

Huffman Engineering & Surveying

537 College Ave.
Santa Rosa, California 95404
(707) 542-6559

PRELIMINARY Drainage Report

For

Owner

Jonathon Davis and Kyle Kubas

431 40th Street, #5

Oakland, California 94609

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p: 510-472-4321

Site

22108 Koftinow Drive

Timber Cove, California

APN: 109-410-020

GRD24-XXXX

October 25, 2024

Job# 22-014



HUFFMAN ENGINEERING & SURVEYING

537 College Avenue, Suite A, Santa Rosa, CA 95404

707-542-6559 www.huffmanengineering.net

October 22, 2024

Drainage Department
County of Sonoma PRMD
2550 Ventura Ave. Santa Rosa, CA 95403

RE: Preliminary Drainage Report
22108 Koftinow Drive, Timber Cove
APN: 109-410-020
GRD24-xxxx

Dear Plan Checker,

Existing Conditions

The site is an existing rural residential parcel located in unincorporated Sonoma County community of Timber Cove, north of Jenner. The property is wooded and undeveloped. There is an existing driveway from Old Redwood Highway. The terrain in the development area is sloping to the south and southeast. The surrounding parcels are wooded and developed with single family residences. Uphill flows enter the development area through sheet flow. Onsite flows travel overland through sheet flow to unnamed blue lined creek to the Pacific Ocean.

The general elevation of the site is between an assumed elevation of 228-254 feet. The Natural Resource Conservation Service (NRCS) Web Soil Survey 2.0 the soils on-site are Mendocino-Empire Complex, 0-50 percent slopes (MnF), Hydrological Soil group and as such have a slow infiltration rate when thoroughly wet, as well as having a slow water transmission rate.

Project Description

The project intends to construct a driveway and building pad for a proposed single family residence. The construction of the proposed residence is intended to maintain the natural drainage patterns.

Care has been taken to minimize flatwork and paving. The result is low to moderate change in CN values for the LOA area (LOA1, 73.2 to 75.0). The result is that a swale with bioretention is required for the 100% delta volume capture requirement to account for the increase in runoff created by LOA area. Per county staff, treatment is assumed to be achieved through volume capture.

In LOA 1 a swale with bioretention measuring 7 ft. wide, with a 5 ft. wide flat bottom, 15 ft. long, and 5 ft. deep, with a 4.5 deep retention area, has been designed. This swale meets 100% of the delta volume capture requirement through a retention area that is 4.5 ft deep below the surface of the trench. Treatment is assumed to be achieved in all areas through the delta volume capture. The swale will outlet to a wide flat area to dissipate the flows before travelling through sheet flow to the roadside ditches.

Delta Volume Capture and Treatment

The site is governed by the State of California Storm Water Regulations and the Sonoma County Grading Ordinance. Because the proposed development is planned within the footprint of existing impervious areas and the use remains in kind with existing the project complies with the Grading Ordinances requirement to limit post development run-off levels and quality to pre-development conditions with the installation of post-construction BMPs consisting of modified swales with bioretention to provide both treatment and delta volume capture. See attached calculations. Treatment is assumed to be achieved through the delta volume capture.

Methodologies & Assumptions

We have analyzed the site using the City of Santa Rosa LID Calculator. Minor to moderate increases in flows will occur as noted above and shown on the attached City of Santa Rosa LID Calculator. We have used the City of Santa Rosa LID worksheet to determine that this project will incorporate a modified swale with bioretention as a treatment measure and delta volume capture measure to deal with the minor increase in runoff generated by the new impervious area. Since the site is not grazed, we've used the CN for woods, (70) to represent most of the site in the pre and post development conditions. A small portion of the capture area represents Impervious – Paved Parking, Rooftop, Driveways (98) to represent the existing roadway as well as to represent proposed driveway. Streets and road – Gravel CN 92 to represent existing gravel road. We have used a CN of 92 for new gravel. Interceptor trees will be planted and downspouts will be disconnected using a grassy area. All runoff flows from or across existing vegetated areas or through vegetated swales before leaving the site. Treatment is assumed to be achieved through the delta volume capture.

Per Sonoma County Water Agency table C-1, average runoff coefficients were calculated for flood control analysis. 10-Year flood control design is based on the Sonoma County Water Agency Flood Management Design Manual (FMDM) Incremental Rational Method using a starting time of concentration of 7 minutes (per FMDM table 3-3 for Lot sizes > ½ acre) to calculate intensity. Hydraulic capacities of swales & culverts were verified using the Mannings equation. We have used the City of Santa Rosa LID flowrate methodology to determine the sizing of the BMP's used to treat stormwater quality. Run-off Coefficient numbers were obtained using Table C.1 for rural residential areas having lots of 2 acres. The parcel is 1.16 acres in size (50,557 square feet). New and replaced impervious surface for the project equals approximately 1852 square feet.

Conclusions


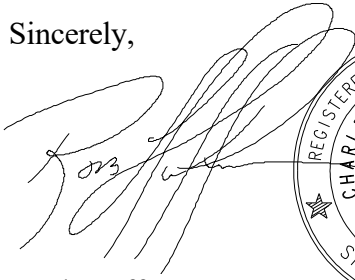
The use of the 100% delta volume capture criteria ensures that no increase in runoff will occur during storms equivalent to the 1", 24-hour duration storm. Pollutants of concern such as runoff from proposed buildings, residential uses and minor vehicular pollutants from temporarily parked vehicles will be treated in the swale with bioretention before releasing to sheet flow across vegetated areas which will provide further treatment before leaving site. This combined with sustainable landscaping will help to ensure that while runoff will increase during the 10-year storm event during the post-development condition, it will do so in such a way that does not negatively impact downslope properties.

Storm water pipes and swales have been designed in accordance with Manning's calculation to ensure capacity during the 10-Year storm event. Due to the sheet flow nature of the site, storm events larger than the 10-year capacity will bypass the drainage features and continue to the existing low point to the northeast of the property and proceed through the existing roadside ditch network to Lichau Creek. If the capacity of the swales and infiltration system was exceeded runoff

would continue in this pattern regardless.

If you have any questions, please call us at 542-6559.

Sincerely,



Rob Huffman, PE
Professional Engineer
RH:ejm
22-014

FOR OFFICE USE ONLY:
Does this project require permanent storm water BMP's?

Y N



File No:	Quadrant
Related Files:	
Set:	
Department Use Only	

2017 Storm Water LID Determination Worksheet

PURPOSE AND APPLICABILITY: Use this form to determine whether or not this project will need to incorporate permanent Storm Water Best Management Practices (BMP's) and submit a Storm Water Low Impact Development Submittal (SW LIDS) as required by the City's National Pollutant Discharge Elimination System Municipal Separate Storm Sewer System (NPDES MS4) only. Your project may still need to incorporate permanent storm water BMP's as required by CALGREEN or North Coast Regional Water Quality Control Board (NCRWQCB).

Part 1: Project Information

Project Name

Applicant (owner or developer) Name

Site Address

Mailing Address

City/State/Zip

City/State/Zip

Permit Number(s) - if applicable

Phone/Email/Fax

Engineer Name

Mailing Address

City/State/Zip

Phone/Email

Type of Application/Project:

Subdivision Grading Permit Building Permit Hillside Development
 Design Review Use Permit Encroachment Time Extensions Other

PART 2: Project Exemptions

1. Is this a project that creates or replaces less than 10,000 square feet of impervious surface, including all project phases and off-site improvements?
 Yes No
2. Is this project a routine maintenance activity¹ that is being conducted to maintain original line and grade, hydraulic capacity, and original purpose of facility such as resurfacing existing roads and parking lots?
 Yes No

¹ "Routine Maintenance Activity" includes activities such as overlays and/or resurfacing of existing roads or parking lots as well as trenching and patching activities and reroofing activities.

3. Is this project a stand-alone pedestrian pathway, trail, or off-street bike lane?

Yes No

Did you answer "YES" to any of the above questions in Part 2?

YES: This project will not need to incorporate permanent Storm Water BMP's as required by the NPDES MS4 permit. **Please complete the Section 4 and "Exemption Signature Section" on Page 4.**

NO: Proceed with worksheet.

Part 3: Project Triggers

Projects that Trigger Requirements:

Please answer the following questions to determine whether this project requires permanent Storm Water BMP's and the submittal of a SW LIDs.

1. Does this project create or replace a combined total of 10,000 square feet or more of impervious surface including all project phases and offsite improvements?

Yes No

2. Does this project create or replace a combined total or 10,000 square feet² or more of impervious street, roads, highways, or freeway construction or reconstruction? Yes No

3. Does this project create or replace a combined total of 1.0 acre of more of impervious surface including all project phases and off-site improvements? Yes No

Did you answer "YES" to any of the above questions in Part 3?

YES: This project requires permanent Storm Water BMP's and the submittal of a SW LIDS. **Please complete the remainder of this worksheet and sign the "Acknowledgment Signature Section" on Page 4.**

NO: This project will not need to incorporate permanent Storm Water BMP's as required by the NPDES MS4 permit. **Please complete the "Exemption Signature Section" on Page 4.**

²Impervious surface replacement, such as the reconstruction of parking lots or excavation to roadway subgrades, is not a routine maintenance activity. Reconstruction is defined as work that replaces surfaces down to the subgrade. Overlays, resurfacing, trenching, and patching are defined as maintenance activities.

Part 4: Project Description

1. Total Project area: square feet
 acres

2. Existing land use(s): (check all that apply)

Commercial Industrial Residential Public Other

Description of buildings, significant site features (creeks, wetlands, heritage trees), etc.:

3. Existing impervious surface area: square feet
 acres

4. Proposed Land Use(s): (check all that apply)

Commercial Industrial Residential Public Other

Description of buildings, significant site features (creeks, wetlands, heritage trees), etc.:

5. Proposed impervious surface area: square feet
 acres

Storm Water LID Determination Worksheet

Acknowledgment Signature Section:

As the property owner or developer, I understand that this project is required to implement permanent Storm Water Best Management Practices and provide a Storm Water Low Impact Development Submittal (SW LIDS) as required by the City's National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit. Any unknown responses must be resolved to determine if the project is subject to these requirements.*

 Applicant Signature

 Date
Exemption Signature Section:

As the property owner or developer, I understand that this project as currently designed does not require permanent Storm Water BMP's nor the submittal of a Storm Water Low Impact Development Submittal (SW LIDS) as required by the City's National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit. I understand that redesign may require submittal of a new Determination Worksheet and may require permanent Storm Water BMP's.*

 Applicant Signature

 Date

*Your project may still need to incorporate permanent storm water BMP's as required by CALGREEN or North Coast Regional Water Quality Control Board (NCRWQCB).

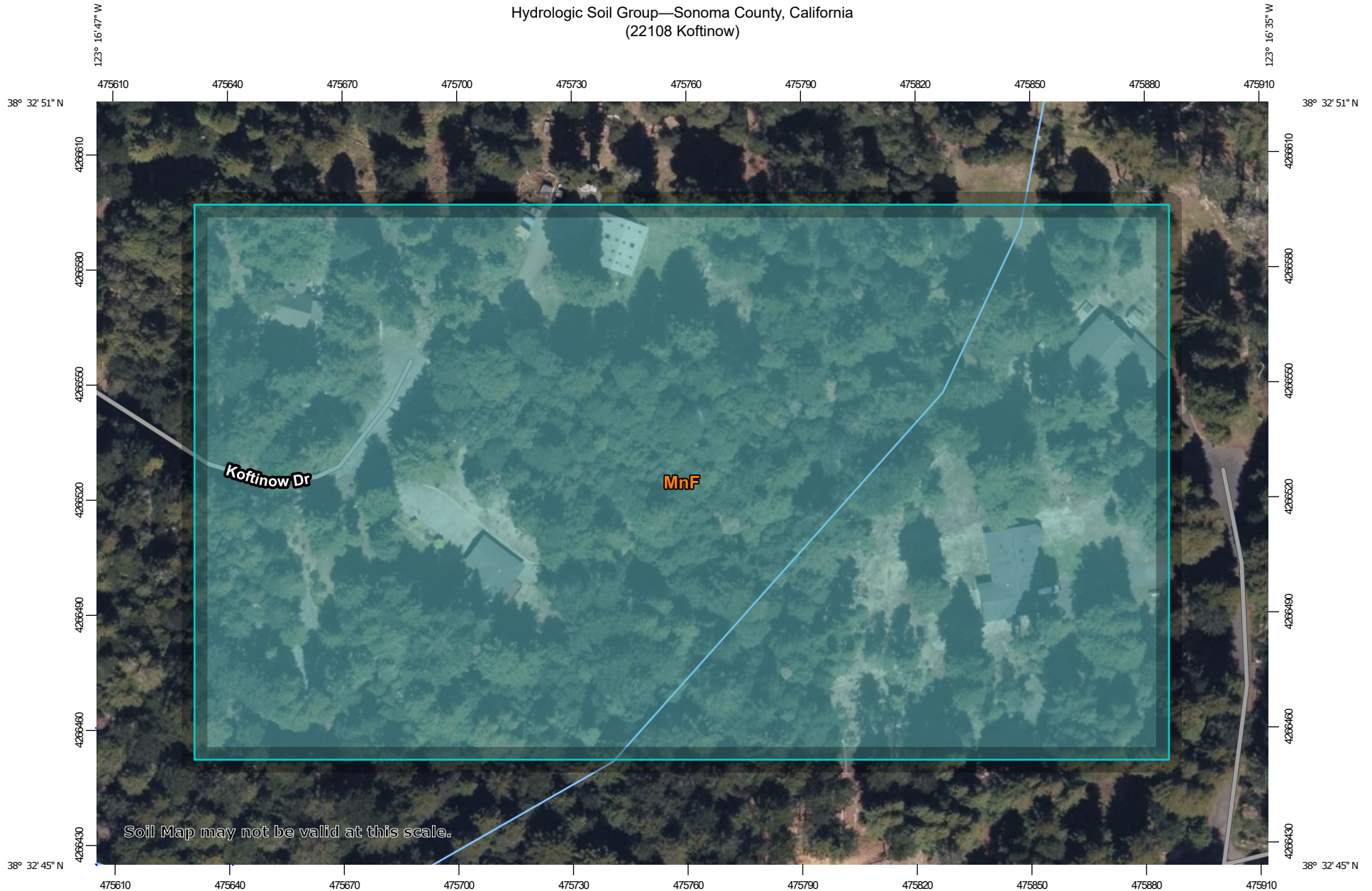
Implementation Requirements: All calculations shall be completed using the "Storm Water Calculator" available at: www.srcity.org/stormwaterLID

Hydromodification Control/100% Volume Capture: Capture (infiltration and/or reuse) of 100% of the volume of runoff generated by a 1.0" 24-hour storm event, as calculated using the "Urban Hydrology for Small Watersheds" TR-55 Manual method. 100% volume capture is the ideal condition and if achieved satisfies all requirements so that no additional treatment is required. This is a retention requirement.

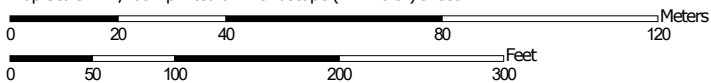
Treatment Requirement: Treatment of 100% of the flow calculated using the modified Rational Method and a known intensity of 0.20 inches per hour.

Delta Volume Capture Requirement: Capture (infiltration and/or reuse) of the increase in volume of storm water due to development generated by a 1.0" 24-hour storm event, as calculated using the "Urban Hydrology for Small Watersheds" TR-55 Manual method. This is a retention requirement.

Hydrologic Soil Group—Sonoma County, California
(22108 Koftinow)



Map Scale: 1:1,400 if printed on A landscape (11" x 8.5") sheet.




Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84



MAP LEGEND

Area of Interest (AOI)









 Area of Interest (AOI)

Soils

Soil Rating Polygons





 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Lines

 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Points




 A
 A/D
 B
 B/D

 C
 C/D
 D
 Not rated or not available


Water Features

 Streams and Canals

Transportation

 Rails
 Interstate Highways
 US Routes
 Major Roads
 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Sonoma County, California
 Survey Area Data: Version 18, Sep 8, 2024

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Data not available.

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
MnF	Mendocino-Empire complex, 0 to 50 percent slopes	C	9.2	100.0%
Totals for Area of Interest			9.2	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

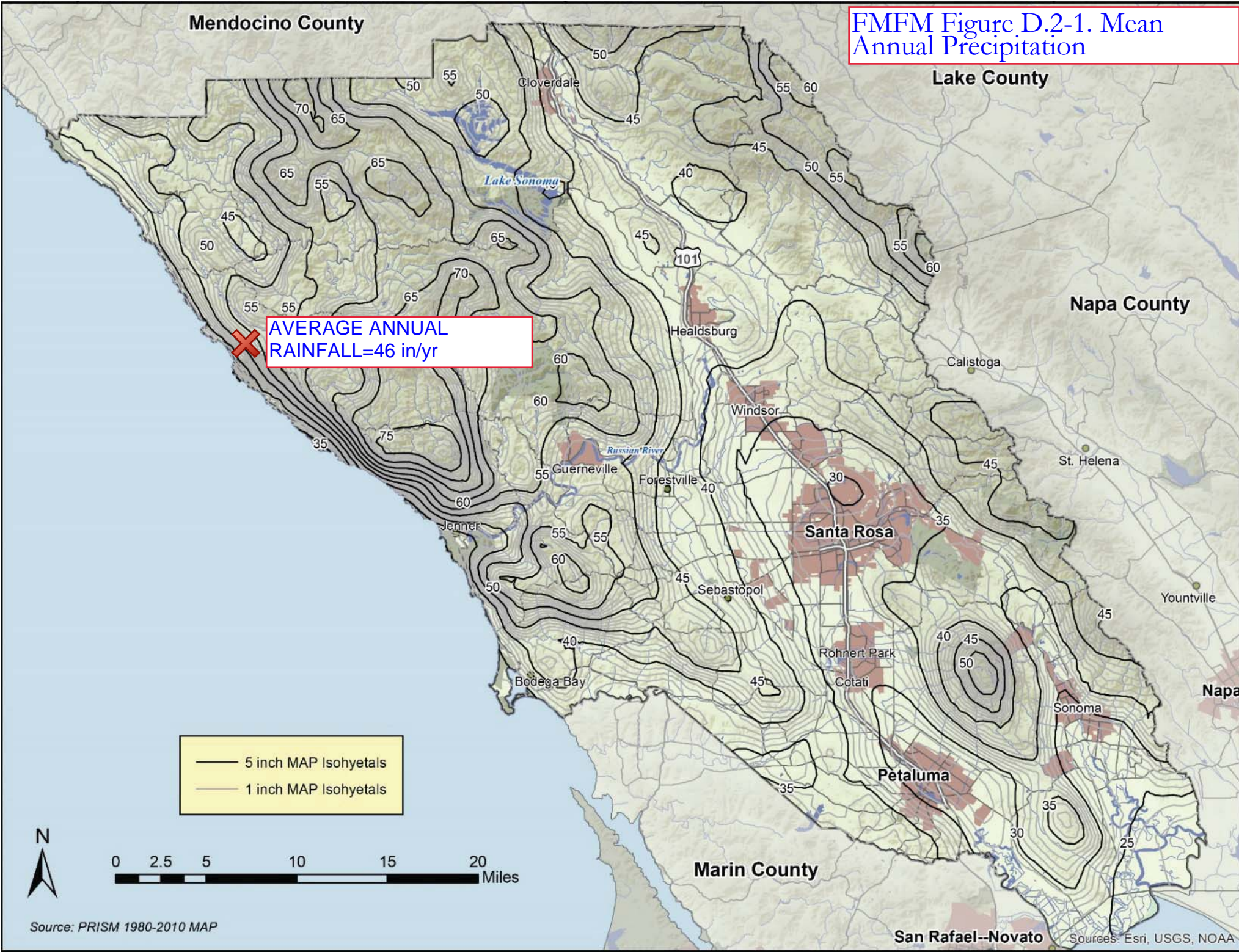
Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

FMFM Figure D.2-1. Mean Annual Precipitation



AVERAGE ANNUAL RAINFALL=46 in/yr

— 5 inch MAP Isohyets
— 1 inch MAP Isohyets



0 2.5 5 10 15 20 Miles

Source: PRISM 1980-2010 MAP

Sources: Esri, USGS, NOAA



STORM WATER CALCULATOR

LID BMP Summary Page & Site Global Values

Project Information: Project Name: Davis Residence Address/Location: 22108 Koftinow Drive Designer: EJM Date: 10/24/2024	Site Information: Mean Seasonal Precipitation (MSP) of Project Site: 46.00 (inches) $K = \text{MSP} / 30$ $K = $ 1.53 Impervious area - pre development: 1,850.0 ft ² Impervious area - post development: 3,702.0 ft ²	Based upon the pre and post development impervious area, the post construction BMP requirement is: <div style="text-align: center; color: red; font-weight: bold; font-size: 1.2em;">Delta Volume & Treatment</div>
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Summary of Saved BMP Results:

BMP ID:	Tributary Area		Requirements		BMP Design Results							
					Hydromodification Control		Flow Base Treatment		Delta Volume Capture			
	Tributary Area (ft ²)	Runoff Reduction Measures (Y/N)	Type of Requirement Met	Type of BMP Design	Percent Achieved	Required V _{Hydromod} (ft ³)	Achieved (ft ³)	Required Q Treatment (cfs)	Achieved (ft ³)	Required V _{Delta} (ft ³)	Achieved (ft ³)	
1	LOA1	33,831	Yes	Delta Volume Capture	Priority 1: P1-06 Swale with Bioretention	101.8					82.5313	210.0000
2												
3												
4												
5												
6												
7												
8												
9												
10												
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STORM WATER CALCULATOR

BMP Tributary Parameters		Project Name: Davis Residence
BMP ID:	LOA1	
BMP Design Criteria:	Delta Volume & Treatment	
Type of BMP Design:	Priority 1: P1-06 Swale with Bioretention	
BMP's Physical Tributary Area:	33,831.0 ft ²	
Description/Notes:		

Runoff Reduction Measures	Resulting reduced Tributary Area used for BMP sizing =	27,148.5 ft ²
	Total Runoff Reduction Measures =	6,682.5 ft ²

Interceptor Trees		Total Number of <u>New</u> trees in BMP Tributary Area: 5
Number of new interceptor Evergreen Trees :	5	
Number of new interceptor Deciduous Trees :	0	
Square footage of qualifying existing tree canopy :	7,576.0 ft ²	

Disconnected Roof Drains	
Select disconnection condition:	Runoff is directed across landscape; Width of area: 15' to 19'

Disconnected Roof Drains Method 1	Disconnected Roof Drains Method 2
Roof area of disconnected downspouts: 0 ft ²	Percent of rooftop area: 100 %
	Select Density: 1 Units per Acre

Paved Area Disconnection	
Paved Area Type:	Select paved area type
Alternatively designed paved area:	0.0 ft ²

Buffer Strips & Bovine Terraces	
Area draining to a Buffer Strip or Bovine Terrace:	0.0 ft ²

Delta Volume Capture; V_{Delta}	V _{DELTA} =	82.53 ft ³
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Hydrologic soil type within tributary area:	C: 0.05 - 0.15 in/hr infiltration (transmission) rate
Predevelopment ground cover description:	Brush: weed-grass mixture with brush major element - Poor (<50% ground cover)
Post development ground cover description:	Brush: weed-grass mixture with brush major element - Poor (<50% ground cover)
CN _{PRE} :	
CN _{POST} :	
User Composite Predevelopment CN:	73.2
User Composite Post development CN:	75.1

BMP Sizing Tool Delta Volume Capture Requirement	Percent of Goal Achieved =	101.78 %
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BMP Volume Below Ground		Ponded Water Above Ground	
Porosity:	0.40	Depth:	0.00 ft
Depth below perforated pipe if present:	4.00 ft	Width:	0.00 ft
Width:	3.50 ft	Length:	0.00 ft
Length:	15.00 ft	Area:	0.00 ft ²
Area:	0.00 ft ²		

CN Composite Work Sheet

Project:
Address/Location:
Designer:
Date:
Inlet Number/Tributary Area/BMP:

INSTRUCTIONS: Please refer to the "Urban Hydrology for Small Watersheds" (TR-55 manual).

Soil Type (Infiltration Rate)	Cover Description	CN	Area ft ²	Product of CN x Area
C: 0.05 - 0.15 in/hr infiltration (transmission) rate	Woods, No Grass - Good (No grazing, forest litter covers soil)	70	29377	2,056,390.0
C: 0.05 - 0.15 in/hr infiltration (transmission) rate	Impervious - Paved Parking, Rooftop, Driveways	98	1850	181,300.0
C: 0.05 - 0.15 in/hr infiltration (transmission) rate	Streets and roads - Paved; open ditches (excluding right-of-way)	92	2606	239,752.0
No Entry	No Entry	0	0	0.0
No Entry	No Entry	0	0	0.0
No Entry	No Entry	0	0	0.0
No Entry	No Entry	0	0	0.0
No Entry	No Entry	0	0	0.0
No Entry	No Entry	0	0	0.0
No Entry	No Entry	0	0	0.0
		Totals =	33833	2,477,442.0

$$CN_{COMPOSIT} = \frac{(CN \times Area) + (CN \times Area) + (CN \times Area) + (CN \times Area) \dots}{Total \text{ Tributary Area}} = \text{Use this } CN_{COMPOSIT} = \boxed{73.2}$$

CN Composite Work Sheet

Project: Davis Residence
 Address/Location: 22108 Koftinow Drive
 Designer: EJM
 Date: October 24, 2024

Inlet Number/Tributary Area/BMP: LOA1 Post Construction

INSTRUCTIONS: Please refer to the "Urban Hydrology for Small Watersheds" (TR-55 manual).

Soil Type (Infiltration Rate)	Cover Description	CN	Area ft ²	Product of CN x Area
C: 0.05 - 0.15 in/hr infiltration (transmission) rate	Woods, No Grass - Good (No grazing, forest litter covers soil)	70	26403	1,848,210.0
C: 0.05 - 0.15 in/hr infiltration (transmission) rate	Impervious - Paved Parking, Rooftop, Driveways	98	3258	319,284.0
C: 0.05 - 0.15 in/hr infiltration (transmission) rate	Streets and roads - Gravel (including right-of-way)	89	3728	331,792.0
C: 0.05 - 0.15 in/hr infiltration (transmission) rate	Streets and roads - Paved; open ditches (excluding right-of-way)	92	444	40,848.0
No Entry	No Entry	0	0	0.0
No Entry	No Entry	0	0	0.0
No Entry	No Entry	0	0	0.0
No Entry	No Entry	0	0	0.0
No Entry	No Entry	0	0	0.0
No Entry	No Entry	0	0	0.0
Totals =			33833	2,540,134.0

$$CN_{COMPOSIT} = \frac{(CN \times Area) + (CN \times Area) + (CN \times Area) + (CN \times Area) \dots}{Total \text{ Tributary Area}} = \text{Use this } CN_{COMPOSIT} = \boxed{75.1}$$