



Appendix A

Report to the Transportation, Water and Infrastructure Committee

April 10, 2017

Detailed cost analysis of the additional requirements in the
Municipal Regional Permit 2.0

Overview ad Corrections	Page 2
C.3.j Green Infrastructure	Page 4
C.10 Trash	Page 11
C.11 Mercury.....	Page 19
C.12 PCB's	Page 26

Overview and Corrections

Overview

The detailed cost analysis that follows for Green infrastructure, Trash, Mercury, and PCBs, use the Appendix in the October 13, 2016 Financial Report to the Committee as a base document. Each one of these four additional requirements has been updated to include any corrections noted below and any new information on costs. It should be noted that although the cost analysis in this Appendix has been updated, the assumptions are still based on the worst case scenario outlined in the October 13, 2016 Financial Report.

All of the cost data presented in this Appendix is summarized in Appendix Tables 1 through 4 at the end of this Appendix. These cost estimates are intended to provide an accuracy level commensurate with the early stages of program planning and development the County is currently exploring. All of these estimates will become more accurate as time goes on and more information is known and experience gained with implementing provisions of MRP 2.0.

Corrections

There were several interpretations of permit requirements that were incorrect and impacted him for the October 13, 2016 Committee report. This section reviews the general assumptions made in preparing the cost estimates, the incorrect interpretations, and the corrections.

The October 13, 2016 Financial Report provided a worst case cost scenario, assuming a modest amount of source properties and a small amount of private development treating PCBs, and the County implementing the bulk of the PCB load reduction measures. The worst case scenario cost for the four additional provisions (Trash, Green Infrastructure, Mercury, and PCBs) was \$202 million. The cost of the four additional provisions plus the annual compliance cost of MRP 1.0 resulted in the total estimated cost for implementing MRP 2.0. After adding the \$3 million annual cost of implementing MRP 1.0, the total five-year permit cost for MRP 2.0 was \$217 million.

There were three primary assumptions in the Financial Report that impact the worst case scenario analysis:

- **2019 Load Reduction.** It was assumed there was a PCB load reduction requirement every year from 2018 to 2020. In fact, there is only a load reduction requirement in 2018 and 2020, and not in 2019. Correcting this assumption reduced the total cost of implementing PCB control measures by about \$13 million. This is also shown in Appendix Table 5 and explained in more detail further in the Appendix.
- **Loads Aren't Additive.** It was also assumed that PCB load reductions do not carry forward from year-to-year. In fact, when a control measure results in a load

reduction that load reduction does carry forward, providing the control measure is maintained on an annual basis to ensure the load reduction is permanent. Correcting this assumption, and clarifying the assumption of 0.5 grams per year load reduction from private development in 2018, 2019, and 2020, had a net reduction in the total cost of implementing PCB control measures of about \$1 million. It turns out that clarifying and correcting these two assumptions balance each other out.

- **Unit Treatment Costs.** The financial analysis used \$215,000 per treated acre as the cost for Green Infrastructure control measures implemented by the County. When the Financial Report was prepared the cost analysis was peer-reviewed, and the peer review consultant indicated the cost range for implementing Green Infrastructure in the Bay Area was between \$200,000 and \$365,000 per treated acre. Subsequent to the Committee meeting, the peer review consultant analyzed cost data from Southern California. The cost data shows the average cost of implementing Green Infrastructure in that part of the State is about \$110,000 per treated acre. Adopting a unit cost of \$110,000 per treated acre would roughly reduce the cost estimates in the Financial Report by half. However, staff recommends continuing to use \$215,000 per treated acre at this point in the planning process. The Bay Area is in the early stages of implementing Green Infrastructure and the unit costs will undoubtedly go down with increased experience. Southern California is several years ahead of the Bay Area in stormwater permit requirements and has been implementing Green Infrastructure improvements longer. We can certainly learn from the experience in Southern California, however, there remain differences in soils, climate, and institutional/financial arrangements that indicate a prudent approach would be to use a cost at the low end of the Bay Area cost range. Using \$215,000 per treated acre is consistent with that prudent approach. The other assumption that affects Green Infrastructure costs is its efficiency in reducing PCB loads. Green Infrastructure treats runoff from land containing PCBs but is not 100% effective at doing so. The Regional Board assigns a default efficiency factor of 70% to Green Infrastructure. A remediation project, on the other hand, addresses PCBs on a specific property to prevent PCBs from running off the property. A remediation project has a 100% efficiency factor. A 70% efficiency factor is used in this report unless noted otherwise.

The corrections noted above reduce the worst case cost scenario for MRP 2.0 to about \$200 million over a five-year permit term.

GREEN INFRASTRUCTURE

Developing a Green Infrastructure Plan For Unincorporated Contra Costa County A requirement of the current Municipal Regional Permit (MRP 2.0)

Updated April 10, 2017

I. Objective and Purpose

The following are the stated objectives and purpose of the Green Infrastructure Plan requirement in the Municipal Regional Permit 2.0:

- Include LID drainage design into public projects
- Provide an implementation guide and planning tool to meet TMDL requirements
- Develop a reasonable assurance analysis that waste load allocations will be met
- Monitor/track implementation effectiveness
- Provide a vision and strategy to convert gray infrastructure to green infrastructure
- Provide criteria and methodology to prioritize Green Infrastructure projects
- Incorporate other waste load reduction plans into a Green Infrastructure Plan, creating an overall master plan
- Track area treated by Green Infrastructure and track amount of directly connected impervious surfaces

Note: This provision C.3.j defines the concept of and outlines the requirements for Green Infrastructure. The compliance costs for implementing Green Infrastructure to effectuate pollutant load reduction, however, will be found in the PCB requirements.

II. Plan Development Process and Cost

The following is a step by step process and resultant costs to meet Green Infrastructure Plan requirements specified in the Municipal Regional Permit 2.0:

Provision C.3.j.i Green Infrastructure Program Plan Development

1. Prepare a Green Infrastructure Plan framework document. (2017)

This will describe the detailed process for the County Board of Supervisors to approve a Plan by June 30, 2017. The framework must include a statement of purpose, specific tasks, and time frames to complete the required elements listed in MRP 2.0. This will entail a primary author, likely an engineer or consultant, for two weeks at \$16,000 (80 x 200), coordination with staff at \$2,000, three team meetings at \$1,500 each, and a review process at \$5,000. To receive Board Approval will require a TWIC meeting with a report and other documentation at \$5,000 and a Board of Supervisors report and presentation at \$2,000.

- Green Infrastructure Plan framework document. \$27,500
- Board approval process. \$7,000

2.a. Develop a mechanism to map and prioritize GI projects on a watershed basis. (2019, 20) It is assumed we will use San Francisco Estuary Institute's (SFEI) GreenPlanIT tool to some extent to provide water chemistry and water quality parameters for pollutant loading. The Clean Water Program has developed a program to map areas for potential and public planned projects. This program is a GIS-based tool that uses land-use, pollution loading, hydrology, and cost data to optimize the placement of Green Infrastructure projects. To use the tool, we will need to provide land-use data at \$1,000, drainage inventory at \$50,000, data on source properties at \$10,000, data for developing feasibility criteria, such as utility location, community design, neighborhood compatibility, soil type, right-of-way availability, etc. at \$50,000, data for developing prioritization criteria, such as water quality parameters, TMDL load reduction requirements, etc. at \$10,000, and coordination at \$5,000. We will also need to ensure data transfer is compatible with our various CIPs (ie, CRIP, Capital Projects, FCCIP) at \$5,000. Finally there will be an annual cost to utilize SFEI's GreenPlanIT at \$5,000 per year. GreenPlanIT is a new program still under development and these estimated costs will need to be verified with SFEI.

For private projects it is assumed we will use the Clean Water Program's tool for tracking purposes, and it is assumed project prioritization is NOT required as implementation is dependent on developer's independent schedules. This will entail estimating Green Infrastructure projects proposed developments will construct, identifying all Green Infrastructure projects under design by developments, and providing this data to the Clean Water Program at least once a year at \$5,000 per year. Identifying opportunity areas on private property, such as parking lots, will entail determining criteria for what types of opportunity areas the County has the jurisdiction to impose Green Infrastructure, and when and how, at \$25,000, reviewing aerial imagery and identifying opportunity sites at \$25,000, and determining and implementing the best way to require Green Infrastructure on private parcels at \$25,000.

- Mapping and prioritization mechanism for public projects. \$131,000
- Mapping and prioritization mechanism for private projects. \$75,000
- Annual cost to determine private project data. \$5,000
- Annual operational costs. \$5,000

2.b. Outputs from the mapping and prioritization mechanism. (2019) It is assumed that the cost for the outputs such as maps, project lists, project ranking, etc., are included in the development of the mechanism itself (C.3.j.i.2.a). This may change as we better understand what the output needs are and how they will be developed.

- No additional cost for this item.

2.c. Develop urban built environment retrofit targets. (2019) It is assumed that the load reduction calculations to determine the targets will be included in the costs for Provision C.11 and C.12. There will be an administrative cost to adapt the load reduction calculations into targets and prepare a report at \$10,000 each for public and private spaces.

- Targets to retrofit the public urban built environment. \$10,000
- Targets to retrofit the private urban built environment. \$10,000

2.d. Develop a process for tracking and mapping completed GI projects. (2019, 20) It is assumed this capability will be available for both public and private projects with SFEI's tool and general coordination will be all that is needed at \$2,000 each year.

- Annual coordination costs. \$2,000

2.e. Develop guidelines for project development, design, and construction to ensure that green infrastructure is not precluded but is included in projects. (2019) The process to develop these guidelines would be required for all types of projects, such as roads, buildings, parking lots, parks, airports, and drainage. It is assumed this would be done at a regional level and our role would be to coordinate the development of guidelines. For example, perhaps MTC for ABAG would take the lead in developing some or all of these guidelines. There would be a cost share to the County for the regional entity to hire the consultant at \$5,000, staff involvement at \$10,000, and staff cost to tweak the guidelines to meet the County's specific needs at \$5,000.

- Develop a suite of guidelines. \$20,000

2.f. Prepare standard specifications and standard plans. (2019) It is assumed this could be done at a regional level, however, we have a significant amount of unique requirements for specifications and construction details that would add additional costs. There would be a cost share to the County for the regional entity to hire a consultant at \$5,000, staff involvement at \$10,000, and staff cost to tweak the standard specifications and standard plans to meet the County's specific needs at \$25,000.

- Prepare standard specifications and plans. \$40,000

2.g. Develop options to include hydro-modification in GI projects. (2019) Hydro-modification must be included in Regulated Projects but a variety of options could be used for non-Regulated Projects. The options analysis should consider watershed health, creek improvements, TMDL load reductions, etc. To achieve this will require developing an options analysis at \$25,000, a policy level discussion and decision at \$10,000, and staff cost to integrate the options into our project development, design, and construction checklists and other planning and implementation processes at \$20,000.

- Develop options for HMP. \$55,000

2.h. Update County's foundational planning documents. (2019) This entails updating the County's General Plan, Specific Plans, Transportation Plan, the Flood Control District's 50 Year Plan, and other key planning documents that impact the design of impervious surfaces. The cost to update the General Plan is likely \$100,000, to develop a Flood Control District plan is also likely \$100,000, and to modify the Transportation Plan is likely \$50,000. Other plans would have to be identified and update costs estimated. These costs represent a placeholder estimate, as it is difficult to estimate the cost of updating these documents until more specifics are known about the Green Infrastructure program, which will be determined when we get closer to implementation and the program is better defined.

- Update County planning documents. \$250,000

2.i. Develop work plan to ensure GI and LID measures are included in developing and amending future planning documents. (2019) This would entail developing a process in those departments and programs that have or will develop or update a key planning document (primarily DCD and PWD) to ensure GI and LID design elements and requirements are included at \$25,000.

- Develop work plan. \$25,000.

2.j. Develop work plan to complete prioritized GI projects. (2019) This work plan is meant to ensure completion of projects identified in an Alternative Compliance Program or part of the Early Implementation list of projects, but these underlying processes will also be used for future GI projects. This will entail developing a separate Green Infrastructure Capital Improvement Program (CIP) at \$50,000, updating our existing road infrastructure CRIP at \$25,000, and modifying our Facilities CIP in Capital Projects at \$25,000, and developing a work plan outlining the process to achieve this at \$25,000.

- Develop work plan and CIP modifications. \$125,000

2.k. Develop a Green Infrastructure Financing Plan. (2019) This requires an evaluation and prioritization of project funding options, such as Alternative Compliance funds, grants, transportation funding from federal, state, and local sources, etc. To achieve this will require research of available funding options, analysis of which projects best fit the various funding options, and development of a strategic plan to go after specific funding for specific projects at \$25,000.

- Develop Financing Plan. \$25,000

3. Develop and adopt policies, ordinances, etc., to ensure implementation of the Green Infrastructure Plan. (2019) This will entail developing standard conditions of approval at \$10,000, revising design manuals and checklists at \$10,000, developing ordinance code language at \$10,000, and

going through the review and adoption process for the ordinance code revisions at \$25,000.

- Adopt policies and ordinances. \$45,000

4.a. Conduct public outreach on the Green Infrastructure Plan and its requirements. (2017, 18, 19, 20) This will entail making presentations at various organizations, such as the Contra Costa Watershed Forum, East Bay Municipal Engineers, Public Managers Association, City-County Engineering Advisory Committee, etc. at \$5,000, and planning, preparing, and holding three workshops at \$2,000 each.

- Annual cost to conduct public outreach. \$11,000

4.b. Provide training to staff on the Green Infrastructure Plan, its requirements, and implementation methods. (2017, 18, 19, 20) This will entail developing a staff training program at \$3,000, and implementing a staff training program at \$3,000 per year.

- Develop staff training. \$3,000
- Annual cost to train staff. \$3,000

4.c. Educate County elected officials on the Green Infrastructure Plan and its requirements and implementation methods. (2017, 18, 19, 20) This will entail planning, preparing, and holding a workshop for the County Planning Commission, the Transportation, Water, and Infrastructure Committee, and the Board of Supervisors at \$5,000 and conduct a workshop at \$2,000 each year thereafter.

- Develop and conduct workshop for County elected officials. \$5,000
- Annual cost to hold workshop. \$2,000

5. Report on Green Infrastructure planning progress. (2017, 18, 19, 20) This entails preparing a report each year outlining the progress on developing and implementing the County's Green Infrastructure Plan at \$5,000 per year.

- Annual cost to report on Green Infrastructure Plan progress. \$5,000

Provision C.3.j.ii. Early Implementation of Green Infrastructure Projects (No Missed Opportunities)

1. Prepare and maintain a list of public and private GI projects, and infrastructure projects that could include GI measures. (2017, 18, 19, 20) This would entail reviewing all development projects and developing a list of GI projects and other projects that could include GI at \$5,000, and reviewing our current CIP project lists to determine which projects could include a GI

component at \$5,000. There would also be an annual cost to update and maintain the list at \$1,000 per year for each list.

- Prepare list of public and private GI projects. \$10,000
- Annual cost to update project lists. \$2,000

2. Prepare a status summary for each public and private GI project. (2017, 18, 19, 20) The intent of this requirement is to report how each public and private project is incorporating Green Infrastructure elements, and explain why Green Infrastructure was not added to those projects that do not have a Green Infrastructure element. These status summaries would be provided in the Annual Report. This would entail researching and drafting a summary report for each private development project each year at \$3,000 and for each public project each year at \$3,000.

- Annual cost to provide project status reports. \$6,000

Provision C.3.j.iii. Participate in Processes to Promote Green Infrastructure

1. Influence regional, state, and federal agencies to fund and incorporate GI measures into local projects. (2017, 18, 19, 20) This requires an annual effort to track political, grant, and financial processes at all levels of government and advocate for the development of Green Infrastructure, the need for additional funding, and ways to increase efficiencies. It is assumed this would be performed at the regional level (for example BASMAA) and would result in a cost share for the County and staff coordination of \$5,000 each year.

- Annual cost to advocate for Green Infrastructure. \$5,000

2. Report on participation goals. (2017, 18, 19, 20) It is assumed this would be performed at a regional level and would entail the County's share in an effort to report on the goals and outcomes of participating in the promotion and advocacy for Green Infrastructure each year at \$5,000.

- Annual cost to develop participation goals. \$5,000

3. Prepare a plan and schedule for new advocacy efforts. (2019) This is required in the 2019 Annual Report. It is assumed this would be performed at a regional level and would entail the County's share in an effort to develop a plan of new and ongoing efforts to promote and advocate for Green Infrastructure at \$5,000.

- Prepare an advocacy plan and schedule. \$5,000

Provision C.3.j.iv. Tracking and Reporting Progress

1. Develop regionally consistent tracking method for Green Infrastructure. (2019) The intent is to have a tracking system that has

information from each jurisdiction (in a format that is consistent throughout the Bay Area) of Green Infrastructure, treated area, and connected and disconnected impervious areas for both public and private projects. The system must also provide information necessary to develop reasonable assurance analysis for TMDL waste load allocations. It is assumed this would be developed at a regional level, possibly through SFEI or BASMAA, with a required cost share from the County at \$10,000 and staff coordination costs of \$10,000.

- Develop tracking method for Green Infrastructure. \$20,000

2. Report progress on tracking methods each year. (2017, 18, 19, 20)

This will entail reviewing the activities for the year, extracting information from the regional tracking entity, and preparing a report for the Annual Report at \$2,000.

- Annual cost to report on tracking method. \$2,000

3. Submit tracking methods and status in 2019 Annual Report. (2019)

This information would have been developed in the two items above so no additional cost is needed.

- No additional cost for this item.

TRASH

Meeting the Trash Load Reduction Schedule for Unincorporated Contra Costa County A requirement of the current Municipal Regional Permit (MRP 2.0)

Updated April 10, 2017

I. Objective and Purpose

The following is the objective and purpose of the Trash Load Reduction requirement in the Municipal Regional Permit 2.0:

- Eliminate trash in our waterways and receiving water bodies

The following are observations of the Trash Load Reduction requirements:

- Full trash capture devices installed in drainage inlets or in drainage systems is the preferred trash load reduction measure
- Creek clean-ups have been devalued as a trash load reduction measure
- Trash load reduction offsets are a temporary solution
- The County did not meet the required 60% load reduction by 2016, however, neither did nine of the 19 cities in the County

II. Trash Load Reduction Process and Cost

The following is a step by step process and resultant costs to meet the Trash Load Reduction requirements specified in the Municipal Regional Permit 2.0:

Provision C.10.a Trash Reduction Requirements

a.i. Meet the prescribed trash reduction targets. (2017, 2019)

The County must reduce trash discharges by 70% by July 1, 2017, and 80% by July 1, 2019. In addition, the County should have achieved 60% reduction by July 1, 2016. If the 60% reduction milestone is not achieved, then the County must prepare a plan and schedule for implementing additional trash load reduction control actions to meet 70%. The County did not reach the 60% milestone, achieving 43% by July 1, 2016. Meeting this requirement will entail developing a plan and schedule at \$25,000 in 2016 and 2018. The plan to meet 70% load reduction by July 2017 includes four key elements: full trash capture devices, on-land cleanups, community-based trash abatement measures, and direct discharge controls. These four key elements and their estimated implementation costs are described in more detail below.

- Develop plan and schedule for 2016 and 2018. \$25,000 each

Full Trash Capture Devices. There are two types of full trash capture: screens or similar features that capture trash at individual storm drain inlets, or hydrodynamic separators on trunk storm drain lines that capture trash coming from many individual inlets. The County is proposing to invest \$300,000 to install full trash capture devices (screens) in storm drain inlets located in high and very high trash generation areas. Based on a 2013 project to install individual full trash capture devices, the average construction cost is about \$600 per unit. Adding to the cost of construction the cost of project planning, development, design, and construction management at \$400 brings the total cost per unit to \$1,000. In early 2017 the County advertised a project to install screens and the average of the three lowest bidders was \$738, so using a total unit cost of \$1,000 is still reasonable. With this budget, the County will be able to retrofit about 300 storm drain inlets. Annual maintenance costs, utilizing a Vactor truck, driver, and assistant, are estimated at \$600 per unit three times a year for a total annual unit cost of \$1,800. As a project, individual screen inserts can be installed fairly quickly and will be utilized in the first two years. Trash separators are much larger facilities and must go through a full design process, including environmental review, and take about two years to plan and install. In the last three years of the permit three trash separators will be installed at an average cost of \$800,000 each. The cost for separators can vary widely depending on the treatment area, utilities, traffic, etc. It is also assumed that maintenance costs for trash separators, cleaned three times a year, are \$10,000 per unit. Even though separators have a high initial capital cost, the annual costs are much less providing a more cost effective lifecycle cost investment.

- Convert drainage inlets to full trash capture (2017). \$300,000
- Convert drainage inlets to full trash capture (2018). \$300,000
- Annual cost to maintain 300 full trash capture inlets. \$540,000
- Install three hydrodynamic trash separators (2019 - 2020). \$2,400,000
- Annual cost to maintain three trash separators. \$30,000

On-Land Clean Up. The County currently has a contract with a debris hauler that provides general pickup service of trash along the County's roadways and within the unincorporated communities. This contract would be expanded to include trash pickup in additional areas, and/or more frequent pickup in the existing service area at \$200,000.

- Additional on-land cleanup services. \$200,000

Community-based Trash Abatement Measures. Trash abatement in heavy trash load areas will be more effective if they are supported by the community and the community actively participates. An example of a

community-based trash abatement measure would be the proposed Adopt-a-Spot program, an extension of the County's successful Adopt-a-Road program. In this case, a person, group of neighbors, or a neighborhood would adopt a drainage inlet or other trash collection feature and actively maintain it. This would entail researching and identifying feasible community-based trash abatement measures and where they could be applied at \$5,000, developing a specific abatement measure, such as the Adopt-a-Spot program, going through the program approval process, and getting it set up and operating at \$25,000, and ongoing annual operational costs at \$10,000.

- Develop a community-based trash abatement program. \$5,000
- Implement an Adopt-a-Spot program (or other program). \$25,000
- Annual operational costs. \$10,000

Direct Discharge Control. This control measure and compliance costs are discussed in more detail later on in provision e.ii.

a.ii. Update trash generation areas. (2016) Trash generation areas were developed, mapped, and submitted in February 2014 using the best data at the time. Based on information and observations since then, the County must update the trash generation areas with the 2016 Annual Report. This will entail analyzing data from the trash generation areas, determine if the trash generation areas are in the correct trash generation rate category (Low, Moderate, High, or Very High), and update the Trash Generation Area Maps at \$25,000.

- Updating the Trash Generation Area Maps. \$25,000

a.ii.a. Establishes full trash capture systems as the standard. Requires trash prevention and control actions be equivalent to or better than full trash capture systems, and defines this as "essentially no trash discharge except in very large storm flows".

- There is no cost for this item

a.ii.b. Modify private storm drain systems to include full trash capture. (2018) The County must ensure that trash from private storm drains that drain to public drainage facilities is captured with full trash capture systems or the equivalent. The County must map all properties greater than 10,000 ft.² that drain directly to public drainage systems by July 2018, indicate the trash generation rate category they are in, and indicate their trash control status. The County has 3129 acres in the Moderate trash generation rate category, 1348 acres in the High trash generation rate category, and 131 acres in the Very High trash generation rate category. These numbers represent the acres of trash generation categories that are within the Urban Limit Line plus a few key major roads

that connect communities. Meeting this requirement will entail developing a map of 10,000 ft.² parcels at \$25,000, develop an inventory of and map private drainage systems throughout the County that drain to public systems at \$50,000, determine the trash capture status of parcels that drain to public drainage systems at \$10,000, develop a legal means to require full trash capture devices on private property at \$50,000, and implement full trash capture requirements on private land at \$25,000.

- Modify private storm drain systems. \$160,000

a.iii. Install mandatory minimum full trash capture systems. The County must install and maintain full trash capture devices to treat runoff from 157 acres (30% of the County's retail/wholesale land area). This requirement was in MRP 1.0 and was completed with the help of grant funding. There is no additional cost for MRP 2.0.

- No additional costs.

b.i.a. Develop a Maintenance Plan to ensure maintenance of full trash capture devices. (2017, 18, 19, 20) The County must maintain full trash capture devices to prevent flooding, plugging of the 5 mm screen, or overflow of the device's trash storage reservoir. Inspection must occur at least once a year, and in High or Very High trash generation rate category areas at least twice per year. The capacity of a device's trash storage reservoir cannot exceed 50% at the time of inspection. This will entail developing a maintenance checklist to ensure appropriate data is gathered with each inspection and developing a maintenance schedule, by trash generation rate category, at \$25,000, developing an acceptable maintenance report format to include the trash storage capacity at the time of maintenance at \$10,000, and budget the cost to maintain full trash capture devices at \$1,800 each per year. The County currently has 139 full trash capture devices in place. The cost to maintain the current full trash capture devices was part of MRP 1.0. The cost increase associated with MRP 2.0 is noted in provision C.10.a.i above.

- Develop maintenance plan for full trash capture devices. \$35,000
- Additional annual cost of maintenance included in C.10.a.i.

b.i.b. Maintain maintenance records and report annually on effectiveness of full trash capture devices. (2017, 18, 19, 20) The County must retain specific information for each full trash capture device, including the date of maintenance, capacity of the trash storage reservoir, any flooding or special problems, any damage that would reduce its function, etc. This information must be reported each year with the Annual Report. All this information will be developed with the maintenance plan identified above, so the only additional cost is for the Annual Report at \$3,000 per year.

- Annual cost to prepare the Annual Report maintenance log. \$3,000

b.i.c. Annual certification of full trash capture systems. (2017, 18, 19, 20) The County must certify each year that their full trash capture systems meet permit compliance. Areas that drain to full trash capture systems are considered to be in a Low trash generation rate category. The cost to develop the certification for the Annual Report is \$1,000 per year.

- Annual cost to provide certification. \$1,000

b.ii.a. Document trash management actions other than full trash capture devices. (2017) The County must identify and document Other Trash Control Actions, defined as all actions other than full trash capture systems. Documentation must include a description of the action, level of implementation, timing and frequency of implementation, standard operating procedures, location, drainage area affected, tracking and enforcement procedures, etc. The County is contemplating several additional control measures such as increasing street sweeping in commercial areas, providing street sweeping in areas currently not swept, expanding the Adopt-a-Road program to include visual assessments to get credit for trash collection, installing curb and gutter in areas with roadside ditches to facilitate street sweeping, or converting roadside ditches to bio-retention facilities, which also act as trash capture devices. This will entail evaluating each potential trash control action, developing a tracking system to gather the required data and provide information for the Annual Report to achieve approximately 27% credit towards the 70% goal at \$25,000.

- Document trash management actions. \$25,000

b.ii.b. Conduct visual assessments to determine effectiveness of other trash management actions. (2019) The County must conduct visual assessments of each trash generation area that has Other Trash Management Actions to determine their effectiveness (full trash capture devices are handled separately). This would entail conducting observations along sidewalks, curbs and gutters, and other places associated with trash generation, at locations covering at least 10% of the trash management area's street miles, and at a frequency consistent with the estimated trash generation rates at \$50,000.

- Conduct visual assessments. \$50,000

b.iii. Calculate trash discharge reduction each year. (2017, 18, 19, 20) The County must calculate the reduction in trash discharge to receiving waters based on the formula provided in MRP 2.0 and submit it with each Annual Report. This will entail gathering the required data to perform the calculation at \$5,000 each year.

- Annual calculation of trash discharge reduction. \$5,000

b.iv. Develop a source control strategy. (2019) The County may adopt source control actions to reduce trash load reductions, which may be valued at up to 10% of the total required load reduction. An example of a source control action would be adopting a ban on plastic bags. This was proposed two years ago and the Board decided not to go forward at that time for a variety of reasons. However, considering the current statewide ban on plastic bags and the value of load reduction this represents, the Committee authorized staff to explore implementing this source control measure at their October 13, 2016 meeting. Developing a strategy would involve identifying possible source control measures, evaluating those measures, determining the feasibility of viable measures, and developing a recommendation and draft strategy for review and approval at \$5,000. Adopting a ban on polystyrene food containers would entail preparing an environmental document at \$5,000, coordinating with surrounding cities at \$25,000, developing an ordinance at \$10,000, going through the ordinance review process at \$25,000, and the ordinance approval process at \$10,000. Enforcing a ban on plastic bags would entail taking a quick representative sample of retail and commercial establishments to determine percentage of compliance at \$5,000, then a more systematic monitoring of all applicable establishments over a longer period of time to include outreach, awareness, and enforcement at \$10,000 per year.

- Develop a source control strategy. \$5,000
- Adopt a ban on polystyrene containers. \$75,000
- Initial assessment of plastic bag ban compliance. \$5,000
- Annual cost of monitoring plastic bag ban. \$10,000

b.v. Develop receiving water monitoring program, with tools and protocols, and conduct the monitoring. (2018, 19, 20) BASMAA will be developing the receiving water monitoring program. The cost to the County will be a share of the start-up costs to develop the program in 2018 at \$10,000 and an annual cost to maintain the receiving water monitoring program at \$5,000.

- Develop receiving water monitoring program cost share. \$10,000
- Annual cost to manage the program. \$5,000

c. Select trash hotspots and conduct cleanups. This requirement is the same as MRP 1.0, so there are no additional costs with the new MRP 2.0.

- No additional costs.

d. Prepare amendments to the Trash Load Reduction Plan. (2016, 18) This will entail preparing amendments to the County's Trash Load

Reduction Plan to meet the required load reduction of 70% by 2017 and 80% by 2019. These costs are included in section C.10.a.i.

- There is no additional cost for this item.

e.i. Evaluate creek and shoreline cleanups as a trash control measure. (2017, 18) The County is allowed to utilize creek and shoreline cleanups as an offset to the trash load reduction requirement. The offset is calculated from a formula contained in MRP 2.0. Based on the formula, the County will receive 1% offset for every 12.4 cubic yards of trash picked up, with a maximum offset of 10%. A small cleanup can fill up one or two 6-yard debris boxes and an average cleanup can fill up one 20-yard debris box. A standard 10 wheel dump truck in our Maintenance Division holds about 10 cubic yards. In 2019 the volume will be increased to 37.6 cubic yards of trash to receive a 1% offset. To meet this offset will entail identifying partners to conduct creek and shoreline cleanups, determining the cost to coordinate and conduct the cleanups, calculating the percent offset to the trash load reduction target, evaluating their benefit to meeting the County's requirement at \$25,000, and analysis of its annual effectiveness at \$5,000 per year.

- Evaluate creek cleanups as a control measure. \$25,000
- Annual analysis of effectiveness. \$5,000

e.ii. Evaluate direct trash discharge control measures to help meet the trash load requirement. (2017, 18) The County is allowed an offset to the trash load reduction requirement for controlling direct discharges of trash to receiving waters from non-storm drain system sources. The offset is calculated from a formula contained in MRP 2.0. The formula results in the same trash volumes as C.10.e.i, 12 cubic yards in 2017 and 38 cubic yards in 2019. The maximum offset is 15%. Cleaning up homeless encampments along creeks would be the most applicable example of a direct discharge of trash from a non-storm drain system source. The County has been spending over \$100,000 a year on homeless encampment cleanups with MRP 1.0. Unfortunately, homeless encampments are usually re-populated within a couple of weeks. This trash discharge control measure would have to prevent re-population of homeless encampments to be effective. This will entail taking a leadership role and coordinating with various County departments, non-profit organizations, and cities to develop an effective homeless encampment removal plan, determining the responsible agency for implementing the various components of the plan for the applicable creeks in the County, and determining the responsible agency for enforcement of the plan to prevent re-population at \$50,000. The County share to implement and enforce the plan each year at \$300,000 (minus \$100,000 existing costs in MRP 1.0) and analysis of its annual effectiveness at \$5,000 per year.

- Develop a homeless encampment removal plan. \$50,000
- Annual cost to implement and enforce the plan. \$200,000
- Annual analysis of effectiveness. \$5,000

f.v.b. Prepare non-compliance report IF the County does not meet the trash load reductions required in 2017 or 2019. If the County does not meet 70% trash load reduction by 2017 or 80% load reduction by 2019, a noncompliance report must be prepared and submitted to the Regional Board. The report must include a plan and schedule to implement full trash capture systems, or equivalent, to attain the required reduction. It is assumed that the fallback plan is to convert all inlets in non-attainment areas to full trash capture. The County has about 7,300 drainage inlets, of which 1,740 are located in Moderate, High, or Very High trash generation areas. It is assumed that 10% of the 1,740 conversions to full trash capture would present an operational problem and require extensive modifications of the storm drain inlet to resolve. For example, if a drainage inlet is functioning marginally in collecting stormwater and a full trash capture device would cause flooding, then perhaps an additional inlet would need to be installed just downstream to handle the overflows. Implementing this option would entail identifying the drainage inlets in the non-attainment areas and assessing their ability to be converted to full trash capture at \$50,000, develop the non-compliance report at \$25,000, develop a project and install full trash capture devices in 1,566 drainage inlets at \$1,000 per inlet (\$600 installation plus \$400 in project planning, development, design, and construction management), develop a project and construct drainage inlet modifications for 174 drainage inlets at \$5,000 per inlet, and budget the cost to maintain these additional full trash capture devices at \$1,800 each per year.

Note: These activities and costs will not be necessary if the required trash load reduction targets are attained.

- Drainage system assessment. \$50,000
- Develop the non-compliance report. \$25,000
- Convert drainage inlets to full trash capture. \$870,000
- Modify inlets to accommodate full trash capture. \$1,570,000
- Annual cost to maintain 1,740 full trash capture inlets. \$3,100,000

MERCURY

Meeting the Mercury Load Reduction Schedule for Unincorporated Contra Costa County A Requirement of the Current Municipal Regional Permit (MRP 2.0)

Updated April 10, 2017

Objective and Purpose

The following are the objectives and purpose of the Mercury Load Reduction requirement in the Municipal Regional Permit 2.0:

- Meet the TMDL schedule for all permittees in the San Francisco Bay Area to remove 48 grams per year by the end of the permit term
- Implement and test a variety of control measures to remove Mercury
- Identify and abate source properties

The following are observations of the Mercury Load Reduction requirements:

- Green Infrastructure is the most favored overall control measure.
- Old industrial and old urban land uses are considered the overall primary source of Mercury, other than source properties.

II. Mercury Load Reduction Process and Cost

The following is a step by step process to meet the Mercury Load Reduction requirements specified in the Municipal Regional Permit 2.0:

Note: Many of the control measures to reduce PCB loads will also reduce Mercury loads, so the cost to comply with almost all the Mercury provisions is included in the compliance costs for PCBs.

Provision C.11: Reducing Mercury Levels in the Bay

a.i. Implement control measures to reduce Mercury. The County must implement source and treatment control measures to reduce Mercury loads, with a specific requirement to reduce 1.37 grams per year by July 2020. All co-permittees within the County must reduce Mercury loads by 9 grams per year by 2020. The County's share of that load reduction, based on population as of January 2015, is 15.26%. The cost to implement the control measures identified in this provision is covered in the provisions outlining the control measures.

- No additional cost for this item.

a.ii.1. Identify current and proposed watersheds or management areas with control measures. (2016) The County must identify the watersheds or management areas (portions of watersheds) where Mercury control measures are currently being implemented and where new control measures will be implemented. This activity is also required for PCBs and the cost to meet this Mercury provision is included in the PCB costs.

- No additional cost for this item.

a.ii.2. Identify current and new control measures. (2016) The County must identify the various types of control measures that are currently being implemented (primarily street sweeping) and control measures that will be implemented. Control measures can include abating source properties, constructing green infrastructure treatment facilities, sweeping streets in management areas, cleaning drainage inlets, redeveloping contaminated areas, diverting stormwater from pump stations to sewer treatment plants, and flushing streets. This activity is also required for PCBs and the cost to meet this Mercury provision is included in the PCB costs.

Note: It should be noted that like PCBs, Mercury attaches to sediment particles, so control measures that remove sediment are an effective way to remove Mercury. However, while PCBs can be highly concentrated in source properties, Mercury is dispersed more evenly throughout the watershed, so control measures that focus on remediating source properties is not as effective with Mercury as with PCBs.

- No additional cost for this item.

a.ii.3. Develop implementation schedule. (2016, 17, 18, 19, 20) The County must develop a schedule to implement new control measures. This activity is also required for PCBs and the cost to meet this Mercury provision is included in the PCB costs.

- No additional cost for this item.

a.ii.4. Implement control measures to meet load reduction requirements. (2018, 2020) The County must implement control measures to reduce Mercury by at least 1.37 grams per year with Green Infrastructure. The calculation of load reduction is based on the land-use type of the drainage area flowing to the control measure. Treating sediment laden stormwater draining from, or preventing sediment from mobilizing in, areas with Old Industrial land uses yields a load reduction of 1.3 grams per acre per year, while Old Urban land uses yields 0.215 grams per acre per year, and New Urban/Other land uses yields 0.033 grams per acre per year. "Old" land use areas are those generally

constructed before 1980 and "New" constructed after 1980. This activity is also required for PCBs and the cost to meet this Mercury provision is included in the PCB costs.

- No additional cost for this item.

a.iii.1. Develop a Progress Report on implementation of control measures. (2016) The County must develop a progress report by April 2016 outlining the steps taken to develop a list of watersheds, identify control measures, and justify the selection of watersheds using monitoring data. This activity is also required for PCBs and the cost to meet this Mercury provision is included in the PCB costs.

- No additional cost for this item.

a.iii.2. Develop an implementation status report for each Annual Report. (2016, 17, 18, 19, 20) The County must develop a status report each year that includes the number, type, and location of control measures (included in C.11.a.ii.2), the description, scope, and start date of the control measures plus implementation progress milestones and schedule for milestone achievement (partially included in C.11.a.ii.2 and C.11.a.ii.3), and indicate the roles and responsibilities of each participating co-permittee where multiple jurisdictions are involved. This activity is also required for PCBs and the cost to meet this Mercury provision is included in the PCB costs.

- No additional cost for this item.

a.iii.3. Annual updates of control measures and implementation milestone achievement. (2017, 18, 19, 20) The County must update the report required in section a.iii.2 above each year. This activity is also required for PCBs and the cost to meet this Mercury provision is included in the PCB costs.

- No additional cost for this item.

b.i. Develop an assessment methodology to quantify Mercury load reductions. (2016) The MRP 2.0 includes a load reduction accounting system based on land-use. The system provides a certain load reduction credit by treating sediment laden stormwater draining from or preventing sediment from mobilizing in areas with Old Industrial, Old Urban, and New Urban/Other land-uses. BASMAA will be developing the assessment methodology based on this accounting system to satisfy this requirement. This activity is also required for PCBs and the cost to meet this Mercury provision is included in the PCB costs.

- No additional cost for this item.

- b.ii. Calculate the Mercury load reduction achieved through the control measures each year. (2017, 18, 19, 20)** The County must calculate the reduction in Mercury load reduction with each of the control measures implemented and operating during the year. This activity is also required for PCBs and the cost to meet this Mercury provision is included in the PCB costs.
- No additional cost for this item.
- b.iii.1. Submit the assessment methodology to the Executive Officer. (2016)** This requirement is being met by BASMAA with no additional cost to the County.
- No additional cost for this item.
- b.iii.2. Provide Mercury load reductions each year in the Annual Report. (2017, 18, 19, 20)** This is included in b.ii above, so there are no additional costs.
- No additional cost for this item.
- b.iii.3. Submit an update of the assessment methodology to the Executive Officer. (2018)** This update will be performed by BASMAA at no additional cost to the County.
- No additional cost for this item.
- c.i. Implement a minimum amount of green infrastructure projects to reduce Mercury loads. (2020)** This activity is also required for PCBs and the cost to meet this Mercury provision is included in the PCB costs.
- No additional cost for this item.
- c.ii.1. Implement green infrastructure projects to reduce Mercury loads by a specified amount. (2020)** All co-permittees in the County must reduce PCB loads by 9 grams per year by June 30, 2020. The County's share of that (15.26%) is 1.37 grams per year. Each permittee may meet this requirement individually or all co-permittees may meet this requirement collectively with agreement through the Clean Water Program. To meet the Mercury load requirement of 1.37 grams per year would require treating 1.5 acres of Old Industrial land uses or 9.1 acres of Old Urban land uses. The County is required to reduce PCBs by 3.51 grams per year with Green Infrastructure. To meet this PCB load reduction would require treating 58.0 acres of Old Industrial land uses or 165.4 acres of Old Urban land uses. This calculation includes a 70% efficiency factor, which is the default factor approved by the Regional Board. The PCB acreage to meet load reduction targets is much greater

than the Mercury load reduction acreage, so meeting the PCB requirement will also meet the Mercury requirement. As a result, the cost to meet the Mercury requirements for this section is included in the cost to meet the PCB requirements.

- No additional cost for this item.

c.ii.2. Prepare a reasonable assurance analysis on the effectiveness of Green Infrastructure projects. (2020) The reasonable assurance analysis must demonstrate how Green Infrastructure will be implemented to achieve load reduction goals by the five counties in the Bay Area with MRP permits, and achieve reductions of at least 10,000 grams per year by 2040. The report must be scientifically rigorous including documentation of all model development, model runs, and required peer review. This analysis and report will be prepared by BASMAA. This activity is also required for PCBs and the cost to meet this Mercury provision is included in the PCB costs.

- No additional cost for this item.

c.iii.1. Prepare report on the quantitative relationship between Green Infrastructure and Mercury load reduction. (2018) This report will be prepared by BASMAA with no additional cost to the County.

- No additional cost for this item

c.iii.2. Prepare report on amount and characteristics of land area treated by Green Infrastructure. (2020) This report must estimate the area of land treated by Green Infrastructure and the land-use type of the treatment area for the years 2020, 2030, and 2040. The report will be prepared by BASMAA at no additional cost to the County.

- No additional cost for this item.

c.iii.3. Submit a reasonable assurance analysis. (2020) This reporting requirement is included in section C.11.c.ii.2.

- No additional cost for this item.

c.iii.4. Prepare report on the amount of Mercury removed with Green Infrastructure (2019, 20) This report must estimate the amount of Mercury load reductions achieved with Green Infrastructure during the term of the permit. This activity is also required for PCBs and the cost to meet this Mercury provision is included in the PCB costs.

- No additional cost for this item.

- d.i. Prepare implementation plan and schedule to achieve TMDL waste-load allocations. (2020)** The County must provide an implementation plan and schedule to implement control measures to meet load reduction requirements and prepare a reasonable assurance analysis that the control measures will attain the TMDL waste-load allocations by 2028. BASMAA will provide an overall framework for the reasonable assurance analysis, but each permittee will have to develop the analysis for their particular control measures. The costs for this provision is included in the more specific requirements outlined below.
- d.ii.1. Identify control measures to be implemented. (2020)** The implementation plan must identify all technically and economically feasible control measures that will be implemented by the County. The reasonable assurance analysis must demonstrate that the control measures will meet the County's proportional share of the TMDL waste-load allocations by 2028. While much of this work will be covered by the requirements in the PCB provision, there will be some additional work needed. This will entail identifying control measures at \$2,000 and preparing the reasonable assurance analysis at \$5,000.
- Identify control measures and perform assurance analysis. \$7,000
- d.ii.2. Develop a schedule to implement control measures. (2020)** The County must develop a schedule to implement the control measures in the implementation plan. This activity is also required for PCBs and the cost to meet this Mercury provision is included in the PCB costs.
- No additional cost for this item.
- d.ii.3. Evaluate overall effectiveness of control measures. (2020)** For each control measure the County must quantify the Mercury load reduction based on field testing results or agreed to equivalencies, identify the capital construction costs and annual maintenance costs, identify any significant environmental impacts resulting from implementation, and develop metrics and calculate efficiencies on a unit basis for comparison purposes. This activity is also required for PCBs and the cost to meet this Mercury provision is included in the PCB costs.
- No additional cost for this item.
- d.iii. Submit the plan and schedule in the 2020 Annual Report.** The cost for this provision is included in the more specific requirements outlined above.
- No additional cost for this item.

e.i.-iii. Implement a risk reduction program. (2016, 17, 18, 19, 20) This provision requires development of a risk reduction program to reduce health risks to those people likely to consume fish caught in San Francisco Bay. This was also a requirement of MRP 1.0 and implemented through the Regional Monitoring Program, so there is no additional cost for MRP 2.0.

- No additional cost for this item.

POLYCHLORINATED BIPHENYLS (PCBs)

Meeting the PCB Load Reduction Schedule for Unincorporated Contra Costa County A Requirement of the Current Municipal Regional Permit (MRP 2.0)

Updated April 10, 2017

I. Objective and Purpose

The following are the objectives and purpose of the Polychlorinated Biphenyls (PCBs) Load Reduction requirement in the Municipal Regional Permit 2.0:

- Meet the TMDL schedule for San Francisco Bay to remove 3 kg/year by the end of the permit term
- Implement and test a variety of control measures to remove PCBs
- Identify and abate source properties
- Establish PCB management during building demolition activities

The following are observations of the PCB Load Reduction requirements:

- Green Infrastructure is the most favored overall control measure
- Old industrial and old urban land uses are considered the overall primary source of PCBs other than source properties

II. PCB Load Reduction Process and Cost

The following is a step by step process and resultant costs to meet the PCB Load Reduction requirements specified in the Municipal Regional Permit 2.0. This cost analysis is based on the assumption that the County must meet its own PCB load reduction targets. This presumes that Bay Area permittees, collectively, are not able to meet the overall TMDL goal and the requirement devolves to the counties, and that Contra Costa County permittees, collectively, are also not able to meet load reduction targets.:

Provision C.12: Reducing PCB Levels in the Bay

a.i. Implement control measures to reduce PCBs. (2018, 2020)

All co-permittees within Contra Costa County must reduce PCB loads by 90 grams per year by 2018 and 560 grams per year by 2020. The 90 gram load reduction in 2018 is carried forward, so the 560 gram load reduction in 2020 includes the 2018 load reduction, leaving a balance of 470 grams.

The County's share of that load reduction, based on population as of January 2015, is 15.26%. The County must therefore implement source and treatment control measures to reduce PCBs by 13.73 grams per year by 2018 and a total of 85.45 grams per year by 2020.

The cost to implement the control measures identified in this provision is covered in the provisions outlining the specific control measure.

- No additional cost for this item

a.ii.1 Identify current and proposed watersheds or management areas with control measures. (2016) The County must identify the watersheds or management areas (portions of watersheds) where PCB control measures are currently being implemented and where new control measures will be implemented. This will entail identifying where control measures are currently being implemented at \$1,000, and analyzing and identifying where new control measures can be implemented at \$10,000.

- Identify watersheds/management areas with control measures. \$11,000

a.ii.2. Identify current and new control measures. (2016) The County must identify the various types of control measures that are currently being implemented (primarily street sweeping) and control measures that will be implemented. PCB molecules attach themselves to sediment particles, so control measures that settle out or capture sediment particles are most effective. Control measures can include abating "source properties" (properties where PCBs were stored or used in industrial processes), constructing green infrastructure treatment facilities, sweeping streets in management areas, cleaning drainage inlets, redeveloping and remediating contaminated areas, diverting stormwater to sewer treatment plants, flushing streets, and managing debris during building demolition and renovation. This will entail identifying the various types of current control measures being used and analyzing and determining what type of control measure would be most appropriate in the new management areas. These costs are included in C.12.a.ii.1 above.

Note: The County is proposing four control measures, 1) identifying source properties throughout the unincorporated County and referring them to the Regional Board, 2) developing a large scale treatment project in the North Richmond Pump Station drainage, 3) construct curb and gutter where none now exists to facilitate street sweeping in and around Old Industrial areas, and 4) construct Green Infrastructure projects throughout the unincorporated County.

- There is no additional cost for this item

- a.ii.3. Develop implementation schedule. (2016, 17, 18, 19, 20)** The County must develop a schedule to implement new control measures at \$10,000, and update it as necessary each year at \$1,000 per year.
- Develop implementation schedule. \$10,000
 - Annual cost to update schedule. \$1,000

- a.ii.4. Implement control measures to meet load reduction requirements. (2018, 2020)** The County must implement control measures to reduce PCBs by 13.73 grams by 2018 and a total of 85.45 grams by 2020. It is assumed the County will avail itself of the 67% load reduction credit for implementing a demolition control program in 2019, leaving a 33% load reduction balance of 28.48 grams by 2020 (reduced from 85.45 grams). The 67% credit goes into effect in 2019, so the 2018 load reduction requirement of 13.73 grams is not reduced. In addition, provision C.12.c.ii.1 requires a minimum of 3.51 grams of the total 2020 load reduction through Green Infrastructure.

The load reduction calculation is based on the land-use type of the drainage area flowing to the control measure. Treating sediment laden stormwater draining from, or preventing sediment from mobilizing in, areas with Old Industrial land uses yields a load reduction of 0.0865 grams per acre per year, while Old Urban land uses yields 0.0303 grams per acre per year, New Urban land uses yields 0.0035 grams per acre per year, and Open Space land uses yields 0.0043 grams per acre per year. "Old" land use areas are those generally constructed before 1980 and "New" are those areas constructed after 1980. To meet the total load requirement of 28.48 grams through treatment only would require treating 329 acres of Old Industrial land uses, 940 acres of Old Urban land uses, 8137 acres of New Urban land uses, or 6623 acres of Open Space land uses. Based on the load reduction yields per acre, it makes sense to focus on areas with Old Industrial and Old Urban land uses.

The County is proposing four control measures to meet PCB load reduction requirements as follows:

Source Properties. This measure would identify properties with very high concentrations of PCBs due to historic uses of the property. The County could then proceed to abate the PCBs or refer the property to the Regional Board for investigation and abatement. If the property is referred to the Regional Board, the County must submit a plan with the referral that describes how the County will prevent PCBs from leaving the site, or from entering the storm drain system. The County would receive 50% of the load reduction credit for properties referred to the Regional Board upon referral, and the remaining 50% credit would be received upon completion of the abatement. If the County abates the property, 100% of the load reduction would be credited upon completion. Abatement projects can take many years. The load reduction credit for

these types of properties is 4.035 grams per acre per year, substantially more than the credit for Old Industrial land uses! A one-acre site referred to the Regional Board each year could result in about 2 grams credit. To implement this control measure the County would need to identify potential parcels for testing at \$10,000, and conduct field testing to determine if there are excessive levels of PCBs at \$25,000. If a parcel is identified and assuming it will be referred to the Regional Board, then the County would need to prepare a referral letter with documentation at \$10,000, develop a containment plan to prevent PCBs from entering the storm drain system at \$10,000, implement the containment project at \$25,000, and maintain the containment feature at \$10,000 per year. The County has been looking at properties in likely areas but has only discovered one potential site, so it is assumed this control measure will only yield 1.0 grams per year.

Cost for possibly 1.0 gram of PCBs. \$80,000

Annual cost to maintain containment features. \$10,000

North Richmond Pump Station. This measure would divert dry weather flows to the West County Wastewater District to remove PCB laden sediments from stormwater runoff. In addition, first flush wet weather events would be diverted for treatment. The County conducted a pilot stormwater diversion project at the North Richmond Pump Station in 2015. That project resulted in 0.00064 grams of PCBs removed in 9.5 work-days (eight hour days), and 0.00084 grams of PCBs removed in one wet weather first flush event. Assuming the Pump Station can divert dry weather type flows for treatment 330 days per year and divert five first flush wet weather events per year, the PCB load reduction would be 0.0262 grams per year. To implement this control measure the County would need to install a permanent connection from the Pump Station to the Wastewater District manhole in Gertrude Avenue at \$50,000, negotiate a permit/agreement with the Wastewater District to treat the diverted flows at \$10,000, and pay a connection fee to the Wastewater District at \$15,000. Load reductions could be increased by doubling the discharge rate to 200 gallons per minute and operating 24 hours per day for 330 days per year. This would increase load reduction to 0.137 grams per year, but would likely require increased testing equipment to safeguard the Wastewater District treatment process at \$25,000 and likely double the connection fee to \$30,000. This project would only be financially feasible if there were no treatment charges for the roughly 95,000,000 gallons diverted to the treatment plant each year. The project would be feasible if the diverted stormwater was viewed as a resource in conjunction with some other re-use project allowing treatment costs to be paid from other sources. To develop this type of re-use project would likely take a year or two to negotiate. Further load reduction increases could be achieved by modifying the Pump Station to maximize flows to the Wastewater District by adding a storage component to capture all flows yet not exceed the capacity of the Wastewater District pipe system. This

would be an expensive project and one not contemplated during this permit term.

One time capital cost for 0.0262 grams of PCBs per year. \$75,000

One time capital cost for 0.137 grams of PCBs per year. \$115,000

Annual cost to treat 95 million gallons. \$Unknown

Enhanced Street Sweeping. This measure would construct curb and gutter in and around Old Industrial land uses where none currently exist, allowing sediment to be picked up by street sweeping. Street sweeping is not effective without curb and gutter. To implement this control measure the County would need to identify areas with Old Industrial land uses where installing curb and gutter would be feasible at \$25,000, developing and building a project to install curb and gutter along 10 blocks (200 feet long blocks) at \$90 per lineal foot (curb and gutter plus 18 inches of pavement), assuming no drainage work is necessary (big assumption), and conducting additional street sweeping at \$50,000 per year. The capital project to implement this control measure would take two years to plan and build. It is assumed this control measure will yield 1.0 grams of PCBs.

Develop feasibility analysis. \$25,000

Capital cost for 1.0 grams of PCBs. \$180,000

Annual cost of Street sweeping. \$50,000

Green Infrastructure. This measure would construct Green Infrastructure projects, mostly in areas with Old Industrial and Old Urban land uses. Projects in Old Industrial areas would be located where installation of curb and gutter was not feasible but conversion of an existing roadside ditch to a bio-retention facility would work. Both public and private Green Infrastructure projects count in calculating the load reduction. It is assumed that private projects will be able to treat 10 acres per year of a mix of Old Industrial and Old Urban land use, with an equivalent load reduction of 0.5 grams per year in 2016, 2017, 2018, 2019, and 2020. This would entail identifying all Green Infrastructure projects proposed by developers, determining the land-use category and area draining to the Green Infrastructure project, and tracking other information required by the Load Reduction Calculator at \$5,000 per year. The County would need to meet the balance of its requirements by implementing Green Infrastructure projects on public property. This would entail identifying the target acreage needed to be treated in Old Industrial or Old Urban land use areas and developing projects to treat the drainage area at a unit treatment cost of \$215,000 per acre (based on the 255 Glacier Drive Parking Lot bio-retention project that treated 1.35 acres at a cost of \$290,000) and an annual maintenance cost of \$3,000 per treated acre. Given the assumptions with the other control measures of 1.0 grams from Source Properties, 0.14 grams from the Pump Station,

1.0 grams from Street Sweeping, and 0.5 grams per year from private Green Infrastructure projects, the public Green Infrastructure project component will have to yield load reductions of 10.09 (13.73 – 3.64) grams in 2018, and 17.39 grams in 2020. The overall 2020 load reduction (28.48) is reduced by the 2018 load reduction (10.09) to determine the balance of load reduction requirement in 2020 (17.39) including private development in 2019 (0.5) and 2020 (0.5). To meet the load reduction requirement of 10.09 grams in 2018 would require treating 116.6 acres of Old Industrial land use area or 333.0 acres of Old Urban land use area. It is assumed 225 acres of a mix of these two land uses will be treated to meet the requirement. This acreage would be multiplied by the treatment cost of \$215,000 per treated acre and reduced by the 70% efficiency factor for Green Infrastructure approved by the Regional Board. Using the same methodology to determine the load reduction requirement costs for 2020, it is assumed that the contribution from private projects will hold steady at 10 acres per year with a load reduction of 0.5 grams per year, so the balance of 17.39 grams will have to be picked up with public Green Infrastructure retrofit projects. The cost to the County would be treating approximately 390 acres of mixed land-use at a unit treatment cost of \$215,000 per acre with a 70% efficiency factor, and an annual maintenance cost of \$3,000 per treated acre. This would represent the worst case cost scenario using the assumptions noted above.

Note: The permit allows implementation collaboratively with other jurisdictions within the County or within the region, which may reduce unit costs.

It should also be noted these costs were peer-reviewed by a consultant in the stormwater field. The consultant indicated costs to construct Green Infrastructure in the Bay Area to treat 1 acre of drainage ranges from \$200,000 up to \$365,000. This report used a cost of \$215,000 per acre, based on a Public Works Department project, which is at the low end of the range. More recent work by the same consultant indicates that average costs in Southern California are about \$110,000 per treated acre. However, since there are enough differences in soils, climate, and institutional arrangements between there and the Bay Area, this analysis continues to use \$215,000 per treated acre.

- Implement control measures (2018). \$69,100,000
- Implement control measures (2020). \$119,800,000
- Annual cost to track private Green Infrastructure projects. \$5,000
- Annual maintenance costs (2018). \$675,000
- Annual maintenance costs (2019). \$675,000
- Annual maintenance costs (2020). \$1,845,000

a.iii.1. Develop a Progress Report on implementation of control measures. (2016) The County must develop a progress report by April 2016 outlining the steps taken to develop a list of watersheds, identify

control measures, justify the selection of watersheds using monitoring data, and report on contamination sites referred to the Regional Board at \$5,000.

- Develop Progress Report. \$5,000

a.iii.2. Develop an implementation status report for each Annual Report. (2017, 18, 19, 20) The County must develop a status report each year that includes the number, type, and location of control measures (included in C.12.a.ii.2), the cumulative listing of all PCB contaminated sites referred to the Regional Board (included in C.12.a.ii.2), the description, scope, and start date of the control measures plus implementation progress milestones and schedule for milestone achievement (partially included in C.12.a.ii.2 and C.12.a.ii.3), and indicate the roles and responsibilities of each participating co-permittee where multiple jurisdictions are involved all at \$3,000.

- Annual cost to do the status report for the Annual Report. \$3,000

a.iii.3. Annual updates of control measures, sites referred to the Regional Board, and implementation milestone achievement. (2017, 18, 19, 20) The County must update the report required in section C.12.a.iii.2 above each year. This cost is included in the provision C.12.a.iii.2 above.

- No additional cost for this item.

a.iii.4. Develop alternative load reduction distribution criteria (optional). (2017) The County must identify and document an alternative method of distributing load reductions within the County, only if it chooses to do so. This would be done in conjunction with all co-permittees within the Clean Water Program. The current method of load reduction distribution is based on the proportional population of each co-permittee within the County, and there is no reason to believe an alternate method would be needed or desired.

- There is no additional cost for this item, unless an alternative load reduction distribution is needed. Developing an alternative load reduction distribution criteria would cost approximately \$25,000.

b.i. Develop an assessment methodology to quantify PCB load reductions. (2016) The MRP 2.0 includes a load reduction accounting system based on land-use. The system provides a certain load reduction credit by treating sediment laden stormwater draining from or preventing sediment from mobilizing in areas with Old Industrial, Old Urban, New Urban, and Open Space land-uses. BASMAA will be developing the assessment methodology based on this accounting system to satisfy this

requirement. The work has been included in this year's BASMAA budget so no additional costs from the County will be needed.

- No additional cost for this item

b.ii. Calculate the PCB load reduction achieved through the control measures each year. (2017, 18, 19, 20) The County must calculate the reduction in PCB load reduction with each of the control measures implemented and operating during the year. BASMAA is developing a Permittee Load Reduction Credit Calculator to facilitate this calculation. The County will receive a 67% load reduction credit if it implements a program to manage building and construction demolition debris containing PCBs (provision C.12.f). Meeting this requirement will entail gathering the specified data and entering it into the Load Reduction Calculator at \$5,000 per year.

- Annual calculation of PCB load reduction. \$5,000

b.iii.1. Submit the assessment methodology to the Executive Officer. (2016) This requirement is being met by BASMAA with no additional cost to the County.

- No additional cost for this item

b.iii.2. Provide PCB load reductions each year in the Annual Report. (2017, 18, 19, 20) This is included in C.12.b.ii above, so there are no additional costs.

- No additional cost for this item

b.iii.3 Submit an update of the assessment methodology to the Executive Officer. (2018) This update will be performed by BASMAA at no additional cost to the County.

- No additional cost for this item.

b.iii.4 Develop alternative load reduction distribution criteria (optional). (2019) This provision is similar to C.12.a.iii.4, except the load reduction distribution alternative is specifically for implementing a PCB containment program for demolition debris.

- There is no additional cost for this item, unless an alternative load reduction distribution is needed. Developing and alternative load reduction distribution criteria would cost approximately \$25,000.

c.i. Implement a minimum amount of green infrastructure projects to reduce PCB loads. (2020) The cost for this provision is included in the more specific requirements outlined below.

c.ii.1 Implement green infrastructure projects to reduce PCB loads by a specified amount. (2020) All co-permittees in Contra Costa County must use Green Infrastructure to reduce PCB loads by 23 grams by June 30, 2020. The County's share of that (15.26%) is 3.51 grams. Each co-permittee may meet this requirement individually or all co-permittees may meet this requirement collectively with agreement through the Clean Water Program. To meet the load requirement of 3.51 grams per year would require treating 40.6 acres of Old Industrial land uses or 115.8 acres of Old Urban land uses. It is assumed 78 acres of a mix of these two land uses will be treated to meet the requirement. To calculate the total cost, this acreage would be multiplied by \$215,000 per treated acre with a 70% default efficiency factor approved by the Regional Board. These acreage quantities are significantly below those proposed in the Green Infrastructure Section of provision C.12.a.ii.4, so this requirement is covered in that prior section.

- There is no additional cost for this item.

c.ii.2. Prepare a reasonable assurance analysis on the effectiveness of Green Infrastructure projects. (2020) The reasonable assurance analysis must demonstrate how Green Infrastructure will be implemented to achieve a load reduction of 3.0 kilograms by the five counties in the Bay Area with MRP permits. The report must be scientifically rigorous including documentation of all model development, model runs, and required peer review. This analysis and report will be prepared by BASMAA and will be included in their annual budget over the next two or three years, so there will be no additional cost to the County. There will be some coordination effort and review time required of County staff to ensure County needs are met at \$2,000.

- Cost to coordinate with the reasonable assurance analysis. \$2,000

c.iii.1. Prepare report on the quantitative relationship between Green Infrastructure and PCB load reduction. (2018) This report will be prepared by BASMAA with no additional cost to the County.

- No additional cost for this item

c.iii.2. Prepare report on amount and characteristics of land area treated by Green Infrastructure. (2020) This report must estimate the area of land treated by Green Infrastructure and the land-use type of the treatment area for the years 2020, 2030, and 2040. The report will be prepared by BASMAA at no additional cost to the County, however, the County will need to coordinate with and provide data to BASMAA for the report at \$5,000.

- Provide information for report. \$5,000

- c.iii.3. Submit a reasonable assurance analysis. (2020)** This reporting requirement was included in section C.12.c.ii.2.
- c.iii.4. Prepare report on the amount of PCBs removed with Green Infrastructure (2019, 20)** This report must estimate the amount of PCB load reductions achieved with Green Infrastructure during the term of the permit. This will entail analyzing test results and calculating load reductions at \$2,000 per year.
- Annual cost for report on load reduction. \$2,000
- d.i. Prepare implementation plan and schedule to achieve TMDL waste-load allocations. (2020)** The County must provide an implementation plan and schedule to implement control measures to meet load reduction requirements and prepare a reasonable assurance analysis that the control measures will attain the TMDL waste-load allocations by 2030. BASMAA will provide an overall framework for the reasonable assurance analysis, but each permittee will have to develop the analysis for their particular control measures. The costs for this provision is included in the more specific requirements outlined below.
- d.ii.1. Identify control measures to be implemented. (2020)** The implementation plan must identify all technically and economically feasible control measures that will be implemented by the County. The reasonable assurance analysis must demonstrate that the control measures will meet the County's proportional share of the TMDL waste-load allocations by 2030. This will entail identifying the control measures at \$5,000 and preparing the reasonable assurance analysis at \$15,000.
- Identify control measures and perform assurance analysis. \$20,000
- d.ii.2. Develop a schedule to implement control measures. (2020)** The County must develop a schedule to implement the control measures in the implementation plan at \$5,000.
- Develop implementation schedule. \$5,000
- d.ii.3. Evaluate overall effectiveness of control measures. (2020)** BASMAA will assist the counties by developing a framework to guide this work. However, for each control measure the County must quantify the PCB load reduction based on field testing results or agreed to equivalencies at \$2,000, identify the capital construction costs and annual maintenance costs at \$2,000, identify any significant environmental impacts resulting from implementation at \$2,000, and develop metrics and calculate efficiencies on a unit basis for comparison purposes at \$10,000.
- Evaluate the effectiveness of control measures. \$16,000

- d.iii. Submit the plan and schedule in the 2020 Annual Report.** The cost for this provision is included in the more specific requirements outlined above.
- e.i.-iii. Evaluate PCBs in public infrastructure facilities. (2018)** This provision requires collection of caulk samples from sealants in storm drain facilities, between concrete curbs and street pavement, and other infrastructure to determine the amount of PCBs present in the caulking materials. BASMAA will be collecting the samples, performing the analysis, and preparing the report to meet this requirement at no additional cost to the County. There will be some coordination effort and review time required of County staff to ensure County needs are met at \$2,000.
- Cost to coordinate with evaluation study. \$2,000
- f.i. Manage demolition debris to prevent PCBs from entering storm drain systems.** This provision requires development of a program to manage PCB laden materials with concentrations of 50 ppm or greater during the demolition of buildings to prevent pollutants from entering the storm drain system. This requires preventing mobilization and transport of PCBs through vehicle track out, airborne releases, soil erosion, or stormwater runoff. This requirement applies to commercial, public, institutional, and industrial structures, but does not apply to single-family residential or wood-frame structures. The costs for this provision is included in the more specific requirements outlined below.
- f.ii.1. Develop demolition debris management protocols. (2019)** The County must demonstrate it has the necessary authority to require management of PCBs during the demolition of applicable structures, a method for identifying the applicable structures within the County's jurisdiction, and management methods to ensure PCBs are not discharged to the storm drain system. BASMAA will prepare a model ordinance and develop a range of acceptable sample protocols for managing construction debris during demolition activities at no additional cost to the County. This will entail adapting the model ordinance to County format at \$5,000, shepherding the prospective ordinance through the County review and approval process at \$10,000, developing a mechanism to flag parcels with applicable buildings in the permit database at \$25,000, and adapting the sample management protocols to the County's business procedures and incorporating them into the permit process at \$5,000.
- Develop debris management protocols. \$45,000
- f.ii.2. Implement demolition debris management protocols. (2019)** The County must incorporate debris management protocols into its permit and inspection system. Most of the cost for this provision is included in

section C.12.f.ii.1 above. This will require training of office staff and field inspectors on the new protocols at \$5,000.

- Implement debris management protocols. \$5,000

f.ii.3. Develop assessment methods to determine effectiveness of demolition debris management protocols. (2019) This provision requires development of an assessment methodology and data collection program to determine the effectiveness of managing demolition debris to reduce PCB loads. BASMAA will be developing the assessment methodology and data collection program, and preparing the report to meet this requirement at no cost to the County.

- No additional cost for this item

Note: It should be noted here that BASMAA will be taking on a significant amount of technical studies to support permittees in meeting MRP 2.0 requirements. At this time it is assumed that all this work can be accomplished with no increase in the annual "dues". However, due to the complexity and amount of work involved with MRP 2.0 an increase in the annual dues to BASMAA would seem likely, resulting in a proportional cost increase to the County.

f.iii.1. Prepare annual status report on implementing demolition debris management protocols. (2016, 17, 18) The County must report on efforts to implement debris management protocols, such as developing ordinances and implementation policies and procedures, obtaining information needed for the various studies, incorporation of this requirement into business practices and processes, and training at \$2,000 each year.

- Annual cost to provide status report. \$2,000

f.iii.2. Prepare exemption justification. (2017) This applies only to jurisdictions requesting an exemption from these requirements, which the County does not qualify for.

- No additional cost for this item

f.iii.3. Prepare status reports on implementing demolition debris management protocols. (2020) This provision requires the County to document how it has met the minimum requirements for implementing debris management protocols at \$2,000.

- Implementation status report. \$2,000

f.iii.4. Prepare report on applicable buildings. (2020) This provision requires the County to track and report on the number of applicable buildings issued a demolition permit each year, a running list of total permits, and description of PCB control measures used. This will entail developing a tracking system for demolition permits with the control measures used at \$10,000 and extracting the information and reporting out at \$1,000.

- Prepare reports on applicable buildings. \$11,000

f.iii.5. Develop assessment methods to determine quantity of PCBs removed with demolition debris management protocols. (2020) This provision requires development of an assessment methodology and data collection program to determine the quantities of PCBs removed by managing demolition debris. BASMAA will be developing the assessment methodology and data collection program, and preparing the report to meet this requirement at no cost to the County.

- No additional cost for this item

g.i.-iii. Develop a fate and transport study of PCBs. (2017, 18, 20) This provision requires development of a fate and transport study describing biological uptake of PCBs in the San Francisco Bay margins. This study will be developed by the San Francisco Estuary Institute at no additional cost to the County.

- No additional cost for this item

h.i.-iii. Implement a risk reduction program. (2016, 17, 18, 19, 20) This provision requires development of a risk reduction program to reduce health risks to those people likely to consume fish caught in San Francisco Bay. This was also a requirement of MRP 1.0 and implemented through the Regional Monitoring Program, so there is no additional cost for MRP 2.0.

- No additional cost for this item

Appendix Table 1. MRP 2.0 Additional Provision Costs: C.3 Green Infrastructure Cost Summary

Provision Number	Requirement	2016	2017	2018	2019	2020
C.3.j.i.1	Prepare Green Infrastructure Plan framework	\$0	\$34,500	\$0	\$0	\$0
C.3.j.i.2.a	Develop mechanism to map and prioritize GI projects on a watershed basis	\$0	\$0	\$0	\$216,000	\$0
C.3.j.i.2.b	Outputs from mapping and prioritization mechanism (see C.3.j.i.2.a)	\$0	\$0	\$0	\$0	\$0
C.3.j.i.2.c	Develop urban built environment retrofit targets	\$0	\$0	\$0	\$20,000	\$0
C.3.j.i.2.d	Develop process to track and map completed GI projects	\$0	\$0	\$0	\$2,000	\$2,000
C.3.j.i.2.e	Develop guidelines for project development, design, and construction to ensure GI is included in projects	\$0	\$0	\$0	\$20,000	\$0
C.3.j.i.2.f	Prepare standard specifications and standard plans	\$0	\$0	\$0	\$40,000	\$0
C.3.j.i.g	Develop options to include hydro-modification in GI projects	\$0	\$0	\$0	\$55,000	\$0
C.3.j.i.2.h	Update County's foundational planning documents	\$0	\$0	\$0	\$250,000	\$0
C.3.j.i.2.i	Develop work-plan to ensure GI and LID measures are included in future planning document amendments	\$0	\$0	\$0	\$25,000	\$0
C.3.j.i.2.j	Develop work-plan to complete prioritized GI projects	\$0	\$0	\$0	\$125,000	\$0
C.3.j.i.2.k	Develop a GI Financing Plan	\$0	\$0	\$0	\$25,000	\$0
C.3.j.i.3	Develop and adopt policies, ordinances to ensure GI Plan implementation	\$0	\$0	\$0	\$45,000	\$0
C.3.j.i.4.a	Conduct public outreach on the GI Plan	\$0	\$11,000	\$11,000	\$11,000	\$11,000
C.3.j.i.4.b	Provide staff training on the GI Plan	\$0	\$6,000	\$3,000	\$3,000	\$3,000
C.3.j.i.4.c	Educate County elected officials on the GI Plan	\$0	\$5,000	\$2,000	\$2,000	\$2,000
C.3.j.i.5	Progress report on GI planning	\$0	\$5,000	\$5,000	\$5,000	\$5,000
C.3.j.ii.1	Prepare and maintain a list of public and private GI projects	\$0	\$12,000	\$2,000	\$2,000	\$2,000
C.3.j.ii.2	Prepare a status summary for each public and private GI project	\$0	\$6,000	\$6,000	\$6,000	\$6,000
C.3.j.iii.1	Influence regional, state, and federal agencies to fund and incorporate GI measures	\$0	\$5,000	\$5,000	\$5,000	\$5,000
C.3.j.iii.2	Report on participation goals	\$0	\$5,000	\$5,000	\$5,000	\$5,000
C.3.j.iii.3	Prepare a plan and schedule for GI advocacy efforts	\$0	\$0	\$0	\$5,000	\$0
C.3.j.iv.1	Develop regionally consistent tracking method for GI	\$0	\$0	\$0	\$20,000	\$0
C.3.j.iv.2	Report progress on tracking methods each year	\$0	\$2,000	\$2,000	\$2,000	\$2,000
C.3.j.iv.3	Submit tracking methods and status in 2019 Annual Report (see j.iv.1)	\$0	\$0	\$0	\$0	\$0
Total Costs		\$0	\$91,500	\$41,000	\$889,000	\$43,000

Appendix Table 2. MRP 2.0 Additional Provision Costs: C.10 Trash Load Reduction Costs Summary

Provision Number	Requirement	Estimated Costs				
		2016	2017	2018	2019	2020
C.10.a.i.	Meet prescribed schedule	\$25,000	\$0	\$25,000	\$0	\$0
a.i.	Meet trash reduction targets: Full trash capture devices	\$0	\$840,000	\$1,380,000	\$1,890,000	\$2,710,000
a.i.	Meet trash reduction targets: On-land clean-up	\$0	\$200,000	\$200,000	\$200,000	\$200,000
a.i.	Meet trash reduction targets: Community-based measures	\$5,000	\$25,000	\$10,000	\$10,000	\$10,000
a.i.	Meet trash reduction targets: Direct discharge control (See e.ii)	\$0	\$0	\$0	\$0	\$0
a.ii.	Update trash generation areas	\$25,000	\$0	\$0	\$0	\$0
a.ii.a.	Establish full trash capture systems as the standard	\$0	\$0	\$0	\$0	\$0
a.ii.b.	Private storm drains to include full trash capture	\$0	\$0	\$160,000	\$0	\$0
a.iii.	Install minimum full trash capture systems (In MRP 1.0)	\$0	\$0	\$0	\$0	\$0
b.i.a.	Maintenance Plan for full trash capture devices	\$0	\$35,000	\$0	\$0	\$0
b.i.b.	Report on effectiveness of full trash capture devices	\$0	\$3,000	\$3,000	\$3,000	\$3,000
b.i.c.	Certification of full trash capture systems	\$0	\$1,000	\$1,000	\$1,000	\$1,000
b.ii.a.	Document other trash management actions	\$0	\$25,000	\$0	\$0	\$0
b.ii.b.	Effectiveness of other trash management actions	\$0	\$0	\$0	\$50,000	\$0
b.iii.	Calculate trash discharge reduction	\$0	\$5,000	\$5,000	\$5,000	\$5,000
b.iv.	Develop source control strategy	\$0	\$85,000	\$10,000	\$10,000	\$10,000
b.v.	Develop receiving water monitoring program	\$0	\$0	\$10,000	\$5,000	\$5,000
c.	Clean-up trash hotspots (In MRP 1.0)	\$0	\$0	\$0	\$0	\$0
d.	Update Trash Load Reduction Plan (see C.10.a.i)	\$0	\$0	\$0	\$0	\$0
e.i.	Evaluate creek/shoreline cleanups as a control measure	\$0	\$25,000	\$5,000	\$5,000	\$5,000
e.ii.	Evaluate direct trash discharge control measures	\$0	\$250,000	\$205,000	\$205,000	\$205,000
f.v.b.	Prepare non-compliance report (If necessary) (see Note 1)					
	Total Costs	\$55,000	\$1,494,000	\$2,014,000	\$2,384,000	\$3,154,000

Notes:

1. If County does not meet the 70% load reduction by 2017 or 80% load reduction by 2018, then the County would convert drainage inlets in the non-attainment area to full trash capture. This would result in a planning cost of \$75,000 in 2017, an implementation cost of \$2,440,000 in 2018, and \$3,100,000 annual increase in maintenance costs.

Appendix Table 3. MRP 2.0 Additional Provision Costs: C.12 PCB Load Reduction Cost Summary

Provision Number	Requirement	2016	2017	2018	2019	2020
C.12.a.i.	Implement PCB control measures	\$0	\$0	\$0	\$0	\$0
a.ii.1	Identify management areas with control measures	\$11,000	\$0	\$0	\$0	\$0
a.ii.2.	Identify current and new control measures (see C.12	\$0	\$0	\$0	\$0	\$0
a.ii.3.	Develop implementation schedule	\$10,000	\$1,000	\$1,000	\$1,000	\$1,000
a.ii.4.	Implement Source Properties control measure	\$0	\$0	\$80,000	\$10,000	\$10,000
a.ii.4.	Implement North Richmon Pump Station control measure	\$0	\$0	\$0	\$0	\$115,000
a.ii.4.	Implement Street Sweeping control measure	\$0	\$0	\$25,000	\$180,000	\$50,000
a.ii.4.	Implement Green Infrastructure control measure	\$0	\$0	\$69,780,000	\$680,000	\$121,650,000
a.iii.1.	Progress report on control measures	\$5,000	\$0	\$0	\$0	\$0
a.iii.2.	Develop status for each Annual Report	\$0	\$3,000	\$3,000	\$3,000	\$3,000
a.iii.3.	Update on control measures, source properties, milestones (see C.12.a.iii.2)	\$0	\$0	\$0	\$0	\$0
a.iii.4.	Alternative load reduction distribution (optional) (see Note 1)					
b.i.	Develop load reduction assessment methodology (BASMAA)	\$0	\$0	\$0	\$0	\$0
b.ii.	Calculate PCB load reduction each year	\$0	\$5,000	\$5,000	\$5,000	\$5,000
b.iii.1.	Submit assessment methodology (BASMAA)	\$0	\$0	\$0	\$0	\$0
b.iii.2.	Provide PCB load reductions each year (included in C.12.b.ii)	\$0	\$0	\$0	\$0	\$0
b.iii.3	Update assessment methodology (BASMAA)	\$0	\$0	\$0	\$0	\$0
b.iii.4	Alternative load reduction distribution (optional) (see Note 1)					
c.i.	Minimum GI projects for PCBs (see C.12.a.ii.4)	\$0	\$0	\$0	\$0	\$0
c.ii.1	Implement GI projects for specified reduction (included in C.12.a.ii.4)	\$0	\$0	\$0	\$0	\$0
c.ii.2.	Reasonable assurance analysis on GI projects (BASMAA)	\$0	\$0	\$0	\$0	\$2,000
c.iii.1.	Report on GI and PCB load reduction (BASMAA)	\$0	\$0	\$0	\$0	\$0
c.iii.2.	Report on land area treated by GI (BASMAA)	\$0	\$0	\$0	\$0	\$5,000

Appendix Table 3. MRP 2.0 Additional Provision Costs: C.12 PCB Load Reduction Cost Summary

Provision Number	Requirement	2016	2017	2018	2019	2020
c.iii.3.	Submit a reasonable assurance analysis (included in C.12.c.ii.2)	\$0	\$0	\$0	\$0	\$0
c.iii.4.	Report on PCBs removed with GI	\$0	\$0	\$0	\$2,000	\$2,000
d.i.	Implementation plan for TMDL waste-load allocations (see C.12.d.ii.1)	\$0	\$0	\$0	\$0	\$0
d.ii.1.	Identify control measures	\$0	\$0	\$0	\$0	\$20,000
d.ii.2.	Implement control measures	\$0	\$0	\$0	\$0	\$5,000
d.ii.3.	Evaluate effectiveness of control measures	\$0	\$0	\$0	\$0	\$16,000
d.iii.	Submit implementation plan (included in C.12.d.ii.1)	\$0	\$0	\$0	\$0	\$0
e.i.-iii.	Evaluate PCBs in public infrastructure facilities (BASMAA)	\$0	\$0	\$2,000	\$0	0
C.12.f.i.	Manage demolition debris to contain PCBs (see C.12.f.ii.1)	\$0	\$0	\$0	\$0	\$0
f.ii.1.	Develop debris management protocols	\$0	\$0	\$0	\$45,000	\$0
f.ii.2.	Implement debris management protocols	\$0	\$0	\$0	\$5,000	\$0
f.ii.3.	Assessment of debris management effectiveness (BASMAA)	\$0	\$0	\$0	\$0	\$0
f.iii.1.	Report on implementing debris management	\$2,000	\$2,000	\$2,000	\$0	\$0
f.iii.2.	Prepare exemption justification (not applicable)					
f.iii.3.	Report on debris management protocols	\$0	\$0	\$0	\$0	\$2,000
f.iii.4.	Report on applicable buildings	\$0	\$0	\$0	\$0	\$11,000
f.iii.5.	Assessment methodology for load reduction (BASMAA)	\$0	\$0	\$0	\$0	\$0
g.i.-iii.	Fate and transport study (SFEI)	\$0	\$0	\$0	\$0	\$0
h.i.-iii.	Risk reduction program (included in MRP 1.0)	\$0	\$0	\$0	\$0	\$0
Total Costs		\$28,000	\$11,000	\$69,898,000	\$931,000	\$121,897,000

Note:

1. The current distribution method of load reduction within the county is based on the proportional population of each co-permittee. If the Clean Water Program decided to develop an alternative distribution methodology, the estimated cost would

Appendix Table 4. MRP 2.0 Additional Provision Costs: Mercury Load Reduction Cost Summary

Provision Number	Requirement	2016	2017	2018	2019	2020
a.i.	Implement Mercury control measures (see Note 1)	\$0	\$0	\$0	\$0	\$0
a.ii.1	Identify management areas with control measures (see Note 1)	\$0	\$0	\$0	\$0	\$0
a.ii.2.	Identify current and new control measures (see Note 1)	\$0	\$0	\$0	\$0	\$0
a.ii.3.	Develop implementation schedule (see Note 1)	\$0	\$0	\$0	\$0	\$0
a.ii.4.	Implement Green Infrastructure control measure (see Note 1)	\$0	\$0	\$0	\$0	\$0
a.iii.1.	Progress report on control measures (see Note 1)	\$0	\$0	\$0	\$0	\$0
a.iii.2.	Develop status for each Annual Report (see Note 1)	\$0	\$0	\$0	\$0	\$0
a.iii.3.	Update on control measures, source properties, milestones (see Note 1)	\$0	\$0	\$0	\$0	\$0
b.i.	Develop load reduction assessment methodology (BASMAA) (see Note 1)	\$0	\$0	\$0	\$0	\$0
b.ii.	Calculate Mercury load reduction each year (see Note 1)	\$0	\$0	\$0	\$0	\$0
b.iii.1.	Submit assessment methodology (BASMAA) (see Note 1)	\$0	\$0	\$0	\$0	\$0
b.iii.2.	Provide Mercury load reductions each year (included in b.ii) (see Note 1)	\$0	\$0	\$0	\$0	\$0
b.iii.3	Update assessment methodology (BASMAA) (see Note 1)	\$0	\$0	\$0	\$0	\$0
c.i.	Minimum GI projects for Mercury (see Note 1)	\$0	\$0	\$0	\$0	\$0
c.ii.1	Implement GI projects for specified reduction (included in a.ii.4) (see Note 1)	\$0	\$0	\$0	\$0	\$0
c.ii.2.	Reasonable assurance analysis on GI projects (BASMAA) (see Note 1)	\$0	\$0	\$0	\$0	\$0
c.iii.1.	Report on GI and Mercury load reduction (BASMAA) (see Note 1)	\$0	\$0	\$0	\$0	\$0
c.iii.2.	Report on land area treated by GI (BASMAA) (see Note 1)	\$0	\$0	\$0	\$0	\$0
c.iii.3.	Submit a reasonable assurance analysis (included in c.ii.2) (see Note 1)	\$0	\$0	\$0	\$0	\$0
c.iii.4.	Report on Mercury removed with GI (see Note 1)	\$0	\$0	\$0	\$0	\$0
d.i.	Implementation plan for TMDL waste-load allocations (see Note 1)	\$0	\$0	\$0	\$0	\$0
d.ii.1.	Identify control measures	\$0	\$0	\$0	\$0	\$7,000
d.ii.2.	Implement control measures (see Note 1)	\$0	\$0	\$0	\$0	\$0
d.ii.3.	Evaluate effectiveness of control measures (see Note 1)	\$0	\$0	\$0	\$0	\$0
d.iii.	Submit implementation plan (included in d.ii.1) (see Note 1)	\$0	\$0	\$0	\$0	\$0
e.i.-iii.	Risk reduction program (included in MRP 1.0) (see Note 1)	\$0	\$0	\$0	\$0	\$0
Total Costs		\$0	\$0	\$0	\$0	\$7,000

Note:

1. Almost all of the costs to implement the Mercury requirements are covered by the PCB implementation costs. In meeting PCB load reduction requirements, the County also meets the Mercury load reduction requirements.

**Appendix Table 5. MRP 2.0 Cost Correction 1
Without 2019 PCB Load Reduction**

Provision No.	Additional Requirements	Expenditures					Totals
		2016	2017	2018	2019	2020	
C.3	Trash	\$55,000	\$719,000	\$539,000	\$419,000	\$344,000	\$2,076,000
C.10	Green Infrastructure	\$0	\$91,500	\$41,000	\$889,000	\$43,000	\$1,064,500
C.11 and C.12	Mercury and PCB	\$31,000	\$11,000	\$13,423,000	\$61,000	\$172,184,000	\$185,710,000
Totals		\$86,000	\$821,500	\$14,003,000	\$1,369,000	\$172,571,000	\$188,850,500