



PROPOSITION 84 Stormwater Grant Program Final Report

Multi-Agency/Multi-Watershed Project to Incorporate Low Impact
Development (LID) Best Management Practices (BMPs) Into Major
Transportation Corridors

Los Angeles River, Los Cerritos Channel, and San Gabriel River

Agreement No. 14-443-550

May 31, 2017

Participating Agencies of the Proposition 84 Grant:

City of Bell Gardens

City of Downey

City of Lynwood

City of Norwalk

City of Paramount

City of Pico Rivera

City of Santa Fe Springs

City of Signal Hill

City of South Gate

City of Vernon

City of Whittier

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I. Executive Summary

On December 4, 2014, the Gateway Watershed Management Authority (GWMA) was awarded a Grant by the State Water Resources Control Board to implement Low Impact Development (LID) BMPs along major transportation corridors. This grant was for the installation of 43 LID BMPs in 11 different cities, which include 20 bioretention tree wells, 1 bioswale, and 22 tree box filters. The installation of these stormwater treatment systems were expected to decrease the loading of metals at multiple sites along the Los Angeles River, San Gabriel River, and Los Cerritos Channel, and their tributaries. All participating cities are members of the GWMA. The awarded grant amount was approximately \$1.34 million; 80% was provided by the State in the amount of \$1.073 million, and 20% in matching funds.

Different types of LID BMPs were implemented in order to evaluate the effectiveness of the various systems. The proposed location of each BMP was chosen based on traffic volume, tributary area, and pollutant concentration. After locations were chosen, each BMP site was marked for underground alert in order to confirm the locations were free of utilities. Construction commenced simultaneously as BMP locations were verified. Additionally, The Monitoring and Reporting Plan required 4 specific locations to be sampled. Samples were taken at the inflow and outflow of the BMPs to assess overall treatment effectiveness, and aggregated results were analyzed for total pollutant load reduction.

Challenges arose during each phase of the grant. One example was the permitting process for construction. The tree box filters, require connection to an existing catch basin in order to discharge treated runoff and overflow. A total of 22 catch basins were established for connection; however, several of these catch basin were owned and maintained by the Los Angeles County Flood Control District (LACFCD). In order to connect to a county-owned catch basin, each respective agency applied for Flood Control Permits. The permit application process took approximately 18 months to approve all proposed locations.

Due to the technicality of the project, several issues arose that resulted in construction and monitoring delays. A total of 11 agencies and 8 subcontractors participated in the grant efforts. Coordination of grant tasks proved challenging among participating parties, where each agency determined the precise location of BMPs in their jurisdiction. For a location to be viable, the proposed site must include the following: 1) the location must be free of utility lines; 2) placement of the BMP must not obstruct the pedestrian right-of-way or impede vehicular traffic; 3) the location must have sufficient space to accommodate its dimensions; 4) the BMP must be located on a transportation corridor to intercept high concentrations of metals

pollution; and 5) the tree box filter BMP must be in the vicinity of a catch basin to allow the BMP to connect to it.

Despite underground alert efforts, utility lines were discovered during the excavation phase which prolonged the construction of the BMPs. In the event an unforeseen line was discovered, each agency had to conclude whether the line was abandoned, must be relocated, or halt all construction activities and find an alternate location. The City of Lynwood discovered a utility line during the excavation phase of one of their tree box filters, which interrupted the construction process.

As the construction of individual BMPs were completed, selected LID BMPs were monitored for pollutant load reduction and overall effectiveness. Due to the delay in construction and variations in precipitation activity, only two types of LID BMPs were sampled: the bioswale in the City of Downey and the bioretention tree wells in the City of Whittier. The monitoring and reporting phase of the project was intended to take place once all 43 LID BMPs were constructed. Due to the number of conflicts in implementing the project, the monitoring phase and the construction phase progressed simultaneously.

A total of 4 sampling events took place at the bioswale in the City of Downey, and a total of 2 sampling events occurred at the bioretention tree wells in the City of Whittier. The bioswale located on Firestone Boulevard performed well in the sampling event that was conducted on January 9, 2017. The results showed significant reductions in copper, lead, and zinc. There was an 83% removal in copper, 64% removal in lead, and a 30% removal in zinc during the first sampling event.

The bioretention tree wells on Milton Avenue showed a reduction in copper, lead, and zinc. One inflow point and two outflow points were sampled for the rain event that occurred on January 19, 2017. The inflow sampling point was located at 7751 Milton Avenue and the two outflow points were located at 7751 and 7913 Milton Avenue. There was a 7% removal in copper concentration and 3% removal in lead concentration. Although lead and copper demonstrated reductions in pollutant concentration, zinc deviated from the expected results and an increase in concentration was exhibited. The increase in contamination levels from the outflow point at 7913 Milton Avenue could be a result of runoff potentially collecting additional pollutants between the two tree well sampling points. Additionally, this area may contain a higher concentration of pollutants, specifically between the two bioretention tree well locations. The increased concentration from the outflow point at 7751 Milton Avenue could be a result of inundation from high flows. All flows bypassing the system may have caused fluctuations in pollutant removal.

A total of 41 out of 43 LID BMPs have been installed, which include 20 bioretention tree wells, 1 bioswale, and 20 tree box filters. The final quarterly report and invoice will be submitted to the State on July 31, 2017. All water quality data obtained through the implementation of the MP will be uploaded to the California Environmental Data Exchange Network (CEDEN) prior to the submittal of the final invoice. The final project summary will also be submitted to the State before the final invoice. All final approved documents will be uploaded to the Financial Assistance Application Submittal Tool (FAAST). All work will be completed by June 30, 2017.

II. Problem Statement & Relevant Issues

Runoff from the project areas have historically been discharged untreated, into the waterbodies within the Los Angeles River, San Gabriel River, and Los Cerritos Channel watersheds. All three watersheds are subject to numerous TMDLs. Transportation corridors are recognized as one of the leading sources in the contribution to metals pollution. Metals and bacteria are pollutants of the highest priority in these watersheds. Metals and bacteria contribute to water quality contamination, and threaten the beneficial uses of receiving water bodies. A reduction in the loading of these pollutants into receiving water bodies will improve water quality and protected beneficial uses. Specifically, the focus of this project was to reduce metal concentrations in stormwater runoff.

There are currently seven active TMDLs within these watersheds: the Los Angeles River and Tributaries Metals TMDL, the Los Angeles River Trash TMDL, the Los Angeles River Nitrogen Compounds and Related Effects TMDL, the Los Angeles River Watershed Bacteria TMDL, the Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters Toxic Pollutants TMDL, the San Gabriel River and Impaired Tributaries Metals and Selenium TMDL, and the Los Cerritos Channel Metals TMDL. In addition, each of these cities is subject to the Los Angeles County Municipal Separate Storm Sewer System Permit (“MS4 Permit” Order No. R4-2012-0175).

The Los Angeles County Department of Public Works (LADPW) has collected over 10 years of monitoring data in the Los Angeles River, Coyote Creek, and the San Gabriel River. Roughly 35-50% of wet weather samples in the Los Angeles River, 30% of wet weather samples in Coyote Creek, and 10-40% of wet weather samples in San Gabriel River exhibited high concentrations of copper, lead, and zinc for California Toxics Rule objectives between 2002 and 2012¹.

Relevant 303(d) listings for metals in each watershed are identified below:

Los Angeles River and Tributaries (Rio Hondo, Compton Creek)

Reach 1 of the Los Angeles River, is listed on the State 303(d) list for copper, lead, and zinc.

Reach 2 of the Los Angeles River is listed for copper and lead.

Compton Creek is listed for copper, and lead. The Rio Hondo is listed for copper, lead, and zinc.

¹ Data collected from the Los Cerritos Channel Metals TMDL. Retrieved online at http://www.waterboards.ca.gov/rwqcb4/water_issues/programs/tmdl/Established/Los%20Cerritos%20Channel%20Metals%20TMDL/03-18-10LosCerritosChannel-metalsTMDLs.pdf.

Lower San Gabriel River and Tributaries (Coyote Creek)

Reach 2 of the San Gabriel River is listed for lead. Coyote Creek is listed for copper, lead, and zinc.

Los Cerritos Channel

The Los Cerritos Channel is listed for copper, lead, and zinc.

A summary of the impaired water bodies and the beneficial uses being threatened by pollutant loading are shown in Table II.1.

Table II.1. Beneficial Uses of Impaired Water Bodies

Impaired Water Body	Beneficial Uses
Los Angeles River	MUN, IND, GWR, REC-1, REC-2, WARM, WILD, WET
Rio Hondo	MUN, GWR, REC-1, REC-2, WARM, WILD, RARE, WET
Compton Creek	MUN, GWR, REC-1, REC-2, WARM, WILD, WET
San Gabriel River	MUN, IND, PROC, AGR, GWR, REC-1, REC-2, WARM, COLD, WILD, SPWN, WET
Los Cerritos Channel	MUN, REC-1, REC-2, WET, WILD
Coyote Creek	MUN, IND, PROC, REC-1, REC-2, WARM, WILD, RARE

III. Project Goals

Stormwater runoff typically sheet flows over paved roadways directly into the storm drain system, carrying with it associated pollutants such as metals. These pollutants are then discharged without treatment into the waterways and ocean. The objective of this project was to install LID BMPs, such as tree box filters, bioswales, and bioretention tree wells to treat stormwater runoff originating from paved roadways and highly urbanized areas.

The specific areas targeted are areas discharging in the Los Angeles River, San Gabriel River, and Los Cerritos Channel watersheds. By implementing different BMPs and monitoring the results of pollutant load reduction, the project can assess the effectiveness of different BMPs. Some agencies constructed one single type of BMP, whereas other agencies have implemented a combination of types of BMPs. For example, the City of Downey has installed a bioswale on a highly-trafficked street, whereas the tree box filters are situated throughout different parts of the City. The City of Lynwood installed 3 tree box filters and 10 bioretention tree wells. The City of Whittier has installed 10 bioretention tree wells in succession along the same streets, such that runoff flows through a sequence of BMPs for optimal treatment.

IV. Project Description

The GWMA was awarded a Grant by the State Water Resources Control Board for the purpose of implementing LID BMPs that will decrease the loading of metals into the Los Angeles River, San Gabriel River, and Los Cerritos Channel, and their tributaries. The grant was awarded in the amount of \$1,073,820 to the eleven cities of the GWMA. The Agreement term began on October 1, 2014 with the completion of work by June 30, 2017.

The tasks and associates deliverables in Table IV.1 were implemented to address the water quality impairments for metals in the Los Angeles River, Los Cerritos Channel, and San Gabriel River Watersheds:

Table IV.1: Project Tasks and Deliverables

Administration			
No.	Grant Agreement Item No.	Task	Deliverables
1.1	G.1	Progress Reports	Progress Reports
1.2	G.4 & G.5	Draft and Final Project Reports	Draft and Final Report submitted to the State Water Quality Control Board
1.3	B.1.2	Issue Public Hearing Notice for DAC Involvement	Public hearing notice inviting DAC community to participate in design and implementation of LID BMPs, public hearing
Planning, Design, Engineering, and Environmental			
No.		Task	Deliverables
2.1-2.2	B.2.1	Planning and Design	Finalize siting of all BMPs, design/select appropriately sized LID BMPs for location, develop individual site plans for each BMP location, engineering review for feasibility
2.3	A.4	Permitting	Local construction permits, LA County permits as necessary
2.4	A.3	Environmental Documentation	CEQA clearance

Construction Administration			
No.		Task	Deliverables
3.1	B.2.3	Construction Contracting	Select construction contract
3.2	B.2.3	Construction Administration	Award and execute construction contract

Construction/Implementation – Tree Box Filters			
No.		Task	Deliverables
3.4.1	B.3	Mobilization and Site Preparation	N/A
3.4.2	B.3	Excavation, Clearing and Grubbing	N/A
3.4.3	B.3	BMP Installation	N/A
3.4.4	B.3	Demobilization	N/A

Construction/Implementation – Bioretention tree box systems			
No.		Task	Deliverables
3.4.1	B.3	Mobilization and Site Preparation	N/A
3.4.2	B.3	Excavation, Clearing and Grubbing	N/A
3.4.3	B.3	BMP Installation	N/A
3.4.4	B.3	Landscaping	N/A
3.4.5	B.3	Demobilization	N/A

Monitoring/Performance			
No.		Task	Deliverables

4.1	A.2.1	Project Assessment and Evaluation Plan (PAEP)	Provide detailed/updated PAEP to the State Water Quality Control Board
4.2	A.2.2	Monitoring Plan Development	Provide detailed/updated Monitoring Plan to the State Water Quality Control Board
4.3	A.2.3	QAPP Development	Provide detailed/updated QAPP to the State Water Quality Control Board
4.4	B.4.1	Storm event monitoring	Conduct 2 water quality monitoring events during the first two storms post installation of the BMPs. Analyze samples collected from inflow and outflow of selected BMPs for copper, lead, and zinc. Prepare Monitoring Report, and conduct desktop calculation of load reductions.
4.5	B.4.2	Data Reporting	Submit Monitoring Report to State Water Quality Control Board
Education/Outreach			
No.		Task	Deliverables
5.1	B.5.1	Press Release in Local Media	Press Release in local media outlets
5.2	B.5.2	Community Event	Conduct one annual community event per watershed, and conduct associated informal survey to assess percentage increase in local stormwater awareness
5.3	B.5.4	Develop and Implement School Outreach	Develop outreach materials related to metals pollution in stormwater and distribute to local schools in each watershed. Coordinate with schools to attend community event.

Forty three (43) LID BMPs were installed throughout the Los Angeles River, San Gabriel River, and Los Cerritos Channel watersheds to treat stormwater runoff. The agencies associated with this Project have identified intersections along major transportation corridors that serve average daily traffic flows greater than 30,000² cars for installation of 7x7 tree box filters and a bioswale. In addition, 20 bioretention tree wells were installed along roadways that have high concentrations of metals. The BMP types, locations, anticipated treatment volumes, and receiving watersheds are listed in Table IV.2

Table IV.2: Final BMP Locations

Type of BMP	Jurisdiction	Location	Latitude	Longitude	Anticipated Treatment Volume	
Tree Box Filter	Bell Gardens	On the east side of Colmar Avenue, North of Gage Avenue	33.974901	-118.156926	7,258 sf	Los Angeles River
Tree Box Filter	Downey	At 12923 Barlin on the west side, north of Cheyenne Street	33.913909	-118.144007	29,032 cf	San Gabriel River & Los Cerritos Channel
Tree Box Filter	Downey	On the west side of Bixler Avenue, north of Prichard Street and east of Downey Avenue	33.908594	-118.151507		
Tree Box Filter	Downey	East side of Faust Avenue, north of Foster Rd	33.910055	-118.115066		
Tree Box Filter	Downey	On the east side of Pangborn Avenue, north of Firestone Boulevard	33.930655	-118.113725		

² Estimated traffic volume per the PAEP. Due to underground utility conflicts, actual number may vary.

Tree Box Filter	Lynwood	Fernwood Avenue at Santa Fe Springs Ave	33.928129	-118.229872	21,774 cf	Los Angeles River
Tree Box Filter	Lynwood	Northwest corner of Clark Street and Wright Road	33.910316	-118.186387		
Tree Box Filter	Lynwood	Southwest corner of Clark Street and Wright Road	33.910231	-118.186271		
Tree Box Filter	Norwalk	14335 Pioneer Blvd (west side) in front of Mail Services and Printing	33.900835	-118.082673	14,156 cf	San Gabriel River
Tree Box Filter	Norwalk	North side of Imperial Highway, west of Volunteer Avenue	33.917235	-118.068937		
Tree Box Filter	Paramount	On the west side of Colorado Avenue, North of Alondra Boulevard	33.889571	-118.161544	14,516 cf	Los Angeles River
Tree Box Filter	Paramount	On the west side of Vermont Avenue, north of Alondra Boulevard	33.889493	-118.162867		
Tree Box Filter	Pico Rivera	On the west side of Paramount Boulevard, north of Mines Avenue	33.995295	-118.094577	14,615 cf	

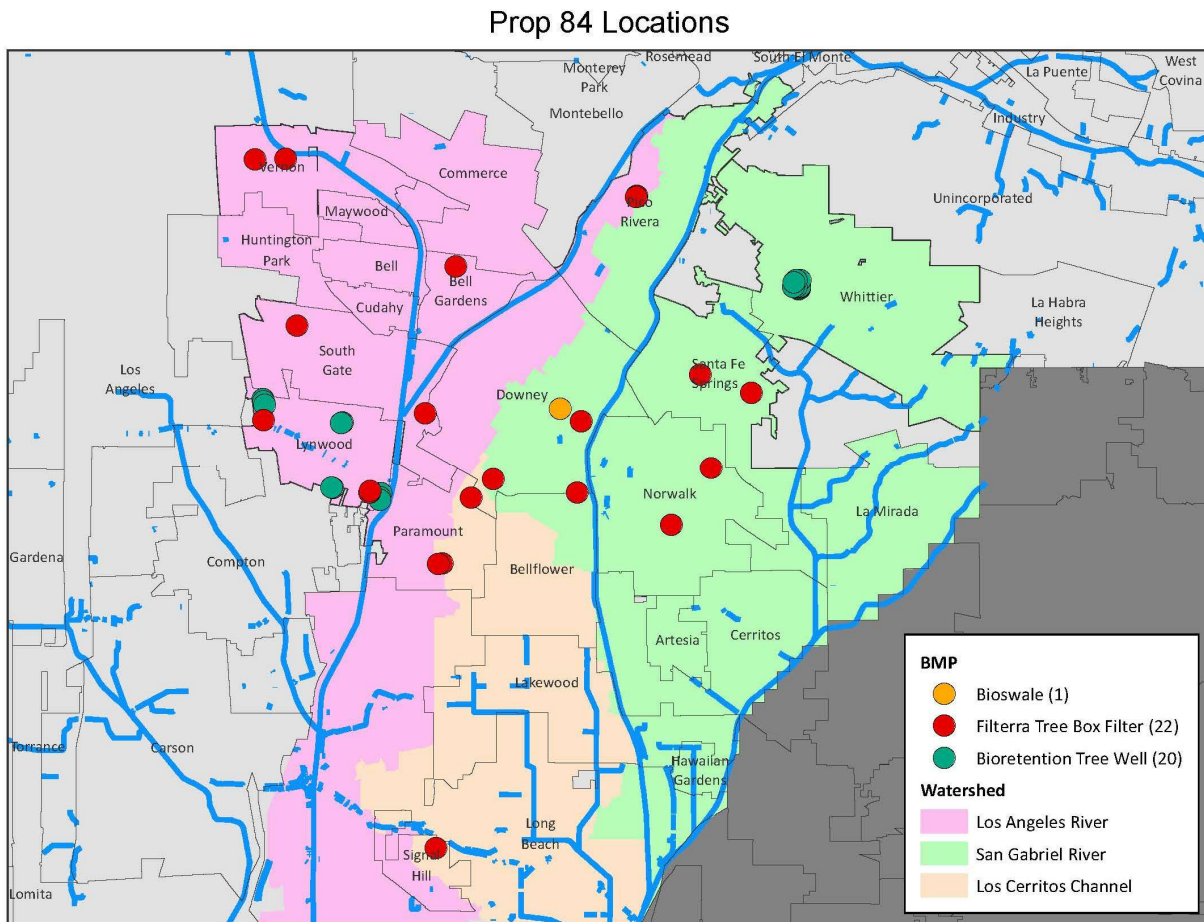
Tree Box Filter	Pico Rivera	On the east side of Paramount Boulevard, south of Mines Avenue	33.994970	-118.094927		Los Angeles River
Tree Box Filter	Santa Fe Springs	On the east side of Norwalk Boulevard south of Hawkins Street	33.944140	-118.072684	14,516 cf	San Gabriel River
Tree Box Filter	Santa Fe Springs	Shoemaker Ave north of Sandoval Street	33.933364	-118.063856		
Tree Box Filter	Signal Hill	Northwest corner of 28th Street and Junipero Avenue	33.808074	-118.163378	14,516 cf	Los Cerritos Channel
Tree Box Filter	Signal Hill	Southwest corner of 28th Street and Junipero Avenue	33.808000	-118.163381		
Tree Box Filter	South Gate	On the north side of Glady Street, west of Garfield Avenue	33.932919	-118.167281	14,156 cf	Los Angeles River
Tree Box Filter	South Gate	Northeast corner of State Street and Independence Avenue	33.958262	-118.211545		
Tree Box Filter	Vernon	On the north side of Vernon Avenue, east of Soto Street	34.005588	-118.215655	14,156 cf	Los Angeles River
Tree Box Filter	Vernon	North side of Vernon Avenue at 2685, east of the railroad tracks	34.005371	-118.226076		

Bioretention Tree Well	Lynwood	12308 Edgebrook Avenue	33.909770	-118.182648	5,870 cf	Los Angeles River
Bioretention Tree Well	Lynwood	12337 Edgebrook Avenue	33.908726	-118.182836		
Bioretention Tree Well	Lynwood	12501 Edgebrook Avenue	33.907931	-118.183040		
Bioretention Tree Well	Lynwood	11077 Eve Avenue	33.930298	-118.195790		
Bioretention Tree Well	Lynwood	3861 Lilita Street	33.930170	-118.196317		
Bioretention Tree Well	Lynwood	3965 Palm Avenue	33.911273	-118.199193		
Bioretention Tree Well	Lynwood	3957 Palm Avenue	33.911412	-118.199529		
Bioretention Tree Well	Lynwood	Santa Fe Avenue and East 108th Street in the City pocket park	33.936884	-118.223123		
Bioretention Tree Well	Lynwood	2719 109th Street	33.936265	-118.223046		

Bioretention Tree Well	Lynwood	2734 E 110th Street	33.935288	-118.222641		
Bioretention Tree Well	Whittier	7951 Comstock Avenue	33.968489	-118.038912	5,870 cf	San Gabriel River
Bioretention Tree Well	Whittier	7939 Comstock Avenue	33.968757	-118.038479		
Bioretention Tree Well	Whittier	7912 Comstock Avenue	33.969080	-118.038470		
Bioretention Tree Well	Whittier	7907 Comstock Avenue	33.969154	-118.038468		
Bioretention Tree Well	Whittier	7751 Comstock Avenue	33.971091	-118.038416		
Bioretention Tree Well	Whittier	7913 Milton Avenue	33.969151	-118.039599		
Bioretention Tree Well	Whittier	7751 Milton Avenue	33.971108	-118.039599		
Bioretention Tree Well	Whittier	7740 Milton Avenue	33.971229	-118.039599		
Bioretention Tree Well	Whittier	7921 Newlin Avenue	33.969128	-118.040699		
Bioretention Tree Well	Whittier	7748 Newlin Avenue	33.970424	-118.040580		

Bioswale	Downey	Along the north side of Firestone Boulevard between Woodruff Avenue and Lakewood Boulevard	33.933515	-118.119080	11,741	San Gabriel River
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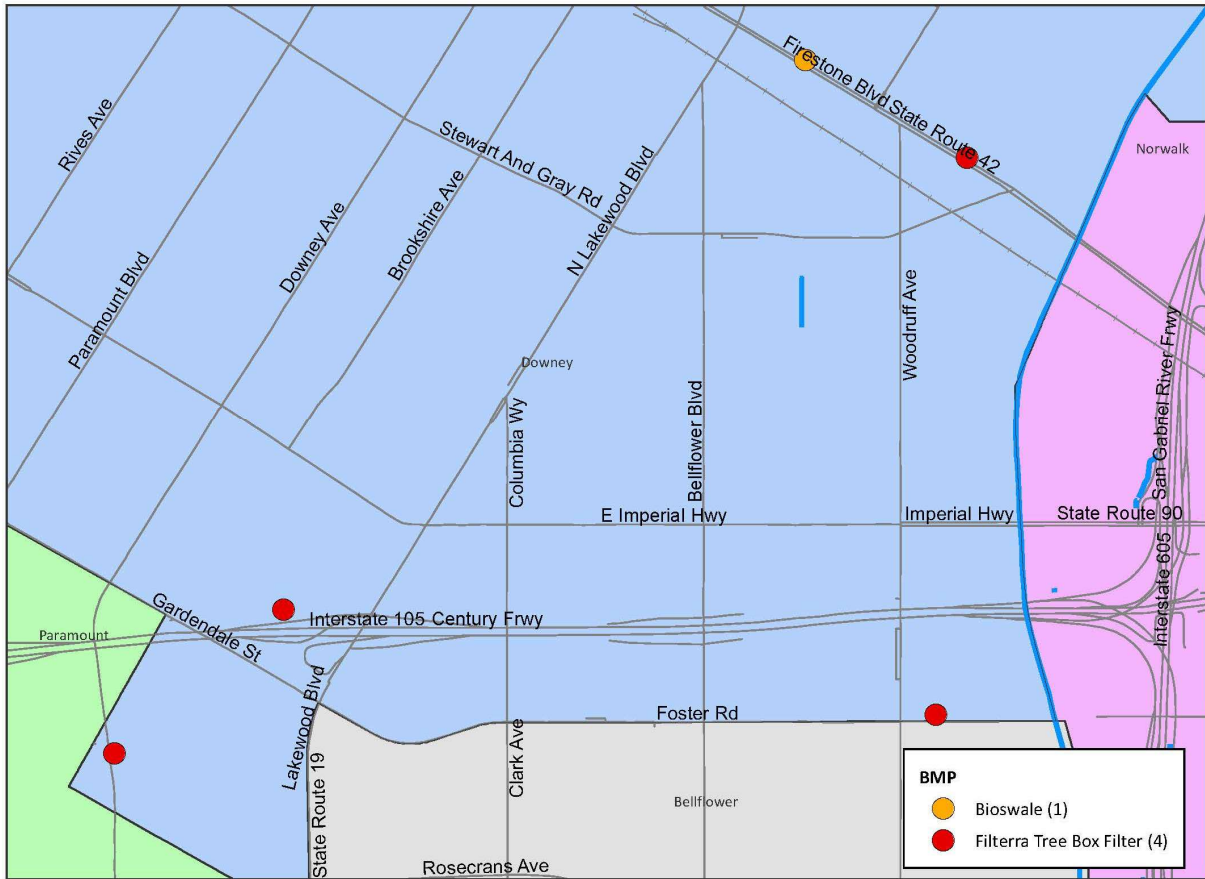
Figure IV.3: Prop 84 Locations



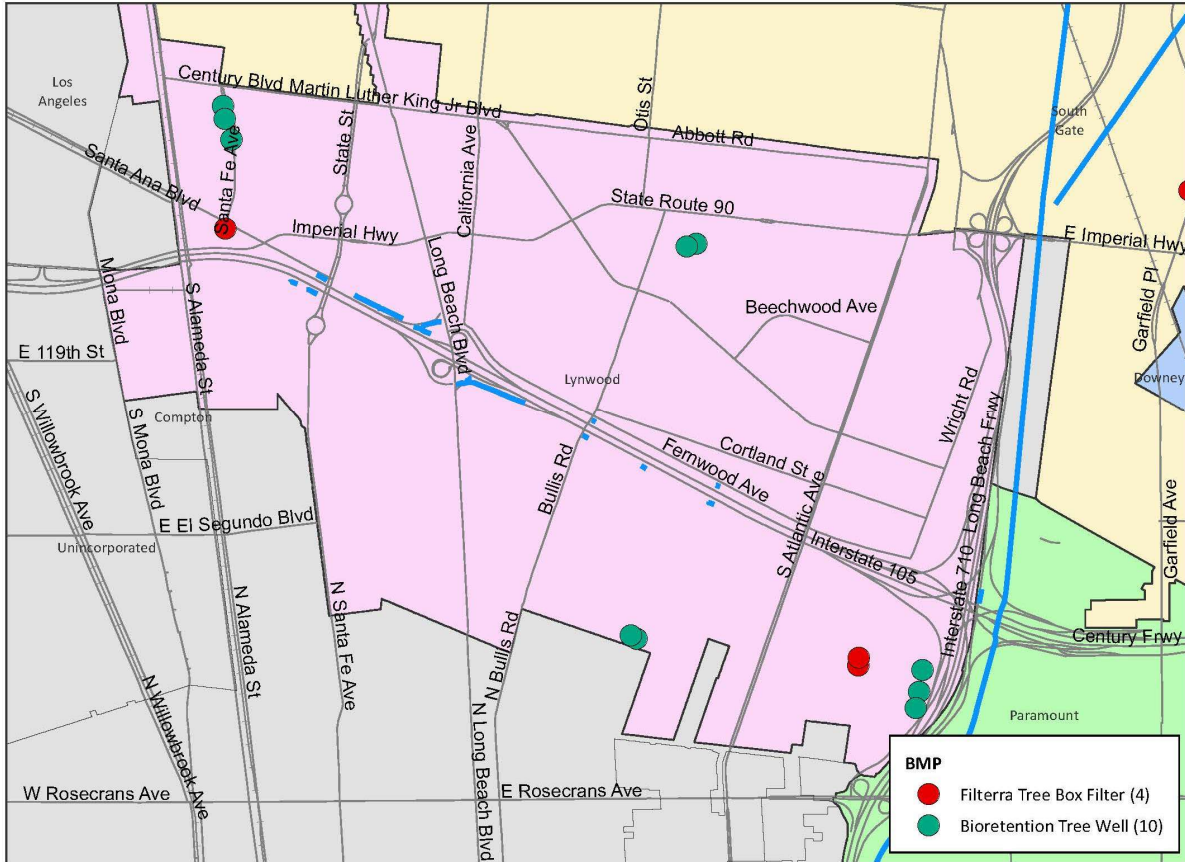
City of Bell Gardens



City of Downey



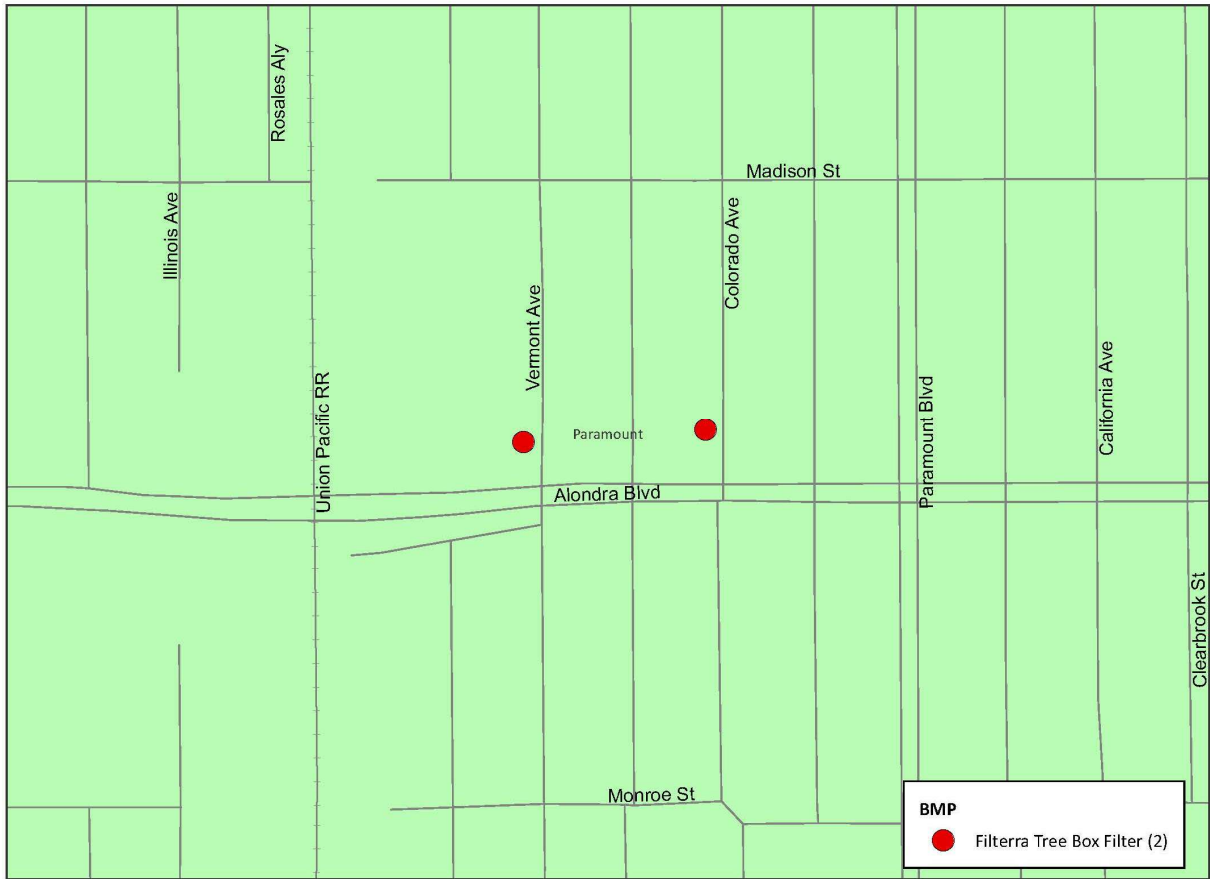
City of Lynwood



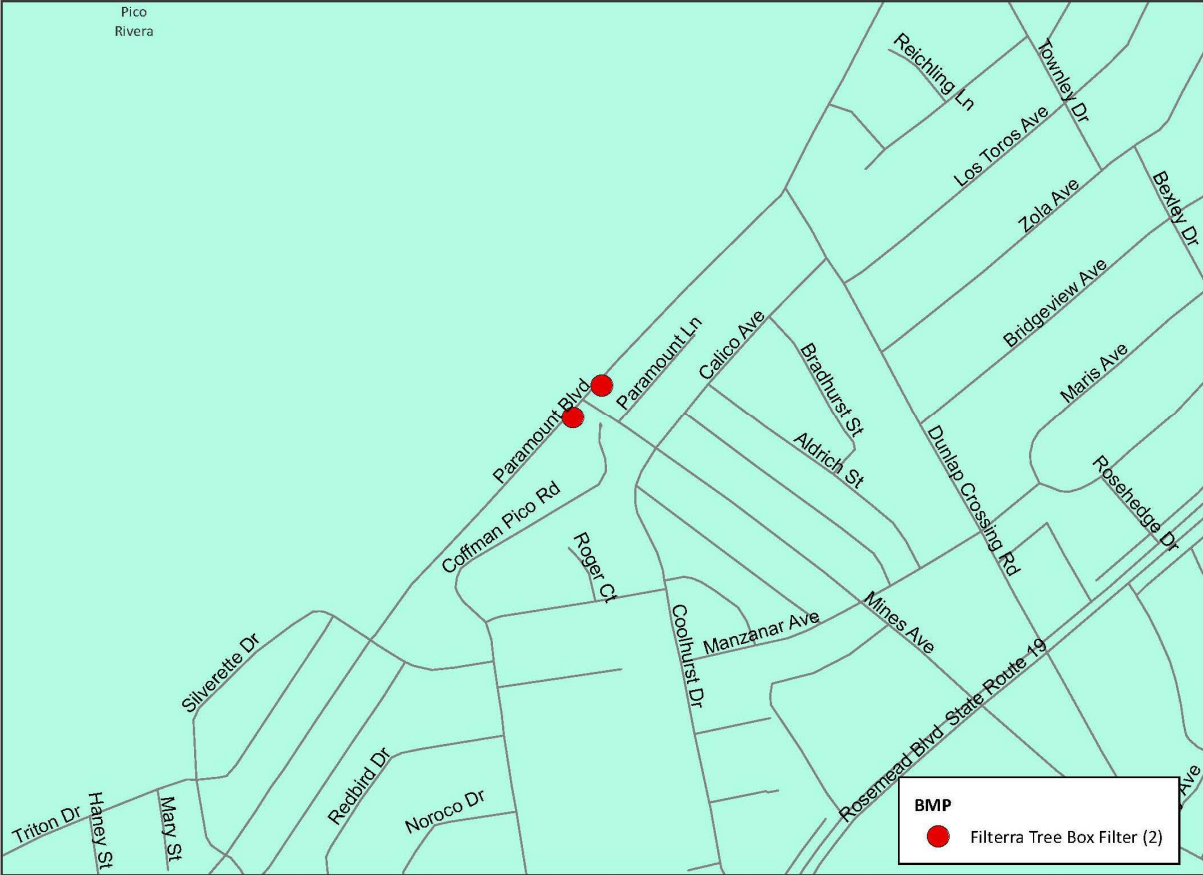
City of Norwalk



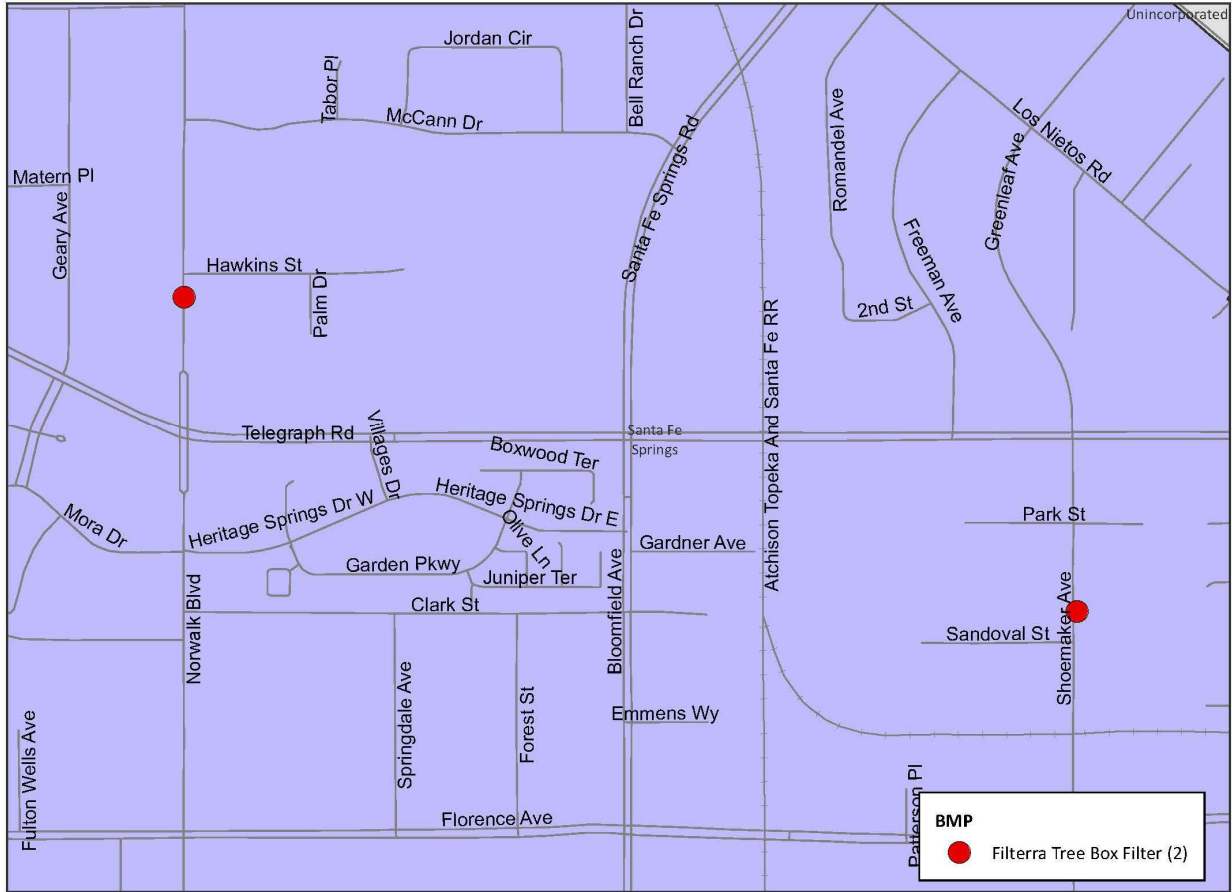
City of Paramount



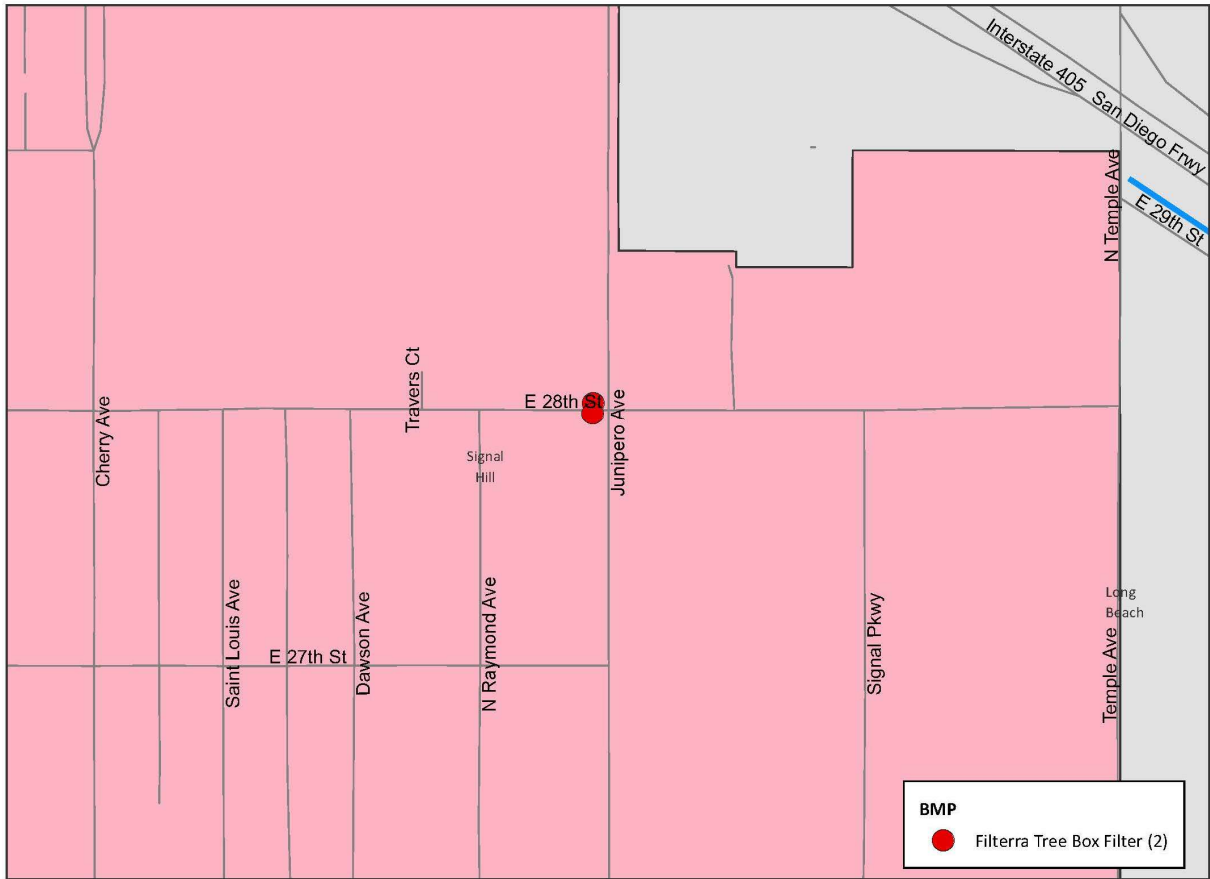
City of Pico Rivera



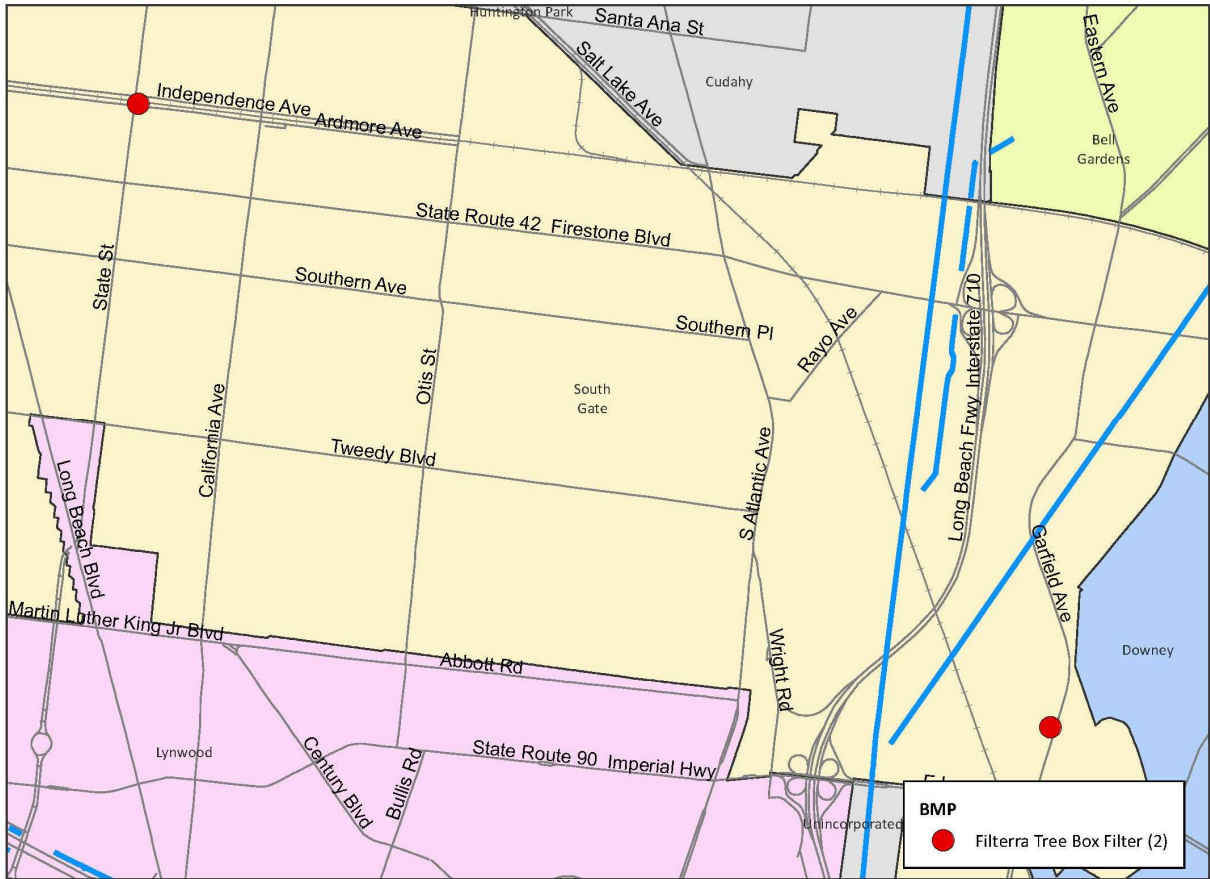
City of Santa Fe Springs



City of Signal Hill



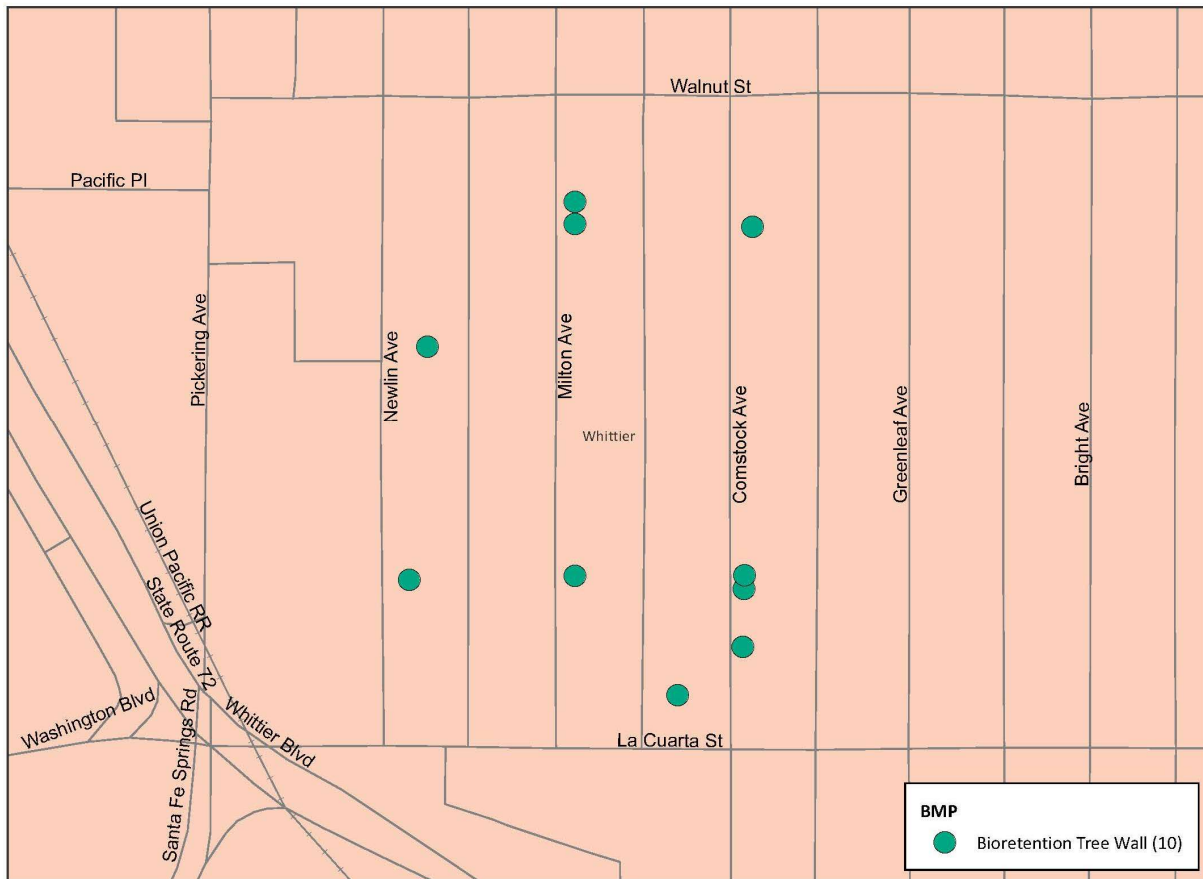
City of South Gate



City of Vernon



City of Whittier



Combined, these BMPs have the capacity to treat approximately 183,157 cubic feet of stormwater runoff from approximately 20 acres of high traffic transportation corridors. Approximately 2.13 acre-feet of stormwater will be treated in the Los Angeles River Watershed, 1.40 acre-feet in the San Gabriel River Watershed, and 0.67 acre-feet in the Los Cerritos Channel Watershed.

Biotreatment BMPs are known to have high removal efficiency of metals, total suspended solids (to which bacteria species often bind), and other pollutants³; therefore, this project has a significant impact on the presence of these pollutants within the associated watersheds. Table V.2 shows expected pollutant removal and associated load reduction for the BMPs.

³ LID Center. Low Impact Development Urban Design Tools Website. Retrieved online at: <http://www.lid-stormwater.net>

V. Project Implementation

This project involved 43 LID BMPs within 11 jurisdictions. 3 different styles of BMPs were used, each with its own unique challenges.

Bioswale Deviation

A vegetated swale was chosen for the City of Downey within a high volume transportation corridor due to the site being in a shopping center. The use of the bioswale will allow for flows from Firestone Boulevard to be captured and treated. During the implementation, drainage from the adjacent commercial parking lot was observed to be another opportunity in treating additional runoff. This accommodation resulted in a higher overall pollutant load reduction in runoff from the area. The grant application initially submitted in October 2013 and finalized in February 2014, included preliminary information for the proposed bioswale to be located along a major transportation corridor in the City of Downey. At the time the grant application was prepared, limited site information regarding the size and water quality capacity was available. Therefore, this information was assumed using conservative values and the best available information. A deviation request was submitted and approved by the State as an amendment to the Grant Agreement. The Grant Agreement was amended on July 7, 2015 to revise the original bioswale design specifications. The length of the bioswale was reduced from the proposed 1,200 linear feet to 668 linear feet due to site constraints. The total capacity of the 668 linear foot bioswale was calculated to have a treatment flow rate capacity of 1.0 cfs (with a tributary area peak flow of 4.4 cfs). This exceeded the treatment capacity of the proposed 1,200 linear feet bioswale, which had a flow rate of 0.86 cfs (with a tributary area peak flow of 0.86 cfs). Therefore, although the proposed vegetated bioswale was reduced in length from what was initially proposed, it exhibited increased flow rate capacity, and in turn, better water quality benefits.

General Constraints

The grant involved 11 participating agencies and 8 subcontractors, which proved difficult in coordinating various tasks and the overall progression of the project. Correspondence took place in the form of emails and conference calls among several agencies and subcontractors. Nearly all grant items and deliverables required approval from their corresponding agency, such that one task could not be completed prior to the finalization of another. For instance, construction of all 43 BMPs could not begin until each agency has finalized all of their respective locations. Once a location is proposed, sites were marked for utility lines in the field and were left on standby until all applicable utility companies were able to confirm that excavation would not cause any impediments. A subsurface installation infrastructure locate notification must be received in order for excavation to commence. In some instances, existing

trees were replaced with the new tree box filters and City workers had to relocate water lines and electrical conduits.

Due to the nature of the proposed BMPs, each agency had to establish the type of landscaping that each BMP will exhibit. This involves submitting landscape plans, and verifying that the chosen species will be able to prosper in the engineered soil media of the BMP. For instance, each individual agency chose the tree species for their tree box filters. This requires confirmation from the manufacturer and compliance with applicable landscape ordinances of each respective agency.

Tree box filters function such that runoff is intercepted by the system prior to entering an adjacent catch basin located downstream. Therefore, locations must be chosen in close proximity to catch basins. Catch basins are either owned and maintained by the respective city, or under the jurisdiction of the Los Angeles County Flood Control District (LACFCD), or herein referred to as the "County." County catch basins require Flood Control Permits. A Flood Control Permit is required to ensure that a proposed use does not interfere with the LACFCDs operation and maintenance responsibilities. Runoff that filters through the media of the tree box filters must discharge to an existing catch basin, and requires a specific permit, called a Connection Permit. This permit is required when an agency proposes to connect a drainage system to an existing LACFCD facility. The application process for County permits was extensive, in which approval of one location was not confirmed for several months. The permits were submitted on November 16th, 2015 and were not approved until March 1st, 2017. Once the permits were approved, the Contractor began construction on the tree boxes. Despite confirmation from utility companies, pipe lines were discovered during the excavation phase. As a result, new locations were proposed and the application process for County permitting continued. Utility conflicts resulted in approximately 65 tree box filter relocations. The cities of Lynwood, Downey, and Santa Fe Springs underwent three location changes for each of their proposed tree box filters.

Construction Conflicts

The size of the BMPs prolonged the planning aspect of the project. For instance, the tree box filters span 49 square feet (a 7'x7' footprint) and must be located on an easement, but must not impede the pedestrian right-of-way. As such, several BMPs encroached on property lines, sidewalks, walkways, parkways, and other areas that must be accessible by pedestrian and vehicular traffic. In some cases, utility lines were located 5 feet from the curb face in which a smaller unit would have fit without the need for utility line relocation. Nonetheless, utility lines were relocated in order to install the 7'x7' units and treat the intended volume of runoff.

An amendment to extend the schedule in the grant agreement was approved in November 2016. The request was submitted due to unforeseen delays with construction and monitoring. During the excavation phase of the tree boxes, countless water and utility lines were discovered which prevented the ability to install the tree boxes in their original locations. The process of choosing suitable sites was proven to be complicated. Once a new locations was identified as physically suitable for the tree box unit, an “Underground Dig Alert” was made to identify any possible water or utility lines. Once the Underground Dig Alert cleared, digging commenced. The construction of the tree box filters began in February 2017.

The construction team faced several challenges while installing the tree box filter on Prichard Street and Bixler Avenue in the City of Downey. The tree box filters weigh approximately 20,000 pounds each, which required a crane to lift and position the BMP into the ground. In this area there were several overhanging power and communication lines that were approximately 30 feet above the installation area. The operator had to skillfully maneuver the crane in order for the tree box filter to be hoisted from the truck into the ground without interrupting any wires. The operation was successful and the tree box filter was placed into the ground.



While installing the tree box filters on the northwest and southwest sides of 28th street in the City of Signal Hill, the construction crew ran into several abandoned lines. The catch basin on the northwest side of 28th Street had a total of 11 abandoned lines despite underground alert efforts. Once these lines were discovered, confirmation to abandon the lines was required prior to moving forward with construction. Once confirmed as abandoned, the pipes were then cut and filled. Construction proceeded seamlessly after the pipes were filled.



A few locations had effortless installations, such as the tree box filter installation on Imperial Highway and Volunteer Avenue in the City of Norwalk. It is also a heavily-trafficked route used by vehicles and pedestrians to access the nearby shopping center. Vehicles and pedestrians were redirected for safety purposes.



Overall, construction conflicts were a recurring matter observed throughout all stages of this grant. As a result of the construction conflicts, a time extension of three months was granted to collect the necessary samples.

VI. Project Evaluation & Effectiveness – Results of PAEP

Section VI.1: Project Assessment and Evaluation Plan

The PAEP describes the manner in which the project will be effective in preventing or reducing pollution and in demonstrating the desired environmental results. The PAEP serves to identify or characterize baseline data; identify pollution source categories; identify and describe current restoration activities, BMPs, load reduction activities, and prevention activities; describe the manner in which the proposed best management practices or management measures will be implemented; summarize how the effectiveness of the proposed practices or measures in preventing or reducing pollution will be determined; determine changes in flow pattern in affected water bodies; and determine economic benefits of implementing the project.

Studies have found contamination levels of the heavy metals in road dust to be highly dependent on traffic volume, brake use, and vehicle speed in highly trafficked areas⁴. According to the Brake Pad Partnership, a group of brake manufacturers, stormwater agencies, and environmental groups, copper from brakes is the single greatest contributor to elevated copper levels in urban creeks⁵.

Many of the cities included in this grant application participated in efforts by the California Stormwater Quality Association (CASQA) and Sustainable Conservation to develop and negotiate brake pad legislation (SB 364), which will ultimately eliminate copper in brake pads by 2025. In addition, many of these same cities are working with CASQA to address zinc in tires through the soon-to-be-adopted California Department of Toxic Substances Control Safer Consumer Product Regulations. These regulations outline a process for identifying and reducing chemicals of concern in priority consumer products. CASQA, with the support of these agencies, is working to compile evidence to support the designation of zinc in tires as a priority consumer product chemical combination in need of evaluation.

Metals and bacteria are pollutants of the highest priority in these watersheds. This project provided a reduction in the average concentrations of copper, lead and zinc at each LID BMP location, in addition to a reduction in total suspended solids leaving each location. The monitoring results estimated the combined load of each pollutant reaching surface waters as a result of BMP implementation. Another goal of the product was to increase community awareness of the source of stormwater pollution in the watersheds. Through the education and

⁴ Duong, Trang T.T., & Lee, Byeong-Kyu, Determining contamination level of heavy metals in road dust from busy traffic areas with different characteristics. *Journal of Environmental Management*: 92(3). March 2011.

⁵ Information retrieved online at <<http://suscon.org/bpp/>>.

outreach component of the project, a percentage increase in community awareness has been achieved.

Section VI.2 Monitoring and Reporting Plan

Water Quality data was collected and used to assess the effectiveness of each LID BMP at removing metal contaminants from stormwater within the project area. Inflow and outflow points were monitored for metal pollutants (copper, lead, zinc) at representative BMP sites to determine the effectiveness of the BMP at removing these metals from stormwater runoff. Based on the results of this monitoring, a desktop calculation of the load reduction reaching surface waters in each watershed was assessed. The MRP serves to describe the baseline water quality or quality of the environment to be addressed; identify the non-point source(s) of pollution to be prevented or reduced by the Project; and provide GPS information for all sampling locations. The MRP was developed during the planning stages of the grant. Results of the MRP is discussed herein Section V.5: Monitoring Results.

Monitoring for the selected BMPs was subcontracted to Kinnetic Laboratories Incorporated (KLI). A technical summary and findings of the overall effectiveness has been provided by KLI, and can found in Appendix II.

Section VI.3 Quality Assurance and Project Plan

The QAPP details the monitoring program and quality assurance measures that were used to determine the effectiveness of a selected list of BMPs after they are installed. The monitoring program will measure the effectiveness of the BMPs by monitoring the concentration of metals (copper, lead, and zinc) in the inflow and outflow of BMPs at four representative sites spread across all three watersheds. The QAPP was developed during the planning stages of the grant process.

Section VI.4: Performance Measures

The Monitoring Plan (MP) stated that the sample collection method would consist of four separate storm events at four BMP locations. Two storm events were to be sampled in the 2015-16 rainy season and two storm events were to be sampled in the 2016-17 rainy season. Two of the four sampling locations collected samples of inflow and outflow in the 2016-17 rainy season. As a result of construction conflicts, the bioswale and the bioretention tree wells in Whittier were not installed in time for sampling to occur in the 2015-16 rainy season. However,

a total of 4 samples were collected at the bioswale and a total of 2 were collected at bioretention tree wells within the 2016-17 rainy season.

The tree box filter installations began in March 2017, immediately after the LACFCD permits were approved on March 1, 2017. The tree box filter BMPs were not installed in time for sampling to occur in the 2015-16 and 2016-17 rainy seasons. Despite conflicts, strong efforts were made to sample as many storm events as possible.

The Monitoring Plan specifies that samples will be collected on work days with a forecast of 80% chance of at least 0.25 inch of rainfall. Despite the sampling criteria in the Monitoring Plan, samples were obtained at every possible rain event. Kinetic Laboratories Incorporated (KLI) took samples in storm events as early as 4:30am and on weekends. During the last storm event on April 8th, 2017 the forecast consisted of a 40% chance of rain with less than 0.25 inch of rainfall. Despite the possibility of low flows, KLI went out to the Cities of Downey and Whittier to attempt to get additional samples. The bioswale in the City of Downey had sufficient flow to sample; however, Whittier did not experience high precipitation activity and additional sampling was not feasible. KLI made every effort to obtain as many samples to the maximum extent practicable in order to demonstrate the BMPs pollutant removal efficiencies. Inflow and outflow were sampled at each of the locations listed in Table V.1.

Table VI.1: Sampling Locations

BMP	City	Sampling Location	Watershed	Samples taken 15-16	Samples taken 16-17
Bioswale	Downey	Firestone Boulevard at Stonewood Mall	San Gabriel River	0	4
Bioretention Tree Wells	Whittier	Inflow at 7751 Comstock; Outflow at 7751 and 7951 Comstock Inflow at 7751 Milton Ave; Outflow at 7751 and 7913 Milton	San Gabriel River	0	2

Section VI.5: Monitoring Results

The goal of this project is to improve stormwater quality by reducing the metal concentrations of copper, lead, and zinc in stormwater runoff. To achieve this goal, water quality sampling was conducted to evaluate the BMPs effectiveness. Monitoring procedures were conducted in accordance with procedures detailed in the MRP/QAPP. Sampling was conducted by collecting six 500mL time-based aliquots at each sampling point into sample containers. For each storm event and each BMP, the six aliquots from the inflow sampling point were composited into one sample for analysis. The same method was used for the outflow sampling point. Collection time for each aliquot for each BMP can be found in Appendix II. Table V.2 reflects the estimate pollutants load reduction that was calculated based on information gathered from referenced sources.

Table VI.2: Estimated Pollutant Load Reduction

Constituents	Pollutant Concentration (IN)		Percent Removal	Pollutant Concentration (OUT)		Concentration Reduction		Load Reduction	
	Value	Units		Value	Units	Value	Units	Value	Units
Total Dissolved Solids	226	mg/L	54.13%	103.67	mg/L	122.33	mg/L	634	kg
Total Cadmium	0.73	ug/L	44.44%	0.41	ug/L	0.32	ug/L	1,683	mg
Dissolved Copper	14	ug/L	45.23%	7.67	ug/L	6.33	ug/L	32,841	mg
Total Copper	39	ug/L	66.61%	13.02	ug/L	25.98	ug/L	134,732	mg
Total Lead	18	ug/L	65.69%	6.18	ug/L	11.82	ug/L	61,325	mg
Dissolved Zinc	152	ug/L	56.44%	66.21	ug/L	85.79	ug/L	444,937	mg
Total Zinc	241	ug/L	77.46%	54.32	ug/L	186.68	ug/L	968,194	mg

All table values are estimates for the purpose of analyzing the anticipated BMP effectiveness. Each BMP may vary in pollutant removal and each area may vary in initial pollutant concentration.

Bioswale Monitoring Results

The bioswale performed well in all 4 sampling events that were conducted on January 9, January 12, February 17 and April 8, 2017. The inflow sampling point was the same exact location for all 4 events, which was a curb opening. However, the outflow sampling points were different for the first two and last two sampling events. The results showed significant reductions in copper, lead, and zinc.

During the first sampling that occurred on January 9, 2017, the inflow concentration of copper was 15 ug/L, and the outflow reflected a concentration of 5.27 ug/L. There was a 64.5% removal in copper concentration. The outflow of lead also yielded positive results. The inflow concentration of lead was 3.07 ug/L, and the outflow reflected a concentration of 0.509 ug/L. This reduction resulted in an 83.4% removal in lead concentrations. The inflow concentration of zinc was 294 ug/L, and the outflow concentration was 204 ug/L. There was a 30% removal in zinc concentration. The outflow sampling point during this event was a drop inlet grate located within the bioswale. The bioswale pollutant reduction results from the first sampling event dated January 9, 2017 can be found in Table VI.3.

Table VI.3: Bioswale Sampling Event 1

Pollutant	Storm Event 1 – January 9, 2017					
	Units	Inflow	Outflow	% Removal	Units	Load Reduction*
Copper	ug/L	15	5.27	64.86	mg	3,234.91
Lead	ug/L	3.07	0.51	83.39	mg	851.45
Zinc	ug/L	294	204	30.61	mg	29,922.13
TSS	mg/L	28	4	85.71	mg	7,979.23
Hardness	mg/L	7	10	-42.86	mg	-997.40
Dissolved Copper	ug/L	6.07	4.41	27.34	mg	551.89
Dissolved Lead	ug/L	0.209	0.18	13.88	mg	8.31
Dissolved Zinc	ug/L	44.7	16.8	62.42	mg	9,275.86
*Total removed for this specific storm event.						

During the second sampling that occurred on January 12, 2017, the inflow concentration of copper was 24.1 ug/L, and the outflow reflected a concentration of 17.9 ug/L. There was a 25% removal in copper concentration. The outflow of lead also yielded positive results. The inflow concentration of lead was 3.55 ug/L, and the outflow reflected a concentration of 3.06 ug/L. This reduction resulted in a 13.8% removal in lead concentrations. The inflow concentration of zinc was 177 ug/L, and the outflow concentration was 151 ug/L. There was a 14.6% removal in zinc concentration. The outflow sampling point during this event was a drop inlet grate located within the bioswale. The bioswale pollutant reduction results from the second sampling event dated January 12, 2017 can be found in Table VI.4.

Table VI.4: Bioswale Sampling Event 2

Pollutant	Storm Event 2 – January 12, 2017					
	Units	Inflow	Outflow	% Removal	Units	Load Reduction*
Copper	ug/L	24.1	17.9	25.73	mg	2,061.30
Lead	ug/L	3.55	3.06	13.8	mg	162.91
Zinc	ug/L	177	151	14.69	mg	8,644.17
TSS	mg/L	30	44	-46.66	mg	-4,654.55
Hardness	mg/L	4	8	-100	mg	-1,329.87
Dissolved Copper	ug/L	7.67	6.63	13.56	mg	345.77
Dissolved Lead	ug/L	0.196	0.22	-12.24	mg	-7.98
Dissolved Zinc	ug/L	44.8	32.9	26.56	mg	3,956.37
*Total removed for this specific storm event.						

During the third sampling that occurred on February 17, 2017, the inflow concentration of copper was 21.7 ug/L, and the outflow reflected a concentration of 15.6 ug/L. There was a 28.1% removal in copper concentration. The outflow of lead also yielded positive results.



Bioswale stormwater inflow
(February 17th Storm Event)



Bioswale stormwater outflow
(February 17th Storm Event)

The inflow concentration of lead was 5.73 ug/L, and the outflow reflected a concentration of 4.32 ug/L. This reduction resulted in a 24.6% removal in lead concentrations. The inflow concentration of zinc was 145 ug/L, and the outflow concentration was 120 ug/L. There was a 17.2% removal in zinc concentration. The outflow sampling point during this event was a French drain discharge point that connected to the existing storm drain system. Runoff filters through the soil media of the bioswale, where it collects in a perforated underdrain within the system. The treated water is then discharged through a French drain located within an existing catch basin. The bioswale pollutant reduction results from the third sampling event dated February 17, 2017 can be found in Table VI.5.

Table VI.5: Bioswale Sampling Event 3

Pollutant	Storm Event 3 – February 17, 2017					
	Units	Inflow	Outflow	% Removal	Units	Load Reduction*
Copper	ug/L	21.7	15.6	28.11	mg	2,028.06
Lead	ug/L	5.73	4.32	24.60	mg	468.78
Zinc	ug/L	145	120	17.24	mg	8,311.70
TSS	mg/L	78	50	35.90	mg	9,309.10
Hardness	mg/L	16	8	50.00	mg	2,659.74
Dissolved Copper	ug/L	7.02	6.55	6.70	mg	156.26
Dissolved Lead	ug/L	0.42	0.46	-9.52	mg	-10.64
Dissolved Zinc	ug/L	42	59.6	-41.90	mg	-5,851.43

*Total removed for this specific storm event.

During the last sampling that occurred on April 8, 2017, the inflow concentration of copper was 104 ug/L, and the outflow reflected a concentration of 80.6 ug/L. There was a 22.5% removal in copper concentration. The outflow of lead also yielded positive results. The inflow concentration of lead was 4.74 ug/L, and the outflow reflected a concentration of 4.41 ug/L. This reduction resulted in a 7% removal in lead concentrations. The inflow concentration of zinc was 947 ug/L, and the outflow concentration was 506 ug/L. There was a 46.6% removal in zinc concentration. The outflow sampling point during this event was a French drain discharge point that connected to the existing storm drain system. The bioswale pollutant reduction results from the fourth sampling event dated April 8, 2017 can be found in Table VI.6.

Table VI.6: Bioswale Sampling Event 4

Pollutant	Storm Event 4 – April 8, 2017					
	Units	Inflow	Outflow	% Removal	Units	Load Reduction*
Copper	ug/L	104	80.6	22.50	mg	7,779.75
Lead	ug/L	4.74	4.41	6.96	mg	109.71
Zinc	ug/L	947	506	46.57	mg	146,618.43
TSS	mg/L	48	40	16.67	mg	2,659.74
Hardness	mg/L	74	89	-20.27	mg	-4,987.02
Dissolved Copper	ug/L	84.2	61.8	27	mg	7,447.29
Dissolved Lead	ug/L	2.00	2.20	-10	mg	-66.50
Dissolved Zinc	ug/L	734	385	47.55	mg	116,031.36
*Total removed for this specific storm event.						

During the first sampling event, the bioswale exhibited the highest reduction in lead concentrations at 851 mg. During the fourth sampling event, the bioswale exhibited the highest reduction in copper and zinc at 7,780 mg and 146,618 mg, respectively (see table VI.7). Fluctuations in initial concentrations could be due to lack of rainfall and the time frame between sampling events. For instance, the last sampling event occurred on April 8, 2017, nearly 2 months following the previous sampling event and after several weeks without any precipitation.

Additional data from the sampling events can be found in Appendix II.

Table VI.7: Bioswale Pollutant Load Reduction Results

Pollutant	Unit	Event 1	Event 2	Event 3	Event 4
Copper	mg	3,234.92	2,061.30	2,028.06	7,779.75
Lead	mg	851.45	162.91	468.78	109.71
Zinc	mg	29,922.13	8,644.17	8,311.70	146,618.4
TSS	mg	7,979.23	-4,654.55	9,309.11	2,659.75
Hardness	mg	-997.40	-1,329.87	2,659.75	-4,987.02
Dissolved Copper	mg	551.90	345.77	156.26	7,447.29
Dissolved Lead	mg	8.31	-7.98	-10.64	-66.49
Dissolved Zinc	mg	9,275.86	3,956.37	-5,851.44	116,031.4

Bioretention Tree Well Monitoring Results

The bioretention tree wells are located on Comstock Avenue, Milton Avenue, and Newlin Avenue in the City of Whittier. Two storms were sampled at specific locations on January 12 and January 19, 2017. A third sampling event was attempted on April 8, 2017; however, samples could not be collected due to lack of flow from insufficient rainfall.

One inflow point and two outflow points were sampled for the rain event that occurred on January 12, 2017. The inflow sampling point was located at 7751 Comstock Avenue and the two outflow points were located at 7751 and 7951 Comstock Avenue. The stormwater flow enters the inlet of the bioretention tree well at 7751 Comstock, exits the BMP and then continues to flow back onto the street before entering the second BMP at 7951 Comstock Avenue. The inflow concentration of copper at 7751 Comstock Avenue was 21 ug/L and the outflow at the same tree well was 12.8 ug/L. The second outflow point at 7951 Comstock Avenue had a copper concentration of 18.9 ug/L. There was a 39% removal in copper concentration from the inflow and outflow point at 7751 Comstock Avenue, and a 10% reduction at outflow point at 7951 Comstock Avenue. The inflow concentration of lead was also 26.1 ug/L, and the outflow at the same tree well was 16 ug/L. The outflow point at 7951 Comstock Avenue had a lead concentration of 26.1 ug/L. There was a 38.6% removal in lead concentration from the inflow point at 7751 Comstock Avenue, and 0% removal at the outflow point at 7951 Comstock Avenue. The inflow concentration of zinc at 7751 Comstock Avenue was 227 ug/L and the outflow at the same point was 181 ug/L. The second outflow point at 7951 Comstock Avenue had a zinc concentration of 182 ug/L. There was a 20% removal in zinc concentration from the inflow and outflow point at 7751 Comstock Avenue, and a 19.8% removal at the outflow

sampling point at 7951 Comstock Avenue. The outflow from the first BMP located at 7751 Comstock had the opportunity to pick up additional pollutants before entering the tree well at 7951 Comstock Avenue, which may explain the increase in pollutant concentrations exhibited at the second outflow. The bioretention tree well pollutant reduction results from this sampling event dated January 12, 2017 can be found in Table VI.8.

Table VI.8: Bioretention Tree Well Sampling Event 1

Pollutant	Storm Event 1 – January 12, 2017						
	Units	Inflow	Outflow-1	Outflow-2	% Removal*	Units	Load Reduction**
Copper	ug/L	21	12.8	18.9	39.04	mg	136.30
Lead	ug/L	26.1	16	26.1	38.70	mg	167.88
Zinc	ug/L	227	181	182	20.26	mg	764.61
TSS	mg/L	157	72	150	54.14	mg	1,412.87
Hardness	mg/L	15	23	12	-53.33	mg	-132.98
Dissolved Copper	ug/L	2.34	2.42	2.77	-3.42	mg	-1.33
Dissolved Lead	ug/L	0.288	0.259	0.236	10.07	mg	0.48
Dissolved Zinc	ug/L	11.4	10.9	12.5	4.39	mg	8.31
	*Pollutant removal percentage based on Outflow-1 **Total removed for this specific storm event.						

One inflow point and two outflow points were sampled for the rain event that occurred on January 19, 2017. The inflow sampling point was located at 7751 Milton Avenue and the two outflow points were located at 7751 and 7913 Milton Avenue. The stormwater flow enters the inlet of the bioretention tree well at 7751 Milton, exits the BMP and then continues to flow back onto the street before entering the second BMP at 7913 Milton Avenue. The outflow from the first BMP located at 7751 Comstock had the opportunity to pick up additional pollutants before entering the tree well at 7913 Milton Avenue. The inflow concentration of copper at 7751 Milton Avenue was 10.7 ug/L and the outflow at the same tree well was 9.92 ug/L. The second outflow point at 7913 Milton Avenue had a copper concentration of 9.89 ug/L. There was a 7% removal in copper concentration from the inflow point at 7751 Milton Avenue to the outflow point at 7913 Milton Avenue. The inflow concentration of lead was also 10.7 ug/L, and the outflow at the same tree well was 8.21 ug/L. The outflow point at 7913 Milton Avenue had a lead concentration of 10.4 ug/L. There was a 3% removal in lead concentration from the inflow point at 7751 Milton Avenue to the outflow point at 7913 Milton Avenue. The increase in contamination levels from the outflow point at 7913 Milton Avenue could be a result of runoff potentially collecting additional pollutants between the two tree well sampling points. Additionally, this area may contain a higher concentration of pollutants. The inflow concentration of zinc at 7751 Milton Avenue was 136 ug/L and the outflow at the same point was 152 ug/L. The second outflow point at 7913 Milton Avenue had a zinc concentration of 142 ug/L. The increased concentration from the outflow point at 7751 Milton Avenue could be a result of inundation from high flows. All flows bypassing the system may have caused fluctuations in pollutant removal. The bioretention tree well pollutant reduction results from this sampling event dated January 19, 2017 can be found in Table VI.9.

Table VI.9: Bioretention Tree Well Sampling Event 2

Pollutant	Storm Event 2 – January 19, 2017						
	Units	Inflow	Outflow-1	Outflow-2	% Removal*	Units	Load Reduction**
Copper	ug/L	10.7	9.92	9.89	7.29	mg	12.97
Lead	ug/L	10.7	8.21	10.4	23.27	mg	41.39
Zinc	ug/L	136	152	142	-11.76	mg	-265.95
TSS	mg/L	43	36	45	16.28	mg	116.35
Hardness	mg/L	11	12	14	-9.10	mg	-16.62
Dissolved Copper	ug/L	4.67	4.74	4.23	-1.50	mg	-1.16
Dissolved Lead	ug/L	0.514	0.472	0.395	8.17	mg	0.69
Dissolved Zinc	ug/L	18.2	14.5	12.5	20.33	mg	61.50
* Pollutant removal percentage based on Outflow-1 **Total removed for this specific storm event.							

On average, the bioretention tree wells reduced 75 mg of copper, 105 mg of lead, and 773 mg of zinc during the 2 sampled rain events (see Table VI.10 for results). During the first sampling event, the bioswale exhibited the highest reduction in copper, lead, and zinc at 136 mg, 168 mg, and 1,812 mg, respectively. Decreased load reduction was exhibited in the second sampling. The performance of these units were expected to decrease over time as the systems have gone through several rain events prior to sampling.



Bioretention Tree Well - 7751 Milton Avenue
(January 19th Storm Event)



Bioretention Tree Well -7913 Milton Avenue
(January 19th Storm Event)

Table VI.10: Bioretention Tree Well Pollutant Load Reduction Results

Pollutant	Event 1	Event 2
Copper	136.30	12.97
Lead	167.88	41.39
Zinc	1811.80	-265.95
TSS	1412.87	116.35
Hardness	-132.99	-16.62
Dissolved Copper	-1.33	-1.16
Dissolved Lead	0.48	0.70
Dissolved Zinc	8.31	61.50

Monitoring Results Conclusion

After receiving the monitoring results for the constructed BMPs, each successive test generally yielded lower percentage removal and pollutant load reduction. An Operation and Maintenance Plan for each BMP was developed to ensure maintenance and continued performance. These plans include components of the BMPs, the frequency of inspections and maintenance, and the responsible entity. Details such as maintenance procedures, requirements, inspections, and frequencies were included in the plan.

It is important to note that the estimated pollutant load reductions were estimates for the purpose of analyzing the anticipated BMP effectiveness. Then, using removal percentages

obtained through data from the *Overview of Performance by BMP Category & Common Pollutant Type - International Stormwater Best Management Practices BMP Database* specific to biofilter systems, an effluent concentration for each pollutant was calculated. The differences in these values were then multiplied by the estimated treatment capacity of the project to find the estimated pollutant load reduction for each pollutant. Each BMP varied in pollutant removal and in initial pollutant concentration. Several in-field factors may result in slight variations and fluctuations exhibited in the sampling results. Firstly, the expected pollutant removal efficiencies of the BMPs are based on proprietary information and do not account for natural variations. During the monitoring phase beginning early January to late February of the 2016-2017 wet season, the BMPs experienced high precipitation activity which may have inundated the systems prior to sampling. As a result, the effectiveness of the BMP at pollutant removal may have decreased. The BMPs were also exposed to higher concentrations of pollution located between sampling points, or from high vehicular traffic and street parking. The bioswale is located on a major transportation corridor on Firestone Boulevard, adjacent to a high traffic shopping mall. Several vehicles use this street and the potential for pollutants is likely to be higher than others. A reduction in the concentrations of copper, lead, and zinc was exhibited at each LID BMP location that was sampled.

VII. Public Outreach

The intent of the public education component was to increase community awareness of the sources of stormwater pollution in the three watersheds. Through community outreach events, we were able to connect with the public and share information pertaining to the improvements that are planned for their communities. One community event was conducted in each of the Los Angeles River, Los Cerritos Channel, and San Gabriel River watersheds, for a total of three community outreach events.

South Gate - Lower Los Angeles River (LLAR) Revitalization Plan Kick Off Event

The first community event took place at Hollydale Park in the City of South Gate at the Lower Los Angeles River Revitalization Plan Kickoff Event. There was a large turnout for this event that included students, families, and local residents. Before the presentations, students and adults were asked about their knowledge of storm water. Approximately 90 students under the age of 18 attended the event, along with approximately 60 adults. Between 90-100% of adults knew that stormwater is discharged into the ocean without receiving treatment. The outreach booth began with a presentation using an EnviroScape model. The EnviroScape is a portable model that vividly demonstrates storm water pollution sources and pollution prevention. By using this model, people learn how storm water can become polluted when it travels through urbanized areas and how their actions can affect the health of our waterways. The EnviroScape is an effective tool as they are engaging and create a real sense of understanding through experience and hands on demonstration. The model is a three-dimensional landscape that illustrates residential, recreational, agricultural, and industrial areas; all in which represent possible sources of storm water pollution.



The EnviroScope presentation served as a preliminary presentation leading up to the discussion pertaining to the BMPs, creating a base understanding of what storm water pollution actually is. The second presentation was made detailing the different LID BMPs that were selected for the grant. This presentation focused on metals pollution and the benefits of having stormwater treatment systems in the community. Students and adults were both provided with outreach materials.

Downey - Healthy Downey 5K for TLC (True Lasting Connections)

The second community event took place at Apollo Park in the City of Downey at the Healthy Downey 5K for TLC event. There were approximately 25 students and 20 adults that participated in the outreach booth.



Approximately 95% of students (10 years and older) knew that storm water goes directly to the storm drain and into the ocean untreated. An estimated 25% of adults knew that stormwater goes directly to the storm drain and into the ocean untreated. At this event, a majority of children knew about stormwater whereas adults did not.

Pico Rivera - Eggstravaganza

The third community event took place at Pico Park in the City of Pico Rivera at the Eggstravaganza event. An estimated 18 students and 33 adults participated in the outreach booth. Approximately 33% of students under the age of 12 knew that storm water goes directly to the storm drain and into the ocean untreated. An estimated 54% of adults knew that storm water goes directly to the storm drain and into the ocean untreated. At this event, most children under the age of 12 did not know that stormwater goes directly to the storm drain untreated.



Overall, the community outreach events increased community awareness about stormwater pollution sources and the impacts that they have on stormwater pollution. Outreach materials were given to all attendees to further the awareness and increase the potential for the information to be spread to others. Residents and students showed great interest in the LID BMPs and were enthusiastic to hear that these treatment systems will assist in reducing stormwater pollution. The positive outcome of the outreach events show promise of increasing community awareness at future events. Annual community outreach will be held at several cities throughout the three watersheds. The cities include, but are not limited to Downey, Norwalk, South Gate, and Signal Hill. The goal will be to increase community awareness by 30% and will be assessed in the following years.

VIII. Conclusions

All LID BMPs performed as reasonably expected. All systems captured and mitigated the targeted pollutants without any system failures.

Section VIII.1: Pollutant Load Reduction

A goal of this project is the evaluation of the efficiencies of individual styles of LID BMPs on removing metals from high transportation corridors. The installation of these systems mitigate high concentrations of metals that would otherwise be deposited further downstream or washed to the Los Angeles River, San Gabriel River, and Los Cerritos Channel. The project has provided multi benefits and addressed stormwater discharges into the Los Angeles River (Reach 2), the Rio Hondo (Reach 1), Compton Creek, the Los Cerritos Channel, San Gabriel River (Reaches 1, 2, and 3), and Coyote Creek. Additionally, this project helped these cities implement the MS4 Permit and move toward a regional approach to watershed management as encouraged by this permit.

Table VIII.1: Performance Indicators for Pollutant Load Reduction

Performance Indicators for Pollutant Load Reduction An Evaluation of the Installed LID BMPs					
Project Goals	Desired Outcomes	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
<ol style="list-style-type: none"> 1. Reduce metal contaminant loading to surface waters in the Los Angeles, Los Cerritos Channel, and San Gabriel River Watersheds. 2. Improve stormwater quality currently discharging from each BMP site. 	<ol style="list-style-type: none"> 1. Reduce total metals (copper, lead, and zinc) contaminant loads from each BMP site. 2. Reduce pollutant concentrations of metals (copper, lead, zinc) and sediment in stormwater leaving each site 	<ol style="list-style-type: none"> 1. Implementing LID BMPs at project sites will biofiltrate/infiltrate rate nearly all runoff and associated pollutants flowing to that site. 2. Implementing LID BMPs at project sites will biofiltrate/infiltrate rate nearly all runoff and associated pollutants flowing to that 	<ol style="list-style-type: none"> 1. Estimated combined load of each pollutant (copper, lead, and zinc) prevented from reaching surface waters as a result of BMP implementation. 2. Reduction in event mean concentrations of copper, lead, and zinc in stormwater runoff leaving each site. 	<ol style="list-style-type: none"> 1. Desktop calculations based on BMP design and performance specification. Calculations for estimating the quantity of water treated and associated pollutant loads captures based on project design, LA County pollutant load data, and desktop calculations. Estimate total load reduction 	<ol style="list-style-type: none"> 1. Reduce Total Copper load by 134,732 mg, Total Lead load by 61,325 mg, and Total Zinc load by 968,194 mg per storm event to the LA River, San Gabriel River, and Los Cerritos Channel.⁶ 2. 67% reduction in Total Copper concentration; 66% reduction in Total Lead concentration; 77% reduction in Total Zinc

⁶ Load reductions based on analysis described in Attachment 6: Technical Report

		site.		based on EMC measured at each site during monitoring events. 2. Comparison of inflow and outflow event mean concentrations of metals at each BMP site sampled.	concentration per storm event ⁷ .
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During the implementation phase, samples were collected from two out of four LID BMPs: One sample at the bioswale in Downey and one sample from the bioretention tree well in Whittier. The Monitoring and Reporting Plan requires sampling at the tree box filter in Signal Hill and one sample at the tree box filter in South Gate. Due to construction delays, sampling the tree box filters were not feasible within the 2016-2017 wet season.

Table VIII.2: Bioswale Reduction Percentages

Pollutant	Event 1	Event 2	Event 3	Event 4
Copper	64.86%	25.73%	28.11%	22.50%
Lead	83.42%	13.8%	24.60%	6.96%
Zinc	30.61%	14.69%	17.24%	46.57%
TSS	85.71%	-46.66%	35.90%	16.67%
Hardness	-42.86%	-100%	50.00%	20.27%
Dissolved Copper	27.34%	13.56%	6.70%	27%
Dissolved Lead	12%	-12.24%	-9.52%	-10%
Dissolved Zinc	62.41%	26.56%	41.90%	47.55%

⁷ Based on percent removal of pollutants described in Attachment 6: Technical Report

Table VIII.3: Bioretention Tree Well Reduction Percentages

Pollutant	Event 1	Event 2
Copper	39.04%	7.29%
Lead	38.70%	23.27%
Zinc	48.02%	-11.76%
TSS	54.14%	16.28%
Hardness	-53.33%	-9.10%
Dissolved Copper	-3.42%	-1.50%
Dissolved Lead	10.07%	8.17%
Dissolved Zinc	4.39%	20.33%

Given the monitoring results, the sampled BMPs demonstrated notable reductions in pollutant loads. For instance, the bioswale in the City of Downey during the first sampling event yielded a 65% reduction in copper concentrations, 83% reduction in lead concentrations, and 31% reduction in zinc (see table VIII.2). The bioretention tree wells in the City of Whittier yielded a 39% reduction in copper, a 48% reduction in zinc and a 39% reduction in lead (see table VIII.3). The monitoring results of bioretention tree wells yielded lower pollutant load reductions and removal percentages than the bioswale. Variations in removal efficiencies could be due to several factors. The size of the bioswale extends 668 linear feet and provides treatment for a major transportation corridor in the City of Downey. The bioswale has demonstrated peak performance in overall stormwater treatment, and has met the targeted reduction percentages for copper and lead as identified in Table VIII.1. Low pollutant removal efficiency of the bioretention tree wells could be a result of how the BMPs were positioned. The bioretention tree wells were constructed along the same side of the specified streets, and functioned as a “treatment train,” such that the overflow from one BMP would flow to the next BMP. Increase in pollutant concentrations as exhibited in the monitoring results could be due to contamination between BMPs or the inundation of the system from high flows. The second sampling event for the bioswale resulted in lower pollutant removal efficiencies than the first sample event. The second sampling results yielded a 26% reduction in copper, 14% reduction in lead, and 15% reduction in zinc. It is important to note that the second sampling event took place three days following the first sampling event. This suggests the effectiveness of the BMP has decreased due to prior rain activity, and that ongoing maintenance must be established to ensure peak performance of the BMPs. The Operation and Maintenance Plan identifies the details and maintenance frequencies.

Table VIII.4: Aggregate Load Reduction

Pollutant	Bioretention Tree Well Load Reduction (20 units) (mg)	Bioswale Load Reduction (mg)
Copper	42,528.72	50,463.95
Lead	52,382.93	13,282.44
Zinc	565,320.73	466,778.58
TSS	440,846.44	124,474.29
Hardness	-41,491.43	-15,559.29
Dissolved Copper	-414.91	8,609.47
Dissolved Lead	150.41	129.66
Dissolved Zinc	2,593.21	144,701.36

Table VIII.5: Aggregate Monitoring Results vs PAEP Estimated Pollutant Load Reduction

Pollutant	Inflow	Outflow	Difference	Load Reduction	PAEP
Copper	21	12.8	8.2	42,529	134,732
Lead	26.1	16	10.1	52,383	61,325
Zinc	227	118	109	565,321	968,194

A total of 20 bioretention tree wells and 22 tree box filters were constructed as part of the grant agreement. Sampling of the tree box filters was infeasible as a result of the construction timeline and lack of rainfall; however, the performance of the bioretention tree wells most closely resemble the general pollutant removal efficiencies of biofilter systems. As such, the first sampling event for the bioretention tree wells in the City of Whittier conducted January 9, 2017 were utilized for the purposes of analyzing the total aggregate pollutant load reduction from the project as seen in Table VIII.5. The monitoring results from the bioretention tree wells indicate that the load reduction did not meet the estimated pollutant load reduction in the PAEP. It is important to note that the estimated pollutant load reduction indicated in the PAEP were the results of in-lab analysis of biofilter systems based on an initial rain event, or “first flush,” where pollutants are exhibited to have the highest concentration in stormwater runoff. Similarly, the results of the first sampling event of the bioretention tree wells were utilized as they accurately demonstrate the pollutant load reductions that occur during the first flush. Additionally, these estimated inflow and outflow pollutant concentrations were also obtained from the *Los Angeles County 1994-2005 Integrated Receiving Water Impacts Report*, based on pollutant concentrations generated from commercial land uses. The LID BMPs of the grant agreement were constructed on major transportation corridors and are subject to pollutants

and pollutant loads generated from street and vehicular activities; therefore, the differences in pollutant load reduction between the precise monitoring results and the PAEP is expected.

Section VIII.2: Education, Outreach, and Capacity Building

All community outreach events resulted in an increase in community awareness of the source of stormwater pollution. Each outreach event presented an opportunity to provide an in-depth explanation of stormwater and the effects on the community and the environment. The EnviroScape model proved to be an exemplary tool in physically showing how stormwater moves throughout the City picking up pollutants, as opposed to a solely verbal explanation. Participants showed great interest in changing their personal lifestyles in efforts to reduce their contributions to stormwater pollution. The positive results reflect that the project goal of increasing awareness was met. An informal survey will be conducted at community events to determine the percentage increase in community awareness of stormwater issue year over year.

Table VIII.2: Performance Indicators for Education, Outreach, and Capacity Building

Performance Indicators for Education, Outreach, and Capacity Building					
Project Goals	Desired Outcomes	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
Increase community awareness of the source of stormwater pollution in the watersheds	Increase community awareness of stormwater issues by 30% by the end of the grant term.	The numbers of attendees at community events focusing on stormwater issues will increase due to the issuance of press releases in local media outlets. The number of school children becoming aware of stormwater issues will increase due to school outreach materials.	The percentage increase of attendees at local community events that are well informed about stormwater issues in the Gateway Regions year over year.	An informal survey will be conducted at two annual community events per watershed to determine the percentage increase in community awareness of stormwater issues year over year.	Increase awareness across the three watersheds by 30% year over year.

Lessons Learned

1. All LID BMPs were intended to be installed on major transportation corridors due to the high concentrations of metals from vehicular traffic; however, major roadways exhibited longstanding utility lines which resulted in the relocation of nearly all LID BMPs. As a result, LID BMPs were relocated to the maximum extent practicable. Nonetheless, relocation delayed the implementation phase.
2. The permitting process was significantly longer than initially anticipated. This had a direct impact on the project as obtaining connection permits for County catch basins delayed the construction phase.
3. Projects of this nature are subject to natural fluctuations in rainfall. The 2017-2018 wet season exhibited high rainfall activity, which may have fully stressed the LID systems, which in turn, reduced the peak performance of the systems during the monitoring phase. However, all sampling events yielded positive pollutant load reduction of metals due to the installed LID BMPs.
4. The design and nature of the LID BMPs require extensive space in the public right-of-way. Finding locations on city easements that did not impede pedestrian traffic proved challenging. For instance, the tree box filters are approximately 7 feet wide by 7 feet long. Despite having a traffic rated grate, the actual footprint of the LID BMP made it difficult to find ideal locations.



Tree Box Filter– 12923 Barlin Avenue (Downey)



Bioretention Tree Well –Santa Fe Springs and E 110th St (Lynwood)



Bioswale – Firestone Boulevard (Downey)

Appendices

Appendix I: PAEP

Attachment 5 – Performance Measures Project Assessment and Evaluation Plan (PAEP)

Multi-Agency, Multi-Watershed Project to Incorporate LID
BMPs into Major Transportation Corridors

Los Angeles Gateway Water Management Authority

2/27/2014

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I. Project Summary

A. Funding Program

The Project is supported by Proposition 84 as part of the Stormwater Grant Program and local matching funds.

B. Project Description

This Project seeks to treat stormwater runoff, and its associated metals pollutants, by installing 43 LID BMPs throughout eleven cities within the Los Angeles River, Lower San Gabriel River, and Los Cerritos Channel watersheds (Figure 1). The participating agencies are the cities of Bell Gardens, Downey, Lynwood, Norwalk, Paramount, Pico Rivera, Santa Fe Springs, Signal Hill, South Gate, Vernon, and Whittier.

Regional Locations

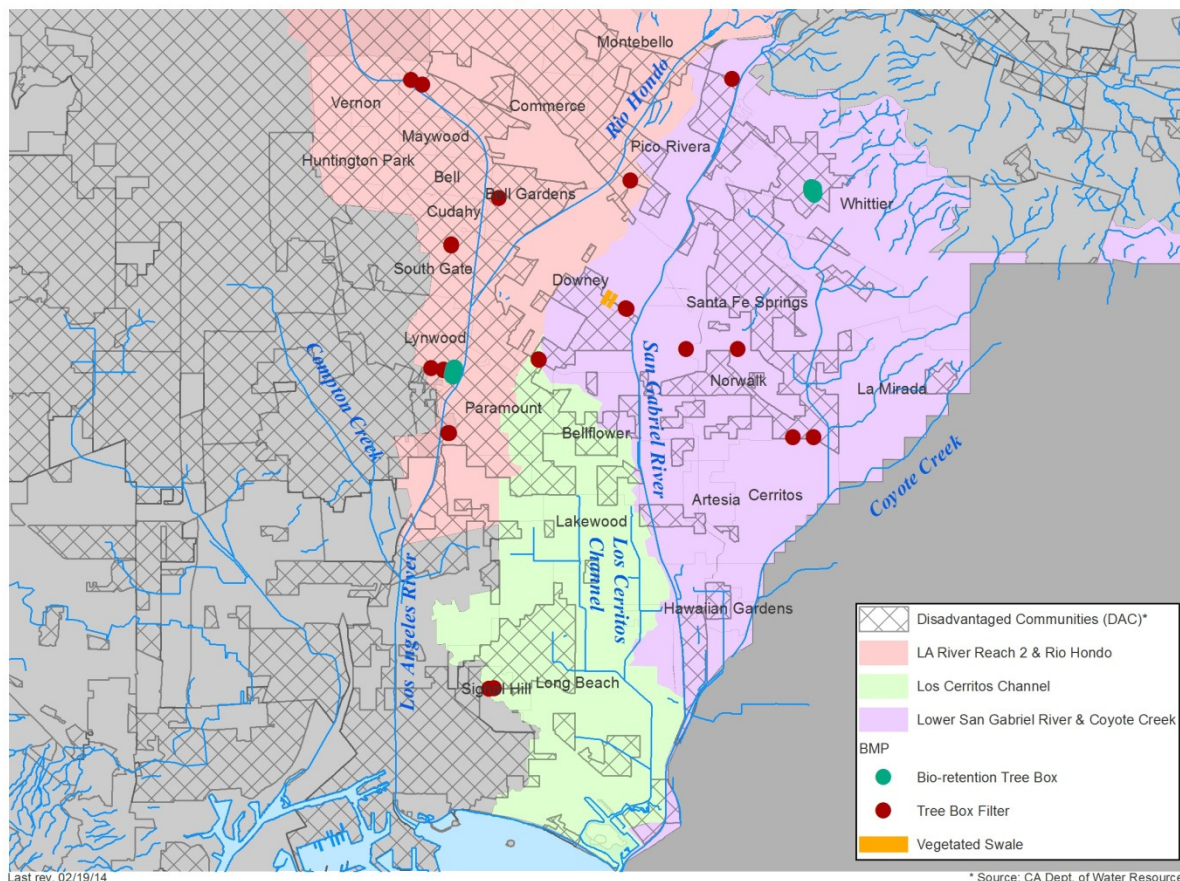


Figure 1: LID BMP Locations.

The objective of this project is to implement Low Impact Development (LID) BMPs, such as tree box filters, bio-swales, and bioretention tree wells, to treat stormwater runoff originating from paved roadways and highly urbanized areas. Runoff from the Project areas currently discharges, untreated, into the waterbodies within the Los Angeles River, Lower San Gabriel River, and Los Cerritos Channel watersheds, all of which are subject to numerous TMDLs, including three metals TMDLs. Biotreatment LID BMPs have high efficiency ratings for the removal of many pollutants, particularly metals. Transportation corridors are recognized to be leading sources in the contribution to metals pollution; therefore, this Project will effectively address the three active metals TMDLs within this region and help to improve stormwater quality in the associated watersheds.

C. Problem Statement

i. Identify or characterize baseline data

The proposed Project will address stormwater runoff discharges into the Los Angeles River (Reaches 1 and 2), the Rio Hondo (Reach 1), Compton Creek, the Los Cerritos Channel, San Gabriel River (Reaches 1, 2, and 3), and Coyote Creek. There are currently seven active TMDLs within these watersheds: the *Los Angeles River and Tributaries Metals TMDL*, the *Los Angeles River Trash TMDL*, the *Los Angeles River Nitrogen Compounds and Related Effects TMDL*, the *Los Angeles River Watershed Bacteria TMDL*, the *Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters Toxic Pollutants TMDL*, the *San Gabriel River and Impaired Tributaries Metals and Selenium TMDL*, and the *Los Cerritos Channel Metals TMDL*. The impairments due to trash and nutrients are currently being addressed through other control measures in the watershed. Therefore, metals and bacteria are pollutants of the highest priority in these watersheds. The focus of this project is to reduce metals concentrations in stormwater runoff.

The relevant 303(d) listings for metals in each watershed are identified below:

- **Los Angeles River and Tributaries (Rio Hondo, Compton Creek)**
Reach 1 of the Los Angeles River, is listed on the State 303(d) list for copper, lead, and zinc. Reach 2 of the Los Angeles River is listed for copper and lead. Compton Creek is listed for copper and lead. The Rio Hondo is listed for copper, lead, and zinc.
- **Lower San Gabriel River and Tributaries (Coyote Creek)**
Reach 2 of the San Gabriel River is listed for lead. Coyote Creek is listed for copper, lead, and zinc.
- **Los Cerritos Channel**
The Los Cerritos Channel is listed for copper, lead, and zinc.

A summary of the impaired water bodies and the beneficial uses being threatened by pollutant loading are shown in Table 1.

Table 1 summary of the impaired water bodies and the beneficial uses

Impaired Water Body	Beneficial Uses
Los Angeles River	MUN, IND, GWR, REC-1, REC-2, WARM, WILD, WET
Rio Hondo	MUN, GWR, REC-1, REC-2, WARM, WILD, RARE, WET
Compton Creek	MUN, GWR, REC-1, REC-2, WARM, WILD, WET
San Gabriel River	MUN, IND, PROC, AGR, GWR, REC-1, REC-2, WARM, COLD, WILD, SPWN, WET
Los Cerritos Channel	MUN, REC-1, REC-2, WET, WILD
Coyote Creek	MUN, IND, PROC, REC-1, REC-2, WARM, WILD, RARE

*Based on the Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties

The Los Angeles County Department of Public Works (LADPW) has collected over 10 years of monitoring data in the Los Angeles River, Coyote Creek, and the San Gabriel River. Roughly 35-50% of wet weather samples in the Los Angeles River, 30% of wet weather samples in Coyote Creek, and 10-40% of wet weather samples in San Gabriel River exceeded California Toxics Rule objectives for copper, lead, and zinc between 2002 and 2012. The City of Long Beach has been collecting stormwater samples since 1999 through its Stormwater Monitoring

Program. Over 50% of wet weather samples of lead, copper, and zinc exceed the California Toxics Rule acute and chronic criteria for metals¹.

ii. Identify pollution source categories

Studies have found contamination levels of the heavy metals in road dust to be highly dependent on traffic volume, brake use, and vehicle speed in highly trafficked areas². According to the Brake Pad Partnership, a group of brake manufacturers, stormwater agencies, and environmental groups, copper from brakes is the single greatest contributor to elevated copper levels in urban creeks³.

iii. Identify and describe current restoration activities; BMPs; load reduction activities; prevention activities

Many of the cities included in this grant application participated in efforts by the California Stormwater Quality Association (CASQA) and Sustainable Conservation to develop and negotiate brake pad legislation (SB 364), which will ultimately eliminate copper in brake pads by 2025. In addition, many of these same cities are working with CASQA to address zinc in tires through the soon-to-be-adopted California Department of Toxic Substances Control Safer Consumer Product Regulations. These regulations outline a process for identifying and reducing chemicals of concern in priority consumer products. CASQA, with the support of these agencies, is working to compile evidence to support the designation of zinc in tires as a priority consumer product chemical combination in need of evaluation.

iv. Describe the manner in which the proposed best management practices or management measures will be implemented

Forty three (43) LID BMPs will be installed throughout the Los Angeles River, Lower San Gabriel River, and Los Cerritos Channel watersheds to treat stormwater runoff. The agencies associated with this Project has identified intersections along major transportation corridors that serve average daily traffic flows greater than 30,000 cars for installation of 6x6 tree box filters and bioswales. In addition, approximately 20 bioretention tree wells will be installed along roadways in locations that are currently being identified. The BMP types, locations, and anticipated treatment volumes are listed in Table 2.

¹ Data collected from the Los Cerritos Channel Metals TMDL. Retrieved online at <http://www.waterboards.ca.gov/rwqcb4/water_issues/programs/tmdl/Established/Los%20Cerritos%20Channel%20Metals%20TMDL/03-18-10LosCerritosChannel-metalsTMDLs.pdf>.

² Duong, Trang T.T., & Lee, Byeong-Kyu, Determining contamination level of heavy metals in road dust from busy traffic areas with different characteristics. *Journal of Environmental Management*: 92(3). March 2011.

³ Information retrieved online at <<http://suscon.org/bpp/>>.

Table 2: LID BMP Locations and Anticipated Treatment Volumes.

City	LID BMPs	Location*	Anticipated Treatment Volume**	Watersheds
Bell Gardens	(1) Tree box filter	(1) Florence Avenue at Garfield Avenue	7,258 cf	Los Angeles River
Downey	(4) Tree box filters	(2) Brookshire Avenue at Gardendale Street at Northeast and northwest corner, (2) Pangborn Avenue at Firestone Boulevard at Northeast and northwest corner	29,032 cf	San Gabriel River Los Cerritos Channel
	(1) Bioswale	(1) Firestone Blvd. at Stonewood Mall	11,741 cf	San Gabriel River
Lynwood	(10) Bioretention Tree Wells	Locations to be determined	5,870 cf	Los Angeles River
	(3) Tree box filters	(1) Clark Street at Atlantic Avenue, (2) Clark Street at Wright Road	21,774 cf	
Norwalk	(2) Tree box filters	(1) Imperial Highway and Volunteer Avenue, (1) Firestone Boulevard and Imperial Highway	14,516 cf	San Gabriel River
Paramount	(2) Tree box filters	(2) Alondra Boulevard west of Hunsaker Avenue	14,516 cf	Los Angeles River
Pico Rivera	(2) Tree box filters	(1) Beverly Boulevard and Tobias Avenue, (1) Slauson Avenue and Paramount Boulevard	14,516 cf	Los Angeles River
Santa Fe Springs	(2) Tree box filters	(1) Alondra Boulevard and Shoemaker Avenue, (1) Alondra Boulevard and Marquardt Avenue	14,516 cf	San Gabriel River
Signal Hill	(2) Tree box filters	(1) Willow Street and Cherry Avenue, (1) Willow Street and Dawson Avenue	14,516 cf	Los Cerritos Channel
South Gate	(2) Tree box filters	(2) Firestone Boulevard and Atlantic Avenue	14,516 cf	Los Angeles River
Vernon	(2) Tree box filters	(2) Bandini Boulevard west of Indiana Street	14,516 cf	Los Angeles River
Whittier	(10) Bioretention Tree Wells	Locations to be determined	5,870 cf	San Gabriel River

*See included maps for BMP location and drainage areas.

**Treatment volume calculations based on a 24-hour, 0.75-inch storm, 6x6 tree box filter units, and a 1200 LF swale.

Combined, these BMPs have the capacity to treat approximately 183, 157 cubic feet of stormwater runoff from approximately 20 acres of high traffic transportation corridors. Approximately 92,966 cubic feet of stormwater will be treated in the Los Angeles River Watershed, 61,159 in the Lower San Gabriel River Watershed, and 29,032 in the Los Cerritos Channel Watershed.

Biotreatment BMPs are known to have a high removal efficiency of metals, total suspended solids (to which bacteria species often bind), and other pollutants⁴; therefore, this project will have a significant impact on the presence of these pollutants within the associated watersheds. Table 3 shows expected pollutant removal and associated load reduction for the BMPs. For a more detailed description of the technical basis for this implementation approach, please refer to Attachment 6: Technical Report. This report outlines the feasibility, performance, and operation and maintenance standards for each type of BMP proposed.

Table 3: Estimated Pollutant Load Reduction.

Constituents	Pollutant Concentration (IN)		Percent Removal	Pollutant Concentration (OUT)		Concentration Reduction		Load Reduction	
	Value	Units		Value	Units	Value	Units	Value	Units
Total Dissolved Solids	226	mg/L	54.13%	103.67	mg/L	122.33	mg/L	634	kg
Total Cadmium	0.73	ug/L	44.44%	0.41	ug/L	0.32	ug/L	1,683	mg
Dissolved Copper	14	ug/L	45.23%	7.67	ug/L	6.33	ug/L	32,841	mg
Total Copper	39	ug/L	66.61%	13.02	ug/L	25.98	ug/L	134,732	mg
Total Lead	18	ug/L	65.69%	6.18	ug/L	11.82	ug/L	61,325	mg
Dissolved Zinc	152	ug/L	56.44%	66.21	ug/L	85.79	ug/L	444,937	mg
Total Zinc	241	ug/L	77.46%	54.32	ug/L	186.68	ug/L	968,194	mg

All table values are estimates for the purpose of analyzing the anticipated BMP effectiveness. Each BMP may vary in pollutant removal and each area may vary in initial pollutant concentration. Effectiveness monitoring will be incorporated as a component of this Project which will accurately determine the Project-specific pollutant load reductions.

- v. Summarize how the effectiveness of the proposed practices or measures in preventing or reducing pollution will be determined

The effectiveness of the proposed BMPs will be measured through representative site monitoring. Inflow and outflow will be sampled at representative locations for each type of BMP proposed (bioretention tree well, tree box filter, and bioswale). Representative locations were chosen based on land use contributing runoff to the location, and were chosen to ensure at least one sampling location in each watershed (Los Angeles River, Los Cerritos Channel, and Lower San Gabriel River).

⁴ LID Center. Low Impact Development Urban Design Tools Website. Retrieved online at: <http://www.lid-stormwater.net>

The locations in Table 4 were determined to be the most representative sites to conduct sampling of BMP inflow and outflow:

Table 4: Sampling Locations.

Type of BMP	City	Location	Watershed	Land Use(s) Contributing Runoff to Site
Bioretention Tree Box	Whittier	TBD	San Gabriel River	Industrial, Commercial, residential
Bioswale	Downey	Pangborn Avenue at Firestone Boulevard at northeast corner	San Gabriel River	Mixed Commercial and Industrial, Residential
Tree Box Filter	South Gate	Firestone Boulevard and Atlantic Avenue	Los Angeles River	Mixed Commercial and Industrial, Residential
Tree Box Filter	Signal Hill	Willow Street and Cherry Avenue	Los Cerritos Channel	Mixed Commercial and Industrial, Residential

At each location identified above, samples of copper, lead, zinc, hardness, and Total Dissolved Solids (TSS) will be collected during four storm events⁵ (two in 2015-16 storm season and two in 2016-17 storm season) post-construction of the LID BMPs. Grab samples will be collected at each location. See Attachment 5: Performance Measures Monitoring Plan/Quality Assurance Project Plan for more detail on the sampling locations.

vi. Determine “changes in flow pattern” in affected water bodies.

The associated waterbodies are all hardened, concrete lined channels; therefore, changes in flow pattern are not anticipated to occur as a result of this project.

vii. Determine economic benefits of implementing the project.

Each of the participating cities contains Disadvantaged Community (DAC) areas. This project will help these cities to comply with TMDL requirements, and help to reduce the likelihood of potential fines and penalties that might otherwise be imposed for TMDL violations. In addition, each of these cities is subject to the Los Angeles County Municipal Separate Storm Sewer System Permit (“MS4 Permit” Order No. R4-2012-0175). This project will help these cities implement the MS4 Permit and move toward a regional approach to watershed management, as encouraged by this permit. Without financial assistance from the State Water Quality Control Board’s Clean Water Program, these cities would be unable to implement this significant environmental Project.

In addition to helping the cities achieve MS4 Permit and TMDL compliance, the participating cities will garner multiple economic benefits from the implementation of this Project. Reducing pollutant loading to waterbodies will improve water quality and protect aquatic and riparian habitat, as well as improve other beneficial uses such as promoting the restoration of associated wildlife, vegetation, recreation, and municipal

⁵ A storm event is a work day (non-holiday week day) with a forecast of an 80% chance of at least 0.25 inch of rainfall.

use. The reduction of pollutants will prevent the loss of tourism dollars in these areas as visitors are discouraged by large amounts of trash and other pollution along LA County beaches and waterbodies. By restoring local recreational opportunities along the LA River, San Gabriel River, Los Cerritos Channel, and associated beaches, the distance of travel to enjoy such recreational opportunities will decrease. Reduced time spent driving to recreational opportunities will have a direct effect on the amount spent on gas. It is likely that this savings will be put back into the economy of the DAC areas. Additionally, the construction components of this Project will generate local jobs immediately, subsequently strengthening the local economy.

This Project also has potential to augment local water supplies. The Los Angeles River, Rio Hondo, Compton Creek, Los Cerritos Channel, San Gabriel River, and Coyote Creek have each been identified for the potential beneficial use for municipal and domestic supply (MUN)⁶. Until water quality is improved, these waterbodies are not suitable for potable water use and can be considered a wasted potable water source. Removing pollutants from these waterbodies will significantly increase the potential of using these waterbodies as potential potable water sources for the Gateway Region. Currently, the Gateway Region relies heavily on imported water, which is expensive and unreliable. Creating additional water supply for potable use in these DAC areas will effectively decrease the amount spent on water, subsequently allowing those funds to be used to strengthen the DAC economy.

D. Project Activities or Tasks:

The tasks and associated deliverables in Table 5 will be implemented to address water quality impairments for metals in the Los Angeles River, Los Cerritos Channel, and San Gabriel River Watersheds:

Table 5: Project Tasks and Deliverables.

Administration		
No.	Task	Deliverables
1.1	Progress Reports	Annual Progress Reports
1.2	Draft and Final Project Reports	Draft and Final Report submitted to the State Water Quality Control Board
1.3	Issue Public Hearing Notice for DAC Involvement	Public hearing notice inviting DAC community to participate in design and implementation of LID BMPs, public hearing
Planning, Design, Engineering, and Environmental		
No.	Task	Deliverables
2.1-2.2	Planning and Design	Finalize siting of all BMPs, design/select appropriately sized LID BMPs for location, develop individual site plans for each BMP location, engineering review for feasibility
2.3	Permitting	Local construction permits, LA County permits as necessary
2.4	Environmental Documentation	CEQA clearance
Construction Administration		
No.	Task	Deliverables
3.1	Construction Contracting	Select construction contract
3.2	Construction Administration	Award and execute construction contract
3.2	Environmental Compliance/Mitigation	Conduct CEAQ initial study, conduct EIR (if necessary), and provide CEQA documentation to State Water Quality Control Board

⁶ Los Angeles Region Water Quality Control Board, *Water Quality Control Plan Los Angeles Region*, Beneficial Uses, October 28, 2011.

Table 5: Project Tasks and Deliverables.

Construction/Implementation – Tree Box Filters		
No.	Task	Deliverables
3.4.1	Mobilization and Site Preparation	N/A
3.4.2	Excavation, Clearing and Grubbing	N/A
3.4.3	BMP Installation	N/A
3.4.4	Demobilization	N/A
Construction/Implementation – Bio-retention tree box systems		
No.	Task	Deliverables
3.4.1	Mobilization and Site Preparation	N/A
3.4.2	Excavation, Clearing and Grubbing	N/A
3.4.3	BMP Installation	N/A
3.4.4	Landscaping	N/A
3.4.5	Demobilization	N/A
Monitoring/Performance		
No.	Task	Deliverables
4.1	Project Assessment and Evaluation Plan (PAEP)	Provide detailed/updated PAEP to the State Water Quality Control Board
4.2	Monitoring Plan Development	Provide detailed/updated Monitoring Plan to the State Water Quality Control Board
4.3	QAPP Development	Provide detailed/updated QAPP to the State Water Quality Control Board
4.4	Storm event monitoring	Conduct 2 water quality monitoring events during the first two storms post installation of the BMPs. Analyze samples collected from inflow and outflow of selected BMPs for copper, lead, and zinc. Prepare Monitoring Report, and conduct desktop calculation of load reductions.
4.5	Data Reporting	Submit Monitoring Report to State Water Quality Control Board
Education/Outreach		
No.	Task	Deliverables
5.1	Press Release in Local Media	Press Release in local media outlets
5.2	Community Event	Conduct one annual community event per watershed, and conduct associated informal survey to assess percentage increase in local stormwater awareness
5.3	Develop and Implement School Outreach	Develop outreach materials related to metals pollution in stormwater and distribute to local schools in each watershed. Coordinate with schools to attend community event.

E. Category of Project Activities or Tasks:

Tasks 1.1 through 4.5 outlined in Table 5 above are in the Pollutant Load Reduction category, while tasks 5.1 through 5.3 are in the Education, Outreach, and Capacity-building category

II. Project Goals & Desired Outcomes

Pollutant Load Reduction

1. Goal: Reduce metal contaminant loading to surface waters in the Los Angeles, Los Cerritos Channel, and San Gabriel River Watersheds

Outcome: Estimate the combined load of each pollutant (copper, lead, and zinc) reaching surface waters as a result of BMP implementation

2. Goal: Improve stormwater quality currently discharging from each project site.

Outcome: Reduction in average concentrations of copper, lead, and zinc at each LID BMP location; reduction in total suspended solids (TSS) leaving each site

Education, Outreach, and Capacity Building

3. Goal: Increase community awareness of the source of stormwater pollution in the watersheds

Outcome: Percentage increase in community awareness

III. Project Performance Measures Tables

Table 1
Pollutant Load Reduction
Multi-Agency, Multi-Watershed Project to Incorporate LID BMPs into Major Transportation Corridors

Project Goals	Desired Outcomes	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
Reduce metal contaminant loading to surface waters in the Los Angeles, Los Cerritos Channel, and San Gabriel River Watersheds	Reduce total metals (copper, lead, and zinc) contaminant loads from each BMP site	Implementing LID BMPs at project sites will biofiltrate/infiltrate nearly all runoff and associated pollutants flowing to that site.	Estimated combined load of each pollutant (copper, lead, and zinc) prevented from reaching surface waters as a result of BMP implementation	Desktop calculations based on BMP design and performance specifications Calculations for estimating the quantity of water treated and associated pollutant loads captured based on project design, LA County pollutant loading data, and desktop calculations Estimate total load reduction based on EMC measured at each site during monitoring events	Reduce Total Copper load to the LA River, San Gabriel River, and Los Cerritos Channel by 134,732 mg per storm event; Reduce Total Lead load to the LA River, San Gabriel River, and Los Cerritos Channel by 61,325 mg per storm event; Reduce Total Zinc load to the LA River, San Gabriel River, and Los Cerritos Channel by 968,194 mg per storm event ⁷
Improve stormwater quality currently discharging from each BMP site.	Reduce pollutant concentrations of metals (copper, lead, zinc) and sediment in stormwater leaving each site.	Implementing LID BMPs at project sites will biofiltrate/infiltrate nearly all runoff and associated pollutants flowing to that site on site.	Reduction in event mean concentrations of copper, lead, and zinc in stormwater runoff leaving each site.	Comparison of inflow and outflow event mean concentrations of metals at each BMP site sampled	67% reduction in Total Copper concentration; 66% reduction in Total Lead concentration; 77% reduction in Total Zinc concentration per storm event ⁸

⁷ Load reductions based on analysis described in Attachment 6:Technical Report

⁸ Based on percent removal of pollutants described in Attachment 6:Technical Report

Table 2
Education, Outreach, and Capacity Building
Multi-Agency, Multi-Watershed Project to Incorporate LID BMPs into Major Transportation Corridors

Project Goals	Desired Outcomes	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
Increase community awareness of the source of stormwater pollution in the watersheds	Increase community awareness of stormwater issues by 30% by the end of the grant term	<p>The numbers of attendees at community events focusing on stormwater issues will increase due to the issuance of press releases in local media outlets</p> <p>The number of schools children becoming aware of stormwater issues will increase due to school outreach materials</p>	The percentage increase of attendees at local community events that are well informed about stormwater issues in the Gateway Regions year over year.	An informal survey will be conducted at two annual community events per watershed to determine the percentage increase in community awareness of stormwater issues year over year	Increase awareness across the three watersheds by 30% year over year.

Appendix II: Monitoring Data Report

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Data Report

Transportation Corridor Low Impact Development BMP Investigation

April 25, 2017

This report presents data collected for stormwater monitoring conducted on major transportation corridor Low Impact Development (LID) BMPS for the LA River Los Cerritos Channel, and Lower San Gabriel River watersheds. Two LID BMPs were monitored by Kinnetic Laboratories in January, February, and April 2017. The first LID BMP is identified as the Downey Bioswale on the North side of Firestone Boulevard at the Stonewood Mall. The second LID BMP is identified as the Whittier Bioretention Tree Wells. Work performed was conducted according to procedures detailed in the project Quality Assurance Project Plan (QAPP) (John Hunter & Associated and Kinnetic Laboratories, 2015).

Four storms were sampled at the Downey Bioswale. These occurred on January 9, January 12, February 17 and April 8, 2017. Both inflow and outflow points were sampled. The inflow sampling point was the same for all four storm events. The outflow sampling point was at a drop inlet grate during the first two storms and a French drain discharge point for the third and fourth event. Sampling was conducted by collecting six 500 mL time-based aliquots at each sampling point into pre-cleaned sample containers provided by the analytical laboratory. Due to the short storm duration of the April 8, 2017 storm, only four of the six aliquots could be collected. For each storm, all aliquots from the inflow sampling point were composited into one sample for analysis, and all aliquots from the outfall sampling point were composited into a second sample for analysis. Collection times for each aliquot are provided in Table 1.

Two storms were sampled at the Whittier Tree Well sites. These occurred on January 12 and January 19, 2017. Sampling was attempted on April 8, 2017, but due to insufficient rainfall and lack of flow, no samples could be collected. One inflow sampling point was sampled and two outflow sampling points were sampled for both storms. For the first storm, the inflow sampling point was at 7751 Comstock. The outflow sampling points were at 7751 and 7951 Comstock. For the second storm, the inflow sampling point was at 7751 Milton Ave. The outflow sampling points were at 7751 and 7913 Milton Avenue. Prior to sampling, the inlets to the tree wells were cleared of trash and debris to allow full runoff to enter the wells. Sampling was conducted by

collecting six 500 mL time-based aliquots at each sampling point into pre-cleaned sample provided by the analytical laboratory. For each storm, the six aliquots from the inflow sampling point were composited into one sample for analysis, and the six aliquots from each of the two outflow sampling point were composited into two additional samples for analysis. Collection times for each aliquot are provided in Table 2.

A blind field duplicate was collected at a single sampling point during each monitored event. The locations of the duplicate samples are identified in Tables 1 and 2. Note that the Downey Bioswale duplicate for the January 12 event was collected from a Whittier Tree well sampling point. Additionally, it was predetermined for the April 8 event that the blind field duplicate would be collected at the Whittier Tree Well sites, but since this site could not be sampled, no field duplicate was submitted for this event.

Empirical observations and water quality measurements for temperature, pH, conductivity, salinity, dissolved oxygen and turbidity were made at each sampling point once during each monitored event. Observation notes and results of all the measurements are provided in field data log sheets in Appendix A. Temperature, conductivity, pH and turbidity measurements are also included in Tables 3 through 8. Select pictures of the sites prior and during the time of sampling are included in Appendix B.

All sample chemical analyses were submitted to Eurofins Calscience. The laboratory performed sample compositing prior to analysis, and the composite samples were analyzed for hardness, total suspended solids and total and dissolved copper, lead and zinc. Results of the chemical analyses are provided in Tables 3 through 6 for the Downey Bioswale and Tables 7 and 8 for the Whittier Tree Wells. The Complete analytical reports including Chain of Custody documentation are provided in Appendix C.

Quality Assurance/Quality Control data in the laboratory reports were reviewed against accuracy, precision, recovery and holding time data quality objectives detailed in the project QAPP. This review resulted in some qualifications to the hardness data. Several hardness values were qualified as an estimate due to poor precision between the original sample and the field duplicate sample. Samples were qualified with a "J" when the relative percent difference (RPD) between the original sample and the field duplicate were outside of the 25% control limit. No other data required any qualifications.

Table 1. DOWNEY BIOSWALE ALIQUOT SAMPLING TIMES

Location	Date	Grab 1 Time	Grab 2 Time	Grab 3 Time	Grab 4 Time	Grab 5 Time	Grab 6 Time
Event 1 Inflow	01/09/2017	04:40	05:10	05:39	06:08	06:28	06:48
Event 1 Inflow Duplicate	01/09/2017	04:38	05:08	05:37	06:07	06:27	06:47
Event 1 Outflow	01/09/2017	04:42	05:12	05:40	06:09	06:29	06:49
Event 2 Inflow	01/12/2017	07:42	08:11	08:41	09:09	09:34	10:03
Event 2 Outflow	01/12/2017	07:43	08:12	08:42	09:10	09:35	10:04
Event 3 Inflow	02/17/2017	14:15	14:45	15:15	15:45	16:15	16:45
Event 3 Inflow Duplicate	02/17/2017	14:16	14:46	15:16	15:46	16:16	16:46
Event 3 Outflow	02/17/2017	14:15	14:45	15:15	15:45	16:15	16:45
Event 4 Inflow	04/08/2017	02:50	03:10	03:20	03:30	N/A	N/A
Event 4 Outflow	04/08/2017	02:50	03:10	03:20	03:30	N/A	N/A

Table 2. WHITTIER TREE WELLS ALIQUOT SAMPLING TIMES

Location	Date	Grab 1 Time	Grab 2 Time	Grab 3 Time	Grab 4 Time	Grab 5 Time	Grab 6 Time
Event 1 Inflow	01/12/2017	08:08	08:38	09:08	12:48	13:12	13:42
Event 1 Outflow-1	01/12/2017	08:09	08:39	09:09	12:49	13:13	13:43
Event 1 Outflow-2	01/12/2017	08:08	08:38	09:08	13:30	13:41	13:52
Event 1 Outflow-2 Duplicate	01/12/2017	08:10	08:40	09:10	13:31	13:42	13:53
Event 2 Inflow	01/19/2017	03:10	03:45	04:05	04:25	4:45	05:05
Event 2 Outflow-1	01/19/2017	03:16	03:46	04:06	04:26	4:46	5:06
Event 2 Outflow-2	01/19/2017	03:17	03:47	04:07	04:27	04:47	05:07
Event 2 Outflow-2 Duplicate	01/19/2017	03:18	03:48	04:08	04:28	04:48	05:08

Table 3. DOWNEY BIOSWALE BMP- WET EVENT 1

ANALYTE	UNITS	WET1 1/9/17 RESULTS	
		INFLOW	OUTFLOW
Conventionals			
pH	pH units	7.40	7.27
Conductivity	mS/cm	0.022	0.091
Solids, Total Suspended	mg/L	28	4
Hardness, Total (as CaCO ₃)	mg/L	7J	10J
Temperature	°C	14.06	14.39
Metals – Total			
Copper	µg/L	15	5.27
Lead	µg/L	3.07	0.509
Zinc	µg/L	294	204
Metals – Dissolved			
Copper	µg/L	6.07	4.41
Lead	µg/L	0.209J	0.184J
Zinc	µg/L	44.7	16.8

Notes:

J = estimated value between the method detection limit and the reporting limit.

J = estimated value as a result of the precision between the sample and field duplicate exceeding the RPD control limit of 25.

Table 4. DOWNEY BIOSWALE BMP- WET EVENT 2

ANALYTE	UNITS	WET2 1/12/17 RESULTS	
		INFLOW	OUTFLOW
Conventionals			
pH	pH units	8.22	7.92
Conductivity	mS/cm	0.030	0.038
Solids, Total Suspended	mg/L	30	44
Hardness, Total (as CaCO ₃)	mg/L	4	8
Temperature	°C	13.13	12.97
Metals – Total			
Copper	µg/L	24.1	17.9
Lead	µg/L	3.55	3.06
Zinc	µg/L	177J	151J
Metals – Dissolved			
Copper	µg/L	7.67	6.63
Lead	µg/L	0.196J	0.22J
Zinc	µg/L	44.8	32.9

Notes:

J = estimated value between the method detection limit and the reporting limit.

Table 5. DOWNEY BIOSWALE BMP- WET EVENT 3

ANALYTE	UNITS	WET3 2/17/17 RESULTS	
		INFLOW	OUTFLOW
Conventionals			
pH	pH units	7.75	7.29
Conductivity	mS/cm	0.49	0.026
Solids, Total Suspended	mg/L	78	50
Hardness, Total (as CaCO ₃)	mg/L	16J	8J
Temperature	°C	14.52	14.51
Metals – Total			
Copper	µg/L	21.7	15.6
Lead	µg/L	5.73	4.32
Zinc	µg/L	145	120
Metals – Dissolved			
Copper	µg/L	7.02	6.55
Lead	µg/L	0.424J	0.456J
Zinc	µg/L	42	59.6

Notes:

J = estimated value between the method detection limit and the reporting limit.

J = estimated value as a result of the precision between the sample and field duplicate exceeding the RPD control limit of 25.

Table 6. DOWNEY BIOSWALE BMP- WET EVENT 4

ANALYTE	UNITS	WET4 4/8/17 RESULTS	
		INFLOW	OUTFLOW
Conventionals			
pH	pH units	6.91	6.86
Conductivity	mS/cm	0.316	0.347
Solids, Total Suspended	mg/L	48	40
Hardness, Total (as CaCO ₃)	mg/L	74	89
Temperature	°C	19.32	18.66
Metals – Total			
Copper	µg/L	104	80.6
Lead	µg/L	4.74	4.41
Zinc	µg/L	947	506
Metals – Dissolved			
Copper	µg/L	84.2	61.8
Lead	µg/L	2.00	2.20
Zinc	µg/L	734	385

Notes:

None

Table 7. WHITTIER BIORETENTION TREE WELL BMP- WET EVENT 1

ANALYTE	UNITS	WET1 1/12/17 RESULTS		
		INFLOW	OUTFLOW-1	OUTFLOW-2
Conventionals				
pH	pH units	7.71	7.66	7.67
Conductivity	mS/cm	0.004	0.032	0.028
Solids, Total Suspended	mg/L	157	72	150
Hardness, Total (as CaCO3)	mg/L	15	23	12
Temperature	°C	13.6	13.4	13.3
Metals – Total				
Copper	µg/L	21	12.8	18.9
Lead	µg/L	26.1	16	26.1
Zinc	µg/L	227J	181J	182J
Metals – Dissolved				
Copper	µg/L	2.34	2.42	2.77
Lead	µg/L	0.288J	0.259J	0.236J
Zinc	µg/L	11.4	10.9	12.5

Notes:

J = estimated value between the method detection limit and the reporting limit.

J = estimated value as a result of the precision between the sample and field duplicate exceeding the RPD control limit of 25.

Table 8. WHITTIER BIORETENTION TREE WELL BMP- WET EVENT 2

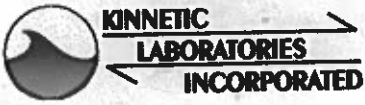
ANALYTE	UNITS	WET2 1/19/17 RESULTS		
		INFLOW	OUTFLOW-1	OUTFLOW-2
Conventionals				
pH	pH units	7.99	8.12	8.23
Conductivity	mS/cm	0.041	0.040	0.048
Solids, Total Suspended	mg/L	43	36	45
Hardness, Total (as CaCO3)	mg/L	11	12	14
Temperature	°C	12.8	12.8	13.2
Metals – Total				
Copper	µg/L	10.7	9.92	9.89
Lead	µg/L	10.7	8.21	10.4
Zinc	µg/L	136	152	142
Metals – Dissolved				
Copper	µg/L	4.67	4.74	4.23
Lead	µg/L	0.514	0.472J	0.395J
Zinc	µg/L	18.2	14.5	12.5

Notes:

J = estimated value between the method detection limit and the reporting limit.

Appendix A

Field Data Sheets



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Downey Bioswale QAPP Field Log

Date/Time: 1/9/17 Site ID: Bioswale Inflow
 Personnel: D. Gotsman, A. Northington Weather: Heavy rain
 Observations: flow from street med-heavy to bioswale

GRAB SAMPLE INFORMATION

Duplicate: (Y) / N

Grab Analyses:	
Grab 1 Time (500mL):	<u>0440</u>
Grab 2 Time (500mL):	<u>0510</u>
Grab 3 Time (500mL):	<u>0539</u>
Grab 4 Time (500mL):	<u>0600</u>
Grab 5 Time (500mL):	<u>0628</u>
Grab 6 Time (500mL):	<u>0648</u>

Duplicate Analyses:	
Dup. 1 Time (500mL):	<u>0438</u>
Dup. 2 Time (500mL):	<u>0508</u>
Dup. 3 Time (500mL):	<u>0537</u>
Dup. 4 Time (500mL):	<u>0607</u>
Dup. 5 Time (500mL):	<u>0627</u>
Dup. 6 Time (500mL):	<u>0647</u>

WATER QUALITY MEASUREMENTS

Water Quality Meter: Quanta 4670

Time	Temp (*C)	Conductivity (mS/cm)	pH	DO (mg/L)	Salinity (PSS)	DO%	Turbidity (NTU)
<u>0459</u>	<u>14.06</u>	<u>0.022</u>	<u>7.40</u>	<u>5.81</u>	<u>0.01</u>	<u>57.6</u>	<u>13.5</u>

NOTES: _____



Downey Bioswale QAPP Field Log

Date/Time: 1/9/17 0430 Site ID: Bioswale outflow
 Personnel: D. Gimsman, A. Worthington Weather: Heavy rain
 Observations: flow from street to bioswale is med-heavy

GRAB SAMPLE INFORMATION

Duplicate: Y / N

Grab Analyses:	
Grab 1 Time (500mL): <u>0442</u>	Grab 4 Time (500mL): <u>0609</u>
Grab 2 Time (500mL): <u>0512</u>	Grab 5 Time (500mL): <u>0629</u>
Grab 3 Time (500mL): <u>0540</u>	Grab 6 Time (500mL): <u>0649</u>

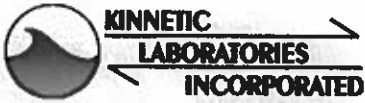
Duplicate Analyses:	
Dup. 1 Time (500mL): <u>N/A</u>	Dup. 4 Time (500mL): <u>N/A</u>
Dup. 2 Time (500mL): <u>N/A</u>	Dup. 5 Time (500mL): <u>N/A</u>
Dup. 3 Time (500mL): <u>N/A</u>	Dup. 6 Time (500mL): <u>N/A</u>

WATER QUALITY MEASUREMENTS

Water Quality Meter: Quanta 4070

Time	Temp (*C)	Conductivity (mS/cm)	pH	DO (mg/L)	Salinity (PSS)	DO%	Turbidity (NTU)
<u>0455</u>	<u>14.39</u>	<u>0.091</u>	<u>7.27</u>	<u>4.19</u>	<u>0.05</u>	<u>39.6</u>	<u>8.3</u>

NOTES: _____



Downey Bioswale QAPP Field Log

Date/Time: 1/12/17 Site ID: Downey - Inflow
 Personnel: D. Gimsman, V. Toknot Weather: Heavy rain
 Observations: Storm flow - heavy

GRAB SAMPLE INFORMATION

Duplicate: Y / N

Grab Analyses:	
Grab 1 Time (500mL): <u>0742</u>	Grab 4 Time (500mL): <u>0909</u>
Grab 2 Time (500mL): <u>0811</u>	Grab 5 Time (500mL): <u>0934</u>
Grab 3 Time (500mL): <u>0841</u>	Grab 6 Time (500mL): <u>1003</u>

Duplicate Analyses:	
Dup. 1 Time (500mL):	Dup. 4 Time (500mL):
Dup. 2 Time (500mL):	Dup. 5 Time (500mL):
Dup. 3 Time (500mL):	Dup. 6 Time (500mL):

WATER QUALITY MEASUREMENTS

Water Quality Meter: Quanta 454p

Time	Temp (*C)	Conductivity (mS/cm)	pH	DO (mg/L)	Salinity (PSS)	DO%	Turbidity (NTU)
<u>8:02</u>	<u>13.13</u>	<u>0.030</u>	<u>8.22</u>	<u>12.4</u>	<u>0.02</u>	<u>97.6</u>	<u>505</u>

NOTES: Mulch/Bark was washed over grate. Grate (outflow) was completely covered upon arrival. Removed some debris as best we could.



Downey Bioswale QAPP Field Log

Date/Time: 1/12/17 Site ID: Downey - outflow
 Personnel: D. Gindman, V. Fudenot Weather: Heavy rain
 Observations: Storm flow - heavy. Mulch/bark covered
outflow grates - removed some debris

GRAB SAMPLE INFORMATION

Duplicate: Y / N

Grab Analyses:	
Grab 1 Time (500mL): <u>0743</u>	Grab 4 Time (500mL): <u>0910</u>
Grab 2 Time (500mL): <u>0812</u>	Grab 5 Time (500mL): <u>0935</u>
Grab 3 Time (500mL): <u>0842</u>	Grab 6 Time (500mL): <u>1004</u>

Duplicate Analyses:	
Dup. 1 Time (500mL): <u>N/A</u>	Dup. 4 Time (500mL):
Dup. 2 Time (500mL):	Dup. 5 Time (500mL):
Dup. 3 Time (500mL):	Dup. 6 Time (500mL):

WATER QUALITY MEASUREMENTS

Water Quality Meter: Quanta 4546

Time	Temp (*C)	Conductivity (mS/cm)	pH	DO (mg/L)	Salinity (PSS)	DO%	Turbidity (NTU)
<u>8:07</u>	<u>12.97</u>	<u>0.038</u>	<u>7.92</u>	<u>8.45</u>	<u>0.02</u>	<u>75.4</u>	<u>50.5</u>

NOTES: Mulch/bark covered grate - was blocking outflow
removed debris as much as possible.



Downey Bioswale QAPP Field Log

Date/Time: 02/17/17 Site ID: Downey-Inflow-Comp
 Personnel: C. Davidson, V. Fortner Weather: rainy
 Observations: ridiculous windy to the point of stumbling

GRAB SAMPLE INFORMATION

Duplicate: (Y) / N

Grab Analyses:			
Grab 1 Time (500mL):	<u>1415</u>	Grab 4 Time (500mL):	<u>1545</u>
Grab 2 Time (500mL):	<u>1445</u>	Grab 5 Time (500mL):	<u>1615</u>
Grab 3 Time (500mL):	<u>1515</u>	Grab 6 Time (500mL):	<u>1645</u>

Duplicate Analyses:			
Dup. 1 Time (500mL):	<u>1416</u>	Dup. 4 Time (500mL):	<u>1546</u>
Dup. 2 Time (500mL):	<u>1446</u>	Dup. 5 Time (500mL):	<u>1616</u>
Dup. 3 Time (500mL):	<u>1516</u>	Dup. 6 Time (500mL):	<u>1646</u>

WATER QUALITY MEASUREMENTS

Water Quality Meter: _____

Time	Temp (*C)	Conductivity (mS/cm)	pH	DO (mg/L)	Salinity (PSS)	DO%	Turbidity (NTU)
<u>1420</u>	<u>14.52</u>	<u>0.49</u>	<u>7.75</u>	<u>10.12</u>	<u>0.03</u>	<u>91.4</u>	<u>60.9</u>

NOTES: Very good flow fast, deep
branches breaking from
conspicuous tree
turbidity Down flow



Downey Bioswale QAPP Field Log

Date/Time: 02/17/17

Site ID: Downey-Outflow-Comp

Personnel: C. Davidson V. Fontenot

Weather: Rain windy

Observations: ridiculously windy to the point of stumbling

GRAB SAMPLE INFORMATION

Duplicate: Y / N

Grab Analyses:			
Grab 1 Time (500mL):	<u>1415</u>	Grab 4 Time (500mL):	<u>1545</u>
Grab 2 Time (500mL):	<u>1445</u>	Grab 5 Time (500mL):	<u>1615</u>
Grab 3 Time (500mL):	<u>1515</u>	Grab 6 Time (500mL):	<u>1645</u>

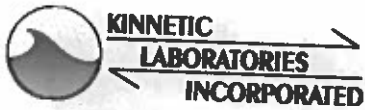
Duplicate Analyses:	
Dup. 1 Time (500mL):	<u>N/A</u>
Dup. 2 Time (500mL):	
Dup. 3 Time (500mL):	
Dup. 4 Time (500mL):	
Dup. 5 Time (500mL):	
Dup. 6 Time (500mL):	

WATER QUALITY MEASUREMENTS

Water Quality Meter: _____

Time	Temp (*C)	Conductivity (mS/cm)	pH	DO (mg/L)	Salinity (PSS)	DO%	Turbidity (NTU)
<u>1447</u>	<u>14.51</u>	<u>0.026</u>	<u>7.29</u>	<u>9.52</u>	<u>0.02</u>	<u>88.5</u>	<u>26.8</u>

NOTES: Attempted to take grab measurement after 1st grab too windy wanted till after second grab. Poured rain drain, flowing fast. Strong in manhole - torrential down pour



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Downey Bioswale QAPP Field Log

Date/Time: 4/8/2017 0210

Site ID: Downey Inflow

Personnel: CD/SS

Weather: Rain

Observations: Dark

GRAB SAMPLE INFORMATION

Duplicate: Y / (N)

Grab Analyses:

Grab 1 Time (500mL): <u>0250</u>	Grab 4 Time (500mL): <u>0330</u>
Grab 2 Time (500mL): <u>0310</u>	Grab 5 Time (500mL): <u>N/A</u>
Grab 3 Time (500mL): <u>0320</u>	Grab 6 Time (500mL): <u>↓</u>

Duplicate Analyses:

Dup. 1 Time (500mL):	Dup. 4 Time (500mL):
Dup. 2 Time (500mL):	Dup. 5 Time (500mL):
Dup. 3 Time (500mL):	Dup. 6 Time (500mL):

WATER QUALITY MEASUREMENTS

Water Quality Meter: QUANTA 4540

Time	Temp (*C)	Conductivity (mS/cm)	pH	DO (mg/L)	Salinity (PSS)	DO%	Turbidity (NTU)
<u>0305</u>	<u>19.32</u>	<u>0.316</u>	<u>6.91</u>	<u>7.81</u>	<u>0.15</u>	<u>77.7</u>	<u>50.2</u>

NOTES:

NOT ENOUGH RAIN TO COLLECT ALL 6 GRABS - RAINED ONLY ~ 1.5 HRS

Downey Bioswale QAPP Field Log

 Date/Time: 4/18/17 0210

 Site ID: Downey Outflow

 Personnel: CD/SS

 Weather: Rain

 Observations: Dark
GRAB SAMPLE INFORMATION

 Duplicate: Y / N *

Grab Analyses:			
Grab 1 Time (500mL):	<u>0250</u>	Grab 4 Time (500mL):	<u>0330</u>
Grab 2 Time (500mL):	<u>0310</u>	Grab 5 Time (500mL):	<u>N/A</u>
Grab 3 Time (500mL):	<u>0320</u>	Grab 6 Time (500mL):	<u>↓</u>

Duplicate Analyses:			
Dup. 1 Time (500mL):		Dup. 4 Time (500mL):	
Dup. 2 Time (500mL):		Dup. 5 Time (500mL):	
Dup. 3 Time (500mL):		Dup. 6 Time (500mL):	

WATER QUALITY MEASUREMENTS

 Water Quality Meter: QUANTA 4540

Time	Temp (*C)	Conductivity (mS/cm)	pH	DO (mg/L)	Salinity (PSS)	DO%	Turbidity (NTU)
<u>0300</u>	<u>18.74</u>	<u>0.525</u>	<u>7.04</u>	<u>7.43</u>	<u>0.25</u>	<u>76.0</u>	<u>59.5</u>
<u>0315</u>	<u>18.66</u>	<u>0.347</u>	<u>7.86</u>	<u>7.28</u>	<u>0.17</u>	<u>78.0</u>	<u>43.8</u>

NOTES:

Two quanta measurements take to try and better sample the same parcels of water

*DUP @ WHITTIER



760.438.8968 office

5225 Avenida Encinas, Suite H, Carlsbad, CA 92008

Environmental & Oceanographic Research

www.KinneticLabs.com

Whittier Tree Well Prop 84 QAPP Field Log

Date/Time: 1/12/17 Site ID: Inflow (7751)
 Personnel: C. Davidson, R. Marquez, D. Gonimas Weather: Rain-Heavy Comstock
 Observations: Oil sheen in tree well

GRAB SAMPLE INFORMATION

Duplicate: Y / N

Grab Analyses:	
Grab 1 Time (500mL): <u>0808</u>	Grab 4 Time (500mL): <u>1248</u>
Grab 2 Time (500mL): <u>0838</u>	Grab 5 Time (500mL): <u>1302</u>
Grab 3 Time (500mL): <u>0908</u>	Grab 6 Time (500mL): <u>1342</u>

Duplicate Analyses:	
Dup. 1 Time (500mL):	Dup. 4 Time (500mL):
Dup. 2 Time (500mL):	Dup. 5 Time (500mL):
Dup. 3 Time (500mL):	Dup. 6 Time (500mL):

WATER QUALITY MEASUREMENTS

Water Quality Meter: Quanta 4548

Time	Temp (*C)	Conductivity (mS/cm)	pH	DO (mg/L)	Salinity (PSS)	DO%	Turbidity (NTU)
<u>0912</u>	<u>13.55</u>	<u>0.004</u>	<u>7.71</u>	<u>10.02</u>	<u>0.02</u>	<u>97.6</u>	<u>45.3</u>

NOTES: Trash blocking inflow - removed
Some trash in tree well and from blocking inflow

Whittier Tree Well Prop 84 QAPP Field Log

Date/Time: 1/12/17 Site ID: Outflow-1 (7751 Connstock)
 Personnel: C. Davidson, R. Marquay Weather: Rain Heavy
 Observations: Oil sheen in tree well, plus a lot of trash

GRAB SAMPLE INFORMATION

 Duplicate: Y / N

Grab Analyses:	
Grab 1 Time (500mL): <u>0809</u>	Grab 4 Time (500mL): <u>1249</u>
Grab 2 Time (500mL): <u>0839</u>	Grab 5 Time (500mL): <u>1313</u>
Grab 3 Time (500mL): <u>0909</u>	Grab 6 Time (500mL): <u>1343</u>

Duplicate Analyses:	
Dup. 1 Time (500mL):	Dup. 4 Time (500mL):
Dup. 2 Time (500mL):	Dup. 5 Time (500mL):
Dup. 3 Time (500mL):	Dup. 6 Time (500mL):

WATER QUALITY MEASUREMENTS

 Water Quality Meter: Quanta 4545

Time	Temp (*C)	Conductivity (mS/cm)	pH	DO (mg/L)	Salinity (PSS)	DO%	Turbidity (NTU)
<u>0915</u>	<u>13.40</u>	<u>0.032</u>	<u>7.66</u>	<u>9.37</u>	<u>0.02</u>	<u>102.1</u>	<u>41.2</u>

NOTES: Need heavy rain for outflow

Whittier Tree Well Prop 84 QAPP Field Log

Date/Time: 1/12/17 Site ID: Outflow - 2 (7951) coms
 Personnel: C. Davidson, R. Marquez Weather: Rain - Heavy
 Observations: Storm drain before tree well site

GRAB SAMPLE INFORMATION

 Duplicate: Y / N

Grab Analyses:	
Grab 1 Time (500mL):	<u>0808</u>
Grab 2 Time (500mL):	<u>0838</u>
Grab 3 Time (500mL):	<u>0908</u>
Grab 4 Time (500mL):	<u>1330</u>
Grab 5 Time (500mL):	<u>1341</u>
Grab 6 Time (500mL):	<u>1352</u>

Duplicate Analyses:	
Dup. 1 Time (500mL):	<u>0810</u>
Dup. 2 Time (500mL):	<u>0840</u>
Dup. 3 Time (500mL):	<u>0910</u>
Dup. 4 Time (500mL):	<u>1331</u>
Dup. 5 Time (500mL):	<u>1342</u>
Dup. 6 Time (500mL):	<u>1353</u>

WATER QUALITY MEASUREMENTS

 Water Quality Meter: Quanta 4548

Time	Temp (*C)	Conductivity (mS/cm)	pH	DO (mg/L)	Salinity (PSS)	DO%	Turbidity (NTU)
<u>0918</u>	<u>13.3</u>	<u>0.028</u>	<u>7.67</u>	<u>853</u>	<u>0.02</u>	<u>79.8</u>	<u>29.0</u>

NOTES: Need heavy rain for a period of time for outflow. Due to storm drain, box requires heavy flow to fill. When rain is heavy, it flows from across the street to fill box - NOT much comes from upstreet on same side due to storm drain



Whittier Tree Well Prop 84 QAPP Field Log

Date/Time: 1/19/17 0310

Site ID: Whittier-inflow-1 *

Personnel: D. Gonsman, V. Focast

Weather: Med heavy rain

Observations: Dark. some trash in tree well. Good flow going in and out. - heavy flow

GRAB SAMPLE INFORMATION

Duplicate: Y / N

Grab Analyses:

Grab 1 Time (500mL): 0315	Grab 4 Time (500mL): 0425
Grab 2 Time (500mL): 0345	Grab 5 Time (500mL): 0445
Grab 3 Time (500mL): 0405	Grab 6 Time (500mL): 0505

Duplicate Analyses:

Dup. 1 Time (500mL): N/A	Dup. 4 Time (500mL):
Dup. 2 Time (500mL):	Dup. 5 Time (500mL):
Dup. 3 Time (500mL):	Dup. 6 Time (500mL):

WATER QUALITY MEASUREMENTS

Water Quality Meter: Quanta 4548

Time	Temp (*C)	Conductivity (mS/cm)	pH	DO (mg/L)	Salinity (PSS)	DO%	Turbidity (NTU)
03:54	12.79	0.041	7.99	9.28	0.02	81.9	237

NOTES: * 7751 Milton Ave inflow



Whittier Tree Well Prop 84 QAPP Field Log

Date/Time: 1/19/17 0310 Site ID: Whittier-outflow-1
 Personnel: D. Gonsman, V. Fokrot Weather: Heavy-med rain
 Observations: Night. Some trash in tree well. Good flow
going through

GRAB SAMPLE INFORMATION

Duplicate: Y / N

Grab Analyses:	
Grab 1 Time (500mL): <u>0316</u>	Grab 4 Time (500mL): <u>0426</u>
Grab 2 Time (500mL): <u>0346</u>	Grab 5 Time (500mL): <u>0446</u>
Grab 3 Time (500mL): <u>0406</u>	Grab 6 Time (500mL): <u>0506</u>

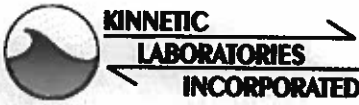
Duplicate Analyses:	
Dup. 1 Time (500mL):	Dup. 4 Time (500mL):
Dup. 2 Time (500mL):	Dup. 5 Time (500mL):
Dup. 3 Time (500mL):	Dup. 6 Time (500mL):

WATER QUALITY MEASUREMENTS

Water Quality Meter: Quanta 4548

Time	Temp (*C)	Conductivity (mS/cm)	pH	DO (mg/L)	Salinity (PSS)	DO%	Turbidity (NTU)
<u>3:53</u>	<u>12.80</u>	<u>0.040</u>	<u>8.12</u>	<u>9.50</u>	<u>0.02</u>	<u>84.7</u>	<u>22.9</u>

NOTES: * 7751 Milton Ave outflow



Whittier Tree Well Prop 84 QAPP Field Log

Date/Time: 1/19/17 0310 Site ID: Whittier-outflow-2
 Personnel: D. Engeman, V. Pokach Weather: Heavy-med rain
 Observations: Night. Some trash in tree well, but not obstructing. Very heavy flow going through

GRAB SAMPLE INFORMATION

Duplicate: Y / N

Grab Analyses:	
Grab 1 Time (500mL): <u>0317</u>	Grab 4 Time (500mL): <u>0427</u>
Grab 2 Time (500mL): <u>0347</u>	Grab 5 Time (500mL): <u>0447</u>
Grab 3 Time (500mL): <u>0407</u>	Grab 6 Time (500mL): <u>0507</u>

Duplicate Analyses: <u>(Long Beach Pump)</u>	
Dup. 1 Time (500mL): <u>0318</u>	Dup. 4 Time (500mL): <u>0428</u>
Dup. 2 Time (500mL): <u>0348</u>	Dup. 5 Time (500mL): <u>0448</u>
Dup. 3 Time (500mL): <u>0408</u>	Dup. 6 Time (500mL): <u>0508</u>

WATER QUALITY MEASUREMENTS

Water Quality Meter: Quanta 4548

Time	Temp (*C)	Conductivity (mS/cm)	pH	DO (mg/L)	Salinity (PSS)	DO%	Turbidity (NTU)
<u>0358</u>	<u>13.19</u>	<u>0.048</u>	<u>8.23</u>	<u>8.30</u>	<u>0.03</u>	<u>77.3</u>	<u>29.4</u>

NOTES: * 7913 Milton Ave Outflow
- some flow comes from opposite side of street



Whittier Tree Well Prop 84 QAPP Field Log

Date/Time: 4/8/17 0230 Site ID: INFLOW-1 (7751 MILTON)
 Personnel: D. Gonsman, V. Fontknot Weather: Light rain
 Observations: light rain, but no flow. Not enough rain to sample

GRAB SAMPLE INFORMATION

Duplicate: Y / N

Grab Analyses:	
Grab 1 Time (500mL):	Grab 4 Time (500mL):
Grab 2 Time (500mL):	Grab 5 Time (500mL):
Grab 3 Time (500mL):	Grab 6 Time (500mL):

None

Duplicate Analyses:	
Dup. 1 Time (500mL):	Dup. 4 Time (500mL):
Dup. 2 Time (500mL):	Dup. 5 Time (500mL):
Dup. 3 Time (500mL):	Dup. 6 Time (500mL):

WATER QUALITY MEASUREMENTS

Water Quality Meter: None

Time	Temp (*C)	Conductivity (mS/cm)	pH	DO (mg/L)	Salinity (PSS)	DO%	Turbidity (NTU)

NOTES: 7751 Milton Ave, Whittier (inflow) tree well
7751 Milton Ave, " (outflow) tree well
7913 Milton Ave, Whittier (outflow) tree well
 - Waited for over an hour but flow never started - rain was too light and short in time

Appendix B

Photographs



Figure B-1. Outflow Grate at the Downey Bioswale



Figure B-2. Inflow to the Downey Bioswale during the January 12 Event.



Figure B-3. Flow in the Downey Bioswale during the January 12 Event.



Figure B-4. Outflow from the Downey Bioswale and the Outflow Sampling Point during the January 12 Event.



Figure B-5. Inflow to the Downey Bioswale during the February 17 Event.



Figure B-6. Flow through the Downey Bioswale during the February 17 Event.



Figure B-7. Outflow from the Downey Bioswale during the February 17 Event.



Figure B-8. Outflow Sampling Point from the Downey Bioswale during the February 17 Event.

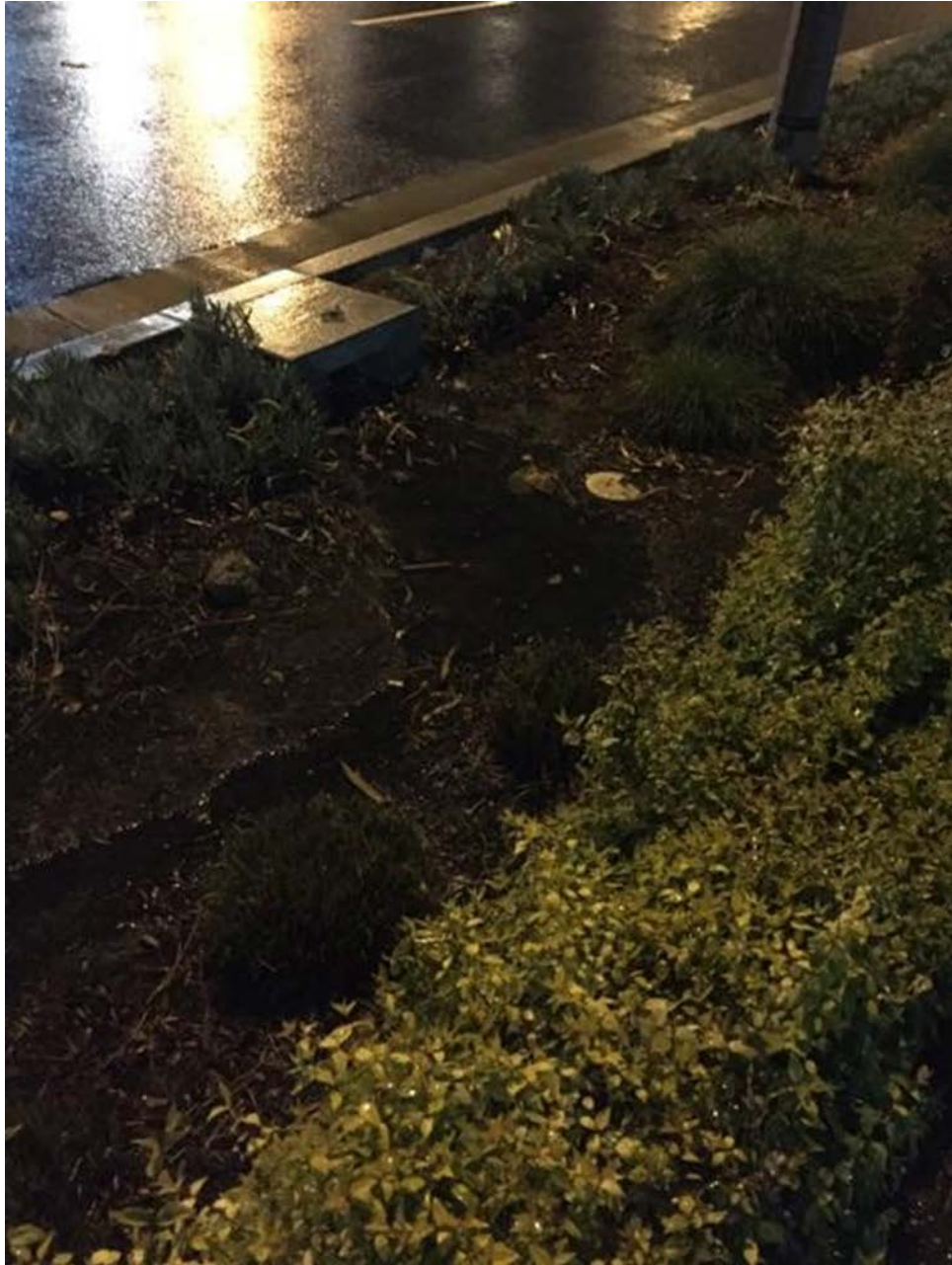


Figure B-9. Inflow to the Downey Bioswale during the April 8 Event.



Figure B-10. Outflow at the Downey Bioswale during the April 8 Event.



Figure B-11. Flow in the Downey Bioswale during the April 8 Event.



Figure B-12. Whittier Tree Well at 7751 Milton Street.



Figure B-13. Whittier Tree Well at 7913 Milton Street.



Figure B-14. Whittier Tree Well at 7751 Comstock.



Figure B-15. Second Whittier Tree Well on Comstock.



Figure B-16. Third Whittier Tree Well on Comstock.



Figure B-17. Flow through the Whitter Tree Well at 7751 Milton Ave. during the January 19 Event.



Figure B-18. Outflow from the Whitter Tree Well at 7751 Milton Ave. during the January 19 Event.



Figure B-19. Flow through the Whitter Tree Well at 7913 Milton Ave. during the January 19 Event.



Figure B-20. Outflow from the Whitter Tree Well at 7913 Milton Ave. during the January 19 Event.



Figure B-21. Whittier Tree Well at 7751 Milton Ave during the April 8 Event.



Figure B-22. Whittier Tree Well at 7913 Milton Ave during the April 8 Event.

Appendix C

Analytical Laboratory Reports



Calscience



WORK ORDER NUMBER: 17-01-0614

The difference is service



AIR | SOIL | WATER | MARINE CHEMISTRY

Analytical Report For

Client: Kinnetic Laboratories, Inc.

Client Project Name: Prop 84 Green Streets BMP

Attention: Danielle Gonsman
2750 East Spring Street
Suite 190
Long Beach, CA 90806-2249

Approved for release on 01/17/2017 by:
Carla Hollowell
Project Manager

ResultLink ▶

Email your PM ▶

Eurofins Calscience, Inc. (Calscience) certifies that the test results provided in this report meet all NELAC requirements for parameters for which accreditation is required or available. Any exceptions to NELAC requirements are noted in the case narrative. The original report of subcontracted analyses, if any, is attached to this report. The results in this report are limited to the sample(s) tested and any reproduction thereof must be made in its entirety. The client or recipient of this report is specifically prohibited from making material changes to said report and, to the extent that such changes are made, Calscience is not responsible, legally or otherwise. The client or recipient agrees to indemnify Calscience for any defense to any litigation which may arise.

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 Work Order Number: 17-01-0614

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Condition Upon Receipt:

Samples were received under Chain-of-Custody (COC) on 01/09/17. They were assigned to Work Order 17-01-0614.

Unless otherwise noted on the Sample Receiving forms all samples were received in good condition and within the recommended EPA temperature criteria for the methods noted on the COC. The COC and Sample Receiving Documents are integral elements of the analytical report and are presented at the back of the report.

Holding Times:

All samples were analyzed within prescribed holding times (HT) and/or in accordance with the Calscience Sample Acceptance Policy unless otherwise noted in the analytical report and/or comprehensive case narrative, if required.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of ≤ 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

Quality Control:

All quality control parameters (QC) were within established control limits except where noted in the QC summary forms or described further within this report.

Subcontractor Information:

Unless otherwise noted below (or on the subcontract form), no samples were subcontracted.

Additional Comments:

Air - Sorbent-extracted air methods (EPA TO-4A, EPA TO-10, EPA TO-13A, EPA TO-17): Analytical results are converted from mass/sample basis to mass/volume basis using client-supplied air volumes.

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are always reported on a wet weight basis.



Calscience

Sample Summary

Client: Kinnetic Laboratories, Inc.	Work Order: 17-01-0614
2750 East Spring Street, Suite 190	Project Name: Prop 84 Green Streets BMP
Long Beach, CA 90806-2249	PO Number: 5720.166
	Date/Time Received: 01/09/17 17:00
	Number of Containers: 21

Attn: Danielle Gonsman

Sample Identification	Lab Number	Collection Date and Time	Number of Containers	Matrix
Downey-Inflow-Grab1	17-01-0614-1	01/09/17 04:40	1	Aqueous
Downey-Inflow-Grab2	17-01-0614-2	01/09/17 05:10	1	Aqueous
Downey-Inflow-Grab3	17-01-0614-3	01/09/17 05:39	1	Aqueous
Downey-Inflow-Grab4	17-01-0614-4	01/09/17 06:08	1	Aqueous
Downey-Inflow-Grab5	17-01-0614-5	01/09/17 06:28	1	Aqueous
Downey-Inflow-Grab6	17-01-0614-6	01/09/17 06:48	1	Aqueous
Downey-Inflow-Comp-Wet1	17-01-0614-7	01/09/17 06:48	1	Aqueous
Downey-Outflow-Grab1	17-01-0614-8	01/09/17 04:42	1	Aqueous
Downey-Outflow-Grab2	17-01-0614-9	01/09/17 05:12	1	Aqueous
Downey-Outflow-Grab3	17-01-0614-10	01/09/17 05:40	1	Aqueous
Downey-Outflow-Grab4	17-01-0614-11	01/09/17 06:09	1	Aqueous
Downey-Outflow-Grab5	17-01-0614-12	01/09/17 06:29	1	Aqueous
Downey-Outflow-Grab6	17-01-0614-13	01/09/17 06:49	1	Aqueous
Downey-Outflow-Comp-Wet1	17-01-0614-14	01/09/17 06:49	1	Aqueous
Long Beach Pump-Grab1	17-01-0614-15	01/09/17 04:38	1	Aqueous
Long Beach Pump-Grab2	17-01-0614-16	01/09/17 05:08	1	Aqueous
Long Beach Pump-Grab3	17-01-0614-17	01/09/17 05:37	1	Aqueous
Long Beach Pump-Grab4	17-01-0614-18	01/09/17 06:07	1	Aqueous
Long Beach Pump-Grab5	17-01-0614-19	01/09/17 06:27	1	Aqueous
Long Beach Pump-Grab6	17-01-0614-20	01/09/17 06:47	1	Aqueous
Long Beach Pump-Comp-Wet1	17-01-0614-21	01/09/17 06:47	1	Aqueous


 Return to Contents



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Analytical Report

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 01/09/17
Work Order: 17-01-0614
Preparation: N/A
Method: SM 2340C
Units: mg/L

Project: Prop 84 Green Streets BMP

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Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Downey-Inflow-Comp-Wet1	17-01-0614-7-A	01/09/17 06:48	Aqueous	BUR21	N/A	01/13/17 15:20	H0113HARB1

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>MDL</u>	<u>DF</u>	<u>Qualifiers</u>
Hardness, Total (as CaCO ₃)	7.0	2.0	0.99	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Downey-Outflow-Comp-Wet1	17-01-0614-14-A	01/09/17 06:49	Aqueous	BUR21	N/A	01/13/17 15:20	H0113HARB1

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>MDL</u>	<u>DF</u>	<u>Qualifiers</u>
Hardness, Total (as CaCO ₃)	10	2.0	0.99	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Long Beach Pump-Comp-Wet1	17-01-0614-21-A	01/09/17 06:47	Aqueous	BUR21	N/A	01/13/17 15:20	H0113HARB1

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>MDL</u>	<u>DF</u>	<u>Qualifiers</u>
Hardness, Total (as CaCO ₃)	12	2.0	0.99	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	099-14-457-687	N/A	Aqueous	BUR21	N/A	01/13/17 15:20	H0113HARB1

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>MDL</u>	<u>DF</u>	<u>Qualifiers</u>
Hardness, Total (as CaCO ₃)	ND	2.0	0.99	1.00	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.



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Analytical Report

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 01/09/17
Work Order: 17-01-0614
Preparation: N/A
Method: SM 2540 D
Units: mg/L

Project: Prop 84 Green Streets BMP

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Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Downey-Inflow-Comp-Wet1	17-01-0614-7-A	01/09/17 06:48	Aqueous	N/A	N/A	01/13/17 16:10	H0113TSSB2

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>MDL</u>	<u>DF</u>	<u>Qualifiers</u>
Solids, Total Suspended	28	1.0	0.83	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Downey-Outflow-Comp-Wet1	17-01-0614-14-A	01/09/17 06:49	Aqueous	N/A	N/A	01/13/17 16:10	H0113TSSB2

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>MDL</u>	<u>DF</u>	<u>Qualifiers</u>
Solids, Total Suspended	4.0	1.0	0.83	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Long Beach Pump-Comp-Wet1	17-01-0614-21-A	01/09/17 06:47	Aqueous	N/A	N/A	01/13/17 16:10	H0113TSSB2

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>MDL</u>	<u>DF</u>	<u>Qualifiers</u>
Solids, Total Suspended	24	1.0	0.83	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	099-09-010-8074	N/A	Aqueous	N/A	01/13/17	01/13/17 16:10	H0113TSSB2

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>MDL</u>	<u>DF</u>	<u>Qualifiers</u>
Solids, Total Suspended	ND	1.0	0.83	1.00	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.



Calscience

Analytical Report

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 01/09/17
Work Order: 17-01-0614
Preparation: Filtered
Method: EPA 200.8
Units: ug/L

Project: Prop 84 Green Streets BMP

Page 1 of 1

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Downey-Inflow-Comp-Wet1	17-01-0614-7-A	01/09/17 06:48	Aqueous	ICP/MS 03	01/10/17	01/11/17 06:11	170110LA4F

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>MDL</u>	<u>DF</u>	<u>Qualifiers</u>
Copper	6.07	1.00	0.140	1.00	B
Lead	0.209	0.500	0.0898	1.00	J
Zinc	44.7	2.00	0.479	1.00	B

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Downey-Outflow-Comp-Wet1	17-01-0614-14-A	01/09/17 06:49	Aqueous	ICP/MS 03	01/10/17	01/11/17 06:14	170110LA4F

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>MDL</u>	<u>DF</u>	<u>Qualifiers</u>
Copper	4.41	1.00	0.140	1.00	B
Lead	0.184	0.500	0.0898	1.00	J
Zinc	16.8	2.00	0.479	1.00	B

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Long Beach Pump-Comp-Wet1	17-01-0614-21-A	01/09/17 06:47	Aqueous	ICP/MS 03	01/10/17	01/11/17 06:16	170110LA4F

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>MDL</u>	<u>DF</u>	<u>Qualifiers</u>
Copper	6.30	1.00	0.140	1.00	B
Lead	0.191	0.500	0.0898	1.00	J
Zinc	33.5	2.00	0.479	1.00	B

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	099-16-094-1683	N/A	Aqueous	ICP/MS 03	01/10/17	01/11/17 05:54	170110LA4F

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>MDL</u>	<u>DF</u>	<u>Qualifiers</u>
Copper	0.394	1.00	0.140	1.00	J
Lead	ND	0.500	0.0898	1.00	
Zinc	0.593	2.00	0.479	1.00	J

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.



Calscience

Analytical Report

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 01/09/17
Work Order: 17-01-0614
Preparation: N/A
Method: EPA 200.8
Units: ug/L

Project: Prop 84 Green Streets BMP

Page 1 of 1

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Downey-Inflow-Comp-Wet1	17-01-0614-7-A	01/09/17 06:48	Aqueous	ICP/MS 03	01/11/17	01/13/17 00:50	170111LA4A

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>MDL</u>	<u>DF</u>	<u>Qualifiers</u>
Copper	15.0	1.00	0.140	1.00	
Lead	3.07	0.500	0.0898	1.00	
Zinc	294	2.00	0.479	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Downey-Outflow-Comp-Wet1	17-01-0614-14-A	01/09/17 06:49	Aqueous	ICP/MS 03	01/11/17	01/13/17 00:53	170111LA4A

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>MDL</u>	<u>DF</u>	<u>Qualifiers</u>
Copper	5.27	1.00	0.140	1.00	
Lead	0.509	0.500	0.0898	1.00	
Zinc	204	2.00	0.479	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Long Beach Pump-Comp-Wet1	17-01-0614-21-A	01/09/17 06:47	Aqueous	ICP/MS 03	01/11/17	01/13/17 00:55	170111LA4A

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>MDL</u>	<u>DF</u>	<u>Qualifiers</u>
Copper	13.3	1.00	0.140	1.00	
Lead	2.55	0.500	0.0898	1.00	
Zinc	188	2.00	0.479	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	099-16-448-12	N/A	Aqueous	ICP/MS 03	01/11/17	01/12/17 19:06	170111LA4A

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>MDL</u>	<u>DF</u>	<u>Qualifiers</u>
Copper	ND	1.00	0.140	1.00	
Lead	ND	0.500	0.0898	1.00	
Zinc	ND	2.00	0.479	1.00	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.



Calscience

Quality Control - Spike/Spike Duplicate

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 01/09/17
Work Order: 17-01-0614
Preparation: Filtered
Method: EPA 200.8

Project: Prop 84 Green Streets BMP

Page 1 of 2

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
Downey-Inflow-Comp-Wet1	Sample	Aqueous	ICP/MS 03	01/10/17	01/11/17 06:11	170110SA4
Downey-Inflow-Comp-Wet1	Matrix Spike	Aqueous	ICP/MS 03	01/10/17	01/11/17 06:06	170110SA4
Downey-Inflow-Comp-Wet1	Matrix Spike Duplicate	Aqueous	ICP/MS 03	01/10/17	01/11/17 06:09	170110SA4

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Copper	6.068	100.0	103.7	98	104.4	98	80-120	1	0-20	
Lead	ND	100.0	93.46	93	93.26	93	80-120	0	0-20	
Zinc	44.66	100.0	137.7	93	136.5	92	80-120	1	0-20	

Return to Contents

RPD: Relative Percent Difference. CL: Control Limits



Calscience

Quality Control - Spike/Spike Duplicate

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 01/09/17
Work Order: 17-01-0614
Preparation: N/A
Method: EPA 200.8

Project: Prop 84 Green Streets BMP

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Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
17-01-0618-1	Sample	Aqueous	ICP/MS 03	01/11/17	01/12/17 20:04	170111SA4
17-01-0618-1	Matrix Spike	Aqueous	ICP/MS 03	01/11/17	01/12/17 19:59	170111SA4
17-01-0618-1	Matrix Spike Duplicate	Aqueous	ICP/MS 03	01/11/17	01/12/17 20:01	170111SA4

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Copper	2.102	100.0	98.92	97	96.48	94	80-120	2	0-20	
Lead	ND	100.0	102.6	103	102.6	103	80-120	0	0-20	
Zinc	101.3	100.0	138.4	37	151.4	50	80-120	9	0-20	3


 Return to Contents

RPD: Relative Percent Difference. CL: Control Limits



Calscience

Quality Control - Sample Duplicate

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 01/09/17
Work Order: 17-01-0614
Preparation: N/A
Method: SM 2340C

Project: Prop 84 Green Streets BMP

Page 1 of 2

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	Duplicate Batch Number
17-01-0557-6	Sample	Aqueous	BUR21	N/A	01/13/17 15:20	H0113HARD1
17-01-0557-6	Sample Duplicate	Aqueous	BUR21	N/A	01/13/17 15:20	H0113HARD1
<u>Parameter</u>		<u>Sample Conc.</u>	<u>DUP Conc.</u>	<u>RPD</u>	<u>RPD CL</u>	<u>Qualifiers</u>
Hardness, Total (as CaCO ₃)		57.00	55.00	4	0-25	

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RPD: Relative Percent Difference. CL: Control Limits



Calscience

Quality Control - Sample Duplicate

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 01/09/17
Work Order: 17-01-0614
Preparation: N/A
Method: SM 2540 D

Project: Prop 84 Green Streets BMP

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Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	Duplicate Batch Number
17-01-0619-1	Sample	Aqueous	N/A	01/13/17 00:00	01/13/17 16:10	H0113TSSD2
17-01-0619-1	Sample Duplicate	Aqueous	N/A	01/13/17 00:00	01/13/17 16:10	H0113TSSD2

Parameter	Sample Conc.	DUP Conc.	RPD	RPD CL	Qualifiers
Solids, Total Suspended	27.60	25.60	8	0-20	



Return to Contents

RPD: Relative Percent Difference. CL: Control Limits



Calscience

Quality Control - LCS/LCSD

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 01/09/17
Work Order: 17-01-0614
Preparation: N/A
Method: SM 2540 D

Project: Prop 84 Green Streets BMP

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Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number			
099-09-010-8074	LCS	Aqueous	N/A	01/13/17	01/13/17 16:10	H0113TSSB2			
099-09-010-8074	LCSD	Aqueous	N/A	01/13/17	01/13/17 16:10	H0113TSSB2			
Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Solids, Total Suspended	100.0	88.00	88	90.00	90	80-120	2	0-20	

Return to Contents

RPD: Relative Percent Difference. CL: Control Limits



Calscience

Quality Control - LCS

Kinnetic Laboratories, Inc.
 2750 East Spring Street, Suite 190
 Long Beach, CA 90806-2249

Date Received: 01/09/17
 Work Order: 17-01-0614
 Preparation: Filtered
 Method: EPA 200.8

Project: Prop 84 Green Streets BMP

Page 2 of 3

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
099-16-094-1683	LCS	Aqueous	ICP/MS 03	01/10/17	01/11/17 05:56	170110LA4F

<u>Parameter</u>	<u>Spike Added</u>	<u>Conc. Recovered</u>	<u>LCS %Rec.</u>	<u>%Rec. CL</u>	<u>Qualifiers</u>
Copper	100.0	95.38	95	80-120	
Lead	100.0	91.94	92	80-120	
Zinc	100.0	95.24	95	80-120	

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RPD: Relative Percent Difference. CL: Control Limits



Calscience

Quality Control - LCS

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 01/09/17
Work Order: 17-01-0614
Preparation: N/A
Method: EPA 200.8

Project: Prop 84 Green Streets BMP

Page 3 of 3

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
099-16-448-12	LCS	Aqueous	ICP/MS 03	01/11/17	01/12/17 19:11	170111LA4A
<u>Parameter</u>		<u>Spike Added</u>	<u>Conc. Recovered</u>	<u>LCS %Rec.</u>	<u>%Rec. CL</u>	<u>Qualifiers</u>
Copper		100.0	103.0	103	80-120	
Lead		100.0	94.41	94	80-120	
Zinc		100.0	97.20	97	80-120	

Return to Contents

RPD: Relative Percent Difference. CL: Control Limits

Glossary of Terms and Qualifiers

Work Order: 17-01-0614

Page 1 of 1

<u>Qualifiers</u>	<u>Definition</u>
*	See applicable analysis comment.
<	Less than the indicated value.
>	Greater than the indicated value.
1	Surrogate compound recovery was out of control due to a required sample dilution. Therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike (MS) or Matrix Spike Duplicate (MSD) compound was out of control due to suspected matrix interference. The associated LCS recovery was in control.
4	The MS/MSD RPD was out of control due to suspected matrix interference.
5	The PDS/PDSD or PES/PESD associated with this batch of samples was out of control due to suspected matrix interference.
6	Surrogate recovery below the acceptance limit.
7	Surrogate recovery above the acceptance limit.
B	Analyte was present in the associated method blank.
BU	Sample analyzed after holding time expired.
BV	Sample received after holding time expired.
CI	See case narrative.
E	Concentration exceeds the calibration range.
ET	Sample was extracted past end of recommended max. holding time.
HD	The chromatographic pattern was inconsistent with the profile of the reference fuel standard.
HDH	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but heavier hydrocarbons were also present (or detected).
HDL	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but lighter hydrocarbons were also present (or detected).
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
JA	Analyte positively identified but quantitation is an estimate.
ME	LCS Recovery Percentage is within Marginal Exceedance (ME) Control Limit range (+/- 4 SD from the mean).
ND	Parameter not detected at the indicated reporting limit.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
SG	The sample extract was subjected to Silica Gel treatment prior to analysis.
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.
	Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are reported on a wet weight basis.
	Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.
	A calculated total result (Example: Total Pesticides) is the summation of each component concentration and/or, if "J" flags are reported, estimated concentration. Component concentrations showing not detected (ND) are summed into the calculated total result as zero concentrations.

Chain of Custody Record

To: Eurofins Calscience
7440 Lincoln Way
Garden Grove, CA 92841
Phone: (714) 895-5494

From: Kinnetic Laboratories, Inc
2750 E. Spring Street, Suite 190
Long Beach, CA 90806
(562) 595-8700

Date Received: _____
Lab #: _____

Contact: Kathy Burney

Contact: Danielle Gonsman



17-01-0614

Project: Downey Bioswale BMP Stormwater
Complete by: Standard TAT

Matrix: Water

Project #: _____

SampleID	StationID	Sample Date	Sample Time	Sample Type	Analysis	Container	Pres	No. of Bottles	LabID	Condition Upon Receipt
Downey-Inflow-Grab1	Bioswale Inflow	1/9/17	0440	Grab	Composite*	500 mL HDPE	4 °C	1		
Downey-Inflow-Grab2	Bioswale Inflow		0570	Grab	Composite*	500 mL HDPE	4 °C	1		
Downey-Inflow-Grab3	Bioswale Inflow		0539	Grab	Composite*	500 mL HDPE	4 °C	1		
Downey-Inflow-Grab4	Bioswale Inflow		0608	Grab	Composite*	500 mL HDPE	4 °C	1		
Downey-Inflow-Grab5	Bioswale Inflow		0628	Grab	Composite*	500 mL HDPE	4 °C	1		
Downey-Inflow-Grab6	Bioswale Inflow		0648	Grab	Composite*	500 mL HDPE	4 °C	1		
Downey-Inflow-Comp-Wet1	Bioswale Inflow	1/9/17	0648	Composite*	TSS, Hardness, Total and Dissolved Cu, Pb, Zn	N/A	4 °C	N/A		

Data Report MUST include the following: Sample ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer. All times on this sheet are military time. Email Sample Receipt Confirmations, PDF reports, and SWAMP EDDs to edd@kinneticlabs.net.

Special Instructions/Comments: *Composite grab samples (Downey-Inflow-Grab1 to -Grab6) into one sample (Downey-Inflow-Comp-Wet1) and perform TSS, Hardness, and Total and Dissolved Cu, Pb, Zn (EPA 200.8) on the composite sample only. Diss. Metals need to be lab filtered. Reference project QAPP for specific QA/QC requirements.

Sampled and Relinquished By:	Date/Time:	Transporter	Received By:	Date/Time:
<i>Thyl</i>	1/9/17 15:05	Cal Science	<i>RMJ</i>	1/9/17 1505
Relinquished By:	Date/Time:	Transporter	Received By:	Date/Time:
<i>Randy</i>	1/9/17 1700		<i>RMJ</i>	1/9/17 1700



Chain of Custody Record

To: Eurofins Calscience
7440 Lincoln Way
Garden Grove, CA 92841
Phone: (714) 895-5494

From: Kinnetic Laboratories, Inc
2750 E. Spring Street, Suite 190
Long Beach, CA 90806
(562) 595-8700

Contact: Kathy Burney

Contact: Danielle Gonsman

Date Received:

Lab #:

Project #: 0614

Matrix: Water

Project #: 0614

SampleID	StationID	Sample Date	Sample Time	Sample Type	Analysis	Container	Pres	No. of Bottles	LabID	Condition Upon Receipt
Downey-Outlet-Grab1	Bioswale Outflow	1/9/17	0442	Grab	Composite*	500 mL HDPE	4 °C	1		
Downey-Outlet-Grab2	Bioswale Outflow		0412	Grab	Composite*	500 mL HDPE	4 °C	1		
Downey-Outlet-Grab3	Bioswale Outflow		0540	Grab	Composite*	500 mL HDPE	4 °C	1		
Downey-Outlet-Grab4	Bioswale Outflow		0609	Grab	Composite*	500 mL HDPE	4 °C	1		
Downey-Outlet-Grab5	Bioswale Outflow		0629	Grab	Composite*	500 mL HDPE	4 °C	1		
Downey-Outlet-Grab6	Bioswale Outflow		0649	Grab	Composite*	500 mL HDPE	4 °C	1		
Downey-Outlet-Comp-Wet1	Bioswale Outflow	1/9/17	0649	Composite*	TSS, Hardness, Total and Dissolved Cu, Pb, Zn	N/A	4 °C	N/A		

Data Report MUST include the following: Sample ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer. All times on this sheet are military time. Email Sample Receipt Confirmations, PDF reports, and SWAMP EDDs to etd@kinneticlabs.net.

Special Instructions/Comments: *Composite grab samples (Downey-Outlet-Grab1 to -Grab6) into one sample (Downey-Outlet-Comp-Wet1) and perform TSS, Hardness, and Total and Dissolved Cu, Pb, Zn (EPA 200.8) on the composite sample only. Diss. Metals need to be lab filtered. Reference project QAPP for specific QA/QC requirements.

Sampled and Relinquished By: *Mary E. [Signature]* Date/Time: 1/9/17 15:05

Transporter: Cal science

Received By: *[Signature]* Date/Time: 1/9/17 1505






Relinquished By: *[Signature]* Date/Time: 1/9/17 1700

Transporter: [Signature]

Received By: *[Signature]* Date/Time: 1/9/17 1700



Chain of Custody Record

To: Eurofins Calscience 7440 Lincoln Way Garden Grove, CA 92841 Phone: (714) 895-5494		From: Kinnetic Laboratories, Inc 2750 E. Spring Street, Suite 190 Long Beach, CA 90806 (562) 595-8700								
Date Received: Lab #:		(0614)		Project #:						
Contact: Kathy Burney		Contact: Danielle Gonsman		Matrix: Water						
Project: Downey Bioswale BMP Stormwater		Complete by: Standard TAT		Project #:						
SampleID	StationID	Sample Date	Sample Time	Sample Type	Analysis	Container	Pres	No. of Bottles	LabID	Condition Upon Receipt
Long Beach Pump-Grab1	Long Beach Pump	1/9/17	0430	Grab	Composite*	500 mL HDPE	4 °C	1		
Long Beach Pump-Grab2	Long Beach Pump		0500	Grab	Composite*	500 mL HDPE	4 °C	1		
Long Beach Pump-Grab3	Long Beach Pump		0937	Grab	Composite*	500 mL HDPE	4 °C	1		
Long Beach Pump-Grab4	Long Beach Pump		0607	Grab	Composite*	500 mL HDPE	4 °C	1		
Long Beach Pump-Grab5	Long Beach Pump		0627	Grab	Composite*	500 mL HDPE	4 °C	1		
Long Beach Pump-Grab6	Long Beach Pump		0647	Grab	Composite*	500 mL HDPE	4 °C	1		
Long Beach Pump-Comp-Wet1	Long Beach Pump	1/9/17	0647	Composite*	TSS, Hardness, Total and Dissolved Cu, Pb, Zn	N/A	4 °C	N/A		
Data Report MUST include the following: Sample ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer. All times on this sheet are military time. Email Sample Receipt Confirmations, PDF reports, and SWAMP EDDs to edd@kinneticlabs.net.										
Special Instructions/Comments: *Composite grab samples (Long Beach Pump-Grab1 to -Grab6) into one sample (Long Beach Pump-Comp-Wet1) and perform TSS, Hardness, and Total and Dissolved Cu, Pb, Zn (EPA 200.8) on the composite sample only. Diss. metals need to be lab filtered. Reference project GAPP for specific QA/QC requirements.										
Sampled and Relinquished By: 		Date/Time: 1/9/17 15:05		Transporter: Cal Science		Received By: 		Date/Time: 1/9/17 1505		
Relinquished By: 		Date/Time: 1/9/17 1700		Transporter:		Received By: 		Date/Time: 1/9/17 1700		

SAMPLE RECEIPT CHECKLIST

COOLER 1 OF 1

CLIENT: KINNETIC LABORATORIES INC.

DATE: 01 / 9 / 2017

TEMPERATURE: (Criteria: 0.0°C – 6.0°C, not frozen except sediment/tissue)
 Thermometer ID: SC3B (CF: 0.0°C); Temperature (w/o CF): 2.3 °C (w/ CF): 2.3 °C; Blank Sample
 Sample(s) outside temperature criteria (PM/APM contacted by: _____)
 Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling
 Sample(s) received at ambient temperature; placed on ice for transport by courier
 Ambient Temperature: Air Filter

Checked by: 676

CUSTODY SEAL:

Cooler Present and Intact Present but Not Intact Not Present N/A
 Sample(s) Present and Intact Present but Not Intact Not Present N/A

Checked by: 676
876

SAMPLE CONDITION:

	Yes	No	N/A
Chain-of-Custody (COC) document(s) received with samples	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
COC document(s) received complete	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Sampling date <input type="checkbox"/> Sampling time <input type="checkbox"/> Matrix <input type="checkbox"/> Number of containers			
<input type="checkbox"/> No analysis requested <input type="checkbox"/> Not relinquished <input type="checkbox"/> No relinquished date <input type="checkbox"/> No relinquished time			
Sampler's name indicated on COC	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sample container label(s) consistent with COC	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sample container(s) intact and in good condition	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Proper containers for analyses requested	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sufficient volume/mass for analyses requested	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Samples received within holding time	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Aqueous samples for certain analyses received within 15-minute holding time			
<input type="checkbox"/> pH <input type="checkbox"/> Residual Chlorine <input type="checkbox"/> Dissolved Sulfide <input type="checkbox"/> Dissolved Oxygen	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Proper preservation chemical(s) noted on COC and/or sample container	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unpreserved aqueous sample(s) received for certain analyses			
<input type="checkbox"/> Volatile Organics <input checked="" type="checkbox"/> Total Metals <input checked="" type="checkbox"/> Dissolved Metals			
Container(s) for certain analysis free of headspace	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/> Volatile Organics <input type="checkbox"/> Dissolved Gases (RSK-175) <input type="checkbox"/> Dissolved Oxygen (SM 4500)			
<input type="checkbox"/> Carbon Dioxide (SM 4500) <input type="checkbox"/> Ferrous Iron (SM 3500) <input type="checkbox"/> Hydrogen Sulfide (Hach)			
Tedlar™ bag(s) free of condensation	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

CONTAINER TYPE:

(Trip Blank Lot Number: _____)

Aqueous: VOA VOA_h VOA_{na2} 100PJ 100PJ_{na2} 125AGB 125AGB_h 125AGB_p 125PB
 125PB_{z_{na}} 250AGB 250CGB 250CGB_s 250PB 250PB_n 500AGB 500AGJ 500AGJ_s
 500PB 1AGB 1AGB_{na2} 1AGB_s 1PB 1PB_{na} _____ _____ _____ _____

Solid: 4ozCGJ 8ozCGJ 16ozCGJ Sleeve (_____) EnCores® (_____) TerraCores® (_____) _____

Air: Tedlar™ Canister Sorbent Tube PUF _____ **Other Matrix** (_____) : _____ _____

Container: A = Amber, B = Bottle, C = Clear, E = Envelope, G = Glass, J = Jar, P = Plastic, and Z = Ziploc/Resealable Bag

Preservative: b = buffered, f = filtered, h = HCl, n = HNO₃, na = NaOH, na₂ = Na₂S₂O₃, p = H₃PO₄,
 s = H₂SO₄, u = ultra-pure, x = Na₂SO₃+NaHSO₄.H₂O, z_{na} = Zn (CH₃CO₂)₂ + NaOH

Labeled/Checked by: 876
676
Reviewed by: 676

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From: Danielle Gonsman [mailto:dgonsman@kinneticlabs.net]
Sent: Tuesday, January 10, 2017 12:09 PM
To: Kathleen Burney
Subject: Re: Downey Bioswale BMP Stormwater - 17-01-0614 - Sample Receipt Confirmation & COC Document

Hi Kathy,

Actually, let's please change the project ID to: **Prop 84 Green Streets BMP** since we have another site we will add to this project. Also, please note project **#5720.166** on the invoice. Revised COC attached.

Thanks!

Danielle

On Tue, Jan 10, 2017 at 10:24 AM, Kathleen Burney <KathleenBurney@eurofinsus.com> wrote:

Hi, Danielle –

Thank you for submitting samples to Eurofins Calscience.

A sample receipt confirmation and copy of your COC are attached. Please review the attached document and let us know if you need to make revisions to the scope of work.

• **Danielle – Just to be sure we are on the same page, please confirm that these samples pertain to the “Prop 84” QAPP and quote 962770 from Michele (right?). Thanks!**

Please let me know if you need anything else.

Thank you.

Kathy Burney
Project Manager Assistant *on behalf of*
Carla Lee Hollowell
Environmental Project Manager



7440 Lincoln Way
GARDEN GROVE, CA 92841
USA
Phone: [+1 714 895 5494](tel:+17148955494)
Mobile: [+1 714 904 1892](tel:+17149041892)

Chain of Custody Record

To: Eurofins Calscience
7440 Lincoln Way
Garden Grove, CA 92841
Phone: (714) 895-5494

Date Received:

Lab #:

From: Kinetic Laboratories, Inc
2750 E. Spring Street, Suite 190
Long Beach, CA 90806
(562) 595-8700

17-01-0614



Project: Downey Bioswale DMW Stormwater
Complete by: Standard TAT
Matrix: Water
Project #: 5720.1616

Sample ID	Station ID	Sample Date	Sample Time	Sample Type	Analysis	Container	Pres	No. of Bottles	Lab ID	Condition Upon Receipt
Downey-Inflow-Grab1	Bioswale Inflow	1/9/17	0440	Grab	Composite*	500 mL HDPE	4°C	1		
Downey-Inflow-Grab2	Bioswale Inflow		0510	Grab	Composite*	500 mL HDPE	4°C	1		
Downey-Inflow-Grab3	Bioswale Inflow		0539	Grab	Composite*	500 mL HDPE	4°C	1		
Downey-Inflow-Grab4	Bioswale Inflow		0608	Grab	Composite*	500 mL HDPE	4°C	1		
Downey-Inflow-Grab5	Bioswale Inflow		0628	Grab	Composite*	500 mL HDPE	4°C	1		
Downey-Inflow-Grab6	Bioswale Inflow		0645	Grab	Composite*	500 mL HDPE	4°C	1		
Downey-Inflow-Comp-Well	Bioswale Inflow	1/9/17	0648	Composite*	TSS, Hardness, Total and Dissolved Cu, Pb, Zn	N/A	4°C	N/A		

Data Report MUST include the following: Sample ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer. All times on this sheet are military time. Email Sample Receipt Confirmations, PDF reports, and SWAMP EDDs to edd@kineticlabs.net.

Special Instructions/Comments: *Composite grab samples (Downey-Inflow-Grab1 to -Grab6) into one sample (Downey-Inflow-Comp-Well) and perform TSS, Hardness, and Total and Dissolved Cu, Pb, Zn (EPA 200.8) on the composite sample only. Diss. Metals need to be lab filtered. Reference project QAPP for specific QA/QC requirements.

Sampled and Relinquished By:	Date/Time:	Transporter	Received By:	Date/Time:
<i>[Signature]</i>	1/9/17 15:05	Cal Science	<i>[Signature]</i>	1/9/17 1505
Relinquished By:	Date/Time:	Transporter	Received By:	Date/Time:
<i>[Signature]</i>	1/9/17 1700		<i>[Signature]</i>	1/9/17 1700

Chain of Custody Record

To: Eurofins Calcelecience
7440 Lincoln Way
Garden Grove, CA 92841
Phone: (714) 895-5494

Date Received:

Lab #:

From: Kinetic Laboratories, Inc
2750 E. Spring Street, Suite 190
Long Beach, CA 90806
(562) 595-8700

0614



Contact: Kathy Burney
Project: Downey-Bioswale-BMP-Stormwater
Complete by: Standard TAT
Matrix: Water
Project #: 5720.166

Sample ID	Site ID	Sample Date	Sample Time	Sample Type	Analyte	Container	Pres	No. of Bottles	Lab ID	Condition Upon Receipt
Downey-Outflow-Grab 1	Bioswale Outflow	1/9/17	0442	Grab	Composite*	500 mL HDPE	4°C	1		
Downey-Outflow-Grab 2	Bioswale Outflow		0412	Grab	Composite*	500 mL HDPE	4°C	1		
Downey-Outflow-Grab 3	Bioswale Outflow		0540	Grab	Composite*	500 mL HDPE	4°C	1		
Downey-Outflow-Grab 4	Bioswale Outflow		0609	Grab	Composite*	500 mL HDPE	4°C	1		
Downey-Outflow-Grab 5	Bioswale Outflow		0629	Grab	Composite*	500 mL HDPE	4°C	1		
Downey-Outflow-Grab 6	Bioswale Outflow		0649	Grab	Composite*	500 mL HDPE	4°C	1		
Downey-Outflow-Comp-Well	Bioswale Outflow	1/9/17	0649	Composite*	TSS, Hardness, Total and Dissolved Cu, Pb, Zn	N/A	4°C	N/A		

Special Instructions/Comments: *Composite grab samples (Downey-Outflow-Grab 1 to -Grab 6) into one sample (Downey-Outflow-Comp-Well) and perform TSS, Hardness, and Total and Dissolved Cu, Pb, Zn (EPA 200.8) on the composite sample only. Diss. Metals need to be lab filtered. Reference project QAPP for specific QA/QC requirements.

Sampled and Relinquished By: *Mye [Signature]* Date/Time: 1/9/17 15:05
 Relinquished By: *Randy W.* Date/Time: 1/9/17 1700
 Transporter: Cal Science
 Received By: *[Signature]* Date/Time: 1/9/17 1505
 Received By: *[Signature]* Date/Time: 1/9/17 1700

Chain of Custody Record

To: Eurofins Calscience
7440 Lincoln Way
Garden Grove, CA 92841
Phone: (714) 895-5494

Date Received:
Lab #:

From: Kinetic Laboratories, Inc
2750 E. Spring Street, Suite 190
Long Beach, CA 90806
(562) 595-8700

0614



Contact: Kathy Burney
Beverly-Bhowmik BMP Stormwater
Project: Standard TAT
PROB BY GREEN STREET'S BMP
Matrix: Water
Project #: 5720.16b

SampleID	StandardID	Sample Date	Sample Time	Sample Type	Analysis	Container	Pres	No. of Bottles	LabID	Condition Upon Receipt
Long Beach Pump-Grab1	Long Beach Pump	1/9/17	0430	Grab	Composite*	500 mL HDPE	4 °C	1		
Long Beach Pump-Grab2	Long Beach Pump		0500	Grab	Composite*	500 mL HDPE	4 °C	1		
Long Beach Pump-Grab3	Long Beach Pump		0537	Grab	Composite*	500 mL HDPE	4 °C	1		
Long Beach Pump-Grab4	Long Beach Pump		0607	Grab	Composite*	500 mL HDPE	4 °C	1		
Long Beach Pump-Grab5	Long Beach Pump		0627	Grab	Composite*	500 mL HDPE	4 °C	1		
Long Beach Pump-Grab6	Long Beach Pump		0647	Grab	Composite*	500 mL HDPE	4 °C	1		
Long Beach Pump-Comp-Wet1	Long Beach Pump	1/9/17	0647	Composite*	TSS, Hardness, Total and Dissolved Cu, Pb, Zn	N/A	4 °C	N/A		

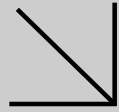
Data Report MUST include the following: Sample ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer. All times on this sheet are military time. Email Sample Receipt Confirmations, PDF reports, and SWAMP EDDs to edd@kineticlabs.net.

Special Instructions/Comments: *Composite grab samples (Long Beach Pump-Grab1 to -Grab6) into one sample (Long Beach Pump-Comp-Wet1) and perform TSS, Hardness, and Total and Dissolved Cu, Pb, Zn (EPA 200.8) on the composite sample only. Diss. metals need to be lab filtered. Reference project QAPP for specific QA/QC requirements.

Sampled and Requisitioned By:	Date/Time:	Transporter:	Received By:	Date/Time:
<i>[Signature]</i>	1/9/17 15:05	Cal Science	<i>[Signature]</i>	1/9/17 15:05
<i>[Signature]</i>	1/9/17 17:00		<i>[Signature]</i>	1/9/17 17:00



Calscience



WORK ORDER NUMBER: 17-01-1035

The difference is service



AIR | SOIL | WATER | MARINE CHEMISTRY

Analytical Report For

Client: Kinnetic Laboratories, Inc.

Client Project Name: Prop 84 Green Streets BMP

Attention: Danielle Gonsman
2750 East Spring Street
Suite 190
Long Beach, CA 90806-2249

Kathleen M. Burney FOR

Approved for release on 01/20/2017 by:
Carla Hollowell
Project Manager

ResultLink ▶

Email your PM ▶

Eurofins Calscience, Inc. (Calscience) certifies that the test results provided in this report meet all NELAC requirements for parameters for which accreditation is required or available. Any exceptions to NELAC requirements are noted in the case narrative. The original report of subcontracted analyses, if any, is attached to this report. The results in this report are limited to the sample(s) tested and any reproduction thereof must be made in its entirety. The client or recipient of this report is specifically prohibited from making material changes to said report and, to the extent that such changes are made, Calscience is not responsible, legally or otherwise. The client or recipient agrees to indemnify Calscience for any defense to any litigation which may arise.

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 Work Order Number: 17-01-1035

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Work Order Narrative

Work Order: 17-01-1035

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Condition Upon Receipt:

Samples were received under Chain-of-Custody (COC) on 01/12/17. They were assigned to Work Order 17-01-1035.

Unless otherwise noted on the Sample Receiving forms all samples were received in good condition and within the recommended EPA temperature criteria for the methods noted on the COC. The COC and Sample Receiving Documents are integral elements of the analytical report and are presented at the back of the report.

Holding Times:

All samples were analyzed within prescribed holding times (HT) and/or in accordance with the Calscience Sample Acceptance Policy unless otherwise noted in the analytical report and/or comprehensive case narrative, if required.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of ≤ 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

Quality Control:

All quality control parameters (QC) were within established control limits except where noted in the QC summary forms or described further within this report.

Subcontractor Information:

Unless otherwise noted below (or on the subcontract form), no samples were subcontracted.

Additional Comments:

Air - Sorbent-extracted air methods (EPA TO-4A, EPA TO-10, EPA TO-13A, EPA TO-17): Analytical results are converted from mass/sample basis to mass/volume basis using client-supplied air volumes.

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are always reported on a wet weight basis.



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Sample Summary

Client: Kinnetic Laboratories, Inc.	Work Order:	17-01-1035
2750 East Spring Street, Suite 190	Project Name:	Prop 84 Green Streets BMP
Long Beach, CA 90806-2249	PO Number:	5720.166
	Date/Time Received:	01/12/17 15:35
	Number of Containers:	42

Attn: Danielle Gonsman

Sample Identification	Lab Number	Collection Date and Time	Number of Containers	Matrix
Downey-Inflow-Grab 1	17-01-1035-1	01/12/17 07:42	1	Aqueous
Downey-Inflow-Grab 2	17-01-1035-2	01/12/17 08:11	1	Aqueous
Downey-Inflow-Grab 3	17-01-1035-3	01/12/17 08:41	1	Aqueous
Downey-Inflow-Grab 4	17-01-1035-4	01/12/17 09:09	1	Aqueous
Downey-Inflow-Grab 5	17-01-1035-5	01/12/17 09:34	1	Aqueous
Downey-Inflow-Grab 6	17-01-1035-6	01/12/17 10:03	1	Aqueous
Downey-Inflow-Comp-Wet2	17-01-1035-7	01/12/17 10:03	1	Aqueous
Downey-Outflow-Grab1	17-01-1035-8	01/12/17 07:43	1	Aqueous
Downey-Outflow-Grab2	17-01-1035-9	01/12/17 08:12	1	Aqueous
Downey-Outflow-Grab3	17-01-1035-10	01/12/17 08:42	1	Aqueous
Downey-Outflow-Grab4	17-01-1035-11	01/12/17 09:10	1	Aqueous
Downey-Outflow-Grab5	17-01-1035-12	01/12/17 09:35	1	Aqueous
Downey-Outflow-Grab6	17-01-1035-13	01/12/17 10:04	1	Aqueous
Downey-Outflow-Comp-Wet2	17-01-1035-14	01/12/17 10:04	1	Aqueous
Whittier-Inflow-1-Grab1	17-01-1035-15	01/12/17 08:08	1	Aqueous
Whittier-Inflow-1-Grab2	17-01-1035-16	01/12/17 08:38	1	Aqueous
Whittier-Inflow-1-Grab3	17-01-1035-17	01/12/17 09:08	1	Aqueous
Whittier-Inflow-1-Grab4	17-01-1035-18	01/12/17 12:48	1	Aqueous
Whittier-Inflow-1-Grab5	17-01-1035-19	01/12/17 13:12	1	Aqueous
Whittier-Inflow-1-Grab6	17-01-1035-20	01/12/17 13:42	1	Aqueous
Whittier-Inflow-1-Comp-Wet1	17-01-1035-21	01/12/17 13:42	1	Aqueous
Whittier-Outflow-1-Grab1	17-01-1035-22	01/12/17 08:09	1	Aqueous
Whittier-Outflow-1-Grab2	17-01-1035-23	01/12/17 08:39	1	Aqueous
Whittier-Outflow-1-Grab3	17-01-1035-24	01/12/17 09:09	1	Aqueous
Whittier-Outflow-1-Grab4	17-01-1035-25	01/12/17 12:49	1	Aqueous
Whittier-Outflow-1-Grab5	17-01-1035-26	01/12/17 13:13	1	Aqueous
Whittier-Outflow-1-Grab6	17-01-1035-27	01/12/17 13:43	1	Aqueous
Whittier-Outflow-1-Comp-Wet1	17-01-1035-28	01/12/17 13:43	1	Aqueous
Whittier-Outflow-2-Grab1	17-01-1035-29	01/12/17 08:08	1	Aqueous
Whittier-Outflow-2-Grab2	17-01-1035-30	01/12/17 08:38	1	Aqueous
Whittier-Outflow-2-Grab3	17-01-1035-31	01/12/17 09:08	1	Aqueous
Whittier-Outflow-2-Grab4	17-01-1035-32	01/12/17 13:30	1	Aqueous
Whittier-Outflow-2-Grab5	17-01-1035-33	01/12/17 13:41	1	Aqueous
Whittier-Outflow-2-Grab6	17-01-1035-34	01/12/17 13:52	1	Aqueous
Whittier-Outflow-2-Comp-Wet1	17-01-1035-35	01/12/17 13:52	1	Aqueous
Long Beach Pump-Grab1	17-01-1035-36	01/12/17 08:08	1	Aqueous
Long Beach Pump-Grab2	17-01-1035-37	01/12/17 08:38	1	Aqueous
Long Beach Pump-Grab3	17-01-1035-38	01/12/17 09:08	1	Aqueous
Long Beach Pump-Grab4	17-01-1035-39	01/12/17 13:30	1	Aqueous
Long Beach Pump-Grab5	17-01-1035-40	01/12/17 13:41	1	Aqueous
Long Beach Pump-Grab6	17-01-1035-41	01/12/17 13:52	1	Aqueous
Long Beach Pump-Comp-Wet2	17-01-1035-42	01/12/17 13:52	1	Aqueous

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Analytical Report

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 01/12/17
Work Order: 17-01-1035
Preparation: N/A
Method: SM 2340C
Units: mg/L

Project: Prop 84 Green Streets BMP

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Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Downey-Inflow-Comp-Wet2	17-01-1035-7-A	01/12/17 10:03	Aqueous	BUR21	N/A	01/16/17 18:39	H0116HARB1

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Hardness, Total (as CaCO ₃)	4.0	2.0	0.99	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Downey-Outflow-Comp-Wet2	17-01-1035-14-A	01/12/17 10:04	Aqueous	BUR21	N/A	01/16/17 18:39	H0116HARB1

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Hardness, Total (as CaCO ₃)	8.0	2.0	0.99	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Whittier-Inflow-1-Comp-Wet1	17-01-1035-21-A	01/12/17 13:42	Aqueous	BUR21	N/A	01/16/17 18:39	H0116HARB1

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Hardness, Total (as CaCO ₃)	15	2.0	0.99	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Whittier-Outflow-1-Comp-Wet1	17-01-1035-28-A	01/12/17 13:43	Aqueous	BUR21	N/A	01/16/17 18:39	H0116HARB1

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Hardness, Total (as CaCO ₃)	23	2.0	0.99	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Whittier-Outflow-2-Comp-Wet1	17-01-1035-35-A	01/12/17 13:52	Aqueous	BUR21	N/A	01/16/17 18:39	H0116HARB1

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Hardness, Total (as CaCO ₃)	12	2.0	0.99	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Long Beach Pump-Comp-Wet2	17-01-1035-42-A	01/12/17 13:52	Aqueous	BUR21	N/A	01/16/17 18:39	H0116HARB1

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Hardness, Total (as CaCO ₃)	11	2.0	0.99	1.00	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.



Calscience

Analytical Report

Kinnetic Laboratories, Inc.
 2750 East Spring Street, Suite 190
 Long Beach, CA 90806-2249

Date Received: 01/12/17
 Work Order: 17-01-1035
 Preparation: N/A
 Method: SM 2340C
 Units: mg/L

Project: Prop 84 Green Streets BMP

Page 2 of 2

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	099-14-457-690	N/A	Aqueous	BUR21	N/A	01/16/17 18:39	H0116HARB1

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>MDL</u>	<u>DF</u>	<u>Qualifiers</u>
Hardness, Total (as CaCO3)	ND	2.0	0.99	1.00	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.



Calscience

Analytical Report

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 01/12/17
Work Order: 17-01-1035
Preparation: N/A
Method: SM 2540 D
Units: mg/L

Project: Prop 84 Green Streets BMP

Page 1 of 2

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Downey-Inflow-Comp-Wet2	17-01-1035-7-A	01/12/17 10:03	Aqueous	N/A	01/17/17	01/17/17 16:00	H0117TSSL2

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Solids, Total Suspended	30	1.0	0.83	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Downey-Outflow-Comp-Wet2	17-01-1035-14-A	01/12/17 10:04	Aqueous	N/A	01/17/17	01/17/17 16:00	H0117TSSL2

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Solids, Total Suspended	44	1.0	0.83	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Whittier-Inflow-1-Comp-Wet1	17-01-1035-21-A	01/12/17 13:42	Aqueous	N/A	01/17/17	01/17/17 16:00	H0117TSSL2

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Solids, Total Suspended	157	1.00	0.829	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Whittier-Outflow-1-Comp-Wet1	17-01-1035-28-A	01/12/17 13:43	Aqueous	N/A	01/17/17	01/17/17 16:00	H0117TSSL2

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Solids, Total Suspended	72	1.0	0.83	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Whittier-Outflow-2-Comp-Wet1	17-01-1035-35-A	01/12/17 13:52	Aqueous	N/A	01/17/17	01/17/17 16:00	H0117TSSL2

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Solids, Total Suspended	150	1.00	0.829	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Long Beach Pump-Comp-Wet2	17-01-1035-42-A	01/12/17 13:52	Aqueous	N/A	01/17/17	01/17/17 16:00	H0117TSSL2

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Solids, Total Suspended	135	1.00	0.829	1.00	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.



Calscience

Analytical Report

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 01/12/17
Work Order: 17-01-1035
Preparation: N/A
Method: SM 2540 D
Units: mg/L

Project: Prop 84 Green Streets BMP

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Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	099-09-010-8088	N/A	Aqueous	N/A	01/17/17	01/17/17 16:00	H0117TSSL2

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>MDL</u>	<u>DF</u>	<u>Qualifiers</u>
Solids, Total Suspended	ND	1.0	0.83	1.00	

Return to Contents

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.



Calscience

Analytical Report

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 01/12/17
Work Order: 17-01-1035
Preparation: Filtered
Method: EPA 200.8
Units: ug/L

Project: Prop 84 Green Streets BMP

Page 1 of 2

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Downey-Inflow-Comp-Wet2	17-01-1035-7-A	01/12/17 10:03	Aqueous	ICP/MS 03	01/12/17	01/13/17 19:50	170112LA4

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>MDL</u>	<u>DF</u>	<u>Qualifiers</u>
Copper	7.67	1.00	0.140	1.00	
Lead	0.196	0.500	0.0898	1.00	J
Zinc	44.8	2.00	0.479	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Downey-Outflow-Comp-Wet2	17-01-1035-14-A	01/12/17 10:04	Aqueous	ICP/MS 03	01/12/17	01/13/17 19:53	170112LA4

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>MDL</u>	<u>DF</u>	<u>Qualifiers</u>
Copper	6.63	1.00	0.140	1.00	
Lead	0.220	0.500	0.0898	1.00	J
Zinc	32.9	2.00	0.479	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Whittier-Inflow-1-Comp-Wet1	17-01-1035-21-A	01/12/17 13:42	Aqueous	ICP/MS 03	01/12/17	01/13/17 19:55	170112LA4

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>MDL</u>	<u>DF</u>	<u>Qualifiers</u>
Copper	2.34	1.00	0.140	1.00	
Lead	0.288	0.500	0.0898	1.00	J
Zinc	11.4	2.00	0.479	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Whittier-Outflow-1-Comp-Wet1	17-01-1035-28-A	01/12/17 13:43	Aqueous	ICP/MS 03	01/12/17	01/13/17 19:58	170112LA4

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>MDL</u>	<u>DF</u>	<u>Qualifiers</u>
Copper	2.42	1.00	0.140	1.00	
Lead	0.259	0.500	0.0898	1.00	J
Zinc	10.9	2.00	0.479	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Whittier-Outflow-2-Comp-Wet1	17-01-1035-35-A	01/12/17 13:52	Aqueous	ICP/MS 03	01/12/17	01/13/17 20:08	170112LA4

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>MDL</u>	<u>DF</u>	<u>Qualifiers</u>
Copper	2.77	1.00	0.140	1.00	
Lead	0.236	0.500	0.0898	1.00	J
Zinc	12.5	2.00	0.479	1.00	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.



Calscience

Analytical Report

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 01/12/17
Work Order: 17-01-1035
Preparation: Filtered
Method: EPA 200.8
Units: ug/L

Project: Prop 84 Green Streets BMP

Page 2 of 2

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Long Beach Pump-Comp-Wet2	17-01-1035-42-A	01/12/17 13:52	Aqueous	ICP/MS 03	01/12/17	01/13/17 20:10	170112LA4

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	2.69	1.00	0.140	1.00	
Lead	0.228	0.500	0.0898	1.00	J
Zinc	11.5	2.00	0.479	1.00	

Method Blank	099-16-094-1699	N/A	Aqueous	ICP/MS 03	01/12/17	01/13/17 19:38	170112LA4
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Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	ND	1.00	0.140	1.00	
Lead	ND	0.500	0.0898	1.00	
Zinc	ND	2.00	0.479	1.00	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.



Calscience

Analytical Report

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 01/12/17
Work Order: 17-01-1035
Preparation: N/A
Method: EPA 200.8
Units: ug/L

Project: Prop 84 Green Streets BMP

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Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Downey-Inflow-Comp-Wet2	17-01-1035-7-A	01/12/17 10:03	Aqueous	ICP/MS 03	01/13/17	01/13/17 20:21	170113LA1

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	24.1	1.00	0.140	1.00	
Lead	3.55	0.500	0.0898	1.00	
Zinc	177	2.00	0.479	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Downey-Outflow-Comp-Wet2	17-01-1035-14-A	01/12/17 10:04	Aqueous	ICP/MS 03	01/13/17	01/13/17 20:18	170113LA1

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	17.9	1.00	0.140	1.00	
Lead	3.06	0.500	0.0898	1.00	
Zinc	151	2.00	0.479	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Whittier-Inflow-1-Comp-Wet1	17-01-1035-21-A	01/12/17 13:42	Aqueous	ICP/MS 03	01/13/17	01/13/17 20:23	170113LA1

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	21.0	1.00	0.140	1.00	
Lead	26.1	0.500	0.0898	1.00	
Zinc	227	2.00	0.479	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Whittier-Outflow-1-Comp-Wet1	17-01-1035-28-A	01/12/17 13:43	Aqueous	ICP/MS 03	01/13/17	01/13/17 20:26	170113LA1

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	12.8	1.00	0.140	1.00	
Lead	16.0	0.500	0.0898	1.00	
Zinc	181	2.00	0.479	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Whittier-Outflow-2-Comp-Wet1	17-01-1035-35-A	01/12/17 13:52	Aqueous	ICP/MS 03	01/13/17	01/13/17 20:28	170113LA1

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	18.9	1.00	0.140	1.00	
Lead	26.1	0.500	0.0898	1.00	
Zinc	182	2.00	0.479	1.00	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.



Calscience

Analytical Report

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 01/12/17
Work Order: 17-01-1035
Preparation: N/A
Method: EPA 200.8
Units: ug/L

Project: Prop 84 Green Streets BMP

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Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Long Beach Pump-Comp-Wet2	17-01-1035-42-A	01/12/17 13:52	Aqueous	ICP/MS 03	01/13/17	01/13/17 20:31	170113LA1

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	19.4	1.00	0.140	1.00	
Lead	23.5	0.500	0.0898	1.00	
Zinc	261	2.00	0.479	1.00	

Method Blank	099-16-448-13	N/A	Aqueous	ICP/MS 03	01/13/17	01/13/17 19:35	170113LA1
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Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	ND	1.00	0.140	1.00	
Lead	ND	0.500	0.0898	1.00	
Zinc	ND	2.00	0.479	1.00	

Return to Contents

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.



Calscience

Quality Control - Spike/Spike Duplicate

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 01/12/17
Work Order: 17-01-1035
Preparation: Filtered
Method: EPA 200.8

Project: Prop 84 Green Streets BMP

Page 1 of 2

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
Downey-Inflow-Comp-Wet2	Sample	Aqueous	ICP/MS 03	01/12/17	01/13/17 19:50	170112SA4A
Downey-Inflow-Comp-Wet2	Matrix Spike	Aqueous	ICP/MS 03	01/12/17	01/13/17 19:45	170112SA4A
Downey-Inflow-Comp-Wet2	Matrix Spike Duplicate	Aqueous	ICP/MS 03	01/12/17	01/13/17 19:48	170112SA4A

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Copper	7.672	100.0	106.6	99	105.5	98	80-120	1	0-20	
Lead	ND	100.0	95.52	96	95.52	96	80-120	0	0-20	
Zinc	44.85	100.0	141.7	97	141.1	96	80-120	0	0-20	


 Return to Contents

RPD: Relative Percent Difference. CL: Control Limits



Calscience

Quality Control - Spike/Spike Duplicate

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 01/12/17
Work Order: 17-01-1035
Preparation: N/A
Method: EPA 200.8

Project: Prop 84 Green Streets BMP

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Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
Downey-Outflow-Comp-Wet2	Sample	Aqueous	ICP/MS 03	01/13/17	01/13/17 20:18	170113SA1
Downey-Outflow-Comp-Wet2	Matrix Spike	Aqueous	ICP/MS 03	01/13/17	01/13/17 20:13	170113SA1
Downey-Outflow-Comp-Wet2	Matrix Spike Duplicate	Aqueous	ICP/MS 03	01/13/17	01/13/17 20:15	170113SA1

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Copper	17.89	100.0	113.8	96	114.7	97	80-120	1	0-20	
Lead	3.062	100.0	97.76	95	97.30	94	80-120	0	0-20	
Zinc	151.2	100.0	240.7	89	243.2	92	80-120	1	0-20	

Return to Contents

RPD: Relative Percent Difference. CL: Control Limits



Calscience

Quality Control - Sample Duplicate

Kinnetic Laboratories, Inc.
 2750 East Spring Street, Suite 190
 Long Beach, CA 90806-2249

Date Received: 01/12/17
 Work Order: 17-01-1035
 Preparation: N/A
 Method: SM 2340C

Project: Prop 84 Green Streets BMP

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Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	Duplicate Batch Number
17-01-0681-1	Sample	Aqueous	BUR21	N/A	01/16/17 18:39	H0116HARD1
17-01-0681-1	Sample Duplicate	Aqueous	BUR21	N/A	01/16/17 18:39	H0116HARD1

<u>Parameter</u>	<u>Sample Conc.</u>	<u>DUP Conc.</u>	<u>RPD</u>	<u>RPD CL</u>	<u>Qualifiers</u>
Hardness, Total (as CaCO3)	211.0	210.0	0	0-25	

Return to Contents

RPD: Relative Percent Difference. CL: Control Limits



Calscience

Quality Control - Sample Duplicate

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 01/12/17
Work Order: 17-01-1035
Preparation: N/A
Method: SM 2540 D

Project: Prop 84 Green Streets BMP

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Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	Duplicate Batch Number
17-01-1016-2	Sample	Aqueous	N/A	01/17/17 00:00	01/17/17 16:00	H0117TSSD2
17-01-1016-2	Sample Duplicate	Aqueous	N/A	01/17/17 00:00	01/17/17 16:00	H0117TSSD2
<u>Parameter</u>		<u>Sample Conc.</u>	<u>DUP Conc.</u>	<u>RPD</u>	<u>RPD CL</u>	<u>Qualifiers</u>
Solids, Total Suspended		542.0	544.0	0	0-20	

Return to Contents

RPD: Relative Percent Difference. CL: Control Limits



Calscience

Quality Control - LCS/LCSD

Kinnetic Laboratories, Inc.
 2750 East Spring Street, Suite 190
 Long Beach, CA 90806-2249

Date Received: 01/12/17
 Work Order: 17-01-1035
 Preparation: N/A
 Method: SM 2540 D

Project: Prop 84 Green Streets BMP

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Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-09-010-8088	LCS	Aqueous	N/A	01/17/17	01/17/17 16:00	H0117TSSL2
099-09-010-8088	LCSD	Aqueous	N/A	01/17/17	01/17/17 16:00	H0117TSSL2

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Solids, Total Suspended	100.0	86.00	86	85.00	85	80-120	1	0-20	

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RPD: Relative Percent Difference. CL: Control Limits

Quality Control - LCS

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 01/12/17
Work Order: 17-01-1035
Preparation: Filtered
Method: EPA 200.8

Project: Prop 84 Green Streets BMP

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Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
099-16-094-1699	LCS	Aqueous	ICP/MS 03	01/12/17	01/13/17 19:43	170112LA4
<u>Parameter</u>		<u>Spike Added</u>	<u>Conc. Recovered</u>	<u>LCS %Rec.</u>	<u>%Rec. CL</u>	<u>Qualifiers</u>
Copper		100.0	98.43	98	80-120	
Lead		100.0	94.80	95	80-120	
Zinc		100.0	97.04	97	80-120	



Calscience

Quality Control - LCS

Kinnetic Laboratories, Inc.
 2750 East Spring Street, Suite 190
 Long Beach, CA 90806-2249

Date Received: 01/12/17
 Work Order: 17-01-1035
 Preparation: N/A
 Method: EPA 200.8

Project: Prop 84 Green Streets BMP

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Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
099-16-448-13	LCS	Aqueous	ICP/MS 03	01/13/17	01/13/17 19:40	170113LA1

<u>Parameter</u>	<u>Spike Added</u>	<u>Conc. Recovered</u>	<u>LCS %Rec.</u>	<u>%Rec. CL</u>	<u>Qualifiers</u>
Copper	100.0	99.32	99	80-120	
Lead	100.0	94.38	94	80-120	
Zinc	100.0	97.18	97	80-120	

Return to Contents 

RPD: Relative Percent Difference. CL: Control Limits

Glossary of Terms and Qualifiers

Work Order: 17-01-1035

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<u>Qualifiers</u>	<u>Definition</u>
*	See applicable analysis comment.
<	Less than the indicated value.
>	Greater than the indicated value.
1	Surrogate compound recovery was out of control due to a required sample dilution. Therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike (MS) or Matrix Spike Duplicate (MSD) compound was out of control due to suspected matrix interference. The associated LCS recovery was in control.
4	The MS/MSD RPD was out of control due to suspected matrix interference.
5	The PDS/PDSD or PES/PESD associated with this batch of samples was out of control due to suspected matrix interference.
6	Surrogate recovery below the acceptance limit.
7	Surrogate recovery above the acceptance limit.
B	Analyte was present in the associated method blank.
BU	Sample analyzed after holding time expired.
BV	Sample received after holding time expired.
CI	See case narrative.
E	Concentration exceeds the calibration range.
ET	Sample was extracted past end of recommended max. holding time.
HD	The chromatographic pattern was inconsistent with the profile of the reference fuel standard.
HDH	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but heavier hydrocarbons were also present (or detected).
HDL	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but lighter hydrocarbons were also present (or detected).
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
JA	Analyte positively identified but quantitation is an estimate.
ME	LCS Recovery Percentage is within Marginal Exceedance (ME) Control Limit range (+/- 4 SD from the mean).
ND	Parameter not detected at the indicated reporting limit.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
SG	The sample extract was subjected to Silica Gel treatment prior to analysis.
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.
	Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are reported on a wet weight basis.
	Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.
	A calculated total result (Example: Total Pesticides) is the summation of each component concentration and/or, if "J" flags are reported, estimated concentration. Component concentrations showing not detected (ND) are summed into the calculated total result as zero concentrations.

Chain of Custody Record

To:
Eurofins Calscience
7440 Lincoln Way
Garden Grove, CA 92841
Phone: (714) 895-5494

From:
Kinnetic Laboratories, Inc
2750 E. Spring Street, Suite 190
Long Beach, CA 90806
(562) 595-8700

Contact: Kathy Burney

Date Received:

Lab #:

Project: Prop 84 Green Streets BMP

Complete by: Standard TAT

Project #: 5720.106k

Matrix: Water

SampleID	StationID	Sample Date	Sample Time	Sample Type	Analysis	Container	Pres	No. of Bottles	LabID	Condition Upon Receipt
Downey-Inflow-Grab1	Downey Bioswale Inflow	11/2/17	0742	Grab	Composite*	500 mL HDPE	4 °C	1	1	
Downey-Inflow-Grab2	Downey Bioswale Inflow		0911	Grab	Composite*	500 mL HDPE	4 °C	1	2	
Downey-Inflow-Grab3	Downey Bioswale Inflow		0941	Grab	Composite*	500 mL HDPE	4 °C	1	3	
Downey-Inflow-Grab4	Downey Bioswale Inflow		0909	Grab	Composite*	500 mL HDPE	4 °C	1	4	
Downey-Inflow-Grab5	Downey Bioswale Inflow		0934	Grab	Composite*	500 mL HDPE	4 °C	1	5	
Downey-Inflow-Grab6	Downey Bioswale Inflow		1003	Grab	Composite*	500 mL HDPE	4 °C	1	6	
Downey-Inflow-Comp-Wet2	Downey Bioswale Inflow	11/2/17	1003	Composite*	TSS, Hardness, Total and Dissolved Cu, Pb, Zn	N/A	N/A	N/A	7	

Data Report MUST include the following: Sample ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer. All times on this sheet are military time. Email Sample Receipt Confirmations, PDF reports, and SWAMP EDDs to edd@kinneticlabs.net.

Special Instructions/Comments: *Composite grab samples (Downey-Inflow-Grab1 to -Grab6) into one sample (Downey-Inflow-Comp-Wet2) and perform TSS, Hardness, and Total and Dissolved Cu, Pb, Zn (EPA 200.8) on the composite sample only. Diss. Metals need to be lab filtered. Reference project QAPP for specific QA/QC requirements.

Sampled and Relinquished By: <i>Danielles</i>	Date/Time: 11/2/17 1535	Transporter: KTI	Received By: <i>Prevel</i>	Date/Time: 11/2/17 0835
Relinquished By:	Date/Time:	Transporter:	Received By:	Date/Time:



Chain of Custody Record

To: Eurofins Calscience
7440 Lincoln Way
Garden Grove, CA 92841
Phone: (714) 895-5494

From: Kinnetic Laboratories, Inc
2750 E. Spring Street, Suite 190
Long Beach, CA 90806
(562) 595-8700

Contact: Kathy Burney

Contact: Danielle Gonsman

Date Received: **1035**

Lab #: **1035**

Project: Prop 84 Green Streets BMP

Matrix: Water

Project #: 5720.166

SampleID	StationID	Sample Date	Sample Time	Sample Type	Analysis	Container	Pres	No. of Bottles	LabID	Condition Upon Receipt
Downey-Outflow-Grab1	Downey Bioswale Outflow	11/2/17	0743	Grab	Composite*	500 mL HDPE	4 °C	1	8	
Downey-Outflow-Grab2	Downey Bioswale Outflow		0812	Grab	Composite*	500 mL HDPE	4 °C	1	9	
Downey-Outflow-Grab3	Downey Bioswale Outflow		0842	Grab	Composite*	500 mL HDPE	4 °C	1	10	
Downey-Outflow-Grab4	Downey Bioswale Outflow		0910	Grab	Composite*	500 mL HDPE	4 °C	1	11	
Downey-Outflow-Grab5	Downey Bioswale Outflow		0935	Grab	Composite*	500 mL HDPE	4 °C	1	12	
Downey-Outflow-Grab6	Downey Bioswale Outflow		1004	Grab	Composite*	500 mL HDPE	4 °C	1	13	
Downey-Outflow-Comp-Wet2	Downey Bioswale Outflow	11/2/17	1004	Composite*	TSS, Hardness, Total and Dissolved Cu, Pb, Zn	N/A	N/A	N/A	14	

Data Report MUST include the following: Sample ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer. All times on this sheet are military time. Email Sample Receipt Confirmations, PDF reports, and SWAMP EDDs to edd@kinneticlabs.net.

Special Instructions/Comments: *Composite grab samples (Downey-Outflow-Grab1 to -Grab6) into one sample (Downey-Outflow-Comp-Wet2) and perform TSS, Hardness, and Total and Dissolved Cu, Pb, Zn (EPA 200.8) on the composite sample only. Diss. Metals need to be lab filtered. Reference project GAPP for specific QA/QC requirements.

Sampled and Relinquished By: *Muller* Date/Time: 11/17/17 1535

Transporter: *Muller* Date/Time: 11/21/17 0835

Relinquished By: *Muller* Date/Time: 11/21/17 0835



Chain of Custody Record

To: Eurofins Calscience
7440 Lincoln Way
Garden Grove, CA 92841
Phone: (714) 895-5494

From: Kinnetic Laboratories, Inc
2750 E. Spring Street, Suite 190
Long Beach, CA 90806
(562) 595-8700

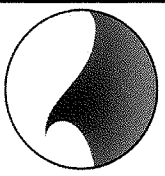
Contact: Kathy Burney

Contact: Danielle Gonsman

Project: Prop 84 Green Streets BMP

Matrix: Water

Project #: 5720.166



1035

Date Received:
Lab #:

SampleID	StationID	Sample Date	Sample Time	Sample Type	Analysis	Container	Pres	No. of Bottles	LabID	Condition Upon Receipt
Whittier-Inflow-1-Grab1	Whittier Tree Well 7751 Inflow-1	11/2/17	0800	Grab	Composite*	500 mL HDPE	4 °C	1	15	
Whittier-Inflow-1-Grab2	Whittier Tree Well 7751 Inflow-1		0830	Grab	Composite*	500 mL HDPE	4 °C	1	16	
Whittier-Inflow-1-Grab3	Whittier Tree Well 7751 Inflow-1		0900	Grab	Composite*	500 mL HDPE	4 °C	1	17	
Whittier-Inflow-1-Grab4	Whittier Tree Well 7751 Inflow-1		1240	Grab	Composite*	500 mL HDPE	4 °C	1	18	
Whittier-Inflow-1-Grab5	Whittier Tree Well 7751 Inflow-1		1312	Grab	Composite*	500 mL HDPE	4 °C	1	19	
Whittier-Inflow-1-Grab6	Whittier Tree Well 7751 Inflow-1		1342	Grab	Composite*	500 mL HDPE	4 °C	1	20	
Whittier-Inflow-1-Comp-Wet1	Whittier Tree Well 7751 Inflow-1	11/2/17	1342	Composite*	TSS, Hardness, Total and Dissolved Cu, Pb, Zn	N/A	N/A	N/A	21	

Data Report MUST include the following: Sample ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer. All times on this sheet are military time. Email Sample Receipt Confirmations, PDF reports, and SWAMP EDDs to edd@kinneticlabs.net.

Special Instructions/Comments: *Composite grab samples (Whittier-Inflow-1-Grab1 to -Grab6) into one sample (Whittier-Inflow-1-Comp-Wet1) and perform TSS, Hardness, and Total and Dissolved Cu, Pb, Zn (EPA 200.8) on the composite sample only. Diss. Metals need to be lab filtered. Reference project QAPP for specific QA/QC requirements.

Sampled and Relinquished By:	Date/Time:	Transporter	Received By:	Date/Time:
<i>[Signature]</i>	11/2/17 1535		<i>[Signature]</i>	11/24/17 0830
Relinquished By:	Date/Time:	Transporter	Received By:	Date/Time:



Chain of Custody Record

To: Eurofins Calscience
7440 Lincoln Way
Garden Grove, CA 92841
Phone: (714) 895-5494

From: Kinnetic Laboratories, Inc
2750 E. Spring Street, Suite 190
Long Beach, CA 90806
(562) 595-8700

Contact: Kathy Burney

Contact: Danielle Gonsman

Date Received:

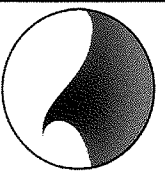
Lab #:

Project: Prop 84 Green Streets BMP

Matrix: Water

Project #: 5720.166

Complete by: Standard TAT



1035

SampleID	StationID	Sample Date	Sample Time	Sample Type	Analysis	Container	Pres	No. of Bottles	LabID	Condition Upon Receipt
Whittier-Outflow-1-Grab1	Whittier Tree Well 7751 Outflow-1	11/21/17	0809	Grab	Composite*	500 mL HDPE	4 °C	1	22	
Whittier-Outflow-1-Grab2	Whittier Tree Well 7751 Outflow-1		0839	Grab	Composite*	500 mL HDPE	4 °C	1	23	
Whittier-Outflow-1-Grab3	Whittier Tree Well 7751 Outflow-1		1209	Grab	Composite*	500 mL HDPE	4 °C	1	24	
Whittier-Outflow-1-Grab4	Whittier Tree Well 7751 Outflow-1		1249	Grab	Composite*	500 mL HDPE	4 °C	1	25	
Whittier-Outflow-1-Grab5	Whittier Tree Well 7751 Outflow-1		1313	Grab	Composite*	500 mL HDPE	4 °C	1	26	
Whittier-Outflow-1-Grab6	Whittier Tree Well 7751 Outflow-1		1343	Grab	Composite*	500 mL HDPE	4 °C	1	27	
Whittier-Outflow-1-Comp-Wet1	Whittier Tree Well 7751 Outflow-1	11/21/17	1343	Composite*	TSS, Hardness, Total and Dissolved Cu, Pb, Zn	N/A	N/A	N/A	28	

Data Report MUST include the following: Sample ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer. All times on this sheet are military time. Email Sample Receipt Confirmations, PDF reports, and SWAMP EDDs to edd@kinneticlabs.net.

Special Instructions/Comments: *Composite grab samples (Whittier-Outflow-1-Wet1-Grab1 to -Grab6) into one sample (Whittier-Outflow-1-Comp-Wet1) and perform TSS, Hardness, and Total and Dissolved Cu, Pb, Zn (EPA 200.8) on the composite sample only. Diss. Metals need to be lab filtered. Reference project QAPP for specific QA/QC requirements.

Sampled and Relinquished By: *[Signature]* **Date/Time:** 11/21/17 1535

Transporter:

Received By: *[Signature]* **Date/Time:** 11/21/17 1030

Relinquished By: *[Signature]* **Date/Time:**



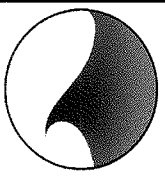
Chain of Custody Record

To: Eurofins Calscience
 7440 Lincoln Way
 Garden Grove, CA 92841
 Phone: (714) 895-5494

From: Kinnetic Laboratories, Inc
 2750 E. Spring Street, Suite 190
 Long Beach, CA 90806
 (562) 595-8700

Contact: Kathy Burney

Contact: Danielle Gonsman



Project: Prop 84 Green Streets BMP

Matrix: Water

Project #: 5720.166

Complete by: Standard TAT

Date Received:

Lab #:

1035

SampleID	StationID	Sample Date	Sample Time	Sample Type	Analysis	Container	Pres	No. of Bottles	LabID	Condition Upon Receipt
Whittier-Outflow-2-Grab1	Whittier Tree Well 7951 Outflow-2	11/21/17	0800	Grab	Composite*	500 mL HDPE	4 °C	1	29	
Whittier-Outflow-2-Grab2	Whittier Tree Well 7951 Outflow-2		0830	Grab	Composite*	500 mL HDPE	4 °C	1	30	
Whittier-Outflow-2-Grab3	Whittier Tree Well 7951 Outflow-2		0900	Grab	Composite*	500 mL HDPE	4 °C	1	31	
Whittier-Outflow-2-Grab4	Whittier Tree Well 7951 Outflow-2		1330	Grab	Composite*	500 mL HDPE	4 °C	1	32	
Whittier-Outflow-2-Grab5	Whittier Tree Well 7951 Outflow-2		1341	Grab	Composite*	500 mL HDPE	4 °C	1	33	
Whittier-Outflow-2-Grab6	Whittier Tree Well 7951 Outflow-2		1352	Grab	Composite*	500 mL HDPE	4 °C	1	34	
Whittier-Outflow-2-Comp-Wet1	Whittier Tree Well 7951 Outflow-2	11/21/17	1352	Composite*	TSS, Hardness, Total and Dissolved Cu, Pb, Zn	N/A	N/A	N/A	35	

Data Report MUST include the following: Sample ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer. All times on this sheet are military time. Email Sample Receipt Confirmations, PDF reports, and SWAMP EDDs to edd@kinneticlabs.net.

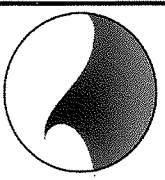
Special Instructions/Comments: *Composite grab samples (Whittier-Outflow-2-Grab1 to -Grab6) into one sample (Whittier-Outflow-2-Comp-Wet1) and perform TSS, Hardness, and Total and Dissolved Cu, Pb, Zn (EPA 200.8) on the composite sample only. Diss. Metals need to be lab filtered. Reference project GAPP for specific QA/QC requirements.

Sampled and Relinquished By:	Date/Time:	Transporter	Received By:	Date/Time:
<i>Dalce</i>	11/17/17 1535		<i>mg</i>	11/17-1535
Relinquished By:	Date/Time:	Transporter	Received By:	Date/Time:



Chain of Custody Record

To: Eurofins Calscience 7440 Lincoln Way Garden Grove, CA 92841 Phone: (714) 895-5494	From: Kinnetic Laboratories, Inc 2750 E. Spring Street, Suite 190 Long Beach, CA 90806 (562) 595-8700
Contact: Kathy Burney	Contact: Danielle Gonsman



(1035)

Project: Prop 84 Green Streets BMP **Project #:** 5720.166

Matrix: Water

SampleID	StationID	Sample Date	Sample Time	Sample Type	Analysis	Container	Pres	No. of Bottles	LabID	Condition Upon Receipt
Long Beach Pump-Grab1	Long Beach Pump	11/2/17	0900	Grab	Composite*	500 mL HDPE	4 °C	1	36	
Long Beach Pump-Grab2	Long Beach Pump		0930	Grab	Composite*	500 mL HDPE	4 °C	1	37	
Long Beach Pump-Grab3	Long Beach Pump		0900	Grab	Composite*	500 mL HDPE	4 °C	1	38	
Long Beach Pump-Grab4	Long Beach Pump		1330	Grab	Composite*	500 mL HDPE	4 °C	1	39	
Long Beach Pump-Grab5	Long Beach Pump		1341	Grab	Composite*	500 mL HDPE	4 °C	1	40	
Long Beach Pump-Grab6	Long Beach Pump		1352	Grab	Composite*	500 mL HDPE	4 °C	1	41	
Long Beach Pump-Comp-Wet2	Long Beach Pump	11/2/17	1352	Composite*	TSS, Hardness, Total and Dissolved Cu, Pb, Zn	N/A	4 °C	N/A	42	

Data Report MUST include the following: Sample ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer. All times on this sheet are military time. Email **Sample Receipt Confirmations, PDF reports, and SWAMP EDDs to edd@kinneticlabs.net.**

Special Instructions/Comments: *Composite grab samples (Long Beach Pump-Grab1 to -Grab6) into one sample (Long Beach Pump-Comp-Wet2) and perform TSS, Hardness, and Total and Dissolved Cu, Pb, Zn (EPA 200.8) on the composite sample only. Diss. metals need to be lab filtered. Reference project QAPP for specific QA/QC requirements.

Sampled and Relinquished By: <i>[Signature]</i>	Date/Time: 11/2/17 1535	Transporter: KLI
Relinquished By: <i>[Signature]</i>	Date/Time:	Received By: <i>[Signature]</i>
	Date/Time:	Received By: <i>[Signature]</i>



SAMPLE RECEIPT CHECKLIST

COOLER 1 OF 1

CLIENT: Kinnetic Labs, Inc.

DATE: 01/12/2017

TEMPERATURE: (Criteria: 0.0°C - 6.0°C, not frozen except sediment/tissue)
Thermometer ID: SC3B (CF: 0.0°C); Temperature (w/o CF): 1-8 °C (w/ CF): 1-8 °C; [] Blank [x] Sample
[] Sample(s) outside temperature criteria (PM/APM contacted by: _____)
[] Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling
[] Sample(s) received at ambient temperature; placed on ice for transport by courier
Ambient Temperature: [] Air [] Filter
Checked by: 836

CUSTODY SEAL:
Cooler [] Present and Intact [] Present but Not Intact [x] Not Present [] N/A Checked by: 836
Sample(s) [] Present and Intact [] Present but Not Intact [x] Not Present [] N/A Checked by: 1053

SAMPLE CONDITION:
Chain-of-Custody (COC) document(s) received with samples [x] Yes [] No [] N/A
COC document(s) received complete [x] Yes [] No [] N/A
[] Sampling date [] Sampling time [] Matrix [] Number of containers
[] No analysis requested [] Not relinquished [] No relinquished date [] No relinquished time
Sampler's name indicated on COC [x] Yes [] No [] N/A
Sample container label(s) consistent with COC [x] Yes [] No [] N/A
Sample container(s) intact and in good condition [x] Yes [] No [] N/A
Proper containers for analyses requested [x] Yes [] No [] N/A
Sufficient volume/mass for analyses requested [x] Yes [] No [] N/A
Samples received within holding time [x] Yes [] No [] N/A
Aqueous samples for certain analyses received within 15-minute holding time
[] pH [] Residual Chlorine [] Dissolved Sulfide [] Dissolved Oxygen [] N/A
Proper preservation chemical(s) noted on COC and/or sample container [x] Yes [] No [] N/A
Unpreserved aqueous sample(s) received for certain analyses
[] Volatile Organics [] Total Metals [x] Dissolved Metals
Container(s) for certain analysis free of headspace [] Yes [] No [x] N/A
[] Volatile Organics [] Dissolved Gases (RSK-175) [] Dissolved Oxygen (SM 4500)
[] Carbon Dioxide (SM 4500) [] Ferrous Iron (SM 3500) [] Hydrogen Sulfide (Hach)
Tedlar™ bag(s) free of condensation [] Yes [] No [x] N/A

CONTAINER TYPE: (Trip Blank Lot Number: _____)
Aqueous: [] VOA [] VOA h [] VOA na2 [] 100PB [] 100PB na2 [] 125AGB [] 125AGB h [] 125AGB p [] 125PB
[] 125PB z nna [] 250AGB [] 250CGB [] 250CGB s [] 250PB [] 250PB n [] 500AGB [] 500AGJ [] 500AGJs
[x] 500PB [] 1AGB [] 1AGB na2 [] 1AGBs [] 1PB [] 1PB na [] [] [] [] []
Solid: [] 4ozCGJ [] 8ozCGJ [] 16ozCGJ [] Sleeve () [] EnCores® () [] TerraCores® () []
Air: [] Tedlar™ [] Canister [] Sorbent Tube [] PUF [] Other Matrix (): [] []
Container: A = Amber, B = Bottle, C = Clear, E = Envelope, G = Glass, J = Jar, P = Plastic, and Z = Ziploc/Resealable Bag
Preservative: b = buffered, f = filtered, h = HCl, n = HNO3, na = NaOH, na2 = Na2S2O3, p = H3PO4, Labeled/Checked by: 1053
s = H2SO4, u = ultra-pure, x = Na2SO3 + NaHSO4.H2O, z nna = Zn (CH3CO2)2 + NaOH Reviewed by: 681



Environmental
Calscience

Supplemental Report 1

The original report has been revised/corrected.



WORK ORDER NUMBER: 17-01-1733

The difference is service



AIR | SOIL | WATER | MARINE CHEMISTRY

Analytical Report For

Client: Kinnetic Laboratories, Inc.

Client Project Name: Prop 84 Green Streets BMP

Attention: Danielle Gonsman
 2750 East Spring Street
 Suite 190
 Long Beach, CA 90806-2249

Kathleen M. Burney FOR

Approved for release on 03/06/2017 by:
 Carla Hollowell
 Project Manager

ResultLink ▶

Email your PM ▶

Eurofins Calscience, Inc. (Calscience) certifies that the test results provided in this report meet all NELAC requirements for parameters for which accreditation is required or available. Any exceptions to NELAC requirements are noted in the case narrative. The original report of subcontracted analyses, if any, is attached to this report. The results in this report are limited to the sample(s) tested and any reproduction thereof must be made in its entirety. The client or recipient of this report is specifically prohibited from making material changes to said report and, to the extent that such changes are made, Calscience is not responsible, legally or otherwise. The client or recipient agrees to indemnify Calscience for any defense to any litigation which may arise.

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 Work Order Number: 17-01-1733

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Condition Upon Receipt:

Samples were received under Chain-of-Custody (COC) on 01/19/17. They were assigned to Work Order 17-01-1733.

Unless otherwise noted on the Sample Receiving forms all samples were received in good condition and within the recommended EPA temperature criteria for the methods noted on the COC. The COC and Sample Receiving Documents are integral elements of the analytical report and are presented at the back of the report.

Holding Times:

All samples were analyzed within prescribed holding times (HT) and/or in accordance with the Calscience Sample Acceptance Policy unless otherwise noted in the analytical report and/or comprehensive case narrative, if required.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of ≤ 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

Quality Control:

All quality control parameters (QC) were within established control limits except where noted in the QC summary forms or described further within this report.

Subcontractor Information:

Unless otherwise noted below (or on the subcontract form), no samples were subcontracted.

Additional Comments:

Air - Sorbent-extracted air methods (EPA TO-4A, EPA TO-10, EPA TO-13A, EPA TO-17): Analytical results are converted from mass/sample basis to mass/volume basis using client-supplied air volumes.

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are always reported on a wet weight basis.



Calscience

Sample Summary

Client: Kinnetic Laboratories, Inc.	Work Order: 17-01-1733
2750 East Spring Street, Suite 190	Project Name: Prop 84 Green Streets BMP
Long Beach, CA 90806-2249	PO Number:
	Date/Time Received: 01/19/17 17:05
	Number of Containers: 28

Attn: Danielle Gonsman

Sample Identification	Lab Number	Collection Date and Time	Number of Containers	Matrix
Whittier-Inflow-1-Grab1	17-01-1733-1	01/19/17 03:15	1	Aqueous
Whittier-Inflow-1-Grab2	17-01-1733-2	01/19/17 03:45	1	Aqueous
Whittier-Inflow-1-Grab3	17-01-1733-3	01/19/17 04:05	1	Aqueous
Whittier-Inflow-1-Grab4	17-01-1733-4	01/19/17 04:25	1	Aqueous
Whittier-Inflow-1-Grab5	17-01-1733-5	01/19/17 04:45	1	Aqueous
Whittier-Inflow-1-Grab6	17-01-1733-6	01/19/17 05:05	1	Aqueous
Whittier-Inflow-1-Comp-Wet2	17-01-1733-7	01/19/17 05:05	1	Aqueous
Whittier-Outflow-1-Grab1	17-01-1733-8	01/19/17 03:16	1	Aqueous
Whittier-Outflow-1-Grab2	17-01-1733-9	01/19/17 03:46	1	Aqueous
Whittier-Outflow-1-Grab3	17-01-1733-10	01/19/17 04:06	1	Aqueous
Whittier-Outflow-1-Grab4	17-01-1733-11	01/19/17 04:26	1	Aqueous
Whittier-Outflow-1-Grab5	17-01-1733-12	01/19/17 04:46	1	Aqueous
Whittier-Outflow-1-Grab6	17-01-1733-13	01/19/17 05:06	1	Aqueous
Whittier-Outflow-1-Comp-Wet2	17-01-1733-14	01/19/17 05:06	1	Aqueous
Whittier-Outflow-2-Grab1	17-01-1733-15	01/19/17 03:17	1	Aqueous
Whittier-Outflow-2-Grab2	17-01-1733-16	01/19/17 03:47	1	Aqueous
Whittier-Outflow-2-Grab3	17-01-1733-17	01/19/17 04:07	1	Aqueous
Whittier-Outflow-2-Grab4	17-01-1733-18	01/19/17 04:27	1	Aqueous
Whittier-Outflow-2-Grab5	17-01-1733-19	01/19/17 04:47	1	Aqueous
Whittier-Outflow-2-Grab6	17-01-1733-20	01/19/17 05:01	1	Aqueous
Whittier-Outflow-2-Comp-Wet2	17-01-1733-21	01/19/17 05:07	1	Aqueous
Long Beach Pump-Grab1	17-01-1733-22	01/19/17 03:18	1	Aqueous
Long Beach Pump-Grab2	17-01-1733-23	01/19/17 03:48	1	Aqueous
Long Beach Pump-Grab3	17-01-1733-24	01/19/17 04:08	1	Aqueous
Long Beach Pump-Grab4	17-01-1733-25	01/19/17 04:28	1	Aqueous
Long Beach Pump-Grab5	17-01-1733-26	01/19/17 04:48	1	Aqueous
Long Beach Pump-Grab6	17-01-1733-27	01/19/17 05:08	1	Aqueous
Long Beach Pump-Comp-Wet3	17-01-1733-28	01/19/17 05:08	1	Aqueous


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Calscience

Analytical Report

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 01/19/17
Work Order: 17-01-1733
Preparation: N/A
Method: SM 2340C
Units: mg/L

Project: Prop 84 Green Streets BMP

Page 1 of 1

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Whittier-Inflow-1-Comp-Wet2	17-01-1733-7-A	01/19/17 05:05	Aqueous	BUR21	N/A	01/23/17 17:00	H0123HARB2

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Hardness, Total (as CaCO ₃)	11	2.0	0.99	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Whittier-Outflow-1-Comp-Wet2	17-01-1733-14-A	01/19/17 05:06	Aqueous	BUR21	N/A	01/23/17 17:00	H0123HARB2

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Hardness, Total (as CaCO ₃)	12	2.0	0.99	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Whittier-Outflow-2-Comp-Wet2	17-01-1733-21-A	01/19/17 05:07	Aqueous	BUR21	N/A	01/23/17 17:00	H0123HARB2

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Hardness, Total (as CaCO ₃)	14	2.0	0.99	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Long Beach Pump-Comp-Wet3	17-01-1733-28-A	01/19/17 05:08	Aqueous	BUR21	N/A	01/23/17 17:00	H0123HARB2

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Hardness, Total (as CaCO ₃)	12	2.0	0.99	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	099-14-457-694	N/A	Aqueous	BUR21	N/A	01/23/17 17:00	H0123HARB2

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Hardness, Total (as CaCO ₃)	ND	2.0	0.99	1.00	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.



Calscience

Analytical Report

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 01/19/17
Work Order: 17-01-1733
Preparation: N/A
Method: SM 2540 D
Units: mg/L

Project: Prop 84 Green Streets BMP

Page 1 of 1

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Whittier-Inflow-1-Comp-Wet2	17-01-1733-7-A	01/19/17 05:05	Aqueous	N/A	01/23/17	01/23/17 14:00	H0123TSSL1

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Solids, Total Suspended	43	1.0	0.83	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Whittier-Outflow-1-Comp-Wet2	17-01-1733-14-A	01/19/17 05:06	Aqueous	N/A	01/23/17	01/23/17 14:00	H0123TSSL1

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Solids, Total Suspended	36	1.0	0.83	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Whittier-Outflow-2-Comp-Wet2	17-01-1733-21-A	01/19/17 05:07	Aqueous	N/A	01/23/17	01/23/17 14:00	H0123TSSL1

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Solids, Total Suspended	45	1.0	0.83	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Long Beach Pump-Comp-Wet3	17-01-1733-28-A	01/19/17 05:08	Aqueous	N/A	01/23/17	01/23/17 14:00	H0123TSSL1

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Solids, Total Suspended	44	1.0	0.83	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	099-09-010-8097	N/A	Aqueous	N/A	01/23/17	01/23/17 14:00	H0123TSSL1

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Solids, Total Suspended	ND	1.0	0.83	1.00	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.



Calscience

Analytical Report

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 01/19/17
Work Order: 17-01-1733
Preparation: Filtered
Method: EPA 200.8
Units: ug/L

Project: Prop 84 Green Streets BMP

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Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Whittier-Inflow-1-Comp-Wet2	17-01-1733-7-A	01/19/17 05:05	Aqueous	ICP/MS 03	01/20/17	01/21/17 02:01	170120LA2

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	4.67	1.00	0.140	1.00	
Lead	0.514	0.500	0.0898	1.00	
Zinc	18.2	2.00	0.479	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Whittier-Outflow-1-Comp-Wet2	17-01-1733-14-A	01/19/17 05:06	Aqueous	ICP/MS 03	01/20/17	01/21/17 02:03	170120LA2

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	4.74	1.00	0.140	1.00	
Lead	0.472	0.500	0.0898	1.00	J
Zinc	14.5	2.00	0.479	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Whittier-Outflow-2-Comp-Wet2	17-01-1733-21-A	01/19/17 05:07	Aqueous	ICP/MS 03	01/20/17	01/21/17 02:06	170120LA2

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	4.23	1.00	0.140	1.00	
Lead	0.395	0.500	0.0898	1.00	J
Zinc	12.5	2.00	0.479	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Long Beach Pump-Comp-Wet3	17-01-1733-28-A	01/19/17 05:08	Aqueous	ICP/MS 03	01/20/17	01/21/17 02:08	170120LA2

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	4.19	1.00	0.140	1.00	
Lead	0.407	0.500	0.0898	1.00	J
Zinc	12.8	2.00	0.479	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	099-16-094-1712	N/A	Aqueous	ICP/MS 03	01/20/17	01/21/17 01:13	170120LA2

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	ND	1.00	0.140	1.00	
Lead	ND	0.500	0.0898	1.00	
Zinc	ND	2.00	0.479	1.00	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.



Calscience

Analytical Report

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 01/19/17
Work Order: 17-01-1733
Preparation: N/A
Method: EPA 200.8
Units: ug/L

Project: Prop 84 Green Streets BMP

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Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Whittier-Inflow-1-Comp-Wet2	17-01-1733-7-A	01/19/17 05:05	Aqueous	ICP/MS 03	01/20/17	01/21/17 02:47	170120LA1A

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	10.7	1.00	0.140	1.00	
Lead	10.7	0.500	0.0898	1.00	
Zinc	136	2.00	0.479	1.00	B

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Whittier-Outflow-1-Comp-Wet2	17-01-1733-14-A	01/19/17 05:06	Aqueous	ICP/MS 03	01/20/17	01/21/17 02:49	170120LA1A

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	9.92	1.00	0.140	1.00	
Lead	8.21	0.500	0.0898	1.00	
Zinc	152	2.00	0.479	1.00	B

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Whittier-Outflow-2-Comp-Wet2	17-01-1733-21-A	01/19/17 05:07	Aqueous	ICP/MS 03	01/20/17	01/21/17 02:52	170120LA1A

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	9.89	1.00	0.140	1.00	
Lead	10.4	0.500	0.0898	1.00	
Zinc	142	2.00	0.479	1.00	B

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Long Beach Pump-Comp-Wet3	17-01-1733-28-A	01/19/17 05:08	Aqueous	ICP/MS 03	01/20/17	01/21/17 02:54	170120LA1A

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	9.74	1.00	0.140	1.00	
Lead	10.5	0.500	0.0898	1.00	
Zinc	171	2.00	0.479	1.00	B

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	099-16-448-14	N/A	Aqueous	ICP/MS 03	01/20/17	01/21/17 00:34	170120LA1A

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	ND	1.00	0.140	1.00	
Lead	ND	0.500	0.0898	1.00	
Zinc	0.655	2.00	0.479	1.00	J

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.



Calscience

Quality Control - Spike/Spike Duplicate

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 01/19/17
Work Order: 17-01-1733
Preparation: Filtered
Method: EPA 200.8

Project: Prop 84 Green Streets BMP

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Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
Whittier-Inflow-1-Comp-Wet2	Sample	Aqueous	ICP/MS 03	01/20/17	01/21/17 02:01	170120SA2A
Whittier-Inflow-1-Comp-Wet2	Matrix Spike	Aqueous	ICP/MS 03	01/20/17	01/21/17 01:56	170120SA2A
Whittier-Inflow-1-Comp-Wet2	Matrix Spike Duplicate	Aqueous	ICP/MS 03	01/20/17	01/21/17 01:58	170120SA2A

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Copper	4.670	100.0	104.6	100	108.6	104	80-120	4	0-20	
Lead	0.5141	100.0	94.68	94	96.97	96	80-120	2	0-20	
Zinc	18.22	100.0	116.1	98	119.1	101	80-120	3	0-20	


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RPD: Relative Percent Difference. CL: Control Limits



Calscience

Quality Control - Spike/Spike Duplicate

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 01/19/17
Work Order: 17-01-1733
Preparation: N/A
Method: EPA 200.8

Project: Prop 84 Green Streets BMP

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Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
Long Beach Pump-Comp-Wet3	Sample	Aqueous	ICP/MS 03	01/20/17	01/21/17 02:54	170120SA1A
Long Beach Pump-Comp-Wet3	Matrix Spike	Aqueous	ICP/MS 03	01/20/17	01/21/17 02:57	170120SA1A
Long Beach Pump-Comp-Wet3	Matrix Spike Duplicate	Aqueous	ICP/MS 03	01/20/17	01/21/17 02:59	170120SA1A

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Copper	9.743	100.0	108.0	98	108.0	98	80-120	0	0-20	
Lead	10.45	100.0	108.5	98	108.2	98	80-120	0	0-20	
Zinc	170.5	100.0	265.6	95	264.5	94	80-120	0	0-20	

Return to Contents

RPD: Relative Percent Difference. CL: Control Limits



Calscience

Quality Control - Sample Duplicate

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 01/19/17
Work Order: 17-01-1733
Preparation: N/A
Method: SM 2340C

Project: Prop 84 Green Streets BMP

Page 1 of 2

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	Duplicate Batch Number
Long Beach Pump-Comp-Wet3	Sample	Aqueous	BUR21	N/A	01/23/17 17:00	H0123HARD2
Long Beach Pump-Comp-Wet3	Sample Duplicate	Aqueous	BUR21	N/A	01/23/17 17:00	H0123HARD2
<u>Parameter</u>		<u>Sample Conc.</u>	<u>DUP Conc.</u>	<u>RPD</u>	<u>RPD CL</u>	<u>Qualifiers</u>
Hardness, Total (as CaCO ₃)		12.00	12.00	0	0-25	

Return to Contents

RPD: Relative Percent Difference. CL: Control Limits



Calscience

Quality Control - Sample Duplicate

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 01/19/17
Work Order: 17-01-1733
Preparation: N/A
Method: SM 2540 D

Project: Prop 84 Green Streets BMP

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Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	Duplicate Batch Number
Whittier-Outflow-1-Comp-Wet2	Sample	Aqueous	N/A	01/23/17 00:00	01/23/17 14:00	H0123TSSD1
Whittier-Outflow-1-Comp-Wet2	Sample Duplicate	Aqueous	N/A	01/23/17 00:00	01/23/17 14:00	H0123TSSD1

Parameter	Sample Conc.	DUP Conc.	RPD	RPD CL	Qualifiers
Solids, Total Suspended	36.50	38.67	6	0-20	

Return to Contents

RPD: Relative Percent Difference. CL: Control Limits



Calscience

Quality Control - LCS/LCSD

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 01/19/17
Work Order: 17-01-1733
Preparation: N/A
Method: SM 2540 D

Project: Prop 84 Green Streets BMP

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Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number			
099-09-010-8097	LCS	Aqueous	N/A	01/23/17	01/23/17 14:00	H0123TSSL1			
099-09-010-8097	LCSD	Aqueous	N/A	01/23/17	01/23/17 14:00	H0123TSSL1			
Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Solids, Total Suspended	100.0	92.00	92	91.00	91	80-120	1	0-20	

Return to Contents

RPD: Relative Percent Difference. CL: Control Limits

Quality Control - LCS

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 01/19/17
Work Order: 17-01-1733
Preparation: Filtered
Method: EPA 200.8

Project: Prop 84 Green Streets BMP

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Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
099-16-094-1712	LCS	Aqueous	ICP/MS 03	01/20/17	01/21/17 01:18	170120LA2
<u>Parameter</u>		<u>Spike Added</u>	<u>Conc. Recovered</u>	<u>LCS %Rec.</u>	<u>%Rec. CL</u>	<u>Qualifiers</u>
Copper		100.0	100.3	100	80-120	
Lead		100.0	96.33	96	80-120	
Zinc		100.0	101.7	102	80-120	

Quality Control - LCS

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 01/19/17
Work Order: 17-01-1733
Preparation: N/A
Method: EPA 200.8

Project: Prop 84 Green Streets BMP

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Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
099-16-448-14	LCS	Aqueous	ICP/MS 03	01/20/17	01/21/17 01:15	170120LA1A
<u>Parameter</u>		<u>Spike Added</u>	<u>Conc. Recovered</u>	<u>LCS %Rec.</u>	<u>%Rec. CL</u>	<u>Qualifiers</u>
Copper		100.0	99.85	100	80-120	
Lead		100.0	95.39	95	80-120	
Zinc		100.0	99.77	100	80-120	

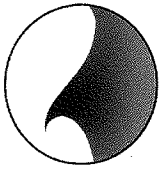
Glossary of Terms and Qualifiers

Work Order: 17-01-1733

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<u>Qualifiers</u>	<u>Definition</u>
*	See applicable analysis comment.
<	Less than the indicated value.
>	Greater than the indicated value.
1	Surrogate compound recovery was out of control due to a required sample dilution. Therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike (MS) or Matrix Spike Duplicate (MSD) compound was out of control due to suspected matrix interference. The associated LCS recovery was in control.
4	The MS/MSD RPD was out of control due to suspected matrix interference.
5	The PDS/PDSD or PES/PESD associated with this batch of samples was out of control due to suspected matrix interference.
6	Surrogate recovery below the acceptance limit.
7	Surrogate recovery above the acceptance limit.
B	Analyte was present in the associated method blank.
BU	Sample analyzed after holding time expired.
BV	Sample received after holding time expired.
CI	See case narrative.
E	Concentration exceeds the calibration range.
ET	Sample was extracted past end of recommended max. holding time.
HD	The chromatographic pattern was inconsistent with the profile of the reference fuel standard.
HDH	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but heavier hydrocarbons were also present (or detected).
HDL	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but lighter hydrocarbons were also present (or detected).
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
JA	Analyte positively identified but quantitation is an estimate.
ME	LCS Recovery Percentage is within Marginal Exceedance (ME) Control Limit range (+/- 4 SD from the mean).
ND	Parameter not detected at the indicated reporting limit.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
SG	The sample extract was subjected to Silica Gel treatment prior to analysis.
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.
	Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are reported on a wet weight basis.
	Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.
	A calculated total result (Example: Total Pesticides) is the summation of each component concentration and/or, if "J" flags are reported, estimated concentration. Component concentrations showing not detected (ND) are summed into the calculated total result as zero concentrations.

Chain of Custody Record



17-01-1733

From:
Kinnetic Laboratories, Inc
2750 E. Spring Street, Suite 190
Long Beach, CA 90806
(562) 595-8700

Contact: Danielle Gonsman

Project #: 5720.166

Matrix: Water

Date Received:

Lab #:

To:
Eurofins Calscience
7440 Lincoln Way
Garden Grove, CA 92841
Phone: (714) 895-5494

Contact: Kathy Burney

Project: Prop 84 Green Streets BMP

Complete by: Standard TAT

SampleID	StationID	Sample Date	Sample Time	Sample Type	Analysis	Container	Pres	No. of Bottles	LabID	Condition Upon Receipt
Whittier-Inflow-1-Grab1	Whittier Tree Well 7751 Milton Inflow-1	1/19/17	0315	Grab	Composite*	500 mL HDPE	4 °C	1	1	
Whittier-Inflow-1-Grab2	Whittier Tree Well 7751 Milton Inflow-1		0345	Grab	Composite*	500 mL HDPE	4 °C	1	2	
Whittier-Inflow-1-Grab3	Whittier Tree Well 7751 Milton Inflow-1		0405	Grab	Composite*	500 mL HDPE	4 °C	1	3	
Whittier-Inflow-1-Grab4	Whittier Tree Well 7751 Milton Inflow-1		0425	Grab	Composite*	500 mL HDPE	4 °C	1	4	
Whittier-Inflow-1-Grab5	Whittier Tree Well 7751 Milton Inflow-1		0445	Grab	Composite*	500 mL HDPE	4 °C	1	5	
Whittier-Inflow-1-Grab6	Whittier Tree Well 7751 Milton Inflow-1		0905	Grab	Composite*	500 mL HDPE	4 °C	1	6	
Whittier-Inflow-1-Comp-Wet2	Whittier Tree Well 7751 Milton Inflow-1	1/19/17	0505	Composite*	TSS, Hardness, Total and Dissolved Cu, Pb, Zn	N/A	N/A	N/A	7	

Data Report MUST include the following: Sample ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer. All times on this sheet are military time. Email Sample Receipt Confirmations, PDF reports, and SWAMP EDDs to edd@kinneticlabs.net.

Special Instructions/Comments: *Composite grab samples (Whittier-Inflow-1-Grab1 to -Grab6) into one sample (Whittier-Inflow-1-Comp-Wet2) and perform TSS, Hardness, and Total and Dissolved Cu, Pb, Zn (EPA 200.8) on the composite sample only. Diss. Metals need to be lab filtered. Reference project QAPP for specific QA/QC requirements. Run MS/MSD on project sample.

Sampled and Relinquished By:	Date/Time:	Transporter	Received By:	Date/Time:
<i>[Signature]</i>	1/19/17 1412	ECT	<i>[Signature]</i>	1/19/17 1412
<i>[Signature]</i>	1/19/17-1705	ECT	<i>[Signature]</i>	1/19/17 1705

Chain of Custody Record

To: Eurofins Calscience
7440 Lincoln Way
Garden Grove, CA 92841
Phone: (714) 895-5494

From: Kinnetic Laboratories, Inc
2750 E. Spring Street, Suite 190
Long Beach, CA 90806
(562) 595-8700

Contact: Kathy Burney

Contact: Danielle Gonsman

Date Received: 11/17

Lab #: 1733

Project: Prop 84 Green Streets BMP

Matrix: Water

Project #: 5720.166

SampleID	StationID	Sample Date	Sample Time	Sample Type	Analysis	Container	Pres	No. of Bottles	LabID	Condition Upon Receipt
Whittier-Outflow-1-Grab1	Whittier Tree Well 7751 Milton Outflow-1	11/17	0310	Grab	Composite*	500 mL HDPE	4 °C	1	8	
Whittier-Outflow-1-Grab2	Whittier Tree Well 7751 Milton Outflow-1		0340	Grab	Composite*	500 mL HDPE	4 °C	1	9	
Whittier-Outflow-1-Grab3	Whittier Tree Well 7751 Milton Outflow-1		0400	Grab	Composite*	500 mL HDPE	4 °C	1	10	
Whittier-Outflow-1-Grab4	Whittier Tree Well 7751 Milton Outflow-1		0420	Grab	Composite*	500 mL HDPE	4 °C	1	11	
Whittier-Outflow-1-Grab5	Whittier Tree Well 7751 Milton Outflow-1		0440	Grab	Composite*	500 mL HDPE	4 °C	1	12	
Whittier-Outflow-1-Grab6	Whittier Tree Well 7751 Milton Outflow-1		0500	Grab	Composite*	500 mL HDPE	4 °C	1	13	
Whittier-Outflow-1-Comp-Wet2	Whittier Tree Well 7751 Milton Outflow-1	11/17	0900	Composite*	TSS, Hardness, Total and Dissolved Cu, Pb, Zn	N/A	N/A	N/A	14	

Data Report MUST include the following: Sample ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer. All times on this sheet are military time. Email Sample Receipt Confirmations, PDF reports, and SWAMP EDDs to edd@kinneticlabs.net.

Special Instructions/Comments: *Composite grab samples (Whittier-Outflow-1-Wet1-Grab1 to -Grab6) into one sample (Whittier-Outflow-1-Comp-Wet2) and perform TSS, Hardness, and Total and Dissolved Cu, Pb, Zn (EPA 200.8) on the composite sample only. Diss. Metals need to be lab filtered. Reference project QAPP for specific QA/QC requirements.

Sampled and Relinquished By: [Signature] Date/Time: 11/19/17 1412

Transporter: ECT

Received By: [Signature] Date/Time: 11/19/17 1412

Relinquished By: [Signature] Date/Time: 11/19/17 1705

Transporter: ECT

Received By: [Signature] Date/Time: 11/19/17 1705

Chain of Custody Record

To: Eurofins Calscience
7440 Lincoln Way
Garden Grove, CA 92841
Phone: (714) 895-5494

From: Kinnetic Laboratories, Inc
2750 E. Spring Street, Suite 190
Long Beach, CA 90806
(562) 595-8700

Date Received: (1733)
Lab #:

Contact: Kathy Burney
Project: Prop 84 Green Streets BMP
Complete by: Standard TAT

Contact: Danielle Gonsman
Matrix: Water
Project #: 5720.166

SampleID	StationID	Sample Date	Sample Time	Sample Type	Analysis	Container	Pres	No. of Bottles	LabID	Condition Upon Receipt
Whittier-Outflow-2-Grab1	Whittier Tree Well 7913 Milton Outflow-2	1/19/17	0317	Grab	Composite*	500 mL HDPE	4 °C	1	15	
Whittier-Outflow-2-Grab2	Whittier Tree Well 7913 Milton Outflow-2		0347	Grab	Composite*	500 mL HDPE	4 °C	1	16	
Whittier-Outflow-2-Grab3	Whittier Tree Well 7913 Milton Outflow-2		0407	Grab	Composite*	500 mL HDPE	4 °C	1	17	
Whittier-Outflow-2-Grab4	Whittier Tree Well 7913 Milton Outflow-2		0427	Grab	Composite*	500 mL HDPE	4 °C	1	18	
Whittier-Outflow-2-Grab5	Whittier Tree Well 7913 Milton Outflow-2		0447	Grab	Composite*	500 mL HDPE	4 °C	1	19	
Whittier-Outflow-2-Grab6	Whittier Tree Well 7913 Milton Outflow-2		0507	Grab	Composite*	500 mL HDPE	4 °C	1	20	
Whittier-Outflow-2-Comp-Wet2	Whittier Tree Well 7913 Milton Outflow-2	1/19/17	0507	Composite*	TSS, Hardness, Total and Dissolved Cu, Pb, Zn	N/A	N/A	N/A	21	

Data Report MUST include the following: Sample ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer. All times on this sheet are military time. Email Sample Receipt Confirmations, PDF reports, and SWAMP EDDs to edd@kinneticlabs.net.

Special Instructions/Comments: *Composite grab samples (Whittier-Outflow-2-Grab1 to -Grab6) into one sample (Whittier-Outflow-2-Comp-Wet2) and perform TSS, Hardness, and Total and Dissolved Cu, Pb, Zn (EPA 200.8) on the composite sample only. Diss. Metals need to be lab filtered. Reference project QAPP for specific QA/QC requirements.

Sampled and Relinquished By:	Date/Time:	Transporter	Received By:	Date/Time:
<i>[Signature]</i>	1/19/17 1412	EC	<i>[Signature]</i>	1/19/17 1412
<i>[Signature]</i>	1/19/17 1705	EC	<i>[Signature]</i>	1/19/17 1705



Chain of Custody Record

To: Eurofins Calscience
 7440 Lincoln Way
 Garden Grove, CA 92841
 Phone: (714) 895-5494

From: Kinnetic Laboratories, Inc
 2750 E. Spring Street, Suite 190
 Long Beach, CA 90806
 (562) 595-8700

Contact: Kathy Burney

Contact: Danielle Gonsman

Project: Prop 84 Green Streets BMP

Matrix: Water

Project #: 5720.166

Complete by: Standard TAT

1733

Date Received:
Lab #:

SampleID	StationID	Sample Date	Sample Time	Sample Type	Analysis	Container	Pres	No. of Bottles	LabID	Condition Upon Receipt
Long Beach Pump-Grab1	Long Beach Pump	1/19/17	0316	Grab	Composite*	500 mL HDPE	4 °C	1	22	
Long Beach Pump-Grab2	Long Beach Pump		0348	Grab	Composite*	500 mL HDPE	4 °C	1	23	
Long Beach Pump-Grab3	Long Beach Pump		0408	Grab	Composite*	500 mL HDPE	4 °C	1	24	
Long Beach Pump-Grab4	Long Beach Pump		0428	Grab	Composite*	500 mL HDPE	4 °C	1	25	
Long Beach Pump-Grab5	Long Beach Pump		0448	Grab	Composite*	500 mL HDPE	4 °C	1	26	
Long Beach Pump-Grab6	Long Beach Pump		0508	Grab	Composite*	500 mL HDPE	4 °C	1	27	
Long Beach Pump-Comp-Wet3	Long Beach Pump	1/19/17	0508	Composite*	TSS, Hardness, Total and Dissolved Cu, Pb, Zn	N/A	N/A	N/A	28	

Data Report MUST include the following: Sample ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer. All times on this sheet are military time. Email Sample Receipt Confirmations, PDF reports, and SWAMP EDDs to edd@kinneticlabs.net.

Special Instructions/Comments: *Composite grab samples (Long Beach Pump-Grab1 to -Grab6) into one sample (Long Beach Pump-Comp-Wet3) and perform TSS, Hardness, and Total and Dissolved Cu, Pb, Zn (EPA 200.8) on the composite sample only. Diss. metals need to be lab filtered. Reference project QAPP for specific QA/QC requirements.

Sampled and Relinquished By:	Date/Time:	Transporter	Received By:	Date/Time:
<i>[Signature]</i>	1/19/17 1412	ECI	<i>[Signature]</i>	1/19/17 1412
<i>[Signature]</i>	1/19/17 1705	ECI	<i>[Signature]</i>	1/19/17 1705



SAMPLE RECEIPT CHECKLIST

COOLER 1 OF 1

CLIENT: Kinnetic

DATE: 01/19/2017

TEMPERATURE: (Criteria: 0.0°C – 6.0°C, not frozen except sediment/tissue)
 Thermometer ID: SC3B (CF: 0.0°C); Temperature (w/o CF): 2.1 °C (w/ CF): 2.1 °C; Blank Sample
 Sample(s) outside temperature criteria (PM/APM contacted by: _____)
 Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling
 Sample(s) received at ambient temperature; placed on ice for transport by courier
 Ambient Temperature: Air Filter

Checked by: SON

CUSTODY SEAL:

Cooler Present and Intact Present but Not Intact Not Present N/A
 Sample(s) Present and Intact Present but Not Intact Not Present N/A

Checked by: SON
 Checked by: 1033

SAMPLE CONDITION:

	Yes	No	N/A
Chain-of-Custody (COC) document(s) received with samples	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
COC document(s) received complete	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Sampling date <input type="checkbox"/> Sampling time <input type="checkbox"/> Matrix <input type="checkbox"/> Number of containers			
<input type="checkbox"/> No analysis requested <input type="checkbox"/> Not relinquished <input type="checkbox"/> No relinquished date <input type="checkbox"/> No relinquished time			
Sampler's name indicated on COC	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sample container label(s) consistent with COC	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sample container(s) intact and in good condition	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Proper containers for analyses requested	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sufficient volume/mass for analyses requested	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Samples received within holding time	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Aqueous samples for certain analyses received within 15-minute holding time			
<input type="checkbox"/> pH <input type="checkbox"/> Residual Chlorine <input type="checkbox"/> Dissolved Sulfide <input type="checkbox"/> Dissolved Oxygen	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Proper preservation chemical(s) noted on COC and/or sample container	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unpreserved aqueous sample(s) received for certain analyses			
<input type="checkbox"/> Volatile Organics <input type="checkbox"/> Total Metals <input checked="" type="checkbox"/> Dissolved Metals			
Container(s) for certain analysis free of headspace	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/> Volatile Organics <input type="checkbox"/> Dissolved Gases (RSK-175) <input type="checkbox"/> Dissolved Oxygen (SM 4500)			
<input type="checkbox"/> Carbon Dioxide (SM 4500) <input type="checkbox"/> Ferrous Iron (SM 3500) <input type="checkbox"/> Hydrogen Sulfide (Hach)			
Tedlar™ bag(s) free of condensation	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

CONTAINER TYPE: (Trip Blank Lot Number: _____)

Aqueous: VOA VOA_h VOA_{na2} 100PJ 100PJ_{na2} 125AGB 125AGB_h 125AGB_p 125PB
 125PB_{znna} 250AGB 250CGB 250CGB_s 250PB 250PB_n 500AGB 500AGJ 500AGJ_s
 500PB 1AGB 1AGB_{na2} 1AGB_s 1PB 1PB_{na} _____ _____ _____

Solid: 4ozCGJ 8ozCGJ 16ozCGJ Sleeve (_____) EnCores® (_____) TerraCores® (_____) _____

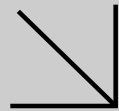
Air: Tedlar™ Canister Sorbent Tube PUF _____ **Other Matrix** (_____) : _____ _____

Container: **A** = Amber, **B** = Bottle, **C** = Clear, **E** = Envelope, **G** = Glass, **J** = Jar, **P** = Plastic, and **Z** = Ziploc/Resealable Bag
 Preservative: **b** = buffered, **f** = filtered, **h** = HCl, **n** = HNO₃, **na** = NaOH, **na₂** = Na₂S₂O₃, **p** = H₃PO₄, **Labeled/Checked by:** 1033
s = H₂SO₄, **u** = ultra-pure, **x** = Na₂SO₃+NaHSO₄.H₂O, **znna** = Zn (CH₃CO₂)₂ + NaOH **Reviewed by:** SON

Return to Contents



Calscience



WORK ORDER NUMBER: 17-02-1713

The difference is service



AIR | SOIL | WATER | MARINE CHEMISTRY

Analytical Report For

Client: Kinnetic Laboratories, Inc.

Client Project Name: Prop 84 Green Streets BMP

Attention: Danielle Gonsman
2750 East Spring Street
Suite 190
Long Beach, CA 90806-2249

Approved for release on 02/27/2017 by:
Carla Hollowell
Project Manager

ResultLink ▶

Email your PM ▶

Eurofins Calscience, Inc. (Calscience) certifies that the test results provided in this report meet all NELAC requirements for parameters for which accreditation is required or available. Any exceptions to NELAC requirements are noted in the case narrative. The original report of subcontracted analyses, if any, is attached to this report. The results in this report are limited to the sample(s) tested and any reproduction thereof must be made in its entirety. The client or recipient of this report is specifically prohibited from making material changes to said report and, to the extent that such changes are made, Calscience is not responsible, legally or otherwise. The client or recipient agrees to indemnify Calscience for any defense to any litigation which may arise.

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 Work Order Number: 17-02-1713

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Condition Upon Receipt:

Samples were received under Chain-of-Custody (COC) on 02/17/17. They were assigned to Work Order 17-02-1713.

Unless otherwise noted on the Sample Receiving forms all samples were received in good condition and within the recommended EPA temperature criteria for the methods noted on the COC. The COC and Sample Receiving Documents are integral elements of the analytical report and are presented at the back of the report.

Holding Times:

All samples were analyzed within prescribed holding times (HT) and/or in accordance with the Calscience Sample Acceptance Policy unless otherwise noted in the analytical report and/or comprehensive case narrative, if required.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of ≤ 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

Quality Control:

All quality control parameters (QC) were within established control limits except where noted in the QC summary forms or described further within this report.

Subcontractor Information:

Unless otherwise noted below (or on the subcontract form), no samples were subcontracted.

Additional Comments:

Air - Sorbent-extracted air methods (EPA TO-4A, EPA TO-10, EPA TO-13A, EPA TO-17): Analytical results are converted from mass/sample basis to mass/volume basis using client-supplied air volumes.

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are always reported on a wet weight basis.



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Sample Summary

Client: Kinnetic Laboratories, Inc.	Work Order: 17-02-1713
2750 East Spring Street, Suite 190	Project Name: Prop 84 Green Streets BMP
Long Beach, CA 90806-2249	PO Number:
	Date/Time Received: 02/17/17 17:53
	Number of Containers: 21

Attn: Danielle Gonsman

Sample Identification	Lab Number	Collection Date and Time	Number of Containers	Matrix
Downey-Inflow-Grab1	17-02-1713-1	02/17/17 14:15	1	Aqueous
Downey-Inflow-Grab2	17-02-1713-2	02/17/17 14:45	1	Aqueous
Downey-Inflow-Grab3	17-02-1713-3	02/17/17 15:15	1	Aqueous
Downey-Inflow-Grab4	17-02-1713-4	02/17/17 15:45	1	Aqueous
Downey-Inflow-Grab5	17-02-1713-5	02/17/17 16:15	1	Aqueous
Downey-Inflow-Grab6	17-02-1713-6	02/17/17 16:45	1	Aqueous
Downey-Inflow-Comp-Wet3	17-02-1713-7	02/17/17 16:45	1	Aqueous
Downey-Outflow-Grab1	17-02-1713-8	02/17/17 14:15	1	Aqueous
Downey-Outflow-Grab2	17-02-1713-9	02/17/17 14:45	1	Aqueous
Downey-Outflow-Grab3	17-02-1713-10	02/17/17 15:15	1	Aqueous
Downey-Outflow-Grab4	17-02-1713-11	02/17/17 15:45	1	Aqueous
Downey-Outflow-Grab5	17-02-1713-12	02/17/17 16:15	1	Aqueous
Downey-Outflow-Grab6	17-02-1713-13	02/17/17 16:45	1	Aqueous
Downey-Outflow-Comp-Wet3	17-02-1713-14	02/17/17 16:45	1	Aqueous
Long Beach Pump-Grab1	17-02-1713-15	02/17/17 14:16	1	Aqueous
Long Beach Pump-Grab2	17-02-1713-16	02/17/17 14:46	1	Aqueous
Long Beach Pump-Grab3	17-02-1713-17	02/17/17 15:16	1	Aqueous
Long Beach Pump-Grab4	17-02-1713-18	02/17/17 15:46	1	Aqueous
Long Beach Pump-Grab5	17-02-1713-19	02/17/17 16:16	1	Aqueous
Long Beach Pump-Grab6	17-02-1713-20	02/17/17 16:46	1	Aqueous
Long Beach Pump-Comp-Wet4	17-02-1713-21	02/17/17 16:46	1	Aqueous


 Return to Contents

Analytical Report

Kinnetic Laboratories, Inc.
 2750 East Spring Street, Suite 190
 Long Beach, CA 90806-2249

Date Received: 02/17/17
 Work Order: 17-02-1713
 Preparation: N/A
 Method: SM 2340C
 Units: mg/L

Project: Prop 84 Green Streets BMP

Page 1 of 1

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Downey-Inflow-Comp-Wet3	17-02-1713-7-A	02/17/17 16:45	Aqueous	BUR21	N/A	02/23/17 15:15	H0223HARB1

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Hardness, Total (as CaCO ₃)	16	2.0	0.99	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Downey-Outflow-Comp-Wet3	17-02-1713-14-A	02/17/17 16:45	Aqueous	BUR21	N/A	02/23/17 15:15	H0223HARB1

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Hardness, Total (as CaCO ₃)	8.0	2.0	0.99	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Long Beach Pump-Comp-Wet4	17-02-1713-21-A	02/17/17 16:46	Aqueous	BUR21	N/A	02/23/17 15:15	H0223HARB1

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Hardness, Total (as CaCO ₃)	7.0	2.0	0.99	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	099-14-457-702	N/A	Aqueous	BUR21	N/A	02/23/17 15:15	H0223HARB1

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Hardness, Total (as CaCO ₃)	ND	2.0	0.99	1.00	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.



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Analytical Report

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 02/17/17
Work Order: 17-02-1713
Preparation: N/A
Method: SM 2540 D
Units: mg/L

Project: Prop 84 Green Streets BMP

Page 1 of 1

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Downey-Inflow-Comp-Wet3	17-02-1713-7-A	02/17/17 16:45	Aqueous	N/A	02/24/17	02/24/17 17:00	H0224TSSL3

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>MDL</u>	<u>DF</u>	<u>Qualifiers</u>
Solids, Total Suspended	78	1.0	0.83	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Downey-Outflow-Comp-Wet3	17-02-1713-14-A	02/17/17 16:45	Aqueous	N/A	02/24/17	02/24/17 17:00	H0224TSSL3

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>MDL</u>	<u>DF</u>	<u>Qualifiers</u>
Solids, Total Suspended	50	1.0	0.83	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Long Beach Pump-Comp-Wet4	17-02-1713-21-A	02/17/17 16:46	Aqueous	N/A	02/24/17	02/24/17 17:00	H0224TSSL3

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>MDL</u>	<u>DF</u>	<u>Qualifiers</u>
Solids, Total Suspended	74	1.0	0.83	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	099-09-010-8172	N/A	Aqueous	N/A	02/24/17	02/24/17 17:00	H0224TSSL3

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>MDL</u>	<u>DF</u>	<u>Qualifiers</u>
Solids, Total Suspended	ND	1.0	0.83	1.00	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.



Calscience

Analytical Report

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 02/17/17
Work Order: 17-02-1713
Preparation: Filtered
Method: EPA 200.8
Units: ug/L

Project: Prop 84 Green Streets BMP

Page 1 of 1

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Downey-Inflow-Comp-Wet3	17-02-1713-7-A	02/17/17 16:45	Aqueous	ICP/MS 03	02/21/17	02/22/17 20:33	170221LA1F

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>MDL</u>	<u>DF</u>	<u>Qualifiers</u>
Copper	7.02	1.00	0.140	1.00	
Lead	0.424	0.500	0.0898	1.00	J
Zinc	42.0	2.00	0.479	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Downey-Outflow-Comp-Wet3	17-02-1713-14-A	02/17/17 16:45	Aqueous	ICP/MS 03	02/21/17	02/22/17 20:35	170221LA1F

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>MDL</u>	<u>DF</u>	<u>Qualifiers</u>
Copper	6.55	1.00	0.140	1.00	
Lead	0.456	0.500	0.0898	1.00	J
Zinc	59.6	2.00	0.479	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Long Beach Pump-Comp-Wet4	17-02-1713-21-A	02/17/17 16:46	Aqueous	ICP/MS 03	02/21/17	02/22/17 20:38	170221LA1F

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>MDL</u>	<u>DF</u>	<u>Qualifiers</u>
Copper	6.47	1.00	0.140	1.00	
Lead	0.353	0.500	0.0898	1.00	J
Zinc	40.6	2.00	0.479	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	099-16-094-1797	N/A	Aqueous	ICP/MS 03	02/21/17	02/23/17 15:18	170221LA1F

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>MDL</u>	<u>DF</u>	<u>Qualifiers</u>
Copper	ND	1.00	0.140	1.00	
Lead	ND	0.500	0.0898	1.00	
Zinc	ND	2.00	0.479	1.00	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.



Calscience

Analytical Report

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 02/17/17
Work Order: 17-02-1713
Preparation: N/A
Method: EPA 200.8
Units: ug/L

Project: Prop 84 Green Streets BMP

Page 1 of 1

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Downey-Inflow-Comp-Wet3	17-02-1713-7-A	02/17/17 16:45	Aqueous	ICP/MS 03	02/21/17	02/22/17 20:40	170220LA5A

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>MDL</u>	<u>DF</u>	<u>Qualifiers</u>
Copper	21.7	1.00	0.140	1.00	
Lead	5.73	0.500	0.0898	1.00	
Zinc	145	2.00	0.479	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Downey-Outflow-Comp-Wet3	17-02-1713-14-A	02/17/17 16:45	Aqueous	ICP/MS 03	02/21/17	02/22/17 21:19	170220LA5A

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>MDL</u>	<u>DF</u>	<u>Qualifiers</u>
Copper	15.6	1.00	0.140	1.00	
Lead	4.32	0.500	0.0898	1.00	
Zinc	120	2.00	0.479	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Long Beach Pump-Comp-Wet4	17-02-1713-21-A	02/17/17 16:46	Aqueous	ICP/MS 03	02/21/17	02/22/17 21:21	170220LA5A

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>MDL</u>	<u>DF</u>	<u>Qualifiers</u>
Copper	21.2	1.00	0.140	1.00	
Lead	6.57	0.500	0.0898	1.00	
Zinc	134	2.00	0.479	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	099-16-448-15	N/A	Aqueous	ICP/MS 03	02/20/17	02/21/17 14:25	170220LA5A

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>MDL</u>	<u>DF</u>	<u>Qualifiers</u>
Copper	ND	1.00	0.140	1.00	
Lead	ND	0.500	0.0898	1.00	
Zinc	ND	2.00	0.479	1.00	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.



Calscience

Quality Control - Spike/Spike Duplicate

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 02/17/17
Work Order: 17-02-1713
Preparation: Filtered
Method: EPA 200.8

Project: Prop 84 Green Streets BMP

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Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
Downey-Inflow-Comp-Wet3	Sample	Aqueous	ICP/MS 03	02/21/17	02/22/17 20:33	170221SA1
Downey-Inflow-Comp-Wet3	Matrix Spike	Aqueous	ICP/MS 03	02/21/17	02/22/17 20:28	170221SA1
Downey-Inflow-Comp-Wet3	Matrix Spike Duplicate	Aqueous	ICP/MS 03	02/21/17	02/22/17 20:30	170221SA1

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Copper	7.017	100.0	111.5	104	112.2	105	80-120	1	0-20	
Lead	ND	100.0	103.8	104	102.2	102	80-120	2	0-20	
Zinc	42.04	100.0	145.4	103	144.3	102	80-120	1	0-20	

RPD: Relative Percent Difference. CL: Control Limits



Calscience

Quality Control - Spike/Spike Duplicate

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 02/17/17
Work Order: 17-02-1713
Preparation: N/A
Method: EPA 200.8

Project: Prop 84 Green Streets BMP

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Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
17-02-1714-3	Sample	Aqueous	ICP/MS 03	02/20/17	02/21/17 14:43	170220SA5
17-02-1714-3	Matrix Spike	Aqueous	ICP/MS 03	02/20/17	02/21/17 14:38	170220SA5
17-02-1714-3	Matrix Spike Duplicate	Aqueous	ICP/MS 03	02/20/17	02/21/17 14:40	170220SA5

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Copper	16.77	100.0	122.8	106	121.2	104	80-120	1	0-20	
Lead	7.835	100.0	111.1	103	109.4	102	80-120	2	0-20	
Zinc	493.8	100.0	586.2	4X	590.6	4X	80-120	4X	0-20	Q

Return to Contents

RPD: Relative Percent Difference. CL: Control Limits



Calscience

Quality Control - Sample Duplicate

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 02/17/17
Work Order: 17-02-1713
Preparation: N/A
Method: SM 2340C

Project: Prop 84 Green Streets BMP

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Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	Duplicate Batch Number
17-02-1833-2	Sample	Aqueous	BUR21	N/A	02/23/17 15:15	H0223HARD1
17-02-1833-2	Sample Duplicate	Aqueous	BUR21	N/A	02/23/17 15:15	H0223HARD1
<u>Parameter</u>		<u>Sample Conc.</u>	<u>DUP Conc.</u>	<u>RPD</u>	<u>RPD CL</u>	<u>Qualifiers</u>
Hardness, Total (as CaCO ₃)		42.00	44.00	5	0-25	

Return to Contents

RPD: Relative Percent Difference. CL: Control Limits



Calscience

Quality Control - Sample Duplicate

Kinnetic Laboratories, Inc.	Date Received:	02/17/17
2750 East Spring Street, Suite 190	Work Order:	17-02-1713
Long Beach, CA 90806-2249	Preparation:	N/A
	Method:	SM 2540 D
Project: Prop 84 Green Streets BMP		Page 2 of 2

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	Duplicate Batch Number
17-02-1760-1	Sample	Aqueous	N/A	02/24/17 00:00	02/24/17 17:00	H0224TSSD3
17-02-1760-1	Sample Duplicate	Aqueous	N/A	02/24/17 00:00	02/24/17 17:00	H0224TSSD3

Parameter	Sample Conc.	DUP Conc.	RPD	RPD CL	Qualifiers
Solids, Total Suspended	72.80	74.20	2	0-20	

Return to Contents

RPD: Relative Percent Difference. CL: Control Limits



Calscience

Quality Control - LCS/LCSD

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 02/17/17
Work Order: 17-02-1713
Preparation: N/A
Method: SM 2540 D

Project: Prop 84 Green Streets BMP

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Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number			
099-09-010-8172	LCS	Aqueous	N/A	02/24/17	02/24/17 17:00	H0224TSSL3			
099-09-010-8172	LCSD	Aqueous	N/A	02/24/17	02/24/17 17:00	H0224TSSL3			
Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Solids, Total Suspended	100.0	93.00	93	98.00	98	80-120	5	0-20	

RPD: Relative Percent Difference. CL: Control Limits

Quality Control - LCS

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 02/17/17
Work Order: 17-02-1713
Preparation: Filtered
Method: EPA 200.8

Project: Prop 84 Green Streets BMP

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Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
099-16-094-1797	LCS	Aqueous	ICP/MS 03	02/21/17	02/23/17 15:29	170221LA1F
<u>Parameter</u>		<u>Spike Added</u>	<u>Conc. Recovered</u>	<u>LCS %Rec.</u>	<u>%Rec. CL</u>	<u>Qualifiers</u>
Copper		100.0	96.80	97	80-120	
Lead		100.0	93.63	94	80-120	
Zinc		100.0	96.87	97	80-120	

Quality Control - LCS

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 02/17/17
Work Order: 17-02-1713
Preparation: N/A
Method: EPA 200.8

Project: Prop 84 Green Streets BMP

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Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
099-16-448-15	LCS	Aqueous	ICP/MS 03	02/20/17	02/21/17 14:28	170220LA5A
<u>Parameter</u>		<u>Spike Added</u>	<u>Conc. Recovered</u>	<u>LCS %Rec.</u>	<u>%Rec. CL</u>	<u>Qualifiers</u>
Copper		100.0	101.9	102	80-120	
Lead		100.0	98.57	99	80-120	
Zinc		100.0	101.4	101	80-120	

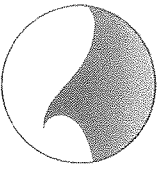


Glossary of Terms and Qualifiers

Work Order: 17-02-1713

Page 1 of 1



<u>Qualifiers</u>	<u>Definition</u>
*	See applicable analysis comment.
<	Less than the indicated value.
>	Greater than the indicated value.
1	Surrogate compound recovery was out of control due to a required sample dilution. Therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike (MS) or Matrix Spike Duplicate (MSD) compound was out of control due to suspected matrix interference. The associated LCS recovery was in control.
4	The MS/MSD RPD was out of control due to suspected matrix interference.
5	The PDS/PDSD or PES/PESD associated with this batch of samples was out of control due to suspected matrix interference.
6	Surrogate recovery below the acceptance limit.
7	Surrogate recovery above the acceptance limit.
B	Analyte was present in the associated method blank.
BU	Sample analyzed after holding time expired.
BV	Sample received after holding time expired.
CI	See case narrative.
E	Concentration exceeds the calibration range.
ET	Sample was extracted past end of recommended max. holding time.
HD	The chromatographic pattern was inconsistent with the profile of the reference fuel standard.
HDH	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but heavier hydrocarbons were also present (or detected).
HDL	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but lighter hydrocarbons were also present (or detected).
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
JA	Analyte positively identified but quantitation is an estimate.
ME	LCS Recovery Percentage is within Marginal Exceedance (ME) Control Limit range (+/- 4 SD from the mean).
ND	Parameter not detected at the indicated reporting limit.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
SG	The sample extract was subjected to Silica Gel treatment prior to analysis.
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.
	Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are reported on a wet weight basis.
	Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.
	A calculated total result (Example: Total Pesticides) is the summation of each component concentration and/or, if "J" flags are reported, estimated concentration. Component concentrations showing not detected (ND) are summed into the calculated total result as zero concentrations.

Chain of Custody Record

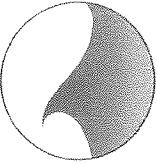


To: Eurofins Calscience 7440 Lincoln Way Garden Grove, CA 92841 Phone: (714) 895-5494		From: Kinnetic Laboratories, Inc 2750 E. Spring Street, Suite 190 Long Beach, CA 90806 (562) 595-8700								
Contact: Kathy Burney		Contact: Danielle Gonsman		Project #: 5720.166						
Project: Prop 84 Green Streets BMP		Matrix: Water		Lab #: 17-02-1713						
Complete by: Standard TAT		Date Received:		LabID						
SampleID	StationID	Sample Date	Sample Time	Sample Type	Analysis	Container	Pres	No. of Bottles	LabID	Condition Upon Receipt
Downey-Inflow-Grab1	Downey Bioswale Inflow	2/17/17	1415	Grab	Composite*	500 mL HDPE	4 °C	1	1	
Downey-Inflow-Grab2	Downey Bioswale Inflow	2/17/17	1445	Grab	Composite*	500 mL HDPE	4 °C	1	2	
Downey-Inflow-Grab3	Downey Bioswale Inflow	2/17/17	1515	Grab	Composite*	500 mL HDPE	4 °C	1	3	
Downey-Inflow-Grab4	Downey Bioswale Inflow	2/17/17	1545	Grab	Composite*	500 mL HDPE	4 °C	1	4	
Downey-Inflow-Grab5	Downey Bioswale Inflow	2/17/17	1615	Grab	Composite*	500 mL HDPE	4 °C	1	5	
Downey-Inflow-Grab6	Downey Bioswale Inflow	2/17/17	1645	Grab	Composite*	500 mL HDPE	4 °C	1	6	
Downey-Inflow-Comp-Wet3	Downey Bioswale Inflow	2/17/17	1645	Composite*	TSS, Hardness, Total and Dissolved Cu, Pb, Zn	N/A	4 °C	N/A	7	
Data Report MUST include the following: Sample ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer. All times on this sheet are military time. Email Sample Receipt Confirmations, PDF reports, and SWAMP EDDs to edd@kinneticlabs.net.										
Special Instructions/Comments: *Composite grab samples (Downey-Inflow-Grab1 to -Grab6) into one sample (Downey-Inflow-Comp-Wet3) and perform TSS, Hardness, and Total and Dissolved Cu, Pb, Zn (EPA 200.8) on the composite sample only. Diss. Metals need to be lab filtered. Reference project GAPP for specific QA/QC requirements.										
Sampled and Relinquished By: 		Date/Time: 2/17/17 1753		Transporter		Received By: 		Date/Time: 2/17/17 1753		Date/Time:
Relinquished By:		Date/Time:		Transporter		Received By:		Date/Time:		Date/Time:



Chain of Custody Record

To: Eurofins Calscience 7440 Lincoln Way Garden Grove, CA 92841 Phone: (714) 895-5494		Date Received: Lab #:		From: Kinnetic Laboratories, Inc 2750 E. Spring Street, Suite 190 Long Beach, CA 90806 (562) 595-8700		Project #: 5720.166					
Contact: Kathy Burney		Matrix: Water		Contact: Danielle Gonsman		Project #: 5720.166					
Project: Prop 84 Green Streets BMP		Complete by: Standard TAT									
Sample ID	Station ID	Sample Date	Sample Time	Sample Type	Analysis	Container	Pres	No. of Bottles	LabID	Condition Upon Receipt	
Downey-Outflow-Grab1	Downey Bioswale Outflow	2/17/17	1415	Grab	Composite*	500 mL HDPE	4 °C	1	8		
Downey-Outflow-Grab2	Downey Bioswale Outflow		1445	Grab	Composite*	500 mL HDPE	4 °C	1	9		
Downey-Outflow-Grab3	Downey Bioswale Outflow		1515	Grab	Composite*	500 mL HDPE	4 °C	1	10		
Downey-Outflow-Grab4	Downey Bioswale Outflow		1545	Grab	Composite*	500 mL HDPE	4 °C	1	11		
Downey-Outflow-Grab5	Downey Bioswale Outflow		1615	Grab	Composite*	500 mL HDPE	4 °C	1	12		
Downey-Outflow-Grab6	Downey Bioswale Outflow		1645	Grab	Composite*	500 mL HDPE	4 °C	1	13		
Downey-Outflow-Comp-Wet3	Downey Bioswale Outflow		1645	Composite*	TSS, Hardness, Total and Dissolved Cu, Pb, Zn	N/A	4 °C	N/A	14		
Data Report MUST include the following: Sample ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer. All times on this sheet are military time. Email Sample Receipt Confirmations, PDF reports, and SWAMP EDDs to edd@kinneticlabs.net.											
Special Instructions/Comments: *Composite grab samples (Downey-Outflow-Grab1 to -Grab6) into one sample (Downey-Outflow-Comp-Wet3) and perform TSS, Hardness, and Total and Dissolved Cu, Pb, Zn (EPA 200.8) on the composite sample only. Diss. Metals need to be lab filtered. Reference project QAPP for specific QA/QC requirements.											
Sampled and Relinquished By: 				Date/Time: 2/17/17 1753		Transporter: KLI		Received By: 		Date/Time: 2/17/17 1753	
Relinquished By:				Date/Time:		Transporter:		Received By:		Date/Time:	

Chain of Custody Record

To: Eurofins Calscience 7440 Lincoln Way Garden Grove, CA 92841 Phone: (714) 895-5494		Date Received: Lab #:		From: Kinnetic Laboratories, Inc 2750 E. Spring Street, Suite 190 Long Beach, CA 90806 (562) 595-8700						
Contact: Kathy Burney		Contact: Danielle Gonsman		Project #: 5720.166						
Project: Prop 84 Green Streets BMP		Matrix: Water								
Complete by: Standard TAT										
SampleID	StationID	Sample Date	Sample Time	Sample Type	Analysis	Container	Pres	No. of Bottles	LabID	Condition Upon Receipt
Long Beach Pump-Grab1	Long Beach Pump	2/17/17	1418	Grab	Composite*	500 mL HDPE	4 °C	1	15	
Long Beach Pump-Grab2	Long Beach Pump		1446	Grab	Composite*	500 mL HDPE	4 °C	1	16	
Long Beach Pump-Grab3	Long Beach Pump		1516	Grab	Composite*	500 mL HDPE	4 °C	1	17	
Long Beach Pump-Grab4	Long Beach Pump		1546	Grab	Composite*	500 mL HDPE	4 °C	1	18	
Long Beach Pump-Grab5	Long Beach Pump		1616	Grab	Composite*	500 mL HDPE	4 °C	1	19	
Long Beach Pump-Grab6	Long Beach Pump		1646	Grab	Composite*	500 mL HDPE	4 °C	1	20	
Long Beach Pump-Comp-Wet4	Long Beach Pump		1646	Composite*	TSS, Hardness, Total and Dissolved Cu, Pb, Zn	N/A	4 °C	N/A	21	
Data Report MUST include the following: Sample ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer. All times on this sheet are military time. Email Sample Receipt Confirmations, PDF reports, and SWAMP EDDs to edd@kinneticlabs.net.										
Special Instructions/Comments: *Composite grab samples (Long Beach Pump-Grab1 to -Grab6) into one sample (Long Beach Pump-Comp-Wet4) and perform TSS, Hardness, and Total and Dissolved Cu, Pb, Zn (EPA 200.8) on the composite sample only. Diss. metals need to be lab filtered. Reference project QAPP for specific QA/QC requirements.										
Sampled and Relinquished By:		Date/Time:		Transporter		Received By:		Date/Time:		
		2/17/17 1753						2/17/17 1753		
Relinquished By:		Date/Time:		Transporter		Received By:		Date/Time:		



SAMPLE RECEIPT CHECKLIST

COOLER 1 OF 1

CLIENT: Kinnetic Labs., Inc.

DATE: 02/17/2017

TEMPERATURE: (Criteria: 0.0°C – 6.0°C, not frozen except sediment/tissue)

Thermometer ID: SC3B (CF: 0.0°C); Temperature (w/o CF): 3.0 °C (w/ CF): 3.0 °C; Blank Sample

Sample(s) outside temperature criteria (PM/APM contacted by: _____)

Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling

Sample(s) received at ambient temperature; placed on ice for transport by courier

Ambient Temperature: Air Filter

Checked by: 836

CUSTODY SEAL:

Cooler Present and Intact Present but Not Intact Not Present N/A

Checked by: 826

Sample(s) Present and Intact Present but Not Intact Not Present N/A

Checked by: 1017

SAMPLE CONDITION:

Chain-of-Custody (COC) document(s) received with samples Yes No N/A

COC document(s) received complete Yes No N/A

Sampling date Sampling time Matrix Number of containers

No analysis requested Not relinquished No relinquished date No relinquished time

Sampler's name indicated on COC Yes No N/A

Sample container label(s) consistent with COC Yes No N/A

Sample container(s) intact and in good condition Yes No N/A

Proper containers for analyses requested Yes No N/A

Sufficient volume/mass for analyses requested Yes No N/A

Samples received within holding time Yes No N/A

Aqueous samples for certain analyses received within 15-minute holding time

pH Residual Chlorine Dissolved Sulfide Dissolved Oxygen Yes No N/A

Proper preservation chemical(s) noted on COC and/or sample container Yes No N/A

Unpreserved aqueous sample(s) received for certain analyses

Volatile Organics Total Metals Dissolved Metals

Container(s) for certain analysis free of headspace Yes No N/A

Volatile Organics Dissolved Gases (RSK-175) Dissolved Oxygen (SM 4500)

Carbon Dioxide (SM 4500) Ferrous Iron (SM 3500) Hydrogen Sulfide (Hach)

Tedlar™ bag(s) free of condensation Yes No N/A

CONTAINER TYPE:

(Trip Blank Lot Number: _____)

Aqueous: VOA VOA_h VOA_{na2} 100PJ 100PJ_{na2} 125AGB 125AGB_h 125AGB_p 125PB

125PB_{z_{na}} 250AGB 250CGB 250CGB_s 250PB 250PB_n 500AGB 500AGJ 500AGJ_s

500PB 1AGB 1AGB_{na2} 1AGB_s 1PB 1PB_{na} _____ _____ _____ _____

Solid: 4ozCGJ 8ozCGJ 16ozCGJ Sleeve (_____) EnCores® (_____) TerraCores® (_____) _____

Air: Tedlar™ Canister Sorbent Tube PUF _____ Other Matrix (_____): _____ _____

Container: A = Amber, B = Bottle, C = Clear, E = Envelope, G = Glass, J = Jar, P = Plastic, and Z = Ziploc/Resealable Bag

Preservative: b = buffered, f = filtered, h = HCl, n = HNO₃, na = NaOH, na₂ = Na₂S₂O₃, p = H₃PO₄,

Labeled/Checked by: 1017

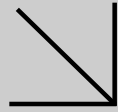
s = H₂SO₄, u = ultra-pure, x = Na₂SO₃+NaHSO₄.H₂O, z_{na} = Zn (CH₃CO₂)₂ + NaOH

Reviewed by: 681

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Calscience



WORK ORDER NUMBER: 17-04-0624

The difference is service



AIR | SOIL | WATER | MARINE CHEMISTRY

Analytical Report For

Client: Kinnetic Laboratories, Inc.

Client Project Name: Prop 84 Green Streets BMP

Attention: Danielle Gonsman
2750 East Spring Street
Suite 190
Long Beach, CA 90806-2249

Carla Hollowell FOL

Approved for release on 04/18/2017 by:
Carla Hollowell
Project Manager

ResultLink ▶

Email your PM ▶

Eurofins Calscience, Inc. (Calscience) certifies that the test results provided in this report meet all NELAC requirements for parameters for which accreditation is required or available. Any exceptions to NELAC requirements are noted in the case narrative. The original report of subcontracted analyses, if any, is attached to this report. The results in this report are limited to the sample(s) tested and any reproduction thereof must be made in its entirety. The client or recipient of this report is specifically prohibited from making material changes to said report and, to the extent that such changes are made, Calscience is not responsible, legally or otherwise. The client or recipient agrees to indemnify Calscience for any defense to any litigation which may arise.

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Work Order Number: 17-04-0624

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Condition Upon Receipt:

Samples were received under Chain-of-Custody (COC) on 04/08/17. They were assigned to Work Order 17-04-0624.

Unless otherwise noted on the Sample Receiving forms all samples were received in good condition and within the recommended EPA temperature criteria for the methods noted on the COC. The COC and Sample Receiving Documents are integral elements of the analytical report and are presented at the back of the report.

Holding Times:

All samples were analyzed within prescribed holding times (HT) and/or in accordance with the Calscience Sample Acceptance Policy unless otherwise noted in the analytical report and/or comprehensive case narrative, if required.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of ≤ 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

Quality Control:

All quality control parameters (QC) were within established control limits except where noted in the QC summary forms or described further within this report.

Subcontractor Information:

Unless otherwise noted below (or on the subcontract form), no samples were subcontracted.

Additional Comments:

Air - Sorbent-extracted air methods (EPA TO-4A, EPA TO-10, EPA TO-13A, EPA TO-17): Analytical results are converted from mass/sample basis to mass/volume basis using client-supplied air volumes.

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are always reported on a wet weight basis.



Calscience

Sample Summary

Client: Kinnetic Laboratories, Inc.	Work Order: 17-04-0624
2750 East Spring Street, Suite 190	Project Name: Prop 84 Green Streets BMP
Long Beach, CA 90806-2249	PO Number:
	Date/Time Received: 04/08/17 11:15
	Number of Containers: 10

Attn: Danielle Gonsman

Sample Identification	Lab Number	Collection Date and Time	Number of Containers	Matrix
Downey-Inflow-Grab1	17-04-0624-1	04/08/17 02:50	1	Aqueous
Downey-Inflow-Grab2	17-04-0624-2	04/08/17 03:10	1	Aqueous
Downey-Inflow-Grab3	17-04-0624-3	04/08/17 03:20	1	Aqueous
Downey-Inflow-Grab4	17-04-0624-4	04/08/17 03:30	1	Aqueous
Downey-Inflow-Comp-Wet4	17-04-0624-5	04/08/17 03:30	1	Aqueous
Downey-Outflow-Grab1	17-04-0624-6	04/08/17 02:50	1	Aqueous
Downey-Outflow-Grab2	17-04-0624-7	04/08/17 03:10	1	Aqueous
Downey-Outflow-Grab3	17-04-0624-8	04/08/17 03:20	1	Aqueous
Downey-Outflow-Grab4	17-04-0624-9	04/08/17 03:30	1	Aqueous
Downey-Outflow-Comp-Wet4	17-04-0624-10	04/08/17 03:30	1	Aqueous



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Analytical Report

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 04/08/17
Work Order: 17-04-0624
Preparation: N/A
Method: SM 2340C
Units: mg/L

Project: Prop 84 Green Streets BMP

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Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Downey-Inflow-Comp-Wet4	17-04-0624-5-A	04/08/17 03:30	Aqueous	BUR21	N/A	04/10/17 18:20	H0410HARB1

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>MDL</u>	<u>DF</u>	<u>Qualifiers</u>
Hardness, Total (as CaCO ₃)	74	2.0	0.99	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Downey-Outflow-Comp-Wet4	17-04-0624-10-A	04/08/17 03:30	Aqueous	BUR21	N/A	04/10/17 18:20	H0410HARB1

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>MDL</u>	<u>DF</u>	<u>Qualifiers</u>
Hardness, Total (as CaCO ₃)	89	2.0	0.99	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	099-14-457-712	N/A	Aqueous	BUR21	N/A	04/10/17 18:20	H0410HARB1

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>MDL</u>	<u>DF</u>	<u>Qualifiers</u>
Hardness, Total (as CaCO ₃)	ND	2.0	0.99	1.00	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.



Calscience

Analytical Report

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 04/08/17
Work Order: 17-04-0624
Preparation: N/A
Method: SM 2540 D
Units: mg/L

Project: Prop 84 Green Streets BMP

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Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Downey-Inflow-Comp-Wet4	17-04-0624-5-A	04/08/17 03:30	Aqueous	N/A	04/13/17	04/13/17 16:00	H0413TSSD3

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>MDL</u>	<u>DF</u>	<u>Qualifiers</u>
Solids, Total Suspended	48	1.0	0.83	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Downey-Outflow-Comp-Wet4	17-04-0624-10-A	04/08/17 03:30	Aqueous	N/A	04/13/17	04/13/17 16:00	H0413TSSD3

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>MDL</u>	<u>DF</u>	<u>Qualifiers</u>
Solids, Total Suspended	40	1.0	0.83	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	099-09-010-8264	N/A	Aqueous	N/A	04/13/17	04/13/17 16:00	H0413TSSD3

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>MDL</u>	<u>DF</u>	<u>Qualifiers</u>
Solids, Total Suspended	ND	1.0	0.83	1.00	

Return to Contents

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.



Calscience

Analytical Report

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 04/08/17
Work Order: 17-04-0624
Preparation: Filtered
Method: EPA 200.8
Units: ug/L

Project: Prop 84 Green Streets BMP

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Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Downey-Inflow-Comp-Wet4	17-04-0624-5-A	04/08/17 03:30	Aqueous	ICP/MS 03	04/12/17	04/13/17 00:03	170412LA2A

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>MDL</u>	<u>DF</u>	<u>Qualifiers</u>
Copper	84.2	1.00	0.140	1.00	
Lead	2.00	0.500	0.0898	1.00	
Zinc	734	2.00	0.479	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Downey-Outflow-Comp-Wet4	17-04-0624-10-A	04/08/17 03:30	Aqueous	ICP/MS 03	04/12/17	04/13/17 00:06	170412LA2A

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>MDL</u>	<u>DF</u>	<u>Qualifiers</u>
Copper	61.8	1.00	0.140	1.00	
Lead	2.20	0.500	0.0898	1.00	
Zinc	385	2.00	0.479	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	099-16-094-1884	N/A	Aqueous	ICP/MS 03	04/12/17	04/12/17 15:25	170412LA2A

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>MDL</u>	<u>DF</u>	<u>Qualifiers</u>
Copper	ND	1.00	0.140	1.00	
Lead	ND	0.500	0.0898	1.00	
Zinc	ND	2.00	0.479	1.00	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.



Calscience

Analytical Report

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 04/08/17
Work Order: 17-04-0624
Preparation: N/A
Method: EPA 200.8
Units: ug/L

Project: Prop 84 Green Streets BMP

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Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Downey-Inflow-Comp-Wet4	17-04-0624-5-A	04/08/17 03:30	Aqueous	ICP/MS 03	04/12/17	04/13/17 00:08	170412LA1A

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>MDL</u>	<u>DF</u>	<u>Qualifiers</u>
Copper	104	1.00	0.140	1.00	
Lead	4.74	0.500	0.0898	1.00	
Zinc	947	2.00	0.479	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Downey-Outflow-Comp-Wet4	17-04-0624-10-A	04/08/17 03:30	Aqueous	ICP/MS 03	04/12/17	04/13/17 00:19	170412LA1A

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>MDL</u>	<u>DF</u>	<u>Qualifiers</u>
Copper	80.6	1.00	0.140	1.00	
Lead	4.41	0.500	0.0898	1.00	
Zinc	506	2.00	0.479	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	099-16-448-18	N/A	Aqueous	ICP/MS 03	04/12/17	04/12/17 15:27	170412LA1A

Comment(s): - Results were evaluated to the MDL (DL), concentrations \geq to the MDL (DL) but $<$ RL (LOQ), if found, are qualified with a "J" flag.

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>MDL</u>	<u>DF</u>	<u>Qualifiers</u>
Copper	ND	1.00	0.140	1.00	
Lead	ND	0.500	0.0898	1.00	
Zinc	ND	2.00	0.479	1.00	

Return to Contents

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.



Calscience

Quality Control - Spike/Spike Duplicate

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 04/08/17
Work Order: 17-04-0624
Preparation: Filtered
Method: EPA 200.8

Project: Prop 84 Green Streets BMP

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Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
17-04-0819-11	Sample	Aqueous	ICP/MS 03	04/12/17	04/12/17 16:16	170412SA2A
17-04-0819-11	Matrix Spike	Aqueous	ICP/MS 03	04/12/17	04/12/17 15:39	170412SA2A
17-04-0819-11	Matrix Spike Duplicate	Aqueous	ICP/MS 03	04/12/17	04/12/17 15:41	170412SA2A

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Copper	34.25	100.0	118.1	84	116.6	82	80-120	1	0-20	
Lead	ND	100.0	108.6	109	108.2	108	80-120	0	0-20	
Zinc	60.37	100.0	141.4	81	137.8	77	80-120	3	0-20	3

Return to Contents

RPD: Relative Percent Difference. CL: Control Limits



Calscience

Quality Control - Spike/Spike Duplicate

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 04/08/17
Work Order: 17-04-0624
Preparation: N/A
Method: EPA 200.8

Project: Prop 84 Green Streets BMP

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Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
17-04-0819-3	Sample	Aqueous	ICP/MS 03	04/12/17	04/12/17 16:28	170412SA1A
17-04-0819-3	Matrix Spike	Aqueous	ICP/MS 03	04/12/17	04/12/17 16:24	170412SA1A
17-04-0819-3	Matrix Spike Duplicate	Aqueous	ICP/MS 03	04/12/17	04/12/17 16:26	170412SA1A

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Copper	75.57	100.0	167.5	92	161.0	85	80-120	4	0-20	
Lead	ND	100.0	116.4	116	109.1	109	80-120	6	0-20	
Zinc	106.8	100.0	175.8	69	173.9	67	80-120	1	0-20	3

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RPD: Relative Percent Difference. CL: Control Limits



Calscience

Quality Control - Sample Duplicate

Kinnetic Laboratories, Inc.
 2750 East Spring Street, Suite 190
 Long Beach, CA 90806-2249

Date Received: 04/08/17
 Work Order: 17-04-0624
 Preparation: N/A
 Method: SM 2340C

Project: Prop 84 Green Streets BMP

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Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	Duplicate Batch Number
Downey-Inflow-Comp-Wet4	Sample	Aqueous	BUR21	N/A	04/10/17 18:20	H0410HARD1
Downey-Inflow-Comp-Wet4	Sample Duplicate	Aqueous	BUR21	N/A	04/10/17 18:20	H0410HARD1

<u>Parameter</u>	<u>Sample Conc.</u>	<u>DUP Conc.</u>	<u>RPD</u>	<u>RPD CL</u>	<u>Qualifiers</u>
Hardness, Total (as CaCO3)	74.00	67.00	10	0-25	

Return to Contents

RPD: Relative Percent Difference. CL: Control Limits



Calscience

Quality Control - Sample Duplicate

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 04/08/17
Work Order: 17-04-0624
Preparation: N/A
Method: SM 2540 D

Project: Prop 84 Green Streets BMP

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Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	Duplicate Batch Number
17-04-0549-2	Sample	Aqueous	N/A	04/13/17 00:00	04/13/17 16:00	H0413TSSD4
17-04-0549-2	Sample Duplicate	Aqueous	N/A	04/13/17 00:00	04/13/17 16:00	H0413TSSD4

Parameter	Sample Conc.	DUP Conc.	RPD	RPD CL	Qualifiers
Solids, Total Suspended	836.0	836.0	0	0-20	



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RPD: Relative Percent Difference. CL: Control Limits



Calscience

Quality Control - LCS/LCSD

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 04/08/17
Work Order: 17-04-0624
Preparation: N/A
Method: SM 2540 D

Project: Prop 84 Green Streets BMP

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Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number			
099-09-010-8264	LCS	Aqueous	N/A	04/13/17	04/13/17 16:00	H0413TSSD3			
099-09-010-8264	LCSD	Aqueous	N/A	04/13/17	04/13/17 16:00	H0413TSSD3			
Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Solids, Total Suspended	100.0	104.0	104	105.0	105	80-120	1	0-20	

Return to Contents

RPD: Relative Percent Difference. CL: Control Limits

Quality Control - LCS

Kinnetic Laboratories, Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806-2249

Date Received: 04/08/17
Work Order: 17-04-0624
Preparation: Filtered
Method: EPA 200.8

Project: Prop 84 Green Streets BMP

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Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
099-16-094-1884	LCS	Aqueous	ICP/MS 03	04/12/17	04/13/17 14:32	170412LA2A
<u>Parameter</u>		<u>Spike Added</u>	<u>Conc. Recovered</u>	<u>LCS %Rec.</u>	<u>%Rec. CL</u>	<u>Qualifiers</u>
Copper		100.0	102.3	102	80-120	
Lead		100.0	98.51	99	80-120	
Zinc		100.0	101.3	101	80-120	



Calscience

Quality Control - LCS

Kinnetic Laboratories, Inc.
 2750 East Spring Street, Suite 190
 Long Beach, CA 90806-2249

Date Received: 04/08/17
 Work Order: 17-04-0624
 Preparation: N/A
 Method: EPA 200.8

Project: Prop 84 Green Streets BMP

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Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
099-16-448-18	LCS	Aqueous	ICP/MS 03	04/12/17	04/13/17 14:29	170412LA1A

<u>Parameter</u>	<u>Spike Added</u>	<u>Conc. Recovered</u>	<u>LCS %Rec.</u>	<u>%Rec. CL</u>	<u>Qualifiers</u>
Copper	100.0	100.4	100	80-120	
Lead	100.0	98.29	98	80-120	
Zinc	100.0	98.61	99	80-120	

Return to Contents

RPD: Relative Percent Difference. CL: Control Limits

Glossary of Terms and Qualifiers

Work Order: 17-04-0624

Page 1 of 1

<u>Qualifiers</u>	<u>Definition</u>
*	See applicable analysis comment.
<	Less than the indicated value.
>	Greater than the indicated value.
1	Surrogate compound recovery was out of control due to a required sample dilution. Therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike (MS) or Matrix Spike Duplicate (MSD) compound was out of control due to suspected matrix interference. The associated LCS recovery was in control.
4	The MS/MSD RPD was out of control due to suspected matrix interference.
5	The PDS/PDSD or PES/PESD associated with this batch of samples was out of control due to suspected matrix interference.
6	Surrogate recovery below the acceptance limit.
7	Surrogate recovery above the acceptance limit.
B	Analyte was present in the associated method blank.
BU	Sample analyzed after holding time expired.
BV	Sample received after holding time expired.
CI	See case narrative.
E	Concentration exceeds the calibration range.
ET	Sample was extracted past end of recommended max. holding time.
HD	The chromatographic pattern was inconsistent with the profile of the reference fuel standard.
HDH	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but heavier hydrocarbons were also present (or detected).
HDL	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but lighter hydrocarbons were also present (or detected).
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
JA	Analyte positively identified but quantitation is an estimate.
ME	LCS Recovery Percentage is within Marginal Exceedance (ME) Control Limit range (+/- 4 SD from the mean).
ND	Parameter not detected at the indicated reporting limit.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
SG	The sample extract was subjected to Silica Gel treatment prior to analysis.
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.
	Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are reported on a wet weight basis.
	Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.
	A calculated total result (Example: Total Pesticides) is the summation of each component concentration and/or, if "J" flags are reported, estimated concentration. Component concentrations showing not detected (ND) are summed into the calculated total result as zero concentrations.

Chain of Custody Record

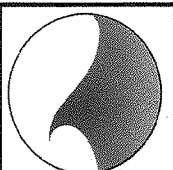
To:
Eurofins Calscience
7440 Lincoln Way
Garden Grove, CA 92841
Phone: (714) 895-5494
Contact: Kathy Burney

From:
Kinnetic Laboratories, Inc
2750 E. Spring Street, Suite 190
Long Beach, CA 90806
(562) 595-8700
Contact: Danielle Gonsman

Date Received:
Lab #:

Project: Prop 64 Green Streets BMP
Complete by: Standard TAT

Matrix: Water
Project #: 5720.166



17-04-0624

SampleID	StationID	Sample Date	Sample Time	Sample Type	Analysis	Container	Pres	No. of Bottles	LabID	Condition Upon Receipt
Downey-Inflow-Grab1	Downey Bioswale Inflow	4/8/17	0250	Grab	Composite*	500 mL HDPE	4 °C	1		1
Downey-Inflow-Grab2	Downey Bioswale Inflow		0310	Grab	Composite*	500 mL HDPE	4 °C	1		2
Downey-Inflow-Grab3	Downey Bioswale Inflow		0320	Grab	Composite*	500 mL HDPE	4 °C	1		3
Downey-Inflow-Grab4	Downey Bioswale Inflow		0330	Grab	Composite*	500 mL HDPE	4 °C	1		4
Downey-Inflow-Grab5	Downey Bioswale Inflow			Grab	Composite*	500 mL HDPE	4 °C	1		
Downey-Inflow-Grab6	Downey Bioswale Inflow			Grab	Composite*	500 mL HDPE	4 °C	1		
Downey-Inflow-Comp-Wet4	Downey Bioswale Inflow	4/8/17	0330	Composite*	TSS, Hardness, Total and Dissolved Cu, Pb, Zn	N/A	4 °C	N/A		5

Data Report MUST include the following: Sample ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer. All times on this sheet are military time. Email Sample Receipt Confirmations, PDF reports, and SWAMP EDDs to edd@kinneticlabs.net.

Special Instructions/Comments: *Composite grab samples (Downey-Inflow-Grab1 to -Grab6) into one sample (Downey-Inflow-Comp-Wet4) and perform TSS, Hardness, and Total and Dissolved Cu, Pb, Zn (EPA 200.8) on the composite sample only. Diss. Metals need to be lab filtered. Reference project QAPP for specific QA/QC requirements.

Sampled and Relinquished By: <i>Dullforce</i>	Date/Time: 4/8/17 1115	Transporter: KLI	Received By: <i>eed</i>	Date/Time: 4/8/17 1115
Relinquished By:	Date/Time:	Transporter:	Received By:	Date/Time:



Chain of Custody Record

To: Eurofins Calscience
7440 Lincoln Way
Garden Grove, CA 92841
Phone: (714) 895-5494

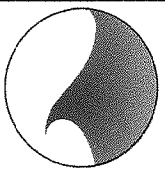
From: Kinnetic Laboratories, Inc
2750 E. Spring Street, Suite 190
Long Beach, CA 90806
(562) 595-8700

Contact: Kathy Burney

Contact: Danielle Gonsman

Date Received:

Lab #:



D624

Project: Prop 84 Green Streets BMP

Matrix: Water

Project #: 5720.166

Complete by: Standard TAT

SampleID	StationID	Sample Date	Sample Time	Sample Type	Analysis	Container	Pres	No. of Bottles	LabID	Condition Upon Receipt
Downey-Outflow-Grab1	Downey Bioswale Outflow	4/8/17	0250	Grab	Composite*	500 mL HDPE	4 °C	1		6
Downey-Outflow-Grab2	Downey Bioswale Outflow	✓	0310	Grab	Composite*	500 mL HDPE	4 °C	1		7
Downey-Outflow-Grab3	Downey Bioswale Outflow	✓	0330	Grab	Composite*	500 mL HDPE	4 °C	1		8
Downey-Outflow-Grab4	Downey Bioswale Outflow	✓	0330	Grab	Composite*	500 mL HDPE	4 °C	1		9
Downey-Outflow-Grab5	Downey Bioswale Outflow			Grab	Composite*	500 mL HDPE	4 °C	1		
Downey-Outflow-Grab6	Downey Bioswale Outflow			Grab	Composite*	500 mL HDPE	4 °C	1		
Downey-Outflow-Comp-Wet4	Downey Bioswale Outflow	4/8/17	0330	Composite*	TSS, Hardness, Total and Dissolved Cu, Pb, Zn	N/A	4 °C	N/A		10

Data Report MUST include the following: Sample ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer. All times on this sheet are military time. Email Sample Receipt Confirmations, PDF reports, and SWAMP EDDs to edd@kinneticlabs.net.

Special Instructions/Comments: *Composite grab samples (Downey-Outflow-Grab1 to -Grab6) into one sample (Downey-Outflow-Comp-Wet4) and perform TSS, Hardness, and Total and Dissolved Cu, Pb, Zn (EPA 200.8) on the composite sample only. Diss. Metals need to be lab filtered. Reference project GAPP for specific QA/QC requirements.

Sampled and Relinquished By:	Date/Time:	Transporter	Received By:	Date/Time:
	4/8/17 1115	KLI		4/8/17 1115
Relinquished By:	Date/Time:	Transporter	Received By:	Date/Time:



SAMPLE RECEIPT CHECKLIST

COOLER 1 OF 1

CLIENT: Kinnetic

DATE: 04 / 08 / 2017

TEMPERATURE: (Criteria: 0.0°C – 6.0°C, not frozen except sediment/tissue)
 Thermometer ID: SC (CF: 0.0°C); Temperature (w/o CF): 1.9 °C (w/ CF): 1.9 °C; Blank Sample
 Sample(s) outside temperature criteria (PM/APM contacted by: _____)
 Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling
 Sample(s) received at ambient temperature; placed on ice for transport by courier
 Ambient Temperature: Air Filter
 Checked by: SR

CUSTODY SEAL:
 Cooler Present and Intact Present but Not Intact Not Present N/A Checked by: SR
 Sample(s) Present and Intact Present but Not Intact Not Present N/A Checked by: 778

SAMPLE CONDITION:	Yes	No	N/A
Chain-of-Custody (COC) document(s) received with samples	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
COC document(s) received complete	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Sampling date <input type="checkbox"/> Sampling time <input type="checkbox"/> Matrix <input type="checkbox"/> Number of containers			
<input type="checkbox"/> No analysis requested <input type="checkbox"/> Not relinquished <input type="checkbox"/> No relinquished date <input type="checkbox"/> No relinquished time			
Sampler's name indicated on COC	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sample container label(s) consistent with COC	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sample container(s) intact and in good condition	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Proper containers for analyses requested	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sufficient volume/mass for analyses requested	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Samples received within holding time	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Aqueous samples for certain analyses received within 15-minute holding time			
<input type="checkbox"/> pH <input type="checkbox"/> Residual Chlorine <input type="checkbox"/> Dissolved Sulfide <input type="checkbox"/> Dissolved Oxygen	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Proper preservation chemical(s) noted on COC and/or sample container	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unpreserved aqueous sample(s) received for certain analyses			
<input type="checkbox"/> Volatile Organics <input type="checkbox"/> Total Metals <input checked="" type="checkbox"/> Dissolved Metals			
Container(s) for certain analysis free of headspace	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/> Volatile Organics <input type="checkbox"/> Dissolved Gases (RSK-175) <input type="checkbox"/> Dissolved Oxygen (SM 4500)			
<input type="checkbox"/> Carbon Dioxide (SM 4500) <input type="checkbox"/> Ferrous Iron (SM 3500) <input type="checkbox"/> Hydrogen Sulfide (Hach)			
Tedlar™ bag(s) free of condensation	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

CONTAINER TYPE: (Trip Blank Lot Number: _____)
Aqueous: VOA VOAh VOAna₂ 100PJ 100PJna₂ 125AGB 125AGBh 125AGBp 125PB
 125PBz_{na} 250AGB 250CGB 250CGBs 250PB 250PBn 500AGB 500AGJ 500AGJs
 500PB 1AGB 1AGBna₂ 1AGBs 1PB 1PBna _____ _____ _____
Solid: 4ozCGJ 8ozCGJ 16ozCGJ Sleeve (_____) EnCores® (_____) TerraCores® (_____) _____
Air: Tedlar™ Canister Sorbent Tube PUF _____ **Other Matrix** (____): _____ _____
 Container: **A** = Amber, **B** = Bottle, **C** = Clear, **E** = Envelope, **G** = Glass, **J** = Jar, **P** = Plastic, and **Z** = Ziploc/Resealable Bag
 Preservative: **b** = buffered, **f** = filtered, **h** = HCl, **n** = HNO₃, **na** = NaOH, **na₂** = Na₂S₂O₃, **p** = H₃PO₄, Labeled/Checked by: 70
s = H₂SO₄, **u** = ultra-pure, **x** = Na₂SO₃+NaHSO₄.H₂O, **z_{na}** = Zn (CH₃CO₂)₂ + NaOH Reviewed by: 1017

Return to Contents

Appendix III: List of Subcontractors

Project Administration

John L. Hunter and Associates, Inc.
6131 Orangethorpe Avenue, Suite 300
Buena Park, CA 90620

WILLDAN

2401 E. Katella Avenue, Suite 300
Anaheim, CA 92806

Construction Management

MCM Management
P.O. Box 3003
Manhattan Beach, CA 90266

Construction

All American Asphalt
P.O. Box 2229
Corona, CA 92878-2229

Community Bank

505 East Colorado Blvd
Pasadena, CA 91101

Kalban, Inc.

26450 Ruether Avenue, Unit 201
Santa Clarita, CA 91350

Palp Inc dba Excel Paving Company

2230 Lemon Avenue
Long Beach, CA 90806

Monitoring and Reporting

Kinnetic Laboratories Inc.
2750 East Spring Street, Suite 190
Long Beach, CA 90806