

Stormwater Control Plan
For a Regulated Project
Riverbend Subdivision

February 08, 2022

Lenox Homes
3675 Mt. Diablo Blvd., Suite 350
Lafayette, CA 94549
APN: 007-041-006

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Table of Contents

| | | |
|--------------|--|-------|
| I. | Project Data | 1 |
| II. | Setting | 1 |
| | II.A. Project Location and Description..... | 1 |
| | II.B. Existing Site Features and Conditions | 1 |
| | II.C. Opportunities and Constraints for Stormwater Control | 2 |
| III. | Low Impact Development Design Strategies | 2 |
| | III.A. Optimization of Site Layout..... | 2 |
| | III.A.1. Limitation of Development Envelope | 2 |
| | III.A.2. Preservation of Natural Drainage Features..... | 2 |
| | III.A.3. Setbacks from creeks, wetlands & riparian habitats..... | 2 |
| | III.A.4. Minimization of imperviousness | 2 |
| | III.A.5. Use of drainage as a design element | 2 |
| | III.B. Use of Permeable Pavements..... | 2 |
| | III.C. Dispersal of runoff to Pervious Areas | 2 |
| | III.D. Stormwater Control Measures | 3 |
| IV. | Documentation of Drainage Design | 4 |
| | IV.A. Descriptions of each drainage management area | 4 |
| | IV.A.1. Table of drainage management areas | 4 |
| | IV.A.2. Drainage Management Area descriptions | 4 |
| | IV.B. Tabulation of Sizing calculations..... | 4 |
| | IV.B.1. Information summary for Bioretention Facility Design | 4 |
| | IV.B.2. Self-Treating Areas | 4 |
| | IV.B.3. Self-Retaining Areas | 4 |
| | IV.B.4. Areas Draining to Self-Retaining Areas..... | 4 |
| | IV.B.5. Areas Draining to Bioretention Facilities..... | 4-10 |
| V. | Source Control Measures | 11 |
| | V.A. Site activities and potential sources of pollutants | 11 |
| | V.B. Source control table | 11 |
| | V.C. Features, Materials, and Methods of Construction of Source Control BMPs | 11 |
| VI. | Stormwater Facilities Maintenance | 12 |
| | VI.A. Ownership Responsibility for Maintenance in Perpetuity | 12 |
| | VI.B. Summary of Maintenance Requirements for Each Stormwater Facility | 12-14 |
| VII | Construction Checklist | 15-16 |
| VIII. | Certifications | 17 |
| | Figures | |
| | Vicinity Map..... | 18 |
| | Bioretention Area detail..... | 19 |
| | Attachments | |
| | Stormwater Control Plan..... | 20 |

I. Project Data

Table 1. Project Data Form

| | |
|--|---|
| Project Name/Number | Lenox Riverbend |
| Application Submittal Date | February 8, 2022 |
| Project Location | 529 Madison St, Petaluma CA 94952 APN 007-041-006 |
| Project Phase No. | N/A |
| Project Type and Description | This project proposes a new diverse low density residential development of 27 lots with average lot sizes of 3,972 s.f. |
| Total Project Site Area (acres) | 3.36 Acres |
| Total New and Replaced Impervious Surface Area | 66937 s.f. (1.53 ac) |
| Total Pre-Project Impervious Surface Area | 1 s.f. |
| Total Post-Project Impervious Surface Area | 66937 s.f. (1.53 ac) |

II. Setting

II.A. Project Location and Description

The project site is approximately 3.36 acres, located at 521 Madison St, Petaluma, California. The existing site consists of an undeveloped lot with a gravel public path along Petaluma River that varies in width from 4.5' to 6.5'. It is the intention of the owner to construct a 27-lot housing development and 35' to 56' wide Private Street from the court at the end of Edith Street to Madison Street.

II.B. Existing Site Features and Conditions

The project site is approximately 3.36 acres, trapezoidal and with elevation change across the site of roughly five feet. The property is surrounded by Clover Stornetta Farms, Inc. to the Southwest, Petaluma River to the Northwest and residential subdivisions to the North and Southeast. The nearest storm drainage system in the area is under Edith Street with a catch basin and inlet at the curb and gutter along the site. There is currently no storm drain system on the site except for a small outfall with a 12" diameter culvert extending approximately 27' from the headwall to an inlet in the West corner of the lot. The site slopes gently away from the center to Petaluma River at the Northwest and Madison Street at the Southeast where surface flow diverges via curb and gutter to nearby storm drain systems that serve the adjacent properties.

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II.C. Opportunities and Constraints for Stormwater Control

The proposed site is designed so that impervious surface area flow is directed into bio-retention basins sized to accept the run-off from the 85th percentile storm. Stormwater runoff exceeding the 85th percentile storm will overflow the bioretention basins as water levels rise and be routed to the proposed on site private storm drain system and adjacent curbs and gutters of Edith Street and Madison Street. The excess flow will be directed to the existing public storm drain systems at Madison Street and Edith Street and terminate at the Vallejo Street pump station in historic drainage patterns, but overall the site is conducive to bio-retention basins and stormwater treatment.

There are constraints to on site stormwater routing and treatment for the multi-use path proposed along Petaluma River. This area will run-off down the bank of the river in historic drainage patterns and treated by vegetation on the bank.

III. Low Impact Development Design Strategies

III.A. Optimization of Site Layout

III.A.1. *Limitation of development envelope*

Due to the proximity to the Petaluma River, the development envelope is restricted by the 50' setback from the top of bank.

III.A.2. *Preservation of natural drainage features*

The rear of the site naturally drains to the river. The area within the 50' development setback has been designed to preserve this historic drainage pattern.

III.A.3. *Setbacks from creeks, wetlands, and riparian habitats*

There is a 50' development setback from the top of the bank of Petaluma River. The subdivision observes this setback. There is an existing multi-use trail along the river that is being improved and lies within the setback.

III.A.4. *Minimization of imperviousness*

The minimum impervious paving is proposed. This mainly consists of the City standard street and sidewalk. Driveways for residents are single vehicle for most plan types. Walkways to the front doors of houses are impervious, but additional walkways to ADUs are pervious. The multi-use trail along the river is as requested from Pedestrian and Bicycle committee and consists of both impervious and pervious surfaces to accommodate all desired uses.

III.A.5. *Use of drainage as a design element*

The entries of the site are abutted on each side by bioretention basins as a combination of both traffic calming measures and drainage features.

III.B. Use of Permeable Pavements

There are permeable pavements proposed as part of the Multi-Use trail.

III.C. Dispersal of Runoff to Pervious Areas

Runoff within the 50' setback of the Petaluma River will flow back to the river in historic drainage patterns.

III.D *Stormwater Control Measures*

Runoff from the site impervious areas is routed to bioretention basins within the private street and planter strip within the public right of way.

IV. Documentation of Drainage Design

IV.B.1. Information Summary for Bioretention Facility Design

| | |
|-----------------------|----------|
| Project Area: 143,269 | |
| DMA 1: | 2,172 sf |
| DMA 1-2 | 3,105 sf |
| DMA 2-3 | 4,672 sf |
| DMA 3-4 | 3,191 sf |
| DMA 5-6 | 3,675 sf |
| DMA 6-7 | 2,991 |
| DMA 7-8 | 3,036 |
| DMA 8 | 2,484 |
| DMA 9 | 2,687 |
| DMA 9-10 | 2,249 |
| DMA 10-11 | 3,069 |
| DMA 11-12 | 2,852 |
| DMA 12-16 | 18,068 |
| DMA 17-19, 27 | 13,381 |
| DMA 19 | 2,647 |
| DMA 20-23 | 15,045 |
| DMA 23-25 | 14,952 |
| DMA 26 | 7,859 |
| DMA A | 786 |
| DMA B | 796 |
| DMA C | 1,247 |
| DMA D | 1,179 |

IV.B.2. Self-treating Area

| | |
|----------|-----------|
| Parcel A | 17,357 sf |
|----------|-----------|

IV.B.3. Self-retaining Area

| | |
|----------------------------|-----------|
| Area within Petaluma River | 13,769 sf |
|----------------------------|-----------|

IV.B.4. Areas Draining to Self-retaining Areas

N/A

IV.B.5.

| DMA Name | DMA Area (s.f.) | Post-Project Surface Type | DMA Runoff Factor | DMA Area x Runoff Factor | Facility Name | | |
|--------------|-----------------|---------------------------|-------------------|--------------------------|----------------------|-------------------------------------|--------------------------------------|
| Roof | 853 | Roof | 1.0 | 852.5 | DMA 1 | | |
| Landscape | 1,008 | Landscape | 0.1 | 100.8 | | | |
| Pavement | 311 | S/W | 1.0 | 311.0 | Sizing Factor | Minimum Facility Area (s.f.) | Proposed Facility Area (s.f.) |
| Total | | | | 1,264.3 | 0.04 | 50.6 | 51.3 |

| DMA Name | DMA Area (s.f.) | Post-Project Surface Type | DMA Runoff Factor | DMA Area x Runoff Factor | Facility Name | | |
|--------------|-----------------|---------------------------|-------------------|--------------------------|----------------|------------------------------|-------------------------------|
| Roof | 1,292 | Roof | 1.0 | 1,292.0 | DMA 1-2 | | |
| Landscape | 1,432 | Landscape | 0.1 | 143.2 | Sizing Factor | Minimum Facility Area (s.f.) | Proposed Facility Area (s.f.) |
| Pavement | 381 | DWY/SW | 1.0 | 381.4 | | | |
| Total | | | | 1,816.6 | 0.04 | 72.7 | 78.5 |

| DMA Name | DMA Area (s.f.) | Post-Project Surface Type | DMA Runoff Factor | DMA Area x Runoff Factor | Facility Name | | |
|--------------|-----------------|---------------------------|-------------------|--------------------------|----------------|------------------------------|-------------------------------|
| Roof | 1,475 | Roof | 1.0 | 1,475.0 | DMA 2-3 | | |
| Landscape | 2,357 | Landscape | 0.1 | 235.7 | Sizing Factor | Minimum Facility Area (s.f.) | Proposed Facility Area (s.f.) |
| Pavement | 840 | DWY/SW | 1.0 | 840.0 | | | |
| Total | | | | 2,550.7 | 0.04 | 102.0 | 116 |

| DMA Name | DMA Area (s.f.) | Post-Project Surface Type | DMA Runoff Factor | DMA Area x Runoff Factor | Facility Name | | |
|--------------|-----------------|---------------------------|-------------------|--------------------------|----------------|------------------------------|-------------------------------|
| Roof | 1,594 | Roof | 1.0 | 1,594.0 | DMA 3-4 | | |
| Landscape | 1,275 | Landscape | 0.1 | 127.5 | Sizing Factor | Minimum Facility Area (s.f.) | Proposed Facility Area (s.f.) |
| Pavement | 322 | DWY/SW | 1.0 | 322.0 | | | |
| Total | | | | 2,043.5 | 0.04 | 81.7 | 87 |

| DMA Name | DMA Area (s.f.) | Post-Project Surface Type | DMA Runoff Factor | DMA Area x Runoff Factor | Facility Name | | |
|--------------|-----------------|---------------------------|-------------------|--------------------------|----------------|------------------------------|-------------------------------|
| Roof | 1,731 | Roof | 1.0 | 1,730.5 | DMA 5-6 | | |
| Landscape | 1,529 | Landscape | 0.1 | 152.9 | Sizing Factor | Minimum Facility Area (s.f.) | Proposed Facility Area (s.f.) |
| Pavement | 415 | DWY/SW | 1.0 | 415.3 | | | |
| Total | | | | 2,298.6 | 0.04 | 91.9 | 92 |

| DMA Name | DMA Area (s.f.) | Post-Project Surface Type | DMA Runoff Factor | DMA Area x Runoff Factor | Facility Name | | |
|--------------|-----------------|---------------------------|-------------------|--------------------------|----------------|------------------------------|-------------------------------|
| Roof | 1,335 | Roof | 1.0 | 1,335.0 | DMA 6-7 | | |
| Landscape | 1,159 | Landscape | 0.1 | 115.9 | | | |
| Pavement | 497 | DWY/SW | 1.0 | 497.0 | Sizing Factor | Minimum Facility Area (s.f.) | Proposed Facility Area (s.f.) |
| Total | | | | 1,947.9 | | | |

| DMA Name | DMA Area (s.f.) | Post-Project Surface Type | DMA Runoff Factor | DMA Area x Runoff Factor | Facility Name | | |
|--------------|-----------------|---------------------------|-------------------|--------------------------|----------------|------------------------------|-------------------------------|
| Roof | 1,360 | Roof | 1.0 | 1,360.0 | DMA 7-8 | | |
| Landscape | 1,556 | Landscape | 0.1 | 155.6 | | | |
| Pavement | 120 | DWY/SW | 1.0 | 120.0 | Sizing Factor | Minimum Facility Area (s.f.) | Proposed Facility Area (s.f.) |
| Total | | | | 1,635.6 | | | |

| DMA Name | DMA Area (s.f.) | Post-Project Surface Type | DMA Runoff Factor | DMA Area x Runoff Factor | Facility Name | | |
|--------------|-----------------|---------------------------|-------------------|--------------------------|---------------|------------------------------|-------------------------------|
| Roof | 853 | Roof | 1.0 | 852.5 | DMA 8 | | |
| Landscape | 1,187 | Landscape | 0.1 | 118.7 | | | |
| Pavement | 444 | DWY/SW | 1.0 | 444.0 | Sizing Factor | Minimum Facility Area (s.f.) | Proposed Facility Area (s.f.) |
| Total | | | | 1,415.2 | | | |

| DMA Name | DMA Area (s.f.) | Post-Project Surface Type | DMA Runoff Factor | DMA Area x Runoff Factor | Facility Name | | |
|--------------|-----------------|---------------------------|-------------------|--------------------------|---------------|------------------------------|-------------------------------|
| Roof | 753 | Roof | 1.0 | 753.0 | DMA 9 | | |
| Landscape | 1,521 | Landscape | 0.1 | 152.1 | | | |
| Pavement | 413 | DWY/SW | 1.0 | 413.0 | Sizing Factor | Minimum Facility Area (s.f.) | Proposed Facility Area (s.f.) |
| Total | | | | 1,318.1 | | | |

| DMA Name | DMA Area (s.f.) | Post-Project Surface Type | DMA Runoff Factor | DMA Area x Runoff Factor | Facility Name | | |
|--------------|-----------------|---------------------------|-------------------|--------------------------|-----------------|------------------------------|-------------------------------|
| Roof | 1,113 | Roof | 1.0 | 1,113.0 | DMA 9-10 | | |
| Landscape | 547 | Landscape | 0.1 | 54.7 | | | |
| Pavement | 589 | DWY/SW | 1.0 | 589.0 | Sizing Factor | Minimum Facility Area (s.f.) | Proposed Facility Area (s.f.) |
| Total | | | | 1,756.7 | | | |

| DMA Name | DMA Area (s.f.) | Post-Project Surface Type | DMA Runoff Factor | DMA Area x Runoff Factor | Facility Name | | |
|--------------|-----------------|---------------------------|-------------------|--------------------------|------------------|------------------------------|-------------------------------|
| Roof | 1,473 | Roof | 1.0 | 1,473.0 | DMA 10-11 | | |
| Landscape | 1,401 | Landscape | 0.1 | 140.1 | | | |
| Pavement | 195 | DWY/SW | 1.0 | 195.0 | Sizing Factor | Minimum Facility Area (s.f.) | Proposed Facility Area (s.f.) |
| Total | | | | 1,808.1 | | | |

| DMA Name | DMA Area (s.f.) | Post-Project Surface Type | DMA Runoff Factor | DMA Area x Runoff Factor | Facility Name | | |
|--------------|-----------------|---------------------------|-------------------|--------------------------|------------------|------------------------------|-------------------------------|
| Roof | 1,364 | Roof | 1.0 | 1,364.0 | DMA 11-12 | | |
| Landscape | 1,126 | Landscape | 0.1 | 112.6 | | | |
| Pavement | 362 | DWY/SW | 1.0 | 362.0 | Sizing Factor | Minimum Facility Area (s.f.) | Proposed Facility Area (s.f.) |
| Total | | | | 1,838.6 | | | |

| DMA Name | DMA Area (s.f.) | Post-Project Surface Type | DMA Runoff Factor | DMA Area x Runoff Factor | Facility Name | | |
|--------------|-----------------|---------------------------|-------------------|--------------------------|------------------|------------------------------|-------------------------------|
| Roof | 6,194 | Roof | 1.0 | 6,194.0 | DMA 12-16 | | |
| Landscape | 6,176 | Landscape | 0.1 | 617.6 | | | |
| Pavement | 5,698 | AC/SW/DWY | 1.0 | 5,698.0 | Sizing Factor | Minimum Facility Area (s.f.) | Proposed Facility Area (s.f.) |
| Total | | | | 12,509.6 | | | |

| DMA Name | DMA Area (s.f.) | Post-Project Surface Type | DMA Runoff Factor | DMA Area x Runoff Factor | Facility Name | | |
|--------------|-----------------|---------------------------|-------------------|--------------------------|----------------------|-------------------------------------|--------------------------------------|
| Roof | 3,646 | Roof | 1.0 | 3,646.0 | DMA 17-19, 27 | | |
| Landscape | 4,237 | Landscape | 0.1 | 423.7 | | | |
| Pavement | 5,498 | AC/SW/DWY. | 1.0 | 5,498.0 | Sizing Factor | Minimum Facility Area (s.f.) | Proposed Facility Area (s.f.) |
| Total | | | | 9,567.7 | 0.04 | 382.7 | 385 |

| DMA Name | DMA Area (s.f.) | Post-Project Surface Type | DMA Runoff Factor | DMA Area x Runoff Factor | Facility Name | | |
|--------------|-----------------|---------------------------|-------------------|--------------------------|----------------------|-------------------------------------|--------------------------------------|
| Roof | 700 | Roof | 1.0 | 700.0 | DMA 19 | | |
| Landscape | 1,505 | Landscape | 0.1 | 150.5 | | | |
| Pavement | 442 | S/W | 1.0 | 442.0 | Sizing Factor | Minimum Facility Area (s.f.) | Proposed Facility Area (s.f.) |
| Total | | | | 1,292.5 | 0.04 | 51.7 | 55 |

| DMA Name | DMA Area (s.f.) | Post-Project Surface Type | DMA Runoff Factor | DMA Area x Runoff Factor | Facility Name | | |
|--------------|-----------------|---------------------------|-------------------|--------------------------|----------------------|-------------------------------------|--------------------------------------|
| Roof | 4,371 | Roof | 1.0 | 4,371.0 | DMA 20-23 | | |
| Landscape | 4,495 | Landscape | 0.1 | 449.5 | | | |
| Pavement | 6,179 | AC/SW/DWY | 1.0 | 6,179.0 | Sizing Factor | Minimum Facility Area (s.f.) | Proposed Facility Area (s.f.) |
| Total | | | | 10,999.5 | 0.04 | 440.0 | 470 |

| DMA Name | DMA Area (s.f.) | Post-Project Surface Type | DMA Runoff Factor | DMA Area x Runoff Factor | Facility Name | | |
|--------------|-----------------|---------------------------|-------------------|--------------------------|----------------------|-------------------------------------|--------------------------------------|
| Roof | 2,948 | Roof | 1.0 | 2,948.0 | DMA 23-25 | | |
| Landscape | 6,698 | Landscape | 0.1 | 669.8 | | | |
| Pavement | 5,306 | AC/SW/DWY. | 1.0 | 5,306.0 | Sizing Factor | Minimum Facility Area (s.f.) | Proposed Facility Area (s.f.) |
| Total | | | | 8,923.8 | 0.04 | 357.0 | 362 |

| DMA Name | DMA Area (s.f.) | Post-Project Surface Type | DMA Runoff Factor | DMA Area x Runoff Factor | Facility Name | | |
|--------------|-----------------|---------------------------|-------------------|--------------------------|----------------------|-------------------------------------|--------------------------------------|
| Roof | 1,347 | Roof | 1.0 | 1,347.2 | DMA 26 | | |
| Landscape | 5,997 | Landscape | 0.1 | 599.7 | | | |
| Pavement | 515 | AC/SW/DWY. | 1.0 | 515.0 | Sizing Factor | Minimum Facility Area (s.f.) | Proposed Facility Area (s.f.) |
| Total | | | | 2,461.9 | 0.04 | 98.5 | 98.5 |

| DMA Name | DMA Area (s.f.) | Post-Project Surface Type | DMA Runoff Factor | DMA Area x Runoff Factor | Facility Name | | |
|--------------|-----------------|---------------------------|-------------------|--------------------------|----------------------|-------------------------------------|--------------------------------------|
| Roof | 0 | Roof | 1.0 | 0.0 | DMA A | | |
| Landscape | 0 | Landscape | 0.1 | 0.0 | | | |
| Pavement | 786 | AC/SW | 1.0 | 786.1 | Sizing Factor | Minimum Facility Area (s.f.) | Proposed Facility Area (s.f.) |
| Total | | | | 786.1 | 0.04 | 31.4 | 47 |

| DMA Name | DMA Area (s.f.) | Post-Project Surface Type | DMA Runoff Factor | DMA Area x Runoff Factor | Facility Name | | |
|--------------|-----------------|---------------------------|-------------------|--------------------------|----------------------|-------------------------------------|--------------------------------------|
| Roof | 0 | Roof | 1.0 | 0.0 | DMA B | | |
| Landscape | 0 | Landscape | 0.1 | 0.0 | | | |
| Pavement | 796 | AC/SW. | 1.0 | 795.7 | Sizing Factor | Minimum Facility Area (s.f.) | Proposed Facility Area (s.f.) |
| Total | | | | 795.7 | 0.04 | 31.8 | 37 |

| DMA Name | DMA Area (s.f.) | Post-Project Surface Type | DMA Runoff Factor | DMA Area x Runoff Factor | Facility Name | | |
|--------------|-----------------|---------------------------|-------------------|--------------------------|----------------------|-------------------------------------|--------------------------------------|
| Roof | 0 | Roof | 1.0 | 0.0 | DMA C | | |
| Landscape | 0 | Landscape | 0.1 | 0.0 | | | |
| Pavement | 1,247 | AC/SW | 1.0 | 1,247.0 | Sizing Factor | Minimum Facility Area (s.f.) | Proposed Facility Area (s.f.) |
| Total | | | | 1,247.0 | 0.04 | 49.9 | 66 |

| DMA Name | DMA Area (s.f.) | Post-Project Surface Type | DMA Runoff Factor | DMA Area x Runoff Factor | Facility Name | | |
|-----------------|------------------------|----------------------------------|--------------------------|---------------------------------|----------------------|-------------------------------------|--------------------------------------|
| Roof | 0 | Roof | 1.0 | 0.0 | DMA D | | |
| Landscape | 0 | Landscape | 0.1 | 0.0 | | | |
| Pavement | 1,179 | AC/Conc. | 1.0 | 1,179.0 | Sizing Factor | Minimum Facility Area (s.f.) | Proposed Facility Area (s.f.) |
| Total | | | | 1,179.0 | 0.04 | 47.2 | 48 |

V. Source Control Measures

| Potential Sources of Runoff Pollutants | Permanent Source Control BMPs | Operational Source Control BMPs |
|--|--|--|
| On-Site storm drain inlets | Mark all inlets with “No Dumping, Drains to River” per notes on sheet C-6 Notes and C-8 Master Utility Plan | Maintain “No Dumping” markers. Provide Stormwater pollution prevention information to new site owners or operators |
| Landscape/Outdoor Pesticide Use | Preserve existing native trees shrubs and ground cover to maximum extent. Design landscaping to promote surface infiltration where appropriate and minimize use of fertilizers and pesticides. Refer to landscape plans for planting and irrigation plans. | Maintain landscaping using minimum to no pesticides. 2 |

VI. Operations and Maintenance Plan

Ownership and Responsibility for Maintenance in Perpetuity

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

Summary of Maintenance Requirements for Each Stormwater Facility

This operation and maintenance manual shall be a guide to ensure the facilities included in the stormwater treatment system are inspected and maintained in good repair and working order.

Facilities to be Maintained:

Bioretention Basins

The site contains 22 bioretention basins as shown and labeled on Stormwater Control Plan LID-1. The size of each basin is provided in the Documentation of the Drainage Design section of this Plan. Each basin shall be a minimum of 30 inches in depth (18" Minimum Planting Medium above 12" Gravel Layer). Each basin will have a hydraulically flat bottom, meaning all points in the bottom of the bioretention basin shall have the same elevation.

Drainage Swales

There are three drainage swales per lot (81 in total) that direct runoff from the rear of the lot to the front. The runoff is then directed to an area drain and under the sidewalk. The lots that face the exterior of the site have the under-sidewalk drains empty into bioretention basins. The lots that face the interior of the site have the under-sidewalk drains empty into the private street gutter pan and the stormwater flows to bioretention basins alongside the private street through curb cutouts.

Annual Inspection

The stormwater treatment system shall be inspected annually prior to October 15th of each year. A report shall be prepared, signed and sealed by a Civil Engineer registered in the State of California and submitted to the County. The report shall indicate the results of the inspection and identify any actions necessary to ensure the proper operation of the stormwater treatment system. Inspection shall include condition of bioretention basins, inlet swales, vegetation and plant health, weed growth, erosion, slope stability, debris, siltation and blockage.

- Inlets and swales leading to basins shall be inspected for erosion and damage due to traffic, either foot or vehicular and repaired accordingly. Minimum depth for inlet swales is 6-inches with 2:1 side slopes. Rock lining will be required when the running slope is greater than 5% (20:1) otherwise ensure that the vegetation in the swales remains in good health.
- Bioretention basins shall be inspected to be free of silt and free draining to the gravel layer and be maintained to a minimum depth of 30-inches and be hydraulically flat. The inspection shall ensure that the upslope berm is intact and functions as intended.

Document Facilities “As Built”

Include from the final construction drawings:

- Plans, elevations, and details of the bioretention facilities. If necessary, annotate the drawings with the designations used in the Stormwater Control Plan so it is clear which drawing refers to which facility.
- Construction details and specifications, including depths of sand or soil, compaction, pipe materials, and bedding.
- Location and layouts of inflow piping and piping to off-site discharge.
- Native soils encountered (e.g., sand or clay lenses beneath or near facilities).

Changes made in the field during construction must be noted in the *final* Plan to be submitted following construction.

Schedule Maintenance Activities

All of the facilities facilities will be maintained on the following schedule at a minimum with the frequency adjusted in response to the needs of each particular facility.

Routine Activities

The facilities will be examined daily for visible trash, and trash will be removed. Any graffiti, vandalism, or other damage will be noted and addressed within 48 hours.

The planted areas will be weeded by hand approximately monthly. 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. At this time, plants will be inspected for health and the irrigation system will be turned on manually and checked for any leaks or broken lines, misdirected spray patterns etc. Any dead plant will be replaced from the mix specified by the landscape architect or with similar plantings appropriate for the unique conditions. When replanting, maintain the design surface elevation and minimize the introduction of soil.

Following Significant Rain Events

A significant rain event will be considered to be one that produces approximately a half-inch or more of rainfall in a 24-hour period. Within 24 hours after each such event, the following will be conducted:

- The surface of the facility will be observed to confirm there is no ponding.
- Inlets will be inspected, and any accumulation of trash or debris will be removed. Any erosion at inlets should be restored to grade.
- The surface of the mulch layer will be inspected for movement of material. Mulch will be replaced and raked smooth if needed. 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"). However, ensure the underlying soil surface beneath the mulch layer is a minimum 6" 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, and that the entire surface is wetted before the overflow elevation is reached.
- Outlet structure will be inspected for any obstructions to assure that mulch is not washed out.

Prior to the Start of the Rainy Season

In September of each year, facility inlets and outlets will be inspected to confirm there is no accumulation of debris that would block flow. Stormwater should drain freely into the bioretention facilities. If not previously addressed during monthly maintenance, any growth and spread of plantings that blocks inlets or the movement of runoff across the surface of the facility will be cut back or removed.

If the facilities are not completely drained in 24 hours, the underdrain may be clogged. Check the overflow outlet to determine if the underdrain is performing properly. There should be no filter fabric or geotextile in the horizontal layers or wrapped at the underdrain. If the underdrain is working, the bioretention area may contain fines. Replace material with mixture of 30-40% aged compost and 60-70% washed granular sand, no fines.

Annually During Winter

Once, in December – February of each year, vegetation will be cut back as needed, debris removed, and plants and mulch replaced as needed. The concrete work will be inspected for damage. The elevation of the top of soil and mulch layer will be confirmed to be consistent with the 6-inch reservoir depth.

Landscape maintenance personnel should be aware of the following:

At no time will synthetic pesticides or fertilizers be applied, nor will any soil amendments, other than aged compost or sand/compost mix, be introduced. The top of soil surface will be maintained at or near the design elevation throughout. Irrigation systems will be maintained to conserve water while maintaining plant health.

Although it is unlikely to be needed, if plants are not thriving compost tea may be applied at a recommended rate of 5 gallons mixed with 15 gallons of water per acre, up to once per year between March and June. Compost tea will not be applied when temperatures are below 50°F or above 90°F or when rain is forecast within the next 48 hours.

The following may be applied for pest control if needed:

- Beneficial nematodes

- Safer® products

- Neem oil

VII. Construction Checklist

Appendix B. Bioretention Facility Construction Inspection Checklist

Layout (to be confirmed prior to beginning excavation)

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

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

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

Overflow or Surface Connection to Storm Drainage

(to be confirmed prior to backfilling with any materials)

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

Underground connection to storm drain/outlet orifice

(to be confirmed prior to backfilling with any materials)

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

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

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

Soil Mix

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

Irrigation

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

Planting

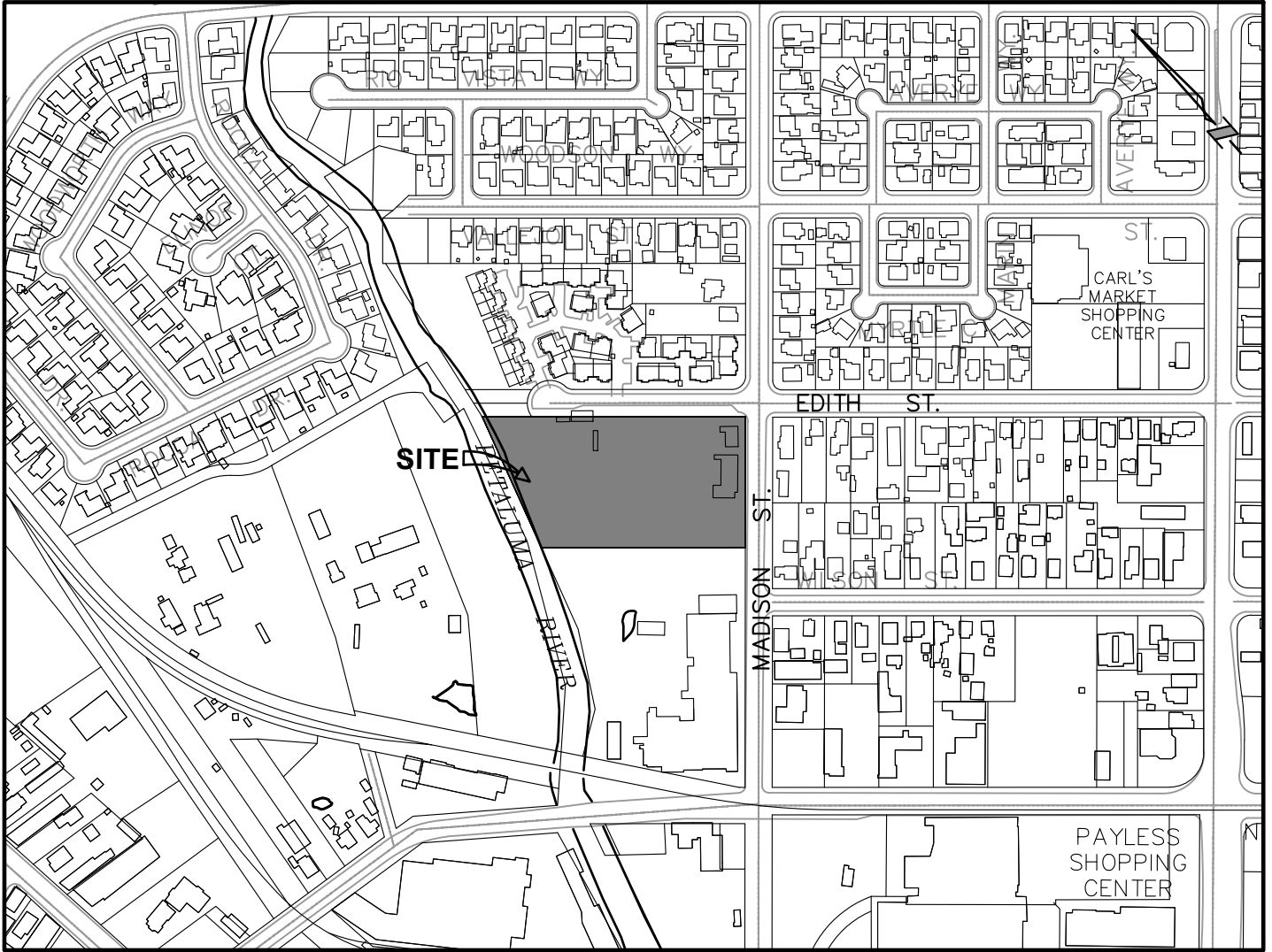
- Plants are installed consistent with approved planting plan, consistent with site water allowance
- Any trees and large shrubs are staked securely
- No fertilizer is added; compost tea may be used
- No native soil or clayey material are imported into the facility with plantings
- 1"-2" mulch may be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

Final Engineering Inspection

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

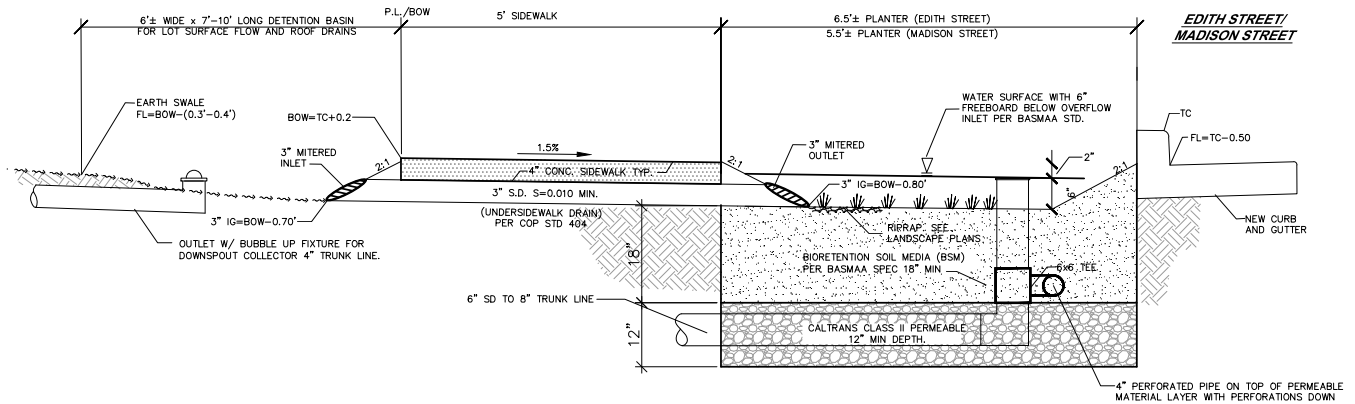
VIII. Certifications

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



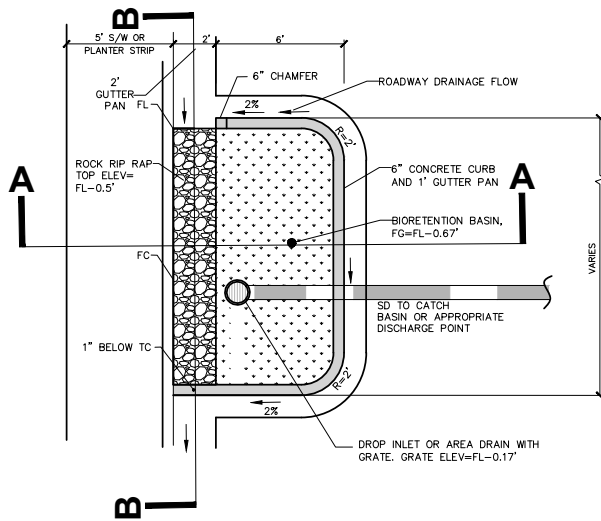
VICINITY MAP

N.T.S.

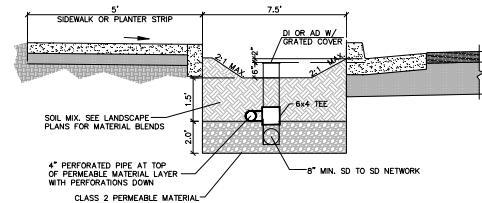


SIDEWALK UNDERDRAIN TO PLANTER STRIP BIORETENTION

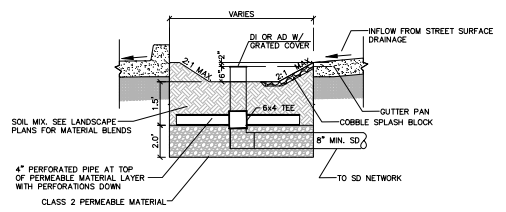
SCALE: 1"=1'



PLAN



SECTION A-A



SECTION B-B

BIORETENTION POP OUT DETAIL

N.T.S.

