“F”

Stormwater Control Plan

Gateway 24 Use Permit P24-00134-UP
Planning Commission Hearing Date (August 6, 2025)

Stormwater Control Plan
For a Regulated Project
Napa Gateway Road

June 5, 2025

Phelan Haugen Development Company
450 Newport Center Drive, Suite 230
Newport Beach, CA 92660
(614) 562-1456

Prepared By:

SIEGFRIED

3428 Brookside Road,
Stockton CA 95219
(209) 943-2021

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This Stormwater Control Plan was prepared using the template dated October 2018.

I. Project Data

Table 1. Project Data Form

Project Name/Number	Napa Gateway Road/ P24-00134
Application Submittal Date	September 6, 2024
Project Location	APN: 057-200-039
Project Phase No.	Not applicable
Project Type and Description	Industrial Warehouse
Total Project Site Area (acres)	4.33 acres
Total New and Replaced Impervious Surface Area	116,794 SF
Total Pre-Project Impervious Surface Area	0 SF
Total Post-Project Impervious Surface Area	116,794 SF

II. Setting

II.A.1 Project Location and Description

Phelan Development is proposing an approximate 4.33-acre development consisting of a single warehouse facility with truck loading docks and onsite auto and trailer parking. The project site is an undeveloped property at the end of the Gateway Road, west of State Highways 12 and 29, north and east of existing commercial developments, and south of the Sheehy Creek, see Figure 1 for the Vicinity Map The project site is located in industrial park zoning district IP:AC.

This Drainage Report has been prepared in support of the proposed development to document the engineering analysis and results of the onsite development. It includes:

- Private onsite storm drain system design based on the 25-year storm event
- Stormwater bioretention basins

Results are provided within each corresponding section. Calculations, exhibits, and supporting documentation are provided within the appendices at the end of this report.

Figure 1. Vicinity Map

II.B. Existing Site Features and Conditions

The existing site is 4.33 acres and has a trapezoidal shape that follows Sheehy Creek. The project site is currently undeveloped with existing elevations ranging from 47 to 59 above MSL. The existing land cover consists of an undeveloped area with a mild sloping grassy topography. Most of the site drains away from Highway 12 on the east side of the project towards the southwest corner of the project at the East Gateway Road cul-de-sac. The rest of the site along the north edge of the site the existing drainage sheet flows north towards Sheehy Creek. The site is within the Napa River Basin and adjacent to Sheehy Creek. There is an existing 24" storm drain that runs along East Gateway Road to Sheehy Creek, which runs through the west side of the property within a 15' storm drain easement. The storm drain pipe outlets to the Napa River and Napa River to San Pablo Bay.

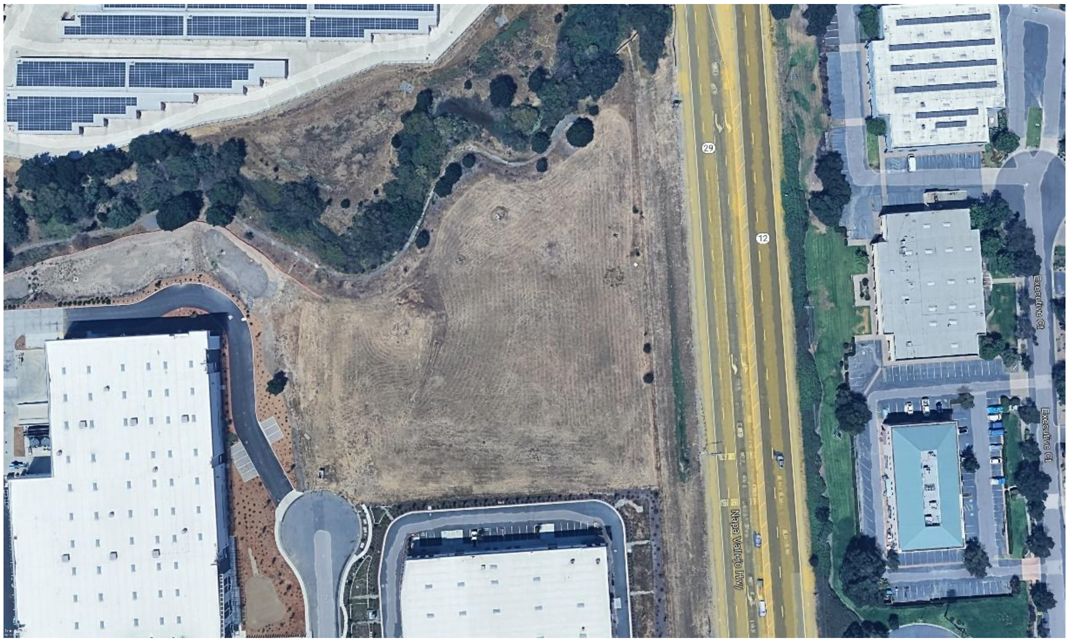

Figure 2: Existing Site Conditions

Hydromodification

The site is within a regional master planned area which does not require onsite hydromodification considerations.

FEMA Mapping

The project site is covered by Map Number 06055C0607F of the FEMA Flood Insurance Rate Map (FIRM) for Napa County. This site is classified as Zone X and designated as an area with minimal flood hazard. The effective FEMA map is dated August 3, 2016 and is provided in Attachment D for reference.

Existing Soil Conditions

According to the Web Soil Survey, the project site consists of Haire loam. Approximately, the first 22 inches is loam, soil depth 22-27 inches is sandy clay loam, soil depth 27-45 inches is clay, and soil depth 45-60 inches is sandy clay. The soil profile results in a hydrologic soil group D classification where the soils have low infiltration rate and a high runoff potential when saturated. In the Project Geotechnical Report by RGH Consultants prepared January 31, 2024 the upper 2 to 4 ½ feet was brown clay, followed by dense clayey sand of the Huichica formation extending down to the maximum depths explored (8 feet). The site was determined to have a soil class of C, which will make infiltration infeasible for the project. Please refer to the Project Geotechnical Report for more information.

Refer to Attachments A for the Existing Drainage Exhibit. Refer to Attachments D for the Web Soil Survey.

II.C. Opportunities and Constraints for Stormwater Control

The land easement on the east side of the project may not be buildable space but may be used for a bioretention basin. The natural grade and the low side of the site at the west edge of the site provides the opportunity to collect and treat drainage in a bioretention basin at this location.

The project is constrained by Sheehy Creek and its setback which lies north of the project site. The 45' Landscape Easement to the west of the State Route 12/29 limits the buildable area but provides proper buffer between the site and the highway. Also, the adjacent lot to the south has an existing swale along the south property line which limits the use of this area for grading purposes. The site contains low permeability soil. The objective of building an industrial warehouse with parking limits the opportunities to reduce the site's imperviousness.

III. Low Impact Development Design Strategies

III.A. Optimization of Site Layout

The proposed site is designed to be consistent with the existing drainage patterns and maximize the landscape and minimize the impervious area without impeding the function of the warehouse. The existing site drains east to west therefore the proposed site has a bioretention basin on the west side of the site to conform to existing drainage and grading features. The proposed site also adheres to the creek setback limit of 35' at Sheehy Creek that is north of the project and the landscape easement of 45' that is adjacent to highway 29. The site layout has been designed to preserve the storm drain pipe and easement while maintaining proper cover over the pipe. A balance has been reached to avoid the setback and easements while using the edges of the site to collect and treat stormwater in bioretention basins.

III.B. Use of Permeable Pavements

The use of permeable pavers was explored, but not feasible for this project.

III.C. Dispersal of Runoff to Pervious Areas

Drainage runoff drains to the edges of the site. Self-treating and self-retained areas were explored but were not feasible with the space and grading constraints presented for this irregular shaped lot.

III.D. Stormwater Control Measures

Runoff from all impervious areas on the site, including roofs and paved areas, will be routed to two bioretention basins (Attachment B). The basins are designed to the criteria in the BASMAA Post-Construction Manual (January 2019), including the following features:

- 12 inches of ponding
- Minimum 18 inches sand/compost mix meeting BASMAA specifications
- Minimum 12 inches of Class 2 permeable, Caltrans specification 68- 2.02F(3)
- Underdrain: minimum 4 in. dia. PVC SDR 35 or equivalent perforated pipe installed with the holes facing down

IV. Documentation of Drainage Design

IV.A. Descriptions of Each Drainage Management Area

IV.A.1. Table of Drainage Management Areas

Table 2. Drainage Management Areas (DMAs) as shown on the Post-Construction Exhibit.

DMA Name	Surface Type	Area (square feet)
DMA 1 (drains to Bioretention Basin #1)	Landscape, Roof, & Paving	44,593 SF
DMA 2 (drains to Bioretention Basin #2)	Landscape, Roof, & Paving	103,937 SF

IV.A.2. Drainage Management Area Descriptions

The proposed development's drainage pattern consists of 2 DMAs that capture and convey site generated stormwater its own corresponding bioretention basin. An exhibit showing the delineations of each drainage management area can be found in Attachment B of this report. Descriptions of each DMA and its flow patterns are listed below:

DMA 1, totaling 44,593 square feet, consists of a smaller portion of roof, truck aisles, parking, drive aisles, truck docks, and landscape areas for the west side of the project. The site spans from the south property line to the Sheehy creek setback on the north edge of the site. The stormwater runoff sheet flows from the building westwards and channelizes in the curb and gutter near DMA 1's bioretention basin. The channelized flow from the curb and gutter will surface flow into the bioretention basin using curb cuts in the curb and gutter. The water collected in the bioretention basin 1 drains through an overflow drain inlet and gets discharged to the existing 24 inch diameter storm drain pipe that crosses through the site within a drainage easement and discharges to Sheehy Creek at the north of the project.

DMA 2, totaling 103,937 square feet, consists of a larger portion of roof, truck aisles, parking, drive aisles, and landscape areas for the east side of the project. The site spans from the south property line to the creek setback on the north edge of the site. The stormwater runoff sheet flows away from the building on the north, south, and east sides of the building and channelizes in curb and gutters or valley gutters. The channelized flow in the gutters flow eastward to the curb and gutter along DMA 2's bioretention basin. The curb and gutter will allow surface flow to discharge into the bioretention basin through curb cuts in the curb and gutter. The water collected in the bioretention basin 2 drains through an overflow drain inlet and gets discharged to the existing 24 inch diameter storm drain pipe that crosses through the site within a drainage easement and discharges to Sheehy Creek at the north of the project.

IV.B. Tabulation and Sizing Calculations

The proposed development's stormwater quality mitigation measures were designed in conformance with City of Napa Standard Specifications dated January 2022, and the BASMAA Post-Construction Manual dated January 2019. All storm water runoff sheet flows to a bioretention basin where one third of the site is collected to the west side of the project and two thirds is collected to the east side of the project. The bioretention basin will treat and settle out sediment and pollutants prior to discharge through the overflow inlet or perforated pipe in the gravel section.

The site is located within the Napa River Basin and hydromodification will not be required due to a regionally master planned stormwater system. The calculated 25-year peak flows in the proposed site condition were used to appropriately size the proposed onsite storm drain facilities. The stormwater generated by the project will be treated by two bioretention basins. The 25-year rainfall intensity, the rainfall depth, and mean annual precipitation were determined using the City of Napa Standard Specifications Tables 2.2. and 2.3. The runoff coefficient for the rational method were determined using Table 2.4 from the City of Napa Standard Specifications. The runoff coefficients for the bioretention basins were determined using Table 4.1 from BASMAA Post-Construction Manual.

Proposed drainage management areas (DMA) were delineated based on the proposed site layout, grading, and bioretention basin capacity available. Each DMA drains to its own corresponding bioretention basin.

Rational Method calculations were completed for each of the DMAs. Results were used to analyze area peak flows and for sizing the onsite storm drain system. Onsite storm drain pipe sizes were calculated using an Excel spreadsheet named Storm Design Sheet shown in Attachments C. The onsite storm drain system was designed for the 25-year storm event in accordance with the City of Napa Standard Specifications.

Bioretention basin area calculations were calculated using BASMAA's Post Construction manual where the bioretention has been sized to be at least 4% of impervious area for the project as required. See attachment C for Provision E.12 Sizing Calculator for more information.

Refer to Attachments B for DMAs, Attachments C for calculations, and Attachment D for supporting documentation.

V. Source Control Measures

V.A. Site activities and potential sources of pollutants

Onsite-site activities that could potentially produce stormwater pollutants include:

- Loading docks
- Parking lots
- Sidewalks
- Trash management

V.B. Site activities and potential sources of pollutants

Table 3. Pollutant Sources and Source Control Measures

Potential Sources of Runoff Pollutants	Permanent Source Control BMPs	Operational Source Control BMPs
On-site storm drain inlets (unauthorized non-stormwater discharges and accidental spills or leaks)	Mark all inlets with the words “No Dumping! Flows to Bay” or similar	Maintain and periodically repaint or replace inlet markings. Provide stormwater pollution prevention information to new site owners, lessees, or operators. See applicable operational BMPs in Fact Sheet SC-44, “Drainage System Maintenance,” in the CASQA Stormwater Quality Handbooks at www.casqa.org/resources/bmp-handbooks Include the following in lease agreements: “Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains.”
Loading docks	Loading docks drain to the bioretention basin prior to discharge.	Move loaded and unloaded items indoors as soon as possible. Clean up debris and trash as needed. See Fact Sheet SC-30, “Outdoor Loading and Unloading,” in the CASQA Stormwater Quality Handbooks at www.casqa.org/resources/bmp-handbooks
Sidewalks, parking lots	Sidewalks and parking lots drain to the bioretention basin prior to discharge.	Sweep plazas, sidewalks, and parking lots regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect washwater containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.
Trash Enclosure	Design trash container areas so that drainage from adjoining roofs and pavement is diverted around the area(s) to avoid run-on. Provide roofs on all trash containers to minimize direct precipitation and prevent rainfall from entering containers. Pave trash storage areas with an impervious surface to mitigate spills. Post signs on all dumpsters informing users that hazardous materials are not to be disposed of therein.	Sweep trash enclosure regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect washwater containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.

VI. Stormwater Basin Maintenance

VI.A. Maintenance Responsibility

Maintenance of stormwater facilities will be the responsibility of the property owner or lease and will be performed by the owner's contractors or employees as part of routine maintenance of buildings, grounds, and landscaping. Applicant accepts responsibility for interim operation and maintenance of stormwater treatment and flow-control facilities within the property limits until such time as this responsibility is formally transferred to a subsequent owner. Necessary maintenance agreements will be executed with the city and leases as required to ensure maintenance is performed.

VI.B. Summary of Maintenance Requirements for Each Stormwater Basin

The two bioretention basins will be maintained as described below. Unpleasant odors will be inspected on an as needed basis. The extended drawdown (ponding > 24 hours) will be inspected after large storm events. The excessive trash/debris accumulation will be inspected bi-annually or as needed. Visible surface contaminants/pollutants will be inspected annually or as needed basis. Vandalism/ catastrophic damage to components or entire system will be inspected on an as needed basis. Unauthorized modifications will be inspected as needed. Excessive weed growth will be inspected annually or as needed. Sediment accumulation at curb cut will be inspected bi-annually. Erosion at inlet, outlet, overflow or side slopes will be inspected bi-annually. Inlet, outlet or overflow structure blockage will be inspected monthly. Irrigation system damaged, leaking or out of adjustment will be inspected as needed. Dead, diseased, dying or missing plants will be inspected bi-annually. Mulch that contains large bare spots /eroded mulch areas will be inspected annually or as needed. Vegetation blocking in- flow at curb cut will be inspected monthly or as needed. Vegetation blocking Operation & Maintenance of other components will be inspected monthly or as needed. Structural damage (planter edges or outlet structure) will be inspected monthly or as needed. Rodent damage/burrowing will be inspected bi-annually. Mosquitos or mosquito larvae observed will be inspected bi-annually.

VII. Construction Checklist

Table 4. Construction Plan Checklist

Stormwater Control Plan Page #	Source Control or Treatment Control Measure	See Plan Sheet #s
7, Post-Construction Exhibit	DMA 1 drains to Bioretention Basin #1; basin is designed as specified	C5.0, C6.0
7, Post-Construction Exhibit	DMA 2 drains to Bioretention Basin #2; basin is designed as specified	C5.0, C6.0
9 and 10, Post-Construction Exhibit	Bioretention Basin #1 and #2 overflows are marked with “no Dumping” message	N/A

VIII. Certifications

The preliminary design of stormwater treatment facilities and other stormwater pollution control measures in this plan are in accordance with the current edition of the BASMAA Post-Construction Manual.

VIIII. References

BASMAA Post Construction Manual (2019, January).

City of Napa (2022, January). Standard Specifications, Section 2 Drainage Standards.

United States Department of Agriculture Natural Resources Conservation Service. Web soil survey. https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx .

Geotechnical Study Report (2024, January 31). RGH Consultants.

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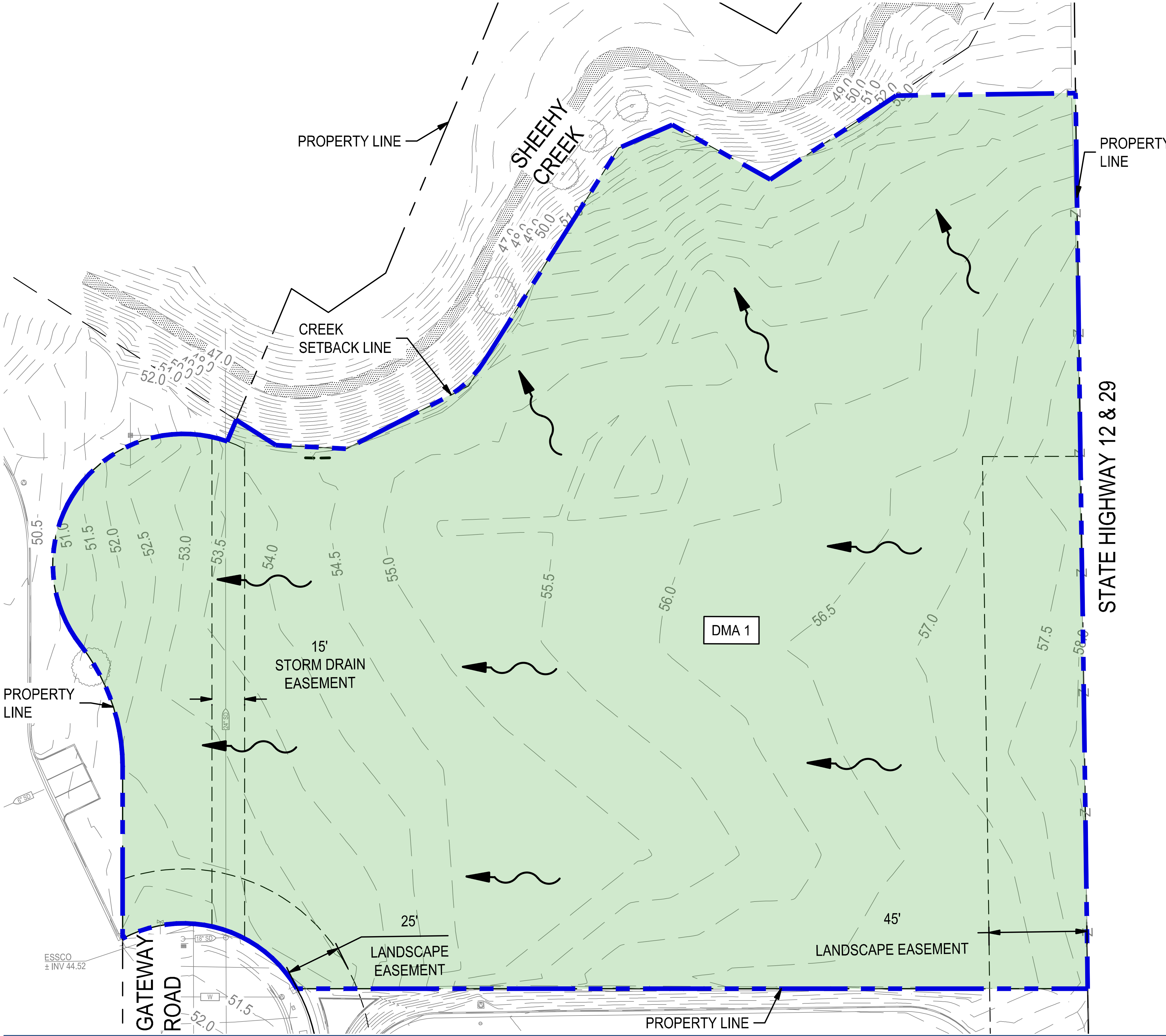
ATTACHMENT A

Existing Drainage Exhibit



PRE-PROJECT RUNOFF COEFFICIENT				
SITE ELEMENT	RUNOFF COEFFICIENT	AREA (SF)	FRACTION OF TOTAL AREA	WEIGHTED RUNOFF COEFF.
MANAGED TURF	0.44	148,530	1.00	0.44
TOTAL		148,530	1.00	0.44

NOTES:

1) REFERENCE: CITY OF NAPA (2022, JANUARY). STANDARD SPECIFICATIONS, SECTION 2 DRAINAGE STANDARDS (25-YEAR STORM ADJUSTED).

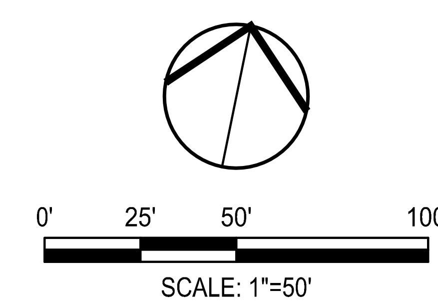
PRE-PROJECT DRAINAGE MANAGEMENT AREAS		
DRAINAGE MANAGEMENT AREA (DMA)	DRAINS TO SOURCE CONTROL MEASURE	
	MANAGED TURF (SF)	TOTAL AREA (SF)
1	148,530	148,530

LEGEND

MANAGED TURF

DMA BOUNDARY

DRAINAGE FLOW PATTERN



JUNE 5, 2025

NAPA GATEWAY
PRE-CONSTRUCTION EXHIBIT
GATEWAY ROAD
NAPA, CA 94558

A1

SIEGFRIED

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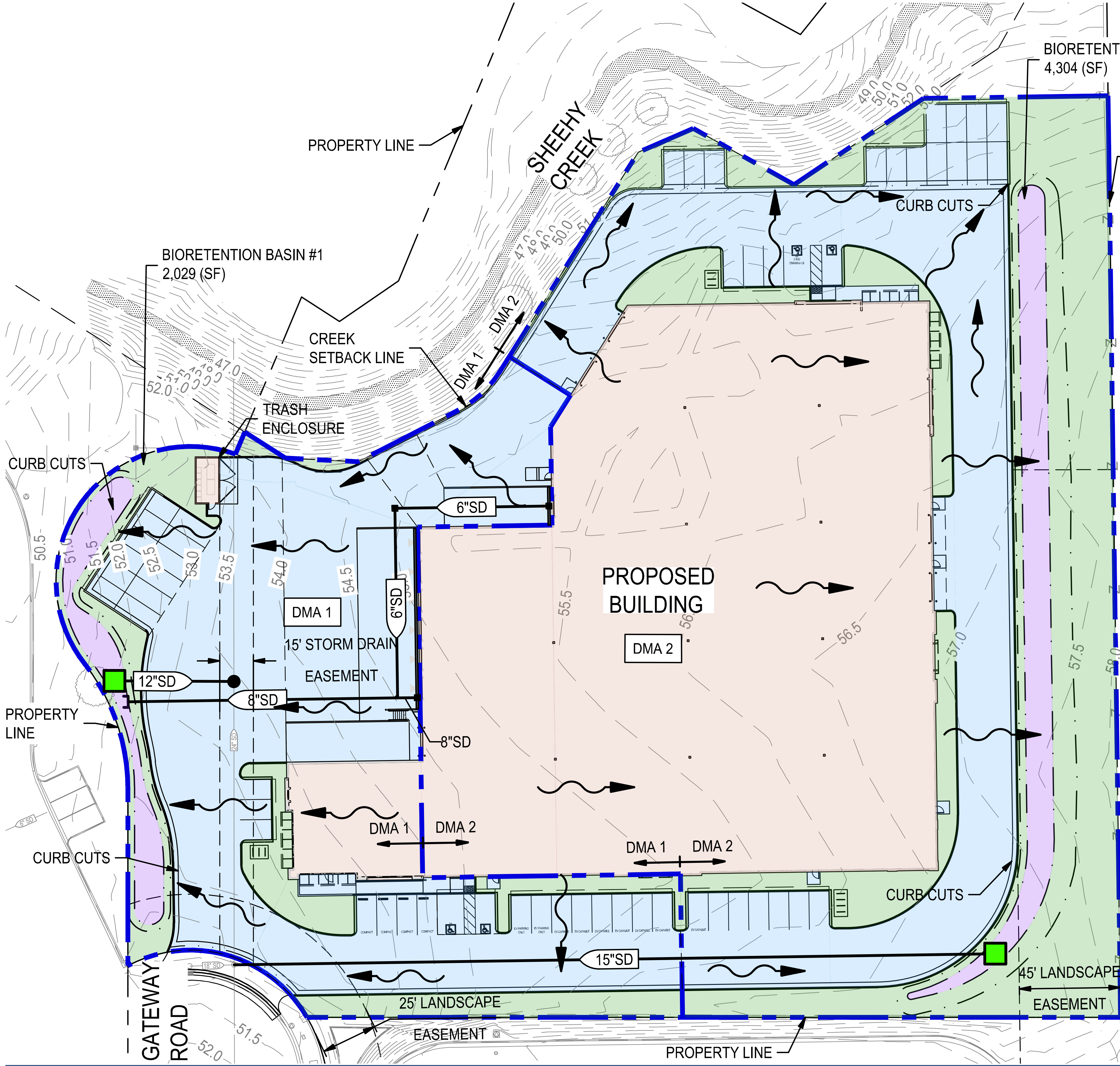
ATTACHMENT B

Proposed Drainage Exhibit and DMA Map



POST-PROJECT RUNOFF COEFFICIENT-CITY OF NAPA STANDARD SPECIFICATIONS

SITE ELEMENT	RUNOFF COEFFICIENT	AREA (SF)	FRACTION OF TOTAL AREA	WEIGHTED RUNOFF COEFF.
ASPHALT/ CONCRETE	1.00	55,447	0.37	0.37
ROOF	1.00	55,014	0.37	0.37
MANAGED TURF	0.44	31,736	0.21	0.09
BIORETENTION	1.00	6,333	0.04	0.04
TOTAL		148,530	1.00	0.88

NOTE:

1) REFERENCE: CITY OF NAPA (2022, JANUARY). STANDARD SPECIFICATIONS, SECTION 2 DRAINAGE STANDARDS.

2) THE CITY OF NAPA RUNOFF COEFFICIENT IS USED FOR PIPE SIZING (25-YEAR STORM).

POST-PROJECT RUNOFF COEFFICIENT-BASMAA STANDARD FOR SMALL STORMS

SITE ELEMENT	RUNOFF COEFFICIENT	AREA (SF)	FRACTION OF TOTAL AREA	WEIGHTED RUNOFF COEFF.
ASPHALT/ CONCRETE	1.00	55,447	0.37	0.37
ROOF	1.00	55,014	0.37	0.37
MANAGED TURF	0.10	31,736	0.21	0.02
BIORETENTION	1.00	6,333	0.04	0.04
TOTAL		148,530	1.00	0.81

NOTE:

1) REFERENCE: BASMAA POST CONSTRUCTION MANUAL (2019, JANUARY).

2) BASMAA RUNOFF COEFFICIENT FOR SMALL STORMS IS USED FOR BIORETENTION TREATMENT SIZING.

POST-PROJECT DRAINAGE MANAGEMENT AREAS

DRAINAGE MANAGEMENT AREA (DMA)	DRAINS TO SOURCE CONTROL MEASURE				
	ASPHALT / CONCRETE (SF)	ROOF (SF)	MANAGED TURF (SF)	BIORETENTION (SF)	TOTAL AREA (SF)
1	31,501	3,310	7,753	2,029	44,593
2	23,946	51,704	23,983	4,304	103,937

LEGEND

- MANAGED TURF
- ASPHALT / CONCRETE
- ROOF
- BIORETENTION BASIN
- DMA BOUNDARY
- DRAINAGE FLOW PATTERN
- DRAIN INLET, INSTALL S-1 SIGNAGE PER FIGURE 4-1 SWQCP

0' 25' 50' 100'

SCALE: 1"=50'

JUNE 5, 2025

NAPA GATEWAY
POST-CONSTRUCTION EXHIBIT

GATEWAY ROAD
NAPA, CA 94558

B1

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ATTACHMENT C

Drainage Calculations

Provision E.12 Sizing Calculator

See the instructions and the BASMAA Post-Construction Manual

Step 1: Enter Total Site Area

Step 2: List names of all DMAs and square footage of each

Step 3: If DMA is "Self-Treating" or "Self-Retaining," **copy** square footage to appropriate column

Step 4: If the DMA is "Drains to Self Retaining" or "Drains to Bioretention" enter runoff factor from Table 4-1

Step 6: For "Drains to Self-Retaining" DMAs, enter the **name of receiving DMA**

Step 5: Slide (move) number from this column to correct column (F or H-Q)

Version 0.3. 2015-12-02.

Total Site Area: 148530

DMA Names	Square Feet	Self-Treating	Self-Retaining	Runoff Factor	Drains to Self-Retaining	Name of Receiving DMA	Basin 1	Basin 2	Basin 3	Basin 4	Basin 5	Basin 6	Basin 7	Basin 8	Basin 9	Basin 10
							BIORETENTION BASINS									
DMA-1A (PERVIOUS)	7753			0.1		DMA 1	775.3									
DMA-1B (IMPERVIOUS)	34811			1		DMA 1	34811									
DMA-2A (PERVIOUS)	23983			0.1		DMA 2		2398.3								
DMA-2B (IMPERVIOUS)	75650			1		DMA 2		75650								
Total DMAs	142197	0	0		0		35586.3	78048.3	0	0	0	0	0	0	0	0
						Sizing Factor	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
						Minimum Size	1423.452	3121.932	0	0	0	0	0	0	0	0
Total Basins	6333	**Step 7:** Enter Facility Footprints				**Footprint on Exhibit**	2029	4304								
DMAs + Basins	148530						OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	OK															

Step 8: Iterate sizes of facility footprints and DMAs until all footprints are at least the minimum **AND** DMAs + Facilities equals Total Site Area

Step 9: Check to make sure Areas Draining to each Receiving Self-Retaining Area do not exceed maximum 2:1 ratio.

Step 10: Check results on this spreadsheet are consistent with what is shown on the SCP Exhibit.

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3428 Brokside Road
Stockton, CA 95219
209.943.2021 Fax: 209.942.0214

Job Number: 23347
Project Name: Napa Gateway Road
Workbook Name: Storm Design Sheet

Sheet 1 of 1
Designed By RRG
Checked By PJS Date 6/5/2025

Beginning Design Data:
Asssumed time to inlet: **10 min**

REGISTERED PROFESSIONAL ENGINEER
PAUL J. SCHNEIDER
No. 62498
Exp. 09/30/25
CIVIL
STATE OF CALIFORNIA

Point of Concentration		Total Inlet Area (ac)	Weighted C	C*A (ac)	∑C*A (ac)	Intensity (in/hr)	Q (CIA) (cfs)	Pipe (in)	Pipe Slope	Length of Pipe (ft)	Velocity (ft/s)	Time in Pipe (min)	Tc Total (min)
Upstream	Downstream												
SDDI 2	ESDMH	2.39	0.82	1.96	1.96	2.41	4.7	15	0.0050	340	6.78	0.84	10.0
SDDI 4	SDDI 5	0.09	0.95	0.09	0.09	2.41	0.2	6	0.0030	69	2.39	0.48	10.0
SDDI 5	SD WYE 1	0.00	0.00	0.00	0.09	2.35	0.2	6	0.0030	85	2.35	0.60	10.5
SDDI 3	SD WYE 1	0.15	0.94	0.14	0.14	2.41	0.3	8	0.0030	9	2.37	0.06	10.0
SD WYE 1	SD OUTFALL	0.00	0.00	0.00	0.23	2.35	0.5	8	0.0030	120	3.17	0.63	10.5
SDDI 1	SDMH 1	0.78	0.82	0.63	0.87	2.27	2.0	12	0.0030	53	4.57	0.19	11.1

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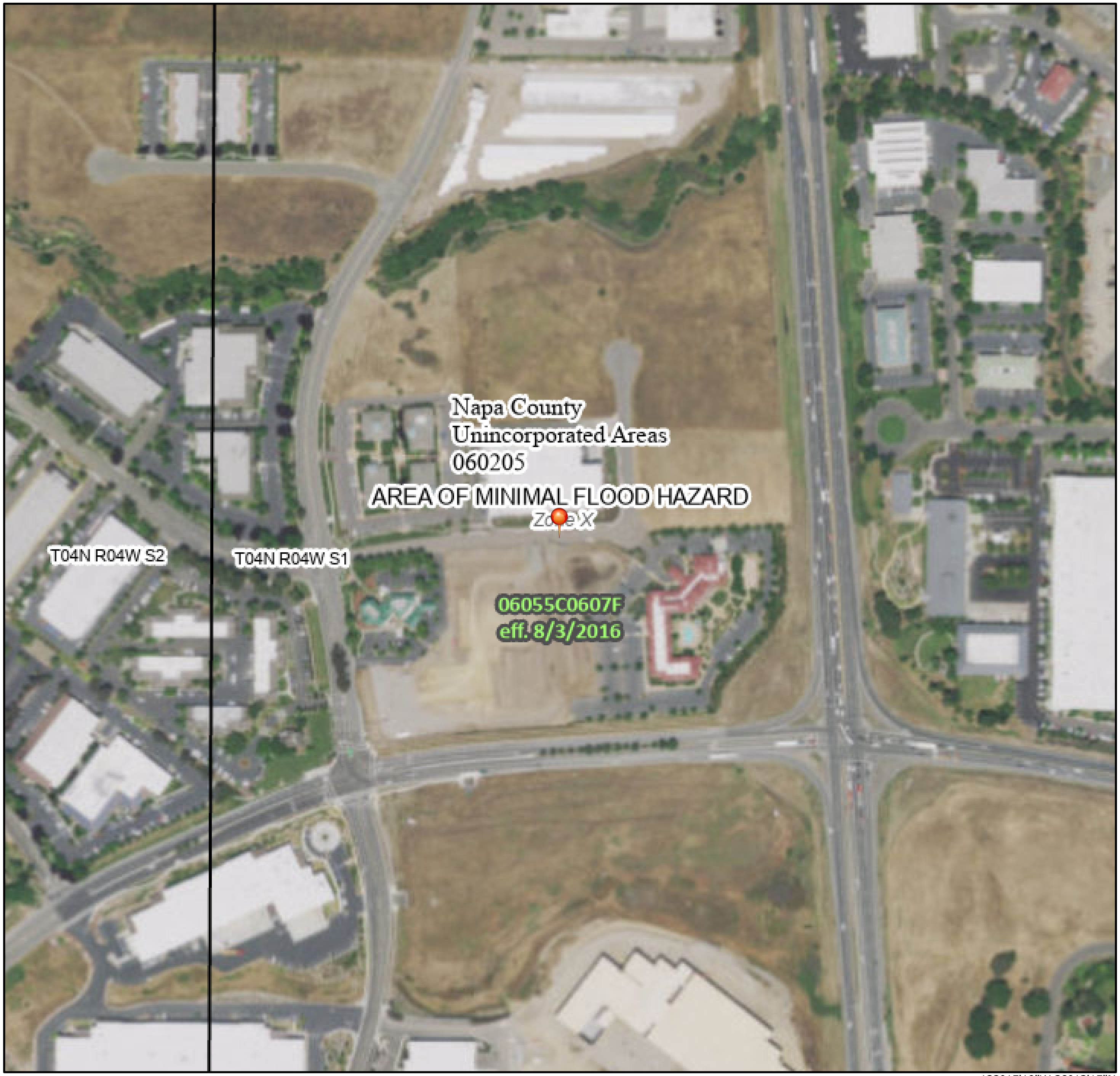
ATTACHMENT D

Supporting Documentation

National Flood Hazard Layer FIRMette

FEMA

122°15'57"W 38°13'43"N



122°15'19"W 38°13'15"N

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

1:6,000

Basemap Imagery Source: USGS National Map 2023

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
- 513 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 3/22/2024 at 12:59 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.

United States Department of Agriculture

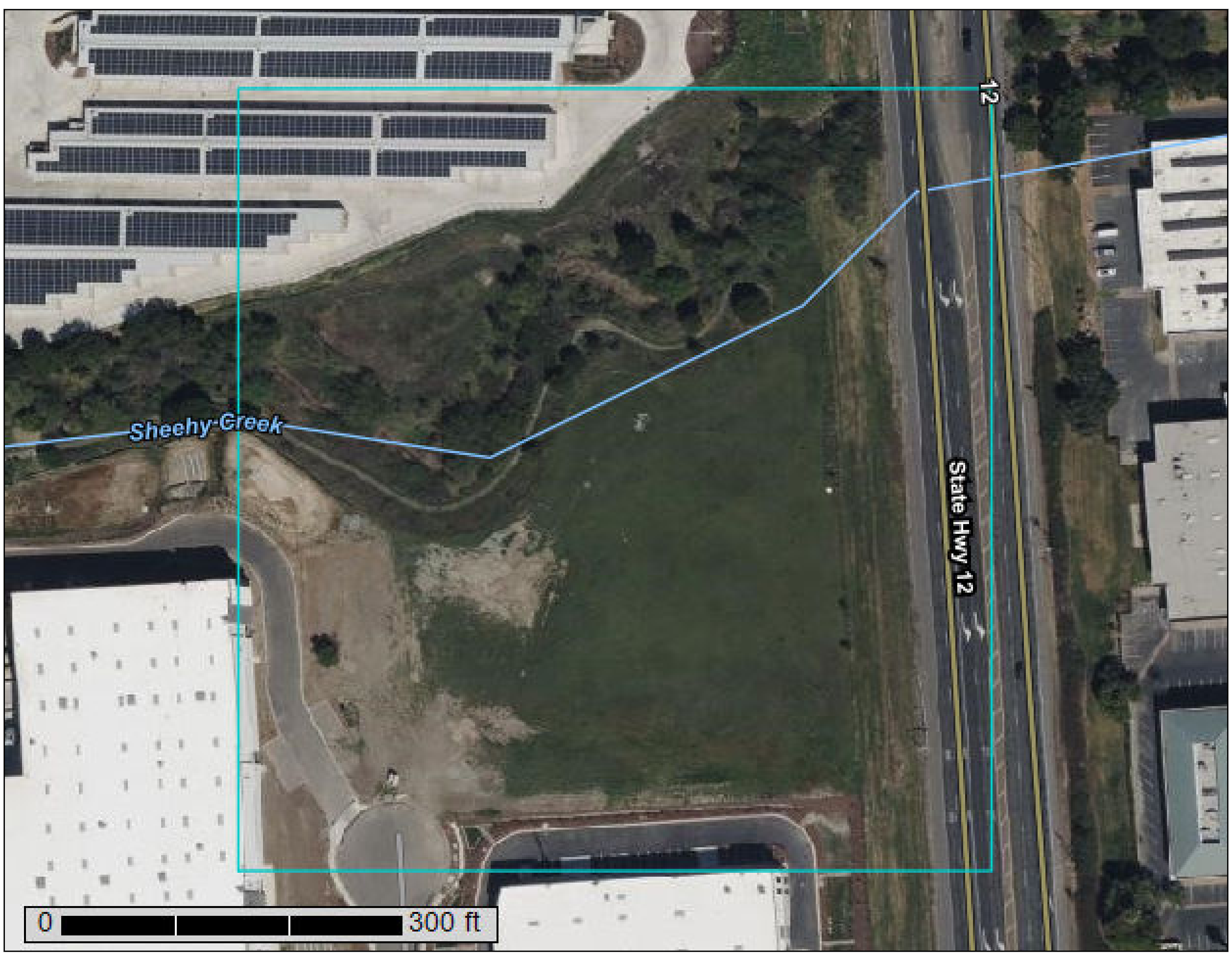
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for

Napa County, California



March 26, 2024

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

Map Scale: 1:1,560 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0, 20, 40, 80, 120

Feet: 0, 50, 100, 200, 300

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 Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

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 1:24,000.

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: Napa County, California
Survey Area Data: Version 16, Sep 11, 2023

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

Date(s) aerial images were photographed: Mar 26, 2022—Apr 25, 2022

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.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
146	Haire loam, 2 to 9 percent slopes	10.4	100.0%
Totals for Area of Interest		**10.4**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Napa County, California

146—Haire loam, 2 to 9 percent slopes

Map Unit Setting

National map unit symbol: hdlh
Elevation: 20 to 2,400 feet
Mean annual precipitation: 25 to 30 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 220 to 260 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Haire and similar soils: 85 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Haire

Setting

Landform: Alluvial fans, terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope, riser
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from sedimentary rock

Typical profile

H1 - 0 to 22 inches: loam
H2 - 22 to 27 inches: sandy clay loam
H3 - 27 to 45 inches: clay
H4 - 45 to 60 inches: sandy clay

Properties and qualities

Slope: 2 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 6.5 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: R014XD089CA - CLAYPAN
Hydric soil rating: No

Minor Components

Clear lake

Percent of map unit: 5 percent
Landform: Alluvial fans
Hydric soil rating: Yes

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