Clean Watersheds for a Clean Bay (CW4CB) 
Task 5 Individual Retrofit Pilot Project Report 

Ettie Street Pump Station Media Filter Project 
Alameda County, Oakland, California 

Prepared for 
Alameda Countywide Clean Water Program 

Prepared by 
Geosyntec consultants 

August 2016
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1. INTRODUCTION AND BACKGROUND

The Bay Area Stormwater Management Agencies Association (BASMAA) Clean Watersheds for a Clean Bay (CW4CB) project evaluated a variety of potential control options to reduce mass loadings of polychlorinated biphenyls (PCBs) and mercury in urban stormwater runoff to San Francisco Bay.

The primary objective of CW4CB Task 5 was to select and implement representative urban stormwater treatment retrofit projects. This objective coincided with Municipal Regional Stormwater NPDES Permit (MRP, Order R2-2009-0074) Provision C.12.e, which required the MRP Permittees to identify and conduct on-site pilot treatment projects in ten locations during the MRP term and to document the knowledge and experience gained to provide a basis for determining the scope of implementation of treatment retrofits in subsequent permit terms.

This report presents results of the Ettie Street Pump Station (ESPS) Media Filter Project in Oakland, California and includes descriptions of the project location, treatment measure, planning and design process, construction process and schedule, cost summary, monitoring plan, and challenges and lessons learned.

2. PROJECT LOCATION

The Ettie Street Pump Station (ESPS) Media Filter Project is located in West Oakland, California at 3465 Ettie Street, adjacent to MacArthur Freeway to the north and Nimitz Freeway to the west. The ESPS is an Alameda County Flood Control and Water Conservation District (ACFCWCD) facility that collects and pumps stormwater runoff to San Francisco Bay. The ESPS watershed comprises approximately 1180 acres in West Oakland and includes approximately 42% residential, 38% industrial, and 20% commercial land use areas. The proposed stormwater treatment measure is a media filter system with two parallel filter beds containing different media. The project location and watershed are shown on Figure 1.

The stormwater program representative for the project is Arleen Feng with the Alameda Countywide Clean Water Program (ACCWP).

3. TREATMENT CONTROL MEASURE

The primary stormwater treatment measure consists of installing two parallel media filter beds to treat PCBs and mercury that enter the ESPS from the watershed. The design media filter flow capacity for both filters is limited to approximately 30 gpm. The media filter system will be located at grade outside the ESPS building and will include a pump and pretreatment storage tank. The pump will draw water up from one of the two forebays into the pretreatment storage tank, which is designed to settle out the fine and coarse particulates. Pumping will be triggered during storm events by elevated turbidity readings from a real-time turbidity sensor in the forebay. The flows will then be evenly split between each media bed using flow control valves. One filter bed will contain rhyolite sand and the second bed will contain a mix of media types,
including rhyolite sand, zeolite, and granulated active carbon (GAC). The discharges from the media beds will be combined before returning to the forebay.

4. CONSTRUCTION PROCESS

ACFCWCD and BASMAA entered into a contract in October 2012. WRECO completed the 100% design in December 2013. Appendix A contains the WECO Conceptual Design Memo, Appendix B contains the latest cost estimate dated December 31, 2013, and Appendix C contains the 100% Design Plans. The project has not yet received approval from the Oakland City Council and is currently on hold. At this time, a bid has not been put out and there is no estimated start date for construction.

5. COST SUMMARY

Table 1. Cost Summary

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<td>The total estimated cost does not include the annual O&amp;M costs.</td>
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The total catchment area is 1,180 acres. The total estimated design and construction cost of the project is $103,810. The estimated total cost per unit area is $88 per acre.

6. MONITORING DATA

As the project has not yet been constructed, no monitoring has been conducted to date.

7. PROJECT OUTCOMES AND LESSONS LEARNED

The one major lesson learned at this time is that the permitting and approval process can significantly delay a project.
8. REFERENCES

Implementing the San Francisco Bay’s PCBs and Mercury TMDLs with a Focus on Urban
Prepared by Applied Marine Sciences, Inc. FINAL. 12 September 12.

BASMAA, 2013a. BASMAA Sampling and Analysis Plan, Clean Watersheds for a Clean Bay –
Implementing the San Francisco Bay’s PCBs and Mercury TMDLs with a Focus on Urban
Runoff, Task 5 Phase I, EPA San Francisco Bay Water Quality Improvement Fund Grant #

Prepared by Brian Currier at the California State University Sacramento Office of Water
Programs. 22 October.

BASMAA, 2013c. BASMAA Sampling and Analysis Plan, Clean Watersheds for a Clean Bay –
Implementing the San Francisco Bay’s PCBs and Mercury TMDLs with a Focus on Urban
Runoff, Task 5 Phase II, EPA San Francisco Bay Water Quality Improvement Fund Grant #

BASMAA, 2013d. Integrated Monitoring Report Part B: PCBs and Mercury Loads Avoided and
Reduced via Stormwater Control Measures. Prepared by Geosyntec Consultants and EOA
Inc. 12 December.


WRECO, 2013. Ettie Street Pump Station Retrofit Project – Conceptual Design, 30% Design
Memorandum. Prepared by WRECO for the Alameda Countywide Clean Water Program. 2
July.
FIGURES
APPENDIX A:
Ettie Street Pump Station Project – Conceptual Design
Memorandum

Date: July 2, 2013
To: Arleen Feng – ACPWA
From: Analette Ochoa / Jennifer Abrams – WRECO
Subject: Ettie Street Pump Station Retrofit Project – Conceptual Design

Introduction

The Ettie Street pump station in the City of Oakland is identified as one of the sites selected by the Bay Area Stormwater Management Agencies Association (BASMAA) as part of the Clean Watersheds for a Clean Bay Implementation Plan. The objective of this Plan is to select and implement representative urban stormwater treatment retrofit projects that can be used to evaluate potential polychlorinated biphenyls (PCBs) load reductions in urban stormwater runoff to the Bay. The purpose of this memorandum is to present a conceptual design for the treatment Best Management Practice (BMP) at the Ettie Street pump station site. The proposed stormwater treatment measure for the project is a media filter system with two separate filter beds containing different media.

Project Location and Existing Site Condition

The Ettie Street Pump Station Retrofit Project is located in West Oakland at the northernmost end of Ettie Street, adjacent to MacArthur Freeway to the north and Nimitz Freeway to the west (Figure 1). The Ettie Street Pump Station is an Alameda County Flood Control and Water Conservation District facility that collects and pumps stormwater runoff to the San Francisco Bay. The Ettie Street pump station receives stormwater runoff from approximately 2,000 acres of West Oakland. This watershed is composed of approximately 42% residential, 38% industrial, and 20% commercial land uses. PCB congeners have been measured in the pump station effluent during dry weather, first flush, and wet weather events.

The existing site layout is shown in Figure 2. Aboveground, the existing pump station consists of a building containing the pump and engine room and the auxiliaries and office. Outside of the building, there is a paved driveway and parking area, with a 6-foot by 25-foot access grate to the forebay below. There are two large vents adjacent to the west side of the access grate. At the northern corner of the property, a 600 gallon constant head tank has been constructed. The tank receives water pumped out of the pump station’s sump. Adjacent to this tank there is a planting area to the west, a gate and a PG&E gas utility access hole to the north, fence to the east, and the access grate and vents to the south. A controller is also located near the tank.
Figure 1. Project Location Map

Source: Google
Design Concept

The Project would install two media filter beds to treat PCBs and mercury (Hg) that enter the Ettie Street pump station from the Ettie Street drainage catchment. A schematic of the Project layout is included in Figure 3. The two media filters would operate in parallel, allowing samples to be taken to compare the performance of the two types of filter media.

The media filters would be located at grade outside the pump station building. Each filter would have a 4-foot by 12-foot footprint. The filters would have covers to prevent rain from entering the system.

Water from the existing storage tank would be pumped up to a sufficient elevation, then split and conveyed to each tank containing the filter media. Water would be directed over a weir onto the
surface of the media filter bed where it would infiltrate down through the 2.5-foot thick filter media to an underdrain. One filter bed would contain rhyolite, and the second bed would contain a mix of media types, including 50% rhyolite, 30% zeolite, and 20% granulated active carbon.

The discharge from the filter media would be collected in a 2-inch slotted pipe underdrain running the length of each tank. The pipe would be surrounded by a rock blanket and the bottom of the filter bed would be sloped for drainage. Each filter bed would discharge to a non-perforated PVC pipe, which would combine before reentering the wet well.

Water quality sampling ports would be located just downstream of the storage tank and at the downstream ends of each filter bed. Flow control valves and backflow preventer valves would be located at the upstream and downstream ends of the filter beds to regulate the flow.

Figure 3. Proposed System Schematic
Cost Information

Cost data was obtained from manufacturers and RSMeans. The detailed estimate is included in the Attachments. The total cost of construction was estimated to be $53,800.

References


Attachments
## Etty Road Conceptual Treatment Cost Estimate

**Oakland, CA**

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July 2, 2013
APPENDIX B:
Ettie Street Pump Station Project – 100% Draft Engineer’s Estimate
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APPENDIX C:
Ettie Street Pump Station Project –
100% Plans
Pollution Prevention - It's Part of the Plan

Make sure your crews and subs do the job right!
Runoff from streets and other paved areas is a major source of pollution and damage to creeks and the San Francisco Bay. Construction activities can directly affect the health of creeks and the Bay unless contractors and crews plan ahead to keep dirt, debris, and other construction waste away from storm drains and local creeks. Following these guidelines and the project specifications will ensure your compliance with County of Alameda requirements.

Materials storage & spill cleanup
Non-hazardous materials management
- Sand, dirt, and similar materials must be stored at least 10 feet (3 meters) from each drain. All construction material must be covered with a tarp and contained with a perimeter control during all weather or when rains are forecasted or when rain is actually falling.
- Use (but don't wash) a deionized water for short duration as needed.
- Store or vacuum excess and other paved areas daily. Do not wash down streets or walk areas with water!
- Recycle all asphalt, concrete, and aggregate base material from demolition activities. Comply with Alameda County Ordinances for recycling construction materials, wood, glass, cardboard, paper, etc.
- Check dumpsters regularly for leaks and to make sure they are not overfilled or replace leaking dumpsters promptly.
- Cover all dumpsters with tarpaulin at the end of every work day or during not weather or when rain is forecasted.
- Follow manufacturer's application instructions for hazardous materials and be careful not to use more than necessary. Do not apply chemicals solutions when rains is forecasted within 24 hours.
- Be sure to arrange for appropriate disposal of all hazardous wastes.

Spill prevention and control
Keep a stockpile of spill cleanup materials (rags, absorbents, etc.) available at the construction site at all times.
- When spills or leaks occur, contain them immediately and be particularly careful to prevent spills and leaks from reaching the gutter, street, or storm drains.
- Never wash spilled material into a gutter, street, storm drain, or sewer.
- Dispose of oil containment and cleanup materials properly.
- Report any hazardous spills immediately! Call 911 or Alameda County Public Works Agency promptly at (510) 678-5508

Construction Entrances and Perimeter
Establish and maintain effective perimeter controls and mobile oil contamination entrance and exit to sufficiently control sediment and solvent discharges from site and tracking off site.
- Store or vacuum any street tracking immediately and secure sediment source to prevent further tracking.

Vehicle and equipment maintenance & cleaning
- Inspect vehicles and equipment for leaks frequently. Use drip pans to catch leaks until repairs are made. Repairs promptly.
- Fuel and minimize vehicles on site only in a berm area or over a drip pan that is big enough to prevent harmless.
- If you must clean vehicles or equipment on site, clean with water only in a berm area that will not allow storm water run into gutters, streets, storm drains, or creeks.
- Do not clean vehicles or equipment on site with using soap, solvents, degreasers, street cleaning equipment, etc.

Dewatering operations
- Effectively manage all runoff, all runoff within the site, all runoff that discharges from the site. Run-on from off site shall be diverted away from all disturbed areas or shall collectively be contained.
- Reduce water for dust control, irrigation, or another on-site purpose to the greatest extent possible.
- Be sure to notify and obtain approval from the Engineer before discharging water to a street, gutter, or storm drain. Filtration or diversion through a basin, tank, or sediment trap may be required.
- In areas of known contamination, testing is required prior to reuse or discharge of groundwater.

Earthwork & contaminated soils
- Keep excavated soil on the site where it will not be collected in the street.
- Transfer to dump trucks should take place on the site, not the street.
- Use those soils, sediments, or other control measures to minimize the flow of oil off the site.
- Earth moving activities are only allowed during dry weather, by permit and as approved by the County Inspector in the field.
- Maintain vegetation in the best form of erosion control. Minimize disturbance to existing vegetation wherever possible.
- If you disturb a slope during construction, prevent erosion by seeding the soil with erosion control fabric, or seed with fertilizer, grasses, or sod. Place fiber rolls downslope until soil is secure.
- Fiber rolls should be deep and collective to soil, or placed in original position.

Saw cutting
- Always completely cut and harden storm drain inlet when saw cutting. Use plastic sheathing (Visqueen) to keep sharp cut ends of the storm drain system.
- Shovel, absorb, or vacuum saw dust on site and push up spills away as soon as you are finished in one location or the end of each work day (whichever is sooner).!
- If saw cut drainage enters a catch basin, clean it up immediately.

Paving/asphalt work
- Always cover storm drain inlet and manholes when paving or applying asphalt and stone base, slurry seal, or fog seal.
- Protect gutters, ditches, and drainage courses with sand, gravel, bags, or silt filters.
- Do not sweep or wash down excess sand from sand blasting into gutters, storm drains, or creeks. Collect sand and store it in stockpile, or dispose of it as trash.
- Do not use water to wash down fresh asphalt concrete pavement.

Concrete, grout, and mortar storage & waste disposal
- Store concrete, grout, and mortar under cover, on pallets, and away from drainage areas. These materials must never touch a storm drain.
- Wash out concrete equipment/trucks off site or in contained washout areas that will not allow discharge of wash water onto the underlying soil or onto the surrounding areas.

Concrete
- Never place concrete/bases or materials in a gutter or street.
- Paint out excess water based paint before cleaning brushes, rollers, or containers in a sink.
- Paint out excess oil based paint before cleaning brushes in flume.
- Fill paint thinner and solvents for those substances possible.
- Dispose of all-based paint ditches and formidable thinner as hazardous waste.

Painting
- Never place pressure treatments or materials in a gutter or street.
- Dispose of all-based paint treatment in a designated area.
- Use water to wash down fresh concrete concrete pavement.

Landscape Materials
- Control, cover, and remove on piles all stockpiled landscape materials (mulch, compost, fertilizers, etc.) during not weather or when rain is forecasted or when rain is actively falling within 14 days.
- Discontinue the application of any erodible landscape material during wet weather.
- Do not use water to wash down fresh asphalt concrete pavement.

Storm drain polluters may be liable for fines of $10,000 or more per day!
GENERAL NOTES:

1. All work is to be done under the direction of the Engineer.
2. Contractors must coordinate their work with the Engineer.
3. The Engineer reserves the right to correct any error or omission in the plans.
4. Any contractor causing damage to the public works property in the performance of the work will be financially responsible for such damage.
5. The Contractor shall be responsible for the maintenance and protection of the work during and after the contract period.
6. The Contractor shall not alter any design or specification without the written approval of the Engineer.

ABBREVIATIONS:

- ETTIE STREET PUMP STATION
- CB-
- ZONE NO. 12 PROJECT
- RETROFIT PROJECT