# Green Infrastructure Plan

## City of Emeryville

June 2019

# Acknowledgments

The City of Emeryville gratefully acknowledges the following individuals and organizations that contributed to this Green Infrastructure Plan:

Alameda County Clean Water Program

Horizon Water and Environment, LLC

The City of Dublin

Geosyntec Consultants

Bay Area Stormwater Management Agencies Association

# Table of Contents

# List of Appendices



# List of Tables



# List of Acronyms

| Acronym | Definition |
|---|---|
| ACCWP | Alameda Countywide Clean Water Program |
| AGOL | ArcGIS Online |
| BAHM | Bay Area Hydrology Model |
| BASMAA | Bay Area Stormwater Management Agencies Association |
| DMA | Drainage management area |
| GI | Green infrastructure |
| LID | Low impact development |
| MRP | Municipal Regional Stormwater Permit |
| HM | Hydromodification management |
| RWQCB | Regional Water Quality Control Board |
| PCBs | Polychlorinated biphenyls |
| TMDL | Total maximum daily load |

# 1. Introduction

## 1.1 Statement of Purpose

The purpose of the Green Infrastructure Plan is to guide the identification, implementation, tracking, and reporting of green infrastructure projects within the City of Emeryville, in accordance with the Municipal Regional Stormwater Permit (MRP), Order No. R2-2015-0049, adopted by the San Francisco Bay Regional Water Quality Control Board on November 15, 2015. "Green infrastructure" refers to a sustainable system that slows runoff by dispersing it to vegetated areas, harvests and uses runoff, promotes infiltration and evapotranspiration, and uses bioretention and other low impact development practices to clean stormwater runoff.

## 1.2 MRP Requirements

This Green Infrastructure Plan has been developed to comply with Green Infrastructure Plan requirements in Provision C.3.j of the MRP, which states in part:

> The Plan is intended to serve as an implementation guide and reporting tool during this and subsequent Permit terms to provide reasonable assurance that urban runoff TMDL waste load allocations (e.g., for the San Francisco Bay mercury and PCBs TMDLs) will be met, and to set goals for reducing, over the long term, the adverse water quality impacts of urbanization and urban runoff on receiving waters. For this Permit term, the Plan is being required, in part, as an alternative to expanding the definition of Regulated Projects prescribed in Provision C.3.b to include all new and redevelopment projects that create or replace 5,000 square feet or more of impervious surface areas and road projects that just replace existing imperious surface area. It also provides a mechanism to establish and implement alternative or in-lieu compliance options for Regulated Projects and to account for and justify Special Projects in accordance with Provision C.3.e.
>
> Over the long term, the Plan is intended to describe how the Permittees will shift their impervious surfaces and storm drain infrastructure from gray, or traditional storm drain infrastructure where runoff flows directly into the storm drain and then the receiving water, to green—that is, to a more-resilient, sustainable system that slows runoff by dispersing it to vegetated areas, harvests and uses runoff, promotes infiltration and evapotranspiration, and uses bioretention and other green infrastructure practices to clean stormwater runoff.
>
> The Plan shall also identify means and methods to prioritize particular areas and projects within each Permittee's jurisdiction, at appropriate geographic and time scales, for implementation of green infrastructure projects. Further, it shall include means and methods to track the area within each Permittee's jurisdiction that is treated by green infrastructure controls and the amount of directly connected impervious area. As appropriate, it shall incorporate plans required elsewhere within this Permit, and specifically plans required for the monitoring of and to ensure appropriate reductions in trash, PCBs, mercury, and other pollutants.

Table 1-1 below links each section of this plan to the applicable MRP provision.

**Table 1-1: Green Infrastructure Plan Sections and Applicable MRP Provisions**

| Section of Green Infrastructure Plan | Applicable MRP Provision |
|---|---|
| 1. Introduction | C.3.j |
| 2. Prioritizing and Mapping Planned and Potential Projects | C.3.j.i.(2)(a) – (c), and C.3.j.i.(2)(j) |
| 2.1 Approach for Prioritizing and Mapping Projects | C.3.j.i.(2)(a) |
| 2.2 Summary of Prioritized Projects | C.3.j.i.(2)(b) |
| 2.3 Impervious Surface Retrofit Targets | C.3.j.i.(2)(c) |
| 2.4 Prioritized Projects for Alternative Compliance Program or Early Implementation | C.3.j.i.(2)(j) |
| 3. Tracking and Mapping Completed Projects | C.3.j.i.(2)(d) & C.3.d.iv.(1) |
| 4. Summary of General Guidelines for GI Projects | C.3.j.i.(2)(e), C.3.j.i.(2)(f), C.3.j.i.(2)(g) |
| 5. Relationship to Other Planning Documents | C.3.j.i.(2)(h) & (i) |
| 6. Evaluation of Funding Options | C.3.j.i.(2)(k) |
| Appendix A. Maps and Lists of Prioritized Projects | C.3.j.i.(2)(b) |
| Appendix B. Workplan to Complete Prioritized Projects | C.3.j.i.(2)(j) |
| Appendix C. General Guidelines for GI Projects | C.3.j.i.(2)(e), C.3.j.i.(2)(f), C.3.j.i.(2)(g) |
| Appendix D. Workplan to Incorporate GI Requirements in Planning Documents | C.3.j.i.(2)(i) |

# 2. Prioritizing and Mapping Planned and Potential Projects

Section 2 describes the use of a mechanism for prioritizing and mapping GI projects as required in Provision C.3.j.i.(2)(a), provides a summary description of lists of prioritized GI projects and other outputs of the mechanism per Provision C.3.j.i.(2)(b), presents targets for areas of impervious surface to be retrofitted as required in Provision C.3.j.i.(2)(c), and discusses prioritized projects for alternative compliance or early implementation.

## 2.1 Approach for Prioritizing and Mapping Projects (GI Mechanism)

This section describes the Alameda Countywide Green Infrastructure Mechanism ("GI Mechanism") used to prioritize and map areas for planned and potential green infrastructure projects. The mechanism consists of the Alameda Countywide Multi-Benefit Metrics Prioritization Protocol ("prioritization protocol") interface, with the Alameda County/Contra Costa Project Tracking and Load Reduction Accounting Tool ArcGIS Online web application ("AGOL tool"). To date, the mechanism has been used to prioritize and map public projects for implementation by 2020, by 2030, and by 2040, as described below. It also includes capabilities to prioritize and map private projects, where appropriate.

As described below, the mechanism includes criteria for prioritization, such as specific logistical constraints, water quality drivers (load reductions of mercury and PCBs consistent with TMDLs), and opportunities to treat runoff from private parcels in street right-of-way (ROW). It also produces outputs, including maps and project lists, which can be incorporated into the City of Emeryville's long-term planning and capital improvement processes. Outputs of the mechanism are included in Appendix A, Maps and Lists of Prioritized Projects.

### *Prioritization of Areas for Planned and Potential Projects*

The Master List of Prioritized Projects, and the Short List of High Priority Projects, included in Appendix A, are outputs of the GI mechanism. The prioritization protocol that produced these outputs is a stepwise GIS analysis documented in the Alameda Countywide Stormwater Resource Plan Screening and Prioritization using Multi-Benefit Metrics Technical Memorandum[1] and summarized below.

**Step 1. Identify planned projects** – Planned future green infrastructure projects within Alameda County were identified and entered into a GIS layer, based on project information provided by local agencies within the county.

**Step 2. Identify opportunity sites** – Additional potential project locations were identified and catalogued by the Alameda Countywide Clean Water Program consultant

[1] Geosyntec. 2017. Alameda Countywide Stormwater Resource Plan Screening and Prioritization using Multi-Benefit Metrics Technical Memorandum. December 13.

Geosyntec using a GIS-based opportunity analysis. The project opportunity analysis followed the steps listed below:

a. Identify publicly-owned parcels.
b. Screen identified public parcels to include only those that are at least 0.1 acre in size and with an average slope of less than 10 percent. Parcels that met these criteria were screened for physical feasibility.
c. Identify non-interstate highway public right-of-way (ROW) within urban areas. Roadways considered included state and county highways and connecting roads and local, neighborhood, and rural roads.
d. Identify land uses or adjacent land uses of the sites resulting from steps b and c.
e. Screen sites identified in steps b and c to remove sites with the following physical constraints:
    i. Regional facilities were not considered for sites that were greater than 500 feet from a storm drain due to limited feasibility in treating runoff from a larger drainage area;
    ii. Parcel-based facilities were not considered for sites that were more than 50% undeveloped due to the limited potential for pollutant reduction of concern load reduction;
    iii. Sites with more than 50% of their drainage area outside of the urbanized area, as these sites would not provide opportunity for significant pollutant of concern load reduction;
    iv. Sites with more than 50% overlying landslide hazard zones to avoid the potential for increasing landslide risk.

**Step 3. Classify planned projects and opportunity sites in preparation for metrics-based evaluation** – A GIS analysis was performed to classify the planned projects identified in step 1 and the opportunity sites identified in step 2 according to four parameters listed below:

a. Green infrastructure project type – Each project received one of the following classifications: parcel-based, regional, or ROW/green street project.
b. Infiltration feasibility - Each project location received one of the following classifications for infiltration: infeasible, partially feasible, or feasible.
c. Facility type – Each project received one of the following classifications: green infrastructure[2], non-green infrastructure treatment control facility, water supply augmentation, flood control facility, hydromodification control, public use area or public education area, programmatic stormwater management opportunity.
d. Drainage area information – A drainage area was identified for each project.

**Step 4. Score projects using an automated metrics-based evaluation** – A quantitative metrics-based multiple benefit evaluation was performed using an automated process. Projects or opportunity sites received a score of 0, 1, or 2 for each of the 14

[2] All opportunity sites identified in step 2 were classified as GI projects. Based on information provided by local agencies in step 1, other classifications were assigned, where appropriate, to planned projects. Projects that were not classified as GI have co-benefits that may include GI.

metrics listed below. The automated scores were used to preliminarily rank the projects by watershed, jurisdiction, project type, and/or project stakeholder(s). Geosyntec provided a jurisdiction-specific list of planned projects and opportunity sites located in the City of Emeryville, including an automated score for each project. Spatial data for the projects included in the list were provided in both GIS shape file and Google Earth KMZ file formats.

a. Parcel area (for regional and parcel-based projects only)
b. Location slope
c. Infiltration feasibility
d. PCBs/mercury yield classification in project drainage area
e. Regional facility
f. Removes pollutant loads from stormwater
g. Augments water supply
h. Provides flood control benefits
i. Re-establishes natural water drainage systems
j. Develops, restores, or enhances habitat and open space
k. Provides enhanced or created recreational and public use areas with potential opportunities for community involvement and education
l. Trash capture co-benefit

**Step 5. Rank the projects based on local considerations** – the City of Emeryville reviewed the jurisdiction-specific list of planned projects and opportunity sites provided in step 4 as part of preparing the Master List of Prioritized Planned and Potential Projects ("Master List") included in Appendix A, Maps and Lists of Prioritized Projects. The City of Emeryville prepared the Master List, which provides a final ranking and prioritizing of planned and potential projects, based on the automated scores derived in step 4 and the additional considerations listed below. These additional considerations are incorporated in the Project Ranking Checklist, included in Appendix A:

a. Cost Considerations:
    i. Capital costs
    ii. Maintenance costs
    iii. Funding sources
b. Opportunity Considerations:
    i. Opportunities to treat runoff from private parcels in retrofitted street ROW
    ii. Synergies with upcoming transportation and other CIP projects
    iii. ROW projects on pedestrian or bicycle priority streets
c. Load Reduction Potential:
    i. Load reduction potential for PCBs and mercury
d. Labor/Staff Considerations:
    i. Ease of construction/installation
    ii. Complexity and/or frequency of operations and maintenance
e. Multiple Benefits:
    i. Consideration of achieving multiple benefits

ii. Potential for aesthetic, community, or other benefits not previously identified

f. Safety and Security Considerations:
   i. Potential to cause a safety hazard and/or measures needed to avoid creating a safety hazard
   ii. Potential for vandalism
g. Implementation Considerations:
   i. Potential for implementation challenges due to site constraints or community opposition
   ii. Existing project concepts with strong community support

### *Mapping of Planned and Potential Projects*

The maps of planned and potential projects are included in Appendix A, Maps and Lists of Prioritized Projects. Prioritized projects from the "short list" of high priority projects were mapped using ArcGIS and were inputting into the AGOL tool. Because the AGOL tool is also used for tracking and reporting on both the initial approval and ongoing operation and maintenance inspections of Provision C.3 Regulated Projects, it provides a complete life-cycle approach for mapping planned and potential GI projects, as well as features related to completed projects described in Section 3, Tracking and Mapping Completed GI Projects.

## 2.2 Summary of Prioritized Projects (Outputs of the GI Mechanism)

This section provides summary information regarding the outputs of the GI Mechanism included in Appendix A, Maps and Lists of Prioritized Projects, which are listed below:

- Prioritization Criteria
- Project Ranking Checklist for Documenting Project-Specific Reviews
- Master List of Prioritized Planned and Potential Projects
- Short List of High Priority Projects
- Maps of Planned and Potential Projects

### *Prioritization Criteria*

The prioritization criteria incorporated in the GI Mechanism are presented in Appendix A, Maps and Lists of Prioritized Projects. These criteria are applied in the automated metrics evaluation described in step 4 of the prioritization protocol described in Section 2.1, Approach for Prioritizing and Mapping Projects (GI Mechanism).

### *Project Ranking Checklist for Documenting Project-Specific Reviews*

Project-specific reviews of GI projects are conducted using the Project Ranking Checklist included in Appendix A, Maps and Lists of Prioritized Projects. This checklist is a tool to support the City of Emeryville in applying the project ranking considerations included in step 5 of the prioritization protocol described in Section 2.1, Approach for Prioritizing and Mapping Projects (GI Mechanism).

### *Master List of Prioritized Planned and Potential Projects*

The Master List of Prioritized Planned and Potential Projects ("Master List"), included in Appendix A, Maps and Lists of Prioritized Projects, is an output of Step 5 of the prioritization protocol described in Section 2.1, Approach for Prioritizing and Mapping Projects (GI Mechanism).

There are thirteen planned and potential projects included in the Master List. Each project is presented with the following information:

- A unique database index number
- Capital Improvement Project Number (if any)
- Project name
- Jurisdiction in which the planned or potential project is located
- Project Location
- Whether the property is in public or private ownership
- Project size in acres
- A short description of the project's potential for inclusion of Green Stormwater Infrastructure

The Master List includes the following additional information, which was developed by the City of Emeryville, after considering the topics listed in the Project Ranking Checklist:

- Rank assigned to the project

### *Short List of High Priority Projects*

The Short List of High Priority Projects ("Short List"), presented in Appendix A, Maps and Lists of Prioritized Projects, includes top-ranked projects from within the Master List. The Short List includes information regarding each high priority project as needed to evaluate projects for potential inclusion in the Capital Improvement Program and to identify potential funding options. Summary information is provided below for projects included in the Short List of High Priority Projects:

- **South Bayfront Bridge and Horton Landing Park** is located between Horton St and the railroad, off 53rd Ave. This is a large-scale project that will become a major feature of the City and will include green infrastructure when completed. It will include a public park and pedestrian/bicycle path, making it a wonderful opportunity to publicly display Emeryville's commitment to resilient stormwater infrastructure and could also include educational signage about the GI systems.
- **40th Street Transit Hub Improvements** is a project by which the City plans to install bus, bicycle and pedestrian improvements on 40th Street. The project will incorporate green infrastructure into the design where possible. Opportunities have been identified for GI landscaping such as rain gardens in the following locations:
  a. between San Pablo Avenue and Adeline Street in nine-foot-wide strips between bus lanes and bikeways near the corners where there are no bus boarding islands;
  b. in the side medians between bus-only lanes and the portion of the two-way bike way that is between San Pablo Avenue and Hubbard Street;

c. in the tapers between bus boarding areas and bus-bike medians between Emery and Watts streets, between Haven and Hollis streets, and between Horton and Hubbard Street; and
d. in the tapers of pedestrian curb extensions at Watts, Harlan, Haven, Hollis, Horton and Hubbard streets.
e. Other possibilities are a permeable bike way, and a rain garden alongside the planned path in Oakland along the north side of 40th Street between Hubbard and Halleck streets.

- The **Eastshore State Park/Powell Street Bioswale** is located on Powell Street near the Watergate residential complex. This project was ranked as a high priority project because it utilizes green infrastructure to fix a problem that traditional grey infrastructure has historically failed to fix in our city. The location of this project (Appendix A) is prone to flooding due to settling of the fill the Marina was built on. This large bioswale will direct the floodwaters away from the street while also utilizing native plants and engineered soils to naturally filtering.
- The **Art Center** is located on 4060 Hollis Street. This project was ranked as a high priority project because it is a project with strong community support. The Art Center will provide a central venue for showcasing the artwork of Emeryville's many artisans and craftspeople. Stormwater from 40th Street flows towards this parcel and the inclusion of stormwater treatment on site would be very effective at reducing the volume of contaminants washing from Emeryville into the Bay.
- The **Davenport Mini-Park Rehabilitation** is located on Powell Street near Trader Vic's. It is a small park that needs its landscaping renovated. It has been chosen as a high priority project because it is in the Marina District, an area that experiences flooding during storm events. The inclusion of Green Infrastructure could promote infiltration and serve as a practical and aesthetic update. The project plans are not completed yet so there is still time to work GI into the designs.

### *Maps of Planned and Potential Projects*

The maps included in Appendix A, Maps and Lists of Prioritized Projects, show the locations of four prioritized green infrastructure projects. Maps of planned and potential projects may be updated, as needed, to provide necessary information relative to the identification of funding options and consideration for potential inclusion in the Capital Improvement Program.

## 2.3 Impervious Surface Retrofit Targets

The City of Emeryville has identified targets for the amount of impervious surface, from public and private projects within its jurisdiction (including redevelopment projects regulated under Provision C.3.b of the MRP), to be retrofitted by 2020, 2030, and 2040. The targets are presented in Table 2-1. The time schedules shown in this table are consistent with the timeframes for assessing load reductions for mercury and PCBs specified in Provisions C.11 and C.12 of the MRP. The City of Emeryville is currently participating in a regional effort to perform a Reasonable Assurance Analysis, that demonstrates how green infrastructure will be implemented to achieve PCB and mercury load reductions. To the extent that the implementation of this Green Infrastructure Plan may support load reductions for mercury and PCBs, as outputs from the Regional Assurance Analysis

become available, the City of Emeryville may consider modifying the targets presented in Table 2-1. Due to uncertainties related to the funding of public green infrastructure projects and the reliability of projections for private development projects, the City of Emeryville will track the progress toward achieving the targets presented in Table 2-1, identify any challenges that arise in achieving these targets, and propose solutions, in coordination with other MRP Permittees.

**Table 2-2: Target Amounts of Existing Impervious Surface to be Retrofitted by 2020, 2030 and 2040**

| Future Year | Target Amount of Existing Impervious Surface to be Retrofitted for Stormwater Treatment with GI (acres) |
|---|---|
| 2020 | 47.8 |
| 2030 | 51.6 |
| 2040 | 117.1 |

Notes:

1. Amounts shown in the table represent areas of impervious surface existing within the City of Emeryville as of July 1, 2002, that are anticipated to be retrofitted by the target years as a result of both public and private projects.
2. Projections of existing impervious surface to be retrofitted are based on anticipated results of actions described in Section 2.4, Prioritized Projects for Alternative Compliance Program or Early Implementation; local knowledge of planned future development; anticipated availability of funding; and future development scenarios generated with the Bay Area UrbanSim model used by the Metropolitan Transportation Commission.

## 2.4 Prioritized Projects for Alternative Compliance Program or Early Implementation

The following prioritized projects have been identified as part of an Alternative Compliance program (in accordance with MRP Provision C.3.e) or as part of early implementation (in accordance with MRP Provision C.3.j.ii):

- **Emeryville Public Marketplace Offsite Stormwater Treatment Plan (Parcel G)**

  Location:
  Site #1 – Doyle Street – 64th Street to Ocean Avenue
  Site #2 – 62ND Street – Doyle Street to Hollis (Doyle-Hollis Park)
  Site #3 – Adeline Street – 45th Street to 53rd Street
  Site #4 – 45th Street and Doyle Street Intersection
  Site #5 – 45th Street – San Pablo Avenue to Doyle Street

  Brief description:
  The Emeryville Marketplace is a 14.5-acre mixed use redevelopment project consisting of several construction phases spread out over a multi-year time period. Stormwater runoff from all redeveloped parcels of the project will be treated with Low Impact Development stormwater treatment under the New and Redevelopment Provision (C.3) of the Municipal Regional Stormwater NPDES Permit. The Emeryville Public Marketplace Project has made every effort to implement these stormwater treatment measures throughout the

redevelopment site. However, there is one area (denoted as Parcel G) in which implementing these stormwater treatment measures is infeasible.

Since this is the case, the property owner, AG-CCRP Public Market, L.P. has determined to implement the use of an Alternative Compliance option with the approval of the City of Emeryville. This option will allow the project to construct off-site stormwater treatment measures (equating to 6,300 square feet of area) to treat an equivalent amount of impervious surface (equating to 158,160 square feet of area) which lies within the same watershed in lieu of constructing these measures within the Parcel G site. These systems will provide an environmental benefit by treating area from roadway surfaces, versus on-site locations where building rooftops are the primary source of stormwater runoff.

Status of completion:

This project is creating green infrastructure systems in many locations throughout the city, some of which are already under construction. All treatment facilities are expected to be completed and operational by the end of 2020.

- **Sherwin Williams Phase 2 Offsite Stormwater Improvements**
  Location: A bioretention area will be installed along Sherwin Avenue

Brief description:
The Sherwin Williams project will redevelop the former Sherwin Williams paint factory site and an adjacent City-owned parcel, including reuse of an existing 74,000 square foot significant structure for office use, construction of five new buildings that will accommodate residential and commercial/retail space. The project will also create two new streets: Hubbard Street extension and 46th Street and approximately 3.53 acres of public park/open space area (which includes greenway) on the City-owned property and in four "Park Open Space" parcels on the property owned by the Developer. As prescribed by MRP C.3.b Stormwater requirements, the project will treat all of it's stormwater onsite.

This off-site portion of the project does not fall under the requirements of C.3.b. It is being constructed based on an agreement between the City and the developer. The City expressed the importance of treating stormwater in the project's surrounding vicinity and in an act of good faith the developer agreed to treat 15,910 square feet of public right of way along Sherwin Avenue.

Status of completion:

Plans for this project have been completed and are in the process of being reviewed by the City. Construction has not yet begun but the project is expected to be completed by the end of 2020.

# 3. Tracking and Mapping Completed GI Projects

The process for tracking and mapping completed GI projects, both public and private, and making the information publicly available, as required by Provision C.3.j.i.(2)(d), is described below. This process was developed by the ACCWP, which participated in regional coordination with BASMAA, to comply with the requirement in Provision C.3.j.iv.(1) that "Permittees shall, individually or collectively, develop and implement regionally-consistent methods to track and report implementation of green infrastructure measures including treated area and connected and disconnected impervious area on both public and private parcels within their jurisdictions."

## 3.1 Project Tracking and Load Reduction Accounting Tool

As a member agency of the ACCWP, the City of Emeryville uses an ArcGIS online (AGOL) web application-based tool, the C3 Project Tracking and Load Reduction Accounting Tool ("AGOL Tool"), which ACCWP developed in cooperation with the Contra Costa Clean Water Program to assist its member agencies in meeting the requirements described above. Detailed information and instructions on the tool can be found in the C3 Project Tracking and Load Reduction Accounting Tool Guidance Document (ACCWP 2017).

The general process for entering GI projects into the AGOL Tool involves logging in to the ArcGIS online web application, opening the tool, and entering data. There are two methods for entering data, but, in general both involve: locating the project area, drawing the project boundary, entering project attributes, drawing the stormwater treatment facility(ies), and entering facility attributes. Project attributes include fields such as jurisdiction, location description, type of project, project name, and additional optional fields that can be populated if the information is known. Facility attributes include hydraulic sizing criterion, project ID, facility type, treatment, and percent of project area treated by the facility.

The City of Emeryville has incorporated the use of the AGOL Tool into its processes for reviewing, approving and reporting C.3 Regulated Projects and non-C.3 Regulated projects that include green infrastructure – encompassing on both public and private projects. The tool includes a feature for generating tables of C.3 Regulated Projects and GI projects that include MRP-required project data for annual reporting purposes.

## 3.2 Making Information Publicly Available

As required by the MRP, the process for tracking and mapping completed projects (public and private) includes making the information generated by the tool publicly available. Information from the tool will be made publicly available as follows.

- On an annual basis, include in the Annual Report for the City of Emeryville's Stormwater Program information from the tool I the form of (1) a list of GI projects (public and private) that are planned for implementation during the permit term as required in Provision C.3.j.ii,

and (2) a list of Regulated Projects approved during the fiscal year reporting period as required in MRP Provision C.3.b.iv.

- Coordinate with ACCWP to develop a viewable version of the AGOL tool, which is anticipated to be embedded on ACCWP's public website and may also be accessible via the City of Emeryville's website.

# 4. Summary of General Guidelines for GI Projects

General Guidelines are presented in Appendix C to guide the city in designing a project that has a unified, complete design that implements the range of functions associated with GI projects, and in providing for appropriate coordination of projects and project elements. The General Guidelines include hydraulic sizing guidance, standard specifications, and typical designs for GI projects. Additional information about the General Guidelines is summarized below.

## 4.1 Implementing Projects with a Unified, Complete Design

The General Guidelines presented in Appendix C focus on designing and coordinating projects that implement a range of functions appropriate to the type of project. For example, the guidelines for designing street projects address a range of functions including pedestrian travel, use as public space, for bicycle, transit, vehicle movement, and as locations for urban forestry. The guidelines for coordination identify measures for implementation during construction to minimize conflicts that may impact green infrastructure.

## 4.2 Hydraulic Sizing Requirements

Provision C.3.j.i.(2)(g) of the MRP states that GI projects are required to meet the treatment and hydromodification management (HM) sizing requirements included in Provisions C.3.c and C.3.d of the MRP. However, an exception to this requirement is provided in Provision C.3.j.i.(2)(g) for street projects that are not Regulated Projects under Provision C.3.b ("non-Regulated Projects").

The General Guidelines in Appendix C provide hydraulic sizing guidance for GI projects, addressing the hydraulic sizing criteria in MRP Provisions C.3.c and C.3.d, as well as the alternate sizing approach for constrained street projects developed by the Bay Area Stormwater Management Agencies Association. These guidelines do not address Regulated Projects as defined in Provision C.3.b of the MRP.

Please note that some non-Regulated Projects are required to implement site design measures in accordance with Provision C.3.i of the MRP. Appendix L of the C.3 Technical Guidance explains how to determine whether Provision C.3.i applies to your project, and how to incorporate applicable site design measures, if required.

Table 4-1 presents a summary of where to find hydraulic sizing guidance, and other applicable guidance, for different types of projects.

**Table 4-1: Where to Find Hydraulic Sizing Guidance and Other Guidance - by Project Type**

| Type of Project | Where to Find Guidance | |
|---|---|---|
| | **Provision C.3.i or HM Guidance, if Applicable** | **Hydraulic Sizing Guidance** |
| Non-Regulated Green Infrastructure Project (public or private project) that is NOT subject to Provision C.3.i3 | Not applicable | Appendix C – General Guidelines for GI Projects |
| Non-Regulated Green Infrastructure Project (public or private project) that IS subject to Provision C.3.i | ACCWP C.3 Technical Guidance (Appendix L, Site Design Requirements for Small Projects) | |
| Regulated Project that is NOT a Hydromodification Management (HM) Project4 | Not applicable | ACCWP C.3 Technical Guidance (Section 5.1, Hydraulic Sizing Criteria) |
| Regulated Project that IS an HM Project | ACCWP C.3 Technical Guidance (Chapter 7, Hydromodification Management Measures) | |

## 4.3 Standard Specifications and Typical Designs

Appendix C of this GI Plan includes typical design drawings and standard specifications for GI projects, which address various types of land-use, transportation, and site characteristics. GI projects may also utilize design guidance provided in Chapter 6 of the C.3 Technical Guidance manual (ACCWP 2017b) for other types of low impact development storm water treatment facilities, subject to municipal staff approval.

[3] MRP Provision C.3.i applies to projects that create and/or replace at least 2,500 but less than 10,000 square feet of impervious surface; and Individual single family home projects that create and/or replace 2,500 square feet or more of impervious surface.

[4] An HM Project is a Regulated Project that creates and/or replaces one acre or more of impervious surface, will increase impervious surface over pre-project conditions, and is located in a susceptible area, as shown on the ACCWP default susceptibility map.

# 5. GI Requirements in Other Planning Documents

In compliance with Provision C.3.j.i.(2)(h), the City of Emeryville has planned to update planning documents that may affect the future alignment, configuration, or design of impervious surfaces within the Permittee's jurisdiction, including, but not limited to, streets, alleys, parking lots, sidewalks, plazas, roofs, and drainage infrastructure.

## 5.1 Anticipated Updates of Additional Planning Documents

The City of Emeryville has identified these planning documents as being in need of updates to incorporate GI requirements, as listed in Table 5-1. Updates to these planning documents have not yet been made for the reasons identified in the table.

**Table 5-1: Planning Documents to Be Updated to Include GI Requirements**

| Name of Planning Document | Reason for Deferral of Document Update |
|---|---|
| General Plan | Additional language surrounding Green Infrastructure will be added to this plan during its next scheduled update; 2029 |
| Climate Action Plan | Additional language surrounding Green Infrastructure will be added to this plan during its next scheduled update; 2026 |
| Parks and Recreation Strategic Plan | Additional language surrounding Green Infrastructure will be added to this plan during its next scheduled update; 2021 |
| Pedestrian and Bicycle Plan | Additional language surrounding Green Infrastructure will be added to this plan during its next scheduled update; 2022 |

More detailed information on the City of Emeryville's plans for updating the documents listed in Table 5-1 can be found in the Workplan to Incorporate Green Infrastructure Requirements in Planning Documents, included as Appendix D.

# 6. Evaluation of Funding Options

The City of Emeryville has evaluated funding options for implementing prioritized projects. The following funding options were evaluated:

- Grant monies, including
    - State Water Resources Control Board (SWRCB) Proposition 1 Grants
    - State Coastal Conservancy (SCC) Proposition 1 Grants
    - California Natural Resources Agency (CNRA) Urban Greening Grants
    - One Bay Area Grants (OBAG)
    - Caltrans Active Transportation Grants
    - Measure AA Funding
    - Community Development Block Grant Entitlement Program
    - Transportation Alternatives Program
- In-Lieu Fees (Single Jurisdiction and multi-jurisdiction;
- Existing resources, including Capital Improvement Program (CIP) funding;
- Development Impact Fees/Capital Contributions

## 6.1 Evaluation Criteria

The funding options were evaluated using the following criteria:

- Ballot approval – This criterion considers whether approval by voters is needed to implement the funding option.
- Reliability – Considers the extent to which the funding option, once implemented, could be relied upon in the future.
- Cost to implement – Considers the resources needed to implement the funding option.
- Obstacles – Considers barriers to implementing the funding option.]]

## 6.2 Evaluations of Funding Options

**Grant Monies**

- Ballot approval – Ballot approval is not required.
- Reliability – Grants are typically awarded for an individual project or planning activity, which must be completed by a specified date. Grants for project construction may specify that funds cannot be spent on maintenance.
- Cost to implement – Cost to prepare the application, which may be a lengthy process. Matching funds are typically required. Depending on the grant, there may be costs to prepare a Storm Water Resources Plan or functionally-equivalent plan.
- Obstacles
    - Resources must be spent to apply for grants, with no guarantee of success in obtaining a grant.
    - In order to receive grant funds from a bond (approved after January 2014), storm water and dry weather runoff capture projects must be included in a Storm Water Resource Plan or functionally-equivalent plan, in accordance with Water Code section 10563 (as amended by Senate Bill 985). The City has taken appropriate measure steps make sure all future projects will be included in a Stormwater Resource Plan.

**In Lieu Fees (Single Jurisdiction)**

- Ballot approval -- In-lieu fees are not classified as a tax or special assessment, and therefore do not require voter approval to be enacted.
- Reliability – Amount of funding would fluctuate, due to the linkage to development projects.
- Cost to implement – Costs include initiating the planning phase of a regional project in preparation to receive contributions, setting up administrative procedures to manage the contributions, and carrying the Regional Project through to completion per the required timeframe.
- Obstacles
    - Predicting sufficient level of contributions to warrant start-up costs.
    - Ensuring sufficient level of contributions to complete one or more regional projects

**In Lieu Fees (Multi-Jurisdiction)**

- Ballot approval -- In-lieu fees are not classified as a tax or special assessment, and therefore do not require voter approval to be enacted.
- Reliability – Amount of funding would fluctuate, due to the linkage to development projects.
- Cost to implement – Costs would be shared across the participating jurisdictions, including the up-front costs of planning and implementing Regional Projects, the ongoing administrative costs to operate the program, and financial exposure with regard to the need to complete projects within required time frames for all contributing Regulated Projects.
- Obstacles – While the agency could potentially influence the development of a multi-jurisdictional in-lieu fee option, the viability of this option would be dependent upon decisions and actions by others, including the establishment of agreements and cost-sharing approaches with other jurisdictions or another entity that may be identified to manage the program.

**Existing Resources**

- Ballot approval – Ballot approval would not be required to use existing resources.
- Reliability – Reliability of funds is high once projects are designated as capital improvement projects (CIP) and given a budget.
- Cost to implement – Resources would be required to verify and document the basis for using an existing funding source for GI planning and implementation, and to modify procedures.
- Obstacles
    - Finding enough money in the City CIP Budget without hurting the funding options of other City infrastructure projects

**Development Impact Fees/Capital Contributions**

- Ballot approval – Impact fees do not require voter or property owner approval to be enacted.
- Reliability – Due to its linkage to private development projects, revenue from impact fees fluctuates with development activity.
- Cost to implement – Costs to implement this option would include the analysis of GI planning and implementation activities to develop fees in proportion to the cost of services provided.
- Obstacles

- Establishment of nexus and proportionality. Impact fees may not be used to fund maintenance activities.

## 6.3 Recommendations

Based on the information presented above, the following funding options are recommended for further study:

- Grant Monies
- In Lieu Fees (Single Jurisdiction)
- Existing Resources
- Development Impact Fees/Capital Contributions should be studied once the City has completed more Green Infrastructure projects and can better estimate their associated costs

Further study of the following funding options is not recommended for the reasons stated below:

- In Lieu Fees (multi-jurisdiction) are not recommended as a funding source to pursue because as a small city, Emeryville has less sway in advocating for the creation of a multi-jurisdictional program that would require funding and additional administrative staff.

# 7. References


Alameda Countywide Clean Water Program. 2017. C3 Project Tracking and Load Reduction Accounting Tool Guidance Document.

Alameda Countywide Clean Water Program. 2017. C.3 Technical Guidance Manual, Version 6.

Alameda Countywide Clean Water Program. 2016. Evaluation of Prioritized Project Funding Options

City of Dublin, California. 2018. Typical Green Infrastructure Designs and Standard Specifications.

Geosyntec. 2017. Alameda Countywide Stormwater Resource Plan Screening and Prioritization using Multi-Benefit Metrics Technical Memorandum. December 13.

National Association of City Transportation Officials. 2017. Urban Street Stormwater Guide.

San Francisco Bay Regional Water Quality Control Board. 2015. Order No. R2-2015-0049, Municipal Regional Stormwater Permit (MRP).

San Mateo Countywide Water Pollution Prevention Program. 2009. San Mateo County Sustainable Green Streets and Parking Lots Design Guidebook.

# Appendix A. Maps and Lists of Prioritized Projects

# Appendix A Master List of Prioritized Planned and Potential Projects

| Index # | CIP # | Rank | Project Name | Jurisdiction | Location | Public/Private | Size (acres) | Green Infrastructure Description |
|---|---|---|---|---|---|---|---|---|
| 1 | CF-02 | 1 | South Bayfront Bridge and Horton Landing Park | City of Emeryville | Between Horton St and the railroad, off of 53rd Ave | Public | 1.23 | This project replaces large areas of currently impervious areas into self treating and self retaining area. It will also include flow through planters and bioretention units for the areas that cannot treat themselves. |
| 2 | PB-10 | 2 | 40th St/San Pablo Transit Hub | City of Emeryville | 40th Street and San Pablo Avenue | Public | Unkown at this time | There are numerous opporunities for GI explained in detail in the List of High Prioirity Projects |
| 3 | CF-01 | 3 | Eastshore State Park/Powell Street Bioswale | California State Park System, Coastal Conservancy, City of Emeryville | Powell st Near Watergate complex | Public | 0.13 | This project would construct a large bioswale to mitigate flooding on Powell Street. Plans have been developed for this plan but may need to be updated to meet current stormwater treatment guidelines. |
| 4 | CF-08 | 4 | Art Center | City of Emeryville | 4060 Hollis | Public | 0.78 | The Art Center has the potential to treat stormwater from 40th street, one of the city's most heavily trafficked and polluted streets. Plans are still being developed and biorentention units or flow through planters are being considered. |
| 5 | FM-08 | 5 | Davenport Mini Park Rehabilitation | City of Emeryville | Powell Street (near Trader Vic's) | Public | 0.21 | This project includes rehabilitation of landscaping, the stairway, and decking. There is opportunity for self treating and self retaining areas as well as for more robust green infrastructure systems. |
| 6 | H-05 | | South Bayfront Site B | City of Emeryville | North of Bay Street Shopping Complex | Public | 3 | This housing development could include stormwater treatment. |
| 7 | M-02 | | Marina Park Improvements | City of Emeryville | Marina Park off Powell Street | Public | Unkown at this time | The Marina needs upgrades to it's stormdrain system. The settling of the fill it is built upon has created flooding issues. Green Infrastructure could help remedy this issue by increasing inflitration in the area. |
| 8 | New | | Bike/Pedestrian Plan Implementation | City of Emeryville | The whole of Emeryville | Public | Unkown at this time | Project goals include cycle/pedestrian path improvements, meaning there is potential for GSI where paths and sidewalks are being widened. |
| 9 | H-02 | | 6150, 5890 and 5900 Christie Housing Site | City of Emeryville | Christie Avenue | Public | Unkown at this time | This housing development could include stormwater treatment. |
| 10 | ST-09 | | Frontage Road Landscape Median Island | City of Emeryville | Frontage Road from Powell St. to the Powell St. I/80 Interchange about 700 feet to the north | Public | Unkown at this time | This project includes 45K sq. ft. of new landscaping. If the street profile allows, this would be a big opportunity for GSI. |
| 11 | T-01 | | Annual Street Rehab/Preventative Maintenance | City of Emeryville | The whole of Emeryville | Public | Unkown at this time | This is a continuing Project that mainly aims to improve the quality of streets. It could include bulbouts with green infrastructure. |
| 12 | New | | San Pablo Crosswalk | City of Emeryville | San Pablo Avenue | Public | Unkown at this time | This project will likely widen the sidewalk and create opportunity for bioretention areas. |
| 13 | New | | 63rd Street - Vallejo to Overland Repaving project | City of Emeryville | 63rd Street | Public | Unkown at this time | This project will repave three city blocks and according to a City Engineer, presents a good opportunity for building green infrastructure. |

# Appendix A: Short List of High Priority Projects

| Priority Level | CIP # | Project name and location | Project description | Status | Description of GI Measures Considered and/or Proposed or Why GI is Impracticable to Implement |
|---|---|---|---|---|---|
| 1 | CF-02 | South Bayfront Bridge and Horton Landing Park + Horton Landing Park Expansion | | Designs finished. Construction to begin soon | There are several bioretention units and flow through planters in the design. There are also several self treating areas. |
| 2 | CF-01 | Eastshore State Park/Powell Street Bioswale | Construct a bioswale to mitigate flooding. Land is controlled by State Parks. | The City has been trying to build this project for years. However, the City must negotiate a development and maintenance agreement with the Park District in order to move forward on construction. An exisiting design drafted by an Engineer in 2004 that may or may not need to be updated | The City would like to build a large swale that will allow water to flow into the protected marsh of Maclaughlin State Park while filtering it for pollutants. |
| 3 | PB-10 | 40th St Transit Hub | The City is reconfiguring 40th Street install bus, bicycle and pedestrian improvements on 40th Street. The project will incorporate green infrastructure into the design where possible. | Preliminary designs are being drafted | 1. Between San Pablo Avenue and Adeline Street in nine-foot-wide strips between bus lanes and bikeways near the corners where there are no bus boarding islands;<br>2. In the side medians between bus-only lanes and the portion of the two-way bike way that is between San Pablo Avenue and Hubbard Street;<br>3. In the tapers between bus boarding areas and bus-bike medians between Emery and Watts streets, between Haven and Hollis streets, and between Horton and Hubbard Street; and<br>4. In the tapers of pedestrian curb extensions at Watts, Harlan, Haven, Hollis, Horton and Hubbard streets.<br>5. Other possibilities are a permeable bike way, and a rain garden alongside the planned path in Oakland along the north side of 40th Street between Hubbard and Halleck streets |
| 4 | FM-08 | Davenport Mini Park Rehabilitation | This project includes rehabilitation of landscaping, the stairway, and decking. | Designs have not been created yet which means there is opportunity for integrating GI | This project is still in it's conceptual phase and specifics of GI measures have not yet been considered. |
| 5 | CF-08 | Art Center | The building needs to be seismically upgraded and needs a roof, water, and lighting prior to any use | Designs have not been created yet which means there is opportunity for integrating GI | The Art Center has the potential to treat stormwater from 40th street, one of the city's most heavily trafficked and polluted streets. Plans are still being developed and biorentention units or flow through planters are being considered as GI options |

# Appendix A:
# Map of High Priority "Short List" Projects

Date: 4/29/2019


Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet
Projection: Lambert Conformal Conic

# Appendix A: Example Project Ranking Checklist

| Item | Topic | Data | Prioritization | | |
|---|---|---|---|---|---|
| | | | High | Med. | Low |
| 1 | **Database Index Number/ CIP #** | | | | |
| 2 | **Location (street address, cross streets, and/or APN):** | | | | |
| 3 | **Project Name (if any):** | | | | |
| 4 | **Cost Considerations** | | | | |
| 4.1 | Capital costs: | | | | |
| 4.2 | Maintenance costs: | | | | |
| 4.3 | Funding sources: | | | | |
| 5 | **Opportunity Considerations** | | | | |
| 5.1 | Opportunities to treat runoff from private parcels in retrofitted street ROW: | | | | |
| 5.2 | Synergies with upcoming transportation and other CIP projects: | | | | |
| 5.3 | ROW projects on pedestrian or bicycle priority streets: | | | | |
| 6 | **Load Reduction Potential Consideration** | | | | |
| 6.1 | Load reduction potential for PCBs and mercury: | | | | |
| 7 | **Labor/Staff Considerations** | | | | |
| 7.1 | Ease of construction/installation | | | | |
| 7.2 | Complexity and/or frequency of operations and maintenance | | | | |
| 8 | **Multiple Benefits Considerations** | | | | |
| 8.1 | Consideration of achieving multiple benefits | | | | |
| 8.2 | Potential for aesthetic, community, or other benefits not previously identified | | | | |
| 9 | **Safety and Security Considerations** | | | | |
| 9.1 | Potential to cause a safety hazard and/or measures needed to avoid creating a safety hazard | | | | |
| 9.2 | Potential for vandalism | | | | |
| 10 | **Implementation Considerations** | | | | |
| 10.1 | Potential for implementation challenges due to site constraints or community opposition | | | | |
| 10.2 | Existing project concepts with strong community support | | | | |

# Appendix B

# Workplan for Completing Prioritized Projects

## 1. Statement of Purpose

The purpose of this workplan is to identify the scheduled timeframes and other key information for implementing prioritized green infrastructure (GI) projects identified as part of a Provision C.3.e Alternative Compliance program or as part of Provision C3J Early Implementation.

## 2. Schedule, Budget, and Responsible Party

The following table identifies milestones for the implementation of prioritized projects, as well as the budget, funding source, and responsible party for each project.

| Name of Project | Schedule | | | | | | | | Budget | Funding source | Responsible Party |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Planning | | Preliminary Design | | Final Design | | Construction | | | | |
| | Start | Finish | Start | Finish | Start | Finish | Start | Finish | | | |
| **Emeryville Public Marketplace Offsite Stormwater Treatment Plan (Parcel G)** | 10/2015 | 7/2017 | 7/2017 | 10/2017 | 10/2017 | N/A | N/A | N/A | Under the Responsibility of the developer | Under the Responsibility of the developer | AC-CCRP PUBLIC MARKET, L.P. |
| **Sherwin Williams Phase 2 Offsite Stormwater Improvements** | 11/2016 | 2/2018 | 2/2018 | 6/2018 | N/A | N/A | N/A | N/A | Under the Responsibility of the developer | Under the Responsibility of the developer | LMC Emeryville I Investor LLC |

# Appendix C. General Guidelines for GI Projects

These General Guidelines have been developed to guide the City of Emeryville in designing a project that has a unified, complete design that implements the range of functions associated with GI projects, and in providing for appropriate coordination of projects and project elements. The guidelines apply to projects that incorporate GI into an existing roadway segment or a previously developed public parcel and are **not** Regulated Projects as defined in Provision C.3.b of the MRP. The guidelines are organized as follows.



## C.1 Functions Associated with GI

The functions associated with GI retrofits of existing streets and GI retrofits of public parcels are identified below.

### *C.1.1 Functions Associated with GI Retrofits of Existing Streets*

The following functions are associated with GI retrofits of existing streets:

- Street use for stormwater management, including treatment;
- Safe pedestrian travel;
- Use as public space for bicycle, transit, and vehicle movement/parking; and
- Use as locations for urban forestry.

### *C.1.2 Functions Associated with GI Retrofits of Public Parcels*

Existing facilities on public parcels may be retrofitted with GI. Although there are potentially a wide range of public uses that could occur on various parcels, key issues are associated with the outdoor use of public parcels for landscaping and parking. The following functions are associated with GI retrofits of public parcels:

- Site use for stormwater management and landscaping
- Circulation and parking within the site

## C.2 Guidelines for GI Retrofits of Existing Streets

Streets must perform the range of functions described in Section C.1.1. The following guidelines provide general guidelines for designing and constructing GI facilities within the right-of-way of existing streets, to address the full range of functions. Additional design guidance for GI facilities, which are also referred to as low impact development (LID) stormwater treatment facilities, is provided in Chapters 5 and 6 of the Alameda Countywide Clean Water Program's C.3 Technical Guidance, which may be downloaded at, www.cleanwaterprogram.org (click Businesses, then Development).

### *C.2.1 Guidelines Addressing Street Use for Stormwater Management*

The GI guidelines to support street functionality for stormwater management are organized around the following objectives:

- Convey stormwater to GI facilities,
- Identify the appropriate GI typical designs for the project, and
- Convey stormwater away from transportation facilities.

#### *Convey Stormwater to GI Facilities*

GI retrofits of existing streets must be designed to convey stormwater runoff from the roadway surface to the proposed GI facilities. Key issues include working with the street profile, working with the existing drainage system, and considering conveyance facilities where needed.

Work with the Existing Street Profile

Modifying the profile of an existing street is costly. Therefore, the designs of GI street retrofits should generally maintain the existing street profile where feasible. The street profile affects how stormwater runoff flows off of a street, and is considered in the design of GI facilities. The most common street profile is crowned, although some streets may be reverse crowned, or may drain to one side, as illustrated in Figures C-1 through C-3. Occasionally, a street may have a flat profile, such as the example shown in Figure C-4 in which a street is designed to drain into pervious pavement. Unless pervious pavement is used for the full width of the street, GI facilities would be located downslope from the roadway surface. In a crowned street, this may allow for GI facilities on both sides of the street. In a reverse crowned street, GI facilities may be considered in the median; and in a side-sloping street, GI facilities would be located on the downslope side.

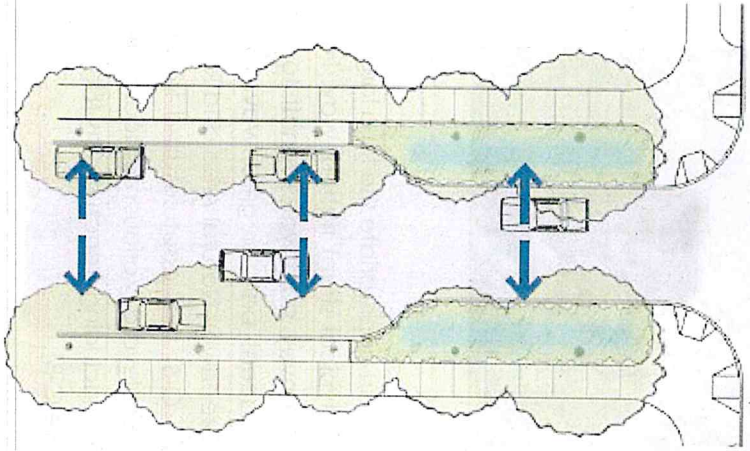


**Figure C-1. Crowned Street Profile.** A crowned street is designed so that the highest elevation is in the middle of the street, such that stormwater runoff drains to the sides of the street. GI facilities may be located on either side of the street.

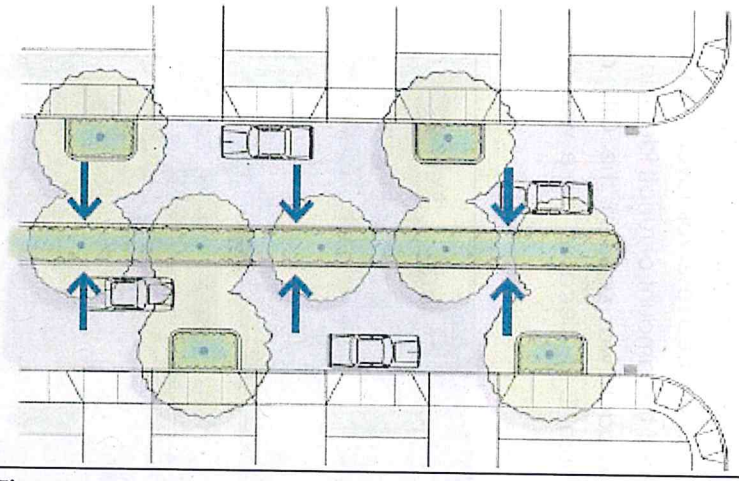


**Figure C-2. Reverse Crowned Street Profile.** A reversed crowned street is the opposite of a crowned street and directs runoff to the center line of the street. GI facilities may be considered in the median.

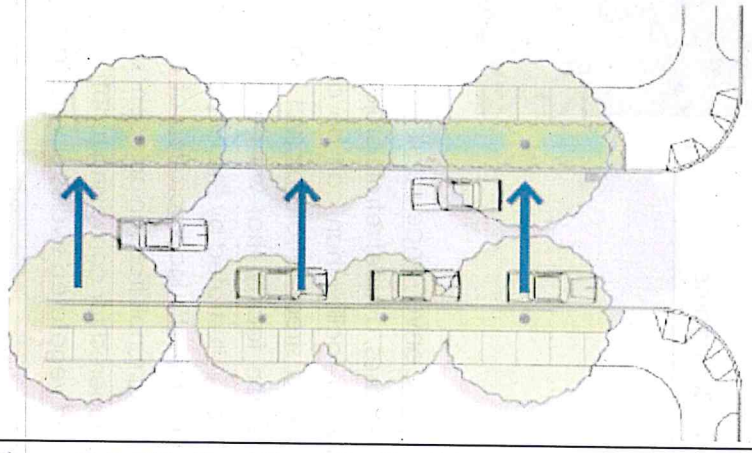


**Figure C-3. Side Shed Street Profile.** Side shed streets are designed to shed all water to one side of the street. GI facilities would be located on the downslope side.

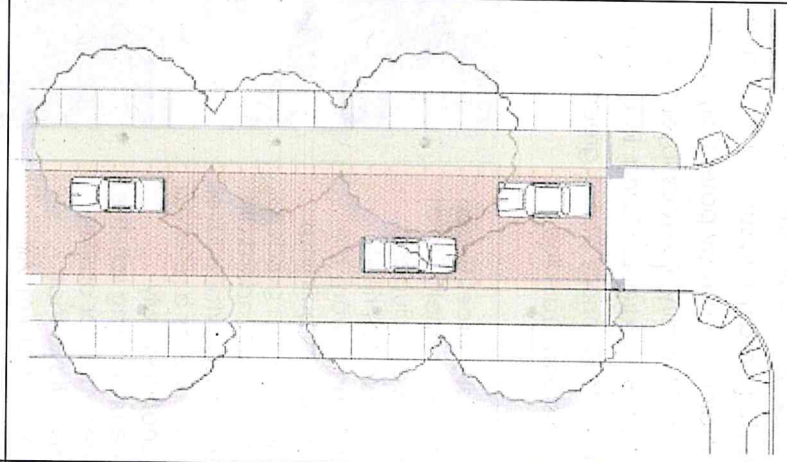


**Figure C-4. Flat Street Profile.** Flat streets are designed to drain through pervious paving. While these facilities do not have a marked slope, they may be graded slightly so that they drain to the sides or center of the street when there is too much water.

*Source: San Mateo Countywide Water Pollution Prevention Program/Nevue Ngan*

## Work with the Existing Drainage System

If an underdrain will be included in the GI facility design, a street retrofit site should have an existing storm drain line, to which the underdrain may be connected. If there is no existing storm drain line, subject to municipal approval, in lieu of an underdrain, sites with poorly draining soils may potentially be designed with an oversized reservoir layer of rock below the GI facility. The rock layer would be sized to hold the amount of runoff identified in Section 6, Hydraulic Sizing Requirements. This approach was used in the City of Burlingame's Donnelly Street green street project (Figure C-5), because there was no available storm drain line.

**Figure C-5. Donnelly Street Green Street Project.** The Donnelly Street Green Street Project includes a rain garden, pictured at right, which captures runoff from the adjacent commercial buildings and parking lot. The rain garden was designed with no underdrain and an enlarged subsurface layer of rock, which serves as a reservoir and allows runoff to slowly infiltrate to the underlying soil. The system was designed for onsite management of flows that exceed the 30-year storm. An overflow to the curb is provided for a 50- to 100-year event scenario.
*Source: City of Burlingame*

## Consider Conveyance Facilities

In some cases, a street retrofit project may be located near an appropriate site for a larger stormwater facility than can be accommodated in the typical street right-of-way. For example, a street retrofit project may be designed to convey stormwater runoff to a bioretention facility that will be constructed on an adjacent park or greenway. This approach is illustrated by the City of El Cerrito's Ohlone Greenway Natural Area and Rain Garden project's incorporation of a rain garden (Figure C-6) that captures and treats stormwater runoff from an adjacent segment of Fairmont Boulevard. Various methods may be considered for conveying runoff to nearby GI facilities, including trench drains (Figure C-7) and vegetated swales or vegetated channels (Figure C-8).

**Figure C-6. Ohlone Greenway Natural Area and Rain Garden.** This rain garden captures and treats runoff from an adjacent segment of Fairmont Boulevard. In this instance, the rain garden location provided an opportunity to convey and treat stormwater outside the street right-of-way.
*Source: PlaceWorks*

**Figure C-7. Trench Drain.** A trench drain can be used to convey runoff to GI facilities.

**Figure C-8. Pervious Drainage Channel.** Pervious, unlined drainage channels can be designed to convey runoff to GI facilities.

## *Identify the Appropriate Typical Design for Street Project Site*

Refer to Attachment C-4 of this appendix to identify appropriate typical design drawings for the project. Typical designs have been developed for various conditions that may occur at a project site. GI projects may also utilize design guidance provided in Chapter 6 of the C.3 Technical Guidance manual for other types of low impact development storm water treatment facilities, subject to municipal staff approval.

### *Apply the Appropriate Hydraulic Sizing Criteria*

Refer to Attachment C-1 for guidance on identifying and using the appropriate hydraulic sizing criteria for the proposed project.

### *Convey Stormwater away from Transportation Facilities*

To manage the risk of flooding, adequate drainage facilities must be provided for all segments of roadway, in accordance with the City of Emeryville's storm drainage design standards, including design criteria, standards, policies, and procedures for storm drainage improvements. All storm drainage facilities must be designed in accordance with the applicable standards and accepted engineering principles, as directed by Public Works.

## C.2.2 Guidelines Addressing Pedestrian Travel within Street Right of Way

To help reduce pollution from automobiles, the City of Emeryville has a goal to improve and expand transportation choices, including the pedestrian mode of travel. As part of meeting this goal, the design of GI retrofits of existing streets should incorporate measures that seek to enhance the safety and attractiveness for pedestrians. The following measures may be considered:

- Incorporate into project intersections curb extensions, also referred to as bulbouts, which reduce the street width at intersections and shorten the length of street crossings for pedestrians, while also providing space for GI facilities (see Figure C-9).
- Provide attractive landscaping designs that enhance the sense of place for pedestrians and may potentially include amenities such as shade trees and seating areas.
- Locate the GI facility between the sidewalk and vehicle travel lanes, in order to enhance pedestrian safety by providing protected sidewalks.

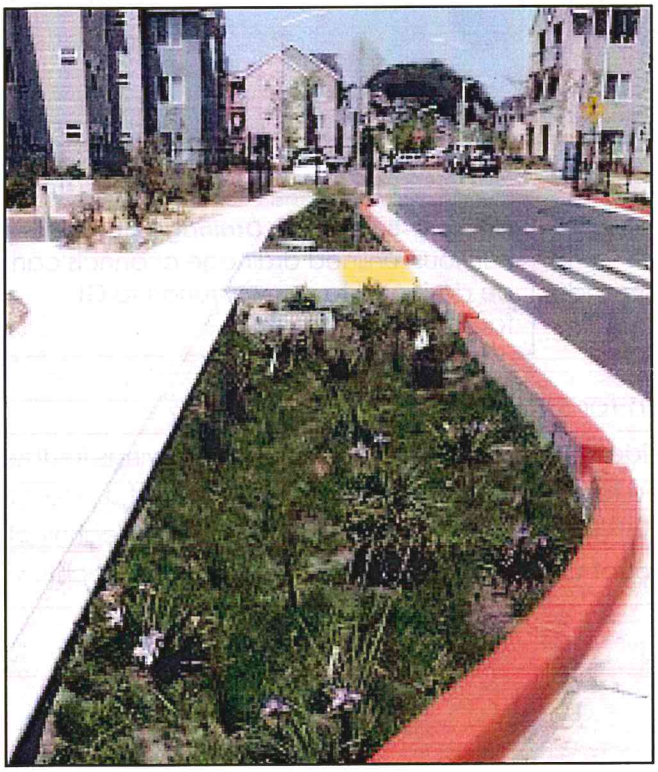


**Figure C-9. Curb Extension.** In addition to reducing the street width and shortening the length of street crossings for pedestrians, curb extensions, or "bulbouts," such as this example in Albany, also provide space for GI facilities.
*Source: bluegreenbldg.com*

### *C.2.3 Guidelines Addressing Street Use for Bicycle, Transit, and Vehicle Movement/Parking*

Complete streets balance the needs of pedestrian, bicycle, automobile, and public transit modes of travel. To meet the goal of improving and expanding transportation choices, described in Section C.2.2, in addition to pedestrian transportation, GI retrofits of existing streets must also be designed to accommodate bicycles, motor vehicles, and, where appropriate, public transit. The design and construction of each GI project should incorporate appropriate measures to enhance transportation safety and help improve the attractiveness of alternative modes of travel. The following measures may be considered:

Bicycle-Friendly Measures

- Include bicycle lanes in GI retrofits of existing streets.
- Provide a protected bicycle lane by locating a GI facility or other landscaped area, or a lane of parking, between a bicycle lane and lanes of motor vehicle travel.
- Include bicycle racks in GI street retrofit projects.

Public Transit-Friendly Measures

- Enhance the comfort of public transit users by providing shelter, shade, and greenscape at bus stops and other public transit stops.
- Integrate GI into transit facilities, such as boarding bulbs and islands, or rooftops of transit shelters.
- Provide bicycle racks at public transit stops.

Motor Vehicle-Friendly Measures

- Implement GI with geometric changes that reduce vehicle speed and/or improve visibility. This may include "road diet" projects that reduce the number of lanes of travel, or traffic calming projects that incorporate areas of landscaping, such as traffic islands, as visual cues to help slow down traffic.
- Provide visual cues to help slow down traffic and alert drivers to the presence of GI facilities, to help prevent motor vehicles from driving into a stormwater facility. Visual cues may include curbs and landscaping that is readily visible to drivers.

### *C.2.4 Guidelines Addressing Urban Forestry in Public Right of Way*

Increasing the planting of street trees in the City of Emeryville is anticipated to benefit local water quality, air quality, energy efficiency, and property values. GI projects should incorporate measures to preserve existing street trees and promote the planting of new street trees. The following measures should be incorporated, as appropriate:

- Prioritize the preservation of existing mature trees.
- Replace any mature trees that are removed by the project.
- Maximize the planting of new trees in accordance with the requirements of Public Works.
- The planting of trees within a GI facility should follow guidance, including the identification of appropriate species, provided in Appendix B of the ACCWP C.3 Technical Guidance,

which may be downloaded at www.cleanwaterprogram.org (click Businesses, then Development).

## C.3 Guidelines for GI Retrofits of Public Parcels

Public parcels must perform the range of functions described in Section C.1. The following guidelines provide general guidelines for GI retrofitting of public parcels, to address the full range of functions. Additional design guidance for GI facilities, which are also referred to as low impact development (LID) storm water treatment facilities, is provided in Chapters 5 and 6 of the ACCWP C.3 Technical Guidance, which may be downloaded at, www.cleanwaterprogram.org (click Businesses, then Development).

### *C.3.1 Guidelines to Address Parking Lot Use for Landscaping and Stormwater Management*

Parking lots often contain excess parking spots and oversized parking spaces and drive aisles. GI retrofits of public parcels should consider options to reduce any unnecessary parking areas, in order to provide space for landscaping, stormwater management, and pedestrian walkways. The following measures may be considered:

*Maximize Space for GI and other Landscaping*
To allow more space for GI and other landscaping, shorten parking stall lengths to 15 feet, and drive/back-up aisle widths to 22 feet subject to municipal approval. Parking should be designed to meet "average day" needs and utilize pervious overflow parking zones to meet peak parking needs.

*Consider Specifying Pervious Paving* Pervious paving may be used in parking lot designs. Where pervious paving is underlain with pervious soil or pervious storage material sufficient to hold the Municipal Stormwater Regional Permit Provision C.3.d volume of rainfall runoff, it is not considered impervious and can function as a self-treating area. Please see Section 6.6 of the C.3 Technical Guidance for further design guidance for pervious pavement installations.

*Convey Stormwater to GI Facilities*
GI retrofits of existing sites must be designed to convey stormwater runoff from impervious surfaces (roofs and/or parking lots) to the proposed GI facilities. Key issues include working with the existing drainage system, and considering conveyance facilities where needed.

Work with the Existing Drainage System
If an underdrain will be included in the GI facility design, the site should have access to an existing storm drain line, to which the underdrain may be connected. If there is no existing storm drain line, subject to municipal approval, in lieu of an underdrain, sites with poorly draining soils may potentially be designed with an oversized reservoir layer of rock below the GI facility. The rock layer would be sized to hold the amount of runoff identified in Section 6, Hydraulic Sizing Requirements. This approach was used in the City of Burlingame's Donnelly Street green street project (Figure C-5), because there was no available storm drain line.

Consider Conveyance Facilities

Various methods may be considered for conveying runoff from impervious surfaces to GI facilities, including trench drains (Figure C-7) and vegetated swales or vegetated channels (Figure C-8). In parking lots that include speed bumps, consider using speed bumps to help direct stormwater runoff to GI facilities.

### *Identify the Appropriate Typical Design for the Project Site*

Refer to Attachment C-4, included in this appendix, to identify appropriate typical design drawings for the project. Typical designs have been developed for various conditions that may occur at a project site. GI projects may also utilize design guidance provided in Chapter 6 of the C.3 Technical Guidance manual for other types of low impact development storm water treatment facilities, subject to municipal staff approval.

### *Apply the Hydraulic Sizing Criteria Identified in Provisions C.3.c and C.3.d*

Refer to Attachment C-1 for guidance on using the appropriate hydraulic sizing criteria in MRP Provisions C.3.c and C.3.d as applicable to design GI projects that are not regulated by Provision C.3.b ("non-Regulated Projects).

### *Prioritize Tree Preservation and Planting*

In order to benefit local water quality, air quality, energy efficiency, and property values, GI projects on public parcels should incorporate measures to preserve existing street trees and promote the planting of new trees. The following measures should be incorporated, as appropriate:

- Prioritize the preservation of existing mature trees.
- Replace any mature trees that are removed by the project.
- Maximize the planting of new trees in accordance with the requirements of Public Works.
- Incorporate trees in landscaped areas within parking lots – which serves to shade vehicles and paved surfaces, improve air and water quality, intercept stormwater in the tree canopy, and take up stormwater through the root system.
- The planting of trees within a GI facility should follow guidance, including the identification of appropriate species, provided in Appendix B of the ACCWP C.3 Technical Guidance, which may be downloaded at www.cleanwaterprogram.org (click Businesses, then Development).

## C.3.2 Guidelines to Address Parking Lot Use for Vehicular Parking

GI retrofits of public parcels should provide for adequate motor vehicle and bicycle parking for the proposed public use. The following measures may be considered:

- Include bicycle parking facilities.
- Provide pedestrian walkways within parking lots, including bridged walkways across GI facilities.
- Provide safe pedestrian access to and directional signage for adjacent public transit stops.
- Consider other improvements to enhance existing pedestrian circulation and safety.

- Depending on the type of use, larger public parcel retrofits should consider providing bicycle storage, changing rooms, and preferred parking for carpooling

## C.4 Guidelines for Coordination of Projects

Installing GI components at a project prior to the completion of that project, or the construction of an adjacent project, has the potential to degrade the functioning of the GI facility. Street improvement or other infrastructure projects, the development of public parcels, and other public and private projects should therefore include coordination of construction schedules to minimize impacts to GI.

The following measures shall be implemented in all GI projects to protect investments in GI:

1. GI facilities shall not be used as temporary sediment basins during construction.
2. Erosion control plans shall include protections for GI; erosion control plans are subject to the requirements of Emeryville's Erosion Control Plan;
3. Installed GI facilities shall be protected from construction runoff and kept offline until the contributing drainage area is stabilized.

Contractors are encouraged to construct GI facilities at the end of a project, to help protect the facilities from construction-related impacts.

# Attachment C-1: Hydraulic Sizing Criteria

This provides guidance on the following topics:

- Hydraulic sizing criteria in MRP Provisions C.3.c and C.3.d as applicable to GI projects that are not regulated by Provision C.3.b ("non-Regulated Projects)
- Alternate sizing approach for constrained street projects

## C1.1 Hydraulic Sizing Criteria in MRP Provisions C.3.c and C.3.d

Provision C.3.c requires the use of low impact development (LID) stormwater controls. To meet the MRP definition of LID, bioretention facilities must have a surface area no smaller than what is required to accommodate a 5 inches/hour stormwater runoff surface loading rate, and infiltrate runoff through biotreatment soil media at a minimum of 5 inches per hour.

Provision C.3.d of the MRP includes volume-based, flow-based, and the combination volume- and flow-based hydraulic sizing criteria. Bioretention areas may be sized using a simplified flow-based hydraulic sizing method, known as the "4 percent method," in which the surface area of the bioretention area is 4 percent of the effective impervious surface area that is treated. However, by using a combination volume- and flow-based hydraulic sizing approach, it may be possible to provide a bioretention area that is less than 4 percent of the effective impervious surface area, which can help reduce costs. Step-by-step instructions for using the 4 percent method and the volume-based sizing criteria are provided in Section 5.1 of the C.3 Technical Guidance. Guidance for using the combination flow and volume criteria from Section 5.1 of the C.3 Technical Guidance document are copied below. The worksheet for using this method is provided in Attachment C-2.

The implementation of LID stormwater treatment facilities designed in accordance with Provisions C.3.c and C.3.d of the MRP will provide hydromodification management benefits by infiltrating and detaining stormwater runoff.

### *Step-by-Step Guidance for Combination Flow and Volume Method*

To apply the combination flow and volume approach, use the following steps, which may be performed using the combination flow and volume sizing criteria Excel worksheet provided in Attachment C-2 of this appendix.

1. **Mean Annual Precipitation**
    - Determine the mean annual precipitation (MAP) for the project site using the Mean Annual Precipitation Map of Alameda County (Attachment C-3). Use the Oakland Airport unit basin storage volume values from Table C1-1 (below) if the project location's mean annual precipitation is 16.4 inches or greater and the San Jose values if it is less than 16.4 inches.

- In order to account for the difference between MAP of the project site and the two rainfall locations shown, calculate the ***MAP adjustment factor*** by dividing the project MAP by the MAP for the applicable rain gauge, as shown below: MAP adjustment factor = (project location mean annual precipitation

$$Map\ adjustment\ factor = \frac{(project\ location\ mean\ annual\ precipitation)}{(18.35\ or\ 14.4, as\ appropriate)}$$

2. **Effective Impervious Area for the Drainage Management Area**
   - Based on the topography of the site and configuration of buildings, divide the site into drainage management areas (DMAs), each of which will drain to a treatment measure. Implement the steps below for each DMA with a volume-based treatment measure.
   - Minimize the amount of landscaping or pervious pavement that will contribute runoff to the treatment measures. Refer to Sections 4.1 and 4.2 of the C.3 Stormwater Technical Guidance to design areas of landscaping or pervious pavement as "self-treating areas" or "self-retaining areas," so that they do not contribute runoff to the LID treatment measure and may be excluded from the DMAs for the treatment measures.
   - For each DMA in which the area that will contribute runoff to the treatment measure includes pervious surfaces (landscaping or properly designed pervious paving), multiply the area of pervious surface by a factor of 0.1.
   - For applicable DMAs, add the product obtained in the previous step to the area of impervious surface, to obtain the "***effective impervious area***." (For DMAs that are 100% impervious, use the entire DMA area.)

3. **Unit Basin Storage Volume**
   - The effective impervious area of a DMA has a runoff coefficient of 1.0. Refer to Table C1-1 to obtain the ***unit basin storage volume*** that corresponds to your rain gauge area. For example, using the Oakland Airport gauge, the unit basin storage volume would be 0.67 inches. Adjust the unit basin storage volume for the site by multiplying the unit basin storage volume value by the MAP adjustment factor calculated in Step 1.
   - Calculate the ***required capture volume*** by multiplying the effective impervious area of the DMA calculated in Step 2 by the adjusted unit basin storage volume. Due to the mixed units that result, such as acre-inches, it is recommended that the resulting volume be converted to cubic feet for use during design. For example, say you determined the adjusted unit basin storage volume to be 0.5 inches, and the effective impervious area draining to the bioretention facility is 7,000 square feet. Then the required capture volume would be:

$$Required\ capture\ volume = 0.5\ inches \times \left(\frac{1\ foot}{12\ inches}\right) \times 7{,}000\ feet^2 = 292\ cubic\ feet$$

| Table C1-1. Unit Basin Storage Volume (Inches) for 80 Percent Capture with 48-Hour Drawdown Time | | |
|---|---|---|
| | | Unit Basin Storage Volume for Effective Impervious Area of Drainage Management Area |
| Location | Mean Annual Precipitation (inches) | Coefficient of 1.00 |
| Oakland Airport | 18.35 | 0.67 |
| San Jose | 14.4 | 0.56 |
| Source: CASQA 2003, cited in Table 6-2 of the C.3 Technical Guidance. | | |

4. **Depth of Infiltration Trench or Pervious Paving Base Layer**
   - Assume that the rain event that generates the required capture volume of runoff determined in Step 3 occurs at a constant rainfall intensity of 0.2 inches/hour from the start of the storm (i.e., assume a rectangular hydrograph). Calculate the ***duration of the rain event*** by dividing the unit basin storage volume by the intensity. In other words, determine the amount of time required for the unit basin storage volume to be achieved at a rate of 0.2 inches/hour. For example, if the unit basin storage volume is 0.5 inches, the rain event duration is 0.5 inches ÷ 0.2 inches/hour = 2.5 hours.

5. **Preliminary Estimate of the Surface Area the Facility**
   - Make a ***preliminary estimate of the surface area*** of the bioretention facility by multiplying the DMA's impervious area (or effective impervious surface if applicable) by the 4 percent method sizing factor of 0.04. For example, a drainage area of 7,000 square feet of impervious surface × 0.04 = 280 square feet of bioretention treatment area.
   - Assume a bioretention area that is about 25% smaller than the bioretention area calculated with the 4 percent method. Using the example above, 280 – (0.25 × 280) = 210 square feet.
   - ***Calculate the volume of runoff that filters through the biotreatment soil*** at a rate of 5 inches per hour (the design surface loading rate for bioretention facilities), for the duration of the rain event calculated in Step 4. For example, for a bioretention treatment area of 210 square feet, with an infiltration rate of 5 inches per hour for a duration of 2.5 hours, the volume of treated runoff = 210 square feet × 5 inches/hour × (1 foot/12 inches) × 2.5 hours = 219 cubic feet. (Note: when calculating ponding depth, the mulch layer is not included in the calculation.)

6. **Initial Adjustment of Depth of Surface Ponding Area**
   - Calculate the portion of the required capture volume ***remaining after treatment is accomplished by filtering*** through the treatment soil. The result is the amount that must be stored in the ponding area above the reduced bioretention area assumed in Step 6. For example, the amount remaining to be stored comparing Step 3 and Step 5 is 292 cubic feet – 219 cubic feet = 73 cubic feet. If this volume

is stored over a surface area of 210 square feet, the ***average ponding depth*** would be 73 cubic feet ÷210 square feet = 0.35 feet or 4.2 inches.

- Check to see if the ***average ponding depth is between 6 and 12 inches***, which is the recommended allowance for ponding in a bioretention facility or flow-through planter.

7. **Optimize the Size of the Treatment Measure**
    - If the ponding depth is greater than 12 inches, a larger surface area will be required. (In the above example, the optimal size of the bioretention area is 190 square feet with a ponding depth of 6 inches.) In order to build conservatism into this sizing method, the Countywide Program recommends that municipalities not approve the design of any bioretention areas or rain gardens that have a surface area that is less than 3 percent of the effective impervious area within the DMA.

Please note that Appendix C of the C.3 Stormwater Technical Guidance includes an example of sizing bioretention areas using the combination flow- and volume-based method.

## *C1.2 Alternate Sizing Approach for Constrained Street Projects*

Provision C.3.j.i.(2)(g) of the MRP allows the jurisdictions subject to the MRP (MRP Permittees) to develop an alternate sizing approach for street projects that are not subject to Provision C.3.b.ii. (non-Regulated Projects) in which project constraints preclude fully meeting the C.3.d sizing requirements. This approach, developed by the Bay Area Stormwater Management Agencies Association (BASMAA), is described as follows.

The Guidance for Sizing Green Infrastructure Facilities in Street Projects, provided by BASMAA and included as Attachment C-6, states that bioretention facilities in street projects should be sized as large as feasible and meet the Provision C.3.d sizing criteria where possible. It further states that bioretention facilities in street projects smaller than what would be required to meet the Provision C.3.d criteria may be appropriate in some circumstances, and provides guidance that may be applied to those circumstances.

# Attachment C-2: Worksheet for Calculating the Combination Flow and Volume Method

The worksheet for calculating the combination flow and volume method is provided on the following page.

# Worksheet for Calculating the Combination Flow and Volume Method

*Instructions: After completing Section 1, make a copy of this Excel file for each Drainage Management Area within the project. Enter information specific to the project and DMA in the cells shaded in yellow. Cells shaded in light blue contain formulas and values that will be automatically calculated.*

## 1.0 Project Information

1-1 Project Name:

1-2 City application ID:

1-3 Site Address or APN:

1-4 Tract or Parcel Map No:

1-5 Site Mean Annual Precip. (MAP)[1] **Inches**

*Refer to the Mean Annual Precipitation Map in Appendix D of the C.3 Technical Guidance to determine the MAP, in inches, for the site.* Click here for map

1-6 Applicable Rain Gauge[2]

*Enter "Oakland Airport" if the site MAP is 16.4 inches or greater. Enter "San Jose" if the site MAP is less than 16.4 inches.*

***MAP adjustment factor is automatically calculated as:***

*(The "Site Mean Annual Precipitation (MAP)" is divided by the MAP for the applicable rain gauge, shown in Table 5.2, below.)*

The calculations presented here are based on the **combination flow and volume hydraulic sizing method** provided in the Clean Water Program Alameda County C.3 Technical Guidance, Version 4.0. The steps presented below are explained in Chapter 5, Section 5.1 of the guidance manual, applicable portions of which are included in this file, in the tab called "Guidance from Chapter 5".

## 2.0 Calculate Percentage of Impervious Surface for Drainage Management Area (DMA)

2-1 Name of DMA:

For items 2-2 and 2-3, enter the areas in square feet for each type of surface within the DMA.

| | Type of Surface | Area of surface type within DMA (Sq. Ft) | Adjust Pervious Surface | Effective Impervious Area |
|---|---|---|---|---|
| 2-2 | Impervious surface | | 1.0 | |
| 2-3 | Pervious service | | 0.1 | |
| | *Total DMA Area (square feet) =* | | | |

2-4 ***Total Effective Impervious Area (EIA)*** **Square feet**

## 3.0 Calculate Unit Basin Storage Volume in Inches

| Table 5-2: Unit Basin Storage Volumes (in inches) for 80 Percent Capture Using 48-Hour Drawdowns | | |
|---|---|---|
| | | Unit Basin Storage Volume (in) for Applicable Runoff Coefficients |
| Applicable Rain Gauge | Mean Annual Precipitation (in) | Coefficient of 1.00 |
| Oakland Airport | 18.35 | 0.67 |
| San Jose | 14.4 | 0.56 |

3-1 ***Unit basin storage volume from Table 5.2:*** **Inches**

*(The coefficient for this method is 1.00, due to the conversion of any landscaping to effective impervious area)*

3-2 ***Adjusted unit basin storage volume:*** **Inches**

*(The unit basin storage volume is adjusted by applying the MAP adjustment factor.)*

3-3 ***Required Capture Volume (in cubic feet):*** **Cubic feet**

*(The adjusted unit basin sizing volume [inches] is multiplied by the size of the DMA and converted to feet)*

## 4.0 Calculate the Duration of the Rain Event

4-1 Rainfall intensity **0.2 Inches per hour**

4-2 Divide Item 3-2 by Item 4-1 **Hours of Rain Event Duration**

## 5.0 Preliminary Estimate of Surface Area of Treatment Measure

5-1 4% of DMA impervious surface **Square feet**

5-2 Area 25% smaller than item 5-1 **Square feet**

5-3 Volume of treated runoff for area in Item 5-2 **Cubic feet** (Item 5-2 * 5 inches per hour * 1/12 * Item 4-2)

## 6.0 Initial Adjustment of Depth of Surface Ponding Area

6-1 Subtract Item 5-3 from Item 3-3 **Cubic feet** (Amount of runoff to be stored in ponding area)

6-2 Divide Item 6-1 by Item 5-2 **Feet** (Depth of stored runoff in surface ponding area)

6-3 Convert Item 6-2 from ft to inches **Inches** (Depth of stored runoff in surface ponding area)

6-4 If ponding depth in Item 6-3 meets your target depth, skip to Item 8-1. If not, continue to Step 7-1.

## 7.0 Optimize Size of Treatment Measure

7-1 Enter an area larger or smaller than Item 5-2 **Sq.ft.** (enter larger area if you need less ponding depth; smaller for more depth.)

7-2 Volume of treated runoff for area in Item 7-1 **Cubic feet** (Item 7-1 * 5 inches per hour * 1/12 * Item 4-2)

7-3 Subtract Item 7-2 from Item 3-3 **Cubic feet** (Amount of runoff to be stored in ponding area)

7-4 Divide Item 7-3 by Item 7-1 **Feet** (Depth of stored runoff in surface ponding area)

7-5 Convert Item 7-4 from feet to inches **Inches** (Depth of stored runoff in surface ponding area)

7-6 If the ponding depth in Item 7-5 meets target, stop here. If not, repeat Steps 7-1 through 7-5 until you obtain target depth

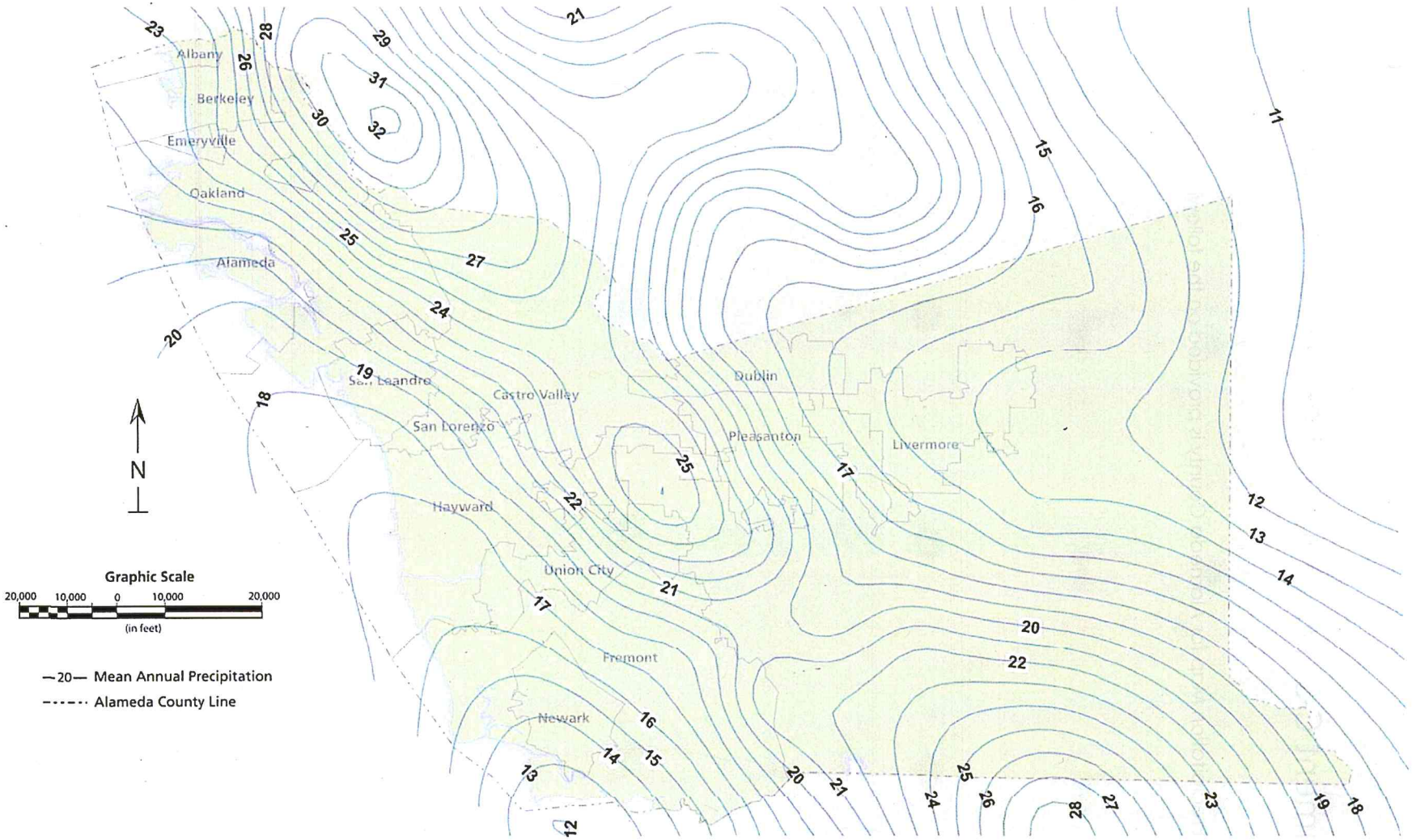
## 8.0 Surface Area of Treatment Measure for DMA

8-1 Final surface area of treatment* **Square feet** (Either Item 5-2 or final amount in Item 7-1)

**Note: Check with the local jurisdiction as to its policy regarding the minimum biotreatment surface area allowed.*

# Attachment C-3: Mean Annual Precipitation Map

The Mean Annual Precipitation Map for Alameda County is provided on the following page.




*This map is Attachment 6 of the Alameda County Hydrology & Hydraulics Manual and may be downloaded as a GIS file from the Alameda County Flood Control District website.*

(District 2011)

Flood Control & Water Conservation DISTRICT

# Mean Annual Precipitation

# Attachment C-4: Standard Specifications and Typical Designs

Standard specifications and typical design drawings for GI projects are provided on the following pages, as indicated in Table C4-1.

**Table C4-1: GI Typical Designs/Standard Specifications**

| Sheet No. | Title of Drawing/Standard Specifications | Site Characteristics | | |
|---|---|---|---|---|
| | | Land Use | Street Classification | Other |
| GI-2A | Bioretention area: Plan view with street parking | Commercial, industrial, or residential | Arterial, collector, or local streets | Parking lane |
| GI-2B | Bioretention area: Bulbout plan view | Commercial, industrial, or residential | Arterial, collector, or local streets | Intersection with sidewalks |
| GI-2C | Bioretention area: Street Median | Commercial, industrial, or residential | Arterial, collector, or local streets | Street Median |
| GI-3A | Bioretention Area: Sloped Sides Cross Section | Commercial, industrial, or residential | Arterial, collector, or local streets | Sidewalk |
| GI-3B | Bioretention Area: Vertical Side Wall Cross Section | Commercial, industrial, or residential | Arterial, collector, or local streets | Parking lane and sidewalk |
| GI-4 | Bioretention Components: Outlet Detail | Commercial, industrial, or residential | Arterial, collector, or local streets | -- |
| GI-5 | Bioretention Components: Edge Treatment Detail | Commercial, industrial, or residential | Arterial, collector, or local streets | No parking |
| GI-6A | Bioretention Components: Gutter Curb Cut Inlet Detail | Commercial, industrial, or residential | Arterial, collector, or local streets | -- |
| GI-6B | Bioretention Components: Trench Drain Curb Cut Inlet Detail | Commercial, industrial, or residential | Arterial, collector, or local streets | Parking lane and sidewalk |
| GI-6C | Bioretention Components: Curb Cut at Bulbout Inlet Detail | Commercial, industrial, or residential | Arterial, collector, or local streets | Intersection with Sidewalks |
| GI-7 | Bioretention Components: Check Dam Detail | Commercial, industrial, or residential | Arterial, collector, or local streets | Slope requiring check dams |

| Sheet No. | Title of Drawing/Standard Specifications | Site Characteristics | | |
|---|---|---|---|---|
| | | Land Use | Street Classification | Other |
| GI-8 | Bioretention Area: With Bike Lane Plan View | Commercial, industrial, or residential | Arterial, collector, or local streets | Bike lane |

Source: Alameda County Clean Water Program, 2018

## PURPOSE:

PROVISION C.3 OF THE MUNICIPAL REGIONAL STORMWATER NPDES PERMIT (MRP) REQUIRES TREATMENT OF IMPERVIOUS SURFACES USING GREEN INFRASTRUCTURE FOR BOTH PUBLIC AND PRIVATE DEVELOPMENT PROJECTS. BIORETENTION AREAS ARE EXPECTED TO BE THE MOST COMMON GREEN INFRASTRUCTURE APPLICATION IN PUBLIC RIGHT-OF-WAY (ROW). THE PURPOSE OF THE BIORETENTION AREA IS TO IMPROVE WATER QUALITY BY FILTRATION THROUGH THE BIOTREATMENT SOIL AND TO CONTROL RUNOFF PEAK FLOW RATES AND VOLUMES THROUGH STORAGE AND INFILTRATION.

## NOTES & GUIDELINES:

1. THE ENGINEER SHALL ADAPT PLAN AND SECTION DRAWINGS TO ADDRESS SITE-SPECIFIC CONDITIONS.
2. BIORETENTION AREA SHALL BE SIZED TO MEET THE REQUIREMENTS OF MRP PROVISION C.3.D SIZING.
3. 48 HOUR MAXIMUM FACILITY DRAWDOWN TIME (TIME FOR MAXIMUM SURFACE PONDING TO DRAIN THROUGH THE BIOTREATMENT SOIL AFTER THE END OF A STORM). REFER TO C.3 TECHNICAL GUIDANCE MANUAL (ACCWP) FOR DRAINAGE CONSIDERATIONS.
4. A STORAGE LAYER OF CALTRANS STANDARD CLASS 2 PERMEABLE MATERIAL IS REQUIRED UNDER THE BIOTREATMENT SOIL. REFER TO C.3 TECHNICAL GUIDANCE MANUAL (ACCWP) FOR SPECIFICATIONS.
5. THE BIORETENTION AREA SLOPE IS TYPICALLY DESIGNED TO MATCH THE LONGITUDINAL SLOPE OF THE ADJACENT ROADWAY/SIDEWALK. THE BOTTOM OF THE BIORETENTION AREA, HOWEVER, SHOULD BE FLAT. CHECK DAMS SHALL BE USED TO TERRACE FACILITIES TO PROVIDE SUFFICIENT PONDING FOR SLOPED INSTALLATIONS. ENGINEER SHALL SPECIFY CHECK DAM HEIGHT AND SPACING. REFER TO DETAIL **GI-7** FOR GUIDANCE ON CHECK DAM DESIGN.
6. DEPENDING ON THE DEPTH OF THE BIORETENTION AREA, ADDITIONAL STRUCTURAL CONSIDERATIONS MAY BE REQUIRED TO ADDRESS HORIZONTAL LOADING. REFER TO DETAIL **GI-5** FOR GUIDANCE ON EDGE TREATMENTS.
7. WHEN FACILITY CONSTRUCTION IMPACTS EXISTING SIDEWALK, ALL SAW CUTS SHALL ADHERE TO CITY OF EMERYVILLE STANDARDS. SAW CUTS SHALL BE ALONG SCORE LINES OR ALONG CONSTRUCTION JOINTS, AS DETERMINED BY THE CITY ENGINEER, AND ANY DISTURBED SIDEWALK FLAGS SHALL BE REPLACED IN THEIR ENTIRETY.
8. BIORETENTION AREAS IN PUBLIC RIGHT OF WAY SHALL BE DESIGNED WITH AN EMERGENCY OVERFLOW. IN THE EVENT THE BIORETENTION AREA OVERFLOW DRAIN IS OBSTRUCTED OR CLOGGED, THE INUNDATION AREA SHALL BE CONTAINED WITHIN THE STREET AND SHALL NOT BE WITHIN ADJACENT PRIVATE PROPERTIES.
9. BIORETENTION AREA VEGETATION SHALL BE SPECIFIED BY DESIGN PROFESSIONAL. SEE C.3 TECHNICAL GUIDANCE MANUAL (ACCWP) FOR PLANT LIST AND VEGETATION GUIDANCE.
10. THE ENGINEER SHALL EVALUATE THE NEED FOR EROSION PROTECTION AT ALL INLET LOCATIONS. ALL COBBLES USED FOR ENERGY DISSIPATION SHALL BE GROUTED.
11. THE PROJECT PLANS SHALL SHOW ALL EXISTING UTILITIES AND INDICATE POTENTIAL UTILITY CROSSINGS OR CONFLICTS.
12. NO UTILITIES, NEW OR EXISTING, SHALL BE LOCATED WITHIN OR BELOW THE TREATMENT AREA.
13. MINIMUM UTILITY SETBACKS AND PROTECTION MEASURES SHALL CONFORM TO CURRENT CITY OF EMERYVILLE STANDARDS AND OTHER UTILITY PROVIDER REQUIREMENTS.
14. VERTICAL SIDEWALLS EXTENDING INTO EXISTING STORM DRAIN PIPE TRENCH BACKFILL SHALL BE DESIGNED WITH A CONCRETE BACKFILL ACCEPTABLE TO THE CITY ENGINEER.
15. OVERFLOW RISER MUST BE FORMED SUCH THAT IT IS A MINIMUM OF 6" ABOVE THE BOTTOM OF THE SYSTEM INLET, OR AS DESIGNED. PLACE STRUCTURE ADJACENT TO PEDESTRIAN EDGE TO ALLOW FOR MONITORING ACCESS.
16. DETAILS WERE DEVELOPED FROM SFPUC GREEN INFRASTRUCTURE TYPICAL DETAILS AND SPECIFICATIONS.

## ENGINEER CHECKLIST (SHALL SPECIFY, AS APPLICABLE):

- ☐ BIORETENTION AREA WIDTH AND LENGTH
- ☐ DEPTH OF PONDING
- ☐ AMOUNT OF FREEBOARD PROVIDED
- ☐ DEPTH OF BIOTREATMENT SOIL (18" MIN)
- ☐ UNDERDRAIN SPECIFICATIONS AND LOCATION (IF FACILITY IS LINED PLACE UNDERDRAIN AT BOTTOM OF FACILITY)
- ☐ BIORETENTION SURFACE ELEVATION (TOP OF BIOTREATMENT SOIL) AT UPSLOPE AND DOWNSLOPE ENDS OF FACILITY
- ☐ CONTROL POINTS AT EVERY BIORETENTION WALL CORNER AND POINT OF TANGENCY
- ☐ DIMENSIONS AND DISTANCE TO EVERY INLET, OUTLET, CHECK DAM, SIDEWALK NOTCH, ETC.
- ☐ ELEVATIONS OF EVERY INLET, OVERFLOW RISER, STRUCTURE RIM AND INVERT, CHECK DAM, BIORETENTION AREA WALL CORNER, AND SIDEWALK NOTCH
- ☐ TYPE AND DESIGN OF BIORETENTION AREA COMPONENTS (E.G., EDGE TREATMENTS, INLETS/GUTTER MODIFICATIONS, UTILITY CROSSINGS, LINER, AND PLANTING DETAILS)

DEPTH AND TYPE OF NON-FLOATING MULCH (3" MIN)

| RELATED TECHNICAL GUIDANCE | SOURCE |
|---|---|
| **BIORETENTION:**<br>- BIOTREATMENT SOIL MIX<br>- CALTRANS CLASS II PERM LAYER STORAGE<br>- PERFORATED UNDERDRAIN<br>- NON-FLOATING MULCH | C.3 TECHNICAL GUIDANCE MANUAL (ACCWP) |

CITY OF EMERYVILLE, CALIFORNIA, PUBLIC WORKS DEPARTMENT

# GI-1
# BIORETENTION AREA: NOTES

STD DETAIL (NTS)

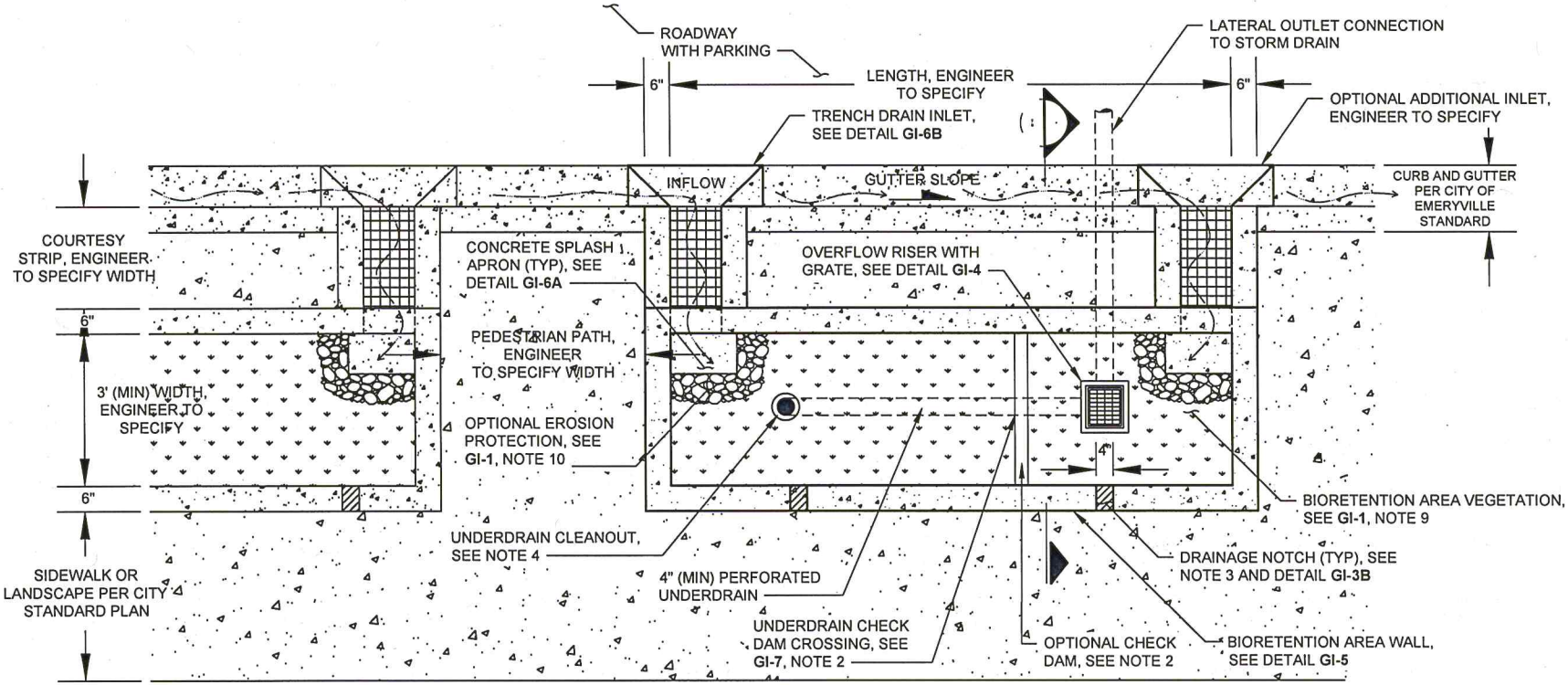
401

PAGE 1 OF 1

CITY ENGINEER

DATE

FEBRUARY 2019




## NOTES:

1. REFER TO **GI-1** NOTES FOR GUIDELINES AND CHECKLIST.
2. CHECK DAMS SHALL BE SPACED TO PROVIDE PONDING PER SITE SPECIFIC DESIGN (SEE DETAIL **GI-7**).
3. LAY OUT DRAINAGE NOTCHES AS APPLICABLE TO PREVENT PONDING BEHIND BIORETENTION AREA WALL WITH 5' MAXIMUM SPACING BETWEEN NOTCHES.
4. PROVIDE ONE UNDERDRAIN CLEANOUT PER BIORETENTION AREA (MIN). CLEANOUT REQUIRED AT UPSTREAM END AND PIPE ANGLE POINTS EXCEEDING 45 DEGREES. LONGITUDINAL SLOPE OF PIPE SHALL BE 0.5% (MIN).

CITY OF EMERYVILLE, CALIFORNIA, PUBLIC WORKS DEPARTMENT

# GI-2.A
# BIORETENTION AREA: PLAN VIEW WITH STREET PARKING

STD DETAIL (NTS)

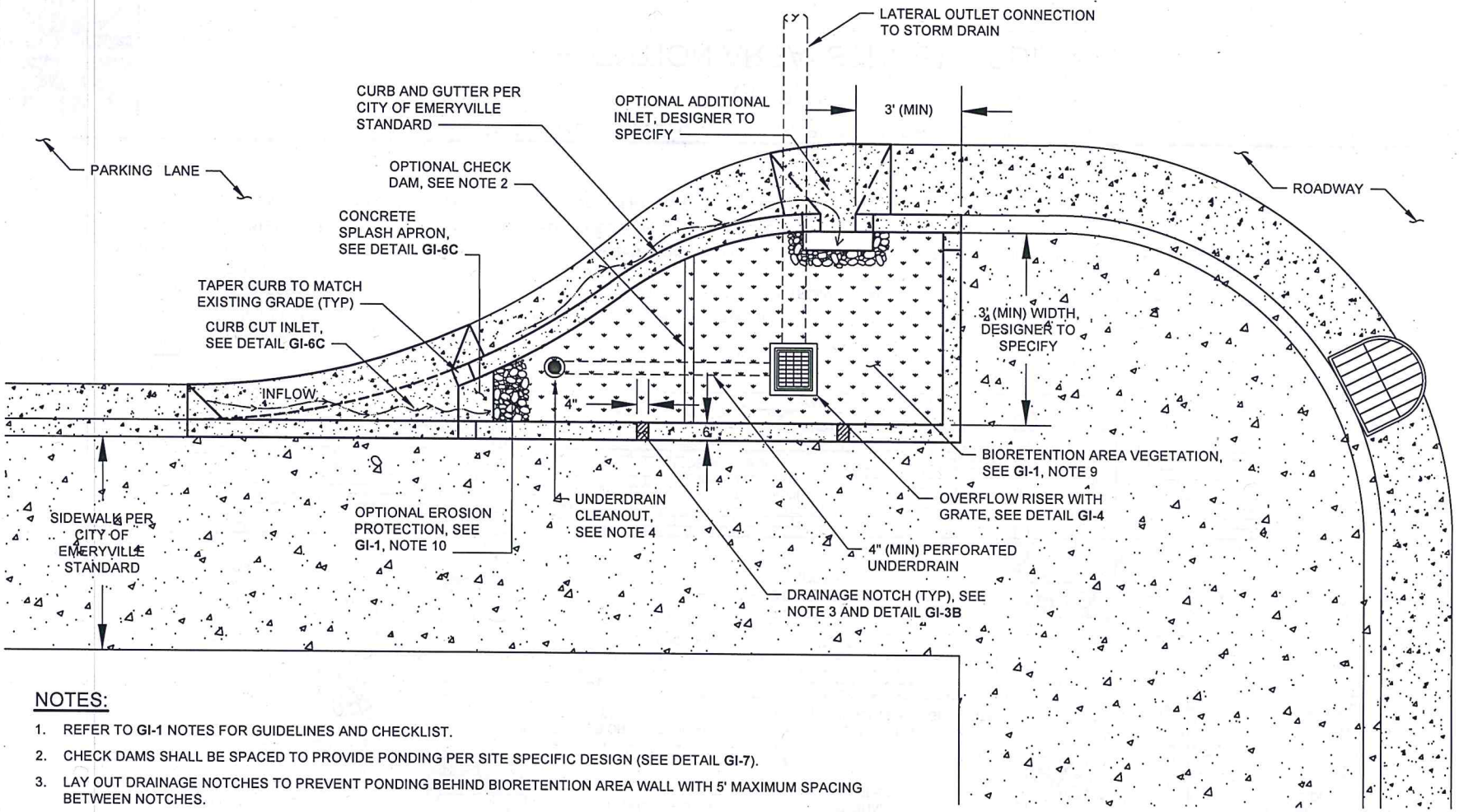
402

PAGE 1 OF 1

CITY ENGINEER

DATE

FEBRUARY 2019




## NOTES:

1. REFER TO **GI-1** NOTES FOR GUIDELINES AND CHECKLIST.
2. CHECK DAMS SHALL BE SPACED TO PROVIDE PONDING PER SITE SPECIFIC DESIGN (SEE DETAIL **GI-7**).
3. LAY OUT DRAINAGE NOTCHES TO PREVENT PONDING BEHIND BIORETENTION AREA WALL WITH 5' MAXIMUM SPACING BETWEEN NOTCHES.
4. PROVIDE ONE UNDERDRAIN CLEANOUT PER BIORETENTION AREA (MIN). CLEANOUT REQUIRED AT UPSTREAM END AND PIPE ANGLE POINTS EXCEEDING 45 DEGREES. LONGITUDINAL SLOPE OF PIPE SHALL BE 0.5% (MIN).

CITY OF EMERYVILLE, CALIFORNIA, PUBLIC WORKS DEPARTMENT

# GI-2.B
# BIORETENTION AREA: BULBOUT PLAN VIEW

STD DETAIL (NTS)

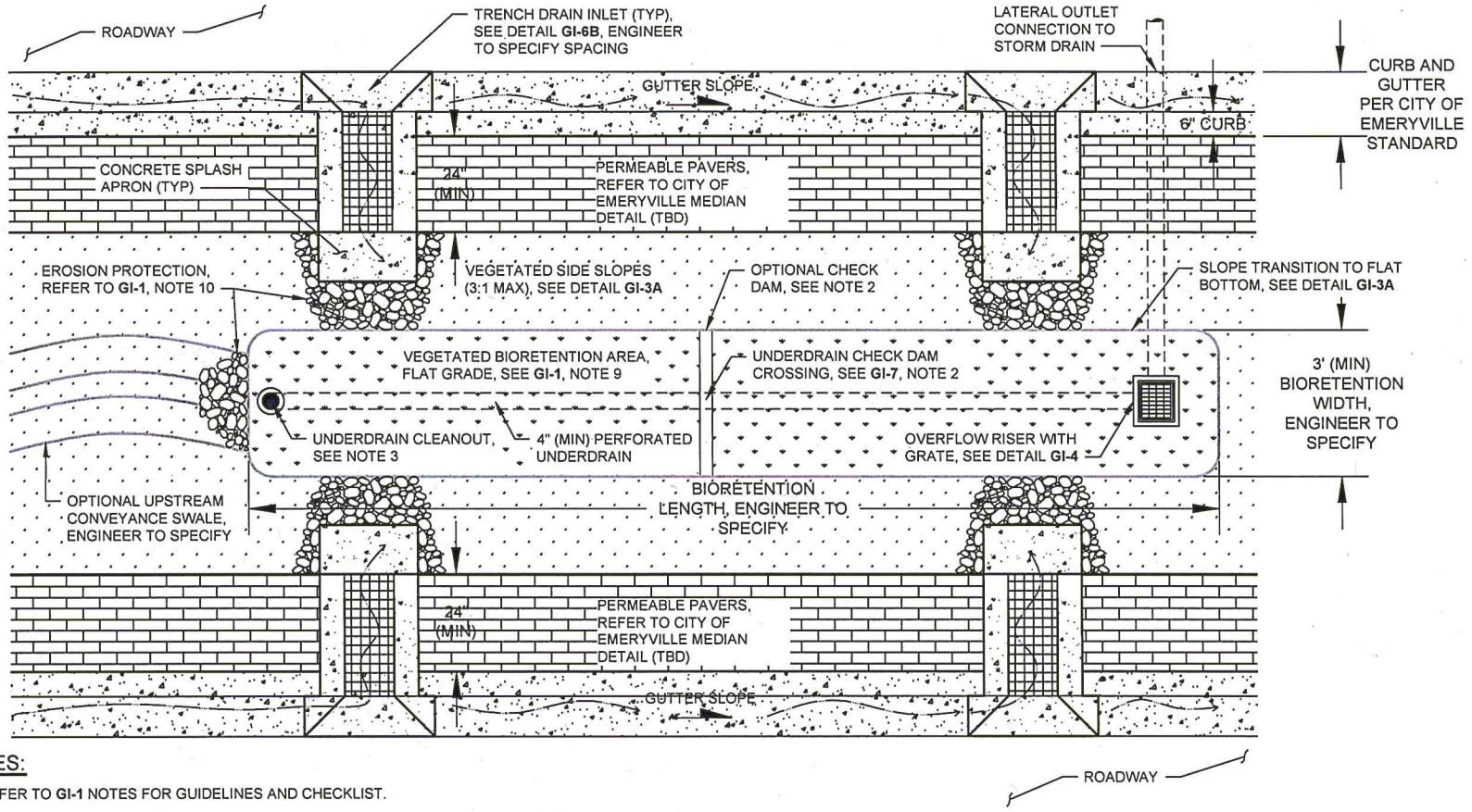
403

PAGE 1 OF 1

CITY ENGINEER

DATE

FEBRUARY 2019




## NOTES:

1. REFER TO **GI-1** NOTES FOR GUIDELINES AND CHECKLIST.
2. CHECK DAMS SHALL BE SPACED TO PROVIDE PONDING PER SITE SPECIFIC DESIGN (SEE DETAIL **GI-7**).
3. PROVIDE ONE UNDERDRAIN CLEANOUT PER BIORETENTION AREA (MIN). CLEANOUT REQUIRED AT UPSTREAM END AND PIPE ANGLE POINTS EXCEEDING 45 DEGREES. LONGITUDINAL SLOPE OF PIPE SHALL BE 0.5% (MIN).
4. DESIGNERS TO REFERENCE AASHTO ROADSIDE SAFETY DESIGN REQUIREMENTS AND CONSIDER USE OF MEDIAN BIORETENTION AREAS IN RELATION TO STREET CLASSIFICATION AND STREET SPEEDS.
5. A STORAGE VOLUME SAFETY FACTOR OF 1.5 SHALL BE INCLUDED IN THE DESIGN OF MEDIAN BIORETENTION AREAS TO PREVENT FLOODING.
6. SLOPED SIDES (**GI-3A**) DEPICTED IN PLAN VIEW ABOVE, REFER TO **GI-3B** IF VERTICAL SIDE WALLS ARE USED.

CITY OF EMERYVILLE, CALIFORNIA, PUBLIC WORKS DEPARTMENT

# GI-2.C
# BIORETENTION AREA: STREET MEDIAN

STD DETAIL (NTS)

404

PAGE 1 OF 1

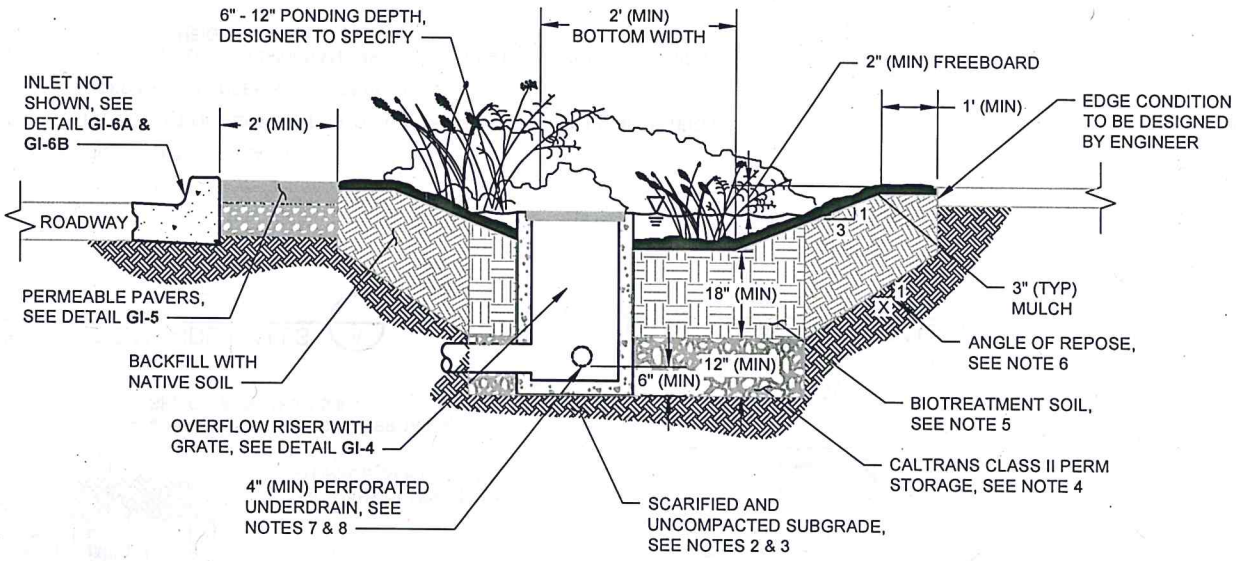
CITY ENGINEER

DATE

FEBRUARY 2019

NOTES:

1. REFER TO **GI-1** NOTES FOR GUIDELINES AND CHECKLIST.
2. AVOID UNNECESSARY COMPACTION OF EXISTING SUBGRADE BELOW AREA.
3. SCARIFY SUBGRADE TO A DEPTH OF 3" (MIN) IMMEDIATELY PRIOR TO PLACEMENT OF CALTRANS CLASS 2 PERMEABLE MATERIAL STORAGE LAYER AND BIOTREATMENT SOIL MATERIALS.
4. AGGREGATE STORAGE LAYER COMPRISED OF 12" MIN CALTRANS CLASS 2 PERMEABLE MATERIAL.
5. REFER TO C.3 TECHNICAL GUIDANCE MANUAL (ACCWP) FOR BIOTREATMENT SOIL MIX SPECIFICATIONS. INSTALL BIOTREATMENT SOIL AT 85% COMPACTION FOLLOWING BASMAA INSTALLATION GUIDANCE.
6. ANGLE OF REPOSE VARIES PER GEOTECHNICAL ENGINEER RECOMMENDATIONS.
7. UNDERDRAIN AND CLEAN OUT PIPE (1 MIN PER FACILITY) REQUIRED, REFER TO C.3 TECHNICAL GUIDANCE MANUAL (ACCWP) FOR DESIGN CONSIDERATIONS. UNDERDRAINS SHOULD BE ELEVATED 6" (MIN) WITHIN THE CALTRANS CLASS 2 PERMEABLE MATERIAL STORAGE LAYER TO PROMOTE INFILTRATION. IN FACILITIES WITH AN IMPERMEABLE LINER, THE UNDERDRAIN SHOULD BE PLACED AT THE BOTTOM OF THE CALTRANS CLASS 2 PERMEABLE MATERIAL STORAGE LAYER.
8. THE UNDERDRAIN IN ALL FACILITIES LOCATED IN THE PUBLIC RIGHT-OF-WAY SHALL BE VIDEO RECORDED AND PROVIDED TO THE CITY FOR REVIEW PRIOR TO PROJECT ACCEPTANCE.




CITY OF EMERYVILLE, CALIFORNIA, PUBLIC WORKS DEPARTMENT

# GI-3.A
# BIORETENTION AREA: SLOPED SIDES CROSS SECTION

STD DETAIL (NTS)

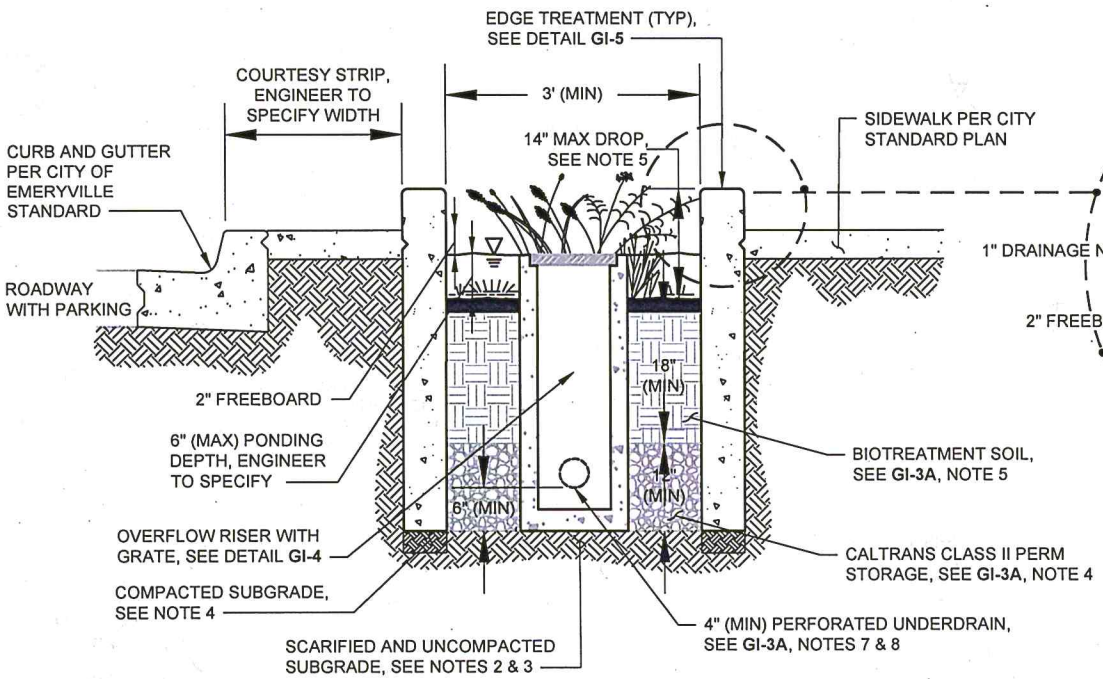
405

PAGE 1 OF 1

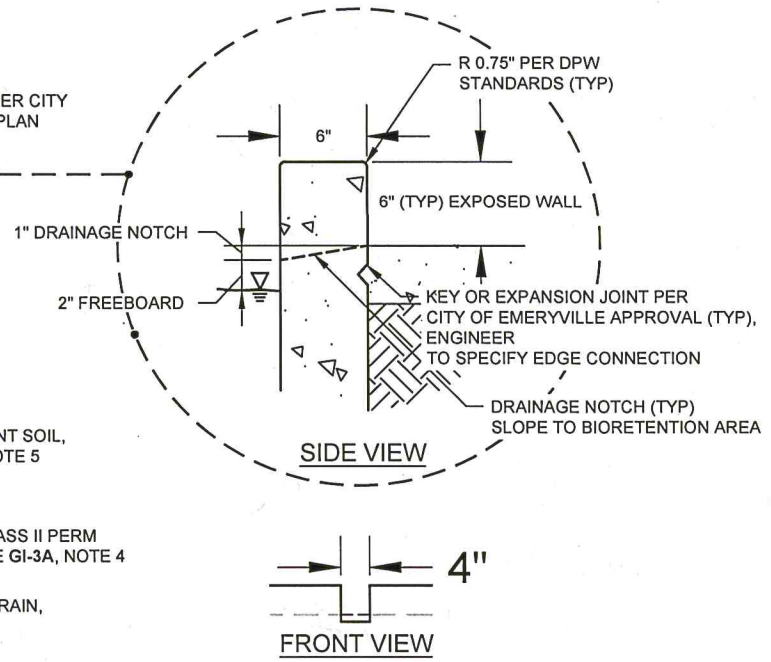
CITY ENGINEER

DATE

FEBRUARY 2019




BIORETENTION AREA WITH VERTICAL SIDE WALLS (A)




DRAINAGE NOTCH DETAIL

## NOTES:

1. REFER TO **GI-1** NOTES FOR GUIDELINES AND CHECKLIST.
2. AVOID UNNECESSARY COMPACTION OF EXISTING SUBGRADE BELOW BIORETENTION AREA.
3. SCARIFY SUBGRADE TO A DEPTH OF 3" (MIN) IMMEDIATELY PRIOR TO PLACEMENT OF AGGREGATE STORAGE AND BIOTREATMENT SOIL MATERIAL.
4. FOR STRUCTURAL SUPPORT, SUBGRADE UNDER WALLS ONLY COMPACTED PER ENGINEER SPECIFICATIONS.
5. MAXIMUM DROP FROM TOP OF CURB TO TOP OF BIOTREATMENT SOIL SHALL INCLUDE CONSIDERATIONS FOR BIOTREATMENT SOIL SETTLEMENT. THE DROP IS THE SUM OF PONDING DEPTH (6" TYP), FREEBOARD (2" TYP), AND CURB HEIGHT (6" TYP).

CITY OF EMERYVILLE, CALIFORNIA, PUBLIC WORKS DEPARTMENT

# GI-3.B
# BIORETENTION AREA: VERTICAL SIDE WALL CROSS SECTION

STD DETAIL (NTS)

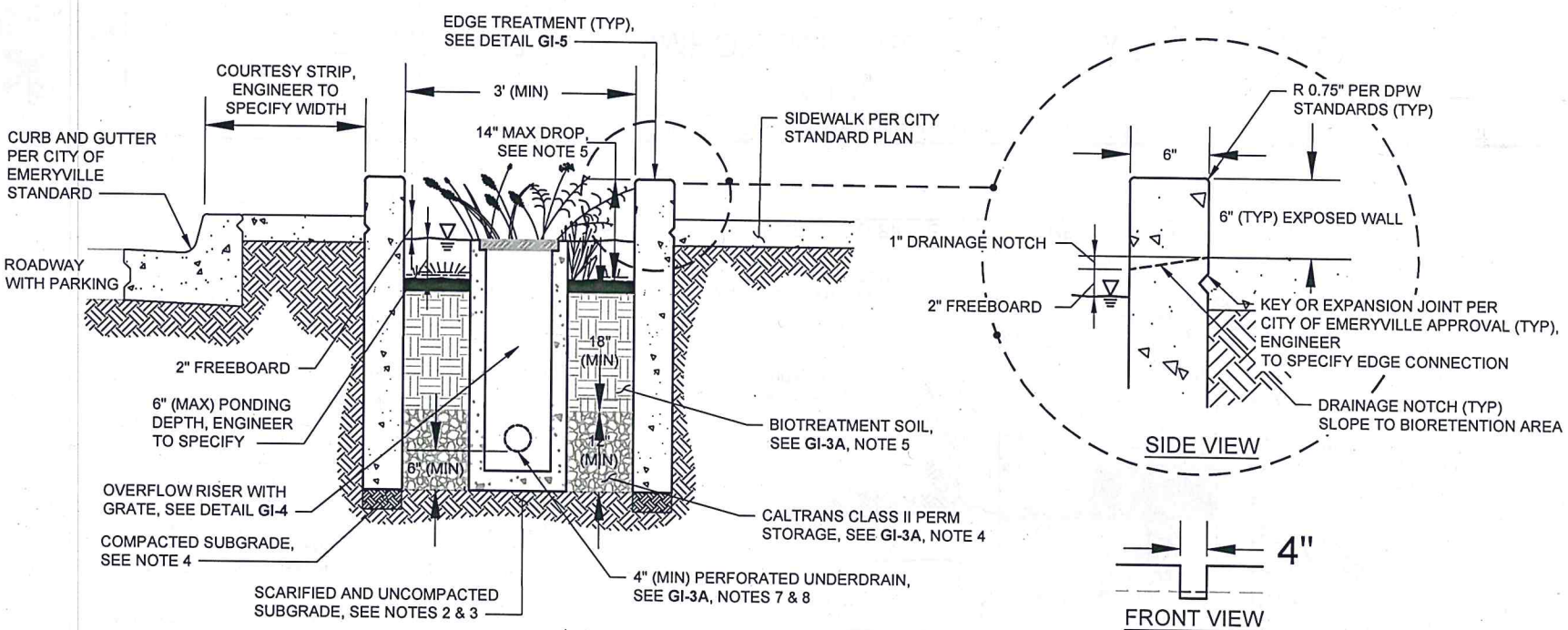
406

PAGE 1 OF 1

CITY ENGINEER

DATE

FEBRUARY 2019




BIORETENTION AREA WITH VERTICAL SIDE WALLS (A)

DRAINAGE NOTCH DETAIL

## NOTES:

1. REFER TO **GI-1** NOTES FOR GUIDELINES AND CHECKLIST.
2. AVOID UNNECESSARY COMPACTION OF EXISTING SUBGRADE BELOW BIORETENTION AREA.
3. SCARIFY SUBGRADE TO A DEPTH OF 3" (MIN) IMMEDIATELY PRIOR TO PLACEMENT OF AGGREGATE STORAGE AND BIOTREATMENT SOIL MATERIAL.
4. FOR STRUCTURAL SUPPORT, SUBGRADE UNDER WALLS ONLY COMPACTED PER ENGINEER SPECIFICATIONS.
5. MAXIMUM DROP FROM TOP OF CURB TO TOP OF BIOTREATMENT SOIL SHALL INCLUDE CONSIDERATIONS FOR BIOTREATMENT SOIL SETTLEMENT. THE DROP IS THE SUM OF PONDING DEPTH (6" TYP), FREEBOARD (2" TYP), AND CURB HEIGHT (6" TYP).

CITY OF EMERYVILLE, CALIFORNIA, PUBLIC WORKS DEPARTMENT

# GI-4
# BIORETENTION COMPONENTS: OUTLET DETAIL

STD DETAIL (NTS)

407

PAGE 1 OF 1

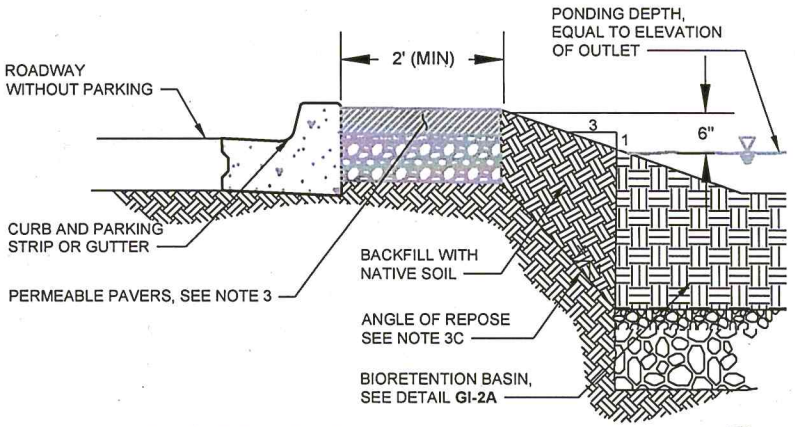
CITY ENGINEER

DATE

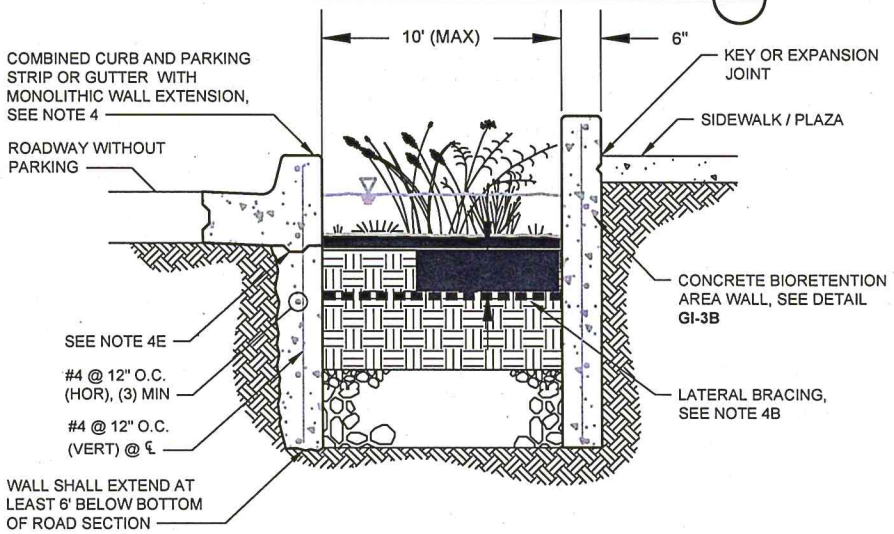
FEBRUARY 2019

## NOTES:

1. REFER TO **GI-1** NOTES FOR GUIDELINES AND CHECKLIST.
2. THE ENGINEER SHALL ADAPT EDGE TREATMENT DESIGN TO ADDRESS SITE SPECIFIC CONSTRAINTS TO EFFECTIVELY STABILIZE ADJACENT PAVEMENT AND MINIMIZE LATERAL MOVEMENT OF WATER.
3. STANDARD CURB EDGE (WHEN SPACE AVAILABLE):
   - A. PERMEABLE PAVER STRIP (2' MIN WIDTH) REQUIRED IF SPRAY IRRIGATION IS USED TO COMPLY WITH WATER EFFICIENT LANDSCAPE ORDINANCE..
   - B. REFER TO CITY OF EMERYVILLE MEDIAN DETAIL (TBD) FOR PERMEABLE STRIP AND UNDERLYING AGGREGATE SPECIFICATIONS.
   - C. ANGLE OF REPOSE VARIES PER GEOTECHNICAL ENGINEERS RECOMMENDATIONS.
4. VERTICAL SIDE WALLS (WHEN SPACE LIMITED):
   - A. ALL BIORETENTION AREA WALLS SHALL EXTEND TO BOTTOM OF AGGREGATE STORAGE LAYER OR DEEPER. MINIMUM DEPTHS SHALL BE DESIGNED TO PREVENT LATERAL SEEPAGE INTO THE ADJACENT PAVEMENT SECTION.
   - B. FOOTING OR LATERAL BRACING SHALL SHALL BE DESIGNED BY THE ENGINEER TO WITHSTAND ANTICIPATED LOADING ASSUMING NO REACTIVE FORCES FROM THE UNCOMPACTED BIOTREATMENT SOIL.
   - C. BIORETENTION AREA WALLS EXTENDING MORE THAN 36" BELOW ADJACENT LOAD-BEARING SURFACE, OR WHEN LOCATED ADJACENT TO PAVERS, SHALL HAVE FOOTING OR LATERAL BRACING. FOOTING OR LATERAL BRACING MAY BE EXCLUDED ONLY IF THE ENGINEER DEMONSTRATES THAT THE PROPOSED WALL DESIGN MEETS LOADING REQUIREMENTS. WALL SHALL NOT ENCROACH INTO TREATMENT AREA.
   - D. CONTRACTOR TO PROVIDE 3" MINIMUM COVER OVER ALL LATERAL BRACING FOR PLANT ESTABLISHMENT.
   - E. ALL CONSTRUCTION COLD JOINTS SHALL INCORPORATE EPOXY, DOWEL/TIE BAR, KEYWAY, OR WATER STOP.




STANDARD CURB EDGE AT BIORETENTION BASIN (1)




EXTENDED BIORETENTION AREA WALL WITH LATERAL BRACING (2)

CITY OF EMERYVILLE, CALIFORNIA, PUBLIC WORKS DEPARTMENT

# GI-5
# BIORETENTION COMPONENTS: EDGE TREATMENT DETAIL

STD DETAIL (NTS)

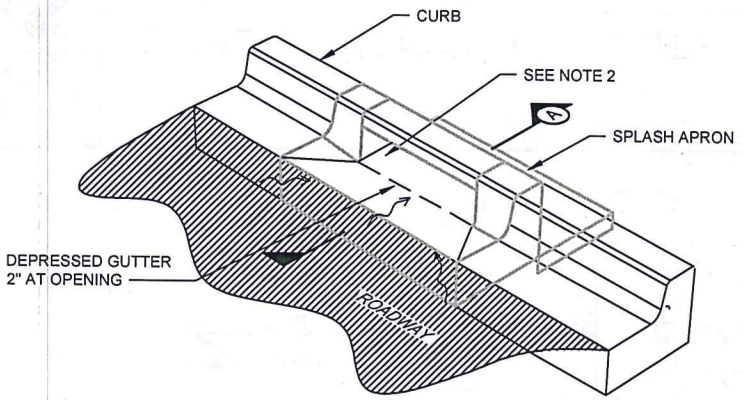
408

PAGE 1 OF 1

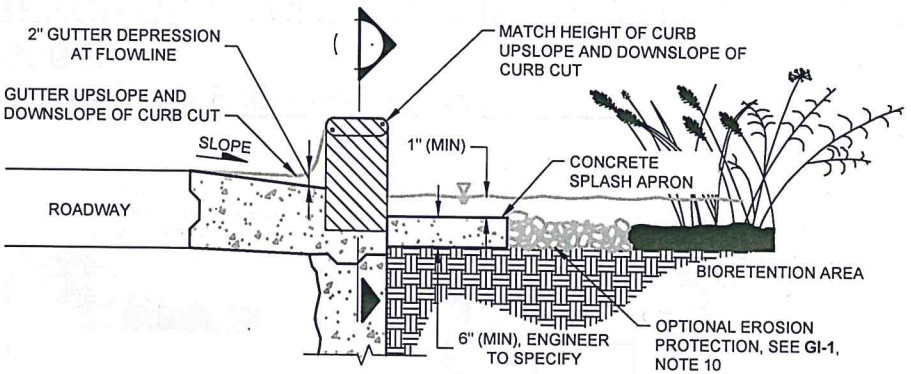
CITY ENGINEER

DATE

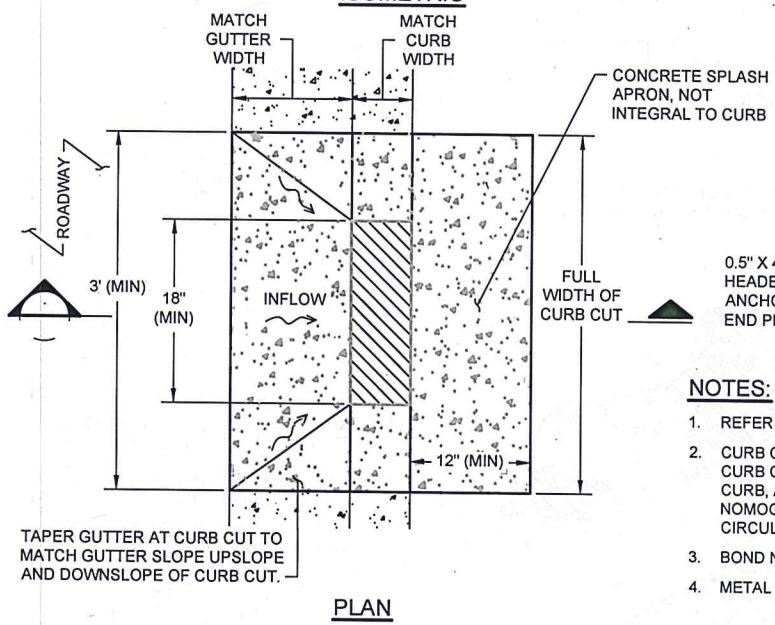
FEBRUARY 2019




ISOMETRIC

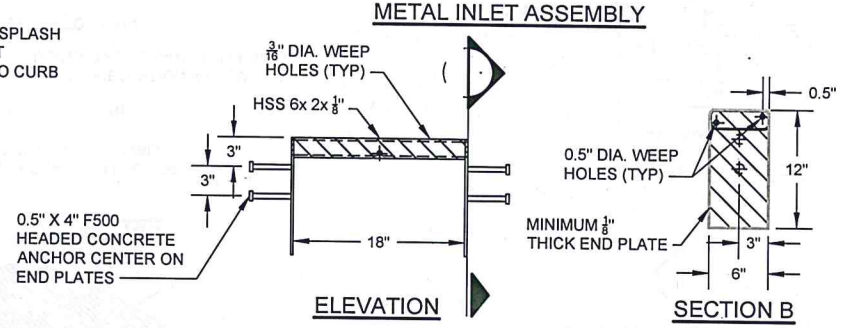



SECTION A




PLAN

METAL INLET ASSEMBLY




## NOTES:

1. REFER TO **GI-1** NOTES FOR GUIDELINES AND CHECKLIST.
2. CURB CUT INLETS SHALL BE ADEQUATELY SIZED, SPACED, AND SLOPED TO MEET HYDRAULIC REQUIREMENTS. THE CURB CUT OPENING WIDTH SHALL BE SIZED BASED ON THE CATCHMENT AREA, LONGITUDINAL SLOPE ALONG THE CURB, AND THE CROSS SLOPE OF THE GUTTER OR ADJACENT PAVEMENT AT THE INLET. SEE SIZING EQUATIONS AND NOMOGRAPHS FOR CURB OPENING INLETS IN THE U.S. DEPARTMENT OF TRANSPORTATION HYDRAULIC ENGINEERING CIRCULAR NO. 27.
3. BOND NEW CURB AND GUTTER TO EXISTING CURB AND GUTTER WITH EPOXY AND DOWEL CONNECTION.
4. METAL INLET ASSEMBLY SHALL BE HOT-DIP GAVANIZED IN ACCORDANCE WITH ASTM A-123.

CITY OF EMERYVILLE, CALIFORNIA, PUBLIC WORKS DEPARTMENT

# GI-6.A
# BIORETENTION COMPONENTS: GUTTER CURB CUT INLET DETAIL

STD DETAIL (NTS)

409

PAGE 1 OF 1

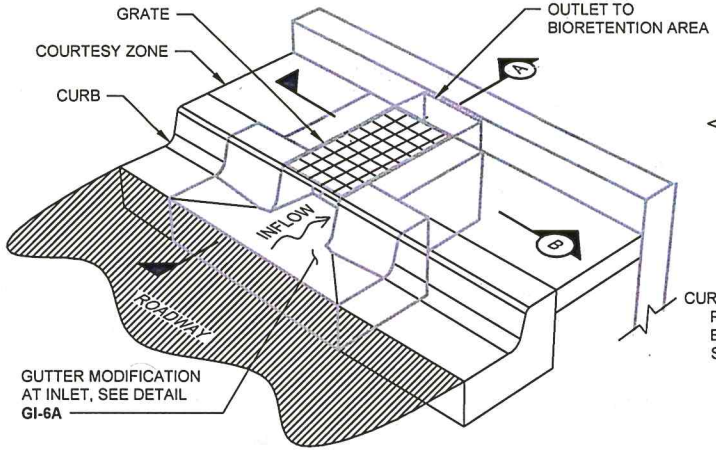
CITY ENGINEER

DATE

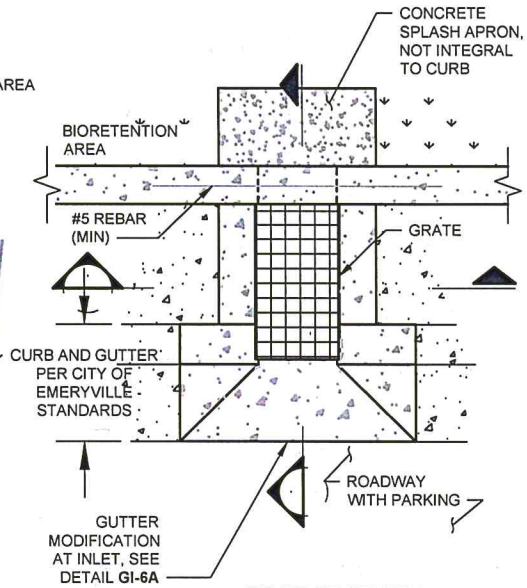
FEBRUARY 2019

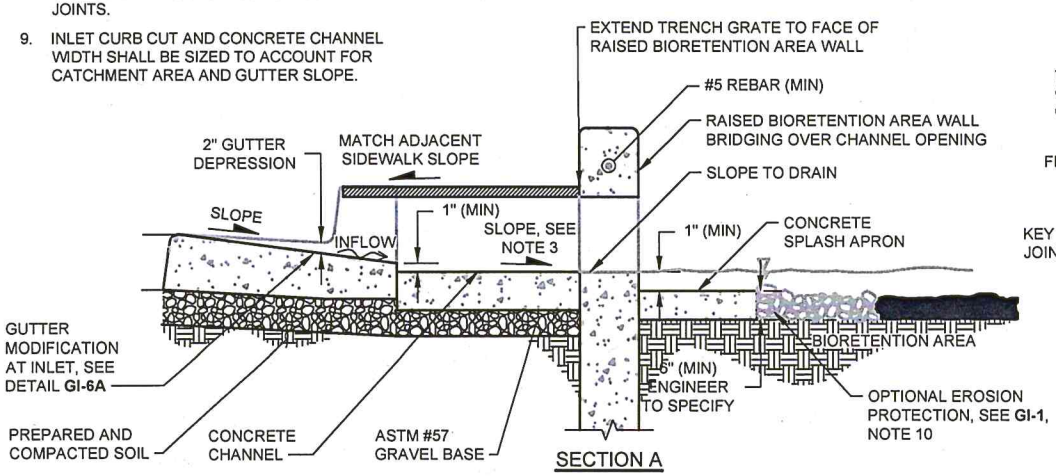
NOTES:

1. REFER TO **GI-1** NOTES FOR GUIDELINES AND CHECKLIST.
2. ALL MATERIAL AND WORKMANSHIP FOR TRENCH DRAIN ASSEMBLY SHALL CONFORM TO CITY OF EMERYVILLE STANDARDS.
3. TRENCH DRAIN INLETS SHALL BE ADEQUATELY SIZED, SPACED, AND SLOPED TO MEET HYDRAULIC REQUIREMENTS. SEE NOTE 2 DETAIL **GI-6A** FOR REFERENCE.
4. SLOPE TO PROVIDE AT LEAST 1" DROP OVER LENGTH OF CHANNEL OR A MINIMUM OF 2%, WHICHEVER IS LARGER.
5. ALL TRENCH GRATES SHALL BE REMOVABLE, RATED PER THE ANTICIPATED LOADING, AND BOLTED IN PLACE OR OUTFITTED WITH APPROVED TAMPER-RESISTANT LOCKING MECHANISM, FLUSH OR RECESSED IN GRATE.
6. BOND NEW CURB AND GUTTER TO EXISTING CURB AND GUTTER WITH EPOXY AND DOWEL CONNECTION.
7. HORIZONTAL CONTROL JOINTS SHALL BE PROVIDED EVERY 10' (LINEAR), OR PER MANUFACTURER'S RECOMMENDATIONS.
8. APPLY EPOXY BONDING AGENT AT ALL TRENCH DRAIN CONSTRUCTION COLD JOINTS.
9. INLET CURB CUT AND CONCRETE CHANNEL WIDTH SHALL BE SIZED TO ACCOUNT FOR CATCHMENT AREA AND GUTTER SLOPE.

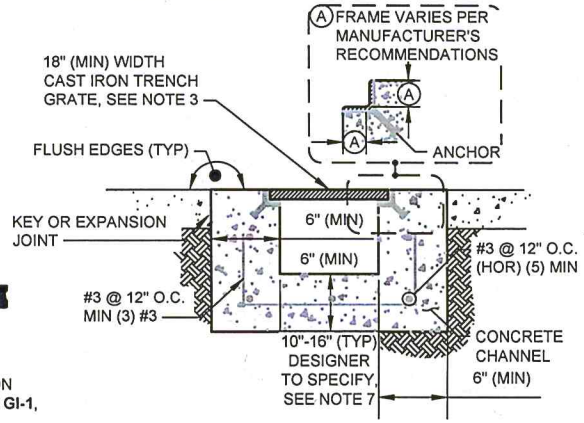



ISOMETRIC



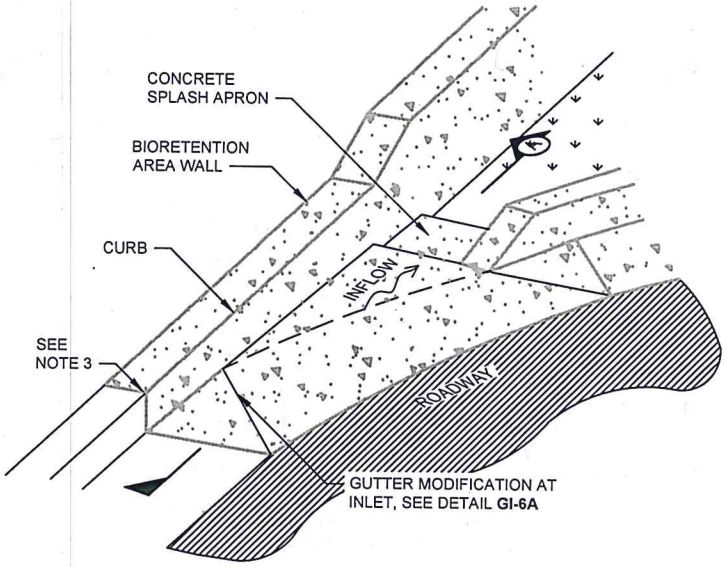




SECTION A

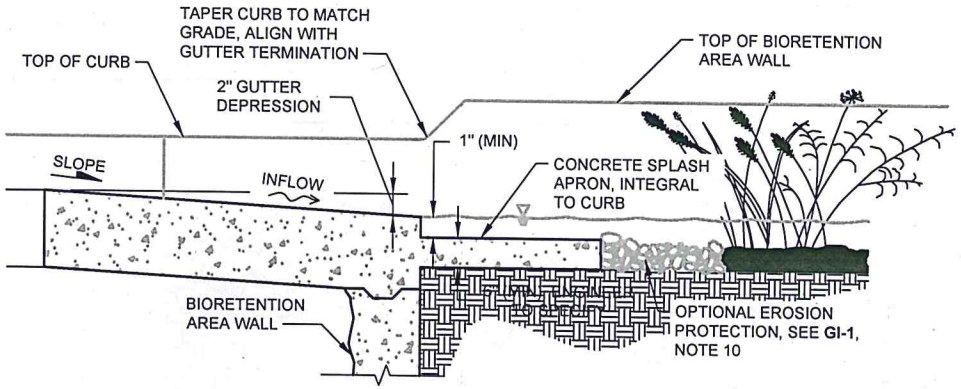



SECTION B

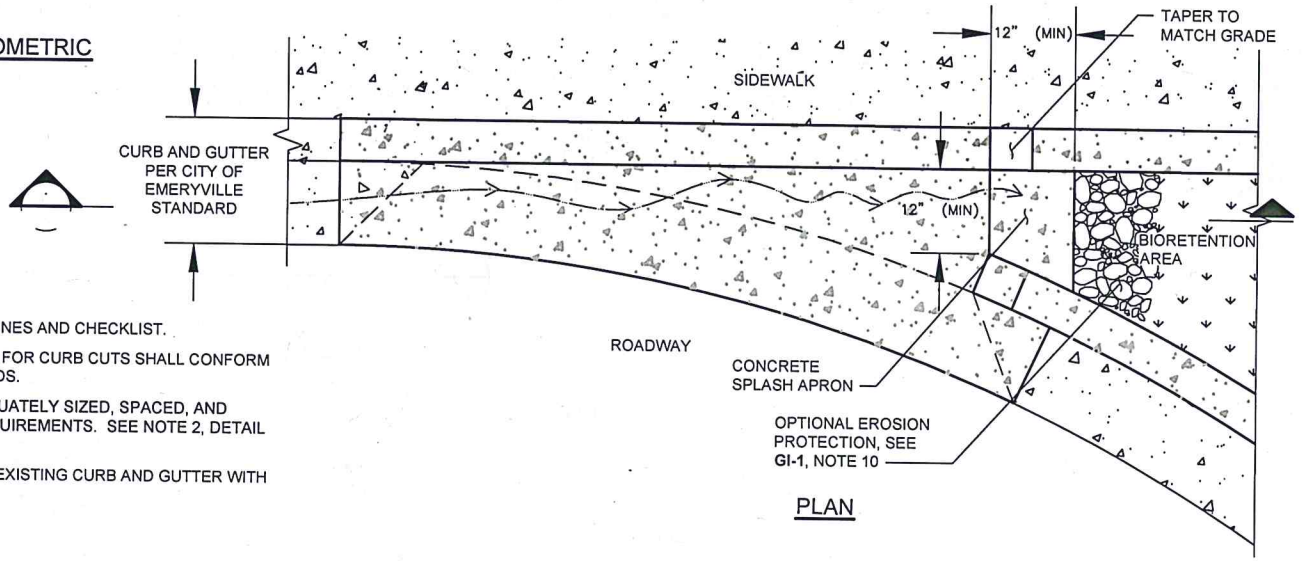
| | | |
|---|---|---|
| | CITY OF EMERYVILLE, CALIFORNIA, PUBLIC WORKS DEPARTMENT | STD DETAIL (NTS) |
| | GI-6.B<br>BIORETENTION COMPONENTS: TRENCH DRAIN CURB CUT INLET DETAIL | 410<br>PAGE 1 OF 1 |
| | CITY ENGINEER / DATE | FEBRUARY 2019 |




ISOMETRIC




SECTION A




PLAN

## NOTES:

1. REFER TO **GI-1** NOTES FOR GUIDELINES AND CHECKLIST.
2. ALL MATERIAL AND WORKMANSHIP FOR CURB CUTS SHALL CONFORM TO CITY OF EMERYVILLE STANDARDS.
3. CURB CUT INLETS SHALL BE ADEQUATELY SIZED, SPACED, AND SLOPED TO MEET HYDRAULIC REQUIREMENTS. SEE NOTE 2, DETAIL **GI-6A** FOR REFERENCE.
4. BOND NEW CURB AND GUTTER TO EXISTING CURB AND GUTTER WITH EPOXY AND DOWEL CONNECTION.

CITY OF EMERYVILLE, CALIFORNIA, PUBLIC WORKS DEPARTMENT

# GI-6.C
# BIORETENTION COMPONENTS: CURB CUT AT BULBOUT INLET DETAIL

STD DETAIL (NTS)

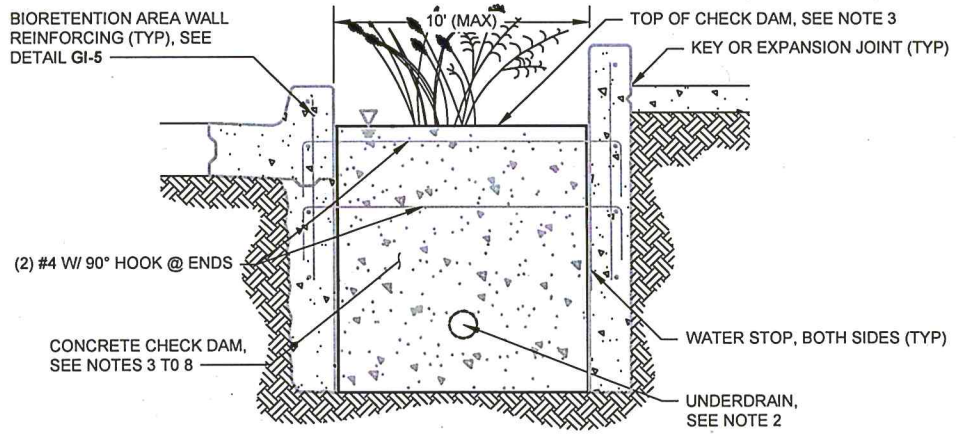
411

PAGE 1 OF 1

CITY ENGINEER

DATE

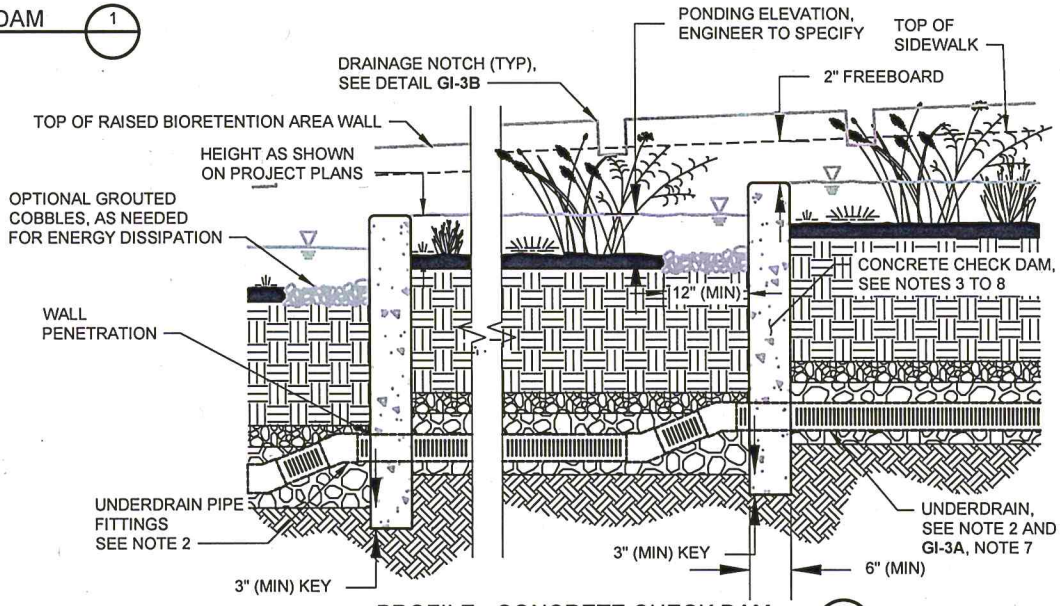
FEBRUARY 2019




SECTION - CONCRETE CHECK DAM 1

## NOTES:

1. REFER TO **GI-1** NOTES FOR GUIDELINES AND CHECKLIST.
2. UNDERDRAIN TO PASS THROUGH CHECK DAM IN NON-PERFORATED HDPE SDR 17 PIPE. PIPE FITTINGS SHALL BE USED TO ACCOMMODATE CHANGES IN GRADE, AS NEEDED.
3. HEIGHT AND SPACING OF CHECK DAMS SHALL BE ESTABLISHED BASED ON THE PONDING DEPTH REQUIRED TO MEET PROJECT HYDROLOGIC PERFORMANCE GOALS AND THE MAXIMUM DESIRED DROP FROM THE SURROUNDING GRADE TO THE FACILITY BOTTOM.
4. FOR BIORETENTION SWALES (SLOPED BOTTOM), THE AVERAGE DEPTH OF PONDING ACROSS THE FACILITY AREA SHALL MEET THE REQUIRED STORAGE DEPTH.
5. ALL MATERIAL AND WORKMANSHIP FOR CHECK DAM ASSEMBLY SHALL CONFORM TO CITY OF EMERYVILLE STANDARD SPECIFICATIONS.
6. CONCRETE CHECK DAM SHALL BE CONTINUOUS (NO JOINTS) AND REINFORCED WITH #4 BAR, PLACED AT 18" ON CENTER, EACH WAY.
7. CONCRETE CHECK DAM SHALL MEET STRUCTURAL REQUIREMENTS FOR LATERAL BRACING WHEN USED AS LATERAL BRACING. COORDINATE WITH ENGINEER.
8. TOP OF CHECK DAM TO BE LEVEL WITH CREST ELEVATION MATCHING PONDING ELEVATION UNLESS NOTCH SIZED TO CONVEY DESIGN FLOWS PROVIDED.
9. GROUT ALL PENETRATIONS, CRACKS, SEAMS, AND JOINTS WITH CLASS "C" MORTAR.




PROFILE - CONCRETE CHECK DAM 2

CITY OF EMERYVILLE, CALIFORNIA, PUBLIC WORKS DEPARTMENT

# GI-7
# BIORETENTION COMPONENTS: CHECK DAM DETAIL

STD DETAIL (NTS)

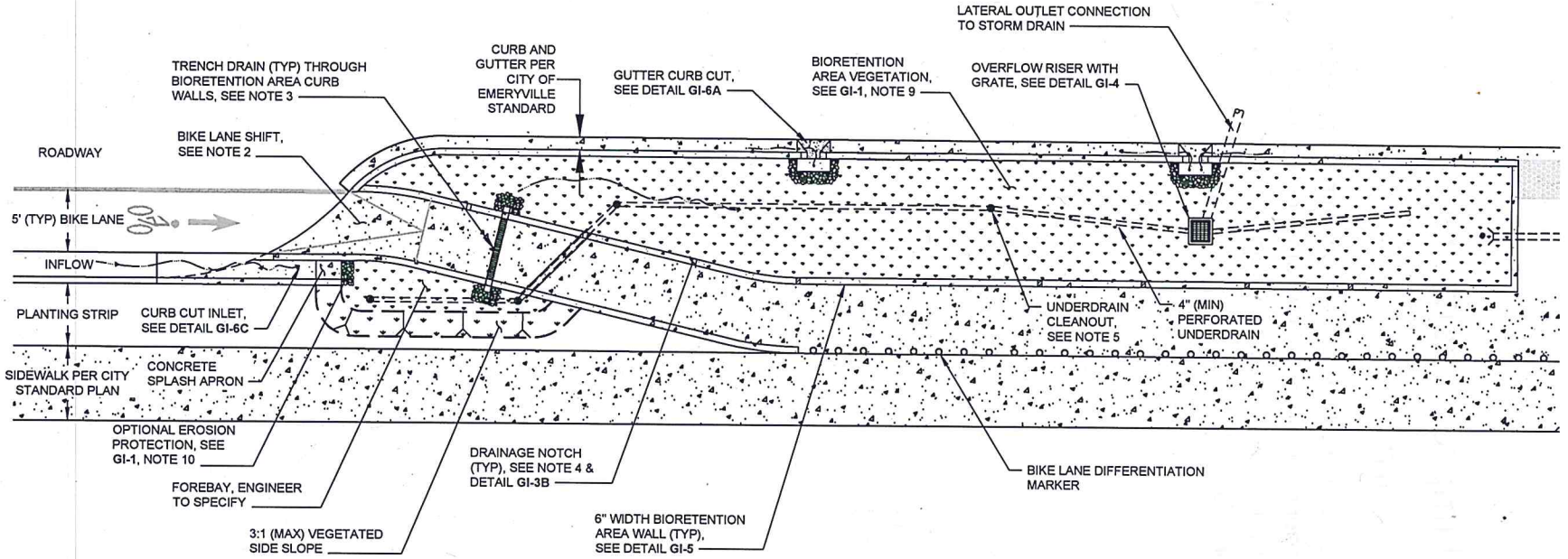
412

PAGE 1 OF 1

CITY ENGINEER

DATE

FEBRUARY 2019




NOTES:

1. REFER TO GI-1 NOTES FOR GUIDELINES AND CHECKLIST.
2. RAMP BIKE LANE UP ONTO BULBOUT AND SHIFT LANE OVER. MAXIMUM 1:5 HORIZONTAL TRANSITION RATE. TRANSITION GEOMETRY SHALL CONFORM TO CITY OF EMERYVILLE STANDARDS.
3. HYDRAULIC CONNECTION OF SEPARATED BIORETENTION AREAS PROVIDED BY TRENCH DRAINS. ENGINEER TO SPECIFY, FOLLOWING FLOW AND STRUCTURAL REQUIREMENTS.
4. LAY OUT DRAINAGE NOTCHES AS APPLICABLE TO PREVENT PONDING BEHIND BIORETENTION AREA WALL WITH 5' MAXIMUM SPACING BETWEEN NOTCHES.
5. PROVIDE ONE UNDERDRAIN CLEANOUT PER BIORETENTION AREA (MIN). CLEANOUT REQUIRED AT UPSTREAM END AND PIPE ANGLE POINTS EXCEEDING 45 DEGREES. LONGITUDINAL SLOPE OF PIPE SHALL BE 0.5% (MIN). PIPE SLEEVES REQUIRED FOR UNDERDRAINS TRANSITIONING BETWEEN BIORETENTION AREAS.
6. DRAWING GI-XX MODIFIED FROM THE BASMAA URBAN GREENING BAY AREA TYPICAL GI DETAILS FIGURE C-1.4.

CITY OF EMERYVILLE, CALIFORNIA, PUBLIC WORKS DEPARTMENT

# GI-8
# BIORETENTION AREA: WITH BIKE LANE PLAN VIEW

STD DETAIL (NTS)

413

PAGE 1 OF 1

CITY ENGINEER

DATE

FEBRUARY 2019

# Attachment C-5: Capital Improvement Projects Sign-off Form

The Clean Water Program's Capital Improvement Projects Sign-off Form is provided on the following page. This form is used by the agency to document whether a Regulated Project (as defined in Provision C.3.b) has complied with Provision C.3 requirements, and whether a non-Regulated Project has been evaluated for GI potential.

cleanwater
PROGRAM

# How to Use the
# C.3 Stormwater Compliance Sign-off Form for Capital Improvement Program (CIP) Projects

## Introduction

The attached checklist is for Alameda Countywide Clean Water Program (Clean Water Program) member agencies to document that capital improvement program (CIP) projects either are exempt or have complied with the requirements for C.3 Regulated Projects, as defined in Provision C.3.b of the Municipal Regional Stormwater Permit (MRP), issued by the San Francisco Bay Regional Water Quality Control Board on November 19, 2015.

## Step-by-Step Instructions

1. Fill out the project information at the top of the form (Project Name, Address, etc.)

2. Review the project description and the square footage of impervious surfaces that will be created and/or replaced by the project to determine whether the project may meet any of the conditions identified in the form, under the heading, "Project is NOT a C.3 Regulated Project and the Review of GI Potential Is Documented." If the project meets any of those conditions, check the appropriate box (or boxes).
   - ▶ If one or more boxes are checked, the project is NOT a C.3 Regulated Project. Continue to Step 3.
   - ▶ If no boxes are checked, the project IS a C.3 Regulated Project. Skip to Step 4.

3. Refer to the Clean Water Program's Worksheet for Identifying GI Potential in Municipal CIP Projects[1] (or your agency's equivalent worksheet or form) to evaluate the project for the potential to include green infrastructure (GI). In the C.3 Stormwater Compliance Sign-off Form for CIP Projects, under the subheading, "Green Infrastructure Potential Review," check the box to indicate the name of the worksheet or form that was used for this review, and indicate the date on which the worksheet or form was completed.
   - ▶ Skip to Step 5.

4. Refer to the project's stormwater control plan, construction documents, and/or other project documentation, such as a completed Stormwater Requirements Checklist[2], to determine whether the requirements for C.3 Regulated Projects have been met. If all requirements have been met, including the hydromodification management (HM) requirements in Provision C.3.g (if applicable) and the documentation of operation and maintenance responsibility as required by Provision C.3.h.ii.(1), check the box to indicate the name of the applicable document(s), and write the date of the document(s).
   - ▶ Continue to Step 5.

5. Sign and date the completed C.3 Stormwater Compliance Sign-off Form for CIP Projects.

---

[1] The worksheet is available on the New Development Subcommittee's members only website at: https://cleanwaterprogram.org/index.php/committees/new-development-committee.html.

[2] The checklist is available on the Clean Water Program's public website at: https://cleanwaterprogram.org/. Click on "Resources," then "Development," and scroll down to "Stormwater Requirements Checklist."

cleanwater PROGRAM

## C.3 Stormwater Compliance Sign-off Form for Capital Improvement Program (CIP) Projects

*This form references Provision C.3 of the Municipal Regional Stormwater Permit (MRP), issued by the San Francisco Bay Regional Water Quality Control Board on November 19, 2015.*

Project Name: _____

Project Address: _____ APN: _____

Contact Person: _____

Contact Phone: _____ Contact Email: _____

☐ **Project is NOT a C.3 "Regulated Project" and the Review of "GI Potential" Is Documented.**

**C.3 "Regulated Project" Review**

The project is NOT a C.3 "Regulated Project" based on the Regulated Project definitions in Provision C.3.b as indicated below. Please check the applicable box(es):

- ☐ Project would create and/or replace less than 5,000 square feet of impervious area.
- ☐ Project would create and/or replace less than 10,000 square feet of impervious area **AND** project does not include auto service/maintenance facilities, restaurants, uncovered parking areas (stand-alone or as part of a larger project), or structures with rooftop parking.
- ☐ Project is a Road Project **AND** project would construct less than 10,000 square feet of new contiguous impervious area when the following are excluded from the calculation:[3]
  - o Sidewalks built as part of new streets or roads that direct stormwater runoff to adjacent vegetated areas.
  - o Bicycle lanes built as part of new streets or roads that are not hydraulically connected to the new streets or roads and that direct stormwater runoff to adjacent impervious areas.
  - o Impervious trails that are:
    - A. less than 10 feet wide and more than 50 feet away from the top of a creek bank.

    OR

    - B. designed to direct stormwater runoff to adjacent vegetated areas or other non-erodible permeable areas (preferably away from creeks or towards the outboard side of levees).
  - o Sidewalks, bicycle lanes, or trails constructed with permeable surfaces (pervious concrete, porous asphalt, unit pavers, or granular materials).
  - o Caltrans highway projects and associated facilities.
- ☐ Project consists of interior remodel.
- ☐ Project consists of routine maintenance and repairs (e.g., roof replacement, replacement of exterior wall surface, and/or pavement resurfacing) within the existing footprint.

[3] *When calculating the impervious area of a Road Project, include all roadway surfaces related to creation of additional traffic lanes (including, for example, passing lanes and turning pockets). Shoulders and widened portion of existing lanes may be excluded from the calculation.*

**"Green Infrastructure (GI) Potential" Review**

Capital improvement program (CIP) projects that are NOT C.3 Regulated Projects must be reviewed to determine whether they have green infrastructure (GI) potential, as required in Provision C.3.j.ii.(2). When conducting these reviews, agencies should follow the Bay Area Municipal Stormwater Management Agencies Association's (BASMAA) Guidance for Identifying GI Potential in Municipal CIP Projects. One way to follow this guidance is to use the Clean Water Program's Worksheet for Identifying GI Potential in Municipal CIP Projects. These documents can be downloaded from www.cleanwaterprogram.com (click "Resources," then "Development"). Please attach documentation to demonstrate that the project was reviewed for GI potential.

The non-C.3 Regulated Project has been reviewed for GI potential as shown in the following document(s):

- ☐ Worksheet for Identifying GI Potential in Municipal CIP Projects, dated: _____
- ☐ Other documentation (describe): _____

☐ **Project IS a C.3 "Regulated Project" — Compliance Documented.**

The C.3 Regulated Project has met all requirements for C.3 Regulated Projects as shown in the following documents:

- ☐ Stormwater Control Plan, dated: _____
- ☐ Construction Documents, dated: _____
- ☐ Other documentation (describe): _____

_____

Signature Date

_____

Name Title

# Attachment C-6: Guidance for Sizing Green Infrastructure Facilities in Street Projects

The Guidance for Sizing Green Infrastructure Facilities in Street Projects, provided by the Bay Area Stormwater Management Agencies Association (BASMAA), is included on the following page of paper copies of this GI Plan. The electronic version of this GI Plan includes the Guidance for Sizing Green Infrastructure Facilities in Street Projects as a stand-alone electronic file.

# Guidance for Sizing Green Infrastructure Facilities in Street Projects

B A S M A A

Bay Area Stormwater Management Agencies Association

Prepared by
Dan Cloak Environmental Consulting
EOA, Inc.

June 2019

## Introduction and Regulatory Background

Provision C.3.j. in the reissued Municipal Regional Stormwater Permit[1] (MRP) requires each Permittee to "complete and implement a Green Infrastructure (GI) Plan for the inclusion of low impact development drainage design into storm drain infrastructure on public and private lands, including streets, roads, storm drains, parking lots, building roofs, and other storm drain infrastructure elements."

Provision C.3.j.i.(g) further mandates that these plans include:

> *Requirements that projects be designed to meet the treatment and hydromodification sizing requirements in Provisions C.3.c. and C.3.d. For street projects not subject to Provision C.3.b.ii. (i.e., non-Regulated Projects) Permittees may collectively propose a single approach with their Green Infrastructure Plans for how to proceed should project constraints preclude fully meeting the C.3.d. sizing requirements. The single approach can include different options to address specific issues or scenarios. That is, the approach shall identify the specific constraints that would preclude meeting the sizing requirements and the design approach(es) to take in that situation. The approach should also consider whether a broad effort to incorporate hydromodification controls into green infrastructure, even where not otherwise required, could significantly improve creek health and whether such implementation may be appropriate, plus all other information as appropriate (e.g., how to account for load reduction for the PCBs or mercury TMDLs).*

This document represents the "single approach" collectively proposed by the Permittees for how to proceed when constraints on GI projects affect facility sizing in street projects. For other types of projects, information on hydraulic sizing is provided in the technical guidance manuals for Provision C.3 developed by each countywide stormwater program.

## Hydraulic Sizing Requirements

MRP Provision C.3.d contains criteria for sizing stormwater treatment facilities. Facilities may be sized on the basis of flow, volume, or a combination of flow and volume. With adoption of the 2009 MRP, a third option for sizing stormwater treatment facilities was added to Provision C.3.d. This option states that "treatment systems that use a combination of flow and volume capacity shall be sized to treat at least 80 percent of the total runoff over the life of the project, using local rainfall data."

This option can also be used to develop sizing factors for facilities with a standard cross-section (i.e., where the volume available to detain runoff is proportional to facility surface area). To calculate sizing factors, inflows, storage, infiltration to groundwater, underdrain discharge, and overflows are tracked for each time-step during a long-term simulation. The continuous simulation is repeated, with variations in the treatment surface area, to determine the minimum area required for the facility to capture and treat 80% of the inflow during the simulation.

---

[1] Order R2-2015-0049

Such an analysis was conducted for BASMAA by Dubin Environmental Consulting and is described in the attached Technical Report. The analysis shows that bioretention facilities with the current-standard cross-section can capture and treat the Provision C.3.d amount of runoff when sized to 1.5% - 3% of tributary equivalent impervious area, depending on location.

**Hydromodification Management**

A principal objective of LID is to mimic natural hydrology in the post-development condition. This is accomplished by retaining and infiltrating runoff flows during small to medium events. Flows from larger events are detained and slowed.

MRP Provision C.3.g. includes requirements and criteria for implementing hydromodification management (HM). These HM requirements apply to Regulated Projects that create or replace an acre or more of impervious area, increase the amount of impervious area over the pre-project condition, and flow to creeks that are at risk of erosion. As such, the HM requirements do not apply to street projects that retrofit drainage systems that receive runoff from existing roofs and paving.

However, Provision C.3.j.i.(g) states that the Permittees' approach to sizing GI facilities "...should also consider whether a broad effort to incorporate hydromodification controls into green infrastructure, even where not otherwise required, could significantly improve creek health and whether such implementation may be appropriate..."

Various criteria for HM design have been used in California and throughout the U.S. These criteria have been based on one or more of the following principles:

- Maintaining watershed processes
- Maintaining a site-specific water balance
- Maintaining the value of the curve number used in the NRCS method of computing peak runoff
- Controlling increases in peak flows from a specified storm size
- Controlling increases in the duration of flows at each intensity within a specified range (flow duration control)
- Controlling the likelihood of downstream erosion in streams (erosion potential, or Ep)

Generally, for any HM criterion used, facilities with more storage and a larger infiltrative area will be more effective in meeting the criterion than facilities with less storage and a smaller infiltrative area.

In the statewide municipal stormwater NPDES permit for small MS4s, Provision E.12.f. includes the following HM standard applicable to Bay Area small MS4s: "Post-project runoff shall not exceed estimated pre-project flow rate for the 2-year, 24-hour storm..."

Dubin (2014) conducted modeling to evaluate whether this standard would be met in the San Francisco Phase II counties (Marin, Sonoma, Napa, and Solano) by a bioretention facility meeting the minimum requirements in that permit's Provision

E.12.f. Dubin's analysis found that a facility sized to 4% of tributary equivalent impervious area, and having a 6-inch deep reservoir with 2 inches of freeboard, 18 inches of treatment soil, and a 12-inch-deep "dead storage" gravel layer below the underdrain, would meet this standard, even in the wettest portions of the Bay Area.

### Additional Considerations for Bioretention Sizing

In summary, bioretention facilities for street projects sized to 1.5% - 3% of tributary equivalent impervious area (depending on their location in the Bay Area) can meet the criteria in Provision C.3.d., according to the modeling study documented in the attached Technical Memo.

There are many reasons to design and build facilities larger than the Provision C.3.d. minimum. Building larger facilities helps ensure the facilities perform to the minimum hydraulic capacity intended, despite minor flaws in design, construction, and maintenance, providing an engineering safety factor for the project. Further, larger-sized facilities may more effectively address objectives to maximize the removal of pollutants (particularly pollutants in dissolved form), to operate as full trash capture devices, and to manage hydromodification effects.

However, municipalities often face considerable challenges in retrofitting existing streetscapes with GI facilities. Constraints and design challenges typically encountered in the public right-of-way include:

- The presence of existing underground utilities (known and unknown during the design phase);
- The presence of existing above-ground fixtures such as street lights, fire hydrants, utility boxes, etc.;
- The presence of existing mature trees and root systems;
- The elevation of or lack of existing storm drains in the area to which to connect underdrains or overflow structures;
- Challenges of defining and controlling any catchment areas on adjacent private parcels that drain to the roadway surface;
- Low soil permeability and strength, and the need to protect the adjacent roadway structure;
- Competition with other assets & uses for limited right-of-way area; and
- Presence of archeologic/cultural deposits.

Use of the sizing factors in the attached Technical Memo will provide municipalities flexibility in design of bioretention facilities for street projects where constraints are present.

### Recommendations for Sizing Approaches for Green Infrastructure Retrofit Facilities in Street Projects

1. Bioretention facilities in street projects should be sized as large as feasible and meet the C.3.d criteria where possible. Constraints in the public right-of-way may affect the size of these facilities and warrant the use of smaller sizing factors.

Bioretention facilities in street projects may use the sizing curves in the attached memorandum to meet the C.3.d criteria. Local municipal staff involved with other assets in the public right of way should be consulted to provide further guidance to design teams as early in the process as possible.

2. Bioretention facilities in street projects smaller than what would be required to meet the Provision C.3.d criteria may be appropriate in some circumstances. As an example, it might be appropriate to construct a bioretention facility where a small proportion of runoff is diverted from a larger runoff stream. Where feasible, such facilities can be designed as "off-line" facilities, where the bypassed runoff is not treated or is treated in a different facility further downstream. In these cases, the proportion of total runoff captured and treated should be estimated using the results of the attached memorandum. In cases where "in-line" bioretention systems cannot meet the C.3.d criteria, the facilities should incorporate erosion control as needed to protect the facility from high flows. See Figures 1 and 2 below for illustration of the in-line and off-line concepts.

3. Pollutant reduction achieved by GI facilities in street projects will be estimated in accordance with the Interim Accounting Methodology[i] or the applicable Reasonable Assurance Analysis[ii].

*Figure 1: Off-line system in El Cerrito where low flow is diverted to the sidewalk planter and high flows continue down the gutter.*

*Figure 2: In-line system in Berkeley/Albany where low and high flows enter the system and overflows exit through a drain within the system.*

[i] The Interim Accounting Methodology for TMDL Loads Reduced Report (BASMAA 2017) describes the methodology that is being used to demonstrate progress towards achieving the PCB and mercury load reductions required during the term of MRP 2.0. The methodology is based on the conversion of land use from a higher to a lower PCB or mercury loading rate during the redevelopment of a parcel. See: www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/stormwater/Municipal/POC/Final%20Interim%20Accounting%20Methodology%20Report%20v.1.1%20(Revised%20March%202017).pdf

[ii] A Reasonable Assurance Analysis (RAA) is a methodology used to demonstrate that implementation of pollutant control measures (such as GI facilities) over a specified time period will meet required pollutant load reductions associated with a TMDL. The Bay Area Reasonable Assurance Analysis Guidance Document (BASMAA 2017) establishes a regional framework and provides guidance for conducting PCBs and mercury RAAs in the San Francisco Bay Area. See: http://basmaa.org/Announcements/bay-area-reasonable-assurance-analysis-guidance-document

# Appendix D. Workplan to Incorporate Green Infrastructure Requirements in Planning Documents

cleanwater
PROGRAM

# Appendix D

# Workplan to Incorporate Green Infrastructure Requirements in Planning Documents

## City of Emeryville

## June 2019

### 1. Statement of Purpose

The purpose of this workplan is to identify how the City of Emeryville will ensure that green infrastructure (GI) and low impact development (LID) measures are appropriately included in plans and planning documents that may affect the future alignment, configuration, or design of impervious surfaces within its jurisdiction. This workplan specifically addresses plans and planning documents that could not be updated prior to the September 30, 2019, which are listed as follows:

- General Plan
- Climate Action Plan
- Parks and Recreation Strategic Plan
- Pedestrian and Bicycle Plan

### 2. Tasks

The incorporation of GI and LID measures in the above-listed plans and planning documents will be accomplished by implementing the following tasks:

***Task 1: Draft Text to Incorporate in the Planning Documents***

Agency staff will develop draft text to incorporate into the identified plans and planning documents. The draft text will set forth green infrastructure requirements for projects that are identified in the applicable plans or planning documents, and for projects that may be developed to meet the planning goals, objectives, and policies articulated in the documents.

***Task 2: Coordination and Outreach to Update Planning Documents***

Agency staff will prepare draft revisions of relevant sections of planning documents to ensure that the GI implementation text prepared in Task 1 is included in the scheduled updates of applicable plans and planning documents. This step will include coordination with and outreach to departments within the agency, stakeholders, decision-making bodies, and the general public. Planning document updates are anticipated to be circulated for public review prior to the final approval of the documents that are updated to include GI requirements.

***Task 3: Track and Record the Update of Planning Documents***

Throughout the process of updating plans and planning documents, and after the documents are updated, agency staff will document coordination with and outreach to departments within the agency, stakeholders, decision-making bodies, and the general public, including the final approval

of the documents that are updated to include GI requirements. This includes tracking and recording the dates on which draft planning documents are circulated for review, the dates on which public hearings or other public meetings are held, and the dates when final planning documents are approved.

## 3. Schedule

The following schedule indicates the timeframes in which Tasks 1, 2, and 3 are scheduled to be implemented for each of the plans and planning documents included in this workplan.

| | Task 1: Draft Text | | Task 2: Circulate Draft | | Task 3: Update/Track | |
|---|---|---|---|---|---|---|
| **Name of Document** | **Start** | **Finish** | **Start** | **Finish** | **Start** | **Finish** |
| General Plan | 04/2028 | 10/2028 | 10/2028 | 01/2029 | 01/2029 | 06/2029 |
| Climate Action Plan | 04/2025 | 10/2025 | 10/2025 | 01/2026 | 01/2026 | 06/2026 |
| Parks and Recreation Strategic Plan | 04/2020 | 10/2020 | 10/2020 | 01/2021 | 01/2021 | 06/2021 |
| Pedestrian and Bicycle Plan | 04/2021 | 10/2021 | 10/2021 | 01/2022 | 01/2022 | 06/2022 |