Preliminary Hydrologic and Hydraulic Drainage Report

For LOT 1 OF TRACT NO 9327

AND LOT 1 AND ½ VAC WALK ADJ ON NE OF TRACT 9328

3130 Charing Cross Road, Glendale CA 91206

Mr. Sam Nazaryan

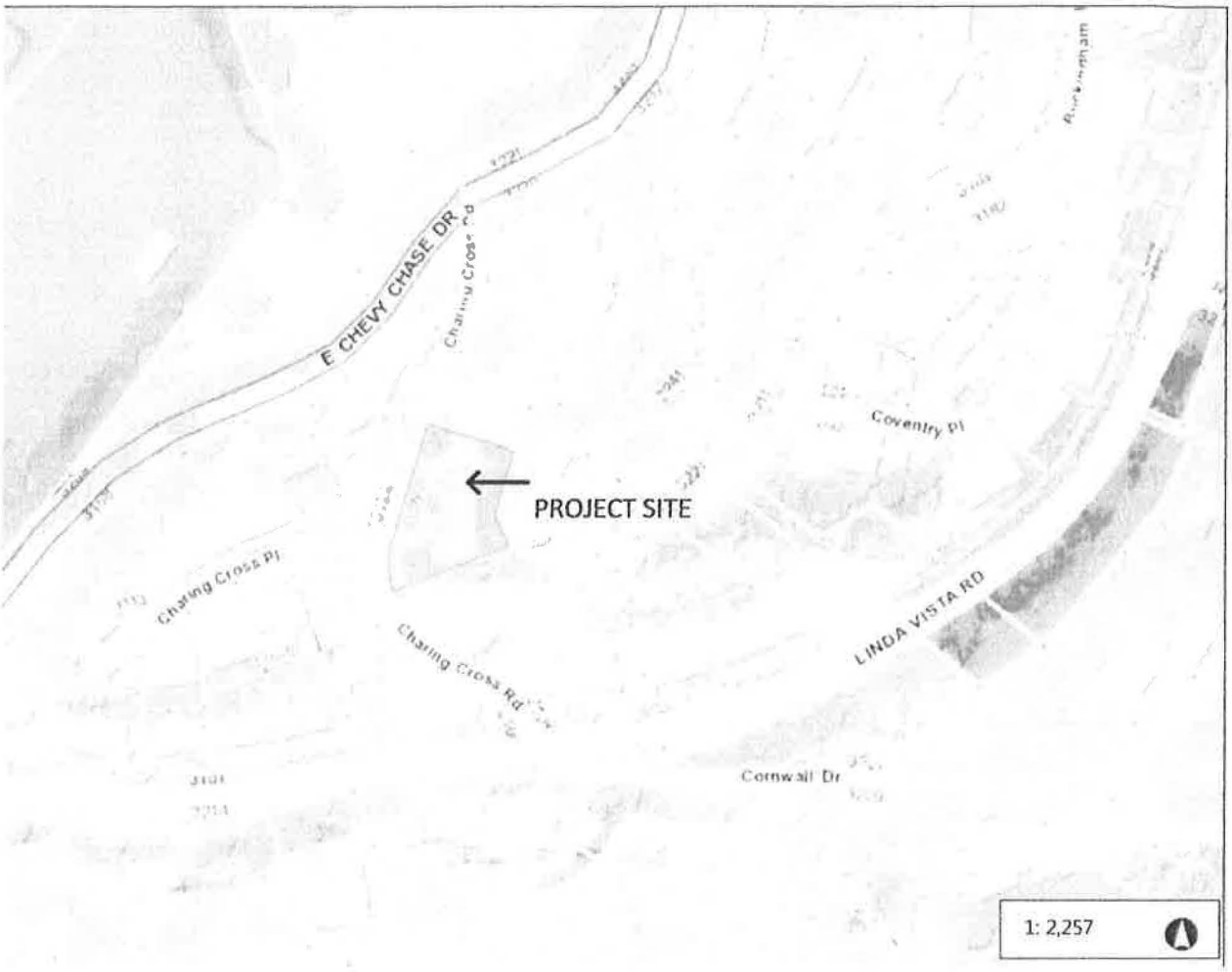
2048 Ashington Drive

Glendale CA 91206

November 15, 2019

Contents

VICINITY MAP



1. SCOPE & DESCRIPTION OF PROJECT AREA

The City of Glendale is located at the southeasternmost edge of the San Fernando Valley, in an area characterized by sharp contrasts in terrain. Distinct topographic features separate the City into four specific areas. From north to south these include 1) the steeply rising range front of the San Gabriel Mountains, 2) the gently south-dipping but elevated alluvial fan surface known as the La Cañada Valley at the base of the San Gabriel Mountains, 3) the lower but not less impressive bedrock highlands of the Verdugo Mountains and the San Rafael Hills, and 4) the even more gently southdipping alluvial surface (piedmont) at the base of the Verdugo Mountains. Farther south, just outside the City limits, is the northeastern end of the Santa Monica Mountains, which are locally referred to as the Hollywood Hills. The Los Angeles River hugs the north side of the Hollywood Hills as it flows easterly through the area; when it reaches the eastern end of the hills, the river veers south to flow through the "Narrows" and the City of Los Angeles on its way to the Pacific Ocean. The two heavily populated alluvial surfaces at the base of the Verdugo and San Gabriel Mountains are linked by the south-trending canyon carved by the Verdugo Wash that separates the Verdugo Mountains on the west from the San Rafael Hills on the east.

The subject site is situated in the San Rafael Hills, east of the Verdugo Mountains.

Nearly all the tributaries flowing northerly and easterly out of the Verdugo Mountains and westerly out of the San Rafael Hills empty into Verdugo Wash. South of the mountains, Verdugo Wash turns to the west-southwest and joins the Los Angeles River near the junction of Highway 134 with the 5 Freeway (Interstate 5). Drainage from the southwestern slope of the Verdugo Mountains flows directly across the alluvial fan and into the Los Angeles River. Verdugo Wash has been confined to a man-made channel through most of Glendale to reduce the potential for it to flood the City.

This report provides an analysis of the project's potential impacts associated with surface water hydrology. The Los Angeles Regional Water Quality Control Board (RWQCB) agreed to use a spatially distributed statistical rainfall distribution for water quality studies. The RWQCB allows the use of 85th percentile 24-hour rainfall event or the 0.75-inch event for Standard Urban Storm Water Mitigation Plan (SUSMP) and Best Management Practices (BMP) design hydrologic studies. During a 50-year, 24-hour storm event, the project site receives approximately 7.2 inches of rainfall.

The project is bounded on the East and South sides by single family residences, on the West side by Charing Cross Road, and on the North side by a vacant lot in a residential area in the City of Glendale, County of Los Angeles. The project site consists of a trapezoid-shaped double lot, gently sloping from the east to the west and currently occupied by a single-family dwelling. There are two adjacent ascending slope lots part of this project; however, the north one is off-limits to development due to Southern California Edison right-of-way and overhead power. The project development lot has a total lot area of 0.139 acres. Single family residences are present on surrounding properties. The project proposes the construction of two-story single-family residence over a garage at the street level.

Construction of the project would require paving, and landscaping on the site as well as earthwork activities (i.e., grading, excavation). As a result, underlying soils would be exposed, making the site temporarily more permeable. However, this increase in permeability would not have a substantial impact on existing drainage patterns and flows, particularly since runoff would be properly controlled through the implementation of appropriate BMPs if required. There will be area drains around the house collecting

the storm water and discharging it to the street. Therefore, construction-related impacts to surface water hydrology would be less than significant.

The impermeable area for the new project will be 0.057 acres. The site was previously occupied by a single-family dwelling of slightly smaller size of the proposed single-family dwelling. The discharge from the proposed project remains about the same since all the runoff will be collected and directed to the street. If required all the runoff would be directed to the proposed BMPs to help reduce pollution in water quality. Stormwater management BMPs are control measures taken to mitigate changes to both quantity and quality of runoff caused through the proposed development.

2. HYDROLOGIC ANALYSIS

The study considers roof runoff area to include the new impervious are. The subject site will add 0.057 of an impervious area due to the new development. The project is in a developed area and there is an existing storm drain system for the area. All the flow from the upstream watershed area is directed to the Sycamore Canyon Channel (map attached in Appendix C). Water directed to our property would be collected by the sewer designed behind the retaining walls and from there will be directed to a catch basin at the end of the swale and further discharges to Charing Cross Road with a pipe behind the retaining walls. The runoff would then be discharged into the existing storm drain system along the Chevy Chase Drive.

The hydrologic parameters were determined from the Los Angeles County Department of Public Works Hydrology Manual, dated January 2006, and the LA County Hydrology GIS. The project site is in the Glendale quad sheet, included in Appendix A. The project is in soil classification type 68. An image from the LA County Hydrology Map GIS Viewer is included in Appendix C, depicting the 50-yr two-tenths rainfall, final 85th percentile (24-hr rainfall), and 1-yr 1-hr rainfall intensity. From this map, it was determined that the project site is on the 1.1 inch 85th percentile isohyets. The 85th percentile, 24-hour rainfall depth from the isohyets map was approximated at 1.1 inches for calculations of LID design (if required). The proportion imperviousness for the site is 41 percent which is higher than the existing impervious area which is 26 percent.

The project site is less than 40 acres, so for this analysis Los Angeles County's HydroCalc was used to determine the Time of Concentration (t_c), the peak flow (Q), and the 24-hr runoff (V_M). Although the watershed is small approximately 0.14 acre, the existing tc was 6 minutes, the new tc remains the same and therefore it is appropriate to use HydroCalc without any adjustment for the onsite watershed size. The modeled design storm frequency is an 85th percentile storm for the BMP design and 50 years, 24 hours for the capacity analysis.

The result of pre and post development flow analysis are summarized in Table 1 below.

DRAINAGE SUBAREA	EXISTING DRAINAGE AREA, AC	POST PROJECT DRAINAGE AREA, AC	EXISTING PEAK FLOW CFS	POST PROJECT PEAK FLOW CFS
A1	0.139	0.139	0.4719	0.4852

Table-1. Pre and post development analysis

3. CONCLUSION

The analysis of surface water hydrology impacts includes a calculation of pre-project and post-project runoff flow rates and volumes during a 50-year storm event using the methodologies directed in the LACDPW Hydrology Manual (2006). Potential impacts to the storm drain system was analyzed by comparing the calculated post-project runoff to the calculated drainage flow capacity of the existing storm drain system.

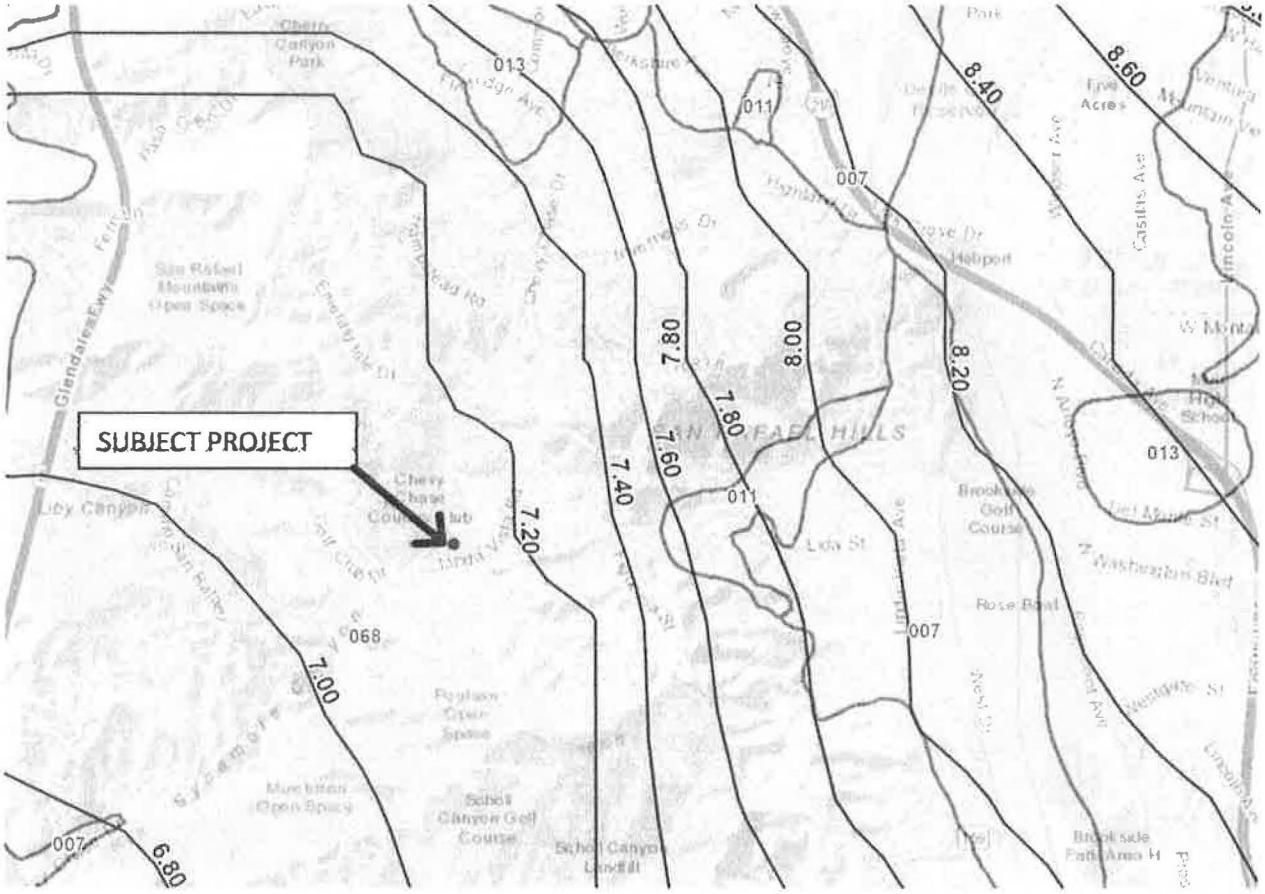
To further protect the new development from upstream run-on, a retaining wall will be constructed along the east of the proposed single-family house and there is an existing retaining wall along the east side of the property.

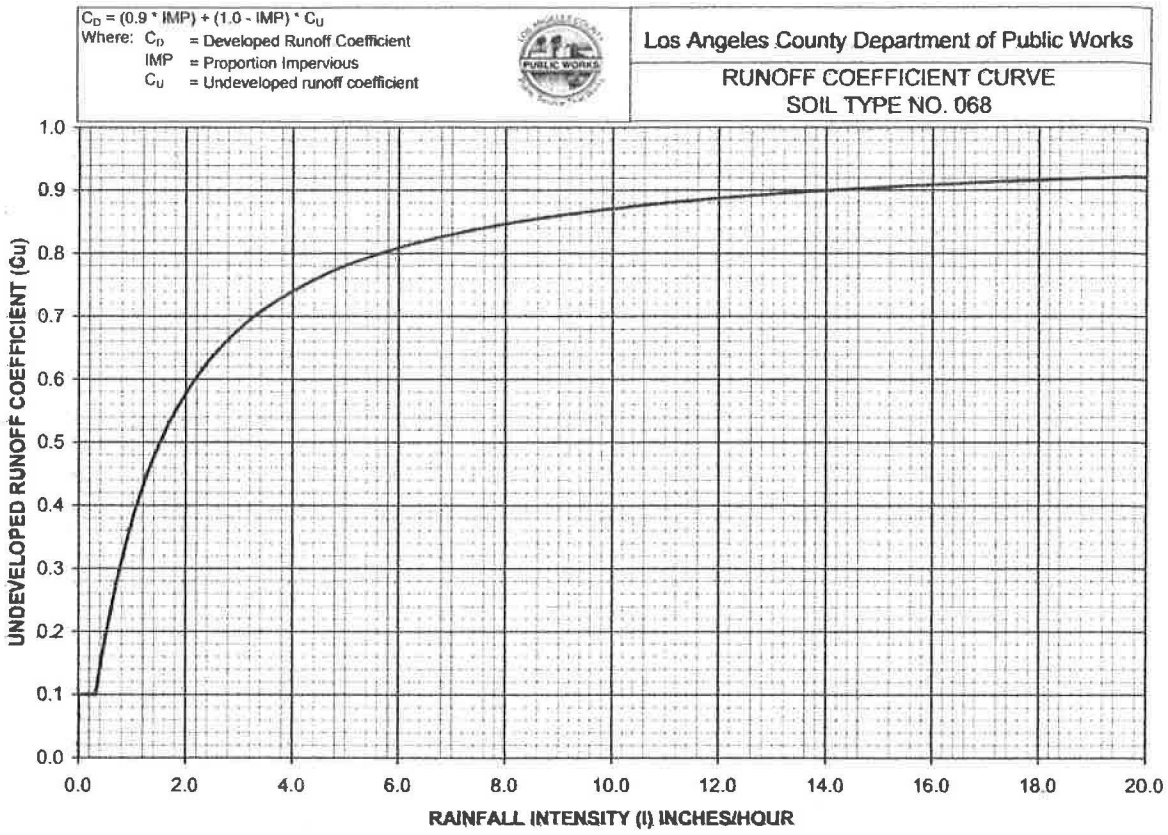
HydroCalc calculations for the 50 year 24-hr are shown in Appendix B. Because this area maintains the imperviousness ratio as close as the undeveloped condition considering the existing single-family dwelling, the proposed project does not significantly alter the pre-development drainage characteristic. Ultimately, the flow rate does not adversely affect the project lot or the surrounding areas and does not contribute to an increase in site erosion. it is recommended by the soil engineer that all permanent slopes be covered with erosion resistant vegetation.

In conclusion, per the calculations in Appendix B, the onsite volume and peak flow of the post-development are slightly higher than the pre-development Volume and peak flow but the discharge from the proposed project will be collected and directed to the street or to the proposed BMP if required; Implementing the BMPs are to help the water quality, reduce stormwater volume and peak flow. The proposed development would not have any potential drainage impact on the drainage pattern of the site or the surrounding areas.

Appendix A

Glendale Isohyet Map





Runoff coefficient curve, soil type no. 68 $C_u = 0.1$

Appendix B

Hydro Calculation Results

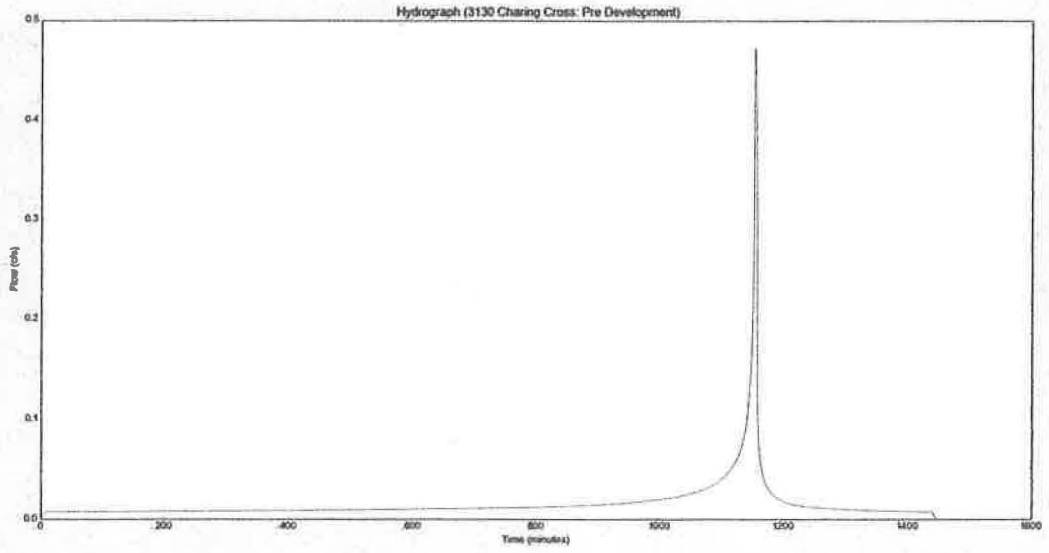
Onsite Pre-Development, existing impervious area is the existing SFD footprint, 1,801 sqft

HydroCalc 1.0.3

Single Subarea | Multi-Subarea

Inputs		Outputs	
Project Name	3130 Charing Cross	Modeled (50-yr) Rainfall Depth (in)	7.2
Subarea ID	Pre Development	Peak Intensity (in/hr)	4.2957
Area (ac)	0.139	Undeveloped Runoff Coefficient (Cu)	0.7518
Flow Path Length (ft)	100	Developed Runoff Coefficient (Cd)	0.7903
Flow Path Slope (vft/hft)	0.45	Time of Concentration (min)	5
24-hr, 50-yr Rainfall Depth (in)	7.2	Clear Peak Flow Rate (cfs)	0.4719
Percent Impervious (0.01-1.0)	0.26	Burned Peak Flow Rate (cfs)	0.4719
Soil Type (2-180)	68	24-Hr Clear Runoff Volume (ac-ft)	0.0309
Design Storm Frequency	50-yr	24-Hr Clear Runoff Volume (cu-ft)	1347.5034
Fire Factor	0		

Chart



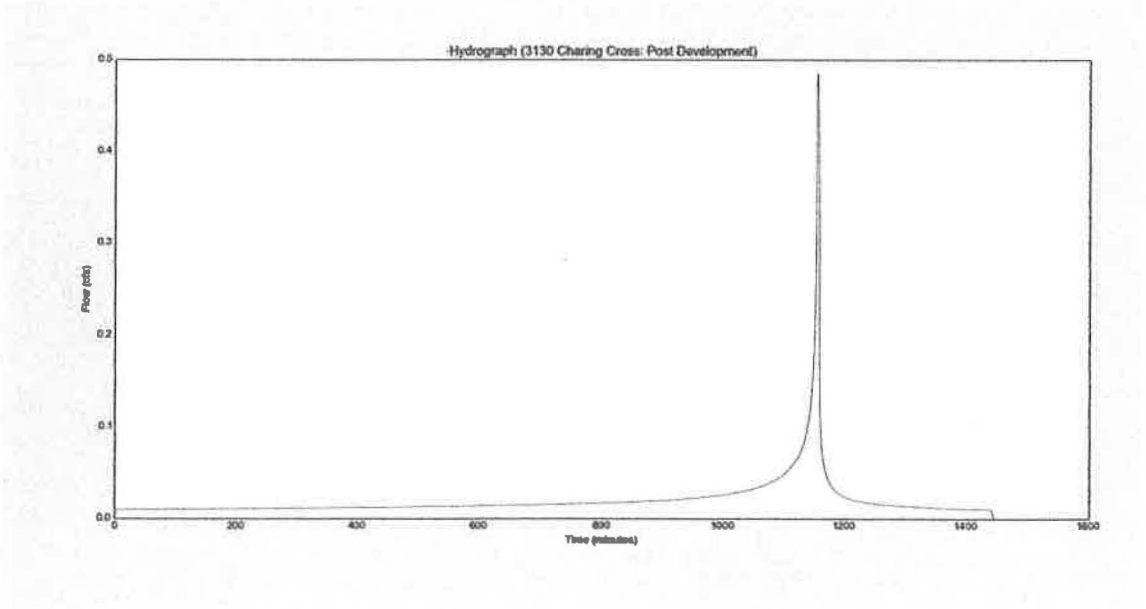
On site Post Development- New impervious will be the new SFD 2,500 sqft

HydroCalc 1.0.3

Single Subarea | Multi-Subarea

Inputs		Outputs	
Project Name	3130 Charing Cross	Modeled (50-yr) Rainfall Depth (in)	7.2
Subarea ID	Post Development	Peak Intensity (in/hr)	4.2957
Area (ac)	0.139	Undeveloped Runoff Coefficient (Cu)	0.7518
Flow Path Length (ft)	100	Developed Runoff Coefficient (Cd)	0.8125
Flow Path Slope (vft/hft)	0.45	Time of Concentration (min)	5
24-hr, 50-yr Rainfall Depth (in)	7.2	Clear Peak Flow Rate (cfs)	0.4852
Percent Impervious (0.01-1.0)	0.41	Burned Peak Flow Rate (cfs)	0.4852
Soil Type (2-180)	68	24-Hr Clear Runoff Volume (ac-ft)	0.0398
Design Storm Frequency	50-yr	24-Hr Clear Runoff Volume (cu-ft)	1731.6432
Fire Factor	0		

Chart



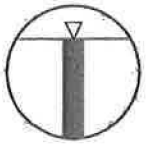
4 inch pipe analysis

Set units: m mm ft in

Pipe diameter, d_0	0.33	ft
Manning roughness, n ?	0.02	
Pressure slope (possibly ? equal to pipe slope), S_0	0.20	rise/run
Percent of (or ratio to) full depth (100% or 1 if flowing full)	0.75	fraction

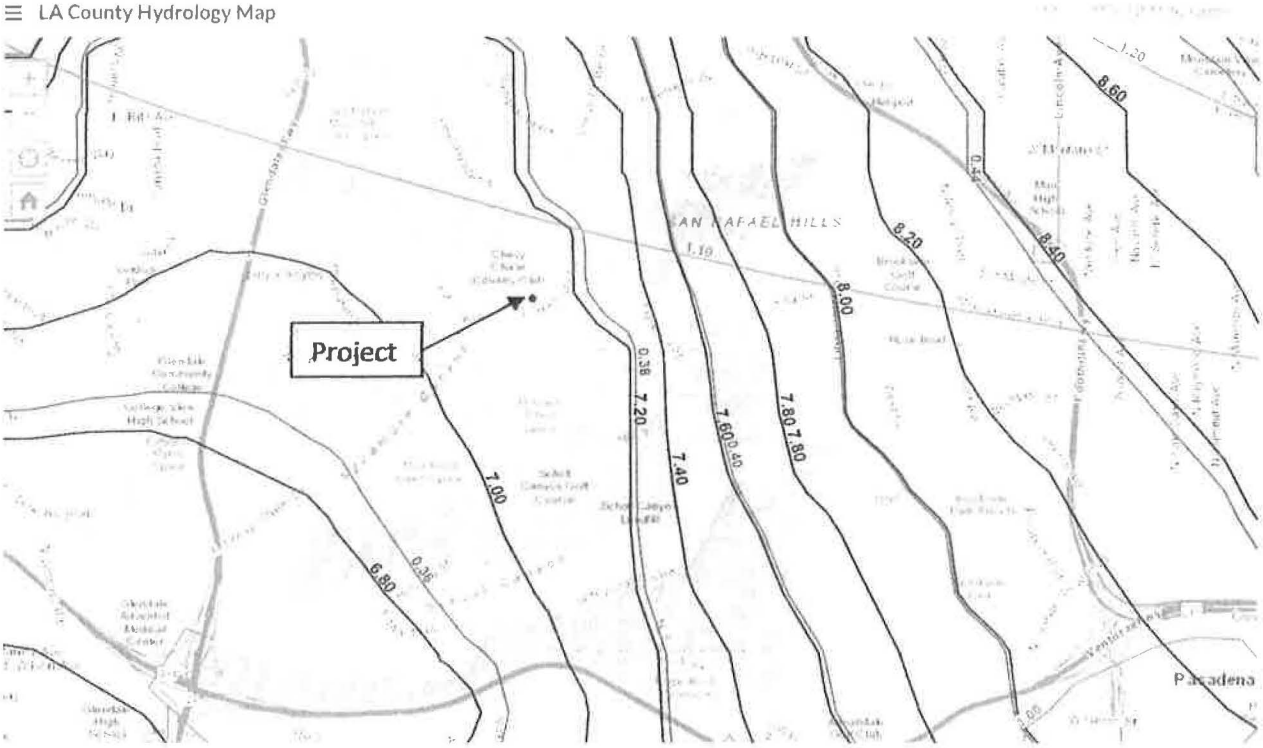
Results

Flow, Q	0.4911	cfs
Velocity, v	7.1372	ft/sec
Velocity head, h_v	0.7917	ft
Flow area	0.0688	ft^2
Wetted perimeter	0.6912	ft
Hydraulic radius	0.0996	ft
Top width, T	0.2858	ft
Froude number, F	2.59	
Shear stress (tractive force), tau	1.2432	psf



Appendix C

Hydrology Map



An image from the LA County Hydrology GIS Viewer depicting the 50-yr 24-hr isohyets (show in dark red), the 1-yr 1-hr isohyets (shown in dark blue), and the final 85th percentile 24-hr rainfall (shown in light blue). The black dot denotes the location of the site.

Existing Storm Drain System for the Area