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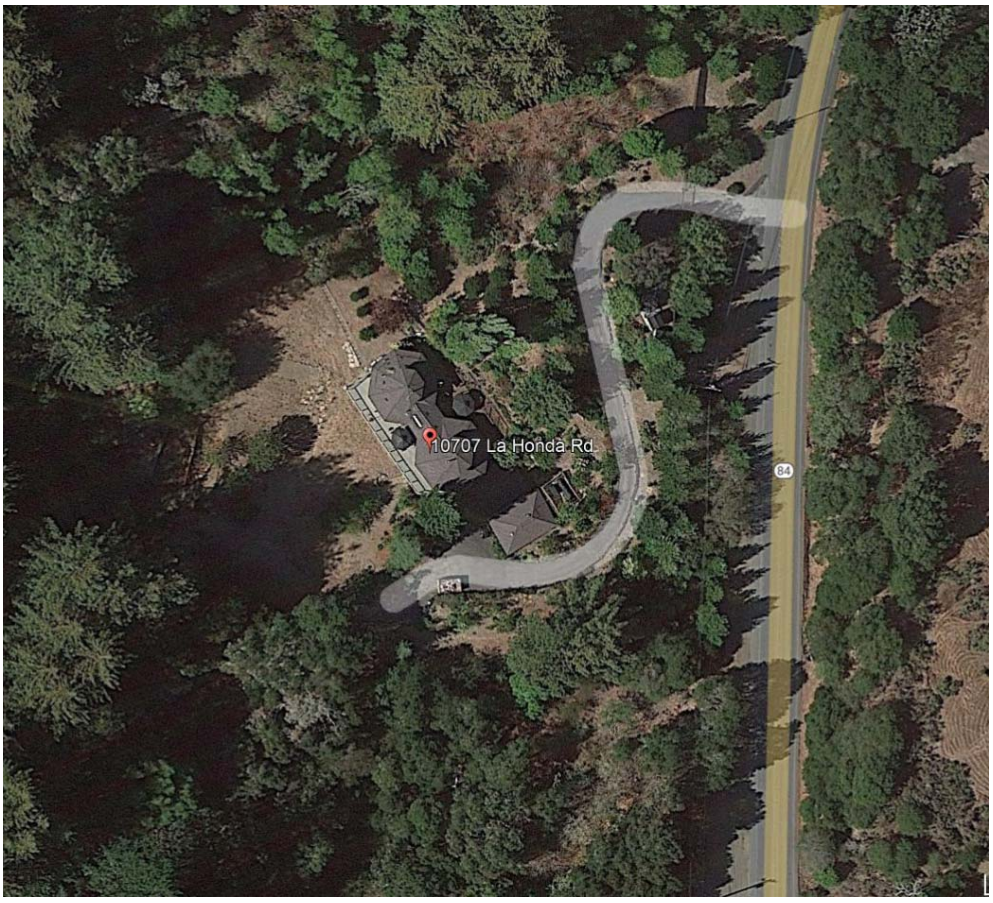
Dated: December 12, 2022
Revised: August 10, 2023

HYDROLOGY STUDY

HEALING CULTURES
10707 La Honda Road
Woodside, California
(Unincorporated San Mateo County)

APN: 078-190-210



This package includes:
- Information Sheet
- Site Hydrology Calculations
- Site Hydrology Exhibits
- Stormwater Treatment Calculations
- Stormwater Retention & Metering Calculations

References:
- Topographic Survey by Lea & Braze Engineering, Inc.
- Grading and Drainage Plan by Lea & Braze Engineering, Inc.
- NOAA Precipitation Intensity Map & Chart
- San Mateo County Drainage Manual
- HydroCAD 7.0 UNIT HYDROGRAPH Definitions
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Site Information:
10707 La Honda Road
Woodside, California
APN: 078-190-210

Project Information:

Gross Lot Area:	496,588 sqft. (11.400 acre)
Hydrology Study Area:	88,600 sqft. (2.034 acre)
Impervious Created / Replaced:	16,242 sqft. (0.373 acre)
Existing Site Impervious Area:	15,764 sqft. (0.362 acre)
Proposed Site Impervious Area:	21,488 sqft. (0.493 acre)
Net Change of Impervious Area:	+5,724 sqft. (+0.131 acre) *Net Increase*

(Pervious Paving = D.G. / Gravel Walkways & Wood Decks)

Existing Site Pervious Paving:	2,501 sqft. (0.057 acre)
Proposed Site Pervious Paving:	5,051 sqft. (0.116 acre)
Net Change of Pervious paving:	+2,550 sqft. (+0.059 acre) *Net Increase*
Existing Site Developed Area:	18,265 sqft. (0.419 acre)
Proposed Site Developed Area:	26,539 sqft. (0.609 acre)
Net Change of Developed Area:	+8,274 sqft. (+0.190 acre) *Net Increase*

Hydrology Information: (Per NOAA Rainfall Intensity Map & Chart)

Storm Interval:	10 Year Return Storm
Initial Time of Concentration (Tc):	10 minutes
Rainfall Intensity (I):	10 year @ 10 minutes = 3.13 in/hr
Runoff Coefficient (C):	0.90 for Impervious areas, 0.30 for Pervious areas
Critical Duration for Retention:	68 minutes (HydroCAD)
Watershed:	San Gregorio
FEMA Flood Zone Designation:	Zone X

Project Introduction:

The approximately 11.40 acre site consists of two irregularly-shaped parcels located on the west side of La Honda Road in a lightly developed, hillside residential area in an un-incorporated area of Woodside in San Mateo County. The site is bounded by La Honda Road to the east, La Honda Creek to the west, and residential parcels to the north and south.

The subject site slopes steeply down to the west, toward La Honda Creek, at an average slope of approximately 30%, with a maximum vertical relief of approximately 106 feet.

The site is currently developed. A two-story residence, with a daylighting basement, and a detached garage are located in the northern central portion of the site. The residence is surrounded by wood decks and minor stone pathways. The site is accessed from La Honda Road by an asphaltic concrete driveway that extends down to the southwest to access the residence and garage. Several water tanks and two sheds are located near the driveway entry. A solar array is located west of the residence. The remainder of the property is vegetated with native grasses, various young to mature trees, and the associated undergrowth.

Drainage across the property can be generally characterized as uncontrolled sheet flow to the west, to La Honda Creek. No defined drainage improvements for the development were noted on the site.

South of the existing residence, a 24" culvert from La Honda Road extends approximately 150 feet into the subject property where it discharges to a seasonal gully that drains to La Honda Creek.

We understand, at this time, that the existing residence and detached garage will remain. The driveway, wood decks, solar array, and the vast majority of the existing hardscape will be demolished and removed.

The project will construct and addition to the residence, remodel the existing detached garage into an accessory structure, and construct a restroom building adjacent to the west. A new concrete driveway and parking area will be constructed in approximately the same location as the existing driveway. The water tank pad will be expanded to accommodate more water tanks, and the wood decks around the residence will be replaced. Various appurtenant concrete and gravel walkways will be constructed around the buildings.

The existing impervious surface is approximately 15,764 square feet, with the total proposed impervious surface being 21,488 square feet, resulting in a net increase in impervious surface area of approximately 5,724 square feet.

An additional 5,051 square feet of pervious paving (wood decks and gravel walkways) will increase the overall existing developed site area of 18,265 square feet, to 26,539 square feet, resulting in a net increase in overall developed area of 8,274 square feet.

Hydrology Calculation Method:

The hydrology calculations provided in the report are based on the 88,600 square foot study area as indicated on the included hydrology exhibits.

The rational method was used for runoff calculations based on the San Mateo County Drainage Criteria for a 10 year storm event. The initial Time of Concentration was assumed to be 10

minutes. Intensity was taken from the site specific NOAA Rainfall Intensity Map & Chart to be 3.13 inches per hour. The C-value for impervious areas is taken as 0.90. The C-value for pervious paving and landscape areas is taken as 0.30.

The project proposes to replace more than 50% of the existing impervious surface. Therefore, the County of San Mateo requires pre-construction runoff to be based on the undeveloped site condition for the purposes of stormwater retention and metering.

The goal is to reduce the amount of stormwater runoff, through the use of an underground retention and metering system, to below the undeveloped site runoff rate and provide a system capable of retaining the additional runoff.

Undeveloped Condition	Post-Construction (Without Metering)	Net Change	
Q = 1.910 cfs.	Q = 2.836 cfs.	Q = +0.926 cfs	(48% Increase)

Site Drainage Design:

Proposed Drainage Improvements: A new on-site storm drain system, using a series of vegetated swales, area drains, and catch basins, will be constructed throughout the site to collect site storm water runoff. Collected runoff will be directed to a below grade stormwater retention system and then metered, to a new flow-through stormwater treatment planter, and then to a new rocked outfall where it will discharge to La Honda Creek in the historical direction.

Retention System Design Summary: To provide a dynamic analysis of the system performance, a HydroCAD stormwater model analysis was run, using the rational method for calculations, using an IDF curve based on the intensities provided by the NOAA stormwater intensity chart for the site for a 10 year return storm with a 10 minute initial time of concentration. (Refer to appendix A for the site map, hydrology information and hydrology exhibits)

To determine the overall post-construction runoff, drainage from the site was analyzed to determine which areas would be subject to capture by the new on-site retention system and which areas would bypass the system.

The Stormwater Control Plan, Exhibit SCP-2, indicates that runoff from the front of the residence roof, the accessory building and restroom building roofs, the driveway, water tanks, the new patios and walkways, and a portion of the undeveloped area above the residence will be subject to capture in the new on-site retention system.

Runoff from the rear of the residence roof, the wood decks on the west side of the residence, the existing stone walkways below the residence, and the remainder of the undeveloped area will not be captured and will be allowed to sheet flow to La Honda Creek as is the current condition.

Although not directed to the stormwater retention system, runoff from the rear of the residence roof is captured and directed to the flow-through treatment planter.
(Refer to the proposed site drainage exhibit in Appendix A for details.)

The system is designed based on HydroCAD modeling of the system in the following manner:

1. Based on HydroCAD modeling, using an initial time of concentration of 10 minutes, the retention system was sized so that the post-development storm events for both captured and uncaptured runoff will be reduced to the fullest extent possible.

2. The retention system, as designed, consists of 50 linear feet of 60" diameter solid HDPE storage pipe providing a total retention volume of 982 cubic feet.

3. Metering is provided by using a metering device with a 2.50" diameter orifice with a calculated outflow rate of 0.379 cubic feet per second.

4. Based on the allowable peak release rate (undeveloped site condition) and the retention and metering proposed, the HydroCAD model was run for the 10 year storm event to verify that the site peak release and retention storage volume are within the required parameters. (Refer to appendix B for site hydrology calculations and HydroCAD modeling results)

A summary of the HydroCAD modeling results is provided below:

10 year storm undeveloped site

Time of Concentration:	10 minutes
Rainfall Intensity:	3.13 in/hr
Calculated Runoff:	1.89 cfs

10 year post-construction

Time of Concentration:	10 minutes
Rainfall Intensity:	3.13 in/hr
Uncaptured Runoff:	1.38 cfs
Metered Outflow:	0.30 cfs
Total Runoff:	1.68 cfs (< 1.89 O.K.)

Critical Duration:	68 minutes
Rainfall Intensity:	1.18 in/hr
Uncaptured Runoff:	0.53 cfs
Metered Outflow:	0.39 cfs
Overflow:	0.16 cfs
Total Runoff:	1.08 cfs (< 1.89 O.K.)

Based on our calculations and the HydroCAD modeling results, we believe that the proposed stormwater retention system is adequate to perform its intended function and is in conformance with the County of San Mateo design criteria.

Provision C.3 Considerations:

Regulated Project Status: Based on the results of the Provision C.3 and C.6 Development Review Checklist, this project is a commercial development that is not a special land use category and proposes to create or replace greater than 10,000 square feet of impervious surface. Therefore, the project must implement stormwater treatment, source control and low impact site design measures to the fullest extent possible.

Stormwater Treatment Measures: All site impervious surface, with the exception of 832 square feet of walkways downhill of the residence and the 1,188 square foot solar panel array, is directed to a new bio-retention area located on the west side of the lot. The required treatment area and ponding depth was calculated using the combination flow & volume method. The calculations were done using the San Mateo Countywide Water pollution Prevention Program Worksheet for Calculating the Combination Flow and Volume Method Spreadsheet.

The calculations indicate that the proposed treatment surface area of 700 square feet, with a ponding depth of 6 inches is sufficient to satisfy the treatment requirements. (Refer to the included treatment area sizing worksheet for full details.)

Source Control Measures: All storm drain inlets shall be marked with the words "No Dumping – Flows to Bay" or the equivalent. Landscape source control measures include minimizing the use of pesticides and fertilizers to the fullest extent possible.

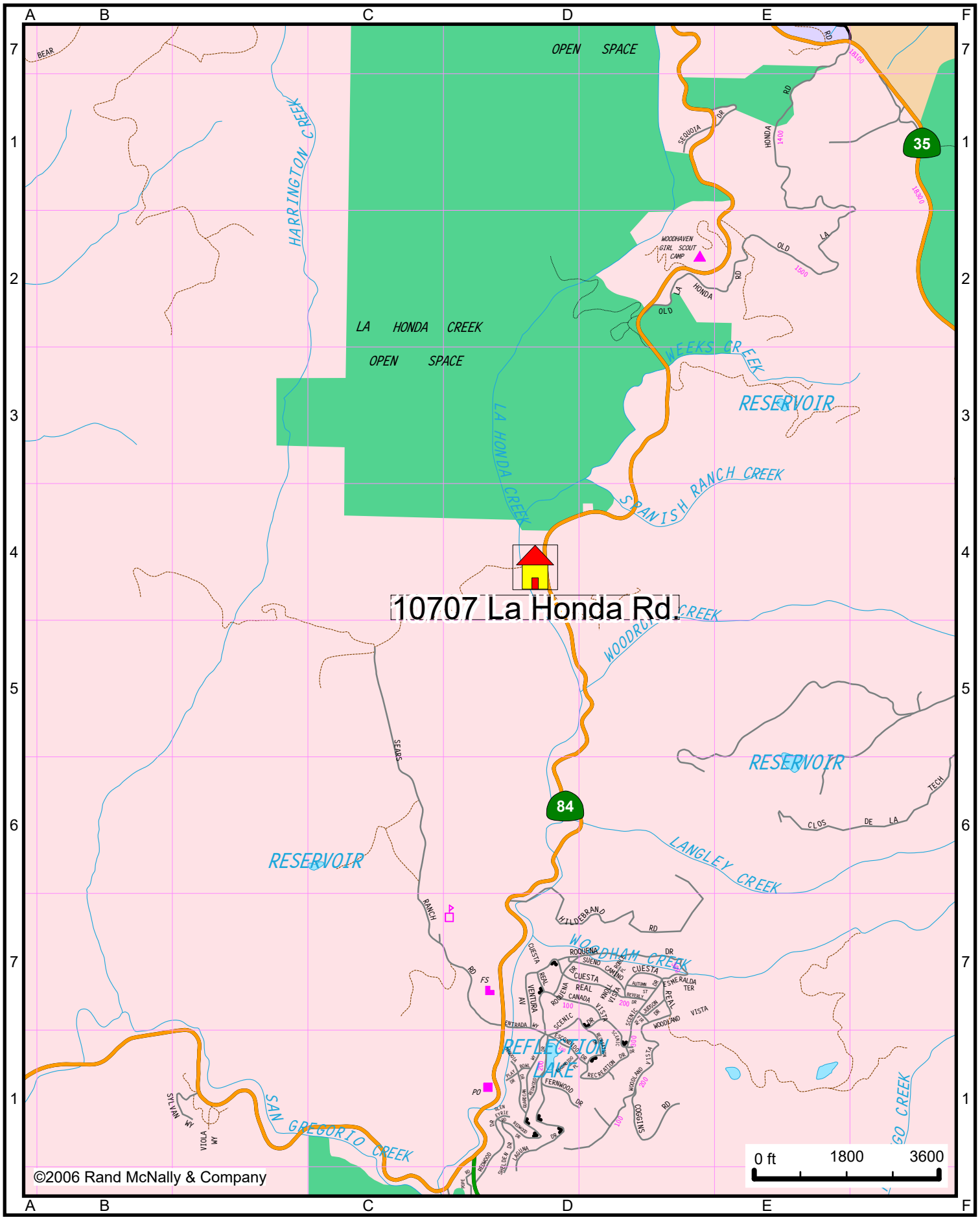
Low Impact Development Site Design Measures: Site design measures proposed for this project include directing runoff from driveways and walkways onto vegetated areas.

Conclusion:

Based on our calculations, Lea & Braze Engineering, Inc., believes that the proposed grading and drainage design is adequate to perform its intended function and is in conformance with the County of San Mateo drainage design criteria. Refer to the included exhibits and calculation sheets for specific information regarding the site drainage design.

APPENDIX A

SITE MAP, HYDROLOGY DATA
&
HYDROLOGY EXHIBITS



10707 La Honda Rd.: 10707 La Honda Rd, Woodside,CA 9402

General Information
Homepage
Progress Reports
FAQ
Glossary

Precipitation Frequency
Data Server
GIS Grids
Maps
Time Series
Temporals
Documents

Probable Maximum Precipitation
Documents

Miscellaneous
Publications
Storm Analysis
Record Precipitation

Contact Us
Inquiries

NOAA ATLAS 14 POINT PRECIPITATION FREQUENCY ESTIMATES: CA

Data description

Data type: Precipitation intensity **Units:** English **Time series type:** Partial duration

Select location

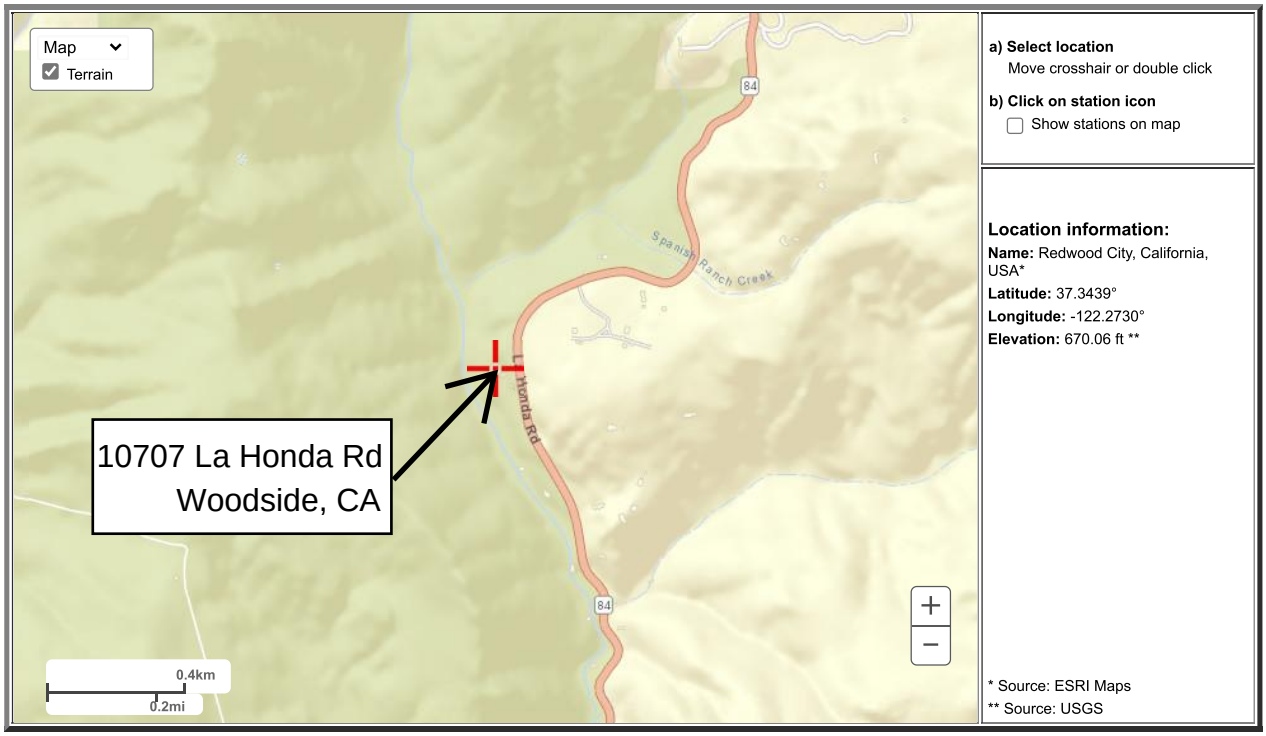
1) Manually:

a) By location (decimal degrees, use "-" for S and W): Latitude: Longitude: Submit

b) By station (list of CA stations): Select station

c) By address 10707 LA Honda Rd, Redwood City, C

2) Use map (if ESRI interactive map is not loading, try adding the host: **https://js.arcgis.com/** to the firewall, or contact us at hdsc.questions@noaa.gov):



POINT PRECIPITATION FREQUENCY (PF) ESTIMATES

WITH 90% CONFIDENCE INTERVALS AND SUPPLEMENTARY INFORMATION
NOAA Atlas 14, Volume 6, Version 2

PF tabular | PF graphical | Supplementary information | Print page

PDS-based precipitation frequency estimates with 90% confidence intervals (in inches/hour)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**2.34** (2.00-2.76)	**2.94** (2.51-3.47)	**3.72** (3.17-4.42)	**4.37** (3.68-5.23)	**5.24** (4.25-6.54)	**5.93** (4.68-7.57)	**6.61** (5.08-8.71)	**7.34** (5.45-10.0)	**8.35** (5.89-11.9)	**9.14** (6.19-13.6)
10-min	**1.68** (1.43-1.98)	**2.11** (1.80-2.49)	**2.67** (2.27-3.16)	**3.13** (2.64-3.74)	**3.76** (3.04-4.69)	**4.24** (3.35-5.43)	**4.74** (3.64-6.25)	**5.26** (3.91-7.17)	**5.98** (4.22-8.56)	**6.55** (4.44-9.77)
15-min	**1.35** (1.16-1.60)	**1.70** (1.45-2.01)	**2.15** (1.83-2.55)	**2.52** (2.13-3.02)	**3.03** (2.45-3.78)	**3.42** (2.70-4.38)	**3.82** (2.93-5.04)	**4.24** (3.15-5.78)	**4.82** (3.40-6.90)	**5.28** (3.58-7.87)
30-min	**0.944** (0.808-1.11)	**1.18** (1.01-1.40)	**1.50** (1.28-1.78)	**1.76** (1.48-2.11)	**2.11** (1.71-2.63)	**2.39** (1.88-3.05)	**2.67** (2.04-3.51)	**2.96** (2.19-4.03)	**3.36** (2.37-4.81)	**3.68** (2.50-5.49)
60-min	**0.668** (0.572-0.788)	**0.838** (0.717-0.991)	**1.06** (0.905-1.26)	**1.25** (1.05-1.49)	**1.50** (1.21-1.87)	**1.69** (1.33-2.16)	**1.89** (1.45-2.49)	**2.10** (1.55-2.85)	**2.38** (1.68-3.41)	**2.61** (1.77-3.89)
2-hr	**0.492** (0.421-0.580)	**0.616** (0.526-0.728)	**0.777** (0.662-0.922)	**0.910** (0.767-1.09)	**1.09** (0.882-1.36)	**1.23** (0.970-1.57)	**1.37** (1.05-1.81)	**1.52** (1.13-2.07)	**1.73** (1.22-2.47)	**1.89** (1.28-2.81)
3-hr	**0.414** (0.355-0.489)	**0.518** (0.443-0.612)	**0.654** (0.557-0.775)	**0.765** (0.645-0.916)	**0.916** (0.742-1.14)	**1.03** (0.816-1.32)	**1.15** (0.884-1.52)	**1.28** (0.947-1.74)	**1.45** (1.02-2.07)	**1.58** (1.07-2.36)
6-hr	**0.297** (0.254-0.351)	**0.372** (0.318-0.440)	**0.471** (0.401-0.558)	**0.551** (0.465-0.660)	**0.661** (0.535-0.824)	**0.746** (0.589-0.954)	**0.833** (0.639-1.10)	**0.923** (0.685-1.26)	**1.05** (0.739-1.50)	**1.14** (0.776-1.71)
12-hr	**0.197** (0.169-0.233)	**0.249** (0.213-0.294)	**0.316** (0.269-0.375)	**0.372** (0.314-0.445)	**0.447** (0.362-0.558)	**0.506** (0.400-0.647)	**0.566** (0.434-0.746)	**0.629** (0.466-0.856)	**0.714** (0.504-1.02)	**0.782** (0.530-1.17)

National Flood Hazard Layer FIRMette

FEMA

122°16'41"W 37°20'56"N

Feet

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

1:6,000

122°16'4"W 37°20'28"N

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

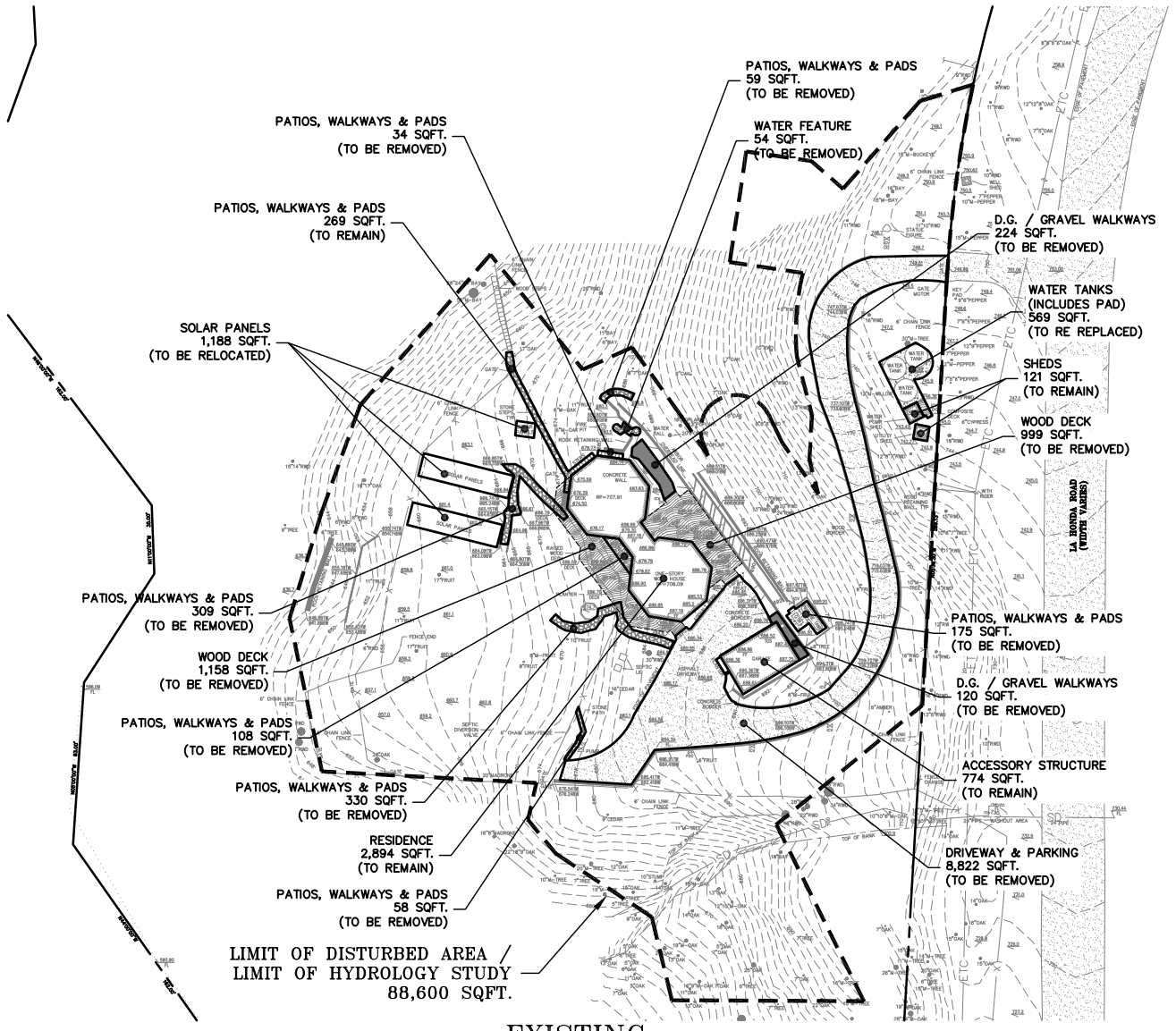
N

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

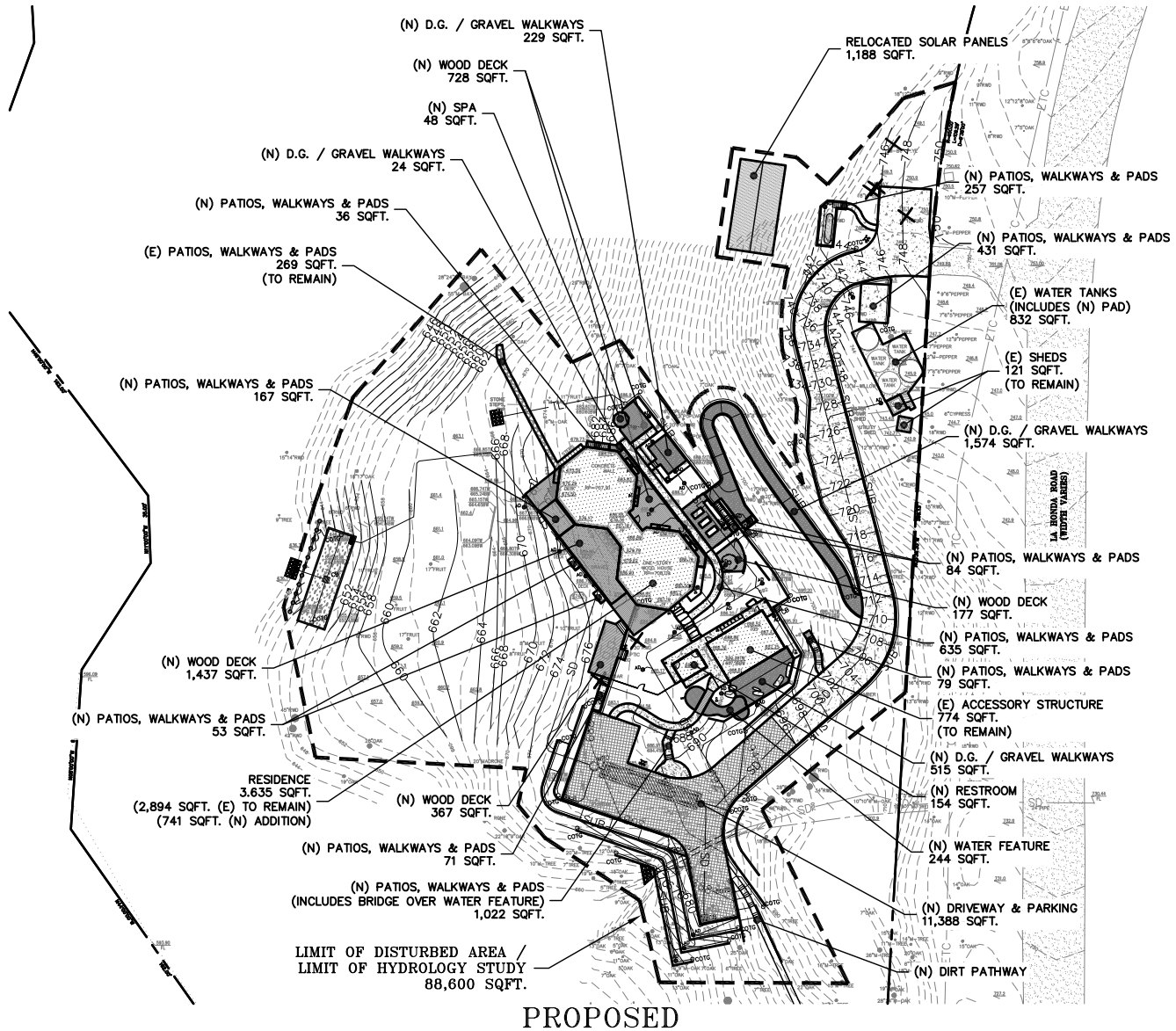
This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 4/25/2022 at 3:51 PM 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.



EXISTING



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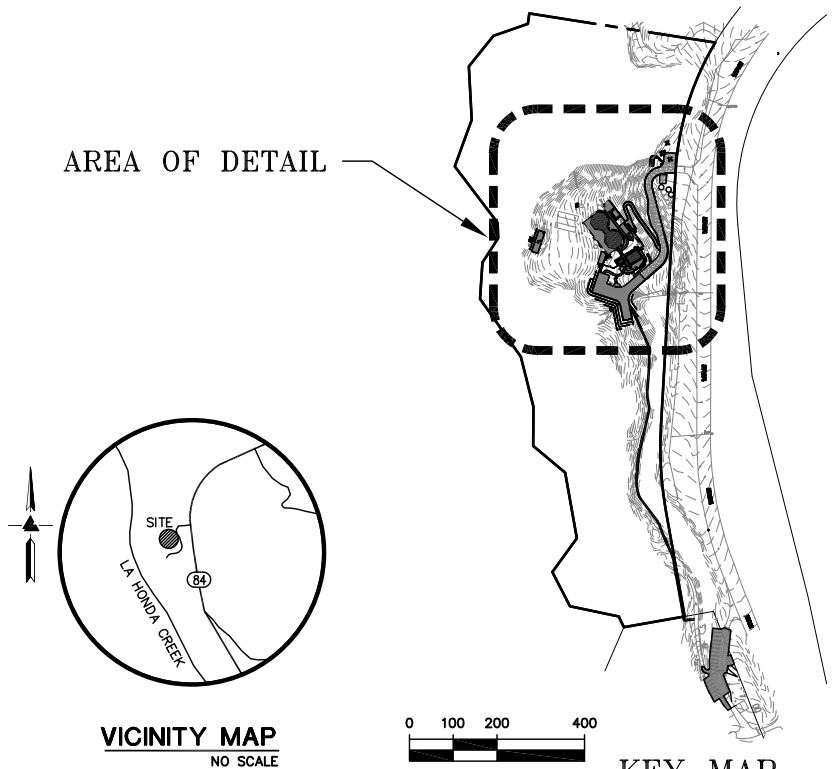
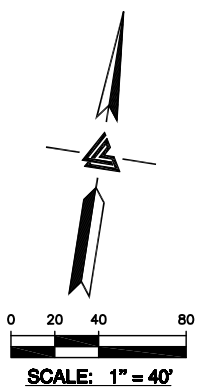


KEY MAP

VICINITY MAP
NO SCALE



DEVELOPMENT INFORMATION

TOTAL SITE AREA	496,588 SQUARE FEET (11.400 ACRE)			
DISTURBED / HYDROLOGY STUDY AREA	88,600 SQUARE FEET (2.034 ACRE)			
IMPERVIOUS AREA	EXISTING TOTAL S.F.	REMOVED TOTAL S.F.	NEW TOTAL S.F.	PROPOSED TOTAL S.F.
RESIDENCE	2,894	0	741	3,635
ACCESSORY BUILDING	774	0	0	774
SHEDS	121	0	0	121
RESTROOM	0	0	154	154
DRIVEWAY & PARKING	8,822	8,822	11,388	11,388
PATIOS, WALKWAYS & PADS	1,342	1,073	2,835	3,104
SOLAR PANELS	1,188	0	0	1,188
SPA	0	0	48	48
WATER FEATURE	54	54	244	244
WATER TANKS	569	569	832	832
TOTAL IMPERVIOUS AREA	15,764	10,518	16,242	21,488
NET CHANGE IN IMPERVIOUS AREA	+ 5,724 SQUARE FEET (NET INCREASE)			
PERVIOUS PAVING				
D.G. / GRAVEL WALKWAY	344	344	2,342	2,342
WOOD DECK	2,157	2,157	2,709	2,709
TOTAL PERVIOUS PAVING	2,501	2,501	5,051	5,051
NET CHANGE IN PERVIOUS PAVING	+ 2,550 SQUARE FEET (NET INCREASE)			
TOTAL DEVELOPED AREA	18,265	13,019	21,293	26,539
NET CHANGE IN DEVELOPED AREA	+ 8,274 SQUARE FEET (NET INCREASE)			
LANDSCAPE AREA	478,323			470,049

REGISTERED PROFESSIONAL ENGINEER
JAMES TOBY
No. 63127
CIVIL
STATE OF CALIFORNIA
ORIGINAL SIGNATURES IN BLUE INK

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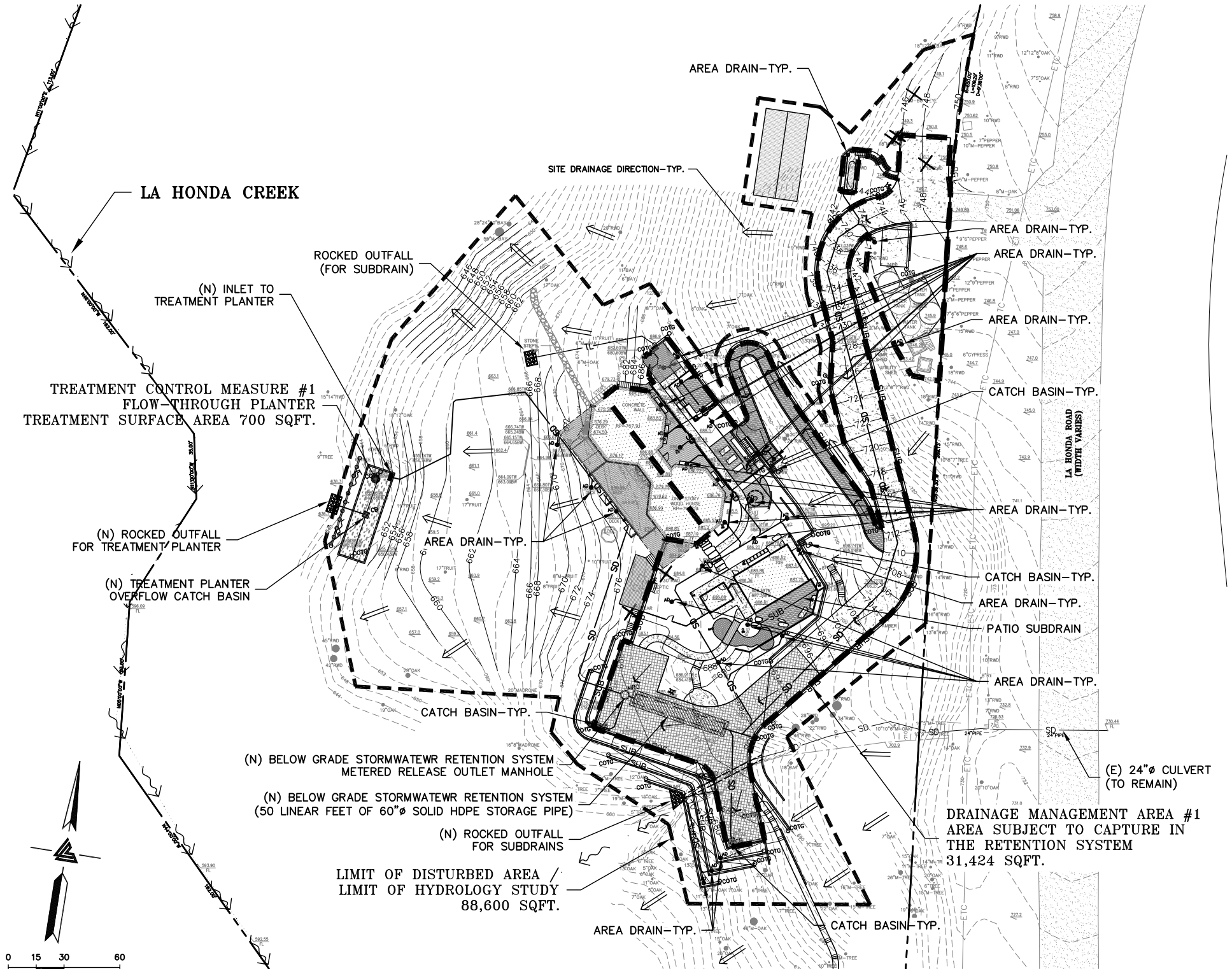
HEALING CULTURES
10707 LA HONDA ROAD
WOODSIDE, CALIFORNIA
SAN MATEO COUNTY
APN: 078-181-010
078-190-190

IMPERVIOUS SURFACE EXHIBIT

–	–
–	–
–	–
–	–
1 PLAN CHECK #1 07-13-23	ZA
REVISIONS	BY
JOB NO: 2200903	
DATE: 12-09-22	
SCALE: 1"=40'	
DESIGN BY: ZA/RM	
CHECKED BY: RC	
SHEET NO:	

SCP-1



TREATMENT CONTROL MEASURE (TCM) SUMMARY TABLE

TREATMENT CONTROL MEASURE (TCM) SUMMARY TABLE														
DRAINAGE MANAGEMENT AREA (DMA)	TREATMENT CONTROL MEASURE (TCM)	LOCATION	TREATMENT TYPE	LID OR NON-LID	SIZING METHOD	DRAINAGE AREA (SQ FT)	IMPERVIOUS AREA (SQ FT)	PERVIOUS AREA (PERMEABLE PAVEMENT) (SQ FT)	PERVIOUS AREA (OTHER) (SQ FT)	% ON-SITE AREA TREATED BY LID OR NON-LID TCM	BIO-RETENTION AREA PROVIDED (SQ FT)	PONDING DEPTH REQUIRED (IN)	OVERFLOW RISER HEIGHT (IN)	PONDING VOLUME REQUIRED (CU FT)	PONDING VOLUME PROVIDED (CU FT)
1	1	ON-SITE	BIORETENTION LINED*** WITH UNDERDRAIN	LID	3. COMBINATION FLOW & VOLUME METHOD****	33,612*	19,468*	3,226	10,918	37.9%	700	5.79	6	338	350
2	–	ON-SITE	SELF-TREATING	LID	–	54,988	2,020**	1,825	51,143	62.1%	–	–	–	–	–
					TOTALS:	88,600	21,488	5,051	62,061	100%					

*INCLUDES 2,188 SQFT. OF RESIDENCE ROOF SENT TO BIO-RETENTION THAT IS NOT SENT TO THE STORMWATER RETENTION SYSTEM.
**INCLUDES 1,188 SQFT. SOLAR PANEL ARRAY
***"LINED" REFERS TO AN IMPERMEABLE LINER PLACED ON THE BOTTOM OF A BIORETENTION BASIN OR A CONCRETE FLOW-THROUGH PLANTER, SUCH THAT NO INFILTRATION INTO NATIVE SOIL OCCURS.
****SIZING FOR BIO-RETENTION AREA REQUIRED CALCULATED USING THE COMBINATION FLOW AND VOLUME APPROACH PROVIDED IN THE C.3 HANDBOOK.

GENERAL PLAN NOTES:

A. THIS PROPOSED PROJECT IS A REGULATED PROJECT UNDER THE MUNICIPAL REGIONAL PERMIT (MRP) PROVISION C3.

B. THE PROJECT WILL CREATE AND REPLACE 14,465 SQUARE FEET OF IMPERVIOUS AREA.

SITE DESIGN MEASURES

THIS PROPOSED SITE PLANS TO:

A. DIRECT ROOF RUNOFF TO BIO-RETENTION FOR TREATMENT.

B. DIRECT DRIVEWAY RUNOFF TO BIO-RETENTION FOR TREATMENT.

C. DIRECT PATIO AND WALKWAY RUNOFF TO BIO-RETENTION FOR TREATMENT.

D. CONSTRUCT WALKWAYS AND/OR PATIOS WITH PERVIOUS OR PERMEABLE SURFACES.

SOURCE CONTROL MEASURES

THE PROPOSED SITE PLANS TO:

A. INCORPORATE SUSTAINABLE LANDSCAPING PRACTICES, SUCH AS MINIMIZING IRRIGATION AND RUNOFF, PROMOTING INFILTRATION, MINIMIZING THE USE OF PESTICIDES AND FERTILIZERS, AND OTHER PRACTICES OF BAY FRIENDLY LANDSCAPING.

B. INSTALL STENCILING AT STORM DRAIN INLETS, SUCH AS "NO DUMPING – DRAINS TO BAY."

STORMWATER TREATMENT MEASURES

THE PROPOSED SITE PLANS TO:

A. USE A FLOW-THROUGH BIO-RETENTION PLANTER TO PROVIDE LID TREATMENT TO IMPERVIOUS SURFACES.

B. THE FLOW-THROUGH BIO-RETENTION PLANTER IS SIZED USING THE COMBINATION FLOW AND VOLUME APPROACH.

HYDROMODIFICATION NOTE:

THE PROJECT PROPOSES TO CREATE / REPLACE GREATER THAN 50% OF THE EXISTING IMPERVIOUS SURFACE.
HYDROMODIFICATION IS PROPOSED FOR THIS PROJECT.

DEVELOPMENT INFORMATION

TOTAL SITE AREA	496,588 SQUARE FEET (11.400 ACRE)			
DISTURBED / HYDROLOGY STUDY AREA	88,600 SQUARE FEET (2.034 ACRE)			
IMPERVIOUS AREA	EXISTING TOTAL S.F.	REMOVED TOTAL S.F.	NEW TOTAL S.F.	PROPOSED TOTAL S.F.
RESIDENCE	2,894	0	741	3,635
ACCESSORY BUILDING	774	0	0	774
SHEDS	121	0	0	121
RESTROOM	0	0	154	154
DRIVEWAY & PARKING	8,822	8,822	11,388	11,388
PATIOS, WALKWAYS & PADS	1,342	1,073	2,835	3,104
SOLAR PANELS	1,188	0	0	1,188
SPA	0	0	48	48
WATER FEATURE	54	54	244	244
WATER TANKS	569	569	832	832
TOTAL IMPERVIOUS AREA	15,764	10,518	16,242	21,488
NET CHANGE IN IMPERVIOUS AREA	+ 5,724 SQUARE FEET (NET INCREASE)			
PERVIOUS PAVING				
D.G. / GRAVEL WALKWAY	344	344	2,342	2,342
WOOD DECK	2,157	2,157	2,709	2,709
TOTAL PERVIOUS PAVING	2,501	2,501	5,051	5,051
NET CHANGE IN PERVIOUS PAVING	+ 2,550 SQUARE FEET (NET INCREASE)			
TOTAL DEVELOPED AREA	18,265	13,019	21,293	26,539
NET CHANGE IN DEVELOPED AREA	+ 8,274 SQUARE FEET (NET INCREASE)			
LANDSCAPE AREA	478,323			470,049

RETENTION SYSTEM INFORMATION

HYDROLOGY STUDY AREA	88,600 SQUARE FEET (2.034 ACRE)		
AREA SUBJECT TO CAPTURE	31,424 SQUARE FEET (0.721 ACRE)		
IMPERVIOUS AREA	PROPOSED TOTAL S.F.	CAPTURED TOTAL S.F.	UN-CAPTURED TOTAL S.F.
RESIDENCE	3,635	1,447	2,188
ACCESSORY BUILDING	774	774	0
SHEDS	121	121	0
RESTROOM	154	154	0
DRIVEWAY & PARKING	11,388	11,388	0
PATIOS, WALKWAYS & PADS	3,104	2,272	832
SOLAR PANELS	1,188	0	1,188
SPA	48	48	0
WATER FEATURE	244	244	0
WATER TANKS	832	832	0
TOTAL IMPERVIOUS AREA	21,488	17,280	4,208
PERVIOUS PAVING			
D.G. / GRAVEL WALKWAY	2,342	2,318	24
WOOD DECK	2,709	908	1,801
TOTAL PERVIOUS PAVING	5,051	3,226	1,825
LANDSCAPE AREA	62,061	10,918	51,143
TOTAL PERVIOUS AREA	67,112	14,144	52,968

REGISTERED PROFESSIONAL ENGINEER
JAMES TOBY
No. 63127
CIVIL
STATE OF CALIFORNIA
ORIGINAL SIGNATURES IN BLUE INK

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HEALING CULTURES
10707 LA HONDA ROAD
WOODSIDE, CALIFORNIA
SAN MATEO COUNTY
APN: 078-181-010
078-190-190

STORMWATER CONTROL PLAN

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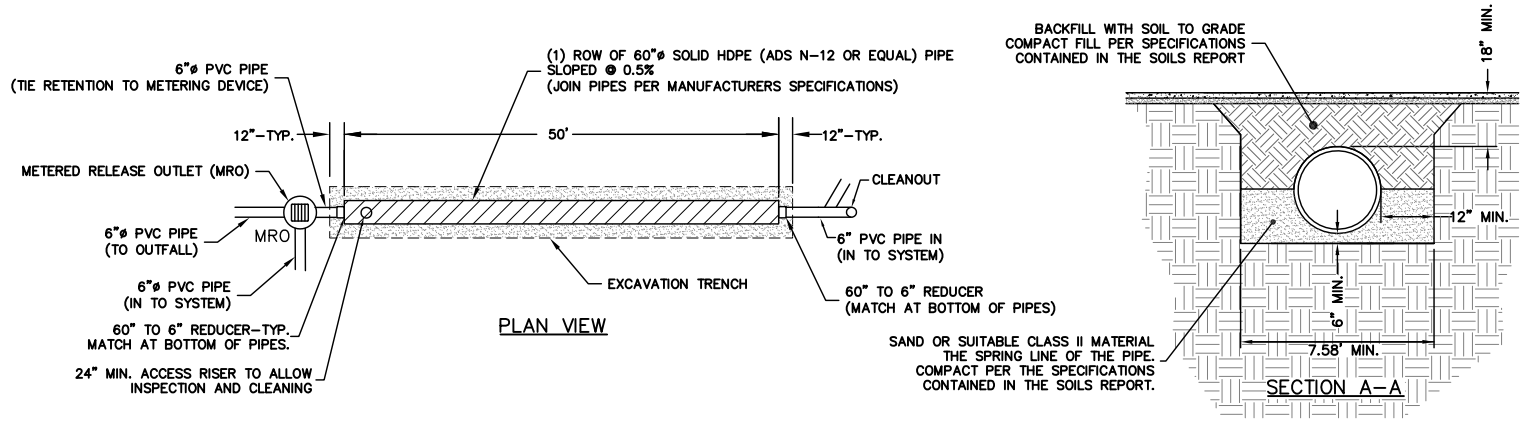
1 PLAN CHECK #1 07-13-23	ZA
REVISIONS	BY
JOB NO:	2200903
DATE:	12-09-22
SCALE:	1"=30'
DESIGN BY:	ZA/RM
CHECKED BY:	RC
SHEET NO:	SCP-2



NOTES:

1. ALL REFERENCES TO CLASS I OR II MATERIAL ARE PER ASTM D2321 "STANDARD PRACTICE FOR UNDERGROUND INSTALLATION OF THERMOPLASTIC PIPE FOR SEWERS AND OTHER GRAVITY FLOW APPLICATIONS", LATEST EDITION.

2. ALL STORM DRAIN SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D2321, LATEST EDITION AND THE MANUFACTURER'S PUBLISHED INSTALLATION GUIDELINES.

3. MEASURES SHOULD BE TAKEN TO PREVENT THE MIGRATION OF NATIVE FINES INTO THE BACKFILL MATERIAL, WHEN REQUIRED. SEE ASTM D2321.

4. FOUNDATION: WHERE THE TRENCH BOTTOM IS UNSTABLE, THE CONTRACTOR SHALL EXCAVATE TO A DEPTH REQUIRED BY THE ENGINEER AND REPLACE WITH SUITABLE MATERIAL AS SPECIFIED BY THE ENGINEER. AS AN ALTERNATIVE AND AT THE DISCRETION OF THE DESIGN ENGINEER, THE TRENCH BOTTOM MAY BE STABILIZED USING A GEOTEXTILE MATERIAL.

5. BEDDING: SUITABLE MATERIAL SHALL BE SAND OR CLASS II*. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION FOR MATERIAL SPECIFICATION TO ENGINEER. UNLESS OTHERWISE NOTED BY THE ENGINEER, MINIMUM BEDDING THICKNESS SHALL BE 4" FOR 4"-24"; 6" FOR 30"-60" COMPACTED TO 90% SPD.

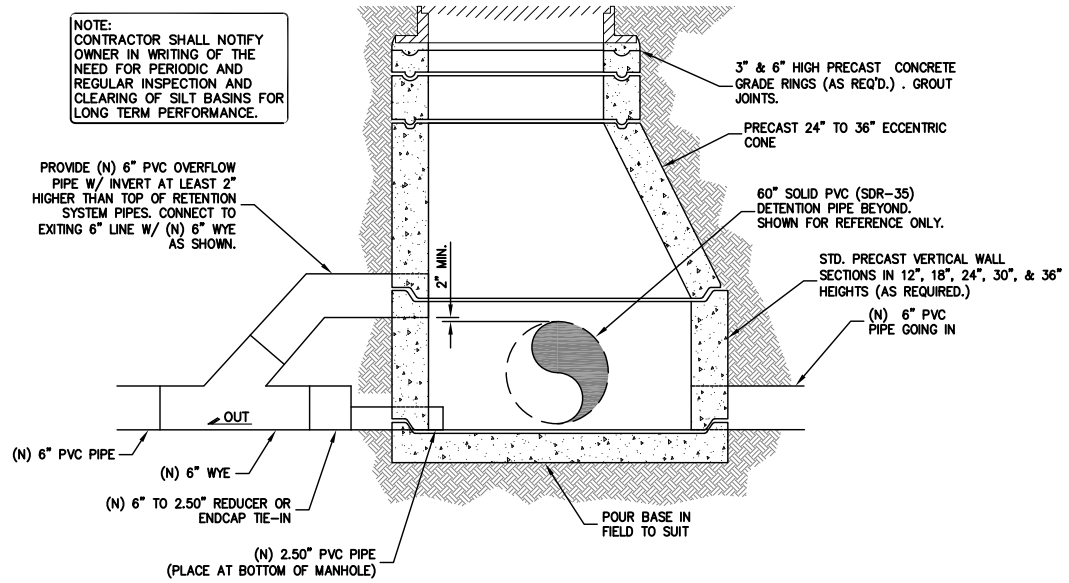
6. INITIAL BACKFILL: SUITABLE MATERIAL SHALL BE SAND OR CLASS II. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION FOR MATERIAL SPECIFICATION TO ENGINEER. MATERIAL SHALL BE INSTALLED AS REQUIRED IN ASTM D2321, LATEST EDITION.

7. MINIMUM COVER: MINIMUM COVER OVER ALL STORM DRAIN SYSTEMS IN NON-TRAFFIC APPLICATIONS (GRASS OR LANDSCAPE AREAS) IS 18" FROM TOP OF PIPE TO GROUND SURFACE, COMPACT AS RECOMMENDED BY THE SOILS ENGINEER. ADDITIONAL COVER MAY BE REQUIRED TO PREVENT FLOATATION.

NOTE:
REFER TO THE PLANS FOR SPECIFIC INLET AND OUTLET LOCATIONS.
REFER TO THE PLANS FOR SPECIFIC ACCESS COVER LOCATIONS.

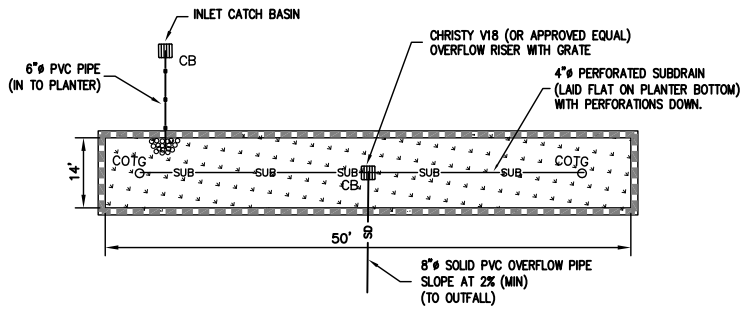
1 SCP-3 STORMWATER RETENTION SYSTEM DETAILS

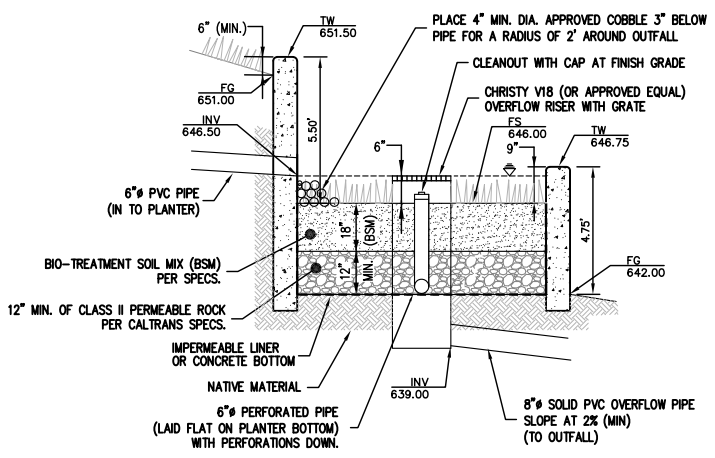
NTS



2 SCP-3 METERED RELEASE OUTLET

NTS





3 SCP-3 BIO-RETENTION DETAIL

NTS

BIO-RETENTION SOIL CONSIDERATIONS

THE BIO-RETENTION PLANTING SOIL SHALL MEET THE REQUIREMENTS SET FORTH IN APPENDIX L OF THE SAN MATEO COUNTY CLEANWATER PROGRAM C.3 STORMWATER TECHNICAL GUIDANCE HANDBOOK.

BIO-RETENTION SOIL SHALL HAVE A MINIMUM PERCOLATION RATE OF 5" PER HOUR AND MAXIMUM PERCOLATION RATE OF 10" PER HOUR. IF NATIVE SOILS DO NOT MEET THIS PERCOLATION REQUIREMENT, AN ADMIXTURE SHALL BE MIXED INTO PLANTING SOIL TO ALLOW FOR A 5" PER HOUR PERCOLATION RATE. IN-SITU TESTING SHALL BE CONDUCTED TO VERIFY THAT THE MATERIAL MEETS THE PERCOLATION REQUIREMENTS.

NO BARK MULCH SHALL BE PLACED IN THE VEGETATED AREA.

IF IMPORT SOIL IS USED, IT SHALL HAVE THE FOLLOWING PROPERTIES FOR SANDY LOAM. A TYPICAL SOIL MIX COMPRISES 50% CONSTRUCTION SAND, 20%-30% TOPSOIL WITH LESS THAN 5% MAXIMUM CLAY CONTENT AN 20%-30% ORGANIC LEAF COMPOST.

Table 1
Routine Maintenance Activities for Flow-Through Planters

No.	Maintenance Task	Frequency of Task
1	Evaluate health of trees and groundcover. Remove and replace all dead and diseased vegetation.	Twice a year
2	Maintain vegetation and the irrigation system. Prune and weed to keep flow-through planter neat and orderly in appearance.	As needed
3	Check that mulch is 3" deep and replenish as necessary. It is recommended that composted arbor mulch be applied once per year to maintain the 3" depth in all bare soil areas except within six inches of tree trunks.	As needed
4	Check that soil is at appropriate depth. Till or replace soil with the approved biotreatment soil mix as necessary to maintain a minimum of 6 inches between top of mulch and overflow weir.	Before wet season and as necessary
5	Remove accumulated sediment, litter and debris from flow-through planter and dispose of properly. Confirm that no clogging will occur and that the box will drain within three to four hours.	Before wet season and as necessary
6	Inspect flow-through planter to ensure that there are no clogs. Test with garden hose to confirm that the planter will drain within three to four hours.	Monthly during the wet season, and as needed after storm events
7	Inspect downspouts from rooftops and sheet flow from paved areas to ensure flow to planter box is unimpeded. Remove debris and repair damaged pipes. Check splash blocks or rocks and repair, replace and replenish as necessary.	Monthly during the wet season, and as needed after storm events
8	Inspect overflow pipe to ensure that it will safely convey excess flows to storm drain. Repair or replace any damaged or disconnected piping.	Before the wet season, and as necessary
9	Inspect flow-through planter to ensure that box is structurally sound (no cracks or leaks). Repair as necessary.	Annually

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SAN MATEO COUNTY

STORMWATER CONTROL DETAILS

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-	-
-	-
1 PLAN CHECK #1 07-13-23	ZA
REVISIONS	BY

JOB NO: 2200903
DATE: 12-09-22
SCALE: N.T.S.
DESIGN BY: ZA/RM
CHECKED BY: RC
SHEET NO:

SCP-3

APPENDIX B

HYDROLOGY CALCULATIONS

HYDROCAD MODELING RESULTS

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Fax (510) 887–3019
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PROJECT	DATE
10707 La Honda Road	August 10, 2023
JOB NO.	BY
2200903	R. West

SITE DEVELOPMENT CALCULATIONS

GROSS SITE AREA:	496,588 sqft.	=	11.400 acre	
HYDROLOGY STUDY AREA	88,600 sqft.	=	2.034 acre	
EXISTING AREA:				
Impervious:	15,764 sqft.	=	0.362 acre	
Pervious Paving:	2,501 sqft.	=	0.057 acre	
Landscape:	70,335 sqft.	=	1.615 acre	
Developed Area:	18,265 sqft.	=	0.419 acre	
Pervious Area:	72,836 sqft.	=	1.672 acre	
PROPOSED AREA:				
Impervious:	21,488 sqft.	=	0.493 acre	
Pervious Paving:	5,051 sqft.	=	0.116 acre	
Landscape:	62,061 sqft.	=	1.425 acre	
Developed Area:	26,539 sqft.	=	0.609 acre	
Pervious Area:	67,112 sqft.	=	1.541 acre	
NET CHANGE OF AREAS:				
Impervious:	5,724 sqft.	=	0.131 acre	(Net Increase)
Pervious Paving:	2,550 sqft.	=	0.059 acre	(Net Increase)
Developed Area:	8,274 sqft.	=	0.190 acre	**(Net Increase)**

BREAKDOWN OF DEVELOPED AREA

Impervious	**Existing**	**Proposed**
Residence	2,894 sqft.	3,635 sqft.
Accessory Building	774 sqft.	774 sqft.
Sheds	121 sqft.	121 sqft.
Restroom	0 sqft.	154 sqft.
Driveway & Parking	8,822 sqft.	11,388 sqft.
Patios, Walkways & Pads	1,342 sqft.	3,104 sqft.
Solar Panels	1,188 sqft.	1,188 sqft.
Spa	0 sqft.	48 sqft.
Water Feature	54 sqft.	244 sqft.
Water Tanks	569 sqft.	832 sqft.
Sub-Total	15,764 sqft.	21,488 sqft.
Pervious Paving		
D.G. / Gravel Walkway	344 sqft.	2,342 sqft.
Wood Decks	2,157 sqft.	2,709 sqft.
Sub-Total	2,501 sqft.	5,051 sqft.
TOTAL	**18,265 sqft.**	**26,539 sqft.**

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PROJECT	DATE
10707 La Honda Road	August 10, 2023
JOB NO.	BY
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SITE HYDROLOGY CALCULATION SUMMARY

Calculations based on a 10 year event with a 10 Minute Initial Time of Concentration

"C" Values

Impervious Areas:	C=	0.90	0.90
Pervious Areas:	C=	0.30	0.30

Rainfall Intensity (I)

$I_{10\ Min.}$ = 3.13 in/hr (From NOAA Web Site)

Un-Developed:

Pervious = 88,600 sqft = 2.034 acre
Q = 1.910

Total Undeveloped Runoff = 1.910 cfs

Post-Construction Without Metering:

Impervious = 21,488 sqft = 0.493 acre
Q = 1.389

Pervious = 67,112 sqft = 1.541 acre
Q = 1.447

Total Post-Construction Runoff = 2.836 cfs Without Metering

Change in Runoff Without Metering $\Delta Q = Q_{POST} - Q_{UNDEVELOPED}$

ΔQ = 0.926 c.f.s. (NET INCREASE)

Post-Construction Runoff With Metering: (From Metering & Retention Calculations)

Total Post-Construction Runoff = 1.791 cfs With Metering

Change in Runoff With Metering $\Delta Q = Q_{POST} - Q_{UNDEVELOPED}$

ΔQ = -0.119 cfs (NET DECREASE)

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PROJECT	DATE
10707 La Honda Road	August 10, 2023
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PRELIMINARY METERING & RETENTION CALCULATIONS

Calculations based on a 10 year event with a 10 Minute Initial Time of Concentration

DESIGN CRITERIA

Retain and Meter runoff from a 10 year storm event with a 10 minute initial time of concentration without increasing the peak runoff rate above the undeveloped condition flow rate

MAXIMUM TOTAL POST-CONSTRUCTION RUNOFF ALLOWED (Undeveloped Rate) **1.910 cfs**

Impervious Area (Un-Captured)	4,208 sqft 0.096 acre	Q =	0.270 cfs
Pervious Area (Un-Captured)	52,968 sqft 1.216 acre	Q =	1.142 cfs
Total Runoff Rate For Non-Captured Areas		Q =	1.412 cfs

MAXIMUM METERING RATE ALLOWED FOR CAPTURED AREA **0.498 cfs**

METERED RELEASE VOLUME

$(Q)_{gal/min}$ = (Orifice Diameter)^2 * (19.63 * Orifice Coefficent * sqrt(h))

Orifice Coefficent = 0.62 (for a circular orifice, thickness < d/4)
h = Headwater - Tailwater (diameter of storage pipe)

Orifice Calculator

Given Input Data:

Solving for ..... Peak Release Rate Based on Orifice Diameter

Orifice Diameter	**2.500**	**in**	
Coefficient	0.62		
Storage Pipe Diameter	5.00	ft	

Computed Results:

Flow Rate	170.089	gal/min	
	0.379	**cf/sec**	**< 0.498**

TOTAL RUNOFF WITH METERING **1.791 < 1.910**

STORAGE VOLUME REQUIRED

Impervious Area (Captured)	17,280	sqft		
	0.397	acre	Q =	1.118 cfs
Pervious Area (Captured)	14,144	sqft		
	0.325	acre	Q =	0.305 cfs
		T otal Captured Q =		1.423 cfs

Post-Construction Runoff Volume	854	cuft	10 min = 600 sec
Metered Release Volume	227	cuft	10 min = 600 sec
Calculated Storage Volume	626	cuft	
Factor of Safety	1.5		
Minimum Required Storage Volume	940	cuft	

RETENTION SYSTEM SIZING CALCULATIONS

Diameter of Pipe =	60	in
Number of Pipes =	1	
Length of Pipes =	50.00	ft.
Area of Pipe =	19.63	sf.
Volume of Pipes =	982	cf.

Storage Volume =	**982 cf.**	**>**	**940 cf.**	**O.K.**

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PROJECT	DATE
10707 La Honda Road	August 10, 2023
JOB NO.	BY
2200903	R. West

HYDROCAD MODELING RESULT SUMMARY

DESIGN CRITERIA

Retain and Meter runoff from a 10 year storm event with a 10 minute initial time of concentration without increasing the peak runoff rate above the undeveloped condition flow rate

10 Year Storm Undeveloped Condition

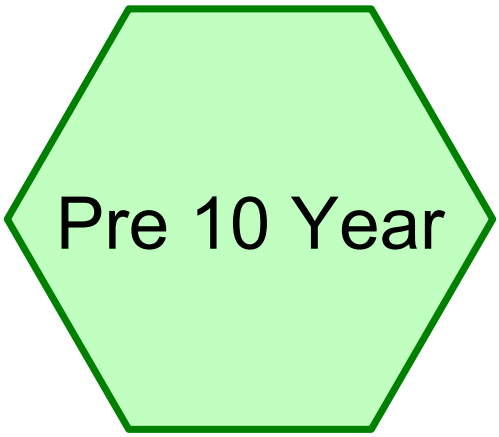
	Time of Concentration:	10	min			
	Rainfall Intensity:	3.13	in/hr			
	Calculated Runoff:	**1.89**	**cfs**			

10 Year Storm Post-Construction

	Time of Concentration:	10	min				
	Rainfall Intensity:	3.13	in/hr				
Non-Captured Runoff	Runoff:	1.38	cfs				
Captured Runoff	Inflow:	1.41	cfs				
	Metered Outflow:	0.30	cfs				
	Total Runoff:	**1.68**	**cuft**	**<**	**1.89**	**cuft**	**O.K.**

Retention System Critical Duration Analysis

	Critical Duration:	68	min				
	Rainfall Intensity:	1.18	in/hr				
Non-Captured Runoff	Runoff:	0.53	cfs				
Captured Runoff	Inflow:	0.54	cfs				
	Metered Outflow:	0.39	cfs				
	Overflow:	0.16	cfs				
	Total Runoff:	**1.08**	**cuft**	**<**	**1.89**	**cuft**	**O.K.**



Undeveloped 10 Year Storm

Subcat Reach Pond Link

Routing Diagram for 10707 La Honda Road Undeveloped 10 Year
Prepared by Lea & Braze Engineering, Inc.

Summary for Subcatchment Pre 10 Year: Undeveloped 10 Year Storm

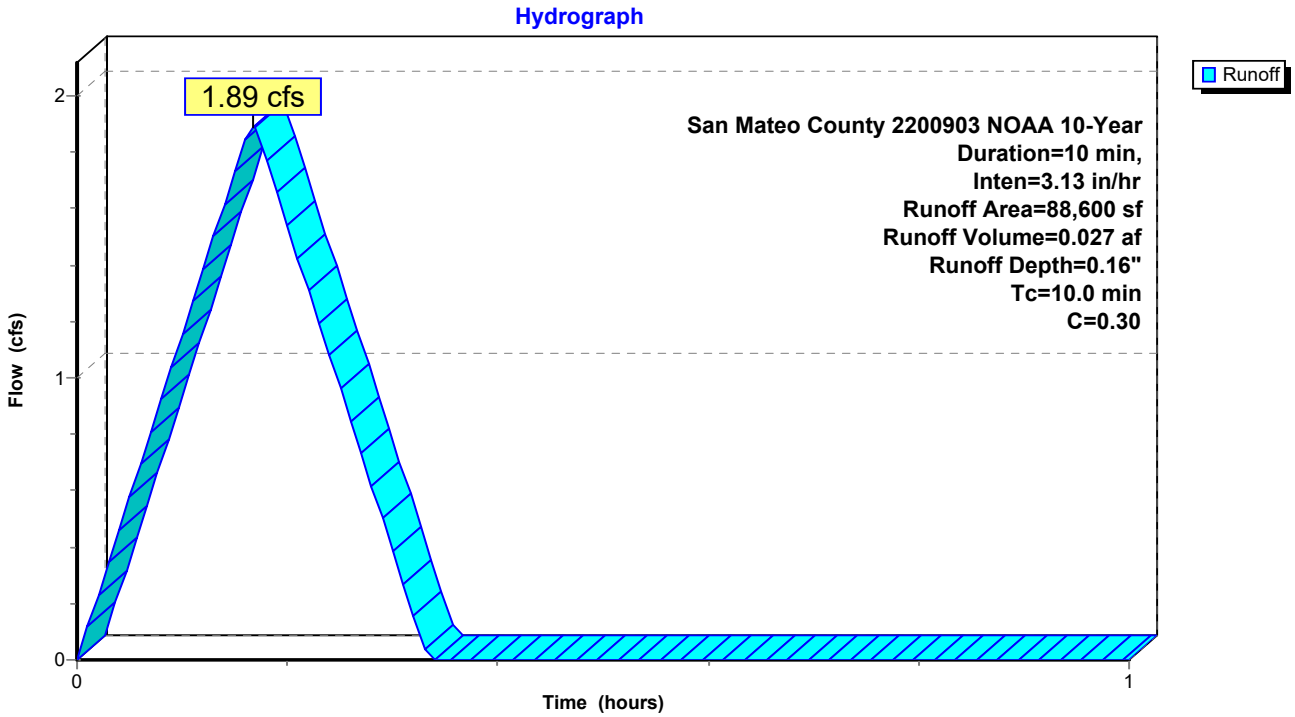
Runoff = 1.89 cfs @ 0.17 hrs, Volume= 0.027 af, Depth= 0.16"

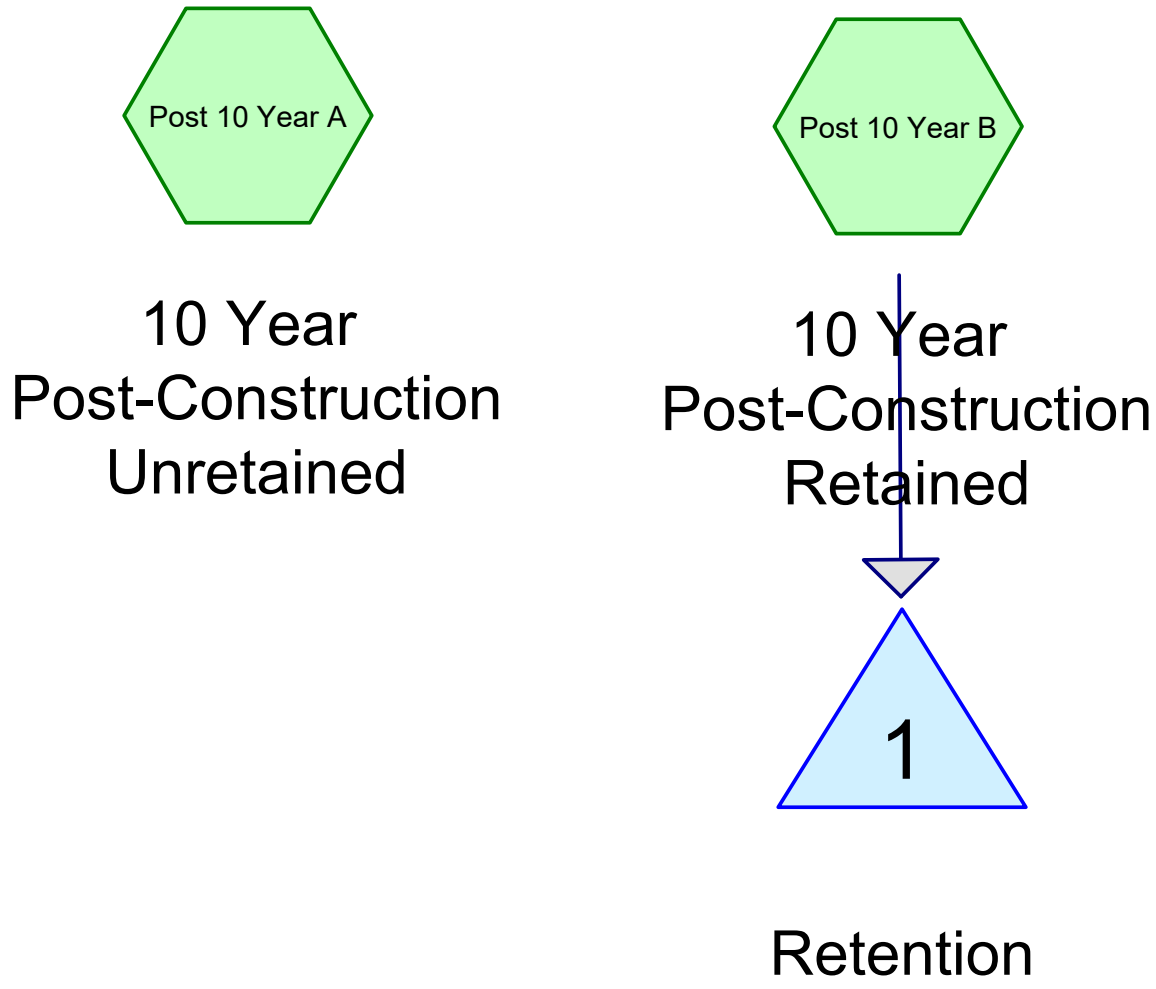
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs
San Mateo County 2200903 NOAA 10-Year Duration=10 min, Inten=3.13 in/hr

Area (sf)	C	Description
88,600	0.30	Pervious
88,600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry,**

Subcatchment Pre 10 Year: Undeveloped 10 Year Storm





Subcat Reach Pond Link

Routing Diagram for 10707 La Honda Road Post Development 10 Year
Prepared by Lea & Braze Engineering, Inc.

Summary for Subcatchment Post 10 Year A: 10 Year Post-Construction Unretained

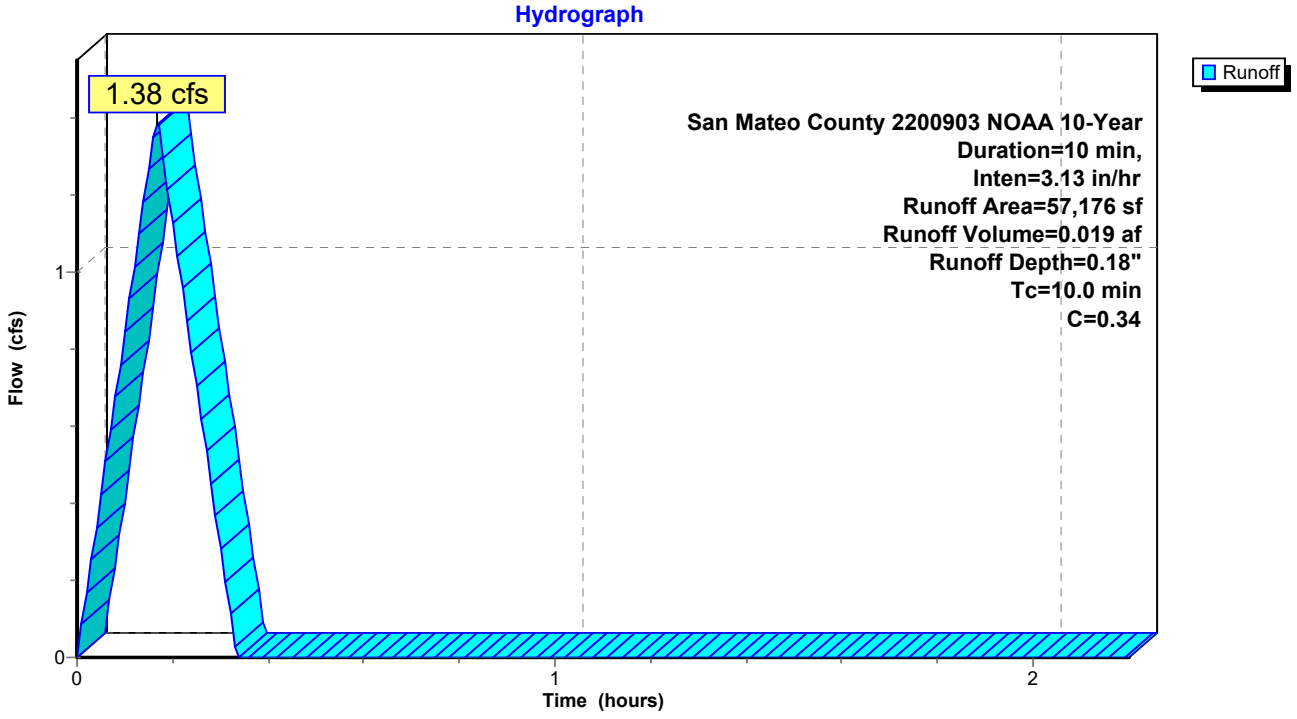
Runoff = 1.38 cfs @ 0.17 hrs, Volume= 0.019 af, Depth= 0.18"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-2.20 hrs, dt= 0.01 hrs
San Mateo County 2200903 NOAA 10-Year Duration=10 min, Inten=3.13 in/hr

Area (sf)	C	Description
4,208	0.90	Impervious
1,825	0.30	Pervious Paving
51,143	0.30	Landscape
57,176	0.34	Weighted Average
57,176		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry,**

Subcatchment Post 10 Year A: 10 Year Post-Construction Unretained



Summary for Subcatchment Post 10 Year B: 10 Year Post-Construction Retained

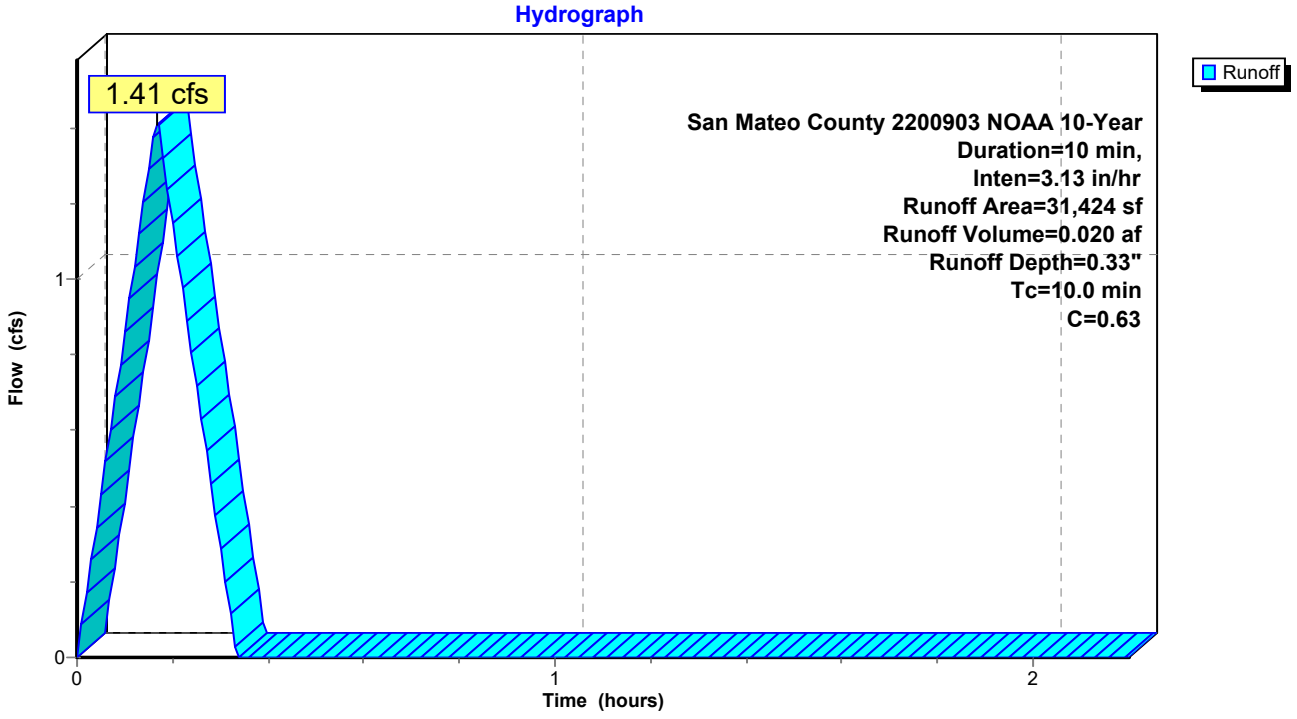
Runoff = 1.41 cfs @ 0.17 hrs, Volume= 0.020 af, Depth= 0.33"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-2.20 hrs, dt= 0.01 hrs
San Mateo County 2200903 NOAA 10-Year Duration=10 min, Inten=3.13 in/hr

Area (sf)	C	Description
17,280	0.90	Impervious
3,226	0.30	Pervious Paving
10,918	0.30	Landscape
31,424	0.63	Weighted Average
31,424		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry,**

Subcatchment Post 10 Year B: 10 Year Post-Construction Retained



Summary for Pond 1: Retention

Inflow Area = 0.721 ac, 0.00% Impervious, Inflow Depth = 0.33" for 10-Year event
Inflow = 1.41 cfs @ 0.17 hrs, Volume= 0.020 af
Outflow = 0.30 cfs @ 0.30 hrs, Volume= 0.020 af, Atten= 79%, Lag= 7.9 min
Primary = 0.30 cfs @ 0.30 hrs, Volume= 0.020 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-2.20 hrs, dt= 0.01 hrs
Peak Elev= 3.38' @ 0.30 hrs Surf.Area= 245 sf Storage= 616 cf

Plug-Flow detention time= 21.6 min calculated for 0.020 af (100% of inflow)
Center-of-Mass det. time= 21.7 min (31.7 - 10.0)

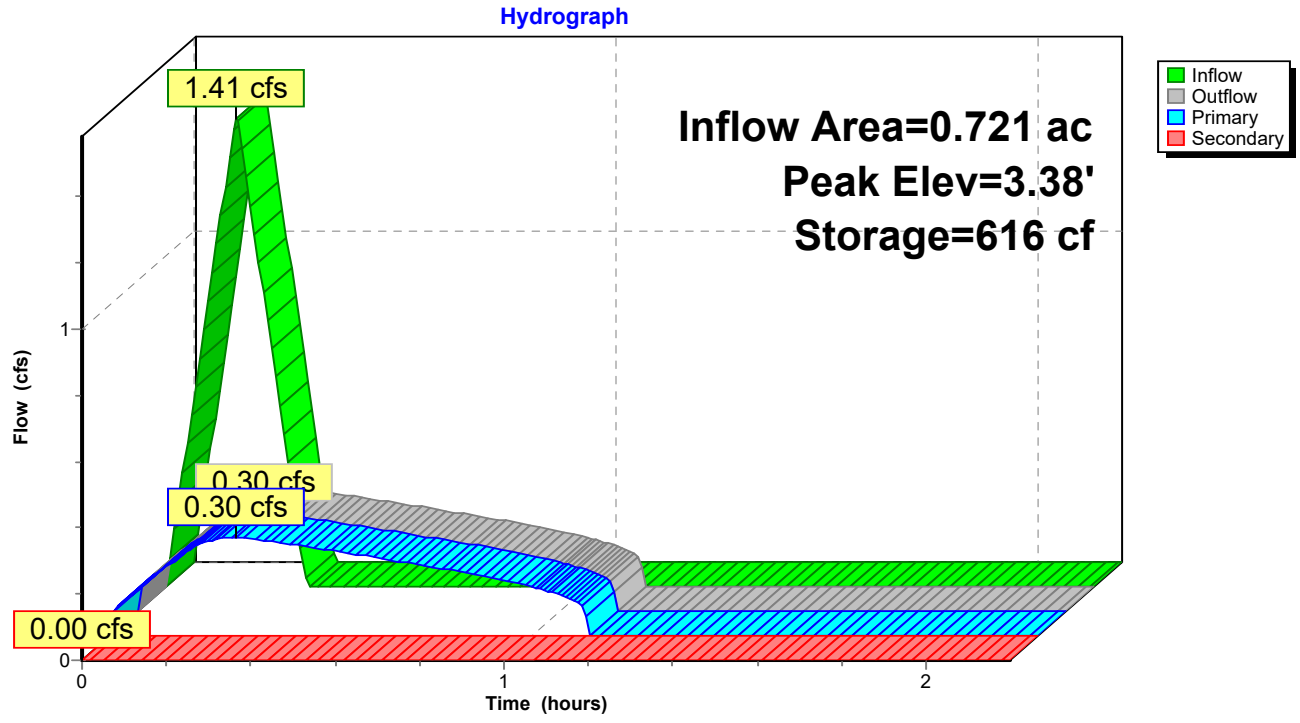
Volume	Invert	Avail.Storage	Storage Description
#1	0.25'	982 cf	**60.0" Round Pipe Storage** L= 50.0' S= 0.0050 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**2.5" Vert. 2.5" Orifice** C= 0.600
#2	Secondary	5.50'	**6.0" Vert. Overflow** C= 0.600

Primary OutFlow Max=0.30 cfs @ 0.30 hrs HW=3.38' (Free Discharge)
└**1=2.5" Orifice** (Orifice Controls 0.30 cfs @ 8.71 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.25' (Free Discharge)
└**2=Overflow** (Controls 0.00 cfs)

Pond 1: Retention



Summary for Subcatchment Post 10 Year A: 10 Year Post-Construction Unretained

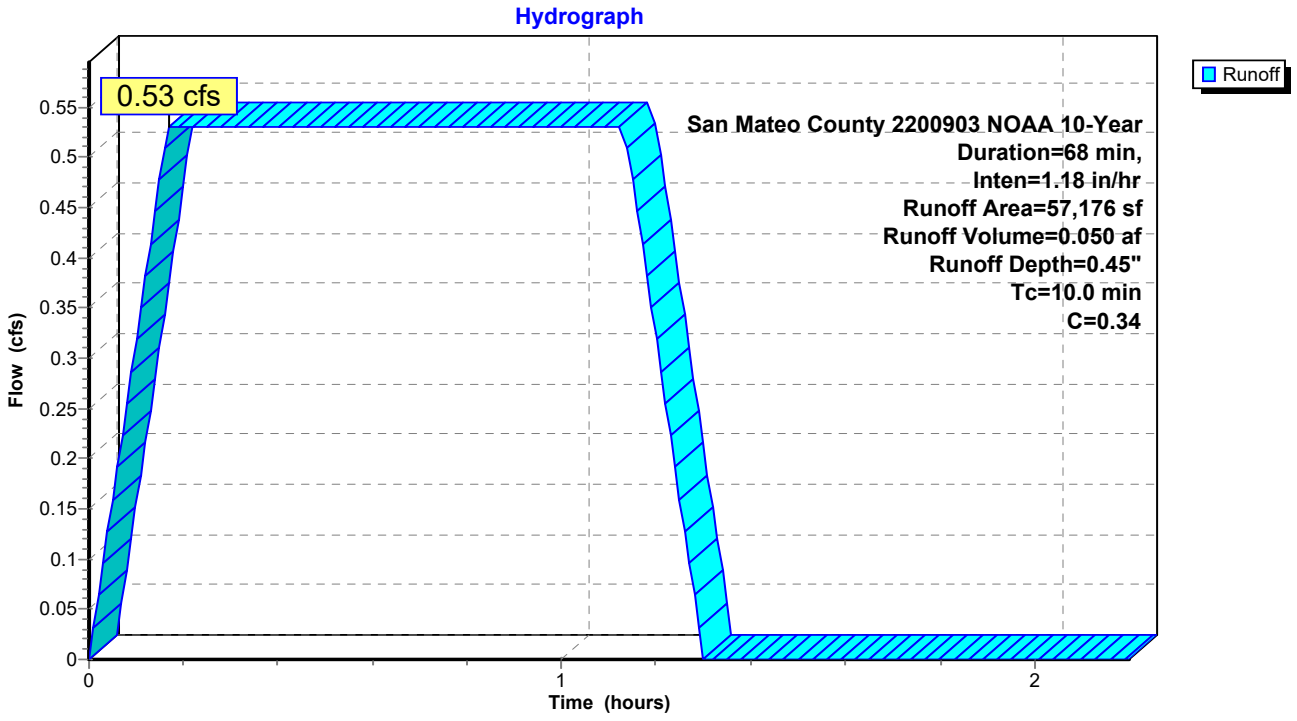
Runoff = 0.53 cfs @ 0.17 hrs, Volume= 0.050 af, Depth= 0.45"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-2.20 hrs, dt= 0.01 hrs
San Mateo County 2200903 NOAA 10-Year Duration=68 min, Inten=1.18 in/hr

Area (sf)	C	Description
4,208	0.90	Impervious
1,825	0.30	Pervious Paving
51,143	0.30	Landscape
57,176	0.34	Weighted Average
57,176		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry,**

Subcatchment Post 10 Year A: 10 Year Post-Construction Unretained



Summary for Subcatchment Post 10 Year B: 10 Year Post-Construction Retained

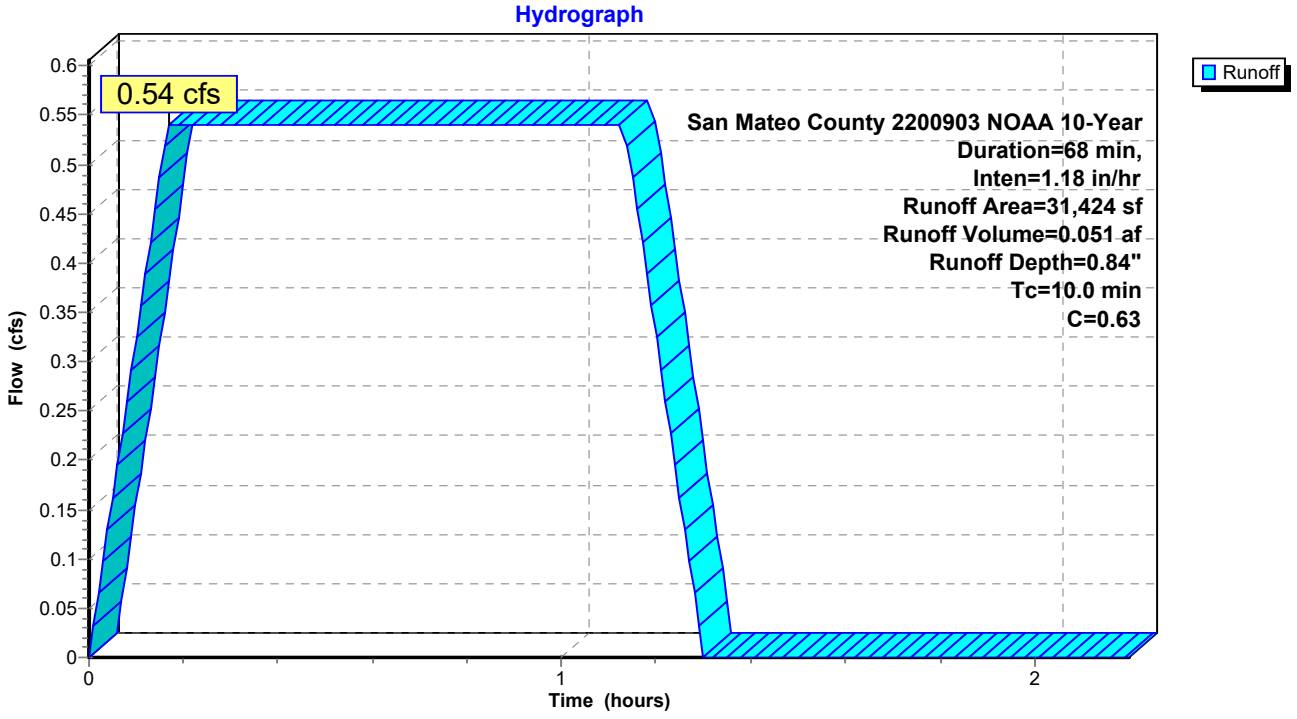
Runoff = 0.54 cfs @ 0.17 hrs, Volume= 0.051 af, Depth= 0.84"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-2.20 hrs, dt= 0.01 hrs
San Mateo County 2200903 NOAA 10-Year Duration=68 min, Inten=1.18 in/hr

Area (sf)	C	Description
17,280	0.90	Impervious
3,226	0.30	Pervious Paving
10,918	0.30	Landscape
31,424	0.63	Weighted Average
31,424		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry,**

Subcatchment Post 10 Year B: 10 Year Post-Construction Retained



Summary for Pond 1: Retention

Inflow Area = 0.721 ac, 0.00% Impervious, Inflow Depth = 0.84" for 10-Year event
Inflow = 0.54 cfs @ 0.17 hrs, Volume= 0.051 af
Outflow = 0.55 cfs @ 1.16 hrs, Volume= 0.049 af, Atten= 0%, Lag= 59.4 min
Primary = 0.39 cfs @ 1.16 hrs, Volume= 0.049 af
Secondary = 0.16 cfs @ 1.16 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-2.20 hrs, dt= 0.01 hrs
Peak Elev= 5.75' @ 1.16 hrs Surf.Area= 0 sf Storage= 982 cf

Plug-Flow detention time= 29.8 min calculated for 0.049 af (97% of inflow)
Center-of-Mass det. time= 28.6 min (67.6 - 39.0)

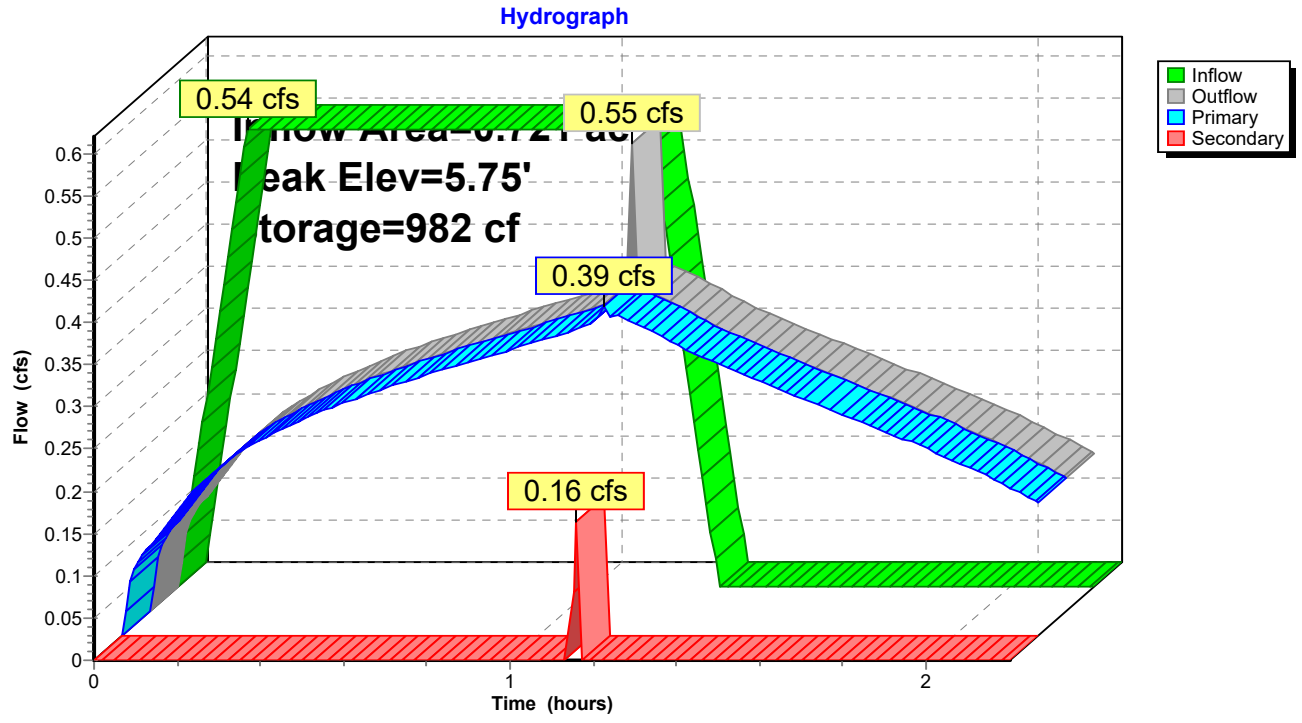
Volume	Invert	Avail.Storage	Storage Description
#1	0.25'	982 cf	**60.0" Round Pipe Storage** L= 50.0' S= 0.0050 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**2.5" Vert. 2.5" Orifice** C= 0.600
#2	Secondary	5.50'	**6.0" Vert. Overflow** C= 0.600

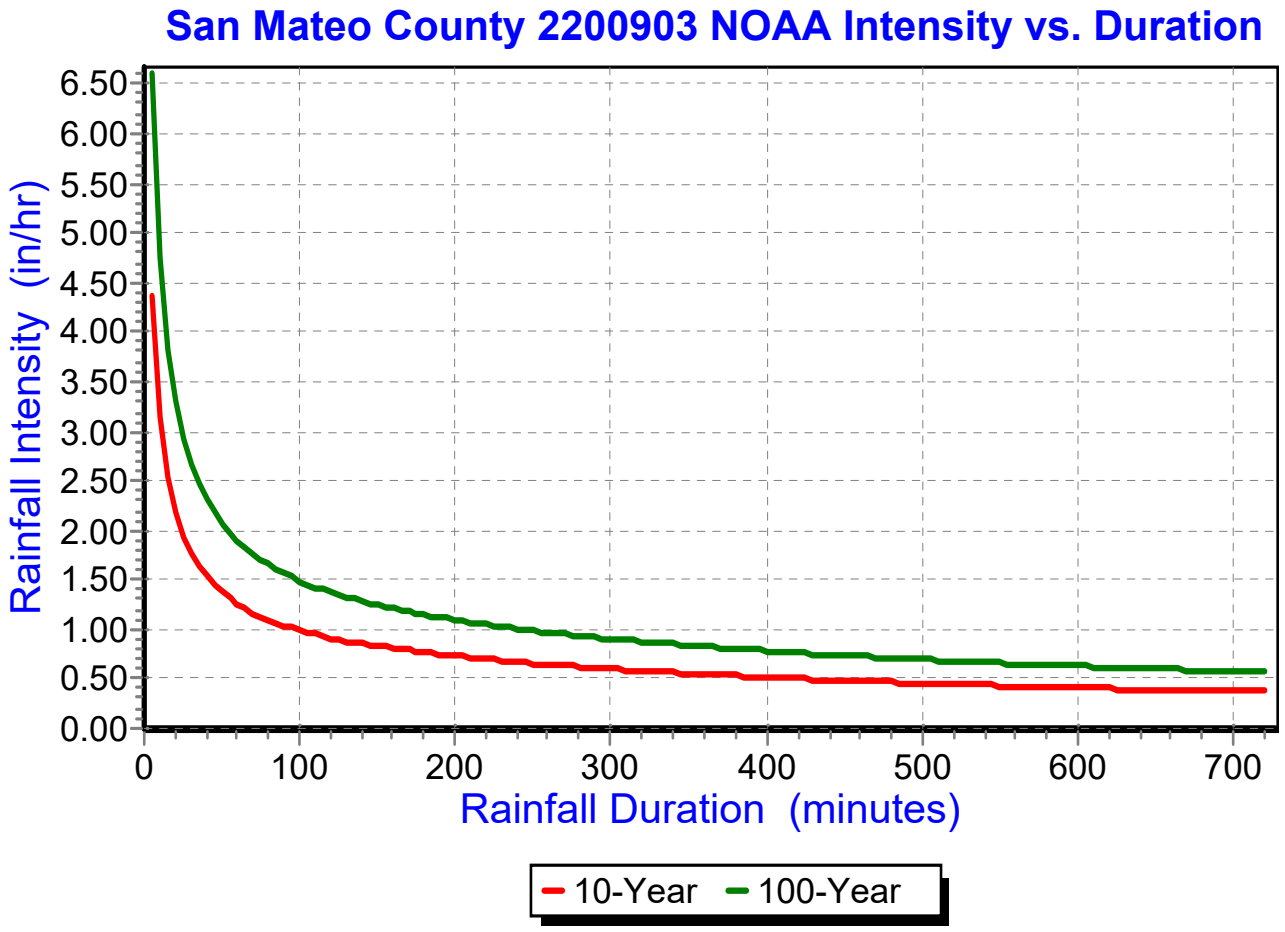
Primary OutFlow Max=0.39 cfs @ 1.16 hrs HW=5.73' (Free Discharge)
└**1=2.5" Orifice** (Orifice Controls 0.39 cfs @ 11.42 fps)

Secondary OutFlow Max=0.16 cfs @ 1.16 hrs HW=5.75' (Free Discharge)
└**2=Overflow** (Orifice Controls 0.16 cfs @ 1.69 fps)

Pond 1: Retention



IDF Curve Report



APPENDIX C

STORMWATER TREATMENT CALCULATIONS

Worksheet for Calculating the Combination Flow and Volume Method

Instructions: After completing Section 1, make a copy of this Excel file for each Drainage Management Area within the project. Enter information specific to the project and DMA in the cells shaded in yellow. Cells shaded in light blue contain formulas and values that will be automatically calculated.

1.0 Project Information

1-1	Project Name:	Healing Cultures
1-2	City application ID:	
1-3	Site Address or APN:	10707 La Honda Road
1-4	Tract or Parcel Map No:	
1-5	Rainfall Region	2
1-6	Region Mean Annual Precipitation (MAP)	24.40
1-7	Site Mean Annual Precipitation (MAP)	34

The calculations presented here are based on the **combination flow and volume sizing method** provided in the Countywide Program's C.3 Technical Guidance, Version 5.0 (2016). The steps presented below are explained in Section 5.1 of the Guidance, applicable portions of which are included in this file, in the sheet named "Guidance from Chapter 5".

Click here for map

1-8 ***MAP adjustment factor is automatically calculated as:*** **1.39**

(The "Site Mean Annual Precipitation (MAP)" is divided by the MAP for the applicable rain gauge, showin in Table 5-3, below.)
Refer to the map in Appendix C of the C.3 Technical Guidance to identify the Rainfall Region for the site.

2.0 Calculate Percentage of Impervious Surface for Drainage Management Area (DMA)

2-1 Name of DMA: **DMA #1**

For items 2-2 and 2-3, enter the areas in square feet for each type of surface within the DMA.

	Type of Surface	Area of surface type within DMA (Sq. Ft.)	Adjust Pervious Surface	Effective Impervious Area
2-2	Impervious surface	19,468	1.0	19,468
2-3	Pervious surface	14,144	0.1	1,414
	Total DMA Area (square feet) =	33,612		

2-4 ***Total Effective Impervious Area (EIA)*** **20,882** **Square feet**

3.0 Calculate Unit Basin Storage Volume in Inches

Table 5-3. Unit Basin Storage Volumes in Inches for 80 Percent Capture Using 48-Hour Drawdowns, based on runoff coefficient

Region	Station, and Mean Annual Precipitation (Inches)	Runoff Coefficient of 1.0
1	Boulder Creek, 55.9"	2.04"
2	La Honda, 24.4"	0.86"
3	Half Moon Bay, 25.92"	0.82"
4	Palo Alto, 14.6"	0.64"
5	San Francisco, 21.0"	0.73"
6	San Francisco airport, 20.1"	0.85"
7	San Francisco Oceanside, 19.3"	0.72"

3-1 ***Unit basin storage volume from Table 5-3:*** **0.86**

(The coefficient for this method is always 1.0, due to the conversion of any landscaping to effective impervious area.)

3-2 ***Adjusted unit basin storage volume:*** **1.20** **Inches**

(The unit basin storage volume [Item 3-1] is adjusted by applying the MAP adjustment factor [Item 1-8].)

3-3 ***Required Capture Volume (in cubic feet):*** **2,085** **Cubic feet**

(The adjusted unit basin sizing volume [Item 3-2] is multiplied by the DMA EIA [Item 2-4] and converted to cubic feet)

4.0 Calculate the Duration of the Rain Event

4-1	Rainfall intensity	0.2	**Inches per hour**
4-2	Divide Item 3-2 by Item 4-1	5.99	**Hours of Rain Event Duration**

5.0 Preliminary Estimate of Surface Area of Treatment Measure

5-1	4% of DMA EIA (Item 2-4)	835.296	**Square feet**
5-2	Area 25% smaller than Item 5-1 (i.e., 3% of DMA EIA)	626.472	**Square feet**
5-3	Volume of treated runoff for area in Item 5-2	1564.04	**Cubic feet** (Item 5-2 * 5 inches per hour * 1/12 * Item 4-2)

6.0 Initial Adjustment of Depth of Surface Ponding Area

6-1	Subtract Item 5-3 from Item 3-3	521.35	**Cubic feet** (Amount of runoff to be stored in ponding area)
6-2	Divide Item 6-1 by Item 5-2	0.83	**Feet** (Depth of stored runoff in surface ponding area)
6-3	Convert Item 6-2 from feet to inches	9.99	**Inches** (Depth of stored runoff in surface ponding area)

6-4 If ponding depth in Item 6-3 meets your target depth (recommend 6"), skip to Item 8-1. If not, continue to Step 7-1.
(Note: Overflow outlet elevation should be set based on the calculated ponding depth.)

7.0 Optimize Size of Treatment Measure

7-1	Enter an area larger than Item 5-2	**700**	**Sq.ft.** (enter larger area if you need less ponding depth.)
7-2	Volume of treated runoff for area in Item 7-1	**1747.61**	**Cubic feet** (Item 7-1 * 5 inches per hour * 1/12 * Item 4-2)
7-3	Subtract Item 7-2 from Item 3-3	**337.78**	**Cubic feet** (Amount of runoff to be stored in ponding area)
7-4	Divide Item 7-3 by Item 7-1	**0.48**	**Feet** (Depth of stored runoff in surface ponding area)
7-5	Convert Item 7-4 from ft. to inches	**5.79**	**Inches** (Depth of stored runoff in surface ponding area)

7-6 If the ponding depth in Item 7-5 meets target, stop here. If not, repeat Steps 7-1 through 7-5 until you obtain target depth.
(Note: Overflow outlet elevation should be set based on the calculated ponding depth.)

8.0 Surface Area of Treatment Measure for DMA

8-1	Final surface area of treatment	**700**	**Square feet** (Either Item 5-2 or final amount in Item 7-1)