



2/12/2020
Revised: 6/5/2020

City of San Diego
1222 First Avenue
San Diego, CA 92101

Subject: Drainage Study Letter for 8423 El Paseo Grande (Project #661815) located at 8423 El Paseo Grande, La Jolla, CA 92037.

To whom it may concern:

This letter provides a summary of the hydrologic calculations performed for the 8423 El Paseo Grande Project (#661815). The analysis provides the calculations for the 100-year peak runoff flow rate for both the pre-project and post-project conditions.

Introduction:

The 8423 El Paseo Grande project consists of the redevelopment of an existing single-family residence that currently exists on the project site. The Project site is located at 8423 El Paseo Grande, along the easterly side of the roadway, across the road from the Pacific Ocean. In the existing conditions, runoff from the existing residence is directed onto the surrounding landscape areas and then sheet flows from east to west across the project site onto El Paseo Grande. Runoff is conveyed along the gutter on the east side of the roadway and drains south, towards the intersection with Camino del Oro where it confluences with runoff draining westerly along Camino del Oro. The runoff then flows westerly, across El Paseo Grande, to an existing grate inlet. The runoff is then conveyed to the west within the existing MS4 storm drain network, until it discharges directly onto the beach, and eventually then it drains to the Pacific Ocean.

Under the post-project conditions, the drainage pattern will not change aside from slight on-site diversions within the proposed drainage system. Runoff from the proposed residence will be collected by a series of roof drains that discharge into adjacent landscaped areas. An on-site private storm drain will collect runoff and discharge it into the gutter along El Paseo Grande via a proposed dual sidewalk underdrain system. Runoff will then drain southerly to the confluence at Camino del Oro, drain westerly across the roadway, and then be collected within the same grate inlet as in pre-project conditions. Refer to Attachment 1 of this letter for the pre- and post-project hydrology maps.

Method of Analysis:

The analysis performed in this study followed guidelines for Rational Method hydrologic calculations outlined in the City of San Diego Drainage Design Manual (January, 2017). The rational method estimates peak flow rates from the following equation:

$Q = C \times I \times A$, where: C = the runoff coefficient based on land use
 I = the rainfall intensity as a function of land use, slope, and distance
 A = the drainage basin area (in acres).

Runoff coefficients for pre- and post-project conditions are determined based on the values provided in Table A-1 of the Drainage Design Manual. The intensity is determined from the Intensity-Duration-Frequency chart provided in Figure A-1.

Table A-1. Runoff Coefficients for Rational Method

Land Use	Runoff Coefficient (C)
	Soil Type ⁽¹⁾
Residential:	
Single Family	0.55 ←
Multi-Units	0.70
Mobile Homes	0.65
Rural (lots greater than ½ acre)	0.45
Commercial ⁽²⁾	
80% Impervious	0.85
Industrial ⁽²⁾	
90% Impervious	0.95

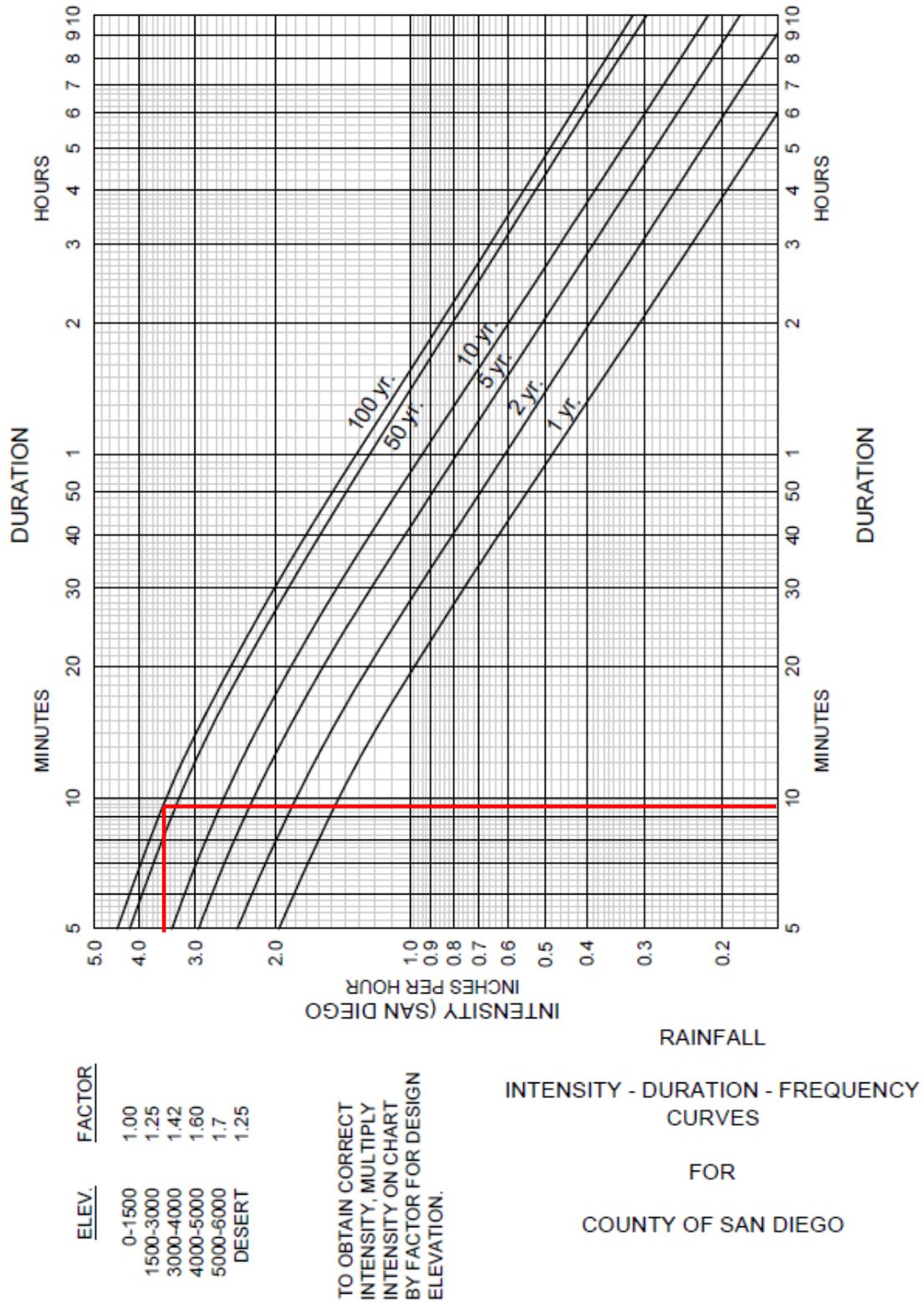


Figure A-1. Intensity-Duration-Frequency Design Chart

Results:

The results of the hydrologic analysis are provided in Table 1. Based on the analysis consistent with the City of San Diego Drainage Design Manual, no increase in peak runoff is anticipated.

Table 1: Summary of hydrologic analysis.

	Total Area (sf)	Impervious Area (sf)	Total Area (ac)	C- Value	Tc (min)	Intensity (in/hr)	Q100 (cfs)
Pre-Project	5,241	3,523	0.12	0.55	9.5	3.5	0.23
Post-Project	5,241	3,347	0.12	0.55	9.5	3.5	0.23

The runoff coefficients for both pre- and post-project conditions were determined from Table A-1 of the Drainage Design Manual. Because the land-use did not change from the pre-project conditions, and the total impervious area will actually decrease as a result of this re-development, a runoff coefficient of 0.55 was used for both pre- and post-project.

The time of concentration was calculated using the equation found on Figure A-4 in the Drainage Design Manual. The calculated time of concentration values were then used to determine the rainfall intensity for pre- and post-project conditions.

$$T = \frac{1.8(1.1-C)\sqrt{D}}{\sqrt[3]{S}} \text{ where: } C = \text{runoff coefficient (Pre-0.55. Post-0.55)}$$

D = flow length (Pre and Post - 150 ft)

S = slope (Pre and Post - 2.1%)

Pre-Project: Tc=9.5 mins I=3.5 in/hr

Post-Project: Tc=9.5 mins I=3.5 in/hr

Overall, the peak flow rate resulting from the 100-year storm event is not anticipated to change from pre-project conditions as a result of this re-development. The land-use will not change and the total impervious area will actually decrease.

Clean Water Act

No waters of the United States exist on the project site. The project site is completely developed with a single-family residence in the pre-project condition and the redevelopment of the existing single-family residence will not discharge dredged or fill materials into areas identified as waters of the United States. As such, the project is not subject to the Clean Water Act Section 401/404 requirements. Proper construction BMPs and site design and source control elements will be implemented to comply with regulations set forth by the San Diego Regional Water Quality Control Board Permit (Order No. R9-2013-0001).

Conclusion:

The hydrologic analysis for the 8423 El Paseo Grande Project was performed in accordance with the City of San Diego Drainage Design Manual. No increase in runoff is anticipated due to the proposed redevelopment of the existing single-family residence. As a result, no adverse impacts to downstream storm water facilities or receiving bodies are anticipated.

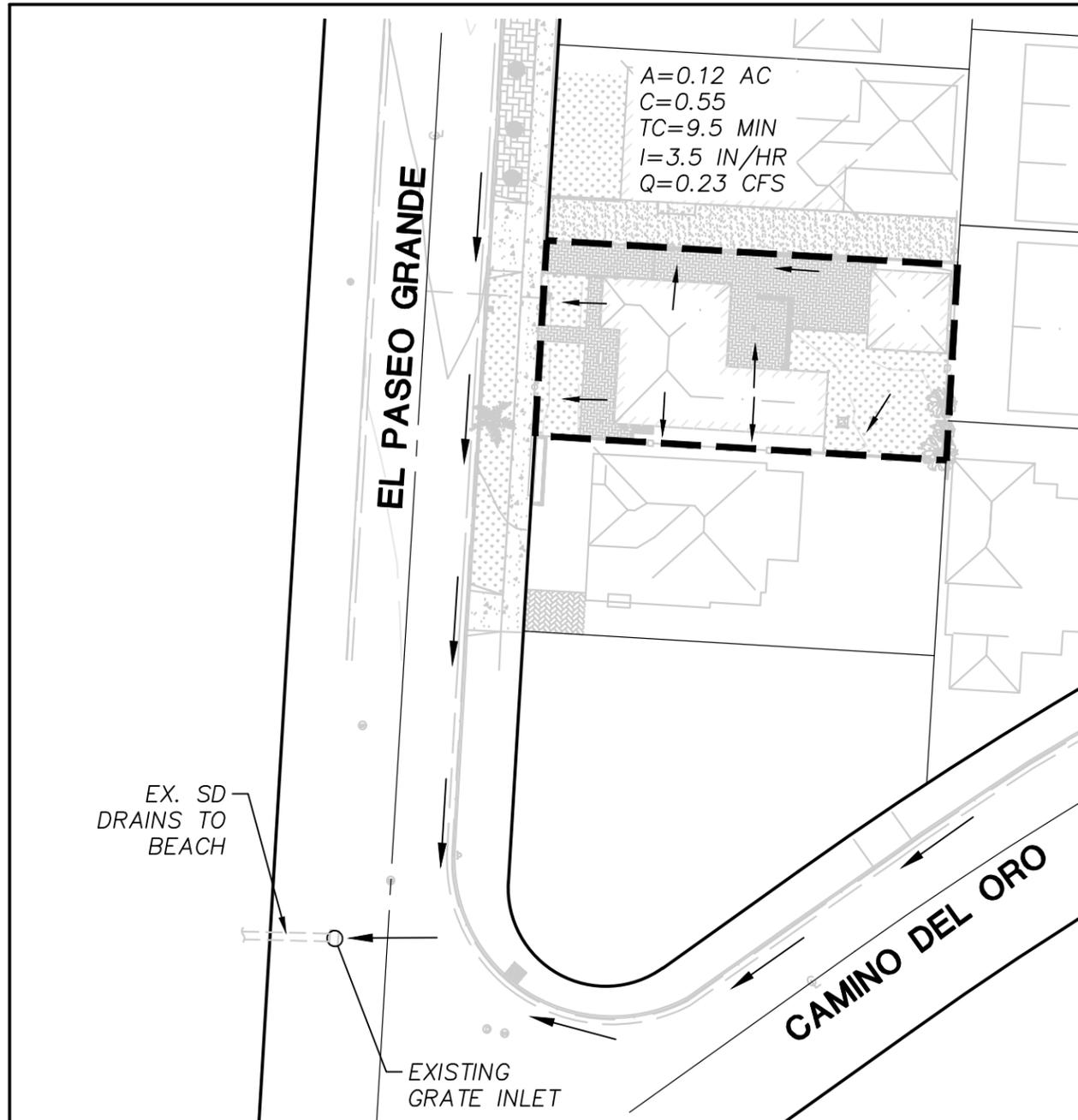
Regards,



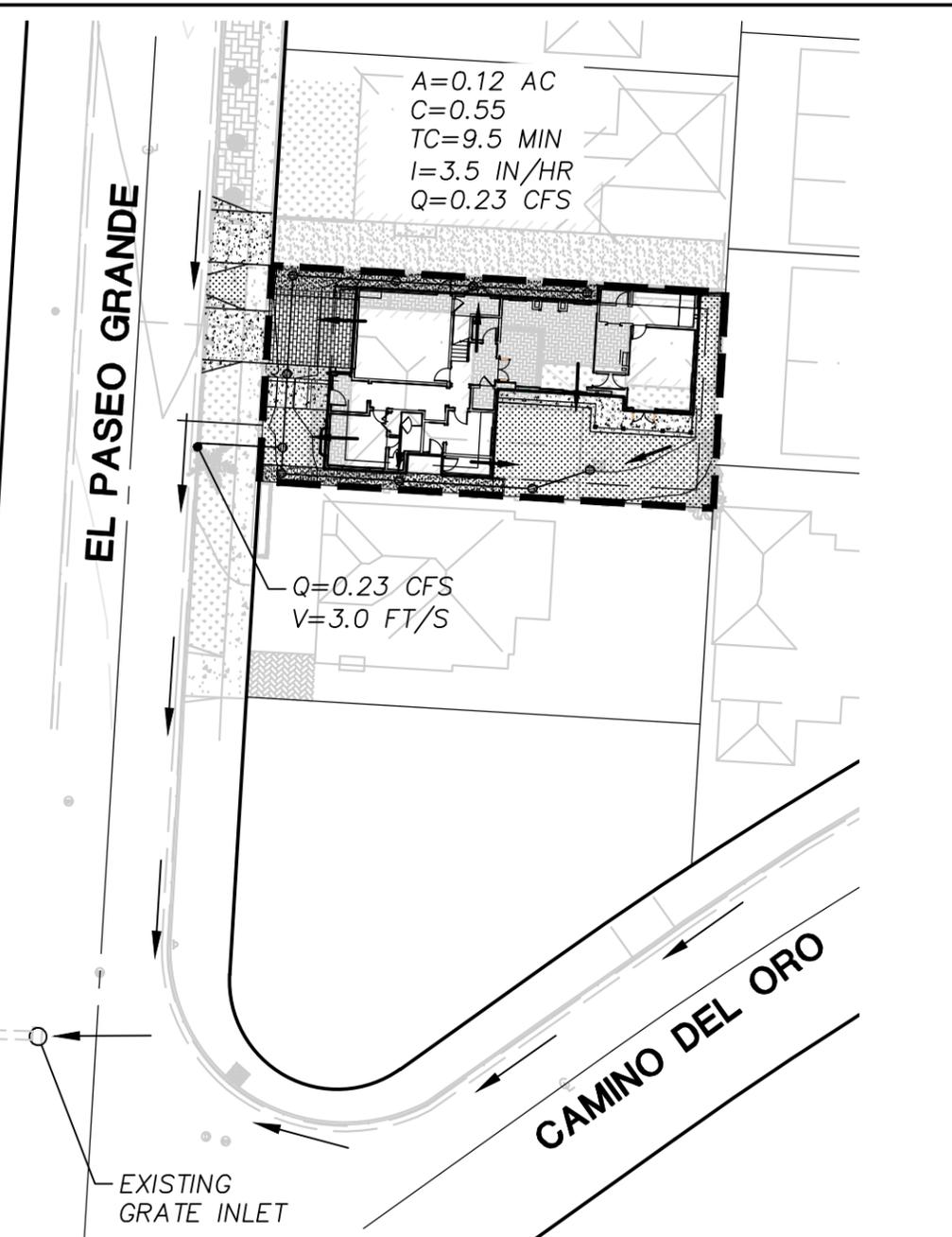
David H. Yeh, PE
Landmark Consulting



ATTACHMENT 1
Hydrology Map



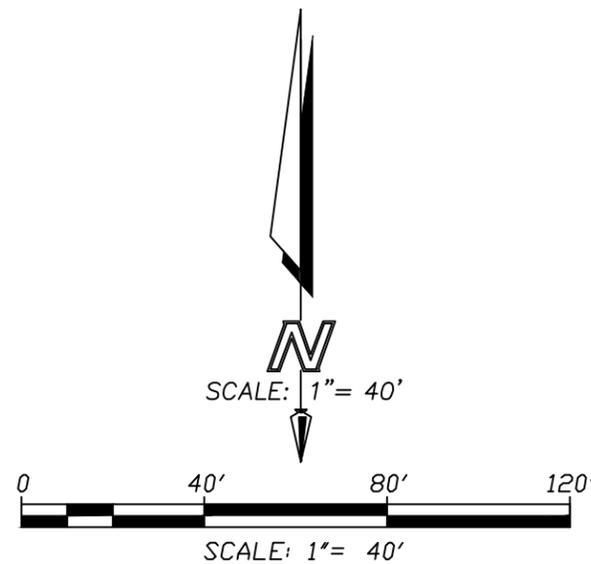
PRE-PROJECT CONDITIONS



POST-PROJECT CONDITIONS

LEGEND

- DRAINAGE BASIN
- FLOW DIRECTION
- PROP. ON-SITE STORM DRAIN



PREPARED BY:

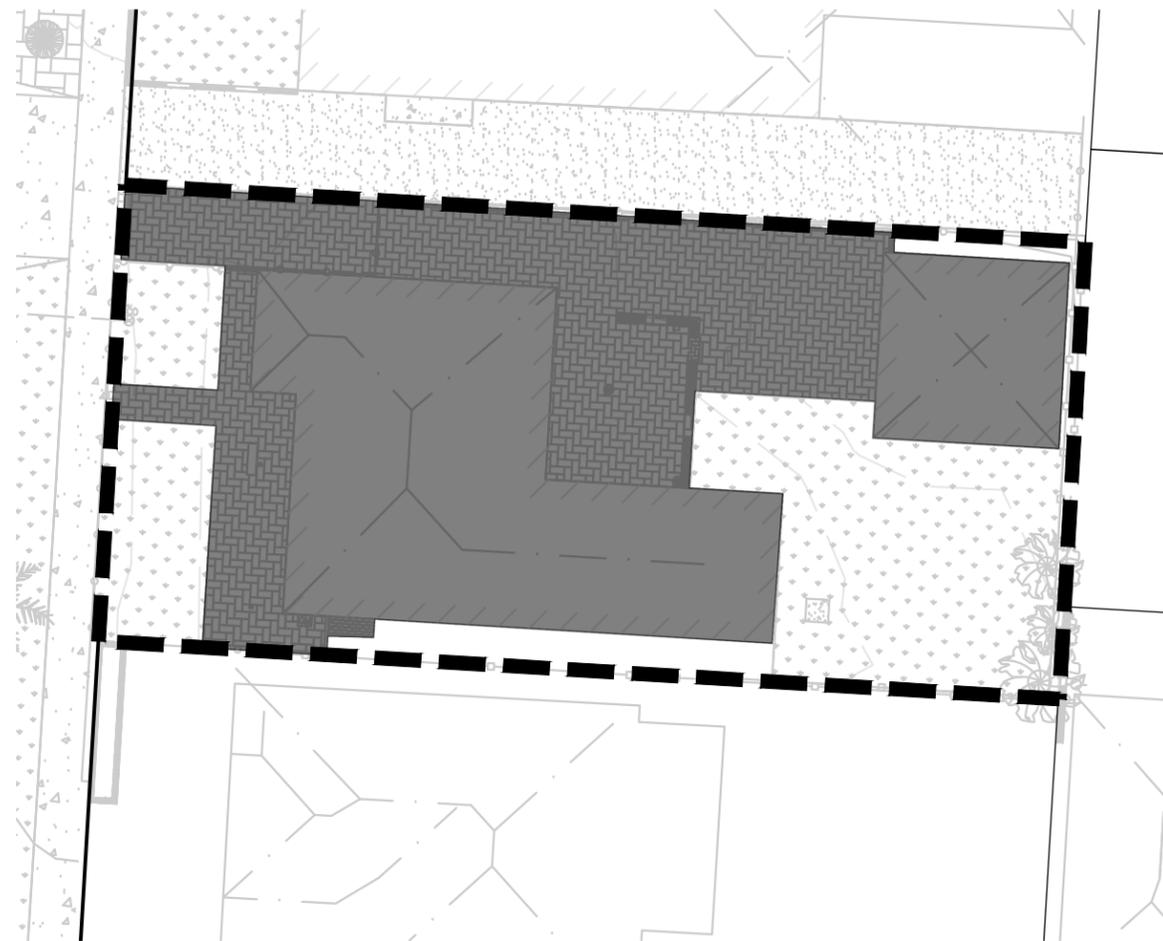


8423 EL PASEO GRANDE

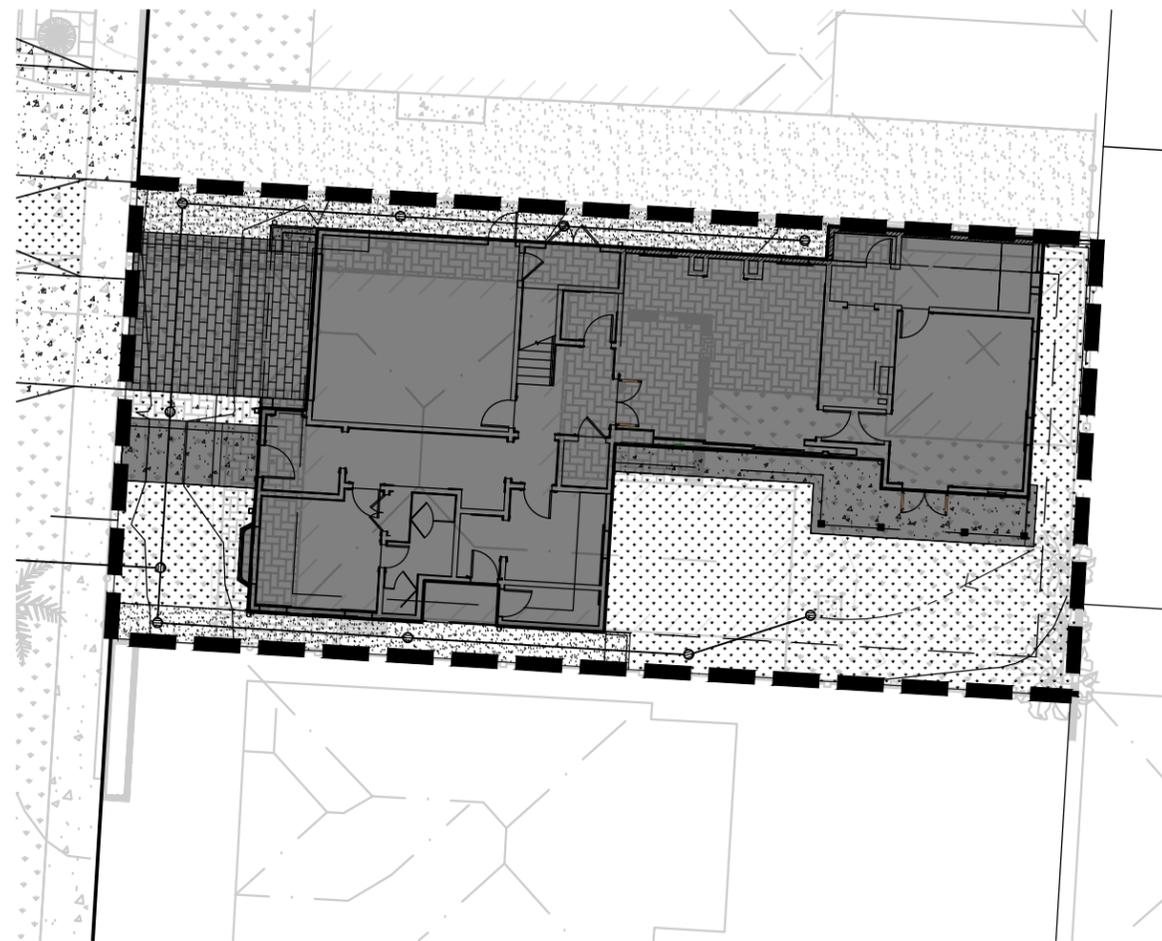
HYDROLOGY MAP
ATTACHMENT 1

SHEET NO. 1 OF 1

ATTACHMENT 2
Impervious Area Exhibit



PRE-PROJECT CONDITIONS



POST-PROJECT CONDITIONS

TOTAL IMPERVIOUS AREA:

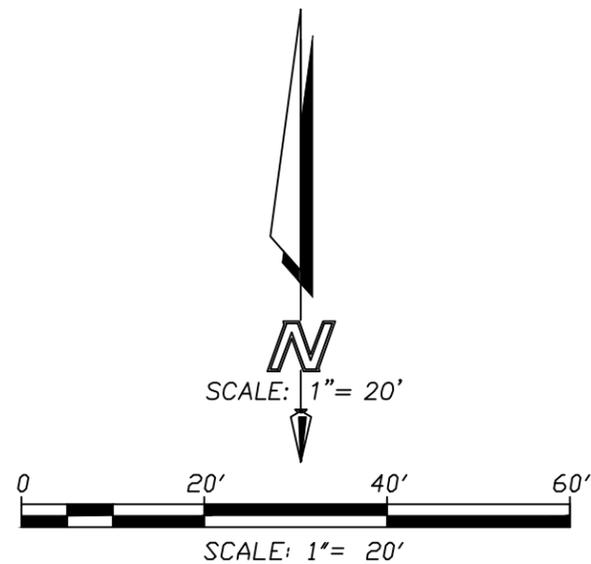
EXISTING: 3,523 SF
 PROPOSED: 3,347 SF
 IMPERVIOUS % DECREASE: -5.0%

TOTAL PERVIOUS AREA:

EXISTING: 1,718 SF
 PROPOSED: 1,894 SF
 PERVIOUS % INCREASE: 10.2%

LEGEND

DRAINAGE BASIN 
 IMPERVIOUS AREA 



PREPARED BY:



8423 EL PASEO GRANDE

IMPERVIOUS AREA EXHIBIT
 ATTACHMENT 2

SHEET NO. 1 OF 1