Brown AND Caldwell

Technical Memorandum

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Prepared for: Bay Area Stormwater Management Agencies Association (BASMAA)

Project Title: Stormwater Diversion Pilot Projects (C.11.f / C.12.f)

Project No: 140589

Technical Memorandum

Subject: Status Report on Candidate Pilot Diversion Projects

Date: August 12, 2011

To: Geoff Brosseau, Executive Director, BASMAA

From: Khalil Abusaba, Supervising Scientist

Copy to: Stormwater Diversion Pilot Projects Oversight Committee

Prepared by: Khalil Abusaba, Ph.D.

1. Executive Summary

This Status Report summarizes activities by Permittees to implement actions required under provisions C.11.f and C.12.f of the Municipal Regional Stormwater National Pollutant Discharge Elimination System (NPDES) Permit (Order No R2-2009-0074), more commonly referred to as the Municipal Regional Permit (MRP). Provisions C.11.f and C.12.f of the MRP are nearly identical provisions for control of mercury (C.11) and polychlorinated biphenyls (PCBs) (C.12) that require the evaluation of pilot diversions to publicly owned treatment works (POTWs) of dry weather urban runoff and/or first flush events from stormwater pump stations. The pilot projects are being evaluated in parallel with other BMP pilot implementation projects, including stormwater treatment retrofits, sediment management pilot projects, and source investigations to identify contaminated sites.

The MRP establishes the following reporting requirements for Permittees:

- **Summarize the results of a feasibility evaluation in the 2010 Annual Report.** On behalf of all MRP Permittees and as part of their 2010 Annual Reports, a Feasibility Evaluation Report was submitted to the San Francisco Bay Regional Water Quality Control Board (Water Board) via the BASMAA Regional Pollutants of Concern and Monitoring Supplement that included selection criteria for candidate diversion projects and a time schedule for pilot projects implementation (Table 1). Delete Table 1? Probably not helpful to have a generic table at this point.
- **Report the status of pilot studies in each subsequent Annual Report** - This Status Report serves in compliance with this MRP requirement.
- Integrated Report Summary – The MRP also requires Permittees to include in the March 15, 2014 Integrated Report information on pilot program effectiveness, mercury loads reduced, and updated feasibility evaluation procedures to guide future diversion project selection.

During 2010 – 2011, stormwater program representatives (on behalf of Permittees) implemented the screening process proposed in the 2010 Feasibility Evaluation Report to propose five candidate and five alternate pilot diversion projects. Representatives met to refine the list based on expected learning benefits, opportunity areas, and constraints identified in the Feasibility Evaluation Report. Staff of the Water Board attended meetings in October 2010, April 2011, and June 2011 to provide their comments on proposed pilot projects. At that time, stormwater program representatives and Water Board staff concurred that there was likely overlap between evaluations of the proposed diversion pilots and sediment management activities and they could to some extent collectively be carried out in fulfillment of Provisions C.11.d and C.12.d of the MRP.

A refined list of six pilot diversion projects, including at least one for each County regulated by the MRP, is shown in Table 1. The corresponding project areas are indicated in Figure 1.

This status report presents an assessment framework that describes flow and constituent monitoring needed to assess loads reduced and avoided, as well as concepts for infrastructure assessments needed to characterize feasibility, potential impacts, and lessons learned from these planned or potential future pilot diversion projects. Next steps planned for 2011 – 2012 include advancing plans, agreements and designs needed for pilot diversion projects and initiating baseline monitoring. Specific details on the status of each pilot diversion project and next steps are summarized by County in Section 3.0.

Table 1. Proposed Pilot Diversion Projects	
County	**Proposed pilot project**
Contra Costa	Dry weather hard-piped diversion from North Richmond pump station into West County Sanitation District POTW
Alameda	1. Dry and wet weather hard-piped diversion from Ettie Street pump station into East Bay Municipal Utility District POTW 2. Dry weather pipe flushing in Ettie Street pump station watershed into East Bay Municipal Utility District POTW
Santa Clara	Dry and wet weather hard-piped diversion from existing structure in Palo Alto to Palo Alto Regional Water Quality Control Plant
Solano	Dry season and first flush vactor truck cleanout of State St. pump station and discharge into Fairfield-Suisun Sewer District POTW
San Mateo	Dry weather street flushing in the Pulgas Creek pump station watershed into South Bayside System Authority POTW.

Figure 1. Locations of Planned Pilot Diversion Projects

2. Background

This Technical Memorandum describes the six stormwater diversion pilot projects that are being planned by Bay Area stormwater programs (on behalf of Permittees) in compliance with provisions C.11.f and C.12.f of the MRP. The MRP requires Permittees to implement control measures on a pilot scale to determine their effectiveness and technical feasibility for reducing discharge of PCBs and mercury to urban runoff. Provisions C.11.f and C.12.f of the MRP are nearly identical provisions for control of mercury (C.11) and polychlorinated biphenyls (PCBs) (C.12) that require the evaluation of pilot diversions of dry weather urban runoff and/or first flush events to publicly owned treatment works (POTWs). The pilot projects are being evaluated in parallel with other BMP pilot implementation projects, including stormwater treatment retrofits, sediment management pilot projects, and source investigations to identify contaminated sites. The MRP requires a minimum of one such pilot diversion project in each county covered by the MRP (Contra Costa, Solano, Alameda, Santa Clara, and San Mateo).

Pilot projects will be led by stormwater management programs and/or their affected Permittees, with coordination and facilitation provided through the Bay Area Stormwater Management Agencies Association (BASMAA). The first deliverable required by provisions C.11.f and C.12.f was a Feasibility Evaluation Report (FER). Representatives of stormwater programs met on a monthly basis from June 2010 through December 2010 to provide oversight and direction on completion of the FER. That deliverable was submitted to the Water Board by BASMAA on behalf of all member agencies and their respective Permittees by September 15, 2010, for incorporation by reference in Permittee/Program Annual Reports. The FER was later revised based on input from the Water Board (the revised version is dated December 1, 2010).

The proposed selection criteria presented in Table 2 below were included in the FER and were designed to assist in the identification of five primary candidates and five alternate candidates for diversion pilot projects. The selection criteria are based on needs, costs, and acceptability of candidate pilot projects.

Table 2. Selection Criteria and Information Needed

Criteria		Information Needed
Needs	Will the pilot project likely yield a significant benefit to mercury and / or PCBs in receiving waters?	PCB concentrations in sediments from the local drainage; Pump station inventories in GIS and tabular formats Event-mean PCB concentrations in stormwater; TSS and flow measurements; Drainage area assessments
	Will the pilot project provide unique or new information?	Peer review from Technical Oversight Committee
	Does a pilot project fit into the broader regional context of pilot-testing a range of pollutant control strategies, including pollution prevention, site remediation, enhanced sediment management, and stormwater treatment retrofitting strategies?	Peer review from Technical Oversight Committee
Costs	Are the capital and operation and maintenance costs associated with diversion prohibitive?	Site investigations Conceptual designs and drawings Preliminary site-specific cost estimates Treatment and connection costs/charges.
Acceptability	Is there an accessible POTW willing and able to provide treatment service?	POTW service area map Communication with POTW managers
	Can the pilot diversion be sited within acceptable design criteria?	Pre-design checklist assessment (Table 1 of FER)

3. Proposed Pilot Projects

This section describes the pilot diversion projects being developed in each MRP county. Details are provided on the locations, approach, expected learning benefits, and current status of each project.

3.1 Contra Costa County

3.1.1 Pilot Project Overview

The Contra Costa County Flood Control and Water Conservation District (CCC-FCWCD) , a copermittee of the Contra Costa County Clean Water Program (CCCWP), is planning a dry weather diversion from the North Richmond Pump station into the West County Sanitation District (WCSD). The pilot project is an opportunity area because it involves a pump station favorably located with respect to the collection system infrastructure. CCC-FCWCD sought and obtained grant funding administered by the San Francisco Estuary Project through U.S. EPA's San Francisco Bay Area Water Quality Improvement Fund. The project is one of several in the "Estuary 2100 Phase 2: Building Partnerships for Resilient Watersheds" program. The grant provides $496,649 in EPA funds, matched by $165,550 from CCC-FCWCD to plan, design, construct, and monitor an engineered diversion into WCSD.

The project is located in a 339 acre watershed comprised mainly of industrial and residential land uses (Figure 2, Figure 3). Because of the watersheds' proximity to older industrial areas known to have elevated PCB concentrations in sediments, and the potential for vehicle tracking and other processes to mobilize PCBs into a "halo" area around sources, this watershed is a useful location to study removal of PCBs.

The plan will proceed in two phases: monitoring and feasibility evaluation (Phase 1), followed (if determined to be feasible) by construction, diversion, and assessment (Phase 2). During the initial monitoring phase, both dry season events and wet season events are planned. One of the wet season monitoring events would provide evenly spaced grab samples across the hydrograph to characterize pollutant distributions over time; other wet season events and all dry season events would characterize pollutants in composite samples. Therefore, although the diversion itself is limited to dry weather because of wet weather capacity constraints, monitoring will provide learning benefits about the potential for pollutant load reductions in wet weather and dry weather.

The expected learning benefits from this pilot diversion project include:

- What is the feasibility and cost of designing and constructing a pump station diversion?
- What are the loads of PCBs and mercury reduced by dry weather diversions?
- What are the permitting procedures in a situation where the pump station owner has no formal connection or relationship to the treatment plant service provider?
- What ancillary water quality benefits are obtained, in addition to PCBs and mercury?
- How can controls be implemented to differentiate wet weather vs. dry weather discharges?
- Does the diversion impact collection system capacity and / or treatment plant operations?

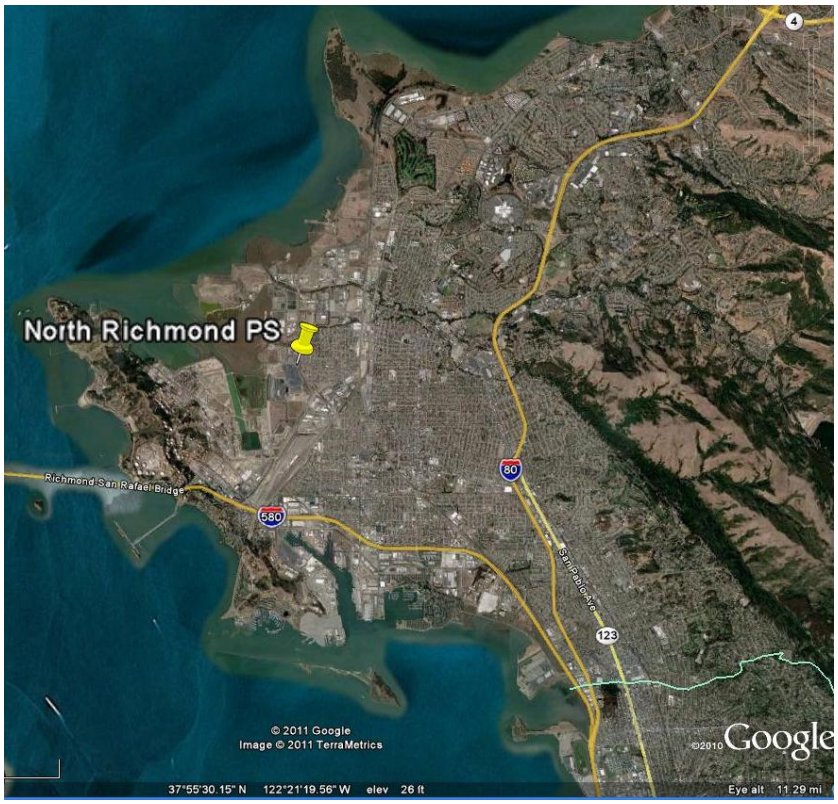

Figure 2. Regional Setting of North Richmond Pump Station Diversion

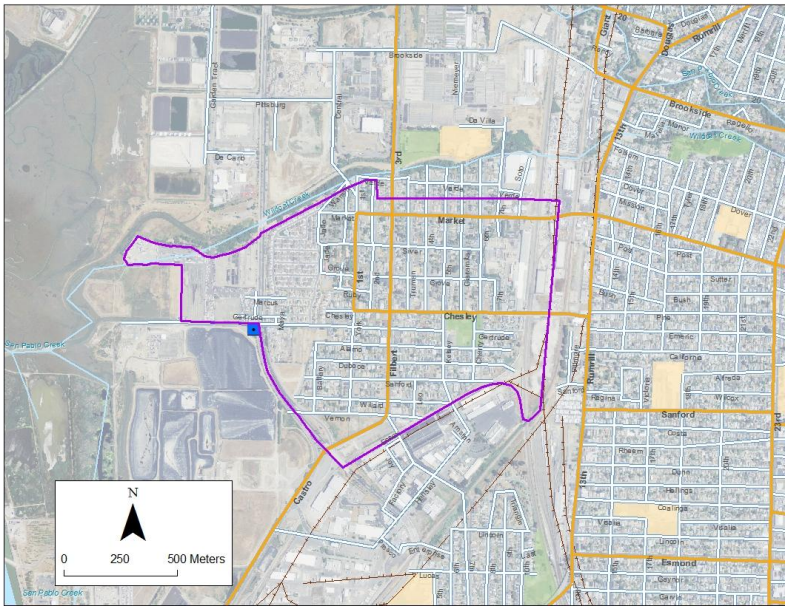

Figure 3. Delineation of Watershed Served by North Richmond Pump Station

Figure from Draft Quality Assurance Project Plan Developed by SFEI

3.1.2 Current Status

A project work plan has been completed, and the San Francisco Estuary Institute (SFEI) has been contracted by the CCC-FCD to provide monitoring services. The watershed has been delineated. A Sampling and Analysis Plan has been completed and dry season baseline monitoring has commenced. Monitoring results are being evaluated by the WCSD to determine whether they meet local limits.

3.1.3 Additional Sediment Management Pilot Project Opportunities

During the conduct of site investigations to implement Provisions C.11.d (enhanced sediment management practices), a storm drain inlet was identified that may be a useful location to evaluate the load reduction benefits of inlet cleaning. A storm drain located at Second Street and Cutting Blvd, in Richmond was inspected after late spring rain storms in May and June of 2011 and found to be clogged. The inlet has been found to have sediments with elevated PCBs in the past.

In preparation for the 2011 - 2012 storm season, The City of Richmond and the CCCWP plan to coordinate with the Veolia Water (The City of Richmond's contractor for operating the wastewater and stormwater infrastructure) to collect and analyze PCBs in sediment samples in conjunction with inlet maintenance. Opportunities will be sought to leverage CCCWP resources to derive MRP-related learning benefits pursuant to provisions C.11.d, C.11.f, C.12.fd, and C.12.f while performing this maintenance activity. The CCCWP will discuss with the City of Richmond and Veolia Water options for disposal of the wash water from the cleanout, including the potentially diverting wash water into the sanitary sewer system.

3.2 Alameda County

As shown previously (Table 2), two pilot projects are proposed in Alameda County:

- Pilot Project No. 1 - Dry and wet weather hard-piped diversion from Ettie Street pump station into East Bay Municipal Utility District POTW
- Pilot Project No. 2 - Dry weather storm drain piping flushing in Ettie Street pump station watershed into East Bay Municipal Utility District POTW

3.2.1 Pilot Project No. 1 Overview

Alameda Countywide Clean Water Program (ACCWP) is planning a pilot diversion project from the Ettie Street Pump Station into the East Bay Municipal Utility District (EBMUD). The Ettie Street Pump Station watershed has been previously identified as impacted by PCB-contaminated sediments as a result of historic land uses[1]. The pump station serves an approximately 1000 acre watershed in an industrialized watershed where some redevelopment has occurred (Figure 4, Figure 5). Some property-specific cleanups have occurred in the watershed as a result of municipal inspections and outreach to property owners. In addition, a pilot project was conducted by EBMUD at that location that involved dry weather diversion and characterization of forebay water during both wet and dry weather[2].

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[1] See references in Yee, D. and L.J. McKee, *Concentrations of PCBs and Hg in soils, sediments and water in the urbanized Bay Area: Implications for best management*. SFEI Contribution 608 March 2010.

[2] East Bay Municipal Utilities District. *Environmental Enhancement Project and Supplemental Environmental Project. Characterization of Stormwater Flows, Diversion of Dry Weather and First Flush Flows to a Publicly-Owned Treatment Works. Final Report.* July 2010.

ACCWP's Ettie Street pump station diversion pilot project is intended to address the following technical and management questions:

- Technical:
  - What is the average and range of variability for PCB and mercury concentrations in stormwater passing through the Ettie St. Pump Station, and how does that compare with previously reported results from EBMUD and the RMP?
  - What is the particle size distribution of suspended sediments in runoff entering the Ettie St. Pump Station, and how do concentrations and mass of PCBs and mercury partition among the size fractions?
- Implementation
  - What are the permitting procedures in a situation where the pump station owner (Alameda County Flood Control and Water Conservation District) has no formal connection or relationship to the treatment plant service provider?
  - What additional considerations apply when the diversion is implemented through a conveyance owned and operated by another jurisdiction (City of Oakland)?
  - What would be the technical and cost considerations for ongoing operation of the pilot diversion?
  - What would be the technical and cost considerations for the stormwater managers if scaling up to a larger diversion?
  - What would be technical, regulatory and cost considerations for EBMUD to accept ongoing or scaled-up pilot diversions? Information needs cited in EBMUD's report include storm-to-storm variability and evaluation of hydraulic capacity.
- Water Quality Benefits
  - What would be the net reductions in PCBs and mercury to the Bay from ongoing or scaled-up diversion from the Ettie Street Pump Station?
  - How would these reductions compare with those resultingfrom alternative reduction strategies based on treatment retrofit a the pump station and/or enhanced sediment management upstream of the pump station?

Planned diversions would consist of two types: after initial pretreatment settling in a storage tank, a complete diversion will discharge the diverted water to the EBMUD plant via the existing City of Oakland sanitary sewer connection at the pump station. In a more limited "study diversion", water from the storage tank will be sampled and released back into the pump station forebay. ACCWP plans to conduct two to four complete diversions, for which it will obtain permission and permits as needed from the city and EBMUD.

For each diversion, a fixed volume of urban runoff entering the Ettie St. Pump Station will be diverted to an above ground storage tank installed adjacent to the Pump Station forebay. Due to limitations on available space and safe bearing loads that can be applied to the soil adjacent to the forebay, the tank volume is expected to be no more than 500 gallons. Figure 6 is an aerial image and schematic of the proposed diversion tank and pump station features.

To optimize capture of PCBs in the diverted volume, diversion from the forebay to storage tank will be triggered by turbidity levels from a sensor installed in the forebay. The turbidity threshold value will be based on a review of recent stormwater data from the pump station and other Bay Area urban stormwater monitoring locations. Once the predetermined turbidity threshold is exceeded, a submersible pump will begin filling the storage tank. Automated samplers will be programmed to characterize forebay concentrations of PCBs, mercury and suspended sediment throughout the sampled event and also at the times of diversion.

At least three wet weather events and one dry weather event will be diverted and sampled. Complete diversions will be implemented for at least two events.

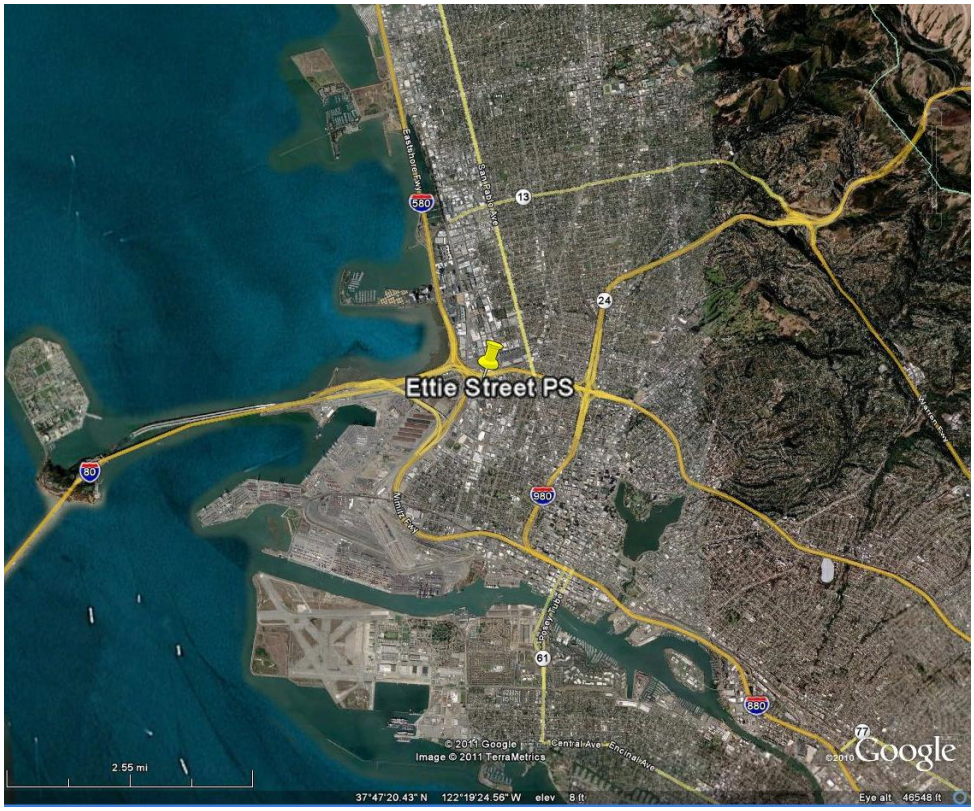

Figure 4. Regional Setting of the Ettie Street Pump Station Diversion

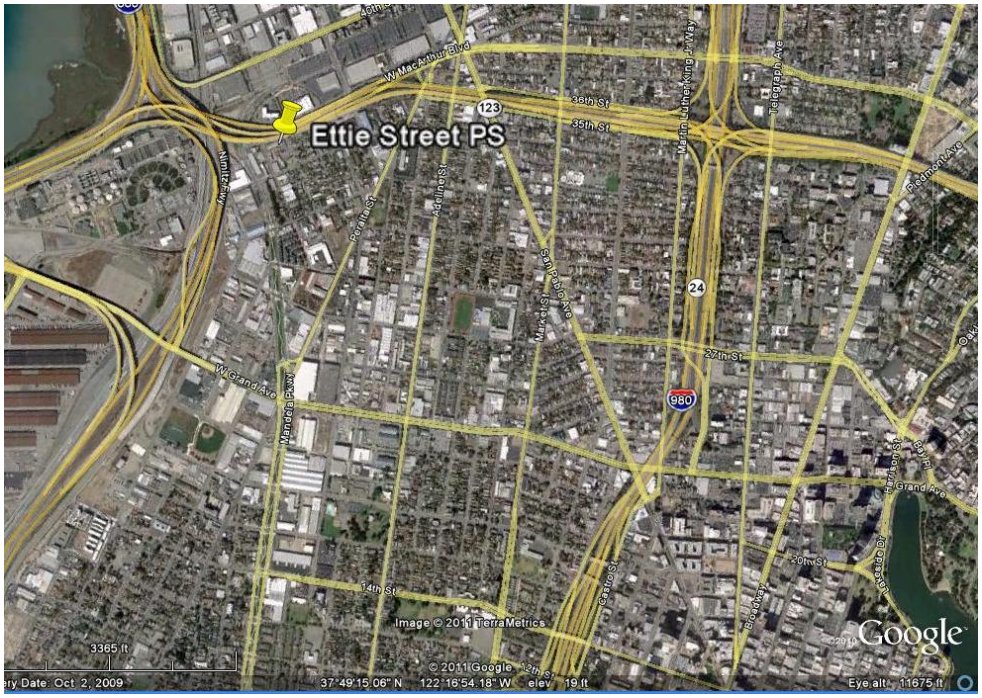

Figure 5. Close-up of area served by Ettie Street Pump Station.

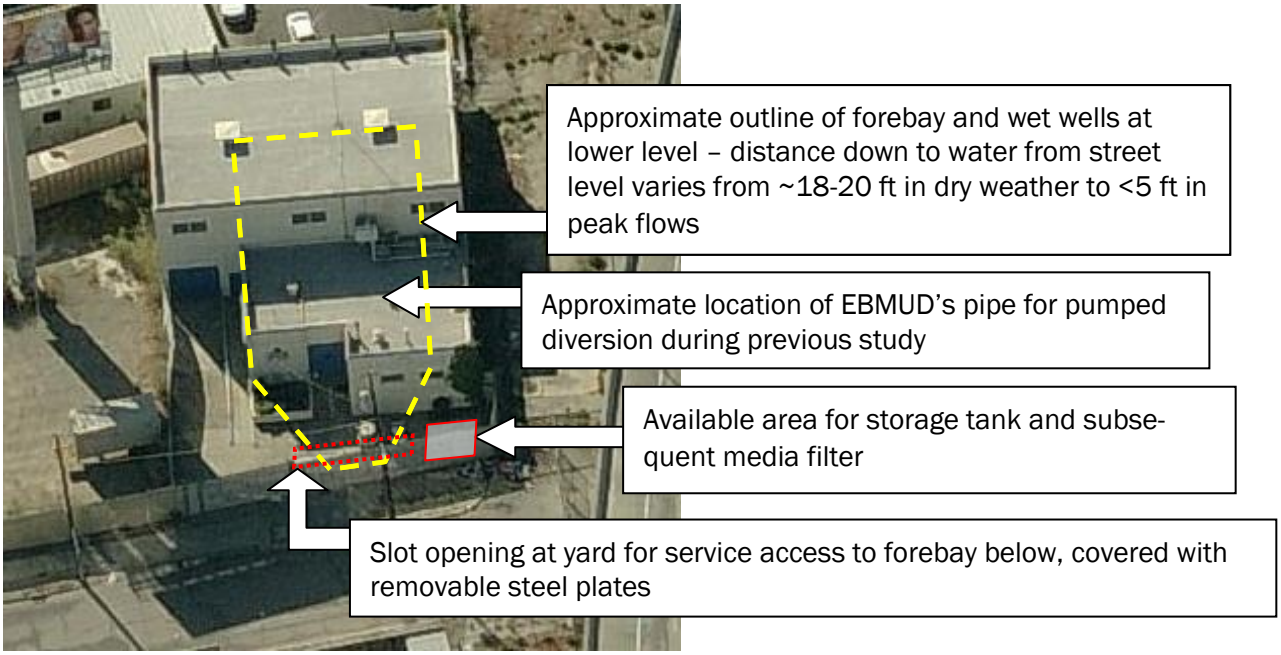

Figure 6. View of Ettie Street Pump Station from the east, with schematic outline of forebay below and approximate diversion tank location in northeast corner of yard

3.2.2 Current Status of Pilot Project No. 1

Larry Walker Associates has prepared a draft memo describing the study design and workplan for the pilot project, based on previous discussion with EBMUD staff. Proposed target milestones for implementation include:

- July-August 2011 obtain concurrence from ACFCWCD, EBMUD and ACCWP on workplan details
- September 2011 Prepare Sampling and Analysis Plan, install diversion tank and samplers
- Winter 2011-12 Conduct pilot diversions and associated monitoring
- July 2012 Report on characterization of diversions
- July 2013 Final project report

3.2.3 Pilot Project No. 2 Overview

The second pilot project being developed in the Ettie Street Pump Station drainage is storm drain piping flushing into the local sanitary sewer collection system served by EBMUD's regional wastewater treatment plant.

The management questions this pilot project would address include:

- Technical challenges:
  - What are the operational challenges and constraints to performing piping flushing and routing the wash water to a POTW?
  - What are the operational challenges and constraints to the POTW receiving this diversion?
- Water quality benefits:
  - What are the PCB and Hg load reduction benefits derived from piping flushing in an old industrial area with elevated PCBs?
  - Are there specific flushing methods and approaches that are more or less effective for removing sediments that contain PCBs and other pollutants?
  - Can piping flushing and follow-up monitoring help identify ongoing sources of PCBs into the stormwater conveyance system?

This type of project essentially entails creating an artificial “first flush,” capturing the flows, and diverting to a POTW. This approach avoids the relatively high costs of diversion structure capital improvements and therefore may be more practical for wider implementation in the future, especially in the short-term.

3.2.4 Current Status of Pilot Project No. 2

The proposed target milestones for implementation of this project include:

- September 2011 - March 2012: ACCWP staff to work with staff from the City of Oakland, ACFCWCD, and EBMUD and the CW4CB Sediment Management Workgroup to prepare a detailed project work plan, including a Sampling and Analysis Plan.

- April - June 2012: ACCWP staff to work with staff from the City of Oakland, ACFCWCD, and EBMUD and the CW4CB Sediment Management Workgroup to plan mobilization of field crews and flushing/monitoring equipment.
- Summer 2012: Conduct piping flushing fieldwork and associated monitoring.
- January 2013: Prepare draft report that documents field methods and evaluates results.
- July 2013: Finalize project report.

3.3 Santa Clara County

3.3.1 Pilot Project Overview

The pilot diversion project that will be implemented and evaluated by the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP), in cooperation with the City of Palo Alto is an existing dry and wet weather diversion structure located in the City of Palo Alto (Figure 6). The diversion structure was constructed in 1993 to divert a limited volume of urban runoff from the stormwater conveyance system to the Palo Alto Regional Water Quality Control Plant. The area draining to the diversion structure is roughly 50 acres and is bound by Hamilton Avenue, Bryant Street, Channing Avenue and Alma Street (Figure 7). The diversion structure's drainage area is comprised of commercial, light industrial, multi-family residential and other land uses. The site was originally selected by the City of Palo Alto because of the land use in the drainage area, the proximity of the sewer trunk line to the storm drain line, and because the sewer trunk line (27" Channing Avenue sewer trunk line) was determined to have excess capacity.

The City of Palo Alto diversion project will address the following management and technical questions:

- Project implementation
  - Construction:
    - What were the challenges and constraints to constructing this diversion?
    - What are the operational challenges and constraints to operating and maintaining this diversion?
  - Operation:
    - What are the operational challenges and constraints to the POTW receiving this diversion?
  - Costs:
    - What were the capital costs of constructing this diversion structure?
    - What are the costs associated with operation and maintenance(O&M) of the diversion structure?
    - What are the additional O&M costs to the POTW receiving the diversion?
    - How do the construction and O&M costs and constraints compare to those of the other pilot strategies outlined in MRP provisions C.11 and C.12?
- Technical & Water Quality
    - What percentage of dry and wet weather flows are diverted under current operation?
    - What are the suspended sediment particle size distributions in wet weather runoff from the drainage area, and how do they change under different flow conditions?
    - What are the water quality benefits and operational challenges of the diversion structure under different flow conditions?

- What are the projected benefits and challenges of operating a similar diversion structure in a larger drainage area and/or an area known to have elevated concentrations of PCBs or mercury?
  - How do these load reductions compare to other pilot strategies outlined in MRP provisions C.11 and C.12 to manage PCB and mercury loads?
  - What are the other benefits to receiving water quality?

Figure 6. Regional Setting of City of Palo Alto Pilot Diversion Project

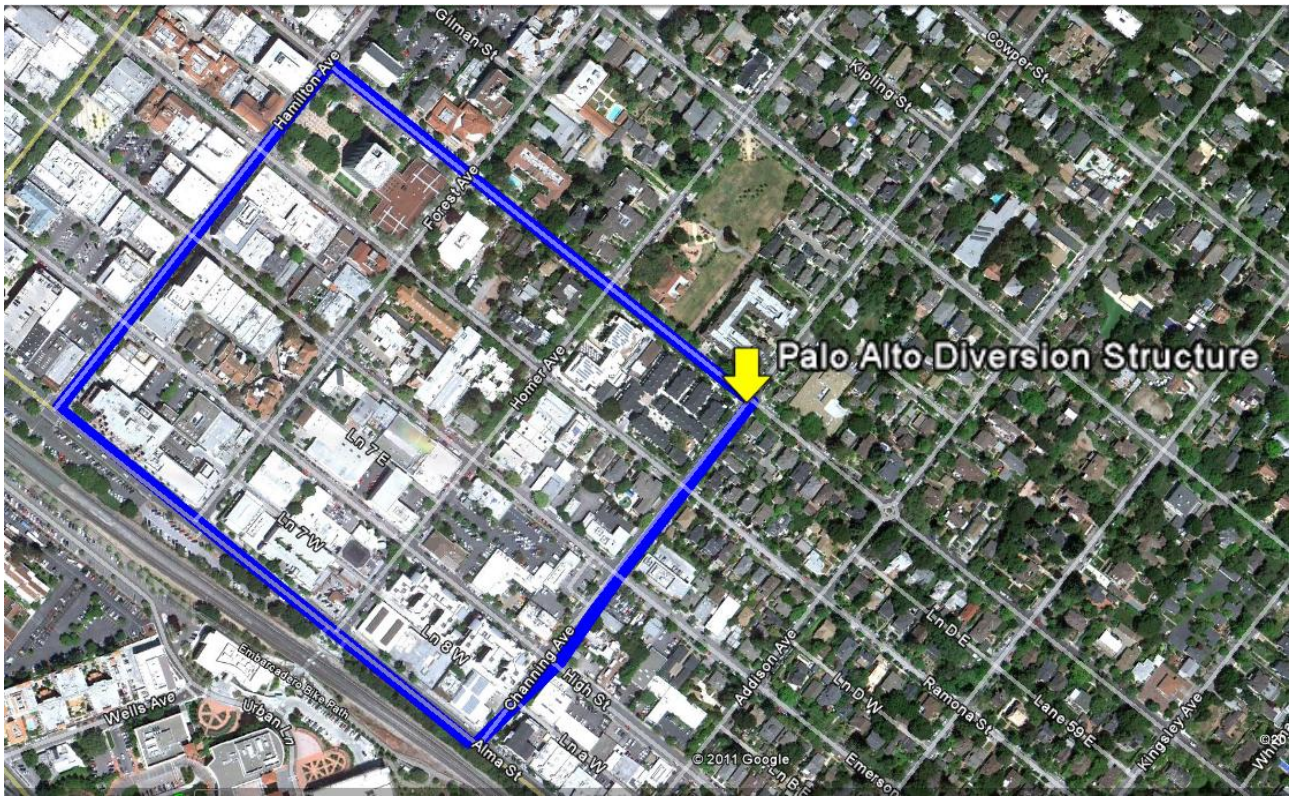

Figure 7. Drainage Area Served by the Palo Alto Diversion Structure

The City of Palo Alto diversion structure includes two valves: a vortex valve and plug valve. The vortex valve is designed to continually regulate flows to the sewer line to reduce erosive velocities. The plug valve diverts flows from the stormwater conveyance system until a designed capacity of 350 gpm (0.78 cfs) is reached. It is estimated that wet weather diversions to the sanitary sewer occur up to a rainfall intensity of 0.33 inches per hour. In addition, the structure was designed with a bar screen to collect large debris and allow solids to settle to the bottom of the vault. The City's maintenance crew regularly cleans out the accumulated debris with a vactor truck.

This pilot diversion project provides a contrast to the other projects described in this status report due to the fact that it requires no pumping (passive) and it has been in place for a number of years, which will provide Permittees with a better understanding of the long-term costs and challenges and assist in addressing the various management and technical questions listed above.

3.3.2 Current Status

SCVURPPP is currently developing a work plan for the Palo Alto Pilot Diversion Project that will guide data and information collection activities over FYs 2011-12 and 2012-13. The work plan will consist of background information, a summary monitoring and cost data collected to-date, and a monitoring/modeling plan. The work plan is expected to be completed in fall 2011. Monitoring will likely initiate during the winter 2011-12 (Water Year 2012) and continue through the winter of 2012-13. Once complete, the monitoring plan will be shared with the BASMAA Pilot Diversion Projects Oversight Committee and the Water Board via the SCVURPPP website.

3.3.3 Additional Sediment Management Pilot Project Opportunities

In addition to the Palo Alto Pilot Diversion Project, SCVURPPP Permittees are also planning two additional projects in the in the Leo Avenue watershed (City of San Jose) that are assessing the ability to remove sediment-bound PCBs and mercury via enhanced street sweeping and stormwater treatment. This location was previously identified in a case study follow-up to the 2001 Joint Stormwater Agencies Project investigation of PCBs in bedded storm drain sediments[3]. This location was evaluated a potential diversion site, but was not located near the necessary size of sanitary sewer system infrastructure for an effective diversion. These projects will complement the Palo Alto Pilot Diversion Project and through planned stormwater monitoring located upstream of the Leo Avenue stormwater treatment devices (i.e., hydrodynamic separator) and simple spreadsheet modeling, they may collectively provide the opportunity to predict the benefits of constructing a structure similar to the Palo Alto diversion structure in a larger drainage area with elevated PCB or mercury concentrations. Additionally, SCVURPPP will continue to collaborate with other stormwater programs carrying out diversion projects to evaluate the effectiveness, such as cost per pound of pollutant, of this management approach to reduce PCB and mercury loads to the Bay.

[3] City of San Jose and EOA. 2003. Year Two Case Study Investigating Elevated Levels of PCBs in Storm Drain Sediments in San Jose, California.

3.4 Solano County

3.4.1 Pilot Project Overview

The Fairfield-Suisun Urban Runoff Management Program (FSURMP) is implementing operational changes at the State Street pump station in the City of Fairfield. Operational changes to be evaluated include: shutting off the stormwater pump station during dry weather; removing standing water in the pump station wet well by vactor truck throughout the dry season and before first flush. Water removed is discharged into the Fairfield Suisun Sewer District collection and treatment system. This pilot project is being implemented to address low dissolved oxygen levels that have been found during dry weather conditions, in compliance with Provision C.2.d of the MRP. Additional monitoring for mercury and PCBs will be implemented to fulfill the requirements of provisions C.11.f and C.12.f.

The pumping station is serves a watershed area of approximately 6 acres (Figure 8, Figure 9). The contributing area is commercial land use (a significant percentage of which is automotive repair).

The expected learning benefits include:

- What are the PCB and mercury loads that are removed during dry weather diversion? (the pump station does not have historic data on mercury or PCBs in sediments)
- Does the reduction in loadings of COD/BOD measurably avoid low dissolved oxygen in receiving waters?
- Does avoiding low dissolved oxygen in receiving waters provide a benefit by reducing methylmercury production?
- Are there any discernible environmental benefits from the enhanced operational procedures of the stormwater pump station?
- Can additional controls at stormwater pump station(s) inlet(s) have a positive impact on water quality being discharged?
- Is there significant water quality stratification in pump station wet wells?

3.4.2 Current Status

Dry weather vactoring and D.O. monitoring has commenced.

3.4.3 Additional Sediment Management Pilot Project Opportunities

Unlike Contra Costa, Alameda, Santa Clara, and San Mateo County, there is not as much information available on existing locations of contaminated sediments. A stormwater treatment retro-fit is planned to be implemented in Solano County. Evaluation of enhanced sediment management practices are also planned. Sediment assessments conducted prior to those activities are expected to identify opportunity areas for street flushing or drainage inlet cleaning evaluations. To the extent that those evaluations can be coordinated with discharge of flushed water to sanitary sewers, additional learning benefits may be derived.

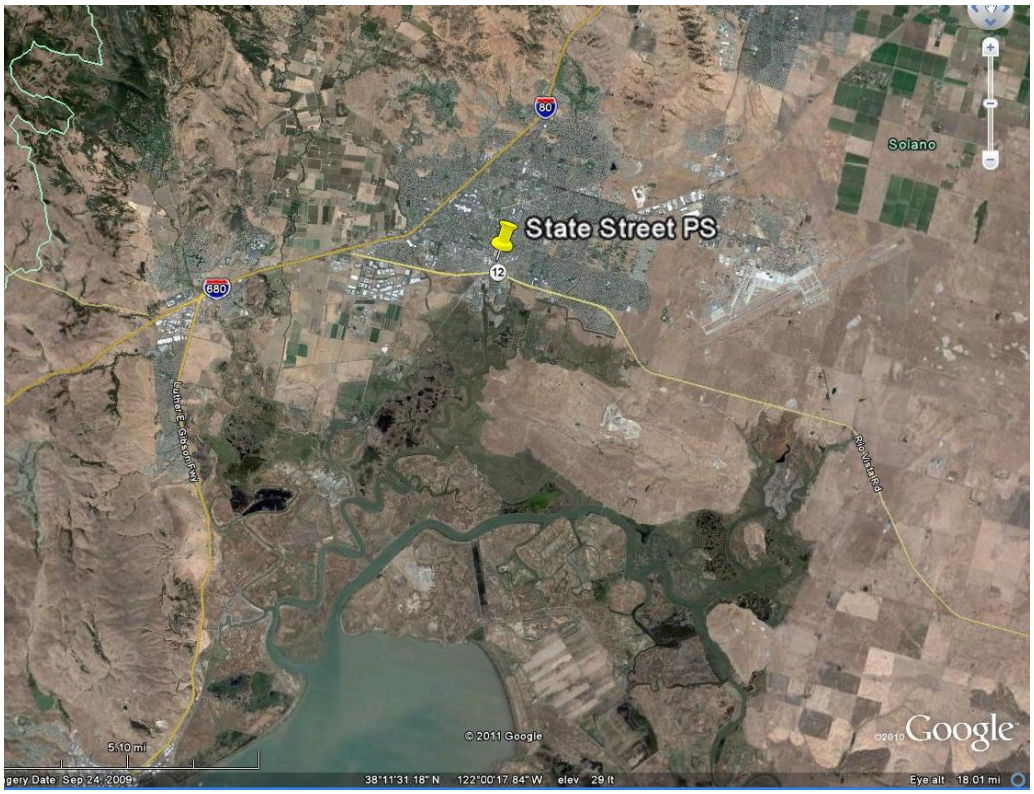

Figure 8. Regional Setting of the State Street Pump Station

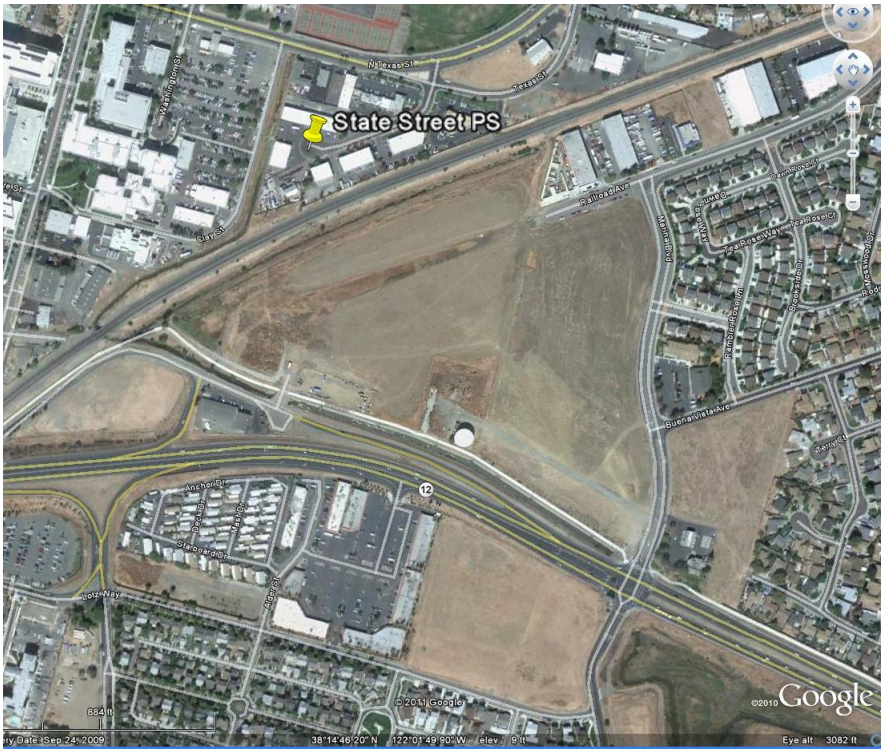

Figure 9. Close View of State Street Pumping Station.

3.5 San Mateo County

3.5.1 Project Overview

The pilot project being developed by the San Mateo County Countywide Water Pollution Prevention Program (SMCWPPP) is street flushing in the Pulgas Creek Pump Station drainage into the local sanitary sewer collection system served by the South Bayside System Authority (SBSA) regional wastewater treatment plant. The approximately 330 acre Pulgas Creek pump station drainage (Figure 10, Figure 11) is located within an old industrial area and has been previously identified as having elevated concentrations of PCBs in storm drain sediments based on a regional dataset compiled by the San Francisco Estuary Institute.

Previous surveys of PCBs in urban runoff sediments revealed relatively high concentrations in samples from the wet well of the Pulgas Creek pump station, which is at the bottom of the watershed. Follow-up investigations confirmed the presence of PCBs and suggested multiple sources within the pump station's watershed. Two possible sources have been identified, a DTSC cleanup site and a PG&E substation, but these sources have not been confirmed and other sources remain unidentified.

The management questions this pilot project would address include:

- Technical challenges:
  - What are the operational challenges and constraints to performing street flushing and routing the wash water to a POTW?
  - What are the operational challenges and constraints to the POTW receiving this diversion?
- Water quality benefits:
  - What are the PCB and Hg load reduction benefits derived from street flushing in an old industrial area with elevated PCBs?
  - Are there specific flushing methods and approaches that are more or less effective for removing sediments that contain PCBs and other pollutants?
  - Can street flushing and follow-up monitoring help identify ongoing sources of PCBs into the stormwater conveyance system?

This type of project essentially entails creating an artificial “first flush,” capturing the flows, and diverting to a POTW. This approach avoids the relatively high costs of diversion structure capital improvements and therefore may be more practical for wider implementation in the future, especially in the short-term.

3.5.2 Current Status

Proposed target milestones for implementation of this project include:

- September 2011 - March 2012: SMCWPPP staff to work with staff from the City of San Carlos and SBSA and the CW4CB Sediment Management Workgroup to prepare a detailed project work plan, including a Sampling and Analysis Plan.
- April - June 2012: SMCWPPP staff to work with staff from the City of San Carlos and SBSA and the CW4CB Sediment Management Workgroup to plan mobilization of field crews and flushing/monitoring equipment.
- Summer 2012: Conduct street flushing fieldwork and associated monitoring.
- January 2013: Prepare draft report that documents field methods and evaluates results.
- July 2013: Finalize project report.

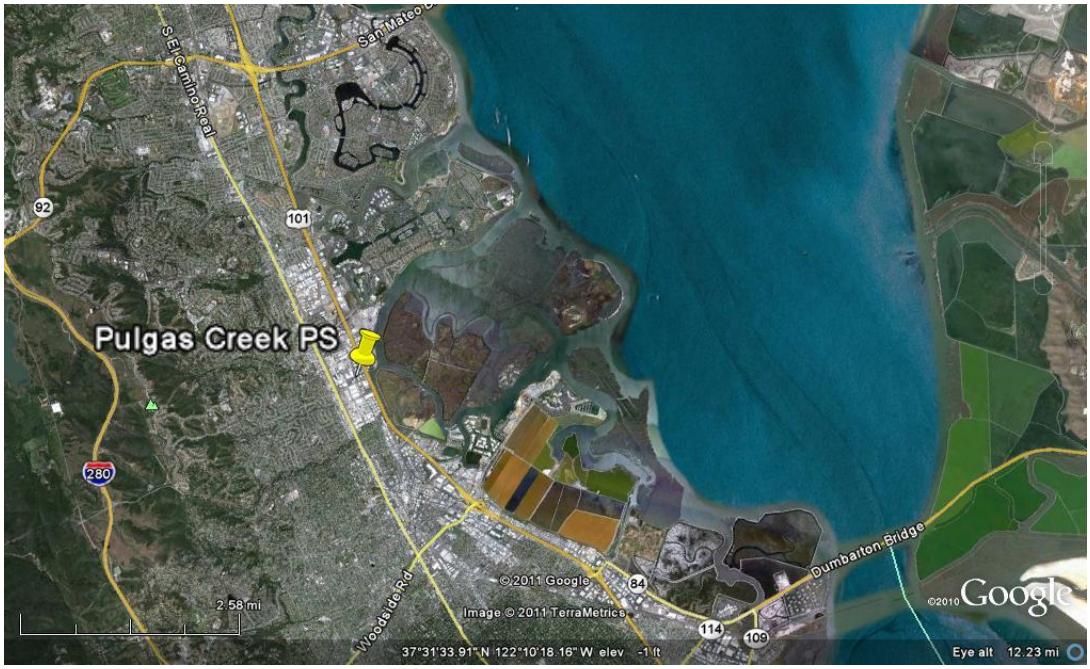

Figure 10. Regional Setting of Pulgas Creek Pump Station.

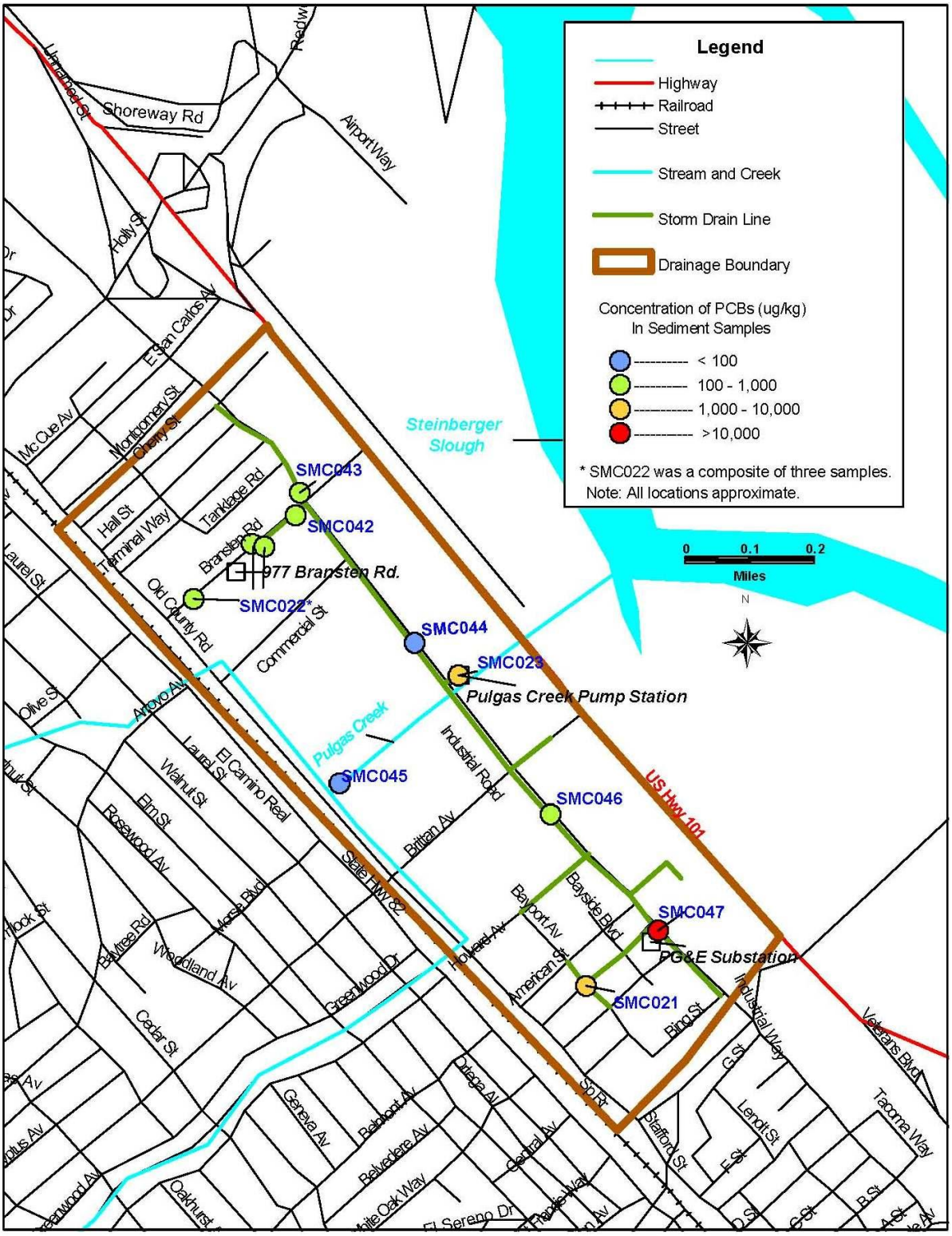

Figure 11. Watershed Delineation of Pulgas Creek Pump Station.

4. Assessment Framework

The monitoring plans for each pilot diversion project will be unique to the project setting and expected learning benefits. This section outlines a framework for assessment that addresses some of the monitoring and assessment issues that are expected to be common among all pilot projects. Assessment tools can be divided into two general questions that any pilot diversion project would need to address:

- What water quality benefits were derived from the pilot diversion?
- What potential future constructability challenges or negative impacts to the receiving POTW could be anticipated as a result of lessons learned from the pilot diversion?

4.1.1 Water Quality Benefits

The Alameda Countywide Clean Water Program has developed a draft monitoring alternatives evaluation for the Ettie Street Pump Station that guides this portion of the assessment framework (Table 3). Monitoring Options are divided into Tier 1 – those considered essential to fulfillment of MRP requirements, and Tier 2, those which provide added value information but are not necessarily required to fulfill MRP requirements. The decision to add Tier 2 options would involve balancing the cost of those added parameters with the value of information gained. For an equivalent cost, limiting the project to Tier 1 Monitoring Options could enable a greater range of spatial and / or temporal coverage.

Table 3. Monitoring Options

	Tier 1	Tier 2
Diversion of dry weather urban runoff and stormwater	Storm event data – rainfall intensity and duration, catchment area, estimated runoff volume Flow data – flow meters, telemetry, pump run times, or number of baker tanks filled Target constituents– mercury, methylmercury, and PCBs MRP Table 8.4 Category 1 Constituents	Suspended Sediment Particle Size* MRP Table 8.4 Category 2 Constituents
Conveyance system cleanouts / street flushing	Volume of water flushed Estimated mass of sediment captured - from disposal manifests, volume estimates of sediments in conveyance systems prior to removal, or TSS times volume of water discharge to POTW during cleanout PCB and mercury concentrations in sediments MRP Table 8.4 Category 1 constituents in sediments Sediment percent fines (<63 microns) Sediment Total organic carbon	MRP Table 8.4 Category 2 Constituents in Sediments Detailed grain size analysis of sediments

**The Alameda Countywide Clean Water Program considers particle size in suspended sediments a Tier 1 constituent for the intended learning benefits of their pilot study.*

4.1.2 Constructability and impacts

Pilot projects have been screened to provide constructible projects that minimize the risk of impacts to receiving POTWs. The 2014 Integrated Report submittal is to include revised selection criteria that would guide future diversion pilot projects. To guide future projects, the revised selection criteria should incorporate lessons learned about potential issues that could affect treatment plants or conveyance systems. Table 4 below summarizes some assessments that could address issues related to impacts on collection systems and POTWs.

Table 4.

Category	Issue	Solution	Action
Collection System	Stormwater diversion exceeds existing collection system hydraulic capacity	Perform capacity evaluation for facilities downstream of planned diversion connection to establish available capacity and maximum allowable stormwater diversion pumping rate.	Desktop or hydraulic model capacity evaluation. Limit stormwater flows to collection system based on evaluation.
	Collection system condition not adequate to handle increased flows.	Perform condition assessment for facilities downstream of planned diversion connection to identify structural or O&M deficiencies that could potentially cause an SSO (roots, grease, pipe collapse, etc.)	CCTV inspection of pipes. Repair or replacement of deficient pipes prior to diversion implementation.
	Hydraulic capacity monitoring after diversion implementation	Monitor flows during wet and dry weather diversions to prevent collection system SSO.	Flow monitoring, SmartCovers (ultrasonic depth measurement devices with warning system), visual wet weather checks at downstream facilities. If flows exceed collection system capacity, stormwater flows should be discharged elsewhere to prevent collection system SSO.
Collection System/WWTP	Trash/debris entering the collection system and/or WWTP could cause obstructions or disrupt processes.	Screen pump station influent to prevent trash from entering collection system/WWTP.	Monitor pump station effluent; clean pump station screening device. Periodic ongoing inspection to monitor increased grit load in the collection system.
WWTP	Stormwater diversion exceeds existing WWTP hydraulic capacity	Confirm that additional hydraulic loading will not exceed capacity of WWTP processes.	Desktop or hydraulic model capacity evaluation. Limit stormwater flows to WWTP based on evaluation.
	Stormwater constituents cause WWTP to exceed effluent discharge limits	Characterization of raw and effluent wastewater to determine WWTP removal rates of stormwater constituents and its impact on the WWTP.	Baseline and periodic sampling during and after discharge events to characterize waste stream (BOD, COD, TSS, ammonia, metals, mercury, PCB, oil and grease, debris).
	Stormwater constituents cause WWTP to exceed discharge limits in biosolids	Long-term characterization of biosolids at a frequent interval following stormwater discharge. Retention time is often 20-30 days following event.	Baseline and periodic sampling following discharge events to characterize biosolids.