

PRELIM HYDROLOGY AND HYDRAULIC STUDY

Grading Permit No. GRD2X-XXX

PROJECT

34-UNIT APARTMENT

13040 COAST ST, GARDEN GROVE, CA 92844

APN: 097-011-03

PREPARED BY

DONG ENGINEERING, INC.

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Garden Grove, CA 92841

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Prepared April 23, 2025

Revised



A handwritten signature in black ink, appearing to read "Truong Dong", positioned to the right of the professional seal.

TRUONG DONG, RCE 75466, EXP: 03/31/2026

Table of contents

Section I: Project Description.....	3
Section II: Construction Hydrology Calculations.....	4
Attachment.....	Hydrology Map

Appendix G: Preliminary Hydrology and Hydraulic Study

Section I: Project Description

- The project site is approximately 0.484 acres which located at 13040 Coast St in the City of Garden Grove
 - The existing site includes 1 preschool building structure, asphalt concrete, concrete walkway, concrete gutter and landscapes. The whole site will be demolished for new construction.
 - The proposed site includes:
 Proposed building structure with 14,992 sf building/garage footprint.
 Driveways and walkway: 3,143 sf
 Landscapes area: 2,953 sf
 + Pervious: 2,953 SF
 + Impervious: 18,135 SF
- There is 1 proposed drainage areas:
- DMA-A: Storm water will be captured via onsite storm drain facilities and surface drainage, then conveyed to a biofiltration device (Modular Wetlands System) where the DCV will be treated. Excess storm runoff will flow to sump pump then discharged to the street, following its existing drainage path.

Base on the attached calculations the anticipated runoffs of the post-development are:

Existing

Area	Acres	Q ₁₀ (cfs)	Q ₂₅ (cfs)	Q ₁₀₀ (cfs)
A	0.275	0.79	0.95	1.21
B	0.226	0.63	0.75	0.96
Total	0.501	1.42	1.70	2.17

Proposed

Area	Acres	Q ₁₀ (cfs)	Q ₂₅ (cfs)	Q ₁₀₀ (cfs)
A	0.484	1.03	1.23	1.58

Q	Q ₁₀ (cfs)	Q ₂₅ (cfs)	Q ₁₀₀ (cfs)
Ratio	0.72	0.73	0.73

Section II: Construction Hydrology Calculations

RATIONAL METHOD HYDROLOGY CALCULATIONS

Project location: 13040 COAST ST, GARDEN GROVE, CA 92844

The Rational method is commonly used for determining peak discharge from relatively small drainage area.

The Rational method is based on the following equation: $Q = 0.9(I - F_m)A$

Where: Q = peak discharge, in cubic feet per second (cfs)

$F_m = a_p \times F_p$: maximum loss rate (in/hr)

F_p = Loss rate for soil group B (in/hr) from O.C. Hydrology manual.

a_p = Pervious area percentage:

a_i = Impervious area percentage

$I = a \times t_b$ = average rainfall intensity for a duration equal to the T_c for the area (in/hr)

a & b : factors in the Intensity regression equation from the Orange County Hydrology Manual

t = time of concentration (min.)

A = drainage area contributing to the design location, in acres.

	DMA	Area	Pervious	a_p
		<i>sq-ft</i>	<i>sq-ft</i>	%
Existing	A	11,975	1,653	0.138
	B	9,843	0	0.000
Proposed	A	21,088	2,953	0.140

Factors in the Intensity regression equation from the Orange County Hydrology Manual	a	b
For 10-year storm	10.209	-0.573
For 25-year storm	11.995	-0.566
For 100-year storm	15.560	-0.573

Soil group	B
F_p =	0.30

RUNOFF CALCULATIONS

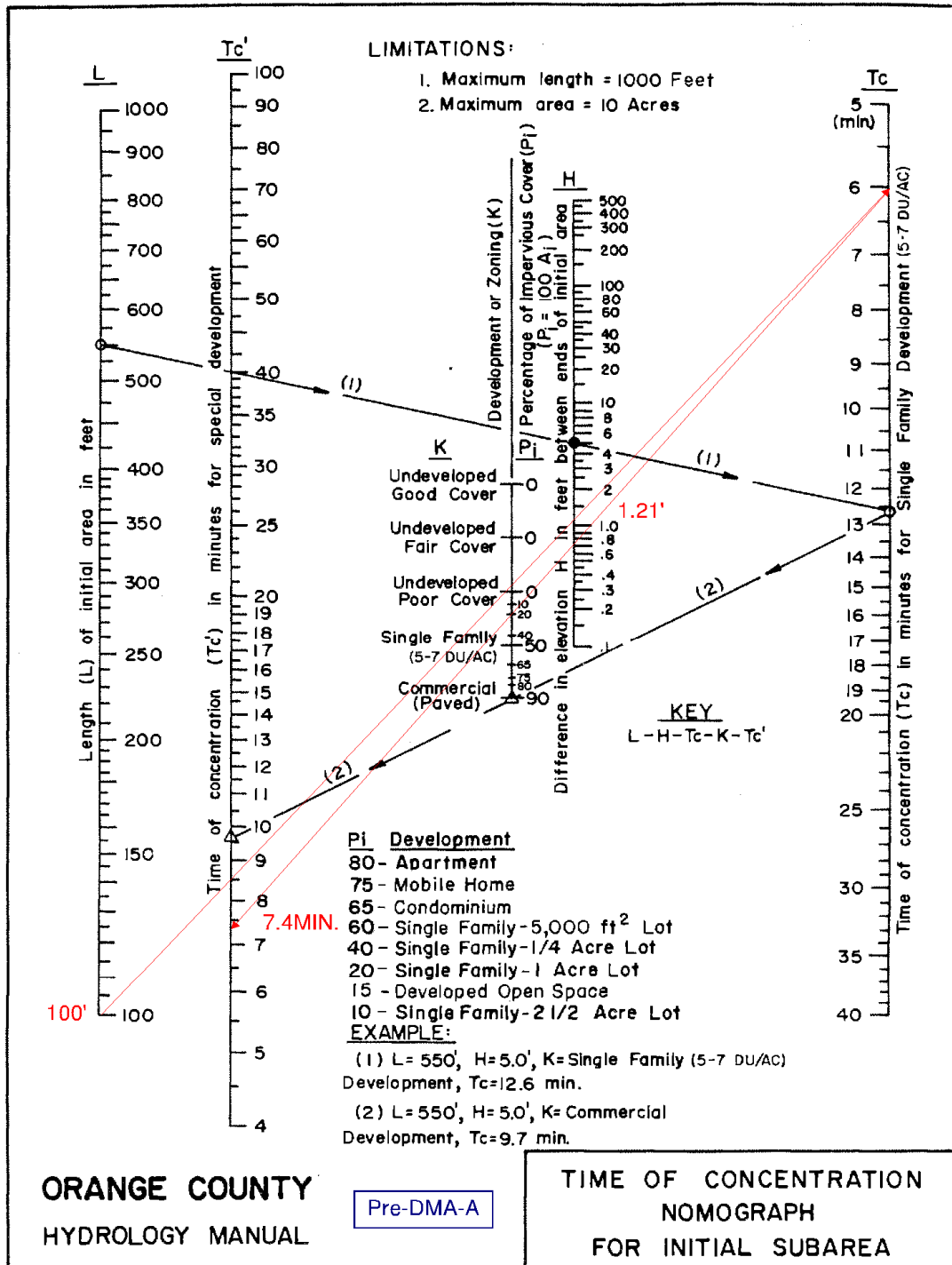
Existing

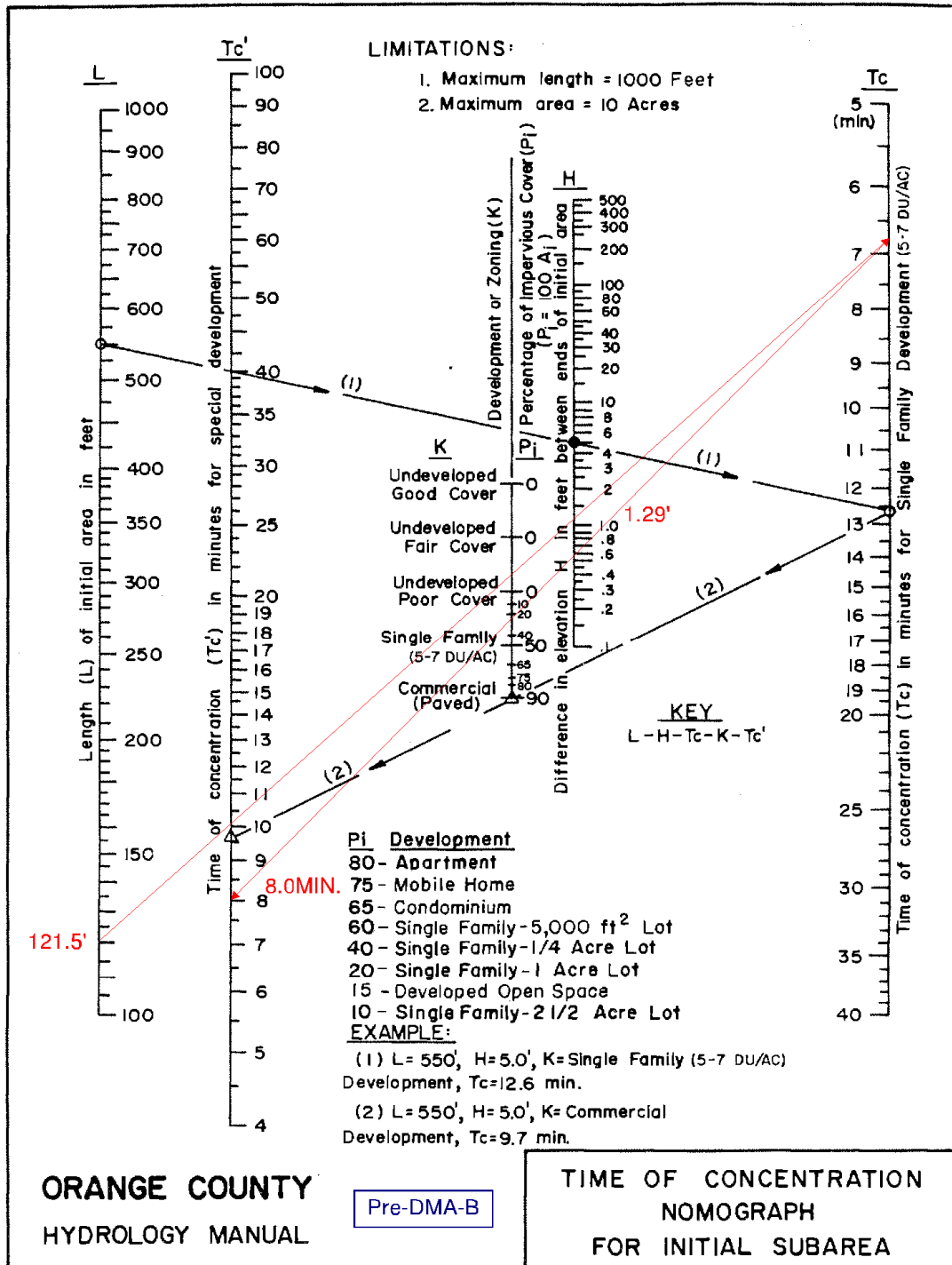
Area	Q	A	Soil	Dev.	T_c	I	F_m	Q	Notes
		(acres)	type	type	(min)	(in/hr)	(in/hr)	(cfs)	
A	Q10	0.275	B	Res.	7.4	3.24	0.04	0.79	Initial area
	Q25	0.275	B	Res.	7.4	3.86	0.04	0.95	Initial area
	Q100	0.275	B	Res.	7.4	4.94	0.04	1.21	Initial area
B	Q10	0.226	B	Res.	8	3.10	0.00	0.63	Initial area
	Q25	0.226	B	Res.	8	3.70	0.00	0.75	Initial area
	Q100	0.226	B	Res.	8	4.73	0.00	0.96	Initial area
Total:	Q10		Q25		Q100				
	1.42		1.70		2.17				

Proposed

A	Q10	0.484	B	Res.	12.5	2.40	0.04	<i>1.03</i>	Initial area
	Q25	0.484	B	Res.	12.5	2.87	0.04	<i>1.23</i>	Initial area
	Q100	0.484	B	Res.	12.5	3.66	0.04	<i>1.58</i>	Initial area
Total:	Q10			Q25			Q100		
	1.03			1.23			1.58		

Existing

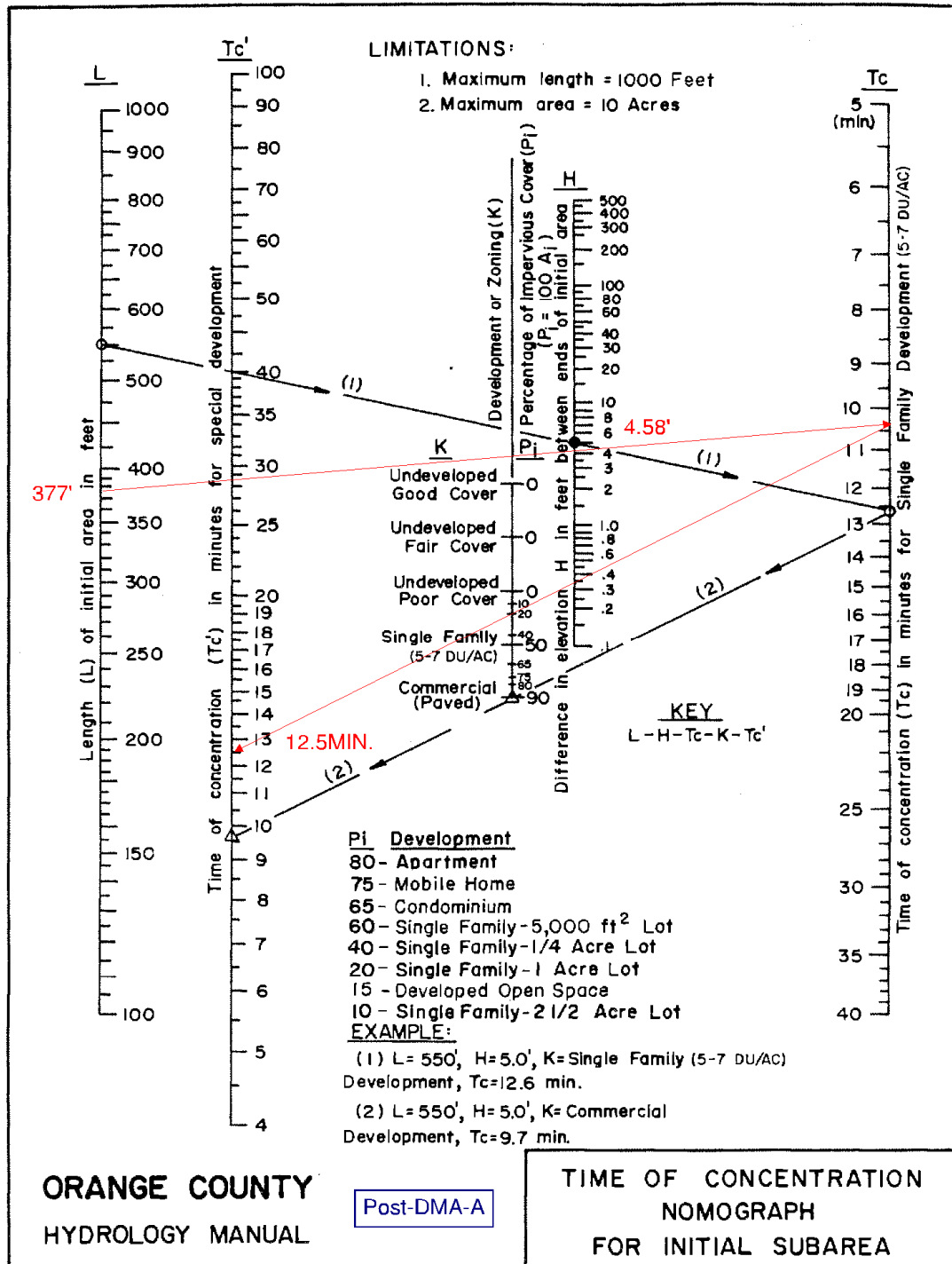




D-4

Figure D-1

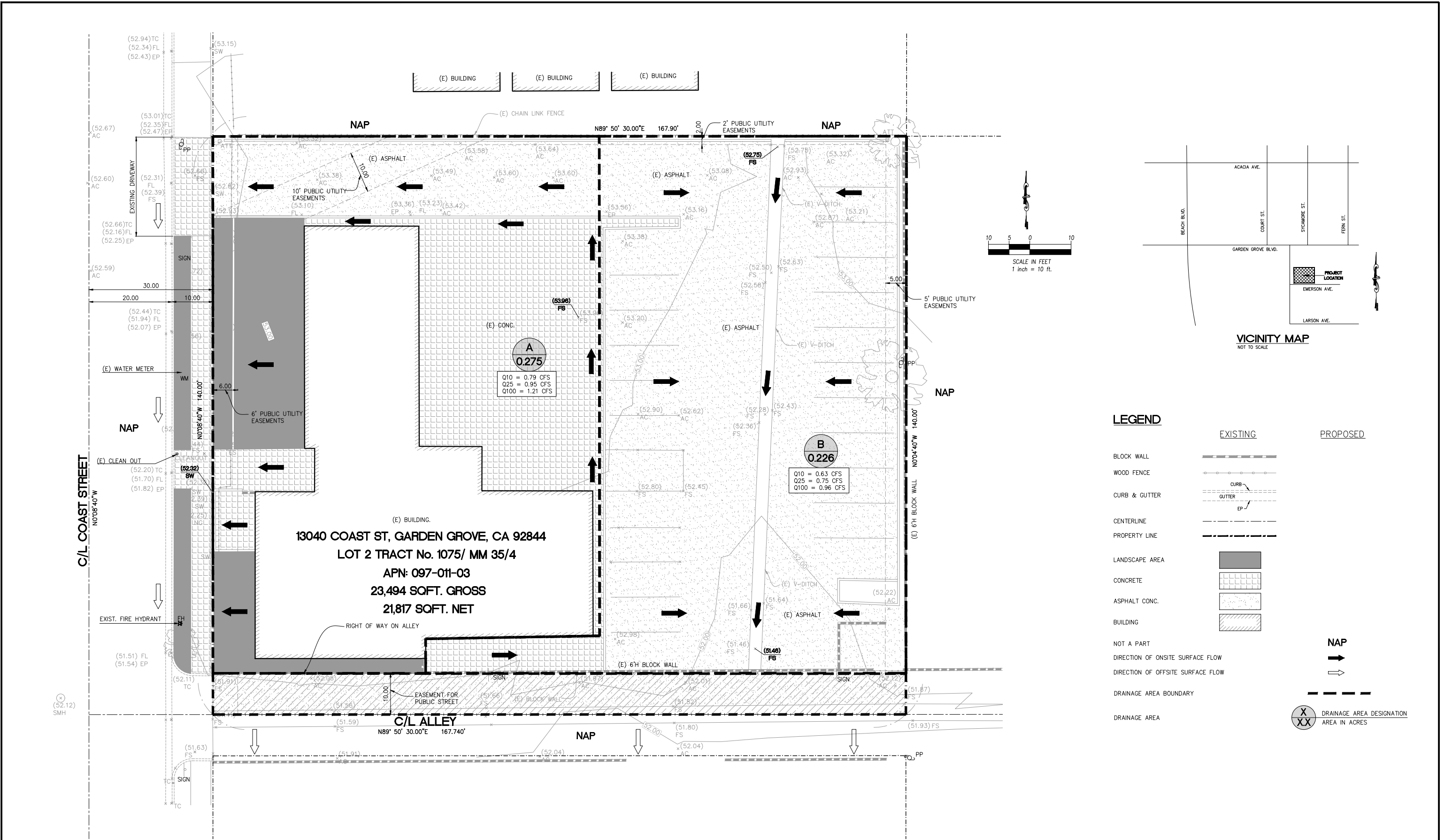
Proposed



D-4

Figure D-1

Attachment A
HYDROLOGY MAP



REVISIONS				
NO.	INIT.	DATE	DESCRIPTION	APP'D DATE

BENCH MARK:
1G-147-70, NAVD88; ELEVATION: 66.528', YEAR LEVELED: 2005.
DESCRIPTION: DESCRIBED BY OCS 2002 - FOUND 3 3/4" OCS ALUMINUM BENCHMARK DISK STAMPED "1G-147-70", SET IN THE TOP OF A 6 IN. BY 6 IN. CONCRETE POST. MONUMENT IS LOCATED IN THE NORTHWESTERLY CORNER OF THE INTERSECTION OF GARDEN GROVE BOULEVARD AND MAGNOLIA STREET, 142 FT. NORTHERLY OF THE NORTH CURB ALONG GARDEN GROVE BOULEVARD AND 53 WESTERLY OF THE CENTERLINE OF MAGNOLIA STREET. MONUMENT IS SET LEVEL WITH THE SIDEWALK.

OWNER OR DEVELOPER:
OWNER: LOC TRAN.
ADDRESS: 13040 COAST ST, GARDEN GROVE, CA 92844
TEL: (214) 682-5559.
SOILS ENGINEER:
ALTA CALIFORNIA GEOTECHNICAL INC
ADDRESS: 170 NORTH MAPLE STREET, CORONA, CA 92880
TEL: (951) 509-7090.
PROJECT NO.: 1-0521, REPORT DATED: MAY 1, 2024.
PREPARED BY: SCOTT A.GRAY, GE 2857.

PREPARED BY:
DONG ENGINEERING, INC.
ADDRESS: 7661 GARDEN GROVE BLVD., GARDEN GROVE, CA 92841.
TEL: (714) 617-5979.
EMAIL: INFO@DONGENGINEERING.COM

DATE SIGNED: 4/23/25

PRELIM EXISTING HYDROLOGY MAP

SITE ADDRESS: 13040 COAST ST, GARDEN GROVE, CA 92844

SCALE: AS NOTED

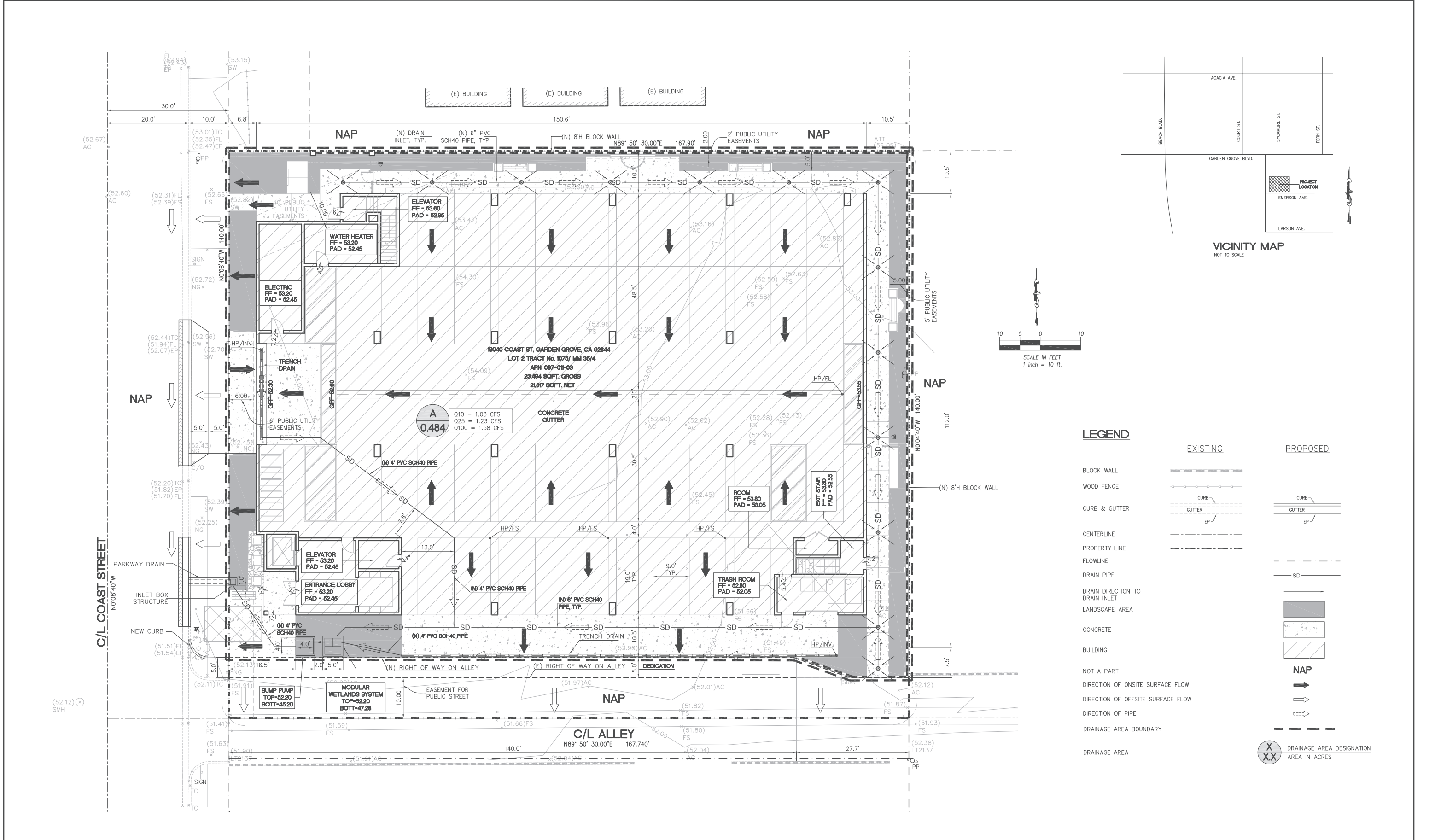
DRAWN BY: GC

CITY OF GARDEN GROVE

G-

SHEET 1 of 2

CHECKED BY: TD



REVISIONS			BENCH MARK:		OWNER OR DEVELOPER:		PREPARED BY:		PRELIM PROPOSED HYDROLOGY MAP	
NO.	INIT.	DATE	DESCRIPTION	APP'D	DATE	16-147-70, NAVD88; ELEVATION: 66.528', YEAR LEVELED: 2005.	OWNER: LOC TRAN.	DONG ENGINEERING, INC.	SITE ADDRESS: 13040 COAST ST, GARDEN GROVE, CA 92844	
						DESCRIPTION: DESCRIBED BY OCS 2002 - FOUND 3 3/4" OCS ALUMINUM BENCHMARK.	ADDRESS: 13040 COAST ST, GARDEN GROVE, CA 92844.	7661 GARDEN GROVE BLVD., GARDEN GROVE, CA 92841.	SCALE: AS NOTED	
						DISK STAMPED "16-147-70", SET IN THE TOP OF A 6 IN. BY 6 IN. CONCRETE POST.	TEL: (214) 682-5559.	TEL: (714) 617-5979.	DRAWN BY: GC	
						MONUMENT IS LOCATED IN THE NORTHWESTERLY CORNER OF THE INTERSECTION OF GARDEN GROVE BOULEVARD AND MAGNOLIA STREET, 142 FT. NORTHERLY OF THE NORTH CURB ALONG GARDEN GROVE BOULEVARD AND 53 WESTERLY OF THE CENTERLINE OF MAGNOLIA STREET. MONUMENT IS SET LEVEL WITH THE SIDEWALK.	SOILS ENGINEER: ALTA CALIFORNIA GEOTECHNICAL INC	EMAIL: INFO@DONGENGINEERING.COM	CHECKED BY: TD	
							ADDRESS: 170 NORTH MAPLE STREET, CORONA, CA 92880		CITY OF GARDEN GROVE	
							TEL: (951) 509-7090.		DATE SIGNED: 4/24/25	
							PROJECT NO.: 1-0521, REPORT DATED: MAY 1, 2024.			
							PREPARED BY: SCOTT A.GRAY, GE 2857.			