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Stormwater Control Plan for a Regulated Project

Anthem Winery P14-00320-MOD and Exception to Road and Street Standards,
Variance P14-00321-VAR and Viewshed, and
Agricultural Erosion Control Plan P14-00322-ECPA
Planning Commission Hearing Date (Wednesday, October 3, 2018)

STORMWATER CONTROL PLAN FOR A REGULATED PROJECT

Prepared for

ANTHEM WINERY
NAPA, CA

THIS REPORT WAS PREPARED IN CONJUNCTION WITH THE INSTRUCTIONS, CRITERIA, AND MINIMUM REQUIREMENTS IN THE BAY AREA STORMWATER MANAGEMENT AGENCIES ASSOCIATION'S (BASMAA'S) POST CONSTRUCTION MANUAL.

Prepared for:

Justin and Julie Arbuckle
400 Spear Street, Suite #122
San Francisco, CA 94105

RSA+ Project No. 4111010.0

December 3, 2015

Revised: June 5, 2018

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TABLES

ATTACHMENTS

I. Project Data

Table 1. Project Data Form

Project Name/Number	Anthem Winery (4111010.0)
Application Submittal Date	December, 2015
Project Location	3123 Dry Creek Road Napa, California 94558 APNs: 035-460-038, 035-470-046
Project Phase No.	N/A
Project Type and Description	Winery Expansion
Total Project Site Area (acres)	44.77 Acres
Total New and Replaced Impervious Surface Area	2.5 Acres
Total Pre-Project Impervious Surface Area	1.1 Acres
Total Post-Project Impervious Surface Area	2.48 Acres

II. Setting

II.A. Project Location and Description

The Anthem Winery project is located at 3123 Dry Creek Road, Napa, California 94558. Refer to Attachment 1 for Vicinity Map. The APNs are 035-460-038 and 035-470-046. The parcels have a combined area of 44.77 +/- acres. The project will include the construction of a new winery, parking area and landscaped areas. The new winery will be constructed in the area of the existing winery and entirely on the south parcel (035-470-046). The existing driveway will be upgraded to provide commercial access. Refer to Attachment 2 for Drainage Management Areas Exhibit, Bioretention Facility Cross-section and Bioretention Construction Inspection Checklist.

II.B. Existing Site Features and Conditions

The parcels include two existing residences, a guest house and a winery. The neighboring parcels are residential. Access to the parcel is from the existing residential driveway connecting to Dry Creek Road. The site is bounded by private residences to the north, east and west, and Redwood Creek to the south.

The predominant soil type in the project area is Fagan Clay Loam, which is of the Hydraulic Soil Group C. Refer to Attachment 1 for Soils Map. The project site straddles two separate watersheds. A portion of the proposed winery drains southwest towards Redwood Creek. The remaining portion of the winery and all the driveway drains northeast toward the Salvador Channel. Slopes on the property range from 1 - 30%. Runoff from the site is conveyed via surface flows to natural drainage channels and conveyed to either the Redwood Creek or the Salvador Channel, which both ultimately discharges to the Napa River.

II.C. Opportunities and Constraints for Stormwater Control

Stormwater treatment facilities have been integrated into the planning, design, construction, operation, and maintenance of the proposed development. The following potential opportunities and constraints were considered in determining the best stormwater control design for this development.

Opportunities for the site include landscaped areas and caves. Bioretention Facilities will be installed in these locations to treat stormwater runoff prior to discharge from the site. Runoff will be conveyed to Bioretention Facilities via surface flows and storm drains.

Constraints include the site location and existing grades.

III. Low Impact Development Design Strategies

III.A. Optimization of Site Layout

1. Limitation of development envelope

   The proposed winery is sited near the previously developed areas of the site. Caves will be constructed to reduce the development footprint.

2. Preservation of natural drainage features

   Bioretention Facilities will be installed to treat and retain storm water before it enters the natural drainage of the site.

3. Setbacks from creeks, wetlands, and riparian habitats

   A riparian setback from Redwood Creek exists on the property. The project is sited at the top of the hill, entirely outside this setback.

4. Minimization of imperviousness

   Parking areas are designed to the minimum widths necessary without compromising public safety and a walkable environment. Landscaped areas are used instead of decorative impervious areas.

5. Use of drainage as a design element

   Bioretention Facilities are incorporated into the aesthetic landscape design of the site.

III.B. Use of Permeable Pavements

Permeable pavements are not in the scope of this project.

III.C. Dispersal of Runoff to Pervious Areas

Stormwater runoff will be directed to landscaped areas to the maximum extent practicable.

III.D. Stormwater Control Measures

Bioretention Facilities, Self-Treating Areas and Low Impact Development (LID) Best Management Practices (BMP) have been incorporated as a stormwater control measures. These Facilities will

collect and treat onsite stormwater. Refer to Attachment 2 for Bioretention Facility Cross-section and Bioretention Construction Inspection Checklist.

IV. Documentation of Drainage

IV.A Drainage Management Areas

Table 2. Drainage Management Areas

DMA Name	Impervious Area (square feet)	Pervious Area (square feet)	Total Area (square feet)
DMA-1	3,881	2,038	5,919
DMA-2	1,609	>73,959	>75,568
DMA-3	3,490	>77,798	>81,288
DMA-4	2,513	1,788	4,301
DMA-5	7,089	5,874	12,963
DMA-6	2,087	1,106	3,193
DMA-7	21,635	1,028	22,663
DMA-8	7,983	-	7,983
DMA-9	912	240	1,152
DMA-10	13,754	-	13,754
DMA-11	5,629	1,450	7,079
DMA-12	28,247	-	28,247

Drainage Management Area Descriptions

DMA 1 consists of the access road, tank farm and treatment pump house. Stormwater sheet flows to vegetated areas for treatment. This treatment is known as Alternate BMP 1.

DMA 2 consists of the cave patio area. Stormwater sheet flows to vegetated areas for treatment as a Self-Treating Area 1.

DMA 3 consists of the southern walkway and the outdoor terrace. Stormwater sheet flows to vegetated areas for treatment as a Self-Treating Area 2.

DMA 4 consists of the outdoor event area. Drainage from this area sheet flows eastward to Bioretention Facility 1.

DMA 5 consists of the kitchen, office and tasting room areas south of the winery. Drainage from this area is conveyed to Bioretention Facility 2 via storm drains and drop inlets.

DMA 6 consists of the bottle room. Drainage from this area is conveyed through storm drains to Bioretention Facility 3.

DMA 7 consists of the parking lot area and fermentation buildings. The stormwater is conveyed via sheet flow and storm drains to the north towards bioretention Facility 4.

DMA 8 consists of the southernmost portion of the driveway. Drainage from this area enters drop inlets to be treated by fossil filters and ultimately to natural flow lines. This treatment is known as Alternate BMP 3.

DMA 9 consists of the parking stalls, east of the proposed winery. Stormwater sheet flows across the parking stalls and discharges into a vegetated area for stormwater treatment. This treatment is shown as Alternative BMP 2.

DMA 10 consists of a portion of the driveway between the winery and Dry Creek Road. Drainage from this area enters drop inlets to be treated by fossil filters and ultimately to natural flow lines. This treatment is known as Alternate BMP 3.

DMA 11 consists of a portion of the driveway north of the proposed bridge. Drainage from this area enters drop inlets to be treated by fossil filters and ultimately to natural flow lines. This treatment is known as Alternate BMP 3.

DMA 12 consists of the northernmost portion of the driveway near Dry Creek Road. Drainage from this area will sheet flow to drop inlets and be treated by fossil filters prior to discharging in a ditch along Dry Creek Road. This treatment is known as Alternate BMP 3.

IV.B. Tabulation and Sizing Calculations

Table 3. Information Summary for Bioretention Facility Design

DMA	Total Project Area (Square Feet)
DMA-4	4,301
DMA-5	12,963
DMA-6	3,193
DMA-7	22,663

Table 4. Self-Treating Areas

DMA	Area (square Feet)
DMA-2	>32,180
DMA-3	>81,288

Table 5. Self-Retaining Areas

This site does not contain any Self-Retaining Areas.

Table 6. Alternate BMPs

DMA	Total Project Area (Square Feet)
DMA-1	5,919
DMA-8	7,983
DMA-9	1,152
DMA-10	13,754
DMA-11	7,079
DMA-12	28,247

Equivalent Treatment Control BMPs

Alternate LID BMP 1 & 2: Utilizes overland flow through a vegetated strip for stormwater treatment. Vegetated areas for each individual water tank, pump house, access road and parking spaces were calculated using the California Phase II LID sizing tool. The sizing tool requires the nearest climate station information, saturated hydraulic conductivity and impervious area before calculating the minimum treatment areas. See Alternate LID BMP Calculations in Attachment 3.

Alternate BMP 3: Utilizes fossil filters that are designed to remove sediment, gross solids, trash and petroleum hydrocarbons from stormwater runoff. Each drop inlet will contain a fossil filter to ensure all stormwater runoff from the driveway is treated before leaving the site. See Attachment 3 for fossil filter specifications.

Table 7. Areas Draining to Bioretention Facilities

DMA Name	DMA Area (Square Feet)	Post-project surface type	DMA Runoff factor	DMA Area × runoff factor	Facility Name		
					Bioretention Facility 1		
DMA-4_P	1,788	Pervious	0.10	179	Sizing Factor	Minimum Facility size	Proposed Facility Size
DMA-4_I	2,513	Impervious	1	2,513			
Total>				2,692	0.04	108	195

DMA Name	DMA Area (Square Feet)	Post-project surface type	DMA Runoff factor	DMA Area × runoff factor	Facility Name		
					Bioretention Facility 2		
DMA-5_P	5,874	Pervious	0.10	587	Sizing Factor	Minimum Facility size	Proposed Facility Size
DMA-5_I	7,089	Impervious	1	7,089			
Total>				7,676	0.04	307	400
DMA Name	DMA Area (Square Feet)	Post-project surface type	DMA Runoff factor	DMA Area × runoff factor	Facility Name		
					Bioretention Facility 3		
DMA-6_P	1,106	Pervious	0.10	111	Sizing Factor	Minimum Facility size	Proposed Facility Size
DMA-6_I	2,087	Impervious	1	2,087			
Total>				2,198	0.04	88	180
DMA Name	DMA Area (Square Feet)	Post-project surface type	DMA Runoff factor	DMA Area × runoff factor	Facility Name		
					Bioretention Facility 4		
DMA-7_P	1,028	Pervious	0.10	103	Sizing Factor	Minimum Facility size	Proposed Facility Size
DMA-7_I	21,635	Impervious	1	21,635			
Total>				21,738	0.04	869	880

V. Source Control Measures

V.A. Site activities and potential sources of pollutants

The site activities and potential sources of pollutants for the Anthem Winery project are listed in table 8, below

Table 8. Control Table

Potential Sources of Runoff Pollutants	Permanent Source Control BMPs	Operational Source Control BMPs
A. On-site storm drain inlets (unauthorized non-stormwater discharges and accidental spills or leaks)	▪ Mark all inlets with the words “No Dumping! Flows to River” or similar.	▪ Maintain and periodically repaint or replace inlet markings. ▪ Provide stormwater pollution prevention information to

Potential Sources of Runoff Pollutants	Permanent Source Control BMPs	Operational Source Control BMPs
		new site owners, lessees, or operators. ▪ See applicable operational BMPs in Fact Sheet SC-74, "Drainage System Maintenance." ▪ 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."
B. Interior floor drains and elevator shaft sump pumps	▪ Interior floor drains and elevator shaft sump pumps will be plumbed to the sanitary sewer.	▪ Inspect and maintain drains to prevent blockages and overflow.
C. Interior parking garages	N/A	N/A
D_1. Need for future indoor & structural pest control	▪ Building design shall incorporate features that discourage entry of pests.	▪ Provide Integrated Pest Management information to owners, lessees, and operators.
D_2. Landscape / outdoor pesticide use / building and grounds maintenance	▪ Final landscape plans will accomplish all of the following: ▪ Preserve existing native trees, shrubs, and ground cover to the maximum extent possible. ▪ Minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution. ▪ Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions. ▪ Use pest-resistant plants, especially adjacent to hardscape. ▪ To insure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.	▪ Maintain landscaping using minimum or no pesticides. ▪ See applicable operational BMPs in Fact Sheet SC-41, "Building and Grounds Maintenance." ▪ Provide IPM information to new owners, lessees and operators.

Potential Sources of Runoff Pollutants	Permanent Source Control BMPs	Operational Source Control BMPs
E. Pools, spas, ponds, decorative fountains, and other water features	N/A	N/A
F. Food service	N/A	N/A
G. Refuse areas	▪ Refuse areas shall be paved with an impervious surface, designed not to allow run-on from adjoining areas, and screened to prevent off-site transport of trash. ▪ Refuse areas shall contain a roof to minimize direct precipitation. ▪ No drain connections shall be made to the Refuse area.	▪ Provide adequate number of receptacles. ▪ Inspect receptacles regularly; repair or replace leaky receptacles. ▪ Keep receptacles covered. ▪ Prohibit/prevent dumping of liquid or hazardous wastes. ▪ Post "no hazardous materials" signs. ▪ Inspect and pick up litter daily and clean up spills immediately. ▪ Keep spill control materials available on-site. ▪ Clean by dry-sweeping only, or with wet/dry vacuum. ▪ See Fact Sheet SC-34, "Waste Handling and Disposal"
H. Industrial processes	▪ All process activities to be performed indoors. No processes to drain to exterior or to storm drain system	▪ Industrial discharge will be mitigated to the winery process wastewater system and will not be discharged to storm drains
I. Outdoor Storage of Equipment or Materials	N/A	N/A
J. Vehicle / equipment cleaning	N/A	N/A
K. Vehicle / equipment repair and maintenance	N/A	N/A
L. Fuel dispensing areas	N/A	N/A
M. Loading docks	N/A	N/A
N. Fire sprinkler test water	▪ Fire sprinkler test water shall be discharged to the sanitary sewer.	▪ See the note in Fact Sheet SC-41, "Building and Grounds Maintenance"
O. Miscellaneous drain or wash water or other sources • Boiler drain lines • Condensate drain lines • Rooftop equipment • Drainage sumps • Roofing, gutters, and trim • Other sources	▪ Boiler drain lines shall be directly or indirectly connected to the sanitary sewer system and may not discharge to the storm drain. ▪ Condensate drain lines may discharge to landscaped areas if the flow is small enough that runoff will not occur. Condensate drain lines may not discharge to the storm drain system.	▪ If architectural copper is used, implement the following BMPs for management of rinsewater during installation: ▪ If possible, purchase copper materials that have been pre-patinated at the factory. ▪ If patination is done on-site, prevent rinse water from entering storm drains by discharging to landscaping or by collecting in a tank and hauling off-site.

Potential Sources of Runoff Pollutants	Permanent Source Control BMPs	Operational Source Control BMPs
	▪ Rooftop equipment with potential to produce pollutants shall be roofed and/or have secondary containment. ▪ Any drainage sumps on-site shall feature a sediment sump to reduce the quantity of sediment in pumped water.	▪ Consider coating the copper materials with an impervious coating that prevents further corrosion and runoff. ▪ Implement the following BMPs during routine maintenance: ▪ Prevent rinse water from entering storm drains by discharging to landscaping or by collecting in a tank and hauling off-site.
P. Plazas, sidewalks, and parking lots		▪ 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 wash water containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.

V.B. Features, Materials, and Methods of Construction of Source Control BMPs

Source control BMPs will be designed and implemented per construction specifications and CASQA BMP fact sheets.

VI. Stormwater Facility Maintenance

VI.A. Ownership and Responsibility for Maintenance in Perpetuity

The applicant accepts responsibility for interim operation and maintenance of stormwater treatment and flow-control facilities until such time as this responsibility is formally transferred to a subsequent owner.

An Operations & Maintenance Plan has been prepared for this project. The owner shall execute a Post-Construction BMP Maintenance Agreement with the County of Napa upon request.

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

The site consists of five self-treating areas, four Bioretention Facilities and two alternate BMP areas. The Bioretention Facilities require maintenance as needed for any damage that may occur. Semi-annual inspections are required for possible erosion, damaged vegetation, debris, and health of any trees or shrubs. These inspections usually occur at the beginning of the wet season and end of the wet season. Any dead or diseased vegetation should be removed and replaced during the inspection. An annual inspection is required to complete the annual report for each Bioretention Facility. During this inspection mulch may be added, and tree stakes and wires replaced. Refer to the Operation & Maintenance Plan for a full description of required inspections and maintenance requirements.

VII. Construction Checklist

Table 9. Construction Checklist

Stormwater Control Plan Page #	Source Control or Treatment Control Measure	Sheet
5	Bioretention Facilities	DMA/UP2/UP3
6	A. On-site storm drain inlets	UP3
7	B. Interior floor drains and elevator shaft sump pumps	Arch.
7	D1. Need for Future indoor & structural pest control	Arch.
7	D2. Landscape/ outdoor pesticide use/ building and ground maintenance	L. Arch
8	G. Refuse areas	UP3
8	N. Fire sprinkler test water	UP Sheets
8	O. Miscellaneous drain or wash	UP Sheets
9	P. Plazas, sidewalks, and parking lots	UP Sheets

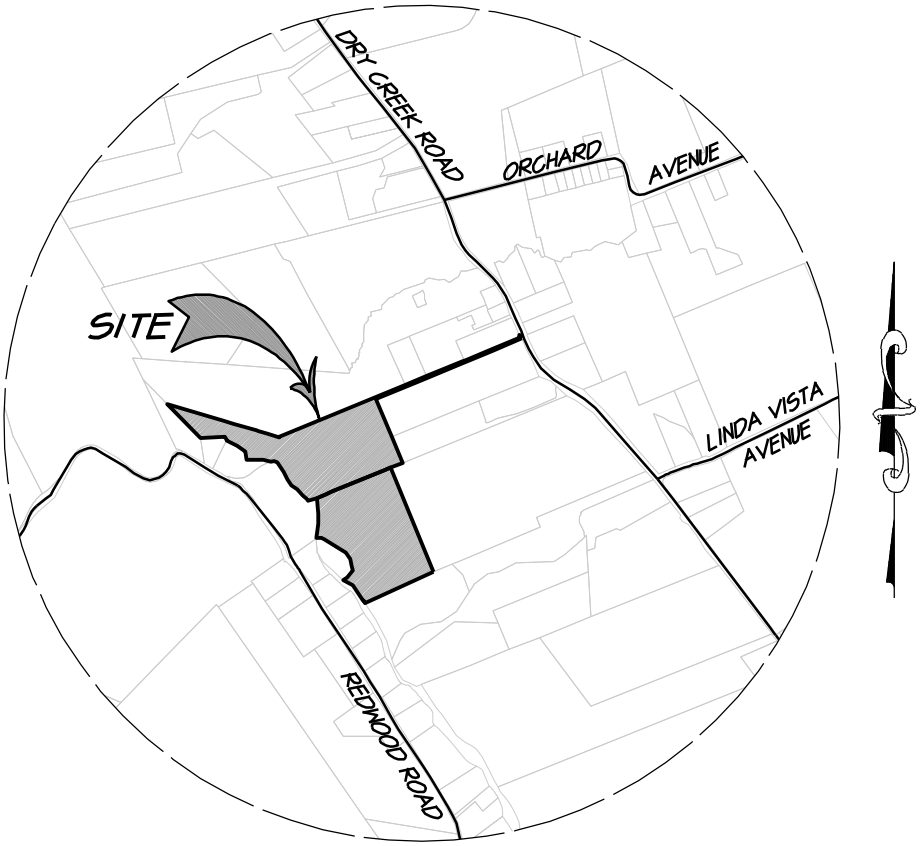
VIII. Certifications

The 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, dated July 14, 2014.

ATTACHMENT 1

VICINITY MAP, USGS MAP, AERIAL PHOTO, SOILS MAP

ANTHEM WINERY
VICINITY MAP
NAPA COUNTY CALIFORNIA



VICINITY MAP

SCALE: 1" = 2000'

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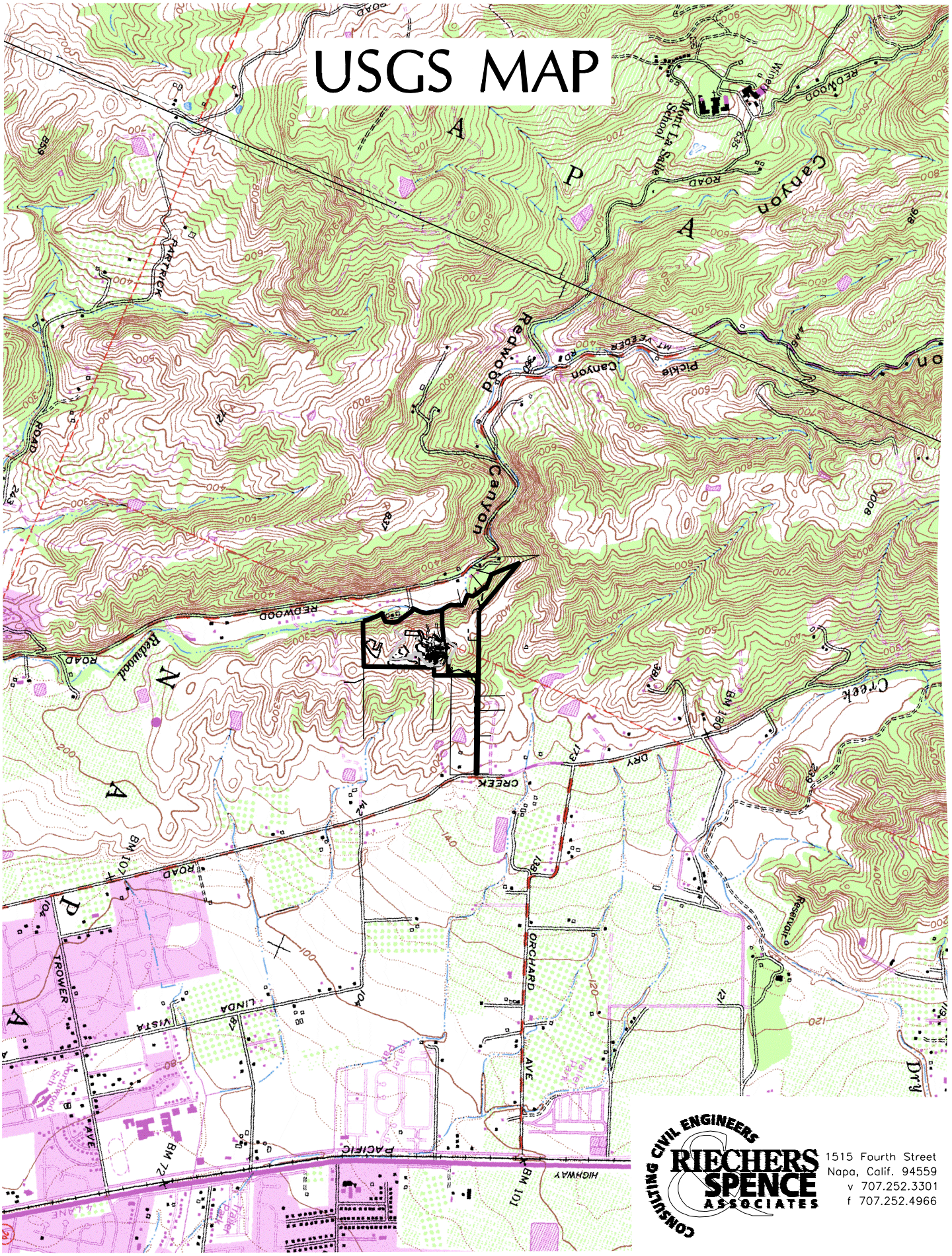
USGS MAP



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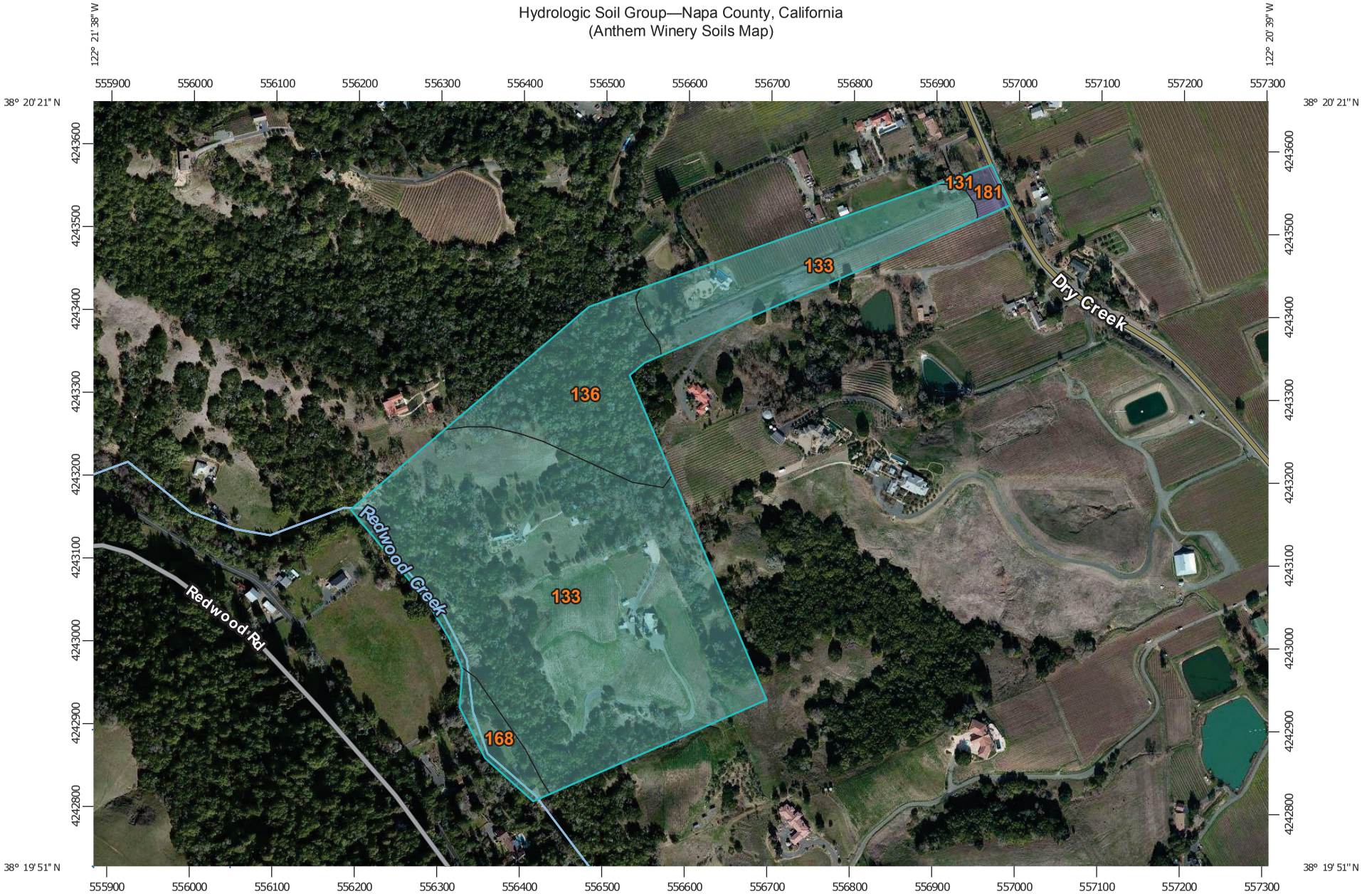
Google earth

feet 1000
meters 400

Hydrologic Soil Group—Napa County, California
(Anthem Winery Soils Map)



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

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: http://websoilsurvey.nrcs.usda.gov
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 7, Sep 25, 2014

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

Date(s) aerial images were photographed: Nov 2, 2010—Feb 17, 2012

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

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Napa County, California (CA055)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
131	Fagan clay loam, 5 to 15 percent slopes	C	0.1	0.2%
133	Fagan clay loam, 30 to 50 percent slopes	C	39.0	80.0%
136	Felton gravelly loam, 30 to 50 percent slopes	C	7.6	15.5%
168	Perkins gravelly loam, 2 to 5 percent slopes	C	1.5	3.2%
181	Yolo loam, 0 to 2 percent slopes	B	0.5	1.1%
Totals for Area of Interest			**48.7**	**100.0%**

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

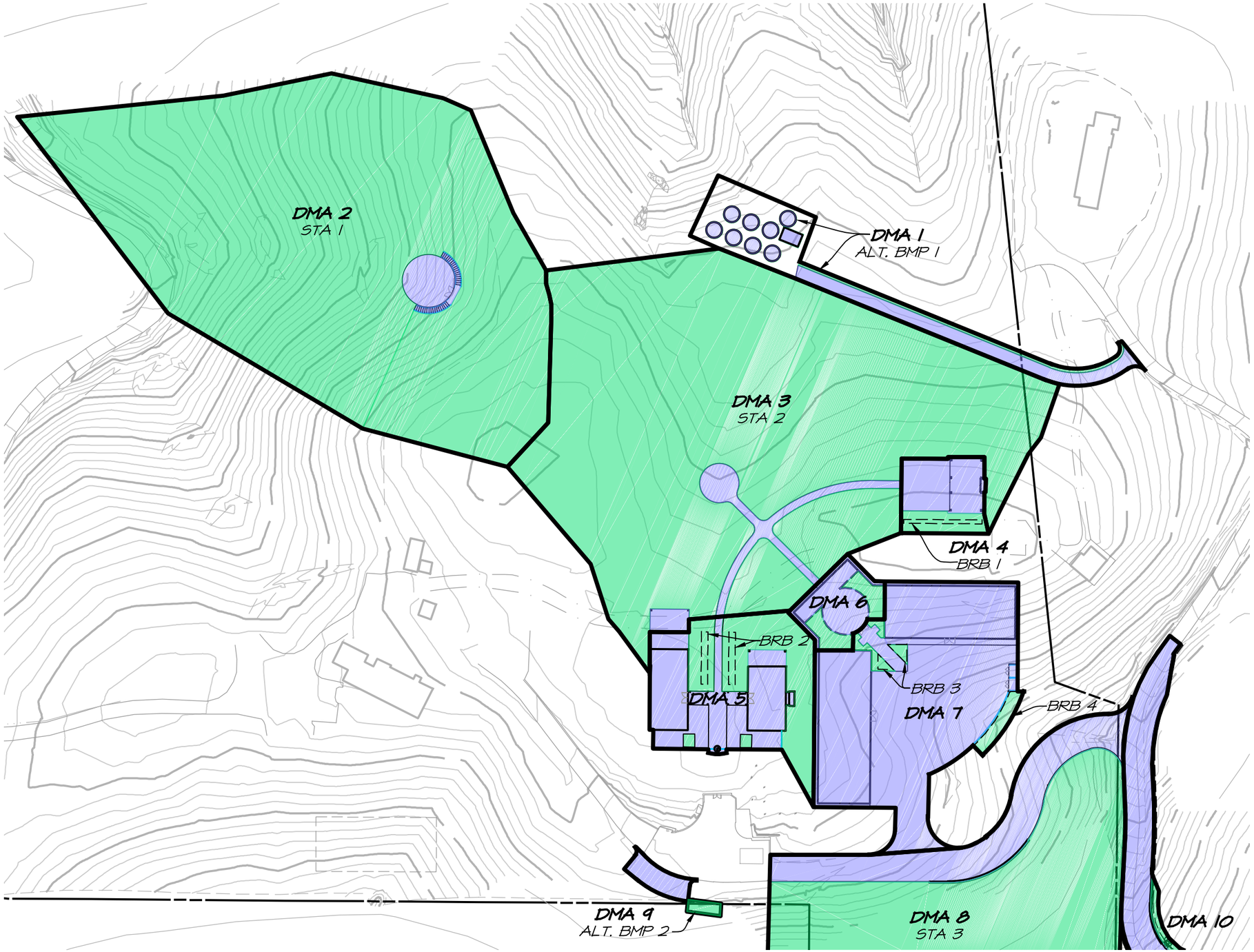
Component Percent Cutoff: None Specified

Tie-break Rule: Higher

ATTACHMENT 2

DRAINAGE MANAGEMENT AREAS EXHIBIT
BIORETENTION FACILITY CROSS-SECTION
BIORETENTION CONSTRUCTION INSPECTION CHECKLIST

ANTHEM WINERY
DRAINAGE MANAGEMENT AREAS EXHIBIT - WINERY



LEGEND	
BRB	BIORETENTION BASIN
ALT. BMP	ALTERNATIVE BMP
STA	SELF-TREATING AREA

DRAINAGE MANAGEMENT AREAS		
DMA	IMPERVIOUS	PERVIOUS
1	3,881 SF	2,038 SF
2	1,609 SF	>30,571 SF
3	2,928 SF	>55,632 SF
4	2,639 SF	1,066 SF
5	7,089 SF	5,874 SF
6	2,087 SF	1,106 SF
7	21,635 SF	1,028 SF
8	7,983 SF	>151,677 SF
9	912 SF	240

GRAPHIC SCALE

80 0 80 160

(IN FEET)
1 inch = 80 FT

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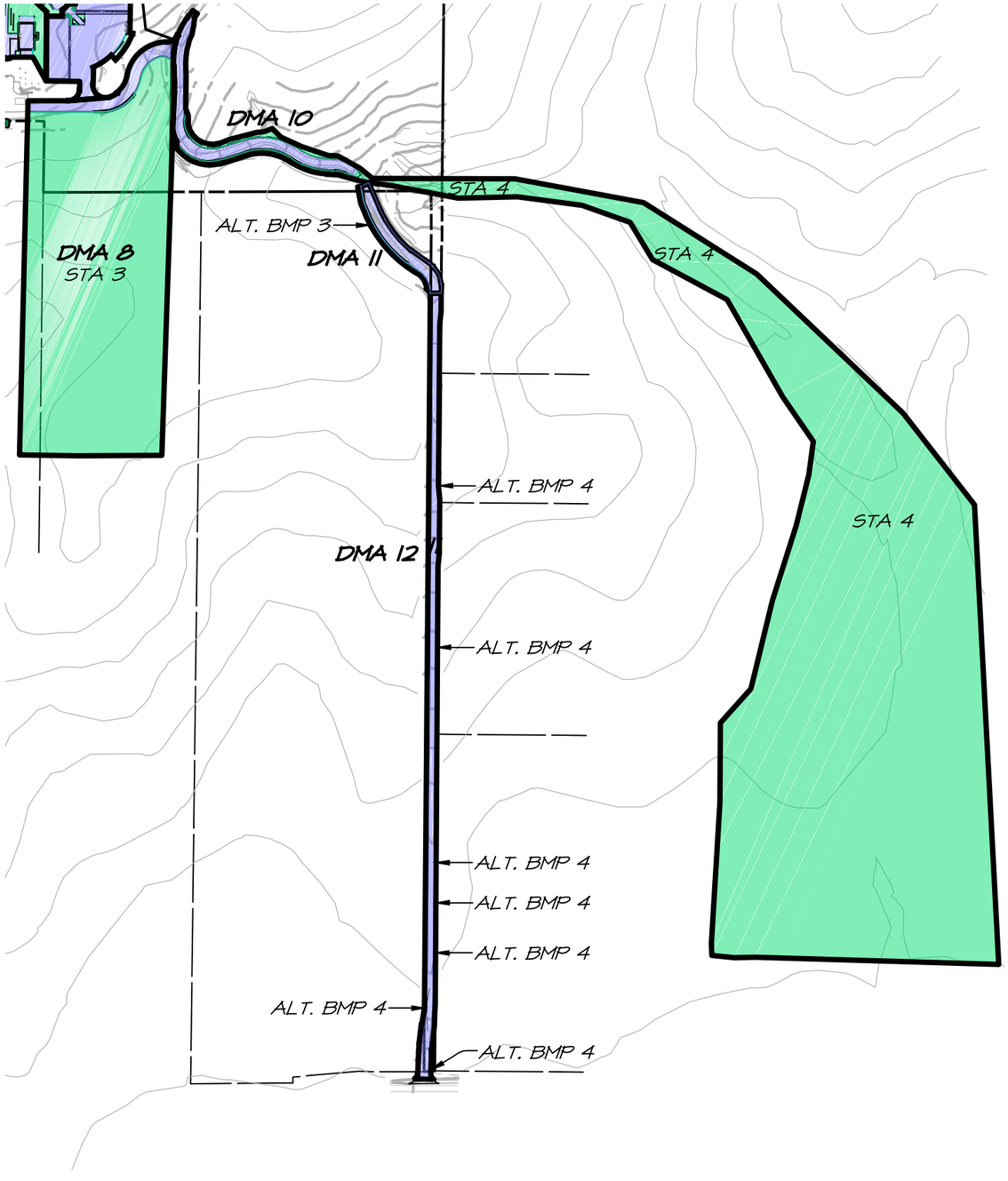
ANTHEM WINERY
DRAINAGE MANAGEMENT AREAS EXHIBIT - DRIVEWAY



LEGEND	
BRB	BIORETENTION BASIN
ALT. BMP	ALTERNATIVE BMP
STA	SELF-TREATING AREA

DRAINAGE MANAGEMENT AREAS		
DMA	IMPERVIOUS	PERVIOUS
8	7,983 SF	>151,677 SF
10	12,851 SF	>244,169 SF
11	5,629 SF	1,450 SF
12	28,247 SF	-

GRAPHIC SCALE

250 0 250 500

(IN FEET)
1 inch = 250 FT

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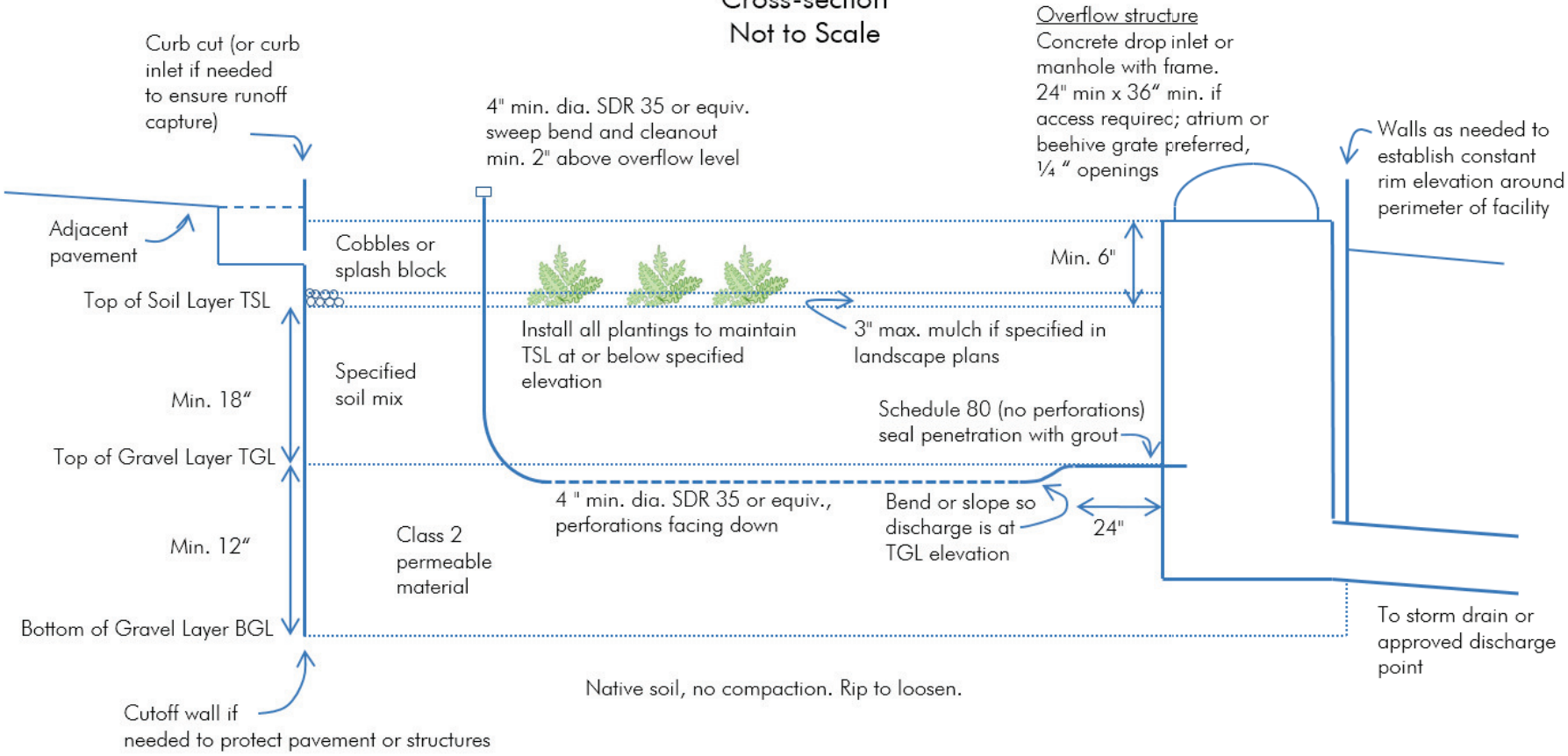
Bioretention Facility

Cross-section
Not to Scale



Allowed variations for special site conditions:

- Facilities located within 10 feet of structures or other potential geotechnical hazards may incorporate an impervious cutoff wall
- Facilities with documented high concentrations of pollutants in underlying soil or groundwater, facilities where infiltration could contribute to a geotechnical hazard, and facilities located on elevated plazas or other structures may incorporate an impervious liner between the native soil and the BGL and locate the underdrain discharge at the BGL (flow-through planter configuration).
- Facilities located in areas of high groundwater, highly infiltrative soils, or where connection of the underdrain to a surface drain or subsurface storm drain are infeasible may omit the underdrain.

Notes:

- No liner, no filter fabric, no landscape cloth.
- Maintain BGL. TGL, TSL throughout facility area at elevations to be specified in plan.
- Class 2 perm layer may extend below and underneath drop inlet.
- Elevation of underdrain discharge is at top of gravel layer.
- See Chapter 4 for instructions on facility sizing and additional specifications.

Appendix B. Bioretention Construction Inspection Checklist

Layout (to be confirmed prior to beginning excavation)

- ❒ Square footage of the facility meets or exceeds minimum shown in Stormwater Control Plan
- ❒ Site grading and grade breaks are consistent with the boundaries of the tributary Drainage Management Area(s) (DMAs) shown in the Stormwater Control Plan
- ❒ Inlet elevation of the facility is low enough to receive drainage from the entire tributary DMA
- ❒ Locations and elevations of overland flow or piping, including roof leaders, from impervious areas to the facility have been laid out and any conflicts resolved
- ❒ Rim elevation of the facility is laid out to be level all the way around, or elevations are consistent with a detailed cross-section showing location and height of interior dams
- ❒ Locations for vaults, utility boxes, and light standards have been identified so that they will not conflict with the facility
- ❒ Facility is protected as needed from construction-phase runoff and sediment

Excavation (to be confirmed prior to backfilling or pipe installation)

- ❒ Excavation conducted with materials and techniques to minimize compaction of soils within the facility area
- ❒ Excavation is to accurate area and depth
- ❒ Slopes or side walls protect from sloughing of native soils into the facility
- ❒ Moisture barrier, if specified, has been added to protect adjacent pavement or structures.
- ❒ Native soils at bottom of excavation are ripped or loosened to promote infiltration

Overflow or Surface Connection to Storm Drainage

(to be confirmed prior to backfilling with any materials)

- ❒ Overflow is at specified elevation
- ❒ No knockouts or side inlets are in overflow riser
- ❒ Overflow location selected to minimize surface flow velocity (near, but offset from, inlet recommended)
- ❒ Grating excludes mulch and litter (beehive or atrium-style grates with ¼" openings recommended)
- ❒ Overflow is connected to storm drain via appropriately sized piping

Underground connection to storm drain/outlet orifice

(to be confirmed prior to backfilling with any materials)

- ❒ Perforated pipe underdrain (PVC SDR 35 or approved equivalent) is installed with holes facing down
- ❒ Perforated pipe is connected to storm drain at specified elevation (typ. bottom of soil elevation)
- ❒ Cleanouts are in accessible locations and connected via sweep bends

Drain Rock/Subdrain (to be confirmed prior to installation of soil mix)

- ❒ Rock is installed as specified, 12" min. depth. Class 2 permeable, Caltrans specification 68-2.02F(3) recommended
- ❒ Rock is smoothed to a consistent top elevation. Depth and top elevation are as shown in plans
- ❒ Slopes or side walls protect from sloughing of native soils into the facility
- ❒ No filter fabric is placed between the subdrain and soil mix layers

Soil Mix

- ❒ Soil mix is as specified.
- ❒ Mix installed in lifts not exceeding 12"
- ❒ Mix is not compacted during installation but may be thoroughly wetted to encourage consolidation
- ❒ Mix is smoothed to a consistent top elevation. Depth of mix (18" min.) and top elevation are as shown in plans, accounting for depth of mulch to follow and required reservoir depth

Irrigation

- ❒ Irrigation system is installed so it can be controlled separately from other landscaped areas. Smart irrigation controllers and drip emitters are recommended and may be required by local code or ordinance.
- ❒ Spray heads, if any, are positioned to avoid direct spray into outlet structures

Planting

- ❒ Plants are installed consistent with approved planting plan, consistent with site water allowance
- ❒ Any trees and large shrubs are staked securely
- ❒ No fertilizer is added; compost tea may be used
- ❒ No native soil or clayey material are imported into the facility with plantings
- ❒ 1"-2" mulch may be applied following planting; mulch selected to avoid floating
- ❒ Final elevation of soil mix maintained following planting
- ❒ Curb openings are free of obstructions

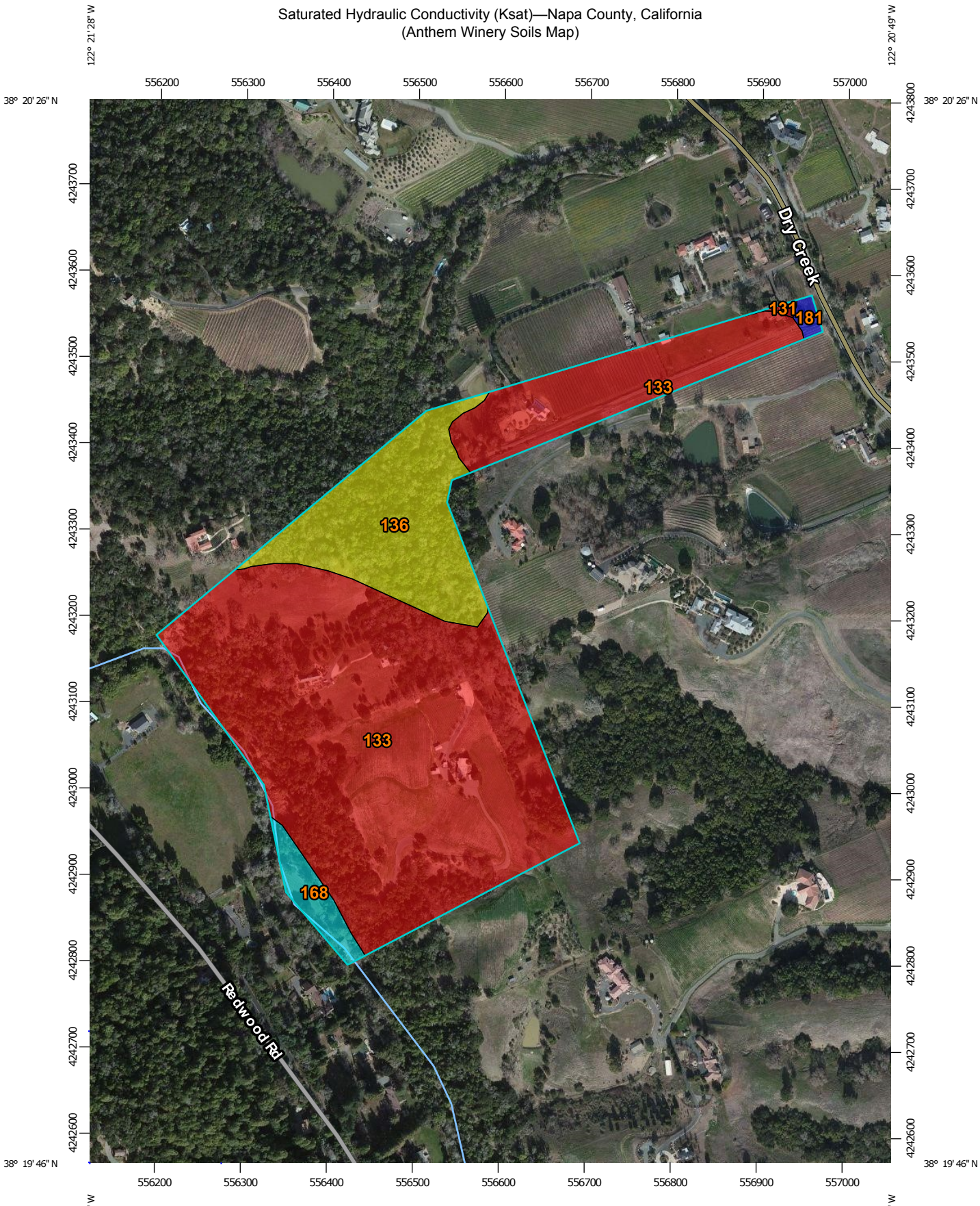
Final Engineering Inspection

- ❒ Drainage Management Area(s) are free of construction sediment and landscaped areas are stabilized
- ❒ Inlets are installed to provide smooth entry of runoff from adjoining pavement, have sufficient reveal (drop from the adjoining pavement to the top of the mulch or soil mix, and are not blocked
- ❒ Inflows from roof leaders and pipes are connected and operable
- ❒ Temporary flow diversions are removed
- ❒ Rock or other energy dissipation at piped or surface inlets is adequate
- ❒ Overflow outlets are configured to allow the facility to flood and fill to near rim before overflow
- ❒ Plantings are healthy and becoming established
- ❒ Irrigation is operable
- ❒ Facility drains rapidly; no surface ponding is evident
- ❒ Any accumulated construction debris, trash, or sediment is removed from facility
- ❒ Permanent signage is installed and is visible to site users and maintenance personnel

ATTACHMENT 3

ALTERNATE LID BMPs

Saturated Hydraulic Conductivity (Ksat)—Napa County, California
(Anthem Winery Soils Map)



Map Scale: 1:6,010 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 250 500 1000 1500

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

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- <= 2.3420
- > 2.3420 and <= 2.8700
- > 2.8700 and <= 4.8486
- > 4.8486 and <= 5.6974
- Not rated or not available

Soil Rating Lines
- <= 2.3420
- > 2.3420 and <= 2.8700
- > 2.8700 and <= 4.8486
- > 4.8486 and <= 5.6974
- Not rated or not available

Soil Rating Points
- <= 2.3420
- > 2.3420 and <= 2.8700
- > 2.8700 and <= 4.8486
- > 4.8486 and <= 5.6974
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

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: http://websoilsurvey.nrcs.usda.gov
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 8, Sep 23, 2015

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

Date(s) aerial images were photographed: Feb 4, 2012—Feb 17, 2012

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.

Saturated Hydraulic Conductivity (Ksat)

Saturated Hydraulic Conductivity (Ksat)— Summary by Map Unit — Napa County, California (CA055)				
Map unit symbol	**Map unit name**	**Rating (micrometers per second)**	**Acres in AOI**	**Percent of AOI**
131	Fagan clay loam, 5 to 15 percent slopes	2.3420	0.1	0.2%
133	Fagan clay loam, 30 to 50 percent slopes	2.3420	38.3	79.0%
136	Felton gravelly loam, 30 to 50 percent slopes	2.8700	8.4	17.4%
168	Perkins gravelly loam, 2 to 5 percent slopes	4.8486	1.4	2.8%
181	Yolo loam, 0 to 10 percent slopes, moist, MLRA 14	5.6974	0.3	0.6%
Totals for Area of Interest			**48.4**	**100.0%**

Description

Saturated hydraulic conductivity (Ksat) refers to the ease with which pores in a saturated soil transmit water. The estimates are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity is considered in the design of soil drainage systems and septic tank absorption fields.

For each soil layer, this attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

The numeric Ksat values have been grouped according to standard Ksat class limits.

Rating Options

Units of Measure: micrometers per second

Aggregation Method: Dominant Component

Component Percent Cutoff: *None Specified*

Tie-break Rule: Fastest

Interpret Nulls as Zero: No

Layer Options (Horizon Aggregation Method): All Layers (Weighted Average)

SACRAMENTO STATE
Office of Water Programs

California Phase II LID Sizing Tool - BMP Details

Summary ALT- BMP #1

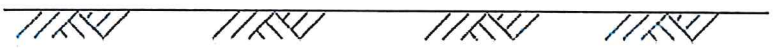
Project name	Pump House
Climate station	SAINT HELENA
Saturated hydraulic conductivity	0.33 in/hr
Impervious area	150 square feet
LID area	39.47 square feet
Total area	189.47 square feet
LID BMP	Overland Flow no amendment
Methodology	Baseline Bioretention or Equivalent Performance
Design storm volumetric runoff coefficient	0.892

Description

Overland flow consists of an existing vegetated strip with no soil amendment. Runoff is allowed to move as sheet flow across the strip, where the vegetation provides filtration and attenuation. The LID BMP type may be ideal where there is a large amount of available space or where the native soils are highly conductive. Overland flows modeled by the CA Phase II LID Sizing Tool apply to strips having 1-15% slopes.

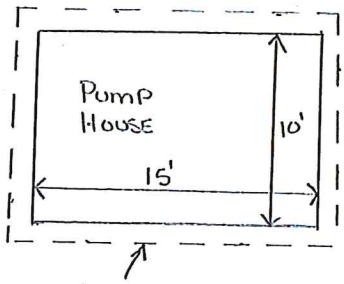
LID BMP - Overland Flow no amendment

Longitudinal slope = 1-15%



Native Soil

No ponding
No soil mix layer
No gravel storage layer
No underdrain



2' VEG. BUFFER STRIP - SLOPE AWAY FROM TANK AT 5%

Depths

LID Layer Depth (inches)

Notes

Note: This LID BMP is an alternative to the more engineered LID BMPs.

$A = A_2 - A_1$

$A_2 = (17')(12') = 204\ ft^2$

$A_1 = (15')(10') = 150\ ft^2$

$A = 204 - 150 = 54\ ft^2 \rightarrow 54\ ft^2 > 39\ ft^2$

$\therefore$ O.K.

SACRAMENTO STATE
Office of Water Programs

California Phase II LID Sizing Tool - BMP Details

Summary ALT- BMP #1

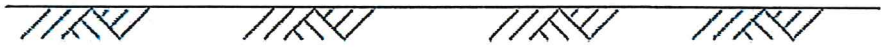
Project name	10' ACCESS ROAD
Climate station	SAINT HELENA
Saturated hydraulic conductivity	0.33 in/hr
Impervious area	10 square feet
LID area	2.63 square feet
Total area	12.63 square feet
LID BMP	Overland Flow no amendment
Methodology	Baseline Bioretention or Equivalent Performance
Design storm volumetric runoff coefficient	0.892

Description

Overland flow consists of an existing vegetated strip with no soil amendment. Runoff is allowed to move as sheet flow across the strip, where the vegetation provides filtration and attenuation. The LID BMP type may be ideal where there is a large amount of available space or where the native soils are highly conductive. Overland flows modeled by the CA Phase II LID Sizing Tool apply to strips having 1-15% slopes.

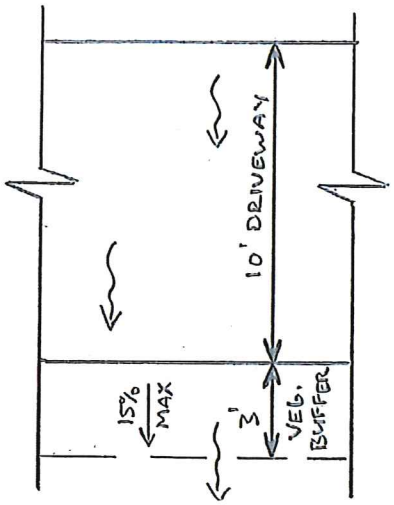
LID BMP - Overland Flow no amendment

Longitudinal slope = 1-15%



Native Soil

No ponding
No soil mix layer
No gravel storage layer
No underdrain



Depths

LID Layer	Depth (inches)

A = 3 SF/LF > 2.63 FT ✓

Notes

Note: This LID BMP is an alternative to the more engineered LID BMPs.

Methodology: Baseline Bioretention or Equivalent Performance

SACRAMENTO STATE
Office of Water Programs

California Phase II LID Sizing Tool - BMP Details

Summary

ALT- BMP #2

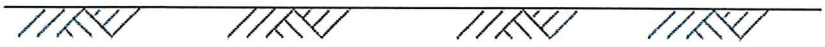
Project name	PARKING STALLS
Climate station	SAINT HELENA
Saturated hydraulic conductivity	0.33 in/hr
Impervious area	912 square feet
LID area	240 square feet
Total area	1152 square feet
LID BMP	Overland Flow no amendment
Methodology	Baseline Bioretention or Equivalent Performance
Design storm volumetric runoff coefficient	0.892

Description

Overland flow consists of an existing vegetated strip with no soil amendment. Runoff is allowed to move as sheet flow across the strip, where the vegetation provides filtration and attenuation. The LID BMP type may be ideal where there is a large amount of available space or where the native soils are highly conductive. Overland flows modeled by the CA Phase II LID Sizing Tool apply to strips having 1-15% slopes.

LID BMP - Overland Flow no amendment

Longitudinal slope = 1-15%



Native Soil

No ponding
No soil mix layer
No gravel storage layer
No underdrain

Depths

LID Layer Depth (inches)

Notes

Note: This LID BMP is an alternative to the more engineered LID BMPs.

The Baseline Bioretention or Equivalent Performance Method is based on Section E.12.e.ii.f of the Phase II permit. This permit section allows use of a stormwater treatment measure designed to: 1) infiltrate, evapotranspire, and/or bioretain runoff based on the sizing criteria from Section E.12.e.ii.c.1, and 2) be as effective as a bioretention system with the following permit-specified design parameters (SWRCB 2013):

1. Maximum surface loading rate of 5 inches per hour, based on the flow rates calculated. A sizing factor of 4% of tributary impervious area may be used.
2. Minimum surface reservoir volume equal to surface area times a depth of 6 inches.
3. Minimum planting medium depth of 18 inches. The planting medium must sustain a minimum infiltration rate of 5 inches per hour throughout the life of the project and must maximize runoff retention and pollutant removal. A mixture of sand (60%-70%) meeting the specifications of American Society for Testing and Materials (ASTM) C33 and compost (30%-40%) may be used.
4. Subsurface drainage/storage (gravel) layer with an area equal to the surface area and having a minimum depth of 12 inches.
5. Underdrain with discharge elevation at top of gravel layer.
6. No compaction of soils beneath the facility, or ripping/loosening of soils if compacted.
7. No liners or other barriers interfering with infiltration.
8. Appropriate plant palette for the specified soil mix and maximum available water use.

The equivalence standard is found in Section E.12.e.ii.g of the permit and allows designs to differ from the E.12.e.ii.f specification if all of the following may be demonstrated (SWRCB 2013):

1. Equal or greater amount of runoff infiltrated or evapotranspired.
2. Equal or lower pollutant concentrations in runoff that is discharged after biotreatment.
3. Equal or greater protection against shock loadings and spills.
4. Equal or greater accessibility and ease of inspection and maintenance.

The CA Phase II LID Sizing Tool's areas reported for the Baseline Bioretention or Equivalent Performance Method are based on a conservative interpretation of the second requirement concerning concentrations. Instead of quantifying the pollutant removal of any filtration or sedimentation mechanisms within an equivalent LID BMP, the tool only accounts for pollutant removal via evapotranspiration and infiltration losses. The assumption is that these latter mechanisms result in pollutant losses that are superior to the filtration mechanism in the permit-specified bioretention. This approach also means that all equivalent LID BMPs are sized to retain on site the same volume of runoff that would be discharged after biotreatment through the permit-specified bioretention.

Further details on this method are provided in the Documentation Manual.

Links

EPA Fact Sheet for Vegetated Filter Strips

General
CASQA LID Portal
Central Coast LID Initiative
EPA Low Impact Development Site
Low Impact Development Urban Design Tools Website
EPA BMP Fact Sheet for Post-Construction Stormwater Management in New Development and Redevelopment
EPA BMP Fact Sheet for On-Lot Treatment
Contech LID Site Planner (LID Feasibility Screening Tool – coming soon...)

FloGard +Plus® Catch Basin Insert Filter

Inlet Filtration

ALT- BMP #3

Removes pollutants from runoff at the source

FloGard +Plus is a catch basin insert filter designed to remove sediment, gross solids, trash, and petroleum hydrocarbons from stormwater runoff. FloGard +Plus is ideally suited for removal of primary pollutants from paved surfaces in commercial and residential areas. Rated filter flow capacities are designed to exceed the required "first flush" treatment flow rate, and the unique dual-bypass design typically exceeds catch basin inlet capacity.

Economical Treatment
Quick, easy, and cost-effective to install, inspect, and maintain.

Efficient Performance
Removes pollutants at the inlet where they are easiest to catch.

Versatile Applications
Appropriate and easy to use on new construction or retrofit projects.

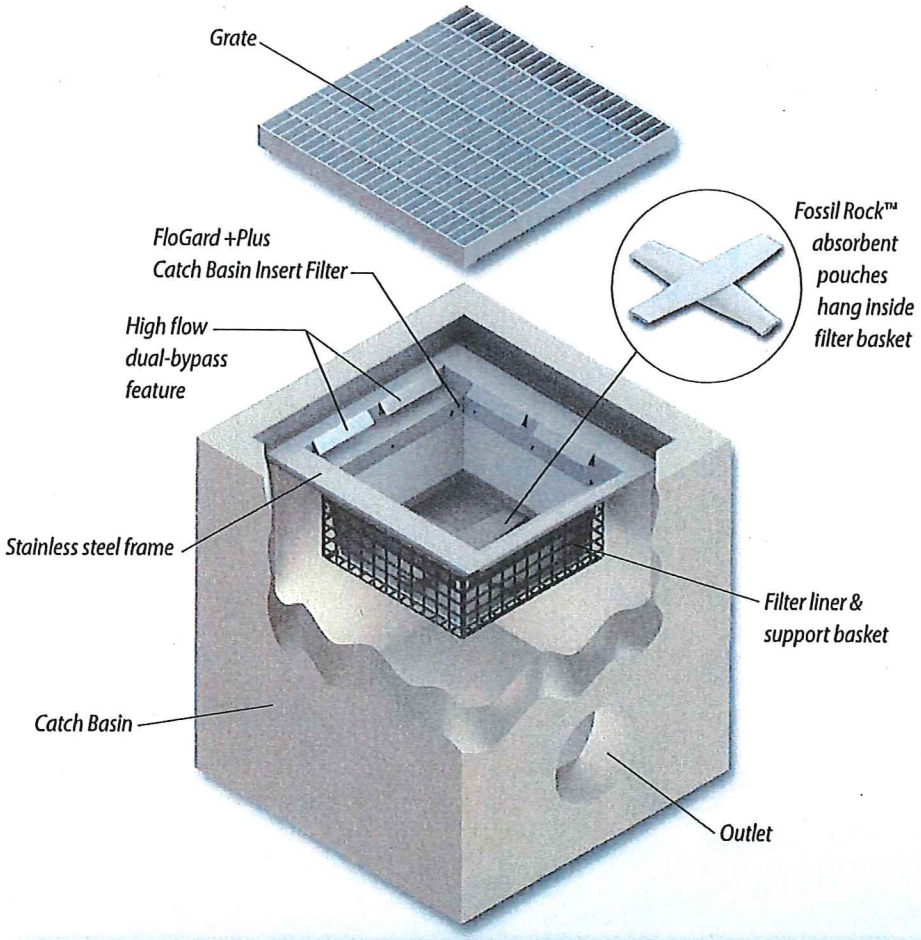
Flexible Design
Available in a wide variety of sizes and configurations, including custom options.

Durable Construction
Built to last and withstand the loads from captured pollutants.

Environmentally Friendly
No standing water minimizes vector, bacteria, and odor problems.

Proven Performance
Field and laboratory tested with up to 86%[1] removal of TSS and 80%[2] removal of oils and grease.

1. *University of Auckland laboratory testing of local street sweep material.*
2. *UCLA laboratory study.*



How It Works:
Flows entering the unit pass through the filter liner basket for removal of sediment, trash, and debris. Optional Fossil Rock™ sorbent pouches installed in the basket effect hydrocarbon capture. As the storm flow exceeds the treatment flow rate, treatment will continue and excess flows will pass through the dual-bypass openings near the top of the unit.

Oldcastle® Stormwater Solutions

FloGard +Plus Catch Basin Insert Filter

Catch basin insert designed to capture sediment, gross solids, trash, and petroleum hydrocarbons from low (first flush) flows, even during the most extreme weather conditions.

Example Types, Sizes, and Capacities

Additional sizes, including regional and custom options are available.

FloGard Combination Inlet
SPECIFIER CHART

MODEL NO. STANDARD DEPTH	STANDARD & SHALLOW DEPTH (Data in these columes is the same for both STANDARD & SHALLOW versions)			STANDARD DEPTH -20 Inches-		MODEL NO. SHALLOW DEPTH	SHALLOW DEPTH -12 Inches-	
	INLET ID Inside Dimension (Inch x Inch)	GRATE OD Outside Dimension (Inch x Inch)	TOTAL BYPASS CAPACITY (cu. ft. / sec.)	SOLIDS STORAGE CAPACITY (cu. ft.)	FILTERED FLOW (cu. ft. / sec.)		SOLIDS STORAGE CAPACITY (cu. ft.)	FILTERED FLOW (cu. ft. / sec.)
FGP-1633FGO	16 X 33	18 X 36	7.0	2.5	1.7	FGP-1633FGO8	1.4	1.1
FGP-1836FGO	18 X 36	18 X 40	6.9	2.3	1.6	FGP-1836FGO8	1.3	.9
FGP-2234FGO	22 X 34	24 X 36	8.1	3.6	2.1	FGP-2234FGO8	2.1	1.4
FGP-2436FGO	24 X 36	24 X 40	8.0	3.4	2.0	FGP-2436FGO8	1.95	1.15

Combination Inlet

FloGard Flat Grated Inlet
SPECIFIER CHART

MODEL NO. STANDARD DEPTH	STANDARD & SHALLOW DEPTH (Data in these columes is the same for both STANDARD & SHALLOW versions)			STANDARD DEPTH -20 Inches-		MODEL NO. SHALLOW DEPTH	SHALLOW DEPTH -12 Inches-	
	INLET ID Inside Dimension (Inch x Inch)	GRATE OD Outside Dimension (Inch x Inch)	TOTAL BYPASS CAPACITY (cu. ft. / sec.)	SOLIDS STORAGE CAPACITY (cu. ft.)	FILTERED FLOW (cu. ft. / sec.)		SOLIDS STORAGE CAPACITY (cu. ft.)	FILTERED FLOW (cu. ft. / sec.)
FGP-12F	12 X 12	12 X 14	2.8	0.3	0.4	FGP-12F8	.15	.25
FGP-16F	16 X 16	16 X 19	4.7	0.8	0.7	FGP-16F8	.45	.4
FGP-18F	18 X 18	18 X 20	4.7	0.8	0.7	FGP-18F8	.45	.4
FGP-1836F	18 X 36	18 X 40	6.9	2.3	1.6	FGP-1836F8	1.3	.9
FGP-21F	22 X 22	22 X 24	6.1	2.2	1.5	FGP-21F8	1.25	.85
FGP-24F	24 X 24	24 X 27	6.1	2.2	1.5	FGP-24F8	1.25	.85
FGP-2436F	24 X 36	24 X 40	8.0	3.4	2.0	FGP-2436F8	1.95	1.15
FGP-2448F	24 X 48	24 X 48	9.3	4.4	2.4	FGP-2448F8	2.5	1.35
FGP-32F-TN	28 X 28	32 X 32	6.3	2.2	1.5	FGP-32F8-TN	1.25	.85
FGP-30F	30 X 30	30 X 34	8.1	3.6	2.0	FGP-30F8	2.05	1.15
FGP-36F	36 X 36	36 X 40	9.1	4.6	2.4	FGP-36F8	2.65	1.35
FGP-3648F	36 X 48	40 X 48	11.5	6.8	3.2	FGP-3648F8	3.9	1.85
FGP-48F	48 X 48	48 X 54	13.2	9.5	3.9	FGP-48F8	5.45	2.25
FGP-1633F	16 X 34	18 X 36	6.9	2.3	1.6	FGP-1633F8	1.3	.9
FGP-2234F	22 X 34	24 X 36	8.0	3.4	2.0	FGP-2234F8	1.95	1.15

Flat Grated Inlet

FloGard Circular Grated Inlet
SPECIFIER CHART

MODEL NUMBER	INLET ID (Ø INCHES)	GRATE OD (Ø INCHES)	SOLIDS STORAGE CAPACITY (CU FT)	FILTERED FLOW (CFS)	TOTAL BYPASS CAPACITY (CFS)
FGP-RF15F	15	18	0.3	0.4	2.8
FGP-RF18F	18	20	0.8	0.7	4.7
FGP-RF20F	20	23	0.8	0.7	4.7
FGP-RF21F	21	23.5	0.8	0.7	4.7
FGP-RF22F	22	24	0.8	0.7	4.7
FGP-RF24F	24	26	0.8	0.7	4.7
FGP-RF30F	30	32	2.2	1.5	6.1
FGP-RF36F	36	39	3.6	2.0	8.1

Circular Frame Catch Basin

Visit our website: oldcastlestormwater.com or call (800) 579-8819 for additional sizes and options.