APPENDIX I:
HYDROLOGY AND WATER QUALITY DATA

Storm Water Low Impact Development Submittal (SW LIDS) Coversheet and Checklist

Note: SW LIDS was previously referred to as "SUSMP" or "SWMP"

***Instructions*: Fill in Part A for Initial SW LIDS and Part B for Final SW LIDS.**
Any drawings or calculations must be attached to this sheet.

1. Submittal Information:

☒ Initial SW LIDS, Submitted Date: 4/6/2022 ☐ Final SW LIDS, Submitted Date: _____

Design Manual Used for Design:

☐ 2005 Standard Urban Storm Water Mitigation Plan (SUSMP)

☐ 2011 Storm Water Low Impact Development Technical Design Manual (SWMP) (Windsor 10-15-14 to 5-2-17)

☒ 2017 Storm Water Low Impact Development Technical Design Manual (SW LIDS) (Windsor 5-3-17 to Present)

2. Applicant Information:

Applicant Name (Owner or Developer): Doyle Heaton

Mailing Address: 3496 Buskirk Ave., Suite 204

City/State/Zip: Pleasant Hill, CA 94523

Phone/Email/Fax: (925) 872-9917

3. Project Information:

Project Name: 7842 Hembree Lane

4. Site Address:

City/State/Zip: Windsor, CA 95492

5. Permit(s):

Note: If the applicant has already applied for permits, please indicate permit number(s) below.

☐ Building Permit	# _____	☒ Design Review	# _____
☐ Encroachment	# _____	☐ Grading Permit	# _____
☐ Hillside Development	# _____	☒ Subdivision	# _____
☐ Time Extension	# _____	☐ Use Permit	# _____

☐ Other(s) _____

Part A: Initial SW LID Submittal

1. Design Information:

Narrative: Please check the items attached to this form, leaving lines to the left blank.
Note: To be submitted with all Project Applications.

Project Description

Reviewer/Applicant

_____ ☒ Description of proposed project type, size, location, and any specific uses or features

_____ ☒ Description of any sensitive features (creeks, wetlands, trees, etc.) and whether they are going to be preserved, removed or altered

_____ ☒ Description of the existing site, including impervious area noted

_____ ☒ Description of other triggering factor(s) such as 401 water quality certification

_____ ☒ Level of treatment and Volume Capture

_____ ☐ Treatment Only ☐ Delta Volume and Treatment ☒ 100% Volume Capture and Treatment

_____ ☒ Describe any "on-site offset" used. "On-site offset" refers to BMPs developed or sized to receive runoff from project improvements made in the public right-of-way, or on a separate parcel, but treated on the project site.

Determination Worksheet

Reviewer/Applicant

_____ ☒ Determination Worksheet must be completed.

Pollution Prevention and Runoff Reduction Measures

Reviewer/Applicant

_____ ☒ Description of all proposed pollution prevention measures (street sweeping, covered trash enclosures, indoor uses, etc.).

_____ ☒ Description of all Runoff Reduction Measures which provide area reduction credits (Interceptor Trees, Impervious Area Disconnection, and/or Alternative Driveway Design).

Type of BMPs Proposed

Reviewer/Applicant

_____ ☒ Description of each type of BMP selected, its priority group, reason for selection, and a narrative of how each works. (A full detail drawing will be required for the final SW LIDS submittal.)

_____ ☒ Completed BMP Selection Table

_____ ☒ Description of level of treatment and volume capture achieved for each BMP.

Maintenance

Reviewer/Applicant

_____ ☐ Preliminary description of maintenance for each type of BMP

_____ ☒ Description of proposed funding source

2. **Exhibits:**

Proposed SW LIDS Exhibit:

Reviewer/Applicant

____ ☒ Exhibit should include: site layout, new or replaced impervious areas, street names, property lines, storm drainage system, and waterways. Also include title, block, scale and north arrow.

____ ☒ Tributary areas shown for all BMPs (including off-site drainage areas)

____ ☒ C value for each tributary area.

____ ☒ Soil Type of existing site.

____ ☒ New or replaced impervious area shown.

____ ☒ All inlets and BMPs, shown (including unique identifier).

____ ☒ All interceptor trees shown.

____ ☒ All proposed BMPs shown including dimensions.

Existing Condition Exhibit

Reviewer/Applicant

____ ☐ Exhibit should include: street names, property lines, storm drainage system, waterways, title block, scale and north arrow.

____ ☐ Soil Type of existing site.

____ ☐ Proposed tributary areas shown for all proposed BMPs with existing impervious area shown and labeled in square feet or acres (including offsite drainage areas). Also, show land cover types and associated C values.

____ ☐ Existing impervious areas. Existing impervious area.

3. **BMP Details:**

Reviewer/Applicant

____ ☒ For each type of BMP selected, provide a preliminary 8.5" x 11" detail for each BMP type or include changes are proposed. If the design varies from fact sheets, describe how and why there were modified.

4. **On Plans:**

Reviewer/Applicant

____ ☒ Show all applicable elements of the selected BMPs on the appropriate plan sheets.

5. **Calculations:**

Reviewer/Applicant

____ ☒ Sizing calculations for each BMP and summary sheet using the Storm Water Calculator found at www.srcity.org/stormwaterLID

____ ☒ Supplemental or supporting calculation if applicable.

6. **Preliminary Plan**

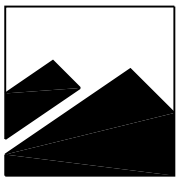
Andrew Bordessa, PE	4/6/22	
Project Representative/Title	Date	Signature
Town Approval/Title	Date	Signature

INITIAL STORM WATER LOW IMPACT DEVELOPMENT SUBMITTAL

7842 HEMBREE LANE

APRIL 2022

CIVIL DESIGN CONSULTANTS, INC.
2200 Range Avenue, Suite 204
Santa Rosa, CA 95403
(707) 542-4820



INITIAL
STORM WATER LOW IMPACT DEVELOPMENT SUBMITTAL

FOR

7842 Hembree Lane

Located at
7842 Hembree Lane
Windsor, CA 95492

APN 163-080-047

Prepared for:

Falcon Point Associates and DRG Builders
3496 Buskirk Ave., Suite 204
Pleasant Hill, CA 94523

April 2022

4/6/22

Prepared by:

CIVIL DESIGN CONSULTANTS, INC.
2200 RANGE AVENUE, SUITE 204
SANTA ROSA, CA 95403

21-107

CONTENTS

ATTACHMENTS

1 INTRODUCTION

The 7842 Hembree Lane project site is within the limits of the Town of Windsor, a CoPermittee of the National Pollutant Discharge Elimination System (NPDES) Phase I Municipal Separate Storm Sewer System (MS4) Storm Water Permit issued by the North Coast Regional Water Quality Control Board (NCRWQCB) for Region 1 in 2016. The NDPES regulates discharges into the watershed with the intent to reduce storm water pollution and protect the water quality of our local creeks and waterways and continue to promote groundwater recharge. The Town of Windsor and the County of Sonoma have adopted the Storm Water Low Impact Development (LID) Technical Design Manual as part of the Storm Water Management Program (SWMP) that is an enforceable part of the NPDES MS4 permit. This Initial Storm Water Low Impact Development Submittal (SWLIDS) was developed to show compliance with the NDPES MS4 permit and the following requirements to the maximum extent practicable:

1. Prevent pollutants generated at the site from leaving the site.

2. Prevent increases in Storm Water runoff for 1.0 inch of rainfall over a 24-hour period.

3. Strive to maximize the amount of land left in a natural undisturbed condition.

This Initial SWLIDS will provide the following information:

- Project Description
- Pollution Prevention Measures
- Types of Best Management Practices (BMPs) selected to mitigate pollutants and provide volume capture
- Responsibility for BMP maintenance
- Location and design of BMPs (on project drawings)

2 PROJECT DESCRIPTION

The Hembree Lane project site is located at 7842 Hembree Lane. The property is located within the Town of Windsor.

The Hembree Lane property has a total area of 5.10 acres and is contained within a single assessor parcel, 163-080-047. The existing site contains approximately 400 trees varying in size from four inches and primarily consisting of the oak variety. The project site includes a seasonal drainage ditch that bisects the property and flows from the northeast to the southwest. The eastern segment of Cornell Street drains to the drainage ditch through a piped drainage system that outlets directly to the drainage ditch which is collected further downstream by an existing drainage system at Country Meadow Lane to the south. The project site is located along the south side of Cornell Street and lies between Robbins Park to the east and Hembree Lane to the west. Existing residential properties are to the south of the project site and along the north side of Cornell Street.

The project is proposed by Falcon Point Associates and DRG Builders as a single, non-phased project. Open space is offered to the Town of Windsor as the 2.1 acre “Parcel A.” The construction of twenty four (24) attached and detached residential lots over the remaining 3.0 acres is proposed. Public improvements include the full build-out of Cornell Street, the extension of Country Meadow Way to Cornell Street, and an extension of Meadowlark Way to serve three additional lots. A total impervious area of 2.1 acres is proposed, triggering the hydromodification control requirement of 100% volume capture and treatment.

Storm water runoff from most of the project will drain to the proposed public street improvements curb and gutter. Runoff will enter bio-retention beds in planter strips through curb openings and will be given the opportunity to infiltrate in underground volume capture before entering the underground drainage system. These features shall not only remove pollutants but will also reduce the amount of runoff by capturing and infiltrating storm water. The LID BMP’s are proposed at various locations throughout the project site, providing treatment for each of the site tributaries. The purpose of these features and their effect on the quality and quantity of runoff leaving the developed site will be further explained throughout this report.

Due to site constraints, on-site offsets are used. The runoff from the westbound lane of Cornell Street within tributary areas TRIB-4 through TRIB-7 cannot be directed to planter-based bio-retention beds because of existing contiguous sidewalk on Cornell Street. In order to achieve 100% Volume Capture, the bio-retention beds within these tributary areas are sized to accommodate the volume of runoff produced by the westbound lane of Cornell Street. The bio-retention beds in TRIB-2 and TRIB-4 are sized to compensate for the inadequate volume capture in TRIB-1 and TRIB-3 respectively.

3 POLLUTION PREVENTION MEASURES

It was assumed during the preliminary stage that each proposed lot will be planted with at least two street trees that will be considered as interceptor trees. The total tributary area used for 100% volume capture calculations has been reduced by taking credit for this measure.

FloGard Catch Basin Insert filter devices will be installed at the proposed and existing catch basins located along the north side of Cornell Street in order to assure the areas not draining to a bio-retention bed will have a treatment device to capture trash and other pollutants prior to entering the underground storm drain system.

4 TYPES OF BMP'S SELECTED TO MITIGATE POLLUTANTS AND PROVIDE VOLUME CAPTURE

Low Impact Development Best Management Practices (LID BMP's) are design features that address the quality and quantity of the storm waters that flow from a development. In most cases, these LID BMPs are used to mitigate a development's impact on the quality of storm water by treating or cleaning the storm water. Some controls have dual treatment control measure capabilities, not only treating, but also containing a required volume of storm water. The Hembree Lane project will implement roadside bio-retention beds with curb openings (Priority 2) to mitigate pollutants and provide volume capture for 1.0 inch of rainfall over a 24-hour period. Volume capture is accomplished by incorporating an area for storm water storage beneath the bio-retention beds.

Roadside bio-retention beds with curb openings (Priority 2) have been selected for this project because of their ability to remove pollutants through a variety of natural physical, biological and chemical treatment processes. Large trash is collected at the surface and easily removed with routine maintenance. Suspended solids and hydrocarbons, pollutants that can degrade the downstream receiving waters of the project, settle out and are removed from runoff. Fine particles are collected within vegetated buffer strips or within the planting soil layer, providing potential nutrients for plant growth. Compared to pipe networks, bio-retention beds with a volume capture layer will provide an opportunity for runoff to infiltrate through native soil before entering the underground storm drain system. This infiltration will reduce runoff from a site, reduce the peak flow in a basin, and provide ground water recharge.

The bio-retention bed section will consist of 12" planting soil on top of structural soil (volume capture) of various depths. The structural soil consists of ¾ inch to 1-½ inch aggregate, with a porosity of 30%, and organic soil material for a thriving landscape environment, meeting standards set forth in the City of Santa Rosa Low Impact Development Design Manual reference document 'E' and the geotechnical report.

The attached plan titled "Initial Storm Water LID Exhibit" shows the proposed general grading pattern for the project along with the tributary drainage areas and proposed LID BMP's. Typical LID BMP details are included in this exhibit. This project meets the hydromodification control requirement by achieving 100% volume capture.

5 RESPONSIBILITY FOR BMP MAINTENANCE

Treatment control devices serving the Hembree Lane project are located within the public right-of-way and will be maintained by the formation of a special tax district.

ATTACHMENTS

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

☐ Y ☐ N

Date Submitted: _____

TOWN OF WINDSOR

Print Form

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

2017 Storm Water LID Determination Worksheet

PURPOSE AND APPLICABILITY: This determination worksheet is intended to satisfy the specific requirements of "ORDER NO. R1-2015-0030, NPDES NO. CA0025054 NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT AND WASTE DISCHARGE REQUIREMENTS FOR DISCHARGES FROM THE MUNICIPAL SEPARATE STORM SEWER SYSTEMS." Additional design requirements imposed by Governing Agencies, such as local grading ordinances, CAL Green, CEQA, 401 permitting, and hydraulic design for flood control still apply as appropriate. Additionally, coverage under another regulation may trigger the requirement to design in accordance with the Storm Water LID Technical Design Manual.

Part 1: Project Information

7842 Hembree Lane Project Name	Doyle Heaton Applicant (owner or developer) Name
7842 Hembree Lane Project Site Address	3496 Buskirk Ave., Suite 204 Applicant Mailing Address
Windsor, CA 95492 Project City/State/Zip	Pleasant Hill, CA 94523 Applicant City/State/Zip
	(925) 872-9917 Applicant Phone/Email/Fax
Permit Number(s) - (if applicable)	
Civil Design Consultants Designer Name	2200 Range Avenue, Suite 204 Designer Mailing Address
Santa Rosa, CA 95403 Designer City/State/Zip	(707) 542-4820 / andy@civildesignconsultants. Designer Phone/Email

Type of Application/Project:

☑ Subdivison ☐ Grading Permit ☐ Building Permit ☐ Hillside Development

☐ DesignReview ☐ Use Permit ☐ Encroachment ☐ Time Extensions ☐ Other :_____

PART 2: Project Exemptions

1. Is this a project that creates or replaces *less than* 10,000 square feet of impervious surface[1], including all project phases and off-site improvements?

   ☐ Yes ☑ No

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

2. Is this project a routine maintenance activity[2] that is being conducted to maintain original line and grade, hydraulic capacity, and original purpose of facility such as resurfacing existing roads and parking lots?

☐ Yes ☐ No

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

☐ Yes ☑ No

4. **Did you answer "YES" to any of the questions in Part 2?**

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

☑ **NO:** Please complete the remainder of this worksheet.

Part 3: Project Triggers

Projects that Trigger Requirements:
Please answer the following questions to determine whether this project requires permanent Storm Water BMP's and the submittal of a SW LIDs as required by the NPDES MS4 Permit order No. R1-2015-0030.

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

☑ Yes ☐ No

2. Does this project create or replace a combined total or 10,000 square feet or more of impervious streets, roads, highways, or freeway construction or reconstruction[3]? ☑ Yes ☐ No

3. Does this project create or replace a combined total of 1.0 acre or more of impervious surface[1] including all project phases and off-site improvements? ☑ Yes ☐ No

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

☑ **YES:** This project will need to incorporate permanent Storm Water BMP's as required by the NPDES MS4 Permit. **Please complete remainder of worksheet and sign the "Acknowledgement Signature Section" on Page 4.**

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

---

1 Imprevious surface replacement, such as the reconstruction of parking lots or excavation to roadway subgrades, is not a routine maintence activity. Reconstruction is defined as work that replaces surfaces down to the subgrade. Overlays, resurfacint, trenching and patching are defined as maintenance activities per section VI.D.2.b.

2 "Rountine Maintenance Activity" includes activities such as overlays and/or resurfacing of existing roads or parking lots as well as trenching and patching activities and reroofing activities per section VI.D.2.b.

3 "Reconstruction" is defined as work that extends into the subgrade of a pavement per section VI.D.2.b.

Part 4: Project Description

1. Total Project area: 5.1 ○ square feet ◉ acres

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

☐ Commercial ☐ Industrial ☑ Residential ☐ Public ☐ Other

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

Approximately 400 trees of various sizes primarily consisting of the oak variety along with a seasonal drainage ditch that runs from northeast to southwest.

3. Existing impervious surface area: 0 ○ square feet ◉ acres

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

☐ Commercial ☐ Industrial ☑ Residential ☐ Public ☐ Other

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

The improvements will see the construction of 24 residential lots, a remainder parcel, and the full buildout of Cornell Street and extension of Country Meadow Way and Meadowlark Way.

5. Proposed impervious surface area: 2.1 ○ square feet ◉ acres

Project Name

2017 Storm Water LID Determination Worksheet | 7842 Hembree Lane

Acknowledgment Signature Section:

As the property owner or developer, I understand that this project is required to implement permanent Storm Water Best Management Practices and provide a Storm Water Low Impact Development Submittal (SW LIDS) as required by the City's National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer Systems (MS4) Permit Order No. R1-2015-0030. *Any unknown responses must be resolved to determine if the project is subject to these requirements.

Falcon Point Assoc LLC
Dale Hewton [illegible]

Applicant Signature

Feb 9, 2022

Date

Exemption Signature Section:

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

Applicant Signature

Date

*** This determination worksheet is intended to satisfy the specific requirements of "ORDER NO. R1-2015-0030, NPDES NO. CA0025054 NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT AND WASTE DISCHARGE REQUIREMENTS FOR DISCHARGES FROM THE MUNICIPAL SEPARATE STORM SEWER SYSTEMS." Additional design requirements imposed by Governing Agencies, such as local grading ordinances, CAL Green, CEQA, 401 permitting, and hydraulic design for flood control still apply as appropriate. Additionally, coverage under another regulation may trigger the requirement to design in accordance with the Storm Water LID Technical Design Manual.**

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

Hydromodification Control/100% Volume Capture: Capture (infiltration and/or reuse) of 100% of the volume of runoff generated by a 1.0" 24-hour storm event, as calculated using the "Urban Hydrology for Small Watersheds" TR-55 Manual method. This is a retention requirement.

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

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

Soil Map—Sonoma County, California
(7842 Hembree Lane)

Map Scale: 1:2,310 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 30 60 120 180

Feet
0 100 200 400 600

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

Sonoma County, California

HuB—Huichica loam, ponded, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: hffn
Elevation: 100 to 300 feet
Mean annual precipitation: 30 inches
Mean annual air temperature: 61 degrees F
Frost-free period: 260 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

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

Description of Huichica

Setting

Landform: Terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from igneous, metamorphic and sedimentary rock

Typical profile

H1 - 0 to 14 inches: loam
H2 - 14 to 23 inches: sandy clay loam
H3 - 23 to 38 inches: clay
H4 - 38 to 57 inches: cemented

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches; 20 to 40 inches to duripan
Drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water supply, 0 to 60 inches: Low (about 3.5 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: D

Ecological site: R014XG912CA - Loamy Terrace
Hydric soil rating: Yes

Minor Components

Clear lake
Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

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

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

Data Source Information

Soil Survey Area: Sonoma County, California
Survey Area Data: Version 15, Sep 10, 2021

Sonoma County, California

HwB—Huichica loam, shallow, ponded, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: hffq
Elevation: 100 to 300 feet
Mean annual precipitation: 30 inches
Mean annual air temperature: 61 degrees F
Frost-free period: 260 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Huichica

Setting

Landform: Terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from igneous, metamorphic and sedimentary rock

Typical profile

H1 - 0 to 12 inches: loam
H2 - 12 to 30 inches: clay
H3 - 30 to 57 inches: cemented

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches; 20 to 40 inches to duripan
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water supply, 0 to 60 inches: Very low (about 1.9 inches)

Interpretive groups

Land capability classification (irrigated): 4w
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: D
Ecological site: R014XG912CA - Loamy Terrace

Hydric soil rating: Yes

Minor Components

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

Zamora
Percent of map unit: 6 percent
Hydric soil rating: No

Clear lake
Percent of map unit: 2 percent
Landform: Depressions
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Sonoma County, California
Survey Area Data: Version 15, Sep 10, 2021

BMP Selection Table

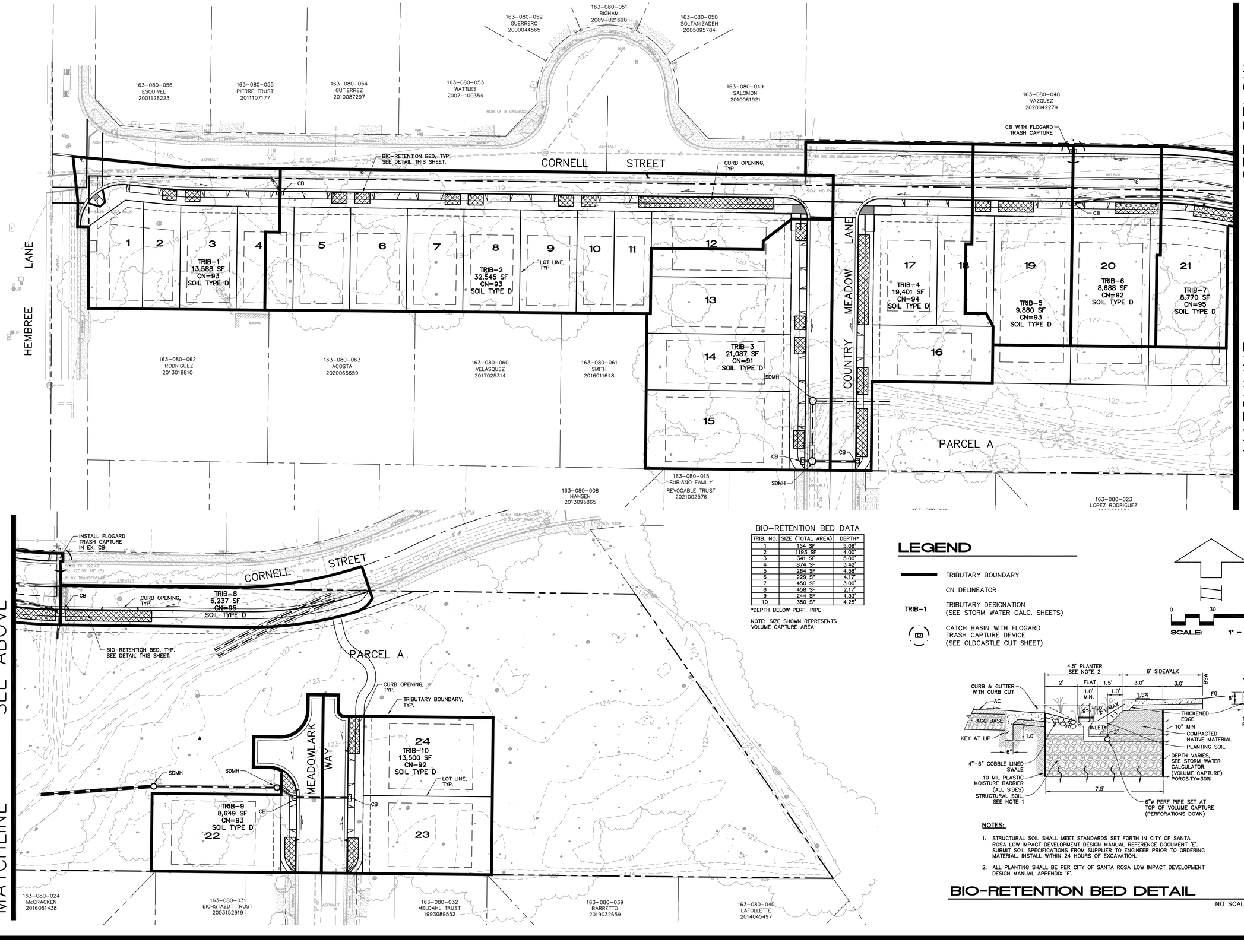
Project Name: 260 Arata Lane, Windsor

	Best Management Practice (BMP)	Detail Sheet	Detail Title	Can be used with...	High Ground Water	Contamination	Slope Constraints	Achieves...	Treatment	Volume Capture	Runoff Reduction Measure	BMP in priority selected?	Yes	No	Unique Identifier of BMP per planes	Explanation of selection	Other notes:
Universal BMP- to be considered on all projects.	Living Roof	N/A	N/A		X	X	X		X	X							
	Rainwater Harvesting	N/A	N/A		X	X	X			X							
Runoff Reduction Measures	Interceptor Trees	N/A	N/A		X	X	X				X		✓				
	Bovine Terrace	RRM-01	Bovine Terrace		X						X						
	Vegetated Buffer Strip	RRM-02	Vegetated Buffer Strip								X						
	Impervious Area Disconnection	N/A	N/A		X	X	X				X						
Priority 1- to be installed with no underdrains or liners. Must drain all stading water within 72 hours.	Bioretention	P1-02	Roadside Bioretention - no C & G						X	X							
	Vegetated Swale- with Bioretention	P1-06	Swale with Bioretention						X	X							
	Constructed Wetlands	N/A	N/A						X	X							
Priority 2 BMPs- with subsurface drains installed above the capture volume.	Bioretention	P2-02	Roadside Bioretinton - Flush Design Roadside						X	X							
		P2-03	Roadside Bioretenion- Contiguous SW						X	X							
		P2-04	Roadside Bioretenion- Curb Opening						X	X			✓				
		P2-05	Roadside Bioretenion- No C & G						X	X							
	Constructed Wetlands	N/A	N/A						X	X							

Date: _____

BMP Selection Table

	Best Management Practice (BMP)	Detail Sheet	Detail Title	Can be used with...	High Ground Water	Contamination	Slope Constraints	Achieves...	Treatment	Volume Capture	Runoff Reduction Measure	BMP in priority selected?	Yes	No	Unique Identifier of BMP per planes	Explanation of selection	Other notes:
Priority 3 BMPs- installed with subdrains and/or impermeable liner. Does not achieve volume capture and must be used as part of a treatment train.	Bioretention	P3-02	Roadside Bioretinton - Flush Design Roadside		X	X	X		X								
		P3-03	Roadside Bioretenion- Contiguous SW		X	X	X		X								
		P3-04	Roadside Bioretenion- Curb Opening		X	X	X		X								
	Flow Through Planters	P3-05	Flow Through Planters		X	X	X		X								
	Vegetated Swale	P3-06	With Bioretention		X	X	X		X	X							
		P3-07	Vegetated Swale		X	X	X		X								
Priority 4 BMPs- does not achieve volume capture and must be used as part of a	Tree Filter Unit				X	X	X		X								
	Modular Bioretention				X	X	X		X								
Priority 5 BMPs- does not achieve volume capture and must be used as part of a treatment train.	Chambered Separator Units				X	X	X		X								
	Centrifugal Separator Units				X	X	X		X								
	Trash Excluders				X	X	X		X								
	Filter Inserts				X	X	X		X								
Priority 6 BMPs- see the "Offset Program" chapter for details.	Offset Program								N/A	N/A	N/A						
Other	Detention				X												



BIO-RETENTION BED DATA

TRIB. NO.	SIZE (TOTAL AREA)	DEPTH*
1	154 SF	5.08'
2	1193 SF	4.00'
3	341 SF	5.00'
4	874 SF	3.42'
5	264 SF	4.58'
6	229 SF	4.17'
7	450 SF	3.00'
8	458 SF	2.17'
9	244 SF	4.33'
10	350 SF	4.25'

*DEPTH BELOW PERF. PIPE

NOTE: SIZE SHOWN REPRESENTS VOLUME CAPTURE AREA

LEGEND

- TRIBUTARY BOUNDARY
- CN DELINEATOR
- TRIB-1 — TRIBUTARY DESIGNATION (SEE STORM WATER CALC. SHEETS)
- CATCH BASIN WITH FLOGARD TRASH CAPTURE DEVICE (SEE OLDCASTLE CUT SHEET)

0 30 60

SCALE: 1" = 30'

NOTES:

1. STRUCTURAL SOIL SHALL MEET STANDARDS SET FORTH IN CITY OF SANTA ROSA LOW IMPACT DEVELOPMENT DESIGN MANUAL REFERENCE DOCUMENT 'E'. SUBMIT SOIL SPECIFICATIONS FROM SUPPLIER TO ENGINEER PRIOR TO ORDERING MATERIAL. INSTALL WITHIN 24 HOURS OF EXCAVATION.
2. ALL PLANTING SHALL BE PER CITY OF SANTA ROSA LOW IMPACT DEVELOPMENT DESIGN MANUAL APPENDIX 'F'.

BIO-RETENTION BED DETAIL

NO SCALE

CIVIL DESIGN CONSULTANTS, INC.
2200 Range Avenue Suite 204
Santa Rosa, CA 95403
(707) 542-4820

PROFESSIONAL ENGINEER * REGISTERED * STATE OF CALIFORNIA
ANDREW BORDESSA
No. 34388
CIVIL
DATE
ANDREW BORDESSA
RCE 34388

INITIAL STORM WATER LID EXHIBIT

HEMBREE LANE

7842 HEMBREE LANE
WINDSOR, CALIFORNIA

DOC.NO. 2012067749
APN 163-080-047

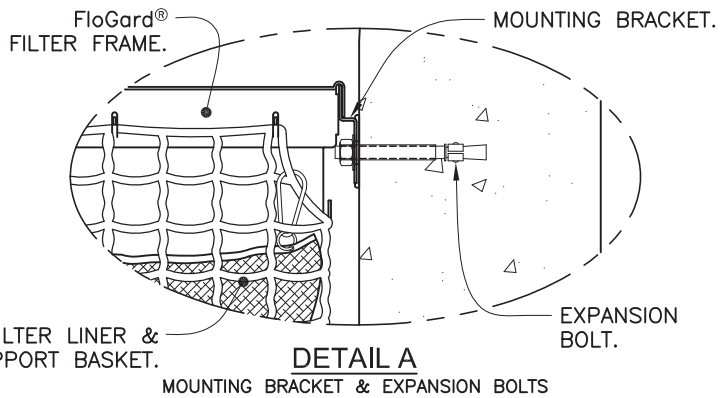
5.10 ACRES
2 LOTS
1 PARCEL
APRIL 2022

JOB NO.
21-107

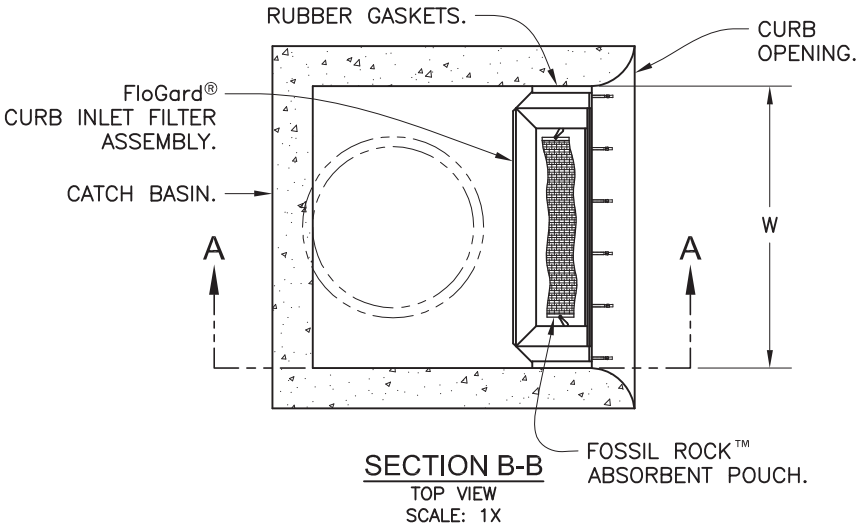
SHEET NO.
1
OF 1 SHEETS

FGP-0002

EXHIBIT C

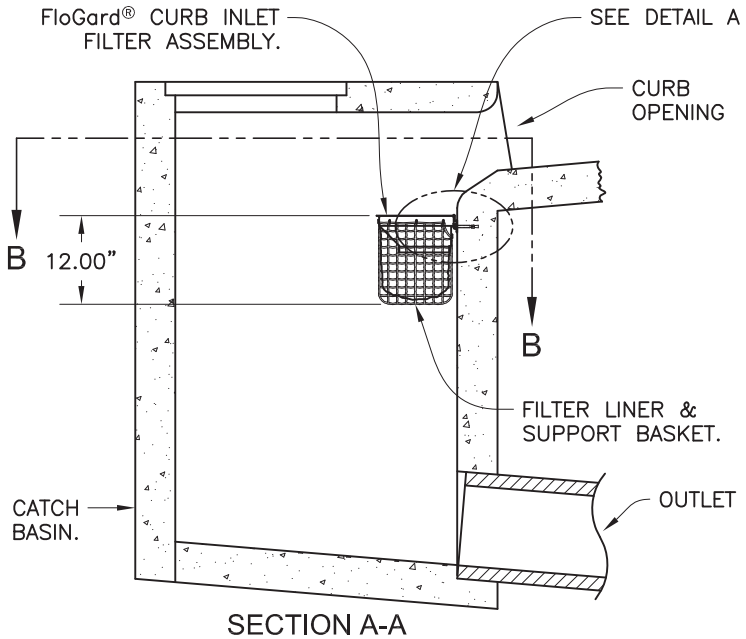


DETAIL A
MOUNTING BRACKET & EXPANSION BOLTS
SEE NOTE 2
SCALE: 6X



SECTION B-B
TOP VIEW
SCALE: 1X

SPECIFIER CHART				
MODEL NO.	Curb Opening Width - W -	Storage Capacity - Cu. Ft. -	Filtered Flow Rate - GPM/CFS -	Bypass Flow Rate - GPM/CFS -
FGP-24CI	2.0' (24")	.95	338 / .75	2,513 / 5.6
FGP-30CI	2.5' (30")	1.20	450 / 1.00	3,008 / 6.7
FGP-36CI	3.0' (36")	1.50	563 / 1.25	3,547 / 7.9
FGP-42CI	3.5' (42")	1.80	675 / 1.50	3,951 / 8.8
FGP-48CI	4.0' (48")	2.10	768 / 1.76	4,445 / 9.9
FGP-5.0CI	5.0' (60")	2.40	900 / 2.00	5,208 / 11.6
FGP-6.0CI	6.0' (72")	3.05	1,126 / 2.51	6,196 / 13.8
FGP-7.0CI	7.0' (84")	3.65	1,350 / 3.01	7,139 / 15.9
FGP-8.0CI	8.0' (96")	4.25	1,576 / 3.51	8,082 / 18.0
FGP-10.0CI	10.0' (120")	4.85	1,800 / 4.01	9,833 / 21.9
FGP-12.0CI	12.0' (144")	6.10	2,252 / 5.02	11,764 / 26.2
FGP-14.0CI	14.0' (168")	7.30	2,700 / 6.02	13,515 / 30.1
FGP-16.0CI	16.0' (192")	8.55	3.152 / 7.02	15,446 / 34.4
FGP-18.0CI	18.0' (216")	9.45	3,490 / 7.78	17,152 / 38.2
FGP-21.0CI	21.0' (252")	10.95	4,050 / 9.02	19,891 / 44.3
FGP-28.0CI	28.0 (336")	14.60	5,400 / 12.03	26,311 / 58.6



SECTION A-A
SIDE VIEW
SCALE: 1X

NOTES:

1. Filter insert shall have a high flow bypass feature.
2. Filter support frame shall be constructed from stainless steel Type 304.
3. Filter medium shall be *Fossil Rock* ™, installed and maintained in accordance with manufacturer specifications.
4. Storage capacity reflects 80% of maximum solids collection prior to impeding filtering bypass.

Inlet
Filtration

FloGard®

Catch Basin Insert Filter

Curb Inlet Style

Oldcastle®
Stormwater Solutions

7921 Southpark Plaza, Suite 200 | Littleton, CO | 80120 | Ph: 800.579.8819 | oldcastlestormwater.com

DRAWING NO.	REV	ECO	DATE	
FGP-0002	E	ECO-0127 JPR 5/18/15	JPR 1/3/06	SHEET 1 OF 1

City of Santa Rosa WATER

STORM WATER CALCULATOR

LID BMP Summary Page & Site Global Values

Project Information:

Project Name:	HEMBREE LANE
Address/Location:	7842 Hemnree Lane, Windsor CA
Designer:	Jose Mederos
Date:	1/28/2022

Site Information:

Mean Seasonal Precipitation (MSP) of Project Site:	30.00	(inches)
K=MSP/3(K=	1.00	
Impervious area - pre development:	0.0	ft^2
Impervious area - post development:	91,337.0	ft^2

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

100% Capture & Treatment

Summary of Saved BMP Results:

		Tributary Area		Requirements		BMP Design Results						
							Hydromodification Control		Flow Base Treatment		Delta Volume Capture	
	BMP ID:	Tributary Area (ft^2.)	Runoff Reduction Measures (Y/N)	Type of Requirement Met	Type of BMP Design	Percent Achieved	Required $V_{Hydromod}$ (ft^3)	Achieved (ft^3)	Required Q Treatment (cfs)	Achieved (ft^3)	Required Vdelta (ft^3)	Achieved (ft^3)
1	TRIB-1	13,588	Yes	Hydromod Volume Capture	Priority 2: P2-04 Roadside Bioretention - Curb Opening	47.8	491.0618	234.8500				
2	TRIB-2	32,545	Yes	Hydromod Volume Capture	Priority 2: P2-04 Roadside Bioretention - Curb Opening	122.1	1172.3124	1431.6001				
3	TRIB-3	21,087	Yes	Hydromod Volume Capture	Priority 2: P2-04 Roadside Bioretention - Curb Opening	83.8	610.3868	511.5000				
4	TRIB-4	19,401	Yes	Hydromod Volume Capture	Priority 2: P2-04 Roadside Bioretention - Curb Opening	112.9	793.6530	895.8500				
5	TRIB-5	9,880	Yes	Hydromod Volume Capture	Priority 2: P2-04 Roadside Bioretention - Curb Opening	101.0	359.4416	363.0000				
6	TRIB-6	8,688	Yes	Hydromod Volume Capture	Priority 2: P2-04 Roadside Bioretention - Curb Opening	100.6	284.5178	286.2495				
7	TRIB-7	8,770	Yes	Hydromod Volume Capture	Priority 2: P2-04 Roadside Bioretention - Curb Opening	100.6	402.4472	405.0000				
8	TRIB-8	6,237	No	Hydromod Volume Capture	Priority 2: P2-04 Roadside Bioretention - Curb Opening	101.6	292.8895	297.6991				
9	TRIB-9	8,649	Yes	Hydromod Volume Capture	Priority 2: P2-04 Roadside Bioretention - Curb Opening	100.1	317.0065	317.1976				
10	TRIB-10	13,500	Yes	Hydromod Volume Capture	Priority 2: P2-04 Roadside Bioretention - Curb Opening	101.6	439.1120	446.2500				
11												
12												
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14												
15												
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STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: HEMBREE LANE

BMP ID: TRIB-1

BMP Design Criteria: 100% Capture & Treatment

Type of BMP Design: Priority 2: P2-04 Roadside Bioretention - Curb Opening

BMP's Physical Tributary Area: 13,588.0 ft^2

Description/Notes:

Runoff Reduction Measures

Resulting reduced Tributary Area used for BMP sizing = 13,088.0 ft^2

Total Runoff Reduction Measures = 500.0 ft^2

Interceptor Trees

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

Number of ***new*** interceptor ***Deciduous Trees*** : 5

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

Total Number of New trees in BMP Tributary Area: 5

Disconnected Roof Drains

Select disconnection condition: Select disconnection condition

Disconnected Roof Drains Method 1

Roof area of disconnected downspouts: 0 ft^2

Disconnected Roof Drains Method 2

Percent of rooftop area: 0 %

Select Density: 1 Units per Acre

Paved Area Disconnection

Paved Area Type: Select paved area type

Alternatively designed paved area: 0.0 ft^2

Buffer Strips & Bovine Terraces

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

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

$V_{HYDROMOD}$ = 491.06 ft^3

Post development hydrologic soil type within tributary area: D: 0 - 0.05 in/hr infiltration (transmission) rate

Post development ground cover description: Residential - 1/8 acre or less (town houses)

CN_{POST} :

User Composite post development CN: 93.0

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = 47.82 %

	BMP Volume Below Ground		Ponded Water Above Ground	
Porosity:	0.30			
Depth below perforated pipe if present:	5.08	ft		
Depth:			0.00	ft
Width:	0.00	ft	0.00	ft
Length:	0.00	ft	0.00	ft
Area:	154.00	ft^2	0.00	ft^2

STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: HEMBREE LANE

BMP ID: TRIB-2

BMP Design Criteria: 100% Capture & Treatment

Type of BMP Design: Priority 2: P2-04 Roadside Bioretention - Curb Opening

BMP's Physical Tributary Area: 32,545.0 ft^2

Description/Notes:

Runoff Reduction Measures

Resulting reduced Tributary Area used for BMP sizing = 31,245.0 ft^2

Total Runoff Reduction Measures = 1,300.0 ft^2

Interceptor Trees

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

Number of ***new*** interceptor ***Deciduous Trees***: 13

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

Total Number of New trees in BMP Tributary Area: 13

Disconnected Roof Drains

Select disconnection condition: Select disconnection condition

Disconnected Roof Drains Method 1

Roof area of disconnected downspouts: 0 ft^2

Disconnected Roof Drains Method 2

Percent of rooftop area: 0 %

Select Density: 1 Units per Acre

Paved Area Disconnection

Paved Area Type: Select paved area type

Alternatively designed paved area: 0.0 ft^2

Buffer Strips & Bovine Terraces

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

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

$V_{HYDROMOD}$ = 1,172.31 ft^3

Post development hydrologic soil type within tributary area: D: 0 - 0.05 in/hr infiltration (transmission) rate

Post development ground cover description: Residential - 1/8 acre or less (town houses)

CN_{POST}:

User Composite post development CN: 93.0

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = 122.12 %

	BMP Volume Below Ground		Ponded Water Above Ground	
Porosity:	0.30			
Depth below perforated pipe if present:	4.00	ft		
Depth:			0.00	ft
Width:	0.00	ft	0.00	ft
Length:	0.00	ft	0.00	ft
Area:	1,193.00	ft^2	0.00	ft^2

STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: HEMBREE LANE

BMP ID:	TRIB-3
BMP Design Criteria:	100% Capture & Treatment
Type of BMP Design:	Priority 2: P2-04 Roadside Bioretention - Curb Opening
BMP's Physical Tributary Area:	21,087.0 ft^2
Description/Notes:	

Runoff Reduction Measures

Resulting reduced Tributary Area used for BMP sizing = 20,387.0 ft^2

Total Runoff Reduction Measures = 700.0 ft^2

Interceptor Trees

Number of ***new*** interceptor ***Evergreen Trees*** :	0	
Number of ***new*** interceptor ***Deciduous Trees*** :	7	Total Number of New trees in BMP Tributary Area: 7
Square footage of qualifying **existing tree canopy**:	0.0 ft^2	

Disconnected Roof Drains

Select disconnection condition: Select disconnection condition

Disconnected Roof Drains Method 1

Roof area of disconnected downspouts: 0 ft^2

Disconnected Roof Drains Method 2

Percent of rooftop area: 0 %

Select Density: 1 Units per Acre

Paved Area Disconnection

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

Buffer Strips & Bovine Terraces

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

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

$V_{HYDROMOD}$ = 610.39 ft^3

Post development hydrologic soil type within tributary area:	D: 0 - 0.05 in/hr infiltration (transmission) rate
Post development ground cover description:	Residential - 1/8 acre or less (town houses)
CN_{POST} :	
User Composite post development CN:	91.0

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = 83.80 %

	BMP Volume Below Ground		Ponded Water Above Ground	
Porosity:	0.30			
Depth below perforated pipe if present:	5.00	ft		
Depth:			0.00	ft
Width:	0.00	ft	0.00	ft
Length:	0.00	ft	0.00	ft
Area:	341.00	ft^2	0.00	ft^2

STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: HEMBREE LANE

BMP ID: TRIB-4

BMP Design Criteria: 100% Capture & Treatment

Type of BMP Design: Priority 2: P2-04 Roadside Bioretention - Curb Opening

BMP's Physical Tributary Area: 19,401.0 ft^2

Description/Notes:

Runoff Reduction Measures

Resulting reduced Tributary Area used for BMP sizing = 18,901.0 ft^2

Total Runoff Reduction Measures = 500.0 ft^2

Interceptor Trees

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

Number of ***new*** interceptor ***Deciduous Trees*** : 5

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

Total Number of New trees in BMP Tributary Area: 5

Disconnected Roof Drains

Select disconnection condition: Select disconnection condition

Disconnected Roof Drains Method 1

Roof area of disconnected downspouts: 0 ft^2

Disconnected Roof Drains Method 2

Percent of rooftop area: 0 %

Select Density: 1 Units per Acre

Paved Area Disconnection

Paved Area Type: Select paved area type

Alternatively designed paved area: 0.0 ft^2

Buffer Strips & Bovine Terraces

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

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

$V_{HYDROMOD}$ = 793.65 ft^3

Post development hydrologic soil type within tributary area: D: 0 - 0.05 in/hr infiltration (transmission) rate

Post development ground cover description: Residential - 1/8 acre or less (town houses)

CN_{POST} :

User Composite post development CN: 94.0

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = 112.88 %

	BMP Volume Below Ground		Ponded Water Above Ground	
Porosity:	0.30			
Depth below perforated pipe if present:	3.42	ft		
Depth:			0.00	ft
Width:	0.00	ft	0.00	ft
Length:	0.00	ft	0.00	ft
Area:	874.00	ft^2	0.00	ft^2

STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: HEMBREE LANE

BMP ID: TRIB-5

BMP Design Criteria: 100% Capture & Treatment

Type of BMP Design: Priority 2: P2-04 Roadside Bioretention - Curb Opening

BMP's Physical Tributary Area: 9,880.0 ft^2

Description/Notes:

Runoff Reduction Measures

Resulting reduced Tributary Area used for BMP sizing = 9,580.0 ft^2

Total Runoff Reduction Measures = 300.0 ft^2

Interceptor Trees

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

Number of ***new*** interceptor ***Deciduous Trees*** : 3

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

Total Number of New trees in BMP Tributary Area: 3

Disconnected Roof Drains

Select disconnection condition: Select disconnection condition

Disconnected Roof Drains Method 1

Roof area of disconnected downspouts: 0 ft^2

Disconnected Roof Drains Method 2

Percent of rooftop area: 0 %

Select Density: 1 Units per Acre

Paved Area Disconnection

Paved Area Type: Select paved area type

Alternatively designed paved area: 0.0 ft^2

Buffer Strips & Bovine Terraces

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

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

$V_{HYDROMOD}$ = 359.44 ft^3

Post development hydrologic soil type within tributary area: D: 0 - 0.05 in/hr infiltration (transmission) rate

Post development ground cover description: Residential - 1/8 acre or less (town houses)

CN_{POST} :

User Composite post development CN: 93.0

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = 100.99 %

	BMP Volume Below Ground		Ponded Water Above Ground	
Porosity:	0.30			
Depth below perforated pipe if present:	4.58	ft	Depth: 0.00	ft
Width:	0.00	ft	Width: 0.00	ft
Length:	0.00	ft	Length: 0.00	ft
Area:	264.00	ft^2	Area: 0.00	ft^2

STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: HEMBREE LANE

BMP ID: TRIB-6

BMP Design Criteria: 100% Capture & Treatment

Type of BMP Design: Priority 2: P2-04 Roadside Bioretention - Curb Opening

BMP's Physical Tributary Area: 8,688.0 ft^2

Description/Notes:

Runoff Reduction Measures

Resulting reduced Tributary Area used for BMP sizing = 8,488.0 ft^2

Total Runoff Reduction Measures = 200.0 ft^2

Interceptor Trees

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

Number of ***new*** interceptor ***Deciduous Trees*** : 2

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

Total Number of New trees in BMP Tributary Area: 2

Disconnected Roof Drains

Select disconnection condition: Select disconnection condition

Disconnected Roof Drains Method 1

Roof area of disconnected downspouts: 0 ft^2

Disconnected Roof Drains Method 2

Percent of rooftop area: 0 %

Select Density: 1 Units per Acre

Paved Area Disconnection

Paved Area Type: Select paved area type

Alternatively designed paved area: 0.0 ft^2

Buffer Strips & Bovine Terraces

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

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

$V_{HYDROMOD}$ = 284.52 ft^3

Post development hydrologic soil type within tributary area: D: 0 - 0.05 in/hr infiltration (transmission) rate

Post development ground cover description: Residential - 1/8 acre or less (town houses)

CN_{POST} :

User Composite post development CN: 92.0

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = 100.61 %

	BMP Volume Below Ground		Ponded Water Above Ground	
Porosity:	0.30			
Depth below perforated pipe if present:	4.17	ft		
Depth:			0.00	ft
Width:	0.00	ft	0.00	ft
Length:	0.00	ft	0.00	ft
Area:	229.00	ft^2	0.00	ft^2

STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: HEMBREE LANE

BMP ID: TRIB-7

BMP Design Criteria: 100% Capture & Treatment

Type of BMP Design: Priority 2: P2-04 Roadside Bioretention - Curb Opening

BMP's Physical Tributary Area: 8,770.0 ft^2

Description/Notes:

Runoff Reduction Measures

Resulting reduced Tributary Area used for BMP sizing = 8,570.0 ft^2

Total Runoff Reduction Measures = 200.0 ft^2

Interceptor Trees

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

Number of ***new*** interceptor ***Deciduous Trees*** : 2

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

Total Number of New trees in BMP Tributary Area: 2

Disconnected Roof Drains

Select disconnection condition: Select disconnection condition

Disconnected Roof Drains Method 1

Roof area of disconnected downspouts: 0 ft^2

Disconnected Roof Drains Method 2

Percent of rooftop area: 0 %

Select Density: 1 Units per Acre

Paved Area Disconnection

Paved Area Type: Select paved area type

Alternatively designed paved area: 0.0 ft^2

Buffer Strips & Bovine Terraces

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

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

$V_{HYDROMOD}$ = 402.45 ft^3

Post development hydrologic soil type within tributary area: D: 0 - 0.05 in/hr infiltration (transmission) rate

Post development ground cover description: Residential - 1/8 acre or less (town houses)

CN_{POST} :

User Composite post development CN: 95.0

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = 100.63 %

	BMP Volume Below Ground		Ponded Water Above Ground	
Porosity:	0.30			
Depth below perforated pipe if present:	3.00	ft		
Depth:			0.00	ft
Width:	0.00	ft	0.00	ft
Length:	0.00	ft	0.00	ft
Area:	450.00	ft^2	0.00	ft^2

STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: **HEMBREE LANE**

BMP ID:	TRIB-8
BMP Design Criteria:	100% Capture & Treatment
Type of BMP Design:	Priority 2: P2-04 Roadside Bioretention - Curb Opening
BMP's Physical Tributary Area:	6,237.0 ft^2
Description/Notes:	

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

$V_{HYDROMOD}$ = 292.89 ft^3

Post development hydrologic soil type within tributary area:	D: 0 - 0.05 in/hr infiltration (transmission) rate
Post development ground cover description:	Streets and roads - Paved; curbs and gutters (excluding right-of-way)
CN_{POST} :	
User Composite post development CN:	95.0

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = 101.64 %

	BMP Volume Below Ground		Ponded Water Above Ground	
Porosity:	0.30			
Depth below perforated pipe if present:	2.17	ft	Depth: 0.00	ft
Width:	0.00	ft	Width: 0.00	ft
Length:	0.00	ft	Length: 0.00	ft
Area:	458.00	ft^2	Area: 0.00	ft^2

STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: HEMBREE LANE

BMP ID: TRIB-9

BMP Design Criteria: 100% Capture & Treatment

Type of BMP Design: Priority 2: P2-04 Roadside Bioretention - Curb Opening

BMP's Physical Tributary Area: 8,649.0 ft^2

Description/Notes:

Runoff Reduction Measures

Resulting reduced Tributary Area used for BMP sizing = 8,449.0 ft^2

Total Runoff Reduction Measures = 200.0 ft^2

Interceptor Trees

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

Number of ***new*** interceptor ***Deciduous Trees*** : 2

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

Total Number of New trees in BMP Tributary Area: 2

Disconnected Roof Drains

Select disconnection condition: Select disconnection condition

Disconnected Roof Drains Method 1

Roof area of disconnected downspouts: 0 ft^2

Disconnected Roof Drains Method 2

Percent of rooftop area: 0 %

Select Density: 1 Units per Acre

Paved Area Disconnection

Paved Area Type: Select paved area type

Alternatively designed paved area: 0.0 ft^2

Buffer Strips & Bovine Terraces

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

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

$V_{HYDROMOD}$ = 317.01 ft^3

Post development hydrologic soil type within tributary area: D: 0 - 0.05 in/hr infiltration (transmission) rate

Post development ground cover description: Residential - 1/8 acre or less (town houses)

CN_{POST} :

User Composite post development CN: 93.0

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = 100.06 %

	BMP Volume Below Ground		Ponded Water Above Ground	
Porosity:	0.30			
Depth below perforated pipe if present:	4.33	ft		
Depth:			0.00	ft
Width:	0.00	ft	0.00	ft
Length:	0.00	ft	0.00	ft
Area:	244.00	ft^2	0.00	ft^2

STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: HEMBREE LANE

BMP ID: TRIB-10

BMP Design Criteria: 100% Capture & Treatment

Type of BMP Design: Priority 2: P2-04 Roadside Bioretention - Curb Opening

BMP's Physical Tributary Area: 13,500.0 ft^2

Description/Notes:

Runoff Reduction Measures

Resulting reduced Tributary Area used for BMP sizing = 13,100.0 ft^2

Total Runoff Reduction Measures = 400.0 ft^2

Interceptor Trees

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

Number of ***new*** interceptor ***Deciduous Trees*** : 4

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

Total Number of New trees in BMP Tributary Area: 4

Disconnected Roof Drains

Select disconnection condition: Select disconnection condition

Disconnected Roof Drains Method 1

Roof area of disconnected downspouts: 0 ft^2

Disconnected Roof Drains Method 2

Percent of rooftop area: 0 %

Select Density: 1 Units per Acre

Paved Area Disconnection

Paved Area Type: Select paved area type

Alternatively designed paved area: 0.0 ft^2

Buffer Strips & Bovine Terraces

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

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

$V_{HYDROMOD}$ = 439.11 ft^3

Post development hydrologic soil type within tributary area: D: 0 - 0.05 in/hr infiltration (transmission) rate

Post development ground cover description: Residential - 1/8 acre or less (town houses)

CN_{POST} :

User Composite post development CN: 92.0

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = 101.63 %

	BMP Volume Below Ground		Ponded Water Above Ground	
Porosity:	0.30			
Depth below perforated pipe if present:	4.25	ft		
Depth:			0.00	ft
Width:	0.00	ft	0.00	ft
Length:	0.00	ft	0.00	ft
Area:	350.00	ft^2	0.00	ft^2

Worksheet 2: Runoff curve number and runoff

Project	By	Date
7842 Hembree Lane	MV	4/6/22
Location	**Checked**	**Date**
Trib 1		

Check One: ☐ Present ☒ Developed

1. Runoff curve number

Soil Name and hydrologic group (appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN 1/ Table 2-2	CN 1/ Figure 2-3	CN 1/ Figure 2-4	Area □acres □sf □%	Product of CN x area
D	LAWN/LANDSCAPE (GOOD CONDITION)	80			3948	315840
D	STREETS, HARDSCAPE AND ROOFOPS	98			9640	944720
					13588	1260560

1/ Use only one CN source per line

Totals ▶

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{1260560}{13588} = 92.8$

Use CN ▶ **93**

Worksheet 2: Runoff curve number and runoff

Project	By	Date
7842 Hembree Lane	MV	4/6/22
Location	Checked	Date
Trib 2		

Check One: ☐ Present ☒ Developed

1. Runoff curve number

Soil Name and hydrologic group (appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN 1/ Table 2-2	CN 1/ Figure 2-3	CN 1/ Figure 2-4	Area □acres □sf □%	Product of CN x area
D	LAWN/LANDSCAPE (GOOD CONDITION)	80			9398	751840
D	STREETS, HARDSCAPE AND ROOFOPS	98			25147	2464406
					34545	3216246

1/ Use only one CN source per line

Totals ▶

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{3216246}{34545} = 93.1$

Use CN ▶ **93**

Worksheet 2: Runoff curve number and runoff

Project	By	Date
7842 Hembree Lane	MV	4/6/22
Location	Checked	Date
Trib 3		

Check One: ☐ Present ☒ Developed

1. Runoff curve number

Soil Name and hydrologic group (appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN 1/ Table 2-2	CN 1/ Figure 2-3	CN 1/ Figure 2-4	Area □acres □sf □%	Product of CN x area
D	LAWN/LANDSCAPE (GOOD CONDITION)	80			8418	673440
D	STREETS, HARDSCAPE AND ROOFOPS	98			12669	1241562
					21087	1915002

1/ Use only one CN source per line

Totals ▶

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{1915002}{21087} = 90.8$

Use CN ▶ **91**

Worksheet 2: Runoff curve number and runoff

Project	By	Date
7842 Hembree Lane	MV	4/6/22
Location	Checked	Date
Trib 4		

Check One: ☐ Present ☒ Developed

1. Runoff curve number

Soil Name and hydrologic group (appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN 1/ Table 2-2	CN 1/ Figure 2-3	CN 1/ Figure 2-4	Area □acres □sf □%	Product of CN x area
D	LAWN/LANDSCAPE (GOOD CONDITION)	80			4831	386480
D	STREETS, HARDSCAPE AND ROOFOPS	98			14570	1427860
					19401	1814340

1/ Use only one CN source per line

Totals ▶

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{1814340}{19401} = 93.5$

Use CN ▶ **94**

Worksheet 2: Runoff curve number and runoff

Project	By	Date
7842 Hembree Lane	MV	4/6/22
Location	Checked	Date
Trib 5		

Check One: ☐ Present ☒ Developed

1. Runoff curve number

Soil Name and hydrologic group (appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN 1/ Table 2-2	CN 1/ Figure 2-3	CN 1/ Figure 2-4	Area □acres □sf □%	Product of CN x area
D	LAWN/LANDSCAPE (GOOD CONDITION)	80			2612	208960
D	STREETS, HARDSCAPE AND ROOFOPS	98			7268	712264
					9880	921224

1/ Use only one CN source per line

Totals ▶

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{921224}{9880} = 93.2$

Use CN ▶ **93**

Worksheet 2: Runoff curve number and runoff

Project	By	Date
7842 Hembree Lane	MV	4/6/22
Location	Checked	Date
Trib 6		

Check One: ☐ Present ☒ Developed

1. Runoff curve number

Soil Name and hydrologic group (appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN 1/ Table 2-2	CN 1/ Figure 2-3	CN 1/ Figure 2-4	Area □acres □sf □%	Product of CN x area
D	LAWN/LANDSCAPE (GOOD CONDITION)	80			2719	217520
D	STREETS, HARDSCAPE AND ROOFOPS	98			5969	584962
					8688	802482

1/ Use only one CN source per line

Totals ▶

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{802482}{8688} = 92.4$

Use CN ▶ **92**

Worksheet 2: Runoff curve number and runoff

Project	By	Date
7842 Hembree Lane	MV	4/6/22
Location	Checked	Date
Trib 7		

Check One: ☐ Present ☒ Developed

1. Runoff curve number

Soil Name and hydrologic group (appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN 1/ Table 2-2	CN 1/ Figure 2-3	CN 1/ Figure 2-4	Area □acres □sf □%	Product of CN x area
D	LAWN/LANDSCAPE (GOOD CONDITION)	80			1637	130960
D	STREETS, HARDSCAPE AND ROOFOPS	98			7133	699034
					8770	829994

1/ Use only one CN source per line

Totals ▶

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{829994}{8770} = 94.6$

Use CN ▶ **95**

Worksheet 2: Runoff curve number and runoff

Project	By	Date
7842 Hembree Lane	MV	4/6/22
Location	Checked	Date
Trib 8		

Check One: ☐ Present ☒ Developed

1. Runoff curve number

Soil Name and hydrologic group (appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN 1/ Table 2-2	CN 1/ Figure 2-3	CN 1/ Figure 2-4	Area □acres □sf □%	Product of CN x area
D	LAWN/LANDSCAPE (GOOD CONDITION)	80			1081	86480
D	STREETS, HARDSCAPE AND ROOFOPS	98			5156	505288
					6237	591768

1/ Use only one CN source per line

Totals ▶

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{591768}{6237} = 94.9$

Use CN ▶ **95**

Worksheet 2: Runoff curve number and runoff

Project	By	Date
7842 Hembree Lane	MV	4/6/22
Location	Checked	Date
Trib 9		

Check One: ☐ Present ☒ Developed

1. Runoff curve number

Soil Name and hydrologic group (appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN 1/ Table 2-2	CN 1/ Figure 2-3	CN 1/ Figure 2-4	Area □acres □sf □%	Product of CN x area
D	LAWN/LANDSCAPE (GOOD CONDITION)	80			2453	196240
D	STREETS, HARDSCAPE AND ROOFOPS	98			6196	607208
					8649	803448

1/ Use only one CN source per line

Totals ▶

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{803448}{8649} = 92.9$

Use CN ▶ **93**

Worksheet 2: Runoff curve number and runoff

Project	By	Date
7842 Hembree Lane	MV	4/6/22
Location	Checked	Date
Trib 10		

Check One: ☐ Present ☒ Developed

1. Runoff curve number

Soil Name and hydrologic group (appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN 1/ Table 2-2	CN 1/ Figure 2-3	CN 1/ Figure 2-4	Area □acres □sf □%	Product of CN x area
D	LAWN/LANDSCAPE (GOOD CONDITION)	80			4514	361120
D	STREETS, HARDSCAPE AND ROOFOPS	98			8986	880628
					13500	1241748

1/ Use only one CN source per line

Totals ▶

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{1241748}{13500} = 92.0$

Use CN ▶ **92**

Inspection Date:_____

Number of Photos: _____

Inspection Form A-1
Inspection of LID Features for Routine Maintenance

TOWN OF WINDSOR

Property Address:_____

Inspector Name:_____

Email:_____

Phone #:_____

Inspection Status Codes:
S = Satisfactory *
D = Deficient

	Drainage				Erosion					
	Drawdown - Drainage - Vector Risk - Pump Out-Blockage				Hydraulic Function - Failure - Sediment Clogging					
Reference code	D1	D2	D3	D4	E1	E2	E3	E4	E5	E6
LID Feature ID:	Evidence of standing water or ponding in the feature 72 hours after the end of a rain storm?	Evidence of the high flow bypass or overflow not working as designed?	Is sediment accumulating in or around feature?	Has water been observed flowing in the pervious concrete section during a low intensity storm?	Is there under cutting or washouts along the sidewalks and/or curbs abutting the planter area?	Is there channelization (gully) forming along the length of the planter area?	Is sediment (sand, dirt, mud) accumulating in the planter area ?	Observed or potential transport of mulch to drainage system?	Are there voids or holes present in the BMP?	Is there evidence of animal activity?

Comments or Changes for Drainage
(Including date and description of repairs and volume of sediment removal, if applicable)

Comments or Changes for Erosion
(Including date and description of repairs, if applicable)

Office Use:
Complete: _____ Issues Corrective Action: _____ Re-Inspection Required: _____

Inspection Form A-2
Inspection of LID Features for Routine Maintenance

TOWN OF WINDSOR

Date: _____ Inspector Name: _____

Property Address: _____

Inspection Status Codes:
S = Satisfactory *
D = Deficient

	Vegetation				General		
	Excessive Mowing - Herbicide Overuse - Health of Desired Vegetation -				Trash and Debris - Improper Modifications - Damage		
Reference code	V1	V2	V3	V4	G1	G2	G4
LID Feature ID:	Is the vegetation clogging the inlet or flow path?	Evidence of Excessive Mowing and/or Herbicide Overuse?	Are there dead or dry plants or excessive weeds?	Is there an absence of correct vegetation?	Is there debris/trash accumulation in the BMP or high flow by pass?	Missing or damage structural features? (Grates, pipes, walls, curbs, etc.)	Evidence of improper modifications or removal of BMP?

Comments or Changes for Vegetation
(Including date and description of repairs/plant replacement, if applicable)

General Comments or Changes
(Including date and description of structural repairs, volume of trash removed, and/or improper modifications, if applicable)

Office Use:
Complete: _____ Issues Corrective Action: _____ Re-Inspection Required: _____