

FINAL REPORT FOR THE
MISSION CREEK BACTERIAL REDUCTION
CLEAN BEACHES INITIATIVE PROJECT
(CBI #208)

This Project received Clean Beaches Initiative funding through Proposition 40, per contract agreement Exhibit A (3.2) and Exhibit D (6).

State Water Resources Control Board
Agreement Number: 02-242-550-1

Prepared by:
City of Santa Barbara
Creeks Restoration/Water Quality Improvement Division
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Introduction

Statement of Purpose

Based on extensive water quality monitoring, indicator bacteria levels are frequently above recreational contact standards in Mission Creek, which discharges to East Beach at Mission Creek, a popular beach area (Figure 1). Sampling indicates that high indicator bacteria levels are the main cause of impaired stream water quality and local beach warnings, which are especially problematic in summer months due to high rates of recreation by residents and tourists. One of the largest inputs to Mission Creek is the runoff from the Westside Storm Drain that discharges into Old Mission Creek.

East Beach at Mission Creek is located immediately east of Santa Barbara's Stearns Wharf. Annually, about 500,000 people visit this beach, and it is especially popular with tourists, as it fronts the ocean-view hotels in Santa Barbara. East Beach is used by swimmers and small craft boaters. From 2001 to 2006, East Beach at Mission Creek was posted 7-28% of beach days during AB411 dates (April 1-October 31) with signs warning beachgoers of the presence of bacterial pollution (Table 1).

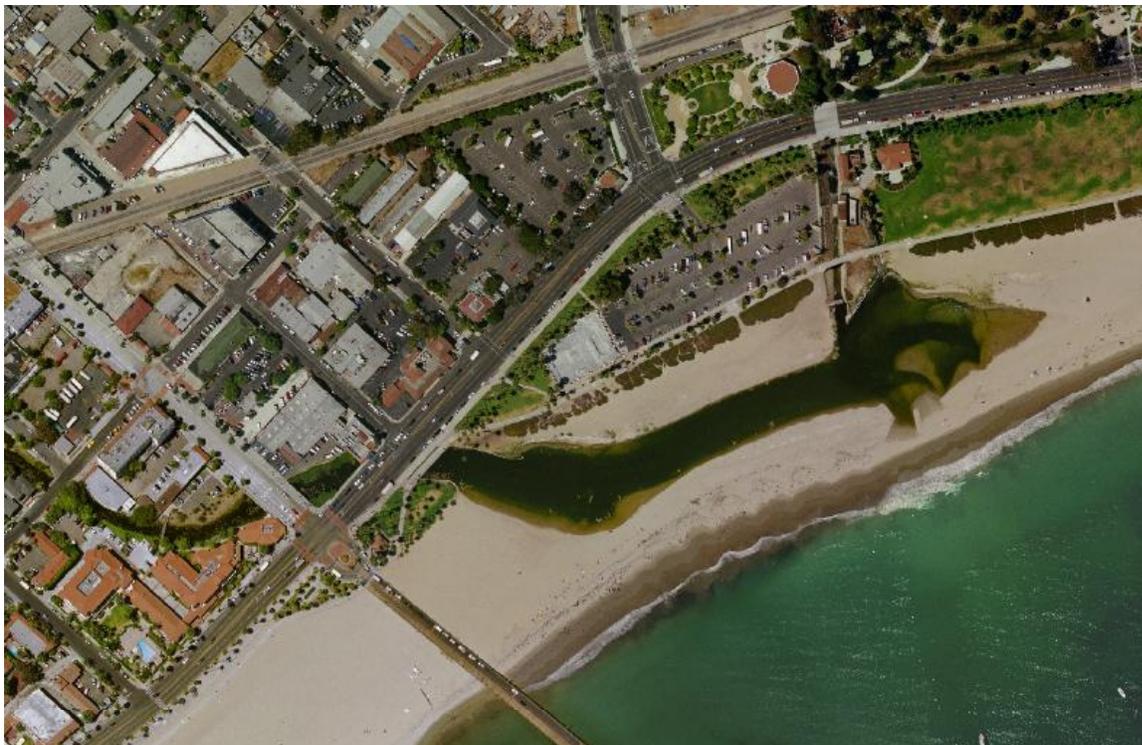


Figure 1. Mission Creek and Mission Lagoon (joined with Laguna Channel) at East Beach.

The purpose of the Westside Summer Urban Runoff Facility (SURF) Project is to divert water in the Westside Storm Drain during low flow conditions to an active treatment facility that uses ultraviolet (UV) light to eliminate microorganisms, including pathogenic bacteria and viruses. Operation of the SURF will improve water quality in Old Mission Creek and contribute to improved water quality in the coastal ocean at East Beach. This Project was identified for

Phase I implementation in a study of pollution hotspots and treatment options that was completed for the Creeks Division, and funded by the Proposition 13 Clean Beaches Initiative Grant Program. Phase I Projects were determined to be high priority, easily implemented, and highly effective in addressing program goals.

Similar to other coastal communities, the City of Santa Barbara is committed to improving the quality of water in our creeks and at our beaches for public health and safety, recreational access, and restoration of riparian and aquatic habitat. The reduction of bacterial pollution will protect human health and expand recreational uses of Santa Barbara beaches.

**Table 1. AB411 Beach Data for East Beach at Mission Creek
(April 1-October 31)**

Year	Warnings	Beach Days Posted	Beach Mile Days Posted	% of Days Posted	Heal the Bay Grade (AB411 dates)
2001	6	16	0.96	7	F
2002	7	26	1.56	12	C
2003	1	2	0.12	1	A
2004	6	15	0.9	7	B
2005	13	42	2.52	20	D
2006	16	60	3.6	28	C

Recognizing the problem of water quality and its impact on human health and tourism, City of Santa Barbara residents passed an initiative that established a 2% increase in the hotel bed tax to fund the new Creeks Restoration/Water Quality Improvement Division of the City's Parks and Recreation Department. The Division was founded in 2001 and began work in earnest trying to understand the pollution problems and to identify and implement solutions.

Because Mission Creek is a relatively "natural" creek running through the foothills and urban corridor of Santa Barbara before reaching the estuaries and beach outlets, it is not suitable at this time for "end-of-pipe" diversion or discharge. Mission Lagoon and Creek provide habitat for the federally endangered tidewater goby and Southern steelhead.

Scope of Project

The Westside SURF Project is located underground and within the boundary of the City-owned Bohnett Park. A diversion structure was built into the existing 84" diameter storm drain. Dry-weather flows up to 150 gallons per minute (approximately 0.4 cubic feet per second) are diverted from the drain to a pump station that then passes the water to a vault housing the treatment facility. Water moves through solid-media filters, in order to remove particulates, and then passes under ultraviolet (UV) light bulbs. The residence time of the water under the bulbs and the intensity of the UV light have been designed to kill bacteria and inactivate viruses in the water. The treated water is then discharged back to the storm drain and flows into Old Mission Creek in Bohnett Park. A valve allows the facility to be closed during the rainy season.

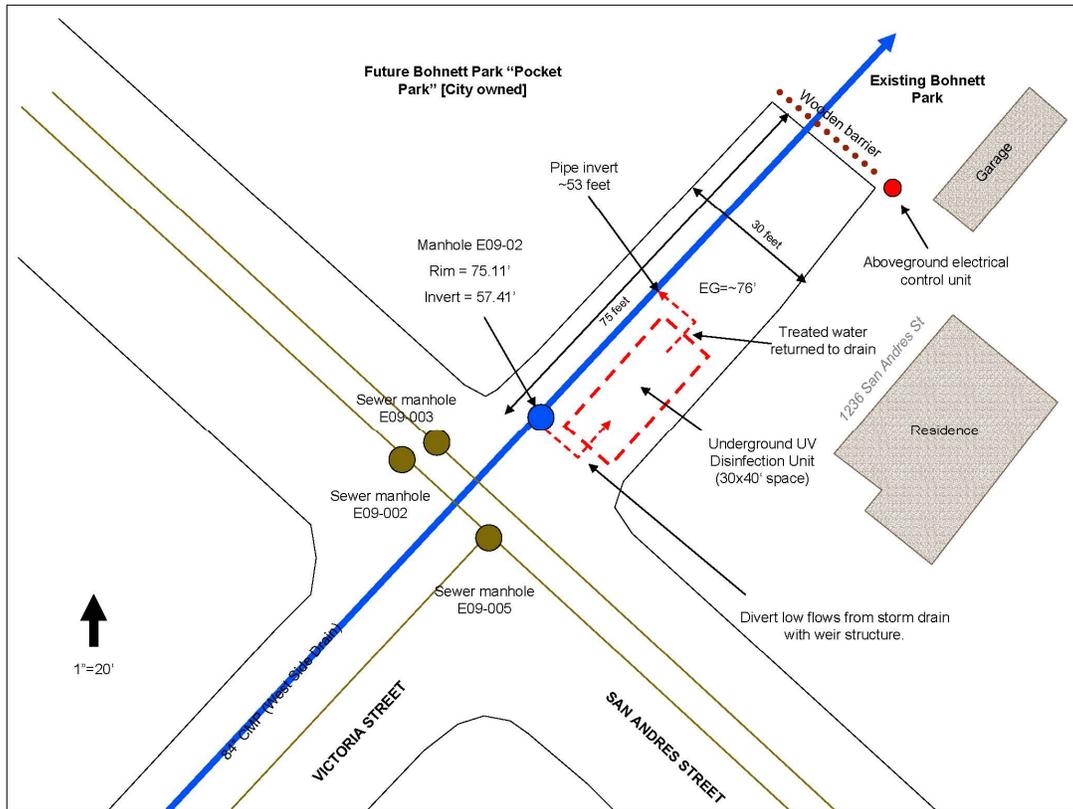


Figure 2. Map showing drainage area of Westside SURF Project.

Approach and Techniques

Design and Construct the SURF Project

The approach for the Westside SURF Project was to hire a consultant to prepare final design plans and specifications for the Westside SURF Project and to hire a construction firm to implement the Project. The Project was identified as being high priority due to the severity of pollution and feasibility of installation in the feasibility study, when a concept design was completed (Figure 3)



Disinfection Unit at West Side Drain

Figure 3. Concept design for Westside SURF Project.

The scope of work included:

1. Project design: develop detailed construction plans and specifications.
 - a. Develop sixty-five (65), ninety (90), and one-hundred (100) percent level construction plans and specifications for City review.
 - b. Prepare contract documents (construction plans, specifications, and final cost estimate) for the Project.
2. Implementation of the Project.
 - a. Construct UV treatment facility Project according to approved plans and specifications.
 - b. Conduct one year of post construction monitoring to evaluate Project effectiveness, in accordance with the approved monitoring and reporting plan.

Task Deliverables Submitted Previously

The task deliverables submitted previously are shown in Table 2.

Table 2. Submittals and Completion Dates

Submittals	Task Due Date	Date Completed
1.1 QAPP	8/1/05	12/20/06
1.2 Monitoring Plan	8/1/05	1/20/07
2.1.2. 100% Construction Plans and Specs	4/1/06	12/20/06
2.1.3. As-Advertised Contract Documents	4/14/06	12/20/06
2.1.4 Copy of Bid Summary and Proof of Advertising	6/15/06	12/20/06
2.2.2 Photo Documentation of Construction	10/15/06	12/20/06 1/20/07 5/30/07
3.1 Annual Progress Summary	7/1/06 7/1/07	12/20/06 8/2/07
3.2 Draft Final Project Report	11/1/07	11/30/07
3.3 Final Project Report	11/15/07	2/10/08
6.1 Progress Reports by the twentieth (20 th) of the month following the end of the calendar quarter	Quarterly	12/20/06 1/20/07 5/30/07 8/2/07 10/31/07 2/10/08
6.2 Expenditure/Invoice Projections	Quarterly	12/20/06 1/20/07 5/30/07 8/2/07 10/31/07
6.3 Grant Summary Form	Day 90	12/20/06
6.4 Natural Resource Projects Inventory Project survey form	Before Final Invoice	2/10/08
#6. Copy of final CEQA/NEPA documentation	9/1/05	12/29/03
#5. Monitoring and Reporting Plan	12/1/05	1/20/07
#6. Final Project Report	11/15/07	2/10/08

Project Budget

The original project budget included \$900,000 in grant funds and no requirement for a match from the City, as shown in the table below. The final project cost was \$1,031,164, of which \$899,262 was reimbursed by the Clean Beaches Initiative and \$131,902 was provided by the City of Santa Barbara.

Budget Item	Initial Budget CBI Grant (No Match Required)	Final Project Cost Reimbursed by CBI Grant	Final Project Cost City Match	Final Project Cost
Personnel Services	\$107,587	\$107,587	\$34,524	\$142,111
Professional/Consultant Services	\$165,413	\$152,559	\$0	\$153,296
Construction	\$627,000	\$639,117	\$97,378	\$736,495
TOTALS	\$900,000	\$899,263	\$131,902	\$1,031,165

Project Results

The Westside SURF Project was designed and installed underground successfully. Project design was carried out by URS Corporation, along with input from the City's Engineering Services Division of the Public Works Department and Project coordination by the City's Creeks Division. The Project was constructed by Specialty Construction Incorporated (SCI), with construction management services provided by URS and the City's Engineering Services Division. A separate, sole-source contract for electrical facilities was completed by Pacific Rim Automation. The SURF Project was completed in December 2006 and began operation on March 27, 2007.

Project Design

Due to the complexity of this Project, the Westside SURF Project design faced several challenges and went through several revisions prior to finalization. First, several geographic features, including private property boundaries, future park requirements, flood control access, utility lines, and pedestrian access constrained the design of the underground facility. Second, the trash-removal device (CDS unit), which was originally included with the Project, resulted in hydraulic impacts to the storm drain capacity that concerned the County Flood Control District. Last, escalating construction costs during the design process led to the cost of the CDS unit being too prohibitive to include in the Project.

The SURF Project is located underground in City-owned property that will be upgraded as the Bohnett Pocket Park in 2008 (Figure 4). Project design was constrained by requirements for pedestrian access in the park and by aesthetic concerns for the park design. In addition, the property was bounded by residential buildings that had encroachments that permitted owner access over City property (ownership and encroachment rights have since changed hands). Further, the Santa Barbara County Flood Control District (SBCFCD) requires truck access over

the park area, limiting the location of certain Project elements. Utility lines, including a large water main, also presented design constraints.

Early in design, the consultant produced a memo detailing the hydraulic impact to the storm drain from putting a diversion weir to move storm water from the storm drain to the CDS unit in order to remove trash and silt during rain events. Review by SBCFCD led to several months of negotiations to obtain approval for the weir and the CDS unit. After lengthy analysis, modeling, and design revision, a solution was identified that involved a compromise between trash removal performance and hydraulic grade line impact. The compromise reduced the amount of rainfall that could be treated by the CDS unit.

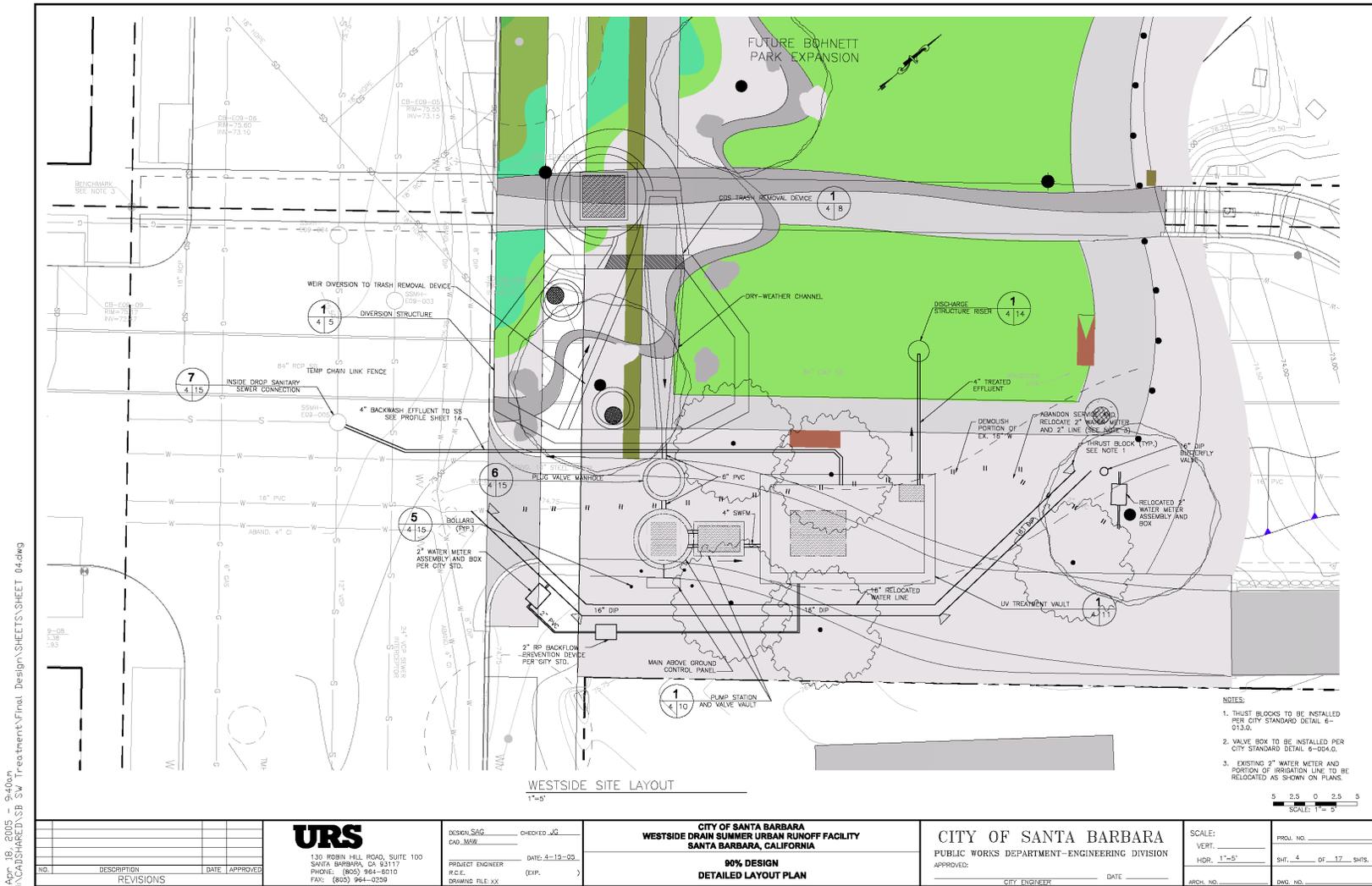


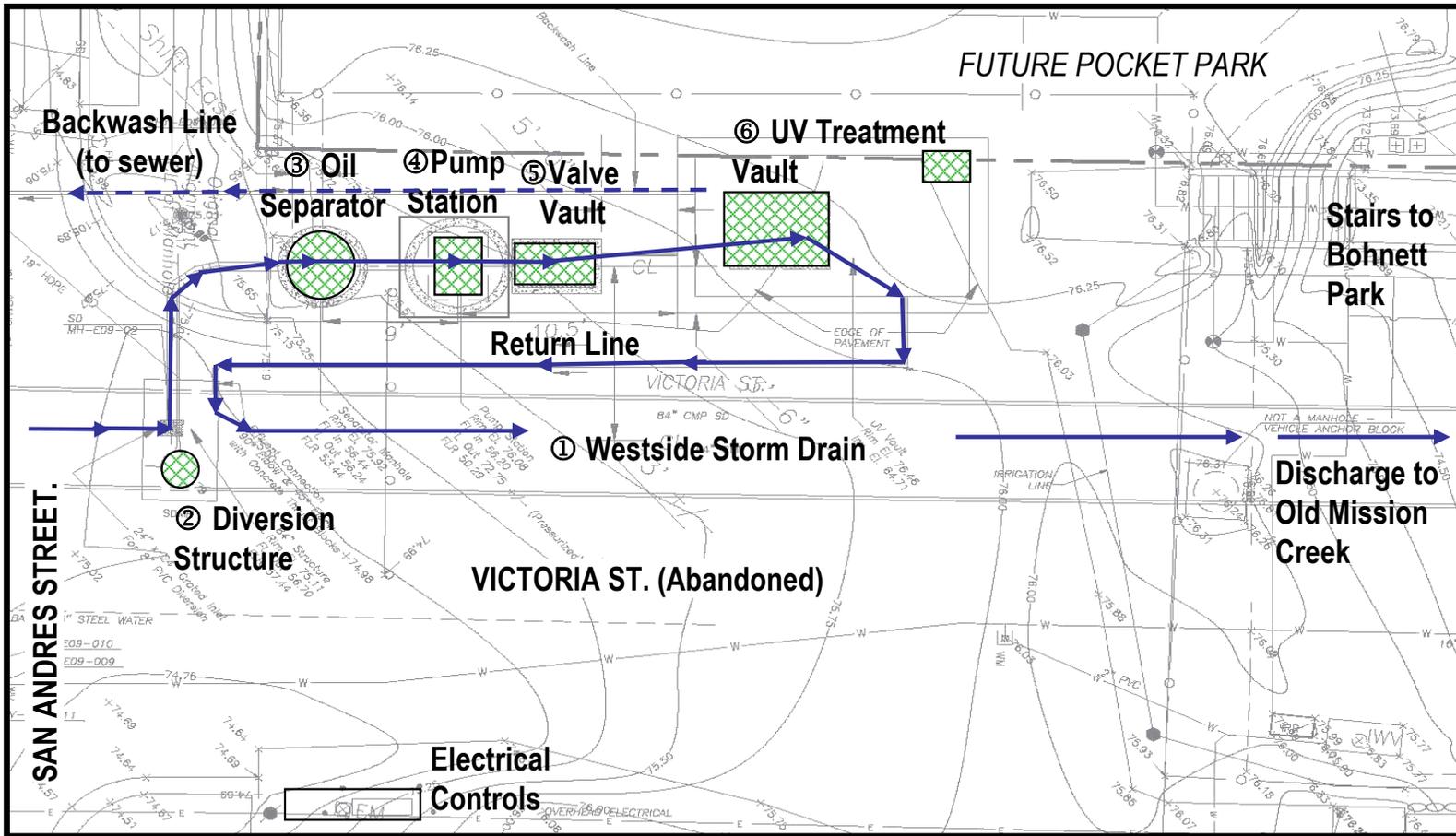
Figure 4. 65% drawing showing Project components and design constraints.

Once approval from SBCFCD was granted, 90% design plans and cost estimated were delivered, with the cost estimates having doubled since Project design began. This result led to additional review and consultation with the City's Creeks Advisory Committee, resulting in the decision to remove the CDS unit from the Project design.

Due to the removal of the CDS unit, a decision to make the SURF Project compatible with the City's SCADA system, and a decision to pursue filtered, rather than potable, water to backwash the media filters, the consultant was required to completely revise the 90% plans, resulting in additional expense and delays. Final plans and cost estimates were completed with no additional challenges.

The final design of the SURF Project includes the following components (see corresponding numbers, Figure 5).

1. Westside Storm Drain (existing)
2. Diversion Structure
 - 18' deep
 - Intersects the 6' diameter Westside Storm Drain
 - Low-flow channel diverts summer flows to treatment facility
 - High flows continue downstream
 - Receives treated effluent from return line
3. Oil Separator Manhole
 - Pre-treats water by removing oil, grease, and sediment
 - 5' diameter, 22' deep
4. Pump Station
 - Pumps water up to valve vault and UV treatment facility
 - 6' diameter, 26' deep
 - Two pumps alternate operation, pumping up to 100 gallons per minute
 - Measured summer flows are around 60 gallons per minute
5. Valve Vault
 - Contains check valves to prevent backflow to storm drain and creek
 - 5' x 3', 4' deep
6. UV Treatment Vault
 - Contains three large filters to remove fine sediment
 - Water passes by ultraviolet light bulbs that disinfect water
 - Filters are cleaned by backwashing and water flows to sewer lines
 - 22' x 14', 12' deep



Project Construction

Compared to the design of the Project, construction of the Westside SURF Project was relatively free of obstacles. Due to conflicts with utility lines, the Project layout was moved to the west side of the storm drain. Because the design was simply reflected to the other side of the storm drain, design changes were not substantial and the process was completed in the field. Once design issues were resolved, Project construction moved forward smoothly.

While the shoring and dewatering for the UV vault took tremendous effort on the part of SCI, this challenge was anticipated and did not cause delays in construction. Installation of the media filters, UV equipment, and electrical controls was undertaken with minor changes, including the movement of a basket strainer to facilitate maintenance and the addition of a sustaining valve to maintain backwash pressure. (see Figure 6 for photographs of the Project components). In addition, sampling ports were added to facilitate monitoring of the facility. The facility was tested on December 4, 2006 and performed successfully in most aspects. Vendors of the pump station, media filters, and UV equipment were on site to provide training.

A ribbon-cutting ceremony took place on December 13, 2006. The event was well attended by members of the public, the City Council, and the Creeks Advisory Committee, along with the Mayor and City staff. The Project was covered favorably in the local press.

Westside SURF Project
Construction Photos
1/1/07-3/31/07



Filter Backwash Controls



UV Equipment, Controls, and Sampling Port

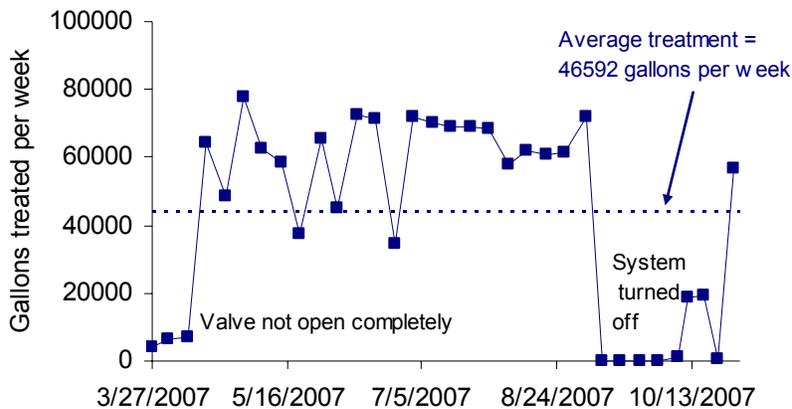


Figure 6. Construction process and Project components.

Maintenance

The Westside SURF Project began treating water from the Westside storm drain on March 27, 2007. The facility is operated and maintained by a private contractor (Process Engineering) with some assistance from the City of Santa Barbara. The contractor checks the site weekly and performs maintenance as required. This being the first season of operation, there have been several issues that have interfered with the operation of the SURF.

One step in the startup of the SURF is the opening of the intake valve located in the oil/water separator vault. This is a screw-type valve that requires approximately 26 turns to be fully open. After startup, not all of the storm drain water was being diverted through the SURF intake. Troubleshooting revealed that the valve was only partially open, so on April 11 it was opened completely. The treatment rate went from approximately 6,000 gallons per week to 64,000 gallons per week after opening the valve (Figure 7).



two occasions and after the second time the basket strainer did not become excessively clogged between weekly visits.

The backwash cycle for the filters is triggered by a buildup of pressure and is designed to clean the filters when there is too much sediment or debris for normal function. The filters are backwashed with filtered water and the backwash is discharged to the sanitary sewer. The filters were found to be backwashing excessively in September. One reason was due to an error in programming that didn't account for the large amount of flow entering the system. This was fixed by reprogramming. The other reason for excessive backwashing was not clear, but seemed to be related to a large amount of debris and/or sediment in the storm drain water.

Dewatering operations from an upstream construction project increased the flow and turbidity of the water in the storm drain. At times the flow in the storm drain was more than could be taken in by the SURF, so it bypassed. While the sediment from the discharge was determined to be treated to the maximum extent practicable, the turbidity was still higher than what the SURF was designed to handle. The increase in flow might have been responsible for carrying more leafy debris to the SURF and also contributed to clogging problems in the grate, strainer, and filters. The SURF was shut down several times during the season to prevent problems due to the high turbidity of incoming waters.

The SURF operated without problems when there was no de-watering upstream, including for the last two weeks of the season. Prior to shut down of the SURF Project for the rainy season (November 5, 2007), the facility was running smoothly. The facility is designed to be shut down during storms that occur during the AB411 season (April 1 – October 31) and during the entire rainy season (November 1 – March 31). See Appendix A for maintenance logs.

Water Quality Monitoring

The Creeks Division has a comprehensive water quality monitoring program and has incorporated monitoring for the diversion Projects into the overall program. The goals of the monitoring plan for the SURF Project were to:

1. Quantify the loads of indicator bacteria that are prevented from entering Old Mission Creek, Mission Creek, and East Beach at Mission Creek as a result of installing the Project.
2. Quantify the effect of the Project in reducing loads of indicator bacteria entering Old Mission Creek, i.e. quantify the fraction of dry-season runoff in the Westside Storm Drain that is diverted for treatment.
3. Test the effectiveness of Project components, i.e. the effect of the media filters and the UV equipment on lowering indicator bacteria levels.
4. Test for the effect of the Project reducing concentrations of indicator bacteria in downstream creek reaches.
5. Test for the effect of the Project on reducing beach postings. Data on beach postings will be obtained from the Santa Barbara County.
6. Conduct one detailed study of the distribution of indicator bacteria immediately downstream of the treatment facility, i.e., test whether and where bacterial regrowth or additional input occurs.

Table 3.1 Summary of Monitoring Design (April 1- October 31)

Monitoring Goal (see above)	Indicator Bacteria Concentration	Flow
1) Load Treated	Weekly (Monday), Laboratory	Weekly flow volume, Instrument
2) Percent of Load Treated	Upon observation of untreated flow, Laboratory	Upon observation of untreated flow, Field
3) Effect of Project components	Monthly, Laboratory	-
4) Downstream Concentration – Creek Sites	Bi-Weekly (Monday), Laboratory	-
5) Downstream Concentration - Beach	Weekly (Monday), Laboratory (County)	-
6) Potential Regrowth/Input Downstream	Once per AB411 season, Laboratory	Once per AB411 season, Instrument and Field

Sampling was carried out according to the approved QAPP and Monitoring Plan.

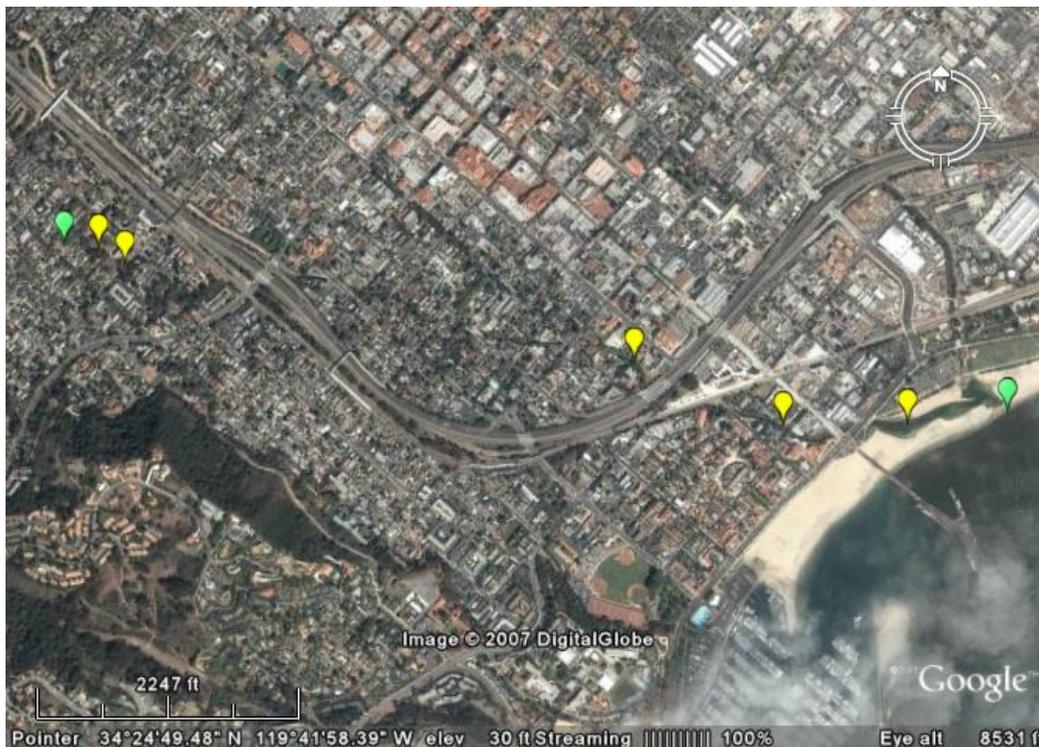
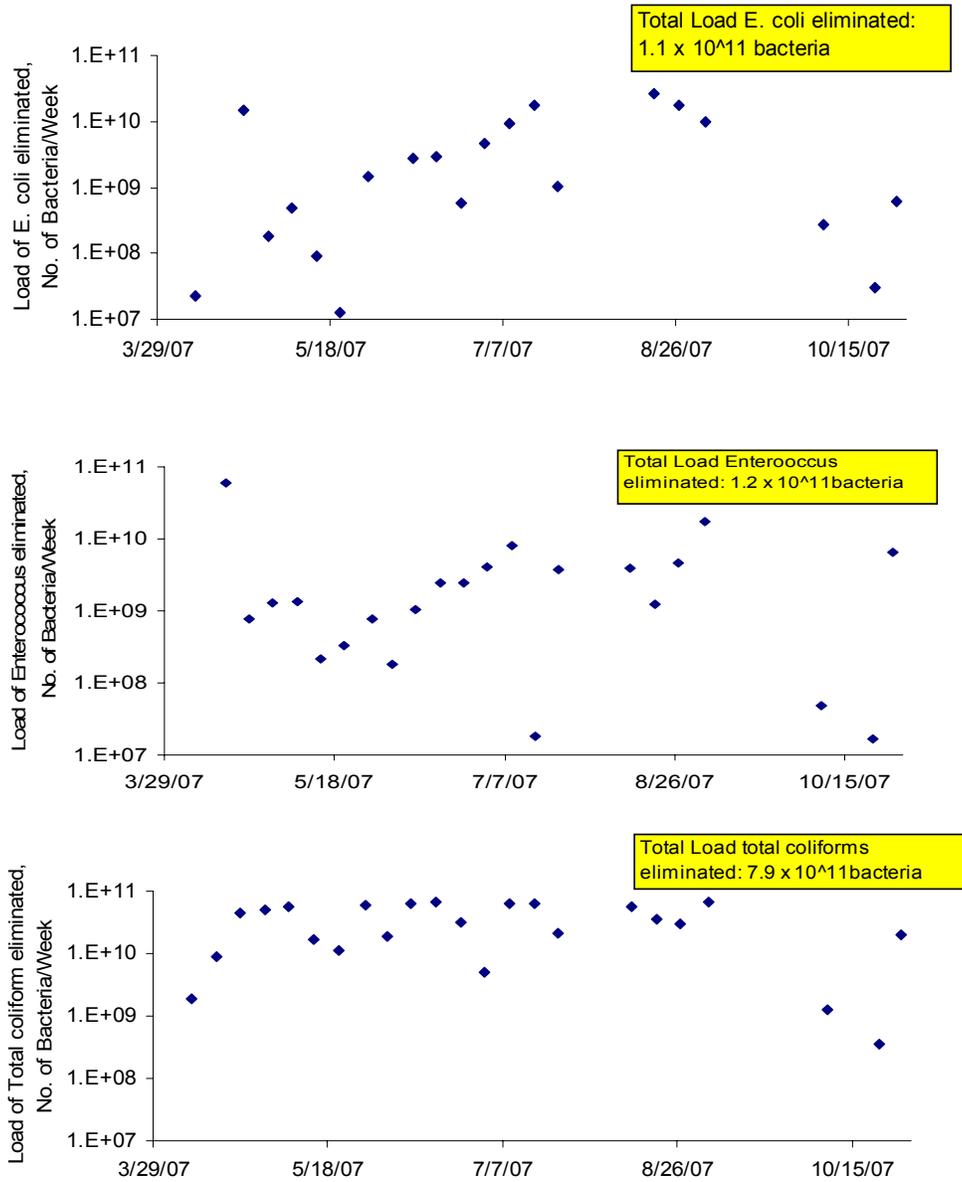


Figure 8. Map of sampling locations for Monitoring Plan. Yellow represents biweekly samples and green represents weekly samples.

Load Reduction Results

The load of indicator bacteria prevented from entering Old Mission Creek during the 2007 AB411 season was approximately 1.1×10^{11} E. coli bacteria, 1.2×10^{11} enterococcus bacteria, and 7.9×10^{11} total coliform bacteria (Figure 9). The loads were calculated based on the weekly flow volumes multiplied by the indicator bacteria values from the inlet port each week, and a conversion factor:

$$\text{Load (No. of bacteria/time)} = \text{Concentration (MPN/100 ml)} \times \text{Flow rate (gallons/week)} \times 37.9$$



Effectiveness of Project components

A comparison of indicator bacteria data, collected weekly, shows the dramatic reduction in concentrations between the inlet port of the SURF Project (downstream of pump station, upstream of media filters), and the outlet port (just downstream of UV bulbs). For *E. coli* and enterococcus, values were usually reduced from ~1000 MPN/100, to < 10 MPN/100 ml (Figure 10). Total coliform was generally reduced to 1-100 MPN/100 ml.

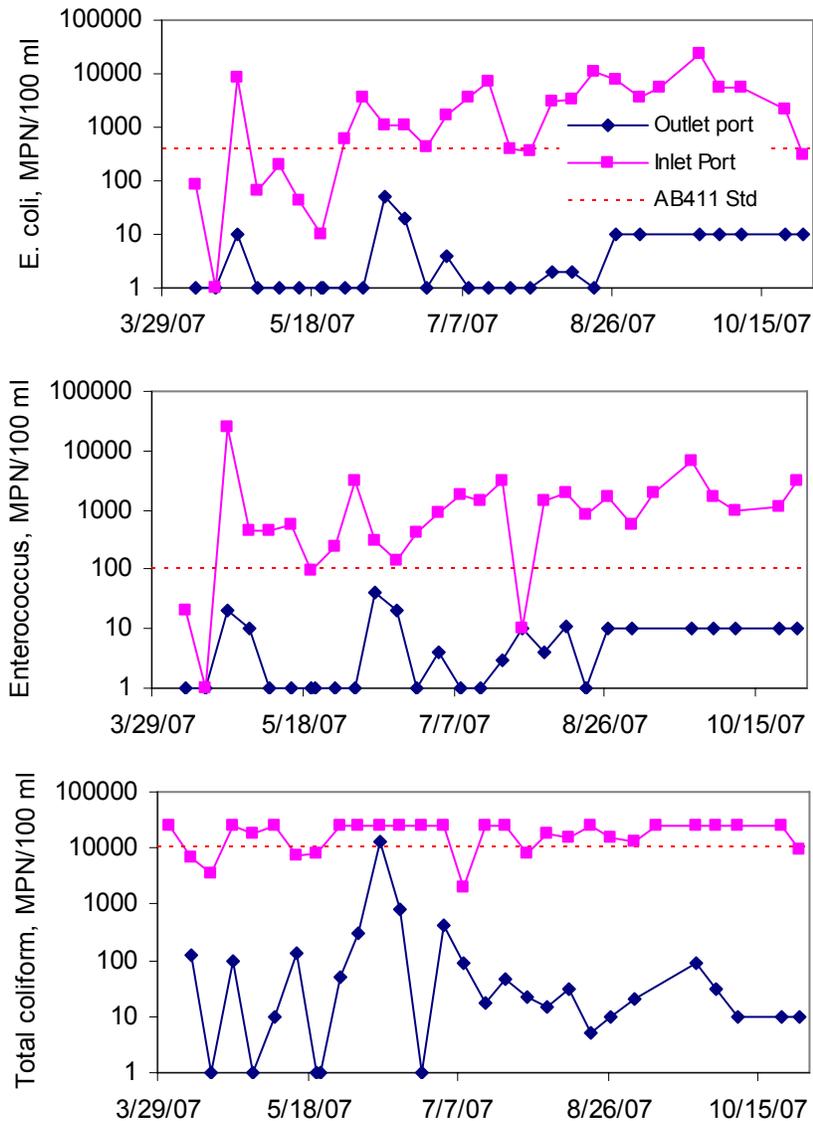


Figure 10. Weekly data demonstrating effectiveness of Westside SURF Project in reducing indicator bacteria concentrations.

Monthly sampling was conducted to test indicator bacteria values at locations within the SURF Project (Figure 11). Results showed no consistent patterns among sample locations. There was a suggestive pattern of higher indicator bacteria concentrations in the pump station, inlet port, and midstream port (downstream of media filters). One hypothesis is that surface biofilms may form and slough bacteria. The media filters did not appear to remove bacteria.

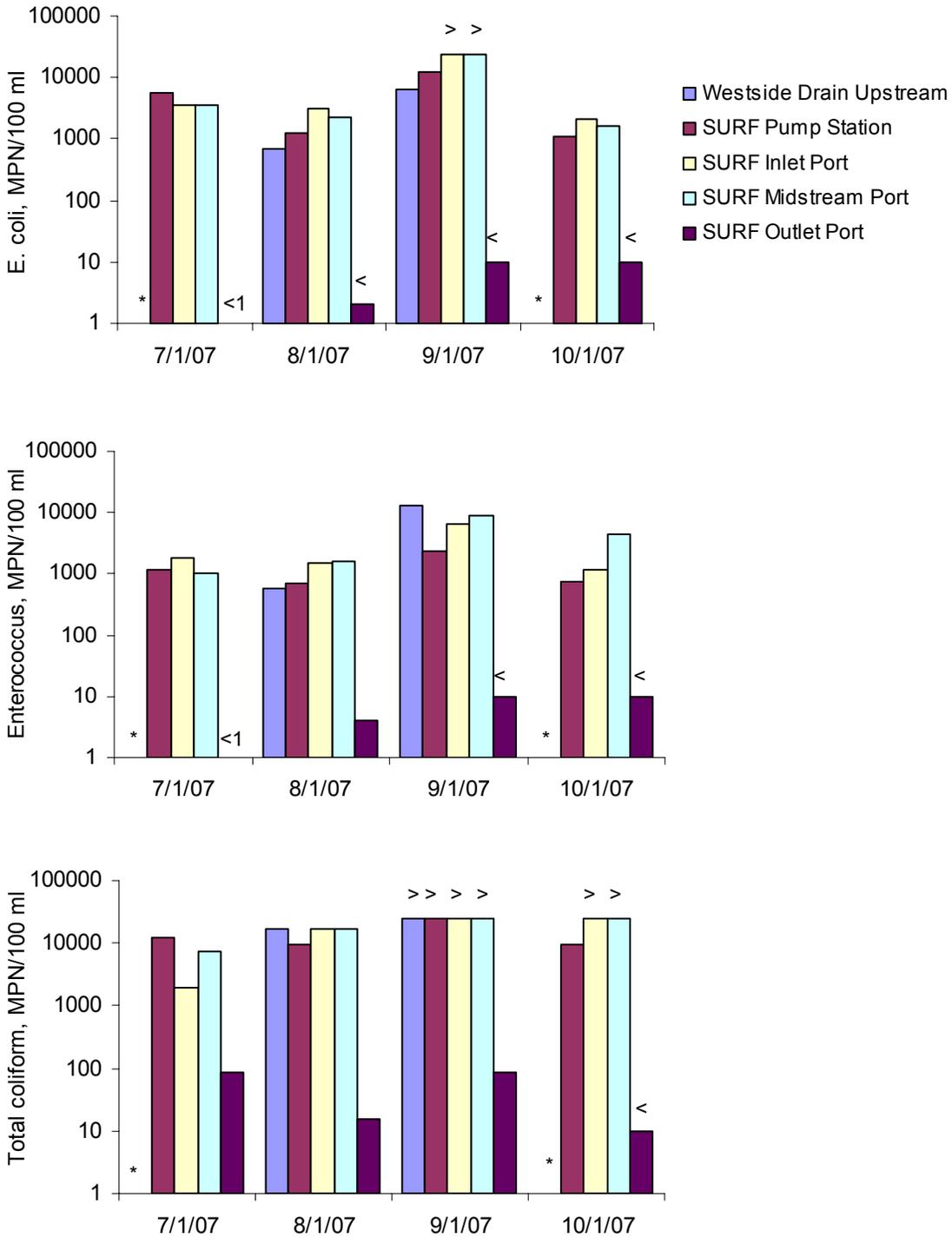


Figure 11. Monthly sampling data showing impact of Project components. Asterisk represents missing data, and >, < symbols represent values greater or less than thresholds.

Downstream Impacts

The downstream impact of the Project is of chief interest to the Creeks Division and the local community. Samples collected at the Westside Drain outlet, immediately downstream of the Project, were variable and often close to background levels, despite the low concentration of indicator bacteria in the facility's outlet port (Figure 12). At the next downstream site, Old Mission Creek at W. Anapamu St., indicator bacteria levels were consistently at background levels found in Mission Creek, as shown by the results from Mission Creek at Gutierrez. Even further downstream, i.e., at Mission Creek at Montecito Street, indicator bacteria concentrations did not appear to relate with the results from Westside SURF Project (Figure 13). These results are not surprising, given similar results at other UV disinfection facilities and the mounting evidence for indicator bacteria survival and growth in sediments and decaying plant material.

It is important to note however, that whether or not the Project impacts downstream indicator bacteria concentrations, the creek and ocean certainly have fewer pathogens than prior to Project installation. The importance of the SURF Project in keeping water safe for swimming is highlighted by results from the City's research with Dr. Patricia Holden, which has identified signals of human waste at the Westside Storm Drain, as discussed below in Additional Benefits.

This result also points to the importance of expanding the focus of the State's efforts to research and development of additional assessment and source tracking tools, as described in the Proposition 50 Clean Beaches Initiative grant guidelines.

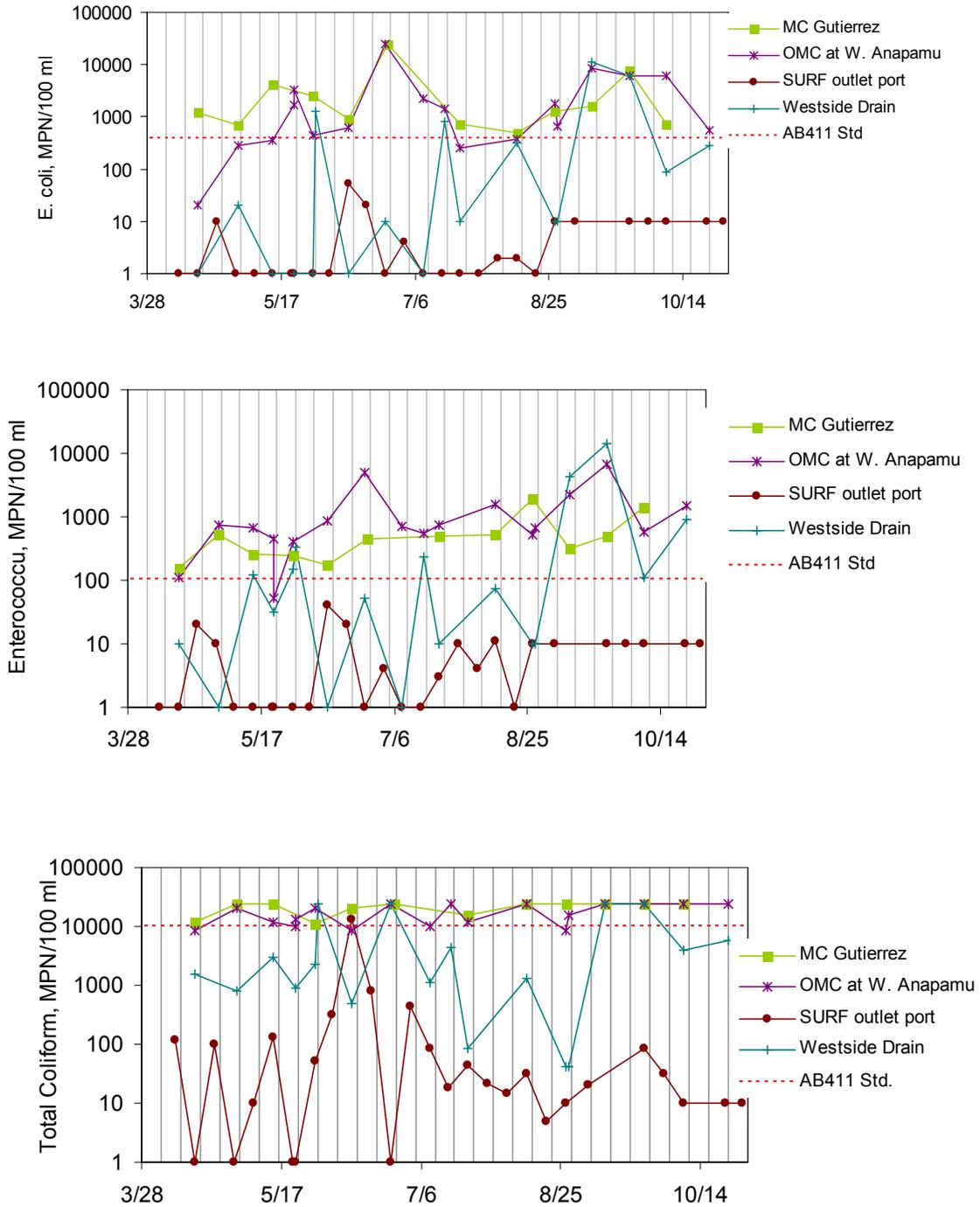


Figure 12. Downstream impacts of Westside SURF Project in Old Mission Creek.

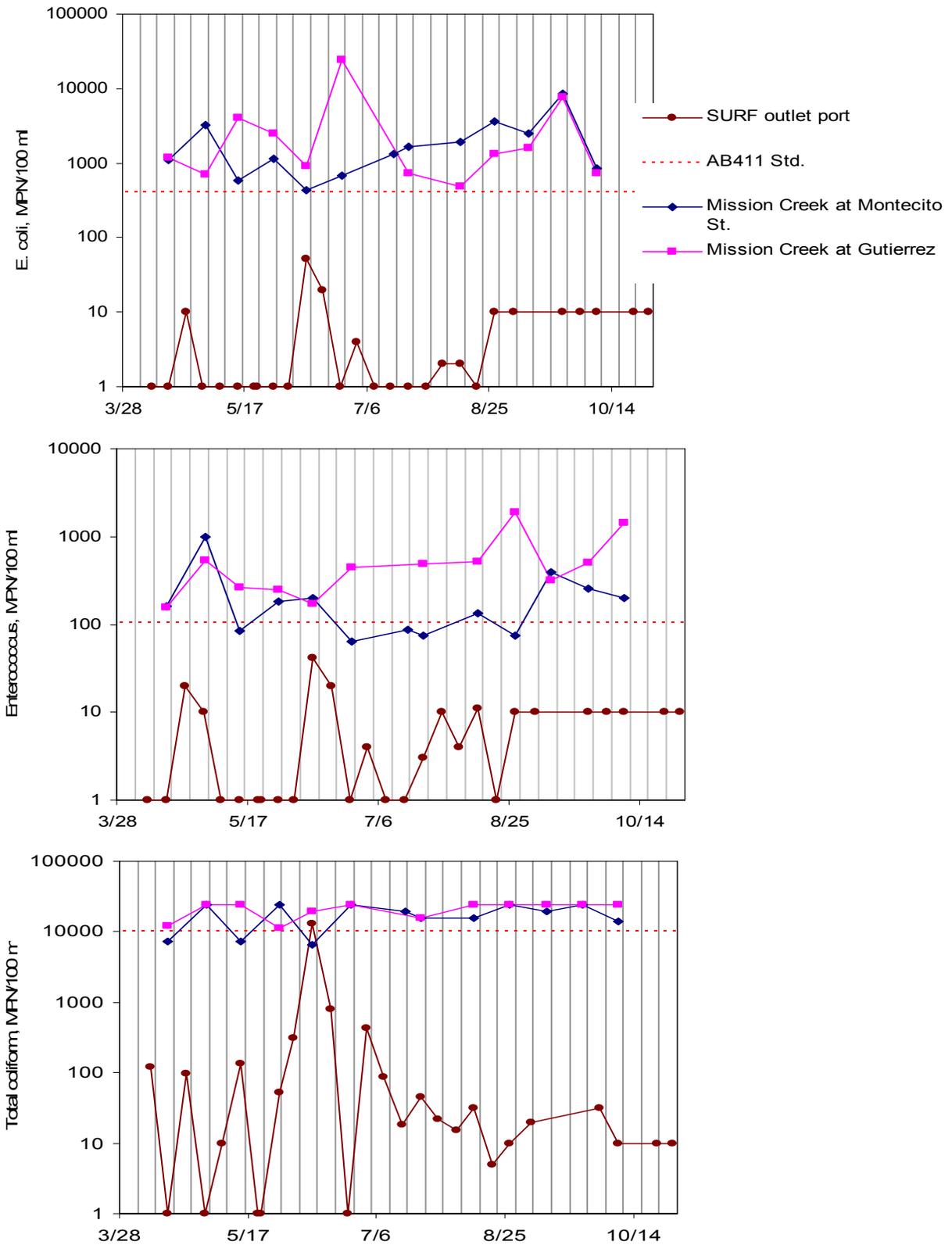


Figure 13. Downstream impacts of the Westside SURF Project in Mission Creek.

AB411 Beach Data

Overall, beach water quality in California was better in 2007 than in 2006 due to a relatively mild winter. East Beach at Mission Creek had beach warnings for each indicator (Figure 14). The AB411 indicator bacteria data collected by the County in the surf zone did not reflect the installation of the Westside SURF Project, which began operation on March 27, 2007. As stated above, it is very important to note that these results do not mean that the ocean is not safer for swimming and recreation due to the installation of the Project. See Appendix B for raw data.

As mentioned in the Introduction, Mission Creek is not suitable for end-of-pipe treatment near the beach. Because of this limitation, the City has long known that decreasing the number of beach warnings will require a long-term capital strategy that may include installation of diversion and treatment projects at multiple drain outlets, augmented by source reduction achieved by education, outreach, and enforcement activities. Despite the lack of results in indicator bacteria levels and beach warnings, the City and residents are encouraged that the number of pathogens in the creeks, and ultimately the oceans, has been decreased by the installation and operation of the UV facility.

Additional Inputs

One study was conducted to identify additional inputs of human waste and/or indicator bacteria to Old Mission Creek near the SURF facility. Using flow measurements and indicator bacteria concentrations, it was found that the water coming from the San Pascal Drain and through the Bohnett Park Oxbow, while only a trickle, harbors very high levels of indicator bacteria (data not shown). In the oxbow area, City staff often observe human waste, often in the wetted area near the channel flow, despite the presence of permanent restrooms in Bohnett Park. The City's Creeks Division pays a private contractor to remove human waste from this area on a weekly basis. In addition, the Creeks Division has re-established a porta-potty in the pocket-park area to discourage contamination of the channel. In casual conversations with local park users, it was learned that many people are afraid to use the porta-potty and restroom for fear of getting sick. The City will conduct additional research to investigate outreach options, potential BMPs, and source-tracking to examine the impact of human waste.

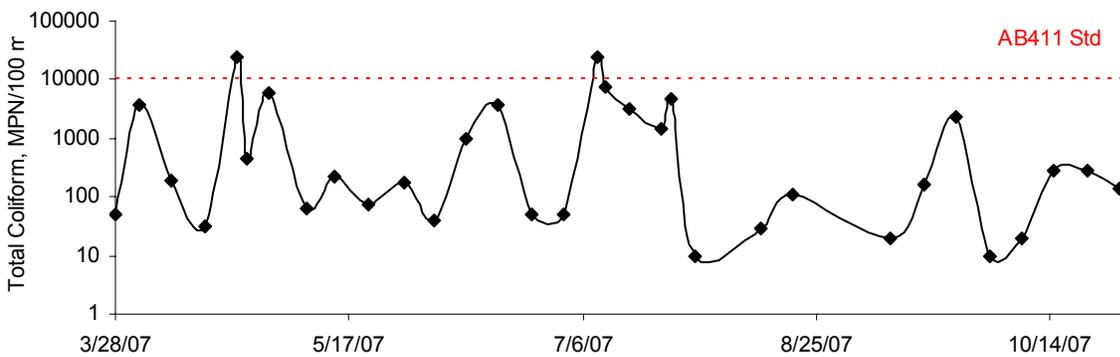
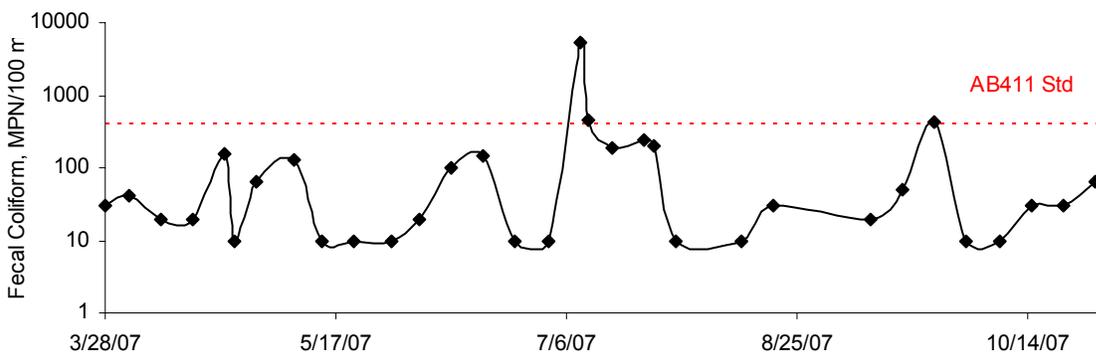
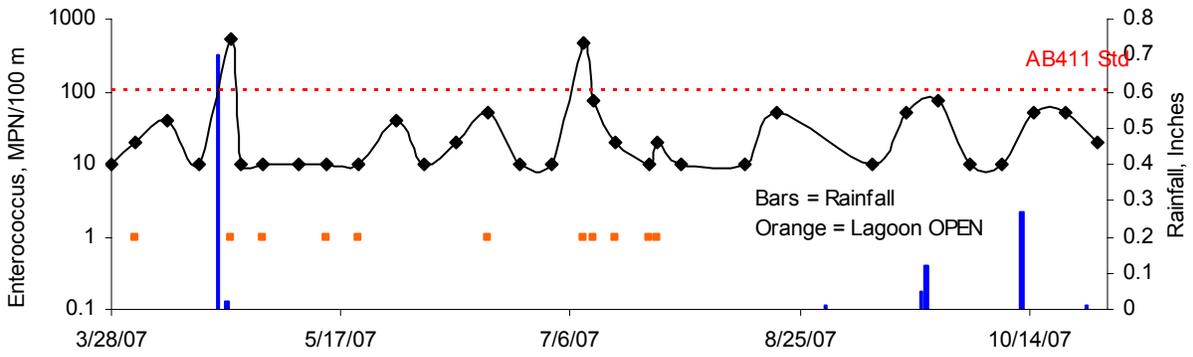


Figure 14. 2007 AB411 beach data for East Beach at Mission Creek.

Additional Benefits

Microbial Source Tracking Research

In addition to indicator bacteria testing, the City has conducted additional research that demonstrates the importance of the SURF facility in reducing health risks from recreational contact with creek water. Due to the many limitations with indicator bacteria data, the City has worked with Dr. Holden at UCSB in order to develop DNA-based methods that can be used to determine if human waste is present in creek, lagoon, and ocean samples. The Project involved the development and application of new methodologies that can be used for discovering human waste in urban watersheds. The Project also involves the identification of potential upstream and intermediate sources of contamination, and the assessment of the fates of contamination during transport in the creek, through the lagoons, and into the ocean during summer low-flow conditions. This research was not required by or described in the Monitoring Plan or the QAPP and is presented here as supporting evidence of the importance of the Project.

A “snapshot” of lower Mission Creek was conducted to survey human waste indicators in sampled waters. These studies were replicated over 3 days (June 28-June 30, 2005) to better understand temporal variability in the signals. One of the sites sampled was the Westside Drain, prior to the installation of the Westside SURF Project. Three methods were used to assess the presence of human waste in samples, including quantitative PCR of human-specific *Bacteroides* bacteria, bacterial community analysis by T-RFLP, and bacterial community analysis by bacterial phylochip. The human-specific *Bacteroides* marker was found at several locations, but not the Westside Drain. The T-RFLP community analysis method showed that all of the urban drains that were sampled, including the Westside Drain, were more similar to sewage influent than to other sources of animal waste (raccoon, gull, dog and cat). Preliminary analysis of the phylochip data found that the Westside Drain samples clustered closer to the sewage and drain samples than to creek and ocean samples.

These results support the conclusion that the Westside SURF Project does treat water that is likely contaminated with human waste. Despite a lack of downstream reduction in indicator bacteria concentrations, the water in Old Mission Creek, Mission Creek, and East Beach at Mission Creek is certainly safer for recreation based on the molecular analysis of the source water.

Additional Efforts to Improve Water Quality

The City of Santa Barbara is committed to identifying solutions to indicator bacteria problems at East Beach at Mission Creek. The City conducts an extensive program involving capital project installation, monitoring and research, storm water management, source removal, and education/outreach in order to improve water quality

1. **Capital Projects:** In addition to the Westside SURF project, the City completed installation of a dry weather storm drain diversion at the Haley Drain, which feeds to Mission Creek. The diversion project was funded by the Clean Beaches Initiative Proposition 13 Grant Program and was completed in 2007. Please see the Final Report for CBI Grant 01-086-550-3 for additional information. Currently, the City is working to address indicator bacteria inputs and contamination from Laguna Channel, which also

drains to East Beach at Mission Creek. The City has received a funding commitment from the Clean Beaches Initiative Proposition 50 Grant Program to begin a watershed study to identify the most appropriate implementation project for the drainage.

- 2. Research and Monitoring:** The City conducts extensive water quality monitoring in the watersheds draining to East Beach at Mission Creek. The monitoring program conducts regular sampling in order to track long-term changes in water quality, assess hot spots of indicator bacteria input, and detect which creek reaches contribute the greatest to indicator bacteria loading in Mission Creek. Data analysis includes efforts to correlate beach warnings with weather patterns and hydrology. Microbial source tracking research is also conducted, as described in the previous section.

The City seeks to continue source tracking research and is in the process of seeking funding from the Clean Beaches Initiative Proposition 50 Grant Program in order to develop source tracking protocols to investigate the physical sources of human waste in Mission Creek.

- 3. Storm Water Management and Enforcement:** The City has submitted a revised Storm Water Management Plan (SWMP) to the Central Coast Regional Water Quality Control Board. The goal of the plan is to reduce the input of pollutants of concern, including indicator bacteria, to creeks in Santa Barbara. The City is committed to implementing the plan as it moves through the approval process. The Plan includes: public education and outreach, public participation and involvement, illicit discharge detection and elimination, construction site runoff control, post-construction runoff control, and pollution prevention or "good housekeeping." As of this time, the City has implemented the following activities – all of which are designed in part to reduce indicator bacteria input to Mission Creek - as part of the SWMP: operational divisions training, water quality enforcement, development of a Clean Water Business Certification Program. The City is actively working on the development of a Technical Guidance Manual and Revised Standards of Approval for construction projects, along with improved methods for sidewalk washing in the downtown area.
- 4. Source Removal:** The City hires a contractor to remove trash and human waste on a biweekly basis from many creek locations in Mission Creek and Laguna Channel. In addition, the streets in the urban corridor of the Mission Creek and Laguna Channel drainages are cleaned by street sweepers on a weekly basis.

Despite the extensive effort put forth by the City of Santa Barbara towards reducing contamination at East Beach at Mission Creek, bacteria levels at East Beach at Mission Creek still occasionally spike above state standards during dry weather. The data described in this report, along with current research and observations, point suggest possible causes of ongoing postings at East Beach, including:

1. The role of hydrologic patterns. During years with late- and early-season rain storms, more beach warnings are posted. In addition, the amount of winter rainfall appears to influence beach warnings into the summer, at East Beach and other beaches throughout Southern California.
2. Indicator bacteria growth in the environment. Evidence is mounting that many indicator bacteria may grow in the environment, including on kelp wrack and estuarine sediments.

3. Animal sources. Bird droppings may contribute to indicator bacteria concentrations at the shoreline, or seed the regrowth of indicator bacteria on sediments and kelp.
4. Human waste. Microbial source tracking and visual observation confirm the presence of human waste in Mission Creek and Laguna Channel. However, it is unknown to what degree human waste contributes to high indicator bacteria numbers. High indicator bacteria levels are often seen when human waste markers are not present and human waste is not observed.

The City is addressing these hypotheses by continuing to implement the programs described above, participate in ongoing research, and continuing to assess the performance of installed treatment projects.

Outreach

An additional benefit of the Project is the opportunity it presented for outreach and education of the community in the surrounding neighborhoods. When notices of construction and traffic disruption were mailed to residents, the opportunity was taken to explain the concept of drainage areas, urban runoff in storm drains, and how the Project would improve water quality. A sign was also erected at the Project site. Both the mailings and sign included Spanish translation. In addition, a ribbon cutting ceremony was used to inform participants about the function of the facility. Example materials are shown in Appendix C.

APPENDIX A. Maintenance Log

Westside SURF Operations and Maintenance Log Summary											
David Cohen, Process Engineering logs from faxed sheets									Tim Burgess logs from notes		
Date	System in Dynamic State? (running)	Pre filter pressure	Post filter pressure	Post filter flow at observation time (GPM)	Backwash filter count (assuming rollover at 1000)	Backwashes this period	Cumulative Gallons Treated	Gallons treated this period		Date	Tim's notes
3/27/2007		n/a	n/a	139				4030		4/2/2007	Debris intake grate-Streets Div. Cleaned.
4/2/2007		25	24	139				6300	Streets Div cleaned intake debris grate of trash		
4/9/2007		26	24	140				7127		4/10/2007	Debris intake grate - trash bags and gravel - Streets Div. Cleaned.
4/16/2007		26	24	140			64330	64330		4/11/2007	Intake valve not opened all the way. Water Res. opened valve on 4/11/07.
4/23/2007		22	20	70			112896	48566	Basket Strainer plugged, cleaned with wire brush to restore normal flow. UV chambers manually cleaned. Filters manually backwashed twice.	4/18/2007	Door stuck to large vault. Could not open. Called David, he said they were fine on Monday. I also told him of trash in the intake grate.
4/30/2007		22	18	70			190498	77602			
5/7/2007		26	24	145			252780	62282			
5/14/2007		26	24	148			310977	58197			
5/21/2007		24	24	151	631		348550	37573	Checked UV 2 lamp 6 conn. All ok, need new lamp. Still output 97%.	5/22/2007	Talked to David. He said that vault doors had been fixed and he has been cheking th oil-water separator for trash, not the intake grate in the Storm Drain. He will check that next.
5/29/2007		26	24	148	738	107	413900	65350	Possible leak - very minor (weep). Could not observe while op. Did see small water trail. Circ. Pump. Discharge to mainline T Fig.	5/31/2007	Went with Streets Division and Kenneth cleaned the intake grate of trash & debris. The debris was keeping most of the water from getting to SURF.
6/4/2007		26	24	no data	912	174	459077	45177	1. Diversion Gate - mild leaf debris est. 5% of top visible area. 2. Basket Strainer-excessive debris-cause of low flow initial read-cleaned and restored flow. 3. UV #1 Wiper Time out alarm - Contacted Aquionics - will devise repari/warranty plan. UV #2 - On line - will. 4. Repaired UV #1 w/cust. Svc. Eng. Tele support. Returned to Service.		

City of Santa Barbara
FINAL REPORT, 02-242-550-1

6/11/2007		24	23	152	1042	130	531509	72432	1. B/w count timer "rolled over" @ 999 sometime last week. 2. Oil/H2O Sep. manhole has acc. Oil layer & some debris. Does not impede flow at this time. Will check weekly. 3. Diversion manhle same amount of debris as last week. Does not impede flow at this time.	6/15/2007	Intake Grated Kenneth & Vidal removed trash, leaves from above grate & sand and gravel from below grate. Water from effluent re-entering intake - about 5-10% of effluent.
6/18/2007		26	24	155	1178	136	603110	71601	1. Cleaned Basket Strainer. 2. UV #2 displayed <90% trans. & warning. Manually initiated wiper 2x. Restored function to 122% - reset panels. 3. Diverter manhole - grated blocked app 15% by snack bags. Will monitor next week.	6/18/2007	Showed David intake grate and talked about him notifying me when it is blocked.
6/25/2007		24	22	142	1652	474	637700	34590	1. Basket strainer excessively plugged. Near zero flow when arrived. Cleaned strainer. B/W filters restore flow to spec. 2. T.B. arrive onsite. Witness plugged basket strainer w/1.5 hrs operation. 3. Disassembled UV2 power end plate assembly. Inspected (2) sleeves and lamp chambers. No excessive wear, foulin, or damage. Wiper system working. 4. Diverter manhole bar screen >50?obstructed. Notified T.B. 5. T.B. and SB Wastewater tech observed basket strainer.....The rest not copied from misaligned fax paper.	6/25/2007	In response to last week's high bacteria nnumbers post filter and UV, David dismantled UV chamber and inspected. Everything looked fine.
7/2/2007		24	24	152	1785	133	709880	72180	1. Minimal accum. Of debris in basket strainer. 2. Diversion M.H. screen 50% obstructed. 3. Oil/H2O sep. M.H. ok.	6/27/2007	Results from 6/25 sample after UV inspection are all <10 MPN
7/9/2007		26	26	150	1919	134	779950	70070	1. Basket strainer minimal acc. 2. Basket strainer o-ring - Replace due to leak. 3. Diversion M.H. looks clear. 4. Oil/H2O sep. M.H. normal acc. From fax cover sheet....All systems operating w/in specs. As for the quote to provide confined space ops to clean the diversion screen, PES can offer this for \$985.00 per visit. I realize that we may not be competitive for this work. However, I will prepare a formal quote, detailing all services at your request.	6/28/2007	Met w/Stewart's De Rooting-Hohn-705-2416. He says drain cleaning will be \$475 each time. 2hrs * \$187.50 + \$100 for confined space entry. Called David, he said he will send quote for cleaning intake grate. He estimated less than \$250.
7/16/2007		24	22	140	2052	133	849160	69210	Diversion manhole 30% obstructed.	7/2/2007	Cameron Benson cleaned debris from intake grate - measured effluent pipe diameter and estimated 5% of effluent washing back into intake.

City of Santa Barbara
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7/23/2007		26	24	147	2186	134	918137	68977	Diversion manhole 30% obstructed. From Fax cover sheet...Tim Please see attached log. All systems ok. Processed almost 70k gallons this week with little accumulated debris in basket strainer and /or diverter screen M.H. Perhaps the re-alignment work you did on the inlet/diversion wier has accounted for the increased production vol. and drop in accumulated debris observed for the last 2 weeks.	7/6/2007	John w/Stewart's De-Rooting cleaned intake and retrofitted effluent pipe permanently so that flow does not re-enter intake. He used a 22 degree elbow and ~20" extension so that discharge comes out of pipe further downstream in storm drain. Initial inspection showed it to work as intended.
7/30/2007	No	26	24	146	2320	134	986728	68591	1. Basket Strainer-normal amount of debris. 2. Diverter screen M.H. due for cleaning.	7/16/2007	Tim inspected intake - 25% covered with bags and leaves.
8/6/2007	Yes	26	22	155	2486	166	1044520	57792	1. Severe basket strainer loading. Flow <50 gpm. Cleaned and restored flow to logge valves.	7/19/2007	Ordered telescoping pole to use in uncovering debris from intake grate from open manhole w/o entering hole.
8/13/2007		26	24	145	2620	134	1106587	62067	Diverter screen is in need of service.	7/20/2007	1st quarterly bill received from Process Engineering - Ok'd to pay.
8/20/2007		24	24	146	2755	135	1167640	61053	Sanitary Division Workers help me to remove M.H. cover bar screen 70%+ obstructed. System flow is ok, but need to schedule M.H. clean out.		
8/27/2007		24	23	135	2889	134	1228996	61356	Diverter screen 50% obstructed w/debris. Flow ok.		
9/4/2007		26	24	148	3042	153	1300998	72002	Basket strainer full of candy wrappers.	9/6/2007	SURF shut down due to excessive backwashing and due to high amount of leaf debris clogging basket strainer.
9/10/2007	No				3042	0	1300998	0	SURF turned off due to excessively high turbidity or leaf debris clogging basket strainer. (No Log Sheet)	9/11/2007	David and Marty visited site. Marty reprogrammed backwash cycle settings. It was set to start backwash cycle at a certain pressure level, and continue backwash cycles until pump well dropped to certain water level. This was a problem because the pump well was filling up with water faster than originally anticipated. Because of the large flow, it was taking many backwash cycles to drop the water level to a level that triggered stopping of backwash and resuming to normal treatment. Marty eliminated water level trigger as a stop point so that there would only be one backwash, then return to normal operation, regardless of water level in pump well.
9/17/2007	No				3042	0	1300998	0	SURF turned off due to excessively high turbidity or leaf debris clogging basket strainer. (No Log Sheet)		
9/24/2007	No	30	25	105	3707	665	1310890	9892			

City of Santa Barbara
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10/1/2007	No				3707	0	1310890	0	SURF turned off due to excessively high turbidity or leaf debris clogging basket strainer. (No Log Sheet)	10/1/2007	Surf purged to sanitary sewer to attempt flush out of leafy debris collected in wet wells and possibly in pipes. Wastewater crews assisted, used net to catch leaves before reaching SS.
10/8/2007	No	26	24	144	3719	12	1312235	1345		10/11/2007	Cal/OSHA consultation with Haifa Hughes confirms that Diversion manhole is a permit confined space, SURF main vault is a non-permit confined space. Creeks Div. staff should no longer enter confined space without proper training, reiterated at staff meeting next day.
10/12/2007	No	26	24	145	3797	78	1331200	18965	78 backwashes for 18925 gal. <250 gallons.		
10/18/2007	No Shut down 10/17/07	26	24	120	3910	113	1350520	19320	1 Backwash per 200 gal.		
10/23/2007	No	26	24	140	3990	80	1350900	380	1. Purged piping & 2 wet well volumes w/ Wastewater & Creeks Crew. 2. Observed 30 minutes of run time w/no pressure drop, or basket strainer problems. Left system on line.		
10/29/2007	Yes	24	24	128	3990	0	1407900	57000	1. System running when arrived. Basket strainer mod.		
11/5/2007	Yes	26	24	146	4257	267	1476732	68832	1. After B/W w/air scour, reduce op press. 2 psig 1)23.5 "Rim to med bed top. 2) 24.0 "Rim to med Bed Top" 3) 25.5 "Rim to med Bed Top". 2. Add 1 gal 2% H2O2 per filter vessel. 3. City sanitation workers shut gate valve on oil/H2O separator. 4. Met w/ Tim and Leigh Ann.		

APPENDIX B. AB411 Beach Data

Results from AB411 Beach Monitoring by the County of Santa Barbara at East Beach at Mission Creek. Yellow shading signifies results above standards.

Date	Total Coliform, MPN/100 ml	Fecal Coliform, MPN/100 ml	Enterococcus, MPN/100 ml	Fecal Coliform: Total Coliform, Total Coliform>1000	Status
AB411 SSM Standard	10,000	400	104	0.2	
4/2/2007	3654	41	20	0.0	
4/9/2007	189	20	41	n/a	
4/16/2007	31	20	<10	n/a	
4/23/2007	>24192	156	520	0.0	Warning
4/25/2007	448	10	<10	n/a	
4/30/2007	6131	63	<10	0.0	
5/8/2007	63	131	<10	n/a	
5/14/2007	231	10	10	n/a	
5/21/2007	74	<10	<10	n/a	
5/29/2007	173	10	41	n/a	
6/4/2007	41	20	<10	n/a	
6/11/2007	959	98	20	n/a	
6/18/2007	3873	148	52	0.0	
6/25/2007	52	10	<10	n/a	
7/2/2007	52	10	<10	n/a	
07/09/07	>24192	5172	480	0.2	Warning
07/11/07	7270	455	74	0.1	Warning
07/16/07	3130	185	20	0.1	
7/23/2007	1500	243	10	0.2	Warning
7/25/2007	4611	197	20	0.0	
7/30/2007	<10	<10	10	n/a	
8/13/2007	30	<10	<10	n/a	
8/20/2007	110	31	52	n/a	
9/10/2007	20	20	<10	n/a	
9/17/2007	158	51	52	n/a	
9/24/2007	2359	416	74	0.2	Warning
10/1/2007	10	<10	<10	n/a	0
10/8/2007	20	10	<10	n/a	0
10/15/2007	292	31	52	n/a	0
10/22/2007	292	31	52	n/a	0
10/29/2007	143	63	20	n/a	0
11/5/2007	52	11	20	n/a	0

APPENDIX C. Outreach Materials

Westside Water Quality Improvement Project

To improve water quality in Santa Barbara's creeks and ocean

The City of Santa Barbara is constructing an ultraviolet (UV) light facility to remove harmful bacteria in the Westside Storm Drain. Polluted urban runoff from overwatering of lawns, car washing, and hosing of sidewalks and driveways, carries bacteria and other pollutants to the storm drains and creeks.

The project will:

- Improve water quality in Old Mission Creek
- Provide safer conditions for children in Bohnett Park
- Contribute to a healthier ocean at East Beach

Project Construction

- June-August 2006

You can help reduce water pollution!

Avoid over-watering your lawn, use less-toxic garden products, sweep yard debris and pick-up after your pet.

For more information, contact: City Creeks at 897-2658 or www.sbcreeks.com



Sponsored by the City of SB Creeks Division. Funded through a grant from the State Water Resources Control Board pursuant to the Clean Beaches Initiative under the California Clean Water, Clean Air, Safe Neighborhood Parks, and Coastal Protection Act of 2002 (Proposition 49) and the City of Santa Barbara Measure B, which is funded by hotel visitors.



La ciudad de Santa Bárbara esta construyendo una instalación de luz ultravioleta (UV) para remover las bacterias dañinas en el drenaje del Westside.

El proyecto:

- Mejorará la calidad del agua del Old Mission Creek [El Viejo Arroyo de la Misión]
- Proveerá condiciones más seguras para los niños en el Bohnett Park
- Contribuirá a tener un océano más saludable en East Beach

Construcción del Proyecto:

- Junio-Agosto del 2006

¡Usted puede ayudar a reducir la contaminación del agua!

Evite regar excesivamente su césped, use menos productos tóxicos en el jardín, barra todos los residuos del jardín y limpie la suciedad dejada por sus animales domésticos.

Para más información póngase en contacto con City Creeks al 897-2658 o www.sbcreeks.com

Proyecto de Mejora del Agua en el Westside

Para mejorar el agua de los arroyos y del océano de Santa Bárbara



City of Santa Barbara
Creeks Division
Post Office Box 1990
Santa Barbara, CA 93102-1990

Did you know that water run-off in your neighborhood drains to Mission Creek?

Westside Water Quality Improvement Project

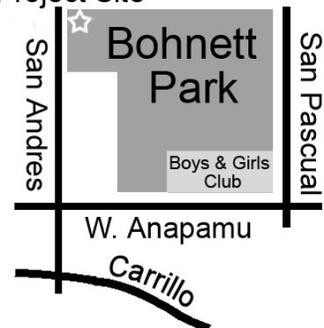
The City of Santa Barbara is constructing an ultraviolet (UV) light facility to remove harmful bacteria in the Westside Storm Drain at Bohnett Park. Polluted urban runoff from overwatering of lawns, car washing, and hosing of sidewalks and driveways, carries bacteria and other pollutants to the storm drains and creeks.

The project will:

- Improve water quality in Old Mission Creek
- Provide safer conditions for children in Bohnett Park
- Contribute to a healthier ocean at East Beach

Project Construction: June-August 2006

Project Site



La ciudad de Santa Bárbara esta construyendo una instalación de luz ultravioleta (UV) para remover las bacterias dañinas en el drenaje del Westside. Los desagües urbanos de tanto regar el pasto, lavar automóviles, y lavar con las mangueras las aceras y las entradas de las casas, hace que esas aguas lleven bacterias y otros contaminantes a los drenajes de lluvia y a los arroyos.

El proyecto:

- Mejorará la calidad del agua del Old Mission Creek [El Viejo Arroyo de la Misión]
- Proveerá condiciones más seguras para los niños en el Bohnett Park
- Contribuirá a tener un océano más saludable en East Beach

Construcción del Proyecto: Junio-Agosto del 2006



Thank you for your patience during construction!

Contact: City Creeks Division, 897-2658

“Help Keep Our Creeks
and Ocean Clean”





City of Santa Barbara
Creeks Division
Post Office Box 1990
Santa Barbara, CA 93102-1990

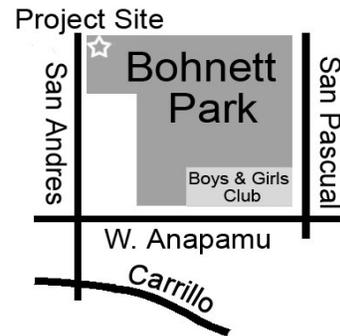
You are invited to a Ribbon Cutting Ceremony at Bohnett Park, December 13...

Westside Water Quality Improvement Project

The City of Santa Barbara has completed construction of an ultraviolet (UV) light facility to remove harmful bacteria in the Westside Storm Drain at Bohnett Park.

The project will:

- Improve water quality in Old Mission Creek
- Provide safer conditions for children in Bohnett Park
- Contribute to a healthier ocean at East Beach



You are Invited to Join Mayor Marty Blum at a Ribbon Cutting Ceremony

Wednesday, December 13, 2006 at 10:00 a.m.

Ceremony to be held onsite at Bohnett Park (San Andres and West Victoria)

***Esta invitado a acompañar al Presidente Municipal Marty Blum a la
ceremonia de corte de listón***

Miércoles, 13 de diciembre 2006 a las 10:00 a.m.

La ceremonia se llevará a cabo en el Parque Bohnett (Calles San Andrés y Victoria Oeste)

La ciudad de Santa Bárbara ha terminado la construcción de una instalación de luz ultravioleta (UV) para remover las bacterias dañinas en el drenaje del Westside.

El proyecto:

- Mejorará la calidad del agua del Old Mission Creek
- Proveerá condiciones más seguras para los niños en el Bohnett Park
- Contribuirá a tener un océano más saludable en East Beach



Contact: City Creeks Division, 897-2658

“Help Keep Our Creeks
and Ocean Clean”

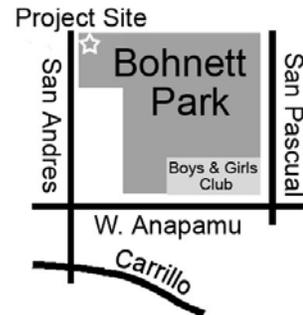


Funded through a grant from the State Water Resources Control Board pursuant to the Clean Beaches Initiative under the California Clean Water, Clean Air, Safe Neighborhood Parks, and Coastal Protection Act of 2002 (Proposition 40) and the City of Santa Barbara Measure B, which is funded by hotel visitors.

Ribbon Cutting Ceremony December 13, 2006

Westside SURF Water Quality Improvement Project

The City of Santa Barbara has completed construction of an ultraviolet light facility to remove harmful bacteria in the Westside Storm Drain at Bohnett Park.



Please Join Mayor Marty Blum and the Santa Barbara City Council, and other Elected and Appointed Officials for the Ribbon Cutting Ceremony.

*Wednesday, December 13, 2006
10:00 a.m.*

Tour the Project and learn about how it will:

- Improve water quality in Old Mission Creek
- Provide safer conditions for children in Bohnett Park
- Contribute to a healthier ocean at East Beach



Ceremony to be held onsite at Bohnett Park
(San Andres and West Victoria)

Contact: City Creeks Division, 897-2658



Funded through a grant from the State Water Resources Control Board pursuant to the Clean Beaches Initiative under the California Clean Water, Clean Air, Safe Neighborhood Parks, and Coastal Protection Act of 2002 (Proposition 40) and the City of Santa Barbara Measure B, which is funded by hotel visitors.



NEWS RELEASE

City of Santa Barbara
Creeks Division

Contact: Jill Zachary
Phone: 897-2508
Fax: 897-2626
JZachary@SantaBarbaraCA.gov

FOR IMMEDIATE RELEASE
12/11/2006

WESTSIDE SURF WATER QUALITY IMPROVEMENT PROJECT COMPLETED-
Ribbon Cutting Ceremony to be held December 13, 2006

SANTA BARBARA, CA – 12/11/2006 –

The ribbon cutting ceremony for the City of Santa Barbara's Westside Summer Urban Runoff Facility (SURF) Water Quality Improvement Project will take place on Wednesday, December 13, 2006 at 10:00 a.m. City of Santa Barbara Mayor Marty Blum will join members of the City Council and other elected and appointed officials, City staff, neighbors and interested community members to celebrate completion of an ultraviolet (UV) light facility to remove harmful bacteria in the Westside Storm Drain at Bohnett Park. The ceremony will be held onsite at Bohnett Park (San Andres and West Victoria).

Community members are invited to the Ribbon Cutting Ceremony to tour the project and learn more about how it will improve water quality in Old Mission Creek, provide safer conditions for children in Bohnett Park, and contribute to a healthier ocean at East Beach. The Westside Storm Drain drains urban runoff from 632 acres and is known to contain contaminated water. The water from the drain discharges to Old Mission Creek and continues downstream to Mission Creek and East Beach where beach warnings are posted when indicator bacteria levels are high.

The Westside SURF project will divert dry weather urban runoff from the Westside Storm Drain to an ultraviolet (UV) light treatment facility. As part of the pre-treatment process, oil, grease and sediment are removed. The water then passes by ultraviolet light and is disinfected before it returns to the drain and is discharged to Old Mission Creek.

The project is funded by a grant from the State Water Resources Control Board pursuant to the Clean Beaches Initiative under the California Clean Water, Clean Air, Safe Neighborhood Parks, and Coastal Protection Act of 2002 (Proposition 40), and by hotel visitors through Measure B.

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VOLUME 1 ISSUE 189

**FRIDAY,
DECEMBER 15**

TODAY'S WEATHER



Cloudy and
Cooler
-HIGH: 68°



Facility will clean up water

BY CHRIS MEAGHER

DAILY SOUND STAFF WRITER

The city's Westside Summer Urban Runoff Facility (SURF) Water Quality Improvement Project has been completed, and with its completion city officials are confident that the water quality in both Mission Creek and near East Beach will be much improved.

The westside stormdrain drains runoff from 632 acres of the city.

The project is "contributing to improved water quality along Mission Creek and ultimately East Beach," Blum said.

The \$1.05 million project cost was offset by a \$900,000 grant from the State Water Resources Control Board, as well as Measure B, a tax increase on hotel visitors to fund the Creeks Restoration and Water Quality Improvement Program.

When dry weather urban runoff enters the storm drains in the 632-acre area, all the pipes direct the runoff to the facility, located below Bohnett Park at the intersection of San Andres and West Victoria streets. Oil, grease and sediment are all removed, and then water passes through the ultraviolet light treatment facility which disinfects the water and sends it back to the drain to be discharged into Old Mission Creek, which then travels to the ocean near East Beach.

The dirty water travels to the sanitation sewer.

The ultraviolet facility can only zap the water so fast, which means the SURF is designed for just urban runoff, not storm water. It can process 100 gallons per minute, which is enough to handle the day-to-day runoff, but not rain.

When a storm rolls through and pro-

See **DRAINS**, page 6

SANTA BARBARA DAILY SOUND / Janelle Holcombe

Santa Barbara Mayor Marty Blum cuts the ribbon in honor of the completion of the city's Westside Summer Urban Runoff Facility (SURF) Water Quality Improvement Project. The \$1.05 million project cost was offset by a \$900,000 grant from the State Water Resources Control Board, as well as Measure B, a tax increase on hotel visitors to fund the Creeks Restoration and Water Quality Improvement Program.



SANTA BARBARA DAILY SOUND / Janelle Holcombe

The \$1.05 million Westside Summer Urban Runoff Facility (SURF) Water Quality Improvement Project has been completed by the city.

DRAINS

FROM PAGE 1

duces more rain than the facility can handle, it just shuts down.

Which works out fine — most of the bacteria and negative runoff goes to the creek in non-rainy conditions.

“This system is very effective during the non-rainy season,” said Dave Cohen from Precision Analytical, the company contracted by the city for the ultraviolet facility.

Doug Clay from Specialty Construction, another contractor, call the project “somewhat simplistic” in design and functionality, and the maintenance was easy.

The project was merely conceptual for a long time, according to Jill Zachary, the city’s creeks manager.

Children often play in or near the creek and ocean water, many times when the bacteria levels are dangerously high.

In 2002 the city looked at how to improve the water quality on the westside, and the location was determined in 2003.

When the city won the \$900,000 grant, the decision to go through with the project was made.

The facility is all underground, and a “pocket park” will be built over it, a “little oasis” according to Billy Goodnick⁴⁵ of the city’s parks and recreation department.

Construction Photos



WESTSIDE WATER QUALITY IMPROVEMENT PROJECT (Summer Urban Runoff Facility)

Ribbon Cutting Ceremony – December 13, 2006

The City of Santa Barbara has completed construction of an ultraviolet (UV) light facility to remove harmful pathogens in urban runoff in the Westside Storm Drain. The project will improve water quality in Old Mission Creek, provide safer conditions for children in Bobnett Park, and contribute to a healthier ocean at East Beach.

AGENDA

- I. WELCOME – Mayor Marty Blum
- II. INTRODUCTION AND ACKNOWLEDGEMENTS – Jill Zachary, Creeks Division Manager
- III. PROJECT ELEMENTS
 - Jill Zachary, Creeks Division Manager
 - Doug Clay, Specialty Construction
 - David Cohen, Precision Analytical
- IV. RIBBON CUTTING AND FACILITY TOUR

ACKNOWLEDGEMENTS

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Project Sponsor: City of Santa Barbara Creeks Division, Parks and Recreation Department

Project Team

City of Santa Barbara Creeks Division, Parks and Recreation Department
City of Santa Barbara Engineering Division, Public Works Department
City of Santa Barbara Water Resources Division, Public Works Department
County of Santa Barbara Flood Control District
URS Corporation
Specialty Construction
Precision Analytical
Pacific Rim Automation



Westside Water Quality Improvement Project

1. Westside Storm Drain

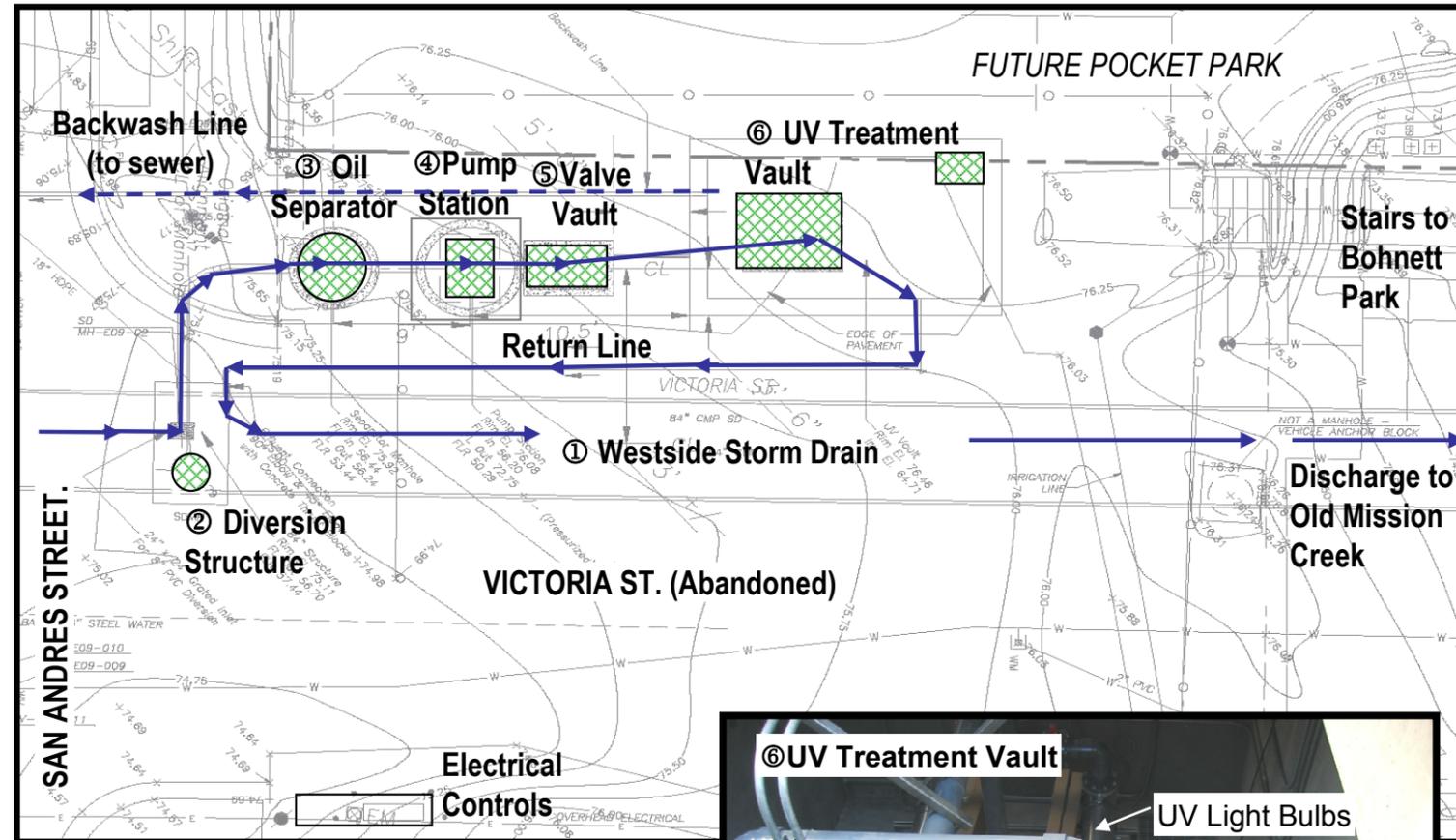
- ✓ Drains 632 acres
- ✓ Known to contain contaminated water
- ✓ Discharges to Old Mission Creek at Bohnett Park, where children play in the water
- ✓ Flow continues downstream to Mission Creek and East Beach, where beach warnings are posted when contamination levels are high.

2. Diversion Structure

- ✓ 18' deep
- ✓ Low-flow channel diverts summer flows to treatment facility
- ✓ High flows continue downstream
- ✓ Receives treated effluent from return line

3. Oil Separator Manhole

- ✓ Pre-treats water by removing oil, grease, and sediment
- ✓ 5' diameter, 22' deep



4. Pump Station

- ✓ Pumps water up to valve vault and UV treatment facility
- ✓ 6' diameter, 26' deep
- ✓ Two pumps alternate operation, pumping up to 100 gallons per minute
- ✓ Measured summer flows are around 60 gallons per minute

5. Valve Vault

- ✓ Contains check valves to prevent backflow to storm drain and creek
- ✓ 5' x 3', 4' deep

6. UV Treatment Vault

- ✓ Contains three large filters to remove fine sediment
- ✓ Water passes by ultraviolet light bulbs that disinfect water
- ✓ Filters are cleaned by backwashing and water flows to sewer lines
- ✓ 22' x 14', 12' deep

