Fernwood Water Improvement Park

Project Physical Benefits

With the construction of the I-105 freeway the city's drainage patterns and hydrology were forever altered and changed. The freeway reduced the permeable area and increased the volume of storm water run-off draining onto the city's streets. The freeway alignment resulted in the closure and re-alignment of several city streets. These re-alignments and closures changed the original drainage design and resulted in flooding of streets and areas that did not experience flooding in the past.

Around 2011 Caltrans installed interceptors on the embankments and removed the existing vegetation. This resulted in increase flows from the I-105 freeway onto Fernwood Avenue and surrounding streets. This increased storm water run-off resulted in severe flooding of the city's streets. The streets look like rivers with depths anywhere from 2-7 inches. Residents complain about the flooding situation and city documented the flooding. The area and streets bounded by Fernwood Avenue, California Avenue, Platt Avenue and Birch Street experience severe flooding. This flooding greatly impacts traffic both vehicular and pedestrian since both California Avenue and Fernwood Avenue are collectors. The intersection of Spruce Street/Fir Street floods north to Lugo Avenue and south to the intersection at Josephine Street, another collector. This is a concern since is located adjacent to Josephine Street and Fir Street is Wilson Elementary. The intersections of Fernwood Avenue and Ernestine Avenue, Gertrude Drive and Harris Avenue flood north to Cortland Avenue and as far south as Agnes Avenue, another collector. The area where these streets are located is about 230 acres and four collectors are impacted. At the end of the storm event, city crews are sent out to remove mud, debris and gravel from Fernwood Avenue between Atlantic Avenue to Long Beach Boulevard and the side streets to keep them open.

In addition to flooding concerns the storm water run-off carries sediments, metals and hydrocarbons through the storm drainage system which does not help comply with the MS-4 storm water requirements. The Fernwood Water Improvement Project is a multi-benefit project that serves disadvantaged communities in the City of Lynwood while meeting IRWMP water management objectives. The project site is currently an empty 5.25-acre lot owned by the City of Lynwood located on a long stretch along Fernwood Ave., between Atlantic Ave. and Long Beach Blvd. and will feature storm water improvement elements such as infiltration areas and bioswales. The project also includes native landscape that will increase habitat for birds, butterfly species and mammals.

The project site drains primarily to the Los Angeles River, which serves as a major flood control channel for the Region. Since the project will increase storage and infiltration capacity at the site, it is expected to reduce flows to the Los Angeles River and therefore enhance the capacity of this water body to provide flood protection. The project site will capture runoff and storm water that primarily drains to the Los Angeles River from the I-105 freeway and will improve storm water quality to help the region meet requirements under the Municipal Separate Storm Sewer System Permit.

The project is expected to improve water quality originating from water that drains from the I-105 Freeway. Stormwater runoff from these areas typically contain metals, nutrients and bacteria, all of which are constituents that may be mitigated by the treatment features that will be included in the project design (i.e. biofiltration and infiltration).

In addition the proposed project will also assist in reducing area flooding along Fernwood Avenue. Based on hydrology calculation and assuming 6 storms per year the average amount of storm water that will be captured and reused through infiltration is 2.875 million gallons per year or about 8.84 acre foot per year based on six storm events. Without this project the 2.875 million gallons of stormwater run-off would end up flooding the street and carrying pollutants into the storm drainage system. Therefore without the project the problem will persist.

The City of Lynwood proposes to develop a multi-benefit water improvement project in conjunction with development of a new Lynwood Walking Park along Fernwood Avenue between Atlantic Avenue and Birch Street in the City of Lynwood. This project would convert a decorative bioswale amenity feature into a bioswale/infiltration system designed to capture and infiltrate, bioretain, or biofilter the discharges from eight Caltrans I-105 storm drains that discharge across the 5.25-acre park site, picking up sediment and discharging much of the stormwater with its load of sediment and pollutants, including metals, from the I-105 into Fernwood Avenue, causing local flooding conditions and the discharge of polluted stormwater into Los Angeles County catch basins in the City and to Reach 2 of the Los Angeles River and the Compton Creek tributary of Reach 1 of the Los Angeles River through the County storm drain system. Compton Creek and the Los Angeles River are both subject to multiple total maximum daily loads (TMDLs), including the Los Angeles River Metals TMDLs. The proposed bioswale/infiltration basin system is designed to include 3,502 linear feet of bioswale and infiltration basins with an average width of eleven feet and a variable depth of 13” to 55” depending on the potential volume of water discharging from I-105 and site constraints. The upper 12” will be a soil matrix for planting. This will be underlain by filter fabric and a variable depth of gravel to provide storage space to promote infiltration. The system is designed to capture and infiltrate or evapo-transpirate a two-hour storm event without any discharge. Thus, except for large storm events, it will prevent the discharge of pollutants in highway runoff to the Los Angeles River, prevent localized flooding, and provide a visual amenity for the Walking Park.

The project objective is to construct a bioswale/infiltration basin water capture system capable of capturing and infiltrating or retaining a sufficient amount of water discharging from eight Caltrans integration drains discharging stormwater from I-105 in order to greatly reduce or eliminate damage to a future park site and flooding on Fernwood Avenue, a cross-town collector street.

Physical benefits for this project include the following:

- Reduce flooding risk
- Improve street safety
- Improve pedestrian safety
- Improve driver safety
- Improve storm water compliance
- Recharge ground water

Annual Physical Benefits

Table 9: Annual Project Physical Benefits.

Name: Gateway Integrated Multi-Benefit Regional Water Management Project – Fernwood Water Improvement Park
Type of Benefit Claimed: Water reduction/conservation
Measure of Benefit Claimed (Name of Units): Acre-Feet of potable water savings.

Physical Benefits			
Year	**Potable Water Savings (Reduced Imported Water) (Acre-Feet) Without Project**	**Potable Water Savings (Reduced Imported Water) (Acre-Feet) With Project**	**Change Resulting from Project Acre-Feet Imported/Groundwater Saved Per Year**
2014	0	8.84	8.84
2015	0	8.84	8.84
2016	0	8.84	8.84

Long Beach Graywater Program

Project Physical Benefits

The Gateway Water Management Authority (GWMA) is proposing a continuation of the "Laundry to Landscape" program that converts graywater to irrigation water. This project will be in the Disadvantage Community section of the City of Long Beach. In this proposal, graywater from 99 homes and 9 multi-unit residential with an expected total of 108 single family residential homes will be diverted from the City's sewer and Sanitation Districts' sewerage treatment plant and redirected for use in local landscaping.

Wastewater from residential dwelling units can generally be classified into two categories, blackwater and graywater. Blackwater is the water from toilets and is highly laden with bacteria and can pose a significant hazard if the public is exposed to contact. Under this proposal, the disposal of backwater will be unchanged and it will continue to be discharged to the City's sanitary sewer system for treatment at the Los Angeles County Sanitation District's sewerage treatment plant.

Graywater is generated from laundries, showers, and bathtubs, which while still subject to higher levels of bacteria than potable water, has significantly less bacteria than black water. Graywater can also contain surfactants (soaps), small food particles that plants can use as nutrients, and other potential pollutants resulting from rinse day-to-day household products.

The potential environmental benefits of the graywater program include:

- Reduced fresh water extraction from rivers and aquifers and reduced reliance on Delta Water
- Improvements to topsoil without the need for purchase and transportation of soil amendments
- Reduced energy use and chemical use at treatment
- Increased plant growth
- Some degree of aquifer recharge, but significant recharge will not be realized until more graywater projects are completed
- Top layers of soil act as a nature filter in the purification process during aquifer recharge
- In Southern California where available water supplies are limited, especially in view of a rapidly growing population, a strong imperative exists for adoption of alternative water technologies

The Los Angeles River and the San Gabriel River are the downstream receiving water bodies, which receive the treated black water and gray water from the sewerage treatment plants. Removal of the soap and nutrient laden wastewater effluent from the current treatment process will improve the existing beneficial uses of the waterbodies.

The Beneficial Uses of inland surface waters include: REC-1 (swimmable), WARM (warm freshwater habitat), COLD (cold freshwater habitat), SAL (inland saline water ecosystems), or COMM (fishable), reflecting the goals of the federal Clean Water Act. In addition, inland waters are usually designated as REC-2 (non-contact water) which include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.

The Region includes bays, estuaries, lagoons, harbors, beaches, and ocean waters. Beneficial uses for these coastal waters provide habitat for marine life and are used extensively for recreation, boating, shipping, and commercial and sport fishing

Alternatives for Addressing Water Quality Objectives

The water quality objective of this project is to create a recycling solution to address conservation issues. There are alternate recycling approaches; however, any recycling program could be incorporated in conjunction to this project rather than in replacement. An alternate to recycling would be to continue discharging the graywater produced as waste.

Annual Physical Benefits

This project will save approximately 2.1 acre feet per year (AFY) of recycled water (based on average of 130 gallons saved per week per installation) which would otherwise be diverted to a treatment plant and then discharged as effluent into a local waterbody (see Table 10).

Table 10: Annual Project Physical Benefits – Potable Water.

Name: Gateway Integrated Multi-Benefit Regional Water Management Project – Long Beach Graywater
Type of Benefit Claimed: Reduction potable water demand
Measure of Benefit Claimed (Name of Units): Acre-Feet of potable water savings.

Physical Benefits			
Year	**Potable Water Savings (Reduced Imported Water) (Acre-Feet) Without Project**	**Potable Water Savings (Reduced Imported Water) (Acre-Feet) With Project**	**Change Resulting from Project Acre-Feet Imported/Groundwater Saved Per Year**
2014	0	2.1	2.1
2015	0	2.1	2.1
2016	0	2.1	2.1

With an annual Project benefit of 2.1 AFY, the greenhouse gas emissions would be reduced by an estimated 3 metric tons, as CO2eq (see

Table 11). This calculation is based on the amount of energy needed to pump 2.1 AFY of imported water over the Tehachapi Mountains and into Southern California.

Greenhouse gas (GHG) valuation is based on 2013 Reserve Price Notices published by the California Environmental Protection Agency Air Resources Board (ARB) as part of the State's Cap-and-Trade Program. The program is a central element of California's Global Warming Solutions Act (AB 32) and covers major sources of GHG emissions in the State such as refineries, power plants, industrial facilities, and transportation fuels. The regulation includes an enforceable GHG cap that will decline over time. ARB will distribute allowances, which are tradable permits, equal to the emission allowed under the cap. Not only do ARB auctions generally curtail the production of GHGs, but they also raise substantial funds for the State.[13]

[13] Los Angeles Times, "California's First Carbon-Credit Auction Raises $290 Million," November 20, 2012.

Table 11: Annual Project Physical Benefits – Greenhouse Gas Emissions.

Name: Gateway Integrated Multi-Benefit Regional Water Management Project – Long Beach Graywater
Type of Benefit Claimed: Reduction of greenhouse gas emissions.
Measure of Benefit Claimed (Name of Units): Metric Tons of reduced greenhouse gas emissions.

Physical Benefits

Year	Reduced Greenhouse Gas Emissions (Metric Tons) Without Project	Reduced Greenhouse Gas Emissions (Metric Tons) With Project	Change Resulting from Project Greenhouse Gas Emissions In Metric Tons Reduced Per Year
2014	0	3	3
2015	0	3	3
2016	0	3	3