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Stormwater Control Plan & Hydrology & Hydraulic Evaluation

Darms Lane Winery P16-00017-UP & P18-00152-VIEW
Planning Commission Hearing Date March 20, 2019

STORMWATER CONTROL PLAN
FOR A REGULATED PROJECT
DARMS LANE WINERY
1150 DARMS LANE
NAPA COUNTY, CA
APN 034-190-034 & -035

Prepared For:

Darms Lane Winery
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Job No. 98-55
December 2018 - Revised
June 2017

BARTELT ENGINEERING

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This Stormwater Control Plan was prepared using the Bay Area Stormwater Agencies Association (BASMAA) template dated July 11, 2014.

1 PROJECT DATA

TABLE 1: PROJECT DATA	
Project Name/Number	Darms Lane Winery
Application Submittal Date	December 2018 - Revised
Project Location	APN: 034-190-034 & -035
Project Phase No.	N/A
Project Type and Description	Use Permit Modification
Total Project Site Area (acres)	4.4± acres
Total New and Replaced Impervious Surface Area (Onsite)	81,460± SF
Total Pre-Project Impervious Surface Area	28,314± SF
Total Post-Project Impervious Surface Area	81,460± SF
Percent Imperviousness Before Construction	1.39%
Percent Imperviousness After Construction	3.99%

2 SETTING

2.1 PROJECT LOCATION AND DESCRIPTION

The Darms Lane Winery project is located at 1150 Darms Lane in Napa County approximately 2 miles north of Napa, California. The winery parcel (APN 034-190-035) is approximately 46.9± acres and is zoned AP (Agricultural Preserve). The proposed project will consist of one (1) phase and have a disturbed area of approximately 4.4± acres. The disturbed area includes the proposed winery, offices and tasting room building, driveways, access roads, parking areas, landscaping, and vineyards.

2.2 EXISTING SITE FEATURES AND CONDITIONS

The subject parcel is currently developed with a residence, a barn, driveway, access roads, and vineyard. Slopes on the proposed development area of the parcel range between zero (0) and forty percent (40) percent. According to the NRCS Soil Report, the soil types found on the parcel are Bale clay loam, (map symbol 104, Hydrologic Soil Group "B"), Bressa-Dibble complex (map symbol 114, Hydrologic Soil Group "C"), Clear Lake clay (map symbol 116, Hydrologic Soil Group "D"), Forward gravelly loam (map symbol 140, Hydrologic Soil Group "B"), Haire loam (map symbol 146, Hydrologic Soil Group "D"), and Hambright-Rock outcrop complex (map symbol 151, Hydrologic Soil Group "D").

2.3 Opportunities and Constraints for Stormwater Control

The development area of the subject parcel is partially flat and partially on foothills. The majority of the flat portion of the parcel is developed with vineyard, while the existing residence and barn are located above the vineyards on the foothills. The location of the proposed winery is north of the existing residence and east of the existing well. All areas of the parcels proposed for development drain toward a blue line stream located along the parcels' eastern property line.

Bioretention facilities will need to be utilized to control stormwater quality and quantity from the proposed improvements. The natural drainage path of the parcel provides an opportunity to capture stormwater within a basin west of the proposed winery and in a basin in the vineyard avenue along the eastern property line. Due to the limited area available on the parcel for new development, this project will maximize the replacement of impervious area; for example, the new driveway generally follows the centerline of the existing driveway to be replaced. Due to the nature of this project, the site will experience heavy vehicles, moderate passenger vehicle traffic and must meet Universal Access requirements. Therefore, the amount of new impervious surface has been limited wherever possible that does not conflict with the future uses.

3 Low Impact Development Design Strategies

3.1 Optimization of Site Layout

3.1.1 Limitation of development envelope

The subject parcel is currently developed with a residence (issued a home occupancy business permit), a barn, driveway, access roads, and vineyard. Under the proposed design, the existing gravel driveway will be replaced with a paved driveway. Including the road, much of the proposed development envelope is situated to comply with Napa County Road and Street Standards to replace current impervious surfaces.

3.1.2 Preservation of natural drainage features

In general, the existing natural drainage features on this site will be maintained under the proposed conditions. After receiving quality and quantity control, stormwater flow will be directed to the blue line stream at the edge of the parcel or retained within existing vineyards. There is over 500 feet of vineyard between the proposed tasting room and winery and the existing blueline stream. The existing storm drain on parcel 034-190-034 will continue to be utilized to carry stormwater. Bioswales and bioretention facilities are proposed to slow down and retain water flows onsite. The location of one (1) bioretention facility is proposed at a naturally low area near the eastern edge of the parcel where water naturally flows in a storm event. The other bioretention facility will replace the basin west of the proposed winery. Weirs will be used to control stormwater flow rates during regulated storm events.

3.1.3 Setbacks from creeks, wetlands and riparian habitats

The wastewater system will be constructed outside of any Napa County septic system setbacks (including well setbacks). The proposed bioretention facility "B" (BRF-B) is proposed to be located outside the blue line stream setback that is located along the eastern edge of the parcel

with APN 034-190-034. Removing a portion of the existing vineyard on parcel 034-190-034 for the constructing the proposed basin is supported by Napa County Planning Department staff as it would otherwise be located within the stream setback or not hydraulically feasible to treat stormwater runoff.

3.1.4 Minimization of imperviousness

Impervious area will increase as a result of the proposed project. Although the impervious area will increase, gravel is proposed to be used as much as possible to reduce stormwater runoff.

3.1.5 Use of drainage as a design element

There are multiple elements proposed for this project that are designed to reduce stormwater runoff and promote infiltration. Drainage swales and bioretention/detention facilities will be utilized within the proposed project to promote infiltration and to slow stormwater flows. Any stormwater that would otherwise overflow the bioretention/detention facilities will enter the existing storm drains at a reduced flow rate and empty into the blue line stream.

3.2 Use of Permeable Pavements

The extent of gravel areas are shown on the Darms Lane Winery Use Permit Drawings prepared by Bartelt Engineering.

3.1 Dispersal of Runoff to Pervious Areas

All runoff is dispersed to pervious areas. These areas include landscaped areas, vineyards, drainage swales, and bioretention/detention facilities.

3.2 Stormwater Control Measures

This project will utilize a combination of self-retaining areas and bioretention/detention facilities. See Section 4.1.1.

4 Documentation of Drainage Design

4.1 Descriptions of Each Drainage Management Area

4.1.1 Table of Drainage Management Areas

The following table is a summary of the Drainage Management Areas (DMA) for this project. The table includes a name, area, DMA type and surface type.

Table 4.1.1: Table of Drainage Management Areas

DMA Name	Area (square feet)	DMA Type	Surface Type
SRA-A	357,669	Self-Retaining Area (SRA)	Landscape
SRA-B	58,221	Bioretention Facility	Landscape
SRA-C	2,252	Bioretention Facility	Landscape
BRF-A	1,492	Bioretention Facility	Landscape
BRF-B	786	Bioretention Facility	Landscape
DBRF-A1	14,029	Areas Draining to Bio	Roof/Paving
DBRF-A1.1	1,818	Areas Draining to Bio	Roof/Paving
DBRF-A1.2	3,144	Areas Draining to Bio	Roof/Paving
DBRF-A1.3	5,502	Areas Draining to Bio	Roof/Paving
DBRF-A2	2,487	Areas Draining to Bio	Roof/Paving
DBRF-B1	16,917	Areas Draining to Bio	Roof/Paving
DBRF-B1.1	1,757	Areas Draining to Bio	Roof/Paving
DSRA-A1	17,496	Areas Draining to SRA	Landscape
DSRA-A1.1	11,207	Areas Draining to SRA	Roof/Paving
DSRA-A1.1.1	5,787	Areas Draining to SRA	Roof/Paving
DSRA-A2	4,421	Areas Draining to SRA	Landscape
DSRA-A3	3,897	Areas Draining to SRA	Roof/Paving
DSRA-A4	326	Areas Draining to SRA	Roof/Paving
DSRA-A5	761	Areas Draining to SRA	Roof/Paving
DSRA-B1	13,828	Areas Draining to SRA	Roof/Paving

4.1.2 Drainage Management Area Descriptions

The project will consist of numerous DMA types which include Self-Retaining Areas, Areas Draining to Self-Retaining Areas, and Areas Draining to Bioretention Facilities.

Self-Retaining Areas on this site consist of all areas starting with the prefix "SRA". The corresponding areas for these DMAs can be seen in Table 4.1.1. The self-retaining areas onsite will consist entirely of vineyard surrounded by vineyard avenues, which help retain stormwater runoff.

The inverts of the existing agricultural subdrains located in the existing vineyards are at a minimum of 3 feet below finish grade and are capped with a minimum of 12 inches of impervious material; therefore, the majority of the vineyards acting as SRAs that do not have subdrains have ample soil depth to retain surface runoff. The amount of SRA listed in the following tables is 50,000 square feet but there is actually more than 300,000 square feet of area is available.

Areas Draining to Self-Retaining Areas on this site consist of all areas starting with the prefix "DSRA". These areas consist of roofs, pavement, pervious pavement, and disturbed landscape areas that do not drain to a bioretention/detention facility.

Areas Draining to Bioretention Facilities on this site consist of all areas starting with the prefix "DBRF". These areas consist of mostly roofs/pavement, but also include a gravel driveway and a landscaped area. There are two (2) bioretention/detention facilities on the site, DBRF-A and DBRF-B.

4.2 TABULATION AND SIZING CALCULATIONS

4.2.1 Information Summary for Bioretention Facility Design

TABLE 4.2.1A: INFORMATION SUMMARY FOR BIORETENTION FACILITY BRF-A	
Total Project Area (Square Feet)	1,493±
DBRF-A1	14,029
DBRF-A1.1	1,818
DBRF-A1.2	3,144
DBRF-A1.3	5,502
DBRF-A2	2,487

TABLE 4.2.1B: INFORMATION SUMMARY FOR BIORETENTION FACILITY BRF-B	
Total Project Area (Square Feet)	786±
DBRF-B1	16,917
DBRF-B1.1	1,757

4.2.2 Self-Treating Areas

There are no self-treating areas within the proposed project area.

4.2.3 Self-Retaining Areas

TABLE 4.2.3: SELF-RETAINING AREAS	
DMA Name	**Area (square feet)**
SRA-A	357,669±
SRA-B	58,221±
SRA-C	2,252±

4.2.4 Areas Draining to Self-Retaining Areas

TABLE 4.2.4: AREAS DRAINING TO SELF-RETAINING AREAS

DMA	Area (square feet)	Post-project surface type	Runoff factor	Receiving self-retaining DMAs	Receiving self-retaining DMA Area (square feet)	Ratio of Impervious : Pervious	
						Discrete	Cumulative
DSRA-A1	17,496	Landscape	0.1	SRA-A	357,669	0.00	0.11
DSRA-A1.1	11,207	Roof/Paving	1.0	SRA-A		0.03	
DSRA-A1.1.1	5,787	Roof/Paving	1.0	SRA-A		0.02	
DSRA-A2	4,421	Landscape	0.1	SRA-A		0.00	
DSRA-A3	3,897	Roof/Paving	1.0	SRA-A		0.01	
DSRA-A4	326	Roof/Paving	1.0	SRA-A		0.00	
DSRA-A5	761	Roof/Paving	1.0	SRA-A		0.00	
DSRA-B1	13,828	Roof/Paving	1.0	SRA-B	58,221	0.24	0.24

4.2.5 Areas Draining to Bioretention Facilities

TABLE 4.2.5A: FORMAT FOR TABULATING AREAS DRAINING TO BIORETENTION FACILITIES AND CALCULATING MINIMUM BIORETENTION FACILITY SIZE

DMA	DMA Area (square feet)	Post-project surface type	DMA Runoff factor	DMA Area x runoff factor	Biorentention Facility #1 (BRF-A)		
					Darms Lane Winery		
DBRF-A1	14,029	Roof/Paving	1.0	14,029	IMP Sizing Factor	Required IMP Facility Size (square feet)	Proposed IMP Facility Size
DBRF-A1.1	1,818	Roof/Paving	1.0	1,818			
DBRF-A1.2	3,144	Roof/Paving	1.0	3,144			
DBRF-A1.3	5,502	Roof/Paving	1.0	5,502			
DBRF-A2	2,487	Roog/Paving	1.0	2,487			
Total (square feet) =				26,980	0.04	1,080	1,493

TABLE 4.2.5B: FORMAT FOR TABULATING AREAS DRAINING TO BIORETENTION FACILITIES AND CALCULATING MINIMUM BIORETENTION FACILITY SIZE

DMA	DMA Area (square feet)	Post-project surface type	DMA Runoff factor	DMA Area x runoff factor	Biorentention Facility #2 (BRF-B)		
					Darms Lane Winery		
DBRF-B1	16,917	Roof/Paving	1.0	16,917	IMP Sizing Factor	Required IMP Facility Size (square feet)	Proposed IMP Facility Size
DBRF-B1.1	1,757	Roof/Paving	1.0	1,757			
Total (square feet) =				18,674	0.04	747	786

5 SOURCE CONTROL MEASURES

5.1 SITE ACTIVITIES AND POTENTIAL SOURCES OF POLLUTANTS

5.1.1 Source Control Table

TABLE 5.1.1: SOURCE CONTROL TABLE

Potential source of runoff pollutants	Permanent source control BMPs	Operational source control BMPs
Onsite storm drain inlets (unauthorized non-stormwater discharges and accidental spills or leaks)	• Mark all inlets with the words "No Dumping! Flows to Bay" or similar.	☐ Maintain and periodically repaint or replace inlet markings ☐ Provide stormwater pollution prevention information to new site owners, lessees or operators ☐ See applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA Stormwater Quality Handbooks at www.casqa.org/resources/bump-handbooks ☐ Include the following in lease agreements: "Tenants 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."
Interior floor drain and elevator shaft sump pumps	• State that interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer.	☐ Inspect and maintain drains to prevent blockages and overflow.

TABLE 5.1.1: SOURCE CONTROL TABLE

Potential source of runoff pollutants	Permanent source control BMPs	Operational source control BMPs
Need for future indoor & structural pest control	• Note building design features that discourage entry of pests.	☐ Provide Integrated Pest Management information to owners, lessees and operators.
Landscape/Outdoor pesticide use/building & grounds maintenance	State that final landscape plans will accomplish all of the following. • Preserve existing native trees, shrubs and ground cover to maximum extent possible. • Design landscaping to 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. • Consider using 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 Sheets SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.casqa.org/resources/bmp-handbooks ☐ Provide IPM information to new owners, lessees and operators.
Food service	• Describe the location and features of the designated cleaning area. • Describe the items to be cleaned in this facility and how it has been sized to insure that the largest items can be accommodated.	State maintenance schedule for grease interceptor.
Refuse areas	• State how site refuse will be handled and provide supporting detail to what is shown on plans.	☐ State how the following will be implemented; Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles

TABLE 5.1.1: SOURCE CONTROL TABLE		
Potential source of runoff pollutants	**Permanent source control BMPs**	**Operational source control BMPs**
	• State that signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.	covered. Prohibit/prevent dumping of liquids or hazardous wastes. Post "no hazardous materials" signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available onsite. See Fact Sheet SC-34, "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbooks at www.casqa.org/resources/bmp-handbooks
Industrial processes	• If the industrial processes are to be located on site, state: "All process activities to be performed indoors. No processes to drain to exterior or to storm drain systems."	☐ See Fact Sheet SC-10, "Non-Stormwater Discharges" in the CASQA Stormwater Quality Handbooks at www.casqa.org/resources/bmp-handbooks
Fire sprinkler test water	• Provide a means to drain fire sprinkler test water to sanitary sewer. • Municipal	☐ See note in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.casqa.org/resources/bmp-handbooks
Condensate drain lines Roofing, gutters & trim	• 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. • Any drainage sumps onsite shall feature a sediment sump to reduce the quantity of sediment in pumped water. • Include controls for other sources as specified by local reviewer.	If architectural copper is used, implement the following BMPs for management of rinse water during installation: ☐ If possible, purchase copper materials that have been pre-patinated at the factory. ☐ If patinated is done onsite, prevent rinse water from entering storm drains by discharging to landscaping or by collecting in a tank and hauling offsite. ☐ 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 offsite.
Plazas, sidewalks & 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 of degreaser and discharge to the sanitary sewer not to a storm drain.

5.2 Features, Materials, and Methods of Construction of Source Control BMPs

Several features were incorporated into the design of the project to minimize the potential for stormwater pollution and are listed below. Please refer to the Darms Lane Winery Use Permit Drawings prepared by Bartelt Engineering for detailed materials and methods of construction of source control BMPs.

6 Stormwater Facility Maintenance

6.1 Ownership and Responsibility for Maintenance in Perpetuity

The Owner agrees to implement the stormwater control strategy as outlined in this document and as shown in the plans prepared by Bartelt Engineering. The Owner accepts responsibility for the installation, operation and maintenance of the stormwater treatment and flow-control facilities noted in this Stormwater Control Plan. The Owner agrees to undertake this responsibility until such time as the responsibility is formally transferred to a subsequent owner.

6.2 Summary of Maintenance Requirements for Each Stormwater Facility

The following activities shall be completed at least annually. The frequency should be adjusted in response to the needs of each particular facility.

Clean up. Remove any soil or debris blocking planter inlets or overflows. Remove trash that typically collects near inlets or gets caught in vegetation.

Prune or cut back plants for health and to ensure flow into inlets and across the surface of the facility. Remove and replant as necessary. When replanting, maintain the design surface elevation and minimize the introduction of soil.

Control weeds by manual methods and soil amendment. In response to problem areas or threatening invasions, corn gluten, white vinegar, vinegar-based products or non-selective natural herbicides such as Burnout or Safer's Sharpshooter may be used.

Add mulch. Aged mulch, also called compost mulch, reduces the ability of weeds to establish, keeps soil moist and replenishes soil nutrients. Mulch is added from time to time as necessary to maintain a mulch layer thickness (some agencies require 3 inches). However, ensure the underlying soil surface beneath the mulch layer is a minimum 6 inches below the overflow elevation, consistently throughout the surface area of the facility. In particular, ensure that the top of the mulch layer is below the facility overflow, so that as the facility fills during a major storm, the entire surface becomes wetted before the overflow elevation is reached.

Check signage. Remove graffiti and replace if necessary.

Check irrigation, if any, to confirm it is adequate but not excessive.

Landscaping maintenance personnel should be aware of the following:

Do not add fertilizer to bioretention facilities. Compost tea, available from various nurseries and garden supply retailers, may be applied at a recommended rate of 5 gallons mixed with 15 gallons of water per acre, up to two weeks prior to planting and once per year between March and June. Do not apply when temperatures are below 50º F or above 90º F or when rain is forecast in the next 48 hours.

Do not use synthetic pesticides on bioretention facilities. Beneficial nematodes and non-toxic controls may be used. Acceptable natural pesticides include Safer® products and Neem oil.

Sidewalks will be swept clean of debris regularly.

7 Construction Checklist

Please refer to the Stormwater Pollution Prevention Plan (SWPPP) prepared by Bartelt Engineering for all construction BMPs.

8 Certifications

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

RECORDING REQUESTED BY and for the BENEFIT OF:

Napa County
Department of Planning, Building and Environmental Services

1195 Third St., room 201
Napa, CA 94559

NO FEE DOCUMENT
Gov. Code § 27383

SPACE ABOVE THIS LINE RESERVED FOR RECORDER'S

AGREEMENT FOR MAINTENANCE OF POST-CONSTRUCTION STORM WATER RUNOFF BEST MANAGEMENT PRACTICES
(Permit No. _____)

THIS AGREEMENT FOR MAINTENANCE OF POST-CONSTRUCTION STORM WATER BEST MANAGEMENT PRACTICES ("Agreement") is made by **Darms Lane, LLC** _____ (the "Owner") and Napa County, a political subdivision of the State of California (the "County"), effective this ____ day of _____, 20___.

RECITALS

A. As of May 20, 2004, discharges from the Napa County Storm Water Management Program's ("Program") Small Municipal Separate Storm Sewer Systems ("Small MS4s") are authorized by the State Water Resources Control Board's General Permit for Storm Water Discharges from Small MS4s, Water Quality Order No. 2003-0005—DWQ ("Phase II General Permit"). The Program, which is comprised of the City of Napa, Town of Yountville, City of Calistoga, City of St. Helena, and Napa County, is now covered under the Phase II General Permit. The Program must implement its Storm Water Management Plan ("SWMP") and comply with the requirements and prohibitions of the Phase II General Permit; and

B. Provision D.e.(4) of the Phase II General Permit requires the County to ensure adequate long-term maintenance of all required Post–Construction Storm Water Treatment Control(s), Hydromodification Control(s), and designated Source Control(s) Best Management Practices ("BMPs"); and

C. The Owner is the fee simple owner of certain real property located within Napa County, California (the "Property"), APN: **034-190-035**, described in Exhibit "A" attached hereto and incorporated herein by reference. The County has approved **the Darms Lane Winery Use Permit P16-00017** (the "Project"). The Project is expressly conditioned upon (1) the Owner's compliance with the BMPs described in Exhibit "C" ("Maintenance Plan"), including the construction of those BMPs shown on Exhibit "B" (the "Site Plan"), both exhibits are attached hereto and incorporated herein by reference; and (2) the Owner's execution of an agreement with the County for the Owner to comply with and maintain those BMPs in perpetuity; and

D. The Owner has submitted a design for the construction of the BMPs shown on the Site Plan, which has been approved by the County; and

E. The Owner is obligated to construct such BMPs in accordance with the approved plans and specifications outlined by the California Stormwater Quality Association (CASQA) BMP Handbooks and the County; and

F. The Owner and County agree that the health, safety, and welfare of the citizens of Napa County require that all BMPs be properly maintained.

NOW, THEREFORE, in consideration of the benefits received and to be received by the Owner as a result of the County's approval of the Project, the Owner hereby agrees with the County as follows:

1. Affected Property: This Agreement affects the Property located within Napa County, California, as described in Exhibit "A."

2. Purpose: The BMPs are designed to remove pollutants from storm water runoff, preclude pollutants from being discharged to storm drain systems, and limit peak storm water runoff discharge rates from the Property. The purpose of this Agreement is to reflect the parties' rights and obligations concerning the maintenance of BMPs and compliance with all BMPs.

3. Owner's Obligations:

A. Performance and Maintenance Criteria. Owner, its successors and assigns, shall use its best efforts to diligently and adequately maintain in perpetuity the BMPs in a manner assuming peak performance at all times, and shall make such changes or modifications, subject to County's prior approval as may be reasonably necessary for the BMPs to continue to operate as designed and approved and to accomplish its intended purpose, in good repair, and in compliance with all applicable Federal, State, and County laws and regulations, including but not limited to the Napa County Storm Water Management Program (a copy of which is on file in the County's Department of Planning, Building and Environmental Services' Engineering Division) (collectively "Regulations"). The Owner shall be responsible for the costs incurred in operating, maintaining, repairing and replacing the BMPs and complying with the Regulations as conditioned by the County. Adequate maintenance is herein defined as maintenance that is necessary or convenient to ensure that the BMPs continue to operate as originally designed and approved and to accomplish their intended purpose. Owner shall not destroy or remove the BMPs nor modify any measure in any manner that would lessen its effectiveness.

B. Maintenance Plan. In addition to Owner's general obligations under Section (A), above, Owner shall, at its own cost, perform all maintenance specified in the Maintenance Plan and file the annual reports identified in Exhibit "D" attached hereto and made a part hereof.

4. Right of Entry: In addition to the rights provided by law, Owner, its successors and assigns, hereby grants permission to County, the Regional Water Quality Control Board ("Regional Board"), and the Napa County Mosquito Abatement District ("NCMAD"), their employees and agents, to enter upon the Property at reasonable times and in a reasonable manner to inspect, assess or observe the BMPs in order to ensure that the BMPs are being properly maintained and are continuing to perform in an adequate manner to protect water quality and the public health and safety. This includes the right to enter upon the Property when one or more of the identified agencies have a reasonable basis to believe that a violation of this Agreement, the County's storm water management program, guidelines, criteria, other written direction, or the Phase II General Permit, and any amendments or reissuances of this permit has occurred. The above-mentioned agencies are also authorized to enter the Property when necessary for abatement of a public nuisance or correction of a violation of the Storm Water Management Program, guideline, criteria or other written direction. Whenever possible, the County, Regional Board and the NCMAD shall provide reasonable notice to Owner before entering the Property.

5. Failure to Maintain: In the event the Owner, its successors or assigns, fails to maintain and repair the BMPs as required by this Agreement, after thirty (30) days written notice thereof, County may and is hereby authorized to cause, at the Owner's sole cost and expense, any and all maintenance to the BMPs necessary under the requirements specified in Exhibit "D". In addition to the actual costs of such maintenance, the Owner shall reimburse County for an additional fifteen percent (15%) thereof to cover costs of administration. All such actual and administrative costs shall accrue interest from the date incurred by County at the maximum rate authorized by law until paid in full. The notice provided herein shall be effective on the date sent by U.S. Mail, first class postage prepaid to the record owner of the

Property as shown on the most recent tax roll. If such costs are not paid within the time frame established by County, the unpaid costs shall be assessed against the Property. Said assessment shall be a lien against the Property and may be collected as ordinary taxes by County. The actions described in this section are in addition to and not in lieu of any and all legal remedies as provided by law, available to County as a result of Owner's failure to maintain the BMPs.

6. Retention of Records: For a time period of the most recent three (3) years, Owner shall maintain written documentation verifying any and all material(s) removed from the subject BMP, including identifying the material(s) removed, quantity, and manner and place of disposal thereof. Such documentation is subject to review by County from time to time upon request.

7. Pesticide and Herbicide Use: Application of any pesticides or herbicides by Owner to meet the obligations of this Agreement shall be minimal and in accordance with all applicable Federal, State, and County laws and regulations and in accordance with any restrictions imposed upon such use or application by Napa County.

8. Security: The County may require the Owner, its successors or assigns, from time to time, to post security in a form, amount, and for a time period satisfactory to County to guarantee performance of the obligations stated herein. Should the Owner, its successors or assigns, fail to perform the obligations under this Agreement, the County may, in the case of a cash bond, act for the Owner, its successors and assigns, using the proceeds from such cash bond, or in the case of a surety bond, require the surety to perform the obligations of this Agreement.

9. Indemnification: The Owner, its successors or assigns, shall indemnify, release, hold harmless, and defend the County from and against any and all claims, demands, suits, liabilities, fines, losses, damages, fines, and payments, including reasonable attorney's fees, claimed or made against the County that are alleged or proven to result or arise from the design, construction, presence, existence, location, operation, or maintenance of the Storm Water Source Controls, Treatment Measures and Baseline Hydromodification Management Measures, covered under the Phase II General Permit, by Owner or County but excluding claims adjudicated to be caused by the sole negligence or willful misconduct of County.

10. Recordation: This Agreement shall be recorded in the Office of the Recorder, Napa County, California, at the expense of the Owner, and shall constitute notice of the obligations herein set forth, which shall run with the land and shall be binding upon all of the successors and assigns in title to the Property. The Owner agrees that whenever the Property is sold, conveyed or otherwise transferred, the Property shall be subject to this Agreement, which shall apply to and bind all present and subsequent owners of the Property or part thereof.

11. Notices: All notices and other communications required or permitted to be given under this Agreement, including any notice of change of address, shall be in writing and given by personal delivery, or deposited with the United States Postal Service, postage prepaid, addressed to the parties intended to be notified. Notice shall be deemed given as of the date of personal delivery, or if mailed, upon the date of deposit with the United States Postal Services. Notice shall be given as follows, except that notice also may be given to the Owner at the address listed herein of this Agreement and to its successors or assigns, at the address(es) shown on the records for the Property maintained by the Assessor, Napa County, California:

TO COUNTY: Director of Planning, Building and Environmental Services
1195 Third Street, Room 210
Napa, CA 94559

TO OWNER: **Darms Lane, LLC**
c/o Tricia Bump Davis
1150 Darms Lane, Napa, CA 94558

12. Maintenance Responsibility: This Agreement shall serve as the signed statement by the Owner accepting responsibility for compliance with the operation and maintenance of BMPs as set forth in this Agreement until the responsibility is legally transferred to another entity. Before the Property is legally transferred to another entity, the Owner shall at a minimum provide to the County at least one of the following:

A. A signed statement from the project proponent accepting responsibility for the operation and maintenance (O&M) of structural control measure(s) until such responsibility is legally transferred to another entity; or

B. Written conditions in the sales or lease agreements or deed for the Project requiring the buyer or lessee to assume responsibility for the O&M of the installed source control(s), treatment system(s), and hydromodification control(s) (if any) until such responsibility is legally transferred to another entity; or

C. Written text in project deeds, or conditions, covenants and restrictions ("CC&Rs") for multi-unit residential projects that require the homeowners' association or, if there is no association, each individual owner to assume responsibility for the O&M of the installed source control(s), treatment system(s), hydromodification control(s) (if any) until such responsibility is legally transferred to another entity; or

D. Any other legally enforceable agreement or mechanism, satisfactory to Napa County Counsel, such as recordation in the property deed, that assigns the O&M responsibility for the installed source control(s), treatment system(s), hydromodification control(s) (if any) to the project owner(s) or the County.

13. General Provisions:

A. Headings. The heading titles for each paragraph of this Agreement are included only as a guide to the contents and are not to be considered as controlling, enlarging, or restricting the interpretation of the Agreement.

B. Severability. If any term of this Agreement (including any phrase, provision, covenant, or condition) is held by a court of competent jurisdiction to be invalid or unenforceable, the Agreement shall be construed as not containing that term, and the remainder of this Agreement shall remain in full force and effect; provided, however, this paragraph shall not be applied to the extent that it would result in a frustration of the parties' intent under this Agreement.

C. Governing Law, Jurisdiction, and Venue. The interpretation, validity, and enforcement of this Agreement shall be governed and interpreted in accordance with the laws of the State of California. Any suit, claim, or legal proceeding of any kind related to this Agreement shall be filed and heard in a court of competent jurisdiction in the County of Napa.

D. Attorney's Fees. In the event any legal action is commenced to enforce or interpret this Agreement, the prevailing party is entitled to reasonable attorney's fees, costs, and expenses incurred, whether or not such action proceeds to judgment.

E. Modifications and Rescission. This Agreement may not be modified orally or in any manner other than by an instrument in writing executed by the County and Owner at the time of modification or rescission.

F. Waivers. Waiver of a breach or default under this Agreement shall not constitute a continuing waiver or a waiver of a subsequent breach of the same or any other provision of this Agreement.

G. Time. Time is of the essence in carrying out the duties hereunder.

H. Entire Agreement. This Agreement, including all documents incorporated herein by reference, comprises the entire integrated understanding between the parties concerning the services described herein. This Agreement supersedes all prior negotiations, agreements, and understandings regarding this matter, whether written or oral. The documents incorporated by reference into this Agreement are complementary; what is called for in one is binding as if called for in all.

I. Each Parties' Role in Drafting the Agreement. Each party to this Agreement has had an opportunity to review the Agreement, confer with legal counsel regarding the meaning of the Agreement, and negotiate revisions to the Agreement. Accordingly, neither party shall rely upon Civil Code Section 1654 in order to interpret any uncertainty in the meaning of the Agreement.

J. Signatures. The individuals executing this Agreement represent and warrant that they have the right, power, legal capacity, and authority to enter into and to execute this Agreement on behalf of the respective legal entities of the Owner and the County.

IN WITNESS WHEREOF, the parties have duly executed this Agreement the day and year first above written.

NAPA COUNTY, A political subdivision of the State of California _____ David Morrison, Director Planning, Building, and Environmental Services Department **"COUNTY"**	**DECLARANT** **Tricia Bump Davis, General Manager** _____ [Printed Name & Title] _____ [Owner Signature] **"OWNER"**
APPROVED AS TO FORM **Office of County Counsel** By: _____ Deputy County Counsel Date: _____	

NEW ACKNOWLEDGMENT EFFECTIVE 01/01/2015

Civil Code 1189(a)

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California
County of _____

On _____before me, *(here insert the name and title of officer),* personally appeared _____, who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.
I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.
Witness my hand and official seal.

Notary's Signature _____ [Seal]

NEW JURAT LANGUAGE EFFECTIVE 01/01/2015

Government Code 8202(a)

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California
County of _____

Subscribed and sworn to (or affirmed) before me on this _____day of _____ ,_____, by _____, proved to me on the basis of satisfactory evidence to be the person(s) who appeared before me.

Notary's Signature_____ [Seal]

Exhibit A

Legal Description of Property

Exhibit B

List of and Legible Reduced-Scale Copy of the Site Plan Showing Location and Type of Source Control(s), Treatment Control(s) and Hydromodification Control(s) Best Management Practices (BMPs)

Refer to the Stormwater Control Plan - Drainage Management Area Exhibit(s). Final Exhibit(s) to be provided with construction documents following Use Permit approval.

Exhibit C

Maintenance Plan for Post Construction Storm Water Source Control(s), Treatment Control(s), and Hydromodification Control(s) Best Management Practices

I. Owner's General Responsibilities:

It shall be the responsibility of the Owner to maintain the Treatment Control(s), Hydromodification Control(s), and designated Source Control(s) (if any) Best Management Practices ("BMPs") identified in Exhibit "B" and to perform the following non-structural Best Management Practices:

A. Inlet Labels. Provide concrete stamping, or equivalent, of all stormwater conveyance system inlets and catch basins within the project area with prohibitive language (e.g. "No Dumping-Drains to XXXX River/Creek/Lake"). Signage shall identify the receiving water the drain discharges to and including a message in Spanish.

B. Private Street and Parking Lot Sweeping. A sweeping program shall be implemented that at a minimum provides for sweeping immediately prior to October 15th, and once monthly. Sweep, collect, and dispose of debris and trash in a proper container. Do not sweep debris onto County streets or into catch basins. Use dry methods of sweeping and vacuuming to clean streets rather than hosing, pressure washing, or steam cleaning. If water is used for cleaning, collect wash waster and dispose of as a hazardous waste or place on site where it can evaporate. Perform street cleaning during dry weather if possible. All oil captured shall be removed and disposed of in accordance with all applicable Federal, State, and County laws and regulations. Catch basins shall be cleaned every six (6) to twelve (12) months, or whenever the sump is half full.

C. Irrigation. Efficient irrigation, appropriate landscape design, and proper maintenance shall be implemented to reduce excess irrigation runoff, promote surface filtration, and minimize use of fertilizers, herbicides, and pesticides.

II. General Performance and Maintenance Criteria:

The Owner shall use its best efforts to diligently and adequately maintain all source control(s), treatment control(s), and hydromodification control(s) (if any) BMPs in perpetuity in such a manner assuming peak performance at all times and shall make such modifications, subject to Napa County ("County") prior approval, as may be necessary for the source control(s), treatment control(s), and hydromodification control(s) (if any) BMPs to continue to operate as designed and approved, to accomplish their intended purpose and in compliance with all applicable Federal, State, and County laws and regulations, including, but not limited to, the Napa County Storm Water Management Program, a copy of which is on file at the County's Department of Planning, Building and Environmental Services' Engineering Division (collectively "Regulations"), as the same may be amended, revised, or replaced from time to time. Adequate maintenance is herein defined as maintenance that is necessary or convenient to ensure that the drainage improvements continue to operate as originally designed and approved and to accomplish their intended purpose. Neither the Owner nor any successors or assigns shall destroy, modify, or remove any source control(s), treatment control(s), and hydromodification control(s) (if any) in any manner that would lessen its effectiveness. The Owner shall be responsible for the costs incurred in operating, maintaining, repairing, and replacing the source control(s), treatment control(s), and hydromodification control(s) (if any) and performing all non-structural BMPs identified above.

III. Specific Requirements:

In addition to the Owner's general responsibilities set forth above, the Owner shall implement an Operations and Maintenance Program for the stormwater treatment and baseline hydromodification management structural control measures defined herein.

A. Infiltration Systems Maintenance. Those Treatment Control BMPs where water enters the ground and moves downward through the unsaturated soil zone. Infiltration Treatment Control BMPs include, but is not limited to: Infiltration trench, infiltration basin, and retention/irrigation systems. Regular maintenance is critical to the successful operation of infiltration systems. Recommended operations and maintenance guidelines shall specifically include the following:

1. Infiltration. Observe drain time for the design storm after completion or modification of the facility to confirm that the desired drain time has been obtained.

2. Inspection. Schedule semiannual inspections for the beginning and end of the wet season, October 15th through April 1st, to identify potential problems such as erosion of side slopes and inverts, standing water, trash and debris and sediment accumulation.

3. Trash/Debris Management. Remove accumulated trash and debris in the infiltration facility at the start and end of the wet season.

4. Vegetation Management. Trim vegetation at the beginning and end of the wet season to prevent establishment of woody vegetation and for aesthetic and vector reasons.

5. Sediment Management. Remove accumulated sediment and re-grade when the accumulated sediment volume exceeds 10% of the infiltration facility.

6. Erosion Control. If erosion is occurring, re-vegetate immediately and stabilize with erosion control mulch or mat until vegetation cover is established.

7. Soil Development. To avoid reversing soil development, scarification or other disturbance should only be performed when there are actual signs of clogging, rather than on a routine basis. Always remove deposited sediment before scarification, and use a hand guided rotary tiller, if possible, or a disc harrow pulled by a very light tractor.

8. Vector Control. The Owner shall retain responsibility to ensure that facilities do not harbor vectors or otherwise create a nuisance, and shall immediately abate any nuisance caused by the facility. A licensed individual or contractor shall be engaged to apply vector pesticide and/or larvicide as necessary. Coordination with the Napa County Mosquito Abatement District is encouraged.

9. Safety. Adopt and enforce a confined space entry plan, if applicable, which meets all requirements of federal, state, and local laws and regulations. Maintenance personnel shall use confined space entry procedures when applicable. The facility shall not be entered, except by a person properly trained, equipped, and qualified to enter a confined space, as identified by local Occupational Safety and Health Administration (OSHA) regulations. All persons should watch for and avoid contact with overhead power lines when inspecting the facility with long sampling devices.

10. Access. Maintain ingress/egress routes in a manner that allows efficient inspection and maintenance to the facility.

B. Retention/Detention System Maintenance. Those treatment control BMPs where the stormwater is captured and retain runoff temporarily and release it to receiving water at predevelopment flow rates or released through evapotranspire runoff to the atmosphere. Retention/Detention treatment control BMPs include, but are not limited to: wet ponds, constructed wetlands, and detention basins. Recommended operations and maintenance guidelines shall specifically include the following:

1. Inspection. Schedule semiannual inspections for the beginning and end of the wet season, October 15th through April 1st, to identify potential problems such as erosion of side slopes and invert, standing water, trash and debris and sediment accumulation.

2. Trash/Debris Management. Remove accumulated trash and debris in the retention/detention facility and around stormwater conveyance systems during the semiannual inspections. The frequency of this activity may be altered to meet specific site conditions.

3. Vegetation Management. Trim vegetation at the beginning and end of the wet season to prevent establishment of woody vegetation and for aesthetic and vector reasons.

4. Sediment Management. Remove accumulated sediment and re-grade about every 5-7 years or when the accumulated sediment volume exceeds 10% of the retention/detention facility volume. Inspect the basin each year for accumulated sediment volume.

5. Vector Control. The Owner shall retain responsibility to ensure that facilities do not harbor vectors or otherwise create a nuisance, and shall immediately abate any nuisance caused by the facility. A licensed individual or contractor shall be engaged to apply vector pesticide and/or larvicide as necessary. Coordination with the Napa County Mosquito Abatement District is encouraged.

6. Safety. Adopt and enforce a confined space entry plan, if applicable, which meets all requirements of federal, state, and local laws and regulations. Maintenance personnel shall use confine space entry procedures when applicable. The facility shall not be entered, except by a person properly trained, equipped, and qualified to enter a confined space, as identified by local Occupational Safety and Health Administration (OSHA) regulations. All persons should watch for and avoid contact with overhead power lines when inspecting the facility with long sampling devices.

7. Access. Maintain ingress/egress routes, including emergent and perimeter shoreline vegetation to facilitate vector surveillance and control activities and efficient inspection and maintenance to the facility.

C. Biofiltration System Maintenance. Those treatment control BMPs where stormwater is designed to transport shallow depths of runoff slowly over vegetation. Biofiltration treatment control BMPs include, but are not limited to: Vegetated swales, vegetated buffer strips, and bioretention. Recommended operations and maintenance guidelines shall specifically include the following:

1. Inspection. Schedule a minimum of biannual inspections for erosion, damage to vegetation, and sediment and debris accumulation preferably at the end of the wet season to schedule summer maintenance and before major fall runoff to be sure the biofiltration facility is ready for winter. However, additional inspection after periods of heavy runoff is desirable.

2. Vegetation Management. Grass height and mowing frequency may not have a large impact on pollutant removal. Consequently, mowing may only be necessary once or twice a year for safety or aesthetics or to suppress weeds and woody vegetation.

3. Trash/Debris Management. The need for litter removal is determined through periodic inspections, but litter should always be removed prior to mowing.

4. Sediment Management. Sediment accumulating near culverts and in channels should be removed when it builds up to 3 inches at any spot, or cover vegetation.

5. Vector Control. The Owner shall retain responsibility to ensure that facilities do not harbor vectors or otherwise create a nuisance, and shall immediately abate any nuisance caused by the facility. A licensed individual or contractor shall be engaged to apply vector pesticide and/or larvicide as necessary. Coordination with the Napa County Mosquito Abatement District is encouraged.

D. Filtration System Maintenance. Those Treatment Control BMPs where stormwater is designed to be filtered through a multi-chambered system which include a pretreatment settling basin and a filter bed filled with sand or other absorptive filtering media. Filtration treatment control BMPs include, but are

not limited to any media filtering device. Recommended operations and maintenance guidelines shall specifically include the following:

1. Inspection. Schedule semiannual inspections for standing water, sediment, trash and debris, and to identify potential problems.

2. Trash/Debris Management. Remove accumulated trash and debris in the sedimentation basin, from the riser pipe, and the filter bed during routine inspections.

3. Filter Performance. Inspect the facility once during the wet season after a large rain event to determine whether the facility is draining completely within 72 hours.

4. Sediment Management. Remove accumulated sediment in the sedimentation basin every 5-7 years or when the accumulated sediment volume exceeds 10% of the retention/detention facility volume.

5. Vector Control. The Owner shall retain responsibility to ensure that facilities do not harbor vectors or otherwise create a nuisance, and shall immediately abate any nuisance caused by the facility. A licensed individual or contractor shall be engaged to apply vector pesticide and/or larvicide as necessary. Coordination with the Napa County Mosquito Abatement District is encouraged.

6. Safety. Maintenance of filtration BMPs involves handling of potentially hazardous material (oil and/or oil sorbent material), which requires special disposal. Additionally, maintenance may involve entry into the filtration BMP underground. Therefore the maintenance operator must be trained in handling and disposal of hazardous waste, and must also be certified for confined space entry if the maintenance will require entry into the filtration BMP. Therefore it is recommended that private BMP owners obtain a maintenance contract with a qualified contractor to provide inspection and maintenance.

E. Vault Separator Maintenance. With respect to any vault separator shown on Exhibit B, if applicable, the Owner shall inspect and maintain the vault separator as follows:

1. Inspection. Schedule two inspections during the first wet season of operation for sediment build-up, accumulated petroleum products, and floating debris. Following the first wet season schedule annual inspections for accumulated sediment, debris and petroleum products.

2. Constituent Management. Vault separator units should be inspected every six months and cleaned when the sediment level reaches 15% of total storage volume and following a spill event. Remove accumulated material with an educator truck on an annual basis or more frequent as needed. It may be necessary to remove and dispose the floatables separately due to the presence of petroleum products.

2. Safety. Do not enter the Vault separator treatment chamber unless properly trained, equipped and qualified to enter a confined space as identified by local OSHA. Watch for and avoid contact with overhead power lines when inspecting the unit with long sampling devices (e.g. Sludge Judge) Vault separator is designed so inspection of the unit can be preformed from grade (i.e. inspect for obstructions, etc.) Qualified personal may enter the upper by-pass chamber and use the insert as a platform to remove obstructions, sewer flushes, or camera surveys. Be aware that the insert may be slippery. Be aware that some units do not have a safety grate over the outlet riser pipe.

3. Vector Control. The Owner shall perform all actions necessary to inhibit the creation of a mosquito nuisance and shall mitigate any mosquito nuisance that develops due to standing water in the vault separator. A licensed individual or contractor shall be engaged to apply a mosquito pesticide and/or larvicide as necessary. Coordination with the Napa County Mosquito Abatement District is encouraged.

IV. General Inspection/Reporting Requirements:

A. Required Actions. In the event one or more of the treatment control(s) and/or hydromodification control(s) BMPs do not meet Performance and Maintenance Criteria described herein, the Owner shall take such corrective actions either identified in this Maintenance Plan, or as may be necessary or convenient, to ensure that they function as required. After taking the corrective action(s), the Owner shall conduct a follow up inspection to evaluate the action(s) taken. Photographs and video images shall be made of the condition of the Drainage Improvements and any corrective actions taken.

B. Inspection Report. A report of the inspection in the form of Exhibit D, as the same may be amended from time to time by the County, shall be submitted within fifteen (15) days after required inspections to:

Napa County Planning, Building and Environmental Services Department
Engineering Division
1195 Third Street, Room 210
Napa, CA 94559

V. Modifications:

Owner, at its sole expense, shall make such modifications to this Maintenance Plan as may be determined by the County to be reasonably necessary to ensure that the treatment control(s) and hydromodification control(s) (if any) continue to operate in accordance with the General Performance and Maintenance Criteria.

Exhibit D

Annual Report Template Form for Post-Construction Storm Water Source Control(s), Treatment Control(s), and Hydromodification Control(s) Best Management Practices (BMPs)

Inspection Report -- BMPs
Napa County Planning, Building and Environmental Services Department
Engineering Division
1195 Third Street, Room 210
Napa, CA 94559

This inspection report is designed to document the inspection and maintenance conducted for the identified BMPs subject to the Maintenance for Post-Construction Storm Water Best Management Practices Agreement dated _____20 between the County and the Owner during the annual reporting period indicated below. Please attach additional pages if necessary to complete any item identified below.

1. Property Information:

Property Address or APN: _____

Current Property Owner: _____

2. Contact Information:

Name of person to contact regarding this report: _____

Phone number and email address of contact person: _____

Address to which correspondence regarding this report should be directed:

_____

_____

3. Reporting Period:

This report documents the inspection and maintenance of the identified treatment measures during the time period from _____ to _____ .

4. BMP Information:

The following BMPs are located on the property identified above and are subject to the Maintenance Agreement:

Identifying Number of BMP	Type of BMP	Location of BMP on the Property
BRF-A	**Bioretention Facility**	**West of the winery.**
BRF-B	**Bioretention Facility**	**Along east property line of**
		APN 034-190-034.

A. <u>Underground Detention ("Facility")</u>

MH Location	Depth of Sediment
N/A	**N/A**

Total amount of accumulated sediment removed from the underground detention system during the reporting period: _____ cubic yards.

The sediment was removed and disposed as follows: _____

_____

Estimated storage capacity at time of inspection: _____

Describe condition of Underground Detention Inlets/Outlets and Overflow Structures:

_____

_____

_____

B. <u>Aboveground Detention</u>

Depth of sediment in pond: _____

Total amount of cubic yards of accumulated sediment removed from the above ground detention system during the reporting period: _____

The sediment was removed and disposed as follows: _____

_____

_____

Was water standing in pond? ☐ YES ☐ NO If yes, describe what was done to eliminate standing water: _____

_____

Are slopes stable? ☐ YES ☐ NO If no, describe measures taken to stabilize slopes:

_____

_____

What is height of vegetation: pond bottom: _____ pond sides _____

C. <u>Vegetated Swale</u>

Height of vegetation: _____ (note: cuttings should be collected and disposed of as yard waste)

Was vegetation damaged? ☐ YES ☐ NO If yes, describe damage and measures taken to repair damage: _____

_____

Was swale clear of trash? ☐ YES ☐ NO

Was sediment present at a depth of over 3"? ☐ YES ☐ NO If yes, identify volume of sediment removed _____. Describe method of removal and identify disposal location: _____

_____

Was there standing water in the swale? ☐ YES ☐ NO If yes, describe measures taken to eliminate standing water: _____

_____

D. Bio-Retention

Were the trees and shrubs healthy? ☐ YES ☐ NO If no, what actions were taken to treat and/or replace vegetation: _____
_____

Was erosion present? ☐ YES ☐ NO if yes, describe actions taken to repair: _____
_____
_____

Was there standing water in the bio-retention facility? ☐ YES ☐ NO If yes, describe measures taken to eliminate standing water:
_____
_____
_____

Was the mulch in good condition? ☐ YES ☐ NO If no, provide date the mulch was replaced: _____ and volume of new mulch _____

Was sediment/debris built up at the inflow point or on top of the bio-retention facility? ☐ YES ☐ NO If yes, identify volume of sediment removed: _____ Describe method of removal and identify disposal location:_____
_____
_____

Was the under drain flowing freely? ☐ YES ☐ NO If no, describe measures taken to clear drain.
_____
_____

What was the pH of the soil? ____ if pH was not in the range of 5.5 and 6.5, identify actions taken to bring the soil pH within that range: _____
_____

E. Wet Vault

MH Location	Depth of Sediment
N/A	**N/A**

Total amount of accumulated sediment removed from the underground detention system during the reporting period: _____ cubic yards.

The sediment was removed and disposed as follows: _____
_____
_____

Describe measures taken to control mosquito breeding: _____
_____
_____

Describe condition of hydrocarbon absorbing mats: _____
_____

Date mats were replaced: _____

Was there contamination of liquid in permanent wet vault? ☐ YES ☐ NO

Date liquid was pumped out: _____

F. Other BMPs

Describe: _____

Condition: _____

Maintenance performed: _____

5. Photos/Video of BMPs:

Photo ID #	Date of Photo	Photo Taken by:	Remarks

6. Inspector Information:

Inspector Name and Title	Inspector's Employer and Address

7. Statement of BMP Condition:

Based on the inspections as documented above, is each BMP identified in this report located where required, maintained as required by the Maintenance Plan and does each BMP function as originally designed and approved and to accomplish its intended purpose? (Check yes or no.)

☐ YES ☐ NO

If "No", describe each problem, proposed solution and schedule of correction: _____

_____

_____

8. Certification:

I hereby certify, under penalty of perjury, that the information presented in this report and attachments is true and complete:

_____ _____

(Signature of Property Owner or Other Responsible Party) (Date)

_____

(Type or Print Name)

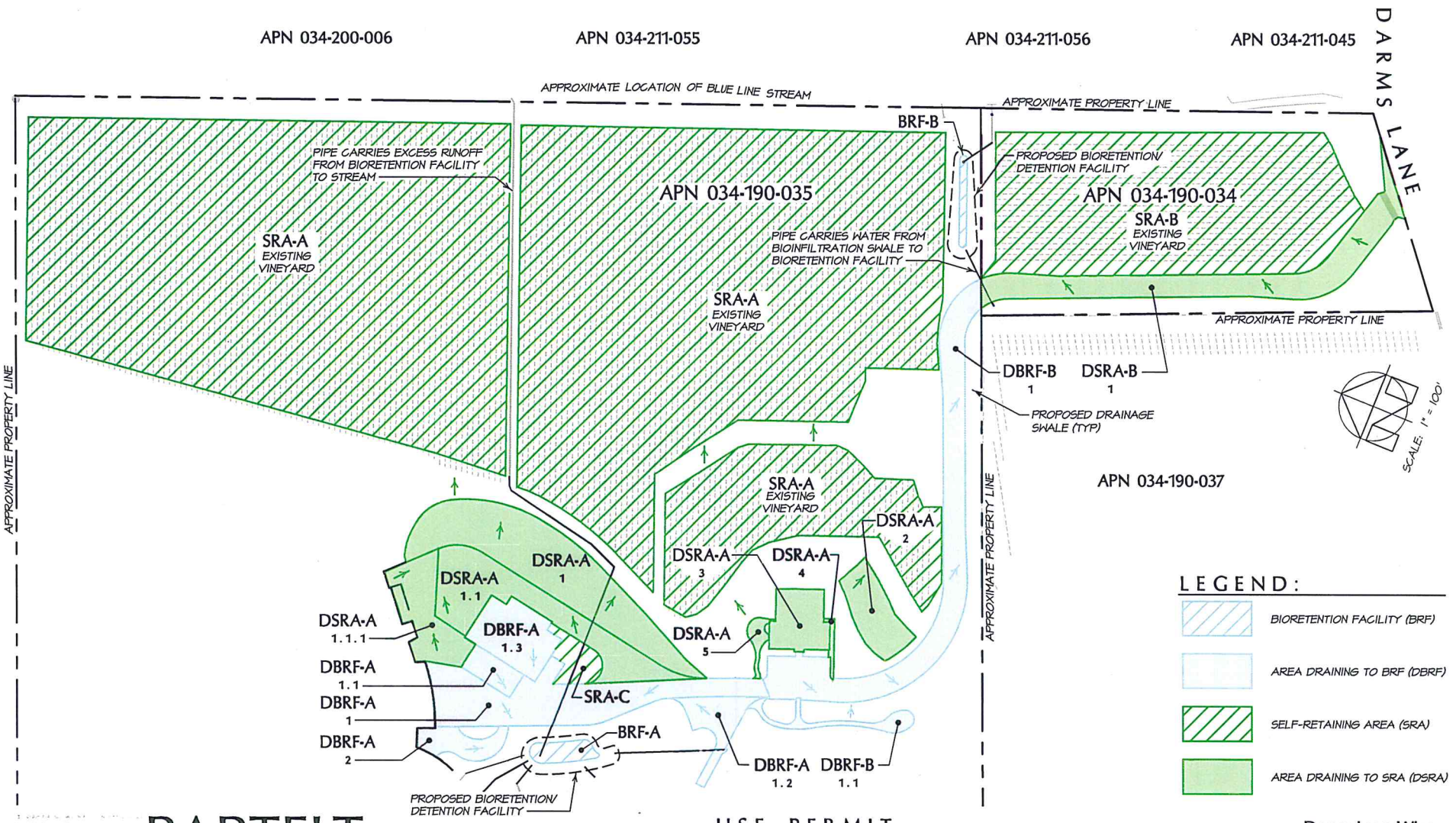
_____

(Company Name)

_____

(Address)

Phone Number: _____ E-mail: _____



USE PERMIT
STORMWATER CONTROL PLAN - DRAINAGE MANAGEMENT AREA EXHIBIT

SCALE: 1" = 100'

BARTELT ENGINEERING
CIVIL ENGINEERING · LAND PLANNING
1303 Jefferson Street, 200 B, Napa, CA 94559
www.barteltengineering.com
· Telephone: 707-258-1301 ·

Darms Lane Winery
1150 Darms Lane
Napa, CA 94558
APN 034-190-034 & -035
Job No. 98-55
Revised - December 2018
Sheet 1 of 1

December 2018 - Revised
Job No. 98-55

BARTELT ENGINEERING

HYDROLOGY AND HYDRAULIC EVALUATION FOR DARMS LANE WINERY 1150 DARMS LANE, NAPA COUNTY, CA APN 034-190-034 & -035

As required by Napa County Planning, Building & Environmental Services (PBES), Bartelt Engineering has prepared a Hydrology and Hydraulic Evaluation for the Darms Lane Winery project to compare pre-development and post-development conditions and estimate project peak storm water runoff impact. For design purposes Bartelt Engineering has also included portions of the watershed that will not be impacted by construction but affects the sizing of the stormwater system in the project area.

PROJECT DESCRIPTION

Currently, the subject parcels (APN 034-190-034 & -035) are 2.32± acres and 46.94± acres, respectively, and contain a residence with an associated Home Occupancy Business Permit[1] with some minor landscaped areas, vineyards as well as miscellaneous structures associated with vineyard operations. The subject parcel APN 034-190-035 currently has an approved Track II Vineyard Erosion Control Plan[2] for 13.50± acres of vineyard that will primarily remain in production.

The project proposes constructing and operating a 30,000 gallons per year winery, tasting room and a paved driveway on a portion of the subject parcel.

EXHIBITS

A Hydrology Exhibit is attached showing the site, approximate property line locations, locations of the existing structures, and proposed development areas. The exhibit was created using topographic information taken from the "Topographic Map of a portion of the lands of Crichton Hall Vineyards" prepared by Michael W. Brooks & Associates dated October 1998 and "Topographic Map of a portion of the lands of Darms Lane Winery" prepared by Terra Firma Surveys, Inc. dated November 2014. Information on existing (pre-development) and proposed (post-development) conditions is also summarized on the exhibit. The parcel is entirely in Zone X which is defined as "areas determined to be outside the 0.2% annual chance floodplain" by FEMA[3] and therefore not impacted by a 500 year flood.

1 Home Occupancy Business Permit issued by PBES on 06/05/2003. Refer to PBES permit #03187 and application #60-15153.

2 Refer to Bartelt Engineering's Track II Vineyard Erosion Control Plan prepared for Crichton Hall Vineyards dated September 2001. Napa County 01107-ECPA.

3 United States Department of Homeland Security, Federal Emergency Management Agency (FEMA), Flood Insurance Rate Map (FIRM), 06055C0505F, September 29, 2010.

HYDROLOGY OVERVIEW

The area proposed for development is abutted on the west by a mountain range and is subjected to run-on from uphill. At an unknown date a large basin was built at the bottom of what is now Vineyard Blocks D and E, likely with the intention of being used as an irrigation storage basin. To minimize vineyard loss from development the existing basin will be graded into a smaller basin so that a portion of the area can be developed for the proposed winery building and other improvements.

In the Hydrology Analysis pre-development conditions for the watershed, which contains Vineyard Blocks D and E, will consider the condition of the area prior to the installation of the existing irrigation basin. The ground cover at Vineyard Blocks D and E will be modeled as brush, like much of the surrounding undeveloped area. We believe that this emulates the most natural condition of the parcel prior to any development and provides the most conservative analysis.

Soils in the reviewed watersheds vary and contain soils from Hydrologic Soil Groups B, C, and D. Soils found in the subject area include Bale clay loam, which is classified as Hydrologic Soil Group B and considered somewhat poorly drained with a slight erosion hazard (map symbol 104), Bressa-Dibble complex, which is classified as Hydrologic Soil Group C and considered well drained with a moderate to severe erosion hazard (map symbol 114), Clear Lake clay, which is classified as Hydrologic Soil Group D and considered poorly drained with little to no erosion hazard (map symbol 116), Haire loam, which is classified as Hydrologic Soil Group D and considered moderately to well drained with a slight erosion hazard (map symbol 146), and Hambright-Rock outcrop complex which is classified as Hydrologic Soil Group D and considered well drained with a slight to moderate erosion hazard (map symbol 151).

Bartelt Engineering has compiled a hydrology analysis with hydraulic calculations to identify drainage areas and respective peak flow rates in conjunction with the existing and proposed drainage improvements associated with the proposed winery development project. This hydrology study utilizes the SCS TR-55 Method to simulate stormwater flow rates for 2, 10, 50, and 100-year 24-hour storm events.

Pre-Development Drainage Patterns

Currently Point of Concentration A (POC A) receives stormwater from Watershed A, which is 17.56± acres and consists of three (3) sub-watersheds; A1, A2, and A3. Watershed A is not expected to receive offsite flows as the watershed originates onsite. Under existing conditions, POC A is considered as the blue-line stream which abuts a portion of the parcels' easterly property line. Pre-development watershed limits are shown in the attached Hydrology Exhibit, Pre-Development. This analysis will model Sub-watersheds A3 and A2 as flowing into sub-watershed A1, as they did naturally before the man-made irrigation basin was constructed uphill of sub-watershed A1.

Sub-watershed A3 has an average slope of 21.7% and drains southeasterly downhill before flowing easterly through sub-watershed A1.

Sub-watershed A2 has an average slope of 25.0% and drains easterly downhill into Sub-watershed A1 before flowing into POC A.

Sub-watershed A1 has an average slope of 9.0% and drains easterly towards POC A. At POC A all runoff from Watershed A has entered the unnamed blue-line stream.

Post-development conditions for Watershed A includes multiple land uses which are shown along with their area and SCS curve number (CN) in Table 1.

TABLE 1: PRE- DEVELOPMENT LAND USE SUMMARY (WATERSHED A)

Land Description	Sub-watershed	Hydrologic Soil Group	Area (ac)	CN
Pasture, grassland, range (fair condition)	A1	B	2.47	69
Pasture, grassland, range (fair condition)		C	2.77	79
Paved parking and roofs			0.35	98
Pasture, grassland, range (fair condition)		D	8.18	84
Paved parking and roofs			0.80	98
Subtotal | Weighted			14.57	82
Brush, weed, grass mixture (poor condition)	A2	D	0.45	83
Brush, weed, grass mixture (poor condition)	A3	C	1.13	77
Brush, weed, grass mixture (poor condition)		D	1.41	83
Subtotal | Weighted			2.54	80
Total | Weighted			17.56	82

Post-Development Drainage Patterns

Under post-development conditions POC A will receive stormwater from Watershed A, which is 17.56± acres and consists of six (6) sub-watersheds: A1, A2, A3.1, A3.2, A3.3, and A3.4. Watershed A is not expected to receive offsite flows and POC A is expected to receive less runoff post-development. A portion of stormwater flow from the neighboring parcel (APN 034-190-037) will be intercepted by a proposed cut-off swale before reaching the proposed driveway and routed into the blue line stream. Drainage improvements for POC A include directing runoff from sub-watersheds A3.1, A3.2, A3.3, and A3.4 into a proposed stormwater detention basin. As the basin fills, the collected stormwater will be released through a 24 inch metered riser and into a 12 inch ADS N-12 storm drain pipe system.

Sub-watershed A2 will capture water from a portion of the proposed paved road and from the hill above the road in a roadside grass-lined swale. Concentrated flow will travel from the roadside swale to the inlet of a proposed 18 inch storm drain, where it will be conveyed

under the proposed driveway and directed to a proposed basin and detained before being allowed to be released into a blueline stream through a proposed riser that will be installed on a portion of the existing storm drain system. Sub-watershed A1 is expected to travel as sheet flow and potentially shallow concentrated flow through the valley floor Vineyard Blocks A, B, and C before reaching POC A. Post-development watershed limits are shown in the attached Hydrology Exhibit Post-Development.

Sub-watershed A3.4 has an average slope of 21.7% and drains southeasterly downhill through Vineyard Block E and into a proposed stormwater detention basin. When the proposed detention basin reaches capacity water will be released to POC A through an existing storm drain pipe system.

Sub-watershed A3.3 has an average slope of 25.0% and drains easterly downhill through Vineyard Block D and into a proposed stormwater detention basin. When the proposed detention basin reaches capacity water will be released to POC A through an existing storm drain pipe system.

Sub-watershed A3.2 is a proposed gravel vineyard access road with an average slope of 15.0%. Runoff from the road will collect in a roadside inlet and travel through a storm drain pipe into the proposed stormwater detention basin. When the proposed detention basin reaches capacity water will be released to POC A through an existing storm drain pipe system.

Sub-watershed A3.1 is a portion of the paved winery development area which drains into the detention basin with an average slope of 1.0%. Runoff from the winery building and driveway is expected to sheet flow to the proposed stormwater detention basin. When the proposed detention basin reaches capacity water will be released to POC A through an existing storm drain pipe system.

Sub-watershed A2 has an average slope of 21.0% and consists of the uphill portion of the proposed paved road and the adjacent hillside. Stormwater will collect in the proposed roadside grass-lined swale where it will flow to a proposed 18 inch storm drain that will direct stormwater under the proposed driveway and into a proposed detention basin adjacent to the blueline stream. When the proposed detention basin reaches capacity water will be released to the blueline stream through a proposed riser connected to an existing storm drain pipe.

Sub-watershed A1 has an average slope of 5.0% and consists of a portion of the proposed winery, offices and tasting room building, and lower portion of the proposed paved road as well as Vineyard Blocks A, B, and C. Stormwater is expected to continue to sheet flow and may form shallow concentrated flow through the vineyards before reaching POC A.

Post-development conditions for Watershed A includes multiple land uses which are shown along with their area and SCS curve number (CN) in Table 2.

TABLE 2: POST- DEVELOPMENT LAND USE SUMMARY (WATERSHED A)

Land Description	Sub-watershed	Hydrologic Soil Group	Area (ac)	CN
Paved parking and roofs	A1	B	0.34	98
Vineyard, > 75% grass cover (good condition)			2.39	61
Paved parking and roofs		C	0.23	98
Vineyard Ave, 50% - 75% grass cover (fair condition)			0.15	79
Vineyard, > 75% grass cover (good condition)			2.17	75
Paved parking and roofs		D	0.20	98
Gravel roads			0.03	91
Vineyard, 50% - 75% grass cover (fair condition)			1.46	84
Vineyard, > 75% grass cover (good condition)			5.67	81
		Subtotal |Weighted	12.64	78
Paved parking and roofs	A2	D	0.28	98
Gravel roads			0.04	91
Grassland (fair condition)			1.07	84
		Subtotal | Weighted	1.39	87
Paved parking and roofs	A3.1	C	0.21	98
Gravel roads			0.01	89
50% - 75% grass cover (fair condition)			0.01	79
Paved parking and roofs		D	0.21	98
Gravel roads			0.03	91
		Subtotal | Weighted	0.47	97
Gravel roads	A3.2	D	0.07	91
Vineyard, > 75% grass cover (good condition)	A3.3	D	0.45	81
Vineyard, > 75% grass cover (good condition)	A3.4	C	1.13	75
Vineyard, > 75% grass cover (good condition)		D	1.41	81
		Subtotal | Weighted	2.54	78
		Total | Weighted	17.56	79

Hydrology Calculations and Results

The SCS TR-55 Method utilizes the watershed area, curve number, equivalent width, average slope, and Manning's coefficient for surface runoff to calculate the time of concentration and peak discharge for a watershed. Sub-watershed parameters and pipe parameters can be found in the attached Subbasin Summary and Link Summary of the Stormwater Reports for post-development conditions for 2-year, 10-year, 50-year, and 100-year, 24-hour storm events. Table 3 compares peak runoff rate and total discharge of pre-development and post-development conditions.

TABLE 3 : PRE AND POST-DEVELOPMENT PEAK STORMWATER RATE COMPARISON FOR 2, 10, 50 & 100-YR, 24-HR STORMS (CFS)

Watershed Area	2-yr, 24-hr (4.50 in)		10-yr, 24-hr (5.67 in)		50-yr, 24-hr (7.97 in)		100-yr, 24-hr (9.02 in)	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
POC A	6.21	4.03	9.83	9.35	17.56	16.64	21.28	20.17

The results of the drainage analysis show that the post-development design by Bartelt Engineering allows for a lower peak discharge at POC A than the pre-development condition.

Stormwater quantity is expected to be reduced from the pre-development to post-development condition as a result of a more robust post-development cover crop. The stormwater retention basins were designed to control stormwater quality in accordance with the BAASMA Stormwater Control Plan Guidelines. See Stormwater Control Plan prepared by Bartelt Engineering.

Hydraulic Calculations and Results

The hydraulic results of the 10-year, 24-hour storm were used to evaluate hydraulic performance as required by Napa County Engineering Division.

Within Watershed A, the calculated stormwater runoff from sub-watersheds A3.1, A3.2, A3.3 and A3.4 will flow into a detention basin with an open top riser. When the detention basin reaches capacity excess stormwater will flow into the top of a 24 inch riser and enter the existing 12 inch ADS N-12 storm drain system where water will discharge into the blueline stream. Stormwater runoff from sub-watershed A2 will flow into a roadside grass-lined drainage swale having a triangular cross section with a side slope of 2:1 (H:V) and a depth of 12 inches. From the roadside grass-lined drainage swale, flow will be directed through an open 18 inch diameter storm drain pipe where concentrated flow will be directed to the detention basin adjacent to the blueline stream. When the detention basin reaches capacity, excess stormwater will either overtop the basin or flow into the weir stand pipe and flow into the blueline stream towards POC A. Hydraulic results for Watershed A are summarized in Table 4 and a full list of parameters is shown in the Pipe Summary section of the included Stormwater Report compiled by AutoCAD Storm and Sanitary Analysis.

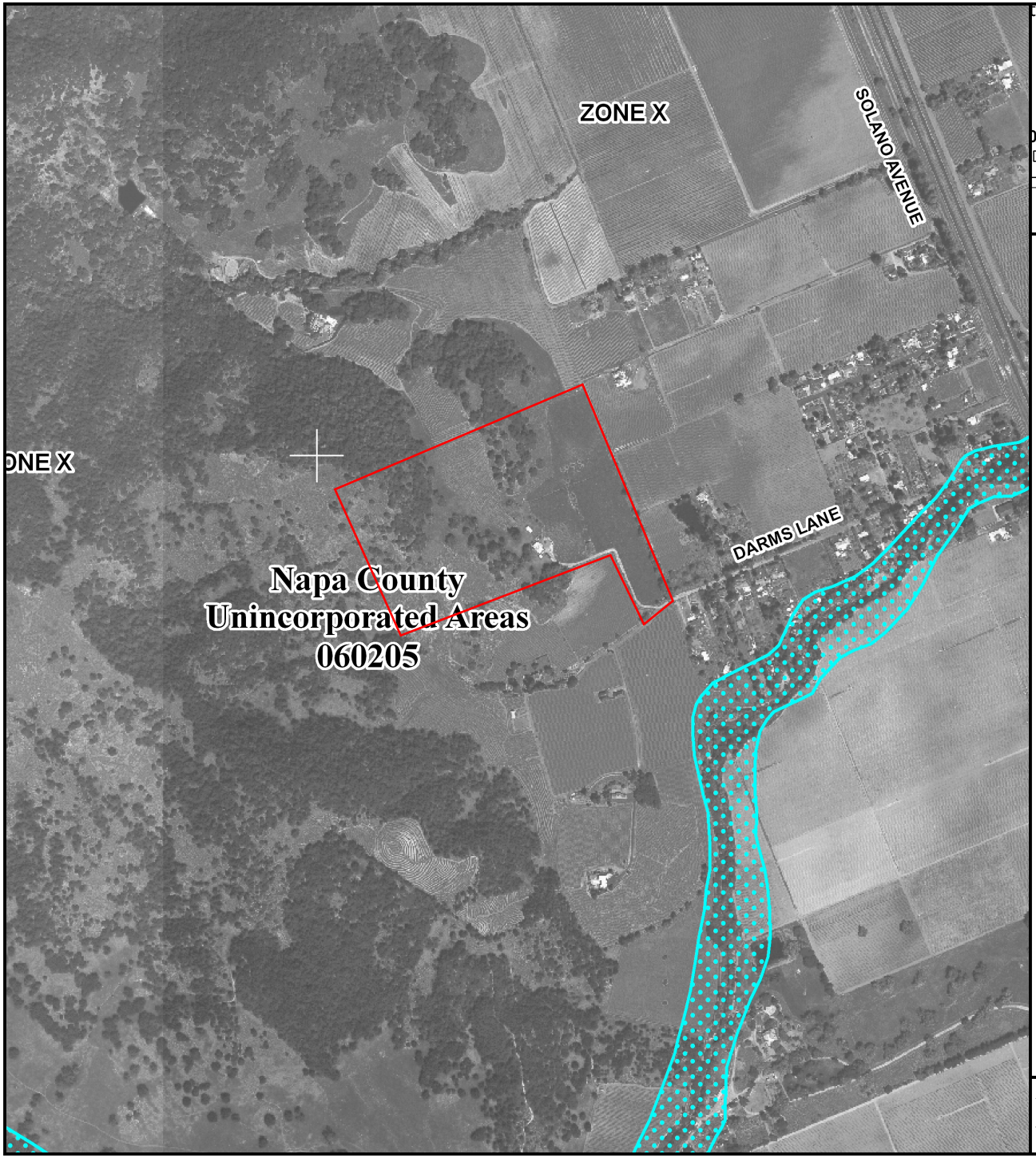
TABLE 4: HYDRAULIC CALCULATIONS FOR POST-DEVELOPMENT 10-YR , 24- HR STORM WATERSHED A

Watershed	Drainage Type	Flow Capacity (cfs)	Peak Flow (cfs)	Flow Depth Ratio (ft/ft)	Peak Velocity (fps)
A3.1, A3.2, A3.3, & A3.4	12″ ADS N-12 Pipe	6.81	2.84	0.45	8.31
A3.2	12″ ADS N-12 Pipe	11.52	0.10	0.06	4.44
A2	Grass-Lined Swale	4.98	1.45	0.63	1.89
	(P) 18″ CMP	12.77	1.45	0.23	4.79

CONCLUSION

The above hydrology calculations indicate that there is no increase in stormwater runoff during a 2, 10, 50, and 100-year, 24-hour storm event. The main component contributing to the decrease in stormwater runoff rate is the improvement in the quality of ground cover from the pre-development condition.

The above hydraulic calculations and results indicate that the proposed stormwater system is sufficiently sized to manage the estimated stormwater runoff from the proposed winery development project for a 10-year, 24-hour storm event.



tional Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'

00 0 1000 2000

FEET

METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0505F

FIRM

FLOOD INSURANCE RATE MAP

NAPA COUNTY, CALIFORNIA
AND INCORPORATED AREAS

PANEL 505 OF 650

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

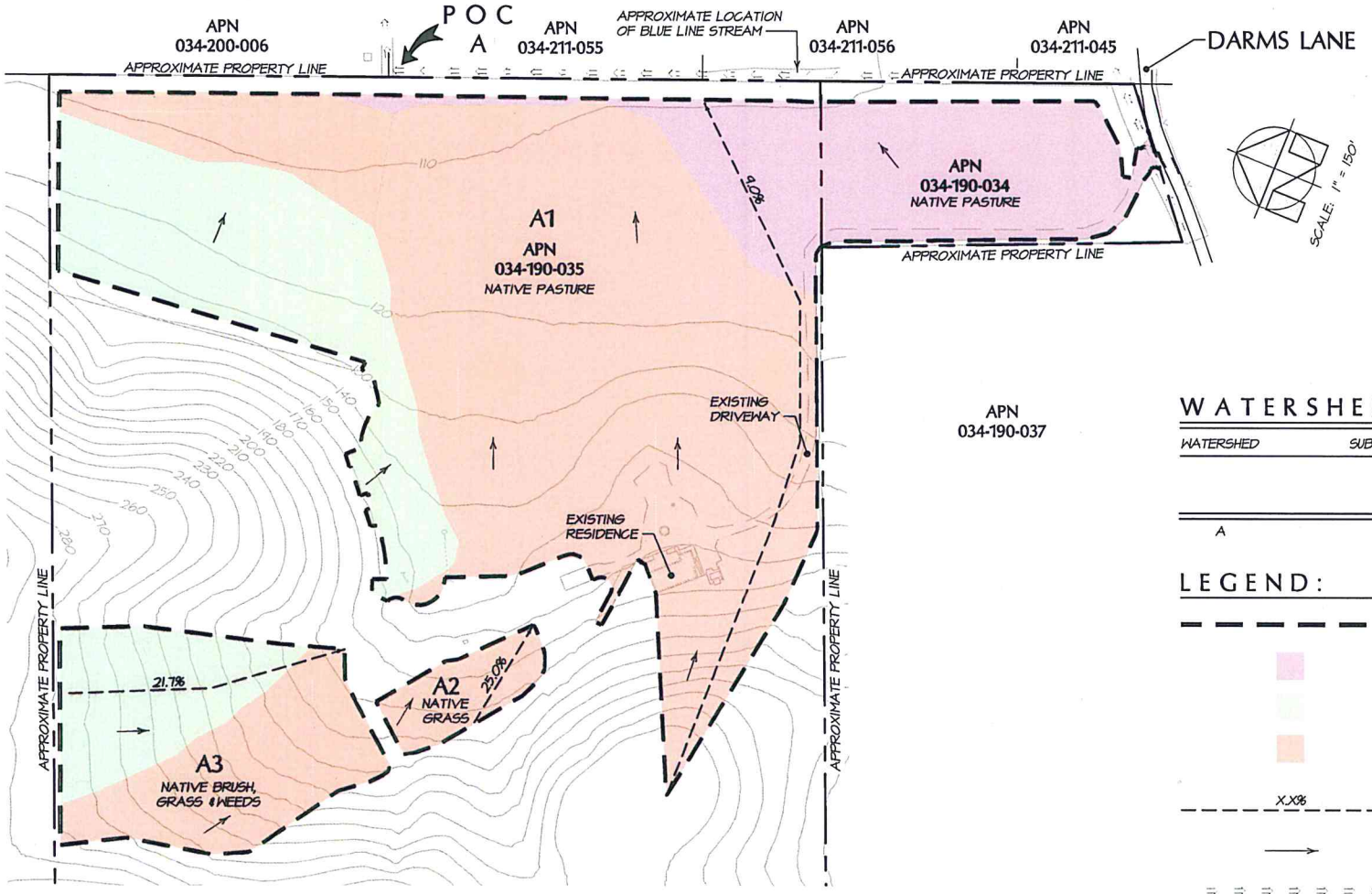
COMMUNITY	NUMBER	PANEL	SUFFIX
NAPA COUNTY	060205	0505	F
NAPA, CITY OF	060207	0505	F

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06055C0505F

MAP REVISED
SEPTEMBER 29, 2010

Federal Emergency Management Agency



WATERSHED AREAS:

WATERSHED	SUB-WATERSHED	AREA (ACRES)
	A1	14.57±
	A2	0.45±
	A3	2.54±
A		17.56±

LEGEND:

- WATERSHED LIMITS
- SOIL CLASS B
- SOIL CLASS C
- SOIL CLASS D
- X.X% — DIRECTION OF OVERLAND FLOW AND SLOPE AVERAGE
- DIRECTION OF OVERLAND FLOW
- EXISTING DRAINAGE COURSE
- AX — WATERSHED LABEL

HYDROLOGY EXHIBIT
PRE-DEVELOPMENT

SCALE: 1" = 150'

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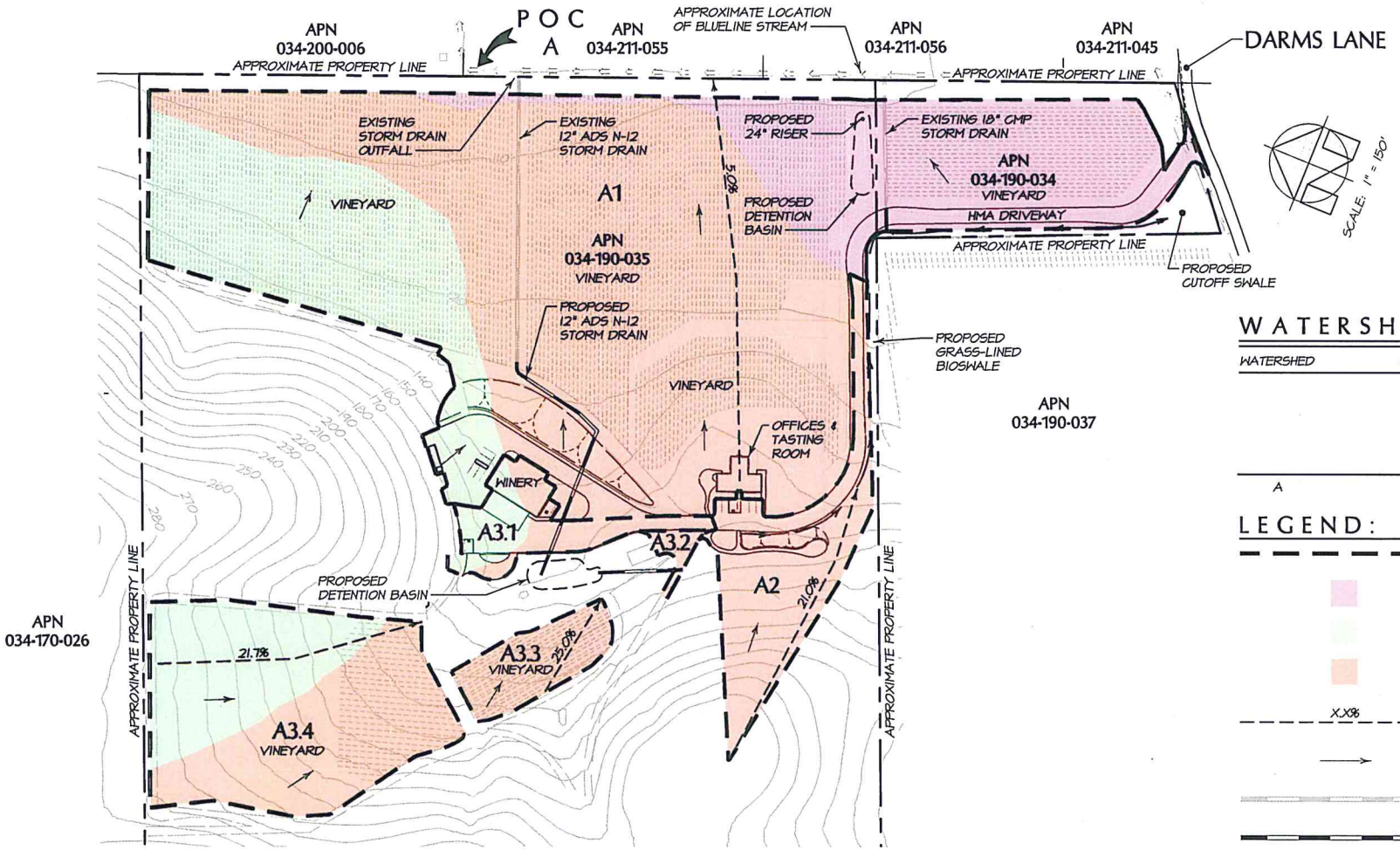
Darms Lane Winery
1150 Darms Lane
Napa, CA 94558
APN 034-190-034 & -035
Job No. 98-55
December 2018
Sheet 1 of 2



WATERSHED AREAS:

WATERSHED	SUB-WATERSHED	AREA (ACRES)
	A1	12.64±
	A2	1.39±
	A3.1	0.47±
	A3.2	0.07±
	A3.3	0.45±
	A3.4	2.54±
A		17.56±

LEGEND:

- WATERSHED LIMITS
- SOIL CLASS B
- SOIL CLASS C
- SOIL CLASS D
- X.X% — DIRECTION OF OVERLAND FLOW AND SLOPE AVERAGE
- DIRECTION OF OVERLAND FLOW
- EXISTING STORM DRAIN PIPE
- PROPOSED STORM DRAIN PIPE
- EXISTING DRAINAGE COURSE
- AX — WATERSHED LABEL

HYDROLOGY EXHIBIT
POST-DEVELOPMENT

SCALE: 1" = 150'

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Darms Lane Winery
1150 Darms Lane
Napa, CA 94558
APN 034-190-034 & -035
Job No. 98-55
Revised - December 2018

NOAA Atlas 14, Volume 6, Version 2
Location name: Napa, California, US*
Latitude: 38.3635°, Longitude: -122.3493°
Elevation: 161 ft*
* source: Google Maps

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

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

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.134** (0.119-0.152)	**0.165** (0.147-0.187)	**0.206** (0.182-0.235)	**0.240** (0.210-0.276)	**0.286** (0.241-0.342)	**0.322** (0.265-0.394)	**0.359** (0.288-0.452)	**0.397** (0.308-0.517)	**0.450** (0.333-0.614)	**0.492** (0.350-0.698)
10-min	**0.192** (0.171-0.218)	**0.236** (0.210-0.269)	**0.295** (0.261-0.336)	**0.343** (0.301-0.395)	**0.410** (0.346-0.490)	**0.461** (0.380-0.565)	**0.514** (0.412-0.648)	**0.570** (0.442-0.741)	**0.645** (0.478-0.880)	**0.705** (0.502-1.00)
15-min	**0.232** (0.207-0.263)	**0.286** (0.254-0.325)	**0.357** (0.316-0.407)	**0.415** (0.364-0.478)	**0.495** (0.418-0.593)	**0.558** (0.460-0.684)	**0.622** (0.499-0.784)	**0.689** (0.535-0.896)	**0.780** (0.578-1.06)	**0.852** (0.607-1.21)
30-min	**0.331** (0.294-0.375)	**0.407** (0.362-0.463)	**0.508** (0.451-0.580)	**0.592** (0.519-0.681)	**0.706** (0.596-0.844)	**0.795** (0.655-0.974)	**0.886** (0.710-1.12)	**0.981** (0.762-1.28)	**1.11** (0.823-1.52)	**1.21** (0.865-1.72)
60-min	**0.477** (0.424-0.541)	**0.587** (0.522-0.667)	**0.733** (0.650-0.836)	**0.853** (0.749-0.982)	**1.02** (0.860-1.22)	**1.15** (0.945-1.41)	**1.28** (1.02-1.61)	**1.42** (1.10-1.84)	**1.60** (1.19-2.19)	**1.75** (1.25-2.48)
2-hr	**0.721** (0.642-0.818)	**0.883** (0.785-1.00)	**1.10** (0.971-1.25)	**1.27** (1.11-1.46)	**1.50** (1.27-1.80)	**1.68** (1.39-2.06)	**1.86** (1.49-2.35)	**2.05** (1.59-2.67)	**2.30** (1.71-3.14)	**2.50** (1.78-3.54)
3-hr	**0.921** (0.820-1.04)	**1.13** (1.00-1.28)	**1.40** (1.24-1.59)	**1.61** (1.42-1.86)	**1.91** (1.61-2.28)	**2.13** (1.76-2.61)	**2.36** (1.89-2.97)	**2.59** (2.01-3.37)	**2.90** (2.15-3.95)	**3.13** (2.23-4.45)
6-hr	**1.37** (1.22-1.55)	**1.68** (1.49-1.91)	**2.08** (1.84-2.37)	**2.41** (2.11-2.77)	**2.84** (2.40-3.40)	**3.17** (2.61-3.88)	**3.50** (2.80-4.41)	**3.83** (2.97-4.98)	**4.27** (3.16-5.83)	**4.61** (3.28-6.54)
12-hr	**1.88** (1.67-2.13)	**2.36** (2.09-2.68)	**2.97** (2.63-3.38)	**3.46** (3.04-3.98)	**4.11** (3.47-4.91)	**4.60** (3.79-5.63)	**5.08** (4.07-6.40)	**5.57** (4.33-7.25)	**6.22** (4.60-8.48)	**6.70** (4.77-9.51)
24-hr	**2.55** (2.30-2.90)	**3.28** (2.95-3.73)	**4.21** (3.78-4.79)	**4.95** (4.41-5.67)	**5.93** (5.14-6.98)	**6.66** (5.67-7.97)	**7.38** (6.16-9.02)	**8.11** (6.61-10.1)	**9.06** (7.14-11.7)	**9.78** (7.48-13.0)
2-day	**3.32** (2.98-3.76)	**4.28** (3.84-4.86)	**5.50** (4.93-6.26)	**6.48** (5.77-7.42)	**7.77** (6.73-9.14)	**8.73** (7.44-10.5)	**9.69** (8.09-11.8)	**10.7** (8.70-13.3)	**11.9** (9.40-15.5)	**12.9** (9.87-17.2)
3-day	**3.87** (3.48-4.39)	**4.99** (4.48-5.66)	**6.42** (5.75-7.30)	**7.55** (6.73-8.65)	**9.06** (7.85-10.7)	**10.2** (8.67-12.2)	**11.3** (9.44-13.8)	**12.4** (10.1-15.6)	**13.9** (11.0-18.0)	**15.1** (11.5-20.1)
4-day	**4.30** (3.87-4.88)	**5.55** (4.99-6.31)	**7.15** (6.41-8.13)	**8.41** (7.49-9.63)	**10.1** (8.73-11.9)	**11.3** (9.63-13.5)	**12.5** (10.5-15.3)	**13.8** (11.2-17.2)	**15.4** (12.1-19.9)	**16.6** (12.7-22.1)
7-day	**5.29** (4.76-6.01)	**6.87** (6.17-7.80)	**8.84** (7.93-10.1)	**10.4** (9.25-11.9)	**12.4** (10.7-14.6)	**13.8** (11.8-16.6)	**15.3** (12.8-18.7)	**16.7** (13.6-20.9)	**18.5** (14.6-24.0)	**19.9** (15.2-26.5)
10-day	**6.01** (5.40-6.82)	**7.81** (7.02-8.87)	**10.1** (9.02-11.4)	**11.8** (10.5-13.5)	**14.0** (12.2-16.5)	**15.6** (13.3-18.7)	**17.2** (14.4-21.0)	**18.7** (15.3-23.4)	**20.7** (16.3-26.8)	**22.1** (16.9-29.5)
20-day	**7.86** (7.07-8.91)	**10.2** (9.20-11.6)	**13.1** (11.8-15.0)	**15.4** (13.7-17.6)	**18.2** (15.8-21.4)	**20.2** (17.2-24.2)	**22.1** (18.5-27.0)	**24.0** (19.5-30.0)	**26.3** (20.7-34.0)	**27.9** (21.4-37.3)
30-day	**9.46** (8.51-10.7)	**12.3** (11.0-13.9)	**15.7** (14.1-17.8)	**18.3** (16.3-20.9)	**21.5** (18.7-25.4)	**23.9** (20.3-28.6)	**26.0** (21.7-31.8)	**28.1** (23.0-35.2)	**30.8** (24.2-39.8)	**32.6** (24.9-43.5)
45-day	**11.6** (10.4-13.2)	**14.9** (13.4-16.9)	**18.9** (17.0-21.5)	**21.9** (19.5-25.1)	**25.7** (22.3-30.3)	**28.4** (24.2-34.0)	**30.9** (25.8-37.8)	**33.3** (27.2-41.7)	**36.3** (28.6-47.0)	**38.3** (29.3-51.1)
60-day	**13.9** (12.5-15.8)	**17.7** (15.9-20.1)	**22.2** (19.9-25.3)	**25.6** (22.8-29.4)	**29.9** (25.9-35.2)	**32.9** (28.0-39.4)	**35.7** (29.8-43.6)	**38.4** (31.3-48.0)	**41.6** (32.8-54.0)	**43.9** (33.6-58.6)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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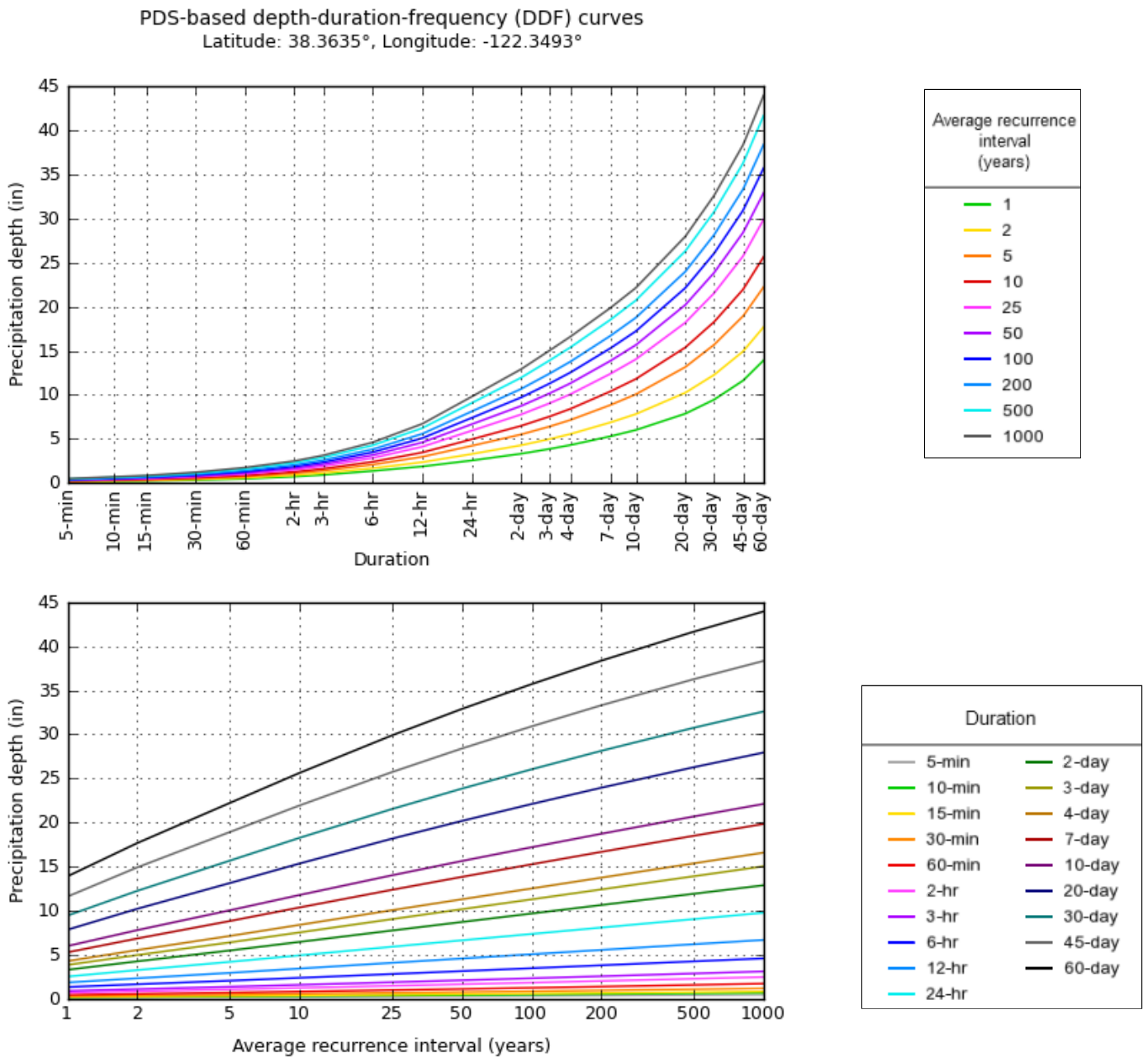
PF graphical



NOAA Atlas 14, Volume 6, Version 2

Created (GMT): Wed Apr 13 00:22:27 2016

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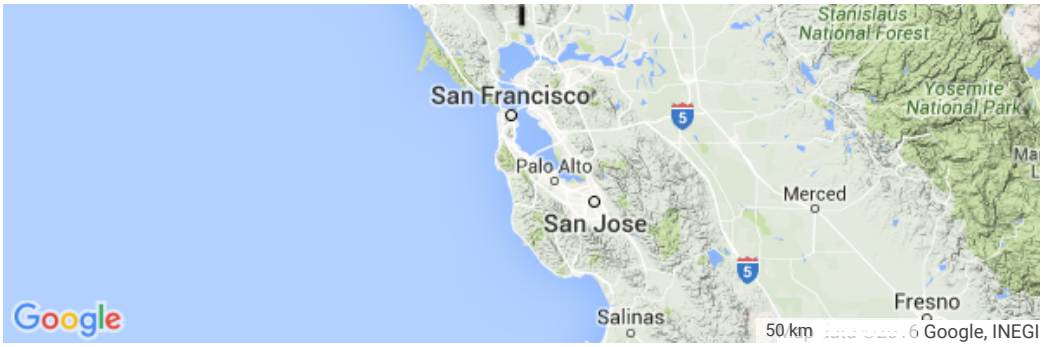
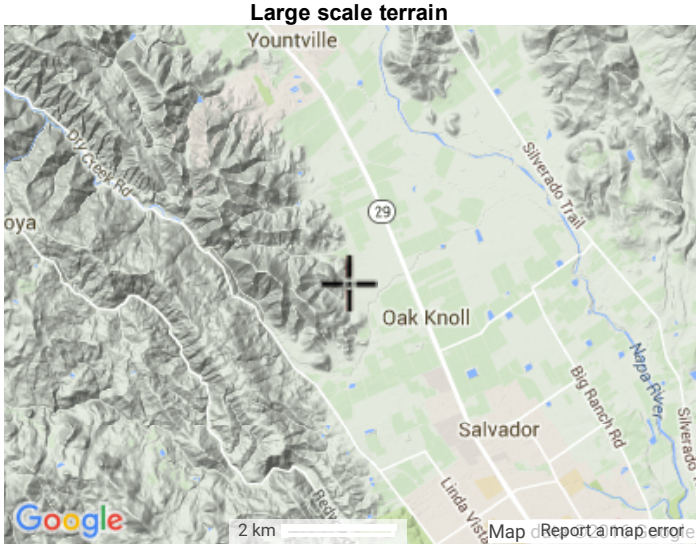
Maps & aerials

Small scale terrain

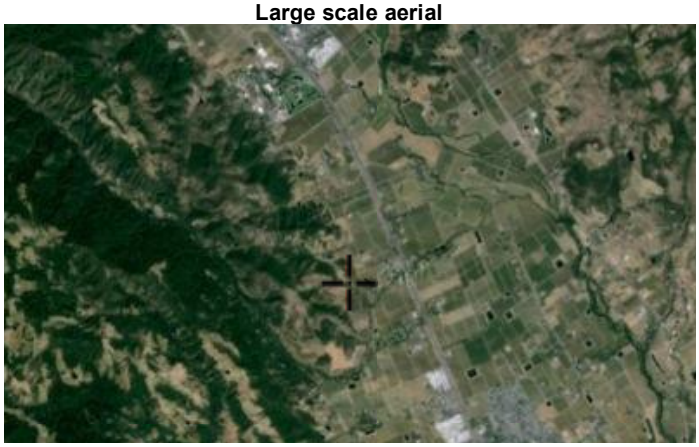


Large scale terrain



Large scale map

Large scale aerial



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National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
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Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

BARTELT ENGINEERING

Project Description

File Name 9855-Post.SPF

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	EPA SWMM
EPA SWMM Infiltration Method	SCS Curve Number
Link Routing Method	Kinematic Wave
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	YES

Analysis Options

Start Analysis On	Apr 12, 2016	00:00:00
End Analysis On	Apr 13, 2016	00:00:00
Start Reporting On	Apr 12, 2016	00:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	30	seconds

Number of Elements

	Qty
Rain Gages	1
Subbasins	6
Nodes	6
Junctions	3
Outfalls	1
Flow Diversions	0
Inlets	0
Storage Nodes	2
Links	5
Channels	1
Pipes	3
Pumps	0
Orifices	0
Weirs	1
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

SN	Rain Gage ID	Data Source	Data Source ID	Rainfall Type	Rain Units	State	County	Return Period (years)	Rainfall Depth (inches)	Rainfall Distribution
1		Time Series	2 YR 24 HR	Cumulative	inches	California	Napa (Yountville)	2	3.73	SCS Type IA 24-hr

BARTELT ENGINEERING

Subbasin Summary

SN	Subbasin ID	Area	Impervious Area	Weighted Curve Number	Average Slope	Equivalent Width	Impervious Area Manning's Roughness	Pervious Area Manning's Roughness	Total Rainfall	Total Infiltration	Total Runoff	Total Runoff Volume	Peak Runoff	Time of Concentration
		(ac)	(%)		(%)	(ft)			(in)	(in)	(in)	(ac-in)	(cfs)	(days hh:mm:ss)
1	A1	12.64	6.00	77.57	5.0000	600.00	0.0150	0.4000	3.73	1.5310	1.77	22.41	1.99	0 02:42:06
2	A2	1.39	25.00	87.02	21.0000	100.00	0.0150	0.2500	3.73	0.7990	2.70	3.76	0.83	0 00:54:05
3	A3.1	0.47	100.00	96.96	1.0000	300.00	0.0150	0.1000	3.73	0.0000	3.66	1.72	0.42	0 00:07:59
4	A3.2	0.07	100.00	91.00	15.0000	40.00	0.0150	0.2500	3.73	0.0000	3.67	0.26	0.06	0 00:03:47
5	A3.3	0.45	0.00	81.00	25.0000	140.00	0.0150	0.4000	3.73	1.4400	2.04	0.92	0.22	0 00:33:35
6	A3.4	2.54	0.00	78.33	21.7000	275.00	0.0150	0.4000	3.73	1.5880	1.85	4.69	0.78	0 01:06:02

BARTELT ENGINEERING

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft^2)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	In - B1	Junction	164.00	165.00	0.00	0.00	1000.00	0.83	164.51	0.49	0 00:00	0.00	0.00
2	In - B1.1	Junction	117.00	118.00	0.00	0.00	1000.00	0.82	118.51	0.49	0 00:00	0.00	0.00
3	In - C1	Junction	165.00	166.00	0.00	0.00	0.00	0.06	165.05	0.95	0 00:00	0.00	0.00
4	Creek	Outfall	113.00					4.03	113.31				
5	Downhill Basin	Storage Node	113.50	115.50	113.50		0.00	0.82	115.16			0.00	0.00
6	Uphill Basin	Storage Node	147.00	150.00	0.00		3531.00	1.45	149.31			0.00	0.00

Storage Nodes

Storage Node : Downhill Basin

Input Data

Invert Elevation (ft)	113.50
Max (Rim) Elevation (ft)	115.50
Max (Rim) Offset (ft)	2.00
Initial Water Elevation (ft)	113.50
Initial Water Depth (ft)	0.00
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	Weir-01	Rectangular	No	115.00	1.50	4.00	0.50	3.33

Output Summary Results

Peak Inflow (cfs)	0.82
Peak Lateral Inflow (cfs)	0.00
Peak Outflow (cfs)	0.82
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	115.16
Max HGL Depth Attained (ft)	1.66
Average HGL Elevation Attained (ft)	114.75
Average HGL Depth Attained (ft)	1.25
Time of Max HGL Occurrence (days hh:mm)	0 08:10
Total Exfiltration Volume (1000-ft³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

BARTELT ENGINEERING

Storage Node : Uphill Basin

Input Data

Invert Elevation (ft)	147.00
Max (Rim) Elevation (ft)	150.00
Max (Rim) Offset (ft)	3.00
Initial Water Elevation (ft)	0.00
Initial Water Depth (ft)	-147.00
Ponded Area (ft^2)	3531.00
Evaporation Loss	0.00

Output Summary Results

Peak Inflow (cfs)	1.45
Peak Lateral Inflow (cfs)	1.39
Peak Outflow (cfs)	1.41
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	149.31
Max HGL Depth Attained (ft)	2.31
Average HGL Elevation Attained (ft)	148.64
Average HGL Depth Attained (ft)	1.64
Time of Max HGL Occurrence (days hh:mm)	0 08:07
Total Exfiltration Volume (1000-ft^3)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

BARTELT ENGINEERING

Project Description

File Name 9855-Post.SPF

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	EPA SWMM
EPA SWMM Infiltration Method	SCS Curve Number
Link Routing Method	Kinematic Wave
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	YES

Analysis Options

Start Analysis On	Apr 12, 2016	00:00:00
End Analysis On	Apr 13, 2016	00:00:00
Start Reporting On	Apr 12, 2016	00:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	30	seconds

Number of Elements

	Qty
Rain Gages	1
Subbasins	6
Nodes	6
Junctions	3
Outfalls	1
Flow Diversions	0
Inlets	0
Storage Nodes	2
Links	5
Channels	1
Pipes	3
Pumps	0
Orifices	0
Weirs	1
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

SN	Rain Gage ID	Data Source	Data Source ID	Rainfall Type	Rain Units	State	County	Return Period (years)	Rainfall Depth (inches)	Rainfall Distribution
1		Time Series	10 YR 24 HR	Cumulative	inches	California	Napa (Yountville)	10	5.67	SCS Type IA 24-hr

BARTELT ENGINEERING

Subbasin Summary

SN	Subbasin ID	Area	Impervious Area	Weighted Curve Number	Average Slope	Equivalent Width	Impervious Area Manning's Roughness	Pervious Area Manning's Roughness	Total Rainfall	Total Infiltration	Total Runoff	Total Runoff Volume	Peak Runoff	Time of Concentration
		(ac)	(%)		(%)	(ft)			(in)	(in)	(in)	(ac-in)	(cfs)	(days hh:mm:ss)
1	A1	12.64	6.00	77.57	5.0000	600.00	0.0150	0.4000	5.67	1.8000	3.37	42.53	5.14	0 02:17:05
2	A2	1.39	25.00	87.02	21.0000	100.00	0.0150	0.2500	5.67	0.8860	4.54	6.30	1.45	0 00:45:44
3	A3.1	0.47	100.00	96.96	1.0000	300.00	0.0150	0.1000	5.67	0.0000	5.60	2.63	0.65	0 00:06:45
4	A3.2	0.07	100.00	91.00	15.0000	40.00	0.0150	0.2500	5.67	0.0000	5.61	0.39	0.10	0 00:03:12
5	A3.3	0.45	0.00	81.00	25.0000	140.00	0.0150	0.4000	5.67	1.6590	3.75	1.69	0.42	0 00:28:24
6	A3.4	2.54	0.00	78.33	21.7000	275.00	0.0150	0.4000	5.67	1.8590	3.48	8.84	1.78	0 00:55:51

BARTELT ENGINEERING

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft²)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	In - B1	Junction	164.00	165.00	0.00	0.00	1000.00	1.45	164.63	0.37	0 00:00	0.00	0.00
2	In - B1.1	Junction	117.00	118.00	0.00	0.00	1000.00	1.45	118.63	0.37	0 00:00	0.00	0.00
3	In - C1	Junction	165.00	166.00	0.00	0.00	0.00	0.10	165.06	0.94	0 00:00	0.00	0.00
4	Creek	Outfall	113.00					9.35	113.45				
5	Downhill Basin	Storage Node	113.50	115.50	113.50		0.00	1.45	115.23			0.00	0.00
6	Uphill Basin	Storage Node	147.00	150.00	0.00		3531.00	2.89	149.45			0.00	0.00

BARTELT ENGINEERING

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Reported Condition
					(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)		(min)	
1	12in ADS Basin	Pipe	Uphill Basin	Creek	740.00	149.00	113.00	4.86	12.0	0.015	2.84	6.81	0.42	8.31	0.45	0.45	0.00	Calculated
2	12in ADS Road	Pipe	In - C1	Uphill Basin	115.00	165.00	149.00	13.91	12.0	0.015	0.10	11.52	0.01	4.44	0.06	0.06	0.00	Calculated
3	18in CMP	Pipe	In - B1.1	Downhill Basin	100.00	117.00	113.50	3.50	18.0	0.020	1.45	12.77	0.11	4.79	0.34	0.23	0.00	Calculated
4	Upper Swale	Channel	In - B1	In - B1.1	560.00	164.00	118.00	8.21	12.0	0.100	1.45	4.98	0.29	1.89	0.63	0.63	0.00	
5	Weir-01	Weir	Downhill Basin	Creek		113.50	113.00				1.44							

Storage Nodes

Storage Node : Downhill Basin

Input Data

Invert Elevation (ft)	113.50
Max (Rim) Elevation (ft)	115.50
Max (Rim) Offset (ft)	2.00
Initial Water Elevation (ft)	113.50
Initial Water Depth (ft)	0.00
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	Weir-01	Rectangular	No	115.00	1.50	4.00	0.50	3.33

Output Summary Results

Peak Inflow (cfs)	1.45
Peak Lateral Inflow (cfs)	0.00
Peak Outflow (cfs)	1.44
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	115.23
Max HGL Depth Attained (ft)	1.73
Average HGL Elevation Attained (ft)	114.84
Average HGL Depth Attained (ft)	1.34
Time of Max HGL Occurrence (days hh:mm)	0 08:09
Total Exfiltration Volume (1000-ft³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

BARTELT ENGINEERING

Storage Node : Uphill Basin

Input Data

Invert Elevation (ft)	147.00
Max (Rim) Elevation (ft)	150.00
Max (Rim) Offset (ft)	3.00
Initial Water Elevation (ft)	0.00
Initial Water Depth (ft)	-147.00
Ponded Area (ft²)	3531.00
Evaporation Loss	0.00

Output Summary Results

Peak Inflow (cfs)	2.89
Peak Lateral Inflow (cfs)	2.80
Peak Outflow (cfs)	2.85
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	149.45
Max HGL Depth Attained (ft)	2.45
Average HGL Elevation Attained (ft)	148.79
Average HGL Depth Attained (ft)	1.79
Time of Max HGL Occurrence (days hh:mm)	0 08:07
Total Exfiltration Volume (1000-ft³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

BARTELT ENGINEERING

Project Description

File Name 9855-Post.SPF

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	EPA SWMM
EPA SWMM Infiltration Method	SCS Curve Number
Link Routing Method	Kinematic Wave
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	YES

Analysis Options

Start Analysis On	Apr 12, 2016	00:00:00
End Analysis On	Apr 13, 2016	00:00:00
Start Reporting On	Apr 12, 2016	00:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	30	seconds

Number of Elements

	Qty
Rain Gages	1
Subbasins	6
Nodes	6
Junctions	3
Outfalls	1
Flow Diversions	0
Inlets	0
Storage Nodes	2
Links	5
Channels	1
Pipes	3
Pumps	0
Orifices	0
Weirs	1
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

SN	Rain Gage ID	Data Source	Data Source ID	Rainfall Type	Rain Units	State	County	Return Period (years)	Rainfall Depth (inches)	Rainfall Distribution
1		Time Series	50 YR 24 HR	Cumulative	inches	California	Napa (Yountville)	50	7.97	SCS Type IA 24-hr

BARTELT ENGINEERING

Subbasin Summary

SN	Subbasin ID	Area (ac)	Impervious Area (%)	Weighted Curve Number	Average Slope (%)	Equivalent Width (ft)	Impervious Area Manning's Roughness	Pervious Area Manning's Roughness	Total Rainfall (in)	Total Infiltration (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	A1	12.64	6.00	77.57	5.0000	600.00	0.0150	0.4000	7.97	1.9940	5.39	68.15	9.86	0 01:59:37
2	A2	1.39	25.00	87.02	21.0000	100.00	0.0150	0.2500	7.97	0.9420	6.76	9.40	2.20	0 00:39:55
3	A3.1	0.47	100.00	96.96	1.0000	300.00	0.0150	0.1000	7.97	0.0000	7.90	3.71	0.91	0 00:05:54
4	A3.2	0.07	100.00	91.00	15.0000	40.00	0.0150	0.2500	7.97	0.0000	7.91	0.55	0.14	0 00:02:47
5	A3.3	0.45	0.00	81.00	25.0000	140.00	0.0150	0.4000	7.97	1.8120	5.88	2.64	0.66	0 00:24:47
6	A3.4	2.54	0.00	78.33	21.7000	275.00	0.0150	0.4000	7.97	2.0530	5.55	14.11	3.07	0 00:48:44

BARTELT ENGINEERING

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft^2)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	In - B1	Junction	164.00	165.00	0.00	0.00	1000.00	2.20	164.74	0.26	0 00:00	0.00	0.00
2	In - B1.1	Junction	117.00	118.00	0.00	0.00	1000.00	2.21	118.74	0.26	0 00:00	0.00	0.00
3	In - C1	Junction	165.00	166.00	0.00	0.00	0.00	0.14	165.08	0.92	0 00:00	0.00	0.00
4	Creek	Outfall	113.00					16.64	113.61				
5	Downhill Basin	Storage Node	113.50	115.50	113.50		0.00	2.21	115.30			0.00	0.00
6	Uphill Basin	Storage Node	147.00	150.00	0.00		3531.00	4.71	149.61			0.00	0.00

Storage Nodes

Storage Node : Downhill Basin

Input Data

Invert Elevation (ft)	113.50
Max (Rim) Elevation (ft)	115.50
Max (Rim) Offset (ft)	2.00
Initial Water Elevation (ft)	113.50
Initial Water Depth (ft)	0.00
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	Weir-01	Rectangular	No	115.00	1.50	4.00	0.50	3.33

Output Summary Results

Peak Inflow (cfs)	2.21
Peak Lateral Inflow (cfs)	0.00
Peak Outflow (cfs)	2.20
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	115.30
Max HGL Depth Attained (ft)	1.8
Average HGL Elevation Attained (ft)	114.91
Average HGL Depth Attained (ft)	1.41
Time of Max HGL Occurrence (days hh:mm)	0 08:08
Total Exfiltration Volume (1000-ft³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

BARTELT ENGINEERING

Storage Node : Uphill Basin

Input Data

Invert Elevation (ft)	147.00
Max (Rim) Elevation (ft)	150.00
Max (Rim) Offset (ft)	3.00
Initial Water Elevation (ft)	0.00
Initial Water Depth (ft)	-147.00
Ponded Area (ft^2)	3531.00
Evaporation Loss	0.00

Output Summary Results

Peak Inflow (cfs)	4.71
Peak Lateral Inflow (cfs)	4.59
Peak Outflow (cfs)	4.65
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	149.61
Max HGL Depth Attained (ft)	2.61
Average HGL Elevation Attained (ft)	148.92
Average HGL Depth Attained (ft)	1.92
Time of Max HGL Occurrence (days hh:mm)	0 08:06
Total Exfiltration Volume (1000-ft^3)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

BARTELT ENGINEERING

Project Description

File Name 9855-Post.SPF

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	EPA SWMM
EPA SWMM Infiltration Method	SCS Curve Number
Link Routing Method	Kinematic Wave
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	YES

Analysis Options

Start Analysis On	Apr 12, 2016	00:00:00
End Analysis On	Apr 13, 2016	00:00:00
Start Reporting On	Apr 12, 2016	00:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	30	seconds

Number of Elements

	Qty
Rain Gages	1
Subbasins	6
Nodes	6
Junctions	3
Outfalls	1
Flow Diversions	0
Inlets	0
Storage Nodes	2
Links	5
Channels	1
Pipes	3
Pumps	0
Orifices	0
Weirs	1
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

SN	Rain Gage ID	Data Source	Data Source ID	Rainfall Type	Rain Units	State	County	Return Period (years)	Rainfall Depth (inches)	Rainfall Distribution
1	24 Hour Storm	Time Series	100 yr	Cumulative	inches	California	Napa (Yountville)	100	9.02	SCS Type IA 24-hr

BARTELT ENGINEERING

Subbasin Summary

SN	Subbasin ID	Area	Impervious Area	Weighted Curve Number	Average Slope	Equivalent Width	Impervious Area Manning's Roughness	Pervious Area Manning's Roughness	Total Rainfall	Total Infiltration	Total Runoff	Total Runoff Volume	Peak Runoff	Time of Concentration
		(ac)	(%)		(%)	(ft)			(in)	(in)	(in)	(ac-in)	(cfs)	(days hh:mm:ss)
1	A1	12.64	6.00	77.57	5.0000	600.00	0.0150	0.4000	9.02	2.0580	6.35	80.21	12.19	0 01:53:50
2	A2	1.39	25.00	87.02	21.0000	100.00	0.0150	0.2500	9.02	0.9600	7.78	10.82	2.55	0 00:37:59
3	A3.1	0.47	100.00	96.96	1.0000	300.00	0.0150	0.1000	9.02	0.0000	8.94	4.20	1.03	0 00:05:36
4	A3.2	0.07	100.00	91.00	15.0000	40.00	0.0150	0.2500	9.02	0.0000	8.96	0.63	0.15	0 00:02:39
5	A3.3	0.45	0.00	81.00	25.0000	140.00	0.0150	0.4000	9.02	1.8610	6.87	3.09	0.78	0 00:23:35
6	A3.4	2.54	0.00	78.33	21.7000	275.00	0.0150	0.4000	9.02	2.1170	6.53	16.58	3.69	0 00:46:22

BARTELT ENGINEERING

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft^2)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	In - B1	Junction	164.00	165.00	0.00	0.00	1000.00	2.55	164.78	0.22	0 00:00	0.00	0.00
2	In - B1.1	Junction	117.00	118.00	0.00	0.00	1000.00	2.56	118.78	0.22	0 00:00	0.00	0.00
3	In - C1	Junction	165.00	166.00	0.00	0.00	0.00	0.15	165.08	0.92	0 00:00	0.00	0.00
4	Creek	Outfall	113.00					20.17	113.68				
5	Downhill Basin	Storage Node	113.50	115.50	113.50		0.00	2.56	115.33			0.00	0.00
6	Uphill Basin	Storage Node	147.00	150.00	0.00		3531.00	5.57	149.68			0.00	0.00

Storage Nodes

Storage Node : Downhill Basin

Input Data

Invert Elevation (ft)	113.50
Max (Rim) Elevation (ft)	115.50
Max (Rim) Offset (ft)	2.00
Initial Water Elevation (ft)	113.50
Initial Water Depth (ft)	0.00
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	Weir-01	Rectangular	No	115.00	1.50	4.00	0.50	3.33

Output Summary Results

Peak Inflow (cfs)	2.56
Peak Lateral Inflow (cfs)	0.00
Peak Outflow (cfs)	2.55
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	115.33
Max HGL Depth Attained (ft)	1.83
Average HGL Elevation Attained (ft)	114.94
Average HGL Depth Attained (ft)	1.44
Time of Max HGL Occurrence (days hh:mm)	0 08:08
Total Exfiltration Volume (1000-ft³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

BARTELT ENGINEERING

Storage Node : Uphill Basin

Input Data

Invert Elevation (ft)	147.00
Max (Rim) Elevation (ft)	150.00
Max (Rim) Offset (ft)	3.00
Initial Water Elevation (ft)	0.00
Initial Water Depth (ft)	-147.00
Ponded Area (ft^2)	3531.00
Evaporation Loss	0.00

Output Summary Results

Peak Inflow (cfs)	5.57
Peak Lateral Inflow (cfs)	5.43
Peak Outflow (cfs)	5.50
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	149.68
Max HGL Depth Attained (ft)	2.68
Average HGL Elevation Attained (ft)	148.96
Average HGL Depth Attained (ft)	1.96
Time of Max HGL Occurrence (days hh:mm)	0 08:06
Total Exfiltration Volume (1000-ft^3)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00