Initial Storm Water Low Impact Development Submittal

For

Barlow Hotel

6782 Sebastopol Avenue & 385 Morris Street
Sebastopol, California
APN 004-750-030, 004-011-017 & 020

GRD24-

JN 24174
August 1th, 2024

Prepared for:
Highway Partners, LLC
6780 Depot Street, #110
Sebastopol, CA 95472
(707) 484-8020

David R Brown, RCE 41833
My license expires 3/31/2026

Prepared by:

adobe associates, inc.
civil engineering | land surveying | wastewater
1220 N. Dutton Ave., Santa Rosa, CA 95401
P. (707) 541-2300 F. (707) 541-2301
Website: www.adobeinc.com

Prepared By: RMS
Checked By: AP

Table of Contents

Appendices

Initial Storm Water Low Impact Development
For
Barlow Hotel

Project Description

The Barlow Hotel is located at 6782 Sebastopol Avenue in Sebastopol, California. This project proposes to construct a commercial hotel, shed, AC and pervious paver parking lot, AC driveway, and associated hardscape. For the Barlow Hotel, offsite parking is being proposed at a separate location located at 385 Morris Street in Sebastopol, California. The project has a total of 101,384 square feet of new/replaced impervious area.

The project area is around 4.42 acres and is located on two different lots. The lot located on 6782 Sebastopol Avenue is currently located on an existing private road called Gravenstein Court. The existing lot contains an existing commercial building, parking lot and associated hardscape. Natural slopes on the site are relatively ranging from 1 to 5 percent, with the parking lot of the property sloping towards a storm drainpipe located under Gravenstein Court on the western property line. The lot located on 385 Morris Street is an empty lot that consists of a concrete pad and retaining wall located around the property. Surface runoff flows from a high point located on the easternly and northernly property line towards two low points located in the center of the property. The soil type present on 6782 Sebastopol Avenue includes BcA (Blucher fine sandy loam, type C soil) and SbC (Sebastopol sandy loam, type C soil). The soil type present on 385 Morris Street includes BcA (Blucher fine sandy loam, type C soil) and CfA (Clear lake clay, type C/D soil). No creeks or wetlands are located on the property. Trees will be protected to the maximum extent feasible.

The proposed project would result in an increase in impervious area, triggering the 100% Volume Capture ***or*** both Delta Volume Capture ***and*** Treatment requirement. The project will be utilizing 100% volume capture for the design strategy for detention and treatment. Additionally, a Storm Water Low Impact Development Submittal, installation of permanent Post Construction Low Impact Development (LID) features, and Best Management Practices (BMP's) are required.

Pollution Prevention Measures and BMP Selection

Runoff from proposed polluted areas will be collected onsite. There will be a storm drain network throughout the site to direct the surface runoff to the proposed bioretention facilities. Runoff from impervious areas including roof drains will be directed toward the bioretention areas. Due to the existing site grading of the frontage improvements, on-site offsets will be used for the frontage improvements (DA-5 from Hotel and DA-3 from Batch Parking) of the project towards the on-site bioretention and runoff reduction measures/credits have been claimed for the pervious pavers used in the project. The open space site conditions warrant the use of a bioretention with no curb and gutter. A P1-02 "Priority 1 Roadside Bioretention-No Curb and Gutter" was selected since the facilities will provide treatment and retention for the site. The bioretention facility will be installed

per attached detail P1-02 “Priority 1 Roadside Bioretention – No Curb and Gutter” from the Santa Rosa Low Impact Development Design Manual.

Additional prevention measures are:

- Design of landscaping to prevent sediment entering the storm drain system and to meet vector control requirements (draw down less than 72 hours).
- Incorporate Integrated Pest Management (IPM) principles and techniques for design and maintenance.
- Contain litter and trash so that it is not dispersed by the wind or runoff during waste removal.
- Maintain stabilized construction entrance to reduce sediment transport offsite.
- Conduct street sweeping at regular intervals to reduce sediment tracking.

Treatment and Volume Capture

The design of the drainage from the site will be such that the total runoff generated by a storm event that produces 1” of rainfall over a 24-hour period will be captured in the bio-retention facilities. Based on the drainage routing, the project site is broken into several Drainage Areas. For the site on 6782 Sebastopol Avenue, Drainage Areas (DA): DA1, DA2, DA3, DA4, and DA5, treatment will be provided in the amended soil within the proposed bioretention systems. Retention and treatment will be provided for DA1, DA2, DA3, DA4, and DA5 will provide a volume capture of 590, 2,610, 1,918, 301, and 315 cubic feet, respectively. DA5 will be offset onsite treatment that will increase the Bioretention-4 size located in DA4. DA5 volume capture of 315 cubic feet will be added to Bioretention-4 increase the bioretention-4 volume capture to 616 cubic feet. For the site on 358 Morris Street, Drainage areas (DA): DA1 and DA2, treatment will be provided in the amended soil within the proposed bioretention systems. DA3 will be offset onsite treatment will increase Bioretention-1 located in DA1 which combining the volume capture of DA1 and DA3 to 651 cubic feet. Retention and treatment will be provided for DA1, DA2 and DA-3 will provide volume capture of 4,460, 1,260, and 60 cubic feet, respectively. DA3 will be offset onsite treatment that will increase the Bioretention-1 size located in DA1. DA5 volume capture of 60 cubic feet will be added to Bioretention-1 increase the volume capture of Bioretention-1 to 4520 cubic feet.

Treatment for the site will be provided by the existing vegetation. Trash and debris 100 microns in diameter will be removed from stormwater runoff by allowing the runoff to filter through the amended soil section of the bioretention facility prior to infiltration into groundwater. Based on the hydrological soil group of the project, a bioretention depth of six inches will have a drawdown time less than 72 hours. Refer to the Initial SWLIDs Exhibit for location and sizing of the bioretention area.

Maintenance and Funding

Monitoring and maintenance of the post-construction BMPs shall be the responsibility of the owner, Highway Partners, LCC, until such a time as ownership is transferred, which includes financial responsibility. All scheduled or unscheduled maintenance to the bioretention facilities shall be documented. Contact Highway Partners, LCC at (707)-484-8020 for an emergency situation.

Maintenance checklist and Maintenance Agreement will be included with Final SWLIDs submittal.

BMP Inspection and Maintenance Schedules

A blockage in the storm drain system will cause water to back up into the treatment facilities and may damage or reduce the BMP performance. For this reason, inspection and maintenance of the storm drain system is considered part of the inspection and maintenance of the treatment facilities. Normal functioning of the facilities may involve retention of water for up to 72 hours following significant storm events.

Inspection Activity	Every 24 Hours During Storm Event	Monthly	Bi-Annual (Oct/April)	As Needed
1. Inspect Bio-retention Facility	x	x		
2. Inspect Inlets	x	x		
3. Inspect Outlets	x	x		
4.Inspect Landscape Areas			x	
5.Inspect Perforated Pipe				x

Storm Drain System

Frequency	Observation	Maintenance Activity
Before each rainy season and as stated in Table 1.	Inspect the storm drain outfall. Look for obstructions, vegetation, debris, litter, sediment, etc. blocking the outfall. Check for bushes, trees, or other dense vegetation growing immediately in front of the outfall.	Remove obstructions, etc.
	Inspect all catch basins. Look for obstructions, vegetation, debris, litter, sediment, etc. blocking the catch basins.	Remove obstructions, etc.
Before each rainy season and after the first heavy rain.	Inspect the entire storm drain system from the upstream end to the outfall, including all catch basins. Observe the flow of water. Any evidence of ponding in the catch basins indicates a blockage.	Find and remove any obstructions. Flushing may be necessary.

Bioretention Facility – Subdrains

Frequency	Observation	Maintenance Activity
Before each rainy season and as stated in Table 1.	Inspect all subdrain cleanouts. Ensure that all cleanout caps are present. Look for obstructions, debris, trash, leaves, vegetation, etc. growing inside the subdrain or covering the cleanout.	Remove any obstructions by hand (if near the cleanout entrance) or by flushing (with pressurized water) if too far down the pipe. Replace missing caps and secure to prevent unauthorized removal or accidental displacement.
	Inspect each subdrain where it enters the catch basin to see whether the subdrain pipe is dry, or is clogged with vegetation. Ensure that the subdrain is flowing by testing with water from the cleanout end.	If water does not flow through the subdrain, rod or flush the line to ensure flow.

Cost Associated with Inspection and Maintenance of BMP's on Private Land, Design life including Periodic replacement Cost:

Necessary inspections and maintenance are to be performed as per the Operation and Maintenance Plan provided with this report. The average annual maintenance cost for one bioretention area is around $1,900. The expected design life is around 30 years. The bioretention areas requires routine operation and maintenance to uphold the desired performance and aesthetic quality as well as ensure performance throughout its expected lifetime.

Conclusion:

Runoff from the impervious surfaces will be directed towards the proposed bio-retention facility that has been sized to meet the 10% volume capture. Treatment will be provided in the amended soil within the proposed bioretention systems and existing vegetation.

APPENDIX A

Determination Worksheet

City of Sebastopol
Determination Worksheet

City Use Only
Project Requires Permanent Storm Water BMPs?
Yes ☐ No ☐

Storm Water Low Impact Development Manual

Purpose: Use this form to determine *whether* or *not* this project will need to incorporate permanent Storm Water Best Management Practices (BMPs) and submit a Standard Urban Storm Water Mitigation Plan (SUSMP).

Applicability: Required with all Master Planning Application Forms. Information presented on this worksheet must reflect final development conditions.

PART 1: INFORMATION

Applicant Name	Highway Partner, LLC
Mailing Address	6780 Depot Street, #110
City	Sebastopol
State Zip Code	CA 95472
Phone	(707)-484-8020
Fax	
Email	

Engineer Name	Adobe Associates, Inc
Mailing Address	1220 North Dutton Avenue
City	Santa Rosa
State Zip Code	CA 95401
Phone	(707)-541-2300
Fax	
Email	

☐ **No Project Engineer**

Project Description

Project Name	Barlow Hotel
Site Address	6782 Sebastopol Avenue & 385 Morris Street

1. Total Project Area:

   _____: Square Feet OR 4.42 : Acre(s)

2. Existing Land Use(s): (Check all that apply)

   ☑ Commercial ☐ Office ☐ Industrial

   ☐ Residential ☐ Community Facilities ☐ Other_____

Description of buildings and site features:

Existing building on site is commercial. There is an adjacent parking lot that also serves a grocery store in the same general vicinity. All building and site features are a part of The Barlow.

3. Existing Impervious Surface Area:

_____: Square Feet or 1.73 : Acres

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

☑ Commercial ☐ Office ☐ Industrial

☐ Residential ☐ Community Facilities ☐ Other_____

Description of buildings and site features:

Proposed apartment building, shed, AC, previous paver parking lot, and associated hardscape.

Type of Application

☐ Design Review ☑ Use Permit ☐ Variance

☐ Subdivision ☐ Lot Line Adjustment ☐ Other_____

PART 2: REGULATORY DETERMINATIONS

Cal Green:

1. Does this Project require a non-residential building permit for a newly constructed building without sleeping accommodations?[1]

☐ **YES:** This project may need to implement permanent Storm Water BMP's and be designed in accordance with the Storm Water Low Impact Development (LID) Technical Design Manual due to CAL Green requirements. Complete the remainder of this worksheet.

☑ **NO:** Complete the reminder of this worksheet.

[1] Additions, alterations, repairs, and existing structures are not subject to the requirements of CAL Green. Please contact the Building and Safety Department for further information on Building Permit requirements.

Section 401:

2. Does this Project require a Section 401 Permit?[2]

   Yes ☐ No ☒

   A. **IF YES**: Are any of the following a component of this project? (Check all that apply)

      ☐ Soil Disturbance (one or more acre)

      ☐ New Outfall

      ☐ New Impervious Surface(s)

If you checked any of the boxes in section 2A, please be advised that this project will require North Coast Regional Water Quality Control Board review and permanent Storm Water BMPs designed in accordance with the Low Impact Development (LID) Technical Design Manual. ***Please go to Page 5 and complete the "Acknowledgement Signature" section.***

Initial Determination:

3. Does this Project create or replace 10,000 square feet or more of impervious surface?

   ☒ **YES:** Complete the remainder of this worksheet.

   ☐ **NO:** This Project does not need to incorporate permanent Storm Water BMPs.
   Please go to Page 5 and complete the "Exemption Signature" section.

PART 3: EXEMPTIONS

1. Is this a **routine maintenance activity**[3] that is being conducted to maintain original line (horizontal alignment) and grade (horizontal alignment), hydraulic capacity, and original purpose of facility, such as resurfacing existing roads and parking lots?

   Yes ☐ No ☒

2. Is this an **emergency activity**[4] required to protect public health and safety?

   Yes ☐ No ☒

3. Is this a project undertaken solely to install or reinstall **public utilities** (such as sewer or water lines) that does not include any additional street or road development or development activities?

   Yes ☐ No ☒

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[2] A 401 Permit is required from the North Coast Regional Water Quality Control Board (NCRWQCB) if any part of this project is located within or adjacent to "waters of the State" which can be a creek, drainage ditch, wetland or any seasonal waterway. Please contact the North Coast Regional Water Quality Control Board for further information on 401 Permit requirements.

[3] "**Routine Maintenance Activity**": This exemption includes activities such as overlays and/or resurfacing of existing roads or parking lots as well as trenching and patching activities and reroofing activities.

[4] "**Emergency Redevelopment**": The Regional Water Quality Control Board must agree that the activities are needed to protect public health and safety to qualify for this exemption.

4. Is this a **reconstruction project**[5], undertaken by a **public agency**, of street or roads remaining within the original footprint and less than 48 feet wide?

   Yes ☐ No ☒

5. Is this 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 3?

☐ **YES: STOP:** This project is exempt and will not need to incorporate permanent Storm Water BMP's. ***Please go to Page 5 and complete the "Exemption Signature" section.***

☒ **NO:** Proceed to Part 4 below to see if this project will need to incorporate permanent Storm Water BMPs.

PART 4: PROJECT TRIGGERS

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

1. Does this **development or redevelopment project** create or replace a combined total of 1.0 acre or more of impervious surface?

   Yes ☒ No ☐

2. Does this project create or replace a combined total or 10,000 feet or more of impervious street, roads, highways, or freeway construction or reconstruction?

   Yes ☒ No ☐

3. Does this project include **four or more new homes**?

   Yes ☐ No ☒

4. Is this project an **industrial development** creating or replacing a combined total of 10,000 ft. or more of impervious surface?

   Yes ☐ No ☒

5. Is this project a **commercial development** creating or replacing a combined total of 10,000 ft. or more of impervious surface?

   Yes ☒ No ☐

6. Is this project a **retail gasoline outlet** creating or replacing a combined total of 10,000 ft. of more or impervious surface?

   Yes ☐ No ☒

[5] "**Reconstruction**": Work that replaces surfaces down to subgrade. Street width is measured from face-of-curb to face-of-curb. Overlays, resurfacing, trenching, and patching are considered maintenance activities and are exempt.

7. Is this project a **restaurant** creating or replacing a combined total of 10,000 ft. or more of impervious surface?[6]

   Yes ☐ No ☑

8. Is this project a **parking lot** (not included as part of a project type listed above) creating or replacing a combined total of 10,000 feet or more impervious surface or with 25 or more parking spaces?

   Yes ☑ No ☐

9. Is this project an **automotive service facility** creating or replacing a combined total of 10,000 ft. or more or impervious surface?

   Yes ☐ No ☑

PART 5: DETERMINATION SIGNATURE

Did you answer "YES" to any of the above questions in Part 4?

☑ **YES**: The project must implement permanent Storm Water BMPs and be designed in accordance with the Storm Water LID Technical Design Manual. A Preliminary Standard Urban Storm Water Mitigation Plan (SUSMP) must be submitted to the Engineering Department. *Please complete the "Acknowledgment Signature" section.*

☐ **NO:** The project will **not** need to incorporate permanent Storm Water BMPs. *Please complete the "Exemption Signature" section.*

Acknowledgment Signature:

As the property owner or applicant, I understand that this project is required to implement permanent Storm Water Best Management Practices and the submittal of a SUSMP. Any unknown responses must be resolved to determine if the project is subject to these requirements.

_____	_____	8/2/2024
Applicant Signature	Printed Name	Date

Exemption Signature:

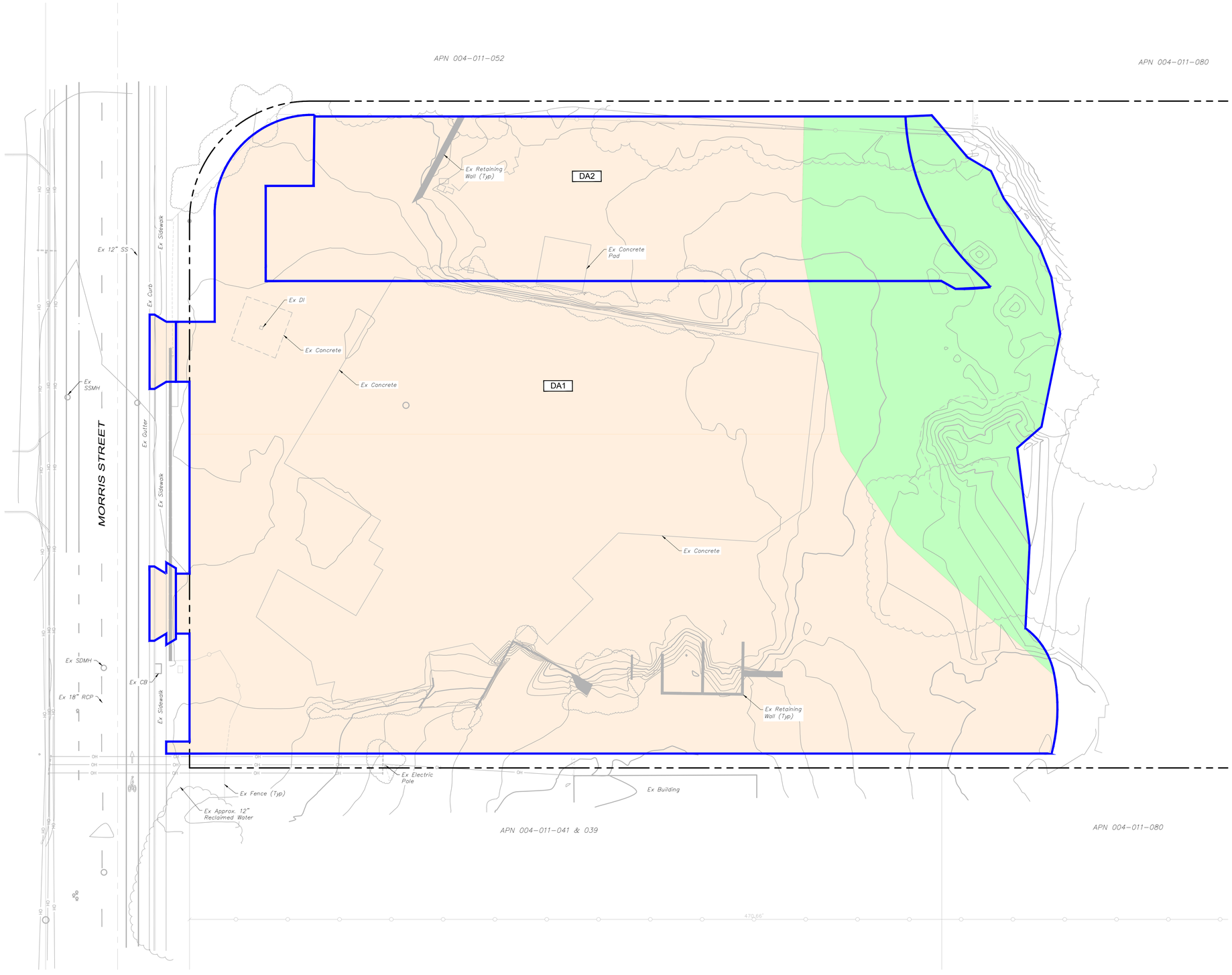
As the property owner or applicant, I understand that this project as currently designed does not require permanent Storm Water BMPs or the submittal of a SUSMP. I understand that redesign may require submittal of a new Determination Worksheet and may require permanent Storm Water BMPs.

_____	_____	_____
Applicant Signature	Printed Name	Date

[6] "**Impervious Surface**": An area that has been modified to reduce storm water runoff capture and percolation into underlying soils. Such surfaces include rooftops, walkways, and parking areas. Permeable pavements shall be considered impervious for this section if they have sub-drains to preclude infiltration into underlying soils.

APPENDIX B

Existing and Proposed SWLIDs Exhibit



DRAINAGE AREA TABLE

DA1 = 1.69 AC (73,756 SF)

DA2 = 0.42 AC (18,510 SF)

DA3 = 0.01 AC (632 SF)

DRAINAGE AREA LEGEND

- DA1 — DRAINAGE MANAGEMENT AREA
- (1) — POINT OF CONCENTRATION
- DRAINAGE AREA BOUNDARY
- PROPERTY LINE (℄)
- HYDROLOGIC SOIL BOUNDARY
- DIRECTION OF FLOW

SOIL TYPE LEGEND

- CfA—CLEAR LAKE CLAY HYDROLOGICAL SOIL TYPE=C/D
- BcA—BLUCHER FINE SANDY LOAM HYDROLOGICAL SOIL TYPE=C

NOTE:

REFER TO SUBMITTED GRADING & DRAINAGE PLANS FOR INVERTS, FLOW LINES, TOP OF GRATE ELEVATIONS AND DRAINAGE SPECIFICATIONS

THIS MAP IS FOR REFERENCE ONLY

N

20' 10' 0 10' 20' 40' 60'

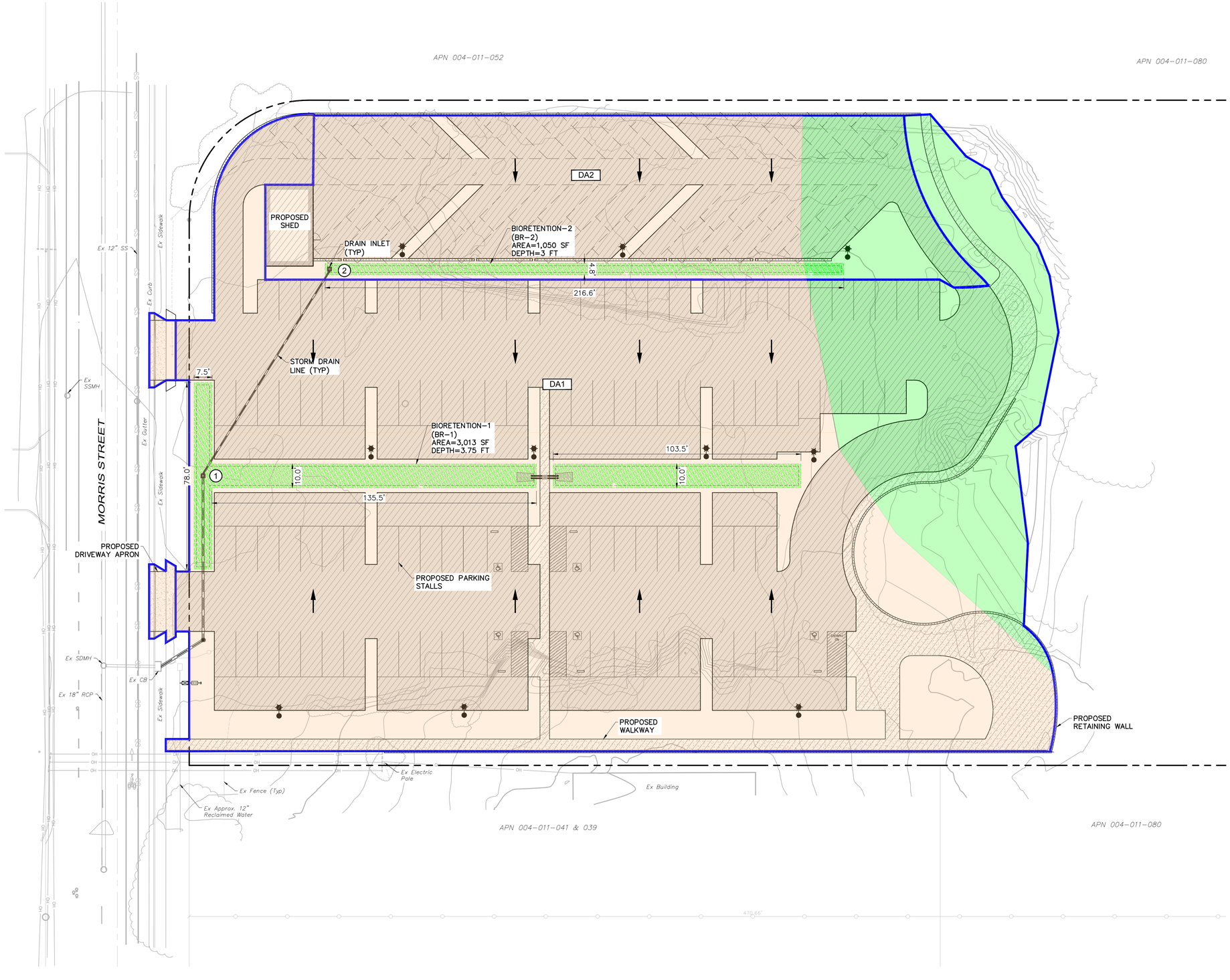
Graphic Scale: 1" = 20'

August 1, 2024

EXISITING SWLIDS CONDITONS

BATCH PLANT PARKING LOT
385 Morris Street, Sebastopol, CA
APN 004-011-017 & 020

adobe associates, inc.
civil engineering | land surveying | wastewater
1220 N. Dutton Ave., Santa Rosa, CA 95401
P. (707) 541-2300 F. (707) 541-2301
Website: www.adobeinc.com
"A Service You Can Count On!"



DRAINAGE AREA TABLE

DA1 = 1.69 AC (73,756 SF)
CN=93

DA2 = 0.42 AC (18,510 SF)
CN=94

DA3 = 0.01 AC (632 SF)
CN=98

DRAINAGE AREA LEGEND

- DA1 — DRAINAGE MANAGEMENT AREA
- (1) — POINT OF CONCENTRATION
- DRAINAGE AREA BOUNDARY
- PROPERTY LINE (℄)
- HYDROLOGIC SOIL BOUNDARY
- DIRECTION OF FLOW

DRAINAGE ROUTING

DA1 → (1)
DA2 → (2)

SOIL TYPE LEGEND

- CfA—CLEAR LAKE CLAY HYDROLOGICAL SOIL TYPE=C/D
- BcA—BLUCHER FINE SANDY LOAM HYDROLOGICAL SOIL TYPE=C

HATCHING LEGEND

- AC PAVEMENT
- HARDSCAPE (SLD)
- IMPERVIOUS AREA =53,657 SF
- BIORETENTION FACILITY

NOTE:

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20' 10' 0 10' 20' 40' 60'

Graphic Scale: 1" = 20'

August 1, 2024

PROPOSED SWLIDS CONDITONS

BATCH PLANT PARKING LOT
385 Morris Street, Sebastopol, CA
APN 004-011-017 & 020

adobe associates, inc.
civil engineering | land surveying | wastewater
1220 N. Dutton Ave., Santa Rosa, CA 95401
P. (707) 541-2300 F. (707) 541-2301
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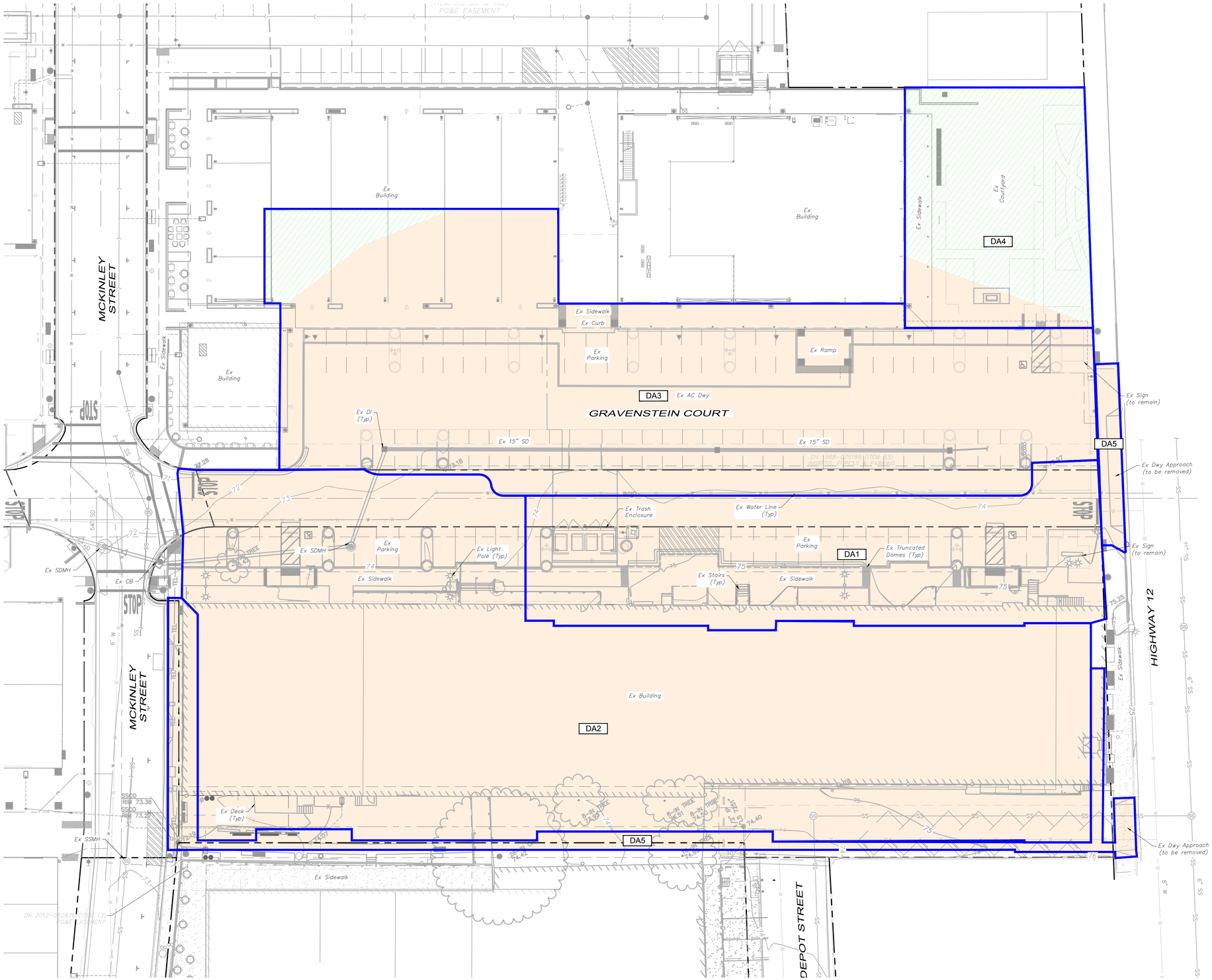

DRAINAGE AREA TABLE

DA1 = 0.32 AC (13,751 SF)
CN=94

DA2 = 0.99 AC (43,070 SF)
CN=96

DA3 = 0.71 AC (30,822 SF)
CN=95

DA4 = 0.18 AC (7,888 SF)
CN=92

DA5 = 0.11 AC (4,806 SF)
CN=95

DRAINAGE AREA LEGEND

- DA1 — DRAINAGE MANAGEMENT AREA
- (1) — POINT OF CONCENTRATION
- DRAINAGE AREA BOUNDARY
- PROPERTY LINE (℄)
- LINE OF ANALYSIS

SOIL TYPE LEGEND

- BcA—BLUCHER FINE SANDY LOAM HYDROLOGICAL SOIL TYPE=C
- SbC—SEBASTOPOL SANDY LOAM HYDROLOGICAL SOIL TYPE=C

NOTE:

REFER TO SUBMITTED GRADING & DRAINAGE PLANS FOR INVERTS, FLOW LINES, TOP OF GRATE ELEVATIONS AND DRAINAGE SPECIFICATIONS

THIS MAP IS FOR REFERENCE ONLY

20' 10' 0 10' 20' 40' 60'

Graphic Scale: 1" = 20'

August 1, 2024

EXISTING SWLIDS CONDITION

BARLOW HOTEL
6782 Sebastopol Avenue, Sebastopol, CA
APN 004-750-030

adobe associates, inc.
civil engineering | land surveying | wastewater
1220 N. Dutton Ave., Santa Rosa, CA 95401
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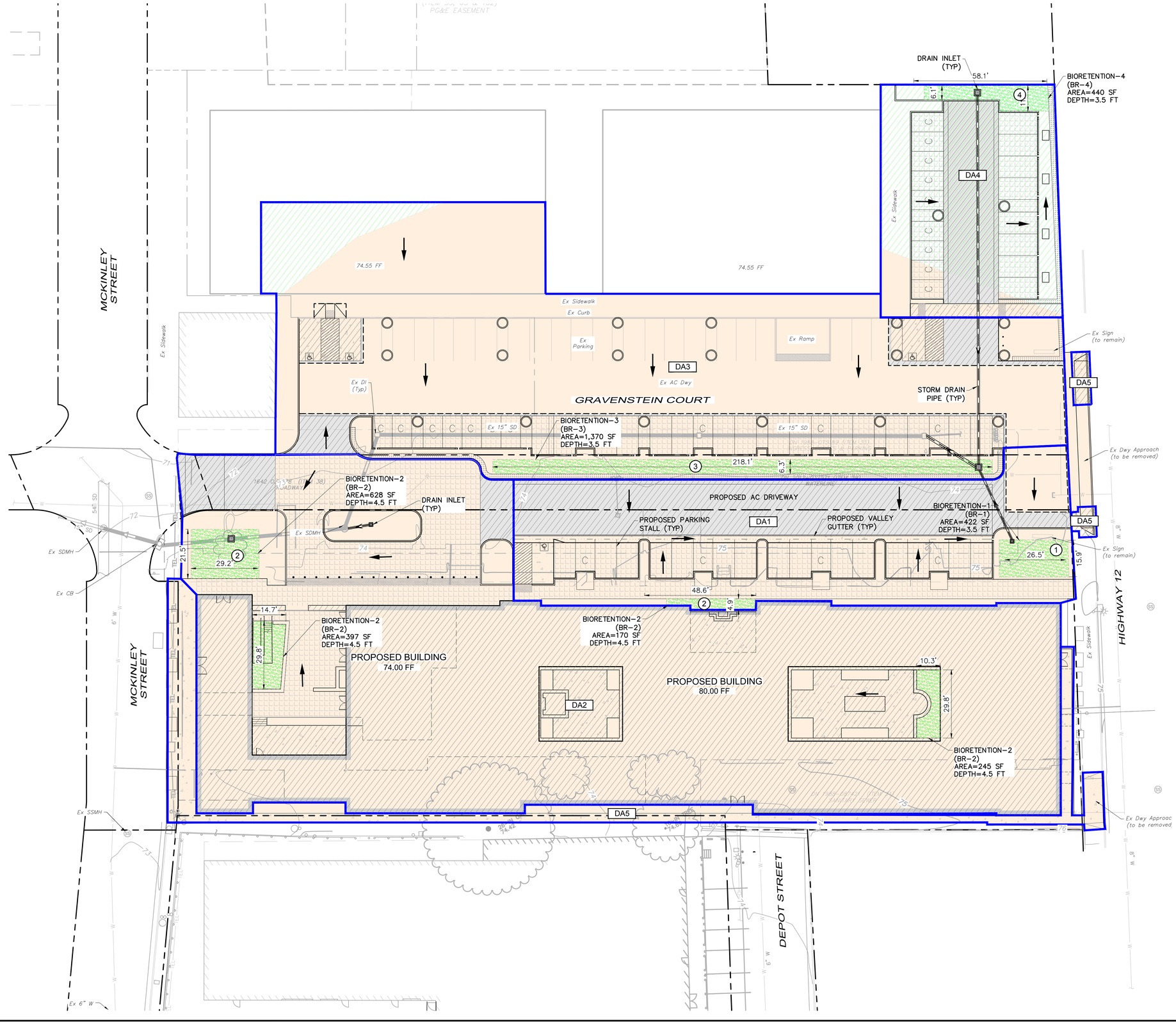

DRAINAGE AREA TABLE

DA1 = 0.32 AC (13,751 SF)
CN=94

DA2 = 0.99 AC (43,070 SF)
CN=96

DA3 = 0.71 AC (30,822 SF)
CN=95

DA4 = 0.18 AC (7,888 SF)
CN=92

DA5 = 0.10 AC (4,322 SF)
CN=95

DRAINAGE AREA LEGEND

- DA1 — DRAINAGE MANAGEMENT AREA
- (1) — POINT OF CONCENTRATION
- DRAINAGE AREA BOUNDARY
- PROPERTY LINE (R)
- LINE OF ANALYSIS
- DIRECTION OF FLOW

DRAINAGE ROUTING

DA1 → (1)
DA2 → (2)
DA3 → (3)
DA4 → (4)

SOIL TYPE LEGEND

- BcA—BLUCHER FINE SANDY LOAM HYDROLOGICAL SOIL TYPE=C
- SbC—SEBASTOPOL SANDY LOAM HYDROLOGICAL SOIL TYPE=C

HATCHING LEGEND

- AC PAVEMENT
- HARDSCAPE (SLD)
- PERMEABLE PAVERS (SLD)
- IMPERVIOUS AREA =47,727 SF
- BIORETENTION FACILITY

NOTE:

REFER TO SUBMITTED GRADING & DRAINAGE PLANS FOR INVERTS, FLOW LINES, TOP OF GRATE ELEVATIONS AND DRAINAGE SPECIFICATIONS

THIS MAP IS FOR REFERENCE ONLY

20' 10' 0 10' 20' 40' 60'

Graphic Scale: 1" = 20'

August 1, 2024

PROPOSED SWLIDS CONDITION

BARLOW HOTEL
6782 Sebastopol Avenue, Sebastopol, CA
APN 004-750-030

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APPENDIX C

Worksheet: Runoff Curve Number

Weighted Runoff Curve Number

Project:	24174-Batch Parking	By:	RMS	Date:	8/6/2024
Location:	DA1				

----- POST-Construction Condtitions -----

1. Runoff Curve Number

Soil Name and Hydrologic Group (Appendix A)	Cover Description (cover type, treatment and hydrologic condition; percent impervious; unconnected/connected impervious ratio)	TR-55 CN* Tables 2-2(a-d)	TR-55 CN* Figure 2-3	TR-55 CN* Figure 2-4	Area Acres Miles^2 Percent	Product of CNxArea
Blucher Fine Sandy Loam, Hydrologic Soil Group C	Ex. Open Space (Fair)	79			0.40	31.49
Blucher Fine Sandy Loam, Hydrologic Soil Group C	Proposed Impervious	98			1.270	124.46
Clear Lake Clay, Hydrologic Soil Group C/D	Ex. Open Space (Fair)	79			0.021	1.69
Clear Lake Clay, Hydrologic Soil Group C/D	Proposed Impervious	98				0.00
						0.00
						0.00
						0.00
						0.00
						0.00

*Use only one CB source per line

Totals 1.69 157.64

CN (weighted) = Total Product / Total Area = 93.28 **Use CN** 93

Weighted Runoff Curve Number

Project:	24174-Batch Parking	By:	RMS	Date:	8/6/2024
Location:	DA2				

----- POST-Construction Condtitions -----

1. Runoff Curve Number

Soil Name and Hydrologic Group (Appendix A)	Cover Description (cover type, treatment and hydrologic condition; percent impervious; unconnected/connected impervious ratio)	TR-55 CN* Tables 2-2(a-d)	TR-55 CN* Figure 2-3	TR-55 CN* Figure 2-4	Area Acres Miles^2 Percent	Product of CNxArea
Blucher Fine Sandy Loam, Hydrologic Soil Group C	Ex. Open Space (Fair)	79			0.08	6.56
Blucher Fine Sandy Loam, Hydrologic Soil Group C	Proposed Impervious	98			0.34	33.03
Clear Lake Clay, Hydrologic Soil Group C/D	Ex. Open Space (Fair)	79				0.00
Clear Lake Clay, Hydrologic Soil Group C/D	Proposed Impervious	98				0.00
						0.00
						0.00
						0.00
						0.00
						0.00

*Use only one CB source per line

Totals 0.42 39.58

CN (weighted) = Total Product / Total Area = 94.25 **Use CN** 94

Weighted Runoff Curve Number

Project:	24174-Barlow Hotel	By:	RMS	Date:	8/6/2024
Location:	DA1				

----- POST-Construction Condtitions -----

1. Runoff Curve Number

Soil Name and Hydrologic Group (Appendix A)	Cover Description (cover type, treatment and hydrologic condition; percent impervious; unconnected/connected impervious ratio)	TR-55 CN* Tables 2-2(a-d)	TR-55 CN* Figure 2-3	TR-55 CN* Figure 2-4	Area Acres Miles^2 Percent	Product of CNxArea
Sebastopol Sandy Loam, Hydrologic Soil Group C	Ex. Open Space (Fair)	79			0.04	3.32
Sebastopol Sandy Loam, Hydrologic Soil Group C	Proposed Impervious	98			0.18	17.15
Sebastopol Sandy Loam, Hydrologic Soil Group C	Proposed Pervious Pavers (Gravel)	89			0.10	9.17
						0.00
						0.00
						0.00
						0.00
						0.00
						0.00

*Use only one CB source per line

Totals 0.32 29.64

CN (weighted) = Total Product / Total Area = 92.61 **Use CN** 93

Weighted Runoff Curve Number

Project:	24174-Barlow Hotel	By:	RMS	Date:	8/6/2024
Location:	DA2				

----- POST-Construction Condtitions -----

1. Runoff Curve Number

Soil Name and Hydrologic Group (Appendix A)	Cover Description (cover type, treatment and hydrologic condition; percent impervious; unconnected/connected impervious ratio)	TR-55 CN* Tables 2-2(a-d)	TR-55 CN* Figure 2-3	TR-55 CN* Figure 2-4	Area Acres Miles^2 Percent	Product of CNxArea
Sebastopol Sandy Loam, Hydrologic Soil Group C	Ex. Open Space (Fair)	79			0.08	6.32
Sebastopol Sandy Loam, Hydrologic Soil Group C	Proposed Impervious	98			0.75	73.50
Sebastopol Sandy Loam, Hydrologic Soil Group C	Proposed Pervious Pavers (Gravel)	89			0.16	14.24
						0.00
						0.00
						0.00
						0.00
						0.00
						0.00

*Use only one CB source per line

Totals 0.99 94.06

CN (weighted) = Total Product / Total Area = 95.01 **Use CN** 95

Weighted Runoff Curve Number

Project:	24174-Barlow Hotel	By:	RMS	Date:	8/6/2024
Location:	DA3				

----- POST-Construction Condtitions -----

1. Runoff Curve Number

Soil Name and Hydrologic Group (Appendix A)	Cover Description (cover type, treatment and hydrologic condition; percent impervious; unconnected/connected impervious ratio)	TR-55 CN* Tables 2-2(a-d)	TR-55 CN* Figure 2-3	TR-55 CN* Figure 2-4	Area Acres Miles^2 Percent	Product of CNxArea
Sebastopol Sandy Loam, Hydrologic Soil Group C	Ex. Open Space (Fair)	79			0.08	5.93
Sebastopol Sandy Loam, Hydrologic Soil Group C	Proposed Impervious	98			0.53	52.14
Sebastopol Sandy Loam, Hydrologic Soil Group C	Proposed Pervious Pavers (Gravel)	89			0.10	8.90
						0.00
						0.00
						0.00
						0.00
						0.00
						0.00

*Use only one CB source per line

Totals 0.71 66.96

CN (weighted) = Total Product / Total Area = 94.71 **Use CN** 95

Weighted Runoff Curve Number

Project:	24174-Barlow Hotel	By:	RMS	Date:	8/6/2024
Location:	DA4				

----- POST-Construction Condtitions -----

1. Runoff Curve Number

Soil Name and Hydrologic Group (Appendix A)	Cover Description (cover type, treatment and hydrologic condition; percent impervious; unconnected/connected impervious ratio)	TR-55 CN* Tables 2-2(a-d)	TR-55 CN* Figure 2-3	TR-55 CN* Figure 2-4	Area Acres Miles^2 Percent	Product of CNxArea
Sebastopol Sandy Loam, Hydrologic Soil Group C	Ex. Open Space (Fair)	79			0.03	2.37
Sebastopol Sandy Loam, Hydrologic Soil Group C	Proposed Impervious	98			0.09	9.02
Sebastopol Sandy Loam, Hydrologic Soil Group C	Proposed Pervious Pavers (Gravel)	89			0.06	5.16
						0.00
						0.00
						0.00
						0.00
						0.00
						0.00

*Use only one CB source per line

Totals 0.18 16.55

CN (weighted) = Total Product / Total Area = 91.93 **Use CN** 92

Weighted Runoff Curve Number

Project:	24174-Barlow Hotel	By:	RMS	Date:	8/6/2024
Location:	DA5				

----- POST-Construction Condtitions -----

1. Runoff Curve Number

Soil Name and Hydrologic Group (Appendix A)	Cover Description (cover type, treatment and hydrologic condition; percent impervious; unconnected/connected impervious ratio)	TR-55 CN* Tables 2-2(a-d)	TR-55 CN* Figure 2-3	TR-55 CN* Figure 2-4	Area Acres Miles^2 Percent	Product of CNxArea
Sebastopol Sandy Loam, Hydrologic Soil Group C	Ex. Open Space (Fair)	79			0.02	1.19
Sebastopol Sandy Loam, Hydrologic Soil Group C	Proposed Impervious	98			0.10	9.31
						0.00
						0.00
						0.00
						0.00
						0.00
						0.00
						0.00

*Use only one CB source per line

Totals 0.11 10.50

CN (weighted) = Total Product / Total Area = 95.41 **Use CN** 95

Table C-2. Runoff Curve Numbers (CNs) for Urban Areas (Synthetic Unit Hydrograph Method)

Cover Type and Hydrologic Condition[1]	Average Percent Impervious Area[2]	Curve Numbers for Hydrologic Soil Group			
		A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.)[3]:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only)[4]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:[5]					
1/8 acre or less (town houses)	70	81	87	91	93
1/4 acre	49	68	79	86	89
1/3 acre	41	63	76	84	87
1/2 acre	32	58	73	82	86
1 acre	24	53	70	80	84
2 acres	11	46	65	77	82
Developing urban areas, newly graded areas (pervious areas only, no vegetation)[6]		77	86	91	94
Idle land (*CN*s are determined using cover types in Table C-3)					

[1] *Average runoff condition, and $I_a = 0.2S$.*

[2] *The average percent impervious area shown was used to develop the composite* CN*s. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a* CN *of 98, and pervious areas are considered equivalent to open space in good hydrologic condition.*

APPENDIX D

Santa Rosa LID Calculator

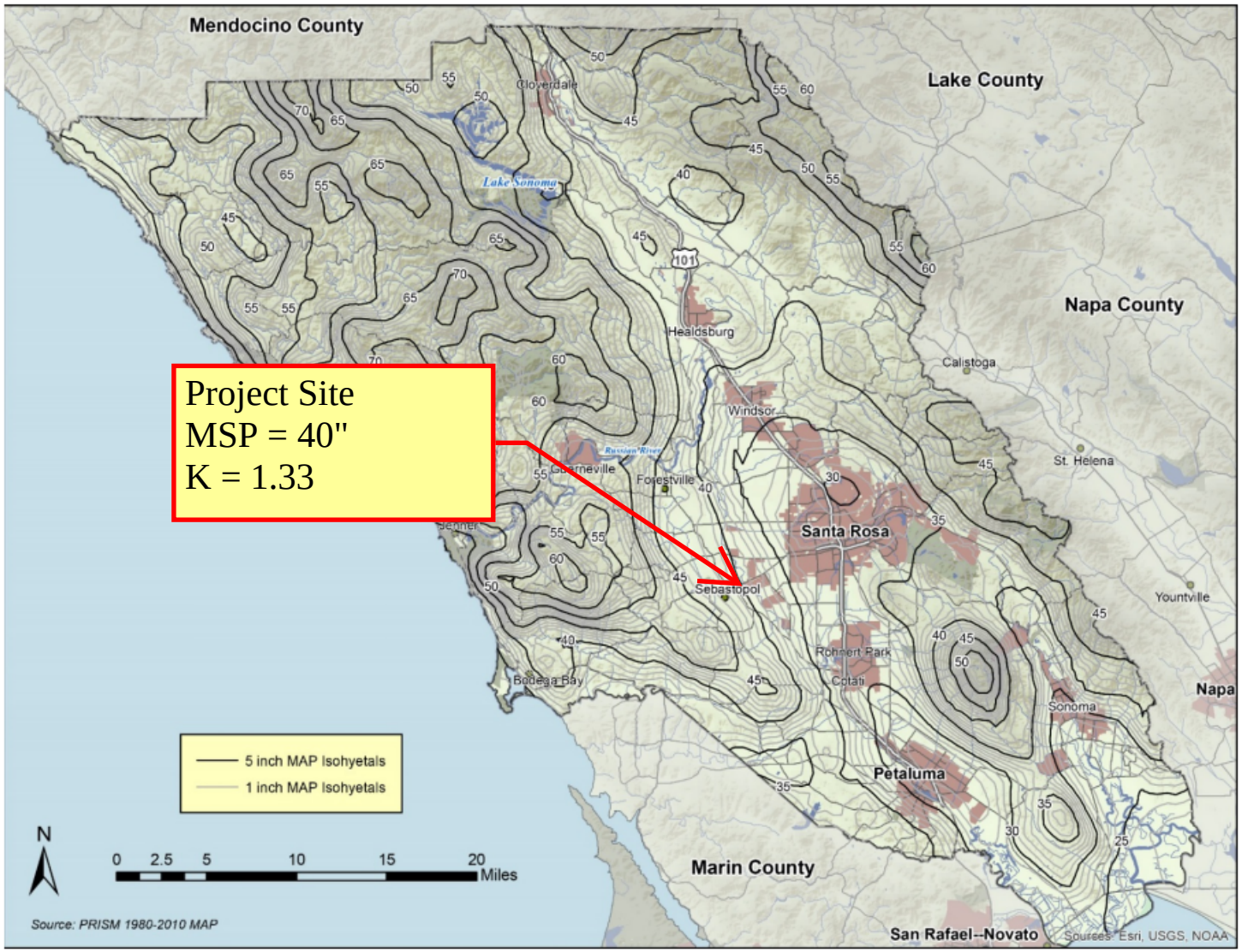

Figure D.2-1. Mean Annual Precipitation

City of Santa Rosa WATER

STORM WATER CALCULATOR

LID BMP Summary Page & Site Global Values

Project Information:

Project Name:	24174-Barlow Hotel
Address/Location:	385 Morris Street, Sebastopol, CA
Designer:	RMS
Date:	8/1/2024

Site Information:

Mean Seasonal Precipitation (MSP) of Project Site:	40.00	(inches)
K=MSP/3(K=	1.33	
Impervious area - pre development:	25,069.0	ft^2
Impervious area - post development:	53,657.0	ft^2

Based upon the pre and post development impervious area, the post construction BMP requirement is:

100% Capture & Treatment

Summary of Saved BMP Results:

		Tributary Area		Requirements		BMP Design Results						
							Hydromodification Control		Flow Base Treatment		Delta Volume Capture	
	BMP ID:	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 Vdelta (ft^3)	Achieved (ft^3)
1	DA1	73,756	No	Hydromod Volume Capture	Priority 1: P1-02 Roadside Bioretention - No Curb and Gutter	100.4	4441.5864	4459.5001				
2	DA2	18,510	No	Hydromod Volume Capture	Priority 1: P1-02 Roadside Bioretention - No Curb and Gutter	103.6	1216.2921	1260.0000				
3	DA3	632	No	Hydromod Volume Capture	Priority 1: P1-02 Roadside Bioretention - No Curb and Gutter	102.0	58.7950	60.0000				
4												
5												
6												
7												
8												
9												
10												
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STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: **24174-Barlow Hotel**

BMP ID:	DA1
BMP Design Criteria:	100% Capture & Treatment
Type of BMP Design:	Priority 1: P1-02 Roadside Bioretention - No Curb and Gutter
BMP's Physical Tributary Area:	73,756.0 ft^2
Description/Notes:	

Hydromodification Requirement: 100% Volume Capture; $V_{HYDROMOD}$

$V_{HYDROMOD}$ = **4,441.59** ft^3

Post development hydrologic soil type within tributary area:	A: greater than 0.30 in/hr infiltration (transmission) rate
Post development ground cover description:	Brush: weed-grass mixture with brush major element - Poor (<50% ground cover)
CN_{POST} :	
User Composite post development CN:	93.0

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = **100.40** %

	BMP Volume Below Ground		Ponded Water Above Ground	
Porosity:	0.40			
Depth below perforated pipe if present:	3.75	ft		
Depth:			0.00	ft
Width:	0.00	ft	0.00	ft
Length:	0.00	ft	0.00	ft
Area:	2,973.00	ft^2	0.00	ft^2

STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: **24174-Barlow Hotel**

BMP ID:	DA2
BMP Design Criteria:	100% Capture & Treatment
Type of BMP Design:	Priority 1: P1-02 Roadside Bioretention - No Curb and Gutter
BMP's Physical Tributary Area:	18,510.0 ft^2
Description/Notes:	

Hydromodification Requirement: 100% Volume Capture; $V_{HYDROMOD}$

$V_{HYDROMOD}$ = **1,216.29** ft^3

Post development hydrologic soil type within tributary area:	A: greater than 0.30 in/hr infiltration (transmission) rate
Post development ground cover description:	Brush: weed-grass mixture with brush major element - Poor (<50% ground cover)
CN_{POST} :	
User Composite post development CN:	94.0

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = **103.59** %

	BMP Volume Below Ground		Ponded Water Above Ground	
Porosity:	0.40			
Depth below perforated pipe if present:	3.00	ft		
Depth:			0.00	ft
Width:	0.00	ft	0.00	ft
Length:	0.00	ft	0.00	ft
Area:	1,050.00	ft^2	0.00	ft^2

STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: **24174-Barlow Hotel**

BMP ID:	DA3
BMP Design Criteria:	100% Capture & Treatment
Type of BMP Design:	Priority 1: P1-02 Roadside Bioretention - No Curb and Gutter
BMP's Physical Tributary Area:	632.0 ft^2
Description/Notes:	

Hydromodification Requirement: 100% Volume Capture; $V_{HYDROMOD}$

$V_{HYDROMOD}$ = **58.79** ft^3

Post development hydrologic soil type within tributary area:	A: greater than 0.30 in/hr infiltration (transmission) rate
Post development ground cover description:	Brush: weed-grass mixture with brush major element - Poor (<50% ground cover)
CN_{POST} :	
User Composite post development CN:	98.0

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = **102.05** %

	BMP Volume Below Ground		Ponded Water Above Ground	
Porosity:	0.40			
Depth below perforated pipe if present:	3.75	ft		
Depth:			0.00	ft
Width:	0.00	ft	0.00	ft
Length:	0.00	ft	0.00	ft
Area:	40.00	ft^2	0.00	ft^2

City of Santa Rosa WATER

STORM WATER CALCULATOR

LID BMP Summary Page & Site Global Values

Project Information:

Project Name:	24174-Barlow Hotel
Address/Location:	6782 Sebastopol Avenue, Sebastopol, CA
Designer:	RMS
Date:	8/6/2024

Site Information:

Mean Seasonal Precipitation (MSP) of Project Site: 40.00 (inches)

K=MSP/3(K= 1.33

Impervious area - pre development: 50,364.0 ft^2

Impervious area - post development: 47,727.0 ft^2

Based upon the pre and post development impervious area, the post construction BMP requirement is:

100% Capture & Treatment

Summary of Saved BMP Results:

		Tributary Area		Requirements		BMP Design Results						
							Hydromodification Control		Flow Base Treatment		Delta Volume Capture	
	BMP ID:	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 Vdelta (ft^3)	Achieved (ft^3)
1	DA1	13,751	Yes	Hydromod Volume Capture	Priority 1: P1-02 Roadside Bioretention - No Curb and Gutter	106.3	555.6500	590.8000				
2	DA2	43,070	Yes	Hydromod Volume Capture	Priority 1: P1-02 Roadside Bioretention - No Curb and Gutter	101.6	2567.9360	2610.0000				
3	DA3	30,822	Yes	Hydromod Volume Capture	Priority 1: P1-02 Roadside Bioretention - No Curb and Gutter	101.0	1899.9216	1918.0000				
4	DA4	7,888	Yes	Hydromod Volume Capture	Priority 1: P1-02 Roadside Bioretention - No Curb and Gutter	101.7	295.8736	301.0000				
5	DA5	4,322	No	Hydromod Volume Capture	Priority 1: P1-02 Roadside Bioretention - No Curb and Gutter	101.7	309.7145	315.0000				
6												
7												
8												
9												
10												
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STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: 24174-Barlow Hotel

BMP ID: DA1

BMP Design Criteria: 100% Capture & Treatment

Type of BMP Design: Priority 1: P1-02 Roadside Bioretention - No Curb and Gutter

BMP's Physical Tributary Area: 13,751.0 ft^2

Description/Notes:

Runoff Reduction Measures

Resulting reduced Tributary Area used for BMP sizing = 9,227.0 ft^2

Total Runoff Reduction Measures = 4,524.0 ft^2

Interceptor Trees

Number of ***new*** interceptor ***Evergreen Trees***: 0

Number of ***new*** interceptor ***Deciduous Trees***: 0

Square footage of qualifying **existing tree canopy**: 0.0 ft^2

Total Number of New trees in BMP Tributary Area: 0

Disconnected Roof Drains

Select disconnection condition: Select disconnection condition

Disconnected Roof Drains Method 1

Roof area of disconnected downspouts: 0 ft^2

Disconnected Roof Drains Method 2

Percent of rooftop area: 0 %

Select Density: 1 Units per Acre

Paved Area Disconnection

Paved Area Type: Porous Pavement

Alternatively designed paved area: 4,524.0 ft^2

Buffer Strips & Bovine Terraces

Area draining to a Buffer Strip or Bovine Terrace: 0.0 ft^2

Hydromodification Requirement: 100% Volume Capture; $V_{HYDROMOD}$

$V_{HYDROMOD}$ = 555.65 ft^3

Post development hydrologic soil type within tributary area: C: 0.05 - 0.15 in/hr infiltration (transmission) rate

Post development ground cover description: Open Space (lawns, parks, golf courses, cemeteries, etc.) - Fair (50% to 75% grass cover)

CN_{POST}:

User Composite post development CN: 93.0

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = 106.33 %

	BMP Volume Below Ground		Ponded Water Above Ground	
Porosity:	0.40			
Depth below perforated pipe if present:	3.50	ft		
Depth:			0.00	ft
Width:	0.00	ft	0.00	ft
Length:	0.00	ft	0.00	ft
Area:	422.00	ft^2	0.00	ft^2

STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: 24174-Barlow Hotel

BMP ID: DA2

BMP Design Criteria: 100% Capture & Treatment

Type of BMP Design: Priority 1: P1-02 Roadside Bioretention - No Curb and Gutter

BMP's Physical Tributary Area: 43,070.0 ft^2

Description/Notes:

Runoff Reduction Measures

Resulting reduced Tributary Area used for BMP sizing = 35,835.0 ft^2

Total Runoff Reduction Measures = 7,235.0 ft^2

Interceptor Trees

Number of ***new*** interceptor ***Evergreen Trees***: 0

Number of ***new*** interceptor ***Deciduous Trees***: 0

Square footage of qualifying **existing tree canopy**: 0.0 ft^2

Total Number of New trees in BMP Tributary Area: 0

Disconnected Roof Drains

Select disconnection condition: Select disconnection condition

Disconnected Roof Drains Method 1

Roof area of disconnected downspouts: 0 ft^2

Disconnected Roof Drains Method 2

Percent of rooftop area: 0 %

Select Density: 1 Units per Acre

Paved Area Disconnection

Paved Area Type: Porous Pavement

Alternatively designed paved area: 7,235.0 ft^2

Buffer Strips & Bovine Terraces

Area draining to a Buffer Strip or Bovine Terrace: 0.0 ft^2

Hydromodification Requirement: 100% Volume Capture; $V_{HYDROMOD}$

$V_{HYDROMOD}$ = 2,567.94 ft^3

Post development hydrologic soil type within tributary area: A: greater than 0.30 in/hr infiltration (transmission) rate

Post development ground cover description: Brush: weed-grass mixture with brush major element - Poor (<50% ground cover)

CN_{POST}:

User Composite post development CN: 95.0

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = 101.64 %

	BMP Volume Below Ground		Ponded Water Above Ground	
Porosity:	0.40			
Depth below perforated pipe if present:	4.50	ft	Depth: 0.00	ft
Width:	0.00	ft	Width: 0.00	ft
Length:	0.00	ft	Length: 0.00	ft
Area:	1,450.00	ft^2	Area: 0.00	ft^2

STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: 24174-Barlow Hotel

BMP ID: DA3

BMP Design Criteria: 100% Capture & Treatment

Type of BMP Design: Priority 1: P1-02 Roadside Bioretention - No Curb and Gutter

BMP's Physical Tributary Area: 30,822.0 ft^2

Description/Notes:

Runoff Reduction Measures

Resulting reduced Tributary Area used for BMP sizing = 26,513.0 ft^2

Total Runoff Reduction Measures = 4,309.0 ft^2

Interceptor Trees

Number of ***new*** interceptor ***Evergreen Trees***: 0

Number of ***new*** interceptor ***Deciduous Trees***: 0

Square footage of qualifying **existing tree canopy**: 0.0 ft^2

Total Number of New trees in BMP Tributary Area: 0

Disconnected Roof Drains

Select disconnection condition: Select disconnection condition

Disconnected Roof Drains Method 1

Roof area of disconnected downspouts: 0 ft^2

Disconnected Roof Drains Method 2

Percent of rooftop area: 0 %

Select Density: 1 Units per Acre

Paved Area Disconnection

Paved Area Type: Porous Pavement

Alternatively designed paved area: 4,309.0 ft^2

Buffer Strips & Bovine Terraces

Area draining to a Buffer Strip or Bovine Terrace: 0.0 ft^2

Hydromodification Requirement: 100% Volume Capture; $V_{HYDROMOD}$

$V_{HYDROMOD}$ = 1,899.92 ft^3

Post development hydrologic soil type within tributary area: A: greater than 0.30 in/hr infiltration (transmission) rate

Post development ground cover description: Brush: weed-grass mixture with brush major element - Poor (<50% ground cover)

CN_{POST}:

User Composite post development CN: 95.0

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = 100.95 %

	BMP Volume Below Ground		Ponded Water Above Ground	
Porosity:	0.40			
Depth below perforated pipe if present:	3.50	ft		
Depth:			0.00	ft
Width:	0.00	ft	0.00	ft
Length:	0.00	ft	0.00	ft
Area:	1,370.00	ft^2	0.00	ft^2

STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: 24174-Barlow Hotel

BMP ID: DA4

BMP Design Criteria: 100% Capture & Treatment

Type of BMP Design: Priority 1: P1-02 Roadside Bioretention - No Curb and Gutter

BMP's Physical Tributary Area: 7,888.0 ft^2

Description/Notes:

Runoff Reduction Measures

Resulting reduced Tributary Area used for BMP sizing = 5,361.0 ft^2

Total Runoff Reduction Measures = 2,527.0 ft^2

Interceptor Trees

Number of ***new*** interceptor ***Evergreen Trees***: 0

Number of ***new*** interceptor ***Deciduous Trees***: 0

Square footage of qualifying **existing tree canopy**: 0.0 ft^2

Total Number of New trees in BMP Tributary Area: 0

Disconnected Roof Drains

Select disconnection condition: Select disconnection condition

Disconnected Roof Drains Method 1

Roof area of disconnected downspouts: 0 ft^2

Disconnected Roof Drains Method 2

Percent of rooftop area: 0 %

Select Density: 1 Units per Acre

Paved Area Disconnection

Paved Area Type: Porous Pavement

Alternatively designed paved area: 2,527.0 ft^2

Buffer Strips & Bovine Terraces

Area draining to a Buffer Strip or Bovine Terrace: 0.0 ft^2

Hydromodification Requirement: 100% Volume Capture; $V_{HYDROMOD}$

$V_{HYDROMOD}$ = 295.87 ft^3

Post development hydrologic soil type within tributary area: A: greater than 0.30 in/hr infiltration (transmission) rate

Post development ground cover description: Brush: weed-grass mixture with brush major element - Poor (<50% ground cover)

CN_{POST}:

User Composite post development CN: 92.0

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = 101.73 %

	BMP Volume Below Ground		Ponded Water Above Ground	
Porosity:	0.40			
Depth below perforated pipe if present:	3.50	ft	Depth: 0.00	ft
Width:	0.00	ft	Width: 0.00	ft
Length:	0.00	ft	Length: 0.00	ft
Area:	215.00	ft^2	Area: 0.00	ft^2

STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: **24174-Barlow Hotel**

BMP ID:	DA5
BMP Design Criteria:	100% Capture & Treatment
Type of BMP Design:	Priority 1: P1-02 Roadside Bioretention - No Curb and Gutter
BMP's Physical Tributary Area:	4,322.0 ft^2
Description/Notes:	

Hydromodification Requirement: 100% Volume Capture; $V_{HYDROMOD}$

$V_{HYDROMOD}$ = **309.71** ft^3

Post development hydrologic soil type within tributary area:	A: greater than 0.30 in/hr infiltration (transmission) rate
Post development ground cover description:	Brush: weed-grass mixture with brush major element - Poor (<50% ground cover)
CN_{POST} :	
User Composite post development CN:	95.0

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = **101.71** %

	BMP Volume Below Ground		Ponded Water Above Ground	
Porosity:	0.40			
Depth below perforated pipe if present:	3.50	ft		
Depth:			0.00	ft
Width:	0.00	ft	0.00	ft
Length:	0.00	ft	0.00	ft
Area:	225.00	ft^2	0.00	ft^2

APPENDIX E

Soil Drawdown Calculations

Soil Drawdown Calculations

For Hydrologic Soil Groups A, B, C, & D

NOTE: The Soil Hydraulic Conductivity values used for the Soil Drawdown Calculations are from Table 7.2 of the*United States Department of Agriculture/Natural Resources Conservation Service's*, Part 630 Hydrology of the **National Enineering Handbook - Chapter 7 Hydrologic Soil Groups**. (Website: *https://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba*)

SOIL TYPE - A

Low Hydraulic Conductivity =	1.42	**in/hr**
High Hydraulic Conductivity =	1.42	**in/hr**
Average Hydraulic Conductivity =	1.42	**in/hr**
Bioretention Surface Depth =	6.00	**in**[1]
Drawdown Time =	4.23	**hrs**

SOIL TYPE - B

Low Hydraulic Conductivity =	0.57	**in/hr**
High Hydraulic Conductivity =	1.42	**in/hr**
Average Hydraulic Conductivity =	1.00	**in/hr**
Bioretention Surface Depth =	6.00	**in**[1]
Drawdown Time =	6.03	**hrs**

SOIL TYPE - C

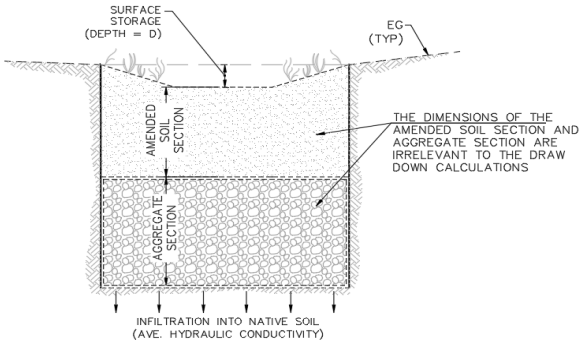
Low Hydraulic Conductivity =	0.06	**in/hr**
High Hydraulic Conductivity =	0.57	**in/hr**
Average Hydraulic Conductivity =	0.32	**in/hr**
Bioretention Surface Depth =	6.00	**in**[1]
Drawdown Time =	19.05	**hrs**

SOIL TYPE - D

Low Hydraulic Conductivity =	0.00	**in/hr**
High Hydraulic Conductivity =	0.06	**in/hr**
Average Hydraulic Conductivity =	0.03	**in/hr**
Bioretention Surface Depth =	2.15	**in**[1]
Drawdown Time =	71.67	**hrs**[2]

Soil Drawdown Equation

$$Drawdown\ Time\ (hrs) = \frac{Depth\ (in)}{Ave.\ Hydraulic\ Conductivity\ (\frac{in}{hr})}$$



TYPICAL BIORETENTION FACILITY/ INFILTRATION TRENCH

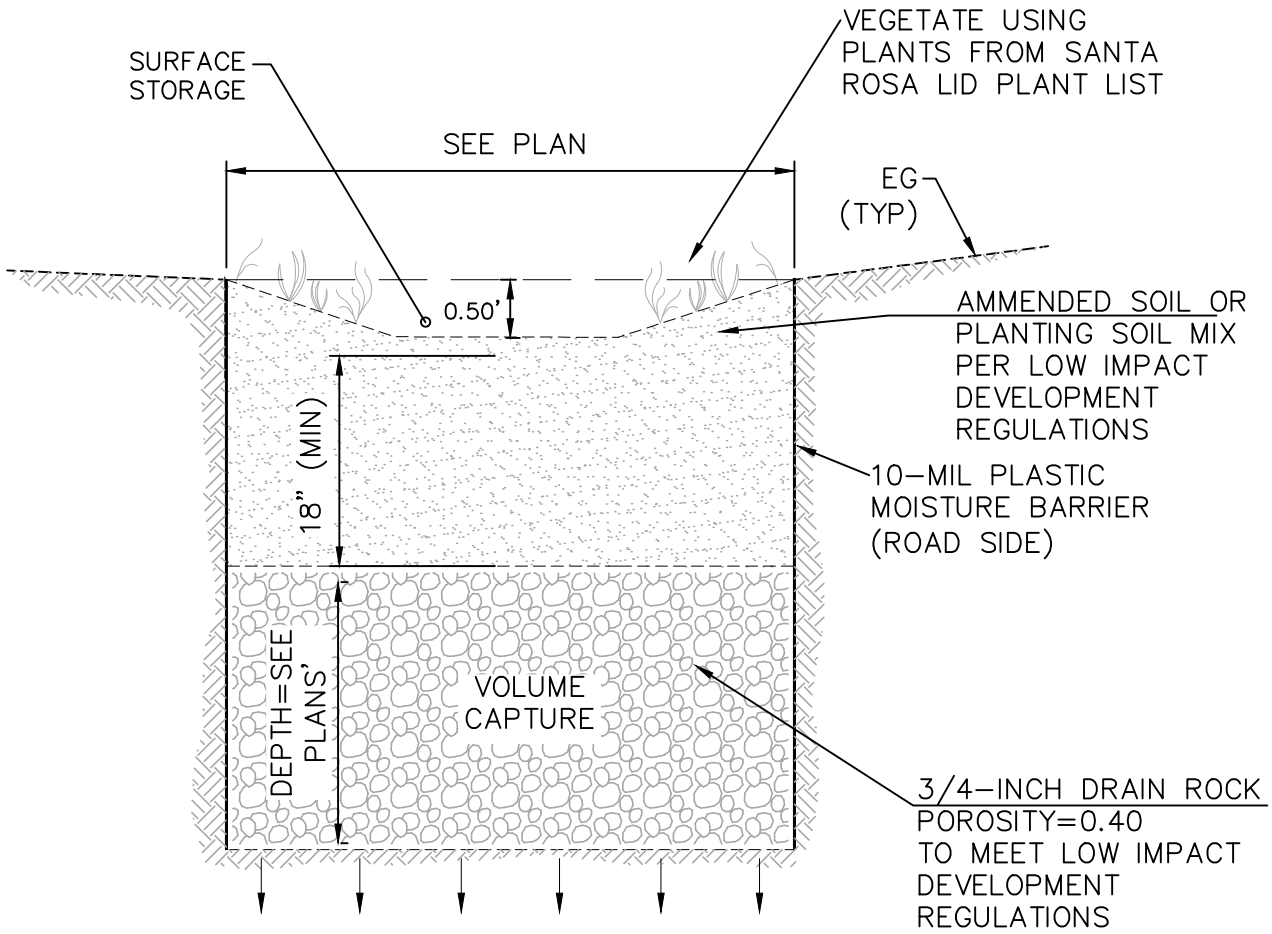
Note

[1] - Per the Santa Rosa LID Calculator the maximum depth of ponding allowes is 6-inchs (0.5-ft)

[2] - The maximum allowable drawdown time is 72-hrs, therefore the maximum allowable depth in Type-D Soils is 2.15-inches.

APPENDIX F

Bioretention Detail & Fact Sheets



NOTES:

1. SOIL MIX, (PLANTING MEDIUM) A MIXTURE OF 60-70% SAND AND 30-40% COMPOST. CONTACT ENGINEER FOR LIST OF APPROVED SUPPLIERS.

August 01, 2024

EXHIBIT - BIORETENTION DETAIL

BARLOW HOTEL
6782 Sebastopol Avenue & 385 Morris Street
APN: 004-750-030, 004-011-017 & 020

adobe associates, inc.
civil engineering | land surveying | wastewater
1220 N. Dutton Ave., Santa Rosa, CA 95401
P. (707) 541-2300 F. (707) 541-2301
Website: www.adobeinc.com
"A Service You Can Count On!"

FACT SHEET- BIORETENTION

BIORETENTION

Also know as: Rain garden, roadside bioretention, and bioretention cell

DESCRIPTION

The bioretention area best management practice (BMP) functions as a soil and plant-based filtration and infiltration feature that removes pollutants through a variety of natural physical, biological, and chemical treatment processes.

ADVANTAGES

- Can be designed to achieve Treatment, Delta Volume Capture, or Hydromodification requirements.
- Enhances water quality of downstream water bodies through natural processes.
- Aesthetically pleasing.
- The vegetation can provide shade and wind breaks, absorbs noise, reduces heat island effects and improves an area's landscape.
- Provides habitat for birds and attracts other pollinators like butterflies and bees.
- Does not interrupt utility installation.
- Does not interfere with tree planting.

FACT SHEET- BIORETENTION

LIMITATIONS

- Specialized design is required for areas where street slopes exceed 10%.
- Should not be used in areas of know contamination. If soil and/or groundwater contamination is present on the site or within a 100' radius of the proposed BMP location, the North Coast Regional Water Quality Control Board will need to be contacted and the site reviewed.
- Should not be used in areas of high groundwater. In general a minimum of 2' of clearance should be provided between the bottom of the bioretention cell and seasonal high groundwater.
- Should not be used in areas of slope instability where infiltrated storm water may cause failure. Slope stability should be determined by a licensed geotechnical engineer.
- Do not use in locations that can negatively impact building foundation or footings. Location shall be approved by a licensed Geotechnical Engineer.

KEY DESIGN FEATURES

ALL BIORETENTION

- Structural soil should be used within the bioretention area requiring load bearing capacity (adjacent to roadways and/or buildings).
- Structural soil, if used, shall be installed as described in Appendix E.
- Some BMPs may not require the use of structural soil and a more organic type planting soil and/or treatment media may be used in its place. It may be possible in some cases to use native soil or to amend the native soil so that it is suitable. Use of non-structural soil will depend on evaluation of the criteria in "Chapter 4-Site Assessment" as well as consideration of structural needs and may require evaluation by a licensed Geotechnical Engineer.
- Underlining native soil should remain un-compacted to preserve infiltration capacity. Fence off the area during construction to protect it from compaction.
- Bottom of bioretention should be un-lined to allow infiltration into native soil.
- Moisture barrier must be installed vertically to protect road sub-base and any trenches adjacent to the bioretention area.
- If used, pervious concrete shall be designed and installed as described in Appendix E and protected during construction to prevent sediment loading.
- If the porous gutter design option is used additional trash and sediment capture BMPs is required.
- A curb opening type design may be used in place of a porous gutter if appropriate for the project and does not require additional trash capture.
- Bioretention areas shall be planted with plants from the approved **Plant List** and **Tree List** included in Appendix F and shall be planted to achieve 51% cover.
- All bioretention areas shall be designed with a designated high flow bypass inlet for storms larger than the design storm.

- For designs that include perforated pipe, the 6" perforated pipe must be installed a minimum of 6" below the adjacent road structural section.
- Perforated pipe shall be installed in straight runs only.
- The volume below the perforated pipe must be sufficient to hold and infiltrate the design volume.

SIZING DESIGN- GOAL AND REQUIREMENTS

- **For all projects:** The treatment component requires that all of the runoff generated by this water quality design storm from impermeable surfaces must be treated on site for the pollutants of concern.
- ***For projects that increase the amount of impervious surface, but create or replace less than a total of one acre:*** The **Delta Volume Capture** component requires that any increase in volume due to development for the water quality design storm must be infiltrated and/or reused on site. Further discussion of the Treatment and Delta Volume Capture requirements and the accompanying formulas can be found in Chapter 6.
- ***For projects that create or replace one acre or more of impervious surface*:** These larger projects must mitigate their impacts by meeting the **Hydromodification Requirement** by capturing 100% of the post development volume generated by the water quality rain event.
- All calculations shall be completed using the "Storm Water Calculator" available at www.srcity.org/stormwaterLID.

INSPECTION AND MAINTENANCE REQUIREMENTS

A maintenance plan shall be provided with the Final SWLID Submittal. The maintenance plan shall include recommended maintenance practices, state the parties responsible for maintenance and upkeep, specify the funding source for ongoing maintenance with provisions for full replacement when necessary and provide site specific inspection checklist.

At a minimum maintenance shall include the following:

- Dry street sweeping upon completion of construction
- Dry street sweeping annually, and
    - When water is observed flowing in the gutter during a low intensity storm.
    - Algae is observed in the gutter.
    - Sediment/debris covers 1/3 of the gutter width or more.
- Inspect twice annually for sedimentation and trash accumulation in the gutter. Obstructions and trash shall be removed and properly disposed of.
- Inspect twice during the rainy season for ponded water.
- Pesticides and fertilizers shall not be used in the bioretention area.
- Plants should be pruned, weeds pulled and dead plants replaced as needed.

APPENDIX G

Soil Classification

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 Sonoma County, California

July 29, 2024

Custom Soil Resource Report
Soil Map

Map Scale: 1:1,100 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 15 30 60 90

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 1:20,000.

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 17, 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
BcA	Blucher fine sandy loam, overwash, 0 to 2 percent slopes	2.4	68.1%
CfA	Clear Lake clay, ponded, 0 to 2 percent slopes	1.1	31.9%
Totals for Area of Interest		**3.5**	**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.

Sonoma County, California

BcA—Blucher fine sandy loam, overwash, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: hfb4
Elevation: 0 to 500 feet
Mean annual precipitation: 25 to 50 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 250 to 270 days
Farmland classification: Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Blucher and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Blucher

Setting

Landform: Drainageways, alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Side slope, tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from sedimentary rock

Typical profile

H1 - 0 to 20 inches: fine sandy loam
H2 - 20 to 34 inches: fine sandy loam
H3 - 34 to 60 inches: clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 42 to 60 inches
Frequency of flooding: Occasional
Frequency of ponding: Occasional
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 9.7 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C
Ecological site: R014XG907CA - Loamy Bottom
Hydric soil rating: Yes

Minor Components

Pajaro

Percent of map unit: 8 percent
Hydric soil rating: No

Steinbeck

Percent of map unit: 7 percent
Hydric soil rating: No

CfA—Clear Lake clay, ponded, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2y8vg
Elevation: 50 to 210 feet
Mean annual precipitation: 27 to 40 inches
Mean annual air temperature: 57 to 58 degrees F
Frost-free period: 265 to 315 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Clear lake and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Clear Lake

Setting

Landform: Basin floors
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Alluvium derived from volcanic and sedimentary rock

Typical profile

Apg - 0 to 8 inches: clay
Assg - 8 to 25 inches: clay
Bssg - 25 to 46 inches: clay
Bkssg - 46 to 52 inches: clay
2Bkg - 52 to 60 inches: clay loam
2Btg - 60 to 72 inches: clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 7 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 10.0
Available water supply, 0 to 60 inches: High (about 9.7 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: C/D
Ecological site: R014XG907CA - Loamy Bottom
Hydric soil rating: Yes

Minor Components

Wright

Percent of map unit: 6 percent
Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Huichica

Percent of map unit: 6 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Zamora

Percent of map unit: 3 percent
Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

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 Sonoma County, California

July 15, 2024

Custom Soil Resource Report
Soil Map

Map Scale: 1:1,500 if printed on A landscape (11" x 8.5") 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 1:20,000.

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)

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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
BcA	Blucher fine sandy loam, overwash, 0 to 2 percent slopes	1.1	18.2%
SbC	Sebastopol sandy loam, 2 to 9 percent slopes	4.9	81.8%
Totals for Area of Interest		**6.0**	**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.

Sonoma County, California

BcA—Blucher fine sandy loam, overwash, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: hfb4
Elevation: 0 to 500 feet
Mean annual precipitation: 25 to 50 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 250 to 270 days
Farmland classification: Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Blucher and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Blucher

Setting

Landform: Drainageways, alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Side slope, tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from sedimentary rock

Typical profile

H1 - 0 to 20 inches: fine sandy loam
H2 - 20 to 34 inches: fine sandy loam
H3 - 34 to 60 inches: clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 42 to 60 inches
Frequency of flooding: Occasional
Frequency of ponding: Occasional
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 9.7 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C
Ecological site: R014XG907CA - Loamy Bottom
Hydric soil rating: Yes

Minor Components

Pajaro

Percent of map unit: 8 percent
Hydric soil rating: No

Steinbeck

Percent of map unit: 7 percent
Hydric soil rating: No

SbC—Sebastopol sandy loam, 2 to 9 percent slopes

Map Unit Setting

National map unit symbol: hfjc
Elevation: 100 to 1,000 feet
Mean annual precipitation: 40 inches
Mean annual air temperature: 55 degrees F
Frost-free period: 200 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Sebastopol and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sebastopol

Setting

Landform: Terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from sedimentary rock

Typical profile

H1 - 0 to 24 inches: sandy loam
H2 - 24 to 28 inches: sandy clay loam
H3 - 28 to 57 inches: clay
H4 - 57 to 62 inches: clay loam
H5 - 62 to 72 inches: sandy clay loam

Properties and qualities

Slope: 2 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: R014XG912CA - Loamy Terrace
Hydric soil rating: No

Minor Components

Blucher

Percent of map unit: 5 percent
Hydric soil rating: No

Goldridge

Percent of map unit: 5 percent
Hydric soil rating: No

Cotati

Percent of map unit: 5 percent
Hydric soil rating: No