

STATEMENT OF QUALIFICATIONS | Prepared for
Town of Atherton

October 5, 2017



Atherton Water Capture Project

Prepared by | **Brown and Caldwell** | Walnut Creek | T 925.937.9010

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October 5, 2017



City Clerk
Attn: Marty Hanneman
Town of Atherton
91 Ashfield Road
Atherton, CA 94027

Statement of Qualifications for the Atherton Water Capture Project

Dear Mr. Hanneman:

Brown and Caldwell (BC) is pleased to present this Statement of Qualifications (SOQ) to the Town of Atherton (Town) for the Atherton Water Capture Project (Project). We confirm reading the Request for Qualifications (RFQ) and are prepared to make our staff available immediately upon approval of a contract consistent with the Preliminary Timeline contained in Attachment 3 of the RFQ. We will manage the work from our Walnut Creek Office and hold regular project development team meetings from this location to coordinate all design services necessary to support and complete the Project. Our team has reviewed background documents and developed an approach that will efficiently apply resources throughout development of the Project to completion the within your deadline.

BC brings industry-recognized expertise in water infrastructure design and construction of stormwater treatment facilities. Our team is experienced with similar projects, which include treatment basins for Caltrans and water capture projects for the San Francisco Public Utilities Commission (SFPUC). Michael Flake, project manager, is in our Walnut Creek office and will be readily accessible to the Town's project manager. Our team includes staff from our Seattle office, and our design subconsultants, Lotus Water and Paradigm located in San Francisco and San Diego, respectively. We have assembled other subconsultants from the Bay Area to provide specialty services related to surveying, environmental planning, geotechnical, and landscape architecture.

This proposal presents our project understanding, general approach, relevant experience, personnel resumes, Professional fees are provided in separate sealed envelope, as outlined in the RFQ and directed from the answers to questions posted by the Town. It is anticipated that the standard Design-Bid-Build contracting approach will be used to construct this project; however, the Town may engage our Design-Build Services to expedite delivery or achieve other efficiencies.

As requested, we have organized this SOQ in a concise and direct manner to allow ease of review while staying within the 25-page limit. The table below serves as a "Table of Contents" and is organized to exhibit how we meet each of the requirements (sections) identified from the RFQ.

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We appreciate the opportunity to provide our services and look forward to supporting the design and delivery of the Project to construction and eventual operation. Should you have any questions or require additional information, please contact Michael Flake at 925.210.2515 or MFlake@BrwnCald.com.

Very truly yours,



Michael Flake, PE
Project Manager

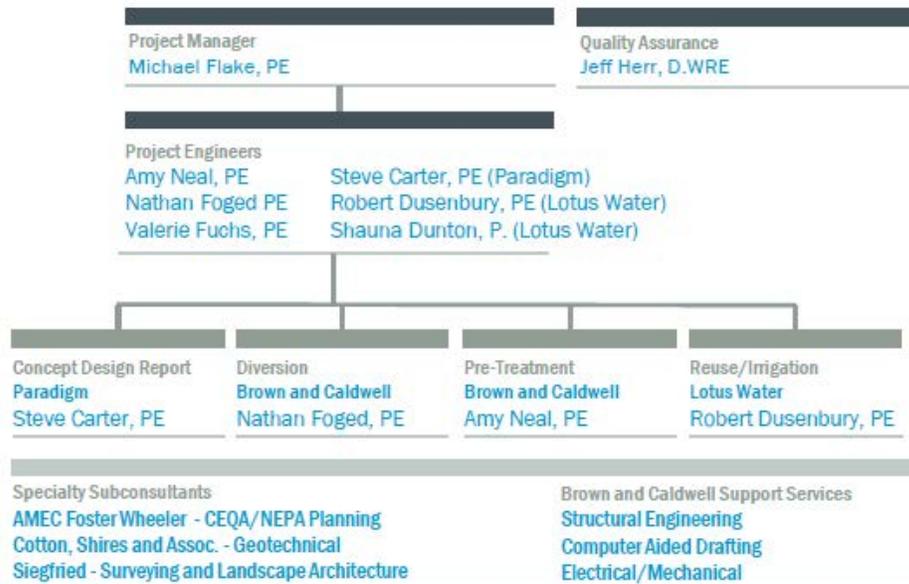


Jeff Kivett, PE*
Vice President/Authorized Signatory

*Registered in states other than California

Team and Firm Qualifications

The BC organizational chart below identifies our core team of project engineers, lead persons for specific design elements, and specialty subconsultants. Two-page resumes for each of the persons depicted on the organization chart below are provided in Attachment B. The resumes begin with our Project Manager, Michael Flake, and are followed by the other named personnel by firm. Although we depict lead engineers for specific portions of the project shown in the organization chart, such as the diversion structure, we anticipate using a collaborative approach on any portion of the design based on needed expertise and availability. The details of the Preliminary Concept Design Report will prescribe design needs and skills; thus, it is desirable to wait until this document is sufficiently complete before making final pronouncements on design teams for key elements of the project. We will hold routine “Project Development Team” meetings to discuss progress, assess resources, and make assignments; this allows the team maximum flexibility towards meeting the aggressive schedule of this Project. Throughout the progress of this Project, BC will have quality assurance checks and actions in advance of making critical decisions and finalizing deliverables.



Summary of Firm’s Relevant Experience and References

BC will act as the prime consultant with specialized support from our subconsultants. Our team has extensive experience in stormwater design and provides the Town redundancy of resources to achieve schedule and project objectives. As a means of proving our expertise to provide the requested services for this Project, we have identified the following projects as relevant experiences and references. Full project descriptions for these projects can be found in Attachment A of this SOQ.

Client/Contact	Project/Dates	Description of Services
Tom Rutsch, P.E. Caltrans, Division of Environmental Analysis Phone: 916-653-7396 tom.rutsch@dot.ca.gov	Caltrans LID Projects (2012-2017)	BC designed low-impact development (LID) measures to treat stormwater from highway segments on Interstate 5 in Sacramento and Highway 210 in Los Angeles. The LID measures were deemed “pilot” as Caltrans is studying the functionality of the devices to effectively treat highway runoff and meet operational needs (i.e. maintenance).
Raphael Garcia San Francisco Public Utilities Commission (SFPUC) Phone: 415-551-4872 rfgarcia@sfgwater.org	Yosemite Creek Daylighting and Water Capture (2012-2017)	Lotus Water is currently designing this project to capture, reuse, and infiltrate stormwater for the SFPUC. This project, like the Atherton Water Capture Project, features large-scale stormwater diversion and capture in a park setting with a multitude of stakeholders. Interagency coordination efforts included the Recreation and Parks Department, Municipal Transportation Agency, Public Works, Fire Department, and Department of Public Health.
Julie Allen City of LA, BOE Phone: 213-694-4270 julie.allen@lacity.org	Echo Park Lake Rehabilitation Project (2007-2012)	BC provided pre-design, design, and construction support services for stormwater BMPs to support TMDL compliance. Designs included: pretreatment hydrodynamic separators, constructed wetlands, bioretention, porous pavement along the lake perimeter path, and improvements to the irrigation system
Andy Flores City of LA, BOE Phone: 213.485.4496 andy.flores@lacity.org	Penmar Water Quality Improvement Project (2007-2014)	BC provided pre-design, design, and construction support services for a storm drain diversion, pump station, and 2.7MG underground storage reservoir. Water stored in the reservoir can either be sent to the Hyperion Treatment Plant or filtered and used as a future water supply.
Matt Fabry San Mateo Countywide Water Pollution Prevention Program (SMCWPPP) Phone: 650-599-1419 mfabry@smcgov.org	San Mateo County Stormwater Resource Plan and Green Infrastructure Project Concepts (2016-2017)	Paradigm supported San Mateo City/County Association of Governments (C/CAG) as lead author of the San Mateo County Storm Water Resource Plan (SWRP). This included development of a process for identification and prioritization of opportunities for green infrastructure (GI) and regional stormwater treatment and capture projects. This process led to the identification of high-priority projects throughout the County, which were simulated in a hydrologic model to provide quantification of benefits. The Town of Atherton Water Capture Project was one of the regional project concepts used to engage Caltrans on a funding partnership to result in eventual design and construction. Paradigm is continuing their support to C/CAG in the development of GI plans and the Reasonable Assurance Analysis (RAA) that demonstrates polychlorinated biphenyls (PCBs) and mercury load reductions resulting from project implementation.

Understanding and Project Approach

The Town has multiple objectives for this Project as follows:

- Implement green infrastructure and stormwater resource planning to capture stormwater for potential reuse and infiltration to groundwater;
- Achieve load reductions in stormwater discharges of PCBs and mercury for compliance with Total Maximum Daily Load (TMDL) requirements;
- Reduce trash discharges to the Bay for meeting Municipal Regional Permit (MRP) conditions and potential, forthcoming trash TMDL requirements;
- Fulfill the Cooperative Implementation Agreement with Caltrans without incurring additional costs; and
- Implement solutions that minimize operations and maintenance (O&M) requirements and impacts to Park users.

A Design Concept for the Project location has already been prepared for potentially accomplishing the objectives above. The Design Concept was prepared by our team member, Paradigm, as part of development of the SWRP to provide planning and identification of viable multi-benefit projects for C/CAG member agencies to make progress towards meeting GI implementation requirements of the MRP and engage the State Water Resources Control Board, Caltrans, and other state and federal agencies on potential grant funds and funding. Through development of the SWRP, Paradigm performed modeling that demonstrated the reductions of PCB and mercury loads that could result from project implementation. Paradigm has since refined these models as part of the RAA and to support GI planning efforts of C/CAG member agencies. Throughout development of the Project, Paradigm will provide a seamless linkage to the RAA to provide quantification of pollutant reduction benefits. Integration with the models used for the RAA will ensure that GI planning efforts accurately incorporate the project. This quantification of pollutant reductions will also be critical to Caltrans for their demonstration of progress towards meeting generation of compliance units.

An additional goal of the project will be the potential reduction of peak wet-weather flows to reduce downstream flooding issues as part of the Flood Management Plan (FMP) for Bayfront Canal and Atherton Channel. As part of a cooperative efforts of the Town, other cities, and the San Mateo County Department of Public Works (DPW), Paradigm was recently selected to lead the FMP as part of DPW's Flood Resiliency Program. In this role, Paradigm can directly inform the Project design to serve the dual benefit of potentially reducing stormflows and reducing impacts to downstream areas, in coordination with other projects identified and prioritized as part of the FMP.

We view the Design Concept as the preferred solution for this Project, and it will be the basis of the Preliminary Engineering Concept Design Report that would function as the Basis of Design Report (BODR). The BODR would be a document for identifying: 1) detailed hydrology, flows and volumes used in the design, as well as geotechnical data and other information sources and studies used to support the design; 2) descriptions of proposed treatment measures, definition of site locations, space requirements, and essential design parameters; and 3) descriptions of proposed modifications and upgrades of existing park and drainage channel infrastructure, including diversion

structures, treatment controls, and irrigation systems. As a result, we have broken the Project into four infrastructure components to make it easier to analyze technical challenges and provide specific design approaches that meet Project objectives. The four infrastructure components are modeled on how stormwater would be captured and treated, infiltrated, reused, and potentially returned to the channel. The four infrastructure components consist of a diversion structure, pre-treatment area, treatment and storage area, and irrigation/discharge return. These components are described in more detail as follows:

Diversion Structure

The first infrastructure component needed is a diversion structure that would direct dry- and wet-weather flows from the Atherton Channel. Since the channel is man-made and not part of a natural stream, the premise of a low flow diversion structure should be feasible without additional constraints or modifications to satisfy natural systems and habitat needs, such as fish bypass. The structure could be a simplistic weir-block used to direct the desired design flow to either the pre-treatment area or storage area. The weir could be used in conjunction with the liner radial, gross solids removal device (GSRD)¹ that could be placed upstream of the diversion to remove trash from 100% of the design flow of Atherton Channel. BC is currently designing six, parallel GSRDs for use in Daly City's Vista Grande Project to affect trash removal under the MRP. Alternatively, the GSRD could be used after the diversion to only affect the diverted portion of the flow, which is only 30% of the Water Quality Volume per the Design Concept developed by Paradigm, and thus at least 30% of the trash load. The team will also analyze the potential to use a two-stage diversion structure with the low-stage diverter capturing dry- and wet-weather flows and a second high-stage diverter capturing peak flows during flood conditions.

Pre-Treatment Area

Although a hydrodynamic separator is mentioned in the Design Concept, we foresee using a linear radial GSRD. The GSRD is designed to remove 100 percent of the gross solids removal from stormwater runoff, and the capacity to retain a year of solids loading to facilitate annual cleaning. Flows from the GSRD could be further affected by an in-line media (i.e. sand) filter to remove finer sediment from dry-weather and low-flow influent to the storage area. The combination of a GSRD and media filter should have a greater impact on removing sediments containing PCBs and mercury; this strategy should also reduce maintenance efforts of the storage area. High-flow influent would enter the storage area via a pipe that could be outfitted with a rubber check valve, such as that developed by Red Valve². The valve would be needed to prevent backflow and vectors (e.g. mosquitos) from entering the storage area. Depending on design and configuration of the final water capture system, bioretention within the park may also be considered for additional settling and filtration of fine sediment.

Treatment/Storage Area (Cistern)

This component of the system would consist of an underground chamber (e.g., cistern, infiltration gallery, etc.), potentially made up of multiple, pre-fabricated modular systems

¹ Caltrans, GSRD: http://www.dot.ca.gov/hq/oppd/storm1/caltrans_20090729.html

² Red Valve: <http://www.redvalve.com/municipal-collection-and-distribution-brochure/>

located under the lawn area of the park (Attachment 1 of the RFQ). The Natural Resource Conservation Service (NRCS) resources define the Project area as having hydraulic soil group (HSG), type C soils. Type C soils are not conducive for infiltration as the primary fate of stormwater; however, a geotechnical investigation will be conducted within the storage area footprint to gain site specific data on the capabilities of infiltration and explore infiltrative technologies, such as infiltration galleries, as a complementary strategy. The storage area would be sized to the extent feasible for detaining, infiltrating, and storing stormwater. The Design Concept identifies a storage capacity equivalent to 30% of the WQV from Atherton Channel; we will attempt to meet or exceed this volume of storage.

Irrigation/Discharge Return

The water contained in the storage area will be a resource available for reuse, most likely as irrigation water to be used within the park or other nearby locations. Extraction of the stored water will require a distribution system common for irrigation uses. It will be important to minimize public exposure to the non-potable water distributed by this system to avoid disinfection and water quality testing requirements, which are not compatible with the project goal of minimizing the ongoing operations and maintenance burden. To that end, the team will focus on distribution systems that do not trigger these requirements, such as drip or subsurface systems. A smaller secondary surface storage reservoir to gravity feed a network of mulch basins is another possibility that could produce a more sustainable option by reducing power demands.

Additionally, we will need to be able to allow flow to the storage area from subsequent storm events even if the current volume stored has not completely infiltrated or been extracted for reuse. Stored water pushed out of the storage area will have been treated; this water will need to exit from an outfall return to Atherton Channel and can be accomplished via an overflow pipe outfitted with a check valve similar to the influent from the pre-treatment area.

Key Descriptions of Firm Experience

The following sub-headings are based on the bullet points listed under Item B of the RFQ (page 6 of 29) and contain our responses to describe our team's experience.

Pre-Treatment for water capture facilities to capture trash, debris, and sediment.

BC has designed several projects that required removal of trash, debris and sediment. The most notable was the pilot design of gross solid removal devices (GSRDs) for Caltrans as outlined earlier in this SOQ. BC designed multiple permutations of the GSRDs, which led to the eventual approval of the inclined screen and the linear radial GSRDs. In addition, BC has evaluated the hydrodynamic separator for Caltrans; concerns were raised regarding maintenance, standing water, and effectiveness, but ultimately the product was not approved due to it being a proprietary product. Being a full-service water firm, BC has dealt with numerous pre-treatment scenarios to remove gross solids as part of treatment of influent from drinking water supply, wastewater, and urban runoff.

Designing water capture projects, including which types of systems and which vendor's systems have been designed - Lotus

As mentioned earlier in this SOQ, the Yosemite Creek project designed by Lotus and the Penmar project designed by BC are two relevant examples of our capabilities to meet this criterion. There are a variety of subsurface storage options available from different manufacturers and the components usually include at least some pre-fabricated components. Our team has worked on projects that employed storage systems ranging from large pre-fabricated concrete boxes (e.g., Oldcastle) to shallow systems that are constructed in place using a combination of geosynthetic liner, gravel fill, and inverted half pipes (e.g., Triton, StormChamber). These systems can be designed for retention and reuse, infiltration, and/or detention with water quality treatment prior to controlled discharge. Manufacturers generally provide an option for a proprietary pre-treatment component that is structurally compatible with their storage system. Primary determinants for choosing which system best fits the project include available space, depth to groundwater or bedrock, ease of maintenance, and sustainability. When space allows, shallower systems are generally less expensive to install and maintain.

Please be aware that direction toward a singular vendor system can sometimes create concern from manufacturers not selected or specified. We will not favor exclusive use of a vendor product (directly or indirectly), instead we will strive to create a competitive bidding situation that is either based on a non-proprietary design or allows for modular use of multiple proprietary devices should it become warranted.

Designing systems to minimize on-going operations and maintenance

BC has been contracted by Caltrans to evaluate numerous treatment controls over the past 20 years. Our experience came to the forefront during our participation on the BMP Pilot Retrofit Project³ for Caltrans that concluded in 2004, wherein we assisted with design and construction of "pilot" treatment controls that we then operated, monitored, and maintained over a 3-year period. Our post construction evaluation efforts were used to identify operational efficiencies and the costs of maintenance as part of the evaluation of treatment technologies. The project became the basis for approval of nine standardized treatment controls allowed for use in the Caltrans right-of-way due not only to pollutant removal effectiveness, but also the ability for the devices to operate in a highway setting and fit within standard maintenance practices that did not require specialized equipment or skills. In 2006, the project won the California Stormwater Quality Association (CASQA) research project of the year for its instrumental use in advancing the understanding of stormwater treatment and the associated operation and maintenance requirements.

Our approach for this project is to actively include representatives of the various municipal organizations that may be required to conduct maintenance or operation of the infrastructure components. We will integrate their feedback into the design, so that operation and maintenance can be conducive to their protocols and equipment. For example, during our design of the Multi-Chambered Treatment Train (MCTT) device under the BMP Pilot Retrofit Project, we included a colored light system to provide a

³ Caltrans, BMP Pilot Retrofit:

http://www.dot.ca.gov/hq/env/stormwater/special/newsetup/pdfs/new_technology/CTSW-RT-01-050.pdf

visible check of the device without having to exit their vehicle during a storm event. This allowed personnel to understand the device was operating, so that they could focus their attention to more important matters, such as localized flooding and vehicular accidents.

Post-capture treatment for irrigation purposes, including which types of post-capture systems and which vendor's systems have been designed

Depending upon the irrigation application, a proprietary system is not always the best solution. If the distribution and delivery infrastructure is in place and compatible with the new water source, then post-capture system components may include only a single sump vault for treatment and pumping. This is generally not the case because sourcing surface irrigation delivery systems with non-potable water requires disinfection, which is onerous from an operations and maintenance perspective, not only because of the equipment itself, but also because these systems require frequent water quality testing, which is labor and cost intensive. Subsurface distribution systems do not have that requirement because the public is protected from exposure. We recommend Netafim Techline driplines, or similar, for subsurface irrigation applications.

While it is too early in the concept development process to make a specific determination, the EPIC Chamber system (or something similar) might be a good fit for the Atherton Water Capture Project. This system involves an integrated ultra-high-efficiency irrigation system on top the storage tanks. This configuration was selected and designed for the Yosemite Creek Daylighting project, which allowed for irrigation of the field to be taken offline and supplied entirely by the capture and reuse system. These fields also drain extremely well and are usable the day after a storm event.

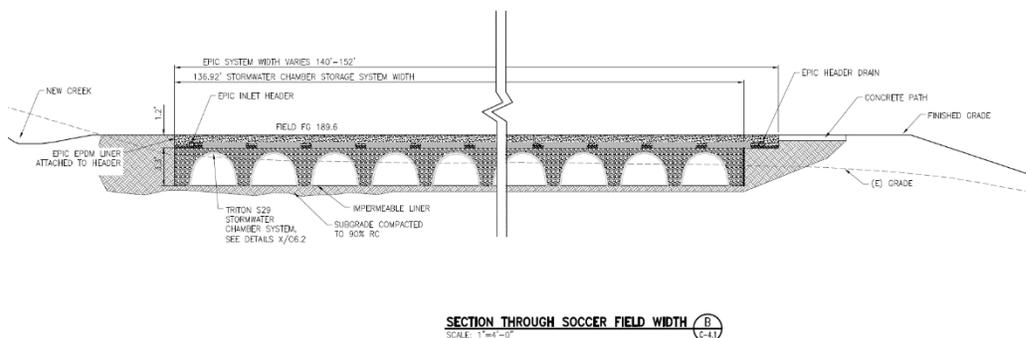


Figure 1. This figure provides a profile of the EPIC grass turf system on top of the storage tank system at the Yosemite Creek project.

Caltrans funded projects

Our team is accustomed to working directly for Caltrans on their stormwater projects and have successfully fulfilled their requirements for meeting standard provisions of State contracts and requirements. Currently, we are serving Caltrans on multiple contracts through the Division of Environmental Analysis that exclusively use funds from the Caltrans Stormwater Program. Nelson Kwong, Senior Transportation Engineer, is a contracts administrator within the Division of Environmental Analysis that may be

contracted at (916) 653-8896 to attest to our long history of working on projects funded by the Caltrans Stormwater Program.

Time constrained projects, including experience with design-build projects

The Caltrans LID project listed in our summary above was a time constrained project that BC implemented as a design-build (DB) project. We conducted a portion of the design in conjunction with the construction to realize a time savings, so that Caltrans could conduct stormwater monitoring of the devices before the onset of the “rainy season” in the Fall of 2016. The project included two sites as described in the project description provided on page XX.

BC is a licensed general contractor in California; our license number is 445796. We also have separate company entity named “BC Constructors” that executes on large scale DB operations in support of wastewater treatment plants and federal environmental cleanups.

Over the years BC’s DB projects have been recognized throughout the industry. Below is a short list of Design-Build Institute of America (DBIA) awards for projects we delivered:

- National DB Award, Water/Wastewater >\$25 million – WWTF Improvements, Fulton County, GA
- DB Excellence Award for Civil Engineering <\$15 million – WTP Improvements, Atlanta, GA
- DB Merit Award, Water/Wastewater < \$15 million – Pump Station and Conveyance, San Diego, CA
- National DB Excellence Award, Water/Wastewater >\$15 million – Pump Station, Atlanta, GA

Working with the San Mateo County, Department of Public Works, Flood Resilience

Paradigm currently supports the County of San Mateo DPW Flood Resilience Program as the lead of an On-Call Engineering and Professional Services Contract for flood protection and drainage system planning and design. Paradigm’s Stephen Carter serves as the Project Manager of this contract, and has participated in workshops with the Town of Atherton, other cities, San Mateo County DPW, and consultants to discuss flood resiliency and management plans for Atherton Channel and design approaches for Bayfront Canal. As part of this contract, Paradigm was recently selected to lead the Flood Management Plan for Atherton Channel and Bayfront Canal, which will consider the benefits of the Project in terms of reducing downstream flooding issues in the watershed.

Designing water-tight water capture facilities where the water is used for future irrigation, i.e., purple pipe applications

Lotus staff have worked on a multitude of water capture and reuse projects in the public realm, including parks and campuses. Governing regulations include Chapter 17 of the California Building Standards Code and Title 22. Treatment and testing requirements for this type of project are evaluated on a case-by-case basis per project, and will likely be informed by initial testing of samples taken from the Atherton Channel to characterize water quality constituents. Distribution systems containing non-potable water are

generally required to use purple pipes and appropriate signage at all points of potential exposure. Design considerations particular to irrigation reuse systems are discussed in the storage and post-capture treatment sections.

Design of dry wells (formerly wick drains) to facilitate improved infiltration

The potential use of dry wells or galleries for infiltration is fully dependent upon results of the geotechnical investigation. Preliminary research into the NRCS soil data survey indicates that the site is located on clay loam with a moderate infiltration capacity of 0.20 to 0.57 inches per hour. This is encouraging considering the most common soil types in the region are primarily clays and not at all conducive to infiltration, but the role of infiltration in restoring storage capacity to the stormwater storage location will not be known until the results of the geotechnical investigation are available. Design (e.g., maximizing contact area and depth with appropriate materials at interface) and construction techniques (e.g., properly scarifying the soil interface) are critical to sustaining maximum infiltration over the life of the project. Other methods to regenerate storage capacity include reuse for irrigation, and treatment prior to metering discharges back to the Atherton Channel. Some combination of these three strategies will regenerate adequate capacity and allow the overall stormwater management and treatment system to meet the water quality and flood control goals of this project. In 2010 on the Emerald Truck project for the City of Modesto, the new alignment of a major sewer pipeline conflicted with existing dry wells that the City relied upon for stormwater management; consequently, we incorporated the design of replacement dry wells at nearby locations in advance of the pipeline construction and abandonment of the original dry wells.

Design of storm drain or open channel diversion structures and piping

BC has designed diversion structures for almost every conceivable situation, including that posed by Atherton Channel. Nathan Foged is depicted as the leader for design of the channel diversion, as he is the hydraulic services leader for BC projects in the western United States. He leads a small group that works on most diversion projects for the company. We have tailored Nathan's resume to identify multiple projects that called for a diversion structure either in an engineered channel or a natural system.

Design of landscape and park restoration as part of a stormwater capture project

Our team has been involved with similar projects in a multitude of both school and park settings, and we understand that the project must offer benefits to all stakeholders, especially the land owner, beyond the water quality objectives of this project. We have identified projects in this SOQ that took place in park settings and will leverage lessons learned from those projects to integrate temporary and permanent management practices into the project plans and specifications, such that the design of the water capture facilities integrate with the park and can be operated with minimal disruption of park uses. For example, locating maintenance access to the underground cistern should be planned along the perimeter of the lawn area, especially outside of the area of play for lacrosse, soccer and other similar lawn activities. In some cases, these facilities can be planned to benefit users when placed at locations for public gathering. For example, an elevated maintenance access could serve as a bench for sitting or structure to give elevated views of play fields, especially when crowds are at grade level.

Principles for minimizing impacts to Park users

We look to address construction impacts and interim post construction impacts in a manner that avoids conflict and maximizes park user experience. Obtaining input on staging from park stakeholders is important during the project development process, as well as ensuring that the contractor and construction manager communicate changes to the public early and often. We can control construction impacts through the project plans and specifications by defining: operating times and days, traffic movements, available staging areas, street sweeping, site cleanliness, screening, and replacement planting. Conducting outreach sessions with park representatives and citizen groups can also be planned to facilitate concerns and address circumstances before they become elevated. Our proposed Project Manager, Mike Flake, was involved with the retrofit and replacement of the Carquinez bridges that spanned over homes and businesses in the Town of Crockett. During that project, a monthly citizens advisory team met with the construction managers and specialty representatives to discuss specific topics and impacts of concern to the residents and business owners. These meetings helped to alleviate citizen concerns and arrive at agreeable solutions between residents and construction entities. Members of the advisory committee became key persons for communicating with the public and devising the monthly agenda based on conversations with others or witnessed concerns. A similar effort could be devised for this project.

Consultant Matrix and Profiles

The following table depicts each team member proposed in this SOQ and discipline areas relevant to the RFQ. After the table are summary profiles of each firm.

Firm Name	Primary Office Location	Relevant Disciplines or Services
Brown and Caldwell	201 North Civic Dr., Suite 200 Walnut Creek, CA 94596	Civil design services, including hydrology, hydraulics, and water treatment. Electrical and mechanical design. Cost estimating of capital support and infrastructure construction. Construction management and constructability reviews.
Lotus Water	215 Kearny Street, Suite A San Francisco, CA 94108	Civil design services, including water treatment and reuse.
Paradigm	9320 Chesapeake Dr., Suite 100 San Diego, CA 92123	Civil design services, including hydrology, hydraulics, and water treatment. Lead for the Preliminary Design Concept Report.
AMEC Foster Wheeler	180 Grand Ave., Suite 1100 Oakland, CA 94501	Environmental planning activities to comply with the California Environmental Quality Act (CEQA).
Siegfried	111 North Market Street, Suite 300 San Jose, CA 95113	Surveying and landscape architecture.
Cotton, Shires and Associates	330 Village Lane Los Gatos, CA 95030	Geotechnical and geologic investigation.

Brown and Caldwell

Established in 1947, BC was founded by Ken Brown and Dave Caldwell, two engineers that simply wanted to solve water quality issues in California. BC has grown to about

1,600 employees, and even though we are now a national firm, we are still headquartered in Walnut Creek, California. In 2016, Engineering News Record ranked us 33rd among the top 200 firms that do environmental work, and 6th of all firms that solely do environmental in the United States. BC prides itself in being a mid-sized consulting company. We're not one of those global, mega firms that brags about the number of employees and beats their chest about projects completed in faraway places. Instead, we focus on you, listen to what you need, and deliver solutions that are effective and efficient.

- **Diversity of Engineers and Scientists** - We provide a unique blend of engineers and scientists to our clients. The scientists mostly contend with discharge characterization and studies, while the engineers mostly contend with civil design, treatment, and infrastructure deployment. We bring these two skill sets together to think through solutions that go beyond engineering (the scientists) and then to find solutions that are pragmatic and grounded in the fundamentals of science (the engineers). We attempt to address every conceivable specialty assignment anticipated under the scope of work, and we provide multiple persons for redundancy and to challenge each other to find the best options for you.
- **We Can Do Construction!** - BC has a California Contractors license to do construction. As described earlier, as part of a design-build effort, we recently completed the construction of LID Pilot sites in Sacramento and Los Angeles counties for Caltrans. Design-Build can be a significant benefit to our clients. If infrastructure is to be designed, then we can also give you the option to build it without having to go through another contracting mechanism. In fact, if time is a significant concern or constraint, then we can utilize a design-build method wherein construction efforts can begin on certain staged or phased items, while the design of other items is being completed or refined. This allows our clients flexibility in getting critical infrastructure deployed sooner to provide public benefit. In some cases, it can be a means to show results to regulators that demand action and tangible assets to meet negotiated outcomes or avoid threat of enforcement.

Paradigm

Formed in 2014, Paradigm is a California-headquartered small business, focused on stormwater management, including planning, modeling, engineering, and regulatory support. With Paradigm's knowledge and understanding of the MRP and TMDLs, they help agencies respond to increasing pressures to improve water quality and reduce impacts from stormwater. Paradigm's experts support some of the largest stormwater programs in the U.S., and have a successful track record in leveraging regulatory and technical expertise to develop water quality improvement strategies that are cost-effective and responsive to permit requirements. Paradigm is uniquely experienced with emerging planning efforts throughout the state, particularly in the areas of GI and regional stormwater capture project implementation, modeling, project planning and engineering, and regulatory compliance requirements. The following is a summary of Paradigm's experience on similar types of projects:

- **San Mateo County SWRP** – Led the development of the SWRP, including approaches for identifying and prioritizing GI and regional stormwater capture

projects throughout San Mateo County. As part of the SWRP, Paradigm prepare concept designs for various projects, including the Atherton Water Capture Project, another Caltrans funded project at Orange Memorial Park in South San Francisco, and Twin Pines Park in Belmont.

- **San Mateo County RAA and GI Plans** – Paradigm is leading the RAA supporting GI planning efforts for C/CAG member agencies, including the modeling of the Atherton Water Capture Project and other GI and regional projects within each city/county jurisdiction. The RAA will set goals for GI planning and implementation through 2040 to demonstrate reductions of PCBs and mercury to meet TMDL waste load allocations and requirements of the MRP.
- **Beverly Hills Regional Stormwater Capture Project Concept** – Prepared the conceptual design for a project at the high school, including site assessment and identification of project opportunities/constraints, evaluation of alternative designs, quantification of stormwater capture, groundwater recharge, and progress towards meeting TMDL implementation goals, and development of cost estimates and project schedule.
- **City of LA Concept Report for Urban Runoff Projects** – Supported the feasibility analysis and development of concepts for stormwater projects in the Arroyo Seco watershed. The study included field reconnaissance, assessment of site configurations and maintenance/accessibility, a geotechnical review, evaluation of alternative project designs (including dry-weather low-flow diversions and wet-weather stormwater capture), modeling, design cost optimization, and cost estimates.
- **City of LA Stormwater and Green Infrastructure 5-Year Capital Improvement Plan (CIP)** – Led development of a CIP that incorporated regional and green street projects included within five watershed plans into a strategy for implementation within the next 5 years. Costs estimates were provided for each project that considered phases for planning, design, construction, and post-construction monitoring. Tools were developed for project prioritization considering cost-effectiveness. Supported engagement of the City Administrative Officer regarding the CIP and future funding needs.
- **City of Carson Regional Stormwater Capture Project Conceptual Designs** – Led conceptual designs for three regional projects. Performed a drainage area and hydrologic analysis to inform project sizing, assessment of jurisdictional stormwater runoff to assist in cost-share discussions, site visits to identify opportunities/constraints, and evaluation of alternatives to determine cost-effective designs. The three concepts were presented were used in discussions to pursue funding and support city decision-making. Carriage Crest Park has received Caltrans funding and is currently under design and construction.

Lotus Water

Established in 2007, Lotus Water (Lotus) is a 10-person civil engineering consulting firm that specializes in delivering sustainable stormwater management solutions and water-sensitive urban designs. For the last decade, Lotus has been on the leading edge of evaluating the triple-bottom line benefits of green infrastructure (GI) and helping municipalities develop their GI programs and implement capital GI projects. Our water quality and resource management systems are not only designed to meet city

requirements, but are optimized to meet project financial goals, integrate seamlessly with site aesthetics, and exceed sustainability targets. In addition to our water resource specialty, Lotus delivers the full spectrum of site civil engineering services.

Lotus staff thrive on collaborative, multidisciplinary teams of design and technical professionals working to optimize the use of space and integrate the form and function of the systems that support overall site programming, connectivity, and function. Our goal on every project is to efficiently transform stormwater from a regulatory burden into a resource that strengthens the finished space by supporting vital landscape and non-potable water systems.

Lotus provides value to our projects by developing innovative yet feasible solutions based on a deep understanding of technical principles, client objectives, community engagement, regulatory requirements, and respecting the importance of every discipline. Through our experience with site design, stormwater management, and non-potable water systems at various scales and complexities, we have built strong working relationships with regulatory and design professionals throughout the Bay Area. Our staff have unique experience working with city agencies and community stakeholders on park projects, as we are currently working on stormwater management elements within six park projects.

- **Yosemite Creek Daylighting Project, San Francisco, CA** – Project sheet included in SOQ.
- **Mission Bay Bayfront Park P22, San Francisco, CA** – This new park is located directly between the new Golden State Warriors arena and the Bay. It is using green infrastructure to comply with stormwater management requirements while meeting the aesthetic needs of this high-profile location and providing important linkages along the shoreline.
- **Hunter's Point Shipyard Northside Park, San Francisco, CA** – This 12-acre waterfront park incorporates various integrative strategies to treat, reuse, and/or detain stormwater from 23 acres of offsite development in addition to onsite runoff.
- **Baker Beach Green Street, San Francisco, CA** – One area of this project contains a series of green nodes (i.e., hybrid bioretention bulb-outs and infiltration galleries) located at crosswalks on El Camino del Mar within Lincoln Park, and another portion contains a large rain garden at an entryway to the Golden Gate National Recreation Area park at iconic Baker Beach. The primary objective of this project is to improve water quality at Baker Beach by infiltrating stormwater and reducing combined sewer discharges onto and nearby the beach.
- **Conservatory of Flowers Support Facilities Master Plan, San Francisco, CA** – This iconic structure in Golden Gate Park is undergoing a conceptual design exercise to re-envision the "back of the house" support space and special event spaces of the Conservatory. Services include conceptual design, community engagement, and charting a path for approvals. Lotus is leading the effort to meet project stormwater management and sustainability goals.
- **McLaren Park Improvement Plan, San Francisco, CA** – As part of a strategic planning effort to create an inventory of improvement project to modernize this 312 acre park, Lotus is identifying opportunities for sustainable water

management systems, including non-potable water reuse, potable water conservation, green stormwater infrastructure, restoration of natural drainage ways, and reduction of flood impacts. Specific strategies will be aligned with priority park elements identified by the Recreation and Park Department and community outreach.

AMEC Foster Wheeler

Amec Foster Wheeler (Amec) has more than 35 years of experience providing high-quality environmental consulting services to clients throughout California and the U.S. As one of the largest environmental consulting firms in the U.S., we have completed more than 2,000 environmental compliance documents and technical studies. We have been deeply involved in the planning and implementation of the MRP, and look forward to applying our experience to help Brown and Caldwell and the Town of Atherton educate stakeholders as to the net environmental benefits of this important stormwater capture project. Below are some examples of our CEQA services provided:

- **Carmel Canine Sports Center Project Environmental Impact Report, Monterey County RMA Planning Department, Salinas, California, August 2015.** Completion of this EIR included working with the State Water Resources Control Board and the Monterey Peninsula Water Management District to secure approval of a Mitigated Negative Declaration (MND) for diversion of 0.42 cubic feet per second from a subterranean stream. This project can be found at: http://www.co.monterey.ca.us/PLANNING/major/Carmel_Canine_Sports_Center/FEIR_PLN130352_081315.pdf
- **Environmental Impact Report (EIR) for the Commercial Cannabis Cultivation and Manufacturing Regulations and Licensing Program, Santa Cruz County, January 2017 – Present.** Amec is leading an EIR for a new regulatory and licensing program. In addition to the no-action alternative, the analysis evaluates potential for impacts under assumptions of the most restrictive and least restrictive regulatory and licensing programs contemplated. This project can be found at: http://sccoplanning.com/Portals/2/County/Planning/env/Cannabis_EIR/Santa%20Cruz%20Co%20Cannabis%20Draft%20EIR.pdf
- **Watershed Management Plan MND, City of Berkeley, October, 2012.** The Berkeley City Council adopted a Watershed Management Plan to support development of Green Infrastructure for stormwater management, supported by a MND prepared by Amec. This project can be found at: https://www.cityofberkeley.info/uploadedFiles/Planning_and_Development/Level_3_-_Commissions/Commission_for_Community_Environmental_Advisory/2012-10-16_AGN_CEAC_Watershed%20Subcommittee%20Attachment.pdf

Siegfried

Founded in 1955, Siegfried is the largest multidisciplinary design firm headquartered in Central California, providing design and engineering services. Having offices in Stockton, Sacramento, and San Jose, Siegfried is recognized as one of the foremost professional services firms in Northern and Central California, as measured by our clients, our employees, and our community. Our innovative, problem-solving approach and technical

expertise continues to shape the success of communities and businesses in each of our practice areas and beyond. Siegfried will be providing Landscape Architecture and Surveying in support of the Atherton Project.

- **Landscape Architecture** - Our designs seamlessly blend softscape and hardscape elements by responding to natural land features that are ultimately user focused and fulfill our client's vision. The broad knowledge and experience of our design staff allows us to utilize a multitude of materials and techniques to deliver the best solution for any project. Being a multidisciplinary firm, our landscape team understands the engineering involved in our projects, and will collaborate with engineers on landscape features and designs to successfully deliver outcomes that meet multiple needs.
- **Surveying** - When accuracy matters and projects require reliable results the first time, our team of surveyors excels. Siegfried delivers detailed surveys you can build upon by using the advanced capabilities of GPS and TPS combined with the human insight and experience needed to apply these tools. The direct link to the field crews streamlines our design process and ensures accurate results by delivering a constant flow of communication between the survey crew in the field and designers and engineers in the office. For our clients, having an exact picture of the existing conditions will allow our team to provide specific solutions tailored to your project.

Cotton, Shires and Associates

Cotton, Shires and Associates, Inc. (CSA) is an accredited small business that was incorporated in 1974, and is a full-service engineering geology and geotechnical engineering consulting firm with offices in northern (Los Gatos, CA), central (San Andreas, CA) and southern (Thousand Oaks, CA) California. The firm personnel include licensed engineering geologists, civil and geotechnical engineers and a geophysicist in addition to GIS analysts, technical illustrating and clerical/accounting support staff.

CSA is recognized throughout the geotechnical industry for expertise in characterization of earth movement, including landslides and rock slope failures. Members of our senior staff have collectively investigated hundreds of earth movement cases throughout the State. Our expertise includes investigative techniques such as detailed geologic mapping, exploratory drilling and logging of large-diameter boreholes, geophysical exploration, trenching, and the installation, analysis and monitoring of instrumentation. CSA maintains state-of-the-art analysis tools and highly qualified personnel for evaluating slope stability of natural slopes, pre-existing landslides and rock slopes. These analyses include regional slope stability evaluations for siting decisions, as well as two- and three-dimensional analyses of site-specific slopes. We use unique techniques best suited to exploration of slope stability problems and provide cost-effective recommendations for siting, design and slope remediation. In 2012 CSA performed an engineering geologic evaluation of the Eagle Canyon Flume for PG&E.

CSA's primary role for Atherton Project will be to provide geotechnical expertise to assess, investigate, and characterize the ability of soils at the project site to infiltrate stored stormwater. The intent of the investigation will be to collect soil data, develop a profile of the subsurface conditions, and formulate engineering conclusions on the ability of the site to support infiltration at the location and, if necessary, help determine if dry wells are a feasible option for promoting infiltration. Most of the office work will be

performed in our Los Gatos office. We intend to use Gregg Drilling to assist with collection of site data.

Comments and Requested Changes to Consultant Services Agreement

Comments on Attachment 4, Consultant Services Agreement of the SOQ are as follows:

11. Responsibility of Consultant, line 4-6, revise to "...loss or damage on account of the negligent performance of the work, accidents or occurrences to the extent cause by the negligence of the Consultant or of any sub-consultants or subcontractors.

12. Insurance, paragraph h., delete second sentence, "Furthermore, the requirements for coverage and limits shall be (1) the minimum coverage and limits specified in this Agreement; or (2) the broader coverage and maximum limits of coverage of an insurance policy or proceeds available to the named Insured; whichever is greater."

15. Notice, line 5, revise to "...deliver by regular mail, email, or overnight express carrier."

23. Default and Remedies, paragraph b., revised to "Upon any Consultant default, that is not remedied promptly, Town shall have the right to immediately suspend or terminate the Agreement, seek specific performance, contract with another party to perform this Agreement. If following termination, Town must complete the Services; Consultant shall be liable to Town for any additional costs and expenses thereby incurred."

25. Documents and Records, paragraph (a), line 3, revise to "...shall become the property of Town upon payment to Consultant and completion of the work to be..."

Exhibit C – Insurance Requirements:

Page 25-26, Other insurance Provisions - Additional Insured Status, revise to "...it's elected and appointed officials, employees, and agents are to be covered as additional insured's on all policies..."

Page 26-27, Verification of Coverage – line 5, revise to "...reserves the right to require copies with confidential information redacted,..."

Page 27, Reliance Upon Professional Skill of Consultant – line 3-4, revise to "...Town relies upon the skill of CONSULTANT to do and perform the work in accordance with generally accepted standards and practices customarily utilized by competent engineering firms in effect at the time CONSULTANT services are performed and CONSULTANT agrees to thus perform the work. The acceptance of CONSULTANT's work by Town does not operate as a release of CONSULTANT from said obligation."

Insurance Coverage Statement

Brown and Caldwell maintains, at a minimum, the following insurance coverages:

1. Commercial General Liability. Coverage is provided by Hartford Fire Insurance Company (Best's Rating A XV) on a standard occurrence liability form and includes premises/operations, personal injury, advertising injury liability, contractual liability, broad form property damage, products/completed operations. There is no exclusion for explosion, underground or collapse. Limits are \$2,000,000 per occurrence, \$4,000,000 general aggregate.

2. Business Automobile Policy. Hartford Fire Insurance Company (Best's Rating A XV) writes the policy on a standard form and coverage applies to all owned, non-owned and hired vehicles. Policy limit is \$2,000,000 each accident.
3. Workers' Compensation. Hartford Accident and Indemnity Company and Twin City Fire Insurance Company (Best's Rating A XV) underwrite this policy. Statutory benefits are provided, as required by state law. Employer's Liability is provided with limits of \$2,000,000.
4. Professional Liability, Including Contractor's Pollution Liability. This policy is underwritten by Lloyd's of London (Best's Rating A XV). It is written on a "claims-made" basis and provides professional liability coverage for negligent acts, errors or omissions arising out of the performance of Brown and Caldwell's professional services, including pollution claims. The current policy has a retroactive date of April 1, 1947. Limits are \$1,000,000 per claim and in the aggregate.

Professional Fees

The proposed rates can be found in sealed envelope not to be opened unless our team is selected by the Town. We assume that all expenses incurred will be reimbursed at actual with pre-approval, except for travel (mileage, tolls, etc.) which would be consistent with the Caltrans Travel Guide for Consultants or federal reimbursement rates. The envelope has been pre-printed with postage for return.



Attachment A

Principal Engineer and Key Staff Resumes

Immediately following this cover sheet on the subsequent pages are resumes for our principal engineer and key staff listed in the SOQ.

Experience Summary

Michael has extensive stormwater experience, including 4 years managing Caltrans’ Stormwater Program as the Office Chief for Stormwater Policy, Planning and Permitting. He developed many of the Caltrans manuals and training programs related to BMP implementation for construction and post-construction. He designed many Best Management Practices (BMPs) specifically used for addressing work related to retrofit and replacement of Bay Area toll bridges, and has led research projects of treatment controls and eventual incorporation of findings into design guidance, specifications, and standard plans. Michael is a Vice President at Brown and Caldwell, and manages a team of 16 people that execute on water resources project in California with a specific emphasis on serving Caltrans on water quality efforts.

Assignment

Principal Engineer

Project Manager

Education

B.S., Civil Engineering, University of California, Davis, 1992

Environmental Management Certificate in Environmental Site Assessment and Remediation, University of California, Berkeley, 1998

Registration

Professional Engineer, Civil, California, No. C054948, 1996

Qualified SWPPP Developer/Practitioner (QSD/QSP), No. 24268

Experience

25 years

Joined Firm

2006

Relevant Expertise

- *Conducting and supervising work related to NPDES permitting and program management of stormwater quality.*
- *TMDL analyses, strategies and compliance implementation.*
- *Self-auditing of design, construction, and overall stormwater program elements.*
- *Non-stormwater management for both construction and post-construction conditions.*
- *Erosion & sediment control design.*
- *Stormwater treatment design*
- *Managed a \$10M public education and outreach campaign – “Don’t Trash California”*

Contract No. 43A0314, District 3 and District 7 LID Pilot Design, Caltrans HQ, Sacramento, California

Contract Manager/Quality Assurance. Michael was the contract manager and provided oversight of the BC Project Manager for delivering this project as a design-build effort. Michael was responsible for contracting services of specialty subconsultants and construction contractors to deliver the project with integrated design and construction process. Michael was also the quality assurance reviewer of the project technical team and responsible for validating design reports, checking hydraulic calculations and sizing treatment controls, reviewing final project plans, and confirming redline revisions of plans, specifications, and details to communicate final direction to the contractor and document as-built plans for final conditions.

Project Fee: \$2,070,000

Involvement: July 2013 to July 2017

Project Planning and Design Guide (PPDG), Caltrans, HQ Stormwater Design, Sacramento, California

Project Manager and Lead Technical Engineer. Michael recently completed an August 2017 version of the PPDG, which is Caltrans’ overall design guidance for storm water BMP implementation. He is currently providing training on the revised PPDG to design staff in each Caltrans district in California.

He previously did an update of the PPDG in 2015, 2010, and was one of the original authors in 2002. The PPDG is updated regularly to reflect the changes in knowledge gained through research and pilot BMP projects, as well as lessons learned from capital projects. A design strategy that uses a pollutant load removal approach provides Caltrans with a reasonable method to comply with water quality criteria and TMDLs. A new approach for treatment in excess of the minimum design requirements was developed to support a crediting system towards future projects that have a treatment deficit or towards TMDL compliance. Many changes are for streamlining direction, but a majority of changes are focused on treatment BMP consideration and implementation within capital projects central to Caltrans’ mission. Infiltration is emphasized as the desirable means of reducing pollutants in discharges, preferably by utilizing existing site conditions and principles of low impact development (LID). Recent changes to the PPDG include updates to storm water data report (SWDR) templates and supporting forms, reference to recent hydromodification guidance and qualifying criteria, and compliance with the Construction General Permit (CGP).

Project Fee: 2017 Revision: \$186,000; 2015 Revision: \$334,000; and 2010 Revision: \$280,000

Involvement: May 2009 to Present

San Francisco-Oakland Bay Bridge (SFOBB) Bioretention Basins, District 4, Oakland, California

Project Manager. In 1998, Michael was part of the original design team at Caltrans and served in the development of six bioretention basins as pilot study treatment devices within the east approach to the new SFOBB. Michael led a report that determined that treatment could not be afforded to runoff from the new bridge due to additional dynamic loading that would be introduced into the structure by incorporating a drainage system. Although the report identified other water quality benefits of the new bridge, the San Francisco Bay Regional Water Quality Control Board (RWQCB) wanted treatment to accompany this monumental project, which at the time was projected to cost over \$800 million. As an alternative, Michael championed an effort to provide treatment of runoff from the toll plaza and approach roadways to the bridge, as these locations posed greater water quality concerns due to the increased pollutant deposition related to “stop and go” traffic. The RWQCB concurred with this assessment and documented the Caltrans commitment through issuance of a Section 401, Water Quality Certification (401 Certification). During the design of the bioretention basins, Michael provided oversight and direction on the configurations, tributary drainage, and media beds. In 2006, the bioretention basins had completed construction and were largest known constructs in California of bioretention for the treatment of stormwater.

At Brown and Caldwell, Michael served as the project manager and primary technical oversight for the operation, maintenance, and monitoring services for the San Francisco Oakland Bay Bridge (SFOBB) Bioretention Pilot Project. Work included maintenance of the bioretention systems, wet weather water quality monitoring, post-storm technical memoranda, data analysis, equipment inspection, and annual reporting for Wet Seasons 2011-12, 2012-13, and 2013-14. During the final year of the project, a final report determined that the bioretention basins were effective measures at removing pollutants from highway runoff, as well as reducing loads attributed polychlorinated byphenyls (PCBs) and mercury. As result, monitoring was deemed complete by the RWQCB, which fulfilled Caltrans’ obligations under the 401 Certification. In the final year, prior to turning the project over to Caltrans Maintenance and at the request of the RWQCB, the BC team developed a Media Analysis Technical Memorandum (MATM) to document the design and determine if results were representative of the Regional Bioretention Soil Guidance & Model Specification - Bay Area Stormwater Management Agencies Association. BC also developed an Operation and Maintenance Guidance for the project site to document maintenance activities to specifically address the following: 1) pump stations, 2) vegetation and media, 3) basin side slopes and walkways, 4) inlet trenches and inlet infrastructure, and 5) underdrain systems. These documents were deemed critical to continued success of the bioretention basins, as Michael had been associated with the project since its inception.

Project Fee: \$1,663,000 (\$1,435,000 under Contract 43A0288 and \$228,000 under Contract 43A0325)

Involvement: Caltrans tenure: 1998 to 2006; and BC tenure: June 2011 to October 2014

Echo Park Rehabilitation Project, Bureau of Engineering, City of Los Angeles, California

Project Engineer. Michael assisted with guidance and direction on the design of vegetation and structural controls used to treat stormwater, as part of a project that provided multi-purpose solutions for stormwater runoff, habitat, and recreation. The reduction of pollutant loads before reaching the lake was crucial to this project’s overall effectiveness. Final design included hydrodynamic separators to provide pretreatment and trash removal of stormwater runoff; constructed wetlands to remove nutrients (e.g., phosphorus); rain gardens and grassy swales to manage runoff from the park. The City officially reopened Echo Park Lake on June 15, 2013, and is being used to meet TMDL requirements attributed to urban runoff. The project has won 10 awards to date.

Project Fee: \$1,100,000

Involvement: November 2009 to August 2010

Alviso Slough Restoration Project, Final Engineer’s Report, Santa Clara Valley Water District, Santa Clara County, California

Supervising Engineer. One of three supervising engineers that “stamped” the Final Report to be used in support of evaluating design options and recommending a preferred design that improves water quality and habitat, restores natural conditions, maintains flood protection, reduces mosquito nuisance, and promotes navigation and recreational access. Michael’s focus was on design alternatives that required dredging and management of materials (sediment, vegetation, and deleterious materials) from channel redesign and integration with the nearby South Bay Salt Pond Restoration Project (which Michael was also supporting). Additionally, Michael contributed to the cost estimates of each alternative necessitating dredging and definition of construction staging operations to minimize environmental impacts.

Project Fee: \$137,000

Involvement: August 2007 to October 2009

Experience Summary

Jeff has over 34 years of environmental engineering experience in watershed and stormwater management, stormwater treatment, surface water monitoring and assessment, and stream and lake restoration, from contract preparation through study, design, QA/QC, value engineering, permitting, bidding, construction administration, startup, and operation and maintenance. His primary areas of expertise include: watershed pollutant sources and loadings; TMDLs; NPDES; structural and nonstructural stormwater BMP evaluation, design, permitting and construction oversight; green infrastructure; regional stormwater retrofit including wetland and chemical treatment; surface water quality monitoring, assessment and restoration; development of enhanced land development regulations, stormwater design criteria and O&M procedures. He has successfully completed over 160 water quality projects including over 50 regional stormwater retrofit projects for public entities. Jeff is a Diplomate, Water Resources Engineer, a member of the American Society of Civil Engineers and the American Academy of Water Resources Engineers, and is a registered Professional Engineer in multiple states.

Assignment

Sr. Technical Review

Education

M.S.E., Environmental Engineering, University of Central Florida, 1983

B.S.E., Environmental Engineering, University of Central Florida, 1981

Registration

Professional Engineer #029019, Georgia, 2003

Professional Engineer #36807, Florida, 1986

Professional Engineer #30951, Washington, 1994

Experience

34 years

Joined Firm

2008

Relevant Expertise

- *Watershed assessment*
- *Green Infrastructure Planning and Design*
- *TMDLs*
- *Stormwater and surface water monitoring and assessment*
- *Pollutant loading analyses*
- *Stream restoration*
- *Stormwater management*
- *Structural and nonstructural BMPs*
- *Stormwater regulations*
- *Lake and reservoir restoration*

Ecological Restoration of Historic Water Works and Mason Mill Park, DeKalb County DWR, DeKalb County, Georgia (metro Atlanta)

Project Manager/Engineer of Record. Obtained GEFA Green Loan for project. Evaluated, designed, permitted and provided bidding and construction support services for stream restoration and low impact development stormwater retrofit elements for the historic water works site and urban park. The sites are adjacent to Burnt Fork Creek and Peachtree Creek; both are verified impaired water segments, due to erosion and sediment transport. The project included: the natural restoration of 1,100 linear feet of an unnamed tributary to Burnt Fork Creek and 800 linear feet of Burnt Fork Creek: the construction of two bioretention cells and one wetland treatment cell: and stormwater collection in a large historic partially buried water storage tank for reuse. The collected stormwater is pumped to a man-made creek as an aesthetic park feature and is used for irrigating the park. Construction completed in 2011.

Lilburn City Park Stormwater Quality Improvements and Camp Creek Restoration, Lilburn, Georgia

Technical Lead/Engineer of Record. The selected concept included relocating approximately 900 feet of Camp Creek to move the eroding creek away from the City Hall park site. In addition to the stream restoration component, BC created a large multi-cell bioretention stormwater treatment system within the historic stream channel that promotes infiltration, reduces erosive velocities from the stormwater outfalls into Camp Creek, and provides water quality treatment for 30 acres of urban land. A trail was constructed along the new creek channel connecting to the park's sidewalk system. BC also completed final construction documents and obtained the necessary permits for construction of the project. BC also provided assistance during bidding and construction, data collection (geomorphological, biological, and hydrological), hydrologic and hydraulic modeling, and pre- and post-construction water quality monitoring. Construction was completed in Fall 2012.

Ronald Reagan Park Stormwater Quality Improvements and Stream Restoration, Gwinnett County Department of Water Resources, Lawrenceville, Georgia

Chief Engineer/Engineer of Record. Project design included bioretention stormwater improvements and stream improvements including bank stabilization of approximately 500 linear feet (LF) and stream restoration of approximately 800 LF using a Priority 1 approach and natural channel design, along with riparian buffer enhancement. [Construction completed 2010]

Lake Claiborne Restoration, Gwinnett County Department of Water Resources, Duluth, Georgia

Chief Engineer/Engineer of Record. This stream and lake restoration project included the restoration of approximately 700 linear feet (LF) of Sweetwater Creek and approximately 200 LF of an unnamed tributary to Lake Claiborne, the construction of two offline wet vegetated ponds for stormwater treatment (BMPs), and the removal of 45,000 cubic yards of accumulated sediment from the Lake. A new lake outfall control structure with operable weir gate was also installed to allow for the fluctuation of the lake's normal water level. BC's scope included evaluation, design, permitting (obtained USACE Nationwide 27 and 43, state stream buffer variance, and local land disturbing permits), easement preparation, subconsultant supervision, bidding assistance, construction oversight and pre- and post-project water quality and biological monitoring. [Construction completed 2011]

Experience Summary

Amy specializes in designing stormwater best management practices (BMPs), providing stormwater permit compliance, developing stormwater design guidance and standards, and providing stormwater quality monitoring on construction projects. Amy has experience in management and design of utility infrastructure projects, and hydrologic and hydraulic design. Her work includes water, storm, and sewer infrastructure projects, that have involved pipeline rehabilitation and erosion control design.

Assignment

Planning and Design

Education

B.S. Civil Engineering, University of Rhode Island, Kingston, RI, 2003

Registration

Professional Civil Engineer, California No. C71803

Professional Civil Engineer, Washington No. 47359

Qualified Storm Water Pollution Prevention Plan Developer (QSD), No. C71803

Experience

13 years

Joined Firm

2008

Tierrasanta Pump Station, City of San Diego, San Diego, California

Stormwater Technical Lead. Amy is responsible for reviewing and updating PS&E documents for stormwater treatment and drainage design improvements for a new pump station to ensure the design meets the City's new permit requirements. The stormwater infrastructure and asphalt pavement design conveys runoff to a bioretention basin. The bioretention basin design was modified to meet both stormwater treatment and newly triggered hydromodification requirements in accordance with updated City standards and guidance manuals. Construction is expected complete in 2017.

Project Fee: \$1,470,000

Involvement: January 2016 to Present

Contract No. 43A0314, BMP Design Guidance Updates, Caltrans HQ, Sacramento, California

Project Manager/Technical Lead. Amy is part of the team responsible for updating the BMP Design Guidance documents to be compliant with Caltrans current National Pollutant Discharge Elimination System permit and Storm Water Management Plan. Updates also reflect requirements and updated

design criteria included in the 2017 PPDG. The team will evaluate the current BMP sizing methodology and identify design criteria modifications to refine BMP sizes. Calculation methodology and criteria modifications will be reflected in the updated guidance.

Project Fee: \$295,000

Involvement: April 2016 to Present

Contract No. 43A0314, District 3 and District 7 LID Pilot Design, Caltrans HQ, Sacramento, California

Project Engineer/Technical Lead. Amy led the project technical team responsible for updating design reports, creating hydraulic calculations, developing project plans, and constructing two pilot projects demonstrating low impact development best management practices in limited right-of-way situations. The pilot BMPs were installed at two project sites and are currently being monitored by Caltrans. The monitoring effort will determine the relative effectiveness of the different treatment media that were utilized in the pilot BMPs.

Project Fee: \$2,070,000

Involvement: July 2013 to July 2017

Auburn Operation and Maintenance Facility Stormwater Improvements, City of Auburn, Washington

Civil Design Lead. Amy was responsible for developing PS&E documents for site grading and drainage design improvements that included new stormwater infrastructure, realignment of an existing water main, and new asphalt pavement. The project included construction of a new decant building. The drainage design incorporated LID site design methods and treatment BMPs to improve site stormwater discharge water quality. Construction was completed in 2016. This project was partially grant-funded by the Washington State Department of Ecology.

Project Fee: \$400,000

Involvement: January 2014 to August 2015

Auburn Operation and Maintenance Facility Stormwater Improvements, City of Auburn, Washington
Civil Design Lead. Amy was responsible for developing PS&E documents for site grading and drainage design improvements that included new stormwater infrastructure, realignment of an existing water main, and new asphalt pavement. The project included construction of a new decant building. The drainage design incorporated LID methods and BMPs to improve site stormwater discharge water quality. Construction was completed in 2016. This project was partially grant-funded by the Washington State Department of Ecology.

Project Fee: \$400,000

Involvement: January 2014 to August 2015

Contract No. 43A0314, Interstate 80/680 Basis of Design for Biofiltration Basin, Caltrans, Sacramento, California

Project Engineer. Amy and team reviewed project documents to evaluate the design of a non-approved Treatment BMP. The team compared the project design to 401 Certification sizing and existing Caltrans guidance sizing and provided recommendations to improve design criteria assumptions. This effort will be used by Caltrans during future collaborations with State and Regional Board staff to provide a basis of post construction treatment crediting and to obtain approval of the design for use as an approved Treatment BMP.

Project Fee: \$22,000

Involvement: August 2013 to November 2013

Contract Nos. 43A0288 and 43A0325, San Francisco-Oakland Bay Bridge Bioretention Site Monitoring, Caltrans, Oakland, California

Project Manager/Design Reviewer. This project improved the quality of flow data collected at the SFOBB Bioretention system. The activities in this project included a review of the existing contract plans and the basis of design document to inform development of design plans, in coordination with a flume manufacturer, for the construction of flume extensions at the inlet channels and outflow stations. The flume extensions were designed to improve the quality of flow data by creating a hydraulic regime with far less turbulence.

Project Fee: \$2,050,000

Involvement: June 2011 to May 2012

Contract Nos. 43A0254 and 43A0314, Project Planning and Design Guide (PPDG), Caltrans, HQ Stormwater Design, Sacramento, California

Project Engineer. Amy collaborated with Caltrans to update the PPDG to comply with the current NPDES permit and SWAMP, to clarify issues identified by District design staff, to update reference to Caltrans research, and to provide guidance on tracking and reporting treatment areas to make certain permit requirements are satisfied. This document is used by designers statewide and this effort produced an improved document for use in the design and documentation of stormwater BMPs. This project includes statewide classroom training on the updated PPDG. Amy assisted in developing a PowerPoint presentation used in the training and she was responsible for developing classroom exercises focused on changes to BMP calculation requirements. In addition to the ongoing project, Amy worked on the previous PPDG updates.

Project Fee: \$650,000

Involvement: May 2009 to September 2010, July 2014 to April 2016, and April 2017 to Present

Contract Nos. 03A1923 and 03A2360, Willits Bypass Water Quality Assessment and Monitoring, Caltrans District 1, Willits, California

Project Engineer. Amy is responsible for development and implementation of the monitoring and reporting program, developed to satisfy the conditions of the projects' 401 Water Quality Certification. This program monitors the impacts of construction on the creeks and gauges mitigation success. Amy is responsible for coordinating and guiding the construction inspection and the water quality teams to gather the correct field data and report in accordance with the standards of the program. Amy is responsible for QC review of daily field inspection reports and for generating monthly summary reports.

Project Fee: \$6,800,000 (\$4.4M under Contract 03A1923 and \$2.8M under Contract 03A2360)

Involvement: April 2013 to Present

Experience Summary

Nathan is a subject matter expert with extensive experience in surface water hydrology, urban stormwater management, open channel and floodplain hydraulics, and sediment transport mechanics. His technical skills include precipitation analyses, hydrologic modeling, hydraulic design, and performance standards for green stormwater infrastructure/low impact development.

Assignment

Hydraulic Design and Channel Diversion

Education

M.S., Bioresource/Civil Engineering, Colorado State University, 2001

B.S., Biological Systems Engineering, University of Nebraska, 1998

Registration

Professional Engineer 66395, California, 2004

Professional Engineer 45533, Washington, 2009

Professional Engineer 92342PE, Oregon, 2017

Certified Floodplain Manager US-07-02747, 2007

Experience

13 years

Joined Firm

2004

Relevant Expertise

- *Hydrologic modeling*
- *Hydraulic modeling*
- *Sediment transport modeling*
- *Floodplain management*
- *Watershed/basin studies*
- *GIS applications in water resources*

Arroyo del Valle Diversion Hydraulic Design, Livermore, California

Project Manager. As aggregate mining operations in the Livermore-Amador Valley are completed and the area is reclaimed, water management features are being constructed for use by the local water district to divert, convey, and store water in the area referred to as the "Chain of Lakes." Nathan is managing the design of a diversion structure consisting of a low-head diversion dam, a fish-passable bypass, and a lateral infiltration gallery. One of Nathan's initial tasks was to perform an alternatives analysis on several configurations to identify a cost-effective option for meeting fish-screening criteria. Nathan and his team developed an innovative design that uses a lateral infiltration bed with perforated horizontal drain pipes. The series of pipes flow into a drain manifold that diverts water by gravity through a channel and into the adjacent lake.

Project Fee: \$440,000

Involvement: September 2013 to present

Yarrow Creek Tributary Channel Stabilization and Flow Bypass, Bellevue, Washington

Hydraulic Design Lead. The Yarrow Creek tributary is a degraded stream due to urbanization and increased runoff. As the stream channel became entrenched, erosion and headcutting threatened nearby roads and infrastructure. Nathan performed modeling and provided hydraulic design support for a stream stabilization/bypass project that replaced a damaged culvert, restored degraded stream channel, and diverted high flows into a flow bypass pipe to protect the channel from further erosion. The bypass diversion design consisted of a 60-inch standard manhole with an internal baffle and a downturned elbow with an orifice plate. When streamflows are low, water is allowed to drain through the orifice into the restored open channel. However, when streamflows exceed the design bypass threshold, water overtops the internal baffle and drains through a buried flow bypass pipe. Nathan also supported the design of the new culvert and a riprap energy dissipater at the bypass pipe outlet.

Project Fee: \$200,000

Involvement: August 2010 to April 2011

Nuff Creek Water Management System, San Mateo County, California

Project Manager. Nuff Creek is an important tributary to Pilarcitos Creek, which has been identified as critical habitat for the recovery of steelhead trout. As part of a conditional use permit for local mining operations, a surface water management system is to be constructed to augment Nuff Creek baseflows during the dry season and mitigate potential impacts due to nearby aggregate mining. Nathan is managing the design of the system, which consists of a stream-flow diversion structure to divert high flows from Nuff Creek just upstream of active mining, a reservoir to store direct runoff and diverted flows, and an outlet structure to release flows back to Nuff Creek. The diversion structure uses an in-line v-notch

weir and a lateral turnout gate that can be controlled manually. The system is to be constructed before the next phase of mining operations.

Project Fee: \$140,000

Involvement: July 2014 to present

North Bethany Regional Stormwater Facility, Clean Water Services, Washington County, Oregon
Project Engineer. Regional stormwater facilities are being constructed in the North Bethany area to provide water quality treatment and flow control for new development. Nathan developed datasets and customized Excel-based modeling tools for sizing these facilities in accordance with the District's current design standards. He used 4-band near infrared aerial photography from the USDA to map impervious areas and characterize existing conditions. He employed Santa Barbara Unit Hydrograph and level-pool routing methodologies to meet the District's peak-matching flow control standard. Nathan also developed an easy-to-use maps and tools to assist the District with permit reviews and development modifications.

Project Fee: \$100,000

Involvement: February 2013 to July 2014

Deming Levee Improvement Project, Whatcom County, Washington
Project Manager. An unmaintained berm and bank revetments on the Nooksack River near the town of Deming were frequently overtopped by high river levels, leading to flooding of nearby properties. Conditions were exacerbated by interior flooding from an adjacent stream. Nathan managed the design of an 800-foot levee extension and embankment tie-in project to protect against bank erosion and reduce recurring river flooding. In addition, the stream was diverted from its existing channel and rerouted directly to the river, which provided an opportunity for new off-channel habitat.

Project Fee: \$600,000

Involvement: April 2011 to September 2017

Experience Summary

Dr. Fuchs is experienced in stormwater BMP evaluation and design, stormwater permit compliance, developing stormwater design guidance and standards, and designing and evaluating stormwater quality monitoring programs. Valerie has experience in hydrologic and hydraulic analysis. Her work includes design of low impact development stormwater treatment practices, drainage systems analysis, and water quality analysis for PCBs and stormwater constituents.

Assignment

Planning and Design

Education

Ph.D., Environmental Engineering, Michigan Technological University, 2009, NSF Fellow

M.S., Environmental Engineering, Michigan Technological University, 2007, IGERT Fellow

B.S., Civil Engineering, Gonzaga University, 2004

Registration

Professional Engineer C81619, California, 2013

Professional Engineer #52615, Washington, 2015

Qualified SWPPP Developer

Envision Sustainability Professional

Experience

6 years

Joined Firm

2014

Relevant Expertise

- *NPDES permit compliance*
- *Green infrastructure design*
- *QA/QC*
- *Surface water quality monitoring and modeling*
- *Watershed modeling*
- *Pollution prevention*
- *Sustainability management plans*

Contract No. 43A0314, BMP Design Guidance Updates, Caltrans HQ, Sacramento, California

Project Engineer. Valerie is part of the team responsible for updating the BMP Design Guidance documents to comply with Caltrans National Pollutant Discharge Elimination System permit and Storm Water Management Plan. Updates reflect requirements and updated design criteria included in the 2017 PPDG. The team is evaluating and updating BMP sizing methodology and identifying design criteria modifications to refine BMP sizes.

Project Fee: \$295,000

Involvement: April 2016 to Present

Contract No. 43A0314, District 3 and District 7 LID Pilot Design, Caltrans HQ, Sacramento, California

Project Engineer. Valerie was responsible for reviewing the basis of design, updating design reports, creating hydraulic calculations, developing project plans, and developing construction reports for pilot projects demonstrating low impact development best management practices in limited right-of-way. The pilot BMPs were installed at two project sites and are currently being monitored by Caltrans. The monitoring effort will determine the relative effectiveness of the different treatment media that were utilized in the pilot BMPs.

Project Fee: \$2,070,000

Involvement: January 2014 to July 2017

Vista Grande Drainage Basin Improvements Final Design, Daly City, California

Construction Wetlands Design Lead. Valerie is responsible for developing the basis of design and PS&E documents for constructed wetlands that will treat the urban low-flow runoff to Lake Merced for heavy metals and other urban runoff contaminants as well as treat recycled lake water for algae removal. The project incorporates vegetated wetland sections for sedimentation of water quality constituents as well as deeper water sections with fish pools for vector control. The project includes coordination of constructed wetland design with high stormflow conveyance, gross solids removal, low-flow pump design, and movement of existing sanitary sewer and electrical utilities, as well as coordination with the neighboring Olympic Club Golf Course and Lake Merced Park.

Project Fee: \$1,620,000

Involvement: April 2017 to Present

Puyallup Shaw Road Storm Improvements, City of Puyallup, Washington

Project Engineer. Valerie was part of a team that analyzed the drainage surrounding the Shaw Road outfall to the Puyallup River, in support of storm sewer design for a new development project. Valerie used GIS mapping tools to define the drainage characteristics and developed a Hydrologic Simulation Program Fortran (HSPF) model of the drainage area to simulate the stormwater runoff for the hydrologic analysis, to be incorporated in the storm sewer hydraulic design.

Project Fee: \$27,000

Involvement: November 2016 to Present

Spokane County PCB Study, Spokane County, Washington

Project Engineer/Permit Support. Valerie is part of a team that monitors toxics (PCB, PBDE, and dioxin) and TSS in the Spokane County sanitary sewer and wastewater treatment plant effluent. Valerie is responsible for the QA/QC review of sampling data, statistical analysis, and annual reporting. The team is developing statistical analysis of long-term bimonthly data and developing a source identification study to determine potential source(s) of criteria pollutants. Valerie developed and maintains a quality assurance project plan and developed NPDES Permit-required annual report.

Project Fee: \$1,759,000

Involvement: January 2014 to Present



Stephen Carter, PE

Project Engineer

EDUCATION AND EXPERIENCE

Master of Science, Environmental Engineering, 1999, University of North Carolina at Chapel Hill
Bachelor of Science, Civil Engineering, 1997, University of North Carolina at Charlotte

PROFESSIONAL REGISTRATIONS

Professional Engineer, California (No. 68816)

PROFESSIONAL SUMMARY

Steve has supported numerous federal, state, and municipal clients in the areas of regulatory support, modeling, emerging stormwater engineering practices, and watershed and infrastructure planning. He has developed innovative approaches to strategic and cost-effective planning of stormwater capture projects to meet TMDL and MS4 permit requirements, including project management of advanced modeling systems to identify cost-effective green infrastructure plans to reduce stormwater impacts, stormwater and green infrastructure design guidance, and project feasibility analysis and design. He has been instrumental in development of strategies supporting the San Mateo County/City Association of Governments (C/CAG), City and County of LA, San Diego, San Francisco Public Utilities Commission (SFPUC), San Antonio, among others, which have resulted in watershed planning approaches and project concepts, designs, and/or funding strategies that have been well-received by public works commissions, city councils, mayor offices, and/or stakeholders and supported cost-conscious project implementation. Steve currently supports the County of San Mateo Department of Public Works Flood Resilience Program as the project manager of the On-Call Engineering and Professional Services Contract for flood protection and drainage system planning and design.

PROJECT EXPERIENCE

San Mateo County Stormwater Resource Plan and Engineering Concepts. Steve served as technical lead in the development of the Stormwater Resource Plan (SRP) of San Mateo County, which positions C/CAG for Proposition I grant funding of green infrastructure projects. Paradigm first performed a comprehensive review of surface waters, aquifers, water quality impairments to those resources, NPDES permit requirements, available GIS and monitoring data, physical characteristics (e.g., land use, topography, imperviousness), and existing management practices within the watersheds. Based on this review, Paradigm developed a process for identification and prioritization of projects in each city/county jurisdiction to provide multiple benefits, including improvement of water quality, flood protection, replenishment of groundwater supplies, water reuse, increased habitat, recreation, among others. Conceptual designs were developed for opportunities from a list of highest priority projects to develop project details, cost estimates, and quantify project benefits in further detail. A total of 22 concepts were developed, consisting of four low impact development (LID) retrofits, 15 green street projects, and three regional stormwater capture projects (Holbrook-Palmer Park, Orange Memorial Park, and Twin Pines Park). Steve served as lead author of the SRP and provided presentations to the C/CAG Stormwater Committee and stakeholders.

San Mateo County Reasonable Assurance Analysis (RAA). Paradigm is currently supporting C/CAG in modeling to demonstrate reasonable assurance that green infrastructure and associated schedules for implementation will result in attainment of Municipal Regional NPDES Permit (MRP) requirements and TMDL wasteload allocations. The MRP requires development of a Green Infrastructure Plan that outlines a strategy for green infrastructure and nonstructural practices to meet mercury and PCB reductions by 2040. To support these planning efforts, Steve is leading model development based on HSPF and SUSTAIN to optimize selection of green infrastructure projects and demonstrate pollutant load reductions to meet interim and final schedule milestones. Building on efforts from the SRP, key outcomes of the modeling will include future projections of the location and amount of green infrastructure needed throughout the County and within individual municipal jurisdictions and watersheds between now and 2040.



Santa Clara Valley Stormwater Resource Plan and RAA. Steve is supporting the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP) as the lead in the identification, prioritization, conceptual design, and modeling of green infrastructure and regional stormwater capture projects to support the Santa Clara Valley Stormwater Resource Plan and RAA. The project will lead to conceptualization of multiple projects for various cities throughout Santa Clara County to support the development of Green Infrastructure Plans. The RAA will include modeling of all project opportunities to demonstrate reductions of PCBs and mercury to meet requirements of TMDLs and the MRP.

Regional Stormwater Capture Project Conceptual Design, Beverly Hills, CA. Paradigm developed a conceptual design for a large-scale regional stormwater capture project for the City of Beverly Hills. The City presented Paradigm with several sites to examine for stormwater capture potential, and Beverly Hills High School was selected as a top opportunity due to its location, proximity to a large storm drain and available open space/footprint. Steve served as the lead engineer, overseeing a team of engineers in development of the concept and QA/QC of associated calculations and cost estimates. The conceptual design consisted of drainage area analysis, sizing of project structures, cost estimates, coordination with planned redevelopment at the project site, and an analysis of water quality benefits received by each alternative. The conceptual design was presented as fact sheets with graphical illustrations that can be used in discussions to pursue funding, discuss project alternatives, and support the City's project decisions.

Regional Stormwater Capture Project Conceptual Designs, Carson, CA. Paradigm developed conceptual designs for large-scale regional stormwater capture projects for the City of Carson. Paradigm has developed three concepts for Carson – Carriage Crest Park, Carnegie Middle School, and Stevenson Park. Steve served as lead engineer, overseeing engineering analyses and cost estimates developed by the team, and providing QA/QC of all calculations. The conceptual designs were presented as fact sheets that were used in discussions to pursue funding, discuss project alternatives, and support City decision-making. Drainage area analysis and hydrologic calculations were performed to inform project sizing. Footprint configurations, diversion alternatives, and project phasing scenarios were presented to the City to assist with project decisions. The Carriage Crest Park concept served as the foundation of discussions with Caltrans for a funding partnership. Carriage Crest Park is currently under design and construction.

Concept Report for Urban Runoff Projects, Los Angeles, CA. Steve served as the technical lead for a feasibility analysis and development of concepts for stormwater projects in the Arroyo Seco watershed for the City of LA. The study included field reconnaissance, assessment of site configurations and maintenance/accessibility, a geotechnical review, evaluation of alternative green infrastructure designs, modeling and cost-optimization for determination of cost-effective designs, and cost estimates. Steve served in a lead role in the development of the technical report that summarized outcomes from the feasibility study and provided recommendations on project designs.

City of Los Angeles Stormwater and Green Infrastructure 5-Year Capital Improvement Plan. Steve served as project manager and overall technical lead in the development of a 5-year CIP for the City of LA that integrated the regional and distributed projects from across the City's five Enhanced Watershed Management Plans (EWMPs). The projects address urban runoff that occurs in wet and dry weather, both of which have an impact on water quality. The CIP included the regional projects and green streets required to address near-term compliance schedules, storm drain projects for flood control, and included scheduling for individual project planning, design, construction, and post-construction activities. Tools were developed for project prioritization considering multiple criteria and evaluations of cost-effectiveness. Steve also supported engagement of the City Administrative Officer (CAO) regarding the CIP and future funding needs, and continues his role supporting the City in strategizing implementation efforts.

As-needed Stormwater Engineering and Consulting Services, City of San Diego, CA (*experience from previous employer*) – Steve served as Program Manager over a \$12.5M as-needed contract for 5 years, supporting the City in all aspects of their stormwater program. Services ranged from stormwater and green infrastructure engineering, strategic planning, and permit negotiations. This wide spectrum of services provided Steve with key insight regarding the responsibilities and challenges of managing a major municipal stormwater program. He developed approaches and tools to inform and provide strategies for evaluating and optimizing cost-effective green infrastructure and stormwater projects, and prepare guidance (e.g., LID design manual) and procedures for green infrastructure planning and design.

Robert Dusenbury, PE

Project Engineer

Robert is a registered civil engineer with 20 years of experience in sustainable water resources planning and design. His areas of expertise include: green infrastructure (GI) and low impact development (LID) stormwater management design; rainwater and graywater reuse systems; computer modeling for surface water hydrology, hydraulics, and water quality; municipal water resources planning; and watershed management planning.

Education

MCE, Environmental Engineering,
Georgia Institute of Technology
BS, Civil and Environmental Engineering,
Georgia Institute of Technology
BA, Economics, University of Virginia

Registrations

Registered Professional Engineer (Civil)
Qualified SWPPP Developer and Practitioner

Selected Project Experience

- **Yosemite Creek Daylighting and Water Capture, San Francisco Public Utilities Commission, CA** – Lead design engineer on a project to daylight a half mile of the historical Yosemite Creek from its headwaters in McLaren Park, the first creek daylighting project in San Francisco. Project goals are to relieve localized flooding, meet local irrigation demand through water capture and reuse, increase biodiversity, enhance park and community amenities, and create educational and recreational opportunities.
- **Baker Beach Green Infrastructure Project, San Francisco Public Utilities Commission, CA** – Lead design engineer for green infrastructure demonstration project in San Francisco. GI elements included permeable pavement, bioretention, and infiltration gallery retrofits in a residential and park setting to alleviate local flooding, reduce runoff to the combined sewer, and limit combined sewage discharges to Baker Beach.
- **Green Infrastructure Maintenance Manual, San Francisco Public Utilities Commission, CA** – Technical lead supporting development of the City of San Francisco Green Infrastructure Maintenance Model, an interactive spreadsheet tool that produces planning-level labor and cost estimates for GI capital projects, and the Green Infrastructure Maintenance Field Guide, which provides direction to field crews for hands-on maintenance activities of City GI projects.
- **Brisbane City Hall LID Retrofit, City of Brisbane, CA** – Project manager and lead designer for a pair of large bioretention facilities, a rain garden, and vegetated swale to capture and treat runoff from the newly renovated Brisbane City Hall and parking lot. The green parking lot retrofit was a demonstration project funded by a grant from the San Mateo Countywide Water Pollution Prevention Program.
- **CASQA Stormwater BMP Handbook, Statewide, CA** – Lotus was the technical lead for updating the BMP sizing and design criteria section of the CASQA New and Redevelopment BMP Handbook. Worked with Tetra Tech to review and edit all sections of the Handbook as part of the 2017 update.
- **Caltrans Linear Filtration BMPs Design, Sacramento, CA** – Design engineer for two linear BMP prototypes as part of a Caltrans pilot project. Designed prototypes for linear versions of both a modified Delaware sand filter and a linear filtration trench with a customized footprint that fit into available right-of-way in order to achieve cost-effective, high-quality water quality treatment with minimum impact and maintenance requirements.
- **Synergies for Compliance with the Non-potable Ordinance (NPO) and Stormwater Management Ordinance (SMO) guidance manual, San Francisco, CA** – Led the modeling study and technical analysis for this effort to provide guidance to designers and developers to reconcile the natural tension between the goals of rainfall capture for stormwater management versus water reuse systems in a Mediterranean climate. This guidebook provides guidance and sample design synergies that can lead to more efficient means of compliance with the both the NPO and the SMO.
- **Rainwater Harvesting Systems, San Francisco, Marin, Sonoma, Napa, San Mateo, Santa Clara, Contra Costa, and Santa Cruz Counties, CA** – Project manager and lead designer on multiple rainwater harvesting systems for indoor and outdoor applications, including the first system in San Francisco permitted for laundry use. In each case, systems were customized to site conditions and client goals. All systems comprised collection, storage, treatment, and redistribution subsystems in conformance to local and state regulations governing rainwater reuse. Storage included both aboveground and underground cisterns, and reuse applications included irrigation, cooling and heating, dilution of groundwater withdrawals, toilet flushing, and laundry.

- **San Mateo County Sustainable Green Streets and Parking Lots Design Guidebook, San Mateo, CA** – Project manager and co-author of the stormwater design guidebook, which won the Outstanding Planning Implementation Award for Innovation in Green Community Planning, presented by the California Chapter of the American Planning Association. Conducted educational workshops in San Mateo and Santa Clara counties pursuant to release of the guidebook.
- **Stream Restoration, Marin Country Day School, Corte Madera, CA** – Designed a channel for stream restoration running along the western boundary of a K–8 school. Created a Hydrologic Modeling System (HEC-HMS) model based on regional elevation, soils, land use, and vegetation data. Using River Analysis System (HEC-RAS) software, designed a channel profile and cross sections to ensure adequate hydraulic capacity. Collaborated with the landscape architect and biologist to stabilize stream banks and provide an appropriate riparian habitat. The permit process involved the City of Corte Madera, Regional Water Board, U.S. Fish & Game, and U.S. Army Corps of Engineers.
- **East Bay Children’s Center Stormwater Control Plan, Palo Alto, CA** – Designed the stormwater management system and wrote the Stormwater Control Plan in full compliance with regional NPDES C.3 stormwater requirements. The system comprises interconnected bioretention facilities, including bioswales that feed rain gardens, to provide water quality treatment and peak flow attenuation in accordance with prescriptive facility sizing requirements.
- **San Antonio Road Green Street Project, City of Los Altos Planning Department, Los Altos, CA** – Project manager and lead designer in charge of grading, drainage, utilities, demolition, and erosion control plans for an 800-foot four-lane local roadway and adjacent retail parking lot in downtown Los Altos. The project replaces over 3,000 square feet of pavement with landscape-based stormwater management LID rain gardens, planters, and bioswales. Managed the project design process from the planning stages through the construction documents stage.
- **R.H. Phillips Winery Floodplain Study, Constellation Wines U.S., Esparto, CA** – Performed floodplain study for a winery using a Hydrologic Modeling System (HEC-HMS) model and River Analysis System (HEC-RAS) to mitigate floodplain hazards related to winery expansion. Coordinated Letter of Map Amendment submittal to FEMA through the Yolo County Floodplain Administrator.
- **Green Infrastructure Monitoring Program, San Francisco Public Utilities Commission, CA** – Technical lead since 2012 for the monitoring of and reporting on 12 green infrastructure projects monitored by the City for purposes of establishing measured baseline performance estimates for different green infrastructure technologies under variable site conditions. Responsibilities include selecting monitoring locations, most appropriate equipment types and configurations, QA/QC protocols, data processing and analysis, helping create standard report template, and creating a 5-year monitoring plan.
- **Urban Watershed Assessments, San Francisco, CA** – Lead technical coordinator for conducting urban watershed assessment for San Francisco’s Bayside basin. Responsibilities included performing a basin-wide flood hazard risk analysis, developing unit costs for different types of green infrastructure, creating stormwater reduction estimates for areas managed by different types of green infrastructure using SWMM and Infoworks, creating a city-wide water balance, and helping to develop a project prioritization method.

Recent Articles and Presentations

“Monitoring and Maintenance Programs Help Protect Infrastructure”, Environmental Science & Engineering, August 2017.

“Growing Green Infrastructure in San Francisco”, Water Environment & Technology (WE&T), December 2016.

“It’s in the ground, now what?: Post-construction monitoring & maintenance of green infrastructure”, Speaker at WEFTEC annual conference, New Orleans, LA, September 2016.



Shauna Dunton, PE

Project Engineer

Shauna Dunton brings 16 years of experience leading design and project management for high-profile green infrastructure (GI) projects in institutional, commercial, residential, and recreational settings in the Bay Area. Her specialties include green building site development, integrated stormwater solutions, GI streetscape design, and non-potable water design. Ms. Dunton has recently served as the project manager on four large-scale green infrastructure projects for the City of San Francisco, and initiated their new Green Infrastructure Construction Training Program.

Education
BS, Civil & Environmental Engineering,
California Polytechnic State University,
San Luis Obispo

Registrations
Registered Professional Engineer (Civil),
California

Selected Project Experience

- **SFPUC Early Implementation Projects, San Francisco, CA** – Project Manager for planning and design on pilot green infrastructure projects in San Francisco to meet performance metrics and community expectations. Project types included green streets, large rain gardens on public parcels, and creek daylighting with water reuse. Scope included project siting, interagency coordination, community outreach, and performance-based design of GI facilities.
- **Mission Bay Bayfront Park P22** – Working with the Mission Bay Development Group, Port of San Francisco, and inter-disciplinary consultant team to design the Bayfront park adjacent to the future Golden State Warriors Arena. The park will provide important linkages along the shoreline and into the Mission Bay neighborhood. Leading the overall water management plan, grading design, and development stormwater permit documents.
- **Hunters Point Shipyard Northside Park, San Francisco, CA** – As the civil engineer on this new 12-acre waterfront park, Lotus is developing drainage, utilities, and stormwater control plans from concept to construction document phase. The park design includes various integrative strategies to treat, reuse, and/or detain stormwater from 23 acres of offsite development in addition to onsite runoff.
- **California College of the Arts, San Francisco, CA** – Leading all civil engineering design services for the new academic building and associated public realm improvements. Spearheading the development of a district-scale non-potable water system that optimizes resource management from the diverse uses on campus by meeting 100% of the non-potable demands while efficiently achieving compliance with the San Francisco Stormwater Management Ordinance.
- **598 Brannan Street, San Francisco, CA** – Overseeing the stormwater management and water reuse system designs for a multi-building, multi-phase project that includes an approximate 1-acre public park. Extensive water reuse system analysis was performed to determine the optimal system that complies with San Francisco's Stormwater Management Ordinance, Non-Potable Water Ordinance, and Recycled Water Ordinance.
- **UC Berkeley Lower Sproul Plaza Redevelopment Project, Berkeley, CA** – Spearheaded the planning and design of the first rainwater for indoor reuse project on the UC Berkeley campus. The project captures runoff from an above-ground plaza and surrounding rooftops, treats it, and distributes to the toilets within the new Student Community Center. Overflow is directed into a large bioretention planter which treats the water and helps extend the nearby creek ecology into the urban site.
- **The Packard Foundation Headquarters Site Design, Los Altos, CA** – Led site design of the LEED Platinum building in downtown Los Altos, which included a comprehensive stormwater management plan, rainwater harvesting system and the green street retrofit of the adjacent city street. The project reduced the site imperviousness from 97% to 35% and incorporated flow-through bioretention planters along the city street. The site's stormwater design was awarded by SCVURPPP in 2013.
- **San Francisco Green Infrastructure Construction Training and Guidebook** – Leading the technical development and implementation of a contractor training program for the City as part of San Francisco's Sewer System Improvement Program to train and certify contractors as qualified GI construction specialists.

- **Green Infrastructure Typical Details and Specifications, San Francisco, CA** – Developed the green infrastructure typical plans, details, and specifications for the City of San Francisco, in collaboration with City staff and design team from Seattle. The BMP standards developed—including bioretention, permeable pavement, and infiltration systems—assist public and private sector design teams in developing construction level green infrastructure designs that meet regulatory standards.
- **BASMAA Urban Greening Bay Area** – Developed framework and led implementation of a design charrette to establish typical details for streetscape GI projects in the Bay Area. The charrette brought together Bay Area GI experts from across the public and private sectors. Based on charrette results and stakeholder feedback, developed final GI concept designs, a detailed list of lessons learned, GI guidance needs, and recommended next steps.
- **Boeddeker Park Redevelopment, San Francisco, CA** – Worked with the Trust for Public Land and SF Rec & Park on redevelopment of this city park within the Tenderloin District. Led the design and site integration of the green infrastructure elements such as permeable pavement, bioretention planters, and an underground infiltration gallery.
- **Boalt Hall UC Berkeley School of Law, Berkeley, CA** – Led the site design of the redevelopment project on the UC Berkeley campus, including design of a combined rainwater harvesting and retention system that helped alleviate downstream capacity issues while also providing non-potable water for irrigation.
- **The San Pedro Waterfront – Town Square and Ports O’ Call Promenade, Los Angeles, CA** – Collaborating with the Port of Los Angeles and a large consultant team, Lotus is developing integrative LID stormwater designs for the redevelopment of this important waterfront area. The scope includes a 30-foot wide, 0.7-mile-long shoreline promenade and a 3.5-acre public square.
- **Religious Retreat Center, Sonoma County, CA** – Developed a comprehensive water management plan for the 120-acre religious retreat center that included the storage, treatment and distribution of well water, surface water, and recycled water. Managed the design, entitlements, and construction of 20-acre-foot reservoir as part of the new private community water system.
- **Spirit Rock Meditation Center, Marin County, CA** – Managed the design and execution of site development plans and technical reports required for the planning permit obtainment for a 200-acre religious retreat center in Marin County. The sustainable development plan included a stormwater management design that maintained existing drainage patterns and quantities, conversion of impervious pavements to permeable pavement, rain gardens, and LID grading strategies.
- **Redberry Ridge Residence, Portola Valley, CA** – Led the design of a Living Building Challenge Net Zero Water residential project. Analyzed available onsite water sources and demands in order to develop a sophisticated water system that utilizes treated rainwater and graywater to meet indoor demands as well as irrigation needs. All onsite infrastructure was carefully designed to avoid the use of any “Red List” materials as defined by the Living Building Challenge.
- **UC Santa Barbara Campus Plan, Goleta, CA** – Collaborated with a multi-disciplinary team on the development of a Net Zero Water and sustainable stormwater management plan for a 10-acre site containing student dormitories and support services. The conceptual water plan evaluated the feasibility and water savings benefits of various non-potable water systems.

Presentations

“It’s Not Easy Being Green: San Francisco’s Ambitious Green Infrastructure Program”, International Low Impact Development Conference, August 2016.

“Green Infrastructure Construction Training”, Presenter to San Francisco Public Works and multiple groups of contractors, 2015 - 2016.

“Sustainable Water Systems”, Guest lecturer at UC Berkeley Sustainability Course, Berkeley, CA, March 2013.

“Green Streets Case Study”, Santa Clara Valley Urban Runoff Pollution Prevention Program Annual C.3 Workshop, June 2011.

“Sustainable Site Development”, Guest lecturer at UC Berkeley Extension, San Francisco, CA, 2008.





Attachment B

Full Project Descriptions

Immediately following this cover sheet on the subsequent pages are 1-page descriptions for the projects listed in the SOQ.

Caltrans LID Pilot Projects

Headquarters Division of Environmental Analysis (HQ-DEA)

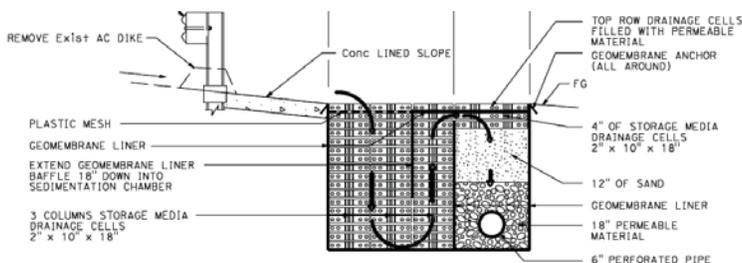


Project Description

BC designed and installed two linear filtration system (LFS) Pilot Studies to evaluate different methods to treat runoff from Caltrans roadways where the right of way is limited to narrow linear areas. In highly urban roadways that are space-constrained, Caltrans wanted to develop LFS concept designs based on the principles of low impact development (LID). In 2009, Caltrans initiated the Linear Filtration Alternatives Pilot Study to investigate the effectiveness and feasibility of using LFS to treat runoff from Caltrans highways. Complete designs were developed for the installation of the linear filtration systems in both Sacramento (Caltrans District 3) and Los Angeles Counties (Caltrans District 7), known as the D-3 and D-7 sites. Once the new NPDES permit was issued in 2012, Caltrans made the decision to continue the pilot study as intended by evaluating the performance of the following four concept pilot BMPs: Linear Filtration Trench, Media Filter Drain, Bioretention Trench, and Linear Sand Filter. During Phase I, the Team completed a study on the BMP design that included updating existing plans, specifications, design reports, traffic handling plans, soils management (aerially deposited lead) plan, and coordinating the design and planning documents. Under Phase II, the Team completed the design drawings and installed the LID Pilot systems at the D-3 and D-7 sites.

A geotechnical evaluation and design of materials to provide a traffic rated covering of the devices, so that placement in and near the clear recovery zone could be allowed. BC hired and managed a small construction firm to perform the installation of the LID BMPs at both D-3 and D-7 sites, which included infrastructure to assist with the eventual monitor of the BMPs. In addition, District 7 staff requested changes in traffic systems and BC along with Caltrans (Tom Rutsch) addressed the request via a project change order.

Future monitoring will determine the relative effectiveness of the different treatment media that were utilized in the Pilots. The deliverable for each of the D-3 and D-7 sites included Final As-Built Drawings, Construction Reports, and Basis of Design Reports prepared in accordance with the BMP Pilot Study Guidance Manual.



Cross section detail of the Linear Filtration Trench.

BC's Role in Project

Prime

Project Value

Total: \$2.1 million

Project Dates

Design and Construction:
June 2007 - June 2012

Reference

Bala Nanjundiah, Project Manager

HQ-DEA, Stormwater

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LFD installation treats stormwater within tight right-of-way limit. This photo shows project just weeks before completion.

Yosemite Creek Daylighting and Water Capture

San Francisco Public Utilities Commission – San Francisco, CA

Yosemite Creek Daylighting is one of eight early Implementation Projects being constructed in San Francisco’s urban watersheds as part of the San Francisco Public Utility Commission’s (SFPUC) Sewer System Improvement Program. The project, currently in the design phase, is in McLaren Park and along adjacent right-of-way. It is the first phase of a long-term plan to resurrect the complete length of historical Yosemite Creek connecting the original headwaters all the way to the Bay.

This project seeks to capture and infiltrate stormwater runoff to reduce localized flooding and flows entering the sewer, store, and reuse parkland runoff to meet local irrigation demand, increase biodiversity, enhance existing park amenities and the community, and facilitate educational opportunities for park visitors, residents, and students. Project components include 2,100 linear feet of daylighted creek channel, 3,600 square feet of rain gardens, a 700,000-gallon underground cistern overlain by a new soccer field with an integrated ultra-high-efficiency irrigation system, and a public gathering and educational plaza. This project accomplishes SFPUC Community Benefits Goals by serving the surrounding socio-economically disadvantaged community.

Project Details

Client:
San Francisco Public Utilities Commission

Scope:
Creek Daylighting and Green Stormwater Infrastructure Design

Area:
106 Acres managed,
0.4 Mile Channel

Budget:
\$7.5M for Construction

Status: In Design

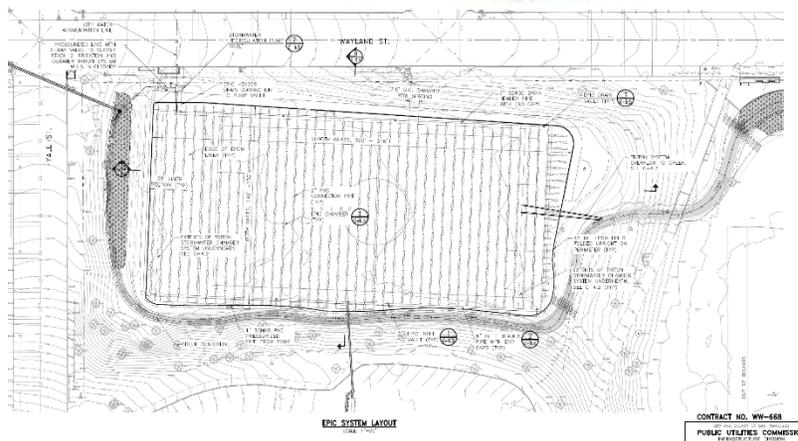
References:
SFPUC
Raphael Garcia, 415-551-4872
Saed Toloui, 415-551-4872

SF Rec & Park
Jacob Gilchrist, 415-581-2561

SFDPW
Lesley Wong, 415- 554-8252



Image credit: SSIP PMC



Echo Park Lake Rehabilitation

Bureau of Engineering
Los Angeles, California



Project Description

Proposition O (Prop O) authorized the issuance of \$500 million in bonds to finance the design and construction of facilities that provide water quality improvements and reduce pollutant loads to impaired waters of the City of Los Angeles (City). Echo Park Lake, located in the Silverado/Echo Park neighborhood of the City, was identified in the 2006 California 303(d) list as being impaired by algae, ammonia, copper, eutrophic (low oxygen) conditions, lead, odor, PCBs, pH, and trash. In compliance with Prop O objectives and total maximum daily load (TMDL) requirements, Echo Park Lake was selected for rehabilitation to improve water quality in both the lake and the Los Angeles River Watershed. In addition, the City required characterization of lake-bed sediments, quantification of contaminated soils; design of in-lake improvements, surrounding parkland runoff treatment measures; and improvements to vegetation, habitat, and parklands through a pre-design, design, and construction support process.

The lake, an historic urban park feature north of downtown Los Angeles, is also a storm water retention basin for controlling moderate storm flows containing significant urban runoff. The project team developed parkland-compatible treatment controls to remove pollutants from influent storm water. The treatment controls include hydrodynamic separators, constructed wetlands, porous paving, and parkland grass swales. In addition, smart irrigation measures drawing upon information from individual weather stations to automatically schedule irrigation based on individual landscape needs and local weather conditions was implemented.

The project will also put lake improvements in place to limit eutrophication and dry season leakage from the lake.

Benefits

- Treats urban stormwater that is mostly from City streets.
- Satisfies multiple stakeholders within the City by implementing solutions that integrated with Park uses.
- Improves compliance with multiple TMDL requirements of the lake and Los Angeles River.

Awards

The Project received multiple awards, including:

- 2013 Outstanding Government Civil Engineering Project, American Society of Civil Engineers, Los Angeles Section.
- 2013 California Best Projects (Southern California) – Water/Environment, Engineering News Record, California.
- 2013 BEST Project Award - Drainage, Water and Wastewater, American Public Works Association, Southern California Chapter.

BC's Role in Project

Design Sub

Project Value

Total: \$50 million

BC Fees: \$1.2 million

Project Dates

Design and Construction:

June 2007 - June 2012

Reference

Julie Allen, Construction Manager

Los Angeles Bureau of Engineering

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Urban park is redesigned to accomplish multi-beneficial efforts for stormwater treatment, irrigation reuse, habitat, and public recreation.

Penmar Water Quality Improvement Project

Los Angeles, California



Project Description

The Penmar Water Quality Improvement Project is a multi-agency sponsored project implemented by the City of Los Angeles. The goal is to minimize discharges of polluted storm water into Santa Monica Bay and address the requirements of the Santa Monica Bay Beaches Bacteria TMDL. The project consists of two-phases.

BC provided design and construction support services for Phase 1, which consisted of a storm drain low-flow diversion, pump station, and a 2.7-MG underground storage reservoir. Flows from the reservoir are being pumped to the sanitary sewer system for treatment, until Phase 2 is implemented, which will consist of stormwater reuse at an adjacent golf course. The project is being developed as a Prop O project, which was passed by the voters of the City of Los Angeles to develop and implement projects to protect public health through stormwater treatment measures. This project required extensive coordination with several City departments, including Engineering, Sanitation, and Recreation and Parks; and the City of Santa Monica, which is tributary to the location. The BC team:

- Developed a dry-weather and wet-weather stormwater diversion system in Los Angeles and Santa Monica.
- Analyzed storm water treatment BMP locations in an urban setting.
- Developed BMPs to address both dry-weather and wet- weather for the Santa Monica Bay Beaches bacteria TMDL.
- Evaluated the beneficial reuse alternatives of urban water runoff and storm flows, and found a feasible reuse option at the adjacent golf course.
- Designed facilities to accommodate varying storm flow conditions.
- Achieved an aggressive design and construction schedule.

Benefits

- Demonstrates that water reuse can be an effective strategy for managing stormwater to be fully compliant with the applicable TMDLs, as well as approach “zero discharge” for that portion of the stormwater that is reused.
- Prevents approximately three-million gallons of untreated stormwater from polluting the Santa Monica Bay beaches.
- Improves tourism economy by reducing beach closure risks



BC's innovative approach to divert wet-weather flows into an underground storage reservoir provided future reuse opportunities for the City without giving up park space for the reservoir.

BC's Role in Project

Prime

Project Value

Total: \$14 million

BC Fees: \$1.9 million

Project Dates

November 2007 –
October, 2012 Design

December 2012 –
July 2013 Construction
Support

Reference

Andy Flores, Project
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Engineering

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San Mateo County Stormwater Resource Plan and Green Infrastructure Project Concepts

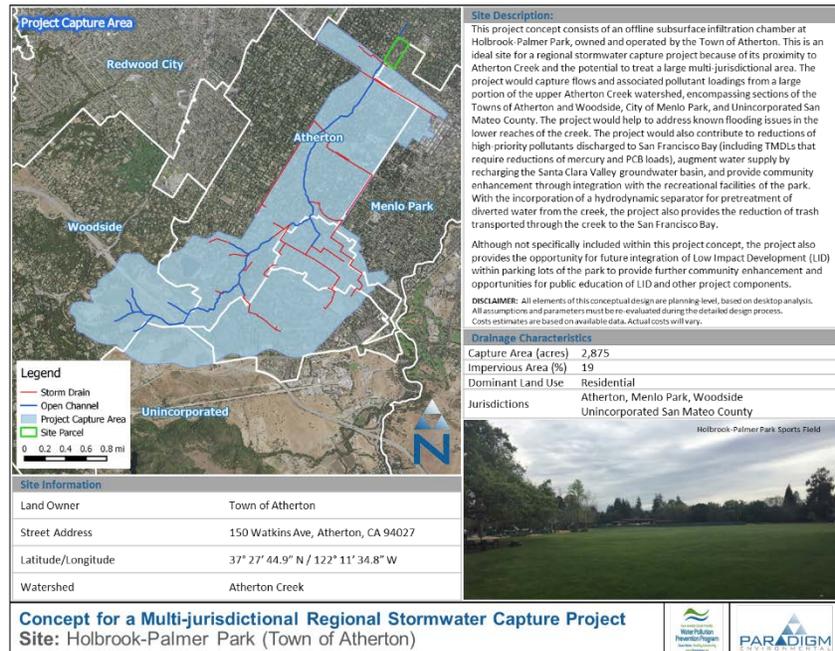
Project Description:

Paradigm is supporting the City/County Association of Governments (C/CAG) of San Mateo County (County) in the preparation of a Countywide Stormwater Resource Plan (SRP). The SRP will satisfy SB 985, State Water Resources Control Board (State Board) guidelines for SRPs, and enable C/CAG to responsibly manage water resources within the County.

Paradigm first performed a comprehensive review of receiving waters, aquifers, water quality impairments to Beneficial Uses of those resources, available GIS and monitoring data, the physical characteristics of the watersheds (e.g., land use, topography, imperviousness), and existing management practices within those watersheds. Based on this review, Paradigm developed a process for identification and prioritization of opportunities for green streets, LID, and regional stormwater capture projects in each city and watershed to provide multiple benefits. Those included improvement of water quality, replenishment groundwater supplies, water reuse, flood protection, increased habitat, recreation, and modification of instream flows.

This process led to the identification of high-priority projects throughout the County, which were simulated in a hydrologic model to provide quantification of benefits associated with stormwater capture and groundwater recharge.

Paradigm also developed conceptual engineering plans for twenty-two high-priority, multi-benefit projects in the County, consisting of four LID retrofit projects, fifteen green street projects, and three regional stormwater capture projects. Paradigm supported preparation of Prop 1 grant applications for three of the green street projects, which were submitted to State Board this past July and were recently approved for funding by State Water Resources Control Board. The Town of Atherton and City of South San Francisco used the regional project concepts to engage Caltrans on funding partnerships, resulting in Caltrans funding project design and construction costs.



Dates of Service: January 2016 – February 2017

Contracted Costs: \$180,000

Client: Matt Fabry, San Mateo Countywide Water Pollution Prevention Program, 555 County Ctr, 5th Fl, Redwood City, CA 94063; phone: 650-599-1419; email: mfabry@smcgov.org



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