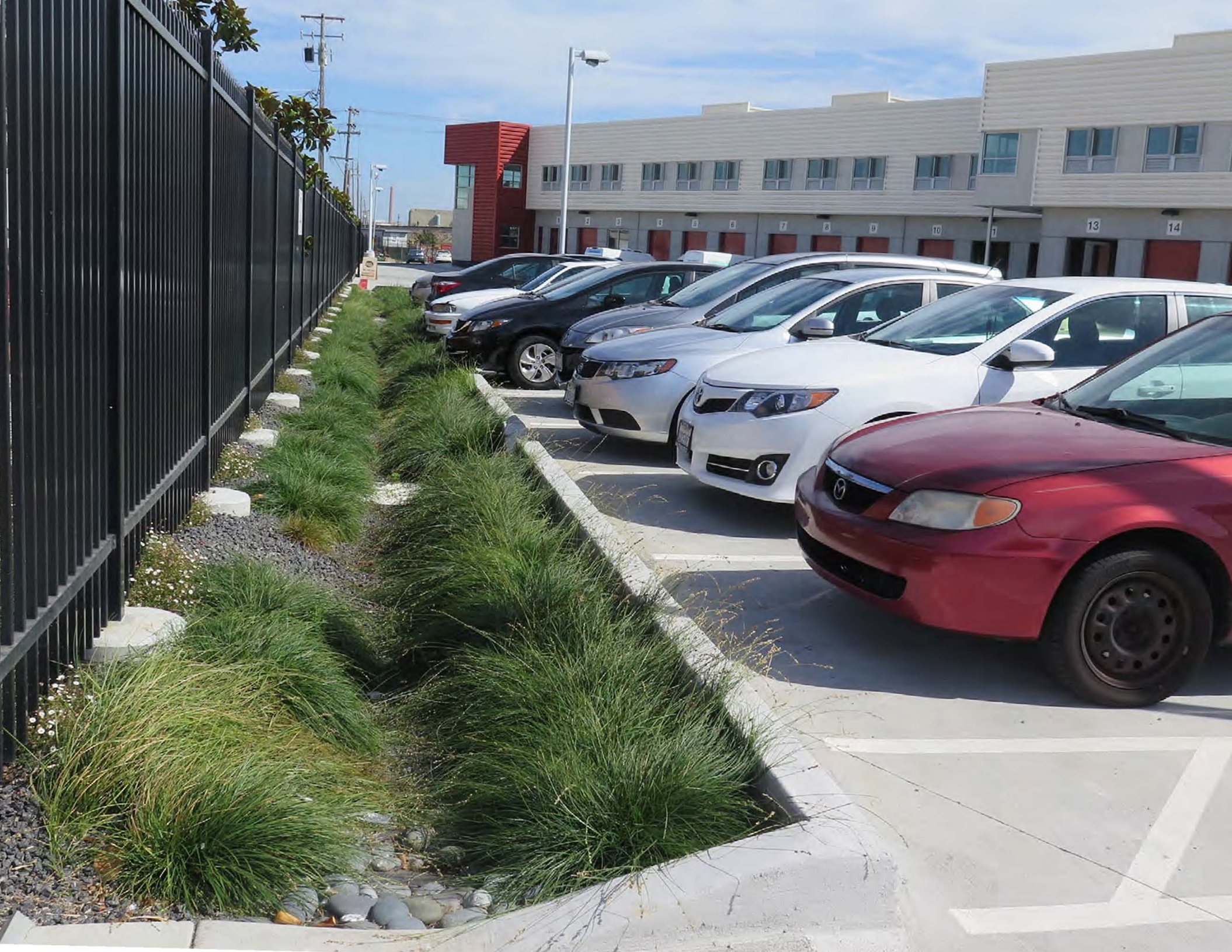
Appendix B: Green Infrastructure Typical Details and Specifications



These typical details and specifications were developed to be manipulated and customized for each individual project by design professionals.

The SFPUC's Urban Watershed Management Program (UWMP) is proud to introduce the *San Francisco Green Infrastructure Typical Details and Specifications*. These details incorporate the latest best practices in green infrastructure (GI) design nation-wide and, at the same time, reflect the unique challenges and specific needs for designing and building GI in the City and County of San Francisco. The details were vetted through an extensive city-family review process and reflect the expertise of many members of the City Family, including Public Works, the Department of Building Inspection, the Municipal Transportation Agency, and the Planning Department.

This Appendix provides general guidance for using the details and specifications effectively during the design and construction document development process.

Bioretention in a plaza manages stormwater from the roof of a residential building in San Francisco. *Photo: Krystal Zamora*

Typical Details for Site-Specific Design

These details show **typical** configurations, rather than required **standard** configurations. This distinction is deliberate on the part of the project team, as we recognize that to create GI projects that are beautiful, functional, and contextual, designers must use their own creative thinking and professional judgement and, above all, be responsive to each site.

To ensure that the details are broadly applicable and can be adapted to many sites, wherever possible the details provide **guidelines** and **ranges of acceptability** instead of precise numeric requirements. Both the Designer Notes for each detail and the details themselves emphasize areas where the designer must exercise professional judgement to respond to the site.

For example, the Designer Notes for the bioretention planter section indicate that planter area, ponding depth, bioretention soil depth, and gravel reservoir course depth must be sized to meet project hydrologic performance goals. On the corresponding drawing, bioretention soil depth is shown with a minimum depth of 18 inches. Ponding depth should be between 2 and 6 inches. In these cases the details are indicating acceptable minimums and maximums but the designer must choose the bioretention soil depth and ponding depth that is appropriate for a given site. Bioretention facilities on a site with A soils may perform very well using the minimum soil depth, while facilities sited on C soils will benefit from a deeper soil profile.

Items that are **required** for system function can be found in the Construction Notes, the General Utility Notes, the Layout Requirements, and the Designer Checklists. For example, the Construction Notes for the bioretention planter section include the following:

1. Avoid compaction of existing subgrade below planter during construction.

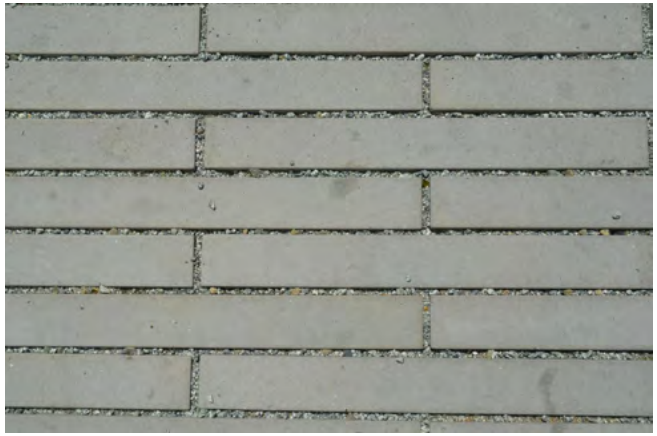
2. Scarify subgrade to a depth of 6 inches (min) immediately prior to placement of gravel storage and bioretention soil.

3. Maximum drop from top of curb to top of bioretention soil shall include considerations for bioretention soil settlement.

Usage on Construction Documents

ACAD drawings of typical details are available for download at www.sfpuc.org/smr. Design professionals must modify facility plan and section configurations, materials, and construction notes to address the project's site conditions and meet project performance goals. To ensure that your use of the details is site-specific, please:

- Adjust plans, sections, and construction notes for site-specific design
- Remove the SFPUC GI Title Block from the details used in your set and replace it with a title that aligns with your projects' construction document nomenclature
- Incorporate all detail call-outs and references into the construction documents so that the contractor will have all the information required to build the project



Permeable pavement along Octavia Blvd in San Francisco.
Photo: Krystal Zamora

Drought tolerant plantings can also be appropriate for vegetated roofs. Photo: Ken Kortkamp

Typical Detail Content

The details are organized to guide the licensed professional to the proper selection, layout, and design of GI technologies (such as permeable pavement and bioretention) and components (such as inlets, outlets, and edge treatments). The components allow the typical details to be modified to reflect specific design approaches and site conditions. The typical details include the following sections:

- Purpose
- Designer Guidelines
- Layout Requirements
- Designer Checklists
- Key Maps
- Facility Plans
- Facility Sections and Profiles
- General Notes
- General Utility Notes
- Construction Notes
- Component Details

Specifications and Design Guidelines

In addition to the Typical Details, several common Specifications and Design Guideline documents have been developed and available for download at www.sfpuc.org/smr.

Specifications

Specifications have been developed in Construction Specifications Insitute (CSI) master format for the most common permeable paving systems and for bioretention soils. Projects submitting an SCP that propose permeable paving and/or biorentention must include the corresponding Specifications within the Supporting Documentation section. Like the Typical Details, these Specifications have been developed to be adjusted where noted in the informational Designer Notes. Designer Notes must be reviewed by the design professional and removed from the final specification prior to submitting the SCP.

Design Guidelines

Design Guideline materials have been developed for common design related topics. SFPUC staff involved in the review process will base SCP approval on these guidelines to ensure BMPs are functional and maintainable.

Willie Brown Middle School in San Francisco utilized rainwater harvesting, bioretention, and permeable pavement to comply with the Stormwater Management Ordinance. *Photo: Krystal Zamora*