Green Infrastructure Plan

JUNE 30, 2019

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Acronyms

ABAG	Association of Bay Area Governments
BASMAA	Bay Area Stormwater Management Agencies Association
CCCWP	Contra Costa Clean Water Program
CCW SWRP	Contra Costa Watersheds Stormwater Resource Plan
GI	Green Infrastructure
GIS	Geographic Information System
IRWMP	Integrated Regional Water Management Plan
MRP	Municipal Regional Stormwater Permit
MTC	Metropolitan Transportation Commission
NPDES	National Pollutant Discharge Elimination System
PCBs	Polychlorinated Biphenyls
RWQCB	California Regional Water Quality Control Board – San Francisco Bay Region
TMDL	Total Maximum Daily Load

1 Introduction and Overview

1.1 Regulatory Mandate

The City of Hercules (City) is one of 76 local government entities subject to the requirements of the California Regional Water Quality Control Board for the San Francisco Bay Region's (RWQCB's) Municipal Regional Stormwater Permit (MRP). The MRP was last reissued in November 2015[1]. The MRP mandates implementation of a comprehensive program of stormwater control measures and actions designed to limit contributions of urban runoff pollutants to San Francisco Bay.

MRP Provision C.3.j.i. requires the City to prepare a Green Infrastructure Plan, to be submitted with its Annual Report to the RWQCB due September 30, 2019.

"Provisions C.11 and C.12 in the MRP require Contra Costa Permittees (Contra Costa County and its 19 cities and towns) to reduce estimated PCBs loading by 23 grams/year and estimated mercury loading by 9 grams/ year using Green Infrastructure by June 30, 2020."

Green Infrastructure (GI) refers to the construction and retrofit of storm drainage to reduce runoff volumes, disperse runoff to vegetated areas, harvest and use runoff where feasible, promote infiltration and evapotranspiration, and use bioretention and other natural systems to detain and treat runoff before it reaches our creeks and Bay. Green infrastructure facilities include, but are not limited to, pervious pavement, infiltration basins, bioretention facilities or "raingardens", green roofs, and rainwater harvesting systems. Green infrastructure can be incorporated into construction on new and previously developed parcels, as well as new and rebuilt streets, roads, and other infrastructure within the public right-of-way.

Water quality in San Francisco Bay is impaired by mercury and by polychlorinated biphenyls (PCBs). Sources of these pollutants include urban stormwater. By reducing and treating stormwater flows, green infrastructure reduces the quantity of these pollutants entering the Bay and will hasten the Bay's recovery.

Provisions C.11 and C.12 in the MRP require Contra Costa Permittees (Contra Costa County and its 19 cities and towns) to reduce estimated PCBs loading by 23 grams/year and estimated mercury loading by 9 grams/year using green infrastructure by June 30, 2020. Regionally, Permittees must also project the load reductions achieved via Green Infrastructure by 2020, 2030, and 2040, showing that collectively, reductions will amount to 3 kg/year PCBs and 10 kg/year mercury by 2040.

[1] Order R2-2015-0049

1.1.1 Further Background on Mercury and PCBs in San Francisco Bay

The MRP pollutant-load reduction requirements are driven by Total Maximum Daily Load (TMDL) requirements adopted by the RWQCB for mercury (Resolution No. R2-2004-0082 and R2-2005-0060) and PCBs (Resolution No. R2-2008-0012). Each TMDL allocates allowable annual loads to San Francisco Bay (a Waste Load Allocation, or WLA) from identified sources, including from urban stormwater.

The mercury TMDL addresses two water quality objectives. The first, established to protect people who consume Bay fish, applies to fish large enough to be consumed by humans. The objective is 0.2 milligrams (mg) of mercury per kilogram (kg) of fish tissue (average wet weight concentration measured in the muscle tissue of fish large enough to be consumed by humans). The second objective, established to protect aquatic organisms and wildlife, applies to small fish (3-5 centimeters in length) commonly consumed by the California least tern, an endangered species. This objective is 0.03 mg mercury per kg fish (average wet weight concentration). To achieve the human health and wildlife fish tissue and bird egg monitoring targets and to attain water quality standards, the Bay-wide suspended sediment mercury concentration target is 0.2 mg mercury per kg dry sediment.

A roughly 50% decrease in sediment, fish tissue, and bird egg mercury concentrations is necessary for the Bay to meet water quality standards. Reductions in sediment mercury concentrations are assumed to result in a proportional reduction in the total amount of mercury in the system, which will result in the achievement of target fish tissue and bird egg concentrations.

The PCBs TMDL was developed based on a fish tissue target of 10 nanograms (ng) of PCBs per gram (g) of fish tissue. This target is based on a cancer risk of one case per an exposed population of 100,000 for the 95th percentile San Francisco Bay Area sport and subsistence fisher consumer (32 g fish per day). A food web model was developed by San Francisco Estuary Institute (SFEI) to identify the sediment target concentration that would yield the fish tissue target; this sediment target was found to be 1 microgram (µg) of PCBs per kg of sediment.

Twenty percent of the estimated allowable PCB external load was allocated to urban stormwater runoff. The Bay Area-wide WLA for PCBs for urban stormwater is 2 kg/yr by 2030. This value was developed based on applying the required sediment concentration (1 µg/kg) to the estimated annual sediment load discharged from local tributaries.

1.2 Objectives and Vision

This Plan will guide a shift from conventional “collect and convey” storm drain infrastructure to more resilient, sustainable stormwater management systems that reduce runoff volumes, disperse runoff to vegetated areas, harvest and use runoff where feasible, promote infiltration and evapotranspiration, and use natural processes to detain and treat runoff. Green infrastructure features and facilities include, but are not limited to, pervious pavement, infiltration basins, and bioretention facilities (“rain gardens”), green roofs, and rainwater harvesting systems.

As required by Provisions C.3.a. through C.3.i. in the MRP, these "Low Impact Development" practices are currently implemented on land development projects in the City. Specific methods and design criteria are spelled out in the Contra Costa Clean Water Program's (CCCWP's) *Stormwater C.3 Guidebook,* which the City has referenced in Chapter 8 of Title 5 of the Municipal Code entitled Stormwater Management and Discharge Control.

This Plan details how similar methods will be incorporated to retrofit existing storm drainage infrastructure using green infrastructure facilities constructed on public and private parcels and within the public right-of-way.

- *Green infrastructure facilities previously constructed in Hercules*

Path To Transit Project for the Regional Intermodal Transportation Center

1.3 Plan Context and Elements

1.3.1 Planning Context

- *Municipal geography*

Hercules is located at 38°01'02"N 122°17'19"W,[28] at the southeast shore of the San Pablo Bay. According to the United States Census Bureau, the city has a total area of 18.2 square miles (47 km2), of which, 6.2 square miles (16 km2) is land and 12.0 square miles (31 km2) (65.87%) is water. Hercules is on the southeastern shores of San Pablo Bay, roughly 4 miles southwest of the Carquinez Bridge. By road, Hercules is roughly 12 miles north of Berkeley, California, 18 miles north of Oakland and 22 miles northeast of San Francisco. The shoreline at this location runs northeast to southwest. Refugio Creek runs through the middle of Hercules in a northwest direction and empties at the shoreline.

- *Demographics*

The 2017 United States Census reported that Hercules had a population of 25,260. The population density was 1,323.5 people per square mile (511.0/km. The Census reported that 24,005 people (99.8% of the population) lived in households, 17 (0.1%) lived in non-institutionalized group quarters, and 38 (0.2%) were institutionalized. The population was spread out with 5,481 people (22.8%) under the age of 18, 2,064 people (8.6%) aged 18 to 24, 6,512 people (27.1%) aged 25 to 44, 7,473 people (31.1%) aged 45 to 64, and 2,530 people (10.5%) who were 65 years of age or older. The median age was 39.0 years. For every 100 females, there were 90.1 males. For every 100 females age 18 and over, there were 86.0 males. There were 8,553 housing units at an average density of 470.5 per quare mile (181.7/km²), of which 8,115 were occupied, of which 6,450 (79.5%) were owner-occupied, and 1,665 (20.5%) were occupied by renters. The homeowner vacancy rate was 2.3%; the rental vacancy rate was 6.2%. 19,067 people (79.2% of the population) lived in owner-occupied housing units and 4,938 people (20.5%) lived in rental housing units.

- *Economic and Social Trends*

Hercules continues to be a very diverse upper middle class community where the majority of adults working outside the house commute to their jobs.

- *Development and Redevelopment Trends*

Hercules is undergoing an upsurge in residential and commercial development which are required to include GI.

- *Commitment and Actions for Sustainability*

  The City recently added a management analyst position which includes working on the Stormwater Program including GI.

- *Staffing and Scope of Sustainability Programs*

  The City recently added a management analyst position which includes working on the Stormwater Program including GI. The Public Works Direct/City Engineer, Maintenance Superintendent, and Assistant Engineer all have assigned duties under the program.

- *CEQA*

  According to Section 13-40.800 Environmental of the Hercules Municipal Code, all proposed projects and applications are subject to environmental review under the California Environmental Quality Act (CEQA) unless exempt under CEQA statutes and guidelines. Projects and applications that are subject to CEQA environmental review will be the subject of a negative declaration, mitigated negative declaration or environmental impact report as required by CEQA and as set forth in the CEQA Guidelines for the City of Hercules.

  As part of this CEQA review, the Public Works Department applies Stormwater Requirements, including GI.

1.3.2 Watersheds and Storm Drainage Infrastructure

- *Watersheds and Watershed Characteristics and Challenges*

  Refugio, Rodeo, and Carquinez Area Watersheds

  According to the Contra Costa Watersheds Stormwater Resource Plan, "Refugio Creek, Rodeo Creek and the various drainages that flow into the Carquinez Strait are located in northwest Contra Costa County. Together, the watersheds encompass 16,348 acres of diverse land cover including pristine oak-covered hills, an interstate highway, ranches, heavy industry, towns, and newer residential development. The City of Hercules and the communities of Rodeo, Crockett, and Port Costa are located in the watershed, with the remainder encompassing unincorporated County land area.

  Refugio Creek, Rodeo Creek, Canada Del Cierbo Creek, and Edwards Creek trend northwest and resemble other West County drainages in that they juxtapose a rural upper watershed with an urbanized or industrialized lower watershed. The upper watershed of Rodeo Creek and its tributaries begin in private ranchland and EBRPD property. An industrial area and the community of Rodeo are in the lower watershed. Two similar drainages to the north of Rodeo begin in *undeveloped land on the east side of* Interstate 80 before being diverted underground through refinery properties.

  Land uses in the Refugio and Rodeo Creek watersheds consist of 4% agricultural lands; 68% urban lands; and 28% open space, parks and recreation areas, and water.

The shorter, steeper Carquinez drainages flow from southeast to northwest following local topography. These drainages are mostly unnamed except for Bull Valley Creek, which flows north through the town of Port Costa, first filling the reservoir located just south of town. The upper watersheds of these smaller drainages also begin in EBRPD land and ranchlands before flowing into residential and industrial areas located on the shores of the Carquinez Strait.

Land uses in the Carquinez area watersheds consist of 33% agricultural lands; 31% urban lands; and 36% open space, parks and recreation areas, and water.

Rodeo Creek has a TMDL for diazinon. Refugio Creek has not been identified in the State's 303(d) list of Impaired Water Bodies (SFBRWQCB, 2017).

- *Major Drainages and Major Drainage Characteristics and Challenges*

The following drainages are identified in the Hercules section of the Countywide Flood Insurance Study (FIS) provided by the Federal Emergency Management Agency (FEMA).

- Refugio Creek
- West Branch Refugio Creek (aka Ohlone Creek)
- East Branch Refugio Creek
- Pinole Creek

- *Storm Sewer System*

The Storm Sewer System conveys stormwater for approximately 60 centerline miles of streets.

- *Storm Sewer Challenges (Pertinent to GI)*

The City is nearly built-out. New areas are designed to include GI, but existing infrastructure is physically constrained and not easily retrofitted. Given the voters did not approve Stormwater levy increases, funding for retrofits is also lacking. Base mapping is needed for the system.

- *Flood Zones*

The **Floodplain Boundaries** section of the current (2017) FIS provided by FEMA states that in order to provide a national standard without regional discrimination, the 1-percent annual chance flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2-percent annual chance flood is employed to indicate additional areas of flood risk in the community. For the stream studied in detail, the 1- and 0.2- percent annual chance floodplains have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps at a scale and a contour interval as shown on Table 12, "Topographic Map Information."

The **Floodways** section of the current (2017) FIS states that the floodways presented in the FIS were computed for certain stream segments on the basis of equal conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations are tabulated for selected cross sections. The computed floodways are shown on the revised FIRM (Published Separately). In cases where

the floodway and 1-percent annual chance floodplain boundaries are either close together or collinear, only the floodway boundary is shown.

The area between the floodway and 1-percent annual chance floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 1-percent annual chance flood more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 1, "Floodway Schematic."

The **Principal Flood Problems** as described in the current (2017) FIS state that there is a history of frequent flooding along the lower portions of Pinole and Refugio Creeks. In the Pinole Creek basin, the East Bay Municipal Utility District has operated a stream gage since 1939. The gage is located 4.5 miles upstream of San Pablo Bay.

The flooding along Pinole Creek was greatly reduced by the construction of a trapezoidal channel by the USACE in 1966 (Reference 14). The flooding along lower Refugio Creek is due to inadequate channel capacity. Past flooding has been very shallow, and damage has been minimal. With the completion of the City's Path To Transit Project and the private Bayfront Development, the flow capacity of Refugio Creek has been greatly enhanced and the potential of damaged to developed project has been minimized.. The last section of Refugio Creek will be improved, including the dog leg, with the Tracks/Railroad Bridge phase of the Regional Intermodal Transportation Center.

Hydraulic analysis also indicates a potential for local flooding at some of the culverts under Sycamore and Refugio Valley Roads, though this has occurred very infrequently in the past..

The section of Pinole Creek that borders the City of Hercules is in a channel constructed by the USACE in 1966 to convey the 2-percent annual chance flood with 2 feet of freeboard.

- *Flood Control Development Policies*

  The City adopted Chapter 7 of Title 10 of the Municipal Code entitled Flood Damage Prevention. The purpose of this section is to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by legally enforceable regulations applied uniformly throughout the community to all publicly and privately owned land within flood prone, mudslide (i.e., mudflow) or flood-related erosion areas.

- *Storm Sewer Opportunities (Pertinent to GI)*

  City is working with developer of Hilltown to incorporate treatment of public streets.

- *Recent and Planned Drainage Improvements*

  City is working with developer of Hilltown to incorporate treatment of public streets.

- *Funding for Maintenance and for Capital Improvements*

No funding.

1.3.3 Related Regional and Countywide Plans and Planning Documents

This Plan has been coordinated with the following regional stormwater documents:

- The Contra Costa Watersheds Stormwater Resource Plan (CCW SWRP). The CCW SWRP was funded by State Water Resources Control Board under a Proposition 1 Grant, with matching contributions provided by Contra Costa municipalities individually and collectively through the Contra Costa Clean Water Program (CCCWP). The CCW SWRP identified and prioritized potential multi-benefit stormwater management projects, including green infrastructure projects in watersheds and jurisdictions throughout Contra Costa County. Projects identified within the CCW SWRP are eligible to apply for future state funding. Many of the projects included in this Plan were drawn from the CCW SWRP project opportunity lists.

- The Contra Costa Countywide Reasonable Assurance Analysis (RAA). The RAA for Green Infrastructure is being prepared by Contra Costa municipalities collectively through the CCCWP and is consistent with guidance prepared by the Bay Area Stormwater Management Agencies Association (BASMAA). The RAA for Green Infrastructure uses a water quality model coupled with continuous simulation hydrologic output to estimate baseline loadings of pollutants and the reductions that might be achieved through green infrastructure implementation in 2020, 2030, and 2040 under various scenarios, which include implementation of projects identified in this Plan. Results pertinent to green infrastructure planning and implementation are discussed in Section 2 of this Plan.

- The City of San Pablo and the City of Richmond have embarked on a Grant application for Alternative Compliance/Water Quality Trading in Contra Costa County. As of this writing the status of the grant success is unknown.

1.3.4 Related Local Planning Documents

Green infrastructure can be integrated into a wide variety of public and private projects. Public projects can incorporate green infrastructure in streets, parks, schools, and other civic properties. In order to ensure that green infrastructure is considered and supported in the range of planning and design processes for these projects, the City has reviewed and/or updated the following planning documents to appropriately incorporate green infrastructure requirements: Green Infrastructure administrative policy will be applied to all capital improvements projects and private development where feasible.

1.3.5 Outreach and Education

The City's Green Infrastructure Plan development process in conjunction with the Contra Costa Clean Water Program engaged a wide variety of stakeholders, including both government staff and community members who

will live, work, and play near future green infrastructure projects in the potential project location identification process. The City also intends to engage relevant government staff and community members as projects move forward towards design and implementation.

The City's GI efforts have been ongoing since 2016 and are summarized below:

- On September 13, 2016, a presentation was made to the City Council to inform them as well as the public of the need for and purpose of green infrastructure. This presentation also discussed trash reduction and the related efforts that the City planned to implement in FY 16-17.
- On June 2017, the City Council approved the Green Infrastructure Plan Framework resolution.
- Coordination is being implemented among Development Engineering, Planning and the City Attorney's Office.
- The adoption process is comprised for coordination between Planning and Engineering with a final adoption via a Council Resolution as a first step in the public education process. The policy will embody the steps for outreach beyond City staff and will rely on promulgating notification to the development community of Program training and informational presentations.
- The City encourages the design professional community in conjunction with the Contra Costa Clean Water Program to attend Program training in Green Infrastructure.
- On September 26, 2018, the City's on-call stormwater consultants participated in the Green Infrastructure Planning Workshop for Permittees.
- The City will participate in a countywide interagency process, convened by the CCCWP, to facilitate excellence and consistency in the design and construction of Green Infrastructure features and facilities. The City will:
    - Share with other Contra Costa municipalities, through the CCCWP, conceptual, preliminary, and final plans and specifications developed for Green Infrastructure projects.
    - Identify significant Green Infrastructure projects and issues encountered during design and construction of those projects and bring those projects and issues forth in online forums and in-person interagency workshops and meetings.
    - Participate in evaluation and recommendation of design details and specifications for Green Infrastructure, where doing so furthers the purposes of countywide consistency and cost-efficiency, and quality of the built facilities.
    - Participate, as a reviewer, in the drafting and updating of a Green Infrastructure Design Guide, the purpose of which will be to assist capital improvement projects staff in Contra Costa municipalities throughout the steps of project identification, evaluation, design, and construction.

1.3.6 Policies, Ordinances, and Legal Mechanisms

- City Council approved the Green Infrastructure Framework in June 2017 with Resolution #2017-050.
- Green Infrastructure Administrative Policy was issued in August 2019.

2 Green Infrastructure Targets

Provisions C.11 and C.12 in the MRP require Contra Costa Permittees (Contra Costa County and its 19 cities and towns) to reduce estimated PCBs loading by 23 grams/year and estimated mercury loading by 9 grams/year using green infrastructure by June 30, 2020. Regionally, Permittees must also project the load reductions achieved via green infrastructure by 2020, 2030, and 2040, showing that collectively, reductions will amount to 3 kg/year PCBs and 10 kg/year mercury by 2040.

This planning process developed and assessed projections for the square footage of impervious surface to be retrofitted and treated with green infrastructure from private projects within the City's jurisdiction by 2020, 2030, and 2040. It also incorporates targets for the square footage of impervious surface to be retrofitted and treated with green infrastructure through potential public projects within the City's jurisdiction by 2020, 2030, and 2040.

2.1 Countywide Attainment Scenario

A "Countywide Attainment Scenario" was modeled as part of the RAA modeling to help Permittees with their GI Planning. The Contra Costa Countywide Reasonable Assurance Analysis (RAA), summarized in the Geosyntec Consultants draft memo to the CCCWP entitled, "Reasonable Assurance Analysis Countywide Attainment Strategy" dated May 1, 2019, attached as Appendix C, focused on PCBs while also evaluating opportunities for mercury reduction. The results of this analysis demonstrate that the public GI retrofit opportunities with the highest potential to reduce PCBs loads are concentrated within a small subset of Contra Costa Permittee area due to the pattern of pre-1980 industrial development within the region. Conversely, many Contra Costa Permittees have no or very few opportunities to contribute significantly toward achievement of PCBs loading reductions via implementation of GI in their communities.

Given the findings, it is likely that a countywide strategy would be the most efficient and effective way to achieve the PCB load reduction goals. However, a preliminary review of the legal and administrative requirements involved with implementing a countywide strategy indicates that they are complex and would require considerable effort to resolve. Additionally, it would require comprehensive dialogue in the public forum lead by the elected officials and ultimately overall agreement which is beyond the scope of this plan.

For the purposes of creating the local GI Plan, Hercules prioritized their GI projects based on achieving other multiple benefits including controlling other stormwater pollutants, preserving and enhancing local stream hydrology, reducing localized flooding, increasing the resiliency of water supply, ancillary benefits that derive from adding landscaped areas within the urbanized environment, and mitigating the urban heat island effect.

2.2 Private Development Projections

To forecast private development, the City participated in a regional process coordinated through the CCCWP and shared with BASMAA member agencies. This process utilized the outputs of UrbanSim, a model developed by the Urban Analytics Lab at the University of California under contract to the Bay Area Metropolitan Transportation Commission (MTC). UrbanSim is a modeling system developed to support the need for analyzing the potential effects of land use policies and infrastructure investments on the development and character of cities and regions. The Bay Area's application of UrbanSim was developed specifically to support the development of Plan Bay Area, the Bay Area's Sustainable Communities planning effort.

MTC forecasts growth in households and jobs and uses the UrbanSim model to identify development and redevelopment sites to satisfy future demand. Model inputs include parcel-specific zoning and real estate data; model outputs show increases in households or jobs attributable to specific parcels. The methods and results of the Bay Area UrbanSim model have been approved by both MTC and Association of Bay Area Government [ABAG] Committees for use in transportation projections and the regional Plan Bay Area development process.

The CCCWP process used outputs from the Bay Area UrbanSim model to map parcels predicted to undergo development or redevelopment in each Contra Costa jurisdiction at each time increment specified in the MRP (2020, 2030, and 2040). The resulting maps were reviewed by local staff for consistency with the City's local knowledge and local planning and economic development initiatives. The maps were revised, and each revision documented.

It is assumed that multifamily residential and commercial/industrial developments will incorporate stormwater treatment facilities (typically bioretention) in accordance with MRP Provisions C.3.b., C.3.c., and C.3.d. Because of high land values, it is expected that more than 50% of the existing impervious area in each parcel will be replaced if a parcel is redeveloped, and therefore the entire parcel will be subject to Provision C.3 requirements (that is, will be retrofit with Green Infrastructure), consistent with the "50% rule" requirements of MRP Provision C.3.b.

Existing impervious surface for each affected parcel was estimated using the 2011 National Land Cover Database. Estimates were spot-checked and revised based on local knowledge and available satellite imagery.

Based on these assumptions and the revised maps, the amounts of existing impervious surface forecast to be retrofit with green infrastructure via private development are as shown in Table 2.

Table 2. Estimates of Impervious Surface to Be Retrofit via Private Development

Year	Total Square Footage	Comments
2020	184,930	
2030	20,857	
2040	645,891	

2.3 Targets for Public Projects

Forecasted impervious surface to be retrofit via public projects is in two categories:

1. Estimated tributary impervious surface for Green Infrastructure Projects identified in this Plan.

2. Additional tributary impervious surface associated with projects yet to be identified. These projects are associated with general geographic areas (neighborhoods or blocks) but specific facility locations have not yet been identified.

These forecasts are summarized in Table 3.

Table 3. Estimates of Impervious Surface to Be Retrofit via Public Projects

Year	Square footage tributary to GI Projects included in this Plan	Additional square footage associated with projects yet to be identified	Total
2020	0	0	0
2030	45,094	0	45,094
2040	0	1,185,438	1,185,438

2.4 Projected Load Reductions

As part of the RAA process, the estimates of projected private development (described in Section 2.2) and the general and specific locations of public projects (summarized in Section 2.3 and detailed in Chapter 3) will be incorporated into a water-quality model and projected pollutant load reductions will be developed for 2020, 2030, and 2040. Details of methods, inputs, and model outputs will be included in the RAA report.

3 Public Project Identification, Prioritization, and Mapping

3.1 Tools for Public Project Identification and Prioritization

The City of Hercules utilized a number of tools to identify and prioritize potential public projects. The first process was the Contra Costa Watersheds Stormwater Resource Plan described briefly in sections 3.1.1 and 3.1.2 below.

- *CCW SWRP Overview*

The Contra Costa Watersheds (CCW) Stormwater Resource Plan (SWRP) was created to help build stormwater management projects and programs within Contra Costa County (County). The plan builds upon a foundation of support for and successful implementation of watershed protection programs, restoration projects, and low impact development throughout the County.

The CCW SWRP forms a connection between regional water quality and water resources planning goals. The CCW SWRP identifies projects that can support municipal GI planning and implementation driven by water quality regulations. The CCW SWRP also reflects the goals of and will be incorporated into Integrated Regional Water Management (IRWM) plans within the County, providing a link between stormwater and management of other water resources. The implementation of multiple benefit CCW SWRP projects will help protect and improve water bodies in the County, which provide important environmental, community, health, and economic benefits within the County. CCW SWRP also represents progress towards treating stormwater as a valuable local water resource.

The process for identifying project opportunities and then selecting ten potential projects for concept development is outlined below.

1. Identify projects – Potential projects were provided by the Permittees and other CCW SWRP stakeholders. Additional potential project locations were identified and catalogued using a geographic information system (GIS)-based opportunity analysis.
2. Score projects using an automated metrics-based evaluation – The CCW SWRP used a quantitative metrics-based multiple benefit evaluation, as required by the Storm Water Resource Plan Guidelines (SWRP Guidelines, SWRCB, 2015), to score potential projects. Multiple benefits evaluated included water quality, water supply, flood control, environmental and community benefits of projects. The scoring was automated using metrics based on available project attributes. These scores were then used to preliminarily rank the projects for each jurisdiction.
3. Rank projects based on input from CCCWP Permittees and the Technical Advisory Group (TAG) – Using the project scores along with other institutional knowledge, the CCCWP, jurisdictions, and Contra Costa Watersheds ES-7 August 2018 DRAFT Stormwater Resource Plan the TAG provided input on project ranking and prioritization of projects as required by the SWRP Guidelines.

4. Develop Project Concept Designs – Ten projects were selected for development of concept designs showing the project footprint, stormwater treatment facilities, projected PCBs and mercury load reductions and other benefits, and a cost estimate. The City of Pleasant Hill's Doris Ave bio-retention project is included in the list.

- *Development of Initial Project Opportunity Lists*

The City developed its project based on the ability of a project to be built in the location and provide meaningful treatment.

The Contra Costa Clean Water Program (CCCWP) led the development of the CCW SWRP, on behalf of Contra Costa County Flood Control and Water Conservation District (Flood Control District), unincorporated Contra Costa County, the 19 incorporated cities and towns within Contra Costa County (Permittees), and other stakeholders. The CCW SWRP development involved a robust outreach program to engage and solicit feedback from the County's well-organized and empowered community groups and the public. A Technical Advisory Group (TAG), made up of representatives from state, regional, and local agencies as well as stakeholder groups, was also established to help guide the CCW SWRP development. The stakeholder developed potential project by gathering the following information for the SWRP:

Facility Name

Location with APN or GPS coordinates

Facility size and or volume

Other information such as assessment of benefits, the stage of planning/completion date and other descriptive information

- *Stakeholder Engagement Process*

The development of a successful CCW SWRP required the coordination and collaboration among municipalities, special districts, NGOs, other stakeholders within the County and the public, as well as government agencies, to gather data, identify project opportunities, and ensure that local goals and values are reflected in the document. A group of technical advisors, representing municipalities, watershed advocacy and planning groups, and disadvantaged communities was assembled into a technical advisory group (TAG) to help guide the development of the CCW SWRP. This section describes the roles of cooperating entities, the TAG, supporting entities, and the public as well as the CCW SWRP's relationship with existing and anticipated planning documents. Specific public education and outreach activities that were conducted during the CCW SWRP development process.

- *Project Opportunity Identification Tool*

A desktop project opportunity analysis was conducted in a GIS platform to identify opportunity locations for GI projects. The desktop GIS analysis entailed screening for publicly-owned parcels and rights-of-way (ROW) without physical feasibility constraints that would preclude implementation of a GI project. The process for identifying additional projects was as follows:

1. Identify publicly owned parcels
2. Screen identified publicly owned parcels
3. Identify right of way
4. Identify land uses

5. Screen all identified locations for physical feasibility

The projects identified through the GIS opportunity analysis and stakeholder GI projects process were categorized as parcel-based, regional, or ROW/green street projects.

- *CCW SWRP criteria for selecting/scoring multi-benefit projects*

The SWRP Guidelines require an assessment of water quality, water supply, flood management, environmental, and community benefits of potential CCW SWRP projects. The SWRP Guidelines divide these benefit categories into "main" and "additional" benefits

Table 4. Benefit Categories of Potential CCW SWRP Projects

Category	Main Benefit	Additional Benefit
Water Quality	• Increased filtration and/or treatment of runoff	• Nonpoint source pollution control • Reestablished natural water drainage and treatment
Water Supply	• Water supply reliability • Conjunctive use	• Water conservation
Flood Management	• Decreased flood risk by reducing runoff rate and/or volume	• Reduced sanitary sewer overflows
Environmental	• Environmental and habitat projection and improvement • Increased urban green space	• Reduced energy use, greenhouse gas emissions, or provides a carbon sink • Reestablishment of the natural hydrograph
Community	• Employment opportunities provided • Public education	• Community involvement • Enhance and/or create recreational and public use areas

Using the information compiled in the identified project opportunity database, each project received a score using the point system. A description of each scored project component is provided below:

Parcel area (for regional and parcel-based GI projects only) – This scoring component awarded more points for larger parcels, as it is easier to site a project on a larger parcel.

Slope – This scoring component is related to ease of construction and implementation. Flatter locations typically require less grading and hydraulic connection considerations and received more points.

Infiltration feasibility – More points were awarded to projects that overlie infiltrating soils, as retention of runoff through infiltration provides enhanced pollutant reduction, reestablishment of natural drainage, groundwater aquifer recharge potential, and reduction of runoff rates, among other beneficial outcomes.

PCBs/mercury yield classification in project drainage area – This scoring component is related to the influent TMDL pollutant loads. Facilities that are in areas with higher pollutant loading rates for PCBs

and mercury have greater potential to reduce pollutant loads. An additional point was awarded to projects with a property within its assumed drainage area that is known to be a source of elevated PCBs loads to the storm drain system.

Removes pollutant loads from stormwater – Points were awarded to facilities designed as green infrastructure or treatment control facilities. More points were awarded to partially and fully infiltrating green infrastructure projects than non-infiltrating projects, as infiltration increases pollutant load reduction. An additional point was awarded for regional projects, as these projects would remove a larger pollutant load than a parcel-based or ROW project.

Augments water supply – Increasing points were awarded based on potential water supply provided. Projects located over infiltrating soils and overlying potential water supply aquifers that promote infiltration were given one point, while projects that are specifically designed to augment water supply were given two points.

Provides flood control benefits – Flood control facilities received points specific to providing flood control benefits. Green infrastructure projects (fully or partially infiltrating) were assumed to provide some flood control benefits, while projects specifically designed to address flooding issues were given more points**.**

Re-establishes natural water drainage systems or develops, restores, or enhances habitat and open space – Hydromodification control, stream restoration, and habitat restoration projects received points specific to providing these environmental benefits. Fully and partially infiltrating green infrastructure projects were given one point for providing hydrologic benefit.

Provides community enhancement and engagement – Projects that specifically provide public use areas or public education components with potential opportunities for community engagement and involvement were given points specific to providing community benefits.

- *Additional criteria used by municipal staff*

  Staff also considered the cost benefit as part of the "buildability" of the projects
- *Prioritization Process*

  The scored project opportunity database was used to create opportunity checklists for each jurisdiction
- *Local staff identification of additional projects*

  Staff added to the SWRP the projects that it already had a concept for or was a location that had potential to be "buildable." This effort will also identify in the field a scope concept for project identified as high potential for contribution to load reduction under the Countywide Attainment Scenario.
- *Integration with Capital Improvement Project planning process*

  All project proposals are evaluated in the context of the City priorities. The highest priority is the maintenance of current facilities. After that new project proposals are evaluated based on funding available and the use of dedicated or restricted funding.
- *Integration with Complete Streets and other transportation planning processes*

  Where funding and right of way opportunities present themselves green infrastructure will be examined for incorporation into transportation projects.

3.2 Maps and Project Lists

The table shown below provides the project currently determined by the City to be feasible for inclusion in this GI Plan. Associated maps are included in Appendix B.

Table 5: City of Hercules Proposed GI Projects

Description	**2020**	**2030**	**2040**
Chelsea Wetlands		X	
Refugio Creek Dogleg Removal		X	
Path To Transit	x		

4 Early Implementation Projects

4.1 Review of Capital Improvement Projects

MRP Provision C.3.j.ii. requires that the City must prepare and maintain a list of public and private green infrastructure projects planned for implementation during the 2015- 2020 permit term, and public projects that have potential for green infrastructure measures. The City submitted an initial list with the FY 15-16 Annual Report to the RWQCB and updated the list in the FY 16-17 and FY 17-18 Annual Reports.

"The CIty submitted an initial project list with the FY15-16 Annual Report, and updated the list in the FY 16-17 and FY 17-18 Annual Reports"

The creation and maintenance of this list is supported by guidance developed by BASMAA: "Guidance for Identifying Green Infrastructure Potential in Municipal Capital Improvement Projects" (May 6, 2016). The BASMAA Guidance is attached to this document as Appendix F.

- *Document current local implementation of this process.*

The City of Hercules is working with land trusts and regulatory agencies and on conservation easement and endowments funding for Path To Transit Project

4.2 List of Projects Identified

CIP Projects with Green Infrastructure potential that were identified during 2015-2019 are listed in Table 6, along with their status.

Table 6. Capital Improvement Projects with Green Infrastructure Potential (identified 2015-2019)

Project Name	Description	Potential Tributary Impervious Area (SF)	Project Status	Included in Green Infrastructure Plan (Y/N)
Restore Chelsea Wetlands	Remove fill from a former wetlands area and restore to be a transitional area between the flood plain and Pinole Creek		Environmental Certification, currently unfunded	Y
Community Swim Center	Replaster pool and reroof		Completed	N

Refugio Lake Park Improvements	Parking lot overlay		Design	Y
Refugio Valley Lake	Retaining wall and Tennis court backboard repair		Future	N
Sidewalk Replacement Project	Repair damaged CG&S and replace slabs damaged by tree roots		Ongoing	N
Annual Street Overlay	Repair of street pavement		Ongoing	N
Annual Repair of Garbage Truck Impacts	Repair of damage caused by overweight garbage trucks		Ongoing	N
Restriping Project	Project to renew street pavement striping		Ongoing	N
Grant Overlay Project OBAG	Grant funded repaving project		Completed	N
RITC -Bay Trail	Retaining Wall Repairs		Completed	Y
RITC - Path to Transit	Repairs to sewer lines and paths		Construction Completed, Environmental Continues	Y
RITC -West Bay Trail	Funding for design and permits, no construction funding		Completed	Y
RITC - Fuel Oil Relocation	Relocation of Kinder Morgan and Shell Fuel Lines for new transit loop retaining walls		Design , currently unfunded	Y
RITC - Track/Signal Work	Railroad bridge, rail retaining wall, and track and		Design, currently unfunded	Y

	signal work			
RITC- Initial Rail station	Rail station building		Planned, however is currently unfunded	Y
RITC -Transit Loop	Creekside park and transit loop roadway and promenade		Deleted	
RITC - Trails, Parks and Plazas	Civic park and park elements.		Design, however is currently unfunded	Y
Inspect and Repair Sewer System	RWQCB compliance project to repair I&I		Ongoing in Phases	N
Wastewater Treatment Plant Improvements	Expand treatment plant		Under construction	N
Replace Corp Yard Mobile Offices	Replace existing trailers		Completed	N
Rehabilitate Lift Stations	Renovate city sewer lift stations		Deleted	N

4.3 Workplan for Completion

Tasks and timeframes for constructing the projects are identified in Section 4.2

RITC is dependent upon obtaining funding, Wastewater Treatment Plant will be completed this year, Lake Refugio will be completed next year.

5 Tracking and Mapping Public and Private Projects Over Time

5.1 Tools and Process

The CCCWP has developed a county-wide GIS platform for maintaining, analyzing, displaying, and reporting relevant municipal stormwater program data and information related to MRP Provisions C.10 (trash load reduction activities) and C.11/C.12 (mercury and PCBs source property identification and abatement screening activities). This tool is also used to track and report on GI project implementation.

The CCCWP's stormwater GIS platform features web maps and applications created using ESRI's ArcGIS Online (AGOL) for Organizations environment, which accesses GIS data, custom web services and reports that are hosted within an Amazon cloud service running ESRI's ArcGIS Server technology.

The C.3 Project Tracking and Load Reduction Accounting Tool within the CCCWP AGOL system is used to track and report on GI project implementation. It is currently used to track and map existing private and public projects incorporating GI; in the future it may also be used to map planned projects and will allow for ongoing review of opportunities for incorporating GI into existing and planned CIPs. The AGOL system can be used to develop maps that can be displayed on public-facing websites or distributed to the public. These maps can be developed to contain information regarding the GI project data input into the AGOL system.

The C.3 Project Tracking and Load Reduction Accounting Tool is intended to be used to allow for estimates of potential project load reduction for PCBs and mercury and presently supports the BASMAA Interim Accounting Methodology for certain load reduction activities. In the future, the tool is planned to be updated with the RAA methodology developed for the County. That functionality is planned to be active by the end of the current permit term.

The City and its consultants actively engage with the AGOL tool and maintain up-to-date City project data. The City currently conducts updates of the AGOL tool at an annual frequency.

5.2 Results

The output from the GIS-based tool (implementation of Green Infrastructure measures) is attached in Appendix A.

6 Design Guidelines and Specifications

6.1 Guidelines for Streetscape and Project Design

- *Description of Guidelines*

  When determining design elements to be included in streetscape improvements and complete streets projects, project managers and designers will consult the National Association of City Transportation Officials (NACTO) Urban Street Stormwater Guide, the San Mateo County Sustainable Green Streets and Parking Lots Design Guidebook, and other resources available on the CCCWP website.

- *Reference to Guidelines (in Appendix or referenced)*

6.2 Specifications and Typical Design Details

- *Description of Specifications and Typical Design Details*

  LID features and facilities will be designed and constructed in accordance with the applicable specifications and criteria in the Contra Costa Clean Water Program's Stormwater C.3 Guidebook. Additional details and specifications, as may be needed for design of street retrofit projects, may be adapted from the San Francisco Public Utilities Commission Stormwater Requirements and Design Guidelines Appendix B (Green Infrastructure Details), the Central Coast Low Impact Development Institute Bioretention Standard Details and Specifications, or other resources compiled by the CCCWP and available through their website.

6.3 Sizing Requirements

The City uses the sizing guidelines generated by the Bay Area Stormwater Management Agencies Association (BASMAA) report, Guidance for Sizing Green Infrastructure Facilities in Street Projects, attached as Appendix E.

MRP Provision C.3.d contains criteria for sizing stormwater treatment facilities. Facilities may be sized on the basis of flow, volume, or a combination of flow and volume. With adoption of the 2009 MRP, a third option for sizing stormwater treatment facilities was added to Provision C.3.d. This option states that "treatment systems that use a combination of flow and volume capacity shall be sized to treat at least 80 percent of the total runoff over the life of the project, using local rainfall data." This option can also be used to develop sizing factors for facilities with a standard cross-section (i.e., where the volume available to detain runoff is proportional to facility surface area). To calculate sizing factors, inflows, storage, infiltration to groundwater, underdrain discharge, and overflows are tracked for each time-step during a long-term simulation. The continuous simulation is repeated, with variations in the treatment surface area, to determine the minimum area required for the facility to capture and treat 80% of the inflow during the simulation.

7 Funding Options

7.1 Funding Strategies Developed Regionally

The City is committed to the implementation of green infrastructure in future development, but also in retrofitting the existing infrastructure to move away from existing "gray" infrastructure. To that end the City will be working collaboratively with its co-permittees in the pursuit of funding and project opportunities that are aimed at creating green infrastructure. The primary purpose in participating in the Contra Costa Watersheds Stormwater Resources Plan (SWRP) development was to be eligible for state grant funds by having all potential projects in the SWRP. The BASMAA Roadmap for Funding of Sustainable Streets will be an important tool in the quest for funding.

BASMAA's "Roadmap for Funding of Sustainable Streets," April 2018, attached as Appendix D, states: (The) "Roadmap, was developed to identify and remedy obstacles to funding for Sustainable Street projects, which are defined as projects that include both Complete Street improvements and green stormwater infrastructure, and that are maintained in a state of good or fair condition. The specific actions included in the Roadmap are designed to improve the capacity – both statewide and in the San Francisco Bay Area -- to fund Sustainable Street projects that support compliance with regional permit requirements to reduce pollutant loading to San Francisco Bay, while also helping to achieve the region's greenhouse gas reduction targets.

"To date, Sustainable Streets have faced funding obstacles due to the restrictions of various funding programs – which may not recognize the potential for overall cost savings that local agencies may achieve through multi-benefit Sustainable Streets projects. Some transportation grants may fund only some aspects of a Sustainable Street project, while resource grants may fund other aspects – and assembling multiple funding sources brings new challenges and costs to a project.

"Over the next 20 to 30 years, cities throughout the Bay Area, and in other parts of California, are required to invest in widespread construction of infrastructure projects that remove pollutants from stormwater runoff, in order to achieve water quality goals for San Francisco Bay. The cost is anticipated to parallel the costs to meet similar requirements in other parts of the state. For example, City of Los Angeles alone, over the next 20 to 30 years, has estimated that $7 to $9 billion dollars will be needed to implement the city's Water Quality Compliance Master Plan for Urban Runoff (Farfsing and Watson 2014). Sustainable Streets are designed to cost effectively deliver multiple benefits, including: climate change mitigation, air quality improvement, water quality improvement, localized flood control, and community benefits.

(The) "Roadmap presents specific actions intended to ease the financial burden local governments are facing by maximizing available resources and/or identifying new funding streams. The specific actions to fund Sustainable Streets are scheduled for the following timeframes:

- Immediate actions, such as addressing Sustainable Streets in grant solicitations
- Short-term actions, such as reviewing policies for better ways to fund Sustainable Streets

- Long-term solutions, including legislative engagement and/or advocacy regarding Sustainable Street"

7.2 Local Funding Strategies

It is noted that per the Permit Requirements, the sources of funding which the City is currently pursuing or will pursue for GI Project development should include an evaluation of prioritized funding options, including, but not limited to, alternative compliance funds, grant monies, new taxes and other levies, and other municipal/Permittee resources.

A first step to evaluating potential local funding strategies would be to work with the CCCWP to investigate the legislative constraints for the use of Contra Costa Transportation Authority sales tax revenue. An initial review indicates that the language of Public Utilities Code Division 19, Chapter 1, Section 180001 (e) stating that the funding is "…to be used to supplement and not replace existing local revenues for transportation purpose" would seem to exclude a Clean Water Act purpose of using the funds used for green infrastructure in conjunction with the pavement maintenance mandate. A second step would be to get a ruling from MTC if the Highway User Gas Tax Account (HUTA), Street and Highways Code Section 2101, could be used for Green Infrastructure. Those are the top priorities.

To fund projects, they are recommended for consideration based on the needs of the various operating departments and divisions (Entities). Each Entity is to provide a prioritized list along with any funding or grant information that may applicable. This is important because all projects compete for scarce funds. General Fund money is typically not available to any Capital Projects as those funds are dedicated to the operation of the general government, including Police operations.

Given the various sources of funds, projects are typically ranked by: 1. health and safety need, 2. maintenance of current facilities, 3. expansion of existing programs and 4. new programs. This ranking is evaluated together with sources of funding, so a project that otherwise may not have a high a priority, has funding that cannot be used elsewhere is funded. This is true for transportation projects that variously have, Gas Tax, Measure C or J, traffic mitigation fee revenue or developer mitigation fees. The most flexible funding is saved to be committed last and restricted funds are programmed first. The flexible funds are used to fill in at the end in their applicable category.

In that context, projects have a scope of work developed and a preliminary plan, sometimes only schematic, is developed. For street projects the scope is based on the need and purpose of the project. If the project is a complete streets project, or a street beautification project, green infrastructure will be considered for incorporation considering a number of factors. First is the need being addressed, the second is whether there is eligible funding for the scope of work. The third is the available right-of-way for the project. Many projects in the developed commercial area are constrained to pavement rehabilitation.

8 Adaptive Management

8.1 Process for Plan Updates

The process to update the plan will be to review what has happened and what has changed as the City moves into the budgeting period. This will be the time to:

- Update the new development commitments that are subject to C.3
- Make any necessary changes to the UrbanSim model to reflect more current future projections
- Add any completed public projects
- Update the CIP list for newly developed desired projects

8.2 Pursuing Future Funding Sources

Pursuing future funding resources will have challenges. As the BASMAA "Roadmap" reports:

"Because each funding programs has historically focused on only one or a few of the multiple benefits provided by Sustainable Streets, local agencies have encountered challenges in funding Sustainable Streets projects including:

- **Ineligible components of Sustainable Streets projects:** Green infrastructure may be ineligible for funding by transportation grants; transportation facilities may be ineligible for funding by resource agency grants.
- **Ineligible activities:** Some grants may not cover all project phases, such as planning or short-term maintenance.
- **Inability to use other grants as matching funds:** Matching funds must cover eligible activities; therefore, grant funding for GI components of a Sustainable Street project may not "count" as a match for a transportation grant, and vice versa.
- **Funding cycles of grants are not coordinated:** Projects that must assemble funding from multiple grants may have difficulty finding two applicable grants that will be available at the same time.
- **Costs of tracking and applying for grants**: Local agencies often lack the resources to track grant opportunities, prepare applications, and "repackage" the same project to apply for multiple grants.
- **Costs of administering and reporting on grants**: Obtaining multiple grants for a single project adds substantial administrative requirements due to separate record-keeping and reporting.
- **Scoring approaches may penalize multiple-benefit projects**: Sustainable Streets projects may not score competitively for grants that seek the most cost-effective transportation solution, due to the inclusion of ineligible costs."

With guidance of the Roadmap, a Roadmap Committee will follow three pathways; Pathway 1 – Prioritize Sustainable Street in Funding Resources, Pathway 2 – Improve Conditions for Projects that Are Funded by Multiple Grants, and Pathway 3 – Pursue Additional Funding Options.

Pathway 1 is to "… maximize the ability of each funding source to fund both transportation and green stormwater infrastructure improvements -- reflecting the integration of transportation and resource benefits in Sustainable Streets …. A number of the actions are specific to the State Water Resources Control Board's Storm Water Grant Program (SWGP) and the Metropolitan Transportation Commission's One Bay Area Grant Program (OBAG)," The

Pathway also looks to "… recommend requirements for interagency collaboration and or participation by key agencies in actions that promote widespread implementation of sustainable streets, recognizing that requirements have been needed for interagency collaboration …"

Pathway 2 seeks to improve conditions for projects with multiple funding sources. The goal is to remove obstacles that agencies have encountered to obtain multiple grants for a single sustainable streets project.

Pathway 3 is intended to find ways to "… improve conditions for local agencies to fund Sustainable Streets projects with a range of funding options, including fees and loans, and the funding of pavement rehabilitation projects, through sources identified in Senate Bill 1 (SB 1), the Road Repair and Accountability Act of 2017, which was signed into law on April 28, 2017."

8.3 Alternative Compliance and Credit Trading Investigations

Alternative compliance will need to be carefully reviewed for both the opportunity to achieve compliance but also to be aware of funding use restraints when working collaboratively. Determining whether the Permittees would collectively pursue Alternative Compliance will be a lengthy process requiring a comprehensive dialogue in the public forum lead by the elected officials. Further, commitment to the implementation of any alternative compliance scenarios would necessarily require overall agreement and is beyond the scope of this plan.

Nonetheless, the Geosyntec Consultants May 1, 2019 memo to the CCCWP entitled "Reasonable Assurance Analysis Countywide Attainment Strategy" details preliminary findings, a countywide attainment scenario and strategy. The memo is attached as Appendix C.