ALAN R. SHORT, P.E.

PRELININARY HYDROLOGY STUDY

FOR

CITY OF CLAREMONT

TENTATIVE TRACT NO. 83751
1830 West Foothill Blvd.

PREPARED FOR:

THE OLSON COMPANY
3010 OLD RANCH PARKWAY, SUITE 100
SEAL BEACH, CA. 92740

PREPARED BY:

Alan R Short

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RCE 30873, EXPIRES 3/31/24

Latest Revision: July 5, 2022

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1. Introduction / Summary

This is a preliminary drainage and Standard Urban Stormwater Mitigation Plan (SUSMP) study for the proposed multifamily development, Tentative Tract No. 83751, a 3.05 acre property located in the southeast corner of the Foothill Boulevard and Town Avenue intersection, in the City of Claremont, Los Angeles County, California, as shown on the following Vicinity Map.

The existing site (Area "A") comprises of a vacant lot in the westerly portion, and an asphalt parking lot with a dirt pad in the location of a previously demolished commercial structure. There is also an off-site adjacent area on the East that drains into the site (Area "B"). This off-site area and existing site generally drain in a southwesterly direction, via an alley gutter along the South of the property, and surface flows into into Town Avenue, as shown on the Existing Hydrology and Off-site Hydrology Maps.

In the proposed condition, the majority of the storm runoff will be collected using a private area drain system consisting of PVC pipes and area drain inlets (Area "C"). The drainage pattern in the existing and proposed conditions are consistent. Since the site is in a flow-by condition, the on-site storm drain system will be designed for the 10-Year Storm Event.

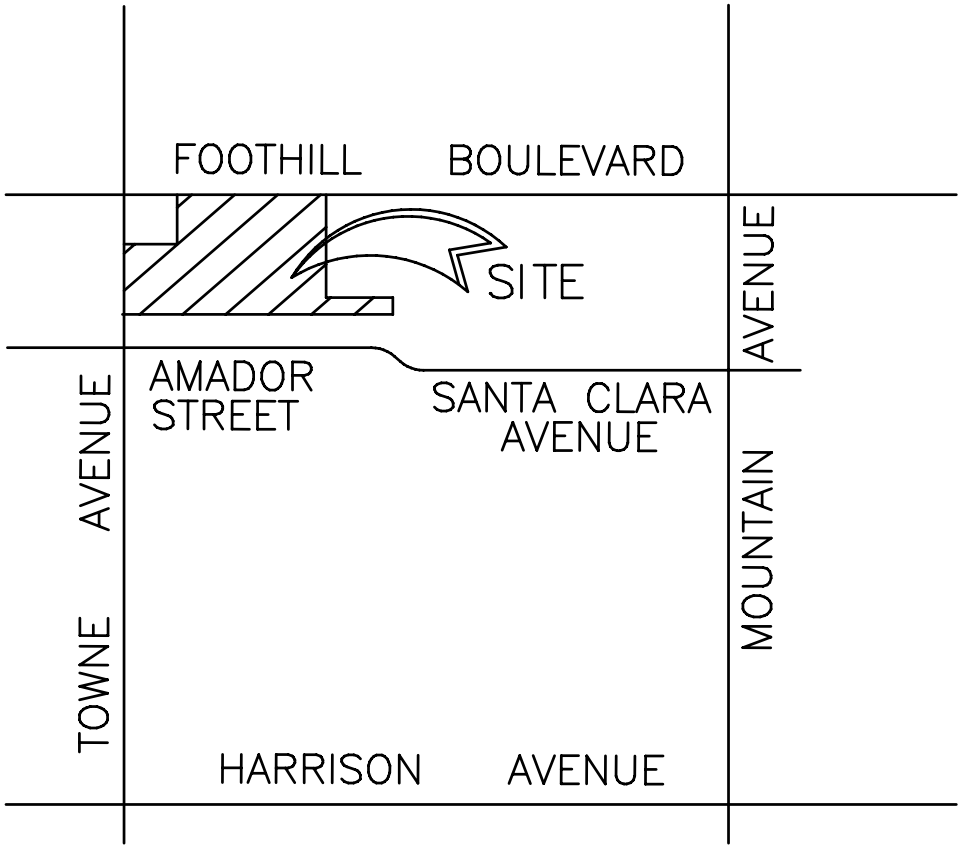
Proposed storm flows collected in the pipe system will be combined in the southwesterly corner of the property using a proposed bubble up catch basin. Initial flows will be diverted to a proposed drywell system and storge pipe that will infiltrate the required 85th percentile storm and the remaining flows will bubble up and surface flow into Town Avenue matching the existing flow pattern. For storms exceeding the 10-Year event, the site will continue to surface drain to Towne Ave., and all Pads and Finished Floors of the proposed buildings will be protected.

Currently, the site does not have any water quality features, however, in the developed condition, the proposed drywells will be used for infiltration for water quality purposes. The 85th percentile flow calculations are provided in this report.

Utilizing the County of Los Angeles' *HydroCals* software, Rational Method Hydrology was performed to calculate the 10- and 50-Year Storm Event flow rates. Using the same software, the Standard Urban Stormwater Mitigation Plan (SUSMP) flow rate was also computed based on the 85th percentile rainfalls as shown on the exhibit from the http://ladpw.org/wrd/hydrologygis/ Website. The results are as follows:

	Pre-Development (Area "A")	Post-Development (Area "C")	Off-Site (Area "B")
10-Year	3.7 cfs	5.4 cfs	5.7 cfs
50-Year	7.5 cfs	9.3 cfs	9.2 cfs
85th Percentile		0.55 cfs	

Per the National Flood Hazard Layer FIRMette (copy attached), the property is located within Flood Zone "X", as defined, *"0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with discharge areas of less than one square mile".*



N

CLAREMONT

VICINITY MAP

NTS THOMAS GUIDE: 601, B–2

2. Existing Hydrology Calculations

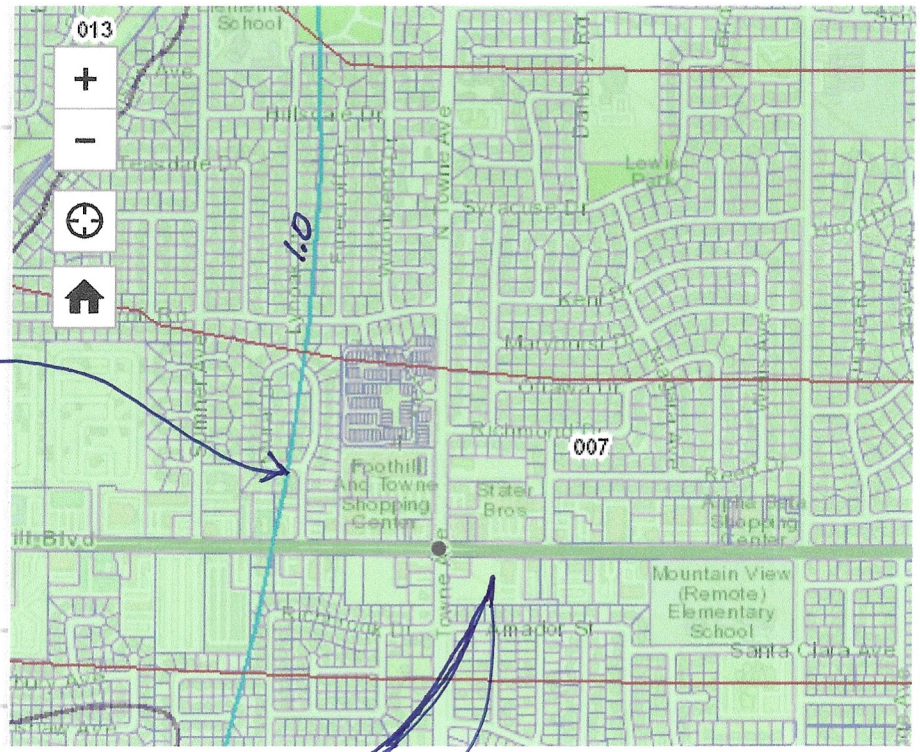
10-Year Storm Event
50-Year Storm Event

About | Legend | Layers

LA County Hydrology Map

Layers

- [x] Hydrology GIS
  - [x] 50yr Two Tenths (Rainfall)
  - [ ] DPA Zones
  - [x] Soils 2004
  - [x] Final 85th Percentile, 24-hr Rainfall
  - [ ] 1-year, 1-hour Rainfall Intensity
  - [ ] Final 95th Percentile, 24-hr Rainfall
- [x] LA County Parcels



FOOTHILL BLVD.

TOWNE AVENUE

N

1"=40'

	TOTAL AREA	3.05 AC
	PERVIOUS AREA	2.33 AC
	% PERVIOUS	76.4 %
	% IMPERVIOUS	23.6 %

PERVIOUS AREA
EXISTING CONDITION
TENTATIVE TRACT NO. 83751
CLAREMONT

LATEST REVISION: 4/4/22

Peak Flow Hydrologic Analysis

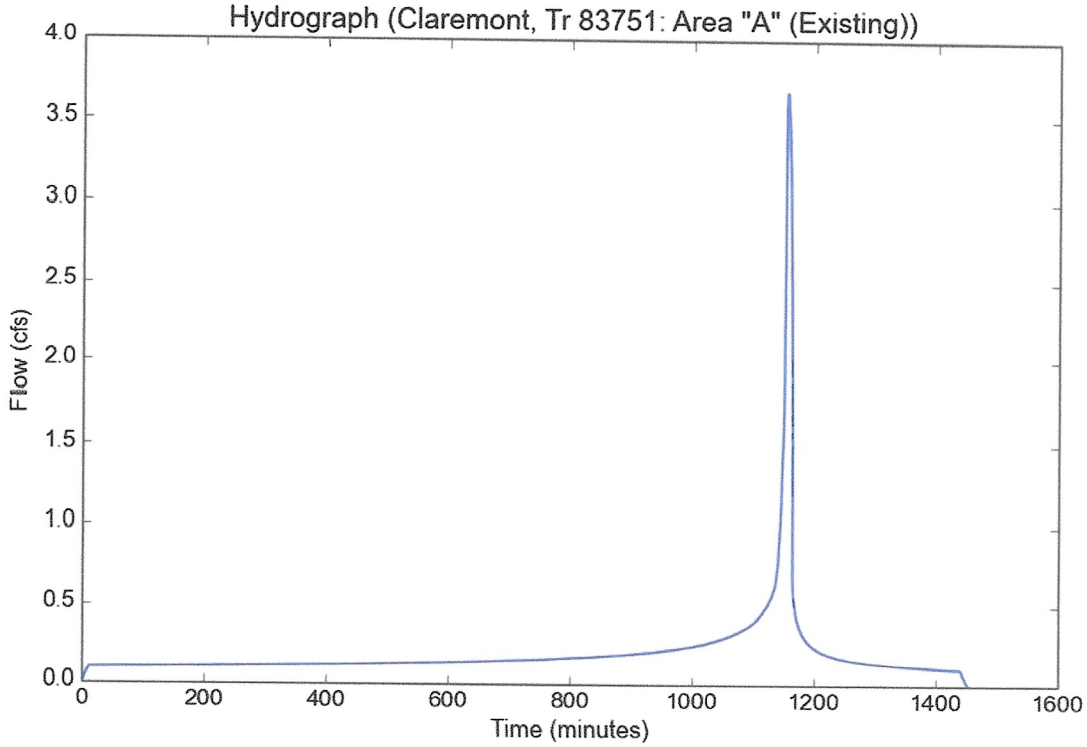
File location: C:/Users/Test/OneDrive/Documents/AKI/ARS/2022-04-11 Claremont/Claremont, Tr 83751 - Area A (Existing) 10-Yr.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Claremont, Tr 83751
Subarea ID	Area "A" (Existing)
Area (ac)	3.05
Flow Path Length (ft)	750.0
Flow Path Slope (vft/hft)	0.0197
50-yr Rainfall Depth (in)	6.93
Percent Impervious	0.236
Soil Type	7
Design Storm Frequency	10-yr
Fire Factor	0
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	4.948
Peak Intensity (in/hr)	1.9563
Undeveloped Runoff Coefficient (Cu)	0.5276
Developed Runoff Coefficient (Cd)	0.6155
Time of Concentration (min)	12.0
Clear Peak Flow Rate (cfs)	3.6726
Burned Peak Flow Rate (cfs)	3.6726
24-Hr Clear Runoff Volume (ac-ft)	0.3935
24-Hr Clear Runoff Volume (cu-ft)	17139.5692



Peak Flow Hydrologic Analysis

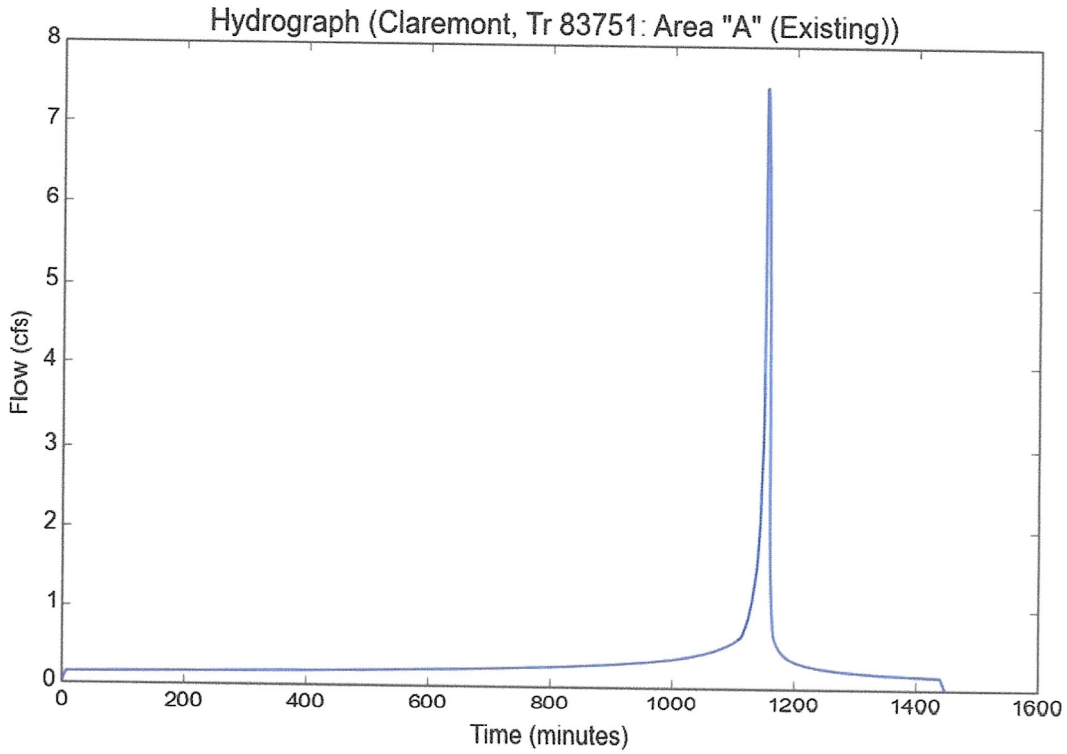
File location: C:/Users/Test/OneDrive/Documents/AKI/ARS/2022-04-11 Claremont/Claremont, Tr 83751 - Area A (Existing) 50-Yr.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Claremont, Tr 83751
Subarea ID	Area "A" (Existing)
Area (ac)	3.05
Flow Path Length (ft)	750.0
Flow Path Slope (vft/hft)	0.0197
50-yr Rainfall Depth (in)	6.93
Percent Impervious	0.236
Soil Type	7
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.93
Peak Intensity (in/hr)	3.3151
Undeveloped Runoff Coefficient (Cu)	0.6892
Developed Runoff Coefficient (Cd)	0.739
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	7.4718
Burned Peak Flow Rate (cfs)	7.4718
24-Hr Clear Runoff Volume (ac-ft)	0.5786
24-Hr Clear Runoff Volume (cu-ft)	25203.5584



Peak Flow Hydrologic Analysis

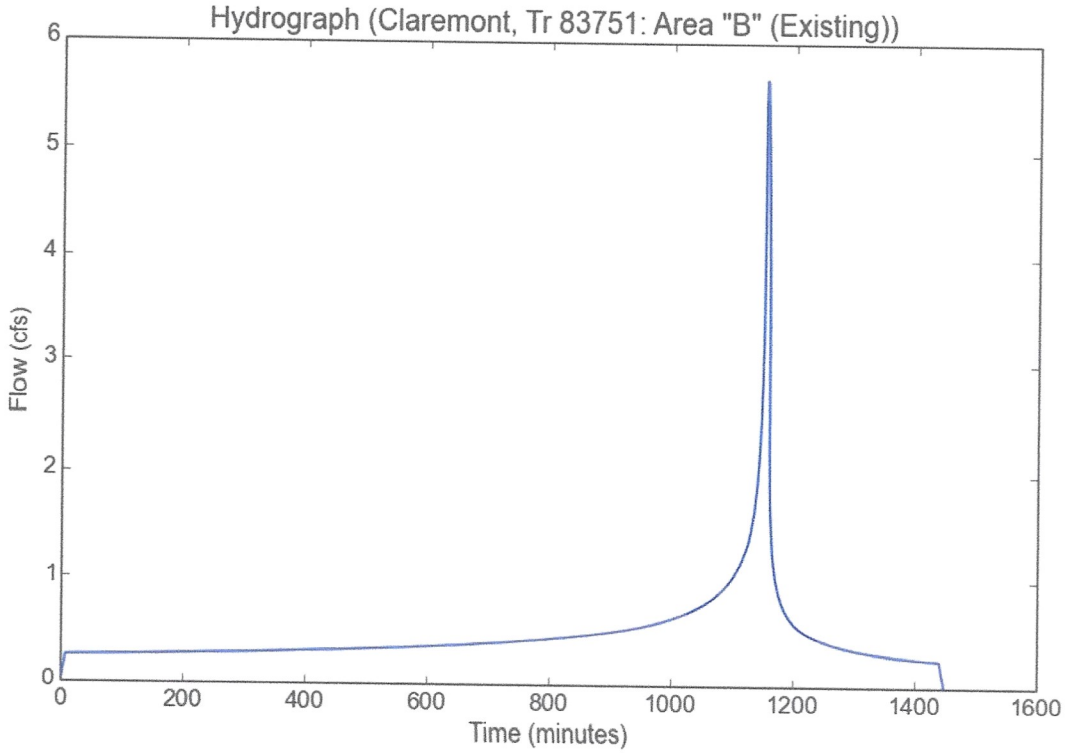
File location: C:/Users/Test/OneDrive/Documents/AKI/ARS/2022-04-11 Claremont/Claremont, Tr 83751 - Area B (Existing) 10-Yr.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Claremont, Tr 83751
Subarea ID	Area "B" (Existing)
Area (ac)	2.75
Flow Path Length (ft)	600.0
Flow Path Slope (vft/hft)	0.0245
50-yr Rainfall Depth (in)	6.93
Percent Impervious	0.9
Soil Type	7
Design Storm Frequency	10-yr
Fire Factor	0
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	4.948
Peak Intensity (in/hr)	2.367
Undeveloped Runoff Coefficient (Cu)	0.5883
Developed Runoff Coefficient (Cd)	0.8688
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	5.6554
Burned Peak Flow Rate (cfs)	5.6554
24-Hr Clear Runoff Volume (ac-ft)	0.9262
24-Hr Clear Runoff Volume (cu-ft)	40346.1325



Peak Flow Hydrologic Analysis

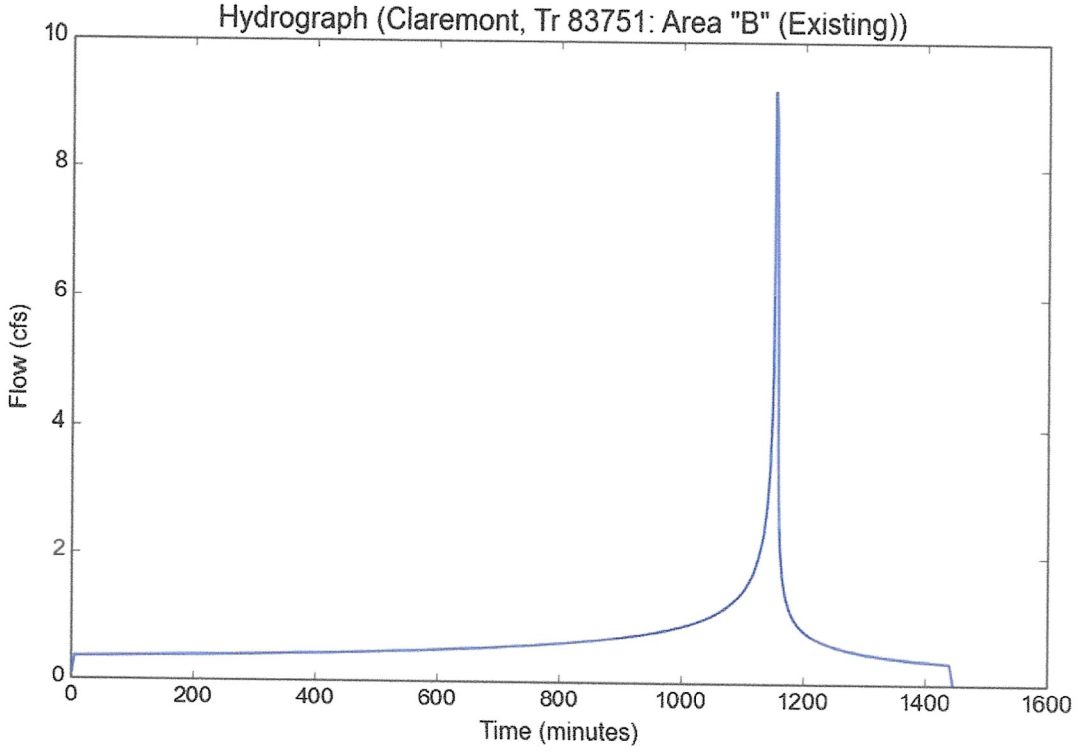
File location: C:/Users/Test/OneDrive/Documents/AKI/ARS/2022-04-11 Claremont/Claremont, Tr 83751 - Area B (Existing) 50-Yr.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Claremont, Tr 83751
Subarea ID	Area "B" (Existing)
Area (ac)	2.75
Flow Path Length (ft)	600.0
Flow Path Slope (vft/hft)	0.0245
50-yr Rainfall Depth (in)	6.93
Percent Impervious	0.9
Soil Type	7
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.93
Peak Intensity (in/hr)	3.7951
Undeveloped Runoff Coefficient (Cu)	0.7289
Developed Runoff Coefficient (Cd)	0.8829
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	9.2143
Burned Peak Flow Rate (cfs)	9.2143
24-Hr Clear Runoff Volume (ac-ft)	1.3004
24-Hr Clear Runoff Volume (cu-ft)	56643.2714



3. Proposed Condition Hydrology Calculations

10-Year Storm Event
50-Year Storm Event
85th Percentile SUSMP

FOOTHILL BLVD.

TOWNE AVENUE

N

1"=40'

	TOTAL AREA	3.05 AC
	PERVIOUS AREA	0.60 AC
	% PERVIOUS	19.7 %
	% IMPERVIOUS	80.3 %

PERVIOUS AREA
PROPOSED CONDITION
TENTATIVE TRACT NO. 83751
CLAREMONT

LATEST REVISION: 4/4/22

Peak Flow Hydrologic Analysis

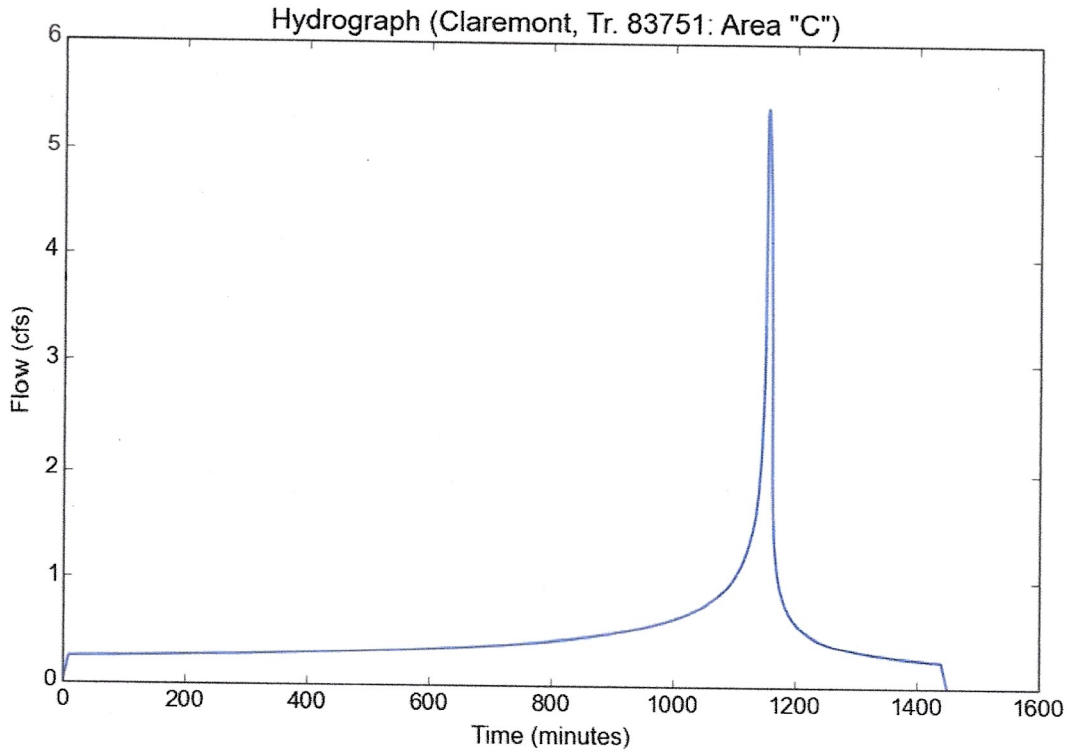
File location: C:/Users/Test/OneDrive/Documents/AKI/ARS/2022-04-11 Claremont/Claremont, Tr 83751 - Area C 10-Yr Prop.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Claremont, Tr. 83751
Subarea ID	Area "C"
Area (ac)	3.05
Flow Path Length (ft)	760.0
Flow Path Slope (vft/hft)	0.0188
50-yr Rainfall Depth (in)	6.93
Percent Impervious	0.803
Soil Type	7
Design Storm Frequency	10-yr
Fire Factor	0
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	4.948
Peak Intensity (in/hr)	2.1313
Undeveloped Runoff Coefficient (Cu)	0.5549
Developed Runoff Coefficient (Cd)	0.832
Time of Concentration (min)	10.0
Clear Peak Flow Rate (cfs)	5.4085
Burned Peak Flow Rate (cfs)	5.4085
24-Hr Clear Runoff Volume (ac-ft)	0.9347
24-Hr Clear Runoff Volume (cu-ft)	40715.8249



Peak Flow Hydrologic Analysis

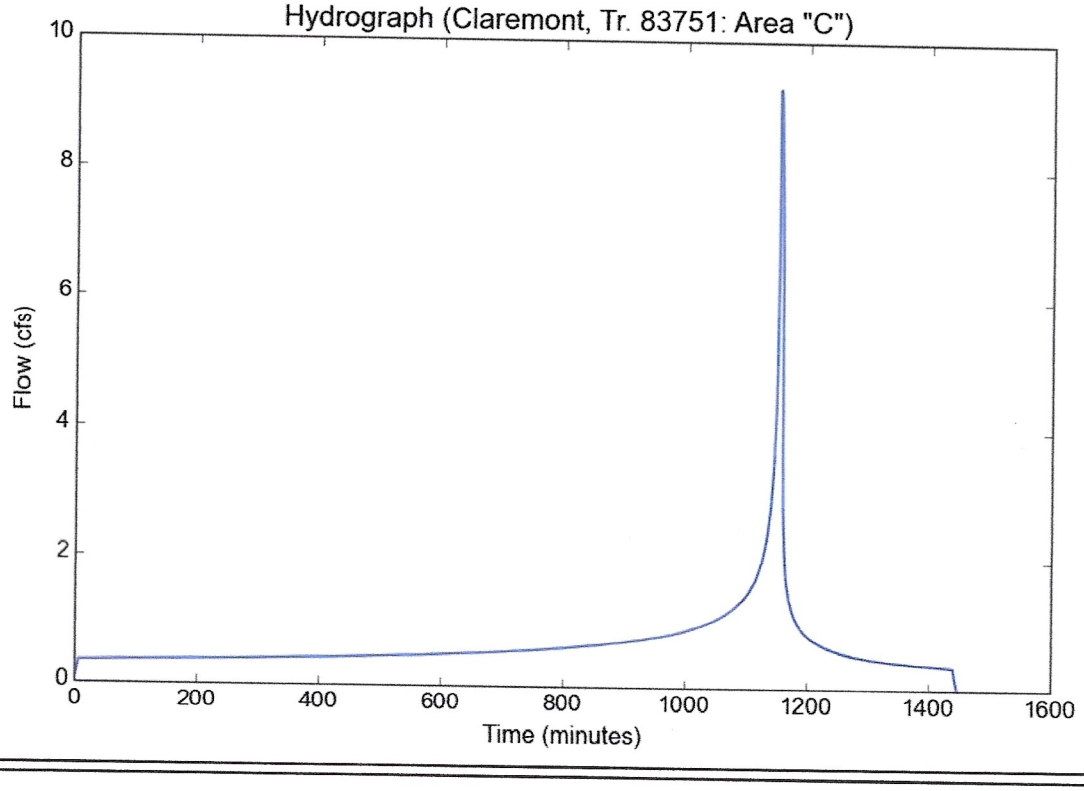
File location: C:/Users/Test/OneDrive/Documents/AKI/ARS/2022-04-11 Claremont/Claremont, Tr 83751 - Area C 50-Yr Prop.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Claremont, Tr. 83751
Subarea ID	Area "C"
Area (ac)	3.05
Flow Path Length (ft)	760.0
Flow Path Slope (vft/hft)	0.0188
50-yr Rainfall Depth (in)	6.93
Percent Impervious	0.803
Soil Type	7
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.93
Peak Intensity (in/hr)	3.5299
Undeveloped Runoff Coefficient (Cu)	0.707
Developed Runoff Coefficient (Cd)	0.862
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	9.2801
Burned Peak Flow Rate (cfs)	9.2801
24-Hr Clear Runoff Volume (ac-ft)	1.316
24-Hr Clear Runoff Volume (cu-ft)	57327.1268



Peak Flow Hydrologic Analysis

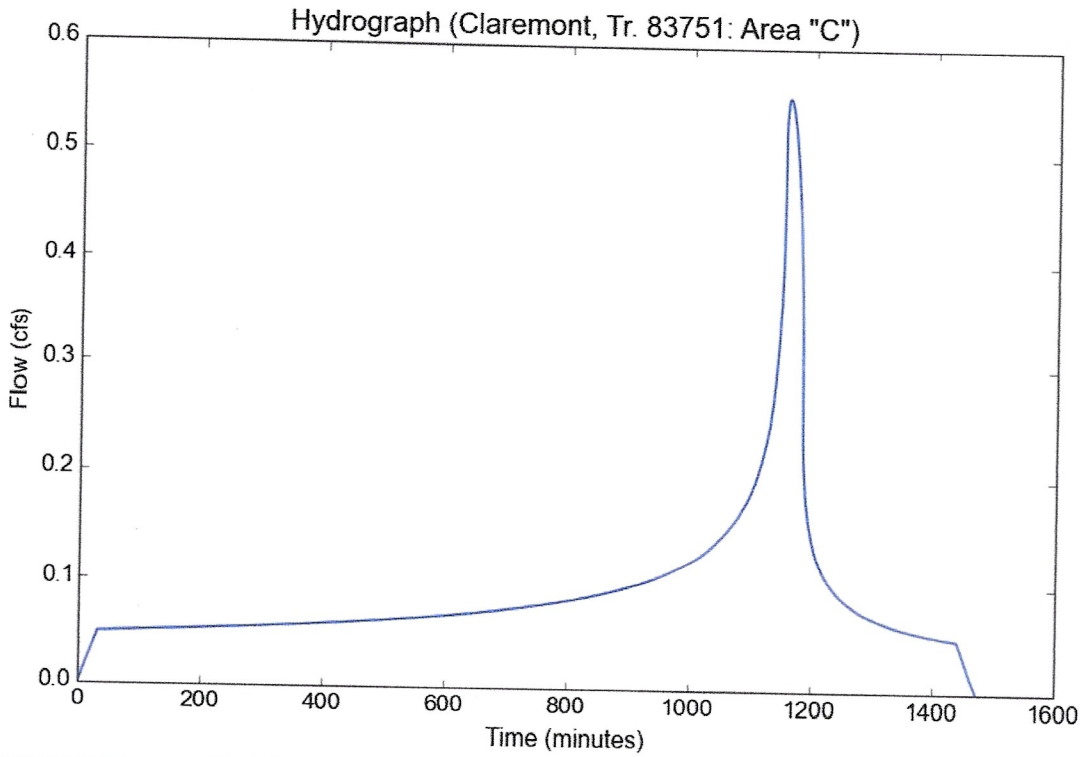
File location: C:/Users/Test/OneDrive/Documents/AKI/ARS/2022-04-11 Claremont/Claremont, Tr. 83751 - Area C 85th.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Claremont, Tr. 83751
Subarea ID	Area "C"
Area (ac)	3.05
Flow Path Length (ft)	760.0
Flow Path Slope (vft/hft)	0.0188
85th Percentile Rainfall Depth (in)	0.98
Percent Impervious	0.803
Soil Type	7
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	0.98
Peak Intensity (in/hr)	0.2444
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.7424
Time of Concentration (min)	32.0
Clear Peak Flow Rate (cfs)	0.5533
Burned Peak Flow Rate (cfs)	0.5533
24-Hr Clear Runoff Volume (ac-ft)	0.1834
24-Hr Clear Runoff Volume (cu-ft)	7988.6255



Appendices

Existing Hydrology Map
Proposed Hydrology Map
FEMA Flood Map

FOOTHILL BLVD.

TOWNE AVENUE

AREA "A"

21
3.05

20

1206.5
FS

N

1"=40'

AREA "B"

SEE OFF-TRACT
HYDROLOGY MAP

21

1191.7
FS

L=750'

LEGEND

DRAINAGE BOUNDARY

SUB-AREA BOUNDARY

10 NODAL POINT

21
0.13 TRIBUTARY NODAL POINT AREA (AC)

EXISTING HYDROLOGY MAP
TENTATIVE TRACT No. 83751
CITY OF CLAREMONT

7/5/22

FOOTHILL BLVD.

1206.3 FG-HP
10
1205.5 TG
1204.5 INV

N
1"=40'

AREA "C"

SEE OFF-SITE HYDROLOGY MAP

TOWNE AVENUE

11
3.05

L=760'

1192.0 TG
1190.0 INV
BUBBLE UP CB
11

LEGEND

DRAINAGE BOUNDARY

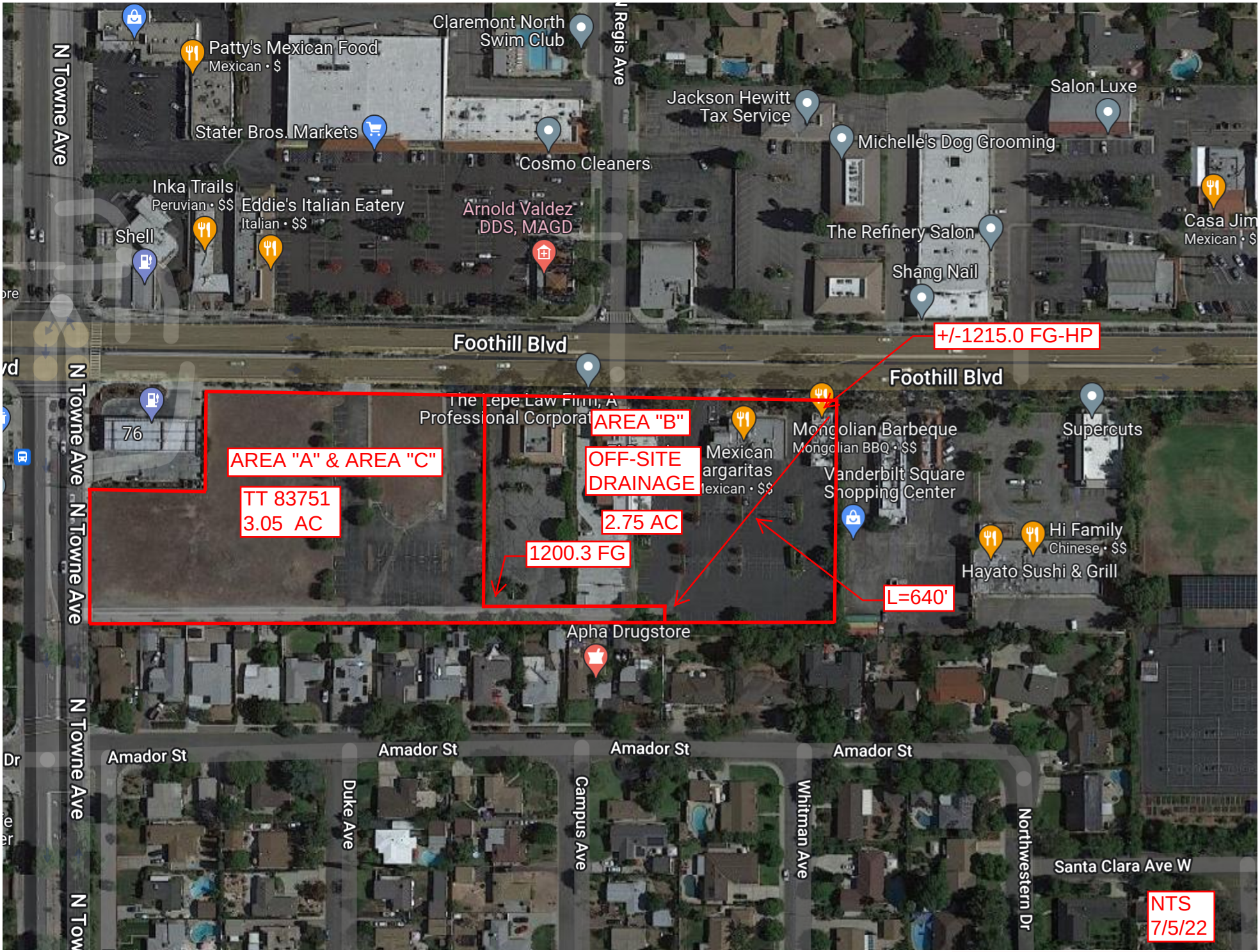
SUB-AREA BOUNDARY

10 NODAL POINT

21 / 0.13 TRIBUTARY NODAL POINT AREA (AC)

PROPOSED HYDROLOGY MAP
TENTATIVE TRACT No. 83751
CITY OF CLAREMONT

7/5/22

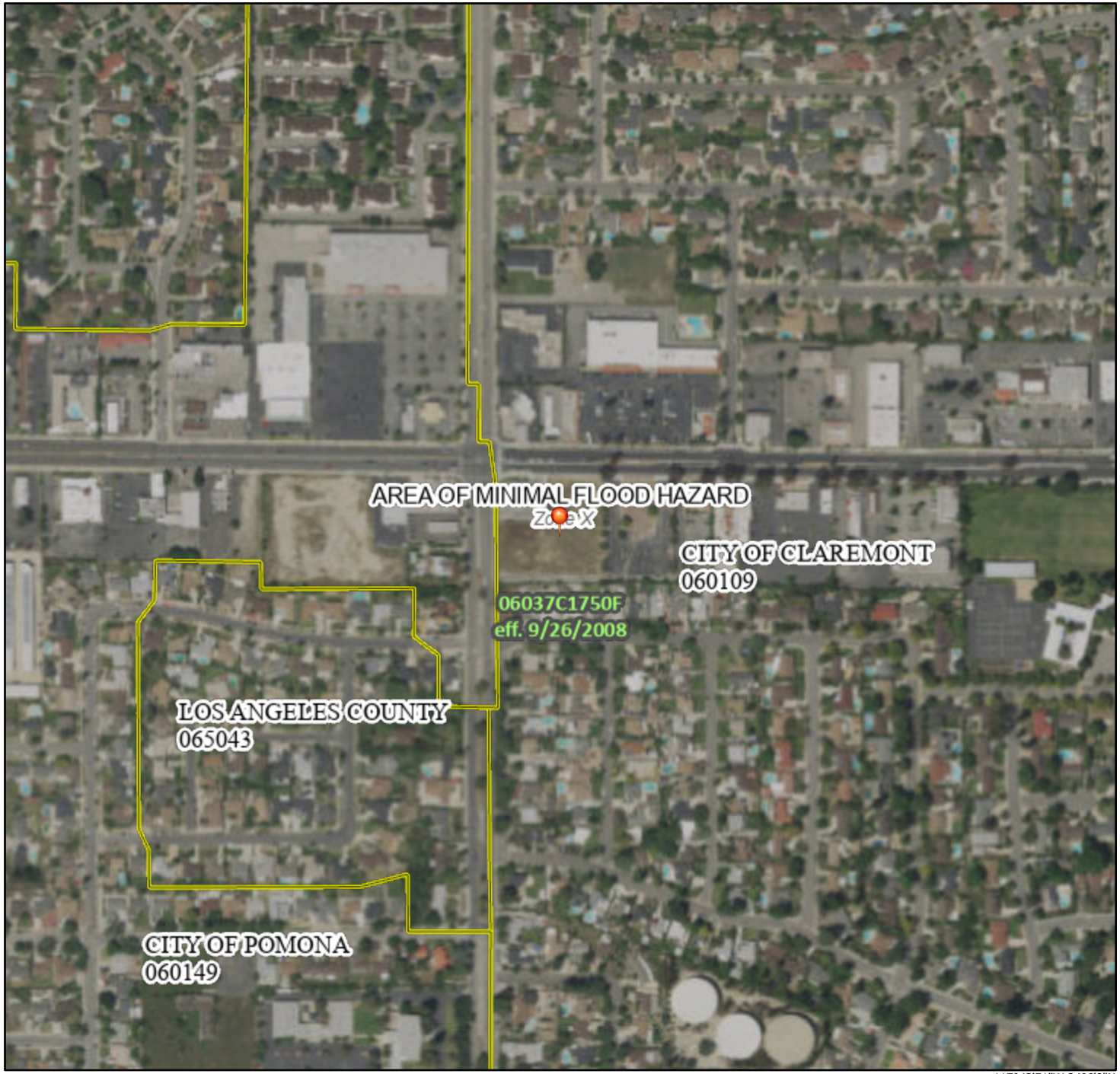


OFF-SITE HYDROLOGY MAP

National Flood Hazard Layer FIRMette

FEMA

117°44'29"W 34°6'38"N



117°43'51"W 34°6'9"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 4/24/2022 at 12:57 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.