

SITE HYDROLOGY REPORT

Compton High School

601 S. Acacia Avenue
Compton, CA 90220

September 8, 2017

Prepared For:

DLR Group

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Prepared By:



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1. INTRODUCTION

This Hydrology report summarizes the storm water BMP design. The report demonstrates that the proposed drainage system will adequately meet the drainage needs of the project site including Low Impact Development (LID) requirements.

2. PROJECT SITE HYDROLOGY

2.1. SITE DESCRIPTION

A. PROJECT SITE

The project site is located in the jurisdiction of the City of Compton, the high school is surrounded by residences and is bounded by the Compton Creek Channel to the west, Laurel Street and West Myrrh Street in the north, Acacia Avenue in the east, and Alondra Avenue and West Cocoa Street in the South. South Oleander Avenue running north and south, which appears to be a vacated street per LA County Assessor's Map, bisects the site, 601 South Acacia Avenue, Compton, California 90220. The project site consists of 40 acres; its approximate coordinates as obtained from Google Earth, are Longitude: 33°53'27.40" N and Latitude: 118°13' 37.49" W.

B. PROJECT LOCATION

The location of the project site is shown on the Map, included in Appendix I.

2.2. HYDROLOGY DATA AND DESIGN CRITERIA

The following hydrology data and design criteria are used in the calculations of the runoff. They follow the Hydrology Method of the Los Angeles County Department of Public Works Hydrology Manual, January 2006. Excerpts from the manual are referenced and are included in Appendix VI.

DESIGN FREQUENCIES

A 85th percentile, 24-hour rainfall criteria is selected for the storm drain design for the project site. Index Isohyetal map included in **Appendix II** was used as a guide in determining the location of the project site to identify the soil type characteristic and the rain fall depth.

A. SOIL TYPE

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The numerical soil classification used for the project is 003 found from 1-H1.9 Hydrologic Map of Los Angeles County Hydrology Manual January 2006, included in Appendix II.

B. RAINFALL DEPTH

The rainfall Isohyetal for the project site falls under 6.2 inches as determined from the Hydrologic Map. The rainfall at this specific project site is determined to be 6.2” for 50-year, 24-hour, the rainfall depth for the final 85th percentile, 24-hr rainfall was found to be 0.85” per hour. The Hydrologic Map, 1-H1.9, is included in Appendix II for reference.

2.3. PERCENTAGE OF IMPERVIOUSNESS

The pre-development imperviousness at the disturbed work location is currently 57%. The percentage of imperviousness for post-development project is approximately 44%. Please see Appendix III Pre-Development and Post-Development Hydrology Maps for more details.

2.4. TRIBUTARY DRAINAGE AREA DESCRIPTION

The total disturbed work and tributary drainage area is 40 Acres and consists of building structures, concrete pavements, asphalt pavement, landscapes, synthetic rubber, and pavers. The total pervious area is approximately 22 acres and the total impervious area is approximately 18 acres.

3. HYDROLOGY STUDY AND CALCULATIONS

The City of Compton uses the methodology of the Los Angeles County Department of Public Works – Hydrology Manual, January 2006 for storm drainage system. Hydrology Calculation for Peak Flow Rate for the total drainage area based on Rational Method is included in Appendix V.

4. STORM WATER MITIGATION

The municipal storm water program requires the preparation of LID (Low Impact Development) to address runoff pollution from post-development projects. The LID should identify Best Management Practices (BMPs) that are appropriate for the watershed pollutants of concern and especially the water constituents that would be generated from the designated project. The goal for the design is to capture and mitigate the volume of runoff produced from an 85th percentile storm event. The rainfall intensity for a 85th percentile was obtain from the 85th percentile 24 hour rainfall depth Los Angeles County map, refer to appendix V. Hydro calculations for an 85th

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percentile storm event are included in Appendix IV.

The following calculation present the data of pre-development and post-development calculation. The pre-hydrology map and pots hydrology map are included in Appendix III.

Project Site Address: 601 South Acacia Avenue, Compton, CA 90220

PRE-DEVELOPMENT RUN-OFF DISCHARGE (Q-PRE)

Total Area = 1744072.44 SF = 40 Acres
 Total Impervious Area = 995882.48 SF = 23 Acres
 Total Pervious Area = 748189.96 SF = 17 Acres
 Percent Impervious = 57%
 Flow Path Length: 1500 FT
 Flow Path Slope: 0.01

<i>Hydrology Data – Existing Condition</i>							<i>85th Percentile</i>	<i>24-hr, 100% Vol</i>
I.D.	Area (SF)	Area (Acres)	PERV %	IMP %	L (ft)	Slope	Q-PRE (cfs)	V-PRE (cu-ft)
PRE-DEVELOP	1744072.44	40	43%	57%	1500	0.01		
TOTAL	1744072.44	40	43%	57%	1500	0.01	0.0139	145.0426

85th percentile 24-Hour Isohyet
 Rainfall: 0.85 in
 Soil Type: 003

POST-DEVELOPMENT RUN-OFF DISCHARGE (Q-POST)

Total Area = 1744072.44 SF = 40 Acres
 Total Impervious Area = 773227.8 SF = 18 Acres
 Total Pervious Area = 970844.64 SF = 22 Acres
 Percent Impervious = 44%
 Flow Path Length: 1500 FT
 Flow Path Slope: 0.01

<i>Hydrology Data – Existing Condition</i>								
I.D.	Area (SF)	Area (Acres)	% PERV	% IMP	L (ft)	Slope	Vm (cu-ft)	Qm (cfs)
A1	1744072.44	40	56%	44%	1500	0.01	55330.09	2.4211
TOTAL	1744072.44	40	56%	44%	1500	0.01	55330.09	2.4211

85th Percentile 24-Hour Isohyet
 Rainfall: 0.85 in
 Soil Type: 003

5. PROJECT CONCLUSIONS AND RECOMMENDATIONS

After reviewing the results of the hydrology study, VCA concludes and recommends that:

1. The proposed storm drain system will be adequate to convey peak flow rate due to 85th percentile, 24-hour rainfall depth.
2. The proposed BMP selected for this site is a detention tank, which is designed to promote capture and reuse and generate a post-condition similar to the pre-conditions.

Appendix I

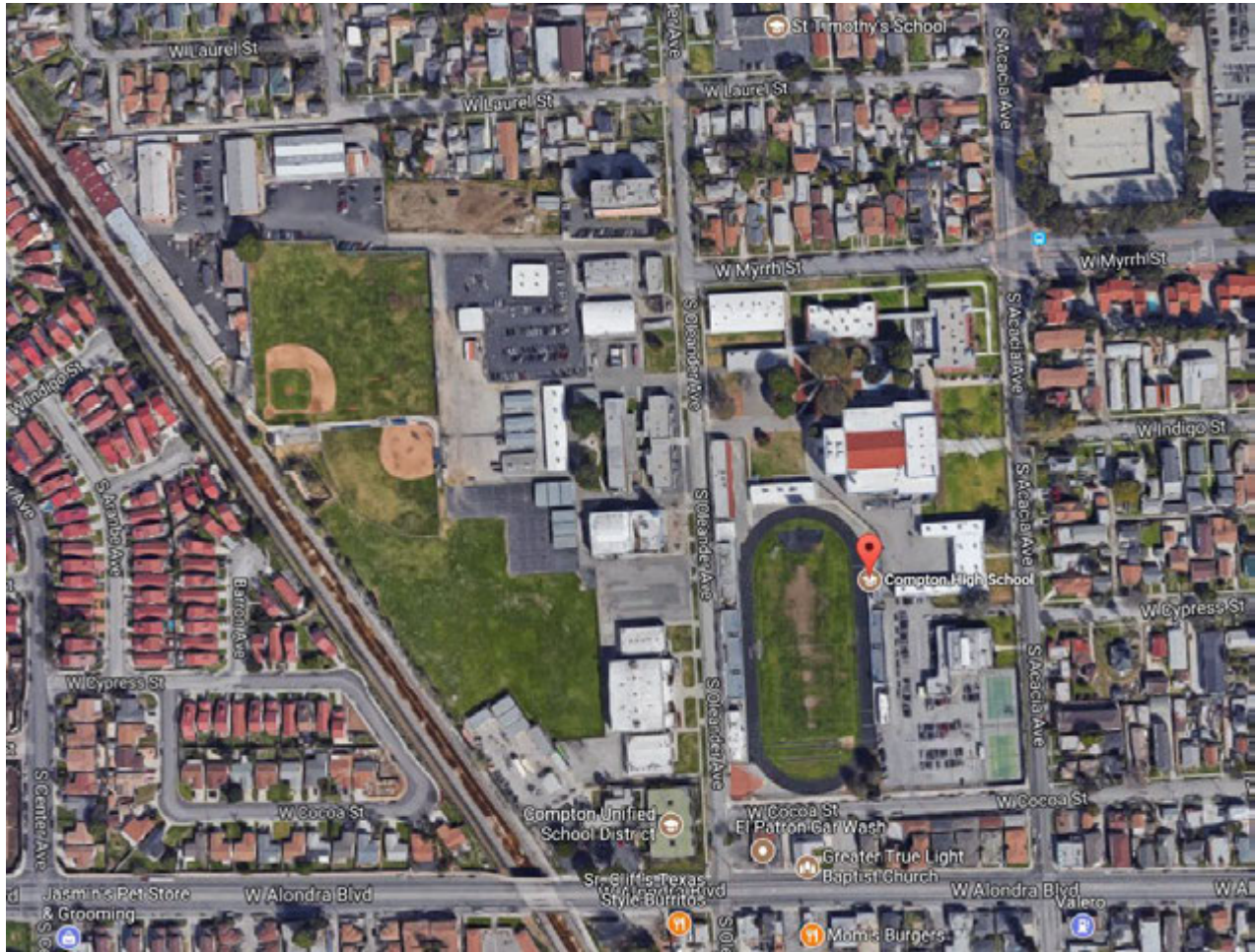
Map

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Appendix II

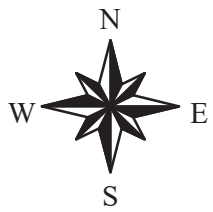
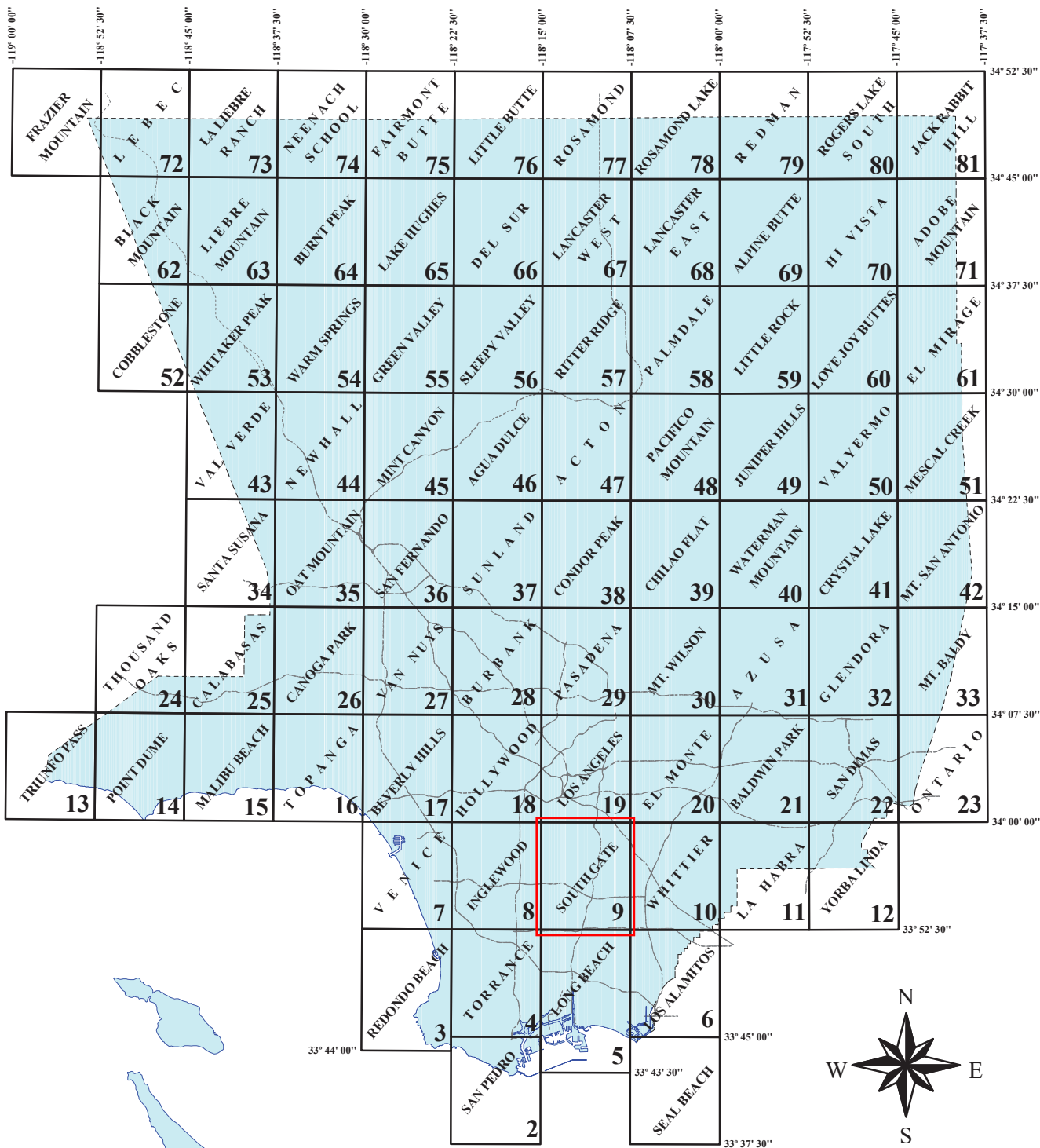
Isohyetal Map
50-Year, 24-Hour

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INDEX ISOHYETAL MAP

50-YEAR 24-HOUR ISOHYET

BASED ON USGS QUADRANGLE



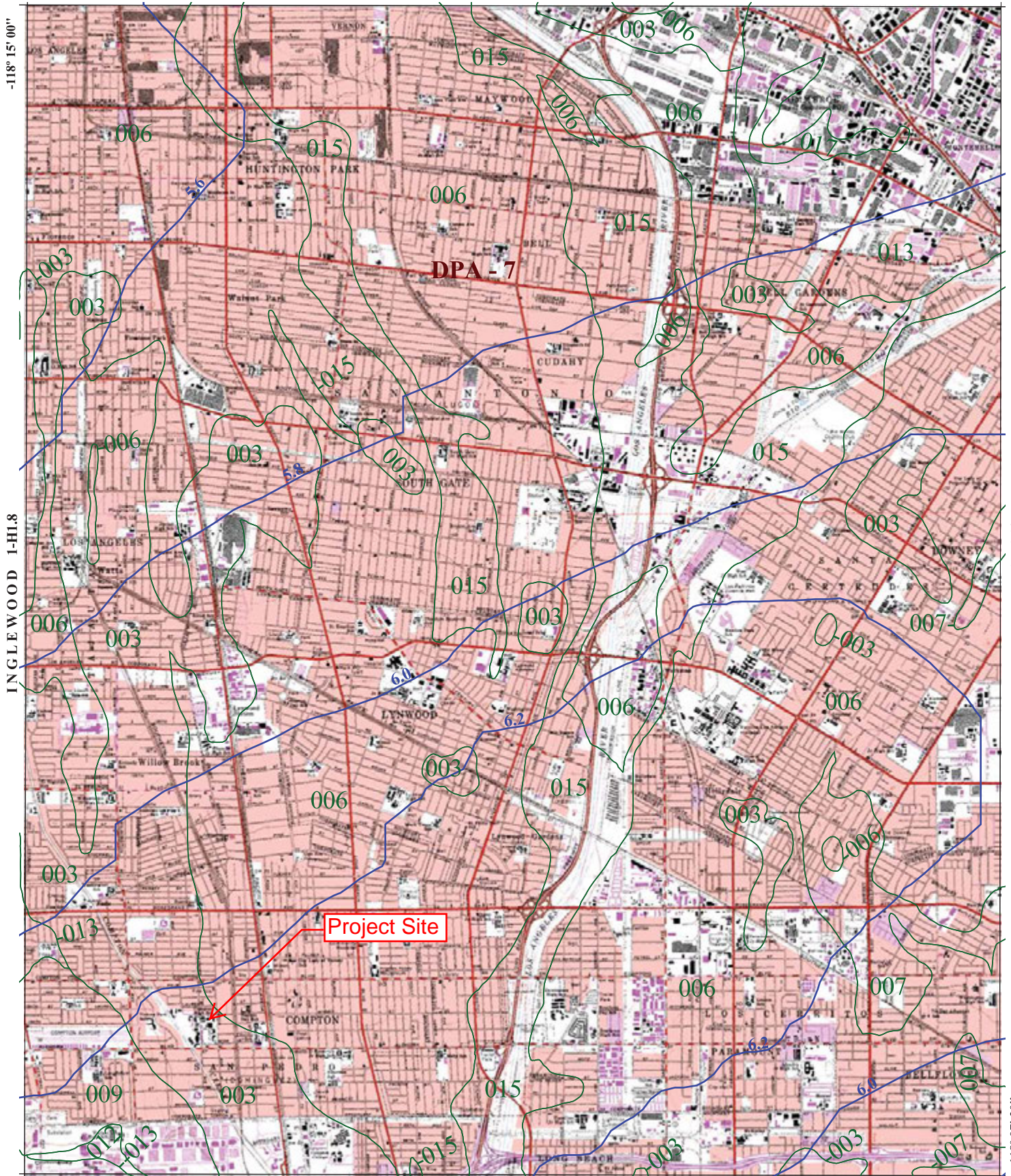
34° 00' 00"

LOS ANGELES 1-HI.19

-118° 15' 00"

INGLEWOOD 1-HI.8

WHITTIER 1-HI.10



-118° 07' 30"

LONG BEACH 1-HI.5

33° 52' 30"



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

SOUTH GATE 50-YEAR 24-HOUR ISOHYET

1-HI.9



Appendix III

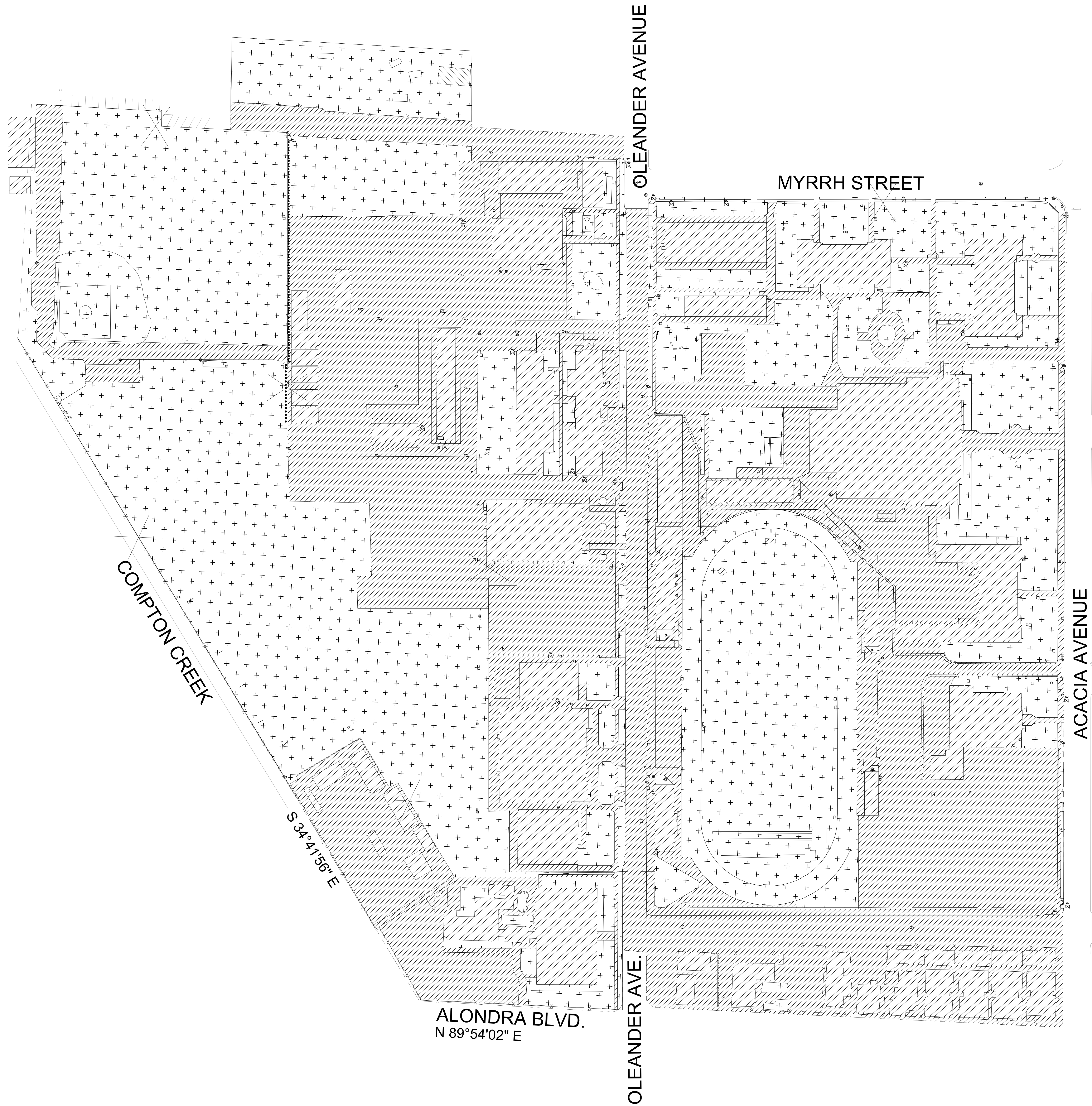
Pre-Development / Post-Development – Hydrology Maps

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COMPTON CREEK

S 32°41'56" E

ALONDRA BLVD.
N 89°54'02" E

OLEANDER AVENUE

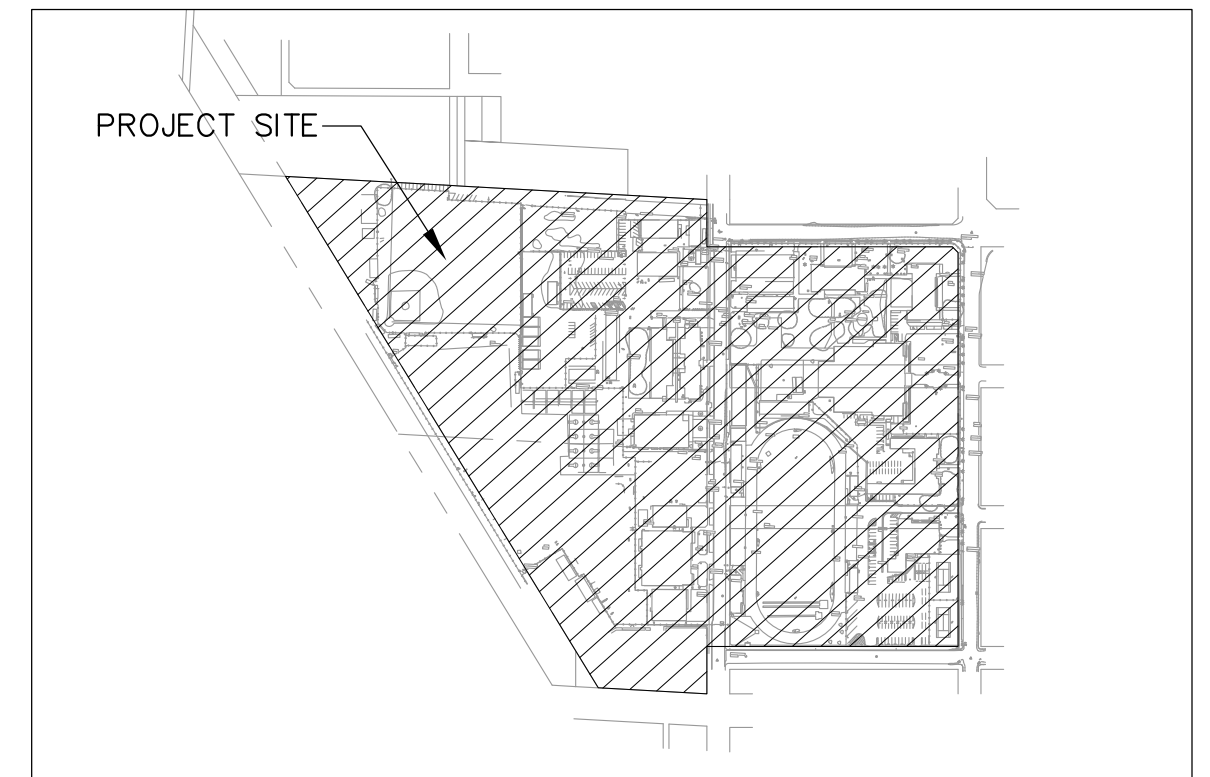
MYRRH STREET

ACACIA AVENUE

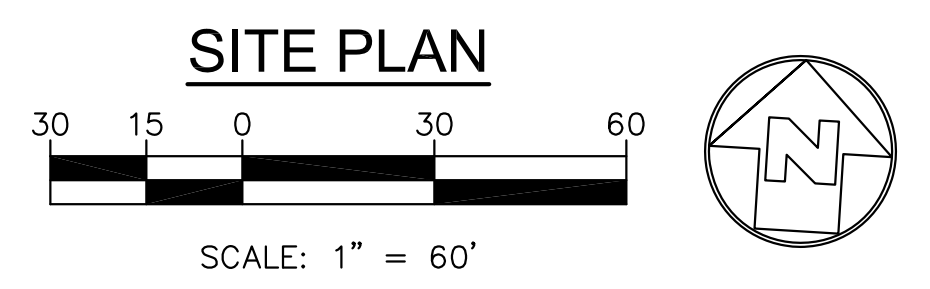
LEGEND:

- IMPERVIOUS PAVEMENT
- IMPERVIOUS AREA
- PERVIOUS AREA
- PRE-DEVELOPMENT AREA BOUNDARY

IMPERVIOUS AREA	=	995,882.48	SF(57%)
PERVIOUS AREA	=	748,189.96	SF(43%)
TOTAL AREA	=	1,744,072.44	SF(100%)



KEYMAP
NTS

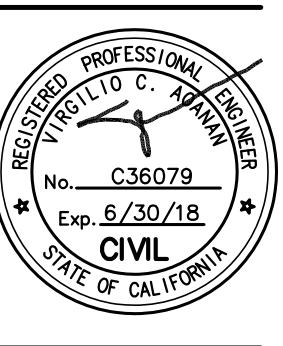


SD SUBMITTAL

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POST-DEVELOPMENT PLAN
COMPTON HIGH SCHOOL

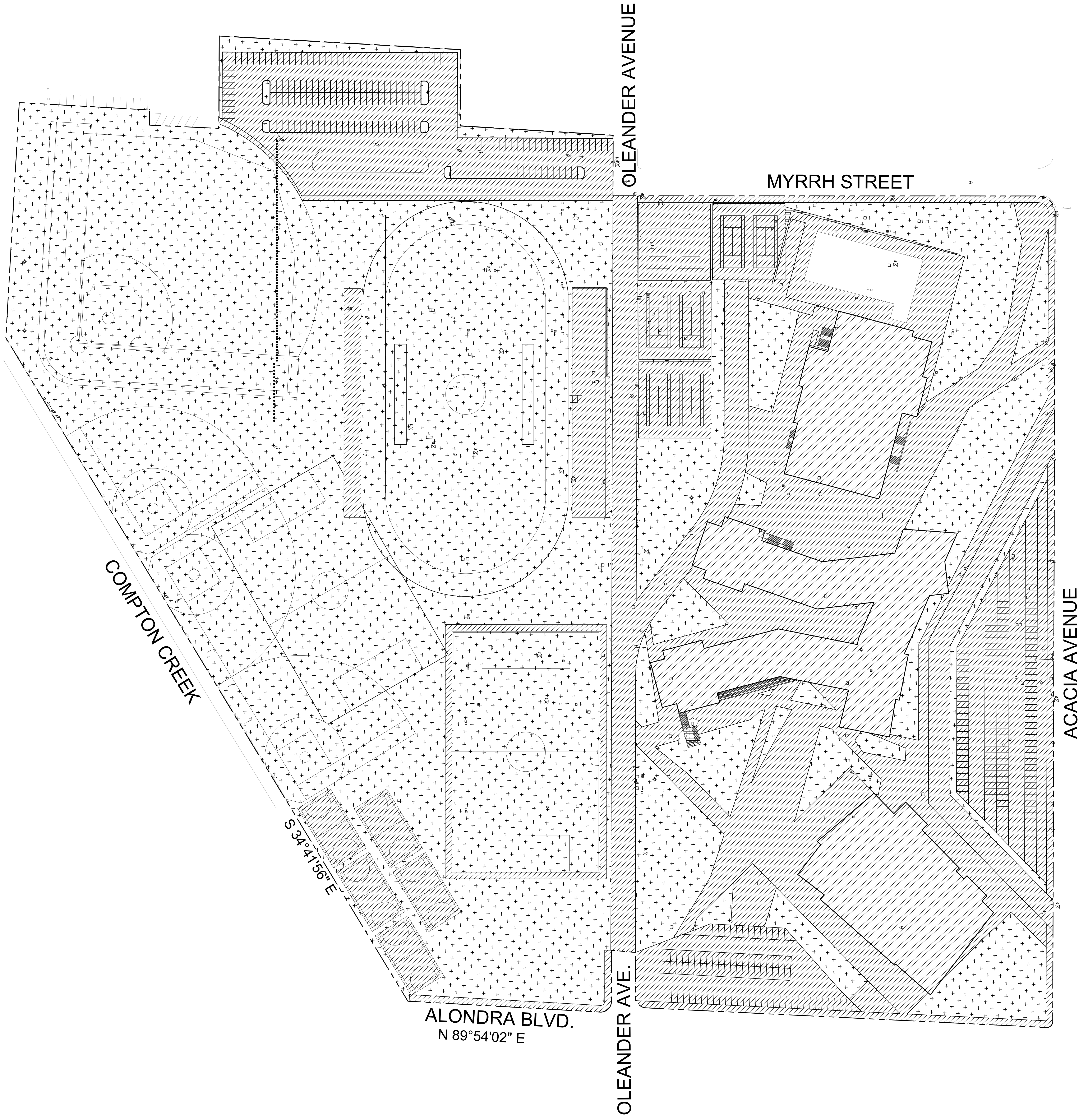
HM-1.0



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DLR Group
Architecture Engineering Planning Interiors

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COMPTON CREEK

S 34°41'56" E

ALONDRA BLVD.
N 89°54'02" E

OLEANDER AVENUE

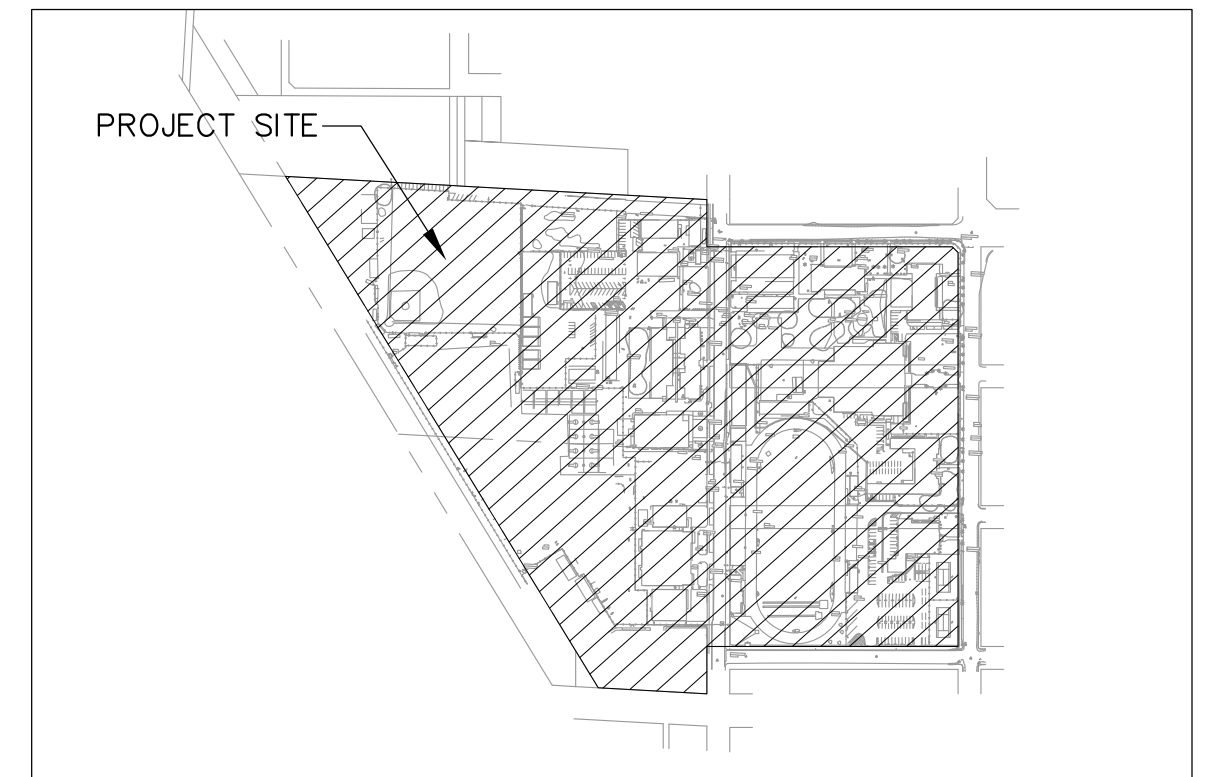
MYRRH STREET

ACACIA AVENUE

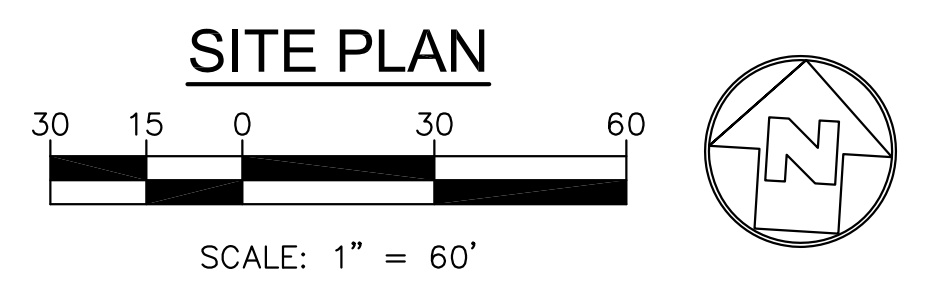
LEGEND:

- IMPERVIOUS PAVEMENT
- IMPERVIOUS AREA
- PERVIOUS AREA
- PRE-DEVELOPMENT AREA BOUNDARY

IMPERVIOUS AREA	=	773,227.80	SF (39%)
PERVIOUS AREA	=	970,844.64	SF (61%)
TOTAL AREA	=	1,744,072.44	SF (100%)

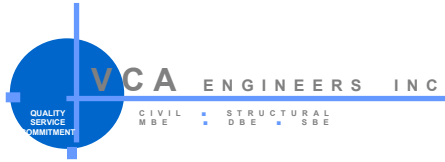


KEYMAP
NTS



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Appendix IV

85th Percentile 24-Hour Rainfall-Depth Map

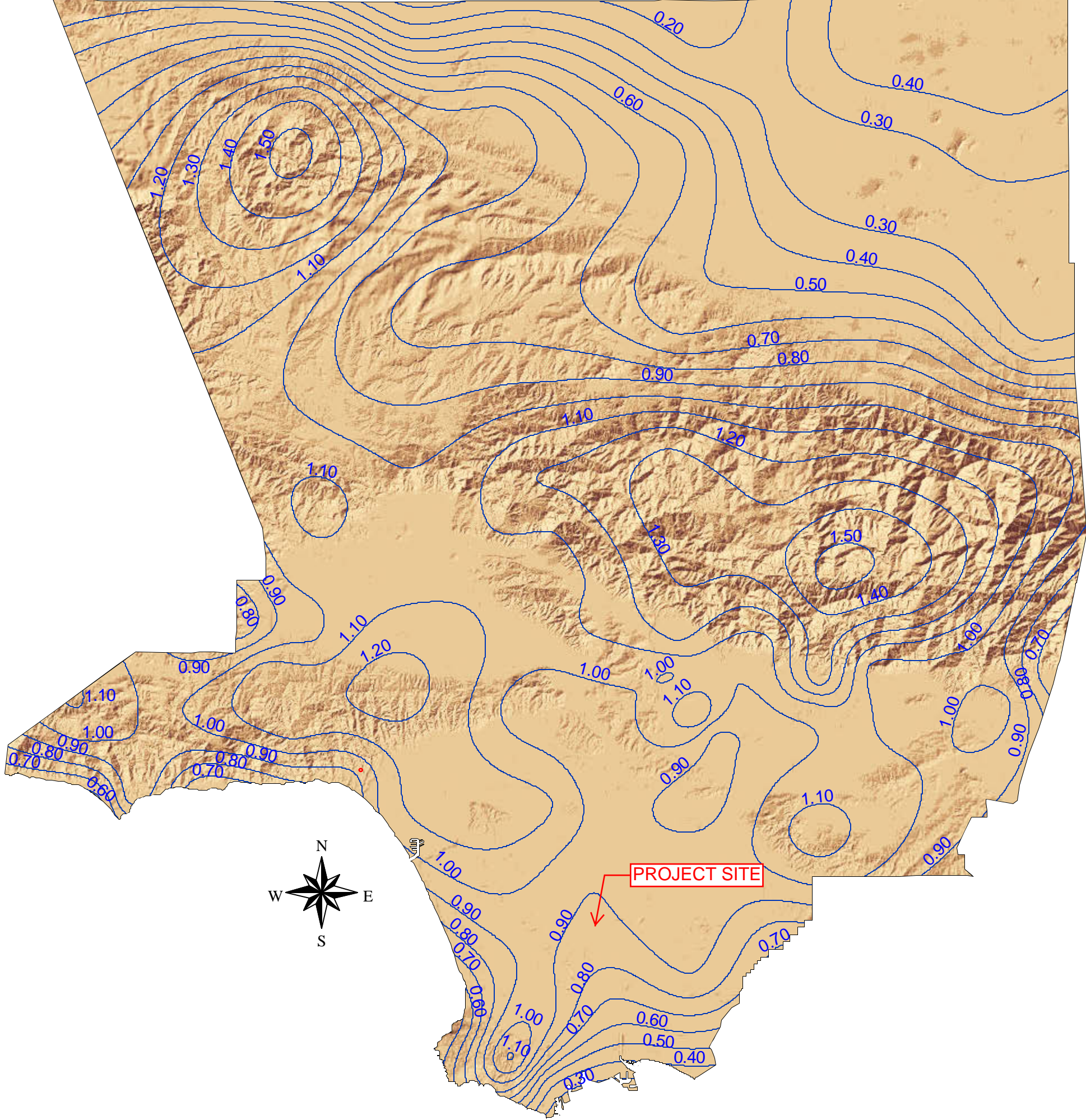
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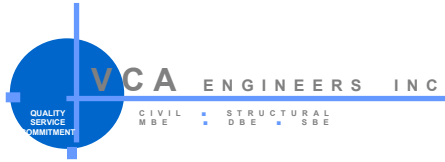
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85th Percentile 24-hr Rainfall Isohyetal Map



 85th Percentile 24-hr Rainfall Depth



Appendix V

85th Percentile 24-Hour Rainfall Hydrology Calculations

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Peak Flow Hydrologic Analysis

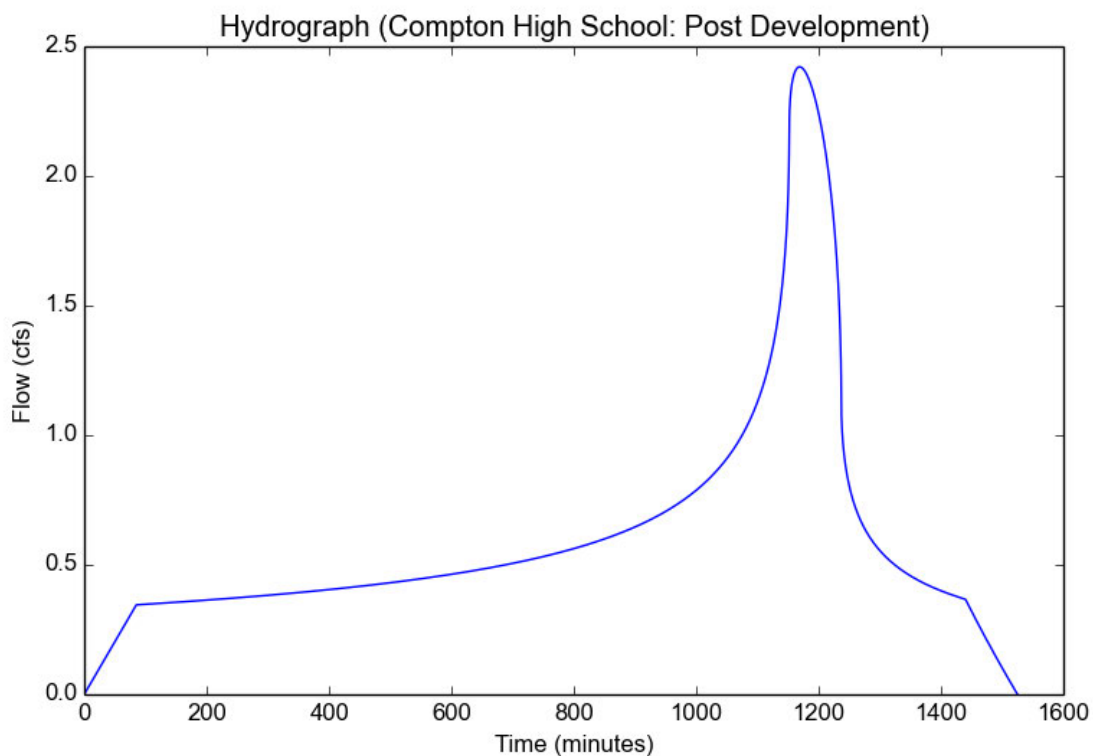
File location: Z:/VCA Projects 4/1598 to XXX/1671-217 Compton High School/Calcs/Hydrocalc - 85th.pdf
Version: HydroCalc 0.2.0-beta

Input Parameters

Project Name	Compton High School
Subarea ID	Post Development
Area (ac)	40.0
Flow Path Length (ft)	1500.0
Flow Path Slope (vft/hft)	0.01
85th Percentile Rainfall Depth (in)	0.85
Percent Impervious	0.44
Soil Type	3
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	0.85
Peak Intensity (in/hr)	0.1339
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.452
Time of Concentration (min)	85.0
Clear Peak Flow Rate (cfs)	2.4211
Burned Peak Flow Rate (cfs)	2.4211
24-Hr Clear Runoff Volume (ac-ft)	1.2702
24-Hr Clear Runoff Volume (cu-ft)	55330.0889



Client: DLR Group
 Project: Compton High School
 601 S. Acacia Avenue
 Compton CA 90220

Job No. 1298
 Date: 9/8/2017
 Engineer: LB/VT

Design for: Capture and Use (City of Los Angeles LID Manual: Appendix F)

WATER QUALITY DESIGN VOLUME	QUANTITY		UNITS
Enter drainage area (A)	1744072.44	A	SF
Impervious Area	773227.8	IA	
Planter area	970844.64	PA	
Catchment Area	792989.48	CA	sq. ft.
Enter design rainfall depth of the storm, (vol. based)	0.85	Pi	in
Calculate rainfall depth, $P = P_i/12$	0.07	P	ft
Calculate water quality design volume	56170.09	V_d	cu. Ft

(assuming biofiltration planter converted to landscape)
 $CA = [0.9 \cdot IA] + [PA + UA] \cdot 0.10$
 Based on Los Angeles County Area 24-hour rainfall
 $P = P_i/12$
 $V_{design} = CA \cdot P$

DETERMINATION OF DESIGN VOLUME IN GALLONS	QUANTITY		UNITS
$V_d \times 7.48 \text{ Gal/ft}^3$	420,152.26	$V_{d(gal)}$	Gallons

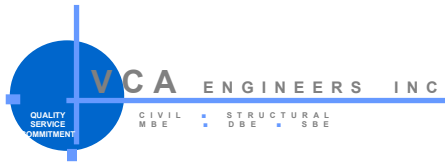
DETERMINATION OF PLANTER AREA	QUANTITY		UNITS
Planting Area (from plan)	970,844.64	PA	sq. ft.

DETERMINATION OF PLANTER FACTOR	QUANTITY		UNITS
Planting Area Factor = $0.40 \times PA$	388,337.86	PAF	sq. ft.

DETERMINE THE 7 - MONTH (OCT 1 - APRIL 30) ESTIMATED TOTAL WATER USE (ETWU)	QUANTITY		UNITS
$ETWU_{(7\text{-Month})} = 21.7 \times 0.62 \times PAF$	5,224,697.51	$ETWU_{(7\text{-Month})}$	Gallons

VERIFY CAPTURED VOLUME:	QUANTITY		UNITS
Design Volume: $V_{design} =$	420,152.26	V_{wq}	Gallons
$ETWU_{(7\text{-month})} =$	5,224,697.51	$ETWU_{(7\text{-Month})}$	Gallons

$V_{design} < ETWU_{(7\text{-month})}$, therefore Capture and Use is Feasible.



Appendix VI

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

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