Appendix G1
Hydrology Report

Hydrology Report

For

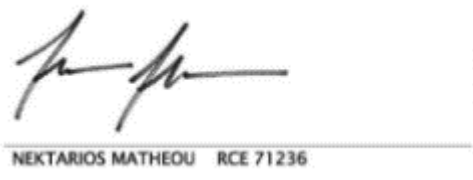
The Sobrato Organization

of

123 Independence Avenue, Menlo Park, California

Prepared By

Kier & Wright Civil Engineers & Land Surveyors, Inc.



NEKTARIOS MATHEOU RCE 71236

September 7, 2022

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PROJECT DESCRIPTION

This is a residential mixed-use project that proposes to build a podium apartment complex and garage, and 116 townhomes with associated infrastructure including trash enclosures and utilities. Additional development includes a park/paseo for public use. The overall project shall disturb 8.15 acres of land at 123 Independence Dr. The existing buildings, parking, and hardscape will be demolished and either reused as fill or off-hauled. The storm drain runoff from the new improvements will continue to be conveyed in a piped system to the existing storm drains located along the project frontages.

EXISTING DRAINAGE

The existing site is drained by an existing on-site storm drain system. The system collects runoff from the parking, roof, and hardscape areas and discharges directly to existing storm drain mains in Independence Dr., Constitution Dr., and Chrysler Dr. via a piped system.

For the existing runoff hydraulic calculations, a time of concentration of 10 minutes was assumed, providing storm intensity values of i_{10} = 1.77 in/hr and i_{100} = 2.77 in/hr.

DMA 1			
Total Area	46669	sf	(1.071 ac)
Impervious Area	40037	sf	(0.919 ac)
Runoff Coefficient	0.786		
$Q_n = C * I_n * A$			
Total Lot runoff rate, Q_{10}	1.49	cfs	
Total Lot runoff rate, Q_{100}	2.33	cfs	
DMA 2			
Total Area	41052	sf	(0.942 ac)
Impervious Area	36927	sf	(0.848 ac)
Runoff Coefficient	0.820		
$Q_n = C * I_n * A$			
Total Lot runoff rate, Q_{10}	1.37	cfs	
Total Lot runoff rate, Q_{100}	2.14	cfs	
DMA 3			
Total Area	47847	sf	(1.098 ac)
Impervious Area	44905	sf	(1.031 ac)
Runoff Coefficient	0.851		
$Q_n = C * I_n * A$			

Total Lot runoff rate, Q_{10}	1.65	cfs	
Total Lot runoff rate, Q_{100}	2.59	cfs	

DMA 4

Total Area	104911	sf	(2.408 ac)
Impervious Area	86084	sf	(1.976 ac)
Runoff Coefficient	0.756		

$Q_n = C * I_n * A$

Total Lot runoff rate, Q_{10}	3.22	cfs	
Total Lot runoff rate, Q_{100}	5.05	cfs	

DMA 5

Total Area	114706	sf	(2.633 ac)
Impervious Area	99196	sf	(2.277 ac)
Runoff Coefficient	0.792		

$Q_n = C * I_n * A$

Total Lot runoff rate, Q_{10}	3.69	cfs	
Total Lot runoff rate, Q_{100}	5.78	cfs	

Existing Site Total:

Q_{10}	11.43	cfs
Q_{100}	17.88	cfs

PROPOSED DRAINAGE

The redeveloped site will be drained by a new on-site storm drain system. The system will collect runoff from the parking, roof, and hardscape areas and convey it to biotreatment ponds/planters for stormwater treatment. After treatment, stormwater will be routed to the existing storm drain network at the associated project frontage, either in Independence Dr., Constitution Dr., or Chrysler Dr.

The new development will decrease the overall impervious area at the site, resulting in reduced stormwater runoff leaving the site. For the proposed runoff hydraulic calculations, a time of concentration of 10 minutes was assumed, providing storm intensity values of i_{10} = 1.77 in/hr and i_{100} = 2.77 in/hr.

DMA 1

Total Area	143918	sf	(3.304 ac)
Impervious Area	113404	sf	(2.603 ac)
Runoff Coefficient	0.730		

$Q_n = C * I_n * A$			
Total Lot runoff rate, Q_{10}	4.27	cfs	
Total Lot runoff rate, Q_{100}	6.68	cfs	
DMA 2			
Total Area	75624	sf	(1.736 ac)
Impervious Area	58889	sf	(1.352 ac)
Runoff Coefficient	0.723		
$Q_n = C * I_n * A$			
Total Lot runoff rate, Q_{10}	2.22	cfs	
Total Lot runoff rate, Q_{100}	3.48	cfs	
DMA 3			
Total Area	21834	sf	(0.501 ac)
Impervious Area	19841	sf	(0.455 ac)
Runoff Coefficient	0.827		
$Q_n = C * I_n * A$			
Total Lot runoff rate, Q_{10}	0.73	cfs	
Total Lot runoff rate, Q_{100}	1.15	cfs	
DMA 4			
Total Area	113734	sf	(2.611 ac)
Impervious Area	97128	sf	(2.23 ac)
Runoff Coefficient	0.783		
$Q_n = C * I_n * A$			
Total Lot runoff rate, Q_{10}	3.62	cfs	
Total Lot runoff rate, Q_{100}	5.66	cfs	
Proposed Site Total:			
Q_{10}	10.85	cfs	
Q_{100}	16.97	cfs	

Comparing the existing conditions with the proposed conditions yields the following changes in flow rate across the site:

- Net Decrease in Q_{10} runoff: 0.58 cfs
- Net Decrease in Q_{100} runoff: 0.91 cfs

DRAINAGE BASIN

All sites ultimately drain to the 54" main in Chrysler Dr. which is within the Atherton Channel Drainage Basin. See page 7.

EXISTING CONDITIONS

The existing site consists of 5 distinct buildings on 8.15 acres of land. The site is currently within FEMA Zone AE and subject to the 100-year flood. The current uses of the site are primarily manufacturing. Each frontage of the site contains landscaping up to the adjacent curb, but no sidewalks are present. The interior of the site is almost exclusively hardscape, consisting of roughly 194,000 sf of asphalt paving and 104,000 sf of building area (detailed breakdown can be found in the C.3 form of the associated Stormwater Management Plan).

The existing condition of this site contains no stormwater treatment measures. All runoff is piped untreated directly into the city storm drain system. We currently lack precise information on the path this water takes, but eventually all water is directed to the existing 24" line on Constitution Dr., 18" line on Independence Dr., and a 54" line on Chrysler. More detailed descriptions of the existing conditions will be provided during the construction documents phase.

In 2003, Menlo Park published the City-wide Storm Drain Study detailing the condition of the City's storm drain network. The study did not provide direct analysis or recommendations for the project area. The nearest analyzed network is "Drainage Area T," which was designated as a Priority 5 (lowest priority) improvement area.

MITIGATION MEASURES

No post-development flow attenuation mitigation measures are required as the post-development flow rate shall be lower than the pre-development flow rate (see attached Impervious Area Worksheet and Impervious Areas exhibits). The proposed project shall be reducing the overall impervious area of the site, which in turn reduces the site's overall runoff coefficient and the flow rate at which water leaves the site. These calculations can be found above.

DRAINAGE PATTERN ANALYSIS

Minimal impacts to the surrounding drainage patterns are anticipated by this project. While the drainage patterns of the site itself will see significant changes as a result of the site being raised out of the base flood elevation, the overall rate at which stormwater will leave the site is expected to decrease slightly. As the flow rate leaving the site will not be negatively impacted by the development, we do not foresee any issues regarding impacts to the upstream or downstream drainage patterns as a result of this project.

HYDRAULIC CALCULATIONS

The hydraulic calculations provided for this analysis were conducted using the rational method. For the purposes of these calculations, the runoff coefficients for the various pervious and impervious areas were taken from Table 5-4 from the C.3 Stormwater Technical Guidance manual, version 4.1 from October 2014 (see below). The intensity used was taken from the NOAA Hydrometeorological Design Studies Center assuming a time of concentration of 10 minutes for both the existing and proposed conditions.

Table 5-4
Estimated Runoff Coefficients for Various Surfaces During Small Storms

Type of Surface	Runoff Coefficients "C" factor
Roofs	0.90
Concrete	0.90
Asphalt	0.90
Grouted pavers	0.90
Pervious concrete	0.10
Pervious asphalt	0.10
Permeable interlocking concrete pavement	0.10
Grid pavements with grass or aggregate surface	0.10
Crushed aggregate	0.10
Grass	0.10

Note: These C-factors are only appropriate for small storm treatment design and should not be used for flood control sizing. When available, locally developed small storm C-factors for various surfaces may be used.

BASIS OF DESIGN

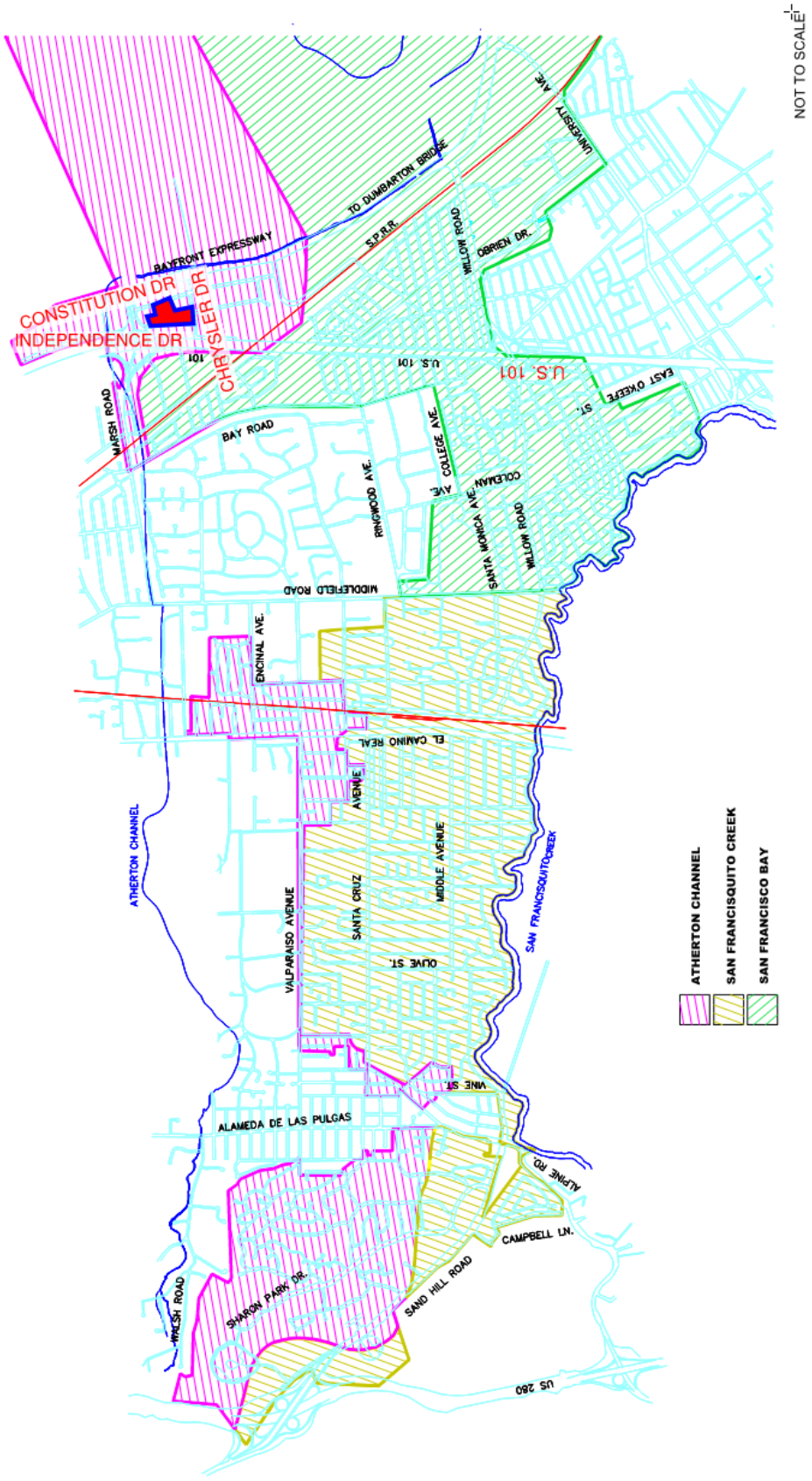
The basis of this design shall be such that the Hydraulic Grade Line of the storm drain system shall be at least 1' below the top of curb or six inches below the flow line of the gutter in locations where a vertical curb is not present. Additionally, the below-grade parking structure shall be protected from infiltration of surface water. As the proposed development will be raised above the existing grade at the site, the hydraulic grade line is expected to be deep within the limits of the onsite improvements. In the city ROW, all points of connection to the public main will be at existing or proposed manholes (not at curb inlets) with at least three feet of cover provided for all laterals. Given these conditions and the fact that the development will not increase the amount or rate of stormwater runoff at the site, no mitigation measures are expected to be necessary in order to comply with the project's design criteria.

[Hydraulic Profiles shall be provided at time of Building Permit submittal]

DRAINAGE BASIN MAP

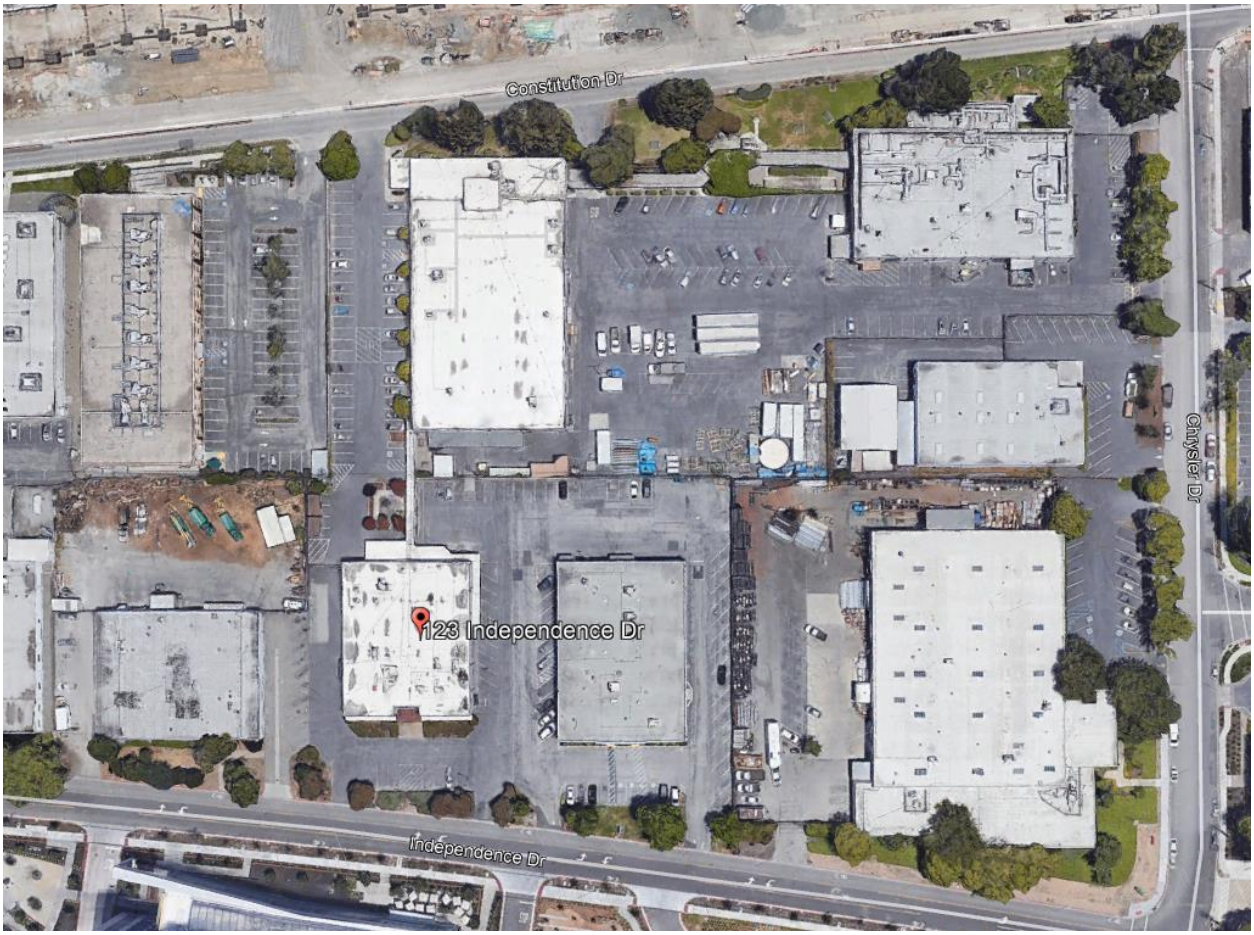
ATTACHMENT A

DRAINAGE BASIN MAP



city of MENLO PARK

ARIAL PHOTO


Constitution Dr
Chrysler Dr
123 Independence Dr
Independence Dr

CITY OF MENLO PARK

Engineering Division
701 Laurel Street
Menlo Park, CA 94025
Phone: (650) 330-6740
Fax: (650) 327-5497

IMPERVIOUS AREA WORKSHEET

FOR NEW DEVELOPMENT AND REDEVELOPEMENT PROJECTS

To comply with the City of Menlo Park Stormwater Ordinance 859 (Chapter 7.42) and the NPDES Permit issued by the California State Water Board, project applicants must report changes in impervious surface area resulting from their new development or redevelopment projects within the city. Therefore all new project applicants shall complete this worksheet, submit it to Engineering for plan review and include the relevant data on the site design plans.

Imperviousness refers to the inability of a surface to absorb water. Higher imperviousness causes more water to run off the surface. Imperviousness reduces the amount of ground water recharge and increases the amount of storm water flowing to local creeks and the Bay. Excessive stormwater causes erosion of creek banks and flooding. Storm water also carries pollutants normally found in pesticides, herbicides, engine oil, copper from brake dust, etc.

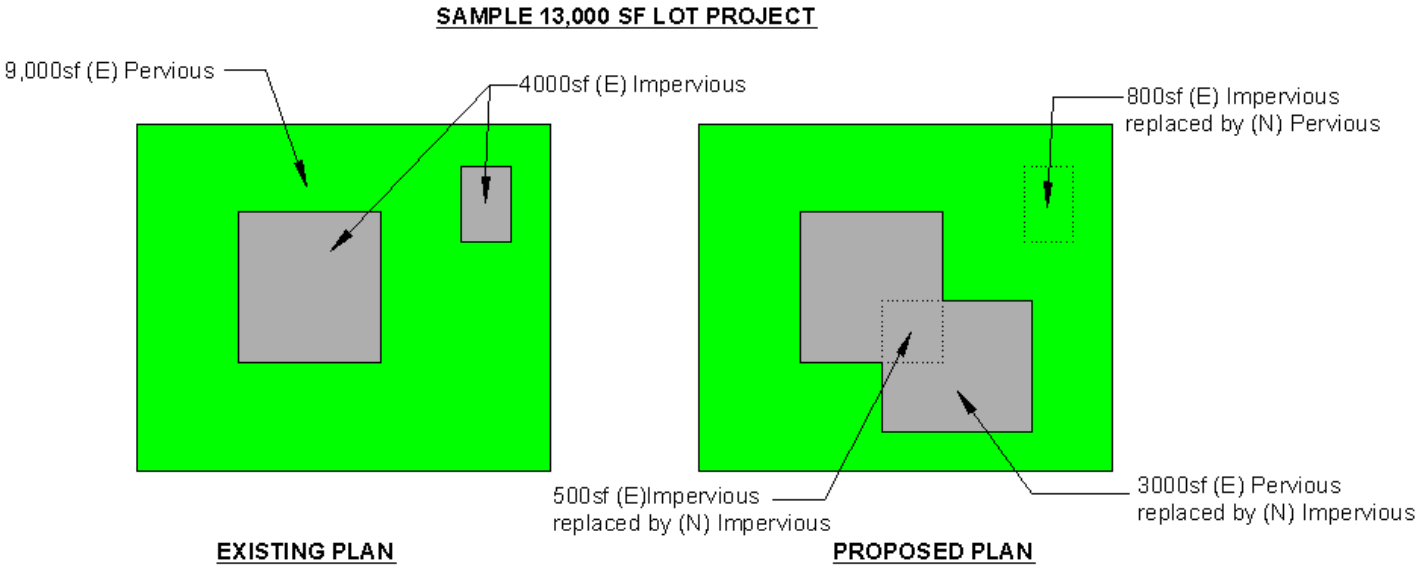
Impervious Surface is defined in this worksheet as any modified surface that **reduces** the land's natural ability to infiltrate or pass water into the soil. This includes any surface that causes storm water to run off in greater quantities than it would have under natural soil conditions given the same rain intensity.

TYPICAL PERVIOUS AND IMPERVIOUS SURFACES

Pervious Surfaces	Impervious Surfaces
Lawn/Vegetal Cover	Rooftops
Soil	Compacted Soil or Aggregate
Sand	Paved Walkways
Ponds	Swimming Pools
Streams/Creeks	Patios
Unpaved Gravel Driveways	Asphalt/Concrete
Pervious Concrete	Permanent Structures
Pervious Asphalt	Sidewalks
Permeable Pavers (Unit Pavers)*	Cobbles
Gravel Bed	

*****Permeable pavers are considered impervious if the underlying substrate is highly compacted soil or impermeable aggregate.

SAMPLE CALCULATION



IMPERVIOUS AREA SUMMARY		
Total Area of Parcel		**A** 13,000 ft^2
Existing Pervious Area		**B** 9,000 ft^2
Existing Impervious Area		**C** 4,000 ft^2
Existing % Impervious	$\frac{C}{A}$ **x 100**	**D** **30.8** **%**
Existing Impervious Area To Be Replaced W/ New Impervious Area		**E** 500 ft^2
Existing Pervious Area To Be Replaced W/ New Impervious Area		**F** 3,000 ft^2
New Impervious Area (Creating and/or Replacing)* *If greater than 10,000sqft, a hydrology report must be submitted	**E + F**	**G** 3,500 ft^2
Existing Impervious Area To Be Replaced W/ New Pervious Area		**H** 800 ft^2
Net Change In Impervious Area *This area is required to be detained/retained on-site	**F – H**	**I** **2,200** **ft^2**
Proposed Pervious Area	**B – I**	**J** 6,800 ft^2
Proposed Impervious Area* *Verify that J + K = A	**C + I**	**K** 6,200 ft^2
Proposed % Impervious	$\frac{K}{A}$ **x 100**	**L** **47.7** **%**

IMPERVIOUS AREA WORKSHEET

Submit this form with the improvement plan set to the City of Menlo Park Engineering Division.

Date: 09-06-2022

APN: 055-236-300, 066-236-240, 055-236-140, 055-236-180, 055-236-280

Property Address: 123 Independence Dr, Menlo Park CA

Project Description: Construction of an apartment complex (316 units and garage), 116 townhomes, trash enclosures, and utilities disturbing 8.14 acres

Contact Name: Nektarios Matheou

Contact Telephone Number: (408) 727-6665

Contact Email: nmatheou@kierwright.com

Title And Sheet# of Submitted Drawing used For Calculations: Stormwater Control Plan, C4.0 & C4.1

Land Use (Circle One):

(Residential) Commercial Industrial Professional Roadway

Drainage Basin (Circle One):

(See the *Hydrology Report Requirements* for a Drainage Basin map.)

(Atherton Creek) San Francisquito Creek San Francisco Bay

I certify that the calculations below accurately reflect the proposed changes and final impervious surfaces for the above project.

Calculations Performed By (Print): Nektarios Matheou

Title: Senior Project Engineer

Calculations Performed By (Signature): _____

Date: 09/06/2022

IMPERVIOUS AREA WORKSHEET

IMPERVIOUS AREA TABLE		
Total Area of Parcel		**A** 355,185 ft^2
Existing Pervious Area		**B** 47,859 ft^2
Existing Impervious Area		**C** ft^2 307,326
Existing % Impervious	$\frac{C}{A}$ **x 100**	**D** 86.5 **%**
Existing Impervious Area To Be Replaced W/ New Impervious Area		**E** ft^2 300,587
Existing Pervious Area To Be Replaced W/ New Impervious Area		**F** ft^2 0
New Impervious Area (Creating and/or Replacing)* *If greater than 10,000sqft, a hydrology report must be submitted	**E + F**	**G** 300,587 ft^2
Existing Impervious Area To Be Replaced W/ New Pervious Area		**H** 6,739 ft^2
Net Change In Impervious Area[1]	**F – H**	**I** ft^2 -6,739
Proposed Pervious Area	**B – I**	**J** ft^2 54598
Proposed Impervious Area* *Verify that J + K = A	**C + I**	**K** ft^2 300,587
Proposed % Impervious	$\frac{K}{A}$ **x 100**	**L** **%** 84.6%

[1] Net change in impervious area is the area required by

DMA	RUNOFF COEFFICIENT	TOTAL AREA (SQ. FT.)	TOTAL AREA (Ac)
1	0.79	46,669	1.07
2	0.83	41,052	0.94
3	0.85	47,847	1.10
4	0.76	104,911	2.41
5	0.79	114,705	2.63

LEGEND

- WATERSHED AREA LIMITS
- FLOW ARROWS
- PATHS FOR TIME OF CONCENTRAION

NORTH

0 15 30 60 90

Scale 1" = 30'

KIER+WRIGHT
3350 Scott Boulevard, Building 22
Santa Clara, California 95054
Phone: (408) 727-6665
www.kierwright.com

123 Independence
Menlo Park, CA

The Sobrato Organization
599 Castro Street, Suite 400
Mountain View, CA

Sheet Title:

EXISTING HYDROLOGY REPORT

Job No. 20004
Date: 09/07/2022
Scale: AS SHOWN
Drawn By: MC

Sheet No:

DMA	RUNOFF COEFFICIENT	TOTAL AREA (SQ. FT.)	TOTAL AREA (Ac)
1	0.73	143,918	3.30
2	0.72	75,624	1.74
3	0.83	21,834	0.50
4	0.78	113,734	2.61

LEGEND

- WATERSHED AREA LIMITS
- FLOW ARROWS
- PATHS FOR TIME OF CONCENTRATION

NORTH

0 15 30 60 90

Scale 1" = 30'

CONSTITUTION DR

INDEPENDENCE DR

CHRYSLER DR

DMA #1

DMA #2

DMA #3

DMA #4

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Mountain View, CA

Sheet Title:

PROPOSED HYDROLOGY REPORT

Job No. 20004
Date: 09/07/2022
Scale: AS SHOWN
Drawn By: MC

Sheet No:

CONSTITUTION DR

INDEPENDENCE DR

CHRYSLER DR

(3) STORAGE CONTAINERS

LEGEND

- BUILDING (IMPERVIOUS)
- AC OR CONCRETE (IMPERVIOUS)
- LANDSCAPE AREA (PERVIOUS)

TOTAL EXISTING IMPERVIOUS AREA: 307,326 SF

NORTH

0 15 30 60 90

Scale 1" = 30'

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Santa Clara, California 95054

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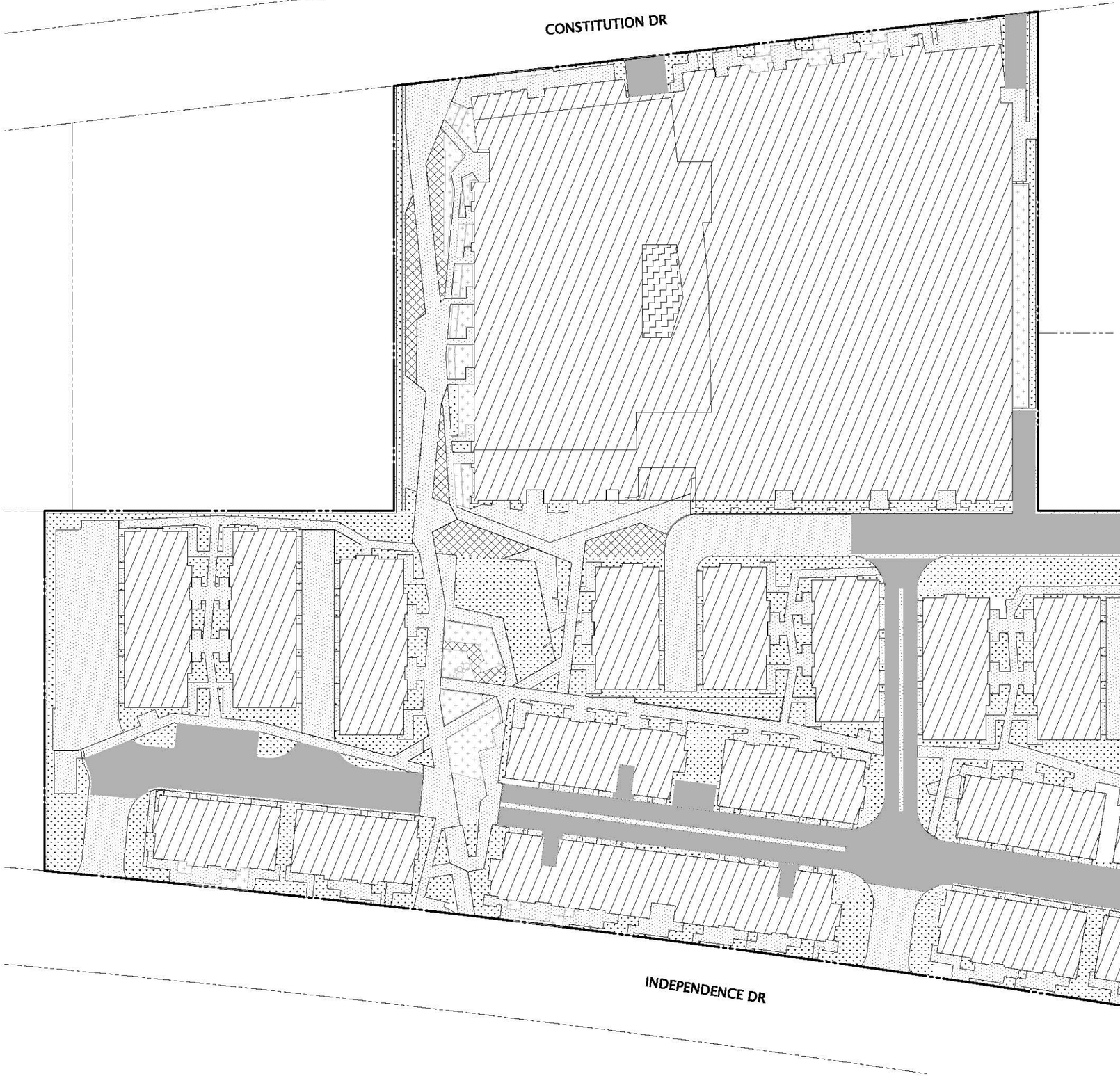
Mountain View, CA

Sheet Title:

EXISTING IMPERVIOUS AREAS

Job No.	20004
Date:	09/07/2022
Scale:	AS SHOWN
Drawn By:	MC

Sheet No:



LEGEND

- BUILDING (IMPERVIOUS)
- CONCRETE (IMPERVIOUS)
- AC (IMPERVIOUS)
- FLOW-THROUGH PLANTER (IMPERVIOUS)
- PERVIOUS PAVEMENT (PERVIOUS)
- LANDSCAPE AREA (PERVIOUS)
- DRAINS TO SANITARY SEWER

TOTAL PROPOSED IMPERVIOUS AREA: 300,587 SF

NORTH

0 15 30 60 90

Scale 1" = 30'

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Santa Clara, California 95054
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Mountain View, CA

Sheet Title:

PROPOSED IMPERVIOUS AREAS

Job No. 20004
Date: 09/07/2022
Scale: AS SHOWN
Drawn By: MC

Sheet No:

Apartment Area Summary - Level 1 (Gross Floor Area Calculations)

BUILDING	RESIDENTIAL UNIT (INCLUDED IN FAR)	LOBBY/COMMON AREA (INCLUDED IN FAR)	LEASING (INCLUDED IN FAR)	AMENITIES (INCLUDED IN FAR)	CIRCULATION (INCLUDED IN FAR)	BOH/MEP/FP/ GAS/TRASH (INCLUDED IN FAR)	GARAGE (NOT INCLUDED IN FAR)
APARTMENT	14,235 SF	3,153 SF	1,239 SF	1,934 SF	5,982 SF	2,990 SF	57,475 SF

STUDIO T SQUARE

: Architecture
: Planning
: Urban Design

: 1970 Broadway, Suite 615
: Oakland, California 94612
: (510) 451 - 2850

123 Independence
Menlo Park, CA

The Sobrato Organization
599 Castro Street, Suite 400
Mountain View, CA

Sheet Title:
APARTMENT FLOOR PLAN LEVEL 1 AND PARKING LEVEL B1

Job No.	20004
Date:	09/17/21
Scale:	As indicated
Drawn By:	Author

Sheet No:
A 2.01