DELTA	RADIUS	LENGTH	TANGENT
(A)	13°25'45"	436.00'	102.20'	51.33'
(B)	88°42'27"	90.00'	139.34'	87.99'
(C)	30°29'02"	1195.00'	635.79'	325.61'
(D)	01°04'41"	1205.00'	22.67'	11.34'

GRAPHIC SCALE: 1" = 40'

REVIEWED LAND DEVELOPMENT DIVISION
BY Ken Ng 10/04/2018
STORM DRAIN SECTION DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	REVISED TOTAL SHEET NUMBER. REVISE HYDRAULIC ELEMENTS	Jason H Fukumitsu		8/14/19
	REVISE AND ADD LATERALS/MAINLINE REVISED "00" PRIVATE DRIVE			

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
JASON H. FUKUMITSU 8/29/18 DATE

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-KUEN LO No. 2522 Exp. 6-30-20 GEOTECHNICAL STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRICE No. 1705 STATE OF CALIFORNIA

Dwg No. 43-F553.1-38

STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
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DWG | SHEET 6 OF 37 39

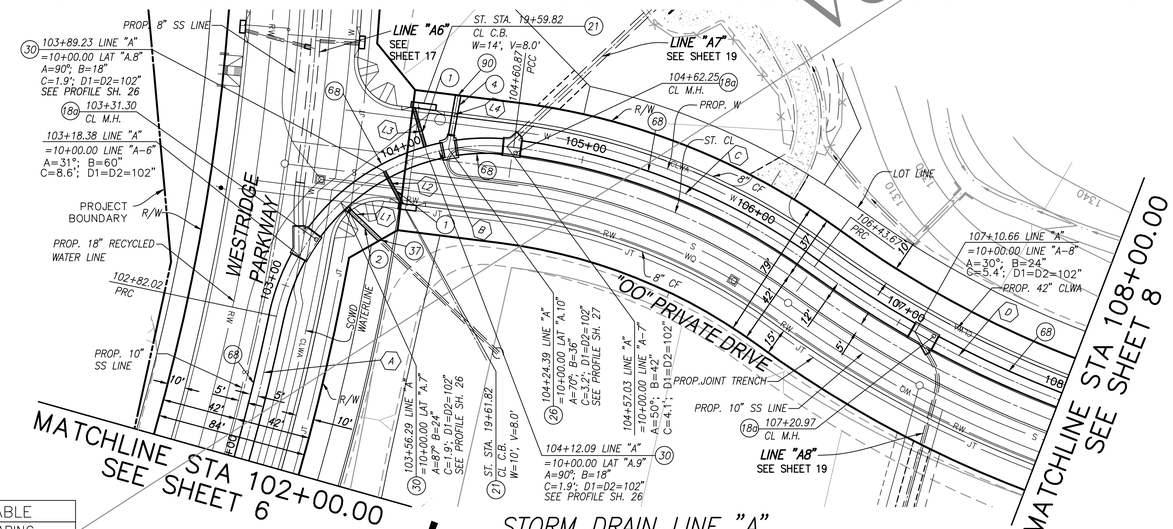
C:\Meetsall Ranch\61105 Mission Village\61105-01\Storm\Prj 2641\MM\080-06_SD_Plan.dwg Plotted on Jun 25, 2018 - 2:16pm by jonga

SCALE: HOR. 1"=40'
VERT. 1"=8'

P.D. NO. 2641



** IF FINAL OVEREXCAVATION TRANSITION FALLS WITHIN PIPE RUBBER GASKET JOINTS WILL BE REQUIRED PROVIDE RUBBER GASKET JOINTS ON EACH SIDE OF TRANSITION (3 JOINTS OR 24" MIN. EACH SIDE)



CONSTRUCTION NOTES

(1) INSTALL 18" R.C.P. (SEE PROFILE FOR D-LOAD)
(2) INSTALL 24" R.C.P. (SEE PROFILE FOR D-LOAD)
(4) INSTALL 36" R.C.P. (SEE PROFILE FOR D-LOAD)
(18a) CONSTRUCT MODIFIED M.H. PER S.P.P.W.C. STD. PLAN NO. 322-2, PER DETAILS ON SHEETS 36 AND 37
(21) CONSTRUCT CURB OPENING CATCH BASIN PER S.P.P.W.C. STD. PLAN NO. 300-3
(26) CONSTRUCT T.S. PER S.P.P.W.C. STD. PLAN 340-2
(30) CONSTRUCT J.S. PER S.P.P.W.C. STD. PLAN 332-2
(37) CONSTRUCT CLEANOUT PER DETAIL 37 ON SHEET 25
(38) CONSTRUCT MANHOLE SAFETY LEDGE PER S.P.P.W.C STD PLAN 330-2
(68) INSTALL 102" R.C.P. (SEE PROFILE FOR D-LOAD)
(90) CONSTRUCT BRICK AND MORTAR PLUG

SD LINE "A" LINE TABLE		
LINE	LENGTH	BEARING
L1	30.29'	S66°12'58"E
L2	20.42'	S48°25'21"E
L3	26.90'	S36°04'37"E
L4	30.50'	S09°57'26"E

LINE "A" CURVE TABLE				
	DELTA	RADIUS	LENGTH	TANGENT
A	03°53'58"	1205.00'	82.02'	41.02'
B	85°23'39"	120.00'	178.85'	110.72'
C	28°56'02"	362.00'	182.80'	93.40'
D	15°14'01"	588.00'	156.33'	78.63'

GRAPHIC SCALE: 1" = 40'

REVIEWED LAND DEVELOPMENT DIVISION
BY STORM DRAIN SECTION 10/04/2018 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	VOIDED SHEET AND REPLACED WITH NEW SHEET			8/14/19

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
8/29/18 DATE

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-KUEN IP No. 25522 Exp. 6-30-20 GEOTECHNICAL STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRIOE No. 1705 STATE OF CALIFORNIA

Dwg No. 43-F553.1-38

STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

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DWG | SHEET 7 OF 37

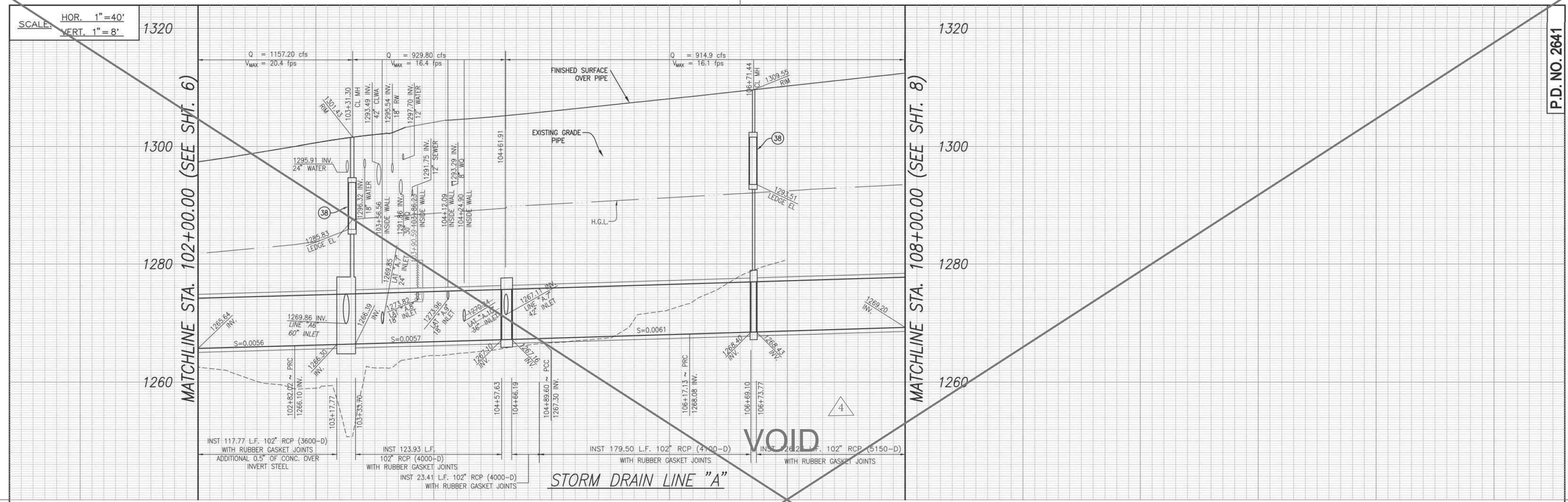
G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2641\HMVDBO-07_SD_Plan.dwg Plotted on Jun 25, 2018-5:38pm by jpinga

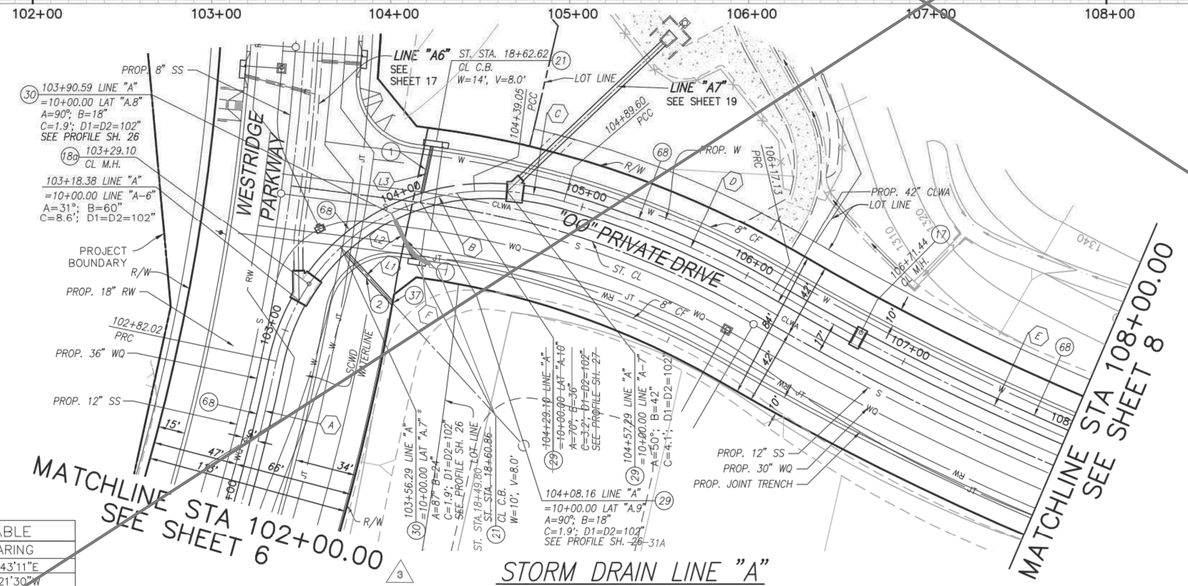
VOID

SCALE: HOR. 1"=40'
VERT. 1"=8'

P.D. NO. 2641

FOR PLAN CHECK ONLY





CONSTRUCTION NOTES

1. INSTALL 18" R.C.P. (SEE PROFILE FOR D-LOAD)
2. INSTALL 24" R.C.P. (SEE PROFILE FOR D-LOAD)
4. INSTALL 36" R.C.P. (SEE PROFILE FOR D-LOAD)
17. CONSTRUCT M.H. PER S.P.P.W.C. STD. PLAN NO. 320-2
18. CONSTRUCT MODIFIED M.H. PER S.P.P.W.C. STD. PLAN NO. 322-2, PER DETAILS ON SHEETS 36 AND 37
21. CONSTRUCT CURB OPENING CATCH BASIN PER S.P.P.W.C. STD. PLAN NO. 300-3 MODIFIED CATCH BASIN PER DETAIL ON SHEET 38 AND 39
29. CONSTRUCT J.S. PER S.P.P.W.C. STD. PLAN 331-3
30. CONSTRUCT J.S. PER S.P.P.W.C. STD. PLAN 332-2
37. CONSTRUCT CLEANOUT PER DETAIL 37 ON SHEET 25
38. CONSTRUCT MANHOLE SAFETY LEDGE PER S.P.P.W.C STD PLAN 330-2
68. INSTALL 102" R.C.P. (SEE PROFILE FOR D-LOAD)
90. CONSTRUCT BRICK AND MORTAR PLUG

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER ANDREW A. PRIDE No. 1705 CERTIFIED ENGINEERING GEOLOGIST STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-KUEN LEE No. 2522 Exp. 6-30-20 GEOTECHNICAL STATE OF CALIFORNIA

SD LINE "A" LINE TABLE		
LINE	LENGTH	BEARING
L1	42.55'	S62°43'11"E
L2	~~28.82'~~ 19.01'	S46°21'30"W
L3	31.40'	S07°57'12"W

LINE "A" CURVE TABLE				
	DELTA	RADIUS	LENGTH	TANGENT
A	03°53'47"	1205.00'	81.95'	40.99
B	74°58'41"	120.00'	157.03'	92.04'
C	19°18'25"	150.00'	50.55'	25.51'
D	14°08'00"	517.00'	127.53'	64.09'
E	07°03'55"	1483.00'	182.87'	91.55'
F	44°44'47"	22.50'	17.57'	9.26'

REVIEWED LAND DEVELOPMENT DIVISION
BY _____ 8/14/19
STORM DRAIN SECTION DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	VOIDED SHEET 7 AND REPLACED WITH SHEET 7A.	Jason H. Fukumitsu		8/14/19
3	RELOCATE CATCH BASIN PER REVISED STREET PLAN, ADD MAINTENANCE RESPONSIBILITY	Jason H. Fukumitsu	M.D. Esgaard	3/15/2021
4	VOID SHEET 7A AND REPLACED WITH SHEET 7B	Jason H. Fukumitsu	M.D. Esgaard	9/28/2021

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
Jason H. Fukumitsu 5/14/2019
JASON H. FUKUMITSU DATE

STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

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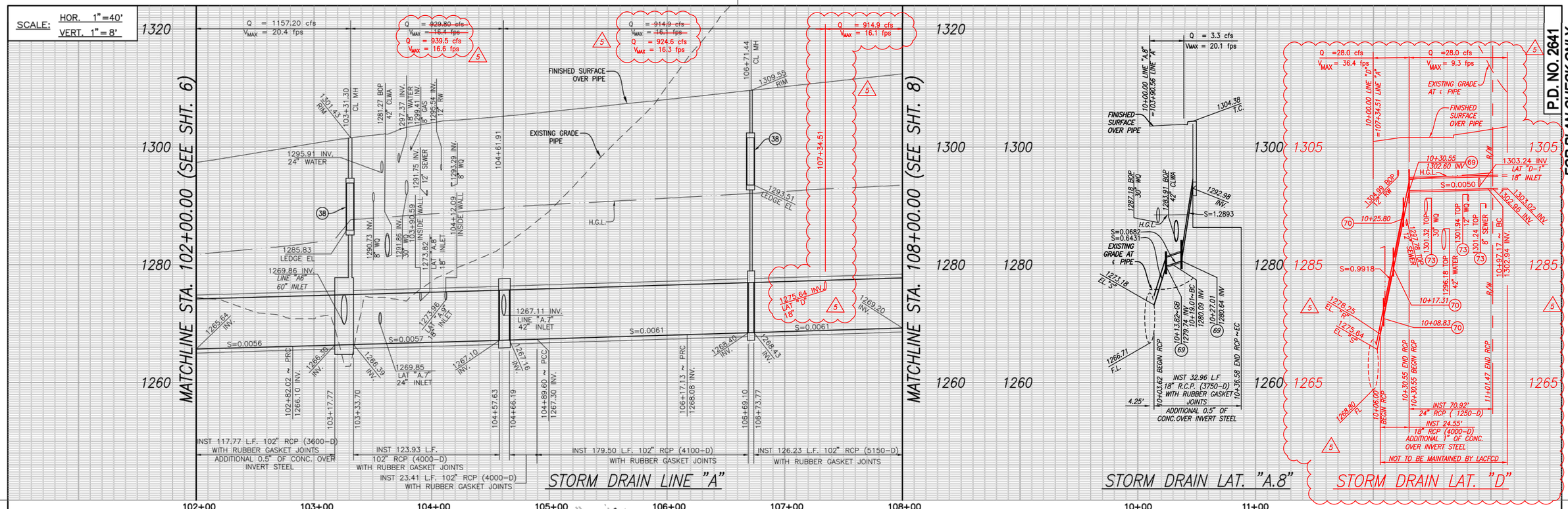
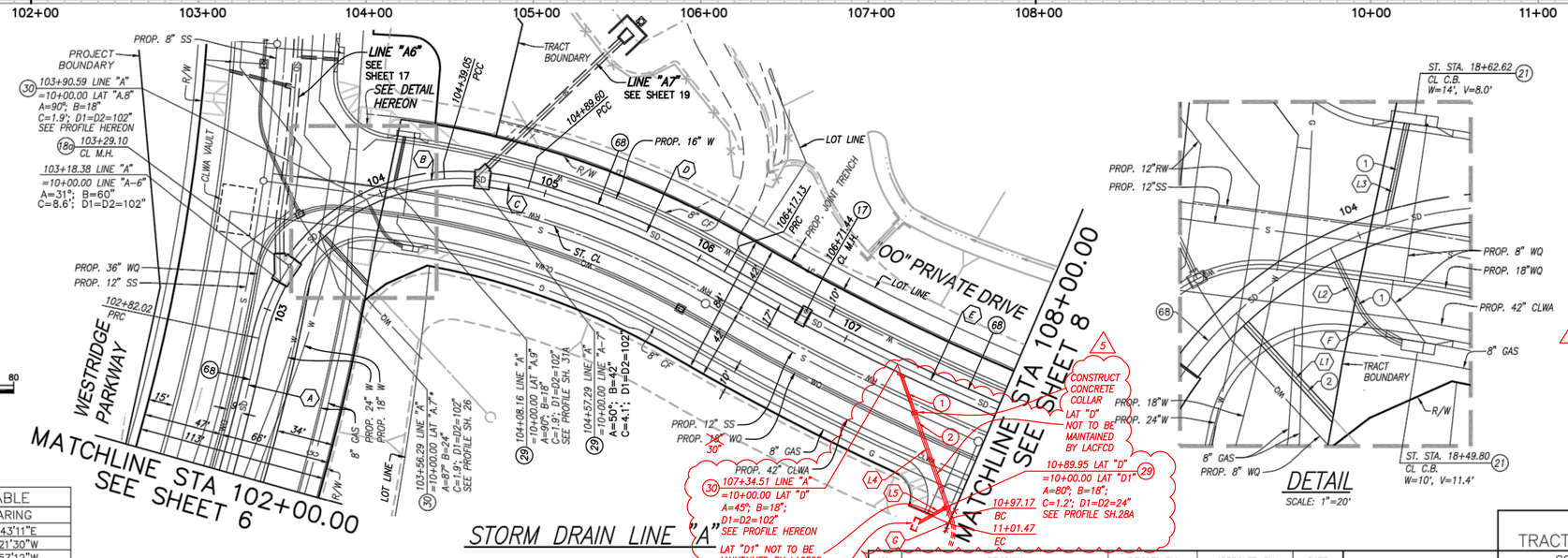
DWG | SHEET 7A OF 39

Dwg No. 43-F553.1-38

G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2641\MM1080-07_SD_Plan-REV 00 STREET.dwg Plotted on May 13, 2019--1:19pm by heidye

SCALE: HOR. 1"=40'
VERT. 1"=8'





SD LINE "A" LINE TABLE		
LINE	LENGTH	BEARING
L1	42.55'	S62°43'11"E
L2	19.01'	S46°21'30"W
L3	31.40'	S07°57'12"W

LINE "A" CURVE TABLE				
	DELTA	RADIUS	LENGTH	TANGENT
A	03°53'47"	1205.00'	81.95'	40.99
B	74°58'41"	120.00'	157.03'	92.04'
C	19°18'25"	150.00'	50.55'	25.51'
D	14°08'00"	517.00'	127.53'	64.09'
E	07°03'55"	1483.00'	182.87'	91.55'
F	44°44'47"	22.50'	17.57'	9.26'

SD LINE "A" LINE TABLE		
LINE	LENGTH	BEARING
L4	97.17'	S39°17'52"E
L5	19.26'	N40°42'08"E

LINE "A" CURVE TABLE				
	DELTA	RADIUS	LENGTH	TANGENT
6	10°56'06"	22.50'	4.29'	2.15'

CONSTRUCTION NOTES

1. INSTALL 18" R.C.P. (SEE PROFILE FOR D-LOAD)
2. INSTALL 24" R.C.P. (SEE PROFILE FOR D-LOAD)
17. CONSTRUCT M.H. PER S.P.P.W.C. STD. PLAN NO. 320-2
18. CONSTRUCT MODIFIED M.H. PER S.P.P.W.C. STD. PLAN NO. 322-2, PER DETAILS ON SHEETS 36 AND 37
21. CONSTRUCT CURB OPENING CATCH BASIN PER S.P.P.W.C. STD. PLAN NO. 300-3 MODIFIED CATCH BASIN PER DETAIL ON SHEET 38 AND 39
29. CONSTRUCT J.S. PER S.P.P.W.C. STD. PLAN 331-3
30. CONSTRUCT J.S. PER S.P.P.W.C. STD. PLAN 332-2
38. CONSTRUCT MANHOLE SAFETY LEDGE PER S.P.P.W.C STD PLAN 330-2
68. INSTALL 102" R.C.P. (SEE PROFILE FOR D-LOAD)
69. CONSTRUCT CONCRETE COLLAR PER S.P.P.W.C. STD. PLAN 380-4
5 — 70. CONSTRUCT PIPE ANCHOR AND BACKFILL STABILIZER PER S.P.P.W.C. STD. PLAN 221-2
5 — 73. CONSTRUCT CONCRETE BLANKET PER S.P.P.W.C. 225-2

REVIEWED LAND DEVELOPMENT DIVISION
BY _____ STORM DRAIN SECTION DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
4	VOIDED SHEET 7A AND REPLACED WITH SHEET 7B AND ADDED LAT A.8 AND CROSSING LOCATIONS WERE			9/28/2021
5	MODIFIED. ADDED LAT D, LAT D1, PROFILE FOR LAT D, CHANGED HYDRAULICS FOR LINE A			01/18/2022

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
8/16/21
JASON H. FUKUMITSU DATE

STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

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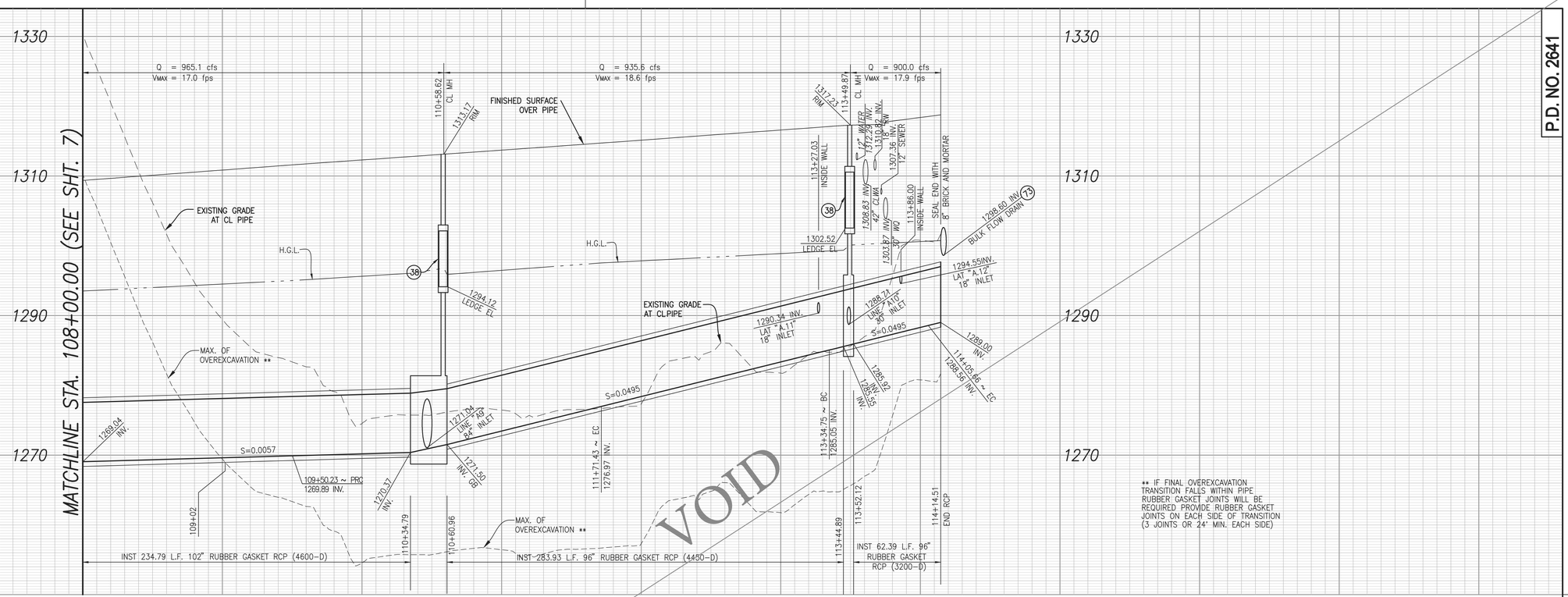
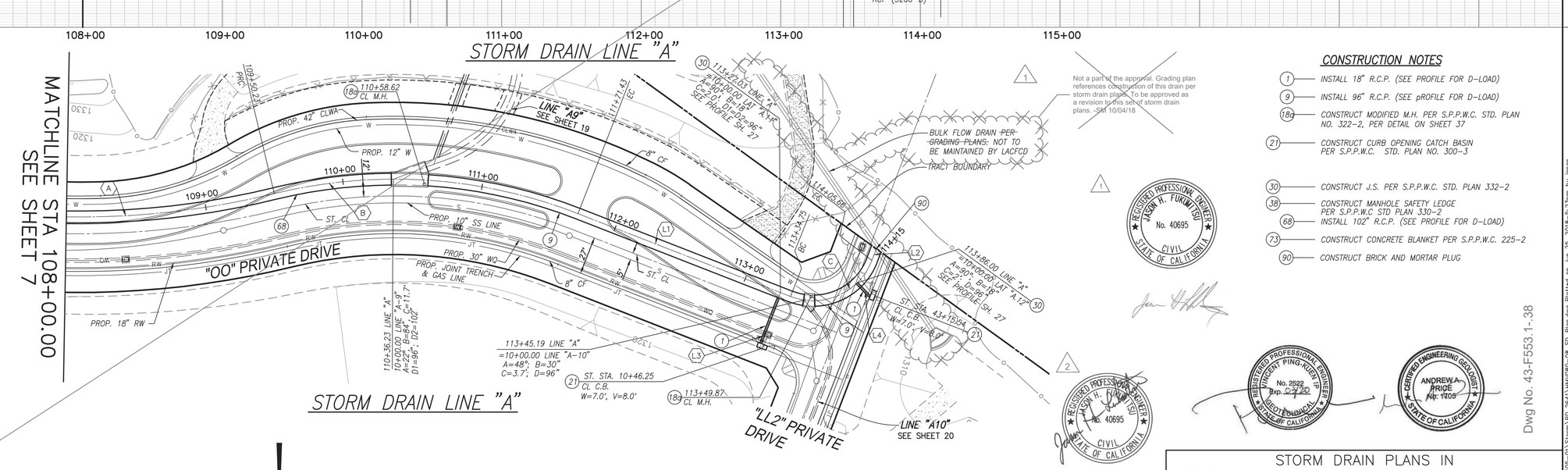
DWG | SHEET 7B OF 39

G:\Vikenhall Ranch\61105 Mission Village\61105-01\Storm\PD 2641\HAK\D85-07_SD_Plan-REV 00 STREET_REV 4.dwg Plotted on Aug 03, 2021-@-2:25pm by sjjhw

SCALE: HOR. 1"=40'
VERT. 1"=8'

P.D. NO. 2641





CONSTRUCTION NOTES

1. INSTALL 18" R.C.P. (SEE PROFILE FOR D-LOAD)
9. INSTALL 96" R.C.P. (SEE pROFILE FOR D-LOAD)
18a. CONSTRUCT MODIFIED M.H. PER S.P.P.W.C. STD. PLAN NO. 322-2, PER DETAIL ON SHEET 37
21. CONSTRUCT CURB OPENING CATCH BASIN PER S.P.P.W.C. STD. PLAN NO. 300-3
30. CONSTRUCT J.S. PER S.P.P.W.C. STD. PLAN 332-2
38. CONSTRUCT MANHOLE SAFETY LEDGE PER S.P.P.W.C STD PLAN 330-2
68. INSTALL 102" R.C.P. (SEE PROFILE FOR D-LOAD)
73. CONSTRUCT CONCRETE BLANKET PER S.P.P.W.C. 225-2
90. CONSTRUCT BRICK AND MORTAR PLUG

SD LINE "A" LINE TABLE		
LINE	LENGTH	BEARING
L1	163.32'	N68°42'54"W
L2	8.85'	S20°59'58"W
L3	39.00'	S21°17'06"W
L4	13.47'	S43°58'21"E

LINE "A" CURVE TABLE			
DELTA	RADIUS	LENGTH	TANGENT
A 14°38'17"	588.00'	150.23'	75.52'
B 35°00'35"	362.00'	221.20'	114.17'
C 90°17'07"	45.00'	70.91'	45.22'

N

40 20 0 40 80

GRAPHIC SCALE: 1" = 40'

REVIEWED LAND DEVELOPMENT DIVISION
BY Pete Mig STORM DRAIN SECTION 10/04/2018 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
1	REMOVE CONDITION; BULK FLOW DRAIN WILL BE CONSTRUCTED AS PART OF ROUGH GRADING PLAN			11/7/18
2	VOIDED SHEET AND REPLACED WITH NEW SHEET			8/14/19

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
8/29/18 JASON H. FUKUMITSU DATE

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-KUEN LI No. 2592 Exp. 6-30-20 GEOTECHNICAL STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRIDE No. 1205 STATE OF CALIFORNIA

Dwg No. 43-F553.1-38

STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

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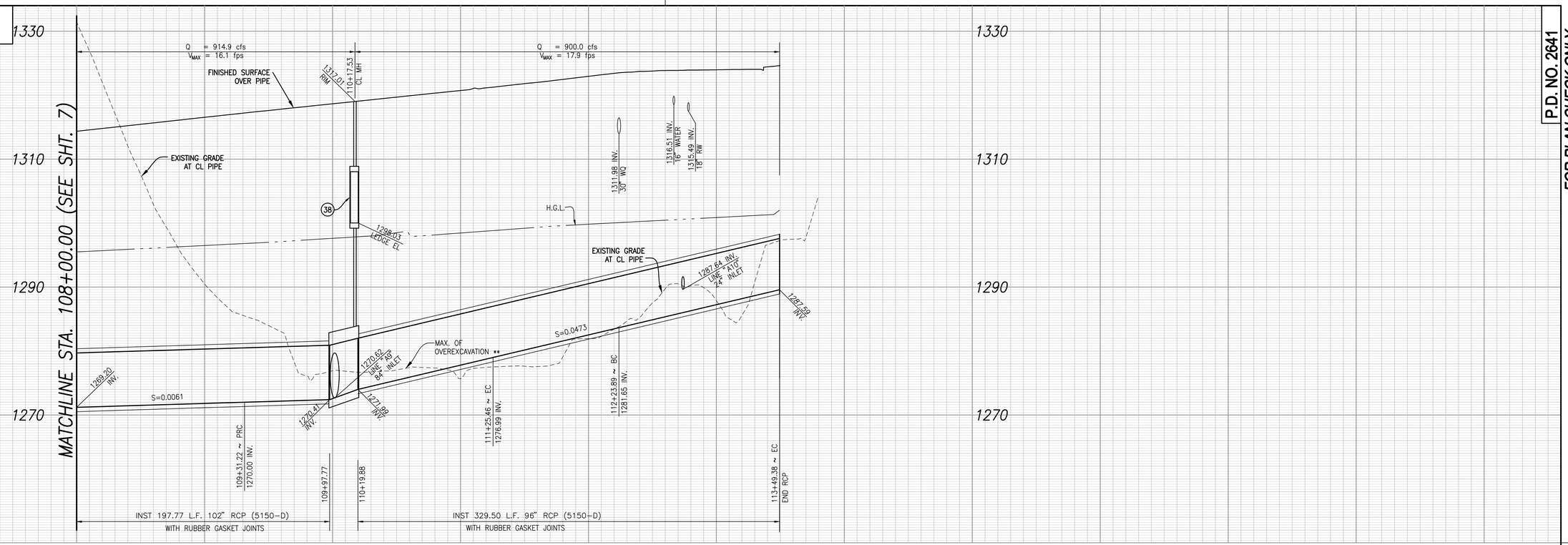
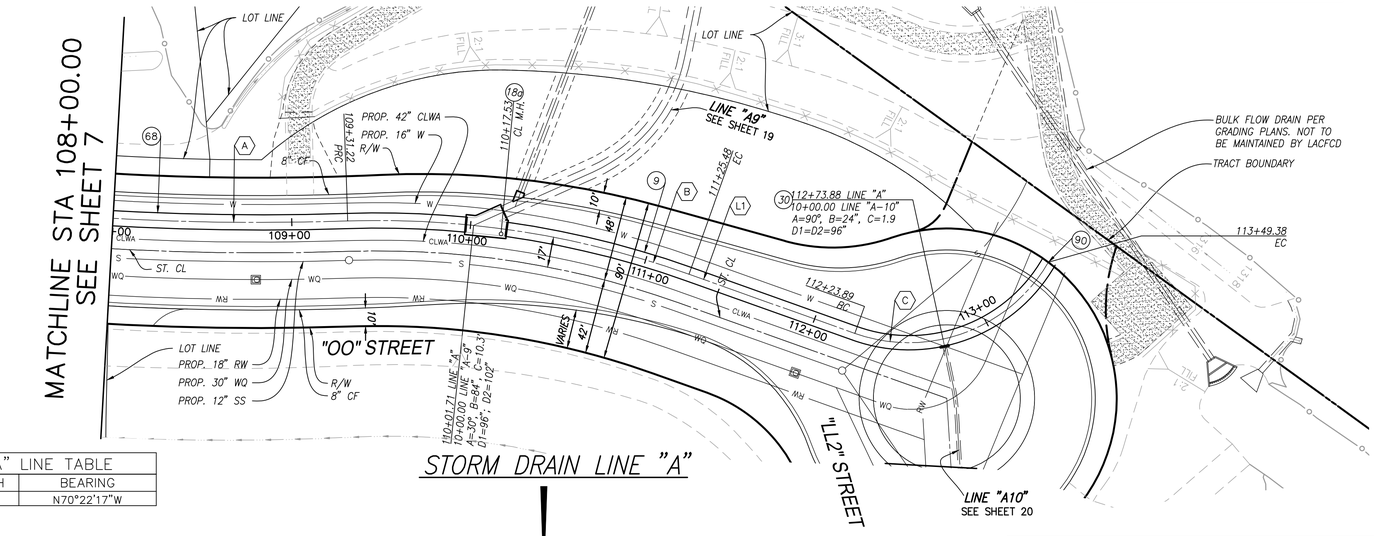
DWG | SHEET 8 OF 37

G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2641\NM1080-08_SD_Plan.dwg Plotted on Jun 25, 2018-5:23pm by jongs

SCALE: HOR. 1"=40'
VERT. 1"=8'



STORM DRAIN LINE "A"



STORM DRAIN LINE "A"

SD LINE "A" LINE TABLE		
LINE	LENGTH	BEARING
(L)	98.42'	N70°22'17"W

LINE "A" CURVE TABLE			
DELTA	RADIUS	LENGTH	TANGENT
(A) 05°04'011"	1483.00'	131.21'	65.65'
(B) 21°31'35"	517.00'	194.24'	98.28'
(C) 79°53'16"	90.00'	125.49'	75.37'

N

40 20 0 40 80

GRAPHIC SCALE: 1" = 40'

REVIEWED LAND DEVELOPMENT DIVISION
BY _____ 8/14/19
STORM DRAIN SECTION DATE

CONSTRUCTION NOTES

(9) INSTALL 96" R.C.P. (SEE PROFILE FOR D-LOAD)
(18a) CONSTRUCT MODIFIED M.H. PER S.P.P.W.C. STD. PLAN NO. 322-2, PER DETAIL ON SHEET 37
(30) CONSTRUCT J.S. PER S.P.P.W.C. STD. PLAN 332-2
(38) CONSTRUCT MANHOLE SAFETY LEDGE PER S.P.P.W.C STD PLAN 330-2
(68) INSTALL 102" R.C.P. (SEE PROFILE FOR D-LOAD)
(73) CONSTRUCT CONCRETE BLANKET PER S.P.P.W.C. 225-2
(90) CONSTRUCT BRICK AND MORTAR PLUG

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	VOIDED SHEET 8 AND REPLACED WITH 8A	Jason H. Fukumitsu		8/14/19

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
5/14/2019
JASON H. FUKUMITSU DATE

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRICE No. 1709 STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-KUEN LEE No. 2522 Exp. 6-30-20 GEOTECHNICAL STATE OF CALIFORNIA

STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
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DWG | SHEET 8A OF 39

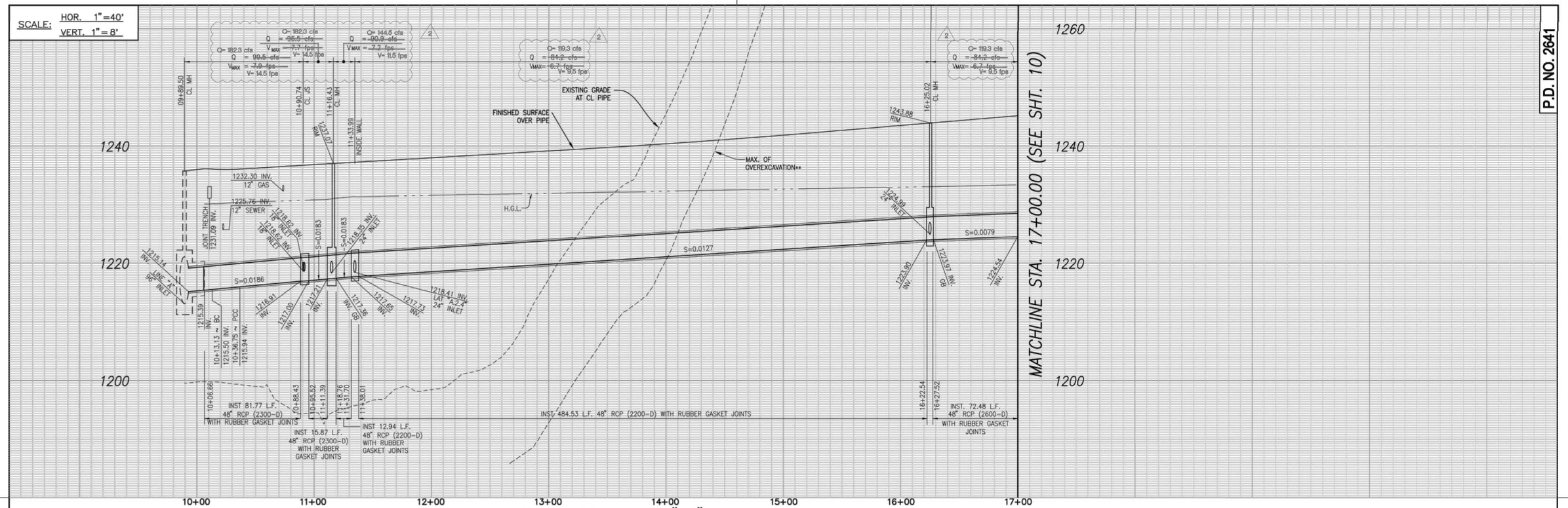
P.D. NO. 2641
FOR PLAN CHECK ONLY

Dwg No. 43-F553.1-38

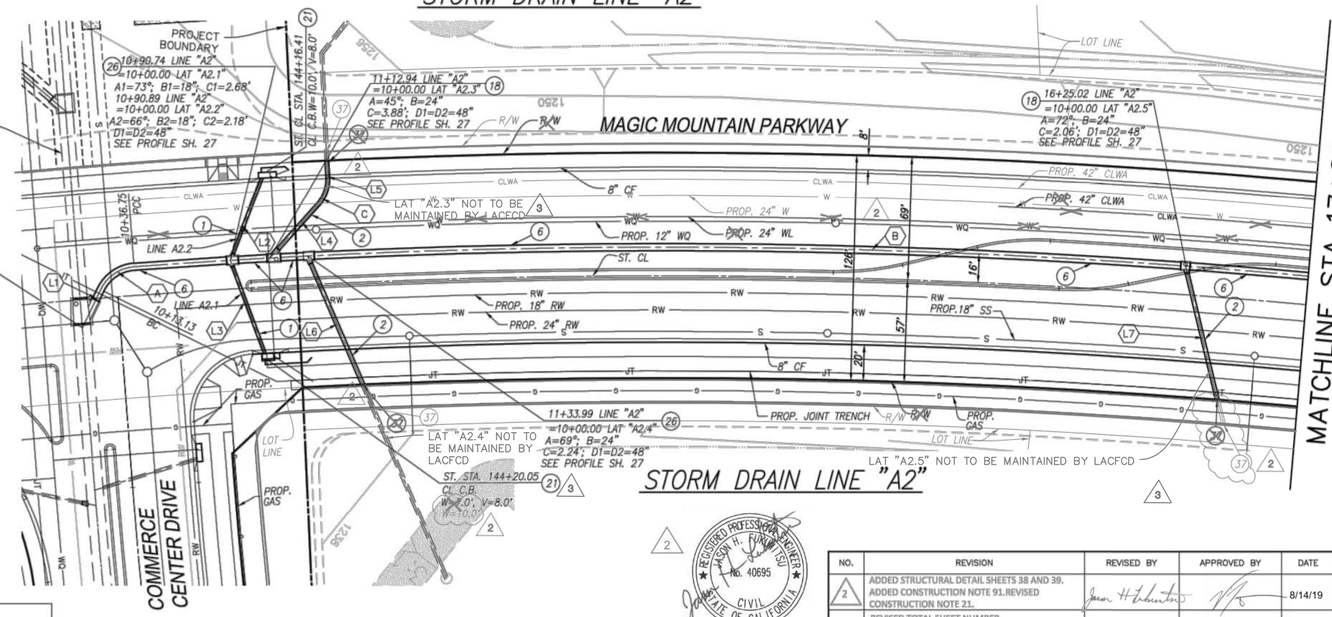
G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2641\MM1080-08_SD_Plan-REV 00 STREET.dwg Plotted on May 13, 2019 - 3:31pm by wallani

SCALE: HOR. 1"=40'
VERT. 1"=8'

P.D. NO. 2641



STORM DRAIN LINE "A2"



STORM DRAIN LINE "A2"

SD LINE "A2" LINE TABLE		
LINE	LENGTH	BEARING
(L1)	23.63'	S20°36'56"W
(L2)	49.26'	N15°41'41"E
(L3)	55.45'	N25°23'42"W
(L4)	39.62'	N07°39'50"W
(L5)	~~9.14'~~ 14.14'	N36°56'48"E
(L6)	~~78.03'~~ 93.02'	S28°20'25"E
(L7)	~~76.64'~~ 91.36'	N18°24'25"W

LINE "A2" CURVE TABLE				
	DELTA	RADIUS	LENGTH	TANGENT
(A)	60°08'39"	22.50'	23.62'	13.03'
(B)	09°27'45"	4016.00'	663.25'	332.38'
(C)	44°36'38"	22.50'	17.52'	9.23'

REVIEWED LAND DEVELOPMENT DIVISION
BY _____ STORM DRAIN SECTION
10/04/2018 DATE

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	ADDED STRUCTURAL DETAIL SHEETS 38 AND 39. ADDED CONSTRUCTION NOTE 91.REVISED CONSTRUCTION NOTE 21.			8/14/19
	REVISED TOTAL SHEET NUMBER. REVISE HYDRAULIC ELEMENTS REVISE AND ADD LATERALS/MAINLINE			
3	REVISED "00" PRIVATE DRIVE ADDED MAINTENANCE RESPONSIBILITY NOTE		MD.	3/15/2021

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
8/29/18
JASON H. FUKUMITSU DATE

CONSTRUCTION NOTES
CONSTRUCTION NOTES

1. INSTALL 18" R.C.P (SEE PROFILE FOR D- LOAD)
2. INSTALL 24" R.C.P (SEE PROFILE FOR D- LOAD)
6. INSTALL 48" R.C.P. (SEE PROFILE FOR D-LOAD)
18. CONSTRUCT M.H. PER S.P.P.W.C.. STD. PLAN 322-2
21. CONSTRUCT CURB OPENING CATCH BASIN PER S.P.P.W.C. STD. PLAN NO. 300-3 MODIFIED CATCH BASIN PER DETAIL ON SHEET 38 AND SHEET 39
26. CONSTRUCT T.S. PER S.P.P.W.C. STD. PLAN 340-2
37. CONSTRUCT CLEANOUT PER DETAIL 37 ON SHEET 25

N

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

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-XUEN IP No. 2622 Exp. 3/31/20 GEOTECHNICAL STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRICE No. 1709 STATE OF CALIFORNIA

Dwg No. 43-F553.1-38

STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

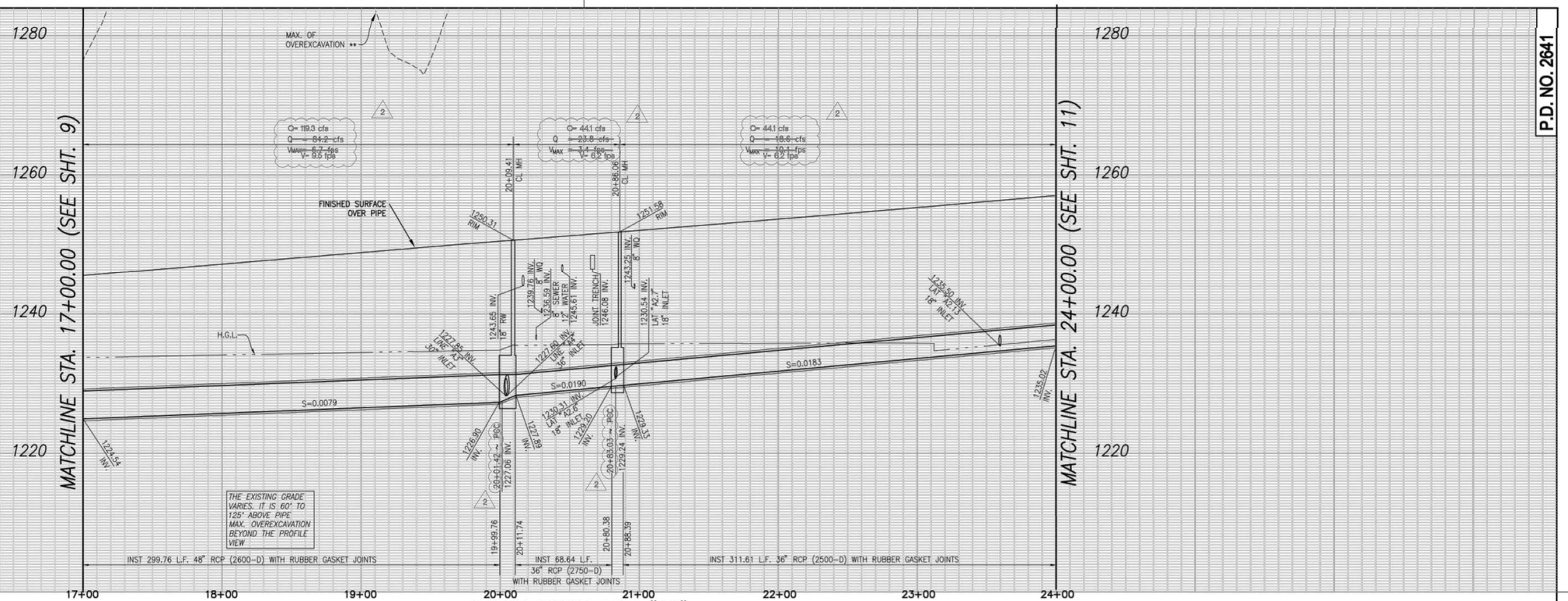
HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
26074 Avenue Hall, Suite 23 ▪ Valencia, CA 91355 ▪ PH: (661) 294-2211 ▪ FX: (661) 294-9890

DWG

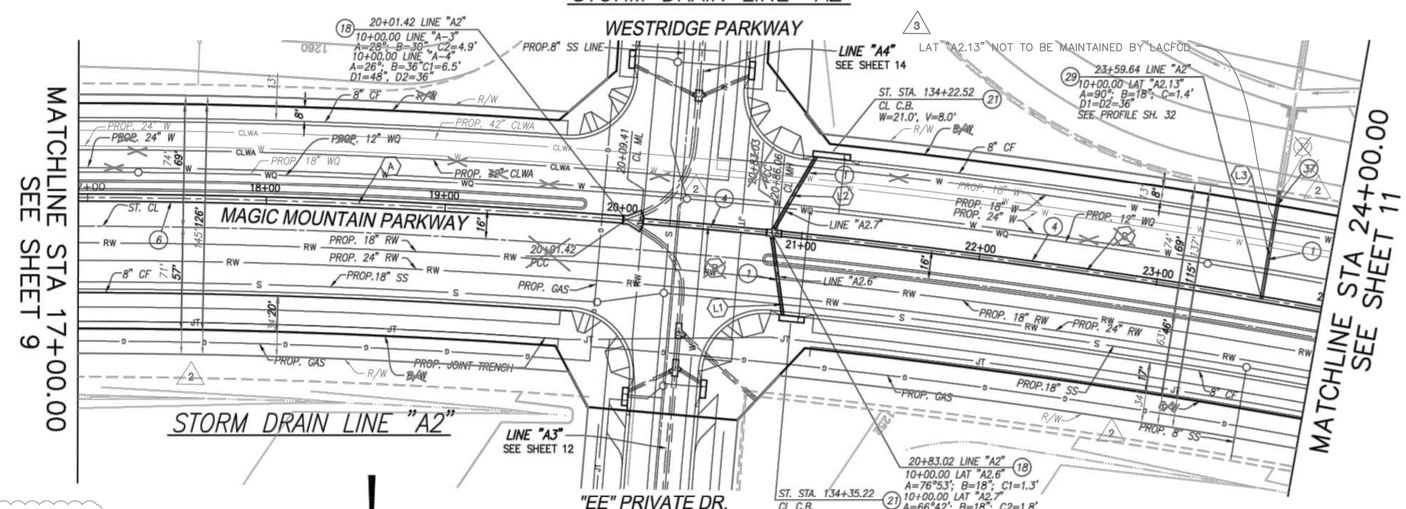
G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2641\WAN085--09_SD_Plan.dwg Plotted on Aug 27, 2018--10:00am by jsahuvoy

SCALE: HOR. 1"=40'
VERT. 1"=8'

P.D. NO. 2641



STORM DRAIN LINE "A2"



SD LINE "A2" LINE TABLE		
LINE	LENGTH	BEARING
L1	46.27'	N07°41'09"W
L2	49.39'	N30°09'34"E
L3	53.00'	N09°38'00"E

58.00'

09°59'13" 700.00' 350.89'

LINE "A2" CURVE TABLE				
	DELTA	RADIUS	LENGTH	TANGENT
A	04°18'01"	4016.00'	301.42'	150.78'
B	01°09'53"	4016.00'	81.64'	40.82'
C	04°31'18"	4016.00'	316.94'	158.55'

GRAPHIC SCALE: 1" = 40'

REVIEWED LAND DEVELOPMENT DIVISION
BY STORM DRAIN SECTION 10/04/2018 DATE

CONSTRUCTION NOTES

1. INSTALL 18" R.C.P. (SEE PROFILE FOR D-LOAD)
4. INSTALL 36" R.C.P. (SEE PROFILE FOR D-LOAD)
6. INSTALL 48" R.C.P. (SEE PROFILE FOR D-LOAD)
18. CONSTRUCT M.H. PER S.P.P.W.C. STD. PLAN 322-2
21. CONSTRUCT CURB OPENING CATCH BASIN PER S.P.P.W.C. STD. PLAN NO. 300-3 MODIFIED CATCH BASIN PER DETAIL ON SHEET 38 AND SHEET 39
29. CONSTRUCT J.S. PER S.P.P.W.C. STD. PLAN 331-3
37. CONSTRUCT CLEANOUT PER DETAIL 37 ON SHEET 25

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-KUEN IP No. 2522 Exp. 6-30-20 GEOTECHNICAL STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRICE No. 1209 STATE OF CALIFORNIA

Dwg No. 43-F553.1-38

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	ADDED STRUCTURAL DETAIL SHEETS 38 AND 39. ADDED CONSTRUCTION NOTE 91.REVISED CONSTRUCTION NOTE 21.			8/14/19
	REVISED TOTAL SHEET NUMBER. REVISE HYDRAULIC ELEMENTS REVISE AND ADD LATERALS/MAINLINE			
3	REVISED "00" PRIVATE DRIVE ADDED MAINTENANCE RESPONSIBILITY NOTE		MD.	3/15/2021

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
JASON H. FUKUMITSU DATE: 8/29/18

STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
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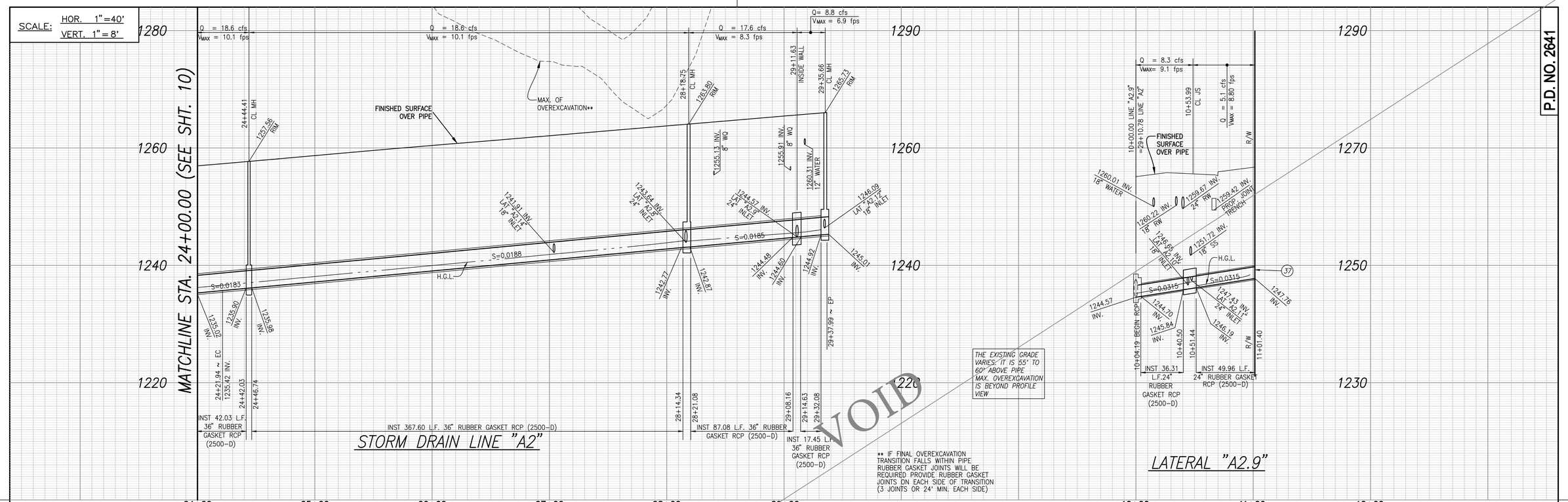
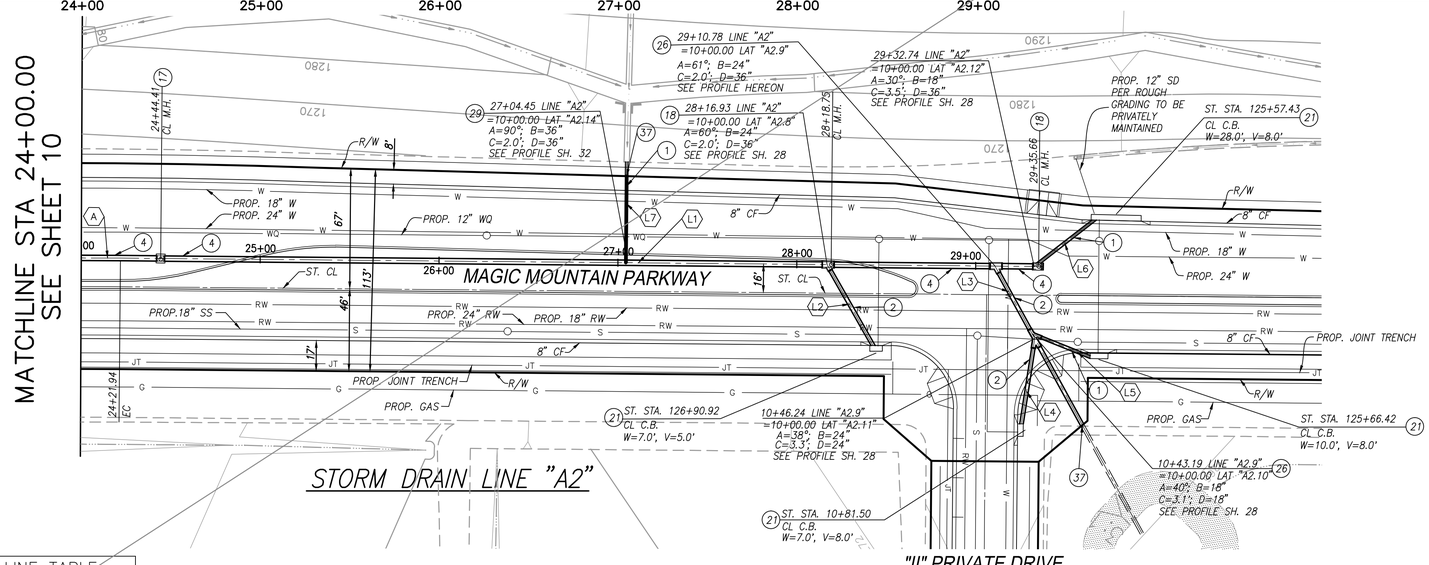
DWG

G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2641\MW080-10_SD_Plan.dwg Plotted on Aug 23, 2018--4:14pm by joshuay

SCALE: HOR. 1"=40'
VERT. 1"=8'

P.D. NO. 2641





CONSTRUCTION NOTES

1. INSTALL 18" R.C.P. (SEE PROFILE FOR D-LOAD)
2. INSTALL 24" R.C.P. (SEE PROFILE FOR D-LOAD)
4. INSTALL 36" R.C.P. (SEE PROFILE FOR D-LOAD)
17. CONST. M.H. PER S.P.P.W.C. STD. PLAN NO. 320-2
18. CONSTRUCT M.H. PER S.P.P.W.C.. STD. PLAN 322-2
21. CONSTRUCT CURB OPENING CATCH BASIN PER S.P.P.W.C. STD. PLAN NO. 300-3
26. CONSTRUCT T.S. PER S.P.P.W.C. STD. PLAN 340-2
29. CONSTRUCT J.S. PER S.P.P.W.C. STD. PLAN 331-3
37. CONSTRUCT CLEANOUT PER DETAIL 37 ON SHEET 25

Dwg No. 43-F553.1-38

GRAPHIC SCALE: 1" = 40'

SD LINE "A2" LINE TABLE		
LINE	LENGTH	BEARING
L1	515.61'	N79°28'41"W
L2	52.02'	S19°35'17"E
L3	101.40'	N18°47'19"E
L4	48.20'	N18°54'30"E
L5	34.85'	S58°15'41"E
L6	42.33'	N62°17'29"E
L7	48.34'	N10°31'19"E

LINE "A2" CURVE TABLE				
	DELTA	RADIUS	LENGTH	TANGENT
A	00°18'47"	4016'	21.94'	10.97'

REVIEWED LAND DEVELOPMENT DIVISION
BY STORM DRAIN SECTION 10/04/2018 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	VOIDED SHEET AND REPLACED WITH NEW SHEET			8/14/19

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
8/29/18
JASON H. FUKUMITSU DATE

REGISTERED PROFESSIONAL ENGINEER VINCENT PING KUBU TP No. 2522 Exp. 6/30 GEOTECHNICAL STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRIDE No. 1209 STATE OF CALIFORNIA

STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
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DWG | SHEET 11 OF 37

G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2641\MM1080-11_SD_Plan.dwg Plotted on Jun 25, 2018-6:29pm by jonas

SCALE: HOR. 1"=40'
VERT. 1"=8'

P.D. NO. 2641
FOR PLAN CHECK ONLY

MATCHLINE STA. 24+00.00 (SEE SHT. 10)

Q = 44.1 cfs
V_{MAX} = 6.2 fps

Q = 44.1 cfs
V_{MAX} = 19.8 fps

Q = 44.1 cfs
V_{MAX} = 20.7 fps

MAX. OF OVEREXCAVATION**

FINISHED SURFACE OVER PIPE

H.G.L.

24+44.41 CL. MH 1257.56 RIM

28+18.75 CL. MH 1263.80 RIM

29+11.63 INSIDE WALL

29+35.66 CL. MH 1265.73 RIM

32+92.65 CL. MH 1271.35 RIM

1272.90 TC

1264.54 INV. 18" WATER
1265.06 INV. 8" WATER

1267.10 INV. 12" WATER

1260.90 INV.

1256.68 INV. 12" WATER

1241.91 INV. LINE "A2" 24" INLET

1240.67 INV. 24" INLET

1243.33 INV. LAT "A2.8" 24" INLET

1255.13 INV. 8" WQ

1255.91 INV. 8" WQ

1260.31 INV. 12" WATER

1246.09 INV. LAT "A2.12" 18" INLET

1251.88 INV.

1252.09 INV.

1256.27 INV.

1259.54 INV. 18" SEWER

1258.58 INV. 18" SEWER

S=0.0183

S=0.0188

S=0.0185

S=0.0196

S=0.0025

1235.20 INV.

1235.89 INV.

1236.98 INV.

1242.77 INV.

1242.78 INV.

1244.48 INV.

1244.60 INV.

1244.92 INV.

1245.01 INV.

24+21.94 ~ EC
1235.42 INV.
24+42.03
24+46.74

33+41.10 ~ BC
33+76.45 ~ EC

THE EXISTING GRADE VARIES, IT IS 55' TO 60' ABOVE PIPE MAX. OVEREXCAVATION IS BEYOND PROFILE VIEW

28+14.34
28+21.08
29+08.16
29+14.63
29+32.08
29+37.55
32+88.92
32+94.98
34+01.95

INST 42.03 L.F. 36" RCP (2500-D) WITH RUBBER GASKET JOINTS

INST 367.60 L.F. 36" RCP (2500-D) WITH RUBBER GASKET JOINTS

INST 87.08 L.F. 36" RCP (2500-D) WITH RUBBER GASKET JOINTS

INST 17.45 L.F. 36" RCP (2500-D) WITH RUBBER GASKET JOINTS

INST 351.37 L.F. 36"RCP (2500-D) WITH RUBBER GASKET JOINTS

INST 106.97 L.F. 36"RCP (2500-D) WITH RUBBER GASKET JOINTS ADDITIONAL 0.5" OF CONC. OVER INVERT STEEL

STORM DRAIN LINE "A2"

24+00 25+00 26+00 27+00 28+00 29+00 30+00 31+00 32+00 33+00 34+00

1290 1260 1240 1220

MATCHLINE STA 24+00.00
SEE SHEET 10

LOT LINE

27+04.45 LINE "A2"
=10+00.00 LAT "A2.14"
A=90°; B=18"
C=2.0'; D=36"
SEE PROFILE SH. 32

LAT "A2.14" NOT TO BE MAINTAINED BY LACFCD 3

26+64.58 LINE "A2"
=10+00.00 LINE "A11"
A=60°, B1=24",
C=2.0'; D1=D2=36"
SEE PROFILE SH. 20

27+39.65 LINE "A2"
=10+00.00 LAT "A2.8"
A=90°; B=18"
C=1.2'; D=36"
SEE PROFILE SH. 28

29+32.74 LINE "A2"
=10+00.00 LINE "A2.12"
A=90°, B1=18",
C=1.2'; D1=D2=36"
SEE PROFILE SH. 28

29+35.66 CL M.H.

28+18.75 CL M.H.

PROP. 12" SD PER ROUGH GRADING TO BE PRIVATELY MAINTAINED

ST. STA 125+57.38
CL C.B.
W=28.0', V=8.0'

32+92.65 CL M.H.

32+90.32 LINE "A2"
=10+00.00 LINE "A2.9"
A=45°, B1=24",
C=2.7'; D1=D2=36"
SEE PROFILE SH. 28

10+14.41 BC
10+32.08 EC
33+41.10 BC
33+76.45 EC

PROP. WQ SUBDRAIN
PROP. 12" WQ
R/W
24+21.94 EC
24+44.41 CL M.H.
PROP. 18" W
PROP. 24" W
ST. MEDIAN
ST. CL
PROP. 18" RW
PROP.18" SS
PROP. 24" RW
PROP. JOINT TRENCH
PROP. GAS
LOT LINE
NEV TRAVELWAY
PROP. WQ SUBDRAIN
8" CF
PROP. 18" W
PROP. 24" W
PROP. JOINT TRENCH
PROP. GAS
NEV TRAVELWAY
ST. STA 127+92.90
CL C.B.
W=10.0', V=8.0'
ST. STA 121+69.78
CL C.B.
W=10.0', V=8.0'
ST. STA 10+84.86
CL C.B.
W=10.0', V=8.0'

"JJ" PRIVATE DRIVE

"II" PRIVATE DRIVE

STORM DRAIN LINE "A2"

CONSTRUCTION NOTES

1. INSTALL 18" R.C.P. (SEE PROFILE FOR D-LOAD)
2. INSTALL 24" R.C.P. (SEE PROFILE FOR D-LOAD)
4. INSTALL 36" R.C.P. (SEE PROFILE FOR D-LOAD)
17. CONST. M.H. PER S.P.P.W.C. STD. PLAN NO. 320-2
18. CONSTRUCT M.H. PER S.P.P.W.C. STD. PLAN 322-2
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26. CONSTRUCT T.S. PER S.P.P.W.C. STD. PLAN 340-2
29. CONSTRUCT J.S. PER S.P.P.W.C. STD. PLAN 331-3
37. ~~CONSTRUCT CLEANOUT PER DETAIL 37 ON SHEET 25~~
3 92. INSTALL 8" FALSE CURB COVER PER DEATIL ON SHEET 2C

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

LINE TABLE		
LINE	LENGTH	BEARING
L1	919.16'	N79°28'41"W
L2	25.50'	S10°31'19"W
L3	53.34'	N10°31'19"E
L4	48.00'	N10°31'19"E
L5	42.33'	N62°17'29"E
L6	14.41'	N34°28'41"W
L7	51.43'	N10°31'19"E

CURVE TABLE				
	DELTA	RADIUS	LENGTH	TANGENT
A	00°18'47"	4016'	21.94'	10.97'
B	90°00'00"	22.50'	35.34'	22.50'
C	45°00'00"	22.50'	17.67'	9.32'
D	67°48'12"	22.50'	26.63'	15.12'

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRICE No. 1705 STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-KUEN DI No. 2522 Exp. 6/30 GEOTECHNICAL STATE OF CALIFORNIA

REVIEWED LAND DEVELOPMENT DIVISION
BY STORM DRAIN SECTION 8/14/19 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	VOIDED SHEET 11 AND REPLACE WITH SHEET 11A	Jason H Fukumitsu		8/14/19
3	ADDED FALSE CURB COVER AND ADDED MAINTENANCE RESPONSIBILITY NOTE	Jason H Fukumitsu	NO.	3/15/2021

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
Jason H Fukumitsu 5/14/2019
JASON H. FUKUMITSU DATE

STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

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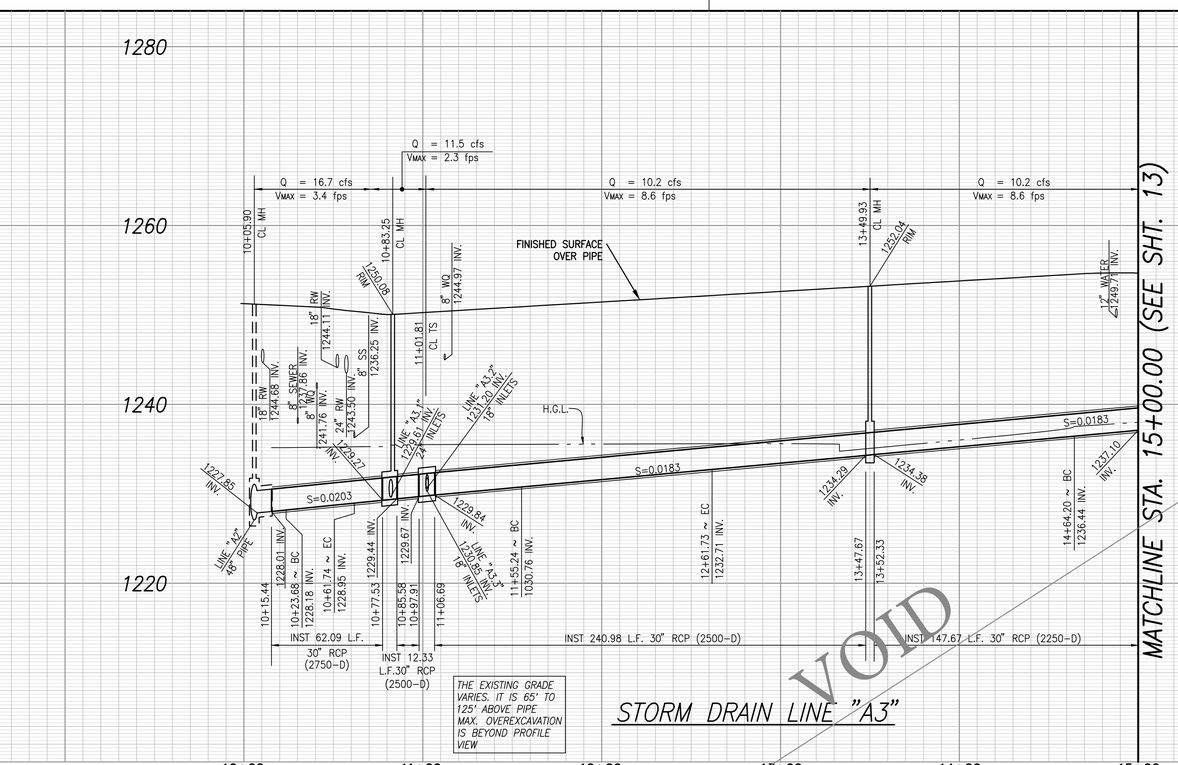
DWG | SHEET 11A OF 39

Dwg No. 43-F553.1-.38

G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2641\HWA080-11_SD_Plan-REV 3 MAP.dwg Plotted on May 13, 2019-5:42pm by heidys

SCALE: HOR. 1"=40'
VERT. 1"=8'

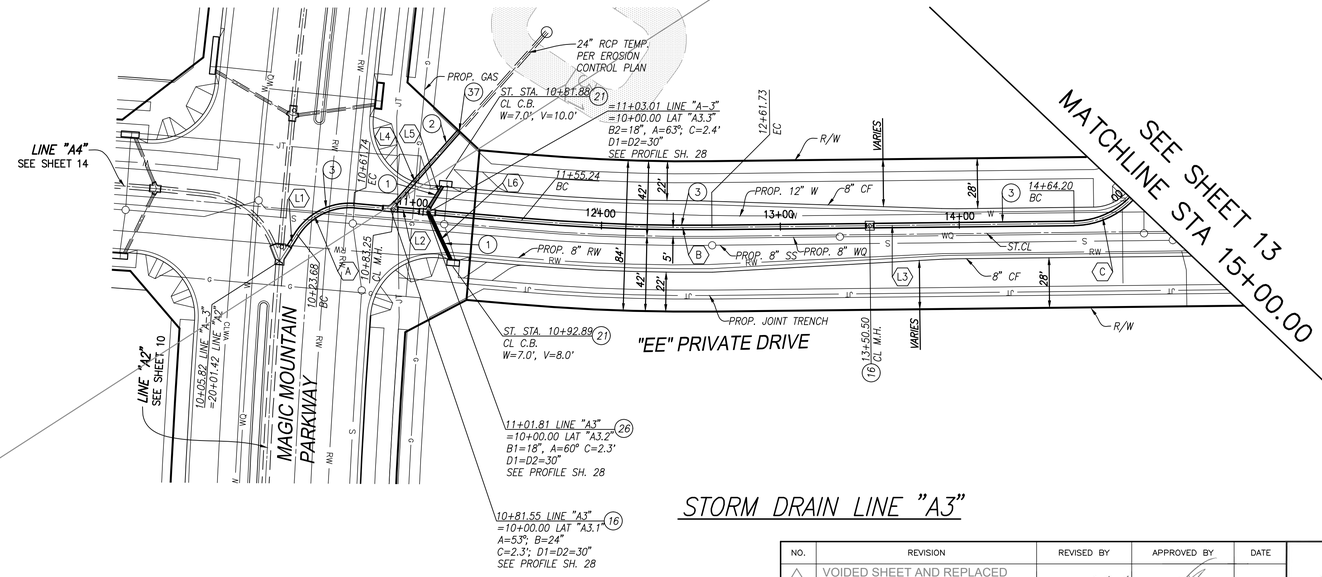
P.D. NO. 2641



THE EXISTING GRADE VARIES, IT IS 65' TO 125' ABOVE PIPE MAX. OVEREXCAVATION IS BEYOND PROFILE VIEW

VOID

STORM DRAIN LINE "A3"



CONSTRUCTION NOTES

1. INSTALL 18" R.C.P. (SEE PROFILE FOR D-LOAD)
2. INSTALL 24" R.C.P. (SEE PROFILE FOR D-LOAD)
3. INSTALL 30" R.C.P. (SEE PROFILE FOR D-LOAD)
16. CONSTRUCT M.H. PER S.P.P.W.C. STD. PLAN 321-2
21. CONSTRUCT CURB OPENING CATCH BASIN PER S.P.P.W.C. STD. PLAN NO. 300-3
26. CONSTRUCT T.S. PER S.P.P.W.C. STD. PLAN 340-2
37. CONSTRUCT CLEANOUT PER DETAIL 37 ON SHEET 25

SD LINE "A3" LINE TABLE		
LINE	LENGTH	BEARING
L1	17.86'	N57°19'36"W
L2	93.51'	N04°58'04"E
L3	202.47'	N00°37'42"W
L4	65.87'	S44°20'53"E
L5	16.82'	N58°00'45"W
L6	28.89'	N64°56'36"E

LINE "A3" CURVE TABLE				
	DELTA	RADIUS	LENGTH	TANGENT
A	62°17'40"	35.00'	38.06'	21.15'
B	05°34'18"	1098.98'	106.48'	53.30'
C	45°34'38"	45.00'	35.80'	18.91'

N

40 20 0 40 80

GRAPHIC SCALE: 1" = 40'

REVIEWED LAND DEVELOPMENT DIVISION
BY STORM DRAIN SECTION 10/04/2018 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	VOIDED SHEET AND REPLACED WITH NEW SHEET			8/14/19

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
8/29/18
JASON H. FUKUMITSU DATE

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-KUEN IP No. 2522 Exp. 6/30 GEOTECHNICAL STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRIDE No. 1705 STATE OF CALIFORNIA

Dwg No. 43-F553.1-38

STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

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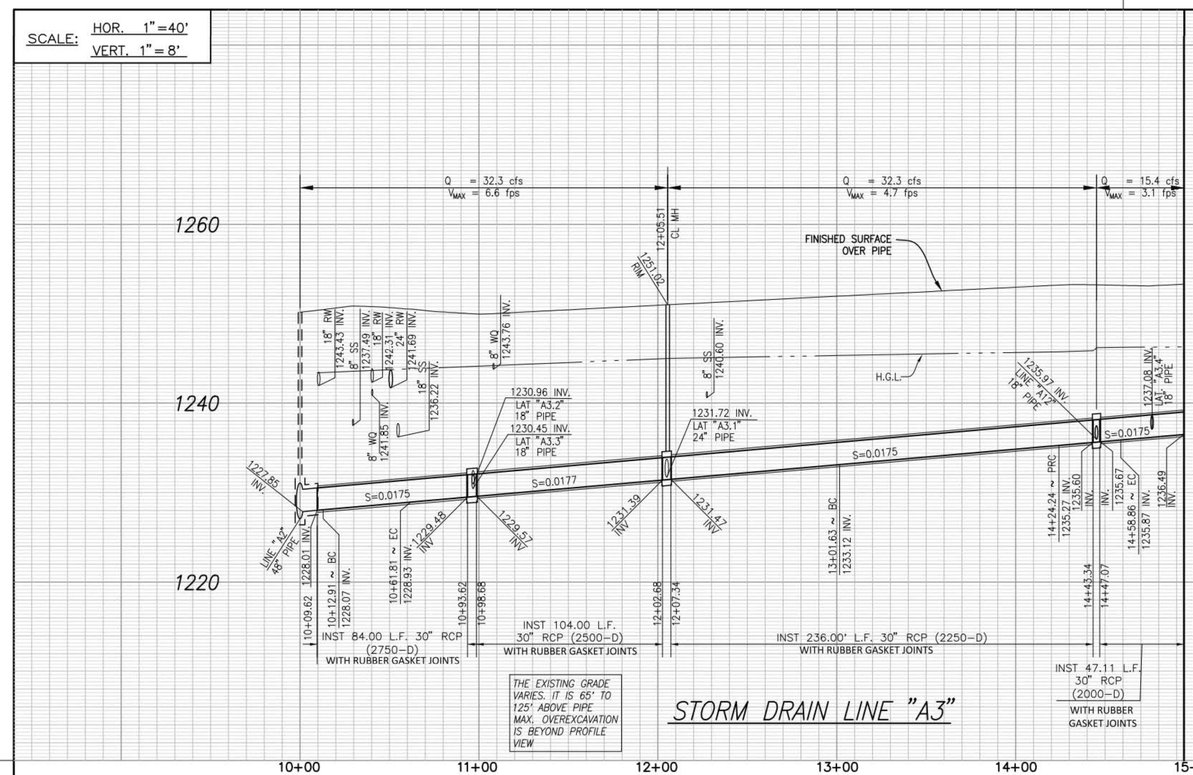
DWG | SHEET 12 OF 37

G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2641\VM\080-12_SD_Plan.dwg Plotted on Jun 25, 2018-6:37pm by jonga

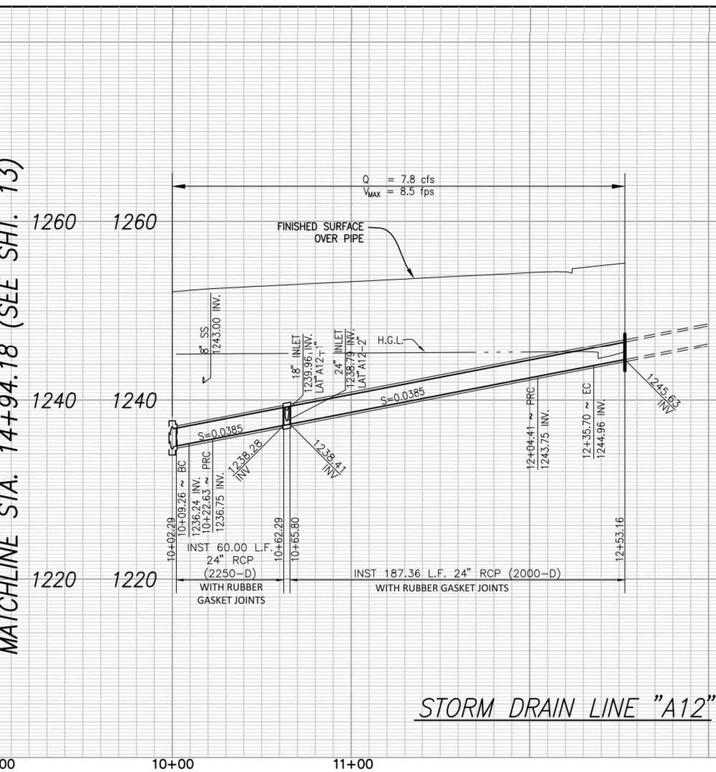
SCALE: HOR. 1"=40'
VERT. 1"=8'

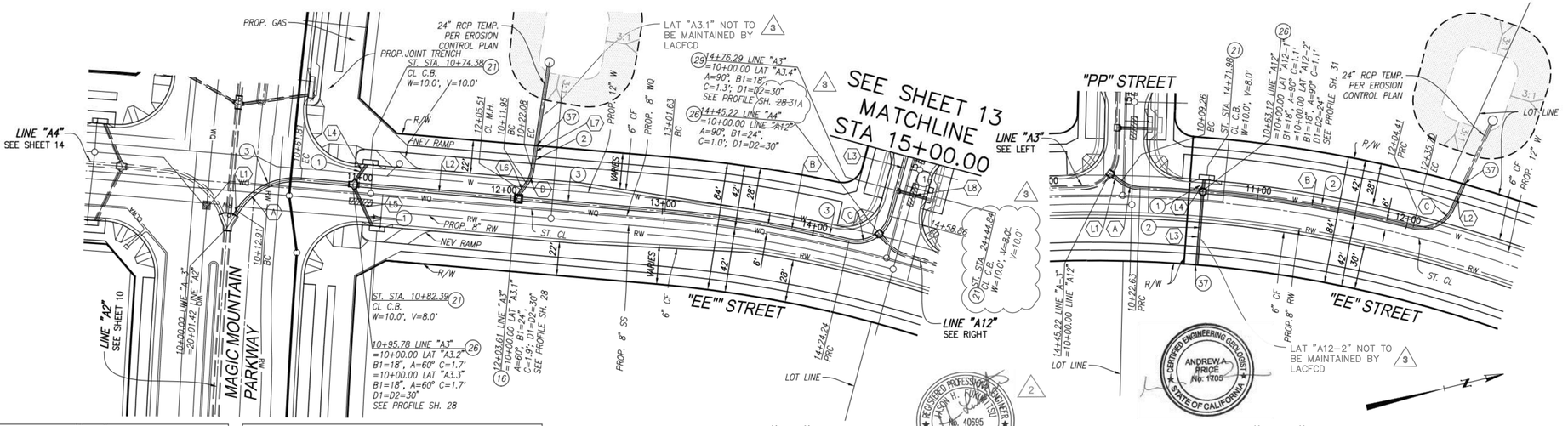
P.D. NO. 2641

FOR PLAN CHECK ONLY



MATCHLINE STA. 14+94.18 (SEE SHT. 13)





CONSTRUCTION NOTES

1. INSTALL 18" R.C.P. (SEE PROFILE FOR D-LOAD)
2. INSTALL 24" R.C.P. (SEE PROFILE FOR D-LOAD)
3. INSTALL 30" R.C.P. (SEE PROFILE FOR D-LOAD)
16. CONSTRUCT M.H. PER S.P.P.W.C. STD. PLAN 321-2
21. CONSTRUCT CURB OPENING CATCH BASIN PER S.P.P.W.C. STD. PLAN NO. 300-3 MODIFIED CATCH BASIN PER DETAIL ON SHEET 38 AND SHEET 39
26. CONSTRUCT T.S. PER S.P.P.W.C. STD. PLAN 340-2
29. CONSTRUCT J.S. PER S.P.P.W.C. STD. PLAN 331-3
37. CONSTRUCT CLEANOUT PER DETAIL 37 ON SHEET 25

SD LINE "A11" LINE TABLE		
LINE	LENGTH	BEARING
L1	9.26'	N49°44'00"E
L2	17.45'	N51°49'32"W
L3	48.00'	N71°36'01"W
L4	8.00'	N71°36'01"W

LINE "A11" CURVE TABLE				
	DELTA	RADIUS	LENGTH	TANGENT
A	34°02'38"	22.50'	13.37'	6.89'
B	12°10'02"	856.00'	181.78'	91.23'
C	79°40'56"	22.50'	31.29'	18.77'

SD LINE "A3" LINE TABLE		
LINE	LENGTH	BEARING
L1	12.91'	N57°19'36"W
L2	239.81'	N04°56'36"E
L3	41.14'	N74°59'25"W
L4	16.17'	N55°04'18"W
L5	30.02'	N64°56'36"E
L6	11.95'	N55°03'24"W
L7	16.10'	N80°50'36"W
L8	26.00'~~20.00'~~	N15°00'35"E

LINE "A3" CURVE TABLE				
	DELTA	RADIUS	LENGTH	TANGENT
A	62°16'12"	45.00'	48.91'	27.18'
B	08°12'26"	856.00'	122.62'	61.41'
C	88°08'27"	22.50'	34.61'	21.78'
D	25°47'12"	22.50'	10.13'	5.15'

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-KUEN LI No. 2522 Exp. 9-30-20 GEOTECHNICAL STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRIDE No. 1705 STATE OF CALIFORNIA

GRAPHIC SCALE: 1" = 40'

REVIEWED LAND DEVELOPMENT DIVISION

BY _____ STORM DRAIN SECTION 8/14/19 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	VOIDED SHEET 12 AND REPLACED WITH SHEET 12A			8/14/19
3	EXTENDED AND UPDATED REFERENCE TO PROFILE FOR LAT. "A3.4", REVISED CB DEPTH. ADDED MAINTENANCE RESPONSIBILITY NOTE			3/15/2021

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

JASON H. FUKUMITSU 5/14/2019 DATE

STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

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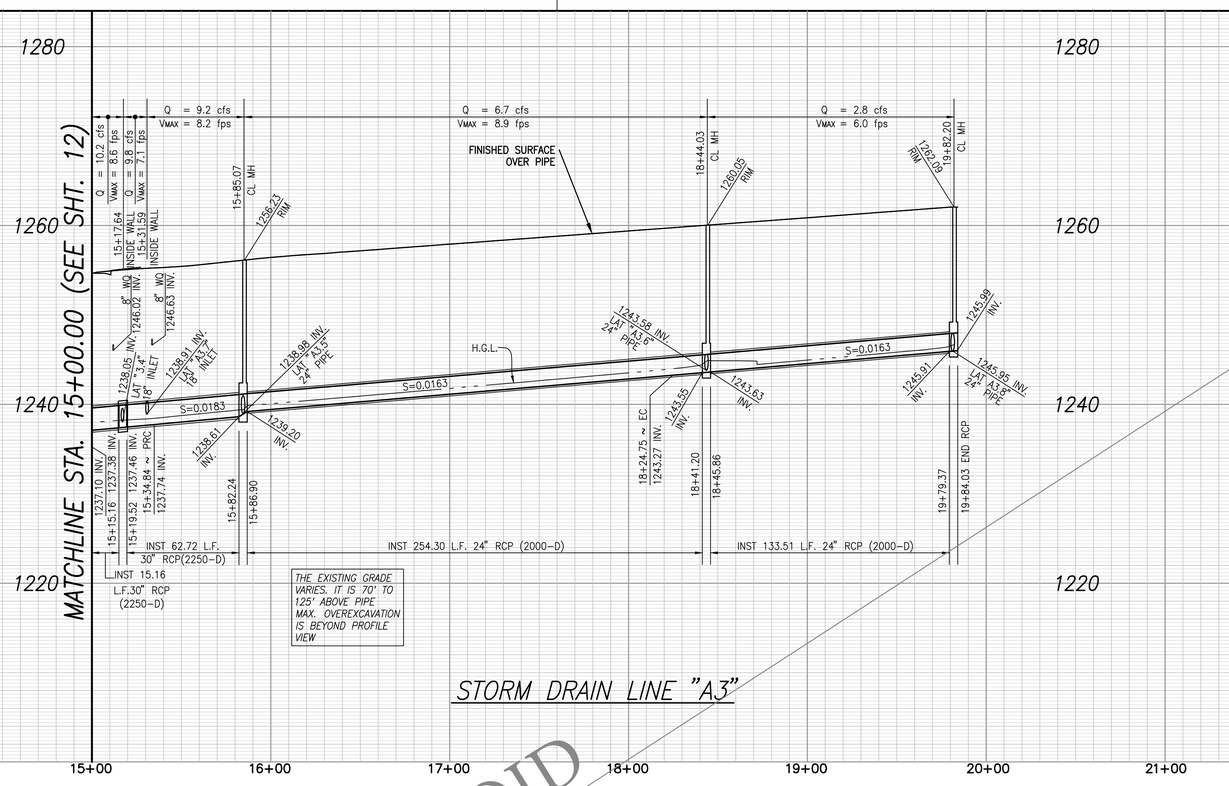
DWG | SHEET 12A OF 39

Dwg No. 43-F553.1-38

G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2641\HAVO80-12_SD_Plan-REV EE STREET.dwg Plotted on Jul 08, 2019--1:23pm by dmur

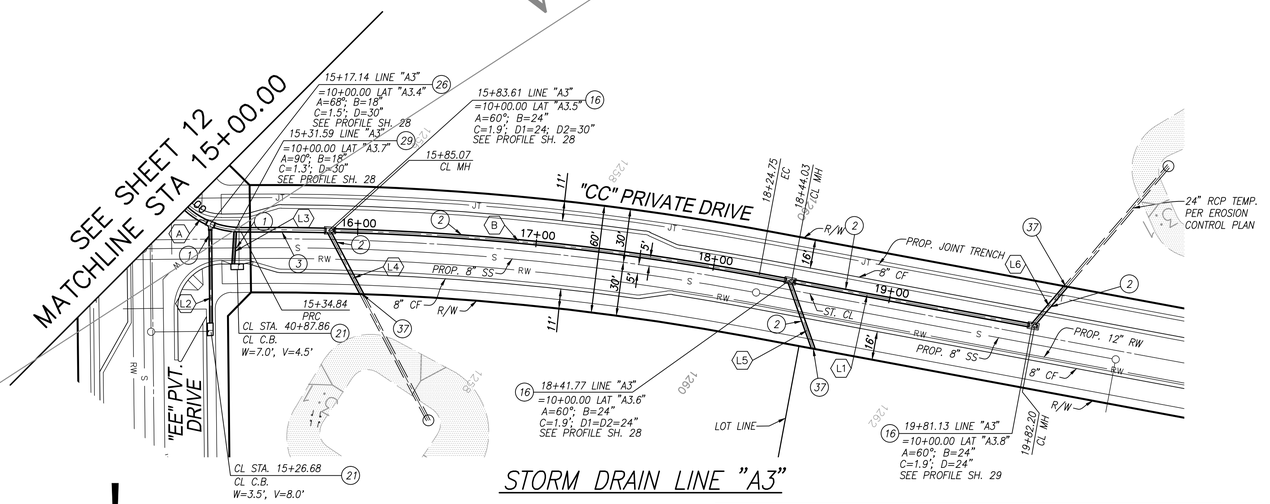
SCALE: HOR. 1"=40'
VERT. 1"=8'

P.D. NO. 2641



STORM DRAIN LINE "A3"

VOID



STORM DRAIN LINE "A3"

CONSTRUCTION NOTES

1. INSTALL 18" R.C.P. (SEE PROFILE FOR D-LOAD)
2. INSTALL 24" R.C.P. (SEE PROFILE FOR D-LOAD)
3. INSTALL 30" R.C.P. (SEE PROFILE FOR D-LOAD)
16. CONSTRUCT M.H. PER S.P.P.W.C. STD. PLAN 321-2
21. CONSTRUCT CURB OPENING CATCH BASIN PER S.P.P.W.C. STD. PLAN NO. 300-3
26. CONSTRUCT T.S. PER S.P.P.W.C. STD. PLAN 340-2
29. CONSTRUCT J.S. PER S.P.P.W.C. STD. PLAN 331-3
37. CONSTRUCT CLEANOUT PER DETAIL 37 ON SHEET 25

Dwg No. 43-F553.1-38

SD LINE "A3" LINE TABLE		
LINE	LENGTH	BEARING
L1	159.28'	N79°28'41"W
L2	55.35'	N00°30'17"W
L3	19.17'	N03°34'40"E
L4	40.17'	N27°43'48"W
L5	40.41'	S19°28'41"E
L6	28.87'	N40°31'19"E

LINE "A3" CURVE TABLE				
	DELTA	RADIUS	LENGTH	TANGENT
A	44°21'17"	45.00'	34.84'	18.34'
B	11°04'57"	1505.00'	289.91'	146.01'

N

40 20 0 40 80

GRAPHIC SCALE: 1" = 40'

REVIEWED LAND DEVELOPMENT DIVISION
BY Ken Ng 10/04/2018
STORM DRAIN SECTION DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	VOIDED SHEET AND REPLACED WITH NEW SHEET	Jason H. Fukumitsu		8/14/19

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
8/29/18
JASON H. FUKUMITSU DATE

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-KUEN TIP No. 25221 Exp. 6-30-20 GEOTECHNICAL STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRICE No. 1209 STATE OF CALIFORNIA

STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

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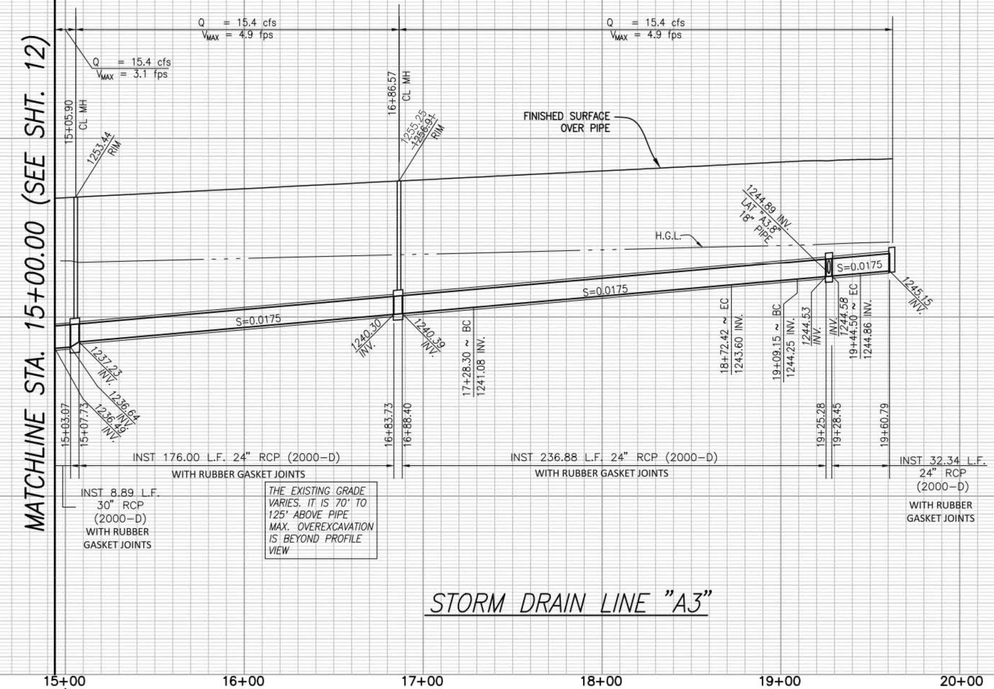
DWG | SHEET 13 OF 37

G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2641\MM080-13_SD_Plan.dwg Plotted on Jun 25, 2018-6:39pm by jonga

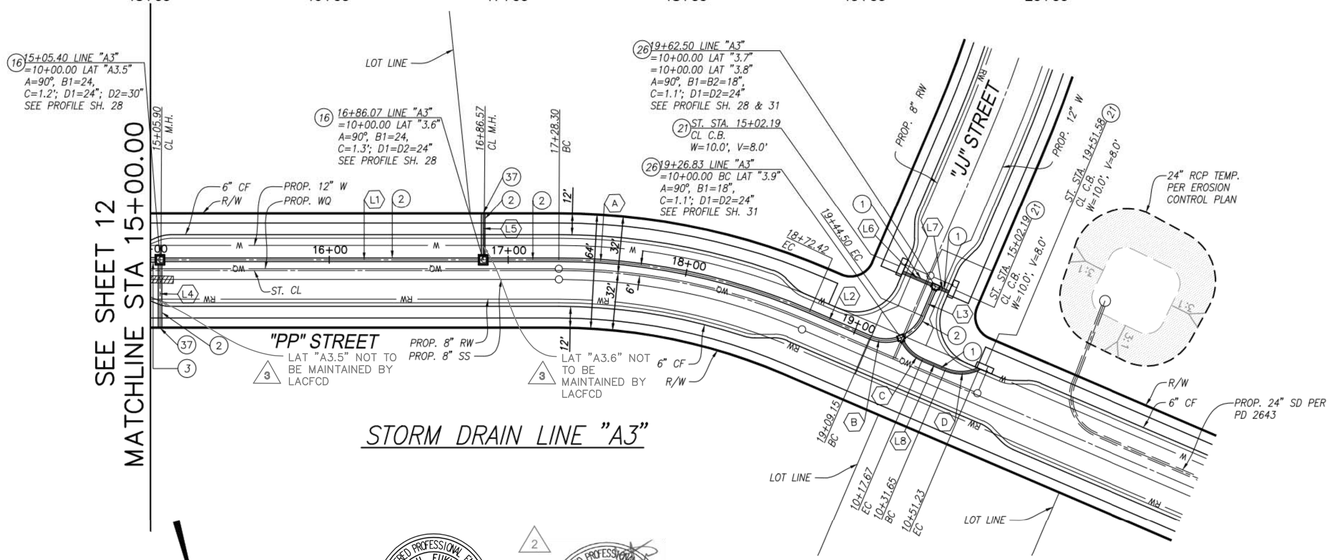
SCALE: HOR. 1"=40'
VERT. 1"=8'

P.D. NO. 2641

FOR PLAN CHECK ONLY



STORM DRAIN LINE "A3"



STORM DRAIN LINE "A3"

CONSTRUCTION NOTES

1. INSTALL 18" R.C.P. (SEE PROFILE FOR D-LOAD)
2. INSTALL 24" R.C.P. (SEE PROFILE FOR D-LOAD)
3. INSTALL 30" R.C.P. (SEE PROFILE FOR D-LOAD)
16. CONSTRUCT M.H. PER S.P.P.W.C. STD. PLAN 321-2
21. CONSTRUCT CURB OPENING CATCH BASIN PER S.P.P.W.C. STD. PLAN NO. 300-3 MODIFIED CATCH BASIN PER DETAIL ON SHEET 38 AND SHEET 39
26. CONSTRUCT T.S. PER S.P.P.W.C. STD. PLAN 340-2
37. CONSTRUCT CLEANOUT PER DETAIL 37 ON SHEET 25

SD LINE "A3" LINE TABLE		
LINE	LENGTH	BEARING
L1	228.30'	N74°59'25"W
L2	36.73'	N51°47'43"W
L3	18.00'	N38°12'17"E
L4	38.00'	N15°00'35"E
L5	26.00'	N15°00'35"E
L6	20.00'	N51°47'43"W
L7	8.00'	N51°47'43"W
L8	13.98'	N51°47'43"W

LINE "A3" CURVE TABLE				
	DELTA	RADIUS	LENGTH	TANGENT
A	23°11'43"	356.00'	144.12'	73.06'
B	90°00'00"	22.50'	35.34'	22.50'
C	45°00'00"	22.50'	17.67'	9.32'
D	49°52'33"	22.50'	19.59'	10.46'

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

REVIEWED LAND DEVELOPMENT DIVISION
BY STORM DRAIN SECTION 8/14/19 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	VOIDED SHEET 13 AND REPLACED WITH SHEET 13A			8/14/19
3	ADDED MAINTENANCE RESPONSIBILITY NOTE			3/15/2021

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
5/14/2019
JASON H. FUKUMITSU DATE

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRICE No. 1705 STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-KUAN IP No. 2622 Exp. 3/31/20 GEOTECHNICAL STATE OF CALIFORNIA

Dwg No. 43-F553.1-38

STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

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DWG

SHEET 13A OF 39

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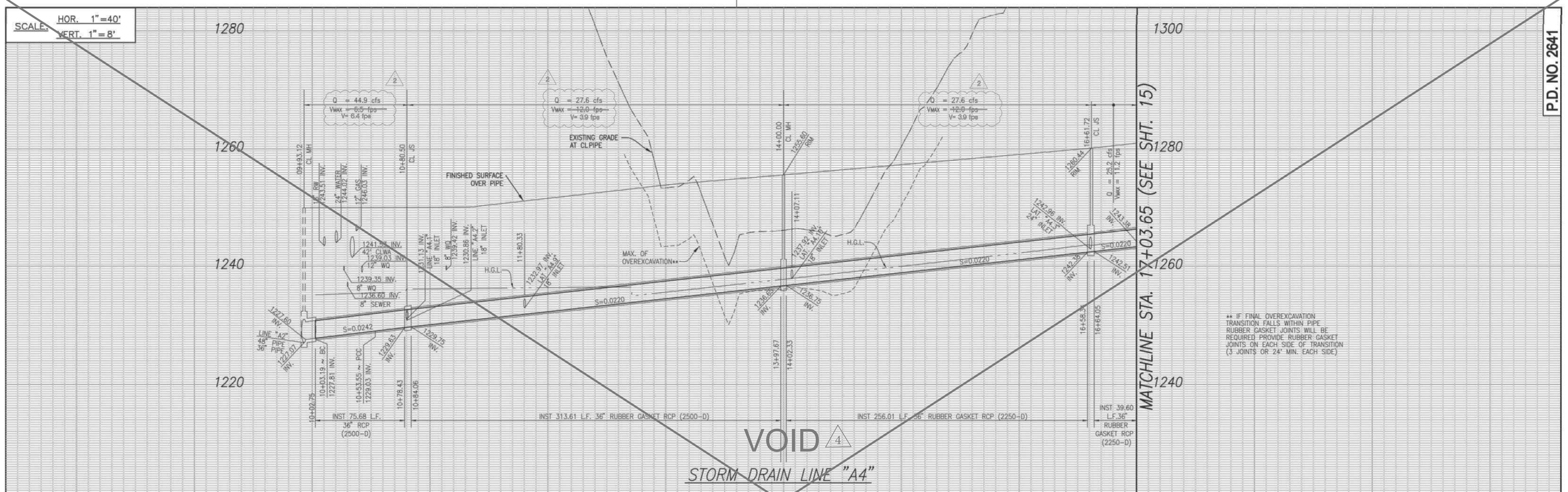
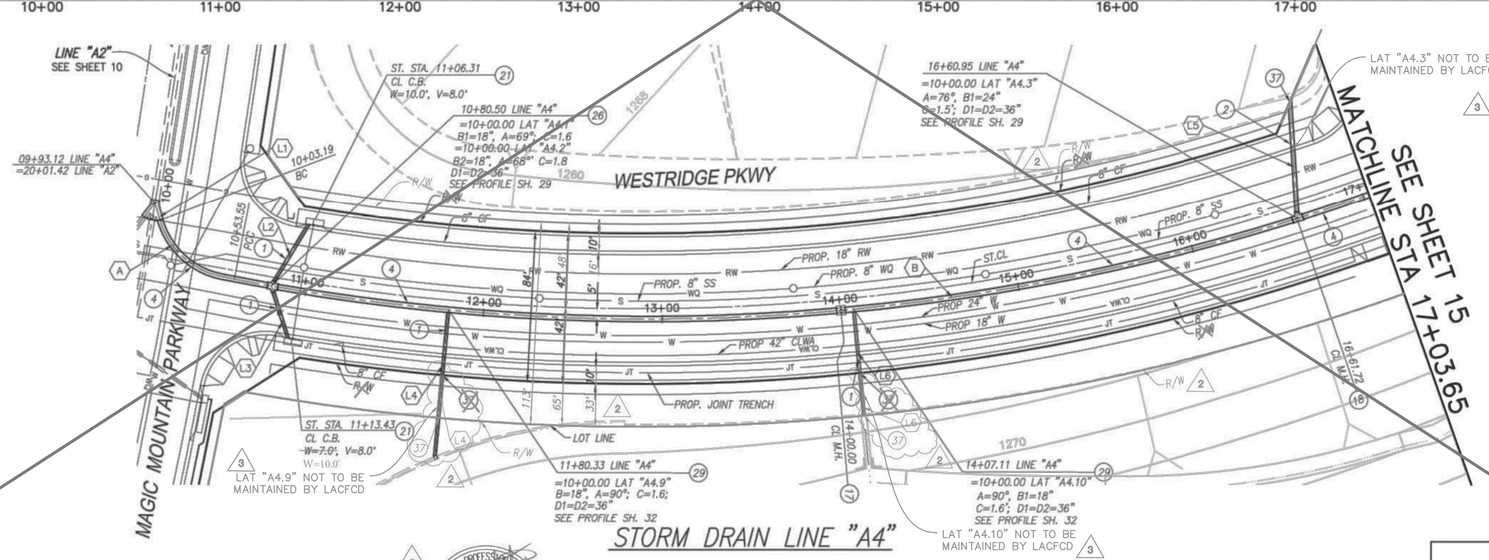
SCALE: HOR. 1"=40'
VERT. 1"=8'

P.D. NO. 2641



** IF FINAL OVEREXCAVATION TRANSITION FALLS WITHIN PIPE RUBBER GASKET JOINTS WILL BE REQUIRED PROVIDE RUBBER GASKET JOINTS ON EACH SIDE OF TRANSITION (3 JOINTS OR 24' MIN. EACH SIDE)

STORM DRAIN LINE "A4"



CONSTRUCTION NOTES

1. INSTALL 18" R.C.P. (SEE PROFILE FOR D-LOAD)
2. INSTALL 24" R.C.P. (SEE PROFILE FOR D-LOAD)
4. INSTALL 36" R.C.P. (SEE PROFILE FOR D-LOAD)
17. CONSTRUCT M.H. PER S.P.P.W.C. STD. PLAN 320-2
18. CONSTRUCT M.H. PER S.P.P.W.C. STD. PLAN 322-2
21. CONSTRUCT CURB OPENING CATCH BASIN PER S.P.P.W.C. STD. PLAN NO. 300-3 (MODIFIED CATCH BASIN PER DETAIL ON SHEET 38 AND SHEET 39
26. CONSTRUCT I.S. PER S.P.P.W.C. STD. PLAN 340-2
29. CONSTRUCT J.S. PER S.P.P.W.C. STD. PLAN 331-3
37. CONSTRUCT CLEANOUT PER DETAIL 37 ON SHEET 25

Dwg No. 43-F553.1-38

SD LINE "A4" LINE TABLE		
LINE	LENGTH	BEARING
L1	10.07'	S68°41'52"W
L2	39.83'	N63°47'01"W
L3	30.35'	S67°20'47"W
L4	36.63'	S89°42'21"E
L5	65.43'	N89°25'05"E
L6	35.80'	N79°30'41"E

LINE "A4" CURVE TABLE				
	DELTA	RADIUS	LENGTH	TANGENT
A	62°39'28"	45.00'	49.21'	27.39'
B	30°37'42"	1205.00'	644.00'	329.97'

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-KUEN LO No. 2522 Exp. 9/30/22 GEOTECHNICAL STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRICE No. 1205 STATE OF CALIFORNIA

GRAPHIC SCALE: 1" = 40'

REVIEWED LAND DEVELOPMENT DIVISION
BY STORM DRAIN SECTION 10/04/2018 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	ADDED STRUCTURAL DETAIL SHEETS 38 AND 39. ADDED CONSTRUCTION NOTE 91.REVISED CONSTRUCTION NOTE 21.			8/14/19
	REVISED TOTAL SHEET NUMBER. REVISE HYDRAULIC ELEMENTS REVISE AND ADD LATERALS/MAINLINE			
	REVISED "00" PRIVATE DRIVE			
3	ADDED MAINTENANCE RESPONSIBILITY NOTE			3/15/2021
4	VOID SHEET 14 AND REPLACED WITH SHEET 14A			9/28/2021

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA 8/29/18 DATE

STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

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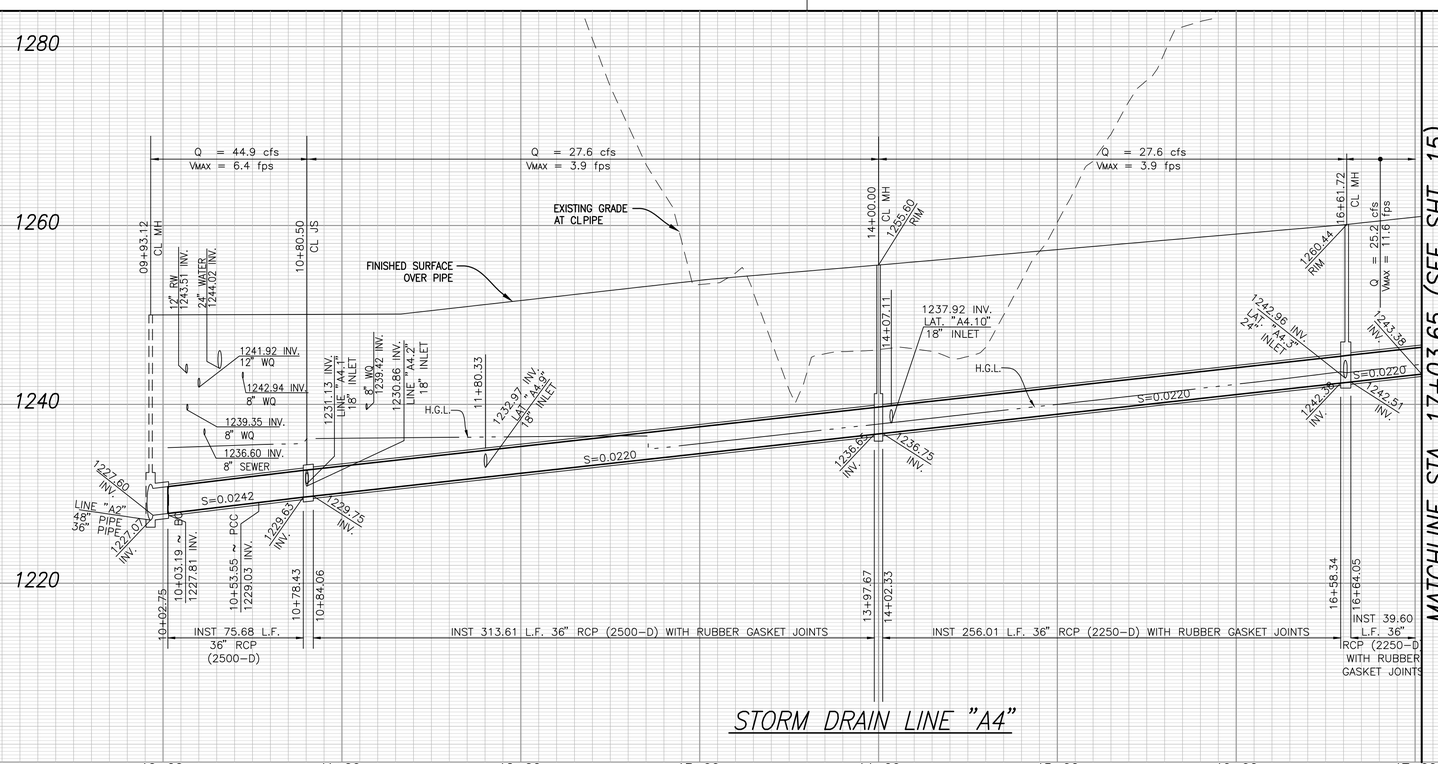
DWG | SHEET 14 OF 32 39

G:\Vikwell\ Ranch\61105 Mission Village\61105-01\Storm\PD 2641\WAVD80-14_SD_Plan.dwg Plotted on Jun 25, 2018--6:47pm by jjorge

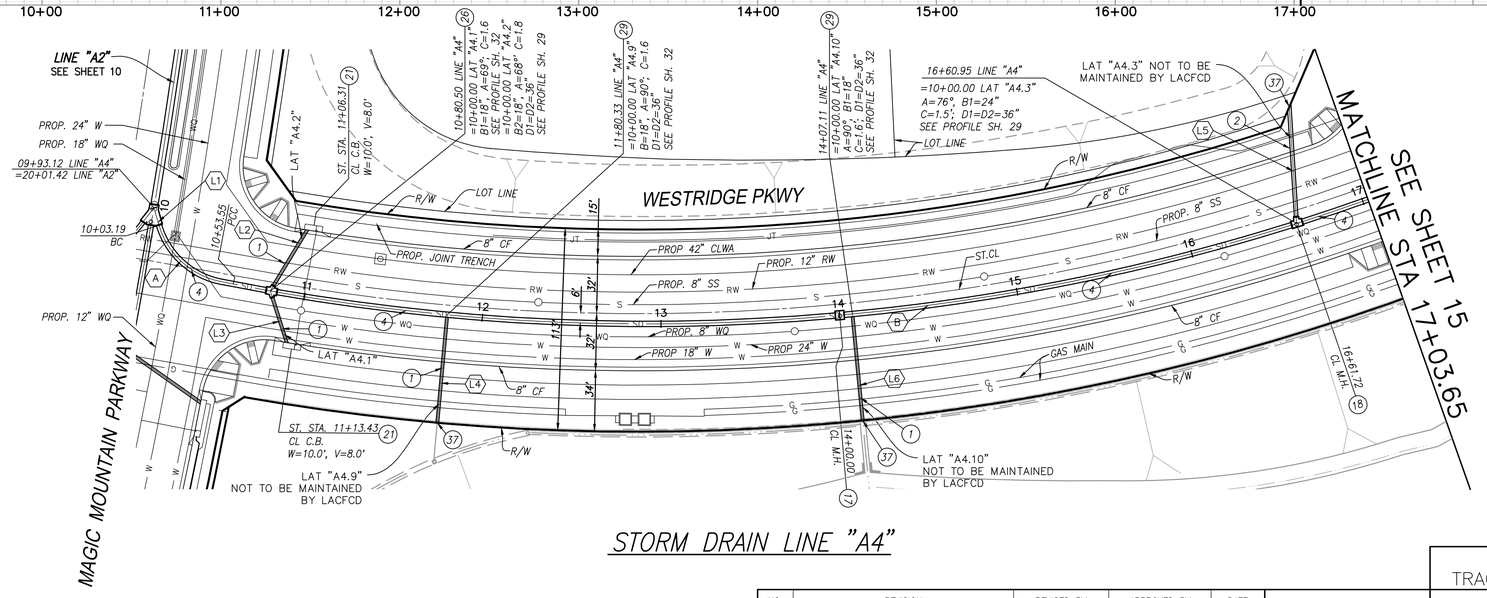
SCALE: HOR. 1"=40'
VERT. 1"=8'



STORM DRAIN LINE "A4"

MATCHLINE STA. 17+03.65 (SEE SHT. 15)

P.D. NO. 2641
FOR PLAN CHECK ONLY



STORM DRAIN LINE "A4"

CONSTRUCTION NOTES

1. INSTALL 18" R.C.P. (SEE PROFILE FOR D-LOAD)
2. INSTALL 24" R.C.P. (SEE PROFILE FOR D-LOAD)
4. INSTALL 36" R.C.P. (SEE PROFILE FOR D-LOAD)
17. CONSTRUCT M.H. PER S.P.P.W.C. STD. PLAN 320-2
18. CONSTRUCT M.H. PER S.P.P.W.C. STD. PLAN 322-2
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26. CONSTRUCT T.S. PER S.P.P.W.C. STD. PLAN 340-2
29. CONSTRUCT J.S. PER S.P.P.W.C. STD. PLAN 331-3
37. CONSTRUCT CLEANOUT PER DETAIL 37 ON SHEET 25

SD LINE "A4" LINE TABLE		
LINE	LENGTH	BEARING
(L1)	10.07'	S68°41'52"W
(L2)	39.83'	N63°47'01"W
(L3)	30.35'	S67°20'47"W
(L4)	60.63'	S89°42'21"E
(L5)	65.43'	N89°25'05"E
(L6)	59.81'	N79°30'41"E

LINE "A4" CURVE TABLE				
	DELTA	RADIUS	LENGTH	TANGENT
(A)	62°39'28"	45.00'	49.21'	27.39'
(B)	30°37'42"	1205.00'	644.00'	329.97'

N

40 20 0 40 80

GRAPHIC SCALE: 1" = 40'

REVIEWED LAND DEVELOPMENT DIVISION

BY _____ DATE
STORM DRAIN SECTION

NO.	REVISION	REVISED BY	APPROVED BY	DATE
4	VOIDED SHEET 14 AND REPLACED WITH 14A.			9/28/2021

REGISTERED PROFESSIONAL ENGINEER
JASON H. FUKUMITSU
No. 40695
CIVIL
STATE OF CALIFORNIA

08/16/21
JASON H. FUKUMITSU DATE

STORM DRAIN PLANS IN
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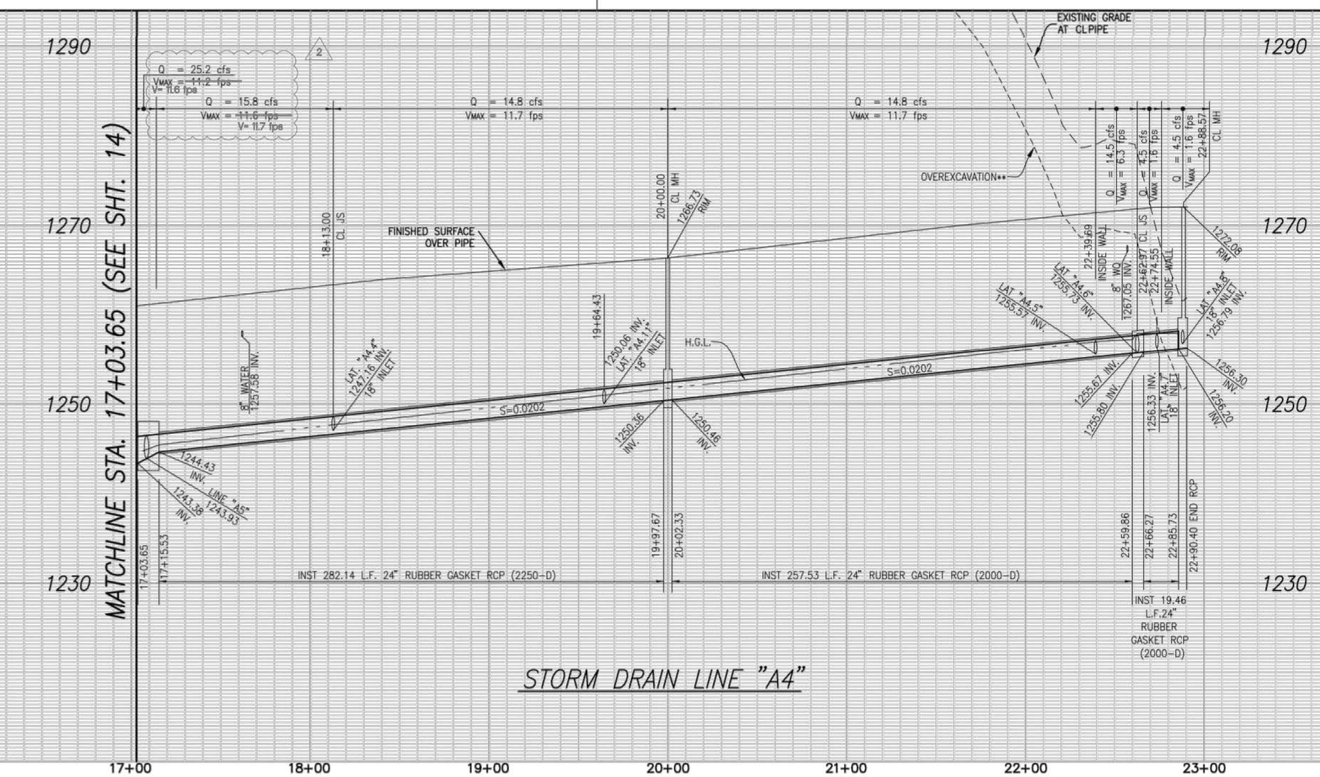
DWG

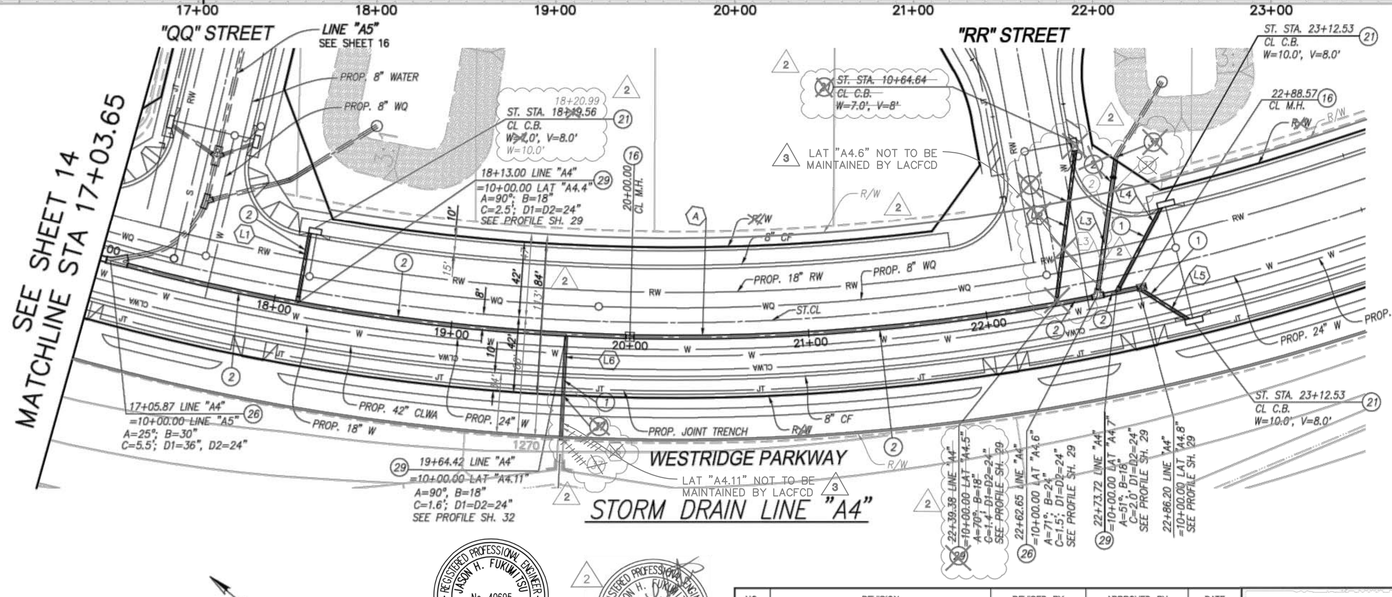
G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2641\HM\086-14_SD_Plan-REV4 WESTRIDGE PARKWAY.dwg Plotted on Jul 27, 2021-11:57am by ajlaw

P.D. NO. 2641

SCALE: HOR. 1"=40'
VERT. 1"=8'



** IF FINAL OVEREXCAVATION TRANSITION FALLS WITHIN PIPE RUBBER GASKET JOINTS WILL BE REQUIRED. PROVIDE RUBBER GASKET JOINTS ON EACH SIDE OF TRANSITION (3 JOINTS OR 24' MIN. EACH SIDE)



CONSTRUCTION NOTES

(1) INSTALL 18" R.C.P. (SEE PROFILE FOR D-LOAD)
(2) INSTALL 24" R.C.P. (SEE PROFILE FOR D-LOAD)
(16) CONSTRUCT M.H. PER S.P.P.W.C. STD. PLAN 321-2
(21) CONSTRUCT CURB OPENING CATCH BASIN PER S.P.P.W.C. STD. PLAN NO. 300-3 MODIFIED CATCH BASIN PER DETAIL 2 ON SHEET 38 AND SHEET 39
(26) CONSTRUCT T.S. PER S.P.P.W.C. STD. PLAN 340-2
(29) CONSTRUCT J.S. PER S.P.P.W.C. STD. PLAN 331-3
(3) (37) CONSTRUCT CLEANOUT PER DETAIL 37 ON SHEET 25

SD LINE "A2" LINE TABLE		
LINE	LENGTH	BEARING
L1	39.55'	S60°13'26"W
L2	86.58'	S57°08'56"W
L3	77.00' 59.01'	S57°42'36"W
L4	53.47'	N77°45'11"E
L5	32.81'	N07°51'44"W
L6	34.01' 58.01'	N53°00'43"E

LINE "A4" CURVE TABLE			
DELTA	RADIUS	LENGTH	TANGENT
(A) 27°53'56"	1205.00'	586.75'	299.31'

GRAPHIC SCALE: 1" = 40'

REVIEWED LAND DEVELOPMENT DIVISION
BY STORM DRAIN SECTION 10/04/2018 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	ADDED STRUCTURAL DETAIL SHEETS 38 AND 39. ADDED CONSTRUCTION NOTE 91.REVISED CONSTRUCTION NOTE 21.			8/14/19
	REVISED TOTAL SHEET NUMBER. REVISE HYDRAULIC ELEMENTS REVISE AND ADD LATERALS/MAINLINE			
	REVISED "00" PRIVATE DRIVE			
3	ADDED MAINTENANCE RESPONSIBILITY NOTE			3/15/2021

JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA 8/29/18 DATE

STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

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REGISTERED PROFESSIONAL ENGINEER VINCENT PING-KUEN IP No. 25720 Exp. 2-29-20 GEOTECHNICAL STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRICE No. 1709 STATE OF CALIFORNIA

DWG

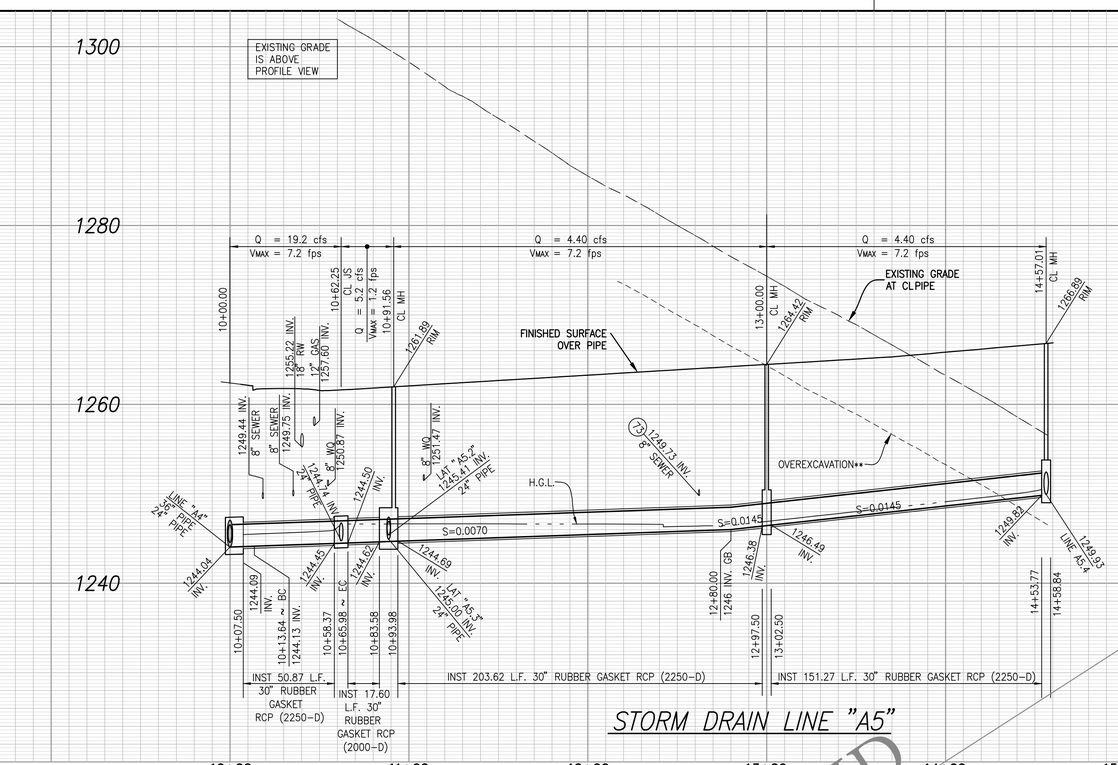
SHEET 15 OF 37 39

Dwg No. 43-F553.1-38

G:\Meadowlark Ranch\61105 Mission Village\61105-01\Storm\PD 2641\MM0805-15_SD_Plan.dwg Posted on Jun 25, 2018-8:17pm by jorga

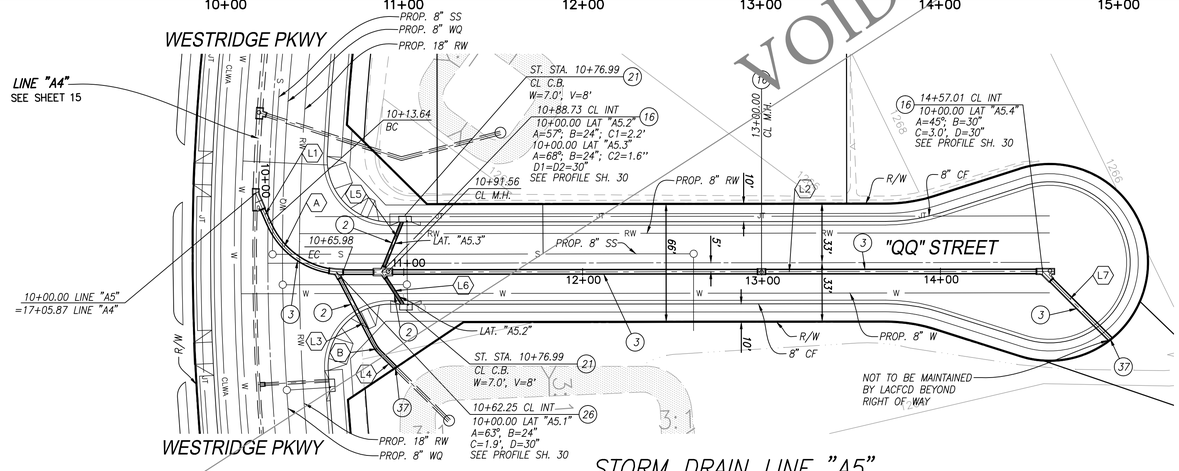
SCALE: HOR. 1"=40'
VERT. 1"=8'

P.D. NO. 2641



STORM DRAIN LINE "A5"

** IF FINAL OVEREXCAVATION TRANSITION FALLS WITHIN PIPE RUBBER GASKET JOINTS WILL BE REQUIRED. PROVIDE RUBBER GASKET JOINTS ON EACH SIDE OF TRANSITION (3 JOINTS OR 24" MIN. EACH SIDE)



STORM DRAIN LINE "A5"

CONSTRUCTION NOTES

(2) INSTALL 24" R.C.P. (SEE PROFILE FOR D-LOAD)
(3) INSTALL 30" R.C.P. (SEE PROFILE FOR D-LOAD)
(16) CONSTRUCT M.H. PER S.P.P.W.C. STD. PLAN 321-2
(21) CONSTRUCT CURB OPENING CATCH BASIN PER S.P.P.W.C. STD. PLAN NO. 300-3
(26) CONSTRUCT T.S. PER S.P.P.W.C. STD. PLAN 340-2
(37) CONSTRUCT CLEANOUT PER DETAIL 37 ON SHEET 25
(73) CONSTRUCT CONCRTE BLANKET PER S.P.P.W.C. 225-2

Dwg No. 43-F553.1-38

SD LINE "A5" LINE TABLE		
LINE	LENGTH	BEARING
(L1)	18.59'	S49°54'52"E
(L2)	397.47'	N63°26'25"E
(L3)	45.11'	N54°03'36"W
(L4)	11.47'	N71°49'28"W
(L5)	30.20'	N04°33'49"W
(L6)	21.47'	S59°36'08"E
(L7)	53.88'	S71°33'35"E

LINE "A5" CURVE TABLE				
	DELTA	RADIUS	LENGTH	TANGENT
(A)	66°38'43"	45.00'	52.34'	29.58'
(B)	17°45'52"	22.50'	6.98'	3.52'

GRAPHIC SCALE: 1" = 40'

REVIEWED LAND DEVELOPMENT DIVISION
BY STORM DRAIN SECTION 10/04/2018 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	VOIDED SHEET AND REPLACED WITH NEW SHEET			8/14/19

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
8/29/18 JASON H. FUKUMITSU DATE

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-KENT LO No. 2622 Exp. 6/30/20 CIVIL STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRICE No. 1705 STATE OF CALIFORNIA

STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
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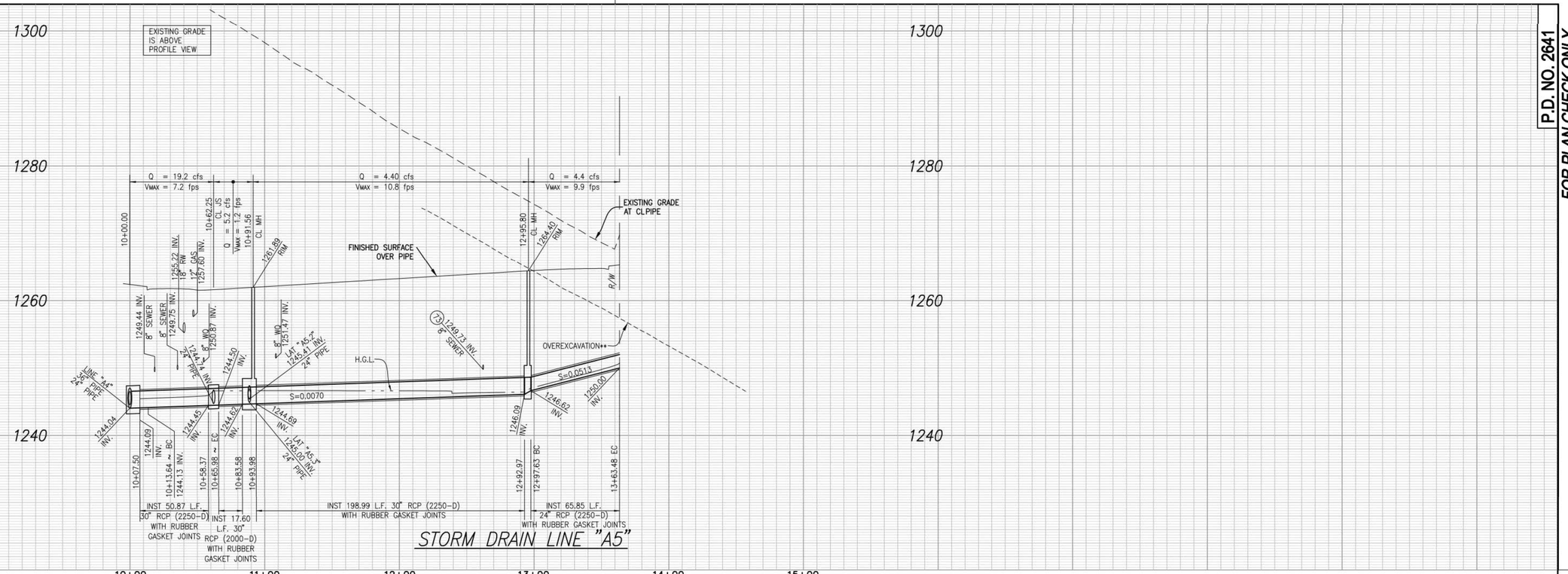
DWG | SHEET 16 OF 37

G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2641\MM1080-16_SD_Plan.dwg Plotted on Jun 25, 2018-8:17am by jpraps

SCALE: HOR. 1"=40'
VERT. 1"=8'



CONSTRUCTION NOTES

1. INSTALL 18" R.C.P. (SEE PROFILE FOR D-LOAD)
2. INSTALL 24" R.C.P. (SEE PROFILE FOR D-LOAD)
3. INSTALL 30" R.C.P. (SEE PROFILE FOR D-LOAD)
16. CONSTRUCT M.H. PER S.P.P.W.C. STD. PLAN 321-2
21. CONSTRUCT CURB OPENING CATCH BASIN PER S.P.P.W.C. STD. PLAN NO. 300-3 MODIFIED CATCH BASIN PER DETAIL ON SHEET 38 AND SHEET 39
26. CONSTRUCT T.S. PER S.P.P.W.C. STD. PLAN 340-2
37. CONSTRUCT CLEANOUT PER DETAIL 37 ON SHEET 25
73. CONSTRUCT CONCRTE BLANKET PER S.P.P.W.C. 225-2

SD LINE "A5" LINE TABLE		
LINE	LENGTH	BEARING
(1)	18.59'	S49°54'52"E
(2)	231.65'	N63°26'25"E
(3)	45.11'	N54°03'36"W
(4)	11.47'	N71°49'28"W
(5)	30.20'	S04°32'57"E
(6)	21.47'	N59°35'08"W

LINE "A5" CURVE TABLE				
	DELTA	RADIUS	LENGTH	TANGENT
(A)	66°38'43"	45.00'	52.34'	29.58'
(B)	17°45'52"	22.50'	6.98'	3.52'
(C)	41°55'03"	90.00'	65.85'	34.47'

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

REVIEWED LAND DEVELOPMENT DIVISION
BY STORM DRAIN SECTION 8/14/19 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	VOIDED SHEET 16 AND REPLACED WITH 16A			8/14/19
3	ADDED MAINTENANCE RESPONSIBILITY NOTE			3/15/2021

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
5/14/2019 JASON H. FUKUMITSU DATE

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRIDE No. 1705 STATE OF CALIFORNIA
REGISTERED PROFESSIONAL ENGINEER VINCENT PING-KUEN LIP No. 2522 Exp. 9/30 GEOTECHNICAL STATE OF CALIFORNIA

STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

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DWG | SHEET 16A OF 39

P.D. NO. 2641
FOR PLAN CHECK ONLY

Dwg No. 43-F553.1-38

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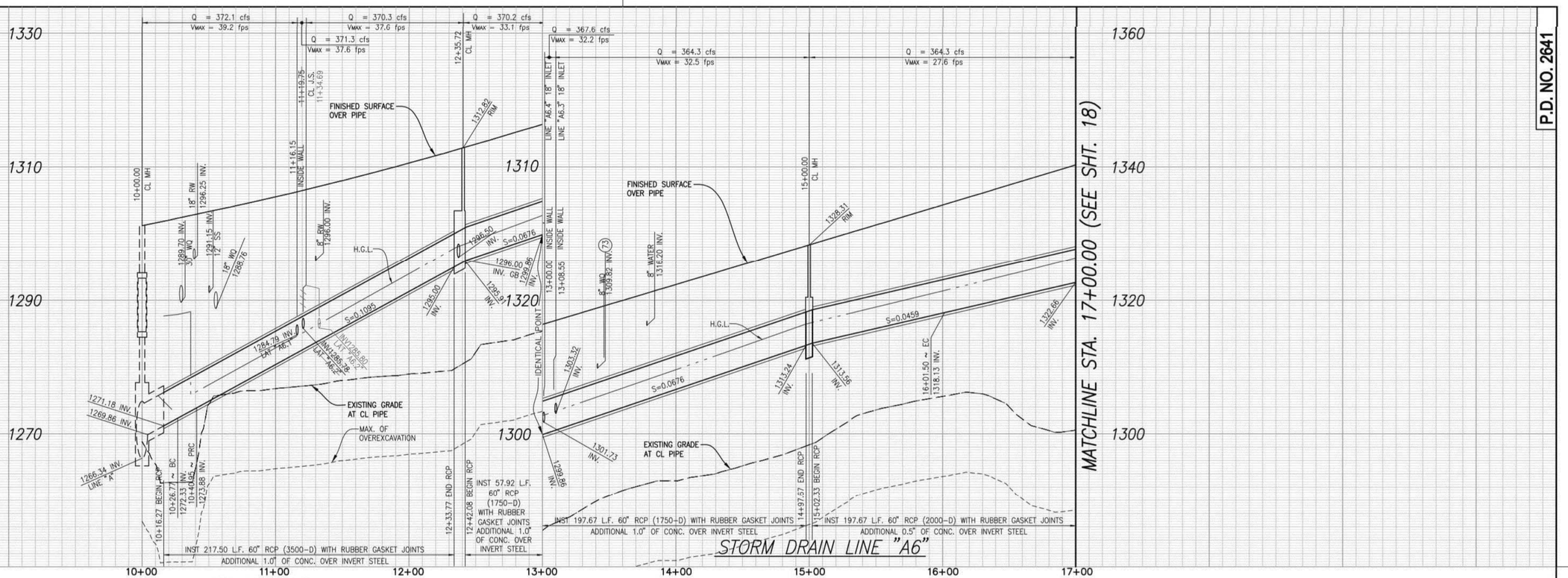
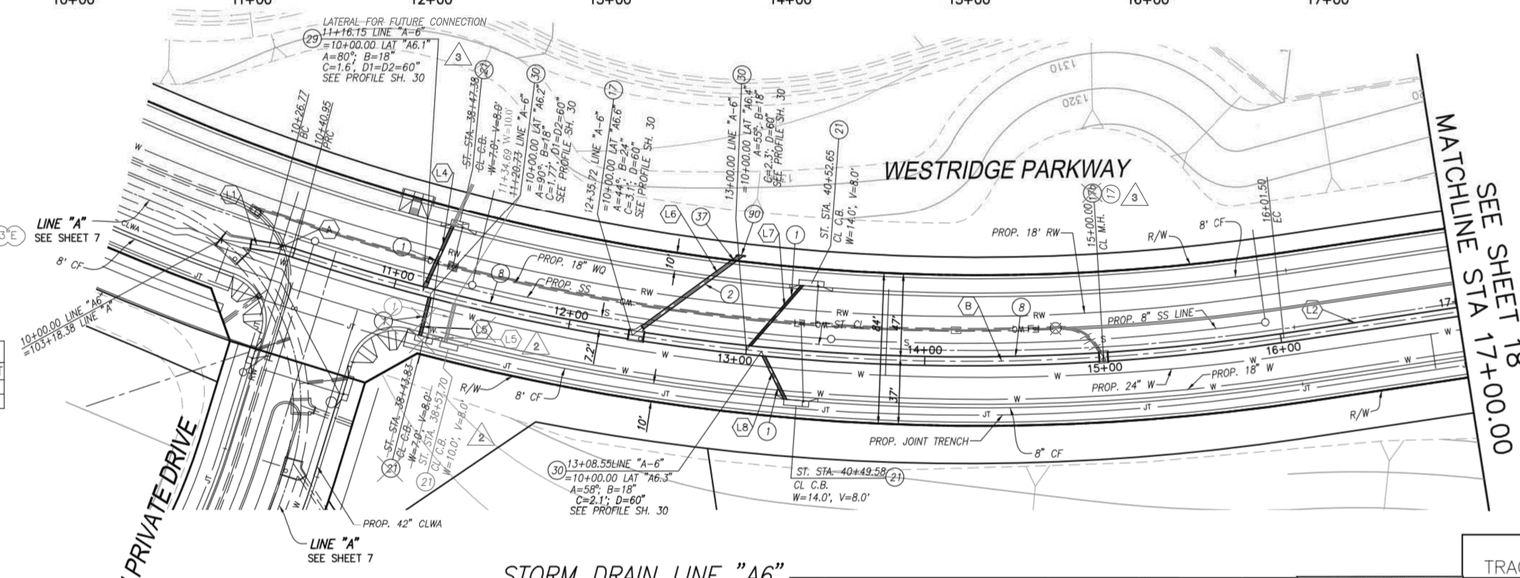
SCALE: HOR. 1"=40'
VERT. 1"=8'

P.D. NO. 2641



LINE "A6" LINE TABLE		
LINE	LENGTH	BEARING
L1	26.77'	S20°49'22"E
L2	98.50'	S38°26'54"E
L3	41.31' 60.56'	S84°37'38"W
L4	24.29' 24.37'	N74°24'42"E
L5	70.53'	S66°03'22"E
L6	47.55'	S78°55'31"E
L7	29.95'	S33°28'52"W

LINE "A6" CURVE TABLE				
	DELTA	RADIUS	LENGTH	TANGENT
A	09°01'40"	90.00'	14.18'	7.11'
B	26°39'12"	1205.00'	560.55'	285.44'



CONSTRUCTION NOTES

1. INSTALL 18" R.C.P. (SEE PROFILE FOR D-LOAD)
2. INSTALL 24" R.C.P. (SEE PROFILE FOR D-LOAD)
8. INSTALL 60" R.C.P. (SEE PROFILE FOR D-LOAD)
9. INSTALL 96" R.C.P. (SEE PROFILE FOR D-LOAD)
17. CONSTRUCT M.H. PER S.P.P.W.C., STD. PLAN 320-2
17a. ~~CONSTRUCT MODIFIED M.H. PER S.P.P.W.C. STD. PLAN NO. 320-2 PER DETAILS ON SHEET 33~~
21. CONSTRUCT CURB OPENING CATCH BASIN PER S.P.P.W.C. STD. PLAN NO. 300-3 (MODIFIED CATCH BASIN PER DETAIL ON SHEET 38 AND SHEET 39
29. CONSTRUCT J.S. PER S.P.P.W.C. STD. PLAN 331-3
30. CONSTRUCT J.S. PER S.P.P.W.C. STD. PLAN 332-2
37. CONSTRUCT CLEANOUT PER DETAIL 37 ON SHEET 25
90. CONSTRUCT BRICK AND MORTAR PLUG

Dwg No. 43-F553.1-38

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-KUEN TIP No. 9522 Exp. 6-30-20 GEOTECHNICAL STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRICE No. 1209 STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

GRAPHIC SCALE: 1" = 40'

REVIEWED LAND DEVELOPMENT DIVISION
BY Pete Mig 10/04/2018
STORM DRAIN SECTION DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	ADDED STRUCTURAL DETAIL SHEETS 38 AND 39. ADDED CONSTRUCTION NOTE 91. REVISED CONSTRUCTION NOTE 21.			8/14/19
	REVISED TOTAL SHEET NUMBER. REVISE HYDRAULIC ELEMENTS REVISE AND ADD LATERALS/MAINLINE			
	REVISED "00" PRIVATE DRIVE			
3	REMOVED CATCH BASIN ON WESTRIDGE PARKWAY, EXTENDED LAT A6.1, ADDED LABELS AND UPDATED WATER QUALITY LINE			3/15/2021

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA 8/29/18
JASON H. FUKUMITSU DATE

STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

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DWG | SHEET 17 OF 39

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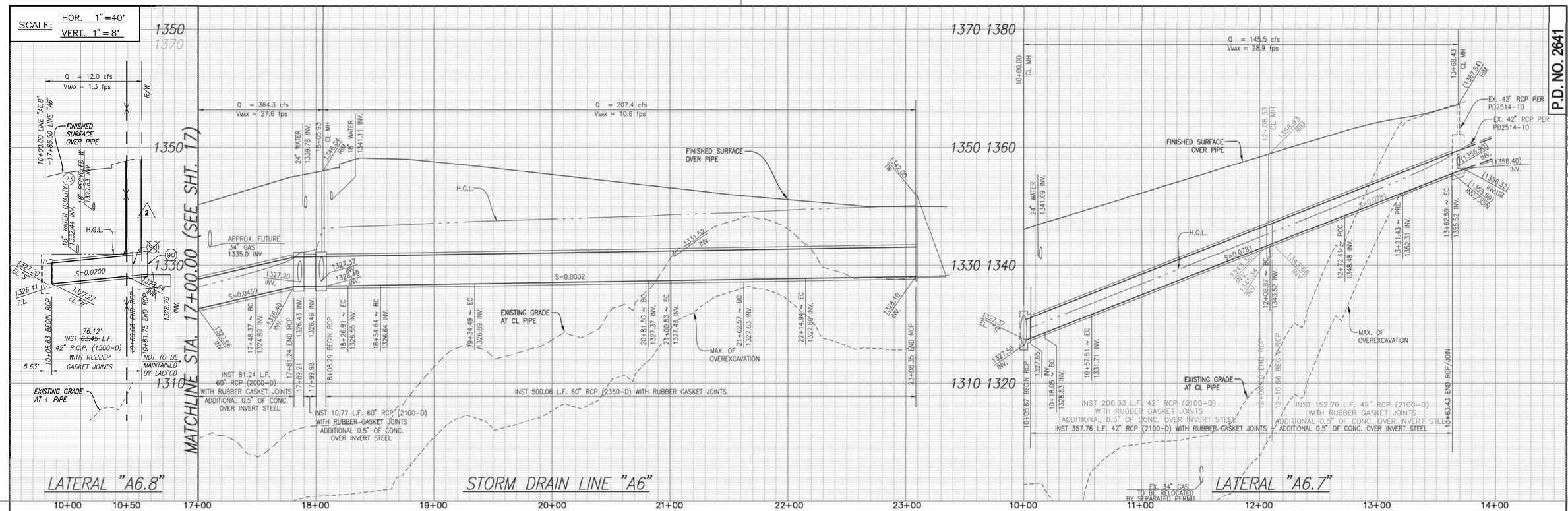
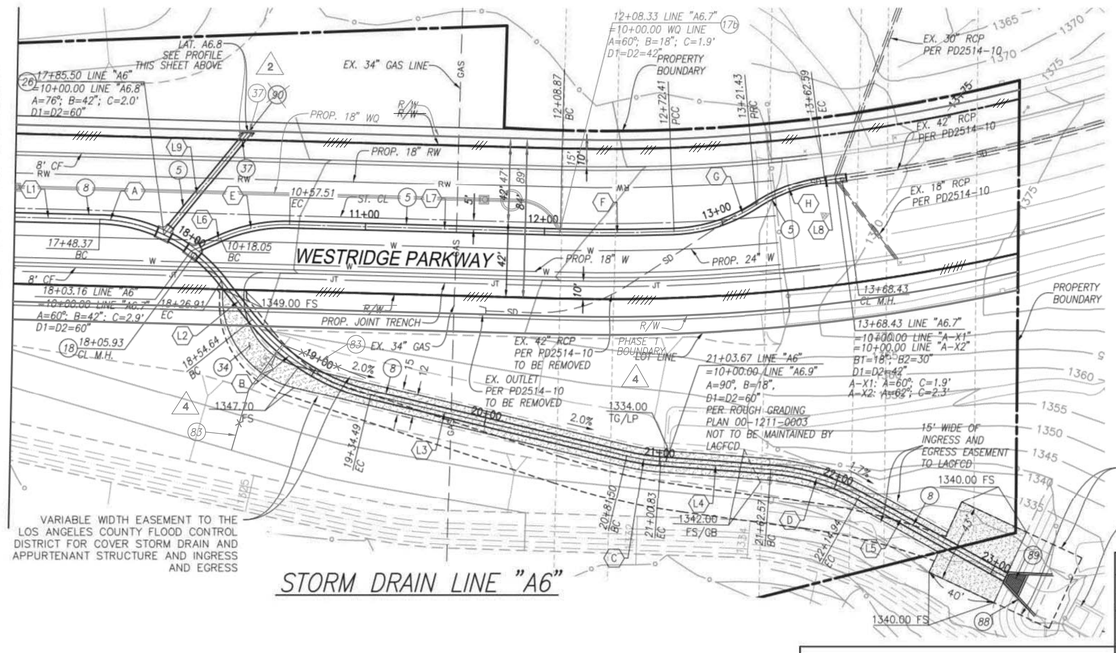
SCALE: HOR. 1"=40'
VERT. 1"=8'

P.D. NO. 2641

FOR PLAN CHECK ONLY





LINE "A6" LINE TABLE		
LINE	LENGTH	BEARING
L1	48.37'	S38°26'54"E
L2	27.73'	N11°33'06"E
L3	147.01'	N26°34'23"W
L4	61.74'	N35°48'19"W
L5	93.41'	N10°48'03"W

LINE "A6" CURVE TABLE				
	DELTA	RADIUS	LENGTH	TANGENT
A	50°00'00"	90.00'	78.54'	41.97'
B	38°07'29"	120.00'	79.85'	41.47'
C	09°13'56"	120.00'	19.34'	9.69'
D	25°00'16"	120.00'	52.37'	26.61'

LINE "A6.7" LINE TABLE		
LINE	LENGTH	BEARING
L6	18.05'	N63°33'50"W
L7	151.37'	S38°26'54"E
L8	0.84'	S47°04'02"E

LINE "A6.7" CURVE TABLE				
	DELTA	RADIUS	LENGTH	TANGENT
E	25°06'56"	90.00'	39.45'	20.05'
F	03°37'21"	1005.00'	63.54'	31.78'
G	31°12'04"	90.00'	49.01'	25.13'
H	26°12'18"	90.00'	41.16'	20.95'

LINE "A6.8" LINE TABLE		
LINE	LENGTH	BEARING
L9	74.06' 81.75'	N89°25'59"E

CONSTRUCTION NOTES

5 — INSTALL 42" R.C.P. (SEE PROFILE FOR D-LOAD)
8 — INSTALL 60" R.C.P. (SEE PROFILE FOR D-LOAD)
18 — CONSTRUCT M.H. PER S.P.P.W.C., STD. PLAN 322-2
26 — CONSTRUCT T.S. PER S.P.P.W.C., STD. PLAN 340-2
34 — CONSTRUCT 3" ASPHALT CONCRETE OVER 4" CRUSHED MISCELLANEOUS BASE PER DETAIL ON SHEET 22 (WIDTH PER PLAN)
37 — CONSTRUCT CLEANOUT PER DETAIL 37 ON SHEET 25
88 — CONSTRUCT HEADWALL PER CALTRANS STANDARD D90
89 — INSTALL INCLINED TRASH RACK PER S.P.P.W.C. 361-2
90 — CONSTRUCT BRICK AND MORTAR PLUG
176 — CONSTRUCT MODIFIED M.H. PER S.P.P.W.C. STD. PLAN NO. 320-2 PER DETAIL ON SHEET 33
73 — CONSTRUCT CONCRETE BLANKET PER S.P.P.W.C. 225
83 — CONSTRUCT CHAIN LINK FENCE AND GATE PER S.P.P.W.C. 225

GRAPHIC SCALE: 1" = 40'

Dwg No. 43-F553.1-38

REVIEWED LAND DEVELOPMENT DIVISION
BY Pete Mig STORM DRAIN SECTION 10/04/2018 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	REVISED TOTAL SHEET NUMBER.	Jason H. Fukumitsu		8/14/19
	REVISE HYDRAULIC ELEMENTS REVISE AND ADD LATERALS/MAINLINE REVISED "00" PRIVATE DRIVE			
4	REVISE RIGHT OF WAY AND BOUNDARY LINE ADDED FENCING AND GATE	Jason H. Fukumitsu		9/28/2021

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
8/29/18 JASON H. FUKUMITSU DATE

STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

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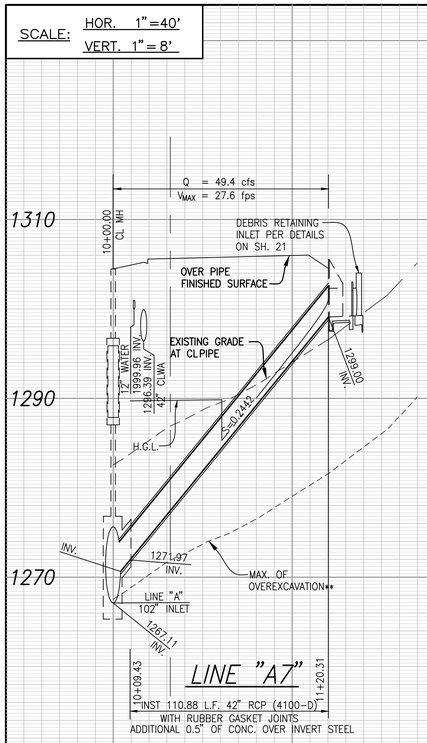
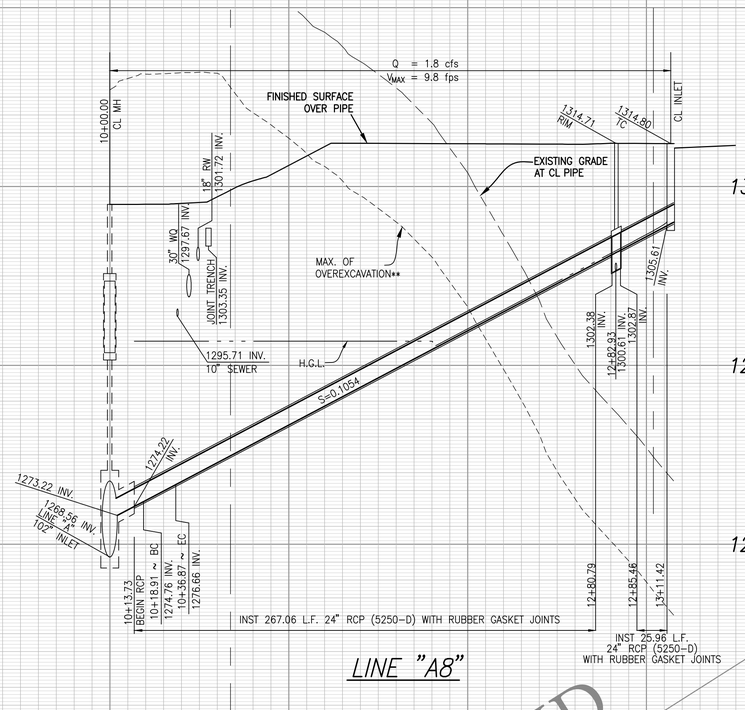
DWG | SHEET 18 OF 39

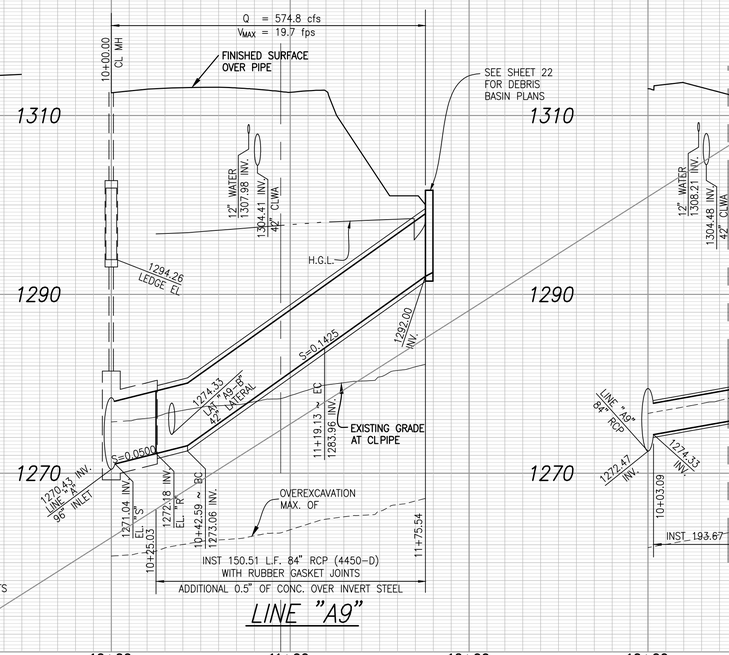
\\HPS\Project\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2641\NM0680-18_SD_Plan.dwg Plotted on Aug 28, 2018--1:51pm by wallisd

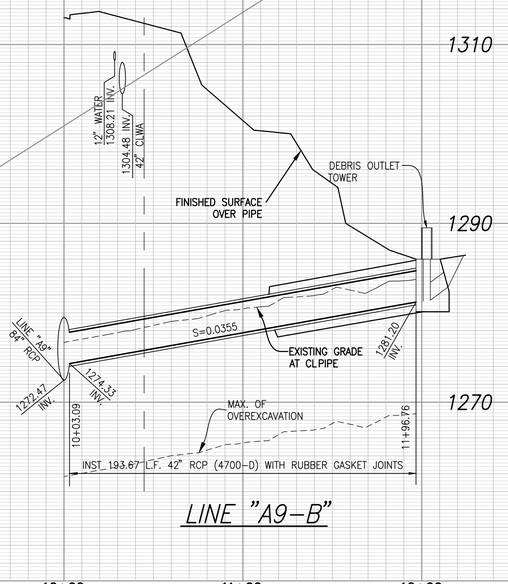
SCALE: HOR. 1"=40'
VERT. 1"=8'

P.D. NO. 2641









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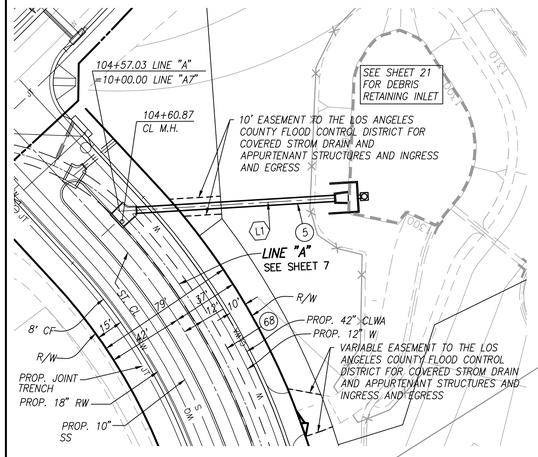

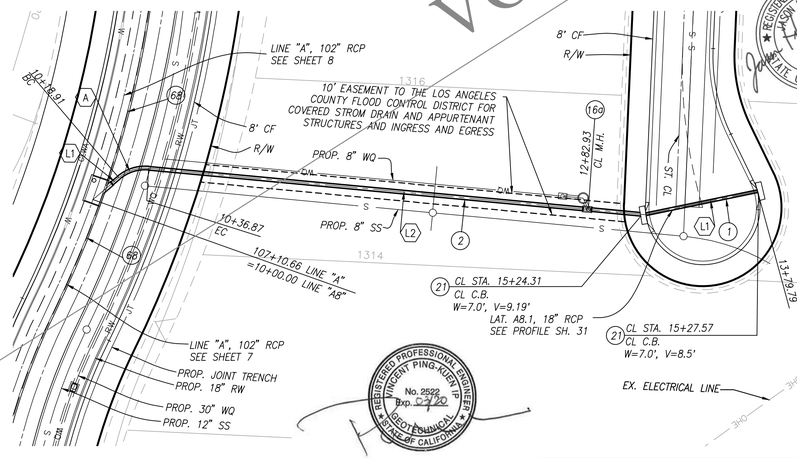

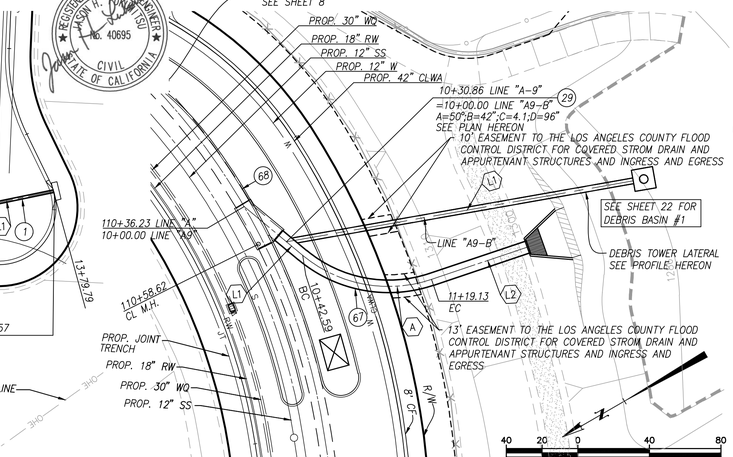

CONSTRUCTION NOTES

1. INSTALL 18" R.C.P. (SEE PROFILE FOR D-LOAD)
2. INSTALL 24" R.C.P. (SEE PROFILE FOR D-LOAD)
5. INSTALL 42" R.C.P. (SEE PROFILE FOR D-LOAD)
16. CONSTRUCT MODIFIED M.H. PER S.P.P.W.C., STD. PLAN 321-2 PER SHEET 33
21. CONSTRUCT CURB OPENING CATCH BASIN PER S.P.P.W.C. STD. PLAN NO. 300-3
29. CONSTRUCT J.S. PER S.P.P.W.C. STD. PLAN 331-3
67. INSTALL 84" R.C.P. (SEE PROFILE FOR D-LOAD)
68. INSTALL 102" R.C.P. (SEE PROFILE FOR D-LOAD)

Dwg No. 43-F553.1-38

VOID

STORM DRAIN LINE "A7"

LINE "A7" LINE TABLE		
LINE	LENGTH	BEARING
L1	120.31'	N26°34'22"E

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRIDE No. 1705 STATE OF CALIFORNIA

GRAPHIC SCALE: 1" = 40'

STORM DRAIN LINE "A8"

LINE "A8" LINE TABLE		
LINE	LENGTH	BEARING
L1	64.67'	S20°39'58"E
L2	278.24'	S04°39'21"E

LINE "A8" CURVE TABLE				
	DELTA	RADIUS	LENGTH	TANGENT
A	45°43'30"	22.50'	17.96'	9.49'

LINE "A8.1" LINE TABLE		
LINE	LENGTH	BEARING
L1	64.67'	S20°39'58"E

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-NIEN CHEN No. 2822 Exp. 9/30 GEOTECHNICAL STATE OF CALIFORNIA

GRAPHIC SCALE: 1" = 40'

REVIEWED LAND DEVELOPMENT DIVISION
BY STORM DRAIN SECTION 10/04/2018 DATE

STORM DRAIN LINE "A9"

LINE "A-9" LINE TABLE		
LINE	LENGTH	BEARING
L1	42.59'	N69°50'18"E
L2	56.40'	N11°22'16"E

LINE "A-9" CURVE TABLE				
	DELTA	RADIUS	LENGTH	TANGENT
A	58°28'02"	75.00'	76.53'	41.97'

LINE "A-9B" LINE TABLE		
LINE	LENGTH	BEARING
L1	196.76'	S20°01'12"W

GRAPHIC SCALE: 1" = 40'

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	VOIDED SHEET AND REPLACED WITH NEW SHEET	Jason H. Fukumitsu		8/14/19

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
8/29/18
JASON H. FUKUMITSU DATE

STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

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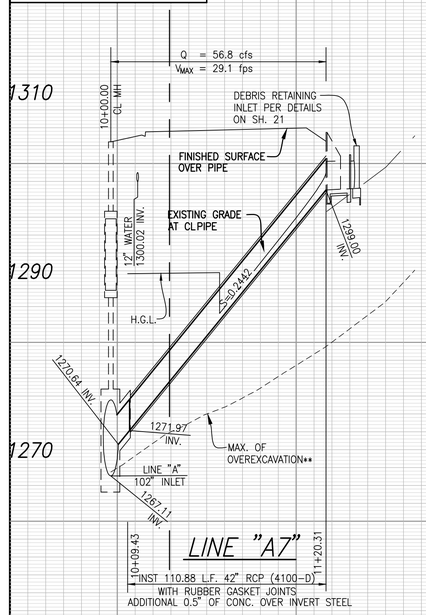
DWG | SHEET 19 OF 37

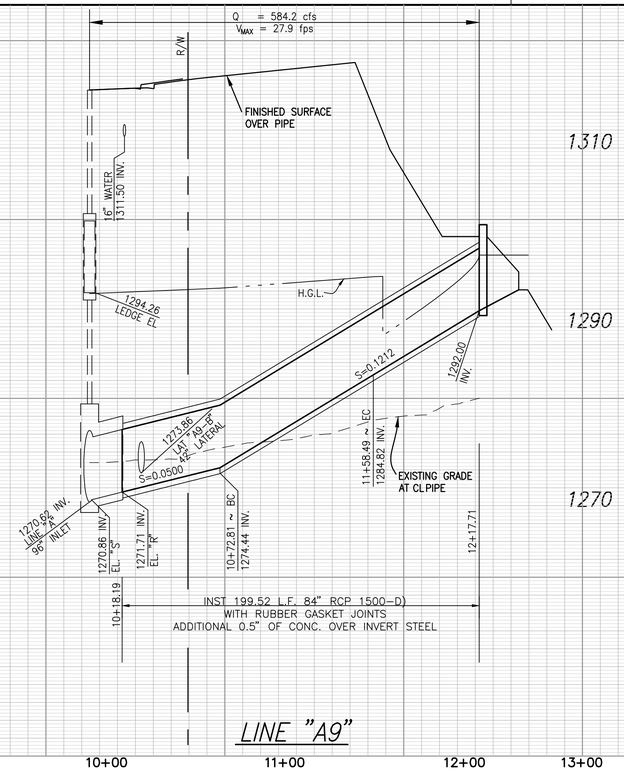
G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2641\VM\080-19_SD_Plan.dwg Plotted on Aug 23, 2018-4:10pm by pstivary

SCALE: HOR. 1"=40'
VERT. 1"=8'

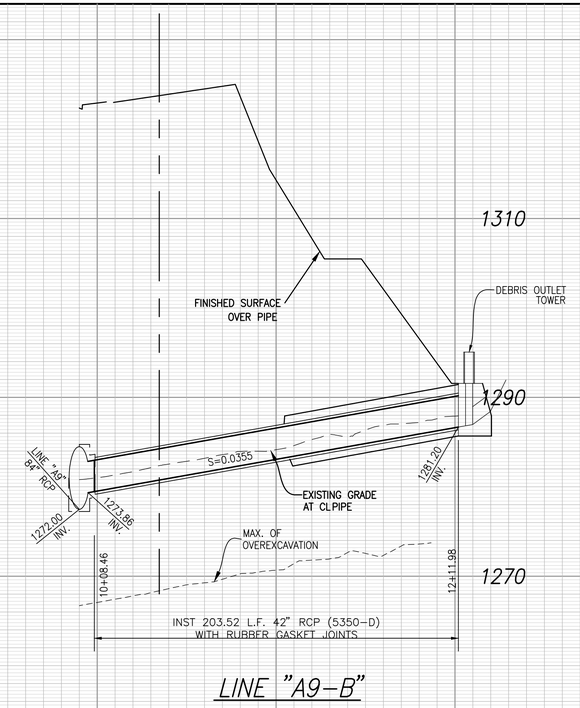
P.D. NO. 2641
FOR PLAN CHECK ONLY



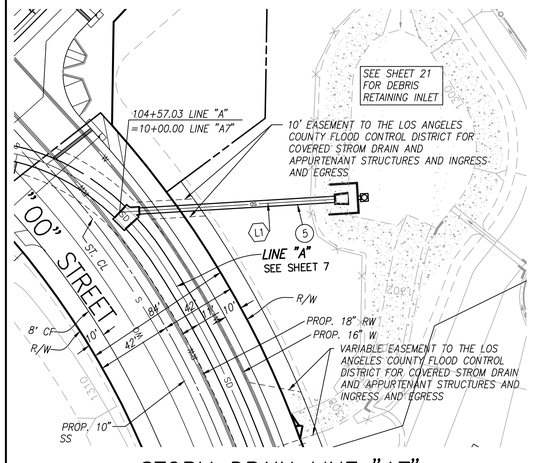
LINE "A7"



LINE "A9"

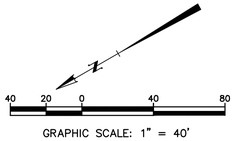


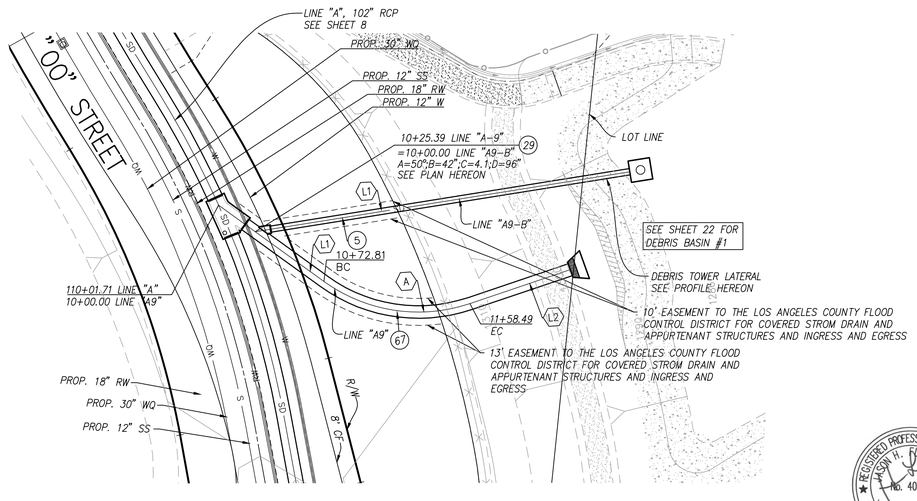
LINE "A9-B"



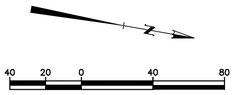
STORM DRAIN LINE "A7"

LINE "A7" LINE TABLE		
LINE	LENGTH	BEARING
(L1)	120.31'	N26°34'22"E





STORM DRAIN LINE "A9"



REVIEWED LAND DEVELOPMENT DIVISION
BY _____ 8/14/19
STORM DRAIN SECTION DATE

CONSTRUCTION NOTES

(1) INSTALL 18" R.C.P. (SEE PROFILE FOR D-LOAD)
(2) INSTALL 24" R.C.P. (SEE PROFILE FOR D-LOAD)
(5) INSTALL 42" R.C.P. (SEE PROFILE FOR D-LOAD)
(16g) CONSTRUCT MODIFIED M.H. PER S.P.P.W.C.. STD. PLAN 321-2
(29) PER SHEET 33 CONSTRUCT J.S. PER S.P.P.W.C. STD. PLAN 331-3
(67) INSTALL 84" R.C.P. (SEE PROFILE FOR D-LOAD)

LINE "A-9" LINE TABLE		
LINE	LENGTH	BEARING
(L1)	72.81'	N65°54'50"E
(L2)	59.23'	N11°22'16"E

LINE "A-9" CURVE TABLE				
	DELTA	RADIUS	LENGTH	TANGENT
(A)	54°32'34"	90.00'	85.68'	46.40'

LINE "A-9B" LINE TABLE		
LINE	LENGTH	BEARING
(L1)	211.98'	S20°54'50"W

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRIDE No. 1709 STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-KUEN IP No. 2522 Exp. 9-30-20 GEOTECHNICAL STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	REPLACEMENT FOR SHEET 20	Jason H. Fukumitsu		8/14/19

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
Jason H. Fukumitsu 5/14/2019
JASON H. FUKUMITSU DATE

STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
26074 Avenue Hall, Suite 23 • Valencia, CA 91355 • PH: (661) 294-2211 • FX: (661) 294-9890

DWG | SHEET 19A OF 39

Dwg No. 43-F553.1-38

G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2641\HM\08-19_SD_Plan LINE A7-A9.dwg Plotted on Jul 08, 2019-10:05am by dinar

SCALE: HOR. 1"=40'
VERT. 1"=8'

P.D. NO. 2641

Q = 24.80 cfs
V_{MAX} = 18.5 fps

Q = 22.40 cfs
V_{MAX} = 15.2 fps

Q = 22.20 cfs
V_{MAX} = 13.0 fps

Q = 21.90 cfs
V_{MAX} = 10.6 fps

Q = 21.60 cfs
V_{MAX} = 10.2 fps

Q = 13.90 cfs
V_{MAX} = 11.4 fps

Q = 13.90 cfs
V_{MAX} = 11.4 fps

1350
1330
1310
1290

10+00.00 CL MH
1323.90 RIM
18" RW 1311.27 INV.
10" SEWER 1305.01 INV.
1305.48 INV.
30" WCI
JOINT TRENCH 1313.64 INV.
MAX. OF OVEREXCAVATION**
S=0.0811
1288.71 INV.
1285.64 INV.
1289.20 INV.
LINE "A" 96" INLET
10+09.58 BEGIN RCP
10+16.15 ~ BC 1289.70 INV.
10+61.71 ~ EC 1293.39 INV.
11+12.29 ~ BC 1297.50 INV.
FINISHED SURFACE OVER PIPE
1326.24 RIM
6" WATER 1320.10 INV.
JOINT TRENCH 1320.90 INV.
12+24.93 INV.
12+31.27 INV.
12+43.63 INV.
12+47.82 INV.
12+53.80 INV.
13+07.01 INV.
12+65.10 CL JS
12+87.91
12+89.15 CL MH
12+93.52
1310.66 INV. 18" LAT "A10.1"
1312.28 INV. 18" LAT "A10.2"
1311.74 INV.
1311.92 INV.
EXISTING GRADE AT CL PIPE
H.G.L.
S=0.0313
MAX. OF OVEREXCAVATION**
15+49.59 ~ EC 1319.95 INV.
15+52.81 INSIDE WALL
15+63.63 INSIDE WALL
1322.35 INV. 18" LAT "A10.4"
1321.00 INV. 18" LAT "A10.3"
1321.24 INV. 18" LAT "A10.5"
15+88.04
15+91.04 CL MH
1332.65 RIM
8" WATER 1333.12 INV.
JOINT TRENCH 1333.91 INV.
15+98.51
15+99
1321.48 INV.
1321.15 INV.
17+97.27
18+00.00 CL M.H.
1344.09 RIM
1335.77 INV. 42" CLWA
16" WATER 1339.47 INV.
JOINT TRENCH 1339.67 INV.
FINISHED SURFACE OVER PIPE
SEAL END WITH 8" BRICK & MORTAR
S=0.0313
1327.72 INV.
1327.87 INV.
18+02.33
18+21.17 ~ BC 1328.47 INV.
18+41.79 ~ EC 1329.11 INV.
18+56.65 1329.57
18+56.65 END RCP
MAX. OF OVEREXCAVATION**

** IF FINAL OVEREXCAVATION TRANSITION FALLS WITHIN PIPE RUBBER GASKET JOINTS WILL BE REQUIRED. PROVIDE RUBBER GASKET JOINTS ON EACH SIDE OF TRANSITION (3 JOINTS MIN. EACH SIDE)

INST 277.33 L.F. 30" RUBBER GASKET RCP (3500-D)
ADDITIONAL 0.5" OF CONC. OVER INVERT STEEL

INST 294.53 L.F. 30" RUBBER GASKET RCP (2000-D)
ADDITIONAL 0.5" OF CONC. OVER INVERT STEEL

INST 198.76 L.F. 30"RUBBER GASKET RCP (2000-D)

INST 54.32 L.F. 30" RUBBER GASKET RCP (2000-D)

NOT TO BE MAINTAINED BY LACFCD

10+00 11+00 12+00 13+00 14+00 15+00 16+00 17+00 18+00 19+00

VOID

STORM DRAIN LINE "A10"

PROJECT BOUNDARY
R/W
LINE A, 96" RCP SEE SHEET 8
"00" PRIVATE DRIVE
"LL2" PRIVATE DRIVE
12+65.10 LINE "A-10" =10+00.00 LAT "A10.1" A=73°; B=18" C=1.7'; D1=D2=30" SEE PROFILE SH. 31
12+27.27 CL M.H.
113+45.19 LINE "A" =10+00.00 LINE "A-10"
12+89.15 LINE "A-10" =10+00.00 LAT "A10.2" A=43°; B=18" C=2.6'; D1=D2=30" SEE PROFILE SH. 31
CL STA. 40+00.31 CL C.B. W=3.5', V=8.0'
PROP. 42" CLWA
PROP. JOINT TRENCH
PROP. 16" W
PROP. 18" RW
CL STA. 10+45.00 CL C.B. W=7.0', V=8.0'
15+63.63 LINE "A-10" =10+00.00 LAT "A10.4" A=90°; B=18" C=1.3'; D1=D2=30" SEE PROFILE SH. 31
ST. STA. 37+39.81 CL C.B. W=7.0', V=8.0'
15+52.81 LINE "A-10" =10+00.00 LAT "A10.3" A=57°53; B=18" C=2.9'; D1=D2=30" SEE PROFILE SH. 31
ST. STA. 37+40.28 CL C.B. W=7.0', V=5.0'
15+91.04 LINE "A-10" =10+00.00 LAT "A10.5" A=30°; B=30" C=4.7'; D1=D2=30" SEE PROFILE SH. 31
10+59.06 LINE "A-10.5" =10+00.00 LINE "A-10.6" =10+00.00 LINE "A-10.7" A1=A2=90°; B1=B2=18" D1=D2=30" SEE PROFILES SH. 31
8' CF
PROP. 42" CLWA
PROP. 8" SS LINE
CL STA. 10+50.00 CL C.B. W=14.0', V=5.0'
LINE "A10.6" SEE SHEET 31
10+77.00 LINE "A10.5" =10+00.00 LAT "A10.8" =10+00.00 LAT "A10.9" A=60°; B=24" C=4.7'; D1=D2=30" SEE PROFILE SH. 31
ST. STA. 10+50.00 CL C.B. W=14.0', V=8.0'
LINE "A10.7" SEE SHEET 31
18+00.00 CL M.H.
18+20.34 PRC
18+40.96 PRC
15+49.59 PRC
LAT "A10.5" SHEET 31
CL M.H. 15+91.04
1324
1320

CONSTRUCTION NOTES

1. INSTALL 18" R.C.P. (SEE PROFILE FOR D-LOAD)
2. INSTALL 24" R.C.P. (SEE PROFILE FOR D-LOAD)
3. INSTALL 30" R.C.P. (SEE PROFILE FOR D-LOAD)
16. CONSTRUCT M.H. PER S.P.P.W.C. STD. PLAN 321-2
16a. CONSTRUCT MODIFIED MH PER SPPWC STD. PLAN 321-2 SEE SHEET 33
18. CONSTRUCT M.H. PER S.P.P.W.C.. STD. PLAN 322-2
21. CONSTRUCT CURB OPENING CATCH BASIN PER S.P.P.W.C. STD. PLAN NO. 300-3
29. CONSTRUCT J.S. PER S.P.P.W.C. STD. PLAN 331-2
37. CONSTRUCT CLEANOUT PER DETAIL 37 ON SHEET 25
38. CONSTRUCT MANHOLE SAFETY LEDGE PER S.P.P.W.C. STD. PLAN 330-1
90. CONSTRUCT BRICK AND MORTAR PLUG

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRICE No. 1705 STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-KENT LO No. 2522 Exp. 6/30/20 CIVIL STATE OF CALIFORNIA

Dwg No. 43-F553.1-38

LINE "A10" LINE TABLE

LINE	LENGTH	BEARING
L1	16.15'	S37°00'54.51"E
L2	50.58'	S21°00'03.16"W
L3	270.75'	S24°58'19.23"E
L4	29.17'	S77°30'11.17"E
L5	45.56'	S78°31'33"W
L6	25.96'	N45°17'35"E
L7	20.78'	N35°01'41"E
L8	9.48'	S64°50'59"W
L9	10.42'	S05°01'41"W
L10	47.07'	S65°09'07"W
L11	11.91'	N24°50'53"W

LINE "A10" LINE TABLE

LINE	LENGTH	BEARING
L12	22.10'	N24°50'53"W
L13	27.52'	S54°50'53"E
L14	39.47'	N05°09'07"E

LINE "A10" CURVE TABLE

	DELTA	RADIUS	LENGTH	TANGENT
A	58°00'58"	45.00'	45.57'	24.95'
B	45°58'22"	545.00'	437.30'	231.19'
C	52°31'52"	22.50'	20.63'	11.10'
D	60°07'26"	22.50'	23.61'	13.02'

STORM DRAIN LINE "A10"

GRAPHIC SCALE: 1" = 40'

REVIEWED LAND DEVELOPMENT DIVISION
BY Pete Mig STORM DRAIN SECTION 10/04/2018 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	VOIDED SHEET AND REPLACED WITH NEW SHEET	Jason H. Fukumitsu		8/14/19

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
8/29/18 JASON H. FUKUMITSU DATE

STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

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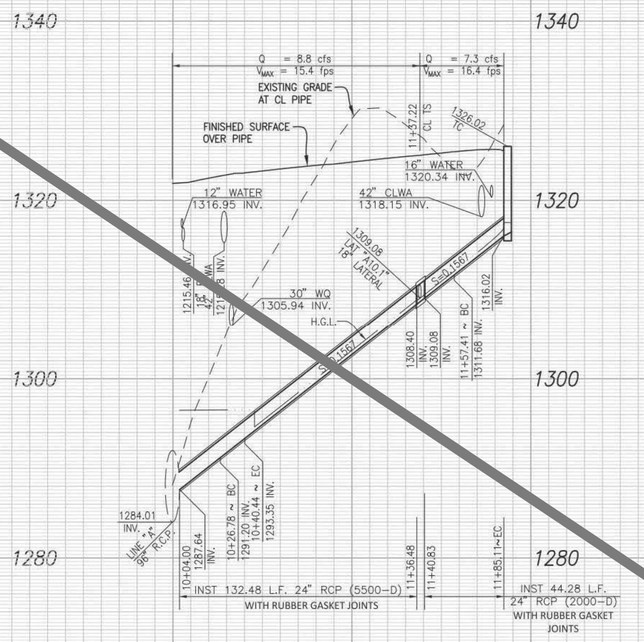
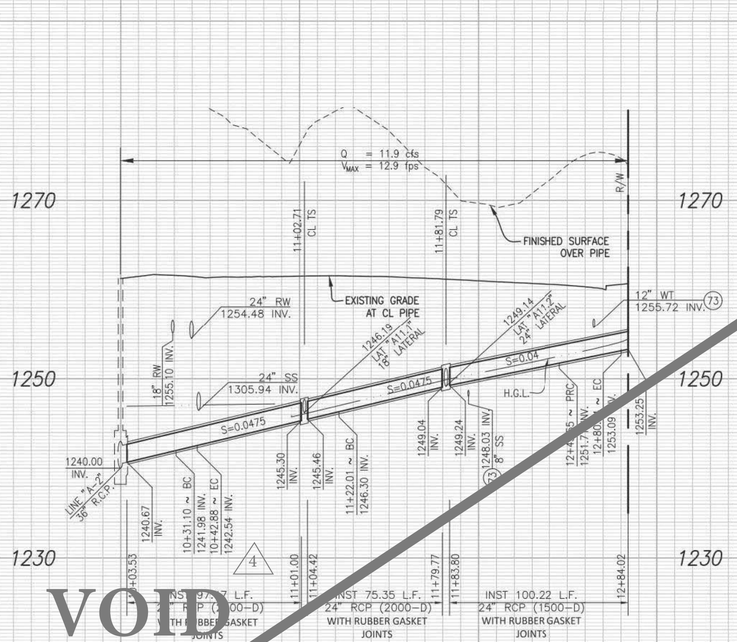
DWG | SHEET 20 OF 37

G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2641\MM1080-20_SD_Plan.dwg Plotted on Jun 25, 2018-8:18pm by jonga

SCALE: HOR. 1"=40'
VERT. 1"=8'





VOID

P.D. NO. 2641

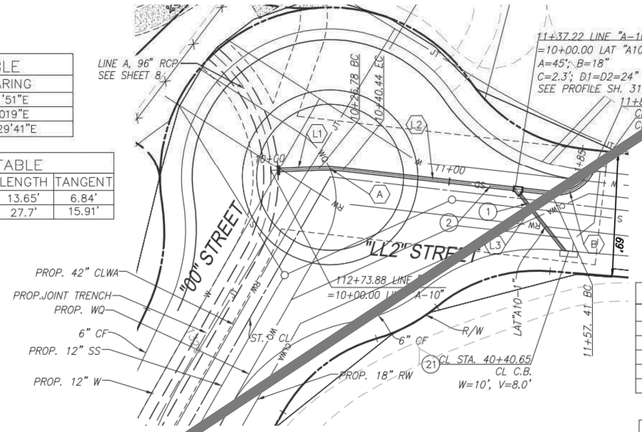
FOR PLAN CHECK ONLY

10+00 11+00 12+00

STORM DRAIN LINE "A10"

LINE "A10" LINE TABLE		
LINE	LENGTH	BEARING
L1	26.78'	S12°11'51"E
L2	116.98'	S03°30'19"E
L3	44.01'	N41°29'41"E

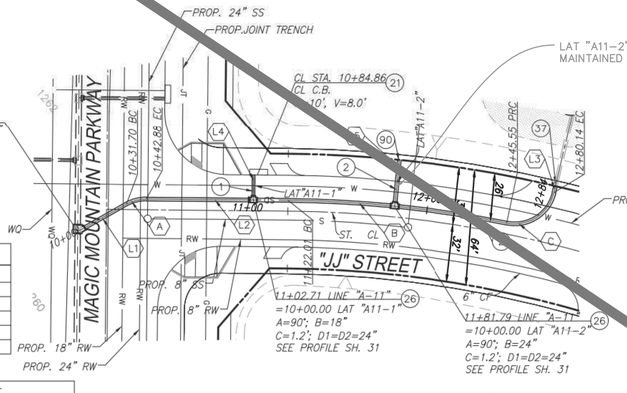
LINE "A10" CURVE TABLE				
	DELTA	RADIUS	LENGTH	TANGENT
A	08°41'32"	90'	13.65'	6.84'
B	70°31'44"	22.50'	27.7'	15.91'



LINE "A11" LINE TABLE		
LINE	LENGTH	BEARING
L1	31.10'	S19°28'41"E
L2	79.13'	S10°31'19"W
L3	3.87'	S66°47'16"E
L4	14.00'	S79°28'41"E
L5	26.00'	S74°15'25"E

LINE "A11" CURVE TABLE				
	DELTA	RADIUS	LENGTH	TANGENT
A	30°00'00"	22.50'	11.78'	6.03'
B	10°47'23"	656.00'	123.54'	61.95'
C	88°05'59"	22.50'	34.60'	21.77'

STORM DRAIN LINE "A11"



CONSTRUCTION NOTES

1. INSTALL 18" R.C.P. (SEE PROFILE FOR D-LOAD)
2. INSTALL 24" R.C.P. (SEE PROFILE FOR D-LOAD)
21. CONSTRUCT CURB OPENING CATCH BASIN PER S.P.P.W.C. STD. PLAN NO. 300-3 MODIFIED CATCH BASIN PER DETAIL ON SHEET 38 AND SHEET 39
26. CONSTRUCT T.S. PER S.P.P.W.C. STD. PLAN 340-2
37. CONSTRUCT CLEANOUT PER DETAIL 37 ON SHEET 25
90. CONSTRUCT BRICK AND MORTAR PLUG
73. CONSTRUCT CONCRETE BLANKET PER S.P.P.W.C 225-2

STORM DRAIN LINE "A10"

STORM DRAIN LINE "A11"

GRAPHIC SCALE: 1" = 40'

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRIDE No. 1705 STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-HSIEN HSIEH No. 2522 Exp. 6/30 GEOTECHNICAL STATE OF CALIFORNIA

REVIEWED LAND DEVELOPMENT DIVISION

BY _____ STORM DRAIN SECTION 8/14/19 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	VOIDED SHEET 20 AND REPLACED WITH SHEET 20A			8/14/19
3	ADDED MAINTENANCE RESPONSIBILITY NOTE			3/15/2021
4	VOID SHEET 20A AND REPLACE WITH SHEET 20B			9/28/2021

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

5/14/2019
JASON H. FUKUMITSU DATE

STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

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DWG | SHEET 20A OF 39

Dwg No. 43-F553.1-38

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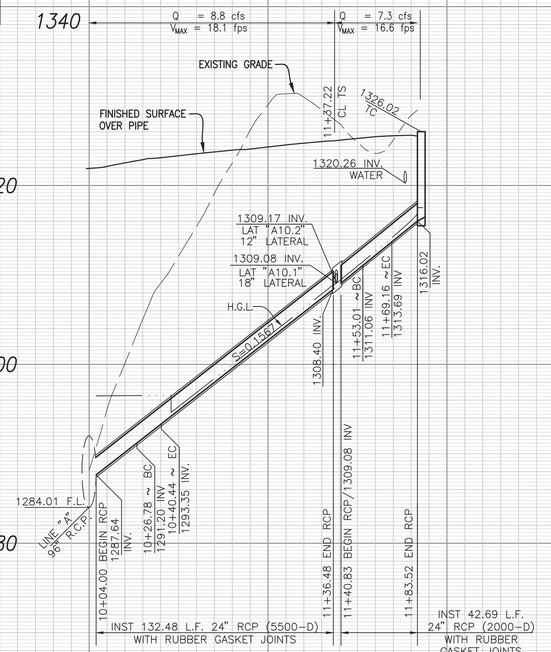
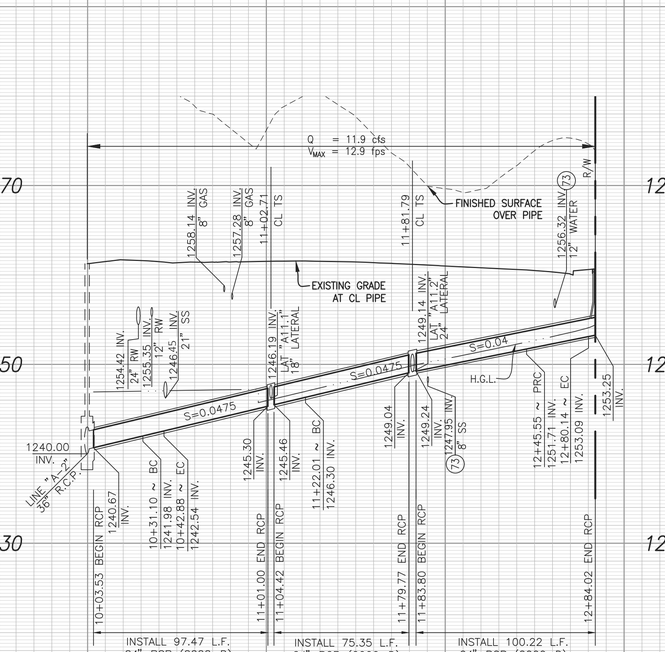
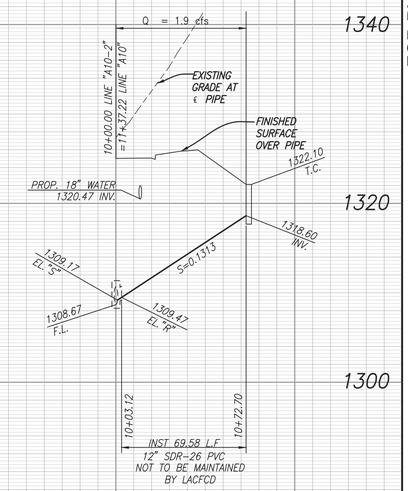
SCALE: HOR. 1"=40'
VERT. 1"=8'



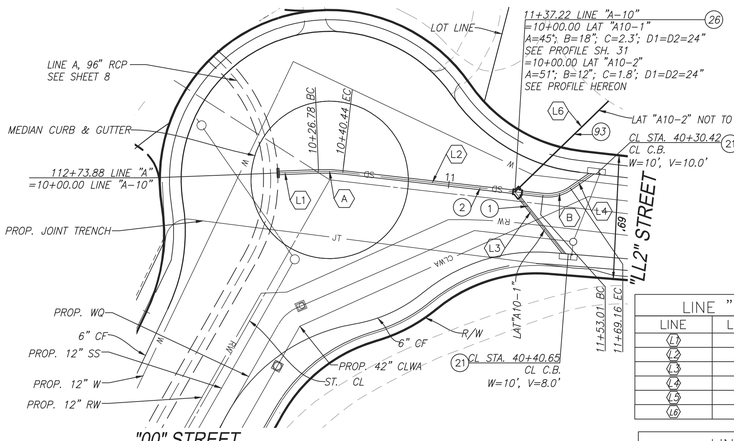




P.D. NO. 2641

FOR PLAN CHECK ONLY

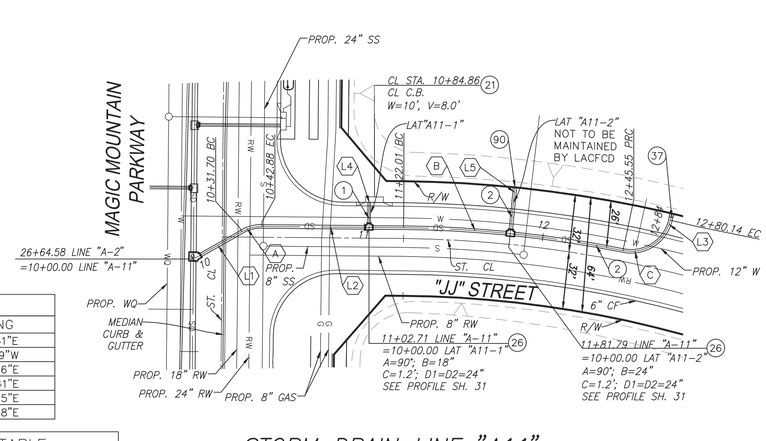
STORM DRAIN LINE "A10"



LINE "A10" LINE TABLE		
LINE	LENGTH	BEARING
L1	26.78'	S12°11'51"E
L2	112.57'	S03°30'19"E
L3	44.01'	N41°29'41"E
L4	14.36'	N50°18'08"E

LINE "A10" CURVE TABLE				
	DELTA	RADIUS	LENGTH	TANGENT
A	08°41'32"	90'	13.65'	6.84'
B	41°08'09"	22.50'	16.15'	8.44'

STORM DRAIN LINE "A11"



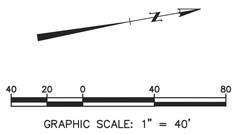
LINE "A11" LINE TABLE		
LINE	LENGTH	BEARING
L1	31.10'	S19°28'41"E
L2	79.13'	S10°31'19"W
L3	3.87'	S66°47'16"E
L4	14.00'	S79°28'41"E
L5	26.00'	S74°15'25"E
L6	72.70'	S54°13'28"E

LINE "A11" CURVE TABLE				
	DELTA	RADIUS	LENGTH	TANGENT
A	30°00'00"	22.50'	11.78'	6.03'
B	10°47'23"	656.00'	123.54'	61.95'
C	88°05'59"	22.50'	34.60'	21.77'

SD LINE "A10-2"

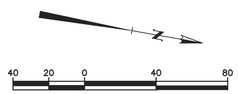
CONSTRUCTION NOTES

1 — INSTALL 18" R.C.P. (SEE PROFILE FOR D-LOAD)
2 — INSTALL 24" R.C.P. (SEE PROFILE FOR D-LOAD)
21 — CONSTRUCT CURB OPENING CATCH BASIN PER S.P.P.W.C. STD. PLAN NO. 300-3 MODIFIED CATCH BASIN PER DETAIL ON SHEET 38 AND SHEET 39
26 — CONSTRUCT T.S. PER S.P.P.W.C. STD. PLAN 340-2
37 — CONSTRUCT CLEANOUT PER DETAIL 37 ON SHEET 25
73 — CONSTRUCT CONCRETE BLANKET PER S.P.P.W.C 225-2
90 — CONSTRUCT BRICK AND MORTAR PLUG
93 — INSTALL 12" PVC SDR-26 PIPE WITH BENDS AND FITTINGS AS REQUIRED



GRAPHIC SCALE: 1" = 40'

STORM DRAIN LINE "A10"



GRAPHIC SCALE: 1" = 40'

STORM DRAIN LINE "A11"

REVIEWED LAND DEVELOPMENT DIVISION

BY _____ STORM DRAIN SECTION DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
4	VOIDED SHEET 20A AND REPLACED WITH SHEET 20B AND ADDED LAT. A10-2 AND CROSSING LOCATIONS WERE MODIFIED.	Jason H Fukumitsu	M.D. Eff'd	9/28/2021

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

Jason H Fukumitsu 8/16/21
JASON H. FUKUMITSU DATE

STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

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DWG

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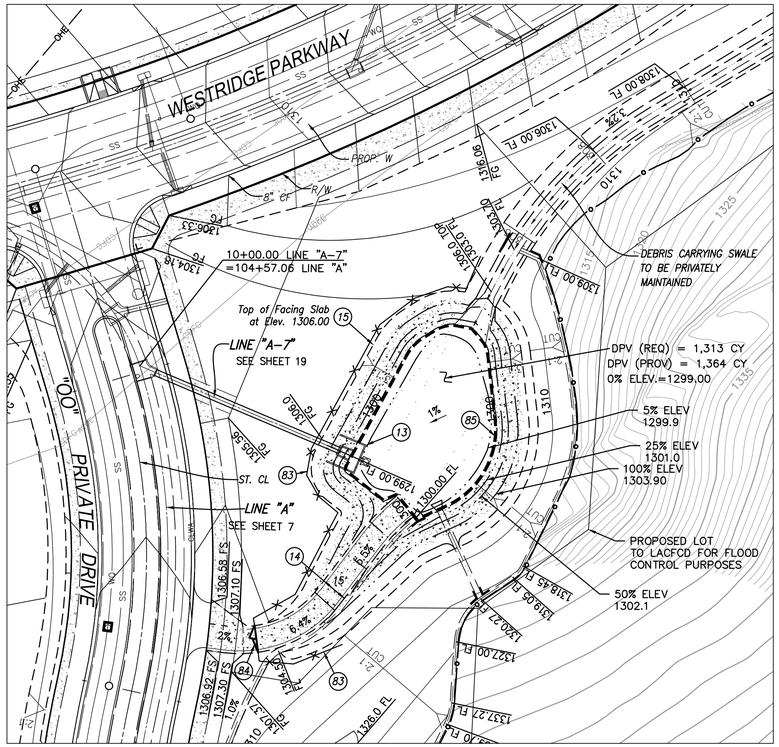
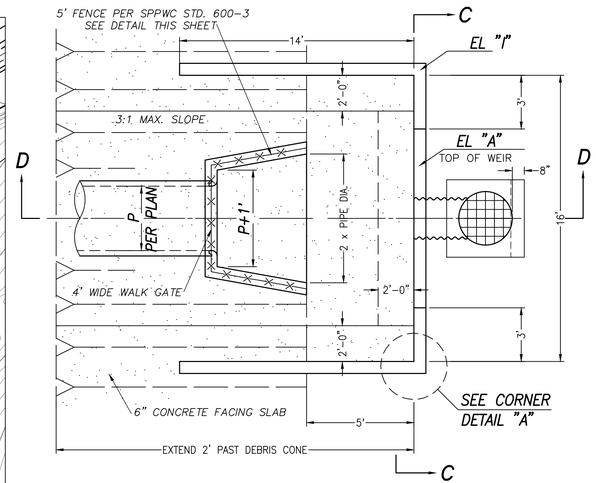
P.D. NO. 2641



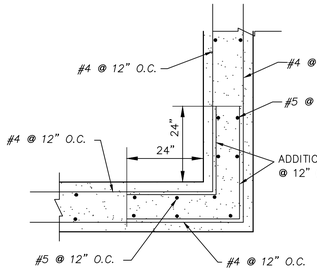
DEBRIS RETAINING INLET

SEE SHEET 19

GRAPHIC SCALE: 1" = 40'



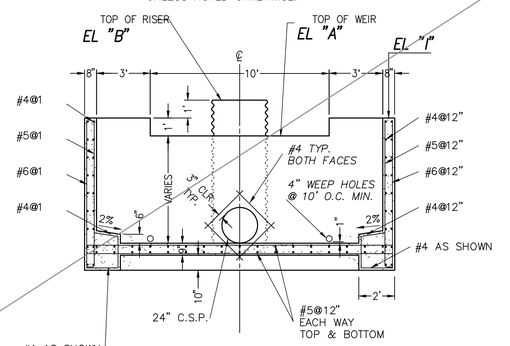
PLAN



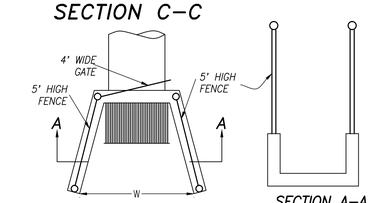
CORNER DETAIL "A"

N.T.S.

NOTE: STEEL SHALL BE 2 " CLEAR UNLESS NOTED OTHERWISE.

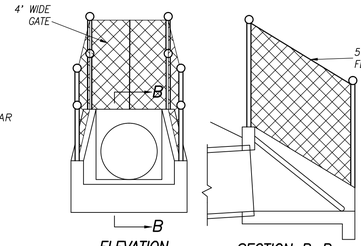


SECTION C-C



PLAN

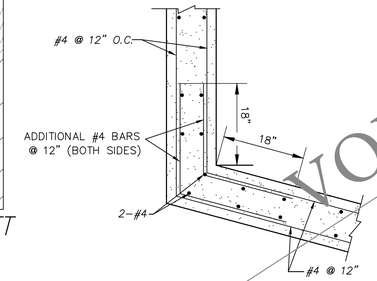
SECTION A-A



ELEVATION

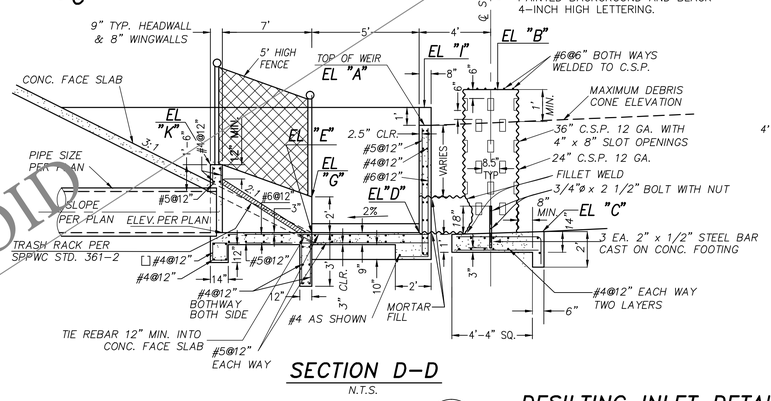
SECTION B-B

CHAIN LINK FENCE, GATE
NOT TO SCALE



CORNER DETAIL "B"

N.T.S.



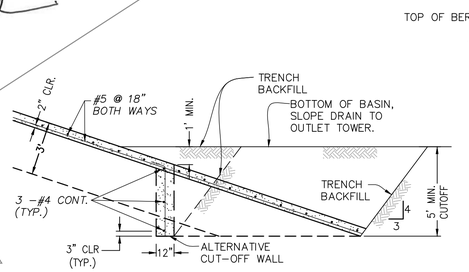
SECTION D-D

N.T.S.

INSTALL SEDIMENT GAUGE BOARDS PAINTED ON C.S.P. TOWER, MARK 0%, 5%, 25%, 50%, AND 100% LEVELS ON TOWER WITH WHITE PAINTED BACKGROUND AND BLACK 4-INCH HIGH LETTERING.

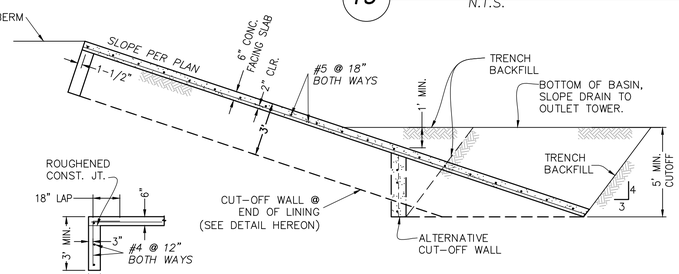
13 DESILTING INLET DETAILS

N.T.S.



85 CUTOFF WALL DETAIL

N.T.S.



FRONT CUT OFF WALL

N.T.S.

NOTES:

1. SEE GRADING PLANS FOR GRADING DETAILS OF BASIN.

CONSTRUCTION NOTES:

13 CONSTRUCT DESILTING INLET PER DETAILS HEREON

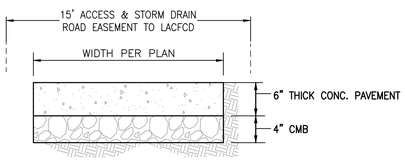
14 CONSTRUCT 6" THICK CONC. ACCESS ROAD OVER 4" CRUSHED MISCELLANEOUS BASE PER DETAILS HEREON (WIDTH PER PLAN)

15 CONSTRUCT CONC. FACING/SLOPE PROTECTION PER DETAILS HEREON

83 CONSTRUCT CHAIN LINK FENCE PER S.P.P.W.C. ST.D PLAN NO 600-3

84 CONSTRUCT DOUBLE DRIVE GATE PER S.P.P.W.C. STD. PLAN NO 600-3 (W=12' PER LEAF)

85 CONSTRUCT CUT OF WALL PER DETAIL HEREON



GEOTECHNICAL NOTES:

1. ALL RECOMMENDED MITIGATION MEASURES, PER THE GEOTECHNICAL ENGINEER.
2. THE SOIL ENGINEER OF RECORD SHALL INSPECT AND APPROVE THE FOUNDATION EXCAVATIONS BEFORE STEEL OR CONCRETE IS PLACED.

*BRUSHED SURFACE IS REQUIRED FOR ACCESS ROAD WHEN RAMP EXCEEDS 10% IN SLOPE

14 CONCRETE ACCESS ROAD

N.T.S.

15 CONCRETE FACING SLAB

N.T.S.

DESILTING INLET STRUCTURE

		ELEVATIONS					
SHT. NO.	LINE	A	B	C	D	E	I
19	A-7	1303.90	1305.90	1299.65	1299.25	1299.15	1304.90

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	VOIDED SHEET AND REPLACED WITH NEW SHEET			8/14/19

REVIEWED LAND DEVELOPMENT DIVISION

BY _____ STORM DRAIN SECTION 10/04/2018 DATE

REGISTERED PROFESSIONAL ENGINEER — VINCENT PING-KUEN IP — No. 2522 — Exp. 6-30-20 — GEOTECHNICAL — STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST — ANDREW A. PRICE — No. 1705 — STATE OF CALIFORNIA

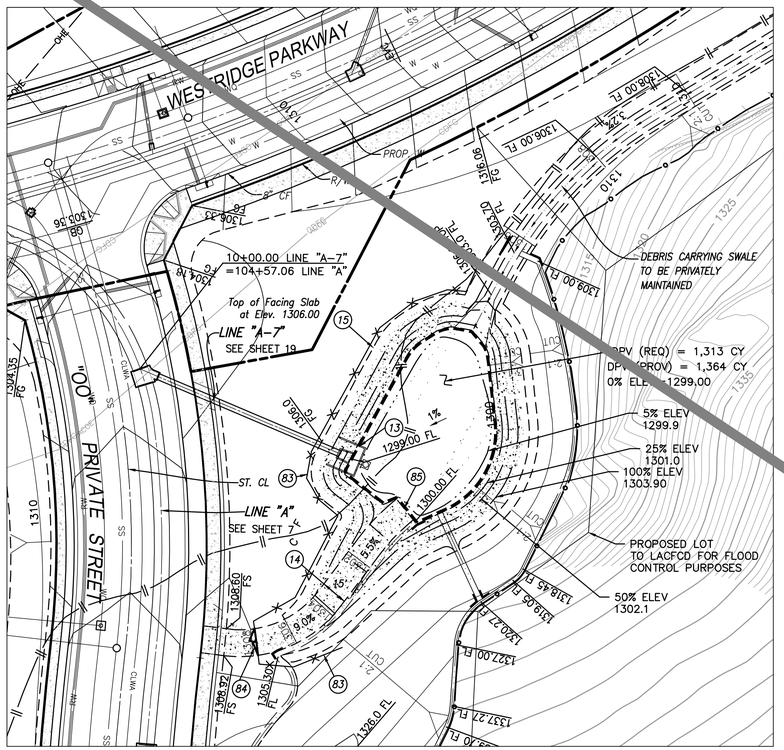
REGISTERED PROFESSIONAL ENGINEER — JASON H. FUKUMITSU — No. 40695 — CIVIL — STATE OF CALIFORNIA — 8/29/18 — JASON H. FUKUMITSU DATE

STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
26074 Avenue Hall, Suite 23 ▪ Valencia, CA 91355 ▪ PH: (661) 294-2211 ▪ FX: (661) 294-9890

DWG | SHEET 21 OF 37

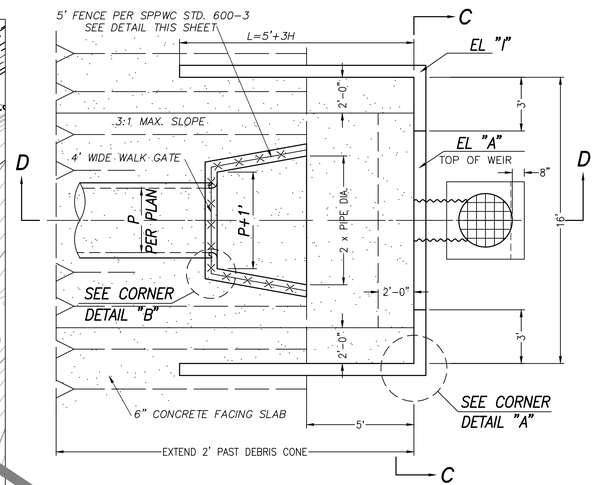
Dwg No. 43-F553.1-38



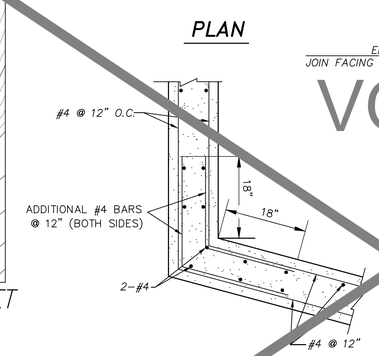
DEBRIS RETAINING INLET
SEE SHEET 19

N

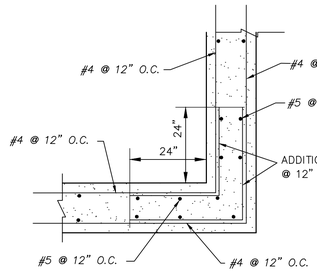
40 20 0 40 80
GRAPHIC SCALE: 1" = 40'



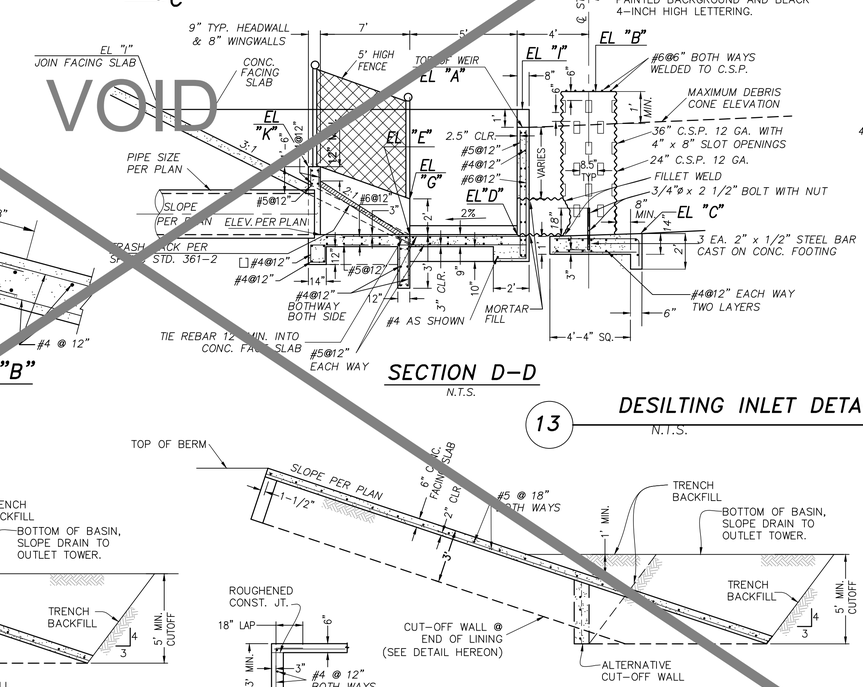
PLAN



CORNER DETAIL "B"
N.T.S.

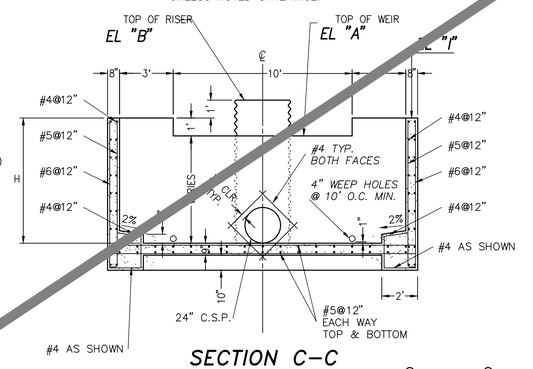


CORNER DETAIL "A"
N.T.S.

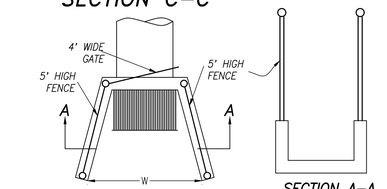


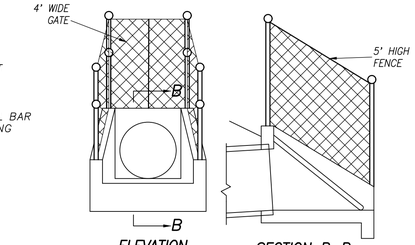
SECTION D-D
N.T.S.

NOTE: STEEL SHALL BE 2 " CLEAR UNLESS NOTED OTHERWISE.



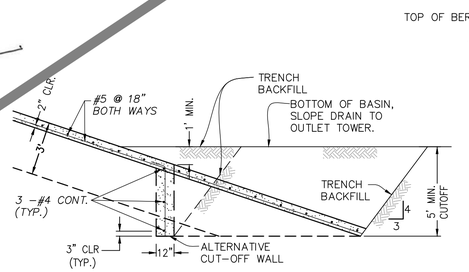
SECTION C-C





CHAIN LINK FENCE, GATE
NOT TO SCALE

DESILTING INLET DETAILS
13
N.T.S.

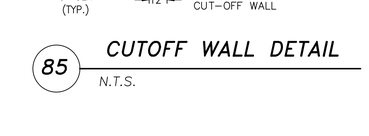


GEOTECHNICAL NOTES:

1. ALL RECOMMENDED MITIGATION MEASURES, PER THE GEOTECHNICAL ENGINEER.
2. THE SOIL ENGINEER OF RECORD SHALL INSPECT AND APPROVE THE FOUNDATION EXCAVATIONS BEFORE STEEL OR CONCRETE IS PLACED.

*BRUSHED SURFACE IS REQUIRED FOR ACCESS ROAD WHEN RAMP EXCEEDS 10% IN SLOPE

CONCRETE ACCESS ROAD
14
N.T.S.



CUTOFF WALL DETAIL
85
N.T.S.

FRONT CUT OFF WALL
N.T.S.

NOTES:

1. SEE GRADING PLANS FOR GRADING DETAILS OF BASIN.

CONSTRUCTION NOTES:

13 CONSTRUCT DESILTING INLET PER DETAILS HEREON
14 CONSTRUCT 6" THICK CONC. ACCESS ROAD OVER 4" CRUSHED MISCELLANEOUS BASE PER DETAILS HEREON (WIDTH PER PLAN)
15 CONSTRUCT CONC. FACING/SLOPE PROTECTION PER DETAILS HEREON
83 CONSTRUCT CHAIN LINK FENCE PER S.P.PW.C. ST.D PLAN NO 600-3
84 CONSTRUCT DOUBLE DRIVE GATE PER S.P.P.W.C. STD. PLAN NO 600-3 (W=12' PER LEAF)
85 CONSTRUCT CUT OF WALL PER DETAIL HEREON

CONCRETE FACING SLAB
15
N.T.S.

DESILTING INLET STRUCTURE

		ELEVATIONS					
SHT. NO.	LINE	A	B	C	D	E	I
19	A-7	1303.90	1305.90	1299.65	1299.25	1299.15	1304.90

REVIEWED LAND DEVELOPMENT DIVISION
BY STORM DRAIN SECTION 8/14/19 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	REPLACEMENT FOR SHEET 21			8/14/19
4	SUPERSED SHEET 21A FOR 21B			9/28/2021

JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
5/14/2019 JASON H. FUKUMITSU DATE

STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
26074 Avenue Hall, Suite 23 ▪ Valencia, CA 91355 ▪ PH: (661) 294-2... FX: (661) 294-9890

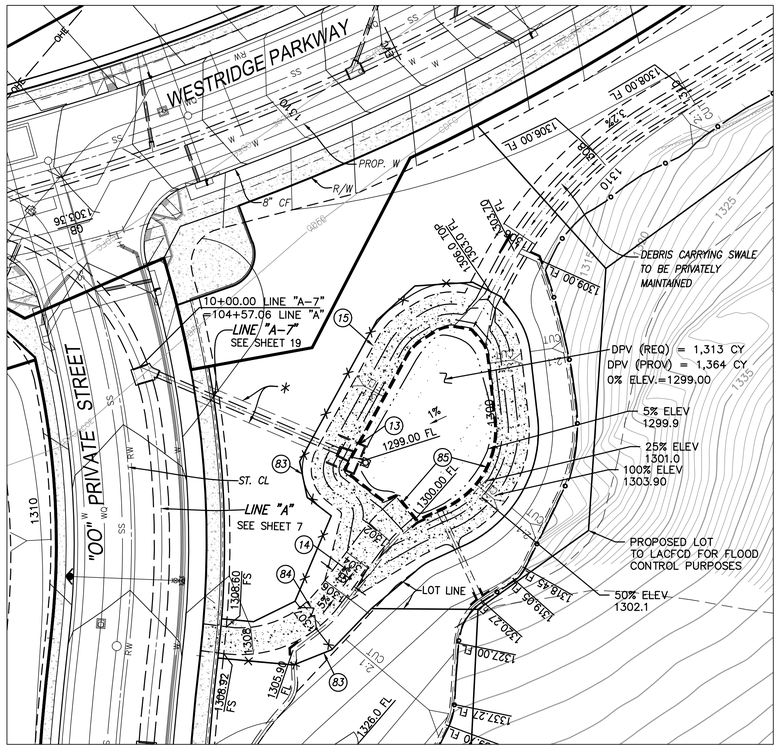
DWG SHEET21AOF 39

P.D. NO. 2641
FOR PLAN CHECK ONLY

Dwg No. 43-F553.1-38

P.D. NO. 2641

FOR PLAN CHECK ONLY



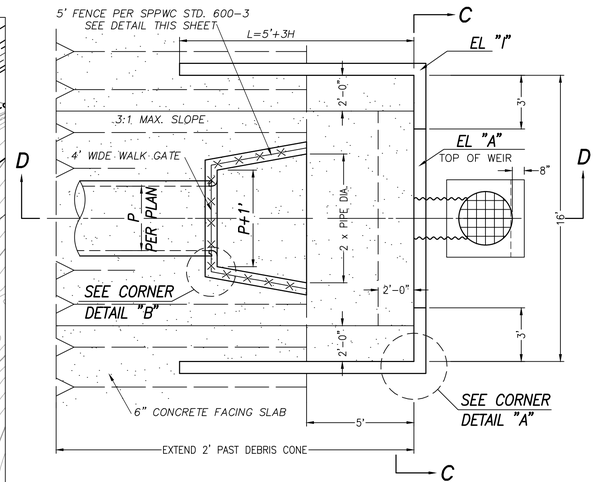
* EASEMENT TO THE LOS ANGLES COUNTY FLOOD CONTROL DISTRICT FOR COVERED STORM DRAIN AND APPURTENANT STRUCTURES

DEBRIS RETAINING INLET

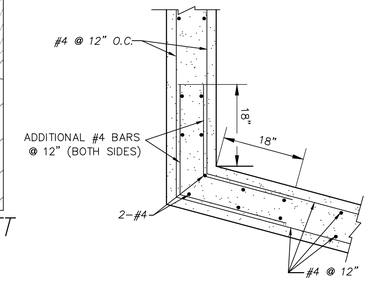
SEE SHEET 19

N

GRAPHIC SCALE: 1" = 40'

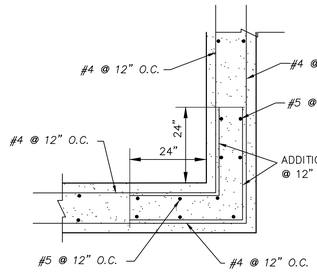


PLAN



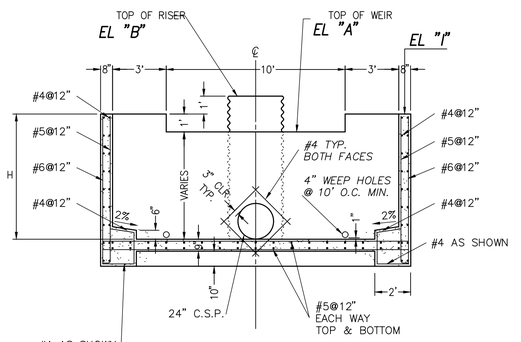
CORNER DETAIL "B"

N.T.S.



CORNER DETAIL "A"

N.T.S.

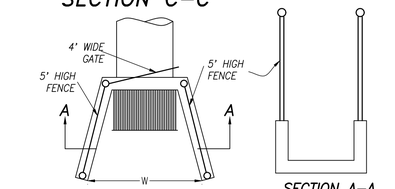


SECTION C-C

SECTION D-D

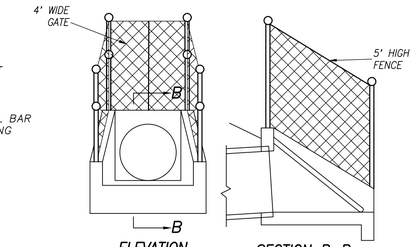
N.T.S.

INSTALL SEDIMENT GAUGE BOARDS PAINTED ON C.S.P. TOWER, MARK 0%, 5%, 25%, 50%, AND 100% LEVELS ON TOWER WITH WHITE PAINTED BACKGROUND AND BLACK 4-INCH HIGH LETTERING.



PLAN

SECTION A-A



ELEVATION

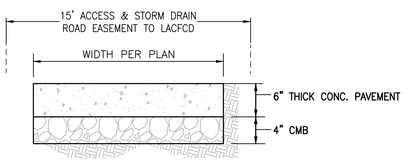
SECTION B-B

CHAIN LINK FENCE, GATE
NOT TO SCALE

DESILTING INLET DETAILS

13

N.T.S.



GEOTECHNICAL NOTES:

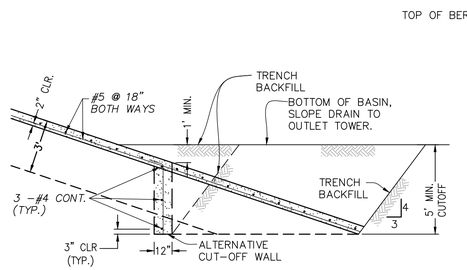
1. ALL RECOMMENDED MITIGATION MEASURES, PER THE GEOTECHNICAL ENGINEER.
2. THE SOIL ENGINEER OF RECORD SHALL INSPECT AND APPROVE THE FOUNDATION EXCAVATIONS BEFORE STEEL OR CONCRETE IS PLACED.

*BRUSHED SURFACE IS REQUIRED FOR ACCESS ROAD WHEN RAMP EXCEEDS 10% IN SLOPE

CONCRETE ACCESS ROAD

14

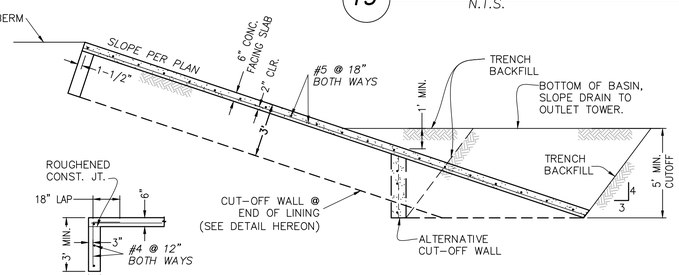
N.T.S.



CUTOFF WALL DETAIL

85

N.T.S.



FRONT CUT OFF WALL

N.T.S.

NOTES:

1. SEE GRADING PLANS FOR GRADING DETAILS OF BASIN.

CONSTRUCTION NOTES:

13 CONSTRUCT DESILTING INLET PER DETAILS HEREON

14 CONSTRUCT 6" THICK CONC. ACCESS ROAD OVER 4" CRUSHED MISCELLANEOUS BASE PER DETAILS HEREON (WIDTH PER PLAN)

15 CONSTRUCT CONC. FACING/SLOPE PROTECTION PER DETAILS HEREON

83 CONSTRUCT CHAIN LINK FENCE PER S.P.PW.C. ST.D PLAN NO 600-3

84 CONSTRUCT DOUBLE DRIVE GATE PER S.P.P.W.C. STD. PLAN NO 600-3 (W=12' PER LEAF)

85 CONSTRUCT CUT OF WALL PER DETAIL HEREON

CONCRETE FACING SLAB

15

N.T.S.

DESILTING INLET STRUCTURE

		ELEVATIONS					
SHT. NO.	LINE	A	B	C	D	E	I
19	A-7	1303.90	1305.90	1299.65	1299.25	1299.15	1304.90

REVIEWED LAND DEVELOPMENT DIVISION

BY _____ DATE _____
STORM DRAIN SECTION

NO.	REVISION	REVISED BY	APPROVED BY	DATE
4	SUPERSEDE SHEET 21A FOR 21B	Jason H. Fukumitsu	MD. Eff.	9/28/2021

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

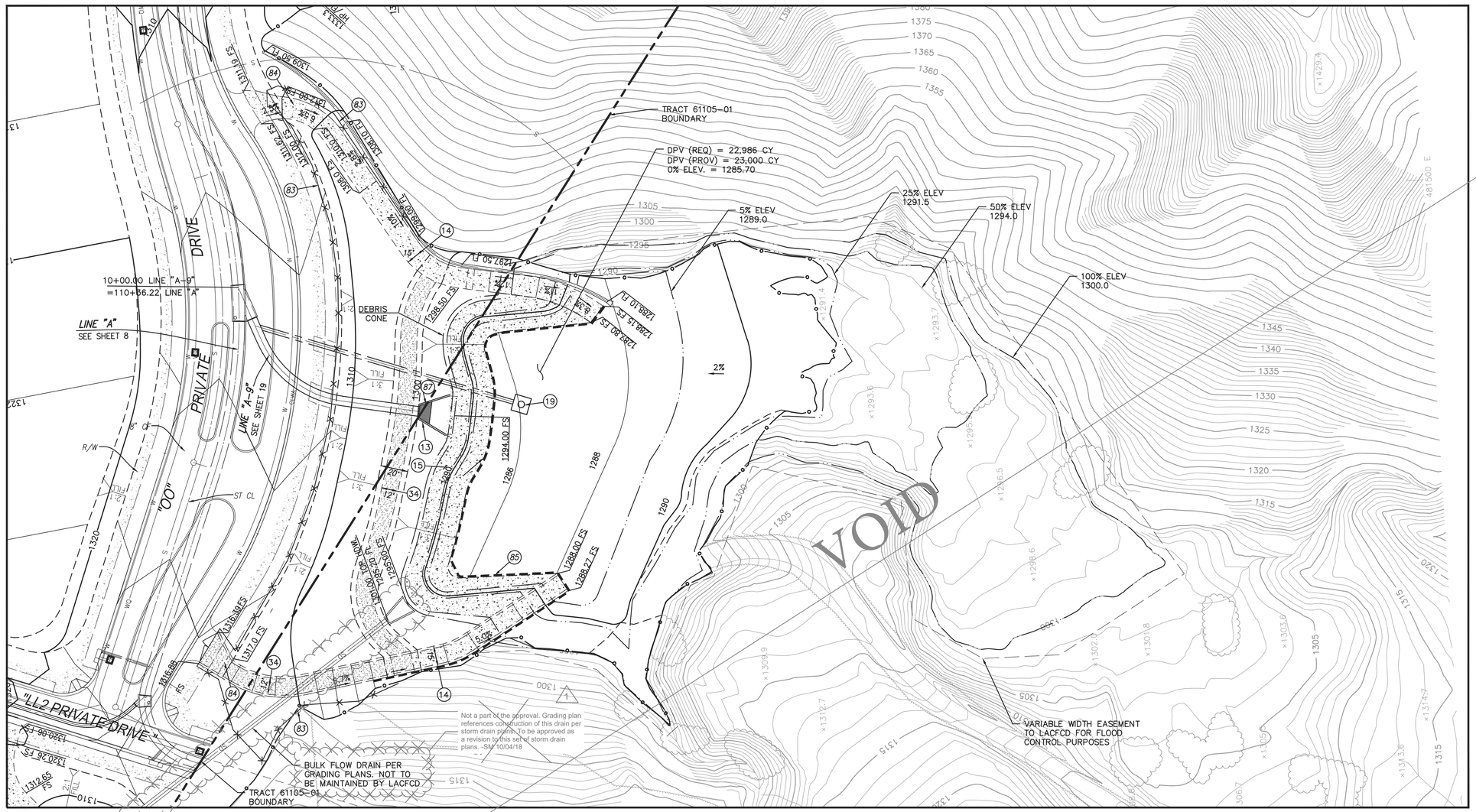
Jason H. Fukumitsu 9/23/21
JASON H. FUKUMITSU DATE

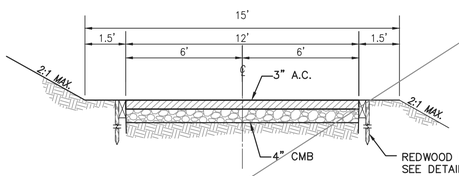
STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
26074 Avenue Hall, Suite 23 ▪ Valencia, CA 91355 ▪ PH: (661) 294-2211 ▪ FX: (661) 294-9890

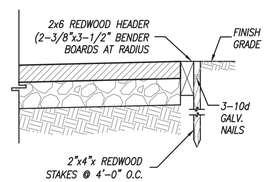
DWG

P.D. NO. 2641





34 A.C. ACCESS ROAD
N.T.S.



REDWOOD HEADER
N.T.S.

GEOTECHNICAL NOTES:
1. ALL RECOMMENDED MITIGATION MEASURES, PER THE GEOTECHNICAL ENGINEER.
2. THE SOIL ENGINEER OF RECORD SHALL INSPECT AND APPROVE THE FOUNDATION EXCAVATIONS BEFORE STEEL OR CONCRETE IS PLACED.

GRAPHIC SCALE: 1" = 40'

DEBRIS BASIN #1
SEE SHEET 19

NOTES:
1. SEE GRADING PLANS FOR GRADING DETAILS OF BASIN.

CONSTRUCTION NOTES:
- (13) CONSTRUCT DESILTING INLET PER DETAILS ON SHEET 21
- (14) CONSTRUCT 6" THICK CONC. ACCESS ROAD OVER 4" CRUSHED MISCELLANEOUS BASE PER DETAILS HEREON (WIDTH PER PLAN)
- (15) CONSTRUCT CONC. FACING/SLOPE PROTECTION PER DETAILS ON SHEET 21
- (19) CONSTRUCT OUTLET TOWER PIPE PER PROFILE ON SHEET 23
- (34) CONSTRUCT 3" ASPHALT CONCRETE OVER 4" CRUSHED MISCELLANEOUS BASE PER DETAIL HEREON
- (83) CONSTRUCT CHAIN LINK FENCE PER S.P.P.W.C. ST.D PLAN NO 600-3
- (84) CONSTRUCT DOUBLE DRIVE GATE PER S.P.P.W.C. STD. PLAN NO 600-3 (W=12' PER LEAF)
- (85) CONSTRUCT CUT OF WALL PER DETAIL ON SHEET 21
- (87) CONSTRUCT SLOPE PROTECTION BARRIER PER S.P.P.W.C. STD. PLAN 360-2

Dwg No. 43-F553.1-38

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-KUEN IP No. 2522 Exp. 6/30/20 GEOTECHNICAL STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRICE No. 1209 STATE OF CALIFORNIA

NO.	REVISION	REVISED BY	APPROVED BY	DATE
1	REMOVE CONDITION: BULK FLOW DRAIN WILL BE CONSTRUCTED AS PART OF ROUGH GRADING PLAN			11/7/18
2	VOIDED SHEET AND REPLACED WITH NEW SHEET			8/14/19

REVIEWED LAND DEVELOPMENT DIVISION
BY _____ STORM DRAIN SECTION
10/04/2018 DATE

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
JASON H. FUKUMITSU 8/29/18 DATE

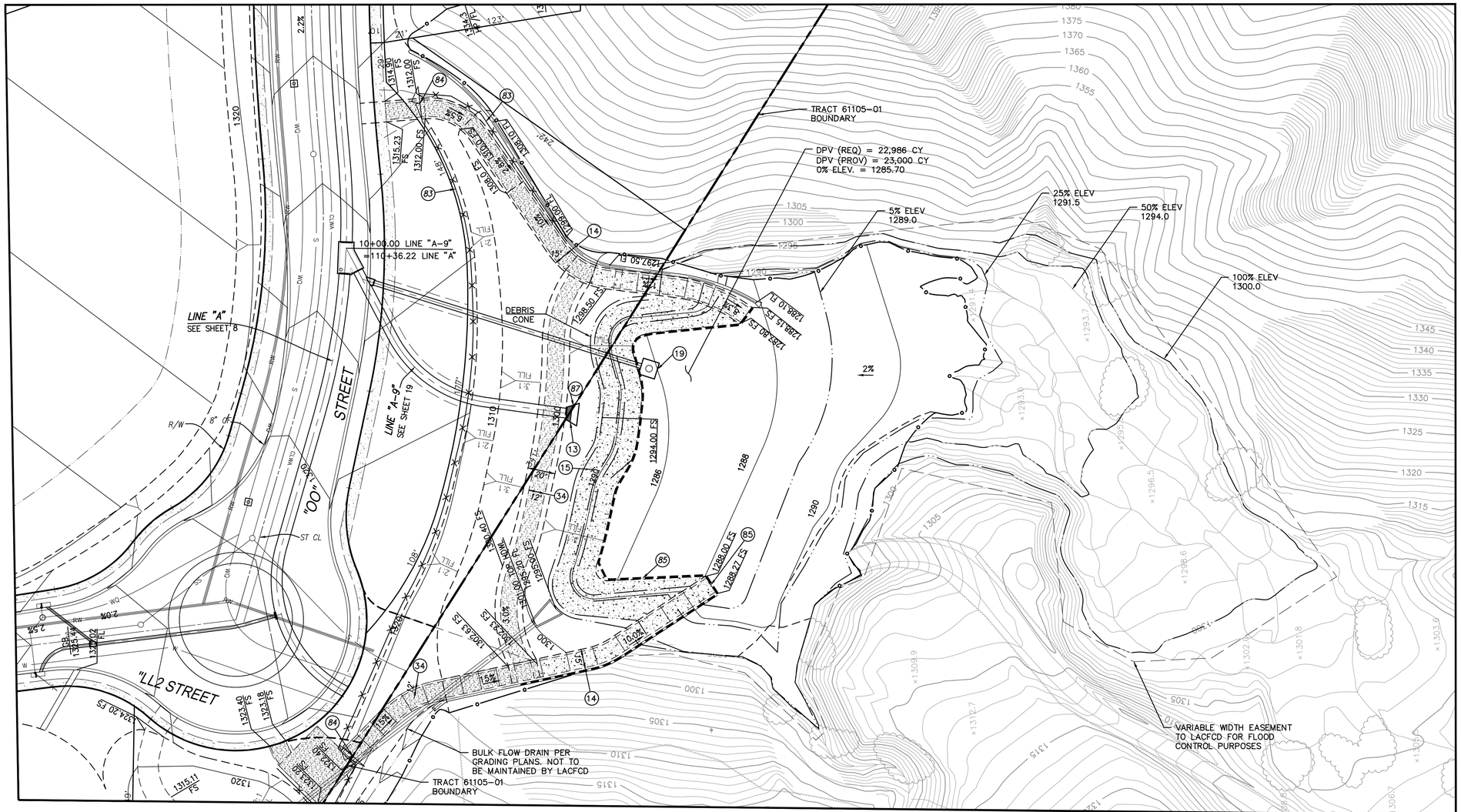
STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

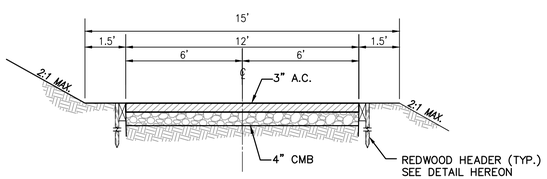
HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
26074 Avenue Hall, Suite 23 ▪ Valencia, CA 91355 ▪ PH: (661) 294-2211 ▪ FX: (661) 294-9890

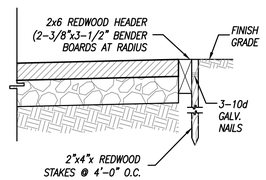
DWG | SHEET 22 OF 37

P.D. NO. 2641

FOR PLAN CHECK ONLY







REDWOOD HEADER
N.T.S.

GEOTECHNICAL NOTES:

1. ALL RECOMMENDED MITIGATION MEASURES, PER THE GEOTECHNICAL ENGINEER.
2. THE SOIL ENGINEER OF RECORD SHALL INSPECT AND APPROVE THE FOUNDATION EXCAVATIONS BEFORE STEEL OR CONCRETE IS PLACED.

NOTES:

1. SEE GRADING PLANS FOR GRADING DETAILS OF BASIN.

CONSTRUCTION NOTES:

(13) CONSTRUCT DESILTING INLET PER DETAILS ON SHEET 21
(14) CONSTRUCT 6" THICK CONC. ACCESS ROAD OVER 4" CRUSHED MISCELLANEOUS BASE PER DETAILS HEREON (WIDTH PER PLAN)
(15) CONSTRUCT CONC. FACING/SLOPE PROTECTION PER DETAILS ON SHEET 21
(19) CONSTRUCT OUTLET TOWER PIPE PER PROFILE ON SHEET 23
(34) CONSTRUCT 3" ASPHALT CONCRETE OVER 4" CRUSHED MISCELLANEOUS BASE PER DETAIL HEREON
(83) CONSTRUCT CHAIN LINK FENCE PER S.P.P.W.C. ST.D PLAN NO 600-3
(84) CONSTRUCT DOUBLE DRIVE GATE PER S.P.P.W.C. STD. PLAN NO 600-3 (W=12' PER LEAF)
(85) CONSTRUCT CUT OF WALL PER DETAIL ON SHEET 21
(87) CONSTRUCT SLOPE PROTECTION BARRIER PER S.P.P.W.C. STD. PLAN 360-2

Dwg No. 43-F553.1-38

34 A.C. ACCESS ROAD
N.T.S.

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRICE No. 1209 STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-KUEN IP No. 2522 Exp. 6-30 GEOTECHNICAL STATE OF CALIFORNIA

REVIEWED LAND DEVELOPMENT DIVISION
BY STORM DRAIN SECTION 8/14/19 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	REPLACEMENT FOR SHEET 22	Jason H Fukumitsu		8/14/19

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

Jason H Fukumitsu 5/14/2019
JASON H. FUKUMITSU DATE

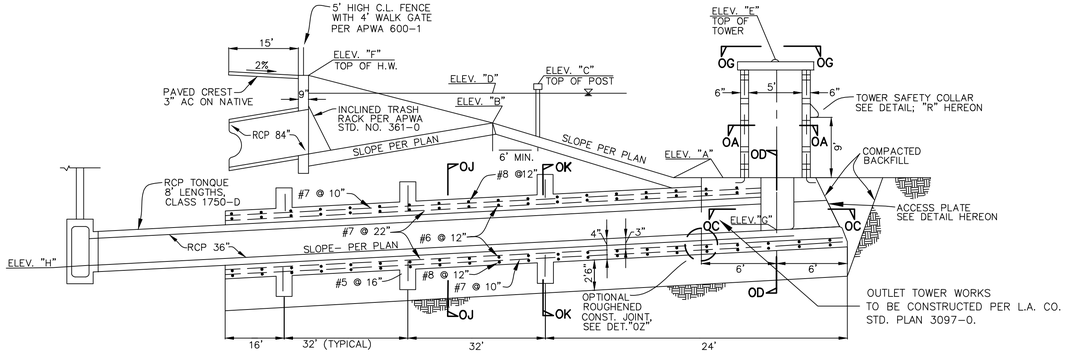
STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
26074 Avenue Hall, Suite 23 ▪ Valencia, CA 91355 ▪ PH: (661) 294-2211 ▪ FX: (661) 294-9890

DWG

SHEET 22 OF 39

P.D. NO. 2641

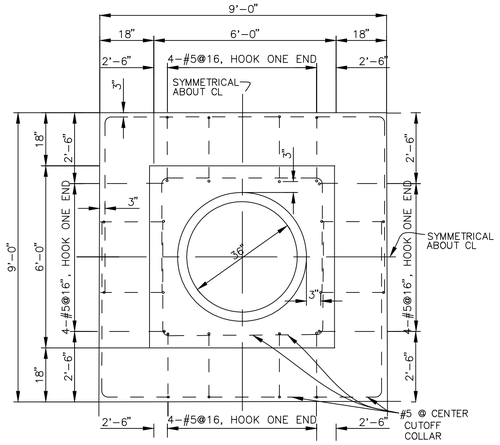


I OUTLET TOWER PROFILE LAT. "A-9" PER LACDPW STD. 3097-0 SECTION A-A
N.T.S.

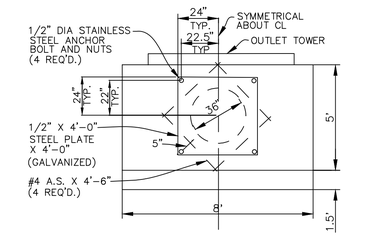
ENCASEMENT REINFORCEMENT

#8 @ 12" (OUTSIDE TRANSVERSE)
#6 @ 12" (INSIDE TRANSVERSE)
#7 @ 10" (OUTSIDE LONGITUDINAL- TOP AND BOTTOM)
#7 @ 22" (INSIDE LONGITUDINAL- TOP AND BOTTOM)
#7 @ 12" NOT SHOWN (OUTSIDE LONGITUDINAL- SIDES)
#7 @ 16" NOT SHOWN (INSIDE LONGITUDINAL- SIDES)

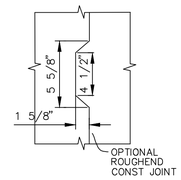
LINE	ELEV. "A"	ELEV. "B"	ELEV. "C"	ELEV. "D"	ELEV. "E"	ELEV. "F"	ELEV. "G"	ELEV. "H"
"A-9"	1286.00'	1294.00'	1298.00'	1297.00'	1299.00'	1300.50'	1280.75'	1276.63'



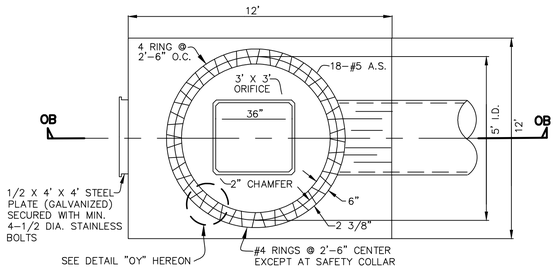
SECTION OK-OK
N.T.S.



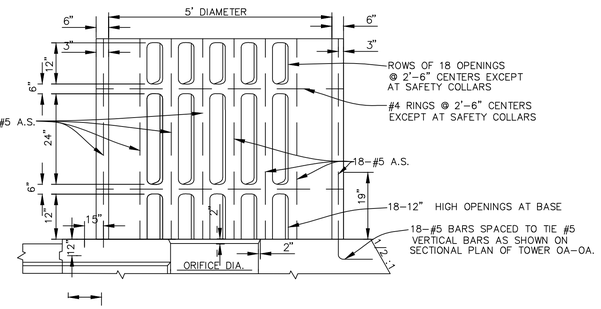
ACCESS PLATE DETAIL
N.T.S.



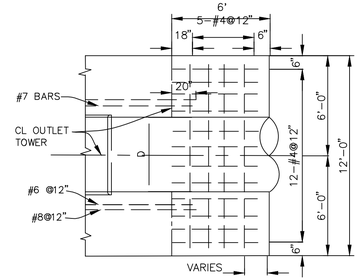
DETAIL "OZ"
N.T.S.



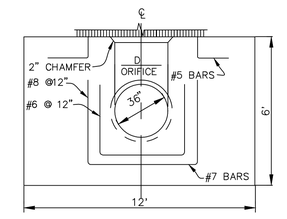
PLAN OA-OA SHOWING SECTIONAL PLAN OF TOWER
N.T.S.



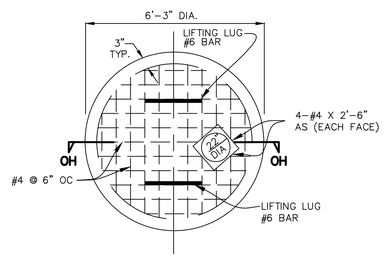
SECTION OB-OB
N.T.S.



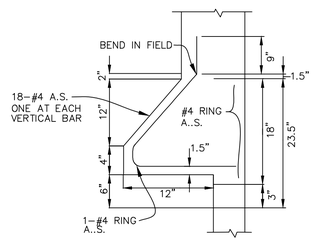
SECTION OC-OC
N.T.S.



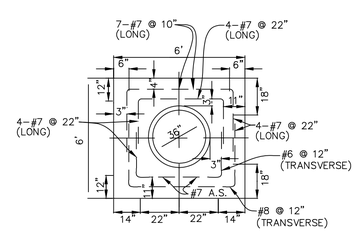
SECTION OD-OD
N.T.S.



PLAN OG-OG SHOWING OUTLET TOWER COVER
N.T.S.



DETAIL "R" OUTLET TOWER SAFETY COLLAR
N.T.S.



SECTION OJ-OJ
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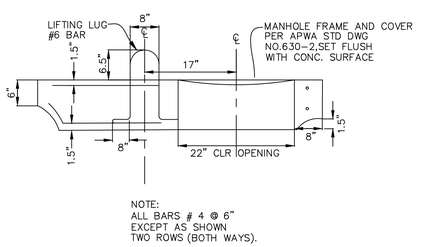
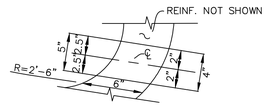


SECTION OH-OH
N.T.S.



DETAIL "OY"
N.T.S.

NOTE:

THE LONGITUDINAL #7 BARS SHOWN IN THE OUTLET PIPE ENCASEMENT ARE DESIGNED FOR HARD GRADE STEEL ONLY. IF MEDIUM GRADE STEEL IS USED IN PLACE OF HARD GRADE STEEL, THE SIZE OR NUMBER OF LONGITUDINAL BARS MUST BE INCREASED TO PROVIDE A TOTAL STEEL AREA EQUAL 1.275 TIMES THE TOTAL AREA OF LONGITUDINAL BARS SHOWN HEREON.

PROVIDE A STENCIL ON THE BASIN'S OUTLET STANDPIPE A GAUGE HEIGHT MEASUREMENT. THIS GAUGE SHALL INCLUDE, BUT NOT LIMITED TO, ONE FOOT INCREMENT MEASUREMENT, SEDIMENT REMOVAL HEIGHTS FOR 5% AND 25% CAPACITY. TO ENHANCE THE GAUGE'S VISIBILITY, FLORESCENT BLACK AND WHITE PAINT WILL BE USED. THE GAUGE'S SHALL BE VISIBLE FROM THE ENTRY GATE/ACCESS ROAD OF THE BASIN.

2 REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

REVIEWED LAND DEVELOPMENT DIVISION
BY _____ STORM DRAIN SECTION
10/04/2018 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	REVISED TOTAL SHEET NUMBER.			8/14/19

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
8/29/18
JASON H. FUKUMITSU DATE

STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

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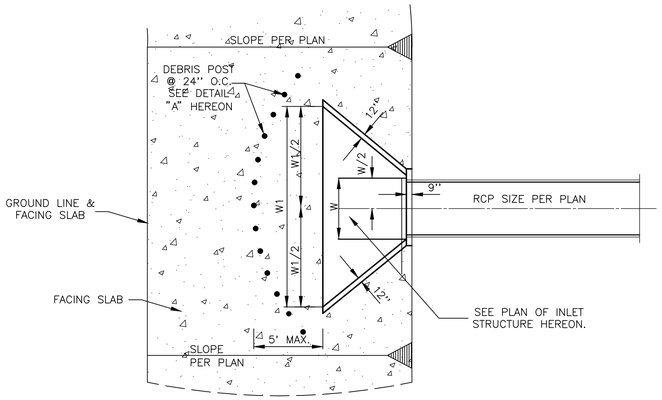
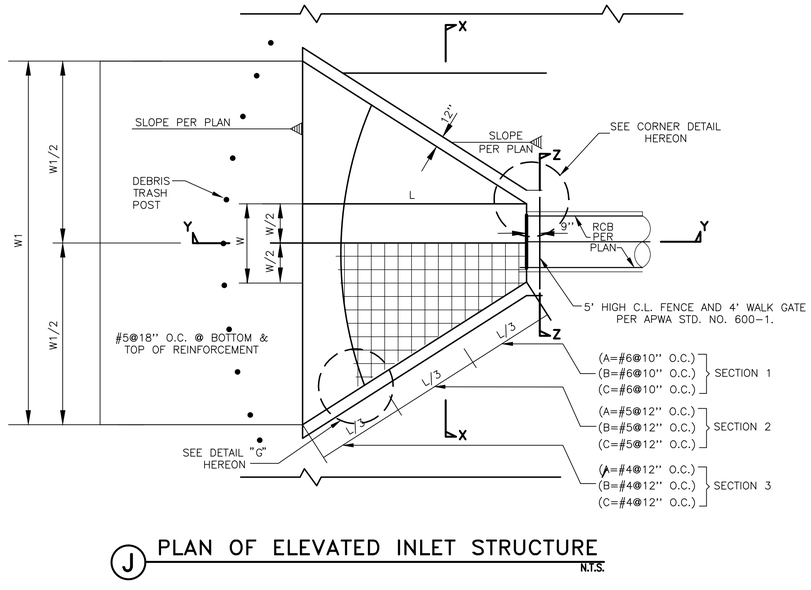
DWG | SHEET 23 OF 37 39

2

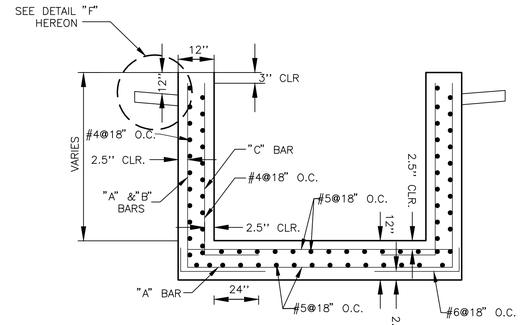
Dwg No. 43-F553.1-38

P.D. NO. 2641

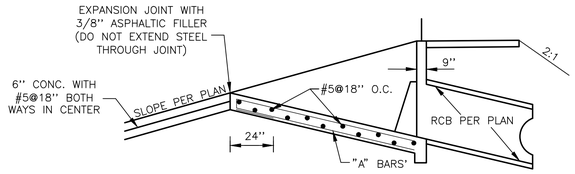




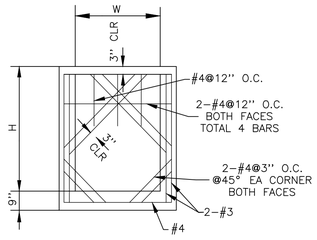
J PLAN OF ELEVATED INLET STRUCTURE
N.T.S.



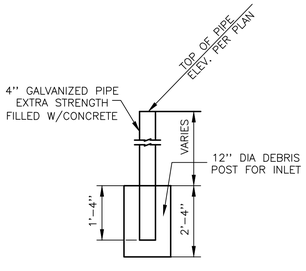
SECTION X – X
N.T.S.



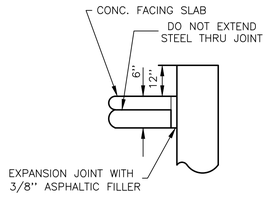
SECTION Y–Y
N.T.S.



SECTION Z – Z
N.T.S.



DETAIL "A"
N.T.S.



DETAIL "F"
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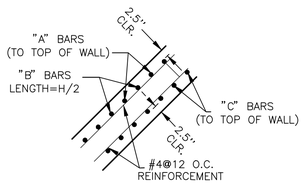

DETAIL "G"
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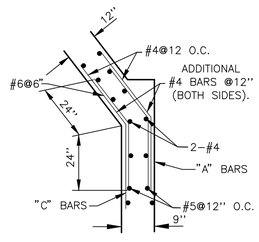

CORNER DETAIL
N.T.S.

DIMENSIONS TABLE

	W	W2	H	L
LINE A–9	9.0'	28.00'	9.5'	14.0'

REVIEWED LAND DEVELOPMENT DIVISION
BY _____ STORM DRAIN SECTION
10/04/2018 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	REVISED TOTAL SHEET NUMBER.			8/14/19

REGISTERED PROFESSIONAL ENGINEER JASON R. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
8/29/18
JASON H. FUKUMITSU DATE

STORM DRAIN PLANS IN
TRACT No. 61105–01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

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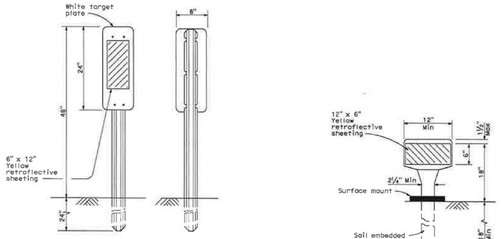
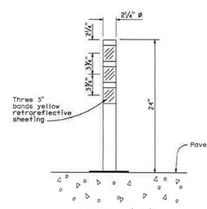
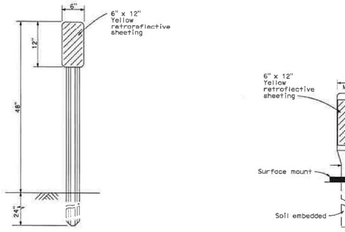
DWG
SHEET 24 OF 37 39

Dwg No. 43-F553.1-38







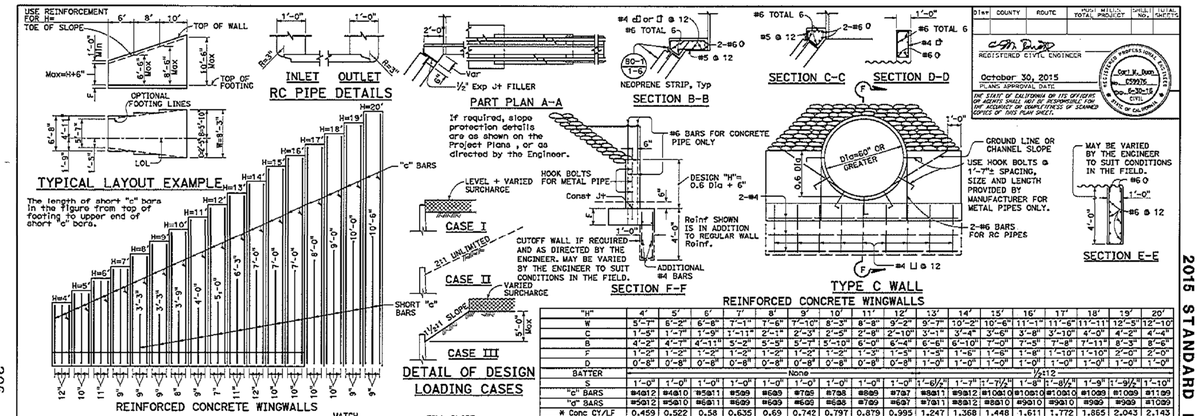
NOTE:
1.See Standard Plan A73A for metal post details and additional markers.

DIST	COUNTY	ROUTE	POST MILES/ TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER
Greg W. Edwards
No. C39396
May 1, 2006
PLANS APPROVAL DATE
The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.
To get to the Caltrans web site, go to: http://www.dot.ca.gov

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
OBJECT MARKERS
NO SCALE
A73A

Return to Table of Contents



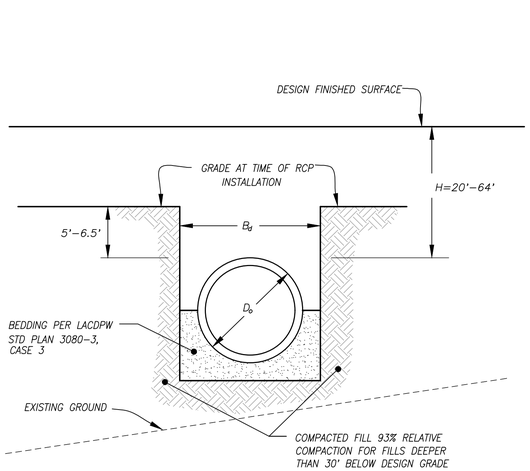
REINFORCED CONCRETE WINGWALLS

"H"	4'	5'	6'	7'	8'	9'	10'	11'	12'	13'	14'	15'	16'	17'	18'	19'	20'
W	5'-7"	6'-2"	6'-8"	7'-1"	7'-6"	7'-10"	8'-3"	8'-8"	9'-2"	9'-7"	10'-2"	10'-6"	11'-1"	11'-6"	11'-11	12'-5"	12'-10"
C	1'-5"	1'-7"	1'-9"	1'-11"	2'-1"	2'-3"	2'-5"	2'-8"	2'-10"	3'-1"	3'-4"	3'-6"	3'-8"	3'-10"	4'-0"	4'-2"	4'-4"
B	4'-2"	4'-7"	4'-11"	5'-2"	5'-5"	5'-7"	5'-10"	6'-0"	6'-4"	6'-8"	6'-10"	7'-0"	7'-3"	7'-6"	7'-11"	8'-3"	8'-6"
F	1'-2"	1'-2"	1'-2"	1'-2"	1'-2"	1'-2"	1'-2"	1'-3"	1'-3"	1'-3"	1'-6"	1'-6"	1'-6"	1'-7"	1'-10"	2'-0"	2'-0"
D	0'-8"	0'-8"	0'-8"	0'-8"	0'-8"	0'-8"	0'-8"	0'-8"	0'-8"	0'-8"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"
BATTER	None										½:12						
S	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-6½"	1'-7½"	1'-8½"	1'-9½"	1'-9½"	1'-9½"	1'-10"
"c" BARS	#4@12	#4@10	#5@11	#5@9	#5@9	#5@9	#7@8	#7@8	#8@8	#8@7	#8@11	#9@12	#10@12	#10@10	#10@10	#10@9	#11@9
"d" BARS	#5@12	#5@10	#5@11	#5@9	#5@9	#5@8	#5@8	#7@9	#6@7	#7@11	#8@12	#8@10	#9@10	#9@9	#9@9	#9@9	#11@9
* Conc CY/LF	0.459	0.522	0.58	0.635	0.69	0.742	0.797	0.879	0.995	1.247	1.368	1.448	1.611	1.772	1.865	2.043	2.143
* Reinf LB/LF	26	32	41	50	59	70	81	95	100	99	120	156	171	181	190	217	267
** Case I qu (ksf), B'(ft)	3.75,2.24	5.66,2.65	3.59,3.11	3.56,3.49	3.52,3.82	3.52,4.21	3.69,4.48	3.77,4.77	3.85,5.17	3.92,5.51	3.92,5.18	4.03,6.45	4.13,6.59	4.26,7.26	4.39,7.57	4.55,7.82	4.85,8.02
** Case II qu (ksf), B'(ft)	1.16,5.58	1.33,6.13	1.51,6.56	1.69,6.98	1.88,7.16	2.08,7.33	2.29,7.80	2.50,7.58	2.72,8.14	2.97,8.47	3.18,8.50	3.41,9.05	3.70,9.43	4.02,8.56	4.26,9.80	4.57,10.09	4.82,10.23
** Case III qu (ksf), B' (ft)	1.26,5.48	1.36,5.91	1.45,6.27	1.54,6.68	1.76,6.50	1.95,7.08	2.11,7.39	2.28,7.58	2.50,7.84	2.66,8.12	2.91,8.59	3.00,8.63	3.22,8.18	3.49,9.18	3.65,9.75	3.89,9.74	4.07,9.96

B'=B-(2) eccentricity, B' is the effective footing width.
* Quantities include 1'-0" extension above the design "H" limit.
** Soil pressure shown in the table is the equivalent uniform pressure per AASHTO LRFD - 11.6.3.2 "L"

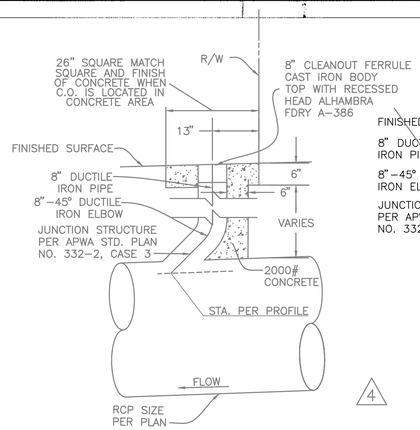
NOTES:
Unit Stresses: f_y = 60,000 psi
f'_c = 3,600 psi
Earth density: 120 pcf
Equivalent fluid pressure: 36 pcf
Elevation, length and angle of flare of wings may be varied by the Engineer to suit conditions encountered in the field. Wall height may be exceeded by 6" before going to the next greater "H".

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
PIPE CULVERT HEADWALLS, ENDWALLS AND WINGWALLS TYPES A, B AND C
NO SCALE
D90

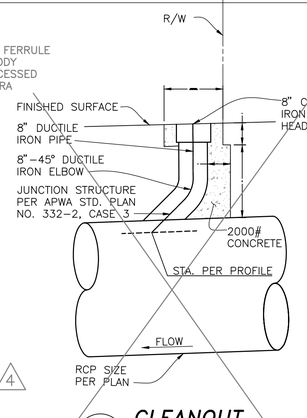


DETAIL FOR RCP INSTALLATION WHERE DEPTH OF COVER IS MORE THAN 20 FEET

N.T.S.



37 CLEANOUT
N.T.S.



4

37 CLEANOUT
N.T.S.

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	REVISED TOTAL SHEET NUMBER.	Jason H. Fukumitsu		8/14/19
4	REVISED CLEANOUT DETAIL	Jason H. Fukumitsu	M.D. Ryan	9/28/2021

REVIEWED LAND DEVELOPMENT DIVISION
BY Ken Mg 10/04/2018
STORM DRAIN SECTION DATE

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
8/29/18
JASON H. FUKUMITSU DATE

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
2

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
2

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-SHIEH TSU No. 2622 Exp. 6/30 GEOTECHNICAL STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRIDE No. 1205 STATE OF CALIFORNIA

Dwg No. 43-F553.1-38

STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

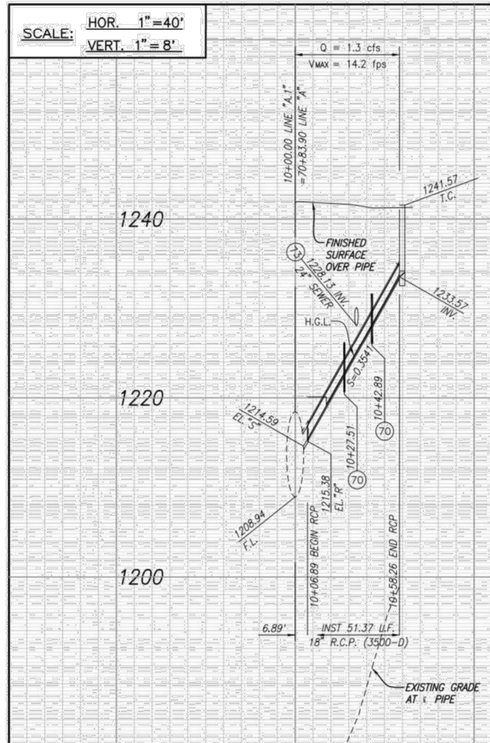
HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
26074 Avenue Hall, Suite 23 ▪ Valencia, CA 91355 ▪ PH: (661) 294-2211 ▪ FX: (661) 294-9890

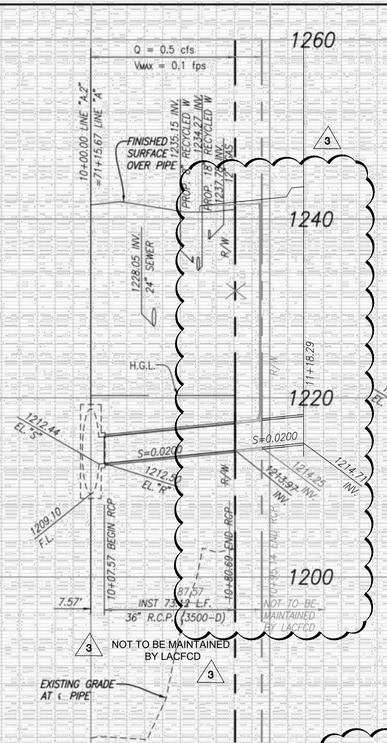
DWG | SHEET 25 OF 39

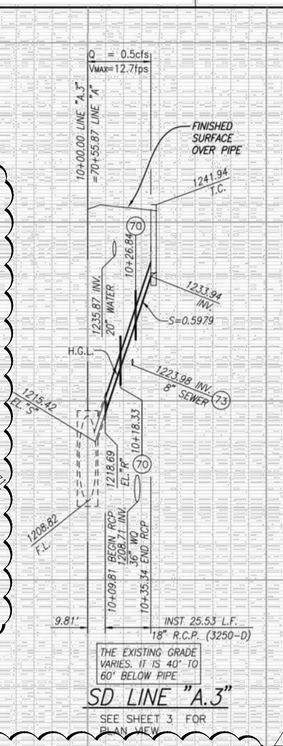
G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2641\HAV080-25_SD_Detail.dwg Plotted on Aug 11, 2021-4:22pm by armondob

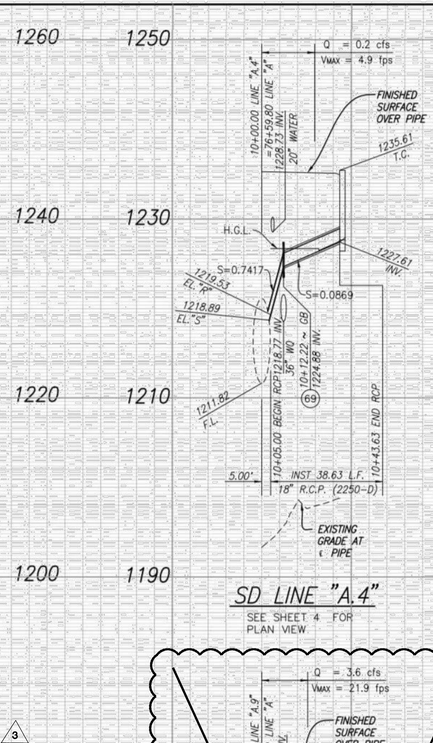
SCALE: HOR. 1"=40'
VERT. 1"=8'

P.D. NO. 2641











SD LINE "A.1"
SEE SHEET 3 FOR PLAN VIEW

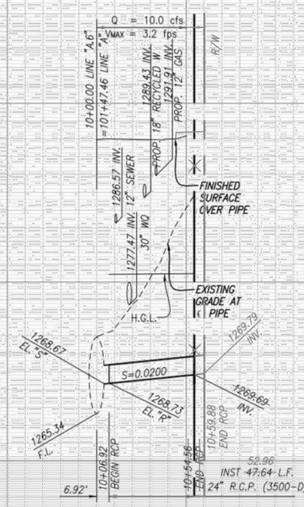
SD LINE "A.2"
SEE SHEET 3 FOR PLAN VIEW

SD LINE "A.3"
SEE SHEET 3 FOR PLAN VIEW

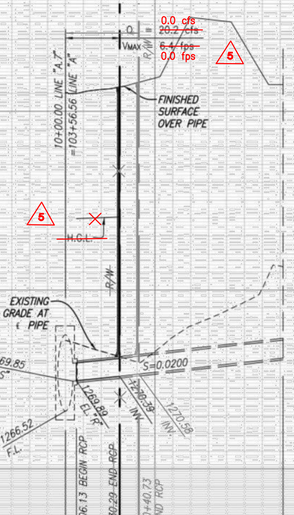
SD LINE "A.4"
SEE SHEET 4 FOR PLAN VIEW

SD LINE "A.5"
SEE SHEET 4 FOR PLAN VIEW

SD LINE "A.6"
SEE SHEET 6 FOR PLAN VIEW



SD LINE "A.7"
SEE SHEET 7 FOR PLAN VIEW



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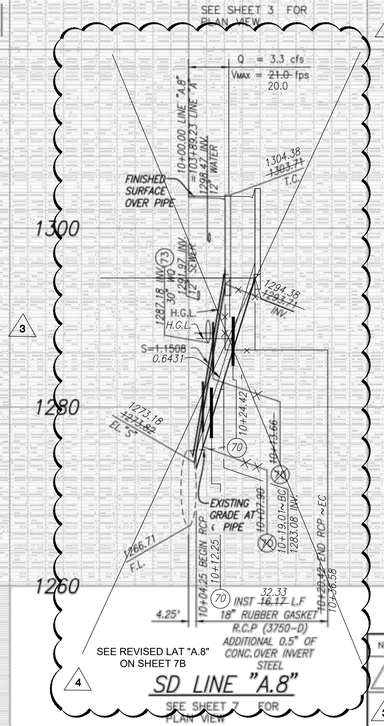

SD LINE "A.8"
SEE SHEET 7 FOR PLAN VIEW

SD LINE "A.9"
SEE SHEET 7 FOR PLAN VIEW

SEE REVISED LAT "A.9" ON SHEET 31A

ALL PIPES REQUIRE RUBBER GASKET

CONSTRUCTION NOTES:

(69) CONSTRUCT CONCRETE COLLAR PER S.P.P.W.C. STD. PLAN 380-4

(70) CONSTRUCT PIPE ANCHOR AND BACKFILL STABILIZER PER S.P.P.W.C. STD. PLAN 221-2

(73) CONSTRUCT CONCRETE BLANKET PER S.P.P.W.C. 225-2

GRAPHIC SCALE: 1" = 40'

REVIEWED LAND DEVELOPMENT DIVISION
BY Steve Ng STORM DRAIN SECTION 10/04/2018 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	REVISED TOTAL SHEET NUMBER.	Jason H. Fukumitsu		8/14/19
3	EXTENDED LAT. A.2 - 5' BEYOND. MODIFICATION TO LAT. A.8 DUE TO CB RELOCATION AND ERASED LAT. A.9 AND ADD MAINTENANCE RESPONSIBILITY			
4	ERASED LAT. A8			
5	CHANGED Q VALUE TO 0 FOR LAT A.7	Jason H. Fukumitsu		01/18/2022

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
8/29/18 JASON H. FUKUMITSU DATE

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRICE No. 1708 STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-KUEN IP No. 25221 Exp. 3-31-20 CIVIL STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
26074 Avenue Hall, Suite 23 ▪ Valencia, CA 91355 ▪ PH: (661) 294-2211 ▪ FX: (661) 294-9890

DWG | SHEET 26 OF 37 39

Dwg No. 43-F553.1-38

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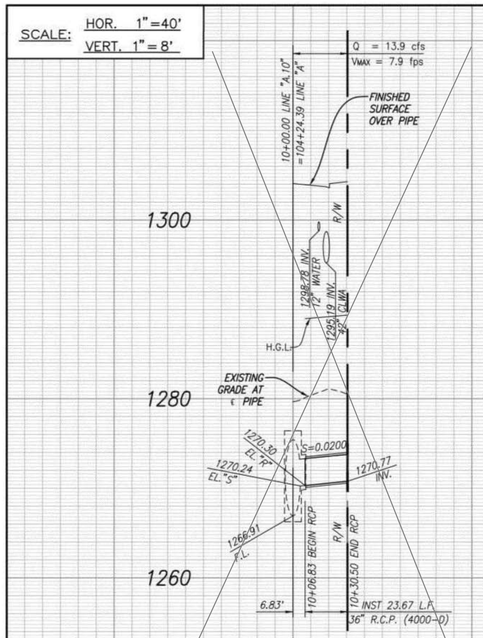
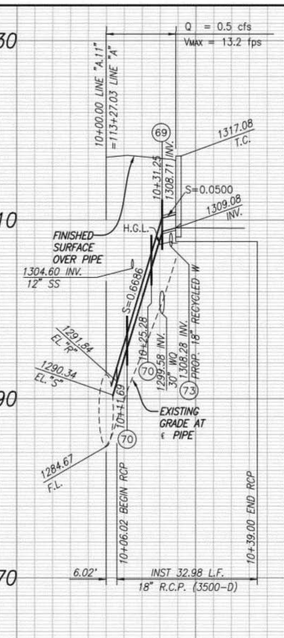
P.D. NO. 2641

SCALE: HOR. 1"=40'
VERT. 1"=8'



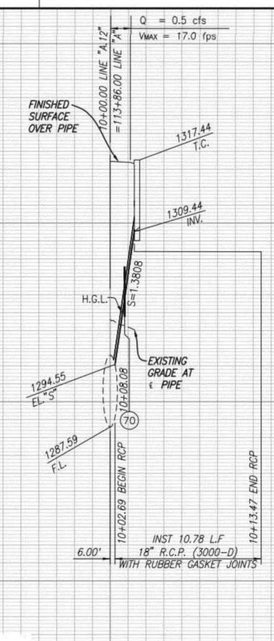
SD LINE "A.10"

SEE SHEET 7 FOR PLAN VIEW



SD LINE "A.11"

SEE SHEET 8 FOR PLAN VIEW



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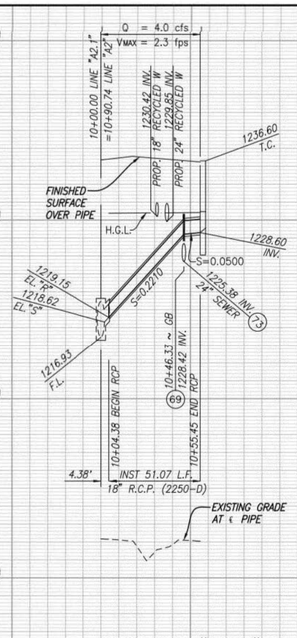
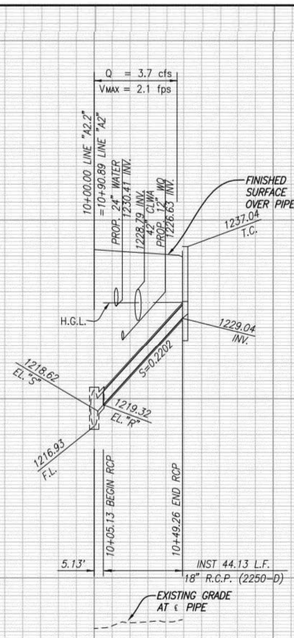
SEE SHEET 8 FOR PLAN VIEW



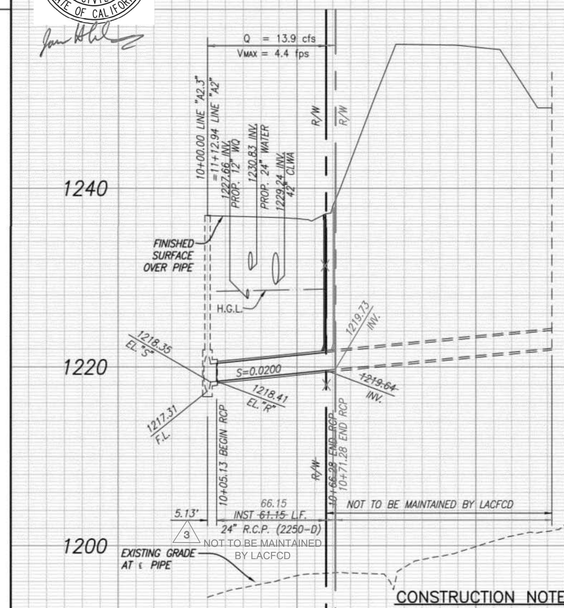
SD LINE "A2.1"

SEE SHEET 9 FOR PLAN VIEW



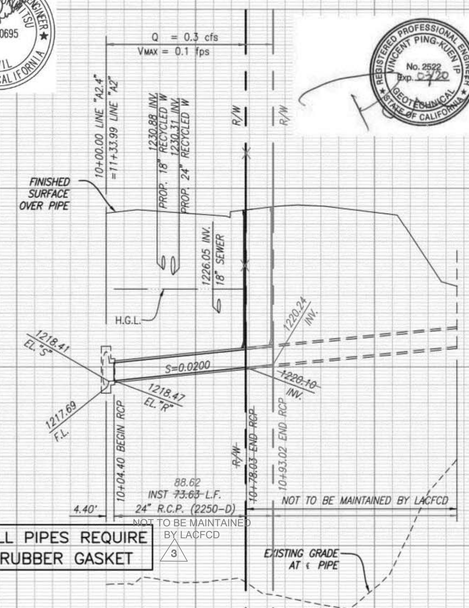
SD LINE "A2.2"

SEE SHEET 9 FOR PLAN VIEW



SD LINE "A2.3"

SEE SHEET 9 FOR PLAN VIEW



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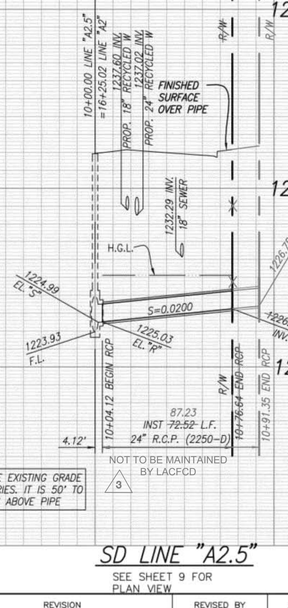
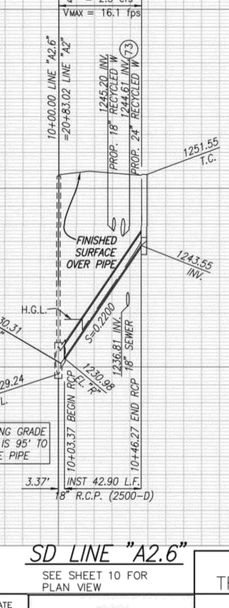
SEE SHEET 9 FOR PLAN VIEW

ALL PIPES REQUIRE RUBBER GASKET



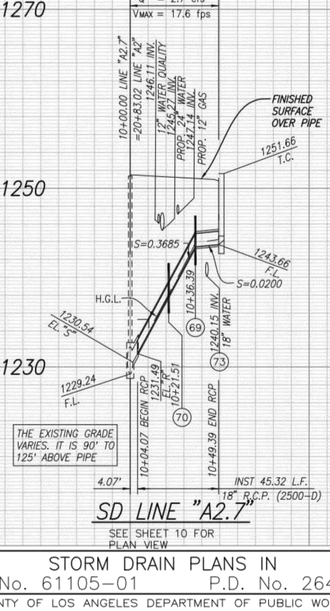
SD LINE "A2.5"

SEE SHEET 9 FOR PLAN VIEW



SD LINE "A2.6"

SEE SHEET 10 FOR PLAN VIEW



SD LINE "A2.7"

SEE SHEET 10 FOR PLAN VIEW

CONSTRUCTION NOTES:

(69) CONSTRUCT CONCRETE COLLAR PER S.P.P.W.C. STD. PLAN 380-4

(70) CONSTRUCT PIPE ANCHOR AND BACKFILL STABILIZER PER S.P.P.W.C. STD. PLAN 221-2

(73) CONSTRUCT CONCRETE BLANKET PER S.P.P.W.C. 225-2

GRAPHIC SCALE: 1" = 40'

REVIEWED LAND DEVELOPMENT DIVISION

BY _____ 10/04/2018
STORM DRAIN SECTION DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	REVISED TOTAL SHEET NUMBER.			8/14/19
3	ADD MAINTENANCE RESPONSIBILITY			3/15/2021

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
8/29/18 DATE

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRIDE No. 1208 STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-KUEN IP No. 2522 exp. 6/30 GEOTECHNICAL STATE OF CALIFORNIA

STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
26074 Avenue Hall, Suite 23 • Valencia, CA 91355 • PH: (661) 294-2211 • FX: (661) 294-9890

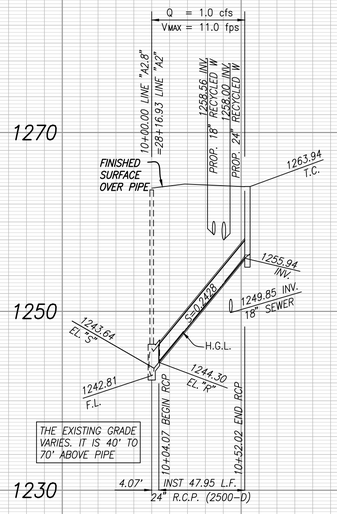
DWG | SHEET 27 OF 37 39

Dwg No. 43-F553.1-38

G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2641\MM0860-27_SD_Profile.dwg Plotted on Aug 30, 2018 - 9:37am by jpshuey

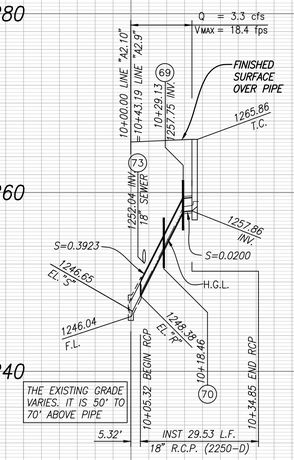
SCALE: HOR. 1"=40'
VERT. 1"=8'

P.D. NO. 2641



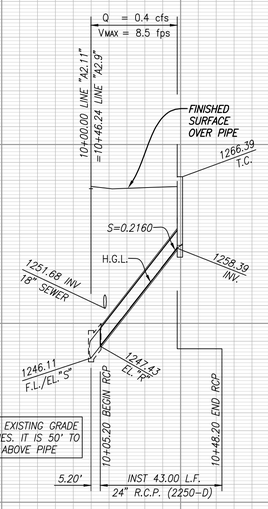
SD LINE "A2.8"

SEE SHEET 11 FOR PLAN VIEW



SD LINE "A2.10"

SEE SHEET 11 FOR PLAN VIEW



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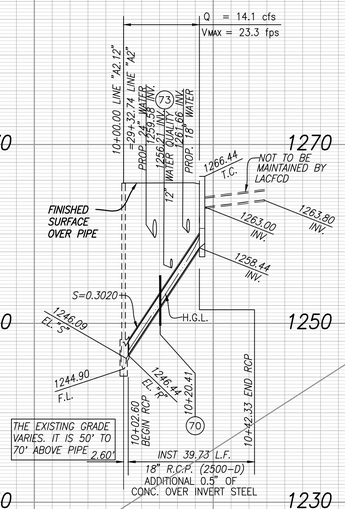
SEE SHEET 11 FOR PLAN VIEW



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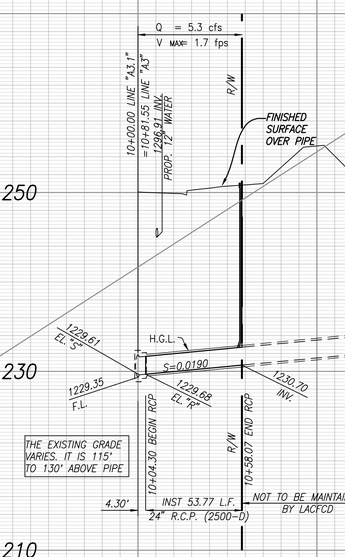
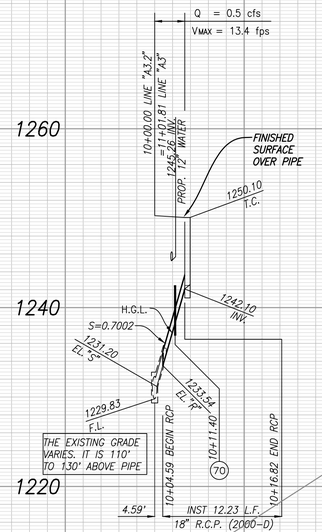
SEE SHEET 11 FOR PLAN VIEW



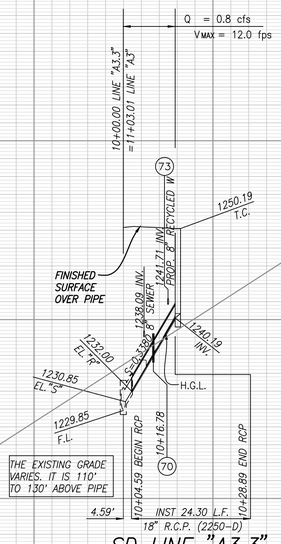
SD LINE "A3.1"

SEE SHEET 12 FOR PLAN VIEW



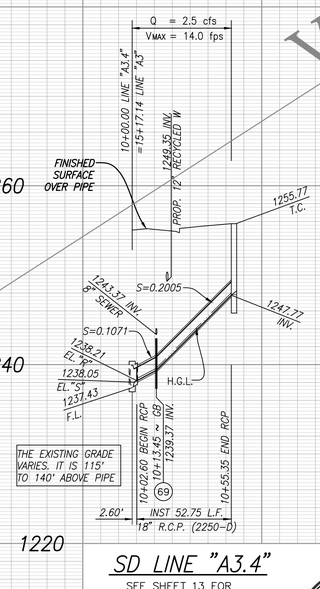
SD LINE "A3.2"

SEE SHEET 12 FOR PLAN VIEW



SD LINE "A3.3"

SEE SHEET 12 FOR PLAN VIEW



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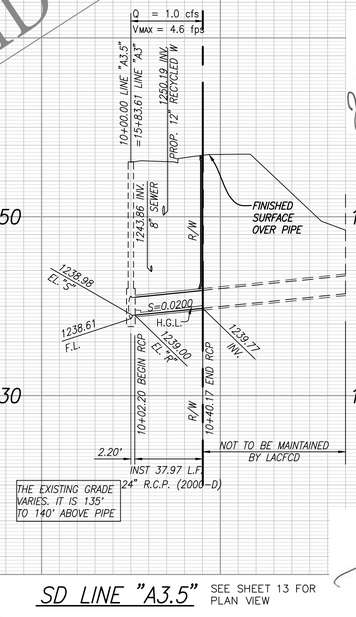
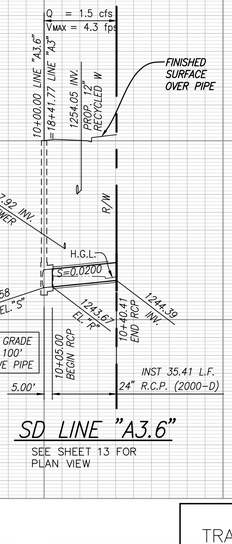
SEE SHEET 13 FOR PLAN VIEW



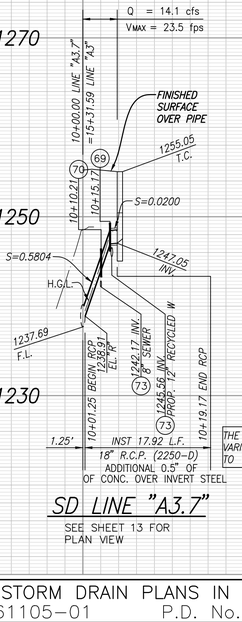
SD LINE "A3.5"

SEE SHEET 13 FOR PLAN VIEW



SD LINE "A3.6"

SEE SHEET 13 FOR PLAN VIEW



SD LINE "A3.7"

SEE SHEET 13 FOR PLAN VIEW

VOID

CONSTRUCTION NOTES:

(69) CONSTRUCT CONCRETE COLLAR PER S.P.P.W.C. STD. PLAN 380-4

(70) CONSTRUCT PIPE ANCHOR AND BACKFILL STABILIZER PER S.P.P.W.C. STD. PLAN 221-2

(73) CONSTRUCT CONCRETE BLANKET PER S.P.P.W.C. 225-2

ALL PIPES REQUIRE RUBBER GASKET

GRAPHIC SCALE: 1" = 40'

REVIEWED LAND DEVELOPMENT DIVISION

BY _____ STORM DRAIN SECTION 10/04/2018 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	VOIDED SHEET AND REPLACED WITH NEW SHEET			8/14/19

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA 8/29/18 JASON H. FUKUMITSU DATE

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRICE No. 1709 STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER No. 26220 WINDSOR PING-ROON TIP CIVIL STATE OF CALIFORNIA

STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
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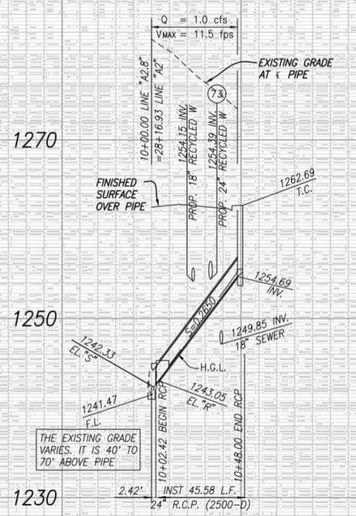
DWG | SHEET 28 OF 37

Dwg No. 43-F553.1-38

G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2641\MW080-28_SD_Profile.dwg Plotted on Aug 30, 2018-9:03am by joshuay

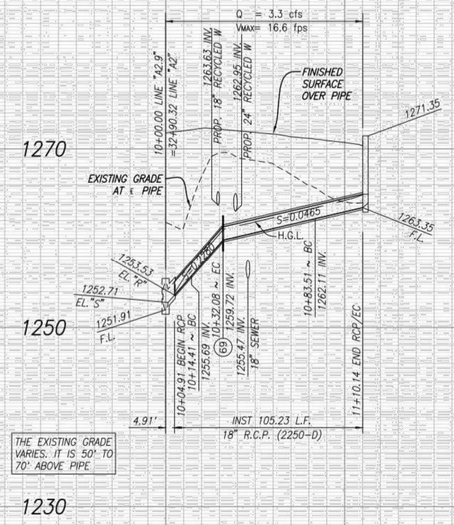
SCALE: HOR. 1"=40'
VERT. 1"=8'

P.D. NO. 2641
FOR PLAN CHECK ONLY



SD LINE "A2.8"

SEE SHEET 11 FOR PLAN VIEW



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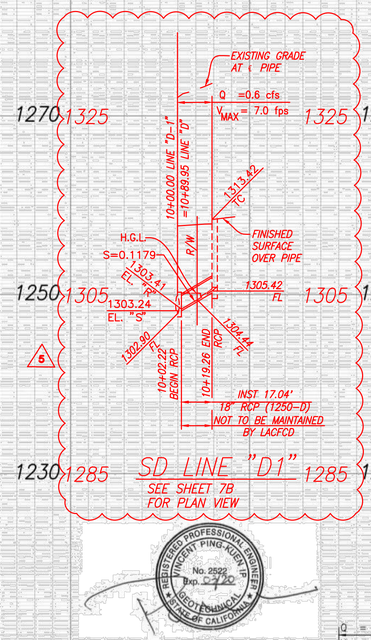
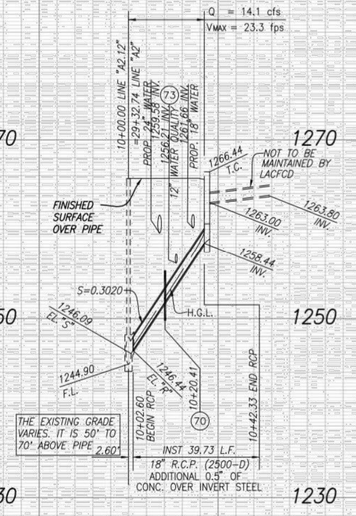
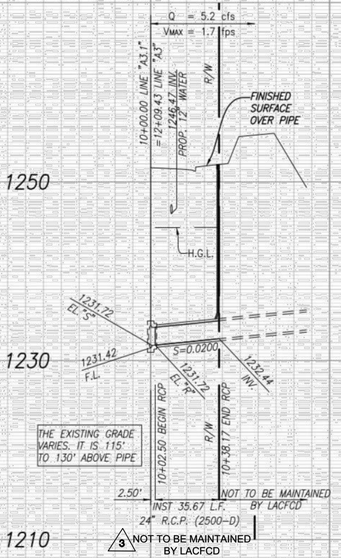
SEE SHEET 11 FOR PLAN VIEW





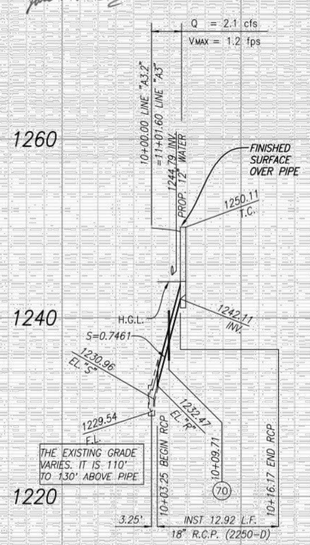
SD LINE "A2.12"

SEE SHEET 11 FOR PLAN VIEW



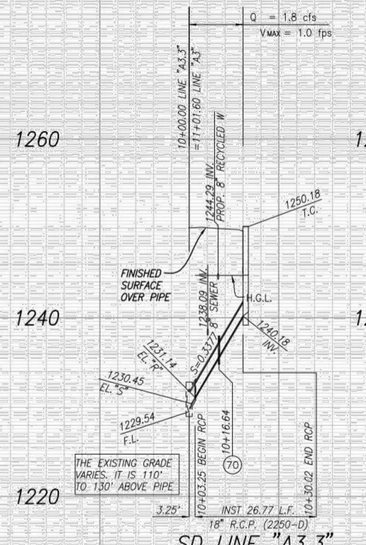
SD LINE "A3.1"

SEE SHEET 12 FOR PLAN VIEW



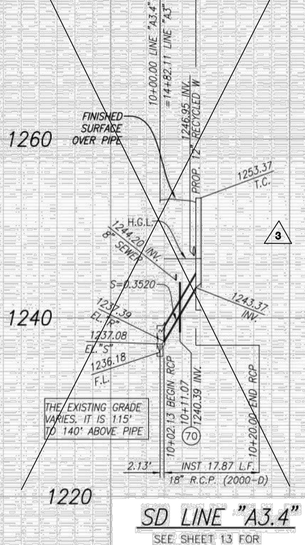
SD LINE "A3.2"

SEE SHEET 12 FOR PLAN VIEW



SD LINE "A3.3"

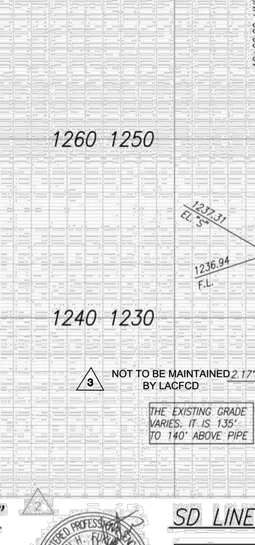
SEE SHEET 12 FOR PLAN VIEW



SD LINE "A3.4"

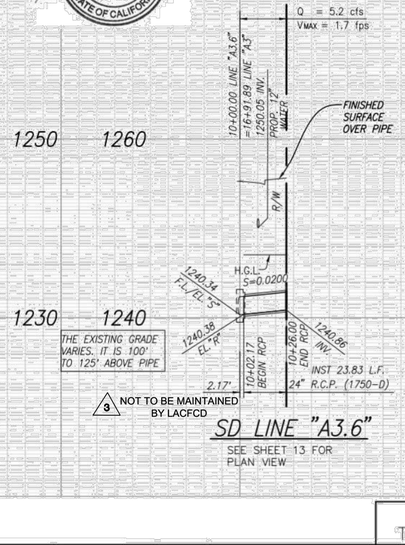
SEE SHEET 13 FOR PLAN VIEW

SEE REVISED LAT "A3.4" ON SHEET 31A



SD LINE "A3.5"

SEE SHEET 13 FOR PLAN VIEW



SD LINE "A3.6"

SEE SHEET 13 FOR PLAN VIEW



SD LINE "A3.7"

SEE SHEET 13 FOR PLAN VIEW

CONSTRUCTION NOTES:

(69) CONSTRUCT CONCRETE COLLAR PER S.P.P.W.C. STD. PLAN 380-4

(70) CONSTRUCT PIPE ANCHOR AND BACKFILL STABILIZER PER S.P.P.W.C. STD. PLAN 221-2

(73) CONSTRUCT CONCRETE BLANKET PER S.P.P.W.C. 225-2

ALL PIPES REQUIRE RUBBER GASKET

GRAPHIC SCALE: 1" = 40'



REVIEWED LAND DEVELOPMENT DIVISION

BY: STORM DRAIN SECTION 8/14/19 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	REPLACEMENT SHEET FOR SHEET 28			8/14/19
3	ADD MAINTENANCE RESPONSIBILITY ADD REMOVE LATERAL A3.4			3/15/2021
5	ADD LATERAL D1			01/18/2022



5/14/2019 DATE

JASON H. FUKUMITSU

STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
26074 Avenue Hall, Suite 23 • Valencia, CA 91355 • PH: (661) 294-2211 • FX: (661) 294-9890

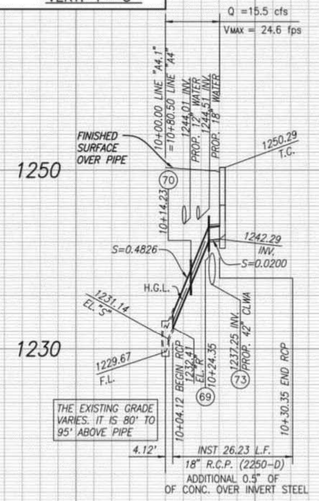
DWG. SHEET 28A OF 39

Dwg No. 43-F553 1-38

C:\Rentrak Ranch\61105 Mission Village\61105-01\Storm\PD 2641\WW\080728_30_Profile_REV.dwg, Plotted on May 08, 2019 - 10:30am by hellga

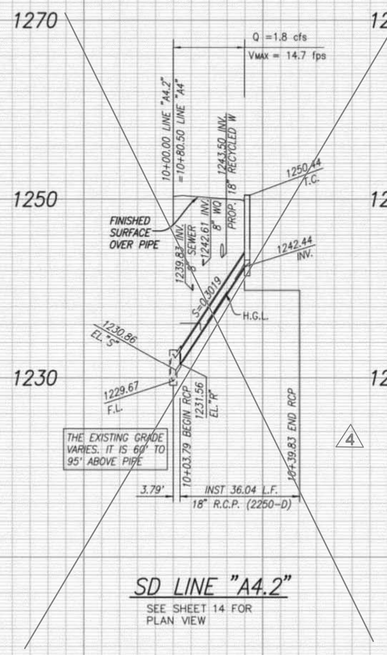
SCALE: HOR. 1"=40'
VERT. 1"=8'

P.D. NO. 2641



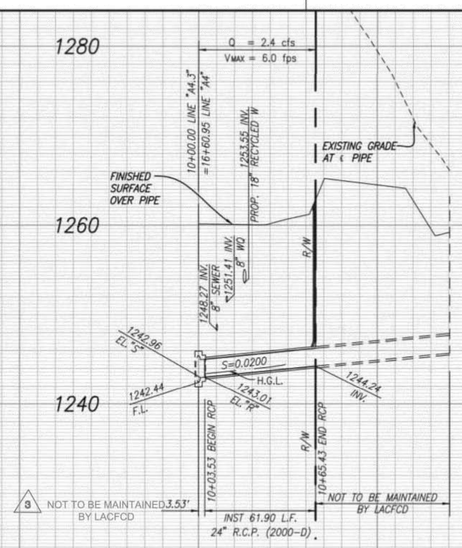
SD LINE "A4.1"

SEE SHEET 14 FOR PLAN VIEW



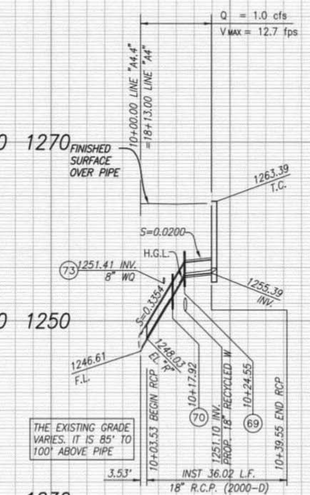
SD LINE "A4.2"

SEE SHEET 14 FOR PLAN VIEW



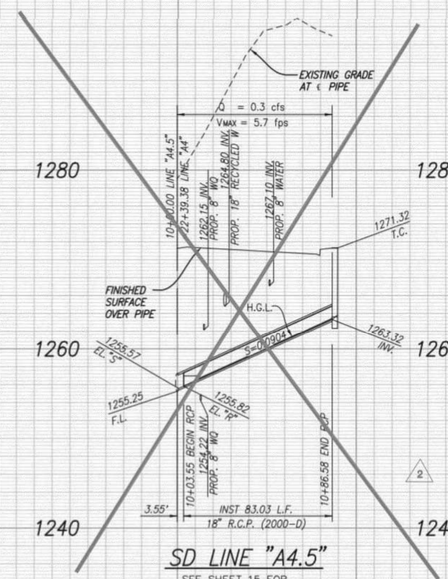
SD LINE "A4.3"

SEE SHEET 14 FOR PLAN VIEW



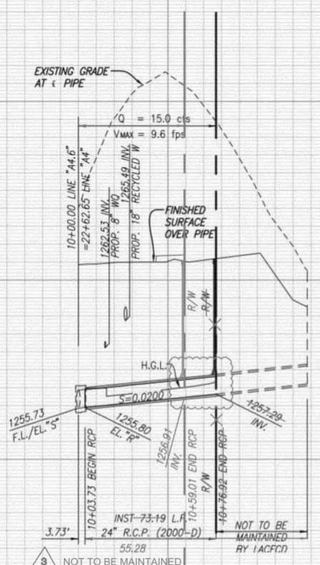
SD LINE "A4.4"

SEE SHEET 15 FOR PLAN VIEW



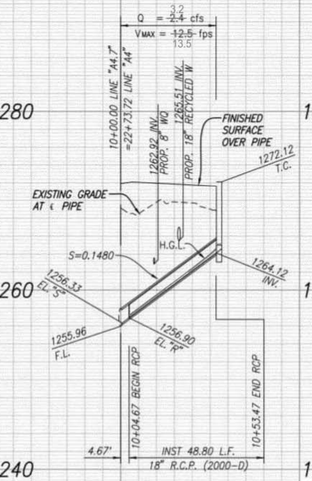
SD LINE "A4.5"

SEE SHEET 15 FOR PLAN VIEW



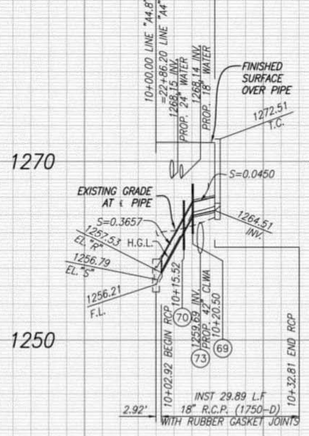
SD LINE "A4.6"

SEE SHEET 15 FOR PLAN VIEW



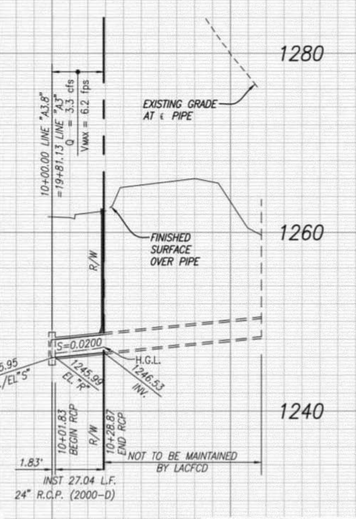
SD LINE "A4.7"

SEE SHEET 15 FOR PLAN VIEW



SD LINE "A4.8"

SEE SHEET 15 FOR PLAN VIEW



SD LINE "A3.8"

SEE SHEET 13 FOR PLAN VIEW

ALL PIPES REQUIRE RUBBER GASKET JOINTS

CONSTRUCTION NOTES:

(69) CONSTRUCT CONCRETE COLLAR PER S.P.P.W.C. STD. PLAN 380-4

(70) CONSTRUCT PIPE ANCHOR AND BACKFILL STABILIZER PER S.P.P.W.C. STD. PLAN 221-2

(73) CONSTRUCT CONCRETE BLANKET PER S.P.P.W.C. 225-2

REGISTERED PROFESSIONAL ENGINEER — JASON H. FUKUMITSU — No. 40695 — CIVIL — STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER — VINCENT FING-KUN P — No. 2522 — Exp. 6-30-20 — GEOTECHNICAL — STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST — ANDREW A. PRIDE — No. 1209 — STATE OF CALIFORNIA

GRAPHIC SCALE: 1" = 40'

REVIEWED LAND DEVELOPMENT DIVISION

BY _____ STORM DRAIN SECTION 10/04/2018 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	REVISED TOTAL SHEET NUMBER. REMOVED LATERAL A4.5			8/14/19
3	ADD MAINTENANCE RESPONSIBILITY		M.D. Caffrey	3/15/2021
4	REMOVE LAT A4.2; SEE SHEET 32 FOR REVISED LAT A4.2		M.D. Caffrey	9/28/2021

REGISTERED PROFESSIONAL ENGINEER — JASON H. FUKUMITSU — No. 40695 — CIVIL — STATE OF CALIFORNIA — 8/29/18 DATE

STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
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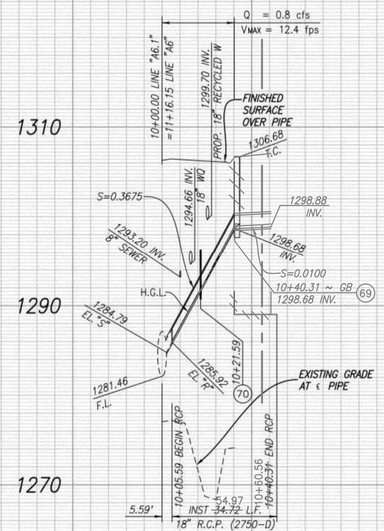
DWG | SHEET 29 OF 32 39

Dwg No. 43-F553.1-38

G:\Viewhall Ranch\61105 Mission Village\61105-01\Storm\PD 2641\VM\080-29_SD_Profile.dwg Plotted on Aug 30, 2018-9:28am by joshuay

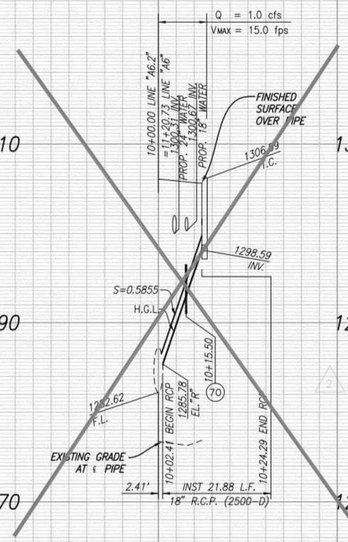
SCALE: HOR. 1"=40'
VERT. 1"=8'

P.D. NO. 2641



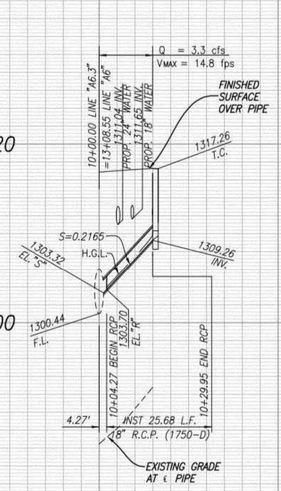
SD LINE "A6.1"

SEE SHEET 17 FOR PLAN VIEW
LATERAL FOR FUTURE CONNECTION



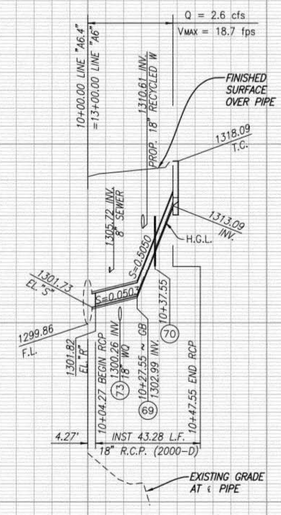
SD LINE "A6.2"

SEE SHEET 17 FOR PLAN VIEW



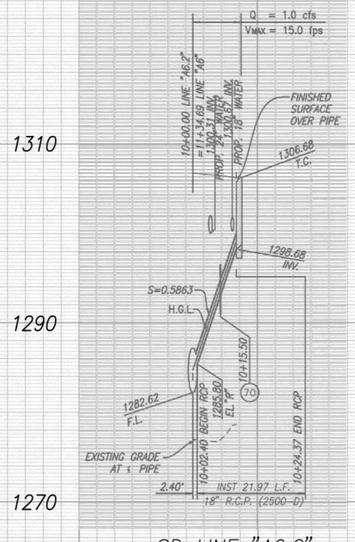
SD LINE "A6.3"

SEE SHEET 17 FOR PLAN VIEW



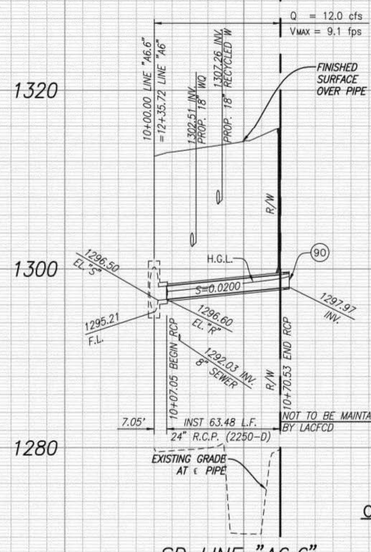
SD LINE "A6.4"

SEE SHEET17 FOR PLAN VIEW



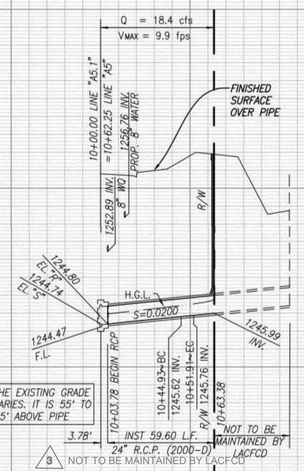
SD LINE "A6.2"

SEE SHEET 17 FOR PLAN VIEW



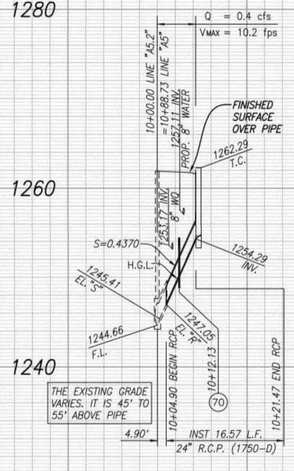
SD LINE "A6.6"

SEE SHEET 17 FOR PLAN VIEW



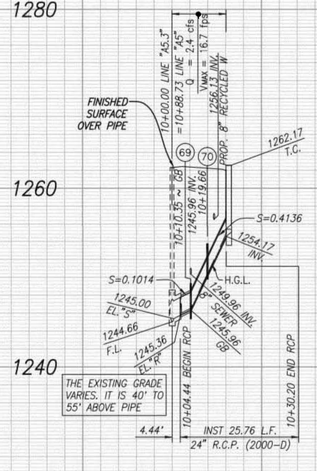
SD LINE "A5.1"

SEE SHEET 16 FOR PLAN VIEW



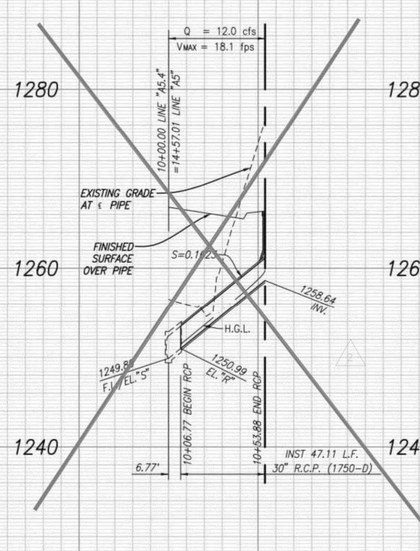
SD LINE "A5.2"

SEE SHEET 16 FOR PLAN VIEW



SD LINE "A5.3"

SEE SHEET 16 FOR PLAN VIEW



SD LINE "A5.4"

SEE SHEET 16 FOR PLAN VIEW

ALL PIPES REQUIRE RUBBER GASKET

CONSTRUCTION NOTES:

69 — CONSTRUCT CONCRETE COLLAR PER S.P.P.W.C. STD. PLAN 380-4

70 — CONSTRUCT PIPE ANCHOR AND BACKFILL STABILIZER PER S.P.P.W.C. STD. PLAN 221-2

73 — CONSTRUCT CONCRETE BLANKET PER S.P.P.W.C. 225-2

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

REVIEWED LAND DEVELOPMENT DIVISION
BY Ken Ng 10/04/2018
STORM DRAIN SECTION DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	REVISED TOTAL SHEET NUMBER.			8/14/19
3	ADD MAINTENANCE RESPONSIBILITY REVISE LAT. A6.1 TO ALLOW FUTURE STREET INTERSECTION		MD.	3/15/2021

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
8/29/18
JASON H. FUKUMITSU DATE

STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
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DWG | SHEET 30 OF 39

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRICE No. 1708 STATE OF CALIFORNIA

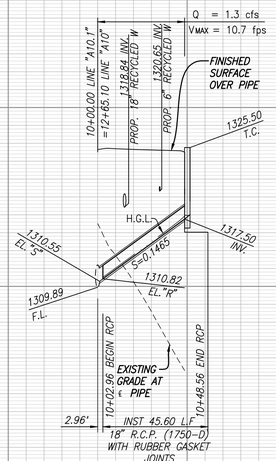
REGISTERED PROFESSIONAL ENGINEER VINCENT PING-XUEN HSU No. 2532 Exp. 6/30/20 CIVIL STATE OF CALIFORNIA

Dwg No. 43-F553.1-38

C:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2641\MM1080-30_SD_Profile.dwg Plotted on Aug 30, 2018-9:16am by jsmusy

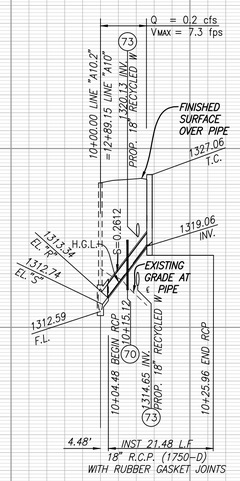
SCALE: HOR. 1"=40'
VERT. 1"=8'

P.D. NO. 2641



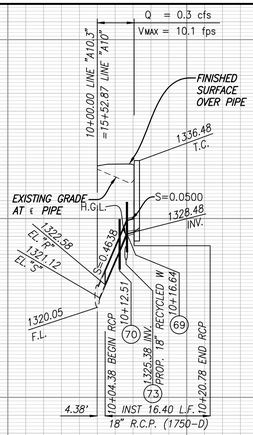
SD LINE "A10.1"

SEE SHEET 20 FOR PLAN VIEW



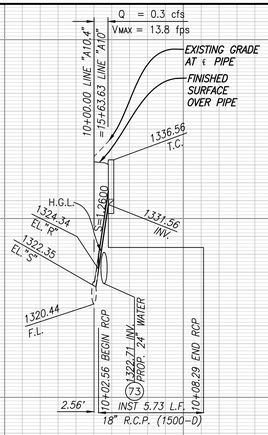
SD LINE "A10.2"

SEE SHEET 20 FOR PLAN VIEW



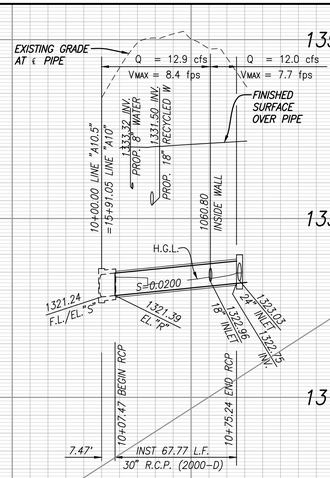
SD LINE "A10.3"

SEE SHEET 20 FOR PLAN VIEW



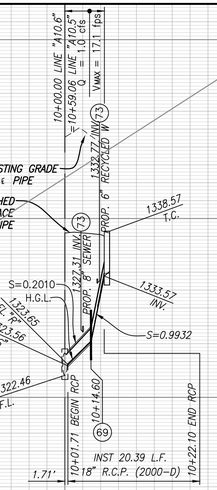
SD LINE "A10.4"

SEE SHEET 20 FOR PLAN VIEW



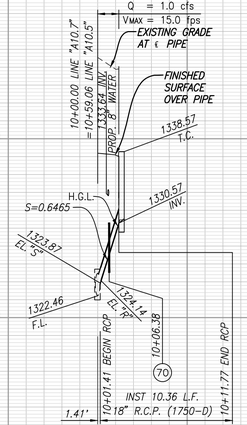
SD LINE "A10.5"

SEE SHEET 20 FOR PLAN VIEW



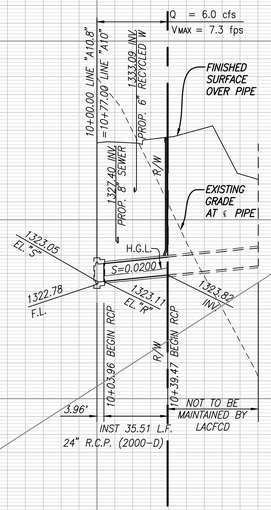
SD LINE "A10.6"

SEE SHEET 20 FOR PLAN VIEW



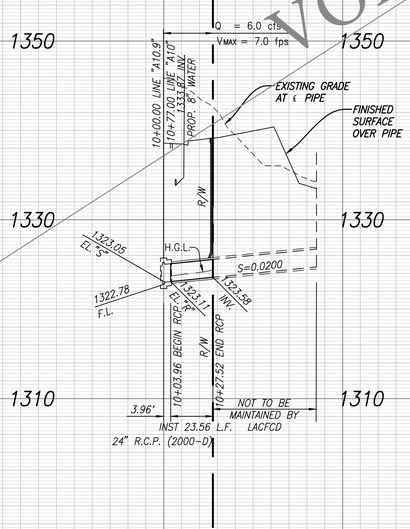
SD LINE "A10.7"

SEE SHEET 20 FOR PLAN VIEW



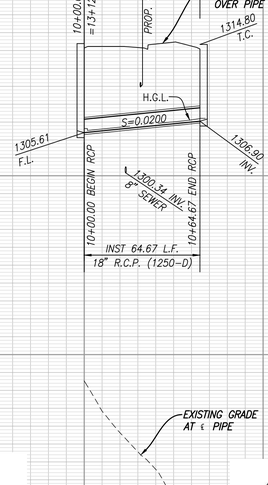
SD LINE "A10.8"

SEE SHEET 20 FOR PLAN VIEW



SD LINE "A10.9"

SEE SHEET 20 FOR PLAN VIEW



SD LINE "A8.1"

SEE SHEET 19 FOR PLAN VIEW

ALL PIPES REQUIRE RUBBER GASKET JOINTS

CONSTRUCTION NOTES:

(69) CONSTRUCT CONCRETE COLLAR PER S.P.P.W.C. STD. PLAN 380-4

(70) CONSTRUCT PIPE ANCHOR AND BACKFILL STABILIZER PER S.P.P.W.C. STD. PLAN 221-2

(73) CONSTRUCT CONCRETE BLANKET PER S.P.P.W.C. 225-2

VOID

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

2

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-XUAN P. No. 2522 Exp. 6/30/20 GEOTECHNICAL STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRIDE No. 1705 STATE OF CALIFORNIA

40 20 0 40 80

GRAPHIC SCALE: 1" = 40'

REVIEWED LAND DEVELOPMENT DIVISION

BY _____ STORM DRAIN SECTION 10/04/2018 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	VOIDED SHEET AND REPLACED WITH NEW SHEET	Jason H Fukumitsu		8/14/19

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA 8/29/18 DATE

STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
26074 Avenue Hall, Suite 23 ▪ Valencia, CA 91355 ▪ PH: (661) 294-2211 ▪ FX: (661) 294-9890

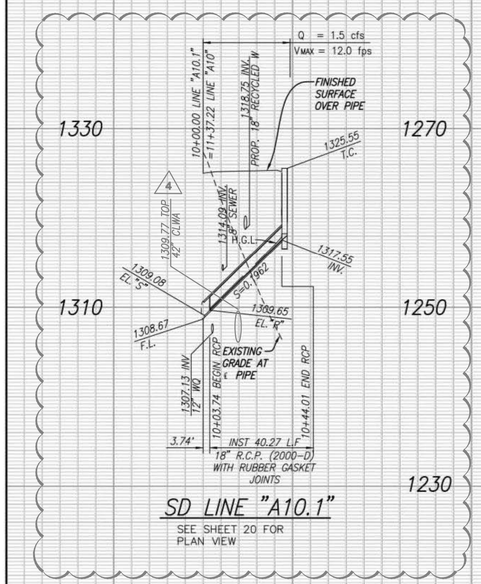
DWG | SHEET 31 OF 37

Dwg No. 43-F553.1-38

G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2641\HAV080-31_SD_Profile.dwg Plotted on Aug 30, 2018-9:18am by pabury

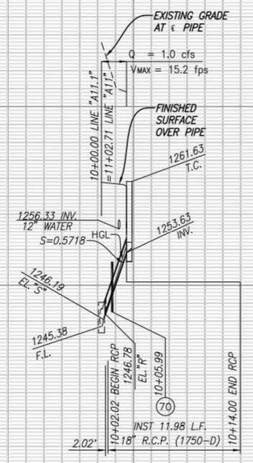
SCALE: HOR. 1"=40'
VERT. 1"=8'

P.D. NO. 2641
FOR PLAN CHECK ONLY



SD LINE "A10.1"

SEE SHEET 20 FOR PLAN VIEW



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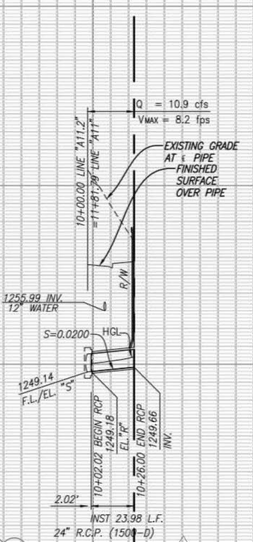
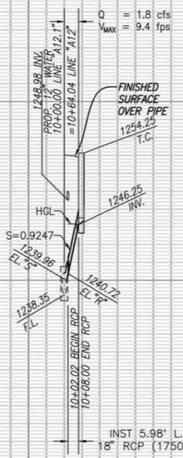
SEE SHEET 20 FOR PLAN VIEW



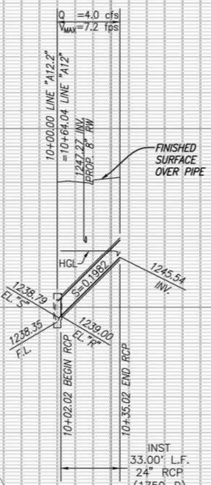
SD LINE "A11-2"

SEE SHEET 20 FOR PLAN VIEW



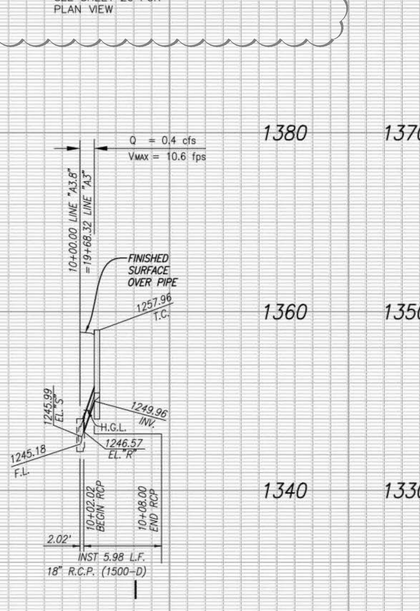
SD LINE "A12-1"

SEE SHEET 12 FOR PLAN VIEW



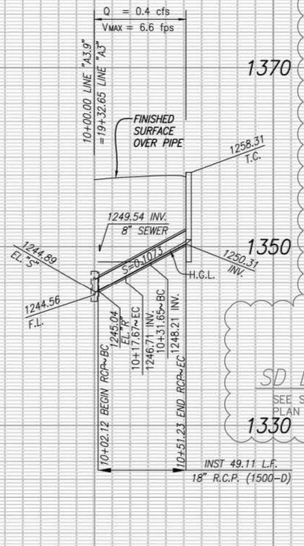
SD LINE "A12-2"

SEE SHEET 12 FOR PLAN VIEW



SD LINE "A3.8"

SEE SHEET 13 FOR PLAN VIEW



SD LINE "A3.9"

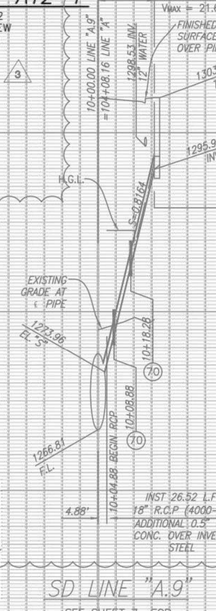
SEE SHEET 13 FOR PLAN VIEW



SD LINE "A3.4"

SEE SHEET 12 FOR PLAN VIEW

THE EXISTING GRADE VARIES, IT IS 115' TO 140' ABOVE PIPE.



SD LINE "A.9"

SEE SHEET 7 FOR PLAN VIEW

ALL PIPES REQUIRE RUBBER GASKET JOINTS

CONSTRUCTION NOTES:

70 CONSTRUCT PIPE ANCHOR AND BACKFILL STABILIZER PER S.P.P.W.C. STD. PLAN 221-2

69 CONSTRUCT CONCRETE COLLAR PER S.P.P.W.C. STD. PLAN 380-4

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER VINCENT PING-HUEN CHOU No. 25282 Exp. 6-30-20 GEOTECHNICAL STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST ANDREW A. PRIDE No. 1209 STATE OF CALIFORNIA

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

REVIEWED LAND DEVELOPMENT DIVISION
BY _____ STORM DRAIN SECTION 8/14/19 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	REPLACEMENT FOR SHEET 31			8/14/19
3	ADDED PROFILE FOR LATERAL "A3.4" AND "A.9" AND ADD MAINTENANCE RESPONSIBILITY			3/15/2021
4	ADDED CLWA CROSSING TO LAT. "A10.1"			9/28/2021

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
5/14/2019
JASON H. FUKUMITSU DATE

STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
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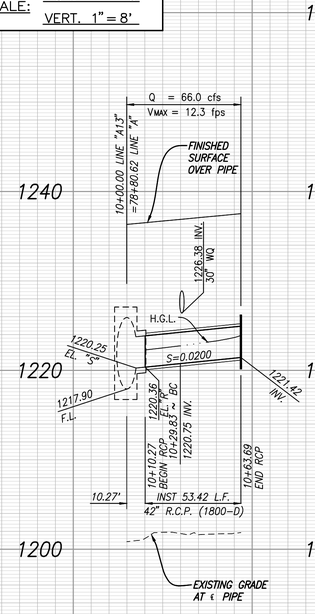
DWG | SHEET 31A OF 39

Dwg No. 43-F553.1-38

G:\Viewhall Ranch\61105 Mission Village\61105-01\Storm\PD 2641\HAV080-31_SD_Profile_REV.dwg Plotted on May 08, 2019-11:07am by heidye

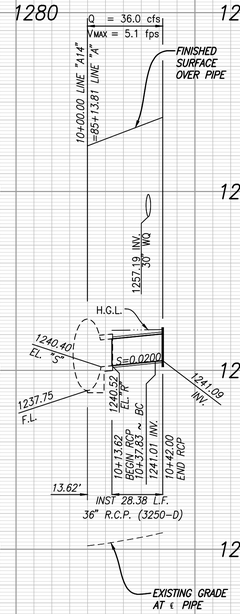
SCALE: HOR. 1"=40'
VERT. 1"=8'

P.D. NO. 2641
FOR PLAN CHECK ONLY



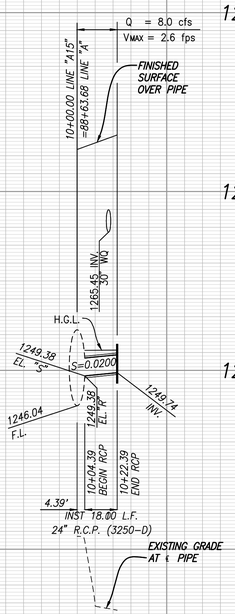
SD LINE "A13"

SEE SHEET 4
FOR PLAN VIEW



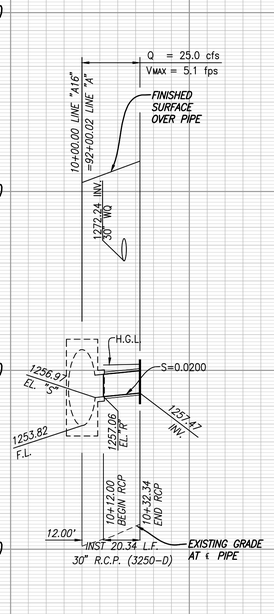
SD LINE "A14"

SEE SHEET 5
FOR PLAN VIEW



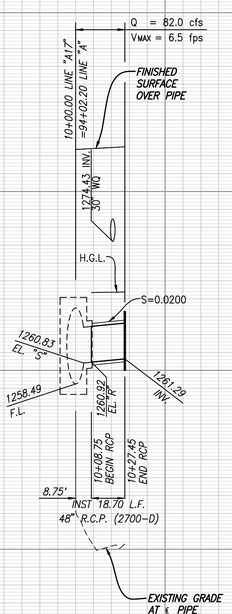
SD LINE "A15"

SEE SHEET 5
FOR PLAN VIEW



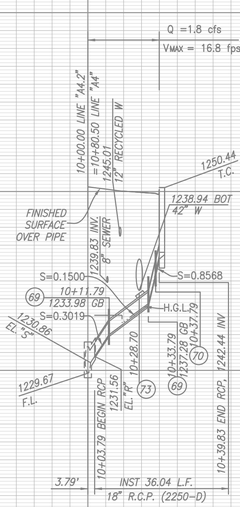
SD LINE "A16"

SEE SHEET 5
FOR PLAN VIEW



SD LINE "A17"

SEE SHEET 6
FOR PLAN VIEW



LAT. A4.2 (4)

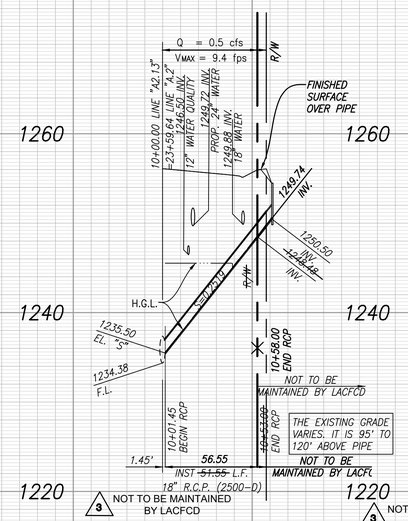
SEE SHEET 14
FOR PLAN VIEW

CONSTRUCTION NOTES:

(69) CONSTRUCT CONCRETE COLLAR PER S.P.P.W.C. STD. PLAN 380-4

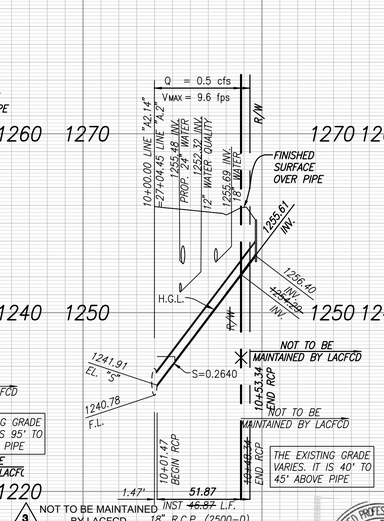
(70) CONSTRUCT PIPE ANCHOR AND BACKFILL STABILIZER PER S.P.P.W.C. STD. PLAN 221-2

(73) CONSTRUCT CONCRETE BLANKET PER S.P.P.W.C. STD. PLAN 225-2



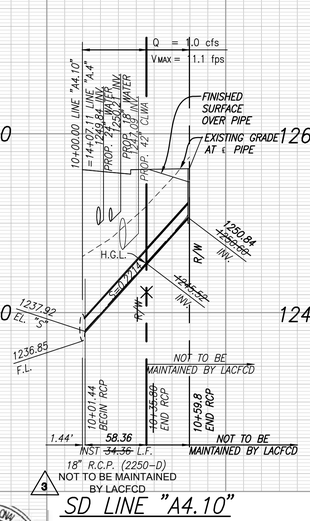
SD LINE "A2.13"

SEE SHEET 10 FOR
PLAN VIEW



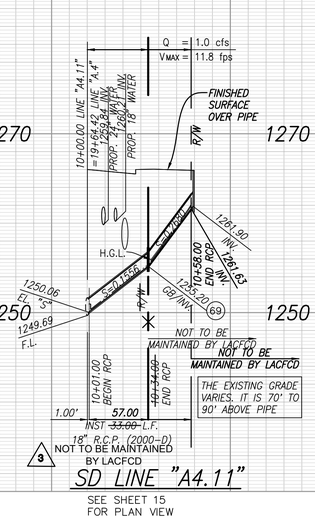
SD LINE "A2.14"

SEE SHEET 11 FOR
PLAN VIEW



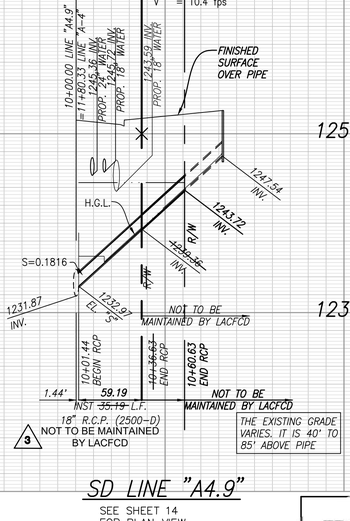
SD LINE "A4.10"

SEE SHEET 14
FOR PLAN VIEW



SD LINE "A4.11"

SEE SHEET 15
FOR PLAN VIEW



SD LINE "A4.9"

SEE SHEET 14
FOR PLAN VIEW

ALL PIPES REQUIRE RUBBER GASKET











Dwg No. 43-F553.1-38

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

REVIEWED LAND DEVELOPMENT DIVISION
BY Ken Ng 10/04/2018
STORM DRAIN SECTION DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	REVISED TOTAL SHEET NUMBER.	Jason H Fukumitsu		8/14/19
3	ADD MAINTENANCE RESPONSIBILITY	Jason H Fukumitsu	A.O. Cepeda	3/15/2021
4	ADD LAT A4.2	Jason H Fukumitsu	A.O. Cepeda	9/28/2021



8/29/18
JASON H. FUKUMITSU DATE

STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

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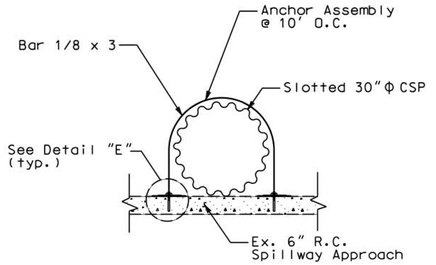
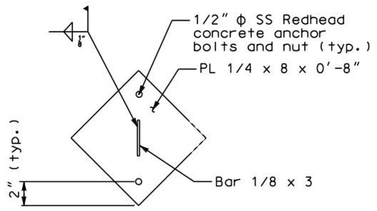
DWG | SHEET 32 OF 34 39

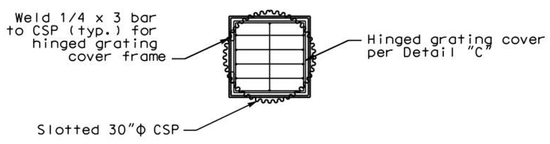
C:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2641\MM\080-32_SD_Profile_rev 4.dwg Plotted on Jul 19, 2021 - 10:30am by ymind



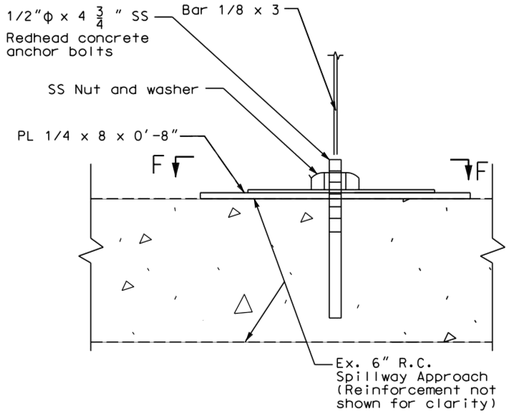
Section D-D
Scale: 1/2" = 1'-0"



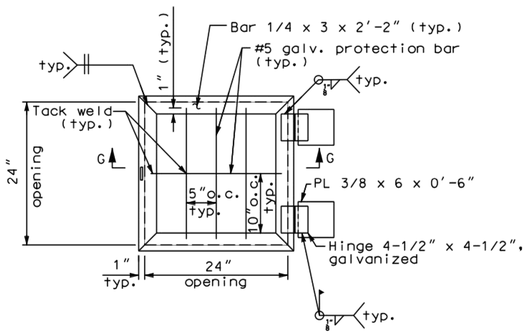
Section F-F
Scale: 2" = 1'-0"



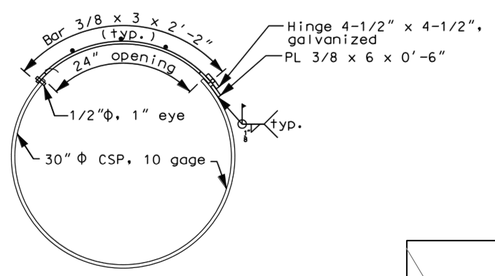
Detail "B"
Scale: 1/2" = 1'-0"



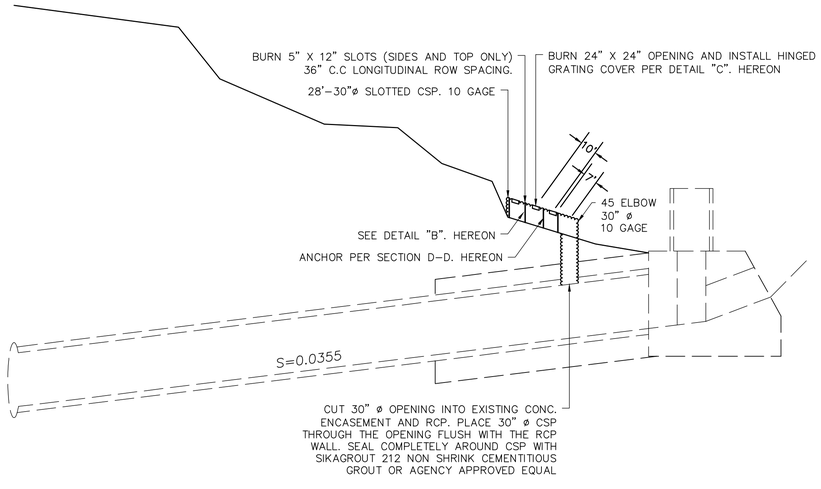
Detail "E"
Scale: 4"=1'-0"



Detail "C"
Scale: 1" = 1'-0"

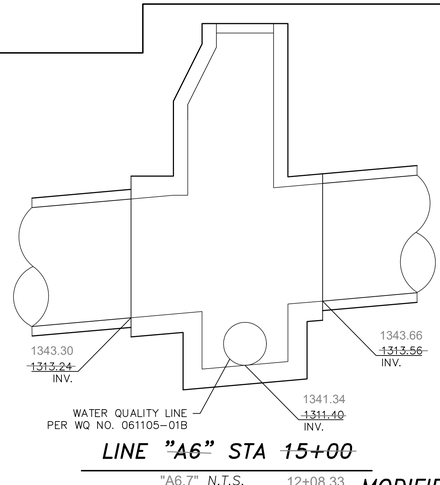


Section G-G
Not to Scale



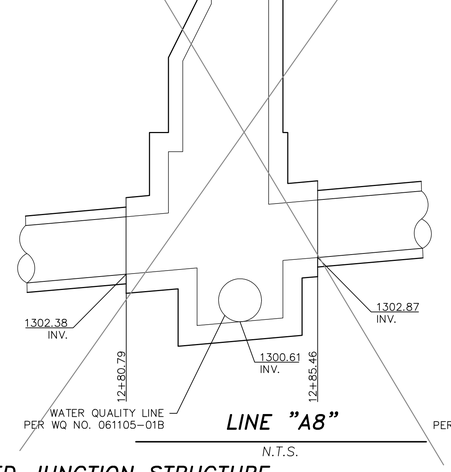
SECONDARY INCLINED PIPE DETAIL

N.T.S.



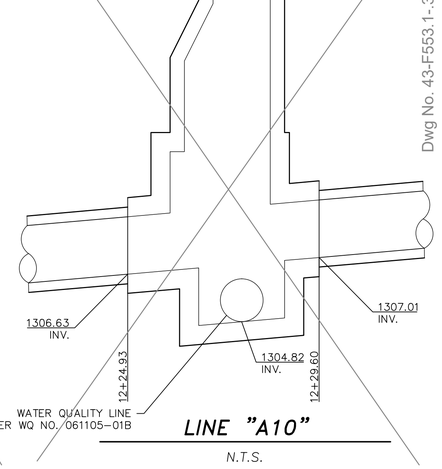
LINE "~~A6~~" STA ~~15+00~~

"A6.7" N.T.S. 12+08.33



LINE "A8"

N.T.S.



LINE "A10"

N.T.S.

MODIFIED JUNCTION STRUCTURE

N.T.S.

STRUCTURAL NOTES

1. EXPOSED EDGES OF CONCRETE MEMBERS SHALL BE ROUNDED OR BEVELED.
2. REINFORCING STEEL SHALL BE IN ACCORDANCE WITH ASTM A 615, GRADE 60.
3. STRUCTURAL STEEL SHALL BE IN ACCORDANCE WITH ASTM A 36.
4. BOLTS SHALL BE IN ACCORDANCE WITH ASTM A 325.

GENERAL NOTES

1. ALL HARDWARE TO BE GALVANIZED BEFORE FABRICATION. TORCHED AREAS WILL BE APPLIED WITH POST FABRICATED GALVANIZATION.
2. FMD SHALL VERIFY ALL LIMITING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING MATERIAL
3. CONNECT CSP SECTIONS WITH STANDARD BAND COUPLER

CONCRETE REMOVAL NOTES

1. MAKE A 1 1/2" SAWCUT ON THE EXPOSED FACES OF THE CONCRETE AT THE REMOVAL LIMITS.
2. AFTER MAKING SAWCUTS, THE CONCRETE SHALL BE REMOVED WITH HAND-HELD EQUIPMENT
3. CARE SHALL BE EXERCISED IN SAWING AT THE REMOVAL LIMITS SO AS NOT TO DAMAGE OR CUT THE REINFORCEMENT IN THE EXISTING CONCRETE.
4. CARE SHALL BE EXERCISED SO THAT DRILLING AND INSTALLING OF ANCHORS BOLTS INTO THE SPILLWAY APPROACH CONCRETE SLAB WILL NOT DAMAGE THE EXISTING STEEL REINFORCEMENT.

REFRENCE

AS BUILT DRAWING — CORPS. OF ENG. DRAWING DWG NO. 205/43-49

P.D. NO. 2641

Dwg No. 43-F553.1-38

REVIEWED LAND DEVELOPMENT DIVISION
BY _____ STORM DRAIN SECTION — 10/04/2018 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	REVISED TOTAL SHEET NUMBER.			8/14/19

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA
8/29/18 JASON H. FUKUMITSU DATE

STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

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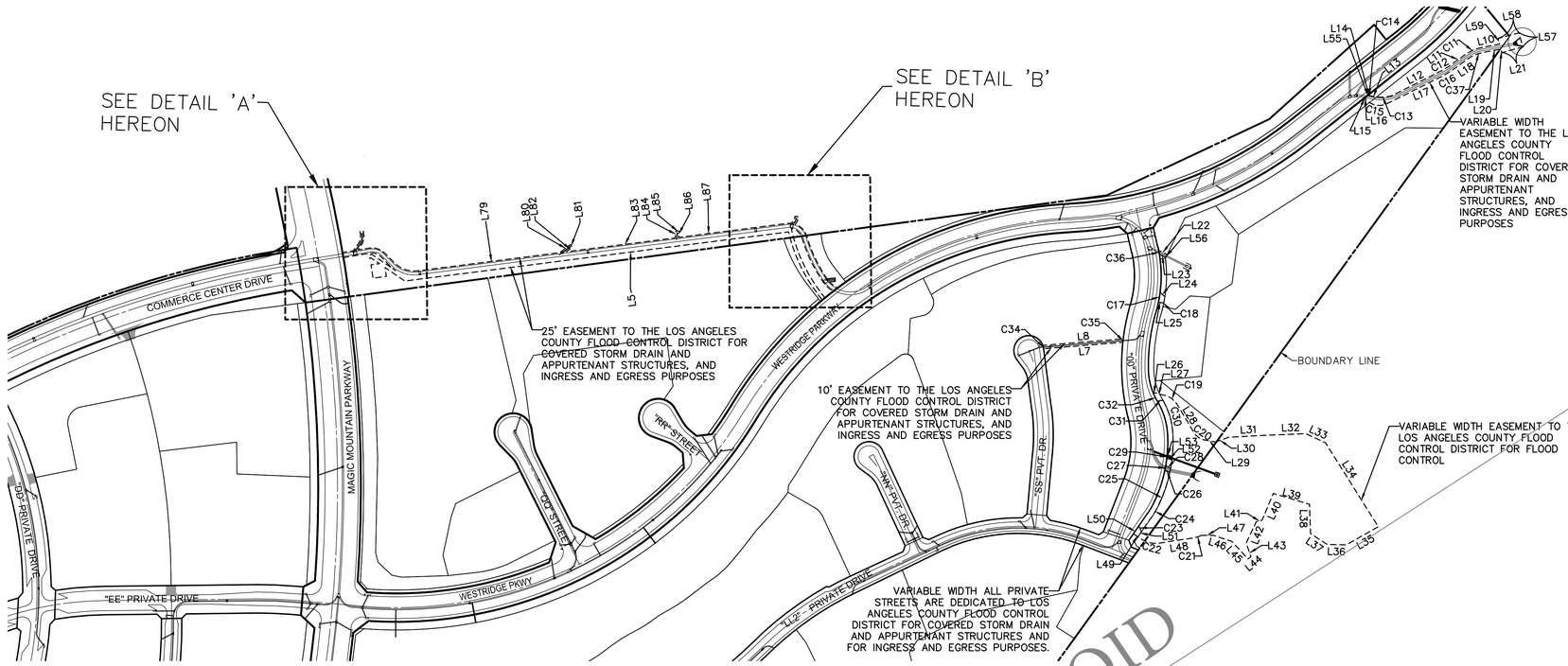
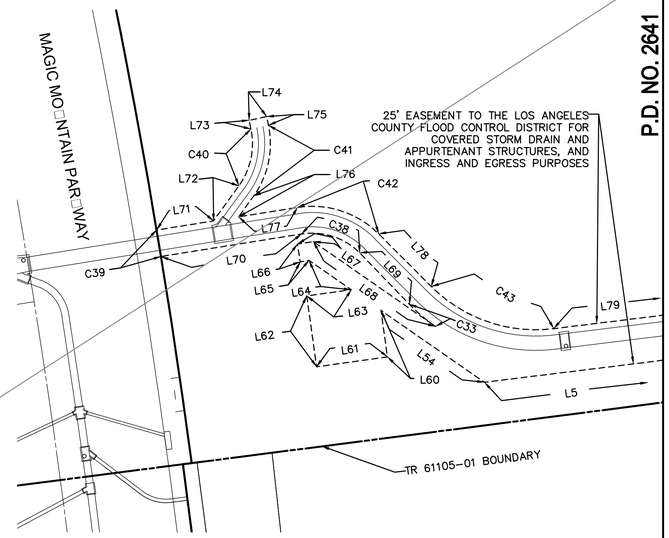
2

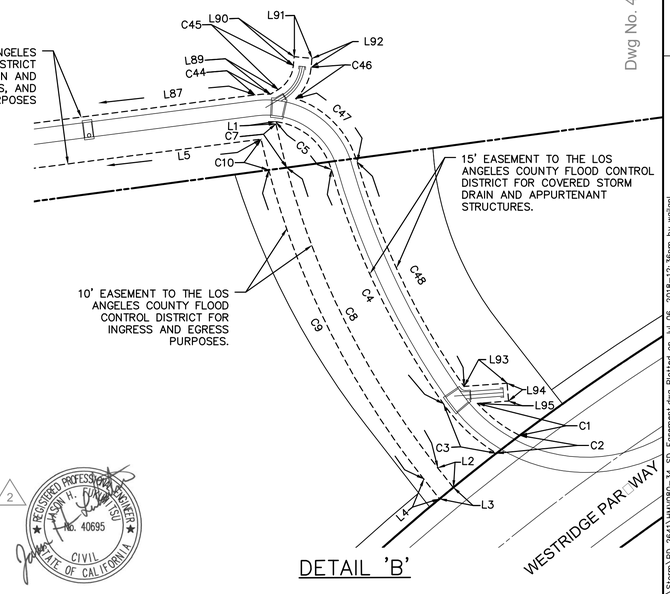
DWG | SHEET 33 OF 37 39





DETAIL 'A'

P.D. NO. 2641



DETAIL 'B'

EASEMENT LINE TABLE		
LINE	LENGTH	BEARING
L1	1.33'	S77°17'41"W
L2	13.99'	S51°38'36"W
L3	10.00'	N39°25'03"W
L4	14.17'	N51°38'36"E
L5	1142.96'	N07°18'15"W
L7	234.87'	S04°39'21"E
L8	238.49'	S04°39'21"E
L9	4.34'	S51°33'06"W
L10	52.74'	N10°48'03"W
L11	61.74'	N35°48'19"W
L12	168.32'	N26°34'23"W
L13	12.08'	N11°33'06"E
L14	2.86'	N51°33'33"E
L15	3.66'	S11°33'06"W
L16	0.05'	S51°33'33"W
L17	189.68'	S26°34'23"E
L18	61.74'	S35°48'19"E
L19	53.86'	S10°48'03"E
L20	11.00'	S74°56'47"W
L21	64.00'	S15°03'13"E
L22	28.63'	S26°34'22"W
L23	21.24'	N26°34'22"E
L24	18.96'	S40°28'33"W
L25	9.84'	N11°05'12"E
L26	10.04'	N05°06'09"E
L27	16.42'	S17°48'32"W
L28	100.82'	N59°04'33"E
L29	32.76'	N10°36'58"E
L30	41.92'	S19°43'16"E
L31	127.78'	S02°57'03"E
L32	100.16'	N02°16'34"W
L33	63.95'	N24°42'52"E

EASEMENT LINE TABLE		
LINE	LENGTH	BEARING
L34	293.30'	N57°49'55"E
L35	108.33'	S29°29'26"E
L36	56.57'	S00°48'25"W
L37	58.91'	S33°11'55"W
L38	86.82'	S87°56'12"W
L39	111.60'	S16°33'37"W
L40	85.03'	S67°20'26"E
L41	18.52'	S17°30'46"E
L42	69.40'	S64°49'24"E
L43	41.90'	N70°42'29"E
L44	10.88'	N38°59'45"W
L45	70.97'	N47°04'30"E
L46	55.92'	N18°02'47"E
L47	36.53'	N00°21'29"E
L48	104.21'	N08°34'35"W
L49	26.40'	N34°46'02"E
L50	28.28'	S55°13'58"E
L51	74.16'	S55°13'58"E
L52	16.42'	N20°01'12"E
L53	16.52'	S20°01'12"W
L54	70.40'	N34°30'54"E
L55	17.35'	N38°26'27"W
L56	10.00'	S64°07'53"W
L57	43.34'	N74°56'47"E
L58	64.00'	N15°03'13"W
L59	17.29'	S74°56'47"W
L60	26.28'	S81°48'53"W
L61	40.00'	N08°11'07"W
L62	40.00'	N81°48'53"E
L63	25.13'	S08°11'07"E
L64	28.72'	N34°30'54"E
L65	5.00'	N09°23'04"W
L66	10.00'	N80°36'56"E

EASEMENT LINE TABLE		
LINE	LENGTH	BEARING
L67	9.03'	S09°23'04"E
L68	83.10'	S34°30'54"W
L69	39.96'	N45°43'10"E
L70	79.60'	N09°23'04"W
L71	32.22'	S09°23'04"E
L72	24.23'	S54°23'04"E
L73	5.00'	N77°46'52"E
L74	10.00'	S12°13'08"E
L75	5.00'	S77°46'52"W
L76	14.23'	N54°23'04"W
L77	33.32'	S09°23'04"E
L78	41.65'	S44°43'48"W
L79	422.41'	S07°18'15"E
L80	39.86'	S37°18'15"E
L81	10.00'	S52°41'45"W
L82	22.54'	N37°18'15"W
L83	323.64'	S07°18'15"E
L84	21.03'	S82°52'01"E
L85	10.00'	S07°07'59"W
L86	18.46'	N82°52'01"W
L87	324.21'	S07°18'15"E
L89	5.06'	S30°55'18"E
L90	5.00'	S84°38'40"E
L91	10.00'	S05°21'20"W
L92	5.00'	N84°38'40"W
L93	24.20'	S04°17'30"E
L94	10.00'	S85°42'30"W
L95	17.46'	N04°17'30"W

EASEMENT CURVE TABLE				
CURVE	LENGTH	RADIUS	DELTA	TANGENT
C1	29.85'	82.50'	20°44'01"	15.09'
C2	16.37'	1242.00'	0°45'18"	8.18'
C3	40.82'	97.50'	23°59'10"	20.71'
C4	145.92'	444.44'	18°48'43"	73.62'
C5	43.57'	37.50'	66°34'07"	24.62'
C6	35.42'	37.50'	54°06'52"	19.15'
C7	25.20'	467.08'	3°05'30"	12.61'
C8	189.25'	467.08'	23°12'54"	95.94'
C9	194.62'	476.50'	23°24'05"	98.68'
C10	17.76'	476.50'	2°08'08"	8.88'
C11	55.64'	127.50'	25°00'16"	28.27'
C12	18.13'	112.50'	9°13'56"	9.08'
C13	54.76'	114.50'	27°24'00"	27.91'
C14	0.71'	38.50'	1°03'46"	0.36'
C15	73.46'	407.50'	10°19'46"	36.83'
C16	65.01'	53.50'	69°37'13"	37.20'
C17	28.61'	387.00'	04°14'08"	14.31'
C18	6.17'	70.00'	05°02'57"	3.09'
C19	52.40'	60.50'	49°37'34"	27.97'
C20	38.06'	45.00'	48°27'35"	20.25'

EASEMENT CURVE TABLE				
CURVE	LENGTH	RADIUS	DELTA	TANGENT
C21	22.99'	65.00'	20°16'02"	11.62'
C22	56.74'	75.00'	43°20'38"	29.80'
C23	18.92'	243.29'	04°27'23"	9.47'
C24	33.63'	226.00'	08°31'29"	16.84'
C25	219.80'	433.00'	29°05'05"	112.32'
C26	16.31'	81.50'	11°28'07"	8.18'
C27	13.78'	417.00'	01°53'34"	6.89'
C28	16.79'	68.50'	14°02'32"	8.44'
C29	10.31'	417.00'	01°24'58"	5.15'
C30	105.23'	226.00'	26°40'45"	53.59'
C31	17.31'	35.00'	28°19'51"	8.83'
C32	28.24'	190.00'	08°31'02"	14.15'
C33	19.20'	98.20'	11°12'17"	9.63'
C34	10.16'	44.04'	13°12'47"	5.10'
C35	10.19'	642.00'	00°54'35"	5.10'
C36	12.51'	387.00'	01°51'08"	6.26'
C37	49.10'	112.50'	25°00'16"	24.95'
C38	35.42'	37.50'	54°06'52"	19.15'
C39	15.00'	4074.00	0°12'39"	7.50'
C40	33.39'	40.00'	47°50'04"	17.74'

EASEMENT CURVE TABLE				
CURVE	LENGTH	RADIUS	DELTA	TANGENT
C41	41.74'	50.00'	47°50'04"	22.17'
C42	49.58'	52.50'	54°06'52"	26.82'
C43	74.92'	82.50'	52°02'03"	40.27'
C44	8.73'	52.50'	9°31'37"	4.37'
C45	16.41'	17.50'	53°43'22"	8.86'
C46	19.99'	27.50'	41°39'23"	10.46'
C47	51.29'	52.50'	55°58'16"	27.90'
C48	139.64'	426.01'	18°46'49"	70.45'

200 100 0 200 400

GRAPHIC SCALE: 1" = 200'

REVIEWED LAND DEVELOPMENT DIVISION

BY _____ 10/04/2018
STORM DRAIN SECTION DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	VOIDED SHEET AND REPLACED WITH NEW SHEET			8/14/19

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

8/29/18
JASON H. FUKUMITSU DATE

STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

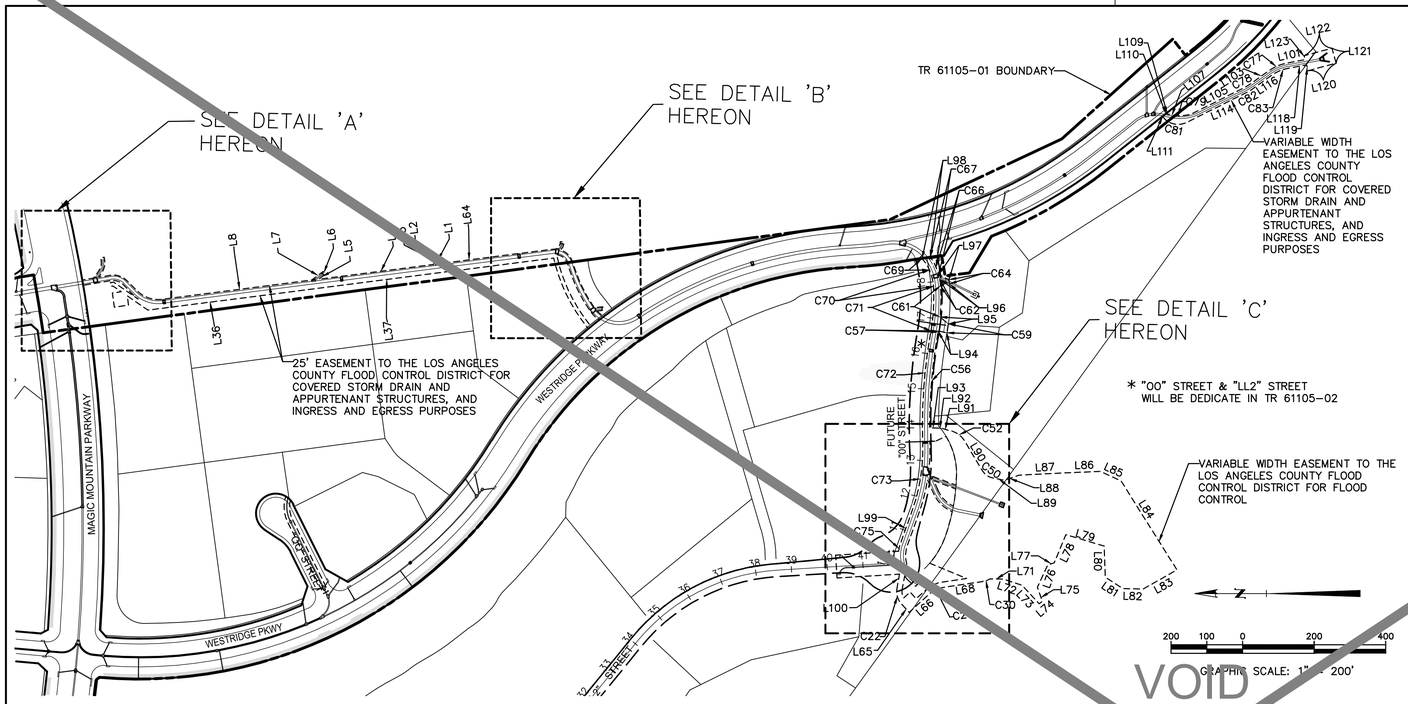
HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
26074 Avenue Hall, Suite 23 • Valencia, CA 91355 • PH: (661) 294-2211 • FX: (661) 294-9890

DWG

SHEET 34 OF 37

Dwg No. 43-F553.1-38

G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2641\HM1086-34_SD_EasementLdwg Plotted on Jul 06, 2018-12:36pm by wallisel



Easement Curve Table			
Curve #	Delta	Radius	Length
C1	52°02'03"	82.50'	74.92'
C2	54°06'52"	52.50'	49.58'
C3	47°50'04"	50.00'	41.74'
C4	47°50'04"	40.00'	33.39'
C5	0°12'39"	4074.00'	14.99'
C6	54°06'52"	37.50'	35.42'
C7	11°12'17"	98.20'	19.20'
C8	2°08'08"	476.50'	17.76'
C9	23°24'05"	476.50'	194.62'
C10	26°30'02"	467.08'	215.77'
C12	66°29'22"	37.50'	43.52'
C13	18°48'43"	444.44'	145.92'
C14	20°52'01"	97.50'	35.51'
C15	0°44'01"	1247.00'	15.97'
C16	16°55'35"	82.50'	24.37'
C17	18°46'49"	426.01'	139.64'
C18	55°58'16"	52.50'	51.29'
C19	41°39'23"	27.50'	19.99'
C20	53°43'22"	17.50'	16.41'
C21	9°31'37"	52.50'	8.73'
C22	41°37'16"	52.94'	38.46'
C26	33°25'44"	60.00'	35.0
C30	20°16'02"	65.00'	22.99'
C50	48°27'35"	45.00'	38.06'
C52	49°37'3	60.50'	52.40'
C56	15°3 37"	1473.00'	269.35'
C57	0°20'54"	527.00'	3.20'
C59	2°34'46"	552.00'	24.85'
C61	9°28'07"	527.00'	87.09'
C62	6°49'15"	160.00'	19.05'
C64	1°13'00"	552.00'	11.72'
C66	7°50'11"	160.00'	21.88'
C67	14°19'14"	130.00'	32.48'
C69	17°49'38"	110.00'	33.91'
C70	19°18'25"	140.00'	47.18'
C71	14°08'00"	507.00'	125.06'
C72	12°08'06"	1493.00'	316.20'
C73	21°31'35"	507.00'	190.48'
C75	12°34'44"	100.00'	21.95'
C77	25°00'16"	127.50'	55.64'
C78	9°13'56"	112.50'	18.13'
C79	27°24'00"	114.50'	54.76'
C81	78°27'24"	53.35'	73.05'
C82	9°13'56"	127.50'	20.54'
C83	25°00'16"	112.50'	49.10'
C84	16°12'01"	35.00'	9.90'
C85	32°17'42"	199.80'	112.62'
C86	3°03'48"	542.76'	29.02'
C87	8°03'4	527.00'	74.16'
C88	0°14'27"	1.00'	6.19'
C89	41°48'11"	82.50'	60.19'
C90	5°07'31"	542.76'	48.5
C91	80°05'39"	80.00'	111.83'
C92	12°09'44"	95.00'	20.17'
C93	24°42'14"	100.00'	43.12'
C95	37°30'21"	37.94'	24.83'
C96	33°25'44"	75.00'	43.76'
C97	21°14'28"	231.66'	85.88'
C98	7°44'01"	542.76'	73.26'
C99	43°49'38"	97.50'	74.58'
C100	10°22'05"	527.00'	95.36'
C101	00°28'14"	1247.00'	10.24'

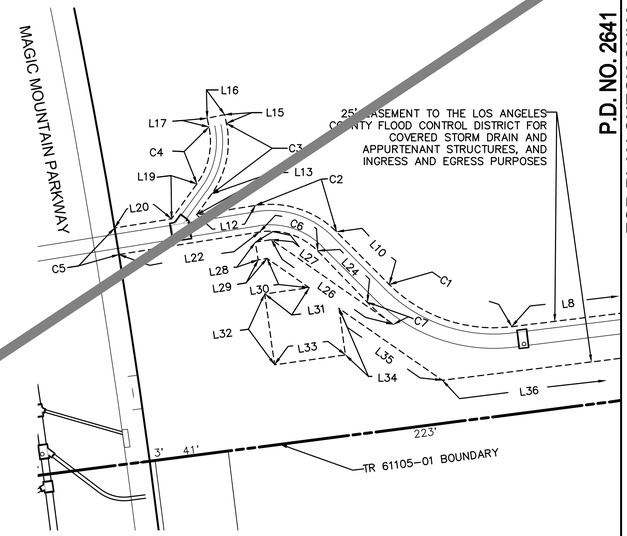
Easement Line Table		
Line #	Length	Direction
L1	18.46'	S82°52'01"E
L2	10.00'	N07°07'59"E
L3	21.03'	N82°52'01"W
L4	323.64'	N07°18'15"W
L5	22.54'	S37°18'15"E
L6	10.00'	N52°41'45"E
L7	39.86'	N37°18'15"W
L8	422.41'	N07°18'15"W
L10	41.65'	N44°43'48"E
L12	33.32'	N09°23'04"W
L13	14.23'	S54°23'04"E
L15	5.00'	N77°46'52"E
L16	10.00'	N12°13'08"W
L17	5.00'	S77°46'52"W
L19	24.23'	N54°23'04"W
L20	32.22'	N09°23'04"W
L22	79.60'	S09°23'04"E
L24	39.96'	S45°43'10"W
L26	83.10'	N34°30'54"E
L27	9.03'	N09°23'04"W
L28	10.00'	S80°36'56"W
L29	5.00'	S09°23'04"E
L30	28.72'	S34°30'54"W
L31	25.13'	N08°11'07"W
L32	40.00'	S81°48'53"W
L33	40.00'	S08°11'07"E
L34	26.28'	N81°48'53"E
L35	70.40'	S34°30'54"W
L36	185.05'	S07°18'15"E
L37	957.91'	S07°18'15"E
L40	9.18'	S52°20'50"W
L42	8.99'	N50°49'21"E
L51	17.46'	S04°17'30"E
L52	10.00'	N85°42'30"E
L53	24.20'	N04°17'30"W
L57	5.00'	S84°38'40

Easement Line Table		
Line #	Length	Direction
L58	10.00'	N05°21'20"E
L59	5.00'	N84°38'40"W
L61	5.06'	N30°55'18"W
L63	46.34'	N07°18'15"W
L64	277.88'	N07°18'15"W
L65	40.00'	S47°59'41"W
L66	80.98'	S42°00'19"E
L68	113.93'	S08°34'35"E
L71	36.53'	S00°21'29"W
L72	55.92'	S18°02'47"W
L73	70.97'	S47°04'30"W
L74	10.88'	S38°59'45"E
L75	41.90'	N70°42'29"E
L76	69.40'	S64°49'24"E
L77	18.52'	S17°30'46"E
L78	85.03'	S67°20'26"E
L79	111.60'	S16°33'37"W
L80	86.82'	S87°56'12"W
L81	58.91'	S33°11'55"W
L82	56.57'	S00°48'25"W
L83	108.33'	S29°29'26"E
L84	293.30'	N57°49'55"E
L85	63.95'	N24°42'52"E
L86	100.16'	N02°16'34"W
L87	127.78'	N02°57'03"W
L88	41.92'	N19°43'16"W
L89	32.76'	N10°36'58"E
L90	100.82'	N59°04'33"E
L91	16.42'	N17°48'32"E
L92	18.25'	N05°06'09
L93	18.00'	N00 24"W
L94	25.01'	S11°05'12"W
L95	7.75'	N40°28'33"E
L96	30.31'	S26°34'22"W
L97	32.47'	N26°34'22"E

Easement Line Table		
Line #	Length	Direction
L98	21.68'	N18°54'53"W
L99	98.42'	N70°22'17"W
L100	40.54'	S80°09'43"E
L101	52.74'	N10°48'03"W
L103	61.74'	N35°48'19"W
L105	168.32'	N26°34'23"W
L107	12.09'	N11°33'06"E
L109	3.56'	N51°33'33"E
L110	17.35'	N38°26'27"W
L111	3.66'	S11°33'06"W
L114	189.68'	S26°34'23"E
L116	61.74'	S35°48'19"E
L118	53.86'	S10°48'03"E
L119	17.12'	S74°56'47"W
L120	81.00'	S15°03'13"E
L121	43.34'	N74°56'47"E
L122	81.00'	N15°03'13"W
L123	11.17'	S74°56'47"W
L125	18.28'	S01°39'25"E
L126	20.17'	S26°48'30"E
L130	73.00'	N20°54'50"E
L131	18.82'	N65°54'50"E
L134	32.85'	S65°54'50"W
L137	65.92'	N20°54'50"
L138	98.42'	N70° 7"W
L143	38.41'	S00°09'43"W
L145	2.00'	S42°00'19"E
L146	25.00'	S47°59'41"W
L147	40.98'	S42°00'19"E
L149	72.47'	S08°34'35"E
L151	111.55'	N22°34'05"E
L155	41.62'	N65°54'50"E
L157	174.74'	N03°30'19"W
L158	64.00'	N86°29'41"E
L159	176.42'	S03°30'19"E

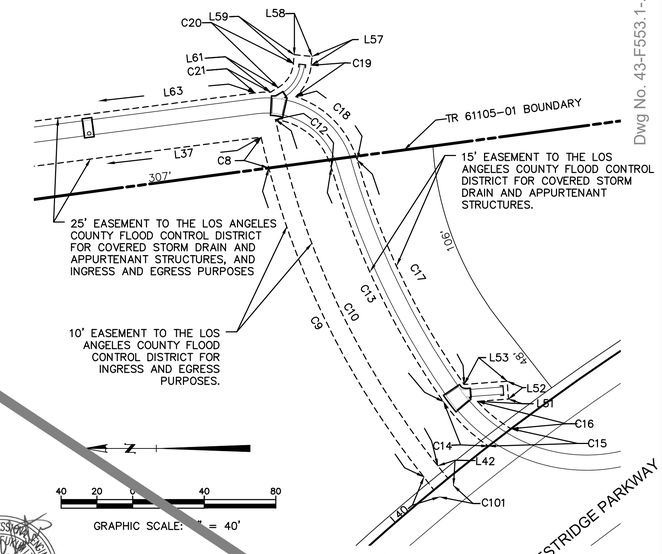
GRAPHIC SCALE: 1" = 60'

DETAIL 'C'



DETAIL 'A'

GRAPHIC SCALE: 1" = 40'



GRAPHIC SCALE: 1" = 40'

DETAIL 'B'

REVIEWED LAND DEVELOPMENT DIVISION

BY _____ 8/14/19

STORM DRAIN SECTION DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	REPLACEMENT FOR SHEET 34	Jason H Fukumitsu		8/14/19
4	SUPERSED 12A FOR 12B FOR EASMENT REVISION	Jason H Fukumitsu	MD.	9/28/2021

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

Jason H Fukumitsu 7/29/2019

JASON H. FUKUMITSU DATE

P.D. NO. 2641

FOR PLAN CHECK ONLY

STORM DRAIN PLANS IN

TRACT No. 61105-01 P.D. No. 2641

COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES LOS ANGELES, INC.

PLANNING ▪ ENGINEERING ▪ SURVEYING

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DWG

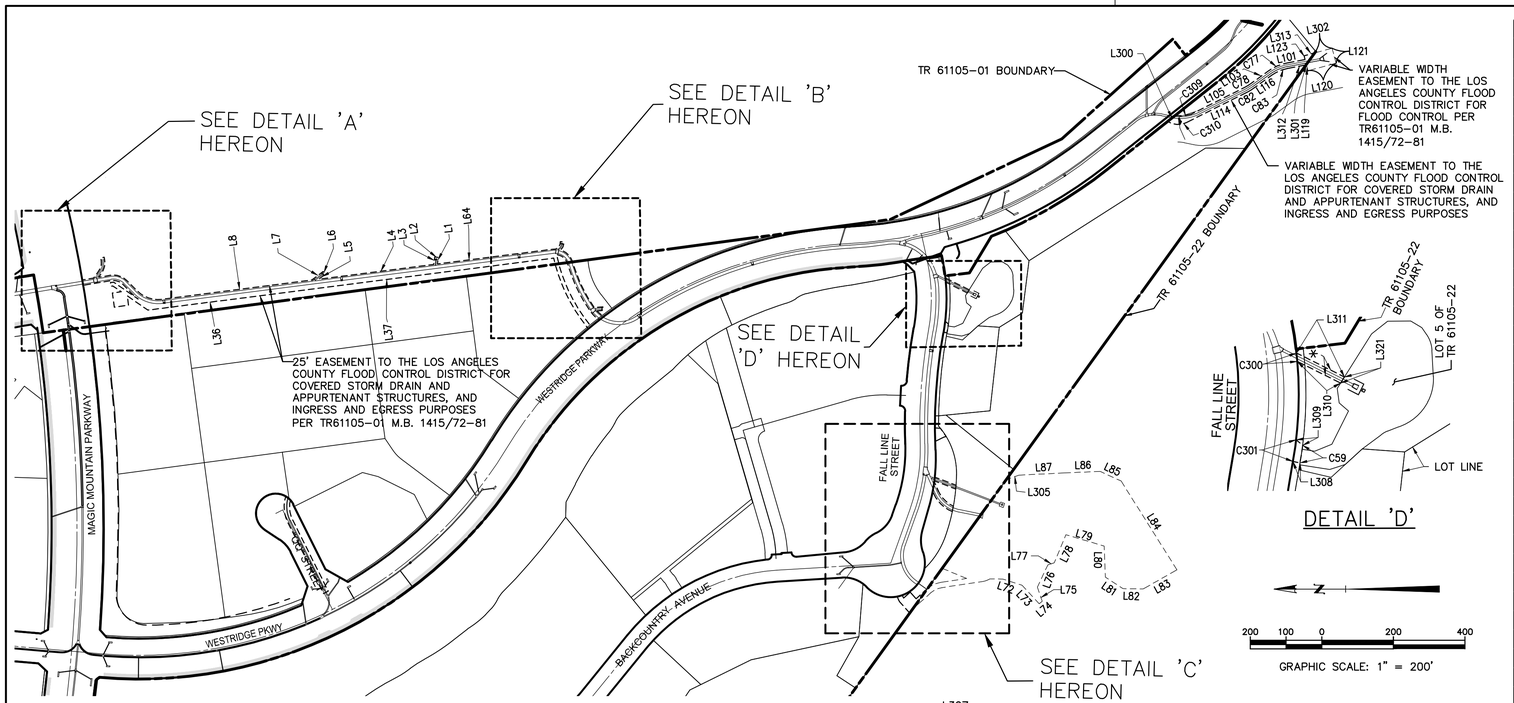
SHEET 34A OF 39

Dwg No. 43-F553.1-38

G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2641\NM1080-34_SD_EasementLines Plotted on Jul 29, 2019-11:20am by heidys

P.D. NO. 2641

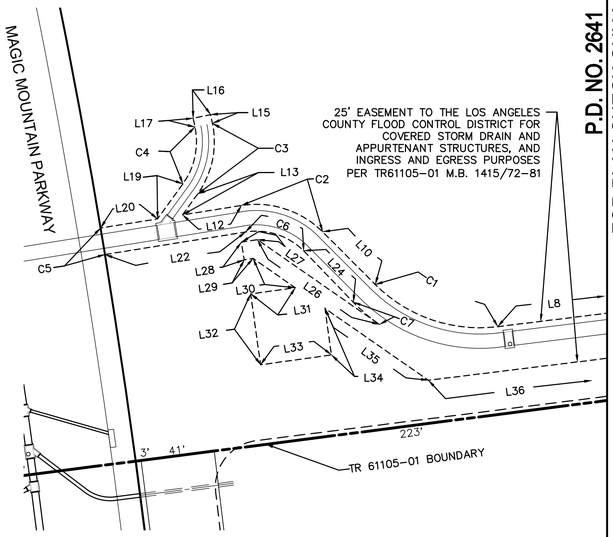
FOR PLAN CHECK ONLY



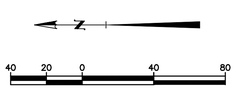
Easement Curve Table			
Curve #	Delta	Radius	Length
C1	52°02'03"	82.50'	74.92'
C2	54°06'52"	52.50'	49.58'
C3	47°50'04"	50.00'	41.74'
C4	47°50'04"	40.00'	33.39'
C5	0°12'39"	4074.00'	14.99'
C6	54°06'52"	37.50'	35.42'
C7	11°12'17"	98.20'	19.20'
C8	2°08'08"	476.50'	17.76'
C9	23°24'05"	476.50'	194.62'
C10	26°30'02"	467.08'	215.77'
C12	66°29'22"	37.50'	43.52'
C13	18°48'43"	444.44'	145.92'
C14	20°52'01"	97.50'	35.51'
C15	0°44'01"	1247.00'	15.97'
C16	16°55'35"	82.50'	24.37'
C17	18°46'49"	426.01'	139.64'
C18	55°58'16"	52.50'	51.29'
C19	41°39'23"	27.50'	19.99'
C20	53°43'22"	17.50'	16.41'
C21	9°31'37"	52.50'	8.73'
C26	33°25'44"	60.00'	35.01'
C30	20°16'02"	65.00'	22.99'
C59	2°34'46"	552.00'	24.85'
C77	25°00'16"	127.50'	55.64'
C78	9°13'56"	112.50'	18.13'
C82	9°13'56"	127.50'	20.54'
C83	25°00'16"	112.50'	49.10'
C84	16°12'01"	35.00'	9.90'
C89	41°48'11"	82.50'	60.19'
C96	33°25'44"	75.00'	43.76'
C99	43°49'38"	97.50'	74.58'
C101	00°28'14"	1247.00'	10.24'
C300	01°14'52"	542.00'	11.81'
C301	03°15'02"	542.00'	30.75'
C302	01°25'01"	1458.00'	36.06'
C303	01°10'57"	500.00'	10.32'
C304	03°08'32"	500.00'	27.42'
C305	01°05'59"	542.76'	10.42'
C306	02°37'06"	542.76'	15.33'
C307	16°49'04"	52.94'	15.42'
C308	09°03'25"	95.00'	15.02'
C309	27°24'00"	114.50'	45.03'
C310	78°27'24"	53.35'	55.55'
C311	12°56'45"	37.94'	8.57'
C312	07°56'43"	199.80'	27.71'

DETAIL 'D'

GRAPHIC SCALE: 1" = 200'



DETAIL 'A'



GRAPHIC SCALE: 1" = 40'

Easement Line Table		
Line #	Length	Direction
L1	18.46'	S82°52'01"E
L2	10.00'	N07°07'59"E
L3	21.03'	N82°52'01"W
L4	323.64'	N07°18'15"W
L5	22.54'	S37°18'15"E
L6	10.00'	N52°41'45"E
L7	39.86'	N37°18'15"W
L8	422.41'	N07°18'15"W
L10	41.65'	N44°43'48"E
L12	33.32'	N09°23'04"W
L13	14.23'	S54°23'04"E
L15	5.00'	N77°46'52"E
L16	10.00'	N12°13'08"W
L17	5.00'	S77°46'52"W
L19	24.23'	N54°23'04"W
L20	32.22'	N09°23'04"W
L22	79.60'	S09°23'04"E
L24	39.96'	S45°43'10"W
L26	83.10'	N34°30'54"E
L27	9.03'	N09°23'04"W
L28	10.00'	S80°36'56"W
L29	5.00'	S09°23'04"E
L30	28.72'	S34°30'54"W
L31	25.13'	N08°11'07"W
L32	40.00'	S81°48'53"W
L33	40.00'	S08°11'07"E
L34	26.28'	N81°48'53"E
L35	70.40'	S34°30'54"W
L36	185.05'	S07°18'15"E
L37	957.91'	S07°18'15"E
L40	9.18'	S52°20'50"W
L42	8.99'	N50°49'21"E
L51	17.46'	S04°17'30"E
L52	10.00'	N85°42'30"E
L53	24.20'	N04°17'30"W
L57	5.00'	S84°38'40"E

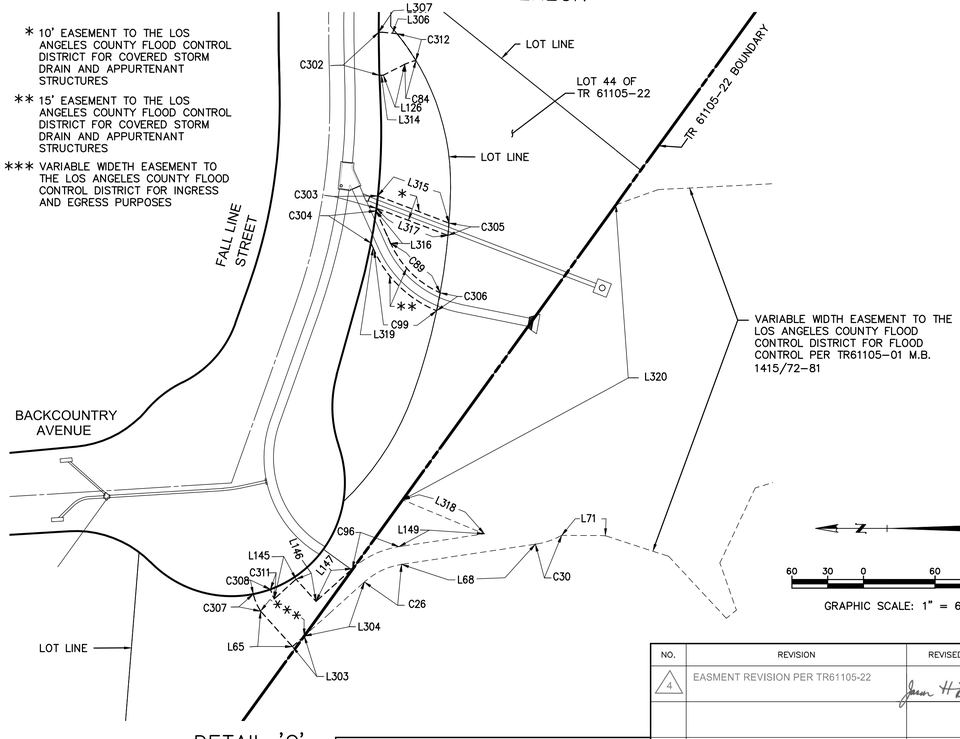
Easement Line Table		
Line #	Length	Direction
L58	10.00'	N05°21'20"E
L59	5.00'	N84°38'40"W
L61	5.06'	N30°55'18"W
L63	46.34'	N07°18'15"W
L64	277.88'	N07°18'15"W
L65	40.00'	S47°59'41"W
L68	113.93'	S08°34'35"E
L71	36.53'	S00°21'29"W
L72	55.92'	S18°02'47"W
L73	70.97'	S47°04'30"W
L74	10.88'	S38°59'45"E
L75	41.90'	N70°42'29"E
L76	69.40'	S64°49'24"E
L77	18.52'	S17°30'46"E
L78	85.03'	S67°20'26"E
L79	111.60'	S16°33'37"W
L80	86.82'	S87°56'12"W
L81	58.91'	S33°11'55"W
L82	56.57'	S00°48'25"W
L83	108.33'	S29°29'26"E
L84	293.30'	N57°49'55"E
L85	63.95'	N24°42'52"E
L86	100.16'	N02°16'34"W
L87	127.78'	N02°57'03"W
L101	52.74'	N10°48'03"W
L103	61.74'	N35°48'19"W
L105	168.32'	N26°34'23"W
L114	189.68'	S26°34'23"E
L116	61.74'	S35°48'19"E
L119	17.12'	S74°56'47"W
L120	81.00'	S15°03'13"E
L121	43.34'	N74°56'47"E
L123	11.17'	S74°56'47"W
L126	20.17'	S26°48'30"E
L145	24.66'	S42°00'19"E
L146	25.00'	S47°59'41"W

Easement Line Table		
Line #	Length	Direction
L147	40.98'	S42°00'19"E
L149	72.47'	S08°34'35"E
L300	26.55'	N38°26'27"W
L301	1.51'	N10°48'03"W
L302	50.37'	N15°03'13"W
L303	13.26'	S42°00'19"E
L304	67.72'	S42°00'19"E
L305	37.64'	N19°43'16"W
L306	12.30'	N05°06'09"E
L307	3.00'	N00°14'24"W
L308	10.00'	S11°05'12"W
L309	11.99'	N40°28'33"E
L310	67.53'	S26°34'22"W
L311	74.80'	N26°34'22"E
L312	52.35'	S10°48'03"E
L313	30.62'	N15°03'13"W
L314	3.28'	S01°39'25"E
L315	63.83'	N20°54'50"E
L316	29.66'	S65°54'50"W
L317	64.20'	N20°54'50"E
L318	74.12'	N22°34'05"E
L319	6.71'	N65°54'50"E
L320	305.28'	S54°08'34"E
L321	10.05'	S57°44'11"E

* 10' EASEMENT TO THE LOS ANGELES COUNTY FLOOD CONTROL DISTRICT FOR COVERED STORM DRAIN AND APPURTENANT STRUCTURES

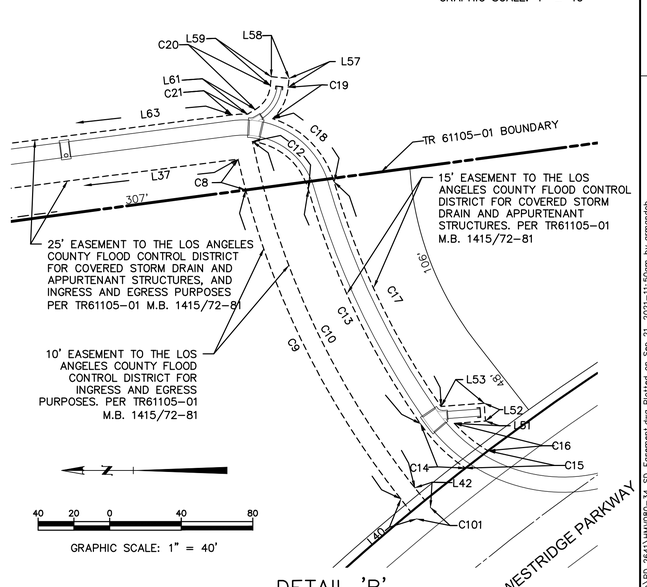
** 15' EASEMENT TO THE LOS ANGELES COUNTY FLOOD CONTROL DISTRICT FOR COVERED STORM DRAIN AND APPURTENANT STRUCTURES

*** VARIABLE WIDETH EASEMENT TO THE LOS ANGELES COUNTY FLOOD CONTROL DISTRICT FOR INGRESS AND EGRESS PURPOSES



DETAIL 'C'

GRAPHIC SCALE: 1" = 60'



DETAIL 'B'

GRAPHIC SCALE: 1" = 40'

NO.	REVISION	REVISED BY	APPROVED BY	DATE
4	EASMENT REVISION PER TR61105-22	Jason H. Fukumitsu	M.D. Esq.	9/28/2021

REVIEWED LAND DEVELOPMENT DIVISION

BY _____ STORM DRAIN SECTION DATE

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 CIVIL STATE OF CALIFORNIA

Jason H. Fukumitsu 9/23/21

JASON H. FUKUMITSU DATE

STORM DRAIN PLANS IN
TRACT No. 61105-01 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
26074 Avenue Hall, Suite 23 • Valencia, CA 91355 • PH: (661) 294-2211 • FX: (661) 294-9890

DWG

SHEET 34B OF 39

G:\Newhall Ranch\61105 Mission Village\61105-01\Storm\PD 2641\HM\080-34_SD_Easement.dwg Plotted on Sep 21, 2021-11:50am by ormondab

FOUNDATION NOTES:

1. BUILDING CODE MINIMUM RECOMMENDATION IS USED IN THIS PROJECT 1806.2 CLASS 5 MATERIAL.
2. FOOTINGS ARE DESIGNED FOR A BEARING PRESSURE OF 1500 PSF AND EXPANSION INDEX 21-50.3. WHERE SLAB-ON-GRADE OCCURS, EXISTING LOOSE SURFACE SOILS AND FILL PLACED WITHIN THE SLAB AREA SHALL BE RECOMPACTED TO A MINIMUM OF 90 PERCENT RELATIVE COMPACTION.
4. THE CONTRACTOR SHALL SUBMIT TO THE CITY OR COUNTY FOUNDATION EXCAVATIONS AND RECOMPACTION REPORTS PRIOR TO PLACING ANY STRUCTURAL AND NON-STRUCTURAL CONCRETE AND REBAR AT THE SUBJECT AREAS.
5. CONTRACTOR SHALL PROVIDE FOR DE-WATERING OF EXCAVATIONS FROM EITHER SURFACE WATER, GROUND WATER OR SEEPAGE.
6. FOOTING AND UTILITY TRENCH BACK FILL WITHIN BUILDING AREA SHALL BE MECHANICALLY COMPACTED IN LAYERS. FLOODING WILL NOT BE PERMITTED.
7. ALL FOOTINGS SHALL BE FOUNDED IN UNDISTURBED NATURAL SOIL PER CODE.
8. IF SOIL IS FOUND TO BE EXPANSIVE, THE FOOTINGS MUST MEET THE FOLLOWING MINIMUM REQUIREMENTS.
   A. DEPTH OF FOOTINGS BELOW THE NATURAL AND FINISH GRADES SHALL NOT BE LESS THAN 27 INCHES FOR EXTERIOR AND 18 INCHES FOR INTERIOR FOOTINGS.
   B. EXTERIOR WALLS AND INTERIOR BEARING WALLS SHALL BE SUPPORTED ON CONTINUOUS FOOTINGS.
   C. FOOTINGS SHALL BE REINFORCED WITH MINIMUM (4) #4 DEFORMED REINFORCING BARS. TWO BARS SHALL BE PLACED 4 INCHES OF THE BOTTOM OF THE FOOTING AND TWO BARS WITHIN 4 INCHES OF THE TOP OF THE FOOTINGS.
   D. THE SOIL BELOW AN INTERIOR CONCRETE SLAB SHALL BE SATURATED WITH MOISTURE TO A DEPTH OF 18 INCHES PRIOR TO PLACING THE CONCRETE.
9. IN THE EVENT EXCAVATIONS REVEAL UNFAVORABLE CONDITIONS, THE SERVICES OF A SOILS ENGINEER AND/OR GEOLOGIST MAY BE REQUIRED.
10. EXCAVATION FOR ANY PURPOSE SHALL NOT REMOVE LATERAL SUPPORT FROM ANY FOUNDATION WITHOUT FIRST UNDERPINNING OR PROTECTING THE FOUNDATION AGAINST SETTLEMENT OR LATERAL TRANSLATION.
11. THE EXCAVATION OUTSIDE THE FOUNDATION SHALL BE BACKFILLED WITH SOIL THAT IS FREE OF ORGANIC MATERIAL, CONSTRUCTION DEBRIS, COBBLES AND BOULDERS OR WITH A CONTROLLED LOW-STRENGTH MATERIAL (CLSM). THE BACKFILL SHALL BE PLACED IN LIFTS AND COMPACTED IN A MANOR THAT DOES NOT DAMAGE THE FOUNDATION OR THE WATERPROOFING OR DAMPPROOFING MATERIAL.
    EXCEPTION: CLSM NEED NOT BE COMPACTED.
12. THE GROUND IMMEDIATELY ADJACENT TO THE FOUNDATION SHALL BE SLOPED AWAY FROM THE BUILDING AT A SLOPE OF NOT LESS THAN ONE UNIT VERTICAL IN 20 UNITS HORIZONTAL (5-PERCENT SLOPE) FOR A MINIMUM DISTANCE OF 10 FEET (3048 MM) MEASURED PERPENDICULAR TO THE FACE OF THE WALL. IF PHYSICAL OBSTRUCTIONS OR LOT LINES PROHIBIT 10 FEET (3048 MM) OF HORIZONTAL DISTANCE, A 5-PERCENT SLOPE SHALL BE PROVIDED TO AN APPROVED ALTERNATIVE METHOD OF DIVERTING WATER AWAY FROM FOUNDATION. SWALES USED FOR THIS PURPOSE SHALL BE SLOPED A MINIMUM OF 2 PERCENT WHERE LOCATED WITHIN 10 FEET (3048 MM) OF THE BUILDING FOUNDATION. IMPERVIOUS SURFACES WITHIN 10 FEET (3048 MM) OF THE BUILDING FOUNDATION SHALL BE SLOPED A MINIMUM OF 2 PERCENT AWAY FROM THE BUILDING.
    EXCEPTION: WHERE CLIMATIC OR SOIL CONDITIONS WARRANT, THE SLOPE OF THE GROUND AWAY FROM THE BUILDING FOUNDATION SHALL BE PERMITTED TO BE REDUCED TO NOT LESS THAN ONE UNIT VERTICAL IN 48 UNITS HORIZONTAL (2-PERCENT SLOPE).
    THE PROCEDURE USED TO ESTABLISH THE FINAL GROUND LEVEL ADJACENT TO THE FOUNDATION SHALL ACCOUNT FOR ADDITIONAL SETTLEMENT OF THE BACKFILL.

ABBREVIATIONS

AB	ANCHOR BOLT	FH	FULL HEIGHT	R&R	REMOVE & REPLACE
ABV	ABOVE	FN	FIELD NAILING	SCHED	SCHEDULE
ADDL	ADDITIONAL	FL	FLOOR	SF	SQUARE FOOT
ADHES	ADHESIVE	FS	FAR SIDE	SHT	SHEET
ALT	ALTERNATE	FDN	FOUNDATION	SIM	SIMILAR
ARCH	ARCHITECT, ARCHITECTURAL	FOC	FACE OF CONCRETE	SN	SOLE ℄ NAILING
BTWN	BETWEEN	FOS	FACE OF STUD	SPEC	SPECIFICATION
BLW	BELOW	FT	FOOT, FEET	SQ	SQUARE
BLDG	BUILDING	FTG	FOOTING	STD	STANDARD
BLKG	BLOCKING	GA	GAGE	STL	STEEL
BM	BEAM	GALV	GALVANIZED	STRUCT	STRUCTURAL
BN	BOUNDARY NAILING	GND	GROUND	SYM	SYMMETRICAL
BOT	BOTTOM	GRD	GRADE	THK	THICK
BS	BOTH SIDES	GT	GIRDER TRUSS	THRD	THREADED
BSMT	BASEMENT	HT	HEIGHT	T&B	TOP & BOTTOM
CF	CUBIC FOOT	HORIZ	HORIZONTAL	TN	TOE NAIL
CJ	CONTROL JOINT, CEILING JOIST	HS	HIGH STRENGTH	TOF	TOP OF FOOTING
CLG	CEILING	INFO	INFORMATION	TOS	TOP OF STEEL
CLR	CLEAR	INT	INTERIOR	TL	TOP OF LEDGER
CMU	CONCRETE MASONRY UNIT	JT	JACK TRUSS	TOW	TOP OF WALL
CNTRSNK	COUNTERSINK/COUNTERSUNK	KP	KING POST	TRANSV	TRANSVERSE
COL	COLUMN	KSI	KIPS PER SQUARE INCH	TS	TUBE STEEL
CONC	CONCRETE	LBS	POUNDS	TYP	TYPICAL
CONN	CONNECTION	LG	LONG	UNO	UNLESS NOTED OTHERWISE
CONST	CONSTRUCTION	LOC'S	LOCATIONS	VERT	VERTICAL
CONT	CONTINUOUS	LONG	LONGITUDINAL	WF	WIDE FLANGE BEAM
CONTR	CONTRACTOR	LT WT	LIGHT WEIGHT	W/	WITH
CVR	COVER	MAX	MAXIMUM	W/O	WITHOUT
DIA	DIAMETER	MB	MACHINE BOLT	WT	WEIGHT
DIR	DIRECTION	MD	METAL DECK	WP	WORKING POINT
D.O.	DO OVER	MECH	MECHANICAL	WWF	WELDED WIRE FABRIC
DSA	DEPARTMENT OF STATE ARCHITECTS	MANUF	MANUFACTURER	WWO	WALL W/ OPENING AND/OR PERFORATED S.W.
DWG	DRAWING	MIN	MINIMUM		
(E)	EXISTING	MISC	MISCELLANEOUS		
EA	EACH	MTL	METAL		
EF	EACH FACE	(N)	NEW		
ELEC	ELECTRICAL	NS	NEAR SIDE, NELSON STUD		
EL	ELEVATION	NW	NORMAL WEIGHT		
EN	EDGE NAILING	OC	ON CENTER		
ENGR	ENGINEER	OH	OPPOSITE HAND		
ES	EDGE SCREW	OPP	OPPOSITE		
EXP JT	EXPANSION JOINT	PSF	POUNDS PER SQUARE FOOT		
EQ	EQUAL	PSI	POUNDS PER SQUARE INCH		
EXT	EXTERIOR	PT	PLATE TRUSS		
FF	FINISHED FLOOR	REINF	REINFORCEMENT		
FG	FINISHED GRADE	REQ	REQUIRE		

SYMBOLS

∠	ANGLE
@	AT
℄	CENTERLINE
℘	PLATE / PROPERTY LINE
#	POUNDS
ø	DIAMETER
⊥	PERPENDICULAR
//	PARALLEL

REINFORCED CONCRETE NOTES CONT.:

26. TOLERANCE FOR d AND MINIMUM CONCRETE COVER IN FLEXURAL MEMBERS, WALLS, AND COMPRESSION MEMBERS SHALL BE AS FOLLOWS:

	TOLERANCE ON d	TOLERANCE ON MINIMUM CONCRETE COVER
d ≤ 8 IN.	±⅜ IN.	−⅜ IN.
d > 8 IN.	±½ IN.	−½ IN.

EXCEPT THAT TOLERANCE FOR THE CLEAR DISTANCE TO FORMED SOFFITS SHALL BE MINUS ¼ IN. AND TOLERANCE FOR COVER SHALL NOT EXCEED MINUS ½ THE MINIMUM CONCRETE COVER REQUIRED IN THE DESIGN DRAWINGS AND SPECIFICATIONS.

27. MAXIMUM CHLORIDE ION CONTENT FOR CORROSION PROTECTION OF REINFORCEMENT:

TYPE OF MEMBER	MAXIMUM WATER SOLUBLE CHLORIDE ION (CI) IN CONCRETE, PERCENT BY WEIGHT OF CEMENT
PRESTRESSED CONCRETE	0.06
REINFORCED CONCRETE EXPOSED TO CHLORIDE IN SERVICE	0.15
REINFORCED CONCRETE THAT WILL BE DRY OR PROTECTED FROM MOISTURE IN SERVICE	1.00
OTHER REINFORCED CONCRETE CONSTRUCTION	0.30

28. TOLERANCE FOR LONGITUDINAL LOCATION OF BEND AND ENDS OF REINFORCEMENT SHALL BE ± 2 IN., EXCEPT THE TOLERANCE SHALL BE ± ½ IN. AT THE DISCONTINUOUS ENDS OF BRACKETS AND CORBELS, AND ± 1 IN. AT THE DISCONTINUOUS ENDS OF OTHER MEMBERS.
29. REINFORCEMENT RESISTING EARTHQUAKE-INDUCED FLEXURAL AND AXIAL FORCES IN FRAME MEMBERS AND IN STRUCTURAL WALL BOUNDARY ELEMENTS SHALL COMPLY WITH ASTM A 706. ASTM A 615 GRADE 60 REINFORCEMENT SHALL BE PERMITTED IN THESE MEMBERS IF:
   A. THE ACTUAL YIELD STRENGTH BASED ON MILL TESTS DOES NOT EXCEED fy BY MORE THAN 18,000 PSI (RETESTS SHALL NOT EXCEED THIS VALUE BY MORE THAN AN ADDITIONAL 3000 PSI): AND
   B. THE RATION OF THE ACTUAL TENSILE STRENGTH TO THE ACTUAL YIELD STRENGTH IS NOT LESS THAN 1.25.THE VALUE OF fy FOR TRANSVERSE REINFORCEMENT INCLUDING SPIRAL REINFORCEMENT SHALL NOT EXCEED 60,000 PSI.
30. CONCRETE FLOOR FLATNESS SHALL BE A MINIMUM OF ¼" : 10 FT. TYP. U.N.O.
31. WHERE CORROSION-RESISTANT REINFORCEMENT (CRR) IS SPECIFIED, USE MMFX2 REBAR ASTM A1035 GRADES 690 AND 830.
32. WELDING OF ELECTRICAL CONDUCTORS TO REINFORCING STEEL IS PROHIBITED WITHOUT THE APPROVAL OF THE ENGINEER OF RECORD.
33. PERFORMANCE OF SHOTCRETE SHALL BE PER ACI 506.2 SPECIFICATIONS.
34. ACI 318 TABLE 26.4.1.1.1(a) – SPECIFICATIONS FOR CEMENTITIOUS MATERIALS

CEMENTITIOUS MATERIALS	SPECIFICATION
PORTLAND CEMENT	ASTM C150
BLENDED HYDRAULIC CEMENTS	ASTM C595, EXCLUDING TYPE IS (≥70) AND TYPE IT (S≥70)
EXPANSIVE HYDRAULIC CEMENTS	ASTM C845
HYDRAULIC CEMENT	ASTM C1157
FLY ASH AND NATURAL POZZOLAN	ASTM C618
SLAG CEMENT	ASTM C989
SILICA FUME	ASTM C1240

35. AGGREGATES – COMPLIANCE REQUIREMENTS:
   A. AGGREGATES SHALL CONFORM TO (1) OR (2):
      1. NORMALWEIGHT AGGREGATE: ASTM C33.
      2. LIGHTWEIGHT AGGREGATE: ASTM C330.
   B. AGGREGATES NOT CONFORMING TO ASTM C33 OR ASTM C330 ARE PERMITTED IF THEY HAVE BEEN SHOWN BY TEST OF ACTUAL SERVICE TO PRODUCE CONCRETE OF ADEQUATE STRENGTH AND DURABILITY AND ARE APPROVED BY THE BUILDING OFFICIAL.
   C. MAXIMUM AGGREGATE SIZE:
      1. FOOTINGS.....1" MAX.
      2. SLAB ON GRADE, GRADE BEAMS.....¾" MAX.
      3. ELEVATED STRUCT. SLABS, BEAMS, FRAMED COLUMNS.....⅜" MAX.
      4. REMAINDER.....¾" MAX.
36. WATER – COMPLIANCE REQUIREMENTS:
   A. MIXING WATER SHALL CONFORM TO ASTM C1602.
   B. MIXING WATER, INCLUDING THAT PORTION OF MIXING WATER CONTRIBUTED IN THE FORM OF FREE MOISTURE ON AGGREGATES, SHALL NOT CONTAIN DELETERIOUS AMOUNTS OF CHLORIDE ION WHEN USED FOR PRESTRESSED CONCRETE, FOR CONCRETE THAT WILL CONTAIN ALUMINUM EMBEDMENTS, OR FOR CONCRETE CAST AGAINST STAY-IN-PLACE GALVANIZED STEEL FORMS.
37. ADMIXTURES – COMPLIANCE REQUIREMENTS:
   A. ADMIXTURES SHALL CONFORM TO (1) THROUGH (4):
      1. WATER REDUCTION AND SETTING TIME MODIFICATION: ASTM C494.
      2. PRODUCING FLOWING CONCRETE: ASTM C1017.
      3. AIR ENTRAINMENT: ASTM C260.
      4. INHIBITING CHLORIDE-INDUCED CORROSION: ASTM C1582.
   B. ADMIXTURES THAT DO NOT CONFORM TO THESE SPECIFICATIONS SHALL BE SUBJECT TO PRIOR REVIEW BY THE LICENSED DESIGN PROFESSIONAL.
   C. CALCIUM CHLORIDE OR ADMIXTURES CONTAINING CHLORIDE FROM SOURCES OTHER THAN IMPURITIES IN ADMIXTURE INGREDIENTS SHALL NOT BE USED IN PRESTRESSED CONCRETE, IN CONCRETE CONTAINING EMBEDDED ALUMINUM, OR IN CONCRETE CAST AGAINST STAY-IN-PLACE GALVANIZED STEEL FORMS.
   D. ADMIXTURES USED IN CONCRETE CONTAINING EXPANSIVE CEMENTS CONFORMING TO ASTM C845 SHALL BE COMPATIBLE WITH THE CEMENT AND PRODUCE NO DELETERIOUS EFFECTS.
38. STEEL FIBER REINFORCEMENT – COMPLIANCE REQUIREMENTS:
   A. STEEL FIBER REINFORCEMENT USED FOR SHEAR RESISTANCE SHALL SATISFY (1) AND (2):
      1. BE DEFORMED AND CONFORM TO ASTM A820.
      2. HAVE A LENGTH-TO-DIAMETER RATIO OF AT LEAST 50 AND NOT EXCEEDING 100.

REINFORCED CONCRETE NOTES:

1. CONCRETE MIXES SHALL BE DESIGNED BY A RECOGNIZED TESTING LABORATORY AND COPIES OF THE DESIGN SHALL BE SENT TO THE ARCHITECT AND THE ENGINEER. COMPRESSIVE STRENGTH TEST REPORTS SHALL BE SUBMITTED TO THE BUILDING DEPARTMENT AND THE ARCHITECT. ALL CONCRETE EXCEPT FOUNDATION CONCRETE SHALL CONTAIN POLYMER BASED WATER REDUCING ADMIXTURE.
2. PORTLAND CEMENT SHALL CONFORM TO ASTM C-150. TYPE II. AGGREGATE FOR STONE CONCRETE SHALL CONFORM TO ASTM C-33. NON-REACTIVE AGGREGATE FOR LIGHTWEIGHT CONCRETE SHALL CONFORM ASTM C-330.
3. ALL REINFORCING BARS, ANCHOR BOLTS, PRE STRESSING TENDONS, AND ALL OTHER CONCRETE INSERTS SHALL BE WELL SECURED IN POSITION PRIOR TO PLACING CONCRETE.
4. THE MAXIMUM SLUMP SHALL NOT EXCEED 4" +/- 1" FOR FOOTINGS, SLABS ON EARTH, AND MASS CONCRETE, AND 5" +/- 1" FOR OTHER CONCRETE. SLUMP MAY BE INCREASED WHEN CHEMICAL ADMIXTURES ARE USED, PROVIDED THAT ADMIXTURE-TREATED CONCRETE HAS THE SAME OR LOWER WATER: CEMENT OR WATER: CEMENTITIOUS MATERIAL RATIO. (ACI 211 TABLE 6.3.1)
5. MINIMUM COMPRESSIVE STRENGTH:
   PROVIDE CONCRETE WITH THE FOLLOWING MINIMUM COMPRESSIVE STRENGTH (f'_c) AT 28 DAYS UNLESS NOTED OTHERWISE (MINIMUM 5 SACKS OF CEMENT PER CUBIC YARD) (MAXIMUM WATER/CEMENT RATIO BY WEIGHT SHALL BE .65 FOR BALANCE):
   A. STRUCTURAL SLABS..... 3000 P.S.I.*(HARDROCK)
   B. COLUMNS..... 3000 P.S.I.*(HARDROCK)
   C. BEAMS..... 3000 P.S.I.*(HARDROCK)
   * 2500 PSI STRENGTH USED FOR DESIGN, SPECIAL INSPECTION NOT REQUIRED.
6. THE COMPRESSIVE STRENGTH OF EXTERIOR SLABS AND FLAT WORK SHALL BE INCREASED FOR MODERATE AND SEVERE WEATHERING EXPOSURE PER TABLE 1904.2.2 OF THE CBC.
7. ALL STRUCTURAL CONCRETE IS TO BE REINFORCED.
8. CONTRACTOR SHALL SUBMIT SLAB CONSTRUCTION JOINT LAYOUT DRAWINGS TO THE ARCHITECT AND ENGINEER FOR REVIEW. THE MAXIMUM SPACING OF CONTROL JOINTS IN SLAB ON GRADE EACH WAY SHALL BE 30X THE SLAB THICKNESS BEFORE 7 DAYS OF CURING. SLABS REQUIRE AT LEAST 7 DAYS CURING (14 DAYS WHERE FLY ASH OR POZOLAN IS USED), AND THE ENVIRONMENT (HUMIDITY AND TEMPERATURE) OF ROOM SHALL BE ACCLIMATED TO LONG TERM CLIMATE CONDITIONS PRIOR TO INSTALLATION OF FLOORING. THE SLAB TEMPERATURE SHALL BE WITHIN 5 DEGREES OF DEW POINT DURING CURING. NO CURING COMPOUND SHALL BE USED, ONLY WET CURED. MOISTURE AND HUMIDITY TESTING SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY HIRED BY THE OWNER, AND TESTS RESULTS SHALL BE SUBMITTED TO THE ARCHITECT FOR APPROVAL PRIOR TO INSTALLATION OF FLOORING.
9. PROJECTING CORNERS OF BEAMS, COLUMNS, WALLS, ETC.. SHALL BE FORMED WITH A 3/4" CHAMFER UNLESS DETAILED OTHERWISE.
10. IF EXPOSURE TO SULFATES, OR SPECIAL EXPOSURE CONDITIONS OCCUR, THE CONCRETE STRENGTH, WATER CEMENT RATIOS, AND OTHER PROPERTIES OF THE CONCRETE MIX SHALL BE IN ACCORDANCE WITH ACI 318 SECTION 4.3. VERIFY WITH SOILS REPORT FOR CORROSIVE CHEMICALS IN THE SOILS.
11. DO NOT POUR CONCRETE WHEN THE TEMPERATURE EXCEEDS 90°F OR 80°F WHEN THE WIND EXCEEDS 12MPH. START CURING AS SOON AS HARD TRAWLING IS DONE. ALL CURING SHALL BE WET CURING BY USING BURLAP FOR A MINIMUM OF 7 DAYS. BURLAP MUST BE PLACED WITHIN 2 HOURS OF POURING (NO SPRAY CURING). WHEN WIND, TEMPERATURE AND HUMIDITY CONDITIONS CAUSE EARLY DISAPPEARANCE OF BLEED WATER, STEPS SHALL BE TAKEN TO USE A FOG SPRAY. CURING SHALL COMMENCE IMMEDIATELY AFTER FINISHING TRAWLING.
12. WHERE AIR ENTRAINED CONCRETE IS SPECIFIED, THE VOLUME OF AIR IN THE MORTAR FRACTION OF CONCRETE MIX DESIGN SHALL BE 9% ±1%.
13. ALL REINFORCING STEEL SHALL CONFORM TO THE REQUIREMENTS OF ASTM A-615 GRADE 60 FOR NO.5 AND LARGER, ASTM A-615 GRADE 40 FOR NO.4 AND SMALLER. AT GRADE BEAMS & CONCRETE FRAMES ALL REINF. SHALL CONFORM TO ASTM A706 REBAR, U.N.O.
14. ALL REINFORCING BAR BENDS SHALL BE MADE COLD.
15. REINFORCING STEEL SHALL BE SPLICED WITH CLASS B SPLICES UNLESS NOTED OTHERWISE ON THE DRAWINGS.
16. LOW HYDROGEN ELECTRODES SHALL BE USED WHEREVER REINFORCING STEEL IS WELDED. BARS SHALL BE A706 GRD. 60 MIN. FOR WELD ABILITY.
17. AT THE TIME CONCRETE IS PLACED, REINFORCEMENT SHALL BE FREE FROM MUD, OIL, OR OTHER NONMETALLIC COATINGS THAT DECREASE BOND. WHERE SPECIFIED IN THE DETAILS, EPOXY-COATING OF STEEL REINFORCEMENT IN ACCORDANCE WITH ACI STANDARDS. EXCEPT FOR PRESTRESSING STEEL, STEEL REINFORCEMENT WITH RUST, MILL SCALE, OR A COMBINATION OF BOTH SHALL BE CONSIDERED SATISFACTORY, PROVIDED THE MINIMUM DIMENSIONS (INCLUDING HEIGHT OF DEFORMATIONS) AND WEIGHT OF A HAND-WIRE-BRUSHED TEST SPECIMEN COMPLY WITH APPLICABLE ASTM SPECIFICATIONS.
18. THE MINIMUM CLEAR SPACING BETWEEN PARALLEL BARS IN A LAYER SHALL BE d_b BUT NOT LESS THAN 1 IN. WHERE PARALLEL REINFORCEMENT IS PLACED IN TWO OR MORE LAYERS, BARS IN THE UPPER LAYERS SHALL BE PLACED DIRECTLY ABOVE BARS IN THE BOTTOM LAYER WITH CLEAR DISTANCE BETWEEN LAYERS NOT LESS THAN 1 IN. 21. CLEAR DISTANCE LIMITATION BETWEEN BARS SHALL APPLY ALSO TO THE CLEAR DISTANCE BETWEEN A CONTACT LAP SPLICE AND ADJACENT SPLICES OR BARS.
19. IN SPIRALLY REINFORCED OR TIED REINFORCED COMPRESSION MEMBERS, CLEAR DISTANCE BETWEEN LONGITUDINAL BARS SHALL BE NOT LESS THAN 1.5db NOR LESS THAN 1½ IN.
20. IN WALLS AND SLABS OTHER THAN CONCRETE JOIST CONSTRUCTION, PRIMARY FLEXURAL REINFORCEMENT SHALL NOT BE SPACED FARTHER APART THAN THREE TIMES THE WALL OR SLAB THICKNESS, NOR FARTHER APART THAN 18 IN.
21. WHERE CONCRETE MUST BE INSTALLED AND CURED IN COLD WEATHER, THE GENERAL REQUIREMENTS AND SPECIFICATIONS OF ASTM STD C-31 SHALL BE IMPLEMENTED.
22. CAST-IN-PLACE CONCRETE (NON-PRESTRESSED)
   THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCEMENT:
   A. CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EART.....3" MIN.
   B. CONCRETE EXPOSED TO EARTH OR WEATHER:
      - NO.6 THROUGH NO.18 BARS.....2" MIN.
      - NO.5 BAR, W31 OR D31 WIRE, AND SMALLER.....1½" MIN.
      C. CONCRETE NOT EXPOSED TO WEATHER OR IN CONTACT WITH GROUND:
      SLABS, WALLS, JOISTS:
      - NO.14 AND NO.18 BARS.....1½" MIN.
      - NO.11 BAR AND SMALLER.....¾" MIN.
      BEAMS, COLUMNS:
      - PRIMARY REINFORCEMENT, TIES, STIRRUPS, SPIRALS.....1½" MIN.
      SHELLS, FOLDED PLATE MEMBERS:
      - NO.6 BAR AND LARGER.....¾" MIN.
      - NO.5 BAR, W31 OR D31 WIRE, AND SMALLER.....½" MIN.
23. BUNDLED BARS:
   FOR BUNDLED BARS, MINIMUM CONCRETE COVER SHALL BE EQUAL TO THE EQUIVALENT DIAMETER OF THE BUNDLE, BUT NEED NOT TO BE GREATER THAN 2 IN.; EXCEPT FOR CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH, WHERE MINIMUM COVER SHALL BE 3 IN. GROUPS OF PARALLEL REINFORCING BARS BUNDLED IN CONTACT TO ACT AS A UNIT SHALL BE LIMITED TO FOUR IN ANY ONE BUNDLE. BUNDLED BARS SHALL BE ENCLOSED WITHIN STIRRUPS OR TIES. BARS LARGER THAN NO. 11 SHALL NOT BE BUNDLED IN BEAMS. INDIVIDUAL BARS WITHIN A BUNDLE TERMINATED WITHIN THE SPAN OF FLEXURAL MEMBERS SHALL TERMINATE AT DIFFERENT POINTS WITH AT LEAST 40d_b STAGGER.
24. CORROSIVE ENVIRONMENTS:
   IN CORROSIVE ENVIRONMENTS OR OTHER SEVERE EXPOSURE CONDITIONS, AMOUNT OF CONCRETE PROTECTION SHALL BE SUITABLY INCREASED, AND DENSENESS AND NONPOROSITY OF PROTECTING CONCRETE SHALL BE CONSIDERED, OR OTHER PROTECTION SHALL BE PROVIDED. "COVER" WHERE NOTED ON PLANS AND DETAILS IS NOT A MINIMUM, UNLESS NOTED AS "MIN." THE COVER SHALL BE AS NOTED WITH TOLERANCE.
25. MINIMUM DIAMETER OF BEND:

MINIMUM DIAMETERS OF BEND	
BAR SIZE	MINIMUM DIAMETER
NO.3 THROUGH NO.8	6d_b
NO.9, NO.10, AND NO.11	8d_b
NO.14 AND NO.18	10d_b

GENERAL STRUCTURAL NOTES:

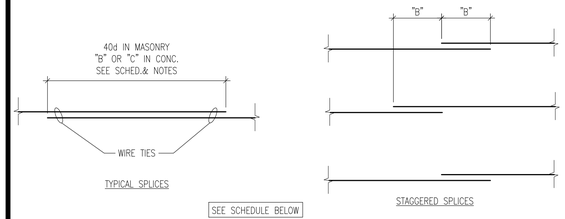
1. THIS DOCUMENT IS AN INSTRUMENT OF PROFESSIONAL SERVICE PREPARED BY RGSE INC. ALTERATION OF THIS DOCUMENT BY ANY PARTY OTHER THAN RGSE INC. IS A VIOLATION OF LAW THAT WILL BE PROSECUTED TO ITS FULLEST EXTENT.
2. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS & CONDITIONS AT THE JOB SITE PRIOR TO STARTING CONSTRUCTION AND THE ARCHITECT/ENGINEER SHALL BE NOTIFIED OF ANY DISCREPANCIES OR INCONSISTENCIES.
3. AT ANY DISCREPANCIES OR CONFLICTS BETWEEN PLAN AND ELEVATION DIMENSIONS SHOWN ON THE ARCHITECTURAL DRAWINGS AND THE STRUCTURAL DRAWINGS, THE ARCHITECTURAL DIMENSIONS SHALL GOVERN. IF ANY OF THESE DIMENSIONS DIFFER BY MORE THAN 5%, THE ENGINEER SHALL BE NOTIFIED OF THE CONFLICT, AND THE CONTRACTOR SHALL WAIT FOR INSTRUCTIONS.
4. THE CONTRACT CONSTRUCTION DRAWINGS AND SPECIFICATIONS REPRESENT THE FINISHED STRUCTURE. UNLESS OTHERWISE NOTED, THEY DO NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE ALL MEASURES NECESSARY TO PROTECT THE STRUCTURE, WORKMEN, AND OTHER PERSONS DURING CONSTRUCTION. SUCH MEASURES SHALL INCLUDE, BUT NOT LIMITED TO: BRACING, ALL SHORING, FORMS, AND SCAFFOLDING.
5. OPENINGS, POCKETS, ETC. SHALL NOT BE PLACED IN SLABS BEAMS, COLUMNS, WALLS, ETC., UNLESS SPECIFICALLY DETAILED ON THE STRUCTURAL DRAWINGS.
6. ALL ASTM SPECIFICATIONS NOTED ON THESE DRAWINGS SHALL BE OF THE LATEST REVISION.
7. IN THE EVENT THAT CERTAIN FEATURES OF CONSTRUCTION ARE NOT FULLY SHOWN ON THE DRAWINGS OR CALLED FOR IN THE NOTES OR SPECIFICATIONS. NOTIFY THE ARCHITECT/ENGINEER IMMEDIATELY & WAIT FOR INSTRUCTIONS.
8. COST OF ADDITIONAL DESIGN WORK NECESSITATED BY SELECTION OF AN OPTION NOT DUE TO ERRORS OR OMISSIONS IN CONSTRUCTION, SHALL BE BORN BY THE CONTRACTOR.
9. WHERE DESIGN AND DETAILS OF PLATE GIRDERS, TRUSSES, ETC., IS TO BE PROVIDED BY FABRICATOR, CONTRACTOR SHALL SUBMIT CALCULATIONS PREPARED BY A CIVIL OR STRUCTURAL ENGINEER, TO THE ENGINEER AND TO THE BUILDING DEPARTMENT FOR REVIEW PRIOR TO FABRICATION.
10. UNLESS AN ITEM ON THE PLANS OR DETAILS IS SPECIFICALLY MARKED AS AN EXISTING ITEM, THE CONTRACTOR IS TO ASSUME THAT IT IS NEW, AND INCLUDE IT IN THE CONSTRUCTION BUDGET.
11. WHERE SOIL REPORT IS CITED, ITS REQUIREMENTS ADOPTED HEREIN.
12. ALL MANUFACTURED PRODUCTS MUST BE INSTALLED PER MANUFACTURER'S RECOMMENDATION.
13. WHILE EVERY REASONABLE EFFORT HAS BEEN MADE TO PROVIDE A BUILDABLE SET ON CONTRACT DOCUMENTS WITH MINIMAL ERRORS OR OMISSIONS, THE CONTRACTOR ACKNOWLEDGES AND UNDERSTANDS THAT THE CONTRACT DOCUMENTS MAY REPRESENT IMPERFECT DATA AND MAY CONTAIN ERRORS, OMISSIONS, CONFLICTS, INCONSISTENCIES, CODE VIOLATIONS AND IMPROPER USE OF MATERIALS. SUCH DEFICIENCIES WILL BE CORRECTED BY THE ARCHITECT OR HIS CONSULTANTS WHEN IDENTIFIED. THE CONTRACTOR AGREES TO CAREFULLY STUDY AND COMPARE THE INDIVIDUAL CONTRACT DOCUMENTS AND REPORT AT ONCE IN WRITING TO THE ARCHITECT ANY DEFICIENCIES THE CONTRACTOR MAY DISCOVER. THE CONTRACTOR FURTHER AGREES TO REQUIRE EACH SUBCONTRACTOR TO LIKEWISE STUDY THE DOCUMENTS AND TO REPORT AT ONCE ANY DEFICIENCIES DISCOVERED. THE CONSULTANT AND ARCHITECT, TOGETHER WITH CONTRACTOR SHALL RESOLVE ALL REPORTED DEFICIENCIES PRIOR TO STARTING ANY WORK. ANY QUESTIONABLE WORK PERFORMED PRIOR TO RESOLUTION OF CONFLICTS OR ERRORS OR FURTHER CLARIFICATION FROM THE ARCHITECT WILL BE DONE AT THE CONTRACTOR'S RISK.
14. OPTIONS, IF PROVIDED HEREIN, ARE FOR CONTRACTOR'S CONVENIENCE. HE SHALL BE RESPONSIBLE FOR ALL CHANGES NECESSARY, SHALL COORDINATE ALL DETAILS, AND SHALL OBTAIN ALL REQUIRED APPROVALS.
15. ANY MECHANICAL AND ELECTRICAL EQUIPMENT, STORAGE RACKS, SAFES, AND ANY OBJECT EXPECTED TO BE IN THE BUILDING THAT HAS AN OPERATIONAL WEIGHT (FULLY LOADED) GREATER THEN 400 LB. FLOOR OR ROOF MOUNTED, OR GREATER THEN 200 LB. SUSPENDED FROM A FLOOR, CEILING OR WALL SHALL BE SHOWN ON THESE DRAWINGS. IF THEY ARE NOT SHOWN ON THESE DRAWINGS, THEY SHALL BE BROUGHT TO THE ATTENTION OF THE STRUCTURAL ENGINEER, AND A CUT SHEET FOR THE SPECIFIC ITEM SHALL BE MADE AVAILABLE.
16. CONSTRUCTION WASTE REDUCTION, DISPOSAL AND RECYCLING SHALL BE IN CONFORMANCE WITH THE REQUIREMENTS OF THE LATEST ADOPTED CALIFORNIA GREEN BUILDING CODE.
17. CONTRACTOR IS TO VERIFY THAT NO EXISTING STEEL REINFORCING, OR TENSION CABLES ARE DAMAGED WHEN INSTALLING POST INSTALLED WEDGE OR CHEMICAL ANCHORS. MECHANICAL ANCHORS ARE ONLY APPROVED FOR INTERIOR DRY USE, OTHERWISE CHEMICAL ANCHORS MUST BE USED.

SPECIAL INSPECTIONS:

1. SPECIAL INSPECTION U.N.O. BY A REGISTERED DEPUTY INSPECTOR APPROVED BY THE ARCHITECT AND/OR ENGINEER AND THE BUILDING DEPARTMENT SHALL BE EMPLOYED BY THE OWNER FOR THE FOLLOWING TYPES OF WORK:
   A. SEE C.B.C. VOL.II, SECTION 1704 FOR ADDITIONAL REQUIREMENTS. DEPUTY INSPECTION MAY BE WAIVED FOR WORK THAT IS MINOR IN NATURE AS INTERPRETED BY THE BUILDING OFFICIAL.
2. THE SPECIAL INSPECTOR SHALL BE A QUALIFIED PERSON WHO SHALL DEMONSTRATE COMPETENCE, TO THE SATISFACTION OF THE BUILDING OFFICIAL, FOR INSPECTION OF THE PARTICULAR TYPE OF CONSTRUCTION OR OPERATION REQUIRING SPECIAL INSPECTION. THE SPECIAL INSPECTOR SHALL OBSERVE THE WORK ASSIGNED FOR CONFORMANCE TO THE APPROVED DESIGN DRAWINGS AND SPECIFICATIONS. THE SPECIAL INSPECTOR SHALL FURNISH INSPECTION REPORTS TO THE BUILDING OFFICIAL, THE ENGINEER OR ARCHITECT OF RECORD, AND OTHER DESIGNATED PERSONS. ALL DISCREPANCIES SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE CONTRACTOR FOR CORRECTION, THE

-

SCALE: 1"=1'-0" | 7



SEE SCHEDULE BELOW

SCHED. OF MIN. SPLICE LENGTH "B" FOR ACI CLASS B LAP SPLICE		
BAR SIZE	3,000 PSI	4,000 PSI
#4	24"	24"
#5	24"	24"
#6	25"	24"
#7	34"	30"
#8	45"	39"
#9	57"	49"
#10	72"	63"
#11	89"	77"

NOTE

1. FOR TOP BARS USE SPLICE LENGTH SHOWN ABOVE X 1.3.
2. d=NORMAL DIAMETER OF SPLICE BAR.
3. SPLICES OF REPETITIVE REINF. IN CONC. SHALL BE STAGGERED PER ACI CLASS B SPLICES AS SHOWN ABOVE.
4. FOR NON-REPETITIVE REINF. IN CONC. OR WHERE SPLICES CAN NOT BE STAGGERED, USE ACI CLASS C SPLICES.
5. SPLICES SHALL BE MADE AWAY FROM POINTS OF MAX. STRESS OR AT LOCATIONS SHOWN ON THE DWG'S.
6. NO LAP SHALL BE LESS THAN TWO FEET.

TYPICAL REINFORCING SPLICES SCALE: 1"=1'-0" | 5

-

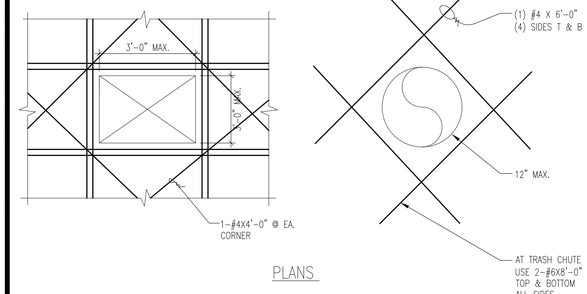
SCALE: 1"=1'-0" | 8

-

SCALE: 1"=1'-0" | 6

NOTE

1. SCHEDULED REINF. NOT SHOWN FOR CLARITY.
2. SEE SLAB SCHEDULE FOR REINFORCING.
3. DO NOT CUT BARS UNLESS ABSOLUTELY NECESSARY.
4. REPLACE EA. INTERRUPTED BAR W/(2) BARS OF THE SAME SIZE & LENGTH, ONE ON EA. SIDE OF OPENING.



PLANS

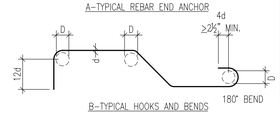
TYP. REINFORCING SLAB AT OPNG. SCALE: 1"=1'-0" | 3

-

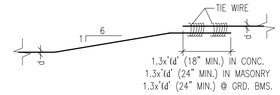
SCALE: 1"=1'-0" | 4

REBAR END ANCHORS SHALL HAVE AN EVALUATION REPORT DEMONSTRATING COMPLIANCE WITH THE CURRENT ACCEPTABLE CRITERIA UNDER THE REFERENCED DESIGN CODE.

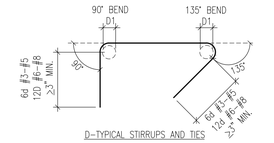
A-TYPICAL REBAR END ANCHOR



B-TYPICAL HOOKS AND BENDS



C-OFFSETS AND SPLICES



D-TYPICAL STIRRUPS AND TIES

TENSION DEVELOPMENT LENGTH SCHEDULE (ld)				
BAR SIZE	f'c=3000 PSI		f'c=4000 PSI	
	TOP BARS	OTHER BARS	TOP BARS	OTHER BARS
#3	22	17	19	15
#4	29	22	25	19
#5	36	28	31	24
#6	43	33	37	29
#7	63	48	54	44
#8	72	55	62	55

MINIMUM BEND DIAMETERS
D=6d FOR #3 THRU #8
D=8d FOR #9 THRU #11
D=10d FOR #14 THRU #18
MINIMUM INSIDE

STIRRUP & TIES
MIN BEND DIAMETERS
D = 4d FOR #3 THRU #5
D = 6d FOR #6 THRU #8

NOTE:
1.35° BENDS REQUIRED @ ROUND HOOP TIES SPLICES.

REINFORCING DETAIL SCALE: 1"=1'-0" | 1

-

SCALE: 1"=1'-0" | 2

Dwg No. 43-F553.1-.38

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Structural Engineers
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Simi Valley, CA 93065
P: 805.522.3379
www.rgseinc.com
info@rgseinc.com
RGSE INC. JOB# 18118B

APPROVED MARK PESTRELLA, DIRECTOR OF PUBLIC WORKS
BY ASSISTANT DIVISION ENGINEER DATE

RECOMMENDED LAND DEVELOPMENT DIVISION
BY STORM DRAIN SECTION DATE

SUBMITTED
BY STORM DRAIN SECTION 10/04/2018 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	REVISED TOTAL SHEET NUMBER.			8/14/19

REGISTERED PROFESSIONAL ENGINEER RAMON GARCIA No. 45955 STRUCTURAL STATE OF CALIFORNIA
DATE 6/18/18

STORM DRAIN PLANS IN
TRACT No. 61105-1 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
26074 Avenue Hall, Suite 23 Valencia, CA 91355 PH: (661) 294-2211 FX: (661) 294-9890

DWG | SHEET 36 OF 37 39

9/26/2018 10:27:00 AM

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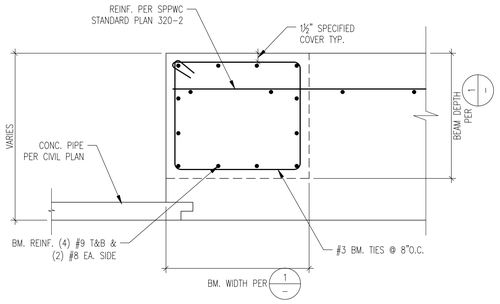
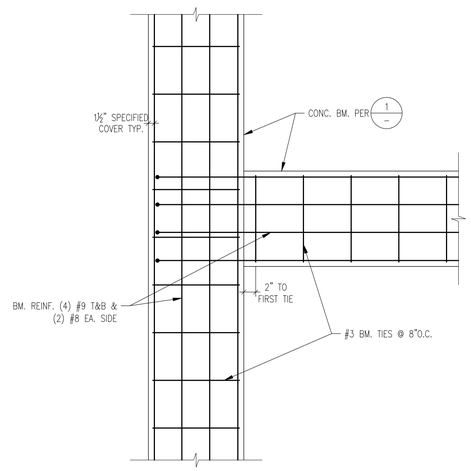
SCALE: 1"=1'-0" | 7



CONC. BEAM SECTION

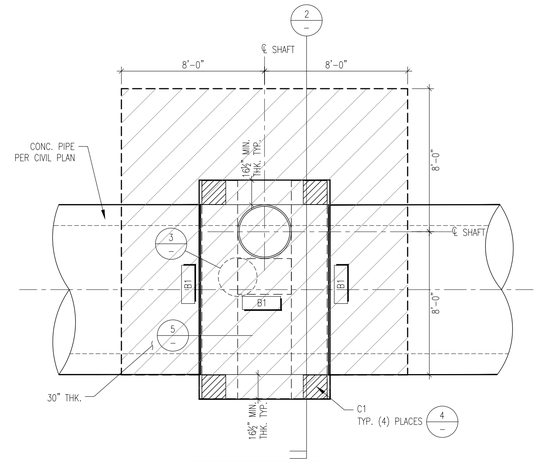
SCALE: 1"=1'-0" | 5



PLAN VIEW

CONC. REINF. @ INTERSECTION OF BMS.

SCALE: 1"=1'-0" | 3



NOTE:
FOR INFO NOT SHOWN SEE (SPPWC) STANDARD PLAN 320-2

LEGEND:

B1 = 24" SQ. CONC. BM. W/ (4) #9 T&B & (2) #8 EA. SIDE W/ #3 TIE @ 8"O.C.

C1 = 16" SQ. MIN. CONC. COL. W/ (8) #6 VERT. & #3 TIES @ 6"O.C.

MANHOLE PIPE PLAN

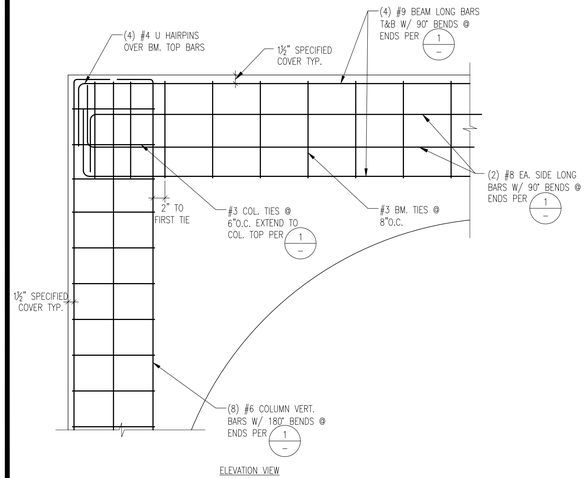
N.T.S. | 1

-

SCALE: 1"=1'-0" | 8

-

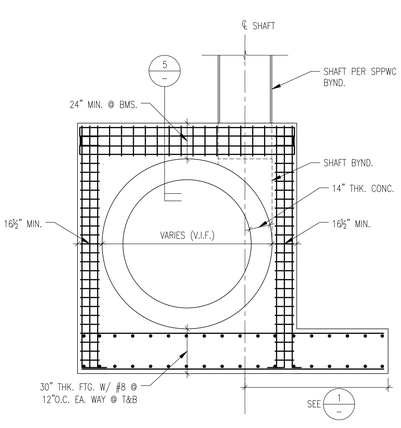
SCALE: 1"=1'-0" | 6



ELEVATION VIEW

BM. - COL. CORNER JOINT

SCALE: 1"=1'-0" | 4



SECTION

N.T.S. | 2

Dwg No. 43-F553.1-38

2

REGISTERED PROFESSIONAL ENGINEER JASON H. LAMBERTSEN No. 40695 CIVIL STATE OF CALIFORNIA

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info@rgseinc.com

RGSE INC. JOB# 18118B

APPROVED MARK PESTRELLA, DIRECTOR OF PUBLIC WORKS
BY ASSISTANT DIVISION ENGINEER DATE

RECOMMENDED LAND DEVELOPMENT DIVISION
BY STORM DRAIN SECTION DATE

SUBMITTED
BY STORM DRAIN SECTION 10/04/2018 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	REVISED TOTAL SHEET NUMBER.			8/14/19

REGISTERED PROFESSIONAL ENGINEER RAMON GARCIA No. 45455 STRUCTURAL STATE OF CALIFORNIA

DATE 6/18/18

STORM DRAIN PLANS IN
TRACT No. 61105-1 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
26074 Avenue Hall, Suite 23 Valencia, CA 91355 PH: (661) 294-2211 FX: (661) 294-9890

2

DWG | SHEET 37 OF 39

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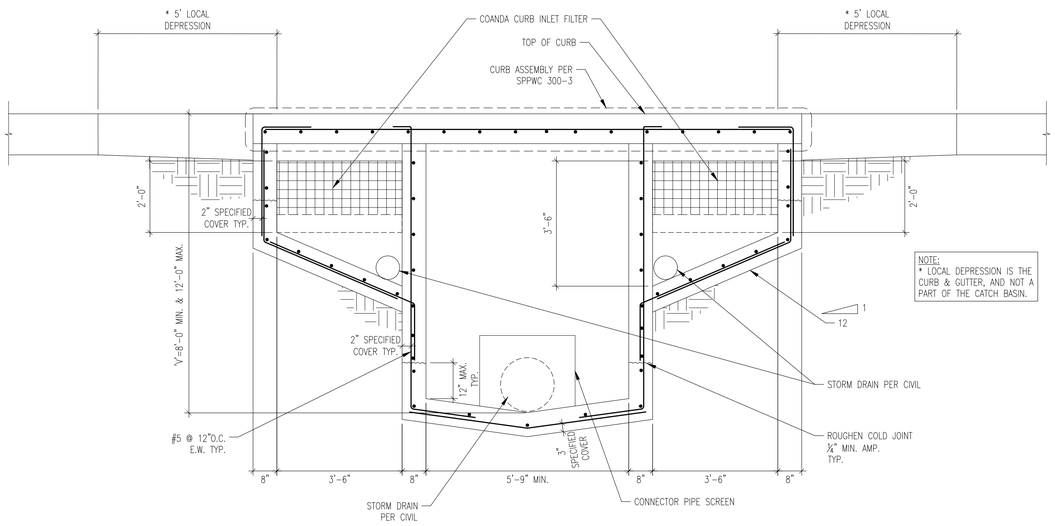
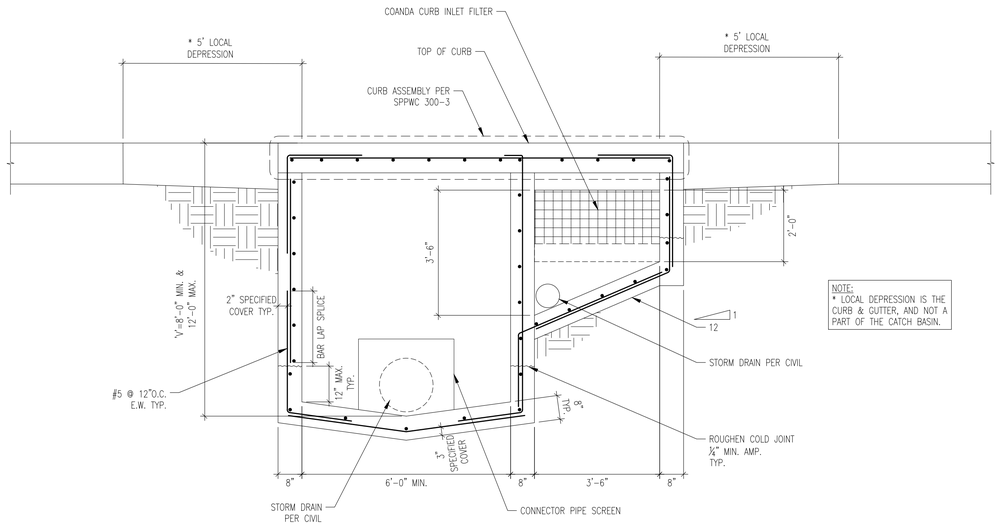
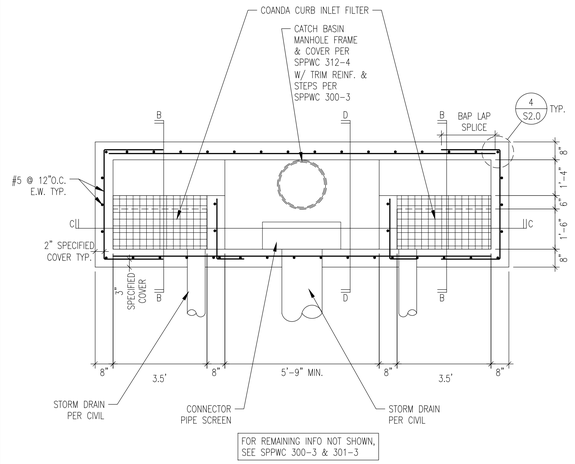


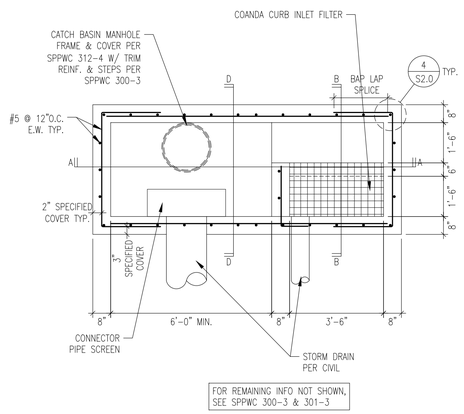
SECTION C-C SCALE: 1/2"=1'-0" 5



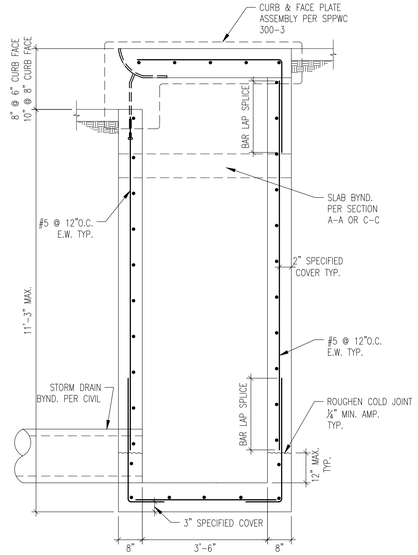
SECTION A-A SCALE: 1/2"=1'-0" 1



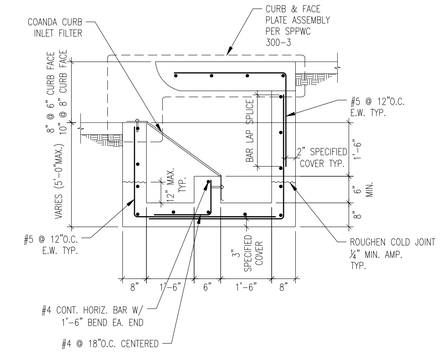
PLAN VIEW (SUMP CONDITION) SCALE: 3/8"=1'-0" 8



PLAN VIEW (BY-PASS CONDITION) SCALE: 3/8"=1'-0" 6



SECTION D-D SCALE: 1/2"=1'-0" 4



SECTION B-B SCALE: 1/2"=1'-0" 2

Dwg No. 43-F553.1-38

2

REGISTERED PROFESSIONAL ENGINEER JASON R. PUNSLY No. 40695 CIVIL STATE OF CALIFORNIA

SUBMITTED

BY STORM DRAIN SECTION 8/14/19 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	ADDED SHEET			8/14/19

REGISTERED PROFESSIONAL ENGINEER JASON GARCIA No. 45915 STRUCTURAL STATE OF CALIFORNIA

DATE 6/18/18

STORM DRAIN PLANS IN
TRACT No. 61105-1 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

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RGSE INC.
JOB# 18118B

DWG

SHEET 38 OF 39

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SCALE: 1"=1'-0" | 7

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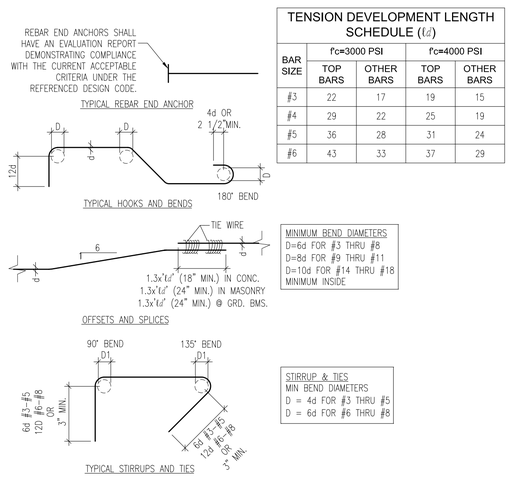
SCALE: 1"=1'-0" | 5

REINFORCING DETAIL

SCALE: 1"=1'-0" | 3



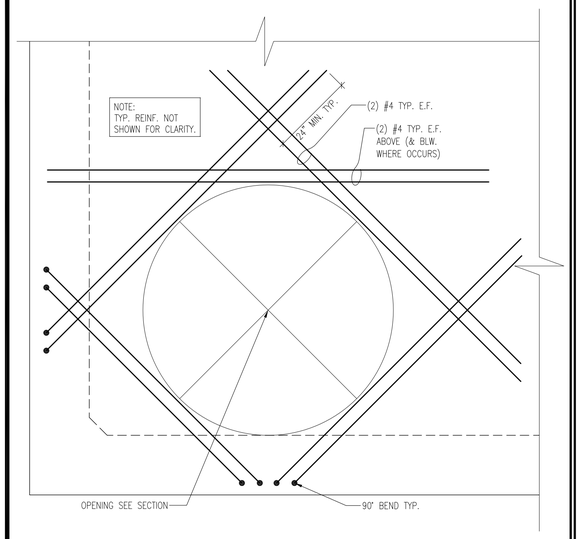
TENSION DEVELOPMENT LENGTH SCHEDULE (ℓd)				
BAR SIZE	f'c=3000 PSI		f'c=4000 PSI	
	TOP BARS	OTHER BARS	TOP BARS	OTHER BARS
#3	22	17	19	15
#4	29	22	25	19
#5	36	28	31	24
#6	43	33	37	29

MINIMUM BEND DIAMETERS
D=6d FOR #3 THRU #8
D=8d FOR #9 THRU #11
D=10d FOR #14 THRU #18
MINIMUM INSIDE

STIRRUP & TIES
MIN BEND DIAMETERS
D = 4d FOR #3 THRU #5
D = 6d FOR #6 THRU #8

REINF. AT OPENING

SCALE: 1"=1'-0" | 1



-

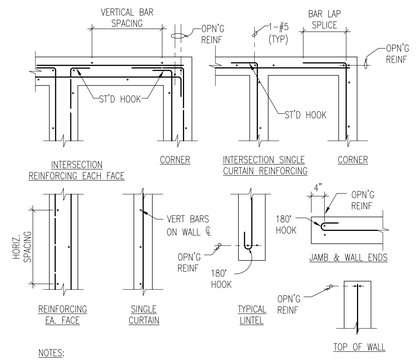
SCALE: 1"=1'-0" | 8

-

SCALE: 1"=1'-0" | 6

TYPICAL CONC. WALL DETAIL

SCALE: 1"=1'-0" | 4



NOTES:

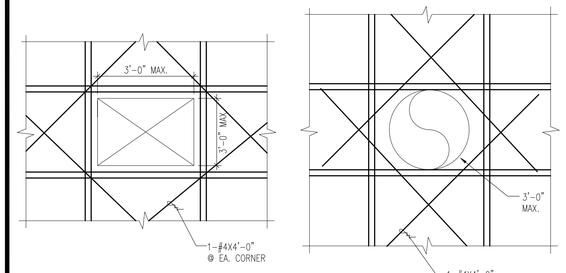
1. REFER TO TYPICAL CONC. WALL REINFORCING SCHEDULE.
2. AT DOUBLE CURTAIN REINFORCING STAGGER VERTICAL AND HORIZONTAL BARS. PLACE VERTICAL REBAR AS CLOSE TO CONC. SURFACE AS THE MINIMUM CLEARANCES WILL PERMIT

REINFORCING SLAB AT OPNG.

SCALE: 1"=1'-0" | 2

NOTE

1. SCHEDULED REINF. NOT SHOWN FOR CLARITY.
2. SEE SLAB SCHEDULE FOR REINFORCING.
3. DO NOT CUT BARS UNLESS ABSOLUTELY NECESSARY.
4. REPLACE EA. INTERRUPTED BAR W/(2) BARS OF THE SAME SIZE & LENGTH, ONE ON EA. SIDE OF OPENING.



PLAN VIEWS

Dwg No. 43-F553.1-38

REGISTERED PROFESSIONAL ENGINEER JASON R. FUKUSU No. 40695 CIVIL STATE OF CALIFORNIA

2

SUBMITTED

BY STORM DRAIN SECTION 8/14/19 DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
2	ADDED SHEET			8/14/19

REGISTERED PROFESSIONAL ENGINEER RAMON GARCIA No. 45955 STRUCTURAL STATE OF CALIFORNIA

DATE 6/18/18

STORM DRAIN PLANS IN
TRACT No. 61105-1 P.D. No. 2641
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

RGSE inc.
Structural Engineers
2720 Cochran St. Suite 8B
Simi Valley, CA 93065
P: 805.522.3379
www.rgseinc.com
info@rgseinc.com

RGSE INC.
JOB# 18118B

DWG

SHEET 39 OF 39

D-7: PD 2514-13

COUNTY OF LOS ANGELES

STORM DRAIN PLANS FOR TRACT NO. 45433 P.D. 2514-13

STORM DRAIN PLANS IN:
TRACT NO: 45433 P.D. NO.: 2514-13

43-F455.1-3

GENERAL NOTES

1. A PERMIT SHALL BE OBTAINED AND A DEPOSIT PAID TO THE DEPARTMENT OF PUBLIC WORKS AT THE PERMIT COUNTER, 900 SOUTH FREMONT AVENUE, 8TH FLOOR, ALHAMBRA AT LEAST 72 HOURS PRIOR TO STARTING WORK UNDER THIS CONTRACT. COPIES OF ALL OTHER REQUIRED PERMITS, SUCH AS FLOOD CONTROL DISTRICT AND ROAD EXCAVATION, MUST BE FILED WITH THE PERMIT APPLICATION.
2. WHEN WORK IS WITHIN A CONTRACT CITY, THE CONTRACTOR MUST CONTACT THE DIRECTOR OF PUBLIC WORKS OF THAT CITY TO DETERMINE THE LOCATION TO PAY THE INSPECTION DEPOSIT.
3. THE CONTRACTOR SHALL CONTACT THE DISTRICT OFFICE LISTED ON THE "APPLICATION FOR STORM DRAIN CONSTRUCTION INSPECTION FORM 1" TO ARRANGE FOR AN ACCEPTABLE CONSTRUCTION START DATE.
4. APPROVAL OF THIS PLAN BY THE COUNTY OF LOS ANGELES DOES NOT CONSTITUTE A REPRESENTATION AS TO THE ACCURACY OF THE LOCATION OR THE EXISTENCE OR NON-EXISTENCE OF ANY UNDERGROUND UTILITY, PIPE OR STRUCTURE WITHIN THE LIMITS OF THIS PROJECT. THIS NOTE APPLIES TO ALL SHEETS.
5. ALL WORK SHALL BE IN ACCORDANCE WITH THE LATEST ADOPTED EDITION OF THE "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION" INCLUDING SUPPLEMENTS AND SHALL BE PROSECUTED ONLY IN THE PRESENCE OF THE DIRECTOR OF PUBLIC WORKS/CITY ENGINEER.
6. THE CONTRACTOR'S ATTENTION IS DIRECTED TO SECTION 7-10.4.1 OF THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION IN REGARD TO SAFETY ORDERS AND SHALL CONFORM TO THE "MINIMUM PUBLIC SAFETY REQUIREMENTS" AS SHOWN IN L.A. COUNTY DEPARTMENT OF PUBLIC WORKS STD. 6008-1.
7. ELEVATIONS ARE IN FEET ABOVE U.S.C. & G.S. MEAN SEA LEVEL DATUM OF 1929, UNLESS OTHERWISE INDICATED.
8. NO CONCRETE SHALL BE PLACED UNTIL THE FORMS AND REINFORCING STEEL HAVE BEEN PLACED, INSPECTED AND APPROVED.
9. ALL STRUCTURAL CONCRETE SHALL BE PORTLAND CEMENT CONCRETE WITH AN ULTIMATE 28 DAY COMPRESSIVE STRENGTH OF 4000 P.S.I. UNLESS OTHERWISE NOTED.
10. TRANSVERSE REINFORCEMENT AND TRANSVERSE JOINTS SHALL BE PLACED AT RIGHT ANGLES (OR RADIAL) TO THE CONDUIT CENTERLINE EXCEPT AS OTHERWISE SHOWN ON THESE DRAWINGS.
11. ALL STEEL ADJACENT TO FACE OF CONCRETE SHALL HAVE 2.5" CLEARANCE UNLESS OTHERWISE SPECIFIED.
12. REINFORCEMENT SHALL BE DEFORMED BARS OF INTERMEDIATE GRADE STEEL PER A.S.T.M. A-615-GRADE 60.
13. ALL BAR BENDS AND HOOKS SHALL CONFORM TO THE AMERICAN CONCRETE INSTITUTE "MANUAL OF STANDARD PRACTICE".
14. DIMENSIONS FROM FACE OF CONCRETE TO STEEL ARE TO CENTER LINE OF STEEL UNLESS OTHERWISE NOTED.
15. ALL STEEL THAT IS TO BE CONTINUOUS SHALL HAVE A MINIMUM LAP OF 30 BAR DIAMETERS OR 18" WHICHEVER IS GREATER.
16. ALL CONSTRUCTION JOINTS IN THE FOOTING ON SLABS AND WALLS SHALL BE IN THE SAME PLANE. NO STAGGERING OF JOINTS WILL BE PERMITTED.
17. ALL EXPOSED EDGES SHALL BE FINISHED WITH A 3/4" CHAMFER.
18. UNLESS OTHERWISE SHOWN, CONCRETE DIMENSIONS SHALL BE MEASURED VERTICALLY OR HORIZONTALLY AND PARALLEL OR AT RIGHT ANGLES (OR RADIAL) TO THE CENTERLINE OF CONSTRUCTION.
19. CONCRETE BACKFILL IS REQUIRED DURING CONSTRUCTION WHEN THE PIPE HAS LESS THAN ONE FOOT OF COVER. THE CONCRETE BACKFILL SHALL CONSIST OF 1:3:5 MIX, PORTLAND CEMENT CONCRETE POURED FROM WALL TO WALL OF TRENCH AND FROM BOTTOM OF TRENCH TO A MINIMUM OF 4 INCHES OVER THE TOP OF THE PIPE.
20. ALL PIPES SHALL BE PLACED IN A TRENCH IN NATURAL GROUND AND/OR COMPACTED FILL. THE GROUND LEVEL BEFORE THE TRENCHING SHALL BE AT LEAST 3 FEET ABOVE THE TOP OF THE PIPE ELEVATION, OR AT FINISH SURFACE ELEVATION, WHICHEVER IS LESS. ALL BACKFILLS IN EASEMENTS SHALL BE COMPACTED TO THE DENSITY REQUIRED BY THE GRADING PLANS.
21. ALL BACKFILL AND FILLS OUTSIDE STREET RIGHT OF WAY SHALL BE COMPACTED TO A MINIMUM RELATIVE COMPACTION OF 90% OF MAXIMUM-DRY DENSITY AS DETERMINED BY ASTM SOIL COMPACTION TEST D1557-91 METHOD "D" UNLESS OTHERWISE SPECIFIED. THIS SHALL BE CERTIFIED BY A SOILS ENGINEER. THIS CERTIFICATION SHALL BE SUBMITTED TO THE DIRECTOR OF PUBLIC WORKS PRIOR TO ACCEPTANCE OF THE WORK BY THE COUNTY.
22. ALL BACKFILL AND FILLS WITHIN STREET RIGHT OF WAY SHALL BE COMPACTED IN ACCORDANCE WITH CITY REQUIREMENTS UNLESS OTHERWISE NOTED AND INSPECTED BY THE DEPARTMENT. CONTRACTOR SHALL NOTIFY THE INSPECTOR AT LEAST 24 HOURS IN ADVANCE FOR SOIL FOR SOIL TESTING AS REQUIRED BY THE INSPECTER.
23. PIPE BEDDING SHALL BE:
    IN ACCORDANCE WITH LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS STANDARD DRAWING NO. 3092 UNLESS OTHERWISE NOTED. THE BEDDING MATERIAL PLACED FROM THE BOTTOM OF THE PIPE TO 1 FOOT OVER THE TOP OF THE PIPE SHALL BE SAND, CRUSHED AGGREGATE, OR NATIVE-FREE DRAINING GRANULAR MATERIAL AND SHALL HAVE A SAND EQUIVALENT OF 20 OR GREATER.
24. PIPE SHALL BE EMBEDDED 5 INCHES INTO ALL STRUCTURES INCLUDING INLET AND OUTLET HEADWALLS, UNLESS OTHERWISE SPECIFIED.
25. UNLESS OTHERWISE SPECIFIED IN THE PROFILE ON THESE PLANS, THE PIPE SHALL BE MANUFACTURED WITH A MINIMUM CONCRETE COVER OVER THE STEEL IN THE INVERT OF 0.75 INCHES FOR R.C.P. UP TO 96 INCHES IN DIAMETER AND 1.25 INCHES FOR PIPE GREATER THAN 96 INCHES IN DIAMETER.
26. ALL CATCH BASINS WITHIN THE DEDICATED STREET RIGHT-OF-WAY SHALL BE CONSTRUCTED PER THE STREET PLANS.
27. THE CONTRACTOR SHALL PROVIDE TO THE SATISFACTION OF THE CITY ENGINEER A SYSTEM FOR CONTRIBUTORY DRAINAGE TO BE OPERABLE AT ALL TIMES UNTIL STORM DRAIN SYSTEM IS ACCEPTED FOR MAINTENANCE. THIS MAY HAVE TO BE DESIGNED BY A CIVIL ENGINEER.
28. ALL REFERENCES ON THIS PLAN TO THE COUNTY ENGINEER, ROAD DEPARTMENT, OR FLOOD CONTROL DISTRICT SHALL APPLY TO THE APPROPRIATE ELEMENTS OF THE DEPARTMENT OF PUBLIC WORKS.
29. EXISTING UTILITIES SHALL BE MAINTAINED IN PLACE BY THE CONTRACTOR, UNLESS OTHERWISE NOTED.
30. WHERE THE UTILITIES ARE INDICATED ON THE DRAWINGS TO BE SUPPORTED, SAID SUPPORTS SHALL BE IN ACCORDANCE WITH STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION NO. 224, UNLESS OTHERWISE INDICATED.
31. ALL OPENINGS RESULTING FROM THE CUTTING OR PARTIAL REMOVAL OF EXISTING CULVERTS, PIPES OR SIMILAR STRUCTURES SHALL BE SEALED WITH 8 INCHES OF BRICK AND MORTAR OR 6 INCHES OF CONCRETE, UNLESS OTHERWISE SHOWN.
32. MANHOLES PER APWA STD. 320-1 AND 321-1 SHALL USE THE STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION 630-2 FOR THE "FRAME AND COVER" AND 635-2 FOR THE "STANDARD DROP STEP".
33. THIS STORM DRAIN WILL NOT BE ACCEPTED FOR MAINTENANCE UNTIL THE STREETS HAVE BEEN PAVED, MANHOLES BROUGHT TO GRADE AND THE SYSTEM CLEANED TO THE SATISFACTION OF THE DIRECTOR OF PUBLIC WORKS.
34. THE LATEST REVISED STANDARD PLAN OR DRAWING SHALL BE USED UNLESS OTHERWISE SPECIFICALLY NOTED.
35. A NPDES PERMIT FROM THE REGIONAL WATER QUALITY CONTROL BOARD IS REQUIRED BEFORE ANY DISCHARGE OF NON-STORM WATER INTO THE STORM DRAIN IS ALLOWED.

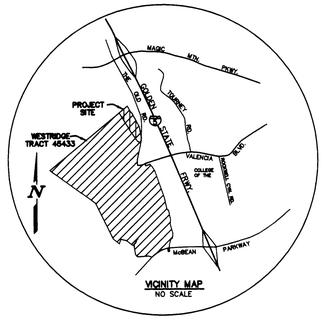
PRIVATE ENGINEER NOTICE TO CONTRACTORS:

THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITY PIPES OR STRUCTURES SHOWN ON THESE PLANS ARE OBTAINED BY A SEARCH OF THE AVAILABLE RECORDS. TO THE BEST OF OUR KNOWLEDGE THERE ARE NO EXISTING UTILITIES EXCEPT AS SHOWN ON THIS MAP. THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT THE UTILITY LINES SHOWN AND ANY OTHER LINES NOT OF RECORD OR NOT SHOWN ON THIS DRAWING. PRIOR TO EXCAVATION THE CONTRACTOR SHALL CALL TOLL FREE (800) 422-4132 TO VERIFY THE UNDERGROUND LOCATION OF GAS AND TELEPHONE LINES.

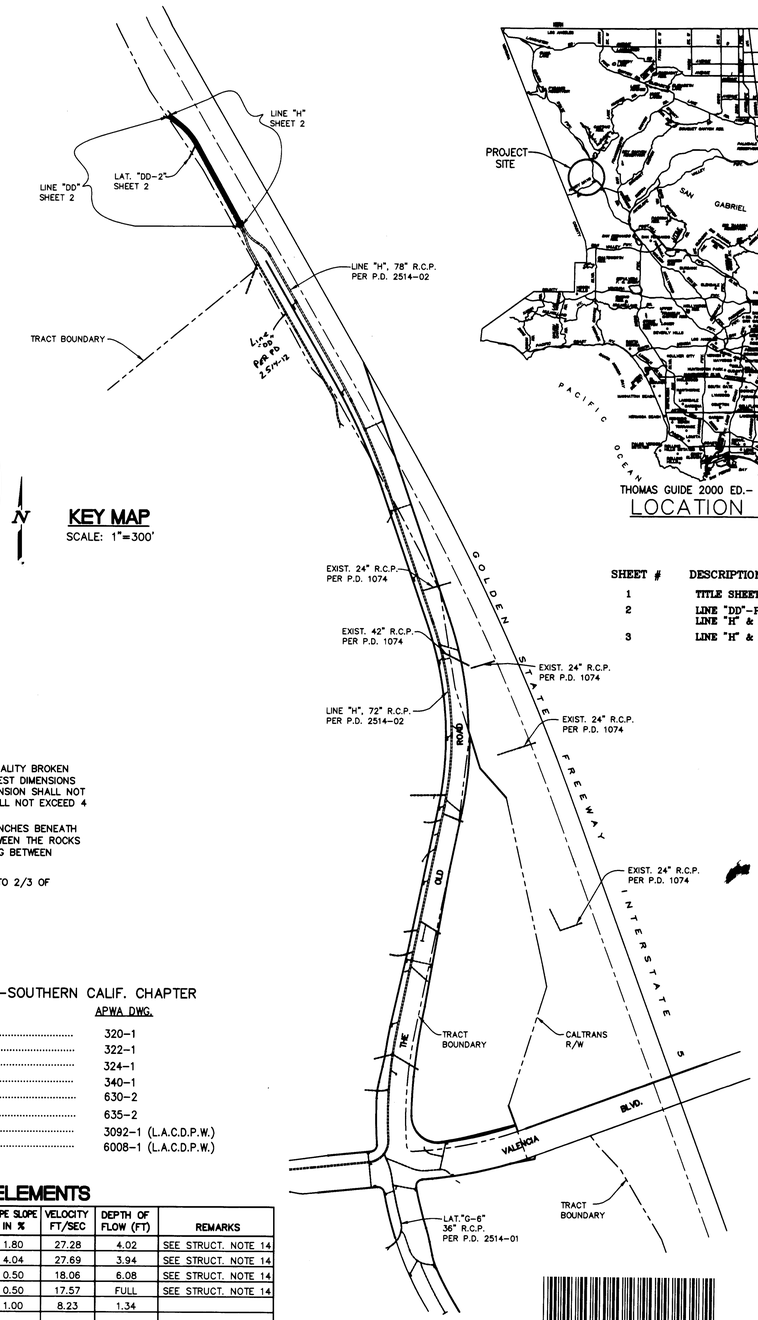
10-12-01
CRAIG M. WHITTEKER R.C.E. NO. 51929

STRUCTURAL NOTES

1. DIMENSIONS FROM FACE OF CONCRETE TO STEEL ARE TO CENTER BAR AND SHALL BE TWO INCHES UNLESS OTHERWISE SHOWN.
2. CONCRETE DIMENSIONS SHALL BE MEASURED HORIZONTALLY OR VERTICALLY ON THE PROFILE AND PARALLEL TO OR AT RIGHT ANGLES (OR RADIALLY) TO CENTERLINE OF CONDUIT ON THE PLAN EXCEPT AS OTHERWISE SHOWN.
3. ALL BAR BENDS AND HOOKS SHALL CONFORM TO THE AMERICAN CONCRETE INSTITUTE'S "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE" LATEST EDITION, SECT. 7.1 & 7.2.
4. PLACING OF REINFORCEMENT SHALL CONFORM TO THE AMERICAN CONCRETE INSTITUTE'S "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE" LATEST EDITION, SECT. 7.5
5. TRANSVERSE CONSTRUCTION JOINTS SHALL NOT BE PLACED WITHIN 30 INCHES OF MANHOLE JUNCTION STRUCTURE OPENING.
6. TRANSVERSE CONSTRUCTION JOINTS IN WALLS AND SLABS SHALL BE IN THE SAME PLANE. NO STAGGERING OF JOINTS WILL BE PERMITTED. TRANSVERSE CONSTRUCTION JOINTS SHALL BE NORMAL OR RADIAL TO THE CENTERLINE OF CONSTRUCTION.
7. THE TRANSVERSE REINFORCING STEEL SHALL TERMINATE ONE AND ONE HALF (1-1/2) INCHES FROM THE CONCRETE SURFACES UNLESS OTHERWISE SHOWN ON THE STRUCTURAL DETAILS.
8. EXPOSED EDGES OF CONCRETE MEMBERS SHALL BE ROUNDED OR BEVELED.
9. NO SPLICES IN TRANSVERSE STEEL REINFORCEMENT WILL BE PERMITTED OTHER THAN SHOWN ON THE DRAWING WITHOUT APPROVAL OF THE ENGINEER. NO MORE THAN TWO SPLICES WILL BE PERMITTED IN ANY LONGITUDINAL BAR BETWEEN TRANSVERSE JOINTS. SPLICES SHALL BE STAGGERED.
10. LONGITUDINAL STEEL SHALL BE LAPPED 20 BAR DIAMETERS AT SPLICES. TRANSVERSE STEEL SHALL BE LAPPED 30 BAR DIAMETERS AT SPLICES.
11. LONGITUDINAL STEEL SHALL TERMINATE TWO INCHES FROM TRANSVERSE CONSTRUCTION JOINTS.
12. TRANSVERSE JOINTS SHALL BE SPACED NOT TO EXCEED 50 FEET NOR BE LESS THAN 10 FEET, MEASURED ALONG THE CENTERLINE OF CONSTRUCTION, EXCEPT AS OTHERWISE SHOWN ON THE DRAWINGS.
13. AT THE BEGINNING AND ENDING OF ALL POURS, A COMPLETE CURTAIN OF MAIN REINFORCEMENT BARS SHALL BE PLACED THREE INCHES FROM THE TRANSVERSE CONSTRUCTION JOINTS.
14. CONCRETE COVER TO STEEL TO BE INCREASED TO 1.25 INCH ON INSIDE FACE OF PIPE.



VICINITY MAP
NO SCALE



KEY MAP
SCALE: 1"=300'

THOMAS GUIDE 2000 ED.- PAGE 4550
LOCATION MAP PROJECT SITE

SHEET #	DESCRIPTION
1	TITLE SHEET
2	LINE "DD"-PLAN AND PROFILE LINE "H" & LAT. "DD-2"-PLAN
3	LINE "H" & LAT. "DD-2" PROFILE; DETAILS

RIPRAP NOTES:

1. ROCKS FOR GROUTED RIPRAP SHALL BE GOOD QUALITY BROKEN CONCRETE AND/OR RIVER RUN ROCK. THE SMALLEST DIMENSIONS SHALL EXCEED 6 INCHES AND THE LARGEST DIMENSION SHALL NOT EXCEED 24 INCHES. THE LARGEST DIMENSION SHALL NOT EXCEED 4 TIMES THE SMALLEST DIMENSION.
2. THERE SHALL BE A GROUT BED OF AT LEAST 2 INCHES BENEATH THE FIRST LAYER OF ROCK. ALL THE VOIDS BETWEEN THE ROCKS SHALL BE FILLED WITH GROUT. MAXIMUM SPACING BETWEEN ROCKS SHALL BE 2 INCHES.
3. SURFACE ROCKS SHALL BE IMBEDDED FROM 1/2 TO 2/3 OF THEIR MAXIMUM DIMENSION.

NOTE: CONCRETE MAY BE SUBSTITUTED FOR GROUT.

LIST OF STANDARDS

AMERICAN PUBLIC WORKS ASSOCIATION-SOUTHERN CALIF. CHAPTER
(1997 EDITION)

	APWA DWG.
MANHOLE PIPE TO PIPE (MAIN LINE ≥ 36")	320-1
MANHOLE PIPE TO PIPE (LARGE SIDE INLET)	322-1
MANHOLE SHAFT	324-1
TRANSITION STRUCTURE PIPE TO PIPE	340-1
MANHOLE FRAME AND COVER	630-2
STANDARD STEEL STEP	635-2
PIPE BEDDING	3092-1 (L.A.C.D.P.W.)
SAFETY REQUIREMENTS	6008-1 (L.A.C.D.P.W.)

GEOLOGY AND SOILS NOTES

1. ALL RECOMMENDATIONS INCLUDED IN R.T. FRANKIAN AND ASSOCIATES REPORTS NO. 94-061-F3, FEBRUARY 19, 1998 AND ALL ADDENDUM'S MUST BE COMPLIED WITH AND ARE PART OF THE GRADING AND STORM DRAIN SPECIFICATIONS.

STORMWATER POLLUTION PLAN NOTES:

A. NOTES

1. ERODED SEDIMENTS AND OTHER POLLUTANTS MUST BE RETAINED ON SITE AND MAY NOT BE TRANSPORTED FROM THE SITE VIA SHEETFLOW, SWALES, AREA DRAINS, NATURAL DRAINAGE COURSES OR WIND.
2. STOCKPILES OF EARTH AND OTHER CONSTRUCTION RELATED MATERIALS MUST BE PROTECTED FROM BEING TRANSPORTED FROM THE SITE BY THE FORCES OF WIND OR WATER.
3. FUELS, OILS, SOLVENTS, AND OTHER TOXIC MATERIALS MUST BE STORED IN ACCORDANCE WITH THEIR LISTING AND ARE NOT TO CONTAMINATE THE SOIL AND SURFACE WATERS. ALL APPROVED STORAGE CONTAINERS ARE TO BE PROTECTED FROM THE WEATHER. SPILLS MUST BE CLEANED UP IMMEDIATELY AND DISPOSED OF IN A PROPER MANNER. SPILLS MAY NOT BE WASHED INTO THE DRAINAGE SYSTEM.
4. EXCESS OR WASTE CONCRETE MAY NOT BE WASHED INTO THE PUBLIC WAY OR ANY OTHER DRAINAGE SYSTEM. PROVISIONS SHALL BE MADE TO RETAIN CONCRETE WASTES ON SITE UNTIL THEY CAN BE DISPOSED OF AS SOLID WASTE.
5. TRASH AND CONSTRUCTION RELATED SOLID WASTES MUST BE DEPOSITED INTO A COVERED RECEPTACLE TO PREVENT CONTAMINATION OF RAINWATER AND DISPERSAL BY WIND.
6. SEDIMENTS AND OTHER MATERIALS MAY NOT BE TRACKED FROM THE SITE BY VEHICLE TRAFFIC. THE CONSTRUCTION ENTRANCE ROADWAYS MUST BE STABILIZED SO AS TO INHIBIT SEDIMENTS FROM BEING DEPOSITED INTO THE PUBLIC WAY. ACCIDENTAL DEPOSITIONS MUST BE SWEPT UP IMMEDIATELY AND MAY NOT BE WASHED DOWN BY RAIN OR OTHER MEANS.
7. ANY SLOPES WITH DISTURBED SOILS OR DENUDED OF VEGETATION MUST BE STABILIZED SO AS TO INHIBIT EROSION BY WIND AND WATER.

B. THE FOLLOWING BMPs AS OUTLINED IN, BUT NOT LIMITED TO, THE "BEST MANAGEMENT PRACTICE HANDBOOK, CALIFORNIA STORMWATER QUALITY TASK FORCE, SACRAMENTO, CALIFORNIA, 1993", OR THE LATEST REVISED EDITION, MAY APPLY DURING THE CONSTRUCTION OF THIS PROJECT (ADDITIONAL MEASURES MAY BE REQUIRED IF DEEMED APPROPRIATE BY COUNTY INSPECTORS):

CA001 - DEWATERING OPERATIONS
CA002 - PAVING OPERATIONS
CA003 - STRUCTURE CONSTRUCTION AND PAINTING
CA010 - MATERIAL DELIVERY AND STORAGE
CA011 - MATERIAL USE
CA012 - SPILL PREVENTION AND CONTROL
CA020 - SOLID WASTE MANAGEMENT
CA021 - HAZARDOUS WASTE MANAGEMENT
CA022 - CONTAMINATED SOIL MANAGEMENT
CA023 - CONCRETE WASTE MANAGEMENT
CA030 - VEHICLE AND EQUIPMENT CLEANING
CA031 - VEHICLE AND EQUIPMENT FUELING
CA032 - VEHICLE AND EQUIPMENT MAINTENANCE
CA040 - EMPLOYEE/SUBCONTRACTOR TRAINING
ESC01 - SCHEDULING
ESC02 - PRESERVATION OF EXISTING VEGETATION
ESC10 - SEEDING AND PLANTING
ESC11 - MULCHING
ESC20 - GEOTEXTILES AND MATS
ESC21 - DUST CONTROLS
ESC22 - TEMPORARY STREAM CROSSING
ESC23 - CONSTRUCTION ROAD STABILIZATION
ESC24 - STABILIZED CONSTRUCTION ENTRANCE
ESC30 - EARTH DIKE
ESC31 - TEMPORARY DRAINS AND SWALES
ESC32 - SLOPE DRAIN
ESC40 - OUTLET PROTECTION
ESC41 - CHECK DAMS
ESC42 - SLOPE ROUGHENING/TERRACING
ESC50 - SILT FENCE
ESC51 - STRAW BALE BARRIERS
ESC52 - SAND BAG BARRIER
ESC53 - BRUSH OR ROCK FILTER
ESC54 - STORM DRAIN INLET PROTECTION
ESC55 - SEDIMENT TRAP
ESC56 - SEDIMENT BASIN

HYDRAULIC ELEMENTS

LINE	STATION	Q50YR. C.F.S.	CONDUIT SIZE	S_f	PIPE SLOPE IN %	VELOCITY FT/SEC	DEPTH OF FLOW (FT)	REMARKS
DD	1+00.00 TO 2+67.42	587	78" R.C.P.	0.0346	1.80	27.28	4.02	SEE STRUCT. NOTE 14
	2+67.42 TO 4+95.00	583	78" R.C.P.	0.0251	4.04	27.69	3.94	SEE STRUCT. NOTE 14
	4+95.00 TO 6+00.00	583	78" R.C.P.	0.0115	0.50	18.06	6.08	SEE STRUCT. NOTE 14
	6+00.00 TO 6+56.29	583	78" R.C.P.	0.0124	0.50	17.57	FULL	SEE STRUCT. NOTE 14
DD-2	1+00.00 TO 1+60.00	22	30" R.C.P.	0.0089	1.00	8.23	1.34	
H	2+22.06 TO 3+94.26	764	78" R.C.P.	0.0265	1.80	28.38	4.91	SEE STRUCT. NOTE 14
	3+94.26 TO 6+23.00	764	78" R.C.P.	0.0273	3.98	29.72	4.70	SEE STRUCT. NOTE 14
	6+23.00 TO 7+83.13	764	78" R.C.P.	0.0200	0.20	23.17	6.35	SEE STRUCT. NOTE 14

APPROVED AS TO NOTES DIRECTOR OF PUBLIC WORKS.
BY ASSISTANT DIVISION ENGINEER 10/25/01 DATE

RECOMMENDED LAND DEVELOPMENT DIVISION
BY SUBDIVISION PLAN CHECKING SECTION 10/22/01 DATE

SUBMITTED
BY SUBDIVISION PLAN CHECKING SECTION 10-22-01 DATE

BENCHMARK: L.A.C.O. PW L5402
DESCRIPTION: RND.HD. SPK.
LOCATION: TOP OF LOWEST HDWL 24 FT W/O C/L THE OLD ROAD (W. RDWY) & 0.6 MILES S/O HENRY MAYO DR.
RECORDED FROM: NEWHALL QUAD.
ELEVATION: 1031.950 DATUM: 1995

		REVISED BY	APPROVED BY	DATE

REGISTERED PROFESSIONAL ENGINEER
CRAIG M. WHITTEKER
NO. 51929
EXP 6-30-02
CIVIL
STATE OF CALIFORNIA

PROJECT ENGINEER 10-12-01 DATE

STORM DRAIN PLANS IN
TRACT No. 45433 P.D. No. 2514-13
COUNTY OF LOS ANGELES

ALLIANCE
LAND PLANNING & ENGINEERING INC.
5962 LAPLACE CT.
SUITE 130
CARLSBAD, CA 92008
TEL: (760) 431-9896

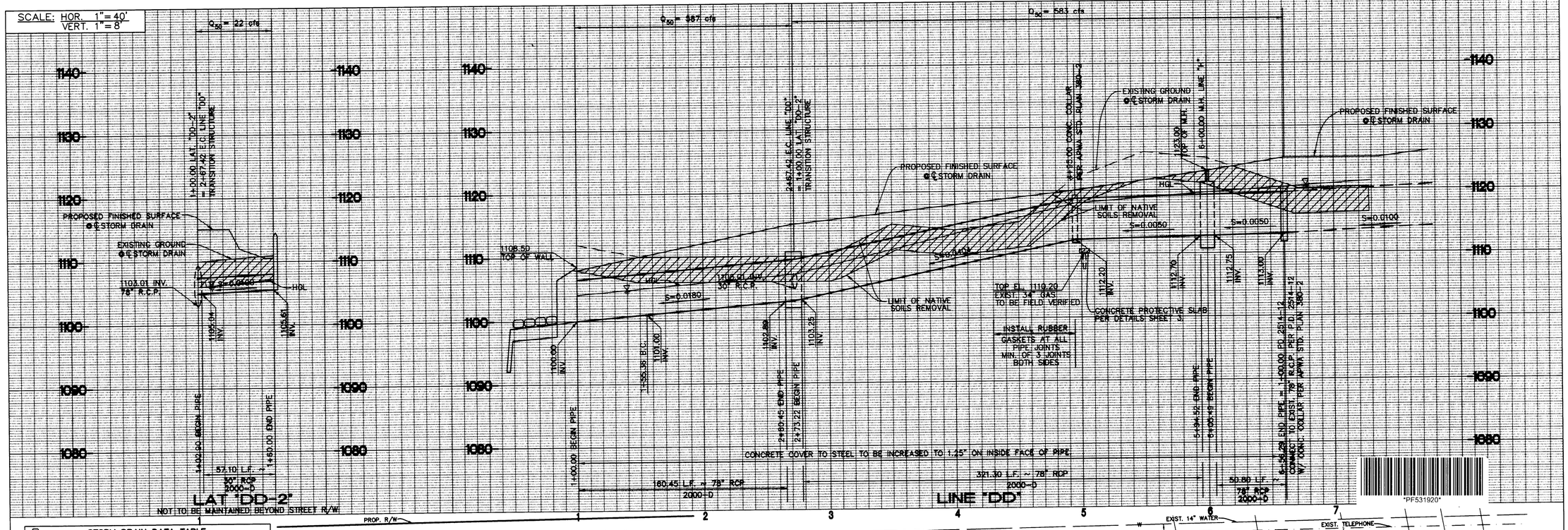
PD 2514-13 SHT 1COV.DWG (J.N. 0125) SHEET 1 OF 3

J.N. 0125 I:\CAD\93004\STORM DRAIN\PD 2514-13\PD 2514-13 SHT 1COV.dwg

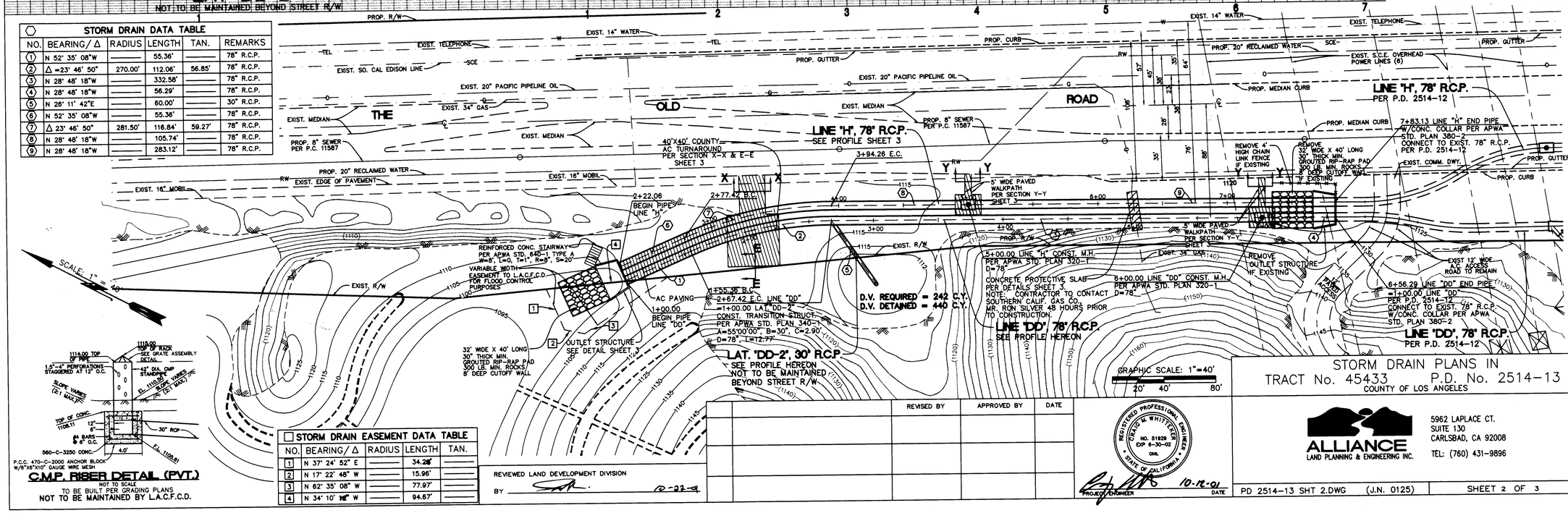
PF531919

P.D. 2514-13

SCALE: HOR. 1"=40'
VERT. 1"=8'



STORM DRAIN DATA TABLE					
NO.	BEARING/ Δ	RADIUS	LENGTH	TAN.	REMARKS
1	N 52° 35' 08"W		55.36'		78" R.C.P.
2	Δ =23° 46' 50"	270.00'	112.06'	56.85'	78" R.C.P.
3	N 28° 48' 18"W		332.58'		78" R.C.P.
4	N 28° 48' 18"W		56.29'		78" R.C.P.
5	N 26° 11' 42"E		60.00'		30" R.C.P.
6	N 52° 35' 08"W		55.36'		78" R.C.P.
7	Δ 23° 46' 50"	281.50'	116.84'	59.27'	78" R.C.P.
8	N 28° 48' 18"W		105.74'		78" R.C.P.
9	N 28° 48' 18"W		283.12'		78" R.C.P.



EASEMENT DATA TABLE				
NO.	BEARING/ Δ	RADIUS	LENGTH	TAN.
1	N 37° 24' 52" E		34.28'	
2	N 17° 22' 48" W		15.96'	
3	N 62° 35' 08" W		77.97'	
4	N 34° 10' 12" W		94.67'	

C.M.P. RISER DETAIL (PVT.)
NOT TO SCALE
TO BE BUILT PER GRADING PLANS
NOT TO BE MAINTAINED BY L.A.C.F.C.D.

REVIEWED LAND DEVELOPMENT DIVISION
BY _____ 10-22-01

		REVISED BY	APPROVED BY	DATE

GRAPHIC SCALE: 1"=40'
20' 40' 80'

REGISTERED PROFESSIONAL ENGINEER
CRAIG M. WHITTAKER
NO. 51828
EXP 6-30-02
CIVIL
STATE OF CALIFORNIA

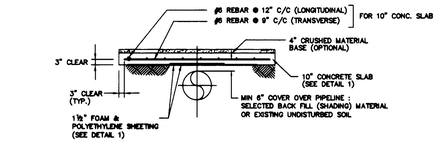
PROJECT ENGINEER 10-12-01 DATE

STORM DRAIN PLANS IN TRACT No. 45433 P.D. No. 2514-13
COUNTY OF LOS ANGELES

ALLIANCE
LAND PLANNING & ENGINEERING INC.
5962 LAPLACE CT.
SUITE 130
CARLSBAD, CA 92008
TEL: (760) 431-9896

PD 2514-13 SHT 2.DWG (J.N. 0125) | SHEET 2 OF 3

J.N. 0125 I:\CAD\93004\STORM DRAIN\PD 2514-13\PD 2514-13 SHT 2.dwg



SECTION U-U

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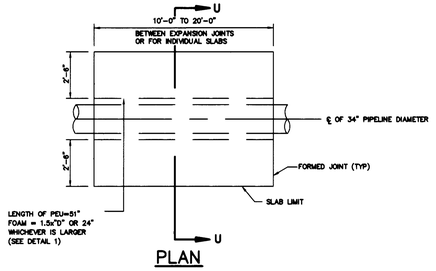
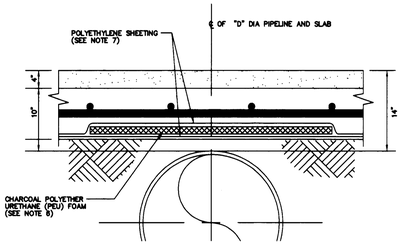


PLAN

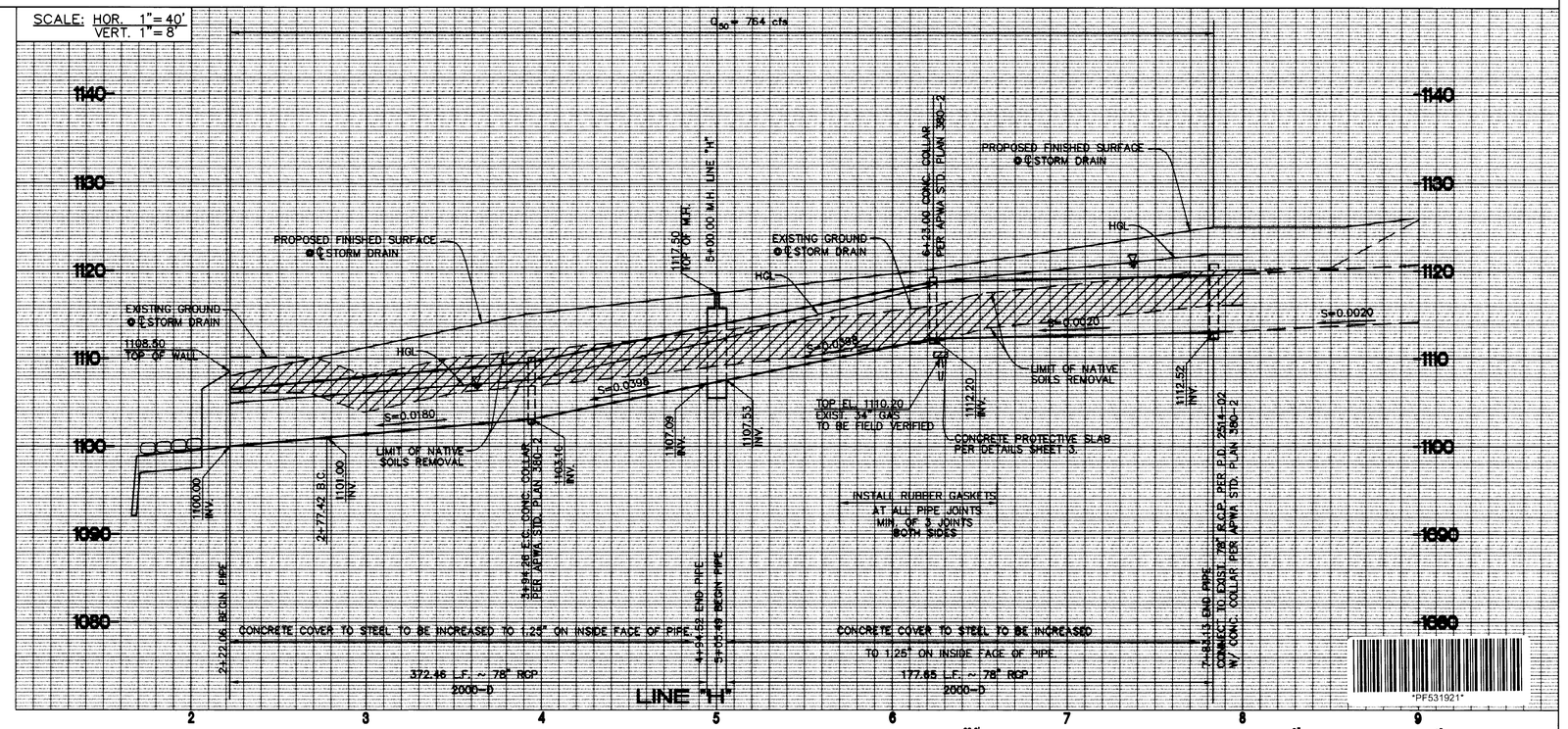


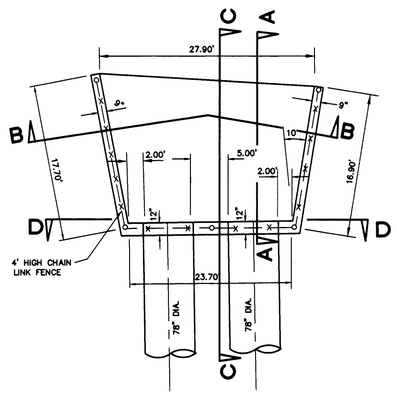
DETAIL 1

NOT TO SCALE

NOTES:

1. THE EXTENT OF CONCRETE PROTECTION SHALL BE (REFER TO PLAN LAYOUT).
2. CONCRETE SLAB IS DESIGNED FOR H 20 TRUCK LOADING, FOR PUBLIC STREET PAVING.
3. CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI AT 28 DAYS.
4. REINFORCING STEEL SHALL BE GRADE 60 DEFORMED BARS CONFORMING TO ASTM A-615. MINIMUM OVERLAP AT SPLICES SHALL BE 24 BAR DIAMETERS.
5. CONCRETE COVER OF REINFORCING STEEL SHALL BE 3 INCHES WHEN POURED AGAINST SOIL, AND 2 INCHES WHEN POURED IN FORMS.
6. 1.80 #/CU FT CHARCOAL POLYETHER URETHANE (PEU) FOAM SHALL BE 1 1/2 INCH THICK (SPECIAL), 2 FEET 6 INCHES WIDE AND CENTERED OVER THE PIPELINE.
7. POLYETHYLENE SHEETING SHALL BE 5 MILS IN THICKNESS AND SHALL OVERLAP THE PEU FOAM BY AT LEAST 1 FOOT ON ALL SIDES.
8. FOR SITE CONDITIONS DIFFERENT THAN SHOWN, CONTACT PIPELINE ENGINEERING FOR SPECIAL DESIGN AND/OR EVALUATION.





PLAN VIEW

NO SCALE

LINES "H" & "DD" OUTLET STRUCTURE

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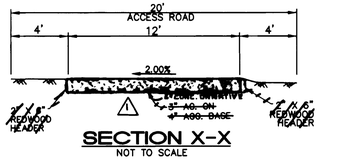

SECTION X-X

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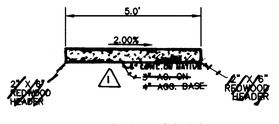

SECTION Y-Y

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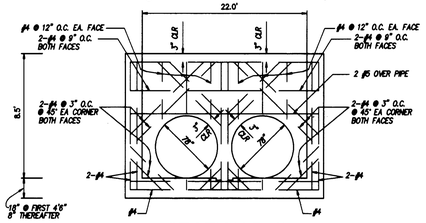

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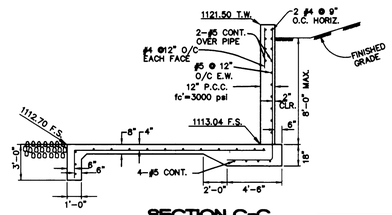

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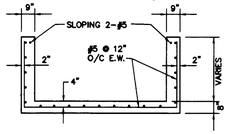

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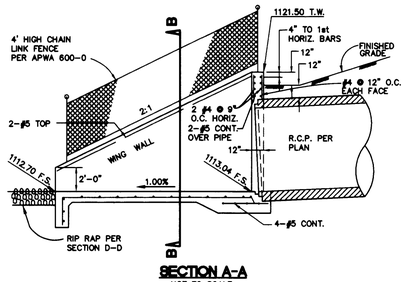

SECTION A-A

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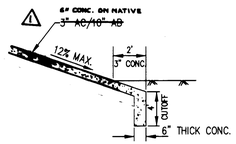

ACCESS ROAD CUTOFF WALL

SECTION E-E

NOT TO SCALE

GRAPHIC SCALE: 1"=40'

20' 40' 80'

REVIEWED LAND DEVELOPMENT DIVISION

BY _____ 10-22-01

		REVISED BY	APPROVED BY	DATE
1	REVISED ACCESS ROAD AND WALK PATH SECTIONS TO BE CONCRETE.	R.C.E. 51928		2/24/05

REGISTERED PROFESSIONAL ENGINEER CRAIG W. WHITTAKER NO. 51928 EXP. 6-30-02 CIVIL STATE OF CALIFORNIA

PROJECT ENGINEER 10-12-01 DATE

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SHEET 3 OF 3

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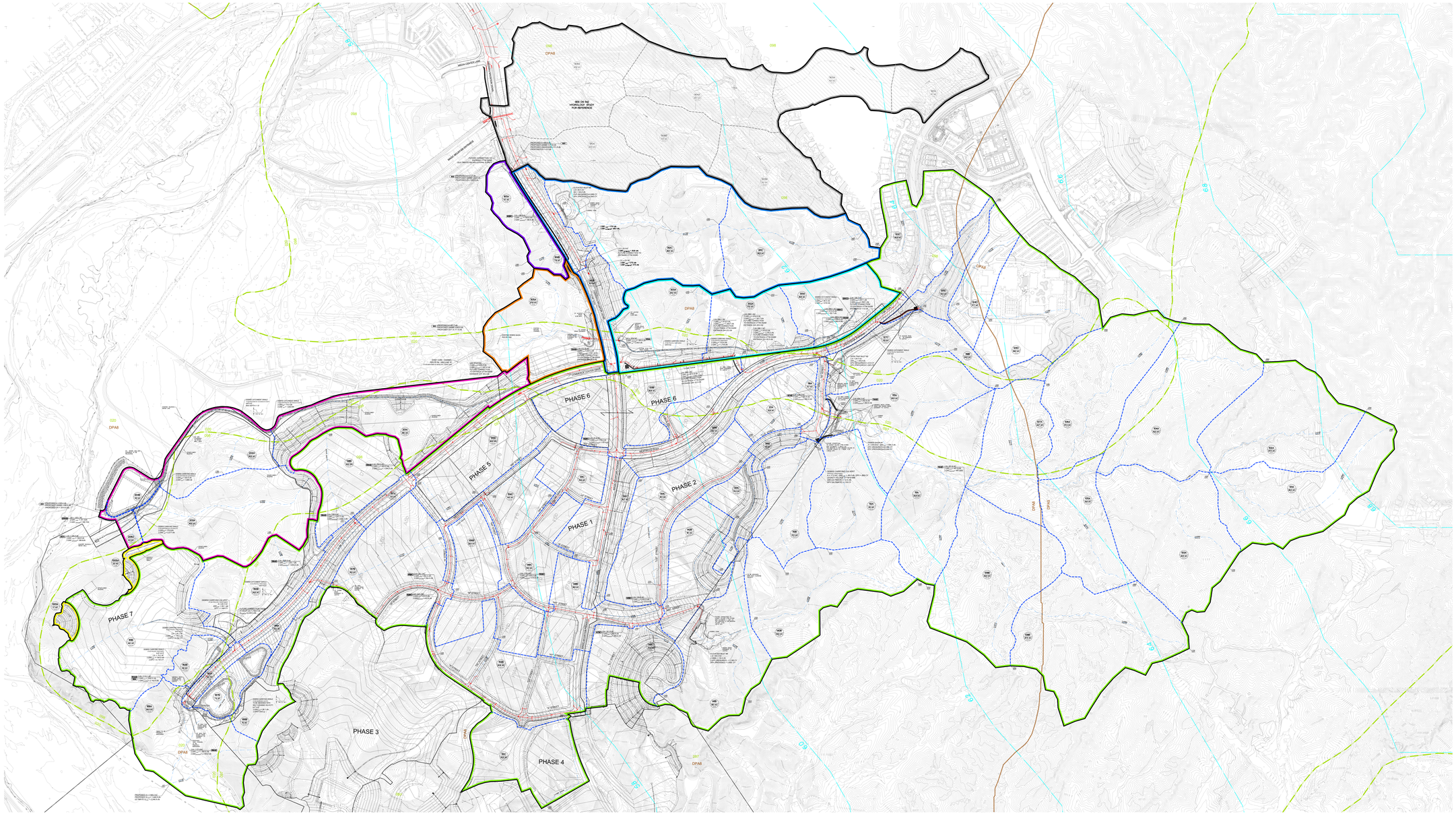
D-8: AVTTM 61105-01, 02, 05, & 06



Hydrology Subareas Data

Subarea ID	Area (ac)	Area (sq ft)	Area (sq mi)	Tc (min)	Tc (hr)	Runoff Coefficient (C)	Rainfall Intensity (in/hr)	Peak Runoff (cfs)	Flow Path Length (ft)	Flow Path Slope (%)	Notes
A1	12.45	542,322	0.0195	18.2	0.30	0.42	2.85	14.9	1,240	3.8	
A2	8.73	380,339	0.0136	14.6	0.24	0.39	3.12	10.6	980	4.5	
A3	5.21	226,948	0.0081	11.3	0.19	0.36	3.48	6.5	760	5.2	
B1	15.02	654,391	0.0235	22.7	0.38	0.45	2.54	17.2	1,610	2.9	
B2	9.88	430,373	0.0154	16.4	0.27	0.41	2.96	12.0	1,120	3.6	
B3	6.34	276,170	0.0099	12.8	0.21	0.38	3.31	8.0	870	4.8	
C1	18.67	813,325	0.0292	25.1	0.42	0.47	2.38	20.9	1,890	2.4	
C2	11.04	480,902	0.0173	17.9	0.30	0.43	2.79	13.2	1,310	3.3	
C3	7.16	311,890	0.0112	13.5	0.23	0.40	3.24	9.3	940	4.6	
D1	4.52	196,891	0.0071	10.2	0.17	0.34	3.62	5.6	690	5.8	
D2	3.18	138,521	0.0050	8.9	0.15	0.32	3.81	3.9	580	6.3	
E1	21.30	927,828	0.0333	28.4	0.47	0.49	2.21	23.1	2,140	2.1	
E2	13.76	599,446	0.0215	20.6	0.34	0.44	2.67	16.2	1,540	3.0	
E3	8.05	350,658	0.0126	15.2	0.25	0.40	3.18	10.2	1,020	4.2	
F1	16.89	735,728	0.0264	23.5	0.39	0.46	2.47	19.2	1,760	2.6	
F2	10.42	453,895	0.0163	17.1	0.28	0.42	2.88	12.6	1,230	3.4	
F3	6.71	292,348	0.0105	13.1	0.22	0.39	3.27	8.6	910	4.7	
G1	19.44	846,806	0.0304	26.3	0.44	0.48	2.31	21.5	1,980	2.2	
G2	12.18	530,561	0.0190	19.0	0.32	0.43	2.74	14.3	1,420	3.1	
G3	7.89	343,688	0.0123	14.8	0.25	0.40	3.21	10.1	1,050	4.0	
H1	14.31	623,344	0.0224	21.4	0.36	0.44	2.61	16.4	1,590	2.8	
H2	9.12	397,267	0.0143	16.0	0.27	0.41	2.99	11.2	1,180	3.5	
H3	5.86	255,262	0.0092	12.4	0.21	0.37	3.36	7.3	830	4.9	
I1	17.55	764,478	0.0274	24.2	0.40	0.46	2.43	19.6	1,810	2.5	
I2	11.27	490,921	0.0176	18.3	0.31	0.42	2.82	13.3	1,340	3.2	
I3	7.42	323,215	0.0116	14.1	0.24	0.39	3.24	9.4	970	4.4	
J1	20.16	878,170	0.0315	27.0	0.45	0.48	2.27	21.9	2,030	2.1	
J2	13.04	568,022	0.0204	19.8	0.33	0.43	2.70	15.1	1,470	3.0	
J3	8.61	375,052	0.0135	15.5	0.26	0.40	3.15	10.8	1,090	4.1	
K1	15.73	685,139	0.0246	22.1	0.37	0.45	2.57	18.2	1,650	2.7	
K2	10.18	443,441	0.0159	16.7	0.28	0.41	2.93	12.2	1,200	3.4	
K3	6.55	285,318	0.0102	13.0	0.22	0.38	3.30	8.2	880	4.8	
L1	18.02	784,951	0.0282	24.8	0.41	0.46	2.40	19.9	1,850	2.5	
L2	11.66	507,910	0.0182	18.6	0.31	0.42	2.80	13.7	1,360	3.2	
L3	7.58	330,185	0.0118	14.3	0.24	0.39	3.22	9.5	980	4.4	
M1	22.41	976,160	0.0350	29.6	0.49	0.50	2.15	24.1	2,230	2.0	
M2	14.49	631,184	0.0226	21.7	0.36	0.44	2.63	16.8	1,620	2.8	
M3	9.34	406,850	0.0146	16.2	0.27	0.41	2.97	11.4	1,190	3.5	
N1	16.12	702,187	0.0252	22.9	0.38	0.45	2.54	18.4	1,680	2.7	
N2	10.47	456,013	0.0164	17.2	0.29	0.42	2.87	12.6	1,240	3.4	
N3	6.78	295,337	0.0106	13.2	0.22	0.38	3.28	8.5	900	4.8	
O1	19.83	863,735	0.0310	26.7	0.44	0.48	2.29	21.8	2,010	2.1	
O2	12.91	562,300	0.0202	19.6	0.33	0.43	2.72	15.1	1,460	3.0	
O3	8.36	364,162	0.0131	15.4	0.26	0.40	3.16	10.6	1,080	4.1	
P1	17.24	750,974	0.0269	24.0	0.40	0.46	2.44	19.3	1,790	2.5	
P2	11.15	485,634	0.0174	18.1	0.30	0.42	2.83	13.2	1,330	3.2	
P3	7.21	314,128	0.0113	13.9	0.23	0.39	3.25	9.1	960	4.5	
Q1	21.68	944,381	0.0339	28.9	0.48	0.49	2.18	23.2	2,180	2.1	
Q2	14.02	610,711	0.0219	21.0	0.35	0.44	2.65	16.3	1,570	2.9	
Q3	9.07	395,089	0.0142	15.9	0.26	0.41	3.00	11.1	1,170	3.6	
R1	15.96	695,218	0.0249	22.5	0.37	0.45	2.56	18.4	1,660	2.7	
R2	10.33	450,035	0.0161	16.9	0.28	0.41	2.91	12.3	1,210	3.4	
R3	6.69	291,476	0.0105	13.1	0.22	0.38	3.29	8.4	890	4.8	
S1	18.84	820,670	0.0294	25.3	0.42	0.47	2.36	20.9	1,900	2.4	
S2	12.21	531,868	0.0191	19.1	0.32	0.43	2.73	14.3	1,430	3.1	
S3	7.91	344,560	0.0124	14.9	0.25	0.40	3.20	10.1	1,060	4.0	
T1	20.37	887,257	0.0318	27.2	0.45	0.48	2.26	22.1	2,050	2.1	
T2	13.18	574,121	0.0206	19.9	0.33	0.43	2.69	15.2	1,480	3.0	
T3	8.54	372,002	0.0133	15.6	0.26	0.40	3.14	10.7	1,100	4.1	
U1	15.89	692,168	0.0248	22.4	0.37	0.45	2.57	18.3	1,670	2.7	
U2	10.27	447,301	0.0160	16.8	0.28	0.41	2.92	12.3	1,220	3.4	
U3	6.64	289,238	0.0104	13.0	0.22	0.38	3.29	8.3	900	4.8	
V1	18.71	814,948	0.0292	25.2	0.42	0.47	2.37	20.8	1,910	2.4	
V2	12.13	528,263	0.0190	19.0	0.32	0.43	2.74	14.3	1,440	3.1	
V3	7.86	342,382	0.0123	14.8	0.25	0.40	3.21	10.1	1,070	4.0	
W1	20.22	880,783	0.0316	27.1	0.45	0.48	2.27	22.0	2,060	2.1	
W2	13.09	570,140	0.0205	19.8	0.33	0.43	2.70	15.2	1,490	3.0	
W3	8.49	369,824	0.0133	15.6	0.26	0.40	3.15	10.7	1,110	4.1	
X1	15.84	689,990	0.0248	22.4	0.37	0.45	2.57	18.3	1,680	2.7	
X2	10.24	446,054	0.0160	16.8	0.28	0.41	2.92	12.3	1,230	3.4	
X3	6.62	288,367	0.0103	13.0	0.22	0.38	3.29	8.3	910	4.8	
Y1	18.65	812,574	0.0292	25.2	0.42	0.47	2.37	20.8	1,920	2.4	
Y2	12.09	526,520	0.0189	19.0	0.32	0.43	2.74	14.2	1,450	3.1	
Y3	7.83	341,075	0.0122	14.8	0.25	0.40	3.21	10.1	1,080	4.0	
Z1	20.15	877,734	0.0315	27.1	0.45	0.48	2.27	21.9	2,070	2.1	
Z2	13.05	568,458	0.0204	19.8	0.33	0.43	2.70	15.1	1,500	3.0	
Z3	8.46	368,518	0.0132	15.6	0.26	0.40	3.15	10.7	1,120	4.1	

NOTES:
1. ALL SUBAREA DATA SHOWN ABOVE IS FOR THE MISSION VALLEY PHASE 1 HYDROLOGY STUDY, DATED 3/28/2018.
2. SUBAREA ID CORRESPONDS TO THE DELINEATION SHOWN ON THE HYDROLOGY STUDY EXHIBIT.
3. TIME OF CONCENTRATION (Tc) AND PEAK RUNOFF VALUES ARE FOR THE 100-YEAR, 6-HOUR STORM EVENT UNLESS OTHERWISE NOTED.
4. RUNOFF COEFFICIENTS (C) ARE BASED ON THE CITY OF SAN DIEGO'S DEVELOPMENT REGULATIONS AND THE HYDROLOGY STUDY'S LAND USE ASSUMPTIONS.
5. FLOW PATH LENGTH AND SLOPE ARE MEASURED FROM THE MOST HYDRAULICALLY REMOTE POINT OF THE SUBAREA TO THE DESIGN POINT.
6. SUBAREAS WITH "OFFSITE" IN THE NOTES COLUMN INCLUDE FLOW FROM UPSTREAM OFFSITE TRIBUTARY AREAS.
7. REFER TO THE HYDROLOGY STUDY APPENDIX FOR DETAILED CALCULATIONS, INCLUDING TIME OF CONCENTRATION PATH DELINEATIONS AND RAINFALL INTENSITY-DURATION-FREQUENCY CURVES.

NOTE: FOR EXISTING INFORMATION REFER TO APPROVED MISSION VILLAGE PHASE 1 HYDROLOGY STUDY, DATED 3/28/2018

HYDROLOGY NOTES

1. HYDROLOGY ANALYSIS WAS PERFORMED USING THE 100-YEAR, 6-HOUR STORM EVENT AS REQUIRED BY THE CITY OF SAN DIEGO'S DRAINAGE DESIGN MANUAL.
2. THE RATIONAL METHOD WAS USED TO CALCULATE PEAK RUNOFF FOR SUBAREAS LESS THAN 1 SQUARE MILE IN AREA.
3. TIME OF CONCENTRATION (Tc) WAS CALCULATED USING THE KIRPICH EQUATION FOR NATURAL FLOW PATHS AND THE FAA METHOD FOR DEVELOPED FLOW PATHS.
4. RUNOFF COEFFICIENTS (C) WERE SELECTED BASED ON THE SOIL TYPE, SLOPE, AND IMPERVIOUSNESS OF EACH SUBAREA, CONSISTENT WITH THE CITY'S GUIDELINES.
5. RAINFALL INTENSITY VALUES WERE OBTAINED FROM THE NOAA ATLAS 14 DATA FOR THE PROJECT LOCATION.
6. A MINIMUM TIME OF CONCENTRATION OF 5 MINUTES WAS USED FOR ALL SUBAREAS.
7. THE HYDROLOGY MODEL WAS CALIBRATED TO MATCH THE RESULTS OF THE EXISTING MISSION VILLAGE PHASE 1 HYDROLOGY STUDY WHERE APPLICABLE.

DRAINAGE DESIGN CRITERIA

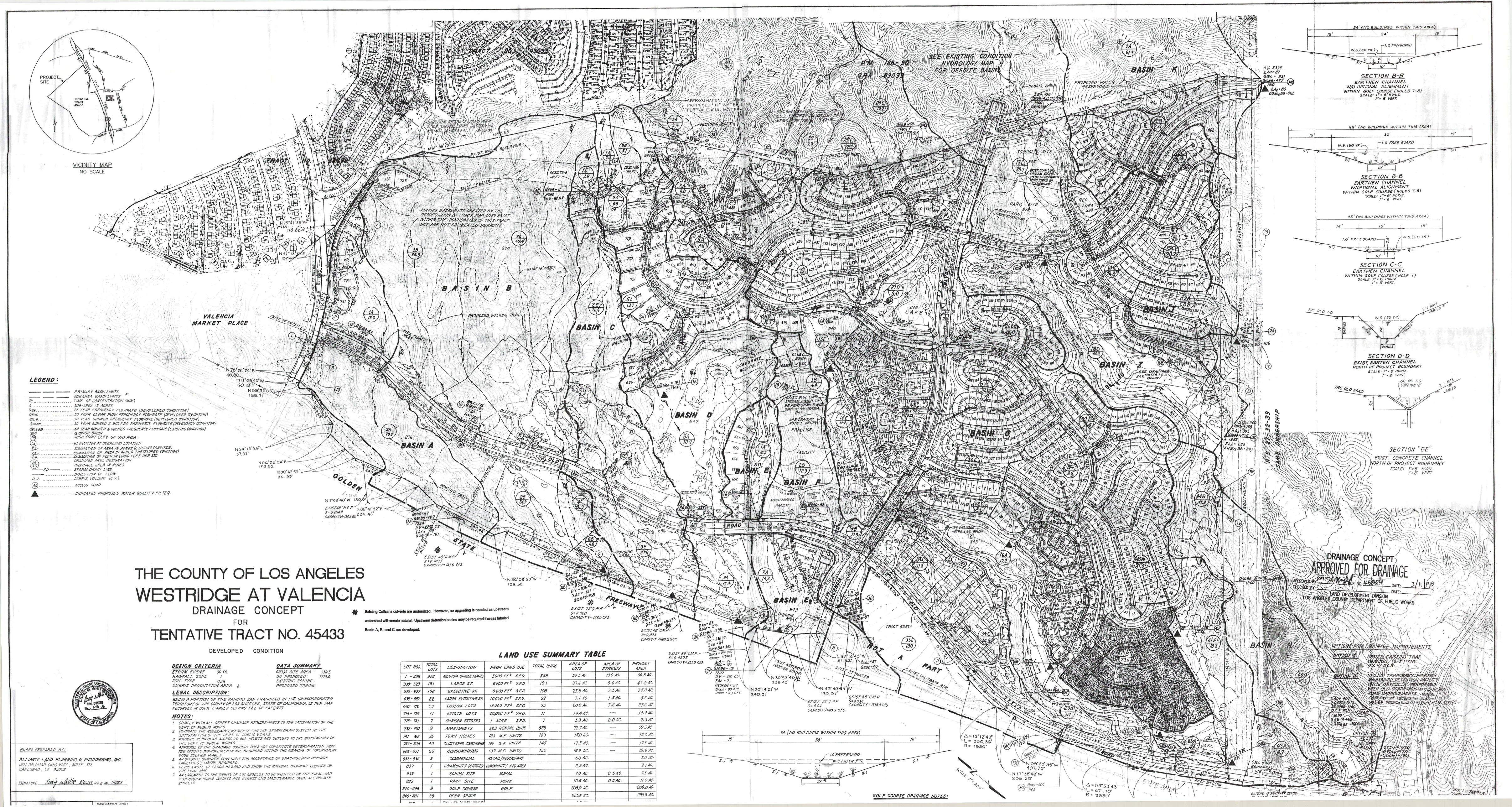
- 100-YEAR, 6-HOUR STORM EVENT
- RATIONAL METHOD FOR AREAS < 1 SQ MI
- MINIMUM TIME OF CONCENTRATION: 5 MIN
- RUNOFF COEFFICIENTS: PER CITY OF SAN DIEGO GUIDELINES
- RAINFALL DATA: NOAA ATLAS 14
- SOIL TYPE: PER GEOTECHNICAL REPORT
- SLOPE: PER GRADING PLAN
- IMPERVIOUSNESS: PER LAND USE

Q = CIA, WHERE:
Q = PEAK RUNOFF (CFS)
C = RUNOFF COEFFICIENT
I = RAINFALL INTENSITY (IN/HR)
A = DRAINAGE AREA (ACRES)

LEGEND

- 470 — 470 ELEVATION
- EXISTING STORM DRAIN
- EXISTING STORM DRAIN TO BE REMOVED
- PROPOSED STORM DRAIN
- PROPOSED STORM DRAIN TO BE ABANDONED
- TIME OF CONCENTRATION
- TIME TO THE FURTHEST BASIN
- SUBAREA
- SUB AREA BOUNDARY
- DPA8 — DRAINAGE PATH
- DPA8 — DRAINAGE PATH BOUNDARY
- 1.5 — SUB AREA RUNOFF
- 12.5 — TIME OF CONCENTRATION
- DPA8 — DRAINAGE PATH
- 12.5 — TIME OF CONCENTRATION
- 1.5 — SUB AREA RUNOFF

D-9: Westridge Tract 45433


VICINITY MAP
NO SCALE
PROJECT SITE
TENTATIVE TRACT NO. 45433
TRACT NO. 45433
BASIN A
BASIN B
BASIN C
BASIN D
BASIN E
BASIN F
BASIN G
BASIN H
BASIN I
BASIN J
BASIN K
VALENCIA MARKET PLACE
PROPOSED WALKING TRAIL
EXIST. 18" WATER
EXIST. 8" WATER
EXIST. 12" WATER
EXIST. 16" WATER
EXIST. 24" WATER
EXIST. 30" WATER
EXIST. 36" WATER
EXIST. 48" WATER
EXIST. 8" SEWER
EXIST. 12" SEWER
EXIST. 15" SEWER
EXIST. 18" SEWER
EXIST. 24" SEWER
EXIST. 30" SEWER
EXIST. 36" SEWER
EXIST. 42" SEWER
EXIST. 48" SEWER
EXIST. 54" SEWER
EXIST. 60" SEWER
EXIST. 66" SEWER
EXIST. 72" SEWER
EXIST. 78" SEWER
EXIST. 84" SEWER
EXIST. 90" SEWER
EXIST.

D-10: DS 542

HYDRAULIC SUMMARY

098

DPA - 8

HYDROLOGY SUMMARY

Watershed 800 (Unmanned Concrete V)		2 year	5 year	10 year	25 year	50 year	50 year Burn	Capital
Existing	Q (cfs)	31.0	76.3	108.2	149.9	182.2	188.0	250.0
Area (ac)	q (cfs/ac)	0.31	0.75	1.07	1.48	1.80	1.86	
100.1	Vol (ac-ft)	3.2	5.9	8.0	11.1	13.6		
Proposed	Q (cfs)	31.5	70.4	102.4	144.7	177.8	183.1	243.5
Area (ac)	q (cfs/ac)	0.31	0.70	1.01	1.43	1.76		
101.2	Vol (ac-ft)	3.2	5.9	8.0	11.1	13.7		
Delta	Q (cfs)	0.5	-5.9	-5.8	-5.2	-4.4	-4.9	-6.5
Area (ac)	q (cfs/ac)	0.00	-0.06	-0.06	-0.05	-0.05		
0.1	Vol (ac-ft)	0.0	0.0	0.0	0.0	0.1		

VTTM-71377
ENTRADA NORTH

PM 18654

PM 12337
MAGIC MOUNTAIN
THEME PARK

VTTM 53295
L.S. 27-32-39
PORTION OF
LOTS 15 & 16
(NEWHALL OWNERSHIP)

EX. 7'X 4' R.C. BOX PER LINE "F" PD 1052

EXISTING OPEN TRAP. CHANNEL PER LINE "B" PD 1052 (TO BE MAINTAINED LACFCD)

SIX FLAGS BOUNDARY

44' WIDE STORM DRAIN EASEMENT TO LACFCD FOR OPEN TRAP. CHANNEL AND APPURTENANT STRUCTURES AND INGRESS AND EGRESS PER LINE "B" PD 1052

MAGIC MOUNTAIN ENTRANCE

EXISTING NATURAL SWALE

VTTM PROJECT BOUNDARY

RIP RAP PAD (TO BE PRIVATELY MAINTAINED)

FUTURE CONNECTION FROM MISSION VILLAGE (TR 61105-01) ΣQ_{CAP}=718 cfs

GUNITE CHANNEL

VARIABLE WIDTH EASEMENT TO LACFCD FOR FLOOD CONTROL PURPOSES

54" SD LINE "B" PER PD 2637 (TO BE MAINTAINED BY LACFCD)

VARIABLE WIDTH EASEMENT TO LACFCD FOR FLOOD CONTROL PURPOSES

DEBRIS CONE

DESILTING INLET #7
(TO BE MAINTAINED BY LACFCD)
ΣA = 40.2 cfs
DEBRIS VOL = 1,032 CY
VOL. PROVIDED = 1,221 CY±

DESILTING INLET #5
(TO BE MAINTAINED BY LACFCD)
ΣA = 422.7 AC
ΣQ_{CAP} = 930.1 cfs
DEBRIS VOL = 4,523 CY
VOL. PROVIDED = 4,855 CY±

JOIN EXISTING CONCRETE CHANNEL
EXISTING A = 426.5 AC
EXISTING Q_{100} = 1,024.0 cfs
EXISTING DPV= 4,579 CY.
PD 1052 Q_{DESIGN}= 1,160 cfs
PROPOSED A=444.2 AC
PROPOSED Q_{CAP} = 950.1 cfs
PROPOSED DPV= 0 CY
Q_{DESIGN}= 1,121.9 cfs

EXISTING PARCEL BOUNDARY

EXISTING ΣA = 101.1 AC
EXISTING ΣQ_{100} = 250.0 cfs
EXISTING DPV = 4,640 CY
PROPOSED ΣA =101.2 AC
PROPOSED ΣQ_{100} = 243.5 cfs
PROPOSED DPV = 4,640 CY

SEE DETAIL A

PROPOSED CULVERT BOX (TO BE MAINTAINED BY LACFCD)

MEDIA CENTER LANE

JOIN METROPOINTE SD PLAN MTD 1764

LINE "A" PER PD 2637
PROPOSED 42" SD (TO BE MAINTAINED BY LACFCD)

42" RCP PER CALTRANS PLANS PER THE OLD ROAD RELOCATION BY METROPOINTE (TO BE MAINTAINED BY LACFCD)

OLD ROAD

PARKWAY

MAGIC MOUNTAIN

LINE "C" PER PD 2637

LINE "D" PER PD 2637

FUTURE CONNECTION FROM ENTRADA (VTTM 53295) ΣQ_{CAP} = 38.6 cfs

DEBRIS CATCHMENT AREA, REQUIRES DEBRIS COLLECTION MAINTENANCE AS NEEDED, NOT TO BE MAINTAINED BY LACFCD

DESILTING INLET #8
(TO BE MAINTAINED BY LACFCD)
ΣA = 20.3 cfs
DEBRIS VOL = 501 CY
VOL. PROVIDED = 652 CY±

EXISTING ΣA = 3.0 AC
EXISTING ΣQ_{CAP} = 7.6 cfs
PROPOSED ΣA = 3.0 AC
PROPOSED ΣQ_{CAP} = 7.6 cfs

EXISTING CATCH BASIN
PER MTD 1764 A= 1.2 AC
PER MTD 1764 Q_{50}= .4 cfs
PER MTD 1764 Q_{PM} = 0.48 cfs
PROPOSED A=1.2 AC
PROPOSED Q_{CAP} = 3.5 cfs
PROPOSED Q_{PM}=0.30 cfs

EXISTING ΣA = 17.5 AC
EXISTING ΣQ_{50} = 39.9 cfs (CLEAR)
EXISTING DPV= 0 CY
PROPOSED ΣA= 19.8 AC
PROPOSED ΣQ_{CAP} = 50.3 cfs
Q_{DESIGN}= 59.5 cfs
(PER APPROVED DCR FOR VTTM 53295)
MTD 1764 Q_{50} = 50.0 cfs

EXISTING CATCH BASIN
PER MTD 1764 A= 1.1 AC
PER MTD 1764 Q_{50}= 4 cfs
PER MTD 1764 Q_{PM} = 0.44 cfs
PROPOSED A=1.2 AC
PROPOSED Q_{CAP} = 3.5 cfs
PROPOSED Q_{PM}=0.30 cfs

ΣA = 985.5 AC
ΣQ_{100} = 1,025.0 cfs

NOTE: NODES 900A & 902A WERE ADDED TO THIS RUN BY USING THE APPROVED AREAS AND FLOWS FROM P.D. 2514-04 & P.D. 2514-10, TRACT 45433. (SEE ATTACHED REFERENCE PLANS)

TR 45433

A = 42.5 AC
Q_{50} = 163.5 cfs
EXISTING SD PER PD 2514-10

A = 249.0 AC
Q_{50} = 863.0 cfs
EXISTING SD PER PD 2514-04

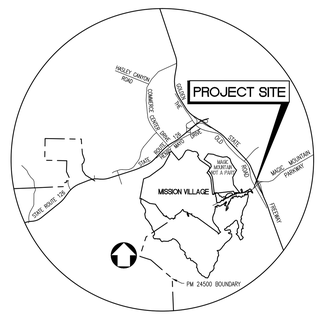
MISSION VILLAGE TR 61105-01

UNNAMED CANYON 1

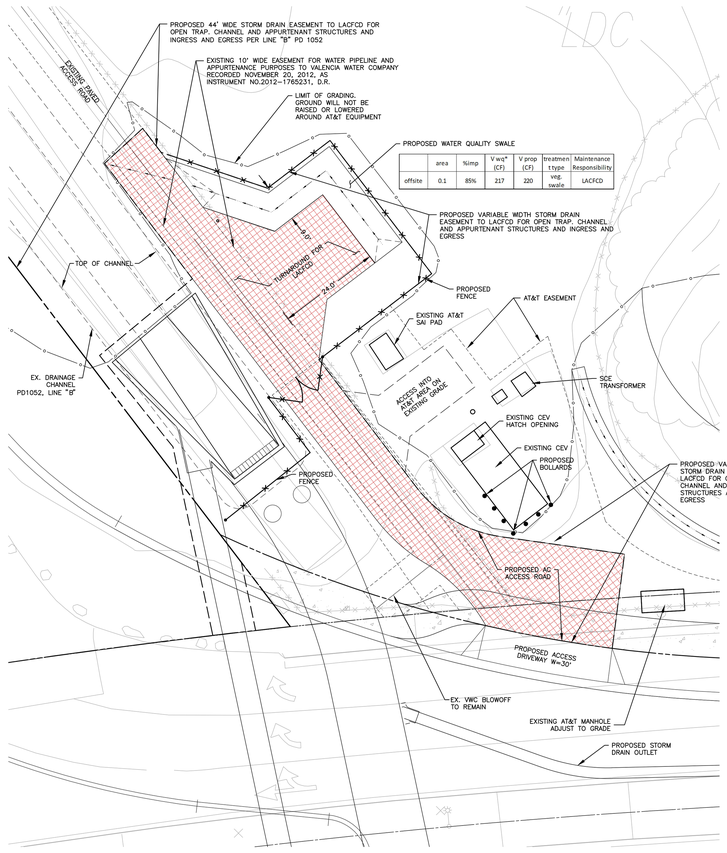
UNNAMED CANYON 2

DEBRIS CONE

DPA - 8
DPA - 5



VICINITY MAP
NOT TO SCALE
THOMAS GUIDE PAGE 4550 B2, B3, C2



	area	%imp	V wq* (CF)	V prop (CF)	treatment type	Maintenance Responsibility
offsite	0.1	85%	217	220	vegetated swale	LACFCD

DETAIL A
AT&T FACILITY AT MAGIC MOUNTAIN PARKWAY
SCALE: 1"=10'

HYDROLOGY STUDY APPROVED
CHECKED BY _____ RCE NO. 76882 DATE 12/26/2017
APPROVED BY _____ DATE 12/26/2017
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS
LAND DEVELOPMENT DIVISION

LEGEND:

- PROJECT BOUNDARY
- EXISTING DRAINAGE AREA BOUNDARY
- EXISTING DRAINAGE SUB-AREA BOUNDARY
- FLOW PATH
- SD — PROPOSED STORM DRAIN
- SD — EXISTING STORM DRAIN
- CDFG — CA DEPT. OF FISH AND GAME JURISDICITON
- FP — EXISTING FLOODWAY
- FW — EXISTING FLOODPLAIN
- SEA23 — SEA RIVER CORRIDOR
- FEMA — FEMA ZONE
- TIME OF CONCENTRATION PATH
- 7.6 — 50 YEAR ISOHYET
- DPA - 8 / DPA - 5 — DEBRIS POTENTIAL AREA (DPA)
- 097 / 020 — SOIL CLASSIFICATION BOUNDARY
- SUBAREA NODE
- 201A / 147 AC / Tc=13 — ACREAGE / TIME OF CONCENTRATION
- 800 — WATERSHED OUTLET NODE
- 205A — CONFLUENCE NODE
- PROPOSED AT&T, VWC AND LACFCD ACCESS

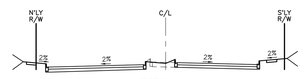
DRAINAGE DESIGN CRITERIA:

1. 50-YR, 24-HR ISOHYETS: 5.9, 6.0, 6.2, 6.4, 6.6
2. SOIL TYPES: 98
3. DESIGN STORMS: 50-YR, 24-HR
4. PERCENT IMPERVIOUS VALUES: UNDEVELOPED – 1%
5. DPA = 8, 35,500 CY PER SQ MI
6. BULK FACTOR = 1.359

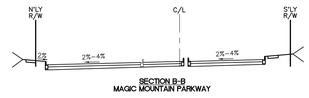
SUMMARY TABLE

Magic Mountain (Divided Street) Proposed condition

Subarea	Node	Soil Type	%Imp	Area (Ac)	ΣAREA (Ac)	50-Yr Isohyet (in)	50-Yr Tc (min)	$Q_{CI}Q_p$ (cfs)	ΣQ_{50} (cfs)	ΣQ_{100} (cfs)	EGDesign (cfs)	Note
801A		98	0.01	32.7	32.7	6.2	11	70.7	70.7	94.0	94.0	
802A		98	0.01	31.5	64.2	6.1	17	54.3	122.8	163.3	163.3	
803B		98	0.01	32.2	32.2	6.0	17	53.3	53.3	70.9	70.9	
804C		98	0.01	4.8	4.8	6.0	12	9.6	9.6	12.8	12.8	
	805BC				37.0				62.1	82.6	82.6	
	806B				37.0				62.1	82.6	82.6	
	807AB				101.2				183.1	243.5	243.5	
	808A				101.2				183.1	243.5	243.5	
900A		98	0.68	249	249	7.2	6	863.0	863.0		863.0	
901A		98	0.01	11.6	260.6	6.4	8	30.3	893.3	41.3	991.6	
902A		98	0.85	42.5	303.1	7.2	5	163.5	880.2		977.0	
903A		98	0.01	16.4	319.5	6.3	12	35.1	915.1	47.7	1006.6	
904A		98	0.01	25.7	345.2	6.2	13	50.9	882.4	69.2	979.5	
905B		98	0.01	23.1	23.1	6.2	10	52.7	52.7			
906B		98	0.01	17.2	40.3	6.2	10	39.3	74.6			
	907AB				385.5				952.5		1025.0	
	908A				385.5				952.5		1025.0	
909A		98	0.01	37.2	422.7	6.2	12	76.8	930.1	104.4	1032.4	
910B		98	0.01	18.6	18.6	6.2	11	40.2	40.2	54.7	54.7	
	911B				18.6				40.2		212.0	future connection from Mission Village (CH171.8cfs)
912B		98	0.79	2.9	21.5	5.9	6		47.5			
	913AB				444.2				950.1		1121.9	
	914A				444.2				961.9	950.1	1046.6 1121.9	
920A		98	0.95	3.4	3.4	6	5	11.0	11.0		49.9	future connection from Entrada (CH38.9cfs)
921B		98	0.01	9.4	9.4	6.1	11	20.3	20.3	27.6	27.6	
923A	923AB				12.8				30.7		51.0	
922A		98	0.7	5.8	18.6	6	6	16.7	46.8		56.2	
924A		98	0.95	1.2	19.8	6	5	3.5	50.3		59.9	per approved DCR for Entrada
930A		98	0.1	1.8	1.8	6	9	4.1	4.1		4.1	
931A		98	0.95	1.2	3	6	6	3.5	7.6		7.6	



SECTION A-A
MAGIC MOUNTAIN PARKWAY



SECTION B-B
MAGIC MOUNTAIN PARKWAY

NORTH

FEET 100' 50' 0 100' 200'
INCHES 1 1/2 0 2

REVISIONS

NO.	DATE

PREPARED BY:
HUNSAKER & ASSOCIATES IRVINE, INC.
PLANNING • ENGINEERING • SURVEYING
30074 Avenue 14th, Suite #203 • Valencia, CA 91355
(661) 799-0310 • FAX (661) 799-0311

OWNER/DEVELOPER:
NEWHALL LAND
25124 SPRINGFIELD CT. #300
SANTA CLARITA, CA 91355
TELEPHONE: (661) 255-4000
REPRESENTATIVE: BILL SCHMING

MISSION VILLAGE TR. 61105
PROPOSED HYDROLOGY MAP FOR
MAGIC MOUNTAIN DEEDED STREET 542
ROUGH GRADING
LOS ANGELES COUNTY
DEPARTMENT OF PUBLIC WORKS

PERMIT NO.

SHEET 1
OF 1

12/26/2017
JASON W. HUNSAKER

D-11: PD 1052

N. 4,265,000 | N. 4,266,000 | N. 4,267,000 | N. 4,268,000 | N. 4,269,000

E. 4,106,000 | E. 4,107,000 | E. 4,108,000 | E. 4,109,000

MAGIC MOUNTAIN BOUNDARY

PROP. MINE TRAIN (2)

LINE "A"

LINE "H" (2) SHEET 13

LINE "J" (2) SHEET 14

LINE "L" (4) SHEET 6

LINE "K" (3) SHEET 5

LINE "G" (2) SHEET 13

LINE "E" SHEET 13

LINE "I" (2) SHEET 14

SHEET 4 | SHEET 5 | SHEET 6 | SHEET 7 | SHEET 3

GRADED DRAINAGE CHANNEL PER MAGIC MOUNTAIN GRADING PLAN C-2

DEBRIS BASIN

MAGIC MOUNTAIN PARK

LINE "D" SHEET 13

LINE "C"

SHEET 12 | SHEET 11

CRUSHED ROCK SURFACE PARKING AREA

GRADED DRAINAGE CHANNEL PER MAGIC MOUNTAIN GRADING PLAN C-2

LINE N (5)

LINE M (5)

PAVED PARKING AREA

LINE "B"

LINE "F" SHEET 14

SHEET 9 | SHEET 8 | SHEET 10

GRADED DRAINAGE CHANNEL PER MAGIC MOUNTAIN GRADING PLAN C-3

(FUTURE)

HENRY MAYO DR.

P.D. Nº 1038

P.D. Nº 1038

RIVER

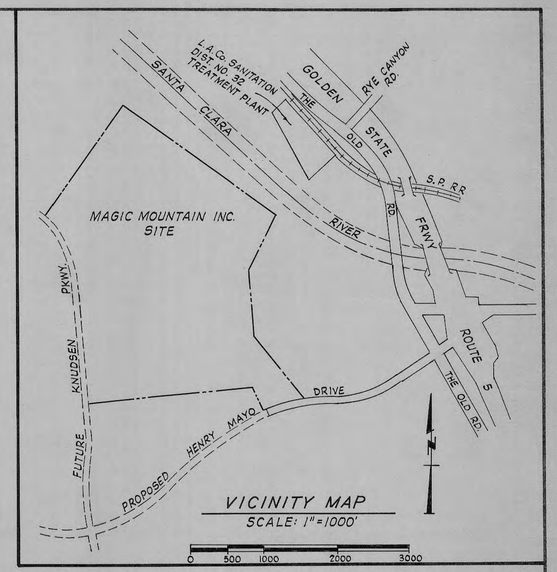
CLARA

SANTA

INDEX MAP

SCALE: 1" = 200'

0 100 200 300 400 600 800



VICINITY MAP

SCALE: 1"=1000'

0 500 1000 2000 3000

NOTE: THIS DRAWING IS ATTACHED TO AND MADE PART OF PERMIT NO. FCDP2019000290 . ANY DEVIATION FROM THE ATTACHED DRAWING WITHOUT WRITTEN AUTHORIZATION FROM THIS DEPARTMENT WILL VOID THIS PERMIT.

INDEX OF DRAWINGS

SHEET NO.	TITLE
1	VICINITY MAP, INDEX MAP, INDEX OF DRAWINGS.
2	GENERAL NOTES, STANDARD PLANS, HYDRAULIC ELEMENTS.
3	LINE "A STA. 3+45.00 TO STA. 12+00.00 PLAN & PROFILE
4	" STA. 12+00.00 TO STA. 24+00.00 "
5	" STA. 24+00.00 TO STA. 36+00.00 "
6	" STA. 36+00.00 TO STA. 47+23.60 "
7	" STA. 47+23.60 TO STA. 50+00.00 "
8	LINE "B" STA. 2+00.00 TO STA. 11+47.74 "
9	" STA. 11+47.74 TO STA. 23+00.00 "
10	" STA. 23+00.00 TO STA. 32+15.43 "
11	LINE "C" STA. 0+00.00 TO STA. 12+43.96 "
12	" STA. 12+43.96 TO STA. 23+48.00 (1) "
13	LINE "D" STA. 0+00.00 TO STA. 1+61.22 "
	LINE "E" STA. 0+00.00 TO STA 0+45.00 "
14	LINE "F" STA. 0+00.00 TO STA. 2+[illegible].00 (1) "
15	TYPICAL STRUCTURAL SECTIONS AND DETAILS
16	MISCELLANEOUS STRUCTURAL DETAILS

BENCH MARK: L.A.C.R.D. B.M. BL. 1774

Road B.M. tag S. Curb of Traffic Island 15' N. of ℄ S. Roadway Henry Mayo Drive & 70' W. of ℄ Golden State Frwy Bridge B 53-1625 Elev. 1078.072'

Newhall Quad. 1965

Andrew L. Haas R.C.E. Nº 12607

DATE: 8-24-70

P.D. NO. 1052

DATE	REVISION	REVISED BY:	DATE	APPROVED BY:
3-4-77	(3) ADDED LINE "K" ON INDEX MAP REMOVED 91'OF 36" S.D. @ END OF LINE C	Valcon Inc. R.C.E. 13696	3/22/77	H. J. Steinbeck
11-11-76	(2) ADDED LINE "L" ON INDEX MAP	VALCON INC. R.C.E. 13696	11/23/76	Howard C. Blazer
11-1-70	(1) REVISE LOCATION OF LINE "F", STATIONS OF LINE "C" AND "E"	Andrew L. Haas	11/6/70	L. Ignacio
11-12-74	(2) ADDED NINE TRAIN, LINES "G", "H", "I" & "J" ON INDEX MAP	Valcon Inc. RCE13696	11/28/75	Howard C. Blazer
9-23-76	(3) ADDED LINE "K" ON INDEX MAP	Valcon, Inc. R.C.E. 13696	11/8/76	Howard C. Blazer

STORMS & LOWE CONSULTING ENGINEERS

OFFICE OF THE COUNTY ENGINEER DESIGN DIVISION

STORMS & LOWE Consulting Engineers CIVIL ENGINEERS 3329 WEST VERNON AVENUE LOS ANGELES 8, CALIFORNIA PHONE ANDROMEDA 5-6431 LAS VEGAS, NEVADA 384 C. TWAIN 735-1484

R. DUELL & ASSOCIATES PLANNING DESIGN ARCHITECTURE 2932 WILSHIRE BLVD., SANTA MONICA, CALIFORNIA

DATE:	SCALE:	DRAWN BY:	CHECKED BY:
8-24-70	AS SHOWN	G.E.R.	J.N.O.

MAGIC MOUNTAIN STORM DRAIN
VALENCIA CALIFORNIA

VICINITY MAP, INDEX MAP, INDEX OF DRAWINGS

COUNTY OF LOS ANGELES, CALIFORNIA
JOHN A. LAMBIE COUNTY ENGINEER

DESIGN DIVISION

APPROVED BY: Carroll D. Smith DIVISION ENGINEER DATE: 10-7-70

CHECKED BY: L. Ignacio R.C.E. NO 11786 OFFICE OF COUNTY ENGINEER DATE: 10-7-70

SHEET 1 OF 16

HYDRAULIC ELEMENTS

LINE	STATION	TO STATION	* Q 25 (c.f.s.)
"A"	50+00.00	28+12.00	1900
	28+12.00	27+50.00	1946
	27+50.00	16+00.00	2038
	16+00.00	6+30.17	2106
	6+30.17	3+45.00	2233
"B"	32+15.43	22+17.98	1160
	22+17.98 (2)	13+80.00	1540
	13+80.00	4+55.81	1640
	4+55.81	2+00.00	1756
"C"	~~22+57.00~~	~~21+19.00~~	~~21.4~~
	~~21+19.00~~	~~19+40.00~~	~~20.7~~
	19+40.00	16+53.00	67
	16+53.00	15+60.00	89
	15+60.00	11+68.00	103
	11+68.00	0+00.00	131
"D"	1+61.22	0+00.00	155
"E"	0+45.00	0+00.00	6 (4)
"F"	2+67.00 (2)	0+82.00	502
	0+82.00	0+00.00	509
"G"	0+79.00	0+00.00	36 (4)

* Design Flows based on 25 year Storm Frequency.

"H"	0+37.00	0+00.00	7 (4)
"I"	0+38.00	0+00.00	5 (4)
"J"	0+17.00	0+00.00	2.5 (4)

"K"	0+20.00	0+00.00	12.1 (4) (5)
"L"	0+20.00	0+00.00	5.5 (4)
"M"	1+40.00	0+00.00	29.3 (4)
"N"	0+83.00	0+00.00	31.4 (4)

LIST OF STANDARD PLANS

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT

Bedding Details _____ 2 - D177
Removable Protection Bar _____ 2 - D175
C.B. No. 5 _____ 2 - D164
C.B. No. 5A _____ 2 - D195
M.H. No. 2 _____ 2 - D184
J.S. No. 1 _____ 2 - D189
J.S. No. 2 _____ 2 - D112
T.S. No. 3 _____ 2 - D188
Standard Drop Step _____ 2 - D96
Conc. Rings, Reducer for manhole _____ 2 - D107
Manhole frame and cover _____ 2 - D181
Catch basin reinforcement _____ 2 - D172
Frame & grating for catch basin _____ 2 - D227
J.S. No. 3 _____ 2 D191
R/W Chain link fence & gate details _____ 2 D178
Headwall fence & gate details _____ 2 D-180

LOS ANGELES COUNTY ENGINEER

Pipe bedding for storm drains _____ D-54
Protection barrier No. 4 _____ D-70
Inlet & Outlet protection _____ D-56
Protection barrier No. 1 _____ D-67
Protection barrier No. 2 _____ D-68

LOS ANGELES COUNTY ROAD DEPT.

Driveway details _____ 36-01

NOTE: THIS DRAWING IS ATTACHED TO AND MADE PART OF PERMIT NO. FCDP2019000290 . ANY DEVIATION FROM THE ATTACHED DRAWING WITHOUT WRITTEN AUTHORIZATION FROM THIS DEPARTMENT WILL VOID THIS PERMIT.

GENERAL NOTES

1. Elevations are in feet above U.S.G.S. mean sea level datum of 1929.
2. All work shall be done in accordance with "Standard Specifications for Public Works Construction", 1970 edition, and shall be prosecuted only in the presence of the County Engineer.
3. Approval of this plan by the County of Los Angeles does not constitute a representation as to the accuracy of the location, or existence or nonexistence of any underground utility, pipe or structure within the limits of this project.
4. All reinforced concrete pipe shall be bedded in accordance with Case Ad bedding per D-54, unless otherwise specified.
5. All manhole covers not in street paving shall be provided with Allen socket set screw locking devices. The Contractor shall drill and tap two holes to a depth of 1 inch at 90 degrees to pick hole and install 3/4 inch by 3/4 Allen socket set screws.
6. All pipe shall be placed in a trench in natural ground and/or compacted fill. The ground level before the trenching shall be at least 3 feet above top of pipe elevation, or at finish surface elevation, whichever is less. All backfill in easements shall be compacted to the density required by the grading plan.
7. A soils engineer shall certify that all fills and backfills over underground storm drains have been compacted or consolidated to a 90% density. This certification shall be submitted to the County Engineer prior to acceptance of the work by the County
8. The contractor's attention is directed to Section 7-10.4.1 of the Standard Specifications for Public Works Construction in regard to safety orders. The contractor shall conform to the "Minimum Public Safety Requirements" as shown on Los Angeles County Engineer Standard S-2.
9. The contractor shall notify the Construction Division by telephone, 629-4747, extension 81551, at least 24 hours before starting any work under this contract.
10. This storm drain will not be accepted for maintenance until the system is cleaned to the satisfaction of the County Engineer.
11. (△) The channel lining shall be concrete or gunite or "shotcrete". If shotcrete is used the following shall apply: (a) The nozzle pressure shall be 80 p.s.i minimum, (b) The minimum 28 day compression strength shall be 3500 p.s.i., (c) The min. thickness shall be 5 inches, (d) Coarse aggregate shall not exceed 28% of the mix and, if used shall be No. 4 crushed aggregate, (e) The finished surface for "shotcrete" shall have the same "n" factor (roughness) as broom finish gunite.

PRIVATE ENGINEERS NOTICE TO CONTRACTORS

The existence and location of any underground utility pipes or structures shown on these plans are obtained by a search of the available records. To the best of our knowledge there are no existing utilities except as shown on this map.
The contractor is required to take due precautionary measures to protect the utility lines shown and any other lines not of record or not shown on this drawing.

Andrew L. Strauss — Registered Civil Engineer No. 12607

August 24, 1970 — Date

CONCRETE & REINFORCEMENT NOTES

1. All concrete shall be Portland cement concrete with an ultimate 28 day compressive strength of 3000 p.s.i.
2. Finish all exposed edges with 3/4" chamfers.
3. Dimensions are from face of concrete to center of reinforcing bars unless otherwise specified.
4. All steel shown adjacent to a face of concrete shall be placed 2-1/2 inches from the concrete face unless otherwise shown.
5. Longitudinal steel shall be continuous and extend through all construction joints except transverse joints in open channels and around all corners unless otherwise shown.
6. All steel that is to be continuous shall have a minimum lap at splices of 30 bar diameters, or 18" whichever is greater.
7. At the beginning and end of all pours a layer of reinforcement shall be placed within 3 inches of the transverse construction joints.
8. Transverse reinforcement and transverse joints shall be placed at right angles (or radial) to conduit center line unless otherwise shown.
9. Unless otherwise shown, concrete dimensions shall be measured vertically or horizontally and parallel or at right angles (or radial) to the center line of construction.
10. Unless otherwise shown, transverse joint keyways in both slabs and walls shall be placed at the end of each pour but the spacing thereof shall not exceed 50 feet nor be less than 10 feet.
11. Transverse construction joints shall not be placed within 30 inches of manhole or junction structure openings.
12. All pipe shall be embedded a minimum of 5 inches into headwalls or other structures, unless specified otherwise.
13. All construction joints in the footing of slabs and walls shall be in the same plane. No staggering of joints will be permitted.
14. No concrete shall be placed until forms and reinforcing steel have been placed, inspected and approved.
15. Reinforcement shall be deformed bars, per A.S.T.M. A-615 Grade 60, and A.S.T.M. A-305-50T.
16. All bar bends and hooks shall conform to the American Concrete Institute "Manual of Standard Practice".

RIP-RAP NOTES

1. Rock for grouted rip-rap shall conform to State of California Division of Highways Standard Specifications as last revised for Grouted Rock Slope Protection. Rock shall be 1/2 ton class and shall be placed in accordance with Method B Placement. The largest dimension shall not exceed 3 times the smallest dimension.
2. There shall be a grout bed of at least 2 inches beneath the first layer of rock. All the voids between the rocks shall be filled with grout. Maximum spacing between rocks shall be 2 inches.
3. Surface rocks shall project 1/3 to 1/4 their diameter above the grout surface.

P.D. NO. 1052

Andrew L. Strauss R.C.E. Nº 12607
DATE: 8-24-70

COUNTY OF LOS ANGELES, CALIFORNIA
JOHN A. LAMBIE — COUNTY ENGINEER

DESIGN DIVISION

APPROVED BY: _____ DIVISION ENGINEER DATE: _____

CHECKED BY: A. Symes R.C.E. NO. 11786 OFFICE OF COUNTY ENGINEER DATE: 10-7-70

DATE	REVISION	REVISED BY:	DATE	APPROVED BY:
3-4-77	(6) ADDED Qes FOR LINE 'M' & 'N'	Volcon Inc RCE 13696	3/22/77	H. J. Steinbeck
11-11-76	(5) ADDED Qes FOR LINE 'L' & REVISED Qes FOR LINE 'K'	Volcon Inc RCE 13696	11/23/76	Edward C. Harris

STORMS & LOWE CONSULTING ENGINEERS

DATE	REVISION	REVISED BY:	DATE	APPROVED BY:
11-2-70	(2) REVISE STATIONS OF HYDRAULIC ELEMENTS TO CONFORM TO REALIGNMENTS	Andrew L. Strauss R.C.E. 12607	11/6/70	A. Symes
11-12-74	(3) REVISED Qes IN LINE 'E' AND ADDED LINE 'G', 'H', 'I' & 'J'	Volcon Inc RCE 13696	11/08/75	Edward C. Harris
9-23-76	(4) ADDED Qes FOR LINE K	Volcon, Inc R.C.E. 13696	10/1/76	Edward C. Harris

OFFICE OF THE COUNTY ENGINEER DESIGN DIVISION

STORMS & LOWE
Consulting Engineers
2829 WEST VERNON AVENUE
LOS ANGELES 8, CALIFORNIA
PHONE AXminster 5-6431
LAS VEGAS, NEVADA
522 E. TWAIN 735-4466

R. DUELL & ASSOCIATES
PLANNING DESIGN ARCHITECTURE
2932 WILSHIRE BLVD., SANTA MONICA, CALIFORNIA

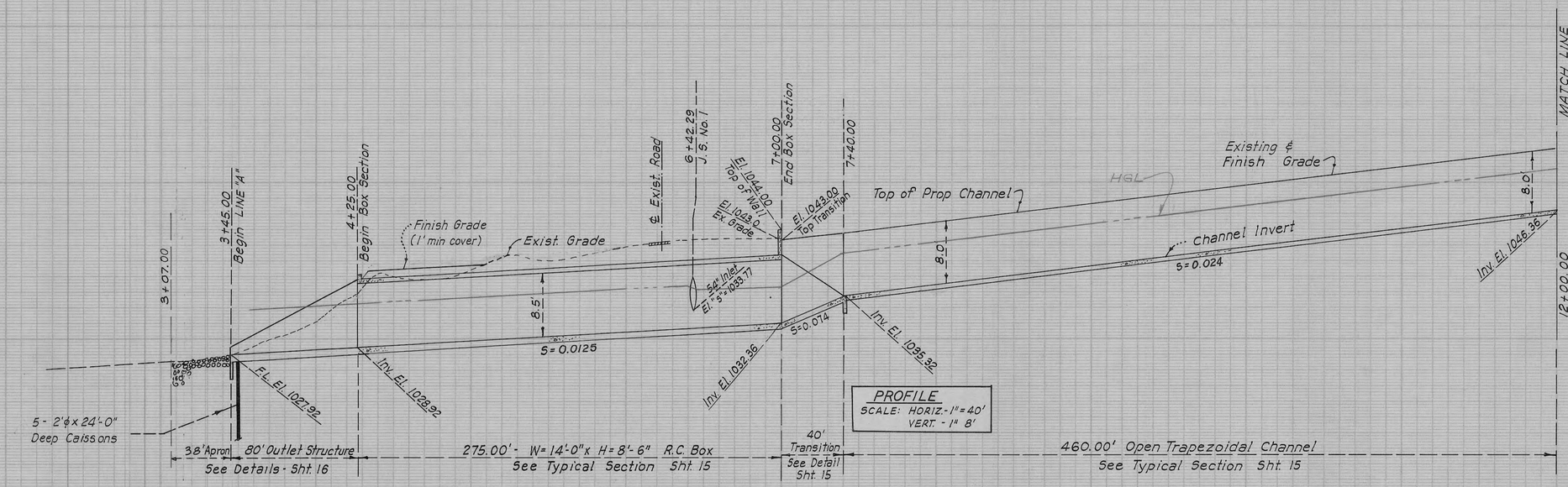
REVISION	DATE:	SCALE:	DRAWN BY:	CHECKED BY:
(△) ADD CONCRETE OR SHOTCRETE ALT. 9-30-70	8-24-70	NONE	G.E.R.	J.N.O.

MAGIC MOUNTAIN STORM DRAIN
VALENCIA — CALIFORNIA

GENERAL NOTES, STANDARD PLANS, HYDRAULIC ELEMENTS

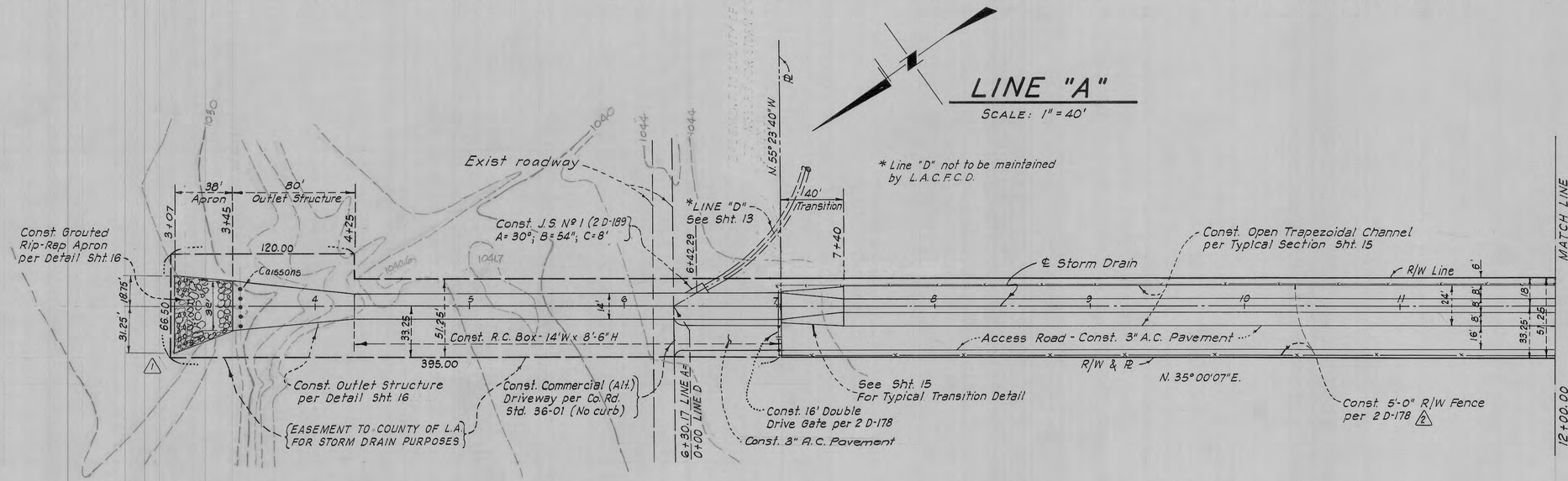
SHEET 2 OF 16

DOUBLE SCALE



PROFILE
SCALE: HORIZ. - 1" = 40'
VERT. - 1" 8'

LINE "A"
SCALE: 1" = 40'



ANTA CLARA RIVER

NOTE: THIS DRAWING IS ATTACHED TO AND MADE PART OF PERMIT NO. FCDP2019000290. ANY DEVIATION FROM THE ATTACHED DRAWING WITHOUT WRITTEN AUTHORIZATION FROM THIS DEPARTMENT WILL VOID THIS PERMIT.

P.D. NO. 1052

Andrew L. Haas R.C.E. Nº 12607
DATE: 8-24-70

COUNTY OF LOS ANGELES, CALIFORNIA
JOHN A. LAMBIE, COUNTY ENGINEER
DESIGN DIVISION
CHECKED BY: J. Haas R.C.E. NO. 11786 DATE: 10-7-70
OFFICE OF COUNTY ENGINEER

STORMS & LOWE
Consulting Engineers
JOB. NO.
2829 WEST VERNON AVENUE
LOS ANGELES 8, CALIFORNIA
PHONE AXMINSTER 5-6431
LAS VEGAS, NEVADA
522 E. TWAIN 755-4468

R. DUELL & ASSOCIATES
PLANNING DESIGN ARCHITECTURE
2932 WILSHIRE BLVD., SANTA MONICA, CALIFORNIA

REVISIONS			
1	REVISE RIP-RAP APRON DIMENSIONS	9-30-70	
2	REVISE FENCE LOCATION ON E-SIDE	9-30-70	

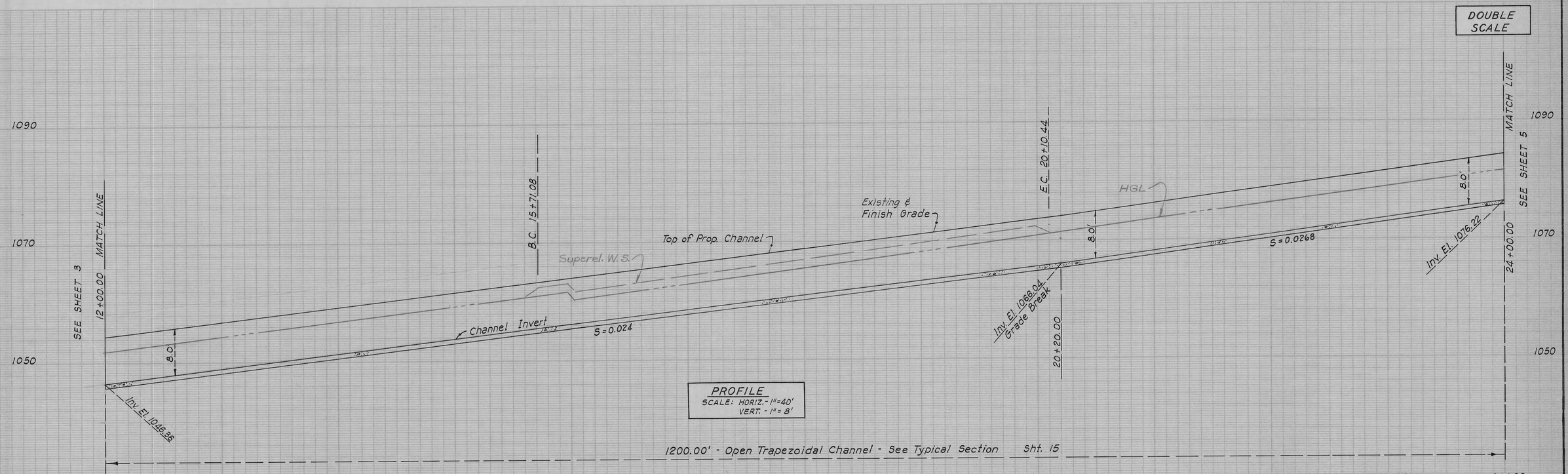
DATE:	SCALE:	DRAWN BY:	CHECKED BY:
8-24-70	AS SHOWN	G.E.R.	J.N.O.

MAGIC MOUNTAIN STORM DRAIN
VALENCIA CALIFORNIA

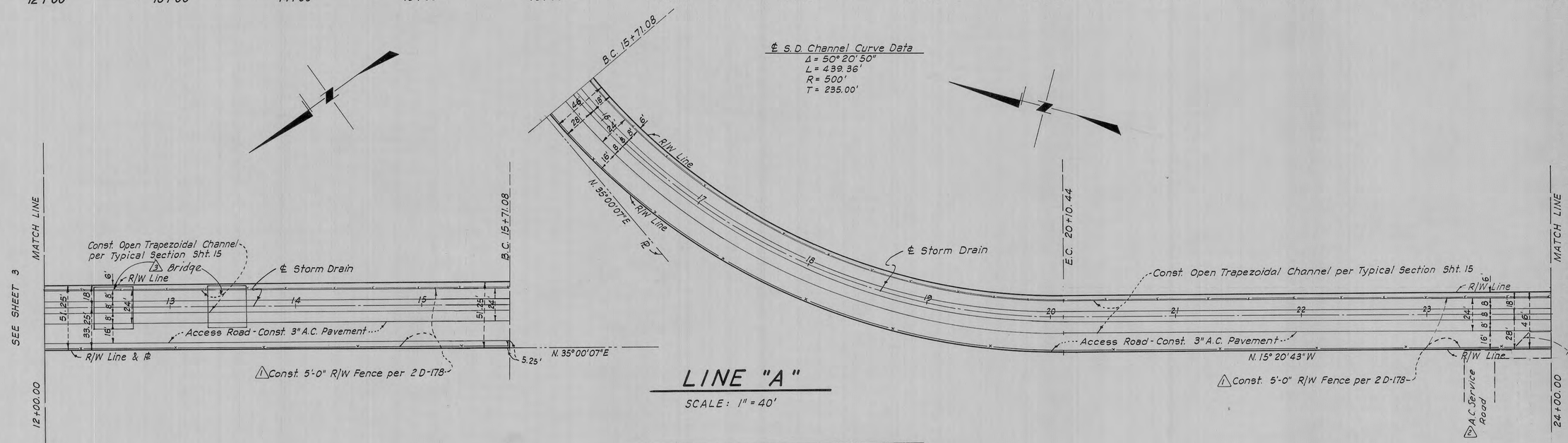
LINE "A"
PLAN AND PROFILE STA. 3+45.00 TO STA. 12+00.00

SHEET 3 OF 16

DOUBLE SCALE



PROFILE
SCALE: HORIZ. - 1"=40'
VERT. - 1"= 8'



LINE "A"
SCALE: 1" = 40'

No.	REVISION	REVISED BY	APPROVED BY	DATE
2	ADDED A.C.	Valcon, Inc. RCE 13636	Howard C. Gray	1/28/75
3	ADDED BRIDGES	Valcon, Inc. RCE 13636		

NOTE: THIS DRAWING IS ATTACHED TO AND MADE PART OF PERMIT NO. FCDP2019000290. ANY DEVIATION FROM THE ATTACHED DRAWING WITHOUT WRITTEN AUTHORIZATION FROM THIS DEPARTMENT WILL VOID THIS PERMIT.

Andrew L. Storms R.C.E. N° 12607
DATE: 8-24-70

STORMS & LOWE
Consulting Engineers
2829 WEST VERNON AVENUE
LOS ANGELES 8, CALIFORNIA
PHONE: AXminster 5-6431
LAS VEGAS, NEVADA
922 E. TWAIN 735-4466

R. DUELL & ASSOCIATES
PLANNING DESIGN ARCHITECTURE
2932 WILSHIRE BLVD., SANTA MONICA, CALIFORNIA

REVISION: ⚠1 REVISE FENCE LOCATION ON EAST SIDE 9-30-70

DATE:	SCALE:	DRAWN BY:	CHECKED BY:
8-24-70	AS SHOWN	G.E.R.	J.N.O.

MAGIC MOUNTAIN STORM DRAIN
VALENCIA CALIFORNIA
LINE "A"
PLAN AND PROFILE STA.12+00.00 TO STA.24+00.00

P.D. NO. 1052

COUNTY OF LOS ANGELES, CALIFORNIA
JOHN A. LAMBIE COUNTY ENGINEER
DESIGN DIVISION
CHECKED BY: A. Gomez R.C.E. NO 11786 DATE: 10-7-70
OFFICE OF COUNTY ENGINEER

SHEET 4 OF 16

P-6-133

DOUBLE SCALE

1110 / 1090 / 1070

J.S.-Type "A"

MATCH LINE

SEE SHEET 4

B.C. 25+26.63

E.C. 28+04.71 LINE "E"

28+12.21 J.S.-Type "A"

28+64.88 J.S.-Type "A"

Superel. W.S.

Top of Prop. Channel

Existing & Finish Grade

HGL

B.C. 33+20.60

34+80.00 J.S.-Type "A"

E.C. 35+22.89

Superel. W.S.

12" Inlet El. S=1109.50

8.0'

36+00.00

Inv. El. 1108.38

SEE SHEET 6

MATCH LINE

18" Inlet El. S=1077.22

8.0

27" Inlet El. S=1090.76

30" Inlet El. S=1089.56

Channel Invert

S=0.0268

Inv. El. 1076.22

24+00.00

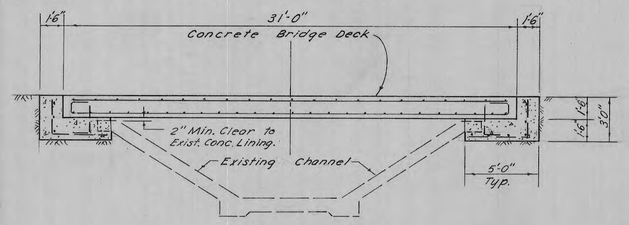
NOTE: THIS DRAWING IS ATTACHED TO AND MADE PART OF PERMIT NO. FCDP2019000290. ANY DEVIATION FROM THE ATTACHED DRAWING WITHOUT WRITTEN AUTHORIZATION FROM THIS DEPARTMENT WILL VOID THIS PERMIT.

PROFILE

SCALE: HORIZ. - 1"=40'
VERT. - 1"= 8'

1200.00' - Open Trapezoidal Channel - See Typical Section Sht. 15

24+00 25+00 26+00 27+00 28+00 29+00 30+00 31+00 32+00 33+00 34+00 35+00 36+00



BRIDGE SECTION

For Information Only.
Bridge to be Constructed per Bridge Plans.
Not to be Maintained by L.A.C.F.C.D.

LINE "A"

SCALE: 1" = 40'

28+04.71 = 0+00 LINE "E"

Const. J.S.-Type "A" A=45°, See Detail Sht. 16

℄ Storm Drain

LINE "E" See Sht. 13

Line "G" See Sht. 13 (2)

Const. Open Trapezoidal Channel per Typical Section Sht. 15

Const. 16' Double Drive Gate Per 2D-178

B.C. 33+46.25

℄ S.D. Channel Curve Data
Δ = 23°10'49"
L = 202.29'
R = 500'
T = 102.55'

Const. J.S.-Type "A" A=45° See Detail Sht. 16

Access Road (2)

Const. 3" Pvmt

Extension by others to Lake Drain

Const. 12'-12" R.C.P. stub Connection to Lake Drain by others (2)

R.W. Line (2)

35+22.89 E.C.

34+80.00

36+00.00

SEE SHEET 6

MATCH LINE

Const. 5'0" Fence (2) Per 2D-178

Utility Lines

R/W Line

Bridge (2)

Const. 5'0" Fence Per 2D-178 (2)

Const. 16' Double Drive Gate Per 2D-178 (2)

Access Road - Const. 3" A.C. Pavement

N. 16°31'11"E.

Const. 5'-0" R/W Fence per 2D-178 (1)

Const. 16' Double Drive Gate Per 2D-178 (2)

Const. J.S. Type "A" Δ=45° See Detail Sht. 16 (2)

28+04.71 E.C.

28+12.21

28+60.00 = 0+100 Line "G"

28+64.88

Const. 5' Fence Per 2D-178

Bridge (2)

Railroad Tracks

N. 6°39'38" W.

Relocated 5' High Fencing

R/W Line (2)

℄ S.D. Channel Curve Data
Δ = 31°51'54"
L = 278.08'
R = 500'
T = 142.74'

24+00

SEE SHEET 4

MATCH LINE

R/W Line

N. 15°20'43" W.

24+65.00

B.C. 25+26.63

25+78.50

Prop. Retaining Wall (2)
Line "H" See Sht. 13 (2)
Const. 18" R.C.P. - Not to be Maintained by the Los Angeles County Flood Control District

Const. J.S. Type "A" Δ=45° (2)

R/W Line & R.

Relocated fence

Utility Lines

16'

1' Min.

(Const. 3" A.C. Pvmt between (3)

12"

1/4" Per Ft.

2"x4" Redwood Header

24'

8' 8' 8'

Relocated Fence

R/W Line

6'

Remove Exist. 3" A.C. Pvmt. between Approx. Sta. 33+73 And 48+67 (2)

For Channel Construction Data See Typical Trapezoidal Channel Section on Sheet No. 15

Exist. 3" A.C. Pvmt.

(2) TYPICAL CHANNEL SECTION AND ROADWAY REVISED BETWEEN APPROX STA. 33+46 AND STA. 49+11.

No.	REVISION	REVISED BY	APPROVED BY	DATE
(2)	Added R.R. Tracks, Bridge, Gates, Retaining Wall, Lines "G" & "H", Utility Lines Relocated Access Rd, R/W Lines, Fences, and Bridge Section Over Channel	Vahan Tro R.C.E. 13696	Howard C. Hays	10/6/70

Andrew L. Shaw R.C.E. N° 12607
DATE: 8-24-70

P.D. NO. 1052

COUNTY OF LOS ANGELES, CALIFORNIA
JOHN A. LAMBIE — COUNTY ENGINEER

DESIGN DIVISION

CHECKED BY: [signature] R.C.E. NO. 11786 DATE: 10-7-70
OFFICE OF COUNTY ENGINEER

STORMS & LOWE
Consulting Engineers
JOB. NO.
2622 WEST VERNON AVENUE
LOS ANGELES 8, CALIFORNIA
PHONE AXminster 5-6431
LAS VEGAS, NEVADA
522 E. TWAIN 758-4486

R. DUELL & ASSOCIATES
PLANNING DESIGN ARCHITECTURE
2932 WILSHIRE BLVD., SANTA MONICA, CALIFORNIA

REVISION: (1) REVISE FENCE LOCATION ON R. SIDE 9-30-70

DATE:	SCALE:	DRAWN BY:	CHECKED BY:
8-24-70	AS SHOWN	G.E.R.	J.N.O.

MAGIC MOUNTAIN STORM DRAIN
VALENCIA — CALIFORNIA

LINE "A"
PLAN AND PROFILE — STA. 24+00.00 TO STA. 36+00.00

SHEET 5 OF 16

DOUBLE SCALE

1150 / 1130 / 1110

SEE SHEET 5

MATCH LINE

36+00.00

8.0'

Inv. El. 1108.38

37+06 J.S. TYPE "A"

B.C. 40+22.89

Superel. W.S.

41+35 J.S. Type "A" (3)

E.C. 42+23.60

Top of Prop. Channel

Channel Invert S = 0.0268

Existing & Finish Grade

HGL

44+00.00 J.S. Type "A"

12" Inlet Elev. = 1130.82 (2)

46+05.00 J.S. Type "A"

(4) 12" Inlet Elev. = 1136.31

8.0'

B.C. 47+23.60

Inv. El. 1138.49

SEE SHEET 7

MATCH LINE

18" INLET 1117.00 INV. EL. (2)

12" ACP PER GRADING PLAN

EXIST'G CHANNEL INV. 1117.60 E. (1116.68)

N.T.S.

(4) LINE "L" ***

16" Inlet 1124.00 Inv. Elev. (3)

PROFILE
SCALE: HORIZ. - 1" = 40'
VERT. - 1" = 8'

18" A.C.P. Per Grading Plan

Exist. Channel

1130 / 1125 / 1120

1124.00 Inv. (1122.22) F.L.

Line K *** (3)

1123.60' - Open Trapezoidal Channel - See Typical Section Sht. 15

36+00 37+00 38+00 39+00 40+00 41+00 42+00 43+00 44+00 45+00 46+00 47+00 48+00

LINE "A"

SCALE: 1" = 40'

℄ S.D. Channel Curve Data
Δ = 28°00'00"
L = 200.71'
R = 500'
T = 101.73'

42+23.60 E.C.

B.C. 40+22.89

LINE "K" (3) 18" A.C.P.

(3) Const. J.S. Type "A" Modified For A.C.P. Δ = 45° See Detail Sht. No. 16

*** LINE "L" (4) 12" ACP

(4) Const. J.S. Type "A" Modified For A.C.P. Δ = 45° See DETAIL ON SHEET 16

37+06 Line A 4+48 Line L

℄ Storm Drain

(2) R/W Line

Access Road - Const 3" A.C. Pavement (2)

(2) Prop. 36" Train

N. 6° 39' 38" W.

N. 29° 39' 38" W.

Relocated R/W Fencing

44+23.00

(Const. J.S. Type "A" Δ = 45° See Detail Sht. 16 (2))

Const. Open Trapezoidal Channel per Typical Section Sht. 15

Access Road - Const. 3" A.C. Pavement

* Line "I" (2) 12" R.C.P. See Sht. 14

R/W Line (2)

Line "J" * 12" R.C.P. see Sht. 14 (2)

0+00 Line "I" = 43+95.00 Line A

0+00 Line "J" = 46+00 Line A

44+00.00

46+05.00

(1) Const. 5'-0" R/W Fence per 2-D-178

MATCH LINE

SEE SHEET 7

B.C. 47+28.60

R/W Line (2)

* Lines "I" and "J" NOT TO BE MAINTAINED BY LOS ANGELES COUNTY FLOOD CONTROL DISTRICT. (2)

** LINE "K" NOT TO BE MAINTAINED BY LOS ANGELES COUNTY FLOOD CONTROL DISTRICT. (3)

*** LINE "L" NOT TO BE MAINTAINED BY LOS ANGELES COUNTY FLOOD CONTROL DISTRICT. (4)

No.	REVISION	REVISED BY	APPROVED BY	DATE
(2)	Added Train, Lines "I" & "J" Maint. Note. Relocated Access Rd., R/W Lines & Fences	Valcon Inc. [illegible] R.C.E. 13696	Edward C. Hays	1/28/75
(3)	Added Line "K", Maint. Note & Profile for Line "K"	Valcon Inc. [illegible] R.C.E. 13696	Edward C. Hays	10/8/74
(4)	ADDED LINE "L", MAINT. NOTE & PROFILE FOR LINE "L"	[illegible] R.C.E. 13696	Edward C. Hays	11/19/74

Andrew L. Graves R.C.E. No 12607
DATE: 8-24-70

P.D. NO. 1052

COUNTY OF LOS ANGELES, CALIFORNIA
JOHN A. LAMBIE — COUNTY ENGINEER

DESIGN DIVISION

CHECKED BY: [illegible] R.C.E. NO. 11786 DATE: 10-7-70
OFFICE OF COUNTY ENGINEER

NOTE: THIS DRAWING IS ATTACHED TO AND MADE PART OF PERMIT NO. FCDP2019000290. ANY DEVIATION FROM THE ATTACHED DRAWING WITHOUT WRITTEN AUTHORIZATION FROM THIS DEPARTMENT WILL VOID THIS PERMIT.

STORMS & LOWE
Consulting Engineers
JOB NO.
2829 WEST VERNON AVENUE
LOS ANGELES 8, CALIFORNIA
PHONE AXminster 5-6431
LAS VEGAS, NEVADA
522 E. TWAIN 735-4466

R. DUELL & ASSOCIATES
PLANNING DESIGN ARCHITECTURE
2932 WILSHIRE BLVD., SANTA MONICA, CALIFORNIA

DATE:	SCALE:	DRAWN BY:	CHECKED BY:
8-24-70	AS SHOWN	G.E.R.	J.N.O.

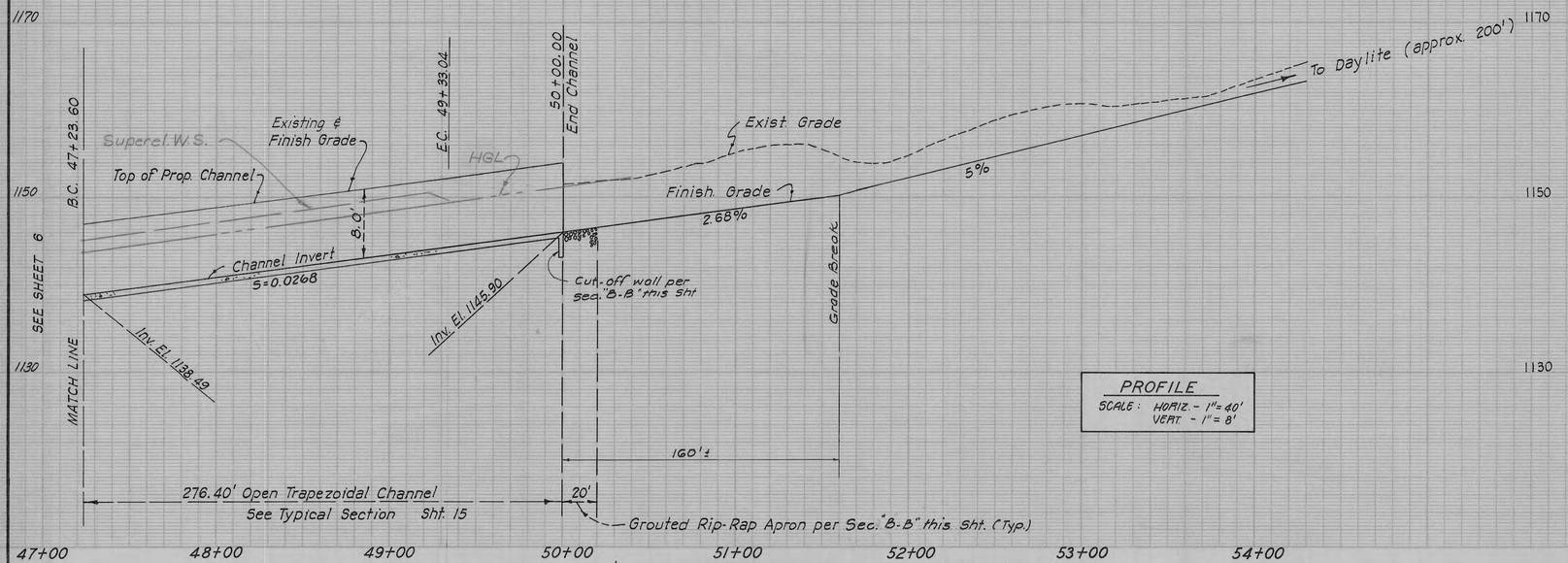
(1) REVISE FENCE LOCATION ON E. SIDE 9-30-70

MAGIC MOUNTAIN STORM DRAIN
VALENCIA — CALIFORNIA

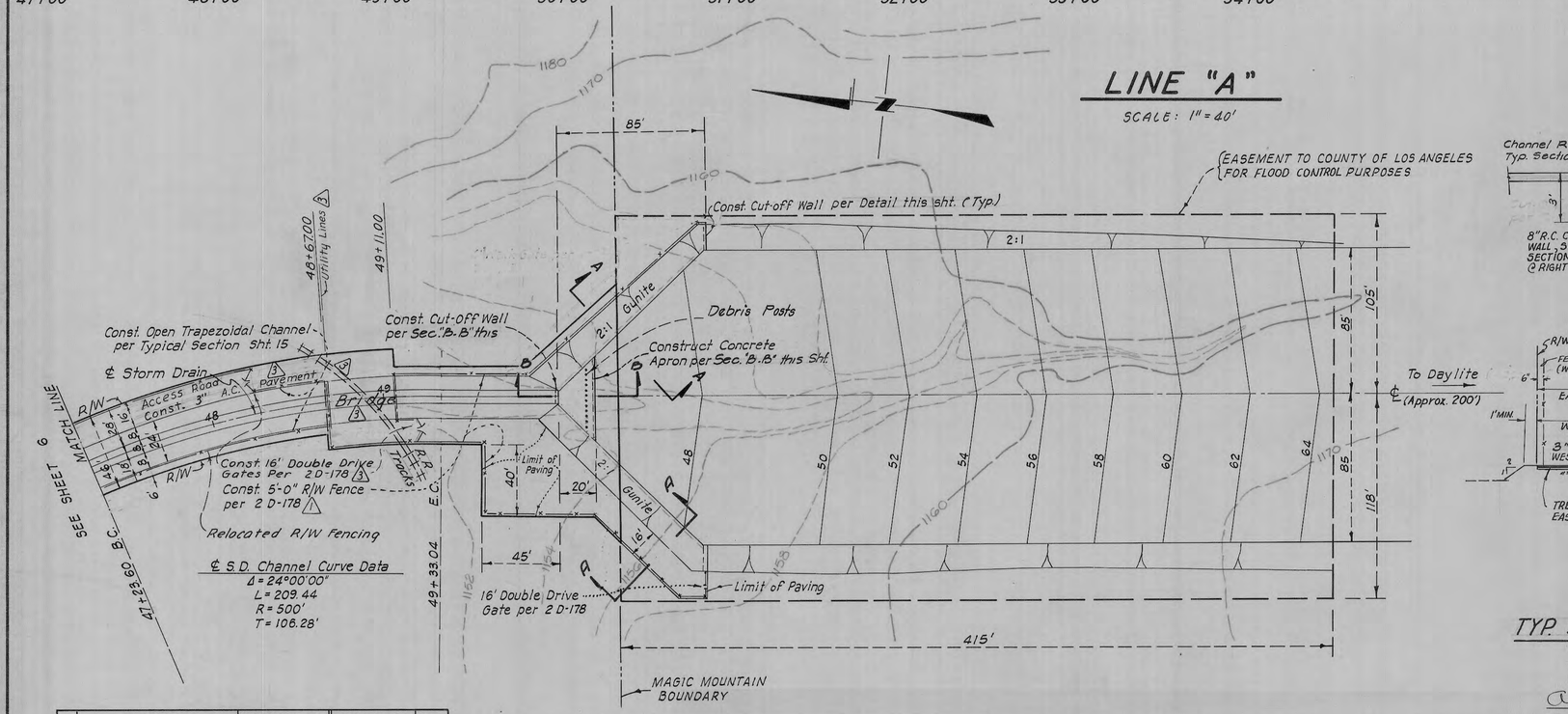
LINE "A"
PLAN AND PROFILE — STA. 36+00.00 TO STA. 47+23.60

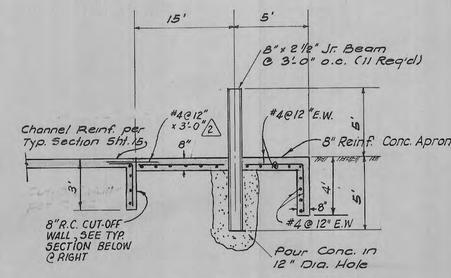
SHEET 6 OF 16

DOUBLE SCALE



PROFILE
SCALE: HORIZ. - 1"= 40'
VERT. - 1"= 8'





SECTION "B-B"
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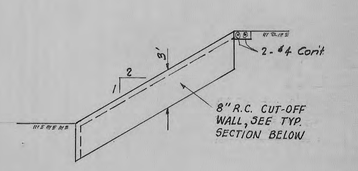
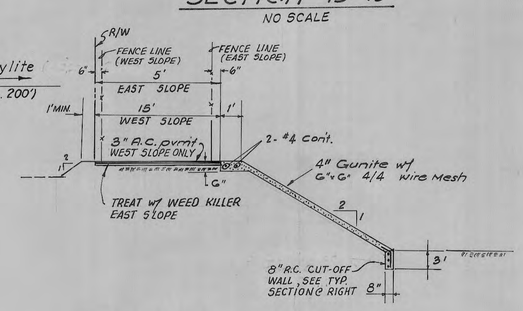
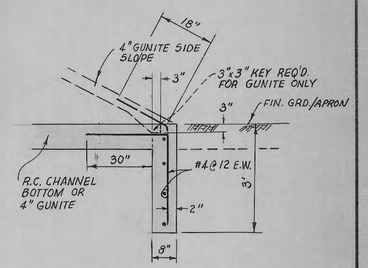


CUT-OFF WALL DETAIL
NO SCALE



TYP. SECTION "A-A"
NO SCALE



TYPICAL SECTION
(CUT-OFF WALL)
NO SCALE

NOTE: THIS DRAWING IS ATTACHED TO AND MADE PART OF PERMIT NO. FCDP2019000290. ANY DEVIATION FROM THE ATTACHED DRAWING WITHOUT WRITTEN AUTHORIZATION FROM THIS DEPARTMENT WILL VOID THIS PERMIT.

P.D. NO. 1052

No.	REVISION	REVISED BY	APPROVED BY	DATE
3	Added Train, Bridge, Gates, Utility Lines. Relocated Access Rd., R/W Lines, Fence	Valerian Tye, RCE 13696	Howard C. Hays	1/24/75

STORMS & LOWE
Consulting Engineers
2829 WEST VERNON AVENUE
LOS ANGELES 8, CALIFORNIA
PHONE AXminster 5-6431
LAS VEGAS, NEVADA
522 E. TWAIN 735-4466

R. DUELL & ASSOCIATES
PLANNING DESIGN ARCHITECTURE
2932 WILSHIRE BLVD., SANTA MONICA, CALIFORNIA

REVISION:			
1	AS WISE FENCE LOCATION ON E. SIDE	9-30-70	
2	ADDED STRUCTURAL DETAIL-N/A	9-30-70	
DATE: 8-24-70	SCALE: AS SHOWN	DRAWN BY: B.C. & G.E.R.	CHECKED BY: J.N.O.

Andrew L. Haas R.C.E. Nº 12607
DATE: 8-24-70

MAGIC MOUNTAIN STORM DRAIN
VALENCIA CALIFORNIA

LINE "A"
PLAN AND PROFILE STA. 47+23.60 TO STA. 50+00.00

COUNTY OF LOS ANGELES, CALIFORNIA
JOHN A. LAMBIE COUNTY ENGINEER

DESIGN DIVISION

CHECKED BY: J. Spencer R.C.E. NO. 11786 DATE: 10-7-70
OFFICE OF COUNTY ENGINEER

SHEET 7 OF 16

P-5-133

DOUBLE SCALE

1090
1070
1050

3+50
4+00
4+30
2+00
2+20
2+45
1+20

El. 1075.00 Top wall
El. 1074.0 ± Ex. Grd.
Ex. Grd.
El. 1074.00 Top Transition
4+74.86 J.& T. I7½" "B"
B.C. 5+21.10
E.C. 6+38.77
Top of Prop Channel
Superel. W.S.
Existing & Finish Grade
HGL
7.0'
Channel Invert
S = 0.032
Inv. El. 1086.00
1147.14
MATCH LINE
SEE SHEET 9

48" Inlet
El. "S" = 1066.46
S = 0.065
S = 0.040
Inv. El. 1063.99
Inv. El. 1060.92±
Inv. El. 1062.04
Inv. El. 1060.02
Inv. El. 1057.1±
4+13 10" C.I.P. Sewer
3+53 18" C.I.P. Sewer
Protect exist sewer per L.A.Co.F.C.D. 2-D 251, case II

20' Outlet Structure
80' Apron
See Details Sht. 16
Begin Line "B"
S = 0.210
Inv. El. 1084.28
Inv. El. 1084.82
Exist. Ground
S = 0.0125
5-2'ϕ x 24' Deep Caissons
W = 12'-0" x D = 8'-0" R.C. Box per typical Section Sht. 15
30'
Transition - See Detail Sht. 15
1147.74' Open Trapezoidal Channel See Typical Section Sht. 15

PROFILE
SCALE: HORIZ. 1"=40'
VERT 1"=8'

0+00 1+00 2+00 3+00 4+00 5+00 6+00 7+00 8+00 9+00 10+00 11+00 12+00

LINE "B"

SCALE: 1" = 40'

℄ S.D. Channel Curve Data
Δ = 6°44'31"
L = 117.67'
R = 1000'
T = 58.90'

20' Outlet Structure
80' Apron
Const. 180'-12'W x 8'D R.C. Box
30' Transition
1040
1070
1+20
2+00
2+20
EASEMENT TO COUNTY OF LOS ANGELES FOR STORM DRAIN PURPOSES
282'
Caissons
2:1
Const. 3" A.C. PAVEMENT
Const. 16' Double Drive Gate per 2 D-178 See Sht. 15 for Typical Transition
4+00.00
4+30.00
4+74.86
5+21.10 B.C.
6+38.77 E.C.
R/W ℄ ℘
℄ Storm Drain
1½:1
Const. Open Trapezoidal Channel per Typical Section Sht. 15
R/W Line
Access Road - Const. 3" A.C. Pavement
60'
45'
15'
89'
30'
42'
Const. Outlet Structure and Grouted Rip-Rap Apron per details Sht. 16 ⚠1
Const. Commercial (AH) Dwy. per Co. Rd. Std. 3C-01 (No Curb)
S. 27°54'41"W.
4+55.81 LINE "B" = 0+00 LINE "C"
LINE "C"* See Sht. 11
Const. J.S. - Type "B" A = 30° See Detail Sht. 16
Const. 5'-0" R/W Fence per 2 D-178 ⚠2
S 21°10'10"W
MAGIC MOUNTAIN BOUNDARY
11+47.74 B.C.
MATCH LINE
SEE SHEET 9

* LINE "C" not to be maintained by L.A.C.F.C.D.

P.D. NO. 1052

NOTE: THIS DRAWING IS ATTACHED TO AND MADE PART OF PERMIT NO. FCDP2019000290. ANY DEVIATION FROM THE ATTACHED DRAWING WITHOUT WRITTEN AUTHORIZATION FROM THIS DEPARTMENT WILL VOID THIS PERMIT.

Andrew S. Haar R.C.E. Nº 12607
DATE: 8-24-70

STORMS & LOWE Consulting Engineers
JOB NO.
2829 WEST VERNON AVENUE
LOS ANGELES 8, CALIFORNIA
PHONE AXminster 5-6431
LAS VEGAS, NEVADA
522 E. TWAIN 733-4466

R. DUELL & ASSOCIATES
PLANNING DESIGN ARCHITECTURE
2932 WILSHIRE BLVD., SANTA MONICA, CALIFORNIA

REVISION:				
⚠1 REVISE OUTLET APRON DIMENSIONS	9-30-70			
⚠2 REVISE FENCE LOCATION PER N.R.D.R.	9-30-70			
DATE:	SCALE:	DRAWN BY:	CHECKED BY:	
8-24-70	AS SHOWN	R.G.-G.E.R.	J.N.O.	

MAGIC MOUNTAIN STORM DRAIN
VALENCIA CALIFORNIA

LINE "B"
PLAN AND PROFILE STA. 2+00.00 TO STA. 11+47.74

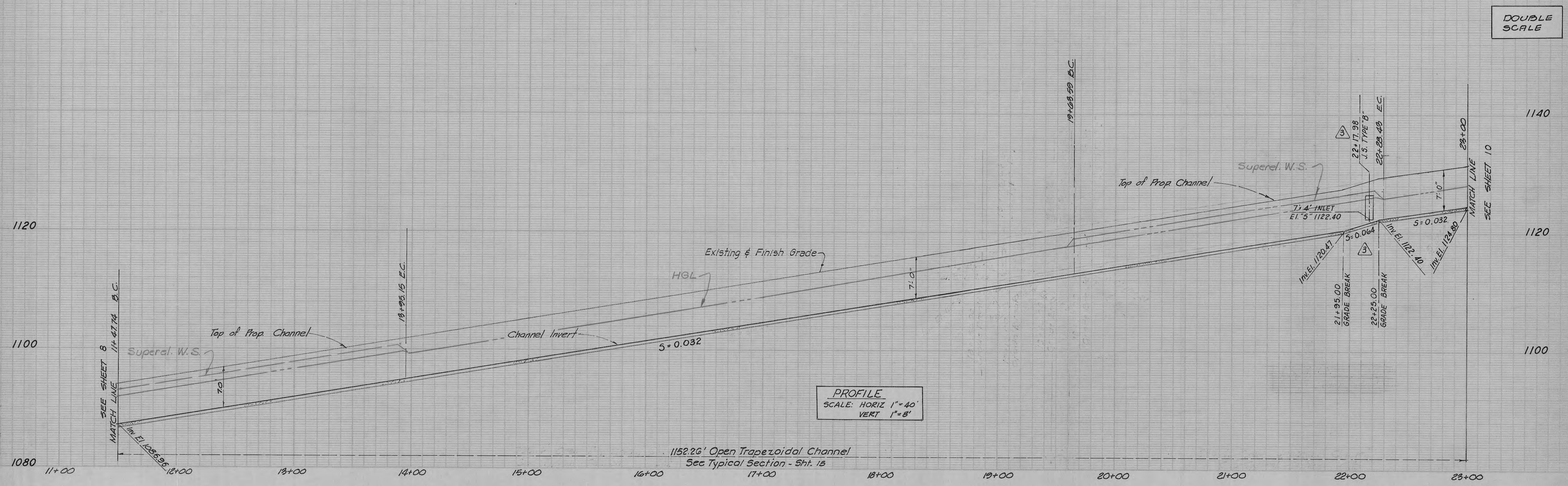
COUNTY OF LOS ANGELES, CALIFORNIA
JOHN A. LAMBIE COUNTY ENGINEER

DESIGN DIVISION

CHECKED BY: A. Gauch R.C.E. NO. 11786 DATE: 10-7-70
OFFICE OF COUNTY ENGINEER

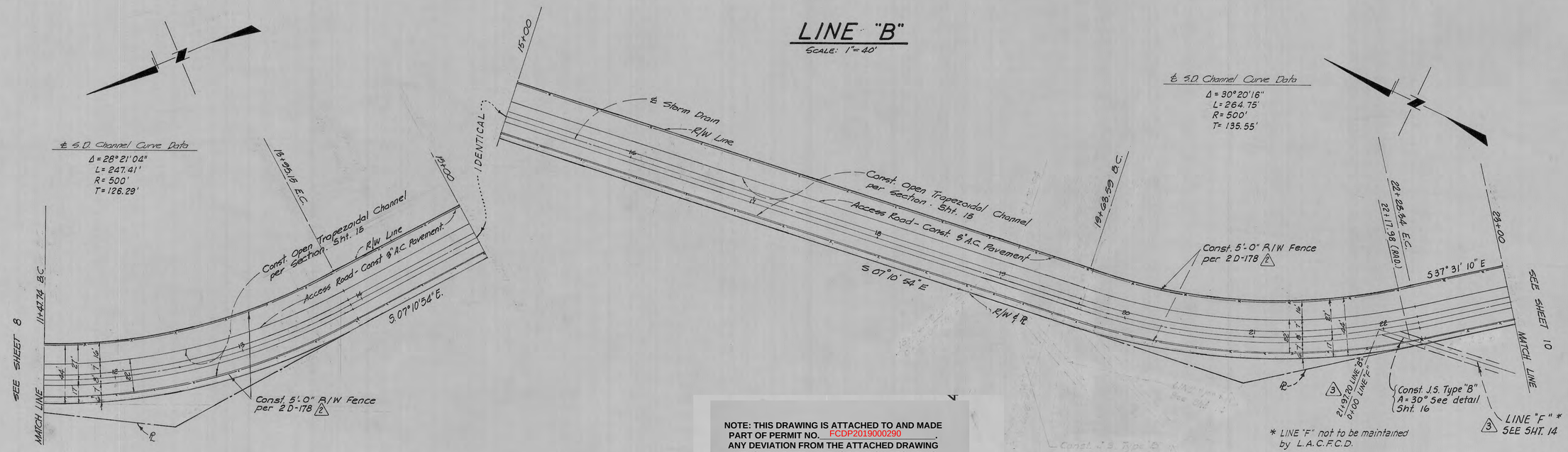
SHEET 8 OF 16

DOUBLE SCALE



PROFILE
SCALE: HORIZ 1"=40'
VERT 1"=8'

LINE "B"
SCALE: 1"=40'



* LINE "F" not to be maintained by L.A.C.F.C.D.

NOTE: THIS DRAWING IS ATTACHED TO AND MADE PART OF PERMIT NO. FCDP2019000290. ANY DEVIATION FROM THE ATTACHED DRAWING WITHOUT WRITTEN AUTHORIZATION FROM THIS DEPARTMENT WILL VOID THIS PERMIT.

P.D. NO. 1052

Andrew L. Jones R.C.E. N° 12607
DATE: 8-24-70

STORMS & LOWE CONSULTING ENGINEERS			OFFICE OF THE COUNTY ENGINEER DESIGN DIVISION	
DATE	REVISION	REVISED BY:	DATE	APPROVED BY:
11-2-70	3 REVISE LOCATION OF GRADE BRK AND JUNCTIONS WITH LINE "F"	Andrew L. Jones RCE 12607	11/6/70	A. Jyuchi

STORMS & LOWE
Consulting Engineers
2829 WEST VERNON AVENUE
LOS ANGELES 8, CALIFORNIA
PHONE AXMINSTER 5-6431
LAS VEGAS, NEVADA
522 E. TWAIN 755-4466

R. DUELL & ASSOCIATES
PLANNING DESIGN ARCHITECTURE
2932 WILSHIRE BLVD., SANTA MONICA, CALIFORNIA

REVISION:			
1 REVISE LOCATION OF LINE "F" AND J.S. TYPE "B"	9-30-70		
2 REVISE LOCATION OF FENCE ON R. SIDE	9-30-70		
DATE:	SCALE:	DRAWN BY:	CHECKED BY:
8-24-70	AS SHOWN	S.W.	J.N.O.

MAGIC MOUNTAIN STORM DRAIN
VALENCIA CALIFORNIA

LINE "B"
PLAN AND PROFILE STA. 11+47.74 TO STA. 23+00.00

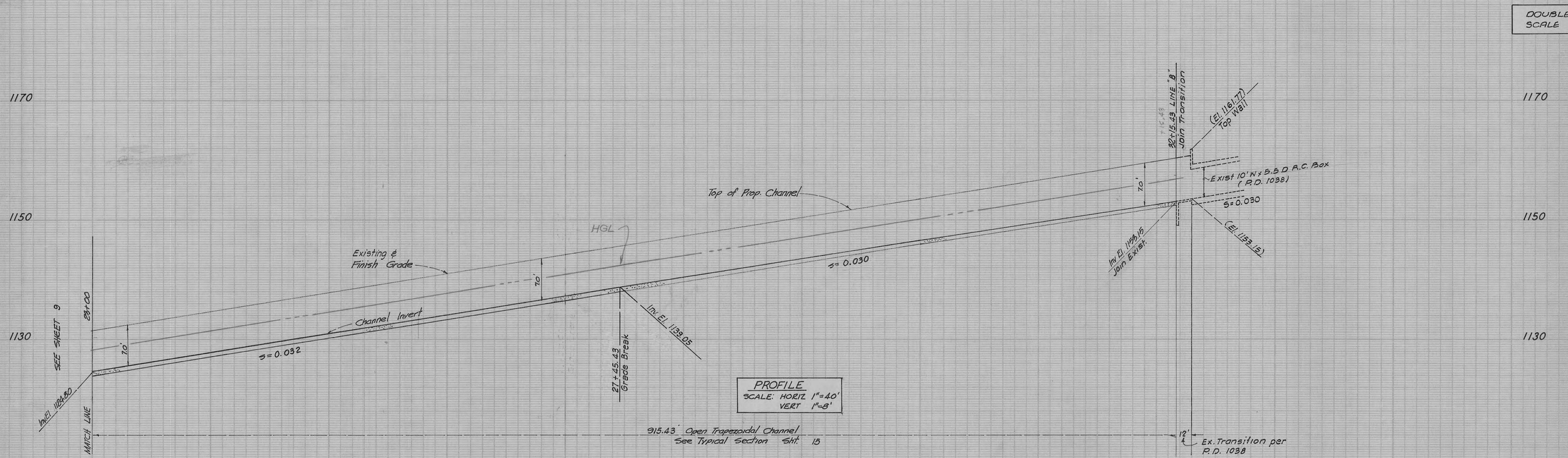
COUNTY OF LOS ANGELES, CALIFORNIA
JOHN A. LAMBIE COUNTY ENGINEER

DESIGN DIVISION

CHECKED BY: A. Jyuchi R.C.E. NO. 11786 DATE: 10-7-70
OFFICE OF COUNTY ENGINEER

SHEET 9 OF 16 (9)
P-5-1133

DOUBLE SCALE

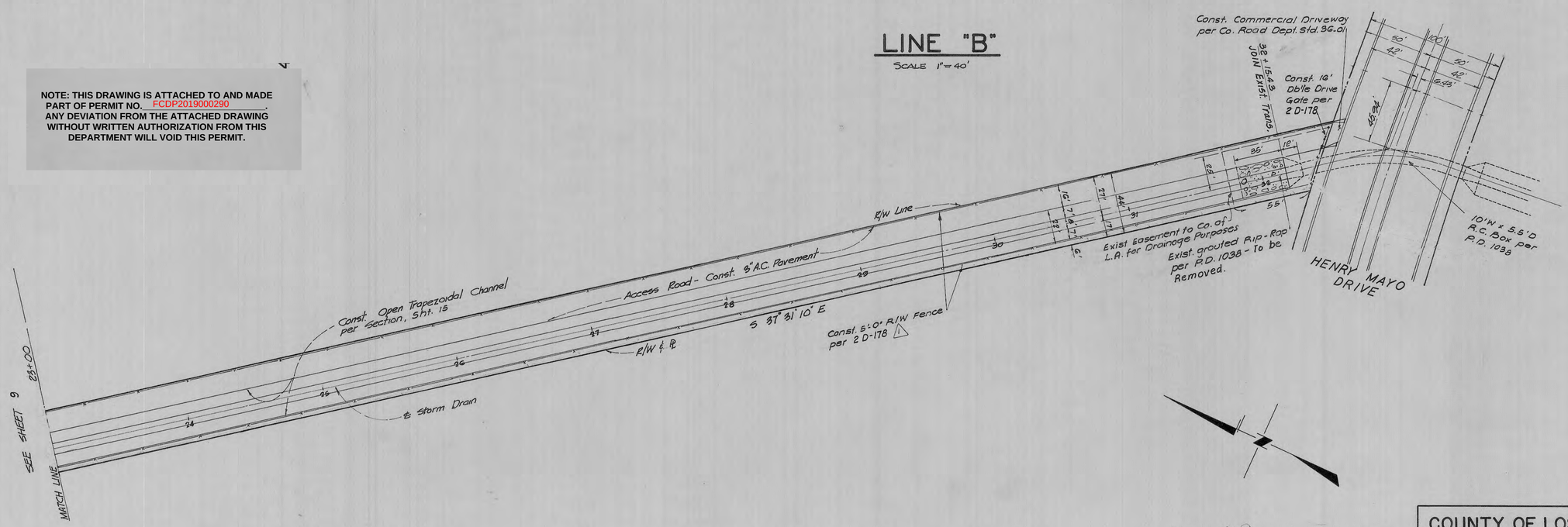


PROFILE

SCALE: HORIZ 1"=40'
VERT 1"=8'

LINE "B"

SCALE 1"=40'



NOTE: THIS DRAWING IS ATTACHED TO AND MADE PART OF PERMIT NO. FCDP2019000290. ANY DEVIATION FROM THE ATTACHED DRAWING WITHOUT WRITTEN AUTHORIZATION FROM THIS DEPARTMENT WILL VOID THIS PERMIT.

Andrew R. Thomas R.C.E. Nº 12607
DATE: 8-24-70

P.D. NO. 1052

COUNTY OF LOS ANGELES, CALIFORNIA
JOHN A. LAMBIE COUNTY ENGINEER

DESIGN DIVISION

CHECKED BY: A. Lynch R.C.E. NO. 11786 DATE: 10-7-70
OFFICE OF COUNTY ENGINEER

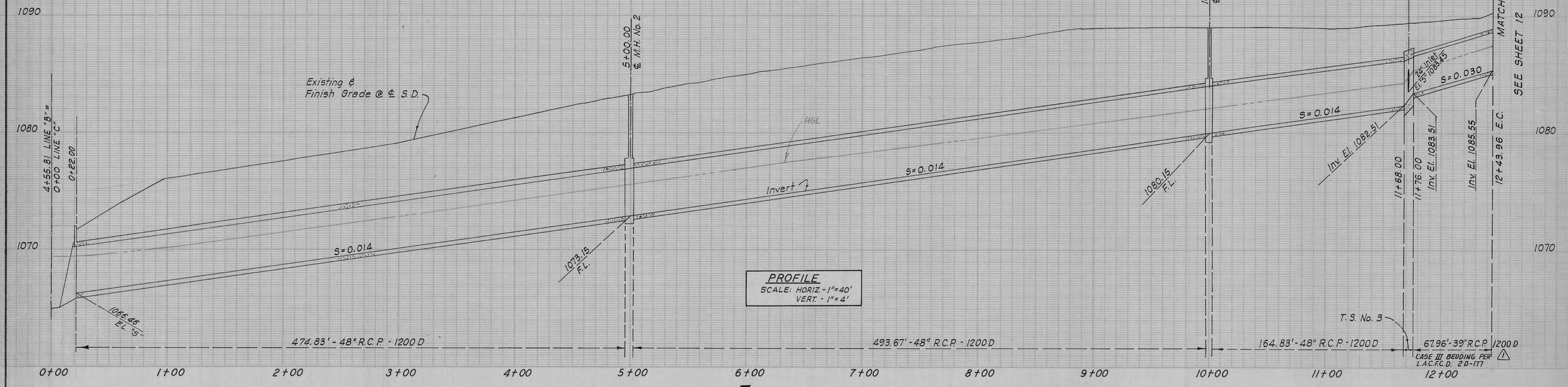
STORMS & LOWE
Consulting Engineers
2829 WEST VERNON AVENUE
LOS ANGELES 8, CALIFORNIA
PHONE AXminster 5-6431
LAS VEGAS, NEVADA
522 E. TWAIN 735-4466

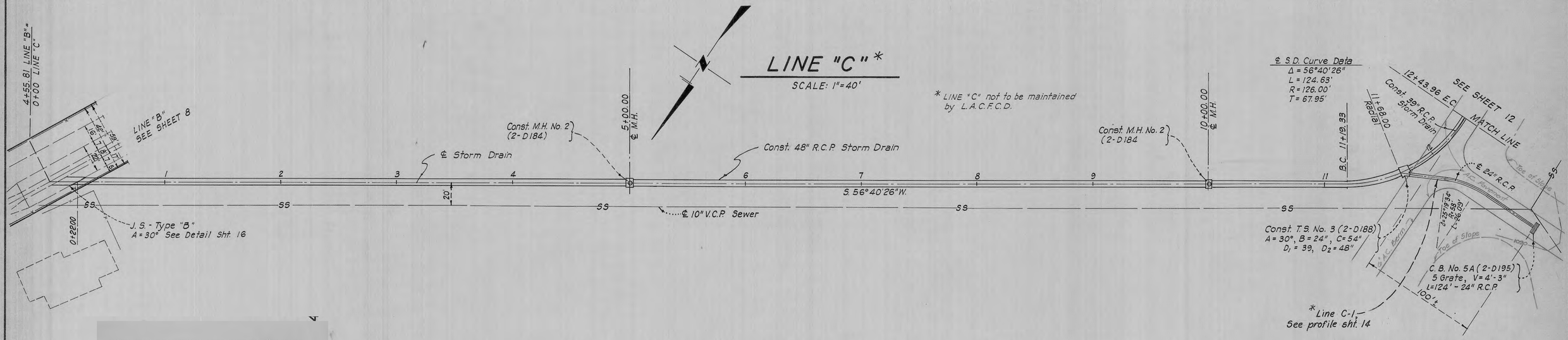
R. DUELL & ASSOCIATES
PLANNING DESIGN ARCHITECTURE
2932 WILSHIRE BLVD., SANTA MONICA, CALIFORNIA

REVISION:			
⚠ Bring Location of Fence on N. Side 9-30-70			
DATE:	SCALE:	DRAWN BY:	CHECKED BY:
8-24-70	AS SHOWN	B.C. & R.G	J.N.O.

MAGIC MOUNTAIN STORM DRAIN
VALENCIA CALIFORNIA

LINE "B"
PLAN AND PROFILE STA. 23+00.00 TO STA. 32+15.43





LINE "C" *

SCALE: 1"=40'

* LINE "C" not to be maintained by L.A.C.F.C.D.

NOTE: THIS DRAWING IS ATTACHED TO AND MADE PART OF PERMIT NO. FCDP2019000290. ANY DEVIATION FROM THE ATTACHED DRAWING WITHOUT WRITTEN AUTHORIZATION FROM THIS DEPARTMENT WILL VOID THIS PERMIT.

P.D. NO. 1052

Andrew C. Graw R.C.E. No 12607
DATE: 8-24-70

STORMS & LOWE
Consulting Engineers
2829 WEST VERNON AVENUE
LOS ANGELES 8, CALIFORNIA
PHONE AXminster 5-6431
LAS VEGAS, NEVADA
522 E. TWAIN 735-4466

R. DUELL & ASSOCIATES
PLANNING DESIGN ARCHITECTURE
2932 WILSHIRE BLVD., SANTA MONICA, CALIFORNIA

REVISION:	DATE:	SCALE:	DRAWN BY:	CHECKED BY:
⚠ REVISE BEDDING AND D-LOAD 9-30-70	8-24-70	AS SHOWN	G.E.R.	J.N.O.

MAGIC MOUNTAIN STORM DRAIN
VALENCIA CALIFORNIA

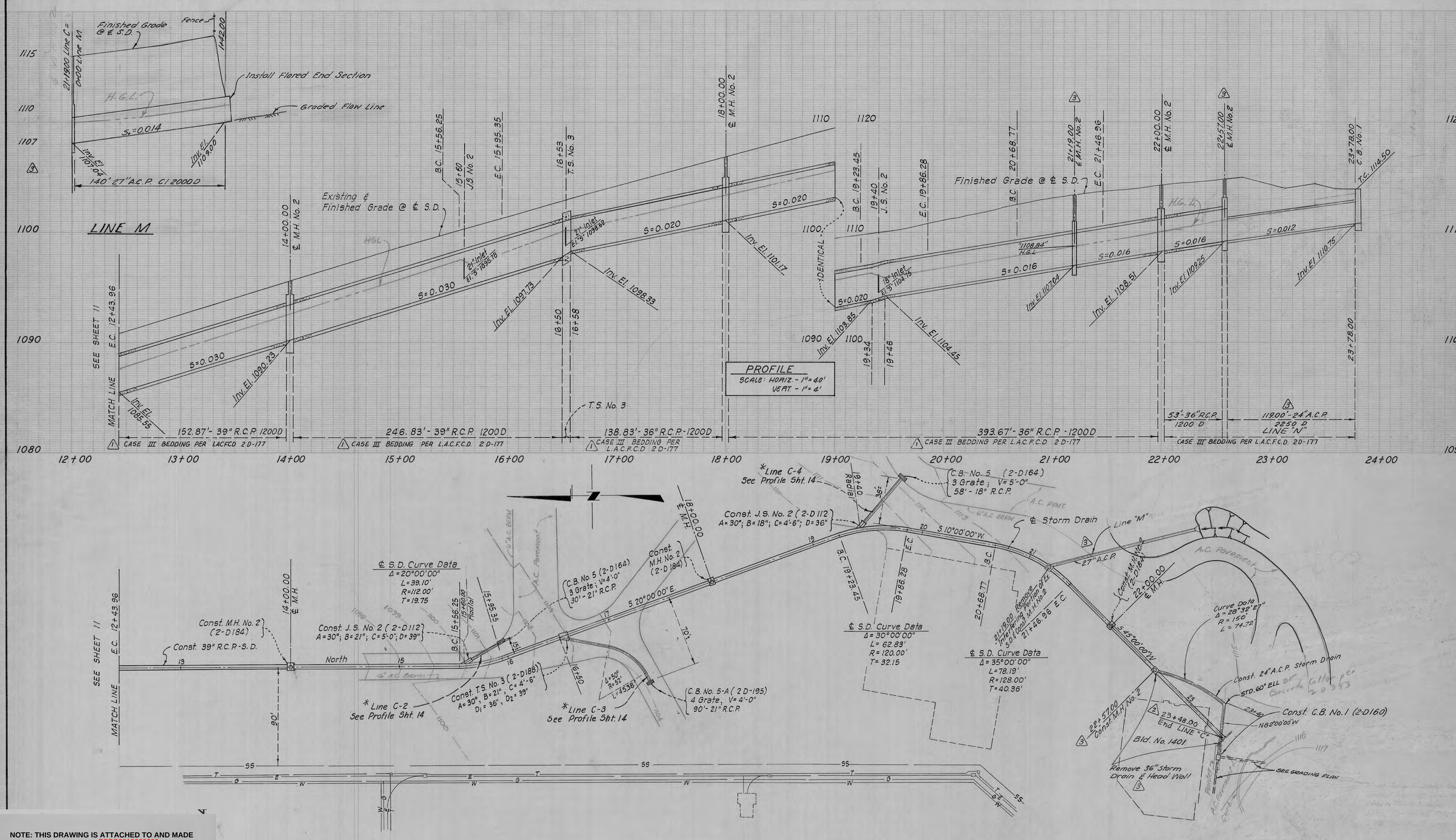
LINE "C"
PLAN AND PROFILE STA. 0+00.00 TO STA. 12+43.96

COUNTY OF LOS ANGELES, CALIFORNIA
JOHN A. LAMBIE COUNTY ENGINEER

DESIGN DIVISION

CHECKED BY: A. Gyuris R.C.E. NO. 11786 DATE: 10-7-70
OFFICE OF COUNTY ENGINEER

SHEET 11 OF 16



LINE "C"*

SCALE: 1" = 40'

* LINE "C" not to be maintained by L.A.C.F.C.D.

NOTE: THIS DRAWING IS ATTACHED TO AND MADE PART OF PERMIT NO. FCDP2019000290. ANY DEVIATION FROM THE ATTACHED DRAWING WITHOUT WRITTEN AUTHORIZATION FROM THIS DEPARTMENT WILL VOID THIS PERMIT.

P.D. NO. 1052

Andrew P. Storms R.C.E. N° 12607
DATE: 8-24-70

STORMS & LOWE CONSULTING ENGINEERS

DATE	REVISION	REVISED BY:
11-2-70	(2) REVISE INLET LOCATION OF LINE "C" TO AVOID CONFLICT WITH WATER LINE	Andrew P. Storms RCE 12607
3-4-77	(3) ADD M.H. @ STA 22+50 & 21+19. REMOVE S.D. & INLET FROM STA 22+57 TO 23+48. ADDED LINE M & LINE N.	Valcon, Inc. R.C.E. 13696

OFFICE OF THE COUNTY ENGINEER DESIGN DIVISION

DATE	APPROVED BY
11/6/70	A. Spacht
3/22/77	A. Spacht

STORMS & LOWE Consulting Engineers
2829 WEST VERNON AVENUE LOS ANGELES 8, CALIFORNIA PHONE AXminster 5-6431
LAS VEGAS, NEVADA 522 E. TWAIN 735-4466

R. DUELL & ASSOCIATES
PLANNING DESIGN ARCHITECTURE
2932 WILSHIRE BLVD., SANTA MONICA, CALIFORNIA

REVISION: (1) REVISE BEDDING AND D-LOADS FOR 36" AND 39" PIPE

DATE:	SCALE:	DRAWN BY:	CHECKED BY:
8-24-70	AS SHOWN	G.E.R.	J.N.O.

MAGIC MOUNTAIN STORM DRAIN
VALENCIA CALIFORNIA

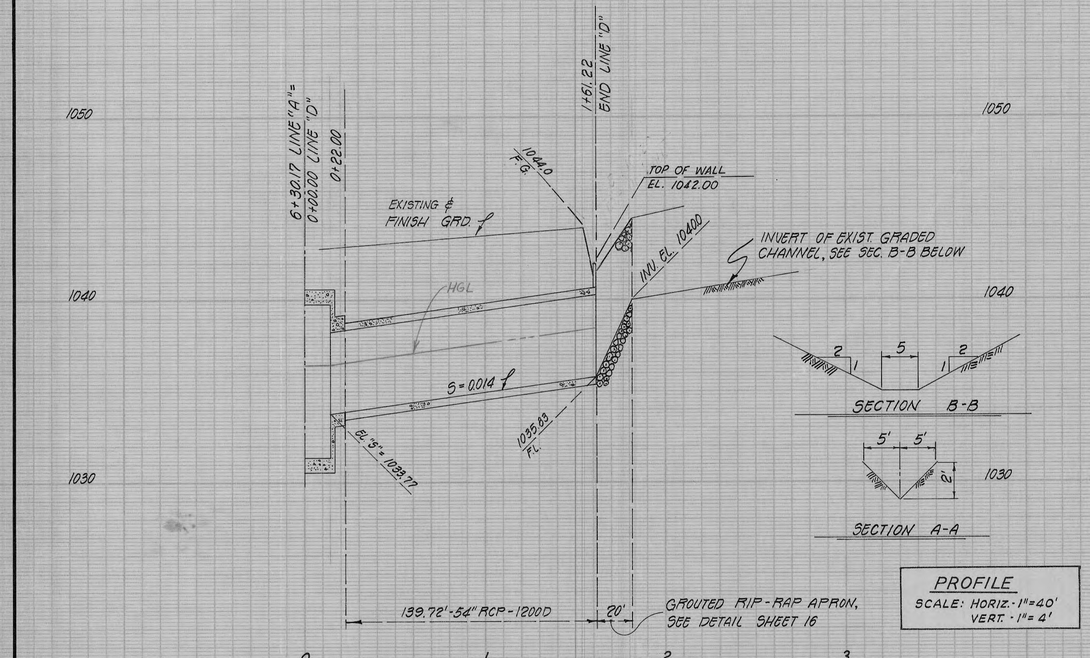
LINE "C"
PLAN AND PROFILE STA. 12+43.96 TO STA. 24+34.13

COUNTY OF LOS ANGELES, CALIFORNIA
JOHN A. LAMBIE COUNTY ENGINEER

DESIGN DIVISION

CHECKED BY: A. Spacht R.C.E. NO. 11786 DATE: 10-7-70
OFFICE OF COUNTY ENGINEER

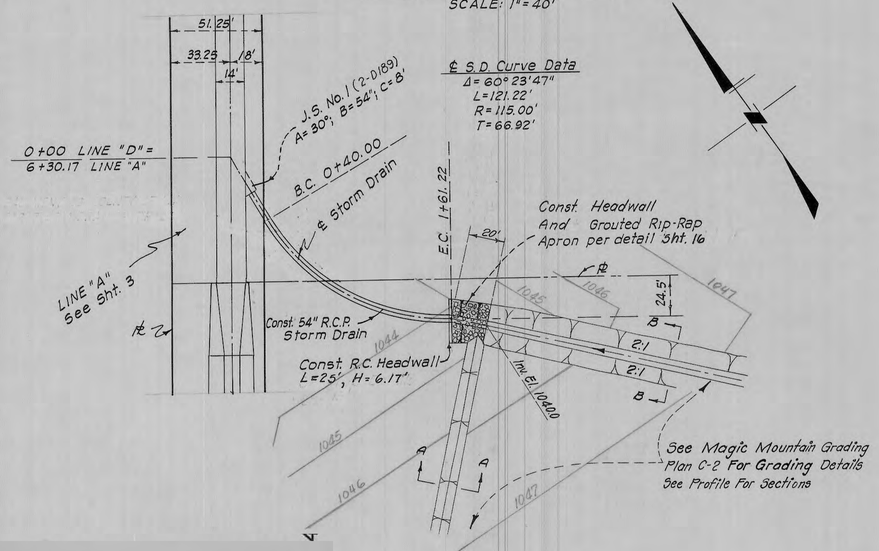
SHEET 12 OF 16



* LINES "D" "E" "G" "H" Not to be maintained by L.A.C.F.C.D.

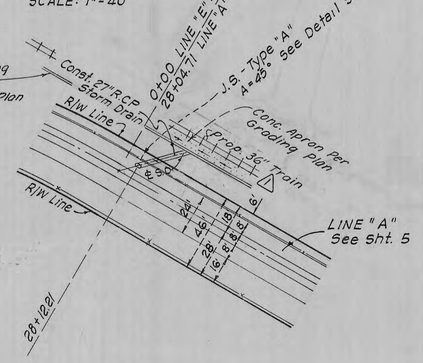
LINE "D" *

SCALE: 1"=40'



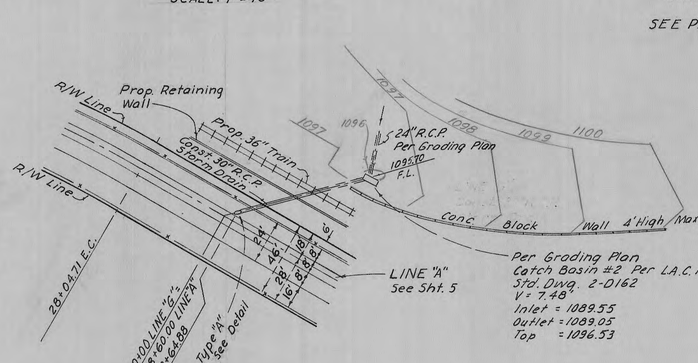
LINE "E" *

SCALE: 1"=40'



LINE "G" *

SCALE: 1"=40'



LINE "H" *

SCALE: 1"=40'

SEE PLAN ON SHT. 5

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No.	REVISION	REVISED BY	APPROVED BY	DATE
1	Added Train, Retaining Wall, Lines "G" & "H" Revised. Maint. Note, Inlet for Line "E"	Valcon, Inc. Ronald H. Beck RCE 13656	Howard A. Hays	1/21/75

Andrew L. Thom R.C.E. 12607
DATE: 8-24-70

P.D. NO. 1052

STORMS & LOWE
Consulting Engineers
2829 WEST VERNON AVENUE
LOS ANGELES 8, CALIFORNIA
PHONE AXminster 5-6431
LAS VEGAS, NEVADA
522 E. TWAIN 755-4466

R. DUELL & ASSOCIATES
PLANNING DESIGN ARCHITECTURE
2932 WILSHIRE BLVD., SANTA MONICA, CALIFORNIA

REVISION:			
DATE: 8-24-70	SCALE: AS SHOWN	DRAWN BY: R.G.	CHECKED BY: J.N.O.

MAGIC MOUNTAIN STORM DRAIN
VALENCIA CALIFORNIA

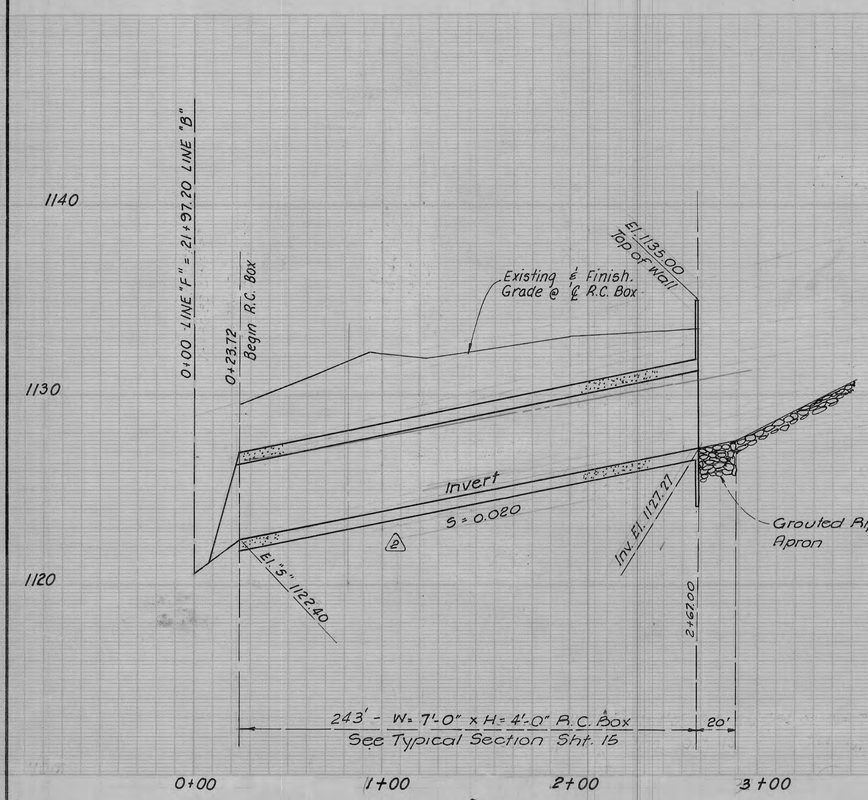
LINE "D, E, G & H
PLAN AND PROFILE

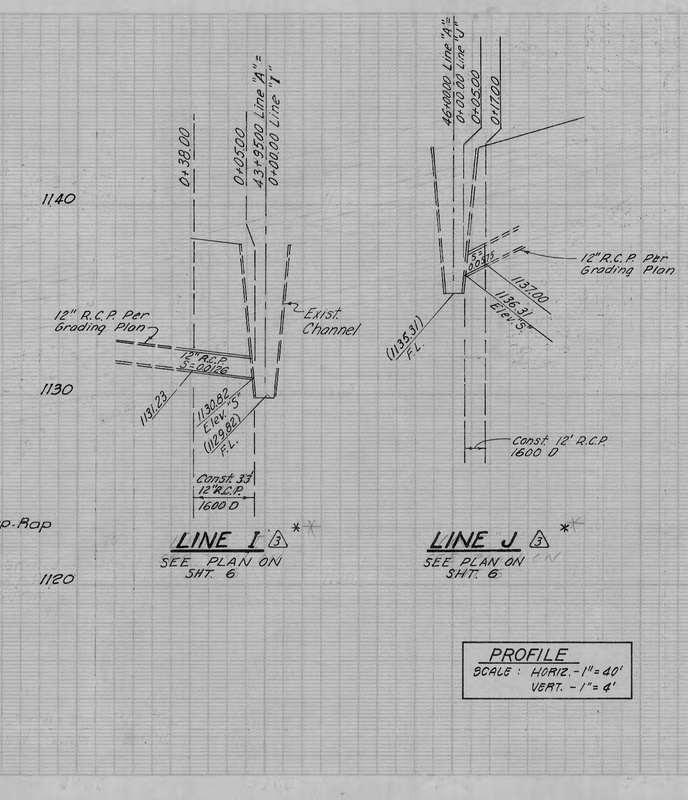
COUNTY OF LOS ANGELES, CALIFORNIA
JOHN A. LAMBIE COUNTY ENGINEER

DESIGN DIVISION

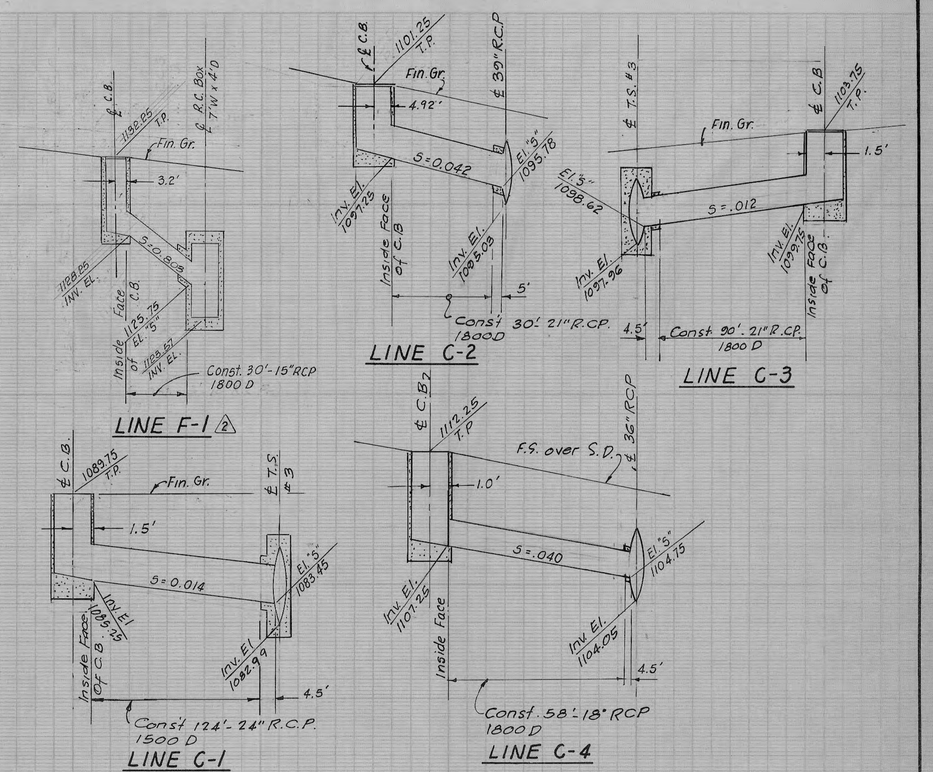
CHECKED BY: A. Hayashi RCE NO. 11786 DATE: 10-7-76
OFFICE OF COUNTY ENGINEER

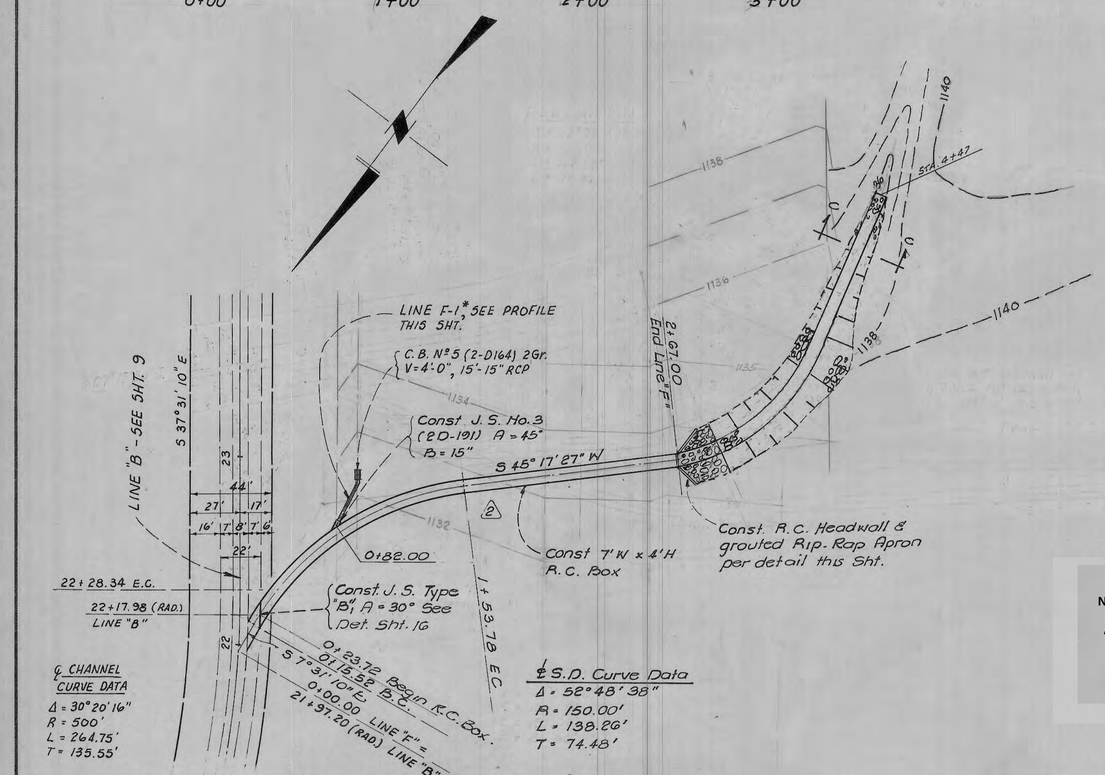
SHEET 13 OF 16





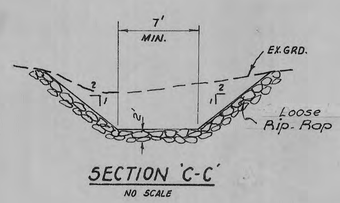
PROFILE
SCALE : HORIZ. - 1" = 40'
VERT. - 1" = 4'



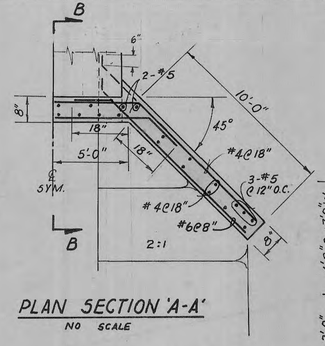


2 LINE "F" *
SCALE : 1" = 40'

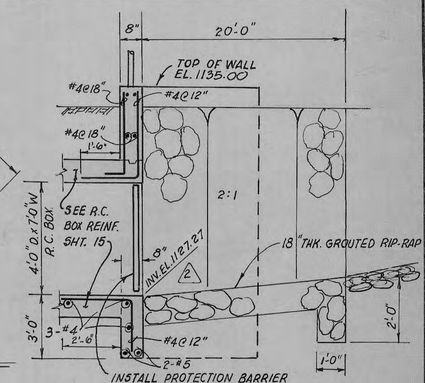
* LINE "F" not to be maintained by L.A.C.F.C.D.
3 * LINES I AND J not to be maintained by L.A.C.F.C.D.

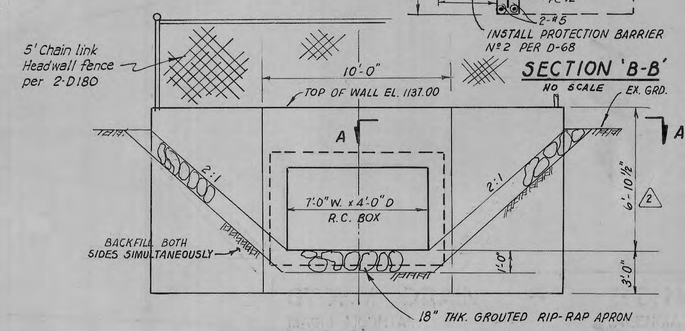


SECTION 'C-C'
NO SCALE



PLAN SECTION 'A-A'
NO SCALE





SECTION 'B-B'
NO SCALE

ELEVATION
NO SCALE

NOTE: THIS DRAWING IS ATTACHED TO AND MADE PART OF PERMIT NO. FCDP2019000290. ANY DEVIATION FROM THE ATTACHED DRAWING WITHOUT WRITTEN AUTHORIZATION FROM THIS DEPARTMENT WILL VOID THIS PERMIT.

P.D. NO. 1052

Andrew C. Hram R.C.E. N° 12607
DATE: 8-24-70

STORMS & LOWE CONSULTING ENGINEERS			OFFICE OF THE COUNTY ENGINEER DESIGN DIVISION	
DATE	REVISION	REVISED BY:	DATE	APPROVED BY
11-2-70	2 RE-ALIGNMENT OF LINE F, REDESIGN TO CONFORM, REVISE LINE F-1, INLET	Andrew C. Hram RCE 12607	11/6/70	M. Iguchi
11-12-74	3 Added Profile For Lines "I" And "J"; Maint. Note	Valcon, Inc. Ronald C. Hargis RCE 13686	11/28/75	Howard C. Hargis

STORMS & LOWE Consulting Engineers
JOB. NO.
2829 WEST VERNON AVENUE
LOS ANGELES 8, CALIFORNIA
PHONE AXMINSTER 5-6431
LAS VEGAS, NEVADA
522 E. TWAIN 735-4466

R. DUELL & ASSOCIATES
PLANNING DESIGN ARCHITECTURE
2932 WILSHIRE BLVD., SANTA MONICA, CALIFORNIA

REVISION:			
1 RE-ALIGN & REDESIGN LINE	9-30-70		
DATE:	SCALE:	DRAWN BY:	CHECKED BY:
8-24-70	AS SHOWN	S.W.	J.N.O.

MAGIC MOUNTAIN STORM DRAIN
VALENCIA CALIFORNIA

LINE "F"
PLAN AND PROFILE STA. 0+00.00 TO STA. 6+76.02

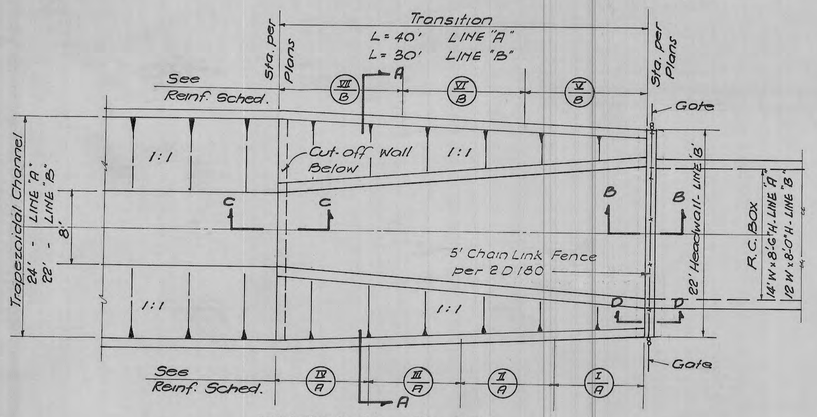
COUNTY OF LOS ANGELES, CALIFORNIA
JOHN A. LAMBIE COUNTY ENGINEER

DESIGN DIVISION

CHECKED BY: M. Iguchi R.C.E. NO. 11786 DATE 10-7-70
OFFICE OF COUNTY ENGINEER

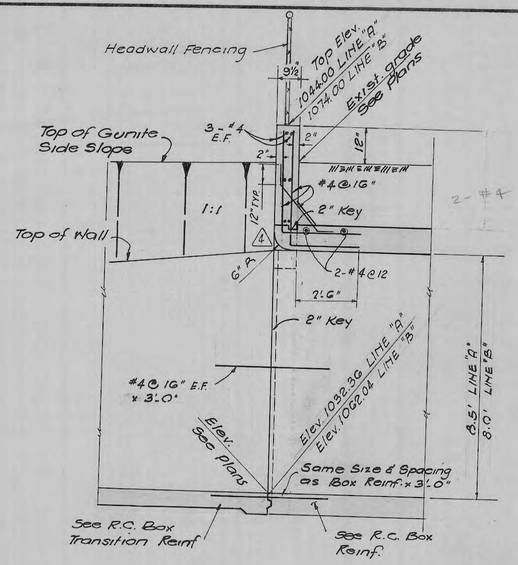
SHEET 14 OF 16

D5-13

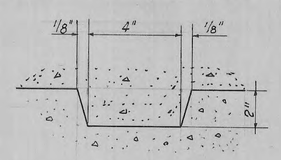


TYPICAL PLAN

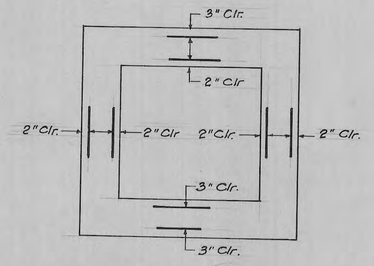
CHANNEL TO R.C. BOX TRANSITION



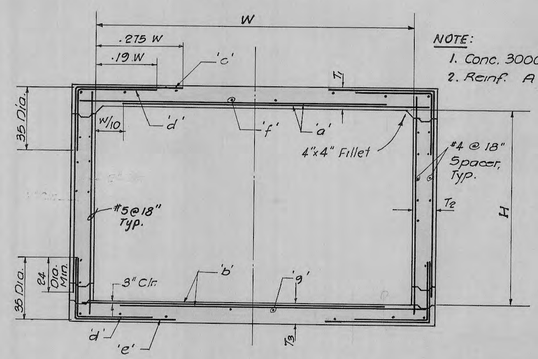
TYPICAL SECTION B-B



TYP. KEY DETAIL



R.C. BOX
TYP. REINF. CLEARANCES

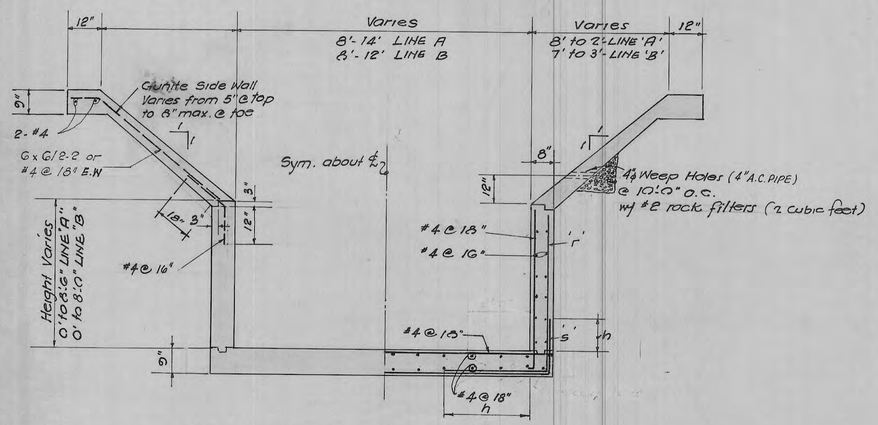


NOTE:
1. Conc. 3000 #/o"
2. Reinf. A 615 Grade 60

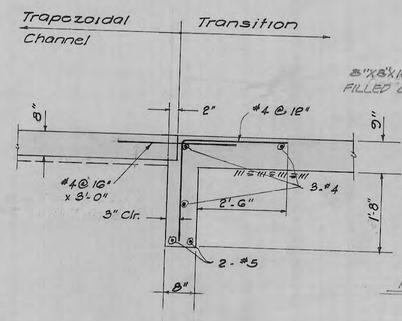
TYPICAL R.C. BOX SECTION

R.C. BOX SCHEDULE					
LINE		A *		B *	F *
SIZE		14'W x 8'-6"H		12'-0" x 8'-0"H	7'-0"W x 4'-0"H
COVER		2'		5'	4'
LOCATION		STA. 4+25 to STA. 7+00		STA 2+20 to STA 4+00	STA 0+23.72 (5) to STA 2+67.00
CONC.	T_1	11"		10"	8 1/2"
	T_2	11"		9 1/4"	7 3/4"
	T_3	11"		10"	8 1/2"
REINF.	a	#6 @ 10"		#6 @ 11"	#5 @ 10"
	b	#6 @ 10"		#6 @ 11"	#5 @ 10"
	c	#6 @ 10"		#6 @ 11"	#5 @ 10"
	d	#6 @ 10"		#6 @ 11"	#5 @ 10"
	e	#6 @ 10"		#6 @ 11"	#5 @ 10"
	f	#4 @ 8"		#4 @ 8"	#4 @ 18"
	g	#4 @ 12"		#4 @ 12"	#4 @ 18"

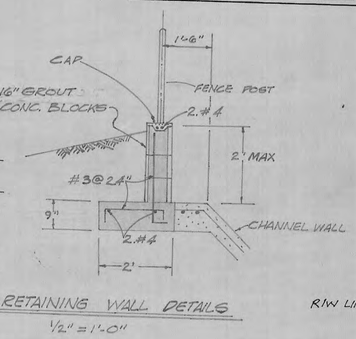
* Designed for H-20 Loading



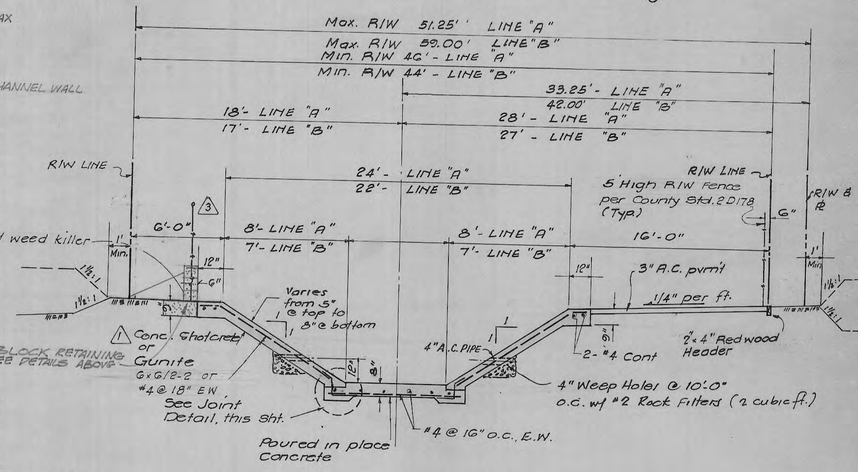
TYPICAL SECTION "A-A"



TYPICAL SECTION "C-C"

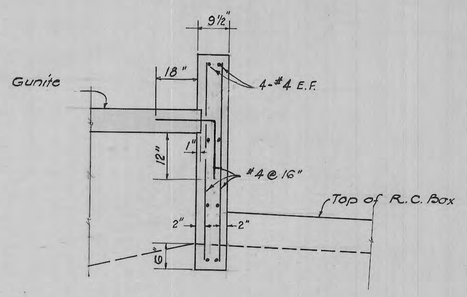


RETAINING WALL DETAILS
1/2" = 1'-0"

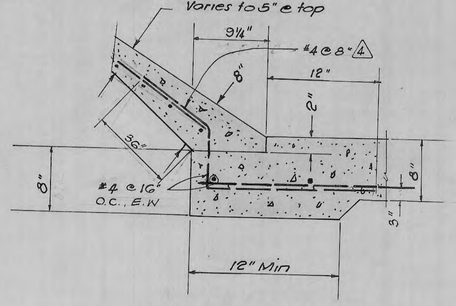


TYPICAL TRAPEZOIDAL CHANNEL SECTION

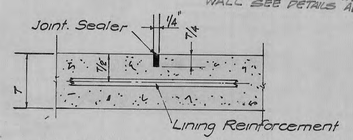
REINF. SCHEDULE								
CHANNEL		A				B		
LOCATION		I	II	III	IV	V	VI	VII
Reinf.	r	#5@11"	#5@12"	#5@12"	#4@11"	#4@10"	#5@12"	#4@11"
	s	#5@11"	#5@12"	——	——	#5@10"	——	——
h		4'-0"	4'-0"	——	——	3'-6"	——	——



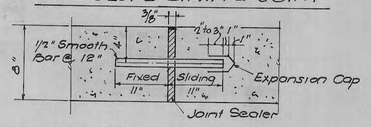
TYPICAL SECTION "D-D"



JOINT DETAIL



SIDE SLOPE LINING JOINT



INVERT LINING JOINT

NOTE: Lining Reinforcement shall not extend through joint.

TRANSVERSE JOINT DETAIL

NOTE: THIS DRAWING IS ATTACHED TO AND MADE PART OF PERMIT NO. FCDP2019000290. ANY DEVIATION FROM THE ATTACHED DRAWING WITHOUT WRITTEN AUTHORIZATION FROM THIS DEPARTMENT WILL VOID THIS PERMIT.

P.D. NO. 1052

STORMS & LOWE CONSULTING ENGINEERS			OFFICE OF THE COUNTY ENGINEER DESIGN DIVISION	
DATE	REVISIONS	REVISED BY:	DATE	APPROVED BY
11-2-70	(5) REVISE LENGTH TO CONFORM TO REALIGNMENT OF LINE 'A'	Andrew L. Storms RCE 12607	11/6/70	H. Symons

STORMS & LOWE
Consulting Engineers
2829 WEST VERNON AVENUE
LOS ANGELES 8, CALIFORNIA
PHONE AXMINSTER 5-6431
LAS VEGAS, NEVADA
522-E, TWAIN 755-4466

R. DUELL & ASSOCIATES
PLANNING DESIGN ARCHITECTURE
2832 WILSHIRE BLVD., SANTA MONICA, CALIFORNIA

REVISION:			DATE:	SCALE:	DRAWN BY:	CHECKED BY:
(1) REISE TO GIVE CONC. OR SHOTCRETE - GUNITE STR.	9-30-70	(4) REVISE STRUCTURAL DETAILING	8-24-70	NONE	B.C.	J.N.O
(2) REVISE LENGTH OF WING F	9-30-70					
(3) REVISE FENCE SECTION	9-30-70					

Andrew L. Storms R.C.E. N° 12607
DATE: 8-24-70

MAGIC MOUNTAIN STORM DRAIN
VALENCIA CALIFORNIA

TYPICAL STRUCTURAL SECTIONS AND DETAILS

COUNTY OF LOS ANGELES, CALIFORNIA
JOHN A. LAMBIE COUNTY ENGINEER

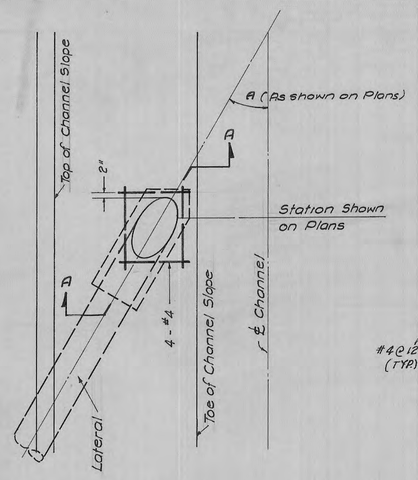
DESIGN DIVISION

CHECKED BY: H. Symons RCE NO. 18786 DATE: 10-7-70
OFFICE OF COUNTY ENGINEER

SHEET 15 OF 16

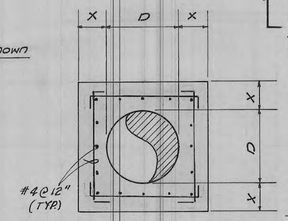
P.S-123

TYP. OUTLET STRUCTURE DETAILS

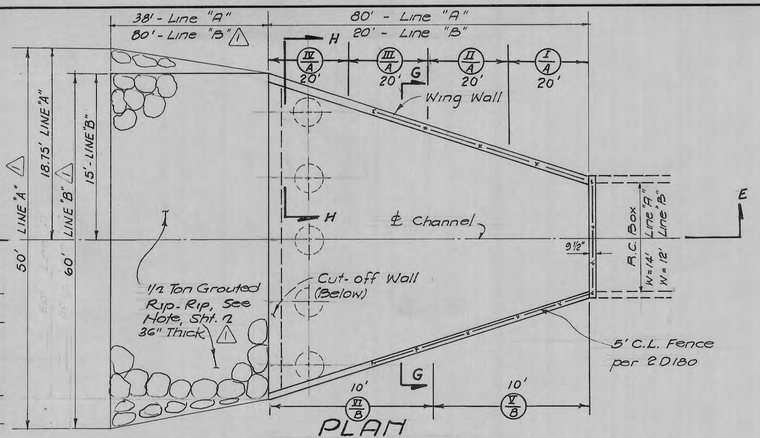


PLAN

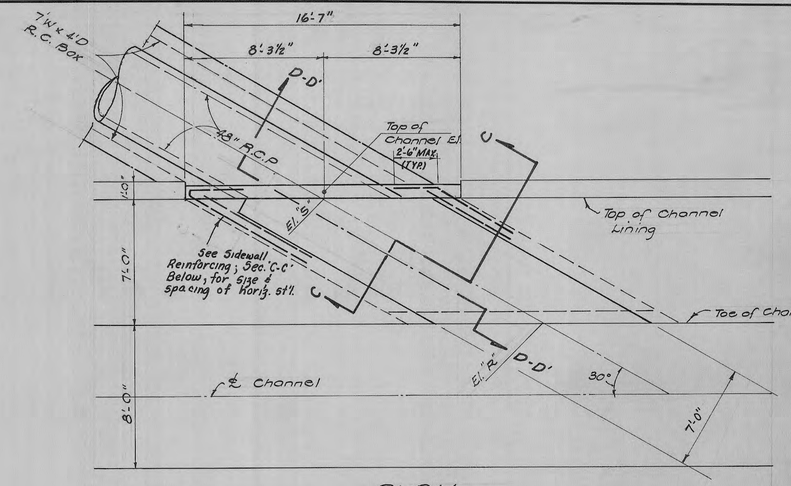
D	X	Y	Z
12"	7"	49"	T+2"
27"	9"	78"	T+2"



SECTION "B-B"

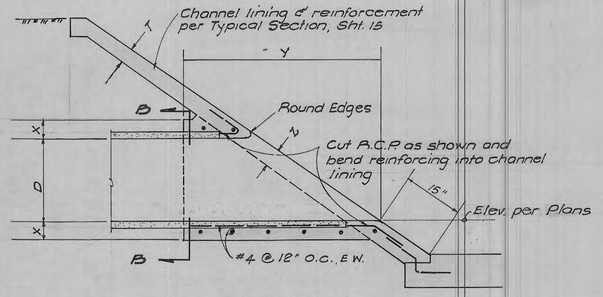


PLAN

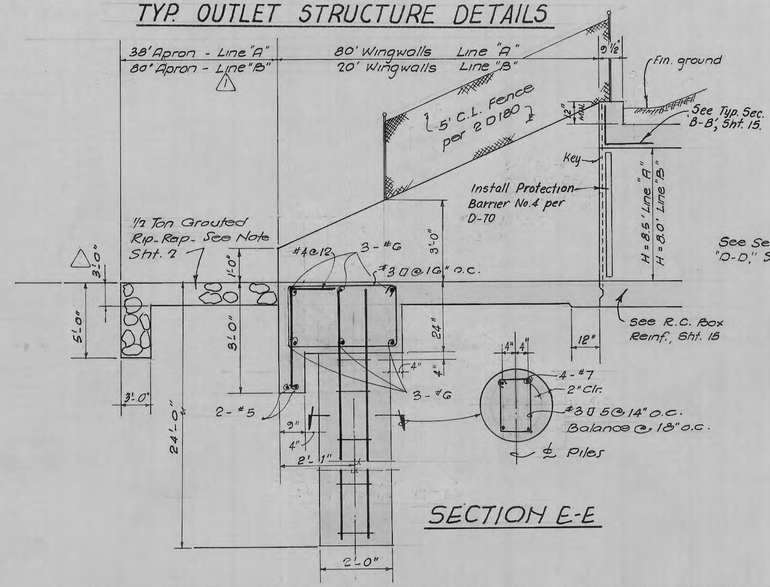


PLAN

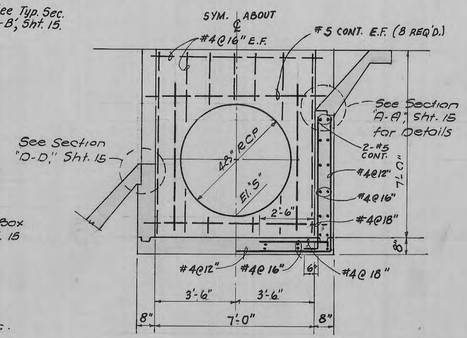
Not to Scale



SECTION "A-A"

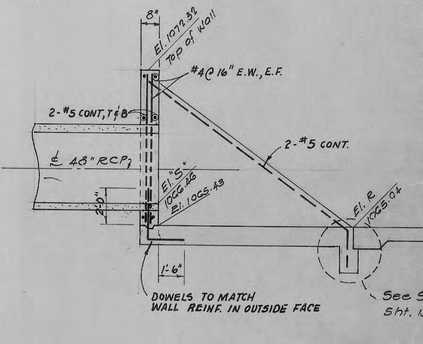


SECTION E-E



SECTION C-C

NOTE: 48" RCP ONLY SHOWN. SIDE WALL AND HEADWALL DETAILS FOR R.C. BOX. IDENTICAL.

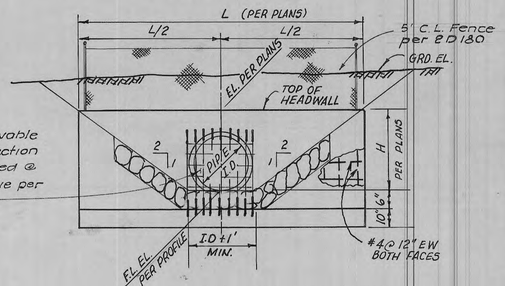


SECTION D-D

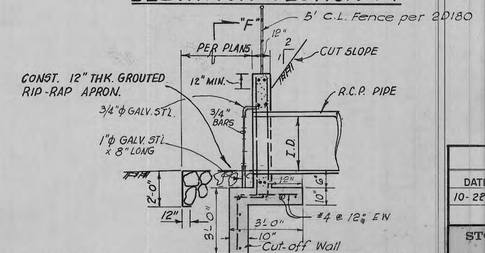
SECTION "A-A"

JUNCTION STRUCTURE TYPE "A"

Not to Scale

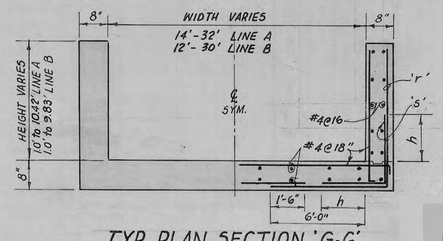


ELEVATION SECTION "F-F"

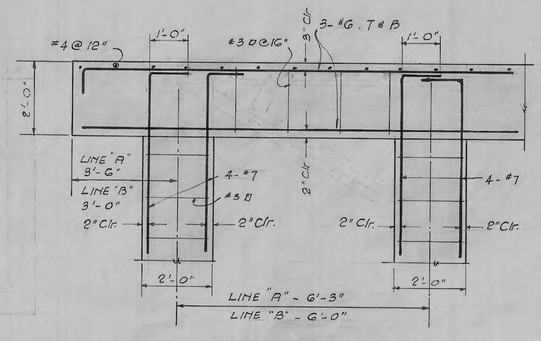


TYPICAL R.C. HEADWALL DETAILS

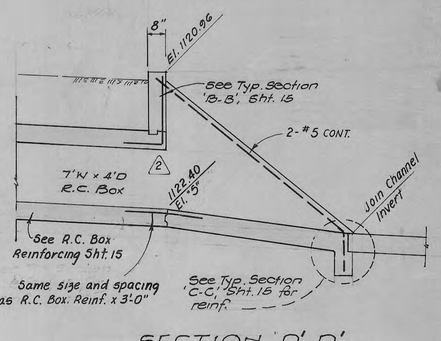
OUTLET STRUCTURE REINFORCING SCHEDULE							
CHANNEL		'A'				'B'	
LOCATION		I	II	III	IV	V	VI
REINF.	r	#5@12"	#4@12"	#4@24"	#4@18"	#4@12"	#4@18"
	s	#5@12"	#4@12"	#4@24"	—	#4@12"	—
h		3'-6"	3'-0"	2'-6"	—	3'-0"	—



TYP. PLAN SECTION 'G-G'



SECTION H-H



SECTION D'-D'

JUNCTION STRUCTURE TYPE "B"

Not to Scale

NOTE: THIS DRAWING IS ATTACHED TO AND MADE PART OF PERMIT NO. FCDP2019000290 ANY DEVIATION FROM THE ATTACHED DRAWING WITHOUT WRITTEN AUTHORIZATION FROM THIS DEPARTMENT WILL VOID THIS PERMIT.

STORMS & LOWE CONSULTING ENGINEERS			OFFICE OF THE COUNTY ENGINEER DESIGN DIVISION	
DATE	REVISION	REVISED BY:	DATE	APPROVED BY:
10-22-70	2 REVISE JUNCTION EL "S" FOR JUNCTION OF LINE "A" AND CHANNEL	CE 12607 11/6/70		A. Gyenes

STORMS & LOWE
Consulting Engineers
2829 WEST VERNON AVENUE
LOS ANGELES 8, CALIFORNIA
PHONE AXMINSTER 5-6431
LAS VEGAS, NEVADA
522 E. TWAIN 735-4466

R. DUELL & ASSOCIATES
PLANNING DESIGN ARCHITECTURE
2932 WILSHIRE BLVD., SANTA MONICA, CALIFORNIA

REVISION:	DATE:	SCALE:	DRAWN BY:	CHECKED BY:
1 REVISE THICKNESS AND DIMENSIONS OF RIP-RAP	9-30-70			
	8-24-70	NONE	B.C.	J.N.O.

Albert L. Thom R.C.E. N° 12607
DATE: 8-24-70

MAGIC MOUNTAIN STORM DRAIN
VALENCIA CALIFORNIA

MISCELLANEOUS STRUCTURAL DETAILS

P.D. NO. 1052

COUNTY OF LOS ANGELES, CALIFORNIA
JOHN A. LAMBIE COUNTY ENGINEER

DESIGN DIVISION

CHECKED BY: A. Gyenes RCE NO. 11786 DATE: 10-7-70
OFFICE OF COUNTY ENGINEER

SHEET 16 OF 16

D-12: Drainage Concept Hydrology Study LID/Water Quality Report Revision Job No. 0930, By Alliance Land Planning & Engineering, Inc.
Date: 12/2017

COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS
LAND DEVELOPMENT DIVISION
HYDROLOGY UNIT

TO: Alliance Date: 11/16/17

ATTN: Craig M. Whitteker

REVIEW OF REVISED HYDROLOGY STUDY

TR/PM NO. **53295** **DATE OF REPORT** **October 2017**
PLAN CHECK NO. **3**

We have reviewed your Revised Hydrology Study.

[X] The Hydrology Study has been approved.

[X] Refer to comments below:

COMMENTS:

1. Infiltration rate for the project site has been assumed but must be approved by Geotechnical and Materials Engineering Division prior to the grading plans. Any changes to the assumed infiltration rate may require a revised Hydrology Study and/or Tentative Map.

2. Work within soft bottom drainage areas (which may include but is not limited to soft bottom basins, channels, watercourses, grade to drain) will require maintenance permits from Fish and Game, Army Corps of Engineers, and RWQCB prior to approval of the storm drain, and the permits must be still active prior to acceptance.

3. A Drainage Benefit Assessment Area must be established prior to the recordation of the final map. This DBAA will be to finance the future ongoing maintenance and capital replacement of all water quality devices/systems identified to be maintained by the County of Los Angeles.

REVIEWED BY _____
VILONG TRUONG (626) 458-4921

REGISTERED PROFESSIONAL ENGINEER
VILONG TRUONG
NO. C82680
CIVIL
STATE OF CALIFORNIA

APPROVED BY: _____

HYDROLOGY STUDY APPROVED

CHECKED BY: _____ RCE NO. 82680 DATE 11/16/2017

APPROVED BY: _____ DATE 11/16/2017

COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS
LAND DEVELOPMENT DIVISION

DRAINAGE CONCEPT
HYDROLOGY STUDY
LID / WATER QUALITY REPORT

— REVISIONS —

County of Los Angeles

Entrada
Tentative Tract No. 53295
Job No. 0930

Prepared For:
Newhall Land & Farming, Co.
25124 Springfield Ct. Suite 300
Valencia, CA 91355

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

REGISTERED PROFESSIONAL ENGINEER
CRAIG M. WHITTAKER
NO. 51929
EXP 6-30-18
CIVIL
STATE OF CALIFORNIA

October 2017



mo





ENTRADA SOUTH

DRAINAGE CONCEPT REPORT

DEVELOPED CONDITION

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\lasoilx.dat

TENT. TRACT 53295 DRAINAGE CONCEPT - DEV. CONDITION - BASIN A STORM DAY 4

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
930 1A	284.9	746.00	284.9	746.00	2	1030.	.01000	.00	.00	0.	98	0	A31	.00
930 2A	11.0	22.28	295.9	730.01	4	110.	.01000	7.25	.00	0.	98	12	A31	.10
930 3A	.0	.00	295.9	725.92	4	1.	.01000	7.25	.00	0.	98	99	A31	.00
930 4B	15.7	35.33	15.7	35.33	4	260.	.05000	2.00	.00	0.	98	11	A31	.80
930 5B	1.3	3.41	17.0	38.67	4	110.	.01000	2.50	.00	0.	98	8	A31	.91
930 6B	2.2	4.19	19.2	42.85	4	370.	.01000	2.50	.00	0.	98	16	A31	.91

CONFLUENCE Q'S

930 7A TA 1160 QA 725.88 QAB 764.74 QB 38.86 930 7B TB 1157 QB 42.51 QBA 598.68 QA 556.18

930 7AB TAB 1160 QAB 764.74 QA 725.88 QB 38.86

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
930 7AB	19.2	42.51	315.1	764.74	4	20.	.01000	7.50	.00	0.	98	0	A31	.00
930 8C	.0	.00	.0	.00	4	1.	.01000	.00	.00	0.	98	99	A31	.00
930 9C	3.0	6.36	3.0	6.36	4	230.	.04200	2.00	.00	0.	98	12	A31	.60
930 10C	1.6	4.37	4.6	10.68	4	50.	.04200	2.00	.00	0.	98	7	A31	.60
930 11C	7.5	21.19	12.1	31.86	4	380.	.01000	2.25	.00	0.	298	7	A31	.10
930 12C	2.3	5.60	14.4	36.90	4	310.	.05500	2.00	.00	0.	98	9	A31	.60
930 13C	.0	.00	14.4	36.64	4	1.	.01000	2.50	.00	0.	98	99	A31	.00
930 14C	2.0	5.47	16.4	41.73	4	200.	.05500	2.00	.00	0.	98	7	A31	.60
930 15C	2.0	5.47	18.4	46.62	4	480.	.05500	2.00	.00	0.	98	7	A31	.60
930 16C	3.4	8.74	21.8	54.68	4	90.	.02000	2.50	.00	0.	98	8	A31	.60
930 17C	8.8	27.01	30.6	76.93	4	440.	.01000	3.25	.00	0.	298	6	A31	.01
930 18C	1.0	3.28	31.6	78.15	4	320.	.02000	2.75	.00	0.	98	5	A31	.60
930 19D	.0	.00	.0	.00	4	1.	.01000	.00	.00	0.	98	99	A31	.00
930 20D	3.9	9.09	3.9	9.09	4	30.	.01000	2.00	.00	0.	98	10	A31	.60
930 21D	2.1	4.89	6.0	13.97	4	100.	.01000	2.00	.00	0.	98	10	A31	.60
930 22D	1.7	4.65	7.7	18.56	4	520.	.05000	2.00	.00	0.	98	7	A31	.60
930 23D	1.9	6.23	9.6	23.28	4	30.	.01000	2.00	.00	0.	98	5	A31	.60
930 24D	2.2	6.01	11.8	29.25	4	80.	.01000	2.25	.00	0.	98	7	A31	.60
930 25D	1.1	3.61	12.9	32.25	4	200.	.01800	2.00	.00	0.	98	5	A31	.60
930 26D	1.1	2.89	14.0	34.75	4	90.	.01000	2.50	.00	0.	98	8	A31	.91
930 27D	.8	2.65	14.8	36.65	4	750.	.05500	2.00	.00	0.	98	5	A31	.85
930 28D	.0	.00	14.8	36.24	4	1.	.01000	2.50	.00	0.	98	99	A31	.00
930 29D	1.3	3.55	16.1	39.29	4	310.	.04000	2.00	.00	0.	98	7	A31	.60
930 30D	2.9	7.07	19.0	45.83	4	80.	.04000	2.00	.00	0.	98	9	A31	.60

CONFLUENCE Q'S

930 31C TC 1156 QC 77.37 QCD 123.05 QD 45.68 930 31D TD 1156 QD 45.68 QDC 123.05 QC 77.37

930 31CD TCD 1156 QCD 123.05 QC 77.37 QD 45.68

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
930 31CD	19.0	45.68	50.6	123.05	4	380.	.01000	3.75	.00	0.	98	0	A31	.00
930 32C	.0	.00	50.6	121.79	4	1.	.01000	3.75	.00	0.	98	99	A31	.00

♀

Program Package Serial Number: 2196
12/10/15 FILE: 201D-A INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 2
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\lasoilx.dat

TENT. TRACT 53295 DRAINAGE CONCEPT - DEV. CONDITION - BASIN A STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
930	33C	11.1	24.98	61.7	145.66	4	180.	.05500	3.00	.00	0.	98	11	A31	.80
930	34E	.0	.00	.0	.00	4	1.	.01000	.00	.00	0.	98	99	A31	.00
930	35E	2.4	6.56	2.4	6.56	4	700.	.01000	2.00	.00	0.	98	7	A31	.60
930	36E	4.7	12.85	7.1	18.51	4	230.	.01000	2.00	.00	0.	98	7	A31	.60
930	37E	.0	.00	7.1	18.19	4	1.	.01000	2.00	.00	0.	98	99	A31	.00

CONFLUENCE Q'S

930 38C TC 1157 QC 144.98 QCE 161.86 QE 16.87 930 38E TE 1155 QE 18.19 QEC 150.52 QC 132.34

930 38CE TCE 1157 QCE 161.86 QC 144.98 QE 16.87

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
930	38CE	7.1	18.19	68.8	161.86	4	420.	.01000	4.25	.00	0.	98	0	A31	.00
930	39C	1.5	3.41	70.3	163.83	4	1.	.01000	4.25	.00	0.	98	11	A31	.91
930	40C	1.5	3.56	71.8	167.07	4	10.	.01000	4.25	.00	0.	98	10	A31	.85
930	41C	5.4	14.94	77.2	176.02	4	10.	.01000	4.25	.00	0.	98	7	A31	.80
930	42C	1.0	2.27	78.2	178.12	4	10.	.01000	4.25	.00	0.	98	11	A31	.91
930	43C	.0	.00	78.2	178.11	4	1.	.01000	4.25	.00	0.	98	99	A31	.00
930	44C	8.7	26.03	86.9	192.98	4	330.	.01000	4.50	.00	0.	98	6	A31	.80

CONFLUENCE Q'S

930 45A TA 1160 QA 764.03 QAC 942.22 QC 178.19 930 45C TC 1158 QC 191.87 QCA 864.46 QA 672.59

930 45AC TAC 1160 QAC 942.22 QA 764.03 QC 178.19

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
930	45AC	86.9	191.87	402.0	942.22	4	1100.	.02500	6.75	.00	0.	98	0	A31	.00
930	46A	4.7	11.12	406.7	935.18	4	60.	.02500	6.75	.00	0.	98	10	A31	.80
930	47A	10.0	22.23	416.7	945.92	4	150.	.01000	8.00	.00	0.	98	10	A31	.01
930	48A	.0	.00	416.7	940.77	4	1.	.01000	8.00	.00	0.	98	99	A31	.00
930	49A	62.1	123.00	478.8	1041.73	5	120.	.01000	11.00	.00	0.	98	0	A31	.00

DRAINAGE BASIN A

DEBRIS VOLUME

DPA 8	35,000 CY/MI^2 =	55 CY/AC
AREA 2A	UNDEVELOPED AREA	11.0 AC
	DEBRIS YIELD	605 CY
AREA 11C	UNDEVELOPED AREA	7.5 AC
	DEBRIS YIELD	412.5 CY
AREA 17C	UNDEVELOPED AREA	8.8 AC
	DEBRIS YIELD	484 CY

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:

HYDROGRAPH AT 930 49A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	1.00	100	45.19	200	47.34	300	49.18	400	52.46
500	55.48	600	60.05	700	65.37	800	71.85	900	81.41
1000	104.33	1050	130.00	1100	173.44	1110	195.46	1120	229.79
1130	271.80	1131	276.82	1132	281.73	1133	285.83	1134	290.98
1135	296.17	1136	301.54	1137	307.31	1138	313.48	1139	320.02
1140	327.27	1141	335.28	1142	345.19	1143	356.04	1144	367.80
1145	380.76	1146	395.00	1147	411.05	1148	428.12	1149	450.82
1150	481.86	1151	518.84	1152	563.39	1153	614.45	1154	668.45
1155	722.26	1156	780.87	1157	844.22	1158	911.55	1159	973.86
1160	1020.35	1161	1041.73	1162	1031.29	1163	981.76	1164	897.71
1165	801.85	1166	709.11	1167	625.26	1168	553.12	1169	494.31
1170	444.94	1171	403.82	1172	368.74	1173	338.37	1174	313.40
1175	291.74	1176	273.52	1177	257.63	1178	245.39	1179	233.47
1180	223.02	1181	214.67	1182	206.35	1183	199.86	1184	192.96
1185	187.65	1186	182.97	1187	177.52	1188	173.37	1189	168.54
1190	164.92	1191	161.55	1192	158.36	1193	154.30	1194	151.46
1195	148.80	1196	146.17	1197	142.76	1198	140.51	1199	138.28
1200	136.13	1201	132.99	1202	130.94	1203	129.11	1204	127.46
1205	125.91	1206	124.44	1207	122.04	1208	120.61	1209	119.11
1210	117.54	1211	116.08	1212	114.76	1213	113.54	1214	112.27
1215	110.04	1216	108.92	1217	107.79	1218	106.72	1219	105.65
1220	104.50	1221	103.32	1222	102.24	1223	101.24	1224	99.36
1225	98.52	1226	97.65	1227	96.94	1228	96.26	1229	95.59
1230	94.97	1231	94.33	1232	93.65	1233	93.00	1234	92.33
1235	91.64	1236	90.96	1237	89.20	1238	88.37	1239	87.52
1240	86.65	1241	85.86	1242	85.16	1243	84.56	1244	84.04
1245	83.56	1246	83.06	1247	82.56	1248	82.07	1249	81.63
1250	81.18	1251	80.75	1252	80.38	1253	80.06	1254	79.76
1255	78.45	1256	78.11	1257	77.73	1258	77.35	1259	76.97
1260	76.57	1261	76.16	1262	75.74	1263	75.35	1264	75.05
1265	74.83	1266	74.62	1267	74.43	1268	74.19	1269	73.88
1270	73.58	1271	73.25	1272	72.87	1273	72.53	1274	72.17
1275	71.80	1276	71.44	1277	71.08	1278	70.69	1279	70.31
1280	69.00	1281	68.73	1282	68.43	1283	68.13	1284	67.83
1285	67.56	1286	67.37	1287	67.20	1288	67.04	1289	66.92
1290	66.75	1291	66.52	1292	66.28	1293	66.06	1294	65.88
1295	65.75	1296	65.62	1297	65.51	1298	65.42	1299	65.29
1300	65.08	1310	63.08	1320	60.41	1330	58.93	1340	57.58
1350	56.00	1360	54.29	1370	51.94	1380	51.22	1390	50.46
1400	49.75	1420	48.23	1440	46.75	1460	45.20	1500	45.19

TOTAL VOLUME THIS HYDROGRAPH = 172.87(Ac.Ft)

```
7   930    1A   284.9 441158    746.200  4
8  5   0.      1. 100.     28. 200.     30. 300.     31. 400.     33.
8 10 500.     35. 600.     38. 700.     42. 800.     46. 900.     52.
8 151000.     67.1050.     83.1100.    110.1110.    125.1120.    150.
8 201130.    176.1131.    178.1132.    181.1133.    184.1134.    187.
8 251135.    190.1136.    194.1137.    199.1138.    204.1139.    210.
8 301140.    217.1141.    224.1142.    232.1143.    240.1144.    248.
8 351145.    257.1146.    267.1147.    278.1148.    290.1149.    309.
8 401150.    332.1151.    361.1152.    399.1153.    454.1154.    527.
8 451155.    610.1156.    690.1157.    742.1158.    746.1159.    708.
8 501160.    642.1161.    566.1162.    490.1163.    423.1164.    366.
8 551165.    321.1166.    284.1167.    253.1168.    228.1169.    208.
8 601170.    190.1171.    175.1172.    165.1173.    156.1174.    149.
8 651175.    142.1176.    136.1177.    131.1178.    127.1179.    123.
8 701180.    119.1181.    116.1182.    113.1183.    110.1184.    107.
8 751185.    105.1186.    102.1187.    100.1188.     98.1189.     96.
8 801190.     94.1191.     92.1192.     91.1193.     89.1194.     88.
8 851195.     86.1196.     84.1197.     83.1198.     82.1199.     81.
8 901200.     80.1201.     79.1202.     78.1203.     77.1204.     75.
8 951205.     74.1206.     73.1207.     73.1208.     72.1209.     71.
81001210.     70.1211.     69.1212.     69.1213.     68.1214.     67.
81051215.     66.1216.     65.1217.     64.1218.     64.1219.     63.
81101220.     63.1221.     62.1222.     62.1223.     62.1224.     61.
81151225.     61.1226.     60.1227.     60.1228.     59.1229.     59.
81201230.     58.1231.     58.1232.     57.1233.     56.1234.     55.
81251235.     55.1236.     54.1237.     54.1238.     54.1239.     54.
81301240.     53.1241.     53.1242.     52.1243.     52.1244.     52.
81351245.     51.1246.     51.1247.     51.1248.     51.1249.     51.
81401250.     50.1251.     50.1252.     50.1253.     49.1254.     49.
81451255.     49.1256.     48.1257.     48.1258.     48.1259.     48.
81501260.     48.1261.     48.1262.     48.1263.     47.1264.     47.
81551265.     47.1266.     46.1267.     46.1268.     46.1269.     45.
81601270.     45.1271.     45.1272.     44.1273.     44.1274.     44.
81651275.     44.1276.     44.1277.     43.1278.     43.1279.     43.
81701280.     43.1281.     43.1282.     43.1283.     43.1284.     43.
81751285.     42.1286.     42.1287.     42.1288.     42.1289.     42.
81801290.     42.1291.     42.1292.     42.1293.     42.1294.     41.
81851295.     41.1296.     41.1297.     41.1298.     40.1299.     40.
81901300.     40.1310.     39.1320.     38.1330.     37.1340.     36.
81951350.     34.1360.     33.1370.     33.1380.     32.1390.     32.
82001400.     31.1420.     30.1440.     29.1460.     28.1500.     28.
7   930   49A    62.1 421156    123.200  4
8  5   0.      1. 100.      7. 200.      7. 300.      7. 400.      8.
8 10 500.      8. 600.      9. 700.      9. 800.     10. 900.     11.
8 151000.     14.1050.     17.1100.     23.1110.     27.1120.     31.
8 201130.     36.1131.     37.1132.     38.1133.     38.1134.     39.
8 251135.     40.1136.     41.1137.     42.1138.     43.1139.     44.
8 301140.     45.1141.     46.1142.     48.1143.     50.1144.     52.
8 351145.     54.1146.     56.1147.     59.1148.     62.1149.     67.
8 401150.     76.1151.     86.1152.     97.1153.    108.1154.    117.
8 451155.    121.1156.    123.1157.    122.1158.    119.1159.    115.
8 501160.    109.1161.    101.1162.     93.1163.     85.1164.     74.
8 551165.     64.1166.     56.1167.     48.1168.     41.1169.     37.
8 601170.     34.1171.     32.1172.     30.1173.     28.1174.     27.
8 651175.     26.1176.     25.1177.     24.1178.     24.1179.     23.
8 701180.     22.1181.     22.1182.     21.1183.     21.1184.     20.
8 751185.     20.1186.     20.1187.     19.1188.     19.1189.     18.
8 801190.     18.1191.     18.1192.     18.1193.     17.1194.     17.
8 851195.     17.1196.     17.1197.     16.1198.     16.1199.     16.
8 901200.     16.1201.     15.1202.     15.1203.     15.1204.     15.
8 951205.     15.1206.     15.1207.     14.1208.     14.1209.     14.
81001210.     14.1211.     14.1212.     14.1213.     14.1214.     14.
81051215.     13.1216.     13.1217.     13.1218.     13.1219.     13.
81101220.     13.1221.     13.1222.     13.1223.     13.1224.     12.
81151225.     12.1226.     12.1227.     12.1228.     12.1229.     12.
81201230.     12.1231.     12.1232.     12.1233.     12.1234.     12.
81251235.     12.1236.     12.1237.     11.1238.     11.1239.     11.
81301240.     11.1241.     11.1242.     11.1243.     11.1244.     11.
81351245.     11.1246.     11.1247.     11.1248.     11.1249.     11.
81401250.     11.1251.     11.1252.     11.1253.     11.1254.     11.
81451255.     10.1256.     10.1257.     10.1258.     10.1259.     10.
81501260.     10.1261.     10.1262.     10.1263.     10.1264.     10.
81551265.     10.1266.     10.1267.     10.1268.     10.1269.     10.
81601270.     10.1271.     10.1272.     10.1273.     10.1274.     10.
81651275.     10.1276.     10.1277.     10.1278.     10.1279.     10.
81701280.      9.1281.      9.1282.      9.1283.      9.1284.      9.
81751285.      9.1286.      9.1287.      9.1288.      9.1289.      9.
81801290.      9.1291.      9.1292.      9.1293.      9.1294.      9.
81851295.      9.1296.      9.1297.      9.1298.      9.1299.      9.
81901300.      9.1310.      9.1320.      8.1330.      8.1340.      8.
81951350.      8.1360.      8.1370.      7.1380.      7.1390.      7.
82001400.      7.1420.      7.1440.      7.1460.      7.1500.      7.
```

Basin A

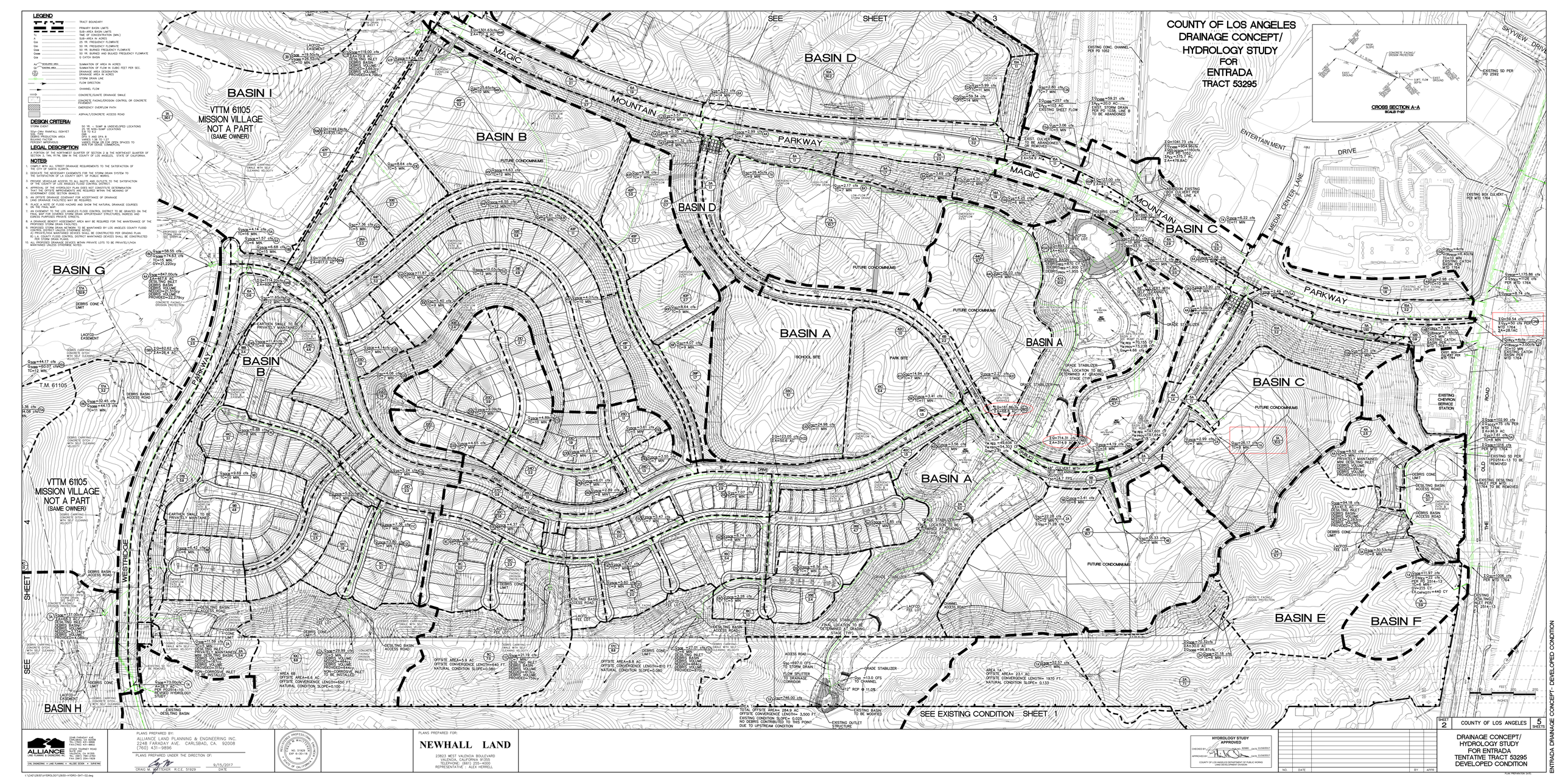
Subarea	Area (Ac)	%imp	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in)	Tc-calculated (min)	Intensity (in/hr)	Cu	Cd
2A	11.0	0.10	98	1230	0.015	6.20	12	2.45	0.82	0.83
4B	15.7	0.80	98	1180	0.020	6.20	11	2.55	0.82	0.88
5B	1.3	0.91	98	820	0.035	5.36	8	2.56	0.82	0.89
6B	2.2	0.91	98	1980	0.020	5.36	16	1.85	0.78	0.89
9C	3.0	0.60	98	820	0.035	5.36	12	2.12	0.80	0.86
10C	1.6	0.60	98	590	0.042	5.36	7	2.73	0.83	0.87
11C	7.5	0.01	98	1000	0.118	6.20	7	3.16	0.84	0.84
12C	2.3	0.60	98	900	0.040	5.36	9	2.43	0.82	0.87
14C	2.0	0.60	98	630	0.034	5.44	7	2.77	0.83	0.87
15C	2.0	0.60	98	730	0.055	5.36	7	2.73	0.83	0.87
16C	3.4	0.60	98	890	0.047	5.44	8	2.60	0.82	0.87
17C	8.8	0.01	98	850	0.129	6.20	6	3.40	0.85	0.85
18C	1.0	0.60	98	350	0.030	5.44	5	3.25	0.85	0.88
20D	3.9	0.60	98	730	0.010	5.36	10	2.31	0.81	0.86
21D	2.1	0.60	98	610	0.005	5.36	10	2.31	0.81	0.86
22D	1.7	0.60	98	530	0.015	5.36	7	2.73	0.83	0.87
23D	1.9	0.60	98	480	0.060	5.36	5	3.20	0.85	0.88
24D	2.2	0.60	98	640	0.060	5.36	7	2.73	0.83	0.87
25D	1.1	0.60	98	370	0.030	5.36	5	3.20	0.85	0.88
26D	1.1	0.91	98	900	0.052	5.36	8	2.51	0.82	0.89
27D	0.8	0.85	98	430	0.050	5.36	5	3.20	0.85	0.89

Note: Skipped No. 3A, 8C, 13C, 19D, 28D

Basin A Continued

Subarea	Area (Ac)	%imp	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in)	Tc-calculated (min)	Intensity (in/hr)	Cu	Cd
29D	1.3	0.60	98	660	0.041	5.36	7	2.73	0.83	0.87
30D	2.9	0.60	98	980	0.055	5.36	9	2.43	0.82	0.87
33C	11.1	0.80	98	1180	0.020	6.10	11	2.51	0.82	0.88
35E	2.4	0.60	98	740	0.047	6.10	7	3.11	0.84	0.88
36E	4.7	0.60	98	860	0.055	6.10	7	3.11	0.84	0.88
39C	1.5	0.91	98	1280	0.030	5.36	11	2.21	0.81	0.89
40C	1.5	0.85	98	1070	0.030	5.36	10	2.31	0.81	0.89
41C	5.4	0.80	98	600	0.020	6.10	7	3.11	0.84	0.89
42C	1.0	0.91	98	1125	0.020	5.36	11	2.21	0.81	0.89
44C	8.7	0.80	98	530	0.020	6.10	6	3.34	0.85	0.89
46A	4.7	0.80	98	990	0.020	6.10	10	2.63	0.82	0.88
47A	10.0	0.01	98	1060	0.033	6.10	10	2.63	0.82	0.82

Note: Skipped No's: 32C, 34E, 37E, 43C


COUNTY OF LOS ANGELES
DRAINAGE CONCEPT/
HYDROLOGY STUDY
FOR
ENTRADA
TRACT 53295
LEGEND
TRACT BOUNDARY
PRIMARY BASIN LIMITS
SUB-AREA BASIN LIMITS
TIME OF CONCENTRATION (MIN.)
25 YR. FREQUENCY FLOWRATE
25 YR. FREQUENCY FLOWRATE
50 YR. FREQUENCY FLOWRATE
50 YR. BURNED FREQUENCY FLOWRATE
50 YR. BURNED AND BULKED FREQUENCY FLOWRATE
Q CATCH BASIN
SUMMATION OF AREA IN ACRES
SUMMATION OF FLOW IN CUBIC FEET PER SEC.
DRAINAGE AREA DESIGNATION
DRAINAGE AREA IN ACRES
STORM DRAIN LINE
FLOW DIRECTION
CHANNEL FLOW
CONCRETE/GUNITE DRAINAGE SWALE
CONCRETE FACING/EROSION CONTROL OR CONCRETE PAVEMENT
EMERGENCY OVERFLOW PATH
ASPHALT/CONCRETE ACCESS ROAD
DESIGN CRITERIA:
STORM EVENT
50 YR. = SUMP & UNDEVELOPED LOCATIONS
25 YR NON-SUMP LOCATIONS
50yr-24hr RAINFALL ISOHYET
100 YEAR
DEBRIS PRODUCTION AREA
SOIL TYPE
PERVIOUS
IMPERVIOUS
PERCENT IMPERVIOUS
LEGAL DESCRIPTION
NOTES
1. COMPLY WITH ALL STREET DRAINAGE REQUIREMENTS TO THE SATISFACTION OF THE CITY OF SANTA CLARITA.
2. DEDICATE THE NECESSARY EASEMENTS FOR THE STORM DRAIN SYSTEM TO THE SATISFACTION OF LA COUNTY DEPT. OF PUBLIC WORKS.
3. PROVIDE VEHICULAR ACCESS TO ALL INLETS AND OUTLETS TO THE SATISFACTION OF THE COUNTY OF LOS ANGELES FLOOD CONTROL DISTRICT.
4. APPROVAL OF THE HYDROLOGY PLAN DOES NOT CONSTITUTE DETERMINATION OF THE EXTENT OF FLOOD HAZARD AREA AS REQUIRED WITHIN THE MEANING OF GOVERNMENT CODE SECTION 66462.5.
5. AN OFFSITE DRAINAGE COVENANT FOR ACCEPTANCE OF DRAINAGE AND DRAINAGE FACILITIES MAY BE REQUIRED.
6. PLACE A NOTE OF FLOOD HAZARD AND SHOW THE NATURAL DRAINAGE COURSES ON THE FINAL MAP.
7. AN EASEMENT TO THE LOS ANGELES FLOOD CONTROL DISTRICT TO BE GRANTED ON THE FINAL MAP FOR COVERED STORM DRAIN APPURTENANT STRUCTURES, INGRESS AND EGRESS FOR PURPOSES OF MAINTENANCE.
8. A DRAIN AGE EASEMENT/ASSESSMENT AREA MAY BE REQUIRED FOR THE MAINTENANCE OF THE PROPOSED STORM DRAIN FACILITIES.
9. PROPOSED STORM DRAIN INCIDENTAL TO BE MAINTAINED BY LOS ANGELES COUNTY FLOOD CONTROL DISTRICT UNLESS NOTED OTHERWISE.
10 PRIVATE/NON MAINTAINED DEVICES SHALL BE CONSTRUCTED PER GRADING PLAN
11 L.A. COUNTY FLOOD CONTROL DISTRICT MAINTAINED DEVICES SHALL BE CONSTRUCTED PER STORM DRAIN PLANS
12. ALL STORM DRAIN FACILITIES ACCESS WITHIN PRIVATE LOTS TO BE PRIVATELY/HOA MAINTAINED UNLESS OTHERWISE NOTED.
BASIN I
VTTM 61105
MISSION VILLAGE
NOT A PART
(SAME OWNER)
BASIN B
BASIN D
BASIN C
BASIN G
BASIN A
BASIN E
BASIN F
BASIN H
SCHOOL SITE
PARK SITE
FUTURE CONDOMINIUMS
MAGIC MOUNTAIN PARKWAY
ENTERTAINMENT DRIVE
MEDIA CENTER LANE
WESTRIDGE
SKYVIEW DRIVE
CLO THE ROAD
EXISTING CHEVRON SERVICE STATION
T.M. 61105
SEE SHEET 3
SEE SHEET 4
SEE SHEET 1
SEE EXISTING CONDITION SHEET 1
CROSS SECTION A-A
SCALED: 1"=20'
EXISTING SD PER PD 2592
EXISTING BOX CULVERT PER MTD 1764
EXISTING CATCH BASIN PER MTD 1764
EXISTING DESILTING INLET PER MTD 1764 TO BE REMOVED
EXISTING SD PER PD2014-13 TO BE REMOVED
EXISTING DESILTING INLET PER PD 2014-13
EXISTING CONC. CHANNEL PER PD 1052
EXIST. CULVERT TO BE ABANDONED OR REMOVED
EXISTING SD PER PD 1052 TO BE ABANDONED
LACFCD FEE LOT
LACFCD EASEMENT
DEBRIS CONE LIMIT
DEBRIS BASIN ACCESS ROAD
EXISTING DESILTING BASIN ACCESS ROAD
CHANNEL ACCESS ROAD
EARTHEN SWALE TO BE PRIVATELY MAINTAINED
GRADE STABILIZER
FINAL LOCATION TO BE DETERMINED AT GRADING STAGE (TYP.)
FLOW SPLITTER TO DRAINAGE CORRIDOR
OFFSITE AREA=5.9 AC
OFFSITE CONVERGENCE LENGTH=640 FT.
NATURAL CONDITION SLOPE=0.060
OFFSITE AREA=8.8 AC
OFFSITE CONVERGENCE LENGTH=810 FT.
NATURAL CONDITION SLOPE=0.080
OFFSITE AREA=6.6 AC
OFFSITE CONVERGENCE LENGTH=650 FT.
NATURAL CONDITION SLOPE=0.100
AREA 1A
OFFSITE AREA= 23.1 AC
OFFSITE CONVERGENCE LENGTH= 1970 FT.
NATURAL CONDITION SLOPE= 0.133
TOTAL OFFSITE AREA= 284.9 AC
OFFSITE CONVERGENCE LENGTH= 3,500 FT.
EXISTING CONDITION SLOPE= 0.025
NO DEBRIS CONTRIBUTED TO THIS POINT DUE TO UPSTREAM CONDITION
EXISTING OUTLET STRUCTURE
EXISTING BASIN TO BE MODIFIED
ALLIANCE
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CIVIL ENGINEERING • LAND PLANNING • RELATED DESIGN • SURVEYING
PLANS PREPARED BY:
ALLIANCE LAND PLANNING & ENGINEERING INC.
2248 FARADAY AVE. CARLSBAD, CA. 92008
(760) 431-9896
PLANS PREPARED UNDER THE DIRECTION OF:
CRAIG M. WHITTEKER R.C.E. 51929
9/15/2017
DATE
REGISTERED PROFESSIONAL ENGINEER
CRAIG MATTHEW WHITTEKER
NO. 51929
EXP. 6-30-18
CIVIL
STATE OF CALIFORNIA
PLANS PREPARED FOR:
NEWHALL LAND
23823 WEST VALENCIA BOULEVARD
VALENCIA, CALIFORNIA 91355
TELEPHONE: (661) 255-4000
REPRESENTATIVE: ALEX HERRELL
HYDROLOGY STUDY APPROVED
CHECKED BY: [illegible] DATE 11/16/2017
APPROVED BY: [illegible] DATE 11/16/2017
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS
LAND DEVELOPMENT DIVISION
NO. DATE BY APP'R
SHEET 2
COUNTY OF LOS ANGELES
5 SHEETS
DRAINAGE CONCEPT/
HYDROLOGY STUDY
FOR ENTRADA
TENTATIVE TRACT 53295
DEVELOPED CONDITION
ENTRADA DRAINAGE CONCEPT - DEVELOPED CONDITION
I:\CAD\13932\HYDROLOGY\13930-HYDRO-SHT-02.dwg
PLAN PREPARATION DATE:

ENTRADA SOUTH - LID
DIVERSION CALCUALTINS FOR 80% LONG TERM CAPTURE (Qpm)

DIVERSION CALCULATIONS - BASIN A

BASIN	DIVERTER	TRIB DA	TRIB AREA	PIPE SIZE	SLOPE	Qpm	Qmax
			ac	in	%	cfs	cfs
A	A1	S	1.3	4	2.0	0.24	0.28
	A2	R	2.1	6	0.5	0.39	0.43
	MAIN	S, R	3.4	6	2.0	0.63	0.86
	A3	C, D, F	21.9	8	13.0	4.03	4.78
TOTAL	OUTLET	ALL	25.3	8	13.0	4.66	4.78

DIVERSION CALCULATIONS - BASIN B

BASIN	DIVERTER	TRIB DA	TRIB AREA	PIPE SIZE	SLOPE	Qpm	Qmax
			ac	in	%	cfs	cfs
B	B1	B1	45.0	10	3.5	10.73	10.84
	B2	P, W	17.9	15	2.4	4.27	4.39
TOTAL	OUTLET	ALL	62.9	18	1.8	15.00	15.27

DIVERSION CALCULATIONS - BASIN C

BASIN	DIVERTER	TRIB DA	TRIB AREA	PIPE SIZE	SLOPE	Qpm	Qmax
			ac	in	%	cfs	cfs
C	C	B2	24.7	8	15.0	4.50	5.14

BASIN A1 - 4" @ 2% = 0.28 cfs

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.012	
Channel Slope	0.02000	ft/ft
Normal Depth	0.33	ft
Diameter	0.33	ft

Results

Discharge	0.28	ft^3/s
Flow Area	0.09	ft^2
Wetted Perimeter	1.04	ft
Hydraulic Radius	0.08	ft
Top Width	0.00	ft
Critical Depth	0.29	ft
Percent Full	100.0	%
Critical Slope	0.01779	ft/ft
Velocity	3.32	ft/s
Velocity Head	0.17	ft
Specific Energy	0.50	ft
Froude Number	0.00	
Maximum Discharge	0.31	ft^3/s
Discharge Full	0.28	ft^3/s
Slope Full	0.02000	ft/ft
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
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s

BASIN A1 - 4" @ 2% = 0.28 cfs

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.33	ft
Critical Depth	0.29	ft
Channel Slope	0.02000	ft/ft
Critical Slope	0.01779	ft/ft

BASIN A2 - 6" @ 0.5% = 0.43 cfs

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.012	
Channel Slope	0.00500	ft/ft
Normal Depth	0.50	ft
Diameter	0.50	ft

Results

Discharge	0.43	ft^3/s
Flow Area	0.20	ft^2
Wetted Perimeter	1.57	ft
Hydraulic Radius	0.13	ft
Top Width	0.00	ft
Critical Depth	0.33	ft
Percent Full	100.0	%
Critical Slope	0.00809	ft/ft
Velocity	2.19	ft/s
Velocity Head	0.07	ft
Specific Energy	0.57	ft
Froude Number	0.00	
Maximum Discharge	0.46	ft^3/s
Discharge Full	0.43	ft^3/s
Slope Full	0.00500	ft/ft
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
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s

BASIN A2 - 6" @ 0.5% = 0.43 cfs

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.50	ft
Critical Depth	0.33	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00809	ft/ft

BASIN A1/A2 MAIN - 6" @ 2% = 0.86 cfs

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.012	
Channel Slope	0.02000	ft/ft
Normal Depth	0.50	ft
Diameter	0.50	ft

Results

Discharge	0.86	ft^3/s
Flow Area	0.20	ft^2
Wetted Perimeter	1.57	ft
Hydraulic Radius	0.13	ft
Top Width	0.00	ft
Critical Depth	0.45	ft
Percent Full	100.0	%
Critical Slope	0.01747	ft/ft
Velocity	4.38	ft/s
Velocity Head	0.30	ft
Specific Energy	0.80	ft
Froude Number	0.00	
Maximum Discharge	0.92	ft^3/s
Discharge Full	0.86	ft^3/s
Slope Full	0.02000	ft/ft
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
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s

BASIN A1/A2 MAIN - 6" @ 2% = 0.86 cfs

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.50	ft
Critical Depth	0.45	ft
Channel Slope	0.02000	ft/ft
Critical Slope	0.01747	ft/ft

BASIN A3 - 8" @ 13% = 4.78 cfs

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.012	
Channel Slope	0.13000	ft/ft
Normal Depth	0.67	ft
Diameter	0.67	ft

Results

Discharge	4.78	ft^3/s
Flow Area	0.35	ft^2
Wetted Perimeter	2.10	ft
Hydraulic Radius	0.17	ft
Top Width	0.00	ft
Critical Depth	0.67	ft
Percent Full	100.0	%
Critical Slope	0.12501	ft/ft
Velocity	13.57	ft/s
Velocity Head	2.86	ft
Specific Energy	3.53	ft
Froude Number	0.00	
Maximum Discharge	5.15	ft^3/s
Discharge Full	4.78	ft^3/s
Slope Full	0.13000	ft/ft
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
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s

BASIN A3 - 8" @ 13% = 4.78 cfs

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.67	ft
Critical Depth	0.67	ft
Channel Slope	0.13000	ft/ft
Critical Slope	0.12501	ft/ft

BASIN B1 - 10" @ 3.5% = 4.39 cfs

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.012	
Channel Slope	0.03500	ft/ft
Normal Depth	0.83	ft
Diameter	0.83	ft

Results

Discharge	4.39	ft^3/s
Flow Area	0.54	ft^2
Wetted Perimeter	2.61	ft
Hydraulic Radius	0.21	ft
Top Width	0.00	ft
Critical Depth	0.81	ft
Percent Full	100.0	%
Critical Slope	0.03106	ft/ft
Velocity	8.12	ft/s
Velocity Head	1.02	ft
Specific Energy	1.85	ft
Froude Number	0.00	
Maximum Discharge	4.73	ft^3/s
Discharge Full	4.39	ft^3/s
Slope Full	0.03500	ft/ft
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
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s

BASIN B1 - 10" @ 3.5% = 4.39 cfs

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.83	ft
Critical Depth	0.81	ft
Channel Slope	0.03500	ft/ft
Critical Slope	0.03106	ft/ft

BASIN B2 - 15" @ 2.4% = 10.84 cfs

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.012	
Channel Slope	0.02400	ft/ft
Normal Depth	1.25	ft
Diameter	1.25	ft

Results

Discharge	10.84	ft^3/s
Flow Area	1.23	ft^2
Wetted Perimeter	3.93	ft
Hydraulic Radius	0.31	ft
Top Width	0.00	ft
Critical Depth	1.20	ft
Percent Full	100.0	%
Critical Slope	0.02092	ft/ft
Velocity	8.83	ft/s
Velocity Head	1.21	ft
Specific Energy	2.46	ft
Froude Number	0.00	
Maximum Discharge	11.66	ft^3/s
Discharge Full	10.84	ft^3/s
Slope Full	0.02400	ft/ft
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
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s

BASIN B2 - 15" @ 2.4% = 10.84 cfs

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.25	ft
Critical Depth	1.20	ft
Channel Slope	0.02400	ft/ft
Critical Slope	0.02092	ft/ft

BASIN B - OUTLET - 18" @ 1.8% = 15.27 cfs

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.012	
Channel Slope	0.01800	ft/ft
Normal Depth	1.50	ft
Diameter	1.50	ft

Results

Discharge	15.27	ft³/s
Flow Area	1.77	ft²
Wetted Perimeter	4.71	ft
Hydraulic Radius	0.38	ft
Top Width	0.00	ft
Critical Depth	1.41	ft
Percent Full	100.0	%
Critical Slope	0.01556	ft/ft
Velocity	8.64	ft/s
Velocity Head	1.16	ft
Specific Energy	2.66	ft
Froude Number	0.00	
Maximum Discharge	16.42	ft³/s
Discharge Full	15.27	ft³/s
Slope Full	0.01800	ft/ft
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
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s

BASIN B - OUTLET - 18" @ 1.8% = 15.27 cfs

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.50	ft
Critical Depth	1.41	ft
Channel Slope	0.01800	ft/ft
Critical Slope	0.01556	ft/ft

BASIN C - 8" @ 15% = 5.14 cfs

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.012	
Channel Slope	0.15000	ft/ft
Normal Depth	0.67	ft
Diameter	0.67	ft

Results

Discharge	5.14	ft^3/s
Flow Area	0.35	ft^2
Wetted Perimeter	2.10	ft
Hydraulic Radius	0.17	ft
Top Width	0.00	ft
Critical Depth	0.67	ft
Percent Full	100.0	%
Critical Slope	0.14499	ft/ft
Velocity	14.57	ft/s
Velocity Head	3.30	ft
Specific Energy	3.97	ft
Froude Number	0.00	
Maximum Discharge	5.53	ft^3/s
Discharge Full	5.14	ft^3/s
Slope Full	0.15000	ft/ft
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
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s

BASIN C - 8" @ 15% = 5.14 cfs

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.67	ft
Critical Depth	0.67	ft
Channel Slope	0.15000	ft/ft
Critical Slope	0.14499	ft/ft

DRAINAGE BASIN AT GOLF COURSE
ENTRADA SOUTH

EXISTING 36" RCP FROM GOLF COURSE (LOW/MID LEVEL FLOWS)

LIMITS OF CONSTRUCTION

PROPOSED HIGH FLOW SPILLWAY GROUTED RIPRAP

WSEL=1252.0

PROPOSED TOP OF CONCRETE 1253 FS

(1245.0) IE

EXISTING TO REMAIN

EXISTING ACCESS ROAD

2:1 CONCRETE

1:1

12'

15%

ACCESS ROAD

PROPERTY LINE

PRIVATE

LACDPW TO MAINTAIN

LIMITS OF CONSTRUCTION

WARP TO EXISTING

BASIN INVERT 1240.0

PROPOSED RCB INLET
Q_{50B} = 746 CFS

PROPOSED PIPE INLET
$Q_{MID-FLOW}$ = 13 CFS

RCB — TRANSITION — RCP

RCP

4%

6%

8%

12'

TURN-AROUND PAD

40'

40'

SCE OH

SCE OH

SCE OH

SCE OH

PROPOSED TOP OF BANK 1253 FG

PROPOSED TOP OF CONCRETE 1253 FS

OUTLET

PROPOSED GRADE STABILIZER

1240

1245

1250

1255

1260

1235

SCALE: 1" = 20'

GRAPHIC SCALE

20 10 0 20 40

(IN FEET)

1 inch = 20 ft.

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I:\CAD\0930\$DRAINAGE CORRIDOR REVISION OCTOBER 2015\EXHIBITS\0930-DIVERTER BASIN EXHIBIT.dwg

DRAINAGE BASIN AT GOLF COURSE
ENTRADA SOUTH
10/18/17

EXISTING 36" RCP
FROM GOLF COURSE
(LOW/MID LEVEL FLOWS)

LIMITS OF
CONSTRUCTION

ROAD

ACCESS

PROPOSED
HIGH FLOW SPILLWAY
GROUTED RIPRAP

1255

WSEL=1252.0

PROPOSED
TOP OF CONCRETE
1253 FS

2:1

CONCRETE

1250

1245

(1245.0)
TF

EXISTING TO
REMAIN

EXISTING

T-1

12'

15%

ACCESS

ROAD

PROPERTY LINE

PROPOSED RCB INLET
Q_{50B} = 746 CFS

LIMITS OF
CONSTRUCTION

PRIVATE

LACDPW TO
MAINTAIN

BASIN INVERT
1240.0

WARP TO
EXISTING

2:1

4%

6%

TURN-AROUND
PAD

8%

12'

RCB

TRANSITION

RCP

RCP

PROPOSED PIPE INLET
$Q_{MID-FLOW}$ = 13 CFS

40'

40'

1250

WSEL=1252.0

SCE OH

SCE OH

1245

1250

1255

CONCRETE

2:1

PROPOSED
TOP OF BANK
1253 FG

PROPOSED
TOP OF CONCRETE
1253 FS

1250

1245

1240

1235

OUTLET

2:1

PROPOSED
GRADE STABILIZER

SCE OH

SCE OH

SCE OH

SCALE: 1"=20'

GRAPHIC SCALE

20 10 0 20 40

(IN FEET)
1 inch = 20 ft.

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Geosyntec consultants

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Memorandum

Date:	24 October 2017
To:	Miles Helfrich, Newhall Land
From:	Aaron Poresky and Austin Orr, Geosyntec Consultants
Subject:	Entrada South – Evaluation of Conformance with Newhall LID Performance Standard

1. INTRODUCTION

The Entrada South Project (Tentative Tract Map (TTM) No. 53295) (Project) includes low impact development (LID) best management practices (BMPs) as shown in the *LID/SUSMP/Water Quality Maintenance Plan Map for Entrada South* (Water Quality Exhibit, Alliance, 2017). The purpose of this memorandum is to verify that the LID BMPs proposed for the Project have been selected and sized in a manner consistent with the Project LID Performance Standard as defined by the Los Angeles County Municipal Separate Storm Sewer System (MS4) Permit (Order No. R4-2012-0175). The Newhall Waste Discharge Requirements (WDRs) (Order No. R4-2012-0139) and the *Newhall Ranch Sub-Regional Stormwater Mitigation Plan (NRSSMP)* (Geosyntec, 2009) also serve as benchmarks for evaluating conformance.

The Project LID Performance Standard establishes three separate conformance metrics, including BMP selection, sizing of individual BMPs for each drainage area, and sizing of BMPs to provide adequate retention volume or equivalent biofiltration volume at the tract map-scale. In summary, this memorandum demonstrates conformance with these three different conformance metrics, including:

- **BMP selection analysis.** LID BMPs have been selected in a manner consistent with the LID selection criteria (i.e., infiltration feasibility criteria) contained in the LID Performance Standard;

- **BMP sizing analysis.** The combination of parcel-based, regional infiltration/ bioinfiltration facilities, and "green street" facilities provide capture and treatment of at least 80 percent of average annual runoff volume for each drainage area within the Project, consistent with the LID Performance Standard; and

- **Tract map-scale retention analysis.** The Project provides retention plus equivalent biofiltration volume consistent with the retention requirements of the Project LID Performance Standard.

Collectively, these findings, which are supported by the analyses in this memorandum, demonstrate that the improvements proposed as part of the Project conform to the applicable standards for managing stormwater quality.

This memorandum also explains why the requirements of the Los Angeles County Department of Public Works' (LACDPW) *Development Planning for Storm Water Management, A Manual for the Standard Urban Stormwater Mitigation Plan* (SUSMP) (Los Angeles County, 2002) and the Los Angeles County LID Ordinance and Manual (LACDPW, 2008, 2009) are met or exceeded when the Project's LID Performance Standard is met.

Section 2 describes the applicable LID Performance Standards which are used to demonstrate Project conformance. Section 3 describes the Project's water quality project design features (PDFs). Section 4 demonstrates conformance of the water quality PDFs to each of the three conformance metrics identified above.

Chronology note: The Entrada South Drainage Concept was previously approved by LACDPW in January 2014. Updates to the project design have been made to preserve a greater portion of Unnamed Canyon 2. This resulted in reduction in project footprint and relocation of the three regional water quality facilities located in the Unnamed Canyon 2 drainage corridor (referred to as Facilities A, B, and C). This memorandum incorporates updates associated with these relatively isolated changes.

2. LID PERFORMANCE STANDARD

2.1 Newhall WDR LID Performance Standard

The Newhall WDR (Order No. R4-2012-0139)[1] was adopted by the Los Angeles Regional Board on September 14, 2012. The Newhall WDR does not directly apply to the Project; however, it serves as the basis for the Newhall LID Performance Standard and as a benchmark for the Project. The Newhall WDR prescribes the LID Performance Standard for the villages within the Newhall Ranch (General Conditions, Paragraph 10):

> Each development area within the Resource Management and Development Plan (RMDP) shall incorporate the following measures. Development areas within the RMDP site shall

[1] http://www.waterboards.ca.gov/rwqcb4/water_issues/programs/401_water_quality_certification/Newhall/index.shtml

comply with all applicable regulatory requirements of the Los Angeles County MS4 Permit in place at the time of the preparation of the Water Quality Technical Report (WQTR) unless an equivalent requirement in the RMDP Clean Water Act Section 401 Water Quality Certification and Waste Discharge Requirements (WDR) is more stringent. Project design features shall be selected and sized to retain the volume of stormwater runoff produced from a 1.1 inch storm event[2] (LID design volume) to reduce the percentage of Effective Impervious Area (EIA) to 5 percent or less of the total project area within the Newhall Ranch Specific Plan. When it has been demonstrated that 100 percent of the LID design volume cannot be feasibly[3] infiltrated, then biofiltration shall be provided for 1.5 times the portion of the LID design volume that is not retained. Runoff from all EIA shall be treated with effective treatment control measures that are selected to address the pollutants of concern and are sized to capture and treat 80 percent of the average annual runoff volume. Each village-level project shall achieve the LID Performance Standard cumulatively, considering the retention volume and equivalent biofiltration volume[4] provided by the project itself and by all previous development phases within the RMDP area. The LID Performance Standard shall be implemented as follows:

Institutional, commercial, multi-family residential, recreation, and park land use parcels shall implement retention or biofiltration BMPs within the parcel footprint. Runoff from roofs, patios, and walkways in single family residential parcels shall be dispersed over landscaped areas to retain runoff. Runoff from the remaining developed area and that which is not retained within the parcel footprints shall flow through the storm drain system to the regional infiltration/ biofiltration facilities. Based on an assessment of feasibility, one of three BMP strategies shall be applied to each project (i.e., village) as follows:

a. If it is feasible to infiltrate all of the runoff produced from the 1.1 inch storm from the developed area (i.e., soil infiltration rates are at least 0.5 inches per hour, and no other technical infeasibility concerns exist), infiltration BMPs *[Category 1]* shall be used. Infiltration BMPs include bioretention (without an underdrain), permeable pavement, infiltration galleries, infiltration basins or trenches, or an equivalent infiltration BMP.

b. If it has been demonstrated in the Project WQTR and Drainage Concept Report that the BMP strategy of subsection (a), of this condition is infeasible, and if the project has low soil infiltration rates (i.e., the soil infiltration rate is less than 0.5 inches per hour), but no other technical infeasibility concerns exist, bioinfiltration BMPs *[Category 2]* shall be

[2] The 85th percentile, 24-hour storm depth is equal to 1.1 inches as determined from the Los Angeles County 85th Percentile 24-hr Rainfall Isohyetal Map (February 2004).
[3] Feasibility shall be based on the approved Ventura County Technical Guidance Manual for Stormwater Quality Control Measures (7-13-2011)).
[4] Biofiltration volume shall be equated to retention volume at a ratio of 1.5 (biofiltration) to 1.0 (retention).

used. Bioinfiltration facilities are similar to bioretention facilities with an underdrain, but they include storage below the underdrain to maximize the volume infiltrated. These facilities shall retain a portion of the runoff from the 1.1 inch design storm, then biofilter 1.5 times the remaining runoff from the 1.1 inch design storm.

c. If it has been demonstrated in the Project WQTR and Drainage Concept Report that the BMP strategies of subsections (a) and (b) of this condition are infeasible, then biofiltration BMPs *[Category 3]* shall be used. These BMPs shall biofilter the runoff produced from the 1.5 times the 1.1 inch design storm.

Runoff from roadways shall be retained or biofiltered in retention or biofiltration BMPs sized to capture the design storm volume or flow, per the guidance in USEPA's *Managing Wet Weather with Green Infrastructure: Green Streets*.

No more than 5% of the total project area shall be treated using conventional treatment methods that address the pollutants of concern. Media filters (or equivalent BMPs that address the pollutants of concern) shall be sized to capture and treat 80% of the average annual runoff volume from the allowable EIA.

Regional facilities shall be implemented to infiltrate or biofilter the runoff volume from the 1.1 inch design storm volume that has not been retained or biofiltered within parcels, single family lots, or road right of ways. Additionally, regional facilities shall be designed to provide extended detention treatment for the additional runoff volume required to provide 80% capture and treatment of the average annual runoff volume for the tributary area to the regional facility per the Newhall Ranch Specific Plan Sub-Regional Stormwater Mitigation Plan treatment performance standard.

[alternative terminology provided in brackets]

The WDR requires that Projects also conform to any aspects of the Los Angeles County MS4 Permit in effect at the time of Project approval that are more stringent than the respective provisions of the WDR.

2.2 Los Angeles MS4 Permit

The Los Angeles County MS4 Permit (Order No. R4-2012-0175) was adopted by the Los Angeles Regional Board on November 8, 2012, and includes an LID Performance Standard that differs slightly from the Newhall WDR LID Performance Standard. Notably, the MS4 Permit varies from the WDR in that:

- The MS4 Permit does not include five percent allowable EIA.

- The MS4 Permit defines biofiltration such that the storage volume provided in such systems cannot be less than the stormwater quality design volume (SWQDv), defined as the runoff from the 1.1 inch precipitation event.

These differences are considered more stringent or equivalently stringent than the Newhall WDR, therefore they replace the respective provisions in the Newhall WDR in the Project LID Performance Standard. In other respects, the Newhall WDR LID Performance Standard is equivalent to that required by the Los Angeles County MS4 Permit, as demonstrated in the subsequent sections. The LID Performance Standard for the project is based on the more stringent provisions of the 2012 MS4 Permit and the Newhall WDR as illustrated in Figure 1.

2.3 Newhall Ranch Sub-Regional Stormwater Mitigation Plan

The approved NRSSMP (Geosyntec, 2008) was developed in 2008 and subsequently amended in November 2010 to include the Project area. The BMP selection and sizing criteria described in the NRSSMP were incorporated into the Newhall WDR LID Performance Standard and made more stringent as part of this incorporation, therefore the NRSSMP does not establish a separate LID Performance Standard for the Project water quality design features proposed as part of this Project.

2.4 Los Angeles County SUSMP

The LACDPW *Development Planning for Storm Water Management, A Manual for the Standard Urban Stormwater Mitigation Plan* (SUSMP) (Los Angeles County, 2002) specifies a design storm volume of 0.75 inches. In comparison, the Newhall WDR LID Performance Standard specifies a design storm of 1.1 inches, with an overlaid requirement of capture and treatment of at least 80 percent of average annual runoff volume. As such, BMPs sized for the Newhall WDR Performance Standard significantly exceed the size of BMPs that would be required for compliance the SUSMP.

2.5 Los Angeles County LID Ordinance

The Los Angeles County LID Manual (LACDPW, 2014) implements the provisions of the 2012 MS4 Permit. This Manual establishes the same standard as the 2012 MS4 Permit.

3. PROPOSED WATER QUALITY PROJECT DESIGN FEATURES

The water quality PDFs include parcel-based LID BMPs, “green streets” BMPs, single family residential hydrologic source controls, and regional infiltration/bioinfiltration facilities. The sections below describe the water quality PDFs that are proposed as part of the Project and how these features have been considered in this conformance analysis.

3.1 Parcel-Based LID BMPs

3.1.1 Parcel-based BMP Commitments

Parcel-based LID BMPs will be implemented within multi-family, commercial, institutional, and park/recreation land uses (see Figure 2) as part of the construction of final parcel improvements. Parcel-based LID BMPs include infiltration (Category 1), bioinfiltration (Category 2), and biofiltration (Category 3) as described in the LID Performance Standard (Section 2.1) and illustrated in Figure 1. Three different applications for parcel-based BMPs occur within the project, depending on the presence and type of downstream regional BMPs:

- Where discharge from parcels drains to a downstream regional infiltration system that is designed to fully infiltrate runoff up to the 80 percent capture sizing standard, specific numeric commitments to parcel-based LID BMPs are not required as part of demonstrating conformance. Regional facilities alone meet the numeric commitments of the LID Performance Standard. This applies to parcels that drain to Regional Facilities A, B, and C.

- Where discharge from parcels drains to a downstream regional biofiltration/bioinfiltration facility that is not a full infiltration facility, parcel-based BMPs are designed for the full SWQDv, and their treated discharge is also treated in the downstream regional facility. The combined effect of parcel-based BMPs and regional LID facilities meets the full LID Performance Standard. This applies to runoff from parcels that drain to Regional Facility D.

- Where discharge from parcels drains to receiving waters without first flowing to a regional LID facility (i.e., "stand alone parcel-based BMPs"), these parcel-based BMPs are designed to: 1) have a minimum storage volume equivalent to the SWQDv, (2) infiltrate to the maximum extent feasible based on parcel-specific infiltration feasibility, (3) biofilter 1.5 times the remaining runoff that cannot be feasibly infiltrated from the 1.1 inch design storm, and (4) achieve 80 percent capture of the average annual runoff. By meeting these criteria, these facilities fully meet the LID Performance Standard as supported by analyses contained in Appendix A.

Parcel-based BMPs have been incorporated into the Project Water Quality Exhibit based on these criteria. See Figure 3 for infeasibility screening results based on analysis by RTF&A (2013, 2017) and Figure 4 for the spatial distribution of the parcel-based treatment categories within the Project. Based on these factors and the estimated impervious cover of each parcel, the Project includes commitments for specific LID volumes for each parcel (see Figure 4). Newhall Land will condition the development of these parcels to require that the volumetric commitments must be provided by

the developers of the parcels (except as adjusted for imperviousness or as part of an approved equivalent approach, as described in Sections 3.1.2 and 3.1.3, below).

3.1.2 Requirements for Imperviousness Different than Planned

The final imperviousness of parcel development plans may deviate from the assumptions made in this submittal, requiring lesser or greater commitments than shown in Figure 4. Developers of parcels shall be required to estimate parcel imperviousness at the final design stage.

- If imperviousness is less than planned, the developer may adjust volume-based commitments downward by the ratio of the final design imperviousness to the planned impervious shown in Figure 4. This will result in lower volume commitments. It will also result in a credit toward overall lower imperviousness within the tributary to the respective regional facility, which will be recorded in a tracking system to be administered by Newhall Land (See Section 3.1.4) and made available to parcels that have higher imperviousness than planned.

- If imperviousness is greater than estimated in Figure 4, the developer shall be required to adjust parcel-based commitments upward by the ratio of actual imperviousness to planned imperviousness. In this case, the parcel-based commitment will be higher. Additionally, the developer will be required to obtain a credit from the tracking system described in Section 3.1.4 to offset the addition of impervious surface tributary to the regional facility.

3.1.3 Equivalent Options for Complying with Parcel-based Commitments

Constraints may be identified in the development of parcel plans that render it infeasible or impracticable to meet the volumetric commitments shown in Figure 4 within the boundaries of the parcel. Alternative approaches may be used that are consistent with applicable requirements and provide equivalent control at the scale of the tributary area to each regional facility:

- As one option, developers of parcels may enter into agreements with adjacent or nearby parcels to provide volume-based commitments in adjacent or nearby parcels. The parcels where volume commitments are provided must be within the regional facility tributary area as the parcel claiming these benefit and shall be constructed prior to occupancy of any parcel that utilizes them for compliance. Parcel-level submittals shall describe how, where, and when commitments will be met and how these BMPs will be maintained.

- Other equivalent options may be considered for approval with demonstration of equivalency and consistency with applicable requirements.

3.1.4 Tracking System for Parcel-based Commitments

Newhall Land shall develop and administer a system for tracking parcel-based commitments within the tributary area to each regional facility. This system shall track adjustments to imperviousness compared to planned imperviousness shown in Figure 4 and shall track implementation of parcel-based BMPs in comparison to commitments. This system shall ensure that:

1) Where parcels have imperviousness greater than shown in Figure 4, other parcels have a reduction in imperviousness such that the overall effect is that the imperviousness to the regional facility does not increase significantly,

2) Where parcels provide a portion of volume on adjacent or nearby parcels, total commitments are met.

3.2 Green Streets

The Project will utilize "green streets" techniques to treat runoff from public right-of-ways in a manner consistent with the USEPA's *Managing Wet Weather with Green Infrastructure: Green Streets* (USEPA, 2008). Two forms of green streets implementation have been incorporated into the Project:

- Where streets are tributary to regional LID facilities, the full requirements of the LID Performance Standard will be met in regional LID facilities. Additionally, the Project will consider the use of swales, biofiltration, and/or bioinfiltration systems where conditions are favorable, however credit for credit for green streets BMPs has not been applied toward sizing the regional LID facilities. In other words, the regional facilities have been sized assuming that no green streets BMPs will be installed, which is considered conservative at this phase of project planning; no specific numeric commitments are made for green streets implementation in these areas.

- For streets that are not tributary to regional LID facilities (i.e., Magic Mountain Parkway and adjacent portions of connecting streets), proprietary flow-based biofiltration BMPs (e.g., Filterra® or equivalent) have been sized per the criteria specified by the LID Performance Standard and the Los Angeles County LID Calculator.

3.3 Single Family Hydrologic Source Controls

Single family residential hydrologic source controls (HSCs) will be implemented across the single family residential portions of the Project. These controls will consist primarily of disconnecting downspouts to areas of amended soil in the front yards of residences, or an equivalent approach.

Because benefits of single family HSCs may vary depending on lot size and soil conditions, a conservative quantification of effectiveness of HSCs was used as part of sizing regional LID facilities. These approaches were not considered at all as part of areas tributary to Facility A, B, and C. They were evaluated in a conservative manner as part of sizing of Regional Facility D. The covenants, codes, and restrictions (CC&Rs) associated with these land uses will require the implementation of HSCs.

3.4 Regional LID Facilities

There are three regional LID facilities proposed within the Project. Regional Facilities A, B, and C are each proposed as infiltration facilities (Category 1) based on feasibility screening results (RTF&A, 2013, 2017, Figure 3). These facilities have been sized and designed to fully infiltrate 80 percent of average annual runoff from the tributary area. While hydrologic source controls will be applied in the tributary area to these watersheds, the effect of these hydrologic source controls has not been claimed in sizing.

Runoff from subwatersheds in the western portion of the Project are proposed to be directed to Mission Village Regional Facility D (See Figure 4), which is sized for its ultimate conditions in which it will accept runoff from Mission Village, Legacy Village, Entrada South, and portions of the existing Westridge community. The ultimate condition of Regional Facility D is considerably more conservative than the interim condition, in which only the Entrada South Project is constructed and the remainder of the tributary area remains undeveloped. Mission Village Facility D is described and analyzed as part of the Mission Village Phase I Final Hydrology Study and associated conformance memorandum (Geosyntec, 2016).

The detailed designs of regional LID facilities will be developed at a later time, and will be developed to be consistent with design and maintenance standards acceptable to LACDPW.

4. CONFORMANCE TO APPLICABLE LID PERFORMANCE STANDARD

This section summarizes the conformance of the Project's proposed LID design features to each element of the Project LID Performance Standard.

4.1 BMP Selection per LID Hierarchy

The Entrada South LID Performance Standard requires that LID BMPs be selected based on an analysis of infiltration feasibility. The follow paragraphs describe how the Project conforms to this requirement.

4.1.1 Parcel-based LID BMPs

Parcel-based LID BMPs were selected using a Project-wide feasibility screening for applicable lots. Parcel-based infiltration feasibility was estimated based on BMP siting recommendations included in the *Geotechnical Infiltration Evaluation Update for Vesting Tentative Tract Map No. 53295* (Infiltration Feasibility Report, RTF&A, 2013). The categorization of parcel-based LID BMPs included in the report was based upon the infiltration rates of the on-site materials, presence of geotechnical hazards, depth to groundwater, and location of fill materials. Additionally, where downstream regional LID facilities would retain the entire SWQDv and would fully infiltration at least 80 percent of average annual runoff, parcel-based BMPs were not required to fully comply with numeric LID sizing and selection criteria. The results of infeasibility screening are presented in Figure 3.

4.1.2 Regional LID Facilities

The Infiltration Feasibility Report (RTF&A, 2013) included results from site-specific infiltration feasibility investigations of Regional Facilities A, B, and C. RTF&A completed one infiltration test per regional infiltration basin area. The average of testing results was 18 inches per hour, with a low of 3.2 inches per hour and a high of 34 inches per hour. Geological studies for all three facilities show the presence of alluvial deposits in the subsurface that extend at least 15 feet below the proposed invert, which indicates the limited potential for groundwater mounding if the full water quality design volume is infiltrated in this area. Groundwater was not encountered in any of the boring tests and was determined to be at least 10 feet below the proposed facilities. RTF&A updated their geotechnical evaluations in 2017 based on the revised Regional Facility locations and found that the current basin locations also support infiltration of the full SWQDv at a preliminary recommended design infiltration rate of 3 inches per hour. Based on these findings, Facilities A, B, and C are proposed as complete infiltration facilities (Category 1), which is consist with the preferred hierarchy for BMP selection.

For Facility D, Leighton and Associates (2013) completed an investigation of infiltration feasibility as part of the Phase 1 Final Hydrology Study for Mission Village. This investigation found that infiltration into Facility D would result in potential geotechnical concerns that cannot be reasonably mitigated. The report stated that infiltration in the facility would likely migrate laterally towards the active river channel, which could adversely impact the stability of the existing bluffs located along the river channel. Thus, the report concluded that a biofiltration facility, designed with limited incidental infiltration, is recommended for Facility D. Facility D is proposed as a biofiltration facility (Category 3). Therefore Regional Facility D is consistent with the selection hierarchy required as part of the LID Performance Standard.

4.2 BMP Sizing for 80 Percent Capture of Drainage Area Runoff

4.2.1 Regional Facilities

The LID Performance Standard requires that regional facilities provide infiltration, biofiltration, and/or extended detention treatment for runoff volume not already addressed within the watershed, to provide 80 percent capture and treatment of the average annual runoff volume for the tributary area to the regional facility regional facilities. The designs of Facilities A, B, C and Regional Facility D were modeled using the EPA SWMM model for a long term continuous simulation period to demonstrate that this standard is met based on the WQ volume contained in the basin below the overflow elevation. This standard must be met for all areas draining to the facility, therefore, the entire tributary area was modeled. A summary of the facility sizing results is described in Table 1. A detailed description of modeling methodology and assumptions used to evaluate sizing is provided in Attachment A. SWMM model files are provided as Appendix A.1 Regional Facility D was modeled based on the ultimate proposed condition of its drainage area, as described in the memorandum: "Mission Village Phase 1 Final Hydrology Study – Evaluation of Conformance with Newhall LID Performance Standard" (Geosyntec Consultants, May 23, 2016).

Table 1: Catchment Parameters and Regional Facility Sizing Results

BMP ID	Tributary Area (acres)[1]	Impervious Fraction of Catchment (%)[1]	WQ Volume Required (volume below overflow) (ac-ft)[2,3]	WQ Volume Provided (volume below overflow) (ac-ft)[3]
Facility A	25.3	74.9	1.6	1.7
Facility B	62.9	61.6	3.4	3.4
Facility C	24.7	51.0	1.1	1.1
Regional Facility D	720.3[4]	45.6[4]	35.2[4]	35.2[4]

[1]Imperviousness based on area weighted average of land use-based values from LA County Hydrology Manual; calculated for purposes of water quality analysis; see Attachment A.
[2] WQ volumes below overflow elevation needed for 80% capture of annual average runoff volume from tributary area.
[3]WQ volume includes pore volume in gravel and media, as well as ponded volume above the media surface and below the overflow elevation; system controlled at outlet, therefore fills from the bottom.
[4]Regional Facility D analysis includes all areas draining to Regional Facility D in the ultimate build-out condition (i.e., Mission Village, Legacy Village constructed). Regional Facility D sizing demonstrated in Mission Village Conformance Memorandum

As shown in Table 1 the provided WQ volumes equal or exceed the required WQ volumes for all facilities and are considered to satisfy the requirements of the LID Performance Standard. While the LID Performance Standard allows some of the 80 percent capture standard to be met via extended detention, the proposed LID facilities include only retention (for Regional Facilities A, B, and C) and biofiltration (Regional Facility D), which provides a superior level of treatment

treatment compared to extended detention, therefore this aspect of the LID Performance Standard is met and exceeded.

Basins A, B, and C will be offline. Water will be diverted to these basins from a diversion structure. Diversion structure capacity has been calculated to ensure that the total system will capture and infiltrate 80 percent of long term runoff volume. The required diversion structure capacity was calculated using SWMM as explained in Attachment A, to determine the flowrate that would provide 80 percent long term infiltration of runoff volume. This flowrate was compared to the based the peak flowrate for the 1.1-inch storm calculated using LACPDW HydroCalc (See Alliance, 2017). Table 2 shows the required and provided diversion flowrates.

Table 2: Required and Provided Diversion Structure Flowrates

BMP ID	Qpm from HydroCalc for 1.1-inch Storm, cfs (Alliance, 2017)	Required Diversion Q from SWMM Model for 80% Long Term Capture, cfs	Provided Diversion Q, cfs
Facility A	4.7	4.7	4.7
Facility B	8.2	15	15
Facility C	2.8	4.5	4.5

As shown in Table 2, the provided diversion flowrates for regional facilities are equal to the larger of the required flowrate for 80 percent long term capture and the Qpm. Refinement of diversion flowrates may be warranted as part of more detailed hydrologic study and water quality plan development.

4.2.2 Parcel-based LID BMPs

Stand-alone parcel-based LID BMPs within the Project were sized with physical storage equal to the SWQDv as calculated using the Los Angeles County LID Calculator. The SWQDv is the controlling sizing factor for these facilities to meet all aspects of the LID Performance Standard, as discussed below and detailed in Attachment A.

For Category 1 facilities, providing the SWQDv equates to retaining the full SWQDv. Analyses provided in Attachment A demonstrate that when the physical storage volume of the facility is set to the SWQDv and the system infiltrates in no greater than 21 hours, average annual capture efficiency is equal to 80 percent and the entire SWQDv is reliably retained.

If retention is not fully feasible or not feasible (Category 2 and Category 3 facilities), the facility shall be sized to store at least the SWQDv and provide biofiltration for 1.5 times the runoff that

cannot be reliably retained. Analyses provided in Attachment A demonstrate that when the physical storage volume of the facility is set to the SWQDv and the media filtration rate is set to 5 inches per hour (minimum allowed per MS4 Permit Attachment H), these facilities biofilter significantly greater than 1.5 times the SWQDv that is not retained and also achieve significantly greater than 80 percent capture of average annual runoff.

The parcel-based BMPs that drain to Regional Facility D do not have a minimum sizing required by the LID Performance Standard, but must be consistent with the selection hierarchy described in the LID Performance Standard and attempt to achieve the maximum feasible retention. Regional Facility D is sized to capture 80 percent of average annual runoff from the entire area tributary to the facility, accounting for the commitments to parcel-based BMPs. Parcel-based facilities were sized following the same criteria as used for stand-alone parcel-based facilities (Category 2), which meets and exceeds the required standard.

As shown in Table 3, the provided volume commitment for parcel-based BMPs is greater than or equal to the required volume.

Table 3: Catchment Parameters and Parcel-based Facility Sizing Results

Basin	Area, ac	Impervious-ness[1]	SWQDv Required[2] (ac-ft)	SWQDv Provided (ac-ft)
Stand-alone Parcel-based LID BMPs in Basin E	29.2	91	2.13	2.13
Stand-alone Parcel-based LID BMPs in Basin X	10.2	80	0.74	0.74
Stand-alone Parcel-based LID BMPs in Basin Y	2.95	88	0.22	0.22
Parcel-based LID BMPs Draining to Regional Facility D	39.6	84	2.82	2.82

[1] See Attachment A for calculations used to estimate impervious cover.
[2]The SWQDv required refers to the total stormwater quality design volume determined by the LA County LID Volume Calculation; this volume is the required storage volume of the system.

4.2.3 Green Street Biofiltration BMPs

Green Streets biofiltration BMPs within the Project area were sized to treat runoff from roadways and areas draining to roadways that are not treated by regional facilities. The Green Streets biofilters (Filterra® or equivalent) are designed as flow-through treatment. The BMPs are sized to treat a design flow rate equivalent to the runoff from a 0.3 in/hr rainfall intensity, which is equivalent to achieving 80 percent average annual capture efficiency (Geosyntec, 2008). The

design intensity of 0.3 in/hour was entered into the Los Angeles County Flow-based LID Calculator to compute the required design flowrates. As illustrated in Table 4, the provided flowrate equals or exceeds the design flowrate in all cases.

Table 4: Catchment Parameters and Green Street Biofilter Sizing Results

Basin	Area (Acres)	Imperviousness (%)	Q Design (cfs)	Q Provided (cfs)
Basin AA	0.93	90	0.23	0.23
Basin BB	1.36	91	0.34	0.34
Basin CC	3.08	89	0.75	0.75
Basin DD	0.61	89	0.15	0.15
Basin EE	0.71	64	0.13	0.13
Basin G	0.63	89	0.15	0.15
Basin H	1.10	78	0.20	0.20
Basin I	2.31	79	0.50	0.50
Basin J	2.68	91	0.59	0.59
Basin K	2.37	69	0.59	0.59
Basin L	3.71	67	0.72	0.72
Basin M	4.01	39	0.77	0.77
Basin N	1.11	57	0.14	0.14
Basin O	3.33	69	0.56	0.56
Basin T	1.20	84	0.28	0.28
Basin U	2.32	50	0.35	0.35
Basin V	1.22	49	0.18	0.18
Total	**32.68**	**70**	**6.62**	**6.62**

4.3 Project Retention of 85th Percentile, 24-hour Storm Event (SWQDv)

The LID Performance Standard requires that project design features be selected and sized to retain the volume of stormwater runoff produced from a 1.1 inch storm event (i.e., the SWQDv) for the Project site. Where it has been demonstrated that 100 percent of the SWQDv cannot be feasibly infiltrated, biofiltration shall be provided for 1.5 times the portion of the SWQDv that is not retained. For the purpose of demonstrating conformance, this standard has been applied to the overall Entrada South Project as well as the portion of the biofiltration storage in Regional Facility D that is allocated for treatment of runoff from the Entrada South Project. The following stepwise process is used to demonstrate conformance with the LID Performance Standard for the Project.

4.3.1 Step 1: Calculate LID Performance Standard

The equivalent retention plus biofiltration volume required to meet the LID Performance Standard was calculated by calculating the runoff from the Project's impervious area for the first 1.1 inches of precipitation using the LA County LID Volume Calculator. A one acre representative catchment was used to determine the runoff volume for one acre of impervious area. This volume was scaled up to the total impervious area within the project. This resulting retention storage volume is the required equivalent retention volume (performance standard) that applies to the project. The performance standard is expressed in acre-feet.

Step 1 Summary - Entrada South LID Performance Standard

Parameter	Value	Source
Total Project Area, ac	382.4	Tentative Tract Map 53295
Project Impervious Area, ac	186.7	Tentative Tract Map 53295, land use-based Impervious estimation
Required Equivalent Retention Volume, ac-ft	**15.3**	V (ac-ft) = Project Impervious Area (ac) × 3,561 [1] cubic feet × (1 acre/43,560 square feet conversion)

[1] Equivalent to the volume calculated from the LA County LID Volume Calculator for a 1-acre representative catchment (100% imperviousness, flow path length of 250 feet, slope of 5%, LA County Soil #098)

4.3.2 Step 2: Calculate Volume in Parcel-based BMPs and Single Family HSCs

The parcel-based LID BMP commitments described in Section 3.1 and the single family HSC commitments described in Section 3.3 are tabulated to compute the total retention volume and biofiltration volume commitments included in the Project. For parcel-based BMPs, retention volume is calculated as follows:

- *Category 1 – Infiltration Feasible – Infiltration BMPs*: Include all water volume provided in BMPs below the overflow elevation.
- *Category 2 – Infiltration Partially Feasible – Bioinfiltration BMPs*: Include all volume provided below underdrains and retained in soil pores for subsequent evapotranspiration.
- *Category 3 - Infiltration Infeasible – Biofiltration BMPs*: Include all volume retained in soil pores for subsequent evapotranspiration.

For the purpose of this analysis, biofiltration volume was counted as the remaining volume of the BMPs (after subtracting retained volume). Water that is biofiltered during the design storm event (i.e., routed) can also be claimed as biofiltration volume; however, this volume is not claimed at this time as it is not necessary to conform to the LID Performance Standard.

Step 2 Summary - Entrada South Parcel-based BMP Retention Volume and Biofiltration Volume

Parcel-based LID and Single Family HSC Tabulations	Sum of Parcel-based Volume Commitments
Parcel-based Retention Volume, ac-ft	2.2
SFD Disconnection Retention Volume[1], ac-ft	0.5
Total parcel-based and SFD Retention Volume, ac-ft	2.7
Total Parcel-based Biofiltration Volume, ac-ft	4.6

[1]SFD Disconnection will be implemented for the Project consistent with the Project LID Performance Standard; however, retention volume credit from SFD Disconnections was not claimed in this performance standard conformance calculation for areas draining to Facilities A, B or C..

4.3.3 Step 3: Calculate Volume Provided in Regional Facilities

The retention volume provided in regional infiltration/bioinfiltration facilities is calculated as the volume stored below the lowest discharge point. The retention volumes provided in each of the three Entrada regional infiltration facilities and the regional biofiltration facility (Basin D) receiving runoff from Entrada were combined to estimate the total retention volume provided by facilities.

- *Category 1 – Infiltration Feasible – Infiltration BMPs*: Include all water volume provided in BMPs below the overflow elevation.
- *Category 2 – Infiltration Partially Feasible – Bioinfiltration BMPs*: Include all volume provided below underdrains and retained in soil pores for subsequent evapotranspiration.
- *Category 3 - Infiltration Infeasible – Biofiltration BMPs*: Include all volume retained in soil pores for subsequent evapotranspiration.

For the purpose of this analysis, biofiltration volume was counted as the remaining volume of the BMPs (after subtracting retained volume) up to the overflow elevation of the BMP. Water that is biofiltered during the design storm event (i.e., routed) can also be claimed as biofiltration volume; however, this volume is not claimed at this time as it is not necessary to conform to the LID Performance Standard.

Step 3 Summary - Entrada South Regional Facility Retention Volume and Biofiltration Volume

Regional Infiltration/ Biofiltration Facilities	Entrada South Regional Facility WQ Volume[1] (ac-ft)	Entrada South Retention Volume[2] (ac-ft)	Entrada South Biofiltration Volume[4] (ac-ft)
Infiltration Facility A	1.7	1.7	0.0
Infiltration Facility B	3.4	3.4	0.0
Infiltration Facility C	1.1	1.1	0.0
Regional Biofiltration Facility D	6.4[3]	0.0	6.4[3]
Regional Facility Total, ac-ft		**6.2**	**6.4**

[1] Includes volume allocated to managing Entrada South runoff only.
[2]Volume below lowest surface discharge, ac-ft
[3]WQ volume of Facility D is larger than shown, however remainder is allocated to treating off-site runoff from other projects therefore is not claimed for Entrada South conformance calculations.
[4]Volume discharged through media, tabulated as volume above underdrain elevation and below overflow elevation.

4.3.4 Step 4: Final Conformance Calculations

Step 4a: Compare Total Feasible Retention Volume Provided to LID Performance Standard

The sum of the total feasible retention volume provided in parcel-based and regional facilities from Steps 2 and 3, respectively, was compared to the performance standard computed in Step 1. The Project is considered to meet the LID Performance Standard if the total retention storage volume provided is equal to or greater than the LID Performance Standard retention volume.

Step 4b: Compute Required Biofiltration Volume and Compare to Provided Biofiltration Volume

The total retention volume provided in the parcel-based and regional facilities is less than the LID Performance Standard design volume. Therefore, the remaining volume not retained was multiplied by 1.5 to compute the required biofiltration volume. This volume was compared to the biofiltration volume provided. As demonstrated in Line 6 and 7 in the table below, the system provides excess retention and biofiltration volume in comparison to the LID Performance Standard, therefore the Project conforms to the LID Performance Standard.

Step 4 Summary - Comparison with LID Performance Standard

Line	Parameter	Value	Explanation
1	Required Retention Volume[1], ac-ft	15.3	From Step 1
2	Volume Reliably Retained, ac-ft	10.8	From Step 2 plus Step 3
3	Remaining Volume Not Reliably Retained, ac-ft	4.5	Line 1 minus Line 2
4	Required Biofiltration Volume, ac-ft	6.8	Line 3 x 1.5
5	Biofiltration Volume Provided, ac-ft	10.8	From Step 2 plus Step 3
6	Excess Biofiltration Volume, ac-ft	4.0	Line 5 minus Line 4
7	Excess Equivalent Retention Volume, ac-ft (surplus)	2.7	Line 6 / 1.5

4.4 Conformance Summary

In summary, this memorandum demonstrates that:

- LID BMPs have been selected in a manner consistent with the LID selection hierarchy (i.e., infiltration feasibility criteria) contained in the LID Performance Standard (Section 4.1);
- The combination of parcel-based LID BMPs and/or regional LID facilities within each watershed provides capture and retention or biofiltration of at least 80 percent of average annual runoff volume, consistent with the LID Performance Standard (Section 4.2); and
- The LID project design features proposed as part of the Entrada South Project provide retention and biofiltration volume consistent with the SWQDv retention and biofiltration requirements at the tract map scale per the LID Performance Standard (Section 4.3).

5. REFERENCES

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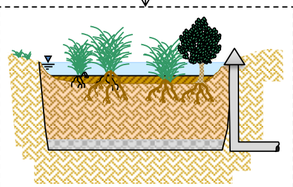
ENTRADA SOUTH LID PERFORMANCE STANDARD

LID project design features (PDFs) shall be selected and sized to retain the volume of stormwater runoff produced from the 1.1-inch design storm event (LID design volume). When it has been demonstrated that 100 percent of the LID design volume cannot be feasibly infiltrated, then biofiltration shall be provided for 1.5 times the portion of the LID design volume that is not retained. Runoff from all impervious area shall be treated with effective treatment control measures that are selected to address the pollutants of concern and are sized to capture and treat 80 percent of the average annual runoff volume.

Institutional, Commercial, Multi-Family Residential, Recreation, and Park Land Uses

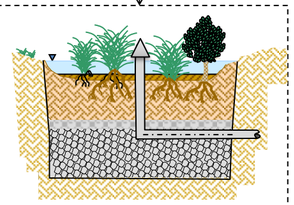
Assess infiltration feasibility

Infiltration Feasible
Category 1: Retain



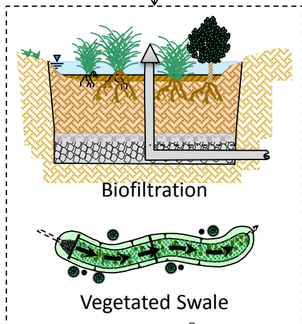
Or equivalent

Infiltration infeasible due to marginal infiltration rate, otherwise feasible
Category 2: Bioinfiltrate
Retain as feasible, then biofilter



Or equivalent

Infiltration infeasible due to hazards (geotechnical, etc.)
Category 3: Biofilter
Or route to regional facility



Or equivalent

Single Family Residential

Roofs, Patios and Walkways

Hydrologic Source Controls
Disconnect Roof Drains;
Disperse Impervious Areas in Landscaped Areas

Remaining Area

Roads

EPA Green Streets Manual

Retain/biofilter as feasible per opportunities and constraints; Retain/biofilter remaining in Regional Facilities

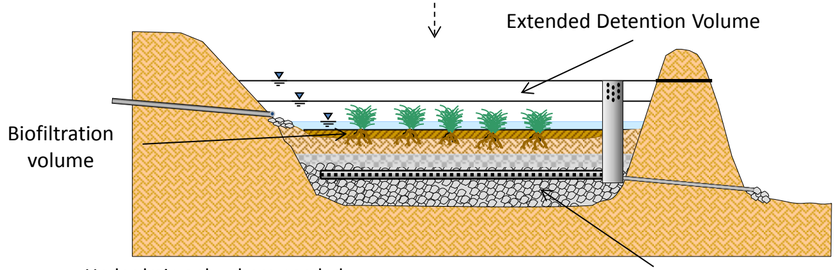
Allowable EIA

Treatment
80% capture of runoff

Media Filters
or equivalent

Underdrain Discharge (Category 2 and 3) and Bypassed Runoff

Regional Infiltration / Biofiltration Facility
Retain where feasible and biofilter remainder to provide equivalent retention of the 1.1-inch LID design storm, plus provide additional volume required for extended detention for 80% capture of all runoff.

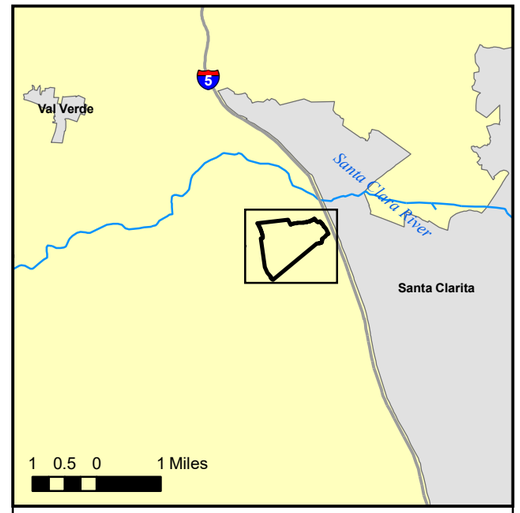


Entrada South LID Performance Standard	Geosyntec consultants	Figure 1

N



600 300 0 600 Feet



Legend

Entrada South Tract Boundary

Land Use

- Commercial
- Education
- Major Road
- Minor Road
- Multi-Family Residential
- Open Space
- Park
- Recreation
- Single-Family Residential
- Water Quality

Figure 2: Land Use

Entrada South
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Prepared By: A. Orr

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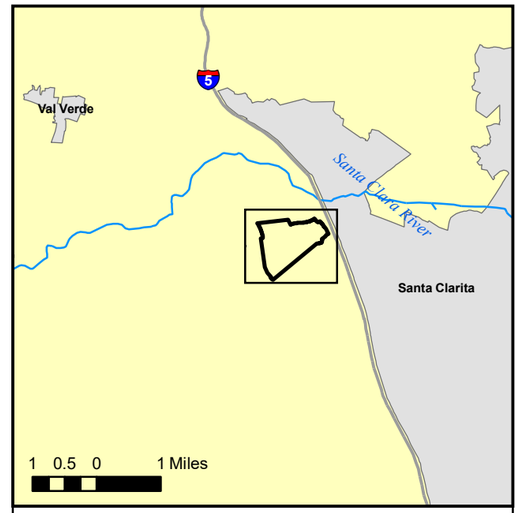

Legend

Entrada South Tract Boundary

Treatment Category

- Open Space; No Category Reported
- Category 1
- Category 2
- Category 3

Figure 3: Infiltration Feasibility Categories

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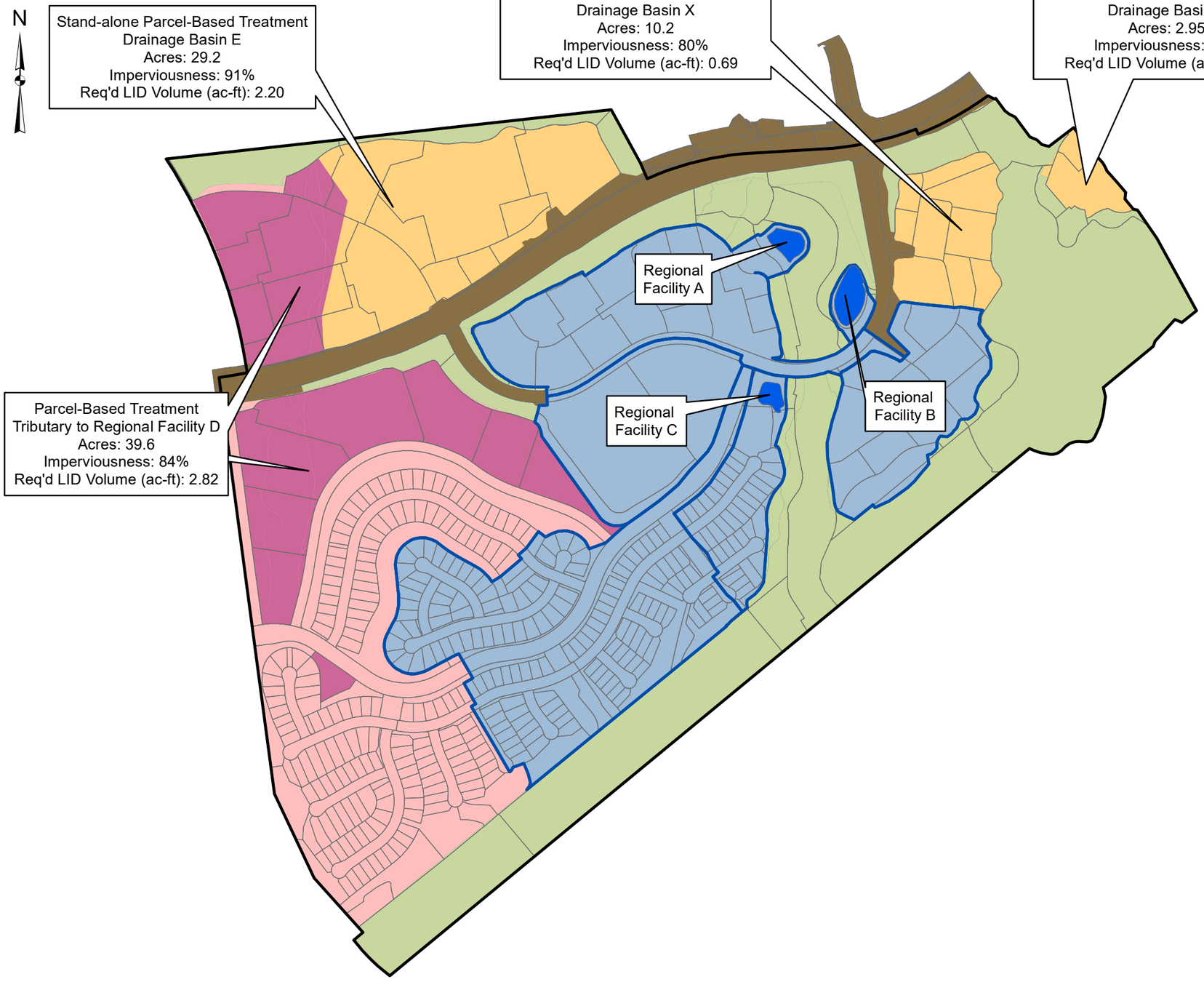
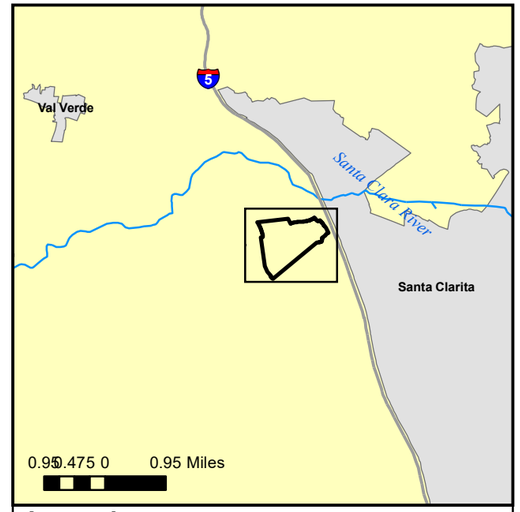
Prepared By: A. Orr





Legend

- Entrada South Tract Boundary
- Parcel-based Treatment Tributary to Regional Facility D

Treatment Category

- Regional Facilities
- Green Street Biofilters
- Tributary to Regional Facility D
- No Treatment Required
- On-Parcel Stand-alone Treatment

Figure 4: Treatment Categories

Entrada South
Conformance Memo

October 2017

Geosyntec consultants

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Prepared By: A. Orr

Attachment A

Modeling Methodology in Support of LID Conformance Analysis

1. INTRODUCTION

The purpose of this attachment is to describe the modeling methodology used to size regional infiltration/bioinfiltration facilities, analyze stand-alone parcel-based LID BMPs, and quantify low impact development (LID) best management practice (BMP) implementation for the Entrada South Project (Project). The model used to size and/or analyze facilities is a nested continuous simulation hydrologic model developed using USEPA Stormwater Management Model (SWMM). The model simulates a continuous runoff hydrograph from watershed tributary to each regional facility using a 40 year rainfall record and conducts continuous hydraulic storage routing to compute the capture efficiency and volume reduction provided in single family, parcel-based, and regional LID BMP. Facilities are sized and evaluated to ensure the that the combined system of water quality project design features (i.e., combination of parcel-based LID, single family hydrologic source controls (HSCs), green streets BMPs, and regional LID facilities) achieves 80 percent capture of watershed runoff per the Project LID Performance Standard. In some cases, the Los Angeles County LID Calculator was used for BMP sizing and SWMM was used to analyze performance to ensure that the 80 percent capture criterion was met.

Subcatchments tributary to each facility were defined based on land use delineations, drainage boundaries, results of infiltration feasibility screening, and soil parameters. The watershed model takes into account commitments to implement parcel-based BMPs and single-family dwelling (SFD) hydrologic source controls (e.g., downspout disconnects). Green Streets are part of the LID Performance Standard, but were not modeled in SWMM in evaluating overall system performance. Regional infiltration facilities within the Project were modeled based on a standard infiltration facility cross section and underlying soil infiltration rates determined by site-specific infiltration testing (R.T Frankian & Associates, 2013, interpreted for new basin locations in 2017). Another regional facility in an adjacent Project (the Mission Village Project), Regional Facility D, receives flows from Entrada South (see Figure 3 of Hydrology Study). The model calculations and inputs associated with sizing of Regional Facility D are provided in the memorandum: "Mission Village Phase 1 Final Hydrology Study – Evaluation of Conformance with Newhall LID Performance Standard" (Geosyntec Consultants, May 23, 2016).

Based on the proposed facility sizes and configurations watershed total LID performance results were evaluated to demonstrate that the combination of Project water quality design features achieves 80 percent capture of average annual subcatchment runoff.

1.1. Project Approval and Revision Chronology

The Entrada South Drainage Concept was previously approved by LACDPW in January 2014. Since that approval, the project design has changed to reduce the footprint of development and preserve a greater portion of Unnamed Canyon 2. This has resulted in changes to the drainage concept and water quality design in the vicinity of Unnamed Canyon 2, particularly water quality treatment basins A, B, and C (regional infiltration facilities). This attachment includes updates to only the portions of the project that have changed.

2. WATERSHED MODELING

The watershed tributary to each regional BMP is modeled as a collection of subcatchments in SWMM. Parameters input into the hydrologic watershed model and the data sources are included in Table 1 below.

Table 2-1: Watershed Model Parameters and Sources

Parameter	Description	Parameter Value/Source
Wet time step	Time step for wet weather runoff calculations	15 min
Dry time step	Time step for dry weather runoff calculations	4 hours
Routing time step	Seconds	30 sec
Routing Option	Method of routing flows through the system	Kinematic Wave method
Infiltration Option	Defines parameters and method used to estimate infiltration in catchment	The Green Ampt method was used; see section 2.3 for more information
Rainfall	Long-term precipitation record	Newhall (NCDC gauge # 046162), 1968-2008
Climate	Evaporation data	CIMIS monthly normal ET data, 60% of Zone 14 (see Table 2); selected based on CIMIS guidance to represent typical drought-tolerant native and non-native/non-invasive landscape.
For subcatchment models:		
Total Area	Area in acres	Land use GIS and CAD layers (see Tables 3 and 4)
Imperviousness	Percent imperviousness of subcatchment area	Determined by area-weighting of land uses in subcatchment (see Tables 3, 4).
Soil parameters	Soil parameters describe how water is infiltrated into soils in pervious areas	Soil types and locations were determined using NRCS Soil Survey and LA County soils data. See section 2.3 for specific soil parameters used in the model.

Parameter	Description	Parameter Value/Source
Depression storage	Surface storage in depressions in pervious or impervious land areas	0.02 inches for impervious areas (James & James, 2000); 0.06 inches for pervious areas (James & James, 2000) In some catchments, depression storage is adjusted to simulate the effects of parcel-based BMPs as discussed in section 4.2.1 and 4.2.2.
Other catchment parameters	Shape and Flowpath	Rectangular; 500 ft flow path length for pervious areas, 250 ft flow path length for impervious area (represents typical overland flow path lengths, a sensitive parameter in regional facility watershed-scale analysis)
	Slope	0.05 ft/ft (represents approximate average of landscaping, streets, and roofs)
	Impervious Manning's n	0.012 (Manning's n for smooth concrete)
	Pervious Manning's n	0.25 (Manning's n for dense grass or shallow flow through decorative bark/rock; either of which is typical of urban landscaping)

2.1. Rainfall & Storm Characteristics

Rainfall analysis was conducted with hourly precipitation data from a 40 year period of record (water year (WY) 1969-2008) recorded at the National Climatic Data Center (NCDC) Newhall rain gauge (station number 046162), located in the town of Newhall, California. Figure 1 shows the location of the Newhall gauge in relation to the Project area. This gauge is located approximately 4 miles from the Project. The gauge elevation of 1,243 ft above mean sea level (AMSL) is comparable to the Project area elevation of approximately 1,000-1,200 ft AMSL.

While the period of record rainfall data collected at the Newhall rain gauge is quite long (40 years), there are some gaps in the record. In order to improve the characterization of rainfall at the project site, estimates of the missing rainfall data were made through correlation of the Newhall rain gauge with the San Fernando rain gauge (NCDC station number 047762) which is located approximately 6 miles away from the Newhall gauge, and 10 miles away from the Project (south and slightly east).

The Castaic Junction gauge monitored by LACDPW is located closer to the Project; however the usable period of record at this gauge is limited to approximately 12 years which is considered too short to produce significant results in long-term simulation. Other gauges in the area report daily rainfall totals only. Hourly data are required to support hydrologic modeling efforts.

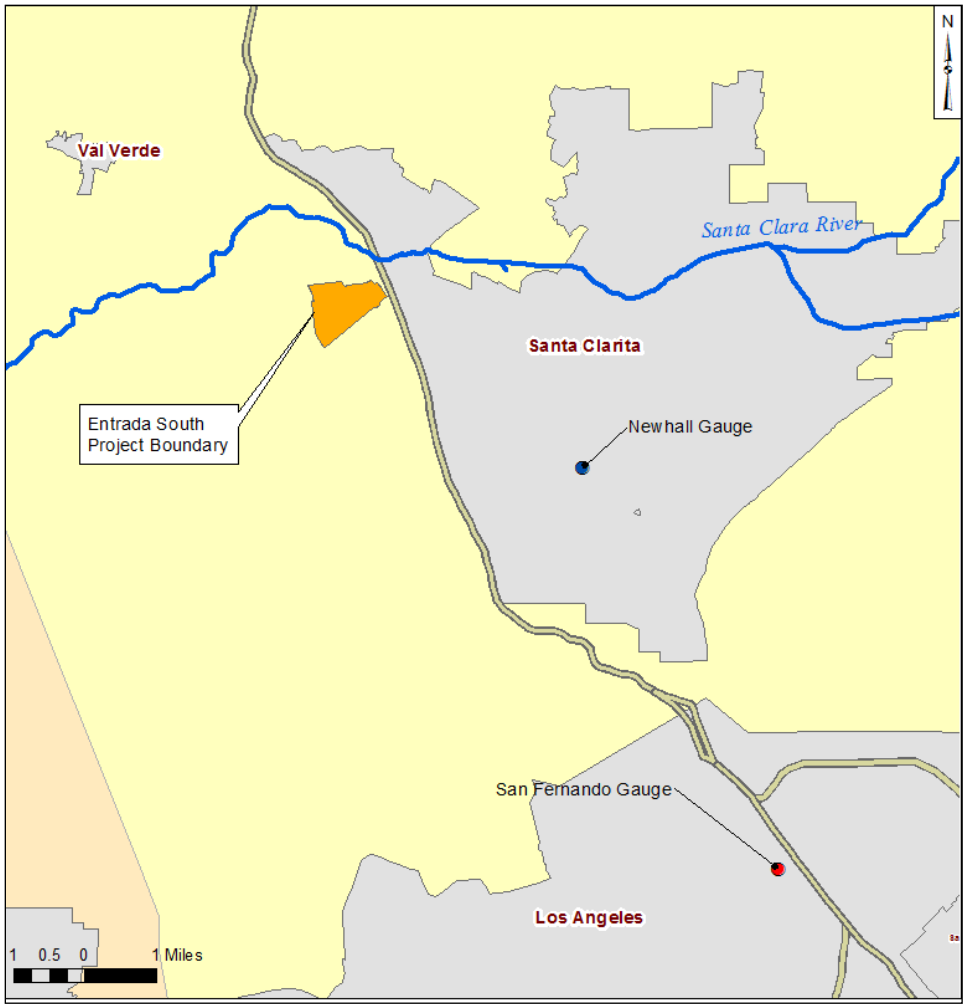


Figure 1: Location of Newhall Rain Gauge in the Vicinity of the Project Area

San Fernando rainfall data was adjusted based on comparison between the two gauges over periods for which they both contained data. A comparison of hourly or daily rainfall totals is not expected to yield a strong correlation as spatial variability is exaggerated on short time scales (i.e. a single storm could result in appreciable rainfall at one gauge and little rainfall at the other). However, monthly correlations are expected to yield meaningful comparison between the gauges when taken over a long period of record. Data from the gauges from WY 1969 to 2008 were screened to keep only the months without missing data and with measured rainfall at both stations. Correlation of the monthly rainfall totals is shown in Figure 2. This monthly correlation indicated slightly higher rainfall amounts at the Newhall gauge compared to the San Fernando gauge.

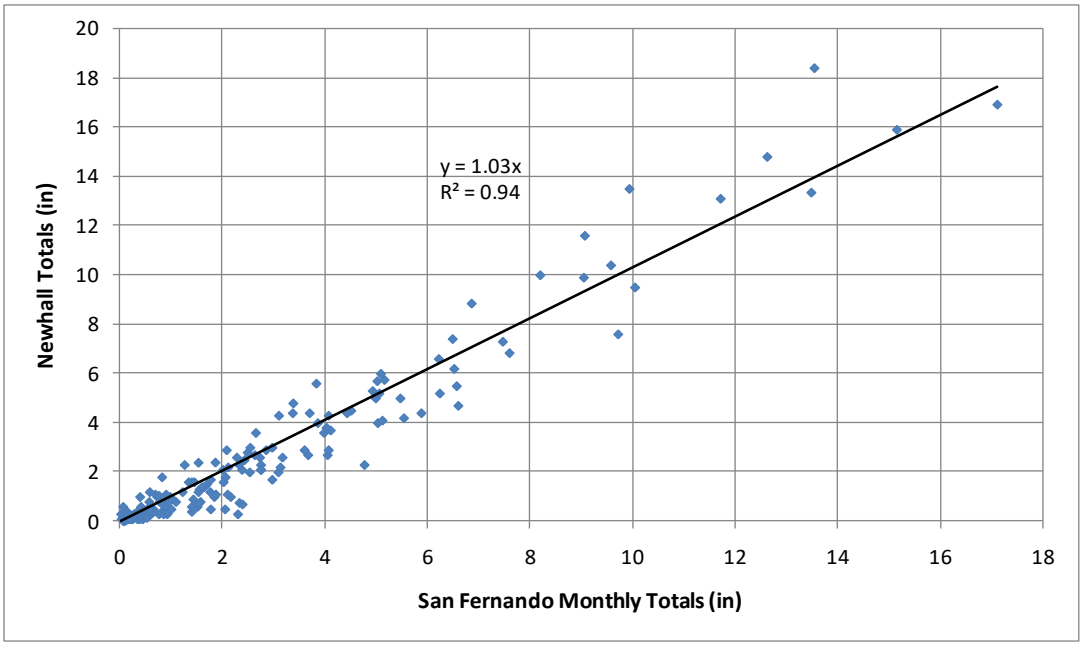


Figure 2: Correlation of Monthly Totals between Newhall & San Fernando Gauges (excluding months with missing data or zero rainfall)

Based on the relationship developed through the monthly comparison, a multiplier of 1.03 was applied to the hourly rainfall data from the San Fernando gauge to fill in the missing periods of rainfall data at the Newhall gauge. Values were rounded to the nearest 1/100 inch after the adjustment.

Summary rainfall analysis was conducted for two data groups: all storm events; and only the storms that were expected to contribute to stormwater runoff (storms >0.1 inches). The rainfall data were analyzed using a code similar in performance to EPA's Synoptic Rainfall Analysis Program (SYNOP). The customized code (GeoSYNOP) facilitates resolving missing periods of data and is more robust when handling the date and time of storms. GeoSYNOP subdivides the rainfall record into discrete events separated by an inter-event dry period, which in this case was set to a minimum of 6 hours. Small rainfall events, which resulted in rainfall of less than or equal to 0.10 inches, were deleted from the record for the purpose of calculating summary statistics. For the Newhall gauge, a total of 609 storm events (>0.1 inches) were segregated from the continuous data from October 1, 1968 to September 30, 2008. Storm statistics for the full (all storms) and the trimmed (storms > 0.1 inch) data sets are shown in Table 2-2. The full rainfall record is used for modeling analysis, however small storm events tend to produce less runoff because of initial abstractions represented in the model.

Table 2-2: Analysis Results for the Actual and Filled Newhall Rainfall Data

Storms	Newhall Gauge WY 1969 – 2008	Patched Record
All Storms	Average annual rainfall (in):	18.4
	Total number of storms:	1011
	Average number of storms per year:	25.3
	Average storm volume (in):	0.73
	Average storm duration (hrs):	7.3
	Average storm intensity (in/hr):	0.097
Storms >0.1 inch	Average annual rainfall (in):	17.4
	Total number of storms:	609
	Average number of storms per year:	15.2
	Average storm volume (in):	1.14
	Average storm duration (hrs):	11.4
	Average storm intensity (in/hr):	0.102

[1] Augmented record includes adjusted data from San Fernando gauge to fill gaps in Newhall gauge record.

2.2. Evapotranspiration

Reference ET values for estimating actual ET rates was taken from the California Irrigation Management Information System (CIMIS) Reference Evapotranspiration Zones map produced by the California Department of Water Resources. The Entrada South Project site is located in zone 14. Reference ET values for zone 14 are reproduced in Table 2-3 below. A model input of 60 percent of reference ET was used per CIMIS guidance to reflect a mix of irrigated and drought tolerant landscape species.

Table 2-3: Evaporation Parameters for Hydrology Model (from CA ET map)

Month	Evapotranspiration Rates			60%
	inch / day	days / month	inch / month	inch / month
January	0.05	31	1.55	0.93
February	0.08	28	2.24	1.34
March	0.12	31	3.72	2.23
April	0.17	30	5.1	3.06
May	0.22	31	6.82	4.09
June	0.26	30	7.8	4.68
July	0.28	31	8.68	5.21
August	0.25	31	7.75	4.65
September	0.19	30	5.7	3.42
October	0.13	31	4.03	2.42
November	0.07	30	2.1	1.26
December	0.05	31	1.55	0.93
Total (year)		**365**	**57.0**	**34.2**

2.3. Regional Facility Tributary Area and Imperviousness

The tributary drainages treated by each of the Project regional facilities were represented per the *LID/SUSMP/Water Quality Maintenance Plan Map for Entrada South* (Water Quality Exhibit, Alliance, 2017) and accompanying *Entrada South Mitigated Flow Table* (Appendix A, Alliance, 2017).

Table 2-4 includes the drainage subbasins and imperviousness values used for areas within the Entrada South boundary for Facilities A, B and C.

Table 2-4: Modeled Developed Conditions Project– Facilities A, B, and C

Facility	Land Use	Acreage	Imperviousness
Facility A	Drainage Basin C	2.0	5
	Drainage Basin D	10.8	80
	Drainage Basin F	9.1	80
	Drainage Basin R	2.1	91
	Drainage Basin S	1.3	80
Facility A Total		**25.3**	**75**
Facility B	Drainage Basin B1	45.0	57
	Drainage Basin P	16.2	80
	Drainage Basin W	1.7	5
Facility B Total		**62.9**	**62**
Facility C	Drainage Basin B2	16.5	45
	Drainage Basin B3	7.2	60
	Drainage Basin Q	1.0	85
Facility C Total		**24.7**	**51**

2.4. Soil Parameters

Drainage basins were divided into sub-catchments based on hydrologic soil group (HSG). The HSGs were identified based on catchment-specific soils distributions obtained from the Natural Resources Conservation Service (NRCS) Soil Survey CA675, and were divided as follows for modeling purposes: HSG A/B, HSG C, and HSG D. Group A soils were grouped with B soils because of the extreme scarcity of soil group A on the Project site and the similarity in infiltration parameters between A and B soils.

Hydrologic soil groups (HSG) and soil texture classes provided in the NRCS soil survey, as well as information provided in the Los Angeles County soils maps, were used to classify soils on the Project site and assign typical ranges of soil parameters to these soil groups. Spatial analyses were used to composite these values by subcatchment. The breakdown by soil type within each subcatchment is included in Table 2-5 below.

Table 2-5: SWMM Modeled Soils Distribution by Drainage Basin – Facilities A, B, and C

Location	Hydrologic Soil Group	Area (acres)	% Total
Facility A	A/B	2.8	11.3%
	C	22.5	88.7%
Facility A Total		**25.3**	
Facility B	A/B	18.4	29.3%
	C	44.5	70.7%
Facility B Total		**62.9**	
Facility C	A/B	0.3	1.1%
	C	24.4	98.9%
Facility C Total		**24.7**	

Green-Ampt suction head and initial moisture deficit values for each HSG were based on the soil texture class reported by the NRCS soil survey for the dominant texture class within the respective HSGs. Green-Ampt saturated hydraulic conductivities (the infiltration capacity of soils in inches of water infiltrated per hour) for each soil group were determined on an area weighted basis as the average of: 1) the low range of saturated hydraulic conductivity (K_{sat}) reported in the NRCS soil survey, 2) infiltration rates by HSG recommended by Musgrave (1955), and 3) characteristics infiltration rates for LACDPW soil classes interpreted from Appendix C of the LA County Hydrology Manual. Spatial analyses were used to composite these infiltration rate values by tributary area. It has been assumed that compaction during construction will reduce the bulk hydraulic conductivity across the development site by approximately 25 percent, on average, in the post-development condition in areas where construction is planned. While localized effects of incidental compaction may be greater, this assumption is believed to represent a reasonable estimate of drainage basin-wide reduction in long term infiltration rate considering that not all pervious areas will be subjected to incidental compaction and vegetation and other natural process tend to restore infiltration rates with time. Infiltration at the location of infiltration BMPs will be avoided to the extent possible. LACDPW soil classes present on the project include soil 020 and 098. Modeled soil parameters are provided in Table 2-6.

Table 2-6: Green-Ampt Soil Parameters – Facilities A, B, and C

Location	Hydrologic Soil Group	Suction Head[1] (in)	IMD[2] (in/in)	Pre- Development Ksat (in/hr)	Post- Development Ksat (in/hr)
Facility A	A/B	8	0.32	0.37	0.28
	C	8	0.29	0.19	0.15
Facility B	A/B	8	0.32	0.37	0.28
	C	8	0.29	0.19	0.15
Facility C	A/B	8	0.32	0.37	0.28
	C	8	0.29	0.19	0.15

[1] Average capillary suction of soils (inches), estimated based on texture class from Rawls, et al., (1983).
[2] Fractional difference between soil porosity and actual moisture content, estimated based on texture class from Rawls, et al., (1983).

2.5. Parcel-based LID BMPs

Parcel-based LID BMPs on the Project include "stand-alone" BMPs, which do not drain to a regional facility, and parcel-based LID BMPs draining to Regional Facility D. Modeling analyses to justify the sizing of parcel-based stand-alone BMPs are stand-alone parcel-based LID BMPs are discussed in this section. Modeling parameters for areas draining to Regional Facility D are discussed in the Mission Village Conformance Memorandum (Geosyntec, 2016).

The controlling sizing factor for parcel-based stand-alone BMPs is the SWQDv, as calculated using the Los Angeles County LID Calculator. Unit area modeling analyses were conducted in SWMM to demonstrate that when parcel-based BMPs are sized for the SWQDv using MS4 Permit requirements to provide minimum 5 inches per hour media filtration rate, they result in greater than 80 percent capture of average annual runoff as well as biofiltration of much greater than 150% of the SWQDv that is not reliably retained.

Table 2-7. Unit Area Model Scenarios to Demonstrate that LA County SWQDv Meets Newhall LID Performance Standard for Parcel-based BMPs

Model Scenario	Category 1 (Infiltration Feasible)	Category 2 (Infiltration Partially Feasible)	Category 3 (Biofiltration, with minor incidental volume reduction)
Tributary Area, Ac	1.0	1.0	1.0
SWQDv, cu-ft	3,561 [1]	3,561 [1]	3,561 [1]
BMP Type	Infiltration (any type); Geometry not relevant; modeling simply assumes SWQDv is reliably infiltrated in 24 hours.	Bioinfiltration (bioretention with elevated underdrain); 18 inches ponding; 18 inches gravel below underdrain	Bioretention with underdrains, negligible incidental infiltration assumed; 18 inches ponding
BMP Volume, cu-ft	3,561	3,561	3,561
Effective Storage Depth Above Underdrain, ft	2 ft depth assumed; no underdrain	1.5	1.5
Effective Storage Depth Below Underdrain, ft		0.6	0
Footprint Area, sq-ft	1,781	1,696	2,374
Media Filtration Rate, controls when underdrain discharges, in/hr	NA	5	5
Underlying Infiltration Rate, in/hr	1.3 in/hr (set based on assumed 18-hour drawdown time)	0.15	0
Head effects on infiltration	Assumed negligible for modeling; conservative	Assumed negligible for modeling; conservative	Assumed negligible for modeling; conservative
Long Term Average Capture Efficiency from SWMM Simulations, %	80%	96%	99%
Percent of SWQDv Retained, %	100%	29%[2]	0%[3]
Percent of Remaining SWQDv Biofiltered, %	NA	267%[2]	267%[3]

[1] Equivalent to the volume calculated from the LA County LID Volume Calculator for a 1-acre representative catchment (100% imperviousness, flow path length of 250 feet, slope of 5%, LA County Soil #098)

[2] See calculations below for Category 2

- 0.6 ft retained × 1,696 sq-ft = 1,018 cu-ft/3,561 = 29%. Remaining SWQDv = 3,561 – 1,018 = 2,543 cu-ft.
- Biofiltration provided as percent of remaining SWQDv = 2,543 cu-ft physical storage + 2.5 ft biofiltration routed during event (6 hours within-storm routing @ 5 in/hr) × 1,696 sq-ft = 6,783 cu-ft. 6783/2,543 = 267%

[3] See calculations below for Category 3

- No retention claimed; remaining SWQDv = 3,561 cu-ft
- Biofiltration provided as percent of remaining SWQDv = 3,561 cu-ft physical storage + 2.5 ft biofiltration routed during event (6 hours within-storm routing @ 5 in/hr) × 2,374 = 9,496 cu-ft. 9,496/3,561 = 267%

A 6 hour routing time in these calculations is considered to be conservative as the design storm duration is 24-hours, by definition, and typical real storm events have durations that typically exceed 6 to 12 hours.

2.6. Single Family Areas

The LID Performance Standard includes hydrologic source controls (HSCs) in single family detached (SFD) land uses, entailing routing of a portion of the impervious area to the pervious area. Single-family HSCs were modeled for parcels that drain to Regional Facility D only; these HSCs were not considered in the sizing of WQ Treatment Basin A, B, or C.

Table 2-8: SFD Disconnect Modeling Parameters for Regional Facility D

Parameter	Input	Source of Parameter Input
Percent of SFD land use disconnected	28%	Analysis of typical 5,000 SF parcels; represents rooftops and sidewalks
Disconnection ratio	4 parts impervious to 1 part pervious receiving flow	Analysis of typical area that can be used for disconnection within typical parcels
Depression storage of receiving pervious area (inches)	0.06	Depression storage set equivalent to pervious area depression storage; this is conservative as these areas are proposed to be amended to provide additional pore space
Infiltration rate of receiving pervious area	Set equivalent to underlying soil infiltration rate used in watershed modeling	Set equivalent to pervious area soil Ksat corresponding to the hydrologic soil group associated with the area

2.7. Summary of BMPs within Watershed Tributary to Each Regional Facility

A summary of the Project areas draining to each of the regional facilities is shown in Table 2-9. Facilities A, B, and C were modeled to receive Project flows directly[1], while Regional Facility D receives flows from areas that are routed through on-parcel and single family areas first.

[1] Note that single family areas draining to Facilities A, B, and C will have HSCs, but they are not modeled for conservatism.

Table 2-9: Areas Draining to Parcel-based BMP Types within Water Quality Facility Drainage Areas

Regional Infiltration/ Biofiltration Facility Drainage Area	Category 2 Parcel-based BMPs		SFD HSC[1]		Directly to Regional Facility		Total	
	Area (Ac)	Imp (%)	Area (Ac)	Imp (%)	Area (Ac)	Imp (%)	Area (Ac)	Imp (%)
Facility A	-	-	-	-	25.3	75	25.3	75
Facility B	-	-	-	-	62.9	62	62.9	62
Facility C	-	-	-	-	24.7	51	24.7	51
Regional Facility D	39.6	84	35.1	60	27.4	21	102.1	59

1 - Includes single-family roofs, patios and sidewalks, draining to a pervious area with an equivalent square-footage.

3. REGIONAL FACILITY MODELING

3.1. Model Representation

Regional infiltration/biofiltration facilities were modeled using a stage-area table to define volume properties and SWMM's built-in hydraulic control elements (e.g., orifices, weirs, outlets) to define discharge from the system (e.g., treated discharge, infiltration, overflow) as a function of the depth of stored water. These facilities were modeled to receive runoff from developed portions of the Project not addressed by stand-alone parcel-based BMPs, including a accounting for diversion structures. Regional Facility D was modeled to receive runoff from tributary areas in Mission Village, Legacy Village, and Entrada South and was simulated to receive runoff not addressed by parcel-based BMPs as well as bypass and treated discharge from parcel-based BMPs and SFD HSCs. Modeling of Mission Village Facility D is described in the Mission Village Phase I Conformance Memo (Geosyntec, 2016).

The continuous inflow hydrograph generated from the subcatchments (accounting for parcel-based retention where applicable) is routed through the regional facilities, accounting for the hydrologic water balance, conceptual diversion structure, hydraulic flow control. The total volumes that are treated, infiltrated, and overflow or bypass over the long term period of record are tabulated and used to evaluate whether the combined LID system achieves 80 percent capture of average annual watershed runoff. Watershed total capture was quantified by comparing the total runoff from the watershed without any BMPs (i.e., the baseline runoff volume) versus the total amount of water that bypasses (at the diversion structure) or overflows (via the overflow structure) the regional LID facilities with BMPs in place. If the total amount bypassing or overflowing is less than or equal to 20 percent of the baseline runoff volume, then the overall system is considered to capture at least 80 percent of watershed runoff volume.

Facility sizing was conducted with model infiltration rates, which incorporate factor(s) of safety on measured infiltration rates to account for the potential for lower infiltration rates in operation due to soil compaction during construction, accumulation of fines in infiltrating surface, and other effects. Measured infiltration rates were obtained via field testing by RTF&A (2013) and are shown in Table 3-1.

Subsequent to Frankian's 2013 investigation, the location of the infiltration facilities changed. The current facility locations were evaluated by Frankian (2017) and found to be in similar geologic formations. Therefore, Frankian (2017) concluded that the results of 2013 testing, with appropriate factors of safety, are considered to be reliable for the current facility locations.

Table 3-1: Measured Infiltration Rates

Location of Sample	Measured Infiltration Rate (in/hr)
Facility A (based on 2013 naming convention)	34
Facility B (based on 2013 naming convention)	17
Facility C (based on 2013 naming convention)	3.2
Vicinity Average Measured Infiltration Rate[1]	***18***
Default Factor of Safety (unitless)	5.0
Default Infiltration Rate (in/hr)	3.6

[1]Variability between samples is believed to represent overall site variability across the discrete points where samples were taken, not necessarily a significant difference between different basin locations. Infiltration testing conducted by Frankian (2013) is still considered to be reliable for the adjusted basin locations (Frankian, 2017).
[2]Based on guidance for selecting factors of safety contained in the Ventura County Technical Guidance Document, and best professional judgments; rates will be confirmed and designs will be adjusted as needed following mass grading.

The default design infiltration rate was further adjusted for modeling to provide for conservatism and an additional margin of safety in designs. Based on recommendations by Frankian (2017), a modeled infiltration rate of 3 inch/hr was used for all facilities. Rates will be confirmed and designs will be adjusted as needed via infiltration testing conducted after the facilities are graded. Design and modeled infiltration rates are included in Table 3-2 below.

Table 3-2: Modeled Infiltration Rates

Location of Sample	Facility WQ Depth, ft	Default Design Infiltration Rate (in/hr) (See Table 3-1	Modeled Infiltration Rate (in/hr)
Facility A	3 ft	3.6	3.0
Facility B	3.75 ft	3.6	3.0
Facility C	3.5 ft	3.6	3.0

Other modeling parameters are provided in Table 3-3 and 3-4 below. A schematic of the regional infiltration facilities A, B, and C is illustrated in Figure 3.

Regional Facility D was modeled and documented as part of the Mission Village Phase 1 Conformance Analysis (Geosyntec 2016).

Table 3-3: Regional Basin Modeling Parameters

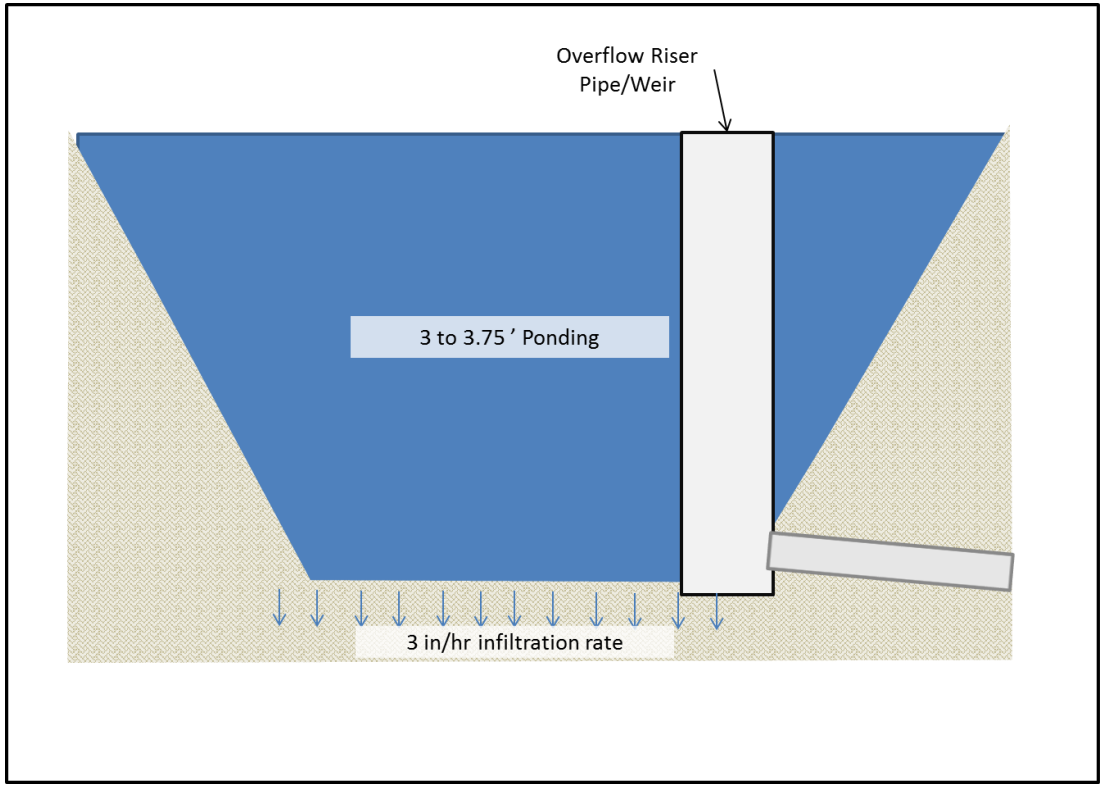
Parameter	Input	Source
Basin volumetric storage	Storage curve of facility	Model representation accounts for ponded water stored above the finished grade.
Basin flow controls	Weir dimensions and elevation to control the overflow elevation of the facility.	Subject to refinement in detailed design of facility. Designs will provide flexibility to adapt control dimensions per operational feedback.
Infiltration	Infiltration losses represented by an "outlet" in SWMM, which is tabular as a function of the wetted surface area and the modeled infiltration rate.	Outflow equals wetted area multiplied by modeled infiltration rate (See Table 3-1 and Table 3-2).
Evapotranspiration	Rate of evaporation from surface ponding and transpiration from amended sand media.	Same as overall watershed (See Table 2-3)
Diversion Structure	A SWMM "divider" was used with a cutoff flow.	Diversion structures have been designed to divert at least this flowrate before bypass.

Each facility's diversion cutoff flowrate is shown in Table 3-4. These rates were iteratively adjusted until the overall long term capture efficiency was at least 80 percent of long term runoff volume.

Table 3-4: Facility Diversion Cutoff Flowrate

LID Facility	Diversion Cutoff Flowrate (cfs)[1]
Facility A	4.7
Facility B	15
Facility C	4.5

[1]Runoff inflow rates greater than the cutoff flowrate bypass the LID facility.



Facility	Ponding Depth (ft)	Infiltration Rate (in/hr)	Facility Volume (acre-ft)
A	3	3	1.6
B	3.75	3	3.4
C	3.5	3	1.1

Figure 3: Schematic and Respective Cross-Section Depths of Entrada South Infiltration Facilities A, B, and C

3.2. Regional Facility Modeling Results

The long-term estimated hydrologic performance of regional facilities (capture efficiency and volume reduction) is reported in Table 3-5, along with the overall watershed capture and volume reduction. The overall watershed capture is inclusive of volume reductions achieved in nested parcel-based BMPs, hydrologic source controls, and regional facilities.

Table 3-5: Regional Facility Performance and Watershed Total Performance

Regional Facility Drainage Area	Tributary Area	Percent Imperviousness of Tributary Area	Regional Facility		Volume Reduction Upstream of Regional Facility[1]	Watershed Capture	Watershed Volume Reduction
			Capture Efficiency of Runoff Volume	Volume Reduction of Captured Water			
A	25.3	74.9%	80%	100%	--	80%	80%
B	62.9	61.6%	80%	100%	--	80%	80%
C	24.7	51.0%	80%	100%	--	80%	80%
Regional Facility D[1]	720.3	45.6%	74%	0.1%	16%	80%	16%

[1] Includes all areas draining to Regional Facility D, including SFD and parcel-based facilities (Source: Geosyntec, 2016)

4. MODEL PARAMETER RELIABILITY AND ASSUMPTIONS

This section discusses the reliability of the model parameters and assumptions that were used as part of this modeling analysis.

4.1. Parcel-based BMP Infiltration Feasibility Screening

The types of parcel-based BMPs applied to commercial, multi-family, institutional, recreation and park land uses was determined based on infiltration feasibility constraints, as described in Section 2. The criteria used to categorize parcel-based treatment based on infiltration constraints are in agreement with the infiltration constraints listed in the *Ventura Technical Guidance Manual* (Ventura County, 2010), the *LA County LID Ordinance and Manual* (LACDPW, 20014), and the *LID BMP Design, Investigation and Reporting Requirements Administrative Manual* (LACDPW, 2014). Constraints were mapped as accurately as possible at this phase of analysis. More detailed site investigation performed at the time of development of parcels may result in somewhat different distributions of parcel-based BMPs, however developers of parcels will obligated to provide the BMP volumes that were assumed in this model analysis. Therefore, the build-out performance of parcel-based BMPs is expected to be reasonably similar to the assumptions used for modeling at this time.

4.2. Parcel-based BMP Infiltration Rates

Infiltration rates beneath parcel-based BMP were assumed based on input from project geotechnical consultant (R.T Franklin & Associates, 2013) based on review of geologic information and proposed sources of fill material. While it is expected that infiltration rates may vary across the Project depending on the source of fill material, the assumed values are believed to be representative of anticipated average conditions and are relatively low. Detailed parcel designs will be supported by site-specific infiltration testing; parcel-based BMP performance is expected to be reasonably similar, on average, to assumptions made for the purpose of this analysis.

4.3. Single Family Hydrologic Source Controls

Single-family hydrologic source controls were not claimed in modeling conducted as part of this analysis. This is a conservative approach that somewhat under predicts the performance of proposed regional LID facilities.

4.4. Regional Facility Infiltration Rates and Model Representations

Infiltration rates in the locations of proposed regional infiltration/biofiltration facilities were estimated based on geologic information, soils data, and testing results available at the time of analysis (R.T Franklin & Associates, 2013, 2017). To account for uncertainty in these estimates, facility sizing was conducted with model infiltration rates, which incorporate factor(s) of safety to account for the potential for lower infiltration rates in operation due to soil compaction during construction, accumulation of fines in infiltrating surface, and other effects. As such, it is believed that infiltration rates are somewhat conservatively selected for the purpose of this analysis and it is anticipated that higher design infiltration rates may be supported through site-specific analysis conducted after bulk grading occurs. Should detailed testing show infiltration rates are lower than assumed, additional design features such as dry wells and/or selectively graded fill material could be used to achieve at least the assumed design infiltration rate.

5. SUMMARY

This attachment describes the modeling methodology used to evaluate the overall performance of water quality/LID design features proposed within the watersheds tributary to Facilities A, B, and C. Modeling of the portion of the Project that drains to Regional Facility D is documented in the Mission Village Phase 1 Conformance Memorandum (Geosyntec, 2016). This approach incorporates, in a conservative manner, the commitments to parcel-based LID and single family HSCs that have been made within the watershed. It also incorporates civil and geotechnical design information that is available at this time for the facilities. This approach results in an estimate of overall performance that is considered to be reliable for evaluating the conformance to the LID Performance Standard applicable to the Project.

6. REFERENCES

Alliance, 2017. Entrada South Major Land Division VTTM No. 53295 – Updated Land Use and Planning Areas, Job No 0930. Prepared for Newhall Land by Alliance.

Alliance, 2017. LID/SUSMP/Water Quality Maintenance Plan Map for Entrada South VTTM No. 53295, Job No 0930. Prepared for Newhall Land by Alliance. Prepared August 2017.

Geosyntec Consultants, 2016. Mission Village Phase 1 Final Hydrology Study – Evaluation of Conformance with Newhall LID Performance Standard. Geosyntec Consultants, May 23, 2016. Edits are currently in progress in response to LACDPW comments.

James and James, 2002. Water Systems Models, Hydrology, A guide to the Rain, Temperature, Runoff, Combine, and Statistics modules of the USEPA SWMM4. CHI publications, Ontario, Canada, 1988-2002. .

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Musgrave, G.W., 1955. "How Much Water Enters the Soils," U.S.D.A. Yearbook, U.S. Department of Agriculture, Washington, DC, pp. 151-159.

R.T. Frankian and Associates (RTF&A), 2010. Geotechnical Evaluation of Infiltration, Vesting Tentative Tract Map Number 61105, Mission Village, Newhall Ranch, Los Angeles County, California. Prepared for Newhall Land by RTF&A. January 2010.

R.T. Frankian and Associates (RTF&A), 2013. Geotechnical Infiltration Evaluation Update, Vesting Tentative Tract Map Number 53295, Entrada South, Newhall Ranch, Los Angeles County, California. Prepared for Newhall Land by RTF&A. August 2013.

R.T. Frankian and Associates (RTF&A), 2017. Geotechnical Review, Revised LID Infiltration Plans, Proposed Water Quality Treatment Basins A, B, and C. Prepared for Newhall Land by RTF&A. August 2017.

Ventura County, 2010. Ventura County Technical Guidance Manual for Stormwater Quality Control Measures. October 2010. http://www.vcstormwater.org/technicalguidancemanual.html

ATTACHMENT A.1: SWMM INPUT AND OUTPUT FILES

Regional Facility Input File (Facilities A, B, and C)[1] (SWMM 5.1) p. 1-4

Regional Facility Output File (SWMM 5.1) p. 5-8

Representative Stand-alone Parcel-based BMP Case Study (SWMM 5.0) p. 9-14

KEY
Annotation is provided in red text and boxes to help orient the reviewer to the key information contained in each file.

[1] Model calculations for Regional Facility D are provided with the Mission Village Phase 1 Conformance Memorandum

```
[TITLE]
;;Project Title/Notes

[OPTIONS]
;;Option             Value
FLOW_UNITS           CFS
INFILTRATION         GREEN_AMPT
FLOW_ROUTING         KINWAVE
LINK_OFFSETS         DEPTH
MIN_SLOPE            0
ALLOW_PONDING        NO
SKIP_STEADY_STATE    NO

START_DATE           10/01/1968
START_TIME           00:00:00
REPORT_START_DATE    10/01/1968
REPORT_START_TIME    00:00:00
END_DATE             10/01/2008
END_TIME             06:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          00:10:00
WET_STEP             00:15:00
DRY_STEP             04:00:00
ROUTING_STEP         0:00:30

INERTIAL_DAMPING     PARTIAL
NORMAL_FLOW_LIMITED  BOTH
FORCE_MAIN_EQUATION  H-W
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         0
MAX_TRIALS           0
HEAD_TOLERANCE       0
SYS_FLOW_TOL         5
LAT_FLOW_TOL         5
MINIMUM_STEP         0.5
THREADS              1

[EVAPORATION]
;;Data Source    Parameters
;;-------------- ----------------
MONTHLY          0.03   0.0479 0.0719 0.102  0.132  0.156  0.168  0.15   0.114  0.0781 0.042  0.03
DRY_ONLY         NO

[RAINGAGES]
;;Name           Format    Interval SCF      Source
;;-------------- --------- ------ ------ ----------
Newhall          INTENSITY 1:00     1        FILE       "NEWHALL_PATCHED_20091119.NCD" 46162      IN

[SUBCATCHMENTS]
;;Name           Rain Gage        Outlet           Area     %Imperv  Width    %Slope   CurbLen  SnapPack
;;-------------- ---------------- ---------------- -------- -------- -------- -------- -------- ----------
A-AB             Newhall          DivA             2.85     60.96    496.13   5        0
A-C              Newhall          DivA             22.45    76.70    3912.14  5        0
B-AB             Newhall          DivB             18.40    72.64    3206.33  5        0
B-C              Newhall          DivB             44.48    56.99    7749.89  5        0
C-AB             Newhall          DivC             0.28     49.53    48.26    5        0
C-C              Newhall          DivC             24.40    50.99    4251.11  5        0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
A-AB             0.012      0.25       0.02       0.06       25         OUTLET
A-C              0.012      0.25       0.02       0.06       25         OUTLET
B-AB             0.012      0.25       0.02       0.06       25         OUTLET
B-C              0.012      0.25       0.02       0.06       25         OUTLET
C-AB             0.012      0.25       0.02       0.06       25         OUTLET
C-C              0.012      0.25       0.02       0.06       25         OUTLET

[INFILTRATION]
;;Subcatchment   Suction    Ksat       IMD
;;-------------- ---------- ---------- ----------
A-AB             8          0.275      0.32
```

This model contains each of the three regional facilities. The tributary areas to these regional facilities are divided along soil unit delineations. Within each soil unit, watershed properties are lumped. This model demonstrates that the regional facilities A, B, and C are sized to infiltration at least 80 percent of average annual runoff. Hydrologic source controls and parcel-based BMPs are not considered in this sizing. Diversion structures are included in the capture efficiency analysis.

```
A-C             8          0.145      0.29
B-AB            8          0.275      0.32
B-C             8          0.145      0.29
C-AB            8          0.275      0.32
C-C             8          0.145      0.29

[JUNCTIONS]
;;Name           Elevation  MaxDepth   InitDepth  SurDepth   Aponded
;;-------------- ---------- ---------- ---------- ---------- ----------
J-DivA-OF       100        0          0          0          0
J-DivB-OF       100        0          0          0          0
J-DivC-OF       100        0          0          0          0

[OUTFALLS]
;;Name           Elevation  Type       Stage Data       Gated    Route To
;;-------------- ---------- ---------- ---------------- -------- ----------------
1               0          FREE                        NO
2               0          FREE                        NO
3               0          FREE                        NO

[DIVIDERS]
;;Name           Elevation  Diverted Link    Type       Parameters
;;-------------- ---------- ---------------- ---------- ----------
DivA            110        D-DivA-OF        CUTOFF     4.66       0          0          0          0
DivB            110        D-DivB-OF        CUTOFF     15         0          0          0          0
DivC            110        D-DivC-OF        CUTOFF     4.5        0          0          0          0

[STORAGE]
;;Name           Elev.    MaxDepth   InitDepth  Shape      Curve Name/Params            N/A      Fevap    Psi      Ksat     IMD
;;-------------- -------- ---------- ---------- ---------- ---------------------------- -------- --------          -------- -----
---
FacilityA       100      18         0          TABULAR    FacilityA                    0        0        0.1      3.000    0.1
FacilityB       100      18         0          TABULAR    FacilityB                    0        0        0.1      3.000    0.1
FacilityC       100      18         0          TABULAR    FacilityC                    0        0        0.1      3.000    0.1

[CONDUITS]
;;Name           From Node        To Node          Length     Roughness  InOffset   OutOffset  InitFlow   MaxFlow
;;-------------- ---------------- ---------------- ---------- ---------- ---------- ---------- ---------- ----------
8               J-DivC-OF        3                10         0.01       0          0          0          0
9               J-DivB-OF        2                10         0.01       0          0          0          0
10              J-DivA-OF        1                10         0.01       0          0          0          0
D-DivA-OF       DivA             J-DivA-OF        20         0.01       0          0          0          0
D-DivA-TR       DivA             FacilityA        20         0.01       0          0          0          0
D-DivB-OF       DivB             J-DivB-OF        20         0.01       0          0          0          0
D-DivB-TR       DivB             FacilityB        20         0.01       0          0          0          0
D-DivC-OF       DivC             J-DivC-OF        20         0.01       0          0          0          0
D-DivC-TR       DivC             FacilityC        20         0.01       0          0          0          0

[WEIRS]
;;Name           From Node        To Node          Type         CrestHt    Qcoeff     Gated    EndCon   EndCoeff   Surcharge
RoadWidth  RoadSurf
;;-------------- ---------------- ---------------- ------------ ---------- ---------- -------- -------- ---------- ---------- ----
------ ----------
1               FacilityA        1                TRANSVERSE   3          3.33       NO       0        0          YES
2               FacilityB        2                TRANSVERSE   3.75       3.33       NO       0        0          YES
3               FacilityC        3                TRANSVERSE   3.5        3.33       NO       0        0          YES

[XSECTIONS]
;;Link           Shape        Geom1            Geom2      Geom3      Geom4      Barrels    Culvert
;;-------------- ------------ ---------------- ---------- ---------- ---------- ---------- ----------
8               DUMMY        0                0          0          0          1
9               DUMMY        0                0          0          0          1
10              DUMMY        0                0          0          0          1
D-DivA-OF       DUMMY        0                0          0          0          1
D-DivA-TR       DUMMY        0                0          0          0          1
D-DivB-OF       DUMMY        0                0          0          0          1
D-DivB-TR       DUMMY        0                0          0          0          1
D-DivC-OF       DUMMY        0                0          0          0          1
D-DivC-TR       DUMMY        0                0          0          0          1
1               RECT_OPEN    10               9.424777961 0          0
2               RECT_OPEN    10               18.84955592 0          0
3               RECT_OPEN    10               9.424777961 0          0

[CURVES]
;;Name           Type       X-Value    Y-Value

2
```

Diversion structure cutoff flowrates.

```
;;-------------- ---------- ---------- ----------
FacilityA        Storage    0.00       24413.00
FacilityA                   0.15       24413.00
FacilityA                   0.24       24413.00
FacilityA                   0.30       24413.00
FacilityA                   0.45       24413.00
FacilityA                   0.60       24413.00
FacilityA                   0.90       24413.00
FacilityA                   1.20       24413.00
FacilityA                   1.50       24413.00
FacilityA                   1.95       24413.00
FacilityA                   2.10       24413.00
FacilityA                   2.25       24413.00
FacilityA                   2.40       24413.00
FacilityA                   2.64       24413.00
FacilityA                   2.70       24413.00
FacilityA                   3.00       24413.00
FacilityA                   10.00      24413.00
;
FacilityB        Storage    0.00       39374.00
FacilityB                   0.19       39374.00
FacilityB                   0.30       39374.00
FacilityB                   0.38       39374.00
FacilityB                   0.56       39374.00
FacilityB                   0.75       39374.00
FacilityB                   1.13       39374.00
FacilityB                   1.50       39374.00
FacilityB                   1.88       39374.00
FacilityB                   2.44       39374.00
FacilityB                   2.63       39374.00
FacilityB                   2.81       39374.00
FacilityB                   3.00       39374.00
FacilityB                   3.30       39374.00
FacilityB                   3.38       39374.00
FacilityB                   3.75       39374.00
FacilityB                   10.00      39374.00
;
FacilityC        Storage    0.00       15515.00
FacilityC                   0.18       15515.00
FacilityC                   0.28       15515.00
FacilityC                   0.35       15515.00
FacilityC                   0.53       15515.00
FacilityC                   0.70       15515.00
FacilityC                   1.05       15515.00
FacilityC                   1.40       15515.00
FacilityC                   1.75       15515.00
FacilityC                   2.28       15515.00
FacilityC                   2.45       15515.00
FacilityC                   2.63       15515.00
FacilityC                   2.80       15515.00
FacilityC                   3.08       15515.00
FacilityC                   3.15       15515.00
FacilityC                   3.50       15515.00
FacilityC                   10.00      15515.00

[REPORT]
;;Reporting Options
INPUT      NO
CONTROLS   NO
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]

[MAP]
DIMENSIONS 0.000 0.000 10000.000 10000.000
Units      None

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
J-DivA-OF        1577.869           4084.699
J-DivB-OF        4446.721           3961.749
J-DivC-OF        7411.202           3989.071
```

Top of Water Quality Volume at 3 ft.

Top of Water Quality Volume at 3.75 ft.

Top of Water Quality Volume at 3.5 ft.

```
1                993.151            2000.000
2                3773.973           1931.507
3                6787.671           1958.904
DivA             949.454            4521.858
DivB             3777.322           4603.825
DivC             6741.803           4562.842
FacilityA        293.716            4057.377
FacilityB        3066.940           3934.426
FacilityC        6127.049           3907.104

[VERTICES]
;;Link           X-Coord            Y-Coord
;;-------------- ------------------ ------------------

[Polygons]
;;Subcatchment   X-Coord            Y-Coord
;;-------------- ------------------ ------------------
A-AB             308.219            7410.959
A-C              1554.795           7465.753
B-AB             3267.123           7410.959
B-C              4294.521           7452.055
C-AB             6404.110           7342.466
C-C              7226.027           7342.466

[SYMBOLS]
;;Gage           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
Newhall          2806.122           8992.347
```

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.011)

WARNING 08: elevation drop exceeds length for Conduit 8
WARNING 08: elevation drop exceeds length for Conduit 9
WARNING 08: elevation drop exceeds length for Conduit 10

****
Rainfall File Summary
****

Station ID	First Date	Last Date	Recording Frequency	Periods w/Precip	Periods Missing	Periods Malfunc.
46162	10/02/1968	12/25/2008	60 min	5324	0	0

****
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
****

****
Analysis Options
****
Flow Units ..... CFS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
Infiltration Method ..... GREEN_AMPT
Flow Routing Method ..... KINWAVE
Starting Date 10/01/1968 00:00:00
Ending Date 10/01/2008 06:00:00
Antecedent Dry Days 0.0
Report Time Step 00:10:00
Wet Time Step 00:15:00
Dry Time Step 04:00:00
Routing Time Step ..... 30.00 sec

Runoff Quantity Continuity	Volume acre-feet	Depth inches
Total Precipitation	6895.087	733.130
Evaporation Loss	192.962	20.517
Infiltration Loss	2300.540	244.608
Surface Runoff	4438.329	471.912
Final Storage	0.000	0.000
Continuity Error (%)	-0.533	

Flow Routing Continuity	Volume acre-feet	Volume 10^6 gal
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	4438.329	1446.296
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	860.406	280.376
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	3579.477	1166.426
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	-0.035	

****
Highest Flow Instability Indexes
****
All links are stable.

****
Routing Time Step Summary
****
Minimum Time Step : 30.00 sec
Average Time Step : 30.00 sec
Maximum Time Step : 30.00 sec
Percent in Steady State : 0.00
Average Iterations per Step : 1.00
Percent Not Converging : 0.00

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS	Runoff Coeff
A-AB	733.13	0.00	19.57	273.20	444.12	34.37	3.79	0.606
A-C	733.13	0.00	25.06	148.26	564.27	343.98	31.36	0.770
B-AB	733.13	0.00	23.36	191.22	522.74	261.17	25.10	0.713
B-C	733.13	0.00	18.98	274.93	442.96	535.00	60.46	0.604
C-AB	733.13	0.00	15.92	353.58	366.92	2.79	0.36	0.500
C-C	733.13	0.00	17.16	313.64	405.83	268.88	32.87	0.554

****
Node Depth Summary
****

Node	Type	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min	Reported Max Depth Feet
J-DivA-OF	JUNCTION	0.00	0.00	100.00	0 00:00	0.00
J-DivB-OF	JUNCTION	0.00	0.00	100.00	0 00:00	0.00
J-DivC-OF	JUNCTION	0.00	0.00	100.00	0 00:00	0.00
1	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
2	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
3	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
DivA	DIVIDER	0.00	0.00	110.00	0 00:00	0.00
DivB	DIVIDER	0.00	0.00	110.00	0 00:00	0.00
DivC	DIVIDER	0.00	0.00	110.00	0 00:00	0.00
FacilityA	STORAGE	0.01	3.21	103.21	13237 09:08	3.21
FacilityB	STORAGE	0.03	4.09	104.09	9597 13:09	4.09
FacilityC	STORAGE	0.02	3.73	103.73	14339 23:09	3.73

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent
J-DivA-OF	JUNCTION	0.00	30.49	10721 20:00	0	59.2	0.000
J-DivB-OF	JUNCTION	0.00	70.55	10721 20:00	0	69.2	0.000
J-DivC-OF	JUNCTION	0.00	28.74	10721 20:00	0	35.8	0.000
1	OUTFALL	0.00	30.49	10721 20:00	0	69.3	0.000
2	OUTFALL	0.00	70.55	10721 20:00	0	157	0.000
3	OUTFALL	0.00	28.74	10721 20:00	0	53.9	0.000
DivA	DIVIDER	35.15	35.15	10721 20:00	378	378	0.000
DivB	DIVIDER	85.55	85.55	10721 20:00	796	796	0.000
DivC	DIVIDER	33.24	33.24	10721 20:00	272	272	0.000
FacilityA	STORAGE	0.00	4.66	110 13:09	0	319	-0.031
FacilityB	STORAGE	0.00	15.00	110 16:10	0	727	-0.043
FacilityC	STORAGE	0.00	4.50	110 13:58	0	236	-0.041

Total Bypass

Total Inflow

****
Node Surcharge Summary
****

No nodes were surcharged.

Example calculation - Facility A
% Capture = 1-(Total Bypass/Total Inflow)
= 1-(69.3/378)
= 81.6%

****
Node Flooding Summary
****

No nodes were flooded.

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 ft3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 ft3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
FacilityA	0.362	0	0	97	78.302	18	13237 09:08	4.66
FacilityB	1.300	0	0	88	160.911	23	9597 13:09	15.00
FacilityC	0.353	0	0	92	57.844	21	14339 23:09	4.50

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10^6 gal
1	0.23	3.25	30.49	69.317
2	0.22	7.42	70.55	157.148
3	0.19	3.04	28.74	53.890
System	0.21	13.71	129.78	280.355

****
Link Flow Summary
****

	Maximum	Time of Max	Maximum	Max/	Max/

Link	Type	Flow| CFS	Occurrence days	Occurrence hr:min	Veloc| ft/sec	Full Flow	Full Depth
8	DUMMY	28.74	10721	20:00			
9	DUMMY	70.55	10721	20:00			
10	DUMMY	30.49	10721	20:00			
D-DivA-OF	DUMMY	30.49	10721	20:00			
D-DivA-TR	DUMMY	4.66	110	13:09			
D-DivB-OF	DUMMY	70.55	10721	20:00			
D-DivB-TR	DUMMY	15.00	110	16:10			
D-DivC-OF	DUMMY	28.74	10721	20:00			
D-DivC-TR	DUMMY	4.50	110	13:58			
1	WEIR	2.96	13237	09:08			0.00
2	WEIR	12.27	9597	13:09			0.00
3	WEIR	3.42	14339	23:09			0.00

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Tue Oct 24 08:57:50 2017
Analysis ended on: Tue Oct 24 08:59:17 2017
Total elapsed time: 00:01:27

```
[TITLE]

[OPTIONS]
FLOW_UNITS              CFS
INFILTRATION            GREEN_AMPT
FLOW_ROUTING            KINWAVE
START_DATE              10/01/1968
START_TIME              00:00:00
REPORT_START_DATE       10/01/1968
REPORT_START_TIME       00:00:00
END_DATE                10/01/2008
END_TIME                06:00:00
SWEEP_START             01/01
SWEEP_END               12/31
DRY_DAYS                0
REPORT_STEP             00:10:00
WET_STEP                00:15:00
DRY_STEP                04:00:00
ROUTING_STEP            0:00:30
ALLOW_PONDING           NO
INERTIAL_DAMPING        PARTIAL
VARIABLE_STEP           0.75
LENGTHENING_STEP        0
MIN_SURFAREA            0
NORMAL_FLOW_LIMITED     BOTH
SKIP_STEADY_STATE       NO
FORCE_MAIN_EQUATION     H-W
LINK_OFFSETS            DEPTH
MIN_SLOPE               0

[EVAPORATION]
;;Type           Parameters
;;-----------    ----------
MONTHLY          0.03    0.0479  0.0719  0.102   0.132   0.156   0.168   0.15    0.114   0.0781  0.042   0.03
DRY_ONLY     NO

[RAINGAGES]
;;               Rain            Time    Snow    Data
;;Name           Type            Intrvl  Catch   Source
;;-------------- ---------       ------  ------  ----------
Newhall          INTENSITY       1:00    1.0     FILE            "NEWHALL_PATCHED_20091119.NCD"   46162           IN

[SUBCATCHMENTS]
;;                                                Total   Pcnt.           Pcnt.   Curb    Snow
;;Name           Raingage        Outlet          Area    Imperv  Width   Slope   Length  Pack
;;-------------- --------------- --------------- ------- ------- ------- ------- ------- ----------
Category1        Newhall         FacilityA       1       100     174.2   5       0
Category2        Newhall         FacilityB       1       100     174.2   5       0
Category3        Newhall         FacilityC       1       100     174.2   5       0

[SUBAREAS]
;;Subcatchment   N-Imperv        N-Perv          S-Imperv        S-Perv          PctZero         RouteTo         PctRouted
;;-------------- ----------      ----------      ----------      ----------      ----------      ----------      ----------
Category1        0.012           0.25            0.02            0.06            25              OUTLET
Category2        0.012           0.25            0.02            0.06            25              OUTLET
Category3        0.012           0.25            0.02            0.06            25              OUTLET

[INFILTRATION]
;;Subcatchment   Suction         HydCon          IMDmax
;;-------------- ----------      ----------      ----------
Category1        8               0.275           0.32
Category2        8               0.275           0.32
Category3        8               0.275           0.32

[JUNCTIONS]
;;               Invert          Max.            Init.           Surcharge       Ponded
;;Name           Elev.           Depth           Depth           Depth           Area
;;-------------- ----------      ----------      ----------      ----------      ----------
Cat2Weir         0               0               0               0               0
Cat3Weir         0               0               0               0               0
Cat1Weir         0               0               0               0               0

[OUTFALLS]
;;               Invert          Outfall         Stage/Table     Tide
;;Name           Elev.           Type            Time Series     Gate
```

A 1-acre unit area was modeled with 100% imperviousness and soil parameters consistent with Regional Facility model.

Catchment is 100% impervious; therefore, no sensitivity to soil parameters.

```
;;--------------  ----------      ----------      ----------------  ----
1               0               FREE                              NO
2               0               FREE                              NO
3               0               FREE                              NO

[STORAGE]
;;              Invert  Max.    Init.   Storage         Curve                   Ponded  Evap.
;;Name          Elev.   Depth   Depth   Curve           Params                  Area    Frac.   Infiltration Parameters
;;--------------  ------  ------  ------  ----------      ----------------------  ------  ------  ----------  ----------  ----------
FacilityA       100     18      0       TABULAR         FacilityA               0       0       .01     1.3     .01
FacilityB       100     18      0       TABULAR         FacilityB               0       0       .01     .15     .01
FacilityC       100     18      0       TABULAR         FacilityC               0       0

[CONDUITS]
;;              Inlet           Outlet                          Manning         Inlet           Outlet          Init.
        Max.
;;Name          Node            Node            Length          N               Offset          Offset          Flow
        Flow
;;--------------  ----------------  ----------------  ----------      ----------      ----------      ----------      ----------
        ----------
4               Cat2Weir        2               10              0.01            0               0               0
        0
5               Cat3Weir        3               10              0.01            0               0               0
        0
6               Cat1Weir        1               10              0.01            0               0               0
        0

[WEIRS]
;;              Inlet           Outlet          Weir            Crest           Disch.          Flap    End     End
;;Name          Node            Node            Type            Height          Coeff.          Gate    Con.    Coeff.
;;--------------  ----------------  ----------------  ------------    ----------      ----------      ----    ----------
1               FacilityA       Cat1Weir        TRANSVERSE      2               3.33            NO      0       0
2               FacilityB       Cat2Weir        TRANSVERSE      2.1             3.33            NO      0       0
3               FacilityC       Cat3Weir        TRANSVERSE      1.5             3.33            NO      0       0

[OUTLETS]
;;              Inlet           Outlet          Outflow         Outlet          Qcoeff/                         Flap
;;Name          Node            Node            Height          Type            QTable          Qexpon          Gate
;;--------------  ----------------  ----------------  ----------      ----------------  ----------------  ----------      ----
Cat2Underdrain  FacilityB       2               .6              TABULAR/HEAD    2Underdrain                     NO
Cat3Underdrain  FacilityC       3               0               TABULAR/HEAD    3Underdrain                     NO

[XSECTIONS]
;;Link          Shape           Geom1           Geom2           Geom3           Geom4           Barrels
;;--------------  ------------    ----------------  ----------      ----------      ----------      ----------
4               DUMMY           0               0               0               0               1
5               DUMMY           0               0               0               0               1
6               DUMMY           0               0               0               0               1
1               RECT_OPEN       16              10              0               0
2               RECT_OPEN       16              10              0               0
3               RECT_OPEN       16              10              0               0

[LOSSES]
;;Link          Inlet           Outlet          Average         Flap Gate
;;--------------  ----------      ----------      ----------      ----------

[CURVES]
;;Name          Type            X-Value         Y-Value
;;--------------  ----------      ----------      ----------
2Underdrain     Rating          0               0
2Underdrain                     .01             .2
2Underdrain                     18              .2

3Underdrain     Rating          0               0
3Underdrain                     .01             .27
3Underdrain                     18              .27

FacilityA       Storage         0               1781
FacilityA                       18              1781

FacilityB       Storage         0               1696
FacilityB                       18              1696

FacilityC       Storage         0               2374
FacilityC                       18              2374
```

Infiltration rate for Category 1 set to yield 21-hour drawdown.

Weir crest height establishes the max WQ depth of each BMP Category; depth below overflow consists of effective storage depth in ponding and gravel pores

Underdrain rating curves developed for 5 in/hr media filtration rate.
Category 2 example:
Q(cfs) = (1/12)*(1/3600)*(5)*surface area
= (1/12)*(1/3600)*5*1696
= 0.20 cfs

```
[REPORT]
INPUT           NO
CONTROLS        NO
SUBCATCHMENTS   ALL
NODES   ALL
LINKS   ALL

[TAGS]

[MAP]
DIMENSIONS      0.000   0.000   10000.000       10000.000
Units           None

[COORDINATES]
;;Node          X-Coord                 Y-Coord
;;--------------------------------------------------------
Cat2Weir        3738.602                2750.760
Cat3Weir        6762.918                2720.365
Cat1Weir        1124.620                2462.006
1               993.151                 2000.000
2               3773.973                1931.507
3               6787.671                1958.904
FacilityA       979.452                 3712.329
FacilityB       3760.274                3589.041
FacilityC       6732.877                3479.452

[VERTICES]
;;Link          X-Coord                 Y-Coord
;;--------------------------------------------------------
Cat2Underdrain  4620.061                2963.526
Cat3Underdrain  7887.538                3161.094

[Polygons]
;;Subcatchment  X-Coord                 Y-Coord
;;--------------------------------------------------------
Category1       308.219                 7410.959
Category2       3267.123                7410.959
Category3       6404.110                7342.466

[SYMBOLS]
;;Gage          X-Coord                 Y-Coord
;;--------------------------------------------------------
Newhall         2806.122                8992.347
```

Representative Parcel-based, Stand-alone BMPs

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.0 (Build 5.0.022)
--------------------------------------------------------------

***********************************************************
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
***********************************************************

****************
Analysis Options
****************
Flow Units ............... CFS
Process Models:
  Rainfall/Runoff ........ YES
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Infiltration Method ...... GREEN_AMPT
Flow Routing Method ...... KINWAVE
Starting Date ............ OCT-01-1968 00:00:00
Ending Date .............. OCT-01-2008 06:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:10:00
Wet Time Step ............ 00:15:00
Dry Time Step ............ 04:00:00
Routing Time Step ........ 30.00 sec


WARNING 04: minimum elevation drop used for Conduit 4
WARNING 04: minimum elevation drop used for Conduit 5
WARNING 04: minimum elevation drop used for Conduit 6

*********************
Rainfall File Summary
*********************
Station    First        Last         Recording   Periods    Periods    Periods
ID         Date         Date         Frequency  w/Precip    Missing    Malfunc.
-------------------------------------------------------------------------------
46162      OCT-02-1968  DEC-25-2008     60 min      5324          0          0


*************************        Volume         Depth
Runoff Quantity Continuity     acre-feet        inches
*************************     ---------       -------
Total Precipitation ......       183.282       733.130
Evaporation Loss .........         8.056        32.224
Infiltration Loss ........         0.000         0.000
Surface Runoff ...........       177.318       709.270
Final Surface Storage ....         0.000         0.000
Continuity Error (%) .....        -1.141


*************************        Volume         Volume
Flow Routing Continuity        acre-feet      10^6 gal
*************************     ---------     ---------
Dry Weather Inflow .......         0.000         0.000
Wet Weather Inflow .......       177.318        57.782
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........         0.000         0.000
External Outflow .........       113.375        36.945
Internal Outflow .........         0.000         0.000
Storage Losses ...........        63.939        20.836
Initial Stored Volume ....         0.000         0.000
Final Stored Volume ......         0.000         0.000
Continuity Error (%) .....         0.002


*******************************
Highest Flow Instability Indexes
```

Three unit-area models were set up to demonstrate that when a BMP is sized per the SWQDv, at least 80% capture is achieved. The three models are as described in Attachment A.

```
*******************************
All links are stable.


************************
Routing Time Step Summary
************************
Minimum Time Step           :    30.00 sec
Average Time Step           :    30.00 sec
Maximum Time Step           :    30.00 sec
Percent in Steady State     :     0.00
Average Iterations per Step :     1.00


**************************
Subcatchment Runoff Summary
**************************

---------------------------------------------------------------------------------------------------
                         Total      Total      Total      Total      Total       Total     Peak  Runoff
                        Precip      Runon       Evap      Infil     Runoff      Runoff   Runoff   Coeff
Subcatchment                in         in         in         in         in    10^6 gal      CFS
---------------------------------------------------------------------------------------------------
Category1               733.13       0.00      32.22       0.00     709.27       19.26     1.44   0.967
Category2               733.13       0.00      32.22       0.00     709.27       19.26     1.44   0.967
Category3               733.13       0.00      32.22       0.00     709.27       19.26     1.44   0.967


******************
Node Depth Summary
******************

-----------------------------------------------------------------
                            Average  Maximum  Maximum  Time of Max
                              Depth    Depth      HGL   Occurrence
Node                 Type      Feet     Feet     Feet  days hr:min
-----------------------------------------------------------------
Cat2Weir             JUNCTION  0.00     0.00     0.00     0  00:00
Cat3Weir             JUNCTION  0.00     0.00     0.00     0  00:00
Cat1Weir             JUNCTION  0.00     0.00     0.00     0  00:00
1                    OUTFALL   0.00     0.00     0.00     0  00:00
2                    OUTFALL   0.00     0.00     0.00     0  00:00
3                    OUTFALL   0.00     0.00     0.00     0  00:00
FacilityA            STORAGE   0.02     2.12   102.12  10721  19:19
FacilityB            STORAGE   0.03     2.21   102.21  10721  19:20
FacilityC            STORAGE   0.00     1.61   101.61  10721  20:00


******************
Node Inflow Summary
******************

-------------------------------------------------------------------------------
                            Maximum  Maximum                  Lateral       Total
                            Lateral    Total  Time of Max      Inflow      Inflow
                             Inflow   Inflow   Occurrence      Volume      Volume
Node                 Type       CFS      CFS  days hr:min    10^6 gal    10^6 gal
-------------------------------------------------------------------------------
Cat2Weir             JUNCTION  0.00     1.24  10721  19:20       0.000       0.732
Cat3Weir             JUNCTION  0.00     1.17  10721  20:00       0.000       0.240
Cat1Weir             JUNCTION  0.00     1.39  10721  19:19       0.000       3.860
1                    OUTFALL   0.00     1.39  10721  19:19       0.000       3.860
2                    OUTFALL   0.00     1.44  10721  19:20       0.000      13.823
3                    OUTFALL   0.00     1.44  10721  20:00       0.000      19.260
FacilityA            STORAGE   1.44     1.44  10721  19:30      19.259      19.259
FacilityB            STORAGE   1.44     1.44  10721  19:30      19.259      19.259
FacilityC            STORAGE   1.44     1.44  10721  19:30      19.259      19.259


**********************
Node Surcharge Summary
**********************

No nodes were surcharged.
```

Total Bypass

Total Inflow

Example calculation - Category 1
% Capture = 1-(Total Bypass/Total Inflow)
= 1-(3.86/19.259)
= 80.0%

****
Node Flooding Summary
****

No nodes were flooded.

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 ft3	Avg Pcnt Full	E&I Pcnt Loss	Maximum Volume 1000 ft3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
FacilityA	0.042	0	80	3.776	12	10721 19:18	1.39
FacilityB	0.057	0	28	3.751	12	10721 19:19	1.44
FacilityC	0.003	0	0	3.816	9	10721 20:00	1.44

****
Outfall Loading Summary
****

Outfall Node	Flow Freq. Pcnt.	Avg. Flow CFS	Max. Flow CFS	Total Volume 10^6 gal
1	0.23	0.17	1.39	3.860
2	1.06	0.14	1.44	13.823
3	2.04	0.10	1.44	19.260
System	1.11	0.41	4.26	36.942

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CFS	Time of Max Occurrence days hr:min	Maximum |Veloc| ft/sec	Max/ Full Flow	Max/ Full Depth
4	DUMMY	1.24	10721 19:20			
5	DUMMY	1.17	10721 20:00			
6	DUMMY	1.39	10721 19:19			
1	WEIR	1.39	10721 19:19			0.00
2	WEIR	1.24	10721 19:20			0.00
3	WEIR	1.17	10721 20:00			0.00
Cat2Underdrain	DUMMY	0.20	110 13:10			
Cat3Underdrain	DUMMY	0.27	110 13:15			

****
Conduit Surcharge Summary
****

Conduit	Hours Full: Both Ends	Hours Full: Upstream	Hours Full: Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
4	0.01	0.01	0.01	350646.01	0.01
5	0.01	0.01	0.01	350646.01	0.01
6	0.01	0.01	0.01	350646.01	0.01

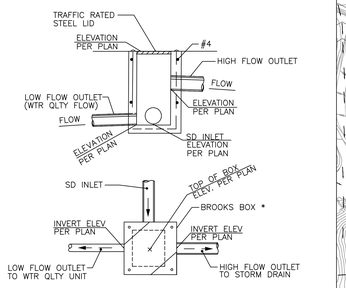
Analysis begun on: Tue Nov 12 09:29:37 2013
Analysis ended on: Tue Nov 12 09:31:12 2013
Total elapsed time: 00:01:35

ENTRADA-SOUTH

LID/WATER QUALITY MAINTENANCE MAP PLAN
PORTION OF TENTATIVE TRACT 53295

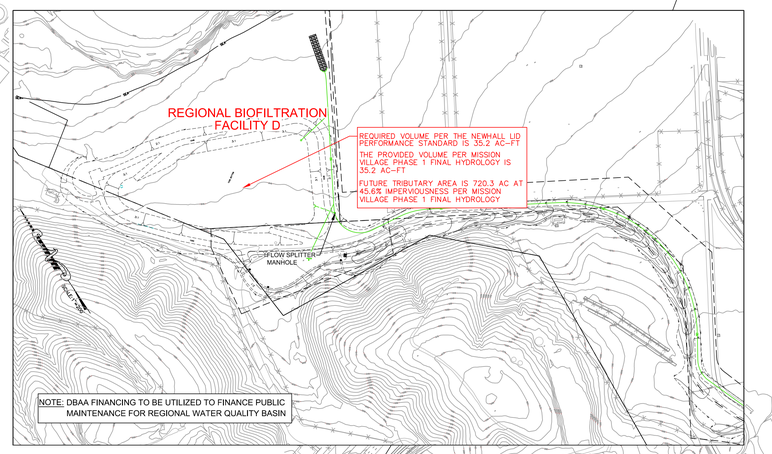
LEGEND

- BIO-RETENTION: - WHOLE AREA NEEDS TO BE SLOPE < 1%
  - MUST HAVE SUB-DRAIN
- PROPOSED STORM DRAIN
- DRAINAGE BASIN BOUNDARIES
- FLOW DIRECTION



* RECOMMENDED PROPRIETARY UNIT BY BROOKS PRODUCTS. KNOCKOUT SIZES, KNOCKOUT LOCATIONS, AND BOX DEPTHS ARE CUSTOMIZABLE PER CONTRACTORS NEEDS.

DIVERSION STRUCTURE DETAIL
NO SCALE



OFFSITE UNDEVELOPED-NORTH
AREA=55.7 AC

TO REGIONAL BIOFILTRATION FACILITY D

STORM DRAIN ACCESS ROAD

BASIN A$_{TOTAL}$=748.3 AC

BASIN A2
AREA=18.4 AC

THE SWQDv MUST BE PROVIDED FOR COMMERCIAL AND MULTI-FAMILY LOTS THAT DRAIN TO MISSION VILLAGE FACILITY D.

CALCULATED TOTAL REQUIRED LID VOLUME = 3.82 AC-FT FOR THE TOTAL AREA OF 39.6 ACRES OF MULTI-FAMILY AND COMMERCIAL THAT DRAINS TO MISSION VILLAGE FACILITY D.

PARCEL-BASED LID BMPS TO BE USED TO THE SATISFACTION OF LACDPW AND TO MEET THE REQUIREMENTS OF THE NEWHALL/ENTRADA SOUTH LID PERFORMANCE STANDARD. TO BE PRIVATELY MAINTAINED.

COMMERCIAL

BASIN E
AREA=29.2 AC
SWQDv =92,783 CF
REQUIRED BMP VOLUME = 92,790 ft³
(OR EQUIVALENT TREATMENT SEE NOTES 1,2, AND 3)

BIO-FILTRATION
SWQDv = 0.50 cfs
Qpw=0.34 cfs
Vm =6,682.9 ft³

BIO-FILTRATION
SWQDv = 0.59 cfs
Qpw=0.44 cfs
Vm =8,816.2 ft³

BASIN I
AREA=2.3 AC

BASIN J
AREA=2.7 AC

BASIN L
AREA=3.7 AC

BIO-FILTRATION
SWQDv = 0.72 cfs
Qpw=0.47 cfs
Vm =9,400.6 ft³

BIO-FILTRATION
SWQDv = 0.14 cfs
Qpw=0.12 cfs
Vm =2,470.0 ft³

INFILTRATION BASIN "A"
TREATS BASIN: C, D, F, P, & S
3.00 ft. DEEP X 24,413 ft²
73,238 ft³ TREATMENT VOLUME
A=25.3 AC
Qpw=4.66 cfs
Vm =70,155 ft³

BIO-FILTRATION
SWQDv = 0.13 cfs
Qpw=0.09 cfs
Vm =1,725.1 ft³

BASIN EE
AREA=0.7 AC.

BIO-FILTRATION
SWQDv = 0.77 cfs
Qpw=0.33 cfs
Vm =6,498.6 ft³

BASIN N
AREA=1.1 AC

BASIN K
AREA=3.4 AC

BASIN H
AREA=1.1 AC

BASIN D
AREA=10.8 AC
Qpw=1.91 cfs
Vm =31,707.7 ft³

BIO-FILTRATION
SWQDv = 0.59 cfs
Qpw=0.31 cfs
Vm =6,105.6 ft³

BASIN F
AREA=9.1 AC
Qpw=1.89 cfs
Vm =26,565.6 ft³

BASIN O
AREA=4.0 AC

BASIN M
AREA=2.0 AC

BIO-FILTRATION
SWQDv = 0.15 cfs
Qpw=0.10 cfs
Vm =1,963.9 ft³

BASIN DD
AREA=0.6 AC

BIO-FILTRATION
SWQDv = 0.56 cfs
Qpw=0.43 cfs
Vm =8,575.5 ft³

BIO-FILTRATION
SWQDv = 0.18 cfs
Qpw=0.12 cfs
Vm =2,371.6 ft³

BASIN CC
AREA=3.1 AC

BIO-FILTRATION
SWQDv = 0.75 cfs
Qpw=0.50 cfs
Vm =9,881.5 ft³

BIO-FILTRATION
SWQDv = 0.10 cfs
Qpw=0.10 cfs
Vm =2,026.4 ft³

BIO-FILTRATION
SWQDv = 0.20 cfs
Qpw=0.16 cfs
Vm =3,145.6 ft³

BASIN A1
AREA=94.4 AC

BASIN G
AREA=0.6 AC.

BASIN Q
AREA=1.0 AC.

BASIN B2
AREA=16.5 AC
Qpw=1.66 cfs
V =30,094 ft³

BASIN C
AREA=2.0 AC
Qpw=0.19 cfs
Vm =3,656.6 ft³

BASIN U
AREA=1.0 AC

BASIN V
AREA=1.2 AC

BASIN BB
AREA=1.4 AC

BIO-FILTRATION
SWQDv = 0.34 cfs
Qpw=0.23 cfs
Vm =4,468.7 ft³

BASIN AA
AREA=0.9 AC

BIO-FILTRATION
SWQDv = 0.23 cfs
Qpw=0.15 cfs
Vm =3,021.1 ft³

INFILTRATION BASIN "B"
TREATS BASIN: B1, P, & W
3.75 ft. DEEP X 39,374 ft²=w
147,654 ft³ TREATMENT VOLUME
Hs=8.2 W AC
Qpw=15.00 cfs
Vm =147,601 ft³

BASIN S
AREA=1.3 AC

BASIN R
AREA=2 AC

BIO-FILTRATION
SWQDv = 0.35 cfs
Qpw=0.23 cfs
Vm =4,595.6 ft³

PARCEL-BASED LID BMPS TO BE USED TO THE SATISFACTION OF LACDPW AND TO MEET THE REQUIREMENTS OF THE NEWHALL/ENTRADA SOUTH LID PERFORMANCE STANDARD. TO BE PRIVATELY MAINTAINED.

BIO-FILTRATION
SWQDv = 0.28 cfs
Qpw=0.18 cfs
Vm =3,671.6 ft³

BASIN Y
AREA=3.0 AC
SWQDv =9,583.2 CF
REQUIRED LID VOLUME = 9,590 ft³
(OR EQUIVALENT TREATMENT SEE NOTES 1,2, AND 3)

BASIN T
AREA=1.2 AC

BIO-FILTRATION
DESIGN Qpw=0.53 cfs
Qpw=0.39 cfs
Vm =6,885.9 ft³

BIO-FILTRATION
DESIGN Qpw=0.35 cfs
Qpw=0.29 cfs
Vm =3,813.7 ft³

BASIN W
AREA=1.7 AC
Qpw=0.05 cfs
Vm =914.9 ft³

BASIN X
AREA=10.2 AC
SWQDv =32,234.4 CF
REQUIRED BMP VOLUME = 32,240 ft³
(OR EQUIVALENT TREATMENT SEE NOTES 1,2, AND 3)

PARCEL-BASED LID BMPS TO BE USED TO THE SATISFACTION OF LACDPW AND TO MEET THE REQUIREMENTS OF THE NEWHALL/ENTRADA SOUTH LID PERFORMANCE STANDARD. TO BE PRIVATELY MAINTAINED.

BASIN P
AREA=16.2 AC
Qpw=3.50 cfs
Vm =47,690.5 ft³

INFILTRATION BASIN "C"
TREATS BASIN: B2, B3, & Q
3.50 ft. DEEP X 15,515 ft²=w
54,303 ft³ TREATMENT VOLUME
A=24.7 AC
Qpw=4.50 cfs
Vm =49,606 ft³

BASIN B1
AREA=45.0 AC
Qpw=4.63 cfs
Vm =99,086 ft³

BASIN B3
AREA=7.2 AC
Qpw=0.95 cfs
Vm =16,423 ft³

T.M. 61105
VTTM 61105
MISSION VILLAGE
NOT A PART
(SAME OWNER)

VTTM 61105
MISSION VILLAGE
NOT A PART
(SAME OWNER)

OFFSITE UNDEVELOPED WEST
AREA = 602.5 AC

OFFSITE -SOUTH
AREA=28.7 AC

OFFSITE -SOUTH
AREA=13.4 AC

CONDOMINIUM SITE
SINGLE FAMILY HOMES
MULTI-FAMILY SITE
SCHOOL SITE
PARK SITE
ACCESS ROAD
ENTERTAINMENT
SKYVIEW DRIVE
FREEWAY
INTERSTATE

PARCEL-BASED LID BMP TREATMENT NOTES

1. LID BMPS TO BE DESIGNED AND PLACED WITHIN THE BASIN WITH FINAL IMPROVEMENT PLANS TO THE SATISFACTION OF LACDPW AND TO MEET THE REQUIREMENTS OF THE NEWHALL/ENTRADA SOUTH LID PERFORMANCE STANDARD.
2. LID BMPS SHALL BE SELECTED TO INFILTRATE THE SWQDv TO THE MAXIMUM EXTENT PRACTICABLE BASED ON PARCEL-LEVEL FEASIBILITY SCREENING. IF INFILTRATION IS NOT FULLY FEASIBLE, THE BMPS SHALL BE SELECTED TO INFILTRATE TO THE EXTENT FEASIBLE AND BIOFILTER THE REMAINING VOLUME NOT RELIABLY RETAINED AT A RATE OF 1.5 TO 1.0. BMP SELECTION SHALL BE PER THE NEWHALL/ENTRADA SOUTH LID PERFORMANCE STANDARD.

NOTE: DBAA FINANCING TO BE UTILIZED TO FINANCE MAINTENANCE FOR BIO-FILTRATIONS DEVICES AND INFILTRATION BASINS

NOTE: SWQDv ARE PER NEWHALL/ENTRADA SOUTH LID PERFORMANCE STANDARD. Qpm AND Vm ARE CALCULATED AS THE GREATER OF EITHER THE COUNTY OF LOS ANGELES LID CALCULATOR OR THE NEWHALL/ENTRADA SOUTH PERFORMANCE STANDARD.

SCALE: 1"=200'

FEET: 200 100 0 200 400
INCHES: 1 1/2 0 1 2

ALLIANCE LAND PLANNING & ENGINEERING INC.
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TEL: (760) 431-9896 FAX: (760) 431-8802
27433 TOURNEY ROAD Suite 250 VALENCIA, CA 91355
TEL: (661) 799-2760 FAX: (661) 254-1929
CIVIL ENGINEERING • LAND PLANNING • HILLSIDE DESIGN • SURVEYING

PLANS PREPARED BY:
ALLIANCE LAND PLANNING & ENGINEERING INC.
2248 FARADAY AVE. CARLSBAD, CA. 92008
(760) 431-9896

PLANS PREPARED UNDER THE DIRECTION OF:
CRAIG M. WHITTEKER R.C.E. 51929 — 10/24/17 DATE

REGISTERED PROFESSIONAL ENGINEER — CRAIG M. WHITTEKER — No. 51929 — EXP. 6-30-18 — CIVIL — STATE OF CALIFORNIA

PLANS PREPARED FOR:
NEWHALL LAND
23823 WEST VALENCIA BOULEVARD
VALENCIA, CALIFORNIA 91355
TELEPHONE: (661) 255-4000
REPRESENTATIVE : ALEX HERRELL

HYDROLOGY STUDY APPROVED
CHECKED BY: RCE NO. 82680 DATE 11/16/2017
APPROVED BY: DATE 11/16/2017
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS
LAND DEVELOPMENT DIVISION

NO.	DATE		BY	APPR

1 | COUNTY OF LOS ANGELES | 1 SHEETS

LID/WATER QUALITY MAINTENANCE PLAN MAP FOR ENTRADA-SOUTH TENTATIVE TRACT 53295

PLAN PREPARATION DATE: 12/21/15

0930/HYDROLOGY/0930-WQMP.dwg

LID RUNOFF CALCULATIONS									
BASIN	AREA (AC)	PROPORTION IMPERVIOUS	SOIL TYPE	RAINFALL AMOUNT (in)	FLOW PATH LENGTH (ft)	FLOWPATH SLOPE	INTENSITY	24-HOUR RUNOFF VOLUME (cu. ft.)	FLOWRATE (CFS)
A	720.30	0.46	98	N/A	N/A	N/A	N/A	N/A	66.30
B1	45.00	0.57	98	1.1	2,930.00	0.04	0.19	99,086	4.63
B2	16.52	0.45	98	1.1	1,295.00	0.03	0.22	30,094	1.66
B3	7.15	0.60	98	1.1	1,400.00	0.03	0.20	16,423	0.95
C	2.02	0.05	98	1.1	260.00	0.20	0.34	1,182	0.18
D	10.82	0.80	98	1.1	1,700.00	0.04	0.24	31,708	1.91
E	29.20	0.91	98	1.1	2,000.00	0.03	0.23	95,956	4.85
F	9.06	0.80	98	1.1	840.00	0.02	0.28	26,566	1.89
G	0.63	0.89	98	1.1	780.00	0.05	0.32	2,026	0.10
H	1.10	0.78	98	1.1	710.00	0.05	0.31	3,146	0.16
I	2.31	0.79	98	1.1	1,410.00	0.01	0.23	6,683	0.34
J	2.68	0.91	98	1.1	1,330.00	0.01	0.24	8,816	0.44
K	2.37	0.69	98	1.1	1,420.00	0.04	0.24	6,106	0.31
L	3.71	0.67	98	1.1	1,380.00	0.04	0.24	9,401	0.47
M	4.01	0.39	98	1.1	1,240.00	0.01	0.20	6,499	0.33
N	1.11	0.57	98	1.1	360.00	0.03	0.34	2,470	0.12
O	3.33	0.69	98	1.1	900.00	0.12	0.25	8,575	0.43
P	16.23	0.80	98	1.1	760.00	0.02	0.29	47,601	3.50
Q	1.00	0.85	98	1.1	1,200.00	0.02	0.26	3,089	0.20
R	2.10	0.91	98	1.1	1,980.00	0.02	0.22	6,886	0.39
S	1.30	0.80	98	1.1	840.00	0.04	0.30	3,814	0.29
T	1.20	0.84	98	1.1	720.00	0.06	0.33	3,672	0.18
U	2.32	0.50	98	1.1	1,170.00	0.04	0.24	4,596	0.23
V	1.22	0.49	98	1.1	720.00	0.05	0.28	2,372	0.12
W	1.65	0.05	98	1.1	360.00	0.06	0.23	915	0.05
X	10.20	0.80	98	1.1	760.00	0.02	0.29	29,935	1.51
Y	2.95	0.88	98	1.1	700.00	0.02	0.30	9,352	0.47
Z	NOT USED								
AA	0.93	0.90	98	1.1	400.00	0.04	0.38	3,021	0.15
BB	1.36	0.91	98	1.1	1,170.00	0.04	0.28	4,469	0.23
CC	3.08	0.89	98	1.1	1,140.00	0.04	0.28	9,881	0.50
DD	0.61	0.89	98	1.1	380.00	0.01	0.36	1,964	0.10
EE	0.71	0.64	98	1.1	380.00	0.01	0.33	1,725	0.09

Entrada South – Evaluation of Conformance with Project LID Performance Standards

ETSU2022000056

Volume III

County of Los Angeles

Prepared for:

Newhall Land and Farming
25124 Springfield Court Suite 300
Valencia, CA 91355

Prepared by:

GEOSYNTEC CONSULTANTS

DATED:
Dec, 2024

HYDROLOGY STUDY APPROVED

REVIEWED BY: _____ DATE 03/12/2025

APPROVED BY: _____ DATE 03/12/2025

COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS
LAND DEVELOPMENT DIVISION

Entrada South Tentative Tract Map No. 53295

Evaluation of Conformance with Project LID Performance Standard

Geosyntec Consultants, December 2025



Limitations

The professional engineering seal affixed to this memorandum pertains specifically to the analysis presented in this memorandum. It does not pertain to the design of the storm drain system or the design of regional LID facilities. The analysis presented in this memorandum relies upon information provided by a third party. We have not independently confirmed the accuracy of this information.

Geosyntec consultants

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Memorandum

Date:	December 2024
To:	Alex Herrell, Five Point
	Jason Fukumitsu, Hunsaker and Associates
From:	Lisa Austin, Leon Li, Lindsey Spencer, and Aaron Poresky, Geosyntec Consultants
Subject:	Entrada South – Evaluation of Conformance with Project LID Performance Standard

1. INTRODUCTION

The Entrada South Project (Tentative Tract Map (TTM) No. 53295 (Project) includes low impact development (LID) best management practices (BMPs) as shown in the *Water Quality Exhibit for Entrada South* (Water Quality Exhibit, Hunsaker, 2024). The purpose of this memorandum is to verify that the LID BMPs proposed for the Project have been selected and sized in a manner consistent with the Project LID Performance Standard as defined by the Municipal Separate Storm Sewer System Discharges within the Coastal Watersheds of Los Angeles and Ventura Counties (MS4) Permit (Order No. R4-2021-0105) and the County of Los Angeles LID Standards Manual (LA County, 2014). The *Newhall Ranch Sub-Regional Stormwater Mitigation Plan* (NRSSMP) (Geosyntec, 2010) also serves as benchmarks for evaluating conformance.

The Project LID Performance Standard establishes three separate conformance metrics, including BMP selection, sizing of BMPs to provide adequate retention volume or equivalent biofiltration volume and sizing of BMPs to provide long-term storm water capture:

- **BMP selection.** LID BMPs have been selected in a manner consistent with the LID selection criteria (i.e., infiltration feasibility criteria) contained in the LID Performance Standard; and

- **LID design storm retention and biofiltration.** The proposed BMPs provide retention or equivalent biofiltration of the LID design storm consistent with the LID Performance Standard; and

- **BMP long-term capture.** The proposed BMPs provide capture and treatment of at least 80 percent of average annual runoff volume for each drainage area within the Project, consistent with the LID Performance Standard.

This memorandum demonstrates conformance with the first two conformance metrics (BMP selection and LID design storm retention and biofiltration). The Project's conformance to the 80 percent long-term capture metric is not documented in this memorandum as it is not a requirement of the MS4 Permit, or the LID Standards Manual and is not subject to review by LA County.

Because the proposed Project disturbs greater than one acre of area and adds more than 10,000 square feet of impervious surface area, this Project is categorized as a Designated Project according to LA County's LID Standards Manual (LA County, 2014). This memorandum also explains why the stormwater management requirements for designated projects are met or exceeded when the Project's LID Performance Standard is met.

Section 2 describes the applicable LID Performance Standards which are used to demonstrate Project conformance. Section 3 describes the Project's water quality project design features (PDFs). Section 4 demonstrates conformance of the water quality PDFs to each of the conformance metrics identified above.

A list of figures and attachments are appended to the end of this memorandum, including:

Figure 1: Entrada South Land Use
Figure 2: Entrada South Drainage Areas and Treatment Categories
Attachment A: Entrada South Low Impact Development Exhibit
Attachment B: Modeling Methodology in Support of LID Conformance Analysis
Attachment C: Model Files

2. LID PERFORMANCE STANDARD

The Project LID Performance Standard described in this section complies with the provisions of the 2021 MS4 Permit, and the LID Standards Manual. As benchmarks, the LID Performance Standard is also consistent with the Newhall Ranch Sub-Regional Stormwater Mitigation Plan (NRSSMP) (Geosyntec, 2010). The LID Performance Standard applies to all developed areas within the Project.

The Project LID Performance Standard is based primarily on Section F.1.d and F.4 of the 2021 MS4 Permit. The Newhall NRSSMP influence the manner in which BMP strategies are applied and result in more stringent criteria in some respects. These additional benchmarks do not reduce the requirement to comply with Section F.1.d and F.4 of the 2021 MS4 Permit. The LID Performance Standard would be implemented as follows:

- Based on an assessment of feasibility[1], one of four BMP strategies shall be applied as follows. BMPs may be applied at the scale of individual parcels or at the scale of regional facilities treating multiple parcels.

    a. If it is feasible to infiltrate all of the runoff produced from the 1.1 inch storm event[2] (LID Design Volume) from the developed area (i.e., soil infiltration rates are at least 0.3 inches per hour, and no other technical infeasibility concerns exist), on-site infiltration BMPs [Category 1] shall be used. Harvest and reuse are not applicable to projects in the NRSSMP because non-potable water demands will be met with recycled water and there is no additional demand for harvested stormwater based on an assessment of harvest and reuse feasibility conducted as part of the overall NRSSMP (Geosyntec, 2010).

    b. If it has been demonstrated in the Project WQTR and Drainage Concept Report that the BMP strategy of subsection (a), of this condition is infeasible, and if the project has low soil infiltration rates (i.e., the soil infiltration rate is less than 0.3 inches per hour), but no other technical infeasibility concerns exist, bioinfiltration BMPs [Category 2] shall be used. Bioinfiltration facilities are similar to bioretention facilities with an underdrain, but they include storage below the underdrain to maximize the volume infiltrated. These facilities shall retain a portion of the runoff from the 1.1 inch design storm, then biofilter 1.5 times the remaining runoff from the 1.1 inch design storm.

    c. If it has been demonstrated in the Project WQTR and Drainage Concept Report that the BMP strategies of subsections (a) and (b) above are infeasible, then biofiltration BMPs [Category 3] shall be used. These BMPs shall biofilter the runoff produced from the 1.5 times the 1.1 inch design storm.

    d. If it has been demonstrated in the Project WQTR and Drainage Concept Report that the BMP strategies of subsections (a), (b) and (c) above are infeasible and this demonstration is accepted by the Los Angeles Regional Water Quality Control Board Executive Officer, then flow-based treatment control BMPs shall be used to filter or treat runoff. These BMPs must be sized and designed to: (1) filter or treat the maximum flow rate of runoff produced from a rainfall intensity of 0.3 inch of rainfall for each hour of a storm event and (2) be certified for "Enhanced Treatment" under the

[1] Feasibility shall be assessed per Section F.4.b.ii.
[2] The 85th percentile, 24-hour storm depth is equal to 1.1 inches as determined from the Los Angeles County 85th Percentile 24-hr Rainfall Isohyetal Map (February 2004).

Washington State Department of Ecology's TAPE Program or an appropriate future BMP certification developed by the State of California.

- The BMPs shall also be demonstrated to provide treatment for at least 80 percent capture and treatment of the average annual runoff volume for the tributary area. This sizing criteria was established to be consistent with Newhall NRSSMP but not required by the MS4 Permit or the LID Standards Manual. While this standard continues to apply to the sizing of LID features, conformance to this requirement is not documented in this memorandum.

- Pretreatment must be provided for stormwater BMPs whose function may be adversely affected by sediment or other pollutants, as specified in Section 7.2 of the LID Manual (LA County, 2014).

- Source control measures, including structural and non-structural (good housekeeping, employee training etc.) measures, applicable to designated new development project should be implemented to the maximum extent practicable, as specified in Section 5.2 of the LID Manual (LA County, 2014).

The same standards shall apply to parcel-based, right-of-way, regional LID facilities. Demonstration of conformance to these standards shall be based on the overall system of BMPs proposed for the Project. This may include combinations of BMPs at multiple scales, collectively demonstrating conformance to this standard.

3. PROPOSED WATER QUALITY PROJECT DESIGN FEATURES

The sections below describe the LID BMPs that are proposed as part of the Project and demonstrate that these BMPs conform to the BMP selection and LID design storm retention and biofiltration requirement in the Project LID Performance Standard. These BMPs are also illustrated in Attachment A (LID Exhibit) of this memorandum.

3.1 Regional LID Facilities

There are two regional LID facilities proposed within the Project. Regional Facility B is proposed as an infiltration facility (Category 1), and Regional Facility C is proposed as a bioinfiltration facility (Category 2). Selection of the type of facilities is based on feasibility screening results (Engeo, 2021). These facilities are designed to treat runoff from much of their respective watersheds, with the exception of open space bypassing treatment (which does not require treatment). The detailed designs of regional LID facilities will be developed at a later time and will be developed to be consistent with design and maintenance standards acceptable to LA County.

Runoff from subwatersheds in the western portion of the Project are proposed to be directed to Mission Village Regional Facility D (See Figure 2), which is sized for its ultimate conditions in which it will accept runoff from Mission Village, Entrada South, and portions of the existing Westridge community. Mission Village Facility D was described and analyzed as part of the Mission Village Phase I Final Hydrology Study and associated conformance memorandum (Geosyntec, 2019). It is reanalyzed in this memorandum to account for the current proposed land uses and drainage boundaries in Entrada South to demonstrate that Basin D continues to meet LID Performance Standards. Regional facilities will be maintained by LA County and funded through a Community Facilities District (CFD).

The regional facilities proposed to provide stormwater treatment for the Project are similar to bioretention LIDs and biofiltration LIDs with underdrain as described in the LID Standards Manual (LA County, 2014) with the exception that maximum ponding depths are somewhat deeper, drainage areas are somewhat larger, and resulting footprints are larger. These basins will incorporate several design enhancements to maintain performance and enable O&M for facilities constructed at a larger scale, including:

- Pre-treatment systems will remove sediment. Additionally, open space areas will be bypassed in separate conveyance systems. Both approaches reduce sediment loading to the media bed and support deeper ponding depths without elevated risk of clogging.

- Enhanced energy dissipation and flow distribution will be provided reduce the risk of surface erosion and spread water through the facility, offsetting the effect of larger basin footprints.

- Outlet structures will have hydraulic controls that limit the maximum rate of flow through the media and underdrains, helping to ensure that water spreads over the full footprint of the facility and does not short-circuit.

- Media will have a higher permeability than standard media (combined with outlet control to reduce the actual filtration rate), improving the resistance to clogging.

- Facilities will have an enhanced gravel storage layer below underdrain discharge elevation to retain pollutants and support incidental infiltration, where feasible.

- O&M access will be provided via access ramps and other features consistent with approaches used for extended detention and flow control basins.

- O&M protocols will be detailed for these facilities as part of an O&M manual; these protocols will account for the larger footprint and ponding depth.

- The facilities will continue to meet LID Standards Manual criteria for media flowrate and drawdown time. Treatment performance and plant health should not be affected by the scale of the facilities.

- During most storms, ponding will not exceed 18 inches of depth; larger storms may exceed this depth for very short periods (1-3 hours).

- Access to facilities will be restricted to avoid safety hazards associated with ponding depths that temporarily exceed 18 inches.

Based on these design adaptations, these regional facilities are functionally equivalent to bioretention LIDs and biofiltration LIDs with underdrain as described in the LID Standards Manual (LA County, 2014) and fully conform to the applicable LID design requirement outlined in the LID Standards Manual (BMP selection, sizing, drawdown time, media filtration rate and pretreatment) as demonstrated in Section 4 of this memorandum.

3.2 Right-of-Way LID BMPs

For two segments of connecting streets ("A Street" and "B Street") to Magic Mountain Parkway (MMP), stand-alone right-of-way (ROW) LID BMPs within the public roadways will be used to meet the full requirements of the LID Performance Standard. Two dedicated areas next to the street segments along MMP as shown on Attachment A are proposed as biofiltration basins to provide treatment for the street runoff. The design of the basins include a sedimentation forebay as pretreatment device. The sediment forebays capture sediment, trash, and debris and increase the longevity of the downstream BMPs. Inclusion of pretreatment for BMPs is consistent with the Standards Manual (LA County, 2014). Preliminary design of the biofiltration basins are provided in Attachment A and the detailed designs of the ROW LID facilities will be developed at a later time and will be developed to be consistent with design and maintenance standards acceptable to LA County.

These ROW LID features will be maintained by LA County funded via Community Facilities District (CFD)

3.3 Parcel-based LID BMPs

Parcel-based LID BMPs will be implemented as part of final parcel improvements for the commercial parcels located in Planning Areas (PAs) 1, 2, 3, and 14 in the Project area. These parcels are categorized as "Parcel-Based LID Treatment" in Figure 2.

Parcel-based LID BMPs will be implemented as part of final parcel improvements. Parcel-based LID BMPs applicable for these parcels include infiltration (Category 1), bioinfiltration (Category

2), and biofiltration (Category 3), which will ultimately be selected based on a parcel-scale assessment of infiltration feasibility, as described in the LID Performance Standard (Section 2.1). Factors considered in selection and placement of parcel-based LID BMPs as part of final parcel improvement plans shall include soil infiltration rates, geotechnical risks, setbacks from structures, slopes, and utility alignments, depth to groundwater, programmed density/uses of the parcel, and other factors deemed relevant as part of LA County review of final parcel improvement plans. Areas that are suitable for infiltration shall be considered as part of site design and BMP placement within parcels.

Infiltration BMPs include bioretention without an underdrain (RET-1[3]), infiltration basins (RET-2[3]) or trenches (RET-3[3]), permeable pavement (RET-5[3]), or an equivalent infiltration BMP. Bioinfiltration and biofiltration BMPs are associated with BMP type BIO-1 under the LID Standards Manual. The design and maintenance of these parcel-based BMPs shall be consistent with the specifications detailed on the LID Standards Manual for the respective BMP type proposed for the Project (LA County, 2014).

Parcel-based BMPs will be designed to: 1) capture the LID design volume (as calculated per the LA County HydroCalc program for the 1.1-inch storm event), (2) infiltrate to the maximum extent feasible based on parcel-specific infiltration feasibility, and (3) biofilter 1.5 times the remaining runoff that cannot be feasibly infiltrated from the 1.1-inch design storm. By meeting these criteria, these facilities meet the BMP selection and LID design storm retention and biofiltration requirements of the LID Performance Standard. Alternative sizing and design configurations that meet the LID Performance Standard may be developed. In either case, conformance shall be documented as part of final parcel improvement plans.

Appropriate pretreatment, such as forebays, vegetated swales and filter strips will be designed as part of final parcel improvements and installed upstream of the parcel-based BMPs. These pretreatment devices captures sediment, trash, and debris and increases the longevity of the downstream BMPs. Inclusion of pretreatment for BMPs is consistent with the LID Standards Manual (LA County, 2014)

Parcel-based LIDs will be maintained by private parcel owner via property owner association or home owner association.

3.4 Source Control BMPs

According to Section 5.2 of the LID Manual, source control measures applicable to designated project (new development) should be implemented for the Project (LA County, 2014). Table 1

[3] Equivalent BMP Type on the LID Standards Manual (LA County, 2014)

summarizes the source control requirements of the LID Manual for designated project (new development) and the corresponding proposed source control BMPs that will be incorporated into the Project.

Table 1 Source Control Requirements and Corresponding Project Best Management Practices

Source Control Requirement	Criteria/ Description	Corresponding Project BMPs
S-1: Storm Drain Message and Signage	• All storm drain inlets and catch basins within the Project area must be marked with prohibitive language and/or graphical icons to discourage illegal dumping. • Signs and prohibitive language and/or graphical icons, which prohibit illegal dumping, must be posted at public access points along channels and creeks within the Project area. • Legibility of stencils and signs must be maintained.	• All storm drain inlets and water quality inlets will be stenciled or labeled. • Signs will be posted in areas where dumping could occur. • The Los Angeles County Department of Public Works and/or Homeowners Associations will maintain stencils and signs.
S-2: Outdoor Material Storage Areas	• Where proposed Project plans include outdoor areas for storage of materials that may contribute pollutants to the storm water conveyance system measures to mitigate impacts must be included.	• Pesticides, fertilizers, paints, and other high-risk materials used for maintenance of common areas, parks, commercial areas, and multifamily residential common areas will be kept in enclosed storage areas.
S-3: Outdoor Trash Storage and Waste Handling Areas	All trash containers must meet the following structural or treatment control BMP requirements: • Trash container areas must have drainage from adjoining roofs and pavement diverter around the areas. • Trash container areas must be screened or walled to prevent offsite transport of trash.	• All outdoor trash storage areas will be covered and isolated from stormwater runoff.

Source Control Requirement	Criteria/ Description	Corresponding Project BMPs
S.4: Outdoor Loading/ Unloading Dock Areas	• Cover loading dock areas or design drainage to minimize run-on and runoff of stormwater • Direct connections to storm drains from depressed loading docks (truck wells) are prohibited	• Loading dock areas will be covered or designed to preclude run-on and runoff. • Direct connections to storm drains from depressed loading docks (truck wells) will be prohibited. • Drains or direct drainage from hydraulically isolated loading dock areas will be connected to an approved sediment/oil/water separator system connected a discharge location as determined by LA County. A manual emergency spill diversion valve upstream of will be provided upstream of the separator.
S-5: Outdoor Vehicle/ Equipment Repair/ Maintenance Areas	• Repair/maintenance bays must be indoors or designed in such a way that does not allow stormwater run-on or contact with stormwater runoff. • Design a repair/maintenance bay drainage system to capture all wash water, leaks, and spills. Connect drains to a sump for collection and disposal. Direct connection of the repair/ maintenance bays to the storm drain system is prohibited. If required by local jurisdiction, obtain an Industrial Waste Discharge Permit.	• Repair/maintenance bays will comply with design requirements.
S6: Outdoor Vehicle/ Equipment/ Accessory Wash Areas	• Self-contained and /or covered, equipped with a clarifier, or other pretreatment facility, and properly connected to a sanitary sewer.	• Areas for washing/steam cleaning of vehicles will be self-contained or covered with a roof or overhang; will be equipped with a wash racks and with the prior approval of the sanitary sewer agency; will be equipped with a clarifier or other pretreatment facility; and will be properly connected to a sanitary sewer.

Source Control Requirement	Criteria/ Description	Corresponding Project BMPs
S7: Fuel and Maintenance Area	• The fuel dispensing area must be covered with an overhanging roof structure or canopy. The cover's minimum dimensions must be greater than the area within the grade break. The cover must not drain onto the fuel dispensing area and the downspouts must be routed to prevent drainage across the fueling area. • The fuel dispensing area must be paved with Portland cement concrete (or equivalent smooth impervious surface). The use of asphalt concrete shall be prohibited. • The fuel dispensing areas must have a 2% to 4% slope to prevent ponding and must be separated from the rest of the site by a grade break that prevents run-on of urban runoff. • At a minimum, the concrete fuel dispensing area must extend 6.5 feet from the corner of each fuel dispenser, or the length at which the hose and nozzle assembly may be operated plus 1 foot (0.3 meter), whichever is less.	• Fueling areas will comply with design requirements.
S-8: Landscape Irrigation Practices	• Do not allow irrigation runoff from the landscaped area to drain directly to storm drain system. • Minimize use of fertilizer, pesticides, and herbicides on landscaped areas. • Plan sites with sufficient landscaped area and dispersal capacity (e.g., ability to receive irrigation water without generating runoff). • Consult a landscape professional regarding appropriate plants, fertilizer, mulching applications, and irrigation requirements (if any) to ensure healthy vegetation growth.	• Native and/or non-native/non-invasive, climate appropriate vegetation will be utilized within the development. • Landscape watering in common areas, commercial areas, multiple family residential areas, and in parks will use efficient irrigation technology utilizing evapotranspiration sensors to minimize excess watering. • The use of the parcel-based LID BMPs and regional infiltration/ biofiltration facilities will prevent the discharge of dry weather urban runoff from the Modified Project. • Landscape and irrigation system design will comply with the design requirements or approved alternatives. • An Integrated Pest Management (IPM) Program will be implemented for common area landscaping in commercial areas and multi-family residential areas.

Source Control Requirement	Criteria/ Description	Corresponding Project BMPs
S-9: Building Materials Selection	• Wood that is pressure treated with arsenate, copper, and chromium compounds may be replaced with alternative building materials. • Minimize or avoid the use of copper and galvanized metals on buildings and in fencing. • Reduce the use of pesticides around foundations through the use of alternative barriers where feasible.	• Pressure treated wood that is treated with arsenate, copper, or chromium compounds may be replaced with alternative building materials. • The use of copper and galvanized metals on buildings and in fencing will be minimized or avoided. • The use of alternative barriers for termites will be considered.
S-10: Animal Care and Handling Facilities	• Site animal care and handling facilities away from the storm drain system and receiving waters. • Manage grazing to prevent impacts to receiving waters. • Manage horse access and horse waste to prevent pollutants from entering the storm drain system or receiving waters.	• The Modified Project does not include animal care facilities, grazing, or horse access.
S-11: Outdoor Horticultural Areas	• Do not allow wash water from horticulture areas to drain directly to the storm drain system or receiving waters.	• Wash water from horticultural areas will not drain directly to the storm drain system or to receiving waters.

4. CONFORMANCE TO APPLICABLE LID PERFORMANCE STANDARD

This section summarizes the conformance of the proposed LID design features to each element of the Project LID Performance Standard that is subject to review by LA County.

4.1 BMP Selection

The Project LID Performance Standard requires that LID BMPs be selected based on an analysis of infiltration feasibility. A preliminary infiltration feasibility report for the Project (ENGEO, 2021) [4]was approved by LA County Geotechnical and Materials Engineering Division in October 2022 and used as basis of BMP selection. The following paragraphs describe how the Project conforms to these requirements.

[4] Plan Case Number ESTU2022000058

4.1.1 Regional LID Facilities

The Project LID Performance Standard requires that LID BMPs be selected based on an analysis of infiltration feasibility.

Regional Facility B. Infiltration feasibility screening (Engeo, 2021) was based on results from site-specific infiltration feasibility investigations of Regional Facility B. Regional Facility B is underlain by young alluvial deposits, which has an average corrected infiltration rate of 3 inches per hour. Furthermore, groundwater was not encountered during the geotechnical investigations. Based on these findings, Facility B is proposed as an infiltration facility (Category 1), which is consistent with the preferred hierarchy for BMP selection.

Regional Facility C. Based on feasibility screening (Engeo, 2021), Regional Facility C is underlain by young alluvial soil or Saugus Formation bedrock. While the infiltration rate of young alluvial deposits supports the selection of an infiltration facility (Category 1), it is unlikely that the underlying Saugus Formation will yield corrected infiltration rates equal or greater than 0.3 inches per hour. As the Saugus Formation is the limiting layer, this condition supports the selection of a bioinfiltration facility (Category 2). Furthermore, groundwater was not encountered during site investigations in this area, which also meets the criteria of either a Category 1 or a Category 2 facility. Based on these findings, Facility C is proposed as a bioinfiltration facility (Category 2).

Regional Facility D (Mission Village). The basis for selection of Regional Facility D is provided in the Mission Village Phase 1, 2, 5 & 6 Water Quality Plan (Regional Facilities B, C and D) – Evaluation of Conformance with Newhall LID Performance Standard (Geosyntec Consultants, 2019). This is a biofiltration facility (Category 3).

Each of the regional facilities has been selected based on an analysis of infiltration feasibility. Therefore, this aspect of the performance standard is met.

4.1.2 Right-of-Way LID BMPs

For the two segments of connecting streets (“A Street” and “B Street”) to Magic Mountain Parkway (Figure 2), infiltration feasibility screening (Engeo, 2021) indicated that the ROW areas consists of certified engineered fill and Category 2 facilities were recommended due to the highly variable infiltration rates of the engineered fill material. However, due to the street segments’ proximity to the graded slopes next to the existing Magic Mountain Parkway, Category 1 and 2 BMPs are not recommended. Therefore, biofiltration basins (Category 3) were proposed to treat the runoff from these two street segments, which is consistent with the LID performance standard.

4.1.3 Parcel-based LID BMPs

For areas identified as treated by parcel-based and ROW BMPs (Figure 2), LID BMPs shall be selected per the feasibility hierarchy described in Section 2.1 as part of final parcel improvement plans to the satisfaction of LA County. Conformance shall be demonstrated as part of final parcel improvement plans. Additionally, the final selection of BMP categories will be informed by a parcel-scale assessment of infiltration feasibility to meet the BMP selection hierarchy of the LID Performance Standard. Therefore, the proposed application of parcel-based and ROW LID BMPs conforms to the BMP selection requirements of the LID Performance Standard.

4.2 BMP Sizing to Achieve Retention or Equivalent Biofiltration of the 85th Percentile, 24-hour Storm Event

4.2.1 Regional Facilities

The LID Performance Standard requires that project design features be selected and sized to retain the volume of stormwater runoff produced from a 1.1-inch storm event (i.e., the LID Design Volume) for the Project site. Where it has been demonstrated that 100 percent of the LID Design Volume cannot be feasibly infiltrated, biofiltration shall be provided for 1.5 times the portion of the LID Design Volume that is not retained. For the purpose of demonstrating conformance, this standard has been applied for each regional LID facility.

To demonstrate that each regional facility meets this standard, the LID design storm runoff time series were calculated using HydroCalc for tributary area to each regional facility and subsequently used as input inflow times series to storage units representing the detailed hydraulic characteristics of the proposed regional facilities (stage-storage, infiltration, filtration and overflow) in an EPA SWMM model. The SWMM model inputs and outputs are provided in Attachment C.

Table 2: Catchment Parameters and Provided Size of Regional Facilities

BMP ID	Tributary Area (Acres)[1,2]	Flow Path Length (feet)	Flow Path Slope (vft/hft)	Soil Type	Impervious Percentage of Catchment[1]	Total Facility Volume Provided (ac-ft)[3]
Facility B	70.9	250	0.05	98	62%	4.53
Facility C	16.1			98	68%	0.79
Facility D[4,5]	329.4			98	62%	21.6

[1] Imperviousness based on area-weighted average of land use-specific imperviousness values from LA County Hydrology Manual; calculated for purposes of water quality analysis (Attachment B).
[2] HydroCalc program has a default drainage area size limit of 40 acres. However, in this case, the use of larger drainage areas is conservative. Drainage area size does not influence runoff volume; it only has an effect on peak flow. For this purpose, we are primarily using HydroCalc to size volumetric BMPs, so the timing of peaks is unimportant. Secondarily, we are using HydroCalc to determine the required water quality diversion flowrate. Having several smaller drainage areas will tend to reduce peak flows compared to one larger drainage area as there will be variability in time of concentration and offsetting of the peaks. Therefore, for the purpose of sizing diversion structures, a single larger drainage area with a short path length and steep slope produces a conservatively high required diversion flowrate compared to if smaller drainage areas were modeled.
[3] Total facility volume includes pore volume in gravel and media, as well as ponded volume above the media surface.
[4] Regional Facility D analysis includes the tributary areas draining to the facility in the final built-out condition, detailed in Table 3.
[5] Facility D was modeled as designed per the Mission Village project.

Regional Facility D was modeled based on the ultimate proposed condition of its drainage area, as described in the memorandum: "Mission Village Phase 1, 2, 5 & 6 Water Quality Plan (Regional Facilities B, C and D) – Evaluation of Conformance with Newhall LID Performance Standard" (Geosyntec Consultants, 2019). The drainage area from Entrada South and the imperviousness in Mission Village tributary area changed somewhat since the Mission Village memorandum; the current proposed Entrada South drainage area was modeled to demonstrate that Regional Facility D is adequately sized. The currently proposed Entrada South drainage area to Facility D is documented in this memorandum and the remaining tributary area to Facility D are summarized in Table 3 summarizes the volume within Regional Facility D that is allocated to each project that it is designed to treat.

Table 3: Regional Facility D – Volume Allocations by Project Comparison

Model Scenario	Project Location	Tributary Area (Acres)	Impervious Fraction of Catchment (%)	Facility Volume Allocated to Tributary Project (ac-ft)[1]
Mission Village Phase 1, 2, 5 & 6 Conformance Memorandum	Mission Village	115.0	66.6	8.8
	Entrada South	121.5	52.3	7.3
	Existing Westridge	95.6	49.1	5.4
	Total	**332.1**	**56.3**	**21.6**
Entrada South Conformance Memorandum	Mission Village	115.0	68.6	8.4
	Entrada South	118.8	64.7	8.2
	Existing Westridge	95.6	49.1	5.0
	Total	**329.4**	**61.5**	**21.6**

[1]Volume allocated to each project were calculated by multiplying the total volume of the Facility by the ratio between impervious areas in each project and the total impervious areas of the entire tributary areas to Regional Facility D.

The regional facilities will be off-line. Water will be diverted to these basins from diversion structures and/or flow-splitting inlets. The required minimum diversion flowrates to each facility were determined using HydroCalc for the 1.1-inch storm event. Basins C and D include biofiltration; therefore, the diversion was sized for 1.5 times the peak of the 1.1-inch storm. Basin B is an infiltration facility; therefore, the diversion rate was based on the peak flow of the 1.1-inch storm without the use of a multiplier. Table 3 shows the required diversion flowrates and the detailed HydroCalc inputs and outputs are provided in Appendix B.

Table 4: Required Diversion Flowrates to Regional Facilities

BMP ID	Required Minimum Diversion Structure Flowrate, cfs[2]
Facility B	20.3
Facility C	7.7
Entrada South to Facility D[1]	40.3

[1] This diversion flowrate applies only to the area from Entrada South draining to Mission Village Basin D. Water will be split between water quality flows and high flows before it enters the Mission Village drainage system.
[2] Diversion structures will be included in Final Hydrology.

Hydrographs were generated using the LA County HydroCalc program for the subwatersheds tributary to each regional LID facility. Because Facilities C and D include biofiltration, the

resulting hydrographs were multiplied by 1.5, consistent with the LID Performance Standard, to produce an "upsized" hydrograph appropriate for biofiltration sizing. The model was run for the duration of the LID design storm event. Table 5 summarizes the portion of the event that was treated and the maximum volume and ponding depth of the regional LID facilities utilized during this event. Additional detail supporting these calculations is provided in Attachment B.

Table 5: Results of LID Design Storm Routing

BMP ID	Runoff Volume for 1.1-inch, LID Storm Event (ac-ft)	Storm Hydrograph Upsizing Multiplier for SWMM Routing[1]	Percent of Upsized Storm Treated by Regional LID Facility[2]	Maximum Percent of WQ Volume Utilized during LID Storm	Maximum Ponding Depth during LID Storm (ft)
Facility B	3.9	1.0	100%	21%	1.5
Facility C	0.9	1.5	100%	69%	1.9
Facility D[3]	17.8	1.5	100%	49%	1.8

[1] Upsizing of LID storm hydrographs only applies to facilities utilizing biofiltration (C and D). Facility B hydrographs are not upsized because these facilities do not include biofiltration.
[2] Percent of upsized storm captured and retained or biofiltered in Regional LID Facility.
[3] Includes all areas draining to Regional Facility D (Source: Geosyntec, 2019).

As demonstrated in Table 5, the proposed regional LID facilities fully capture the applicable upsized LID design storm event and comply with the requirement to retain or provide equivalent biofiltration for the 85th percentile, 24-hour storm event. These regional facilities are also sized to treat 80 percent of average annual runoff volume (not demonstrated in this memorandum), which is why they have excess capacity to treat the runoff from the 85th percentile storm event.

4.2.2 Right-of-Way LID BMPs

The LID Performance Standard requires that ROW BMPs to be selected and sized to retain the volume of stormwater runoff produced from a 1.1-inch storm event (i.e., the LID Design Volume) for the Project site. Where it has been demonstrated that 100 percent of the LID Design Volume cannot be feasibly infiltrated, biofiltration shall be provided for 1.5 times the portion of the LID Design Volume that is not retained.

Table 6 summarizes the inputs and outputs in HydroCalc. Model files are provided in Attachment C.

Table 6 HydroCalc Inputs and Outputs for Drainage Area Proposed to be Treated by ROW LID

	"A Street"	"B Street"
HydroCalc Inputs		
Area (acres)	0.74	1.7
Length (feet)	250	250
Slope	0.05	0.05
Depth (inches)	1.1	1.1
Imperviousness[1]	0.91	0.80
Soil Type	98	98
Storm Frequency	85th percentile storm	85th percentile storm
HydroCalc Outputs		
Clear Peak Flow Rate (cfs)	0.29	0.58
24-hr Clear Runoff Volume (cubic feet)	2,436	4,935
Upsized Runoff Volume (150%) for Biofiltration Sizing (cubic feet)	3,654	7,402

[1]Imperviousness of the drainage area is calculated by area-weighted average imperviousness between the multi-use trail and riverbank access road area (50% impervious) and the adjacent developed open space (1% impervious).

As shown in Attachment A, the proposed biofiltration basin for segment of A Street is 75 feet in length and 20 feet in width; the proposed biofiltration basin for segment of B Street is 100 feet in length and 30 feet in width. Both basins are proposed with 12 inches of ponding depth, 24 inches of media layer, a gravel layer underneath and perforated underdrains in the gravel layer to discharge the biofiltered runoff. This vertical profile provides an effective storage depth of 18 inches is provided, assuming 25 percent porosity for the media layer (Virginia Department of Conservation and Recreation, 2011). Therefore, a total of 2,250 cubic feet and 4,500 cubic feet of static volumes are provided for the A Street basin and B Street basin respectively.

Table 7 summarizes the dimensions of the biofiltration LIDs for both streets based on the proposed design and how the LIDs meet the applicable sizing standards.

Table 7 Sizing Conformance Demonstration for Right-of-Way LID BMP

Drainage Area	Required Biofiltration Volume (150% of the LID Design Volume) (cubic feet)	Provided Static Biofiltra-tion Volume (cubic feet)	Provided Biofiltra-tion Footprint (square feet)	Additional Volume Biofiltered During Storm Duration (cubic feet)[1]	Total Provided Biofiltration Volume (Static+ Routed Volume, cubic feet)	Drawdown Time to Media Surface hours[2]
A St ROW LID	3,654	2,250	1,500	3,750	6,000	2.4
B St ROW LID	7,402	4,500	3,000	7,500	12,000	2.4

1 – Based on a conservative design storm routing time of 6 hours (reduced from HydroCalc duration of 24-hours) and media flowrate of 5 inches per hour over the footprint of the BMP.
2- Based on 12-inch ponding depth and 5 in/hr media flowrate.

As shown in Table 7, the total provided biofiltered volume for the ROW LIDs proposed for the two street segments is substantially more than 150% of runoff volume from the 1.1-inch 85th percentile storm while drawing down completely within 3 hours. Incidental infiltration is not considered in this analysis as a conservative assumption. Therefore, the proposed biofiltration ROW LID fully complies with the requirement to retain or provide biofiltration 150% of runoff from the 85th percentile, 24-hour storm event. These ROW LID facilities are also sized to treat 80 percent of average annual runoff volume (not demonstrated in this memorandum), which is why they have excess capacity to treat the runoff from the 85th percentile storm event.

4.2.3 Parcel-based BMPs

The LID Performance Standard requires that parcel-based to be sized to retain the volume of stormwater runoff produced from a 1.1-inch storm event (i.e., the LID Design Volume) for the Project site. Where it has been demonstrated that 100 percent of the LID Design Volume cannot be feasibly infiltrated, biofiltration shall be provided for 1.5 times the portion of the LID Design Volume that is not retained.

Parcel-based LIDs will be sized with a static volume equivalent to the 1.1-inch LID Design Volume for each parcel area. An underdrain will be used for Category 2 and 3. By following this sizing approach, we demonstrate that the sizing standard above is met regardless of the infiltration feasibility category that is determined.

HydroCalc was used to generate the 1.1” LID Design Volume assuming flow path width of 250 feet and catchment slope of 5%. The imperviousness of each parcel is based on land use and the dominant LA County soil type (020 or 098) underlays each planning area treated by parcel-based

LID is used as soil type input. The HydroCalc inputs and outputs for each parcel are summarized in Table 8. Model files are provided in Attachment C.

Table 8 HydroCalc Inputs and Outputs for Parcels Treated by Parcel-based LID BMPs

Planning Area	Area (ac)	Land Use	Imperv.	Soil Type	Length (ft.)	Slope	24-hr Clear Runoff Volume (cu. ft.)	Required Biofiltration Volume (150% of the LID Design Volume) (cubic feet)
PA 1	20.8	Commercial	0.91	020	250	0.05	68,337	102,506
PA 2&3	25.6	Commercial	0.91	098			83,960	125940
PA 14	2.7	Commercial	0.91	098			8,829	13,244

If parcel-scale infiltration feasibility study shows that Category 1 (infiltration) BMP is feasible for any parcel proposed to be treated by parcel-based LID BMPs, infiltration BMPs already sized with the static volume equivalent to the LID Design Volume will be able to retain 100% of the LID Design Volume.

If parcel-scale infiltration feasibility study shows that Category 2 (bioinfiltration) or Category 3 (biofiltration) BMP is feasible for any parcel, LID BMPs sized with the static volume equivalent to the LID Design Volume still include an underdrain and media bed with adequate capacity to biofilter 150% of the LID Design Volume with reasonable BMP design assumptions including:

- 12 inches of ponding depth, 24 inches of media layer and a gravel layer underneath with perforated, resulting in 18 inches of effective depth with an assumed media porosity of 0.25 (neglecting the gravel storage);
- 5 inches per hour media filtration rate (the lower limit of the range of filtration rate recommended by the LID Standards Manual);
- 6 hours of routing period during the 24-hour design storm duration (conservative assumption);
- Incidental infiltration into the underlaying soils for Category 2 BMP is not considered (conservative assumption);

Because infiltration is not considered in this analysis, both Category 2 and Category 3 parcel-based LID designs provide an effective storage depth of 18 inches between the ponding and media layer and are identical for the purpose of the conformance analysis. Where some infiltration does occur, the resulting performance would be greater.

The total volume biofiltered is the sum of the static biofiltration volume and the additional volume routed during the storm event. This additional biofiltration volume was calculated by multiplying the media filtration rate (5 inches per hour) by routing time (6 hours) and the provided biofiltration footprint of each parcel. The total capacity of the parcel-based LID is calculated by adding the provided static biofiltration volume and the additional routed biofiltered volume. This sizing conformance demonstration calculation for each parcel is shown in Table 9.

Table 9 shows that providing a static LID volume equal to the runoff from the 1.1" storm results in conformance with sizing criteria regardless of the eventual infiltration feasibility category:

- Where parcels are Category 1, the static volume provided in the LID BMPs (Column D) is equal to the required volume (Column B) without considering any routing. The drawdown (Column H) is well within the 96-hour limit.

- Where parcels are Category 2 or 3, the total biofiltered volume (Column G) substantially exceeds the required biofiltration volume (Column C), even without considering any incidental infiltration and using a conservatively short routing time.

In summary, this sizing analysis demonstrates that parcel-based LIDs sized to the full LID Design Volume can achieve retention or equivalent biofiltration of the LID Design Volume regardless of feasibility conditions that may be encountered during the final parcel improvement phase of the Project.

Table 9 Sizing Conformance Demonstration for Parcel-Based LID BMPs

A	B	C	D	E	F	G	H	I
Parcel ID	**Required Infiltration Volume (if Category 1 Parcel)**	**Required Biofiltration Volume (150% of the LID Design Volume) (cubic feet) (if Category 2 or 3 Parcel)**	**Provided Static LID Volume (cubic feet)**	**Provided LID Footprint (square feet)**	**Additional Volume Biofiltered During Storm Duration from Category 2 or 3 BMPs (cubic feet)[1]**	**Total Biofiltration Volume in Category 2 or 3 BMPs (Static+ Routed Volume, cu-ft)**	**Drawdown of Stored Volume in Category 1 (hours)[2]**	**Drawdown to Media Surface in Category 2 or 3 (hours)[3]**
Planning Area 1	68,337	102,506	68,337	45,558	113,896	182,233	12 - 24	2.4
Planning Area 2&3	83,960	125,940	83,960	55,973	139,933	223,893	12 - 24	2.4
Planning Area 14	8,829	13,244	8,829	5,886	14,716	23,545	12 - 24	2.4

1 – Based on a conservative design storm routing time of 6 hours (reduced from HydroCalc duration of 24-hours) and media flowrate of 5 inches per hour over the footprint of the BMP.

2 – Based on ponding depth of 12 inches and 1 to 2 in/hr infiltration rates, consistent with likely rates in Category 1 areas.

3 – Based on 12-inch ponding depth and 5 in/hr media flowrate.

4.3 Conformance Summary

In summary, this memorandum demonstrates that:

- LID BMPs have been selected in a manner consistent with the LID selection hierarchy (i.e., infiltration feasibility criteria) contained in the LID Performance Standard (Section 4.1), which is consistent with the 2021 MS4 permit;

- The LID project design features proposed as part of the Entrada South Project provide retention and biofiltration volume consistent with the LID Design Volume retention and biofiltration requirements per the LID Performance Standard (Section 4.2), which is consistent with the 2021 MS4 permit.

- Pretreatment and source control BMPs area proposed as part of the Entrada South Project in a manner consistent with the 2021 MS4 permit.

For areas treated by parcel-based BMPs (Figure 2), the BMPs shall be selected and sized to the satisfaction of LA County as part of final parcel improvement plans. Based on the commitments described in Section 4.2, the application of parcel-based BMPs to these areas will satisfy the BMP selection and LID design storm retention and biofiltration requirement in the LID Performance Standard. The basis for this finding is documented in Section 4.1 and 4.2, and the availability of space in typical parcel plans has been demonstrated.

Therefore, the project design features proposed to manage runoff from the Entrada South Project conform to the Project's LID Performance Standard.

5. REFERENCES

Engeo, 2021. Infiltration Feasibility for Low Impact Design (LID) Stormwater Quality Features. Entrada South – Vesting Tentative Tract Map 53295 Newhall Ranch Preliminary

Geosyntec Consultants (Geosyntec), 2010. Newhall Ranch Specific Plan Sub-Regional Stormwater Mitigation Plan. Prepared for Newhall Land by Geosyntec Consultants. April 2009, Amended March 2010.

Geosyntec Consultants (Geosyntec), 2019. Memorandum: Mission Village Phase 1, 2, 5 & 6 Water Quality Plan (Regional Facilities B, C and D) – Evaluation of Conformance with Newhall LID Performance Standard. October 9, 2019.

Hunsaker, 2024. LID Exhibit for Entrada South TTM No. 53295.

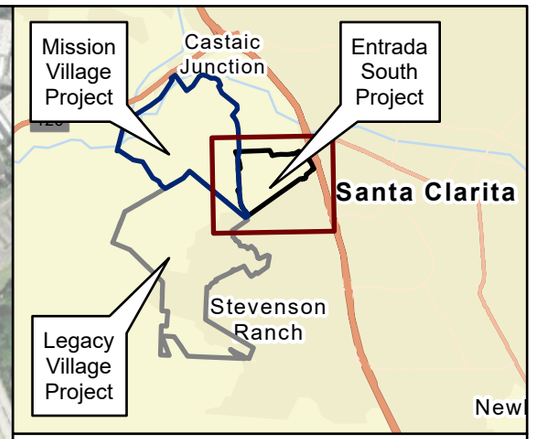
Los Angeles County (LA County), 2014. County of Los Angeles Low Impact Development Standards Manual.

LARWQCB, 2021. Waste Discharge Requirements and National Pollutant Discharge Elimination System (NPDES) Permit for Municipal Separate Storm Sewer System (MS4) Discharges within the Coastal Watersheds of Los Angeles and Ventura Counties (Order No. R4-2021-0105).

Virginia Department of Conservation and Recreation (VA DCR), 2011. Bioretention VDCR Stormwater Design Specification No. 9, Version 1.9.

Figures





Legend

Entrada South Boundary

Land Use

- Commercial
- Multi-Family Residential
- Open Space
- Recreation
- Recreation Trails
- Road
- Access Road
- Water

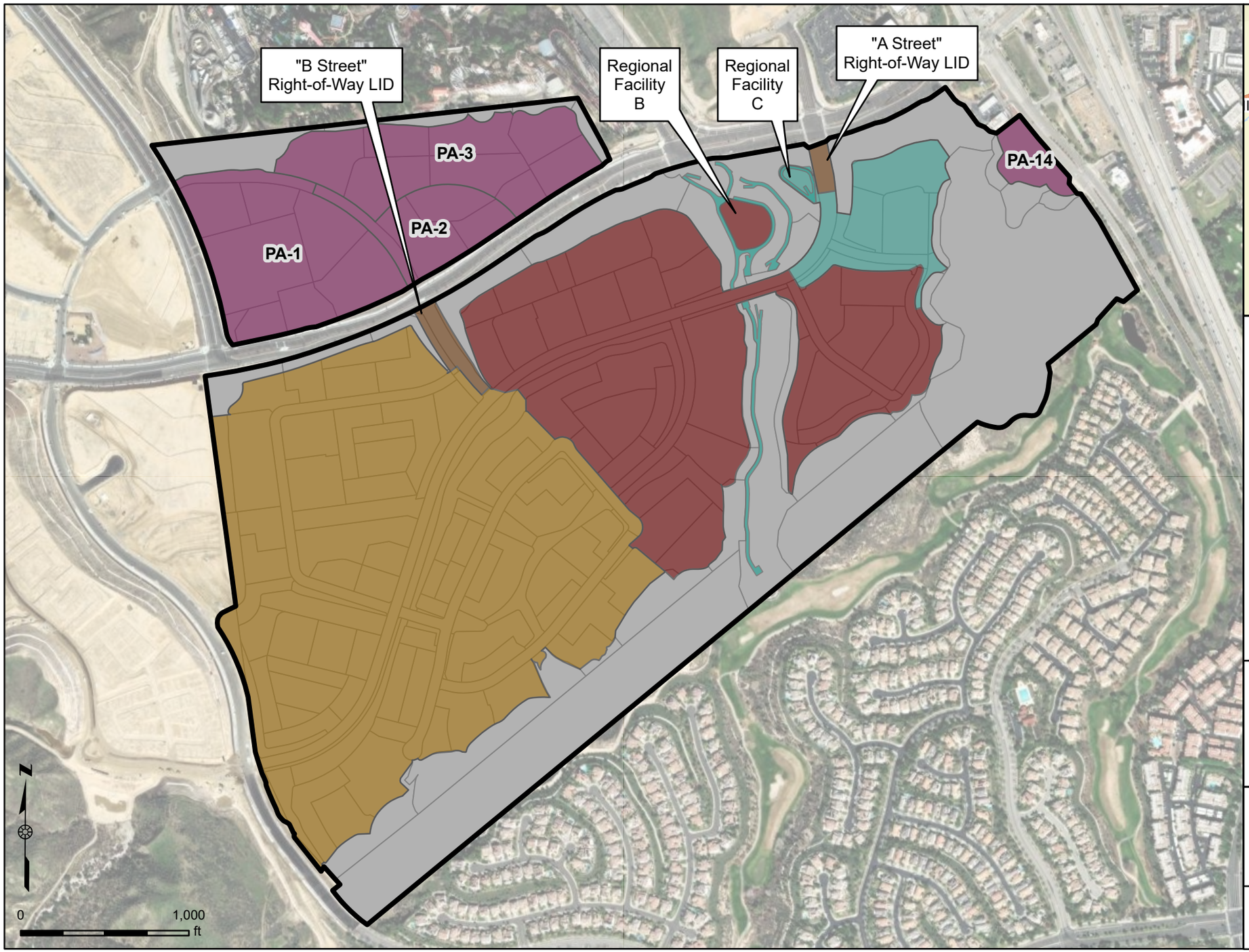
Entrada South Land Use

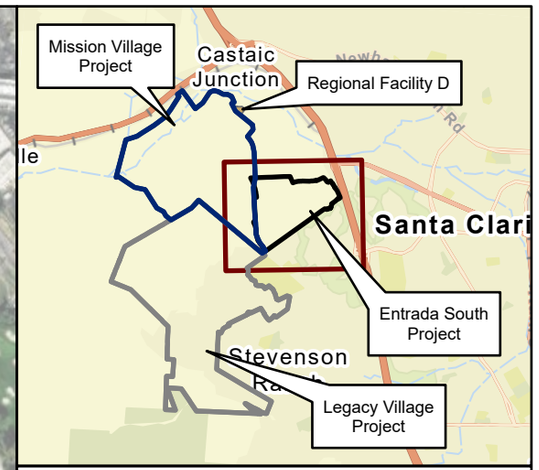
Entrada South Conformance Memo

Geosyntec consultants

November 2024

Figure 1





Legend

Drainage Areas to Proposed Treatment BMPs

- Regional Facility B
- Regional Facility C
- Regional Facility D
- Parcel-Based LID
- Right-of-Way LID
- Open Space Bypassing Treatment

Entrada South Drainage Areas & Treatment Categories

Entrada South Conformance Memo

Geosyntec consultants

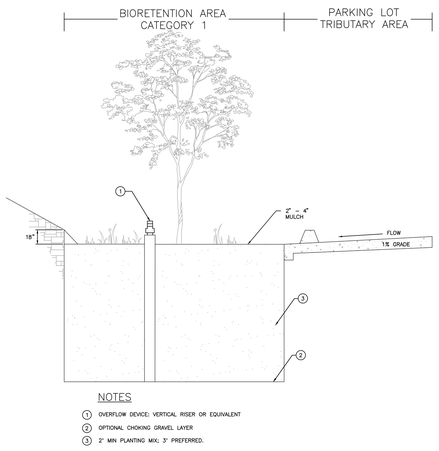
November 2024

Figure 2

Attachments

Attachment A

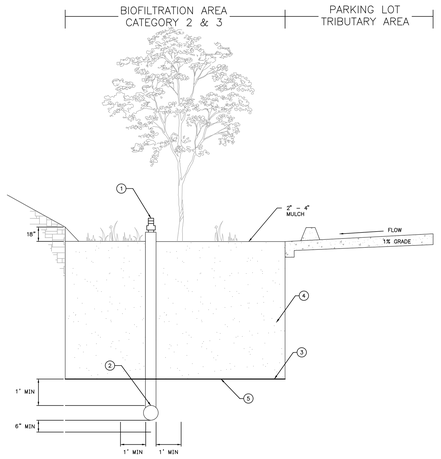
Entrada South LID Exhibit(Geosyntec)-Map



NOTES

1. OVERFLOW DEVICE: VERTICAL RISER OR EQUIVALENT
2. OPTIONAL CHOKING GRAVEL LAYER
3. 2' MIN PLANTING MIX; 3' PREFERRED.

TYPICAL BIORETENTION DETAIL FOR PARCEL BASED LID (CATEGORY 1)
NTS



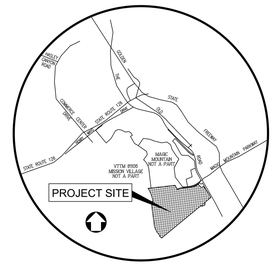
NOTES

1. OVERFLOW DEVICE: VERTICAL RISER OR EQUIVALENT
2. PERFORATED 6" MIN PVC PIPE UNDERDRAIN SYSTEM. WHERE SOIL CONDITIONS ALLOW, OMIT THE UNDERDRAIN AND INSTALL AN APPROPRIATELY SIZED GRAVEL DRAINAGE LAYER (TYPICALLY A WASHED 57 STONE) BENEATH THE PLANTING MEDIA FOR ENHANCED INFILTRATION.
3. OPTIONAL CHOKING GRAVEL LAYER
4. 2' MIN PLANTING MIX; 3' PREFERRED.
5. LINER NOT REQUIRED FOR CATEGORY 2. LINER IS REQUIRED FOR CATEGORY 3.

TYPICAL BIOINFILTRATION DETAIL FOR PARCEL BASED LID (CATEGORY 2 & 3)
NTS

LEGEND:

- EXISTING STORM DRAIN LINE
- PROPOSED STORM DRAIN
- EXISTING WATER QUALITY LINE
- PROPOSED WATER QUALITY LINE
- TRIBUTARY AREA TO BASIN B
- TRIBUTARY AREA TO BASIN C
- TRIBUTARY AREA TO MISSION VILLAGE REGIONAL WATER QUALITY BASIN D
- TRIBUTARY AREA FOR RIGHT-OF-WAY LID "A STREET"
- TRIBUTARY AREA FOR RIGHT-OF-WAY LID "B STREET"
- TRIBUTARY AREA FOR PARCEL BASED TREATMENT AREA PA-1
- TRIBUTARY AREA FOR PARCEL BASED TREATMENT AREA PA-2
- TRIBUTARY AREA FOR PARCEL BASED TREATMENT AREA PA-3
- TRIBUTARY AREA FOR PARCEL BASED TREATMENT AREA PA-14
- AVAILABLE LID FOOTPRINT FOR PARCEL BASED LID
- AVAILABLE LID FOOTPRINT FOR RIGHT-OF-WAY LID
- DIVERSION STRUCTURE
- CDS UNIT

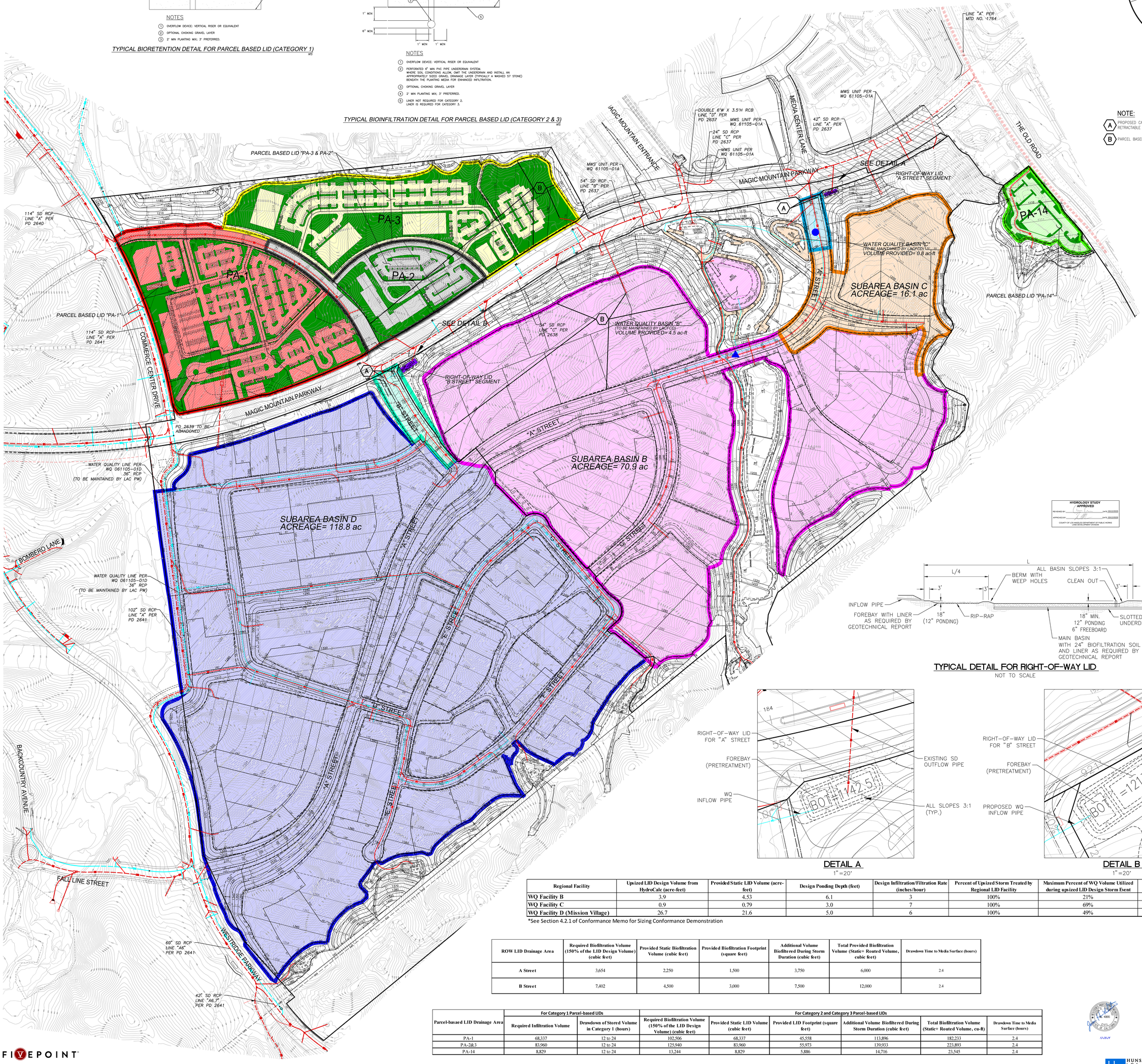


VICINITY MAP
NOT TO SCALE

NOTE:

A. PROPOSED CATCH BASINS SHALL BE INSTALLED WITH ARS (AUTOMATIC RETRACTABLE SCREENS) AND CPS (CONNECTOR PIPE SCREEN).

B. PARCEL BASED TRASH CONTROL. CDS OR TRASH EXCLUDING INLETS.



HYDROLOGY STUDY
APPROVED

REVIEWED BY: _____ DATE 03/12/2025

APPROVED BY: _____ DATE 03/12/2025

COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS
LAND DEVELOPMENT DIVISION

TYPICAL DETAIL FOR RIGHT-OF-WAY LID
NOT TO SCALE

DETAIL A
1"=20'

DETAIL B
1"=20'

Regional Facility	Upsized LID Design Volume from HydroCalc (acre-feet)	Provided Static LID Volume (acre-feet)	Design Ponding Depth (feet)	Design Infiltration/Filtration Rate (inches/hour)	Percent of Upsized Storm Treated by Regional LID Facility	Maximum Percent of WQ Volume Utilized during upsized LID Design Storm Event	Drawdown Time to Media Surface (hours)
WQ Facility B	3.9	4.53	6.1	3	100%	21%	24
WQ Facility C	0.9	0.79	3.0	7	100%	69%	8
WQ Facility D (Mission Village)	26.7	21.6	5.0	6	100%	49%	13

*See Section 4.2.1 of Conformance Memo for Sizing Conformance Demonstration

ROW LID Drainage Area	Required Biofiltration Volume (150% of the LID Design Volume) (cubic feet)	Provided Static Biofiltration Volume (cubic feet)	Provided Biofiltration Footprint (square feet)	Additional Volume Biofiltered During Storm Duration (cubic feet)	Total Provided Biofiltration Volume (Static+ Routed Volume, cubic feet)	Drawdown Time to Media Surface (hours)
A Street	3,654	2,250	1,500	3,750	6,000	2.4
B Street	7,402	4,500	3,000	7,500	12,000	2.4

Parcel-based LID Drainage Area	For Category 1 Parcel-based LIDs		For Category 2 and Category 3 Parcel-based LIDs				
	Required Infiltration Volume	Drawdown of Stored Volume in Category 1 (hours)	Required Biofiltration Volume (150% of the LID Design Volume) (cubic feet)	Provided Static LID Volume (cubic feet)	Provided LID Footprint (square feet)	Additional Volume Biofiltered During Storm Duration (cubic feet)	Total Biofiltration Volume (Static+ Routed Volume, cu-ft)	Drawdown Time to Media Surface (hours)
PA-1	68,337	12 to 24	102,506	68,337	45,558	113,896	182,233	2.4
PA-2&3	83,960	12 to 24	125,940	83,960	55,973	139,933	223,893	2.4
PA-14	8,829	12 to 24	13,244	8,829	5,886	14,716	23,545	2.4

FIVEPOINT

INSIGHTS

FEET
100' 50' 0 100' 200'
1/8" 1/4" INCHES

12-18-24

TRACT 53295
LID EXHIBIT
ENTRADA SOUTH

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DATE: 04/25/25 REV. DATE: 11/08/2024
PROJECT NO: 0015-035-019 SHEET 1 OF 1

H15035-01_ENTRADA SOUTH LID EXHIBIT.DWG

Attachment B

Modeling Methodology

engineers | scientists | innovators

Geosyntec consultants

Attachment B

Modeling Methodology in Support of LID Conformance Analysis

1. INTRODUCTION

The purpose of this attachment is to describe the modeling methodology used to demonstrate that the proposed regional infiltration/bioinfiltration facilities for the Entrada South Project (Project) are sized to satisfy the retention or equivalent biofiltration of the 85th Percentile, 24-hour Storm Event requirement in the Project LID Performance Standard.

To demonstrate that each regional facility meets this standard, the LID design storm runoff time series were calculated using HydroCalc for tributary area to each regional facility and subsequently used as input inflow times series to storage units representing the detailed hydraulic characteristics of the proposed regional facilities (stage-storage, infiltration, filtration and overflow) in an USEPA Stormwater Management Model (SWMM).

Subcatchments tributary to each facility were defined based on land use delineations, drainage boundaries, results of infiltration feasibility screening, and soil parameters. Regional facilities within the Project were modeled in SWMM. Based on the proposed facility sizes and configurations, watershed LID performance results were evaluated to demonstrate that the regional LID facilities achieve the retention or equivalent biofiltration of the 85th Percentile, 24-hour Storm Event requirement in the LID Performance Standard.

Part of Entrada South drains to Regional Facility D in the adjacent Mission Village Project. The facility design and tributary areas were previously documented in Mission Village Phase 1, 2, 5 & 6 Conformance Memorandum (Geosyntec, 2019). Since the time of that memorandum, the land uses and drainage areas from Entrada South have changed. This memorandum documents the updated Entrada South drainage areas and land uses. It also includes the full updated model files and results to demonstrate that Regional Facility D is still adequately sized. The regional facility itself is not changed compared to the Mission Village Phase 1, 2, 5 & 6 Conformance Memorandum (Geosyntec, 2019). Additionally, drainage areas outside of Entrada South are not changed except for a small difference in imperviousness in Mission Village. Therefore, this memorandum does not include a description of the other areas draining to Regional Facility D as these are still consistent with the Mission Village Phase 1, 2, 5 & 6 Conformance Memorandum.

Detailed model input and output files from HydroCalc and SWMM are annotated and provided in Attachment C.

2. WATERSHED MODELING

Each subcatchment tributary to each regional BMP is modeled using HydroCalc. Subcatchment parameter input and the output are summarized in the following sections. Hydrographs from each tributary during the 85th percentile 1.1-inch 24-hour storm was generated using HydroCalc and used as input for the EPA SWMM model detailed in Section 3.

2.1. Regional Facility Tributary Area and Imperviousness

The tributary drainages treated by each of the Project regional facilities were represented per the *LID Exhibit for Entrada South* (Hunsaker, 2024). Table 2-1 includes the drainage subbasins and imperviousness values used for areas within the Entrada South boundary that are proposed to drain to Facilities B, C and Regional Facility D in Mission Village.

Table 2-1: Modeled Developed Conditions Project– Facilities B, C, and D

Facility	Land Use	Acreage	Imperviousness
Facility B	Multi-Family Residential	50.3	74
	Open Space	9.2	1
	Recreation	2.0	80
	Recreation Trails	4.2	10
	Road	4.6	91
	Water Quality Facility	0.6	100
Facility B Total		**70.9**	**62**
Facility C	Multi-Family Residential	7.9	74
	Open Space	1.9	1
	Recreation Trails	0.3	10
	Road	1.1	91
	Access Road	4.6	80
	Water Quality Facility	0.4	100
Facility C Total		**16.1**	**68**
Facility D	Multi-Family Residential	82.2	74
	Open Space	11.5	1
	Recreation	1.7	80
	Recreation Trails	8.4	10
	Road	15.1	91
Facility D Total[1]		**118.8**	**65**

[1] Facility D Total refers to contributing subbasins within Entrada South project boundary only. See Mission Village Phase 1, 2, 5 & 6 Conformance Memorandum (Geosyntec, 2019) for contributing subbasin characteristics outside Entrada South project boundary.

Regional Facility D was modeled based on the ultimate proposed condition of its drainage area, as described in the memorandum: "Mission Village Phase 1, 2, 5 & 6 Water Quality Plan (Regional Facilities B, C and D) – Evaluation of Conformance with Newhall LID Performance Standard" (Geosyntec Consultants, 2019). The drainage area from Entrada South and the imperviousness in Mission Village tributary area changed somewhat since the Mission Village memorandum; the current proposed Entrada South drainage area was modeled to demonstrate that Regional Facility

D is adequately sized. A comparison of the total tributary area to Regional Facility D between the current model and the model documented in the Mission Village Conformance Memorandum is presented in Table 2-2.

Table 2-2: Summary of Tributary Area to Regional Facility D and Comparison with Scenario Modeled in the Mission Village Conformance Memorandum.

Model Scenario	Project Location	Tributary Area (Acres)	Impervious Fraction of Catchment (%)
Mission Village Phase 1, 2, 5 & 6 Conformance Memorandum	Mission Village	115.0	66.6
	Entrada South	121.5	52.3
	Existing Westridge	95.6	49.1
	Total	**332.1**	**56.3**
Entrada South Conformance Memorandum	Mission Village	115.0	68.6
	Entrada South	118.8	64.7
	Existing Westridge	95.6	49.1
	Total	**329.4**	**61.5**

2.2. Other Subcatchment Input Parameters

According to the LA County Soils Map (LACDPW, 2023), LA County soil type 098 is the underlying soils for vast majority of the Entrada South project area. Therefore, this soil type is used as soil type input for all of the tributary areas to the regional facilities. In addition, flow path length of 250 feet and flow path slope of 5% were assumed inputs for the tributary areas to the regional facilities.

2.3. HydroCalc Output

The peak runoff flow rates and total runoff volumes during the 1.1-inch 24-hour storm from the three tributary areas within the Project boundary draining to Regional Facility B, C and D from HydroCalc output are summarized in Table 2-3. The hydrographs from these three drainage areas are also illustrated in Attachment C. The output hydrograph for area draining to Facility B will be used as inflow input for the SWMM model detailed in Section 3. The output hydrographs for areas draining to Facility C and D will be multiplied by 150% and used as inflow input for the SWMM model because these two facilities because the design of them include biofiltration.

Table 2-3. HydroCalc Output for Tributary Areas within Entrada South Draining to Regional Facility B, C and D during 85th Percentile 1.1-inch 24-hour Storm

HydroCalc Output	Facility B	Facility C	Facility D (within Entrada South Boundary)
Clear Peak Flow Rate (cfs)	20.3	5.1	26.9
24-Hr Clear Runoff Volume (ac-ft)	3.9	0.97	6.7

3. REGIONAL FACILITY MODELING

3.1. EPA SWMM Model Input

A design storm simulation is performed in SWMM using the hydrographs generated by HydroCalc as input the incorporating the hydraulic properties of the proposed regional facilities. The general simulation parameters are provided in Table 3-1.

Table 3-1: SWMM Model Parameters

Parameter	Description	Parameter Value
Routing time step	Seconds	30 sec
Routing Option	Method of routing flows through the system	Kinematic Wave method
Inflow Time Series	Runoff hydrographs from the 1.1-inch 24-hour design storm documented in Section 2 and detailed in Attachment C	HydroCalc output

3.2. Model Representation

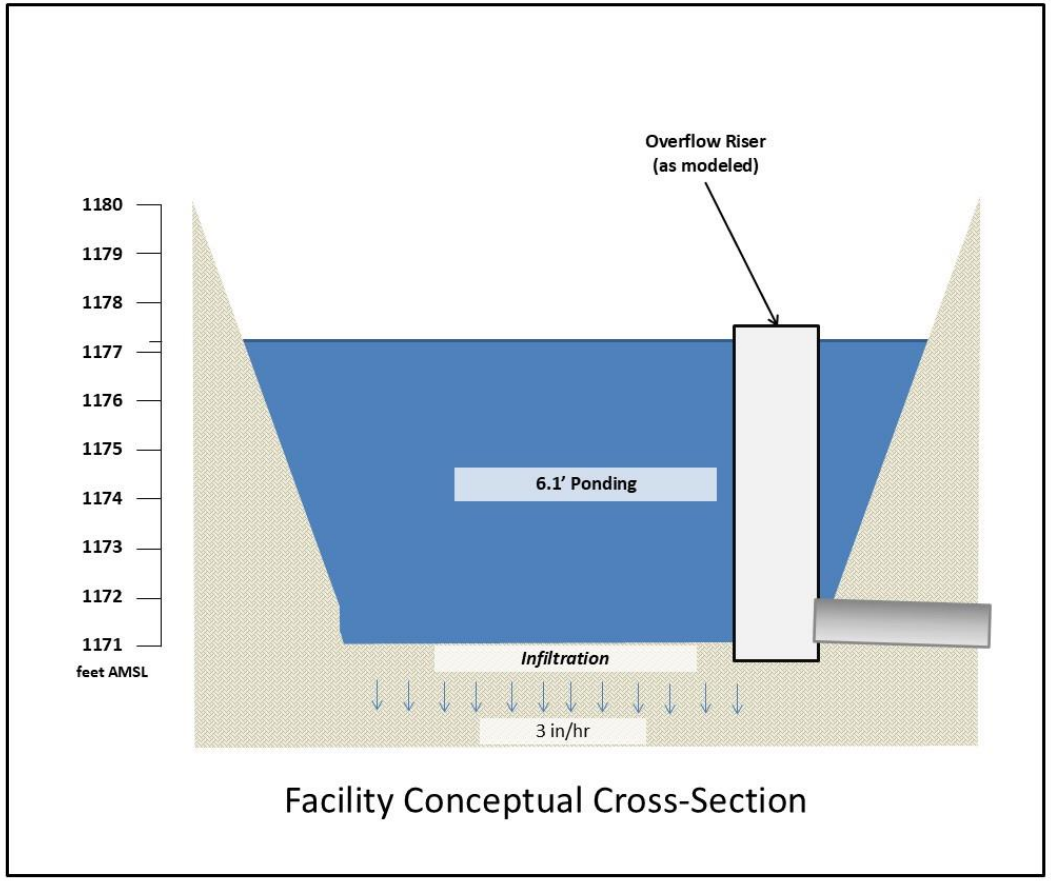
Regional facilities were modeled using a stage-area table to define volume properties and SWMM's built-in hydraulic control elements (e.g., orifices, weirs, outlets) to define discharge from the system (e.g., treated discharge, infiltration, overflow) as a function of the depth of stored water. These facilities were modeled to receive runoff from developed portions of the Project accounting for diversion structures. Regional Facility D was modeled to receive runoff from tributary areas in Mission Village, Legacy Village, and Entrada South. Modeling of Mission Village Facility D is described in the Mission Village Phase 1, 2, 5 & 6 Conformance Memorandum (Geosyntec, 2019).

During the design storm simulation, the inflow hydrograph generated from the HydroCalc is routed into the regional facilities in SWMM, accounting for the hydrologic water balance, conceptual diversion structure, and hydraulic flow control.

Facility sizing was conducted with model infiltration rates, which is consistent with the recommendations by Engeo (2021). The infiltration feasibility report (Engeo, 2021) recommends the design of an infiltration facility for Regional Facility B with a corrected infiltration rate of 3.0 inches per hour based on the infiltration feasibility study (Engeo, 2021). Regional Facility C is a Category 2 basin per the infiltration feasibility study. As a conservative assumption, the underlaying infiltration from the Category 2 Basin A is not modeled in SWMM. Regional Facility D is proposed as a biofiltration facility (lined, no infiltration) due to low soil infiltration rate; the basis for this decision is further discussed in the Mission Village Phase 1, 2, 5 & 6 Conformance Memorandum (Geosyntec, 2019).

Schematic drawings of Regional Facility B, C and D are illustrated in Figure 1 through Figure 3. Regional Facility D was modeled and documented as part of the Mission Village Phase 1, 2, 5 & 6 Conformance Memorandum (Geosyntec, 2019).

Entrada South Regional Facility B - Infiltration



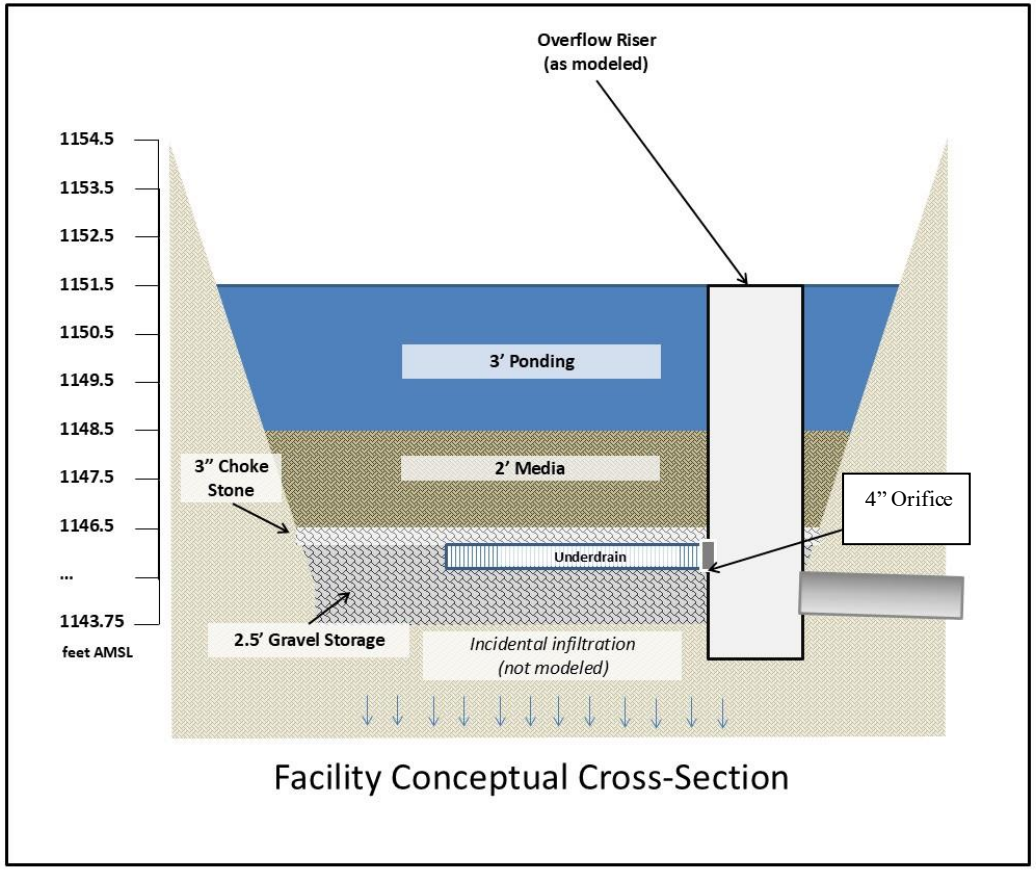
Facility Stage-Area Curve

Elevation, ft AMSL	Depth from Media Surface, ft	Area, sq-ft
1171	**0**	25,987
1172	**1**	27,945
1173	**2**	29,973
1174	**3**	32,063
1175	**4**	34,209
1176	**5**	36,619
1177	**6**	39,156
1177.1	**6.1**	39,441
1178	**7**	42,006
1179	**8**	45,127
1180	**9**	48,619

Total Storage Volume @ 1177.1 ft AMSL:
4.5 ac-ft

Figure 1: Schematic and Respective Cross-Section Depths of Entrada South Infiltration Facility B

Entrada South Regional Facility C - Bioinfiltration



Facility Conceptual Cross-Section

Facility Stage-Area Curve

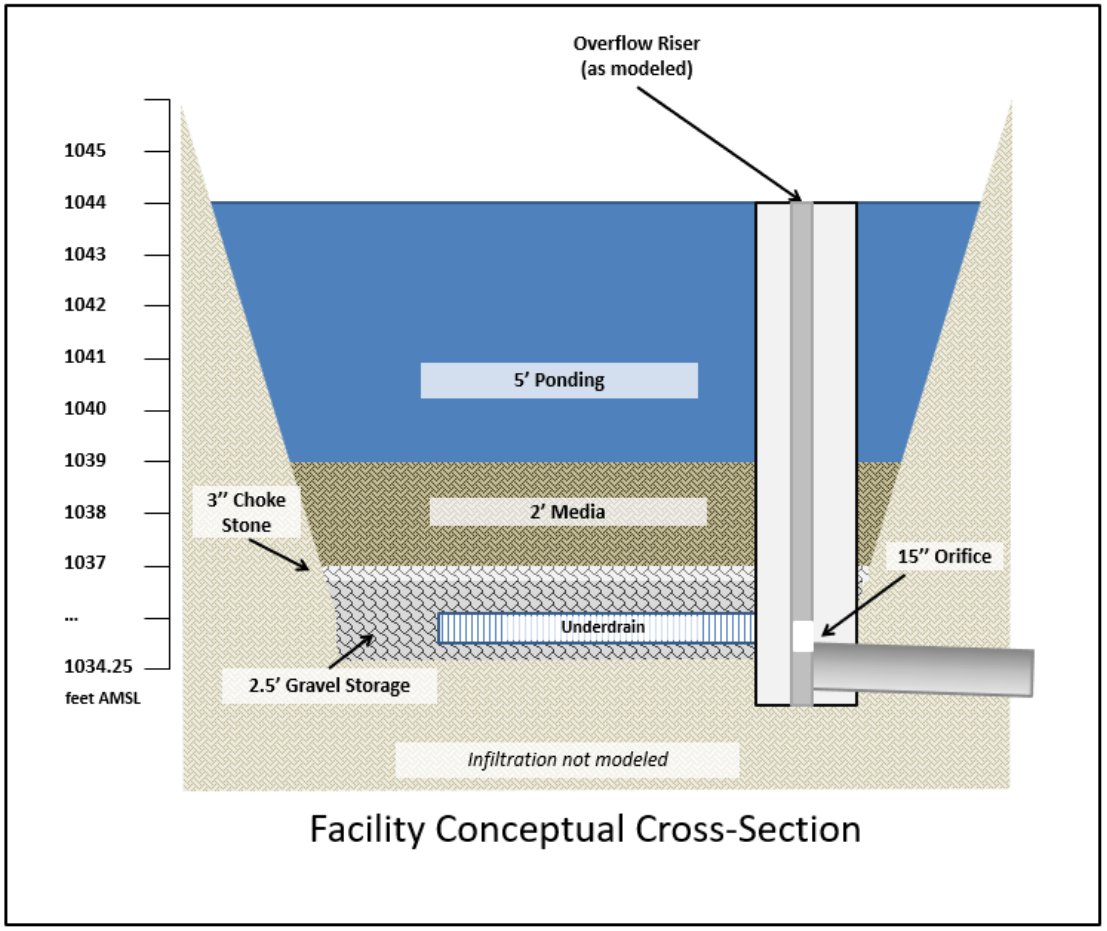
Depth from Media Surface, ft	Layer Base Elevation, ft AMSL	Area, sq-ft	Material	Porosity, %
-	1143.75	6,235	gravel	40
-	1146.25	6,235	choke stone	40
-	1146.5	6,235	media	25
0	1148.5	6,235	ponding	100
1	1149.5	7,432	ponding	100
2	1150.5	8,713	ponding	100
3	1151.5	10,108	ponding	100
4	1152.5	11,647	ponding	100
5	1153.5	13,242	ponding	100
6	1154.5	15,651	ponding	100

Total Ponding Volume @ 1151.5 ft AMSL:
0.56 ac-ft

Total Storage Volume @ 1151.5 ft AMSL (including pore space):
0.79 ac-ft

Figure 2: Schematic and Respective Cross-Section Depths of Entrada South Bioinfiltration Facility C

Mission Village Regional Facility D - Biofiltration



Facility Conceptual Cross-Section

Facility Stage-Area Curve

Depth from Media Surface, ft	Elevation, ft AMSL	Area, sq-ft	Material	Porosity, %
-	1034.25	133,120	base	-
-	1036.75	133,120	gravel	40
-	1037	133,120	choke stone	40
-	1037.01	133,120	media	25
-	1039	133,120	media	25
0	1039.01	133,120	ponding	100
1	1040	137,986	ponding	100
2	1041	142,949	ponding	100
3	1042	147,953	ponding	100
4	1043	153,029	ponding	100
5	1044	158,264	ponding	100
6	1045	163,389	ponding	100

Total Ponding Volume @ 1044 ft AMSL:
16.7 ac-ft

Total Storage Volume @ 1044 ft AMSL (including pore space):
21.6 ac-ft

Figure 3: Schematic and Respective Cross-Section Depths of Mission Village Biofiltration Facility D

The regional facilities will be off-line. Water will be diverted at diversion structures and/or flow-splitting inlets: flow up to the required treatment flowrates will be diverted to the water quality basins and the high flow will bypass the basins. The required minimum diversion flowrates to each facility were determined using HydroCalc for the 1.1-inch storm event. Basin C and D includes biofiltration; therefore, the diversion was sized for 1.5 times the peak of the 1.1-inch storm in the EPA SWMM model. Table 3-2 shows the required diversion flowrates and the detailed HydroCalc inputs and outputs are provided in Attachment C.

Table 3-2: Required Diversion Flowrates to Regional Facilities

BMP ID	Required Minimum Diversion Structure Flowrate, cfs
Regional Facility B	20.3
Regional Facility C	7.7
Regional Facility D	40.3

An example EPA SWMM model with explanation of each element in the model for regional facilities are provided in Figure 4 (Category 1 facilities) and Figure 5 (Category 2 and 3 facilities). Detailed SWMM model input and output files are provided in Attachment C.

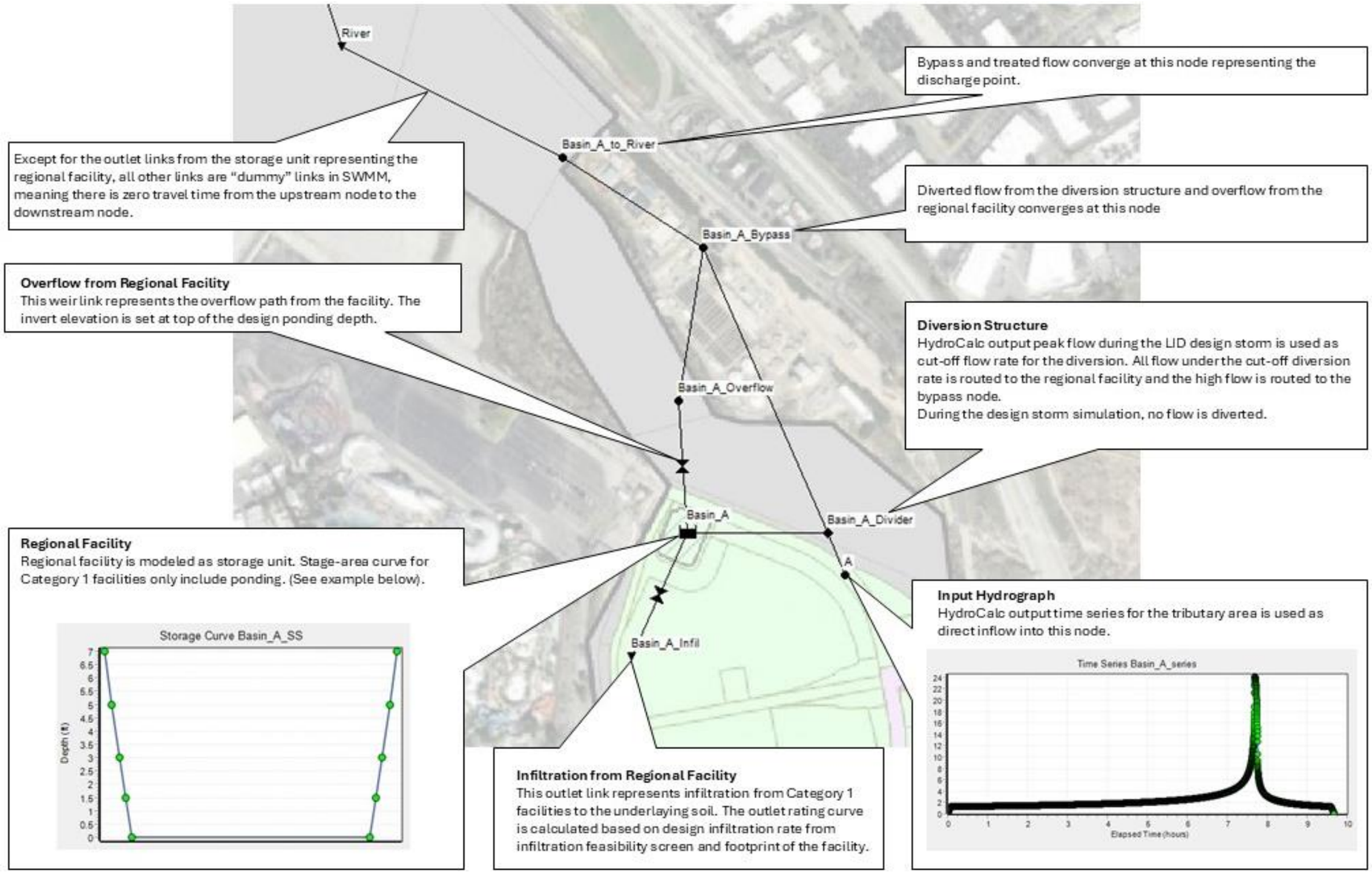


Figure 4 Explanation of EPA SWMM Model of an Example Regional Facility (Category 1)

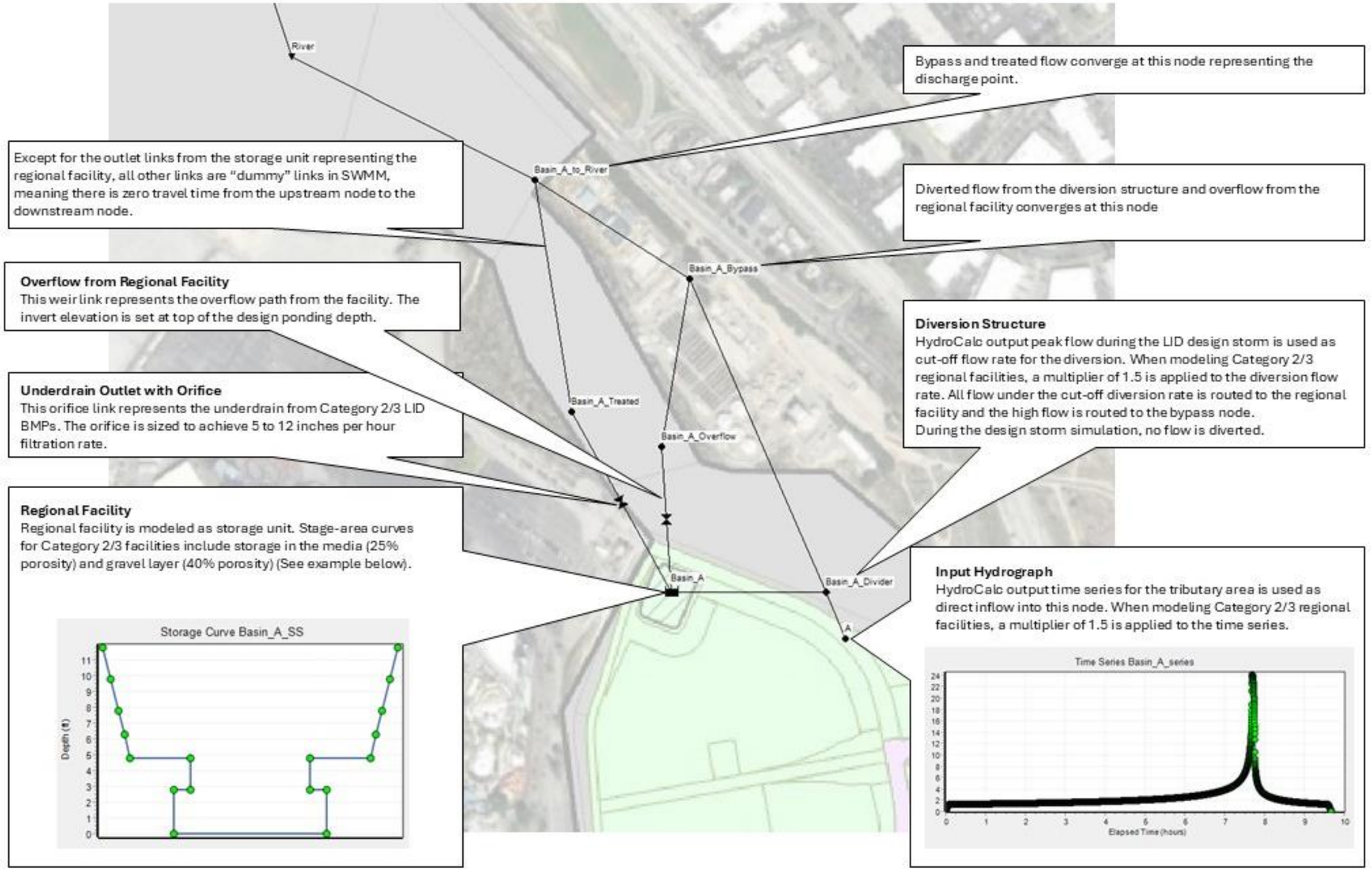


Figure 5 Explanation of EPA SWMM Model of an Example Regional Facility (Category 2 - 3)

3.3. Regional Facility Modeling Results

The provided sizes of the regional facilities is required to satisfy the LID performance standard to infiltrate 100% of the 1.1-inch storm event or biofilter 150% of the 1.1-inch storm event that is not retained. As summarized above, HydroCalc was used to generate input hydrographs that were routed through the SWMM models. These input hydrographs were based on the clear flows for the 1.1-inch LID design event; a multiplier of 1.5 was used for the bioinfiltration and biofiltration basins. The model was run to simulate the duration of the stormwater runoff from the LID design storm. The maximum ponding depth during the simulation were extracted from the SWMM model results and compared to the provided ponding depth for all three proposed regional facilities. As shown in Table 3-3, the maximum ponding depths for all three regional facilities did not exceed the provided ponding depths and therefore the provided sizes of the regional facilities satisfy the sizing requirement to infiltrate 100% of the 1.1-inch storm event or biofilter 150% of the 1.1-inch storm event that is not retained.

Table 3-3: Maximum Depth during 1.1-Inch Storm Event and Ponding Depth Comparison for Regional Facilities

Regional Facility	1.1-inch Storm Event Scaling Factor[1]	Maximum Ponding Depth during Scaled 1.1-inch Storm Event[2] (ft)	WQ Ponding Depth Provided (ft)
B	1.0	1.5	6.1
C	1.5	1.9	3.0
D	1.5	1.8	5.0

1-Scaling factor of 1.0 applies to infiltration basins; scaling factor of 1.5 applies to bioinfiltration and biofiltration basins.
2-Maximum ponding depth above media surface. For Facility B which has no biofiltration component, this is the maximum ponding depth above the basin floor.

To ensure that facilities fall within target operational parameters for regional facilities, including drawdown time and media filtration rate, the inflow time series to the regional facilities in the SWMM model was modified such that the facilities were filled up to their respective overflow stages and the modeling results were extracted during the drawdown process from overflow stage to the media surface. According to the LA County LID Standards Manual, the target drawdown time to the surface of the facility was less than 96 hours and the target media filtration rate was between 5 and 12 inches per hour. As shown in Table 3-4, facility performance was consistent with these targets.

Table 3-4: Regional Facility Operational Parameters

Regional Facility	Estimated Drawdown Time to Surface of Facility from Brim Full, hours	Estimated Maximum Media Filtration Rate when system is at overflow stage, in/hr	Basis
Target	< 96	5 - 12	LA County LID Standards Manual
Regional Facility B	24	N/A	Extracted from model output
Regional Facility C	8	7	Extracted from model output
Regional Facility D	13	6	Extracted from model output

Note: Facility outlet structures subject to refinement as part of detailed design; facility operational parameters are subject to minor revision within target bounds.

4. SUMMARY

This attachment describes the modeling methodology used to evaluate the overall performance of water quality/LID design features proposed within the watersheds tributary to Facilities B, C and Facility D located within Mission Village. The analysis documented in this attachment demonstrated that the regional facilities proposed for the Project are sized to satisfy the retention or equivalent biofiltration of the 85th Percentile, 24-hour Storm Event requirement in the Project LID Performance Standard. The modeling approach incorporates civil and geotechnical design information that is available at this time for the facilities. This approach results in an estimate of overall performance that is considered to be reliable for evaluating the conformance to the LID Performance Standard applicable to the Project.

Note, that modeling of Regional Facility D is documented in the Mission Village Phase 1, 2, 5 & 6 Conformance Memorandum (Geosyntec, 2019). This memorandum does not document the drainage areas for the other projects that drain to Basin D. This memorandum does document the updated drainage area from Entrada South and the updated modeling results for Regional Facility D that incorporate updates from the tributary area draining from within the Entrada South project.

5. REFERENCES

Engeo, 2021. Analysis of Infiltration Feasibility for Entrada South Project. Entrada South – Vesting Tentative Tract Map 53295 Newhall Ranch Preliminary Infiltration Feasibility for Low Impact Design (LID) Stormwater Quality Features.

Geosyntec Consultants (Geosyntec), 2019. Memorandum: Mission Village Phase 1, 2, 5 & 6 Water Quality Plan (Regional Facilities B, C and D) – Evaluation of Conformance with Newhall LID Performance Standard. October 9, 2019.

Hunsaker, 2024. LID Exhibit for Entrada South TTM No. 53295.

Attachment C

Model Files

APPENDIX C: HYDROCALC AND SWMM INPUTS AND OUTPUTS

HydroCalc Regional Facilities B, C, and D, Inputs Table

HydroCalc Parcel-Based and Right-of-Way LIDs, Inputs Table

HydroCalc Regional Facilities B, C, and D, Output Files

HydroCalc Parcel-Based and Right-of-Way LIDs, Output Files

Entrada South Regional Facilities B and C, 1.1-Inch Storm Input File

Entrada South Regional Facility B and C, 1.1-Inch Storm Output File

Entrada South Regional Facility B and C Output Graphs

Mission Village Regional Facility D, 150% 1.1-Inch Storm Input File

Mission Village Regional Facility D, 150% 1.1-Inch Storm Output File

Mission Village Regional Facility D Output Graphs

Text has been inserted in red boxes in key locations to orient the reviewer to critical modeling inputs and outputs.

HydroCalc Inputs – Regional Facilities B, C, and D			
Subarea ID	**B**	**C**	**Basin D - ES**
Area (ac)	70.88	16.14	118.8
Flow Path Length (ft)	250	250	500
Flow Path Slope (vft/hft)	0.05	0.05	0.05
85th Percentile Rainfall Depth (in)	1.1	1.1	1.1
Percent Impervious	0.6229	0.6822	0.6468
Soil Type	98	98	98
Design Storm Frequency	85th percentile storm	85th percentile storm	85th percentile storm
Fire Factor	0	0	0

HydroCalc Inputs – Parcel-Based and Right-of-Way LIDs					
Subarea ID	**PA-1**	**PA-2&3**	**PA-14**	**A St ROW**	**B St ROW**
Area (ac)	20.8	25.6	2.7	0.7	1.7
Flow Path Length (ft)	250	250	250	250	250
Flow Path Slope (vft/hft)	0.05	0.05	0.05	0.05	0.05
85th Percentile Rainfall Depth (in)	1.1	1.1	1.1	1.1	1.1
Percent Impervious	0.91	0.91	0.91	0.91	0.80
Soil Type	20	98	98	98	98
Design Storm Frequency	85th percentile storm	85th percentile storm	85th percentile storm	85th percentile storm	85th percentile storm
Fire Factor	0	0	0	0	0

Peak Flow Hydrologic Analysis

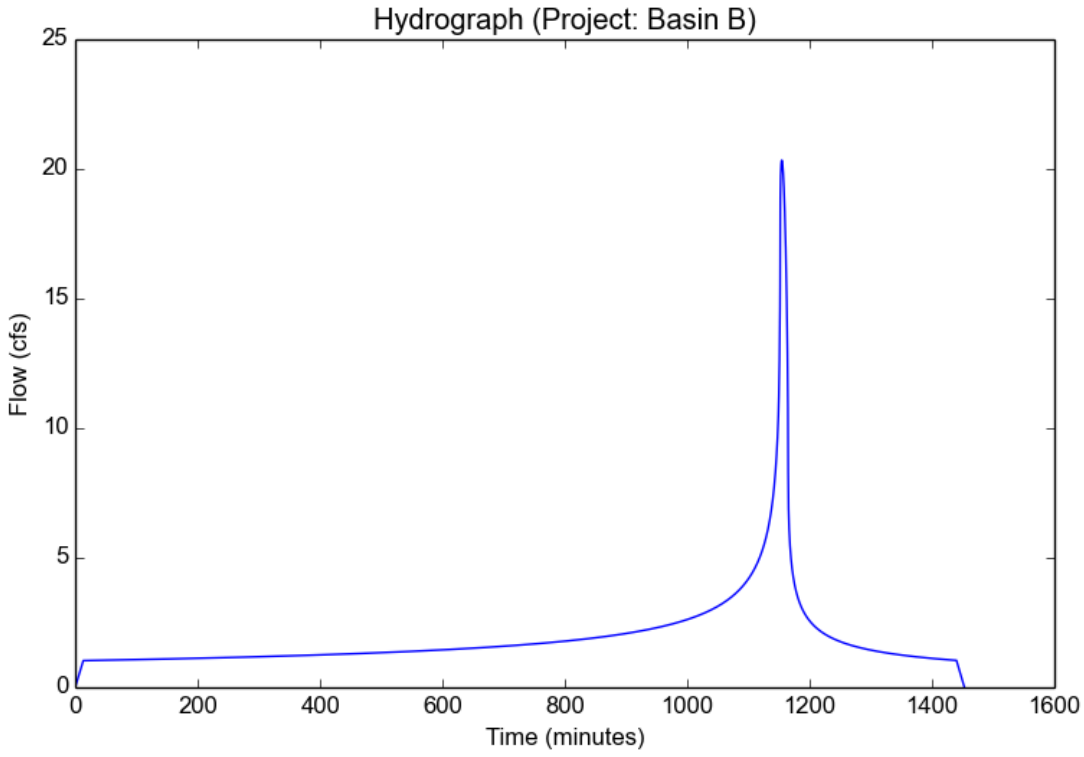
File location: P:/Clients/Newhall_Land/Projects/CWR0782_ES_VCC_Hydrology_2022/Entrada_South/Conformance Memo/Round_4_Dec2023/Project -
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Project
Subarea ID	Basin B
Area (ac)	70.88
Flow Path Length (ft)	250.0
Flow Path Slope (vft/hft)	0.05
85th Percentile Rainfall Depth (in)	1.1
Percent Impervious	0.6229
Soil Type	98
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.1
Peak Intensity (in/hr)	0.4188
Undeveloped Runoff Coefficient (Cu)	0.33
Developed Runoff Coefficient (Cd)	0.685
Time of Concentration (min)	13.0
Clear Peak Flow Rate (cfs)	20.3375
Burned Peak Flow Rate (cfs)	20.3375
24-Hr Clear Runoff Volume (ac-ft)	3.8893
24-Hr Clear Runoff Volume (cu-ft)	169416.4834



Peak Flow Hydrologic Analysis

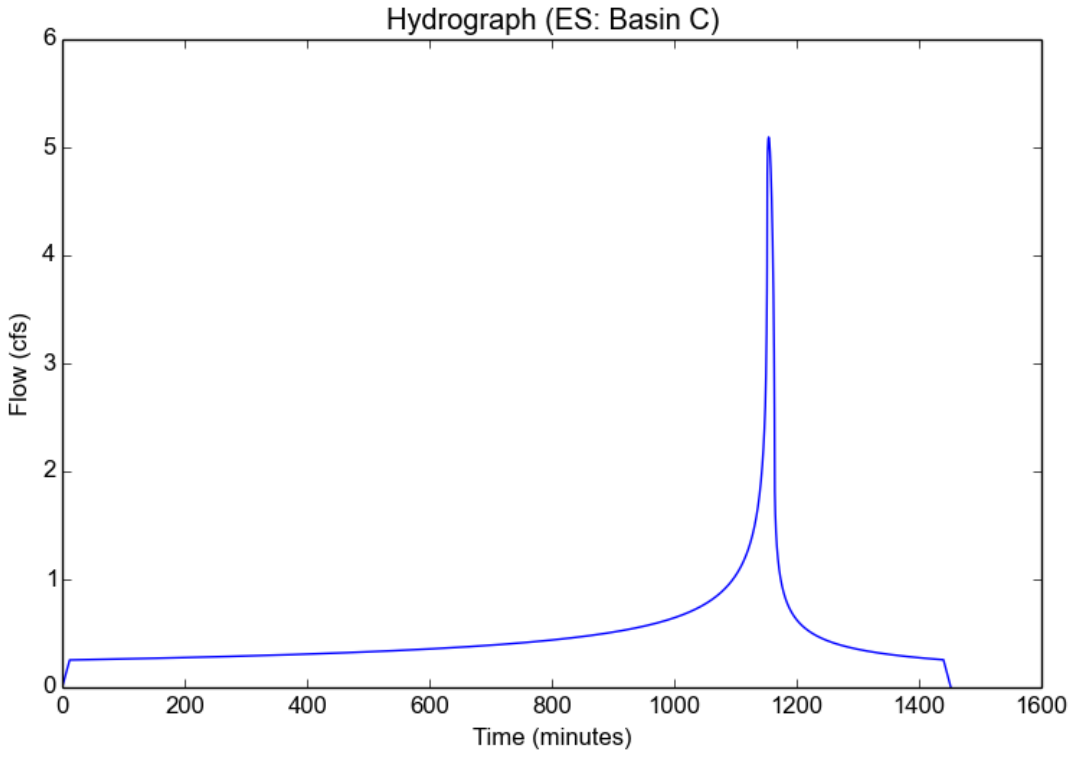
File location: P:/Clients/Newhall_Land/Projects/CWR0782_ES_VCC_Hydrology_2022/Entrada_South/Conformance Memo/Round_5_Oct2024/Attachme
Version: HydroCalc 1.0.3

Input Parameters

Project Name	ES
Subarea ID	Basin C
Area (ac)	16.14
Flow Path Length (ft)	250.0
Flow Path Slope (vft/hft)	0.05
85th Percentile Rainfall Depth (in)	1.1
Percent Impervious	0.6822
Soil Type	98
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.1
Peak Intensity (in/hr)	0.4349
Undeveloped Runoff Coefficient (Cu)	0.3518
Developed Runoff Coefficient (Cd)	0.7258
Time of Concentration (min)	12.0
Clear Peak Flow Rate (cfs)	5.0946
Burned Peak Flow Rate (cfs)	5.0946
24-Hr Clear Runoff Volume (ac-ft)	0.9545
24-Hr Clear Runoff Volume (cu-ft)	41577.4298



Peak Flow Hydrologic Analysis

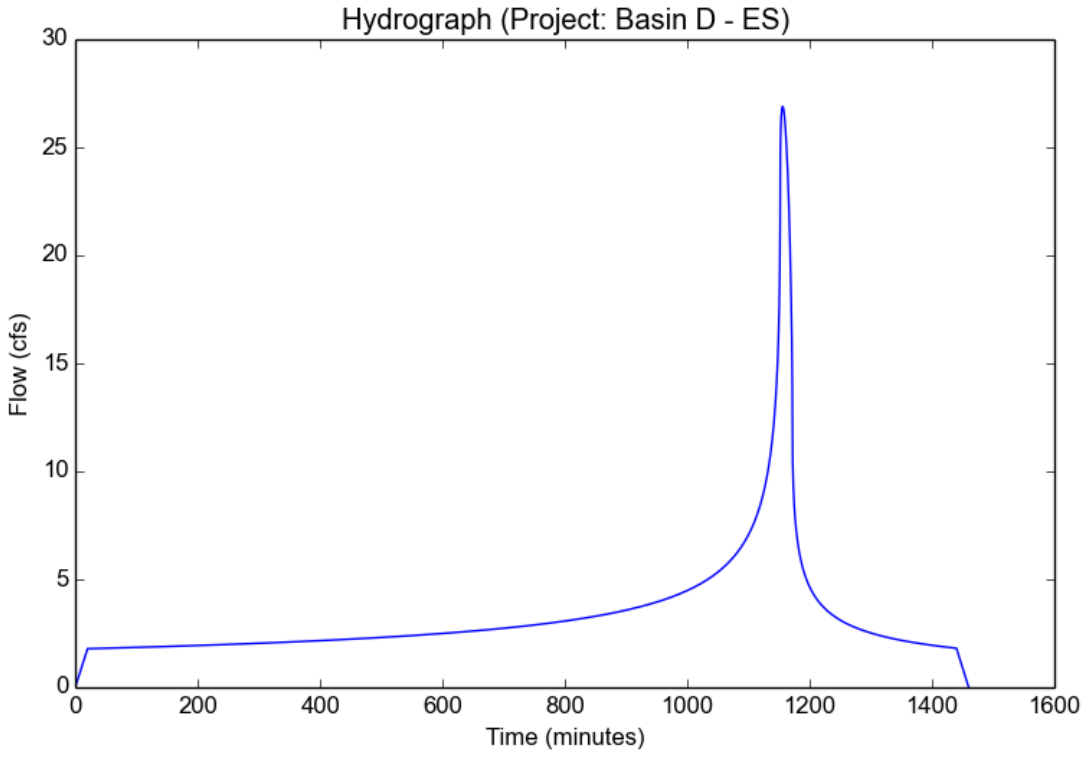
File location: P:/Clients/Newhall_Land/Projects/CWR0782_ES_VCC_Hydrology_2022/Entrada_South/Conformance Memo/Round_4_Dec2023/Project -
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Project
Subarea ID	Basin D - ES
Area (ac)	118.8
Flow Path Length (ft)	500.0
Flow Path Slope (vft/hft)	0.05
85th Percentile Rainfall Depth (in)	1.1
Percent Impervious	0.6468
Soil Type	98
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.1
Peak Intensity (in/hr)	0.3421
Undeveloped Runoff Coefficient (Cu)	0.2254
Developed Runoff Coefficient (Cd)	0.6617
Time of Concentration (min)	20.0
Clear Peak Flow Rate (cfs)	26.8923
Burned Peak Flow Rate (cfs)	26.8923
24-Hr Clear Runoff Volume (ac-ft)	6.6997
24-Hr Clear Runoff Volume (cu-ft)	291836.9449



Peak Flow Hydrologic Analysis

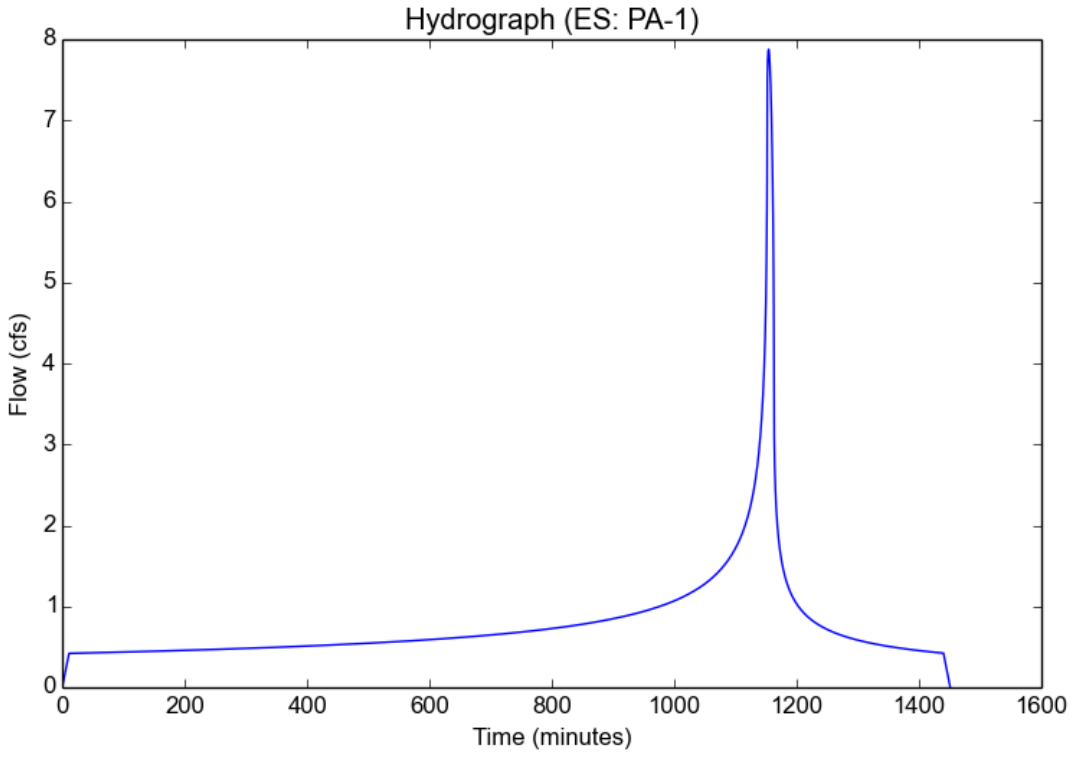
File location: C:/Users/lindsey.spencer/OneDrive - Geosyntec/Desktop/HydroCalc/ES Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	ES
Subarea ID	PA-1
Area (ac)	20.83318466
Flow Path Length (ft)	250.0
Flow Path Slope (vft/hft)	0.05
85th Percentile Rainfall Depth (in)	1.1
Percent Impervious	0.91
Soil Type	20
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.1
Peak Intensity (in/hr)	0.4531
Undeveloped Runoff Coefficient (Cu)	0.1723
Developed Runoff Coefficient (Cd)	0.8345
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	7.8767
Burned Peak Flow Rate (cfs)	7.8767
24-Hr Clear Runoff Volume (ac-ft)	1.5688
24-Hr Clear Runoff Volume (cu-ft)	68337.463



Peak Flow Hydrologic Analysis

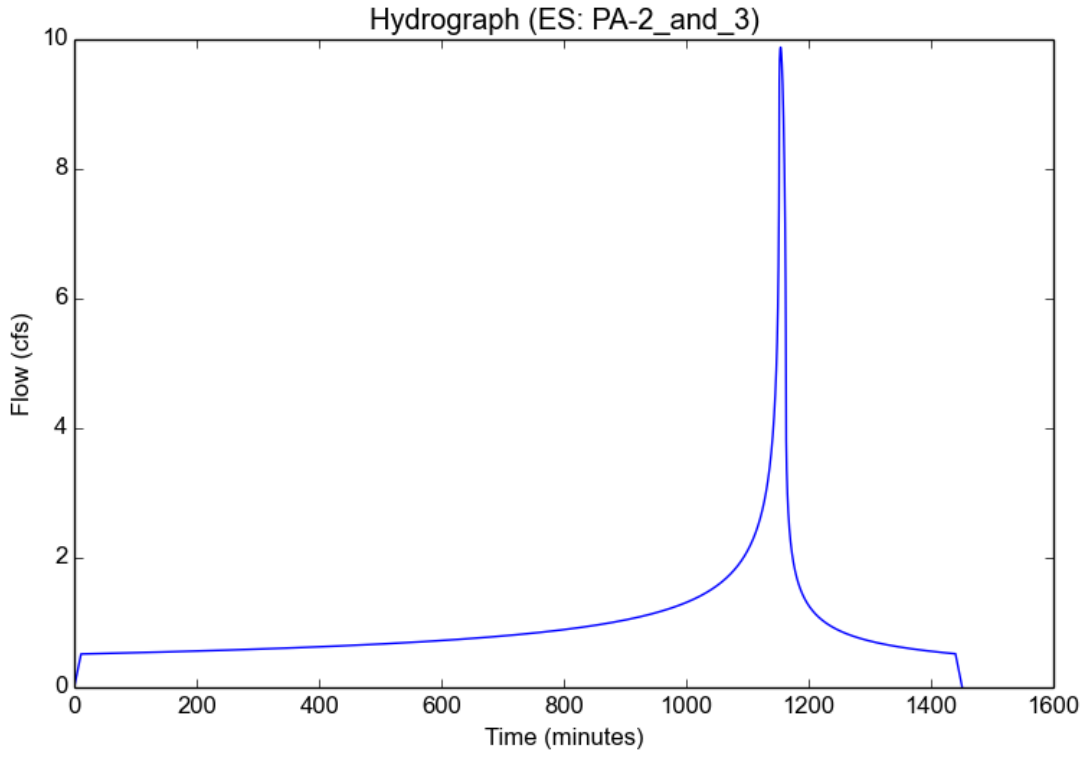
File location: C:/Users/lindsey.spencer/OneDrive - Geosyntec/Desktop/HydroCalc/ES Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	ES
Subarea ID	PA-2_and_3
Area (ac)	25.56162241
Flow Path Length (ft)	250.0
Flow Path Slope (vft/hft)	0.05
85th Percentile Rainfall Depth (in)	1.1
Percent Impervious	0.91
Soil Type	98
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.1
Peak Intensity (in/hr)	0.4531
Undeveloped Runoff Coefficient (Cu)	0.3766
Developed Runoff Coefficient (Cd)	0.8529
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	9.8773
Burned Peak Flow Rate (cfs)	9.8773
24-Hr Clear Runoff Volume (ac-ft)	1.9275
24-Hr Clear Runoff Volume (cu-ft)	83959.8332



Peak Flow Hydrologic Analysis

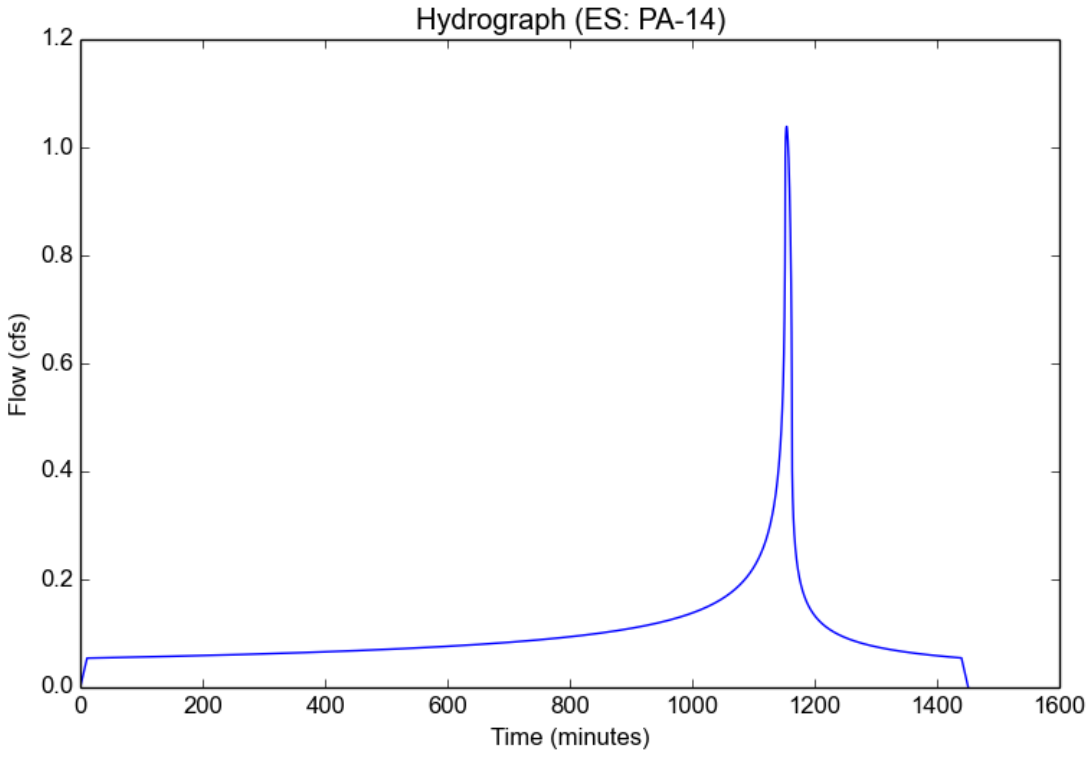
File location: C:/Users/lindsey.spencer/OneDrive - Geosyntec/Desktop/HydroCalc/ES Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	ES
Subarea ID	PA-14
Area (ac)	2.688091755
Flow Path Length (ft)	250.0
Flow Path Slope (vft/hft)	0.05
85th Percentile Rainfall Depth (in)	1.1
Percent Impervious	0.91
Soil Type	98
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.1
Peak Intensity (in/hr)	0.4531
Undeveloped Runoff Coefficient (Cu)	0.3766
Developed Runoff Coefficient (Cd)	0.8529
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	1.0387
Burned Peak Flow Rate (cfs)	1.0387
24-Hr Clear Runoff Volume (ac-ft)	0.2027
24-Hr Clear Runoff Volume (cu-ft)	8829.3197



Peak Flow Hydrologic Analysis

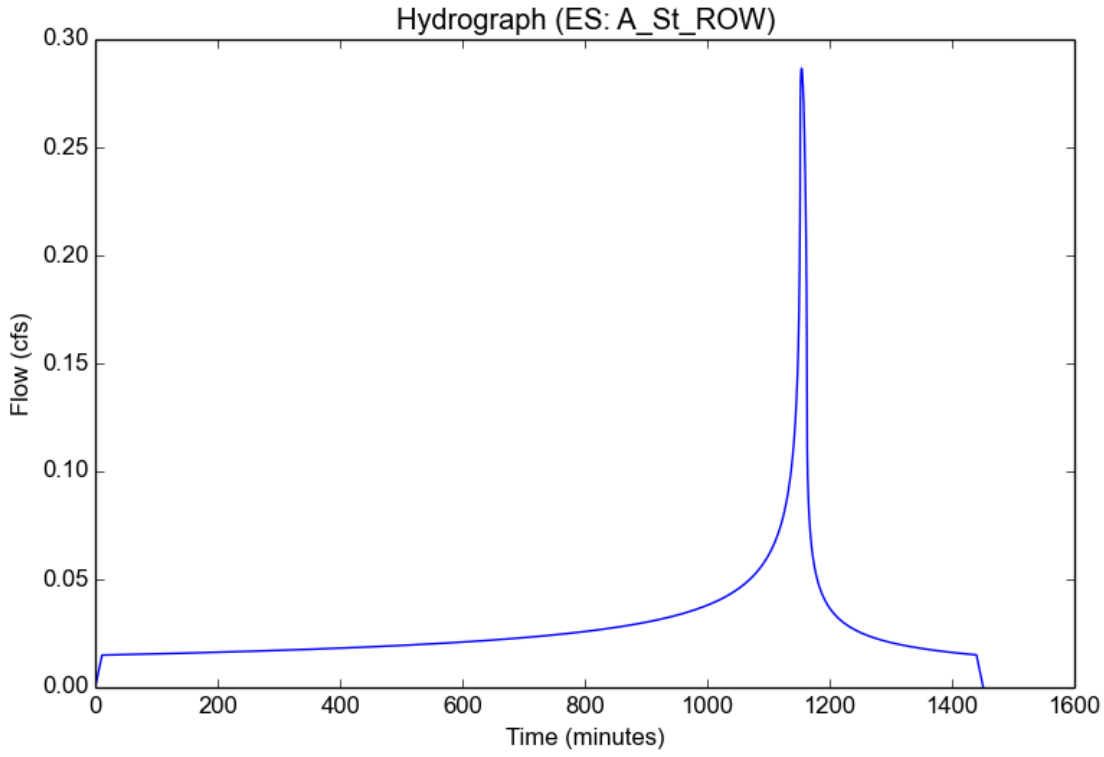
File location: C:/Users/lindsey.spencer/OneDrive - Geosyntec/Desktop/HydroCalc/ES Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	ES
Subarea ID	A_St_ROW
Area (ac)	0.741638422
Flow Path Length (ft)	250.0
Flow Path Slope (vft/hft)	0.05
85th Percentile Rainfall Depth (in)	1.1
Percent Impervious	0.91
Soil Type	98
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.1
Peak Intensity (in/hr)	0.4531
Undeveloped Runoff Coefficient (Cu)	0.3766
Developed Runoff Coefficient (Cd)	0.8529
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	0.2866
Burned Peak Flow Rate (cfs)	0.2866
24-Hr Clear Runoff Volume (ac-ft)	0.0559
24-Hr Clear Runoff Volume (cu-ft)	2435.9893



Peak Flow Hydrologic Analysis

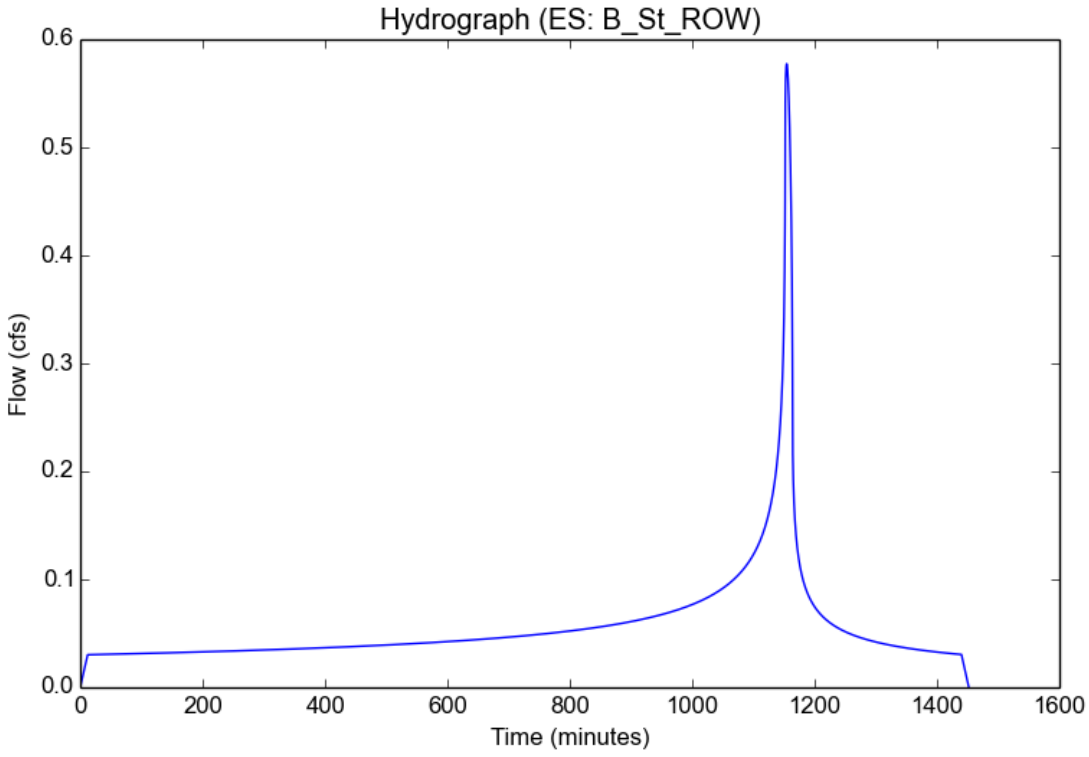
File location: C:/Users/lindsey.spencer/OneDrive - Geosyntec/Desktop/HydroCalc/ES Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	ES
Subarea ID	B_St_ROW
Area (ac)	1.684358968
Flow Path Length (ft)	250.0
Flow Path Slope (vft/hft)	0.05
85th Percentile Rainfall Depth (in)	1.1
Percent Impervious	0.795951275
Soil Type	98
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.1
Peak Intensity (in/hr)	0.4349
Undeveloped Runoff Coefficient (Cu)	0.3518
Developed Runoff Coefficient (Cd)	0.7881
Time of Concentration (min)	12.0
Clear Peak Flow Rate (cfs)	0.5773
Burned Peak Flow Rate (cfs)	0.5773
24-Hr Clear Runoff Volume (ac-ft)	0.1133
24-Hr Clear Runoff Volume (cu-ft)	4934.6194



```
[TITLE]
;;Project Title/Notes

[OPTIONS]
;;Option             Value
FLOW_UNITS           CFS
INFILTRATION         GREEN_AMPT
FLOW_ROUTING         KINWAVE
LINK_OFFSETS         DEPTH
MIN_SLOPE            0
ALLOW_PONDING        NO
SKIP_STEADY_STATE    NO

START_DATE           01/01/2017
START_TIME           00:00:00
REPORT_START_DATE    01/01/2017
REPORT_START_TIME    00:00:00
END_DATE             01/10/2017
END_TIME             06:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          00:10:00
WET_STEP             00:15:00
DRY_STEP             04:00:00
ROUTING_STEP         0:00:30
RULE_STEP            00:00:00

INERTIAL_DAMPING     PARTIAL
NORMAL_FLOW_LIMITED  BOTH
FORCE_MAIN_EQUATION  H-W
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         12.566
MAX_TRIALS           8
HEAD_TOLERANCE       0.005
SYS_FLOW_TOL         5
LAT_FLOW_TOL         5
MINIMUM_STEP         0.5
THREADS              1
```

```
[EVAPORATION]
;;Data Source    Parameters
;;-------------- ----------------
MONTHLY          0.03   0.0479 0.0719 0.102  0.132  0.156  0.168  0.15   0.114  0.0781 0.042  0.03
DRY_ONLY         NO

[JUNCTIONS]
;;Name           Elevation  MaxDepth   InitDepth  SurDepth   Aponded
;;-------------- ---------- ---------- ---------- ---------- ----------
B                0          0          0          0          0
B_Bypass         10         0          0          0          0
B_Overflow       3          900        0          0          0
B_to_River       2          0          0          0          0
C                0          0          0          0          0
C_Bypass         10         0          0          0          0
C_Overflow       3          900        0          0          0
C_to_River       2          0          0          0          0
C_Treated        0          0          0          0          0

[OUTFALLS]
;;Name           Elevation  Type       Stage Data       Gated    Route To
;;-------------- ---------- ---------- ---------------- -------- ----------------
River            0          FREE                        NO
C_Infil          0          FREE                        NO
B_Infil          0          FREE                        NO

[DIVIDERS]
;;Name           Elevation  Diverted Link    Type       Parameters
;;-------------- ---------- ---------------- ---------- ----------
WQ_B             20         15               CUTOFF     20.34      0          0          0          0
WQ_C             20         13               CUTOFF     7.70       0          0          0          0

[STORAGE]
;;Name           Elev.    MaxDepth   InitDepth  Shape      Curve Name/Params            N/A      Fevap    Psi
Ksat     IMD
;;-------------- -------- ---------- ---------- ---------- ---------------------------- -------- --------
RegFac_B         5        25         0          TABULAR    B_Storage                    0        0
RegFac_C         5        25         0          TABULAR    C_Storage                    0        0
```

```
[CONDUITS]
;;Name           From Node        To Node          Length     Roughness  InOffset   OutOffset  InitFlow   MaxFlow
;;-------------- ---------------- ---------------- ---------- ---------- ---------- ---------- ---------- --------
7                WQ_C             RegFac_C         25         0.01       0          0          0          0
8                WQ_B             RegFac_B         25         0.01       0          0          0          0
10               C_Overflow       C_Bypass         25         0.01       0          0          0          0
12               B                WQ_B             400        0.01       0          0          0          0
13               WQ_C             C_Bypass         25         0.01       0          0          0          0
14               C_Bypass         C_to_River       25         0.01       0          0          0          0
15               WQ_B             B_Bypass         25         0.01       0          0          0          0
16               C                WQ_C             400        0.01       0          0          0          0
17               B_Overflow       B_Bypass         25         0.01       0          0          0          0
29               B_Bypass         B_to_River       25         0.01       0          0          0          0
31               B_to_River       River            25         0.01       0          0          0          0
32               C_to_River       River            25         0.01       0          0          0          0
38               C_Treated        C_to_River       400        0.01       0          0          0          0

[ORIFICES]
;;Name           From Node        To Node          Type         Offset     Qcoeff     Gated    CloseTime
;;-------------- ---------------- ---------------- ------------ ---------- ---------- -------- ----------
C_Treated        RegFac_C         C_Treated        SIDE         2.25       0.65       NO       0

[WEIRS]
;;Name           From Node        To Node          Type         CrestHt    Qcoeff     Gated    EndCon   EndCoeff
Surcharge  RoadWidth  RoadSurf   Coeff. Curve
;;-------------- ---------------- ---------------- ------------ ---------- ---------- -------- -------- ----------
B_Overflow       RegFac_B         B_Overflow       TRANSVERSE   6.1        3.33       NO       0        0      YES
C_Overflow       RegFac_C         C_Overflow       TRANSVERSE   7.75       3.33       NO       0        0      YES

[OUTLETS]
;;Name           From Node        To Node          Offset     Type               QTable/Qcoeff    Qexpon     Gated
;;-------------- ---------------- ---------------- ---------- ---------------- ---------------- ---------- --------
B_Infil          RegFac_B         B_Infil          0          TABULAR/DEPTH    B_Infil                     NO
C_Infil          RegFac_C         C_Infil          0          TABULAR/DEPTH    C_Infil                     NO

[XSECTIONS]
;;Link           Shape        Geom1            Geom2      Geom3      Geom4      Barrels    Culvert
;;-------------- ------------ ---------------- ---------- ---------- ---------- ---------- ----------
7                DUMMY        0                0          0          0          1
8                DUMMY        0                0          0          0          1
10               DUMMY        0                0          0          0          1
12               DUMMY        0                0          0          0          1
```

Design total depths of Regional Facilities B and C

```
13              DUMMY        0               0          0          0          1
14              DUMMY        0               0          0          0          1
15              DUMMY        0               0          0          0          1
16              DUMMY        0               0          0          0          1
17              DUMMY        0               0          0          0          1
29              DUMMY        0               0          0          0          1
31              DUMMY        0               0          0          0          1
32              DUMMY        0               0          0          0          1
38              DUMMY        0               0          0          0          1
C_Treated       CIRCULAR     0.33            0          0          0
B_Overflow      RECT_OPEN    100             12         0          0
C_Overflow      RECT_OPEN    100             12         0          0

[INFLOWS]
;;Node           Constituent      Time Series      Type     Mfactor  Sfactor  Baseline Pattern
;;-------------- ---------------- ---------------- -------- -------- -------- -------- --------
B               FLOW             B_Series         FLOW     1.0      1
C               FLOW             C_Series         FLOW     1.0      1.5


[CURVES]
;;Name           Type       X-Value    Y-Value
;;-------------- ---------- ---------- ----------
B_Infil         Rating     0          1.80
B_Infil                    1          1.94
B_Infil                    2          2.08
B_Infil                    3          2.23
B_Infil                    4          2.38
B_Infil                    5          2.54
B_Infil                    6          2.72
B_Infil                    6.5        2.82
B_Infil                    7          2.92
;
C_Infil         Rating     0          0.0
C_Infil                    2.75       0.0
C_Infil                    2.76       0.0
C_Infil                    4.75       0.0
C_Infil                    4.76       0.0
C_Infil                    5.75       0.0
C_Infil                    6.75       0.0
C_Infil                    7.75       0.0
;
```

```
B_Storage        Storage    0          25987
B_Storage                   1          27945
B_Storage                   2          29973
B_Storage                   3          32063
B_Storage                   4          34209
B_Storage                   5          36619
B_Storage                   6          39156
B_Storage                   7          42006
B_Storage                   8          45127
B_Storage                   9          48619
;
C_Storage        Storage    0          2494
C_Storage                   2.75       2494
C_Storage                   2.76       1559
C_Storage                   4.75       1559
C_Storage                   4.76       6235
C_Storage                   5.76       7432
C_Storage                   6.76       8713
C_Storage                   7.76       10108
C_Storage                   8.76       11647
C_Storage                   9.76       13242
C_Storage                   10.76      15651
```

Storage curves: Regional Facilities B and C

```
[TIMESERIES]
;;Name            Date       Time       Value
;;--------------- ---------- ---------- ----------
[HYDROCALC OUTPUT TIMESERIES - BASIN B]
[HYDROCALC OUTPUT TIMESERIES - BASIN C]

[REPORT]
;;Reporting Options
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]

[MAP]
DIMENSIONS -130.293 4579.247 12395.702 13681.120
Units      None
```

```
[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
B                6239.557           7833.385
B_Bypass         7712.688           11286.647
B_Overflow       7840.795           10873.859
B_to_River       9534.651           12610.417
C                9950.246           9154.468
C_Bypass         10815.719          11984.118
C_Overflow       10232.121          11457.456
C_to_River       10602.207          12695.822
C_Treated        9961.673           11941.415
River            10532.017          13225.220
C_Infil          8736.015           9688.730
B_Infil          8056.046           9552.736
WQ_B             6705.821           8678.490
WQ_C             9979.387           9659.588
RegFac_B         8104.615           10067.570
RegFac_C         8833.154           10271.560

[VERTICES]
;;Link           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
```

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)
--------------------------------------------------------------


***********************************************************
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
***********************************************************

****************
Analysis Options
****************
Flow Units ............... CFS
Process Models:
  Rainfall/Runoff ........ NO
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Flow Routing Method ...... KINWAVE
Starting Date ............ 01/01/2017 00:00:00
Ending Date .............. 01/10/2017 06:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:10:00
Routing Time Step ........ 30.00 sec


*************************        Volume        Volume
Flow Routing Continuity        acre-feet      10^6 gal
*************************     ---------     ---------
Dry Weather Inflow .......         0.000         0.000
Wet Weather Inflow .......         0.000         0.000
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........         5.334         1.738
External Outflow .........         5.182         1.688
Flooding Loss ............         0.000         0.000
Evaporation Loss .........         0.000         0.000
Exfiltration Loss ........         0.000         0.000
Initial Stored Volume ....         0.000         0.000
Final Stored Volume ......         0.129         0.042
```

Continuity Error (%) 0.441

****
Highest Flow Instability Indexes
****
Link B_Infil (-3)

****
Routing Time Step Summary
****
Minimum Time Step : 30.00 sec
Average Time Step : 30.00 sec
Maximum Time Step : 30.00 sec
Percent in Steady State : 0.00
Average Iterations per Step : 1.00
Percent Not Converging : 0.00

****
Node Depth Summary
****

Node	Type	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min	Reported Max Depth Feet
B	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
B_Bypass	JUNCTION	0.00	0.00	10.00	0 00:00	0.00
B_Overflow	JUNCTION	0.00	0.00	3.00	0 00:00	0.00
B_to_River	JUNCTION	0.00	0.00	2.00	0 00:00	0.00
C	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
C_Bypass	JUNCTION	0.00	0.00	10.00	0 00:00	0.00
C_Overflow	JUNCTION	0.00	0.00	3.00	0 00:00	0.00
C_to_River	JUNCTION	0.00	0.00	2.00	0 00:00	0.00
C_Treated	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
River	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
C_Infil	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
B_Infil	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
WQ_B	DIVIDER	0.00	0.00	20.00	0 00:00	0.00
WQ_C	DIVIDER	0.00	0.00	20.00	0 00:00	0.00
RegFac_B	STORAGE	0.05	1.52	6.52	0 20:28	1.52
RegFac_C	STORAGE	2.50	6.63	11.63	0 20:04	6.63

The maximum depths in Regional Facilities B and C during the storm event are lower than the design total depths of:

- B: 6.1 feet (basin bottom at 0 feet)
- C: 7.75 feet (media surface at 4.75 feet)

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent	
B	JUNCTION	20.31	20.31	0 19:15	1.27	1.27	0.000	
B_Bypass	JUNCTION	0.00	0.00	0 00:00	0	0	0.000	gal
B_Overflow	JUNCTION	0.00	0.00	0 00:00	0	0	0.000	gal
B_to_River	JUNCTION	0.00	0.00	0 00:00	0	0	0.000	gal
C	JUNCTION	7.70	7.70	0 19:15	0.473	0.473	0.000	
C_Bypass	JUNCTION	0.00	0.00	0 19:15	0	7.47e-07	0.000	gal
C_Overflow	JUNCTION	0.00	0.00	0 00:00	0	0	0.000	gal
C_to_River	JUNCTION	0.00	0.92	0 20:04	0	0.431	0.000	
C_Treated	JUNCTION	0.00	0.92	0 20:04	0	0.431	0.000	
River	OUTFALL	0.00	0.92	0 20:04	0	0.431	0.000	
C_Infil	OUTFALL	0.00	0.00	0 00:00	0	0	0.000	
B_Infil	OUTFALL	0.00	2.01	0 20:28	0	1.26	0.000	
WQ_B	DIVIDER	0.00	20.31	0 19:15	0	1.27	0.000	
WQ_C	DIVIDER	0.00	7.70	0 19:15	0	0.473	0.000	
RegFac_B	STORAGE	0.00	20.31	0 19:15	0	1.27	0.611	
RegFac_C	STORAGE	0.00	7.70	0 19:15	0	0.473	-0.003	

****
Node Flooding Summary
****

No nodes were flooded.

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 ft3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 ft3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS

RegFac_B	1.359	0.1	0	0	41.829	2.7	0	20:28	2.01
RegFac_C	6.316	1.2	0	0	23.805	4.4	0	20:04	0.92

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10^6 gal
River	16.85	0.43	0.92	0.431
C_Infil	0.00	0.00	0.00	0.000
B_Infil	11.74	1.79	2.01	1.258
System	9.53	2.22	2.93	1.688

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CFS	Time of Max Occurrence days	hr:min	Maximum |Veloc| ft/sec	Max/ Full Flow	Max/ Full Depth
7	DUMMY	7.70	0	19:15			
8	DUMMY	20.31	0	19:15			
10	DUMMY	0.00	0	00:00			
12	DUMMY	20.31	0	19:15			
13	DUMMY	0.00	0	19:15			
14	DUMMY	0.00	0	19:15			
15	DUMMY	0.00	0	00:00			
16	DUMMY	7.70	0	19:15			
17	DUMMY	0.00	0	00:00			
29	DUMMY	0.00	0	00:00			
31	DUMMY	0.00	0	00:00			
32	DUMMY	0.92	0	20:04			
38	DUMMY	0.92	0	20:04			
C_Treated	ORIFICE	0.92	0	20:04			0.00
B_Overflow	WEIR	0.00	0	00:00			0.00

C_Overflow	WEIR	0.00	0	00:00	0.00
B_Infil	DUMMY	2.01	0	20:28	
C_Infil	DUMMY	0.00	0	00:00	

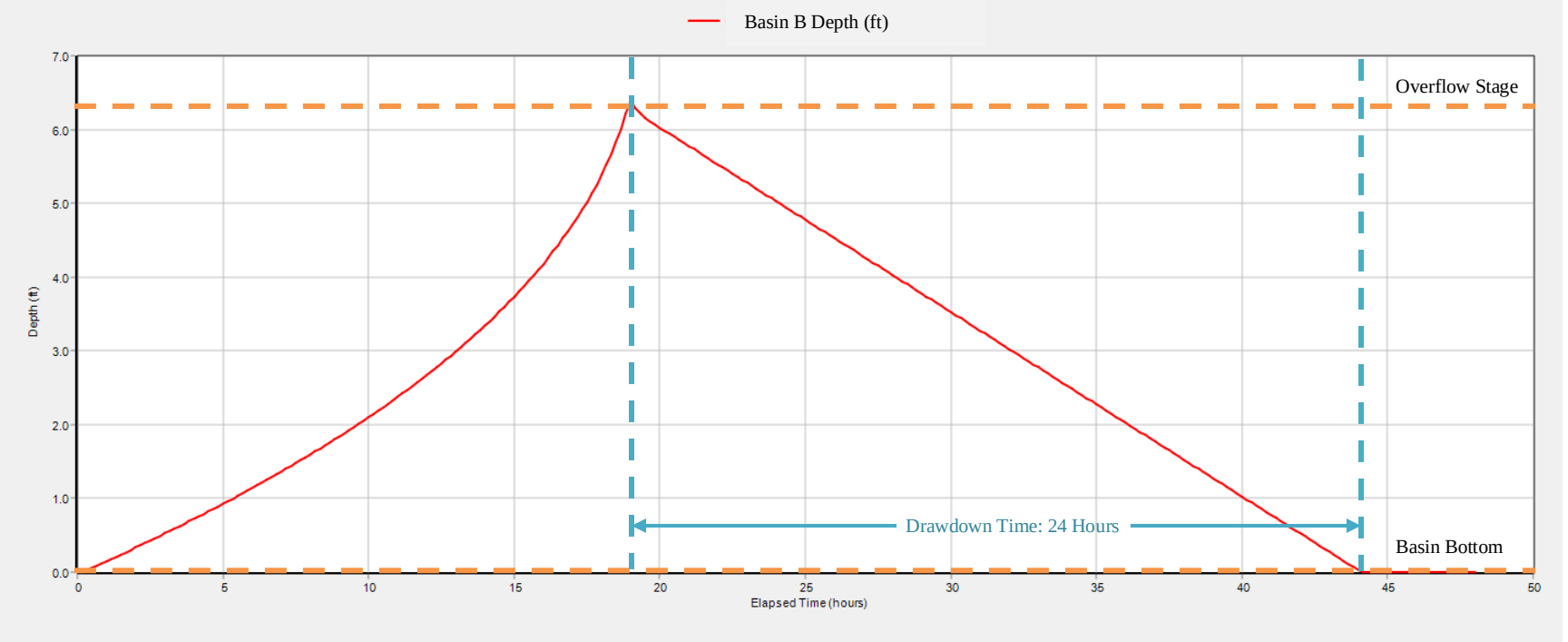
****
Conduit Surcharge Summary
****

No conduits were surcharged.

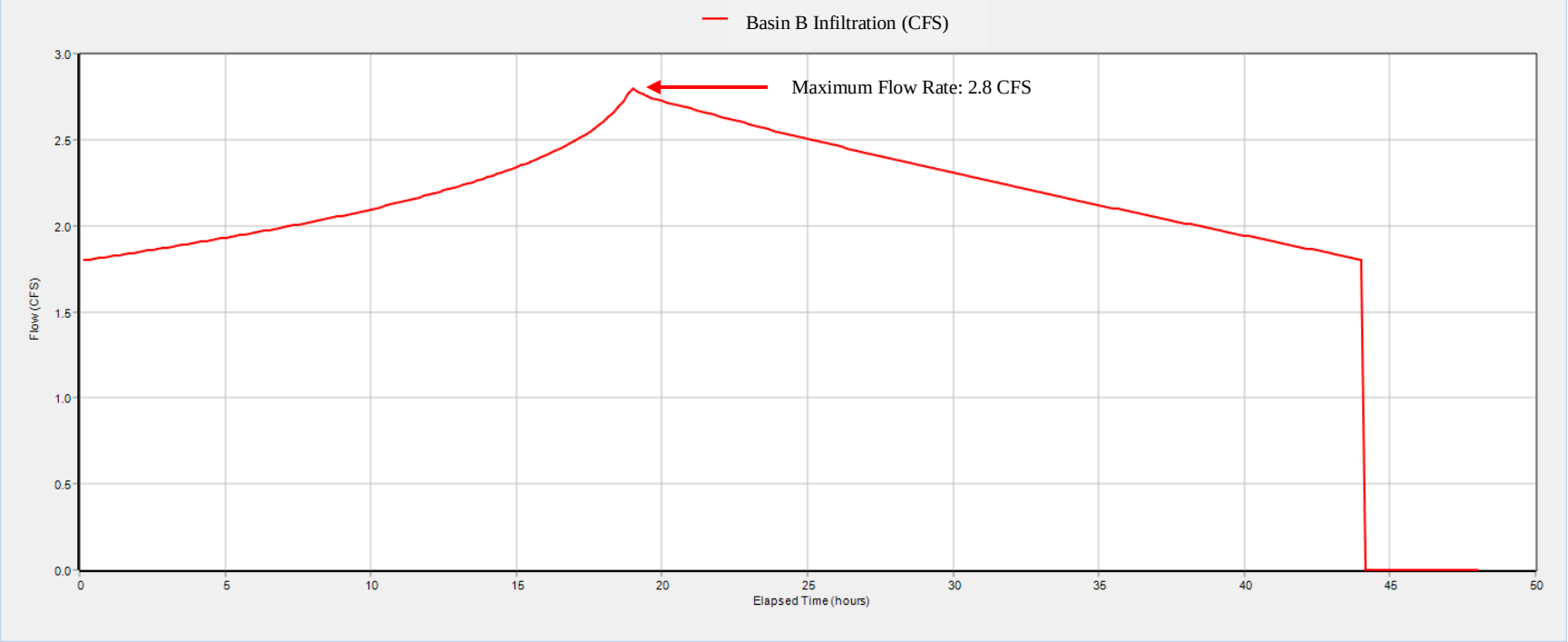
Analysis begun on: Fri Nov 1 11:11:59 2024
Analysis ended on: Fri Nov 1 11:12:00 2024
Total elapsed time: 00:00:01

Basin B

Storage Unit Depth:

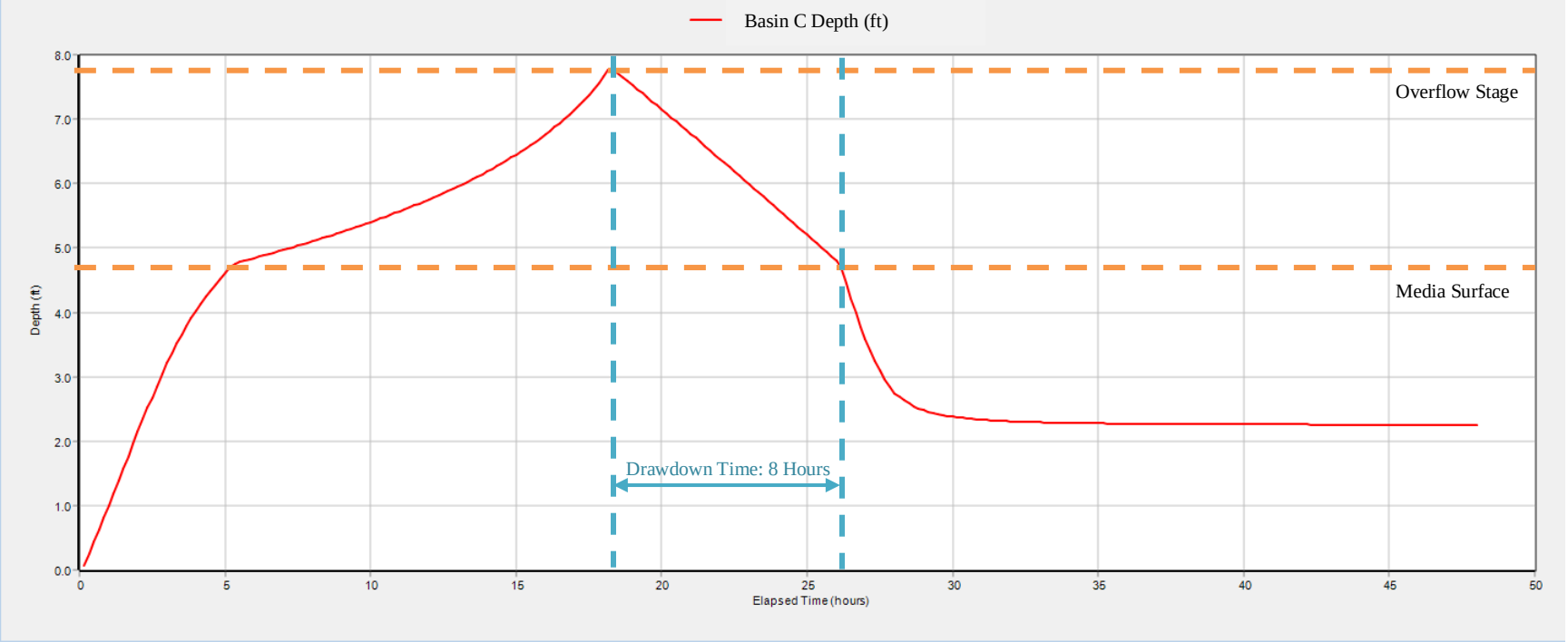


Infiltration Flow:

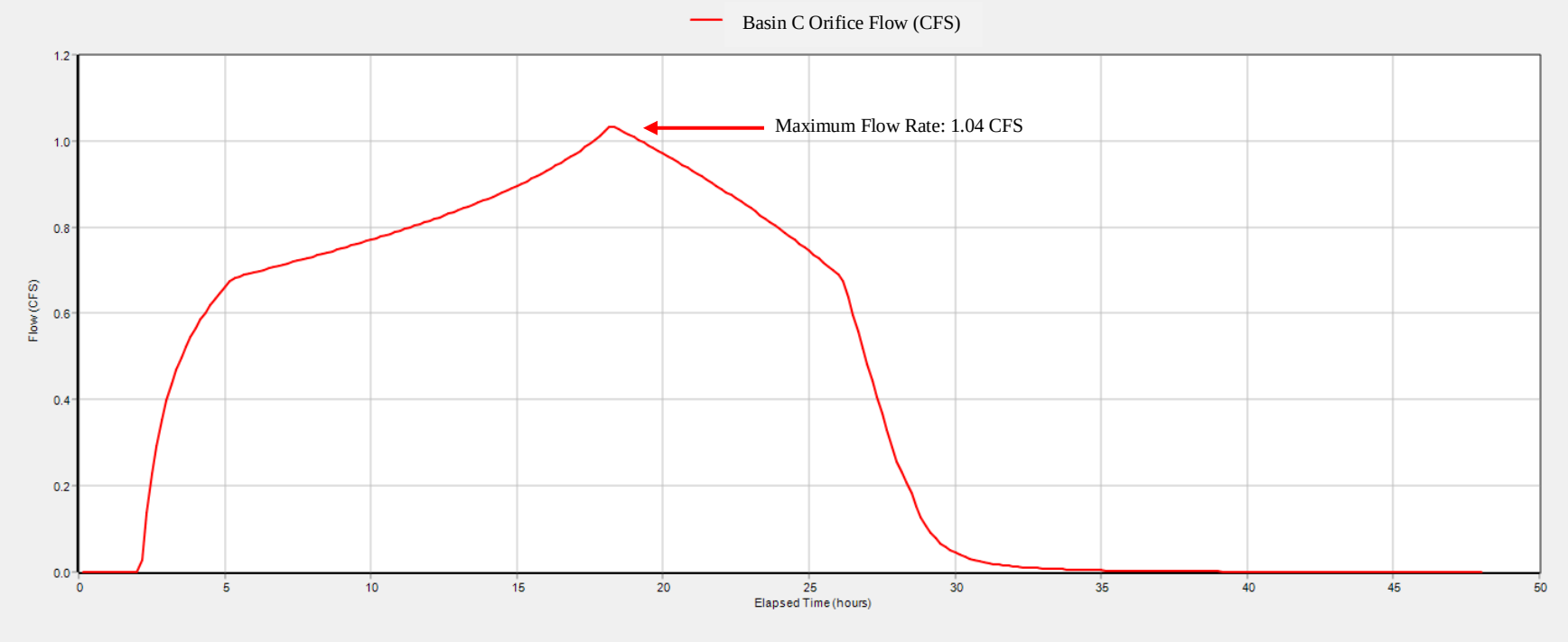


Basin B Infiltration:
2.8 CFS * 3600 seconds/hour = 10,080 cubic feet per hour
10,080 cubic feet per hour / 39,158 square feet basin bottom footprint = 0.25 feet per hour infiltration
0.25 feet/hr * 12 inches/foot = 3 inches per hour

Basin C
Storage Unit Depth:



Treated Flow:



Basin C Media Filtration:
1.04 CFS * 3600 seconds/hour = 3,744 cubic feet per hour
3,744 cubic feet per hour / 6,235 square feet media surface footprint = 0.6 feet per hour filtration
0.6 feet/hr * 12 inches/foot = 7.2 inches per hour

```
[TITLE]
;;Project Title/Notes

[OPTIONS]
;;Option             Value
FLOW_UNITS           CFS
INFILTRATION         GREEN_AMPT
FLOW_ROUTING         KINWAVE
LINK_OFFSETS         DEPTH
MIN_SLOPE            0
ALLOW_PONDING        NO
SKIP_STEADY_STATE    NO

START_DATE           01/01/2017
START_TIME           00:00:00
REPORT_START_DATE    01/01/2017
REPORT_START_TIME    00:00:00
END_DATE             01/05/2017
END_TIME             06:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          00:10:00
WET_STEP             00:15:00
DRY_STEP             04:00:00
ROUTING_STEP         0:00:30
RULE_STEP            00:00:00

INERTIAL_DAMPING     PARTIAL
NORMAL_FLOW_LIMITED  BOTH
FORCE_MAIN_EQUATION  H-W
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         12.566
MAX_TRIALS           8
HEAD_TOLERANCE       0.005
SYS_FLOW_TOL         5
LAT_FLOW_TOL         5
MINIMUM_STEP         0.5
THREADS              1

[EVAPORATION]
;;Data Source    Parameters
```

```
;;-------------- ----------------
MONTHLY          0.03   0.0479 0.0719 0.102  0.132  0.156  0.168  0.15   0.114  0.0781 0.042  0.03
DRY_ONLY         NO

[JUNCTIONS]
;;Name           Elevation  MaxDepth   InitDepth  SurDepth   Aponded
;;-------------- ---------- ---------- ---------- ---------- ----------
D_Overflow       3          900        0          0          0
D_to_River       2          0          0          0          0
D_Treated        3          900        0          0          0
D1_Bypass        10         0          0          0          0
ES_Bypass        10         0          0          0          0
MV_Bypass        10         0          0          0          0
WQ_D_D1          25         0          0          0          0
WQ_D_ES          25         0          0          0          0
WQ_D_MV          25         0          0          0          0

[OUTFALLS]
;;Name           Elevation  Type       Stage Data       Gated    Route To
;;-------------- ---------- ---------- ---------------- -------- ----------------
River            0          FREE                        NO

[DIVIDERS]
;;Name           Elevation  Diverted Link    Type       Parameters
;;-------------- ---------- ---------------- ---------- ----------
D1_Div           20         19               CUTOFF     16.8       0          0          0          0
ES_Div           20         ES_Bypass        CUTOFF     36.75      0          0          0          0
MV_Div           20         1                CUTOFF     40.6       0          0          0          0

[STORAGE]
;;Name           Elev.    MaxDepth   InitDepth  Shape      Curve Name/Params            N/A      Fevap    Psi
Ksat     IMD
;;-------------- -------- ---------- ---------- ---------- ---------------------------- -------- --------
RegFacD          5        25         0          TABULAR    D_Storage                    0        0

[CONDUITS]
;;Name           From Node        To Node          Length     Roughness  InOffset   OutOffset  InitFlow   MaxFlow
;;-------------- ---------------- ---------------- ---------- ---------- ---------- ---------- ---------- --------
--
3                D_Overflow       D_to_River       25         0.01       0          0          0          0
4                D_Treated        D_to_River       25         0.01       0          0          0          0
ES_Direct_to_D   ES_Div           RegFacD          25         0.01       0          0          0          0
D1_Direct_to_D   D1_Div           RegFacD          25         0.01       0          0          0          0
```

```
19              D1_Div          D1_Bypass       25          0.01        0           0           0           0
20              D1_Bypass       River           25          0.01        0           0           0           0
22              D_to_River      River           25          0.01        0           0           0           0
ES_Bypass       ES_Div          ES_Bypass       25          0.01        0           0           0           0
24              MV_Bypass       River           25          0.01        0           0           0           0
1               MV_Div          MV_Bypass       25          0.01        0           0           0           0
MV_Direct_to_D  MV_Div          RegFacD         25          0.01        0           0           0           0
2               ES_Bypass       River           25          0.01        0           0           0           0
5               WQ_D_D1         D1_Div          25          0.01        0           0           0           0
6               WQ_D_MV         MV_Div          25          0.01        0           0           0           0
7               WQ_D_ES         ES_Div          25          0.01        0           0           0           0

[ORIFICES]
;;Name           From Node       To Node         Type         Offset     Qcoeff     Gated    CloseTime
;;-------------- --------------- --------------- ------------ ---------- ---------- -------- -------
D_Treated       RegFacD         D_Treated       SIDE         0          0.61       NO       0

[WEIRS]
;;Name           From Node       To Node         Type         CrestHt    Qcoeff     Gated    EndCon   EndCoeff
Surcharge  RoadWidth  RoadSurf   Coeff. Curve
;;-------------- --------------- --------------- ------------ ---------- ---------- -------- -------- ----------
D_Overflow      RegFacD         D_Overflow      TRANSVERSE   9.75       3.33       NO       0        0          YES

[XSECTIONS]
;;Link           Shape        Geom1           Geom2      Geom3      Geom4      Barrels    Culvert
;;-------------- ------------ --------------- ---------- ---------- ---------- ---------- ----------
3               DUMMY        0               0          0          0          1
4               DUMMY        0               0          0          0          1
ES_Direct_to_D  DUMMY        0               0          0          0          1
D1_Direct_to_D  DUMMY        0               0          0          0          1
19              DUMMY        0               0          0          0          1
20              DUMMY        0               0          0          0          1
22              DUMMY        0               0          0          0          1
ES_Bypass       DUMMY        0               0          0          0          1
24              DUMMY        0               0          0          0          1
1               DUMMY        0               0          0          0          1
MV_Direct_to_D  DUMMY        0               0          0          0          1
2               DUMMY        0               0          0          0          1
5               DUMMY        0               0          0          0          1
6               DUMMY        0               0          0          0          1
7               DUMMY        0               0          0          0          1
D_Treated       CIRCULAR     1.25            0          0          0
D_Overflow      RECT_OPEN    100             12         0          0
```

Design total depth of MV Regional Facility D

```
[INFLOWS]
;;Node           Constituent      Time Series      Type     Mfactor  Sfactor  Baseline Pattern
;;-------------- ---------------- ---------------- -------- -------- -------- -------- --------
WQ_D_D1          FLOW             D1_Series        FLOW     1.0      1.5
WQ_D_ES          FLOW             ES_Series        FLOW     1.0      1.5
WQ_D_MV          FLOW             MV_Series        FLOW     1.0      1.5

[CURVES]
;;Name           Type       X-Value     Y-Value
;;-------------- ---------- ----------- -----------
D_Storage        Storage    0           53248
D_Storage                   2.5         53248
D_Storage                   2.75        53248
D_Storage                   2.76        33280
D_Storage                   4.75        33280
D_Storage                   4.76        133120
D_Storage                   5.75        137986
D_Storage                   6.75        142949
D_Storage                   7.75        147953
D_Storage                   8.75        153029
D_Storage                   9.75        158264
D_Storage                   10.75       163389

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
[HYDROCALC OUTPUT TIMESERIES - BASIN D-D1]
[HYDROCALC OUTPUT TIMESERIES - BASIN D-ES]
[HYDROCALC OUTPUT TIMESERIES - BASIN D-MV]

[REPORT]
;;Reporting Options
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]

[MAP]
DIMENSIONS 0.000 0.000 10000.000 10000.000
Units      None
```

Storage curve: MV Regional Facility D

```
[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
D_Overflow       677.695            3991.462
D_to_River       -1318.036          2700.107
D_Treated        -304.162           4493.063
D1_Bypass        1339.381           3372.465
ES_Bypass        2449.306           3148.346
MV_Bypass        -1147.279          4717.182
WQ_D_D1          2033.084           4322.305
WQ_D_ES          4767.442           4959.302
WQ_D_MV          805.763            7022.412
River            -2203.842          1824.973
D1_Div           1787.620           4738.527
ES_Div           3281.750           4663.821
MV_Div           464.248            6371.398
RegFacD          1275.347           5699.039

[VERTICES]
;;Link           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
```

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)
--------------------------------------------------------------


***********************************************************
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
***********************************************************

****************
Analysis Options
****************
Flow Units ............... CFS
Process Models:
  Rainfall/Runoff ........ NO
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Flow Routing Method ...... KINWAVE
Starting Date ............ 01/01/2017 00:00:00
Ending Date .............. 01/05/2017 06:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:10:00
Routing Time Step ........ 30.00 sec


*************************        Volume         Volume
Flow Routing Continuity        acre-feet      10^6 gal
*************************     ---------      ---------
Dry Weather Inflow .......         0.000          0.000
Wet Weather Inflow .......         0.000          0.000
Groundwater Inflow .......         0.000          0.000
RDII Inflow ..............         0.000          0.000
External Inflow ..........        26.670          8.691
External Outflow .........        26.654          8.686
Flooding Loss ............         0.000          0.000
Evaporation Loss .........         0.000          0.000
Exfiltration Loss ........         0.000          0.000
Initial Stored Volume ....         0.000          0.000
```

```
Final Stored Volume ......          0.016          0.005
Continuity Error (%) .....         -0.001
```

```
*******************************
Highest Flow Instability Indexes
*******************************
All links are stable.
```

```
*************************
Routing Time Step Summary
*************************
Minimum Time Step           :    30.00 sec
Average Time Step           :    30.00 sec
Maximum Time Step           :    30.00 sec
Percent in Steady State     :     0.00
Average Iterations per Step :     1.00
Percent Not Converging      :     0.00
```

```
******************
Node Depth Summary
******************
```

Node	Type	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min	Reported Max Depth Feet
D_Overflow	JUNCTION	0.00	0.00	3.00	0 00:00	0.00
D_to_River	JUNCTION	0.00	0.00	2.00	0 00:00	0.00
D_Treated	JUNCTION	0.00	0.00	3.00	0 00:00	0.00
D1_Bypass	JUNCTION	0.00	0.00	10.00	0 00:00	0.00
ES_Bypass	JUNCTION	0.00	0.00	10.00	0 00:00	0.00
MV_Bypass	JUNCTION	0.00	0.00	10.00	0 00:00	0.00
WQ_D_D1	JUNCTION	0.00	0.00	25.00	0 00:00	0.00
WQ_D_ES	JUNCTION	0.00	0.00	25.00	0 00:00	0.00
WQ_D_MV	JUNCTION	0.00	0.00	25.00	0 00:00	0.00
River	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
D1_Div	DIVIDER	0.00	0.00	20.00	0 00:00	0.00
ES_Div	DIVIDER	0.00	0.00	20.00	0 00:00	0.00
MV_Div	DIVIDER	0.00	0.00	20.00	0 00:00	0.00
RegFacD	STORAGE	1.18	6.54	11.54	0 20:29	6.54

The maximum depth in Regional Facility D during the storm event is lower than the design total depth of 9.75 feet (media surface at 4.75 ft).

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent	
D_Overflow	JUNCTION	0.00	0.00	0 00:00	0	0	0.000	gal
D_to_River	JUNCTION	0.00	14.61	0 20:29	0	8.69	0.000	
D_Treated	JUNCTION	0.00	14.61	0 20:29	0	8.69	0.000	
D1_Bypass	JUNCTION	0.00	0.04	0 19:21	0	6.14e-05	0.000	
ES_Bypass	JUNCTION	0.00	0.00	0 00:00	0	0	0.000	gal
MV_Bypass	JUNCTION	0.00	0.00	0 00:00	0	0	0.000	gal
WQ_D_D1	JUNCTION	16.84	16.84	0 19:21	2.09	2.09	0.000	
WQ_D_ES	JUNCTION	40.34	40.34	0 19:16	3.27	3.27	0.000	
WQ_D_MV	JUNCTION	40.58	40.58	0 19:16	3.33	3.33	0.000	
River	OUTFALL	0.00	14.61	0 20:29	0	8.69	0.000	
D1_Div	DIVIDER	0.00	16.84	0 19:21	0	2.09	0.000	
ES_Div	DIVIDER	0.00	40.34	0 19:16	0	3.27	0.000	
MV_Div	DIVIDER	0.00	40.58	0 19:16	0	3.33	0.000	
RegFacD	STORAGE	0.00	97.56	0 19:16	0	8.69	-0.001	

****
Node Flooding Summary
****

No nodes were flooded.

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 ft3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 ft3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
RegFacD	66.799	2	0	0	459.206	12	0 20:28	14.61

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10^6 gal
River	99.91	3.16	14.61	8.685
System	99.91	3.16	14.61	8.685

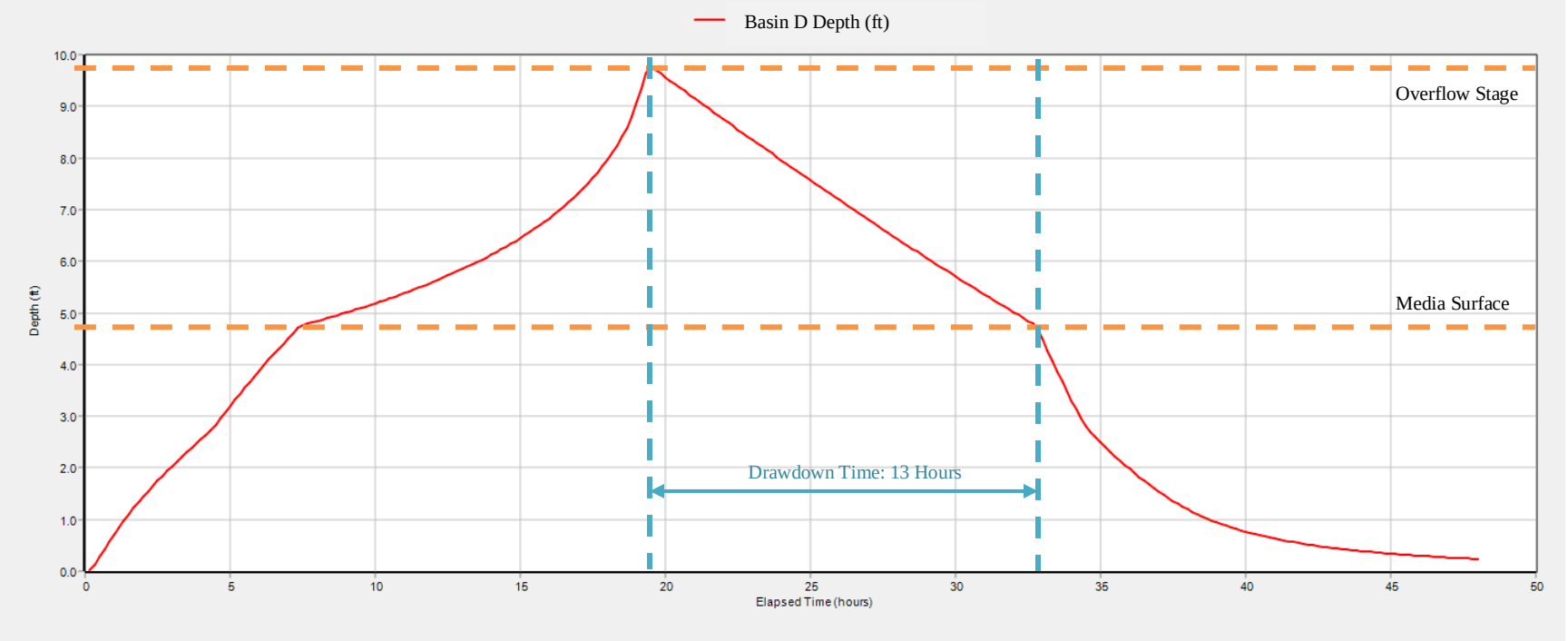
****
Link Flow Summary
****

Link	Type	Maximum |Flow| CFS	Time of Max Occurrence days hr:min	Maximum |Veloc| ft/sec	Max/ Full Flow	Max/ Full Depth
3	DUMMY	0.00	0 00:00			
4	DUMMY	14.61	0 20:29			
ES_Direct_to_D	DUMMY	40.34	0 19:16			
D1_Direct_to_D	DUMMY	16.80	0 19:19			
19	DUMMY	0.04	0 19:21			
20	DUMMY	0.04	0 19:21			
22	DUMMY	14.61	0 20:29			
ES_Bypass	DUMMY	0.00	0 00:00			
24	DUMMY	0.00	0 00:00			
1	DUMMY	0.00	0 00:00			
MV_Direct_to_D	DUMMY	40.58	0 19:16			
2	DUMMY	0.00	0 00:00			
5	DUMMY	16.84	0 19:21			
6	DUMMY	40.58	0 19:16			
7	DUMMY	40.34	0 19:16			
D_Treated	ORIFICE	14.61	0 20:29			0.00
D_Overflow	WEIR	0.00	0 00:00			0.00

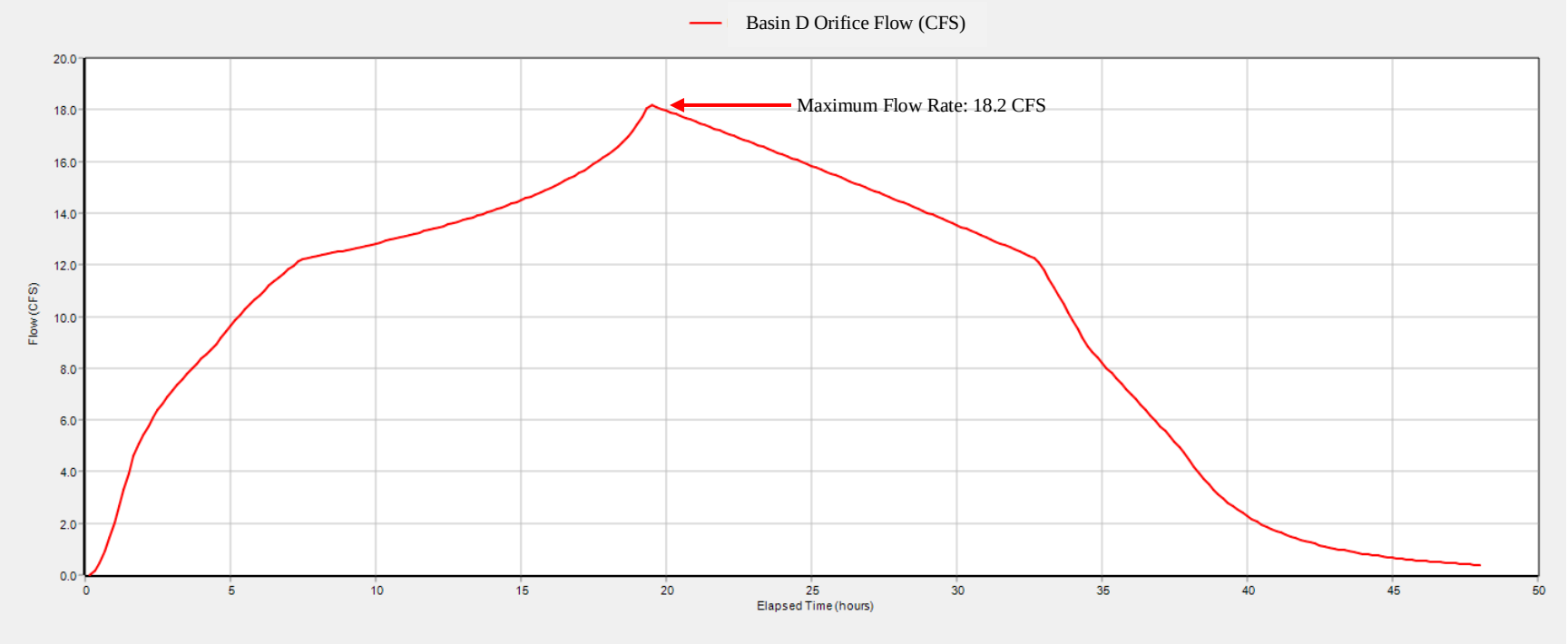
****
Conduit Surcharge Summary

```
************************

No conduits were surcharged.


Analysis begun on:  Mon Dec 12 09:25:19 2022
Analysis ended on:  Mon Dec 12 09:25:19 2022
Total elapsed time: < 1 sec
```

Basin D
Storage Unit Depth:



Treated Flow:



Basin D Media Filtration:
18.2 CFS * 3600 seconds/hour = 65,520 cubic feet per hour
65,520 cubic feet per hour / 133,120 square feet media surface footprint = 0.49 feet per hour filtration
0.49 feet/hr * 12 inches/foot = 5.9 inches per hour

ENTRADA SOUTH DRAINAGE CHANNEL ANALYSIS

Volume IV

County of Los Angeles

Prepared for:

Newhall Land and Farming
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Prepared by:

PACE ADVANCED WATER ENGINEERING

DATED:
02/13/2025

HYDROLOGY STUDY APPROVED

REVIEWED BY:_____ DATE 03/12/2025

APPROVED BY:_____ DATE 03/12/2025

COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS
LAND DEVELOPMENT DIVISION

PACE
Advanced Water Engineering

Technical Memorandum



Date: February 13, 2025

To: Jason Fukumitsu, PE; Hunsaker & Associates

Cc: Alex Herrell; Five Point-Newhall Ranch

From: Jose Cruz, PE
Cherise Thompson, EIT

Re: Entrada South Unnamed Canyon 2 – Equilibrium Slope Analysis # A373

1.0 Introduction

The purpose of this technical memorandum is to provide a summary of the hydraulic design of the Unnamed Canyon 2 drainage channel, which is part of the Entrada South development in Santa Clarita, California. In existing conditions, flow enters the channel from the neighboring Westridge golf course to the south, through an existing 36-inch storm drain pipe, as well as overland flow during larger storm events. The drainage channel is approximately 2,500 linear feet in length and flows from the south to the north. On the north end of the channel, flow enters an existing culvert at Magic Mountain Parkway before discharging to the Santa Clara River.

As part of the Entrada South development plan, the existing outlet structure at the upstream end of the channel will be partially demolished and replaced by small basin that will route flows to a bypass storm drain. From the bypass storm drain, smaller flows (average annual flows, equivalent to the 1 to 2-yr historic flow events) will be routed to the Unnamed Canyon 2 drainage channel via a low-flow diversion. The Unnamed Canyon 2 drainage channel will convey the flow to a proposed debris basin at the downstream end of the project reach (Debris Basin #7). During larger storm events, a majority of the flow entering the storm drain will bypass the low flow diversion and flow directly to the downstream debris basin. While peak flow rates in the Unnamed Canyon 2 drainage channel will be significantly reduced from existing conditions, the channel is designed to continue to convey smaller flow rates in order to sustain vegetation in the channel. Portions of the channel are under U.S. Army Corps of Engineers/California Department of Fish and Wildlife (USACE/CDFW) jurisdiction, shown on **Figure 1**. The proposed channel will be completely re-graded, and grade control structures will be installed in order to protect against lateral and vertical erosion. The channel banks will be engineered slopes that will support the adjacent access roads and trails that are proposed to be constructed parallel to the channel.

The drainage channel will be bisected by the proposed “A Street” alignment, beneath which a culvert will be installed, for flow conveyance.

2.0 Hydrology

A Modified Rational Method hydrology analysis was performed by Hunsaker and Associates (ESTU# 2022000056), which provided flow rates tributary to the Unnamed Canyon 2 drainage channel. The hydrology was performed for a 50-yr storm event; however, a majority of the runoff from the tributary watersheds is proposed to be diverted away from the Unnamed Canyon 2 channel and into a proposed storm drain. A fraction of the flow is designed to continue down the Unnamed Canyon 2 channel through a diversion in the proposed storm drain. The amount of diverted flow was determined by Dudek, the environmental consultant for the project, based on the minimum flow required to support vegetation / habitat in the channel (13 cfs). Incremental increases in flow rate occur throughout the channel reach, originating

from local sub-watersheds. The incremental increases are based on the aforementioned 50-yr hydrology; however, the increases are minor and the total cumulative flow at the downstream terminus of the channel is relatively small (37.3 cfs). The design flow rates during a 50-yr storm, shown in **Table 1**, are significantly smaller than in the pre-development condition. A local drainage map exhibit with key node locations can be found in **Enclosure 3** included with this memo. Additionally, a project-wide hydrology drainage concept map has been provided in **Enclosure 5**, which provides greater context for the Unnamed Canyon 2 channel in relation to the project at-large. It should be noted that the flow rates from the hydrology analysis are subject to change, due to ongoing and minor changes to the drainage area as the project approaches final design. During the final design phases, if there are additional changes to the hydrology, all changes will be incorporated into the analysis presented herein.

Table 1: Hydrology Data

Reach	Description of Reach	HEC-RAS Sections	Flow Rate (cfs)
Reach 1	From Node D to Node C on drainage map exhibit (see Enclosures)	STA 1447.98 to STA 2320.35	37.3
Reach 2	From Node C to Node B on drainage map exhibit (see Enclosures)	STA 2320.35 to STA 3440.63	33.6
Reach 3	From Node B to Node A on drainage map exhibit (see Enclosures)	STA 3440.63 to STA 3895.84	25.1
Inlet	Flow diverted from the proposed storm drain to the Unnamed Canyon 2 channel	U/S Conditions	13.0

The flow rates shown in **Table 1** were applied in the hydraulic models and subsequent equilibrium slope analysis discussed in this memo. Reaches were delineated based on the locations of flow changes indicated in the data provided by Hunsaker.

3.0 Preliminary Hydraulic Model Preparation

PACE prepared one-dimensional (1D) hydraulic models using HEC-RAS Version 6.2. A preliminary set of models were run using existing conditions channel invert as a base, in order to provide a realistic estimate of the Unnamed Canyon 2 drainage channel's equilibrium slope. The preliminary equilibrium slope results were used to inform the design of the proposed channel slope. The hydraulic results from the proposed conditions channel geometry were used to re-calculate the equilibrium slope in post-project conditions and verify the results produced by the preliminary analysis.

Two preliminary hydraulic models were created: one representing pre-project invert conditions with post-project flows, and one representing pre-project invert conditions where a self-forming channel has formed, also with post-project flows. It was determined that using pre-project condition flow rates would not produce useful results, since there is no future condition where the full 50-year flow is routed through the channel. Each of the HEC-RAS models developed for this analysis are described herein:

"EX – Unnamed Canyon 2" HEC-RAS Model (Plan 01) represents the channel with sides reflecting post-development grading conditions (banks only), while the invert reflects the pre-development gradient. Additionally, this plan utilizes post-project flows, which are significantly reduced from the existing condition due to the diversion at the upstream end. A composite of the 2011 topographic data and the proposed grading plan was used to cut the sections of this plan. This plan was used to predict what slope the channel would stabilize at (i.e. reach equilibrium). Equilibrium slope calculations were performed using the results of this model; however, it was noted that the flow depths in the existing geometry cross-sections were extremely shallow. In many documented cases, flow that is spread out over a wide area and a shallow depth will carve out a low-flow path where the water travels in a more concentrated and energy-efficient manner toward its downstream destination. For this reason, another model was created, using existing geometry, where a self-forming channel has formed.

"EX – Unnamed Canyon 2 – Self-Form" HEC-RAS Model (Plan 02) is the same geometric configuration as Plan 01, with exception to a self-forming channel, which has formed. Equilibrium slope calculations were

also performed using the results of this model. The parameters used to create the self-forming channel in this model are described in the section titled **"***Self-Forming Channel Parameters***"** herein.

Two additional hydraulic models (Plans 03 and 04) were prepared, where the channel invert was graded to the predicted stable slope using results from Plans 01 and 02, in order to verify the channel slope would not degrade in post-project grading conditions. Plans 03 and 04 are described in the section titled "**Proposed Grading Condition Hydraulic Model**" herein.

3.0.1 Structures

No structures exist in existing conditions in the Unnamed Canyon 2 drainage channel, so none were included in the preliminary hydraulic modeling.

3.0.2 Manning's Roughness Coefficients

A uniform Manning's roughness coefficient was applied to both preliminary models, which was selected from Chow's summary of Manning's roughness values. The Unnamed Canyon 2 channel can be categorized most accurately under Chow's "Main Channels – straight, full stage, no rifts or deep pools – some stones and weeds", where "minimum" Manning's value is 0.03, "normal" is 0.035, and "maximum" is 0.040. For this analysis, the minimum Manning's value from this range was selected – 0.03.

3.0.3 Boundary Conditions

The preliminary hydraulic models were run using the mixed flow regime. Therefore, a boundary condition was required at both upstream and downstream ends. In the Existing (Plan 01) and Existing - Self-Form (Plan 02) channel conditions, normal depth was used as the boundary condition input. The pre-development natural channel continues uninterrupted at the downstream end of Reach 1, absent of any structures or basin-type features.

The slopes used for each model were identical, as they were both determined using 2011 Newhall Ranch topographic data (See **Table 2**).

Table 2: Normal Depth Boundary Conditions – Plan 01 & 02

Plan	Upstream Boundary Condition	Downstream Boundary Condition
Existing	0.009	0.023
Existing Self-Form	0.009	0.023

3.0.4 Cross-Section Spacing

The preliminary models contain 48 sections, with average spacing of 60 feet. The total length of the modeled channel is approximately 2,500 feet. Cross-sections were placed at key locations in the channel where changes to the geometry occur, such as contractions, expansions, bends, and at grade breaks in the invert. Cross sections were cut from 2011 Newhall Ranch topographic data. The geometric changes made to the self-forming channel model sections are described below.

3.0.5 Self-Forming Channel Parameters

"Channel-forming flows" or "dominant discharge flows" describe a condition where a small amount of flow carves an efficient flow path through a wide channel section (a.k.a self-forming channel). These flows are typically not associated with storm events used to evaluate flood risk (i.e. 100-yr or Capital Flood). There is some variation in research as to what exact storm event qualifies as a "channel forming flow", but generally, they fall between a recurrence interval of 1 to 10 years. "Channel-forming flows" will alter a channel until it reaches equilibrium. In existing conditions, a meandering self-forming channel has been observed within the Unnamed Canyon 2 drainage channel and it is assumed the proposed condition will be similar, considering how the channel will regularly convey flows significantly smaller than the pre-development 50-yr event.

The self-forming channel was assumed to have a rectangular shape with a width that was determined using the Dawdy Equation. The Dawdy Equation (Dawdy, 1979) is used in the FEMA approach to identifying regulatory flood hazards on an active alluvial fan. Namely, in the single channel region of the fan, the width and depth of the self-forming channel can be defined as a function of the discharge; and the flow in these channels occurs at critical depth. The width of the self-forming channel is defined as the point where the derivative of the width with respect to the depth is (-200). Given this assumption, the width of the self-forming channel is:

$$W = 9.4Q^{0.4}$$

where,

$W = \text{width of the self-forming channel (ft)}$
$Q = \text{flow (cfs)}$

The depth of the self-forming channel was determined by back-calculating the height of flow in the rectangular self-forming channel using Manning's equation. These dimensions were used to incorporate the self-forming channel into the HEC-RAS model while maintaining the channel's existing longitudinal slope.

3.0.6 Hydraulic Results

The hydraulic results summarized in **Tables 3 and 4** were used to perform the equilibrium slope analysis. The results are averaged by reach, which were defined by locations where the flow rate changes in the channel. The average excludes sections at drop structure tops, slopes, or toes, since those sections exhibit depths and velocities that don't conform with the average channel characteristics.

Table 3: HEC-RAS Results for Plan 01

Hydraulic Parameter	Reach 1	Reach 2	Reach 3
Flow Rate (cfs)	37.3	33.6	25.1
Average Channel Depth (ft)	0.6	0.4	0.7
Average Velocity (ft/s)	3.94	2.71	3.32
Average Top Width (ft)	37	76	26
Average Froude Number	1.13	1.11	1.15
Average Energy Slope (ft/ft)	0.026	0.030	0.052

Table 4: HEC-RAS Results for Plan 02

Hydraulic Parameter	Reach 1	Reach 2	Reach 3
Flow Rate (cfs)	37.3	33.6	25.1
Average Channel Depth (ft)	0.3	0.3	0.4
Average Velocity (ft/s)	3.13	3.19	2.97
Average Top Width (ft)	45	39	34
Average Froude Number	1.06	1.09	1.12
Average Energy Slope (ft/ft)	0.025	0.027	0.036

4.0 Preliminary Equilibrium Slope Analysis

In most alluvial channels, a stable channel slope is achieved when the supply of sediment and the sediment transport capacity of the channel are balanced, or in equilibrium. For Unnamed Canyon 2, the sediment supply has been significantly reduced over time, due to the development of the areas upstream of the project. As a result, the natural channel has experienced considerable erosion and has transformed from a braided stream with multiple threaded channels to a severely incised and widened channel (Geosyntec, 2013).

The equilibrium slope was calculated using a variety of methods including (1) the Incipient Motion Equation from HEC-20 (**Eqn. 6.17**) (2) the Meyer-Peter Muller Equation from HEC-20 (**Eqn. 6.18**), and (3) methodology outlined in the Albuquerque Metropolitan Arroyo Flood Control Agency (AMAFCA) Sediment and Erosion Design Guide.

4.0.1 Sediment Data

PACE used sediment data obtained from the particle size distribution test report prepared by ENGEO in 2021. Two sample points were taken in the streambed and were filtered out to only include particles 3" in diameter or smaller. This prevented larger, superficial grain sizes from skewing the data. Per ENGEO's observation, it is normal for the sediment in alluvial channels to vary in size over a very short distance and to have over-bank deposits consisting of fine-grained silts and clays. The particle size distribution data from the two sample points were averaged and used for the equilibrium slope calculations of the entire channel.

4.0.2 HEC-20 Incipient Motion Equation

Methodology outlined in Hydraulic Engineering Circular No. 20 (HEC-20) was used to estimate the equilibrium slope of the drainage channel at Unnamed Canyon 2. For clear-water releases of flow from dams, detention ponds, or other retention structures, there is no sediment supply delivered to the channel from upstream reaches. Such is the case with the Unnamed Canyon 2 channel, which is preceded by Debris Basin #5. In this case, the channel would be expected to degrade until the reduction in slope results in a boundary shear stress too low to entrain the bed material. In a sand bed channel, such as Unnamed Canyon 2, the channel slope would have to be extremely low to reach incipient motion conditions and the amount of degradation could be significant. Depending on the bed and bank materials, the degrading channel can narrow as it deepens or the banks can become unstable and the channel can widen. Channel widening temporarily replenishes sediment supply. **Equation 6.17** from HEC-20 assumes the channel width remains constant for future conditions.

Equation 6.17 combines the Incipient Motion Relationship (Equation 6.13) and Manning's Equation (Equation 3.3) to calculate the equilibrium slope where bed material movement ceases.

> *The Incipient Motion Relationship* describes the condition where the hydraulic forces acting on a sediment particle are equal to the forces resisting motion. The particle is at a critical condition where a slight increase in the hydraulic forces will cause the particle to move. The hydraulic forces consist of lift and drag and are usually represented in a simplified form by the shear stress of the flow acting on the particle. Incipient motion conditions can be analyzed using the Shields diagram. The Incipient Motion Relationship can be used to calculate a sediment particle size that will move for a particular hydraulic condition or to calculate the shear stress required to move a particular particle size. The average shear stress acting on the channel includes all the factors contributing to resistance of flow.
>
> *The Manning's Equation* recognizes that flow rate is a function of gravitational forces on water in a sloping channel and the resistance produced by friction between the water and wetted surface of the channel. Manning's Equation can be used to determine the velocity and discharge of flow under steady, uniform conditions in open channels.

The Incipient Motion Relationship and Manning's equation are combined to produce the following equation:

$$S_{eq} = \left[K_s D_c \left(\frac{\gamma_s - \gamma}{\gamma}\right)\right]^{10/7} \left(\frac{1.486}{q \times n}\right)^{6/7} \qquad \textbf{Equation 6.17}$$

where,

S_{eq} = Equilibrium slope (ft/ft)
K_s = Shields Parameter (assumed to be 0.047)
D_c = Critical bed material size = D_{90} (ft)
γ_s = Specific weight of sediment (165.4 lb/ft^3)
γ = Specific weight of water (62.4 lb/ft^3)
q = Discharge per unit width (ft^2/s)
n = Manning's roughness coefficient

The critical size (D_C) used in this equation should be D_{90} because the bed will coarsen as degradation occurs.

The Shield's Parameter can range from 0.03 to 0.10 for natural sediments based on particle shape, angularity, gradation, and imbrication. The use of 0.047 for sand sizes provides reasonable results (Meyer-Peter and Muller 1948, Gessler 1971), while lower values (0.03) are commonly used for gravel and cobble sizes. The sediment observed in Unnamed Canyon 2 is sandy; therefore, the Shield's Parameter was assumed to be 0.047.

4.0.3 HEC-20 Meyer-Peter Muller Equation

Another approach described in HEC-20 is also used for determining the equilibrium slope of a channel with no upstream sediment supply. Equation 6.18 is presented by the USBR using the Meyer-Peter Muller equation for beginning of transport (USBR 1984). If adjustment of the hydraulic depth due to the reduction in channel slope is included in the equation, the USBR equation is:

$$S_{eq} = 60.1 \frac{(D_{50})^{10/7} n^{9/7}}{(D_{90})^{5/14} q^{6/7}} \qquad \textbf{Equation 6.18}$$

where,

S_{eq} = Equilibrium slope (ft/ft)
n = Manning's roughness coefficient
q = Discharge per unit width (ft^2/s)
D_{50} = Median particle size (ft)
D_{90} = Particle diameter representing the 90% cumulative diameter (ft)

The stable slope computation is made for the "dominant discharge", which is defined as the flow affecting the ultimate shape and hydraulics of the channel. Unnamed Channel 2 is designed to accept a portion of the 50-yr flow from the proposed storm drain mainline. This diverted water is significantly smaller than the 50-yr pre-development flow, and can be accurately characterized as "dominant discharge". Therefore, the design flow rates for Unnamed Canyon 2 presented in the **Hydrology** section are appropriate for use in the calculation of equilibrium slope using **Equation 6.18**.

4.0.4 AMAFCA Method

A third method was considered, based on the equations provided in the Albuquerque Metropolitan Arroyo Flood Control Agency (AMAFCA) Sediment and Erosion Design Guide. Equations 3.59 and 3.60 from the AMAFCA Design Guide provide an estimate of the maximum stable channel slope in an alluvial channel when the sediment supply cannot be accurately estimated.

These equations were developed for cases where there is an unacceptable uncertainty in the estimated upstream bed material supply, and are based on the observation that stable alluvial channels rarely maintain supercritical flow for extended periods of time. High velocities associated with supercritical flow in sand-bed streams will result in extreme rates of bed material transport. The stream, reacting to this high transport capacity, will erode its bed and banks to a condition that will sustain transport rates consistent with the upstream supply. The typical Froude number range of a stable channel is between 0.7 and 1.0. A Froude number of 0.75 was selected for the present analysis, in order to evaluate the equilibrium slope. A Froude number of 0.75 reflects a condition where flow is sub-critical and stable. Froude numbers approaching 1.0 tend to be unstable and can produce widely varying results.

Using these assumptions, the maximum stable slope for a channel of given geometry and dominant discharge can be computed by combining the relationship for the Froude Number with a uniform flow formula. Using the wide rectangular channel assumption, which is valid for most arroyo channels, the following equations can be derived for stable channel slope:

$$S_{eq} = C \times Q^{-0.133} \quad \textbf{Equation 3.59}$$

where,

S_{eq} = Equilibrium slope (ft/ft)
Q = Discharge (cfs)

$$C = 18.28 \times n^2 \times F^{0.133} \times F_r^{2.133} \quad \textbf{Equation 3.60}$$

where,

Q = Discharge (cfs)
n = Manning's roughness coefficient
F = width to depth ratio of flow in channel (ft/ft)
Fr = Maximum Froude number (0.75)

The AMAFCA Design Guide states that the aforementioned equations can be used to obtain an initial approximation of the stable slope for use in locating grade control structures and bank protection measures.

4.0.5 Results of the Preliminary Equilibrium Slope Analysis

Table 5 shows the results of the three equilibrium slope methods for the pre-project channel conditions (with post-project flows). **Table** 6 shows the results of the three methods for pre-project channel conditions where a self-forming channel has formed (with post-project flows).

Table 5: Equilibrium Slopes Calculated for Plan 01

Existing Geometry, Post-Project Flows			
	Incipient Motion (Eqn. 6-17)	Meyer-Peter Muller (Eqn. 6-18)	AMAFCA
Reach 1	0.023	0.005	0.010
Reach 2	0.052	0.011	0.011
Reach 3	0.032	0.007	0.010
Average	0.035	0.007	0.011

Table 6: Equilibrium Slopes Calculated for Plan 02

Existing Geometry, Self-Forming Channel, Post-Project Flows			
	Incipient Motion (Eqn. 6-17)	Meyer-Peter Muller (Eqn. 6-18)	AMAFCA
Reach 1	0.036	0.007	0.011
Reach 2	0.037	0.008	0.011
Reach 3	0.042	0.009	0.011
Average	0.038	0.008	0.011

The three equilibrium slope methods provide a range of slopes, which are averaged by method in the tables above. The Incipient Motion method generally produced the steepest slopes, 3.5 to 3.8%. The Meyer-Peter Muller method generally produced the smallest slopes, from 0.7% to 0.8%. The AMAFCA method produced results of a median value, around 1.1%. Based on the results of all three methods, a design slope of 1% was selected for the proposed channel. This slope is most in-line with the results from the AMAFCA method, and is a median value.

5.0 Proposed Grading Condition Hydraulic Model

PACE prepared two proposed grading conditions hydraulic models based on the preliminary equilibrium slope calculations. A uniform channel slope was used for both proposed models, set at the estimated equilibrium slope of 1%, which is based on equilibrium slope calculations using results from Plans 01 and 02. Grade control structures were intermittently placed along the channel length in order to make up the height deficit caused by the shallower slope. The hydraulic results from the proposed conditions models (Plans 03 and 04) were then used to re-calculate the equilibrium slope in post-project conditions (with 1% channel slope) to verify the results produced by the preliminary analysis. The proposed conditions HEC-RAS models developed for this analysis are described below:

"PR ND – Unnamed Canyon 2" HEC-RAS Model (Plan 03) represents post-project grading conditions, with post-project flows. The grading plan obtained from Hunsaker & Associates was used to cut sections for this model. Normal depth (ND) was used as the downstream boundary condition for this model, reflecting a design where the downstream culvert and basin do not restrict the flow rate in the channel. Further discussion of the downstream boundary condition is discussed in the section titled **"***Boundary Conditions***"** herein. Equilibrium slope calculations were performed using the results of Plan 03, in order to verify that the design slope selected, based on the preliminary analysis, was appropriate to use.

"PR WSE – Unnamed Canyon 2" HEC-RAS Model (Plan 04) is identical to Plan 03, with exception to the downstream boundary condition. A maximum water surface elevation (WSE) was determined as the downstream boundary condition of this model, reflective of a design where the downstream culvert and basin restrict the flow rate in the channel, to the point that the water surface reaches a maximum elevation (without infringing upon the required freeboard). Further discussion of the downstream boundary condition is discussed in the section titled "*Boundary Conditions*" herein. Equilibrium slope calculations were also performed on this model, in order to verify that the design slope selected, based on the preliminary analysis, was appropriate to use.

5.0.1 Structures

Only one culvert was included in the post-project conditions HEC-RAS models. The proposed development will include the "A Street" road crossing. A 4 ft. diameter culvert will be installed at the base of the road in order to convey flow from one side to the other. The culvert is located between HEC-RAS sections 2320.35 and 2119.93 and has a design slope of 5%.

The proposed drop structures were incorporated into the models using a series of tightly spaced cross sections along the top, slope, and toe of the drop. HEC-RAS guidance was used for the spacing of the sections and general drop structure modeling procedures.

5.0.2 Manning's Roughness Coefficient

For most sections, a uniform manning's coefficient of 0.03 was used, which is the same roughness coefficient used in the preliminary models. However, for sections located at grade control structures and the associated rock apron and invert lining, an increased manning's roughness coefficient of 0.04 was used.

5.0.3 Boundary Conditions

The proposed condition hydraulic models were run using the mixed flow regime. Therefore, a boundary condition was required at both upstream and downstream limits.

In the proposed condition, Debris Basin No.7 will be installed at the downstream end of Reach 1, introducing the potential for water to back up to a depth higher than normal depth. The final design of the pipe leading to Debris Basin No.7 and the surrounding grades will ultimately determine the downstream water surface elevation condition in the Unnamed Canyon 2 channel; however, these design details will be determined at during the final design phase of the project. Due to the uncertainty of the final design condition at the downstream end of the Unnamed Canyon 2 channel, two scenarios were run in the proposed condition hydraulic model: (1) Plan 03 utilizes normal depth as the downstream boundary condition, which produces the smallest flow depths and therefore highest velocities; (2) Plan 04 utilizes a maximum water surface

elevation providing 2.5 ft. of freeboard as the downstream boundary condition, which produces the maximum flow depths and therefore lowest velocities.

The slope used for the Plan 03 downstream boundary condition were determined using the Hunsaker proposed grading plan. The maximum water surface elevation used for the Plan 04 downstream boundary condition was determined by subtracting 2.5 ft. of freeboard from the minimum top of bank elevation shown on the Hunsaker proposed grading plan (1180.0 ft. elev.). Boundary conditions used for each proposed condition plan are summarized in **Table 7**.

Table 7: Boundary Conditions – Plans 03 and 04

Plan	Upstream Boundary Condition	Downstream Boundary Condition
Proposed (Normal Depth)	S = 0.009	S = 0.010
Proposed (Max. Water Surface Elevation)	S = 0.009	WSE = 1177.5'

5.0.4 Cross-Section Spacing

The proposed condition models contain the same 48 cut cross-sections as the preliminary hydraulic models; however, a large number of sections were added to the proposed conditions models in the vicinity of grade control structures, through interpolation. For the areas immediately upstream of the grade control structure crest, immediately downstream of the crest, and immediately downstream of the toe, cross-sections were interpolated at 1-ft. intervals, in order to capture the rapidly varying water depth and velocity at these locations. The total length of the modeled channel was unchanged from the preliminary hydraulic models, at approximately 2,500 feet. Cross sections were cut from a composite of 2011 Newhall Ranch topographic data and the Hunsaker grading plan.

5.0.5 Grade Control Structure Locations

The grade control structures were placed in locations that would reduce impacts to the USACE/CDFW jurisdictional areas to the maximum extent possible. **Figure 1** shows the grade control structures in relation to the USACE/CDFW jurisdictional boundary. Structures were most ideally placed in narrow portions of the channel, where the impact to the jurisdictional areas would be minimal. Due to the irregular spacing of the sections, the drop heights at each grade control structure also vary. However, all structures have several features in common: (1) slope of the grouted rock chute is 1:1, (2) grouted rock extends 5 feet upstream of the grade control structure crest, and (3) a loose rock apron extends 8 feet downstream of each grade control structure. **Figure 2** provides dimensions and layout of a typical structure.

5.0.6 Results of the Proposed Grading Condition Hydraulic Analysis

The HEC-RAS results for the proposed conditions models are shown in **Table 8 and 9**. Results are averaged by reach, which were delineated based on flow change locations.

Table 8: HEC-RAS Results from Plan 03

Hydraulic Parameter	Reach 1	Reach 2	Reach 3
Flow Rate (cfs)	37.3	33.6	25.1
Average Channel Depth (ft)	0.5	0.4	0.9
Average Velocity (ft/s)	2.06	1.57	2.50
Average Top Width (ft)	61	104	32
Average Froude Number	0.66	0.59	0.74
Average Energy Slope (ft/ft)	0.009	0.009	0.012

Table 9: HEC-RAS Results from Plan 04

Hydraulic Parameter	Reach 1	Reach 2	Reach 3
Flow Rate (cfs)	37.3	33.6	25.1
Average Channel Depth (ft)	0.9	0.4	0.9
Average Velocity (ft/s)	1.80	1.57	2.50
Average Top Width (ft)	63	104	31
Average Froude Number	0.56	0.59	0.74
Average Energy Slope (ft/ft)	0.008	0.009	0.012

6.0 Updated Equilibrium Slope Analysis Results

The hydraulic parameters obtained from the proposed conditions hydraulic models were used in the three equilibrium slope equations described in the section titled "**Preliminary Equilibrium Slope Analysis**" herein. The results from that analysis for the proposed conditions are shown in **Table 10 and 11**. These values demonstrate that the channel is not expected to degrade if constructed at a 1% slope, regardless of downstream boundary condition. The results of all three methods applied show that the equilibrium slope will trend toward 1% at a minimum (aggradation). This confirms that the initial slope of 1% selected for design based on the preliminary hydraulic models and equilibrium slope analysis was appropriate to use.

Table 10: Equilibrium Slopes Calculated for Plan 03

Proposed Geometry Condition, Post-Project Flows, Normal Depth Downstream Boundary Condition			
	Incipient Motion (Eqn. 6-17)	Meyer-Peter Muller (Eqn. 6-18)	AMAFCA
Reach 1	0.046	0.010	0.011
Reach 2	0.075	0.016	0.013
Reach 3	0.032	0.007	0.011
Average	0.051	0.011	0.011

Table 11: Equilibrium Slopes Calculated for Plan 04

Proposed Geometry Condition, Post-Project Flows, Max. WSE Downstream Boundary Condition			
	Incipient Motion (Eqn. 6-17)	Meyer-Peter Muller (Eqn. 6-18)	AMAFCA
Reach 1	0.047	0.010	0.011
Reach 2	0.075	0.016	0.013
Reach 3	0.032	0.007	0.011
Average	0.052	0.011	0.011

7.0 Erosion Protection

As mentioned in the previous section, the Unnamed Canyon 2 channel is not expected to degrade in the proposed condition. Additionally, velocities in the channel between drops are relatively low, with a maximum velocity of 4.0 ft/s and an average velocity of 1.9 ft/s, indicating that erosion is unlikely between drop structures. However, some protection is proposed to be installed along the banks between drops, in order to prevent potential undermining if a low-flow channel were to form and migrate to the banks.

The proposed bank protection will be in the form of turf reinforcement mats (TRM), installed along the channel banks for the channel reaches between grade control structures.

A reasonable assumption for the depth of protection below the invert can be taken from the LA County Sedimentation Manual. Chapter 5 recommends incorporating a toe-down depth of 2 ft. at levees, in order to account for local scour. The proposed TRM will, instead, be installed at a minimum of 2.5 feet below the proposed channel invert. The 2.5 ft. depth adds an extra factor of safety and allows for a smooth transition

at the rock at the toe of each drop, which has a minimum thickness of 2.5 ft. The TRM will also extend 1-foot above the invert of the channel (which is greater than the maximum depth found in the channel). **Figure 2** shows a typical section at a grade control structure, which helps demonstrate the TRM placement.

The approach used for sizing the loose and grouted rock at the grade control structures was slightly different than the approach used in the rest of the channel. The velocities observed at each grade control structure vary considerably as the flow transitions between subcritical and supercritical flow regimes. At each grade control structure, additional sections were interpolated within the hydraulic model at 1-foot intervals, in order to capture the rapidly changing depths and velocities. A velocity profile was plotted at each of these sections, as shown in **Figure 3** through **Figure 10**. The zone where rapidly changing velocity occurs was averaged and compared to the peak velocity occurring in that zone. In all cases, it was determined that using the maximum velocity, as opposed to the average, would be suitable for sizing the rock. Rock sizing tables found in Appendix F of the Los Angeles County Hydraulic Design Manual provide guidance on bank protection with respect to channel velocities (See **Table 12**). **Table 13** summarizes the average and maximum velocities at each structure, which can be compared to the minimum LACFCD rock sizes and layer thicknesses shown in **Table 12**. It should be noted that the results from the proposed condition model with downstream boundary condition equal to a maximum water surface elevation were not used in the TRM / rock sizing analysis, as they represent a condition with maximum flow depths and, therefore, minimum velocities.

The grade control structure chute is proposed to consist of grouted rock, which would also extend 5 feet upstream of the crest. A loose rock apron will be installed downstream of each grade control structure for a length of 8 feet. The rock apron downstream of the grade control structures was set at 8 feet uniformly, since this encompasses the zone where the velocities transition back to sub-critical flow regime at all structures. The channel slopes at each drop structure are also proposed to be lined with grouted rock, from 5 feet upstream of the crest to the end of the apron. **Figure 2** shows a typical section at a grade control structure, which helps demonstrate the loose and grouted rock placement.

Table 12: LACFCD Hydraulic Design Manual – Min. Rock Size for Levees

Channel Velocities (ft/s)	LACFCD Rock Size (D_{50})	LACFCD Levee Thickness (2 x D_{50})	LACFCD Filter Thickness
0 – 7	50 lb. (10-in.)	20-inch	6-inch
7 – 9	100 lb. (12-in.)	24-inch	6-inch
10	150 lb. (15-in.)	30-inch	9-inch

Table 13: Summary of Velocities at Grade Control Structures

Grade Control Structure ID	Station at Crest of Grade Control Structure	Maximum Velocity (ft/s)	Average Velocity (ft/s)
1	36+54.26	7.0	5.4
2	35+37.09	6.6	3.1
3	32+53.32	9.0	5.6
4	30+04.33	7.6	5.5
5	27+04.94	7.3	4.4
6	18+11.06	6.8	5.1
7	16+52.33	7.8	5.6
8	15+22.84	7.5	4.6

Table 13 shows the maximum and average velocities at each grade control structure, which can be compared to the minimum rock sizing criteria from the LA County Hydraulic Design Manual in **Table 12**. In all cases, the rock size selected for design was larger than what the Design Manual requires. The chute and side slopes at each structure is proposed to consist of 100-lb grouted rock. The loose rock apron

downstream of each structure is proposed to consist of 150-lb rock. This was done in light of the fact that the rock apron will need to protect against impinging flows, and will therefore need to be more robust.

8.0 Enclosures

1. HEC-RAS Output Data
2. Equilibrium Slope Calculations
3. Drainage Map
4. Digital HEC-RAS Model
    a. Plan 01 – EX – Unnamed Canyon 2
    b. Plan 02 – EX – Unnamed Canyon 2 – Self Form
    c. Plan 03 – PR ND – Unnamed Canyon 2
    d. Plan 04 –PR WSE – Unnamed Canyon 2
5. Drainage Concept Map (Whole Site Hydrology)

MATCHLINE SEE BELOW RIGHT

STA 27+04.79
STRUCTURE #5
INV 1199.00
INV 1202.90

STA 30+09.49
STRUCTURE #4
INV 1205.85
INV 1210.86

STA 32+53.43
STRUCTURE #3
INV 1213.35
INV 1217.41

GRADE CONTROL STRUCTURES

CDFW LIMITS

USACE LIMITS

34" GAS LINE

30' EASEMENT FOR GAS LINE

STA 34+40.63
END REACH 2
BEGIN REACH 3

STA 35+36.59
STRUCTURE #2
INV 1220.20
INV 1225.20

STA 36+52.44
STRUCTURE #1
INV 1226.39
INV 1230.13

EX. OVERHEAD
ELECTRICAL LINES (SCE)

SCE EASEMENT

STA 38+95.84
END REACH 3

LOW FLOW
DIVERSION OUTLET
TO CHANNEL

STORM DRAIN
MAIN LINE

MAGIC MOUNTAIN PKWY

STA 18+10.40
STRUCTURE #6
INV 1181.04
INV 1182.84

STA 16+51.64
STRUCTURE #7
INV 1179.47
INV 1177.56

STA 15+22.85
STRUCTURE #8
INV 1176.29
INV 1174.79

GRADE CONTROL STRUCTURE

STA 14+47.98
BEGIN REACH 1

"A" STREET

STA 23+20.35
END REACH 1/
BEGIN REACH 2

4 FT DIA. CULVERT

USACE LIMITS

MATCHLINE SEE ABOVE LEFT

50 25 0 50 100

NO	BY	DATE	REVISIONS	DATE	APP.

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SCALE 1" = 50'
DESIGNED JC
DRAWN BP
CHECKED JC
DATE NOVEMBER 2023
JOB NO. A373

TITLE
UNNAMED CANYON 2
DRAINAGE CHANNEL

JOB
ENTRADA SOUTH
TTM 53295
VALENCIA CA

PACE
Advanced Water Engineering
17520 Newhope Street, Suite 200 | Fountain Valley, CA 92708
P: (714) 481-7300 | www.paceware.com

FIGURE
01

JOB NO. A373

Xrefs: 0930-BASE_DRN.dwg; 0930-EASTMNTS.dwg; (0930-LOTLINES_DRN.dwg; A373-EXISTING TOPO-2011.dwg; SCE OH-LINES.dwg; A373 Prop Site Layout.dwg; A373 Prop Drop Structure.dwg; A373-Jurisdictional Lines (Jurisdiction_20160119).dwg
Dimscale = 1; LTscale = 1; PSltscale = 1; ACAD Ver. = 23.0s (LMS Tech); Viewtabs = 1

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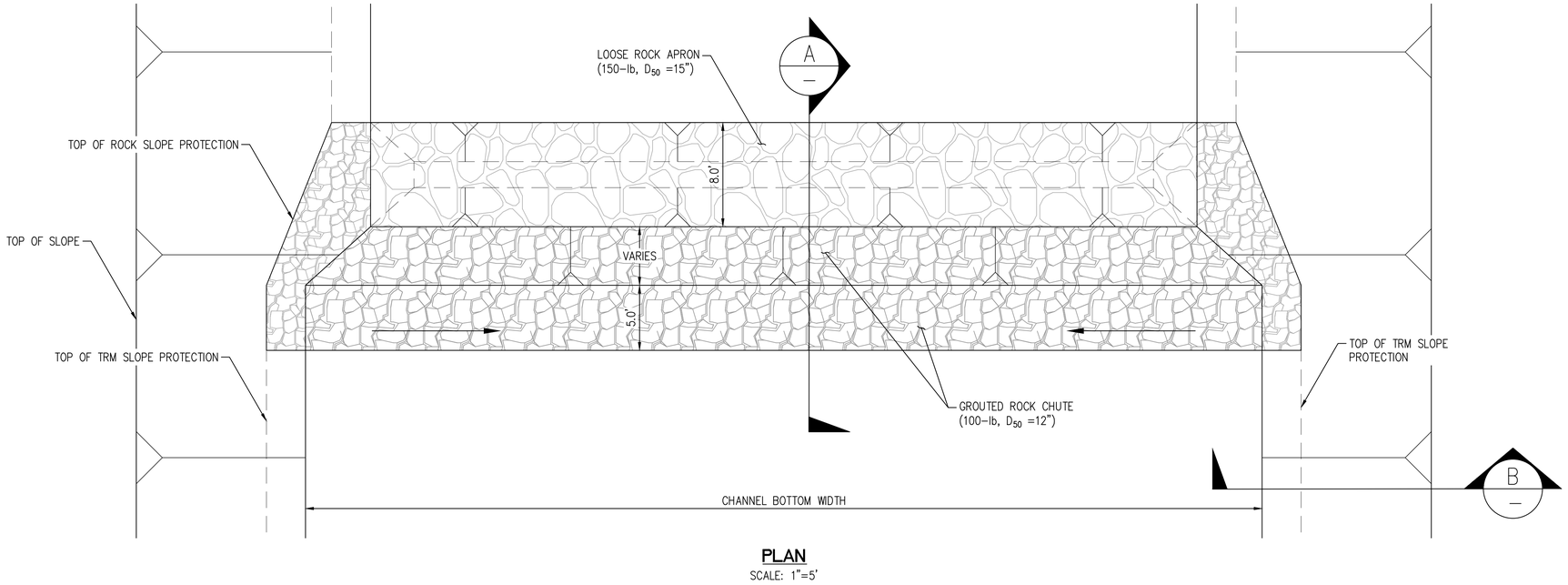

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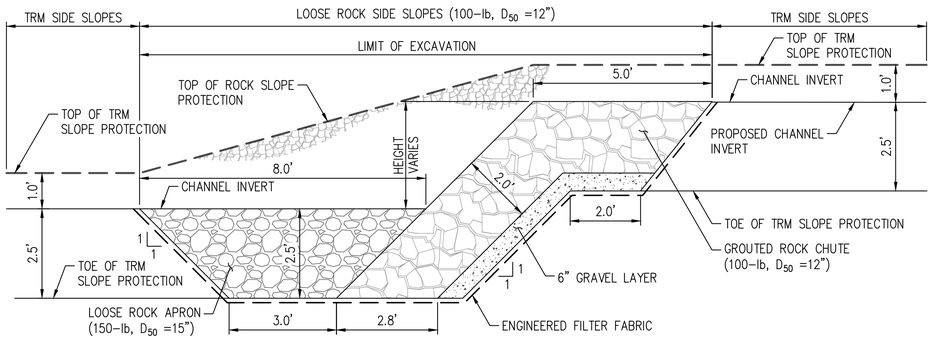

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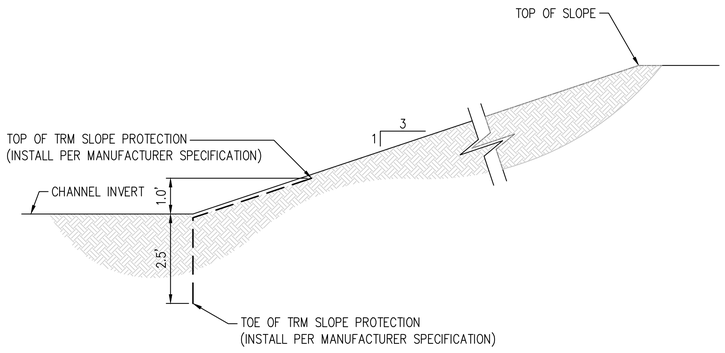

SECTION B
SCALE: 1"=2'

NO	BY	DATE	REVISIONS	DATE	APP.

SCALE 1" = 50'
DESIGNED JC
DRAWN BP
CHECKED JC
DATE JUNE 2022
JOB NO. A373

TITLE
GRADE CONTROL
STRUCTURE PLAN
AND SECTIONS

JOB
ENTRADA SOUTH
TTM 53295
VALENCIA CA

PACE
Advanced Water Engineering
17520 Newhope Street Suite 200 | Fountain Valley, CA 92708
P: (714) 481-7300 | www.pacewater.com

FIGURE
02

JOB NO. A373

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P:\A373\Engineering\GlobalExhibits\A373-Plans and Sections.dwg - Tab: 11X17 PLAN SECTION - by cthompson on 11/22/23 at 4:19:20 PM

Figure 3: Structure 1 Velocity Profile

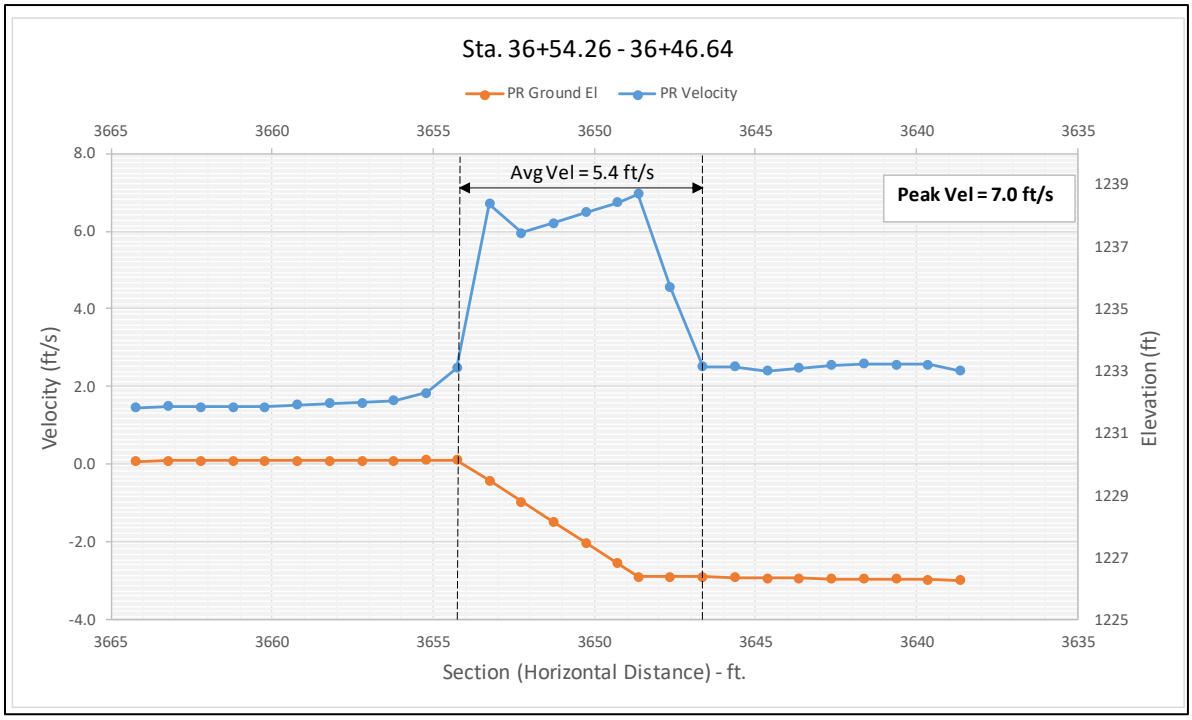


Figure 4: Structure 2 Velocity Profile

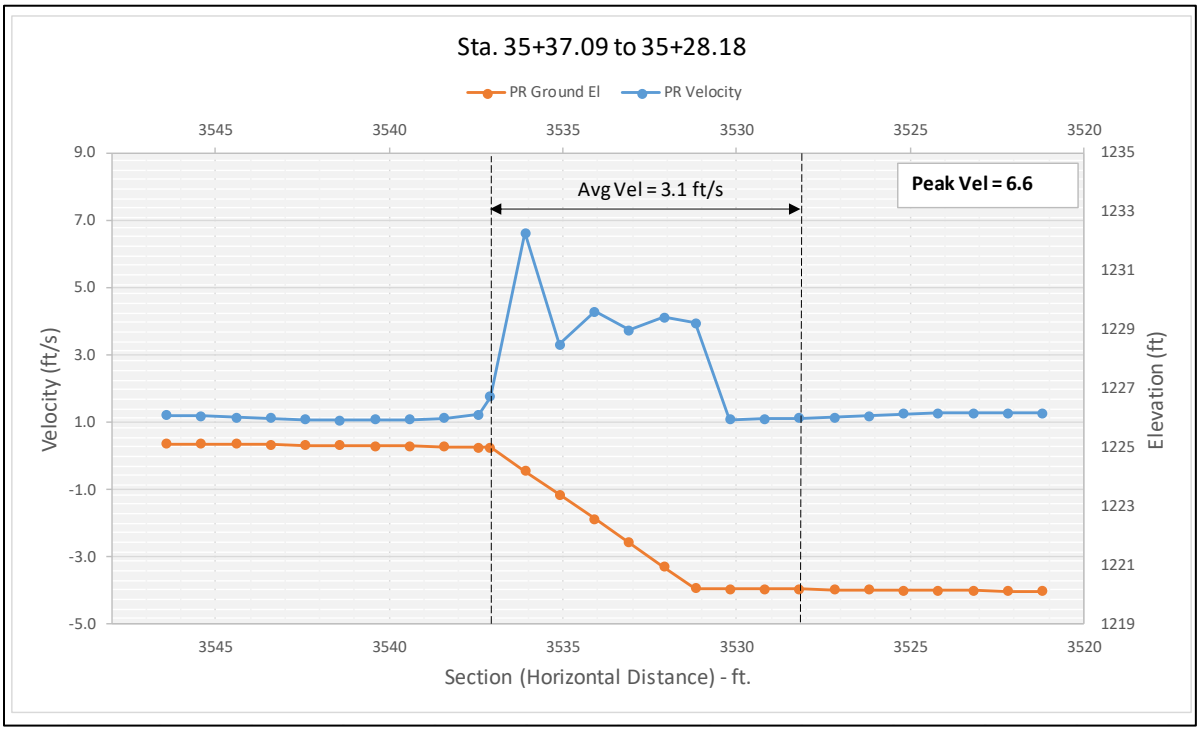


Figure 5: Structure 3 Velocity Profile

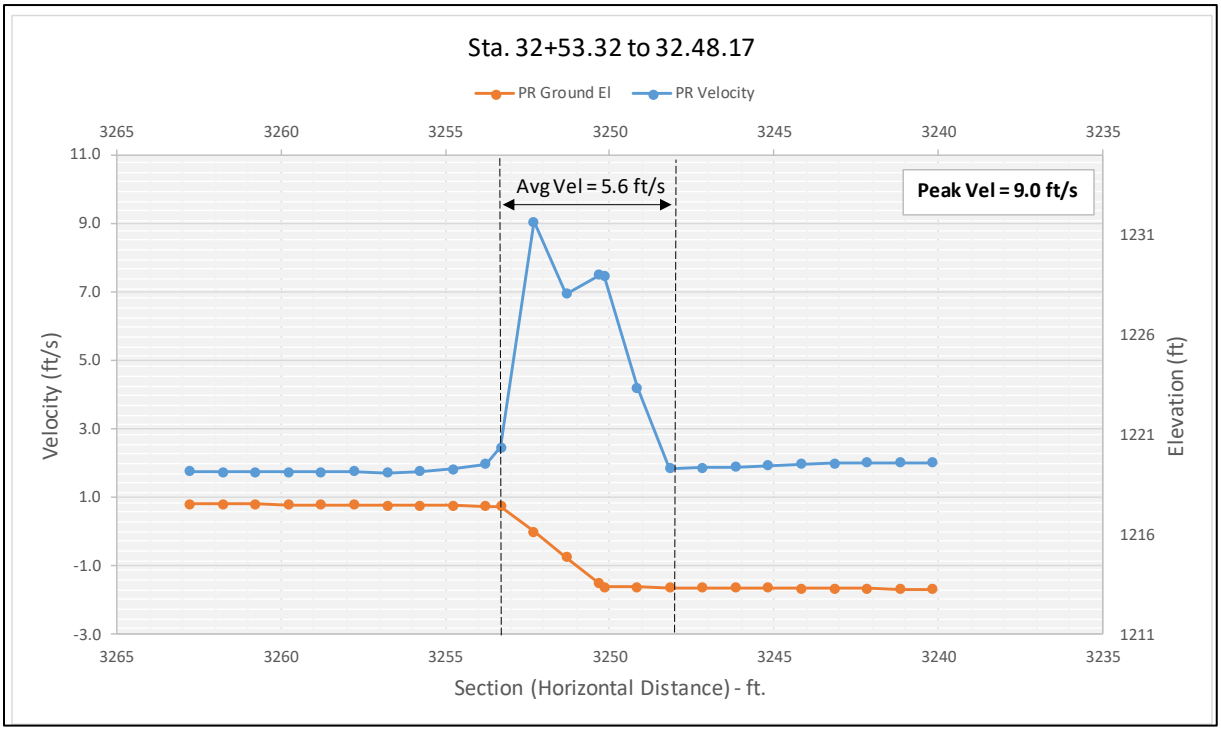


Figure 6: Structure 4 Velocity Profile

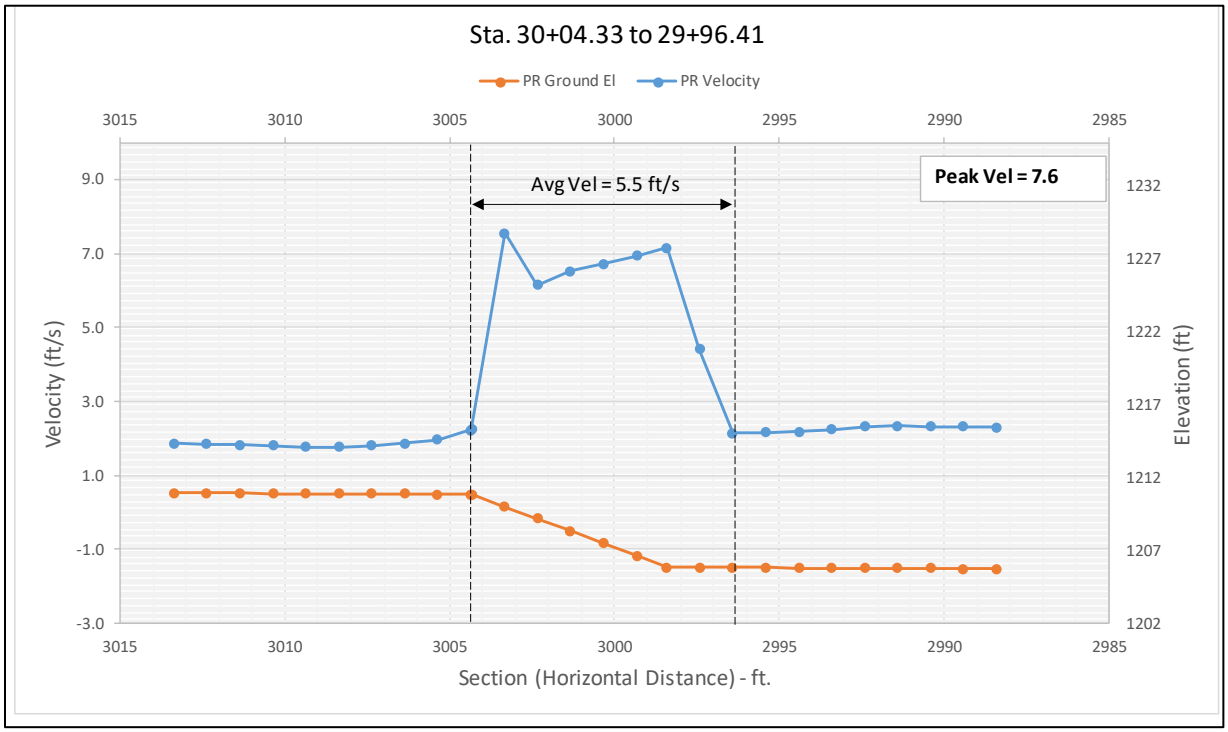


Figure 7: Structure 5 Velocity Profile

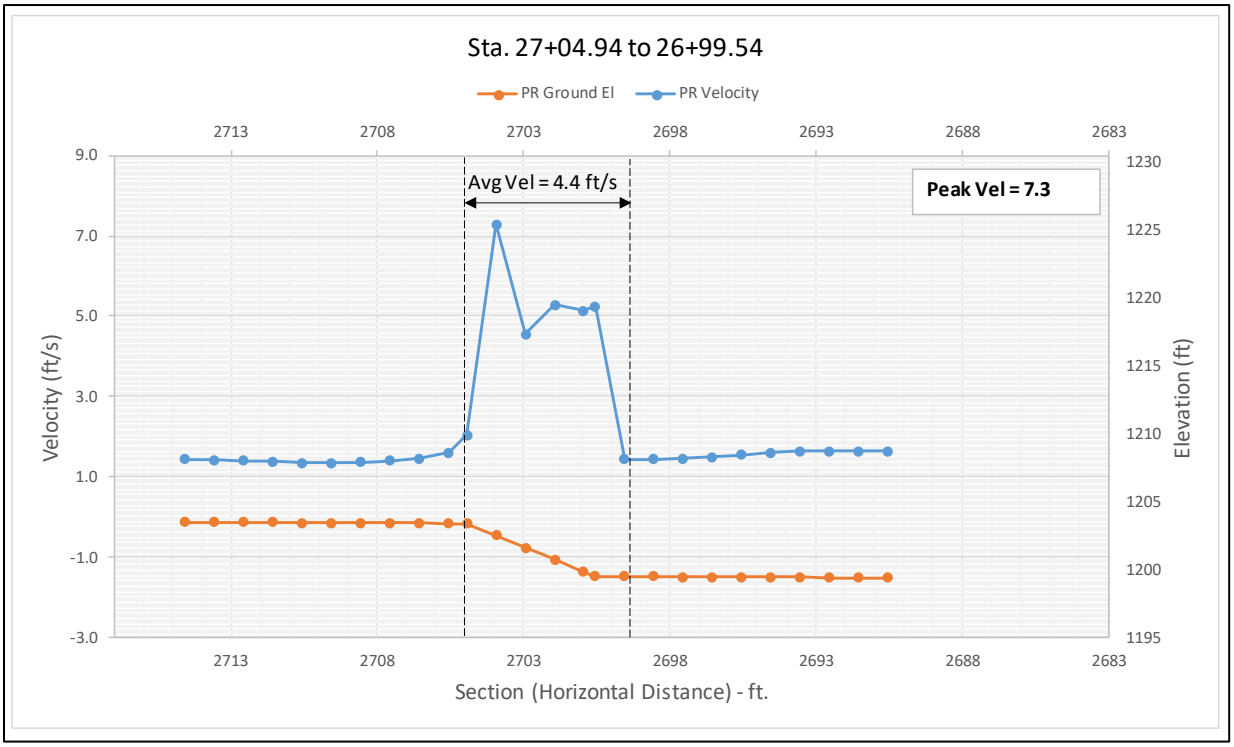


Figure 8: Structure 6 Velocity Profile

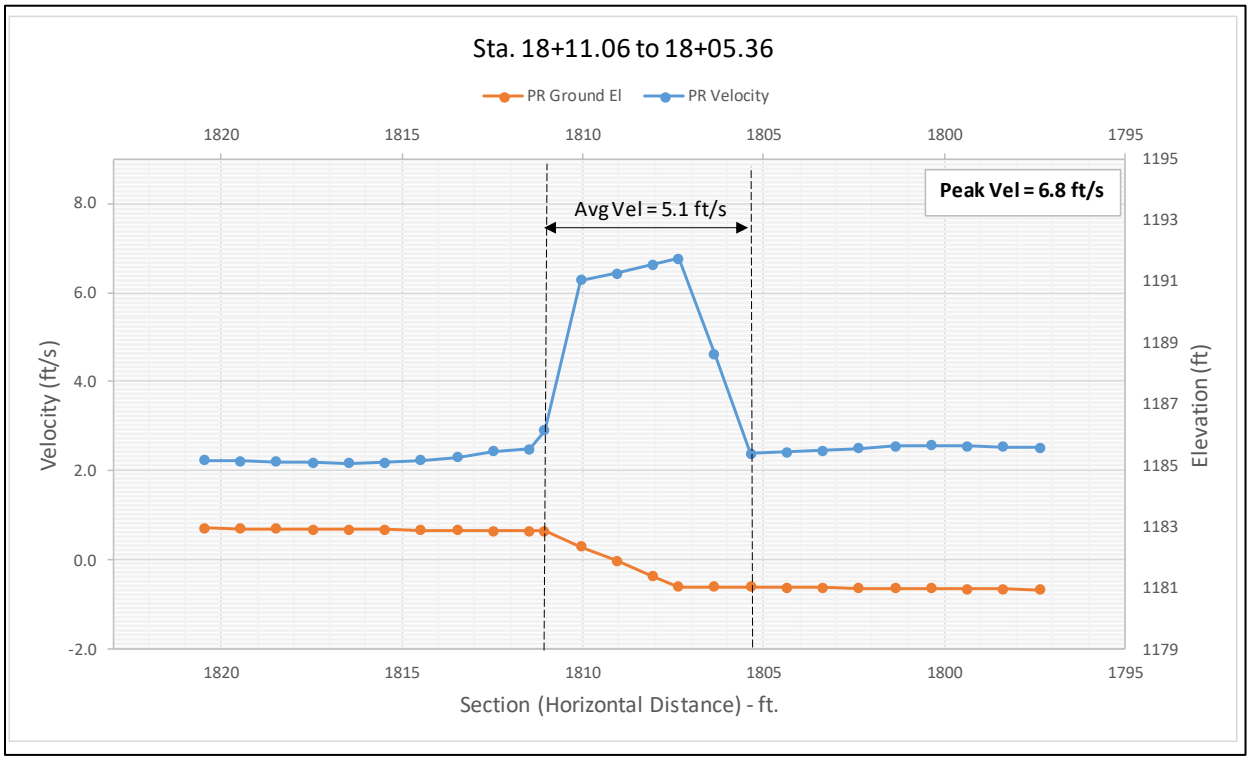


Figure 9: Structure 7 Velocity Profile

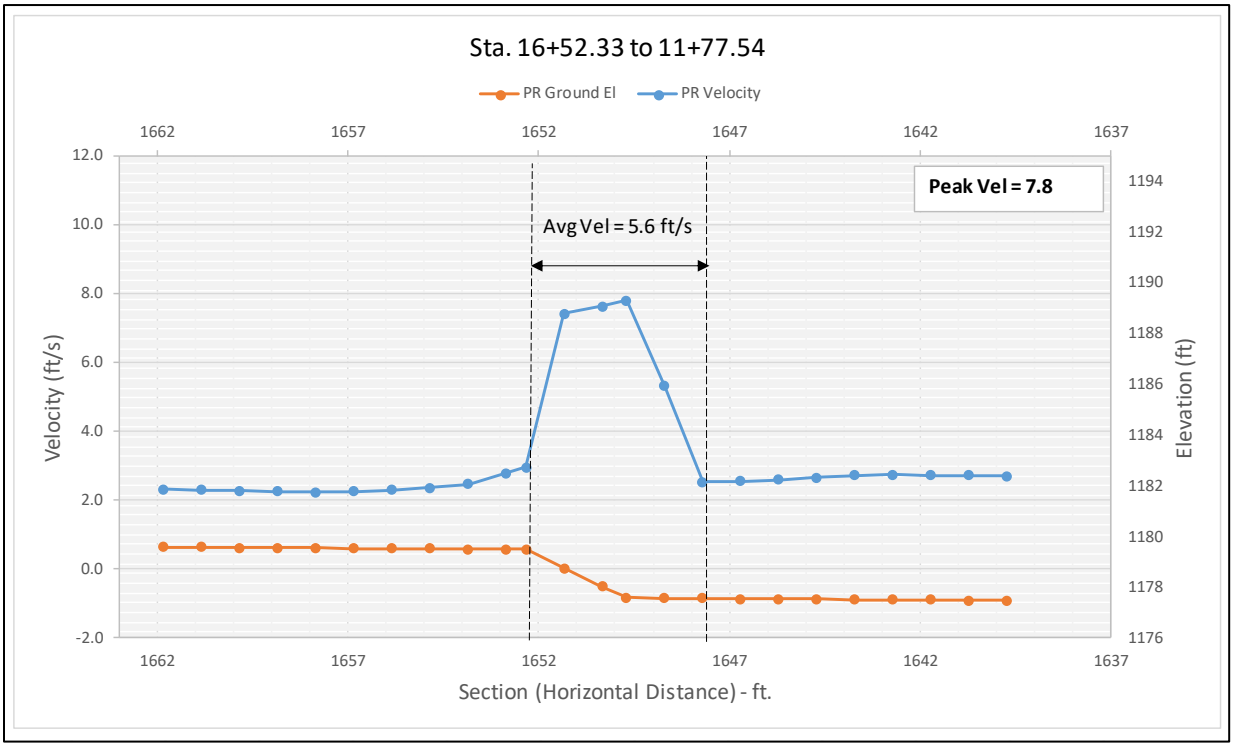
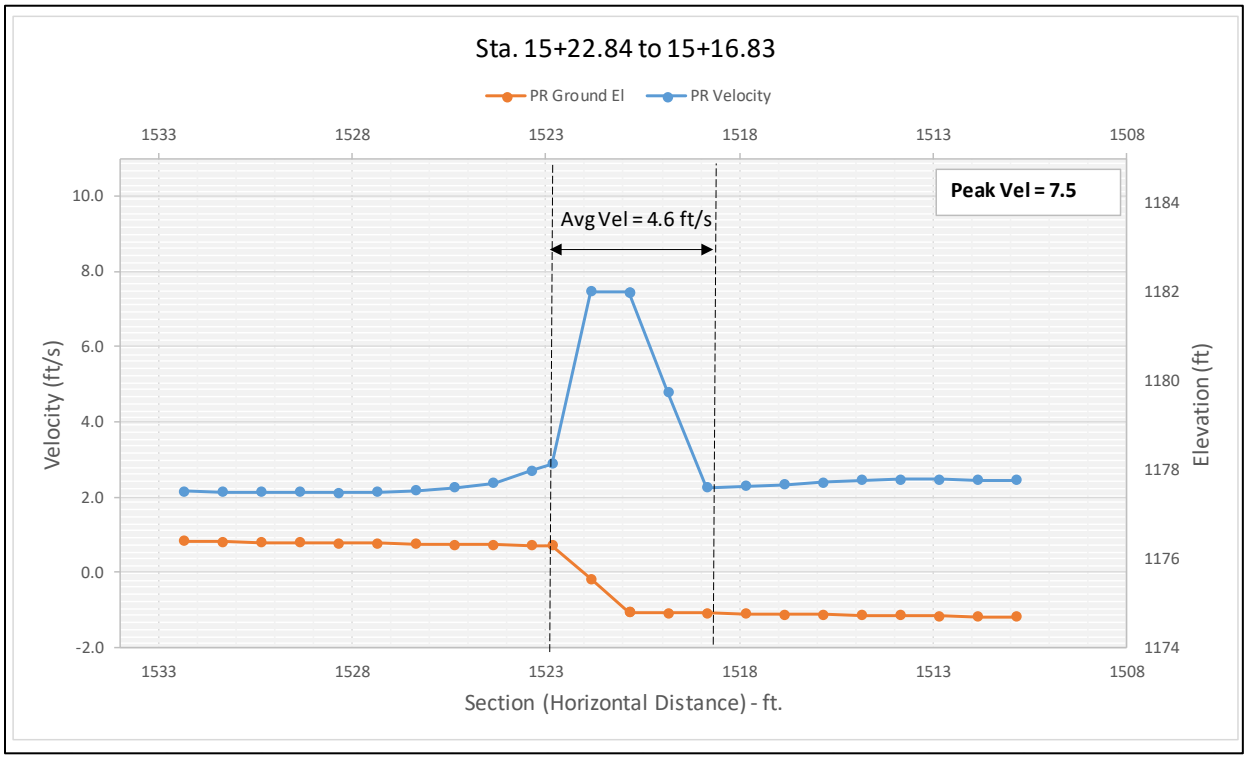


Figure 10: Structure 8 Velocity Profile



1 – HEC-RAS Output Data

HEC-RAS Plan: Plan 01 River: Entrada Reach: 1 Profile: PF 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	3895.84	PF 1	25.10	1230.93	1233.074	1231.60900	1233.08	0.000185	0.817	30.71	22.35	0.12
1	3850.61	PF 1	25.10	1232.17	1232.923		1233.05	0.011721	2.819	8.90	23.14	0.80
1	3806.24	PF 1	25.10	1231.73	1232.489		1232.59	0.009020	2.535	9.90	24.71	0.71
1	3765.08	PF 1	25.10	1231.32	1231.907	1231.90700	1232.06	0.019417	3.181	7.89	24.91	1.00
1	3713.23	PF 1	25.10	1229.97	1230.769	1230.79400	1231.02	0.020785	3.978	6.31	15.05	1.08
1	3654.26	PF 1	25.10	1226.59	1226.743	1226.93300	1227.69	0.364465	7.905	3.22	24.12	3.78
1	3648.64	PF 1	25.10	1226.50	1226.911	1226.85200	1227.02	0.010961	2.578	9.67	27.16	0.77
1	3605.41	PF 1	25.10	1225.91	1226.227	1226.21900	1226.31	0.016013	2.345	10.70	46.71	0.86
1	3537.09	PF 1	25.10	1224.36	1224.937	1224.93700	1225.07	0.020576	2.953	8.50	31.24	1.00
1	3531.18	PF 1	25.10	1224.13	1224.630	1224.70700	1224.89	0.042858	4.056	6.19	24.46	1.42
1	3440.63	PF 1	33.60	1221.99	1222.398	1222.39800	1222.51	0.021520	2.674	12.57	55.94	0.99
1	3366.51	PF 1	33.60	1219.32	1219.821	1219.91700	1220.14	0.051341	4.512	7.45	28.95	1.57
1	3305.78	PF 1	33.60	1216.49	1217.065	1217.16000	1217.38	0.040282	4.519	7.44	24.19	1.44
1	3253.32	PF 1	33.60	1214.98	1215.313	1215.33900	1215.45	0.032128	2.947	11.40	59.58	1.19
1	3250.17	PF 1	33.60	1214.88	1215.172	1215.21300	1215.33	0.042625	3.142	10.69	62.75	1.34
1	3186.18	PF 1	33.60	1213.19	1213.534	1213.53400	1213.65	0.021774	2.674	12.56	56.74	1.00
1	3091.83	PF 1	33.60	1210.75	1211.032	1211.06900	1211.23	0.030174	3.547	9.47	35.53	1.21
1	3030.37	PF 1	33.60	1209.00	1209.445	1209.45100	1209.56	0.024090	2.670	12.59	61.16	1.04
1	3004.33	PF 1	33.60	1208.51	1208.849	1208.88100	1209.01	0.033896	3.173	10.59	51.28	1.23
1	2998.41	PF 1	33.60	1208.37	1208.722	1208.73900	1208.86	0.027749	2.948	11.40	53.04	1.12
1	2955.4	PF 1	33.60	1207.24	1207.636	1207.68300	1207.82	0.057739	3.395	9.90	64.60	1.53
1	2914.65	PF 1	33.60	1206.45	1206.777	1206.77700	1206.87	0.022726	2.434	13.81	73.89	0.99
1	2815.59	PF 1	33.60	1204.13	1204.478	1204.47800	1204.56	0.024097	2.232	15.05	96.03	0.99
1	2782.59	PF 1	33.60	1203.00	1203.324	1203.38400	1203.58	0.034498	4.092	8.21	27.60	1.32
1	2743.58	PF 1	33.60	1202.49	1202.818	1202.81500	1202.88	0.023382	2.053	16.37	115.73	0.96
1	2704.94	PF 1	33.60	1201.05	1201.809	1201.80900	1201.91	0.027543	2.499	13.44	79.73	1.07
1	2700.54	PF 1	33.60	1201.55	1201.649	1201.69100	1201.81	0.017389	0.825	11.21	58.29	0.69
1	2661.04	PF 1	33.60	1200.70	1200.957	1200.95600	1201.03	0.024090	2.139	15.81	109.73	0.98
1	2616.7	PF 1	33.60	1199.67	1200.039	1200.02500	1200.08	0.018657	1.710	20.09	172.25	0.85
1	2540.68	PF 1	33.60	1198.01	1198.387	1198.38700	1198.45	0.025221	1.963	17.11	136.97	0.98
1	2481.7	PF 1	33.60	1196.68	1197.060	1197.08400	1197.16	0.016337	1.762	15.44	88.89	0.81
1	2409.33	PF 1	33.60	1195.25	1195.443	1195.48200	1195.61	0.040072	1.596	14.03	164.52	1.11
1	2320.35	PF 1	37.30	1193.00	1193.141	1193.14100	1193.21	0.025410	2.077	17.96	133.12	1.00
1	2119.93	PF 1	37.30	1187.00	1187.403	1187.46700	1187.68	0.029776	4.247	8.78	25.00	1.26
1	2068.55	PF 1	37.30	1186.00	1186.278	1186.37600	1186.62	0.052099	4.682	7.97	29.82	1.60
1	2000.07	PF 1	37.30	1184.00	1185.260	1185.09400	1185.49	0.008253	3.874	9.63	11.54	0.75
1	1943.65	PF 1	37.30	1183.66	1184.639	1184.63900	1184.91	0.012866	4.265	9.41	18.94	0.91
1	1862.48	PF 1	37.30	1181.99	1182.464	1182.63600	1183.03	0.050218	6.044	6.17	15.23	1.67
1	1811.06	PF 1	37.30	1180.69	1181.455	1181.45500	1181.77	0.015897	4.535	8.22	12.98	1.00
1	1807.36	PF 1	37.30	1180.46	1181.059	1181.23100	1181.65	0.044025	6.153	6.06	13.06	1.59
1	1777.34	PF 1	37.30	1180.00	1180.467	1180.55400	1180.80	0.038557	4.631	8.05	24.23	1.42
1	1709.86	PF 1	37.30	1178.12	1178.755	1178.75500	1178.88	0.018323	4.016	13.56	53.46	1.00
1	1652.33	PF 1	37.30	1177.00	1177.479	1177.43900	1177.62	0.012776	3.077	12.53	33.39	0.85
1	1649.71	PF 1	37.30	1177.00	1177.464		1177.58	0.010257	2.714	13.81	35.09	0.76
1	1602.35	PF 1	37.30	1176.22	1176.709	1176.70600	1176.88	0.018520	3.294	11.14	31.01	0.99
1	1522.84	PF 1	37.30	1174.86	1175.215	1175.21500	1175.36	0.018923	3.091	12.59	45.94	0.98
1	1520.83	PF 1	37.30	1174.81	1175.128	1175.16400	1175.31	0.027028	3.464	11.15	45.00	1.16
1	1447.98	PF 1	37.30	1172.71	1173.182	1173.19500	1173.31	0.027504	2.837	13.32	67.98	1.11

HEC-RAS Plan: Plan 02 River: Entrada Reach: 1 Profile: PF 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	3895.84	PF 1	25.10	1230.66	1232.306	1230.91600	1232.31	0.000047	0.447	56.14	34.10	0.06
1	3850.61	PF 1	25.10	1231.90	1232.197		1232.29	0.013000	2.482	10.11	34.10	0.80
1	3806.24	PF 1	25.10	1231.46	1231.826		1231.89	0.006487	2.012	12.48	34.10	0.59
1	3765.08	PF 1	25.10	1231.05	1231.306	1231.30600	1231.44	0.021152	2.875	8.73	34.10	1.00
1	3713.23	PF 1	25.10	1229.70	1229.926	1229.95700	1230.09	0.031988	3.258	7.70	34.10	1.21
1	3654.26	PF 1	25.10	1226.32	1226.474	1226.57600	1226.83	0.115252	4.793	5.24	34.10	2.16
1	3648.64	PF 1	25.10	1226.23	1226.399	1226.48600	1226.69	0.083741	4.354	5.77	34.10	1.87
1	3605.41	PF 1	25.10	1225.64	1225.896	1225.89600	1226.03	0.021019	2.870	8.75	34.10	1.00
1	3537.09	PF 1	25.10	1224.09	1224.334	1224.34700	1224.48	0.024665	3.012	8.33	34.10	1.07
1	3531.18	PF 1	25.10	1223.86	1224.064	1224.11600	1224.27	0.045180	3.615	6.94	34.10	1.41
1	3440.63	PF 1	33.60	1221.72	1222.008	1222.00800	1222.15	0.020256	3.041	11.05	38.43	1.00
1	3366.51	PF 1	33.60	1219.05	1219.246	1219.33600	1219.56	0.073104	4.483	7.49	38.30	1.79
1	3305.78	PF 1	33.60	1216.22	1216.469	1216.50800	1216.66	0.032851	3.523	9.54	38.30	1.24
1	3253.32	PF 1	33.60	1214.73	1215.001	1215.01700	1215.16	0.024795	3.236	10.38	38.32	1.10
1	3250.17	PF 1	33.60	1214.61	1214.847	1214.89700	1215.06	0.038546	3.697	9.09	38.30	1.34
1	3186.18	PF 1	33.60	1212.92	1213.148	1213.20900	1213.38	0.044154	3.851	8.72	38.30	1.42
1	3091.83	PF 1	33.60	1210.48	1210.768	1210.76800	1210.91	0.020323	3.048	11.02	38.30	1.00
1	3030.37	PF 1	33.60	1208.73	1208.963	1209.01200	1209.18	0.041011	3.767	8.92	38.30	1.38
1	3004.33	PF 1	33.60	1208.24	1208.529	1208.52900	1208.67	0.020125	3.039	11.06	38.30	1.00
1	2998.41	PF 1	33.60	1208.10	1208.359	1208.38800	1208.54	0.028872	3.388	9.92	38.30	1.17
1	2955.4	PF 1	33.60	1206.97	1207.244	1207.25800	1207.40	0.024057	3.207	10.48	38.30	1.08
1	2914.65	PF 1	33.60	1206.18	1206.485	1206.48500	1206.61	0.021751	2.819	11.92	49.09	1.01
1	2815.59	PF 1	33.60	1203.86	1204.130	1204.14500	1204.29	0.025006	3.245	10.36	38.30	1.10
1	2782.59	PF 1	33.60	1202.73	1203.093	1203.01800	1203.18	0.009456	2.419	13.89	38.30	0.71
1	2743.58	PF 1	33.60	1202.22	1202.507	1202.50700	1202.65	0.020496	3.056	11.00	38.31	1.01
1	2704.94	PF 1	33.60	1200.78	1201.187	1201.06900	1201.26	0.006480	2.154	15.60	38.55	0.60
1	2700.54	PF 1	33.60	1200.73	1201.168		1201.23	0.005124	1.995	16.84	39.16	0.54
1	2661.04	PF 1	33.60	1200.43	1200.717	1200.71700	1200.86	0.021021	3.056	10.99	39.02	1.02
1	2616.7	PF 1	33.60	1199.40	1199.669	1199.68800	1199.83	0.025537	3.265	10.29	38.30	1.11
1	2540.68	PF 1	33.60	1197.74	1197.964	1198.02800	1198.20	0.046678	3.916	8.58	38.30	1.46
1	2481.7	PF 1	33.60	1196.29	1196.578	1196.57800	1196.72	0.020181	3.041	11.05	38.31	1.00
1	2409.33	PF 1	33.60	1194.83	1195.120	1195.11800	1195.26	0.019845	3.026	11.10	38.31	0.99
1	2320.35	PF 1	37.30	1192.71	1193.043	1193.04300	1193.12	0.028909	2.206	16.91	125.56	1.06
1	2119.93	PF 1	37.30	1186.71	1186.974	1187.01000	1187.17	0.030404	3.527	10.58	40.00	1.21
1	2068.55	PF 1	37.30	1185.71	1186.010	1186.01000	1186.16	0.019855	3.100	12.03	40.03	1.00
1	2000.07	PF 1	37.30	1183.71	1184.200	1184.01100	1184.26	0.003957	1.905	19.58	40.00	0.48
1	1943.65	PF 1	37.30	1183.37	1183.670	1183.67000	1183.82	0.019966	3.107	12.01	40.00	1.00
1	1862.48	PF 1	37.30	1181.70	1181.995	1181.99900	1182.15	0.021197	3.163	11.79	40.00	1.03
1	1811.06	PF 1	37.30	1180.40	1180.666	1180.70100	1180.86	0.029943	3.511	10.63	40.00	1.20
1	1807.36	PF 1	37.30	1180.17	1180.381	1180.46900	1180.68	0.063843	4.411	8.46	40.00	1.69
1	1777.34	PF 1	37.30	1179.71	1180.010	1180.01000	1180.16	0.020101	3.113	11.98	40.00	1.00
1	1709.86	PF 1	37.30	1177.83	1178.074	1178.13000	1178.30	0.039607	3.820	9.77	40.00	1.36
1	1652.33	PF 1	37.30	1176.71	1177.113	1177.00700	1177.20	0.007517	2.313	16.13	40.00	0.64
1	1649.71	PF 1	37.30	1176.71	1177.020	1177.00900	1177.16	0.017909	3.006	12.41	40.00	0.95
1	1602.35	PF 1	37.30	1175.93	1176.260	1176.22800	1176.38	0.014576	2.825	13.20	40.00	0.87
1	1522.84	PF 1	37.30	1174.57	1174.869	1174.86900	1175.02	0.020264	3.121	11.95	40.00	1.01
1	1520.83	PF 1	37.30	1174.52	1174.819	1174.82000	1174.97	0.020357	3.128	11.93	39.91	1.01
1	1447.98	PF 1	37.30	1172.42	1172.660	1172.71900	1172.90	0.042210	3.893	9.58	40.00	1.40

HEC-RAS Plan: Plan 03 River: Entrada Reach: 1 Profile: PF 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	3895.84	PF 1	25.10	1230.93	1233.074	1231.60900	1233.08	0.000185	0.817	30.71	22.35	0.12
1	3850.61	PF 1	25.10	1232.17	1232.923		1233.05	0.011721	2.819	8.90	23.14	0.80
1	3806.24	PF 1	25.10	1231.73	1232.489		1232.59	0.009020	2.535	9.90	24.71	0.71
1	3765.08	PF 1	25.10	1231.32	1231.907	1231.90700	1232.06	0.019417	3.181	7.89	24.91	1.00
1	3713.23	PF 1	25.10	1229.97	1230.769	1230.79400	1231.02	0.020785	3.978	6.31	15.05	1.08
1	3712.23*	PF 1	25.10	1229.97	1230.673	1230.75100	1230.99	0.028222	4.522	5.55	13.74	1.25
1	3711.23*	PF 1	25.10	1229.98	1230.708	1230.71100	1230.93	0.018258	3.791	6.62	15.41	1.02
1	3710.23*	PF 1	25.10	1229.98	1230.619	1230.67600	1230.91	0.025294	4.304	5.83	14.33	1.19
1	3709.23*	PF 1	25.10	1229.98	1230.626	1230.64100	1230.86	0.019331	3.861	6.50	15.38	1.05
1	3708.23*	PF 1	25.10	1229.98	1230.545	1230.60800	1230.84	0.026710	4.343	5.78	14.62	1.22
1	3707.23*	PF 1	25.10	1229.99	1230.555	1230.58300	1230.80	0.021347	3.959	6.34	15.58	1.09
1	3706.23*	PF 1	25.10	1229.99	1230.605	1230.56100	1230.77	0.013525	3.293	7.62	17.53	0.88
1	3705.23*	PF 1	25.10	1229.99	1230.602		1230.75	0.011739	3.100	8.10	18.34	0.82
1	3704.23*	PF 1	25.10	1229.99	1230.598		1230.73	0.010437	2.943	8.53	19.13	0.78
1	3703.23*	PF 1	25.10	1230.00	1230.593		1230.72	0.009791	2.842	8.83	19.90	0.75
1	3702.23*	PF 1	25.10	1230.00	1230.590		1230.70	0.008773	2.717	9.24	20.52	0.71
1	3701.23*	PF 1	25.10	1230.00	1230.586		1230.69	0.008059	2.608	9.62	21.32	0.68
1	3700.23*	PF 1	25.10	1230.01	1230.581		1230.68	0.007718	2.537	9.89	22.12	0.67
1	3699.23*	PF 1	25.10	1230.01	1230.578		1230.67	0.007148	2.445	10.27	22.93	0.64
1	3698.23*	PF 1	25.10	1230.01	1230.575		1230.66	0.006545	2.347	10.69	23.76	0.62
1	3697.23*	PF 1	25.10	1230.01	1230.572		1230.65	0.006122	2.269	11.06	24.60	0.60
1	3696.23*	PF 1	25.10	1230.02	1230.568		1230.65	0.005999	2.227	11.27	25.39	0.59
1	3695.23*	PF 1	25.10	1230.02	1230.565		1230.64	0.005620	2.157	11.64	26.19	0.57
1	3694.23*	PF 1	25.10	1230.02	1230.562		1230.63	0.005232	2.086	12.03	26.99	0.55
1	3693.23*	PF 1	25.10	1230.02	1230.559		1230.62	0.004928	2.022	12.41	27.89	0.53
1	3692.23*	PF 1	25.10	1230.03	1230.555		1230.62	0.004935	2.002	12.54	28.65	0.53
1	3691.23*	PF 1	25.10	1230.03	1230.552		1230.61	0.004687	1.950	12.87	29.45	0.52
1	3690.23*	PF 1	25.10	1230.03	1230.550		1230.61	0.004426	1.893	13.26	30.35	0.51
1	3689.23*	PF 1	25.10	1230.04	1230.546		1230.60	0.004481	1.882	13.34	31.11	0.51
1	3688.23*	PF 1	25.10	1230.04	1230.543		1230.60	0.004285	1.839	13.65	31.89	0.50
1	3687.23*	PF 1	25.10	1230.04	1230.540		1230.59	0.004098	1.794	13.99	32.81	0.48
1	3686.23*	PF 1	25.10	1230.04	1230.538		1230.59	0.003914	1.753	14.32	33.59	0.47
1	3685.23*	PF 1	25.10	1230.05	1230.534		1230.58	0.003986	1.748	14.36	34.28	0.48
1	3684.23*	PF 1	25.10	1230.05	1230.531		1230.58	0.003806	1.710	14.68	34.97	0.47
1	3683.23*	PF 1	25.10	1230.05	1230.529		1230.57	0.003666	1.677	14.97	35.70	0.46
1	3682.23*	PF 1	25.10	1230.05	1230.526		1230.57	0.003519	1.644	15.27	36.39	0.45
1	3681.23*	PF 1	25.10	1230.06	1230.523		1230.57	0.003624	1.647	15.24	37.05	0.45
1	3680.22*	PF 1	25.10	1230.06	1230.520		1230.56	0.003492	1.616	15.53	37.78	0.44
1	3679.22*	PF 1	25.10	1230.06	1230.517		1230.56	0.003361	1.586	15.83	38.49	0.44
1	3678.22*	PF 1	25.10	1230.06	1230.515		1230.55	0.003262	1.560	16.09	39.21	0.43
1	3677.22*	PF 1	25.10	1230.07	1230.511		1230.55	0.003408	1.571	15.98	39.83	0.44
1	3676.22*	PF 1	25.10	1230.07	1230.509		1230.55	0.003293	1.543	16.26	40.56	0.43
1	3675.22*	PF 1	25.10	1230.07	1230.506		1230.54	0.003213	1.521	16.50	41.29	0.42
1	3674.22*	PF 1	25.10	1230.08	1230.502		1230.54	0.003401	1.538	16.32	41.94	0.43
1	3673.22*	PF 1	25.10	1230.08	1230.499		1230.54	0.003329	1.517	16.55	42.73	0.43
1	3672.22*	PF 1	25.10	1230.08	1230.496		1230.53	0.003254	1.496	16.78	43.49	0.42
1	3671.22*	PF 1	25.10	1230.08	1230.494		1230.53	0.003198	1.477	17.00	44.31	0.42
1	3670.22*	PF 1	25.10	1230.09	1230.490		1230.52	0.003429	1.499	16.75	44.99	0.43
1	3669.22*	PF 1	25.10	1230.09	1230.487		1230.52	0.003386	1.482	16.94	45.86	0.43
1	3668.22*	PF 1	25.10	1230.09	1230.484		1230.52	0.003327	1.464	17.14	46.61	0.43
1	3667.22*	PF 1	25.10	1230.09	1230.481		1230.51	0.003292	1.449	17.32	47.46	0.42
1	3666.22*	PF 1	25.10	1230.10	1230.476		1230.51	0.003573	1.475	17.01	48.23	0.44
1	3665.22*	PF 1	25.10	1230.10	1230.473		1230.51	0.003526	1.463	17.15	48.76	0.43
1	3664.22*	PF 1	25.10	1230.10	1230.470		1230.50	0.003477	1.452	17.29	49.24	0.43
1	3663.22*	PF 1	25.10	1230.11	1230.465		1230.50	0.003834	1.489	16.86	49.71	0.45
1	3662.22*	PF 1	25.10	1230.11	1230.461		1230.50	0.003813	1.481	16.95	50.21	0.45
1	3661.22*	PF 1	25.10	1230.11	1230.458		1230.49	0.003809	1.474	17.02	50.72	0.45
1	3660.22*	PF 1	25.10	1230.11	1230.454		1230.49	0.003826	1.471	17.07	51.21	0.45
1	3659.22*	PF 1	25.10	1230.12	1230.445		1230.48	0.007893	1.532	16.38	51.68	0.48
1	3658.22*	PF 1	25.10	1230.12	1230.436		1230.47	0.008457	1.558	16.11	52.16	0.49
1	3657.22*	PF 1	25.10	1230.12	1230.425		1230.47	0.009227	1.594	15.74	52.61	0.51
1	3656.22*	PF 1	25.10	1230.12	1230.413		1230.46	0.010340	1.644	15.27	53.06	0.54
1	3655.22*	PF 1	25.10	1230.13	1230.389		1230.44	0.015228	1.841	13.63	53.47	0.64
1	3654.26	PF 1	25.10	1230.13	1230.321	1230.32100	1230.42	0.040775	2.472	10.15	53.60	1.00
1	3653.26*	PF 1	25.10	1229.47	1229.547	1229.67300	1230.25	0.998385	6.711	3.74	48.63	4.27
1	3652.26*	PF 1	25.10	1228.80	1228.896	1229.01100	1229.45	0.592154	5.948	4.22	44.43	3.40
1	3651.26*	PF 1	25.10	1228.14	1228.241	1228.36900	1228.84	0.601634	6.222	4.03	40.16	3.46
1	3650.27*	PF 1	25.10	1227.47	1227.579	1227.71800	1228.23	0.593076	6.480	3.87	35.90	3.48
1	3649.27*	PF 1	25.10	1226.81	1226.929	1227.08200	1227.64	0.575445	6.752	3.72	31.65	3.47
1	3648.64	PF 1	25.10	1226.39	1226.516	1226.67800	1227.27	0.565246	6.955	3.61	29.00	3.48
1	3647.64*	PF 1	25.10	1226.38	1226.564	1226.65700	1226.89	0.147542	4.548	5.52	30.61	1.89
1	3646.64*	PF 1	25.10	1226.37	1226.686	1226.64300	1226.78	0.022128	2.507	10.01	32.67	0.80
1	3645.64*	PF 1	25.10	1226.36	1226.662		1226.76	0.023592	2.519	9.96	33.86	0.82
1	3644.64*	PF 1	25.10	1226.34	1226.644		1226.73	0.021447	2.413	10.40	35.12	0.78
1	3643.64*	PF 1	25.10	1226.33	1226.617		1226.71	0.024064	2.465	10.18	36.29	0.82
1	3642.64*	PF 1	25.10	1226.32	1226.588		1226.69	0.028178	2.553	9.83	37.45	0.88
1	3641.64*	PF 1	25.10	1226.31	1226.567	1226.55000	1226.67	0.017156	2.582	9.72	38.64	0.91
1	3640.64*	PF 1	25.10	1226.30	1226.550	1226.53300	1226.65	0.017618	2.570	9.77	39.87	0.92
1	3639.64*	PF 1	25.10	1226.29	1226.532	1226.52100	1226.64	0.018353	2.571	9.76	41.07	0.93

HEC-RAS Plan: Plan 03 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	3638.64*	PF 1	25.10	1226.27	1226.520	1226.49600	1226.61	0.015449	2.411	10.41	42.39	0.86
1	3637.64*	PF 1	25.10	1226.26	1226.506		1226.59	0.015399	2.381	10.54	43.63	0.85
1	3636.64*	PF 1	25.10	1226.25	1226.491		1226.58	0.015477	2.358	10.64	44.87	0.85
1	3635.64*	PF 1	25.10	1226.24	1226.476	1226.45300	1226.56	0.015703	2.343	10.71	46.11	0.86
1	3634.64*	PF 1	25.10	1226.23	1226.460		1226.55	0.016210	2.341	10.72	47.34	0.87
1	3633.64*	PF 1	25.10	1226.22	1226.443		1226.53	0.016928	2.347	10.69	48.56	0.88
1	3632.64*	PF 1	25.10	1226.20	1226.432		1226.51	0.014213	2.204	11.39	49.88	0.81
1	3631.64*	PF 1	25.10	1226.19	1226.418		1226.49	0.014167	2.180	11.51	51.12	0.81
1	3630.64*	PF 1	25.10	1226.18	1226.405		1226.48	0.014247	2.163	11.60	52.37	0.81
1	3629.64*	PF 1	25.10	1226.17	1226.391		1226.46	0.014385	2.149	11.68	53.61	0.81
1	3628.64*	PF 1	25.10	1226.16	1226.376		1226.45	0.014700	2.143	11.71	54.85	0.82
1	3627.64*	PF 1	25.10	1226.15	1226.360		1226.43	0.015318	2.151	11.67	56.08	0.83
1	3626.64*	PF 1	25.10	1226.14	1226.344		1226.42	0.016119	2.165	11.59	57.31	0.85
1	3625.64*	PF 1	25.10	1226.12	1226.333		1226.40	0.013497	2.034	12.34	58.63	0.78
1	3624.64*	PF 1	25.10	1226.11	1226.320		1226.38	0.013559	2.020	12.43	59.88	0.78
1	3623.64*	PF 1	25.10	1226.10	1226.306		1226.37	0.013702	2.010	12.49	61.12	0.78
1	3622.64*	PF 1	25.10	1226.09	1226.292		1226.36	0.014006	2.007	12.51	62.37	0.79
1	3621.64*	PF 1	25.10	1226.08	1226.277		1226.34	0.014654	2.019	12.43	63.59	0.80
1	3620.64*	PF 1	25.10	1226.07	1226.262		1226.33	0.015402	2.033	12.34	64.82	0.82
1	3619.64*	PF 1	25.10	1226.05	1226.251		1226.31	0.012831	1.909	13.15	66.14	0.76
1	3618.64*	PF 1	25.10	1226.04	1226.238		1226.29	0.012890	1.898	13.23	67.39	0.76
1	3617.64*	PF 1	25.10	1226.03	1226.225		1226.28	0.012990	1.888	13.29	68.64	0.76
1	3616.64*	PF 1	25.10	1226.02	1226.212		1226.27	0.013163	1.882	13.34	69.89	0.76
1	3615.64*	PF 1	25.10	1226.01	1226.199		1226.25	0.013506	1.884	13.33	71.13	0.77
1	3614.64*	PF 1	25.10	1226.00	1226.184		1226.24	0.014158	1.897	13.23	72.38	0.78
1	3613.64*	PF 1	25.10	1225.99	1226.169		1226.23	0.015056	1.920	13.08	73.60	0.80
1	3612.64*	PF 1	25.10	1225.97	1226.157		1226.21	0.012447	1.800	13.94	74.93	0.74
1	3611.63*	PF 1	25.10	1225.96	1226.145		1226.20	0.012513	1.791	14.01	76.18	0.74
1	3610.63*	PF 1	25.10	1225.95	1226.133		1226.18	0.012652	1.785	14.06	77.43	0.74
1	3609.63*	PF 1	25.10	1225.94	1226.120		1226.17	0.012920	1.785	14.06	78.68	0.74
1	3608.63*	PF 1	25.10	1225.93	1226.106		1226.16	0.013493	1.797	13.96	79.92	0.76
1	3607.63*	PF 1	25.10	1225.92	1226.092		1226.14	0.014053	1.808	13.88	81.16	0.77
1	3606.63*	PF 1	25.10	1225.90	1226.084		1226.13	0.010931	1.666	15.07	82.50	0.69
1	3605.63*	PF 1	25.10	1225.89	1226.074		1226.12	0.010625	1.642	15.29	83.76	0.68
1	3605.41	PF 1	25.10	1225.89	1226.070		1226.11	0.011261	1.669	15.04	84.02	0.70
1	3604.41*	PF 1	25.10	1225.88	1226.060		1226.10	0.010960	1.644	15.27	85.44	0.69
1	3603.41*	PF 1	25.10	1225.86	1226.046		1226.09	0.011393	1.652	15.19	86.86	0.70
1	3602.41*	PF 1	25.10	1225.85	1226.035		1226.08	0.011155	1.631	15.39	88.28	0.69
1	3601.41*	PF 1	25.10	1225.84	1226.025		1226.07	0.010899	1.610	15.59	89.71	0.68
1	3600.41*	PF 1	25.10	1225.82	1226.011		1226.05	0.011372	1.620	15.49	91.13	0.69
1	3599.41*	PF 1	25.10	1225.81	1226.000		1226.04	0.011182	1.602	15.67	92.55	0.69
1	3598.41*	PF 1	25.10	1225.80	1225.990		1226.03	0.010921	1.581	15.87	93.97	0.68
1	3597.41*	PF 1	25.10	1225.79	1225.979		1226.02	0.010672	1.561	16.08	95.38	0.67
1	3596.41*	PF 1	25.10	1225.77	1225.966		1226.00	0.011100	1.570	15.99	96.81	0.68
1	3595.41*	PF 1	25.10	1225.76	1225.955		1225.99	0.010885	1.552	16.17	98.23	0.67
1	3594.41*	PF 1	25.10	1225.75	1225.945		1225.98	0.010627	1.532	16.39	99.65	0.67
1	3593.41*	PF 1	25.10	1225.73	1225.931		1225.97	0.011057	1.541	16.28	101.09	0.68
1	3592.41*	PF 1	25.10	1225.72	1225.921		1225.96	0.010831	1.523	16.48	102.51	0.67
1	3591.41*	PF 1	25.10	1225.71	1225.911		1225.95	0.010589	1.505	16.68	103.92	0.66
1	3590.41*	PF 1	25.10	1225.69	1225.897		1225.93	0.011080	1.517	16.55	105.35	0.67
1	3589.41*	PF 1	25.10	1225.68	1225.886		1225.92	0.010898	1.501	16.72	106.77	0.67
1	3588.41*	PF 1	25.10	1225.67	1225.876		1225.91	0.010667	1.484	16.91	108.19	0.66
1	3587.41*	PF 1	25.10	1225.66	1225.866		1225.90	0.010390	1.465	17.14	109.61	0.65
1	3586.41*	PF 1	25.10	1225.64	1225.853		1225.89	0.010823	1.475	17.02	111.04	0.66
1	3585.41*	PF 1	25.10	1225.63	1225.843		1225.88	0.010575	1.457	17.22	112.47	0.66
1	3584.41*	PF 1	25.10	1225.62	1225.833		1225.87	0.010365	1.441	17.41	113.89	0.65
1	3583.41*	PF 1	25.10	1225.60	1225.819		1225.85	0.010824	1.453	17.27	115.32	0.66
1	3582.41*	PF 1	25.10	1225.59	1225.809		1225.84	0.010618	1.438	17.46	116.73	0.66
1	3581.41*	PF 1	25.10	1225.58	1225.799		1225.83	0.010391	1.421	17.66	118.15	0.65
1	3580.41*	PF 1	25.10	1225.56	1225.786		1225.82	0.010849	1.433	17.52	119.58	0.66
1	3579.41*	PF 1	25.10	1225.55	1225.776		1225.81	0.010654	1.419	17.69	121.00	0.65
1	3578.41*	PF 1	25.10	1225.54	1225.765		1225.80	0.010436	1.403	17.89	122.42	0.65
1	3577.41*	PF 1	25.10	1225.53	1225.755		1225.79	0.010194	1.387	18.10	123.85	0.64
1	3576.41*	PF 1	25.10	1225.51	1225.742		1225.77	0.010639	1.398	17.95	125.29	0.65
1	3575.41*	PF 1	25.10	1225.50	1225.732		1225.76	0.010401	1.383	18.15	126.71	0.64
1	3574.41*	PF 1	25.10	1225.49	1225.722		1225.75	0.010142	1.366	18.37	128.14	0.64
1	3573.41*	PF 1	25.10	1225.47	1225.709		1225.74	0.010578	1.377	18.22	129.57	0.65
1	3572.41*	PF 1	25.10	1225.46	1225.699		1225.73	0.010438	1.366	18.38	130.99	0.64
1	3571.41*	PF 1	25.10	1225.45	1225.689		1225.72	0.010184	1.350	18.59	132.41	0.64
1	3570.41*	PF 1	25.10	1225.43	1225.676		1225.71	0.010676	1.363	18.41	133.84	0.65
1	3569.41*	PF 1	25.10	1225.42	1225.666		1225.69	0.010512	1.351	18.58	135.27	0.64
1	3568.41*	PF 1	25.10	1225.41	1225.656		1225.68	0.010294	1.337	18.77	136.69	0.64
1	3567.41*	PF 1	25.10	1225.40	1225.646		1225.67	0.010053	1.322	18.98	138.11	0.63
1	3566.41*	PF 1	25.10	1225.38	1225.633		1225.66	0.010531	1.335	18.80	139.54	0.64
1	3565.41*	PF 1	25.10	1225.37	1225.623		1225.65	0.010319	1.322	18.99	140.96	0.63
1	3564.41*	PF 1	25.10	1225.36	1225.613		1225.64	0.010084	1.307	19.20	142.38	0.63
1	3563.41*	PF 1	25.10	1225.34	1225.600		1225.63	0.010584	1.321	19.00	143.81	0.64
1	3562.41*	PF 1	25.10	1225.33	1225.590		1225.62	0.010409	1.310	19.17	145.23	0.64
1	3561.41*	PF 1	25.10	1225.32	1225.580		1225.61	0.010206	1.297	19.36	146.66	0.63

HEC-RAS Plan: Plan 03 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	3560.41*	PF 1	25.10	1225.30	1225.567		1225.59	0.010769	1.313	19.12	148.09	0.64
1	3559.41*	PF 1	25.10	1225.29	1225.557		1225.58	0.010766	1.308	19.20	149.51	0.64
1	3558.41*	PF 1	25.10	1225.28	1225.546		1225.57	0.010733	1.301	19.29	150.93	0.64
1	3557.41*	PF 1	25.10	1225.26	1225.532		1225.56	0.011734	1.332	18.85	152.35	0.67
1	3556.41*	PF 1	25.10	1225.25	1225.518		1225.55	0.012601	1.356	18.52	153.75	0.69
1	3555.41*	PF 1	25.10	1225.24	1225.504		1225.53	0.013805	1.388	18.08	155.15	0.72
1	3554.41*	PF 1	25.10	1225.23	1225.496		1225.52	0.009810	1.248	20.11	156.61	0.61
1	3553.41*	PF 1	25.10	1225.21	1225.484		1225.51	0.010217	1.259	19.94	158.05	0.62
1	3552.41*	PF 1	25.10	1225.20	1225.474		1225.50	0.010003	1.246	20.14	159.47	0.62
1	3551.41*	PF 1	25.10	1225.19	1225.465		1225.49	0.009702	1.231	20.39	160.90	0.61
1	3550.41*	PF 1	25.10	1225.17	1225.453		1225.48	0.010022	1.238	20.27	162.33	0.62
1	3549.41*	PF 1	25.10	1225.16	1225.443		1225.47	0.009753	1.224	20.51	163.76	0.61
1	3548.41*	PF 1	25.10	1225.15	1225.434		1225.46	0.009431	1.208	20.79	165.18	0.60
1	3547.42*	PF 1	25.10	1225.13	1225.422		1225.45	0.009654	1.212	20.71	166.62	0.61
1	3546.42*	PF 1	25.10	1225.12	1225.413		1225.44	0.009248	1.192	21.05	168.05	0.59
1	3545.42*	PF 1	25.10	1225.11	1225.404		1225.43	0.008747	1.168	21.48	169.50	0.58
1	3544.42*	PF 1	25.10	1225.10	1225.396		1225.42	0.008156	1.140	22.02	171.06	0.56
1	3543.42*	PF 1	25.10	1225.08	1225.389		1225.41	0.007548	1.109	22.62	172.65	0.54
1	3542.42*	PF 1	25.10	1225.07	1225.382		1225.40	0.006811	1.072	23.42	174.23	0.52
1	3541.42*	PF 1	25.10	1225.06	1225.373		1225.39	0.011479	1.051	23.88	175.77	0.50
1	3540.42*	PF 1	25.10	1225.04	1225.360		1225.38	0.012104	1.064	23.59	177.29	0.51
1	3539.42*	PF 1	25.10	1225.03	1225.347		1225.37	0.012831	1.079	23.26	178.82	0.53
1	3538.42*	PF 1	25.10	1225.02	1225.332		1225.35	0.014275	1.111	22.59	180.03	0.55
1	3537.42*	PF 1	25.10	1225.00	1225.312		1225.33	0.018819	1.205	20.83	180.97	0.63
1	3537.09	PF 1	25.10	1225.00	1225.276	1225.27600	1225.32	0.064871	1.747	14.37	181.12	1.09
1	3536.09*	PF 1	25.10	1224.19	1224.369	1224.43700	1225.05	5.312615	6.621	3.79	176.28	7.96
1	3535.09*	PF 1	25.10	1223.38	1223.553	1223.59500	1223.72	0.502339	3.296	7.62	171.95	2.76
1	3534.09*	PF 1	25.10	1222.56	1222.694	1222.74400	1222.98	1.158192	4.280	5.86	167.43	4.03
1	3533.09*	PF 1	25.10	1221.75	1221.861	1221.90700	1222.08	0.700259	3.720	6.75	163.00	3.22
1	3532.09*	PF 1	25.10	1220.94	1221.009	1221.07300	1221.27	0.932716	4.100	6.12	158.48	3.68
1	3531.18	PF 1	25.10	1220.20	1220.241	1220.29200	1220.48	0.790950	3.942	6.37	154.43	3.42
1	3530.18*	PF 1	25.10	1220.19	1220.340	1220.28300	1220.36	0.010728	1.083	23.17	155.00	0.49
1	3529.18*	PF 1	25.10	1220.18	1220.329		1220.35	0.011069	1.094	22.94	154.89	0.50
1	3528.18*	PF 1	25.10	1220.17	1220.317		1220.34	0.011580	1.109	22.63	154.80	0.51
1	3527.18*	PF 1	25.10	1220.16	1220.304		1220.32	0.012365	1.131	22.18	154.70	0.53
1	3526.18*	PF 1	25.10	1220.15	1220.289		1220.31	0.013850	1.171	21.44	154.58	0.55
1	3525.18*	PF 1	25.10	1220.14	1220.272		1220.30	0.016405	1.232	20.37	154.45	0.60
1	3524.18*	PF 1	25.10	1220.13	1220.259		1220.28	0.009954	1.261	19.90	154.36	0.62
1	3523.18*	PF 1	25.10	1220.12	1220.249		1220.27	0.009934	1.261	19.91	154.27	0.62
1	3522.18*	PF 1	25.10	1220.11	1220.239		1220.26	0.009946	1.261	19.90	154.18	0.62
1	3521.18*	PF 1	25.10	1220.10	1220.229		1220.25	0.009925	1.261	19.91	154.10	0.62
1	3520.18*	PF 1	25.10	1220.09	1220.219		1220.24	0.009937	1.262	19.90	154.01	0.62
1	3519.18*	PF 1	25.10	1220.08	1220.210		1220.23	0.009916	1.261	19.90	153.93	0.62
1	3518.18*	PF 1	25.10	1220.07	1220.200		1220.22	0.009928	1.262	19.89	153.84	0.62
1	3517.18*	PF 1	25.10	1220.06	1220.190		1220.21	0.009971	1.264	19.86	153.75	0.62
1	3516.18*	PF 1	25.10	1220.05	1220.180		1220.20	0.009950	1.263	19.87	153.67	0.62
1	3515.18*	PF 1	25.10	1220.04	1220.170		1220.19	0.009961	1.264	19.86	153.58	0.62
1	3514.18*	PF 1	25.10	1220.03	1220.160		1220.19	0.009942	1.263	19.87	153.49	0.62
1	3513.18*	PF 1	25.10	1220.02	1220.150		1220.18	0.009952	1.264	19.86	153.41	0.62
1	3512.18*	PF 1	25.10	1220.01	1220.140		1220.17	0.009933	1.264	19.86	153.32	0.62
1	3511.18*	PF 1	25.10	1220.00	1220.130		1220.16	0.009943	1.264	19.85	153.24	0.62
1	3510.18*	PF 1	25.10	1219.99	1220.120		1220.15	0.009924	1.264	19.86	153.15	0.62
1	3509.18*	PF 1	25.10	1219.98	1220.110		1220.14	0.009934	1.265	19.85	153.07	0.62
1	3508.18*	PF 1	25.10	1219.97	1220.100		1220.13	0.009915	1.264	19.86	152.98	0.62
1	3507.18*	PF 1	25.10	1219.96	1220.090		1220.12	0.009927	1.265	19.84	152.89	0.62
1	3506.18*	PF 1	25.10	1219.95	1220.080		1220.11	0.009906	1.264	19.85	152.81	0.62
1	3505.18*	PF 1	25.10	1219.94	1220.070		1220.10	0.009887	1.264	19.86	152.72	0.62
1	3504.18*	PF 1	25.10	1219.93	1220.060		1220.09	0.009930	1.266	19.83	152.63	0.62
1	3503.18*	PF 1	25.10	1219.92	1220.050		1220.08	0.009971	1.268	19.80	152.55	0.62
1	3502.18*	PF 1	25.10	1219.91	1220.040		1220.07	0.009951	1.267	19.81	152.47	0.62
1	3501.18*	PF 1	25.10	1219.90	1220.030		1220.06	0.009933	1.267	19.81	152.37	0.62
1	3500.18*	PF 1	25.10	1219.89	1220.020		1220.05	0.009943	1.267	19.80	152.29	0.62
1	3499.18*	PF 1	25.10	1219.88	1220.010		1220.04	0.009954	1.268	19.79	152.21	0.62
1	3498.18*	PF 1	25.10	1219.87	1220.000		1220.03	0.009967	1.269	19.78	152.11	0.62
1	3497.18*	PF 1	25.10	1219.86	1219.990		1220.02	0.009946	1.268	19.79	152.03	0.62
1	3496.18*	PF 1	25.10	1219.85	1219.980		1220.01	0.009957	1.269	19.78	151.95	0.62
1	3495.18*	PF 1	25.10	1219.84	1219.970		1220.00	0.009969	1.270	19.77	151.86	0.62
1	3494.18*	PF 1	25.10	1219.83	1219.961		1219.99	0.009949	1.269	19.77	151.77	0.62
1	3493.18*	PF 1	25.10	1219.82	1219.951		1219.98	0.009929	1.269	19.78	151.69	0.62
1	3492.18*	PF 1	25.10	1219.81	1219.941		1219.97	0.009941	1.270	19.77	151.61	0.62
1	3491.18*	PF 1	25.10	1219.80	1219.931		1219.96	0.009953	1.270	19.76	151.51	0.62
1	3490.18*	PF 1	25.10	1219.79	1219.921		1219.95	0.009932	1.270	19.77	151.44	0.62
1	3489.18*	PF 1	25.10	1219.78	1219.911		1219.94	0.009944	1.271	19.75	151.35	0.62
1	3488.18*	PF 1	25.10	1219.77	1219.901		1219.93	0.009955	1.271	19.74	151.27	0.62
1	3487.18*	PF 1	25.10	1219.76	1219.891		1219.92	0.009967	1.272	19.73	151.18	0.62
1	3486.18*	PF 1	25.10	1219.75	1219.881		1219.91	0.009948	1.272	19.74	151.09	0.62
1	3485.18*	PF 1	25.10	1219.74	1219.871		1219.90	0.009958	1.272	19.73	151.01	0.62
1	3484.18*	PF 1	25.10	1219.73	1219.861		1219.89	0.009970	1.273	19.72	150.92	0.62
1	3483.18*	PF 1	25.10	1219.72	1219.851		1219.88	0.009951	1.273	19.72	150.83	0.62

HEC-RAS Plan: Plan 03 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	3482.18*	PF 1	25.10	1219.71	1219.841		1219.87	0.009962	1.273	19.71	150.75	0.62
1	3481.18*	PF 1	25.10	1219.70	1219.831		1219.86	0.009943	1.273	19.72	150.66	0.62
1	3480.18*	PF 1	25.10	1219.69	1219.821		1219.85	0.009924	1.272	19.73	150.57	0.62
1	3479.18*	PF 1	25.10	1219.68	1219.811		1219.84	0.009935	1.273	19.71	150.49	0.62
1	3478.18*	PF 1	25.10	1219.67	1219.801		1219.83	0.009945	1.274	19.70	150.41	0.62
1	3477.18*	PF 1	25.10	1219.66	1219.791		1219.82	0.009957	1.275	19.69	150.32	0.62
1	3476.18*	PF 1	25.10	1219.65	1219.781		1219.81	0.009969	1.275	19.68	150.23	0.62
1	3475.18*	PF 1	25.10	1219.64	1219.771		1219.80	0.009949	1.275	19.69	150.15	0.62
1	3474.18*	PF 1	25.10	1219.63	1219.761		1219.79	0.009961	1.276	19.68	150.06	0.62
1	3473.18*	PF 1	25.10	1219.62	1219.752		1219.78	0.009942	1.275	19.68	149.97	0.62
1	3472.18*	PF 1	25.10	1219.61	1219.742		1219.77	0.009953	1.276	19.67	149.89	0.62
1	3471.18*	PF 1	25.10	1219.60	1219.732		1219.76	0.009963	1.277	19.66	149.81	0.62
1	3470.18*	PF 1	25.10	1219.59	1219.722		1219.75	0.009946	1.276	19.67	149.71	0.62
1	3469.18*	PF 1	25.10	1219.58	1219.712		1219.74	0.009926	1.276	19.67	149.63	0.62
1	3468.18*	PF 1	25.10	1219.57	1219.702		1219.73	0.009906	1.275	19.68	149.55	0.62
1	3467.18*	PF 1	25.10	1219.56	1219.692		1219.72	0.009919	1.276	19.67	149.45	0.62
1	3466.18*	PF 1	25.10	1219.55	1219.682		1219.71	0.009930	1.277	19.66	149.37	0.62
1	3465.18*	PF 1	25.10	1219.54	1219.672		1219.70	0.009910	1.276	19.67	149.29	0.62
1	3464.18*	PF 1	25.10	1219.53	1219.662		1219.69	0.009922	1.277	19.65	149.20	0.62
1	3463.18*	PF 1	25.10	1219.52	1219.652		1219.68	0.009904	1.277	19.66	149.11	0.62
1	3462.18*	PF 1	25.10	1219.51	1219.642		1219.67	0.009884	1.276	19.67	149.03	0.62
1	3461.18*	PF 1	25.10	1219.50	1219.632		1219.66	0.009896	1.277	19.66	148.94	0.62
1	3460.18*	PF 1	25.10	1219.49	1219.622		1219.65	0.009877	1.277	19.66	148.86	0.62
1	3459.18*	PF 1	25.10	1219.48	1219.613		1219.64	0.009858	1.276	19.67	148.78	0.62
1	3458.18*	PF 1	25.10	1219.47	1219.603		1219.63	0.009809	1.274	19.69	148.69	0.62
1	3457.18*	PF 1	25.10	1219.46	1219.593		1219.62	0.009761	1.273	19.72	148.60	0.62
1	3456.18*	PF 1	25.10	1219.45	1219.583		1219.61	0.009712	1.271	19.74	148.52	0.61
1	3455.18*	PF 1	25.10	1219.44	1219.574		1219.60	0.009636	1.269	19.79	148.43	0.61
1	3454.18*	PF 1	25.10	1219.43	1219.564		1219.59	0.009559	1.266	19.83	148.35	0.61
1	3453.18*	PF 1	25.10	1219.42	1219.555		1219.58	0.009455	1.262	19.89	148.27	0.61
1	3452.18*	PF 1	25.10	1219.41	1219.545		1219.57	0.009296	1.256	19.99	148.18	0.60
1	3451.18*	PF 1	25.10	1219.40	1219.536		1219.56	0.009086	1.247	20.12	148.11	0.60
1	3450.18*	PF 1	25.10	1219.39	1219.527		1219.55	0.008830	1.237	20.29	148.03	0.59
1	3449.18*	PF 1	25.10	1219.38	1219.519		1219.54	0.008534	1.225	20.49	147.94	0.58
1	3448.18*	PF 1	25.10	1219.37	1219.511		1219.53	0.008178	1.209	20.75	147.87	0.57
1	3447.18*	PF 1	25.10	1219.36	1219.503		1219.53	0.007753	1.190	21.09	147.81	0.56
1	3446.18*	PF 1	25.10	1219.35	1219.496		1219.52	0.007297	1.169	21.47	147.72	0.54
1	3445.18*	PF 1	25.10	1219.34	1219.489		1219.51	0.006798	1.145	21.92	147.66	0.52
1	3444.18*	PF 1	25.10	1219.33	1219.483		1219.50	0.006259	1.117	22.47	147.61	0.50
1	3443.18*	PF 1	25.10	1219.32	1219.477		1219.50	0.005716	1.087	23.09	147.54	0.48
1	3442.18*	PF 1	25.10	1219.31	1219.472		1219.49	0.005193	1.057	23.76	147.48	0.46
1	3441.18*	PF 1	25.10	1219.30	1219.468		1219.48	0.004617	1.020	24.61	147.43	0.44
1	3440.63	PF 1	33.60	1219.29	1219.445		1219.48	0.010712	1.476	22.77	147.31	0.66
1	3366.51	PF 1	33.60	1218.55	1218.715		1218.75	0.009062	1.412	23.79	145.08	0.61
1	3305.78	PF 1	33.60	1217.94	1218.156		1218.20	0.009037	1.684	19.95	93.19	0.64
1	3304.78*	PF 1	33.60	1217.93	1218.146		1218.19	0.009043	1.687	19.91	92.82	0.64
1	3303.78*	PF 1	33.60	1217.92	1218.137		1218.18	0.009031	1.689	19.89	92.45	0.64
1	3302.78*	PF 1	33.60	1217.91	1218.127		1218.17	0.009022	1.691	19.86	92.07	0.64
1	3301.78*	PF 1	33.60	1217.90	1218.118		1218.16	0.009011	1.694	19.84	91.71	0.64
1	3300.78*	PF 1	33.60	1217.89	1218.109		1218.15	0.009002	1.696	19.81	91.33	0.64
1	3299.78*	PF 1	33.60	1217.88	1218.099		1218.14	0.008993	1.698	19.79	90.96	0.64
1	3298.78*	PF 1	33.60	1217.87	1218.090		1218.14	0.008985	1.700	19.76	90.59	0.64
1	3297.78*	PF 1	33.60	1217.86	1218.080		1218.13	0.008977	1.703	19.73	90.22	0.64
1	3296.78*	PF 1	33.60	1217.85	1218.071		1218.12	0.008987	1.706	19.69	89.84	0.64
1	3295.78*	PF 1	33.60	1217.84	1218.061		1218.11	0.008979	1.708	19.67	89.48	0.64
1	3294.78*	PF 1	33.60	1217.83	1218.052		1218.10	0.008958	1.710	19.65	89.10	0.64
1	3293.78*	PF 1	33.60	1217.82	1218.043		1218.09	0.008935	1.712	19.63	88.74	0.64
1	3292.78*	PF 1	33.60	1217.81	1218.033		1218.08	0.008948	1.715	19.59	88.36	0.64
1	3291.78*	PF 1	33.60	1217.80	1218.024		1218.07	0.008942	1.718	19.56	87.99	0.64
1	3290.78*	PF 1	33.60	1217.79	1218.015		1218.06	0.008923	1.720	19.54	87.62	0.64
1	3289.78*	PF 1	33.60	1217.78	1218.005		1218.05	0.008919	1.722	19.51	87.25	0.64
1	3288.78*	PF 1	33.60	1217.77	1217.996		1218.04	0.008901	1.724	19.49	86.88	0.64
1	3287.78*	PF 1	33.60	1217.76	1217.987		1218.03	0.008882	1.726	19.47	86.51	0.64
1	3286.78*	PF 1	33.60	1217.75	1217.977		1218.02	0.008882	1.729	19.43	86.13	0.64
1	3285.78*	PF 1	33.60	1217.74	1217.968		1218.02	0.008864	1.731	19.41	85.77	0.64
1	3284.78*	PF 1	33.60	1217.73	1217.959		1218.01	0.008849	1.733	19.39	85.39	0.64
1	3283.78*	PF 1	33.60	1217.72	1217.949		1218.00	0.008848	1.736	19.36	85.03	0.64
1	3282.78*	PF 1	33.60	1217.71	1217.940		1217.99	0.008835	1.738	19.33	84.65	0.64
1	3281.78*	PF 1	33.60	1217.70	1217.931		1217.98	0.008822	1.741	19.30	84.28	0.64
1	3280.78*	PF 1	33.60	1217.69	1217.922		1217.97	0.008794	1.742	19.29	83.90	0.64
1	3279.78*	PF 1	33.60	1217.68	1217.912		1217.96	0.008796	1.745	19.25	83.54	0.64
1	3278.78*	PF 1	33.60	1217.67	1217.903		1217.95	0.008769	1.747	19.24	83.16	0.64
1	3277.78*	PF 1	33.60	1217.66	1217.894		1217.94	0.008742	1.748	19.22	82.79	0.64
1	3276.78*	PF 1	33.60	1217.65	1217.885		1217.93	0.008717	1.750	19.20	82.42	0.64
1	3275.78*	PF 1	33.60	1217.64	1217.876		1217.92	0.008676	1.750	19.20	82.06	0.64
1	3274.78*	PF 1	33.60	1217.63	1217.867		1217.92	0.008653	1.752	19.18	81.68	0.64
1	3273.78*	PF 1	33.60	1217.62	1217.858		1217.91	0.008614	1.753	19.17	81.32	0.64
1	3272.78*	PF 1	33.60	1217.61	1217.849		1217.90	0.008564	1.753	19.17	80.94	0.64
1	3271.78*	PF 1	33.60	1217.60	1217.840		1217.89	0.008527	1.754	19.16	80.58	0.63

HEC-RAS Plan: Plan 03 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	3270.78*	PF 1	33.60	1217.59	1217.831		1217.88	0.008464	1.753	19.16	80.21	0.63
1	3269.78*	PF 1	33.60	1217.58	1217.822		1217.87	0.008418	1.754	19.16	79.83	0.63
1	3268.78*	PF 1	33.60	1217.57	1217.813		1217.86	0.008370	1.754	19.16	79.47	0.63
1	3267.78*	PF 1	33.60	1217.56	1217.804		1217.85	0.008326	1.754	19.15	79.10	0.63
1	3266.78*	PF 1	33.60	1217.55	1217.796		1217.84	0.008267	1.754	19.16	78.74	0.63
1	3265.78*	PF 1	33.60	1217.54	1217.787		1217.84	0.008198	1.753	19.17	78.36	0.62
1	3264.78*	PF 1	33.60	1217.53	1217.778		1217.83	0.008129	1.752	19.18	78.00	0.62
1	3263.78*	PF 1	33.60	1217.52	1217.770		1217.82	0.008050	1.750	19.20	77.63	0.62
1	3262.78*	PF 1	33.60	1217.51	1217.761		1217.81	0.007946	1.746	19.24	77.27	0.62
1	3261.78*	PF 1	33.60	1217.50	1217.753		1217.80	0.007847	1.743	19.28	76.90	0.61
1	3260.78*	PF 1	33.60	1217.49	1217.745		1217.79	0.007735	1.739	19.32	76.54	0.61
1	3259.78*	PF 1	33.60	1217.48	1217.737		1217.78	0.007606	1.733	19.38	76.17	0.61
1	3258.78*	PF 1	33.60	1217.47	1217.729		1217.78	0.007478	1.728	19.45	75.82	0.60
1	3257.78*	PF 1	33.60	1217.46	1217.718		1217.77	0.013687	1.747	19.24	75.43	0.61
1	3256.78*	PF 1	33.60	1217.44	1217.705		1217.75	0.012629	1.708	19.67	75.10	0.59
1	3255.78*	PF 1	33.60	1217.43	1217.689		1217.74	0.013750	1.756	19.14	74.68	0.61
1	3254.78*	PF 1	33.60	1217.42	1217.671		1217.72	0.015512	1.825	18.41	74.26	0.65
1	3253.78*	PF 1	33.60	1217.41	1217.644		1217.70	0.019777	1.968	17.07	73.78	0.72
1	3253.32	PF 1	33.60	1217.41	1217.599	1217.59900	1217.69	0.040702	2.450	13.72	73.34	1.00
1	3252.32*	PF 1	33.60	1216.12	1216.175	1216.31800	1217.45	2.839276	9.042	3.72	67.66	6.80
1	3251.32*	PF 1	33.60	1214.83	1214.907	1215.03600	1215.66	1.065060	6.936	4.84	62.92	4.41
1	3250.32*	PF 1	33.60	1213.54	1213.618	1213.75800	1214.49	1.239915	7.498	4.48	58.05	4.76
1	3250.17	PF 1	33.60	1213.35	1213.429	1213.57000	1214.30	1.212747	7.484	4.49	57.34	4.72
1	3249.17*	PF 1	33.60	1213.34	1213.480	1213.56100	1213.76	0.177616	4.203	7.99	57.41	1.99
1	3248.17*	PF 1	33.60	1213.33	1213.651	1213.55200	1213.70	0.011308	1.829	18.37	58.21	0.57
1	3247.17*	PF 1	33.60	1213.32	1213.638		1213.69	0.011785	1.856	18.10	57.89	0.59
1	3246.17*	PF 1	33.60	1213.31	1213.624		1213.68	0.012426	1.890	17.78	57.58	0.60
1	3245.17*	PF 1	33.60	1213.30	1213.609		1213.67	0.013266	1.931	17.40	57.25	0.62
1	3244.17*	PF 1	33.60	1213.29	1213.594		1213.65	0.014163	1.974	17.02	56.92	0.64
1	3243.17*	PF 1	33.60	1213.28	1213.583		1213.64	0.008174	1.994	16.85	56.62	0.64
1	3242.17*	PF 1	33.60	1213.27	1213.574		1213.64	0.008161	1.997	16.83	56.33	0.64
1	3241.17*	PF 1	33.60	1213.26	1213.565		1213.63	0.008141	2.000	16.80	56.04	0.64
1	3240.17*	PF 1	33.60	1213.25	1213.556		1213.62	0.008117	2.002	16.79	55.77	0.64
1	3239.17*	PF 1	33.60	1213.24	1213.547		1213.61	0.008109	2.005	16.75	55.47	0.64
1	3238.17*	PF 1	33.60	1213.23	1213.538		1213.60	0.008092	2.008	16.73	55.18	0.64
1	3237.17*	PF 1	33.60	1213.22	1213.530		1213.59	0.008073	2.011	16.71	54.90	0.64
1	3236.17*	PF 1	33.60	1213.21	1213.521		1213.58	0.008058	2.014	16.68	54.61	0.64
1	3235.17*	PF 1	33.60	1213.20	1213.512		1213.58	0.008044	2.018	16.65	54.31	0.64
1	3234.17*	PF 1	33.60	1213.19	1213.503		1213.57	0.008028	2.021	16.63	54.03	0.64
1	3233.17*	PF 1	33.60	1213.18	1213.495		1213.56	0.008013	2.024	16.60	53.75	0.64
1	3232.17*	PF 1	33.60	1213.17	1213.486		1213.55	0.008001	2.027	16.58	53.46	0.64
1	3231.17*	PF 1	33.60	1213.16	1213.477		1213.54	0.007988	2.030	16.55	53.17	0.64
1	3230.17*	PF 1	33.60	1213.15	1213.468		1213.53	0.007968	2.033	16.52	52.88	0.64
1	3229.17*	PF 1	33.60	1213.14	1213.460		1213.52	0.007946	2.036	16.50	52.60	0.64
1	3228.17*	PF 1	33.60	1213.13	1213.451		1213.52	0.007929	2.039	16.48	52.31	0.64
1	3227.17*	PF 1	33.60	1213.12	1213.442		1213.51	0.007909	2.042	16.45	52.02	0.64
1	3226.17*	PF 1	33.60	1213.11	1213.434		1213.50	0.007891	2.045	16.43	51.74	0.64
1	3225.17*	PF 1	33.60	1213.10	1213.425		1213.49	0.007876	2.049	16.40	51.45	0.64
1	3224.17*	PF 1	33.60	1213.09	1213.416		1213.48	0.007873	2.053	16.37	51.16	0.64
1	3223.17*	PF 1	33.60	1213.08	1213.407		1213.47	0.007857	2.056	16.34	50.88	0.64
1	3222.17*	PF 1	33.60	1213.07	1213.399		1213.47	0.007855	2.061	16.30	50.58	0.64
1	3221.17*	PF 1	33.60	1213.06	1213.390		1213.46	0.007864	2.066	16.26	50.29	0.64
1	3220.17*	PF 1	33.60	1213.05	1213.381		1213.45	0.007858	2.070	16.23	50.02	0.64
1	3219.17*	PF 1	33.60	1213.04	1213.373		1213.44	0.007840	2.074	16.20	49.73	0.64
1	3218.17*	PF 1	33.60	1213.03	1213.364		1213.43	0.007842	2.079	16.16	49.43	0.64
1	3217.17*	PF 1	33.60	1213.02	1213.355		1213.42	0.007842	2.083	16.13	49.15	0.64
1	3216.17*	PF 1	33.60	1213.01	1213.346		1213.41	0.007836	2.088	16.09	48.86	0.64
1	3215.17*	PF 1	33.60	1213.00	1213.338		1213.41	0.007842	2.093	16.05	48.57	0.64
1	3214.17*	PF 1	33.60	1212.99	1213.329		1213.40	0.007831	2.097	16.02	48.29	0.64
1	3213.17*	PF 1	33.60	1212.98	1213.320		1213.39	0.007838	2.103	15.98	48.00	0.64
1	3212.17*	PF 1	33.60	1212.97	1213.311		1213.38	0.007843	2.108	15.94	47.72	0.64
1	3211.17*	PF 1	33.60	1212.96	1213.302		1213.37	0.007852	2.114	15.89	47.43	0.64
1	3210.17*	PF 1	33.60	1212.95	1213.294		1213.36	0.007862	2.120	15.85	47.13	0.64
1	3209.17*	PF 1	33.60	1212.94	1213.285		1213.36	0.007870	2.126	15.80	46.85	0.65
1	3208.17*	PF 1	33.60	1212.93	1213.276		1213.35	0.007888	2.133	15.76	46.57	0.65
1	3207.17*	PF 1	33.60	1212.92	1213.267		1213.34	0.007910	2.140	15.70	46.27	0.65
1	3206.17*	PF 1	33.60	1212.91	1213.258		1213.33	0.007930	2.147	15.65	45.99	0.65
1	3205.17*	PF 1	33.60	1212.90	1213.249		1213.32	0.007964	2.155	15.59	45.70	0.65
1	3204.17*	PF 1	33.60	1212.89	1213.240		1213.31	0.007998	2.163	15.53	45.40	0.65
1	3203.17*	PF 1	33.60	1212.88	1213.231		1213.30	0.008031	2.171	15.48	45.12	0.65
1	3202.17*	PF 1	33.60	1212.87	1213.222		1213.30	0.008068	2.180	15.41	44.82	0.66
1	3201.17*	PF 1	33.60	1212.86	1213.213		1213.29	0.008111	2.189	15.35	44.54	0.66
1	3200.17*	PF 1	33.60	1212.85	1213.204		1213.28	0.008156	2.198	15.28	44.25	0.66
1	3199.17*	PF 1	33.60	1212.84	1213.194		1213.27	0.008225	2.210	15.21	43.96	0.66
1	3198.17*	PF 1	33.60	1212.83	1213.185		1213.26	0.008282	2.220	15.13	43.67	0.66
1	3197.17*	PF 1	33.60	1212.82	1213.176		1213.25	0.008364	2.233	15.05	43.37	0.67
1	3196.17*	PF 1	33.60	1212.81	1213.166		1213.25	0.008466	2.247	14.95	43.08	0.67
1	3195.17*	PF 1	33.60	1212.80	1213.156		1213.24	0.008553	2.260	14.87	42.80	0.68
1	3194.17*	PF 1	33.60	1212.79	1213.146		1213.23	0.008680	2.276	14.76	42.50	0.68

HEC-RAS Plan: Plan 03 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	3193.17*	PF 1	33.60	1212.78	1213.136		1213.22	0.008809	2.293	14.66	42.20	0.69
1	3192.17*	PF 1	33.60	1212.77	1213.126		1213.21	0.008957	2.311	14.54	41.91	0.69
1	3191.17*	PF 1	33.60	1212.76	1213.116		1213.20	0.009125	2.330	14.42	41.60	0.70
1	3190.17*	PF 1	33.60	1212.75	1213.105		1213.19	0.009328	2.352	14.28	41.30	0.71
1	3189.17*	PF 1	33.60	1212.74	1213.094		1213.18	0.009543	2.375	14.14	41.01	0.71
1	3188.17*	PF 1	33.60	1212.73	1213.083		1213.17	0.009799	2.401	13.99	40.71	0.72
1	3187.17*	PF 1	33.60	1212.72	1213.071		1213.16	0.010115	2.432	13.82	40.40	0.73
1	3186.18	PF 1	33.60	1212.71	1213.059		1213.15	0.010499	2.467	13.62	40.09	0.75
1	3091.83	PF 1	33.60	1211.75	1212.049		1212.13	0.011217	2.315	14.51	49.41	0.75
1	3030.37	PF 1	33.60	1211.13	1211.384		1211.45	0.010925	2.052	16.37	65.54	0.72
1	3029.37*	PF 1	33.60	1211.12	1211.373		1211.44	0.010920	2.048	16.40	65.83	0.72
1	3028.37*	PF 1	33.60	1211.11	1211.362		1211.43	0.010913	2.044	16.44	66.13	0.72
1	3027.37*	PF 1	33.60	1211.10	1211.351		1211.42	0.010927	2.041	16.46	66.42	0.72
1	3026.37*	PF 1	33.60	1211.09	1211.340		1211.41	0.010960	2.040	16.47	66.72	0.72
1	3025.37*	PF 1	33.60	1211.08	1211.330		1211.39	0.010955	2.036	16.51	67.02	0.72
1	3024.37*	PF 1	33.60	1211.07	1211.319		1211.38	0.010972	2.033	16.53	67.32	0.72
1	3023.37*	PF 1	33.60	1211.06	1211.308		1211.37	0.011026	2.032	16.53	67.62	0.72
1	3022.37*	PF 1	33.60	1211.05	1211.297		1211.36	0.011045	2.030	16.55	67.92	0.72
1	3021.37*	PF 1	33.60	1211.04	1211.286		1211.35	0.011098	2.029	16.56	68.23	0.73
1	3020.37*	PF 1	33.60	1211.03	1211.275		1211.34	0.011156	2.029	16.56	68.53	0.73
1	3019.37*	PF 1	33.60	1211.02	1211.263		1211.33	0.011254	2.030	16.55	68.83	0.73
1	3018.37*	PF 1	33.60	1211.01	1211.252		1211.32	0.011369	2.033	16.53	69.14	0.73
1	3017.37*	PF 1	33.60	1211.00	1211.241		1211.31	0.011452	2.034	16.52	69.44	0.74
1	3016.37*	PF 1	33.60	1210.98	1211.234		1211.29	0.009538	1.921	17.49	69.84	0.68
1	3015.37*	PF 1	33.60	1210.97	1211.224		1211.28	0.009325	1.904	17.65	70.17	0.67
1	3014.37*	PF 1	33.60	1210.96	1211.216		1211.27	0.009090	1.886	17.81	70.49	0.66
1	3013.37*	PF 1	33.60	1210.95	1211.207		1211.26	0.008835	1.867	18.00	70.81	0.65
1	3012.37*	PF 1	33.60	1210.94	1211.199		1211.25	0.008558	1.845	18.21	71.15	0.64
1	3011.37*	PF 1	33.60	1210.93	1211.191		1211.24	0.008281	1.824	18.42	71.48	0.63
1	3010.37*	PF 1	33.60	1210.92	1211.183		1211.23	0.007965	1.800	18.67	71.81	0.62
1	3009.37*	PF 1	33.60	1210.91	1211.176		1211.23	0.007640	1.774	18.94	72.14	0.61
1	3008.37*	PF 1	33.60	1210.90	1211.165		1211.21	0.013620	1.772	18.96	72.46	0.61
1	3007.37*	PF 1	33.60	1210.89	1211.149		1211.20	0.014544	1.805	18.62	72.74	0.63
1	3006.37*	PF 1	33.60	1210.88	1211.131		1211.18	0.016042	1.856	18.11	73.01	0.66
1	3005.37*	PF 1	33.60	1210.87	1211.107		1211.17	0.019266	1.958	17.16	73.25	0.71
1	3004.37*	PF 1	33.60	1210.86	1211.067		1211.14	0.029918	2.233	15.05	73.39	0.87
1	3004.33	PF 1	33.60	1210.86	1211.064	1211.06400	1211.14	0.031119	2.259	14.87	73.39	0.88
1	3003.33*	PF 1	33.60	1210.01	1210.076	1210.20700	1210.96	1.574335	7.562	4.44	67.98	5.21
1	3002.33*	PF 1	33.60	1209.17	1209.256	1209.37600	1209.84	0.723334	6.151	5.46	63.55	3.70
1	3001.33*	PF 1	33.60	1208.32	1208.408	1208.53600	1209.07	0.798501	6.528	5.15	58.99	3.90
1	3000.32*	PF 1	33.60	1207.47	1207.562	1207.69900	1208.27	0.794196	6.729	4.99	54.45	3.92
1	2999.32*	PF 1	33.60	1206.62	1206.718	1206.86300	1207.47	0.784689	6.942	4.84	49.92	3.93
1	2998.41	PF 1	33.60	1205.85	1205.953	1206.10600	1206.75	0.773138	7.154	4.70	45.79	3.94
1	2997.41*	PF 1	33.60	1205.84	1206.005	1206.09400	1206.31	0.157463	4.407	7.62	46.59	1.92
1	2996.41*	PF 1	33.60	1205.83	1206.165	1206.08100	1206.24	0.014671	2.135	15.74	48.04	0.66
1	2995.41*	PF 1	33.60	1205.82	1206.148		1206.22	0.015349	2.157	15.58	48.44	0.67
1	2994.41*	PF 1	33.60	1205.81	1206.130		1206.21	0.016398	2.193	15.32	48.82	0.69
1	2993.41*	PF 1	33.60	1205.80	1206.109		1206.19	0.018074	2.252	14.92	49.19	0.72
1	2992.41*	PF 1	33.60	1205.79	1206.088		1206.17	0.020063	2.317	14.50	49.55	0.75
1	2991.41*	PF 1	33.60	1205.78	1206.073		1206.16	0.011727	2.336	14.38	49.96	0.77
1	2990.41*	PF 1	33.60	1205.77	1206.062		1206.15	0.011716	2.327	14.44	50.38	0.77
1	2989.41*	PF 1	33.60	1205.76	1206.050		1206.13	0.011696	2.319	14.49	50.79	0.77
1	2988.41*	PF 1	33.60	1205.75	1206.039		1206.12	0.011691	2.311	14.54	51.21	0.76
1	2987.41*	PF 1	33.60	1205.74	1206.027		1206.11	0.011667	2.302	14.60	51.64	0.76
1	2986.41*	PF 1	33.60	1205.73	1206.016		1206.10	0.011651	2.293	14.65	52.07	0.76
1	2985.41*	PF 1	33.60	1205.72	1206.005		1206.09	0.011637	2.285	14.70	52.49	0.76
1	2984.41*	PF 1	33.60	1205.71	1205.994		1206.07	0.011608	2.276	14.76	52.91	0.76
1	2983.41*	PF 1	33.60	1205.70	1205.982		1206.06	0.011583	2.267	14.82	53.33	0.76
1	2982.41*	PF 1	33.60	1205.69	1205.971		1206.05	0.011555	2.258	14.88	53.77	0.76
1	2981.41*	PF 1	33.60	1205.68	1205.960		1206.04	0.011567	2.252	14.92	54.19	0.76
1	2980.41*	PF 1	33.60	1205.67	1205.949		1206.03	0.011532	2.243	14.98	54.61	0.76
1	2979.41*	PF 1	33.60	1205.66	1205.938		1206.02	0.011498	2.234	15.04	55.03	0.75
1	2978.41*	PF 1	33.60	1205.65	1205.926		1206.00	0.011463	2.225	15.10	55.47	0.75
1	2977.41*	PF 1	33.60	1205.64	1205.915		1205.99	0.011451	2.218	15.15	55.89	0.75
1	2976.41*	PF 1	33.60	1205.63	1205.904		1205.98	0.011441	2.210	15.20	56.31	0.75
1	2975.41*	PF 1	33.60	1205.62	1205.893		1205.97	0.011450	2.204	15.24	56.74	0.75
1	2974.41*	PF 1	33.60	1205.61	1205.882		1205.96	0.011406	2.195	15.31	57.17	0.75
1	2973.41*	PF 1	33.60	1205.60	1205.870		1205.95	0.011385	2.188	15.36	57.59	0.75
1	2972.41*	PF 1	33.60	1205.59	1205.859		1205.93	0.011371	2.180	15.41	58.01	0.75
1	2971.41*	PF 1	33.60	1205.58	1205.848		1205.92	0.011354	2.173	15.46	58.43	0.74
1	2970.41*	PF 1	33.60	1205.57	1205.837		1205.91	0.011339	2.166	15.51	58.85	0.74
1	2969.41*	PF 1	33.60	1205.56	1205.826		1205.90	0.011322	2.159	15.56	59.29	0.74
1	2968.41*	PF 1	33.60	1205.55	1205.815		1205.89	0.011276	2.150	15.63	59.71	0.74
1	2967.41*	PF 1	33.60	1205.54	1205.804		1205.88	0.011250	2.142	15.68	60.14	0.74
1	2966.41*	PF 1	33.60	1205.53	1205.793		1205.86	0.011225	2.135	15.74	60.56	0.74
1	2965.41*	PF 1	33.60	1205.52	1205.782		1205.85	0.011198	2.127	15.79	60.99	0.74
1	2964.41*	PF 1	33.60	1205.51	1205.772		1205.84	0.011142	2.118	15.86	61.42	0.73
1	2963.41*	PF 1	33.60	1205.50	1205.761		1205.83	0.011105	2.110	15.92	61.85	0.73
1	2962.41*	PF 1	33.60	1205.49	1205.750		1205.82	0.011069	2.103	15.98	62.27	0.73

HEC-RAS Plan: Plan 03 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	2961.41*	PF 1	33.60	1205.48	1205.739		1205.81	0.011032	2.095	16.04	62.70	0.73
1	2960.41*	PF 1	33.60	1205.47	1205.728		1205.80	0.010982	2.086	16.11	63.13	0.73
1	2959.41*	PF 1	33.60	1205.46	1205.718		1205.79	0.010917	2.077	16.18	63.56	0.73
1	2958.41*	PF 1	33.60	1205.45	1205.707		1205.77	0.010836	2.067	16.26	63.98	0.72
1	2957.41*	PF 1	33.60	1205.44	1205.697		1205.76	0.010723	2.055	16.35	64.41	0.72
1	2956.41*	PF 1	33.60	1205.43	1205.687		1205.75	0.010642	2.044	16.43	64.85	0.72
1	2955.41*	PF 1	33.60	1205.42	1205.676		1205.74	0.010519	2.032	16.53	65.27	0.71
1	2955.4	PF 1	33.60	1205.42	1205.676		1205.74	0.010550	2.034	16.52	65.28	0.71
1	2914.65	PF 1	33.60	1205.01	1205.243		1205.30	0.010524	1.910	17.59	76.28	0.70
1	2815.59	PF 1	33.60	1204.02	1204.205		1204.25	0.010556	1.648	20.39	110.59	0.68
1	2782.59	PF 1	33.60	1203.69	1203.868		1203.91	0.010073	1.569	21.41	120.68	0.66
1	2743.58	PF 1	33.60	1203.30	1203.473		1203.51	0.010188	1.548	21.70	125.91	0.66
1	2742.58*	PF 1	33.60	1203.29	1203.463		1203.50	0.010166	1.546	21.73	126.05	0.66
1	2741.58*	PF 1	33.60	1203.28	1203.453		1203.49	0.010191	1.547	21.72	126.19	0.66
1	2740.58*	PF 1	33.60	1203.27	1203.443		1203.48	0.010190	1.546	21.73	126.34	0.66
1	2739.58*	PF 1	33.60	1203.26	1203.433		1203.47	0.010192	1.545	21.74	126.48	0.66
1	2738.58*	PF 1	33.60	1203.25	1203.422		1203.46	0.010243	1.547	21.72	126.60	0.66
1	2737.58*	PF 1	33.60	1203.24	1203.412		1203.45	0.010269	1.548	21.71	126.74	0.66
1	2736.58*	PF 1	33.60	1203.23	1203.402		1203.44	0.010319	1.549	21.69	126.88	0.66
1	2735.58*	PF 1	33.60	1203.22	1203.391		1203.43	0.010394	1.552	21.65	127.02	0.66
1	2734.58*	PF 1	33.60	1203.21	1203.380		1203.42	0.010494	1.556	21.60	127.16	0.67
1	2733.58*	PF 1	33.60	1203.20	1203.370		1203.41	0.010648	1.562	21.51	127.30	0.67
1	2732.58*	PF 1	33.60	1203.19	1203.359		1203.40	0.010857	1.570	21.40	127.43	0.68
1	2731.58*	PF 1	33.60	1203.18	1203.347		1203.39	0.011290	1.588	21.16	127.56	0.69
1	2730.58*	PF 1	33.60	1203.17	1203.334		1203.37	0.011952	1.615	20.81	127.68	0.71
1	2729.58*	PF 1	33.60	1203.16	1203.321		1203.36	0.012701	1.644	20.44	127.79	0.72
1	2728.58*	PF 1	33.60	1203.14	1203.312		1203.35	0.010041	1.531	21.94	128.01	0.65
1	2727.58*	PF 1	33.60	1203.13	1203.302		1203.34	0.009995	1.528	21.98	128.15	0.65
1	2726.58*	PF 1	33.60	1203.12	1203.292		1203.33	0.009949	1.526	22.02	128.29	0.65
1	2725.58*	PF 1	33.60	1203.11	1203.282		1203.32	0.009928	1.524	22.05	128.43	0.65
1	2724.58*	PF 1	33.60	1203.10	1203.272		1203.31	0.009883	1.521	22.09	128.57	0.65
1	2723.58*	PF 1	33.60	1203.09	1203.263		1203.30	0.009814	1.517	22.14	128.72	0.64
1	2722.58*	PF 1	33.60	1203.08	1203.253		1203.29	0.009745	1.513	22.20	128.87	0.64
1	2721.58*	PF 1	33.60	1203.07	1203.243		1203.28	0.009656	1.509	22.27	129.01	0.64
1	2720.58*	PF 1	33.60	1203.06	1203.234		1203.27	0.009569	1.504	22.34	129.14	0.64
1	2719.58*	PF 1	33.60	1203.05	1203.224		1203.26	0.009415	1.496	22.46	129.29	0.63
1	2718.57*	PF 1	33.60	1203.04	1203.215		1203.25	0.009264	1.488	22.58	129.43	0.63
1	2717.57*	PF 1	33.60	1203.03	1203.206		1203.24	0.009095	1.479	22.72	129.58	0.62
1	2716.57*	PF 1	33.60	1203.02	1203.197		1203.23	0.008867	1.467	22.90	129.73	0.62
1	2715.57*	PF 1	33.60	1203.01	1203.189		1203.22	0.008608	1.454	23.12	129.88	0.61
1	2714.57*	PF 1	33.60	1203.00	1203.181		1203.21	0.008302	1.437	23.38	130.03	0.60
1	2713.57*	PF 1	33.60	1202.99	1203.173		1203.20	0.007957	1.418	23.69	130.19	0.59
1	2712.57*	PF 1	33.60	1202.98	1203.165		1203.20	0.007596	1.398	24.03	130.34	0.57
1	2711.57*	PF 1	33.60	1202.97	1203.158		1203.19	0.007209	1.376	24.42	130.49	0.56
1	2710.57*	PF 1	33.60	1202.96	1203.151		1203.18	0.006788	1.350	24.88	130.66	0.55
1	2709.57*	PF 1	33.60	1202.95	1203.142		1203.17	0.011863	1.343	25.02	130.80	0.54
1	2708.57*	PF 1	33.60	1202.94	1203.129		1203.16	0.012487	1.363	24.65	130.92	0.55
1	2707.57*	PF 1	33.60	1202.93	1203.115		1203.15	0.013536	1.396	24.07	131.04	0.57
1	2706.57*	PF 1	33.60	1202.92	1203.097		1203.13	0.015497	1.453	23.12	131.13	0.61
1	2705.57*	PF 1	33.60	1202.91	1203.070		1203.11	0.021587	1.605	20.93	131.17	0.71
1	2704.94	PF 1	33.60	1202.90	1203.027	1203.02700	1203.09	0.046785	2.025	16.59	131.06	1.00
1	2703.94*	PF 1	33.60	1202.01	1202.047	1202.14000	1202.87	3.155764	7.289	4.61	125.57	6.71
1	2702.94*	PF 1	33.60	1201.13	1201.191	1201.26400	1201.51	0.625722	4.556	7.37	120.77	3.25
1	2701.94*	PF 1	33.60	1200.24	1200.295	1200.37700	1200.73	0.973389	5.291	6.35	115.78	3.98
1	2700.94*	PF 1	33.60	1199.35	1199.409	1199.49200	1199.82	0.833575	5.139	6.54	110.84	3.73
1	2700.54	PF 1	33.60	1199.00	1199.059	1199.14400	1199.49	0.869761	5.242	6.41	108.89	3.81
1	2699.54*	PF 1	33.60	1198.99	1199.205	1199.13300	1199.24	0.011575	1.429	23.52	110.00	0.54
1	2698.54*	PF 1	33.60	1198.98	1199.193		1199.23	0.011987	1.443	23.29	110.16	0.55
1	2697.54*	PF 1	33.60	1198.97	1199.179		1199.21	0.012562	1.462	22.98	110.32	0.56
1	2696.54*	PF 1	33.60	1198.96	1199.165		1199.20	0.013468	1.492	22.51	110.46	0.58
1	2695.54*	PF 1	33.60	1198.95	1199.148		1199.19	0.014976	1.540	21.82	110.58	0.61
1	2694.54*	PF 1	33.60	1198.94	1199.130		1199.17	0.017108	1.602	20.97	110.70	0.65
1	2693.54*	PF 1	33.60	1198.93	1199.117		1199.16	0.010191	1.629	20.63	110.85	0.67
1	2692.54*	PF 1	33.60	1198.92	1199.107		1199.15	0.010202	1.629	20.63	111.03	0.67
1	2691.54*	PF 1	33.60	1198.91	1199.097		1199.14	0.010193	1.627	20.65	111.20	0.67
1	2690.54*	PF 1	33.60	1198.90	1199.086		1199.13	0.010206	1.627	20.65	111.37	0.67
1	2689.54*	PF 1	33.60	1198.89	1199.076		1199.12	0.010197	1.625	20.67	111.54	0.67
1	2688.54*	PF 1	33.60	1198.88	1199.066		1199.11	0.010188	1.624	20.69	111.71	0.67
1	2687.54*	PF 1	33.60	1198.87	1199.056		1199.10	0.010199	1.623	20.70	111.89	0.67
1	2686.54*	PF 1	33.60	1198.86	1199.046		1199.09	0.010192	1.622	20.71	112.04	0.67
1	2685.54*	PF 1	33.60	1198.85	1199.036		1199.08	0.010161	1.620	20.74	112.21	0.66
1	2684.54*	PF 1	33.60	1198.84	1199.026		1199.07	0.010130	1.617	20.78	112.38	0.66
1	2683.54*	PF 1	33.60	1198.83	1199.016		1199.06	0.010099	1.615	20.81	112.56	0.66
1	2682.54*	PF 1	33.60	1198.82	1199.006		1199.05	0.010067	1.612	20.84	112.73	0.66
1	2681.54*	PF 1	33.60	1198.81	1198.996		1199.04	0.010080	1.612	20.85	112.90	0.66
1	2680.54*	PF 1	33.60	1198.80	1198.986		1199.03	0.010050	1.609	20.88	113.07	0.66
1	2679.54*	PF 1	33.60	1198.79	1198.976		1199.02	0.010019	1.607	20.91	113.24	0.66
1	2678.54*	PF 1	33.60	1198.78	1198.966		1199.01	0.009969	1.604	20.95	113.40	0.66
1	2677.54*	PF 1	33.60	1198.77	1198.956		1199.00	0.009915	1.600	21.00	113.58	0.66

HEC-RAS Plan: Plan 03 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	2676.54*	PF 1	33.60	1198.76	1198.946		1198.99	0.009842	1.596	21.06	113.76	0.65
1	2675.54*	PF 1	33.60	1198.75	1198.936		1198.98	0.009748	1.590	21.13	113.93	0.65
1	2674.54*	PF 1	33.60	1198.74	1198.927		1198.97	0.009656	1.584	21.21	114.10	0.65
1	2673.54*	PF 1	33.60	1198.73	1198.917		1198.96	0.009543	1.578	21.29	114.27	0.64
1	2672.54*	PF 1	33.60	1198.72	1198.908		1198.95	0.009410	1.570	21.40	114.46	0.64
1	2671.54*	PF 1	33.60	1198.71	1198.899		1198.94	0.009241	1.561	21.53	114.63	0.64
1	2670.54*	PF 1	33.60	1198.70	1198.890		1198.93	0.009056	1.550	21.67	114.81	0.63
1	2669.54*	PF 1	33.60	1198.69	1198.881		1198.92	0.008840	1.538	21.84	114.98	0.62
1	2668.54*	PF 1	33.60	1198.68	1198.872		1198.91	0.008610	1.525	22.03	115.15	0.61
1	2667.54*	PF 1	33.60	1198.67	1198.864		1198.90	0.008333	1.509	22.26	115.34	0.61
1	2666.54*	PF 1	33.60	1198.66	1198.856		1198.89	0.008018	1.491	22.53	115.53	0.60
1	2665.54*	PF 1	33.60	1198.65	1198.849		1198.88	0.007671	1.471	22.85	115.71	0.58
1	2664.54*	PF 1	33.60	1198.64	1198.841		1198.87	0.007298	1.448	23.21	115.90	0.57
1	2663.54*	PF 1	33.60	1198.63	1198.834		1198.87	0.006906	1.423	23.61	116.10	0.56
1	2662.54*	PF 1	33.60	1198.62	1198.828		1198.86	0.006515	1.397	24.04	116.29	0.54
1	2661.54*	PF 1	33.60	1198.61	1198.822		1198.85	0.006093	1.369	24.55	116.48	0.53
1	2661.04	PF 1	33.60	1198.60	1198.820	1198.75100	1198.85	0.005362	1.317	25.52	116.61	0.50
1	2616.7	PF 1	33.60	1198.16	1198.294	1198.29400	1198.37	0.029799	2.232	15.05	112.81	1.08
1	2540.68	PF 1	33.60	1197.39	1197.695	1197.53400	1197.71	0.002058	1.012	33.19	109.62	0.32
1	2481.7	PF 1	33.60	1196.79	1197.698		1197.70	0.000040	0.287	117.10	133.07	0.05
1	2409.33	PF 1	33.60	1196.06	1197.698		1197.70	0.000005	0.144	232.68	146.96	0.02
1	2320.35	PF 1	37.30	1195.17	1197.698	1195.34400	1197.70	0.000003	0.151	246.60	105.15	0.02
1	2300		Culvert									
1	2119.93	PF 1	37.30	1185.98	1186.238	1186.22100	1186.34	0.016961	2.587	14.42	56.71	0.90
1	2068.55	PF 1	37.30	1185.47	1185.740		1185.79	0.007149	1.734	21.51	80.60	0.59
1	2000.07	PF 1	37.30	1184.78	1185.088		1185.18	0.011433	2.382	15.66	51.83	0.76
1	1943.65	PF 1	37.30	1184.21	1184.538		1184.61	0.008877	2.188	17.05	52.99	0.68
1	1862.48	PF 1	37.30	1183.39	1183.726		1183.82	0.010728	2.440	15.29	46.50	0.75
1	1861.48*	PF 1	37.30	1183.38	1183.715		1183.81	0.010782	2.442	15.27	46.57	0.75
1	1860.48*	PF 1	37.30	1183.37	1183.704		1183.80	0.010862	2.446	15.25	46.64	0.75
1	1859.48*	PF 1	37.30	1183.36	1183.693		1183.79	0.010966	2.452	15.21	46.70	0.76
1	1858.48*	PF 1	37.30	1183.35	1183.681		1183.78	0.011090	2.459	15.17	46.77	0.76
1	1857.48*	PF 1	37.30	1183.34	1183.670		1183.76	0.011229	2.466	15.12	46.84	0.77
1	1856.48*	PF 1	37.30	1183.33	1183.658		1183.75	0.011429	2.478	15.05	46.91	0.77
1	1855.48*	PF 1	37.30	1183.32	1183.646		1183.74	0.011629	2.490	14.98	46.96	0.78
1	1854.48*	PF 1	37.30	1183.30	1183.635		1183.73	0.010510	2.413	15.46	47.09	0.74
1	1853.48*	PF 1	37.30	1183.29	1183.625		1183.72	0.010525	2.412	15.46	47.17	0.74
1	1852.48*	PF 1	37.30	1183.28	1183.615		1183.71	0.010539	2.412	15.47	47.25	0.74
1	1851.48*	PF 1	37.30	1183.27	1183.604		1183.69	0.010588	2.414	15.45	47.30	0.74
1	1850.48*	PF 1	37.30	1183.26	1183.593		1183.68	0.010616	2.414	15.45	47.38	0.75
1	1849.48*	PF 1	37.30	1183.25	1183.583		1183.67	0.010644	2.415	15.45	47.46	0.75
1	1848.48*	PF 1	37.30	1183.24	1183.572		1183.66	0.010699	2.417	15.43	47.53	0.75
1	1847.48*	PF 1	37.30	1183.23	1183.561		1183.65	0.010759	2.419	15.42	47.60	0.75
1	1846.48*	PF 1	37.30	1183.22	1183.550		1183.64	0.010832	2.423	15.39	47.66	0.75
1	1845.48*	PF 1	37.30	1183.21	1183.539		1183.63	0.010916	2.427	15.37	47.73	0.75
1	1844.48*	PF 1	37.30	1183.20	1183.527		1183.62	0.011015	2.432	15.34	47.81	0.76
1	1843.48*	PF 1	37.30	1183.19	1183.516		1183.61	0.011189	2.443	15.27	47.87	0.76
1	1842.48*	PF 1	37.30	1183.18	1183.504		1183.60	0.011411	2.456	15.19	47.92	0.77
1	1841.48*	PF 1	37.30	1183.17	1183.492		1183.59	0.011589	2.466	15.13	47.99	0.77
1	1840.48*	PF 1	37.30	1183.15	1183.482		1183.57	0.010437	2.387	15.63	48.13	0.74
1	1839.48*	PF 1	37.30	1183.14	1183.471		1183.56	0.010457	2.387	15.63	48.20	0.74
1	1838.48*	PF 1	37.30	1183.13	1183.461		1183.55	0.010473	2.387	15.63	48.27	0.74
1	1837.48*	PF 1	37.30	1183.12	1183.450		1183.54	0.010493	2.387	15.63	48.34	0.74
1	1836.48*	PF 1	37.30	1183.11	1183.440		1183.53	0.010496	2.385	15.64	48.42	0.74
1	1835.48*	PF 1	37.30	1183.10	1183.429		1183.52	0.010517	2.385	15.64	48.49	0.74
1	1834.48*	PF 1	37.30	1183.09	1183.419		1183.51	0.010533	2.385	15.64	48.56	0.74
1	1833.48*	PF 1	37.30	1183.08	1183.408		1183.50	0.010554	2.385	15.64	48.63	0.74
1	1832.48*	PF 1	37.30	1183.07	1183.398		1183.49	0.010584	2.386	15.64	48.71	0.74
1	1831.48*	PF 1	37.30	1183.06	1183.387		1183.48	0.010645	2.388	15.62	48.77	0.74
1	1830.48*	PF 1	37.30	1183.05	1183.376		1183.47	0.010689	2.390	15.61	48.85	0.75
1	1829.48*	PF 1	37.30	1183.04	1183.365		1183.45	0.010751	2.393	15.59	48.91	0.75
1	1828.48*	PF 1	37.30	1183.03	1183.354		1183.44	0.010809	2.395	15.57	48.99	0.75
1	1827.48*	PF 1	37.30	1183.02	1183.344		1183.43	0.010845	2.396	15.57	49.06	0.75
1	1826.48*	PF 1	37.30	1183.00	1183.337		1183.42	0.009470	2.298	16.23	49.21	0.71
1	1825.48*	PF 1	37.30	1182.99	1183.328		1183.41	0.009369	2.289	16.30	49.29	0.70
1	1824.48*	PF 1	37.30	1182.98	1183.318		1183.40	0.009252	2.279	16.37	49.37	0.70
1	1823.48*	PF 1	37.30	1182.97	1183.310		1183.39	0.009125	2.268	16.45	49.45	0.69
1	1822.48*	PF 1	37.30	1182.96	1183.301		1183.38	0.008986	2.256	16.53	49.54	0.69
1	1821.48*	PF 1	37.30	1182.95	1183.292		1183.37	0.008839	2.243	16.63	49.62	0.68
1	1820.48*	PF 1	37.30	1182.94	1183.284		1183.36	0.008688	2.230	16.72	49.70	0.68
1	1819.48*	PF 1	37.30	1182.93	1183.275		1183.35	0.008541	2.217	16.82	49.78	0.67
1	1818.48*	PF 1	37.30	1182.92	1183.267		1183.34	0.008363	2.202	16.94	49.87	0.67
1	1817.48*	PF 1	37.30	1182.91	1183.259		1183.33	0.008180	2.186	17.07	49.97	0.66
1	1816.48*	PF 1	37.30	1182.90	1183.251		1183.32	0.007983	2.168	17.20	50.06	0.65
1	1815.48*	PF 1	37.30	1182.89	1183.239		1183.31	0.014508	2.182	17.10	50.11	0.66
1	1814.48*	PF 1	37.30	1182.88	1183.220		1183.30	0.015656	2.232	16.71	50.14	0.68
1	1813.48*	PF 1	37.30	1182.87	1183.199		1183.28	0.017502	2.307	16.17	50.15	0.72
1	1812.48*	PF 1	37.30	1182.86	1183.172		1183.26	0.020690	2.427	15.37	50.13	0.77
1	1811.48*	PF 1	37.30	1182.84	1183.146		1183.24	0.022135	2.476	15.07	50.15	0.80

HEC-RAS Plan: Plan 03 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	1811.06	PF 1	37.30	1182.84	1183.102	1183.10200	1183.23	0.037106	2.896	12.88	49.92	1.01
1	1810.06*	PF 1	37.30	1182.35	1182.480	1182.62200	1183.09	0.438397	6.273	5.95	46.13	3.08
1	1809.06*	PF 1	37.30	1181.87	1182.006	1182.15800	1182.65	0.435066	6.427	5.80	43.17	3.09
1	1808.06*	PF 1	37.30	1181.38	1181.521	1181.68200	1182.21	0.439747	6.633	5.62	40.21	3.13
1	1807.36	PF 1	37.30	1181.04	1181.187	1181.35000	1181.90	0.435751	6.756	5.52	38.13	3.13
1	1806.36*	PF 1	37.30	1181.03	1181.241	1181.34100	1181.57	0.126484	4.630	8.06	38.76	1.79
1	1805.36*	PF 1	37.30	1181.02	1181.421	1181.32800	1181.51	0.014623	2.389	15.62	40.15	0.68
1	1804.36*	PF 1	37.30	1181.01	1181.404		1181.50	0.015281	2.416	15.44	40.34	0.69
1	1803.36*	PF 1	37.30	1181.00	1181.386		1181.48	0.016190	2.453	15.20	40.54	0.71
1	1802.36*	PF 1	37.30	1180.99	1181.366		1181.46	0.017510	2.507	14.88	40.72	0.73
1	1801.36*	PF 1	37.30	1180.98	1181.346		1181.45	0.018902	2.561	14.57	40.91	0.76
1	1800.36*	PF 1	37.30	1180.97	1181.332		1181.44	0.010851	2.571	14.51	41.13	0.76
1	1799.36*	PF 1	37.30	1180.96	1181.322		1181.42	0.010726	2.556	14.59	41.38	0.76
1	1798.36*	PF 1	37.30	1180.95	1181.312		1181.41	0.010585	2.540	14.69	41.62	0.75
1	1797.36*	PF 1	37.30	1180.94	1181.303		1181.40	0.010418	2.522	14.79	41.88	0.75
1	1796.36*	PF 1	37.30	1180.93	1181.293		1181.39	0.010271	2.505	14.89	42.12	0.74
1	1795.36*	PF 1	37.30	1180.92	1181.284		1181.38	0.010092	2.486	15.00	42.36	0.74
1	1794.36*	PF 1	37.30	1180.91	1181.275		1181.37	0.009880	2.464	15.14	42.62	0.73
1	1793.36*	PF 1	37.30	1180.90	1181.265		1181.36	0.009688	2.444	15.26	42.86	0.72
1	1792.36*	PF 1	37.30	1180.90	1181.249		1181.35	0.011176	2.548	14.64	43.00	0.77
1	1791.36*	PF 1	37.30	1180.89	1181.238		1181.34	0.011101	2.537	14.70	43.26	0.77
1	1790.36*	PF 1	37.30	1180.88	1181.228		1181.33	0.011038	2.527	14.76	43.50	0.76
1	1789.36*	PF 1	37.30	1180.87	1181.217		1181.32	0.010977	2.518	14.82	43.73	0.76
1	1788.36*	PF 1	37.30	1180.86	1181.207		1181.30	0.010898	2.506	14.88	43.98	0.76
1	1787.36*	PF 1	37.30	1180.85	1181.196		1181.29	0.010814	2.495	14.95	44.22	0.76
1	1786.36*	PF 1	37.30	1180.84	1181.186		1181.28	0.010718	2.483	15.02	44.46	0.75
1	1785.36*	PF 1	37.30	1180.83	1181.176		1181.27	0.010593	2.469	15.11	44.71	0.75
1	1784.36*	PF 1	37.30	1180.82	1181.166		1181.26	0.010476	2.456	15.19	44.95	0.74
1	1783.36*	PF 1	37.30	1180.81	1181.156		1181.25	0.010343	2.441	15.28	45.20	0.74
1	1782.36*	PF 1	37.30	1180.80	1181.147		1181.24	0.010182	2.424	15.39	45.44	0.73
1	1781.36*	PF 1	37.30	1180.79	1181.137		1181.23	0.010007	2.406	15.50	45.70	0.73
1	1780.36*	PF 1	37.30	1180.78	1181.128		1181.22	0.009813	2.387	15.63	45.95	0.72
1	1779.36*	PF 1	37.30	1180.77	1181.119		1181.21	0.009605	2.366	15.76	46.20	0.71
1	1778.36*	PF 1	37.30	1180.76	1181.110		1181.20	0.009403	2.346	15.90	46.44	0.71
1	1777.36*	PF 1	37.30	1180.75	1181.102		1181.19	0.009169	2.324	16.05	46.70	0.70
1	1777.34	PF 1	37.30	1180.75	1181.101		1181.19	0.009201	2.326	16.04	46.70	0.70
1	1709.86	PF 1	37.30	1180.06	1180.422		1180.52	0.010674	2.551	14.62	41.44	0.76
1	1708.86*	PF 1	37.30	1180.05	1180.412		1180.51	0.010693	2.550	14.63	41.53	0.76
1	1707.86*	PF 1	37.30	1180.04	1180.401		1180.50	0.010699	2.548	14.64	41.63	0.76
1	1706.86*	PF 1	37.30	1180.03	1180.391		1180.49	0.010706	2.546	14.65	41.72	0.76
1	1705.86*	PF 1	37.30	1180.02	1180.380		1180.48	0.010719	2.545	14.66	41.81	0.76
1	1704.86*	PF 1	37.30	1180.01	1180.369		1180.47	0.010726	2.543	14.67	41.91	0.76
1	1703.86*	PF 1	37.30	1180.00	1180.359		1180.46	0.010734	2.541	14.68	42.00	0.76
1	1702.86*	PF 1	37.30	1179.99	1180.348		1180.45	0.010754	2.540	14.68	42.10	0.76
1	1701.86*	PF 1	37.30	1179.98	1180.337		1180.44	0.010762	2.539	14.69	42.20	0.76
1	1700.86*	PF 1	37.30	1179.97	1180.327		1180.43	0.010771	2.537	14.70	42.29	0.76
1	1699.86*	PF 1	37.30	1179.96	1180.316		1180.42	0.010809	2.538	14.70	42.38	0.76
1	1698.86*	PF 1	37.30	1179.95	1180.305		1180.41	0.010843	2.538	14.70	42.47	0.76
1	1697.86*	PF 1	37.30	1179.94	1180.294		1180.39	0.010877	2.538	14.70	42.57	0.76
1	1696.86*	PF 1	37.30	1179.93	1180.283		1180.38	0.010950	2.541	14.68	42.66	0.76
1	1695.86*	PF 1	37.30	1179.92	1180.272		1180.37	0.011011	2.543	14.67	42.75	0.77
1	1694.86*	PF 1	37.30	1179.91	1180.261		1180.36	0.011086	2.546	14.65	42.85	0.77
1	1693.86*	PF 1	37.30	1179.90	1180.249		1180.35	0.011187	2.551	14.62	42.94	0.77
1	1692.86*	PF 1	37.30	1179.89	1180.237		1180.34	0.011323	2.558	14.58	43.02	0.77
1	1691.86*	PF 1	37.30	1179.88	1180.225		1180.33	0.011483	2.567	14.53	43.11	0.78
1	1690.86*	PF 1	37.30	1179.87	1180.214		1180.32	0.011619	2.574	14.49	43.19	0.78
1	1689.86*	PF 1	37.30	1179.85	1180.203		1180.30	0.010528	2.495	14.95	43.35	0.75
1	1688.86*	PF 1	37.30	1179.84	1180.193		1180.29	0.010519	2.492	14.97	43.44	0.75
1	1687.86*	PF 1	37.30	1179.83	1180.183		1180.28	0.010493	2.488	14.99	43.54	0.75
1	1686.86*	PF 1	37.30	1179.82	1180.172		1180.27	0.010485	2.486	15.01	43.63	0.75
1	1685.86*	PF 1	37.30	1179.81	1180.162		1180.26	0.010483	2.483	15.02	43.72	0.75
1	1684.86*	PF 1	37.30	1179.80	1180.152		1180.25	0.010470	2.480	15.04	43.82	0.75
1	1683.86*	PF 1	37.30	1179.79	1180.141		1180.24	0.010444	2.476	15.06	43.92	0.75
1	1682.86*	PF 1	37.30	1179.78	1180.131		1180.23	0.010419	2.472	15.09	44.02	0.74
1	1681.86*	PF 1	37.30	1179.77	1180.121		1180.22	0.010394	2.468	15.11	44.12	0.74
1	1680.86*	PF 1	37.30	1179.76	1180.111		1180.21	0.010369	2.464	15.14	44.21	0.74
1	1679.86*	PF 1	37.30	1179.75	1180.100		1180.20	0.010349	2.461	15.16	44.30	0.74
1	1678.86*	PF 1	37.30	1179.74	1180.090		1180.18	0.010313	2.456	15.19	44.40	0.74
1	1677.86*	PF 1	37.30	1179.73	1180.080		1180.17	0.010277	2.451	15.22	44.50	0.74
1	1676.86*	PF 1	37.30	1179.72	1180.070		1180.16	0.010241	2.446	15.25	44.60	0.74
1	1675.86*	PF 1	37.30	1179.71	1180.060		1180.15	0.010181	2.440	15.29	44.70	0.74
1	1674.86*	PF 1	37.30	1179.70	1180.050		1180.14	0.010122	2.434	15.33	44.80	0.73
1	1673.86*	PF 1	37.30	1179.69	1180.040		1180.13	0.010068	2.428	15.36	44.89	0.73
1	1672.86*	PF 1	37.30	1179.68	1180.031		1180.12	0.010010	2.421	15.41	44.99	0.73
1	1671.86*	PF 1	37.30	1179.67	1180.021		1180.11	0.009941	2.414	15.45	45.09	0.73
1	1670.86*	PF 1	37.30	1179.66	1180.011		1180.10	0.009849	2.405	15.51	45.20	0.72
1	1669.86*	PF 1	37.30	1179.65	1180.002		1180.09	0.009758	2.396	15.57	45.30	0.72
1	1668.86*	PF 1	37.30	1179.64	1179.992		1180.08	0.009657	2.387	15.63	45.41	0.72
1	1667.86*	PF 1	37.30	1179.63	1179.983		1180.07	0.009535	2.375	15.70	45.51	0.71

HEC-RAS Plan: Plan 03 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	1666.86*	PF 1	37.30	1179.62	1179.974		1180.06	0.009420	2.365	15.77	45.60	0.71
1	1665.86*	PF 1	37.30	1179.61	1179.965		1180.05	0.009291	2.353	15.85	45.71	0.70
1	1664.86*	PF 1	37.30	1179.60	1179.956		1180.04	0.009153	2.340	15.94	45.82	0.70
1	1663.86*	PF 1	37.30	1179.59	1179.947		1180.03	0.009008	2.327	16.03	45.93	0.69
1	1662.86*	PF 1	37.30	1179.58	1179.939		1180.02	0.008856	2.313	16.13	46.03	0.69
1	1661.86*	PF 1	37.30	1179.57	1179.930		1180.01	0.008686	2.297	16.24	46.14	0.68
1	1660.86*	PF 1	37.30	1179.56	1179.922		1180.00	0.008534	2.283	16.34	46.24	0.68
1	1659.86*	PF 1	37.30	1179.55	1179.914		1179.99	0.008344	2.265	16.46	46.35	0.67
1	1658.86*	PF 1	37.30	1179.54	1179.906		1179.98	0.008150	2.247	16.60	46.47	0.66
1	1657.86*	PF 1	37.30	1179.53	1179.898		1179.98	0.007953	2.229	16.74	46.58	0.66
1	1656.86*	PF 1	37.30	1179.52	1179.886		1179.96	0.014376	2.238	16.67	46.67	0.66
1	1655.86*	PF 1	37.30	1179.51	1179.868		1179.95	0.015333	2.281	16.35	46.72	0.68
1	1654.86*	PF 1	37.30	1179.50	1179.848		1179.93	0.016830	2.345	15.91	46.75	0.71
1	1653.86*	PF 1	37.30	1179.49	1179.822		1179.92	0.019636	2.456	15.19	46.75	0.76
1	1652.86*	PF 1	37.30	1179.48	1179.774	1179.75700	1179.89	0.029472	2.778	13.43	46.62	0.91
1	1652.33	PF 1	37.30	1179.47	1179.746	1179.74600	1179.88	0.035992	2.951	12.64	46.57	1.00
1	1651.33*	PF 1	37.30	1178.74	1178.862	1179.03200	1179.71	0.664984	7.396	5.04	41.76	3.75
1	1650.33*	PF 1	37.30	1178.01	1178.140	1178.32000	1179.05	0.648885	7.630	4.89	37.92	3.75
1	1649.71	PF 1	37.30	1177.56	1177.696	1177.88200	1178.64	0.638112	7.790	4.79	35.56	3.74
1	1648.71*	PF 1	37.30	1177.55	1177.747	1177.87400	1178.18	0.182593	5.302	7.04	36.39	2.13
1	1647.71*	PF 1	37.30	1177.54	1177.941	1177.86100	1178.04	0.016359	2.523	14.79	38.08	0.71
1	1646.71*	PF 1	37.30	1177.53	1177.923		1178.02	0.017081	2.545	14.66	38.51	0.73
1	1645.71*	PF 1	37.30	1177.52	1177.902		1178.01	0.018204	2.583	14.44	38.90	0.75
1	1644.71*	PF 1	37.30	1177.51	1177.879		1177.99	0.020030	2.648	14.09	39.29	0.78
1	1643.71*	PF 1	37.30	1177.50	1177.856		1177.97	0.022058	2.715	13.74	39.69	0.81
1	1642.71*	PF 1	37.30	1177.49	1177.840		1177.96	0.012828	2.730	13.66	40.13	0.82
1	1641.71*	PF 1	37.30	1177.48	1177.827		1177.94	0.012786	2.715	13.74	40.58	0.82
1	1640.71*	PF 1	37.30	1177.47	1177.815		1177.93	0.012720	2.699	13.82	41.04	0.82
1	1639.71*	PF 1	37.30	1177.46	1177.803		1177.92	0.012674	2.684	13.90	41.50	0.82
1	1638.71*	PF 1	37.30	1177.45	1177.791		1177.90	0.012618	2.669	13.98	41.96	0.82
1	1637.71*	PF 1	37.30	1177.44	1177.779		1177.89	0.012589	2.656	14.05	42.40	0.81
1	1636.71*	PF 1	37.30	1177.43	1177.767		1177.88	0.012558	2.642	14.12	42.86	0.81
1	1635.71*	PF 1	37.30	1177.42	1177.755		1177.86	0.012501	2.628	14.19	43.32	0.81
1	1634.71*	PF 1	37.30	1177.41	1177.744		1177.85	0.012465	2.614	14.27	43.78	0.81
1	1633.71*	PF 1	37.30	1177.40	1177.732		1177.84	0.012433	2.602	14.34	44.24	0.81
1	1632.71*	PF 1	37.30	1177.39	1177.720		1177.82	0.012391	2.588	14.41	44.70	0.80
1	1631.71*	PF 1	37.30	1177.38	1177.708		1177.81	0.012347	2.575	14.49	45.17	0.80
1	1630.71*	PF 1	37.30	1177.37	1177.696		1177.80	0.012297	2.561	14.56	45.63	0.80
1	1629.71*	PF 1	37.30	1177.36	1177.684		1177.79	0.012257	2.549	14.63	46.08	0.80
1	1628.71*	PF 1	37.30	1177.35	1177.673		1177.77	0.012231	2.537	14.70	46.53	0.80
1	1627.71*	PF 1	37.30	1177.34	1177.661		1177.76	0.012194	2.525	14.77	47.00	0.79
1	1626.71*	PF 1	37.30	1177.33	1177.649		1177.75	0.012145	2.512	14.85	47.45	0.79
1	1625.71*	PF 1	37.30	1177.32	1177.638		1177.74	0.012099	2.500	14.92	47.91	0.79
1	1624.71*	PF 1	37.30	1177.31	1177.626		1177.72	0.012073	2.488	14.99	48.38	0.79
1	1623.71*	PF 1	37.30	1177.30	1177.615		1177.71	0.012019	2.476	15.07	48.84	0.79
1	1622.71*	PF 1	37.30	1177.29	1177.603		1177.70	0.011985	2.464	15.14	49.30	0.78
1	1621.71*	PF 1	37.30	1177.28	1177.592		1177.69	0.011942	2.453	15.21	49.75	0.78
1	1620.71*	PF 1	37.30	1177.27	1177.580		1177.67	0.011878	2.440	15.29	50.22	0.78
1	1619.71*	PF 1	37.30	1177.26	1177.569		1177.66	0.011822	2.427	15.37	50.68	0.78
1	1618.71*	PF 1	37.30	1177.25	1177.558		1177.65	0.011754	2.414	15.45	51.15	0.77
1	1617.71*	PF 1	37.30	1177.24	1177.546		1177.64	0.011704	2.403	15.52	51.61	0.77
1	1616.71*	PF 1	37.30	1177.23	1177.535		1177.62	0.011626	2.389	15.61	52.07	0.77
1	1615.71*	PF 1	37.30	1177.22	1177.524		1177.61	0.011551	2.376	15.70	52.53	0.77
1	1614.71*	PF 1	37.30	1177.21	1177.513		1177.60	0.011453	2.362	15.79	52.99	0.76
1	1613.71*	PF 1	37.30	1177.20	1177.502		1177.59	0.011353	2.348	15.89	53.45	0.76
1	1612.71*	PF 1	37.30	1177.19	1177.492		1177.58	0.011240	2.333	15.99	53.92	0.76
1	1611.71*	PF 1	37.30	1177.18	1177.481		1177.56	0.011116	2.317	16.10	54.39	0.75
1	1610.71*	PF 1	37.30	1177.17	1177.471		1177.55	0.010951	2.299	16.23	54.85	0.75
1	1609.71*	PF 1	37.30	1177.16	1177.461		1177.54	0.010775	2.280	16.36	55.32	0.74
1	1608.71*	PF 1	37.30	1177.15	1177.451		1177.53	0.010571	2.259	16.51	55.80	0.73
1	1607.71*	PF 1	37.30	1177.14	1177.441		1177.52	0.010334	2.236	16.68	56.28	0.72
1	1606.71*	PF 1	37.30	1177.13	1177.432		1177.51	0.010080	2.212	16.86	56.74	0.72
1	1605.71*	PF 1	37.30	1177.12	1177.423		1177.50	0.009804	2.186	17.06	57.22	0.71
1	1604.71*	PF 1	37.30	1177.11	1177.414		1177.49	0.009499	2.159	17.28	57.70	0.70
1	1603.71*	PF 1	37.30	1177.10	1177.406		1177.48	0.009181	2.130	17.52	58.17	0.68
1	1602.71*	PF 1	37.30	1177.09	1177.398		1177.47	0.008852	2.099	17.77	58.66	0.67
1	1602.35	PF 1	37.30	1177.09	1177.393		1177.46	0.009245	2.125	17.55	58.80	0.69
1	1601.35*	PF 1	37.30	1177.08	1177.384		1177.45	0.009246	2.127	17.54	58.69	0.69
1	1600.35*	PF 1	37.30	1177.07	1177.374		1177.44	0.009236	2.127	17.53	58.58	0.69
1	1599.35*	PF 1	37.30	1177.06	1177.364		1177.44	0.009250	2.130	17.51	58.47	0.69
1	1598.35*	PF 1	37.30	1177.05	1177.355		1177.43	0.009235	2.130	17.51	58.38	0.69
1	1597.35*	PF 1	37.30	1177.04	1177.345		1177.42	0.009235	2.132	17.50	58.27	0.69
1	1596.35*	PF 1	37.30	1177.03	1177.336		1177.41	0.009240	2.134	17.48	58.15	0.69
1	1595.35*	PF 1	37.30	1177.02	1177.326		1177.40	0.009243	2.136	17.46	58.03	0.69
1	1594.35*	PF 1	37.30	1177.01	1177.316		1177.39	0.009244	2.138	17.45	57.90	0.69
1	1593.35*	PF 1	37.30	1177.00	1177.307		1177.38	0.009233	2.139	17.44	57.78	0.69
1	1592.35*	PF 1	37.30	1176.99	1177.297		1177.37	0.009234	2.141	17.42	57.65	0.69
1	1591.35*	PF 1	37.30	1176.98	1177.288		1177.36	0.009218	2.141	17.42	57.56	0.69
1	1590.35*	PF 1	37.30	1176.97	1177.278		1177.35	0.009209	2.142	17.41	57.44	0.69

HEC-RAS Plan: Plan 03 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	1589.35*	PF 1	37.30	1176.96	1177.268		1177.34	0.009216	2.145	17.39	57.31	0.69
1	1588.35*	PF 1	37.30	1176.95	1177.259		1177.33	0.009219	2.147	17.38	57.19	0.69
1	1587.35*	PF 1	37.30	1176.94	1177.249		1177.32	0.009207	2.148	17.37	57.08	0.69
1	1586.35*	PF 1	37.30	1176.93	1177.240		1177.31	0.009223	2.150	17.34	56.96	0.69
1	1585.35*	PF 1	37.30	1176.92	1177.230		1177.30	0.009226	2.153	17.33	56.84	0.69
1	1584.35*	PF 1	37.30	1176.91	1177.220		1177.29	0.009227	2.154	17.31	56.73	0.69
1	1583.35*	PF 1	37.30	1176.90	1177.211		1177.28	0.009230	2.156	17.30	56.62	0.69
1	1582.35*	PF 1	37.30	1176.89	1177.201		1177.27	0.009234	2.158	17.28	56.50	0.69
1	1581.35*	PF 1	37.30	1176.88	1177.192		1177.26	0.009223	2.159	17.28	56.39	0.69
1	1580.35*	PF 1	37.30	1176.87	1177.182		1177.26	0.009227	2.161	17.26	56.27	0.69
1	1579.35*	PF 1	37.30	1176.86	1177.172		1177.25	0.009232	2.163	17.24	56.15	0.69
1	1578.35*	PF 1	37.30	1176.85	1177.163		1177.24	0.009221	2.164	17.23	56.04	0.69
1	1577.35*	PF 1	37.30	1176.84	1177.153		1177.23	0.009226	2.166	17.22	55.92	0.69
1	1576.35*	PF 1	37.30	1176.83	1177.143		1177.22	0.009229	2.168	17.20	55.82	0.69
1	1575.35*	PF 1	37.30	1176.82	1177.134		1177.21	0.009219	2.169	17.19	55.71	0.69
1	1574.35*	PF 1	37.30	1176.81	1177.124		1177.20	0.009224	2.172	17.18	55.59	0.69
1	1573.35*	PF 1	37.30	1176.80	1177.115		1177.19	0.009230	2.174	17.16	55.47	0.69
1	1572.35*	PF 1	37.30	1176.79	1177.105		1177.18	0.009232	2.176	17.14	55.36	0.69
1	1571.35*	PF 1	37.30	1176.78	1177.096		1177.17	0.009225	2.177	17.13	55.24	0.69
1	1570.35*	PF 1	37.30	1176.77	1177.086		1177.16	0.009219	2.178	17.12	55.12	0.69
1	1569.35*	PF 1	37.30	1176.76	1177.077		1177.15	0.009197	2.178	17.12	55.03	0.69
1	1568.35*	PF 1	37.30	1176.75	1177.067		1177.14	0.009191	2.180	17.11	54.91	0.69
1	1567.35*	PF 1	37.30	1176.74	1177.058		1177.13	0.009173	2.181	17.11	54.79	0.69
1	1566.35*	PF 1	37.30	1176.73	1177.048		1177.12	0.009165	2.182	17.10	54.68	0.69
1	1565.35*	PF 1	37.30	1176.72	1177.039		1177.11	0.009162	2.183	17.08	54.56	0.69
1	1564.35*	PF 1	37.30	1176.71	1177.029		1177.10	0.009146	2.184	17.08	54.44	0.69
1	1563.35*	PF 1	37.30	1176.70	1177.020		1177.09	0.009140	2.186	17.07	54.32	0.69
1	1562.35*	PF 1	37.30	1176.69	1177.010		1177.09	0.009132	2.187	17.06	54.22	0.69
1	1561.35*	PF 1	37.30	1176.68	1177.001		1177.08	0.009138	2.189	17.04	54.10	0.69
1	1560.35*	PF 1	37.30	1176.67	1176.991		1177.07	0.009134	2.191	17.03	53.98	0.69
1	1559.35*	PF 1	37.30	1176.66	1176.982		1177.06	0.009115	2.191	17.02	53.87	0.69
1	1558.35*	PF 1	37.30	1176.65	1176.972		1177.05	0.009110	2.193	17.01	53.76	0.69
1	1557.35*	PF 1	37.30	1176.64	1176.963		1177.04	0.009095	2.193	17.01	53.64	0.69
1	1556.35*	PF 1	37.30	1176.63	1176.953		1177.03	0.009076	2.194	17.00	53.53	0.69
1	1555.35*	PF 1	37.30	1176.62	1176.944		1177.02	0.009060	2.194	17.00	53.42	0.69
1	1554.35*	PF 1	37.30	1176.61	1176.935		1177.01	0.009045	2.195	16.99	53.30	0.69
1	1553.35*	PF 1	37.30	1176.60	1176.925		1177.00	0.009016	2.195	16.99	53.20	0.68
1	1552.35*	PF 1	37.30	1176.59	1176.916		1176.99	0.008991	2.195	16.99	53.08	0.68
1	1551.35*	PF 1	37.30	1176.58	1176.907		1176.98	0.008976	2.196	16.99	52.96	0.68
1	1550.35*	PF 1	37.30	1176.57	1176.898		1176.97	0.008937	2.195	17.00	52.86	0.68
1	1549.35*	PF 1	37.30	1176.56	1176.888		1176.96	0.008923	2.196	16.99	52.74	0.68
1	1548.35*	PF 1	37.30	1176.55	1176.879		1176.95	0.008899	2.196	16.99	52.62	0.68
1	1547.35*	PF 1	37.30	1176.54	1176.870		1176.95	0.008871	2.195	16.99	52.52	0.68
1	1546.35*	PF 1	37.30	1176.53	1176.861		1176.94	0.008836	2.195	17.00	52.41	0.68
1	1545.35*	PF 1	37.30	1176.52	1176.852		1176.93	0.008791	2.193	17.01	52.29	0.68
1	1544.35*	PF 1	37.30	1176.51	1176.843		1176.92	0.008743	2.191	17.02	52.19	0.68
1	1543.35*	PF 1	37.30	1176.50	1176.833		1176.91	0.008699	2.190	17.03	52.07	0.68
1	1542.35*	PF 1	37.30	1176.49	1176.825		1176.90	0.008645	2.188	17.05	51.96	0.67
1	1541.35*	PF 1	37.30	1176.48	1176.816		1176.89	0.008592	2.186	17.07	51.84	0.67
1	1540.35*	PF 1	37.30	1176.47	1176.807		1176.88	0.008528	2.183	17.09	51.74	0.67
1	1539.35*	PF 1	37.30	1176.46	1176.798		1176.87	0.008466	2.180	17.11	51.62	0.67
1	1538.35*	PF 1	37.30	1176.45	1176.789		1176.86	0.008405	2.177	17.13	51.51	0.67
1	1537.35*	PF 1	37.30	1176.44	1176.781		1176.85	0.008332	2.173	17.17	51.41	0.66
1	1536.35*	PF 1	37.30	1176.43	1176.772		1176.85	0.008273	2.170	17.19	51.29	0.66
1	1535.35*	PF 1	37.30	1176.42	1176.763		1176.84	0.008195	2.166	17.22	51.18	0.66
1	1534.35*	PF 1	37.30	1176.41	1176.755		1176.83	0.008115	2.161	17.26	51.08	0.66
1	1533.35*	PF 1	37.30	1176.40	1176.746		1176.82	0.008030	2.156	17.30	50.98	0.65
1	1532.35*	PF 1	37.30	1176.39	1176.738		1176.81	0.007929	2.150	17.35	50.86	0.65
1	1531.35*	PF 1	37.30	1176.38	1176.730		1176.80	0.007826	2.143	17.40	50.77	0.65
1	1530.35*	PF 1	37.30	1176.37	1176.722		1176.79	0.007719	2.136	17.46	50.65	0.64
1	1529.35*	PF 1	37.30	1176.36	1176.714		1176.79	0.007598	2.128	17.53	50.55	0.64
1	1528.35*	PF 1	37.30	1176.35	1176.706		1176.78	0.007476	2.119	17.60	50.45	0.63
1	1527.35*	PF 1	37.30	1176.34	1176.695		1176.77	0.013589	2.136	17.47	50.32	0.64
1	1526.35*	PF 1	37.30	1176.33	1176.678		1176.75	0.014592	2.184	17.08	50.16	0.66
1	1525.35*	PF 1	37.30	1176.32	1176.658		1176.74	0.016105	2.253	16.55	49.99	0.69
1	1524.35*	PF 1	37.30	1176.31	1176.632		1176.72	0.019034	2.373	15.72	49.78	0.74
1	1523.35*	PF 1	37.30	1176.30	1176.583	1176.56400	1176.70	0.029479	2.714	13.74	49.42	0.91
1	1522.84	PF 1	37.30	1176.29	1176.556	1176.55600	1176.69	0.036174	2.890	12.91	49.26	1.00
1	1521.84*	PF 1	37.30	1175.54	1175.649	1175.81500	1176.52	0.779735	7.463	5.00	46.03	3.99
1	1520.84*	PF 1	37.30	1174.79	1174.906	1175.07400	1175.77	0.720997	7.436	5.02	43.78	3.87
1	1520.83	PF 1	37.30	1174.79	1174.906	1175.07300	1175.76	0.714076	7.416	5.03	43.76	3.86
1	1519.83*	PF 1	37.30	1174.78	1174.958	1175.06300	1175.31	0.169225	4.786	7.79	44.41	2.01
1	1518.83*	PF 1	37.30	1174.77	1175.139	1175.05000	1175.22	0.014470	2.259	16.51	45.83	0.66
1	1517.83*	PF 1	37.30	1174.76	1175.123		1175.20	0.015159	2.286	16.32	46.06	0.68
1	1516.83*	PF 1	37.30	1174.75	1175.104		1175.19	0.016175	2.326	16.03	46.30	0.70
1	1515.83*	PF 1	37.30	1174.74	1175.084		1175.17	0.017735	2.387	15.62	46.50	0.73
1	1514.83*	PF 1	37.30	1174.73	1175.063		1175.16	0.019511	2.452	15.21	46.71	0.76
1	1513.83*	PF 1	37.30	1174.72	1175.048		1175.14	0.011347	2.472	15.09	46.96	0.77
1	1512.83*	PF 1	37.30	1174.71	1175.037		1175.13	0.011339	2.466	15.13	47.22	0.77

HEC-RAS Plan: Plan 03 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	1511.83*	PF 1	37.30	1174.70	1175.026		1175.12	0.011328	2.459	15.17	47.49	0.77
1	1510.83*	PF 1	37.30	1174.69	1175.015		1175.11	0.011337	2.454	15.20	47.76	0.77
1	1509.83*	PF 1	37.30	1174.68	1175.004		1175.10	0.011347	2.450	15.23	48.02	0.77
1	1508.83*	PF 1	37.30	1174.67	1174.993		1175.09	0.011340	2.444	15.26	48.29	0.77
1	1507.83*	PF 1	37.30	1174.66	1174.982		1175.07	0.011319	2.437	15.31	48.57	0.77
1	1506.83*	PF 1	37.30	1174.65	1174.970		1175.06	0.011324	2.432	15.34	48.82	0.77
1	1505.83*	PF 1	37.30	1174.64	1174.959		1175.05	0.011320	2.426	15.37	49.10	0.76
1	1504.83*	PF 1	37.30	1174.63	1174.948		1175.04	0.011317	2.421	15.41	49.37	0.76
1	1503.83*	PF 1	37.30	1174.62	1174.937		1175.03	0.011320	2.416	15.44	49.63	0.76
1	1502.83*	PF 1	37.30	1174.61	1174.926		1175.02	0.011325	2.411	15.47	49.90	0.76
1	1501.83*	PF 1	37.30	1174.60	1174.915		1175.01	0.011325	2.406	15.50	50.17	0.76
1	1500.83*	PF 1	37.30	1174.59	1174.904		1174.99	0.011347	2.402	15.53	50.43	0.76
1	1499.83*	PF 1	37.30	1174.58	1174.892		1174.98	0.011365	2.398	15.55	50.71	0.76
1	1498.83*	PF 1	37.30	1174.57	1174.881		1174.97	0.011394	2.395	15.57	50.96	0.76
1	1497.83*	PF 1	37.30	1174.56	1174.870		1174.96	0.011445	2.394	15.58	51.23	0.77
1	1496.83*	PF 1	37.30	1174.55	1174.859		1174.95	0.011482	2.391	15.60	51.50	0.77
1	1495.83*	PF 1	37.30	1174.54	1174.847		1174.94	0.011546	2.390	15.61	51.75	0.77
1	1494.83*	PF 1	37.30	1174.53	1174.836		1174.92	0.011602	2.389	15.62	52.03	0.77
1	1493.83*	PF 1	37.30	1174.52	1174.824		1174.91	0.011692	2.389	15.61	52.29	0.77
1	1492.83*	PF 1	37.30	1174.51	1174.812		1174.90	0.011820	2.392	15.59	52.55	0.77
1	1491.83*	PF 1	37.30	1174.50	1174.800		1174.89	0.012002	2.399	15.55	52.81	0.78
1	1490.83*	PF 1	37.30	1174.49	1174.787		1174.88	0.012218	2.407	15.50	53.07	0.79
1	1489.83*	PF 1	37.30	1174.48	1174.774		1174.87	0.012446	2.416	15.44	53.33	0.79
1	1488.83*	PF 1	37.30	1174.46	1174.764		1174.85	0.011070	2.326	16.03	53.66	0.75
1	1487.83*	PF 1	37.30	1174.45	1174.753		1174.84	0.011060	2.321	16.07	53.93	0.75
1	1486.83*	PF 1	37.30	1174.44	1174.742		1174.83	0.011036	2.315	16.11	54.19	0.75
1	1485.83*	PF 1	37.30	1174.43	1174.731		1174.81	0.011038	2.311	16.14	54.47	0.75
1	1484.83*	PF 1	37.30	1174.42	1174.721		1174.80	0.011026	2.305	16.18	54.74	0.75
1	1483.83*	PF 1	37.30	1174.41	1174.710		1174.79	0.011024	2.301	16.21	55.00	0.75
1	1482.83*	PF 1	37.30	1174.40	1174.699		1174.78	0.011014	2.296	16.25	55.27	0.75
1	1481.83*	PF 1	37.30	1174.39	1174.688		1174.77	0.011005	2.290	16.29	55.55	0.75
1	1480.83*	PF 1	37.30	1174.38	1174.677		1174.76	0.011001	2.286	16.32	55.81	0.75
1	1479.83*	PF 1	37.30	1174.37	1174.666		1174.75	0.010997	2.281	16.35	56.08	0.74
1	1478.83*	PF 1	37.30	1174.36	1174.655		1174.74	0.010991	2.276	16.39	56.35	0.74
1	1477.83*	PF 1	37.30	1174.35	1174.645		1174.73	0.010989	2.272	16.42	56.62	0.74
1	1476.83*	PF 1	37.30	1174.34	1174.634		1174.71	0.010969	2.266	16.46	56.89	0.74
1	1475.83*	PF 1	37.30	1174.33	1174.623		1174.70	0.010954	2.261	16.49	57.16	0.74
1	1474.83*	PF 1	37.30	1174.32	1174.612		1174.69	0.010955	2.257	16.52	57.42	0.74
1	1473.83*	PF 1	37.30	1174.31	1174.601		1174.68	0.010968	2.254	16.55	57.70	0.74
1	1472.83*	PF 1	37.30	1174.30	1174.591		1174.67	0.010955	2.249	16.59	57.96	0.74
1	1471.83*	PF 1	37.30	1174.29	1174.580		1174.66	0.010959	2.245	16.62	58.23	0.74
1	1470.83*	PF 1	37.30	1174.28	1174.569		1174.65	0.010943	2.240	16.65	58.50	0.74
1	1469.83*	PF 1	37.30	1174.27	1174.558		1174.64	0.010929	2.235	16.69	58.78	0.74
1	1468.83*	PF 1	37.30	1174.26	1174.547		1174.63	0.010923	2.230	16.72	59.03	0.74
1	1467.83*	PF 1	37.30	1174.25	1174.537		1174.61	0.010910	2.226	16.76	59.31	0.74
1	1466.83*	PF 1	37.30	1174.24	1174.526		1174.60	0.010898	2.221	16.80	59.59	0.74
1	1465.83*	PF 1	37.30	1174.23	1174.515		1174.59	0.010890	2.216	16.83	59.85	0.74
1	1464.83*	PF 1	37.30	1174.22	1174.505		1174.58	0.010883	2.212	16.86	60.12	0.74
1	1463.83*	PF 1	37.30	1174.21	1174.494		1174.57	0.010873	2.207	16.90	60.39	0.74
1	1462.83*	PF 1	37.30	1174.20	1174.483		1174.56	0.010852	2.202	16.94	60.66	0.73
1	1461.83*	PF 1	37.30	1174.19	1174.473		1174.55	0.010828	2.197	16.98	60.94	0.73
1	1460.83*	PF 1	37.30	1174.18	1174.462		1174.54	0.010843	2.194	17.00	61.19	0.73
1	1459.83*	PF 1	37.30	1174.17	1174.451		1174.53	0.010820	2.189	17.04	61.47	0.73
1	1458.83*	PF 1	37.30	1174.16	1174.441		1174.52	0.010798	2.183	17.08	61.74	0.73
1	1457.83*	PF 1	37.30	1174.15	1174.430		1174.50	0.010780	2.178	17.12	62.01	0.73
1	1456.83*	PF 1	37.30	1174.14	1174.419		1174.49	0.010763	2.174	17.16	62.28	0.73
1	1455.83*	PF 1	37.30	1174.13	1174.409		1174.48	0.010743	2.169	17.20	62.55	0.73
1	1454.83*	PF 1	37.30	1174.12	1174.398		1174.47	0.010711	2.163	17.24	62.82	0.73
1	1453.83*	PF 1	37.30	1174.11	1174.388		1174.46	0.010661	2.156	17.30	63.10	0.73
1	1452.83*	PF 1	37.30	1174.10	1174.377		1174.45	0.010630	2.151	17.34	63.36	0.72
1	1451.83*	PF 1	37.30	1174.09	1174.367		1174.44	0.010600	2.145	17.39	63.63	0.72
1	1450.83*	PF 1	37.30	1174.08	1174.357		1174.43	0.010537	2.138	17.45	63.91	0.72
1	1449.83*	PF 1	37.30	1174.07	1174.346		1174.42	0.010474	2.130	17.51	64.19	0.72
1	1448.83*	PF 1	37.30	1174.06	1174.336		1174.41	0.010403	2.122	17.57	64.45	0.72
1	1447.98	PF 1	37.30	1174.05	1174.328	1174.27100	1174.40	0.010113	2.101	17.75	64.70	0.71

HEC-RAS Plan: Plan 04 River: Entrada Reach: 1 Profile: PF 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	3895.84	PF 1	25.10	1230.93	1233.074	1231.60900	1233.08	0.000185	0.817	30.71	22.35	0.12
1	3850.61	PF 1	25.10	1232.17	1232.923		1233.05	0.011721	2.819	8.90	23.14	0.80
1	3806.24	PF 1	25.10	1231.73	1232.489		1232.59	0.009020	2.535	9.90	24.71	0.71
1	3765.08	PF 1	25.10	1231.32	1231.907	1231.90700	1232.06	0.019417	3.181	7.89	24.91	1.00
1	3713.23	PF 1	25.10	1229.97	1230.769	1230.79400	1231.02	0.020785	3.978	6.31	15.05	1.08
1	3712.23*	PF 1	25.10	1229.97	1230.673	1230.75100	1230.99	0.028222	4.522	5.55	13.74	1.25
1	3711.23*	PF 1	25.10	1229.98	1230.708	1230.71100	1230.93	0.018258	3.791	6.62	15.41	1.02
1	3710.23*	PF 1	25.10	1229.98	1230.619	1230.67600	1230.91	0.025294	4.304	5.83	14.33	1.19
1	3709.23*	PF 1	25.10	1229.98	1230.626	1230.64100	1230.86	0.019331	3.861	6.50	15.38	1.05
1	3708.23*	PF 1	25.10	1229.98	1230.545	1230.60800	1230.84	0.026710	4.343	5.78	14.62	1.22
1	3707.23*	PF 1	25.10	1229.99	1230.555	1230.58300	1230.80	0.021347	3.959	6.34	15.58	1.09
1	3706.23*	PF 1	25.10	1229.99	1230.605	1230.56100	1230.77	0.013525	3.293	7.62	17.53	0.88
1	3705.23*	PF 1	25.10	1229.99	1230.602		1230.75	0.011739	3.100	8.10	18.34	0.82
1	3704.23*	PF 1	25.10	1229.99	1230.598		1230.73	0.010437	2.943	8.53	19.13	0.78
1	3703.23*	PF 1	25.10	1230.00	1230.593		1230.72	0.009791	2.842	8.83	19.90	0.75
1	3702.23*	PF 1	25.10	1230.00	1230.590		1230.70	0.008773	2.717	9.24	20.52	0.71
1	3701.23*	PF 1	25.10	1230.00	1230.586		1230.69	0.008059	2.608	9.62	21.32	0.68
1	3700.23*	PF 1	25.10	1230.01	1230.581		1230.68	0.007718	2.537	9.89	22.12	0.67
1	3699.23*	PF 1	25.10	1230.01	1230.578		1230.67	0.007148	2.445	10.27	22.93	0.64
1	3698.23*	PF 1	25.10	1230.01	1230.575		1230.66	0.006545	2.347	10.69	23.76	0.62
1	3697.23*	PF 1	25.10	1230.01	1230.572		1230.65	0.006122	2.269	11.06	24.60	0.60
1	3696.23*	PF 1	25.10	1230.02	1230.568		1230.65	0.005999	2.227	11.27	25.39	0.59
1	3695.23*	PF 1	25.10	1230.02	1230.565		1230.64	0.005620	2.157	11.64	26.19	0.57
1	3694.23*	PF 1	25.10	1230.02	1230.562		1230.63	0.005232	2.086	12.03	26.99	0.55
1	3693.23*	PF 1	25.10	1230.02	1230.559		1230.62	0.004928	2.022	12.41	27.89	0.53
1	3692.23*	PF 1	25.10	1230.03	1230.555		1230.62	0.004935	2.002	12.54	28.65	0.53
1	3691.23*	PF 1	25.10	1230.03	1230.552		1230.61	0.004687	1.950	12.87	29.45	0.52
1	3690.23*	PF 1	25.10	1230.03	1230.550		1230.61	0.004426	1.893	13.26	30.35	0.51
1	3689.23*	PF 1	25.10	1230.04	1230.546		1230.60	0.004481	1.882	13.34	31.11	0.51
1	3688.23*	PF 1	25.10	1230.04	1230.543		1230.60	0.004285	1.839	13.65	31.89	0.50
1	3687.23*	PF 1	25.10	1230.04	1230.540		1230.59	0.004098	1.794	13.99	32.81	0.48
1	3686.23*	PF 1	25.10	1230.04	1230.538		1230.59	0.003914	1.753	14.32	33.59	0.47
1	3685.23*	PF 1	25.10	1230.05	1230.534		1230.58	0.003986	1.748	14.36	34.28	0.48
1	3684.23*	PF 1	25.10	1230.05	1230.531		1230.58	0.003806	1.710	14.68	34.97	0.47
1	3683.23*	PF 1	25.10	1230.05	1230.529		1230.57	0.003666	1.677	14.97	35.70	0.46
1	3682.23*	PF 1	25.10	1230.05	1230.526		1230.57	0.003519	1.644	15.27	36.39	0.45
1	3681.23*	PF 1	25.10	1230.06	1230.523		1230.57	0.003624	1.647	15.24	37.05	0.45
1	3680.22*	PF 1	25.10	1230.06	1230.520		1230.56	0.003492	1.616	15.53	37.78	0.44
1	3679.22*	PF 1	25.10	1230.06	1230.517		1230.56	0.003361	1.586	15.83	38.49	0.44
1	3678.22*	PF 1	25.10	1230.06	1230.515		1230.55	0.003262	1.560	16.09	39.21	0.43
1	3677.22*	PF 1	25.10	1230.07	1230.511		1230.55	0.003408	1.571	15.98	39.83	0.44
1	3676.22*	PF 1	25.10	1230.07	1230.509		1230.55	0.003293	1.543	16.26	40.56	0.43
1	3675.22*	PF 1	25.10	1230.07	1230.506		1230.54	0.003213	1.521	16.50	41.29	0.42
1	3674.22*	PF 1	25.10	1230.08	1230.502		1230.54	0.003401	1.538	16.32	41.94	0.43
1	3673.22*	PF 1	25.10	1230.08	1230.499		1230.54	0.003329	1.517	16.55	42.73	0.43
1	3672.22*	PF 1	25.10	1230.08	1230.496		1230.53	0.003254	1.496	16.78	43.49	0.42
1	3671.22*	PF 1	25.10	1230.08	1230.494		1230.53	0.003198	1.477	17.00	44.31	0.42
1	3670.22*	PF 1	25.10	1230.09	1230.490		1230.52	0.003429	1.499	16.75	44.99	0.43
1	3669.22*	PF 1	25.10	1230.09	1230.487		1230.52	0.003386	1.482	16.94	45.86	0.43
1	3668.22*	PF 1	25.10	1230.09	1230.484		1230.52	0.003327	1.464	17.14	46.61	0.43
1	3667.22*	PF 1	25.10	1230.09	1230.481		1230.51	0.003292	1.449	17.32	47.46	0.42
1	3666.22*	PF 1	25.10	1230.10	1230.476		1230.51	0.003573	1.475	17.01	48.23	0.44
1	3665.22*	PF 1	25.10	1230.10	1230.473		1230.51	0.003526	1.463	17.15	48.76	0.43
1	3664.22*	PF 1	25.10	1230.10	1230.470		1230.50	0.003477	1.452	17.29	49.24	0.43
1	3663.22*	PF 1	25.10	1230.11	1230.465		1230.50	0.003834	1.489	16.86	49.71	0.45
1	3662.22*	PF 1	25.10	1230.11	1230.461		1230.50	0.003813	1.481	16.95	50.21	0.45
1	3661.22*	PF 1	25.10	1230.11	1230.458		1230.49	0.003809	1.474	17.02	50.72	0.45
1	3660.22*	PF 1	25.10	1230.11	1230.454		1230.49	0.003826	1.471	17.07	51.21	0.45
1	3659.22*	PF 1	25.10	1230.12	1230.445		1230.48	0.007893	1.532	16.38	51.68	0.48
1	3658.22*	PF 1	25.10	1230.12	1230.436		1230.47	0.008457	1.558	16.11	52.16	0.49
1	3657.22*	PF 1	25.10	1230.12	1230.425		1230.47	0.009227	1.594	15.74	52.61	0.51
1	3656.22*	PF 1	25.10	1230.12	1230.413		1230.46	0.010340	1.644	15.27	53.06	0.54
1	3655.22*	PF 1	25.10	1230.13	1230.389		1230.44	0.015228	1.841	13.63	53.47	0.64
1	3654.26	PF 1	25.10	1230.13	1230.321	1230.32100	1230.42	0.040775	2.472	10.15	53.60	1.00
1	3653.26*	PF 1	25.10	1229.47	1229.547	1229.67300	1230.25	0.998385	6.711	3.74	48.63	4.27
1	3652.26*	PF 1	25.10	1228.80	1228.896	1229.01100	1229.45	0.592154	5.948	4.22	44.43	3.40
1	3651.26*	PF 1	25.10	1228.14	1228.241	1228.36900	1228.84	0.601634	6.222	4.03	40.16	3.46
1	3650.27*	PF 1	25.10	1227.47	1227.579	1227.71800	1228.23	0.593076	6.480	3.87	35.90	3.48
1	3649.27*	PF 1	25.10	1226.81	1226.929	1227.08200	1227.64	0.575445	6.752	3.72	31.65	3.47
1	3648.64	PF 1	25.10	1226.39	1226.516	1226.67800	1227.27	0.565246	6.955	3.61	29.00	3.48
1	3647.64*	PF 1	25.10	1226.38	1226.564	1226.65700	1226.89	0.147542	4.548	5.52	30.61	1.89
1	3646.64*	PF 1	25.10	1226.37	1226.686	1226.64300	1226.78	0.022128	2.507	10.01	32.67	0.80
1	3645.64*	PF 1	25.10	1226.36	1226.662		1226.76	0.023592	2.519	9.96	33.86	0.82
1	3644.64*	PF 1	25.10	1226.34	1226.644		1226.73	0.021447	2.413	10.40	35.12	0.78
1	3643.64*	PF 1	25.10	1226.33	1226.617		1226.71	0.024064	2.465	10.18	36.29	0.82
1	3642.64*	PF 1	25.10	1226.32	1226.588		1226.69	0.028178	2.553	9.83	37.45	0.88
1	3641.64*	PF 1	25.10	1226.31	1226.567	1226.55000	1226.67	0.017156	2.582	9.72	38.64	0.91
1	3640.64*	PF 1	25.10	1226.30	1226.550	1226.53300	1226.65	0.017618	2.570	9.77	39.87	0.92
1	3639.64*	PF 1	25.10	1226.29	1226.532	1226.52100	1226.64	0.018353	2.571	9.76	41.07	0.93

HEC-RAS Plan: Plan 04 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	3638.64*	PF 1	25.10	1226.27	1226.520	1226.49600	1226.61	0.015449	2.411	10.41	42.39	0.86
1	3637.64*	PF 1	25.10	1226.26	1226.506		1226.59	0.015399	2.381	10.54	43.63	0.85
1	3636.64*	PF 1	25.10	1226.25	1226.491		1226.58	0.015477	2.358	10.64	44.87	0.85
1	3635.64*	PF 1	25.10	1226.24	1226.476	1226.45300	1226.56	0.015703	2.343	10.71	46.11	0.86
1	3634.64*	PF 1	25.10	1226.23	1226.460		1226.55	0.016210	2.341	10.72	47.34	0.87
1	3633.64*	PF 1	25.10	1226.22	1226.443		1226.53	0.016928	2.347	10.69	48.56	0.88
1	3632.64*	PF 1	25.10	1226.20	1226.432		1226.51	0.014213	2.204	11.39	49.88	0.81
1	3631.64*	PF 1	25.10	1226.19	1226.418		1226.49	0.014167	2.180	11.51	51.12	0.81
1	3630.64*	PF 1	25.10	1226.18	1226.405		1226.48	0.014247	2.163	11.60	52.37	0.81
1	3629.64*	PF 1	25.10	1226.17	1226.391		1226.46	0.014385	2.149	11.68	53.61	0.81
1	3628.64*	PF 1	25.10	1226.16	1226.376		1226.45	0.014700	2.143	11.71	54.85	0.82
1	3627.64*	PF 1	25.10	1226.15	1226.360		1226.43	0.015318	2.151	11.67	56.08	0.83
1	3626.64*	PF 1	25.10	1226.14	1226.344		1226.42	0.016119	2.165	11.59	57.31	0.85
1	3625.64*	PF 1	25.10	1226.12	1226.333		1226.40	0.013497	2.034	12.34	58.63	0.78
1	3624.64*	PF 1	25.10	1226.11	1226.320		1226.38	0.013559	2.020	12.43	59.88	0.78
1	3623.64*	PF 1	25.10	1226.10	1226.306		1226.37	0.013702	2.010	12.49	61.12	0.78
1	3622.64*	PF 1	25.10	1226.09	1226.292		1226.36	0.014006	2.007	12.51	62.37	0.79
1	3621.64*	PF 1	25.10	1226.08	1226.277		1226.34	0.014654	2.019	12.43	63.59	0.80
1	3620.64*	PF 1	25.10	1226.07	1226.262		1226.33	0.015402	2.033	12.34	64.82	0.82
1	3619.64*	PF 1	25.10	1226.05	1226.251		1226.31	0.012831	1.909	13.15	66.14	0.76
1	3618.64*	PF 1	25.10	1226.04	1226.238		1226.29	0.012890	1.898	13.23	67.39	0.76
1	3617.64*	PF 1	25.10	1226.03	1226.225		1226.28	0.012990	1.888	13.29	68.64	0.76
1	3616.64*	PF 1	25.10	1226.02	1226.212		1226.27	0.013163	1.882	13.34	69.89	0.76
1	3615.64*	PF 1	25.10	1226.01	1226.199		1226.25	0.013506	1.884	13.33	71.13	0.77
1	3614.64*	PF 1	25.10	1226.00	1226.184		1226.24	0.014158	1.897	13.23	72.38	0.78
1	3613.64*	PF 1	25.10	1225.99	1226.169		1226.23	0.015056	1.920	13.08	73.60	0.80
1	3612.64*	PF 1	25.10	1225.97	1226.157		1226.21	0.012447	1.800	13.94	74.93	0.74
1	3611.63*	PF 1	25.10	1225.96	1226.145		1226.20	0.012513	1.791	14.01	76.18	0.74
1	3610.63*	PF 1	25.10	1225.95	1226.133		1226.18	0.012652	1.785	14.06	77.43	0.74
1	3609.63*	PF 1	25.10	1225.94	1226.120		1226.17	0.012920	1.785	14.06	78.68	0.74
1	3608.63*	PF 1	25.10	1225.93	1226.106		1226.16	0.013493	1.797	13.96	79.92	0.76
1	3607.63*	PF 1	25.10	1225.92	1226.092		1226.14	0.014053	1.808	13.88	81.16	0.77
1	3606.63*	PF 1	25.10	1225.90	1226.084		1226.13	0.010931	1.666	15.07	82.50	0.69
1	3605.63*	PF 1	25.10	1225.89	1226.074		1226.12	0.010625	1.642	15.29	83.76	0.68
1	3605.41	PF 1	25.10	1225.89	1226.070		1226.11	0.011261	1.669	15.04	84.02	0.70
1	3604.41*	PF 1	25.10	1225.88	1226.060		1226.10	0.010960	1.644	15.27	85.44	0.69
1	3603.41*	PF 1	25.10	1225.86	1226.046		1226.09	0.011393	1.652	15.19	86.86	0.70
1	3602.41*	PF 1	25.10	1225.85	1226.035		1226.08	0.011155	1.631	15.39	88.28	0.69
1	3601.41*	PF 1	25.10	1225.84	1226.025		1226.07	0.010899	1.610	15.59	89.71	0.68
1	3600.41*	PF 1	25.10	1225.82	1226.011		1226.05	0.011372	1.620	15.49	91.13	0.69
1	3599.41*	PF 1	25.10	1225.81	1226.000		1226.04	0.011182	1.602	15.67	92.55	0.69
1	3598.41*	PF 1	25.10	1225.80	1225.990		1226.03	0.010921	1.581	15.87	93.97	0.68
1	3597.41*	PF 1	25.10	1225.79	1225.979		1226.02	0.010672	1.561	16.08	95.38	0.67
1	3596.41*	PF 1	25.10	1225.77	1225.966		1226.00	0.011100	1.570	15.99	96.81	0.68
1	3595.41*	PF 1	25.10	1225.76	1225.955		1225.99	0.010885	1.552	16.17	98.23	0.67
1	3594.41*	PF 1	25.10	1225.75	1225.945		1225.98	0.010627	1.532	16.39	99.65	0.67
1	3593.41*	PF 1	25.10	1225.73	1225.931		1225.97	0.011057	1.541	16.28	101.09	0.68
1	3592.41*	PF 1	25.10	1225.72	1225.921		1225.96	0.010831	1.523	16.48	102.51	0.67
1	3591.41*	PF 1	25.10	1225.71	1225.911		1225.95	0.010589	1.505	16.68	103.92	0.66
1	3590.41*	PF 1	25.10	1225.69	1225.897		1225.93	0.011080	1.517	16.55	105.35	0.67
1	3589.41*	PF 1	25.10	1225.68	1225.886		1225.92	0.010898	1.501	16.72	106.77	0.67
1	3588.41*	PF 1	25.10	1225.67	1225.876		1225.91	0.010667	1.484	16.91	108.19	0.66
1	3587.41*	PF 1	25.10	1225.66	1225.866		1225.90	0.010390	1.465	17.14	109.61	0.65
1	3586.41*	PF 1	25.10	1225.64	1225.853		1225.89	0.010823	1.475	17.02	111.04	0.66
1	3585.41*	PF 1	25.10	1225.63	1225.843		1225.88	0.010575	1.457	17.22	112.47	0.66
1	3584.41*	PF 1	25.10	1225.62	1225.833		1225.87	0.010365	1.441	17.41	113.89	0.65
1	3583.41*	PF 1	25.10	1225.60	1225.819		1225.85	0.010824	1.453	17.27	115.32	0.66
1	3582.41*	PF 1	25.10	1225.59	1225.809		1225.84	0.010618	1.438	17.46	116.73	0.66
1	3581.41*	PF 1	25.10	1225.58	1225.799		1225.83	0.010391	1.421	17.66	118.15	0.65
1	3580.41*	PF 1	25.10	1225.56	1225.786		1225.82	0.010849	1.433	17.52	119.58	0.66
1	3579.41*	PF 1	25.10	1225.55	1225.776		1225.81	0.010654	1.419	17.69	121.00	0.65
1	3578.41*	PF 1	25.10	1225.54	1225.765		1225.80	0.010436	1.403	17.89	122.42	0.65
1	3577.41*	PF 1	25.10	1225.53	1225.755		1225.79	0.010194	1.387	18.10	123.85	0.64
1	3576.41*	PF 1	25.10	1225.51	1225.742		1225.77	0.010639	1.398	17.95	125.29	0.65
1	3575.41*	PF 1	25.10	1225.50	1225.732		1225.76	0.010401	1.383	18.15	126.71	0.64
1	3574.41*	PF 1	25.10	1225.49	1225.722		1225.75	0.010142	1.366	18.37	128.14	0.64
1	3573.41*	PF 1	25.10	1225.47	1225.709		1225.74	0.010578	1.377	18.22	129.57	0.65
1	3572.41*	PF 1	25.10	1225.46	1225.699		1225.73	0.010438	1.366	18.38	130.99	0.64
1	3571.41*	PF 1	25.10	1225.45	1225.689		1225.72	0.010184	1.350	18.59	132.41	0.64
1	3570.41*	PF 1	25.10	1225.43	1225.676		1225.71	0.010676	1.363	18.41	133.84	0.65
1	3569.41*	PF 1	25.10	1225.42	1225.666		1225.69	0.010512	1.351	18.58	135.27	0.64
1	3568.41*	PF 1	25.10	1225.41	1225.656		1225.68	0.010294	1.337	18.77	136.69	0.64
1	3567.41*	PF 1	25.10	1225.40	1225.646		1225.67	0.010053	1.322	18.98	138.11	0.63
1	3566.41*	PF 1	25.10	1225.38	1225.633		1225.66	0.010531	1.335	18.80	139.54	0.64
1	3565.41*	PF 1	25.10	1225.37	1225.623		1225.65	0.010319	1.322	18.99	140.96	0.63
1	3564.41*	PF 1	25.10	1225.36	1225.613		1225.64	0.010084	1.307	19.20	142.38	0.63
1	3563.41*	PF 1	25.10	1225.34	1225.600		1225.63	0.010584	1.321	19.00	143.81	0.64
1	3562.41*	PF 1	25.10	1225.33	1225.590		1225.62	0.010409	1.310	19.17	145.23	0.64
1	3561.41*	PF 1	25.10	1225.32	1225.580		1225.61	0.010206	1.297	19.36	146.66	0.63

HEC-RAS Plan: Plan 04 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	3560.41*	PF 1	25.10	1225.30	1225.567		1225.59	0.010769	1.313	19.12	148.09	0.64
1	3559.41*	PF 1	25.10	1225.29	1225.557		1225.58	0.010766	1.308	19.20	149.51	0.64
1	3558.41*	PF 1	25.10	1225.28	1225.546		1225.57	0.010733	1.301	19.29	150.93	0.64
1	3557.41*	PF 1	25.10	1225.26	1225.532		1225.56	0.011734	1.332	18.85	152.35	0.67
1	3556.41*	PF 1	25.10	1225.25	1225.518		1225.55	0.012601	1.356	18.52	153.75	0.69
1	3555.41*	PF 1	25.10	1225.24	1225.504		1225.53	0.013805	1.388	18.08	155.15	0.72
1	3554.41*	PF 1	25.10	1225.23	1225.496		1225.52	0.009810	1.248	20.11	156.61	0.61
1	3553.41*	PF 1	25.10	1225.21	1225.484		1225.51	0.010217	1.259	19.94	158.05	0.62
1	3552.41*	PF 1	25.10	1225.20	1225.474		1225.50	0.010003	1.246	20.14	159.47	0.62
1	3551.41*	PF 1	25.10	1225.19	1225.465		1225.49	0.009702	1.231	20.39	160.90	0.61
1	3550.41*	PF 1	25.10	1225.17	1225.453		1225.48	0.010022	1.238	20.27	162.33	0.62
1	3549.41*	PF 1	25.10	1225.16	1225.443		1225.47	0.009753	1.224	20.51	163.76	0.61
1	3548.41*	PF 1	25.10	1225.15	1225.434		1225.46	0.009431	1.208	20.79	165.18	0.60
1	3547.42*	PF 1	25.10	1225.13	1225.422		1225.45	0.009654	1.212	20.71	166.62	0.61
1	3546.42*	PF 1	25.10	1225.12	1225.413		1225.44	0.009248	1.192	21.05	168.05	0.59
1	3545.42*	PF 1	25.10	1225.11	1225.404		1225.43	0.008747	1.168	21.48	169.50	0.58
1	3544.42*	PF 1	25.10	1225.10	1225.396		1225.42	0.008156	1.140	22.02	171.06	0.56
1	3543.42*	PF 1	25.10	1225.08	1225.389		1225.41	0.007548	1.109	22.62	172.65	0.54
1	3542.42*	PF 1	25.10	1225.07	1225.382		1225.40	0.006811	1.072	23.42	174.23	0.52
1	3541.42*	PF 1	25.10	1225.06	1225.373		1225.39	0.011479	1.051	23.88	175.77	0.50
1	3540.42*	PF 1	25.10	1225.04	1225.360		1225.38	0.012104	1.064	23.59	177.29	0.51
1	3539.42*	PF 1	25.10	1225.03	1225.347		1225.37	0.012831	1.079	23.26	178.82	0.53
1	3538.42*	PF 1	25.10	1225.02	1225.332		1225.35	0.014275	1.111	22.59	180.03	0.55
1	3537.42*	PF 1	25.10	1225.00	1225.312		1225.33	0.018819	1.205	20.83	180.97	0.63
1	3537.09	PF 1	25.10	1225.00	1225.276	1225.27600	1225.32	0.064871	1.747	14.37	181.12	1.09
1	3536.09*	PF 1	25.10	1224.19	1224.369	1224.43700	1225.05	5.312615	6.621	3.79	176.28	7.96
1	3535.09*	PF 1	25.10	1223.38	1223.553	1223.59500	1223.72	0.502339	3.296	7.62	171.95	2.76
1	3534.09*	PF 1	25.10	1222.56	1222.694	1222.74400	1222.98	1.158192	4.280	5.86	167.43	4.03
1	3533.09*	PF 1	25.10	1221.75	1221.861	1221.90700	1222.08	0.700259	3.720	6.75	163.00	3.22
1	3532.09*	PF 1	25.10	1220.94	1221.009	1221.07300	1221.27	0.932716	4.100	6.12	158.48	3.68
1	3531.18	PF 1	25.10	1220.20	1220.241	1220.29200	1220.48	0.790950	3.942	6.37	154.43	3.42
1	3530.18*	PF 1	25.10	1220.19	1220.340	1220.28300	1220.36	0.010728	1.083	23.17	155.00	0.49
1	3529.18*	PF 1	25.10	1220.18	1220.329		1220.35	0.011069	1.094	22.94	154.89	0.50
1	3528.18*	PF 1	25.10	1220.17	1220.317		1220.34	0.011580	1.109	22.63	154.80	0.51
1	3527.18*	PF 1	25.10	1220.16	1220.304		1220.32	0.012365	1.131	22.18	154.70	0.53
1	3526.18*	PF 1	25.10	1220.15	1220.289		1220.31	0.013850	1.171	21.44	154.58	0.55
1	3525.18*	PF 1	25.10	1220.14	1220.272		1220.30	0.016405	1.232	20.37	154.45	0.60
1	3524.18*	PF 1	25.10	1220.13	1220.259		1220.28	0.009954	1.261	19.90	154.36	0.62
1	3523.18*	PF 1	25.10	1220.12	1220.249		1220.27	0.009934	1.261	19.91	154.27	0.62
1	3522.18*	PF 1	25.10	1220.11	1220.239		1220.26	0.009946	1.261	19.90	154.18	0.62
1	3521.18*	PF 1	25.10	1220.10	1220.229		1220.25	0.009925	1.261	19.91	154.10	0.62
1	3520.18*	PF 1	25.10	1220.09	1220.219		1220.24	0.009937	1.262	19.90	154.01	0.62
1	3519.18*	PF 1	25.10	1220.08	1220.210		1220.23	0.009916	1.261	19.90	153.93	0.62
1	3518.18*	PF 1	25.10	1220.07	1220.200		1220.22	0.009928	1.262	19.89	153.84	0.62
1	3517.18*	PF 1	25.10	1220.06	1220.190		1220.21	0.009971	1.264	19.86	153.75	0.62
1	3516.18*	PF 1	25.10	1220.05	1220.180		1220.20	0.009950	1.263	19.87	153.67	0.62
1	3515.18*	PF 1	25.10	1220.04	1220.170		1220.19	0.009961	1.264	19.86	153.58	0.62
1	3514.18*	PF 1	25.10	1220.03	1220.160		1220.19	0.009942	1.263	19.87	153.49	0.62
1	3513.18*	PF 1	25.10	1220.02	1220.150		1220.18	0.009952	1.264	19.86	153.41	0.62
1	3512.18*	PF 1	25.10	1220.01	1220.140		1220.17	0.009933	1.264	19.86	153.32	0.62
1	3511.18*	PF 1	25.10	1220.00	1220.130		1220.16	0.009943	1.264	19.85	153.24	0.62
1	3510.18*	PF 1	25.10	1219.99	1220.120		1220.15	0.009924	1.264	19.86	153.15	0.62
1	3509.18*	PF 1	25.10	1219.98	1220.110		1220.14	0.009934	1.265	19.85	153.07	0.62
1	3508.18*	PF 1	25.10	1219.97	1220.100		1220.13	0.009915	1.264	19.86	152.98	0.62
1	3507.18*	PF 1	25.10	1219.96	1220.090		1220.12	0.009927	1.265	19.84	152.89	0.62
1	3506.18*	PF 1	25.10	1219.95	1220.080		1220.11	0.009906	1.264	19.85	152.81	0.62
1	3505.18*	PF 1	25.10	1219.94	1220.070		1220.10	0.009887	1.264	19.86	152.72	0.62
1	3504.18*	PF 1	25.10	1219.93	1220.060		1220.09	0.009930	1.266	19.83	152.63	0.62
1	3503.18*	PF 1	25.10	1219.92	1220.050		1220.08	0.009971	1.268	19.80	152.55	0.62
1	3502.18*	PF 1	25.10	1219.91	1220.040		1220.07	0.009951	1.267	19.81	152.47	0.62
1	3501.18*	PF 1	25.10	1219.90	1220.030		1220.06	0.009933	1.267	19.81	152.37	0.62
1	3500.18*	PF 1	25.10	1219.89	1220.020		1220.05	0.009943	1.267	19.80	152.29	0.62
1	3499.18*	PF 1	25.10	1219.88	1220.010		1220.04	0.009954	1.268	19.79	152.21	0.62
1	3498.18*	PF 1	25.10	1219.87	1220.000		1220.03	0.009967	1.269	19.78	152.11	0.62
1	3497.18*	PF 1	25.10	1219.86	1219.990		1220.02	0.009946	1.268	19.79	152.03	0.62
1	3496.18*	PF 1	25.10	1219.85	1219.980		1220.01	0.009957	1.269	19.78	151.95	0.62
1	3495.18*	PF 1	25.10	1219.84	1219.970		1220.00	0.009969	1.270	19.77	151.86	0.62
1	3494.18*	PF 1	25.10	1219.83	1219.961		1219.99	0.009949	1.269	19.77	151.77	0.62
1	3493.18*	PF 1	25.10	1219.82	1219.951		1219.98	0.009929	1.269	19.78	151.69	0.62
1	3492.18*	PF 1	25.10	1219.81	1219.941		1219.97	0.009941	1.270	19.77	151.61	0.62
1	3491.18*	PF 1	25.10	1219.80	1219.931		1219.96	0.009953	1.270	19.76	151.51	0.62
1	3490.18*	PF 1	25.10	1219.79	1219.921		1219.95	0.009932	1.270	19.77	151.44	0.62
1	3489.18*	PF 1	25.10	1219.78	1219.911		1219.94	0.009944	1.271	19.75	151.35	0.62
1	3488.18*	PF 1	25.10	1219.77	1219.901		1219.93	0.009955	1.271	19.74	151.27	0.62
1	3487.18*	PF 1	25.10	1219.76	1219.891		1219.92	0.009967	1.272	19.73	151.18	0.62
1	3486.18*	PF 1	25.10	1219.75	1219.881		1219.91	0.009948	1.272	19.74	151.09	0.62
1	3485.18*	PF 1	25.10	1219.74	1219.871		1219.90	0.009958	1.272	19.73	151.01	0.62
1	3484.18*	PF 1	25.10	1219.73	1219.861		1219.89	0.009970	1.273	19.72	150.92	0.62
1	3483.18*	PF 1	25.10	1219.72	1219.851		1219.88	0.009951	1.273	19.72	150.83	0.62

HEC-RAS Plan: Plan 04 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	3482.18*	PF 1	25.10	1219.71	1219.841		1219.87	0.009962	1.273	19.71	150.75	0.62
1	3481.18*	PF 1	25.10	1219.70	1219.831		1219.86	0.009943	1.273	19.72	150.66	0.62
1	3480.18*	PF 1	25.10	1219.69	1219.821		1219.85	0.009924	1.272	19.73	150.57	0.62
1	3479.18*	PF 1	25.10	1219.68	1219.811		1219.84	0.009935	1.273	19.71	150.49	0.62
1	3478.18*	PF 1	25.10	1219.67	1219.801		1219.83	0.009945	1.274	19.70	150.41	0.62
1	3477.18*	PF 1	25.10	1219.66	1219.791		1219.82	0.009957	1.275	19.69	150.32	0.62
1	3476.18*	PF 1	25.10	1219.65	1219.781		1219.81	0.009969	1.275	19.68	150.23	0.62
1	3475.18*	PF 1	25.10	1219.64	1219.771		1219.80	0.009949	1.275	19.69	150.15	0.62
1	3474.18*	PF 1	25.10	1219.63	1219.761		1219.79	0.009961	1.276	19.68	150.06	0.62
1	3473.18*	PF 1	25.10	1219.62	1219.752		1219.78	0.009942	1.275	19.68	149.97	0.62
1	3472.18*	PF 1	25.10	1219.61	1219.742		1219.77	0.009953	1.276	19.67	149.89	0.62
1	3471.18*	PF 1	25.10	1219.60	1219.732		1219.76	0.009963	1.277	19.66	149.81	0.62
1	3470.18*	PF 1	25.10	1219.59	1219.722		1219.75	0.009946	1.276	19.67	149.71	0.62
1	3469.18*	PF 1	25.10	1219.58	1219.712		1219.74	0.009926	1.276	19.67	149.63	0.62
1	3468.18*	PF 1	25.10	1219.57	1219.702		1219.73	0.009906	1.275	19.68	149.55	0.62
1	3467.18*	PF 1	25.10	1219.56	1219.692		1219.72	0.009919	1.276	19.67	149.45	0.62
1	3466.18*	PF 1	25.10	1219.55	1219.682		1219.71	0.009930	1.277	19.66	149.37	0.62
1	3465.18*	PF 1	25.10	1219.54	1219.672		1219.70	0.009910	1.276	19.67	149.29	0.62
1	3464.18*	PF 1	25.10	1219.53	1219.662		1219.69	0.009922	1.277	19.65	149.20	0.62
1	3463.18*	PF 1	25.10	1219.52	1219.652		1219.68	0.009904	1.277	19.66	149.11	0.62
1	3462.18*	PF 1	25.10	1219.51	1219.642		1219.67	0.009884	1.276	19.67	149.03	0.62
1	3461.18*	PF 1	25.10	1219.50	1219.632		1219.66	0.009896	1.277	19.66	148.94	0.62
1	3460.18*	PF 1	25.10	1219.49	1219.622		1219.65	0.009877	1.277	19.66	148.86	0.62
1	3459.18*	PF 1	25.10	1219.48	1219.613		1219.64	0.009858	1.276	19.67	148.78	0.62
1	3458.18*	PF 1	25.10	1219.47	1219.603		1219.63	0.009809	1.274	19.69	148.69	0.62
1	3457.18*	PF 1	25.10	1219.46	1219.593		1219.62	0.009761	1.273	19.72	148.60	0.62
1	3456.18*	PF 1	25.10	1219.45	1219.583		1219.61	0.009712	1.271	19.74	148.52	0.61
1	3455.18*	PF 1	25.10	1219.44	1219.574		1219.60	0.009636	1.269	19.79	148.43	0.61
1	3454.18*	PF 1	25.10	1219.43	1219.564		1219.59	0.009559	1.266	19.83	148.35	0.61
1	3453.18*	PF 1	25.10	1219.42	1219.555		1219.58	0.009455	1.262	19.89	148.27	0.61
1	3452.18*	PF 1	25.10	1219.41	1219.545		1219.57	0.009296	1.256	19.99	148.18	0.60
1	3451.18*	PF 1	25.10	1219.40	1219.536		1219.56	0.009086	1.247	20.12	148.11	0.60
1	3450.18*	PF 1	25.10	1219.39	1219.527		1219.55	0.008830	1.237	20.29	148.03	0.59
1	3449.18*	PF 1	25.10	1219.38	1219.519		1219.54	0.008534	1.225	20.49	147.94	0.58
1	3448.18*	PF 1	25.10	1219.37	1219.511		1219.53	0.008178	1.209	20.75	147.87	0.57
1	3447.18*	PF 1	25.10	1219.36	1219.503		1219.53	0.007753	1.190	21.09	147.81	0.56
1	3446.18*	PF 1	25.10	1219.35	1219.496		1219.52	0.007297	1.169	21.47	147.72	0.54
1	3445.18*	PF 1	25.10	1219.34	1219.489		1219.51	0.006798	1.145	21.92	147.66	0.52
1	3444.18*	PF 1	25.10	1219.33	1219.483		1219.50	0.006259	1.117	22.47	147.61	0.50
1	3443.18*	PF 1	25.10	1219.32	1219.477		1219.50	0.005716	1.087	23.09	147.54	0.48
1	3442.18*	PF 1	25.10	1219.31	1219.472		1219.49	0.005193	1.057	23.76	147.48	0.46
1	3441.18*	PF 1	25.10	1219.30	1219.468		1219.48	0.004617	1.020	24.61	147.43	0.44
1	3440.63	PF 1	33.60	1219.29	1219.445		1219.48	0.010712	1.476	22.77	147.31	0.66
1	3366.51	PF 1	33.60	1218.55	1218.715		1218.75	0.009062	1.412	23.79	145.08	0.61
1	3305.78	PF 1	33.60	1217.94	1218.156		1218.20	0.009037	1.684	19.95	93.19	0.64
1	3304.78*	PF 1	33.60	1217.93	1218.146		1218.19	0.009043	1.687	19.91	92.82	0.64
1	3303.78*	PF 1	33.60	1217.92	1218.137		1218.18	0.009031	1.689	19.89	92.45	0.64
1	3302.78*	PF 1	33.60	1217.91	1218.127		1218.17	0.009022	1.691	19.86	92.07	0.64
1	3301.78*	PF 1	33.60	1217.90	1218.118		1218.16	0.009011	1.694	19.84	91.71	0.64
1	3300.78*	PF 1	33.60	1217.89	1218.109		1218.15	0.009002	1.696	19.81	91.33	0.64
1	3299.78*	PF 1	33.60	1217.88	1218.099		1218.14	0.008993	1.698	19.79	90.96	0.64
1	3298.78*	PF 1	33.60	1217.87	1218.090		1218.14	0.008985	1.700	19.76	90.59	0.64
1	3297.78*	PF 1	33.60	1217.86	1218.080		1218.13	0.008977	1.703	19.73	90.22	0.64
1	3296.78*	PF 1	33.60	1217.85	1218.071		1218.12	0.008987	1.706	19.69	89.84	0.64
1	3295.78*	PF 1	33.60	1217.84	1218.061		1218.11	0.008979	1.708	19.67	89.48	0.64
1	3294.78*	PF 1	33.60	1217.83	1218.052		1218.10	0.008958	1.710	19.65	89.10	0.64
1	3293.78*	PF 1	33.60	1217.82	1218.043		1218.09	0.008935	1.712	19.63	88.74	0.64
1	3292.78*	PF 1	33.60	1217.81	1218.033		1218.08	0.008948	1.715	19.59	88.36	0.64
1	3291.78*	PF 1	33.60	1217.80	1218.024		1218.07	0.008942	1.718	19.56	87.99	0.64
1	3290.78*	PF 1	33.60	1217.79	1218.015		1218.06	0.008923	1.720	19.54	87.62	0.64
1	3289.78*	PF 1	33.60	1217.78	1218.005		1218.05	0.008919	1.722	19.51	87.25	0.64
1	3288.78*	PF 1	33.60	1217.77	1217.996		1218.04	0.008901	1.724	19.49	86.88	0.64
1	3287.78*	PF 1	33.60	1217.76	1217.987		1218.03	0.008882	1.726	19.47	86.51	0.64
1	3286.78*	PF 1	33.60	1217.75	1217.977		1218.02	0.008882	1.729	19.43	86.13	0.64
1	3285.78*	PF 1	33.60	1217.74	1217.968		1218.02	0.008864	1.731	19.41	85.77	0.64
1	3284.78*	PF 1	33.60	1217.73	1217.959		1218.01	0.008849	1.733	19.39	85.39	0.64
1	3283.78*	PF 1	33.60	1217.72	1217.949		1218.00	0.008848	1.736	19.36	85.03	0.64
1	3282.78*	PF 1	33.60	1217.71	1217.940		1217.99	0.008835	1.738	19.33	84.65	0.64
1	3281.78*	PF 1	33.60	1217.70	1217.931		1217.98	0.008822	1.741	19.30	84.28	0.64
1	3280.78*	PF 1	33.60	1217.69	1217.922		1217.97	0.008794	1.742	19.29	83.90	0.64
1	3279.78*	PF 1	33.60	1217.68	1217.912		1217.96	0.008796	1.745	19.25	83.54	0.64
1	3278.78*	PF 1	33.60	1217.67	1217.903		1217.95	0.008769	1.747	19.24	83.16	0.64
1	3277.78*	PF 1	33.60	1217.66	1217.894		1217.94	0.008742	1.748	19.22	82.79	0.64
1	3276.78*	PF 1	33.60	1217.65	1217.885		1217.93	0.008717	1.750	19.20	82.42	0.64
1	3275.78*	PF 1	33.60	1217.64	1217.876		1217.92	0.008676	1.750	19.20	82.06	0.64
1	3274.78*	PF 1	33.60	1217.63	1217.867		1217.92	0.008653	1.752	19.18	81.68	0.64
1	3273.78*	PF 1	33.60	1217.62	1217.858		1217.91	0.008614	1.753	19.17	81.32	0.64
1	3272.78*	PF 1	33.60	1217.61	1217.849		1217.90	0.008564	1.753	19.17	80.94	0.64
1	3271.78*	PF 1	33.60	1217.60	1217.840		1217.89	0.008527	1.754	19.16	80.58	0.63

HEC-RAS Plan: Plan 04 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	3270.78*	PF 1	33.60	1217.59	1217.831		1217.88	0.008464	1.753	19.16	80.21	0.63
1	3269.78*	PF 1	33.60	1217.58	1217.822		1217.87	0.008418	1.754	19.16	79.83	0.63
1	3268.78*	PF 1	33.60	1217.57	1217.813		1217.86	0.008370	1.754	19.16	79.47	0.63
1	3267.78*	PF 1	33.60	1217.56	1217.804		1217.85	0.008326	1.754	19.15	79.10	0.63
1	3266.78*	PF 1	33.60	1217.55	1217.796		1217.84	0.008267	1.754	19.16	78.74	0.63
1	3265.78*	PF 1	33.60	1217.54	1217.787		1217.84	0.008198	1.753	19.17	78.36	0.62
1	3264.78*	PF 1	33.60	1217.53	1217.778		1217.83	0.008129	1.752	19.18	78.00	0.62
1	3263.78*	PF 1	33.60	1217.52	1217.770		1217.82	0.008050	1.750	19.20	77.63	0.62
1	3262.78*	PF 1	33.60	1217.51	1217.761		1217.81	0.007946	1.746	19.24	77.27	0.62
1	3261.78*	PF 1	33.60	1217.50	1217.753		1217.80	0.007847	1.743	19.28	76.90	0.61
1	3260.78*	PF 1	33.60	1217.49	1217.745		1217.79	0.007735	1.739	19.32	76.54	0.61
1	3259.78*	PF 1	33.60	1217.48	1217.737		1217.78	0.007606	1.733	19.38	76.17	0.61
1	3258.78*	PF 1	33.60	1217.47	1217.729		1217.78	0.007478	1.728	19.45	75.82	0.60
1	3257.78*	PF 1	33.60	1217.46	1217.718		1217.77	0.013687	1.747	19.24	75.43	0.61
1	3256.78*	PF 1	33.60	1217.44	1217.705		1217.75	0.012629	1.708	19.67	75.10	0.59
1	3255.78*	PF 1	33.60	1217.43	1217.689		1217.74	0.013750	1.756	19.14	74.68	0.61
1	3254.78*	PF 1	33.60	1217.42	1217.671		1217.72	0.015512	1.825	18.41	74.26	0.65
1	3253.78*	PF 1	33.60	1217.41	1217.644		1217.70	0.019777	1.968	17.07	73.78	0.72
1	3253.32	PF 1	33.60	1217.41	1217.599	1217.59900	1217.69	0.040702	2.450	13.72	73.34	1.00
1	3252.32*	PF 1	33.60	1216.12	1216.175	1216.31800	1217.45	2.839276	9.042	3.72	67.66	6.80
1	3251.32*	PF 1	33.60	1214.83	1214.907	1215.03600	1215.66	1.065060	6.936	4.84	62.92	4.41
1	3250.32*	PF 1	33.60	1213.54	1213.618	1213.75800	1214.49	1.239915	7.498	4.48	58.05	4.76
1	3250.17	PF 1	33.60	1213.35	1213.429	1213.57000	1214.30	1.212747	7.484	4.49	57.34	4.72
1	3249.17*	PF 1	33.60	1213.34	1213.480	1213.56100	1213.76	0.177616	4.203	7.99	57.41	1.99
1	3248.17*	PF 1	33.60	1213.33	1213.651	1213.55200	1213.70	0.011308	1.829	18.37	58.21	0.57
1	3247.17*	PF 1	33.60	1213.32	1213.638		1213.69	0.011785	1.856	18.10	57.89	0.59
1	3246.17*	PF 1	33.60	1213.31	1213.624		1213.68	0.012426	1.890	17.78	57.58	0.60
1	3245.17*	PF 1	33.60	1213.30	1213.609		1213.67	0.013266	1.931	17.40	57.25	0.62
1	3244.17*	PF 1	33.60	1213.29	1213.594		1213.65	0.014163	1.974	17.02	56.92	0.64
1	3243.17*	PF 1	33.60	1213.28	1213.583		1213.64	0.008174	1.994	16.85	56.62	0.64
1	3242.17*	PF 1	33.60	1213.27	1213.574		1213.64	0.008161	1.997	16.83	56.33	0.64
1	3241.17*	PF 1	33.60	1213.26	1213.565		1213.63	0.008141	2.000	16.80	56.04	0.64
1	3240.17*	PF 1	33.60	1213.25	1213.556		1213.62	0.008117	2.002	16.79	55.77	0.64
1	3239.17*	PF 1	33.60	1213.24	1213.547		1213.61	0.008109	2.005	16.75	55.47	0.64
1	3238.17*	PF 1	33.60	1213.23	1213.538		1213.60	0.008092	2.008	16.73	55.18	0.64
1	3237.17*	PF 1	33.60	1213.22	1213.530		1213.59	0.008073	2.011	16.71	54.90	0.64
1	3236.17*	PF 1	33.60	1213.21	1213.521		1213.58	0.008058	2.014	16.68	54.61	0.64
1	3235.17*	PF 1	33.60	1213.20	1213.512		1213.58	0.008044	2.018	16.65	54.31	0.64
1	3234.17*	PF 1	33.60	1213.19	1213.503		1213.57	0.008028	2.021	16.63	54.03	0.64
1	3233.17*	PF 1	33.60	1213.18	1213.495		1213.56	0.008013	2.024	16.60	53.75	0.64
1	3232.17*	PF 1	33.60	1213.17	1213.486		1213.55	0.008001	2.027	16.58	53.46	0.64
1	3231.17*	PF 1	33.60	1213.16	1213.477		1213.54	0.007988	2.030	16.55	53.17	0.64
1	3230.17*	PF 1	33.60	1213.15	1213.468		1213.53	0.007968	2.033	16.52	52.88	0.64
1	3229.17*	PF 1	33.60	1213.14	1213.460		1213.52	0.007946	2.036	16.50	52.60	0.64
1	3228.17*	PF 1	33.60	1213.13	1213.451		1213.52	0.007929	2.039	16.48	52.31	0.64
1	3227.17*	PF 1	33.60	1213.12	1213.442		1213.51	0.007909	2.042	16.45	52.02	0.64
1	3226.17*	PF 1	33.60	1213.11	1213.434		1213.50	0.007891	2.045	16.43	51.74	0.64
1	3225.17*	PF 1	33.60	1213.10	1213.425		1213.49	0.007876	2.049	16.40	51.45	0.64
1	3224.17*	PF 1	33.60	1213.09	1213.416		1213.48	0.007873	2.053	16.37	51.16	0.64
1	3223.17*	PF 1	33.60	1213.08	1213.407		1213.47	0.007857	2.056	16.34	50.88	0.64
1	3222.17*	PF 1	33.60	1213.07	1213.399		1213.47	0.007855	2.061	16.30	50.58	0.64
1	3221.17*	PF 1	33.60	1213.06	1213.390		1213.46	0.007864	2.066	16.26	50.29	0.64
1	3220.17*	PF 1	33.60	1213.05	1213.381		1213.45	0.007858	2.070	16.23	50.02	0.64
1	3219.17*	PF 1	33.60	1213.04	1213.373		1213.44	0.007840	2.074	16.20	49.73	0.64
1	3218.17*	PF 1	33.60	1213.03	1213.364		1213.43	0.007842	2.079	16.16	49.43	0.64
1	3217.17*	PF 1	33.60	1213.02	1213.355		1213.42	0.007842	2.083	16.13	49.15	0.64
1	3216.17*	PF 1	33.60	1213.01	1213.346		1213.41	0.007836	2.088	16.09	48.86	0.64
1	3215.17*	PF 1	33.60	1213.00	1213.338		1213.41	0.007842	2.093	16.05	48.57	0.64
1	3214.17*	PF 1	33.60	1212.99	1213.329		1213.40	0.007831	2.097	16.02	48.29	0.64
1	3213.17*	PF 1	33.60	1212.98	1213.320		1213.39	0.007838	2.103	15.98	48.00	0.64
1	3212.17*	PF 1	33.60	1212.97	1213.311		1213.38	0.007843	2.108	15.94	47.72	0.64
1	3211.17*	PF 1	33.60	1212.96	1213.302		1213.37	0.007852	2.114	15.89	47.43	0.64
1	3210.17*	PF 1	33.60	1212.95	1213.294		1213.36	0.007862	2.120	15.85	47.13	0.64
1	3209.17*	PF 1	33.60	1212.94	1213.285		1213.36	0.007870	2.126	15.80	46.85	0.65
1	3208.17*	PF 1	33.60	1212.93	1213.276		1213.35	0.007888	2.133	15.76	46.57	0.65
1	3207.17*	PF 1	33.60	1212.92	1213.267		1213.34	0.007910	2.140	15.70	46.27	0.65
1	3206.17*	PF 1	33.60	1212.91	1213.258		1213.33	0.007930	2.147	15.65	45.99	0.65
1	3205.17*	PF 1	33.60	1212.90	1213.249		1213.32	0.007964	2.155	15.59	45.70	0.65
1	3204.17*	PF 1	33.60	1212.89	1213.240		1213.31	0.007998	2.163	15.53	45.40	0.65
1	3203.17*	PF 1	33.60	1212.88	1213.231		1213.30	0.008031	2.171	15.48	45.12	0.65
1	3202.17*	PF 1	33.60	1212.87	1213.222		1213.30	0.008068	2.180	15.41	44.82	0.66
1	3201.17*	PF 1	33.60	1212.86	1213.213		1213.29	0.008111	2.189	15.35	44.54	0.66
1	3200.17*	PF 1	33.60	1212.85	1213.204		1213.28	0.008156	2.198	15.28	44.25	0.66
1	3199.17*	PF 1	33.60	1212.84	1213.194		1213.27	0.008225	2.210	15.21	43.96	0.66
1	3198.17*	PF 1	33.60	1212.83	1213.185		1213.26	0.008282	2.220	15.13	43.67	0.66
1	3197.17*	PF 1	33.60	1212.82	1213.176		1213.25	0.008364	2.233	15.05	43.37	0.67
1	3196.17*	PF 1	33.60	1212.81	1213.166		1213.25	0.008466	2.247	14.95	43.08	0.67
1	3195.17*	PF 1	33.60	1212.80	1213.156		1213.24	0.008553	2.260	14.87	42.80	0.68
1	3194.17*	PF 1	33.60	1212.79	1213.146		1213.23	0.008680	2.276	14.76	42.50	0.68

HEC-RAS Plan: Plan 04 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	3193.17*	PF 1	33.60	1212.78	1213.136		1213.22	0.008809	2.293	14.66	42.20	0.69
1	3192.17*	PF 1	33.60	1212.77	1213.126		1213.21	0.008957	2.311	14.54	41.91	0.69
1	3191.17*	PF 1	33.60	1212.76	1213.116		1213.20	0.009125	2.330	14.42	41.60	0.70
1	3190.17*	PF 1	33.60	1212.75	1213.105		1213.19	0.009328	2.352	14.28	41.30	0.71
1	3189.17*	PF 1	33.60	1212.74	1213.094		1213.18	0.009543	2.375	14.14	41.01	0.71
1	3188.17*	PF 1	33.60	1212.73	1213.083		1213.17	0.009799	2.401	13.99	40.71	0.72
1	3187.17*	PF 1	33.60	1212.72	1213.071		1213.16	0.010115	2.432	13.82	40.40	0.73
1	3186.18	PF 1	33.60	1212.71	1213.059		1213.15	0.010499	2.467	13.62	40.09	0.75
1	3091.83	PF 1	33.60	1211.75	1212.049		1212.13	0.011217	2.315	14.51	49.41	0.75
1	3030.37	PF 1	33.60	1211.13	1211.384		1211.45	0.010925	2.052	16.37	65.54	0.72
1	3029.37*	PF 1	33.60	1211.12	1211.373		1211.44	0.010920	2.048	16.40	65.83	0.72
1	3028.37*	PF 1	33.60	1211.11	1211.362		1211.43	0.010913	2.044	16.44	66.13	0.72
1	3027.37*	PF 1	33.60	1211.10	1211.351		1211.42	0.010927	2.041	16.46	66.42	0.72
1	3026.37*	PF 1	33.60	1211.09	1211.340		1211.41	0.010960	2.040	16.47	66.72	0.72
1	3025.37*	PF 1	33.60	1211.08	1211.330		1211.39	0.010955	2.036	16.51	67.02	0.72
1	3024.37*	PF 1	33.60	1211.07	1211.319		1211.38	0.010972	2.033	16.53	67.32	0.72
1	3023.37*	PF 1	33.60	1211.06	1211.308		1211.37	0.011026	2.032	16.53	67.62	0.72
1	3022.37*	PF 1	33.60	1211.05	1211.297		1211.36	0.011045	2.030	16.55	67.92	0.72
1	3021.37*	PF 1	33.60	1211.04	1211.286		1211.35	0.011098	2.029	16.56	68.23	0.73
1	3020.37*	PF 1	33.60	1211.03	1211.275		1211.34	0.011156	2.029	16.56	68.53	0.73
1	3019.37*	PF 1	33.60	1211.02	1211.263		1211.33	0.011254	2.030	16.55	68.83	0.73
1	3018.37*	PF 1	33.60	1211.01	1211.252		1211.32	0.011369	2.033	16.53	69.14	0.73
1	3017.37*	PF 1	33.60	1211.00	1211.241		1211.31	0.011452	2.034	16.52	69.44	0.74
1	3016.37*	PF 1	33.60	1210.98	1211.234		1211.29	0.009538	1.921	17.49	69.84	0.68
1	3015.37*	PF 1	33.60	1210.97	1211.224		1211.28	0.009325	1.904	17.65	70.17	0.67
1	3014.37*	PF 1	33.60	1210.96	1211.216		1211.27	0.009090	1.886	17.81	70.49	0.66
1	3013.37*	PF 1	33.60	1210.95	1211.207		1211.26	0.008835	1.867	18.00	70.81	0.65
1	3012.37*	PF 1	33.60	1210.94	1211.199		1211.25	0.008558	1.845	18.21	71.15	0.64
1	3011.37*	PF 1	33.60	1210.93	1211.191		1211.24	0.008281	1.824	18.42	71.48	0.63
1	3010.37*	PF 1	33.60	1210.92	1211.183		1211.23	0.007965	1.800	18.67	71.81	0.62
1	3009.37*	PF 1	33.60	1210.91	1211.176		1211.23	0.007640	1.774	18.94	72.14	0.61
1	3008.37*	PF 1	33.60	1210.90	1211.165		1211.21	0.013620	1.772	18.96	72.46	0.61
1	3007.37*	PF 1	33.60	1210.89	1211.149		1211.20	0.014544	1.805	18.62	72.74	0.63
1	3006.37*	PF 1	33.60	1210.88	1211.131		1211.18	0.016042	1.856	18.11	73.01	0.66
1	3005.37*	PF 1	33.60	1210.87	1211.107		1211.17	0.019266	1.958	17.16	73.25	0.71
1	3004.37*	PF 1	33.60	1210.86	1211.067		1211.14	0.029918	2.233	15.05	73.39	0.87
1	3004.33	PF 1	33.60	1210.86	1211.064	1211.06400	1211.14	0.031119	2.259	14.87	73.39	0.88
1	3003.33*	PF 1	33.60	1210.01	1210.076	1210.20700	1210.96	1.574335	7.562	4.44	67.98	5.21
1	3002.33*	PF 1	33.60	1209.17	1209.256	1209.37600	1209.84	0.723334	6.151	5.46	63.55	3.70
1	3001.33*	PF 1	33.60	1208.32	1208.408	1208.53600	1209.07	0.798501	6.528	5.15	58.99	3.90
1	3000.32*	PF 1	33.60	1207.47	1207.562	1207.69900	1208.27	0.794196	6.729	4.99	54.45	3.92
1	2999.32*	PF 1	33.60	1206.62	1206.718	1206.86300	1207.47	0.784689	6.942	4.84	49.92	3.93
1	2998.41	PF 1	33.60	1205.85	1205.953	1206.10600	1206.75	0.773138	7.154	4.70	45.79	3.94
1	2997.41*	PF 1	33.60	1205.84	1206.005	1206.09400	1206.31	0.157463	4.407	7.62	46.59	1.92
1	2996.41*	PF 1	33.60	1205.83	1206.165	1206.08100	1206.24	0.014671	2.135	15.74	48.04	0.66
1	2995.41*	PF 1	33.60	1205.82	1206.148		1206.22	0.015349	2.157	15.58	48.44	0.67
1	2994.41*	PF 1	33.60	1205.81	1206.130		1206.21	0.016398	2.193	15.32	48.82	0.69
1	2993.41*	PF 1	33.60	1205.80	1206.109		1206.19	0.018074	2.252	14.92	49.19	0.72
1	2992.41*	PF 1	33.60	1205.79	1206.088		1206.17	0.020063	2.317	14.50	49.55	0.75
1	2991.41*	PF 1	33.60	1205.78	1206.073		1206.16	0.011727	2.336	14.38	49.96	0.77
1	2990.41*	PF 1	33.60	1205.77	1206.062		1206.15	0.011716	2.327	14.44	50.38	0.77
1	2989.41*	PF 1	33.60	1205.76	1206.050		1206.13	0.011696	2.319	14.49	50.79	0.77
1	2988.41*	PF 1	33.60	1205.75	1206.039		1206.12	0.011691	2.311	14.54	51.21	0.76
1	2987.41*	PF 1	33.60	1205.74	1206.027		1206.11	0.011667	2.302	14.60	51.64	0.76
1	2986.41*	PF 1	33.60	1205.73	1206.016		1206.10	0.011651	2.293	14.65	52.07	0.76
1	2985.41*	PF 1	33.60	1205.72	1206.005		1206.09	0.011637	2.285	14.70	52.49	0.76
1	2984.41*	PF 1	33.60	1205.71	1205.994		1206.07	0.011608	2.276	14.76	52.91	0.76
1	2983.41*	PF 1	33.60	1205.70	1205.982		1206.06	0.011583	2.267	14.82	53.33	0.76
1	2982.41*	PF 1	33.60	1205.69	1205.971		1206.05	0.011555	2.258	14.88	53.77	0.76
1	2981.41*	PF 1	33.60	1205.68	1205.960		1206.04	0.011567	2.252	14.92	54.19	0.76
1	2980.41*	PF 1	33.60	1205.67	1205.949		1206.03	0.011532	2.243	14.98	54.61	0.76
1	2979.41*	PF 1	33.60	1205.66	1205.938		1206.02	0.011498	2.234	15.04	55.03	0.75
1	2978.41*	PF 1	33.60	1205.65	1205.926		1206.00	0.011463	2.225	15.10	55.47	0.75
1	2977.41*	PF 1	33.60	1205.64	1205.915		1205.99	0.011451	2.218	15.15	55.89	0.75
1	2976.41*	PF 1	33.60	1205.63	1205.904		1205.98	0.011441	2.210	15.20	56.31	0.75
1	2975.41*	PF 1	33.60	1205.62	1205.893		1205.97	0.011450	2.204	15.24	56.74	0.75
1	2974.41*	PF 1	33.60	1205.61	1205.882		1205.96	0.011406	2.195	15.31	57.17	0.75
1	2973.41*	PF 1	33.60	1205.60	1205.870		1205.95	0.011385	2.188	15.36	57.59	0.75
1	2972.41*	PF 1	33.60	1205.59	1205.859		1205.93	0.011371	2.180	15.41	58.01	0.75
1	2971.41*	PF 1	33.60	1205.58	1205.848		1205.92	0.011354	2.173	15.46	58.43	0.74
1	2970.41*	PF 1	33.60	1205.57	1205.837		1205.91	0.011339	2.166	15.51	58.85	0.74
1	2969.41*	PF 1	33.60	1205.56	1205.826		1205.90	0.011322	2.159	15.56	59.29	0.74
1	2968.41*	PF 1	33.60	1205.55	1205.815		1205.89	0.011276	2.150	15.63	59.71	0.74
1	2967.41*	PF 1	33.60	1205.54	1205.804		1205.88	0.011250	2.142	15.68	60.14	0.74
1	2966.41*	PF 1	33.60	1205.53	1205.793		1205.86	0.011225	2.135	15.74	60.56	0.74
1	2965.41*	PF 1	33.60	1205.52	1205.782		1205.85	0.011198	2.127	15.79	60.99	0.74
1	2964.41*	PF 1	33.60	1205.51	1205.772		1205.84	0.011142	2.118	15.86	61.42	0.73
1	2963.41*	PF 1	33.60	1205.50	1205.761		1205.83	0.011105	2.110	15.92	61.85	0.73
1	2962.41*	PF 1	33.60	1205.49	1205.750		1205.82	0.011069	2.103	15.98	62.27	0.73

HEC-RAS Plan: Plan 04 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	2961.41*	PF 1	33.60	1205.48	1205.739		1205.81	0.011032	2.095	16.04	62.70	0.73
1	2960.41*	PF 1	33.60	1205.47	1205.728		1205.80	0.010982	2.086	16.11	63.13	0.73
1	2959.41*	PF 1	33.60	1205.46	1205.718		1205.79	0.010917	2.077	16.18	63.56	0.73
1	2958.41*	PF 1	33.60	1205.45	1205.707		1205.77	0.010836	2.067	16.26	63.98	0.72
1	2957.41*	PF 1	33.60	1205.44	1205.697		1205.76	0.010723	2.055	16.35	64.41	0.72
1	2956.41*	PF 1	33.60	1205.43	1205.687		1205.75	0.010642	2.044	16.43	64.85	0.72
1	2955.41*	PF 1	33.60	1205.42	1205.676		1205.74	0.010519	2.032	16.53	65.27	0.71
1	2955.4	PF 1	33.60	1205.42	1205.676		1205.74	0.010550	2.034	16.52	65.28	0.71
1	2914.65	PF 1	33.60	1205.01	1205.243		1205.30	0.010524	1.910	17.59	76.28	0.70
1	2815.59	PF 1	33.60	1204.02	1204.205		1204.25	0.010556	1.648	20.39	110.59	0.68
1	2782.59	PF 1	33.60	1203.69	1203.868		1203.91	0.010073	1.569	21.41	120.68	0.66
1	2743.58	PF 1	33.60	1203.30	1203.473		1203.51	0.010188	1.548	21.70	125.91	0.66
1	2742.58*	PF 1	33.60	1203.29	1203.463		1203.50	0.010166	1.546	21.73	126.05	0.66
1	2741.58*	PF 1	33.60	1203.28	1203.453		1203.49	0.010191	1.547	21.72	126.19	0.66
1	2740.58*	PF 1	33.60	1203.27	1203.443		1203.48	0.010190	1.546	21.73	126.34	0.66
1	2739.58*	PF 1	33.60	1203.26	1203.433		1203.47	0.010192	1.545	21.74	126.48	0.66
1	2738.58*	PF 1	33.60	1203.25	1203.422		1203.46	0.010243	1.547	21.72	126.60	0.66
1	2737.58*	PF 1	33.60	1203.24	1203.412		1203.45	0.010269	1.548	21.71	126.74	0.66
1	2736.58*	PF 1	33.60	1203.23	1203.402		1203.44	0.010319	1.549	21.69	126.88	0.66
1	2735.58*	PF 1	33.60	1203.22	1203.391		1203.43	0.010394	1.552	21.65	127.02	0.66
1	2734.58*	PF 1	33.60	1203.21	1203.380		1203.42	0.010494	1.556	21.60	127.16	0.67
1	2733.58*	PF 1	33.60	1203.20	1203.370		1203.41	0.010648	1.562	21.51	127.30	0.67
1	2732.58*	PF 1	33.60	1203.19	1203.359		1203.40	0.010857	1.570	21.40	127.43	0.68
1	2731.58*	PF 1	33.60	1203.18	1203.347		1203.39	0.011290	1.588	21.16	127.56	0.69
1	2730.58*	PF 1	33.60	1203.17	1203.334		1203.37	0.011952	1.615	20.81	127.68	0.71
1	2729.58*	PF 1	33.60	1203.16	1203.321		1203.36	0.012701	1.644	20.44	127.79	0.72
1	2728.58*	PF 1	33.60	1203.14	1203.312		1203.35	0.010041	1.531	21.94	128.01	0.65
1	2727.58*	PF 1	33.60	1203.13	1203.302		1203.34	0.009995	1.528	21.98	128.15	0.65
1	2726.58*	PF 1	33.60	1203.12	1203.292		1203.33	0.009949	1.526	22.02	128.29	0.65
1	2725.58*	PF 1	33.60	1203.11	1203.282		1203.32	0.009928	1.524	22.05	128.43	0.65
1	2724.58*	PF 1	33.60	1203.10	1203.272		1203.31	0.009883	1.521	22.09	128.57	0.65
1	2723.58*	PF 1	33.60	1203.09	1203.263		1203.30	0.009814	1.517	22.14	128.72	0.64
1	2722.58*	PF 1	33.60	1203.08	1203.253		1203.29	0.009745	1.513	22.20	128.87	0.64
1	2721.58*	PF 1	33.60	1203.07	1203.243		1203.28	0.009656	1.509	22.27	129.01	0.64
1	2720.58*	PF 1	33.60	1203.06	1203.234		1203.27	0.009569	1.504	22.34	129.14	0.64
1	2719.58*	PF 1	33.60	1203.05	1203.224		1203.26	0.009415	1.496	22.46	129.29	0.63
1	2718.57*	PF 1	33.60	1203.04	1203.215		1203.25	0.009264	1.488	22.58	129.43	0.63
1	2717.57*	PF 1	33.60	1203.03	1203.206		1203.24	0.009095	1.479	22.72	129.58	0.62
1	2716.57*	PF 1	33.60	1203.02	1203.197		1203.23	0.008867	1.467	22.90	129.73	0.62
1	2715.57*	PF 1	33.60	1203.01	1203.189		1203.22	0.008608	1.454	23.12	129.88	0.61
1	2714.57*	PF 1	33.60	1203.00	1203.181		1203.21	0.008302	1.437	23.38	130.03	0.60
1	2713.57*	PF 1	33.60	1202.99	1203.173		1203.20	0.007957	1.418	23.69	130.19	0.59
1	2712.57*	PF 1	33.60	1202.98	1203.165		1203.20	0.007596	1.398	24.03	130.34	0.57
1	2711.57*	PF 1	33.60	1202.97	1203.158		1203.19	0.007209	1.376	24.42	130.49	0.56
1	2710.57*	PF 1	33.60	1202.96	1203.151		1203.18	0.006788	1.350	24.88	130.66	0.55
1	2709.57*	PF 1	33.60	1202.95	1203.142		1203.17	0.011863	1.343	25.02	130.80	0.54
1	2708.57*	PF 1	33.60	1202.94	1203.129		1203.16	0.012487	1.363	24.65	130.92	0.55
1	2707.57*	PF 1	33.60	1202.93	1203.115		1203.15	0.013536	1.396	24.07	131.04	0.57
1	2706.57*	PF 1	33.60	1202.92	1203.097		1203.13	0.015497	1.453	23.12	131.13	0.61
1	2705.57*	PF 1	33.60	1202.91	1203.070		1203.11	0.021587	1.605	20.93	131.17	0.71
1	2704.94	PF 1	33.60	1202.90	1203.027	1203.02700	1203.09	0.046785	2.025	16.59	131.06	1.00
1	2703.94*	PF 1	33.60	1202.01	1202.047	1202.14000	1202.87	3.155764	7.289	4.61	125.57	6.71
1	2702.94*	PF 1	33.60	1201.13	1201.191	1201.26400	1201.51	0.625722	4.556	7.37	120.77	3.25
1	2701.94*	PF 1	33.60	1200.24	1200.295	1200.37700	1200.73	0.973389	5.291	6.35	115.78	3.98
1	2700.94*	PF 1	33.60	1199.35	1199.409	1199.49200	1199.82	0.833575	5.139	6.54	110.84	3.73
1	2700.54	PF 1	33.60	1199.00	1199.059	1199.14400	1199.49	0.869761	5.242	6.41	108.89	3.81
1	2699.54*	PF 1	33.60	1198.99	1199.205	1199.13300	1199.24	0.011575	1.429	23.52	110.00	0.54
1	2698.54*	PF 1	33.60	1198.98	1199.193		1199.23	0.011987	1.443	23.29	110.16	0.55
1	2697.54*	PF 1	33.60	1198.97	1199.179		1199.21	0.012562	1.462	22.98	110.32	0.56
1	2696.54*	PF 1	33.60	1198.96	1199.165		1199.20	0.013468	1.492	22.51	110.46	0.58
1	2695.54*	PF 1	33.60	1198.95	1199.148		1199.19	0.014976	1.540	21.82	110.58	0.61
1	2694.54*	PF 1	33.60	1198.94	1199.130		1199.17	0.017108	1.602	20.97	110.70	0.65
1	2693.54*	PF 1	33.60	1198.93	1199.117		1199.16	0.010191	1.629	20.63	110.85	0.67
1	2692.54*	PF 1	33.60	1198.92	1199.107		1199.15	0.010202	1.629	20.63	111.03	0.67
1	2691.54*	PF 1	33.60	1198.91	1199.097		1199.14	0.010193	1.627	20.65	111.20	0.67
1	2690.54*	PF 1	33.60	1198.90	1199.086		1199.13	0.010206	1.627	20.65	111.37	0.67
1	2689.54*	PF 1	33.60	1198.89	1199.076		1199.12	0.010197	1.625	20.67	111.54	0.67
1	2688.54*	PF 1	33.60	1198.88	1199.066		1199.11	0.010188	1.624	20.69	111.71	0.67
1	2687.54*	PF 1	33.60	1198.87	1199.056		1199.10	0.010199	1.623	20.70	111.89	0.67
1	2686.54*	PF 1	33.60	1198.86	1199.046		1199.09	0.010192	1.622	20.71	112.04	0.67
1	2685.54*	PF 1	33.60	1198.85	1199.036		1199.08	0.010161	1.620	20.74	112.21	0.66
1	2684.54*	PF 1	33.60	1198.84	1199.026		1199.07	0.010130	1.617	20.78	112.38	0.66
1	2683.54*	PF 1	33.60	1198.83	1199.016		1199.06	0.010099	1.615	20.81	112.56	0.66
1	2682.54*	PF 1	33.60	1198.82	1199.006		1199.05	0.010067	1.612	20.84	112.73	0.66
1	2681.54*	PF 1	33.60	1198.81	1198.996		1199.04	0.010080	1.612	20.85	112.90	0.66
1	2680.54*	PF 1	33.60	1198.80	1198.986		1199.03	0.010050	1.609	20.88	113.07	0.66
1	2679.54*	PF 1	33.60	1198.79	1198.976		1199.02	0.010019	1.607	20.91	113.24	0.66
1	2678.54*	PF 1	33.60	1198.78	1198.966		1199.01	0.009969	1.604	20.95	113.40	0.66
1	2677.54*	PF 1	33.60	1198.77	1198.956		1199.00	0.009915	1.600	21.00	113.58	0.66

HEC-RAS Plan: Plan 04 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	2676.54*	PF 1	33.60	1198.76	1198.946		1198.99	0.009842	1.596	21.06	113.76	0.65
1	2675.54*	PF 1	33.60	1198.75	1198.936		1198.98	0.009748	1.590	21.13	113.93	0.65
1	2674.54*	PF 1	33.60	1198.74	1198.927		1198.97	0.009656	1.584	21.21	114.10	0.65
1	2673.54*	PF 1	33.60	1198.73	1198.917		1198.96	0.009543	1.578	21.29	114.27	0.64
1	2672.54*	PF 1	33.60	1198.72	1198.908		1198.95	0.009410	1.570	21.40	114.46	0.64
1	2671.54*	PF 1	33.60	1198.71	1198.899		1198.94	0.009241	1.561	21.53	114.63	0.64
1	2670.54*	PF 1	33.60	1198.70	1198.890		1198.93	0.009056	1.550	21.67	114.81	0.63
1	2669.54*	PF 1	33.60	1198.69	1198.881		1198.92	0.008840	1.538	21.84	114.98	0.62
1	2668.54*	PF 1	33.60	1198.68	1198.872		1198.91	0.008610	1.525	22.03	115.15	0.61
1	2667.54*	PF 1	33.60	1198.67	1198.864		1198.90	0.008333	1.509	22.26	115.34	0.61
1	2666.54*	PF 1	33.60	1198.66	1198.856		1198.89	0.008018	1.491	22.53	115.53	0.60
1	2665.54*	PF 1	33.60	1198.65	1198.849		1198.88	0.007671	1.471	22.85	115.71	0.58
1	2664.54*	PF 1	33.60	1198.64	1198.841		1198.87	0.007298	1.448	23.21	115.90	0.57
1	2663.54*	PF 1	33.60	1198.63	1198.834		1198.87	0.006906	1.423	23.61	116.10	0.56
1	2662.54*	PF 1	33.60	1198.62	1198.828		1198.86	0.006515	1.397	24.04	116.29	0.54
1	2661.54*	PF 1	33.60	1198.61	1198.822		1198.85	0.006093	1.369	24.55	116.48	0.53
1	2661.04	PF 1	33.60	1198.60	1198.820	1198.75100	1198.85	0.005362	1.317	25.52	116.61	0.50
1	2616.7	PF 1	33.60	1198.16	1198.294	1198.29400	1198.37	0.029799	2.232	15.05	112.81	1.08
1	2540.68	PF 1	33.60	1197.39	1197.695	1197.53400	1197.71	0.002058	1.012	33.19	109.62	0.32
1	2481.7	PF 1	33.60	1196.79	1197.698		1197.70	0.000040	0.287	117.10	133.07	0.05
1	2409.33	PF 1	33.60	1196.06	1197.698		1197.70	0.000005	0.144	232.68	146.96	0.02
1	2320.35	PF 1	37.30	1195.17	1197.698	1195.34400	1197.70	0.000003	0.151	246.60	105.15	0.02
1	2300		Culvert									
1	2119.93	PF 1	37.30	1185.98	1186.238	1186.22100	1186.34	0.016961	2.587	14.42	56.71	0.90
1	2068.55	PF 1	37.30	1185.47	1185.740		1185.79	0.007149	1.734	21.51	80.60	0.59
1	2000.07	PF 1	37.30	1184.78	1185.088		1185.18	0.011433	2.382	15.66	51.83	0.76
1	1943.65	PF 1	37.30	1184.21	1184.538		1184.61	0.008877	2.188	17.05	52.99	0.68
1	1862.48	PF 1	37.30	1183.39	1183.726		1183.82	0.010728	2.440	15.29	46.50	0.75
1	1861.48*	PF 1	37.30	1183.38	1183.715		1183.81	0.010782	2.442	15.27	46.57	0.75
1	1860.48*	PF 1	37.30	1183.37	1183.704		1183.80	0.010862	2.446	15.25	46.64	0.75
1	1859.48*	PF 1	37.30	1183.36	1183.693		1183.79	0.010966	2.452	15.21	46.70	0.76
1	1858.48*	PF 1	37.30	1183.35	1183.681		1183.78	0.011090	2.459	15.17	46.77	0.76
1	1857.48*	PF 1	37.30	1183.34	1183.670		1183.76	0.011229	2.466	15.12	46.84	0.77
1	1856.48*	PF 1	37.30	1183.33	1183.658		1183.75	0.011429	2.478	15.05	46.91	0.77
1	1855.48*	PF 1	37.30	1183.32	1183.646		1183.74	0.011629	2.490	14.98	46.96	0.78
1	1854.48*	PF 1	37.30	1183.30	1183.635		1183.73	0.010510	2.413	15.46	47.09	0.74
1	1853.48*	PF 1	37.30	1183.29	1183.625		1183.72	0.010525	2.412	15.46	47.17	0.74
1	1852.48*	PF 1	37.30	1183.28	1183.615		1183.71	0.010539	2.412	15.47	47.25	0.74
1	1851.48*	PF 1	37.30	1183.27	1183.604		1183.69	0.010588	2.414	15.45	47.30	0.74
1	1850.48*	PF 1	37.30	1183.26	1183.593		1183.68	0.010616	2.414	15.45	47.38	0.75
1	1849.48*	PF 1	37.30	1183.25	1183.583		1183.67	0.010644	2.415	15.45	47.46	0.75
1	1848.48*	PF 1	37.30	1183.24	1183.572		1183.66	0.010699	2.417	15.43	47.53	0.75
1	1847.48*	PF 1	37.30	1183.23	1183.561		1183.65	0.010759	2.419	15.42	47.60	0.75
1	1846.48*	PF 1	37.30	1183.22	1183.550		1183.64	0.010832	2.423	15.39	47.66	0.75
1	1845.48*	PF 1	37.30	1183.21	1183.539		1183.63	0.010916	2.427	15.37	47.73	0.75
1	1844.48*	PF 1	37.30	1183.20	1183.527		1183.62	0.011015	2.432	15.34	47.81	0.76
1	1843.48*	PF 1	37.30	1183.19	1183.516		1183.61	0.011189	2.443	15.27	47.87	0.76
1	1842.48*	PF 1	37.30	1183.18	1183.504		1183.60	0.011411	2.456	15.19	47.92	0.77
1	1841.48*	PF 1	37.30	1183.17	1183.492		1183.59	0.011589	2.466	15.13	47.99	0.77
1	1840.48*	PF 1	37.30	1183.15	1183.482		1183.57	0.010437	2.387	15.63	48.13	0.74
1	1839.48*	PF 1	37.30	1183.14	1183.471		1183.56	0.010457	2.387	15.63	48.20	0.74
1	1838.48*	PF 1	37.30	1183.13	1183.461		1183.55	0.010473	2.387	15.63	48.27	0.74
1	1837.48*	PF 1	37.30	1183.12	1183.450		1183.54	0.010493	2.387	15.63	48.34	0.74
1	1836.48*	PF 1	37.30	1183.11	1183.440		1183.53	0.010496	2.385	15.64	48.42	0.74
1	1835.48*	PF 1	37.30	1183.10	1183.429		1183.52	0.010517	2.385	15.64	48.49	0.74
1	1834.48*	PF 1	37.30	1183.09	1183.419		1183.51	0.010533	2.385	15.64	48.56	0.74
1	1833.48*	PF 1	37.30	1183.08	1183.408		1183.50	0.010554	2.385	15.64	48.63	0.74
1	1832.48*	PF 1	37.30	1183.07	1183.398		1183.49	0.010584	2.386	15.64	48.71	0.74
1	1831.48*	PF 1	37.30	1183.06	1183.387		1183.48	0.010645	2.388	15.62	48.77	0.74
1	1830.48*	PF 1	37.30	1183.05	1183.376		1183.47	0.010689	2.390	15.61	48.85	0.75
1	1829.48*	PF 1	37.30	1183.04	1183.365		1183.45	0.010751	2.393	15.59	48.91	0.75
1	1828.48*	PF 1	37.30	1183.03	1183.354		1183.44	0.010809	2.395	15.57	48.99	0.75
1	1827.48*	PF 1	37.30	1183.02	1183.344		1183.43	0.010845	2.396	15.57	49.06	0.75
1	1826.48*	PF 1	37.30	1183.00	1183.337		1183.42	0.009470	2.298	16.23	49.21	0.71
1	1825.48*	PF 1	37.30	1182.99	1183.328		1183.41	0.009369	2.289	16.30	49.29	0.70
1	1824.48*	PF 1	37.30	1182.98	1183.318		1183.40	0.009252	2.279	16.37	49.37	0.70
1	1823.48*	PF 1	37.30	1182.97	1183.310		1183.39	0.009125	2.268	16.45	49.45	0.69
1	1822.48*	PF 1	37.30	1182.96	1183.301		1183.38	0.008986	2.256	16.53	49.54	0.69
1	1821.48*	PF 1	37.30	1182.95	1183.292		1183.37	0.008839	2.243	16.63	49.62	0.68
1	1820.48*	PF 1	37.30	1182.94	1183.284		1183.36	0.008688	2.230	16.72	49.70	0.68
1	1819.48*	PF 1	37.30	1182.93	1183.275		1183.35	0.008541	2.217	16.82	49.78	0.67
1	1818.48*	PF 1	37.30	1182.92	1183.267		1183.34	0.008363	2.202	16.94	49.87	0.67
1	1817.48*	PF 1	37.30	1182.91	1183.259		1183.33	0.008180	2.186	17.07	49.97	0.66
1	1816.48*	PF 1	37.30	1182.90	1183.251		1183.32	0.007983	2.168	17.20	50.06	0.65
1	1815.48*	PF 1	37.30	1182.89	1183.239		1183.31	0.014508	2.182	17.10	50.11	0.66
1	1814.48*	PF 1	37.30	1182.88	1183.220		1183.30	0.015656	2.232	16.71	50.14	0.68
1	1813.48*	PF 1	37.30	1182.87	1183.199		1183.28	0.017502	2.307	16.17	50.15	0.72
1	1812.48*	PF 1	37.30	1182.86	1183.172		1183.26	0.020690	2.427	15.37	50.13	0.77
1	1811.48*	PF 1	37.30	1182.84	1183.146		1183.24	0.022135	2.476	15.07	50.15	0.80

HEC-RAS Plan: Plan 04 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	1811.06	PF 1	37.30	1182.84	1183.102	1183.10200	1183.23	0.037106	2.896	12.88	49.92	1.01
1	1810.06*	PF 1	37.30	1182.35	1182.480	1182.62200	1183.09	0.438397	6.273	5.95	46.13	3.08
1	1809.06*	PF 1	37.30	1181.87	1182.006	1182.15800	1182.65	0.435066	6.427	5.80	43.17	3.09
1	1808.06*	PF 1	37.30	1181.38	1181.521	1181.68200	1182.21	0.439747	6.633	5.62	40.21	3.13
1	1807.36	PF 1	37.30	1181.04	1181.187	1181.35000	1181.90	0.435751	6.756	5.52	38.13	3.13
1	1806.36*	PF 1	37.30	1181.03	1181.241	1181.34100	1181.57	0.126484	4.630	8.06	38.76	1.79
1	1805.36*	PF 1	37.30	1181.02	1181.421	1181.32800	1181.51	0.014623	2.389	15.62	40.15	0.68
1	1804.36*	PF 1	37.30	1181.01	1181.404		1181.50	0.015281	2.416	15.44	40.34	0.69
1	1803.36*	PF 1	37.30	1181.00	1181.386		1181.48	0.016190	2.453	15.20	40.54	0.71
1	1802.36*	PF 1	37.30	1180.99	1181.366		1181.46	0.017510	2.507	14.88	40.72	0.73
1	1801.36*	PF 1	37.30	1180.98	1181.346		1181.45	0.018902	2.561	14.57	40.91	0.76
1	1800.36*	PF 1	37.30	1180.97	1181.332		1181.44	0.010851	2.571	14.51	41.13	0.76
1	1799.36*	PF 1	37.30	1180.96	1181.322		1181.42	0.010726	2.556	14.59	41.38	0.76
1	1798.36*	PF 1	37.30	1180.95	1181.312		1181.41	0.010585	2.540	14.69	41.62	0.75
1	1797.36*	PF 1	37.30	1180.94	1181.303		1181.40	0.010418	2.522	14.79	41.88	0.75
1	1796.36*	PF 1	37.30	1180.93	1181.293		1181.39	0.010271	2.505	14.89	42.12	0.74
1	1795.36*	PF 1	37.30	1180.92	1181.284		1181.38	0.010092	2.486	15.00	42.36	0.74
1	1794.36*	PF 1	37.30	1180.91	1181.275		1181.37	0.009880	2.464	15.14	42.62	0.73
1	1793.36*	PF 1	37.30	1180.90	1181.265		1181.36	0.009688	2.444	15.26	42.86	0.72
1	1792.36*	PF 1	37.30	1180.90	1181.249		1181.35	0.011176	2.548	14.64	43.00	0.77
1	1791.36*	PF 1	37.30	1180.89	1181.238		1181.34	0.011101	2.537	14.70	43.26	0.77
1	1790.36*	PF 1	37.30	1180.88	1181.228		1181.33	0.011038	2.527	14.76	43.50	0.76
1	1789.36*	PF 1	37.30	1180.87	1181.217		1181.32	0.010977	2.518	14.82	43.73	0.76
1	1788.36*	PF 1	37.30	1180.86	1181.207		1181.30	0.010898	2.506	14.88	43.98	0.76
1	1787.36*	PF 1	37.30	1180.85	1181.196		1181.29	0.010814	2.495	14.95	44.22	0.76
1	1786.36*	PF 1	37.30	1180.84	1181.186		1181.28	0.010718	2.483	15.02	44.46	0.75
1	1785.36*	PF 1	37.30	1180.83	1181.176		1181.27	0.010593	2.469	15.11	44.71	0.75
1	1784.36*	PF 1	37.30	1180.82	1181.166		1181.26	0.010476	2.456	15.19	44.95	0.74
1	1783.36*	PF 1	37.30	1180.81	1181.156		1181.25	0.010343	2.441	15.28	45.20	0.74
1	1782.36*	PF 1	37.30	1180.80	1181.147		1181.24	0.010182	2.424	15.39	45.44	0.73
1	1781.36*	PF 1	37.30	1180.79	1181.137		1181.23	0.010007	2.406	15.50	45.70	0.73
1	1780.36*	PF 1	37.30	1180.78	1181.128		1181.22	0.009813	2.387	15.63	45.95	0.72
1	1779.36*	PF 1	37.30	1180.77	1181.119		1181.21	0.009605	2.366	15.76	46.20	0.71
1	1778.36*	PF 1	37.30	1180.76	1181.110		1181.20	0.009403	2.346	15.90	46.44	0.71
1	1777.36*	PF 1	37.30	1180.75	1181.102		1181.19	0.009169	2.324	16.05	46.70	0.70
1	1777.34	PF 1	37.30	1180.75	1181.101		1181.19	0.009201	2.326	16.04	46.70	0.70
1	1709.86	PF 1	37.30	1180.06	1180.422		1180.52	0.010674	2.551	14.62	41.44	0.76
1	1708.86*	PF 1	37.30	1180.05	1180.412		1180.51	0.010693	2.550	14.63	41.53	0.76
1	1707.86*	PF 1	37.30	1180.04	1180.401		1180.50	0.010699	2.548	14.64	41.63	0.76
1	1706.86*	PF 1	37.30	1180.03	1180.391		1180.49	0.010706	2.546	14.65	41.72	0.76
1	1705.86*	PF 1	37.30	1180.02	1180.380		1180.48	0.010719	2.545	14.66	41.81	0.76
1	1704.86*	PF 1	37.30	1180.01	1180.369		1180.47	0.010726	2.543	14.67	41.91	0.76
1	1703.86*	PF 1	37.30	1180.00	1180.359		1180.46	0.010734	2.541	14.68	42.00	0.76
1	1702.86*	PF 1	37.30	1179.99	1180.348		1180.45	0.010754	2.540	14.68	42.10	0.76
1	1701.86*	PF 1	37.30	1179.98	1180.337		1180.44	0.010762	2.539	14.69	42.20	0.76
1	1700.86*	PF 1	37.30	1179.97	1180.327		1180.43	0.010771	2.537	14.70	42.29	0.76
1	1699.86*	PF 1	37.30	1179.96	1180.316		1180.42	0.010809	2.538	14.70	42.38	0.76
1	1698.86*	PF 1	37.30	1179.95	1180.305		1180.41	0.010843	2.538	14.70	42.47	0.76
1	1697.86*	PF 1	37.30	1179.94	1180.294		1180.39	0.010877	2.538	14.70	42.57	0.76
1	1696.86*	PF 1	37.30	1179.93	1180.283		1180.38	0.010950	2.541	14.68	42.66	0.76
1	1695.86*	PF 1	37.30	1179.92	1180.272		1180.37	0.011011	2.543	14.67	42.75	0.77
1	1694.86*	PF 1	37.30	1179.91	1180.261		1180.36	0.011086	2.546	14.65	42.85	0.77
1	1693.86*	PF 1	37.30	1179.90	1180.249		1180.35	0.011187	2.551	14.62	42.94	0.77
1	1692.86*	PF 1	37.30	1179.89	1180.237		1180.34	0.011323	2.558	14.58	43.02	0.77
1	1691.86*	PF 1	37.30	1179.88	1180.225		1180.33	0.011483	2.567	14.53	43.11	0.78
1	1690.86*	PF 1	37.30	1179.87	1180.214		1180.32	0.011619	2.574	14.49	43.19	0.78
1	1689.86*	PF 1	37.30	1179.85	1180.203		1180.30	0.010528	2.495	14.95	43.35	0.75
1	1688.86*	PF 1	37.30	1179.84	1180.193		1180.29	0.010519	2.492	14.97	43.44	0.75
1	1687.86*	PF 1	37.30	1179.83	1180.183		1180.28	0.010493	2.488	14.99	43.54	0.75
1	1686.86*	PF 1	37.30	1179.82	1180.172		1180.27	0.010485	2.486	15.01	43.63	0.75
1	1685.86*	PF 1	37.30	1179.81	1180.162		1180.26	0.010483	2.483	15.02	43.72	0.75
1	1684.86*	PF 1	37.30	1179.80	1180.152		1180.25	0.010470	2.480	15.04	43.82	0.75
1	1683.86*	PF 1	37.30	1179.79	1180.141		1180.24	0.010444	2.476	15.06	43.92	0.75
1	1682.86*	PF 1	37.30	1179.78	1180.131		1180.23	0.010419	2.472	15.09	44.02	0.74
1	1681.86*	PF 1	37.30	1179.77	1180.121		1180.22	0.010394	2.468	15.11	44.12	0.74
1	1680.86*	PF 1	37.30	1179.76	1180.111		1180.21	0.010369	2.464	15.14	44.21	0.74
1	1679.86*	PF 1	37.30	1179.75	1180.100		1180.20	0.010349	2.461	15.16	44.30	0.74
1	1678.86*	PF 1	37.30	1179.74	1180.090		1180.18	0.010313	2.456	15.19	44.40	0.74
1	1677.86*	PF 1	37.30	1179.73	1180.080		1180.17	0.010277	2.451	15.22	44.50	0.74
1	1676.86*	PF 1	37.30	1179.72	1180.070		1180.16	0.010241	2.446	15.25	44.60	0.74
1	1675.86*	PF 1	37.30	1179.71	1180.060		1180.15	0.010181	2.440	15.29	44.70	0.74
1	1674.86*	PF 1	37.30	1179.70	1180.050		1180.14	0.010122	2.434	15.33	44.80	0.73
1	1673.86*	PF 1	37.30	1179.69	1180.040		1180.13	0.010068	2.428	15.36	44.89	0.73
1	1672.86*	PF 1	37.30	1179.68	1180.031		1180.12	0.010010	2.421	15.41	44.99	0.73
1	1671.86*	PF 1	37.30	1179.67	1180.021		1180.11	0.009941	2.414	15.45	45.09	0.73
1	1670.86*	PF 1	37.30	1179.66	1180.011		1180.10	0.009849	2.405	15.51	45.20	0.72
1	1669.86*	PF 1	37.30	1179.65	1180.002		1180.09	0.009758	2.396	15.57	45.30	0.72
1	1668.86*	PF 1	37.30	1179.64	1179.992		1180.08	0.009657	2.387	15.63	45.41	0.72
1	1667.86*	PF 1	37.30	1179.63	1179.983		1180.07	0.009535	2.375	15.70	45.51	0.71

HEC-RAS Plan: Plan 04 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	1666.86*	PF 1	37.30	1179.62	1179.974		1180.06	0.009420	2.365	15.77	45.60	0.71
1	1665.86*	PF 1	37.30	1179.61	1179.965		1180.05	0.009291	2.353	15.85	45.71	0.70
1	1664.86*	PF 1	37.30	1179.60	1179.956		1180.04	0.009153	2.340	15.94	45.82	0.70
1	1663.86*	PF 1	37.30	1179.59	1179.947		1180.03	0.009008	2.327	16.03	45.93	0.69
1	1662.86*	PF 1	37.30	1179.58	1179.939		1180.02	0.008856	2.313	16.13	46.03	0.69
1	1661.86*	PF 1	37.30	1179.57	1179.930		1180.01	0.008686	2.297	16.24	46.14	0.68
1	1660.86*	PF 1	37.30	1179.56	1179.922		1180.00	0.008534	2.283	16.34	46.24	0.68
1	1659.86*	PF 1	37.30	1179.55	1179.914		1179.99	0.008344	2.265	16.46	46.35	0.67
1	1658.86*	PF 1	37.30	1179.54	1179.906		1179.98	0.008150	2.247	16.60	46.47	0.66
1	1657.86*	PF 1	37.30	1179.53	1179.898		1179.98	0.007953	2.229	16.74	46.58	0.66
1	1656.86*	PF 1	37.30	1179.52	1179.886		1179.96	0.014376	2.238	16.67	46.67	0.66
1	1655.86*	PF 1	37.30	1179.51	1179.868		1179.95	0.015333	2.281	16.35	46.72	0.68
1	1654.86*	PF 1	37.30	1179.50	1179.848		1179.93	0.016830	2.345	15.91	46.75	0.71
1	1653.86*	PF 1	37.30	1179.49	1179.822		1179.92	0.019636	2.456	15.19	46.75	0.76
1	1652.86*	PF 1	37.30	1179.48	1179.774	1179.75700	1179.89	0.029472	2.778	13.43	46.62	0.91
1	1652.33	PF 1	37.30	1179.47	1179.746	1179.74600	1179.88	0.035992	2.951	12.64	46.57	1.00
1	1651.33*	PF 1	37.30	1178.74	1178.862	1179.03200	1179.71	0.664984	7.396	5.04	41.76	3.75
1	1650.33*	PF 1	37.30	1178.01	1178.140	1178.32000	1179.05	0.648885	7.630	4.89	37.92	3.75
1	1649.71	PF 1	37.30	1177.56	1177.696	1177.88200	1178.64	0.638112	7.790	4.79	35.56	3.74
1	1648.71*	PF 1	37.30	1177.55	1177.747	1177.87400	1178.18	0.182593	5.302	7.04	36.39	2.13
1	1647.71*	PF 1	37.30	1177.54	1177.941	1177.86100	1178.04	0.016325	2.521	14.79	38.09	0.71
1	1646.71*	PF 1	37.30	1177.53	1177.923		1178.02	0.017045	2.543	14.67	38.51	0.73
1	1645.71*	PF 1	37.30	1177.52	1177.903		1178.01	0.018165	2.581	14.45	38.90	0.75
1	1644.71*	PF 1	37.30	1177.51	1177.879		1177.99	0.019941	2.644	14.11	39.30	0.78
1	1643.71*	PF 1	37.30	1177.50	1177.856		1177.97	0.021957	2.711	13.76	39.70	0.81
1	1642.71*	PF 1	37.30	1177.49	1177.840		1177.96	0.012753	2.725	13.69	40.13	0.82
1	1641.71*	PF 1	37.30	1177.48	1177.828		1177.94	0.012667	2.707	13.78	40.59	0.82
1	1640.71*	PF 1	37.30	1177.47	1177.816		1177.93	0.012600	2.691	13.86	41.05	0.82
1	1639.71*	PF 1	37.30	1177.46	1177.805		1177.92	0.012524	2.674	13.95	41.51	0.81
1	1638.71*	PF 1	37.30	1177.45	1177.793		1177.90	0.012439	2.657	14.04	41.97	0.81
1	1637.71*	PF 1	37.30	1177.44	1177.781		1177.89	0.012364	2.641	14.12	42.42	0.81
1	1636.71*	PF 1	37.30	1177.43	1177.769		1177.88	0.012303	2.626	14.20	42.88	0.80
1	1635.71*	PF 1	37.30	1177.42	1177.758		1177.86	0.012202	2.608	14.30	43.34	0.80
1	1634.71*	PF 1	37.30	1177.41	1177.746		1177.85	0.012105	2.591	14.40	43.80	0.80
1	1633.71*	PF 1	37.30	1177.40	1177.735		1177.84	0.011984	2.573	14.50	44.26	0.79
1	1632.71*	PF 1	37.30	1177.39	1177.724		1177.83	0.011853	2.553	14.61	44.72	0.79
1	1631.71*	PF 1	37.30	1177.38	1177.713		1177.81	0.011693	2.532	14.73	45.20	0.78
1	1630.71*	PF 1	37.30	1177.37	1177.703		1177.80	0.011529	2.511	14.85	45.66	0.78
1	1629.71*	PF 1	37.30	1177.36	1177.692		1177.79	0.011347	2.489	14.98	46.12	0.77
1	1628.71*	PF 1	37.30	1177.35	1177.682		1177.78	0.011138	2.466	15.13	46.59	0.76
1	1627.71*	PF 1	37.30	1177.34	1177.672		1177.76	0.010908	2.440	15.28	47.06	0.75
1	1626.71*	PF 1	37.30	1177.33	1177.662		1177.75	0.010647	2.413	15.46	47.53	0.75
1	1625.71*	PF 1	37.30	1177.32	1177.653		1177.74	0.010368	2.385	15.64	48.00	0.74
1	1624.71*	PF 1	37.30	1177.31	1177.644		1177.73	0.010061	2.354	15.85	48.48	0.73
1	1623.71*	PF 1	37.30	1177.30	1177.635		1177.72	0.009730	2.321	16.07	48.96	0.71
1	1622.71*	PF 1	37.30	1177.29	1177.627		1177.71	0.009390	2.288	16.30	49.44	0.70
1	1621.71*	PF 1	37.30	1177.28	1177.619		1177.70	0.009035	2.253	16.56	49.91	0.69
1	1620.71*	PF 1	37.30	1177.27	1177.611		1177.69	0.008658	2.215	16.84	50.40	0.68
1	1619.71*	PF 1	37.30	1177.26	1177.604		1177.68	0.008282	2.178	17.13	50.89	0.66
1	1618.71*	PF 1	37.30	1177.25	1177.596		1177.67	0.007899	2.139	17.44	51.38	0.65
1	1617.71*	PF 1	37.30	1177.24	1177.590		1177.66	0.007501	2.098	17.78	51.87	0.63
1	1616.71*	PF 1	37.30	1177.23	1177.583		1177.65	0.007110	2.057	18.14	52.36	0.62
1	1615.71*	PF 1	37.30	1177.22	1177.578		1177.64	0.006720	2.015	18.51	52.85	0.60
1	1614.71*	PF 1	37.30	1177.21	1177.572		1177.63	0.006336	1.972	18.91	53.34	0.58
1	1613.71*	PF 1	37.30	1177.20	1177.567		1177.62	0.005962	1.929	19.33	53.84	0.57
1	1612.71*	PF 1	37.30	1177.19	1177.562		1177.62	0.005596	1.886	19.78	54.34	0.55
1	1611.71*	PF 1	37.30	1177.18	1177.557		1177.61	0.005245	1.843	20.24	54.84	0.53
1	1610.71*	PF 1	37.30	1177.17	1177.553		1177.60	0.004868	1.795	20.77	55.35	0.52
1	1609.71*	PF 1	37.30	1177.16	1177.550		1177.60	0.004513	1.749	21.33	55.86	0.50
1	1608.71*	PF 1	37.30	1177.15	1177.547		1177.59	0.004179	1.703	21.91	56.38	0.48
1	1607.71*	PF 1	37.30	1177.14	1177.544		1177.59	0.003868	1.657	22.51	56.90	0.46
1	1606.71*	PF 1	37.30	1177.13	1177.542		1177.58	0.003575	1.613	23.13	57.40	0.45
1	1605.71*	PF 1	37.30	1177.12	1177.540		1177.58	0.003301	1.569	23.77	57.92	0.43
1	1604.71*	PF 1	37.30	1177.11	1177.537		1177.57	0.003048	1.527	24.43	58.43	0.42
1	1603.71*	PF 1	37.30	1177.10	1177.536		1177.57	0.002814	1.485	25.11	58.95	0.40
1	1602.71*	PF 1	37.30	1177.09	1177.534		1177.57	0.002598	1.445	25.81	59.47	0.39
1	1602.35	PF 1	37.30	1177.09	1177.533		1177.57	0.002600	1.444	25.84	59.64	0.39
1	1601.35*	PF 1	37.30	1177.08	1177.531		1177.56	0.002460	1.420	26.26	59.58	0.38
1	1600.35*	PF 1	37.30	1177.07	1177.529		1177.56	0.002324	1.397	26.70	59.53	0.37
1	1599.35*	PF 1	37.30	1177.06	1177.528		1177.56	0.002200	1.375	27.14	59.47	0.36
1	1598.35*	PF 1	37.30	1177.05	1177.526		1177.55	0.002080	1.352	27.59	59.43	0.35
1	1597.35*	PF 1	37.30	1177.04	1177.525		1177.55	0.001966	1.330	28.05	59.39	0.34
1	1596.35*	PF 1	37.30	1177.03	1177.523		1177.55	0.001861	1.309	28.50	59.32	0.33
1	1595.35*	PF 1	37.30	1177.02	1177.522		1177.55	0.001763	1.288	28.96	59.26	0.32
1	1594.35*	PF 1	37.30	1177.01	1177.521		1177.55	0.001672	1.268	29.41	59.20	0.32
1	1593.35*	PF 1	37.30	1177.00	1177.520		1177.54	0.001585	1.248	29.88	59.14	0.31
1	1592.35*	PF 1	37.30	1176.99	1177.519		1177.54	0.001503	1.229	30.35	59.07	0.30
1	1591.35*	PF 1	37.30	1176.98	1177.518		1177.54	0.001425	1.210	30.83	59.04	0.30
1	1590.35*	PF 1	37.30	1176.97	1177.517		1177.54	0.001353	1.192	31.29	58.98	0.29

HEC-RAS Plan: Plan 04 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	1589.35*	PF 1	37.30	1176.96	1177.516		1177.54	0.001287	1.175	31.75	58.90	0.28
1	1588.35*	PF 1	37.30	1176.95	1177.515		1177.54	0.001225	1.158	32.21	58.83	0.28
1	1587.35*	PF 1	37.30	1176.94	1177.514		1177.53	0.001166	1.141	32.68	58.76	0.27
1	1586.35*	PF 1	37.30	1176.93	1177.513		1177.53	0.001111	1.125	33.14	58.69	0.26
1	1585.35*	PF 1	37.30	1176.92	1177.512		1177.53	0.001058	1.110	33.61	58.62	0.26
1	1584.35*	PF 1	37.30	1176.91	1177.511		1177.53	0.001008	1.094	34.09	58.54	0.25
1	1583.35*	PF 1	37.30	1176.90	1177.511		1177.53	0.000961	1.079	34.57	58.50	0.25
1	1582.35*	PF 1	37.30	1176.89	1177.510		1177.53	0.000917	1.064	35.04	58.41	0.24
1	1581.35*	PF 1	37.30	1176.88	1177.510		1177.53	0.000874	1.050	35.53	58.34	0.24
1	1580.35*	PF 1	37.30	1176.87	1177.509		1177.53	0.000835	1.036	36.00	58.24	0.23
1	1579.35*	PF 1	37.30	1176.86	1177.509		1177.53	0.000799	1.023	36.47	58.17	0.23
1	1578.35*	PF 1	37.30	1176.85	1177.508		1177.52	0.000764	1.010	36.94	58.11	0.22
1	1577.35*	PF 1	37.30	1176.84	1177.508		1177.52	0.000731	0.997	37.43	58.05	0.22
1	1576.35*	PF 1	37.30	1176.83	1177.507		1177.52	0.000700	0.984	37.91	58.01	0.21
1	1575.35*	PF 1	37.30	1176.82	1177.507		1177.52	0.000670	0.972	38.39	57.95	0.21
1	1574.35*	PF 1	37.30	1176.81	1177.506		1177.52	0.000642	0.960	38.85	57.89	0.21
1	1573.35*	PF 1	37.30	1176.80	1177.506		1177.52	0.000617	0.949	39.32	57.82	0.20
1	1572.35*	PF 1	37.30	1176.79	1177.505		1177.52	0.000592	0.937	39.79	57.76	0.20
1	1571.35*	PF 1	37.30	1176.78	1177.505		1177.52	0.000568	0.927	40.26	57.69	0.20
1	1570.35*	PF 1	37.30	1176.77	1177.505		1177.52	0.000546	0.916	40.73	57.63	0.19
1	1569.35*	PF 1	37.30	1176.76	1177.505		1177.52	0.000525	0.905	41.22	57.60	0.19
1	1568.35*	PF 1	37.30	1176.75	1177.504		1177.52	0.000505	0.895	41.68	57.53	0.19
1	1567.35*	PF 1	37.30	1176.74	1177.504		1177.52	0.000486	0.885	42.14	57.47	0.18
1	1566.35*	PF 1	37.30	1176.73	1177.503		1177.52	0.000468	0.875	42.61	57.41	0.18
1	1565.35*	PF 1	37.30	1176.72	1177.503		1177.52	0.000450	0.866	43.07	57.35	0.18
1	1564.35*	PF 1	37.30	1176.71	1177.503		1177.51	0.000434	0.857	43.53	57.28	0.17
1	1563.35*	PF 1	37.30	1176.70	1177.503		1177.51	0.000419	0.848	43.99	57.22	0.17
1	1562.35*	PF 1	37.30	1176.69	1177.502		1177.51	0.000404	0.839	44.46	57.18	0.17
1	1561.35*	PF 1	37.30	1176.68	1177.502		1177.51	0.000390	0.831	44.91	57.12	0.17
1	1560.35*	PF 1	37.30	1176.67	1177.502		1177.51	0.000376	0.822	45.37	57.05	0.16
1	1559.35*	PF 1	37.30	1176.66	1177.501		1177.51	0.000363	0.814	45.83	56.99	0.16
1	1558.35*	PF 1	37.30	1176.65	1177.501		1177.51	0.000351	0.806	46.29	56.93	0.16
1	1557.35*	PF 1	37.30	1176.64	1177.501		1177.51	0.000339	0.798	46.74	56.87	0.16
1	1556.35*	PF 1	37.30	1176.63	1177.501		1177.51	0.000328	0.790	47.21	56.82	0.15
1	1555.35*	PF 1	37.30	1176.62	1177.501		1177.51	0.000317	0.783	47.67	56.77	0.15
1	1554.35*	PF 1	37.30	1176.61	1177.500		1177.51	0.000307	0.775	48.11	56.71	0.15
1	1553.35*	PF 1	37.30	1176.60	1177.500		1177.51	0.000297	0.768	48.57	56.65	0.15
1	1552.35*	PF 1	37.30	1176.59	1177.500		1177.51	0.000288	0.761	49.01	56.58	0.14
1	1551.35*	PF 1	37.30	1176.58	1177.500		1177.51	0.000279	0.754	49.46	56.53	0.14
1	1550.35*	PF 1	37.30	1176.57	1177.500		1177.51	0.000270	0.747	49.90	56.47	0.14
1	1549.35*	PF 1	37.30	1176.56	1177.499		1177.51	0.000262	0.741	50.34	56.41	0.14
1	1548.35*	PF 1	37.30	1176.55	1177.499		1177.51	0.000254	0.735	50.78	56.34	0.14
1	1547.35*	PF 1	37.30	1176.54	1177.499		1177.51	0.000247	0.728	51.25	56.31	0.13
1	1546.35*	PF 1	37.30	1176.53	1177.499		1177.51	0.000239	0.722	51.69	56.24	0.13
1	1545.35*	PF 1	37.30	1176.52	1177.499		1177.51	0.000232	0.716	52.12	56.18	0.13
1	1544.35*	PF 1	37.30	1176.51	1177.499		1177.51	0.000226	0.710	52.57	56.13	0.13
1	1543.35*	PF 1	37.30	1176.50	1177.499		1177.51	0.000219	0.704	53.00	56.06	0.13
1	1542.35*	PF 1	37.30	1176.49	1177.499		1177.51	0.000213	0.698	53.44	56.00	0.13
1	1541.35*	PF 1	37.30	1176.48	1177.499		1177.51	0.000207	0.692	53.87	55.94	0.12
1	1540.35*	PF 1	37.30	1176.47	1177.498		1177.51	0.000201	0.687	54.31	55.90	0.12
1	1539.35*	PF 1	37.30	1176.46	1177.498		1177.51	0.000196	0.681	54.73	55.84	0.12
1	1538.35*	PF 1	37.30	1176.45	1177.498		1177.51	0.000191	0.676	55.16	55.78	0.12
1	1537.35*	PF 1	37.30	1176.44	1177.498		1177.51	0.000186	0.671	55.59	55.71	0.12
1	1536.35*	PF 1	37.30	1176.43	1177.498		1177.51	0.000181	0.666	56.01	55.65	0.12
1	1535.35*	PF 1	37.30	1176.42	1177.498		1177.51	0.000176	0.661	56.42	55.59	0.12
1	1534.35*	PF 1	37.30	1176.41	1177.498		1177.50	0.000172	0.656	56.85	55.54	0.11
1	1533.35*	PF 1	37.30	1176.40	1177.497		1177.50	0.000167	0.651	57.28	55.50	0.11
1	1532.35*	PF 1	37.30	1176.39	1177.497		1177.50	0.000163	0.647	57.69	55.43	0.11
1	1531.35*	PF 1	37.30	1176.38	1177.497		1177.50	0.000159	0.642	58.12	55.38	0.11
1	1530.35*	PF 1	37.30	1176.37	1177.497		1177.50	0.000155	0.637	58.52	55.31	0.11
1	1529.35*	PF 1	37.30	1176.36	1177.497		1177.50	0.000151	0.633	58.94	55.25	0.11
1	1528.35*	PF 1	37.30	1176.35	1177.497		1177.50	0.000147	0.628	59.37	55.20	0.11
1	1527.35*	PF 1	37.30	1176.34	1177.497		1177.50	0.000256	0.624	59.77	55.13	0.11
1	1526.35*	PF 1	37.30	1176.33	1177.497		1177.50	0.000250	0.620	60.18	55.09	0.10
1	1525.35*	PF 1	37.30	1176.32	1177.497		1177.50	0.000244	0.616	60.59	55.04	0.10
1	1524.35*	PF 1	37.30	1176.31	1177.496		1177.50	0.000238	0.612	60.98	54.97	0.10
1	1523.35*	PF 1	37.30	1176.30	1177.496		1177.50	0.000233	0.608	61.38	54.91	0.10
1	1522.84	PF 1	37.30	1176.29	1177.496		1177.50	0.000227	0.603	61.85	54.90	0.10
1	1521.84*	PF 1	37.30	1175.54	1177.499		1177.50	0.000048	0.372	100.36	57.12	0.05
1	1520.84*	PF 1	37.30	1174.79	1177.499		1177.50	0.000021	0.260	143.24	74.90	0.03
1	1520.83	PF 1	37.30	1174.79	1177.499		1177.50	0.000021	0.260	143.20	74.89	0.03
1	1519.83*	PF 1	37.30	1174.78	1177.499		1177.50	0.000021	0.259	143.75	75.27	0.03
1	1518.83*	PF 1	37.30	1174.77	1177.499		1177.50	0.000021	0.258	144.51	75.69	0.03
1	1517.83*	PF 1	37.30	1174.76	1177.499		1177.50	0.000021	0.257	145.07	76.08	0.03
1	1516.83*	PF 1	37.30	1174.75	1177.499		1177.50	0.000020	0.256	145.85	76.51	0.03
1	1515.83*	PF 1	37.30	1174.74	1177.499		1177.50	0.000020	0.255	146.40	76.90	0.03
1	1514.83*	PF 1	37.30	1174.73	1177.499		1177.50	0.000020	0.254	147.14	77.31	0.03
1	1513.83*	PF 1	37.30	1174.72	1177.499		1177.50	0.000008	0.252	148.21	61.66	0.03
1	1512.83*	PF 1	37.30	1174.71	1177.499		1177.50	0.000008	0.249	149.61	62.01	0.03

HEC-RAS Plan: Plan 04 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	1511.83*	PF 1	37.30	1174.70	1177.499		1177.50	0.000008	0.247	150.98	62.32	0.03
1	1510.83*	PF 1	37.30	1174.69	1177.499		1177.50	0.000008	0.245	152.39	62.68	0.03
1	1509.83*	PF 1	37.30	1174.68	1177.500		1177.50	0.000007	0.243	153.77	63.00	0.03
1	1508.83*	PF 1	37.30	1174.67	1177.500		1177.50	0.000007	0.240	155.16	63.31	0.03
1	1507.83*	PF 1	37.30	1174.66	1177.500		1177.50	0.000007	0.238	156.61	63.67	0.03
1	1506.83*	PF 1	37.30	1174.65	1177.500		1177.50	0.000007	0.236	157.99	63.99	0.03
1	1505.83*	PF 1	37.30	1174.64	1177.500		1177.50	0.000007	0.234	159.45	64.35	0.03
1	1504.83*	PF 1	37.30	1174.63	1177.500		1177.50	0.000007	0.232	160.87	64.66	0.03
1	1503.83*	PF 1	37.30	1174.62	1177.500		1177.50	0.000006	0.230	162.33	65.02	0.03
1	1502.83*	PF 1	37.30	1174.61	1177.500		1177.50	0.000006	0.228	163.75	65.34	0.03
1	1501.83*	PF 1	37.30	1174.60	1177.500		1177.50	0.000006	0.226	165.23	65.68	0.03
1	1500.83*	PF 1	37.30	1174.59	1177.500		1177.50	0.000006	0.224	166.68	66.02	0.02
1	1499.83*	PF 1	37.30	1174.58	1177.500		1177.50	0.000006	0.222	168.16	66.36	0.02
1	1498.83*	PF 1	37.30	1174.57	1177.500		1177.50	0.000006	0.220	169.57	66.67	0.02
1	1497.83*	PF 1	37.30	1174.56	1177.500		1177.50	0.000006	0.218	171.06	67.01	0.02
1	1496.83*	PF 1	37.30	1174.55	1177.500		1177.50	0.000006	0.216	172.55	67.35	0.02
1	1495.83*	PF 1	37.30	1174.54	1177.500		1177.50	0.000005	0.214	173.99	67.66	0.02
1	1494.83*	PF 1	37.30	1174.53	1177.500		1177.50	0.000005	0.212	175.53	68.03	0.02
1	1493.83*	PF 1	37.30	1174.52	1177.500		1177.50	0.000005	0.211	177.01	68.35	0.02
1	1492.83*	PF 1	37.30	1174.51	1177.500		1177.50	0.000005	0.209	178.52	68.69	0.02
1	1491.83*	PF 1	37.30	1174.50	1177.500		1177.50	0.000005	0.207	180.04	69.02	0.02
1	1490.83*	PF 1	37.30	1174.49	1177.500		1177.50	0.000005	0.205	181.57	69.36	0.02
1	1489.83*	PF 1	37.30	1174.48	1177.500		1177.50	0.000005	0.204	183.08	69.69	0.02
1	1488.83*	PF 1	37.30	1174.46	1177.500		1177.50	0.000005	0.201	185.29	70.07	0.02
1	1487.83*	PF 1	37.30	1174.45	1177.500		1177.50	0.000005	0.200	186.78	70.38	0.02
1	1486.83*	PF 1	37.30	1174.44	1177.500		1177.50	0.000004	0.198	188.35	70.73	0.02
1	1485.83*	PF 1	37.30	1174.43	1177.500		1177.50	0.000004	0.196	189.89	71.06	0.02
1	1484.83*	PF 1	37.30	1174.42	1177.500		1177.50	0.000004	0.195	191.43	71.38	0.02
1	1483.83*	PF 1	37.30	1174.41	1177.500		1177.50	0.000004	0.193	192.99	71.72	0.02
1	1482.83*	PF 1	37.30	1174.40	1177.500		1177.50	0.000004	0.192	194.56	72.05	0.02
1	1481.83*	PF 1	37.30	1174.39	1177.500		1177.50	0.000004	0.190	196.17	72.40	0.02
1	1480.83*	PF 1	37.30	1174.38	1177.500		1177.50	0.000004	0.189	197.72	72.72	0.02
1	1479.83*	PF 1	37.30	1174.37	1177.500		1177.50	0.000004	0.187	199.32	73.07	0.02
1	1478.83*	PF 1	37.30	1174.36	1177.500		1177.50	0.000004	0.186	200.92	73.40	0.02
1	1477.83*	PF 1	37.30	1174.35	1177.500		1177.50	0.000004	0.184	202.52	73.74	0.02
1	1476.83*	PF 1	37.30	1174.34	1177.500		1177.50	0.000004	0.183	204.12	74.07	0.02
1	1475.83*	PF 1	37.30	1174.33	1177.500		1177.50	0.000004	0.181	205.75	74.41	0.02
1	1474.83*	PF 1	37.30	1174.32	1177.500		1177.50	0.000003	0.180	207.33	74.73	0.02
1	1473.83*	PF 1	37.30	1174.31	1177.500		1177.50	0.000003	0.178	208.97	75.08	0.02
1	1472.83*	PF 1	37.30	1174.30	1177.500		1177.50	0.000003	0.177	210.59	75.41	0.02
1	1471.83*	PF 1	37.30	1174.29	1177.500		1177.50	0.000003	0.176	212.19	75.72	0.02
1	1470.83*	PF 1	37.30	1174.28	1177.500		1177.50	0.000003	0.174	213.89	76.09	0.02
1	1469.83*	PF 1	37.30	1174.27	1177.500		1177.50	0.000003	0.173	215.53	76.41	0.02
1	1468.83*	PF 1	37.30	1174.26	1177.500		1177.50	0.000003	0.172	217.15	76.74	0.02
1	1467.83*	PF 1	37.30	1174.25	1177.500		1177.50	0.000003	0.170	218.84	77.08	0.02
1	1466.83*	PF 1	37.30	1174.24	1177.500		1177.50	0.000003	0.169	220.52	77.42	0.02
1	1465.83*	PF 1	37.30	1174.23	1177.500		1177.50	0.000003	0.168	222.18	77.75	0.02
1	1464.83*	PF 1	37.30	1174.22	1177.500		1177.50	0.000003	0.167	223.86	78.10	0.02
1	1463.83*	PF 1	37.30	1174.21	1177.500		1177.50	0.000003	0.165	225.55	78.42	0.02
1	1462.83*	PF 1	37.30	1174.20	1177.500		1177.50	0.000003	0.164	227.22	78.75	0.02
1	1461.83*	PF 1	37.30	1174.19	1177.500		1177.50	0.000003	0.163	228.95	79.09	0.02
1	1460.83*	PF 1	37.30	1174.18	1177.500		1177.50	0.000003	0.162	230.58	79.41	0.02
1	1459.83*	PF 1	37.30	1174.17	1177.500		1177.50	0.000003	0.161	232.33	79.76	0.02
1	1458.83*	PF 1	37.30	1174.16	1177.500		1177.50	0.000003	0.159	234.05	80.09	0.02
1	1457.83*	PF 1	37.30	1174.15	1177.500		1177.50	0.000002	0.158	235.79	80.44	0.02
1	1456.83*	PF 1	37.30	1174.14	1177.500		1177.50	0.000002	0.157	237.48	80.75	0.02
1	1455.83*	PF 1	37.30	1174.13	1177.500		1177.50	0.000002	0.156	239.24	81.10	0.02
1	1454.83*	PF 1	37.30	1174.12	1177.500		1177.50	0.000002	0.155	240.97	81.44	0.02
1	1453.83*	PF 1	37.30	1174.11	1177.500		1177.50	0.000002	0.154	242.73	81.77	0.02
1	1452.83*	PF 1	37.30	1174.10	1177.500		1177.50	0.000002	0.153	244.45	82.09	0.02
1	1451.83*	PF 1	37.30	1174.09	1177.500		1177.50	0.000002	0.151	246.24	82.45	0.02
1	1450.83*	PF 1	37.30	1174.08	1177.500		1177.50	0.000002	0.150	247.98	82.76	0.02
1	1449.83*	PF 1	37.30	1174.07	1177.500		1177.50	0.000002	0.149	249.78	83.11	0.02
1	1448.83*	PF 1	37.30	1174.06	1177.500		1177.50	0.000002	0.148	251.52	83.44	0.02
1	1447.98	PF 1	37.30	1174.05	1177.500	1174.27100	1177.50	0.000002	0.147	253.16	83.73	0.01

2 – Equilibrium Slope Calculations

EX No Self-Form

Reach	AMAFCA					
	Fr = 0.7	Fr = 0.75	Fr = 0.8	Fr = 0.85	Fr = 0.9	Fr = 1.0
1	0.009	0.010	0.012	0.014	0.015	0.019
2	0.010	0.011	0.013	0.015	0.017	0.021
3	0.009	0.010	0.012	0.013	0.015	0.019

Reach	HEC-20 Eq. 6.17	Reach	HEC-20 Eq. 6.18
1	0.023	1	0.005
2	0.052	2	0.011
3	0.032	3	0.007

EX Self-Form

Reach	AMAFCA					
	Fr = 0.7	Fr = 0.75	Fr = 0.8	Fr = 0.85	Fr = 0.9	Fr = 1.0
1	0.009	0.011	0.012	0.014	0.016	0.020
2	0.009	0.011	0.012	0.014	0.016	0.020
3	0.010	0.011	0.013	0.015	0.016	0.021

Reach	HEC-20 Eq. 6.17	Reach	HEC-20 Eq. 6.18
1	0.036	1	0.007
2	0.037	2	0.008
3	0.042	3	0.009

Proposed - DS ND

Reach	AMAFCA					
	Fr = 0.7	Fr = 0.75	Fr = 0.8	Fr = 0.85	Fr = 0.9	Fr = 1.0
1	0.009	0.011	0.013	0.014	0.016	0.020
2	0.011	0.013	0.014	0.016	0.019	0.023
3	0.009	0.011	0.012	0.014	0.016	0.020

Reach	HEC-20 Eq. 6.17	Reach	HEC-20 Eq. 6.18
1	0.046	1	0.010
2	0.075	2	0.016
3	0.032	3	0.007

Avg AMAFCA	Avg 6.17	Avg 6.18
0.011	0.051	0.011

Proposed - DS WSE

Reach	AMAFCA					
	Fr = 0.7	Fr = 0.75	Fr = 0.8	Fr = 0.85	Fr = 0.9	Fr = 1.0
1	0.009	0.011	0.012	0.014	0.016	0.020
2	0.011	0.013	0.014	0.016	0.019	0.023
3	0.009	0.011	0.012	0.014	0.016	0.020

Reach	HEC-20 Eq. 6.17	Reach	HEC-20 Eq. 6.18
1	0.047	1	0.010
2	0.075	2	0.016
3	0.032	3	0.007

Avg AMAFCA	Avg 6.17	Avg 6.18
0.011	0.051	0.011

Existing Conditions																		
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Max Chl Dpth	Wetted Perim	Hydraulic Radius	q	W/D Ratio	Length Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)		(ft)	(ft)	(ft^2/ft)	cfs/ft		(ft)
1	3895.84	PF 1	25.1	1230.93	1233.074	1231.609	1233.08	0.000185	0.817	30.71	22.35	0.12	2.14	23.02	1.33	1.12	10.44	45.23
1	3850.61	PF 1	25.1	1232.17	1232.923		1233.05	0.011721	2.819	8.9	23.14	0.8	0.75	23.36	0.38	1.08	30.85	44.36
1	3806.24	PF 1	25.1	1231.73	1232.489		1232.59	0.00902	2.535	9.9	24.71	0.71	0.76	25.04	0.40	1.02	32.51	41.16
1	3765.08	PF 1	25.1	1231.32	1231.907	1231.907	1232.06	0.019417	3.181	7.89	24.91	1	0.59	25.22	0.31	1.01	42.22	51.85
1	3713.23	PF 1	25.1	1229.97	1230.769	1230.794	1231.02	0.020785	3.978	6.31	15.05	1.08	0.8	15.18	0.42	1.67	18.81	58.96
1	3654.26	PF 1	25.1	1226.59	1226.743	1226.933	1227.69	0.364465	7.905	3.22	24.12	3.78	0.15	24.17	0.13	1.04	160.80	5.63
1	3648.64	PF 1	25.1	1226.5	1226.911	1226.852	1227.02	0.010961	2.578	9.67	27.16	0.77	0.41	27.31	0.35	0.92	66.24	43.22
1	3605.41	PF 1	25.1	1225.91	1226.227	1226.219	1226.31	0.016013	2.345	10.7	46.71	0.86	0.32	46.75	0.23	0.54	145.97	68.33
1	3537.09	PF 1	25.1	1224.36	1224.937	1224.937	1225.07	0.020576	2.953	8.5	31.24	1	0.58	31.73	0.27	0.80	53.86	5.91
1	3531.18	PF 1	25.1	1224.13	1224.63	1224.707	1224.89	0.042858	4.056	6.19	24.46	1.42	0.5	24.88	0.25	1.03	48.92	90.55
1	3440.63	PF 1	33.6	1221.99	1222.398	1222.398	1222.51	0.02152	2.674	12.57	55.94	0.99	0.41	56.28	0.22	0.60	136.44	74.11
1	3366.51	PF 1	33.6	1219.32	1219.821	1219.917	1220.14	0.051341	4.512	7.45	28.95	1.57	0.5	29.22	0.25	1.16	57.90	60.74
1	3305.78	PF 1	33.6	1216.49	1217.065	1217.16	1217.38	0.040282	4.519	7.44	24.19	1.44	0.58	24.27	0.31	1.39	41.71	52.46
1	3253.32	PF 1	33.6	1214.98	1215.313	1215.339	1215.45	0.032128	2.947	11.4	59.58	1.19	0.33	59.6	0.19	0.56	180.55	3.15
1	3250.17	PF 1	33.6	1214.88	1215.172	1215.213	1215.33	0.042625	3.142	10.69	62.75	1.34	0.29	62.76	0.17	0.54	216.38	63.99
1	3186.18	PF 1	33.6	1213.19	1213.534	1213.534	1213.65	0.021774	2.674	12.56	56.74	1	0.34	56.76	0.22	0.59	166.88	94.35
1	3091.83	PF 1	33.6	1210.75	1211.032	1211.069	1211.23	0.030174	3.547	9.47	35.53	1.21	0.28	35.8	0.26	0.95	126.89	61.46
1	3030.37	PF 1	33.6	1209	1209.445	1209.451	1209.56	0.02409	2.67	12.59	61.16	1.04	0.44	61.5	0.20	0.55	139.00	26.04
1	3004.33	PF 1	33.6	1208.51	1208.849	1208.881	1209.01	0.033896	3.173	10.59	51.28	1.23	0.34	51.58	0.21	0.66	150.82	5.91
1	2998.41	PF 1	33.6	1208.37	1208.722	1208.739	1208.86	0.027749	2.948	11.4	53.04	1.12	0.35	53.37	0.21	0.63	151.54	43.01
1	2955.4	PF 1	33.6	1207.24	1207.636	1207.683	1207.82	0.057739	3.395	9.9	64.6	1.53	0.4	64.94	0.15	0.52	161.50	40.75
1	2914.65	PF 1	33.6	1206.45	1206.777	1206.777	1206.87	0.022726	2.434	13.81	73.89	0.99	0.33	74.19	0.19	0.45	223.91	99.06
1	2815.59	PF 1	33.6	1204.13	1204.478	1204.478	1204.56	0.024097	2.232	15.05	96.03	0.99	0.35	96.23	0.16	0.35	274.37	33.00
1	2782.59	PF 1	33.6	1203	1203.324	1203.384	1203.58	0.034498	4.092	8.21	27.6	1.32	0.32	27.68	0.30	1.22	86.25	39.02
1	2743.58	PF 1	33.6	1202.49	1202.818	1202.815	1202.88	0.023382	2.053	16.37	115.73	0.96	0.33	115.95	0.14	0.29	350.70	38.63
1	2704.94	PF 1	33.6	1201.05	1201.809	1201.809	1201.91	0.027543	2.499	13.44	79.73	1.07	0.76	80.18	0.17	0.42	104.91	4.40
1	2700.54	PF 1	33.6	1201.55	1201.649	1201.691	1201.81	0.017389	0.825	11.21	58.29	0.69	0.65	58.57	0.19	0.58	89.68	39.50
1	2661.04	PF 1	33.6	1200.7	1200.957	1200.956	1201.03	0.02409	2.139	15.81	109.73	0.98	0.26	109.9	0.14	0.31	422.04	44.34
1	2616.7	PF 1	33.6	1199.67	1200.039	1200.025	1200.08	0.018657	1.71	20.09	172.25	0.85	0.37	172.48	0.12	0.20	465.54	76.03
1	2540.68	PF 1	33.6	1198.01	1198.387	1198.387	1198.45	0.025221	1.963	17.11	136.97	0.98	0.38	137.27	0.12	0.25	360.45	58.97
1	2481.7	PF 1	33.6	1196.68	1197.06	1197.084	1197.16	0.016337	1.762	15.44	88.89	0.81	0.5	89.27	0.17	0.38	177.78	72.38
1	2409.33	PF 1	33.6	1195.25	1195.443	1195.482	1195.61	0.040072	1.596	14.03	164.52	1.11	0.34	164.82	0.09	0.20	483.88	88.97
1	2320.35	PF 1	37.3	1193	1193.141	1193.141	1193.21	0.02541	2.077	17.96	133.12	1	0.14	133.12	0.13	0.28	950.86	200.44
1	2119.93	PF 1	37.3	1187	1187.403	1187.467	1187.68	0.029776	4.247	8.78	25	1.26	0.4	25.08	0.35	1.49	62.50	51.36
1	2068.55	PF 1	37.3	1186	1186.278	1186.376	1186.62	0.052099	4.682	7.97	29.82	1.6	0.28	29.9	0.27	1.25	106.50	68.48
1	2000.07	PF 1	37.3	1184	1185.26	1185.094	1185.49	0.008253	3.874	9.63	11.54	0.75	1.26	12.05	0.80	3.23	9.16	56.42
1	1943.65	PF 1	37.3	1183.66	1184.639	1184.639	1184.91	0.012866	4.265	9.41	18.94	0.91	0.98	19.28	0.49	1.97	19.33	81.17
1	1862.48	PF 1	37.3	1181.99	1182.464	1182.636	1183.03	0.050218	6.044	6.17	15.23	1.67	0.47	15.36	0.40	2.45	32.40	51.42
1	1811.06	PF 1	37.3	1180.69	1181.455	1181.455	1181.77	0.015897	4.535	8.22	12.98	1	0.76	13.29	0.62	2.87	17.08	3.7
1	1807.36	PF 1	37.3	1180.46	1181.059	1181.231	1181.65	0.044025	6.153	6.06	13.06	1.59	0.6	13.31	0.46	2.86	21.77	30.02
1	1777.34	PF 1	37.3	1180	1180.467	1180.554	1180.8	0.038557	4.631	8.05	24.23	1.42	0.47	24.51	0.33	1.54	51.55	67.48
1	1709.86	PF 1	37.3	1178.12	1178.755	1178.755	1178.88	0.018323	4.016	13.56	53.46	1	0.64	53.69	0.25	0.70	83.53	57.53
1	1652.33	PF 1	37.3	1177	1177.479	1177.439	1177.62	0.012776	3.077	12.53	33.39	0.85	0.48	33.68	0.37	1.12	69.56	2.62
1	1649.71	PF 1	37.3	1177	1177.464		1177.58	0.010257	2.714	13.81	35.09	0.76	0.46	35.51	0.39	1.06	76.28	47.36
1	1602.35	PF 1	37.3	1176.22	1176.709	1176.706	1176.88	0.01852	3.294	11.14	31.01	0.99	0.73	31.82	0.35	1.20	42.48	79.51
1	1522.84	PF 1	37.3	1174.86	1175.215	1175.215	1175.36	0.018923	3.091	12.59	45.94	0.98	0.36	46.25	0.27	0.81	127.61	2.01
1	1520.83	PF 1	37.3	1174.81	1175.128	1175.164	1175.31	0.027028	3.464	11.15	45	1.16	0.32	45.19	0.25	0.83	140.63	72.85
1	1447.98	PF 1	37.3	1172.71	1173.182	1173.195	1173.31	0.027504	2.837	13.32	67.98	1.11	0.47	68.24	0.20	0.55	144.64	

Parameter	Reach 1 STA 1447.98 to STA 2320.35	Reach 2 STA 2409.33 to STA 3440.63	Reach 3 STA 3531.18 to STA 3895.84
Discharge (cfs)	37.3	33.6	25.1
Average Hydr Radius (ft)	0.37	0.19	0.41
Average Width (ft)	37.24	76.25	26.39
Average Discharge Per Unit Width, q (cfs/ft)	1.51	0.58	1.02
Average Energy Slope, S (dimensionless)	0.0257	0.0299	0.0516
Average Froude Number, Fr (dimensionless)	1.128	1.110	1.154
Average Manning n-value	0.030	0.030	0.030
Average Velocity (fps)	3.938	2.705	3.317
Average Depth (ft)	0.551	0.402	0.700
D50 (ft) Average 1	0.0235	0.0235	0.0235
D90 (ft) Average 1	0.1126	0.1126	0.1126
Temperature (˚F)	60	60	60
Kinematic viscosity of water, v (ft^2/s)	0.00001217	0.00001217	0.00001217
Unit Weight of Water, γ_w (lb/ft^3)	62.4	62.4	62.4
Specific Weight of Sediment, γ_s (lb/ft^3)	165.4	165.4	165.4

Albuquerque Metroploitan Arroyo Flood Control Authority Sediment and Erosion Design Guide Equation 3.59

$$S_{eq} = CQ^{-0.133}$$

$$C = 18.28 n^2 F^{0.133} F_r^{2.133}$$

F = width/depth ratio typicall about 40 (Leopold and Miller, 1956; Harvey, 1985)

	Fr = 0.7	Fr = 0.75	Fr = 0.8	Fr = 0.85	Fr = 0.9	Fr = 1.0
Reach 1						
Flowrate, Q (cfs)	37.3	37.3	37.3	37.3	37.3	37.3
Manning roughness coefficient, n	0.030	0.030	0.030	0.030	0.030	0.030
Width/Depth Ratio, F (ft/ft)	122.24	122.24	122.24	122.24	122.24	122.24
Froude Number, Fr	0.700	0.750	0.800	0.850	0.900	1.000
C	0.0146	0.0169	0.0194	0.0220	0.0249	0.0312
Equilibrium Slope, S_{eq} (ft/ft)	**0.0090**	**0.0104**	**0.0120**	**0.0136**	**0.0154**	**0.0193**
Reach 2						
	Fr = 0.7	**Fr = 0.75**	**Fr = 0.8**	**Fr = 0.85**	**Fr = 0.9**	**Fr = 1.0**
Flowrate, Q (cfs)	33.6	33.6	33.6	33.6	33.6	33.6
Manning roughness coefficient, n	0.030	0.030	0.030	0.030	0.030	0.030
Width/Depth Ratio, F (ft/ft)	207.69	207.69	207.69	207.69	207.69	207.69
Froude Number, Fr	0.700	0.750	0.800	0.850	0.900	1.000
C	0.0156	0.0181	0.0208	0.0237	0.0267	0.0335
Equilibrium Slope, S_{eq} (ft/ft)	**0.0098**	**0.0113**	**0.0130**	**0.0148**	**0.0167**	**0.0210**
Reach 3						
	Fr = 0.7	**Fr = 0.75**	**Fr = 0.8**	**Fr = 0.85**	**Fr = 0.9**	**Fr = 1.0**
Flowrate, Q (cfs)	25.1	25.1	25.1	25.1	25.1	25.1
Manning roughness coefficient, n	0.030	0.030	0.030	0.030	0.030	0.030
Width/Depth Ratio, F (ft/ft)	61.06	61.06	61.06	61.06	61.06	61.06
Froude Number, Fr	0.700	0.750	0.800	0.850	0.900	1.000
C	0.0133	0.0154	0.0177	0.0201	0.0227	0.0284
Equilibrium Slope, S_{eq} (ft/ft)	**0.0087**	**0.0100**	**0.0115**	**0.0131**	**0.0148**	**0.0185**
Avg. Across All Reaches =	**0.0092**	**0.0106**	**0.0122**	**0.0138**	**0.0156**	**0.0196**

HEC-20 Equation 6.17

$$S_{eq} = \left[K_s D_c \left(\frac{\gamma_s - \gamma}{\gamma} \right) \right]^{\frac{10}{7}} \left(\frac{1.486}{qn} \right)^{\frac{6}{7}}$$

$D_C = D_{90}$

	Reach 1 STA 1447.98 to STA 2320.35	**Reach 2 STA 2409.33 to STA 3440.63**	**Reach 3 STA 3531.18 to STA 3895.84**
Original stream energy slope, S (ft/ft)	0.0257	0.0299	0.0516
Mean bed sediment diameter, D (ft)	0.0235	0.0235	0.0235
Specific weight of sediment, γ_s (lb/ft^3)	165.4	165.4	165.4
Specific weight of water, γ (lb/ft^3)	62.4	62.4	62.4
Kinematic viscosity of water, v (ft/sec^2)	0.00001217	0.00001217	0.00001217
Hydraulic radius or mean depth, d in wide channels (ft)	0.55	0.40	0.70
Shear velocity, U* (ft/s)	0.67	0.62	1.08
Boundary Reynold's number, R*	1302	1200	2080
Shields parameter, Ks (see HEC-20)	0.047	0.047	0.047
Shear Stress, τ_0 (lb/ft^2)	0.88	0.75	2.25
Critical bed material size, Dc (ft) = D90 Average 1	0.11	0.11	0.11
Manning roughness coefficient, n	0.030	0.030	0.030
Channel discharge per unit width, q (ft^2/s)	1.51	0.58	1.02
Equilibrium Slope, S_{eq} (ft/ft)	**0.023**	**0.052**	**0.032**

HEC-20 Equation 6.18

Another approach to determining an equilibrium slope under conditions of no upstream sediment supply is presented by the USBR using the Meyer-Peter Muller equation for beginning of transport (USBR 1984). If adjustment of the hydraulic depth due to the reduction in channel slope is included in the equation, the USBR equation is:

$$S_{eq} = K_u \frac{(D_{50})^{10/7} n^{9/7}}{(D_{90})^{5/14} q^{6/7}} \qquad (6.18)$$

where:

K_u = 60.1 English
K_u = 28.0 SI

	Reach 1 STA 1447.98 to STA 2320.35	Reach 2 STA 2409.33 to STA 3440.63	Reach 3 STA 3531.18 to STA 3895.84
Original stream energy slope, S (ft/ft)	0.0257	0.0299	0.0516
D50 (ft) Average 1	0.0235	0.0235	0.0235
D90 (ft) Average 1	0.1126	0.1126	0.1126
Manning roughness coefficient, n	0.030	0.030	0.030
Channel discharge per unit width, q (ft^2/s)	1.51	0.58	1.02
Equilibrium Slope, S_{eq} (ft/ft)	**0.0048**	**0.0108**	**0.0067**

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Max Chl Dpth	Wetted Perim	Hydraulic Radius	q	W/D Ratio
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)		(ft)	(ft)	(ft^2/ft)	cfs/ft	
1	3895.84	PF 1	25.1	1230.66	1232.306	1230.916	1232.31	0.000047	0.447	56.14	34.1	0.06	1.65	37.39	1.50	0.74	20.67
1	3850.61	PF 1	25.1	1231.9	1232.197		1232.29	0.013	2.482	10.11	34.1	0.8	0.3	34.69	0.29	0.74	113.67
1	3806.24	PF 1	25.1	1231.46	1231.826		1231.89	0.006487	2.012	12.48	34.1	0.59	0.37	34.83	0.36	0.74	92.16
1	3765.08	PF 1	25.1	1231.05	1231.306	1231.306	1231.44	0.021152	2.875	8.73	34.1	1	0.26	34.61	0.25	0.74	131.15
1	3713.23	PF 1	25.1	1229.7	1229.926	1229.957	1230.09	0.031988	3.258	7.7	34.1	1.21	0.23	34.55	0.22	0.74	148.26
1	3654.26	PF 1	25.1	1226.32	1226.474	1226.576	1226.83	0.115252	4.793	5.24	34.1	2.16	0.15	34.41	0.15	0.74	227.33
1	3648.64	PF 1	25.1	1226.23	1226.399	1226.486	1226.69	0.083741	4.354	5.77	34.1	1.87	0.17	34.44	0.17	0.74	200.59
1	3605.41	PF 1	25.1	1225.64	1225.896	1225.896	1226.03	0.021019	2.87	8.75	34.1	1	0.26	34.61	0.25	0.74	131.15
1	3537.09	PF 1	25.1	1224.09	1224.334	1224.347	1224.48	0.024665	3.012	8.33	34.1	1.07	0.24	34.59	0.24	0.74	142.08
1	3531.18	PF 1	25.1	1223.86	1224.064	1224.116	1224.27	0.04518	3.615	6.94	34.1	1.41	0.2	34.51	0.20	0.74	170.50
1	3440.63	PF 1	33.6	1221.72	1222.008	1222.008	1222.15	0.020256	3.041	11.05	38.43	1	0.29	39.01	0.28	0.87	132.52
1	3366.51	PF 1	33.6	1219.05	1219.246	1219.336	1219.56	0.073104	4.483	7.49	38.3	1.79	0.2	38.69	0.19	0.88	191.50
1	3305.78	PF 1	33.6	1216.22	1216.469	1216.508	1216.66	0.032851	3.523	9.54	38.3	1.24	0.25	38.8	0.25	0.88	153.20
1	3253.32	PF 1	33.6	1214.73	1215.001	1215.017	1215.16	0.024795	3.236	10.38	38.32	1.1	0.27	38.86	0.27	0.88	141.93
1	3250.17	PF 1	33.6	1214.61	1214.847	1214.897	1215.06	0.038546	3.697	9.09	38.3	1.34	0.24	38.77	0.23	0.88	159.58
1	3186.18	PF 1	33.6	1212.92	1213.148	1213.209	1213.38	0.044154	3.851	8.72	38.3	1.42	0.23	38.76	0.22	0.88	166.52
1	3091.83	PF 1	33.6	1210.48	1210.768	1210.768	1210.91	0.020323	3.048	11.02	38.3	1	0.29	38.88	0.28	0.88	132.07
1	3030.37	PF 1	33.6	1208.73	1208.963	1209.012	1209.18	0.041011	3.767	8.92	38.3	1.38	0.23	38.77	0.23	0.88	166.52
1	3004.33	PF 1	33.6	1208.24	1208.529	1208.529	1208.67	0.020125	3.039	11.06	38.3	1	0.29	38.88	0.28	0.88	132.07
1	2998.41	PF 1	33.6	1208.1	1208.359	1208.388	1208.54	0.028872	3.388	9.92	38.3	1.17	0.26	38.82	0.26	0.88	147.31
1	2955.4	PF 1	33.6	1206.97	1207.244	1207.258	1207.4	0.024057	3.207	10.48	38.3	1.08	0.27	38.85	0.27	0.88	141.85
1	2914.65	PF 1	33.6	1206.18	1206.485	1206.485	1206.61	0.021751	2.819	11.92	49.09	1.01	0.3	49.73	0.24	0.68	163.63
1	2815.59	PF 1	33.6	1203.86	1204.13	1204.145	1204.29	0.025006	3.245	10.36	38.3	1.1	0.27	38.84	0.27	0.88	141.85
1	2782.59	PF 1	33.6	1202.73	1203.093	1203.018	1203.18	0.009456	2.419	13.89	38.3	0.71	0.36	39.03	0.36	0.88	106.39
1	2743.58	PF 1	33.6	1202.22	1202.507	1202.507	1202.65	0.020496	3.056	11	38.31	1.01	0.29	38.88	0.28	0.88	132.10
1	2704.94	PF 1	33.6	1200.78	1201.187	1201.069	1201.26	0.00648	2.154	15.6	38.55	0.6	0.41	39.29	0.40	0.87	94.02
1	2700.54	PF 1	33.6	1200.73	1201.168		1201.23	0.005124	1.995	16.84	39.16	0.54	0.44	39.9	0.42	0.86	89.00
1	2661.04	PF 1	33.6	1200.43	1200.717	1200.717	1200.86	0.021021	3.056	10.99	39.02	1.02	0.29	39.6	0.28	0.86	134.55
1	2616.7	PF 1	33.6	1199.4	1199.669	1199.688	1199.83	0.025537	3.265	10.29	38.3	1.11	0.27	38.84	0.26	0.88	141.85
1	2540.68	PF 1	33.6	1197.74	1197.964	1198.028	1198.2	0.046678	3.916	8.58	38.3	1.46	0.22	38.75	0.22	0.88	174.09
1	2481.7	PF 1	33.6	1196.29	1196.578	1196.578	1196.72	0.020181	3.041	11.05	38.31	1	0.29	38.88	0.28	0.88	132.10
1	2409.33	PF 1	33.6	1194.83	1195.12	1195.118	1195.26	0.019845	3.026	11.1	38.31	0.99	0.29	38.88	0.29	0.88	132.10
1	2320.35	PF 1	37.3	1192.71	1193.043	1193.043	1193.12	0.028909	2.206	16.91	125.56	1.06	0.33	126.14	0.13	0.30	380.48
1	2119.93	PF 1	37.3	1186.71	1186.974	1187.01	1187.17	0.030404	3.527	10.58	40	1.21	0.26	40.53	0.26	0.93	153.85
1	2068.55	PF 1	37.3	1185.71	1186.01	1186.01	1186.16	0.019855	3.1	12.03	40.03	1	0.3	40.63	0.30	0.93	133.43
1	2000.07	PF 1	37.3	1183.71	1184.2	1184.011	1184.26	0.003957	1.905	19.58	40	0.48	0.49	40.98	0.48	0.93	81.63
1	1943.65	PF 1	37.3	1183.37	1183.67	1183.67	1183.82	0.019966	3.107	12.01	40	1	0.3	40.6	0.30	0.93	133.33
1	1862.48	PF 1	37.3	1181.7	1181.995	1181.999	1182.15	0.021197	3.163	11.79	40	1.03	0.29	40.59	0.29	0.93	137.93
1	1811.06	PF 1	37.3	1180.4	1180.666	1180.701	1180.86	0.029943	3.511	10.63	40	1.2	0.27	40.53	0.26	0.93	148.15
1	1807.36	PF 1	37.3	1180.17	1180.381	1180.469	1180.68	0.063843	4.411	8.46	40	1.69	0.21	40.42	0.21	0.93	190.48
1	1777.34	PF 1	37.3	1179.71	1180.01	1180.01	1180.16	0.020101	3.113	11.98	40	1	0.3	40.6	0.30	0.93	133.33
1	1709.86	PF 1	37.3	1177.83	1178.074	1178.13	1178.3	0.039607	3.82	9.77	40	1.36	0.24	40.49	0.24	0.93	166.67
1	1652.33	PF 1	37.3	1176.71	1177.113	1177.007	1177.2	0.007517	2.313	16.13	40	0.64	0.4	40.81	0.40	0.93	100.00
1	1649.71	PF 1	37.3	1176.71	1177.02	1177.009	1177.16	0.017909	3.006	12.41	40	0.95	0.31	40.62	0.31	0.93	129.03
1	1602.35	PF 1	37.3	1175.93	1176.26	1176.228	1176.38	0.014576	2.825	13.2	40	0.87	0.33	40.66	0.32	0.93	121.21
1	1522.84	PF 1	37.3	1174.57	1174.869	1174.869	1175.02	0.020264	3.121	11.95	40	1.01	0.3	40.6	0.29	0.93	133.33
1	1520.83	PF 1	37.3	1174.52	1174.819	1174.82	1174.97	0.020357	3.128	11.93	39.91	1.01	0.3	40.51	0.29	0.93	133.03
1	1447.98	PF 1	37.3	1172.42	1172.66	1172.719	1172.9	0.04221	3.893	9.58	40	1.4	0.24	40.48	0.24	0.93	166.67

Results From EX (No Self-Form) Model								
River Sta	Q (cfs)	Min Ch El (ft)	Length Chnl (ft)	Flow Area (ft^2)	Top Width (ft)	Avg Slope	Self-Forming Channel Width (ft)	Approx. Depth (Hydraulic Toolbox)
3895.84	25.1	1230.93	45.23	30.71	22.35	0.0186	34.1	0.27
3850.61	25.1	1232.17	44.36	8.9	23.14	0.0186	34.1	0.27
3806.24	25.1	1231.73	41.16	9.9	24.71	0.0186	34.1	0.27
3765.08	25.1	1231.32	51.85	7.89	24.91	0.0186	34.1	0.27
3713.23	25.1	1229.97	58.96	6.31	15.05	0.0186	34.1	0.27
3654.26	25.1	1226.59	5.63	3.22	24.12	0.0186	34.1	0.27
3648.64	25.1	1226.5	43.22	9.67	27.16	0.0186	34.1	0.27
3605.41	25.1	1225.91	68.33	10.7	46.71	0.0186	34.1	0.27
3537.09	25.1	1224.36	5.91	8.5	31.24	0.0186	34.1	0.27
3531.18	25.1	1224.13	90.55	6.19	24.46	0.0186	34.1	0.27
3440.63	33.6	1221.99	74.11	12.57	55.94	0.0259	38.3	0.27
3366.51	33.6	1219.32	60.74	7.45	28.95	0.0259	38.3	0.27
3305.78	33.6	1216.49	52.46	7.44	24.19	0.0259	38.3	0.27
3253.32	33.6	1214.98	3.15	11.4	59.58	0.0259	38.3	0.27
3250.17	33.6	1214.88	63.99	10.69	62.75	0.0259	38.3	0.27
3186.18	33.6	1213.19	94.35	12.56	56.74	0.0259	38.3	0.27
3091.83	33.6	1210.75	61.46	9.47	35.53	0.0259	38.3	0.27
3030.37	33.6	1209	26.04	12.59	61.16	0.0259	38.3	0.27
3004.33	33.6	1208.51	5.91	10.59	51.28	0.0259	38.3	0.27
2998.41	33.6	1208.37	43.01	11.4	53.04	0.0259	38.3	0.27
2955.4	33.6	1207.24	40.75	9.9	64.6	0.0259	38.3	0.27
2914.65	33.6	1206.45	99.06	13.81	73.89	0.0259	38.3	0.27
2815.59	33.6	1204.13	33.00	15.05	96.03	0.0259	38.3	0.27
2782.59	33.6	1203	39.02	8.21	27.6	0.0259	38.3	0.27
2743.58	33.6	1202.49	38.63	16.37	115.73	0.0259	38.3	0.27
2704.94	33.6	1201.05	4.40	13.44	79.73	0.0259	38.3	0.27
2700.54	33.6	1201.55	39.50	11.21	58.29	0.0259	38.3	0.27
2661.04	33.6	1200.7	44.34	15.81	109.73	0.0259	38.3	0.27
2616.7	33.6	1199.67	76.03	20.09	172.25	0.0259	38.3	0.27
2540.68	33.6	1198.01	58.97	17.11	136.97	0.0259	38.3	0.27
2481.7	33.6	1196.68	72.38	15.44	88.89	0.0259	38.3	0.27
2409.33	33.6	1195.25	88.97	14.03	164.52	0.0259	38.3	0.27
2320.35	37.3	1193	200.44	17.96	133.12	0.0233	40.0	0.29
2119.93	37.3	1187	51.36	8.78	25	0.0233	40.0	0.29
2068.55	37.3	1186	68.48	7.97	29.82	0.0233	40.0	0.29
2000.07	37.3	1184	56.42	9.63	11.54	0.0233	40.0	0.29
1943.65	37.3	1183.66	81.17	9.41	18.94	0.0233	40.0	0.29
1862.48	37.3	1181.99	51.42	6.17	15.23	0.0233	40.0	0.29
1811.06	37.3	1180.69	3.70	8.22	12.98	0.0233	40.0	0.29
1807.36	37.3	1180.46	30.02	6.06	13.06	0.0233	40.0	0.29
1777.34	37.3	1180	67.48	8.05	24.23	0.0233	40.0	0.29
1709.86	37.3	1178.12	57.53	13.56	53.46	0.0233	40.0	0.29
1652.33	37.3	1177	2.62	12.53	33.39	0.0233	40.0	0.29
1649.71	37.3	1177	47.36	13.81	35.09	0.0233	40.0	0.29
1602.35	37.3	1176.22	79.51	11.14	31.01	0.0233	40.0	0.29
1522.84	37.3	1174.86	2.01	12.59	45.94	0.0233	40.0	0.29
1520.83	37.3	1174.81	72.85	11.15	45	0.0233	40.0	0.29
1447.98	37.3	1172.71		13.32	67.98	0.0233	40.0	0.29

n = 0.03

Parameter	Reach 1 STA 1447.98 to STA 2320.35	Reach 2 STA 2409.33 to STA 3440.63	Reach 3 STA 3531.18 to STA 3895.84
Discharge (cfs)	37.3	33.6	25.1
Average Hydr Radius (ft)	0.29	0.28	0.36
Average Width (ft)	45.34	38.88	34.10
Average Discharge Per Unit Width, q (cfs/ft)	0.89	0.87	0.74
Average Energy Slope, S (dimensionless)	0.0250	0.0268	0.0363
Average Froude Number, Fr (dimensionless)	1.057	1.094	1.117
Average Manning n-value	0.030	0.030	0.030
Average Velocity (fps)	3.134	3.194	2.972
Average Depth (ft)	0.304	0.284	0.383
D50 (ft) Average 1	0.0235	0.0235	0.0235
D90 (ft) Average 1	0.1126	0.1126	0.1126
Temperature (˚F)	60	60	60
Kinematic viscosity of water, v (ft^2/s)	0.00001217	0.00001217	0.00001217
Unit Weight of Water, γ_w (lb/ft^3)	62.4	62.4	62.4
Specific Weight of Sediment, γ_s (lb/ft^3)	165.4	165.4	165.4

Albuquerque Metroploitan Arroyo Flood Control Authority Sediment and Erosion Design Guide Equation 3.59

$$S_{eq} = CQ^{-0.133}$$

$$C = 18.28 n^2 F^{0.133} F_r^{2.133}$$

F = width/depth ratio typicall about 40 (Leopold and Miller, 1956; Harvey, 1985)

	Fr = 0.7	Fr = 0.75	Fr = 0.8	Fr = 0.85	Fr = 0.9	Fr = 1.0
Reach 1						
Flowrate, Q (cfs)	37.3	37.3	37.3	37.3	37.3	37.3
Manning roughness coefficient, n	0.030	0.030	0.030	0.030	0.030	0.030
Width/Depth Ratio, F (ft/ft)	152.66	152.66	152.66	152.66	152.66	152.66
Froude Number, Fr	0.700	0.750	0.800	0.850	0.900	1.000
C	0.0150	0.0174	0.0200	0.0227	0.0256	0.0321
Equilibrium Slope, S_{eq} (ft/ft)	**0.0093**	**0.0107**	**0.0123**	**0.0140**	**0.0158**	**0.0198**
Reach 2						
	Fr = 0.7	**Fr = 0.75**	**Fr = 0.8**	**Fr = 0.85**	**Fr = 0.9**	**Fr = 1.0**
Flowrate, Q (cfs)	33.6	33.6	33.6	33.6	33.6	33.6
Manning roughness coefficient, n	0.030	0.030	0.030	0.030	0.030	0.030
Width/Depth Ratio, F (ft/ft)	141.22	141.22	141.22	141.22	141.22	141.22
Froude Number, Fr	0.700	0.750	0.800	0.850	0.900	1.000
C	0.0149	0.0172	0.0197	0.0225	0.0254	0.0318
Equilibrium Slope, S_{eq} (ft/ft)	**0.0093**	**0.0108**	**0.0124**	**0.0141**	**0.0159**	**0.0199**
Reach 3						
	Fr = 0.7	**Fr = 0.75**	**Fr = 0.8**	**Fr = 0.85**	**Fr = 0.9**	**Fr = 1.0**
Flowrate, Q (cfs)	25.1	25.1	25.1	25.1	25.1	25.1
Manning roughness coefficient, n	0.030	0.030	0.030	0.030	0.030	0.030
Width/Depth Ratio, F (ft/ft)	137.76	137.76	137.76	137.76	137.76	137.76
Froude Number, Fr	0.700	0.750	0.800	0.850	0.900	1.000
C	0.0148	0.0171	0.0197	0.0224	0.0253	0.0317
Equilibrium Slope, S_{eq} (ft/ft)	**0.0096**	**0.0112**	**0.0128**	**0.0146**	**0.0165**	**0.0206**
Avg. Across All Reaches =	**0.0094**	**0.0109**	**0.0125**	**0.0142**	**0.0161**	**0.0201**

HEC-20 Equation 6.17

$$S_{eq} = \left[K_s D_c \left(\frac{\gamma_s - \gamma}{\gamma} \right) \right]^{\frac{10}{7}} \left(\frac{1.486}{qn} \right)^{\frac{6}{7}}$$

Dc = D90

	Reach 1 STA 1447.98 to STA 2320.35	Reach 2 STA 2409.33 to STA 3440.63	Reach 3 STA 3531.18 to STA 3895.84
Original stream energy slope, S (ft/ft)	0.0257	0.0299	0.0516
Mean bed sediment diameter, D (ft)	0.1126	0.1126	0.1126
Specific weight of sediment, γ_s (lb/ft^3)	165.4	165.4	165.4
Specific weight of water, γ (lb/ft^3)	62.4	62.4	62.4
Kinematic viscosity of water, v (ft/sec^2)	0.00001217	0.00001217	0.00001217
Hydraulic radius or mean depth, d in wide channels (ft)	0.30	0.28	0.38
Shear velocity, U* (ft/s)	0.50	0.52	0.80
Boundary Reynold's number, R*	4640	4838	7382
Shields parameter, Ks (see HEC-20)	0.047	0.047	0.047
Shear Stress, τ_o (lb/ft^2)	0.49	0.53	1.23
Critical bed material size, Dc (ft) = D90 Average 1	0.11	0.11	0.11
Manning roughness coefficient, n	0.030	0.030	0.030
Channel discharge per unit width, q (ft^2/s)	0.89	0.87	0.74
Equilibrium Slope, S_{eq} (ft/ft)	**0.036**	**0.037**	**0.042**

HEC-20 Equation 6.18

Another approach to determining an equilibrium slope under conditions of no upstream sediment supply is presented by the USBR using the Meyer-Peter Muller equation for beginning of transport (USBR 1984). If adjustment of the hydraulic depth due to the reduction in channel slope is included in the equation, the USBR equation is:

$$S_{eq} = K_u \frac{(D_{50})^{10/7} n^{9/7}}{(D_{90})^{5/14} q^{6/7}} \qquad (6.18)$$

where:

K_u = 60.1 English
K_u = 28.0 SI

	Reach 1 STA 1447.98 to STA 2320.35	Reach 2 STA 2409.33 to STA 3440.63	Reach 3 STA 3531.18 to STA 3895.84
Original stream energy slope, S (ft/ft)	0.0257	0.0299	0.0516
D50 (ft) Average 1	0.0235	0.0235	0.0235
D90 (ft) Average 1	0.112614013	0.112614013	0.112614013
Manning roughness coefficient, n	0.030	0.030	0.030
Channel discharge per unit width, q (ft^2/s)	0.89	0.87	0.74
Equilibrium Slope, S_{eq} (ft/ft)	**0.0075**	**0.0077**	**0.0088**

River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Max Chl Dpth	Wetted Perim	Hydraulic Radius	q	W/D Ratio	Length Chnl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)		(ft)	(ft)	(ft^2/ft)	cfs/ft		(ft)
1	3895.84	25.1	1230.93	1233.074	1231.609	1233.08	0.000185	0.817	30.71	22.35	0.12	2.14	23.02	1.33	1.123043	10.443925	45.23
1	3850.61	25.1	1232.17	1232.923		1233.05	0.011721	2.819	8.9	23.14	0.8	0.75	23.36	0.38	1.084702	30.853333	44.36
1	3806.24	25.1	1231.73	1232.489		1232.59	0.00902	2.535	9.9	24.71	0.71	0.76	25.04	0.40	1.015783	32.513158	41.16
1	3765.08	25.1	1231.32	1231.907	1231.907	1232.06	0.019417	3.181	7.89	24.91	1	0.59	25.22	0.31	1.007627	42.220339	51.85
1	3713.23	25.1	1229.97	1230.769	1230.794	1231.02	0.020785	3.978	6.31	15.05	1.08	0.8	15.18	0.42	1.667774	18.8125	58.96
1	3654.26	25.1	1230.13	1230.321	1230.321	1230.42	0.040775	2.472	10.15	53.6	1	0.19	53.66	0.19	0.468284	282.10526	5.63
1	3648.64	25.1	1226.39	1226.516	1226.678	1227.27	0.565246	6.955	3.61	29	3.48	0.13	29.04	0.12	0.865517	223.07692	43.22
1	3605.41	25.1	1225.89	1226.07		1226.11	0.011261	1.669	15.04	84.02	0.7	0.18	84.08	0.18	0.298738	466.77778	68.33
1	3537.09	25.1	1225	1225.276	1225.276	1225.32	0.064871	1.747	14.37	181.12	1.09	0.28	181.18	0.08	0.138582	646.85714	5.91
1	3531.18	25.1	1220.2	1220.241	1220.292	1220.48	0.79095	3.942	6.37	154.43	3.42	0.04	154.44	0.04	0.162533	3860.75	90.55
1	3440.63	33.6	1219.29	1219.445		1219.48	0.010712	1.476	22.77	147.31	0.66	0.16	147.36	0.15	0.22809	920.6875	74.11
1	3366.51	33.6	1218.55	1218.715		1218.75	0.009062	1.412	23.79	145.08	0.61	0.16	145.13	0.16	0.231596	906.75	60.74
1	3305.78	33.6	1217.94	1218.156		1218.2	0.009037	1.684	19.95	93.19	0.64	0.22	93.26	0.21	0.360554	423.59091	52.46
1	3253.32	33.6	1217.41	1217.599	1217.599	1217.69	0.040702	2.45	13.72	73.34	1	0.19	73.4	0.19	0.45814	386	3.15
1	3250.17	33.6	1213.35	1213.429	1213.57	1214.3	1.212747	7.484	4.49	57.34	4.72	0.08	57.37	0.08	0.585978	716.75	63.99
1	3186.18	33.6	1212.71	1213.059		1213.15	0.010499	2.467	13.62	40.09	0.75	0.35	40.21	0.34	0.838114	114.54286	94.35
1	3091.83	33.6	1211.75	1212.049		1212.13	0.011217	2.315	14.51	49.41	0.75	0.3	49.5	0.29	0.680024	164.7	61.46
1	3030.37	33.6	1211.13	1211.384		1211.45	0.010925	2.052	16.37	65.54	0.72	0.25	65.61	0.25	0.512664	262.16	26.04
1	3004.33	33.6	1210.86	1211.064	1211.064	1211.14	0.031119	2.259	14.87	73.39	0.88	0.2	73.45	0.20	0.457828	366.95	5.91
1	2998.41	33.6	1205.85	1205.953	1206.106	1206.75	0.773138	7.154	4.7	45.79	3.94	0.1	45.82	0.10	0.733785	457.9	43.01
1	2955.4	33.6	1205.42	1205.676		1205.74	0.01055	2.034	16.52	65.28	0.71	0.26	65.36	0.25	0.514706	251.07692	40.75
1	2914.65	33.6	1205.01	1205.243		1205.3	0.010524	1.91	17.59	76.28	0.7	0.23	76.35	0.23	0.440482	331.65217	99.06
1	2815.59	33.6	1204.02	1204.205		1204.25	0.010556	1.648	20.39	110.59	0.68	0.19	110.65	0.18	0.303825	582.05263	33.00
1	2782.59	33.6	1203.69	1203.868		1203.91	0.010073	1.569	21.41	120.68	0.66	0.18	120.74	0.18	0.278422	670.44444	39.02
1	2743.58	33.6	1203.3	1203.473		1203.51	0.010188	1.548	21.7	125.91	0.66	0.17	125.96	0.17	0.266857	740.64706	38.63
1	2704.94	33.6	1202.9	1203.027	1203.027	1203.09	0.046785	2.025	16.59	131.06	1	0.13	131.1	0.13	0.256371	1008.1538	4.40
1	2700.54	33.6	1199	1199.059	1199.144	1199.49	0.869761	5.242	6.41	108.89	3.81	0.06	108.91	0.06	0.308568	1814.8333	39.50
1	2661.04	33.6	1198.6	1198.82	1198.751	1198.85	0.005362	1.317	25.52	116.61	0.5	0.22	116.68	0.22	0.28814	530.04545	44.34
1	2616.7	33.6	1198.16	1198.294	1198.294	1198.37	0.029799	2.232	15.05	112.81	1.08	0.13	112.86	0.13	0.297846	867.76923	76.03
1	2540.68	33.6	1197.39	1197.695	1197.534	1197.71	0.002058	1.012	33.19	109.62	0.32	0.31	109.72	0.30	0.306513	353.6129	58.97
1	2481.7	33.6	1196.79	1197.698		1197.7	0.00004	0.287	117.1	133.07	0.05	0.91	133.29	0.88	0.252499	146.23077	72.38
1	2409.33	33.6	1196.06	1197.698		1197.7	0.000005	0.144	232.68	146.96	0.02	1.64	147.49	1.58	0.228634	89.609756	88.97
1	2320.35	37.3	1195.17	1197.698	1195.344	1197.7	0.000003	0.151	246.6	105.15	0.02	2.53	105.97	2.33	0.354731	41.561265	200.44
1	2119.93	37.3	1185.98	1186.238	1186.221	1186.34	0.016961	2.587	14.42	56.71	0.9	0.26	56.79	0.25	0.657732	218.11538	51.36
1	2068.55	37.3	1185.47	1185.74		1185.79	0.007149	1.734	21.51	80.6	0.59	0.27	80.69	0.27	0.462779	298.51852	68.48
1	2000.07	37.3	1184.78	1185.088		1185.18	0.011433	2.382	15.66	51.83	0.76	0.31	51.93	0.30	0.71966	167.19355	56.42
1	1943.65	37.3	1184.21	1184.538		1184.61	0.008877	2.188	17.05	52.99	0.68	0.33	53.1	0.32	0.703906	160.57576	81.17
1	1862.48	37.3	1183.39	1183.726		1183.82	0.010728	2.44	15.29	46.5	0.75	0.34	46.61	0.33	0.802151	136.76471	51.42
1	1811.06	37.3	1182.84	1183.102	1183.102	1183.23	0.037106	2.896	12.88	49.92	1.01	0.26	50.01	0.26	0.747196	192	3.7
1	1807.36	37.3	1181.04	1181.187	1181.35	1181.9	0.435751	6.756	5.52	38.13	3.13	0.15	38.18	0.14	0.978232	254.2	30.02
1	1777.34	37.3	1180.75	1181.101		1181.19	0.009201	2.326	16.04	46.7	0.7	0.35	46.81	0.34	0.798715	133.42857	67.48
1	1709.86	37.3	1180.06	1180.422		1180.52	0.010674	2.551	14.62	41.44	0.76	0.36	41.55	0.35	0.900097	115.11111	57.53
1	1652.33	37.3	1179.47	1179.746	1179.746	1179.88	0.035992	2.951	12.64	46.57	1	0.28	46.66	0.27	0.800945	166.32143	2.62
1	1649.71	37.3	1177.56	1177.696	1177.882	1178.64	0.638112	7.79	4.79	35.56	3.74	0.14	35.6	0.13	1.048931	254	47.36
1	1602.35	37.3	1177.09	1177.393		1177.46	0.009245	2.125	17.55	58.8	0.69	0.3	58.9	0.30	0.634354	196	79.51
1	1522.84	37.3	1176.29	1176.556	1176.556	1176.69	0.036174	2.89	12.91	49.26	1	0.27	49.34	0.26	0.757207	182.44444	2.01
1	1520.83	37.3	1174.79	1174.906	1175.073	1175.76	0.714076	7.416	5.03	43.76	3.86	0.12	43.8	0.11	0.852377	364.66667	72.85
1	1447.98	37.3	1174.05	1174.328	1174.271	1174.4	0.010113	2.101	17.75	64.7	0.71	0.28	64.79	0.27	0.576507	231.07143	

Parameter	Reach 1 STA 1447.98 to STA 2320.35	Reach 2 STA 2409.33 to STA 3440.63	Reach 3 STA 3531.18 to STA 3895.84
Discharge (cfs)	37.3	33.6	25.1
Average Hydr Radius (ft)	0.51	0.35	0.50
Average Width (ft)	60.54	103.65	32.36
Average Discharge Per Unit Width, q (cfs/ft)	0.66	0.38	1.03
Average Energy Slope, S (dimensionless)	0.0094	0.0094	0.0121
Average Froude Number, Fr (dimensionless)	0.656	0.594	0.735
Average Manning n-value	0.030	0.030	0.030
Average Velocity (fps)	2.059	1.569	2.500
Average Depth (ft)	0.533	0.355	0.870
D50 (ft) Average 1	0.0235	0.0235	0.0235
D90 (ft) Average 1	0.1126	0.1126	0.1126
Temperature (˚F)	60	60	60
Kinematic viscosity of water, v (ft^2/s)	0.00001217	0.00001217	0.00001217
Unit Weight of Water, γ_w (lb/ft^3)	62.4	62.4	62.4
Specific Weight of Sediment, γ_s (lb/ft^3)	165.4	165.4	165.4

**Note: Average values exclude cross-sections at drop structure tops and toes*

Albuquerque Metroploitan Arroyo Flood Control Authority Sediment and Erosion Design Guide Equation 3.59

$$S_{eq} = CQ^{-0.133} \qquad C = 18.28 n^2 F^{0.133} F_r^{2.133}$$

F = width/depth ratio typicall about 40 (Leopold and Miller, 1956; Harvey, 1985)

	Fr = 0.7	Fr = 0.75	Fr = 0.8	Fr = 0.85	Fr = 0.9	Fr = 1.0
Reach 1						
Flowrate, Q (cfs)	37.3	37.3	37.3	37.3	37.3	37.3
Manning roughness coefficient, n	0.030	0.030	0.030	0.030	0.030	0.030
Width/Depth Ratio, F (ft/ft)	169.83	169.83	169.83	169.83	169.83	169.83
Froude Number, Fr	0.700	0.750	0.800	0.850	0.900	1.000
C	0.0152	0.0176	0.0202	0.0230	0.0260	0.0326
Equilibrium Slope, S_{eq} (ft/ft)	**0.0094**	**0.0109**	**0.0125**	**0.0142**	**0.0161**	**0.0201**
Reach 2						
	Fr = 0.7	**Fr = 0.75**	**Fr = 0.8**	**Fr = 0.85**	**Fr = 0.9**	**Fr = 1.0**
Flowrate, Q (cfs)	33.6	33.6	33.6	33.6	33.6	33.6
Manning roughness coefficient, n	0.030	0.030	0.030	0.030	0.030	0.030
Width/Depth Ratio, F (ft/ft)	459.72	459.72	459.72	459.72	459.72	459.72
Froude Number, Fr	0.700	0.750	0.800	0.850	0.900	1.000
C	0.0174	0.0201	0.0231	0.0263	0.0297	0.0372
Equilibrium Slope, S_{eq} (ft/ft)	**0.0109**	**0.0126**	**0.0145**	**0.0165**	**0.0186**	**0.0233**
Reach 3						
	Fr = 0.7	**Fr = 0.75**	**Fr = 0.8**	**Fr = 0.85**	**Fr = 0.9**	**Fr = 1.0**
Flowrate, Q (cfs)	25.1	25.1	25.1	25.1	25.1	25.1
Manning roughness coefficient, n	0.030	0.030	0.030	0.030	0.030	0.030
Width/Depth Ratio, F (ft/ft)	100.27	100.27	100.27	100.27	100.27	100.27
Froude Number, Fr	0.700	0.750	0.800	0.850	0.900	1.000
C	0.0142	0.0164	0.0189	0.0215	0.0243	0.0304
Equilibrium Slope, S_{eq} (ft/ft)	**0.0092**	**0.0107**	**0.0123**	**0.0140**	**0.0158**	**0.0198**

HEC-20 Equation 6.17

$$S_{eq} = \left[K_s D_c \left(\frac{\gamma_s - \gamma}{\gamma} \right) \right]^{\frac{10}{7}} \left(\frac{1.486}{qn} \right)^{\frac{6}{7}}$$

$D_C = D_{90}$

	Reach 1 STA 1447.98 to STA 2320.35	Reach 2 STA 2409.33 to STA 3440.63	Reach 3 STA 3531.18 to STA 3895.84
Original stream energy slope, S (ft/ft)	0.0257	0.0299	0.0516
Mean bed sediment diameter, D (ft)	0.0004	0.0004	0.0004
Specific weight of sediment, γ_s (lb/ft^3)	165.4	165.4	165.4
Specific weight of water, γ (lb/ft^3)	62.4	62.4	62.4
Kinematic viscosity of water, v (ft/sec^2)	0.00001217	0.00001217	0.00001217
Hydraulic radius or mean depth, d in wide channels (ft)	0.53	0.36	0.87
Shear velocity, U* (ft/s)	0.66	0.58	1.20
Boundary Reynold's number, R*	20	18	37
Shields parameter, Ks (see HEC-20)	0.047	0.047	0.047
Shear Stress, τ_0 (lb/ft^2)	0.85	0.66	2.80
Critical bed material size, D_c (ft) = D_{90} Average 1	0.11	0.11	0.11
Manning roughness coefficient, n	0.030	0.030	0.030
Channel discharge per unit width, q (ft^2/s)	0.66	0.38	1.03
Equilibrium Slope, S_{eq} (ft/ft)	**0.046**	**0.075**	**0.032**

HEC-20 Equation 6.18

Another approach to determining an equilibrium slope under conditions of no upstream sediment supply is presented by the USBR using the Meyer-Peter Muller equation for beginning of transport (USBR 1984). If adjustment of the hydraulic depth due to the reduction in channel slope is included in the equation, the USBR equation is:

$$S_{eq} = K_u \frac{(D_{50})^{10/7} n^{9/7}}{(D_{90})^{5/14} q^{6/7}} \qquad (6.18)$$

where:

K_u = 60.1 English
K_u = 28.0 SI

	Reach 1 STA 1447.98 to STA 2320.35	Reach 2 STA 2409.33 to STA 3440.63	Reach 3 STA 3531.18 to STA 3895.84
Original stream energy slope, S (ft/ft)	0.0257	0.0299	0.0516
D_{50} (ft) Average 1	0.0235	0.0235	0.0235
D_{90} (ft) Average 1	0.1126	0.1126	0.1126
Manning roughness coefficient, n	0.030	0.030	0.030
Channel discharge per unit width, q (ft^2/s)	0.66	0.38	1.03
Equilibrium Slope, S_{eq} (ft/ft)	**0.0097**	**0.0157**	**0.0066**

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Max Chl Dpth	Wetted Perim	Hydraulic Radius	q	W/D Ratio	Length Chnl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)		(ft)	(ft)	(ft^2/ft)	cfs/ft		(ft)
1	3895.84	25.1	1230.93	1233.074	1231.609	1233.08	0.000185	0.817	30.71	22.35	0.12	2.14	23.02	1.40	1.123043	10.443925	45.23
1	3850.61	25.1	1232.17	1232.923		1233.05	0.011721	2.819	8.9	23.14	0.8	0.75	23.36	0.36	1.084702	30.853333	44.36
1	3806.24	25.1	1231.73	1232.489		1232.59	0.00902	2.535	9.9	24.71	0.71	0.76	25.04	0.38	1.015783	32.513158	41.16
1	3765.08	25.1	1231.32	1231.907	1231.907	1232.06	0.019417	3.181	7.89	24.91	1	0.59	25.22	0.29	1.007627	42.220339	51.85
1	3713.23	25.1	1229.97	1230.769	1230.794	1231.02	0.020785	3.978	6.31	15.05	1.08	0.8	15.18	0.40	1.667774	18.8125	58.96
1	3654.26	25.1	1230.13	1230.321	1230.321	1230.42	0.040775	2.472	10.15	53.6	1	0.19	53.66	0.17	0.468284	282.10526	5.63
1	3648.64	25.1	1226.39	1226.516	1226.678	1227.27	0.565246	6.955	3.61	29	3.48	0.13	29.04	0.11	0.865517	223.07692	43.22
1	3605.41	25.1	1225.89	1226.07		1226.11	0.011261	1.669	15.04	84.02	0.7	0.18	84.08	0.16	0.298738	466.77778	68.33
1	3537.09	25.1	1225	1225.276	1225.276	1225.32	0.064871	1.747	14.37	181.12	1.09	0.28	181.18	0.08	0.138582	646.85714	5.91
1	3531.18	25.1	1220.2	1220.241	1220.292	1220.48	0.79095	3.942	6.37	154.43	3.42	0.04	154.44	0.04	0.162533	3860.75	90.55
1	3440.63	33.6	1219.29	1219.445		1219.48	0.010712	1.476	22.77	147.31	0.66	0.16	147.36	0.16	0.22809	920.6875	74.11
1	3366.51	33.6	1218.55	1218.715		1218.75	0.009062	1.412	23.79	145.08	0.61	0.16	145.13	0.16	0.231596	906.75	60.74
1	3305.78	33.6	1217.94	1218.156		1218.2	0.009037	1.684	19.95	93.19	0.64	0.22	93.26	0.21	0.360554	423.59091	52.46
1	3253.32	33.6	1217.41	1217.599	1217.599	1217.69	0.040702	2.45	13.72	73.34	1	0.19	73.4	0.19	0.45814	386	3.15
1	3250.17	33.6	1213.35	1213.429	1213.57	1214.3	1.212747	7.484	4.49	57.34	4.72	0.08	57.37	0.08	0.585978	716.75	63.99
1	3186.18	33.6	1212.71	1213.059		1213.15	0.010499	2.467	13.62	40.09	0.75	0.35	40.21	0.34	0.838114	114.54286	94.35
1	3091.83	33.6	1211.75	1212.049		1212.13	0.011217	2.315	14.51	49.41	0.75	0.3	49.5	0.29	0.680024	164.7	61.46
1	3030.37	33.6	1211.13	1211.384		1211.45	0.010925	2.052	16.37	65.54	0.72	0.25	65.61	0.25	0.512664	262.16	26.04
1	3004.33	33.6	1210.86	1211.064	1211.064	1211.14	0.031119	2.259	14.87	73.39	0.88	0.2	73.45	0.20	0.457828	366.95	5.91
1	2998.41	33.6	1205.85	1205.953	1206.106	1206.75	0.773138	7.154	4.7	45.79	3.94	0.1	45.82	0.10	0.733785	457.9	43.01
1	2955.4	33.6	1205.42	1205.676		1205.74	0.01055	2.034	16.52	65.28	0.71	0.26	65.36	0.25	0.514706	251.07692	40.75
1	2914.65	33.6	1205.01	1205.243		1205.3	0.010524	1.91	17.59	76.28	0.7	0.23	76.35	0.23	0.440482	331.65217	99.06
1	2815.59	33.6	1204.02	1204.205		1204.25	0.010556	1.648	20.39	110.59	0.68	0.19	110.65	0.18	0.303825	582.05263	33.00
1	2782.59	33.6	1203.69	1203.868		1203.91	0.010073	1.569	21.41	120.68	0.66	0.18	120.74	0.18	0.278422	670.44444	39.02
1	2743.58	33.6	1203.3	1203.473		1203.51	0.010188	1.548	21.7	125.91	0.66	0.17	125.96	0.17	0.266857	740.64706	38.63
1	2704.94	33.6	1202.9	1203.027	1203.027	1203.09	0.046785	2.025	16.59	131.06	1	0.13	131.1	0.13	0.256371	1008.1538	4.40
1	2700.54	33.6	1199	1199.059	1199.144	1199.49	0.869761	5.242	6.41	108.89	3.81	0.06	108.91	0.06	0.308568	1814.8333	39.50
1	2661.04	33.6	1198.6	1198.82	1198.751	1198.85	0.005362	1.317	25.52	116.61	0.5	0.22	116.68	0.22	0.28814	530.04545	44.34
1	2616.7	33.6	1198.16	1198.294	1198.294	1198.37	0.029799	2.232	15.05	112.81	1.08	0.13	112.86	0.14	0.297846	867.76923	76.03
1	2540.68	33.6	1197.39	1197.695	1197.534	1197.71	0.002058	1.012	33.19	109.62	0.32	0.31	109.72	0.31	0.306513	353.6129	58.97
1	2481.7	33.6	1196.79	1197.698		1197.7	0.00004	0.287	117.1	133.07	0.05	0.91	133.29	0.89	0.252499	146.23077	72.38
1	2409.33	33.6	1196.06	1197.698		1197.7	0.000005	0.144	232.68	146.96	0.02	1.64	147.49	1.58	0.228634	89.609756	88.97
1	2320.35	37.3	1195.17	1197.698	1195.344	1197.7	0.000003	0.151	246.6	105.15	0.02	2.53	105.97	2.33	0.354731	41.561265	200.44
1	2119.93	37.3	1185.98	1186.238	1186.221	1186.34	0.016961	2.587	14.42	56.71	0.9	0.26	56.79	0.25	0.657732	218.11538	51.36
1	2068.55	37.3	1185.47	1185.74		1185.79	0.007149	1.734	21.51	80.6	0.59	0.27	80.69	0.27	0.462779	298.51852	68.48
1	2000.07	37.3	1184.78	1185.088		1185.18	0.011433	2.382	15.66	51.83	0.76	0.31	51.93	0.30	0.71966	167.19355	56.42
1	1943.65	37.3	1184.21	1184.538		1184.61	0.008877	2.188	17.05	52.99	0.68	0.33	53.1	0.32	0.703906	160.57576	81.17
1	1862.48	37.3	1183.39	1183.726		1183.82	0.010728	2.44	15.29	46.5	0.75	0.34	46.61	0.33	0.802151	136.76471	51.42
1	1811.06	37.3	1182.84	1183.102	1183.102	1183.23	0.037106	2.896	12.88	49.92	1.01	0.26	50.01	0.26	0.747196	192	3.7
1	1807.36	37.3	1181.04	1181.187	1181.35	1181.9	0.435751	6.756	5.52	38.13	3.13	0.15	38.18	0.15	0.978232	254.2	30.02
1	1777.34	37.3	1180.75	1181.101		1181.19	0.009201	2.326	16.04	46.7	0.7	0.35	46.81	0.34	0.798715	133.42857	67.48
1	1709.86	37.3	1180.06	1180.422		1180.52	0.010674	2.551	14.62	41.44	0.76	0.36	41.55	0.35	0.900097	115.11111	57.53
1	1652.33	37.3	1179.47	1179.746	1179.746	1179.88	0.035992	2.951	12.64	46.57	1	0.28	46.66	0.27	0.800945	166.32143	2.62
1	1649.71	37.3	1177.56	1177.696	1177.882	1178.64	0.638112	7.79	4.79	35.56	3.74	0.14	35.6	0.13	1.048931	254	47.36
1	1602.35	37.3	1177.09	1177.533		1177.57	0.0026	1.444	25.84	59.64	0.39	0.44	59.78	0.43	0.625419	135.54545	79.51
1	1522.84	37.3	1176.29	1177.496		1177.5	0.000227	0.603	61.85	54.9	0.1	1.21	55.29	1.12	0.679417	45.371901	2.01
1	1520.83	37.3	1174.79	1177.499		1177.5	0.000021	0.26	143.2	74.89	0.03	2.71	75.77	1.89	0.498064	27.634686	72.85
1	1447.98	37.3	1174.05	1177.5	1174.271	1177.5	0.000002	0.147	253.16	83.73	0.01	3.45	84.85	2.98	0.44548	24.269565	

Parameter	Reach 1 STA 1447.98 to STA 2320.35	Reach 2 STA 2409.33 to STA 3440.63	Reach 3 STA 3531.18 to STA 3895.84
Discharge (cfs)	37.3	33.6	25.1
Average Hydr Radius (ft)	0.79	0.35	0.50
Average Width (ft)	62.53	103.65	32.36
Average Discharge Per Unit Width, q (cfs/ft)	0.65	0.38	1.03
Average Energy Slope, S (dimensionless)	0.0078	0.0094	0.0121
Average Froude Number, Fr (dimensionless)	0.556	0.594	0.735
Average Manning n-value	0.030	0.030	0.030
Average Velocity (fps)	1.795	1.569	2.500
Average Depth (ft)	0.864	0.355	0.870
D50 (ft) Average 1	0.0235	0.0235	0.0235
D90 (ft) Average 1	0.1126	0.1126	0.1126
Temperature (˚F)	60	60	60
Kinematic viscosity of water, v (ft^2/s)	0.00001217	0.00001217	0.00001217
Unit Weight of Water, γ_w (lb/ft^3)	62.4	62.4	62.4
Specific Weight of Sediment, γ_s (lb/ft^3)	165.4	165.4	165.4

**Note: Average values exclude cross-sections at drop structure tops and toes*

Albuquerque Metroploitan Arroyo Flood Control Authority
Sediment and Erosion Design Guide
Equation 3.59

$$S_{eq} = CQ^{-0.133}$$

$$C = 18.28 n^2 F^{0.133} F_r^{2.133}$$

F = width/depth ratio typicall about 40 (Leopold and Miller, 1956; Harvey, 1985)

	Fr = 0.7	Fr = 0.75	Fr = 0.8	Fr = 0.85	Fr = 0.9	Fr = 1.0
Reach 1						
Flowrate, Q (cfs)	37.3	37.3	37.3	37.3	37.3	37.3
Manning roughness coefficient, n	0.030	0.030	0.030	0.030	0.030	0.030
Width/Depth Ratio, F (ft/ft)	143.11	143.11	143.11	143.11	143.11	143.11
Froude Number, Fr	0.700	0.750	0.800	0.850	0.900	1.000
C	0.0149	0.0172	0.0198	0.0225	0.0254	0.0318
Equilibrium Slope, S_{eq} (ft/ft)	**0.0092**	**0.0107**	**0.0122**	**0.0139**	**0.0157**	**0.0197**
Reach 2						
	Fr = 0.7	**Fr = 0.75**	**Fr = 0.8**	**Fr = 0.85**	**Fr = 0.9**	**Fr = 1.0**
Flowrate, Q (cfs)	33.6	33.6	33.6	33.6	33.6	33.6
Manning roughness coefficient, n	0.030	0.030	0.030	0.030	0.030	0.030
Width/Depth Ratio, F (ft/ft)	459.72	459.72	459.72	459.72	459.72	459.72
Froude Number, Fr	0.700	0.750	0.800	0.850	0.900	1.000
C	0.0174	0.0201	0.0231	0.0263	0.0297	0.0372
Equilibrium Slope, S_{eq} (ft/ft)	**0.0109**	**0.0126**	**0.0145**	**0.0165**	**0.0186**	**0.0233**
Reach 3						
	Fr = 0.7	**Fr = 0.75**	**Fr = 0.8**	**Fr = 0.85**	**Fr = 0.9**	**Fr = 1.0**
Flowrate, Q (cfs)	25.1	25.1	25.1	25.1	25.1	25.1
Manning roughness coefficient, n	0.030	0.030	0.030	0.030	0.030	0.030
Width/Depth Ratio, F (ft/ft)	100.27	100.27	100.27	100.27	100.27	100.27
Froude Number, Fr	0.700	0.750	0.800	0.850	0.900	1.000
C	0.0142	0.0164	0.0189	0.0215	0.0243	0.0304
Equilibrium Slope, S_{eq} (ft/ft)	**0.0092**	**0.0107**	**0.0123**	**0.0140**	**0.0158**	**0.0198**

HEC-20 Equation 6.17

$$S_{eq} = \left[K_s D_c \left(\frac{\gamma_s - \gamma}{\gamma} \right) \right]^{\frac{10}{7}} \left(\frac{1.486}{qn} \right)^{\frac{6}{7}}$$

$D_C = D_{90}$

	Reach 1 STA 1447.98 to STA 2320.35	Reach 2 STA 2409.33 to STA 3440.63	Reach 3 STA 3531.18 to STA 3895.84
Original stream energy slope, S (ft/ft)	0.0257	0.0299	0.0516
Mean bed sediment diameter, D (ft)	0.0004	0.0004	0.0004
Specific weight of sediment, γ_s (lb/ft^3)	165.4	165.4	165.4
Specific weight of water, γ (lb/ft^3)	62.4	62.4	62.4
Kinematic viscosity of water, v (ft/sec^2)	0.00001217	0.00001217	0.00001217
Hydraulic radius or mean depth, d in wide channels (ft)	0.86	0.36	0.87
Shear velocity, U* (ft/s)	0.84	0.58	1.20
Boundary Reynold's number, R*	26	18	37
Shields parameter, Ks (see HEC-20)	0.047	0.047	0.047
Shear Stress, τ_0 (lb/ft^2)	1.38	0.66	2.80
Critical bed material size, D_c (ft) = D_{90} Average 1	0.11	0.11	0.11
Manning roughness coefficient, n	0.030	0.030	0.030
Channel discharge per unit width, q (ft^2/s)	0.65	0.38	1.03
Equilibrium Slope, S_{eq} (ft/ft)	**0.047**	**0.075**	**0.032**

HEC-20 Equation 6.18

Another approach to determining an equilibrium slope under conditions of no upstream sediment supply is presented by the USBR using the Meyer-Peter Muller equation for beginning of transport (USBR 1984). If adjustment of the hydraulic depth due to the reduction in channel slope is included in the equation, the USBR equation is:

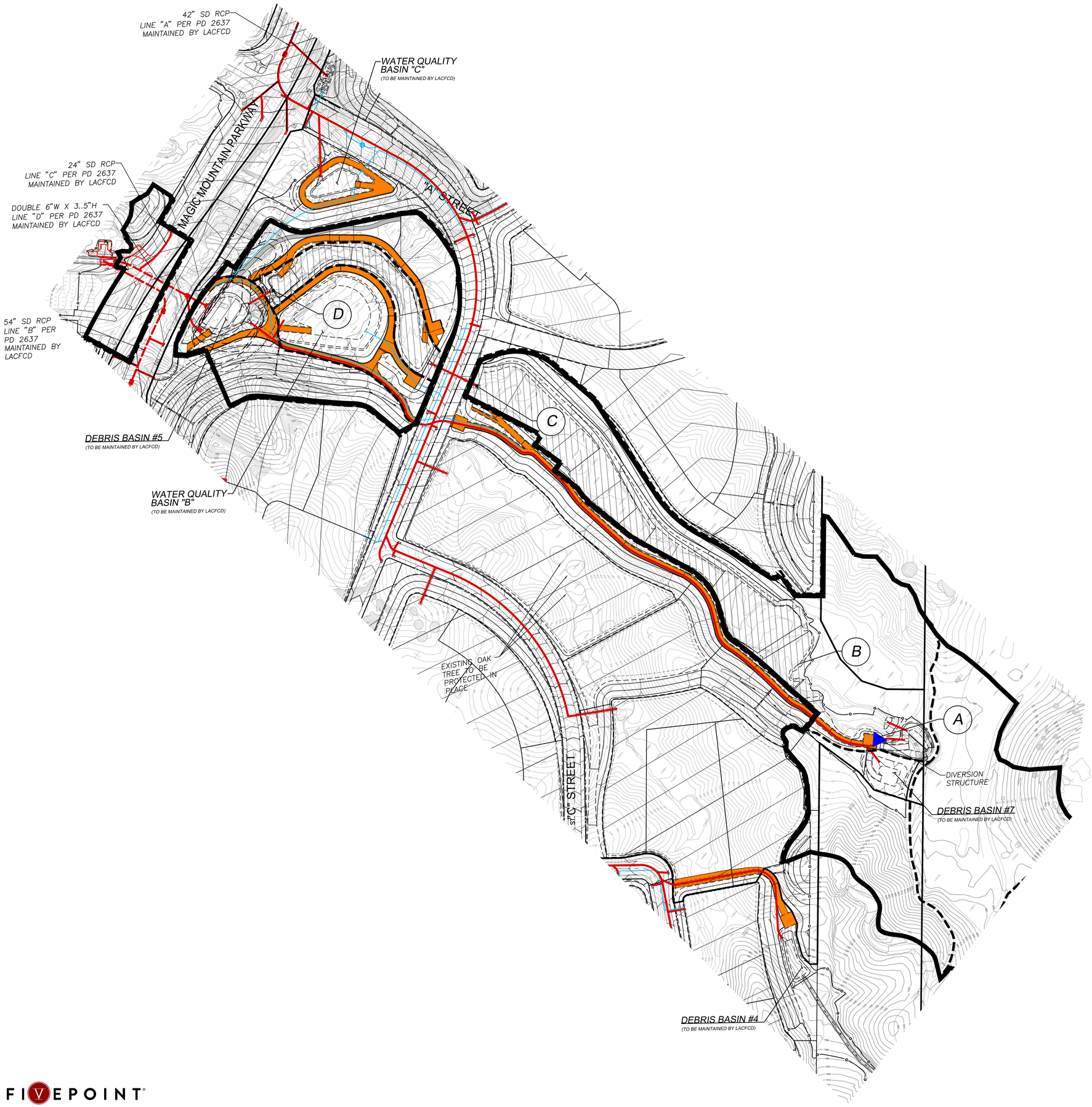
$$S_{eq} = K_u \frac{(D_{50})^{10/7} n^{9/7}}{(D_{90})^{5/14} q^{6/7}} \qquad (6.18)$$

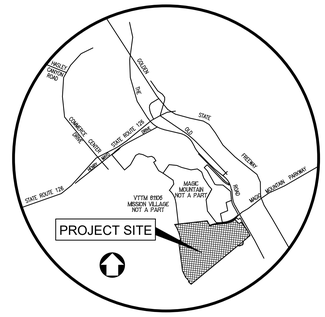
where:

K_u = 60.1 English
K_u = 28.0 SI

	Reach 1 STA 1447.98 to STA 2320.35	Reach 2 STA 2409.33 to STA 3440.63	Reach 3 STA 3531.18 to STA 3895.84
Original stream energy slope, S (ft/ft)	0.0257	0.0299	0.0516
D_{50} (ft) Average 1	0.0235	0.0235	0.0235
D_{90} (ft) Average 1	0.1126	0.1126	0.1126
Manning roughness coefficient, n	0.030	0.030	0.030
Channel discharge per unit width, q (ft^2/s)	0.65	0.38	1.03
Equilibrium Slope, S_{eq} (ft/ft)	**0.0099**	**0.0157**	**0.0066**

3 – Drainage Map





VICINITY MAP
NOT TO SCALE

LEGEND:

- PHASING LIMITS
- PROPOSED WATERSHED 100 BOUNDARY PER PROPOSED ENTRADA SOUTH HYDROLOGY MAP
- PROPOSED SUBAREA BOUNDARY FOR WATERSHED 100 PER PROPOSED ENTRADA SOUTH HYDROLOGY MAP
- EXISTING STORM DRAIN
- PROPOSED STORM DRAIN
- WQ — WATER QUALITY
- ACCESS ROAD
- NATURAL CHANNEL
- DIVERSION STRUCTURE

SUMMARY TABLE:

Node	Area	Q	QB	QBB	ΣQ	ΣQB	ΣQBB	DV	ΣDV	Note
A	N/A	13.0			13.0			N/A	N/A	Diversion Flow
B	6.2	12.1	12.3	14.0	25.1	25.3	27.0	213	213	Subarea 107B
C	4.4	8.5	8.8	9.9	33.6	34.1	36.9		213	
D	1.5	3.7	3.8		37.3	37.9	40.7		213	Subarea 109B

HYDROLOGY STUDY
APPROVED
REVIEWED BY: _____ DATE 03/12/2025
APPROVED BY: _____ DATE 03/12/2025
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS
LAND DEVELOPMENT DIVISION

NORTH

FEET
100' 50' 0 100' 200'
1" 1/2 0 1" 2"
INCHES

TRACT 53295
UNNAMED CANYON 2 EXHIBIT
ENTRADA SOUTH

FIVEPOINT

REGISTERED PROFESSIONAL ENGINEER
JOSEPH T. FUNK
No. 40695
CIVIL
STATE OF CALIFORNIA
02/14/25

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
26074 Avenue Hall, Suite #23 ▪ Valencia, CA 91355
FX: (661) 294-9890 ▪ PH: (661) 294-2211

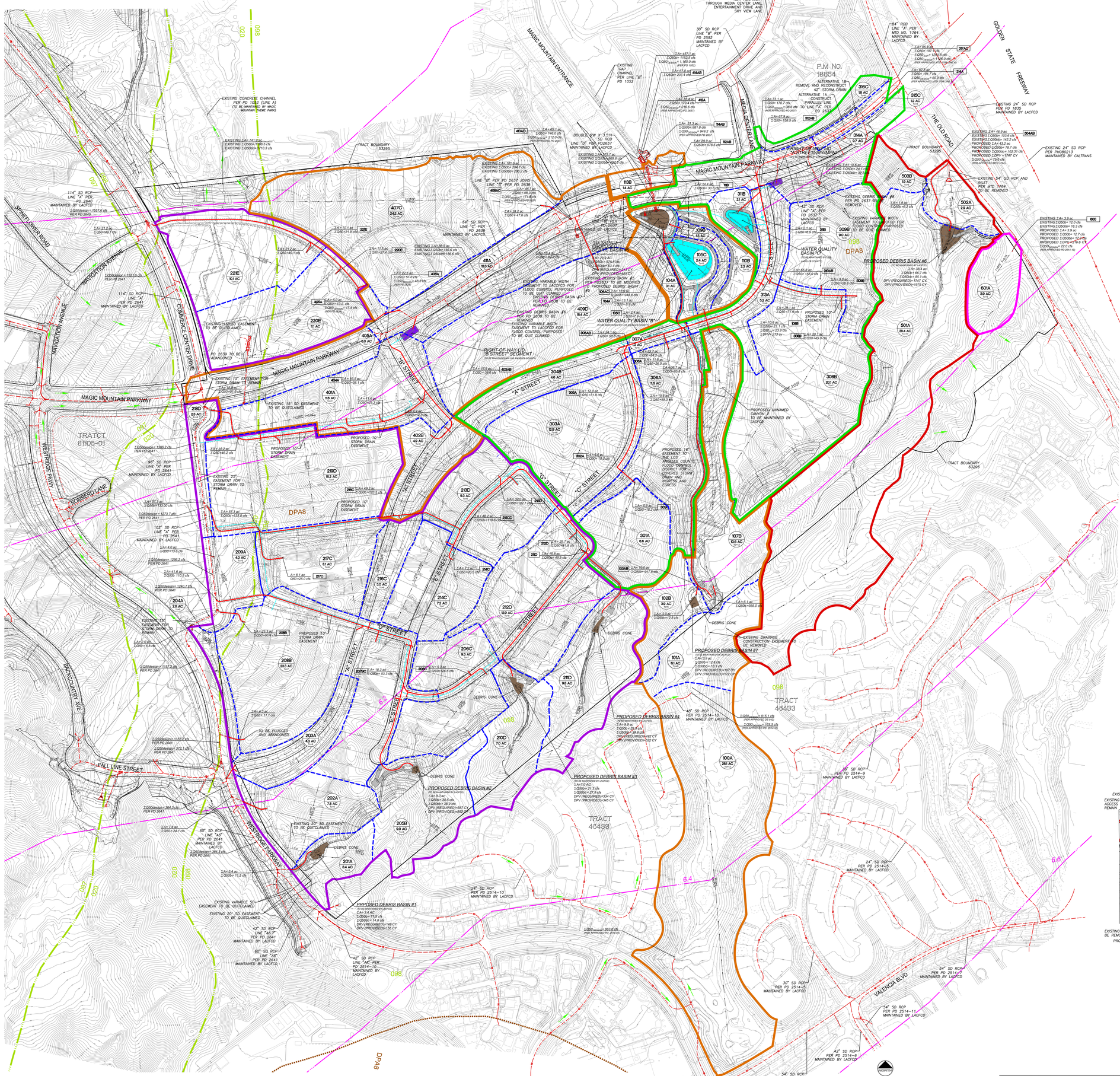
DATE: 02/04/2025 *REV. DATE:*
PROJECT NO: 0015-035-019 *SHEET 1 OF 1*

H&S057-01_ENTRADA SOUTH UNNAMED CANYON 2 EXHIBIT.DWG

G:\Newhall Ranch\53295 Entrada South\Hydrology\H&S057-01_Entrada South Unnamed Canyon 2 Exhibit.dwg Plotted on Feb 04, 2025 by smoore

4 – Digital HEC-RAS Model

5 – Drainage Concept Map (Whole Site Hydrology)


SANTA CLARA RIVER
MAGIC MOUNTAIN ENTRANCE
MAGIC MOUNTAIN PARKWAY
MEDIA CENTER LANE
GOLDEN STATE FREEWAY
THE OLD ROAD
SPINNEY LOOKER ROAD
NAVIGATION AVENUE
COMMERCE CENTER DRIVE
WESTRIDGE PKWY
BOBBERO LANE
BACKCOUNTRY AVE.
FALL LINE STREET
VALENCIA BLVD
"A" STREET
"B" STREET
"C" STREET
"D" STREET
"E" STREET
"F" STREET
"G" STREET
P.M. NO. 18854
TRACT 61105-01
TRACT 45433
TRACT BOUNDARY 53295
ALTERNATIVE 1B - NEW ALIGNMENT THROUGH MEDIA CENTER LANE, ENTERTAINMENT DRIVE AND SKY VIEW LANE
ALTERNATIVE 1B - REMOVE AND RECONSTRUCT 42" STORM DRAIN
ALTERNATIVE 1A - CONSTRUCT PARALLEL LINE TO LINE "A" PER PD 2637
RIGHT-OF-WAY LID "A STREET" SEGMENT
RIGHT-OF-WAY LID "B STREET" SEGMENT
PROPOSED UNNAMED CANYON 2 TO BE MAINTAINED BY LACFCD
PROPOSED 16' EASEMENT TO THE LOS ANGELES COUNTY FLOOD CONTROL DISTRICT FOR COVERED STORM DRAIN AND INGRESS AND EGRESS
EXISTING DRAINAGE CONSTRUCTION EASEMENT TO BE REMOVED
EXISTING VARIABLE WIDTH EASEMENT TO LACFCD FOR FLOOD CONTROL PURPOSES TO BE QUIT CLAIMED
EXISTING 15' SD EASEMENT TO BE QUITCLAIMED
EXISTING 25' SD EASEMENT TO BE QUITCLAIMED
EXISTING 20' SD EASEMENT TO BE QUITCLAIMED
PROPOSED 10' STORM DRAIN EASEMENT
EXISTING 15' EASEMENT FOR STORM DRAIN TO REMAIN
EXISTING 15' EASEMENT FOR STORM DRAIN TO REMOVE
PD 2639 TO BE ABANDONED
TO BE PLUGGED AND ABANDONED
DEBRIS CONE
PROPOSED DEBRIS BASIN #1
(TO BE MAINTAINED BY LACFCD)
1.A= 3.4 AC
1.Q50b = 11.5 cfs
1.Q500b= 14.8 cfs
DPV (REQUIRED)=146 CY
DPV (PROVIDED)= 150 CY
PROPOSED DEBRIS BASIN #2
(TO BE MAINTAINED BY LACFCD)
1.A= 8.0 AC
1.Q50b = 30.0 cfs
1.Q500b= 39.9 cfs
DPV (REQUIRED)=387 CY
DPV (PROVIDED)=882 CY
PROPOSED DEBRIS BASIN #3
(TO BE MAINTAINED BY LACFCD)
1.A=7.0 AC
1.Q50b = 21.5 cfs
1.Q500b= 27.9 cfs
DPV (REQUIRED)=334 CY
DPV (PROVIDED)=345 CY
PROPOSED DEBRIS BASIN #4
(TO BE MAINTAINED BY LACFCD)
1.A= 9.8 ac
1.Q50b = 26.6 cfs
1.Q500b= 38.6 cfs
DPV (REQUIRED)=492 CY
DPV (PROVIDED)=532 CY
PROPOSED DEBRIS BASIN #5
(TO BE MAINTAINED BY LACFCD)
1.A= 38.4 ac
1.Q50b = 66.7 cfs
1.Q500b= 85.1 cfs
DPV (REQUIRED)= 1747 CY
DPV (PROVIDED)=1979 CY
PROPOSED DEBRIS BASIN #6
(TO BE MAINTAINED BY LACFCD)
1.A= 38.4 ac
1.Q50b = 66.7 cfs
1.Q500b= 85.1 cfs
DPV (REQUIRED)= 1747 CY
DPV (PROVIDED)=1979 CY
PROPOSED DEBRIS BASIN #7
(TO BE MAINTAINED BY LACFCD)
1.A= 3.9 ac
1.Q50b = 12.6 cfs
1.Q500b= 16.3 cfs
DPV (REQUIRED)=167 CY
DPV (PROVIDED)=172 CY
WATER QUALITY BASIN "A"
(TO BE MAINTAINED BY LACFCD)
WATER QUALITY BASIN "B"
(TO BE MAINTAINED BY LACFCD)
DPA8
DPA8
DPA8
DPA8
114" SD RCP LINE "A" PER PD 2640 MAINTAINED BY LACFCD
Q50Odesign = 1557.6 cfs PER PD 2640
114" SD RCP LINE "A" PER PD 2641 MAINTAINED BY LACFCD
Q50Odesign = 1527.6 cfs PER PD 2641
96" SD RCP LINE "A" PER PD 2641 MAINTAINED BY LACFCD
Q50Odesign = 1273.7 cfs PER PD 2641
102" SD RCP LINE "A" PER PD 2641 MAINTAINED BY LACFCD
Q50Odesign = 1266.2 cfs PER PD 2641
Q50Odesign = 1240.7 cfs PER PD 2641
Q50Odesign = 1167.2 cfs PER PD 2641
Q50Odesign = 1157.2 cfs PER PD 2641
Q50Odesign = 1122.1 cfs PER PD 2641
Q50Odesign = 364.2 cfs PER PD 2641
Q50Odesign = 364.2 cfs PER PD 2641
60" SD RCP LINE "A6" PER PD 2641 MAINTAINED BY LACFCD
60" SD RCP LINE "A5" PER PD 2641 MAINTAINED BY LACFCD
42" SD RCP LINE "A4" PER PD 2514-10 MAINTAINED BY LACFCD
42" SD RCP LINE "A6" PER PD 2641 MAINTAINED BY LACFCD
48" SD RCP PER PD 2514-10 MAINTAINED BY LACFCD
Q50O design = 915.1 cfs (PER APPROVED PD 2514-10)
Q50O design = 103.5 cfs (PER APPROVED PD 2514-10)
36" SD RCP PER PD 2514-9 MAINTAINED BY LACFCD
24" SD RCP PER PD 2514-10 MAINTAINED BY LACFCD
24" SD RCP PER PD 2514-5 MAINTAINED BY LACFCD
30" SD RCP PER PD 2514-5 MAINTAINED BY LACFCD
54" SD RCP PER PD 2514-5 MAINTAINED BY LACFCD
54" SD RCP PER PD 2514-11 MAINTAINED BY LACFCD
42" SD RCP PER PD 2514-5 MAINTAINED BY LACFCD
54" SD RCP PER PD 2514-3 MAINTAINED BY LACFCD
Q50 design = 863.6 cfs (PER APPROVED PD 2514-05)
84" RCB LINE "A" PER MTD NO. 1764 MAINTAINED BY LACFCD
24" SD RCP PER PD 1835 MAINTAINED BY LACFCD
24" SD RCP PER PHO80213 MAINTAINED BY CALTRANS
EXISTING CONCRETE CHANNEL PER PD 1052 (LINE A) (TO BE MAINTAINED BY MAGIC MOUNTAIN THEME PARK)
EXISTING TRAP CHANNEL PER LINE "B" PD 1052
30" SD RCP LINE "B" PER PD 2592 MAINTAINED BY LACFCD
54" SD RCP LINE "C" PER PD 2638 MAINTAINED BY LACFCD
DOUBLE 9'W X 3.5'H SD RCB LINE "D" PER PD2637 MAINTAINED BY LACFCD
EXISTING 24" SD RCP PER PD 1835 MAINTAINED BY LACFCD
EXISTING 54" SD RCP AND INLET PER MTD 1764 TO BE REMOVED
EXISTING DEBRIS BASIN #6 PER PD 2637 TO BE REMOVED
EXISTING VARIABLE WIDTH EASEMENT TO LACFCD FOR FLOOD CONTROL PURPOSES TO BE QUIT CLAIMED
EXISTING DEBRIS BASIN #5 PER PD2637 TO BE MODIFIED TO PROPOSED DEBRIS BASIN #5
EXISTING DEBRIS BASIN #6 PER PD 2638 TO BE REMOVED
EXISTING VARIABLE WIDTH EASEMENT TO LACFCD FOR FLOOD CONTROL PURPOSES TO BE QUIT CLAIMED
EXISTING 24" SD RCP PER PHO80213 MAINTAINED BY CALTRANS
EXISTING 54" SD RCP PER MTD 1764 TO BE REMOVED
EXISTING 1.A= 3.9 ac Q50= 6.2 cfs
EXISTING 1.A= 10.6 ac EXISTING 1.Q50= 24.1 cfs EXISTING 1.Q500= 32.8 cfs
EXISTING 1.A= 46.9 ac EXISTING1.Q50b= 103.6 cfs EXISTING1.Q500b= 142.2 cfs PROPOSED 1.A= 43.2 ac PROPOSED 1.Q50b= 78.7 cfs PROPOSED 1.Q500b= 102.31 cfs PROVIDED 1.OPV = 174* CY 1.Q50O design = 75.0 cfs (PER APPROVED MTD 1764)
EXISTING 1.A= 3.9 ac Q50= 12.0 cfs EXISTING1.Q500= 16.3 cfs PROPOSED 1.A= 3.9 ac PROPOSED 1.Q50b= 12.7 cfs PROPOSED 1.Q500b= 17.4 cfs PROPOSED 1.OPV = 216.6 CY 1.Q50O design = 22.0 cfs (PER APPROVED PD 2514-10)
EXISTING 1.A= 3.9 ac EXISTING1.Q50b= 12.0 cfs EXISTING1.Q500b= 16.3 cfs PROPOSED 1.A= 3.9 ac PROPOSED 1.Q50b= 12.7 cfs PROPOSED 1.Q500b= 17.4 cfs PROPOSED 1.OPV = 216.6 CY 1.Q50O design = 22.0 cfs (PER APPROVED PD 2514-10)
EXISTING 1.A= 46.9 ac EXISTING1.Q50b= 103.6 cfs EXISTING1.Q500b= 142.2 cfs PROPOSED 1.A= 43.2 ac PROPOSED 1.Q50b= 78.7 cfs PROPOSED 1.Q500b= 102.31 cfs PROVIDED 1.OPV = 174* CY 1.Q50O design = 75.0 cfs (PER APPROVED MTD 1764)
EXISTING 1.A= 3.9 ac Q50= 6.2 cfs
EXISTING 1.A= 10.6 ac EXISTING 1.Q50= 24.1 cfs EXISTING 1.Q500= 32.8 cfs
EXISTING 1.A= 2.1 ac 1.Q50= 6.5 cfs
EXISTING 1.A= 7.1 ac 1.Q50= 17.0 cfs
EXISTING 1.A= 31.3 ac 1.Q50= 98.1 cfs 1.Q500= 141.0 cfs
EXISTING 1.A= 73.1 ac 1.Q50= 170.7 cfs 1.Q500= 236.6 cfs
EXISTING 1.A= 67.0 ac 1.Q50= 158.5 cfs
EXISTING 1.A= 70.4 ac 1.Q50= 170.4 cfs 1.Q500= 216.6 cfs
EXISTING 1.A= 457.3 ac 1.Q50= 1152.5 cfs 1.Q500= 1,160.0 cfs
EXISTING 1.A= 67.0 ac 1.Q50= 237.4 cfs
EXISTING 1.A= 101.6 ac EXISTING 1.Q50= 204.7 cfs EXISTING 1.Q500= 286.2 cfs
EXISTING 1.A= 74.1 ac EXISTING 1.Q50= 181.3 cfs EXISTING 1.Q500= 254.4 cfs
EXISTING 1.A= 741.2 ac EXISTING 1.Q50= 1766.5 cfs EXISTING 1.Q500= 2710.3 cfs
EXISTING 1.A= 21.2 ac 1.Q50= 149.1 cfs
EXISTING 1.A= 11.1 ac 1.Q50= 107.4 cfs
EXISTING 1.A= 22.5 ac 1.Q50= 51.0 cfs 1.Q500= 48.3 cfs
EXISTING 1.A= 80.0 ac EXISTING 1.Q50= 156.6 cfs EXISTING 1.Q500= 156.6 cfs
EXISTING 1.A= 39.2 ac 1.Q50= 47.8 cfs
EXISTING 1.A= 10.1 ac 1.Q50= 21.9 cfs
EXISTING 1.A= 10.4 ac 1.Q50= 31.0 cfs
EXISTING 1.A= 14.4 ac 1.Q50= 32.1 cfs
EXISTING 1.A= 65.4 ac 1.Q50= 98.0 cfs
EXISTING 1.A= 2.1 ac 1.Q50= 4.6 cfs
EXISTING 1.A= 65.8 ac 1.Q50= 134.0 cfs
EXISTING 1.A= 4.6 ac 1.Q50= 10.6 cfs
EXISTING 1.A= 6.5 ac 1.Q50= 18.2 cfs
EXISTING 1.A= 6.6 ac 1.Q50= 18.2 cfs
EXISTING 1.A= 10.6 ac 1.Q50= 21.1 cfs 1.Q500= 23.9 cfs 1.OPV= 213 cy
EXISTING 1.A= 30.1 ac 1.Q50= 145.0 cfs
EXISTING 1.A= 11.6 ac 1.Q50= 49.0 cfs
EXISTING 1.A= 11.6 ac 1.Q50= 5.2 cfs
EXISTING 1.A= 11.6 ac 1.Q50= 38.1 cfs
EXISTING 1.A= 18.6 ac 1.Q50= 91.6 cfs
EXISTING 1.A= 30.2 ac 1.Q50= 107.7 cfs
EXISTING 1.A= 46.2 ac 1.Q50= 119.8 cfs
EXISTING 1.A= 29.7 ac 1.Q50= 91.5 cfs
EXISTING 1.A= 16.8 ac 1.Q50= 49.5 cfs
EXISTING 1.A= 7.2 ac 1.Q50= 30.5 cfs
EXISTING 1.A= 6.1 ac Q50= 25.0 cfs
EXISTING 1.A= 23.3 ac 1.Q50= 60.8 cfs
EXISTING 1.A= 18.3 ac Q50= 53.3 cfs
EXISTING 1.A= 8.3 ac 1.Q50= 11.1 cfs
EXISTING 1.A= 2.0 ac 1.Q50= 6.8 cfs
EXISTING 1.A= 7.8 ac 1.Q50= 24.1 cfs
EXISTING 1.A= 3.4 ac 1.Q50b= 11.5 cfs
EXISTING 1.A= 6.6 ac 1.Q50= 18.2 cfs
EXISTING 1.A= 6.6 ac 1.Q50= 18.2 cfs
EXISTING 1.A= 7.2 ac 1.Q50= 30.5 cfs
EXISTING 1.A= 3.9 ac 1.Q50b= 12.8 cfs
EXISTING 1.A= 6.1 ac 1.Q50b= 20.0 cfs
EXISTING 1.A= 3.9 ac 1.Q50b= 12.8 cfs
EXISTING 1.A= 31.3 ac 1.Q50b= 98.1 cfs 1.Q500b= 141.0 cfs
EXISTING 1.A= 29.8 ac 1.Q50b= 97.5 cfs
EXISTING 1.A= 14.4 ac 1.Q50b= 32.1 cfs
EXISTING 1.A= 65.4 ac 1.Q50b= 98.0 cfs
EXISTING 1.A= 4.6 ac 1.Q50b= 10.6 cfs
EXISTING 1.A= 6.5 ac 1.Q50b= 18.2 cfs
EXISTING 1.A= 6.6 ac 1.Q50b= 18.2 cfs
EXISTING 1.A= 10.6 ac 1.Q50b= 21.1 cfs 1.Q500b= 23.9 cfs 1.OPV= 213 cy
EXISTING 1.A= 30.1 ac 1.Q50b= 145.0 cfs
EXISTING 1.A= 11.6 ac 1.Q50b= 49.0 cfs
EXISTING 1.A= 11.6 ac 1.Q50b= 5.2 cfs
EXISTING 1.A= 11.6 ac 1.Q50b= 38.1 cfs
EXISTING 1.A= 18.6 ac 1.Q50b= 91.6 cfs
EXISTING 1.A= 30.2 ac 1.Q50b= 107.7 cfs
EXISTING 1.A= 46.2 ac 1.Q50b= 119.8 cfs
EXISTING 1.A= 29.7 ac 1.Q50b= 91.5 cfs
EXISTING 1.A= 16.8 ac 1.Q50b= 49.5 cfs
EXISTING 1.A= 7.2 ac 1.Q50b= 30.5 cfs
EXISTING 1.A= 6.1 ac Q50b= 25.0 cfs
EXISTING 1.A= 23.3 ac 1.Q50b= 60.8 cfs
EXISTING 1.A= 18.3 ac Q50b= 53.3 cfs
EXISTING 1.A= 8.3 ac 1.Q50b= 11.1 cfs
EXISTING 1.A= 2.0 ac 1.Q50b= 6.8 cfs
EXISTING 1.A= 7.8 ac 1.Q50b= 24.1 cfs
EXISTING 1.A= 3.4 ac 1.Q50b= 11.5 cfs
EXISTING 1.A= 6.6 ac 1.Q50b= 18.2 cfs
EXISTING 1.A= 6.6 ac 1.Q50b= 18.2 cfs
EXISTING 1.A= 7.2 ac 1.Q50b