

# PROP. 84 REMOVING BARRIERS TO LID: MUNICIPAL CODE UPDATE ASSISTANCE

CASE STUDY: INTEGRATING LID INTO MORRO BAY'S STREETS

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## CASE STUDY: INTEGRATING LID INTO MORRO BAY'S STREETS

Morro Bay is a city in San Luis Obispo County that is situated approximately 12 miles north of San Luis Obispo at the crossroads of Highway 1 and Highway 41 on California's Central Coast. Morro Bay sits along a natural estuary characterized by Morro Rock, an extinct volcano extending 500 feet in elevation amid water protected by a natural sand spit. According to the United States Census Bureau, the Morro Bay has a total area of 10.3 square miles, of which, 5.3 square miles of it is land and 5.0 square miles of it is water.

The climate of Morro Bay is moderated by its proximity to the Pacific Ocean resulting in a cool-summer Mediterranean climate. Morro Bay's average high temperatures range from around 65° F in December to 71° F during September and October. Average annual precipitation is around 17.5 inches, with most rainfall occurring between November and April. There is an average of 50 days with measurable precipitation annually.

Morro Bay is primarily a residential community and a vacation destination, especially during the summer months. Between 2000 and 2010, Morro Bay's population fell by 116 (-1.1%); however, the number of new dwelling units rose by 69 dwelling units (1.1%). The number of occasional, or seasonal, dwelling units rose from 980 dwelling units to 1,125 dwelling units. The 14.8 percent growth in seasonal dwelling unit occupancy explains how construction grew during the period while population diminished.

The City's topography includes very hilly areas with low-infiltrating native soils, which presents a challenge for stormwater management. Additionally, many streets in the City are unimproved (e.g., no curb/gutter/sidewalk) such as the north end neighborhoods and objectives to implement urban greening, improve pedestrian mobility, and use low impact development strategies can be especially challenging in these areas of the City.

CASQA's project team selected Morro Bay as a project participant because the City is a good example of a small community with geologic characteristics that make LID challenging. Although Morro Bay has experienced little growth in the last 15 years, the City is exploring additional sources of potable water that may result in both growth and redevelopment.

Because of the geological challenges faced throughout the City, the work included a concept design for a residential street located in the northern portion of the City (i.e., Greenwood Avenue) to illustrate how LID measures could be integrated the City approach to manage its street network. As described more fully below, the CASQA project team performed the following tasks:

- Green Complete Street for Local Streets
- Greenwood Avenue Retrofit Concept Design
- Bioretention Standard Details and Specifications

## GREEN COMPLETE STREET STANDARDS

The City of Morro Bay has identified opportunities to integrate green stormwater infrastructure into its street prisms. City staff noted that the opportunities are primarily related to retrofits along local street classifications. The CASQA grant project team prepared concepts to integrate of bioretention into its local street classification.

### GREEN/COMPLETE STREET STANDARDS

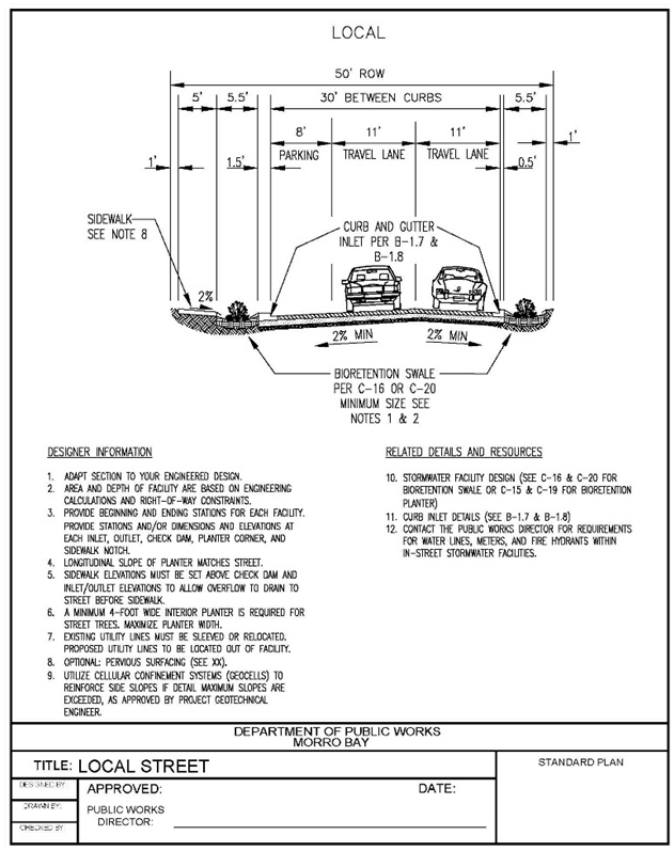
Green/complete street standards were prepared for the local street classification within the City of Morro Bay. The street section was created with the following objectives:

- Create Standards that support post-construction stormwater control requirements under the Stormwater National Pollutant Discharge Elimination System (NPDES) Permits (e.g., stormwater volume retention and water quality treatment using low impact development design).
- Create a local street standard that would have a curb face to curb face width of 30 feet and contain two 11-foot travel lanes and an 8-foot parking lane, with bioretention facilities situated between the back of curb and the sidewalk on both sides of the street.
- Focus on design strategies that provide a cost-effective approach to implement Green/Complete Streets.

Morro Bay's existing street designs include wide, paved streets, which generate high volumes of stormwater runoff and associated pollutants. There is very little stormwater infrastructure in the City's existing network of streets. City staff concluded that integrating green infrastructure principles within its rights-of-way would help to reduce flooding and improve water quality.

In order to implement the use of LID practices within City rights-of-way, the CASQA grant project team prepared a section for integrating bioretention into the City's local street classification. Figure 1 depicts a street section that was prepared for Morro Bay.

Figure 1: Section for a Morro Bay Local Street



To review the street section that was prepared for the City of Morro Bay, please visit the [California LID Portal](https://www.casqa.org/resources/california-lid-portal) under the Standard Details & Specifications tab or through the current link:  
<https://www.casqa.org/resources/california-lid-portal>

## GREENWOOD AVENUE RETROFIT

Morro Bay has goals to improve its streets to achieve multiple objectives and provide multiple benefits. Green/complete street principles were applied to the retrofit design for Greenwood Avenue, where the following objectives guided the design:

- Prepare a design that would support post-construction stormwater control requirements under the Stormwater National Pollutant Discharge Elimination System (NPDES) Permits (e.g., stormwater volume retention and water quality treatment using low impact development design).
- Prepare a design that integrates other modes of travel (e.g., bike lanes, pedestrian access, and transit).

- Focus on design strategies that provide a cost-effective approach to implement Green/Complete Streets.

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### GREENWOOD AVENUE RETROFIT

A concept design for retrofit of Greenwood Avenue was prepared to provide Morro Bay with a design that would provide stormwater management and water quality benefits within the context of a collector street right-of-way.

On May 25, 2016, Kevin Perry of Urban Rain|Design and Darla Inglis met with City of Morro Bay staff to kick off the project. City staff discussed the constraints of the project site, and opportunities to accommodate both green infrastructure and pedestrian/bike improvements along the Greenwood Avenue project corridor. Kevin Perry walked the project site and recorded existing conditions.

On June 16, 2016, Kevin Perry submitted a preliminary corridor-wide concept plan for City staff to share with the public at an annual event. The public noted its desire to keep the potential improvements along Greenwood Avenue semi-rural in nature. In July, Darla Inglis met with City staff to further define what “semi-rural character” meant within the context of street design. She discussed alternatives that would balance green infrastructure, bicycle/pedestrian use, and rural character.

On September 26, 2016, Kevin Perry and Darla Inglis met with City staff to discuss the three design options for Greenwood Avenue depending on the amount of green infrastructure desired and different bike and pedestrian configurations. City staff recommended looking at a forth option that maximized bike and pedestrian improvements.

On February 22, 2017, Urban Rain|Design provided the City of Morro Bay an updated design that included a forth option for Greenwood Avenue. After review and consideration by City staff and decision makers, on June 14, 2017, Morro Bay staff directed Kevin Perry on the preferred approach for the Greenwood Avenue retrofit. The typical plan views and perspective sketches for the preferred design are depicted in Figures 2-6, below.

Figure 2: Greenwood Avenue Retrofit (North)

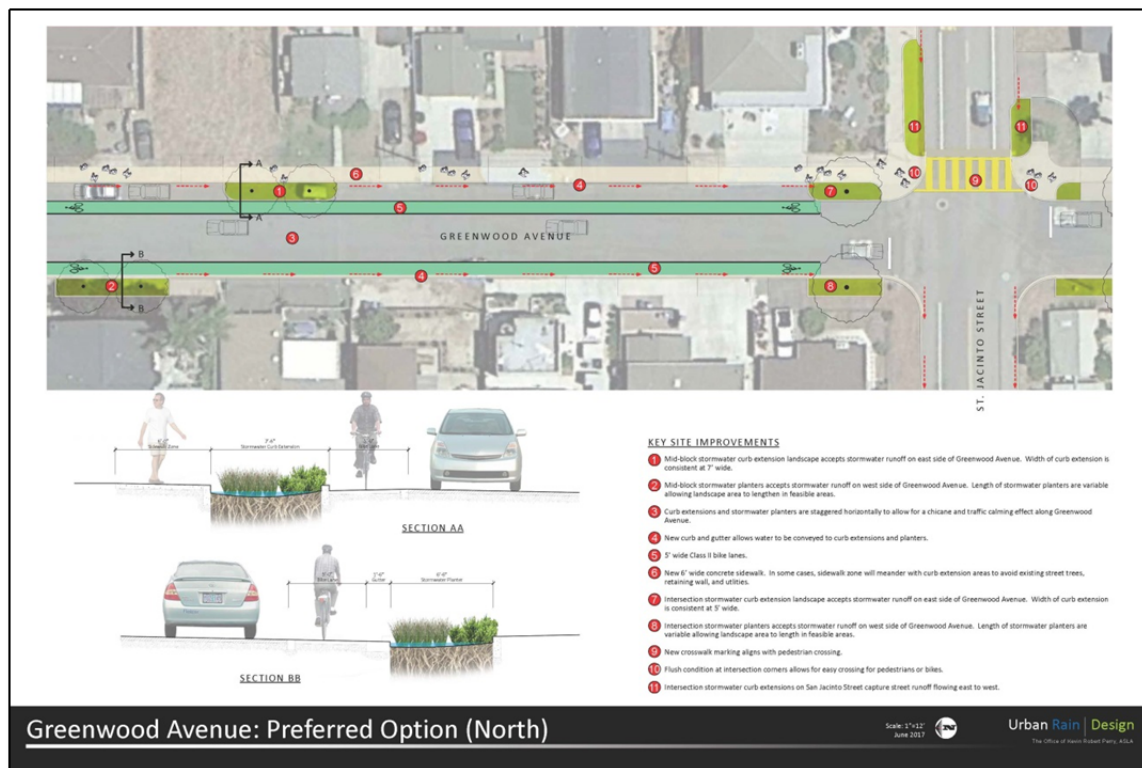


Figure 3: Greenwood Avenue Retrofit (South)

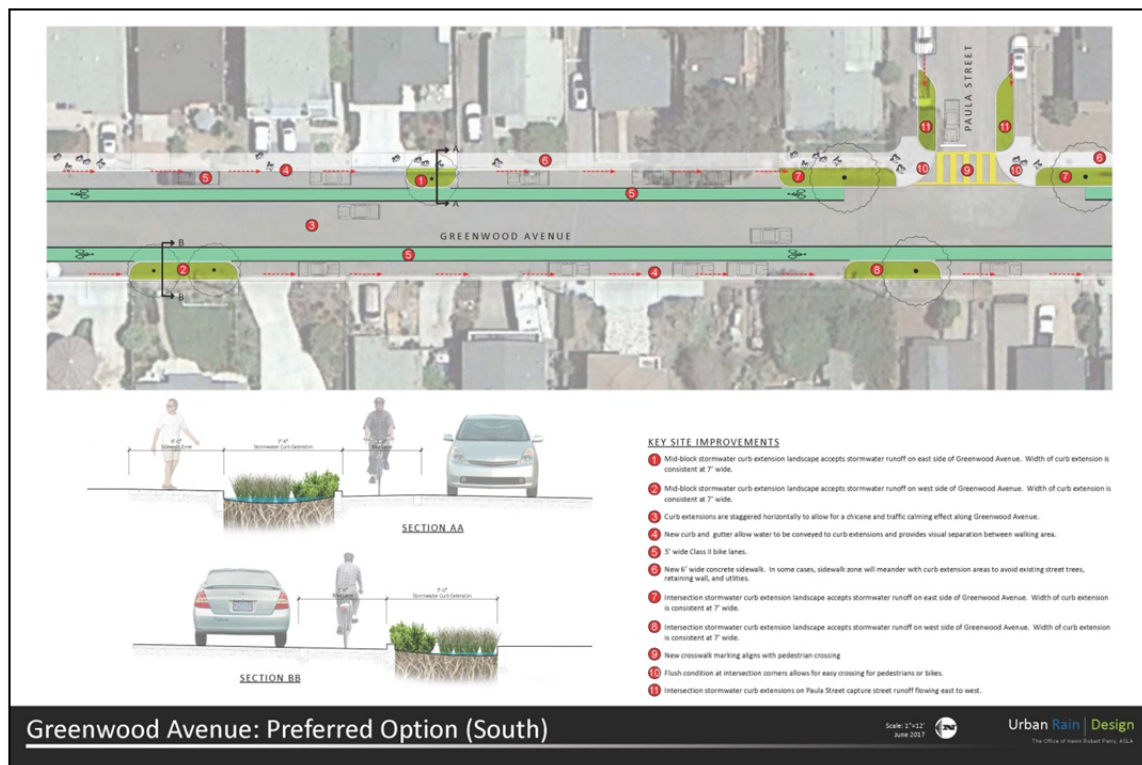


Figure 4: Greenwood Avenue Perspective Sketches



Figure 5: Greenwood Avenue (Sequoia Street to Elena Street)



**Figure 6: Greenwood Avenue (Elena Street to Avalon Street)**



The following assumptions were undergirded the development of the preferred concept design:

1. The concept design focused on an LID or Green Street “lite” approach meaning, the concept design integrated elements of LID that are realistic related to cost, technical feasibility, parking constraints, etc. This design approach avoids the cost and impact of a full street retrofit, which typically is economically infeasible.
2. The preferred concept design maximized bicycle lanes and provided pedestrian facilities on one side of the street.
3. Green stormwater infrastructure was emphasized at intersections.

## BIORETENTION/BIOFILTRATION STANDARD DRAWINGS AND SPECIFICATIONS

In order to implement the use of LID practices within the City, there is a need for design standards and details to ensure proper construction and installation. Standard drawings for bioretention facilities were assembled by the grant project team for the City based standards originating from LIDI to maintain consistency with Statewide NPDES and Region 3 PCR requirements. The standard drawings and specifications originated out of work that was performed by the Central Coast Low Impact Development Initiative (LIDI). The LIDI details were then modified through this grant based on extensive input from the participating municipalities, stormwater design professionals, and peer review by a design team not associated with the initial development of the details.

The refinements to the bioretention and biofiltration standard drawings addressed various edge conditions (with variations for facilities within the landscape strip adjacent to travel lanes or on-street parking and within a parking lot), pervious pavements, edge conditions such as curb inlets and flat curbs, overflow structures and planting palates for landscaping frequently inundated areas of the facilities. After the drawings were completed, the numbering for the drawings was changed to reflect the adopted numbering conventions for the City of Monterey, and the drawings were placed within the City's standard title block.

To review the bioretention standard plans prepared for the City of Morro Bay, please see the [California LID Portal](#) under the Standard Details & Specifications tab or through the current link:

<https://www.casqa.org/resources/california-lid-portal>

Figure 5: Bioretention Standard Drawings

