LANDSCAPE ARCHITECTURE FOUNDATION

Elmer Avenue Neighborhood Retrofit

Landscape Peformance Benefits

- Infiltrates up to 5.4 million gallons of stormwater annually.
- Improves water quality by reducing concentrations of lead, copper and total suspended solids by 60%, 33%, and 18% respectively, by passing water through a catch basin sump before it enters the infiltration gallery.
- Reduces potable water use by 30% for homeowners with enhanced front yards and 10% for others, saving homeowners $120-$360 annually.
- Increased soil sequestration potential by approximately 6 times, resulting in 7.25 tons of carbon sequestered annually by soil and plant tissue.
- Educates at least 300 visitors annually on water issues and best management practices for stormwater.
- Increased resident satisfaction with their block's walkability from less than 2% of survey respondents in 2006 to 92% in 2011.
- Increased resident understanding that rain falling on local homes can be captured and used to supply the community with water. Only 60% of survey respondents agreed with this statement in 2006 compared to 100% in 2011.

Overview

The Elmer Avenue Neighborhood Retrofit transformed a typical residential street into a model "green street" by incorporating stormwater best management practices (BMPs) that capture and filter runoff from a 40-acre area. Before this project, the Sun Valley neighborhood had no pedestrian or stormwater infrastructure and was subject to frequent flooding. Now vegetated bioswales and a subsurface infiltration gallery that runs the length of the street allow up to 16 acre-feet of water to recharge groundwater supplies annually. These BMPs, along with rainbarrels, trench drains, and permeable pavers on private property, improve the street's performance and aesthetic qualities, and serve as a demonstration project for both residents and policy makers.

Sustainable Features

- The underground infiltration gallery below Elmer Avenue is capable of capturing 750,000 gallons of runoff.
- Modified curbs and gutters direct runoff to 24 bio-swales that collectively are capable of capturing and treating 115,000 gallons of runoff and add 1,728 sf of planted areas to the neighborhood. While the majority of infiltration occurs through the underground infiltration gallery, the bioswales provide an important visual demonstration of stormwater capture in an arid environment. They dramatically fill during rain events, after appearing dry the majority of the year.
- Bioswales are planted with drought tolerant native and Mediterranean plants, which require minimal irrigation once established, and a mulch layer to reduce evaporation.
- Adjacent to the sidewalks, 23 native trees were planted, along with southern California native and climate appropriate plants.

Designer
Stivers & Associates, Inc.

Land Use
Retrofit
Residential

Project Type
Streetscape
Stormwater management facility

Location
7700 Block of Elmer Avenue
Los Angeles, California 91352

Size
4 acres (street and residential lots along one city block), but captures stormwater from a 40-acre area

Budget
~$2.7 million - Total; ~$1.8 million - Total construction; $200,000 - Landscape construction on private property; $200,000 - Construction of landscape elements in public right-of-way

Completion Date
2010

- 13 of the street's 24 homeowners opted to replace their traditional front yards with new "California-friendly" landscapes.
- Smart meters, 13 rain barrels (each with a 55-gallon capacity to capture roof run-off for reuse), and 6,000 feet of high-efficiency drip irrigation were installed at the participating private residences.
- Permeable paving surfaces, including 63 sf of permeable concrete and 1,560 sf of permeable pavers, were installed.
- Five solar-powered LED street lights collectively save 1,730 kW of power annually.

Challenge

Los Angeles faces considerable water supply challenges, relying heavily on imported water and having significantly reduced many of its local groundwater aquifers. To explore the safety and viability of using decentralized stormwater management and infiltration strategies to recharge groundwater supplies, the Council for Watershed Health initiated the Los Angeles Basin Water Augmentation Study (WAS) in 2000. The first two phases of the WAS assessed the impact of stormwater infiltration on groundwater quality and found no significant negative impacts. The goal of Phase III was to was to build a demonstration project by retrofitting an existing residential street with state-of-the-art BMPs and monitoring its stormwater performance. The project had to fit seamlessly into the neighborhood and meet the objectives of multiple stakeholders, including residents, the Council for Watershed Health, and the City of L.A. Other challenges included finding a qualified contractor who could work with City contractors and install the various landscape conservation features, training homeowners in landscape maintenance, and monitoring of the project's performance.

Solution

Elmer Avenue was selected for the demonstration project because it fit various criteria: infrastructure improvements were needed, the soil type was conducive for infiltration, and there was political interest and support for the project in this area. The design team spent considerable time understanding the existing landscape uses, maintenance regime, vegetation, and themes, so that the final design would meet community needs and create a sense of place. Six community meetings were held in English and Spanish where residents gave input and were involved with design decisions. Volunteer events, maintenance manuals and training encouraged neighborhood participation and project ownership. With support from the City of Los Angeles, WAS partners, and local universities, the Council for Watershed Health is implementing a monitoring program to measure performance and gauge success.

Cost Comparison

- Construction of the Elmer Avenue retrofit cost $1.8 million, compared with an estimated $1.2 million minimum to install a traditional storm drain system that would connect the 40-acre watershed to the larger Los Angeles stormwater network. Though the two approaches are fairly comparable in price, the "green street" approach improves surface water quality and recharges groundwater, while a traditional conveyance system would not.

Lessons Learned

- When a project involves an extensive number of city departments and stakeholders, additional time should be built into the proces for upfront planning and design coordination.
- For projects where participation is solicited to install features on private property, project organizers should have a plan for those that don't buy in on the project initially but come around after they see results.
- The design of stormwater management systems should be site specific. Standard plans will not always be the optimal way to meet the objectives of all stakeholders.
- The bioswales are collecting more sediment and trash than anticipated, increasing maintenance needs, which are the responsibility of the adjacent homeowners. There is a need to explore alternative approaches or acquire more long-term funds for maintenance, so that homeowners are not solely responsible.
- More models for critique should be developed so that new techniques can be tried and tested.

Project Team

Project Management: Council of Watershed Health
Community Engagement and PM Support: TreePeople, Urban Semillas
Landscape Architect: Stivers & Associates, Inc., Wilson Environmental Design, City of Los Angeles Bureau of Street Services
Civil Engineering, Stormwater and Street Design: City of Los Angeles Bureau of Sanitation and Bureau of Street Services, Amec Geomatrix
Public ROW Contractor: City of Los Angeles Bureau of Street Services
Private Property Contractor: Pierre Landscaping

Role of the Landscape Architect

Served as designers and planners, meeting the needs of multiple agencies, departments, and homeowners. Actively studied and observed the vernacular landscape of the neighborhood and inventoried existing conditions. Provided construction oversight, observation, reporting, created the maintenance manual and helped educate residents.

Case Study Prepared by:
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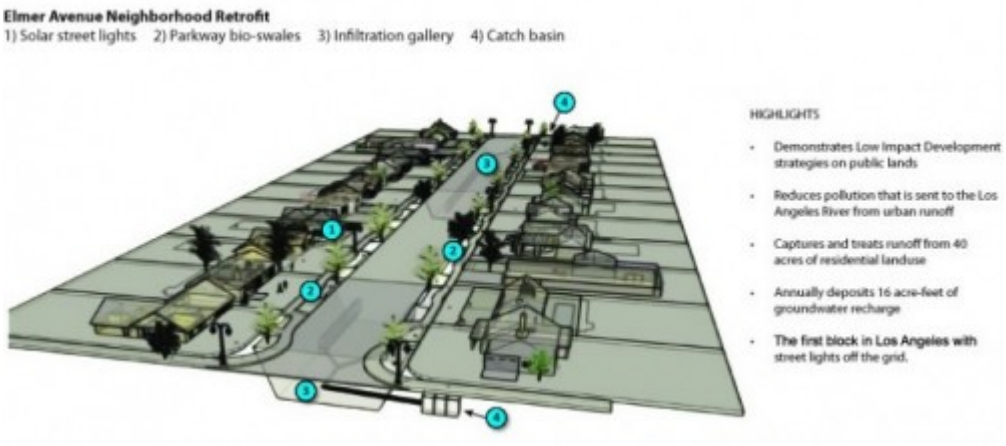
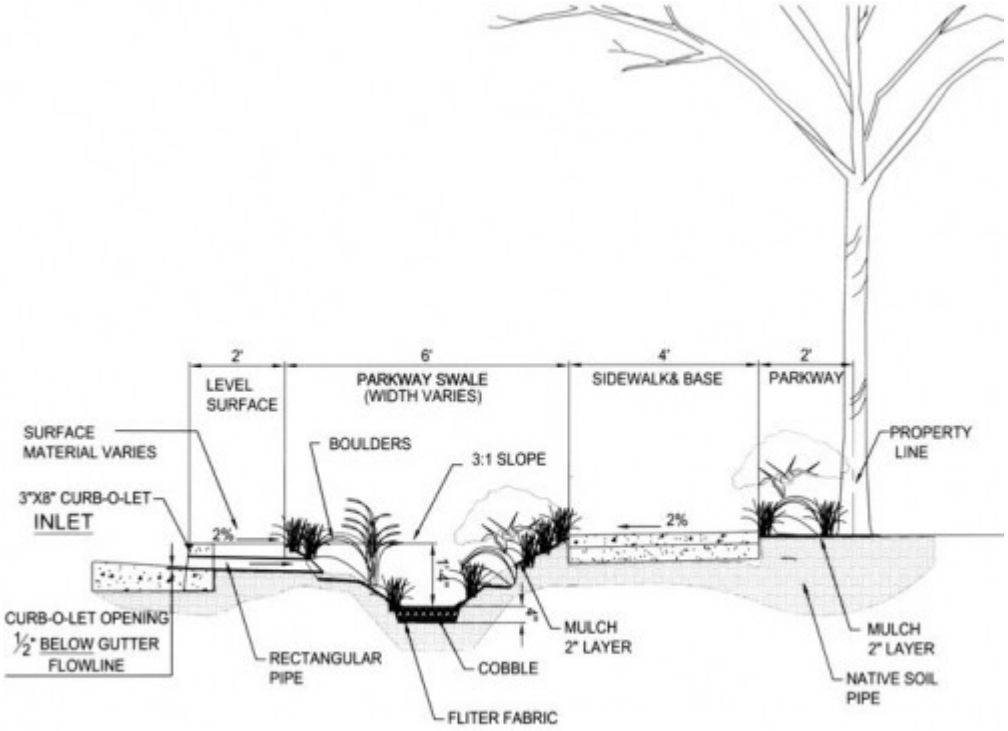
References & Resources

Council of Watershed Health - Elmer Ave Retrofit
California Stormwater Quality Association (CASQA) Outstanding Stormwater BMP Implementation Project Award
County of Los Angeles Green Leadership Award
Featured in "Practice Makes Pervious", Landscape Architecture Magazine, July, 2011

Additional Images





SECTION: PARKWAY SWALE

SCALE: 1/2" = 1'-0"