Appendix A

Drainage Basins

Figure A-1
City of Los Altos
Adobe System

Legend

- Nodes
- Adobe Basins
- City Limits

Pipe Network

Diameter

- Up to 18-inch
- 21-inch to 30-inch
- 36-inch and Larger

Adobe Creek

0 750 1,500 Feet

Schaaf & Wheeler
CONSULTING CIVIL ENINGEERS

Figure A-2
City of Los Altos
Hale System

Legend

- Nodes
- Hale Basins
- City Limits

Pipe Network

Diameter

- Up to 18-inch
- 21-inch to 30-inch
- 36-inch and Larger

Hale Creek

Loyola Creek

Permanente Creek

0 750 1,500 Feet

Schaaf & Wheeler
CONSULTING CIVIL ENINGEERS

Figure A-3
City of Los Altos
Permanente System

Legend

- Nodes
- Permanente Basins
- City Limits

Pipe Network

Diameter

- Up to 18-inch
- 21-inch to 30-inch
- 36-inch and Larger

Permanente Creek

0 500 1,000 Feet

Schaaf & Wheeler
CONSULTING CIVIL ENINGEERS

Figure A-4
City of Los Altos
Permanente/Stevens System

Legend

- Nodes
- Permanente/Stevens Basins
- City Limits

Pipe Network

Diameter

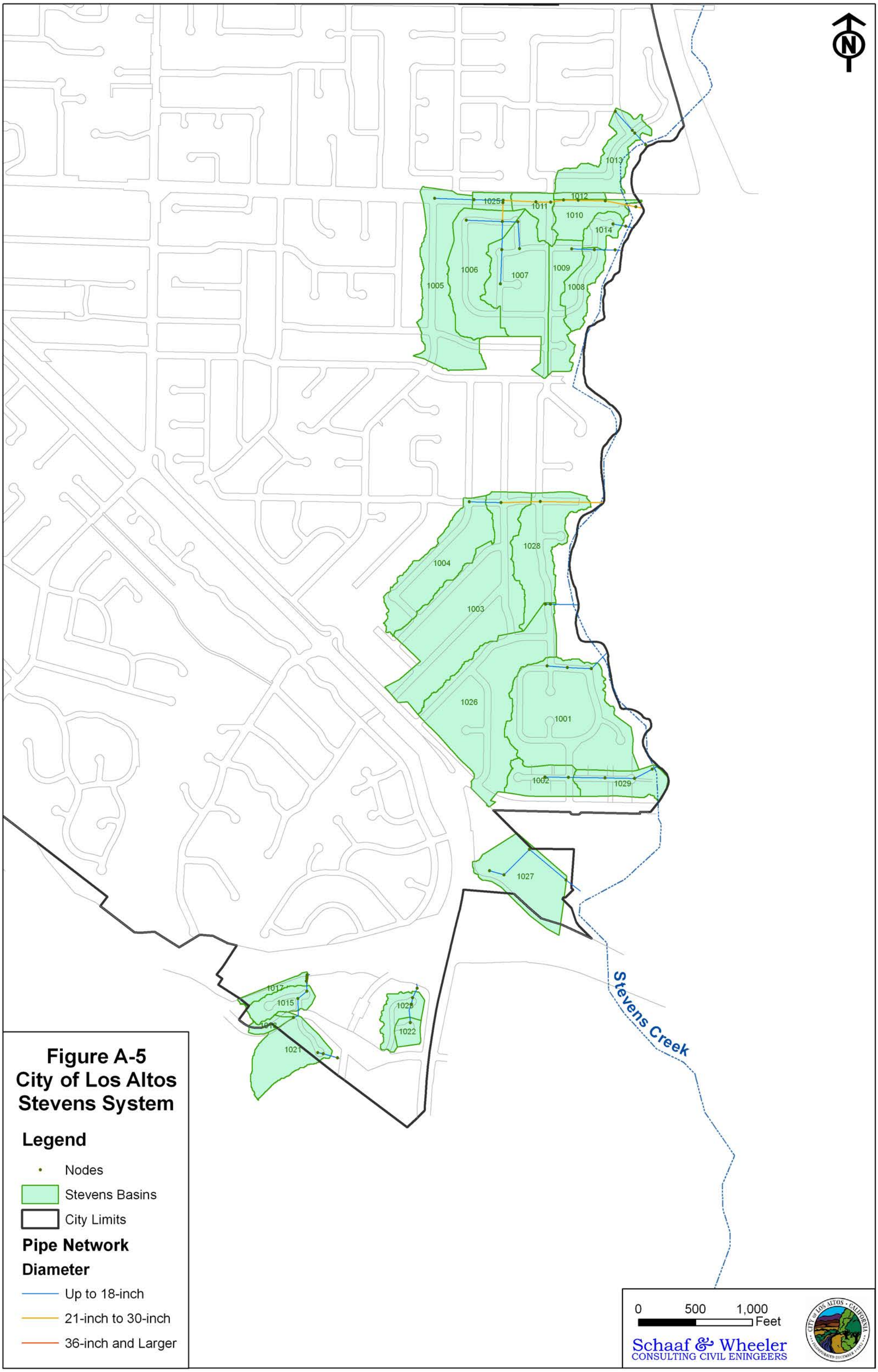
- Up to 18-inch
- 21-inch to 30-inch
- 36-inch and Larger

Permanente Creek

Stevens Creek

0 500 1,000 Feet

Schaaf & Wheeler
CONSULTING CIVIL ENINGEERS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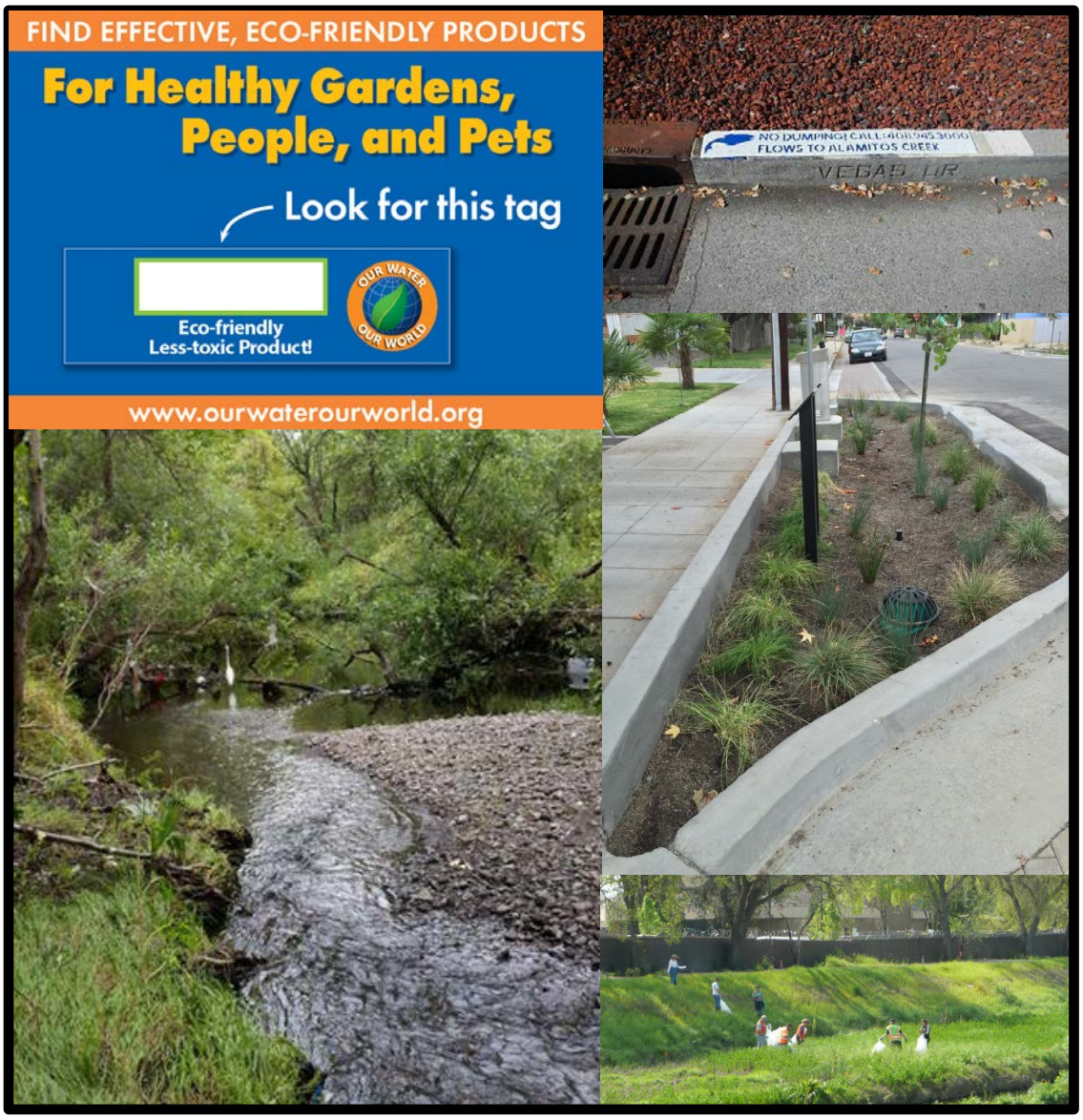
Stevens Creek
Figure A-5
City of Los Altos
Stevens System
Legend
Nodes
Stevens Basins
City Limits
Pipe Network
Diameter
Up to 18-inch
21-inch to 30-inch
36-inch and Larger
0
500
1,000
Feet
Schaaf & Wheeler
CONSULTING CIVIL ENINGEERS

Appendix B

NPDES Permit

California Regional Water Quality Control Board
San Francisco Bay Region
Municipal Regional Stormwater NPDES Permit

Order No. R2-2015-0049
NPDES Permit No. CAS612008
November 19, 2015



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California Regional Water Quality Control Board
San Francisco Bay Region
Municipal Regional Stormwater NPDES Permit

ORDER No. R2-2015-0049
NPDES PERMIT No. CAS612008

Issuing Waste Discharge Requirements and National Pollutant Discharge Elimination System (NPDES) Permit for the discharge of stormwater runoff from the municipal separate storm sewer systems (MS4s) of the following jurisdictions and entities, which are permitted under this San Francisco Bay Municipal Regional Stormwater Permit (MRP):

The cities of Alameda, Albany, Berkeley, Dublin, Emeryville, Fremont, Hayward, Livermore, Newark, Oakland, Piedmont, Pleasanton, San Leandro, and Union City, Alameda County, the Alameda County Flood Control and Water Conservation District, and Zone 7 of the Alameda County Flood Control and Water Conservation District, which have joined together to form the Alameda Countywide Clean Water Program (Alameda Permittees)

The cities of Clayton, Concord, El Cerrito, Hercules, Lafayette, Martinez, Orinda, Pinole, Pittsburg, Pleasant Hill, Richmond, San Pablo, San Ramon, and Walnut Creek, the towns of Danville and Moraga, Contra Costa County, the Contra Costa County Flood Control and Water Conservation District, which have joined together to form the Contra Costa Clean Water Program (Contra Costa Permittees)

The cities of Campbell, Cupertino, Los Altos, Milpitas, Monte Sereno, Mountain View, Palo Alto, San Jose, Santa Clara, Saratoga, and Sunnyvale, the towns of Los Altos Hills and Los Gatos, the Santa Clara Valley Water District, and Santa Clara County, which have joined together to form the Santa Clara Valley Urban Runoff Pollution Prevention Program (Santa Clara Permittees)

The cities of Belmont, Brisbane, Burlingame, Daly City, East Palo Alto, Foster City, Half Moon Bay, Menlo Park, Millbrae, Pacifica, Redwood City, San Bruno, San Carlos, San Mateo, and South San Francisco, the towns of Atherton, Colma, Hillsborough, Portola Valley, and Woodside, the San Mateo County Flood Control District, and San Mateo County, which have joined together to form the San Mateo Countywide Water Pollution Prevention Program (San Mateo Permittees)

The cities of Fairfield and Suisun City, which have joined together to form the Fairfield-Suisun Urban Runoff Management Program (Fairfield-Suisun Permittees)

The City of Vallejo and the Vallejo Sanitation and Flood Control District (Vallejo Permittees)

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The California Regional Water Quality Control Board, San Francisco Bay Region, (hereinafter referred to as the Water Board) finds that:

FINDINGS

Incorporation of Fact Sheet

1. The Fact Sheet for the San Francisco Bay Municipal Regional Stormwater National Pollutant Discharge Elimination System (NPDES) Permit (Attachment A) includes cited regulatory and legal references and additional explanatory information in support of the requirements of this Permit. The Fact Sheet, including any supplements thereto, is hereby incorporated by reference.

Existing Permit

2. **Alameda County—**The cities of Alameda, Albany, Berkeley, Dublin, Emeryville, Fremont, Hayward, Livermore, Newark, Oakland, Piedmont, Pleasanton, San Leandro, and Union City, Alameda County (Unincorporated area), the Alameda County Flood Control and Water Conservation District, and Zone 7 of the Alameda County Flood Control and Water Conservation District have joined together to form the Alameda Countywide Clean Water Program (hereinafter collectively referred to as the Alameda Permittees) and have submitted a permit application (Report of Waste Discharge), dated May 30, 2014, for reissuance of their waste discharge requirements under the NPDES permit to discharge stormwater runoff from storm drains and watercourses within the Alameda Permittees' jurisdictions. The Alameda Permittees are currently subject to NPDES Permit No. CAS612008 issued by Order No. R2-2009-0074 on October 14, 2009, and amended by Order No. R2-2011-0083 on November 28, 2011, to discharge stormwater runoff from storm drains and watercourses within their jurisdictions.

3. **Contra Costa County—**The cities of Clayton, Concord, El Cerrito, Hercules, Lafayette, Martinez, Orinda, Pinole, Pittsburg, Pleasant Hill, Richmond, San Pablo, San Ramon, and Walnut Creek, the towns of Danville and Moraga, Contra Costa County, and the Contra Costa County Flood Control and Water Conservation District have joined together to form the Contra Costa Clean Water Program (hereinafter collectively referred to as the Contra Costa Permittees) and have submitted a permit application (Report of Waste Discharge), dated June 2, 2014, for reissuance of their waste discharge requirements under the NPDES permit to discharge stormwater runoff from storm drains and watercourses within the Contra Costa Permittees' jurisdictions. The Contra Costa Permittees are currently subject to NPDES Permit No. CAS612008 issued by Order No. R2-2009-0074 on October 14, 2009, and amended by Order No. R2-2011-0083 on November 28, 2011, to discharge stormwater runoff from storm drains and watercourses within their jurisdictions.

4. **San Mateo County—**The cities of Belmont, Brisbane, Burlingame, Daly City, East Palo Alto, Foster City, Half Moon Bay, Menlo Park, Millbrae, Pacifica, Redwood City, San Bruno, San Carlos, San Mateo, and South San Francisco, the towns of Atherton, Colma, Hillsborough, Portola Valley, and Woodside, the San Mateo County Flood Control District and San Mateo County have joined together to form the San Mateo Countywide Water

Pollution Prevention Program (hereinafter collectively referred to as the San Mateo Permittees) and have submitted a permit application (Report of Waste Discharge), dated May 30, 2014, for reissuance of their waste discharge requirements under the NPDES permit to discharge stormwater runoff from storm drains and watercourses within the San Mateo Permittees' jurisdictions. The San Mateo Permittees are currently subject to NPDES Permit No. CAS612008 issued by Order No. R2-2009-0074 on October 14, 2009, and amended by Order No. R2-2011-0083 on November 28, 2011, to discharge stormwater runoff from storm drains and watercourses within their jurisdictions.

5. **Santa Clara County—**The cities of Campbell, Cupertino, Los Altos, Milpitas, Monte Sereno, Mountain View, Palo Alto, San Jose, Santa Clara, Saratoga, and Sunnyvale, the towns of Los Altos Hills and Los Gatos, the Santa Clara Valley Water District, and the County of Santa Clara have joined together to form the Santa Clara Valley Urban Runoff Pollution Prevention Program (hereinafter collectively referred to as the Santa Clara Permittees) and have submitted a permit application (Report of Waste Discharge), dated May 29, 2014, for reissuance of their waste discharge requirements under the NPDES permit to discharge stormwater runoff from storm drains and watercourses within the Santa Clara Permittees' jurisdictions. The Santa Clara Permittees are currently subject to NPDES Permit No. CAS612008 issued by Order No. R2-2009-0074 on October 14, 2009, and amended by Order No. R2-2011-0083 on November 28, 2011, to discharge stormwater runoff from storm drains and watercourses within their jurisdictions.

6. **Fairfield-Suisun—**The cities of Fairfield and Suisun City have joined together to form the Fairfield-Suisun Urban Runoff Management Program (hereinafter referred to as the Fairfield-Suisun Permittees) and have submitted a permit application (Report of Waste Discharge), dated June 2, 2014, for reissuance of their waste discharge requirements under the NPDES permit to discharge stormwater runoff from storm drains and watercourses within the Fairfield-Suisun Permittees' jurisdictions. The Fairfield-Suisun Permittees are currently subject to NPDES Permit No. CAS0612008 issued by Order No. R2-2009-0074 on October 14, 2009, and amended by Order No. R2-2011-0083 on November 28, 2011, to discharge stormwater runoff from storm drains and watercourses within their jurisdictions.

7. **Vallejo—**The City of Vallejo and the Vallejo Sanitary District (hereinafter referred to as the Vallejo Permittees) have submitted permit applications (Report of Waste Discharge), dated July 3 and June 2, 2014, respectively, for reissuance of their waste discharge requirements under the NPDES permit to discharge stormwater runoff from storm drains and watercourses within the Vallejo Permittees' jurisdictions. The Vallejo Permittees are currently subject to NPDES Permit No. CAS612008 issued by Order No. R2-2009-0074 on October 14, 2009, and amended by Order No. R2-2011-0083, to discharge stormwater runoff from storm drains and watercourses within the their jurisdictions.

8. The Alameda, Contra Costa, San Mateo, Santa Clara, Fairfield-Suisun, and Vallejo Permittees are hereinafter referred to in this Order as the Permittees.

Applicable Federal, State and Regional Regulations

9. Section 402(p) of the federal Clean Water Act (CWA), as amended by the Water Quality Act of 1987, requires NPDES permits for stormwater discharges from municipal separate storm sewer systems (MS4s), stormwater discharges associated with industrial activity (including

construction activities), and designated stormwater discharges, which are considered significant contributors of pollutants to waters of the United States. On November 16, 1990, USEPA published regulations (40 CFR Part 122), which prescribe permit application requirements for MS4s pursuant to CWA 402(p). On May 17, 1996, USEPA published an Interpretive Policy Memorandum on Reapplication Requirements for Municipal Separate Storm Sewer Systems, which provided guidance on permit application requirements for regulated MS4s.

10. The Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) is the Water Board's master water quality control planning document. It designates beneficial uses and water quality objectives for waters of the State, including surface waters and groundwater. It also includes programs of implementation to achieve water quality objectives. The Basin Plan was duly adopted by the Water Board and approved by the State Water Resources Control Board (State Water Board), Office of Administrative Law, and USEPA, where required.

11. The Water Board finds stormwater discharges from urban and developing areas in the San Francisco Bay Region to be significant sources of certain pollutants that cause or may be causing or threatening to cause or contribute to water quality impairment in waters of the Region. Furthermore, as delineated in the CWA section 303(d) list, the Water Board has found that there is a reasonable potential that municipal stormwater discharges cause or may cause or contribute to an excursion above water quality standards for the following pollutants: mercury, PCBs, furans, dieldrin, chlordane, DDT, trash, and selenium in San Francisco Bay segments; pesticide associated toxicity, and trash in urban creeks; and trash and low dissolved oxygen in Lake Merritt, in Alameda County. In accordance with CWA section 303(d), the Water Board is required to establish Total Maximum Daily Loads (TMDLs) for these pollutants to these waters to gradually eliminate impairment and attain water quality standards. Therefore, pollutant control actions and further pollutant impact assessments by the Permittees are warranted and required pursuant to this Order.

12. Under section 13389 of the California Water Code, this action to adopt an NPDES permit is exempt from the provisions of Chapter 3 of the California Environmental Quality Act (CEQA).

Nature of Discharges and Sources of Pollutants

13. Stormwater runoff is generated from various land uses in all the hydrologic sub-basins in the Basin and discharges into watercourses, which in turn flow into Central, Lower and South San Francisco Bay, and Suisun and San Pablo Bays.

14. The quality and quantity of runoff discharges vary considerably and are affected by hydrology, geology, land use, season, and sequence and duration of hydrologic events. Pollutants of concern in these discharges are certain heavy metals; excessive sediment production from erosion due to anthropogenic activities; petroleum hydrocarbons from sources such as used motor oil; microbial pathogens of domestic sewage origin from illicit discharges; certain pesticides associated with acute aquatic toxicity; excessive nutrient loads, which can cause or contribute to the depletion of dissolved oxygen and/or toxic concentrations of dissolved ammonia; trash, which impairs beneficial uses including, but not

limited to, support for aquatic life; and other pollutants that can cause aquatic toxicity in the receiving waters.

15. Federal, State or regional entities within the Permittees' boundaries, not currently named in this Order, operate storm drain facilities and/or discharge stormwater to the storm drains and watercourses covered by this Order. The Permittees may lack jurisdiction over these entities. Consequently, the Water Board recognizes that the Permittees should not be held responsible for such facilities and/or discharges. The Water Board will consider such facilities for coverage under its NPDES permitting scheme pursuant to USEPA stormwater regulations.
16. Certain pollutants present in stormwater and/or urban runoff can be derived from extraneous sources over which the Permittees have limited or no direct jurisdiction. Examples of such pollutants and their respective sources are polycyclic aromatic hydrocarbons (PAHs), which are products of internal combustion engine operation and other sources; heavy metals, such as copper from vehicle brake pad wear and zinc from vehicle tire wear; dioxins as products of combustion; polybrominated diphenyl ethers that are incorporated in many household products as flame retardants; mercury resulting from atmospheric deposition; and naturally occurring minerals from local geology. All these pollutants, and others, can be deposited on paved surfaces, rooftops, and other impervious surfaces as fine airborne particles—thus yielding stormwater runoff pollution that is unrelated to the activity associated with a given project site.
17. The Water Board will notify interested agencies and interested persons of the availability of reports, plans, and schedules, including Annual Reports, and will provide interested persons with an opportunity for a public hearing and/or an opportunity to submit their written views and recommendations. The Water Board will consider all comments and may modify the reports, plans, or schedules or may modify this Order in accordance with applicable law. All submittals required by this Order conditioned with acceptance by the Water Board will be subject to these notification, comment, and public hearing procedures.
18. The Water Board notified the Permittees and interested agencies and persons of its intent to adopt this Order and provided an opportunity to submit written comments and recommendations.
19. The Water Board, in a public meeting, heard and considered all comments pertaining to the discharge.
20. This Order supersedes and rescinds Order Nos. R2-2009-0074 and R2-2011-0083.
21. This Order serves as a NPDES permit, pursuant to CWA section 402, or amendments thereto, and shall become effective January 1, 2016, provided the Regional Administrator, USEPA, Region 9, has no objections.

THEREFORE, IT IS HEREBY ORDERED that Order No. R2-2009-0074 and R2-2011-0183 are rescinded upon the effective date of this Order except for enforcement purposes, and, in order to meet the provisions of Water Code division 7 (commencing with § 13000) and regulations adopted thereunder, and the provisions of the CWA and regulations and guidelines adopted thereunder, the Permittees shall comply with the following requirements in this Order. This action in no way prevents the Water Board from taking enforcement action for past violations of the previous orders.

A. DISCHARGE PROHIBITIONS

A.1. The Permittees shall, within their respective jurisdictions, effectively prohibit the discharge of non-stormwater (materials other than stormwater) into storm drain systems and watercourses. NPDES-permitted discharges are exempt from this prohibition. Provision C.15 describes a tiered categorization of non-stormwater discharges based on potential for pollutant content that may be discharged upon adequate assurance that the discharge contains no pollutants of concern at concentrations that will impact beneficial uses or cause exceedances of water quality standards.

A.2. It shall be prohibited to discharge rubbish, refuse, bark, sawdust, or other solid wastes into surface waters or at any place where they would contact or where they would be eventually transported to surface waters, including flood plain areas.

B. RECEIVING WATER LIMITATIONS

B.1. The discharge shall not cause the following conditions to create a condition of nuisance or to adversely affect beneficial uses of waters of the State:

- **a.** Floating, suspended, or deposited macroscopic particulate matter, or foam;
- **b.** Bottom deposits or aquatic growths;
- **c.** Alteration of temperature, turbidity, or apparent color beyond present natural background levels;
- **d.** Visible, floating, suspended, or deposited oil or other products of petroleum origin; and
- **e.** Substances present in concentrations or quantities that would cause deleterious effects on aquatic biota, wildlife, or waterfowl, or that render any of these unfit for human consumption.

B.2. The discharge shall not cause or contribute to a violation of any applicable water quality standard for receiving waters. If applicable water quality objectives are adopted and approved by the State Water Board after the date of the adoption of this Order, the Water Board may revise and modify this Order as appropriate.

C.1. Compliance with Discharge Prohibitions and Receiving Waters Limitations

The Permittees shall comply with Discharge Prohibitions A.1 and A.2 and Receiving Water Limitations B.1 and B.2 through the timely implementation of control measures and other actions as specified in Provisions C.2 through C.15. Compliance with Provisions C.9 through C.12 and C.14 of this Order, which prescribe requirements and schedules for Permittees identified therein to manage their discharges that may cause or contribute to violations of water quality standards (WQS) for pesticides, trash, mercury, polychlorinated biphenyls (PCBs), and bacteria, shall constitute compliance during the term of this Order with Receiving Water Limitations B.1 and B.2 for the pollutants and the receiving waters identified in the provisions. Compliance with Provision C.10, which prescribes requirements and schedules for Permittees to manage their discharges of trash, shall also constitute compliance with Discharge Prohibitions A.1 and A.2 during the term of this Order for discharges of trash. If exceedance(s) of (WQS), except for exceedances of water quality standards for pesticides, trash, mercury, PCBs, and bacteria that are managed pursuant to Provisions C.9 through C.12 and C.14, persist in receiving waters notwithstanding the implementation of the required controls and actions, the Permittees shall comply with the following procedure:

a. Upon a determination by either the Permittee(s) or the Water Board that discharges are causing or contributing to an exceedance of an applicable (WQS), the Permittee(s) shall notify, within no more than 30 days, and thereafter submit a report to the Water Board that describes controls or best management practices (BMPs) that are currently being implemented, and the current level of implementation, and additional controls or BMPs that will be implemented, and/or an increased level of implementation, to prevent or reduce the discharge of pollutants that are causing or contributing to the exceedance of water quality standards. The report may be submitted in conjunction with the Annual Report, unless the Water Board directs an earlier submittal, and shall constitute a request to the Water Board for amendment of this NPDES Permit. The report and application for amendment shall include an implementation schedule. The Water Board may require modifications to the report and application for amendment; and

b. Submit any modifications to the report required by the Water Board within 30 days of notification.

As long as Permittees have complied with the procedures set forth above, they do not have to repeat the same procedure for continuing or recurring exceedances of the same receiving water limitations unless directed by the Water Board to develop additional control measures and BMPs and reinitiate the Permit amendment process.

C.2. Municipal Operations

The purpose of this provision is to ensure implementation of appropriate BMPs by all Permittees to control and reduce non-stormwater and polluted stormwater discharges to storm drains and watercourses during operation, inspection, and routine repair and maintenance activities of municipal facilities and infrastructure.

C.2.a. Street and Road Repair and Maintenance

i. Task Description – Asphalt/Concrete Removal, Cutting, Installation, and Repair

The Permittees shall implement appropriate BMPs at street and road repair and/or maintenance sites to control debris and waste materials during road and parking lot installation, repaving, or repair maintenance activities, such as those described in the California Stormwater Quality Association's (CASQA's) Handbook for Municipal Operations.

ii. Implementation Levels

(1) The Permittees shall require proper management of concrete slurry and wastewater, asphalt, pavement cutting, and other street and road maintenance materials and wastewater to avoid discharge to storm drains from such work sites. The Permittees shall coordinate with sanitary sewer agencies to determine if disposal to the sanitary sewer system is available for the wastewater generated from these activities provided that appropriate approvals are obtained and pretreatment standards are met.

(2) The Permittees shall require sweeping and/or vacuuming to remove debris, concrete, or sediment residues from such work sites upon completion of work. The Permittees shall require cleanup of all construction debris, spills, and leaks using dry methods (e.g., absorbent materials, rags, pads, and vacuuming), as described in the Bay Area Stormwater Management Agencies Association's (BASMAA's) Blueprint for a Clean Bay.

iii. Reporting – The Permittees shall report on implementation of and compliance with these BMPs in the Annual Report.

C.2.b. Sidewalk/Plaza Maintenance and Pavement Washing

i. Task Description – The Permittees shall implement and require to be implemented BMPs that prevent the discharge of polluted wash water and non-stormwater to storm drains for pavement washing; sidewalk and plaza cleaning; mobile cleaning; pressure washing operations in locations such as parking lots and garages; trash areas; and gas station fueling areas. The Permittees shall implement the BMPs included in BASMAA's Mobile Surface Cleaner Program. The Permittees shall coordinate with sanitary sewer agencies to determine if disposal to the sanitary sewer is available for the wastewater generated from these activities provided that appropriate approvals and pretreatment standards are met.

ii. Reporting – The Permittees shall report on implementation of and compliance with these BMPs in their Annual Report.

C.2.c. Bridge and Structure Maintenance and Graffiti Removal

i. Task Description

(1) The Permittees shall implement appropriate BMPs to prevent polluted stormwater and non-stormwater discharges from bridges and structural maintenance activities directly over water or into storm drains.

(2) The Permittees shall implement BMPs for graffiti removal that prevent non-stormwater and wash water discharges into storm drains.

ii. Implementation Levels

(1) The Permittees shall prevent all debris, including structural materials and coating debris, such as paint chips, and other debris and pollutants generated in bridge and structure maintenance or graffiti removal from entering storm drains or water courses.

(2) The Permittees shall protect nearby storm drain inlets before removing graffiti from walls, signs, sidewalks, or other structures. The Permittees shall prevent any discharge of debris, cleaning compound waste, paint waste, or wash water due to graffiti removal from entering storm drains or watercourses.

(3) The Permittees shall use proper disposal methods for wastes generated from these activities. The Permittees shall train their employees and/or specify in contracts the proper capture and disposal methods for the wastes generated.

iii. Reporting – The Permittees shall report on implementation of and compliance with these BMPs in their Annual Report.

C.2.d. Stormwater Pump Stations

i. Task Description –The Permittees shall implement measures to operate, inspect, and maintain stormwater pump stations to eliminate non-stormwater discharges containing pollutants, and to reduce pollutant loads in stormwater discharges to comply with WQSs.

ii. Implementation Levels – The Permittees shall comply with the following at Permittee-owned or -operated pump stations:

(1) Upon becoming aware that the discharge from a pump station has a dissolved oxygen (DO) concentration below 3.0 mg/L, implement corrective actions, such as continuous pumping at a low flow rate, aeration, or other appropriate methods to maintain DO concentrations of the discharge above 3 milligrams per liter (mg/L) and verify the effectiveness of the corrective actions with monitoring. Corrective actions do not need to be implemented on discharges from pump stations that

remain in the stormwater collection system or infiltrate into a dry creek immediately downstream.

(2) Ensure that pump stations are free from debris and trash and replace any oil absorbent booms, as needed, and investigate and abate illicit discharges. Pump stations excluded from C.2.d.ii.(1) above are not excluded from this requirement.

(3) The Permittees shall maintain records of inspection, maintenance, implementation of corrective actions, and any monitoring records at Permittee-owned or -operated pumped stations. These records shall be made available to Water Board staff or its representatives during inspections and audits, or otherwise upon request.

C.2.e. Rural Public Works Construction and Maintenance

i. Task Description – Rural Road and Public Works Construction and Maintenance

For the purpose of this provision, rural means any watershed or portion thereof that is developed with large lot home-sites, such as one acre or larger, or with primarily agricultural, grazing, or open space uses. The Permittees shall implement and require contractors to implement BMPs for erosion and sediment control during and after construction for maintenance activities on rural roads, particularly in or adjacent to stream channels or wetlands. The Permittees shall notify the Water Board, the California Department of Fish and Wildlife (CDFW), and the U.S. Army Corps of Engineers, where applicable, and obtain appropriate agency permits for rural public works activities before work in or near creeks and wetlands.

ii. Implementation Level

(1) The Permittees shall continue to implement BMPs for erosion and sediment control measures during construction and maintenance activities on rural roads, including developing and implementing appropriate training and technical assistance resources for rural public works activities.

(2) The Permittees shall implement appropriate BMPs for the following activities. BMPs shall minimize impacts on streams and wetlands in the course of rural road and public works maintenance and construction activities:

(a) Road design, construction, maintenance, and repairs in rural areas that prevent and control road-related erosion and sediment transport;

(b) Identification and prioritization of rural road maintenance on the basis of soil erosion potential, slope steepness, and stream habitat resources;

(c) Construction of roads and culverts that do not impact creek functions. New or replaced culverts shall not create a migratory fish passage barrier, where migratory fish are present, or lead to stream instability;

(d) Implementation of an inspection program to maintain rural roads' structural integrity and prevent impacts to water quality;

(e) Maintenance of rural roads adjacent to streams and riparian habitat to reduce erosion, replace damaging shotgun culverts, and address excessive erosion;

(f) Re-grading of unpaved rural roads to slope outward where consistent with road engineering safety standards, and installation of water bars as appropriate; and

(g) Replacement of existing culverts or design of new culverts or bridge crossings shall use measures to reduce erosion, provide fish passage, and maintain natural stream geomorphology in a stable manner.

(3) The Permittees shall incorporate existing training and guidance on permitting requirements for rural public works activities so as to stress the importance of proper planning and construction to avoid water quality impacts.

(4) The Permittees shall provide training incorporating these BMPs to rural public works maintenance staff at least twice within this Permit term.

iii. Reporting – The Permittees shall report on the implementation of and compliance with BMPs for the rural public works construction and maintenance activities in their Annual Report, including reporting on increased maintenance in priority areas.

C.2.f. Corporation Yard BMP Implementation

i. Task Description – Corporation Yard Maintenance

(1) The Permittees shall implement and maintain a site-specific Stormwater Pollution Prevention Plan (SWPPP) for corporation yards, including municipal vehicle maintenance, heavy equipment, and maintenance vehicle parking areas, and material storage facilities, to comply with water quality standards. Each SWPPP shall incorporate all applicable BMPs that are described in the California Stormwater Quality Association's (CASQA's) Handbook for Municipal Operations and the Caltrans Storm Water Quality Handbook Maintenance Staff Guide, May 2003, and its addenda, as appropriate.

(2) The requirements in this provision shall apply only to facilities that are not covered under the State Water Board's Industrial Stormwater NPDES General Permit.

ii. Implementation Level

(1) Implement BMPs to minimize pollutant discharges in stormwater and prohibit non-stormwater discharges, such as wash waters and street sweeper, vactor, and other related equipment wash water. Pollution control actions shall include, but not be limited to, good housekeeping practices, material and waste storage control, and vehicle leak and spill control.

(2) Routinely inspect corporation yards to ensure that non-stormwater discharges are not entering the storm drain system and pollutant discharges are prevented to the maximum extent practicable. At a minimum, each corporation yard shall be fully inspected each year between September 1 and September 30, beginning the 2016-2017 reporting year. Active non-stormwater discharges shall cease immediately. Corrective actions shall be implemented before the next rain event, but no longer than 10 business days after the potential and/or actual discharges are discovered. Corrective actions can be temporary and more time can be allowed for permanent corrective actions. If more than 10 business days are required for compliance, a rationale shall be recorded.

(3) Plumb all vehicle and equipment wash areas to the sanitary sewer after coordination with the local sanitary sewer agency and equip with a pretreatment device (if necessary) in accordance with the requirements of the local sanitary sewer agency.

(4) Use dry cleanup methods when cleaning debris and spills from corporation yards. If wet cleaning methods must be used (e.g., pressure washing), the Permittee shall ensure that wash water is collected and disposed in the sanitary sewer after coordination with the local sanitary sewer agency and in accordance with the requirements of the local sanitary sewer agency. Any private companies hired by the Permittee to perform cleaning activities on Permittee-owned property shall follow the same requirements. In areas where sanitary sewer connection is not available, the Permittees shall collect and haul the wash water to a municipal wastewater treatment plant, or implement appropriate BMPs and dispose of the wastewater to land in a manner that does not adversely impact surface water or groundwater.

(5) Outdoor storage areas containing pollutants shall be covered and/or bermed to prevent discharges of polluted stormwater runoff or run-on to storm drain inlets.

iii. Reporting

(1) In the 2015-2016 Annual Report, Permittees shall report on implementation of SWPPPs, the results of inspections, and any followup actions in their Annual Report.

(2) Beginning with the 2016-2017 Annual Report, Permittees shall list activities conducted in the corporation yards that have BMPs in the site-specific SWPPP, date of inspections, the results of inspections, and any followup actions, including the date of any necessary corrective actions implemented, in their Annual Report.

C.3. New Development and Redevelopment

The goal of Provision C.3 is for the Permittees to use their planning authorities to include appropriate source control, site design, and stormwater treatment measures in new development and redevelopment projects to address stormwater runoff pollutant discharges and prevent increases in runoff flows from new development and redevelopment projects. This goal is to be accomplished primarily through the implementation of low impact development (LID) techniques.

C.3.a. New Development and Redevelopment Performance Standard Implementation

i. Task Description – At a minimum, each Permittee shall:

(1) Have adequate legal authority to implement all requirements of Provision C.3;

(2) Have adequate development review and permitting procedures to impose conditions of approval or other enforceable mechanisms to implement the requirements of Provision C.3. For projects discharging directly to CWA section 303(d)-listed waterbodies, conditions of approval must require that post-development runoff not exceed pre-development levels for such pollutants that are listed;

(3) Evaluate potential water quality effects and identify appropriate mitigation measures when conducting environmental reviews, such as under CEQA;

(4) Provide training adequate to implement the requirements of Provision C.3 for staff, including interdepartmental training;

(5) Provide outreach adequate to implement the requirements of Provision C.3, including providing education materials to municipal staff, developers, contractors, construction site operators, and owner/builders, early in the planning process and as appropriate;

(6) For all new development and redevelopment projects that are subject to the Permittee's planning, building, development, or other comparable review, but not regulated by Provision C.3, encourage the inclusion of adequate site design measures that may include minimizing land disturbance and impervious surfaces (especially parking lots); clustering of structures and pavement; directing roof runoff to vegetated areas; use of micro-detention, including distributed landscape-based detention; preservation of open space; protection and/or restoration of riparian areas and wetlands as project amenities;

(7) For all new development and redevelopment projects that are subject to the Permittee's planning, building, development, or other comparable review, but not regulated by Provision C.3, encourage the inclusion of adequate source control measures to limit pollutant generation, discharge, and runoff. These source control measures should include:

- Storm drain inlet stenciling.

- Landscaping that minimizes irrigation and runoff, promotes surface infiltration where possible, minimizes the use of pesticides and fertilizers, and incorporates appropriate sustainable landscaping practices and programs, such as Bay-Friendly Landscaping.
- Appropriate covers, drains, and storage precautions for outdoor material storage areas, loading docks, repair/maintenance bays, and fueling areas.
- Covered trash, food waste, and compactor enclosures.
- Plumbing of the following discharges to the sanitary sewer, subject to the local sanitary sewer agency's regulations and standards:
  - Discharges from indoor floor mat/equipment/hood filter wash racks or covered outdoor wash racks for restaurants.
  - Dumpster drips from covered trash and food compactor enclosures.
  - Discharges from outdoor covered wash areas for vehicles, equipment, and accessories.
  - Swimming pool water, if discharge to onsite vegetated areas is not a feasible option.
  - Fire sprinkler test water, if discharge to onsite vegetated areas is not a feasible option.

(8) Revise, as necessary, General Plans to integrate water quality and watershed protection with water supply, flood control, habitat protection, groundwater recharge, and other sustainable development principles and policies (e.g., referencing the Bay-Friendly Landscape Guidelines).

ii. Reporting – Provide a brief summary of the method(s) of implementation of Provisions C.3.a.i.(1)–(8) in the 2016 Annual Report.

C.3.b. Regulated Projects

i. Task Description – The Permittees shall require all projects fitting the category descriptions listed in Provision C.3.b.ii. below (hereinafter called Regulated Projects) to implement LID source control, site design, and stormwater treatment onsite or at a joint stormwater treatment facility[1] in accordance with Provisions C.3.c. and C.3.d., unless the Provision C.3.e. alternate compliance options are invoked. For adjacent Regulated Projects that will discharge runoff to a joint stormwater treatment facility, the treatment facility must be completed by the end of construction of the first Regulated Project that will be discharging runoff to the joint stormwater treatment facility.

(1) Any Regulated Project that has been approved with stormwater treatment measures in compliance with Provision C.3.d. under a previous MS4

[1] **Joint stormwater treatment facility** – Stormwater treatment facility built to treat the combined runoff from two or more Regulated Projects.

permit is exempt from the requirements of Provision C.3.c. (low impact development requirements).

(2) Any Regulated Project that was approved with no Provision C.3. stormwater treatment requirements under a previous MS4 permit and that has not begun construction by the effective date of this permit, shall be required to fully comply with the requirements of C.3.c. and C.3.d. Permittees may grant exemptions from this requirement as follows:

(a) An exemption may be granted to:

(i) Any Regulated Project that was previously approved with a vesting tentative map that confers a vested right to proceed with development in substantial compliance with the ordinance, policies, and standards in effect at the time the vesting tentative map was approved or conditionally approved, as allowed by State law.

(ii) Any Regulated Project for which the Permittee has no legal authority to require changes to previously granted approvals, such as projects that have been granted building permits.

(b) An exemption from the LID requirements of Provision C.3.c. may be granted to any Regulated Project as long as stormwater treatment with media filters is provided that comply with the hydraulic sizing requirements of Provision C.3.d.

Regulated Projects, as they are defined in this Provision, do not include detached single-family home projects that are not part of a larger plan of development.

ii. Regulated Projects are defined in the following categories:

(1) **Special Land Use Categories**

(a) **New Development or redevelopment projects** that fall into one of the categories listed below and that create and/or replace 5000 square feet or more of impervious surface (collectively over the entire project site). This category includes development projects of the following four types on public or private land that fall under the planning and building authority of a Permittee:

(i) Auto service facilities, described by the following Standard Industrial Classification (SIC) Codes: 5013, 5014, 5541, 7532-7534, and 7536-7539;

(ii) Retail gasoline outlets;

(iii) Restaurants (SIC Code 5812); or

(iv) Stand-alone uncovered parking lots and uncovered parking lots that are part of a development project if the parking lot creates and/or replaces 5,000 square feet or more of impervious surface. This category includes the top uncovered portion of parking structures, unless drainage from the uncovered portion is

connected to the sanitary sewer along with the covered portions of the parking structure.

(b) For redevelopment projects in the categories specified in Provision C.3.b.ii.(1)(a)(i)-(iv), specific exclusions are:

(i) Interior remodels; and

(ii) Routine maintenance or repair such as:

- roof or exterior wall surface replacement, and/or
- pavement resurfacing within the existing footprint.

(c) Where a redevelopment project in the categories specified in Provision C.3.b.ii.(1)(a)(i)-(iv) results in an alteration of **50 percent or more** of the impervious surface of a previously existing development that was not subject to Provision C.3, the entire project, consisting of all existing, new, and/or replaced impervious surfaces, must be included in the treatment system design (i.e., stormwater treatment systems must be designed and sized to treat stormwater runoff from the entire redevelopment project).

(d) Where a redevelopment project in the categories specified in Provision C.3.b.ii.(1)(a)(i)-(iv) results in an alteration of **less than 50 percent** of the impervious surface of a previously existing development that was not subject to Provision C.3, only the new and/or replaced impervious surface of the project must be included in the treatment system design (i.e., stormwater treatment systems must be designed and sized to treat stormwater runoff from the new and/or replaced impervious surface of the project).

(2) **Other Development Projects**

New development projects that create 10,000 square feet or more of impervious surface (collectively over the entire project site) including commercial, industrial, residential housing subdivisions (i.e., detached single-family home subdivisions, multi-family attached subdivisions (town homes), condominiums, and apartments), mixed-use, and public projects. This category includes development projects on public or private land that fall under the planning and building authority of a Permittee. Detached single-family home projects that are not part of a larger plan of development are specifically excluded.

(3) **Other Redevelopment Projects**

Redevelopment projects that create and/or replace 10,000 square feet or more of impervious surface (collectively over the entire project site) including commercial, industrial, residential housing subdivisions (i.e., detached single-family home subdivisions, multi-family attached subdivisions (town homes), condominiums, and apartments), mixed-use, and public projects. Redevelopment is any land-disturbing activity that results in the creation, addition, or replacement of exterior impervious surface area on a site on which some past development has occurred. This

category includes redevelopment projects on public or private land that fall under the planning and building authority of a Permittee.

Specific exclusions to this category are:

- Interior remodels; and
- Routine maintenance or repair such as:
  - roof or exterior wall surface replacement, and/or
  - pavement resurfacing within the existing footprint.

(a) Where a redevelopment project results in an alteration of **50 percent or more** of the impervious surface of a previously existing development that was not subject to Provision C.3, the entire project, consisting of all existing, new, and/or replaced impervious surfaces, must be included in the treatment system design (i.e., stormwater treatment systems must be designed and sized to treat stormwater runoff from the entire redevelopment project).

(b) Where a redevelopment results in an alteration **of less than 50 percent** of the impervious surface of a previously existing development that was not subject to Provision C.3., only the new and/or replaced impervious surface of the project must be included in the treatment system design (i.e., stormwater treatment systems must be designed and sized to treat stormwater runoff from the new and/or replaced impervious surface of the project).

(4) **Road Projects**

Any of the following types of road projects that create 10,000 square feet or more of newly constructed contiguous impervious surface and that fall under the building and planning authority of a Permittee:

(a) Construction of new streets or roads, including sidewalks and bicycle lanes built as part of the new streets or roads.

(b) Widening of existing streets or roads with additional traffic lanes.

(i) Where the addition of traffic lanes results in an alteration of more than 50 percent of the impervious surface of an existing street or road within the project that was not subject to Provision C.3, the entire project, consisting of all existing, new, and/or replaced impervious surfaces, shall be included in the treatment system design (i.e., stormwater treatment systems must be designed and sized to treat stormwater runoff from the entire street or road that had additional traffic lanes added).

(ii) Where the addition of traffic lanes results in an alteration of less than 50 percent of the impervious surface of an existing street or road within the project that was not subject to Provision C.3, only the new and/or replaced impervious surface of the project must be included in the treatment system design (i.e., stormwater treatment systems must be designed and sized to treat

stormwater runoff from only the new traffic lanes). However, if the stormwater runoff from the existing traffic lanes and the added traffic lanes cannot be separated, any onsite treatment system shall be designed and sized to treat stormwater runoff from the entire street or road. If an offsite treatment system is installed or in-lieu fees paid in accordance with Provision C.3.e, the offsite treatment system or in-lieu fees must address only the stormwater runoff from the added traffic lanes.

(c) Construction of impervious trails that are greater than 10 feet wide or are creek-side (within 50 feet of the top of bank).

(d) Specific exclusions to Provisions C.3.b.ii.(4)(a)-(c) include the following:

- Sidewalks built as part of new streets or roads and built to direct stormwater runoff to adjacent vegetated areas.
- Bicycle lanes built as part of new streets or roads but are not hydraulically connected to the new streets or roads and that direct stormwater runoff to adjacent vegetated areas.
- Impervious trails built to direct stormwater runoff to adjacent vegetated areas, or other non-erodible permeable areas, preferably away from creeks or towards the outboard side of levees.
- Sidewalks, bicycle lanes, or trails constructed with permeable surfaces.[2]
- Caltrans highway projects and associated facilities.

iii. Implementation Level – All elements of Provision C.3.b.i.-ii. shall be fully implemented immediately, including a database or equivalent tabular format that contains all the information listed under Reporting (Provision C.3.b.iv.)

iv. Reporting

(1) **C.3.b.i.(2) Reporting**

In the 2017 Annual Report, each Permittee shall provide a complete list of the development projects that are subject to the requirements of Provision C.3.b.i.(2). For each such project, the Permittee shall indicate the type of stormwater treatment system required or the specific exemption granted, pursuant to Provision C.3.b.i.(2)(a) and (b). If a Permittee has no projects subject to Provision C.3.b.i.(2), it shall so state in the 2017 Annual Report.

(2) **Annual Reporting – C.3.b.ii. Regulated Projects**

For each Regulated Project approved during the fiscal year reporting period, the following information shall be reported electronically in the

[2] Permeable surfaces include pervious concrete, porous asphalt, unit pavers, and granular materials.

fiscal year Annual Report, in tabular form (as set forth in the attached Provision C.3.b. Sample Reporting Table):

(a) Project Name, Number, Location (cross streets), and Street Address;

(b) Name of Developer, Phase No. (if project is being constructed in phases, each phase should have a separate entry), Project Type (e.g., commercial, industrial, multi-unit residential, mixed-use, public), and description;

(c) Project watershed;

(d) Total project site area and total area of land disturbed;

(e) Total new impervious surface area and/or total replaced impervious surface area;

(f) If redevelopment or road widening project, total pre-project impervious surface area and total post-project impervious surface area;

(g) Status of project (e.g., application date, application deemed complete date, project approval date);

(h) Source control measures;

(i) Site design measures;

(j) All post-construction stormwater treatment systems installed onsite, at a joint stormwater treatment facility, and/or at an offsite location;

(k) Operation and maintenance responsibility mechanism for the life of the project;

(l) Hydraulic Sizing Criteria used;

(m) Alternative compliance measures for Regulated Project (if applicable)

  (i) If alternative compliance will be provided at an offsite location in accordance with Provision C.3.e.i.(1), include information required in Provision C.3.b.iv.(2)(a) – (l) for the offsite project; and

  (ii) If alternative compliance will be provided by paying in-lieu fees in accordance with Provision C.3.e.i.(2), provide information required in Provision C.3.b.iv.(2)(a) – (l) for the Regional Project. Additionally, provide a summary of the Regional Project's goals, duration, estimated completion date, total estimated cost of the Regional Project, and estimated monetary contribution from the Regulated Project to the Regional Project; and

(n) Hydromodification (HM) Controls (see Provision C.3.g.) – If not required, state why not. If required, state control method used.

C.3.c. Low Impact Development (LID)

The goal of LID is to reduce runoff and mimic a site's predevelopment hydrology by minimizing disturbed areas and impervious cover and then infiltrating, storing,

detaining, evapotranspiring, and/or biotreating stormwater runoff close to its source. LID employs principles such as preserving and recreating natural landscape features and minimizing imperviousness to create functional and appealing site drainage that treats stormwater as a resource, rather than a waste product. Practices used to adhere to these LID principles include measures such as rain barrels and cisterns, green roofs, permeable pavement, preserving undeveloped open space, and biotreatment through rain gardens, bioretention units, bioswales, and planter/tree boxes.

Task Description

i. The Permittees shall, at a minimum, implement the following LID requirements:

(1) **Source Control Requirements**

Require all Regulated Projects to implement source control measures onsite that, at a minimum, shall include the following:

(a) Minimization of stormwater pollutants of concern in urban runoff through measures that may include plumbing of the following discharges to the sanitary sewer, subject to the local sanitary sewer agency's regulations and standards:

- Discharges from indoor floor mat/equipment/hood filter wash racks or covered outdoor wash racks for restaurants;
- Dumpster drips from covered trash, food waste, and compactor enclosures;
- Discharges from covered outdoor wash areas for vehicles, equipment, and accessories;
- Swimming pool water, if discharge to onsite vegetated areas is not a feasible option; and
- Fire sprinkler test water, if discharge to onsite vegetated areas is not a feasible option;

(b) Properly designed covers, drains, and storage precautions for outdoor material storage areas, loading docks, repair/maintenance bays, and fueling areas;

(c) Properly designed trash storage areas;

(d) Landscaping that minimizes irrigation and runoff, promotes surface infiltration, minimizes the use of pesticides and fertilizers, and incorporates other appropriate sustainable landscaping practices and programs such as Bay-Friendly Landscaping;

(e) Efficient irrigation systems; and

(f) Storm drain system stenciling or signage.

(2) **Site Design and Stormwater Treatment Requirements**

(a) Require each Regulated Project to implement at least the following design strategies onsite:

(i) Limit disturbance of natural water bodies and drainage systems; minimize compaction of highly permeable soils; protect slopes

and channels; and minimize impacts from stormwater and urban runoff on the biological integrity of natural drainage systems and water bodies;

(ii) Conserve natural areas, including existing trees, other vegetation, and soils;

(iii) Minimize impervious surfaces;

(iv) Minimize disturbances to natural drainages; and

(v) Minimize stormwater runoff by implementing one or more of the following site design measures:

- Direct roof runoff into cisterns or rain barrels for reuse.
- Direct roof runoff onto vegetated areas.
- Direct runoff from sidewalks, walkways, and/or patios onto vegetated areas.
- Direct runoff from driveways and/or uncovered parking lots onto vegetated areas.
- Construct sidewalks, walkways, and/or patios with pervious pavement systems.[3]
- Construct driveways, bike lanes, and/or uncovered parking lots with pervious pavement systems.

(b) Permittees shall collectively, on a regional or countywide basis, develop and adopt design specifications for pervious pavement systems, subject to the Executive Officer's approval. If countywide design specifications have been adopted and are contained in countywide stormwater handbooks, Permittees may reference these documents in the Annual Reports.

(c) Require each Regulated Project to treat 100% of the amount of runoff identified in Provision C.3.d for the Regulated Project's drainage area with LID treatment measures onsite or with LID treatment measures at a joint stormwater treatment facility.

(i) LID treatment measures are harvesting and use, infiltration, evapotranspiration, and biotreatment.

(ii) Biotreatment (or bioretention) systems shall be designed to have a surface area no smaller than what is required to accommodate a 5 inches/hour stormwater runoff surface loading rate, infiltrate runoff through biotreatment soil media at a minimum of 5 inches per hour, and maximize infiltration to the native soil during the life of the Regulated Project. The soil media for biotreatment (or bioretention) systems shall be designed to sustain healthy, vigorous plant growth and maximize stormwater runoff retention

[3] Pervious pavement systems include pervious asphalt, pervious concrete, pervious pavers, and grid pavers.

and pollutant removal. Permittees shall ensure that Regulated Projects use biotreatment soil media that meet the minimum specifications set forth in Attachment L of the previous permit (Order No. R2-2009-0074), dated November 28, 2011. Permittees may collectively (on an all-Permittee scale or countywide scale) develop and adopt revisions to the soil media minimum specifications, subject to the Executive Officer's approval.

(iii) Green roofs may be considered biotreatment systems that treat roof runoff only if they meet certain minimum specifications. Permittees shall ensure that green roofs installed at Regulated Projects meet the following minimum specifications:

(i) The green roof system planting media shall be sufficiently deep to provide capacity within the pore space of the media for the required runoff volume specified by Provision C.3.d.i.(1).

(ii) The green roof system planting media shall be sufficiently deep to support the long term health of the vegetation selected for the green roof, as specified by a landscape architect or other knowledgeable professional.

(d) Require any Regulated Project that does not comply with Provision C.3.c.i.(2)(c) above to meet the requirements established in Provision C.3.e for alternative compliance.

ii. Reporting

(1) Permittees shall collectively submit in the 2016 Annual Report, design specifications for pervious pavement systems that have been developed and adopted on a regional or countywide basis. If Permittees within a countywide program are using countywide design specifications that have been adopted and are contained in a countywide stormwater handbook, those Permittees may reference the countywide stormwater handbook in-lieu of submitting the actual design specifications.

(2) For specific tasks listed above that are reported using the reporting tables required for Provision C.3.b.iv, a reference to those tables will suffice.

C.3.d. Numeric Sizing Criteria for Stormwater Treatment Systems

i. Task Description – The Permittees shall require that stormwater treatment systems constructed for Regulated Projects meet at least one of the following hydraulic sizing design criteria:

(1) **Volume Hydraulic Design Basis** – Treatment systems whose primary mode of action depends on volume capacity shall be designed to treat stormwater runoff equal to:

(a) The maximized stormwater capture volume for the area, on the basis of historical rainfall records, determined using the formula and volume capture coefficients set forth in Urban Runoff Quality Management, WEF Manual of Practice No. 23/ASCE Manual of Practice No. 87, (1998), pages 175–178 (e.g., approximately the 85th percentile 24-hour storm runoff event); or

(b) The volume of annual runoff required to achieve 80 percent or more capture, determined in accordance with the methodology set forth in Section 5 of CASQA's Stormwater Best Management Practice Handbook, New Development and Redevelopment (2003), using local rainfall data.

(2) **Flow Hydraulic Design Basis** – Treatment systems whose primary mode of action depends on flow capacity shall be sized to treat:

(a) 10 percent of the 50-year peak flow rate;

(b) The flow of runoff produced by a rain event equal to at least two times the 85th percentile hourly rainfall intensity for the applicable area, based on historical records of hourly rainfall depths; or

(c) The flow of runoff resulting from a rain event equal to at least 0.2 inches per hour intensity.

(3) **Combination Flow and Volume Design Basis** – 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.

ii. Reporting – Permittees shall use the reporting tables required in Provision C.3.b.iv.(2)

iii. Limitations on Use of Infiltration Devices in Stormwater Treatment Systems

(1) For Regulated Projects, each Permittee shall review planned land use and proposed treatment design to verify that installed stormwater treatment systems with no under-drain, and that function primarily as infiltration devices, should not cause or contribute to the degradation of groundwater quality at project sites. An infiltration device is any structure that is designed to infiltrate stormwater into the subsurface and, as designed, bypass the natural groundwater protection afforded by surface soil.

Infiltration devices include dry wells, injection wells, and infiltration trenches (includes french drains).

(2) For any Regulated Project that includes plans to install stormwater treatment systems which function primarily as infiltration devices, the Permittee shall require that:

(a) Appropriate pollution prevention and source control measures are implemented to protect groundwater at the project site, including the inclusion of a minimum of two feet of suitable soil to achieve a maximum 5 inches/hour infiltration rate for the infiltration system;

(b) Adequate maintenance is provided to maximize pollutant removal capabilities;

(c) The vertical distance from the base of any infiltration device to the seasonal high groundwater mark is at least 10 feet. (Note that some locations within the Permittees' jurisdictions are characterized by highly porous soils and/or high groundwater tables. In these areas, a greater vertical distance from the base of the infiltration device to the seasonal high groundwater mark may be appropriate, and treatment system approvals should be subject to a higher level of analysis that considers the potential for pollutants (such as from onsite chemical use), the level of pretreatment to be achieved, and other similar factors in the overall analysis of groundwater safety);

(d) Unless stormwater is first treated by a method other than infiltration, infiltration devices are not approved as treatment measures for runoff from areas of industrial or light industrial activity; areas subject to high vehicular traffic (i.e., 25,000 or greater average daily traffic on a main roadway or 15,000 or more average daily traffic on any intersecting roadway); automotive repair shops; car washes; fleet storage areas (e.g., bus, truck); nurseries; and other land uses that pose a high threat to water quality;

(e) Infiltration devices are not placed in the vicinity of known contamination sites unless it has been demonstrated that increased infiltration will not increase leaching of contaminants from soil, alter groundwater flow conditions affecting contaminant migration in groundwater, or adversely affect remedial activities; and

(f) Infiltration devices are located a minimum of 100 feet horizontally away from any known water supply wells, septic systems, and underground storage tanks with hazardous materials. (Note that some locations within the Permittees' jurisdictions are characterized by highly porous soils and/or high groundwater tables. In these areas, a greater horizontal distance from the infiltration device to known water supply wells, septic systems, or underground storage tanks with hazardous materials may be appropriate, and treatment system approvals should be subject to a higher level of analysis that considers the potential for pollutants (such as from onsite chemical use), the

level of pretreatment to be achieved, and other similar factors in the overall analysis of groundwater safety).

C.3.e. Alternative or In-Lieu Compliance with Provision C.3.b.

i. The Permittees may allow a Regulated Project to provide alternative compliance with Provision C.3.b in accordance with one of the two options listed below:

(1) **Option 1: LID Treatment at an Offsite Location**
Treat a portion of the amount of runoff identified in Provision C.3.d for the Regulated Project's drainage area with LID treatment measures onsite or with LID treatment measures at a joint stormwater treatment facility **and** treat the remaining portion of the Provision C.3.d runoff with LID treatment measures at an offsite project in the same watershed. The offsite LID treatment measures must provide hydraulically-sized treatment (in accordance with Provision C.3.d) of an equivalent quantity of both stormwater runoff and pollutant loading and achieve a net environmental benefit.

(2) **Option 2: Payment of In-Lieu Fees**
Treat a portion of the amount of runoff identified in Provision C.3.d for the Regulated Project's drainage area with LID treatment measures onsite or with LID treatment measures at a joint stormwater treatment facility **and** pay equivalent in-lieu fees[4] to treat the remaining portion of the Provision C.3.d runoff with LID treatment measures at a Regional Project.[5] The Regional Project must achieve a net environmental benefit.

(3) For the alternative compliance options described in Provision C.3.e.i.(1) and (2) above, offsite and Regional Projects must be completed within three years after the end of construction of the Regulated Project. However, the timeline for completion of a Regional Project may be extended, up to five years after the completion of the Regulated Project, with prior Executive Officer approval. Executive Officer approval will be granted contingent upon a demonstration of good faith efforts to implement the Regional Project, such as having funds encumbered and applying for the appropriate regulatory permits.

ii. Special Projects

(1) When considered at the watershed scale, certain land development projects characterized as smart growth, high density, or transit-oriented development can either reduce existing impervious surfaces, or create less "accessory" impervious areas and automobile-related pollutant impacts.

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[4] **In-lieu fees** – Monetary amount necessary to provide both hydraulically-sized treatment (in accordance with Provision C.3.d) with LID treatment measures of an equivalent quantity of stormwater runoff and pollutant loading, and a proportional share of the operation and maintenance costs of the Regional Project.

[5] **Regional Project –** A regional or municipal stormwater treatment facility that discharges into the same watershed as the Regulated Project.

Incentive LID Treatment Reduction Credits approved by the Water Board may be applied to these Special Projects, which are Regulated Projects that meet the specific criteria listed below in Provision C.3.e.ii.(2). For any Special Project, the allowable incentive LID Treatment Reduction Credit is the maximum percentage of the amount of runoff identified in Provision C.3.d. for the Special Project's drainage area, that may be treated with one or a combination of the following two types of non-LID treatment systems:

- Tree-box-type high flowrate biofilters
- Vault-based high flowrate media filters

The allowed LID Treatment Reduction Credit recognizes that density and space limitations for the Special Projects identified herein may make 100% LID treatment infeasible.

(2) Prior to granting any LID Treatment Reduction Credits, Permittees must first establish all the following:

(a) The infeasibility of treating 100% of the amount of runoff identified in Provision C.3.d for the Regulated Project's drainage area with LID treatment measures onsite;

(b) The infeasibility of treating 100% of the amount of runoff identified in Provision C.3.d for the Regulated Project's drainage area with LID treatment measures offsite or paying in-lieu fees to treat 100% of the Provision C.3.d runoff with LID treatment measures at an offsite or Regional Project; and

(c) The infeasibility of treating 100% of the amount of runoff identified in Provision C.3.d for the Regulated Project's drainage area with some combination of LID treatment measures onsite, offsite, and/or paying in-lieu fees towards at an offsite or Regional Project.

For each Special Project, a Permittee shall document the basis of infeasibility used to establish technical and/or economic infeasibility.

Under Provision C.3.e.vi, each Permittee is required to report on the infeasibility of 100% LID treatment in each scenario described in Provision C.3.e.ii.(2)(a)-(c) above, for each of the Special Projects for which LID Treatment Reduction Credit was applied.

(3) Category A Special Project Criteria

(a) To be considered a Category A Special Project, a Regulated Project must meet all of the following criteria:

(i) Be built as part of a Permittee's stated objective to preserve or enhance a pedestrian-oriented type of urban design.

(ii) Be located in a Permittee's designated central business district, downtown core area or downtown core zoning district, neighborhood business district or comparable pedestrian-

oriented commercial district, or historic preservation site and/or district.

(iii) Create and/or replace one half acre or less of impervious surface area.

(iv) Include no surface parking, except for incidental surface parking. Incidental surface parking is allowed only for emergency vehicle access, Americans with Disabilities Act (ADA) accessibility, and passenger and freight loading zones.

(v) Have at least 85% coverage for the entire project site by permanent structures. The remaining 15% portion of the site is to be used for safety access, parking structure entrances, trash and recycling service, utility access, pedestrian connections, public uses, landscaping, and stormwater treatment.

(b) Any Category A Special Project may qualify for 100% LID Treatment Reduction Credit, which would allow the Category A Special Project to treat up to 100% of the amount of runoff identified in Provision C.3.d. for the Project's drainage area with either one or a combination of the two types of non-LID treatment systems listed in Provision C.3.e.ii.(1) above.

(4) Category B Special Project Criteria

(a) To be considered a Category B Special Project, a Regulated Project must meet all of the following criteria:

(i) Be built as part of a Permittee's stated objective to preserve or enhance a pedestrian-oriented type of urban design.

(ii) Be located in a Permittee's designated central business district, downtown core area or downtown core zoning district, neighborhood business district or comparable pedestrian-oriented commercial district, or historic preservation site and/or district.

(iii) Create and/or replace greater than one-half acre but no more than 2 acres of impervious surface area.

(iv) Include no surface parking, except for incidental surface parking. Incidental surface parking is allowed only for emergency vehicle access, ADA accessibility, and passenger and freight loading zones.

(v) Have at least 85% coverage for the entire project site by permanent structures. The remaining 15% portion of the site is to be used for safety access, parking structure entrances, trash and recycling service, utility access, pedestrian connections, public uses, landscaping, and stormwater treatment.

(b) For any Category B Special Project, the maximum LID Treatment Reduction Credit allowed is determined based on the density achieved by the Project in accordance with the criteria listed below. Density is

expressed in Floor Area Ratios (FARs[6]) for commercial development projects, in Dwelling Units per Acre (DU/Ac) for residential development projects, and in FARs and DU/Ac for mixed-use development projects.

(i) 50% Maximum LID Treatment Reduction Credit

- For any commercial Category B Special Project with an FAR of at least 2:1, up to 50% of the amount of runoff identified in Provision C.3.d. for the Project's drainage area may be treated with either one or a combination of the two types of non-LID treatment systems listed in Provision C.3.e.ii.(1) above.
- For any residential Category B Special Project with a gross density[7] of at least 50 DU/Ac, up to 50% of the amount of runoff identified in Provision C.3.d. for the Project's drainage area may be treated with either one or a combination of the two types of non-LID treatment systems listed in Provision C.3.e.ii.(1) above.
- For any mixed use Category B Special Project with an FAR of at least 2:1 or a gross density of at least 50 DU/Ac, up to 50% of the amount of runoff identified in Provision C.3.d. for the Project's drainage area may be treated with either one or a combination of the two types of non-LID treatment systems listed in Provision C.3.e.ii.(1) above.

(ii) 75% Maximum LID Treatment Reduction Credit

- For any commercial Category B Special Project with an FAR of at least 3:1, up to 75% of the amount of runoff identified in Provision C.3.d. for the Project's drainage area may be treated with either one or a combination of the two types of non-LID treatment systems listed in Provision C.3.e.ii.(1) above.
- For any residential Category B Special Project with a gross density of at least 75 DU/Ac, up to 75% of the amount of runoff identified in Provision C.3.d. for the Project's drainage area may be treated with either one or a combination of the two types of non-LID treatment systems listed in Provision C.3.e.ii.(1) above.
- For any mixed use Category B Special Project with an FAR of at least 3:1 or a gross density of at least 75 DU/Ac, up to 75% of the amount of runoff identified in Provision C.3.d. for the Project's drainage area may be treated with either one or a combination of the two types of non-LID treatment systems listed in Provision C.3.e.ii.(1) above.

(iii) 100% Maximum LID Treatment Reduction Credit

[6] **Floor Area Ratio** – The ratio of the total floor area on all floors of all buildings at a project site (except structures, floors, or floor areas dedicated to parking) to the total project site area.

[7] **Gross Density** – The total number of residential units divided by the acreage of the entire site area, including land occupied by public right-of-ways, recreational, civic, commercial and other non-residential uses.

- For any commercial Category B Special Project with an FAR of at least 4:1, up to 100% of the amount of runoff identified in Provision C.3.d. for the Project's drainage area may be treated with either one or a combination of the two types of non-LID treatment systems listed in Provision C.3.e.ii.(1) above.
- For any residential Category B Special Project with a gross density of at least 100 DU/Ac, up to 100% of the amount of runoff identified in Provision C.3.d. for the Project's drainage area may be treated with either one or a combination of the two types of non-LID treatment systems listed in Provision C.3.e.ii.(1) above.
- For any mixed use Category B Special Project with an FAR of at least 4:1 or a gross density of at least 100 DU/Ac, up to 100% of the amount of runoff identified in Provision C.3.d. for the Project's drainage area may be treated with either one or a combination of the two types of non-LID treatment systems listed in Provision C.3.e.ii.(1) above.

(5) Category C Special Project Criteria (Transit-Oriented Development)

(a) Transit-Oriented Development refers to the clustering of homes, jobs, shops and services in close proximity to rail stations, ferry terminals or bus stops offering access to frequent, high-quality transit services. This pattern typically involves compact development and a mixing of different land uses, along with amenities like pedestrian-friendly streets. To be considered a Category C Special Project, a Regulated Project must meet all of the following criteria:

(i) Be characterized as a non-auto-related land use project. That is, Category C specifically excludes any Regulated Project that is a stand-alone surface parking lot; car dealership; auto and truck rental facility with onsite surface storage; fast-food restaurant, bank or pharmacy with drive-through lanes; gas station, car wash, auto repair and service facility; or other auto-related project unrelated to the concept of Transit-Oriented Development.

(ii) If a commercial development project, achieve at least an FAR of 2:1.

(iii) If a residential development project, achieve at least a gross density of 25 DU/Ac.

(iv) If a mixed use development project, achieve at least an FAR of 2:1 or a gross density of 25 DU/Ac.

(b) For any Category C Special Project, the total maximum LID Treatment Reduction Credit allowed is the sum of three different types of credits that the Category C Special Project may qualify for, namely: Location, Density and Minimized Surface Parking Credits.

(c) Location Credits

(i) A Category C Special Project may qualify for the following Location Credits:

a. 50% Location Credit: Located within a ¼ mile radius of an existing or planned transit hub.

b. 25% Location Credit: Located within a ½ mile radius of an existing or planned transit hub.

c. 25% Location Credit: Located within a planned Priority Development Area (PDA), which is an infill development area formally designated by the Association of Bay Area Government's / Metropolitan Transportation Commission's FOCUS regional planning program. FOCUS is a regional incentive-based development and conservation strategy for the San Francisco Bay Area.

(ii) Only one Location Credit may be used by an individual Category C Special Project, even if the project qualifies for multiple Location Credits.

(iii) At least 50% or more of a Category C Special Project's site must be located within the ¼ or ½ mile radius of an existing or planned transit hub to qualify for the corresponding Location Credits listed above. One hundred percent of a Category C Special Project's site must be located within a PDA to qualify for the corresponding Location Credit listed above.

(iv) Transit hub is defined as a rail, light rail, or commuter rail station, ferry terminal, or bus transfer station served by three or more bus routes (i.e., a bus stop with no supporting services does not qualify). A planned transit hub is a station on the MTC's Regional Transit Expansion Program list, per MTC's Resolution 3434 (revised April 2006), which is a regional priority funding plan for future transit stations in the San Francisco Bay Area.

(d) Density Credits: To qualify for any Density Credits, a Category C Special Project must first qualify for one of the Location Credits listed in Provision C.3.e.ii.(5)(c) above.

(i) A Category C Special Project that is a commercial or mixed-use development project may qualify for the following Density Credits:

a. 10% Density Credit: Achieve an FAR of at least 2:1.

b. 20% Density Credit: Achieve an FAR of at least 4:1.

c. 30% Density Credit: Achieve an FAR of at least 6:1.

(ii) A Category C Special Project that is a residential or mixed-use development project may qualify for the following Density Credits:

a. 10% Density Credit: Achieve a gross density of at least 30 DU/Ac.

b. 20% Density Credit: Achieve a gross density of at least 60 DU/Ac.

c. 30% Density Credit: Achieve a gross density of at least 100 DU/Ac.

(iii) Commercial Category C Projects do not qualify for Density Credits based on DU/Ac and residential Category C Projects do not qualify for Density Credits based on FAR. Mixed use Category C Projects may use Density Credits based on either DU/Ac or FAR, but not both.

(iv) Only one Density Credit may be used by an individual Category C Special Project, even if the project qualifies for multiple Density Credits.

(e) Minimized Surface Parking Credits: To qualify for any Minimized Surface Parking Credits, a Category C Special Project must first qualify for one of the Location Credits listed in Provision C.3.e.ii.(5)(c) above.

(i) A Category C Special Project may qualify for the following Minimized Surface Parking Credits:

a. 10% Minimized Surface Parking Credit: Have 10% or less of the total post-project impervious surface area dedicated to at-grade surface parking. The at-grade surface parking must be treated with LID treatment measures.

b. 20% Minimized Surface Parking Credit: Have no surface parking except for incidental surface parking. Incidental surface parking is allowed only for emergency vehicle access, ADA accessibility, and passenger and freight loading zones.

(ii) Only one Minimized Surface Parking Credit may be used by an individual Category C Special Project, even if the project qualifies for multiple Minimized Surface Parking Credits.

(6) Any Regulated Project that meets all the criteria for multiple Special Projects Categories (i.e., a Regulated Project that may be characterized as a Category B or C Special Project) may only use the LID Treatment Reduction Credit allowed under one of the Special Projects Categories (i.e., a Regulated Project that may be characterized as a Category B or C Special Project may use the LID Treatment Reduction Credit allowed under Category B or Category C, but not the sum of both.).

iii. Implementation Level

(1) Provisions C.3.e.i-ii supersede any Alternative Compliance Policies previously approved by the Executive Officer.

(2) The definitions of FAR and gross density applicable to Provisions C.3.e.ii.(4) and (5) are effective July 1, 2016, and shall apply to all Special Projects granted final discretionary approval on or after July 1, 2016.

(3) For all offsite projects and Regional Projects installed in accordance with Provision C.3.e.i-ii, the Permittees shall meet the Operation & Maintenance (O&M) requirements of Provision C.3.h.

iv. Reporting – Annual reporting shall be done in conjunction with reporting requirements under Provision C.3.b.iv.(2).

Any Permittee choosing to require 100% LID treatment onsite for all Regulated Projects and not allow alternative compliance under Provision C.3.e, shall include a statement to that effect in each Annual Report.

v. Reporting on Special Projects

(1) Permittees shall track any identified potential Special Projects, including those projects that have submitted planning applications but that have not received final discretionary approval.

(2) In each Annual Report, Permittees shall report to the Water Board on these tracked potential Special Projects using Table 3.1 found at the end of Provision C.3. All the required column entry information listed in Table 3.1 shall be reported for each potential Special Project. Any Permittee with no Special Projects shall so state.

For each Special Project listed in Table 3.1, Permittees shall include a narrative discussion of the feasibility or infeasibility of 100% LID treatment onsite, offsite, and at a Regional Project. The narrative discussion shall address each of the following:

(a) The infeasibility of treating 100% of the amount of runoff identified in Provision C.3.d for the Regulated Project's drainage area with LID treatment measures onsite.

(b) The infeasibility of treating 100% of the amount of runoff identified in Provision C.3.d for the Regulated Project's drainage area with LID treatment measures offsite or paying in-lieu fees to treat 100% of the Provision C.3.d runoff with LID treatment measures at a Regional Project.

(c) The infeasibility of treating 100% of the amount of runoff identified in Provision C.3.d for the Regulated Project's drainage area with some combination of LID treatment measures onsite, offsite, and/or paying in-lieu fees towards a Regional Project.

Both technical and economic feasibility or infeasibility shall be discussed, as applicable. The discussion shall also contain enough technical and/or economic detail to document the basis of infeasibility used.

(3) Once a Special Project has final discretionary approval, it shall be reported in the Provision C.3.b. Reporting Table in the same reporting year that the project was approved. In addition to the column entries contained in the

Provision C.3.b. Reporting Table, the Permittees shall provide the following supplemental information for each approved Special Project:

(a) Submittal Date: Date that a planning application for the Special Project was submitted.

(b) Description: Type of project, number of floors, number of units (commercial, mixed-use, residential), type of parking, and other relevant information.

(c) Site Acreage: Total site area in acres.

(d) Gross Density in DU/Ac: Number of dwelling units per acre.

(e) Density in FAR: Floor Area Ratio.

(f) Special Project Category: For each applicable Special Project Category, list the specific criteria applied to determine applicability. For each non-applicable Special Project Category, indicate n/a.

(g) LID Treatment Reduction Credit: For each applicable Special Project Category, state the maximum total LID Treatment Reduction Credit applied. For Category C Special Projects also list the individual Location, Density, and Minimized Surface Parking Credits applied.

(h) Stormwater Treatment Systems: List all proposed stormwater treatment systems and the corresponding percentage of the total amount of runoff runoff identified in Provision C.3.d. for the Project's drainage area that will be treated by each treatment system.

(i) List of Non-LID Stormwater Treatment Systems: List all non-LID stormwater treatment systems approved. For each type of non-LID treatment system, indicate: (1) the percentage of the total amount of runoff identified in Provision C.3.d. for the Special Project's drainage area, and (2) whether the treatment system either meets minimum design criteria published by a government agency or received certification issued by a government agency, and reference the applicable criteria or certification.

C.3.f. Alternative Certification of Stormwater Treatment Systems

i. Task Description – In lieu of reviewing a Regulated Project's adherence to Provision C.3.d, a Permittee may elect to have a third party conduct detailed review and certify the Regulated Project's adherence to Provision C.3.d. The third party reviewer must be a Civil Engineer or a Licensed Architect or Landscape Architect registered in the State of California or staff of another Permittee subject to the requirements of this Permit.

ii. Implementation Level – Any Permittee accepting third-party reviews must make a reasonable effort to ensure that the third party has no conflict of interest with regard to the Regulated Project in question. That is, any consultant or contractor (or his/her employees) hired to design and/or construct a stormwater treatment system for a Regulated Project shall not also be the certifying third party. The Permittee must verify that the third party certifying any Regulated Project has current training on stormwater treatment system design (within three

years of the certification signature date) for water quality and understands the groundwater protection principles applicable to Regulated Project sites.

Training conducted by an organization with stormwater treatment system design expertise (such as a college or university, the American Society of Civil Engineers, American Society of Landscape Architects, American Public Works Association, California Water Environment Association (CWEA), BASMAA, National Association of Flood & Stormwater Management Agencies, CASQA, or the equivalent, may be considered qualifying training.

iii. Reporting – Projects reviewed by third parties shall be noted in reporting tables for Provision C.3.b.

C.3.g. Hydromodification Management

i. Hydromodification Management (HM) Projects are Regulated Projects that create and/or replace one acre or more of impervious surface except where one of the following applies. All HM Projects shall meet the Hydromodification Management Standard of Provision C.3.g.ii.

(1) The post-project impervious surface area is less than, or the same as, the pre-project impervious surface area.

(2) The project is located in a catchment that drains to a hardened (e.g., continuously lined with concrete) engineered channel or channels or enclosed pipes that extend continuously to the Bay, Delta, or flow-controlled reservoir, or drains to channels that are tidally influenced.

(3) The project is located in a catchment or subwatershed that is highly developed (i.e., that is 70% or more impervious).[8]

The Hydromodification Applicability Maps developed by the Permittees in the Alameda, Santa Clara, San Mateo, and Fairfield-Suisun Programs, and the City of Vallejo, under the Previous Permit remain in effect and are provided in Attachment C to this Permit. Permittees that do not have the location-based applicability criteria (Provision C.3.g.i.(2) – (3)) shown on existing maps shall develop, or require to be developed, new maps, overlays to existing maps, or other equivalent information that demonstrates whether a project falls under one of those two criteria. Such maps, overlays, or other equivalent information shall be acceptable to the Executive Officer and shall not be effective until accepted by the Executive Officer.

ii. HM Standard

Stormwater discharges from HM Projects shall not cause an increase in the erosion potential of the receiving stream over the pre-project (existing) condition. Increases in runoff flow and volume shall be managed so that post-

[8] The Permittees' maps accepted for the Previous Permit were prepared using this standard, adjusted to 65% imperviousness to account for the presence of vegetation on the photographic references used to determine imperviousness. Thus, the maps for the Previous Permit are accepted as meeting the 70% requirement.

project runoff shall not exceed estimated pre-project rates and durations, where such increased flow and/or volume is likely to cause increased potential for erosion of creek beds and banks, silt pollutant generation, or other adverse impacts on beneficial uses due to increased erosive force. The demonstration that post-project stormwater runoff does not exceed estimated pre-project runoff rates and durations shall include the following:

(1) **Range of Flows to Control:** For Alameda, Contra Costa, San Mateo, and Santa Clara Permittees, and the City of Vallejo, HM controls shall be designed such that post-project stormwater discharge rates and durations match pre-project discharge rates and durations from 10 percent of the pre-project 2-year peak flow[9] up to the pre-project 10-year peak flow. For Fairfield-Suisun Permittees, HM controls shall be designed such that post-project stormwater discharge rates and durations shall match from 20 percent of the 2-year peak flow up to the pre-project 10-year peak flow.

(2) **Goodness of Fit Criteria:** The post-project flow duration curve shall not deviate above the pre-project flow duration curve by more than 10 percent over more than 10 percent of the length of the curve corresponding to the range of flows to control.

(3) **Standard HM Modeling:** Permittees shall use, or shall cause to be used, a continuous simulation hydrologic computer model to simulate pre-project and post-project runoff, or sizing factors or charts developed using such a model, to design onsite or regional HM controls. The Permittees shall compare, or shall cause to be compared, the pre-project and post-project model output for a long-term rainfall record and shall show that applicable performance criteria in C.3.g.ii.(1)-(3) above are met. HM controls designed using the Bay Area Hydrology Model (BAHM) and site-specific input data shall be considered to meet the HM Standard. Such use must be consistent with directions and options set forth in the most current BAHM User Manual. Modifications to the BAHM shall be acceptable to the Executive Officer, shall be consistent with the requirements of this Provision, and shall be reported as required below:

- **Precipitation Data:** Precipitation data used in the modeling of HM controls shall, at a minimum, be 30 years of hourly rainfall data representative of the area being modeled. Where a longer rainfall record is available, the longer record shall be used.
- **Calculating Post-Project Runoff:** Retention and detention basins shall be considered impervious surfaces for purposes of calculating

[9] Where referred to in this Order, the 2-year peak flow is determined using a flood frequency analysis based on USGS Bulletin 17 B to obtain the peak flow statistically expected to occur at a 2-year recurrence interval. In this analysis, the appropriate record of hourly rainfall data (e.g., 35-50 years of data) is run through a continuous simulation hydrologic model, the annual peak flows are identified, rank ordered, and the 2-year peak flow is estimated. Such models include U.S. EPA's Hydrologic Simulation Program—Fortran (HSPF), the U.S. Army Corps of Engineers' Hydrologic Engineering Center-Hydrologic Modeling System (HEC-HMS), and U.S. EPA's Storm Water Management Model (SWMM).

post-project runoff. Pre- and post-project runoff shall be calculated and compared for the entire site, without separating or excluding areas that may be considered self-retaining.

iii. HM Standard – Methodology for Direct Simulation of Erosion Potential

The Permittees may, collectively, propose an additional method, using direct simulation of erosion potential, by which to meet the HM Standard in Provision C.3.g.ii. Such a method shall be submitted to the Water Board for review and shall not be effective until approved by the Executive Officer. At a minimum, a proposal to use this additional method shall demonstrate that stormwater discharges from HM Projects using the method will not cause an increase in the erosion potential of the receiving stream over the pre-project (existing) condition, and that increases in runoff flow and volume will be managed so that post-project runoff does not exceed estimated pre-project rates and durations, where such increased flow and/or volume is likely to cause increased potential for erosion of creek beds and banks, silt pollutant generation, or other adverse impacts on beneficial uses due to increased erosive force. Such demonstration shall include, but not be limited to:

(1) An appropriately detailed discussion of the theoretical approach behind the method and the results for the areas to which it is proposed to be applied;

(2) Appropriate continuous simulation hydrologic modeling using Region-specific field data, including creek data (cross sections, longitudinal data, etc.), precipitation data (a record of at least 30 years of hourly data that is appropriately representative of the areas where the method is to be applied), safety factor(s), and HM control designs; and

(3) A description of how the method will be applied, including any models produced and how they will be used by the Permittees and/or project proponents. Such description shall include a listing of HM controls that may be used to comply with the HM requirements of this Permit, a description, with appropriate technical support, of how they will be sized to comply and how the Permittees will ensure appropriate implementation of the method, and all other necessary information, as appropriate.

iv. Types of HM Controls

Projects shall meet the HM Standard using any of the following HM controls or a combination thereof:

(1) **Onsite HM controls** are flow duration control structures, LID features and facilities, and hydrologic source controls that collectively result in the HM Standard being met at the point(s) where stormwater runoff discharges from the project site.

(2) **Regional HM controls** are flow duration control structures that collect stormwater runoff discharge from multiple projects (each of which shall incorporate hydrologic source control measures as well) and are designed

such that the HM Standard is met for all the projects at the point where the regional HM control discharges.

(3) **In-stream measures** shall be an option only where the stream, which receives runoff from the project, is already impacted by erosive flows and shows evidence of excessive sediment, erosion, deposition, or is a hardened channel.

In-stream measures involve modifying the receiving stream channel slope and geometry so that the stream can convey the new flow regime without increasing the potential for erosion and aggradation. In-stream measures are intended to improve long-term channel stability and prevent erosion by reducing the erosive forces imposed on the channel boundary.

In-stream measures, or a combination of in-stream and onsite controls, shall be designed to achieve the HM Standard from the point where the project(s) discharge(s) to the stream to the mouth of the stream or to achieve an equivalent degree of flow control mitigation (based on amount of impervious surface mitigated) as part of an in-stream project located in the same watershed. Designing in-stream controls requires a hydrologic and geomorphic evaluation (including a longitudinal profile) of the stream system downstream and upstream of the project. As with all in-stream activities, other regulatory permits must be obtained by the project proponent.[10]

v. Implementation Level

All HM Projects shall meet the HM Standard in Provision C.3.g.ii immediately. For Contra Costa Permittees, Projects receiving final planning entitlements on or before January 3, 2018, may be allowed to use the Contra Costa design standards from the Previous Permit. After January 3, 2018, for Contra Costa Permittees, Projects shall comply with the Contra Costa design standards, including any modifications made.

vi. Reporting

(1) New HM Applicability Maps or equivalent information prepared pursuant to Provision C.3.g.i, for those Permittees who do not have an approved Map, shall be submitted, acceptable to the Executive Officer, not later than the second Annual Report following the Permit's effective date.

(2) Contra Costa Permittees shall, with the 2017 Annual Report , submit a technical report, acceptable to the Executive Officer, consisting of an HM Management Plan describing how Contra Costa will implement the Permit's HM requirements (e.g., how it will update or modify its practices to meet Permit requirements). At a minimum, the technical report shall

[10] In-stream control projects require a Stream Alteration Agreement from CDFW, a CWA section 404 permit from the U.S. Army Corps of Engineers, and a section 401 certification from the Water Board. Early discussions with these agencies on the acceptability of an in-stream modification are necessary to avoid project delays or redesign.

provide additional analysis and discussion as to how existing data appropriately evaluates how existing practices available for use meet the Permit's HM requirements, including limit conditions. The report shall, as necessary, propose modifications to Contra Costa's current HM practices, or propose alternate practices that have been accepted by the Water Board, to meet the Permit's HM requirements. The report may also: provide additional data on monitored installations; provide additional analysis and discussion as to how existing and additional data appropriately evaluates existing practices, including limit conditions and the range of conditions present across Contra Costa County; and provide other information or discussion, as appropriate.

(3) Reporting of HM projects shall be as described in Provision C.3.b.

(4) Permittees shall report collectively, with each Annual Report, a listing, summary, and date of modifications made to the BAHM, including the technical rationale. This shall be prepared at the countywide program level and submitted on behalf of participating Permittees.

(5) In addition, for each HM Project approved during the reporting period, Permittees shall collect and make available the following information. Information shall be reported electronically, and, where appropriate, in tabular form.

- Device(s) or method(s) used to meet the HM Standard, such as detention basin(s), biodetention unit(s), regional detention basin, or in-stream control(s);
- Method used by the project proponent to design and size the device or method used to meet the HM Standard;
- Site plans identifying impervious areas, surface flow directions for the entire site, and location(s) of HM measures;
- For projects using standard sizing charts, a summary of sizing calculations used;
- For projects using the BAHM, a listing of model inputs; and
- For projects using custom modeling, a summary of the modeling calculations with a corresponding graph showing curve matching (existing, post-project, and post-project-with HM controls curves).

C.3.h. Operation and Maintenance of Stormwater Treatment Systems

i. Task Description – Each Permittee shall implement an Operation and Maintenance (O&M) Verification Program.

ii. Implementation Level – At a minimum, the O&M Verification Program shall include the following elements:

(1) Conditions of approval or other legally enforceable agreements or mechanisms for all Regulated Projects that, at a minimum, require at least one of the following from all project proponents and their successors in control of the Project or successors in fee title:

(a) The project proponent's signed statement accepting responsibility for the O&M of the installed pervious pavement system(s) (if any), onsite, joint, and/or offsite stormwater treatment system(s), and HM control(s) (if any) until such responsibility is legally transferred to another entity;

(b) Written conditions in the sales or lease agreements or deed for the project that requires the buyer or lessee to assume responsibility for the O&M of the pervious pavement system(s) (if any), onsite, joint, and/or offsite installed stormwater treatment system(s), and HM control(s) (if any) until such responsibility is legally transferred to another entity;

(c) Written text in project deeds, or conditions, covenants and restrictions (CCRs) for multi-unit residential projects that require the homeowners association or, if there is no association, each individual owner to assume responsibility for the O&M of the installed pervious pavement system(s) (if any), onsite, joint, and/or offsite stormwater treatment system(s), and HM control(s) (if any) until such responsibility is legally transferred to another entity; or

(d) Any other legally enforceable agreement or mechanism, such as recordation in the property deed, that assigns the O&M responsibility for the installed pervious pavement system(s) (if any), onsite, joint, and/or offsite treatment system(s) and HM control(s) (if any) to the project owner(s) or the Permittee.

(2) Coordination with the appropriate mosquito and vector control agency with jurisdiction to establish a protocol for notification of installed stormwater treatment systems and HM controls.

(3) Conditions of approval or other legally enforceable agreements or mechanisms for all Regulated Projects that require the granting of site access to all representatives of the Permittee, local mosquito and vector control agency staff, and Water Board staff, for the sole purpose of performing O&M inspections of the installed pervious pavement system(s) (if any), stormwater treatment system(s) and HM control(s) (if any).

(4) A database or equivalent tabular format of the following:

(a) All pervious pavement system(s) that total 3000 square feet or more installed at Regulated Projects, offsite, or at a Regional Project. The total square footage should not include pervious pavement systems installed as private-use patios for single family homes, townhomes, or condominiums.

(b) All stormwater treatment systems installed onsite at Regulated Projects, offsite, or at a joint or Regional Project.

(c) All HM controls installed onsite at Regulated Projects, offsite, or at a joint or Regional Project.

(5) The database or equivalent tabular format required in Provision C.3.h.ii.(4) shall include the following information for each Regulated Project, offsite project, and Regional Project:

(a) Name and address of the project;

(b) Names of the owner(s) and responsible operator(s) of the installed pervious pavement system(s) (if any), stormwater treatment system(s), and/or HM control(s);

(c) Specific description of the location (or a map showing the location) of the installed pervious pavement system(s) (if any), stormwater treatment system(s), and HM control(s) (if any);

(d) Date(s) that the pervious pavement system(s) (if any), stormwater treatment system(s), and HM controls (if any) was/were installed;

(e) Description of the type and size of the pervious pavement systems (if any), stormwater treatment system(s), and HM control(s) (if any) installed;

(f) Detailed information on O&M inspections. For each inspection, include the following:

(i) Date of inspection.

(ii) Type of inspection (e.g., installation, annual, followup, spot).

(iii) Type(s) of pervious pavement systems inspected (e.g., pervious concrete, pervious asphalt, pervious pavers).

(iv) Type(s) of stormwater treatment systems inspected (e.g., swale, bioretention unit, tree well) and an indication of whether the treatment system is an onsite, joint, or offsite system.

(v) Type of HM controls inspected.

(vi) Inspection findings or results (e.g., proper installation, proper operation and maintenance, system not operating properly because of plugging, bypass of stormwater because of improper installation or maintenance, maintenance required immediately).

(vii) Enforcement action(s) taken, if any (e.g., verbal warning, notice of violation, compliance schedule, administrative citation, administrative order).

(6) A prioritized O&M Inspection Plan for inspecting all pervious pavement systems that total 3,000 square feet or more (excluding private-use patios for single family homes, townhomes, or condominiums), stormwater treatment systems and HM controls installed at Regulated Projects, offsite locations, and/or at joint or Regional Projects. For residential subdivisions with pervious pavement systems that include individual driveways, inspection of a representative number of driveways is sufficient.

At a minimum, the O&M Inspection Plan must specify the following for each fiscal year:

(a) Inspection by the Permittee of all newly installed pervious pavement systems that total 3,000 square feet or more (excluding private-use patios for single family homes, townhomes, or condominiums), stormwater treatment systems, and HM controls (at Regulated Projects, offsite locations, and/or at joint or Regional Projects) at the completion of installation to ensure approved plans have been followed. For residential subdivisions with pervious pavement systems that include individual driveways, inspection of a representative number of driveways is sufficient;

(b) Inspection by the Permittee of an average of 20 percent, but no less than 15 percent, of the total number (at the end of the preceding fiscal year) of Regulated Projects, offsite projects, or Regional Projects. Each inspection shall include inspection of all pervious pavement systems that total 3,000 square feet or more (excluding private-use patios for single family homes, townhomes, or condominiums), stormwater treatment systems, and HM controls installed at the Regulated Project, offsite project, or Regional Project. For residential subdivisions with pervious pavement systems that include individual driveways, inspection of a representative number of driveways is sufficient;

(c) Inspection by the Permittee of all Regulated Projects, offsite projects, or Regional Projects at least once every five years. Each inspection shall include inspection of all pervious pavement systems that total 3,000 square feet or more (excluding private-use patios for single family homes, townhomes, or condominiums), stormwater treatment systems, and HM controls installed at the Regulated Project, offsite project, or Regional Project. For residential subdivisions with pervious pavement systems that include individual driveways, inspection of a representative number of driveways is sufficient; and

(d) For vault-based stormwater treatment systems, Permittees may accept 3rd party inspection reports in lieu of conducting Permittee O&M inspections only if the 3rd party inspections are conducted at least annually. Information from each 3rd party inspection shall be included in the database or tabular format required in Provision C.3.h.ii.(5) and each inspection shall be clearly identified as a 3rd party inspection.

Each 3rd party inspection report must clearly document the following:

(i) Name of 3rd party inspection company.

(ii) Date of inspection.

(iii) Condition of the treatment unit(s) at the time of inspection.

(iv) Description of maintenance activities performed during the inspection.

(v) Date- and time-stamped photographs of the inside of the vault unit(s) before and after maintenance activities.

(7) An Enforcement Response Plan (ERP) for all O&M inspections that serves as a reference document for inspection staff so that consistent enforcement actions can be taken to bring development projects into compliance. At a minimum, the ERP must contain the following:

(a) Enforcement Procedures – A description of the Permittee's procedures from the discovery of problems through the confirmation of implementation of corrective actions. This shall include guidance for recognizing common problems with the different types of pervious pavement systems, stormwater treatment systems, and/or HM controls, remedies for the problems, and appropriate enforcement actions, followup inspections, and appropriate time periods for implementation of corrective actions, and the roles and responsibilities of staff responsible for implementing the ERP.

(b) Enforcement Tools and Field Scenarios – A discussion of the various, escalating enforcement tools appropriate for different field scenarios of problems identified with the pervious pavement systems, stormwater treatment systems, and/or HM controls as well as for different types of inadequate response to enforcement actions taken.

(c) Timely Correction of Identified Problems – A description of the Permittee's procedures for assigning due dates for corrective actions. Permittees shall require timely correction of all identified problems with the pervious pavement systems, stormwater treatment systems, and/or HM controls.

Corrective actions shall be implemented no longer than 30 days after a problem is identified by an inspector. Corrective actions can be temporary and more time may be allowed for permanent corrective actions. If more than 30 days are required for compliance, a rationale shall be recorded in the electronic database or equivalent tabular system.

iii. Due Date for Implementation: Immediate, except as follows:

(1) July 1, 2016, for Provision C.3.h.ii.(6) and all requirements pertaining to pervious pavement systems in Provisions C.3.h.ii.(1)-(5), C.3.h.iv., and C.3.h.v.

(2) July 1, 2017, for Provision C.3.h.ii.(7).

iv. Maintenance Approvals: The Permittees shall ensure that all pervious pavement systems that total 3,000 square feet or more (excluding private-use patios for single family homes, townhomes, or condominiums), stormwater treatment systems, and HM controls installed onsite, offsite, or at a joint or Regional Project by development proponents are properly operated and maintained for the life of the projects. In cases where the responsible party for a pervious pavement system, stormwater treatment system or HM control has

worked diligently and in good faith with the appropriate State and federal agencies to obtain approvals necessary to complete maintenance activities, but these approvals are not granted, the Permittees shall be deemed to be in compliance with this Provision. Permittees shall ensure that constructed wetlands installed by Regulated Projects and used for urban runoff treatment shall abide by the Water Board's Resolution No. 94-102: Policy on the Use of Constructed Wetlands for Urban Runoff Pollution Control and the O&M requirements contained therein.

v. Reporting

(1) The database or equivalent tabular format required in Provisions C.3.b.ii.(4) and (5) shall be maintained by the Permittees. Upon request from the Executive Officer, information from this database or equivalent tabular format shall be submitted to Water Board staff for review. The requested information may include specific details on each inspection conducted within particular timeframes, such as several fiscal years.

(2) On an annual basis, before the wet season, provide a list of newly installed (installed within the reporting period) stormwater treatment systems and HM controls to the local mosquito and vector control agency and the Water Board. This list shall include the facility locations and a description of the stormwater treatment measures and HM controls installed.

(3) Each Permittee shall report the following information in the Annual Report each year:

(a) Total number of Regulated Projects in the Permittee's database or tabular format as of the end of the reporting period (fiscal year).

(b) Total number of Regulated Projects, offsite projects, and Regional Projects inspected during the reporting period (fiscal year).

(c) Percentage of the total number of Regulated Projects that were inspected during the reporting period (fiscal year).

(d) A discussion of the inspection findings for the year and any common problems encountered with various types of pervious pavement systems, treatment systems and/or HM controls. This discussion should include a general comparison to the inspection findings from the previous year.

(e) A discussion of the effectiveness of the Permittee's O&M Program and any proposed changes to improve the O&M Program (e.g., changes in prioritization plan or frequency of O&M inspections, other changes to improve effectiveness of program).

(f) For the 2016 Annual Report, Permittees may report on the total number and percentage of treatment and HM controls inspected, and exclude discussion of inspection findings for pervious pavement systems.

(4) Each Permittee shall certify in the 2017 Annual Report that an Enforcement Response Plan has been completed by July 1, 2017.

C.3.i. Required Site Design Measures for Small Projects and Detached Single-Family Home Projects

i. Task Description – The Permittees shall require all development projects, which create and/or replace ≥ 2,500 ft^2 to < 10,000 ft^2 of impervious surface, and detached single-family home projects,[11] which create and/or replace 2,500 square feet or more of impervious surface, to install one or more of the following site design measures:

- Direct roof runoff into cisterns or rain barrels for reuse.
- Direct roof runoff onto vegetated areas.
- Direct runoff from sidewalks, walkways, and/or patios onto vegetated areas.
- Direct runoff from driveways and/or uncovered parking lots onto vegetated areas.
- Construct sidewalks, walkways, and/or patios with permeable surfaces.[2]
- Construct bike lanes, driveways, and/or uncovered parking lots with permeable surfaces.[2]

This provision applies to all development projects that require approvals and/or permits issued under the Permittees' planning, building, or other comparable authority.

ii. Reporting – On an annual basis, discuss the implementation of the requirements of Provision C.3.i, including ordinance revisions, permit conditions, development of standard specifications and/or guidance materials, and staff training.

C.3.j. Green Infrastructure Planning and Implementation

The Permittees shall complete and implement a Green Infrastructure Plan for the inclusion of low impact development drainage design into storm drain infrastructure on public and private lands, including streets, roads, storm drains, parking lots, building roofs, and other storm drain infrastructure elements.

The Plan is intended to serve as an implementation guide and reporting tool during this and subsequent Permit terms to provide reasonable assurance that urban runoff TMDL wasteload allocations (e.g., for the San Francisco Bay mercury and PCBs TMDLs) will be met, and to set goals for reducing, over the long term, the adverse water quality impacts of urbanization and urban runoff on receiving waters. For this Permit term, the Plan is being required, in part, as an alternative to expanding the definition of Regulated Projects prescribed in Provision C.3.b to include all new and redevelopment projects that create or replace 5,000 square feet or more of impervious surface areas and road projects that just replace existing imperious surface area. It also provides a mechanism to establish and implement alternative or

[11] **Detached single-family home project** – The building of one single new house or the addition and/or replacement of impervious surface to one single existing house, which is not part of a larger plan of development.

in-lieu compliance options for Regulated Projects and to account for and justify Special Projects in accordance with Provision C.3.e.

Over the long term, the Plan is intended to describe how the Permittees will shift their impervious surfaces and storm drain infrastructure from gray, or traditional storm drain infrastructure where runoff flows directly into the storm drain and then the receiving water, to green—that is, to a more-resilient, sustainable system that slows runoff by dispersing it to vegetated areas, harvests and uses runoff, promotes infiltration and evapotranspiration, and uses bioretention and other green infrastructure practices to clean stormwater runoff.

The Plan shall also identify means and methods to prioritize particular areas and projects within each Permittee's jurisdiction, at appropriate geographic and time scales, for implementation of green infrastructure projects. Further, it shall include means and methods to track the area within each Permittee's jurisdiction that is treated by green infrastructure controls and the amount of directly connected impervious area. As appropriate, it shall incorporate plans required elsewhere within this Permit, and specifically plans required for the monitoring of and to ensure appropriate reductions in trash, PCBs, mercury, and other pollutants.

The Permittees may comply with any requirement of this Provision through a collaborative effort.

i. Green Infrastructure Program Plan Development

Each Permittee shall:

(1) Prepare a framework or workplan that describes specific tasks and timeframes for development of its Green Infrastructure Plan. This framework or workplan shall be approved by the Permittee's governing body, mayor, city manager, or county manager by June 30, 2017. At a minimum, the framework or workplan shall include a statement of purpose, tasks, and timeframes to complete the elements listed in Provision C.3.j.i.(2) below.

(2) Prepare a Green Infrastructure Plan, subject to Executive Officer approval, that contains the following elements:

(a) A mechanism (e.g., SFEI's GreenPlanIT tool or another tool) to prioritize and map areas for potential and planned projects, both public and private, on a drainage-area-specific basis, for implementation over the following time schedules, which are consistent with the timeframes for assessing load reductions specified in Provisions C.11. and C.12:

(i) By 2020;

(ii) By 2030; and

(iii) By 2040.

The mechanism shall include criteria for prioritization (e.g., specific logistical constraints, water quality drivers (e.g., TMDLs), opportunities to treat runoff from private parcels in retrofitted street

right-of-way) and outputs (e.g., maps, project lists) that can be incorporated into the Permittee's long-term planning and capital improvement processes.

(b) Outputs from the mechanism described above, including, but not limited to, the prioritization criteria, maps, lists, and all other information, as appropriate. Individual project-specific reviews completed using these mechanisms are not required to be submitted with the Plan, but shall be made available upon request.

(c) Targets for the amount of impervious surface, from public and private projects, within the Permittee's jurisdiction to be retrofitted over the following time schedules, which are consistent with the timeframes for assessing load reductions specified in Provisions C.11. and C.12:

(i) By 2020;

(ii) By 2030; and

(iii) By 2040.

(d) A process for tracking and mapping completed projects, public and private, and making the information publically available (e.g., SFEI's GreenPlanIT tool).

(e) General guidelines for overall streetscape and project design and construction so that projects have a unified, complete design that implements the range of functions associated with the projects. For example, for streets, these functions include, but are not limited to, street use for stormwater management, including treatment, safe pedestrian travel, use as public space, for bicycle, transit, vehicle movement, and as locations for urban forestry. The guidelines should call for the Permittee to coordinate, for example, street improvement projects so that related improvements are constructed simultaneously to minimize conflicts that may impact green infrastructure.

(f) Standard specifications and, as appropriate, typical design details and related information necessary for the Permittee to incorporate green infrastructure into projects in its jurisdiction. The specifications shall be sufficient to address the different street and project types within a Permittee's jurisdiction, as defined by land use and transportation characteristics.

(g) Requirement(s) that projects be designed to meet the treatment and hydromodification sizing requirements in Provisions C.3.c. and C.3.d. For street projects not subject to Provision C.3.b.ii. (i.e., non-Regulated Projects), Permittees may collectively propose a single approach with their Green Infrastructure Plans for how to proceed should project constraints preclude fully meeting the C.3.d sizing requirements. The single approach can include different options to address specific issues or scenarios. That is, the approach shall identify the specific constraints that would preclude meeting the sizing requirements and the design approach(es) to take in that

situation. The approach should also consider whether a broad effort to incorporate hydromodification controls into green infrastructure, even where not otherwise required, could significantly improve creek health and whether such implementation may be appropriate, plus all other information, as appropriate (e.g., how to account for load reduction for the PCBs or mercury TMDLs).

(h) A summary of the planning documents the Permittee has updated or otherwise modified to appropriately incorporate green infrastructure requirements, such as: General Plans, Specific Plans, Complete Streets Plans, Active Transportation Plans, Storm Drain Master Plans, Pavement Work Plans, Urban Forestry Plans, Flood Control or Flood Management Plans, and other plans that may affect the future alignment, configuration, or design of impervious surfaces within the Permittee's jurisdiction, including, but not limited to, streets, alleys, parking lots, sidewalks, plazas, roofs, and drainage infrastructure. Permittees are expected to complete these modifications as a part of completing the Green Infrastructure Plan, and by not later than the end of the permit term.

(i) To the extent not addressed above, a workplan identifying how the Permittee will ensure that green infrastructure and low impact development measures are appropriately included in future plans (e.g., new or amended versions of the kinds of plans listed above).

(j) A workplan to complete prioritized projects identified as part of a Provision C.3.e Alternative Compliance program or part of Provision C.3.j Early Implementation.

(k) An evaluation of prioritized project funding options, including, but not limited to: Alternative Compliance funds; grant monies, including transportation project grants from federal, State, and local agencies; existing Permittee resources; new tax or other levies; and other sources of funds.

(3) Adopt policies, ordinances, and/or other appropriate legal mechanisms to ensure implementation of the Green Infrastructure Plan in accordance with the requirements of this provision.

(4) Conduct outreach and education in accordance with the following:

(a) Conduct public outreach on the requirements of this provision, including outreach coordinated with adoption or revision of standard specifications and planning documents, and with the initiation and planning of infrastructure projects. Such outreach shall include general outreach and targeted outreach to and training for professionals involved in infrastructure planning and design.

(b) Train appropriate staff, including planning, engineering, public works maintenance, finance, fire/life safety, and management staff on the requirements of this provision and methods of implementation.

(c) Educate appropriate Permittee elected officials (e.g., mayors, city council members, county supervisors, district board members) on the requirements of this provision and methods of implementation.

(5) Report on Green Infrastructure Planning as follows:

(a) Each Permittee shall submit documentation in the 2017 Annual Report that its framework or workplan for development of its Green Infrastructure Plan was approved by its governing body, mayor, city manager, or county manager by June 30. 2017.

(b) Each Permittee shall submit its completed Green Infrastructure Plan with the 2019 Annual Report.

(c) Each Permittee shall submit documentation of its legal mechanisms to ensure implementation of its Green Infrastructure Plan with the 2019 Annual Report.

(d) Each Permittee shall submit a summary of its outreach and education efforts in each Annual Report.

ii. Early Implementation of Green Infrastructure Projects (No Missed Opportunities)

Each Permittee shall:

(1) Prepare and maintain a list of green infrastructure projects, public and private, that are already planned for implementation during the permit term and infrastructure projects planned for implementation during the permit term that have potential for green infrastructure measures.

(2) Submit the list with each Annual Report and a summary of planning or implementation status for each public green infrastructure project and each private green infrastructure project that is not also a Regulated Project as defined in Provision C.3.b.ii. Include a summary of how each public infrastructure project with green infrastructure potential will include green infrastructure measures to the maximum extent practicable during the permit term. For any public infrastructure project where implementation of green infrastructure measures is not practicable, submit a brief description of the project and the reasons green infrastructure measures were impracticable to implement.

iii. Participate in Processes to Promote Green Infrastructure

(1) The Permittees shall, individually or collectively, track processes, assemble and submit information, and provide informational materials and presentations as needed to assist relevant regional, State, and federal agencies to plan, design, and fund incorporation of green infrastructure measures into local infrastructure projects, including transportation projects. Issues to be addressed include coordinating the timing of funding from different sources, changes to standard designs and design criteria, ranking and prioritizing projects for funding, and implementation of cooperative in-lieu programs.

(2) In each Annual Report, Permittees shall report on the goals and outcomes during the reporting year of work undertaken to participate in processes to promote green infrastructure.

(3) In the 2019 Annual Report, Permittees shall submit a plan and schedule for new and ongoing efforts to participate in processes to promote green infrastructure.

iv. Tracking and Reporting Progress

(1) The Permittees shall, individually or collectively, develop and implement regionally-consistent methods to track and report implementation of green infrastructure measures including treated area and connected and disconnected impervious area on both public and private parcels within their jurisdictions. The methods shall also address tracking needed to provide reasonable assurance that wasteload allocations for TMDLs, including the San Francisco Bay PCBs and mercury TMDLs, and reductions for trash, are being met.

(2) In each Annual Report, Permittees shall report progress on development and implementation of the tracking methods.

(3) In the 2019 Annual Report, Permittees shall submit the tracking methods and report implementation of green infrastructure measures including treated area, and connected and disconnected impervious area on both public and private parcels within their jurisdictions.

Table 3.1 Standard Tracking and Reporting Form for Potential Special Projects

Project No.	Permittee	Address	Application Submittal Date	Description	Site Total Acreage	Gross Density DU/Ac	FAR	Special Project Category	LID Treatment Reduction Credit	Stormwater Treatment Systems

Project No: Number of the Special Project as it appears in Table 3.1

Permittee: Name of the Permittee in whose jurisdiction the Special Project will be built.

Address: Address of the Special Project; if no street address, state the cross streets.

Submittal Date: Date that a planning application for the Special Project was submitted; if a planning application has not been submitted, include a projected application submittal date.

Description: Type of project (commercial, mixed-use, residential), number of floors, number of units, type of parking, and other relevant information.

Site Acreage: Total site area in acres.

Gross Density in DU/Ac: Number of dwelling units per acre.

FAR: Floor Area Ratio

Special Project Category: For each Special Project Category, indicate applicability. If a Category is applicable, list the specific criteria applied to determine applicability.

LID Treatment Reduction Credit: For each applicable Special Project Category, state the maximum total LID Treatment Reduction Credit available. For Category C Special Projects also list the individual Location, Density, and Minimized Surface Parking Credits available.

Stormwater Treatment Systems: List all proposed stormwater treatment systems and the corresponding percentage of the total amount of runoff runoff identified in Provision C.3.d. for the Project's drainage area that will be treated by each treatment system.

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C.4. Industrial and Commercial Site Controls

Each Permittee shall implement an industrial and commercial site control program at all sites that could reasonably be considered to cause or contribute to pollution of stormwater runoff. Permittees shall conduct inspections, effective followup, and enforcement to abate potential and actual non-stormwater discharges, consistent with each Permittee's respective Enforcement Response Plan. These combined efforts will prevent the discharge of pollutants and impacts to beneficial uses of receiving waters. Inspections shall confirm implementation of appropriate and effective BMPs and other pollutant controls by industrial and commercial site operators.

C.4.a. Legal Authority for Effective Site Management

i. Task Description – Permittees shall have sufficient legal authority to inspect, require effective stormwater pollutant control, and implement progressively stricter enforcement to achieve expedient compliance and pollutant abatement at commercial and industrial sites within their jurisdiction.

ii. Implementation Level – Permittees shall have the legal authority to oversee, inspect, and require expedient compliance and pollution abatement at all industrial and commercial sites which may be reasonably considered to cause or contribute to pollution of stormwater runoff. Permittees shall have the legal authority to require implementation of appropriate BMPs at industrial and commercial facilities to address pollutant sources associated with outdoor process and manufacturing areas; outdoor material storage areas; outdoor waste storage and disposal areas; outdoor vehicle and equipment storage and maintenance areas; outdoor parking areas and access roads; outdoor wash areas; outdoor drainage from indoor areas, rooftop equipment; and contaminated and erodible surface areas; and other sources determined by the Permittees or the Water Board Executive Officer to have a reasonable potential to contribute to pollution of stormwater runoff.

C.4.b. Industrial and Commercial Business Inspection Plan (Inspection Plan)

i. Task Description – Permittees shall continue to update and implement an Inspection Plan that will serve as a prioritized inspection workplan. This Inspection Plan will allow inspection staff to categorize the commercial and industrial sites within the Permittee's jurisdiction by pollutant threat and inspection frequency, change inspection frequency based on site performance, and add and remove sites as businesses open and close.

ii. Implementation Level

(1) Facilities For Prioritization Into Inspection Plan

Commercial and industrial facilities with the functional aspects and types described below, and other facilities identified by the Permittees as reasonably likely to contribute to pollution of stormwater runoff, shall be prioritized for inspection on the basis of the potential for water quality impact using criteria such as pollutant sources on site, pollutants of

concern, proximity to a waterbody, potential and actual discharge history of the facility, and other relevant factors. The following are some of the functional aspects of businesses and types of businesses that shall be included in the Inspection Plan:

(a) Sites that include the following types of functions that may produce pollutants when exposed to stormwater include, but are not limited to:

- Outdoor process and manufacturing areas
- Outdoor material storage areas
- Outdoor waste storage and disposal areas
- Outdoor vehicle and equipment storage and maintenance areas
- Outdoor wash areas
- Outdoor drainage from indoor areas
- Rooftop equipment
- Other sources determined by the Permittee or Water Board as reasonably likely to contribute to pollution of stormwater runoff.

(b) The following types of industrial and commercial businesses that have a reasonable likelihood to be sources of pollutants to stormwater and non-stormwater discharges:

- Industrial facilities, as defined at 40 CFR 122.26(b)(14), including those subject to the Statewide NPDES General Permit for Stormwater Discharges Associated with Industrial Activity (hereinafter the Industrial General Permit);
- Vehicle Salvage yards;
- Metal and other recycled materials collection facilities, and waste transfer facilities;
- Vehicle mechanical repair, maintenance, fueling, or cleaning facilities;
- Building trades central facilities or yards, corporation yards;
- Nurseries and greenhouses;
- Building material retailers and storage;
- Plastic manufacturers; and
- Other facilities designated by the Permittee or Water Board to be reasonably likely to contribute to pollution of stormwater runoff.

(2) Inspection Plan – The Inspection Plan shall be updated annually and shall contain the following information:

(a) A description of the process for prioritizing inspections and frequency of inspections. The prioritization criteria shall assign a more frequent inspection schedule to the highest priority facilities per Provision C.4.b.ii.(1). If any geographical areas are to be targeted for

inspections due to high potential for stormwater pollution, these areas should be indicated in the Inspection Plan.

(b) Assign appropriate inspection frequency for each industrial and commercial facility based on the priority established in Provision C.4.b.ii.(2)(a) above, potential for contributing pollution to stormwater runoff, and commensurate with the threat to water quality.

(c) A mechanism to include new businesses that warrant inspections.

(d) Total number and a list of all industrial and commercial facilities requiring inspections, within each Permittee's jurisdiction, based on the prioritization criteria established in Provision C.4.(b)ii.(2)(a). This list shall be updated annually.

(e) List of facilities scheduled for inspection each fiscal year of the MRP permit term. Each fiscal year's inspection list shall be added to the Inspection Plan at the beginning of the fiscal year as part of the annual update. Previous fiscal years' inspection lists shall remain in the Inspection Plan.

(3) **Record Keeping** – For each facility identified in Provision C.4.b.ii.(2)(d), the Permittee shall maintain a database or equivalent tabular system of at least the following information:

(a) Name and address of the business and local business operator;

(b) A brief description of business activity or pollutant source, including SIC code. Examples: outdoor process/manufacturing areas, outdoor material storage areas, outdoor waste storage and disposal areas, outdoor vehicle and equipment storage and maintenance areas, outdoor parking areas and access roads, outdoor wash areas, rooftop equipment, and outdoor drainage from indoor areas;

(c) Inspection priority and inspection frequency; and

(d) If coverage under the Industrial General Permit is required.

iii. Reporting – The Permittees shall include the list of all industrial and commercial facilities requiring inspections identified in Provision C.4.b.ii.(2)(d) in each Annual Report.

C.4.c. Enforcement Response Plan (ERP)

i. Task Description – Each Permittee shall implement and update, as needed, its ERP – a reference document for inspection staff to take consistent actions to achieve timely and effective compliance from all commercial and industrial site operators.

ii. Implementation Level – The ERP shall contain the following:

(1) Enforcement Procedures – A description of the Permittee's procedures, from the discovery of problems through the confirmation of implementation of corrective actions. This shall include guidance for appropriate enforcement actions, followup inspections, referrals to another agency, appropriate time periods for implementation of corrective actions,

and the roles and responsibilities of staff responsible for implementing the ERP.

(2) Enforcement Tools and Field Scenarios – A discussion of the various, escalating enforcement tools for different field scenarios, including, but not limited to potential discharges (e.g., housekeeping issues, evidence of actual non-stormwater discharges, lack of BMPs, inadequate BMPs, and inappropriate BMPs), actual non-stormwater discharges, non-compliance with previous enforcement actions, and sites with a history of potential and/or actual non-stormwater discharges.

(3) Timely Correction of Potential and Actual Non-stormwater Discharges – A description of the Permittee's procedures for assigning due dates for corrective actions. Permittees shall require timely correction of all potential and actual non-stormwater discharges. Permittees shall require active non-stormwater discharges to cease immediately. Corrective actions shall be implemented before the next rain event, but no longer than 10 business days after the potential and/or actual non-stormwater discharges are discovered. Corrective actions can be temporary and more time can be allowed for permanent corrective actions. If more than 10 business day are required for compliance, a rationale shall be recorded in the electronic database or equivalent tabular system.

(4) Referral and Coordination with Other Agencies – Each Permittee shall enforce its stormwater ordinances to achieve compliance at sites with observed potential and actual non-stormwater discharges required in Discharge Prohibition A.1. For cases in which Permittee enforcement tools are inadequate to remedy the noncompliance, the Permittee shall refer the case to the Water Board, district attorney, or other relevant agencies for additional enforcement.

C.4.d. Inspections

i. Task Description – Each Permittee shall conduct inspections according to the Inspection Plan in Provision C.4.b.ii.(2) and the ERP in Provision C.4.c.ii. to enforce its ordinance to prevent stormwater pollution.

ii. Implementation Level

(1) Inspections – Inspections shall be conducted to include at least the following activities:

(a) Observations for appropriate BMPs to prevent stormwater runoff pollution or illicit discharge;

(b) Observations for evidence of unauthorized discharges, illicit connections, and potential discharge of pollutants to stormwater;

(c) Observations for noncompliance with Permittee ordinances and other local requirements; and

(d) Verification of coverage under the Industrial General Permit, if applicable.

(2) Record Keeping – Permittees shall maintain adequate records to demonstrate compliance and appropriate followup enforcement responses for facilities inspected. Permittees shall maintain an electronic database or equivalent tabular system that contains the following information regarding industrial and commercial site inspections:

(a) Name of facility/site inspected

(b) Inspection date

(c) Industrial General Permit coverage required (Yes or No)

(d) Compliance status

(e) Specific problems

(f) Type of enforcement (if applicable)

(g) Problem resolution date

(h) Additional comments

The electronic database or equivalent tabular system shall be made readily available to Water Board staff or its representative during inspections and audits.

(3) Data Evaluation – Permittees shall evaluate the frequency of potential and actual non-stormwater discharges by business category. Note trends and, as needed, implement focused inspections or education in subsequent years to address trends.

iii. Reporting

(1) Permittees shall include the following information in the 2015-2016 Annual Report:

(a) Number of inspections conducted, Number of violations issued (excluding verbal warnings), Percentage of sites inspected in violation, and number and percent of violations resolved within 10 working days or otherwise deemed resolved in a longer, but still timely manner;

(b) Frequency and types/categories of violations observed, Frequency and type of enforcement conducted;

(c) Summary of types of violations noted by business category; and

(d) Facilities that are required to have coverage under the Industrial General Permit, but have not filed for coverage.

(2) Beginning with the 2016-2017 Annual Report, Permittees shall include the following information in each Annual Report:

(a) Number of inspections conducted;

(b) Number of each type of enforcement action, as listed in each Permittee's ERP, issued;

(c) Number of enforcement actions or discreet number of potential and actual discharges fully resolved within 10 working days or otherwise deemed resolved in a longer, but still timely manner;

(d) Frequency of potential and actual non-stormwater discharges by business category; and

(e) A list of facilities that are required to have coverage under the Industrial General Permit, but have not filed for coverage.

C.4.e. Staff Training

i. Task Description – Permittees shall provide focused training for industrial and commercial site inspectors and illicit discharge detection and elimination inspectors annually. Trainings may be program-wide, region-wide, or Permittee-specific.

ii. Implementation Level – At a minimum, provide inspection training, within the 5-year term of this Permit, in the following topics:

(1) Urban runoff pollution prevention;

(2) Inspection procedures;

(3) Business Inspection Plan;

(4) Enforcement Response Plan;

(5) Illicit Discharge Detection and Elimination; and

(6) Appropriate BMPs to be used at different industrial and commercial facilities.

iii. Reporting – The Permittees shall include the following information in each Annual Report:

(1) Dates of training;

(2) Training topics covered;

(3) Percentage of industrial and commercial site inspectors attending training; and

(4) Percentage of Illicit Discharge, Detection, and Elimination inspectors attending training.

C.5. Illicit Discharge Detection and Elimination

The purpose of this provision is to implement the illicit discharge prohibition and to ensure illicit discharges are detected and controlled that are not otherwise controlled under provisions C.4. – Industrial and Commercial Site Controls and C.6. – Construction Site Controls. Permittees shall implement an illicit discharge program that includes an active surveillance component and a centralized complaint collection and followup component to detect and eliminate illicit discharges into the MS4. Permittees shall maintain a complaint tracking and followup data system as their primary accountability reporting for this provision.

C.5.a. Legal Authority

i. Task Description – Permittees shall have the legal authority to prohibit and control illicit discharges and implement progressively stricter enforcement to achieve expedient compliance.

ii. Implementation Level

(1) Permittees shall have adequate legal authority to address illicit discharges to the MS4, including, but not limited to, the following:

(a) Sewage;

(b) Discharges of wash water resulting from the cleaning of exterior surfaces and pavement, or the equipment and other facilities of any commercial business, or any other public or private facility, including discharges from mobile cleaning businesses;

(c) Discharges of runoff from material storage areas, including those containing chemicals, fuels, or other potentially polluting or hazardous materials;

(d) Discharges of pool or fountain water containing chlorine, biocides, or other chemicals; discharges of pool or fountain filter backwash water;

(e) Discharges of sediment, pet waste, vegetation clippings, or other landscape or construction-related wastes; and

(f) Discharges of food-related wastes (e.g., grease, fish processing wastes, restaurant kitchen mat and trash bin wash water).

(2) Permittees shall have adequate legal authority to prohibit, discover through inspection and surveillance, and eliminate illicit connections and discharges to the MS4.

(3) Permittees shall have adequate legal authority to control the discharge of spills, dumping, or disposal of materials other than storm water to the MS4.

C.5.b. Enforcement Response Plan (ERP)

i. Task Description – Each Permittee shall implement and update, as needed, its ERP – a reference document for inspection staff to take consistent actions to

achieve timely and effective abatement of illicit discharges and compliance from responsible parties.

ii. Implementation Level – The ERP shall contain the following:

(1) Enforcement Procedures – A description of the Permittee's procedures from the discovery of a problem through the confirmation of implementation of corrective actions. This shall include guidance for appropriate enforcement actions, followup inspections, referrals to another agency, appropriate time periods for implementation of corrective actions, and the roles and responsibilities of staff responsible for implementing the ERP.

(2) Enforcement Tools and Field Scenarios – A discussion of the various, escalating enforcement tools for different field scenarios, including, but not limited to potential discharges (e.g., housekeeping issues, evidence of actual discharges, lack of BMPs, inadequate BMPs, and inappropriate BMPs), actual discharges, non-compliance with previous enforcement actions, and sites with a history of potential and/or actual discharges.

(3) Timely Correction of Potential and Actual Discharges – A description of the Permittee's procedures for assigning due dates for corrective actions. Each Permittee shall require timely correction of all potential and/or actual discharges. Active discharges shall be required to cease immediately. Corrective actions shall be implemented before the next rain event, but no longer than 10 business days after the potential and/or actual discharges are discovered. Corrective actions can be temporary and more time can be allowed for permanent corrective actions. If more than 10 business days are required for compliance, a rationale shall be recorded in the electronic database or equivalent tabular system.

C.5.c. Spill, Dumping, and Complaint Response Program

i. Task Description – Each Permittee shall implement a program to respond to spills, dumping, and complaints.

ii. Implementation Level

(1) Each Permittee shall have a central contact point for the public and Permittee's staff to report spills, dumping, and complaints. At a minimum, this central contact point shall include a phone number. Permittee shall also include, as feasible, user friendly web reporting for spills and dumping.

(2) Each Permittee shall publicize the phone number and web reporting address, if used, to internal Permittee's staff and the public. The Permittee's website shall be one of the places the central contact point is publicized. The Permittee's website shall be updated with the central contact point to report spills and dumping by June 30, 2016. This central contact point shall be readily searchable on the Permittee's website.

(3) Each Permittee shall require its municipal staff conducting routine maintenance and inspection activities to report illicit discharges found during their activities to the central contact point so that illicit discharge staff can investigate and track.

(4) Each Permittee shall maintain and update, as needed, a spill, dumping, and complaint response flow chart and/or phone tree for the Permittee's staff responsible for the spill and dumping response program. At a minimum, this flow chart and/or phone tree shall identify staff or positions responsible for receiving the complaints and investigating and abating the complaints.

(5) Each Permittee shall maintain and update, as needed, a spill, dumping, and complaint response flow chart and phone tree or contact list for internal use that shows the various responsible agencies and their contacts, who would be involved in illicit discharge incident response that goes beyond the Permittee's immediate capabilities.

(6) Each Permittee shall conduct reactive inspections in response to spill, dumping, and complaint reports and shall also conduct followup inspections, as needed, to ensure that corrective measures have been effectively implemented to achieve and maintain compliance.

iii. Reporting – Permittees shall provide the following information in the 2016 and 2020 Annual Reports:

(1) The spill and dumping reporting phone number and the web address, if used;

(2) A screen shot of the Permittee's website showing the central contact point; and

(3) A discussion of how the central contact point – spill and dumping reporting phone number and, if used, the web address – is being publicized to Permittees' staff and the public.

C.5.d. Tracking and Case Followup

i. Task Description – All incidents or discharges reported to the spill, dumping, and complaints central contact point, that might discharge into the MS4, shall be logged to track followup and response through problem resolution. The data collected shall be sufficient to demonstrate escalating responses for repeated problems and inter/intra-agency coordination, where appropriate. It is not necessary to track and report data according to this provision if they are tracked and reported according to State Water Resource Control Board Order No. 2006-0003-DWQ.

ii. Implementation Level – Maintain a water quality spills, dumping, and complaints tracking and followup in an electronic database or equivalent tabular system.

The spill and discharge complaint tracking system shall contain the following information:

(1) Complaint information:
  (a) Date and time of complaint,
  (b) Type of pollutant, and
  (c) Problem Status (potential or actual discharge.).

(2) Investigation information:
  (a) Date and time started,
  (b) Type of pollutant,
  (c) Entered storm drain and/or receiving water,
  (d) Date and time abated, and
  (e) Type of enforcement based on the Permittee's ERP.

The electronic database or equivalent tabular system shall be made available to Water Board staff or representatives during audits or inspections.

iii. Reporting – Permittees shall provide the following information in the Annual Report:

(1) Number of discharges reported;

(2) Number of discharges reaching storm drains and/or receiving waters; and

(3) Number discharges resolved in a timely manner.

C.5.e. Control of Mobile Sources

i. Task Description – Permittees shall have oversight and control of pollutants associated with mobile businesses.

ii. Implementation Level – Each Permittee shall implement a program to reduce the discharge of pollutants from mobile businesses.

(1) The program shall include the following:
  (a) Implementation of minimum standards and BMPs for each of the various types of mobile businesses, such as automobile washing, power washing, steam cleaning, and carpet cleaning.
  (b) Implementation of an enforcement strategy that specifically addresses the unique characteristics of mobile businesses.
  (c) Regularly updating mobile business inventories.
  (d) Implementation of an outreach and education strategy to mobile businesses operating within the Permittee's jurisdiction.
  (e) Inspection of mobile businesses, as needed.

(2) Permittees may cooperate county-wide and/or region-wide with the implementation of their programs for mobile businesses, including sharing

of mobile business inventories, BMP requirements, enforcement action information, and education.

iii. Reporting

(1) In the 2017 Annual Report, each Permittee shall provide the following: (a) minimum standards and BMPs for each of the various types of mobile businesses; (b) its enforcement strategy; (c) a list and summary of the specific outreach events and education conducted to the different types of mobile businesses operating within the Permittee's jurisdiction; (d) the number of inspections conducted at mobile businesses and/or job sites in 2016-2017; (e) discuss enforcement actions taken against mobile businesses in 2016-2017; (f) Permittee's inventory of mobile businesses operating within the Permittee's jurisdiction; and (g) a list and summary of the county-wide or regional activities conducted, including sharing of mobile business inventories, BMP requirements, enforcement action information, and education (Permittees' annual reports may refer to the county-wide or regional reports for this information.).

(2) In the 2019 Annual Report, each Permittee shall include at least the following: (a) changes to minimum standards and BMPs for each of the various types of mobile businesses since the 2017 Annual Report; (b) changes to the Permittee's enforcement strategy; (c) minimum standards and BMPs developed for additional types of mobile businesses; (d) a list and summary of specific outreach events and education conducted to each type of mobile businesses operating within the Permittee's jurisdiction during the Permit term; (e) a discussion of the inspections conducted at mobile businesses and/or job sites; (f) Permittee's inventory of mobile businesses operating within the Permittee's jurisdiction; and (g) a discussion of the enforcement actions taken against mobile businesses during the permit term.

C.5.f. Municipal Separate Storm Sewer System (MS4) Map

i. Task Description – Each Permittee shall make the map(s) of its MS4 available.

ii. Implementation Level – Permittees shall make maps of the MS4 publicly available, either electronically or in hard copy. Public availability shall be made through a single point of contact that is convenient for the public, such as a staffed counter or web accessible maps. The MS4 map availability shall be publicized through Permittee directories and web pages.

iii. Reporting – In the 2016 and 2019 Annual Reports, Permittees shall discuss how they make MS4 maps available to the public and how they publicize the availability of the MS4 maps.

C.6. Construction Site Control

Each Permittee shall implement a construction site inspection and control program at all construction sites, with followup and enforcement consistent with each Permittee's respective ERP, to prevent construction site discharges of pollutants into the storm drains. Inspections shall confirm implementation of appropriate and effective erosion and other construction pollutant controls by construction site operators/developers. Each Permittee shall in its reporting demonstrate the effectiveness of its inspections and enforcement activities to prevent polluted construction site discharges into storm drains.

C.6.a. Legal Authority for Effective Site Management

i. Task Description – Permittees shall have the ability to require effective stormwater pollutant controls to prevent discharge of pollutants into the storm drains, and implement progressively stricter enforcement to achieve expedient compliance and cleanup at all public and private construction sites.

ii. Implementation Level

(1) Permittees shall have the legal authority to require at all construction sites year-round effective erosion control, run-on and runoff control, sediment control, active treatment systems (as appropriate), good site management, and non-storm water management through all phases of construction (including, but not limited to, site grading, building, and finishing of lots) until the site is fully stabilized by landscaping or the installation of permanent erosion control measures.

(2) Permittees shall have the legal authority to oversee, inspect, and require expedient compliance and cleanup at all construction sites year-round.

C.6.b. Enforcement Response Plan (ERP)

i. Task Description – Each Permittee shall implement and update, as needed, its ERP – a reference document for inspection staff to take consistent actions to achieve timely and effective compliance at all public and private construction sites.

ii. Implementation Level – The ERP shall contain the following:

(1) Enforcement Procedures – A description of the Permittee's procedures from the discovery of the problems through the confirmation of implementation of corrective actions. This shall include guidance for appropriate enforcement actions, followup inspections, referrals to another agency, appropriate time periods for implementation of corrective actions, and the roles and responsibilities of staff responsible for implementing the ERP.

(2) Enforcement Tools and Field Scenarios – A discussion of the various, escalating enforcement tools for different field scenarios, including, but not limited to, potential discharges (e.g., housekeeping issues, evidence of actual discharges, lack of ERP, inadequate BMPs, and inappropriate

BMPs), actual discharges, non-compliance with previous enforcement actions, and sites with a history of potential and/or actual discharges.

(3) Timely Correction of Potential and Actual Discharges – A description of the Permittee's procedures for assigning due dates for corrective actions. Permittees shall require timely correction of all potential and actual discharges. Permittees shall require actual non-stormwater discharges to cease immediately. Corrective actions shall be implemented before the next rain event, but no longer than 10 business days after the potential and/or actual discharges are discovered. Corrective actions can be temporary and more time can be allowed for permanent corrective actions. If more than 10 business days are required for compliance, a rationale shall be recorded in the electronic database or equivalent tabular system.

C.6.c. Best Management Practices Categories

i. Task Description – Permittees shall require all construction sites to have site-specific, and seasonally and phase-appropriate, effective BMPS) in the following six categories:

- Erosion Control
- Run-on and Run-off Control
- Sediment Control
- Active Treatment Systems, as necessary
- Good Site Management
- Non-Stormwater Management.

ii. Implementation Level

The BMPs targeting specific construction site pollutants within the six categories listed in C.6.c.i. shall be site-specific. Site-specific BMPs targeting specific pollutants from the six categories listed in C.6.c.i. may be a combination of BMPs from:

- CASQA, BMP Handbook, Construction, January 2009.
- Caltrans Stormwater Quality Handbooks, Construction Site Best Management Practices Manual, March 2003, and addenda.
- New BMPs available since the release of these handbooks.
- Other BMPs shown to provide equivalent protection.

C.6.d. Plan Approval Process

i. Task Description – Permittees shall review erosion control plans for consistency with local requirements and the appropriateness and adequacy of proposed BMPs for each site before issuance of grading permits for projects. Permittees shall also verify that sites disturbing one acre or more of land have filed a Notice of Intent for permit coverage under the Construction General Permit.

ii. Implementation Level – Before approval and issuance of local grading permits, each Permittee shall perform the following:

(1) Review the site operator's/developer's erosion/pollution control plan or Stormwater Pollution Prevention Plan (SWPPP) to verify compliance with the Permittee's grading ordinance and other local requirements. Also review the site operator's/developer's erosion/pollution control plan or SWPPP to verify that seasonally appropriate and effective BMPs for the six categories listed in C.6.c.i. are planned;

(2) For sites disturbing one acre or more of soil, verify that the site operators/developers have filed a Notice of Intent for permit coverage under the Construction General Permit; and

(3) Provide construction stormwater management educational materials to site operators/developers, as appropriate.

C.6.e. Inspections

i. Task Description – Permittees shall conduct inspections to determine compliance with local ordinances (grading and stormwater) and determine the effectiveness of the BMPs in the six categories listed in C.6.c.i. in preventing the discharge of construction pollutants into the storm drain; and Permittees shall require timely corrections of all actual and potential discharges observed.

ii. Implementation Level

(1) **Wet Season Notification**

By September 1 of each year, each Permittee shall remind all site developers and/or owners disturbing one acre or more of soil, hillside projects, and high priority sites to prepare for the upcoming wet season.

(2) **Frequency of Inspections**

Inspections shall be conducted monthly during the wet season[12] at the following sites:

(a) All construction sites disturbing one or more acre of land;

(b) All hillside projects[13] (based on the Permittee's map of hillside development areas or criteria, or if the Permittee does not have a map of hillside development areas or criteria, those projects on sites with ≥15% slope) disturbing greater than or equal to 5,000 square feet; and

(c) High Priority Sites – Other sites determined by the Permittee or the Water Board as significant threats to water quality. In evaluating threat to water quality, the following factors shall be considered:

(i) Soil erosion potential or soil type;

(ii) Site slope;

[12] For the purpose of inspections, the wet season is defined as October through April, but sites need to implement seasonally appropriate BMPs in the six categories listed in C.6.c.i throughout the year.

[13] Effective July 1, 2016.

(iii) Project size and type;

(iv) Sensitivity or receiving waterbodies;

(v) Proximity to receiving waterbodies;

(vi) Non-stormwater discharges; and

(vii) Any other relevant factors as determined by the local agency or the Water Board.

(3) **Contents of Inspections**

Inspections shall focus on the adequacy and effectiveness of the site-specific BMPs implemented for the six categories listed in C.6.c.i. Permittees shall require timely corrections of all actual and potential problems observed. Inspections of construction sites shall include, but are not limited to, the following:

(a) Assessment of compliance with Permittee's ordinances and permits related to urban runoff, including the implementation and maintenance of the verified erosion/pollution control plan or SWPPP (from C.6.d.ii.(1));

(b) Assessment of the adequacy and effectiveness of the site-specific BMPs implemented for the six categories listed in C.6.c.i.;

(c) Visual observations for:

- actual discharges of sediment and/or construction related materials into storm drains and/or waterbodies.
- evidence of sediment and/or construction related materials discharges into storm drains and/or waterbodies.
- illicit connections, and
- potential illicit connections.

(d) Education on stormwater pollution prevention, as needed.

(4) **Tracking**

All inspections shall be recorded on a written or electronic inspection form. Inspectors shall follow the ERP for all actual and potential discharges discovered during the inspection.

Permittees shall track in an electronic database or tabular format all inspections. This electronic database or tabular format shall be made readily available during inspections and audits by the Water Board staff or its representatives. This electronic database or tabular format shall record the following information for each site inspection:

(a) Site name;

(b) Inspection date;

(c) Weather during inspection;

(d) Enforcement Response Level (Use ERP);

(e) Problem(s) observed using Illicit Discharge and the six BMP categories listed in C.6.c.i.;

(f) Resolution of Problems noted using the following three standardized categories: Problems Fixed, Need More Time, and Escalate Enforcement; and

(g) Comments, which shall include all Rationales for Longer Compliance Time, all escalation in enforcement discussions, and any other information that may be relevant to that site inspection.

iii. Reporting

(1) In the 2016 Annual Report, each Permittee shall certify the criteria it uses to determine hillside developments. If the Permittee is using maps of hillside developments areas or other written criteria, include a copy in the Annual Report.

(2) In the 2015-2016 Annual Report, each Permittee shall summarize the following information:

(a) Total number of active sites disturbing less than one acre of soil requiring inspection;

(b) Total number of active sites disturbing one acre or more of soil;

(c) Total number of inspections conducted;

(d) Number and percentage[14] of violations in each of the six categories listed in C.6.c.i.;

(e) Number and percentage[15] of each type of enforcement action taken as listed in each Permittee's ERP;

(f) Number of discharges, actual and those inferred through evidence, of sediment or other construction related materials;

(g) Number of sites with discharges, actual and those inferred through evidence, of sediment or other construction related materials;

(h) Number and percentage[16] of violations fully corrected prior to the next rain event but no longer than 10 business days after the violations are discovered or otherwise considered in a timely, though longer period; and

(i) Number and percentage[17] of violations not fully corrected 30 days after the violations are discovered.

(3) Beginning with the 2016-2017 Annual Report, each Permittee shall summarize the following information:

[14] Percentage shall be calculated as number of violations in each category divided by total number of violations in all six categories.

[15] Percentage shall be calculated as number of each type of enforcement action divided by the total number of enforcement actions.

[16] Percentage shall be calculated as follows: number of violations fully corrected prior to the goal of the next rain event but no later than 10 business days after the violations are discovered divided by the total number of violations for the reporting year.

[17] Percentage shall be calculated as follows: number of violations not fully corrected 30 days after the violations are discovered divided by the total number of violations for the reporting year.

(a) Total number of active hillside sites disturbing less than one acre of soil requiring inspection;

(b) Total number of active sites disturbing 1 acre or more of soil;

(c) Total number of active sites disturbing less than one acre of soil identified as High Priority sites in C.6.e.ii.(2)(c) requiring inspections;

(d) Total number of inspections conducted;

(e) Number of each type of enforcement action taken as listed in each Permittee's ERP;

(f) Number of illicit discharges, actual and those inferred through evidence, of sediment or other construction-related materials;

(g) Number of enforcement actions or discrete number of potential and actual discharges fully corrected prior to the next rain event, but no longer than 10 business days after the potential and actual discharges[18] are discovered or otherwise considered corrected in a timely, though longer period.

(4) In each Annual Report, each Permittee shall evaluate its respective electronic database or tabular format and the summaries produced in C.6.e.ii.(4) above. This evaluation shall include findings on the program's strength, comparison to previous years' results, as well as areas that need more focused education for site owners, operators, and developers the following year.

(5) The Executive Officer may require that the information recorded and tracked by C.6.e.ii.(4) be submitted electronically or in a tabular format. Permittees shall submit the information within 10 working days of the Executive Officer's requirement. Submittal of the information in tabular form for the reporting year is not required in each Annual Report, but it is encouraged.

C.6.f. Staff Training

i. Task Description – Permittees shall provide training or access to training for staff conducting construction stormwater inspections.

ii. Implementation Level – Permittees shall provide training at least every other year to municipal staff responsible for conducting construction site stormwater inspections. Training topics shall include information on correct uses of specific BMPs, proper installation and maintenance of BMPs, Permit requirements, local requirements, and the ERP.

iii. Reporting – Permittees shall include in each Annual Report the following information: training topics covered, dates of training, and the number of the Permittees' inspectors attending each training. If there was no training in that year, so state.

[18] Permittees who track by discrete potential and actual discharges shall report by discrete discharges. Permittees who track by enforcement actions shall report by enforcement actions.

C.7. Public Information and Outreach

Each Permittee shall increase the awareness of a broad spectrum of the community, including a diversity of socioeconomic groups and ethnic communities, regarding the impacts of stormwater pollution on receiving waters and potential solutions to mitigate the problems caused; positively influence the waste disposal and runoff pollution generation behavior of target audiences by encouraging implementation of appropriate solutions; and involve various citizens in mitigating the impacts of stormwater pollution. Outreach required in other provisions may be conducted under Provision C.7.

C.7.a. Storm Drain Inlet Marking

i. Task Description – Permittees shall mark and maintain municipally-maintained storm drain inlets with an appropriate stormwater pollution prevention message, such as "No dumping, drains to Bay" or equivalent. For newly-approved, privately maintained streets, Permittees shall require storm drain inlet markings with an appropriate stormwater pollution prevention message by the project developer upon construction and maintenance of markings through the development maintenance entity. Markings on the storm drain inlets shall be verified prior to acceptance of the project.

ii. Implementation Level

(1) Inspect and maintain storm drain inlet markings of at least 80 percent of municipality-maintained inlets to ensure they are legibly labeled with a no dumping message or equivalent once per permit term.

(2) Storm drain inlet markings of newly developed privately-maintained streets shall be verified prior to acceptance of the project. Permittees shall require maintenance of the storm drain inlet markings through the development maintenance entity.

iii. Reporting – In the 2020 Annual Report, each Permittee shall (1) state how many municipally-maintained storm drain inlets it has, (2) certify that at least 80 percent of municipality-maintained storm drain inlet markings are legibly labeled with an appropriate stormwater pollution prevention message during the permit term; (3) include a picture of a labeled municipality-maintained inlet; and (4) certify that all privately-maintained streets had storm drain inlet markings verified prior to acceptance of the project and were required to maintain the storm drain inlet markings through the development maintenance entity.

C.7.b. Outreach Campaigns

i. Task Description – Permittees shall continue to participate in or contribute to outreach campaigns, with the goal of significantly increasing overall awareness of stormwater runoff pollution prevention messages and behavior changes in target audiences.

ii. Implementation Level

(1) Target a broad audience with a minimum of one outreach campaign with specific stormwater runoff pollution prevention messages. The outreach

campaign(s) should utilize various electronic and print media, and paid and free media to best reach the different target audiences. The outreach campaign(s) may be coordinated regionally or county-wide.

(2) Permittees shall conduct a post-campaign effectiveness assessment/evaluation to identify and quantify the audiences' knowledge, trends, and attitudes and/or practices; and to measure the overall population's awareness of the messages and behavior changes achieved by the outreach campaigns. Effectiveness assessment/evaluation may be done regionally or county-wide.

iii. Reporting – In the Annual Report following the post-campaign effectiveness assessment/evaluation, each Permittee (or the Countywide Program, if the effectiveness assessment/evaluation was done county-wide or the regional program, if the effectiveness assessment/evaluation was done regionally) shall provide a report of the effectiveness assessment/evaluation completed, which, at minimum, shall include the following:

(1) A description of the outreach campaign.

(2) A summary of how the effectiveness assessment/evaluation was implemented.

(3) An analysis of the effectiveness assessment/evaluation results.

(4) A discussion of the measurable changes in awareness and behavior achieved.

(5) A discussion of the planned or future outreach campaigns to influence awareness and behavior changes regarding stormwater runoff pollution prevention messages.

C.7.c. Stormwater Pollution Prevention Education

i. Task Description – Permittees shall continue to maintain a point of contact to provide the public with stormwater pollution prevention information.

ii. Implementation Level

(1) Each Permittee shall maintain and publicize one point of contact for information on stormwater issues, watershed characteristics, and stormwater pollution prevention alternatives. This point of contact can be maintained individually or collectively and Permittees may combine this function with the spill and dumping complaint central contact point required in C.5.

(2) Each Permittee shall place and maintain information on stormwater issues, watershed characteristics, and stormwater pollution prevention alternatives on its website. In lieu of posting the detailed informational pages directly on their individual websites, Permittees may choose to provide links from their websites to the countywide program's and/or BASMAA's websites. Each Permittee shall publicize its website.

iii. Reporting – In the 2016 Annual Report, each Permittee shall list the point of contact, discuss how this point of contact and stormwater pollution website are publicized and maintained, and certify that it has a website dedicated to providing and maintaining information on stormwater issues, watershed characteristics, and stormwater pollution prevention alternatives.

C.7.d. Public Outreach and Citizen Involvement Events

i. Task Description – Public outreach shall include a variety of pollution prevention message such as car washing; proper use, storage and disposal of vehicle waste fluids; household waste materials disposal; pesticide use; and trash. Public outreach events may include venues such as fairs, shows, and workshops. Citizen involvement events may include venues such as creek/shore clean-ups, adopt-an-inlet/creek/beach programs, volunteer monitoring, storm drain inlet marking, riparian restoration activities, community grants.

ii. Implementation Level – Each Permittee shall annually participate and/or host a mix of public outreach and citizen involvement events according to its population, as shown in the table below:

Table 7.1 Public Outreach and Citizen Involvement Events[19]

Permittee Population	Number of Events
< 10,000	2
10,001– 40,000	4
40,001 – 100,000	5
100,001 – 175,000	7
175,001 – 250,000	8
> 250,000	10
Non-population-based Permittees[20]	6

iii. Reporting – In each Annual Report, each Permittee shall list the events (name of event, event location, and event date) participated in; identity whether the event is public outreach or citizen involvement; and assess the effectiveness of efforts with appropriate measures (e.g., success at reaching a broad spectrum of the community, number of participants compared to previous years, post-event effectiveness assessment/evaluation results, quantity/volume of materials cleaned up and comparisons to previous efforts).

C.7.e. Watershed Stewardship Collaborative Efforts

i. Task Description – Permittees shall individually or collectively encourage and support watershed stewardship collaborative efforts of community groups such as the Contra Costa Watershed Forum, the Santa Clara Basin Watershed

[19] Permittees may claim individual credits for all events in which their Countywide Program or BASMAA participates, supports, and/or hosts, which are publicized to reach the Permittee's jurisdiction.

[20] Alameda County Flood Control and Water Conservation District, Contra Costa Flood Control and Water Conservation District, Santa Clara Valley Water District, Vallejo Sanitation and Flood Control District, and Zone 7 of the Alameda County Flood Control and Water Conservation District

Management Initiative, "friends of creek" groups, and other organizations that benefit the health of the watershed, such as the Bay-Friendly Landscaping and Gardening Coalition. If no such organizations exist, encourage and support development of grassroots watershed groups or engagement of an existing group, such as a neighborhood association, in watershed stewardship activities. Coordinate with existing groups to further stewardship efforts.

ii. Implementation Level – Annually demonstrate effort.

iii. Reporting – In each Annual Report, each Permittee shall state the level of effort, describe the support given, state what efforts were undertaken and the results of these efforts, and provide an evaluation of the effectiveness of these efforts.

C.7.f. School-Age Children Outreach

i. Task Description – Permittees shall individually or collectively implement outreach activities designed to increase awareness of stormwater and/or watershed message(s) in school-age children (K through 12).

ii. Implementation Level – Implement annually and demonstrate effectiveness of efforts through assessment.

iii. Reporting – In each Annual Report, each Permittee shall state the level of effort, spectrum of children reached, and methods used, and provide an evaluation of the effectiveness of these efforts.

C.7.g. Outreach to Municipal Officials

i. Task Description – Permittees shall conduct outreach to municipal officials. One alternative means of accomplishing this is through the use of the Nonpoint Education for Municipal Officials program (NEMO) to significantly increase overall awareness of stormwater and/or watershed message(s) among regional municipal officials.

ii. Implementation Level – At least once per permit cycle, or more often.

iii. Reporting – Permittees shall summarize efforts in the 2020 Annual Report.

C.8. Water Quality Monitoring

C.8.a. Compliance Options

All Permittees shall comply with all the monitoring requirements in this Provision. Permittees may choose any of the following mechanisms, or a combination of these mechanisms, to meet the monitoring requirements:

i. **Regional Collaboration.** Permittees are encouraged to continue contributing to the Regional Monitoring Collaborative (RMC), which coordinates water quality monitoring conducted by all the Permittees. Permittees are encouraged to consider and assign additional duties to the RMC for purposes of increased efficiencies, particularly, but not limited to, reporting duties.

ii. **Area-wide Stormwater Program.** Permittees may contribute to their countywide or area-wide Stormwater Program, so that the Stormwater Program conducts monitoring on behalf of its members.

iii. **Third-party Monitoring.** Permittees may use data collected by a third-party organization, such as the Water Board or Department of Pesticide Regulation, to fulfill a monitoring requirement, provided the data are demonstrated to meet the data quality objectives described in Provision C.8.b.

C.8.b. Monitoring Protocols and Data Quality

Where applicable, monitoring data must be Surface Water Ambient Monitoring Program (SWAMP) comparable. Minimum data quality shall be consistent with the latest version of the SWAMP Quality Assurance Project Plan (QAPrP) for applicable parameters, including data quality objectives, field and laboratory blanks, field duplicates, laboratory spikes, and clean techniques, using the most recent SWAMP Standard Operating Procedures.

C.8.c. San Francisco Estuary Receiving Water Monitoring

With limited exceptions, urban runoff from the Permittees' jurisdictions ultimately discharges to the San Francisco Estuary. Monitoring of the Estuary is intended to answer questions[21] such as:

- Are chemical concentrations in the Estuary potentially at levels of potential concern and are associated impacts likely?
- What are the concentrations and masses of contaminants in the Estuary and its segments?
- What are the sources, pathways, loadings, and processes leading to contaminant related impacts in the Estuary?
- Have the concentrations, masses, and associated impacts of contaminants in the Estuary increased or decreased?

[21] http://www.sfei.org/rmp/objectives (9/15/2014). While the stated objectives may change over time, the intent of this provision is for Permittees to continue contributing financially and as stakeholders in such a program as the RMP, which monitors the quality of San Francisco Bay.

- What are the projected concentrations, masses, and associated impacts of contaminants in the Estuary?

The Permittees shall participate in implementing an Estuary receiving water monitoring program, at a minimum equivalent to the San Francisco Estuary Regional Monitoring Program by contributing their fair-share financially on an annual basis.

C.8.d. Creek Status Monitoring

Creek status monitoring is intended to assess the chemical, physical, and biological impacts of urban runoff on receiving waters. In particular, the monitoring required by this provision is intended to answer the following questions:

- Are water quality objectives, both numeric and narrative, being met in local receiving waters, including creeks, rivers and tributaries?
- Are conditions in local receiving waters supportive of or likely to be supportive of beneficial uses?

i. Biological Assessment including Nutrients and General Water Quality Parameters

(1) Field and Laboratory Method – The Permittees shall conduct biological assessments (also referred to herein as bioassessments) in accordance with SWAMP Standard Operating Procedures[22,23,24] and shall include collection and reporting of in-stream biological and physical habitat data according to the *SWAMP Standard Operating Procedures for Bioassessment,*[3] including benthic algae, benthic macroinvertebrates, water chemistry, and full characterization of physical habitat. The bioassessment sampling method shall be multihabitat reach-wide. For algae, the assessment shall include all analytes in the protocol, including diatom and soft algae taxonomy, biomass (ash-free dry weight), chlorophyll a, pebble count algae information, and reach-wide algal percent cover. Physical Habitat (PHab) Assessment shall include the SWAMP full physical habitat characterization method.

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[22] Ode, P.R. 2007. *Standard Operating Procedures for Collecting Benthic Macroinvertebrate Samples and Associated Physical and Chemical Data for Ambient Bioassessments in California,* State Water Board Surface Water Ambient Monitoring Program (SWAMP), as subsequently revised [http://www.waterboards.ca.gov/water_issues/programs/swamp/docs/swamp_sop_bio.pdf].

[23] Current methods are documented in (1) *SWAMP Standard Operating Procedure (SOP) and Interim Guidance on Quality Assurance for SWAMP Bioassessments, Memorandum to SWAMP Roundtable from Beverly H. van Buuren and Peter R. Ode, May 21, 2007*, and (2) *Amendment to SWAMP Interim Guidance on Quality Assurance for SWAMP Bioassessments, Memorandum to SWAMP Roundtable from Beverly H. van Buuren and Peter R. Ode, September 17, 2008* both available at http://www.waterboards.ca.gov/water_issues/programs/swamp/tools.shtml#methods.

[24] The Standard Operating Procedure for algae sampling and evaluation is available in the following: Fetscher, A. and K. McLaughlin, May 16, 2008. *Incorporating Bioassessment Using Freshwater Algae into California's Surface Water Ambient Monitoring Program (SWAMP).* Technical Report 563 and current SWAMP-approved updates to Standard Operating Procedures therein. Available at http://www.waterboards.ca.gov/water_issues/programs/swamp/docs/reports/563_periphyton_bioassessment.pdf.

(2) The sampling crew shall be trained by a SWAMP-approved trainer and possess a Scientific Collection Permit from the California Department of Fish and Wildlife and participate in a SWAMP-approved inter-calibration exercise at least once in the Permit term. The Permittee may, but is not required to, modify its sampling procedures if these referenced procedures change during the Permit term. In such case, the Permittee shall notify the Water Board and follow the updated SWAMP procedures.

(3) Macroinvertebrates shall be identified and classified according to the *Standard Taxonomic Effort (STE) Level I of the Southwestern Association of Freshwater Invertebrate Taxonomists (SAFIT)*[25] (except Chironomids should be identified to subfamily) using a fixed count of 600 organisms per sample. The laboratory shall follow the *SWAMP Standard Operating Procedures for Laboratory Processing and Identification of Benthic Macroinvertebrates in California*.[26] Soft-bodied algae and diatom algae shall be identified to the species level. Algae identifications must be harmonized with the SWAMP master taxa list. All quality assurance and quality control steps specified in the *SWAMP Quality Assurance Program Plan*[1] shall be performed.

(4) The Permittees shall measure general water quality parameters using a sonde and collect nutrient samples at a site when biological samples are collected. The general water quality parameters shall include temperature, dissolved oxygen, pH, and specific conductance. Nutrients samples shall be analyzed for total ammonia, nitrate, nitrite, total Kjeldahl nitrogen, total nitrogen (calculated), dissolved orthophosphate and total phosphorous, silica, and chloride.

(5) In conducting the required bioassessment monitoring, the Permittees shall take precautions to prevent the introduction or spread of aquatic invasive species.

(6) Sample Design/Locations – The Permittees shall continue to use the probabilistic sample design developed in the previous Permit term to select sample locations. Also, Permittees shall continue to use the sampling site order and the rationale to exclude potential sites as previously defined by the sample design and reconnaissance standard operating procedures. After a statistically representative data set (i.e., approximately 30 samples) has been collected to address management questions related to condition of aquatic life, Permittees may select up to 20% of sample locations on a targeted basis to evaluate temporal trends in or other impacts to aquatic life condition.

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[25] The current SAFIT STEs (November 28, 2006) list requirements for both the Level I and Level II taxonomic effort, and are located at http://www.waterboards.ca.gov/water_issues/programs/swamp/safit.shtml. When new editions are published by SAFIT, they will supersede all previous editions. All editions will be posted at the State Water Board's SWAMP website.

[26] http://www.waterboards.ca.gov/water_issues/programs/swamp/docs/bmi_lab_sop_final.pdf.

(7) Frequency, Timeframe and Number of Sites – Sampling shall occur once per year during the appropriate index period (April 15-June 30) with consideration of antecedent rainfall. Sampling is a one-time grab sample for biological communities, nutrients, and general water quality collected on the same day. The Permittees shall collect at least the minimum number of samples as shown below:

Sampling Agency	Minimum Number of Samples
Alameda Permittees	20 per year
Santa Clara Permittees	20 per year
Contra Costa Permittees	10 per year
San Mateo Permittees	10 per year
Fairfield-Suisun Permittees	8 per 5-year period
Vallejo Permittees	4 per 5-year period

(8) Followup – Sites scoring less than 0.795 according to the California Stream Condition Index[27] (CSCI) are appropriate for a Stressor Source Identification (SSID) project as defined in C.8.e. Such a score indicates a substantially degraded biological community relative to reference conditions. Sites where there is a substantial difference in CSCI score observed at a location relative to upstream or downstream sites are also appropriate for a SSID project. If many samples show a degraded biological condition, sites where water quality is most likely to cause and contribute to this degradation may be prioritized by the Permittee for a SSID project.

ii. Chlorine

(1) Field and Laboratory Method – Permittees shall collect a grab sample and analyze for free and total chlorine using methods specified in the BASMAA Regional Monitoring Coalition Creek Status Monitoring Program Standard Operating Procedures.

(2) Sample Design/Locations – Sample locations may be selected by the Permittees to monitor locations near known or suspected potable water line breaks; to coincide with bioassessment sites; to coincide with creek restoration sites; or to resample a location where chlorine has been found in the past.

(3) Frequency, Timeframe, and Number of Samples – Samples shall be collected in spring or summer. Vallejo and Fairfield-Suisun Permittees each shall collect their samples by the end of the second year of the permit term. The Permittees shall collect at least the minimum number of samples as shown below:

[27] Documentation for the CSCI and information on calculating scores can be found at http://www.swrcb.ca.gov/plans_policies/biological_objective.shtml.

Sampling Agency	Minimum Number of Locations Sampled
Alameda Permittees	20 per year
Santa Clara Permittees	20 per year
Contra Costa Permittees	10 per year
San Mateo Permittees	10 per year
Fairfield-Suisun Permittees	8 per 5-year period
Vallejo Permittees	4 per 5-year period

(4) Followup – The Permittees shall immediately resample if the chlorine concentration is greater than 0.1 mg/L. If the resample is still greater than 0.1 mg/L, then Permittees shall report the observation to the appropriate Permittee central contact point for illicit discharges so that the illicit discharge staff can investigate and abate the associated discharge in accordance with its Provision C.5.e - Spill and Dumping Complaint Response Program.

iii. Temperature

(1) Field Method – The Permittees shall monitor temperature of their streams using a digital temperature logger or equivalent.

(2) Sample Design/Locations – The Permittees shall monitor stream reaches that are documented to support cold water fisheries and where either past data or best professional judgment indicates that temperatures may negatively affect that beneficial use.

(3) Frequency, Timeframe and Number of Sites – Loggers shall be installed so that water temperatures are recorded at 60-minute intervals from April through September at the number of sites specified below. Vallejo and Fairfield-Suisun Permittees each shall collect their samples by the end of the second year of the permit term. The Permittees shall collect at least the minimum number of samples as shown below:

Sampling Agency	Minimum Number of Stream Reaches Sampled
Alameda Permittees	8 per year
Santa Clara Permittees	8 per year
Contra Costa Permittees	4 per year
San Mateo Permittees	4 per year
Fairfield-Suisun Permittees	2 per 5-year period
Vallejo Permittees	2 per 5-year period

(4) Followup – The Permittees shall identify a site for which results at one sampling station exceed the applicable temperature trigger or demonstrate a spike in temperature with no obvious natural explanation as a candidate SSID project. The temperature trigger is defined as when two or more weekly average temperatures exceed the Maximum Weekly Average Temperature of 17.0°C for a Steelhead stream, or when 20% of the results

at one sampling station exceed the instantaneous maximum of 24°C.[28] Permittees shall calculate the weekly average temperature by breaking the measurements into non-overlapping, 7-day periods.

iv. Continuous Monitoring of Dissolved Oxygen, Temperature, and pH

(1) Field and Laboratory Method – The Permittees shall monitor general water quality parameters of streams using a water quality sonde or equivalent. Parameters shall include dissolved oxygen (mg/L and % saturation), pH, specific conductance (µS), and temperature (°C).

(2) Sample Design/Locations – The Permittees shall monitor stream reaches that are documented to support cold water fisheries or where either past data or best professional judgment indicates that temperature may negatively affect the cold water beneficial use.

(3) Frequency, Timeframe, and Number of Sites – The Permittees shall install sondes so that parameters are recorded at 15-minute intervals over 1-2 weeks in the spring concurrent with bioassessment sampling and 1-2 weeks in summer at the same sites. The Permittees shall monitor at least the minimum number of sites as shown below:

Sampling Agency	Minimum Number of Sample Sites in Spring	Minimum # of Sample Sites in Summer
Alameda Permittees	3 per year	3 per year
Santa Clara Permittees	3 per year	3 per year
Contra Costa Permittees	2 per year	2 per year
San Mateo Permittees	2 per year	2 per year
Fairfield-Suisun Permittees	2 per permit term	2 per 5-year period
Vallejo Permittees	2 per permit term	2 per 5-year period

(4) Followup – When results at one sampling station exceed the applicable temperature or dissolved oxygen trigger or demonstrate a spike in temperature or drop in dissolved oxygen with no obvious natural explanation, the Permittees shall identify that sample site as a candidate SSID project. The Permittees shall calculate the weekly average temperature and dissolved oxygen by separating the measurements into non-overlapping, 7-day periods. The temperature trigger is defined as any of the following:

a. Maximum Weekly Average Temperature exceeds 17.0°C for a Steelhead stream, or 20 percent of the instantaneous results exceed 24°C[8];

[28] This maximum weekly average temperature trigger corresponds to a 10% reduction in growth as listed in Table 7.3 in Sullivan K., Martin, D.J., Cardwell, R.D., Toll, J.E., Duke, S. 2000. *An Analysis of the Effects of Temperature on Salmonids of the Pacific Northwest with Implications for Selecting Temperature Criteria, Sustainable Ecosystem Institute*). The 24° C acute lethal threshold is the more protective threshold cited on page 4-1 in Sullivan et al. (2000).

b. 20 percent of instantaneous pH results are < 6.5 or > 8.5;

c. 20 percent of the instantaneous specific conductance results are > 2000µS, or there is a spike in readings with no obvious natural explanation; or

d. 20 percent of instantaneous dissolved oxygen results are < 7 mg/L in a cold water fishery stream.

v. Pathogen Indicators

(1) Field and Laboratory Method – The Permittees shall collect and analyze samples for Enteroccoci and *E. coli* in accordance with the most recent U.S. EPA protocols.[29]

(2) Sample Design/Locations – The Permittees shall collect one or more samples in a creek and at an area where water-contact recreation is likely or at an opportunistic location where there is potential to detect leaking sewerage infrastructure.

(3) Frequency, Timeframe and Number of Sites – The Permittees shall collect samples in the dry season. Permittees shall collect at least the minimum number of samples as shown below:

Sampling Agency	Minimum Number of Sample Sites
Alameda Permittees	5 per year
Santa Clara Permittees	5 per year
Contra Costa Permittees	5 per year
San Mateo Permittees	5 per year
Fairfield-Suisun Permittees	3 per 5-year period
Vallejo Permittees	3 per 5-year period

(4) Followup – If U.S. EPA's statistical threshold value[30] for 36 per 1000 primary contact recreators is exceeded, the water body reach shall be identified as a candidate SSID project.

C.8.e. Stressor/Source Identification (SSID) Projects

When any monitoring result triggers a candidate for a SSID project followup as indicated within the provisions of C.8.d and C.8.g, the Permittees shall take the following actions, as also required by Provision C.1. If the trigger stressor or source is already known, the Permittee(s) shall take appropriate followup action to reduce the water quality stressor or source and count this action as a completed SSID Project.

SSID projects are intended to be oriented toward taking action(s) to alleviate stressors and reduce sources of pollutants; thus the Permittees shall attempt to

[29] U.S. EPA protocols available at http://water.epa.gov/scitech/methods/cwa/methods_index.cfm. Analytical methods listed here are also acceptable: http://water.epa.gov/grants_funding/beachgrants/chapter4.cfm

[30] U.S. EPA. 2012. *Recreational Water Quality Criteria*. Office of Water 820-F-12-058. Table 4.

complete all steps for half their required SSID projects, at a minimum, during the permit term.

i. Review monitoring (C.8.d and C.8.g) results annually and maintain a list of all results exceeding thresholds described therein. Pollutant of Concern Monitoring (C.8.f) results may be included on the list as appropriate.

ii. Select followup SSID projects from the list developed in C.8.e.i. based on criteria such as magnitude of threshold exceedance; parameter (for a variety of parameters); likelihood stormwater management action(s) could address the exceedance; and similar priorities.

(1) Permittees who conduct SSID projects through a regional collaborative shall collectively initiate a minimum of eight new SSID projects (minimum of one for toxicity) during the Permit term. Because these SSID projects are being conducted through a regional collaborative, all SSID project reports shall be presented in a unified, regional-level report when submitted to the Water Board. In the case that no sample exhibits toxicity, as defined within the method required in this section, during the permit term, a SSID project for toxicity is not required.

(2) If conducted through a countywide Stormwater Program, the Santa Clara and Alameda Permittees each shall be required to initiate five (minimum of one for toxicity) SSID projects; the Contra Costa and San Mateo Permittees each shall be required to initiate three SSID (one for toxicity) projects; and the Fairfield-Suisun and Vallejo Permittees each shall be required to initiate one SSID project(s) during the Permit term. In the case that no sample exhibits toxicity, as defined within the method required in this section, within a countywide program area during the permit term, a SSID project for toxicity is not required.

iii. The Permittees shall conduct site specific SSID project(s) (or non-site specific if the problem is wide-spread) in the stepwise process described below:

(1) Step 1: The Permittees shall develop a work plan for each SSID project and submit the work plans with the Urban Creeks Monitoring Report (UCMR) such that a minimum of half the required number of SSID projects are started (at a minimum, have a workplan) by the third year of the permit term, with the goal of completing Step 2, at a minimum, for half the required SSID projects within the permit term. The work plan shall:

(a) Define the problem (e.g., magnitude and temporal and geographic extent) to the extent known;

(b) Describe the SSID project objectives, including the management context within which the results of the investigation will be used;

(c) Consider the problem within a watershed context and look at multiple types of related indicators, where possible (e.g., basic water quality data and biological assessment results);

(d) List candidate causes of the problem (e.g., biological stressors, pollutant sources, and physical stressors);

(e) Establish a schedule for investigating the cause(s) of the trigger stressor/source to begin upon completion of the workplan. Investigations may include evaluation of existing data, desktop analyses of land uses and management actions, and/or collection of new data.

(f) Conduct a site specific study (or non-site specific if the problem is wide-spread) in a stepwise process to identify and isolate the cause(s) of the trigger stressor/source. This study should follow guidance for Toxicity Reduction Evaluations (TRE) or Toxicity Identification Evaluations (TIE)[18]. A TRE, as adapted for urban stormwater, allows Permittees to use other sources of information (such as industrial facility stormwater monitoring reports) in attempting to determine the trigger cause, potentially eliminating the need for a TIE. If a TRE does not result in identification of the stressor/source, Permittees shall conduct a TIE. For toxicity studies where there is no chemical pollutant associated with the creek status monitoring sample exhibiting toxicity, a TIE should be conducted. Where chemical data indicate a pollutant, such as fipronil or a pyrethroid, is present at adverse effects levels in the sample location, it is not necessary to conduct a TIE, and the SSID project would be considered complete;

(g) For physical habitat, physiochemical pollutants (dissolved oxygen, pH, conductivity, temperature), nutrients, metals, and other stressors, the investigation shall generally follow Step 5 (Identify Probably Causes) of the Causal Analysis/Diagnosis Decision Information System (CADDIS); [31]

(h) For pathogen indicators, the study shall generally follow the California Microbial Source Identification Manual: A Tiered Approach to Identifying Fecal Pollution Sources to Beaches (2013) or equivalent process or method;[32] and

(i) The Permittees may modify the SSID Work Plan in subsequent years of the Permit term in order to address new Creek Status (or POC) results that exceed applicable thresholds and are of a higher priority based on the criteria in C.8.e.ii.

(2) Step 2: The Permittees shall conduct SSID investigations according to the schedule in each SSID project work plan and shall report on the status of SSID investigations annually in the UCMR. Local stormwater Permittees shall be advised of the SSID project and consulted regarding

[31] http://www.epa.gov/caddis/si_step5_overview.html

[32] http://www.swrcb.ca.gov/water_issues/programs/beaches/cbi_projects/docs/sipp_manual.pdf

possible local sources and potential management actions during the work plan phase and periodically throughout the SSID project.

(3) Step 3: Follow-up actions.

(a) When a Permittee(s) determines that discharges to its stormwater collection system(s) contribute to an exceedance of a water quality standard or an exceedance of a trigger threshold such that the water body's beneficial uses are not supported, the Permittee(s) shall submit a report in the UCMR that describes BMPs that are currently being implemented, and the current level of implementation, and additional BMPs that will be implemented, and/or an increased level of implementation, to prevent or reduce the discharge of pollutants that are causing or contributing to the exceedance of WQS. The report shall include an implementation schedule.

(b) If a Permittee(s) determines that discharges from its (their) stormwater collection system(s) are not contributing to an exceedance of a water quality standard, the Permittee(s) may end the SSID project. The Executive Officer must concur in writing before an SSID project is determined to be completed.

In cases where SSID investigations prove inconclusive (e.g., the trigger threshold exceedance is episodic or reasonable methods do not reveal a stressor/source), the Permittee(s) may request that the Executive Officer consider the SSID project complete.

(c) Reporting: The Permittees shall submit an SSID status report in each UCMR which summarizes the actions taken in C.8.e.i-iii above. The SSID status report shall include a running summary of all SSID projects (C.8.e.ii), including start date, brief problem definition, and schedule for each project. As projects progress, the SSID report shall describe findings and monitoring results and outline steps for the upcoming year for each ongoing project. The Permittees shall submit the SSID status report with each UCMR.

iv. As long as Permittees have complied with the procedures set forth above, they do not have to repeat the same procedure for continuing or recurring exceedances of the same receiving water limitations unless directed to do so by the Water Board.

C.8.f. Pollutants of Concern Monitoring

Pollutants of Concern (POC) monitoring is intended to assess inputs of POCs to the Bay from local tributaries and urban runoff, provide information to support implementation of TMDLs and other pollutant control strategies, assess progress toward achieving wasteload allocations for TMDLs and help resolve uncertainties associated with loading estimates and impairments associated with these pollutants.

In particular, monitoring required by this provision must be directed toward addressing the following five priority POC management information needs:

1. **Source Identification** - identifying which sources or watershed source areas provide the greatest opportunities for reductions of POCs in urban stormwater runoff;
2. **Contributions to Bay Impairment** - identifying which watershed source areas contribute most to the impairment of San Francisco Bay beneficial uses (due to source intensity and sensitivity of discharge location);
3. **Management Action Effectiveness** - providing support for planning future management actions or evaluating the effectiveness or impacts of existing management actions;
4. **Loads and Status** - providing information on POC loads, concentrations, and presence in local tributaries or urban stormwater discharges; and
5. **Trends** - evaluating trends in POC loading to the Bay and POC concentrations in urban stormwater discharges or local tributaries over time.

Not all information needs apply to all POCs (see Table 8.2 below for details).

i. Sampling Methods – The Permittees shall implement or cause to be implemented the monitoring components shown in Table 8.1 in order to address each of the five POC management information needs.

Table 8.1 POC Monitoring Methods

Monitoring Type	Information Need	Monitoring Methods
1	Identify Source Areas	Monitoring methods to identify watershed sources of POCs should include: • Collection and analysis of POCs on sediments in urban stormwater runoff that are transported through MS4s or receiving waters during stormwater runoff events; or • Collection and analysis of POCs on bedded sediments deposited in MS4s or receiving waters; or • Collection and analysis of POCs in stormwater runoff or bedded sediments on source area properties (e.g. private property); or, • Other monitoring methods designed to identify specific sources or uses of POCs (e.g., caulk in roadways or building materials) or watershed source areas.
2	Identify watershed areas contributing most to Bay impairment	Monitoring methods to identify watershed areas contributing most to Bay impairment should include: • Methods described for Monitoring Type #1; or • Collection of small fish tissue (or equivalent indicator) near tributary confluences with the Bay and analysis for POCs; or • Collection of bedded sediments near tributary confluences with the Bay and analysis for POCs.
3	Provide support for future or existing management actions	Monitoring methods to support future or existing management actions should include: • Methods described for Monitoring Type #1, with a focus on monitoring the effectiveness of specific management actions in reducing or avoiding POCs in MS4 discharges.
4	Provide information on POC loads, concentrations, or presence / absence	Monitoring methods to provide information on POC loads, concentrations or presence/absence should include: • Methods described for Monitoring Type #1, in combination with quantitative modeling associated with quantifying POC loads from MS4s or small tributaries to the Bay.
5	Evaluate POC trends	Monitoring methods to provide information on trends in POC loads and concentrations overtime may include: Methods described for Monitoring Type #1 or #2.

ii. Parameters and Monitoring Frequency – The Permittees shall conduct POC monitoring consistent with the monitoring intensity and frequency specified in Table 8.2. Monitoring frequencies are described as the total and minimum number of samples that Permittees within a countywide Stormwater Program shall collectively collect and analyze in a Water Year (October 1 – September 30). Minimum number of samples that Permittees within a countywide Stormwater Program shall collect by the end of the Permit term to address each monitoring type are also specified.

Table 8.2 POC Monitoring Parameters, Effort and Type

Pollutant of Concern	**Total Samples[a] Collected /Analyzed (yearly minimum) for each Countywide Program: Alameda, Contra Costa, Santa Clara, and San Mateo**	**Minimum Number of Samples for each Monitoring Type[b]**
Polychlorinated Biphenyls (PCBs)	80 (8)	8 samples minimum for monitoring types 1-5
Total Mercury	80 (8)	8 samples minimum for monitoring types 1-5
Copper	20 (2)	4 samples minimum for monitoring types 4-5
Emerging Contaminants[c]: Must include but not limited to: Perfluorooctane Sulfonates (PFOS, in sediment) Perfluoroalkyl sulfonates (PFAS, in sediment) Alternative flame retardants	See footnote c	See footnote c
Ancillary Parameters[d]: Total organic carbon Suspended sediments (SSC) Hardness	as necessary to address management questions for other POCs – see footnote d	
Nutrients: Ammonium, Nitrate, Nitrite, Total Kjeldahl Nitrogen, Orthophosphate, Total Phosphorus (all nutrients collected together for each sample)	20 (2) for each nutrient species	20 samples for monitoring type 4 for each nutrient species.

[a] This column indicates the total number of samples, across all applicable monitoring types (i.e., monitoring types 1-5 from Table 8.1), that must be collected during the permit term. The number in parentheses indicates the minimum number of samples that must be collected, across all applicable monitoring types, during each of the five years of the permit. For example, 80 total samples must be collected for both total PCBs and mercury by each set of Santa Clara County, San Mateo County, Alameda County, and Contra Costa County Permittees during the term of the permit. Permittees must collect a minimum of 8 PCBs samples every year of the permit term, including the final year.

[b] This column indicates the monitoring types from Table 8.1 that are applicable to this POC along with the minimum number of samples that shall be collected by each set of Permittees (i.e., Santa Clara County, San Mateo County, Alameda County, and Contra Costa County) by the end of year four of the permit. The applicable monitoring type(s) is also stated to illustrate the management information need(s) motivating the collected data. For example, each set of Permittees (i.e., the Countywide Programs for Santa Clara, San Mateo, Alameda, and Contra Costa counties) must collect and analyze at least 8 samples to address monitoring types 1-5 in Table 8.1 for both total PCBs and total mercury. Some collected samples may address multiple management questions.

[c] The Permittees shall conduct or cause to be conducted a special study that addresses relevant management information needs for emerging contaminants. The special study must account for relevant CECs in stormwater and would address at least PFOS, PFAS, and alternative flame retardants being used to replace PBDEs.

[d] Total Organic Carbon (TOC) data are not used independently. Rather, TOC can be useful for normalizing PCBs data collected in water and sediment. TOC shall be collected concurrently with PCBs data that should be normalized to TOC. Similarly, suspended sediment concentrations (SSC) samples should be collected and analyzed when water samples are collected that will be used to assess loads, loading trends, or BMP effectiveness for PCBs and Mercury. Hardness data are used in conjunction with copper concentrations collected in fresh water.

iii. **POC Parameters and Analytical Methods** – Samples collected consistent with Table 8.2 shall be analyzed for parameters listed in Table 8.3. Where no laboratory method is listed in Table 8.3, Permittees shall use U.S. EPA or SWAMP-approved methods.

Table 8.3 POC Analytes and Analytical Methods

Pollutant of Concern	Matrix	Analyte(s) or Test Species	Laboratory Analytical Methods
Polychlorinated Biphenyls (PCBs)	Water	Total PCBs	U.S. EPA 1668 (RMP 40)
		Total Organic Carbon	
		Suspended sediments (SSC)	
	Bedded Sediment	Total PCBs	As appropriate to address the management information need: U.S. EPA 1668 (RMP 40), 8082A, or 8270D modified by Method 1625
		Total organic carbon	
Mercury	Water	Total Mercury	
	Bedded Sediment	Total Mercury	
Copper	Water	Total Copper	
		Dissolved Copper	
		Hardness	
Nutrients	Water	Ammonium	
		Nitrate	
		Nitrite	
		Total Kjeldahl Nitrogen	
		Orthophosphate	
		Total Phosphorus	

C.8.g. Pesticides and Toxicity Monitoring

The Permittees shall conduct wet weather and dry weather monitoring of pesticides and toxicity in urban creeks. If a statewide coordinated pesticides and pesticides-related toxicity monitoring program begins collecting data on an ongoing basis during the Permit term, Permittees may request the Executive Officer modify, reduce or eliminate this monitoring requirement, provided the resultant change, viewed in context of the statewide program, would result in overall improvement of pesticide monitoring data collection.

i. Toxicity in Water Column - Dry Weather

(1) Field and Laboratory Method – The Permittees shall collect grab samples of receiving water using applicable SWAMP comparable methodology. These samples shall be analyzed for the test organisms listed, and by the methods described, on Table 8.4.

Toxicity shall be evaluated using the Test of Significant Toxicity (TST) statistical approach.[33] Each sample shall be subject to determination of "Pass" or "Fail" and shall indicate "Percent Effect" from toxicity using nondiluted samples. The TST null hypothesis shall be "mean sample response $\leq 0.75 \times$ mean control response." A test result that rejects this null hypothesis shall be reported as "Pass." A test result that does not reject this null hypothesis shall be reported as "Fail." The relative "Percent Effect" of the sample is defined and reported as: ((Mean control response – Mean sample response) ÷ Mean control response)) × 100.

Table 8.4 Water Column Aquatic Toxicity Analytical Procedures

Test Species	Test Endpoint(s)	Units	U.S. EPA Method
Pimephales promelas (Fathead Minnow)	Larval Survival and Growth	Pass or Fail using TST, % Effect	EPA-821-R-02-013[34] EPA 833-R-10-003[35]
Ceriodaphnia dubia (Freshwater Crustacean)	Survival[a]	Pass or Fail, % Effect <25% Passes, >25% Fails	EPA-821-R-02-013 EPA 833-R-10-003
Ceriodaphnia dubia (Freshwater Crustacean)	Reproduction	Pass or Fail using TST, % Effect	EPA-821-R-02-013 EPA 833-R-10-003
Selenastrum capricornutum (Green Algae)	Growth	Pass or Fail using TST, % Effect	EPA-821-R-02-013 EPA 833-R-10-003
Hyalella azteca (Freshwater Amphipod)	Survival	Pass or Fail using TST, % Effect[b]	EPA-821-R-02-012[36] EPA 833-R-10-003
Chironomus dilutus (midge)	Survival	Pass or Fail using TST, % Effect[b]	EPA-821-R-02-012 EPA 833-R-10-003

[33] National Pollutant Discharge Elimination System Test of Significant Toxicity Implementation Document (EPA 833-R-10-003, 2010), Appendix A, Figure A-1, and Table A-1.

[34] *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms.* EPA/821/R-02/013, 2002; Table IA, 40 CFR Part 136.

[35] *National Pollutant Discharge Elimination System Test of Significant Toxicity Implementation Document* (EPA 833-R-10-003) 2010.

[36] *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms* (EPA/821/R-02/012, 2002; Table IA, 40 CFR Part 136). See Appendix B, page 238, for *H.azteca* and *C.dilutus* methods.

[a] The *Ceriodaphnia dubia* chronic toxicity test design for the survival endpoint is not amenable to the TST, Welch's t-test so the survival endpoint will be determined as a percent effect using the TST approach. A percent effect less than 25 percent will be considered a "pass," and a percent effect equal to or greater than 25 percent will be considered a "fail."
[b] For *Hyalella* and *Chironomus* acute toxicity test methods, the test result will be considered a "pass," regardless of a TST determination of "fail" if the percent survival in the receiving water is equal to or greater than 90 percent.

(2) Sample Design/Locations – Sample locations may be selected by the Permittees to monitor locations where toxicity could be likely; to coincide with bioassessment sites; to coincide with creek restoration sites; or to resample a location where toxicity has been found in the past.

(3) Frequency, Timeframe and Number of Sites – The Permittees shall collect samples annually in the dry season. Vallejo and Fairfield-Suisun Permittees each shall collect their sample by the end of the second water year of the permit term. The Permittees shall collect at least the minimum number of samples as shown below:

Sampling Agency	Minimum Number of Sample Sites
Alameda Permittees	2 per year
Santa Clara Permittees	2 per year
Contra Costa Permittees	1 per year
San Mateo Permittees	1 per year
Fairfield-Suisun & Vallejo Permittees collectively	1 per 5-year period

ii. Toxicity, Pesticides and Other Pollutants in Sediment - Dry Weather

(1) Field and Laboratory Method – The Permittees shall collect grab samples of creek sediment using applicable SWAMP comparable methodology. These samples shall be analyzed for the pollutants and organisms listed and by the methods described on Table 8.5. Where no laboratory method is listed in Table 8.5, Permittees shall use U.S. EPA or SWAMP-approved methods.

Table 8.5 Sediment Toxicity & Pollutants Analytical Procedures

Test Species or Pollutant	Units	Laboratory Method
Hyalella azteca and *Chironomus dilutus survival*[a]	Pass/Fail using TST, % Effect[a]	EPA-600/R-99-064[37]
Pyrethroids: bifenthrin, cyfluthrin, cypermethrin, deltamethrin, esfenvalerate, lambda-cyhalothrin, permethrin		EPA 3540C followed by EPA 8270D by NCI-GCMS
Carbaryl		
Fipronil		
Total PAHs		
Arsenic, Cadmium, Chromium, Copper, Lead, Nickel, Zinc		
Total organic carbon		
Grain size		

[37] *Methods for Measuring the Toxicity and Bioaccumulation of Sediment-associated Contaminants with Freshwater Invertebrates* (EPA 600/R-99-064) Second Edition. March 2000.

[a] For *Hyalella* and *Chironomus* acute toxicity test methods, the test result will be considered a "pass," regardless of a TST determination of "fail" if the percent survival in the receiving water is equal to or greater than 90 percent. The false positive rate (beta error) is 0.05 and the negative rate (alpha error) is 0.25 for these test methods.

(2) Sample Design/Locations – Samples shall be collected at fine-grained depositional locations. Such sample locations may be selected by the Permittees to monitor locations where toxicity could be likely, to coincide with bioassessment sites, or to resample a location where toxicity has been found in the past, for example.

(3) Frequency, Timeframe, and Number of Sites – The Permittees shall collect samples annually during the dry season. Vallejo and Fairfield-Suisun Permittees each shall collect their sample by the end of the second year of the permit term. Permittees shall collect at least the minimum number of samples as shown below:

Sampling Agency	Minimum Number of Sample Sites
Alameda Permittees	2 per year
Santa Clara Permittees	2 per year
Contra Costa Permittees	1 per year
San Mateo Permittees	1 per year
Fairfield-Suisun & Vallejo Permittees collectively	1 per 5-year period

iii. Wet Weather Pesticides and Toxicity Monitoring

(1) Field and Laboratory Method – The Permittees shall collect water column samples and analyze them for the following parameters using the methods specified in Tables 8.4 and 8.5. For imidacloprid, Permittees shall specify an analytical method that achieves a reporting level as close to 0.05 ppb as possible, but in no case exceeds 0.1 ppb).

- Pyrethroids: bifenthrin, cyfluthrin, cypermethrin, deltamethrin, esfenvalerate, lambda-cyhalothrin, permethrin
- Imidacloprid
- Indoxacarb[38]
- Fipronil
- Toxicity

(2) Sample Design/Locations – The Permittees shall collect samples annually during storm events. Sample locations shall be representative of urban watersheds (i.e., bottom of watershed locations).

(3) Frequency, Timeframe, and Number of Sites – If this (C.8.g.iii) sampling is conducted by the RMC on behalf of all Permittees, a total of ten (10) samples shall be collected over the Permit term, with a minimum of six (6) samples collected by the end of the third water year of the permit term. If this (C.8.g.iii)

[38] Indoxacarb shall be a required analyte in the water year following notification by the Executive Officer that an analytical method with appropriate quality assurance and sensitivity is available. At the time of Permit issuance, an analytical method has not been developed.

sampling is conducted by Countywide Stormwater Programs, Permittees shall collect at least the minimum number of samples as shown below:

Sampling Agency	Minimum Number of Sample Sites
Alameda Permittees	1 per year
Santa Clara Permittees	1 per year
Contra Costa Permittees	1 per year
San Mateo Permittees	1 per year
Fairfield-Suisun & Vallejo Permittees collectively	1 per 5-year period

iv. Followup – The Permittees shall identify a site as a candidate SSID project when analytical results indicate any of the following:

(1) A toxicity test of growth, reproduction, or survival of any test organism is reported as "fail" in both the initial sampling and a second, followup sampling, and both have ≥ 50% Percent Effect;

(2) A pollutant is present at a concentration exceeding its water quality objective in the Basin Plan;

(3) For pollutants without WQOs, results exceed Probable Effects Concentrations or Threshold Effects Concentrations.[39]

C.8.h. Reporting

i. Water Quality Standard Exceedence – When data collected pursuant to C.8.a.- C.8.g. indicate that discharges are causing or contributing to an exceedance of an applicable water quality standard, the Permittees shall notify the Water Board within no more than 30 days of such a determination and submit a followup report in accordance with Provision C.1 requirements. This reporting requirement shall not apply to continuing or recurring exceedances of water quality standards previously reported to the Water Board or to exceedances of pollutants that are to be addressed pursuant to Provisions C.9 through C.14 of this Order, consistent with Provision C.1.

ii. Electronic Reporting – The Permittees shall submit to the California Environmental Data Exchange Network (CEDEN) all results from monitoring conducted pursuant to Provisions C.8.d. Creek Status, C.8.e. SSID Projects (as applicable), C.8.f. Pollutants of Concern and C.8.g. Pesticides and Toxicity. Data that CEDEN cannot accept are exempt from this requirement.

(1) Data shall be submitted in SWAMP formats and with the quality controls required by CEDEN.

[39] TEC and PEC are found in MacDonald, D.D., G.G. Ingersoll, and T.A. Berger. 2000. Development and Evaluation of Consensus-based Sediment Quality Guidelines for Freshwater Ecosystems. *Archives of Environ. Contamination and Toxicology* 39(1):20–31. More recent TECs and PECs may be used if lower than stated in MacDonald 2000.

(2) Data collected during the previous October 1–September 30 period shall be submitted by March 31 of each year.

iii. Urban Creeks Monitoring Report – The Permittees shall submit a comprehensive Urban Creeks Monitoring Report no later than March 31 of each year, reporting on all data collected during the foregoing October 1–September 30 period. Each Urban Creeks Monitoring Report shall contain summaries of Creek Status, SSID Projects, and Pollutants of Concern Monitoring including, as appropriate, the following:

(1) Immediately following the Table of Contents, a completed Water Year Summary Table that lists each Program's monitoring sites, with a row for each site. The table columns contain: Site ID; creek name; land use; latitude; longitude; bioassessment, nutrient; chlorine; water column toxicity; sediment toxicity and chemistry; pathogens; temperature loggers; and general water quality (sonde data). For each site, list the site information and check the parameters sampled at that site. This will provide a summary of all Creek Status Monitoring conducted that water year.

(2) An SSID status report pursuant to Provision C.8.e.iv.

(3) For all data, a statement of the data quality.

(4) An analysis of the data, which shall include the following:

(a) Identification and analysis of any trends in stormwater or receiving water quality which shall include:

- Calculations of CSCI scores and physical habitat endpoints;
- Comparison of CSCI scores to:
  - Each other;
  - Any applicable, available reference site(s); and
  - Physical habitat endpoints.

(b) A discussion of the data for each monitoring program component, which shall:

- Discuss monitoring data relative to prior conditions, beneficial uses and applicable water quality standards as described in the Basin Plan, the Ocean Plan, or the California Toxics Rule or other applicable water quality control plans;
- Where appropriate, develop hypotheses to investigate regarding pollutant sources, trends, and BMP effectiveness;
- Identify and prioritize water quality problems;
- Identify potential sources of water quality problems;
- Describe followup actions;
- Evaluate the effectiveness of existing control measures; and
- Identify management actions needed to address water quality problems.

iv. Pollutants of Concern Monitoring Reports – By October 15 of each year of the permit (beginning in 2016), the Permittees shall submit a report describing the allocation of sampling effort for POC monitoring for the forthcoming year (i.e., the water year that began October 1 of that year) and what was accomplished for POC monitoring during the preceding water year. The report shall include (for preceding year and projected for forthcoming year): monitoring locations, number and types of samples collected, purpose of sampling (management question addressed), and analytes measured. Any data not reportable to CEDEN should be included in the following Urban Creeks Monitoring Report due annually on March 31.

v. Integrated Monitoring Report – No later than March 31 of the fifth year of the Permit term, Permittees shall submit an Integrated Monitoring Report in lieu of the annual Urban Creeks Monitoring Report. This report will be part of the next Report of Waste Discharge for the reissuance of this Permit. The Integrated Monitoring Report shall report on all the data collected since the previous Integrated Monitoring Report and shall contain the following:

(1) The Water Year Summary Table, as described in Provision C.8.h.iii, containing information pertaining to the fourth year monitoring data;

(2) A comprehensive analysis of all data collected pursuant to Provision C.8. since the previous Integrated Monitoring Report, and may include other pertinent studies;

(3) For POCs, the report shall include methods, data, calculations, load estimates, and source estimates for each POC parameter, as applicable; and

(4) The Integrated Monitoring Report shall include a budget summary for each monitoring requirement and recommendations for future monitoring.

vi. Standard Report Content – All monitoring reports shall include the following:

(1) The purpose of the monitoring and briefly describe the study design rationale;

(2) Quality Assurance/Quality Control summaries for sample collection and analytical methods, including a discussion of any limitations of the data;

(3) Brief descriptions of sampling protocols and analytical methods;

(4) Sample location description, including water body name and segment and latitude and longitude coordinates;

(5) Sample ID, collection date (and time if relevant), media (e.g., water, filtered water, bed sediment, tissue);

(6) Concentrations detected, measurement units, and detection limits;

(7) Assessment, analysis, and interpretation of the data for each monitoring program component;

(8) A listing of volunteer and other non-Permittee entities whose data are included in the report; and

(9) Assessment of compliance with applicable water quality standards.

C.9. Pesticides Toxicity Control

To prevent the impairment of urban streams by pesticide-related toxicity, the Permittees shall implement a pesticide toxicity control program that addresses, within their jurisdictions, their own and others' use of pesticides that pose a threat to water quality and that have the potential to enter the municipal conveyance system.

This provision implements requirements of the TMDL for Diazinon and Pesticide-Related Toxicity for Urban Creeks in the region. The TMDL includes urban runoff allocations for Diazinon of 100 ng/l and for pesticide-related toxicity of 1.0 Acute Toxicity Units (TUa) and 1.0 Chronic Toxicity Units (TUc) to be met in urban creek waters. U.S. EPA phased out urban uses of diazinon in the mid-2000s, and diazinon is no longer detected in urban creeks in the region. Pesticide-related toxicity continues to occur, because State and federal pesticide regulatory programs, as currently implemented, allow pesticides to be used in ways that cause or contribute to aquatic toxicity. In adopting the TMDL implementation plan, the Water Board recognized that (1) Permittees must control their own use of pesticides, but Permittees are not solely responsible for attaining the allocations, because their authority to regulate others' pesticide use is constrained by federal and State law; and (2) because a realistic date for achieving allocations cannot be discerned given the current framework for pesticide regulation, reviewing the implementation strategy every five years, at permit reissuance, is the appropriate timeline. Accordingly, the Permittees' requirements for addressing the allocations are set forth in the TMDL implementation plan and are included in this provision.

Urban-use pesticides of concern to water quality include: diamides (chlorantraniliprole and cyantraniliprole); diuron, fipronil and its degradates; indoxacarb; organophosphorous insecticides (chlorpyrifos, diazinon, and malathion); pyrethroids (metofluthrin, bifenthrin, cyfluthrin, beta-cyfluthrin, cypermethrin, deltamethrin, esfenvalerate, lambda-cyhalothrin, and permethrin); and carbamates (e.g., carbaryl and aldicarb).

C.9.a. Maintain and Implement an Integrated Pest Management (IPM) Policy or Ordinance and Standard Operating Procedures

All Permittees have developed a pesticide toxicity control program for use of pesticides in municipal operations and on municipal property based on the concepts of IPM[40] and have adopted an IPM policy or ordinance and standard operating procedures to implement the policy or ordinance.

[40] IPM is an ecosystem-based strategy that focuses on long-term prevention of pests or their damage through a combination of techniques such as biological control, habitat manipulation, modification of cultural practices, and use of resistant varieties. Pesticides are used only after monitoring indicates they are needed according to established guidelines, and treatments are made with the goal of removing only the target organism. Pest control materials are selected and applied in a manner that minimizes risks to human health, beneficial and non-target organisms, and the environment. IPM techniques could include biological controls (e.g., ladybugs and other natural enemies or predators); physical or mechanical controls (e.g., hand labor or mowing, caulking entry points to buildings); cultural controls (e.g., mulching, alternative plant type selection, and enhanced cleaning and containment of food sources in buildings); and reduced risk chemical controls (e.g., soaps or oils).

i. Task Description – The Permittees shall implement their IPM policies or ordinances and standard operating procedures and update their IPM policies or ordinances and standard operating procedures as needed to ensure their use of pesticides do not cause or contribute to pesticide-caused toxicity in receiving waters.

ii. Implementation - Each Permittee shall require municipal employees and contractors to adhere to its IPM policy or ordinance and standard operating procedures in all the Permittee's municipal operations and on all municipal property.

iii. Reporting

(1) In their Annual Reports, the Permittees shall certify they are implementing their IPM policy or ordinance and standard operating procedures, report trends in quantities and types of pesticide active ingredients used, and explain any increases in use of pesticides of concern to water quality as listed in the introduction section of this Provision. Trends and quantities of pesticide active ingredient usage shall be reported beginning with the September 2017 Annual Report.

(2) In their Annual Reports, the Permittees shall provide a brief description (e.g., one or two sentences) of two IPM tactics or strategies implemented in the reporting year. Examples could include non-chemical strategies such as monitoring, mowing weeds, mulching, and redesign of problematic landscapes; preventive actions such as sealing holes and gaps in structures, improving sanitation, and outreach to employees about how their actions contribute to pest presence; and examples of integration of several strategies into a cohesive whole, such as tackling a rat problem by educating building occupants, improving sanitation, trimming trees away from buildings, sealing holes in the structure, and trapping rodents. To the extent possible, different IPM actions should be described each year, so that a range of IPM actions is described over the permit term.

(3) IPM policies or ordinances and IPM standard operating procedures shall be submitted to the Water Board upon request.

C.9.b. Train Municipal Employees

i. Task Description– The Permittees shall ensure that all municipal employees who, within the scope of their duties, apply or use pesticides are trained in IPM practices and the Permittee's IPM policy or ordinance and standard operating procedures. This training may also include other training opportunities such as Bay-Friendly Landscape Maintenance Training & Qualification Program, provided both structural and landscape pest control training are provided.

ii. Reporting

(1) In their Annual Reports, the Permittees shall report the percentage of municipal employees who apply pesticides who have received training in their IPM policy or ordinance and IPM standard operating procedures

within the last year. This report shall briefly describe the nature of the training, such as tailgate training provided by a Permittee's IPM coordinator, IPM training through the Pesticide Applicators Professional Association, etc.

(2) The Permittees shall submit training materials (e.g., course outline, date, and list of attendees) upon request.

C.9.c. Require Contractors to Implement IPM

i. Task Description – The Permittees shall hire IPM-certified contractors or include contract specifications requiring contractors to implement IPM, so that all contractors practice IPM on municipal properties. The Permittees shall observe contractor pesticide applications to verify that contractors implement their contract specifications in accordance with the Permittee's IPM policies or ordinance and standard operating procedures. Permittees shall note that contractor certification as a pest control advisor (PCA) alone is not evidence of IPM implementation. Similarly, IPM certifications awarded to a pest control company may not guarantee an individual employee will always use IPM strategies. Thus, periodic Permittee observation of contractor performance is necessary.

ii. Implementation – Permittees shall periodically monitor their contractors' activities to verify full implementation of IPM techniques. This shall include, at a minimum, evaluation of lists of pesticides and amounts of active ingredient used.

iii. Reporting – In their Annual Reports, the Permittees shall state how they verified contractor compliance with IPM policies and any actions taken or needed to correct contractor performance.

C.9.d. Interface with County Agricultural Commissioners

i. Task Description – The Permittees shall maintain communications with county agricultural commissioners to (a) get input and assistance on urban pest management practices and use of pesticides, (b) inform them of water quality issues related to pesticides, and (c) report any observed or citizen-reported violations of pesticide regulations (e.g., illegal handling and applications of pesticides) associated with stormwater management, particularly the California Department of Pesticide Regulation (DPR) surface water protection regulations for outdoor, nonagricultural use of pyrethroid pesticides by any person performing pest control for hire (http://www.cdpr.ca.gov/docs/legbills/rulepkgs/11-004/text_final.pdf).

ii. Reporting – In their Annual Reports, the Permittees shall briefly describe the communications they have had with county agricultural commissioners and report followup actions to correct violations of pesticide regulations.

C.9.e. Public Outreach

i. Task Description – Permittees shall undertake outreach programs to (a) encourage communities within the Permittee's jurisdiction to reduce their reliance on pesticides that threaten water quality; (b) encourage public and private landscape irrigation management that minimizes pesticide runoff; and (c) promote appropriate disposal of unused pesticides.

ii. Implementation – The Permittees shall conduct each of the following:

(1) **Point of Purchase Outreach**: The Permittees shall:

- Conduct outreach to consumers at the point of purchase;
- Provide targeted information on proper pesticide use and disposal, potential adverse impacts on water quality, and less toxic methods of pest prevention and control; and
- Participate in and provide resources for the "Our Water, Our World" program or a functionally-equivalent pesticide use reduction outreach program.

(2) **Pest Control Contracting Outreach:** The Permittees shall conduct outreach to residents who use or contract for structural pest control and landscape professionals by (a) explaining the links between pesticide usage and water quality; and (b) providing information about IPM in structural pest management certification programs and landscape professional trainings; and (c) disseminating tips for hiring structural pest control operators and landscape professionals, such as the tips prepared by the University of California Extension IPM Program (UC-IPM).

(3) **Outreach to Pest Control Professionals:** The Permittees shall conduct outreach to pest control operators, urging them to promote IPM services to customers and to become IPM-certified by Ecowise Certified or a functionally-equivalent certification program. Permittees are encouraged to work with the Pesticide Applicators Professional Association; the California Association of Pest Control Advisors; DPR; county agricultural commissioners; UC-IPM; BASMAA; EcoWise Certified Program (or functionally equivalent certification program); Bio-integral Resource Center and others to promote IPM to pest control operators.

iii. Reporting – In each Annual Report, Permittees shall describe their actions taken in the three outreach categories above. Outreach conducted at the county or regional level shall be described in Annual Reports prepared at that respective level; reiteration in individual Permittee reports is discouraged. Reports shall include a brief description of outreach conducted in each of the three categories, including level of effort, messages and target audience. (The effectiveness of outreach efforts shall be evaluated only once in the Permit term, as required in Provision C.9.f.).

C.9.f. Track and Participate in Relevant Regulatory Processes

i. Task Description – The Permittees shall conduct the following activities, which may be done at a county, regional, or state wide level:

(1) The Permittees shall track U.S. EPA pesticide evaluation and registration activities as they relate to surface water quality and, when necessary, encourage U.S. EPA to coordinate implementation of the Federal Insecticide, Fungicide, and Rodenticide Act and the CWA and to accommodate water quality concerns within its pesticide registration process;

(2) The Permittees shall track DPR pesticide evaluation activities as they relate to surface water quality and, when necessary, encourage DPR to coordinate implementation of the California Food and Agriculture Code with the California Water Code and to accommodate water quality concerns within its pesticide evaluation process;

(3) The Permittees shall assemble and submit information (such as monitoring data) as needed to assist DPR and county agricultural commissioners in ensuring that pesticide applications comply with WQS; and

(4) As appropriate, the Permittees shall submit comment letters on U.S. EPA and DPR re-registration, re-evaluation, and other actions relating to pesticides of concern for water quality.

ii. Reporting – In their Annual Reports, the Permittees shall summarize participation efforts, information submitted, and how regulatory actions were affected. Permittees who contribute to a county, regional, or state wide effort shall submit one report at the county or regional level. Duplicate reporting is discouraged.

C.9.g. Evaluate Implementation of Pesticide Source Control Actions

i. Task Description – This task is necessary to gauge how effective the implementation actions taken by Permittees are in (a) achieving TMDL targets and (b) avoiding future pesticide-related toxicity in urban creeks. Once during the permit term, Permittees shall conduct a thoughtful evaluation of their IPM efforts, how effective these efforts appear to be, and how they could be improved.

ii. Implementation – The Permittees shall evaluate the effectiveness of the pesticide control measures implemented by their staff and contractors, evaluate attainment of pesticide concentration and toxicity targets for water and sediment from monitoring data (collected by Permittees, research agencies, and/or State agencies), and identify additions and/or improvements to existing control measures needed to attain targets, with an implementation time schedule.

iii. Reporting – In their 2019 Annual Reports, the Permittees shall submit this evaluation, which shall include an assessment of the effectiveness of their IPM efforts required in Provisions C.9.a-e and g; a discussion of any improvements

made in these efforts in the preceding five years; and any changes in water quality regarding pesticide toxicity in urban creeks. This evaluation shall also include a brief description of one or more pesticide-related area(s) the Permittee will focus on enhancing during the subsequent permit term. Work conducted at the county or regional level shall be evaluated at that respective level; reiteration in individual Permittee evaluation reports is discouraged.

C.10. Trash Load Reduction

The Permittees shall demonstrate compliance with Discharge Prohibition A.1, for trash discharges, Discharge Prohibition A.2, and trash-related Receiving Water Limitations through the timely implementation of control measures and other actions to reduce trash loads from municipal separate storm sewer systems in accordance with the requirements of this provision. Flood management agencies are not subject to these trash reduction requirements except for continued implementation of requirements for trash full capture systems and Trash Hot Spot cleanups, as specified in subsections C.10.b.i and C.10.c.

C.10.a. Trash Reduction Requirements

Permittees shall implement trash load reduction control actions in accordance with the following schedule and trash generation area management requirements, including mandatory minimum full trash capture systems, to meet the goal of 100 percent trash load reduction or no adverse impact to receiving waters from trash by July 1, 2022.

i. Schedule – Permittees shall reduce trash discharges from 2009 levels, described below, to receiving waters in accordance with the following schedule:

a. 70 percent by July 1, 2017; and
b. 80 percent by July 1, 2019.

In addition, Permittees should achieve 60 percent reduction by July 1, 2016. This is not a mandatory deadline; rather, it shall be used as a performance guideline to meet the mandatory July 1, 2017 deadline. Permittees that do not attain the 60 percent performance guideline shall submit documentation of a plan and schedule of implementation of additional trash load reduction control actions that will attain the July 1, 2017 deadline.

ii. Trash Generation Area Management – Permittees shall demonstrate attainment of the C.10.a.i trash discharges percentage-reduction requirements by management of mapped trash generation areas within their jurisdictions delineated on Trash Generation Area Maps included with their Long Term Trash Reduction Plans, submitted in February 2014, in accordance with the requirements and accounting set forth in this provision. The February 2014 maps provide the 2009 trash levels and delineate trash generation areas within Permittees' jurisdictions into the following trash generation rate categories

Low = less than 5 gal/acre/yr;
Moderate = 5-10 gal/acre/yr;
High = 10-50 gal/acre/yr; and
Very High = greater than 50 gal/acre/yr.

Permittees also designated trash management areas on their February 2014 maps encompassing one or more trash generation areas, within which they will implement trash control actions. Permittees shall have an opportunity to correct and/or revise, based on improved information, the 2009 trash levels and trash generation areas in their February 2014 maps by submitting the correction and/or revision no later than the 2016 Annual Report deadline.

a. Permittees shall implement trash prevention and control actions, including full trash capture systems or other trash management actions, or combinations of actions, with trash discharge control equivalent to or better than full trash capture systems, to reduce trash generation to a Low trash generation rate or better. Actions equivalent to full trash capture means actions that send no more trash down the storm drain system than a full trash capture device would allow, which is essentially no trash discharge except in very large storm flows. The C.10.a.i percent reductions shall be demonstrated by percent of 2009 Very High, High, and Moderate trash generation areas reduced to lower trash generation categories or Low trash generation by the C.10.a.i mandatory deadlines.

b. Permittees shall ensure that lands that they do not own or operate, but that are plumbed directly to their storm drain systems in Very High, High, and Moderate trash generation areas are equipped with full trash capture systems or are managed with trash discharge control actions equivalent to or better than full trash capture systems. The efficacy of the latter shall be assessed with visual assessments in accordance with C.10.b.ii. If there is a full trash capture device downstream of these lands, no other trash control is required. Permittees shall map the location, or otherwise record the location, of all such lands greater than 10,000 ft^2 that are plumbed directly to their storm drain systems by July 1, 2018, including the trash control status of these areas. This information shall be retained by the Permittees for inspection upon request.

iii. Mandatory Minimum Full Trash Capture Systems - Permittees shall install and maintain a mandatory minimum number of full trash capture devices, to treat runoff from an area equivalent to 30 percent of retail/wholesale land area, as documented by the Association of Bay Area Governments, which drains to the storm drain system within their jurisdictions. A city Permittee with a population less than 12,000 and retail/wholesale land less than 40 acres, or a population less than 2,000, is exempt from this full trash capture requirement. Table 2 in Attachment E contains the minimum amount of drainage areas that must be treated with full trash capture devices by each city or county Permittee, and the minimum number of trash capture devices required to be installed and maintained by flood management agency Permittees.

A full capture system is any single device or series of devices that traps all particles retained by a 5 mm mesh screen and has a design treatment capacity of not less than the peak flow rate resulting from a one-year, one-hour, storm in the sub-drainage area or designed to carry at least the same flow as the storm drain connected to the inlet. The device(s) must also have a trash reservoir large enough to contain a reasonable amount of trash safely without overflowing trash into the overflow outlet between maintenance events. Types of systems certified by the State Water Resources Control Board are deemed full capture systems. A stormwater treatment facility implemented in accordance with Provision C.3 is also deemed a full capture system if the facility, including its maintenance prevents the discharge of trash to the downstream MS4 and receiving waters

and discharge points from the facility, including overflows, are appropriately screened or otherwise configured to meet the full trash capture screening specification for storm flows up to the full trash capture one year, one hour storm hydraulic specification (C.10.a.iii.).

C.10.b. Demonstration of Trash Reduction Outcomes

i. Full Trash Capture Systems – Permittees shall maintain, and provide for inspection and review upon request, documentation of the design, operation, and maintenance of each of their full trash capture systems, including the mapped location and drainage area served by each system.

a. **Maintenance** – The maintenance of each full capture device shall be adequate to prevent plugging, including plugging of the 5 mm screen leading to trash overflow and bypass, flooding, or a full condition of the device's trash reservoir causing bypassing of trash. All full trash capture devices shall be inspected and maintained at least once per year. All such devices in high or very high trash generation areas shall be inspected at least two times per year, with the inspections spaced at least three months or more apart. If this frequency of inspection is found excessive after two inspections, the inspection frequency can be reduced to once per year.

   If any such device is found to have a plugged or blinded screen or is greater than 50 percent full of trash during a maintenance event, the maintenance frequency shall be increased so that the device is neither plugged nor more than half full of trash at the next maintenance event.

b. **Maintenance Records** – Permittees shall retain device specific maintenance records, including, at a minimum: the date(s) of maintenance, the capacity condition of the device at the time of maintenance (full and overflowing or with storage capacity remaining), any special problems such as flooding, screen blinding or plugging from leaves, plastic bags, or other debris causing overflow, damage reducing function, or other negative conditions. A summary of this information shall be reported in each Annual Report which may be limited to the number of full capture devices maintained that exhibited a plugged, full or overflowing condition upon maintenance.

c. **Certification** – Permittees shall certify annually that each of their full trash capture systems is operated and maintained to meet full trash capture system requirements. Drainage areas served by an adequately maintained full trash capture system will be considered equivalent to or better than a Low trash generation area.

ii. Other Trash Management Actions – Permittees shall maintain, and provide for inspection and review upon request, documentation of non-full trash capture system trash control actions that verifies implementation of each action. Permittees shall also conduct assessment of the action that verifies effectiveness of the action or combination of actions and maintain, and provide for inspection and review upon request, documentation of assessments.

a. **Implementation Documentation** – Permittees shall maintain documentation of trash control actions that describes each action or combination of actions, the level of implementation, the timing and frequency of implementation, standard operating procedures if applicable, location(s) of implementation actions including mapped location(s) and drainage area(s) affected or description of areal extent, tracking and enforcement procedures if applicable, and other information relevant to effective implementation of the action or combination of actions.

b. **Visual Assessment of Outcomes of Other Trash Management Actions** – Permittees shall conduct visual on-land assessment, including photo documentation, or other acceptable assessment method (see C.10.b.ii.b.(iv.)), of each trash generation area within which it is implementing other trash management actions or combination of actions other than full trash capture, to determine or verify the effectiveness of the action or combination of actions. Permittees may assess and account for one or more trash generation areas in a single trash management area within which a control action or combination of control actions is implemented. The visual on-land assessment method used shall meet or exceed the following criteria:

(i) Conduct observations within a trash management area of the sidewalk, curb and gutter, or locations associated with trash generation sources.

(ii) Conduct observations at randomly selected locations covering at least ten percent of a trash management area's street miles; or conduct observations at strategic locations with justification they are representative of trash generation in the management area and they will represent the effectiveness of the control action(s) implemented or planned in the management area.

(iii) Conduct observations at a frequency consistent with known or estimated trash generation rate(s) within a trash management area and the time frequency of implementation of the control action(s) implemented or planned in the management area. Conduct observations for effectiveness approximately at the halfway point of the interval between instances of recurring trash control actions such as street sweeping and on-land cleanup.

(iv) Permittees may put forth substantive and credible evidence that certain management actions or sets of management actions when performed to a specified performance standard yield a certain trash reduction outcome reliably. Such a proposal shall be made to the Executive Officer as a submittal separate from any other submittals or reports. If this evidence is accepted by the Executive Officer, the Permittees may claim a similar trash reduction outcome by demonstrating that they have performed these trash reduction actions within certain trash management areas to the same performance standard accepted by the Executive Officer.

iii. Percentage Discharge Reduction – Percentage discharge reduction from 2009 from Very High generation areas reduced to High, Moderate, and Low, High

generation areas reduced to Moderate and Low, and Moderate trash generation areas reduced to Low trash generation category to meet the required total percent reduction ($\%_{Reduction}$) shall be calculated based on the following formula:

$$\% \text{ Reduction} = 100\ [(12A_{VH(2009)} + 4A_{H(2009)} + A_{M(2009)}) - (12A_{VH} + 4A_{H} + A_{M})] \\ / (12A_{VH2009} + 4A_{H2009} + A_{M2009})$$

where:

$A_{VH(2009)}$	=	total amount of the 2009 very high trash generation category jurisdictional area
$A_{H(2009)}$	=	total amount of the 2009 high trash generation category jurisdictional area
$A_{M(2009)}$	=	total amount of the 2009 moderate trash generation category jurisdictional area
A_{VH}	=	total amount of very high trash generation category jurisdictional area in the reporting year
A_{H}	=	total amount of high trash generation category jurisdictional area in the reporting year
A_{M}	=	total amount of moderate trash generation category jurisdictional area in the reporting year
12	=	Very High to Moderate weighing ratio
4	=	High to Moderate weighing ratio
100	=	fraction to percentage conversion factor

iv. Source Control – Permittee jurisdiction-wide actions to reduce trash at the source, particularly persistent trash items, may be valued toward trash load reduction compliance by up to ten percent load reduction total for all such actions. To claim a load percentage reduction value, Permittees must provide substantive and credible evidence that these actions reduce trash by the claimed value. A Permittee may reference studies in other jurisdictions if it provides evidence that the implementation of source control in its jurisdiction is similarly implemented as the source control assessed in the reference studies.

v. Receiving Water Monitoring – Permittees shall conduct receiving water monitoring and develop receiving water monitoring tools and protocols and a monitoring program designed, to the extent possible, to answer the following questions:

- Have a Permittee's trash control actions effectively prevented trash within a Permittee's jurisdiction from discharging into receiving water(s)?
- Is trash present in receiving water(s), including transport from one receiving water to another, e.g., from a creek to a San Francisco Bay segment, at levels that may cause adverse water quality impacts?
- Are trash discharges from a Permittee's jurisdiction causing or contributing to adverse trash impacts in receiving water(s)?
- Are there sources outside of a Permittee's jurisdiction that are causing or contributing to adverse trash impacts in receiving water(s)?

The monitoring tools and protocols shall include direct measurements and/or observations of trash in receiving water(s), or in scenarios where direct measurements or observations are not feasible, surrogates for trash in receiving waters, such as measurement or observations of trash on stream banks or shorelines.

a. **Development and Testing Plan** – Permittees shall submit a plan acceptable to the Executive Officer by July 1, 2017, to develop and test a proposed receiving water monitoring program that includes the following:
   (i) Description of the tools and protocols;
   (ii) Description of discharge and receiving water scenarios, which will be considered, that accounts for the various receiving waters and watershed, community, and drainage characteristics within Permittees' jurisdictions that affect the discharge of trash and its fate and effect in receiving water(s);
   (iii) Description of factors, in addition to those in C.10.b.v.a.(ii), that will be considered and evaluated to determine scenarios and spatial and temporal representativeness;
   (iv) Identification of sites, representative of all the Permittees and discharge and receiving water scenarios, that will be monitored during this permit term;
   (v) Development of a system to manage and access monitoring results;
   (vi) Opportunity for input and participation by interested parties;
   (vii) Scientific peer review of the tools and protocols and testing results; and
   (viii) Schedule for development and testing; with monitoring at representative sites starting no later than October 2017.

   If the Permittees conduct this work through an independent third party, approved by the Executive Officer, the Plan may be submitted by July 2018, with monitoring to begin no later than October 2018.

b. **Report and Proposed Monitoring Program** – Permittees shall report progress in the 2018 Annual Report, and submit a preliminary report by July 1, 2019 and a final report by July 1, 2020 on the proposed trash receiving water monitoring program. The progress report is not required if the Permittees conduct this work through an independent third party, approved by the Executive Officer, that provides input and participation by interested parties and scientific peer review of the tools and protocols and testing results and proposed receiving monitoring program.

C.10.c. Trash Hot Spot Selection and Cleanup

Trash Hot Spots in receiving waters shall be cleaned annually to achieve the multiple benefits of abatement of impacts and to learn more about the sources and transport routes of trash loading.

i. Trash Hot Spot Cleanup and Definition – The Permittees shall clean selected Trash Hot Spots to a level of "no visual impact" at least one time per year for the

term of the permit. Trash Hot Spots shall be sections of creek or shoreline significantly impacted by trash of at least 100 yards of creek length or 200 yards of shoreline length.

ii. **Trash Hot Spot Selection** – Permittees shall maintain the same number of trash hot spots identified in the previous permit term, which are included in Attachment E. Permittees may select new trash hot spot locations if past locations are no longer trash hotspots or if other locations may better align with trash management areas.

iii. **Trash Hot Spot Assessments** – The Permittees shall quantify the volume of material removed from each Trash Hot Spot cleanup and attempt to identify sources to the extent readily feasible. Documentation of the cleanup activity to be retained by the Permittee shall include the trash condition before and after cleanup of the entire hot spot using photo documentation with a minimum of one photo per 100 feet of hot spot length and the total volume of trash and litter removed from the hot spot. Permittees shall report the volume removed for the most recent five years of hot spot cleanup in each Annual Report, or if a new trash hot spot location is selected, Permittees shall report the volume removed for the years of cleanup of that hotspot.

C.10.d. Trash Load Reduction Plans

Each Permittee shall maintain, and provide for inspection and review upon request, a Trash Load Reduction Plan, including an implementation schedule to meet the C.10.a Trash Load Reduction requirements. A summary of any new revisions to the Plan shall be included in the Annual Report. The Plan shall describe trash load reduction control actions being implemented or planned and the trash generation areas or trash management areas where the actions are or will be implemented, including jurisdiction-wide actions, such as source control ordinances

The Plans may include actions to control sources outside of the Permittee's jurisdiction that are causing or contributing to adverse trash impacts in the receiving water(s). Permittees who choose to implement such control actions may account for them towards meeting the C.10.a Trash Load Reduction requirements as long as they can demonstrate the controls will be sustained and they quantify the sustained load reduction benefit relative to control actions in the trash generation areas or trash management areas in their jurisdiction that drained to the affected receiving water.

C.10.e. Optional Trash Load Reduction Offset Opportunities

i. **Additional Creek and Shoreline Cleanup** – A Permittee may offset part of its provision C.10.a trash load percent reduction requirement by conducting additional cleanup of creek and shoreline areas beyond trash hot spot cleanups required by C.10.c if the additional cleanup efforts are conducted at a frequency of at least twice per year and sufficient to demonstrate sustained improvement of the creek or shoreline area. The maximum offset that may be claimed is ten percent.

A Permittee may claim a load reduction offset of one percent for each total of trash volume removed from additional cleanups that is three and a third percent

for the 2016 performance guideline and 2017 mandatory trash load reduction deadline, and ten percent for the 2019 mandatory trash load reduction deadline, of the Permittee's 2009 trash load volume estimates, based on its trash generation maps and average categorical trash generation rates (see C.10.a.ii), in accordance with the following formula:

1% Reduction Offset (Volume) = $(12\ A_{VH(2009)} + 4\ A_{H(2009)} + A_{M(2009)})$ OF

where:

$A_{VH(2009)}$	=	total amount of 2009 very high trash generation category jurisdictional area
$A_{H(2009)}$	=	total amount of 2009 high trash generation category jurisdictional area
$A_{M(2009)}$	=	total amount of 2009 moderate trash generation category jurisdictional area
12	=	Very High to Moderate weighing ratio
4	=	High to Moderate weighing ratio
OF	=	offset factor equal to (7.5 x 0.033) for the 2016 performance guideline and 2017 mandatory trash load reduction deadline, where 7.5 is the conversion from acres to gallons based on trash generation rates and 0.033 is the three to one offset ratio, or (7.5 x 0.1) for the 2019 mandatory trash load reduction deadline, where 7.5 is the conversion from acres to gallons based on trash generation rates and 0.1 is the ten to one offset ratio.

ii. Direct Trash Discharge Controls – A Permittee may offset an additional part of its provision C.10.a trash load percent reduction requirement by implementing a comprehensive plan approved by the Executive Officer for control of direct discharges of trash to receiving waters from non-storm drain system sources. The maximum offset that may be claimed is fifteen percent using the C.10.e.i formula. The plan shall be submitted not later than February 1 of the first year in which the offset will be reported in the following Annual Report and shall include the following:

a. description of sources of the directly discharged trash;
b. description of control actions that will be implemented during the permit term to prevent or reduce direct discharge trash loads in a systematic and comprehensive manner;
c. map of the affected receiving water area and associated watershed; and
d. description of how effectiveness of controls will be assessed, including documentation of controls, quantification of trash volume controlled, and assessment of resulting improvements to receiving water conditions.

C.10.f. Reporting

Each Permittee shall provide the following in each Annual Report:

i. A summary of trash control actions within each trash management area, including the types of actions, levels of implementation, areal extent of implementation, and whether the actions are ongoing or new, including initiation date.

ii. Upon request by the Executive Officer, an updated trash generation area map or maps, which include trash management areas, including the locations and associated drainage areas and of full trash capture systems and other trash control actions, and the location of Trash Hot Spots, with highlight or other indication of any revisions or changes from the previous year map(s). These maps can be used to illustrate progress toward achieving the trash reduction requirements in C.10.a.i.

iii. Should a Permittee correct and/or revise its 2009 trash generation map submitted in February 2014, the corrected or revised 2009 trash generation map shall be submitted in the 2016 Annual Report, if the Permittee has not already submitted the corrected or revised map. Certification that each of its full trash capture systems is operated and maintained to meet full trash capture system requirements; a description of any systems that did not meet full trash capture system requirements (e.g., due to plugging or overflowing); and any corrective actions taken.

iv. An accounting of its non-full trash capture system trash control actions assessments by providing a summary description of assessments in each of its trash management areas, including the number and dates of observations.

v. An accounting of progress toward or attainment of C.10.a.i trash discharge reduction performance guidelines and mandatory deadlines using the C.10.a.ii trash generation area mapping methodology and formula.

a. If a Permittee cannot demonstrate attainment of the 2016 performance guideline, it shall submit a detailed plan and schedule of implementation of additional trash load reduction control actions that will attain the 2017 mandatory deadline.

b. If a Permittee cannot demonstrate attainment of the 2017 or 2019 mandatory trash load reduction deadline, it shall submit a report of non-compliance with the associated Annual Report, or in advance of the Annual Report, that describes actions to comply with the mandatory reduction deadline in a timely manner. The report shall include a plan and schedule for implementation of full trash capture systems sufficient to attain the required reduction. A Permittee may submit a plan and schedule for implementation of other trash management actions to attain the required reduction in an area where implementation of a full trash capture system is not feasible. In such cases, the report shall include identification of the area and documentation of the basis of the Permittee's determination that implementation of a full trash capture system is not feasible.

vi. In the 2018 Annual Report, progress on development and testing of the receiving water monitoring program.

vii. The volume removed for the most recent five years of hot spot cleanup for each of its trash hot spots, or for the years of cleanup if a new trash hot spot location has been selected.

viii. For Permittees claiming a C.10.e.i offset, based on additional cleanup of creek and shoreline areas, a summary description of the additional cleanup actions.

ix. For Permittees claiming a C.10.e.ii offset, based on non-storm drain system trash controls, a summary description of control actions receiving water assessment results, quantification of trash volume controlled, and assessment of resulting improvements in receiving water condition, the claimed offset and documentation of information used in the C.10.e.i formula.

C.11. Mercury Controls

The Permittees shall implement the following control program for mercury. The Permittees shall perform the control measures (source control, treatment control, and pollution prevention strategies) and report on those control measures according to the provisions below. The provisions implement the urban runoff requirements of the San Francisco Bay and Guadalupe River Watershed mercury TMDLs and reduce mercury loads to make substantial progress toward achieving the urban runoff mercury load allocations established for the TMDLs. The aggregate, regionwide, urban runoff wasteload allocation from the San Francisco Bay mercury TMDL is 82 kg/yr. The TMDL implementation plan calls for attainment of the allocation by February 2028 and, as a way to measure progress, attainment of an interim loading milestone by February 2018 of 120 kg/yr, halfway between the 2003 estimated load, 160 kg/yr, and the aggregate allocation. The Permittees may comply with any requirement of this provision through a collaborative effort.

C.11.a. Implement Control Measures to Achieve Mercury Load Reductions

i. Task Description – Permittees shall implement mercury source and treatment control measures and pollution prevention strategies to reduce mercury loads throughout the area covered by this Permit (permit-area).

ii. Implementation level – To comply with this provision element, Permittees shall:

(1) Identify the watersheds or portions of watersheds (management areas) in which mercury control measures are currently being implemented and those in which new control measures will be implemented during the term of this Permit (many or most may be the same watersheds as those identified for C.12.a.ii(1));

(2) Identify the control measures that are currently being implemented and those that will be implemented in each watershed and management area (may be the same as those identified for C.12.a.ii(2));

(3) Submit a schedule of control measure implementation; and

(4) Implement mercury source and treatment control measures and pollution prevention strategies and quantify mercury load reductions achieved by using the accounting methods established according to provision C.11.b.

iii. Reporting

(1) The Permittees shall report by April 1, 2016, progress toward developing a list of the watersheds and management areas where mercury control measures are currently being implemented and those in which control measures will be implemented (C.11.a.ii(1)) during the term of this Permit as well as the monitoring data and other information used to select these watersheds and management areas.

(2) The Permittees shall report in their 2016 Annual Report the list of watersheds and management areas where control measures are currently being implemented or will be implemented during the term of the Permit (C.11.a.ii(1)) along with the specific control measures (C.11.a.ii(2)) that are currently being implemented and those that will be implemented in these watersheds and management areas and an implementation schedule (C.11.a.ii(3)) for these control measures. In addition to the list of watersheds and management areas, this report shall include:

a. The number, type, and locations and/or frequency (if applicable) of control measures;

b. The description, scope, and start date of pollution prevention measures;

c. For each structural control and non-structural BMP, interim implementation progress milestones (e.g., construction milestones for structural BMPs or other relevant implementation milestones for structural and non-structural BMPs) and a schedule for milestone achievement; and

d. Clear statements of the roles and responsibilities of each participating Permittee for implementation of pollution prevention or control measures identified under C.11.a.ii(2).

(3) Beginning with the 2017 Annual Report and continuing in all Annual Reports, Permittees shall update all the information required under C.11.a.iii(2) as necessary to account for new control measures implemented, but not described, in the 2016 Annual Report.

C.11.b. Assess Mercury Load Reductions from Stormwater

i. Task Description – The Permittees shall develop and implement an assessment methodology and data collection program to quantify in a technically sound manner mercury loads reduced through implementation of pollution prevention, source control, and treatment control measures, including mercury source control, stormwater treatment, green infrastructure, and other measures. The Permittees shall use the assessment methodology to demonstrate progress toward achieving the load reductions required in this Permit term and the program area wasteload allocations.

A reasonable and technically sound load reduction accounting system is described in the Fact Sheet and is based on information submitted by the Permittees in the January 2014 Integrated Monitoring Report. This task consists of documenting the method described in the Fact Sheet or any alternative methodology, updating and refining the accounting system to account for new information, justifying assumptions, analytical methods, sampling schemes and parameters used to quantify the load reduction for each type of control measure, and indicating what information will be collected and submitted to confirm the calculated load reduction for each control measure implemented.

ii. Implementation Level – The Permittees shall adequately quantify the mercury load reductions achieved through implementing pollution prevention, source control, and treatment control efforts.

iii. Reporting

(1) In their 2016 Annual Report the Permittees shall submit, for Executive Officer approval, the assessment methodology and data collection program required in C.11.b.i.

(2) Beginning with the 2017 Annual Report, Permittees shall report annually the loads reduced using the default (from Fact Sheet) or alternative approved assessment methodology to demonstrate cumulative mercury load reduced from each control measure implemented since the beginning of the Permit term. Permittees shall submit all supporting data and information necessary to substantiate the load reduction estimates, including appropriate reference to the control measures described in the reporting required under C.11.a.

(3) In their 2018 and subsequent Annual Reports, the Permittees shall submit, for Executive Officer approval, any refinements, if necessary, to the measurement and estimation methodologies to assess mercury load reductions in the subsequent permit.

C.11.c. Plan and Implement Green Infrastructure to reduce mercury loads

i. Task Description – Permittees shall implement green infrastructure projects during the term of the Permit to achieve the mercury load reductions performance criteria in Table 11.1. Green infrastructure projects on both public and private land can serve to achieve this load reduction requirement. Additionally, Permittees shall prepare a reasonable assurance analysis (see below and Fact Sheet) to demonstrate quantitatively that mercury load reductions of at least 10 kg/yr will be achieved by 2040 through implementation of green infrastructure throughout the permit-area.

ii. Implementation Level

(1) The Permittees shall implement sufficient green infrastructure projects so that mercury loads are collectively reduced by 48 g/yr by June 30, 2020, which shall be extended to December 31, 2020, if the Permittees provide documentation that control measures that will attain the load reduction will be implemented by December 31, 2020. Permittees shall demonstrate achievement of these load reductions by using the accounting methods approved under provision C.11.b.iii(1). Load reductions from green infrastructure projects implemented prior to the effective date of this Permit may be counted toward the required green infrastructure reductions of this Permit term if these projects were established and implemented during the Previous Permit term, but load reductions from the activity were not realized or credited during the Previous Permit term.

The Permittees may meet the load reduction as a group. The load reduction requirements summed over all Permittees within each county are set forth in Table 11.1. If neither the permit-area-wide total load reduction nor the county-specific load reduction is achieved, Permittees shall achieve load reductions consistent with their share of the county total. The individual Permittee share of the county load reduction is the proportion of county population in each municipality.

If all the Permittees in a county wish to use an alternative method of distributing the county load reductions, these Permittees shall report through their countywide stormwater programs on their alternative method (if different from default population-based method) for assigning Permittee-specific load fractions in the 2017 Annual Report. This can be determined by the Permittees within the counties and may be different from one county to the next, but all Permittees within a county shall use the same method of distributing the county load reductions. Any acceptable alternative load reduction criteria must be approved through an amendment of this Permit.

Table 11.1 Mercury Load Reduction Performance Criteria via Green Infrastructure Implementation by County

County Permittees	**Mercury Load Reduction (g/yr) by June 30, 2020, through green infrastructure**
Alameda Permittees	15
Contra Costa Permittees	9
San Mateo Permittees	6
Santa Clara Permittees	16
Solano Permittees: Suisun City, Vallejo, Fairfield	2
Totals	**48**

(2) Permittees shall prepare a reasonable assurance analysis of future mercury load reductions by doing the following:

a. Quantify the relationship between areal extent of green infrastructure implementation and mercury load reductions. This quantification should take into consideration the scale of contamination of the treated area as well as the pollutant removal effectiveness of likely green infrastructure strategies.

b. Estimate the amount and characteristics of land area that will be treated through green infrastructure by 2020, 2030, and 2040.

c. Estimate the amount of mercury load reductions that will result from green infrastructure implementation by 2020, 2030, and 2040.

d. Quantitatively demonstrate that mercury reductions of at least 10 kg/yr will be realized by 2040 through implementation of green infrastructure projects.
e. Ensure that the calculation methods, models, model inputs, and modeling assumptions used to fulfill C.11.c.ii(2)(a-d) have been validated through a peer review process.

iii. Reporting

(1) The Permittees shall submit in their 2018 Annual Report, as part of reporting for C.11.b.iii(2), the quantitative relationship between green infrastructure implementation and mercury load reductions. This submittal shall include all data used and a full description of models and model inputs relied on to establish this relationship.

(2) The Permittees shall submit in their 2020 Annual Report an estimate of the amount and characteristics of land area that will be treated through green infrastructure implementation by 2020, 2030, and 2040. This submittal shall include all data used and a full description of models and model inputs relied on to generate this estimate.

(3) The Permittees shall submit in their 2020 Annual Report a reasonable assurance analysis to demonstrate quantitatively that mercury reductions of at least 10 kg/yr will be realized by 2040 through implementation of green infrastructure projects. This submittal shall include all data used and a full description of models and model inputs relied on to make the demonstration and documentation of peer review of the reasonable assurance analysis.

(4) The Permittees shall submit as part of reporting for C.11.b.iii(2), beginning with their 2019 Annual Report, an estimate of the amount of mercury load reductions resulting from green infrastructure implementation during the term of the Permit. This submittal shall include all data used and a full description of models and model inputs relied on to generate this estimate.

(5) All Permittees in a county may submit, in the 2017 Annual Report, an alternative (different from the population-based default described in C.11.c.ii(1)) and supporting information to derive Permittee-specific proportions of load reduction criteria.

C.11.d. Prepare Implementation Plan and Schedule to Achieve TMDL Allocations

i. Task Description – Permittees shall prepare a plan and schedule for mercury control measure implementation and reasonable assurance analysis demonstrating that sufficient control measures will be implemented to attain the mercury TMDL wasteload allocations by 2028. This plan may share many elements of a similar plan developed for PCBs according to Provision C.12.d.

ii. Implementation level – Permittees shall prepare a mercury control measure implementation plan and corresponding reasonable assurance analysis that demonstrates quantitatively that the plan will result in mercury load reductions sufficient to attain the mercury TMDL wasteload allocations by 2028. The plan must:

(1) Identify all technically and economically feasible mercury control measures (including green infrastructure projects) to be implemented;

(2) Include a schedule according to which these technically and economically feasible control measures will be fully implemented; and

(3) Provide an evaluation and quantification of the mercury load reduction of such measures as well as an evaluation of costs, control measure efficiency and significant environmental impacts resulting from their implementation.

iii. Reporting

Permittees shall submit the plan and schedule in the 2020 Annual Report.

C.11.e. Implement a Risk Reduction Program

i. Task Description – The Permittees shall conduct an ongoing risk reduction program to address public health impacts of mercury in San Francisco Bay/Delta fish. The fish risk reduction program shall take actions to reduce actual and potential health risks in those people and communities most likely to consume San Francisco Bay-caught fish, such as subsistence fishers and their families. The risk reduction framework developed in the Previous Permit term, which funded community-based organizations to develop and deliver appropriate communications to appropriately targeted individuals and communities, is an appropriate approach.

ii. Implementation Level

(1) At a minimum, Permittees shall conduct or cause to be conducted an ongoing risk reduction program with the potential to reach 3000 individuals annually who are likely consumers of San Francisco Bay-caught fish. Permittees are encouraged to collaborate with San Francisco Bay industrial and wastewater discharger agencies in meeting this requirement.

(2) In year four of the permit term, Permittees shall evaluate the effectiveness of their risk reduction program.

iii. Reporting – The Permittees shall report on the status of the risk reduction program in each of their Annual Reports, including a brief description of actions taken, an estimate of the number of people reached, and why these people are deemed likely to consume Bay fish. The Permittees shall report the findings of the effectiveness evaluation of their risk reduction program in their 2020 Annual Report.

C.12. Polychlorinated Biphenyls (PCBs) Controls

The Permittees shall implement the following control program for PCBs. The Permittees shall implement PCBs control measures (source control, treatment control, and pollution prevention strategies) in areas where benefits are most likely to accrue (focused implementation) and report on those control measures according to the provisions below. The provisions implement the urban runoff requirements of the PCBs TMDL. Permittees shall reduce PCBs loads by a specified amount during the term of the Permit, thereby making substantial progress toward achieving the urban runoff PCBs wasteload allocation in the Basin Plan. The allocation, on an aggregate and regionwide basis, is 2 kg/yr (1.6 kg/yr allocated to Permittees) to be achieved by March 2030. This wasteload allocation represents a load reduction from all urban runoff sources to the Bay of approximately 18 kg/yr (14.4 kg/yr from Permittees) compared to loads estimated using data collected in 2003. The Permittees may comply with any requirement of this Provision through a collaborative effort.

C.12.a. Implement Control Measures to Achieve PCBs Load Reductions.

i. Task Description – Permittees shall implement PCBs source and treatment control measures and pollution prevention strategies to achieve PCBs load reductions in Table 12.1 throughout the area covered by this Permit (permit-area).

ii. Implementation level –To comply with this provision element, Permittees shall:

(1) Identify the watersheds or portions of watersheds (management areas) in which PCBs control measures are currently being implemented and those in which new control measures will be implemented during the term of this permit;

(2) Identify the control measures that are currently being implemented and those that will be implemented in each watershed and management area;

(3) Submit a schedule of control measure implementation; and

(4) Implement sufficient control measures to achieve the permit-area-wide reduction stated below or the county-specific load reduction performance criteria shown in Table 12.1. The Permittees shall demonstrate achievement of these load reductions as required in provision C.12.b. Load reductions from control measures implemented prior to the effective date of this Permit may be counted toward the required reductions of this Permit term if these control measures were established or implemented during the Previous Permit term, but load reductions from the activity were not realized or credited during the Previous Permit term (e.g., they were implemented after the 2014 Integrated Monitoring Report was submitted).

For all Permittees combined, these county-specific average annual PCBs load reduction performance criteria shall total 0.5 kg/yr by June 30, 2018, and 3.0 kg/yr by June 30, 2020. The June 30, 2020, deadline shall be extended to December 31, 2020, if the Permittees provide documentation that control measures that will attain the load reduction will be implemented by December 31, 2020. The Fact Sheet describes the amount of PCBs load reduction benefit associated with implementing a number of control measures.

The Permittees may meet the load reductions as a group. The load reduction requirements summed over all Permittees within each county are set forth in Table 12.1. If neither the permit-area-wide total load reduction criteria nor the county-specific load reduction criterion is achieved, Permittees shall achieve load reductions consistent with their share of the county total. The individual Permittee share of the county load reduction performance criteria is the proportion of county population in each municipality.

If all the Permittees in a county wish to use an alternative method of distributing the county load reductions, these Permittees shall report through their countywide stormwater programs on their alternative method (if different from default population-based method) for assigning Permittee-specific load fractions in the 2017 Annual Report. This can be determined by the Permittees within the counties and may be different from one county to the next, but all Permittees within a county shall use the same method of distributing the county load reductions. Any acceptable alternative load reduction criteria must be approved through an amendment of this Permit.

Table 12.1 PCBs Load Reductions Performance Criteria by County

County	**PCBs load reduction (g/yr) by June 30, 2018**	**PCBs Load Reduction (g/yr) by June 30, 2020**
Alameda Permittees	160	940
Contra Costa Permittees	90	560
San Mateo Permittees	60	370
Santa Clara Permittees	160	940
Solano Permittees: Suisun City, Vallejo, Fairfield	30	190
Totals	**500**	**3000**

iii. Reporting

(1) The Permittees shall report by April 1, 2016, progress toward developing a list of the watersheds and management areas where PCBs control measures are currently being implemented and those in which control measures will be implemented (C.12.a.ii(1)) during the term of this Permit as well as the monitoring data and other information used to select these watersheds and management areas. This list should include watersheds containing contaminated sites referred to the Water Board as well.

(2) The Permittees shall report in their 2016 Annual Report the list of watersheds and management areas where control measures are currently being implemented or will be implemented during the term of the Permit (C.12.a.ii(1)) along with the specific control measures (C.12.a.ii(2)) that are currently being implemented and those that will be implemented in these watersheds and management areas

and an implementation schedule (C.12.a.ii(3)) for these control measures. In addition to the list of watersheds and management areas, this report shall include:

a. The number, type, and locations and/or frequency (if applicable) of control measures;
b. A cumulative listing of all potentially PCB-contaminated sites Permittees have discovered and referred to the Water Board to date, with a brief summary description of each site and where to obtain further information;
c. The description, scope, and start date, of PCBs control measures;
d. For each structural control and non-structural BMP, interim implementation progress milestones (e.g., construction milestones for structural controls or other relevant implementation milestones for structural controls and non-structural BMPs) and a schedule for milestone achievement; and
e. Clear statements of the roles and responsibilities of each participating Permittee for implementation of pollution prevention or control measures identified under C.12.a.ii(2).

(3) Beginning with the 2017 Annual Report and continuing in all Annual Reports, Permittees shall update all the information required under C.12.a.iii(2) as necessary to account for new control measures implemented but not described in the 2016 Annual Report.

(4) All Permittees in a county may submit, in the 2017 Annual Report, an alternative (different from the default described in C.12.a.ii(4)) and supporting information to derive Permittee-specific proportions of load reduction criteria.

C.12.b. Assess PCBs Load Reductions from Stormwater

i. Task Description – The Permittees shall develop, document, and implement an assessment methodology and data collection program to quantify in a technically sound manner PCBs loads reduced through implementation of pollution prevention, source control, and treatment control measures, including PCBs source control, stormwater treatment, green infrastructure and other measures. The Permittees shall use the assessment methodology to demonstrate progress toward achieving the load reductions required in this Permit term and the program area wasteload allocations.

A reasonable and technically sound load reduction accounting system is described in the Fact Sheet and is based on information submitted by Permittees in the January 2014 Integrated Monitoring Report. This task consists of documenting the method described in the Fact Sheet or any alternative methodology, updating and refining the accounting system to account for new information, justifying assumptions, analytical methods, sampling schemes and parameters used to quantify the load reduction for each type of control measure, and indicating what information will be collected and submitted to confirm the calculated load reduction for each unit of activity.

ii. Implementation Level – The Permittees shall adequately quantify the PCBs load reductions achieved through all the pollution prevention, source control, and

treatment control measures Permittees will implement in this Permit term, except for measures to manage PCB-containing materials and wastes during building demolitions (C.12.f).

For this Permit term, the Permittees will receive a total of 2000 g/yr (2 kg/yr) PCBs load reduction value if they have developed and implemented effective protocols for managing PCB-containing materials during demolition so that PCBs do not drain into the MS4 as required in provision C.12.f. The 2000 g/yr PCBs load reduction value shall be in furtherance of meeting the June 30, 2020, 3000 g/yr requirement in Table 12.1.

The Permittee-specific portion of the 2000 g/yr PCBs load reduction value shall be based on the proportion of county population in each municipality. If all the Permittees in a county wish to use an alternative method of distributing the county load reductions for managing PCB-containing materials during demolition, these Permittees shall report through their countywide stormwater programs on their alternative method (if different from default population-based method) for assigning Permittee-specific load fractions in the 2019 Annual Report. This can be determined by the Permittees within the counties and may be different from one county to the next, but all Permittees within a county shall use the same method of distributing the county load reductions. Any acceptable alternative load reduction criteria must be approved through an amendment of this Permit.

iii. Reporting

(1) In their 2016 Annual Report the Permittees shall submit for approval by the Executive Officer the assessment methodology and data collection program required in C.12.b.i. and described in C.12.b.ii.

(2) Beginning with the 2017 Annual Report, Permittees shall report annually the loads reduced using the default (from the Fact Sheet) or alternative approved assessment methodology to demonstrate cumulative PCBs load reduced from each control measure implemented since the beginning of the Permit term. Permittees shall submit all supporting data and information necessary to substantiate the load reduction estimates, including appropriate reference to the control measures described in the reporting required under C.12.a.

(3) In their 2018 and subsequent Annual Reports, the Permittees shall submit, for Executive Officer approval, any refinements, if necessary, to the measurement and estimation methodologies to assess PCBs load reductions in the subsequent Permit.

(4) All Permittees in a county may submit, in the 2019 Annual Report, an alternative (different from the default population-based method) and supporting information to derive Permittee-specific shares of load reduction value associated with implementation of C.12.f.

C.12.c. Plan and Implement Green Infrastructure to reduce PCBs loads

i. Task Description – Permittees shall implement green infrastructure projects during the term of the Permit to achieve PCBs load reduction performance criteria in Table

12.2 in furtherance of meeting the 3000 g/year load reduction criteria required in C.12.a.ii.(4) and Table 12.1. Green infrastructure projects on both public and private land can serve to achieve this load reduction requirement. Additionally, Permittees shall prepare a reasonable assurance analysis (see below and the Fact Sheet) to demonstrate quantitatively that PCBs load reductions of at least 3 kg/yr will be achieved by 2040 through implementation of green infrastructure throughout the permit-area.

Table 12.2 PCBs Load Reduction Performance Criteria via Green Infrastructure Implementation by County

County Permittees	PCBs Load Reduction (g/yr) by June 30, 2020, through green infrastructure
Alameda Permittees	37
Contra Costa Permittees	23
San Mateo Permittees	15
Santa Clara Permittees	37
Solano Permittees: Suisun City, Vallejo, Fairfield	8
Totals	**120**

ii. Implementation Level

(1) The Permittees shall implement green infrastructure projects so that PCBs loads are collectively reduced by 120 g/yr by June 30, 2020, which shall be extended to December 31, 2020, if the Permittees provide documentation that control measures that will attain the load reduction will be implemented by December 31, 2020. Permittees shall demonstrate achievement of these load reductions by using the accounting methods approved under provision C.12.b.iii(1). Load reductions from green infrastructure projects implemented prior to the effective date of this Permit may be counted toward the required green infrastructure reductions of this Permit term if these projects were established and implemented during the Previous Permit term, but load reductions from the activity were not realized or credited during the Previous Permit term.

The Permittees may meet the load reduction as a group. The load reduction requirements summed over all Permittees within each county are set forth in Table 12.2. If neither the permit-area-wide total load reduction nor the county-specific load reduction is achieved, Permittees shall achieve load reductions consistent with their share of the county total under provision C.12.a.ii(4).

(2) Permittees shall prepare a reasonable assurance analysis that demonstrates how green infrastructure will be implemented in order to achieve a PCBs load reduction of 3 kg/yr across the permit-area by 2040. This analysis shall include the following:

a. Quantify the relationship between areal extent of green infrastructure implementation and PCBs load reductions, taking into consideration the scale of contamination of the treated area as well as the pollutant removal effectiveness of likely green infrastructure strategies;

b. Estimate the amount and characteristics of land area that will be treated through green infrastructure by 2020, 2030, and 2040;

c. Estimate the amount of PCBs load reductions that will result from green infrastructure implementation by 2020, 2030, and 2040;

d. Quantitatively demonstrate that PCBs reductions of at least 3 kg/yr will be realized by 2040 through implementation of green infrastructure projects; and

e. Ensure that the calculation methods, models, model inputs and modeling assumptions used to fulfill C.12.c.ii(2)a-d have been validated through a peer review process.

iii. Reporting

(1) The Permittees shall submit in their 2018 Annual Report, as part of reporting for C.12.b.iii(3), the quantitative relationship between green infrastructure implementation and PCBs load reductions. This submittal shall include all data used and a full description of models and model inputs relied on to establish this relationship.

(2) The Permittees shall submit in their 2020 Annual Report an estimate of the amount and characteristics of land area that will be treated through green infrastructure implementation by 2020, 2030, and 2040. This submittal shall include all data used and a full description of models and model inputs relied on to generate this estimate.

(3) The Permittees shall submit in their 2020 Annual Report a reasonable assurance analysis to demonstrate quantitatively that PCBs reductions of at least 3 kg/yr will be realized by 2040 through implementation of green infrastructure projects. This submittal shall include all data used and a full description of models and model inputs relied on to make the demonstration and documentation of peer review of the reasonable assurance analysis.

(4) The Permittees shall submit as part of reporting for C.12.b.iii(4), beginning with their 2019 Annual Report an estimate of the amount of PCBs load reductions resulting from green infrastructure implementation during the term of the Permit. This submittal shall include all data used and a full description of models and model inputs relied on to generate this estimate.

C.12.d. Prepare Implementation Plan and Schedule to Achieve TMDL Wasteload Allocations

i. Task Description – Permittees shall prepare a plan and schedule for PCBs control measure implementation and reasonable assurance analysis demonstrating that sufficient control measures will be implemented to attain the PCBs TMDL wasteload allocations by 2030.

ii. Implementation level – Permittees shall prepare a PCBs control measures implementation plan and corresponding reasonable assurance analysis that demonstrates quantitatively that the plan will result in PCBs load reductions sufficient to attain the PCBs TMDL wasteload allocations by 2030. The plan must:

(1) Identify all technically and economically feasible PCBs control measures to be implemented (including green infrastructure projects); and

(2) Include a schedule according to which these technically and economically feasible control measures will be fully implemented; and

(3) Provide an evaluation and quantification of the PCBs load reduction of such measures as well as an evaluation of costs, control measure efficiency and significant environmental impacts resulting from their implementation.

iii. Reporting

Permittees shall submit the plan and schedule in the 2020 Annual Report.

C.12.e. Evaluate PCBs Presence in Caulks/Sealants Used in Storm Drain or Roadway Infrastructure in Public Rights-of-Way

i. Task Description –Permittees shall collect samples of caulk and other sealants used in storm drains and between concrete curbs and street pavement and investigate whether PCBs are present in such material and in what concentrations. PCBs are most likely present in material applied during the 1970s, so the focus of the investigations should be on structures installed during this era.

ii. Implementation Level

Permittees shall collect at least 20 composite samples (throughout the permit-area) of the caulks and sealants used in storm drains or roadway infrastructure in public rights-of-way and analyze this material for PCBs in such a way as to be able to detect a minimum PCBs concentration of 200 parts per billion. This sampling and analysis will count toward partial fulfillment of the monitoring effort aimed at finding PCBs sources (see management information need in C.8.f).

iii. Reporting

Permittees shall report on the results (including all data gathered) of this investigation no later than the 2018 Annual Report.

C.12.f. Manage PCB-Containing Materials and Wastes During Building Demolition Activities So That PCBs Do Not Enter Municipal Storm Drains

i. Task Description – Permittees shall develop and implement or cause to be developed and implemented an effective protocol for managing materials with PCBs concentrations of 50 ppm or greater in applicable structures at the time such structures undergo demolition so that PCBs do not enter MS4s. PCBs from these structures can enter storm drains during and/or after demolition through vehicle track-out, airborne releases, soil erosion, or stormwater runoff.

Applicable structures include, at a minimum, commercial, public, institutional and industrial structures constructed or remodeled between the years 1950 and 1980 with building materials with PCBs concentrations of 50 ppm or greater. Single-family residential and wood frame structures are exempt.

A Permittee is exempt from this requirement if it provides evidence acceptable to the Executive Officer that the only structures that existed pre-1980 within its jurisdiction were single-family residential and/or wood-frame structures.

ii. Implementation Level

(1) The Permittees shall develop a protocol by June 30, 2019, that includes each of the following components, at a minimum:

a. The necessary authority to ensure that PCBs do not enter MS4s from PCB-containing materials in applicable structures at the time such structures undergo demolition;

b. A method for identifying applicable structures prior to their demolition; and

c. Method(s) for ensuring PCBs are not discharged to the storm drain from demolition of applicable structures.

(2) By July 1, 2019, and thereafter, the Permittees shall implement or cause to be implemented the PCBs management protocol for ensuring PCBs are not discharged to MS4s from demolition of applicable structures via vehicle track-out, airborne releases, soil erosion, or stormwater runoff.

(3) By July 1, 2019, Permittees shall develop an assessment methodology and data collection program to quantify in a technically sound manner PCBs loads reduced through implementation of the protocol for controlling PCBs during demolition of applicable structures.

iii. Reporting

(1) In their 2016, 2017, and 2018 Annual Reports, the Permittees shall summarize the steps they have taken to begin implementing this requirement, which could include working with State and local agencies on inter-agency coordination regarding building demolitions, developing ordinances or policies, obtaining information materials, updating or supplementing permit application materials, developing a tracking tool for potential PCB-containing structures, and training relevant staff as needed to comply with this sub-provision.

(2) Each Permittee seeking exemption from C.12.f requirements must submit in its 2017 Annual Report documentation, such as historic maps or other historic records, that clearly demonstrates that the only structures that existed pre-1980 within its jurisdiction were single-family residential and/or wood-frame structures.

(3) In their 2020 Annual Report, the Permittees shall provide documentation demonstrating implementation with each of the minimum requirements in C.12.f.ii(1)(a)-(c).

(4) In their 2020 Annual Report and thereafter, the Permittees shall provide documentation of each of the following items:

a. The number of applicable structures that applied for a demolition permit during the reporting year; and
b. A running list of the applicable structures that applied for a demolition permit (since the date the PCBs control protocol was implemented) that had material(s) with PCBs at 50 ppm or greater, with the address, demolition date, and brief description of PCBs control method(s) used.

(5) In their 2020 Annual Report, Permittees shall submit an assessment methodology and data collection program to quantify PCBs loads reduced through implementation of the protocol for controlling PCBs during building demolition. This should be reported at the regional level on behalf of all Permittees.

C.12.g. Fate and Transport Study of PCBs: Urban Runoff Impact on San Francisco Bay Margins

i. Task Description – The Permittees shall conduct or cause to be conducted studies concerning the fate, transport, and biological uptake of PCBs discharged from urban runoff to San Francisco Bay margin areas.

ii. Implementation Level – The specific information needs include understanding the in-Bay transport of PCBs discharged in urban runoff, the sediment and food web PCBs concentrations in margin areas receiving urban runoff, the influence of urban runoff on the patterns of food web PCBs accumulation, especially in Bay margins, and the identification of drainages where urban runoff PCBs are particularly important in food web accumulation.

iii. Reporting – The Permittees shall submit in their 2017 Annual Report a workplan describing the specific manner in which these information needs will be accomplished and describing the studies to be performed with a preliminary schedule. The Permittees shall report on status of the studies in their 2018 Annual Report. The Permittees shall report in the March 15, 2020, Integrated Monitoring Report the findings and results of the studies completed, planned, or in progress as well as implications of studies on potential control measures to be investigated, piloted or implemented in future permit cycles.

C.12.h. Implement a Risk Reduction Program

i. Task Description – The Permittees shall conduct an ongoing risk reduction program to address public health impacts of PCBs in San Francisco Bay/Delta fish. The fish risk reduction program shall take actions to reduce actual and potential health risks in those people and communities most likely to consume San Francisco Bay-caught fish, such as subsistence fishers and their families. The risk reduction framework developed in the Previous Permit term, which funded community-based organizations to develop and deliver appropriate communications to appropriately targeted individuals and communities, is an appropriate approach. Permittees should work with local health departments, the Bay Area Clean Water Agencies, and the Western States Petroleum Association to leverage resources for this program and to appropriately target at-risk populations.

ii. Implementation Level

(1) At a minimum, Permittees shall conduct or cause to be conducted an ongoing risk reduction program with the potential to reach 3,000 individuals annually who are likely consumers of San Francisco Bay-caught fish. Permittees are encouraged to collaborate with San Francisco Bay industrial and wastewater discharger agencies in meeting this requirement.

(2) In year four of the Permit term, Permittees shall evaluate the effectiveness of their risk reduction program.

iii. Reporting – The Permittees shall report on the status of the risk reduction program in each of their Annual Reports, including a brief description of actions taken, an estimate of the number of people reached, and why these people are deemed likely to consume Bay fish. The Permittees shall report the findings of the effectiveness evaluation of their risk reduction program in their 2020 Annual Report.

C.13. Copper Controls

The Permittees shall implement the following control program for copper. The Permittees shall implement the control measures and accomplish the reporting on those control measures according to the provisions below. The purpose of these provisions is to implement the control measures identified in the Basin Plan amendment necessary to support the copper site-specific objectives in San Francisco Bay. The Permittees may comply with any requirement of C.13 Provisions through a collaborative effort.

C.13.a. Manage Waste Generated from Cleaning and Treating of Copper Architectural Features, Including Copper Roofs, during Construction and Post-Construction.

i. Task Description – The Permittees shall prohibit the discharge of wastewater to storm drains generated from the installation, cleaning, treating, and washing of the surface of copper architectural features, including copper roofs.

ii. Implementation Level

(1) The Permittees shall require, when issuing building permits, use of appropriate BMPs for managing waste during and post-construction.

(2) The Permittees shall educate installers and operators on appropriate BMPs for managing copper-containing wastes.

(3) The Permittees shall enforce against noncompliance.

iii. Reporting

(1) In the 2016 Annual Report, the Permittees shall certify that legal authority currently exists to prohibit the discharge of wastewater to storm drains generated from the installation, cleaning, treating, and washing of copper architectural features, including copper roofs.

(2) In the 2016 Annual Report, the Permittees shall report how copper architectural features are addressed through the issuance of building permits.

(3) The Permittees shall report annually permitting and enforcement activities.

C.13.b. Manage Discharges from Pools, Spas, and Fountains that Contain Copper-Based Chemicals

i. Task Description – Permittees shall prohibit discharges to storm drains from pools, spas, and fountains that contain copper-based chemicals.

ii. Implementation Level – The Permittees shall either: 1) require installation of a sanitary sewer discharge connection for pools, spas, and fountains, including connection for filter backwash, with a proper permit from the POTWs; or 2) require diversion of discharge for use in landscaping or irrigation.

iii. Reporting

(1) In the 2016 Annual Report, the Permittees shall certify that legal authority currently exists to prohibit the discharges to storm drains of water containing copper-based chemicals from pools, spas, and fountains.

(2) In the 2016 Annual Report, the Permittees shall report how copper-containing discharges from pools, spas, and fountains are addressed to accomplish the prohibition of the discharge.

(3) The Permittees shall report annually on any enforcement activities.

C.13.c. Industrial Sources

i. Task Description – The Permittees shall ensure industrial facilities do not discharge elevated levels of copper to storm drains by ensuring, through industrial facility inspections, that proper BMPs are in place.

ii. Implementation Level

(1) As part of industrial site controls required by Provision C.4, the Permittees shall identify facilities likely to use copper or have sources of copper (e.g., plating facilities, metal finishers, auto dismantlers) and include them in their inspection program plans.

(2) The Permittees shall educate industrial inspectors on industrial facilities likely to use copper or have sources of copper and proper BMPs for them.

(3) As part of the industrial inspection, inspectors shall ensure that proper BMPs are in place at such facilities to minimize discharge of copper to storm drains, including consideration of roof runoff that might accumulate copper deposits from ventilation systems on site.

iii. Reporting

The Permittees shall highlight copper reduction results in the industrial inspection component in the C.13 portion of each Annual Report.

C.14. City of Pacifica and San Mateo County Fecal Indicator Bacteria Controls

The City of Pacifica (City) and San Mateo County (County) Permittees shall implement Provision C.14 for fecal indicator bacteria. The City and County shall implement fecal indicator bacteria control measures in areas where benefits are most likely to accrue (focused implementation) and report on those control measures according to this provision. The goal of this provision is to implement the urban runoff (stormwater runoff and dry weather flows) requirements of the San Pedro Creek (Creek) and Pacifica State Beach (Beach) Indicator Bacteria TMDL (TMDL) and reduce exceedances of the bacterial water quality objectives for the water contact recreation beneficial use during the term of the Permit, thereby making substantial progress toward achieving the TMDL wasteload allocations. The wasteload allocations and the dates they must be attained by are listed in Table 14.1 below. The City and County may comply with any requirement of this provision through a collaborative effort.

Table 14.1. Numeric Targets, TMDLs, and Allocations Based on Allowable Exceedances of Single-Sample Bacteria Objectives for San Pedro Creek and Pacifica State Beach

	San Pedro Creek		**Pacifica State Beach**		
	Dry Weather	Wet Weather	Summer Dry Weather (Apr. 1 to Oct. 31)	Winter Dry Weather (Nov. 1 to Mar. 31)	Wet Weather[4]
Allowable Exceedances of Single-Sample Objectives (assuming daily sampling is conducted) [1,2,]	4	26	0	2	30
Allowable Exceedances of Single-Sample Objectives (assuming weekly sampling is conducted) [3]	1	4	0	1	5
Attainment Date	August 1, 2028	August 1, 2028	August 1, 2021	August 1, 2021	August 1, 2021

1. Allowable exceedances are calculated by multiplying exceedance rates observed in the Reference System(s) by the Number of Days during each respective period in the reference year (1994).
2. To end up with whole numbers, where the fractional remainder for the calculated allowable exceedance days exceeds 0.1, the number of days is rounded up.
3. To determine the allowable number of exceedance events given a weekly sampling regime, as practiced for monitoring San Pedro Creek and Pacifica State Beach, the number of exceedance days was adjusted by solving for "X" in the following equation: X = (exceedance days x 52 weeks) / 365 days.
4. Wet weather is defined as any day with 0.1 inches of rain or more and the following three days.

C.14.a. Implement Control Measures to Achieve Indicator Bacteria Wasteload Allocations.

i. Task Description – The City and County shall implement bacteria control measures and pollution prevention strategies to prevent or reduce discharges of bacteria from their storm drain systems to meet the stormwater TMDL

wasteload allocations in the San Pedro Creek watershed and Pacifica State Beach Indicator Bacteria TMDL (TMDL Project Area).

ii. Implementation Level – In order to comply with this provision element:

(1) The County shall effectively prohibit potential illicit discharges into its storm sewer system from sanitary sewer overflows or the sanitary sewer lines within its jurisdiction.

(2) The County shall address bacteria discharges from the existing and future commercial horse and dog kennel facilities (facilities) into its storm sewer sytem within its jurisdiction as follows:

(a) Conduct annual site inspections of each facility for code compliance by June 30 of each year, beginning in 2016.

(b) Conduct an annual compliance review of each facility's current manure, stormwater, and drainage management plans by June 30 of each year, beginning in 2016.

(c) Enforcement actions for noncompliant facilities will be in line with the County's Confined Animal Ordinance.

(3) The City shall address bacteria discharges from the existing and future commercial horse facilities (facilities) within its jurisdiction as follows:

(a) Review each facility's compliance with the City's Administrative Policy on "Standards for Keeping Animals."

(b) Review each facility's compliance with the City's Municipal Code on "Animal Excreta."

(c) Conduct annual compliance review and inspection of each facility by June 30 of each year, beginning in 2016.

(d) Take progressive enforcement action(s), as needed, to bring noncompliant facilities into compliance with the City's Administrative Policy on "Standards for Keeping Animals" and Municipal Code on "Animal Excreta."

(4) The City shall install new dog waste clean-up signs, waste bag dispensers, and trash cans at a minimum of 10 (ten) high priority locations within the TMDL Project Area (each site to receive all three elements: sign, bag dispenser, and trash can, unless some of the elements are already in place) by June 30, 2016. The high priority sites for these installations shall be determined via visual inspections of popular dog walking areas and their potential to discharge improperly deposited dog waste to the Creek or Beach.

(5) The City shall develop and implement a visual inspection and cleanup plan for high dog waste accumulation areas along San Pedro Creek and its tributaries by June 30, 2016. From April 1 through October 31, inspections and cleanups shall, at a minimum, be conducted on a quarterly basis (e.g., once each in April, July, and October). From November 1 through March 31, inspections and cleanups shall be conducted prior to forecast rain

events with a forecast rainfall depth of 0.2 inches or more (as measured at Half Moon Bay Airport (KHAF) Meteorological Station), and at a frequency of no less than once a month.

(6) The City shall develop and implement an enhanced pet waste public outreach and education campaign by June 30, 2016, that, at a minimum, includes all the following:

(a) Explore the possibility of establishing a new public pet waste management stakeholder group (e.g., formal or informal dog owners club).

(b) Prepare and implement public service announcements regarding pet waste management and associated impacts to the Creek and Beach to play on the local television station and to include in print ads in the Pacifica Tribune.

(c) Distribute a mailer with an informational brochure to residents and businesses describing proper pet waste management, the linkage of the watershed to the Creek and Beach, and the adverse impact on those water bodies and those recreating in them from improper pet waste management.

(d) Add a new web page to the City website with information on the TMDL and the water quality monitoring and BMP implementation activities, as well as information about proper pet waste management and the impact of improperly deposited waste on water quality of the Creek and Beach and public health.

(e) Create and implement a pre-rain pet waste cleanup email alert to residents, reminding them to cleanup accumulated pet waste in their yards that could otherwise get washed into the Creek and Beach.

(f) Participate in local events and festivals to distribute pet waste management materials (educational fliers, dog waste bags, etc.).

(7) The City and County, based on the results of the source characterization and BMP effectiveness, and wasteload allocation attainment analyses described in sections C.14.b-c, shall modify or refocus control measure implementation efforts as appropriate, at a frequency of no less than every two years.

iii. Reporting

(1) No later than March 15 of each year, the City and County shall submit a comprehensive TMDL Status and Monitoring Report, reporting on the specific control measures (as listed in section C.14.a.ii above) that have been implemented in the TMDL Project Area during the forgoing October 1 through September 30 period. This report shall include:

(a) The number, type, and locations and/or frequency (if applicable) of control measures;

(b) The description, scope, and start date of pollution prevention measures; and

(c) Clear statements of the responsibilities of each participating Permittee for implementation of pollution prevention or control measures.

(2) Beginning with the 2017 TMDL Status and Monitoring Report and continuing in all TMDL Status and Monitoring Reports, the City and County shall update all the information as necessary to account for new control measures implemented, but not described in the 2016 TMDL Status and Monitoring Report or revisions to control measures.

C.14.b. Conduct Water Quality Monitoring to Assess Attainment of Wasteload Allocations

i. Task Description - The purpose of the attainment monitoring is to determine whether or not the TMDL wasteload allocations are attained.

ii. Implementation Level - In order to comply with this provision element, the City and County shall conduct attainment water quality monitoring activities as follows:

(1) Sample Locations – Two stations shall be monitored to assess attainment of wasteload allocations for stormwater runoff and dry weather flows: the mouth of San Pedro Creek (Creek Mouth) and Pacifica State Beach (Linda Mar #5).

(2) Sampling Frequency – The two attainment stations shall be monitored weekly on an ongoing basis for fecal indicator bacteria. The weekly sampling shall occur year-round regardless of weather conditions, provided the conditions are safe for field staff to collect the samples.

(3) Constituents –Fecal indicator bacteria species measured in freshwater samples collected from the Creek Mouth shall include E. coli and total coliform. Fecal indicator bacteria species measured in ocean water samples collected from Linda Mar #5 station shall include enterococci, fecal coliform, and total coliform.

iii. Reporting

(1) In their Annual TMDL Status and Monitoring Reports submitted on March 15 each year, the City and County shall analyze, summarize, and report the results of the ongoing attainment monitoring, as follows:

(a) The City and County shall complete a data evaluation, which shall focus on determining whether the TMDL wasteload allocations are being attained in San Pedro Creek and at Pacifica State Beach.

(b) The indicator bacteria results from the attainment monitoring stations (Creek Mouth and Linda Mar #5 stations) shall be compared to applicable bacterial water quality objectives and the allowable exceedances of those objectives as specified in the TMDL (Table 14.1).

(c) The data evaluation shall include tabulation and review of local rainfall data to determine whether the weekly attainment monitoring sampling events occurred during dry weather or wet weather.

(d) An ongoing quantitative analysis of trends in bacteria densities and exceedances of applicable water quality objectives at the two attainment stations shall be conducted and reported annually.

(e) A detailed and comprehensive assessment of wasteload allocation attainment by the end of year 4 of the Permit term shall be completed. If wasteload allocations are not achieved by the end of the Permit term, no later than 180 days prior to Permit expiration, the City and County shall submit a plan in their Report Of Waste Discharge, acceptable to the Executive Officer, that describes additional control measures or increased levels of existing control measures that will be implemented to prevent or reduce discharges of bacteria to storm drain systems to attain wasteload allocations. The plan shall include implementation methods, an implementation schedule, and proposed milestones.

C.14.c. Conduct Water Quality Monitoring to Characterize Sources of Bacteria in The Project Area and to Assess BMP Effectiveness

i. Task Description – The purpose of characterization monitoring is to better characterize indicator bacteria contributions from specific sources and to evaluate control measure effectiveness. The characterization monitoring shall provide data to:

(1) Characterize indicator bacteria densities in subwatersheds, storm drain outfalls, and pump stations that have not been sampled in the past. Results of the investigation may be used to drive future control measure actions.

(2) Establish baseline (or current) conditions against which future monitoring results can be compared following new or ongoing control measure implementation.

Characterization monitoring shall be conducted every other year on a water year basis (i.e., October 1 through September 30) beginning with Water Year 2016 (WY2016) (i.e., October 1, 2015 – September 30, 2016). WY2016 characterization monitoring shall assess *E. coli* densities throughout the San Pedro Creek watershed, with a focus on the culverted branches of the North Fork. The City and County may elect to focus on other areas with potential or suspected bacteria sources during subsequent years. In WY2016, human-, horse-, and dog-specific genetic markers shall be analyzed for a subset of the samples to investigate whether these species contribute fecal contamination to the Creek. The characterization monitoring shall be iterative in nature and allow for flexibility of design and details in future years. Subsequent years of characterization monitoring, at a minimum, shall have the same level of effort as WY2016; however, in future years, based on the results of the WY2016 monitoring, alternative sampling stations may be targeted, sampling intensities may be modified, sampling frequencies may be adjusted, and/or the species-specific genetic marker sampling may be revised.

ii. Implementation Level – The City and County shall conduct characterization monitoring activities as follows:

(1) Sample Locations – in WY2016, a minimum of twelve sampling stations shall be monitored. The selected sampling stations for the WY2016 characterization monitoring are divided into three separate categories, as follows:

(a) Subwatersheds – Four subwatersheds shall be targeted in WY2016: the North Fork (three stations), Middle Fork (one station), Sanchez Fork (one station), and Main Stem (three stations);

(b) Pump stations – The Linda Mar and Anza pump stations shall be sampled during wet weather discharge events to the Beach (during dry weather, flows entering these stations are pumped to a wastewater treatment facility and do not discharge to the Creek or Beach);

(c) Stormwater outfalls – The Crespi Canal, which is an engineered and concrete-lined drainage ditch, shall be sampled if it has flowing water.

In addition to the above stations, the Creek mouth shall be also sampled during events when species-specific genetic marker samples are collected (see section C.14.c.ii.3).

In monitoring years subsequent to the WY2016 monitoring year, based on the results of the WY2016 monitoring, the sample locations and quantity may be modified. However, in each subsequent monitoring year, a minimum of one hundred ten (110) fecal indicator bacteria samples shall be collected.

(2) Sampling Frequency – in WY2016, the characterization stations shall be sampled a minimum of ten times over the course of the water year, as follows:

(a) Characterization monitoring shall begin in WY2016 with the first sample collected in Winter 2016;

(b) Wet season – Five sampling events shall be conducted during each of the wet season months (November through March). To the extent possible, wet season sampling events shall occur during wet weather, which as defined in the TMDL is any day with 0.1 inch of rain or more and the following three days;

(c) Dry season – Five sampling events shall be conducted during the dry season on a monthly basis from May through September.

In subsequent monitoring years, based on the results of the WY2016 monitoring, the sampling frequency may be modified. However, in each subsequent monitoring year, a minimum of one hundred ten (110) fecal indicator bacteria samples shall be collected.

(3) Constituents – All samples shall be analyzed for *E. coli*. In addition, during each monitoring year (i.e., WY2016, and every other water year thereafter), at a minimum, samples collected at four stations during four sampling events (two wet season, two dry season) shall be analyzed for

human-, horse-, and dog-specific genetic markers to assess whether the targeted host species contribute fecal contamination to the Creek and Beach.

(4) Monitoring Protocols and Data Quality – Where applicable, monitoring data must be SWAMP comparable. Minimum data quality shall be consistent with the latest version of the SWAMP Quality Assurance Project Plan (QAPP) for applicable parameters, including data quality objectives, field and laboratory blanks, field duplicates, laboratory spikes, and clean techniques, using the most recent SWAMP Standard Operating Procedures.

(5) Future Revisions – Any and all changes to the characterization monitoring plan in subsequent years (e.g., WY2018, WY2020, etc.) shall be submitted to the Executive Officer for review and acceptance no later than 90 days prior to implementation.

iii. Reporting

(1) In their Annual TMDL Status and Monitoring Reports beginning with the 2016 report submitted on March 15, 2017, and every other year's report thereafter, the City and County shall submit a comprehensive Characterization Monitoring Report reporting on all data collected during the preceding October 1 through September monitoring period.

(2) Data evaluation shall focus on addressing the following questions:
   (a) Which land uses and/or sources contribute most to bacteria impairments in San Pedro Creek watershed?
   (b) Are controllable sources of fecal contamination (e.g., human, horses, and dogs) present in the San Pedro Creek watershed?
   (c) What are the multi-year indicator bacteria density trends in the Creek and at the Beach (i.e., do control measures appear to be reducing bacteria)?

(3) As appropriate, the Report shall include the following:
   (a) Immediately following the Table of Contents, a Data Tables section that includes all the data collected pursuant to Provision C.14.d. and contains the following information pertaining to the foregoing monitoring period:
      (i) A map showing all monitoring locations;
      (ii) Immediately following the map, a single completed Locations and Parameters Table containing the following columns or rows for each location sampled: numeric site identifier, a short-hand site name such as "Creek Mouth," latitude, longitude, and parameters assessed;
      (iii) Immediately following the Locations and Parameters Table, a single completed Results Table containing the following columns or rows for each location sampled: the short-hand site name and

datum/result for each constituent analyzed. Constituents that exceed applicable water quality objectives shall be highlighted.

(b) For all data, a statement of the data quality.

(c) An analysis of the data, which includes the following:

(i) Basic descriptive statistics using indicator bacteria data;

(ii) Identification and evaluation of any controllable sources of fecal contamination (e.g., human, horses, and dogs) present in the San Pedro Creek watershed;

(iii) Identification and analysis of any trends in stormwater or receiving water quality; and

(iv) Consideration of variability in the data sets.

(d) A discussion of the data, which shall:

(i) Discuss monitoring data relative to prior conditions, beneficial uses and applicable water quality standards as described in the Basin or the Ocean plans;

(ii) Where appropriate, develop hypotheses to investigate regarding pollutant sources, trends, and BMP effectiveness;

(iii) Identify and prioritize water quality problems;

(iv) Identify potential sources of water quality problems;

(v) Describe followup actions;

(vi) Evaluate the effectiveness of existing control measures; and

(vii) Identify management actions needed to address water quality problems.

C.15. Exempted and Conditionally Exempted Discharges

The objective of this provision is to exempt unpolluted non-stormwater discharges from Discharge Prohibition A.1 and to conditionally exempt non-stormwater discharges that are potential sources of pollutants. In order for non-stormwater discharges to be conditionally exempted from Discharge Prohibition A.1, the Permittees must identify appropriate BMPs, monitor the non-stormwater discharges where necessary, and ensure implementation of effective control measures – as listed below – to eliminate adverse impacts to waters of the State consistent with the discharge prohibitions of the Order.

C.15.a. Exempted Non-Stormwater Discharges (Exempted Discharges):

i. Discharge Type – In carrying out Discharge Prohibition A.1, the following unpolluted discharges are exempted from prohibition of non-stormwater discharges:

(1) Flows from riparian habitats or wetlands;

(2) Diverted stream flows;

(3) Flows from natural springs;

(4) Rising ground waters;

(5) Uncontaminated and unpolluted groundwater infiltration;

(6) Single family homes' pumped groundwater, foundation drains, and water from crawl space pumps and footing drains;

(7) Pumped groundwater from drinking water aquifers (excludes well development); and

(8) NPDES permitted discharges (individual or general permits).

ii. Implementation Level – The non-stormwater discharges listed in Provision C.15.a.i above are exempted unless they are identified by the Permittees or the Executive Officer as sources of pollutants to receiving waters. If any of the above categories of discharges, or sources of such discharges, are identified as sources of pollutants to receiving waters, such categories or sources shall be addressed as conditionally exempted discharges in accordance with Provision C.15.b below.

C.15.b. Conditionally Exempted Non-Stormwater Discharges:

The following non-stormwater discharges are also exempt from Discharge Prohibition A.1 if they are either identified by the Permittees or the Executive Officer as not being sources of pollutants to receiving waters, or if appropriate control measures to eliminate adverse impacts of such sources are developed and implemented in accordance with the tasks and implementation levels of each category of Provision C.15.b.i-vi below.

i. Discharge Type – Pumped Groundwater, Foundation Drains, and Water from Crawl Space Pumps and Footing Drains

(1) **Pumped Groundwater from Non-Drinking Water Aquifers**

Groundwater pumped from a monitoring well, used for groundwater basin management, which is owned and/or operated by a Permittee is allowed if the following requirements are met:

(a) **Implementation Level** – Twice a year (once during the wet season and once during the dry season), representative samples shall be taken from each aquifer that potentially will discharge or has discharged into a storm drain. Samples collected and analyzed for compliance in accordance with self-monitoring requirements of other NPDES permits or sample data collected for drinking water regulatory compliance may be submitted to comply with this requirement as long as they meet the following criteria:

(i) The water samples shall meet water quality standards consistent with the existing effluent limitations or pollutant triggers in the Water Board's NPDES Groundwater General Permit, NPDES No. CAG912002.

(ii) The water samples shall be analyzed using approved U.S. EPA methods: (a) U.S. EPA Method 8015 Modified for total petroleum hydrocarbons; (b) U.S. EPA Method 8260B and 8270C or equivalent for volatile and semi-volatile organic compounds; and (c) approved U.S. EPA methods to meet the triggers for the metals listed in the general permit discussed in C.15.(b)i.(1)(a)(i) above.

(iii) The water samples shall be analyzed for pH and turbidity.

If a Permittee is unable to comply with the above criteria, the Permittee shall notify the Water Board upon becoming aware of the compliance issue.

(b) **Required BMPs and Monitoring** – When greater than 2,500 gallons per day of uncontaminated (meeting the criteria in C.15.b.i.(1)(a)(i)) groundwater is discharged from these monitoring wells, the following shall be implemented:

(i) Test the receiving water, upstream and downstream of the discharge point, to determine ambient turbidity and pH prior to discharging. Receiving water monitoring is not required if the discharge infiltrates into a dry creek immediately downstream.

(ii) Test water samples for turbidity and pH on the first two consecutive days of dewatering.

(iii) Maintain proper control of the discharge at the discharge point to prevent erosion, scouring of banks, nuisance, contamination, and excess sedimentation in the receiving waters.

(iv) Maintain proper control of the flowrate and total flow during discharge so that it will not have a negative impact on the receiving waters.

(v) Appropriate BMPs shall be implemented to remove total suspended solids and silt to allowable discharge levels. Appropriate BMPs may include filtration, settling, coagulant application with no residual coagulant discharge, minor odor or color removal with activated carbon, small scale peroxide addition, or other minor treatment.

(vi) Turbidity of the discharged groundwater shall be maintained below 50 NTU for discharges to dry creeks, 110 percent of the ambient stream turbidity for a flowing stream with turbidities greater than 50 NTU, or 5 NTU above ambient turbidity for flowing streams with turbidities less than or equal to 50 NTU.

(vii) The pH of the discharged groundwater shall be maintained within the range of 6.5 to 8.5 and shall not vary from normal ambient pH by more than 0.5 pH units.

(c) If the Permittee is unable to comply with the criteria in Provision C.15.b.i.(1)(b)(i)-(vii), discharge shall cease immediately and the Permittee shall employ treatment to meet the above criteria, use other means of disposal, or apply for coverage under the Water Board's NPDES Groundwater General Permits.

(d) **Reporting** – The Permittees shall maintain records of these discharges, BMPs implemented, and any monitoring data collected.

(2) **Pumped[41] Groundwater, Foundation Drains, and Water from Crawl Space Pumps and Footing Drains**

(a) Proposed new discharges of uncontaminated groundwater at flows of 10,000 gallons/day or more and all new discharges of potentially contaminated groundwater shall be reported to the Water Board so that they can be subject to NPDES permitting requirements. Proposed new discharges of uncontaminated groundwater at flows of less than 10,000 gallons/day shall be encouraged to discharge to a landscaped area or bioretention unit that is large enough to accommodate the volume.

(b) If the groundwater cannot be discharged to a landscaped area or bioretention unit and the discharge is greater than 2,500 gallons per day, it can only be considered for discharge once the following sampling is done to verify that the discharge is uncontaminated:

(i) The discharge shall meet WQS consistent with the existing effluent limitations or pollutant triggers in theWater Board's NPDES Groundwater General Permit, NPDES No. CAG912002.

[41] Pumped groundwater not exempted in C.15.a or conditionally exempted in C.15.b.i.(1).

(ii) The Permittees shall require that water samples from these discharge types be analyzed using the following approved U.S. EPA methods:

- U.S. EPA Method 8015 Modified for total petroleum hydrocarbons, and U.S. EPA Method 8260B and 8270C or equivalent for volatile and semi-volatile organic compounds.
- The approved U.S. EPA Methods for the metals listed below that meet the corresponding Reporting Limits:

Metal	Reporting Limit
Antimony	6 µg/l
Arsenic	10 µg/l
Beryllium	4 µg/l
Cadmium	1.1 µg/l
Chromium VI	11 µg/l
Copper[42]	5.9 µg/l
Copper[43]	3.4 µg/l
Copper[44]	4.7 µg/l
Lead	3.2 µg/l
Mercury	0.025 µg/l
Nickel	19 µg/l
Selenium	5 µg/l
Silver	2.2 µg/l
Thallium	1.7 µg/l
Zinc	86 µg/l
Cyanide	2.9 µg/l

(c) **Monitoring and Required BMPs** – When the discharge has been verified as uncontaminated per sampling completed in C.15.b.i.(2)(b) above, the Permittees shall require the following:

(i) Test the receiving water, upstream and downstream of the discharge point, to determine ambient turbidity and pH prior to discharging. Receiving water monitoring is not required if the discharge infiltrates into a dry creek immediately downstream or if accessing the sampling points poses safety to personnel.

(ii) Test water samples for turbidity and pH on the first two consecutive days of dewatering.

(iii) Maintain proper control of the discharge at the discharge point to prevent erosion, scouring of bank, nuisance, contamination, and excess sedimentation in the receiving waters.

[42] Applicable to Suisun Bay and San Pablo Bay segments of San Francisco Bay.
[43] Applicable to Central Bay and Lower Bay segments of San Francisco Bay.
[44] Applicable to South San Francisco Bay segments of San Francisco Bay.

(iv) Maintain proper control of the flow rate and total flow during discharge so that it will not have a negative impact on the receiving waters.

(v) Appropriate BMPs to render pumped groundwater free of pollutants and therefore exempted from prohibition may include the following: filtration, settling, coagulant application with no residual coagulant discharge, minor odor or color removal with activated carbon, small scale peroxide addition, or other minor treatment.

(vi) Turbidity of discharged groundwater shall be maintained below 50 NTU for discharges to dry creeks, 110 percent of the ambient stream turbidity for a flowing stream with turbidities greater than 50 NTU, or 5 NTU above ambient turbidity for a flowing stream with turbidities less than or equal to 50 NTU.

(vii) The pH of discharged water shall be maintained within the range of 6.5 to 8.5 and shall not vary from normal ambient pH by more than 0.5 pH units.

(d) If a Permittee determines that a discharger or a project proponent is unable to comply with the criteria in C.15.b.i.(2)(c)(i)-(vii), the Permittee shall require the discharge to cease immediately and require that the discharger employ treatment to meet the above criteria, use other means of disposal, or apply for coverage under the Water Board's NPDES Groundwater General Permit.

(e) **Reporting** – The Permittees shall maintain records of these discharges, BMPs implemented, and any monitoring data collected.

ii. Discharge Type – Air Conditioning Condensate

Required BMPs – Condensate from air conditioning units shall be reused or directed to landscaped areas or the ground. Discharge to a storm drain system may be allowed if discharge to landscaped areas or the ground is not feasible.

iii. Discharge Type – Emergency Discharges of Potable Water

(1) **Emergency Discharges** –Discharges resulting from firefighting activities.

(2) Required BMPs

(a) The Permittees shall implement or require firefighting personnel to implement BMPs for emergency discharges. However, the BMPs should not interfere with immediate emergency response operations or impact public health and safety. BMPs may include, but are not limited to, the plugging of the storm drain collection system for temporary storage, the proper disposal of water according to jurisdictional requirements, and the use of foam where there may be toxic substances on the property the fire is located.

(b) During emergency situations, priority of efforts shall be directed toward life, property, and the environment (in descending order). The

Permittees or firefighting personnel shall control the pollution threat from their activities to the extent that time and resources allow.

(3) **Reporting Requirements** – Reporting requirements will be determined by Water Board staff on a case-by-case basis, such as for fire incidents at chemical plants.

iv. Discharge Type – Individual Residential Car Washing

Required BMPs

(1) The Permittees shall discourage through outreach efforts individual residential car washing within their jurisdictional areas that discharge directly into their storm drain systems.

(2) The Permittees shall encourage individuals to direct car wash waters to landscaped areas, use as little detergent as necessary, or wash cars at commercial car wash facilities.

v. Discharge Type – Swimming Pool, Hot Tub, Spa, and Fountain Water Discharges

(1) **Required BMPs**

(a) The Permittees shall prohibit discharge of water that contains chlorine residual, copper algaecide, filter backwash or other pollutants to storm drains or to waterbodies. Such polluted discharges from pools, hot tubs, spas, and fountains shall be directed to the sanitary sewer (with the local sanitary sewer agency's approval) or to landscaped areas that can accommodate the volume.

(b) Discharges from swimming pools, hot tubs, spas and fountains shall be allowed into storm drain collection systems only if there are no other feasible disposal alternatives (e.g., disposal to sanitary sewer or landscaped areas) and if the discharge is properly dechlorinated to non-detectable levels of chlorine consistent with water quality standards.

(c) The Permittees shall require that new or rebuilt swimming pools, hot tubs, spas and fountains within their jurisdictions have a connection[45] to the sanitary sewer to facilitate draining events. The Permittees shall coordinate with local sanitary sewer agencies to determine the standards and requirements necessary for the installation of a sanitary sewer discharge location to allow draining events for pools, hot tubs, spas, and fountains to occur with the proper permits from the local sanitary sewer agency.

(d) The Permittees shall improve their public outreach and educational efforts and ensure implementation of the required BMPs and compliance in commercial, municipal, and residential facilities.

[45] This connection could be a drain in the pool to the sanitary sewer or a sanitary sewer clean out located close enough to the pool so that a hose can readily direct the pool discharge into the sanitary sewer clean out.

(e) The Permittees shall implement the Illicit Discharge Enforcement Response Plan from C.5.b for polluted (contains chlorine, copper algaecide, filter backwash, or other pollutants) swimming pool, hot tub, spa, or fountain waters that get discharged into the storm drain.

(2) **Reporting** – The Permittees shall keep records of the authorized major discharges of dechlorinated pool, hot tubs, spa, and fountain water to the storm drain, including BMPs employed; such records shall be available for inspection by the Water Board.

vi. Discharge Type – Irrigation Water, Landscape Irrigation, and Lawn or Garden Watering

(1) **Required BMPs** – The Permittees shall promote measures that minimize runoff and pollutant loading from excess irrigation via the following:

(a) Promoting and/or working with potable water purveyors to promote conservation programs that minimize discharges from lawn watering and landscape irrigation practices;

(b) Promoting outreach messages regarding the use of less toxic options for pest control and landscape management;

(c) Promoting and/or working with potable water purveyors to promote the use of drought tolerant, native vegetation to minimize landscape irrigation demands;

(d) Promoting and/or working with potable water purveyors to promote outreach messages that encourage appropriate applications of water needed for irrigation and other watering practices; and

(e) Implementing the Illicit Discharge Enforcement Response Plan from C.5.b, as necessary, for ongoing, large-volume landscape irrigation runoff to their storm drain systems.

(2) **Reporting** – The Permittees shall provide implementation summaries in their Annual Report.

C.16. Discharges to Areas of Special Biological Significance

This Provision applies to stormwater discharges from the County of San Mateo into James V. Fitzgerald Marine Reserve Area of Special Biological Significance (ASBS). As set forth in the Fact Sheet, the State Water Board granted an exception to the ASBS discharge prohibition (ASBS Exception) in the Ocean Plan to applicants including the County of San Mateo for their existing stormwater discharges into ASBSs, provided they receive authorization to discharge by an NPDES permit; the discharges comply with all applicable terms, prohibitions, and special conditions of Attachment B - Special Protections (Special Protections) attached to and part of the ASBS Exception; and the discharges are essential for flood control or slope stability, designed to prevent soil erosion, occur only during wet weather, and are composed of only stormwater runoff. This Provision serves as the authorization for the County of San Mateo to discharge stormwater into the ASBS in accordance with the requirements below.

C.16.a. Discharges to the James V. Fitzgerald Marine Reserve ASBS

i. If the County of San Mateo meets all of the conditions set forth in Provision C.16.a.i. and C.16.a.ii., its stormwater discharges into the James V. Fitzgerald Marine Reserve ASBS from MS4 outfalls that were constructed or were under construction prior to January 1, 2005, are permitted for those discharges that:

(1) Are essential for flood control or slope stability, including roof, landscape, road, and parking lot drainage;

(2) Are designed to prevent soil erosion;

(3) Occur only during wet weather; and

(4) Are composed only of stormwater runoff.

ii. The County of San Mateo shall comply with all of the applicable terms, prohibitions, and special conditions of the Special Protections of the ASBS Exception set forth in State Water Board Resolution No. 2012-0012, as amended by State Water Board Resolution No. 2012-0031, including monitoring requirements, as they apply to stormwater. The Special Protections are hereby incorporated by reference into this Order and attached hereto as Attachment F. Notwithstanding anything to the contrary in this Order, the County of San Mateo shall not alter the natural ocean quality of the ASBS; shall not discharge trash into the ASBS; and shall not discharge non-stormwater into the ASBS except as provided in the Special Protections. As required by the Special Protections, the County of San Mateo shall address the preceding requirements (other than trash) in an ASBS Compliance Plan to be approved by the State Water Board Executive Director or the Regional Water Board Executive Officer and comply with the compliance schedule set forth in the Special Protections.

iii. Reporting – In addition to the monitoring requirements of the Special Restrictions, the County of San Mateo shall submit, upon approval by the State Water Board Executive Director, a copy of its approved ASBS Compliance Plan.

C.17. Annual Reports

C.17.a. The Permittees shall submit Annual Reports electronically in all cases by September 30 of each year. Each Annual Report shall report on the previous fiscal year beginning July 1 and ending June 30. The annual reporting requirements are set forth in Provisions C.1 – C.16. A paper copy of each Annual Report shall be submitted by October 15 of each year. The Permittees shall retain documentation as necessary to support their Annual Report. The Permittees shall make this supporting information available upon request within a timely manner, generally no more than ten business days unless otherwise agreed to by the Executive Officer.

C.17.b. The Permittees shall collaboratively develop a common annual reporting format for acceptance by the Executive Officer by April 1, 2016. The resulting Annual Report Form, once approved, shall be used by all Permittees. The Annual Report Form may be changed by April 1 of each year for the following Annual Report, to more accurately reflect the reporting requirements of Provisions C.1 – C.16, with the agreement of the Permittees and by the approval of the Executive Officer.

C.17.c. The Permittees shall certify in each Annual Report that they are in compliance with all requirements of the Order. If a Permittee is unable to certify compliance with a requirement, it must submit, in the cover letter of the Annual Report, the reason for failure to comply, a description and schedule of tasks necessary to achieve compliance, and an estimated date for achieving full compliance.

C.18. Modifications to this Order

This Order may be modified, or alternatively, revoked or reissued, before the expiration date as follows:

C.18.a. To address significant changed conditions identified in the technical or Annual Reports required by the Water Board, or through other means or communication, that were unknown at the time of the issuance of this Order;

C.18.b. To incorporate applicable requirements of statewide water quality control plans adopted by the State Water Board or amendments to the Basin Plan approved by the State Water Board;

C.18.c. To comply with any applicable requirements, guidelines, or regulations issued or approved under section 402(p) of the CWA, if the requirement, guideline, or regulation so issued or approved contains different conditions or additional requirements not provided for in this Order. The Order as modified or reissued under this paragraph shall also contain any other requirements of the CWA then applicable; or

C.18.d. To approve and incorporate an alternative method or methods of distributing the county load reductions for mercury or PCBs on a Permittee-specific basis, as allowed by Provisions C.11 and C.12.

C.19. Standard Provisions

Each Permittee shall comply with all parts of the Standard Provisions contained in Attachment G of this Order.

C.20. Expiration Date

This Order expires on December 31, 2020, five years from the effective date of this Order. The Permittees must file a Report of Waste Discharge in accordance with Title 23, California Code of Regulations, not later than 180 days in advance of such date as application for reissuance of waste discharge requirements.

C.21. Rescission of Old Order

Order No. R2-2009-0074 is hereby rescinded on the effective date of this Order, which shall be January 1, 2016, provided that the Regional Administrator of U.S. EPA, Region IX, does not object.

C.22. Effective Date

The Effective Date of this Order and Permit shall be January 1, 2016, provided that the Regional Administrator of U.S. EPA, Region IX, does not object**.**

I, Bruce H. Wolfe, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on November 19, 2015.

Bruce H. Wolfe
Executive Officer

Attachment A: Municipal Regional Stormwater Permit Fact Sheet
Attachment B: Provision C.3.b. Sample Reporting Table
Attachment C: Provision C.3.g. Hydromodification Applicability Maps
Attachment D: Provision C.8. Standard Monitoring Provisions
Attachment E: Provision C.10. Supporting Information
Attachment F: Provision C.16. ASBS Special Protection Zone
Attachment G: Standard NPDES Stormwater Permit Provisions

ACRONYMS & ABBREVIATIONS

ACCWP	Alameda Countywide Clean Water Program
BAHM	Bay Area Hydrology Model
Basin Plan	Water Quality Control Plan for the San Francisco Bay Basin
BASMAA	Bay Area Stormwater Management Agencies Association
BMPs	Best Management Practices
CASQA	California Stormwater Quality Association
CCC	California Coastal Commission
CCCWP	Contra Costa Clean Water Program
CDFW	California Department of Fish and **W**ildlife
CEDEN	California Environmental Data Exchange Network
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CSBP	California Stream Bioassessment Procedures
CSCI	California Stream Condition Index
CWA	Federal Clean Water Act
CWC or Water Code	California Water Code
DCIA	Directly Connected Impervious Area
DPR	California Department of Pesticide Regulation
ERP	Enforcement Response Plan
FR	Federal Register
GIS	Geographic information System
HBANC	Homebuilders Association of Northern California
HM	Hydromodification Management
HMP	Hydromodification Management Plan
IC/ID	Illicit Connections and Illicit Discharges
IPM	Integrated Pest Management
LID	Low Impact Development
MEP	Maximum Extent Practicable

MRP	Municipal Stormwater Regional Permit
MS4	Municipal Separate Storm Sewer System
MTC	Metropolitan Transportation Commission
NAFSMA	National Association of Flood & Stormwater Management Agencies
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRDC	Natural Resources Defense Council
O&M	Operation and Maintenance
PAHs	Polynuclear Aromatic Hydrocarbons
PBDE	Polybrominated Diphenyl Ether
PCA	Pest Control Advisor
PCBs	Polychlorinated Biphenyls
PHAB	Physical Habitat (e.g., of streams)
POTW	Publicly Owned Treatment Works
QAPP	Quality Assurance Project Plan
RAA	Reasonable Assurance Analysis
RCRA	Federal Resource Conservation and Recovery Act
RMC	Regional Monitoring Coalition
RMP	Regional Monitoring Program
ROWD	Report of Waste Discharge
RTA	Rapid Trash Assessment
SARA	Federal Superfund Amendments and Reauthorization Act
SCURTA	Santa Clara Urban Rapid Trash Assessment
SCVURPPP	Santa Clara Valley Urban Runoff Pollution Prevention Program
SIC	Standard Industrial Classification
SMWPPP	San Mateo Countywide Water Pollution Prevention Program
SSID	Stressor Source Identification
SOP	Standard Operating Procedure
SWAMP	Surface Water Ambient Monitoring Program
SWPPP	Stormwater Pollution Prevention Plan

State Water Board	State Water Resources Control Board
TIE	Toxicity Identification Evaluation
TMDLs	Total Maximum Daily Loads
TSCA	Federal Toxic Substances Control Act
TST	Test of Significant Toxicity
TU	Toxicity Units
UCMR	Urban Creeks Monitoring Report
U.S. EPA	Unites States Environmental Protection Agency
Water Board	San Francisco Bay Regional Water Quality Control Board
WLAs	Wasteload Allocations
WQS	Water Quality Standards

GLOSSARY

Arterial Roads	Freeways, multilane highways, and other important roadways that supplement the Interstate System. Arterial roads connect, as directly as practicable, principal urbanized areas, cities, and industrial centers.
Beneficial Uses	The uses of water of the State protected against degradation, such as domestic, municipal, agricultural and industrial supply; power generation; recreation; aesthetic enjoyment; navigation and preservation of fish and wildlife, and other aquatic resources or preserves.
Collector Roads	Major and minor roads that connect local roads with arterial roads. Collector roads provide less mobility than arterial roads at lower speeds and for shorter distances.
Commercial Development	Development or redevelopment to be used for commercial purposes, such as office buildings, retail or wholesale facilities, restaurants, shopping centers, hotels, and warehouses.
Construction Site	Any project, including projects requiring coverage under the General Construction Permit, that involves soil disturbing activities including, but not limited to, clearing, grading, paving, disturbances to ground such as stockpiling, and excavation. Construction sites are all sites with disturbed or graded land area not protected by vegetation, or pavement, that are subject to a building or grading permit.
Conditionally Exempted Non-Stormwater Discharge	Non-stormwater discharges that are prohibited by A.1. of this Permit, unless such discharges are authorized by a separate NPDES permit or are not in violation of WQS because appropriate BMPs have been implemented to reduce pollutants to the maximum extent practicable, consistent with Provision C.15.
Discharger	Any responsible party or site owner or operator within the Permittees' jurisdiction whose site discharges stormwater runoff~~,~~ or a non-stormwater discharge.
Detached Single-family Home Project	The building of one single new house or the addition and/or replacement of impervious surface associated with one single existing house, which is not part of a larger plan of development.
Development	Construction, rehabilitation, redevelopment, or reconstruction of any public or private residential project (whether single-family, multi-unit, or planned unit development); or industrial, commercial, retail or other nonresidential project, including public agency projects.
Estate Residential Development	Development zoned for a minimum 1 acre lot size.
Emerging Pollutants	Pollutants in water that either: (1) May not have been thoroughly studied to date but are suspected by the scientific community to be a source of impairment of beneficial uses and/or present a health risk; or (2) Are not yet part of a monitoring program.

Erosion	The diminishing or wearing away of land due to wind, or water. Often the eroded debris (silt or sediment) becomes a pollutant via stormwater runoff. Erosion occurs naturally, but can be intensified by land disturbing and grading activities such as farming, development, road building, and timber harvesting.
Floor Area Ratio	The ratio of the total floor area on all floors of all buildings at a project site (except structures or floors dedicated to parking) to the total project site area.
Full Trash Capture Device	Full trash capture systems are defined as "any device or series of devices that traps all particles retained by a 5mm mesh screen and has a design treatment capacity of not less than the peak flow rate resulting from a one-year, one-hour, storm in the tributary drainage catchment area." Trash collection booms and sea curtains do not meet this definition, but are effective for removal of floating trash if properly maintained. Because these devices do not meet the Full Trash Capture Device definition, only ¼ of the catchment area treated by these measures is credited toward meeting the trash management area requirement of C.10.a.
General Permits	Waste Discharge Requirements or NPDES Permits containing requirements that are applicable to a class or category of dischargers. The State has general stormwater permits for construction sites that disturb soil of 1 acre or more; industrial facilities; `Phase II smaller municipalities (including nontraditional Small MS4s, which are governmental facilities, such as military bases, public campuses, and prison and hospital complexes); and small linear underground/overhead projects disturbing at least 1 acre, but less than 5 acres (including trenching and staging areas).
Grading	The cutting and/or filling of the land surface to a slope or elevation.
Green Infrastructure	Infrastructure that uses vegetation, soils, and natural processes to manage water and create healthier urban environments. At the scale of a city or county, green infrastructure refers to the patchwork of natural areas that provides habitat, flood protection, cleaner air, and cleaner water. At the scale of a neighborhood or site, green infrastructure refers to stormwater management systems that mimic nature by soaking up and storing water.
Gross Density	The total number of residential units divided by the acreage of the entire site area, including land occupied by public right-of-ways, recreational, civic, commercial and other non-residential uses.
Hydrologic source control measures	Site design techniques that minimize and/or slow the rate of stormwater runoff from the site.
Hydromodification	The modification of a stream's hydrograph, caused in general by increases in flows and durations that result when land is developed (e.g., made more impervious). The effects of hydromodification include, but are not limited to, increased bed and bank erosion, loss of habitat, increased sediment transport and deposition, and increased flooding.

Illicit Discharge	Any discharge to a municipal separate storm sewer (storm drain) system (MS4) that is prohibited under local, State, or federal statutes, ordinances, codes, or regulations. The term *illicit discharge* includes all non-stormwater discharges not composed entirely of stormwater and discharges that are identified under Section A. (Discharge Prohibitions) of this Permit. The term illicit discharge does not include discharges that are regulated by an NPDES permit (other than the NPDES permit for discharges from the MS4) or authorized by the Executive Officer.
Impervious Surface	A surface covering or pavement of a developed parcel of land that prevents the land's natural ability to absorb and infiltrate rainfall/stormwater. Impervious surfaces include, but are not limited to, roof tops; walkways; patios; driveways; parking lots; storage areas; impervious concrete and asphalt; and any other continuous watertight pavement or covering. Landscaped soil and pervious pavement, including pavers with pervious openings and seams, underlain with pervious soil or pervious storage material, such as a gravel layer sufficient to hold at least the C.3.d volume of rainfall runoff are not impervious surfaces. Open, uncovered retention/detention facilities shall not be considered as impervious surfaces for purposes of determining whether a project is a Regulated Project under Provisions C.3.b. and C.3.g. Open, uncovered retention/detention facilities shall be considered impervious surfaces for purposes of runoff modeling and meeting the Hydromodification Standard.
Industrial Development	Development or redevelopment of property to be used for industrial purposes, such as factories; manufacturing buildings; and research and development parks.
Infill Site	A site in an urbanized area where the immediately adjacent parcels are developed with one or more qualified urban uses or at least 75% of the perimeter of the site adjoins parcels that are developed with qualified urban uses and the remaining 25% of the site adjoins parcels that have previously been developed for qualified urban uses and no parcel within the site has been created within the past 10 years.
Infiltration Device	Any structure that is deeper than wide and designed to infiltrate stormwater into the subsurface, and, as designed, bypass the natural groundwater protection afforded by surface soil. These devices include dry wells, injection wells, and infiltration trenches (includes french drains).
Joint Stormwater Treatment Facility	A stormwater treatment facility built to treat the combined runoff from two or more Regulated Projects located adjacent to each other.
Local Roads	Roads that provide limited mobility and are the primary access to residential areas, businesses, farms, and other local areas. Local roads offer the lowest level of mobility and usually contain no bus routes. Service to through traffic movement usually is deliberately discouraged in local roads.

Maximum Extent Practicable (MEP)	A standard for implementation of stormwater management actions to reduce pollutants in stormwater. CWA 402(p)(3)(B)(iii) requires that municipal stormwater permits "shall require controls to reduce the discharge of pollutants to the maximum extent practicable, including management practices, control techniques and system, design and engineering methods, and such other provisions as the Administrator or the state determines appropriate for the control of such pollutants." Also see State Water Board Order WQ 2000-11.
Mixed-use Development or Redevelopment	Development or redevelopment of property to be used for two or more different uses, all intended to be harmonious and complementary. An example is a high-rise building with retail shops on the first 2 floors, office space on floors 3 through 10, apartments on the next 10 floors, and a restaurant on the top floor.
Municipal Separate Storm Sewer System (MS4)	A conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains), as defined in 40 CFR 122.26(b)(8): (1) Owned or operated by a state, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to state law...including special districts under state law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization or a designated and approved management agency under section 208 of the CWA) that discharges into waters of the United States; (2) Designed or used for collecting or conveying stormwater; (3) Which is not a combined sewer; and (4) Which is not part of a Publicly Owned Treatment Works (POTW), as defined in 40 CFR 122.2.
Municipal Corporation Yards, Vehicle Maintenance/Material Storage Facilities/	Any Permittee-owned or -operated facility, or portion thereof, that: (1) Conducts industrial activity, operates or stores equipment, and materials; (2) Performs fleet vehicle service/maintenance including repair, maintenance, washing, or fueling; and/or (3) Performs maintenance and/or repair of machinery/equipment;
National Pollutant Discharge Elimination System (NPDES)	A national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under sections 307, 402, 318, and 405 of the CWA.
Notice of Intent (NOI)	The application form by which dischargers seek coverage under General Permits, unless the General Permit requires otherwise.
Parking Lot	Land area or facility for the parking or storage of motor vehicles used for business, commerce, industry, or personal use.
Permittee/Permittees	Municipal agency/agencies that are named in and subject to the requirements of this Permit.
Permit Effective Date	The date at least 45 days after Permit adoption, provided the Regional Administrator of U.S. EPA Region 9 has no objection, whichever is later.

Pervious Pavement	Pavement that stores and infiltrates rainfall at a rate equal to immediately surrounding unpaved, landscaped areas, or that stores and infiltrates the rainfall runoff volume described in C.3.d.
Point Source	Any discernible, confined, and discrete conveyance including, but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operations, landfill leachate collection systems, vessel, or other floating craft, from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural stormwater runoff.
Pollutants of Concern	Pollutants that impair waterbodies listed under CWA section 303(d), pollutants associated with the land use type of a development, including pollutants commonly associated with urban runoff. Pollutants commonly associated with stormwater runoff include, but are not limited to, total suspended solids; sediment; pathogens (e.g., bacteria, viruses, protozoa); heavy metals (e.g., copper, lead, zinc, and cadmium); petroleum products and PAHs; synthetic organics (e.g., pesticides, herbicides, and PCBs); nutrients (e.g., nitrogen and phosphorus fertilizers); oxygen-demanding substances (e.g., decaying vegetation and animal waste); and trash.
Potable Water	Water that is safe for domestic use, drinking, and cooking.
Pre-Project Runoff Conditions	Stormwater runoff conditions that exist onsite immediately before development activities occur. This definition is not intended to be interpreted as that period before any human-induced land activities occurred. This definition pertains to redevelopment as well as initial development.
Public Development	Any construction, rehabilitation, redevelopment or reconstruction of any public agency project, including but not limited to, libraries, office buildings, roads, and highways.
Redevelopment	Land-disturbing activity that results in the creation, addition, or replacement of exterior impervious surface area on a site on which some past development has occurred.
Regional Monitoring Program (RMP)	A monitoring program aimed at determining San Francisco Bay Region receiving water conditions. The program was established in 1993 through an agreement among the Water Board, wastewater discharger agencies, dredgers, Municipal Stormwater Permittees and the San Francisco Estuary Institute to provide regular sampling of Bay sediments, water, and organisms for pollutants. The program is funded by the dischargers and managed by the San Francisco Estuary Institute.
Regional Project	A regional or municipal stormwater treatment facility that discharges into the same watershed that the Regulated Project does.
Regulated Projects	Development projects as defined in Provision C.3.b.ii.
Residential Housing Subdivision	Any property development of multiple single-family homes or of dwelling units intended for multiple families/households (e.g., apartments, condominiums, and town homes).

Retrofitting	Installing improved pollution control devices at existing facilities to attain water quality objectives.
Sediments	Soil, sand, and minerals washed from land into water, usually after rain.
Solid Waste	All putrescible and nonputrescible solid, semisolid, and liquid wastes as defined by California Government Code Section 68055.1 (h).
Source Control BMPs	Land use or site planning practices, or structural or nonstructural measures, that aim to prevent runoff pollution by reducing the potential for contact with rainfall runoff at the source of pollution. Source control BMPs minimize the contact between pollutants and urban runoff.
Standard Industrial Classification (SIC)	A federal system for classifying establishments by the type of activity in which they are engaged using a four-digit code.
Stormwater Pumping Station	Mechanical device (or pump) that is installed in MS4s or pipelines to discharge stormwater runoff and prevent flooding.
Stormwater Treatment System	Any engineered system designed to remove pollutants from stormwater runoff by settling, filtration, biological degradation, plant uptake, media absorption/adsorption or other physical, biological, or chemical process. This includes landscape-based systems such as grassy swales and bioretention units as well as proprietary systems.
Surface Water Ambient Monitoring Program (SWAMP)	The State Water Board's program to monitor surface water quality; coordinate consistent scientific methods; and design strategies for improving water quality monitoring, assessment, and reporting.
Total Maximum Daily Loads (TMDLs)	The maximum amount of a pollutant that can be discharged into a waterbody from all sources (point and nonpoint) and still maintain WQS. Under CWA section 303(d), TMDLs must be developed for all waterbodies that do not meet WQS even after application of technology-based controls, more stringent effluent limitations required by a state or local authority, and other pollution control requirements such as BMPs.
Toxicity Identification Evaluation (TIE)	TIE is a series of laboratory procedures used to identify the chemical(s) responsible for toxicity to aquatic life. These procedures are designed to decrease, increase, or transform the bioavailable fractions of contaminants to assess their contributions to sample toxicity. TIEs are conducted separately on water column and sediment samples.
Trash and Litter	Trash consists of litter and particles of litter. California Government Code Section 68055.1 (g) defines litter as all improperly discarded waste material, including, but not limited to, convenience food, beverage, and other product packages or containers constructed of steel, aluminum, glass, paper, plastic, and other natural and synthetic materials, thrown or deposited on the lands and waters of the State, but not including the properly discarded waste of the primary processing of agriculture, mining, logging, sawmilling, or manufacturing.

Treatment	Any method, technique, or process designed to remove pollutants and/or solids from polluted stormwater runoff, wastewater, or effluent.
Waste Load Allocations (WLAs)	A portion of a receiving water's TMDL that is allocated to one of its existing or future point sources of pollution.
Water Quality Control Plan (Basin Plan)	The Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) is the Board's master water quality control planning document. It designates beneficial uses and water quality objectives for waters of the State within the Region, including surface waters and groundwater. It also includes programs of implementation to achieve water quality objectives and discharge prohibitions. The Basin Plan was duly adopted and approved by the State Water Board, U.S. EPA, and the Office of Administrative Law where required.
Water Quality Objectives	The limits or levels of water quality elements or biological characteristics established to reasonably protect the beneficial uses of water or to prevent pollution problems within a specific area. Water quality objectives may be numeric or narrative.
Water Quality Standards	State-adopted and U.S. EPA-approved water quality standards for waterbodies. The standards prescribe the use of the waterbody and establish the WQS that must be met to protect designated uses. Water quality standards also include the federal and State anti-degradation policy.
Wet Season	October 1 through April 30 of each year

ATTACHMENT A

MUNICIPAL REGIONAL STORMWATER PERMIT

FACT SHEET

FACT SHEET/RATIONALE
TECHNICAL REPORT

for

ORDER NO. R2-2015-0049

NPDES Permit No. CAS612008

Municipal Regional Stormwater NPDES Permit
and
Waste Discharge Requirements

for

The cities of Alameda, Albany, Berkeley, Dublin, Emeryville, Fremont, Hayward, Livermore, Newark, Oakland, Piedmont, Pleasanton, San Leandro, and Union City, Alameda County, the Alameda County Flood Control and Water Conservation District, and Zone 7 of the Alameda County Flood Control and Water Conservation District, which have joined together to form the Alameda Countywide Clean Water Program

The cities of Clayton, Concord, El Cerrito, Hercules, Lafayette, Martinez, Orinda, Pinole, Pittsburg, Pleasant Hill, Richmond, San Pablo, San Ramon, and Walnut Creek, the towns of Danville and Moraga, Contra Costa County, and the Contra Costa County Flood Control and Water Conservation District, which have joined together to form the Contra Costa Clean Water Program

The cities of Campbell, Cupertino, Los Altos, Milpitas, Monte Sereno, Mountain View, Palo Alto, San Jose, Santa Clara, Saratoga, and Sunnyvale, the towns of Los Altos Hills and Los Gatos, the Santa Clara Valley Water District, and Santa Clara County, which have joined together to form the Santa Clara Valley Urban Runoff Pollution Prevention Program

The cities of Belmont, Brisbane, Burlingame, Daly City, East Palo Alto, Foster City, Half Moon Bay, Menlo Park, Millbrae, Pacifica, Redwood City, San Bruno, San Carlos, San Mateo, and South San Francisco, the towns of Atherton, Colma, Hillsborough, Portola Valley, and Woodside, the San Mateo County Flood Control District, and San Mateo County, which have joined together to form the San Mateo Countywide Water Pollution Prevention Program

The cities of Fairfield and Suisun City, which have joined together to form the Fairfield-Suisun Urban Runoff Management Program

The City of Vallejo and the Vallejo Sanitation and Flood Control District

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I. CONTACT INFORMATION

Water Board Staff Contact: Dale Bowyer, 1515 Clay Street, Suite 1400, Oakland, CA 94612, 510-622-2323, 510-622-2501 (fax), email: dbowyer@waterboards.ca.gov

The Permit and other related documents can be downloaded from the Water Board website at:

http://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/stormwater/Municipal/mrp_sw_reissuance.shtml

Comments can be electronically submitted to mrp.reissuance@waterboards.ca.gov.

All documents referenced in this Fact Sheet and in the Order are available for public review at the Water Board office, located at the address listed above. Public records are available for inspection during regular business hours, from 9:00 am to 4:00 pm, Monday through Friday, 12 - 1 pm excluded. To schedule an appointment to inspect public records, contact Melinda Wong at 510-622-2430.

II. PERMIT GOALS AND PUBLIC PROCESS

Goals

The Goals for the Municipal Regional Stormwater Permit (hereinafter, the Permit) include:

1. Continue regulating six Phase I municipal stormwater NPDES permits in one consistent permit that is regional in scope.
2. Include more specificity in NPDES permit requirements than the pre-2009 permits which lacked concrete requirements and thus did not result in the desired improvement of water quality. Continue requiring (A) stormwater management actions, (B) a specific level of implementation for each action or set of actions, and (C) reporting and effectiveness evaluation requirements for each action sufficient to determine compliance.
3. Incorporate the Stormwater Management Plan level of detail and specificity into the Permit. Stormwater Management Plans have always been considered integral to the municipal stormwater NPDES permits, but have not received the level of public review in the adoption process necessary relative to their importance in adequate stormwater pollutant management implementation.
4. Implement and enhance actions to control 303(d) listed pollutants, pollutants of concern, and achieve Waste Load Allocations adopted under Total Maximum Daily Loads.
5. Implement more specific and comprehensive stormwater monitoring, including monitoring for 303(d) listed pollutants.

Public Process

Water Board staff conducted stakeholder meetings with the Permittees and other interested parties to develop this Permit. These meetings included Water Board staff, representatives of the Permittees, and representatives of environmental groups.

Implementation

It is the Water Board's intent that this Permit shall ensure attainment of applicable water quality objectives and protection of the beneficial uses of receiving waters and associated habitat. This Permit requires that discharges shall not cause exceedances of water quality objectives nor shall they cause certain conditions to occur that create a condition of nuisance or water quality impairment in receiving waters. Accordingly, the Water Board is requiring that these standard requirements be addressed through the implementation of technically and economically feasible control measures to reduce pollutants in stormwater discharges to the maximum extent practicable as provided in section 402(p) of the CWA. In addition, this Permit contains water quality-based effluent limitations to implement TMDLs. Compliance with the Discharge Prohibitions, Receiving Water Limitations, and Provisions of this Permit is deemed compliance with the requirements of this Permit. If these measures, in combination with controls on other point and nonpoint sources of pollutants, do not result in attainment of applicable water quality objectives, the Water Board may invoke Provision C.1. and C.18 to impose additional conditions that require implementation of additional control measures.

Each of the Permittees is individually responsible for adoption and enforcement of ordinances and policies, for implementation of assigned control measures or best management practices (BMPs) needed to prevent or reduce pollutants in stormwater, and for providing funds for the capital, operation, and maintenance expenditures necessary to implement such control measures/BMPs within its jurisdiction. Each Permittee is also responsible for its share of the costs of the area-wide component of the countywide program to which the Permittee belongs. Enforcement actions concerning non-compliance with the Permit will be pursued against individual Permittee(s) responsible for specific violations of the Permit.

III. BACKGROUND

Early Permitting Approach

The federal Clean Water Act (CWA) was amended in 1987 to address urban stormwater runoff pollution of the nation’s waters. One requirement of the amendment was that many municipalities throughout the United States were obligated for the first time to obtain National Pollutant Discharge Elimination System (NPDES) permits for discharges of urban runoff from their Municipal Separate Storm Sewer Systems (MS4s). In response to the CWA amendment (and the pending federal NPDES regulations that would implement the amendment), the Water Board issued municipal stormwater Phase I permits in the early 1990s. These permits were issued to the entire county-wide urban areas of Santa Clara, Alameda, San Mateo and Contra Costa counties, rather than to individual cities over 100,000 population threshold. The cities chose to collaborate in countywide groups, pool

resources and expertise, and share information, public outreach and monitoring costs, among other tasks.

During the early permitting cycles, the county-wide programs developed many of the implementation specifics that were set forth in their Stormwater Pollution Prevention Management Plans (Plans). The permit orders were relatively simple documents that referred to the Plans for implementation details. Often specific aspects of permit and Plan implementation evolved during the five year permit cycle, with relatively significant changes approved at the Water Board staff level without significant public review and comment.

Merging Permit Requirements and Specific Requirements Previously Contained in Stormwater Management Plans

U.S. Environmental Protection Agency (U.S. EPA) stormwater rules for Phase I stormwater permits envisioned a process in which municipal stormwater management programs contained the detailed BMP and specific level of implementation information, and are reviewed and approved by the permitting agency before the municipal NPDES stormwater permits are adopted. The previous permits established a definition of a stormwater management program and required each Permittee to submit an urban runoff management plan and annual work plans for implementing its stormwater management program. An advantage to this approach was that it provided maximum flexibility for Permittees to tailor their stormwater management programs to reflect local priorities and needs. However, Water Board staff found it difficult to determine Permittees' compliance with the permits, due to the lack of specific requirements and measurable outcomes of some required actions in the plans.

Moreover, these stormwater management plans and amendments thereto made by the Permittees were not subject to public input, contrary to the U.S. Ninth Circuit Court's decision in the Phase II stormwater context that public participation is required for a stormwater management plan, because the substantive information about how an operator will reduce pollutants to the maximum extent possible was found in the stormwater management plan rather than the permit itself. (*Environmental Defense Center v. EPA* (9th Cir. 2003) 344 F.3d 832, 857.)

This Permit continues to modify these previous approaches by establishing the stormwater management program requirements and defining up front, as part of the Permit Development Process, the minimum acceptable elements of the municipal stormwater management program. The advantages of this approach are that it satisfies the public involvement requirements of both the federal Clean Water Act and the California Water Code. An advantage for Permittees and the public of this approach is that the permit requirements are known at the time of permit issuance and not left to be determined later through an iterative review and approval of stormwater management plan process, during which time was spent more on getting an acceptable plan than on-the-ground actions. While it may still be necessary to amend the Permit prior to expiration where allowed, any need to do this should be minimized.

This Permit does not include approval of all Permittees' stormwater management programs or annual reports as part of the administration of the Permit. To do so would require

significantly increased staff resources. Instead, minimum measures have been established to simplify assessment of compliance and allow the public to more easily assess each Permittee's compliance. Each Permit provision and its reporting requirements are written with this in mind. That is, each provision establishes the required actions, minimum implementation levels (i.e., minimum percentage of facilities inspected annually, escalating enforcement, reporting requirements for tracking projects, number of monitoring sites), and specific reporting elements to substantiate that these implementation levels have been met. Water Board staff will evaluate each individual Permittee's compliance through annual report review and the audit process.

The challenge in drafting the Permit is to provide the flexibility described above considering the different sizes and resources of the numerous Permittees, while ensuring that the Permit is still enforceable. To achieve this, the Permit frequently prescribes minimum measurable outcomes, while providing Permittees with flexibility in the approaches they use to meet those outcomes. Enforceability has been found to be a critical aspect of the Permit. A balance between flexibility and enforceability has been crafted into the Permit.

Current Permit Approach

As stated above, because stormwater management plans were legally an integral part of the permits and were subject to complete public notice, review and comment, this permit reissuance continues to incorporate those plan level details in the Permit, thus merging the Permittees' stormwater management plans into the Permit in one document. This Permit specifies the following: 1) requirements to effectively prohibit non-stormwater discharges into the storm drain system, pursuant to CWA § 402(p)(3)(B)(ii); 2) technology-based effluent limitations that require controls to reduce the discharge of pollutants to the "maximum extent practicable" (MEP)[1] pursuant to CWA § 402(p)(3)(B)(iii); and 3) water quality-based effluent limitations (WQBELs) pursuant to CWA § 402(p)(3)(B)(iii), which authorizes the inclusion of "such other provisions as the Administrator or the State determines appropriate for the control of [] pollutants," for pesticides, trash, mercury, PCBs, and bacteria, in addition to technology-based effluent limitations. WQBELs for these pollutants are appropriate for control because water quality standards are not being met and these pollutants have impaired Bay Area waters. The Permit includes requirements for the following components:

- Discharge Prohibitions and Receiving Water Limitations

[1] The Clean Water Act and its regulations have not specifically defined "MEP"; rather, it is a flexible and evolving standard. Congress established this flexible MEP standard so that administrative bodies would have "the tools to meet the fundamental goals of the Clean Water Act in the context of storm water pollution."(*Building Industry Ass'n of San Diego County v. State Water Resources Control Board* (2004) 124 Cal.App.4th 866, 884.) This standard was designed to allow permit writers flexibility to tailor permits to the site-specific nature of MS4s and to use a combination of pollution controls that may be different in different permits. (*In re City of Irving, Texas, Municipal Storm Sewer System* (July 16, 2001) 10 E.A.D. 111 (E.P.A.).) The MEP standard is also expected to evolve in light of programmatic improvements, new source control initiatives, and technological advances that serve to improve the overall effectiveness of storm water management programs in reducing pollutant loading to receiving waters. This is consistent with USEPA's interpretation of storm water management programs. As explained by USEPA in its 1990 rulemaking, "EPA anticipates that storm water management programs will evolve and mature over time" (55 Fed.Reg. 47990, 48052 (Nov. 16, 1990)).

- Municipal Operations
- New Development and Redevelopment
- Industrial and Commercial Site Controls
- Illicit Discharge and Elimination
- Construction Site Controls
- Public Information and Outreach
- Water Quality Monitoring
- Pesticides Toxicity Controls
- Trash Reduction
- Mercury Controls
- PCBs Controls
- Copper Controls
- Pacifica and San Mateo County Beach and San Pedro Creek Bacteria Controls for Beach and San Pedro Creek
- Exempt and Conditionally Exempt Discharges
- San Mateo County Discharges to ASBS

IV. ECONOMIC ISSUES

California Water Code (CWC) section 13241 requires the Water Board to consider certain factors, including economic considerations, in the adoption of water quality objectives. CWC section 13263 requires the Water Board to take into consideration the provisions of CWC section 13241 in adopting waste discharge requirements.

In *City of Burbank v. State Water Resources Control Bd.* (2005) 35 Cal.4th 613, the California Supreme Court considered whether regional water boards must comply with CWC section 13241 when issuing waste discharge requirements under CWC section 13263(a) by taking into account the costs a permittee will incur in complying with the permit requirements. The Court concluded that whether it is necessary to consider such cost information "depends on whether those restrictions meet or exceed the requirements of the federal Clean Water Act." (*Id*. at p. 627.) The Court ruled that regional water boards may not consider the factors in CWC section 13241, including economics, to justify imposing pollutant restrictions that are less stringent than applicable federal law requires. (*Id*. at pp. 618, 626-627 ["[Water Code section 13377 specifies that [ ] discharge permits issued by California's regional boards must meet the federal standards set by federal law. In effect, section 13377 forbids a regional board's consideration of any economic hardship on the part of the permit holder if doing so would result in the dilution of the requirements set by Congress in the Clean Water Act...Because CWC section 13263 cannot authorize what federal law forbids, it cannot authorize a regional board, when issuing a [ ] discharge permit, to use compliance costs to justify pollutant restrictions that do not comply with federal clean water standards."]). However, when pollutant restrictions in an NPDES permit are more stringent than federal law requires, CWC section 13263 requires that the regional water boards consider the factors described in CWC section 13241 as they apply to those specific restrictions.

As discussed in Section V.C., State Mandates, the Water Board finds that the requirements in this Order are not more stringent than the minimum federal requirements. Among other requirements, federal law requires MS4 permits to include requirements to effectively prohibit non-storm water discharges into the MS4s, in addition to requiring controls to reduce the discharge of pollutants in stormwater to the MEP, and other provisions as USEPA or the State determines are appropriate for the control of pollutants in MS4 discharges.

The requirements in this Order may be more specific or detailed than those enumerated in federal regulations under 40 CFR 122.26 and guidance; however, the requirements have been designed to be consistent with and within the federal statutory mandates described in CWA section 402(p)(3)(B)(ii) and (iii) and the related federal regulations and guidance. Consistent with federal law, all of the conditions in this Order could have been included in a permit adopted by USEPA in the absence of the in lieu authority of California to issue NPDES permits.

Moreover, the inclusion of numeric WQBELs in this Order does not cause this Order to be more stringent than federal law. Federal law authorizes both narrative and numeric effluent limitations to meet state water quality standards. The inclusion of WQBELs as discharge specifications in an NPDES permit in order to achieve compliance with water quality standards is not a more stringent requirement than the inclusion of BMP-based permit limitations to achieve water quality standards (State Water Board Order No. WQ 2006-0012 (Boeing)). Therefore, consideration of the factors set forth in CWC section 13241 is not required for permit requirements to implement the effective prohibition on the discharge of non-stormwater discharges into the MS4 or for controls to reduce the discharge of pollutants in stormwater to the MEP, or other provisions that the Water Board has determined appropriate to control such pollutants, as those requirements are mandated by federal law.

While the Water Board need not consider costs under CWC section 13241, the Water Board nevertheless has considered cost information, especially since it is a consideration in the implementation of technology controls to the MEP.

In 2000, the State Water Board issued a precedential order (Order WQ 2000-11 (Cities of Bellflower, et al.)) stating that cost of compliance with the programs and requirements of a municipal stormwater permit is a relevant factor in determining MEP. The Order also explicitly stated that a cost benefit analysis is not required. The State Water Board discussed costs as follows:

> While the standard of MEP is not defined in the storm water regulations or the Clean Water Act, the term has been defined in other federal rules. . . . .
>
> These definitions focus mostly on technical feasibility, but cost is also a relevant factor. There must be a serious attempt to comply, and practical solutions may not be lightly rejected. If, from the list of BMPs, a permittee chooses only a few of the least expensive methods, it is likely that MEP has not been met. On the other hand, if a permittee employs all applicable BMPs except those where it can show that they are not technically feasible in the locality, or whose cost would exceed any benefit to be derived, it would have met the standard. MEP requires permittees to choose effective

> BMPs, and to reject applicable BMPs only where other effective BMPs will serve the same purpose, the BMPs would not be technically feasible, or the cost would be prohibitive. Thus while cost is a factor, the Regional Water Board is not required to perform a cost-benefit analysis.

(State Water Board Order WQ 2000-11, supra, p.20.) The cost of complying with TMDL waste load allocations is not required to be considered since TMDLs are not subject to the MEP standard. Federal law requires that NPDES permits contain effluent limitations consistent with the assumptions of any applicable wasteload allocation in a TMDL. (40 C.F.R. §122.44(d)(1)(vii)(B).) With that background, we turn to economic considerations.

Economic discussions of urban runoff management programs tend to focus on costs incurred by municipalities in developing and implementing the programs. This is appropriate, and these costs are significant and a major issue for the Permittees. However, when considering the cost of implementing the urban runoff programs, it is also important to consider the alternative costs incurred by not fully implementing the programs, as well as the benefits that result from program implementation.

It is very difficult to ascertain the true cost of implementation of the Permittees' urban runoff management programs because of inconsistencies in reporting by the Permittees. Reported costs of compliance for the same program element can vary widely from Permittee to Permittee, often by a very wide margin that is not easily explained.[2] Despite these problems, efforts have been made to identify urban runoff management program costs, which can be helpful in understanding the costs of program implementation.

In 1999, U.S. EPA reported on multiple studies it conducted to determine the cost of urban runoff management programs. A study of Phase II municipalities determined that the annual cost of the Phase II program was expected to be $9.16 per household. U.S. EPA also studied 35 Phase I municipalities, finding costs to be similar to those anticipated for Phase II municipalities, at $9.08 per household annually.[3]

A study on program cost was also conducted by the Los Angeles Regional Water Quality Control Board (LARWQCB), where program costs reported in the municipalities' annual reports were assessed. The LARWQCB estimated that average per household cost to implement the MS4 program in Los Angeles County was $12.50.

The State Water Board also commissioned a study by the California State University, Sacramento, to assess costs of the Phase I MS4 program. This study is current and includes an assessment of costs incurred by the City of Encinitas in implementing its program. Annual cost per household in the study ranged from $18-46, with the City of Encinitas representing the upper end of the range.[4] The cost of the City of Encinitas' program is understandable, given the City's coastal location, reliance on tourism, and consent decree with environmental groups regarding its program. For these reasons, as well as the general recognition the City of Encinitas receives for implementing a superior program, the City's program cost can be considered as the high end of the spectrum for Permittee urban runoff management program costs.

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2 LARWQCB, 2003. Review and Analysis of Budget Data Submitted by the Permittees for Fiscal Years 2000-2003.p.2

3 Federal Register / Vol. 64, No. 235 / Wednesday, December 8, 1999 / Rules and Regulations. P. 68791-68792.

4 State Water Board, 2005. NPDES Stormwater Cost Survey. P. ii

It is important to note that reported program costs are not all attributable to compliance with MS4 permits. Many program components, and their associated costs, existed before any MS4 permits were issued. For example, street sweeping and trash collection costs cannot be solely or even principally attributable to MS4 permit compliance, since these practices have long been implemented by municipalities. Therefore, true program cost resulting from MS4 permit requirements is some fraction of reported costs. The California State University, Sacramento study found that only 38% of program costs are new costs fully attributable to MS4 permits. The remainder of program costs were either pre-existing or resulted from enhancement of pre-exiting programs.[5] The County of Orange found that even lesser amounts of program costs are solely attributable to MS4 permit compliance, reporting that the amount attributable to implement its Drainage Area Management Plan, its municipal stormwater permit requirements, is less than 20% of the total budget. The remaining 80% is attributable to pre-existing programs.[6]

It is also important to acknowledge that the vast majority of costs that will be incurred as a result of implementing the Order are not new. Urban runoff management programs have been in place in this region for over 25 years. Any increase in cost to the Permittees will be incremental in nature.

Urban runoff management programs cannot be considered in terms of their costs only. The programs must also be viewed in terms of their value to the public. For example, household willingness to pay for improvements in fresh water quality for fishing and boating has been estimated by U.S. EPA to be $158-210 annually or $13 - $17.50 monthly.[7] This estimate can be considered conservative, since it does not include important considerations such as marine waters benefits, wildlife benefits, or flood control benefits. The California State University, Sacramento, study corroborates U.S. EPA's estimates, reporting annual household willingness to pay for statewide clean water to be $180 or $15 monthly.[8] When viewed in comparison to household costs of existing urban runoff management programs, these household willingness to pay estimates exhibit that per household costs incurred by Permittees to implement their urban runoff management programs remain reasonable.

Another important way to consider urban runoff management program costs is to consider the implementation cost in terms of costs incurred by not improving the programs. Urban runoff in southern California has been found to cause illness in people bathing near storm drains.[9] A study of south Huntington Beach and north Newport Beach found that an illness rate of about 0.8% among bathers at those beaches resulted in about $3 million annually in health-related expenses.[10] Extrapolation of such numbers to the beaches and other water contact recreation in San Francisco Bay and the tributary creeks of the region could result in huge expenses to the public.

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5 Ibid. P. 58.

6 County of Orange, 2000. A NPDES Annual Progress Report. P. 60. More current data from the County of Orange is not used in this discussion because the County of Orange no longer reports such information.

7 Federal Register / Vol. 64, No. 235 / Wednesday, December 8, 1999 / Rules and Regulations. P. 68793.

8 State Water Board, 2005. NPDES Stormwater Cost Survey. P. iv.

9 Haile, R.W., et al, 1996. An Epidemiological Study of Possible Adverse Health Effects of Swimming in Santa Monica Bay. Santa Monica Bay Restoration Project.

10 Los Angeles Times, May 2, 2005. Here's What Ocean Germs Cost You: A UC Irvine Study Tallies the Cost of Treatment and Lost Wages for Beachgoers Who Get Sick.

Urban runoff and its impact on receiving waters also places a cost on tourism. The California Division of Tourism has estimated that each out-of-state visitor spends $101.00 a day. The experience of Huntington Beach provides an example of the potential economic impact of poor water quality. Approximately 8 miles of Huntington Beach were closed for two months in the middle of summer of 1999, impacting beach visitation and undoubtedly impacting the local economy.

Finally, it is important to consider the benefits of urban runoff management programs in conjunction with their costs. A study conducted by USC/UCLA assessed the costs and benefits of implementing various approaches for achieving compliance with the MS4 permits in the Los Angeles Region. The study found that non-structural systems would cost $2.8 billion but provide $5.6 billion in benefit. If structural systems were determined to be needed, the study found that total costs would be $5.7 to $7.4 billion, while benefits could reach $18 billion.[11] Costs are anticipated to be borne over many years – probably ten years at least. As can be seen, the benefits of the programs are expected to considerably exceed their costs. Such findings are corroborated by U.S. EPA, which found that the benefits of implementation of its Phase II stormwater rule would also outweigh the costs.[12]

Considering the above, the Water Board finds that the requirements in this Order are reasonably necessary to protect beneficial uses identified in the Basin Plan and the economic information related to costs of compliance supports protecting those beneficial uses.

V. RELEVANT STATUTES, REGULATIONS, PLANS AND POLICIES

A. Legal Authorities.

This Order is issued pursuant to section 402 of the CWA and implementing regulations adopted by the U.S. EPA and chapter 5.5, division 7 of the CWC (commencing with section 13370). This Order serves as an NPDES permit for point source discharges to surface waters. This Order also serves as waste discharge requirements pursuant to article 4, chapter 4, division 7 of the CWC (commencing with section 13260).

In addition to the legal authority citations below, they are also provided with each permit provision in this Fact Sheet.

CWA 402(p)(3)(B)(ii) – The CWA requires in section 402(p)(3)(B)(ii) that permits for discharges from municipal storm sewers "shall include a requirement to effectively prohibit non-stormwater discharges into the storm sewers."

CWA 402(p)(3)(B)(iii) – The CWA requires in section 402(p)(3)(B)(iii) that permits for discharges from municipal storm sewers "shall require controls to reduce the discharge of pollutants to the maximum extent practicable, including management practices, control techniques and system, design and engineering methods, and such other provisions as the Administrator or the State determines appropriate for the control of such pollutants."

[11] LARWQCB, 2004. Alternative Approaches to Stormwater Control.
[12] Federal Register / Vol. 64, No. 235 / Wednesday, December 8, 1999 / Rules and Regulations. P. 68791.

40 CFR 122.26(d)(2)(i)(B,C,E, and F) – Federal NPDES regulations 40 CFR 122.26(d)(2)(i)(B,C,D,E, and F) require that each Permittee's permit application "shall consist of: (i) Adequate legal authority. A demonstration that the applicant can operate pursuant to legal authority established by statute, ordinance or series of contracts which authorizes or enables the applicant at a minimum to: […] (B) Prohibit through ordinance, order or similar means, illicit discharges to the municipal separate storm sewer; (C) Control through ordinance, order or similar means the discharge to a municipal separate storm sewer of spills, dumping or disposal of materials other than storm water; (D) Control through interagency agreements among co-applicants the contribution of pollutants from one portion of the municipal system to another portion of the municipal system; (E) Require compliance with condition in ordinances, permits, contracts or orders; and (F) Carry out all inspection, surveillance and monitoring procedures necessary to determine compliance and noncompliance with permit conditions including the prohibition on illicit discharges to the municipal separate storm sewer."

40 CFR 122.26(d)(2)(iv) – Federal NPDES regulation 40 CFR 122.26(d)(2)(iv) requires "a comprehensive planning process which involves public participation and where necessary intergovernmental coordination, to reduce the discharge of pollutants to the maximum extent practicable using management practices, control techniques and system, design and engineering methods, and such other provisions which are appropriate. The program shall also include a description of staff and equipment available to implement the program. […] Proposed programs may impose controls on a system wide basis, a watershed basis, a jurisdiction basis, or on individual outfalls. […] Proposed management programs shall describe priorities for implementing controls."

40 CFR 122.26(d)(2)(iv)(A -D) – Federal NPDES regulations 40 CFR 122.26(d)(2)(iv)(A - D) require municipalities to implement controls to reduce pollutants in urban runoff from new development and significant redevelopment, construction, and commercial, residential, industrial, and municipal land uses or activities. Control of illicit discharges is also required.

CWC 13377 – CWC section 13377 requires that "[n]otwithstanding any other provision of this division, the state board or the regional boards shall, as required or authorized by the CWA, as amended, issue waste discharge requirements and dredged or fill material permits which apply and ensure compliance with all applicable provisions of the act and acts amendatory thereof or supplementary, thereto, together with any more stringent effluent standards or limitation necessary to implement water quality control plans, or for the protection of beneficial uses, or to prevent nuisance."

B. State and Federal Regulations, Policies, and Plans

1. Water Quality Control Plan. The CWA requires the Water Board to establish water quality standards for each water body in its region. Water quality standards include beneficial uses, water quality objectives and criteria that are established at levels sufficient to protect beneficial uses, and an antidegradation policy to prevent degrading of waters. The Water Board adopted the Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan), which designates beneficial uses, establishes water quality objectives, and contains implementation programs

and policies to achieve those objectives for all waters addressed through the plan. The Urban Runoff Management, Comprehensive Control Program section of the Basin Plan requires the Permittees to address existing water quality problems and prevent new problems associated with urban runoff through the development and implementation of a comprehensive control program focused on reducing current levels of pollutant loading to storm drains to the maximum extent practicable. The Basin Plan's comprehensive program requirements are designed to be consistent with federal regulations (40 CFR Parts 122-124) and are implemented through issuance of NPDES permits to owners and operators of MS4s. Pursuant to Water Code sections 13263 and 13377, the requirements in this Order implement the Basin Plan.

2. Water Quality Control Plan for Ocean Waters of California, California Ocean Plan

   In 1972, the State Water Board adopted the Water Quality Control Plan for Ocean Waters of California, California Ocean Plan (Ocean Plan). The State Water Board adopted the most recent amended Ocean Plan on October 16, 2012, and it was approved by the Office of Administrative Law and USEPA. The Ocean Plan is applicable, in its entirety, to ocean waters of the state. In order to protect beneficial uses, the Ocean Plan establishes water quality objectives and a program of implementation. Pursuant to Water Code sections 13263 and 13377, the requirements of this Order implement the Ocean Plan.

   The Ocean Plan prohibits the discharge of waste to designated Areas of Special Biological Significance (ASBS). ASBS are ocean areas designated by the State Water Board as requiring special protection through the maintenance of natural water quality. The California Ocean Plan states that the State Water Board may grant an exception to California Ocean Plan provisions where the State Water Board determines that the exception will not compromise protection of ocean waters for beneficial uses and the public interest will be served. In 2012, the State Water Board adopted Resolutions 2012-0012 and 2012-0031 (ASBS Exception), which grant an exception to the Ocean Plan prohibition on discharges to ASBS for a limited number of applicants, including San Mateo County for stormwater discharges into the James V. Fitzgerald Marine Reserve ASBS. The ASBS Exception contains "Special Protections" to maintain natural water quality and protect the beneficial uses of the ASBS. In order to legally discharge into an ASBS, San Mateo County must comply with the terms of the Special Protections and obtain coverage under this Order. This Order incorporates the terms of the Special Protections for San Mateo's discharges into the ASBS.

3. National Toxics Rule (NTR) and California Toxics Rule (CTR). U.S. EPA adopted the NTR on December 22, 1992, and amended it on May 4, 1995 and November 9, 1999. About 40 criteria in the NTR apply in California. On May 18, 2000, U.S. EPA adopted the CTR. The CTR promulgated new toxics criteria for California and incorporated the previously adopted NTR criteria that applied in the State. U.S. EPA amended the CTR on February 13, 2001. These rules contain water quality criteria for priority pollutants.

4. Antidegradation Policy. Federal regulations (40 CFR 131.12) require that the state water quality standards include an antidegradation policy consistent with the federal antidegradation policy. The State Water Board established California's antidegradation policy in State Water Board Resolution No. 68-16 ("Statement of Policy with Respect to Maintaining the Quality of the Waters of the State"). State Water Board Resolution No. 68-16 incorporates the federal antidegradation policy where the federal policy applies under federal law.

   The Basin Plan implements, and incorporates by reference, both the State and federal antidegradation policies. Resolution No. 68-16 and 40 CFR section 131.12 require the Water Board to maintain high quality waters of the State unless degradation is justified based on specific findings. First, the Water Board must ensure that "existing instream uses and the level of water quality necessary to protect the existing uses" are maintained and protected. Second, if the baseline quality of a water body for a given constituent exceeds levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water, that quality shall be maintained and protected through the requirements of the Order unless the Water Board makes findings that (1) any lowering of the water quality is necessary to accommodate important economic or social development in the area in which the waters are located; (2) water quality adequate to protect existing uses fully is assured; and (3) the highest statutory and regulatory requirements for all new and existing point sources and all cost-effective and reasonable best management practices for nonpoint source control are achieved.

   The Water Board must also comply with any requirements of State Water Board Resolution No. 68-16 beyond those imposed through incorporation of the federal antidegradation policy. In particular, the Water Board must find that not only present, but also anticipated future uses of water are protected, and must ensure best practicable treatment or control of the discharges. The baseline quality considered in making the appropriate findings is the best quality of the water since 1968, the year of the adoption of Resolution No. 68-16, or a lower level if that lower level was allowed through a permitting action that was consistent with the federal and state antidegradation policies. The discharges permitted in this Order are consistent with the antidegradation provisions of 40 CFR section 131.12 and Resolution 68-16 as set out below:

   a. Many of the waters within the area covered by this Order are impaired and by multiple pollutants discharged through MS4s and are not high quality waters with regard to these pollutants. In most cases, there are insufficient data to determine whether these water bodies were impaired as early as 1968, but the limited available data shows impairment dating back for more than two decades. Many such water bodies are listed on the State's CWA Section 303(d) List and the Water Board has established TMDLs to address the impairments (see V.6). This Order ensures that instream (beneficial) water uses and the level of water quality necessary to protect the existing uses is maintained and protected. This Order requires the Permittees to comply with permit provisions to implement the wasteload allocations set forth in the TMDLs in order to restore the beneficial uses of the impaired water bodies

consistent with the assumptions and requirements of the TMDLs. This Order further requires compliance with receiving water limitations to meet water quality standards in the receiving water either by showing compliance or by implementing actions to comply with water-quality based requirements (limitations) set forth in specific pollutants of concern provisions.

b. To the extent that some of the water bodies within the area covered by this Order are high quality waters with regard to some constituents, the Board finds as follows:

Allowing limited degradation of high quality water bodies through MS4 discharges is necessary to accommodate important economic or social development in the area and is consistent with the maximum benefit to the people of the state. The discharge of stormwater in certain circumstances is to the maximum benefit to the people of the State because it can assist with maintaining instream flows that support beneficial uses, may spur the development of multiple-benefit projects, and may be necessary for flood management, and public safety as well as to accommodate development in the area. The alternative – capturing all stormwater from all storm events – would be an enormous opportunity cost that would preclude MS4 permittees from spending substantial funds on other important social needs. The Order ensures that any limited degradation does not affect existing and anticipated future uses of the water and does not result in water quality less than established standards. The Order requires compliance with receiving water limitations that act as a floor to any limited degradation.

The Order requires the highest statutory and regulatory requirements and requires that the Permittees meet best practicable treatment or control. The Order prohibits all non-stormwater discharges, with a few enumerated exceptions, through the MS4 to the receiving waters. As required by 40 CFR section 122.44(a), the Permittees must comply with the "maximum extent practicable" technology-based standard set forth in CWA section 402(p), and implement extensive minimum control measures in a stormwater management program. Recognizing that best practicable treatment or control may evolve over time, the Order includes new and more specific requirements as compared to Order No. R2-2009-0074.

5. Anti-backsliding Regulations. Section 402(o)(2) and 303(d)(4) of the CWA and federal regulations at 40 CFR 122.44(l) prohibit backsliding in NPDES permits. These anti-backsliding provisions require effluent limitations in a reissued permit to be as stringent as those in the previous permit, with some exceptions where limitations may be relaxed. While this Order allows implementation of alternative compliance paths in Provisions C.9 to C.12 and C.1 to comply with receiving water limitations for pollutants and receiving waters identified therein, the availability of the alternatives and the corresponding availability of additional time to come into compliance with receiving water limitations does not violate the anti-backsliding provisions.

The receiving water limitations provisions of this Order are imposed under section 402(p)(3)(B) of the Clean Water Act rather than based on best professional judgment, or based on section 301(b)(1)(C) or sections 303(d) or (e), and are, accordingly, not subject to the anti-backsliding requirements of section 402(o). Although the non-applicability is less clear with respect to the regulatory anti-backsliding provisions in 40 CFR 122.44(l), the regulatory history suggests that USEPA's intent was to establish the anti-backsliding regulations with respect to evolving technology standards for traditional point sources. (See, e.g., 44 Fed.Reg. 32854, 32864 (Jun. 7, 1979)). Assuming the regulatory anti-backsliding provisions apply, it is not violated for two reasons. First, the actual requirements in Provisions C.9 to C.12 and C.1 are as or more stringent than the requirements in the previous permit. Second, to the extent explicitly allowing compliance with the receiving water limitations through implementation of C.9 to C.12 and C.14 is comparable to and less stringent than what the previous permit required, the exception to backsliding based on new information and changed circumstances since the last permit applies.

The alternative compliance paths in Provisions C.9 to C.12 and C.14 of this Order were informed by new information available to the Board from experience and knowledge gained through implementation of actions required by the previous permit and results of source identification studies and control measure effectiveness studies since the adoption of the previous permit. In particular, the Water Board recognizes the need and significance of explicitly allowing time to plan, design, fund, operate and maintain controls necessary to attain water quality improvements and comply with receiving water limitations. This is especially true where, as here, the alternative compliance paths allowed by this Order requires implementation of controls that are more stringent than controls of the previous permit. Thus, even if the receiving water limitations are subject to anti-backsliding requirements, they were revised based on changed circumstances and new information that would support an exception to the anti-backsliding provisions. (40 C.F.R. § 122.44(l)(1); 40 C.F.R. § 122.62(a)(2); 40 C.F.R. §122.44(l)(2)(i)(B)(1)).

6. Impaired Waters on CWA 303(d) List. CWA section 303(d)(1) requires each state to identify specific water bodies within its boundaries where water quality standards are not being met or are not expected to be met after implementation of technology-based effluent limitations on point sources. Water bodies that do not meet water quality standards are considered impaired and are placed on the state's "303(d) List." Periodically, U.S. EPA approves the state's 303(d) List. In October 2011, U.S. EPA approved a revised list of impaired waters prepared pursuant to CWA section 303(d), which requires identification of specific water bodies where it is expected that water quality standards will not be met after implementation of technology-based effluent limitations on point sources. Where it has not done so already, the Water Board plans to adopt Total Maximum Daily Loads (TMDLs) for pollutants on the 303(d) list. TMDLs establish wasteload allocations for point sources and load allocations for non-point sources, and are established to achieve the water quality standards for the impaired waters.

The Water Board has established TMDLs for pesticide-related toxicity, mercury, PCBs, pathogens, among others, to remedy water quality impairments in various water bodies in and around San Francisco Bay. These TMDLs identify MS4 discharges as a source of pollutants to these water bodies, and, as required, establish wasteload allocations (WLAs) for MS4 discharges to reduce the amount of pollutant discharged to receiving waters. CWA section 402(p)(3)(B)(iii) requires the Water Board to impose permit conditions, including: "management practices, control techniques and system, design and engineering methods, and such other provisions as the Administrator or the State determines appropriate for the control of such pollutants." Federal regulations also require that NDPES permits contain WQBELs consistent with the assumptions and requirements of all available WLAs (40 CFR 122.44(d)(1)(vii)(B)). CWC sections 13263 and 13377 also require that permits include limitations necessary to implement water quality control plans. Therefore, this Order includes WQBELs and other provisions to implement the TMDL WLAs assigned to Permittees regulated by this Order.

7. California Environmental Quality Act. The action to adopt an NPDES Permit is exempt from the provisions of the California Environmental Quality Act (Pub. Resources Code, § 21000 et seq.) ("CEQA") pursuant to Water Code section 13389, since the adoption or modification of a NPDES permit for an existing source is statutorily exempt and this Order only serves to implement a NPDES permit (*County of Los Angeles v. State Water Resources Control Board (2006) 143 Cal.App.4th 985*; *Pacific Water Conditioning Assn, Inc. v. City Council of City of Riverside* (1977) 73 Cal.App.3d 546, 555-556.).

8. Endangered Species Act Requirements. This Order does not authorize any act that results in the taking of a threatened or endangered species or any act that is now prohibited, or becomes prohibited in the future, under either the California Endangered Species Act (Fish and Game Code §§ 2050 to 2097) or the Federal Endangered Species Act (16 U.S.C.A. §§ 1531 to 1544). This Order requires compliance with limits, receiving water limits, and other requirements to protect the beneficial uses of waters of the State, including protecting rare, threatened, or endangered species. Each Permittee is responsible for meeting all applicable federal and State Endangered Species Act requirements.

C. State Mandates

Article XIII B, Section 6(a) of the California Constitution provides that whenever "any state agency mandates a new program or higher level of service on any local government, the state shall provide a subvention of funds to reimburse that local government for the costs of the program or increased level of service." The requirements in this Permit do not constitute an unfunded local government mandate subject to subvention under Article XIIIB, Section (6) of the California Constitution for several reasons.

First, this Permit implements federally-mandated requirements under CWA section 402, subdivision (p)(3)(B). (33 U.S.C. § 1342(p)(3)(B).) This includes federal

requirements to effectively prohibit non-stormwater discharges, to reduce the discharge of pollutants to the maximum extent practicable, and to include such other provisions as the Administrator or the State determines appropriate for the control of such pollutants. Federal cases have held that these provisions require the development of permits and permit provisions on a case-by-case basis to satisfy federal requirements. (*Natural Resources Defense Council, Inc. v. USEPA* (9th Cir. 1992) 966 F.2d 1292, 1308, fn. 17.) The authority exercised under this Permit is not reserved state authority under the CWA's savings clause (cf. *Burbank v. State Water Resources Control Bd*. (2005) 35 Cal.4th 613, 627-628 [relying on 33 U.S.C. § 1370, which allows a state to develop requirements that are not less stringent than federal requirements]), but instead, is part of a federal mandate to develop pollutant reduction requirements for MS4. To this extent, it is entirely federal authority that forms the legal basis to establish the permit provisions. (See, *City of Rancho Cucamonga v. Regional Water Quality Control Bd.-Santa Ana Region* (2006) 135 Cal.App.4th 1377, 1389; *Building Industry Association of San Diego County v. State Water Resources Control Bd*. (2004) 124 Cal.App.4th 866, 882-883.)

The requirements of this Permit do not constitute a new program or a higher level of service as compared to the requirements contained in the previous permits. The overarching requirement to impose controls to reduce the pollutants in discharges from MS4s is dictated by the CWA and is not new to this permit cycle (33 USC section 1342(p)(3)(B)). The inclusion of new and advanced measures as the MS4 programs evolve and mature over time is anticipated under the CWA (55 FR 47990, 48052 (Nov. 16, 1990)), and to the extent requirements in this Permit are interpreted as new advanced measures, they do not constitute a new program or higher level of service.

The maximum extent practicable standard under CWA section 402(p)(3)(B)(iii) is a flexible standard that balances a number of considerations, including technical feasibility, cost, public acceptance, regulatory compliance, and effectiveness. (*Building Ind. Ass'n. of San Diego v. State Water Resources Control Bd*. (2004) 124 Cal.App.4th 866, 873-874, 889.) Such considerations change over time with advances in technology and with experience gained in stormwater management (55 FR 47990, 48052 (Nov. 16, 1990)). Accordingly, the determination of whether the Permit conditions exceed the requirements of federal law cannot be based on a point by point comparison of the permit conditions and the six minimum measures that are required "at a minimum" to reduce pollutants to the maximum extent practicable and to protect water quality (40 C.F.R. §122.34). Likewise, individual permit provisions cannot be considered in isolation. When implementing the federal requirement to reduce pollutants to the maximum extent practicable, the entire permit must be evaluated as a whole. The Second Appellate District of the Court of Appeal has affirmed this approach in a case that is now pending before the California Supreme Court. (*State Department of Finance v. Commission on State Mandates* (2014) 316 P.3d 1218, review granted (2013) 220 Cal.App.4th 740.)

Furthermore, in the analogous Phase II MS4 context, U.S. EPA has issued an MS4 Permit Improvement Guide (April 2010, available at: http://www.epa.gov/npdes/pubs/ms4permit_improvement_guide.pdf) that

recommends many provisions for Phase II MS4 permits not explicitly specified in the six minimum measures established at Code of Federal Regulations, title 40, section 122.34.

The requirements of the Permit are necessary to reduce the discharge of pollutants to the MEP. The Water Board finds that the requirements of the Permit are practicable, do not exceed federal law, and thus do not constitute an unfunded mandate. These findings are the expert conclusions of the principal state agency charged with implementing the NPDES program in California (CWC sections 13001, 13370). The provisions in this to effectively prohibit non-stormwater discharges are also mandated by the CWA (33 USC section 1342(p)(3)(B)(ii)). Likewise, the provisions of this Permit to implement TMDLs are federal mandates. The CWA requires TMDLs to be developed for waterbodies that do not meet federal water quality standards. (33 U.S.C. § 1313(d).) Once U.S. EPA or a state develops a TMDL, federal law requires that permits must contain effluent limitations consistent with the assumptions of any applicable WLA. (40 CFR 122.44(d)(1)(vii)(B).)

Second, the Permittees' obligations under this Permit are similar to the obligations of nongovernmental dischargers who are issued NPDES permits for stormwater discharges. With a few inapplicable exceptions, the CWA regulates the discharge of pollutants from point sources (33 U.S.C. § 1342), and the Porter-Cologne regulates the discharge of waste (Water Code section 13263), both without regard to the source of the pollutant or waste. As a result, the costs incurred by local agencies to protect water quality reflect an overarching regulatory scheme that places similar requirements on governmental and nongovernmental dischargers. (See *County of Los Angeles v. State of California* (1987) 43 Cal.3d 46, 57-58 [finding comprehensive workers compensation scheme did not create a cost for local agencies that was subject to state subvention].)

Third, the Permittees have requested permit coverage in lieu of compliance with the complete prohibition against the discharge of pollutants contained in CWA section 301, subdivision (a) (33 U.S.C. § 1311(a)) and in lieu of numeric restrictions on their discharges. To the extent Permittees have voluntarily availed themselves of the Permit, the program is not a state mandate. (Accord *County of San Diego v. State of California* (1997) 15 Cal.4th 68, 107-108.) Likewise, the Permittees have voluntarily sought a program-based municipal stormwater permit in lieu of a numeric limits approach. (See *City of Abilene v. U.S. EPA* (5th Cir. 2003) 325 F.3d 657, 662-663 [noting that municipalities can choose between a management permit or a permit with numeric limits].) The Permittees' voluntary decision to file a Report of Waste Discharge proposing a program-based permit is a voluntary decision not subject to subvention. (See *Environmental Defense Center v. U.S. EPA* (9th Cir. 2003) 344 F.3d 832, 845-848.)

Fourth, the Permittees' responsibility for preventing discharges of waste that can create conditions of pollution or nuisance from conveyances that are within their ownership or control under State law predates the enactment of Article XIIIB, Section (6) of the California Constitution.

Finally, even if any of this Permit's provisions could be considered unfunded mandates, under Government Code section 17556, subdivision (d), a state mandate is not subject to reimbursement if the local agency has the authority to charge a fee. The Permittees have the authority to levy service charges, fees, or assessments sufficient to pay for compliance with this Order, subject to certain voting requirements contained in the California Constitution. (See Cal. Const., Art. XIII D, section 6, subd. (c); see also *Howard Jarvis Taxpayers Ass'n v. City of Salinas* (2002) 98 Cal.App.4th 1351, 1358-1359.) The Fact Sheet demonstrates that numerous activities contribute to the pollutant loading in the MS4. Permittees can levy service charges, fees, or assessments on these activities, independent of real property ownership. (See, e.g., *Apartment Association of Los Angeles County, Inc. v. City of Los Angeles* (2001) 24 Cal.4th 830, 842 [upholding inspection fees associated with renting property].) The ability of a local agency to defray the cost of a program without raising taxes indicates that a program does not entail a cost subject to subvention. (*County of Fresno v. State of California* (1991) 53 Cal.3d 482, 487-488.)

D. Statewide General Industrial and Construction Stormwater Permits

The State Water Board has issued NPDES general permits for the regulation of stormwater discharges associated with industrial activities and construction activities. To effectively implement the New Development (and significant redevelopment) and Construction Controls, Illicit Discharge Controls, and Industrial and Commercial Discharge Controls components in this Permit, the Permittees will conduct investigations and local regulatory activities at industrial and construction sites covered by these general permits. However, under the CWA, the Water Board cannot delegate its own authority to enforce these general permits to the Permittees. Therefore, Water Board staff intends to work cooperatively with the Permittees to ensure that industries and construction sites within the Permittees' jurisdictions are in compliance with applicable general permit requirements and are not subject to uncoordinated stormwater regulatory activities.

E. Regulated Parties

Each of the Permittees listed in this Permit owns or operates a MS4, through which it discharges urban runoff into waters of the United States within the San Francisco Bay Region. These MS4s fall into one or more of the following categories: (1) a medium or large MS4 that services a population of greater than 100,000 or 250,000 respectively; or (2) a small MS4 that is "interrelated" to a medium or large MS4; or (3) an MS4 which contributes to a violation of a water quality standard; or (4) an MS4 which is a significant contributor of pollutants to waters of the United States.

F. Permit Coverage

The Permittees each have jurisdiction over and maintenance responsibility for their respective MS4s in the Region. Federal, State or regional entities within the Permittees' boundaries, not currently named in this Permit, operate storm drain facilities and/or discharge stormwater to the storm drains and watercourses covered

by this Permit. The Permittees may lack jurisdiction over these entities. Consequently, the Water Board recognizes that the Permittees should not be held responsible for such facilities and/or discharges. The Water Board will consider such facilities for coverage under NPDES permitting pursuant to U.S. EPA Phase II stormwater regulations. Under Phase II, the Water Board intends to permit these federal, State, and regional entities through use of a statewide Phase II NPDES General Permit.

VI. PERMIT PROVISIONS

A. Discharge Prohibitions

Prohibition A.1. Legal Authority – CWA 402(p)(3)(B)(ii) – The CWA requires in section 402(p)(3)(B)(ii) that permits for discharges from municipal storm sewers "shall include a requirement to effectively prohibit non-stormwater discharges into the storm sewers."

Prohibition A.2. Legal Authority – San Francisco Bay Basin Plan, Chapter 4 Implementation, Table 4-1, Prohibition 7.

B. Receiving Water Limitations

Receiving Water Limitation B.1. Legal Authority – San Francisco Bay Basin Plan, Chapter 3, Water Quality Objectives.

Receiving Water Limitation B.2. Legal Authority – Federal regulations require each NPDES permit to include limitations necessary to achieve water quality standards. 40 CFR 122.44(d)(1)(i). The State Water Board has previously determined that limitations necessary to meet water quality standards are appropriate for the control of pollutants discharged by MS4s and must be included in MS4 permits. (State Water Board Orders WQ 91-03, 98-01, 99-05, and 2001-15).). This Order accordingly requires that discharges shall not cause or contribute to violations of water quality standards.

C. Provisions

C.1. Compliance with Discharge Prohibitions and Receiving Water Limitations

Legal Authority

Broad Legal Authority: CWA sections 402(p)(3)(B)(ii-iii), CWC sections 13377 and 13263, and Federal NPDES regulations 40 CFR 122.26(d)(2)(i)(B, C, E, and F) and 40 CFR 122.26(d)(2)(iv).

Specific Legal Authority: The Water Board's Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) contains water quality objectives as well as the following waste discharge prohibition: "The discharge of waste to waters of the state in a manner causing, or threatening to cause a condition of

pollution, contamination, or nuisance as defined in California Water Code Section 13050, is prohibited."

California Water Code section 13050(l) states "(1) 'Pollution' means an alteration of the quality of waters of the state by waste to a degree which unreasonably affects either of the following: (A) The water for beneficial uses. (B) Facilities which serve beneficial uses. (2) 'Pollution' may include "contamination."

California Water Code section 13050(k) states "'Contamination' means an impairment of the quality of waters of the state by waste to a degree which creates a hazard to public health through poisoning or through the spread of disease. 'Contamination' includes any equivalent effect resulting from the disposal of waste, whether or not waters of the state are affected."

California Water Code section 13050(m) states "'Nuisance' means anything which meets all of the following requirements: (1) Is injurious to health, or is indecent or offensive to the senses, or an obstruction to the free use of property, so as to interfere with the comfortable enjoyment of life or property. (2) Affects at the same time an entire community or neighborhood, or any considerable number of persons, although the extent of the annoyance or damage inflicted upon individuals may be unequal. (3) Occurs during, or as a result of, the treatment or disposal of wastes."

California Water Code section 13241 requires each water board to "establish such water quality objectives in water quality control plans as in its judgment will ensure the reasonable protection of beneficial uses and the prevention of nuisance […]."

California Water Code Section 13243 provides that a water board, "in a water quality control plan or in waste discharge requirements, may specify certain conditions or areas where the discharge of waste, or certain types of waste, will not be permitted."

California Water Code Section 13263(a) provides that waste discharge requirements prescribed by the water board implement the Basin Plan.

Federal NPDES regulations 40 CFR 122.26(d)(2)(iv)(A -D) require municipalities to implement controls to reduce pollutants in urban runoff from commercial, residential, industrial, and construction land uses or activities.

Federal NPDES regulations 40 CFR 122.26(d)(2)(i)(A -D) require municipalities to have legal authority to control various discharges to their MS4.

Federal NPDES regulation 40 CFR 122.44(d)(1) requires NPDES permits to include any requirements necessary to "[a]chieve water quality standards established under section 303 of the CWA, including State narrative criteria for water quality."

Federal NPDES regulation 40 CFR 122.44(d)(1)(i) requires NPDES permits to include limitations to "control all pollutants or pollutant parameters (either conventional, nonconventional, or toxic pollutants) which the Director

determines are or may be discharged at a level which will cause, have reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality."

State Water Board Orders WQ 98-01 and 99-05 are precedential orders that require municipal stormwater permits to not cause or contribute to exceedances of water quality standards in the receiving water. The State Water Board Order 95-01 specifically requires that Provision C.1 include language that Permittees shall comply with discharge prohibitions and receiving water limitations through timely implementation of control measures and other actions to reduce pollutants in the discharges, whereby adopting an iterative approach to complying with the limitations. Courts have held that compliance with the iterative process does not excuse liability for violations of water quality standards. (*Building Industry Assn. of San Diego v. State Water Resources Control Board* (2004) 124 Cal.App.4th 866; *City of Rancho Cucamonga v. Regional Water Quality Control Bd*. (2006) 135 Cal.App.4th 1377; *Natural Resources Defense Council v. County of Los Angeles* (9th Cir. 2011) 673 F.3d. 880, rev'd on other grounds sub nom. *Los Angeles County Flood Control Dist. v. Natural Resources Defense Council* (2013) 133 S.Ct. 710, mod. by *Natural Resources Defense Council v. County of Los Angeles* (9th Cir. 2013) 725 F.3d 1194, cert. den. *Los Angeles County Flood Control Dist. v. Natural Resources Defense Council* (2014) 134 S.Ct. 2135.)

State Water Board Order WQ 2015-0075 directs regional water boards to consider reasonable alternative compliance options for meeting receiving water limitations. Order WQ 2015-0075 specifically directs regional water boards to follow the principles stated below when issuing a municipal stormwater permit, unless a board makes a specific showing that application of a given principle is not appropriate for region-specific or permit-specific reasons.

1. The receiving water limitations provisions of Phase I MS4 permits should continue to require compliance with water quality standards in the receiving water and should not deem good faith engagement in the iterative process to constitute such compliance. The Phase I MS4 permits should therefore continue to use the receiving water limitations provisions as directed by State Water Board Order WQ 99-05.
2. The Phase I MS4 permits should include a provision stating that, for water body-pollutant combinations with a TMDL, full compliance with the requirements of the TMDL constitutes compliance with the receiving water limitations for that water body-pollutant combination.
3. The Phase I MS4 permits should incorporate an ambitious, rigorous, and transparent alternative compliance path that allows permittees appropriate time to come into compliance with receiving water limitations without being in violation of the receiving water limitations during full implementation of the compliance alternative.
4. The alternative compliance path should encourage watershed-based approaches, address multiple contaminants, and incorporate TMDL requirements.

5. The alternative compliance path should encourage the use of green infrastructure and the adoption of low impact development principles.
6. The alternative compliance path should encourage multi-benefit regional projects that capture, infiltrate, and reuse stormwater and support a local sustainable water supply.
7. The alternative compliance path should have rigor and accountability. Permittees should be required, through a transparent process, to show that they have analyzed the water quality issues in the watershed, prioritized those issues, and proposed appropriate solutions. Permittees should be further required, again through a transparent process, to monitor the results and return to their analysis to verify assumptions and update the solutions. Permittees should be required to conduct this type of adaptive management on their own initiative without waiting for direction from the regional water board.

Alternative Path to Compliance with Discharge Prohibitions and Receiving Water Limitations for Certain Pollutants

This Order, as did the previous order, goes beyond requiring an open-ended iterative approach to compliance with water quality standards by including pollutant-specific provisions, C.9 through C.12 and C.14, with numerical WQBELs or narrative WQBELs with milestones and deadlines. The provisions and limitations implement adopted TMDL wasteload allocations and the associated implementation plans in the Basin Plan and specify what Permittees must do during the term of the Order to manage discharges of the specific pollutants that may cause or contribute to violations of water quality standards. If complied with, the Permittees will be deemed in compliance with Receiving Water Limitations B.1 and B.2 for these pollutants. The requirements of C.9 through C.12 and C.14 are ambitious and rigorous because they will require Permittees to fully commit to and implement challenging but achievable tasks to ultimately meet water quality objectives, including objective interim numeric effluent limitations. Accordingly, this Order explicitly applies principles 1, 2, and 3 (above) of State Water Board Order WQ 2015-0075 and provides an alternative path to compliance with Discharge Prohibitions and Receiving Water Limitations for the following pollutant – water body combinations: pesticides and pesticide-caused toxicity in all receiving waters (Provision C.9); trash in all receiving waters (Provision C.10); mercury in all San Francisco Bay segments and receiving waters in the Guadaloupe River watershed (Provision C.11); polychlorinated biphenyls (PCBs) in all San Francisco Bay segments (Provision C.12); and fecal indicator bacteria in San Pedro Creek and Pacifica State Beach receiving waters (Provision C.14).

This rigorous compliance alternative also applies Order WQ 2015-0075 principle 4. It implements all applicable TMDL requirements and calls for or allows for implementation of trash, mercury, and PCBs controls in watershed and drainage areas where they are most needed and most likely to be effective and promotes and allows use of controls with multiple pollutant benefits. The watershed-based approach addressing multiple pollutants is not appropriate for the pesticides and pesticide-caused toxicity requirements. Consistent with the TMDL wasteload allocation and implementation plan, these requirements are pollution prevention management practices specific to urban use

pesticides and apply to all watersheds and drainage areas. The fecal indicator bacteria requirements for discharges to San Pedro Creek and Pacifica State Beach receiving waters implement TMDL requirements and call for fecal indicator bacteria-specific pollution prevention controls consistent with current knowledge of sources and activities in the watershed.

Provision C.3 of the Order calls for adoption and implementation of low impact development consistent with Order WQ 2015-0075 principles 5 and 6. The mercury and PCBs provisions (C.11 and C.12) explicitly recognize and call for use of green infrastructure to meet pollutant load reduction requirements. The trash provision allows use of low impact development green infrastructure as full trash capture systems, if appropriately designed, operated, and maintained. Although not directly required in the pesticides and fecal indicator bacteria provisions, low impact development principles and development and implementation of green infrastructure plans, including consideration of multi-benefit regional projects, could also have pesticides and bacteria load reduction benefits.

Consistent with Order WQ 2015-0075 principle 7, each of the pollutant-specific provisions also contain concrete milestones and deadlines and reporting requirements that provide rigor and accountability. All reports, plans, and other required submittals will be made available to all interested parties and input and feedback from interested parties will be considered in the evaluation of all submittals.

The Order also includes monitoring requirements (Provision C.8) to assess water body and watershed conditions and effectiveness of control actions towards attainment of water quality standards and to inform selection and implementation of new control actions or adaptive improvements of control actions.

Consistent with the TMDLs, more time than the term of the Order will be necessary to attain water quality standards for mercury and PCBs. In these cases, the associated Order provision includes an additional requirement for the Permittees to submit a proposed plan of additional or improved control actions and schedule of implementation to attain water quality standards or TMDL wasteload allocations for the Water Board's consideration of numerical or narrative WQBELs in the subsequent order.

This Order also includes specific requirements to control copper in discharges to all San Francisco Bay segments (Provision C.13) in accordance with the Basin Plan implementation plan of the site-specific water quality objectives for copper in these receiving waters. However, the Permittees already comply with Receiving Water Limitations for copper in all San Francisco Bay segments since these copper objectives are attained in these receiving waters.

C.2. Municipal Operations

Legal Authority

The following legal authority applies to Provision C.2:

Broad Legal Authority: CWA sections 402(p)(3)(B)(ii-iii), California Water Code (CWC) sections 13377 and 13263, and Federal NPDES regulations 40 CFR 122.26(d)(2)(i)(B, C, E, and F) and 40 CFR 122.26(d)(2)(iv).

Specific Legal Authority: Federal NPDES regulation 40 CFR 122.26(d)(2)(iv)(A)(1) requires "[a] description of maintenance activities and a maintenance schedule for structural controls to reduce pollutants (including floatables) in discharges from municipal separate storm sewers."

Federal NPDES regulation 40 CFR 122.26(d)(2)(iv)(A)(3) requires "[a] description for operating and maintaining public streets, roads and highways and procedures for reducing the impact on receiving waters of discharges from municipal storm sewer systems, including pollutants discharged as a result of deicing activities."

Federal NPDES regulation 40 CFR 122.26(d)(2)(iv)(A)(4) requires "[a] description of procedures to assure that flood management projects assess the impacts on the water quality of receiving waterbodies and that existing structural flood control devices have been evaluated to determine if retrofitting the device to provide additional pollutant removal from storm water is feasible."

Federal NPDES regulation 40 CFR 122.26(d)(2)(iv)(A)(5) requires "[a] description of a program to monitor pollutants in runoff from operating or closed municipal landfills or other treatment, storage or disposal facilities for municipal waste, which shall identify priorities and procedures for inspections and establishing and implementing control measures for such discharges."

Federal NPDES regulation 40 CFR 122.26(d)(2)(iv)(A)(6) requires "[a] description of a program to reduce to the maximum extent practicable, pollutants in discharges from municipal separate storm sewers associated with the application of pesticides, herbicides, and fertilizer which will include, as appropriate, controls such as educational activities, permits, certifications, and other measures for commercial applicators and distributors, and controls for application in public right-of-ways and at municipal facilities."

Federal NPDES regulation 40 CFR 122.44(d)(1)(i) requires NPDES permits to include limitations to "control all pollutants or pollutant parameters (either conventional, nonconventional, or toxic pollutants) which the Director determines are or may be discharged at a level which will cause, have reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality."

Fact Sheet Findings in Support of Provision C.2

C.2-1 Municipal maintenance activities are potential sources of pollutants unless appropriate inspection, pollutant source control, and cleanup measures are implemented during routine maintenance works to minimize pollutant discharges to storm drainage facilities.

Sediment accumulated on paved surfaces, such as roads, parking lots, parks, sidewalks, landscaping, and corporation yards, is the major source of point source pollutants found in urban runoff. Thus, Provision C.2 requires the Permittees to designate minimum BMPs for all municipal facilities and activities as part of their ongoing pollution prevention efforts as set forth in this Permit. Such prevention measures include, but are not limited to, activities as described below. The work of municipal maintenance personnel is vital to minimize stormwater pollution because personnel work directly on municipal storm drains and other municipal facilities. Through work such as inspecting and cleaning storm drain drop inlets and pipes and conducting municipal construction and maintenance activities upstream of the storm drain, municipal maintenance personnel are directly responsible for preventing and removing pollutants from the storm drain. Maintenance personnel also play an important role in educating the public and in reporting and cleaning up illicit discharges.

C.2-2 Road construction and other activities can disturb the soil and drainage patterns to streams in undeveloped areas, causing excess runoff and thereby erosion and the release of sediment. In particular, poorly designed roads can act as man-made drainages that carry runoff and sediment into natural streams, impacting water quality.

Provision C.2 also requires the Permittees to implement effective BMPs for the following rural works maintenance and support activities: (a) Road design, construction, maintenance, and repairs in rural areas that prevent and control road-related erosion and sediment transport; (b) Identification and prioritization of rural roads maintenance on the basis of soil erosion potential, slope steepness, and stream habitat resources; (c) Road and culvert construction designs that do not impact creek functions. New or replaced culverts shall not create a migratory fish passage barrier, where migratory fish are present, or lead to stream instability; (d) Development and implementation of an inspection program to maintain road structural integrity and prevent impacts to water quality; (e) Provide adequate maintenance of rural roads adjacent to streams and riparian habitat to reduce erosion, replace damaging shotgun culverts, re-grade roads to slope outward where consistent with road engineering safety standards, and install water bars; and (f) When replacing existing culverts or redesigning new culverts or bridge crossings use measures to reduce erosion, provide fish passage and maintain natural stream geomorphology in a stable manner.

Road construction, culvert installation, and other rural maintenance activities can disturb the soil and drainage patterns to streams in undeveloped areas, causing excess runoff and thereby erosion and the release of sediment. Poorly

designed roads can act as preferential drainage pathways that carry runoff and sediment into natural streams, impacting water quality. In addition, other rural public works activities, including those the BMP approach would address, have the potential to significantly affect sediment discharge and transport within streams and other waterways, which can degrade the beneficial uses of those waterways. This Provision would help ensure that these impacts are appropriately controlled.

Specific Provision C.2 Requirements

Provision C.2.a-e. (Operation and Maintenance of Municipal Separate Storm Sewer Systems (MS4) facilities) requires that the Permittees implement appropriate pollution control measures during maintenance activities and to inspect and, if necessary, clean municipal facilities, such as conveyance systems, pump stations, and corporation yards, before the rainy season. The requirements will assist the Permittees to prioritize tasks, implement appropriate BMPs, evaluate the effectiveness of the implemented BMPs, and compile and submit annual reports.

Provision C.2.d. (Stormwater Pump Stations) Water Board staff investigated the occurrence of low salinity and dissolved oxygen (DO) conditions in Old Alameda Creek (Alameda County) and Alviso Slough (Santa Clara County) in September and October of 2005. Water Board staff became aware of this problem in their review of receiving water and discharge sampling conducted by the U.S. Geological Survey as part of its routine monitoring on discharges associated with the former salt ponds managed by the U.S. Fish and Wildlife Service in Santa Clara County and the California Department of Fish and Wildlife in Alameda County.

Discharge of black-colored water from the Alvarado pump station to Old Alameda Creek was observed at the time of the data collection on September 7, 2005, confirming dry weather urban runoff as the source of the documented violations of the 5 mg/L (DO) water quality objective. Such conditions were measured again on September 21, 2005.

On October 17, 2005, waters in Alviso Slough were much less saline than the salt ponds and had the lowest documented dissolved oxygen of the summer, suggesting a dry weather urban runoff source. The (DO) sag was detected from surface to bottom at 2.3 mg/L at a salinity of less than 1 part per thousand (ppt), mid-day, when oxygen levels should be high at the surface. The sloughs have a typical depth of 6 feet.

Investigations of these incidents found that stormwater pump stations, universally operated by automatic float triggers, have been confirmed as the cause in at least one instance and may represent an overlooked source of controllable pollution to the San Francisco Bay Estuary and its tidal sloughs. The discharges of dry weather urban runoff from these pump stations were not being managed to protect water quality and surveillance monitoring detected measurable negative water quality consequences of this current state of pump station management.

Pump station discharges are controllable point sources of pollution that are virtually unregulated, causing violations of water quality objectives. Therefore, the Previous Permit required (1) an inventory of pump stations, (2) inspection of pump stations twice a year during the dry season to collect (DO) data and implement corrective actions for DO

at or below 3 milligrams per liter (mg/l), and (3) inspection of pump stations after two storm events during the wet season to collect data on the presence of trash and other water quality parameters.

The Permittees have submitted a list of all pump stations. DO data in annual reports shows that turning on the pumps aerates the water, thereby increasing the DO of the water to at least 3 (mg/l), the minimum DO requirement.

40 CFR 122.26(d)(2)(I)(f) requires Permittees to carry out all inspection, surveillance, and monitoring procedures necessary to determine compliance and noncompliance with permit conditions, including the prohibition on illicit discharges to the MS4. Pump stations, which collect and discharge from the storm drain systems, cannot contribute discharges with dissolved oxygen (DO) level below 3 mg/L. Previous pump station reporting shows that implementation of corrective actions (i.e., BMPs) prior to the pumps, combined with using the pumps to discharge collected water, as opposed to simply allowing it to overflow, aerates the water to a DO level of at least 3 mg/L. Thus, this Permit removes the specific requirements for the monitoring of DO at pump stations and allows the Permittees greater flexibility to ensure that all water discharged from pumps stations is at least 3 mg/l. The reporting requirement has also been removed from this Permit, but Permittees must maintain any sampling records and make them available upon request.

The Previous Permit also wanted to explore the use of the pump stations for trash capture to protect the beneficial uses of the receiving waters. Information collected shows that pump stations as trash capture devices are inefficient because their reservoirs are too small to contain trash. At the same time, many municipalities have installed full and partial trash capture devices at select storm drain inlets.

Provision C.2.f. (Corporation Yard BMP Implementation) requires Permittees to implement the BMP in site-specific Stormwater Pollution Prevention Plans (SWPPPs) to minimize pollutant discharges in stormwater and non-stormwater discharges. The Previous Permit required SWPPPs to be developed and implemented by July 1, 2010. SWPPPs should have specific BMPs for different functions of the corporation yard and provide guidance for frequent mini inspections to ensure that appropriate BMPs are implemented. During the Previous Permit term, Water Board staff and U.S. EPA staff inspected a few of the Permittees' corporation yards and evaluated the corresponding SWPPPs. All inspected corporation yards had actual and/or potential discharges. Most of the countywide programs developed templates for the SWPPPs. Individual Permittees were supposed to customize the template to fit their corporation yards. Some Permittees did not fully customize the SWPPP template. A few Permittees have comprehensive, site-specific SWPPPs. Water Board staff also evaluated this Provision in annual reports. The Previous Permit required routine inspections in different areas of the corporation yard and at least one inspection prior to the start of the rainy season. The intent of the inspection requirement was to have regular mini-inspections and one full corporation yard inspection sometime in late August or in September, right before the start of the rainy season in October, to make sure the corporation yard was clean and all issues were resolved before the start of the rainy season. Some Permittees inspected in the spring or early summer and documented that as the inspection for the year to comply with this

Provision in the annual report due the following September. Other Permittees did not inspect until late fall or winter. Some Permittees documented issues but the annual reports either did not document the corrective actions or corrective actions were implemented weeks or months later. Therefore, this Permit clearly identifies the timeframe of when the annual inspections must occur and requires corrective actions to be implemented before the next rain event, but no longer than 10 business days after the potential and/or actual discharges are discovered. This is consistent with the timeframe for implementation of corrective actions in provisions C.4. and C.5.

C.3. New Development and Redevelopment

Legal Authority

Broad Legal Authority: CWA Sections 402(p)(3)(B)(ii-iii), CWA Section 402(a), CWC Sections 13377 and 13263, and Federal NPDES regulations 40 CFR 122.26(d)(2)(i)(B, C, E, and F), 40 CFR 131.12, and 40 CFR 122.26(d)(2)(iv).

Fact Sheet Findings in Support of Provision C.3

C.3-1 Urban development begins at the land use planning phase; therefore, this phase provides the greatest cost-effective opportunities to protect water quality in new development and redevelopment. When a Permittee incorporates policies and principles designed to safeguard water resources into its General Plan and development project approval processes, it has taken a critical step toward the preservation of local water resources for current and future generations.

C.3-2 Provision C.3. is based on the premise that Permittees are responsible for considering potential stormwater impacts when making planning and land use decisions. The goal of Provision C.3. is for Permittees to use their planning authority to reduce pollutant discharges and runoff flow into the storm drain system primarily through the implementation of low impact development (LID) techniques.

C.3-3 To accomplish this goal, Permittees shall require new development and redevelopment projects to implement appropriate source control, site design, and stormwater treatment measures to address both soluble and insoluble stormwater runoff pollutant discharges and prevent increases in runoff flow from these projects. Permittees shall also complete and implement a Green Infrastructure Plan for the inclusion of low impact development drainage design into storm drain infrastructure on public and private lands, including streets, roads, storm drains, parking lots, building roofs and other storm drain infrastructure elements. Neither Provision C.3. nor any of its requirements are intended to restrict or control local land use decision-making authority.

C.3-4 Certain control measures implemented or required by Permittees for urban runoff management might create a habitat for vectors (e.g., mosquitoes and rodents) if not properly designed or maintained. Close collaboration and cooperative efforts among Permittees, local vector control agencies, Water Board staff, and the State Department of Public Health are necessary to minimize potential nuisances and public health impacts resulting from vector breeding.

C.3-5 The Water Board recognized in its Policy on the Use of Constructed Wetlands for Urban Runoff Pollution Control (Resolution No. 94-102) that urban runoff treatment wetlands that are constructed and operated pursuant to that Resolution and are constructed outside a creek or other receiving water are stormwater treatment systems and, as such, are not waters of the United States subject to

regulation pursuant to Sections 401 or 404 of the federal Clean Water Act. This is consistent with the stayed 2015 Clean Water Rule exempting stormwater control features from the definition of "waters of the U.S." (80 Fed. Reg. 37054 (June 29, 2015).) Water Board staff is working with the California Department of Fish and (CDFW) and U.S. Fish and Wildlife Service (USFWS) to identify how maintenance for stormwater treatment controls required under permits such as this Permit can be appropriately streamlined, given CDFW and USFWS requirements, and particularly those that address special status species. This Permit requires Permittees to ensure that constructed wetlands installed by Regulated Projects are consistent with Resolution No. 94-102 and the operation and maintenance requirements contained therein.

C.3-6 The Permit requires Permittees to ensure that pervious pavement systems of 3000 square feet or more, onsite, joint, and offsite stormwater treatment systems, and HM controls installed by Regulated Projects are properly operated and maintained for the life of the Projects. In cases where the responsible parties for the treatment systems or HM controls have worked diligently and in good faith with the appropriate state and federal agencies to obtain approvals necessary to complete maintenance activities for the treatment systems or HM controls, but these approvals are not granted, the Permittees shall be considered by the Water Board to be in compliance with Provision C.3.h.iv. of the Permit.

Specific Provision C.3 Requirements

Provision C.3.a. (New Development and Redevelopment Performance Standard Implementation) sets forth essentially the same legal authority, development review and permitting, environmental review, training, and outreach requirements that are contained in the previous permit.

Provision C.3.b. (Regulated Projects) establishes the different categories of new development and redevelopment projects that Permittees must regulate under Provision C.3. These categories are defined on the basis of the land use and the amount of impervious surface created and/or replaced by the project because all impervious surfaces contribute pollutants to stormwater runoff and certain land uses contribute more pollutants. Impervious surfaces can neither absorb water nor remove pollutants as the natural, vegetated soil they replaced can. Also, urban development creates new pollution by bringing higher levels of car emissions that are aerially deposited, car maintenance wastes, pesticides, household hazardous wastes, pet wastes, and trash, which can all be washed into the storm sewer.

This permit is a 3rd generation permit containing stormwater treatment requirements for development projects. Past permits have grandfathered development projects approved prior to those permits' effective dates, essentially exempting the projects and allowing them to provide no or insufficient stormwater treatment. Water Board staff believe a small number of these development projects that were approved more than a decade ago have still not begun construction. A decade is sufficient time to justify requiring the Permittees to revise and update these stagnant development permits to include current LID treatment requirements. Therefore, this provision removes the grandfathering of

development projects approved with no stormwater treatment requirements and that have not begun construction. However, this provision allows exemptions for some of these previously approved projects in situations where the Permittees lack legal authority to retroactively change their previous approvals. This provision also allows some of these previously approved projects to use non-LID stormwater treatment instead of LID treatment because of space constraints.

To confirm that the total number of Projects previously approved without any Provision C.3. compliant stormwater treatment is indeed small, Provision C.3.b.iv.(1) includes a requirement for Permittees to provide in their 2017 Annual Report a complete list of these types of development projects. For each such Project, the Permittee shall indicate the type of stormwater treatment system required or the specific exemption granted, pursuant to Provision C.3.b.i.(2)(a) and (b). This reporting requirement only applies to Permittees that have Projects subject to Provision C.3.b.i.(2).

Regulated Projects approved with non-LID stormwater treatment measures in compliance with the hydraulic sizing criteria of Provision C.3.d. will continue to be grandfathered.

Provision C.3.c (Low Impact Development (LID)) recognizes LID as a cost-effective, beneficial, holistic, integrated stormwater management strategy.[13] The goal of LID is to reduce runoff and mimic a site's predevelopment hydrology by minimizing disturbed areas and impervious cover and then infiltrating, storing, detaining, evapotranspiring, and/or biotreating stormwater runoff close to its source. LID employs principles such as preserving and recreating natural landscape features and minimizing imperviousness to create functional and appealing site drainage that treats stormwater as a resource, rather than a waste product. Practices used to adhere to these LID principles include measures such as preserving undeveloped open space, rain barrels and cisterns, green roofs, pervious pavement systems, and biotreatment through rain gardens, bioretention units, bioswales, and planter/tree boxes. This is a standard, current, ordinary, and regular practice being implemented in numerous jurisdictions in California, the U.S., and internationally, including: the Permittees' jurisdictions, Los Angeles, San Diego, San Francisco, Portland, OR, Seattle, Minneapolis, Milwaukee, Kansas City, Chicago, New York City, Philadelphia, Auckland, New Zealand, Chinese "sponge cities" such as Wuhan and Changde, and others.

This Provision sets forth a three-pronged approach to LID with source control, site design, and stormwater treatment requirements. The concepts and techniques for incorporating LID into development projects, particularly for site design, have been extensively discussed in BASMAA's Start at the Source manual (1999) and its companion document, Using Site Design Techniques to Meet Development Standards for Stormwater Quality (May 2003), as well as in various other LID reference documents.

Provision C.3.c.i.(1) lists source control measures that must be included in all Regulated Projects as well as some that are applicable only to certain types of

[13] U.S. EPA, *Reducing Stormwater Costs through Low Impact Development (LID) Strategies and Practices* **(**Publication Number EPA 841-F-07-006, December 2007) http://water.epa.gov/polwaste/green/upload/2008_01_02_NPS_lid_costs07uments_reducingstormwatercosts-2.pdf**)**

businesses and facilities. These measures are recognized nationwide as basic, effective techniques to minimize the introduction of pollutants into stormwater runoff.

Provision C.3.c.i.(2)(a) lists site design elements that must be implemented at all Regulated Projects. These design elements are basic, effective techniques to minimize pollutant concentrations in stormwater runoff as well as the volume and frequency of discharge of the runoff. One design element requires each Regulated Project to include at least one site design measure from a list of six that includes recycling of roof runoff, directing runoff into vegetated areas, and installation of pervious pavement systems instead of traditional paving. All these measures serve to reduce the amount of runoff and its associated pollutants being discharged from the Regulated Project.

Provision C.3.c.i.(2)(b) requires the Permittees to collectively develop and adopt design specifications for pervious pavement systems, subject to the Executive Officer's approval. However, this subprovision allows Permittees to reference pervious pavement design specifications previously developed by countywide programs and adopted into countywide stormwater handbooks. Design specifications are necessary because improperly designed and engineered pervious pavement systems may cause flooding and the discharge of insufficiently treated stormwater runoff.

Provision C.3.c.i.(2)(c) requires each Regulated Project to treat 100% of the Provision C.3.d. runoff with LID treatment measures onsite or with LID treatment measures at a joint stormwater treatment facility.

Provision C.3.c.i.(2)(c)(i) defines LID treatment measures as harvesting and use, infiltration, evapotranspiration, or biotreatment.

The Previous Permit required that a properly engineered and maintained biotreatment system may be considered only if it was infeasible to implement harvesting and use, infiltration, or evapotranspiration at a project site. Infeasibility may result from conditions including the following:

- Locations where seasonal high groundwater would be within 10 feet of the base of the LID treatment measure.
- Locations within 100 feet of a groundwater well used for drinking water.
- Development sites where pollutant mobilization in the soil or groundwater is a documented concern.
- Locations with potential geotechnical hazards.
- Smart growth and infill or redevelopment sites where the density and/or nature of the project would create significant difficulty for compliance with the onsite volume retention requirement.
- Locations with tight clay soils that significantly limit the infiltration of stormwater.

The Previous Permit also required the Permittees to produce two reports during the permit term. The first report[14] established criteria and procedures for Permittees to follow to implement the hierarchy of LID treatment measures listed above (i.e., harvesting and use, infiltration, and evapotranspiration must be considered prior to biotreatment). The second report[15] reviewed data from two years of the Permittees' Annual Reports to evaluate the results of applying the feasibility / infeasibility criteria. The conclusions of the second report were:

- Infiltration of some runoff is feasible on most projects, although in the clay soils typical of the Bay Area, the amount of runoff than can be infiltrated is unpredictable and highly variable.
- Very few development projects create the quantity and timing of non-potable water demand required to feasibly harvest and use the amount of runoff specified in Provision C.3.d.
- Bioretention facilities, when designed according to the criteria in current Permittee guidance, could infiltrate 40% - 80% of the total runoff, depending on rainfall patterns and facility size. However, the amount of runoff that would be infiltrated over the life of a particular project is variable and unpredictable because of uncertainty in the near-term and long-term infiltration performance of underlying soils. Infiltration can be maximized by ensuring project designs meet current design criteria and by ensuring treatment systems are constructed as designed.

The Permittees completed a "White Paper" on Provision C.3. on February 27, 2015.[16] The White Paper concluded that the pollutant removal performance of biotreatment facilities, overall and on average, is equivalent or better than the likely real-world performance of harvest and use facilities and as good as the likely performance of infiltration facilities when considered over the long term. The White Paper also noted that biotreatment facilities require less maintenance and are less prone to failure than harvest and use facilities, and in some cases, are also preferable to direct infiltration facilities.

Based on the data provided by the above Permittee reports, this Permit removes the Previous Permit's restriction on allowing properly engineered and maintained biotreatment systems only after an infeasibility analysis of harvesting and use, infiltration, or evapotranspiration treatment measures.

Provision C.3.c.i.(2)(c)(ii) requires biotreatment systems to meet minimum performance specifications in order to be considered as LID treatment. This subprovision also requires biotreatment soil media to meet the current minimum specifications developed and included in the Previous Permit.[17] However, this subprovision recognizes that the current soil media specifications may need to be

[14] *Harvest and Use, Infiltration and Evapotranspiration Feasibility/ Infeasibility Criteria Report (2011)*
[15] *Status Report on the Application of Feasibility / Infeasibility Criteria for Low Impact Development (2013)*
[16] BASMAA, February 27, 2015. "White Paper" on Provision C.3 in MRP 2.0: Final Report.
[17] Attachment L of Board Order No. R2-2009-0074, adopted October 14, 2009, and revised November 27, 2011.

modified because of variability in climate, rainfall, and compost composition among the different counties. Therefore, this subprovision allows for the Permittees to collectively (on an all-Permittee scale or countywide scale) develop and adopt revisions to the current soil media minimum specifications, subject to the Executive Officer's approval.

Provision C.3.d (Numeric Sizing Criteria for Stormwater Treatment Systems) lists the hydraulic sizing design criteria that the stormwater treatment systems installed for Regulated Projects must meet. The volume and flow hydraulic design criteria are the same as those required in the Previous Permit. These criteria ensure that stormwater treatment systems will be designed to treat the optimum amount of relatively smaller-sized runoff-generating storms each year. That is, the treatment systems will be sized to treat the majority of rainfall events generating polluted runoff but will not have to be sized to treat the few very large annual storms as well. For many projects, such large treatment systems become infeasible to incorporate into the projects.

Provision C.3.d.iv. defines infiltration devices and establishes limits on the use of stormwater treatment systems that function primarily as infiltration devices. The restriction that infiltration devices have to be deeper than wide has been removed to reflect current design practices. The intent of the Provision is to ensure that the use of infiltration devices, where feasible and safe from the standpoint of structural integrity, must also not cause or contribute to the degradation of groundwater quality at the project sites.

Provision C.3.e (Alternative or In-Lieu Compliance with Provision C.3.b.) recognizes that not all Regulated Projects may be able to install LID treatment systems onsite because of site conditions, such as existing underground utilities, right-of-way constraints, and limited space.

Provision C.3.e.i. This Provision allows any Regulated Project to provide LID treatment for up to 100% of the required Provision C.3.d. stormwater runoff at an offsite location or pay equivalent in-lieu fees to provide LID treatment at a Regional Project, as long as the offsite or Regional Project is in the same watershed as the Regulated Project and constructed within 3 years of the end of construction of the Regulated Project. The 3 years of additional time are allowed because more time may be required to complete construction of offsite and Regional projects because of administrative, legal, and/or construction delays. We acknowledge in some instances, an even longer time may be required to complete construction of Regional Projects because they may involve a variety of public agencies and stakeholder groups and a longer planning and construction phase. Therefore, the timeline for completion of a Regional Project may be extended up to 5 years after the completion of the Regulated Project, with prior Executive Officer approval. Executive Officer approval will be granted contingent upon a demonstration of good faith efforts to implement the Regional Project, such as having funds encumbered and applying for the appropriate regulatory permits.

Provision C.3.e.ii. (Special Projects) When considered at the watershed scale, certain types of smart growth, high density, and transit-oriented development can either reduce existing impervious surfaces, or create less "accessory" impervious areas and auto-related pollutant impacts. Incentive LID Treatment Reduction Credits approved by the Water Board may be applied to these types of Special Projects. This Provision includes specific criteria for determining which types of Regulated Projects may be considered Special Projects and establishes different categories of Special Projects based on size, land use type, and density. Except for Category A, which represents the smallest Special Projects, this Provision also uses location, density, and parking criteria to establish a tiered approach for determining the total LID Treatment Reduction Credit available for any given Special Project. The total available LID Treatment Reduction Credit may be used to reduce the amount of stormwater runoff that must be treated with LID stormwater treatment systems. The remaining amount of stormwater runoff must be treated with one or a combination of the following two specific non-LID treatment systems:

- Tree-box-type high flowrate biofilters
- Vault-based high flowrate media filters

This Provision is the same as in the Previous Permit except for the following three changes:

- Density LID Treatment Reduction Credits are allowed for mixed use development projects, which consist of a mix of residential and commercial land uses, based on density measured by either the dwelling units per acre or floor area ratio. This change acknowledges that mixed use development projects can vary from mostly commercial to mostly residential. The Previous Permit did not accommodate this variability and penalized dense mixed use projects that are mostly residential by restricting density LID Treatment Reduction Credits to only floor area ratio criteria.
- Definitions of gross density and floor area ratio have been included in Provision C.3.b.ii. to aid consistent implementation of this Provision by all Permittees. Gross Density is defined as the total number of residential units divided by the acreage of the entire site area, including land occupied by public right-of-ways, recreational, civic, commercial and other non-residential uses. Floor Area Ratio (FAR) is defined as the ratio of the total floor area on all floors of all buildings at a project site (except structures, floors, or floor areas dedicated to parking) to the total project site area. Gross density and FAR have been purposely defined to include public rights-of-way, recreational, civic, commercial, and other non-residential uses so as to raise the bar for Regulated Projects to qualify for the LID Reduction Credits allowed in Provision C.3.e.ii. That is, these more conservative gross density and FAR values may result in some Regulated Projects qualifying for less LID Reduction Credits or not qualifying at all.

  The reporting data for Special Projects under the current permit shows that "lack of space to provide full LID stormwater treatment" is the most frequent reason invoked for why 100% LID treatment onsite is infeasible. Therefore, it is appropriate that the space reserved for public rights-of-way, recreation, civic,

commercial, and other non-residential uses are included in the calculations for gross density and FAR, especially since many of these areas may be used for installation of LID treatment measures.

- To reduce the burden of reporting, the semi-annual reporting of Special Projects that are being considered by Permittees prior to the Permittees granting final planning approval has been reduced to annual, within the Annual Report. Although the frequency of reporting has been reduced, the current reporting requirements for this Provision are unchanged because the data is necessary for Water Board staff to validate the Permittees' analysis of the number and size of potential Special Projects that may be approved during this permit term. Water Board staff intends to use the data collected in the proposed reporting requirements to revise the Special Projects criteria as appropriate for the next permit term.

Provision C.3.f (Alternative Certification of Stormwater Treatment Systems) allows Permittees to have a third-party review and certify a Regulated Project's compliance with the hydraulic design criteria in Provision C.3.d. Some municipalities do not have the staffing resources to perform these technical reviews. The third-party review option addresses this staffing issue. This Provision requires Permittees to make a reasonable effort to ensure that the third-party reviewer has no conflict of interest with regard to the Regulated Project being reviewed.

Provision C.3.g. (Hydromodification Management) requires that certain new development projects manage increases in stormwater runoff flow and volume so that post-project runoff shall not exceed estimated pre-project runoff rates and durations, where such increased flow and/or volume is likely to cause increased potential for erosion of creek beds and banks, silt pollutant generation, or other adverse impacts on beneficial uses due to increased erosive force.

Background for Provision C.3.g. Based on Hydrograph Modification Management Plans prepared by the Permittees, the Water Board adopted hydromodification management (HM) requirements for Alameda Permittees (March 2007), Contra Costa Permittees (July 2006), Fairfield-Suisun Permittees (March 2007), Santa Clara Permittees (July 2005), and San Mateo Permittees (March 2007). Those HM requirements are stated in Provision C.3.g., and Attachment C includes maps prepared by the Alameda, Santa Clara, San Mateo, and Fairfield-Suisun Permittees showing areas where HM requirements apply.

The Alameda, Santa Clara and San Mateo Permittees have adapted the Western Washington Hydrology Model[18] for modeling runoff from development project sites, sizing flow duration control structures, and determining overall compliance of such structures and other HM control structures (HM controls) in controlling runoff from the project sites to manage hydromodification impacts as described in the Permit. The adapted model is called the Bay Area Hydrology Model (BAHM).[19] All Permittees may

[18] http://www.ecy.wa.gov/programs/wq/stormwater/wwhm_training/wwhm/wwhm_v2/instructions_v2.html
[19] See www.bayareahydrologymodel.org, Resources.

use the BAHM if its inputs reflect actual conditions at the project site and surrounding area, including receiving water conditions. As Permittees gain experience in designing and operating HM controls, the Programs may make adjustments in the BAHM to improve its function in controlling excess runoff and managing hydromodification impacts. Notification of all such changes shall be given to the Water Board and the public through such mechanism as an electronic email list.

The Contra Costa Permittees have developed sizing charts for the design of flow duration control devices. The Previous Permit allowed the Contra Costa Permittees to conduct a monitoring program to verify the performance of these devices and to identify whether streams to which Contra Costa Permittees discharge may have a different susceptibility to HM impacts, thus justifying a different threshold for control of flows resulting in those impacts. The Contra Costa Permittees submitted an IMP Monitoring Report,[20] which found that Contra Costa HM measures generally, but not entirely, met the Previous Permit's HM requirements for the Alameda, Santa Clara, and San Mateo Permittees, and the City of Vallejo. The Contra Costa Permittees did not submit information showing that Contra Costa creeks had a different susceptibility to erosion. That is, they did not submit a justification for using erosion thresholds different than those accepted for the Alameda, Santa Clara, and San Mateo Permittees, and the City of Vallejo. Under the Previous Permit, the Water Board had accepted a higher threshold for control of HM effects (i.e., controlling the range of flows beginning at 20% of the 2-year pre-project peak flow, as opposed to 10% of the 2-year pre-project peak flow). Because this additional information was not submitted, and Contra Costa streams are generally similar to other Bay Area streams, the Permit extends the 10% standard to Contra Costa, and includes requirements for Contra Costa to complete modifications to its HM approach to ensure that projects implement that consistent approach within a specified time.

The Previous Permit Provision C.3.g.v. required the City of Vallejo to complete a hydrograph modification management plan (HMP) by July 1, 2013, in lieu of complying with Previous Permit Provision C.3.g.i-iv. The City submitted its Final HMP on April 24, 2013,[21] and the HMP was subsequently accepted by Board staff. The Final HMP incorporates the same requirements as for the Alameda, Santa Clara, and San Mateo Permittees. The Permit requires the City to comply with those requirements.

The Fairfield-Suisun Permittees are required to comply with the HM criteria established in this Permit. However, they have a threshold for control of erosive flows that is greater than the other Permittees: 20 percent of the 2-year peak flow. This criterion, which is greater than the criterion allowed for other Bay Area Stormwater Countywide Programs, is based on data collected from Laurel and Ledgewood Creeks and technical analyses of these site-specific data.

The Water Board recognizes that the collective knowledge of management of erosive flows and durations from new and redevelopment is evolving, and that the topics listed below are appropriate topics for further study. Such a study may be initiated by Water Board staff, or the Executive Officer may request that all Bay Region municipal

[20] Contra Costa Clean Water Program, September 15, 2013. IMP Monitoring Report: IMP Model Calibration and Validation Project.

[21] City of Vallejo (Geosyntec), April 2013. Final Hydromodification Management Plan (HMP).

stormwater Permittees jointly conduct investigations as appropriate. Any future proposed changes to the Permittees' HM provisions may reflect improved understanding of these issues:

- Potential incremental costs, and benefits to waterways, from controlling a range of flows up to the 35- or 50-year peak flow, versus controlling up to the 10-year peak flow, as required by this Permit;
- The allowable low-flow (also called Qcp and currently specified as 10–20 percent of the pre-project 2-year runoff from the site) from HM controls;
- The effectiveness of self-retaining areas for management of post-project flows and durations; and/or
- The appropriate basis for determining cost-based impracticability of treating stormwater runoff and controlling excess runoff flows and durations.

Provision C.3.g.i. defines the subset of Regulated Projects that must install hydromodification controls (HM controls). This subset, called HM Projects, are Regulated Projects that create and/or replace one acre or more of impervious surface and are not specifically excluded by the conditions expressed in C.3.g.i.(1)-(3). Those conditions identify areas where the potential for single-project and/or cumulative development hydromodification impacts to creeks is minimal, and thus HM controls are not required. Such areas include creeks that are concrete-lined or significantly hardened (e.g., with concrete) from point of discharge and continuously downstream to their outfall into San Francisco Bay; underground storm drains discharging to the Bay; and construction of infill projects in highly developed watersheds.[22] The Alameda, Santa Clara, San Mateo, and Fairfield-Suisun Permittees have developed maps showing where HM controls are required (Attachment C). This Provision requires Permittees that have not previously submitted an HM Applicability Map or equivalent information to prepare and submit that information, acceptable to the Executive Officer, consistent with the requirements of Provision C.3.g.

Provision C.3.g.ii. establishes the standard HM controls that all HM Projects must meet. The HM Standard is based largely on the standards proposed by Permittees in their Hydrograph Modification Management Plans. The method for calculating post-project runoff in regards to HM controls is standard practice in Washington State and is equally applicable in California.

Provision C.3.g.iii. provides a procedure for the Permittees to propose an additional method for demonstrating compliance with HM requirements. This method would directly simulate erosion potential, and would be required to ensure that projects implementing HM controls with this method, if accepted by the Executive Officer, meet the Permit's HM criteria. This provision requires submittal of appropriate analyses demonstrating that the method will substantively comply with HM requirements; it may not be implemented on projects until accepted by the Executive Officer.

[22] Within the context of Provision C.3.g., "highly developed watersheds" refers to catchments or sub-catchments that are 70 percent impervious or more.

Provision C.3.g.iv. identifies and defines three methods of hydromodification management.

Provision C.3.g.v. establishes the timeframes for meeting the HM Standard defined in Provision C.3.g.ii.

Provision C.3.g.vi. describes the information required to be collected and/or submitted in the Permittees' Annual Reports regarding HM Projects. This Provision also describes specific required information for Contra Costa Permittees to submit with the 2017 Annual Report.

Provision C.3.h (Operation and Maintenance of Stormwater Treatment Systems) establishes permitting requirements to ensure that proper maintenance for the life of the Regulated Project is provided for all pervious pavement systems of 3,000 square feet or more; onsite, joint, and offsite stormwater treatment systems; and HM controls installed.

This Provision adds a requirement for Permittees to include pervious pavement systems of 3,000 square feet or more in their Operation and Maintenance Agreements, database of Regulated Projects, and inspection checklists. Pervious pavement systems serve as site design measures that directly reduce the amount of impervious surface area and therefore, the size of the stormwater treatment system(s) required to comply with Provision C.3.d. Adequate routine maintenance of pervious pavement systems is essential because clogged systems become impervious and may result in untreated stormwater runoff or additional load on stormwater treatment systems that result in inadequately treated stormwater runoff. To lessen the burden of inspecting so many pervious pavement systems, only those of 3,000 square feet or more are required to be inspected and patios for private-use at single-family homes, townhomes, or condominiums are specifically excluded. In the case of large subdivisions where the total pervious pavement system area is equal to or greater than 3,000 square feet, but the pervious pavement installations are on individual driveways that are less than 3,000 square feet, inspection of a representative number of driveways will suffice.

Provision C.3.h.ii.(6) The Previous Permit required Permittees to inspect at least 20% of all stormwater treatment systems annually, at least 20% of all vault-based systems annually, and every treatment system at least once every 5 years. Permittees have indicated that each inspection of a Regulated Project routinely includes inspection of pervious pavement systems, stormwater treatment systems and HM controls installed at the Project. Therefore, this Provision revises the inspection frequency requirements such that the minimum number of inspections required annually is tied to a percentage of the total number of Regulated Projects, instead of the total number of individual treatment systems and HM controls. This lessens the tracking burden for the Permittees and better reflects the way actual inspections are conducted.

This Provision requires each Permittee to inspect all its Regulated Projects at least once every 5 years and inspect an average of 20%, but no less than 15% of the total number of Regulated Projects annually. This requirement serves to prevent failed or improperly maintained pervious pavement systems, stormwater treatment systems, or

HM controls from going undetected until the 5th year. Neither of these inspection frequency requirements interferes with the Permittees' current ability to prioritize their inspections based on factors such as types of maintenance agreements, owner or contractor maintained systems, maintenance history, past compliance problems at certain Projects, etc.

Provision C.3.h.ii.(6)(d) This Provision allows Permittees to accept third party inspection reports for vault-based stormwater treatment systems in lieu of conducting Permittee inspections, but only if the third party inspections are conducted at least annually, which is the normal frequency for maintenance of these systems. Each third party inspection must be included in the database or tabular format required in Provision C.3.h.ii.(4) and (5) and clearly identified as a third party inspection, Each third party inspection report must document the third party inspection company, date of inspection, condition of the treatment unit(s) at the time of inspection, maintenance activities performed, and appearance of the inside of the vault units (with photos) before and after maintenance.

Provision C.3.h.ii.(7) As the number of Regulated Projects grows, the Permittees' O&M inspection programs must grow as well. Therefore, this Provision requires each Permittee to develop and implement an Enforcement Response Plan (ERP) for O&M inspections. The ERP serves as a reference document for inspection staff so that consistent enforcement actions can be taken to bring development projects into compliance. This Provision establishes minimum requirements for the ERPs. One of these requirements is that corrective actions must be implemented within 30 days after a problem is identified by an inspector. Thirty days is more than adequate time, considering that many of the problems identified in past O&M inspection reports have been lack of maintenance service or build-up of sediment or debris. The correction of such deficiencies should not take more than 30 days. This Provision also allows for greater than 30 days to complete permanent corrective actions, such as installing additional curb cuts and making grading or vegetation improvements.

Provision C.3.h.iv. This Provision sets the implementation dates for adding pervious pavement to Permittees' O&M programs and complying with the revised minimum inspection frequencies to July 1, 2016, so as to align with the Permittees' fiscal years. This allows time for the Permittees to revise their O&M programs and budget for the revisions. This Provision also specifies a July 1, 2017, due date for implementation of an ERP for the same reasons.

Provision C.3.h.v. As in the Previous Permit, this Provision requires the Permittees to maintain a database or equivalent tabular format with detailed information on each O&M inspection and any necessary enforcement actions against Regulated Projects. To lessen the burden of reporting, this Provision only requires summary data on inspections conducted each fiscal year to be reported in the Annual Report, instead of detailed information on each O&M inspection. However, upon request by the Executive Officer, detailed information from the database or tabular format must be submitted.

Provision C.3.i. (Required Site Design Measures for Small Project and Detached Single-Family Homes Projects) contains requirements on single-family home projects that create and/or replace 2,500 square feet or more of impervious surface and small development projects that create and/or replace > 2,500 ft^2 to <10,000 ft^2 impervious surface (collectively over the entire project). A detached single-family home project is defined as the building of one single new house or the addition and/or replacement of impervious surface to one single existing house, which is not part of a larger plan of development. This Provision requires these projects to select and implement one or more stormwater site design measures from a list of six. These site design measures are basic methods to reduce the amount and flowrate of stormwater runoff from projects and provide some pollutant removal treatment of the runoff that does leave the projects. Under this Provision, only projects that already require approvals and/or permits under the Permittees' current planning, building, or other comparable authority are regulated. Hence this Provision does not require Permittees to regulate small development and single-family home projects that would not otherwise be regulated under the Permittees' current ordinances or authorities. Water Board staff recognizes that the stormwater runoff pollutant and volume contribution from each one of these projects may be small; however, the cumulative impacts could be significant. This Provision serves to address some of these cumulative impacts in a simple way that will not be too administratively burdensome on the Permittees.

Provision C.3.j. (Green Infrastructure Planning and Implementation) requires Permittees to complete and implement a Green Infrastructure Plan (Plan) for the inclusion of low impact development drainage design into storm drain infrastructure on public and private lands, including streets, roads, storm drains, parking lots, building roofs, and other storm drain infrastructure elements.

The Plan is intended to serve as an implementation guide and reporting tool during this and subsequent Permit terms to provide reasonable assurance that urban runoff Total Maximum Daily Load (TMDL) wasteload allocations (e.g., for the San Francisco Bay mercury and PCBs TMDLs) will be met, and to set goals for reducing, over the long term, the adverse water quality impacts of urbanization and urban runoff on receiving waters. For this Permit term, the Plan is in lieu of expanding the definition of Regulated Projects prescribed in Provision C.3.b.ii. to include all new and redevelopment projects that create or replace 5,000 square feet or more of impervious surface areas and road projects that just replace existing imperious surface area. However, subsequent permits may include different impervious surface thresholds or other criteria for Regulated Projects. The Plan also provides a mechanism to establish and implement alternative or in lieu compliance options for Regulated Projects and to account for and justify Special Projects in accordance with Provision C.3.e.ii.

Over the long term, the Plan is intended to describe how the Permittees will shift their impervious surfaces and storm drain infrastructure from gray, or traditional storm drain infrastructure where runoff flows directly into the storm drain and then the receiving water, to green—that is, to a more-resilient, sustainable system that slows runoff by dispersing it to vegetated areas, harvests and uses runoff, promotes infiltration and

evapotranspiration, and uses bioretention and other green infrastructure practices to clean stormwater runoff.

The Plan shall also identify means and methods to prioritize particular areas and projects within each Permittee's jurisdiction, at appropriate geographic and time scales, for implementation of green infrastructure projects. Further, it shall include means and methods to track the area within each Permittee's jurisdiction that is treated by green infrastructure controls and the amount of directly connected impervious area. As appropriate, it shall incorporate plans required elsewhere within this Permit, and specifically plans required for the monitoring of and to ensure appropriate reductions in trash and PCBs, mercury, and other pollutants. Permittees may comply with any requirement of this Provision through a collaborative effort.

Provision C.3.j.i.(1) This Provision requires each Permittee to prepare a framework or workplan that describes specific tasks and timeframes for developing its Green Infrastructure Plan. The framework or workplan is required to be approved by each Permittee's governing body, mayor, city manager, or county manager by June 30, 2017. This approval process provides assurance to the Water Board that Permittees are committed to the development of the Plan and implementation of green infrastructure.

Provision C.3.j.i.(2) This Provision specifies minimum elements that each Green Infrastructure Plan must contain to ensure that each Plan is robust and appropriately identifies the means and methods that each Permittee will employ to implement green infrastructure over time. These minimum elements (discussed below) are not overly prescriptive, so as to allow Permittees flexibility in developing their Plans.

(a) A mechanism to prioritize and map areas for potential and planned projects, both public and private, on a drainage-area specific basis. Implementation of these projects is required to be projected over the same timeframes as specified in Provisions C.11. and C.12. for assessing mercury and PCB load reductions because green infrastructure and projects are an acknowledged means of pollutant load reductions. Each Permittee has flexibility in choosing the mechanism as long as it includes criteria for prioritization and outputs that can be incorporated into its long-term planning and capital improvement processes.

(b) Targets for the amount of impervious surface, from public and private projects, within the Permittee's jurisdiction to be retrofitted over the same timeframes as specified in Provisions C.11. and C.12. for assessing mercury and PCB load reductions. These self-determined targets represent the green infrastructure work that each Permittee has proactively identified will be completed beyond what would be completed in its community anyway.

(c) A process for tracking and mapping completed projects, public and private, and making the information publicly available. Again, each Permittee has flexibility in what they use to comply with this Provision.

(d) General guidelines and standard specifications for overall streetscape and project design and construction to ensure that projects have a unified, complete design that implements the range of functions associated with the projects. These

guidelines and standard specifications, while crucial to a Green Infrastructure Plan, already exist in many reference documents for green infrastructure design and are readily available.

(e) Requirement(s) that projects be designed to meet the treatment and hydromodification sizing requirements in Provisions C.3.c. and C.3.d. In recognition of space and drainage constraints that may occur for public green infrastructure road projects not subject to Provision C.3.b.ii. (i.e., non-Regulated Projects), this Provision allows Permittees to collectively propose a single approach for how to proceed should project constraints preclude fully meeting the C.3.d. sizing requirements. The single approach can include different options to address specific issues, constraints, or scenarios.

(f) A summary of the planning documents the Permittee has updated or otherwise modified as well as how the Permittee will ensure that green infrastructure requirements will be included in future plans. The purpose of this element is to show that each Permittee is considering green infrastructure in all aspects of its urban planning.

(g) A workplan to complete prioritized projects identified as part of a Provision C.3.e Alternative Compliance program or part of Provision C.3.j Early Implementation.

(h) An evaluation of prioritized project funding options, including, but not limited to: Alternative Compliance funds; grant monies, including transportation project grants from federal, state, and local agencies; existing Permittee resources; new tax or other levies; and other sources of funds.

At U.S. EPA's request, Water Board staff has included at the end of this Fact Sheet section an outline of information used in part by MS4 permittees in the Los Angeles area in their preparation of watershed management plans. We recommend that Permittees consider this information as they prepare Green Infrastructure Plans.

Provision C.3.j.i.(5) requires each Permittee to document in its 2017 Annual Report that the framework or workplan for development of its Green Infrastructure Plan was approved by June 30, 2017, as required by Provision C.3.j.i.(1). This Provision also requires each Permittee to submit its Green Infrastructure Plan and documentation of the legal mechanisms to implement the Plan with the 2019 Annual Report. Based on other cities' past experiences in developing Green Infrastructure Plans, Water Board staff believes the deadlines specified provide adequate time for each Permittee to complete the framework or workplan as well as the Green Infrastructure Plan itself. Allowing the entire permit term to complete the Green Infrastructure Plans is too much time and prevents any of the Plans from being used by Board staff to inform the development of the MRP in the next permit term.

Provision C.3.j.ii.(1) requires each Permittee to prepare and maintain a list of green infrastructure projects, public and private, that are already planned for implementation during the permit term and infrastructure projects planned for implementation that have potential for green infrastructure measures.

Provision C.3.j.ii.(2) requires the list to be submitted with each Annual Report along with a summary of planning or implementation status for each public green

infrastructure project and each private green infrastructure project that is not also a Regulated Project under Provision C.3.b.ii. This Provision also requires each Permittee to include a summary of how each public infrastructure project with green infrastructure potential will include green infrastructure measures to the maximum extent practicable during the permit term. For any public infrastructure project where implementation of green infrastructure measures is not practicable, the Permittee is required to submit a brief description of the project and the reasons green infrastructure measures were impracticable to implement.

The purpose of Provision C.3.j.ii. is to ensure that each Permittee is proactively developing green infrastructure projects and including green infrastructure elements into already planned infrastructure projects as much as possible, while the Green Infrastructure Plan is being developed.

Provision C.3.j.iii. requires the Permittees, individually or collectively, to track processes, assemble and submit information, and provide information, materials, and presentations as needed to assist relevant regional, state, and federal agencies to plan, design , and fund green infrastructure measures into local infrastructure projects, including transportation projects.

Provision C.3.j.iv. requires the Permittees, individually or collectively, to develop and implement regionally-consistent methods to track and report implementation of green infrastructure measures including treated area and connected and disconnected impervious area on both public and private parcels within their jurisdictions. The methods shall also address tracking needed to provide reasonable assurance that wasteload allocations for TMDLs, including the San Francisco Bay PCBs and mercury TMDLs, and reductions for trash, are being met.

Attachment A to U.S. EPA's Comments on the May 11, 2015 Tentative Order Suggested Components of Green Infrastructure Plans

Outlined below are some potential ideas for Green Infrastructure (GI) plans.to be developed by Bay Area permittees during MRP 2.0. Components provided below primarily arise from Los Angeles Regional Water Board guidance for reasonable assurance in watershed management plans as part of MS4 permit. Many components, but perhaps not all, will be applicable to GI plans for Bay Area. EPA encourages the Water Board to consider these ideas, modify as they deem appropriate, and include similar description of GI framework in the MRP 2.0 Fact Sheet. We recognize the continued partnership of MS4 permittees, the Water Board, EPA, and other stakeholders to discuss these ideas prior to inclusion into final GI plans.

A. Identify the water quality priorities with watershed.
   1. Include any applicable required water quality milestones and compliance deadlines
   2. Describe watershed features, waterbodies any other relevant environmental setting information
   3. Outline other municipal specific goals to be addressed; e.g., flood risk, sea level protection, groundwater infiltration.

B. Describe current BMPs and estimate existing pollutant loads
   1. List pollutant sources in watershed
   2. Provide map of major MS4 outfalls
   3. List any current BMPs within watershed (structural and non-structural)
   4. Using existing data (up to 10 yrs), give estimates of pollutant loads from watershed. (could be cone-based if no flow measurements available)
   5. Define on pollutant specific basis
   6. To extent data available and feasible, assess critical condition loads
   7. Describe variability of estimations.

C. Estimate required pollutant load reductions
   1. To extent feasible, provide estimate of pollutant load reductions, if mass-based then calculate difference between current and allowable loads; if concentration- based then define the two values.

D. Identify future control measures/BMPs/strategies to be implemented
   1. Describe drainage areas for implementation
   2. Identify control measures for stormwater and non-stormwater discharges; include number, location(s) and type; i.e., structural or non-structural controls, within new development, retrofit of existing development, stream/habitat restoration projects,
   3. Clarify pollutants to be addressed
   4. Define/map location of each control measure in watershed/jurisdiction
   5. Quantify upstream drainage area captured by each BMP
   6. Clarify if municipal effort only, private efforts or public/private projects
   7. Identify if project is within local jurisdiction or regional and describe cities involved.

E. Provide schedule of implementation
   1. Identify interim milestones and dates for achievement (within this permit cycle)
   2. Identify all future and final dates for achievement

3. Demonstrate that existing and future control measures will yield final pollutant load reductions and/or meet receiving water limits.

F. Provide Pollutant Reduction Plan
   1. Identify compliance points (should be consistent with any existing regulatory compliance locations; e.g., TMDL monitoring sites expected to assess compliance)
   2. Consider assessment locations in association with MS4 outfalls to monitor pollutant load responses due to upstream control measures.
   3. Describe and evaluate selected control measures - appropriate for pollutant and sizing for load capture
   4. Demonstrate selected control measures have reasonable assurance to meet interim/final requirements.
   5. Describe adaptive management process if pollutant milestones are not met and added BMPs are needed
   6. Include timeframe for future re-assessments.

G. If model used, provide description of watershed model
   1. Identify model type; e.g., watershed, receiving water, BMP performance, empirical
   2. Provide (minimum required) model components: input data, parameters, BMP performance parameters, output
   3. Describe model calibration acceptance criteria
   4. Describe efficiency for BMP performance parameters
   5. Demonstrate model outputs for existing pollutant loads will be addressed by combination of control measures/BMPs to achieve final milestones.

H. Describe corresponding water quality monitoring program
   1. Identify parameters of concern, all monitoring sites, sampling frequency (including wet and dry weather events)
   2. Clarify which monitoring sites are MS4 outfalls
   3. Briefly describe analytical methods and QA procedures to support monitoring
   4. Describe any future monitoring locations and anticipated timeframe of data collection
   5. Briefly describe pollutant sources upstream of monitoring sites.

I. Identify post-implementation tracking assessment efforts
   1. Once completed, describe the BMPs implemented, including any modifications from original project design
   2. Describe assessment procedures for evaluating effectiveness of control measure and corresponding pollutant load reductions for each implemented BMP, as necessary
   3. Provide schedule for re-evaluation of BMP load reductions over long term.

C.4. Industrial and Commercial Site Controls

Legal Authority

Broad Legal Authority: CWA sections 402(p)(3)(B)(ii-iii), CWC sections 13377 and 13263, and Federal NPDES regulations 40 CFR 122.26(d)(2)(i)(B, C, D, E, and F) and 40 CFR 122.26(d)(2)(iv).

Specific Legal Authority: Federal NPDES regulation 40 CFR 122.26(d)(2)(iv)(C) requires "[a] description of a program to monitor and control pollutants in storm water discharges to municipal systems from municipal landfills, hazardous waste treatment, disposal and recovery facilities, industrial facilities that are subject to section 313 of title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA), and industrial facilities that the municipal permit applicant determines are contributing a substantial pollutant loading to the municipal storm sewer system." Other specific legal authority is cited below.

Specific Provision C.4. Requirements

Provision C.4. has been revised from the Previous Permit so that related topics are grouped together better. A new Provision C.4.d. – Inspections has been created. It essentially consolidates, from the Previous Permit, the inspection requirements in Provision C.4.d. – Inspection Plan and Provision C.4.c. – Enforcement Response Plan.

Provision C.4.a (Legal Authority)

Federal NPDES regulation 40 CFR 122.26(d)(2)(i)(A) provides that each Permittee must demonstrate that it can control "through ordinance, permit, contract, order or similar means, the contribution of pollutants to the municipal storm sewer by storm water discharges associated with industrial activity and the quality of storm water discharged from site of industrial activity."

Provision C.4.b (Inspection Plan)

Federal NPDES regulation 40 CFR 122.26(d)(2)(iv)(C)(1) provides that Permittees must "identify priorities and procedures for inspections and establishing and implementing control measures for such discharges." The Permit continues to require Permittees to implement an industrial and commercial site controls program to reduce pollutants in runoff from all industrial and commercial sites/sources.

Federal NPDES regulation 40 CFR 122.26(d)(2)(ii) provides that Permittees "[p]rovide an inventory, organized by watershed of the name and address, and a description (such as SIC codes) which best reflects the principal products or services provided by each facility which may discharge, to the municipal separate storm sewer, storm water associated with industrial activity."

The Permit continues to require Permittees to identify various industrial sites and sources subject to the Industrial General Permit or other individual NPDES permit. U.S. EPA supports the municipalities regulating industrial sites and sources that are already covered by an NPDES permit:

> Municipal operators of large and medium municipal separate storm sewer systems are responsible for obtaining system-wide or area permits for their system's discharges. These permits are expected to require that controls be placed on storm water discharges associated with industrial activity which discharge through the municipal system. It is anticipated that general or individual permits covering industrial storm water discharges to these municipal separate storm sewer systems will require industries to comply with the terms of the permit issued to the municipality, as well as other terms specific to the Permittee.[23]

And:

> Although today's rule will require industrial discharges through municipal storm sewers to be covered by separate permit, USEPA still believes that municipal operators of large and medium municipal systems have an important role in source identification and the development of pollutant controls for industries that discharge storm water through municipal separate storm sewer systems is appropriate. Under the CWA, large and medium municipalities are responsible for reducing pollutants in discharges from municipal separate storm sewers to the maximum extent practicable. Because storm water from industrial facilities may be a major contributor of pollutants to municipal separate storm sewer systems, municipalities are obligated to develop controls for storm water discharges associated with industrial activity through their system in their storm water management program.[24]

This Permit does not require the Permittees to submit the list of facilities scheduled for inspection each year with annual reports. Instead, Permittees are to add each year's inspection list to the Inspection Plan as part of the annual update to the Inspection Plan. Permittees may choose to keep their annual lists in their databases or in electronic form. The annual lists must be made readily available to Water Board staff or its representatives upon request.

Water Board staff reviewed about 20% of the Permittees' Inspection Plans during the Previous Permit term. A few of those Inspection Plans also provide detailed flow charts or instructions on how to conduct inspections, fill out the inspect forms, execute enforcement actions, conduct follow-up, and fulfill tracking and reporting for the MRP. These comprehensive Inspection Plans help ensure inspection consistency and serve as excellent training documents for new inspection staff.

Provision C.4.c (Enforcement Response Plan) requires the Permittees to implement and update, as needed, their Enforcement Response Plan (ERP) that serves as a reference for inspection staff to take consistent and timely responses to actual or potential stormwater pollution problems discovered in the course of industrial/commercial stormwater inspections. The ERP provides guidance on (1) progressively stricter enforcement to achieve timely compliance, (2) enforcement scenarios, (3) follow-up inspections, (4) referral to another agency, (5) appropriate time periods for

[23] *Federal Register*. Vol. 55, No. 222, Friday, November 16, 1990, Rules and Regulations. P. 48056
[24] Ibid

implementation of corrective actions, and (6) the roles and responsibilities of staff responsible for implementing the ERP. ERPs are unique to each Permittee. As such, this Permit continues to have broad requirements for the ERP. This allows the individual Permittee maximum flexibility to customize the ERP to fit its legal authority and the way it does business. Corrective actions must be implemented before the next rain event, but no longer than 10 business days after the potential and/or actual discharges are discovered. Short timeframes for implementing corrective actions encourage businesses to take care of the issues promptly, thus prevent mobilizing potential discharges. Permittees must also require immediate cessation of active non-stormwater discharges, timely implementation of corrective actions to clean up the discharge, and implementation of measures to prevent future active discharges.

This Permit standardizes and clarifies the ERP requirements in provisions C.4., C.5, and C.6. to eliminate any ambiguity in the requirements.

Provision C.4.d (Inspections) takes the inspection requirements from the Previous Permit's Provision C.4.b. Inspection Plan and C.4.c. ERP and consolidates them together into this Provision. Inspection frequencies are determined by each Permittee in its Inspection and Enforcement Response Plans.

U.S. EPA guidance states "management programs should address minimum frequency for routine inspections." The U.S. EPA Fact Sheet—Visual Inspection says "[t]o be effective, inspections must be carried out routinely." [25]

Permittees have asked that this Permit reduce the record keeping and reporting requirements. The specific record keeping requirements are minimal information that needs to be recorded for each inspection and it is essential to document each inspection to develop a history for the facility. Water Board staff evaluations of MS4 programs showed that many Permittees have very comprehensive inspection database records. Annual reports need to provide enough information to show compliance. During the Previous Permit term, annual reports showed few violations for the corresponding number of inspections completed. This did not match with the field inspection experience of Water Board staff. Further investigation showed that some Permittees do not consider potential discharges to be violations.

The Previous Permit exempted verbal warnings from being reported in the annual reports. Water Board staff expected verbal warnings to have very limited use and only given for very minor issues that do not warrant anything in writing. However, from Water Board inspections, and annual report and ERP reviews, we concluded that many Permittees report minimal violations for the number of inspections completed because only observed non-stormwater discharges were considered violations and issued some type of written enforcement action. Potential discharges were all given verbal warnings and it was unclear if these potential discharges were corrected in a timely manner because there was no written documentation on the potential discharges or verbal warnings issued. Examples of potential discharges include housekeeping issues, evidence of actual non-stormwater discharges that are not ongoing during an inspection, lack of BMPs,

[25] U.S. EPA. 1999. 832-F-99-046, "Storm Water Management Fact Sheet – Visual Inspection."

inadequate BMPs, and inappropriate BMPs. Potential discharges need timely corrective actions.

Some Permittees feel that a 10-business day window to implement corrective action is not necessary and even unreasonable during the dry months for potential discharges and especially for minor potential discharges. Permittees have the discretion to add a rationale for allowing a longer time period, especially for corrective actions that require things such as capital improvements, revisions to standard operating procedures, and staff training. However, Water Board staff thinks that prompt implementation of corrective actions for most potential discharges minimizes the risk of potential discharges becoming actual discharges when things are knocked over, when the area is hosed with water, and/or during the next rain event. The Water Board staff has been told by a couple of Permittees that they prefer shorter corrective action timeframes because sites tend to take care of them right away versus forgetting about the corrective actions when given a longer corrective action timeframe. Throughout the Previous Permit term, Water Board staff asked Permittees for a list of minor potential discharges. The only minor issue listed was open dumpster/garbage can lids. Water Board staff concurred that open dumpster/garbage can lids is minor, can be corrected immediately, and would not require any additional follow-up. Water Board industrial and construction inspectors consider open dumpster/garbage can lids and small amounts of trash/debris on the ground to be minor violations that can quickly be corrected, because staff at the industrial or construction sites can immediately cover the dumpsters and pick up and appropriately dispose of the trash. Water Board inspectors note those issues and corrective actions in their inspection reports. This Permit now requires reporting of all potential and actual non-stormwater discharges based on the enforcement levels in each Permittee's ERP, so that Water Board staff can evaluate whether Permittees are conducting appropriate followup.

This Permit becomes effective half way through the 2015-2016 reporting year. The reporting requirements for this Permit are slightly different than the reporting requirements for the Previous Permit. In response to the Permittees commenting on the difficulties of reporting under two different permits, this Permit, C.4.d.iii.(1), continues the reporting requirements from the Previous Permit to the end of the 2015-2016 reporting year. The new reporting requirements, C.4.d.iii.(2), become effective the 2016-2017 reporting year.

Provision C.4.f (Staff Training) section of the Permit requires the Permittees to conduct annual staff trainings for inspectors. Trainings are necessary to keep inspectors current on enforcement policies and current MEP BMPs for industrial and commercial stormwater runoff discharges.

C.5. Illicit Discharge Detection and Elimination

Legal Authority

The following legal authority applies to section C.5:

Broad Legal Authority: CWA sections 402(p)(3)(B)(ii-iii), CWC sections 13377 and 13263, and Federal NPDES regulations 40 CFR 122.26(d)(2)(i)(B, C, D, E, and F) and 40 CFR 122.26(d)(2)(iv).

Specific Legal Authority: Federal NPDES regulations 40 CFR 122.26(d)(1)(iii)(B)(1) provides that the Permittee shall include in their application "the location of known municipal storm sewer system outfalls discharging to waters of the United States."

Federal NPDES regulations 40 CFR 122.26(d)(1)(iii)(B)(5) provides that the Permittee shall include in their application "[t]he location of major structural controls for storm water discharge (retention basins, detention basins, major infiltration devices, etc."

Federal NPDES regulations 40 CFR 122.26(d)(2)(i)(B) provides that the Permittee shall have adequate legal authority to "[p]rohibit through ordinance, order or similar means, illicit discharges to the municipal separate storm sewer."

Federal NPDES regulations 40 CFR 122.26(d)(2)(i)(F) provides that the Permittee shall have adequate legal authority to "[c]arry out all inspection, surveillance and monitoring procedures necessary to determine compliance and noncompliance with permit conditions including the prohibition on illicit discharges to the municipal separate storm sewer."

Federal NPDES regulations 40 CFR 122.26(d)(2)(iv)(B) requires that the Permittee have a " description of a program, including a schedule, to detect and remove (or require the discharger to the municipal storm sewer to obtain a separate NPDES permit for) illicit discharges and improper disposal into the storm sewer."

Federal NPDES regulation 40 CFR 122.26(d)(2)(iv)(B)(1) requires a "program, including inspections, to implement and enforce an ordinance, orders or similar means to prevent illicit discharges to the municipal storm sewer system."

Federal NPDES regulation 40 CFR 122.26(d)(2)(iv)(B)(2) requires a "description of procedures to conduct on-going field screening activities during the life of the permit, including areas or locations that will be evaluated by such field screens."

Federal NPDES regulation 40 CFR 122.26(d)(2)(iv)(B)(3) requires a "description of procedures to be followed to investigate portions of the separate storm sewer system that, based on the results of the field screen, or other appropriate information, indicate a reasonable potential of containing illicit discharges or other sources of non-storm water."

Federal NPDES regulations 40 CFR 122.26(d)(2)(iv)(B)(4) requires a "description of procedures to prevent, contain, and respond to spills that may discharge into the municipal separate storm sewer."

Federal NPDES regulations 40 CFR 122.26(d)(2)(iv)(B)(5) requires a "description of a program to promote, publicize, and facilitate public reporting of the presence of illicit discharges or water quality impacts associated with discharges from municipal separate storm sewers."

Federal NPDES regulations 40 CFR 122.26(d)(2)(iv)(B)(7) requires a "description of controls to limit infiltration of seepage from municipal sanitary sewers to municipal separate storm sewer systems where necessary."

Fact Sheet Findings in Support of Provision C.5

C.5-1 Illicit discharges that are not comprised entirely of stormwater are not authorized to enter the MS4 and are considered to be illicit discharges, unless authorized by a separate NPDES permit, or exempted or conditionally exempted in Provision C.15.

C.5-2 Every Permittee must have the ability to effectively prohibit non-stormwater discharges to the MS4 by actively detecting and eliminating illicit discharges and disposal into its MS4.

C.5-3 Illicit discharges to the storm drain system can be detected in several ways. Permittee staff can detect discharges during their course of other tasks, and business owners and other aware citizens can observe and report suspect discharges. The Permittee must have a direct means for these reports of suspected polluted discharges to the MS4 to be received, responded to in a timely manner, and to receive adequate documentation, tracking, and response through problem resolution.

Removal of Routine Collection System Screening Requirement

The Previous Permit required the Permittees to perform routine surveys for illicit discharges and illegal dumping in above ground check points in the collection system including elements that are typically inspected for maintenance purposes, such as end of pipes, creeks, flood conveyances, storm drain inlets, and catch basins, to seek and eliminate illicit connections and discharges. The results of the screenings were reported in annual reports. No illicit connections were reported. However, Permittees have found illicit discharges during the screenings and they were cleaned up. It is unclear if personnel conducting the screenings reported these illicit discharges to the illicit discharge staff for investigation and tracking. We have added language to C.5.c. – Spill, Dumping, and Complaint Response Program to ensure that illicit discharges found by municipal staff conducting routine maintenance and inspection activities on the collection system are reported to the illicit discharge staff for investigation and tracking. This is based on the federal NPDES regulation 40 CFR 122.26(d)(2)(iv)(B)(3), which requires "procedures to be followed to investigate portions of the separate storm sewer system that, based on the results of the field screen, or other appropriate information, indicate a reasonable potential of containing illicit discharges or other sources of non-storm water."

Specific Provision C.5 Requirements

Provision C.5.a (Legal Authority) requires each Permittee have adequate legal authority to prohibit illicit discharges to storm sewers as required by federal regulations at 40 CFR 122.26(d)(2)(i)(B). Illicit and inadvertent connections to MS4 systems result in a discharge into the MS4 that is not comprised entirely of stormwater. Every Permittee must have the ability to discover, inspect, enforce its ordinance, track, and clean up stormwater pollution discharges by illicit connections and other illegal discharges to the MS4 system.

Provision C.5.b (ERP) requires Permittees to implement and update, as needed, their ERP to ensure consistent and timely response to illicit discharges and connections to the MS4. The ERP provides guidance on (1) progressively stricter enforcement to achieve timely compliance, (2) follow-up inspection, (3) referral to another agency, (3) appropriate time periods for implementation of corrective actions, and (4) the roles and responsibilities of staff responsible for implementing the ERP. Corrective actions must be implemented before the next rain event, but no longer than 10 business days after the potential and/or actual discharges are discovered. Permittees must also require immediate cessation of active discharges, and timely implementation of corrective actions to clean up the discharge and implementation of measures to prevent future active discharges.

Water Board staff reviewed more than half of the Permittees' ERPs during the Previous Permit term. Almost all of those Permittees have one ERP to satisfy the ERP requirements in provisions C.4., C5., and C.6. While a couple of Permittees have detailed, comprehensive plans, more than half of the ERPs reviewed did not comply with the ERP requirements in the Previous Permit. Therefore, the ERP requirements in this Permit are standardized in provisions C.4., C5., and C.6.

Provision C.5.c (Spill, Dumping, and Complaint Response Program) Federal NPDES regulations 40 CFR 122.26(d)(2)(iv)(B)(4) requires "a description of procedures to prevent, contain, and respond to spills that may discharge into the municipal separate storm sewer." This Provision of the Permit requires the Permittees to establish and maintain a central point of contact including phone numbers for spills, dumping, and complaints reporting. Reports from the public and other Permittee staff are an essential tool in discovering and investigating illicit discharge activities into the MS4. Maintaining contact points will help ensure that there is effective reporting to assist with the discovery of prohibited discharges. Each Permittee must have a means to adequately track the suspected polluted discharges from reporting through problem resolution.

Provision C.5.d (Tracking and Case Followup) section of the Permit requires Permittees to track and monitor followup for all incidents and discharges reported to the spills, dumping, and complaint response system that could discharge into the MS4. This requirement is included so Permittees can demonstrate compliance with the ERP requirements in Provision C.5.b and to ensure that illicit discharge reports receive adequate follow up through to resolution.

All municipalities, counties, district, and other public entities that own or operate sanitary sewer systems greater than one mile in length that collect and/or convey untreated or partially treated wastewater to a publicly owned treatment facility in California are

required to report sanitary sewer overflows to the California Integrated Water Quality System Project pursuant to the State Water Board's Order No. 2006-003-DWQ (Statewide General Waste Discharge Requirements for Sanitary Sewer Systems) and Order WQ 2013-0058-EXEC (Adopting Amended Monitoring Requirements for Statewide General Waste Discharge Requirements for Sanitary Sewer Systems order. Sewage discharges that are reported to the California Integrated Water Quality System Project do not need to be tracked and reported in Provision C.5.

Provision C.5.e (Control of Mobile Sources) requires each Permittee to implement a program to reduce the discharge of pollutants from mobile businesses. The purpose of this section is to implement oversight and control of pollutants associated with mobile business sources to the MEP. The Previous Permit required Permittees to develop and implement a program to reduce the discharge of pollutants from mobile businesses. Water Board staff evaluated five Permittees' implementation of Provision C.5., which included Provision C.5.e. – Control of Mobile Sources. Water Board staff evaluated one Permittee in each of the five counties with Permittees covered under the Previous Permit. Three of the Permittees evaluated complied with this Provision. It was evident that they had put in the thought and actions to comply. Two of the Permittees evaluated did not comply with this Provision. They were dependent on the county-wide and/or regional programs to implement this Provision for them. The regional program was supposed to expand the existing regional Surface Cleaner Training and Recognition Program to include two new mobile business categories: automotive washing and carpet cleaning; develop marketing materials, training videos, and self-test applications for those two new mobile business categories; create Spanish tracks of the information for each new business type; and create a web-based application to share information about mobile businesses among the Permittees. At the time of the 2013-2014 Annual Report, none of those regional tasks had been completed. In order to understand what Permittees are doing to control pollutants from mobile sources, this Permit continues the requirements of the Previous Permit and collects data on each Permittee's implementation of the provision.

Provision C.5.f (Municipal Separate Storm Sewer System (MS4) Map) As part of the permit application process, federal NPDES regulations 40 CFR 122.26(d)(1)(iii)(B)(1) and 40 CFR 122.26(d)(1)(iii)(B)(5) specify that dischargers must identify the location of any major outfall that discharges to waters of the United States, as well as the location of major structural controls for stormwater discharges. A major outfall is any outfall that discharges from a single pipe with an inside diameter of 36 inches or more or its equivalent (discharge from a single conveyance other than a circular pipe which is associated with a drainage area of more than 50 acres) or; for areas zoned for industrial activities, any pipe with a diameter of 12 inches or more or its equivalent (discharge from other than a circular pipe associated with a drainage area of 2 acres or more). The permitting agency may not process a permit until the applicant has fully complied with the application requirements.[26] If, at the time of application, the information is unavailable, the Permit must require implementation of a program to meet the application requirements.[27] All Permittees have complied with this requirement. This Permit

[26] 40 CFR 124.3 (applicable to state programs, see section 123.25).
[27] 40 CFR 122.26(d)(1)(iv)(E).

continues to require the Permittees to advertise the availability of the maps of their MS4 system and to make available these maps to the public upon request.

C.6. Construction Site Control

Legal Authority

The following legal authority applies to section C.6:

Broad Legal Authority: CWA sections 402(p)(3)(B)(ii-iii), CWC sections 13377 and 13263, and Federal NPDES regulations 40 CFR 122.26(d)(2)(i)(B, C, D, E, and F) and 40 CFR 122.26(d)(2)(iv).

Specific Legal Authority: Federal NPDES regulation 40 CFR 122.26(d)(2)(iv)(D) requires "[a] description of a program to implement and maintain structural and non-structural best management practices to reduce pollutants in storm water runoff from construction sites to the municipal storm sewer system."

Federal NPDES regulation 40 CFR 122.26(d)(2)(iv)(D)(1) requires "[a] description of procedures for site planning which incorporate consideration of potential water quality impacts."

Federal NPDES regulation 40 CFR 122.26(d)(2)(iv)(D)(2) requires "[a] description of requirements for nonstructural and structural best management practices."

Federal NPDES regulation 40 CFR 122.26(d)(2)(iv)(D)(3) requires "[a] description of procedures for identifying priorities for inspecting sites and enforcing control measures which consider the nature of the construction activity, topography, and the characteristics of soils and receiving water quality."

Federal NPDES regulation 40 CFR 122.26(d)(2)(iv)(D)(4) requires "[a] description of appropriate educational and training measures for construction site operators."

Federal NPDES regulation 40 CFR 122.26(d)(2)(i)(A) provides that each Permittee must demonstrate that it can control, "through ordinance, permit, contract, order or similar means, the contribution of pollutants to the municipal storm sewer by storm water discharges associated with industrial activity and the quality of storm water discharged from site of industrial activity."

Federal NPDES regulation 40 CFR 122.26(b)(14) provides that "[t]he following categories of facilities are considered to be engaging in 'industrial activity' for the purposes of this subsection: […] (x) Construction activity including cleaning, grading and excavation activities […]."

Federal NPDES regulation 40 CFR 122.44(d)(1)(i) requires NPDES permits to include limitations to "control all pollutants or pollutant parameters (either conventional, non-conventional, or toxic pollutants) which the Director determines are or may be discharged at a level which will cause, have reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality."

Fact Sheet Findings in Support of Provision C.6.

C.6-1 Vegetation clearing, mass grading, lot leveling, and excavation expose soil to erosion processes and increase the potential for sediment mobilization, runoff and deposition in receiving waters. Construction sites without adequate BMP implementation result in sediment runoff rates that greatly exceed the natural erosion rates of undisturbed lands, causing siltation and impairment of receiving waters.

C.6-2 Excess sediment can cloud the water, reducing the amount of sunlight reaching aquatic plants, clog fish gills, smother aquatic habitat and spawning areas, and impede navigation in our waterways. Sediment also transports other pollutants, such as nutrients, metals, and oils and grease. Permittees are on-site at local construction sites for grading and building permit inspections, and also have in many cases dedicated construction stormwater inspectors with training in verifying that effective BMPs are in place and maintained. Permittees also have effective tools available to achieve compliance with adequate erosion control, such as stop work orders and citations.

C.6-3 Mobilized sediment from construction sites can flow into the MS4 and then into receiving waters. According to the 2004 National Water Quality Inventory,[28] States and Tribes report that sediment is one of the top 10 causes of impairment of assessed rivers and streams, next to pathogens, habitat alteration, organic enrichment or oxygen depletion, nutrients, metals, etc. Sediment impairs 35,177 river and stream miles (14% of the impaired river and stream miles). Sources of sedimentation include agriculture, urban runoff, construction, and forestry. Sediment runoff rates from construction sites, however, are typically 10 to 20 times greater than those of agricultural lands, and 1,000 to 2,000 times greater than those of forest lands. During a short period of time, construction sites can contribute more sediment to streams than can be deposited naturally during several decades.[29]

Specific Provision C.6 Requirements

Provision C.6.a. Legal Authority for Effective Site Management. Federal NPDES regulation 40 CFR 122.26(d)(2)(i)(A) requires that each Permittee demonstrate that it can control "through ordinance, permit, contract, order or similar means, the contribution of pollutants to the municipal storm sewer by storm water discharges associated with industrial activity and the quality of storm water discharged from site of industrial activity." This section of the Permit requires each Permittee to have the authority to require year-round, seasonally and phase appropriate effective erosion control, run-on and runoff control, sediment control, active treatment systems, good site management, and non stormwater management through all phases of site grading, building, and finishing of lots. All Permittees should already have this authority.

[28] http://www.epa.gov/owow/305b/2004report/2004_305Breport.pdf

[29] U.S. EPA. December 2005. *Stormwater Phase II Final Rule Fact Sheet Series – Construction Site Runoff Control Minimum Control Measure*. EPA 833-F-00-008. Fact Sheet 2.6.

In its Phase II Compliance Assistance Guidance, U.S. EPA says that "[i]nspections give the MS4 operator an opportunity to provide additional guidance and education, issue warnings, or assess penalties."[30] To issue warnings and assess penalties during inspections to achieve timely corrective actions from sites, inspectors must have the legal authority to conduct enforcement.

Provision C.6.b. Enforcement Response Plan (ERP). This section requires each Permittee to implement and update, as needed, its Enforcement Response Plan (ERP), which serves as a reference for inspection staff to take consistent actions and timely response to achieve effective, timely corrective compliance from all public and private construction site owners/operators.

U.S. EPA supports enforcement of ordinances and permits at construction sites, stating "[e]ffective inspection and enforcement requires […] penalties to deter infractions and intervention by the municipal authority to correct violations."[31] In addition, U.S. EPA expects permits issued to municipalities to address "weak inspection and enforcement."[32] For these reasons, the enforcement requirements in this section have been established, while providing sufficient flexibility for each Permittee's unique stormwater program. Prior to the issuance of the Previous Permit, Water Board staff had noted deficiencies in the Permittees' enforcement procedures and implementation during inspections. The most common issues found were that enforcement was not firm and appropriate to correct the violation, and that repeat violations did not result in escalated enforcement procedures. Therefore, the Previous Permit required Permittees to develop ERPs.

The ERP provides guidance on (1) progressively stricter enforcement to achieve timely compliance, (2) enforcement scenarios, (3) follow-up inspections, (4) referral to another agency, (5) appropriate time periods for implementation of corrective actions, and (6) the roles and responsibilities of staff responsible for implementing the ERP. ERPs are unique to each Permittee. As such, this Permit continues to have broad requirements for the ERP. This allows the individual Permittee maximum flexibility to customize the ERP to fit its legal authority and ordinary business practices. Permittees must require immediate cessation of active non-stormwater discharges, timely implementation of corrective actions to clean up the discharge, and implementation of measures to prevent future active discharges. Corrective actions must be implemented before the next rain event, but no longer than 10 business days after the potential and/or actual discharges are discovered. Construction sites are required by the statewide NPDES General Permit for Stormwater Discharges Associated with Construction Activities (Construction General Permit) to keep supplies on hand to address BMP issues rapidly. In a few cases, such as slope inaccessibility, it may require longer than 10 days before crews can safely access an eroded area. Corrective actions can be temporary and more time can be allowed for permanent corrective actions. The Permittees' tracking data needs to provide a rationale for the longer compliance timeframe.

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[30] U.S. EPA. 2000. 833-R-00-002, Storm Water Phase II Compliance Assistance Guide, pp.4-31

[31] U.S. EPA. 1992. Guidance 833-8-92-002. Section 6.3.2.3.

[32] *Federal Register*. Vol. 55, No. 222, Friday, November 16, 1990. Rules and Regulations. p.48058.

Water Board staff reviewed more than half of the Permittees' ERPs during the Previous Permit term. While a couple of Permittees have detailed, comprehensive plans, more than half of the ERPs reviewed did not comply with the ERP requirements in the Previous Permit. Therefore, this Permit standardizes and clarifies the ERP requirements in provisions C.4., C.5., and C.6. to eliminate any ambiguity in the requirements.

Provision C.6.c. Best Management Practices Categories. This section requires all Permittees to require all construction sites to have year-round seasonally appropriate effective BMPs in the following six categories: (1) erosion control, (2) run-on and runoff control, (3) sediment control, (4) active treatment systems, (5) good site management, and (6) non stormwater management. These BMP categories are listed in the Construction General Permit. The Water Board decided it was too prescriptive and inappropriate to require a specific set of BMPs that are to be applicable to all sites. Every site is different with regards to terrain, soil type, soil disturbance, and proximity to a waterbody. The Construction General Permit recognizes these different factors and requires site-specific BMPs through the (SWPPP), which addresses the six specified BMP categories. This Permit similarly allows Permittees the flexibility to determine if the BMPs for each construction site are effective and appropriate. This Permit also allows the Permittees and the project proponents the necessary flexibility to make immediate decisions on appropriate, cutting-edge technology to prevent the discharge of construction pollutants into storm drains, waterways, and rights-of-way. Appropriate BMPs for the different site conditions can be found in different handbooks and manuals. Therefore, this Permit is consistent with the Construction General Permit in its requirements for BMPs in the six specified categories.

Vegetation clearing, mass grading, lot leveling, and excavation expose soil to erosion processes and increase the potential for sediment mobilization, runoff into the MS4, and deposition in receiving waters. Construction sites without adequate BMP implementation result in sediment runoff rates that greatly exceed the natural erosion rates of undisturbed lands, causing siltation and impairment of receiving waters. This can even occur in conjunction with unexpected rain events during the dry season (defined as May 1 through September 30). Although rare, significant rains can occur in the San Francisco Bay Region during the dry season. Therefore, Permittees should ensure that construction sites have materials on hand for rapid rain response during the whole year, including during the dry season.

Normally, stormwater restrictions on grading should be implemented during the wet season from October 1 through April 30. Section C.6.c.ii.(1).d of the Permit requires "project proponents to minimize grading during the wet season and scheduling of grading with seasonal dry weather periods to the extent feasible." If grading does occur during the wet season, Permittees shall require project proponents to (1) implement additional BMPs as necessary, (2) keep supplies available for rapid response to storm events, and (3) minimize wet-season, exposed, and graded areas to the absolute minimum necessary.

Slope stabilization is necessary on all active and inactive slopes during rain events regardless of the season, except in areas implementing advanced treatment. Slope stabilization is also required on inactive slopes throughout the rainy season. These

requirements are necessary because unstabilized slopes at construction sites are significant sources of erosion and sediment discharges during rainstorms. "Steep slopes are the most highly erodible surface of a construction site, and require special attention."[33] U.S. EPA emphasizes the importance of slope stabilization when it states "slope length and steepness are key influences on both the volume and velocity of surface runoff. Long slopes deliver more runoff to the base of slopes and steep slopes increase runoff velocity; both conditions enhance the potential for erosion to occur."[34] In lieu of vegetation preservation or replanting, soil stabilization is the most effective measure in preventing erosion on slopes. Research has shown that effective soil stabilization can reduce sediment discharge concentrations up to six times, as compared to soils without stabilization.[35] Slope stabilization at construction sites for erosion control is already the consensus among the regulatory community and is found throughout construction BMP manuals and permits. For these reasons, Permittees must ensure that slope stabilization is implemented on sites, as appropriate.

It is also necessary that Permittees ensure that construction sites are revegetated as early as feasible. Implementation of revegetation reduces the threat of polluted stormwater discharges from construction sites. Construction sites should permanently stabilize disturbed soils with vegetation at the conclusion of each phase of construction.[36] A survey of grading and clearing programs found one-third of the programs without a time limit for permanent revegetation, "thereby increasing the chances for soil erosion to occur."[37] U.S. EPA states "the establishment and maintenance of vegetation are the most important factors to minimizing erosion during development."[38]

To ensure the MEP standard and water quality standards are met, active treatment systems may be necessary at some construction sites. Requirements for active system requirements are located in the Construction General Permit, Attachment F.

Provision C.6.d. Plan Approval Process. This section of the Permit requires the Permittees to review project proponents' stormwater management plans for compliance with local regulations, policies, and procedures. U.S. EPA states that it is often easier and more effective to incorporate stormwater quality controls during the site plan review process or earlier.[39] In the Phase I stormwater regulations, U.S. EPA states that a primary control technique is good site planning.[40] U.S. EPA goes on to note that the most efficient controls result when a comprehensive stormwater management system is in place.[41] To determine if a construction site is in compliance with construction and grading ordinances and permits, U.S. EPA states that the "MS4 operator should review

[33] Schueler, T., and H. Holland. 2000. *Muddy Water In—Muddy Water Out*? The Practice of Watershed Protection. p. 6.
[34] U.S. EPA. 1990. *Sediment and Erosion Control: An Inventory of Current Practices*. p. II-1.
[35] Schueler, T., and H. Holland. 2000. "Muddy Water In—Muddy Water Out?" *The Practice of Watershed Protection*. p. 5.
[36] Ibid.
[37] Ibid. p. 11.
[38] U.S. EPA. 1990. *Sediment and Erosion Control: An Inventory of Current Practices*. p. II-1.
[39] U.S. EPA. 2000. *Storm Water Phase II Compliance Assistance Guide*. EPA 833-R-00-002. Section 6.3.2.1.
[40] *Federal Register*. Vol. 55, No. 222, Friday, November 16, 1990. Rules and Regulations. p. 48034.
[41] Ibid.

the site plans submitted by the construction site operator before ground is broken."[42] Site plan review aids in compliance and enforcement efforts since it alerts the "MS4 operator early in the process to the planned use or non-use of proper BMPs and provides a way to track new construction activities."[43]

Provision C.6.e. (Inspections) The Water Board allows flexibility on the legal authority language, ERP, and BMPs required on a site. This section of the Permit pulls together the accountability of the whole Provision through regular inspections, consistent enforcement, and meaningful tracking. These three elements will help ensure that effective construction pollutant controls are in place in order to minimize construction polluted runoff to the storm drain and waterbodies.

This section clearly identifies the level of effort necessary by Permittees to minimize construction pollutant runoff into storm drains and ultimately, waterbodies, including tracking and reporting sufficient to demonstrate and document Permittee compliance.

This section requires monthly inspections during the wet season of all construction sites disturbing one or more acre of land, all hillside projects, and all high priority sites determined by the Permittee or the Water Board to be significant threats to water quality. Inspections must focus on the adequacy and effectiveness of the site-specific BMPs implemented for the six BMP categories. Each Permittee must implement its ERP and require timely corrections of all actual and potential problems observed. All corrective actions must be implemented before the next rain event, but no longer than 10 business days after the violations are discovered. A longer time period to implement corrective actions is allowed with a reasonable rationale. All inspections must be recorded on a written or electronic inspection form, and also tracked in an electronic database or tabular format.

The Previous Permit required Permittees to have the legal authority to require effective construction stormwater controls at all construction sites, regardless of the amount of soil disturbed. Water Board staff has observed disturbed construction sites where minimal BMPs were being implemented, and has seen stormwater transport construction site pollutants into the storm drain. For these reasons, ideally, all construction sites with a grading permit from a Permittee should have stormwater inspections during the rainy season to ensure adequate BMPs are implemented and construction pollutants are not entering the storm drain. Construction sites with steeper slopes pose a more-significant threat of discharging construction-related pollutants to the storm drain because they are likely to have higher runoff velocities and because their BMPs must be more robust and more-robustly installed and maintained in order to control pollutants, as compared to less-steep sites. Water Board staff has observed storm water move sediment and other construction-related pollutants into storm drains at sites ranging from those with flat slopes to those with slopes greater than 15%. Because of the relatively greater threat posed by steeper sites, this Permit adds a specific requirement to inspect all hillside projects disturbing greater than or equal to 5,000 square feet of soil. For those Permittees that do not have a hillside development

[42] U.S. EPA. 2000. *Storm Water Phase II Compliance Assistance Guide*. EPA 833-R-00-002. Section 4.6.2.4, pp. 4–30.
[43] Ibid. pp. 4–31.

map or definition, this Permit defines hillside development as development occurring on land with a slope greater than or equal to 15%.

The Previous Permit required Permittees to report the number of violations fully corrected prior to the next event, but no longer than 10 business days after the potential and actual discharges are discovered or otherwise considered corrected in a timely, though longer period. This proved challenging for many Permittees because they track enforcement actions and not discreet violations. While Water Board staff does want to understand how many potential and actual discharges are discovered and resolved in a timely manner, this would require significant changes in databases for some Permittees. The big picture of how many violations or enforcement actions for annual reporting will suffice, as inspection forms are available for more detailed review. Therefore, this Permit allows Permittees to either report by enforcement actions or discreet number of potential and actual discharges.

The Permittees asked that this Permit reduce the reporting since all of the tracking data are available to Water Board staff. This Permit reduces the reporting to what is minimally necessary to provide meaningful data and demonstrate permit compliance.

This Permit becomes effective half way through the 2015-2016 reporting year. The reporting requirements for this Permit are slightly different than the reporting requirements for the Previous Permit. In response to the Permittees commenting on the difficulties of reporting under two different permits, this Permit, Provision C.6.e.iii.(1), continues the reporting requirements from the Previous Permit to the end of the 2015-2016 reporting year. The new reporting requirements, C.6.3.iii.(3), become effective the 2016-2017 reporting year.

Provision C.6.f. Staff Training. This section of the Permit requires Permittees to conduct annual staff trainings for municipal staff. These trainings have been found to be extremely effective means to educate inspectors and to inform them of any changes to local ordinances and state laws. Trainings provide valuable opportunity for Permittees to network and share strategies used for effective enforcement and management of erosion control practices.

C.7. Public Information and Outreach

Legal Authority

The following legal authority applies to section C.7:

Broad Legal Authority: CWA sections 402(p)(3)(B)(ii-iii), CWC sections 13377 and 13263, and Federal NPDES regulations 40 CFR 122.26(d)(2)(i)(B, C, E, and F) and 40 CFR 122.26(d)(2)(iv).

Specific Legal Authority: Federal NPDES regulation 40 CFR 122.26(d)(2)(iv)(A)(6) requires "[a] description of a program to reduce to the maximum extent practicable, pollutants in discharges from municipal separate storm sewers associated with the application of pesticides, herbicides, and fertilizer which will include, as appropriate, controls such as educational activities, permits, certifications, and other measures for commercial applicators and distributors, and controls for application in public right-of-ways and at municipal facilities."

Federal NPDES regulation 40 CFR 122.26(d)(2)(iv)(B)(5) requires "a description of a program to promote, publicize, and facilitate public reporting of the presence of illicit discharges or water quality impacts associated with discharges from municipal separate storm sewers."

Federal NPDES regulation 40 CFR 122.26(d)(2)(iv)(B)(6) requires "[a] description of educational activities, public information activities, and other appropriate activities to facilitate the proper management and disposal of used oil and toxic materials."

Fact Sheet Finding in Support of Provision C.7.

C.7-1 An informed and knowledgeable community is critical to the success of a stormwater program since it helps ensure greater support for the program as the public gains a greater understanding of stormwater pollution issues.

C.7-2 An informed community also ensures greater compliance with the program as the public becomes aware of the personal responsibilities expected of them and others in the community, including the individual actions they can take to protect or improve the quality of area waters.

C.7-3 The public education programs should use a mix of appropriate local strategies to address the viewpoints and concerns of a variety of audiences and communities, including minority and disadvantaged communities, as well as children.[44]

C.7-4 Target audiences should include (1) government agencies and official to achieve better communication, consistency, collaboration, and coordination at the federal, state, and local levels and (2) K-12/Youth Groups.

[44] U.S. EPA. 2000. Storm Water Phase II Compliance Assistance Guide. EPA 833-R-00-002.

C.7-5 Citizen involvement events should make every effort to reach out and engage all economic and ethnic groups.[45]

Removal of Media Relations

The Previous Permit had specific requirements for Permittees to participate in or contribute to a media relations campaign. This Permit removes these specific requirements to allow Permittees more flexibility on how to conduct public outreach on different stormwater runoff pollution messages that they feel are most urgent. It is anticipated that Permittees will continue to use public service announcements, social media, and other free media as part of the public outreach required in Provision C.7.b.

Specific Provision C.7 Requirements

Provision C.7.a. Storm Drain Inlet Marking. Storm drain inlet marking is a long-established program of outreach to the public on the nature of the storm drain system, providing the information that the storm drain system connects directly to creeks and the Bay and does not receive treatment. Past public awareness surveys have demonstrated that this BMP has achieved significant impact in raising awareness in the general public and meets the MEP standard as a required action. Therefore, it is important to set a goal of ensuring that all municipally-maintained inlets are legible labeled with a no dumping message. If storm drain marking can be conducted as a volunteer activity, it has additional public involvement value.

Provision C.7.b. Outreach Campaigns. Permittees have long been implementing outreach campaigns to educate their residents on different stormwater runoff pollution prevention messages. The Permit requires a minimum of one public outreach campaign. It is anticipated that the Bay Area Stormwater Management Agencies Association (BASMAA) will continue implementing the *Our Water, Our World* pesticide use reduction outreach campaign. It is anticipated that individual Permittees, and/or their respective countywide program, and/or BASMAA, will either continue existing public outreach campaigns or start new ones. This Permit removes specificity regarding the expected public outreach campaigns and how they must be conducted. This recognizes that the Permittees have decades of public outreach experience and allows maximum flexibility to best reach their residents regarding the impacts of stormwater pollution on receiving waters and potential solutions to mitigate the problems caused, and positively influence waste disposal practices and runoff pollution generation by encouraging the implementation of appropriate solutions. Permittees can utilize various electronic and print media, and paid and free media to best reach the different various target audiences. This Permit still requires an effectiveness assessment/evaluation after each outreach campaign. This provides the opportunity for the Permittees to evaluate whether they have best reached residents with the utilized stormwater pollution prevention messages in the outreach campaigns and how to move forward with future outreach campaigns.

Provision C.7.c. Stormwater Pollution Prevention Education. As the public becomes more aware of water quality issues and how certain behaviors negatively impact stormwater runoff, they will need more information on how to minimize stormwater

[45] U.S. EPA. 2000. Storm Water Phase II Compliance Assistance Guide. EPA 833-R-00-002.

pollution. The Previous Permit required Permittees to have and publicize a centralized stormwater point of contact to provide the public with information on watershed characteristics and stormwater pollution prevention alternatives. The Permittees already disseminate numerous brochures, pamphlets, and fact sheets on a number of different stormwater pollution prevention messages which have a stormwater point of contact on them. Some Permittees also have these materials in other languages to reach their populations for whom English is not a first language. Many Permittees have also placed these pollution prevention materials on their websites. Since citizens increasingly use the internet to search for information, this Permit goes further to require all Permittees to place information on watershed characteristics and stormwater pollution prevention materials on their websites.

Provision C.7.d. Public Outreach and Citizen Involvement Events. This Permit combines Public Outreach and Citizen Involvement. Permittees need informed citizens to influence positive stormwater pollution behavior. Therefore, Permittees need to continue communicating with a broach spectrum of citizens with stormwater pollution prevention information through long-established outreach mechanism such as staffing tables or booths at fairs, street fairs, and other community events. Permittees shall continue utilizing appropriate outreach materials, such as printed materials, newsletter/journal articles, and videos. Permittees shall also utilize existing community outreach events, such as the Bringing Back the Natives Garden Tour. Combining Citizen Involvement Events with Public Outreach in this Permit does not minimize the importance of Citizen Involvement in events such as creek cleanups and restorations. It is important to provide opportunities for citizens to actively practice being good stewards of our environment. The combined specified numbers of events for Public Outreach and Citizen Involvement in this Permit are, for the most part, slightly less than the combined specified numbers in the Previous Permit. However, many Permittees claimed credit for both public outreach and citizen involvement for a number of events each year. In addition, this Permit has new requirements for each Permittee to have and maintain information on stormwater issues, watershed characteristics, and stormwater pollution prevention alternatives on its website and to advertise this website. It is anticipated that this website will provide the needed stormwater pollution prevention information to citizens more readily.

Provision C.7.e. Watershed Stewardship Collaborative Efforts. Watershed and Creek groups are comprised of active citizens, but they often need support from the local jurisdiction and certainly need to coordinate actions with Permittees such as flood districts and cities.

Provision C.7.f. School-Age Children Outreach. Outreach to school children has proven to be a particularly successful program with an enthusiastic audience who are efficient to reach. School children also take the message home to their parents, neighbors, and friends. In addition, they are the next generation of decision-makers and consumers.

Provision C.7.g. Outreach to Municipal Officials. It is important for Permittee staff to periodically inform Municipal Officials of the permit requirements and also future planning and resource needs driven by the permit and stormwater regulations.

C.8. Water Quality Monitoring

Legal Authority

Broad Legal Authority: CWA § 308; Federal NPDES regulations 40 CFR §§122.26(d)(2), 122.41(h), (j)-(l), 122.42(c), 122.44(i), and 122.48.

Specific Legal Authority: Permittees must conduct a comprehensive monitoring program and submit reports as required under Federal NPDES regulations cited above. CWC Section 13383 further authorizes the Regional Water Board to establish monitoring, inspection, entry, reporting, and recordkeeping requirements.

Fact Sheet Findings in Support of Provision C.8

C.8-1 In response to questions regarding the type of WQBELs that are most appropriate for NPDES stormwater permits, and because of the nature of stormwater discharges, U.S. EPA established the following approach to stormwater monitoring:

Each storm water permit should include a coordinated and cost-effective monitoring program to gather necessary information to determine the extent to which the permit provides for attainment of applicable water quality standards and to determine the appropriate conditions or limitations for subsequent permits. Such a monitoring program may include ambient monitoring, receiving water assessment, discharge monitoring (as needed), or a combination of monitoring procedures designed to gather necessary information.[46]

According to U.S. EPA, the benefits of stormwater runoff monitoring include, but are not limited to, the following:

- Providing a means for evaluating the environmental risk of stormwater discharges by identifying types and amounts of pollutants present;
- Determining the relative potential for stormwater discharges to contribute to water quality impacts or water quality standard violations;
- Identifying potential sources of pollutants; and
- Eliminating or controlling identified sources more specifically through permit conditions.[47]

C.8-2 Provision C.8 requires Permittees to conduct water quality monitoring, including ambient monitoring and monitoring of receiving waters, in accordance with 40 CFR 122.44(i) and 122.48. One purpose of water quality monitoring is to demonstrate the effectiveness of the Permittees' stormwater management actions pursuant to this Permit and, accordingly, demonstrate

[46] U.S. EPA. 1996. Interim Permitting Approach for Water Quality-Based Effluent Limitations in Stormwater Permits. Sept. 1, 1996. http://www.epa.gov/npdes/pubs/swpol.pdf

[47] U.S. EPA. 1992. NPDES Storm Water Sampling Guidance Document. EPA/833-B-92-001.

compliance with the conditions of the Permit. Other water quality monitoring objectives under this Permit include:

- Assess the chemical, physical, and biological impacts of urban runoff on receiving waters;
- Characterize stormwater discharges;
- Assess compliance with Total Maximum Daily Loads (TMDLs) and Wasteload Allocations (WLAs) in impaired waterbodies;
- Assess progress toward reducing receiving water concentrations of impairing pollutants;
- Assess compliance with numeric and narrative water quality objectives and standards;
- Identify sources of pollutants;
- Assess stream channel function and condition, as related to urban stormwater discharges;
- Assess the overall health and evaluate long-term trends in receiving water quality; and
- Measure and improve the effectiveness of the Permittees' urban runoff control programs and the Permittees' implemented BMPs.

C.8-3 Monitoring programs are an essential element in the improvement of urban runoff management efforts. Data collected from monitoring programs can be assessed to determine the effectiveness of management programs and practices, which is vital for the success of the iterative approach, also called the "continuous improvement" approach, used to meet the Maximum Extent Practicable (MEP) standard where applicable. When water quality data indicate that water quality standards or objectives are not being met, particular pollutants, sources, and drainage areas can be identified and targeted for urban runoff management efforts. The iterative process in Provision C.1, Water Quality Standards Exceedances, could potentially be triggered by monitoring results. Ultimately, the results of the monitoring program must be used to focus actions to reduce pollutant loadings to comply with applicable WLAs, and protect and enhance the beneficial uses of the receiving waters in the Permittees' jurisdictions and the San Francisco Bay.

C.8-4 Under the CWA, NPDES permits must contain conditions that require both monitoring and reporting of monitoring results to ensure compliance. (See 33 U.S.C. § 1342(a)(2); 40 C.F.R. § 122.44(i)(1)-(2).) The regulations provide, in pertinent part:

> *In addition to the conditions established under §122.43(a), each NPDES permit shall include conditions meeting the following requirements when applicable.*
>
> *(i) Monitoring requirements. In addition to § 122.48, the following monitoring requirements:*
>
> *(1) To assure compliance with permit limitations, requirements to monitor:*

> *(i) The mass (or other measurement specified in the permit) for each pollutant limited in the permit;*
>
> *(ii) The volume of effluent discharged from each outfall;*
>
> *(iii) Other measurements as appropriate including pollutants in internal waste streams under § 122.45(i); pollutants in intake water for net limitations under § 122.45(f); frequency, rate of discharge, etc., for noncontinuous discharges under § 122.45(e); pollutants subject to notification requirements under § 122.42(a); and pollutants in sewage sludge or other monitoring as specified in 40 CFR part 503; or as determined to be necessary on a case-by-case basis pursuant to section 405(d)(4) of the CWA.*
>
> *(iv) According to sufficiently sensitive test procedures (i.e., methods) approved under 40 CFR part 136 for the analysis of pollutants or pollutant parameters or required under 40 CFR chapter 1, subchapter N or O. . . .*
>
> *(2) Except as provided in paragraphs (i)(4) and (i)(5) of this section, requirements to report monitoring results shall be established on a case-by-case basis with a frequency dependent on the nature and effect of the discharge, but in no case less than once a year. . . .*
>
> *40 C.F.R. § 122.44(i)(1)-(2). This section allows "for monitoring other than mass or volume, namely some 'other measurement specified in the permit [ ] for each pollutant limited in the permit.'" (NRDC v. U.S.EPA, No. 13-1745, 2015 WL 5780393 at *20 (2nd Cir. Oct. 5, 2015).) The regulations at 40 C.F.R. § 122.48 state that all permits specify the "[r]equired monitoring including type, intervals, and frequency sufficient to yield data which are representative of the monitored activity including, when appropriate, continuous monitoring."*

Consistent with the federal regulations, water quality monitoring requirements in Provision C.8 require specific monitoring that will yield data that is both representative of the monitored activity and necessary to assure compliance with the requirements of the Permit, as described below.

C.8 requires monitoring[48]:

> *(1) At or near outfalls during storm events to obtain flow-weighted concentrations (mass) of pollutants of concern. Flow-weighted monitoring is required to assess progress on attaining TMDLs, including assuring compliance with the required load reductions in the permit (C.8.f. Pollution of Concern Monitoring). This monitoring supports estimates of MS4 pollutant loads to receiving waters and requires data collection to support planning for control actions. The latter includes monitoring effectiveness of control measures and identifying pollutant source areas; and*

[48] Provisions C.2-C.4, C.6, C8, C.10, C.13-C.16 contain additional monitoring and reporting requirements to assure compliance with the requirements therein.

(2) In receiving waters during wet and dry weather to assess the physical, chemical and biological impacts of MS4 discharges to urban streams (C.8.d. Creek Status Monitoring).

Creek Status Monitoring requires receiving water monitoring of the types, frequencies and intervals sufficient to yield information on the physical, chemical and biological status of those water bodies. Receiving water monitoring is specified here in lieu of outfall monitoring for the following reasons. First, there are no end-of-pipe limits in the permit to measure. Instead, the permit requires, for example, PCB load reductions; outfall monitoring would not allow the Board to assess whether the PCB limits are met. Second, there are hundreds if not thousands of outfalls in the Permittees' jurisdictions and it is impractical to monitor every single outfall due to both cost and safety concerns. Monitoring a subset of outfalls would provide information about MS4 discharges at those specific locations at only one limited point in time, which leads to the third point that outfall monitoring is time- and spatially limited. In contrast, the required receiving water monitoring integrates the physical, biological and chemical effects to the water body of all MS4 discharges from multiple outfalls over multiple storms (i.e., time and space), yielding more useful data than outfall monitoring to determine compliance with the permit. Receiving water monitoring is done in a probabilistic or rotating basis, depending on the parameter, again yielding more useful data than fixed-location monitoring. Also, both dry weather and storm flows are addressed in receiving water monitoring, whereas outfall monitoring is normally conducted only during storm events. Dry weather discharges can constitute a significant portion of annual pollutant loadings from storm systems in urban areas (NRC 2008).

To provide an example of how receiving water monitoring better captures permit compliance, consider an illicit discharge of chloramine from a swimming pool to an MS4. Both outfall and receiving water monitoring could detect the discharge. However, outfall monitoring would need to be done at the exact location and time of an illicit discharge otherwise it would go undetected, because the discharge would have moved through the outfall and into receiving waters. In contrast, receiving water monitoring could detect chloramine for a longer period of time (depending on pH, organic carbon and temperature) from upstream outfalls to the point where dilution prevents detection. Chloramine can be fairly stable and could be detected in urban waters in summer months, when outfall monitoring is generally not conducted. Receiving water monitoring, which is required in both dry and wet weather, can and has detected chlorine (a break-down product of chloramine), leading to efforts to correct the illicit discharge problem.

Receiving water monitoring as a means to evaluate compliance with permit conditions is supported by the National Research Council (NRC). In *Urban Stormwater Management in the United States*, NRC states that the quality of stormwater from urbanized areas has been well-characterized.[49] Continuing

[49] National Research Council. 2008. Urban Stormwater Management in the United States.

MS4 end-of-pipe monitoring produces data of limited usefulness because of a variety of shortcomings (as detailed in the report). The NRC strongly recommends[50] that MS4 programs modify their evaluation metrics and methods to include biological and physical monitoring and an increased emphasis on watershed scale analyses to ascertain what is actually going on in receiving waters, much like what is required in the permit. Further, NRC finds that biological assessments (as required in the Permit) respond to the range of non-chemical stressors identified as being important in urban waterways including habitat degradation, hydrological alterations, and sediment and siltation impacts, as well as to the influence of nutrients and other chemical stressors where chemical criteria do not exist or where their effects are difficult to measure directly (e.g., episodic stressors).

U.S. EPA Interim Permitting Approach for Water Quality-Based Effluent Limitations in Storm Water Permits notes that:

> …storm water monitoring can be conducted for two basic reasons: 1) to identify if problems are present, either in the receiving water or in the discharge, and to characterize the cause(s) of such problems; and 2) to assess the effectiveness of storm water controls in reducing contaminants and making improvements in water quality.

Section C.8 of this permit satisfies these two objectives by requiring monitoring that will provide Permittees with sufficient data to pinpoint sources of pollutants and assess the effectiveness of efforts to reduce pollutants, both at the source and in receiving waters.

C.8-5 The Water Quality Monitoring Provision is intended to provide answers to fundamental management questions, outlined below. Monitoring is intended to progress as iterative steps toward ensuring that the Permittees' can fully answer, through progressive monitoring actions, management questions that include the following:

- Are conditions in receiving waters protective, or likely to be protective, of beneficial uses?
- What is the extent and magnitude of the current or potential receiving water problems?
- What is the relative urban runoff contribution to the receiving water problem(s)?
- What are the sources of urban runoff that contribute to receiving water problem(s)?
- Are conditions in receiving waters getting better or worse?

C.8-6 On April 15, 1992, the Water Board adopted Resolution No. 92-043 directing the Executive Officer to implement the Regional Monitoring Program for San Francisco Bay. Subsequent to a public hearing and various meetings, Water

[50] U.S. EPA has endorsed the NRC's recommendation. (See, e.g., EPA's District of Columbia MS4 Permit No. DC0000221 Fact Sheet, 2011.)

Board staff requested major permit holders in the Region, under authority of CWC section 13267, to report on the water quality of the Estuary. These permit holders, including the Permittees, responded to this request by participating in a collaborative effort through the San Francisco Estuary Institute. This effort has come to be known as the San Francisco Estuary Regional Monitoring Program (RMP). The RMP involves collection and analysis of data on pollutants and toxicity in water, sediment and biota of the Estuary. Because the RMP monitors waters in each Permittee's jurisdiction and gathers data on the pollutants discussed in this Permit, the Permittees are required to continue to report on the water quality of the Estuary, as presently required. Compliance with the requirement through participation in the RMP is considered to be adequate compliance.

C.8-7 The Surface Water Ambient Monitoring Program (SWAMP) is a statewide monitoring effort, administered by the State Water Board, designed to assess the conditions of surface waters throughout California. One purpose of SWAMP is to integrate existing water quality monitoring activities of the State Water Board and the Regional Water Boards, and to coordinate with other monitoring programs. Provision C.8 contains a framework, referred to as a regional monitoring collaborative, within which Permittees can elect to work cooperatively with SWAMP to maximize the value and utility of both the Permittees' and SWAMP's monitoring resources. In working cooperatively with SWAMP, Permittees can develop a monitoring program that evaluates waters in its jurisdiction and gathers data on each of the pollutants of concern discussed in this Permit.

C.8-8 In 1998, BASMAA published *Support Document for Development of the Regional Stormwater Monitoring Strategy*,[51] a document describing a possible strategy for coordinating the monitoring activities of BASMAA member agencies. The document states:

> BASMAA's member agencies are connected not only by geography but also by an overlapping set of environmental issues and processes and a common regulatory structure. It is only natural that the evolution of their individual stormwater management programs has led toward increasing amounts of information sharing, cooperation, and coordination.

In the Previous Permit, Permittees were given the option to implement this same concept by forming a regional monitoring collaborative, which they did. In conducting some of the monitoring required in this Provision, the Regional Monitoring Collaborative (RMC) provides efficiencies and economies of scale by performing certain tasks (e.g., planning, contracting, data quality assurance, data management and analysis, and reporting) at the regional level on behalf of

[51] EcoAnalysis, Inc. & Michael Drennan Assoc., Inc., *Support Document for Development of the Regional Stormwater Monitoring Strategy*, prepared for Bay Area Stormwater Management Agencies Association, March 2, 1998.

all Permittees. Further benefits are expected as more monitoring requirements are fulfilled through the RMC.

C.8-9 This Permit includes monitoring requirements to verify compliance with adopted TMDL WLAs and to provide data needed for TMDL development and/or implementation. This Permit incorporates the TMDLs' WLAs adopted by the Water Board as required under CWA section 303(d).

C.8-10 SB1070 (California Legislative year 2005/2006) found that there is no single place where the public can go to get a look at the health of local water bodies. SB1070 also states that all information available to agencies shall be made readily available to the public via the Internet. This Permit requires water quality data to be submitted in a specified format and uploaded to a centralized Internet site so that the public has ready access to the data.

Specific Provision C.8 Requirements

Each of the components of the monitoring provision is necessary to meet the objectives and answer the questions listed in the findings above. Justifications for each monitoring component are discussed below.

Provision C.8.a. Compliance Options. Provision C.8.a. provides Permittees options for obtaining monitoring data through various organizational structures, including use of data obtained by other parties. This is intended to achieve the following:

- Promote cost savings through economies of scale and eliminate redundant monitoring by various entities;
- Promote consistency in monitoring methods and data quality; and
- Simplify reporting.

In this Permit, all the Stormwater Countywide Programs are encouraged to work collaboratively to conduct all or most of the required monitoring and reporting on a region-wide basis. For each monitoring component that is conducted collaboratively, one report would be prepared on behalf of all contributing Permittees; separate reports would not be required from each Program. Cost savings could result also from reduced contract and oversight hours, fewer quality assurance/quality control samples, shared sampling labor costs, and laboratory efficiencies.

Provision C.8.b. Monitoring Protocols and Data Quality. Clean Water Act regulations (40 CFR 122.41(j)(1)) require that data submitted pursuant to a NPDES permit meet certain quality standards. To achieve this, and to obtain data of known quality that can be compared to data collected in other California urban creeks, the permit requires monitoring data be collected and analyzed in accordance with the SWAMP Quality Assurance Project Plan and Standard Operating Procedures or U.S. EPA methods. The BASMAA Regional Monitoring Coalition's Creek Status Monitoring Program Quality Assurance Project Plan (January 2014) and Standard Operating Procedures (January 2014) have been deemed to be SWAMP comparable. These two BASMAA documents may be updated to reflect the changing state-of-the-science with Executive Officer's approval.

Provision C.8.c. San Francisco Estuary Receiving Water Monitoring. The San Francisco Estuary is the ultimate receiving water for most of the urban runoff in this region. For this reason and because of the high value of its beneficial uses, Provision C.8.c requires focused monitoring on the Estuary to continue. Since the mid-1990s, Permittees have caused this monitoring to be conducted by contributing financially and with technical expertise, to the RMP. Provision C.8.c requires such monitoring to continue.

Provisions C.8.d. Creek Status Monitoring. Based on the stated goals of the CWA, Creek Status Monitoring employs a three-pronged approach to monitoring water quality which includes chemical-specific monitoring, toxicity testing, and bioassessments (U.S. EPA 1991a). Each of the three elements has distinct advantages and all three work together to ensure that the physical, chemical and biological integrity of our waters are protected. Creek Status Monitoring includes probabilistic and targeted sampling of urban creeks and serves as a surrogate to monitoring the discharge from all major outfalls. Sampling the Permittees' numerous outfalls is impractical due to costs and safety factors and the resulting data would not provide commensurately better information. By sampling the sediment, biota and water column in urban creeks, the Permittees can determine where water quality problems are occurring in the creeks, then work to identify which outfalls and land uses are causing or contributing to the problem. In short, Creek Status Monitoring is needed and useful for identifying water quality problems and assessing the health of streams; it is the first step in identifying sources of pollutants and an important component in evaluating the effectiveness of an urban runoff management program. Requirements for number, frequency and general locations of samples are established to sufficiently indicate whether water quality is supportive, or likely to be supportive, of beneficial uses and whether water quality objectives are being met, at a minimum.

Provision C.8.d.i. Biological Assessment including Nutrients and General Water Quality Parameters. Biological Assessment is needed to provide site-specific information about the health and diversity of freshwater benthic communities within a specific reach of a creek, using standard procedures developed and/or used by the SWAMP. It consists of collecting samples of benthic communities and conducting a taxonomic identification to measure community abundance and diversity. Urban creek sampling can be directly compared to a non-urban or reference creek to assess benthic community health. Biological indicators, including the California Stream Condition Index (CSCI), are developed using reference streams, so the calculation of a CSCI score at an urban site already takes comparison to reference conditions into account. This monitoring can also provide information on cumulative pollutant exposure/impacts because pollutant impacts to the benthic community accumulate and occur over time. Nutrient monitoring is necessary because recent monitoring data indicate nutrients, which can increase algal growth and decrease dissolved oxygen concentrations, are present in significant concentrations in Bay Area creeks. The sampling timeframe (generally between April 15 and June 30) is when invertebrates are developed enough to be captured in the sampling equipment but not developed enough to have emerged (flown off), and thus is the timeframe in which necessary information concerning biological integrity can be obtained.

Provision C.8.d.ii. Chlorine monitoring is needed to detect a release of potable water or other chlorinated water sources, which are toxic to aquatic life.

Provision C.8.d.iii. Temperature monitoring is needed to determine if conditions in creeks to which urban runoff is discharged are supportive of cold-water and warm-water beneficial uses, as appropriate.

Provision C.8.d.iv. Continuous monitoring of dissolved oxygen, temperature, and pH is required because these parameters are fundamental to supporting aquatic life beneficial uses and they impact the effect of pollutants in freshwater (e.g., ammonia toxicity is dependent on pH and temperature).

Provision C.8.d.v. Pathogen Indicator monitoring is needed to detect pathogens in waterbodies that could be sources of impairment to recreational uses at or near the sampling location.

Provision C.8.d. (All Parameters) **Monitoring Frequency, Duration, and Location.** Creek Status Monitoring continues to be an annual requirement for the Permittees, except for two much smaller Permittees, Fairfield-Suisun and Vallejo. For each of the Creek Status Monitoring parameters, the number or frequency of samples required is based on the relative population within the countywide stormwater program. Costs are minimized while data necessary for successful stormwater management are obtained. Monitoring durations are based on the amount of data needed to understand the potential effects related to each Creek Status Monitoring parameter. Monitoring frequencies and durations are specified for each parameter.

Creek Status Monitoring locations are to be selected on a probabilistic (random) or targeted basis, depending on the parameter, in similar fashion to SWAMP. If correctly sited, sampling stations are expected to be very useful in answering the monitoring program's management questions and meeting its goals. For this reason, Provision C.8.d. requires sample locations to be based on surrounding land use, likelihood of urban runoff impacts, existing data gaps, and similar considerations. This will help maximize the utility of the sample locations, while also providing the Permittees with adequate flexibility to ultimately choose practical Creek Status Monitoring locations.

Provision C.8.e. Stressor/Source Identification (SSID) Projects are necessary to identify sources of pollutants; identify new or emerging pollutants; and improve stormwater management actions. When Creek Status Monitoring results indicate an exceedance of a water quality objective, a temperature or toxic effect threshold, or other "trigger," these results become candidates for SSID projects. The trigger provides a threshold for considering follow up, and Permittees select which results will be followed up on via a SSID project based on criteria such as magnitude of threshold exceedance; parameter (for a variety of parameters); and likelihood stormwater management action(s) could address the exceedance. A minimum number of SSID Projects is required, rather than a SSID for every monitoring result that exceeds a "trigger" threshold. Every trigger exceedance need not result in a SSID project because (1) triggers are not water quality objectives in most cases and (2) this approach requires investigation of potential water quality issues without duplicating efforts.

Through SSID projects, Permittees must identify the source of the problem and take steps to reduce any pollutants discharged from or through their municipal storm sewer systems. This requirement conforms to the process, outlined in Provision C.1., of complying with the Discharge Prohibition and Receiving Water Limitations. The timeframes for initiating and completing follow-up actions acknowledge the realities of budgeting for these studies, some, but not all of which could require funding above the level available in a given fiscal year. If multiple "triggers" are identified through monitoring, Permittees must focus on the highest priority problems; a cap on the total number of source identification projects conducted within the Permit term is provided to cap Permittees' potential costs.

C.8.f. Pollutants of Concern[52] Monitoring. CWA section 303(d) TMDL requirements, as implemented under the CWC, require a monitoring plan designed to measure the effectiveness of the TMDL point and nonpoint source control measures and the progress the water body is making toward attaining water quality objectives. Such a plan necessarily includes collection of water quality data. Provision C.8.f. Pollutants of Concern (POC) monitoring is intended to assess inputs of Pollutants of Concern to the Bay from local tributaries and urban runoff; provide information to support implementation of TMDLs and other pollutant control strategies; assess progress toward achieving wasteload allocations (WLAs) for TMDLs; and help resolve uncertainties in loading estimates and impairments associated with these pollutants.

In particular, POC monitoring addresses five priority POC management information needs:

1) Source Identification - identifying which sources or watershed source areas provide the greatest opportunities for reductions of POCs in urban stormwater runoff;

2) Contributions to Bay Impairment - identifying which watershed source areas contribute most to the impairment of San Francisco Bay beneficial uses (due to source intensity and sensitivity of discharge location);

3) Management Action Effectiveness - providing support for planning future management actions or evaluating the effectiveness or impacts of existing management actions;

4) Loads and Status - providing information on POC loads, concentrations, and presence in local tributaries or urban stormwater discharges; and

5) Trends - evaluating trends in POC loading to the Bay and POC concentrations in urban stormwater discharges or local tributaries over time.

The Permit specifies monitoring methods that can be used to address these information needs and which information needs apply to each pollutant of concern. The Permit provides flexibility in the number of samples, or level of effort, but requires minimums to be met annually and over the Permit term. The level of effort (expressed as required number of samples collected and analyzed) is similar to the level of sampling and analysis effort for pollutants of concern monitoring required in the Previous Permit term.

[52] See sections C.9, C.11, C.12, and C.13 of this Fact Sheet for more information on Pollutants of Concern.

The approach for POC monitoring does not specify specific monitoring locations or monitoring frequencies at those specific locations. Rather, the Permit requires that monitoring be intelligently and flexibly directed toward answering the management information needs (that apply to a given pollutant), and this flexibility allows the monitoring strategy to be adapted and improved based on information obtained from monitoring conducted early in the permit term. The flexibility also allows the Permittees to continue collecting useful information even during drought years in which conditions limit some types of data collection (e.g., storm even sampling) but not others (e.g., collection of bed sediment). As is true of Creek Status Monitoring, it is impractical to sample all of the urban runoff outfalls in the region, and these outfall data (obtained at great expense) would not provide commensurately better information relative to the management information needs for pollutants of concern. By strategically sampling the sediment and water column in urban creeks and conveyances, the Permittees can better address the five information needs stated above.

To some extent, POC monitoring builds on what we already know about pollutants in creeks (also referred to as tributaries to the Bay) and leads to more effective actions to control those pollutants. For example, we know that pesticide-related toxicity has been widespread and results from approved pesticide uses. POC monitoring for toxicity therefore is tailored to provide information on which pesticides are currently a concern to water quality; a limited number of toxicity samples provides adequate information. Other requirements for number, frequency and general locations of samples are similarly tailored to information needs.

Provisions C.8.g. Pesticides and Toxicity Monitoring. Toxicity testing provides a tool for assessing toxic effects (acute and chronic) of all the chemicals in samples of stormwater, receiving waters or sediments and allows the cumulative effect of the pollutants present in the sample to be evaluated, rather than the toxic responses to individual chemicals. Toxicity in water and on sediment also are monitored in order to determine whether the numeric targets of the Diazinon and Pesticide-Related Toxicity in Urban Creeks TMDL are being achieved, and to help provide evidence on whether pesticide-related toxicity is decreasing in urban creek waters.

This subprovision combines all the pesticide and toxicity into one place, where previous permits had pesticide and toxicity monitoring in both Creek Status and Pollutants of Concern Monitoring subprovisions. This format is intended to provide for more thoughtful dry weather and wet weather sampling designs that may provide more meaningful data for the region and potentially for statewide studies. Since the Urban Creeks TMDL was adopted by the Water Board in 2005, it has become more apparent that pesticide related toxicity water quality problems are similar in urban waterways across the State. At this time, efforts have begun to develop a statewide coordinated pesticides and pesticide-related toxicity monitoring program. In addition, pesticide-related water quality issues are subject to change as different pesticide products gain market share and increase in urban usage. For these reasons, Permittees may request the Executive Officer modify, reduce or eliminate the requirements of this subprovision during the permit term, provided the resultant change, viewed in context of the statewide program, would result in overall improvement of pesticide monitoring data collection.

This Permit describes type, interval and frequency of pesticides and toxicity monitoring sufficient to yield data which are representative of both dry weather and wet weather urban runoff. Required analytes include toxicity and pesticides that are being found at or near concentrations that cause chronic or acute effects to aquatic organisms. Required test methods include the relatively recent Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms (EPA/821/R-02/013, 2002; Table IA, 40 CFR Part 136) for chronic toxicity. The test species are selected as the most sensitive species to pollutants currently known or suspected to be present in stormwater discharges. All required methods and test species are consistent with those used by SWAMP as well as those required in other California MS4 permits, including the statewide Caltrans permit.

The non-pesticide pollutants arsenic, cadmium, chromium, copper, lead, nickel, and zinc are included in this subprovision in order to facilitate the synoptic collection of these pollutants in sediment with toxicity in sediment during the dry season.

C.8.h. Reporting. CWC section 13383 provides authority for the Water Board to require technical water quality reports. Provision C.8.h. requires Permittees to submit electronic and comprehensive reports on their water quality monitoring activities to (1) determine compliance with monitoring requirements; (2) provide information useful in evaluating compliance with all Permit requirements; (3) enhance public awareness of the water quality in local streams and the Bay; and (4) standardize reporting to better facilitate analyses of the data, including for the CWA section 303(d) listing process.

C.9. – C.14. Pollutants of Concern including Total Maximum Daily Loads

Provisions C.9 through C.14 pertain to pollutants of concern, including those for which TMDLs have been adopted.

Legal Authority

The following legal authority applies to provisions C.9 through C.14:

Broad Legal Authority: CWA sections 402(p)(3)(B)(ii-iii), CWC sections 13377 and 13383, and Federal NPDES regulations 40 CFR 122.26(d)(2)(i)(B, C, E, and F) and 40 CFR 122.26(d)(2)(iv).

Specific Legal Authority: The TMDL-based requirements for pesticides, mercury, PCBs, and bacteria have been imposed in accordance with 40 Code of Federal Regulations section 122.44(d)(1)(vii)(B). Pursuant to 40 Code of Federal Regulations section 122.44(d)(1)(vii)(B), the effluent limitations for NPDES permits must be consistent with the assumptions and requirements of any available Waste Load Allocation (WLA) for the discharge prepared by the state and approved by U.S. EPA, or established by U.S. EPA. In addition, Water Code section 13263, subdivision (a), requires that waste discharge requirements implement any relevant water quality control plans (basin plans), including TMDL requirements that have been incorporated into the basin plans. In addition, under CWA section 402(p)(3)(B)(iii), MS4 discharges "shall require controls to reduce the discharge of pollutants to the maximum extent practicable . . . and such other provisions as the Administrator or the State determines appropriate for the control of such pollutants." (33 U.S.C. § 1342(p)(3)(B)(iii).) Under this provision, the Water Board may include requirements for reducing pollutants in stormwater discharges as necessary for compliance with water quality standards. (*See Defenders of Wildlife v. Browner* (9th Cir. 1999) 191 F.3d 1159, 1166.) This includes requirements to meet TMDLs since TMDL targets are an interpretation of water quality standards.

The Water Board may impose WQBELs effluent limitations that are BMPs or numeric effluent limitations. (33 U.S.C. §1342(p)(3)(B)(iii); 40 C.F.R. §122.44(k)(2)&(3) and § 122.44(d)(1)(vii)(B).) This is consistent with U.S. EPA's November 26, 2014, "Revision to the November 22, 2002, Memorandum 'Establishing Total Maximum Daily Load (TMDL) Wasteload Allocations (WLAs) for Storm Water Sources and NPDES Permit Requirements Based on Those WLAs'" (2014 U.S. EPA Memo.) This memorandum, while not binding authority, states "[w]here the TMDL includes WLAs for stormwater sources that provide numeric pollutant loads, the WLA should, where feasible, be translated into effective, measurable WQBELs that will achieve this objective. This could take the form of a numeric limit, or of a measurable, objective BMP-based limit that is projected to achieve the WLA." The 2014 U.S. EPA Memo further acknowledges that the permitting authority should consider the schedules in the TMDL as it decides whether and how to establish enforceable interim requirement and interim dates in the Permit. The interim deadlines in the Provisions are consistent with and in furtherance of the deadlines in the TMDLs.

For trash, the Water Board is authorized to impose effluent limitations under 40 CFR 122.44(d)(1)(i), which requires NPDES permits to include limitations to "control all pollutants or pollutant parameters (either conventional, nonconventional, or toxic pollutants) which are or may be discharged at a level which will cause, have reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality." Trash is being discharged at levels that cause an excursion above the water quality objectives for floating, settleable and suspended materials. For copper, the Permit requires best management practices and copper control measures to prevent urban runoff discharges from causing or contributing to exceedances of copper site-specific water quality objectives for the Bay, consistent with the Basin Plan. Water Code section 13263 requires that waste discharge requirements implement the Basin Plan.

Basin Plan Requirements: Section 4.8 of the Region's Water Quality Control Plan (Basin Plan) states that NPDES stormwater permits issued to municipalities will include requirements to prevent or reduce discharges of pollutants that cause or contribute to violations of water quality objectives. The Water Board has been taking a phased approach of first requiring technically and economically feasible controls to reduce pollutant discharges to the maximum extent practicable. Where this does not result in attainment of water quality objectives, the Basin Plan states the Water Board will require implementation of additional control measures to meet water quality objectives. The Basin Plan also contains urban stormwater TMDL implementation requirements at sections 7.1.1, 7.2.2, 7.7.1, 7.2.3, and 7.4.1 for pesticide-related toxicity, mercury, PCBs, and bacteria. The Basin Plan also requires urban stormwater requirements for copper in section 7.2.1. Finally, the Basin Plan Table 4-1 includes Prohibition 7, which prohibits the discharge of "rubbish, refuse, bark, sawdust, or other solid wastes into surface waters or at any place where they would contact or where they would be eventually transported to surface waters, including flood plain areas."

General Strategy for Sediment-Bound Pollutants (Mercury and PCBs)

The control measures for mercury are intended to implement the urban runoff requirements stemming from TMDLs for these pollutants. The control measures required for PCBs are intended to implement those that are consistent with control measures in the PCBs TMDL implementation plan. The urban runoff management requirements in the PCBs TMDL implementation plan call for permit-term requirements based on an implementation of controls to reduce PCBs, and that is the intended approach of the required provisions for all pollutants of concern. Many of the control actions addressing PCBs and mercury will result in reductions of a host of sediment-bound pollutants, including legacy pesticides, PBDEs, and others. The strategy for these pollutants is to use PCBs control to guide decisions concerning where to focus effort, but implementation of the control efforts would take into account the benefits for controlling other pollutants of concern. The POC strategy also includes a phased approach that provides for pilot scale testing (in the 2009 issuance of this permit) and for identifying areas with POC sources. The overall strategy for addressing sediment bound POCs includes the following modes:

1. Pilot-testing in a few specific locations.

2. Focused implementation in areas where benefits are most likely to accrue.
3. Full-scale implementation throughout the region.
4. Other: This may refer to experimental control measures, Research and Development, desktop analysis, laboratory studies, and/or literature review.

The logic of such categorization is that, as actions are tested and confidence is gained regarding the control measure's effectiveness, the control measure may be implemented with a greater scope. For example, an untested control measure for which the effectiveness is uncertain may be implemented as a pilot project in a few locations during a permit term. If benefits result, and the action is deemed effective, it will be implemented in subsequent permit terms in a focused fashion in more locations or perhaps fully implemented throughout the Region, depending upon the nature of the measure. Conversely, the benefits of other control measures may be well known, and these control measures should be implemented in all applicable locations and/or situations. By conducting actions in this way and gathering additional information about effectiveness and cost, we will advance our understanding and be able to perform an updated assessment of the suite of actions.

During the Previous Permit term, a large part of the effort was focused on gathering necessary information about control measure effectiveness. In effect, most of the control measures were implemented at the pilot scale. In this Permit term, the emphasis will shift toward focused and perhaps full-scale implementation of the most effective control measures, and progress will be measured through accounting for specific load reductions. In subsequent permit terms control measures will be implemented on the basis of what we learn in this term, and we will, thus, achieve iterative refinement and improvement through time.

Background on Specific Provisions: Pursuant to CWA§ 402(p)(3)(B)(ii)-(iii) and 40 CFR § 122.44(d)(1)(vii)(B) , Provisions C.9 through C.14 contain technology-based requirements to control pollutants to the MEP, such other provisions the Water Board has determined appropriate for the control of pollutants under CWA, water quality-based requirements consistent with the assumptions and requirements of any WLAs in the applicable TMDLs, and requirements to effectively prohibit non-stormwater discharges into storm sewers. Provision C.9 contains requirements to implement the TMDL for pesticide-related toxicity in urban creeks. Provision C.10 contains requirements to implement narrative water quality objectives related to trash in all receiving water. Provision C.11 contains requirements to implement the San Francisco Bay mercury TMDL WLAs and the TMDL WLAs for mercury in the Guadalupe River Watershed. Provision C.12 contains requirements to implement the San Francisco Bay PCBs TMDL WLAs. Provision C.13 contains requirements to implement the copper site-specific objectives for San Francisco Bay. Provision C.14 contains requirements to implement the TMDL WLAs for San Pedro Creek and Pacifica State Beach Bacteria.

C.9. Pesticides Toxicity Control

Fact Sheet Findings in Support of Provision C.9

C.9-1 This Permit implements the Basin Plan amendments adopted by the Water Board that establish a Water Quality Containment Strategy and TMDL for diazinon and pesticide-related toxicity for Bay Area urban creeks on November 16, 2005, and approved by the State Water Board on November 15, 2006. The Water Quality Containment Strategy requires urban runoff management agencies to minimize their own pesticide use, conduct outreach to others, lead monitoring efforts, and take actions related to pesticide regulatory programs. Control measures implemented by urban runoff management agencies and other entities (except construction and industrial sites) shall reduce pesticides in urban runoff.

C.9-2 The TMDL is allocated to all urban runoff, including urban runoff associated with MS4s, Caltrans facilities, and industrial, construction, and institutional sites. The allocations are expressed in terms of toxic units and diazinon concentrations.

C.9-3 This provision is consistent with 2014 U.S. EPA Memo[53] providing guidance on implementing TMDL WLAs in NPDES storm water permits. Specifically, this provision establishes clear actions to achieve pesticide load reductions as well as other requirements (see C.9.f) necessary to achieve receiving water limits. The timeline for achieving the TMDL is not a fixed date for the following reasons. Pesticide-related toxicity continues to occur because state and federal pesticide regulatory programs, as currently implemented, allow pesticides to be used in ways that cause or contribute to aquatic toxicity. The TMDL implementation plan recognizes that (1) Permittees must control their own use of pesticides, but Permittees are not solely responsible for attaining the allocations, because their authority to regulate others' pesticide use is constrained by federal and state law; and (2) because a realistic date for achieving allocations cannot be discerned given the current pesticide regulatory framework, reviewing the implementation strategy every five years, at permit reissuance, is the appropriate timeline.

Specific Provision C.9 Requirements

C.9 provisions implement the TMDL for Urban Creeks Pesticide Toxicity. All C.9 provisions are stated explicitly in the implementation plan for this TMDL. Permittees are encouraged to coordinate activities with the Urban Pesticide Committee and other agencies and organizations. The Urban Pesticides Committee has served as an information clearinghouse and as a forum for coordinating pesticide TMDL implementation. The list of urban-use pesticides of concern to water quality includes

[53] U.S. EPA. November 26, 2014. Revisions to the November 22, 2002 Memorandum "Establishing Total Maximum Daily Load (TMDL) Wasteload Allocations (WLAs) for Storm Water Sources and NPDES Permit Requirements Based on Those WLAs"

pesticides for which local area monitoring data exceed or approach benchmarks and pesticides currently linked to toxicity in surface waters.

Provisions C.9.a through C.9.d are designed to insure that integrated pest management (IPM) is adopted and implemented as policy by all municipalities. IPM is a pest control strategy that uses an array of complementary methods: natural predators and parasites, pest-resistant varieties, cultural practices, biological controls, various physical techniques, and pesticides as a last resort. If implemented properly, it is an approach that can significantly reduce or eliminate the use of pesticides. The implementation of IPM will be assured through training of municipal employees and contractor requirements.

Provision C.9.e directs the municipalities to conduct outreach to consumers at point of purchase, to residents who contract for pest control, and to pest control professionals. Such targeted outreach is often intended to make the public and pest control professionals aware of the water quality impacts of current-use pesticides that are impacting or have potential to negatively impact urban creeks.

Provision C.9.f requires that municipalities (through cooperation or participation with BASMAA and CASQA track and participate in pesticide regulatory processes like the U.S. EPA pesticide evaluation and registration activities related to surface water quality, and the California Department of Pesticide Regulation pesticide evaluation activities. The goal of these efforts is to provide pertinent water quality data and encourage both the state and federal pesticide regulatory agencies to fully evaluate aquatic impacts and to mitigate for impacts to urban water bodies within the pesticide regulation or registration process. Accomplishing this goal would represent the most efficient and effective means to prevent pesticide-related water quality problems in the future.

Provision C.9.g requires Permittees to evaluate the effectiveness of their pesticide source control actions and is critical to the success of municipal efforts to control pesticide-related toxicity. Future permits must be based on an updated assessment of what is working and what is not. With every provision comes the responsibility to assess its effectiveness and report on these findings through the Permit. The particulars of assessment will depend on the nature of the control measure.

C.10. Trash Load Reduction

Legal Authority

The following legal authority applies to section C.10:

Broad Legal Authority: CWA sections 402(p)(3)(B)(ii-iii), CWC sections 13383, 13377 and 13263, and Federal NPDES regulations 40 CFR 122.26(d)(2)(i)(B, C, D, E, and F), 40 CFR 122.26(d)(2)(iv) , and 40 CFR § 122.44(d)(1)(i).

Specific Legal Authority: Federal NPES regulations 40 CFR 122.26(d)(2)(i) requires "a demonstration that the [Permittee] can operate pursuant to legal authority established by statute, ordinance or series of contracts which authorizes or enables the [Permittee] at a minimum to . . . (B) Prohibit through ordinance, order or similar means, illicit discharges to the municipal separate storm sewer; (C) Control through ordinance, order or similar means the discharge to a municipal separate storm sewer of spills, dumping or disposal of materials other than storm water . . . ."

Federal NPDES regulations 40 CFR 122.26(d)(2)(iv)(A)(1) requires "a description of maintenance activities and a maintenance schedule for structural controls to reduce pollutants (including floatables) in discharges from municipal separate storm sewers."

Federal NPDES regulation 40 CFR 122.26(d)(2)(iv)(B) requires "shall be based on a description of a program, including a schedule, to detect and remove (or require the discharger to the municipal storm sewer to obtain a separate NPDES permit for) illicit discharges and improper disposal into the storm sewer."

Federal NPDES regulation 40 CFR 122.26(d)(2)(iv)(B)(2) requires "a description of procedures to conduct on-going field screening activities during the life of the permit, including areas or locations that will be evaluated by such field screens."

Federal NPDES regulation 40 CFR 122.26(d)(2)(iv)(B)(3) requires "a description of procedures to be followed to investigate portions of the separate storm sewer system that, based on the results of the field screen, or other appropriate information, indicate a reasonable potential of containing illicit discharges or other sources of non-storm water."

Federal NPDES regulations 40 CFR 122.26(d)(2)(iv)(B)(4) requires "a description of procedures to prevent, contain, and respond to spills that may discharge into the municipal separate storm sewer."

Federal NPDES regulations 40 CFR § 122.44(d)(1)(i) requires limitations for pollutants which are or may be discharged at a level which has the reasonable potential to cause or contribute to an excursion above any water quality standard, including any narrative criteria for water quality.

San Francisco Bay Basin Plan contains these narrative water quality objectives applicable to trash: floating material (waters shall not contain floating material,

including solids, liquids, foams, and scum, in concentrations that cause nuisance or adversely affect beneficial uses); settleable material (waters shall not contain substances in concentrations that result in the deposition of material that cause nuisance or adversely affect beneficial uses); and suspended material (waters shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses). Trash is being discharged at levels that have the reasonable potential to cause or contribute to excursions of these narrative water quality objectives. There are currently 26 waterbodies in the Region impaired by trash on the Clean Water Act section 303(d) list and most are receiving waters of discharges from Permittees' municipal storm drain systems. In additional, all Permittees have identified trash hot spots in their receiving water in a July 2010 submittal required by the previous permit. NPDES permitting authorities have discretion to include requirements for reducing pollutants in storm water as necessary for compliance with water quality standards. (*Defenders of Wildlife v. Browner* (9th Cir. 1999) 191 F.3d 1159, 1166.) U.S. EPA recommends that for MS4 discharges with reasonable potential to cause or contribute to a water quality excursion, a permitting authority exercises its discretion to include clear, specific, and measurable requirements and, where feasible, numeric effluent limitations as necessary to meet water quality standards.[54] The permit contains such requirements to meet water quality standards.

The Basin Plan also contains includes Chapter 4 – Implementation, Table 4-1 Prohibitions, Prohibition 7, which prohibits the discharge of rubbish, refuse, bark, sawdust, or other solid wastes into surface waters or at any place where they would contact or where they would be eventually transported to surface waters, including flood plain areas. This prohibition was adopted by the Water Board in the 1975 Basin Plan, primarily to protect recreational uses such as boating.

In addition to the foregoing, it should be noted that the State Water Board on April 7, 2015, adopted amendments to the Ocean Plan and the Inland Surface Waters and Inland Bays and Estuaries Plans that establish a narrative water quality objective for trash; establish a prohibition on the discharge of trash; provide implementation requirements for permitted storm water and other dischargers; set a time schedule for compliance, and provide a framework for monitoring and reporting requirements (collectively, Trash Amendments). These Trash Amendments are subject to review by the Office of Administrative Law and U.S. EPA and are not yet effective. Nonetheless, the C.10 requirements of this Permit are consistent with the Trash Amendments.

[54] U.S. EPA, November 26, 2014, "Revisions to the November 22, 2002 Memorandum 'Establishing Total Maximum Daily Load Waste Allocations for Storm Water Sources and NPDES Permit Requirements Based on Those WLAs.'"

Fact Sheet Findings in Support of Provision C.10

C.10-1 Trash is a pervasive problem near and in creeks and in San Francisco Bay. Controlling trash continues to be one of the priorities for this Permit reissuance, not only because of the trash discharge prohibition, but also because trash causes major impacts on our enjoyment of creeks and the Bay. There are also significant impacts on aquatic life and habitat in those waters, and eventually to the global ocean ecosystem, where plastic often floats; persists in the environment for hundreds of years - if not forever; concentrates organic toxins; and is ingested by aquatic life. There are also physical impacts, as aquatic species can become entangled and ensnared, and can ingest plastic that looks like prey, losing the ability to feed properly.

For the purposes of this provision, trash is defined to consist of litter and particles of litter. Manmade litter is defined in California Government Code section 68055.1 (g): *Litter* means all improperly discarded waste material, including, but not limited to, convenience food, beverage, and other product packages or containers constructed of steel, aluminum, glass, paper, plastic, and other natural and synthetic materials, thrown or deposited on the lands and waters of the state, but not including the properly discarded waste of the primary processing of agriculture, mining, logging, sawmilling, or manufacturing.

C.10-2 Data collected by Water Board staff using the SWAMP Rapid Trash Assessment (RTA) Protocol,[55] over the 2003–2005 timeframe,[56] suggested that the approach to managing trash in waterbodies was not reducing the adverse impact on beneficial uses. The levels of trash in the waters of the San Francisco Bay Region were and are alarmingly high, considering the Basin Plan prohibits discharge of trash and that littering is illegal with potentially large fines. Even during dry weather conditions, a significant quantity of trash, particularly plastic, is making its way into waters and being transported downstream to San Francisco Bay and the Pacific Ocean. On the basis of 85 surveys conducted at 26 sites throughout the Bay Area, staff has found an average of 2.93 pieces of trash for every foot of stream. All the trash was removed when it was surveyed, indicating high return rates of trash over the 2003–2005 study period. There did not appear to be one county within the Region with significantly higher trash in waters relative to other counties—the highest wet weather deposition rates were found in western Contra Costa County, and the highest dry weather deposition was found in Sonoma County. Results of the trash in waterbodies assessment work by staff show that rather than adjacent neighborhoods polluting the sites at the bottom of the watershed, these areas, which tend to have lower property values, are subject to trash washing off with urban stormwater runoff cumulatively from the entire watershed.

C.10-3 A number of key conclusions can be made on the basis of the trash measurement in streams:

[55] SWAMP Rapid Trash Assessment Protocol, Version 8
[56] SWAMP S.F. Bay Region Trash Report, January 23, 2007

- Lower watershed sites have higher densities of trash.
- All watersheds studied in the San Francisco Bay Region have high levels of trash.
- There are trash source hotspots (usually associated with parks, schools, or poorly-kept commercial facilities located near creek channels) that appear to contribute a significant portion of the trash deposition at lower watershed sites.
- Homeless encampments and creekside litter from a variety of sources is a significant source of trash directly dumped and placed in the riparian zone where it can be swept into receiving waters by storm flows.
- Dry season deposition of trash, associated with wind and dry season runoff, contributes measurable levels of trash to downstream locations.
- The majority of trash is plastic at lower watershed sites where trash accumulates in the wet season. This suggests that urban runoff is a major source of floatable plastic found in the ocean and on beaches as marine debris. While much of the initial trash deposited and washed into receiving waters is paper, the plastic trash, both floatable and non-floatable is the most persistent trash that survives, significantly impacting the Bay and Ocean.
- Parks that have more evident management of trash by city staff and local volunteers, including cleanup within the creek channel, have measurably less trash pieces and higher RTA scores.

C.10-4 The ubiquitous, unacceptable levels of trash in waters of the San Francisco Bay Region warrant a comprehensive and progressive program of education, warning, and enforcement, and certain areas warrant consideration of structural controls and treatment.

C.10-5 Trash in urban waterways of coastal areas can become marine debris, known to harm fish and wildlife and cause adverse economic impacts.[57] Trash is a regulated water pollutant that has many characteristics of concern to water quality. It accumulates in streams, rivers, bays, and ocean beaches throughout the San Francisco Bay Region, particularly in urban areas.

C.10-6 Trash adversely affects numerous beneficial uses of waters, particularly recreation and aquatic habitat. Not all trash and debris delivered to streams are of equal concern with regards to water quality. Besides the obvious negative aesthetic effects, most of the harm of trash in surface waters is imparted to wildlife in the form of entanglement or ingestion.[58,59] Some elements of trash exhibit significant threats to human health, such as discarded medical waste,

[57] Moore, S.L., and M.J. Allen. 2000. Distribution of anthropogenic and natural debris on the mainland shelf of the Southern California Bight. *Mar. Poll. Bull*. 40:83-88.

[58] Laist, D. W. and M. Liffmann. 2000. *Impacts of marine debris: research and management needs*. Issue papers of the International Marine Debris Conference, Aug. 6-11, 2000. Honolulu, HI, pp. 16–29.

[59] McCauley, S.J. and K.A. Bjorndahl. 1998. Conservation implications of dietary dilution from debris ingestion: sublethal effects in post-hatchling loggerhead sea turtles. *Conserv. Biol.* 13(4):925-929.

human or pet waste, and broken glass.[60] Also, some household and industrial wastes can contain toxic batteries, pesticide containers, and fluorescent light bulbs that contain mercury. Large trash items, such as discarded appliances, can present physical barriers to natural stream flow, causing physical impacts such as bank erosion. From a management perspective, the persistent accumulation of trash in a waterbody is of particular concern, and signifies a priority for prevention of trash discharges. Also of concern are trash hotspots where illegal dumping, littering, and/or accumulation of trash occur.

C.10-7 The Water Board, at its February 11, 2009, hearing, adopted a resolution proposing that 26 waterbodies in the region be added to the 303(d) list for the pollutant trash. The adopted Resolution and supporting documents are contained in Attachment 10.1 – 303(d) Trash Resolution and Staff Report Feb 2009.

C.10-8 The trash control strategies, monitoring requirements, and mandatory deadlines for trash reductions meet the "Maximum Extent Practicable" (MEP) standard contemplated by the CWA and include such other provisions as the Board determines appropriate for control to ultimately meet the narrative water quality objectives for floating material, settleable material, and suspended material. (CWA §402(p)(3)(B)(iii)) This Permit builds on the data and information collected in the last permit term and increases expectations of Permittees in this Permit. In particular, this Permit requires that the Permittees make significant progress toward having no trash impact on receiving waters by implementing a combination of increased full trash capture, and trash reduction and elimination measures that have similar effect to full trash capture. This is consistent with the statewide amendment to the Ocean Plan and the Inland Surface Waters, Bays and Estuaries Plan relating to trash controls. This Permit includes trash generation source identification and control, visual assessment data collection, and development of receiving water monitoring protocols. These requirements reflect the most current knowledge and data available concerning effectiveness of trash control strategies such as full trash capture, enhanced maintenance methods and current thinking regarding the best methods to assess trash reduction outcomes for the various trash reduction methods.

Specific Provision C.10 Requirements

C.10.a. Trash Reduction Requirements

C.10.a.i. Trash Reduction Schedule – This provision includes compliance deadlines of 70 percent trash load reduction by 2017 and 80 percent trash load reduction by 2019. To provide assurance that Permittees are making timely progress towards meeting the 2017 deadlines, this provision includes a performance guideline of 60 percent trash load reduction by 2016.. This performance guideline is a reporting requirement, but not an enforceable end point. It is a benchmark for assessing progress, and Permittees that do not attain the 60 percent performance guideline are

[60] Sheavly, S.B. 2004. *Marine Debris: an Overview of a Critical Issue for our Oceans.* 2004 International Coastal Cleanup Conference, San Juan, Puerto Rico. The Ocean Conservancy.

required to provide documentation in a report to the Water Board that adequate trash management actions to attain the forthcoming 2017 mandatory deadline is underway or scheduled. The compliance deadlines are consistent with the previous permits goals of 70 percent trash load reduction by 2017 and 100 percent trash load reduction (or no adverse trash impact) by 2022.

C.10.a.ii. Trash Generation Area Management – The overarching strategy for reducing trash involves mapping trash generation areas within a Permittee's jurisdiction, then applying effective trash reduction actions to the areas of trash generation and assessing the effectiveness of those actions in delineated trash generation areas, until trash generation is reduced to the no impact level over a Permittee's entire jurisdiction. The Permittees reported these trash generation maps with their Long Term Trash Reduction Plans February, 2014, and these maps provide the 2009 trash generation levels, which were required by the previous permit. Permittees that find inaccuracies in their submitted maps may submit corrected 2009 trash generation maps with their 2016 Annual Reports. Permittees developed their 2009 generation maps by dividing their jurisdiction into Very High, High, Moderate, and Low trash generation areas based on the following ranges of trash generation rates:

Low = less than 5 gal/acre/yr;
Moderate = 5-10 gal/acre/yr;
High = 10-50 gal/acre/yr; and
Very High = greater than 50 gal/acre/yr.

C.10.a.ii.a. Actual trash loading values, particularly in areas of high and very high trash generation areas, may vary significantly, but these delineated ranges provide a frame of reference for tracking and demonstrating trash load reductions and provide relative trash generation weight of these four categories. Permittees likely will need to reduce trash generation to at least Low to attain the ultimate required water quality-based outcome of no trash loads that cause or contribute to adverse trash impacts in receiving waters, i.e., the 2022 goal. Whether attainment of Low trash generation rates are sufficient will be evaluated and considered in the development of requirements in the next permit. Demonstration that trash management actions reduce trash generation from Very High, High, or Moderate to a Low trash generation rate during this permit term provides a practicable means of demonstrating trash load reduction and attainment of the 2017 and 2019, 70 and 80 percent trash load reduction requirements, respectively, and consideration of the 2016 performance guideline.

C.10.a.ii.b. Permittees are responsible for trash discharges from their storm drain systems. Permittees have direct control over their properties and right of way, but must also exert control over other lands, such as commercial parking lots, that are plumbed directly into their storm drain system, since trash washed into such conveyance by stormwater will then directly impact receiving waters without encountering trash control actions on public right of way. Permittees may use a variety of means to ensure that either full trash capture devices are installed on such conveyances prior to intersection with the public storm drain system or that other

control actions equivalent to full trash capture are implemented on those private lands and such actions are verified through assessment, similar to the on-land visual assessment. Permittees must report the status of all such lands in parcel sizes over 10,000 ft^2 and place them on their trash generation maps or otherwise record location and status information about them. While Permittees are responsible for all such land in their jurisdictions, the Permit sets a reporting threshold of 10,000 ft^2 with the goal of balancing appropriate oversight over those lands and limiting the total number of specific parcels or area that must be identified and mapped.

C.10.a.iii. Minimum Full Trash Capture - This provision requirement is carried forward from the previous permit. Full trash capture systems provide a direct and effective mean to control trash discharges to and from storm drain systems. Commercial retail/wholesale land use area is a simple surrogate of trash generation area, and the minimum amount of area that was required to be treated with full trash capture systems was considered reasonable and achievable. Most, if not all, Permittees have already met or exceeded the minimum full trash capture requirement. Full trash capture system screening and treatment flow capacity specifications are the same as those specified in the previous permit. They are also the same as the full trash capture specifications in the Trash Amendments adopted by the State Water Board.

C.10.b Demonstration of Trash Reduction Outcomes

C.10.b.i.(a.-c.) Full Trash Capture Systems - Full trash capture systems must be maintained to be effective. If a full trash capture systems enters a rain period with a full trash reservoir, or is clogged with leaves or trash, trash may bypass the device and it will not function as a full trash capture device. Therefore these devices must be frequently inspected and maintained at a sufficient level. These requirements allow for Permittees to conduct inspections and maintenance in a flexible, as-needed, manner. Permittees are required to maintain adequate maintenance records and report any full trash capture devices found to be not adequately maintained or improperly functioning. Permittees are also required to certify annually that all of their full trash capture devices are adequately operated and maintained.

C.10.b.ii. Other Trash Management Actions

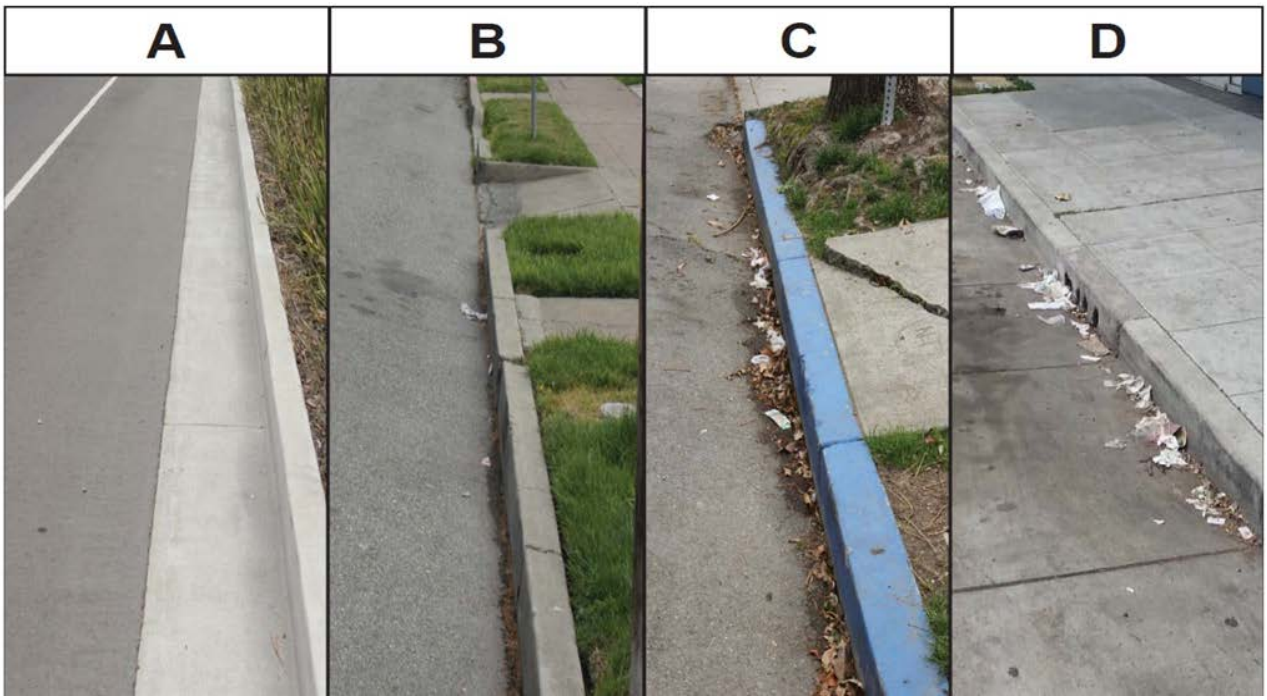
C.10.b.ii.a. Implementation Documentation – Documentation of trash management or control actions implemented and areas of implementation is essential to support trash reduction effectiveness and trash condition improvement.

C.10.b.ii.b.((i)-(iv)) Visual Assessment of Outcomes of Other Trash Management Actions – The primary tool currently available for determining trash reduction action success and positive outcomes is visual assessment, with photo documentation of trash generation and conditions in areas that drain to storm drains. Visual assessment involves observing a sufficient portion of each, e.g., sidewalk and curb area, at a frequency that adequately represents the trash management area condition relative to the type(s) of management actions implemented in the area. The frequency of required visual assessments depends on the rate of trash generation, the sources and types of trash, trash management actions deployed, and time of year. During the wet season, October through April, visual assessments in a trash

management area must be conducted at a frequency that determines whether there may be trash discharges to the storm drain system from sources or areas of trash accumulations before a trash management action or combination of actions is implemented or between recurring trash management actions. The degree of trash reduction that a Permittee claims also affects the frequency of visual assessment necessary to make the claim. Higher reduction claims typically require higher frequency of assessments.

During the wet season, for claims that a trash generation area has been reduced to a low trash generation area, this should be at least once per month in what was a very high trash generation area, at least twice per quarter in what was a high trash generation area, and once per quarter in what was a moderate trash generation area. Permittees, with justification, may conduct less frequent visual assessments for claims that a trash generation area has been reduced from what was a very high trash generation area to a high or moderate trash generation area or from what was a high trash generation area to a moderate trash generation area. Frequency of visual assessments during the dry season, May through September, should be at least once per quarter, including, and preferably, within the month (September) before the wet season begins. Higher frequencies of visual assessments than those illustrated above may be required to demonstrate effectiveness of trash control actions and claimed trash reduction. Lower frequencies than those illustrated above may also be acceptable with justification.

At this point in time, due to the lack of a standard method or protocol to effectively measure trash in receiving waters from municipal storm drains, visual assessment is the best type of monitoring to assure compliance with the Permit's requirements to implement trash management actions to reduce trash discharges into municipal storm drains. (See 40 CFR § 122.44(i).) The required amount, type, interval and frequency will yield data that is representative of the monitored activity, as required by 40 CFR § 122.48(b). This graphic demonstrates four trash visual conditions that correspond to the four trash generation categories of Very High (D), High (C), Moderate (B) and Low (A).



It is also possible to assess trash reduction outcome by documenting and verifying that trash management actions in a trash management area are equivalent to trash management actions implemented in an equivalent trash management area, and the actions in the equivalent trash management area have been assessed to be effective in accordance with a specified performance standard and the assessment results are reproducible. In such cases, it may be possible to extrapolate the performance assessment results to the equivalent trash management area with some verification. If this evidence is proposed by Permittees and accepted by the Executive Officer, Permittees may claim a similar trash reduction outcome by demonstrating that they have performed these trash reduction actions within similar trash management areas to the same performance standard.

C.10.b.iii. Percentage Discharge Reduction – Demonstration that trash management actions reduce trash generation from Very High, High, or Moderate to lower trash generation categories and the Low generation status during this permit term provides a practicable means of demonstrating trash load reduction and attainment of the 70 and 80 percent trash load reduction deadlines and consideration of the 2016 performance guideline (C.10.a.ii.a)**.** However, trash management actions in Very High and High trash generation areas will result in more trash load reduction than actions in Moderate trash generation. Accordingly, a trash reduction demonstration methodology that provides relative benefit weight to actions in Very High and High areas is preferable to one that just considers percentage change in Very High, High, and Moderate trash generation area. The trash generation rates used by Permittees to delineate and map their 2009 trash generation area maps provide a means to provide a relative benefit weight to demonstrated reductions in the areas of Very High and High trash generation, even if they are not reduced all the way to Low generation.

The delineation of trash generation areas were based on ranges of trash generation rates (C.10.a.ii.). Therefore, the ratios of the approximate midpoints of the categorical trash generation ranges provides a means of weighing relative benefit to actions in Very High and High areas compared to actions in Moderate areas. The Moderate range is 5-10 gal/acre/yr, with a midpoint of 7.5 gal/acre/yr. The High range is 10-50 gal/acre/yr with a midpoint of 30 gal/acre/yr. Therefore, the weighed ratio of High to Moderate is 30/7.5 = 4. The Very High range, greater than 50 gal/acre/yr, does not have a specified upper bound that allows calculation of a midpoint. An alternative that provides reasonable weighing of Very High is 90 gal/acre/yr, which is 40 percent higher than the low end of the Very High range. This results in a weighed ratio of Very High to Moderate of 90/7.5 = 12.

The following formula provides a means of demonstrating attainment of the percent trash load reduction deadline and performance guidelines with weighted benefit of Very High and High trash generation area percent reductions relative to Moderate trash generation area percent reductions:

$$\% \text{ Reduction} = 100\ [(12\ A_{VH(2009)} + 4\ A_{H(2009)} + A_{M(2009)})\ - (12\ A_{VH} + 4\ A_{H} + A_{M})]\ /\ (12\ A_{VH2009} + 4\ A_{H2009} + A_{M2009})$$

where:

$A_{VH(2009)}$ = total amount of the 2009 very high trash generation category jurisdictional area

$A_{H(2009)}$ = total amount of the 2009 high trash generation category jurisdictional area

$A_{M(2009)}$ = total amount of the 2009 moderate trash generation category jurisdictional area

A_{VH} = total amount of very high trash generation category jurisdictional area in the reporting year

A_{H} = total amount of high trash generation category jurisdictional area in the reporting year

A_{M} = total amount of moderate trash generation category jurisdictional area in the reporting year

12 = Very High to Moderate weighing ratio

4 = High to Moderate weighing ratio

100 = fraction to percentage conversion factor

C.10.b.iv. Source Control – Jurisdiction-wide source control actions will have trash generation and load reduction benefit beyond what can be accounted for in trash management area specific assessment-based percentage discharge reduction (C.10.b.iii). These include Permittee efforts to adopt and implement source control on certain types of trash, particularly persistent, floating litter and other particularly difficult types of trash that are easily blown by the wind or clog full trash capture devices. This type of trash has been documented to be a significant percentage of the trash collected in full trash capture devices, and Permittees that have implemented such source control have documented significantly less such litter types in their hand collection of trash and litter on land. Permittees will be allowed to claim load

reduction compliance value of up to ten percent load reduction total for all such actions. This would be added to the % Reduction amount calculated by the C.10.b.iii - Percentage Discharge Reduction formula in demonstrating attainment of the percent trash load reduction deadline requirements and performance guideline. To claim a load percentage reduction value, Permittees must provide substantial evidence that these actions reduce trash by the claimed value. A Permittee may reference studies in other jurisdictions if it provides evidence that the implementation of source control in its jurisdiction is similarly implemented as the source control assessed in the reference studies. Source control load reduction value(s) will be reviewed during reissuance of the Permit, and value(s) for source control load reductions might not be continued and allowed in the next permit, particularly in areas where the value of source controls will be accounted for in observed reductions in trash in trash generation areas, to avoid double counting. Also, the focus of the next permit will move to attainment of the 2022 goal and consideration of receiving water condition compliance indicators, and source control load reduction values may no longer be relevant.

C.10.b.v. Receiving Water Monitoring – Receiving water monitoring for trash provides additional evidence and can verify that full trash capture systems and other trash management actions are preventing trash from discharging into receiving waters and whether additional actions may be necessary associated with sources within a Permittee's jurisdiction. They can also show whether there are ongoing sources outside of the Permittee's jurisdiction that are causing or contributing to adverse trash impacts in the receiving water(s). There are currently no standard methods and protocols for monitoring trash in receiving waters. However, BASMAA is developing and testing some trash monitoring tools and protocols via a California Proposition 84 grant funded project (Agreement # 12-420-550), *Tracking California's Trash*. During this Permit term, the Permittees will develop and test trash receiving water monitoring tools and protocols designed, to the extent possible, to answer the following questions:

1. Have a Permittee's trash control actions effectively prevented trash within a Permittee's jurisdiction from discharging into receiving water(s)?
2. Is trash present in receiving water(s), including transport from one receiving water to another, e.g., from a creek to a San Francisco Bay segment, at levels that may cause adverse water quality impacts?
3. Are trash discharges from a Permittee's jurisdiction causing or contributing to adverse trash impacts in receiving water(s)?
4. Are there sources outside of a Permittee's jurisdiction that are causing or contributing to adverse trash impacts in receiving water(s)?

The monitoring tools and protocols may include direct measurements and/or observation of trash in receiving waters. In scenarios where direct measurements or observations are not feasible, surrogates for trash in receiving waters, such as measurement or observation of trash on shorelines or creek banks may provide a practicable means of monitoring trash. This includes consideration and appropriate simplification of the shoreline and creek bank trash assessment method developed by

Water Board staff, *Rapid Trash Assessment Method Applied to Waters of the San Francisco Bay Region: Trash Measurement in Streams. Surface Water Ambient Monitoring Program.* April 2007.

The goal is to establish the least expensive and simplest to use monitoring methods and protocols that are applicable to the various discharge and receiving water scenarios that accounts for the various receiving waters and watershed, community, and drainage characteristics within Permittees' jurisdictions that affect the discharge of trash and its fate and effect in receiving water(s). These and other factors, such as feasibility, location logistics, types of trash, complexity, and costs, provide a means to focus and limit the number of monitoring tools and protocols, and determine spatial and temporal representativeness of the tools and protocols, representativeness of scenarios that will be tested.

Keys to establishing the least expensive and simplest to use monitoring methods and protocols include: their acceptance and use by interested parties; ensuring their scientific integrity by having them peer reviewed; and a user-friendly system to manage and access monitoring results. To provide a balance between allowing time to develop and test the tools and protocols and allowing enough time to review the proposed monitoring program in advance of reissuance of the Permit, Permittees must submit a preliminary report on the proposed monitoring program by July 1, 2019, a year in advance of the final proposed monitoring program due July 1, 2020, six months before the Permit expires. This should allow for early resolution of some monitoring program issues that are not dependent on completion of tests. Given the interest in receiving water monitoring by multiple parties, Permittees are encouraged to conduct development and testing of the tools and protocols and development of the monitoring program through an independent third party, such as the San Francisco Estuary Institute, that provides for interested party participation and scientific peer review of the work. Permittees will not be required to submit the preliminary monitoring program report if the work is conducted by an independent third party.

C.10.c. Trash Hot Spot Selection and Clean Up

The previous permit included a requirement for Permittees to cleanup a minimum number of Trash Hot Spots in receiving waters or on shorelines or creek banks associated with their jurisdictions. Trash Hot Spot cleanups remove trash discharged from a Permittee's jurisdiction and lessen the adverse impacts from the discharges until they are abated by a Permittee's trash management actions. Trash Hot Spot cleanups have an added benefit in that may also remove discharges of trash from non-storm drain sources, e.g., direct dumping or homeless encampments. They also provide an additional means of assessing the effectiveness or Permittees' trash management actions and identification of the types and sources of trash. The required Trash Hot Spot assessment is based on the SWAMP Rapid Trash Assessment Protocol.

C.10.d. Trash Load Reduction Plans

The previous permit required Permittees to prepare a Plan to achieve the 2017 and 2022 trash reduction deadline requirements. A Trash Load Reduction Plan provides a means for Permittees to determine and account for appropriate trash management actions in their

trash management areas and their schedule of implementation, and it provides documentation of planned actions that can be referenced if annual performance guidelines are not met. It also provides a basis for justifying and accounting for the types and locations of Permittees' assessments of trash management actions, and for optional trash load offset opportunities allowed by C.10e.

C.10.e. Optional Trash Load Reduction Offset Opportunities

C.10.e.i. Additional Creek and Shoreline Cleanup - Some Permittees cleanup more than the minimum required C.10.c Trash Hot Spot cleanups. These additional creek and shoreline cleanups are of value in removing trash from shorelines and creeks or creek banks that are causing or may cause adverse impacts to receiving waters. Permittees conduct some of these additional cleanups with community volunteers, which creates additional public outreach and participation benefits.

The volume of trash removed in these cleanups tends to be high compared to the estimated volume rate loads calculated using the average (nominal midpoint) trash generation rates (C.10.a.ii). This is due in part to Trash Hot Spot locations, which are often downstream of Very High and High trash generation areas with actual generation rates at the upper end of those category ranges. Another reason may be that these cleanups likely remove trash from direct discharges other than from Permittees' storm drain systems. Also, these cleanups sometimes occur just one-time so the volume of trash removed cannot be directly compared with required trash reduction rate volumes.

One way to recognize the value of these additional cleanups and to account for the short-term benefit (volume) of cleanups compared to ongoing trash load discharges (average volume /time) is to use an offset ratio of three to one for the 2016 performance guideline and 2017 mandatory trash load reduction deadline, and ten to one for the 2019 mandatory trash load reduction deadline, when comparing additional cleanup volumes with 2009 trash load estimates based on using average trash generation category values and to cap the offset amount. The following formula generates a Permittee-specific trash volume amount, based on its 2009 categorical trash generation areas and a three to one or ten to one offset ratio, which may be used to offset one percent of a required percent load reduction value:

$$1\%\ \text{Reduction Offset (volume)} = (12\ A_{VH(2009)} + 4\ A_{H(2009)} + A_{M(2009)})\ OF$$

where:

$A_{VH(2009)}$	=	total amount of 2009 very high trash generation category jurisdictional area
$A_{H(2009)}$	=	total amount of 2009 high trash generation category jurisdictional area
$A_{M(2009)}$	=	total amount of 2009 moderate trash generation category jurisdictional area
12	=	Very High to Moderate weighing ratio
4	=	High to Moderate weighing ratio
OF	=	offset factor equal to (7.5 x 0.033) for the 2016 performance guideline and 2017 mandatory trash load reduction deadline, where 7.5 is the conversion from acres to gallons based on trash

generation rates and 0.033 is the three to one offset ratio, or (7.5 x 0.1) for the 2019 mandatory trash load reduction deadline, where 7.5 is the conversion from acres to gallons based on trash generation rates and 0.1 is the ten to one offset ratio.

A Permittee can compare trash volumes collected from additional cleanups to this calculated offset volume and apply one percent offset to a C.10.a.i percent load reduction requirement for each collected volume that equals the 1% Reduction Offset (volume). However, the total offset that can be claimed to avoid over-compensation associated with the short-term benefit (volume) of cleanups compared to ongoing trash load discharges (average volume/time) is limited to ten percent. Furthermore, to justify the offset the associated cleanups must occur more than once per year and preferably at a frequency sufficient to demonstrate sustained improvement of a creek or shoreline area. Offset values will be reviewed during reissuance of the permit, and value(s) for cleanups might not be continued and allowed in the next permit, particularly in areas where Permittees have responsibility for discharges of trash to a cleanup area. The focus of the next permit will move to attainment of the 2022 goal and consideration of receiving water condition compliance indicators, and cleanup values may no longer be relevant.

C.10.e.ii. Direct Discharge Controls - Some Permittees are faced with the challenge that large amounts of trash are discharged to receiving waters in their jurisdiction from homeless encampments and direct dumping. These trash discharges are separate from and in addition to discharges from Permittee storm drain systems. Elimination and prevention of adverse water quality impacts due to trash and attainment of water quality standards in receiving waters will require management of these non-storm drain system discharges in addition to control of storm drain system trash discharges by Permittees. Accordingly, some Permittees are taking or are willing to take actions to control these other sources by implementing a comprehensive plan to control all sources of trash discharged to receiving waters in their jurisdiction. Accordingly, Permittees should be allowed to offset some of their percent load reduction requirements if they control these other sources.

Permittees have and likely will continue to demonstrate the benefit of controlling these additional sources by accounting for the volume of trash collected. As with additional creek and shoreline cleanups, the volume of trash removed cannot be compared directly with trash load discharge rate (volume/time).The simplest, and possibly only way to account for these additional control actions, until more rigorous assessment and accountability methods are developed, is to allow a Permittee to offset part of its C.10.a trash load percent reduction requirement using the C.10.e.i formula to determine an offset from additional creek and shoreline cleanup. However, since control of these other sources by Permittees will be through implementation of a comprehensive and sustained program, Permittees that implement a comprehensive plan approved by the Executive Officer merit a higher offset cap than that allowed by C.10.e.i for additional creek and shoreline cleanup. A fifteen percent offset-cap based on the C.10.e.i formula provides a balance between incentive and reward for control of these non-storm drain system sources and the uncertainties associated with the

simple formula. It is likely that this offset will be removed from this provision during the next permit term. This will occur as the 2022 target deadline approaches and the focus turns to determining the condition of the receiving waters to determine compliance.

C.10.f. Reporting

The reporting requirements reflect the minimum amount of information needed to demonstrate compliance with all Provision C.10 requirements.

Costs of Trash Control

With the assistance of a $5 million grant from the American Recovery and Reinvestment Act obtained and distributed by the San Francisco Estuary Partnership, the Permittees cumulatively exceeded the full trash capture permit requirement acreage by over a factor of four. Therefore, it would appear that the following cost estimate produced in 2008 significantly over-estimated the costs of full trash capture installation at the time.

Costs for either enhanced trash management measure implementation or installation and maintenance of trash capture devices are significant, but when spread over several years, and when viewed on a per-capita basis, are reasonable.

Trash is costly to remove from our aquatic resource environments. Staff from the California Coastal Commission report that the Coastal Cleanup Day budget statewide: $200,000-250,000 for Coastal Commission staff, and much more from participating local agencies. The main component of this event is the 18,000 volunteer-hours, which translates to $3,247,200 in labor, and so is equivalent to $3,250,000-3,500,000 per year to clean up 903,566 pounds of trash and recyclables at $3.60 to $3.90 per pound. This is one of the most cost-effective events because of volunteer labor and donations. The County of Los Angeles spends $20 million per year to sweep beaches for trash, according to Coastal Commission staff.

Mr. Morad Sedrak, the TMDL Implementation Program Manager, Bureau of Sanitation, Department of Public Works, City of Los Angeles, reports that the City plans to invest $72 million dollars for storm drain catch basin based capture device installation primarily, for a City of 4 million population, for a per-capita cost of $18 dollars. This effort is occurring over a span of over five years, for an annual per-capita cost of under $4.

Mr. Sedrak reports that O&M costs are not anticipated to increase, as the City of L.A. is already budgeted for 3 catch basin cleanings per year. He also states that catch basin inserts installed inside the catch basin in front of the lateral pipe, which have been certified by the Los Angeles Regional Water Board as total capture trash control devices, cost approximately $800 to $3,000 (including installation) depending on the depth of the catch basin. .

Furthermore, the price for catch basin opening screen covers, which are designed to retain trash at the street level for removal by sweepers, and also to open if there is a potential flooding blockage, ranges roughly from $800 to $4,500, depending on the opening size of the catch basin.

The City of Los Angeles has currently spent 27 million dollars on a retrofit program to install catch basin devices in approximately 30% of its area, with either inserts or screens or both. Mr. Sedrak states that Los Angeles plans to spend $45 million over the next 3 years to retrofit the remaining catch basins within the City. The total number of catch basins within the City is approximately 52,000.

The following are links to information about the Los Angeles trash control approach:

http://www.lastormwater.org/Siteorg/program/TMDLs/trashtmdl.htm

http://www.lastormwater.org/Siteorg/download/pdfs/general_info/Request-Certification-10-06.pdf)

http://www.lastorhttp://www.lastormwater.org/Siteorg/download/pdfs/general_info/Request-Certification-10-06.pdfmwater.org/Siteorg/program/poll_abate/cbscreens.htm

http://www.lastormwater.org/Siteorg/program/poll_abate/cbinserts.htm

http://www.lastormwater.org/Siteorg/program/poll_abate/cbscreens.htm

In Oakland, the Lake Merritt Institute is currently budgeted at $160,000 per year, with trash and litter removal from the Lake as a major task. The budget has increased from about $45,000 in 1996 to current levels. In the period of 1996-2005 the Lake Merritt Institute staff, utilizing significant volunteer resources, and accomplishing other education tasks, removed 410,859 pounds of trash from the Lake at cost of $951,725, or $2.30 per pound.

The City of Oakland reports that installation of two vortex and screen separators cost $821,000 for installations and treat tributary catchments of 192 acres before discharge to Lake Merritt (a cost of $4,276 per acre). The following table details these costs and other pertinent information

City of Oakland—CDS Unit Overview 9-07

Existing CDS unit location	Outfall number	Treatment area (acres)	Cost of implementation	Sizing	Maintenance requirements	Comments
Intersection of 27th and Valdez Streets	56*	71	$203,000 to contactor; plus ~$100,000 City costs	73 cfs peak flow; 36" stormdrain; Unit sizing: 18'6'6' box with 10'11"diam x 9'6" long cylinder	Visually inspect CDS Unit; remove trash and debris with Hydro Flusher bi-monthly	Installed in 2006. Required relocation of electrical conduit. Water main and gas line were also in the way; the box was adjusted to accommodate these conflicts.
Intersection of 22nd and Valley Streets	56*	121	$368,000 to contactor; plus ~$150,000 City costs	115 cfs peak flow; 54" storm drain; Unit sizing: 18'8.5'6' box with 12'diam x 9'6" long cylinder	Visually inspect CDS Unit; remove trash and debris with Hydro Flusher bi-monthly	Installed in 2006. Installation costs were higher than anticipated. Sewer lines and PGE facilities were exposed that were not known before. Unit had to be modified and poured-in-place.

* The City is treating 192 acres or 72 percent of the 252 acres draining to outfall number 56.

Additional cost information on various trash capture devices is included in the Santa Clara Valley Urban Runoff Pollution Prevention Program BMP Trash Toolbox (July 2007). The Toolbox contains cost information for both trash capture devices and enhanced trash management measure implementation, covers a broad range of options and also discusses operation and maintenance costs. Catch basin screens are included with an earlier estimate by the City of Los Angeles of $44 million over 10 years to install devices in 34,000 inlets.

The City of Oakland provided information on the cost of trash booms. The Damon Slough trash boom or sea curtain cost $36,000 for purchase and installation, including slough side access improvements for maintenance and trash removal. Annual maintenance costs have been $77,000 for weekly maintenance, which includes use of a crane for floating trash removal.

C.11. Mercury Controls

The purpose of this provision is to implement the urban runoff requirements of the San Francisco Bay and Guadalupe River Watershed mercury TMDLs and reduce mercury loads to make substantial progress toward achieving the urban runoff mercury wasteload allocations established for the TMDLs.

The C.11 provisions follow the general approach for sediment-bound pollutants discussed above (General Strategy for Sediment-Bound Pollutants (Mercury and PCBs**))** and accordingly, build on understanding gained from pilot testing many control measures during the Previous Permit term. During this Permit term Permittees are expected to continue to improve the level of certainty concerning control measure benefit and effectiveness by implementing actions in a phased approach, and then expand implementation of those actions that prove effective, and perhaps scale back or discontinue those that are not effective.

However in contrast to the Previous Permit term, this Permit does not specify control measures to implement to achieve load reductions. Rather, the permit requires development and implementation of a load reduction accounting scheme along with a quantitative demonstration of the load reductions that result from implementation of all relevant control measures. The Permittees may comply with any requirement of this provision through a collaborative effort. Many of the control measures may be chosen primarily for the purpose of achieving PCBs load reductions, but substantial mercury load reductions may result as a tangential benefit and should be accounted for.

Fact Sheet Findings in Support of Provision C.11

C.11-1 On August 9, 2006, the Water Board adopted a Basin Plan amendment including a revised TMDL for mercury in San Francisco Bay, two new water quality objectives, and an implementation plan to achieve the TMDL. The State Water Board and U.S. EPA have also approved this Basin Plan amendment. C.11-3 through C.11-7 are components of the Mercury TMDL implementation plan relevant to implementation through the municipal stormwater permit.

C.11-2 On October 8, 2008, the Water Board adopted a Basin Plan amendment including a TMDL for mercury in the Guadalupe River Watershed (GRW) and an implementation plan to achieve the TMDL. The State Water Board and U.S. EPA have also approved this Basin Plan amendment. The GRW mercury TMDL assigns an urban stormwater runoff allocation proportionally equivalent to the mass allocation in the San Francisco Bay mercury TMDL. Accordingly, the GRW urban stormwater runoff mercury allocation is simply the fraction of the Santa Clara Valley Urban Runoff Pollution Prevention Program allocation attributed to the Guadalupe River watershed. The urban stormwater runoff allocation implicitly includes all current and future permitted discharges within the geographic boundaries of municipalities and unincorporated areas including, but not limited to, California Department of Transportation (Caltrans) roadways and non-roadway facilities and rights-of-way, atmospheric deposition, public

facilities, properties proximate to stream banks, industrial facilities, and construction sites.

C.11-3 The 2003 load of mercury from urban runoff was estimated to be 160 kg/yr, and the aggregate WLAs for urban runoff is 82 kg/yr and shall be implemented through the NPDES stormwater permits issued to urban runoff management agencies and Caltrans. The urban stormwater runoff allocations implicitly include all current and future permitted discharges, not otherwise addressed by another allocation, and unpermitted discharges within the geographic boundaries of urban runoff management agencies (collectively, *source category*) including, but not limited to, Caltrans roadway and non-roadway facilities and rights-of-way, atmospheric deposition, public facilities, properties proximate to stream banks, industrial facilities, and construction sites.

C.11-4 The allocations for this source category shall be achieved within 20 years, and, as a way to measure progress, an interim loading milestone of 120 kg/yr, halfway between the current load and the allocation, should be achieved within 10 years. If the interim loading milestone is not achieved, NPDES-permitted entities shall demonstrate reasonable and measurable progress toward achieving the 10-year loading milestone.

C.11-5 The NPDES permits for urban runoff management agencies shall require the implementation of BMPs and control measures designed to achieve the allocations or accomplish the load reductions derived from the allocations. In addition to controlling mercury loads, BMPs or control measures shall include actions to reduce mercury-related risks to humans and wildlife. Requirements in the permit issued or reissued and applicable for the term of the permit shall be based on an updated assessment of control measures intended to reduce pollutants in stormwater runoff and remain consistent with the section of the Basin Plan chapter titled, *Surface Water Protection and Management—Point Source Control—Stormwater Discharges*.

C.11-6 The following additional requirements are or shall be incorporated into NPDES permits issued or reissued by the Water Board for urban runoff management agencies.

a. Evaluate and report on the spatial extent, magnitude, and cause of contamination for locations where elevated mercury concentrations exist;

b. Continue to develop and implement a mercury source control program;

c. Implement a monitoring system to quantify either mercury loads or loads reduced through treatment, source control, and other management efforts;

d. Monitor levels of methylmercury in discharges. This requirement was satisfactorily accomplished during the last permit term and will not be included in the permit during this permit term;

e. Conduct or cause to be conducted studies aimed at better understanding mercury fate, transport, and biological uptake in San Francisco Bay and tidal

areas. This requirement is not necessary at the moment and will not be included in the permit during this permit term;

f. Develop an equitable allocation-sharing scheme in consultation with Caltrans to address Caltrans roadway and non-roadway facilities in the program area, and report the details to the Water Board (This was satisfactorily accomplished during the last permit term);

g. Prepare an Annual Report that documents compliance with the above requirements and documents either mercury loads discharged, or loads reduced through ongoing pollution prevention and control activities; and

h. Demonstrate progress toward (a) the interim loading milestone, or (b) attainment of the allocations shown in Individual WLAs (see Table 4-w of the Basin Plan amendment), by using one of the following methods:

(1) Quantify the annual average mercury load reduced by implementing

i. Pollution prevention activities, and
ii. Source and treatment controls. The benefit of efforts to reduce mercury-related risk to wildlife and humans should also be quantified. The Water Board will recognize such efforts as progress toward achieving the interim milestone and the mercury-related water quality standards upon which the allocations and corresponding load reductions are based. Loads reduced as a result of actions implemented after 2001 (or earlier if actions taken are not reflected in the 2001 load estimate) may be used to estimate load reductions.

(2) Quantify the mercury load as a rolling 5-year annual average using data on flow and water column mercury concentrations.

(3) Quantitatively demonstrate that the mercury concentration of suspended sediment that best represents sediment discharged with urban runoff is below the suspended sediment target.

C.11-7 Urban runoff management agencies have a responsibility to oversee various discharges within the agencies' geographic boundaries. However, if it is determined that a source is substantially contributing to mercury loads to the Bay or is outside the jurisdiction or authority of an agency, the Water Board will consider a request from an urban runoff management agency that may include an allocation, load reduction, and/or other regulatory requirements for the source in question.

C.11-8 Recent estimates using the latest available data suggest that the urban runoff mercury loading to San Francisco Bay is on the order of 115 kg/yr (McKee and Yee 2015[61]). While this figure is based on environmental data and thus has

[61] McKee, L.J. and Yee, D., 2015. Sources, Pathways and Loadings: Multi-Year Synthesis. A technical report prepared for the Regional Monitoring Program for Water Quality in San Francisco Bay (RMP), Sources, Pathways and Loadings Workgroup (SPLWG), Small Tributaries Loading Strategy (STLS). San Francisco Estuary Institute, Richmond, California.

inherent uncertainty associated with it, it suggests that current mercury loading is approximately equal to the interim TMDL loading milestone (to be reached at the half-way point of TMDL implementation, 2017) of 120 kg/yr. If mercury loads can be reduced by approximately 35 additional kg/yr, urban runoff loading would meet the TMDL wasteload allocation.

C.11-9 Mercury is distributed more uniformly throughout the urban landscape than PCBs. For example, loading from older industrial and other polluted source areas accounts for only 6% of the average annual mercury load, but these areas account for over 50% of the average annual PCBs load (McKee and Yee 2015). The likely stronger role of atmospheric deposition in the case of mercury, which may account for up to 50% of the mercury found in urban runoff, is part of the reason for the more uniform mercury distribution in the landscape (McKee and Yee 2015).

C.11-10 Monitoring data indicate that, while not always the case, watersheds with high PCB~~s~~ concentrations often contain high or moderately high mercury concentrations (McKee and Yee 2015). Therefore, control strategies focused on finding and managing PCBs-contaminated drainages will often yield mercury load reduction benefits as well.

C.11-11 This provision is consistent with a recent U.S. EPA memorandum[62] providing guidance on implementing TMDL WLAs in NPDES stormwater permits. Specifically, this provision establishes clear and concrete milestones and deadlines (see C.11.a.iii) for the activities associated with achieving mercury load reductions as well as other requirements (see C.11.b-h.), necessary to achieve receiving water limits of this Permit term relative to the mercury TMDL WLA.

Specific Provision C.11 Requirements

Provision C.11.a. requires Permittees to implement control measures to achieve mercury load reductions. In order to comply with this requirement, Permittees must identify the mercury control measures and the watersheds and management areas in which these measures will be implemented and a time schedule for implementation. Moreover, Permittees must demonstrate quantitatively the load reductions achieved through use of the accounting scheme developed through C.11.b.

This provision is critical to the successful implementation of the urban runoff requirements from the mercury TMDL. The accountability mechanism for control measure implementation consists of three parts: 1) the identification of control measures and associated watersheds and management areas, 2) a commitment to an implementation schedule, and 3) the quantification of load reductions resulting from control measure implementation. Many or most of the control measures that will generate mercury reduction benefits will be chosen based on the benefit for PCBs load reductions.

[62] U.S. EPA. November 26, 2014. Revisions to the November 22, 2002 Memorandum "Establishing Total Maximum Daily Load (TMDL) Wasteload Allocations (WLAs) for Storm Water Sources and NPDES Permit Requirements Based on Those WLAs"

Available data indicate that this strategy of focusing on PCBs will yield mercury load reductions in many circumstances. However, there are conceivable control measures that are unique to mercury, like those addressing collection and recycling of mercury-containing devices, and these are, in fact, required by household hazardous waste and producer responsibility laws.

Recent loading estimates suggest that current mercury loading to the Bay is at or below the interim loading milestone established in the TMDL. Moreover, mercury is more evenly distributed in the landscape than PCBs so there are fewer opportunities to find and address heavily contaminated (with mercury) sites to achieve substantial, short-term load reductions. Instead, much of the additional benefit to reduce mercury urban runoff loads will come from a combination of proper disposal and management of mercury containing products as well as much more extensive treatment elements (e.g., green infrastructure) incorporated into the stormwater infrastructure. For these reasons, short-term load reduction performance criteria are not included in C.11.a (in contrast to C.12.a for PCBs).

Provision C.11.b. requires Permittees to develop and implement an assessment methodology and data collection program to quantify mercury loads reduced through implementation of any and all pollution prevention, source control and treatment control efforts required by the provisions of this Permit or load reductions achieved through other relevant efforts not explicitly required by the provisions of this Permit.

Permittees submitted land-use mass yields of mercury in their 2014Integrated Monitoring Report (IMR) for the Previous Permit. When these yields were multiplied by the total area of various land-use categories, the estimated regionwide (for the entire region that discharges to the Bay) mercury load was lower than the load estimated in the mercury TMDL by approximately a factor of 1.3. Therefore, the land-use yields were multiplied by a factor of 1.3 in order to normalize to the estimated baseline mercury load in the mercury TMDL and to agree with recent load estimates from runoff. The resultant (adjusted) mass yields for three land-use types shown here are based on data Permittees collected during the Previous Permit term and provide a reasonable means of calculating the mercury load reductions for control measures implemented in corresponding areas. Permittees may refine these yields when they submit supporting documentation in their 2016 Annual Report.

- Old Industrial Land Use = 1300 mg mercury/acre/year
- Old Urban Land Use = 215 mg mercury/acre/year
- New Urban areas and Other = 33 mg mercury/acre/year

The land-use yield provides a convenient way to calculate the resulting load reduction of various sorts of control measure strategies. For example, when contaminated areas are **newly or redeveloped**, the pollutant yield of the area will be reduced through a variety of mechanisms (i.e., removal, capping, paving of contaminated sediment). So, the amount of mercury load reduction can be obtained by multiplying the area of new/redevelopment by the difference in yield (either old industrial minus new urban or old urban minus new urban, whichever pre-development land-use is applicable).

The mercury load reductions for **retrofits or other treatment controls** (including green infrastructure) can be calculated by multiplying the area treated by the assumed land-use yield of the treated area multiplied by the efficiency factor of the treatment method (using a default value of 70 percent or an efficiency established through documentation of implemented method and reported in annual reports).

For **contaminated private properties** that are referred to the Water Board or other agencies for subsequent remediation, the estimated load reduction can be derived by assuming that the mercury yield of the source area is reduced over the course of site cleanup from a high yield to the old urban yield (215 mg mercury/acre/year). Source areas identified for the purpose of referral tend to have much higher areal yields, but data are not currently available to provide an interim estimate for the mercury yield of such contaminated sites. Permittees would need to provide this information prior to receiving mercury load reduction credit from referral of private properties for cleanup.

This provision allows the opportunity for Permittees to update their default load reduction accounting factors, as adjusted by the Water Board, and in some cases extending the accounting framework presented in the IMR, justifying assumptions and parameters used to quantify the load reduction for each type of control measure, and indicating what information will be collected to confirm the load reduction for each type of implemented control measure. Any adjustments to the default accounting framework must be submitted for Executive Officer approval.

Provision C.11.c Available information suggests that mercury is distributed more uniformly throughout the Bay Area landscape than is the case for PCBs. Therefore, a focus on highly contaminated areas (with mercury) may not be enough to achieve the TMDL-required load reductions. A critical part of the strategy to reduce urban runoff mercury loads will be the widespread implementation of green infrastructure control measures to intercept mercury-containing sediment and stormwater before it is discharged to receiving water. Provision C.11.c requires Permittees to implement green infrastructure projects during the term of the permit to achieve mercury load reductions of 48 g/year by June 30, 2020. This green infrastructure load reduction requirement is feasible in that these load reductions are approximately equivalent to the scale of load reduction achieved during the Previous Permit term through green infrastructure and C.3-related treatment controls (Integrated Monitoring Report 2014). It is reasonable to expect that a similar or greater pace of redevelopment plus green infrastructure implementation on public property can be achieved during this Permit term. The green infrastructure load reduction requirement is warranted because it is important to provide a clear performance expectation for Permittees for green infrastructure implementation because widespread and effective green infrastructure implementation will be an important component of achieving the load reductions necessary to achieve the mercury TMDL wasteload allocation.

County-specific load reductions are derived from the allocations and load reductions stated in the mercury TMDL. Namely, the TMDL-required load reduction for a county was divided by the total TMDL-required load reduction for the permit area (the area covered by this Permit) and this fraction was multiplied by 48 g/yr to derive the county-

specific green infrastructure load reduction requirement. While not required in the Permit, it will be essential to develop effective and easy-to-use tracking and visualization tools so Permittees, regulators, and stakeholders can monitor progress of green infrastructure implementation and its water quality impacts.

Because mercury is distributed throughout the urban landscape, extensive implementation of green infrastructure elements is going to be necessary to achieve the load reductions required by the TMDL. However, the planning, financing and implementation of green infrastructure is going to take a long time, perhaps as much as 25 years or more. This also means that the load reduction benefits of such implementation will also be realized over an extended time frame. To ensure that Bay Area municipalities are working effectively and expeditiously in implementing appropriate green infrastructure controls to reduce loads of mercury, PCBs and other pollutants of concern, the Permit requires Permittees to prepare a reasonable assurance analysis to rigorously and quantitatively demonstrate that mercury load reductions of at least 10 kg/yr throughout the permit area will be achieved over the course of the next 25 years (i.e., by 2040) through implementation of green infrastructure throughout the permit area..

Preparing the reasonable assurance analysis will be a step-wise process. Permittees must: establish the relationship between areal extent of green infrastructure implementation and mercury load reductions, estimate the amount and characteristics of land area that will be treated through green infrastructure in future years, and estimate the amount of mercury load reductions that will result from green infrastructure implementation by specific future years. Ultimately, the reasonable assurance analysis will require the use of one or more models. Permittees must therefore ensure that the calculation methods, models, model inputs and modeling assumptions used to make the demonstration have been validated through a peer review process.

Fortunately, the permittees in the Bay Area can take advantage of related (reasonable assurance analysis) efforts already underway in Southern California. The Los Angeles Regional Water Board has produced a useful set of guidelines for conducting a Reasonable Assurance Analysis (RAA) for the watershed management programs that are required through their MS4 permits.[63] These guidelines provide an excellent reference and starting point for the RAA required through C.11/12.c in terms of the mechanics of the analysis, BMP identification, critical condition selection, choice of models, model calibration criteria, modeling inputs, and model outputs. The crucial feature of the Southern California RAAs is that they must demonstrate with sufficient analytical rigor that the suite of foreseeable control measures to reduce loads will result in compliance with final WLAs. The RAA performed for PCBs and mercury for the San Francisco Bay Area will be similar in many respects to the type of analysis described in the Southern California guidance document, but they must also account for the local watershed characteristics as well as what has been learned about the distribution, fate, and transport characteristics of PCBs and mercury.

[63] Los Angeles Regional Water Quality Control Board (LARWQCB) 2015. *Guidelines for Conducting Reasonable Assurance Analysis in a Watershed Management Program, Including an Enhanced Watershed Management Program*.

Provisions C.11.d requires Permittees to prepare a long-term plan and schedule for mercury control measure implementation and corresponding reasonable assurance analysis quantitatively demonstrating that sufficient control measures will be implemented to attain the mercury TMDL wasteload allocations. The type of analysis for this provision shares many features with the one conducted as part of C.11.c.

The mercury TMDL anticipated the challenge of achieving the urban runoff mercury load reductions required to meet the TMDL allocations within the twenty-year implementation time frame. The TMDL implementation plan states that

"the Water Board will consider modifying the schedule for achievement of the load allocations for a source category or individual discharger provided that they have complied with all applicable permit requirements and all of the following have been accomplished relative to that source category or discharger:"

- *A diligent effort has been made to quantify mercury loads and the sources of mercury and potential bioavailability of mercury in the discharge;*
- *Documentation has been prepared that demonstrates that all technically and economically feasible and cost effective control measures recognized by the Water Board as applicable for that source category or discharger have been fully implemented, and evaluates and quantifies the comprehensive water quality benefit of such measures;*
- *A demonstration has been made that achievement of the allocation will require more than the remaining 10 years originally envisioned; and*
- *A plan has been prepared that includes a schedule for evaluating the effectiveness and feasibility of additional control measures and implementing additional controls as appropriate.*

Provision C.11.d provides the opportunity for Permittees to describe the full suite of actions that will be required to achieve the TMDL along with realistic timelines for this achievement. For example, as explained previously the load reductions for mercury are going to depend heavily on long-term implementation of control strategies (like green infrastructure) that extend beyond the current implementation timeframe of the mercury TMDL. The long-term plan and schedule required as part of this provision will lay the foundation for a formal recognition of an implementation timeframe that is longer than originally conceived in the TMDL.

Provision C.11.e requires actions that manage human health risk due to mercury and PCBs. These may include efforts to communicate the health risks of eating Bay fish and other efforts aimed at high risk-communities such as subsistence fishers and their families. The risk reduction framework developed in the previous permit term, which funded community based organizations to develop and deliver appropriate communications to appropriately targeted individuals and communities, is an appropriate approach.

C.12. PCBs Controls

The purpose of this provision is to implement the urban runoff requirements of the San Francisco Bay PCBs TMDL and reduce PCBs loads to make substantial progress toward achieving the urban runoff PCBs wasteload allocations established for the TMDL. In order to make substantial progress, Permittees must implement PCBs control measures strategically during this Permit term. Moreover, aggressive control measure implementation combined with thoughtful planning for the future (see C.12.d) are conditions that must be satisfied before the Water Board can consider an implementation timeframe longer than the 20 years provided in the TMDL.

The C.12 requirements follow the general approach for sediment-bound pollutants discussed above (General Strategy for Sediment-Bound Pollutants (Mercury and PCBs)) and accordingly, build on understanding gained during the Previous Permit term. During the Previous Permit, Permittees were required to pilot test a variety of control measures in a limited number of watersheds or portions of a watershed (management area). Building on that knowledge, this provision requires Permittees to implement PCBs control measures (source control, treatment control and/or pollution prevention strategies) in areas where benefits are most likely to accrue (focused implementation) and to report on the loads reduced through implementation of those control measures.

In contrast to the Previous Permit, this Permit does not require implementation of specific control measures. Rather, the Permittees must use their judgment and knowledge of their watersheds to choose the optimum suite of control measures in order to optimize PCBs load reductions. A technically sound load reduction accounting method, based on information gained during the testing phase and based on information reported at the end of the Previous Permit, is provided in this Permit Fact Sheet to provide certainty for Permittees.

As discussed below, based on information gained during control measure pilot testing and reported during the Previous Permit term, load reductions on the order of those required by this Permit are achievable (see Basis for Required PCBs Load Reductions in MRP *2*, February 23, 2015) and necessary in order to make progress toward achieving the regionwide urban runoff wasteload allocation of 2 kg/yr (representing a load reduction from all urban runoff sources of approximately 18 kg/yr compared to loads estimated using data collected in 2003) within the 20-year TMDL timeframe. Further, load reductions resulting from a variety of PCBs control measures may be feasibly calculated in a straightforward manner (see below), and numeric load reduction requirements provide an unambiguous accountability metric against which to evaluate the sufficiency of control measure implementation. In contrast, it is problematic to assess the sufficiency of Permit requirements that merely call for the implementation of BMPs without a specification of the extent or intensity of such BMP implementation. Because specific load reductions are called for by the TMDL, the approach employed in the Permit (specific load reduction requirements) is both more straightforward and appropriate.

The area covered by the Permit (permit area) is smaller than the region that discharges to the Bay. The discharges in the permit area have been allocated 1.6 kg/yr of the total 2 kg/yr wasteload allocation and the total load reductions required from Permittees in the permit area during TMDL implementation is 14.4 kg/yr of the 18 kg/yr regionwide total.

Fact Sheet Findings in Support of Provision C.12

C.12-1 On February 13, 2008, the Water Board adopted a Basin Plan amendment establishing a TMDL for PCBs in San Francisco Bay and an implementation plan to achieve the TMDL. U.S. EPA approved the TMDL on March 29, 2010.

C.12-2 The following excerpts from the TMDL implementation plan are relevant to implementation of the municipal stormwater permit:

"The 2003 load of PCBs from urban runoff is 20 kg/yr, and the aggregate WLAs for urban runoff total 2 kg/yr. Stormwater runoff wasteload allocations shall be achieved within 20 years and shall be implemented through the NPDES stormwater permits issued to stormwater runoff management agencies and the California Department of Transportation (Caltrans). The urban stormwater runoff wasteload allocations implicitly include all current and future permitted discharges, not otherwise addressed by another allocation, and unpermitted discharges within the geographic boundaries of stormwater runoff management agencies including, but not limited to, Caltrans roadway and non-roadway facilities and rights-of-way, atmospheric deposition, public facilities, properties proximate to stream banks, industrial facilities, and construction sites.

Requirements in each NPDES permit issued or reissued shall be based on an updated assessment of best management practices and control measures intended to reduce PCBs in urban stormwater runoff. Control measures implemented by stormwater runoff management agencies and other entities … shall reduce PCBs in stormwater runoff to the maximum extent practicable….

In the first five-year permit term, stormwater Permittees will be required to implement control measures on a pilot scale to determine their effectiveness and technical feasibility. In the second permit term, stormwater Permittees will be required to implement effective control measures, that will not cause significant adverse environmental impacts, in strategic locations, and to develop a plan to fully implement control measures that will result in attainment of allocations, including an analysis of costs, efficiency of control measures and an identification of any significant environmental impacts. Subsequent permits will include requirements and a schedule to implement technically feasible, effective and cost efficient control measures to attain allocations. If, as a consequence, allocations cannot be attained, the Water Board will take action to review and revise the allocations and these implementation requirements as part of adaptive implementation.

In addition, stormwater Permittees will be required to develop and implement a monitoring system to quantify PCBs urban stormwater runoff loads and the

load reductions achieved through treatment, source control and other actions; support actions to reduce the health risks of people who consume PCBs-contaminated San Francisco Bay fish; and conduct or cause to be conducted monitoring, and studies to fill critical data needs identified in the adaptive implementation section."

C.12-3 Urban runoff management agencies have a responsibility to oversee various discharges within the agencies' geographic boundaries. However, if it is determined that a source is substantially contributing to PCBs loads to the Bay or is outside the jurisdiction or authority of an agency, the Water Board will consider a request from an urban runoff management agency that may include an allocation, load reduction, and/or other regulatory requirements for the source in question. If these sources are contributing to urban runoff loads (as opposed to direct Bay discharge), load reductions from these sources will count toward meeting the urban runoff wasteload allocations.

C.12-4 Some PCB congeners have dioxin-like properties. Dioxins are persistent, bioaccumulative, toxic compounds that are produced from the combustion of organic materials in the presence of chlorine. Dioxins enter the air through fuel and waste emissions, including diesel and other motor vehicle exhaust fumes and trash incineration, and are carried in rain and contaminate soil. Dioxins bioaccumulate in fat, and most human exposure occurs through the consumption of animal fats, including those from fish. Therefore, the actions targeting PCBs will likely have the simultaneous benefit of addressing a portion of the dioxin impairment resulting from dioxin-like PCBs.

C.12-5 Recent estimates using the latest available data suggest that the urban runoff PCBs loading to San Francisco Bay is on the order of 19 kg/yr (McKee and Yee 2015). While this figure is based on environmental data and thus has inherent uncertainty associated with it, it agrees very well with the regional urban runoff load estimate of 20 kg/yr provided in the TMDL report.

C.12-6 Studies suggest that PCBs load reductions of approximately 6 kg/yr are possible by 2030 through control measures like street sweeping, control of PCBs during building demolition and renovation, drop inlet cleaning, treatment retrofits, redevelopment of contaminated areas, pump station diversion, and street flushing (McKee and Yee 2015). While there are substantial uncertainties associated with these estimates, these results suggest that a substantial portion of the additional load reductions (~ 12 kg/yr) necessary to achieve the PCBs TMDL may need to come from identification and cleanup of PCBs-contaminated properties.

C.12-7 The distribution of PCBs in the urban landscape is much more variable than it is for mercury. For example, data indicate that PCBs-contaminated land uses yield perhaps 800 times more PCBs per unit area compared to the least contaminated land uses. By contrast, there is a 70-fold difference between the highest and lowest yielding land uses for mercury (McKee and Yee 2015). A large proportion (about 53 percent) of annual average urban runoff PCB loading is

likely coming from old industrial or other contaminated areas (McKee and Yee 2015).

C.12-8 A significant recent accomplishment of the Sources, Pathways, and Loadings workgroup of the Regional Monitoring Program has been the development and refinement of a regional watershed spreadsheet model (RWSM). This GIS-based model estimates relative land use and source area yields, and integrates them to provide a transparent, mutually accepted, and peer-reviewed analysis of relative watershed scale yield. Outputs from model runs to date suggest yields for the most polluted watershed in excess of 1000 g/km^2 for PCBs and mercury and a variation between watersheds of ~100,000-fold for PCBs and ~200-fold for mercury. To date, modeling results have a large amount of uncertainty in terms of absolute magnitude, but the results are capturing the patterns of contaminant distribution and transport. The model output is generally consistent with what is known about the distribution of these contaminants in the landscape from stormwater and bedded sediment data. The results are also consistent with what monitoring data tell us about the relative mercury and PCBs loads from land use and source area categories. The predictive power of this modeling tool will be improved as more data are available to characterize PCBs and mercury concentrations in the watersheds and will be useful in predicting regional and sub-regional scale loads of PCBs and other contaminants under a variety of management scenarios (McKee and Yee 2015).

C.12-9 Sufficient information is available to establish default factors for PCBs load reduction credit resulting from foreseeable control measures implemented during this permit term (see information under C.12.b below). For treatment controls, the estimated load reductions can be calculated by multiplying the assumed land-use PCB yearly mass yield by the treated area and by a treatment efficiency factor. The load reduction resulting from cleaning up contaminated properties can be estimated by recognizing that the yield of the contaminated property will be reduced to an assumed background level over the course of site cleanup. The load reduction resulting from controlling PCBs in building materials during demolition can be estimated by estimating the amount of PCBs in the building, the fraction of those PCBs that would enter the storm drain system in the absence of controls, and the efficiency of control measures applied to the demolished building to prevent such PCBs release.

C.12-10 Limited sampling data from Bay Area structures built between 1950 and 1980 suggest that PCB concentrations in caulks here are similar to those in other parts of North America and Europe. Samples collected in about 1350 buildings in Switzerland constructed between 1950 and 1980 found almost half the buildings contained PCBs in caulk, with most samples containing >100 ppm and 20 percent containing 10,000 ppm or more. In Bay Area samples, 40 percentcontained > 50 ppm PCBs and 20% contained > 10,000 ppm PCBs. The study estimates that certain types of Bay Area structures built 1950-1980 contain a mid-range average of 4.7 kg PCBs per building. An estimated 6300 currently standing non-residential buildings in the MRP area were built between

1954 and1974. The mid-range estimate of the total PCB mass in caulk in these buildings is 10,500 kg[64].

C.12-11 Currently there are no protocols for identifying PCBs-containing structures at the time of demolition so that PCBs do not enter municipal storm drains. Some demolition sites, especially high-profile sites such as hospitals, bridges and sports arenas, comply with federal law (Toxic Substances Control Act) and State regulations (California Code of Regulations Title 22) that require a project proponent to determine the presence of PCBs and other hazardous substances and to follow applicable disposal requirements. Soil sampling data from such demolition projects indicate that significant concentrations of PCBs can be present in site soils. Such PCB-laden sediment, particularly at a demolition site without adequate controls, is transported by vehicle tracking, wind erosion or precipitation runoff to the storm drain. PCBs entering the storm drain system during dry weather are non-stormwater discharges that must be effectively prohibited pursuant to CWA § 402(p)(3)(B)(ii). PCBs that are discharged into storm drain systems and waters of the U.S. through stormwater runoff are appropriate for control in order to make progress in achieving the PCBs TMDL wasteload allocations for urban runoff, pursuant to CWA § 402(p)(3)(B)(iii).

C.12-12 U.S. EPA has developed guidelines, available at its "Steps to Safe Renovation and Abatement of Buildings That Have PCB-Containing Caulk" website, for identifying and removing PCBs in building materials that can help in the effort to manage PCBs so that they do not enter municipal storm drains. In addition, during the Previous Permit term, starting in 2009, the Permittees participated in the grant-funded "PCBs in Caulk Project", which addressed potential impacts of PCBs released into stormwater runoff during demolition or remodeling projects in the San Francisco Bay Area. This project fulfilled the permit requirement to investigate the costs, effectiveness, and technical feasibility of PCBs control measures to minimize the release of PCBs in caulks and sealants to stormwater runoff during demolition or remodeling projects. Products developed through this grant-funded project include a fact sheet for developers; a fact sheet on sampling methods; BMPs to control PCBs in caulk at demolition or renovation sites; a Model Implementation Process to incorporate a requirement to use BMPs into the municipal demolition permitting process; a training strategy to train and deploy municipal staff, such as hazardous material or building inspectors, to ensure proper implementation of BMPs; and a technical memorandum on relevant regulations and policies.

C.12-13 This provision is consistent with a recent U.S. EPA memorandum[65] providing guidance on implementing TMDL WLAs in NPDES stormwater permits.

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[64] Klosterhaus S. and McKee L. et al. 2014. *Polychlorinated Biphenyls in the exterior caulk of San Francisco Bay Area buildings, California, USA*. Environment International 66 (2014) 38–43.

[65] U.S. EPA. November 26, 2014. Revisions to the November 22, 2002 Memorandum "Establishing Total Maximum Daily Load (TMDL) Wasteload Allocations (WLAs) for Storm Water Sources and NPDES Permit Requirements Based on Those WLAs."

Specifically, this provision establishes clear and concrete milestones and deadlines (see C.12.a.iii) for the achievement of specific PCBs load reductions as well as other requirements (see C.12.b-h.), necessary to achieve receiving water limits of this permit term relative to the PCBs TMDL WLAs.

Specific Provision C.12 Requirements

Provision C.12.a. requires Permittees to implement control measures to achieve specific PCBs load reductions. In order to comply with this requirement, Permittees must identify the PCBs control measures and the watersheds and management areas in which these measures will be implemented and a time schedule for implementation.

In the first year, the Permittees have to identify watersheds and management areas and control measures sufficient to achieve the near term load reduction performance criterion (0.5 kg/yr by June 30, 2018). In subsequent years, the Permittees have to report annually any new watersheds and management areas and control measures necessary to achieve the ultimate PCB load reduction performance criterion (3 kg/yr) by June 30, 2020.

Moreover, Permittees must quantitatively demonstrate the load reductions achieved through use of the load reduction accounting scheme described below and/or further developed through the actions required under C.12.b. This provision element is critical to the successful implementation of the urban runoff requirements of the PCBs TMDL. The accountability mechanism for control measure implementation consists of three parts: 1) the identification of control measures and associated watersheds, 2) a commitment to an implementation schedule, and 3) the quantification of load reductions resulting from control measure implementation.

This provision requires that Permittees achieve annual PCBs load reductions totaling 0.5 kg/yr by June 30, 2018, and 3.0 kg/yr by June 30, 2020. These load reductions are achievable with the associated deadlines and are based on an assessment of BMPs and control measures controls to reduce PCBs as further described below.

The PCBs load reductions achieved through implementation of Provision C.12.a can be estimated for a unit of activity for a number of anticipated control measures. The effectiveness and benefits of control measures remain uncertain because of limited implementation experience and relatively scarce data on control measure effectiveness for a range of conditions. However, there are sufficient data to develop a starting point for a reasonable system of estimating load reductions as a function of the scale and intensity of control measure implementation.

A simple approach for estimating the load reductions associated with certain control measures involves use of a land-use pollutant yield. A land-use yield is an estimate of the mass of a contaminant contributed by an area of a particular land-use per unit time. Essentially, different types of land uses yield different amounts of pollutants because land use types differ in their degree of contamination resulting from differing intensities of historical or ongoing use of pollutants in those land uses. PCBs were more heavily used in older industrial areas so older industrial land use areas yield a much higher mass of PCBs per unit area than newer urban land use areas where PCBs were never intensively used.

Permittees submitted land-use mass yields of PCBs in their 2014 Integrated Monitoring Report. When these yields were multiplied by the total area of various land-use categories, the estimated region-wide (the entire region that discharges to the Bay) PCBs load was lower than the load estimated in the PCBs TMDL by approximately a factor of 1.73. Therefore, the land-use yields were multiplied by a factor of 1.73 in order to normalize to the estimated baseline PCBs load in the PCBs TMDL and to agree with recent load estimates from runoff. The resultant (adjusted) mass yields for three land-use types shown below are based on data Permittees collected during the Previous Permit term and provide a reasonable means of establishing the PCBs load reductions for control measures implemented in corresponding areas[66]. Permittees may refine these yields when they submit supporting documentation in their 2016 Annual Report.

- Old Industrial Land Use = 86.5 mg PCBs/acre/year
- Old Urban Land Use = 30.3 mg PCBs/acre/year
- New Urban areas and Other = 3.5 mg PCBs/acre/year
- Open Space = 4.3 mg/acre/year

The land-use yield provides a convenient way to estimate the load reduction of various sorts of control measure strategies. For example, when contaminated areas are **newly or redeveloped**, the pollutant yield of the area will be reduced through a variety of mechanisms (i.e., removal, capping, paving of contaminated sediment). So, the amount of PCBs load reduction can be obtained by multiplying the area of new/redevelopment by the difference in yield (either old industrial minus new urban or old urban minus new urban, whichever pre-development land-use is applicable).

The PCBs load reductions for **retrofits or other treatment controls** (including green infrastructure) can be calculated by multiplying the area treated by the assumed land-use yield of the treated area multiplied by the efficiency factor of the treatment method (using a default value of 70 percent or an efficiency established through documentation of implemented method and reported in annual reports).

For **contaminated private properties** that are referred to the Water Board or other agencies for subsequent remediation, the estimated load reduction can be derived by assuming that the PCBs yield of the source area is reduced over the course of site cleanup. Source areas identified for the purpose of referral tend to have much higher areal yields, based on an analysis of the Ettie Street pump station watershed in Oakland. Information adapted from the IMR suggests that 3975 mg PCBs/acre/year is a reasonable interim estimate for the yield of such contaminated sites (Geosyntec 2015). The cleanups will be assumed to take ten years from the date of referral to the Water Board. The assumed result of the cleanup is that the PCBs yield will be reduced over the course of ten years from 3975 mg PCBs/acre/year to the old urban yield of 30.3 mg PCBs/acre/year, or a reduction of 3940 mg PCBs/acre/yr.

Fifty percent of this load reduction will be credited during this Permit term for properties that are referred to the Water Board during the first three years of the Permit term and for which Permittees implement enhanced operation and maintenance measures in the vicinity of the referred property. Often, contaminated properties have a "halo" of

[66] *PCBs Yield Coefficients for MRP 2.0*. Geosyntec Consultants. September 23, 2015.

contamination, and contaminated sediments in this halo can be transported to receiving waters through the stormwater conveyance system. Further, pollutants from the source area may continue to be transported offsite while remediation occurs. Therefore, enhancing operation and maintenance measures in areas immediately adjacent to the source area while the source property is being remediated is a priority to prevent PCBs transport to receiving waters. If enhanced maintenance measures are not implemented in the immediate vicinity of the referred property, the calculated load reduction will be recognized upon completion of the cleanup project.

PCBs load reductions resulting from implementing control measures to prevent discharge to storm drains of **PCBs in building materials during demolition** will be computed as: the mass of PCBs contained in applicable buildings[67] multiplied by the fraction of PCBs entering stormwater conveyances in the absence of controls multiplied by the effectiveness of controls preventing PCBs from entering stormwater conveyances. Each term in this calculation can be represented by a range of values, and information is limited on some of these terms (particularly the fraction of PCBs entering storm drains). However, reasonable values, derived from information available from Klosterhaus (2011) are:

- Mass of PCBs per building = 5 kg
- Number of regulated buildings demolished = 50
- Average fraction of PCBs that enters MS4s during demolition without controls = 1 percent
- Average effectiveness of controls at preventing PCBs from entering storm drains = 80 percent

Multiplying these parameters suggests that about 2 kg/yr of PCBs loads can be reduced by effectively controlling PCBs during demolition. The actual number of demolitions will vary, but 2 kg represents a reasonable estimate and is the basis for establishing the yearly load reduction credit for controlling the release of PCBs to storm drains from such demolitions. If a Permittee implements a control program consistent with these assumptions, a share of the 2 kg/yr credit, pro-rated by population, will be allocated to that Permittee. Permittees may propose an alternative means (other than population-based) of allocating the permit-area-wide load reduction credit associated with implementing C.12.f with the 2019 Annual Report.

Permittees will also likely employ **enhanced operation and maintenance control measures** to reduce loads of mercury and PCBs. These strategies include: street sweeping, drain inlet cleaning, pump station maintenance, PCBs captured by full trash capture devices, etc. It is not possible to state, in advance, specific parameters to allow for load reduction estimates. However, the load reduction calculation is straightforward. The pollutant load reduction (either baseline or enhanced) is the product of the volume of material collected by the control measure multiplied by the percent of the collected material that is sediment multiplied by the density of that sediment multiplied by the concentration of the pollutant in that sediment. The load reduction credit is then simply

[67] Applicable buildings include buildings (excluding single family residential and wood frame buildings) constructed from 1950 through 1980 with PCBs concentration in caulks/sealants greater than 50 ppm.

the difference between the load reductions achieved with enhanced effort and those achieved with a baseline level of effort (which may be zero if the control measure is new rather than an increased intensity of an existing measure).

PCBs load reduction from other activities can be similarly established and documented through quantification of the amount of material (e.g., sediment or water or other waste) prevented from entering receiving waters multiplied by the concentration of PCBs in that material. The load reduction calculated for all implemented measures shall be summed and compared to the load reduction requirements in Tables 12.1 and 12.2. Permittees can demonstrate compliance with the load reduction requirements by summing the load reduction assigned to each type of activity they undertake. For example, if Permittees meet the Permit requirements for demolitions of regulated buildings (C.12.f) designed to achieve the control effectiveness consistent with the calculation outlined above, then a permit-area-wide load reduction of 2 kg/yr will be applied to the 3 kg/yr by the June 30, 2020, load reduction requirement. Further, Permittees would account for the area treated by green infrastructure, apply the appropriate land use PCB yield, and sum the load reduction over all such treatment installations. Similarly, the calculated load reduction resulting from property referrals and enhanced operation and maintenance can be accounted for using the approach described previously. Summing up all PCBs load reductions from all relevant control measures would constitute the permit-area-wide PCBs load reduction, county-specific, or Permittee-specific PCBs load reduction. Permittees, as a group, are encouraged to implement PCBs controls in the locations with the greatest opportunities for load reduction and be held accountable as a group. However, if the overall load reduction criteria (for all Permittees combined) are not met, the Permit provides an accountability mechanism in the form of load reduction performance criteria for each county in the permit area, calculated according to the proportions used to establish county-specific load allocations in the PCBs TMDL. For example, the load allocation for all Permittees within Alameda County in the PCBs TMDL is 0.5 kg/yr. The estimated baseline load according to the TMDL is 5 kg/yr. This represents achieving a load reduction over 20 years of 4.5 kg/yr (of the 18 kg/yr reduction from urban runoff sources to the Bay overall). However, the Permittees' jurisdictions have an estimated total load reduction responsibility of 14.4 kg/yr, because some of the urban runoff load comes from areas not under the Permittees' jurisdiction. Therefore, the Permittees within Alameda County are responsible for 4.5/14.4 (~ 31.25 %) of the load reductions from the permit area. Applying this same fraction to the required 3,000 g/yr load reduction results in a load reduction for the Alameda County Permittees of 940 g/yr. The load reduction for other counties (e.g., all Contra Costa Permittees combined, all Santa Clara Permittees combined, all San Mateo Permittees combined, and Solano Permittees [Suisun City, Vallejo, Fairfield] combined) can be derived similarly by subtracting the TMDL load allocations from the baseline load estimates and then dividing by 14.4 and then multiplying by either 500 g/yr (for the June 30, 2018, load reductions) or 3,000 g/yr (for the June 30, 2020, load reductions).

Load reduction opportunities almost certainly vary by jurisdiction. Some jurisdictions (e.g., those with a higher proportion of old industrial land use) may have more PCBs-contaminated sites and, hence, greater potential opportunities to implement control measures to reduce loads. Further, the total PCBs load reduction across the entire area

covered under this Permit is relevant to the recovery of San Francisco Bay. Therefore, as long as the total load reductions (500 g/yr by June 30, 2018, and 3 kg/yr by June 30, 2020) are achieved, the load reduction distribution among the counties is much less of a concern.

However, if the permit-areawide total load reduction performance criteria are not achieved, the Permittees in counties meeting the county-level load reduction criteria in the Permit will be deemed in compliance with the performance criteria. If both the permit-area-wide total load reduction criterion and county-specific load reduction criterion are not achieved, those Permittees will be deemed in compliance if they have achieved load reductions consistent with their proportion of the county total established under C.12.b.iii(1). Allocation of the county-wide load reduction responsibility to individual Permittees is based on the fraction of county population in each Permittees' municipality. This is consistent with the assumptions and requirements of the PCBs TMDL in that the permit-area-wide load allocation was distributed to each county based on the proportion of permit-area-wide population contained in each county. Other methods could be used to distribute the county-wide PCBs load reduction performance criteria to individual municipalities (e.g., proportion of county total of certain land-uses associated with PCB presence contained in each municipality). Permittees may propose another alternative as part of reporting on C.12.b.iii(2).

Provision C.12.b. requires Permittees to develop and implement an assessment methodology and data collection program to quantify PCBs loads reduced through implementation of any and all pollution prevention, source control and treatment control efforts required by the provisions of this Permit or load reductions achieved through other relevant efforts not explicitly required by the provisions of this Permit. The default approach for establishing load reductions for various implementation activities is described above. Early in the Permit term (2016), Permittees will submit documentation supporting this default approach for load reduction accounting along with a description of the data to be collected to establish load reduction value. In particular, C.11/12.b.iii(1) requires Permittees to submit specific details showing how they will perform the calculations to account for mercury and PCBs load reductions from all types of control measures for the reduction of these pollutants. This information includes what data will be used to assign treated areas; how to assign land use to select a yield; and how material will be sampled to determine the contaminant concentration (for control measures requiring such information). Permittees should also identify the types of supporting information that will be submitted so that the calculations can be reproduced. As Permittees gain implementation experience and collect information on this implementation, they may request refinement of the accounting system for use in subsequent Permit terms.

Permittees are encouraged to build on the framework developed in response to a Previous Permit requirement and submitted by Permittees in January 2014 in their Integrated Monitoring Report. This could include updating and in some cases extending the framework presented in that document, justifying assumptions and selected parameters used for each type of control measure, and indicating what information will be collected and submitted to calculate the load reduction for each implemented control measure. The accounting scheme for use in this Permit term and summarized above along with the

refined accounting scheme submitted near the end of the permit term (for use in subsequent Permits) must both be submitted for Executive Officer approval.

Many of the legacy sources of PCBs are found in Bay margins contaminated by historical industrial activity. These legacy sources may be contributing to storm drain runoff conveyances, but Permittees may have jurisdictional challenges in addressing the sources in private property. In addition, Permittees are responsible for contamination in public rights of way. Permittees are expected to make diligent efforts both to address contamination on public property and to refer source properties to the Water Board for possible cleanup and abatement.

Provision C.12.c. requires Permittees to implement green infrastructure projects during the term of the Permit to achieve PCBs load reductions of 120 g/year by June 30, 2020. The county-specific responsibilities for this load reduction are shown in Table 12.2 of the Permit. These county-specific green infrastructure load reduction requirements were derived using the same methodology described above for Provision C.12.a.

Some Bay Area drainages contain notably elevated PCBs concentrations in suspended or bedded sediment (e.g., > 500 ppb in bedded sediment). A recent analysis of soil PCBs and mercury data collected in the Bay Area identifies 15 sites where maximum concentrations exceed 3.8 mg/kg for PCBs and 1.6 mg/kg for total mercury. Areas with moderately high PCBs concentrations (e.g., 100-500 ppb) were found throughout areas where historical industrial activity involved use of PCBs (McKee and Yee 2015). Placing green infrastructure in highly- and moderately-contaminated areas will form an important element in achieving the PCBs TMDL-required load reductions. However, green infrastructure implementation is a long-term proposition and there is value in placing green infrastructure across the broader landscape to intercept PCBs before they are discharged to receiving water.

To ensure that Bay Area municipalities are working effectively and expeditiously in implementing appropriate green infrastructure controls to reduce loads of mercury, PCBs, and other pollutants of concern, the Permit requires Permittees to prepare a reasonable assurance analysis that rigorously and quantitatively demonstrates PCBs load reductions of at least 3 kg/yr throughout the permit area will be achieved by 2040 through implementation of green infrastructure throughout the permit area. The effort to prepare a reasonable assurance analysis is described above under C.11.c.

Provision C.12.d. requires Permittees to prepare a plan and schedule for PCBs control measure implementation and corresponding reasonable assurance analysis to quantitatively demonstrate that sufficient control measures will be implemented to attain the PCBs TMDL wasteload allocations. The Permit requires that this plan must: identify all technically and economically feasible PCBs control measures (including green infrastructure projects) to be implemented; include a schedule according to which these technically and economically feasible control measures will be fully implemented; and provide an evaluation and quantification of the PCBs load reduction of such measures as well as an evaluation of costs, control measure efficiency, and significant environmental impacts resulting from their implementation:

The PCBs TMDL anticipated the challenge of achieving the urban runoff load reductions required to meet the TMDL allocations within the twenty-year implementation time frame. The TMDL implementation plan states that

"... achievement of the allocations for stormwater runoff, which is projected to take 20 years, will be challenging. Consequently, the Water Board will consider modifying the schedule for achievement of the load allocations for stormwater runoff provided that dischargers have complied with all applicable permit requirements and accomplished all of the following:

- *A diligent effort has been made to quantify PCBs loads and the sources of PCBs in the discharge;*
- *Documentation has been prepared that demonstrates that all technically and economically feasible and cost-effective control measures recognized by the Water Board have been fully implemented, and evaluates and quantifies the PCBs load reduction of such measures;*
- *A demonstration has been made that achievement of the allocation will require more than the remaining 10 years originally envisioned; and*
- *A plan has been prepared that includes a schedule for evaluating the effectiveness and feasibility of additional control measures and implementing additional controls as appropriate.*"

Provision C.12.d provides the opportunity for Permittees to describe the full suite of actions that will be required to achieve the TMDL along with realistic timelines for this achievement. The load reductions for PCBs are difficult and time-consuming to achieve because of the distribution of sources in the landscape; challenges associated with finding and reducing these existing sources; and unpredictability related to demolition of PCBs containing structures. Further, some part of the expected PCB load reduction will come from long-term implementation of control strategies (like green infrastructure) that extend beyond the current implementation timeframe of the TMDL. The long-term plan and schedule required by this provision will help lay the foundation for an implementation timeframe that is longer than that stated in the TMDL.

Provision C.12.e. requires that Permittees collect samples of caulk and other sealants used in storm drains and between concrete curbs and street pavement and investigate whether PCBs are present in such material and in what concentrations. PCBs are most likely present in material applied during the 1970s, so the focus of the investigations should be on structures installed during this era. The Washington Department of Ecology discovered that PCBs-containing caulk (sealant) was used inside the City of Tacoma's storm drains during a 1970s repair. There is reason to believe that such use was not isolated to this one location. The sampling and analysis required by this Provision C.12 element will count toward partial fulfillment of the monitoring effort aimed at finding PCBs sources (see management information need in C.8.f).

Provision C.12.f. requires Permittees to develop a protocol for controlling PCBs during building demolition so that PCBs are not transmitted to storm drains via vehicle trackout, airborne releases, soil erosion or stormwater runoff during or after demolition. Because this is a new management practice, three years are allotted to working with entities, such as the Bay Air Quality Management District, U.S. EPA, and waste management entities,

to coordinate oversight functions and otherwise develop a coordinated protocol. After the development period, Permittees shall implement the protocol such that PCBs are controlled during the demolition of applicable structures so that they do not enter municipal storm drains. During this Permit term, applicable structures are limited to potential PCB-containing industrial, public, and commercial structures. Single-family residential and wood frame structures are excluded. In future permits, other types of structures and renovations may be included in the protocol.

The Integrated Monitoring Report (IMR)[68] presents estimates of the mass of PCBs per building (constructed or renovated prior to 1979) ranging from 0.6-16 kg and contribution to stormwater ranging from 0.8 to 4000 grams/year. This is one of the largest known sources of PCBs, although it is distributed throughout the region. For a building with 4.7 kg of PCBs and current control measures of medium effectiveness, there may be 280 grams of PCBs released to stormwater during demolition, assuming control measures are only moderately effective. If only control measures of low effectiveness were in place, such a building would release 560 grams PCBs during demolition.

Permittee 2014 Annual Reports, New and Redevelopment Section "Projects Approved" tables (C.3.b.v.(1)) provided a means to gauge the potential number of redevelopment projects involving applicable structures. While these tables are not required to list all the information necessary to determine if applicable structures will be demolished during redevelopment, in some cases enough information is provided. In 6 of the 11 Permittees reviewed, potential PCB-containing structures are planned to be demolished, including one project in which 14 buildings likely built between 1950 and 1980 will be demolished.

Water Board staff also contacted Bay Area waste management entities, such as county recycling and construction debris recovery programs. Brief discussions revealed the following:

- In general, demolition project proponents must submit debris recovery plans to these entities prior to commencing demolition. These plans could be modified to include information on the likelihood and/or actual existence of PCB-containing materials in the structure.
- Waste management entities tend to have technical advisory committees that could advise on appropriate approaches/frameworks for controlling PCBs during demolition so that they do not enter storm drains.
- Applicable structures are a small subset of all demolitions in the Bay Area.
- Some cities use software for recording demolition projects that could be modified by adding a form(s) for applicable structures.
- There are a limited number (approximately 30-40) of construction and debris processing facilities in the Bay Area, and they are listed on county web sites. At least two of these facilities are known PCB-containing sites, although both include metal processing facilities in addition to other debris recycling.
- One waste management entity has produced a video documenting a large-scale demolition project at a former Army Base that had a variety of hazardous

[68] Integrated Monitoring Report Part B: PCB and Mercury Loads Avoided and Reduced via Stormwater (IMR). Prepared by Geosyntec Consultants for the Bay Area Stormwater Management Agencies Association. 2013.

materials to dispose of, including PCBs. Another pointed to You-Tube videos showing how to remove PCB-containing caulk prior to demolition.

These facts (see also C.10, C.11 and C.12 above) indicate that a workable protocol for controlling PCBs during demolition so that they do not enter storm drain systems could be built upon existing demolition requirements and utilize existing information resources.

Some municipalities may have no applicable structures (i.e., the only structures that existed pre-1980 were single-family residential or wood-frame structures). Such Permittees may provide documentation acceptable to the Executive Officer in their 2017 Annual Reports to seek exemption from the requirement to develop a PCBs demolition control program. This allows time for compilation of this documentation, such as historic maps or other historic records, and for determining which Permittees are exempt prior to year the July 1, 2019, requirement to begin implementing the protocols.

Provision C.12.g. There are still uncertainties surrounding the magnitude and nature of PCBs reaching the Bay in urban runoff and the ultimate fate of such PCBs, including biological uptake. Provision C.12.g requires that Permittees ensure that fate and transport studies of PCBs in urban runoff are completed. The specific information needs include understanding the in-Bay transport of PCBs discharged in urban runoff, the sediment and food web PCBs concentrations in margin areas receiving urban runoff, the influence of urban runoff on the patterns of food web PCBs accumulation, especially in Bay margins, and the identification of drainages where urban runoff PCBs are particularly important in food web accumulation.

Provision C.12.h. requires actions that manage human health risk due to mercury and PCBs. These may include efforts to communicate the health risks of eating Bay fish and other efforts aimed at high risk-communities such as subsistence fishers and their families. The risk reduction framework developed in the Previous Permit term, which funded community-based organizations to develop and deliver appropriate communications to appropriately targeted individuals and communities, is an appropriate approach.

C.13. Copper Controls

Chronic and acute site-specific objectives (SSOs) for dissolved copper have been established in all segments of San Francisco Bay. The plan to implement the SSOs and ensure the achievement and ongoing maintenance of the SSOs in the entire Bay includes three types of actions for urban runoff management agencies. These actions are implemented through this Permit as provisions to control urban runoff sources of copper.

The control measures for urban runoff target significant sources of copper identified in a report produced in 2004 for the Clean Estuary Partnership.[69] This report updated information on sources of copper in urban runoff, loading estimates and associated level of uncertainty, and summarized feasible control measures and priorities for further investigation. Accordingly, the Permit provisions target major sources of copper including architectural copper, copper pesticides, and industrial copper use.

Fact Sheet Findings in Support of Provision C.13.

C.13-1 Urban runoff is a conveyance mechanism by which copper reaches San Francisco Bay.

C.13-2 Copper has the reasonable potential to cause or contribute to exceedances of copper water quality standards in San Francisco Bay.

C.13-3 SSOs for dissolved copper have been adopted for all segments of San Francisco Bay.

C.13-4 The Permit requirements to control copper to the MEP are necessary to implement and support ongoing achievement of the SSOs.

C.13-5 One of the major sources of copper to urban runoff has been addressed through passage of Senate Bill 346 in 2010, which requires brake pad manufacturers to reduce the use of copper in brake pads sold in California to no more than 5% by weight by 2021, and no more than 0.5% by 2025. The law also provides an objective process to ensure that any new brake materials meet all applicable safety and performance standards. To make sure that new materials will not cause future environmental problems, the law requires brake manufacturers to screen potential alternatives for their impacts on human health and the environment using the Toxic Information Clearinghouse, and to select less hazardous options.

C.13-6 A scientific uncertainty regarding sediment toxicity was identified during the development of SSOs for copper. Bay sediment copper concentrations are somewhat elevated above the natural background (from native soils). Local soils contain 30- 35 ppm (DW, dry weight) based on deep (> 2 meter) sediment core results for SF Bay. The copper ERL (effects range low) is 34 ppm (DW)

[69] TDC (TDC Environmental), 2004. *Copper Sources in Urban Runoff and Shoreline Activities*. Prepared for the Clean Estuary Partnership.

and the ERM (effect range median) is 240 ppm (DW). Thus, the natural concentration of local soils is very close to the ERL. There has never been an exceedance of the ERM in the 975 samples collected and analyzed through RMP data. The maximum copper sediment concentration ever recorded in RMP samples (94 ppm DW) is well below the LC50 of the amphipod *Eohaustorius estaurius* (534 ppm) or the amphipod crustacean *Hyalella azteca* (260 ppm). Surface sediment copper concentrations have trended lower over the last 20 years according to monitoring in the Bay. The median surface concentration of copper was 40 ppm (DW) during the period 1993-2004 and dropped to 38 ppm in 2005-2014. This reduced concentration occurred despite significant population increases in the Bay Area and despite the fact that much more sampling effort was conducted in the shallower parts of the Bay (where copper concentrations would be expected to be higher due to human activities and urban sources) during the latter period because of a re-design of RMP sampling strategies. There was some evidence of possible copper-related toxicity in the late 1990s, but there has not been additional evidence of this phenomenon. The possible sediment toxicity occurred in the northern portions of San Francisco Bay (Suisun Bay and San Pablo Bay) where sediment copper concentrations are higher. However, the decrease in median sediment copper concentrations in the northern estuary from the time period 1993-2004 (52 ppm DW) to 2005-2014 (45 ppm DW) has been even more pronounced than the reduction for the Bay as a whole. Because there has not been additional evidence of copper sediment toxicity and copper concentrations in surface sediments appear to be decreasing over time, Permit requirements to further investigate copper sediment toxicity in San Francisco Bay were satisfied by information collected under MRP 1.0 and are no longer needed. If more evidence of such toxicity does appear, this requirement may be re-instated.

C.13-7 A scientific uncertainty regarding the olfactory impairment of salmonids was identified during development of SSOs for copper. Exposure to dissolved copper has been shown to cause olfactory impairment at relatively low concentrations in freshwater fish, resulting in an impaired avoidance response to predators. When the SSOs were established, studies were planned to address whether or not this phenomenon occurred in estuarine water. The studies[70] were supported in part through requirements in the Previous Permit and were conducted by David Baldwin of NOAA's Northwest Fisheries Science Center. Dr. Baldwin measured the firing of neurons in response to exposure to odorant chemicals. The studies indicate that salmon in saline or moderately saline water are much less sensitive than salmon in freshwater, and that the potential effect of copper on salmon olfaction is not a concern in the Bay.

[70] David Baldwin, NOAA Fisheries, Northwest Fisheries Science Center, 2015. *Impact of dissolved copper on the olfactory system of juvenile salmon, Phase II: Effect of estuarine salinity on olfactory toxicity.*

Specific Provision C.13. Requirements

Provision C.13.a. Copper is used as an architectural feature in roofs, gutters and downspouts. When these roofs are cleaned with aggressive cleaning solutions, substantial amounts of copper can be liberated. Provision C.13.a for architectural copper involves a variety of strategies ranging from BMPs to prohibition against discharge of these cleaning wastes to the storm drain.

Provision C.13.b. Copper is commonly used as an algaecide in pools, spas, and fountains. Provision C.13.b prohibits discharge to the storm drain of copper-containing wastewater from such amenities.

Provision C.13.c. Some industrial facilities likely use copper or have sources of copper (e.g., plating facilities, metal finishers, and auto dismantlers). This control measure requires municipalities to include these facilities in their inspection program plans.

C.14. Bacteria Controls

The purpose of this provision is to implement the stormwater runoff and dry weather flow (urban runoff) requirements of the San Pedro Creek and Pacifica State Beach Bacteria TMDL (TMDL) and reduce bacteria loads to make substantial progress toward achieving the urban runoff bacteria wasteload allocations established for the TMDL.

Fact Sheet Findings in Support of Provision C.14

C.14-1 This Permit implements the Basin Plan amendment adopted by the Water Board on November 14, 2012, that establishes a TMDL and an Implementation Plan for bacteria in San Pedro Creek and at Pacifica State Beach. The State Water Board and U.S. EPA have also approved this Basin Plan amendment.

C.14-2 The implementation plan requires the City of Pacifica and San Mateo County (the Pacifica and San Mateo Permittees) to implement bacteria control measures, conduct education and outreach to others, and conduct water quality monitoring efforts. Control measures implemented by the Pacifica and San Mateo Permittees shall reduce bacteria in urban runoff to achieve TMDL wasteload allocations.

C.14-3 The TMDL is allocated to all urban runoff, including urban runoff associated with MS4s and Caltrans facilities. The allocations are expressed in terms of allowable exceedances of single sample bacteria water quality objectives for the water contact recreation beneficial use and shall be achieved by August 2021 for Pacifica State Beach and August 2028 for San Pedro Creek.

C.14-4 The Pacifica and San Mateo Permittees may comply with any requirement of this provision through a collaborative effort.

Specific Provision C.14 Requirements

Provision C.14.a. requires the Pacifica and San Mateo Permittees to implement various control measures and education and outreach activities to achieve bacteria load reductions. In order to comply with this requirement, the Pacifica and San Mateo Permittees must implement measures such as: effectively prohibit potential illicit discharges to the storm drain from the sanitary sewer collection system; address bacteria discharges from existing and future commercial horse facilities; install dog waste-clean-up signs, waste bag dispensers, and trash receptacles at high priority areas; develop and implement a visual inspection and clean-up plan for high dog waste accumulation areas; and develop and implement an enhanced public outreach and education campaign for managing pet waste. This provision also requires the Pacifica and San Mateo Permittees to modify or refocus control measure implementation efforts as appropriate.

This provision is critical to the successful implementation of the urban runoff requirements for the TMDL. The accountability mechanism for control measure implementation consists of three parts: 1) the identification of control measures and associated watersheds or locations, 2) a commitment to an implementation schedule, and 3) the quantification of the benefit resulting from control measure implementation.

Provision C.14.b. requires the Pacifica and San Mateo Permittees to conduct a water quality monitoring program to assess attainment of wasteload allocations. The monitoring and reporting requirements of Provision C.14 are authorized under Clean Water Act § 308, 40 C.F.R. §§ 122.26(d)(2), 122.41(h),(j) and (l), 122.42(c), 122.44(i) and 122.48, and Water Code § 13383. In order to comply with this requirement, the Pacifica and San Mateo Permittees are required to monitor bacteria levels in San Pedro Creek and at Pacifica State Beach and analyze, summarize, and report the results of the monitoring to the Water Board. Further, they must provide an annual report of the quantitative analysis of trends in bacteria densities and exceedances of applicable water quality objectives. This provision is necessary to determine whether or not wasteload allocations are being attained, so additional or enhanced measures are implemented, if necessary.

Provision C.14.c. requires the Pacifica and San Mateo Permittees to conduct a water quality monitoring program to 1) better characterize bacteria sources and 2) evaluate the effectiveness of the bacteria control measures. The results of the monitoring shall be reported to the Water Board on an annual basis. The findings from these assessments will be used throughout this and future Permit terms to revise, refocus, and enhance bacteria control measures to make them as effective and efficient as possible. Future permits will be based on an updated assessment of bacteria sources and control measure effectiveness. This provision is necessary to allow the Pacifica and San Mateo Permittees to identify and implement effective BMPs in an efficient manner.

C.15. Exempted and Conditionally Exempted Discharges

Legal Authority

Broad Legal Authority: CWA section 402(p)(3)(B)(ii-iii), CWC sections 13377 and 13263, 40 CFR 122.26(d)(2)(i)(B, C, D, E, and F), and 40 CFR 122.26(d)(2)(iv).

Specific Legal Authority: Federal NPDES regulation 40 CFR 122.26(d)(2)(iv)(B) requires MS4 operators "to detect and remove (or require the discharger to the municipal separate storm sewer to obtain a separate NPDES permit for) illicit discharges and improper disposal into the storm sewer."

Federal NPDES regulation 40 CFR 122.26(d)(2)(iv)(B)(1) provides that the Permittees shall prevent all types of illicit discharges into the MS4 except for certain non-stormwater discharges. Illicit discharge means "any discharge to a municipal separate storm sewer that is not composed entirely of storm water except discharges pursuant to a NPDES permit (other than the NPDES permit for discharges from the municipal separate storm sewer) and discharges resulting from fire fighting activities" (40 CFR 122.26(b)(2)).

Fact Sheet Findings in Support of Provision C.15.

Prohibition A.1. effectively prohibits the discharge of non-stormwater discharges into the storm sewer system. However, certain types of non-stormwater discharges may be exempted from this prohibition if they are unpolluted and do not violate water quality standards. Other types of non-stormwater discharges may be conditionally exempted from Prohibition A.1. if the discharger employs appropriate control measures and BMPs prior to discharge, and monitors and reports on the discharge.

Removal of Conditional Exemption for Planned and Unplanned Discharges of the Potable Water System

The Previous Permit contained requirements for planned and unplanned discharges from the potable water systems owned and/or operated by Permittees who are water purveyors. The discharges were conditionally exempted provided the Permittees complied with the BMP, monitoring, and reporting requirements in the Previous Permit. The requirements were necessary because potable water discharges contain chlorine and chloramines, two very toxic chemicals to aquatic life, and can cause erosion, scouring of stream and creek banks, and sedimentation. The conditional exemption and requirements were included as an interim measure until such time an NPDES permit regulating potable water discharges was adopted. The State Water Board has since adopted the statewide General NPDES Permit for Drinking Water System Discharges to Waters of the United States, Order WQ 2014-0194-DWQ (Potable Water General Permit) on November 18, 2014. Therefore, the conditional exemption and requirements for planned and unplanned discharges from the Permittees' potable water systems is no longer necessary. The Permittees should seek coverage under the Potable Water General Permit for their potable water system discharges. NPDES-permitted discharges, such as those permitted by the Potable Water General Permit, are exempt from Discharge Prohibition A.1.

Specific Provision C.15. Requirements

Provision C.15.a. Exempted Non-Stormwater Discharges. This section of the Permit identifies the types of non-stormwater discharges that are exempted from Discharge Prohibition A.1. if such discharges are unpolluted and do not violate water quality standards. If any exempted non-stormwater discharge is identified as a source of pollutants to receiving waters, the discharge shall be addressed as a conditionally exempted discharge and must meet the requirements of Provision C.15.b.

Provision C.15.b. Conditionally Exempted Non-Stormwater Discharges. This section of the Permit identifies the types of non-stormwater discharges that are conditionally exempted from Discharge Prohibition A.1. if they are identified by Permittees or the Executive Officer as not being sources of pollutants to receiving waters. To eliminate adverse impacts from such discharges, project proponents shall implement appropriate pollutant control measures and BMPs, and where applicable, shall monitor and report on the discharges in accordance with the requirements specified in Provision C.15.b. The intent of Provision C.15.b.'s requirements is to facilitate Permittees in regulating these non-stormwater discharges to the storm drains since the Permittees have ultimate responsibility for what flows in those storm drains to receiving waters. For all planned discharges, the nature and characteristic of the discharge must be verified prior to the discharge so that effective pollution control measures are implemented, if deemed necessary. Such preventative measures are cheaper by far than post-discharge cleanup efforts.

Provision C.15.b.i.(1). Pumped Groundwater from Non Drinking Water Aquifers. These aquifers tend to be shallower than drinking water aquifers and more subject to contamination. The wells must be purged prior to sample collection. Since wells are purged regularly, this section of the Permit requires twice a year monitoring of these aquifers. Discharges of pumped groundwater from nondrinking water aquifers, which are owned and/or operated by Permittees who pump groundwater as drinking water, are conditionally exempted as long as the discharges meet the requirements in this section of the Permit.

Provision C.15.b.i.(2). Pumped Groundwater, Foundation Drains, and Water from Crawl Space Pumps and Footing Drains. This section of the Permit encourages these types of discharges to be directed to landscaped areas or bioretention units, when feasible. If the discharges cannot be directed to vegetated areas, it requires testing to determine if the discharge is uncontaminated. Uncontaminated discharges shall be treated, if necessary, to meet specified discharge limits for turbidity and pH.

Provision C.15.b.ii. Air Conditioning Condensate. Small air conditioning units are usually operated during the warm weather months. The condensate from these units is uncontaminated and unlikely to reach a storm drain or waters of the State because it tends to be low in volume and tends to evaporate or percolate readily. Therefore, condensate from small air conditioning units should be discharged to landscaped areas or the ground. Commercial and industrial air conditioning units tend to produce year-round continuous flows of condensate. It may be difficult to direct a continuous flow to a landscaped area large enough to accommodate the volume. While the

condensate tends to be uncontaminated, it picks up contaminates on its way to the storm drain and/or waters of the State and can contribute to unnecessary dry weather flows. Therefore, discharges from new commercial and industrial air conditioning units should be discharged to landscaped areas, if they can accommodate the continuous volume, or to the sanitary sewer, with the local sanitary sewer agency's approval. If none of these options are feasible, air conditioning condensate can be directly discharged into the storm drain. If descaling or anti-algal agents are used to treat the air conditioning units, residues from these agents must be properly disposed of.

Provision C.15.b.iii. Emergency Discharges of the Potable Water. Potable water discharges contribute pollution to water quality in receiving waters because they contain chlorine or chloramines, two very toxic chemicals to aquatic life. Potable water discharges can cause erosion and scouring of stream and creek banks, and sedimentation can result if effective BMPs are not implemented. This section of the Permit acknowledges that in cases of emergency discharge, such as from firefighting and disasters, priority of efforts shall be directed toward life, property, and the environment, in that order. Therefore, Permittees are required to implement BMPs that do not interfere with immediate emergency response operations or impact public health and safety. Reporting requirements for such events shall be determined by Water Board staff on a case-by-case basis.

Provision C.15.b.iv. Individual Residential Car Washing. Soaps and automotive pollutants such as oil and metals can be discharged into storm drains and waterbodies from individual residential car washing activities. However, it is not feasible to prohibit individual residential car washing because it would require too much resources for the Permittees to regulate the prohibition. This section of the Permit requires Permittees to encourage residents to implement BMPs such as directing car washwaters to landscaped areas, using as little detergent as possible, and washing cars at commercial car washing facilities.

Provision C.15.b.v. Swimming Pool, Hot tub, Spa, and Fountain Water Discharges. These types of discharges can contain high levels of chlorine and copper. Permittees shall prohibit the discharge of such waters that contain chlorine residual, copper algaecide, filter backwash, or other pollutants to the storm drains or to waterbodies. High flow rates into the storm drain or a waterbody could cause erosion and scouring of the stream or creek banks. These types of discharges should be directed to landscaped areas large enough to accommodate the volume or to the sanitary sewer, with the local sanitary sewer's approval. If these discharge options are not feasible and the swimming pool, hot tub, spa, or fountain water discharges must enter the storm drain, they must be dechlorinated to non-detectable levels of chlorine and they must not contain copper algaecide. Flow rate should be regulated to minimize downstream erosion and scouring. We strongly encourage local sanitary sewer agencies to accept these types of non-stormwater discharges, especially for new and rebuilt ones where a connection could be achieved with marginal effort. This provision also requires Permittees to coordinate with local sanitary agencies in these efforts.

Provision C.15.b.v.i. Irrigation Water, Landscape Irrigation, and Lawn or Garden Watering. Fertilizers and pesticides can be washed off of landscaping and discharged into storm drains and waterbodies. However, it is not feasible to prohibit excessive irrigation because it would require too much resource for the Permittees to regulate such a prohibition. It is also not feasible for individual Permittees to ban the use of fertilizers and pesticides. This section of the Permit requires Permittees to promote and/or work with potable water purveyors to promote measures that minimize runoff and pollutant loading from excess irrigation, such as conservation programs, outreach regarding overwatering and less toxic options for pest control and landscape management, the use of drought tolerant and native vegetation, and to implement appropriate illicit discharge response and enforcement for ongoing, large-volume landscape irrigation runoff to the storm drains.

C.16. Discharges to Areas of Special Biological Significance

Legal Authority

Broad Legal Authority: CWA section 402(p)(3)(B)(ii-iii), CWC sections 13377 and 13263, 40 CFR 122.26(d)(2)(i)(B, C, D, E, and F), and 40 CFR 122.26(d)(2)(iv).

Specific Legal Authority:
In 1972, the State Water Board adopted the Water Quality Control Plan for Ocean Waters of California, California Ocean Plan (Ocean Plan). The State Water Board adopted the most recent amendment to the Ocean Plan on October 16, 2012, and the plan was subsequently approved by the State Office of Administrative Law and U.S. EPA. The State Water Board is responsible for reviewing the Ocean Plan water quality standards and for modifying and adopting standards in accordance with CWA section 303(c)(1) and CWC section 13170.2. Pursuant to CWA sections 13263 and 13377, this Permit implements the Ocean Plan. In accordance with the Ocean Plan, the State Water Board granted an exception to the prohibition of stormwater discharges to Areas of Special Biological Significance (ASBSs), as discussed further below.

Fact Sheet Findings in Support of Provision C.16.

The Ocean Plan prohibits the discharge of waste to designated ASBSs. ASBSs are designated by the State Water Board as ocean areas requiring protection of species or biological communities to the extent that alteration of natural water quality is undesirable. On March 20, 2012, the State Water Board approved Resolution No. 2012-0012, approving a general exception to the Ocean Plan prohibition against discharges to ASBSs for certain nonpoint source discharges and NPDES-permitted municipal storm water discharges (ASBS Exception), as long as those discharges are covered under an appropriate authorization to discharge, such as this Order and comply with the Special Protections contained in Attachment B (Special Protections) to that resolution, among other requirements. The ASBS Exception was subsequently amended by State Water Board Resolution No. 2012-0031, which required pollutant reductions to be achieved within six years, in accordance with ASBS Compliance Plans. This provision applies to discharges from the County of San Mateo into the James V. Fitzgerald Marine Reserve ASBS. The provision authorizes the County of San Mateo's stormwater discharge as set forth in the provision and implements the Ocean Plan and the exceptions granted under it by the State Water Board to allow the County of San Mateo to discharge stormwater into the ASBS. The requirements of the Provision are from the ASBS Exception and its Special Protections, which are incorporated into the Order as Attachment E.

Attachment G: Standard NPDES Stormwater Permit Provisions

The following legal authority applies to Attachment J:

Broad Legal Authority: CWA sections 402(p)(3)(B)(ii-iii), CWC section 13377, and federal NPDES regulations 40 CFR 122.26(d)(2)(i)(B, C, D, E, and F) and 40 CFR 122.26(d)(2)(iv).

Specific Legal Authority: Standard provisions, reporting requirements, and notifications are consistent to all NPDES permits and are generally found in federal NPDES regulation 40 CFR 122.41.

Attachment G includes Standard Provisions. These Standard Provisions ensure that NPDES stormwater permits are consistent and compatible with USEPA's federal regulations. Some Standard Provision sections specific to publicly owned sewage treatment works are not included in Attachment G.

Fact Sheet Attachment C10

303(d) Trash Resolution and Staff Report February 2009

Available
at http://www.waterboards.ca.gov/sanfranciscobay/board_decisions/adopted_orders/2009/R2-2009-0008.pdf

ATTACHMENT B

Provision C.3.b.
Sample Reporting Table

Provision C.3.b. Sample Reporting Table
Regulated Projects Approved During the Reporting Period 07/15 to 06/16
City of Eden Annual Report FY 2015-16

Project Name, Project Number, Location, Street Address,	Name of Developer, Project Phase No.,[1] Project Type & Description	Project Watershed[2]	Total Site Area, Total Area of Land Disturbed	Total New and/or Replaced Impervious Surface Area[3]	Total Pre- and Post-Project Impervious Surface Area[4]	Status of Project[5]	Source Control Measures	Site Design Measures	Treatment Systems Installed[6]	Operation & Maintenance Responsibility Mechanism	Hydraulic Sizing Criteria	Alternative Compliance Measures[7,8]	HM Controls[9,10]
Private Projects													
Nirvana Estates; Project #05-122; Property bounded by Paradise Lane, Serenity Drive, and Eternity Circle; Eden, CA	Heavenly Homes; Phase 1; Construction of 156 single-family homes and 45 townhomes with commercial shops and underground parking.	Runoff from site drains to Babbling Brook	25 acres site area, 21 acres disturbed	20 acres new	20 acres post-project	Application submitted 12/29/14, Application deemed complete 1/30/15, Project approved 7/16/15	Stenciled inlets, street sweeping, covered parking, car wash pad drains to sanitary sewer	Pervious pavement for all driveways, sidewalks, and commercial plaza	vegetated swales, detention basins,	Conditions of Approval require Homeowners Association to perform regular maintenance. Written record will be made available to City inspectors.	WEF Method	n/a	Contra Costa sizing charts used to design detention basin at Peace Park. Also contributed to in-stream projects in Babbling Brook
Barter Heaven; Project #05-345; Shoppers Lane & Bargain Avenue; 14578 Shoppers Lane, Eden, CA	Deals Galore Development Co.; Demolition of strip mall and parking lot and construction of 500-unit 5-story shopping mall with underground parking and limited outdoor parking.	Runoff from site drains to Bargain River	5 acres site area, 3 acres disturbed	1 acre new, 2 acres replaced	3.5 acres pre-project, 4.5 acres post-project	Application submitted 7/9/15, Application deemed complete 8/2/15, Project approved 12/12/15	Stenciled inlets, trash enclosures, underground parking, street sweeping	One-way aisles to minimize outdoor parking footprint; roof drains to planter boxes	tree wells with bioretention; planter boxes with bioretention	Conditions of Approval require property owner (landlord) to perform regular maintenance. Written record will be made available to City inspectors.	BMP Handbook Method	$ 250,000 paid to Renew Regional Project sponsored by Riverworks Foundation, 243 Water Way, Eden, CA 408-345-6789	Renew Project includes treatment and HM Controls

Provision C.3.b. Sample Reporting Table
Regulated Projects Approved During the Reporting Period 07/15 to 06/16
City of Eden Annual Report FY 2015-16

Project Name, Project Number, Location, Street Address,	Name of Developer, Project Phase No.,[1] Project Type & Description	Project Watershed[2]	Total Site Area, Total Area of Land Disturbed	Total New and/or Replaced Impervious Surface Area[3]	Total Pre- and Post-Project Impervious Surface Area[4]	Status of Project[5]	Source Control Measures	Site Design Measures	Treatment Systems Installed[6]	Operation & Maintenance Responsibility Mechanism	Hydraulic Sizing Criteria	Alternative Compliance Measures[7,8]	HM Controls[9,10]
New Beginnings; Project No. #05-456; Hope Street & Chance Road; 567 Hope Boulevard, Eden, CA	Fresh Start Corporation; Demolition of abandoned warehouse and construction of a 5-story building with 250 low-income rental housing units.	Runoff from site drains to Poor Man Creek	5 acres site area, 100,000 ft^2 disturbed	1 acre replaced	2 acres pre-project, 1 acre post-project	Application submitted 2/9/16, Application deemed complete 4/10/16; Project approved 6/30/16	Trash enclosures, underground parking, street sweeping, car wash pad drains to sanitary sewer	roof drains to landscaping	parking runoff flows to six bioretention units/gardens	Conditions of Approval require property owner (landlord) to perform regular maintenance. Written record will be made available to City inspectors.	BMP Handbook Method	n/a	n/a
Public Projects													
Gridlock Relief, Project No. #05-99, ABC Blvd between Main and Huett Streets, Eden, CA	City of Eden. Widening of ABC Blvd from 4 to 6 lanes	Runoff from site drains to Congestion River	6 acres site area, 3 acres disturbed	2 acres new, 1 acre replaced	4 acres pre-project, 6 acres post-project	Application submitted 7/9/15, Application deemed complete 10/6/15, Project approved 12/9/15, Construction scheduled to begin 7/10/16	none	ABC Blvd sloped to drain runoff into landscaped areas in median	Runoff leaving underdrain system of landscaped median is pumped to bioretention gardens along either side of ABC Blvd	Signed statement from City of Eden assuming post-construction responsibility for treatment BMP maintenance.	WEF Method	n/a	BAHM used to design and size stormwater treatment units so that increased runoff is detained.

Sample Reporting Table C.3.b. Footnotes

1. If a project is being constructed in Phases, use a separate row entry for each Phase.
2. State the watershed(s) that the Regulated Project drains to. Optional but recommended: Also state the downstream watershed(s).
3. State both the total new impervious surface area and the total replaced impervious surface area, as applicable.
4. For redevelopment projects state both the pre-project impervious surface area and the post-project impervious surface area.
5. State project application date; application deemed complete date; and final, major, staff-level discretionary review and approval date.
6. List stormwater treatment system(s) installed onsite or at a joint stormwater treatment system facility.
7. For Alternative Compliance at an offsite location in accordance with Provision C.3.e.i.(1), on a separate page, give a discussion of the alternative compliance site including the information specified in Provision C.3.b.iv.(2)(m)(i) for the offsite project.
8. For Alternative Compliance by paying in-lieu fees in accordance with Provision C.3.e.i.(2), on a separate page, provide the information specified in Provision C.3.b.iv.(2)(m)(ii) for the Regional Project.
9. If HM control is not required, state why not.
10. If HM control is required, state control method used (e.g., method to design and size device(s) or method(s) used to meet the HM Standard, and description of device(s) or method(s) used, such as detention basin(s), biodetention unit(s), regional detention basin, or in-stream control).

Instructions for Provision C.3.b. Sample Reporting Table

1. **Project Name, Number, Location, and Street Address** – Include the following information:
   - Name of the project
   - Number of the project (if applicable)
   - Location of the project with cross streets
   - Street address of the project (if available)

2. **Name of Developer, Project Phase Number, Project Type, and Project Description** – Include the following information:
   - Name of the developer
   - Project phase name and/or number (only if the project is being developed in phases) – each phase should have a separate row entry
   - Type of development (i.e., new and/or redevelopment)
   - Description of development (e.g., 5-story office building, residential with 160 single-family homes with five 4-story buildings to contain 200 condominiums, 100 unit 2-story shopping mall, mixed use retail and residential development (apartments), industrial warehouse)

3. **Project Watershed**
   - State the watershed(s) that the Project drains into
   - Optional but recommended: Also state the downstream watershed(s)

4. **Total Site Area and Total Area of Land Disturbed** – State the total site area and the total area of land disturbed.

5. **Total New and/or Replaced Impervious Surface Area**
   - State the total new impervious surface area
   - State the total replaced impervious surface area, as applicable

6. **Total Pre- and Post-Project Impervious Surface Area** – For redevelopment projects, state both the pre-project impervious surface area and the post-project impervious surface area.

7. **Status of Project –** Include the following information:
   - Project application submittal date
   - Project application deemed complete date
   - Final, major, staff-level discretionary review and approval date

8. **Source Control Measures** – List all source control measures that have been or will be included in the project.

9. Site Design Measures – List all site design measures that have been or will be included in the project.

10. Treatment Systems Installed – List all post-construction stormwater treatment system(s) installed onsite and/or at a joint stormwater treatment system facility.

11. Operation and Maintenance Responsibility Mechanism – List the legal mechanism(s) that have been or will be used to assign responsibility for the maintenance of the post-construction stormwater treatment systems.

12. Hydraulic Sizing Criteria Used – List the hydraulic sizing criteria used for the Project.

13. Alternative Compliance Measures

- **Option 1: LID Treatment at an Offsite Location (Provision C.3.e.i.(1))** – On a separate page, give a discussion of the alternative compliance project including the information specified in Provision C.3.b.v.(1)(m)(i) for the offsite project.
- **Option 2: Payment of In-Lieu Fees (Provision C.3.e.i.(2))** – On a separate page, provide the information specified in Provision C.3.b.v.(1)(m)(ii).

14. HM Controls

- If HM control is not required, state why not
- If HM control is required, state control method used (e.g., method to design and size device(s), method(s) used to meet the HM Standard, and description of device(s) or method(s) used, such as detention basin(s), biodetention unit(s), regional detention basins, or in-stream control)

ATTACHMENT C

Provision C.3.g.
Hydromodification Applicability Map

Attachment A:
HMP susceptibility map

Alameda Countywide
Clean Water Program
November 13, 2006

LEGEND (see text also)

- Major highways
- Major watersheds
- County boundary
- Streets

Channel type

- Natural creek or stream (susceptible)
- Earthen channel or connector
- Engineered channel - materials unknown
- Engineered channel - concrete
- Enclosed pipe or culvert

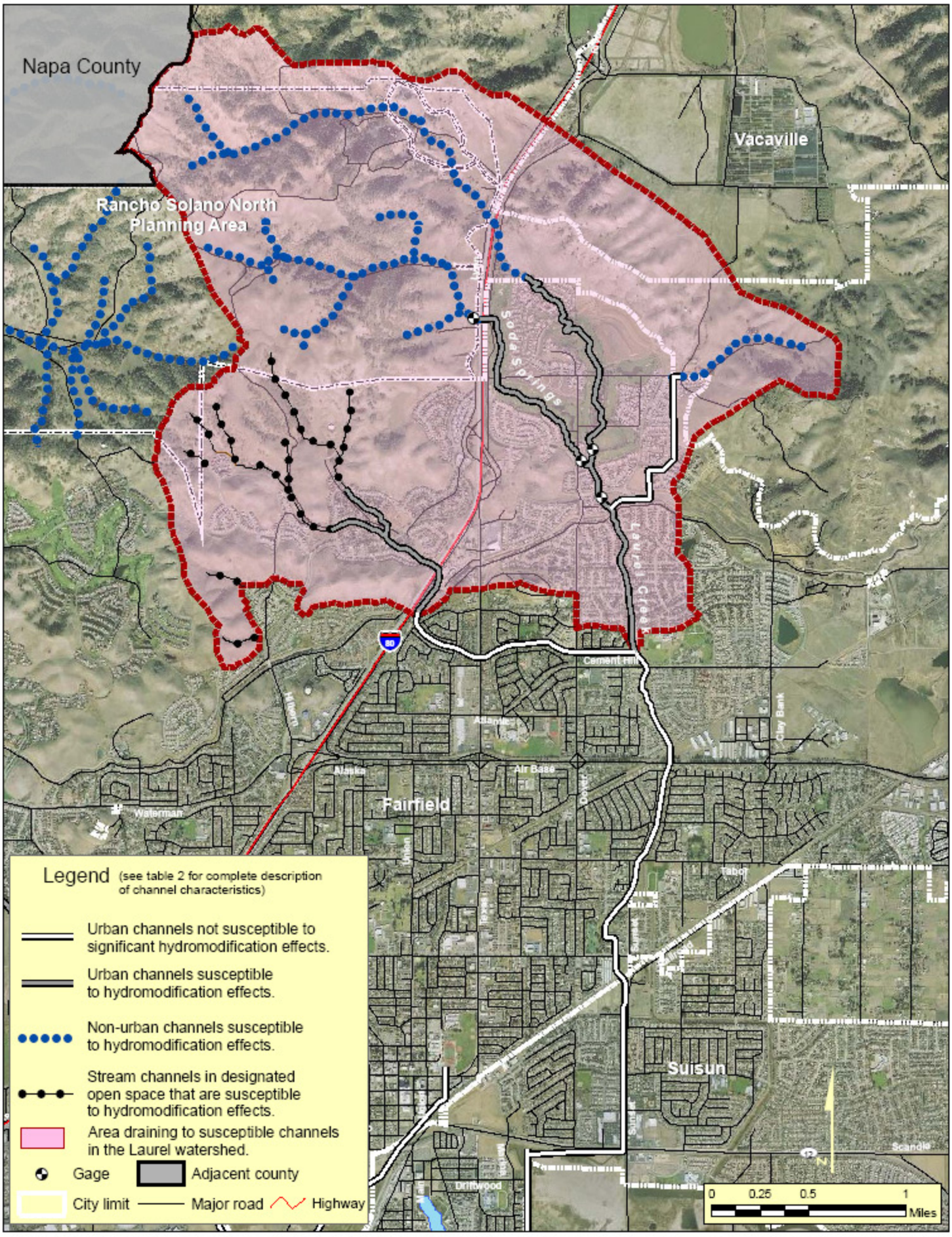
- Special consideration - San Lorenzo & Alameda Creeks
- Special consideration - Codornices Creek
- Hill or high slope region (susceptible)
- Tidally influenced / depositional - exempt
- Not included in HMP

Data sources:
Alameda County Flood Control and Water Conservation District; ACCWP;
Zone 7 Water Agency; U.S. Census Bureau; U.S. Geological Survey;
William Lettis Associates (Oakland Museum creek and watershed mapping project);
Balance Hydrologics and EIP Associates (Proposed test of the approach for the ACCWP HMM Preliminary Map, July 2003)

N
W E
S

2 0 2 4 6 Miles

Contra Costa County
Alameda County
Contra Costa County
Alameda County
Alameda County
Santa Clara County
Alameda County
Santa Clara County
Alameda County
San Joaquin County



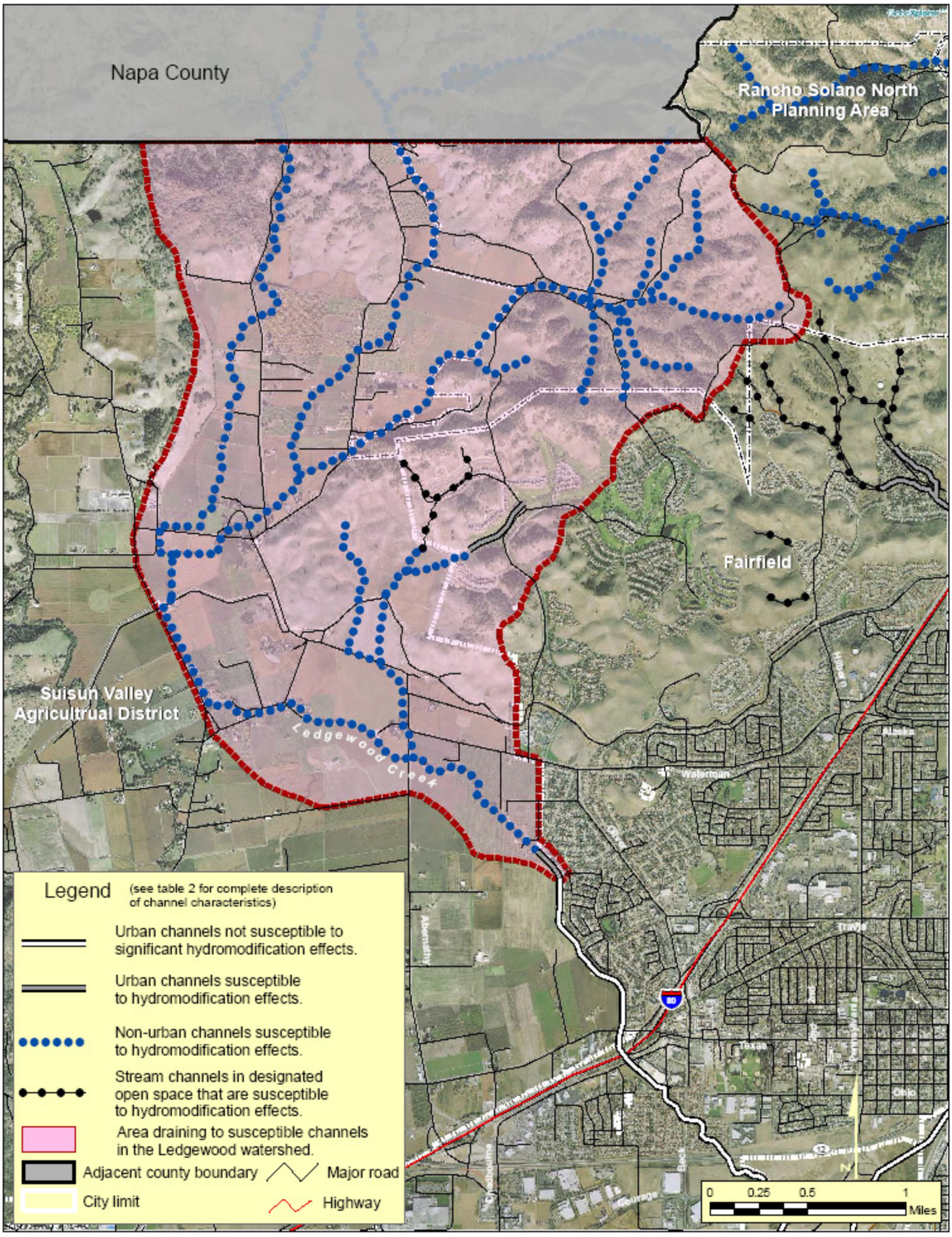
Source: Basemap data provided by Fairfield-Suisun Sewer District. Note that the roads layer does not include the most recently urbanized areas (north of Cement Hill Road, for example).

Balance Hydrologics, Inc.

Figure 2. Map showing HMP channel Classification for the Laurel Creek watershed. The mid- to upper reaches include all channels within the watershed that are susceptible to hydromodification effects (dotted and gray-shaded channels on this map). Hydromodification controls are not required for projects that drain directly to non-susceptible urban channels.

W:\Projects\204126 Fairfield HMP\204003\204126_Figure2_edits.mxd

©2006 Balance Hydrologics, Inc.



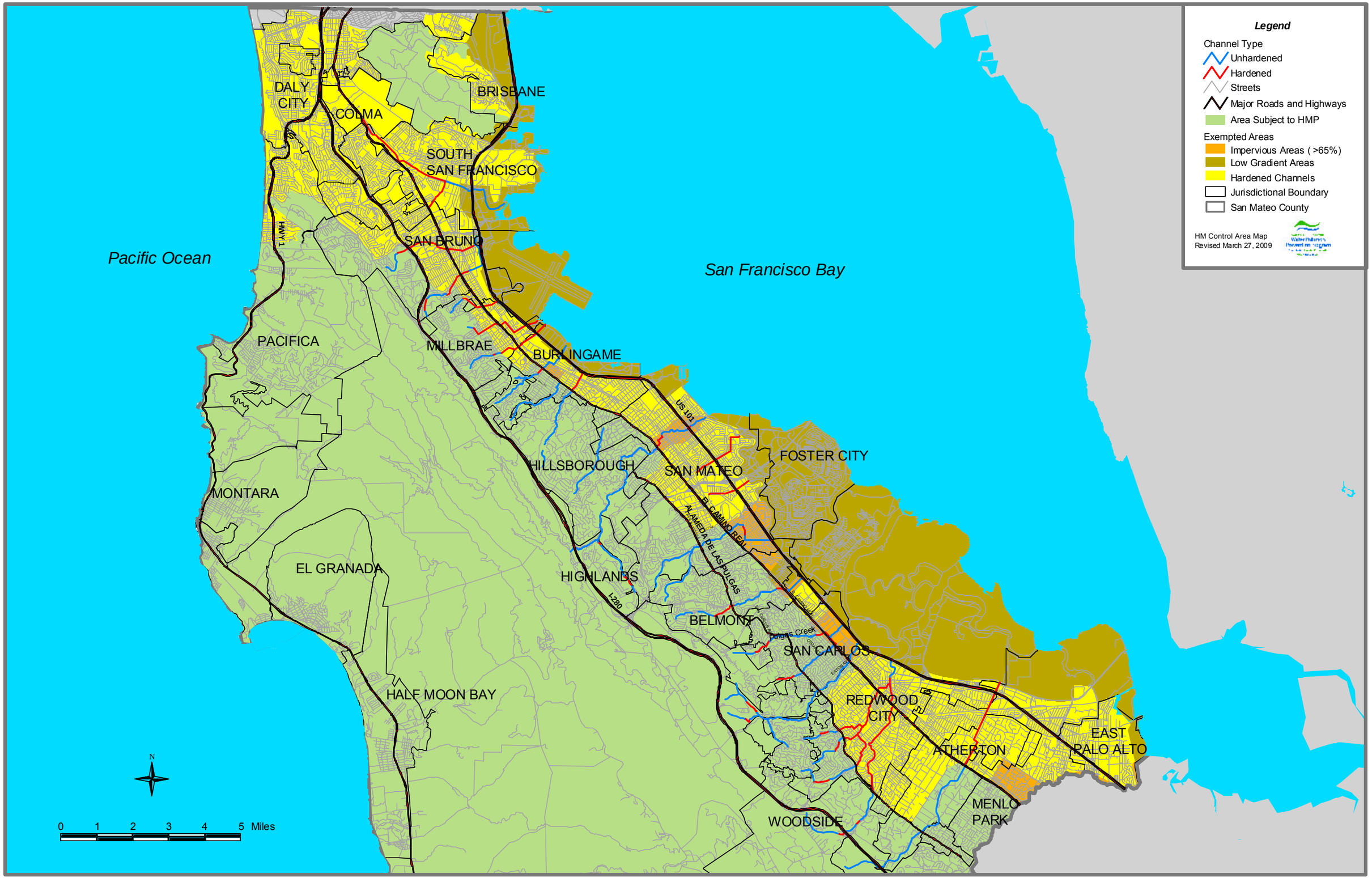
Basemap data provided by Fairfield-Suisun Sewer District. Note that the roads layer does not include the most recently urbanized areas, as shown in the aerial photo.

Balance Hydrologics, Inc.

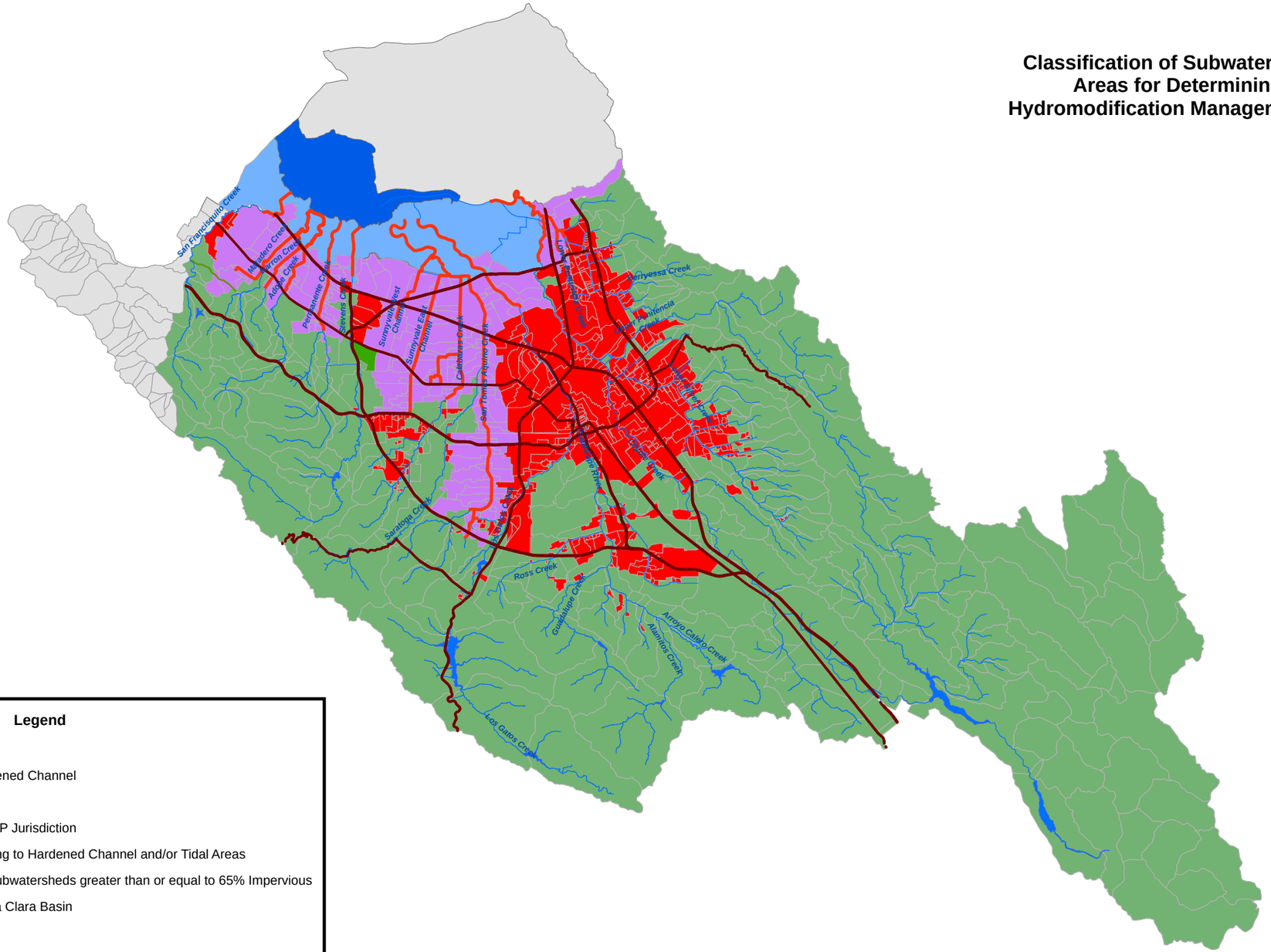
Figure 3. Map showing HMP channel Classification for the Ledgewood Creek watershed. The mid- to upper reaches include all channels within the watershed that are susceptible to hydromodification effects (dotted and gray-shaded channels on this map), however areas outside the City of Fairfield are not included in this permit unless annexed by the city. The non-developed areas within the current city limits are designated open space in relatively steep terrain, and are unlikely to be converted to urban areas however the HMP still applies in these areas.

W:\Projects\204126 Fairfield HMP\204003\204126_Figure3_edits.mxd

©2006 Balance Hydrologics, Inc.


Legend
Channel Type
Unhardened
Hardened
Streets
Major Roads and Highways
Area Subject to HMP
Exempted Areas
Impervious Areas (>65%)
Low Gradient Areas
Hardened Channels
Jurisdictional Boundary
San Mateo County
HM Control Area Map
Revised March 27, 2009
Pacific Ocean
San Francisco Bay
DALY CITY
COLMA
BRISBANE
SOUTH SAN FRANCISCO
SAN BRUNO
HWY 1
PACIFICA
MILLBRAE
BURLINGAME
US 101
FOSTER CITY
SAN MATEO
HILLSBOROUGH
EL CAMINO REAL
ALAMEDA DE LAS PULGAS
MONTARA
EL GRANADA
HIGHLANDS
I-280
BELMONT
San Carlos Creek
Belmont Creek
Pulgas Creek
SAN CARLOS
HALF MOON BAY
REDWOOD CITY
ATHERTON
EAST PALO ALTO
MENLO PARK
WOODSIDE
N
0 1 2 3 4 5 Miles

Classification of Subwatersheds and Catchment Areas for Determining Applicability of Hydromodification Management (HM) Requirements



Legend

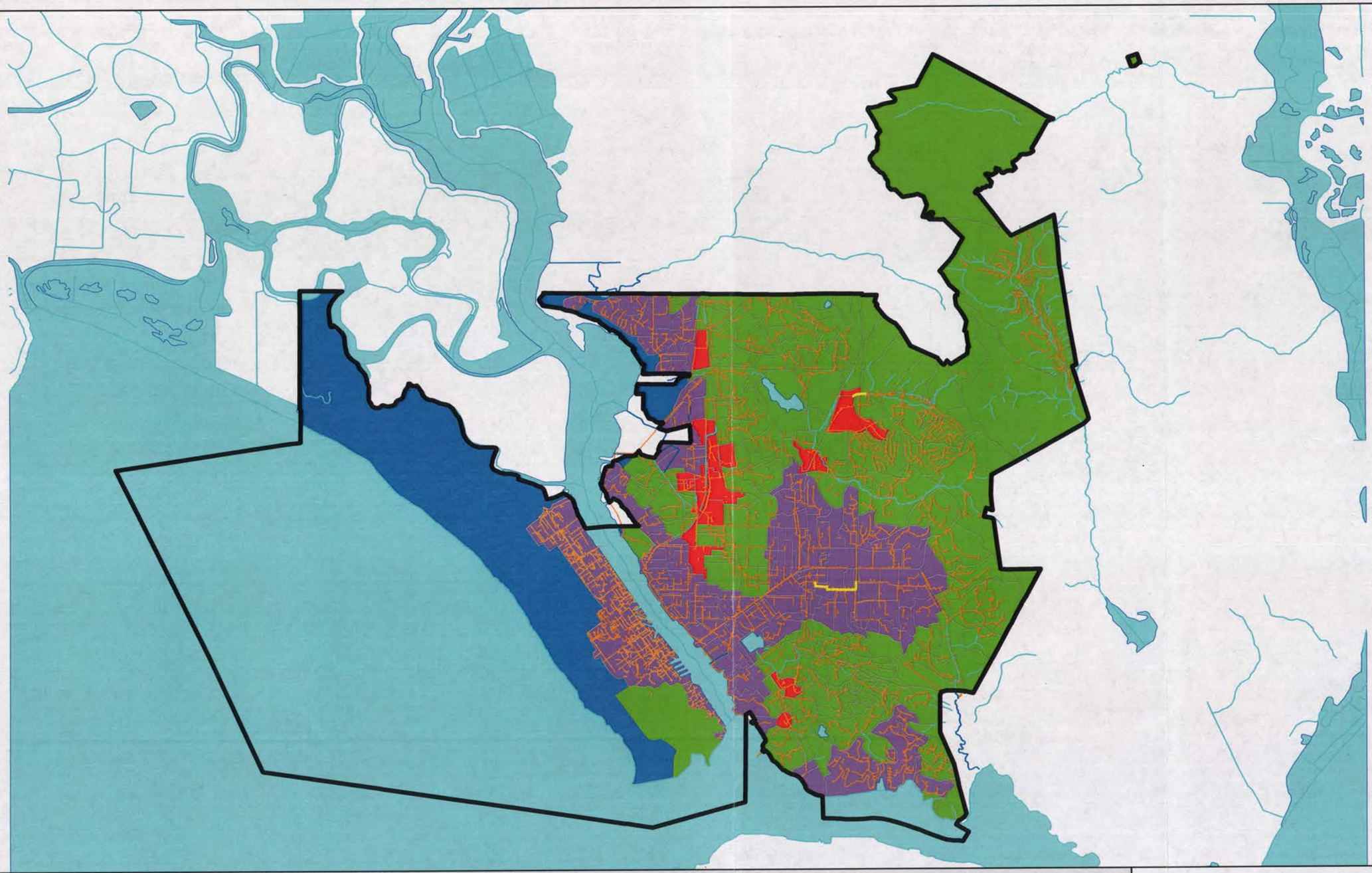
- Major Roads
- Continuously Hardened Channel
- Major Creeks
- Outside SCVURPPP Jurisdiction
- Catchments Draining to Hardened Channel and/or Tidal Areas
- Catchments and Subwatersheds greater than or equal to 65% Impervious
- Reservoirs in Santa Clara Basin
- Baylands
- Subwatersheds less than 65% Impervious

Revision Date: November 2010

N

0 0.5 1 2 3 4 5 Miles

This map contains revisions to the March 2009 version to reflect updated impervious surface data and/or catchment boundaries in the Cities of San Jose, Sunnyvale, Mountain View, and Milpitas, as described in the report to the Water Board dated October 14, 2010, consistent with the HM applicability criteria set forth in Attachment F, Section 4 of the MRP.



Legend

- HMP Boundary
- Fully Hardened Channels
- Non-Hardened Channels (Non-Tidal)
- Non-Hardened Channels (Tidal)
- Storm Drain System
- Open Water
- Areas Draining to Continuously Hardened Conveyances to the Bay
- HMP Applicable Areas
- Subcatchments with greater than or equal to 65% Impervious
- Baylands

N

0 1.25 2.5 3.75 Miles

HMP Applicability Map

Vallejo HMP

Geosyntec consultants

WW1538 | April 2013

Figure 3-1

P:\GIS\Vallejo_HMP\Projects\Figure3-1.mxd

ATTACHMENT D

Provision C.8.
Standard Monitoring Provisions

All monitoring activities shall meet the following requirements:

1. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. [40 CFR 122.41(j)(1)]
2. Permittees shall retain records of all monitoring information, including all calibration and maintenance of monitoring instrumentation, and copies of all reports required by this Order for a period of at least five (5) years from the date of the sample, measurement, report, or application. This period may be extended by request of the Water Board or USEPA at any time and shall be extended during the course of any unresolved litigation regarding this discharge. [40 CFR 122.41(j)(2), CWC section 13383(a)]
3. Records of monitoring information shall include [40 CFR 122.41(j)(3)]:
   a. The date, exact place, and time of sampling or measurements;
   b. The individual(s) who performed the sampling or measurements;
   c. The date(s) analyses were performed;
   d. The individual(s) who performed the analyses;
   e. The analytical techniques or methods used; and,
   f. The results of such analyses.
4. The CWA provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this Order shall, upon conviction, be punished by a fine of not more than $10,000, or by imprisonment for not more than two years, or both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment is a fine of not more than $20,000 per day of violation, or by imprisonment of not more than four years, or both. [40 CFR 122.41(j)(5)]
5. Calculations for all limitations that require averaging of measurements shall utilize an arithmetic mean unless otherwise specified in the monitoring Provisions. [40 CFR 122.41(l)(4)(iii)]
6. All chemical, bacteriological, and toxicity analyses shall be conducted at a laboratory certified for such analyses by the California Department of Health Services or a laboratory approved by the Executive Officer.
7. For priority toxic pollutants that are identified in the California Toxics Rule (CTR) (65 Fed. Reg. 31682), the Permittees shall instruct their laboratories to establish calibration standards that are equivalent to or lower than the Minimum Levels (MLs) published in Appendix 4 of the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (SIP). If a Permittee can demonstrate that a particular ML is not attainable, in accordance with procedures set forth in 40 CFR 136, the lowest quantifiable concentration of the lowest calibration standard analyzed by a specific analytical procedure (assuming that all the method specified sample weights, volumes, and processing steps have been followed) may be used instead of the ML listed in Appendix 4 of the SIP. The Permittee must submit documentation from the laboratory to the Water Board for approval prior to raising the ML for any priority toxic pollutant.

8. The CWA provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or non-compliance shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than six months per violation, or by both. [40 CFR 122.41(k)(2)]
9. If a Permittee monitors any pollutant more frequently than required by the Permit, unless otherwise specified in the Order, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the reports requested by the Water Board. [40 CFR 122.41(l)(4)(ii)]

ATTACHMENT E

Supporting Information for Provision C.10.

Permittee 2009 Mapped Acreages of Trash Generation Rates

Minimum Full Trash Capture Area

Minimum Trash Hot Spots to be Annually Cleaned

And

Example Trash Generation Rate Map

Table 1. Trash Generation Areas Mapped as of June 2015

County	Permittee	Trash Generation Category (acres) as presented in Long-Term Trash Reduction Plans				
		Low	Moderate	High	Very High	Total
Alameda	Alameda	3,729	1,496	263	10	**5,498**
Alameda	Alameda County	229,012	2,434	347	-	**231,793**
Alameda	Albany	555	305	119	12	**991**
Alameda	Berkeley	2,792	2,317	763	216	**6,088**
Alameda	Dublin	6,498	859	289	-	**7,645**
Alameda	Emeryville	68	351	171	125	**715**
Alameda	Fremont	30,166	6,465	740	-	**37,372**
Alameda	Hayward	10,745	7,008	1,395	165	**19,312**
Alameda	Livermore	11,355	3,325	534	-	**15,214**
Alameda	Newark	2,918	1,816	631	25	**5,391**
Alameda	Oakland	14,432	5,663	4,860	3,465	**28,420**
Alameda	Piedmont	977	109	1	-	**1,086**
Alameda	Pleasanton	13,172	1,416	176	-	**14,765**
Alameda	San Leandro	2,818	4,044	790	77	**7,729**
Alameda	Union City	10,234	1,660	228	-	**12,122**
Contra Costa	Concord	10,832	2,415	678	72	**13,997**
Contra Costa	Contra Costa County	174,854	3,707	1,717	118	**180,396**
Contra Costa	Danville	11,282	106	3	-	**11,391**
Contra Costa	El Cerrito	1,817	311	169	4	**2,301**
Contra Costa	Hercules	3,753	188	12	-	**3,952**
Contra Costa	Lafayette	9,252	245	1	-	**9,498**
Contra Costa	Martinez	5,004	1,777	93	1	**6,875**
Contra Costa	Moraga	5,711	92	125	-	**5,929**
Contra Costa	Orinda	7,764	232	50	-	**8,046**
Contra Costa	Pinole	2,827	136	171	-	**3,134**
Contra Costa	Pittsburg	5,824	2,892	210	132	**9,058**

County	Permittee	Trash Generation Category (acres) as presented in Long-Term Trash Reduction Plans				
		Low	Moderate	High	Very High	Total
Contra Costa	Pleasant Hill	2,873	1,080	371	22	**4,346**
Contra Costa	Richmond	10,704	4,538	1,774	269	**17,285**
Contra Costa	San Pablo	325	682	481	72	**1,560**
Contra Costa	San Ramon	10,536	1,184	-	-	**11,720**
Contra Costa	Walnut Creek	11,329	963	115	-	**12,407**
San Mateo	Atherton	2,984	230	-	-	**3,214**
San Mateo	Belmont	2,517	240	62	-	**2,820**
San Mateo	Brisbane	1,220	473	60	21	**1,775**
San Mateo	Burlingame	1,964	592	99	-	**2,654**
San Mateo	Colma	1,026	122	74	4	**1,225**
San Mateo	Daly City	2,553	1,015	407	-	**3,975**
San Mateo	East Palo Alto	97	879	356	97	**1,428**
San Mateo	Foster City	2,187	109	-	-	**2,296**
San Mateo	Half Moon Bay	3,657	187	51	-	**3,895**
San Mateo	Hillsborough	3,944	7	-	-	**3,950**
San Mateo	Menlo Park	4,811	292	3	-	**5,106**
San Mateo	Millbrae	1,512	369	79	-	**1,959**
San Mateo	Pacifica	7,321	472	104	-	**7,898**
San Mateo	Portola Valley	5,786	5	-	-	**5,790**
San Mateo	Redwood City	7,128	398	1,576	398	**9,502**
San Mateo	San Bruno	2,065	965	57	-	**3,088**
San Mateo	San Carlos	2,584	604	78	-	**3,265**
San Mateo	San Mateo	4,340	2,343	302	-	**6,985**
San Mateo	San Mateo County	172,050	272	362	-	**172,683**
San Mateo	South San Francisco	2,724	2,321	337	-	**5,382**
San Mateo	Woodside	6,989	2	-	-	**6,991**
Santa Clara	Campbell	2,335	1,133	273	-	**3,741**
Santa Clara	Cupertino	5,446	1,161	274	-	**6,881**
Santa Clara	Los Altos	3,966	10	14	-	**3,990**
Santa Clara	Los Altos Hills	5,377	6	-	-	**5,383**
Santa Clara	Los Gatos	6,275	698	-	-	**6,973**
Santa Clara	Milpitas	5,065	3,002	98	2	**8,167**

County	Permittee	Trash Generation Category (acres) as presented in Long-Term Trash Reduction Plans				
		Low	**Moderate**	**High**	**Very High**	**Total**
Santa Clara	Monte Sereno	1,018	9	-	-	**1,027**
Santa Clara	Mountain View	3,882	2,626	460	-	**6,968**
Santa Clara	Palo Alto	12,592	1,539	53	-	**14,184**
Santa Clara	San Jose	73,366	21,823	5,709	549	**101,447**
Santa Clara	Santa Clara	5,217	4,855	841	12	**10,925**
Santa Clara	Santa Clara County	380,316	678	1,123	-	**382,117**
Santa Clara	Saratoga	7,207	409	-	-	**7,616**
Santa Clara	Sunnyvale	7,082	4,075	907	11	**12,075**
Solano	Fairfield	18,578	240	57	-	**18,875**
Solano	Suisun City	2,043	12	9	-	**2,064**
Solano	Vallejo	10,980	4,314	1,948	476	**17,718**
	Total	**1,404,362**	**118,302**	**33,046**	**6,355**	**1,562,066**

Table 2. Minimum Trash Capture Area and Trash Hot Spots for Population Based Permittees

Data Source: http://quake.abag.ca.gov/mitigation/pickdbh2.html and Association of Bay Area Governments, 2005 ABAG Land Use Existing Land Use in 2005: Report and Data for Bay Area Counties

	Population	Retail / Wholesale Commercial Acres	**Minimum Full Trash Capture Catchment Area (Acres)**[1]	# of Trash Hot Spots per 30K Population	# of Trash Hot Spots per 100 Retail / Wholesale Commercial Acres	**Minimum # of Trash Hot Spots**[2]
Alameda County						
San Leandro	73,402	721	**216**	2	7	4
Oakland	420,183	759	**228**	14	8	8
Dublin	46,934	377	**113**	1	3	**3**
Emeryville	9,727	69	**21**	1	1	1
Albany	16,877	95	**28**	1	1	1
Berkeley	106,697	183	**55**	3	1	3
Alameda County Unincorporated.	140,825	375	**112**	4	3	4
Alameda	75,823	402	**121**	2	4	**4**
Fremont	213,512	698	**209**	7	6	7
Hayward	149,205	726	**218**	4	7	**7**
Livermore	83,604	423	**127**	2	4	**4**
Newark	43,872	314	**94**	1	3	**3**
Piedmont	11,100	1	**0**	1	1	1
Pleasanton	69,388	366	**110**	2	3	**3**
Union City	73,402	183	**55**	2	1	2

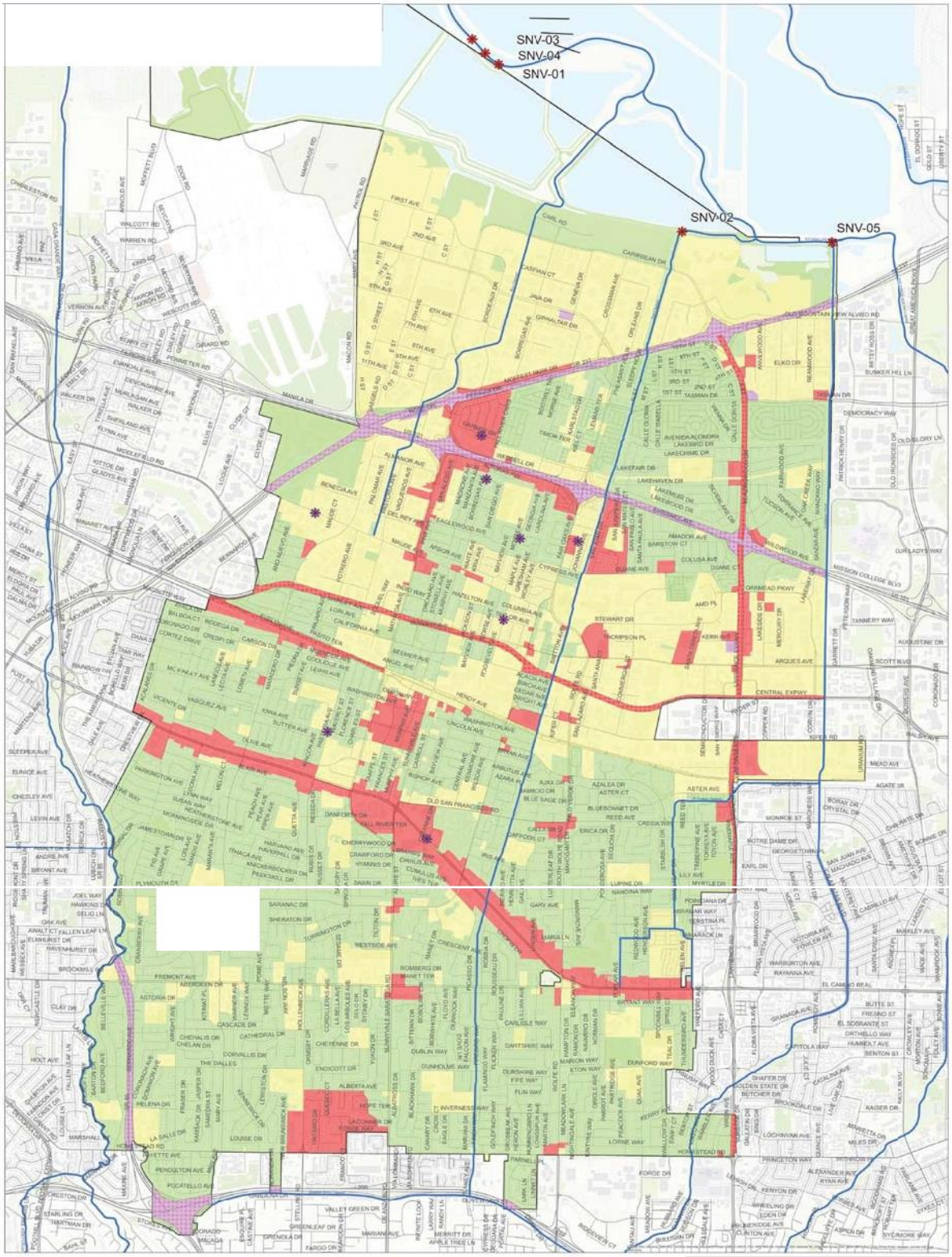
[1] 30% of Retail / Wholesale Commercial Acres – If population under 12,000 and Retail/Wholesale Commercial < 40 acres, Permittee is exempt from Minimum Full Trash Capture Requirement – C.10.iii.a.

[2] If the hot spot # based on % commercial area is more than twice that based on population, the minimum hot spot # is double the population based #.

	Population	Retail / Wholesale Commercial Acres	**Minimum Full Trash Capture Catchment Area (Acres)[1]**	# of Trash Hot Spots per 30K Population	# of Trash Hot Spots per 100 Retail / Wholesale Commercial Acres	**Minimum # of Trash Hot Spots[2]**
San Mateo County						
San Mateo County Unincorporated.	65,844	71	**21**	2	1	2
Atherton	7,475	0	**0**	1	1	1
Belmont	26,078	58	**17**	1	1	1
Brisbane	3,861	16	**0**	1	1	1
Burlingame	28,867	123	**37**	1	1	1
Colma	1,613	106	**0**	1	1	1
Portola Valley	4,639	9	**0**	1	1	1
Daly City	106,361	242	**73**	3	2	3
East Palo Alto	32,897	59	**18**	1	1	1
Foster City	30,308	67	**20**	1	1	1
Half Moon Bay	13,046	49	**15**	1	1	1
Hillsborough	11,272	0	**0**	1	1	1
Menlo Park	31,490	83	**25**	1	1	1
Millbrae	21,387	68	**20**	1	1	1
Pacifica	39,616	100	**30**	1	1	1
Redwood City	77,269	309	**93**	2	3	**3**
San Bruno	43,444	137	**41**	1	1	1
San Carlos	28,857	129	**39**	1	1	1
San Mateo	95,776	275	**82**	3	2	3
South San Francisco	63,744	195	**58**	2	1	2
Woodside	5,625	9	**0**	1	1	1

	Population	Retail / Wholesale Commercial Acres	**Minimum Full Trash Capture Catchment Area (Acres)** [1]	# of Trash Hot Spots per 30K Population	# of Trash Hot Spots per 100 Retail / Wholesale Commercial Acres	**Minimum # of Trash Hot Spots**[2]
Contra Costa County						
Contra Costa County Unincorporated.	152,744	524	**157**	5	5	5
Concord	123,776	1016	**305**	4	10	8
Walnut Creek	65,306	329	**99**	2	3	**3**
Clayton	10,784	21	**(0)**	1	1	1
Danville	42,629	134	**40**	1	1	1
El Cerrito	23,320	105	**32**	1	1	1
Hercules	24,324	37	**11**	1	1	1
Lafayette	23,962	68	**20**	1	1	1
Martinez	36,144	142	**43**	1	1	1
Moraga	16,138	108	**32**	1	1	1
Orinda	17,542	24	**7**	1	1	1
Pinole	19,193	140	**42**	1	1	1
Pittsburg	63,652	520	**156**	2	5	4
Pleasant Hill	33,377	219	**66**	1	2	**2**
Richmond	103,577	391	**117**	3	3	3
San Pablo	31,190	131	**39**	1	1	1
San Ramon	59,002	274	**82**	1	2	**2**
Santa Clara County						
Santa Clara County Unincorporated	99,122	270	**47**	3	3	3
Campbell	38,889	137	**41**	1	1	1
Cupertino	55,551	213	**64**	2	2	2
Los Altos	28,291	65	**20**	1	1	1

	Population	Retail / Wholesale Commercial Acres	**Minimum Full Trash Capture Catchment Area (Acres)** [1]	# of Trash Hot Spots per 30K Population	# of Trash Hot Spots per 100 Retail / Wholesale Commercial Acres	**Minimum # of Trash Hot Spots**[2]
Los Altos Hills	8,837	0	**0**	1	1	1
Los Gatos	30,296	163	**49**	1	1	1
Milpitas	69,419	457	**137**	2	4	**4**
Monte Sereno	3,579	0	**0**	1	1	1
Mountain View	73,932	375	**112**	2	3	**3**
Santa Clara	115,503	560	**168**	3	5	**5**
Saratoga	31,592	41	**12**	1	1	1
San Jose	989,496	2983	**895**	32	29	32
Sunnyvale	137,538	548	**164**	3	5	**5**
Palo Alto	63,367	282	**84**	2	2	2
Solano County						
Vallejo	120,416	559	**168**	4	5	**5**
Fairfield	106,142	486	**146**	3	4	**4**
Suisun	28,031	75	**22**	1	1	1
Totals	4,930,339	19057	**5718**	165	184	349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ATTACHMENT F

State Water Resources Control Board Resolution No. 2012-0031, Attachment B Special Protections for Areas of Biological Significance

STATE WATER RESOURCES CONTROL BOARD
RESOLUTION NO. 2012-0031

Attachment B - Special Protections for Areas of Special Biological Significance, Governing Point Source Discharges of Storm Water and Nonpoint Source Waste Discharges

I. PROVISIONS FOR POINT SOURCE DISCHARGES OF STORM WATER AND NONPOINT SOURCE WASTE DISCHARGES

The following terms, prohibitions, and special conditions (hereafter collectively referred to as special conditions) are established as limitations on point source storm water and nonpoint source discharges. These special conditions provide Special Protections for marine aquatic life and natural water quality in Areas of Special Biological Significance (ASBS), as required for State Water Quality Protection Areas pursuant to California Public Resources Code Sections 36700(f) and 36710(f). These Special Protections are adopted by the State Water Board as part of the California Ocean Plan (Ocean Plan) General Exception.

The special conditions are organized by category of discharge. The State Water Resources Control Board (State Water Board) and Regional Water Quality Control Boards (Regional Water Boards) will determine categories and the means of regulation for those categories [e.g., Point Source Storm Water National Pollutant Discharge Elimination System (NPDES) or Nonpoint Source].

A. PERMITTED POINT SOURCE DISCHARGES OF STORM WATER

1. General Provisions for Permitted Point Source Discharges of Storm Water

   a. Existing storm water discharges into an ASBS are allowed only under the following conditions:

      (1) The discharges are authorized by an NPDES permit issued by the State Water Board or Regional Water Board;

      (2) The discharges comply with all of the applicable terms, prohibitions, and special conditions contained in these Special Protections; and

      (3) The discharges:

         (i) Are essential for flood control or slope stability, including roof, landscape, road, and parking lot drainage;

         (ii) Are designed to prevent soil erosion;

         (iii) Occur only during wet weather;

         (iv) Are composed of only storm water runoff.

b . Discharges composed of storm water runoff shall not alter natural ocean water quality in an ASBS.

c. The discharge of trash is prohibited.

d. Only discharges from existing storm water outfalls are allowed. Any proposed or new storm water runoff discharge shall be routed to existing storm water discharge outfalls and shall not result in any new contribution of waste to an ASBS (i.e., no additional pollutant loading). "Existing storm water outfalls" are those that were constructed or under construction prior to January 1, 2005. "New contribution of waste" is defined as any addition of waste beyond what would have occurred as of January 1, 2005. A change to an existing storm water outfall, in terms of re-location or alteration, in order to comply with these special conditions, is allowed and does not constitute a new discharge.

e. Non-storm water discharges are prohibited except as provided below:

(1) The term "non-storm water discharges" means any waste discharges from a municipal separate storm sewer system (MS4) or other NPDES permitted storm drain system to an ASBS that are not composed entirely of storm water.

(2) (i) The following non-storm water discharges are allowed, provided that the discharges are essential for emergency response purposes, structural stability, slope stability or occur naturally:

(a) Discharges associated with emergency fire fighting operations.

(b) Foundation and footing drains.

(c) Water from crawl space or basement pumps.

(d) Hillside dewatering.

(e) Naturally occurring groundwater seepage via a storm drain.

(f) Non-anthropogenic flows from a naturally occurring stream via a culvert or storm drain, as long as there are no contributions of anthropogenic runoff.

(ii) An NPDES permitting authority may authorize non-storm water discharges to an MS4 with a direct discharge to an ASBS only to the extent the NPDES permitting authority finds that the discharge does not alter natural ocean water quality in the ASBS.

(3) Authorized non-storm water discharges shall not cause or contribute to a violation of the water quality objectives in Chapter II of the Ocean Plan nor alter natural ocean water quality in an ASBS.

2. Compliance Plans for Inclusion in Storm Water Management Plans (SWMP) and Storm Water Pollution Prevention Plans (SWPPP).

The discharger shall specifically address the prohibition of non-storm water runoff and the requirement to maintain natural water quality for storm water discharges to an ASBS in an ASBS Compliance Plan to be included in its SWMP or a SWPPP, as appropriate to permit type. If a statewide permit includes a SWMP, then the discharger shall prepare a stand-alone compliance

plan for ASBS discharges. The ASBS Compliance Plan is subject to approval by the Executive Director of the State Water Board (statewide permits) or Executive Officer of the Regional Water Board (for permits issued by Regional Water Boards).

a. The Compliance Plan shall include a map of surface drainage of storm water runoff, showing areas of sheet runoff, prioritize discharges, and describe any structural Best Management Practices (BMPs) already employed and/or BMPs to be employed in the future. Priority discharges are those that pose the greatest water quality threat and which are identified to require installation of structural BMPs. The map shall also show the storm water conveyances in relation to other features such as service areas, sewage conveyances and treatment facilities, landslides, areas prone to erosion, and waste and hazardous material storage areas, if applicable. The SWMP or SWPPP shall also include a procedure for updating the map and plan when changes are made to the storm water conveyance facilities.

b. The ASBS Compliance Plan shall describe the measures by which all non-authorized non-storm water runoff (e.g., dry weather flows) has been eliminated, how these measures will be maintained over time, and how these measures are monitored and documented.

c. For Municipal Separate Storm Sewer System (MS4s), the ASBS Compliance Plan shall require minimum inspection frequencies as follows:

(1) The minimum inspection frequency for construction sites shall be weekly during rainy season;

(2) The minimum inspection frequency for industrial facilities shall be monthly during the rainy season;

(3) The minimum inspection frequency for commercial facilities (e.g., restaurants) shall be twice during the rainy season; and

(4) Storm water outfall drains equal to or greater than 18 inches (457 mm) in diameter or width shall be inspected once prior to the beginning of the rainy season and once during the rainy season and maintained to remove trash and other anthropogenic debris.

d. The ASBS Compliance Plan shall address storm water discharges (wet weather flows) and, in particular, describe how pollutant reductions in storm water runoff, that are necessary to comply with these special conditions, will be achieved through BMPs. Structural BMPs need not be installed if the discharger can document to the satisfaction of the State Water Board Executive Director (statewide permits) or Regional Water Board Executive Officer (Regional Water Board permits) that such installation would pose a threat to health or safety. BMPs to control storm water runoff discharges (at the end-of-pipe) during a design storm shall be designed to achieve on average the following target levels:

(1) Table B Instantaneous Maximum Water Quality Objectives in Chapter II of the Ocean Plan; or

(2) A 90% reduction in pollutant loading during storm events, for the applicant's total discharges.

The baseline for these determinations is the effective date of the Exception, except for those structural BMPs installed between January 1, 2005 and adoption of these Special Protections, and the reductions must be achieved and documented within six (6) years of the effective date.

e. The ASBS Compliance Plan shall address erosion control and the prevention of anthropogenic sedimentation in ASBS. The natural habitat conditions in the ASBS shall not be altered as a result of anthropogenic sedimentation.

f. The ASBS Compliance Plan shall describe the non-structural BMPs currently employed and planned in the future (including those for construction activities), and include an implementation schedule. The ASBS Compliance Plan shall include non-structural BMPs that address public education and outreach. Education and outreach efforts must adequately inform the public that direct discharges of pollutants from private property not entering an MS4 are prohibited. The ASBS Compliance Plan shall also describe the structural BMPs, including any low impact development (LID) measures, currently employed and planned for higher threat discharges and include an implementation schedule. To control storm water runoff discharges (at the end-of-pipe) during a design storm, Permittees must first consider, and use where feasible, LID practices to infiltrate, use, or evapotranspirate storm water runoff on-site, if LID practices would be the most effective at reducing pollutants from entering the ASBS.

g. The BMPs and implementation schedule shall be designed to ensure that natural water quality conditions in the receiving water are achieved and maintained by either reducing flows from impervious surfaces or reducing pollutant loading, or some combination thereof.

h. If the results of the receiving water monitoring described in IV.B. of these special conditions indicate that the storm water runoff is causing or contributing to an alteration of natural ocean water quality in the ASBS, the discharger shall submit a report to the State Water Board and Regional Water Board within 30 days of receiving the results.

(1) The report shall identify the constituents in storm water runoff that alter natural ocean water quality and the sources of these constituents.

(2) The report shall describe BMPs that are currently being implemented, BMPs that are identified in the SWMP or SWPPP for future implementation, and any additional BMPs that may be added to the SWMP or SWPPP to address the alteration of natural water quality. The report shall include a new or modified implementation schedule for the BMPs.

(3) Within 30 days of the approval of the report by the State Water Board Executive Director (statewide permits) or Regional Water Board Executive Officer (Regional Water Board permits), the discharger shall revise its ASBS Compliance Plan to incorporate any new or modified BMPs that have been or will be implemented, the implementation schedule, and any additional monitoring required.

(4) As long as the discharger has complied with the procedures described above and is implementing the revised SWMP or SWPPP, the discharger does not have to repeat the same procedure for continuing or recurring exceedances of natural ocean water quality conditions due to the same constituent.

(5) The requirements of this section are in addition to the terms, prohibitions, and conditions contained in these Special Protections.

3. Compliance Schedule

a. On the effective date of the Exception, all non-authorized non-storm water discharges (e.g., dry weather flow) are effectively prohibited.

b. Within eighteen (18) months from the effective date of the Exception, the discharger shall submit a draft written ASBS Compliance Plan to the State Water Board Executive Director (statewide permits) or Regional Water Board Executive Officer (Regional Water Board permits) that describes its strategy to comply with these special conditions, including the requirement to maintain natural water quality in the affected ASBS. The ASBS Compliance Plan shall include a description of appropriate non-structural controls and a time schedule to implement structural controls (implementation schedule) to comply with these special conditions for inclusion in the discharger's SWMP or SWPPP, as appropriate to permit type. The final ASBS Compliance Plan, including a description and final schedule for structural controls based on the results of runoff and receiving water monitoring, must be submitted within thirty (30) months from the effective date of the Exception.

c. Within 18 months of the effective date of the Exception, any non-structural controls that are necessary to comply with these special conditions shall be implemented.

d. Within six (6) years of the effective date of the Exception, any structural controls identified in the ASBS Compliance Plan that are necessary to comply with these special conditions shall be operational.

e. Within six (6) years of the effective date of the Exception, all dischargers must comply with the requirement that their discharges into the affected ASBS maintain natural ocean water quality. If the initial results of post-storm receiving water quality testing indicate levels higher than the 85th percentile threshold of reference water quality data and the pre-storm receiving water levels, then the discharger must re-sample the receiving water, pre- and post-storm. If after re-sampling the post-storm levels are still higher than the 85th percentile threshold of reference water quality data, and the pre-storm receiving water levels, for any constituent, then natural ocean water quality is exceeded. See attached Flowchart.

f. The Executive Director of the State Water Board (statewide permits) or Executive Officer of the Regional Water Board (Regional Water Board permits) may only authorize additional time to comply with the special conditions d. and e., above if good cause exists to do so. Good cause means a physical impossibility or lack of funding.

If a discharger claims physical impossibility, it shall notify the Board in writing within thirty (30) days of the date that the discharger first knew of the event or circumstance that caused or would cause it to fail to meet the deadline in d. or e. The notice shall describe

the reason for the noncompliance or anticipated noncompliance and specifically refer to this Section of this Exception. It shall describe the anticipated length of time the delay in compliance may persist, the cause or causes of the delay as well as measures to minimize the impact of the delay on water quality, the measures taken or to be taken by the discharger to prevent or minimize the delay, the schedule by which the measures will be implemented, and the anticipated date of compliance. The discharger shall adopt all reasonable measures to avoid and minimize such delays and their impact on water quality.

The discharger may request an extension of time for compliance based on lack of funding. The request for an extension shall require:

1. for municipalities, a demonstration of significant hardship to discharger ratepayers, by showing the relationship of storm water fees to annual household income for residents within the discharger's jurisdictional area, and the discharger has made timely and complete applications for all available bond and grant funding, and either no bond or grant funding is available, or bond and/or grant funding is inadequate; or

2. for other governmental agencies, a demonstration and documentation of a good faith effort to acquire funding through that agency's budgetary process, and a demonstration that funding was unavailable or inadequate.

B. NONPOINT SOURCE DISCHARGES

1. General Provisions for Nonpoint Sources

   a. Existing nonpoint source waste discharges are allowed into an ASBS only under the following conditions:

      (1) The discharges are authorized under waste discharge requirements, a conditional waiver of waste discharge requirements, or a conditional prohibition issued by the State Water Board or a Regional Water Board.

      (2) The discharges are in compliance with the applicable terms, prohibitions, and special conditions contained in these Special Protections.

      (3) The discharges:

         (i) Are essential for flood control or slope stability, including roof, landscape, road, and parking lot drainage;

         (ii) Are designed to prevent soil erosion;

         (iii) Occur only during wet weather;

         (iv) Are composed of only storm water runoff.

   b. Discharges composed of storm water runoff shall not alter natural ocean water quality in an ASBS.

c. The discharge of trash is prohibited.

d. Only existing nonpoint source waste discharges are allowed. "Existing nonpoint source waste discharges" are discharges that were ongoing prior to January 1, 2005. "New nonpoint source discharges" are defined as those that commenced on or after January 1, 2005. A change to an existing nonpoint source discharge, in terms of relocation or alteration, in order to comply with these special conditions, is allowed and does not constitute a new discharge.

e. Non-storm water discharges from nonpoint sources (those not subject to an NPDES Permit) are prohibited except as provided below:

(1) The term "non-storm water discharges" means any waste discharges that are not composed entirely of storm water.

(2) The following non-storm water discharges are allowed, provided that the discharges are essential for emergency response purposes, structural stability, slope stability, or occur naturally:

(i) Discharges associated with emergency fire fighting operations.

(ii) Foundation and footing drains.

(iii) Water from crawl space or basement pumps.

(iv) Hillside dewatering.

(v) Naturally occurring groundwater seepage via a storm drain.

(vi) Non-anthropogenic flows from a naturally occurring stream via a culvert or storm drain, as long as there are no contributions of anthropogenic runoff.

(3) Authorized non-storm water discharges shall not cause or contribute to a violation of the water quality objectives in Chapter II of the Ocean Plan nor alter natural ocean water quality in an ASBS.

f. At the San Clemente Island ASBS, discharges incidental to military training and research, development, test, and evaluation operations are allowed. Discharges incidental to underwater demolition and other in-water explosions are not allowed in the two military closure areas in the vicinity of Wilson Cove and Castle Rock. Discharges must not result in a violation of the water quality objectives, including the protection of the marine aquatic life beneficial use, anywhere in the ASBS.

g. At the San Nicolas Island and Begg Rock ASBS, discharges incidental to military research, development, testing, and evaluation of, and training with, guided missile and other weapons systems, fleet training exercises, small-scale amphibious warfare training, and special warfare training are allowed. Discharges incidental to underwater demolition and other in-water explosions are not allowed. Discharges must not result in a violation of the water quality objectives, including the protection of the marine aquatic life beneficial use, anywhere in the ASBS.

h. All other nonpoint source discharges not specifically authorized above are prohibited.

2. Planning and Reporting

a. The nonpoint source discharger shall develop an ASBS Pollution Prevention ~~P~~lan, including an implementation schedule, to address storm water runoff and any other nonpoint source discharges from its facilities. The ASBS Pollution Prevention Plan must be equivalent in contents to an ASBS Compliance Plan as described in I (A)(2) in this document. The ASBS Pollution Prevention Plan is subject to approval by the Executive Director of the State Water Board (statewide waivers or waste discharge requirements) or Executive Officer of the Regional Water Board (Regional Water Board waivers or waste discharge requirements).

b. The ASBS Pollution Prevention Plan shall address storm water discharges (wet weather flows) and, in particular, describe how pollutant reductions in storm water runoff that are necessary to comply with these special conditions, will be achieved through Management Measures and associated Management Practices (Management Measures/Practices). Structural BMPs need not be installed if the discharger can document to the satisfaction of the State Water Board Executive Director or Regional Water Board Executive Officer that such installation would pose a threat to health or safety. Management Measures to control storm water runoff during a design storm shall achieve on average the following target levels:

(1) Table B Instantaneous Maximum Water Quality Objectives in Chapter II of the Ocean Plan; or

(2) A 90% reduction in pollutant loading during storm events, for the applicant's total discharges.

The baseline for these determinations is the effective date of the Exception, except for those structural BMPs installed between January 1, 2005 and adoption of these Special Protections, and the reductions must be achieved and documented within six (6) years of the effective date.

c. If the results of the receiving water monitoring described in IV.B. of these special conditions indicate that the storm water runoff or other nonpoint source pollution is causing or contributing to an alteration of natural ocean water quality in the ASBS, the discharger shall submit a report to the State Water Board and the Regional Water Board within 30 days of receiving the results.

(1) The report shall identify the constituents that alter natural water quality and the sources of these constituents.

(2) The report shall describe Management Measures/Practices that are currently being implemented, Management Measures/Practices that are identified in the ASBS Pollution Prevention Plan for future implementation, and any additional Management Measures/Practices that may be added to the Pollution Prevention Plan to address the alteration of natural water quality. The report shall include a new or modified implementation schedule for the Management Measures/Practices.

(3) Within 30 days of the approval of the report by the State Water Board Executive Director (statewide waivers or waste discharge requirements) or Executive Officer of the Regional Water Board (Regional Water Board waivers or waste discharge requirements), the discharger shall revise its ASBS Pollution Prevention Plan to incorporate any new or modified Management Measures/Practices that have been or will be implemented, the implementation schedule, and any additional monitoring required.

(4) As long as the discharger has complied with the procedures described above and is implementing the revised ASBS Pollution Prevention Plan, the discharger does not have to repeat the same procedure for continuing or recurring exceedances of natural water quality conditions due to the same constituent.

(5) The requirements of this section are in addition to the terms, prohibitions, and conditions contained in these Special Protections.

3. Compliance Schedule

a. On the effective date of the Exception, all non-authorized non-storm water discharges (e.g., dry weather flow) are effectively prohibited.

b. Within eighteen (18) months from the effective date of the Exception, the dischargers shall submit a draft written ASBS Pollution Prevention Plan to the State Water Board Executive Director (statewide waivers or waste discharge requirements) or Executive Officer of the Regional Water Board (Regional Water Board waivers or waste discharge requirements) that describes its strategy to comply with these special conditions, including the requirement to maintain natural ocean water quality in the affected ASBS. The Pollution Prevention Plan shall include a description of appropriate non-structural controls and a time schedule to implement structural controls to comply with these special conditions for inclusion in the discharger's Pollution Prevention Plan. The final ASBS Pollution Prevention Plan, including a description and final schedule for structural controls based on the results of runoff and receiving water monitoring, must be submitted within thirty (30) months from the effective date of the Exception.

c. Within 18 months of the effective date of the Exception, any non-structural controls that are necessary to comply with these Special Protections shall be implemented.

d. Within six (6) years of the effective date of the Exception, any structural controls identified in the ASBS Pollution Prevention Plan that are necessary to comply with these special conditions shall be operational.

e. Within six (6) years of the effective date of the Exception, all dischargers must comply with the requirement that their discharges into the affected ASBS maintain natural ocean water quality. If the initial results of post-storm receiving water quality testing indicate levels higher than the 85th percentile threshold of reference water quality data and the pre-storm receiving water levels, then the discharger must re-sample the receiving water pre- and post-storm. If after re-sampling the post-storm levels are still higher than the 85th percentile threshold of reference water quality data and the pre-storm receiving water levels, for any constituent, then natural ocean water quality is exceeded. See attached Flowchart.

f. The Executive Director of the State Water Board (statewide waivers or waste discharge requirements) or Executive Officer of the Regional Water Board (Regional Water Board waivers or waste discharge requirements) may only authorize additional time to comply with the special conditions d. and e., above if good cause exists to do so. Good cause means a physical impossibility or lack of funding.

If a discharger claims physical impossibility, it shall notify the Board in writing within thirty (30) days of the date that the discharger first knew of the event or circumstance that caused or would cause it to fail to meet the deadline in d. or e. The notice shall describe the reason for the noncompliance or anticipated noncompliance and specifically refer to this Section of this Exception. It shall describe the anticipated length of time the delay in compliance may persist, the cause or causes of the delay as well as measures to minimize the impact of the delay on water quality, the measures taken or to be taken by the discharger to prevent or minimize the delay, the schedule by which the measures will be implemented, and the anticipated date of compliance. The discharger shall adopt all reasonable measures to avoid and minimize such delays and their impact on water quality.

The discharger may request an extension of time for compliance based on lack of funding. The request for an extension shall require:

1. a demonstration that the discharger has made timely and complete applications for all available bond and grant funding, and either no bond or grant funding is available, or bond and/or grant funding is inadequate; or

2. for governmental agencies, a demonstration and documentation of a good faith effort to acquire funding through that agency's budgetary process, and a demonstration that funding was unavailable or inadequate.

II. ADDITIONAL REQUIREMENTS FOR PARKS AND RECREATION FACILITIES

In addition to the provisions in Section I (A) or I (B), respectively, a discharger with parks and recreation facilities shall comply with the following:

A. The discharger shall include a section in an ASBS Compliance Plan (for NPDES dischargers) or an ASBS Pollution Prevention Plan (for nonpoint source dischargers) to address storm water runoff from parks and recreation facilities.

1. The plan shall identify all pollutant sources, including sediment sources, which may result in waste entering storm water runoff. Pollutant sources include, but are not limited to, roadside rest areas and vistas, picnic areas, campgrounds, trash receptacles, maintenance facilities, park personnel housing, portable toilets, leach fields, fuel tanks, roads, piers, and boat launch facilities.

2. The plan shall describe BMPs or Management Measures/Practices that will be implemented to control soil erosion (both temporary and permanent erosion controls) and reduce or eliminate pollutants in storm water runoff in order to achieve and maintain natural water quality conditions in the affected ASBS. The plan shall include BMPs or

Management Measures/Practices to ensure that trails and culverts are maintained to prevent erosion and minimize waste discharges to ASBS.

3. The plan shall include BMPs or Management Measures/Practices to prevent the discharge of pesticides or other chemicals, including agricultural chemicals, in storm water runoff to the affected ASBS.

4. The plan shall include BMPs or Management Measures/Practices that address public education and outreach. The goal of these BMPs or Management Measures/Practices is to ensure that the public is adequately informed that waste discharges to the affected ASBS are prohibited or limited by special conditions in these Special Protections. The BMPs or Management Measures/Practices shall include signage at camping, picnicking, beach and roadside parking areas, and visitor centers, or other appropriate measures, which notify the public of any applicable requirements of these Special Protections and identify the ASBS boundaries.

5. The plan shall include BMPs or Management Measures/Practices that address the prohibition against the discharge of trash to ASBS. The BMPs or Management Measures/Practices shall include measures to ensure that adequate trash receptacles are available for public use at visitor facilities, including parking areas, and that the receptacles are adequately maintained to prevent trash discharges into the ASBS. Appropriate measures include covering trash receptacles to prevent trash from being wind blown and periodically emptying the receptacles to prevent overflows.

6. The plan shall include BMPs or Management Measures/Practices to address runoff from parking areas and other developed features to ensure that the runoff does not alter natural water quality in the affected ASBS. BMPs or Management Measures/Practices shall include measures to reduce pollutant loading in runoff to the ASBS through installation of natural area buffers (LID), treatment, or other appropriate measures.

B. Maintenance and repair of park and recreation facilities must not result in waste discharges to the ASBS. The practice of road oiling must be minimized or eliminated, and must not result in waste discharges to the ASBS.

III. ADDITIONAL REQUIREMENTS – WATERFRONT AND MARINE OPERATIONS

In addition to the provisions in Section I (A) or I (B), respectively, a discharger with waterfront and marine operations shall comply with the following:

A. For discharges related to waterfront and marine operations, the discharger shall develop a Waterfront and Marine Operations Management Plan (Waterfront Plan). This plan shall contain appropriate Management Measures/Practices to address nonpoint source pollutant discharges to the affected ASBS.

1. The Waterfront Plan shall contain appropriate Management Measures/Practices for any waste discharges associated with the operation and maintenance of vessels, moorings, piers, launch ramps, and cleaning stations in order to ensure that beneficial uses are protected and natural water quality is maintained in the affected ASBS.

2. For discharges from marinas and recreational boating activities, the Waterfront Plan shall include appropriate Management Measures, described in The Plan for California's Nonpoint Source Pollution Control Program, for marinas and recreational boating, or equivalent practices, to ensure that nonpoint source pollutant discharges do not alter natural water quality in the affected ASBS.

3. The Waterfront Plan shall include Management Practices to address public education and outreach to ensure that the public is adequately informed that waste discharges to the affected ASBS are prohibited or limited by special conditions in these Special Protections. The management practices shall include appropriate signage, or similar measures, to inform the public of the ASBS restrictions and to identify the ASBS boundaries.

4. The Waterfront Plan shall include Management Practices to address the prohibition against trash discharges to ASBS. The Management Practices shall include the provision of adequate trash receptacles for marine recreation areas, including parking areas, launch ramps, and docks. The plan shall also include appropriate Management Practices to ensure that the receptacles are adequately maintained and secured in order to prevent trash discharges into the ASBS. Appropriate Management Practices include covering the trash receptacles to prevent trash from being windblown, staking or securing the trash receptacles so they don't tip over, and periodically emptying the receptacles to prevent overflow.

5. The discharger shall submit its Waterfront Plan to the by the State Water Board Executive Director (statewide waivers or waste discharge requirements) or Executive Officer of the Regional Water Board (Regional Water Board waivers or waste discharge requirements) within six months of the effective date of these special conditions. The Waterfront Plan is subject to approval by the State Water Board Executive Director or the Regional Water Board Executive Officer, as appropriate. The plan must be fully implemented within 18 months of the effective date of the Exception.

B. The discharge of chlorine, soaps, petroleum, other chemical contaminants, trash, fish offal, or human sewage to ASBS is prohibited. Sinks and fish cleaning stations are point source discharges of wastes and are prohibited from discharging into ASBS. Anthropogenic accumulations of discarded fouling organisms on the sea floor must be minimized.

C. Limited-term activities, such as the repair, renovation, or maintenance of waterfront facilities, including, but not limited to, piers, docks, moorings, and breakwaters, are authorized only in accordance with Chapter III.E.2 of the Ocean Plan.

D. If the discharger anticipates that the discharger will fail to fully implement the approved Waterfront Plan within the 18 month deadline, the discharger shall submit a technical report as soon as practicable to the State Water Board Executive Director or the Regional Water Board Executive Officer, as appropriate. The technical report shall contain reasons for failing to meet the deadline and propose a revised schedule to fully implement the plan.

E. The State Water Board or the Regional Water Board may, for good cause, authorize additional time to comply with the Waterfront Plan. Good cause means a physical impossibility or lack of funding.

If a discharger claims physical impossibility, it shall notify the Board in writing within thirty (30) days of the date that the discharger first knew of the event or circumstance that caused or would cause it to fail to meet the deadline in Section III.A.5. The notice shall describe the reason for the noncompliance or anticipated noncompliance and specifically refer to this Section of this Exception. It shall describe the anticipated length of time the delay in compliance may persist, the cause or causes of the delay as well as measures to minimize the impact of the delay on water quality, the measures taken or to be taken by the discharger to prevent or minimize the delay, the schedule by which the measures will be implemented, and the anticipated date of compliance. The discharger shall adopt all reasonable measures to avoid and minimize such delays and their impact on water quality. The discharger may request an extension of time for compliance based on lack of funding. The request for an extension shall require:

1. a demonstration of significant hardship by showing that the discharger has made timely and complete applications for all available bond and grant funding, and either no bond or grant funding is available, or bond and/or grant funding is inadequate.

2. for governmental agencies, a demonstration and documentation of a good faith effort to acquire funding through that agency's budgetary process, and a demonstration that funding was unavailable or inadequate.

IV. MONITORING REQUIREMENTS

Monitoring is mandatory for all dischargers to assure compliance with the Ocean Plan. Monitoring requirements include both: (A) core discharge monitoring, and (B) ocean receiving water monitoring. The State and Regional Water Boards must approve sampling site locations and any adjustments to the monitoring programs. All ocean receiving water and reference area monitoring must be comparable with the Water Boards' Surface Water Ambient Monitoring Program (SWAMP).

Safety concerns: Sample locations and sampling periods must be determined considering safety issues. Sampling may be postponed upon notification to the State and Regional Water Boards if hazardous conditions prevail.

Analytical Chemistry Methods: All constituents must be analyzed using the lowest minimum detection limits comparable to the Ocean Plan water quality objectives. For metal analysis, all samples, including storm water effluent, reference samples, and ocean receiving water samples, must be analyzed by the approved analytical method with the lowest minimum detection limits (currently Inductively Coupled Plasma/Mass Spectrometry) described in the Ocean Plan.

A. CORE DISCHARGE MONITORING PROGRAM

1. General sampling requirements for timing and storm size:

   Runoff must be collected during a storm event that is greater than 0.1 inch and generates runoff, and at least 72 hours from the previously measurable storm event. Runoff samples shall be collected during the same storm and at approximately the same time when post-

storm receiving water is sampled, and analyzed for the same constituents as receiving water and reference site samples (see section IV B) as described below.

2. Runoff flow measurements

   a. For municipal/industrial storm water outfalls in existence as of December 31, 2007, 18 inches (457mm) or greater in diameter/width (including multiple outfall pipes in combination having a width of 18 inches, runoff flows must be measured or calculated, using a method acceptable to and approved by the State and Regional Water Boards.

   b. This will be reported annually for each precipitation season to the State and Regional Water Boards.

3. Runoff samples – storm events

   a. For outfalls equal to or greater than 18 inches (0.46m) in diameter or width:

      (1) samples of storm water runoff shall be collected during the same storm as receiving water samples and analyzed for oil and grease, total suspended solids, and, within the range of the southern sea otter indicator bacteria or some other measure of fecal contamination; and

      (2) samples of storm water runoff shall be collected and analyzed for critical life stage chronic toxicity (one invertebrate or algal species) at least once during each storm season when receiving water is sampled in the ASBS.

      (3) If an applicant has no outfall greater than 36 inches, then storm water runoff from the applicant's largest outfall shall be further collected during the same storm as receiving water samples and analyzed for Ocean Plan Table B metals for protection of marine life, Ocean Plan polynuclear aromatic hydrocarbons (PAHs), current use pesticides (pyrethroids and OP pesticides), and nutrients (ammonia, nitrate and phosphates).

   b. For outfalls equal to or greater than 36 inches (0.91m) in diameter or width:

      (1) samples of storm water runoff shall be collected during the same storm as receiving water samples and analyzed for oil and grease, total suspended solids, and, within the range of the southern sea otter indicator bacteria or some other measure of fecal contamination; and

      (2) samples of storm water runoff shall be further collected during the same storm as receiving water samples and analyzed for Ocean Plan Table B metals for protection of marine life, Ocean Plan polynuclear aromatic hydrocarbons (PAHs), current use pesticides (pyrethroids and OP pesticides), and nutrients (ammonia, nitrate and phosphates); and

      (3) samples of storm water runoff shall be collected and analyzed for critical life stage chronic toxicity (one invertebrate or algal species) at least once during each storm season when receiving water is sampled in the ASBS.

IV (B)] in addition to (a.) and (b.) above, a minimum of the two largest outfalls or 20 percent of the larger outfalls, whichever is greater, shall be sampled (flow weighted composite samples) at least three times annually during wet weather (storm event) and analyzed for all Ocean Plan Table A constituents, Table B constituents for marine aquatic life protection (except for toxicity, only chronic toxicity for three species shall be required), DDT, PCBs, Ocean Plan PAHs, OP pesticides, pyrethroids, nitrates, phosphates, and Ocean Plan indicator bacteria. For parties discharging to ASBS in more than one Regional Water Board region, at a minimum, one (the largest) such discharge shall be sampled annually in each Region.

4. The Executive Director of the State Water Board (statewide permits) or Executive Officer of the Regional Water Board (Regional Water Board permits) may reduce or suspend core monitoring once the storm runoff is fully characterized. This determination may be made at any point after the discharge is fully characterized, but is best made after the monitoring results from the first permit cycle are assessed.

B. Ocean Receiving Water and Reference Area Monitoring Program

In addition to performing the Core Discharge Monitoring Program in Section II.A above, all applicants having authorized discharges must perform ocean receiving water monitoring. In order to fulfill the requirements for monitoring the physical, chemical, and biological characteristics of the ocean receiving waters within their ASBS, dischargers may choose either (1) an individual monitoring program, or (2) participation in a regional integrated monitoring program.

1. Individual Monitoring Program: The requirements listed below are for those dischargers who elect to perform an individual monitoring program to fulfill the requirements for monitoring the physical, chemical, and biological characteristics of the ocean receiving waters within the affected ASBS. In addition to Core Discharge Monitoring, the following additional monitoring requirements shall be met:

    a. Three times annually, during wet weather (storm events), the receiving water at the point of discharge from the outfalls described in section (IV)(A)(3)(c) above shall be sampled and analyzed for Ocean Plan Table A constituents, Table B constituents for marine aquatic life, DDT, PCBs, Ocean Plan PAHs, OP pesticides, pyrethroids, nitrates, phosphates, salinity, chronic toxicity (three species), and Ocean Plan indicator bacteria.

    The sample location for the ocean receiving water shall be in the surf zone at the point of discharges; this must be at the same location where storm water runoff is sampled. Receiving water shall be sampled prior to (pre-storm) and during (or immediately after) the same storm (post storm). Post storm sampling shall be during the same storm and at approximately the same time as when the runoff is sampled. Reference water quality shall also be sampled three times annually and analyzed for the same constituents pre-storm and post-storm, during the same storm seasons when receiving water is sampled. Reference stations will be determined by the State Water Board's Division of Water Quality and the applicable Regional Water Board(s).

    b. Sediment sampling shall occur at least three times during every five (5) year period. The subtidal sediment (sand or finer, if present) at the discharge shall be sampled and analyzed for Ocean Plan Table B constituents for marine aquatic life, DDT, PCBs, PAHs,

using the amphipod *Eohaustorius estuarius* must be performed.

c. A quantitative survey of intertidal benthic marine life shall be performed at the discharge and at a reference site. The survey shall be performed at least once every five (5) year period. The survey design is subject to approval by the Regional Water Board and the State Water Board's Division of Water Quality. The results of the survey shall be completed and submitted to the State Water Board and Regional Water Board at least six months prior to the end of the permit cycle.

d. Once during each five (5) year period, a bioaccumulation study shall be conducted to determine the concentrations of metals and synthetic organic pollutants at representative discharge sites and at representative reference sites. The study design is subject to approval by the Regional Water Board and the State Water Board's Division of Water Quality. The bioaccumulation study may include California mussels (*Mytilus californianus*) and/or sand crabs (*Emerita analoga* or *Blepharipoda occidentalis*). Based on the study results, the Regional Water Board and the State Water Board's Division of Water Quality, may adjust the study design in subsequent permits, or add or modify additional test organisms (such as shore crabs or fish), or modify the study design appropriate for the area and best available sensitive measures of contaminant exposure.

e. Marine Debris: Representative quantitative observations for trash by type and source shall be performed along the coast of the ASBS within the influence of the discharger's outfalls. The design, including locations and frequency, of the marine debris observations is subject to approval by the Regional Water Board and State Water Board's Division of Water Quality.

f. The monitoring requirements of the Individual Monitoring Program in this section are minimum requirements. After a minimum of one (1) year of continuous water quality monitoring of the discharges and ocean receiving waters, the Executive Director of the State Water Board (statewide permits) or Executive Officer of the Regional Water Board (Regional Water Board permits) may require additional monitoring, or adjust, reduce or suspend receiving water and reference station monitoring. This determination may be made at any point after the discharge and receiving water is fully characterized, but is best made after the monitoring results from the first permit cycle are assessed.

2. Regional Integrated Monitoring Program: Dischargers may elect to participate in a regional integrated monitoring program, in lieu of an individual monitoring program, to fulfill the requirements for monitoring the physical, chemical, and biological characteristics of the ocean receiving waters within their ASBS. This regional approach shall characterize natural water quality, pre- and post-storm, in ocean reference areas near the mouths of identified open space watersheds and the effects of the discharges on natural water quality (physical, chemical, and toxicity) in the ASBS receiving waters, and should include benthic marine aquatic life and bioaccumulation components. The design of the ASBS stratum of a regional integrated monitoring program may deviate from the otherwise prescribed individual monitoring approach (in Section IV.B.1) if approved by the State Water Board's Division of Water Quality and the Regional Water Boards.

   a. Ocean reference areas shall be located at the drainages of flowing watersheds with minimal development (in no instance more than 10% development), and shall not be located in CWA Section 303(d) listed waterbodies or have tributaries that are 303(d)

listed. Reference areas shall be free of wastewater discharges and anthropogenic non-storm water runoff. A minimum of low threat storm runoff discharges (e.g. stream highway overpasses and campgrounds) may be allowed on a case-by-case basis. Reference areas shall be located in the same region as the ASBS receiving water monitoring occurs. The reference areas for each Region are subject to approval by the participants in the regional monitoring program and the State Water Board's Division of Water Quality and the applicable Regional Water Board(s). A minimum of three ocean reference water samples must be collected from each station, each from a separate storm during the same storm season that receiving water is sampled. A minimum of one reference location shall be sampled for each ASBS receiving water site sampled per responsible party. For parties discharging to ASBS in more than one Regional Water Board region, at a minimum, one reference station and one receiving water station shall be sampled in each region.

b. ASBS ocean receiving water must be sampled in the surf zone at the location where the runoff makes contact with ocean water (i.e. at "point zero"). Ocean receiving water stations must be representative of worst-case discharge conditions (i.e. co-located at a large drain greater than 36 inches, or if drains greater than 36 inches are not present in the ASBS then the largest drain greater than18 inches.) Ocean receiving water stations are subject to approval by the participants in the regional monitoring program and the State Water Board's Division of Water Quality and the applicable Regional Water Board(s). A minimum of three ocean receiving water samples must be collected during each storm season from each station, each from a separate storm. A minimum of one receiving water location shall be sampled in each ASBS per responsible party in that ASBS. For parties discharging to ASBS in more than one Regional Water Board region, at a minimum, one reference station and one receiving water station shall be sampled in each region.

c. Reference and receiving water sampling shall commence during the first full storm season following the adoption of these special conditions, and post-storm samples shall be collected during the same storm event when storm water runoff is sampled. Sampling shall occur in a minimum of two storm seasons. For those ASBS dischargers that have already participated in the Southern California Bight 2008 ASBS regional monitoring effort, sampling may be limited to only one storm season.

d. Receiving water and reference samples shall be analyzed for the same constituents as storm water runoff samples. At a minimum, constituents to be sampled and analyzed in reference and discharge receiving waters must include oil and grease, total suspended solids, Ocean Plan Table B metals for protection of marine life, Ocean Plan PAHs, pyrethroids, OP pesticides, ammonia, nitrate, phosphates, and critical life stage chronic toxicity for three species. In addition, within the range of the southern sea otter, indicator bacteria or some other measure of fecal contamination shall be analyzed.

3. Waterfront and Marine Operations: In addition to the above requirements for ocean receiving water monitoring, additional monitoring must be performed for marinas and boat launch and pier facilities:

   a. For all marina or mooring field operators, in mooring fields with 10 or more occupied moorings, the ocean receiving water must be sampled for Ocean Plan indicator bacteria, residual chlorine, copper, zinc, grease and oil, methylene blue active substances (MBAS), and ammonia nitrogen.

(1) For mooring field operators opting for an individual monitoring program (Section IV.B.1 above), this sampling must occur weekly (on the weekend) from May through October.

(2) For mooring field operators opting to participate in a regional integrated monitoring program (Section IV.B.2 above), this sampling must occur monthly from May through October on a high use weekend in each month. The Water Boards may allow a reduction in the frequency of sampling, through the regional monitoring program, after the first year of monitoring.

b. For all mooring field operators, the subtidal sediment (sand or finer, if present) within mooring fields and below piers shall be sampled and analyzed for Ocean Plan Table B metals (for marine aquatic life beneficial use), acute toxicity, PAHs, and tributyltin. For sediment toxicity testing, only an acute toxicity test using the amphipod *Eohaustorius estuarius* must be performed. This sampling shall occur at least three times during a five (5) year period. For mooring field operators opting to participate in a regional integrated monitoring program, the Water Boards may allow a reduction in the frequency of sampling after the first sampling effort's results are assessed.

Glossary

At the point of discharge(s) – Means in the surf zone immediately where runoff from an outfall meets the ocean water (a.k.a., at point zero).

Areas of Special Biological Significance (ASBS) – Those areas designated by the State Water Board as ocean areas requiring protection of species or biological communities to the extent that alteration of natural water quality is undesirable. All Areas of Special Biological Significance are also classified as a subset of State Water Quality Protection Areas.

Design storm – For purposes of these Special Protections, a design storm is defined as the volume of runoff produced from one inch of precipitation per day or, if this definition is inconsistent with the discharger's applicable storm water permit, then the design storm shall be the definition included in the discharger's applicable storm water permit.

Development – Relevant to reference monitoring sites, means urban, industrial, agricultural, grazing, mining, and timber harvesting land uses.

Higher threat discharges - Permitted storm drains discharging equal to or greater than 18 inches, industrial storm drains, agricultural runoff discharged through an MS4, discharges associated with waterfront and marina operations (e.g., piers, launch ramps, mooring fields, and associated vessel support activities, except for passive discharges defined below), and direct discharges associated with commercial or industrial activities to ASBS.

Low Impact Development (LID) – A sustainable practice that benefits water supply and contributes to water quality protection. Unlike traditional storm water management, which entails collecting and conveying storm water runoff through storm drains, pipes, or other conveyances to a centralized storm water facility, LID focuses on using site design and storm water management to maintain the site's pre-development runoff rates and volumes. The goal of LID is to mimic a site's predevelopment hydrology by using design techniques that infiltrate, filter, store, evaporate, and detain runoff close to the source of rainfall.

Marine Operations – Marinas or mooring fields that contain slips or mooring locations for 10 or more vessels.

Management Measure (MM) - Economically achievable measures for the control of the addition of pollutants from various classes of nonpoint sources of pollution, which reflect the greatest degree of pollutant reduction achievable through the application of the best available nonpoint pollution control practices, technologies, processes, siting criteria, operating methods, or other alternatives. For example, in the "marinas and recreational boating" land-use category specified in the Plan for California's Nonpoint Source Pollution Control Program (NPS Program Plan) (SWRCB, 1999), "boat cleaning and maintenance" is considered a MM or the source of a specific class or type of NPS pollution.

Management Practice (MP) - The practices (e.g., structural, non-structural, operational, or other alternatives) that can be used either individually or in combination to address a specific MM class or classes of NPS pollution. For example, for the "boat cleaning and maintenance" MM, specific MPs can include, but are not limited to, methods for the selection of environmentally sensitive hull paints or methods for cleaning/removal of hull copper anti-fouling paints.

Municipal Separate Storm Sewer System (MS4) – A municipally-owned storm sewer system regulated under the Phase I or Phase II storm water program implemented in compliance with Clean Water Act section 402(p). Note that an MS4 program's boundaries are not necessarily congruent with the permittee's political boundaries.

Natural Ocean Water Quality - The water quality (based on selected physical, chemical and biological characteristics) that is required to sustain marine ecosystems, and which is without apparent human influence, *i.e.*, an absence of significant amounts of: (a) man-made constituents (*e.g.,* DDT); (b) other chemical (*e.g.,* trace metals), physical (temperature/thermal pollution, sediment burial), and biological (*e.g.*, bacteria) constituents at concentrations that have been elevated due to man's activities above those resulting from the naturally occurring processes that affect the area in question; and (c) non-indigenous biota (*e.g.,* invasive algal bloom species) that have been introduced either deliberately or accidentally by man. Discharges "*shall not alter natural ocean water quality*" as determined by a comparison to the range of constituent concentrations in reference areas agreed upon via the regional monitoring program(s). If monitoring information indicates that *natural ocean water quality* is not maintained, but there is sufficient evidence that a discharge is not contributing to the alteration of natural water quality, then the Regional Water Board may make that determination. In this case, sufficient information must include runoff sample data that has equal or lower concentrations for the range of constituents at the applicable reference area(s).

Nonpoint source – Nonpoint pollution sources generally are sources that do not meet the definition of a point source. Nonpoint source pollution typically results from land runoff, precipitation, atmospheric deposition, agricultural drainage, marine/boating operations or hydrologic modification. Nonpoint sources, for purposes of these Special Protections, include discharges that are not required to be regulated under an NPDES permit.

Non-storm water discharge – Any runoff that is not the result of a precipitation event. This is often referred to as "dry weather flow."

Non-structural control – A Best Management Practice that involves operational, maintenance, regulatory (e.g., ordinances) or educational activities designed to reduce or eliminate pollutants in runoff, and that are not structural controls (i.e. there are no physical structures involved).

Physical impossibility - Means any act of God, war, fire, earthquake, windstorm, flood or natural catastrophe; unexpected and unintended accidents not caused by discharger or its employees' negligence; civil disturbance, vandalism, sabotage or terrorism; restrain by court order or public authority or agency; or action or non-action by, or inability to obtain the necessary authorizations or approvals from any governmental agency other than the permittee.

Representative sites and monitoring procedures – Are to be proposed by the discharger, with appropriate rationale, and subject to approval by Water Board staff.

Sheet-flow – Runoff that flows across land surfaces at a shallow depth relative to the cross-sectional width of the flow. These types of flow may or may not enter a storm drain system before discharge to receiving waters.

Storm Season – Also referred to as rainy season, means the months of the year from the onset of rainfall during autumn until the cessation of rainfall in the spring.

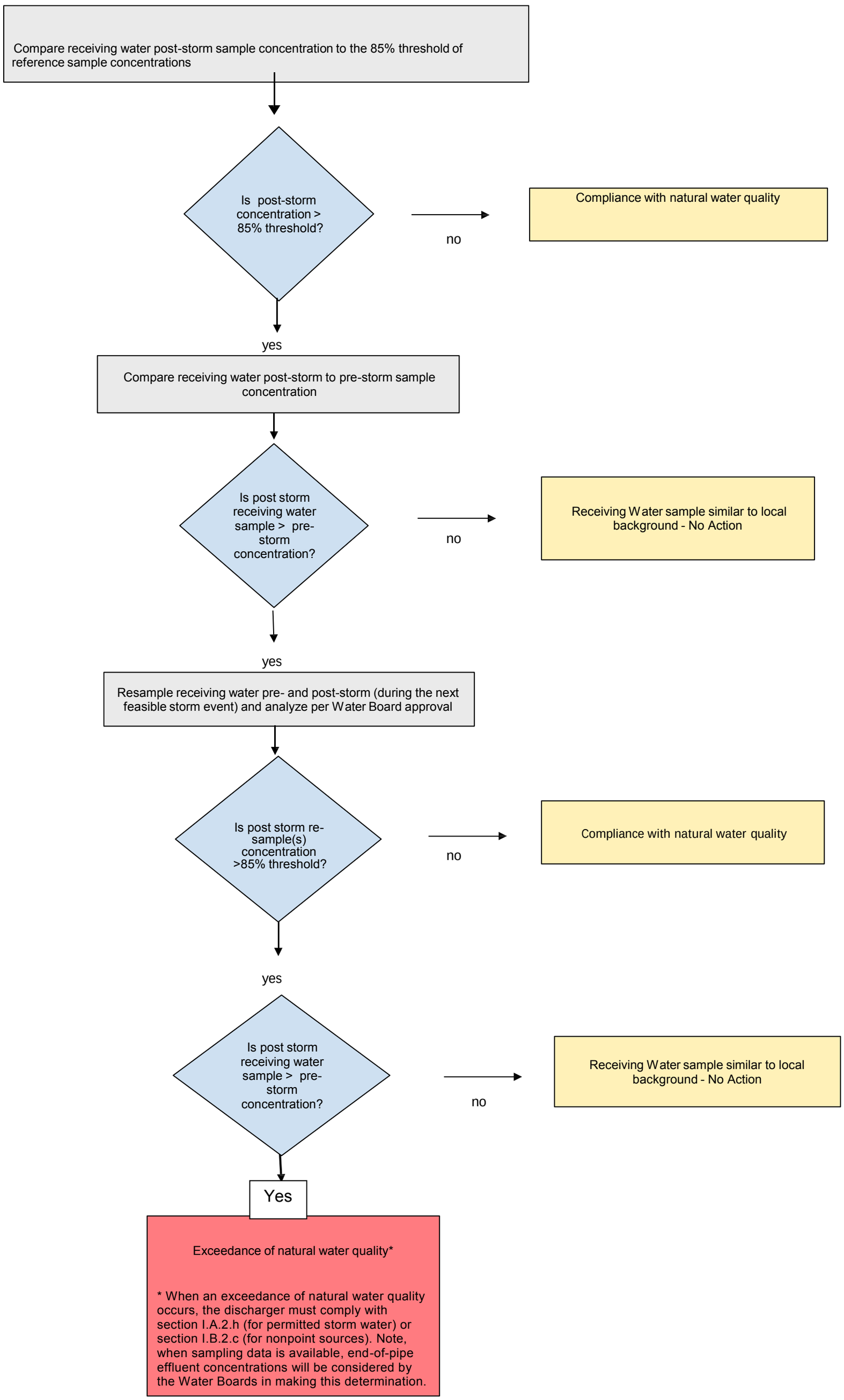
Structural control – A Best Management Practice that involves the installation of engineering solutions to the physical treatment or infiltration of runoff.

Surf Zone - The surf zone is defined as the submerged area between the breaking waves and the shoreline at any one time.

Surface Water Ambient Monitoring Program (SWAMP) comparable – Means that the monitoring program must 1) meet or exceed 2008 SWAMP Quality Assurance Program Management Plan (QAPP) Measurement Quality Objectives, or 2) have a Quality Assurance Project Plan that has been approved by SWAMP; in addition data must be formatted to match the database requirements of the SWAMP Information Management System. Adherence to the measurement quality objectives in the Southern California Bight 2008 ASBS Regional Monitoring Program QAPP and data base management comprises being SWAMP comparable.

Waterfront Operations - Piers, launch ramps, and cleaning stations in the water or on the adjacent shoreline.

Attachment 1
Special Protections Sections I(A)(3)(e) and I(B)(3)(e)
Flowchart to Deteremine Compliance with natural Water Quality



ATTACHMENT G

Standard NPDES Stormwater Permit Provisions

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD SAN FRANCISCO BAY REGION

Standard Provisions and Reporting Requirements for NPDES Stormwater Discharge Permits

November 19, 2015

A. GENERAL PROVISIONS

1. Neither the treatment nor the discharge of pollutants shall create a pollution, contamination, or nuisance as defined by Section 13050 of the California Water Code.

2. All discharges authorized by this Order shall be consistent with the terms and conditions of this Order.

3. Duty to Comply

a. If a toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is established under Section 307(a) of the Clean Water Act, or amendments thereto, for a toxic pollutant which is present in the discharge authorized herein and such standard or prohibition is more stringent than any limitation upon such pollutant in a Board adopted Order, discharger must comply with the new standard or prohibition. The Board will revise or modify the Order in accordance with such toxic effluent standard or prohibition and so notify the discharger.

b. If more stringent applicable water quality standards are approved pursuant to Section 303 of the Clean Water Act, or amendments thereto, the discharger must comply with the new standard. The Board will revise and modify this Order in accordance with such more stringent standards.

c. The filing of a request by the discharger for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition. [40 CFR 122.41(f)]

4. Duty to Mitigate

The discharger shall take all reasonable steps to minimize or prevent any discharge in violation of this order and permit which has a reasonable likelihood of adversely affecting public health or the environment, including such accelerated or additional monitoring as requested by the Board or Executive Officer to determine the nature and impact of the violation. [40 CFR 122.41(d)]

5. Pursuant to U.S. Environmental Protection Agency regulations the discharger must notify the Water Board as soon as it knows or has reason to believe (1) that they have begun or expect to begin, use or manufacture of a pollutant not reported in the permit application,

or (2) a discharge of toxic pollutants not limited by this permit has occurred, or will occur, in concentrations that exceed the limits specified in 40 CFR 122.42(a).

6. The discharge of any radiological, chemical, or biological warfare agent waste is prohibited.

7. All facilities used for transport, treatment, or disposal of wastes shall be adequately protected against overflow or washout as the result of a 100-year frequency flood.

8. Collection, treatment, storage and disposal systems shall be operated in a manner that precludes public contact with wastewater, except where excluding the public is inappropriate, warning signs shall be posted.

9. Property Rights

This Order and Permit does not convey any property rights of any sort or any exclusive privileges. The requirements prescribed herein do not authorize the commission of any act causing injury to the property of another, nor protect the discharger from liabilities under federal, state or local laws, nor create a vested right for the discharge to continue the waste discharge or guarantee the discharger a capacity right in the receiving water. [40 CFR 122.41(g)]

10. Inspection and Entry

The Board or its authorized representatives shall be allowed:

a. Entry upon premises where a regulated facility or activity is located or conducted, or where records are kept under the conditions of the order and permit;

b. Access to and copy at, reasonable times, any records that must be kept under the conditions of the order and permit;

c. To inspect at reasonable times any facility, equipment (including monitoring and control equipment), practices, or operations regulated or required under the order and permit; and

d. To photograph, sample, and monitor, at reasonable times for the purpose of assuring compliance with the order and permit or as otherwise authorized by the Clean Water Act, any substances or parameters at any locations. [40 CFR 122.41(i)]

11. Permit Actions

This Order and Permit may be modified, revoked and reissued, or terminated in accordance with applicable State and/or Federal regulations. Cause for taking such action includes, but is not limited to any of the following:

a. Violation of any term or condition contained in the Order and Permit;

b. Obtaining the Order and Permit by misrepresentation, or by failure to disclose fully all relevant facts;

c. Endangerment to public health or environment that can only be regulated to acceptable levels by order and permit modification or termination; and

d. Any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge.

12. Duty to Provide Information

The discharger shall furnish, within a reasonable time, any information the Board may request to determine whether cause exists for modifying, revoking and reissuing, or terminating the permit. The discharger shall also furnish to the Board, upon request, copies of records required to be kept by its permit. [40 CFR 122.41(h)]

13. Availability

A copy of this permit shall be maintained at the discharge facility and be available at all times to operating personnel.

14. Continuation of Expired Permit

This permit continues in force and effect until a new permit is issued or the Board rescinds the permit. Only those dischargers authorized to discharge under the expiring permit are covered by the continued permit.

B. GENERAL REPORTING REQUIREMENTS

1. Signatory Requirements

a. All reports required by the order and permit and other information requested by the Board or U.S. EPA Region 9 shall be signed by a principal executive officer or ranking elected official of the discharger, or by a duly authorized representative of that person. [40 CFR 122.22(b)]

b. Certification

All reports signed by a duly authorized representative under Provision E.1.a. shall contain the following certification:
"I certify under penalty of law that this document and all attachments are prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations." [40 CFR 122.22(d)]

2. Should the discharger discover that it failed to submit any relevant facts or that it submitted incorrect information in any report, it shall promptly submit the missing or correct information. [40 CFR 122.41(l)(8)]

3. False Reporting

Any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall be subject to enforcement procedures as identified in Section F of these Provisions.

4. Transfers

a. This permit is not transferable to any person except after notice to the Board. The Board may require modification or revocation and reissuance of the permit to change the name of the Permittee and incorporate such other requirements as may be necessary under the Clean Water Act.

b. Transfer of control or ownership of a waste discharge facility under an National Pollutant Discharge Elimination System permit must be preceded by a notice to the Board at least 30 days in advance of the proposed transfer date. The notice must include a written agreement between the existing discharger and proposed discharger containing specific dates for transfer of responsibility, coverage, and liability between them. Whether an order and permit may be transferred without modification or revocation and reissuance is at the discretion of the Board. If order and permit modification or revocation and reissuance is necessary, transfer may be delayed 180 days after the Board's receipt of a complete application for waste discharge requirements and an NPDES permit.

5. Compliance Reporting

a. Planned Changes

The discharger shall file with the Board a report of waste discharge at least 120 days before making any material change or proposed change in the character, location or volume of the discharge.

b. Compliance Schedules

Reports of compliance or noncompliance with, or any progress reports on, interim and final compliance dates contained in any compliance schedule shall be submitted within 10 working days following each scheduled date unless otherwise specified within this order and permit. If reporting noncompliance, the report shall include a description of the reason for failure to comply, a description and schedule of tasks necessary to achieve compliance and an estimated date for achieving full compliance. A final report shall be submitted within 10 working days of achieving full compliance, documenting full compliance

c. Non-compliance Reporting (Twenty-four hour reporting:)

i. The discharger shall report any noncompliance that may endanger health or the environment. All pertinent information shall be provided orally within 24 hours from the time the discharger becomes aware of the circumstances. A written submission shall also be provided within five working days of the time the discharger becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times and, if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

C. ENFORCEMENT

1. The provision contained in this enforcement section shall not act as a limitation on the statutory or regulatory authority of the Board.

2. Any violation of the permit constitutes violation of the California Water Code and regulations adopted hereunder and the provisions of the Clean Water Act, and is the basis for enforcement action, permit termination, permit revocation and reissuance, denial of an application for permit reissuance; or a combination thereof.

3. The Board may impose administrative civil liability, may refer a discharger to the State Attorney General to seek civil monetary penalties, may seek injunctive relief or take other appropriate enforcement action as provided in the California Water Code or federal law for violation of Board orders.

4. It shall not be a defense for a discharger in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this order and permit.

5. A discharger seeking to establish the occurrence of any upset (See Definitions, G. 24) has the burden of proof. A discharger who wishes to establish the affirmative defense of any upset in an action brought for noncompliance shall demonstrate, through properly signed contemporaneous operating logs, or other relevant evidence that:

a. an upset occurred and that the Permittee can identify the cause(s) or the upset;

b. the permitted facility was being properly operated at the time of the upset;

c. the discharger submitted notice of the upset as required in paragraph E.6.d.; and

d. the discharger complied with any remedial measures required under A.4.

No determination made before an action for noncompliance, such as during administrative review of claims that noncompliance was caused by an upset, is final administrative action subject to judicial review.
In any enforcement proceeding, the discharger seeking to establish the occurrence of any upset has the burden of proof. [40 CFR 122.41(n)]

D. DEFINITIONS

1. Duly authorized representative is one whose:

a. Authorization is made in writing by a principal executive officer or ranking elected official;

b. Authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as general manager in a partnership, manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.); and

c. Written authorization is submitted to the U.S. EPA Region 9. If an authorization becomes no longer accurate because a different individual or position has

responsibility for the overall operation of the facility, a new authorization satisfying the requirements above must be submitted to the Board and U.S. EPA Region 9 prior to or together with any reports, information, or applications to be signed by an authorized representative.

2. Hazardous substance means any substance designated under 40 CFR 116 pursuant to Section 311 of the Clean Water Act.

3. Priority pollutants are those constituents referred to in 40 CFR S122, Appendix D and listed in the U.S. EPA NPDES Application Form 2C, (dated 6/80) Items V-3 through V-9.

4. Storm Water means storm water runoff, snow melt runoff, and surface runoff and drainage. It excludes infiltration and runoff from agricultural land.

5. Toxic pollutant means any pollutant listed as toxic under Section 307(a)(1) of the Clean Water Act or under 40 CFR S401.15.

6. Waste, waste discharge, discharge of waste, and discharge are used interchangeably in this order and permit. The requirements of this order and permit are applicable to the entire volume of water, and the material therein, which is disposed of to surface and ground waters of the State of California.

Appendix C

Trash Capture Plan

Schaaf & Wheeler
CONSULTING CIVIL ENGINEERS

870 Market Street, Suite 1278
San Francisco, CA 94102-2906
(415) 433-4848
FAX (415) 433-1029
swsf@swsv.com

DRAFT FINAL MEMO

TO: Larry Lind, City of Los Altos

DATE: January 5, 2011

FROM: Schaaf & Wheeler:
M. Eliza McNulty, P.E.
Dan Schaaf, P.E.
Stephanie Conran, P.E.

JOB #: COLA.02.10

SUBJECT: City of Los Altos Trash Capture Plan – Draft Final Report

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1. Introduction / Background

1.1. Purpose of the Plan

This Trash Capture Plan has been created in response to requirements set forth in the new Municipal Regional Stormwater Permit, Provision C.10. Before now, the Permit has included regulations on a variety of pollutants that the City of Los Alto (City) has effectively complied with to improve the conditions of its receiving waters. The new permit now includes trash as one of these pollutants to be regulated. The City has retained Schaaf & Wheeler to prepare this Trash Capture Plan in an effort to comply with the regulations of the new Permit by creating a strategy to effectively reach required milestones within the allotted timeframes.

1.2. Brief Summary of the City of Los Altos (City)

The City of Los Altos is on the southern end of the San Francisco Peninsula in Santa Clara County. It is bordered by Los Altos Hills, Sunnyvale, Mountain View, Palo Alto, Cupertino, and Unincorporated Santa Clara County. Los Altos is relatively flat, with elevations ranging from 50 feet National Geodetic Vertical Datum (NGVD), to about 450 feet NGVD. Although open space is scattered throughout the City, the vast majority of Los Altos has been urbanized with various residential and commercial land uses. Runoff

generated within the City's boundary is conveyed through the City owned storm drain system that outfalls to four creeks (Hale, Permanente, Adobe, and Stevens) and then to the San Francisco Bay. Because the City of Los Altos is located at the toe of the Santa Cruz Mountains, the capacity of these drainage systems is linked to the slope of the land and influence of the creek channels.

1.3. Regulatory Background

The new NPDES permit has been issued, Order R2-2009-0074, dated October 14, 2009. As part of this new permit, trash reduction requirements have been implemented as outlined in Provision C.10. SCVURPPP oversees the implementation trash reduction requirements and reports to the Regional Board in behalf of all the individual Permitees.

1.3.1. NPDES Permit Requirements

1.3.1.1. Progress Report Feb 1, 2011

The NPDES permit requires each permittee to submit a progress report that indicates whether it is determining its baseline trash load and trash load reduction method individually or collaboratively with other permittees and a summary of the approach being used.

SCVURPPP is expected to provide the data and methodology upon which the baseline trash load calculations will be based. Los Altos will use this data together with their GIS data to make the calculations. Los Altos will submit the required progress report to SCVURPPP who will then compile the report with the reports from the other Permittees and submit them collectively.

1.3.1.2. Short-Term Plan by Feb 1, 2012

The NPDES Permit states that each Permittee shall submit a Short-Term Trash Load Reduction Plan, including an implementation schedule, to the Water Board by February 1, 2012. The Plan must describe control measures and BMPs, including any trash reduction ordinances, that are currently being implemented and the current level of implementation. Additional control measures and BMPs that will be implemented, and/or an increased level of implementation designed to attain a 40% trash load reduction from its MS4 by July 1, 2014 shall also be included. The Short-Term Plan shall account for the required mandatory minimum full trash capture device(s) and trash hot spot cleanup, described in Section 3 and 1.4 of this report, respectively. The City shall be responsible for completing the Short-Term Plan.

1.3.1.3. Baseline Load and Reduction Tracking Method by Feb. 1, 2012

Each Permittee shall determine the baseline trash load from its MS4 to establish the basis for trash load reductions and submit the determined load level to the Water Board by February 1, 2012, along with documentation of methodology used to determine the load level. The submittal shall also include a description of

the trash load reduction tracking method that will be used to account for trash load reduction actions and to demonstrate progress and attainment of trash load reduction levels. The submittal shall account for the drainage areas of a Permittee's jurisdiction that are associated with the baseline trash load from its MS4, and the baseline trash load level per unit area by land use type and drainage area characteristics used to derive the total baseline trash load level.

The Baseline Load and Trash Tracking Method report will be submitted by Los Altos or SCVURPPP and will not fall under the responsibility of the City. The City will be involved in a collaborative effort with SCVURPPP during this process for reasons explained throughout this report.

1.3.1.4. Full Capture Device treating 20 acres by July 1, 2014

Permittees shall install and maintain a mandatory minimum number of full trash capture devices by July 1, 2014. The City must install one or more trash capture device(s) that traps all particles retained by a 5 mm mesh screen with a design treatment capacity at least equal to the 1-year (generally 85th percentile), 1-hour storm for a 20 acre area of commercial land use .

1.3.1.5. Long-Term Plan by Feb 1, 2014

Each Permittee shall submit a Long-Term Trash Load Reduction Plan, including an implementation schedule, to the Water Board by February 1, 2014. The Plan shall describe control measures and BMPs, including any trash reduction ordinances, that are being implemented and the level of implementation. Any additional control measures and BMPs that will be implemented and/or an increased level of implementation designed to attain a 70% trash load reduction from its MS4 by July 1, 2017, and 100% by July 1, 2022, shall be included. The City shall be responsible for generating the Long-Term Plan.

1.3.1.6. 40% Reduction in Baseline by July 1, 2014

The Short-Term Trash Load Reduction Plan must be fully implemented to attain a 40% reduction by July 1, 2014.

1.3.1.7. 70% Reduction in Baseline by 2017

The Long-Term Trash Load Reduction Plan must be fully implemented to attain a 70% reduction by July 1, 2017 according to the current permit. However, since these deadlines fall after the issuance of the next permit, it is possible that this could change.

1.3.1.8. 100% Reduction in Baseline by 2022

The Long-Term Trash Load Reduction Plan must be fully implemented to attain a 100% reduction by July 1, 2022 according to the current permit. However, since these deadlines fall after the issuance of the next permit, it is possible that this could change.

1.3.1.9. Reporting Requirements

Permittees are required to submit annual reports to the Water Board showing progress toward meeting the regulatory requirements. In the past, the City has submitted annual reports to SCVURPPP as required by the Permit, who then submits a single annual report to the Water Board on behalf of all of the co-permittees. Annual reporting requirements specific to trash reduction include a summary of trash load reduction actions (control measures and BMPs) including: the types of actions and levels of implementation; the total trash loads and dominant types of trash removed by its actions; and the total trash loads and dominant types of trash for each type of action. Trash hot spot data (see Section 1.4) shall also be included. Beginning with the 2012 Annual Report, each Permittee shall report its percent annual trash load reduction relative to its baseline trash load.

The Permittees shall retain records for review, providing supporting documentation of trash load reduction actions. These records will also include volume and dominant type of trash removed from full trash capture devices, each Trash Hot Spot cleanup, and additional control measures or BMPs implemented. Data may be combined for specific types of full trash capture devices deployed in the same drainage area.

1.3.2. SCVURPPP's Role

1.3.2.1. Establish Baseline

Los Altos will submit the Progress Report to SCVURPPP as required by the Permit. This Progress Report will include a summary of the approach used to establish the baseline trash load.

Trash reduction goals in the NPDES permit are stated in terms of a percentage reduction and not volume. These reduction goals are intended to reflect the percentage of trash produced that will be captured. Therefore, a baseline trash load must be established to set the trash load currently being generated within the City limits. SCVURPPP is in the process of establishing data, reduction factors, and methodology upon which the Permittees will base their baseline calculations on.

It appears that SCVURPPP supply land use and other GIS data received by the Association of Bay Area Governments (ABAG). The City is in possession of GIS data that is greatly superior to this data. The City should use its own SDMP GIS data together with SCVURPPP's reduction factors and methodology to establish their baseline.

1.3.2.2. Establish Trash Load Reduction Tracking Method

SCVURPPP will determine the trash load reduction tracking method that will be used to account for trash load reduction actions. The City will need to apply this method to demonstrate progress and attainment of trash load reduction levels.

1.3.3. San Francisco Estuary Partnership's Role

1.3.3.1. General Program description

In October 2009, the San Francisco Estuary Partnership (SFEP) was awarded $5 million in federal stimulus funds (American Recovery and Reinvestment Act of 2009) to support a Bay Area-wide Trash Capture Demonstration Project. All Bay Area cities and counties that wish to participate will receive trash capture devices to retrofit existing storm drainage infrastructure. In addition to allowing municipalities try out different types of devices, the project will kick off compliance with new permit requirements and provide for monitoring and information sharing among agencies. This collaborative, regional project is funded through the State Water Resources Control Board's Clean Water State Revolving Fund.

1.3.3.2. City commitment deadline of January 1, 2011

In July, SFEP sent the City a contract which will need to be signed and returned to SFEP to secure the allotment of grant funds set aside for the City of Los Altos. This contract needs to be received by SFEP by January 1, 2011. SFEP has confirmed that there may be some leniency to this date if it is clear that the funds are desired; the City has begun the process of getting the contract signed, and a best possible effort is being made to get it returned as quickly as possible. If the City chooses not to sign the contract or does not take any action before the deadline, the money will be forfeited and reallocated to another municipality.

1.3.3.3. City allotment of $20,283

The SFEP grant funds have been divided among the various municipalities under the SFEP's stewardship. The allotment set aside for the City of Los Altos is $20,283.

1.4. Hot Spot Requirements

1.4.1. Description of NPDES requirements

Permittees shall cleanup selected Trash Hot Spots to a level of "no visual impact" at least one time per year for the term of the permit. Trash Hot Spots shall be at least 100 yards of creek length. Permittees shall quantify the volume of material removed from Trash Hot Spot cleanup and identify the dominant types of trash removed and their sources to the extent possible. Documentation shall include the trash condition before and after cleanup of the entire hot spot using photo documentation with a minimum of one photo per 50 feet of hot spot length. The City of Los Altos is required to select one Trash Hot Spot.

1.4.2. City Hot Spot: Stevens Creek just downstream of Highway 280

One Hot Spot has been identified for the City of Los Altos which is located on Stevens Creek just downstream of Highway 280. This spot lies on the City's boundary with Cupertino and the efforts to clean it are shared. Since freeways tend to be major trash generators, this is likely the source for the trash problem occurring in this area.

1.4.3. Scheduled for May and September

Trash cleanup for this Hot Spot has taken place in May and September 2010. It is expected that cleanups will occur once per summer in the future. This meets the NPDES requirement of one annual documented cleanup.

1.5. Current City Trash Activities

1.5.1. Parks

Trash clean up in parks is mostly outsourced. Contractors pick up trash daily during the summer and five days per week during the winter. City staff picks up trash the remaining two days during the winter.

1.5.2. Boulevards & Downtown

Boulevards and Downtown areas are inspected and cleaned up as necessary on a weekly basis by City staff. Contractor empties downtown trash cans on a daily basis. The Downtown Association also organizes cleanups.

1.5.3. Street Sweeping

All street sweeping is performed by a contractor and funded by the Solid Waste Program.

1.5.3.1. Residential

Street sweeping is completed once a month during the summer and twice a month during the winter months (December, January, February).

1.5.3.2. Civic Center, Downtown Plaza, Major Streets

Street sweeping is completed once a week and after special events.

1.5.4. Storm Water / Storm Drain Inlets

Storm drains are cleaned in the Fall and on an on-call basis. This is completed by City crews. Storm drain grates are lifted with the assistance of an electric crane and extended shovels are used to remove debris. VAC CON is used only for deep inlets. During heavy leaf season, crews supplement street sweeping by picking up leaves and storm debris with a tractor and dump trucks. Seasonal Storm Patrols also pick up debris.

2. Baseline Trash Load

2.1. Importance of Baseline Value

The baseline trash load is an estimate. It is improbable to physically measure how much trash the City generates; therefore, assumptions are used to estimate the load. This causes uncertainty in the baseline load and it may not accurately reflect how much trash is actually generated. It is critical that the baseline value established be accurate, and not be overestimated. If the value is overestimated, it will be impossible to reach the goals required by the permit. For example if the trash baseline for the City is set incorrectly high, then it would be possible for literally every piece of trash within the City limits to be collected and still not meet the reduction goals. In this scenario, despite reducing trash loads to zero within the City, the data would indicate non-compliance due to an inflated baseline value.

2.2. Volume per Unit Area

Based on draft documents available from SCVURPPP (see 2.4 for a detailed description), it is expected that SCVURPPP's baseline methodology will most likely be based primarily on land use. Each type of land use will be assigned a trash generation factor which states a volume of trash generated per area unit per time unit for that land use. These various trash generation factors would be applied across the City according to existing land use maps.

2.3. Composition of Trash in Relation to Land Use and Drainage Area Characteristics

In addition to the volume of trash, the composition of trash is largely dependent on land use as well. Commercial areas generate larger litter such as cups, wrappers, bags, etc., whereas residential areas produce smaller scraps of litter which become mixed with fallen leaves and branches. It is therefore valuable to focus efforts on commercial areas since a higher percentage of the debris collected will be trash.

2.4. SCVURPPP August Study

SCVURPPP issued a memorandum dated August 10, 2010 named "Preliminary Maps Illustrating Potential Trash Management Areas", outlining a preliminary approach to complying with the new requirements. This memo is understood to be considered a draft.

2.4.1. Summary of Methodology & Findings

This study was focused on providing data to help determine the best locations for trash capture device placement. The study assumed that all catch basins in the City have identical circular drainage areas. Each circular drainage area was intersected with available ABAG land use data. Trash loading rates were applied to land uses based on pilot studies in San Jose and Sunnyvale. The weighted trash rate for each catch basin was determined and ranked.

2.4.2. Discussion of Results

The methods used to determine trash loading and inlet potential capture volumes are reasonable in the absence of better data; however the City does have access to significantly better data. The City will therefore utilize its own SDMP GIS to determine rates and preferred locations for full capture treatment devices, producing maps that create a significantly more reliable approach to full capture device placement. Since the characteristics of Los Altos vary significantly from San Jose and Sunnyvale, this will be a better approach.

2.5. Implications for Tracking Methodology (i.e. implies tracking will need to be volumetric)

Though SCVURPPP did not discuss in their study what they intend to use as a tracking methodology, because the trash generation data was presented as volumes, the tracking method developed may also be volumetric. This would require careful bookkeeping and measuring to track all trash collected from the various methods of trash reduction. This could be problematic because trash capture devices and street sweeping collect more than just trash. Sticks, leaves, and other natural debris will be mixed with trash, particularly in a city like Los Altos where vegetation is plentiful. It is not known whether vegetative debris could be included in the trash volume or whether it must be separated out physically or estimated mathematically.

3. Full Capture Device

3.1. Deadline: July 1, 2014

The required full trash capture device(s) shall be installed and maintained by July 1, 2014. Schaaf & Wheeler recommends that the device be installed by the summer of 2012 so data from the following winter rainy season can demonstrate the 40% trash capture requirement. If the 40% is not reached, the City would have another summer to implement additional action items. This also gives another rainy season to document the trash capture rate.

3.2. Required Standards

The City must install one or more trash capture device(s) that traps all particles retained by a 5 mm mesh screen with a design treatment capacity at least equal to the 1-year, 1-hour storm for a 20 acre area of commercial land use. Statistically, the 1-year, 1-hour storm does not exist. The 85th percentile storm (1.17-year) is a more appropriate event for estimating runoff.

Though several alternatives for locations are provided, only one installation is required. Stated alternatives for locations and devices are included to provide options.

3.3. Recommended Location Alternatives

Four locations have been identified that could satisfy the capture requirements. Each has a minimum of 20 acres of contributing commercial land and each is located in either a parking lot or a very low use residential street (for ease of construction and maintenance). The choice as to which would be the preferred location should be based on cost,

efficiency, hydraulic effects, possession or ability to receive possession of an easement and the desire for publicity (grant funds require publicity in various forms). The choice may also be based on whether the City would prefer to go beyond the minimum short-term requirement and get closer to the ultimate 100% requirement by spending more upfront for a larger device. These locations are shown in Figure 1 and are described below. Pipe flows and dimensions at the device locations are included from the Draft Los Altos Stormdrain Master Plan (Schaaf & Wheeler, 2010).

- **Location #1** – *Calico Corners parking lot (4294 El Camino Real), right before the outfall to Adobe Creek.* This location could be advantageous in that it includes major arterial drainage that, though classified as commercial, typically generates even higher trash loads than commercial areas do. The drainage area is nearly 300 acres and would necessitate a large device with high upfront costs. However, this could be the more cost efficient route in the long term since it may meet most or all of the trash capture requirements, and having a single device could decrease O&M costs. The areas of commercial land use within the drainage area are in close proximity to the proposed device location; therefore, the majority of the trash entering the storm drain system will not have a significant distance to travel before reaching the device. This decreases the potential for blockage in the system. Potential hurdles for this location could include difficulty in attaining proper easements from the property owner and potential hydraulic effects on the system.

  A = 294 ac
  % Commercial ≈ 35%
  EXISTING Q10=138 cfs (peak flow for pipe "A2P-102_A2O-101")
  Future Q10=142 cfs
  Improved Q10=142 cfs
  Existing Pipe Diameter = 60-inches

- **Location #2** – *Mundell Way terminus, right before outfall to Adobe Creek*. The benefits of this location include the ability to provide a large device which covers a very large area (562 acres) similarly to Location #1. However, a smaller percentage of the area is commercial and this area resides upstream of a residential area, creating a long travel distance before the trash can be captured. The access and right-of-way provided at this location is likely the most beneficial of all four locations. Since the location is in the street, the City likely has full use of the street width to work with and, at the end of a cul-de-sac, there would be almost no traffic to contend with and most likely very few utilities conflicts. This location is not beneficial for public outreach and visibility will have to be provided via the media (newspapers, etc) instead of signage, should grant stipulations require it. Negative backwater effects on the system could also be a potential problem.

  A = 562 ac
  % Commercial ≈ 20%
  EXISTING Q10=**186 cfs** (peak flow for pipe "B1D-302_B1O-201")
  Future Q10=205 cfs
  Improved Q10=205 cfs

Existing Pipe Diameter = 66-inches

- **Location #3** – *View Street (anywhere).* The major benefit of this location is that the entire drainage area is commercial. If a smaller (less expensive) device is desired, this area would be optimal. Because View Street is residential, traffic should be minimal, allowing for ease of access and maintenance. Due to the proximity of the commercial area, the project would still be relatively visible. Keeping the device near the source of the problem decreases the potential for clogged pipes downstream. This location resides in the upper part of the watershed where slopes are steeper and the potential for negative backwater effects are minimal.

  A = 41 ac
  % Commercial = Almost 100%
  EXISTING Q10=**53 cfs** (peak flow for pipe "E2D-501_E2D-215")
  Future Q10=7 cfs
  Improved Q10=56 cfs
  Existing Pipe Diameter = 36-inches

- **Location #4** – Parking lot between Stuart's Apparel (157 Main Street) and Plaza South, before confluence with 30-inch stormdrain in San Antonio Road. This location has benefits similar to Location #3. The drainage area is smaller and so a smaller, less expensive device could be installed, with a corresponding decrease in treatment rate. Access and easements have the potential to be slightly more difficult than Location #3, though manageable. This location will likely be the most publicly visible.

  A = 23 ac
  % Commercial = 100%
  EXISTING Q10=**23 cfs** (peak flow for pipe "E2F-536_E2D-537")
  Future Q10=23 cfs
  Improved Q10=23 cfs
  Existing Pipe Diameter = 24-inches

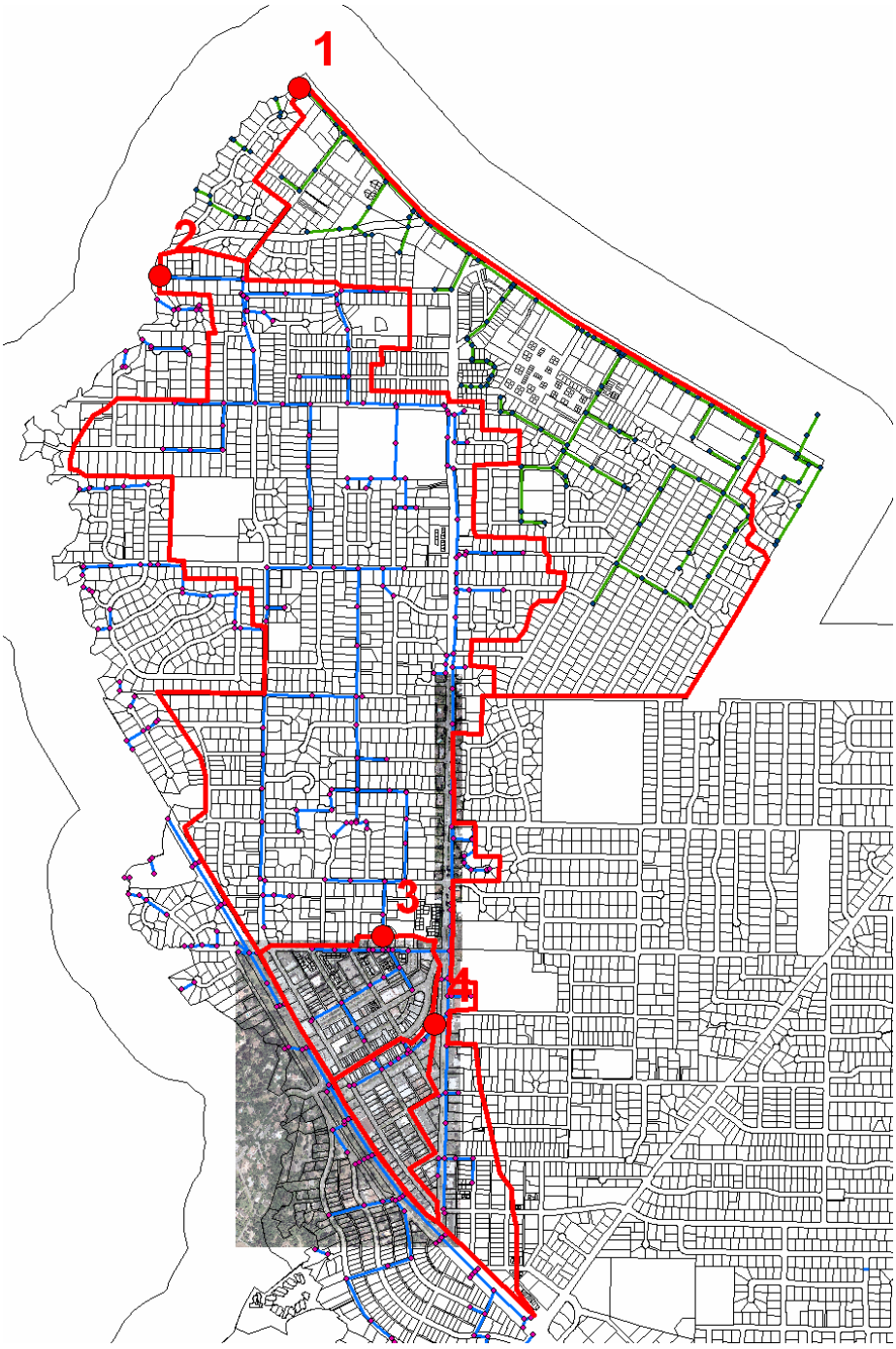


Figure 1: Possible Locations for Full Trash Capture Devices

3.4. Recommend Device Alternatives

3.4.1. Cost

The cost of the various trash capture devices is dependent upon the size, type, manufacturer, installation and other variables. Costs escalate as the capacity increases, though this is not normally a linear relationship. The cost per flow unit often decreases as the capacity increases. Different types of devices vary in cost

due to installation costs and quality since some devices require cast-in place vaults or significant depths and some devices remove fine sediments (treats the water to C.3 standards which are far beyond that required for NPDES trash capture). There is a significant variability in cost between brands. Device cost estimates are provided in Table 1.

3.4.2. O&M

O&M costs will likely be similar for all locations. Maintenance frequency would be similar for all of the locations. O&M procedures could be formulated after observing the performance of the device during the first year of operation.

3.4.3. Hydraulic Considerations

Trash capture devices disrupt the continuous flow within a pipe and therefore have the potential to create backwater effects within the stormdrain system. The extent of these effects will differ by model and will need to be evaluated at the design stage. Since backwater effects can induce drainage issues where the system is already at capacity, it is important from a public safety standpoint that these effects be evaluated before making a final decision on a specific device. The likelihood that backwater will be an issue decreases as the drainage area decreases and the average pipe slope increases. Therefore, smaller drainage areas higher in the watershed would be more like to avoid hydraulic problems. Inadequate O&M could have the potential to negatively impact the system hydraulically.

3.5. Ranking & Recommendation of Full Capture Device & Location

Preliminary cost estimates have been provided by several manufacturers of devices on the SF Bay Water Board Approved High Capacity Devices List (SFEP, 2010). Because the City does not have experience using any of these devices, it is not known how extensive maintenance will be. It may be best to install the smaller devices needed at Locations #3 and #4 first. Unexpected problems or maintenance issues that may be encountered would be on a smaller scale and the lessons learned could be applied on the larger, more expensive devices for Locations #1 and #2. The SFEP intends to track the performance of devices around the Bay. This data could be used to make educated decisions on the larger devices.

The four devices under consideration include the Kristar Swirl-Flo Screen Separator, the Kristar Nettech Gross Pollutant Trap, the Bio Clean Nutrient Separating Baffle Box, and the Roscoe Moss Storm Flo Screen. Each device has pros and cons that should be considered by the City. The preliminary cost estimates range from $5,500 - $35,200 per device for Locations #3 and #4. These costs do not include installation and some do not include key components such as vaults or lids. Maintenance costs have not been estimated. Table 1 shows the preliminary estimates of device costs.

Table 1: Preliminary Trash Capture Device

Device	Area 1	Area 2	Area 3	Area 4	Not Included
Kristar Nettech			$15,000	$15,000	Installation
Kristar SwirlFlo			$5,500	$5,500	Installation
BioClean Nutrient Separating Baffle Box	$137,000	$205,500	$35,200	$24,000	Installation, risers or lids
Roscoe Moss Storm Flo	$87,400	$131,500	$22,800	$13,100	Installation or vault

The City of Dublin estimates the total cost including installation has averaged 2 to 3 times the cost of the device alone. Kristar respresentative Sue Lillo though email correspondence agreed that this is a reasonable estimate for their devices. Dublin's maintenance has required one annual visit from a contracted maintenance company that charges approximately $2,500 per visit. Los Altos may find maintenance costs to be less expensive, since the maintenance may be able to be completed in house due to the anticipated purchase of a vac truck.

Based primarily on cost, Schaaf & Wheeler's recommendation would be to install a Kristar SwirlFlo in Area 3 first, then in Area 4 if necessary. Area 3 has a larger drainage area than Area 4 but can be treated with the same size unit; therefore, Area 3 has greater cost value. These devices will be located off-line to allow for adequate bypass. Area 3 is less likely to have right-of-way and utility conflicts. Further design should find it more feasible for construction. Based on Dublin's cost ratio, the estimated construction cost for Area 3 and 4 is $16,500 apiece.

The BioClean and Roscoe Moss devices, though more expensive, appear to have greater capacities which may decrease maintenance. There may be greater water quality benefits with the BioClean device because it is designed to capture fine sediments. If the City feels that improved water quality beyond the trash capture requirements is worth the extra cost, devices should be compared with that in mind.

Final design should include an analysis of backwater effects on the drainage system, adequacy of bypass structures and the effects on storm drain capacity. An operation and maintenance plan as well as a trash tracking plan should be established.

Local inlet filters may be considered in smaller areas, such as near schools or smaller commercial areas, were a large device is not feasible.. Local inlet filters generally have a higher maintenance cost per acre than large devices; however, they may prove valuable where the drainage areas aren't large enough to justify a large device. Inlet filter costs are approximately $300 each and maintenance costs are anticipated to be approximately $140 per year per inlet. Inlet filters may be an inexpensive option for increasing trash capture to reach a goal quickly.

3.6. The City of Los Altos has approximately $190,000 budgeted, not including SFEP grant money, over the next couple of years for the engineering design, purchase and installation of trash capture devices. This should be enough to install devices at both

Locations #3 and #4. However, only one is required for compliance. The additional device would increase trash capture rates. ***Schedule for Implementation (Construction Summer 2012)***

The chosen full trash capture device should be installed by the summer of 2012. This will provide time to collect performance data and take any addition actions necessary to meet the 40% benchmark on time.

3.7. Post-Construction Tracking

All trash removed from the trash capture device will be measured according to the tracking methodology that will be established and is a condition of the Permit. During the first winter after installation, maintenance should be completed frequently to both determine how effective the device is as well as help provide the data regarding how frequently maintenance should be performed. After the first winter, a more detailed O&M plan can be established.

4. Trash Reduction Requirements

4.1. Regulatory Summary Under City Responsibility

- Short-Term Reduction Plan by Feb. 1, 2012
- Long-Term Reduction Plan by Feb. 1, 2014
- Full Capture Device treating 20 acres by July 1, 2014
- 40% Reduction by July 1, 2014
- 70% Reduction by 2017
- 100% Reduction by 2022
- Annual Reporting

4.2. Implementation Scheduling and Milestones

4.2.1. Prioritized Trash Reduction Activities

The top priority will be to continue existing trash capture activities (outlined in Section 1.5) with the implementation of improved tracking of the trash capture as required by the Permit. The next priority will be installing the full trash capture device(s) as recommended. If these actions do not meet the prescribed benchmark, additional action items may be chosen by the City "buffet-style" as described in the Short Term Reduction Plan.

4.2.2. Tracking of Trash Capture (i.e. Reduction) After Completion of Each Activity

All trash captured must be tracked. At this point, it is assumed that the measuring will be volumetric. After each trash reduction activity, trash volumes should be measured, logged, and submitted to the City's Engineering Division. SCVURPPP is

in the process of setting forth the trash tracking methodology. Each submission may include the following information:

- Date
- Who performed the trash reduction activity
- Volume of trash
- Who measured the volume
- Dominant type of trash
- Percentage of actual trash (versus organics)
- Items counts

The exact method for tracking the trash collected is forthcoming. City supervisory staff will be responsible for maintaining the running log for each year and insuring that all data is complete and accurate.

4.2.3. Flexible Scheduling of Implementation Based on Tracking Results

With a running log of captured trash being kept by City supervisory staff, the City will be able to determine the trash deficit for the yearly reduction. This data is critical for the City to make certain goals are met. Because it is unknown how effective each trash capture activity will be, the plan will need to be flexible. It is expected that the plan will be in a continual state of flux and has been set up to be able to accommodate this. As trash data is collected, a greater or fewer number of trash collecting activities can be prescribed in order to meet trash goals within the specified time frames. The City will need to be vigilant in monitoring trash activities to ensure there is sufficient time to implement additional measures if necessary.

5. Short Term Trash Reduction Plan

5.1. 40% Trash Reduction by 2014

The Short Term Reduction Plan outlines how the City intends to reach the 40% reduction of the trash baseline by July 1, 2014. This plan must include all elements outlined in Section 1.3.1.2, including action items and an implementation schedule. This plan is due Feb. 1, 2012.

5.2. Options for Achieving 40%

5.2.1. All Existing Trash Activities

All existing trash activities will be continued as currently constituted.

5.2.2. Full Trash Capture Device (assume construction summer 2012)

A full trash capture device must be included in this plan as discussed in Section 3.

5.2.3. Possible Action Items

If the trash capture device is installed and existing trash activities diligently continued and tracking data indicates the 40% goal may not be met, addition action items may be implemented. These action items may be chosen "buffet-style" by City staff, meaning that any number, combination, or amount of them may be used at the discretion of the City to achieve the desired goal. These items include and may not be limited to the following:

- Additional full trash capture devices
- Increased street sweeping
- Increased trash walks including inspection and cleaning of ditches
- Increased stormdrain inlet cleaning
- First flush debris collection
- Others

5.3. Prioritize Options

The City has indicated that additional trash capture devices are preferred over all other options where major capture increases are needed to achieve required benchmarks. Other options are preferred where only small capture increases are needed.

5.4. Annual Schedule of Implementation (2012 – 2014)

Action Item	Schedule of Implementation
Current trash activities	Continual
Track capture	Continual
Install required trash capture device	By Summer 2012
Evaluate reduction level being achieved	Spring 2013
Implement additional action items if 40% is not achieved	Summer 2013
Submit Annual Report indicating achievement of 40% reduction	July 1, 2014

6. Long Term Trash Reduction

The Long Term Reduction Plan outlines how the City intends to reach the 70% reduction of the trash baseline by July 1, 2017 and 100% reduction by July 1, 2022. This plan must include all elements outlined in Section 1.3.1.5, including action items and an implementation schedule. This plan is due Feb. 1, 2014.

6.1. 70% Trash Reduction by 2017

6.1.1. Carry-over of un-used Short Term Trash Reduction Actions

Any alternative action items outlined in the Short Term Plan may be implemented in the Long Term Plan in greater quantity or frequency to achieve the higher reduction level. It may be that the actions taken in the implementation of the Short Term Plan

result in a higher reduction than anticipated. If 70% has already been achieved, this section of the Long Term Plan may be omitted.

6.1.2. Mechanical Device Options Analysis & Recommendation

Full trash capture devices in addition to those installed to reach the 40% reduction should be implemented. The decision of which devices to install and where should be based on the efficiency and maintenance track record for those installed for the 40% plan. If there is a large deficit to cover, the large devices for Areas 1 and/or 2 should be considered. If only the device in Area 3 is installed, Area 4 should first be considered. If Areas 3 and 4 have proved to remove much more than 40%, possible local inlet filters should be considered in lieu of large devices.

Data and experience received through the implementation of the Short-Term Plan should be used in the consideration of specific options. Manufacturers can provide additional data on the expected effects on storm drain capacity, operations and maintenance, costs, implementation schedule, etc. of any specific device.

6.2. 100% by 2022

6.2.1. Carry-over of un-used 70% Reduction Actions

Any alternative action items outlined in the Short Term Plan or the 70% reduction may be implemented in 100% reduction in greater quantity or frequency to achieve the higher reduction level. If 100% has already been achieved, this section of the Long Term Plan may be omitted.

6.2.2. Mechanical Device Options Analysis & Recommendation

Full trash capture devices in addition to those installed to reach the 70% reduction should be implemented. The plan as outlined for the 70% reduction should be followed, but to a greater degree to achieve 100%.

Data and experience received through the implementation of the Short-Term Plan should be used in the consideration of specific options. Manufacturers can provide additional data on the expected effects on storm drain capacity, operations and maintenance, costs, implementation schedule, etc. of any specific device.

7. Implementation

7.1. Proposed Schedule

The schedule through 2014 is outlined in Section 5.4. This schedule outlines the minimum that needs to be accomplished during that time frame. Beyond this, the detailed schedule will need to be evaluated based on the trash reduction results tracked by the implementation of the Short-Term Plan. Based on anticipated trash load reduction, action items should be employed every summer and tracked the following winter until the desired benchmarks are achieved.

7.2. Cost / Budget Implications / Schedule

There appears to be sufficient funds budgeted for the implementation of the Short-Term Plan, included devices for both Locations #3 and #4. Once the trash reduction data from the implementation of the Short-Term Plan is attained, an estimate of the extent of action items that will be required for the implementation of the Long-Term Plan, and thereby an estimate of the costs required, should be able to be approximated. These estimates can then be used to properly allocate funds for the Long-Term Plan to be spent 2014-2021. Since there are multiple years available to achieve the 70% and 100% reduction benchmarks, which action items are implemented and when (past the Short-Term Plan) may be adjusted to fit budget timing restraints.

7.3. Flow Chart

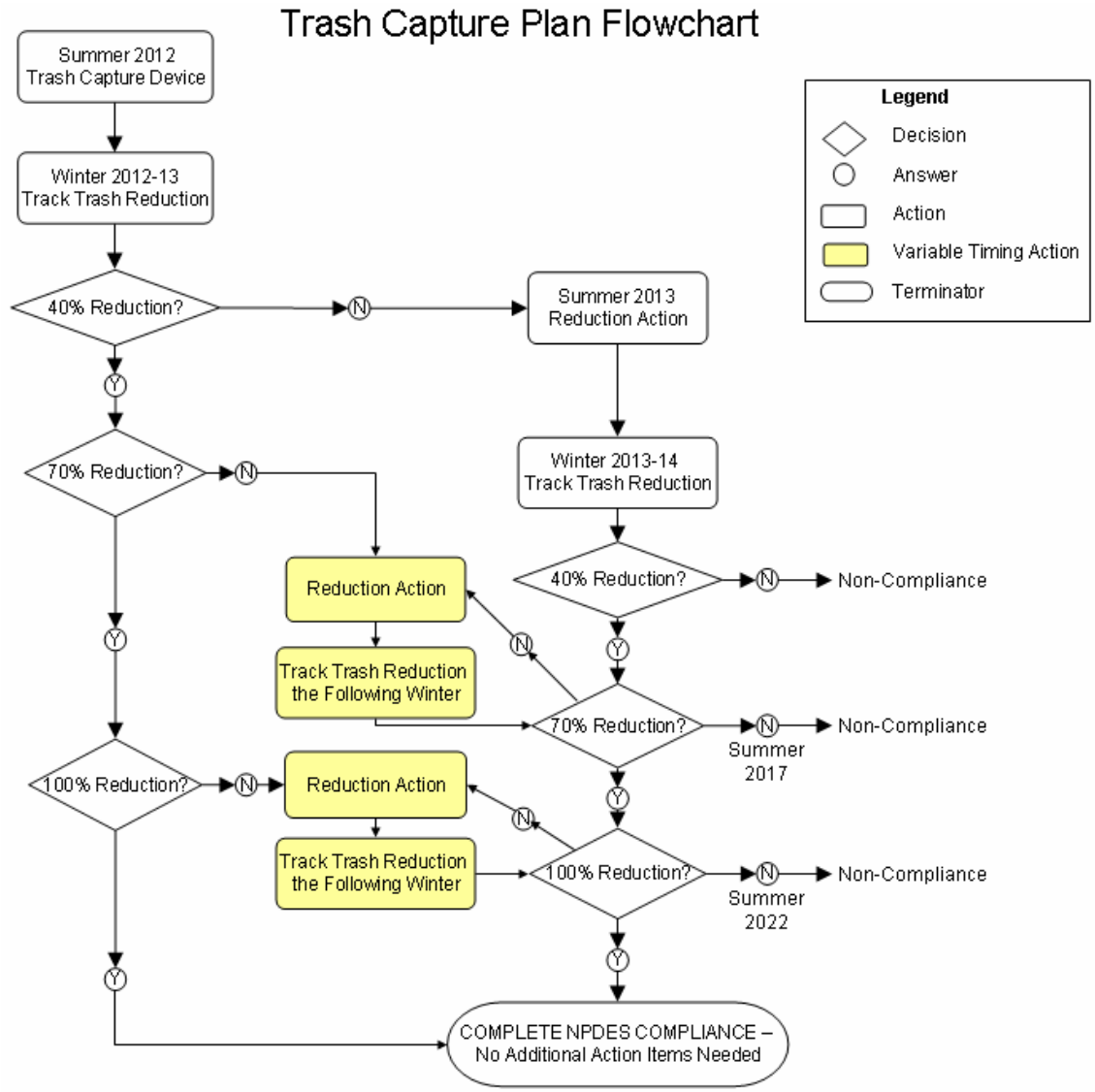


Figure 2: Trash Capture Plan Flowchart

7.4. Adjustment of Schedule as Necessary

Due to the nature of the reduction benchmarks, a portion of the schedule can be adjusted if needed, such as if budget is not yet available or if benchmarks are reached early. Where there are several years available to complete an item, the action is marked yellow in Figure 2. Though these actions items do not need to be completed until the deadlines shown, it is in the City's best interest to complete them early, on a yearly basis. This will give the City time to employ additional actions items on the yearly data tracking cycle until the desired benchmark is met. This should keep the City from finding themselves in a position of non-compliance.

Appendix D

Methodologies

METHODOLOGIES

GIS Based Modeling

The MIKE-URBAN SWMM model works within ArcGIS and can simulate runoff, open channel flow, pipe flow, and water quality. The program is used to model the Los Altos storm drain system because of its capabilities with overland flow, weirs, and pipe networks; the incorporation of the SCS Curve Number hydrology method; and the overall stability of the model. Though the models were developed using the proprietary MIKE-URBAN, the final models are compatible with the public domain version (V13) of EPA SWMM5.

Operation

Two separate calculations are performed by SWMM for the City of Los Altos models: a stormwater runoff calculation that determines the amount of water entering the storm drain system from a specific rainfall event; and a pipe flow calculation that replicates how the storm drain system will convey those flows to outlets. Flows resulting from the runoff calculation are used as inflows for the subsequent pipe flow calculation.

SWMM has three infiltration methods: Horton, Green-Ampt, and Curve Number. Los Altos storm drain models use the Curve Number method. The runoff simulation duration is set equal to the design storm duration or some lesser duration depending on the period of interest; a 24-hour storm is used in Los Altos.

The SWMM pipe flow model offers a choice of three flow description approximations: Steady State, Kinematic Wave, and Dynamic Wave; each is distinguished based on the set of forces that each takes into account. The Los Altos storm drain model uses the most comprehensive flow description, Dynamic Wave, which incorporates the effects of gravitational, friction, pressure gradient and inertial forces. Because it accounts for all forces affecting flow conditions, this method allows the model to accurately simulate fast transitions and backwater profiles. Water above the node rims is simulated by using an artificial basin above the ground level. The area of the storage above the node is set between 1,000 and 3,000 square feet, based on location, replicating the effects of street storage during storm events. 3,000 square feet was only used at the upstream node in the each system to simulate additional upstream watershed storage. Water stored in the artificial basin begins to re-enter the system when system capacity allows. The pipe flow simulation can be executed using either a constant or variable time step, and can be run for any portion of the time interval specified by the input rainfall time series and corresponding calculated runoff hydrograph. A time step range of 1 to 10 seconds is used for models within Los Altos with an adjustment factor of 1.5. These values are based on model stability and computation time.

Input and Output

SWMM pipe flow calculations require network data, operational data, and boundary data as input. Network data consists of the pipe network elements including nodes (manholes, outlets, and storage nodes) and links (pipes, culverts, and open channels). Parameters required to describe nodes include *x* and *y* coordinates of the node, a unique name, node type (junction, outlet or basin), depth and invert levels, and water levels at outlets.

Parameters required to describe links include the name of upstream and downstream nodes, shape and dimensions, material, and upstream and downstream inverts. Structural system elements including gates and weirs are all modeled as functional relationships connecting two nodes in the system, or associated with one node in the case of free flow out of the system. Operational data consists of parameters which describe how these elements function in the network. Boundary data for the pipe flow computation can include any external loading, inflow discharges, water levels at interaction points with receiving waters; as well as the results of a run-off calculation.

Output from the pipe flow computation includes the calculated water level at each node, weir discharges, water level in network branches, discharge in network branches, water velocity in network branches, water volume in the system and time step data. Output is viewed using GIS, SWMM or the MIKE URBAN program. Results may be displayed in plan view or as a profile for a selected network section, and may be viewed as a temporal animation or at maximum or minimum values. Additional outputs which can be derived from SWMM pipe flow results using GIS include: water depth, flooding level, pressure in closed conduits, percentage pipe filling, the flow calculated for each link, and model stability and numeric continuity.

Runoff Estimation

A design storm is used in lieu of a single historic storm event to ensure that local rainfall statistics (i.e. depth, duration and frequency) are preserved. When combined with regional specific data for land use and loss rates, the model should produce runoff estimates that are consistent with frequency analyses of gauged stream-flow in the Santa Clara County area. In other words, the ten-year design storm pattern used for SWMM modeling creates results consistent with a ten-year storm runoff event.

Precipitation frequency analyses are based on concepts of probability and statistics. Engineers generally assume that frequency (probability) of a rainfall event is coincident with frequency of direct storm water runoff, although runoff is determined by a number of factors (particularly land use conditions in the basin) in addition to the precipitation event. The frequency of occurrence for precipitation (and by assumption, runoff) is ten years to evaluate storm drain performance for this master plan.

*Runoff **Characteristics** and Design Storm*

The Santa Clara County manual provides the total rainfall depth for each MAP and storm frequency using the following equation:

$$x_{T,D} = A_{T,D} + (B_{T,D}\,MAP)$$

Where: $x_{T,D}$ = precipitation depth for a specific return period and storm duration (inches), T = return period (years), D = storm duration (hours), $A_{T,D}$, $B_{T,D}$ = coefficients from Tables B-1 and - 2 (dimensionless), MAP = Mean Annual Precipitation (inches).

The precipitation intensity, iT,D is given by:

$$i_{T,D} = \frac{x_{T\,D}}{D}$$

The Mean Annual Precipitation (MAP) range within Los Altos is 14-inches to 22-inches based on the MAP figure in the County manual (Figure A-2).

The 10-year storm intensity graph for a MAP of 18-inches is shown in Figure D-1.

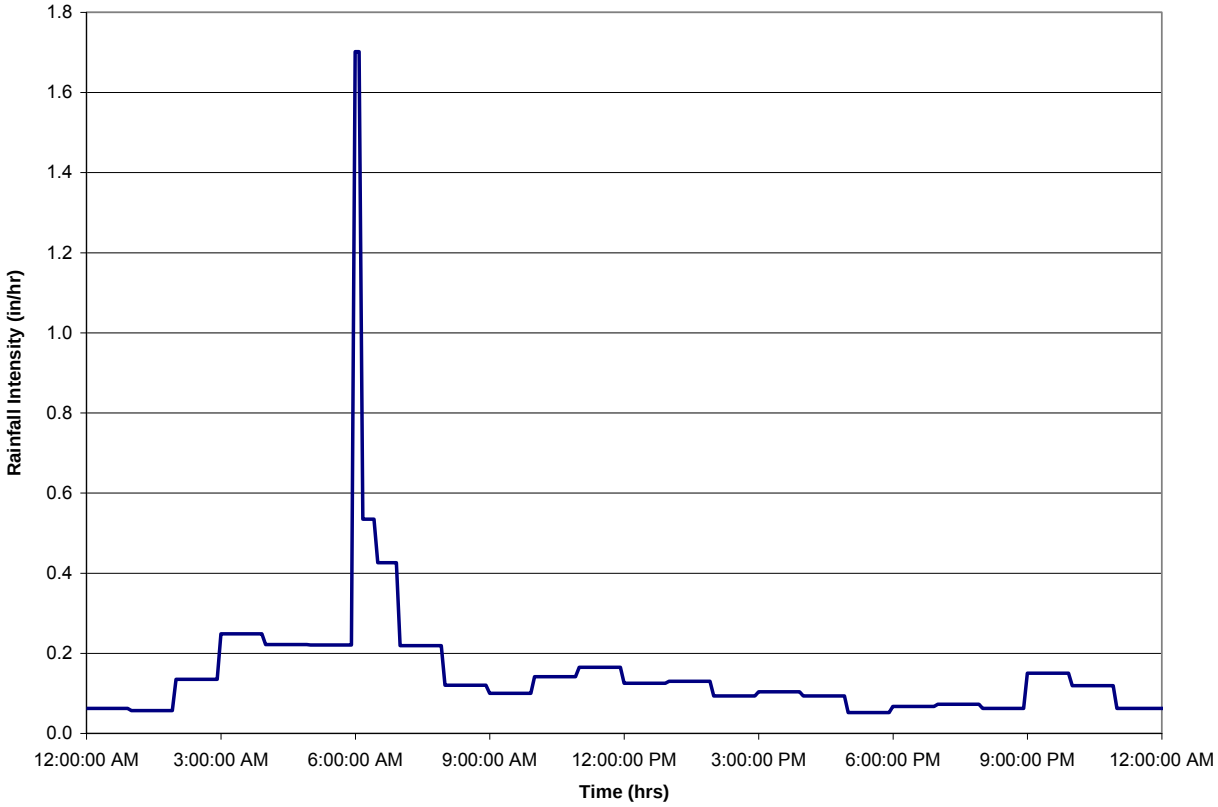


Figure D-1*:* Santa Clara County 10-Year Storm Intensity Graph (MAP 18")

*Basin **Runoff** and Loss Parameters*

SWMM includes limited hydrologic loss parameters. Basin lag, or lag time, is defined as the time elapsed between rain fall occurring within a basin and runoff occurring at an outlet point. SWMM uses basin slope (S), Manning's roughness coefficient (N), and basin width (W) to determine lag time. Slope is expressed in percent, roughness values for pervious (N-pervious) and impervious (N-impervious) are dimensionless and width is expressed in feet. SWMM does not provide detailed documentation of how lag time is calculated; furthermore, it is unclear of what exactly the W value is. The SWMM manual defines it as:

Characteristic width of the overland flow path for sheet flow runoff (feet or meters)...Adjustments should be made to the width parameter to produce good fits to measured runoff hydrographs.

It should be noted that the basin roughness factor (N) is not the same as Manning's roughness coefficient (n). Typical N values are shown in Table D-1.

Table D-1: Overland N Values

Surface	N
Smooth asphalt	0.011
Smooth concrete	0.012
Ordinary concrete lining	0.013
Good wood	0.014
Brick with cement mortar	0.014
Vitrified clay	0.015
Cast iron	0.015
Corrugated metal pipes	0.024
Cement rubble surface	0.024
Fallow soils (no residue)	0.05
Cultivated soils	
Residue cover <20%	0.06
Residue cover >20%	0.17
Range (natural)	0.13
Grasses	
Short, prairie	0.15
Dense	0.24
Bermuda grass	0.41
Woods	
Light underbrush	0.4
Dense underbrush	0.8

Although the County Hydrology Manual provides a generalized map of basin slopes, Schaaf & Wheeler has calculated basin slope using the County LiDAR data and found that a total of 65 of 661 basins had slopes greater than 5%, with a peak slope of 21.7% calculated.

Drainage System Analyses

Pipes are modeled as one-dimensional closed conduit links which connect two nodes in the models. The conduit link is described by a constant cross-section along its length, constant bottom slope, and straight alignment. Unsteady flow in closed conduits is calculated using conservation of continuity and momentum equations, distinguishing between pipes flowing partially full (free surface flow), and those flowing full (pressurized flow). The Darcy-Wiebach equation for pressure flow conditions was selected for this study. Most pipes within the Los Altos model are modeled as reinforced concrete pipe (RCP) with a Manning's '*n'* of 0.013. There are a few corrugated metal pipes (CMP), mostly outfalls, with '*n' of* 0.022.

Open Channels

Open channel within the drainage network are modeled as one-dimensional links which connect two nodes in the model. The conduit link is described by a constant cross-section along its length, constant bottom slope, and straight alignment. SWMM uses Manning's equation for open channel flow. The channels within the Los Altos model are modeled with '*n'* of 0.025.

System Extensions

Due to the City's rural street characteristics, there are numerous locations where no storm drain pipe network exists. In many cases this does not pose any significant flooding risk. There are, however, areas of the City that do experience repetitive nuance flooding due to the lack of a formal drainage system. Streets that could benefit from an extension of the pipe network are based on model results and City staff knowledge. Extensions are recommended on streets where the improved model results have a hydraulic grade line (HGL) more than 6-inches above the ground surface.

Outlet Boundary Conditions

Pipe network outlets require a water surface elevation to modeling backwater effects from receiving waters. In areas that outlet to a channel, the water surface elevation is set at the 10-year FEMA FIS level. For outlets to channel sections not studied by FEMA, an arbitrary static water level of 4 feet above the pipe invert was assumed. Adjustments were then made where the assumed static channel water level was higher than the ground elevations of upstream nodes.

Appendix E

Data

DATA COLLECTION

AutoCAD and GIS

The City's AutoCAD and GIS data were missing a large quantity of information critical to accurately modeling the storm drain system. Routinely encountered examples include:

- missing pipe sizes;
- no manhole indicated where two pipes join;
- catch-basins represented as manholes;
- sections of the system not drawn into the plans;
- rim and/or invert elevations missing from all manholes and catch-basins (nodes);
- assumed pipe slopes missing on 54 percent of pipes; and
- all outfall elevations missing

Schaaf & Wheeler found that much of the storm drain data in AutoCAD were either not included or un-attributed. The City's GIS has 2,289 pipes and 2,247 nodes (manholes, catch basins and outfalls). All nodes were lacking rim and invert elevations. Only two of the 2,289 pipe links did not have diameter information and 1,240 did not include slope information. It was noted that pipes with no diameter in the City's AutoCAD were assigned a 12-inch diameter, by the City, in the GIS. In some cases this 12-inch size is incorrect. The previously described topographic data was used to assign rim elevations to all nodes in order to create a consistent source of surface elevations.

Historical Data and As-Builts

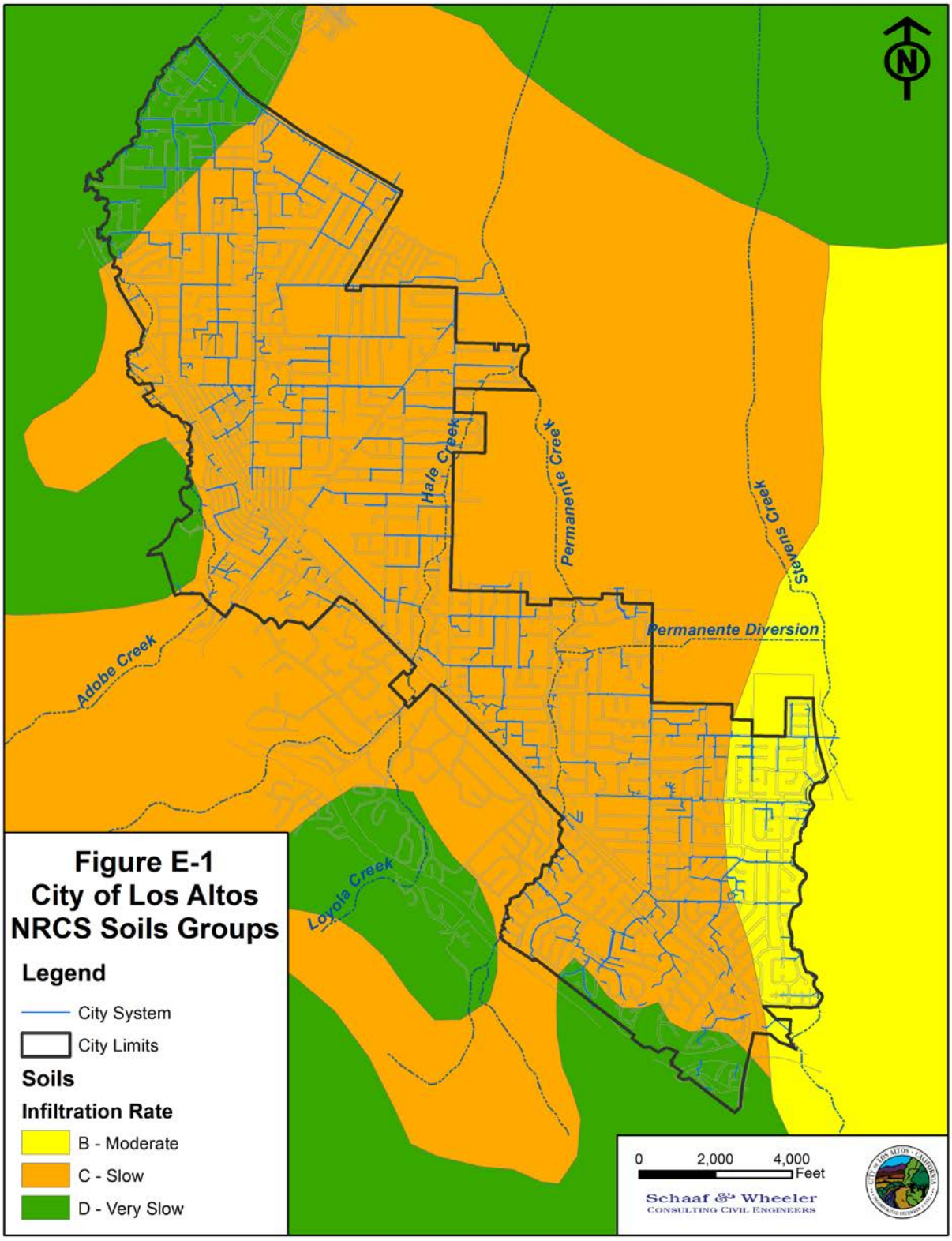
A hard copy of the 1966 SDMP was also reviewed for relevant data. As-built information from Caltrans and Santa Clara County for Highway 280, El Camino Real and Foothill Expressway was reviewed for storm drainage data. The City's as-built and improvement plans were reference for data. A key data source is the *City of Los Altos Storm Drainage Assessment District - Prj 1967-11, "As-built 3/11/1969."*

Field Measurements

Schaaf & Wheeler conducted selective field research to verify pipe sizes, layouts, and to measure invert depths.

Soils

Figure E-1 shows the NRCS classification of the soils within the City of Los Altos.


Hale Creek
Permanente Creek
Stevens Creek
Permanente Diversion
Adobe Creek
Loyola Creek
Figure E-1
City of Los Altos
NRCS Soils Groups
Legend
City System
City Limits
Soils
Infiltration Rate
B - Moderate
C - Slow
D - Very Slow
0
2,000
4,000
Feet
Schaaf & Wheeler
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Land Use

Although open space is scattered throughout the City, the vast majority of Los Altos has been urbanized. The *2002 City of Los Altos General Plan* sets the City's development policies for the period 2002-2020. The City's zoning information was made available to Schaaf & Wheeler in graphical and GIS formats. Figure E-2 is the effective City Zoning Map and Figure E-2a is the effective Land Use map. The City's parcel GIS data, which includes zoning and land use attributes, was used to determine runoff characteristics. Each land use type is assigned a runoff curve number that varies with land use and soil type, as set forth in the Santa Clara County Hydrology Manual.

The hydrologic methodology used for the City's Storm Drain Master Plan (SDMP) is consistent with the County Drainage Manual. Rainfall runoff is determined by soil type, CN, and percent impervious. Infiltration losses are based on CN and only applied to pervious surfaces. Soils classification is based on hydraulic soil group (A, B, C or D); this data is produced by the National Resource Conservation Service (NRCDS) and available in GIS format from the Santa Clara Valley Water District (SCVWD). Figure E-3 illustrates the soil groups in the City of Los Altos. Because Los Altos has a number of residential neighborhoods without sidewalks or curb and gutter, land use CN values are adjusted to incorporate the increased imperious area by assuming 15% of the street right-of-way (ROW) is pervious with CN values representing poor quality open space. These CN values are associated with low vegetation that may not be well maintained, gravel, and bare dirt.

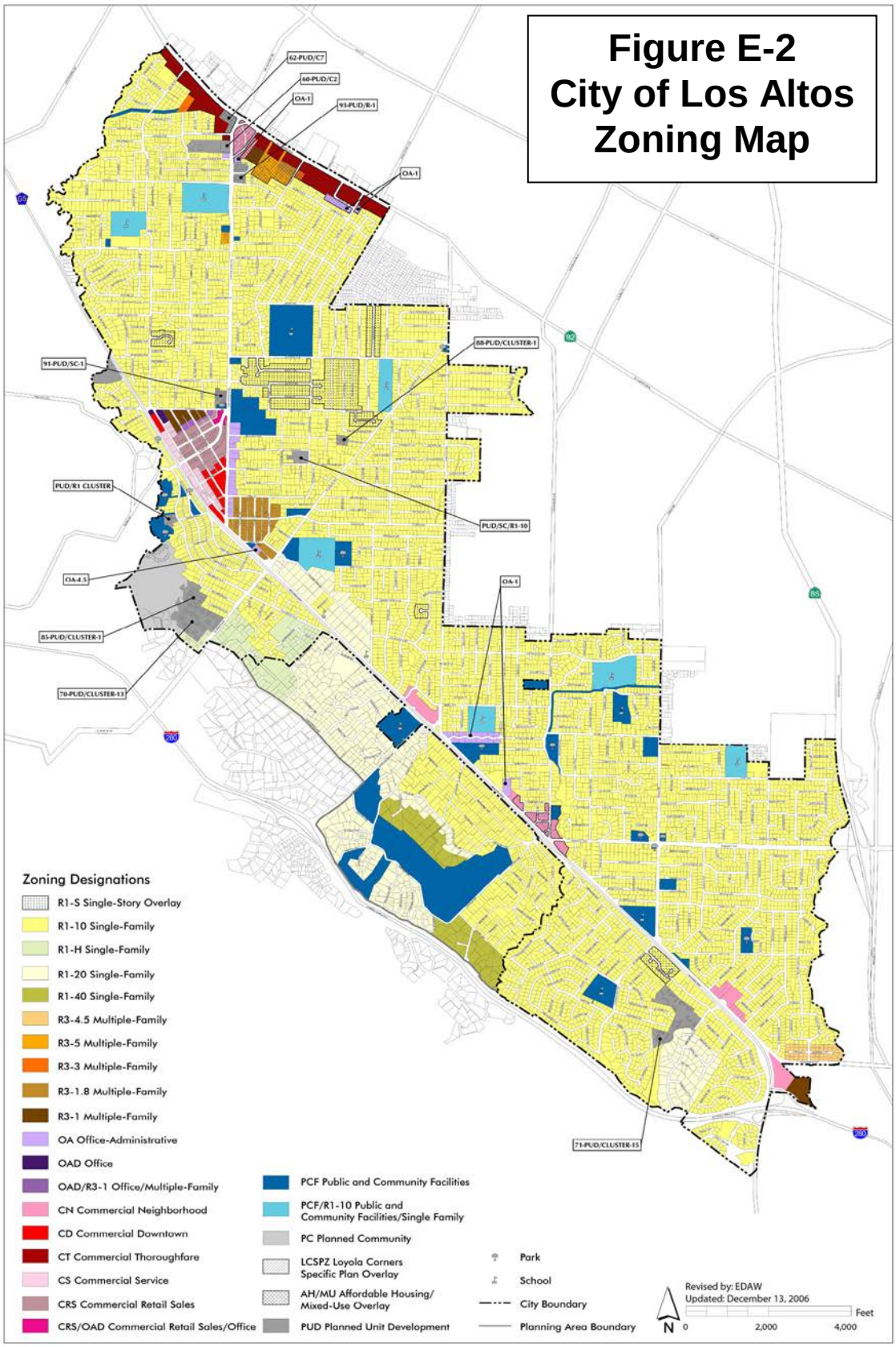
Figure E-2
City of Los Altos
Zoning Map
62-PUD/C7
60-PUD/C2
OA-1
93-PUD/R-1
OA-1
88-PUD/CLUSTER-1
91-PUD/SC-1
PUD/R1 CLUSTER
PUD/SC/R1-10
OA-4.5
OA-1
85-PUD/CLUSTER-1
70-PUD/CLUSTER-13
71-PUD/CLUSTER-15
Zoning Designations
R1-S Single-Story Overlay
R1-10 Single-Family
R1-H Single-Family
R1-20 Single-Family
R1-40 Single-Family
R3-4.5 Multiple-Family
R3-5 Multiple-Family
R3-3 Multiple-Family
R3-1.8 Multiple-Family
R3-1 Multiple-Family
OA Office-Administrative
OAD Office
OAD/R3-1 Office/Multiple-Family
CN Commercial Neighborhood
CD Commercial Downtown
CT Commercial Thoroughfare
CS Commercial Service
CRS Commercial Retail Sales
CRS/OAD Commercial Retail Sales/Office
PCF Public and Community Facilities
PCF/R1-10 Public and Community Facilities/Single Family
PC Planned Community
LCSPZ Loyola Corners Specific Plan Overlay
AH/MU Affordable Housing/ Mixed-Use Overlay
PUD Planned Unit Development
Park
School
City Boundary
Planning Area Boundary
Revised by: EDAW
Updated: December 13, 2006
N
0
2,000
4,000
Feet

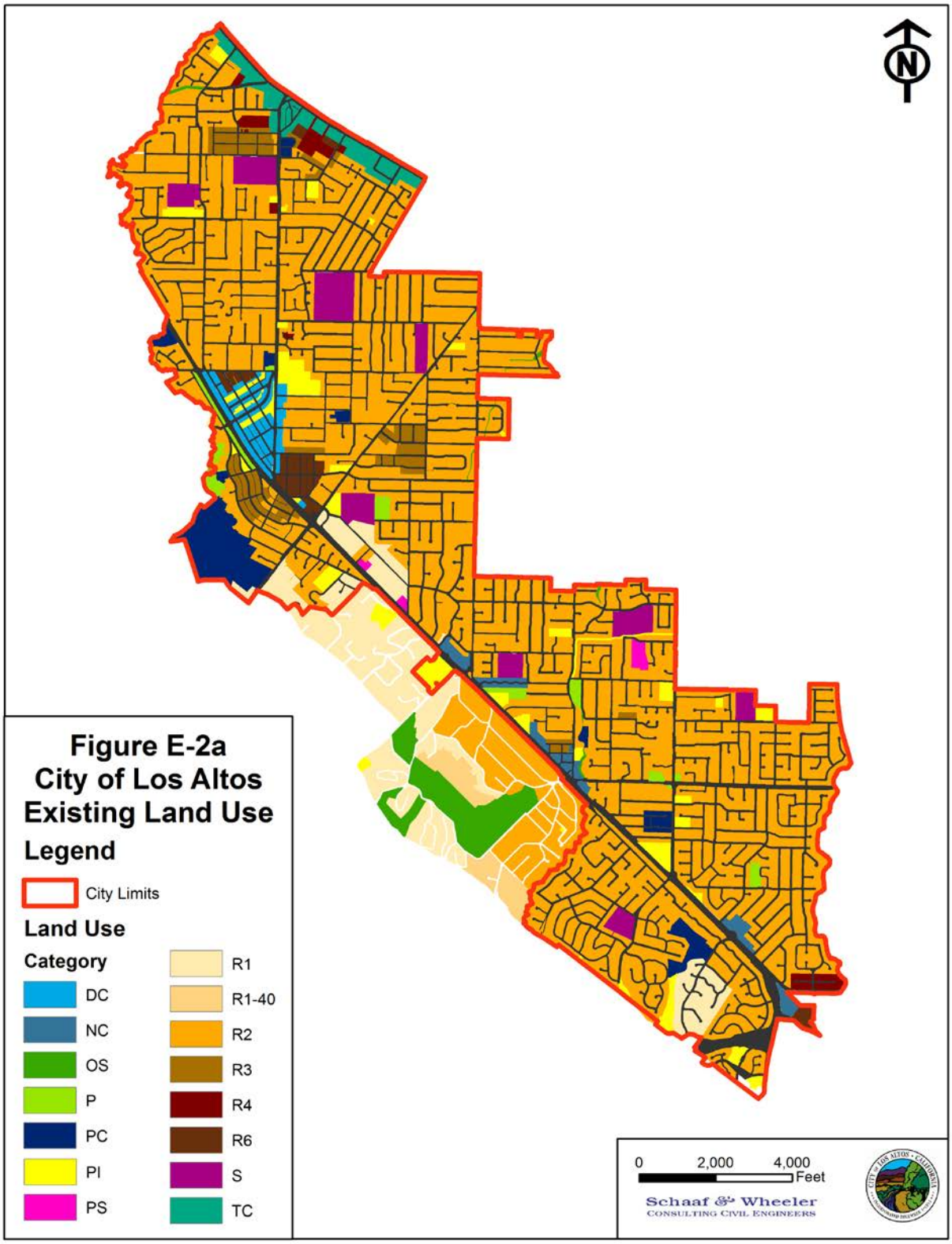
Figure E-2a
City of Los Altos
Existing Land Use
Legend
City Limits
Land Use
Category
DC
NC
OS
P
PC
PI
PS
R1
R1-40
R2
R3
R4
R6
S
TC
0
2,000
4,000
Feet
Schaaf & Wheeler
CONSULTING CIVIL ENGINEERS

Because the City of Los Altos is mostly built out, there is little potential for large development within the City's limits; however there is potential for redevelopment and other land use changes that could affect runoff. Schaaf & Wheeler analyzed the changes in CN and imperviousness based on the City's parcel GIS. This data includes current land use attributes as well as zoning. We assumed zoning represents future land uses. Figure E-3 illustrates the future land use patterns. Based on the City's GIS, zoned land uses in Los Altos are roughly 71% residential, 3% office and commercial, 5% public facilities and, 21% street ROW. Table E-1 contains the percent impervious and CN values for each zoning category.

Table E-1. Zoning SCS Curve Numbers and Percent Impervious

LAND USE CATEGORY	Percent Impervious	Hydrologic Condition	Soil Group B	Soil Group C	Soil Group D
Single Story Overlay (R1-S)	40%	Fair	58	71	74
Single Family (R1-10)	50%	Fair	58	71	74
Single Family (R1-H)	50%	Fair	58	71	74
Single Family (R1-20)	40%	Fair	58	71	74
Single Family (R1-40)	40%	Fair	58	71	74
Multiple-Family (R3-4.5)	50%	Fair	58	71	74
Multiple-Family (R3-5)	50%	Fair	58	71	74
Multiple-Family (R3-3)	50%	Fair	58	71	74
Multiple-Family (R3-1.8)	60%	Fair	58	71	74
Multiple-Family (R3-1)	60%	Fair	58	71	74
Office-Administrative (OA)	90%	Fair	58	71	74
Office/Multiple-Family (OAD/R3-1)	90%	Fair	58	71	74
Commericial Neighborhood (CN)	95%	Fair	58	71	74
Commericial Downtown (CD)	95%	Fair	58	71	74
Commercial Thoroughfare (CT)	95%	Fair	58	71	74
Commercial Service (CS)	95%	Fair	58	71	74
Commercial Retail Sales (CRS)	95%	Fair	58	71	74
Commercial Retail Sales/Office (CRS/OAD)	95%	Fair	58	71	74
Public and Community Facilities (PCF)	95%	Fair	58	71	74
Public and Community Facilities/Single (PCF/R1-10)	50%	Fair	58	71	74
Planned Community (PC)	50%	Fair	58	71	74
Planned Unit Development (PUD)	50%	Fair	58	71	74
Streets (TR)	85%	Poor	68	78	79

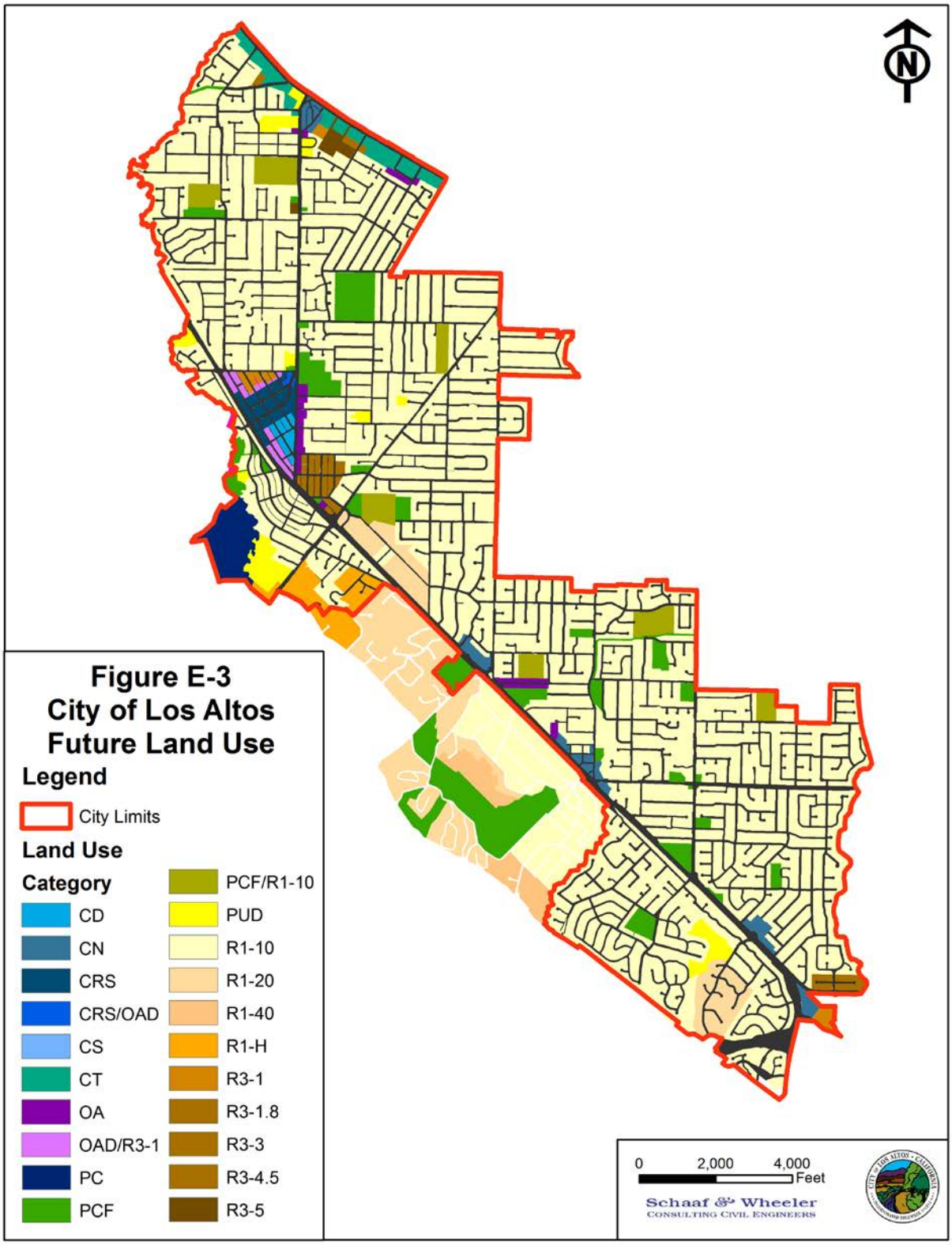
Figure E-3
City of Los Altos
Future Land Use
Legend
City Limits
Land Use
Category
CD
CN
CRS
CRS/OAD
CS
CT
OA
OAD/R3-1
PC
PCF
PCF/R1-10
PUD
R1-10
R1-20
R1-40
R1-H
R3-1
R3-1.8
R3-3
R3-4.5
R3-5
0
2,000
4,000
Feet
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Changes in land use could impact the Curve Number or watershed imperviousness, thereby changing the response to a given storm event. Because this hydrologic methodology only applies the Curve Number within the pervious areas, and there are no changes to the parameters affecting the pervious Curve Numbers (soil type and hydrologic condition), changing land use would only cause very slight changes to weighted Curve Numbers based on the small changes in impervious area. While these very small changes are accounted for in the hydrologic models, they are not worth depicting graphically.

The major land use change potentially affecting storm runoff is an increase in impervious area. Figure E-4 shows the potential changes in imperviousness of each sub-watershed in the City. There are some areas of the City where the impervious percentage for land use is higher than zoning values. Our analysis assumes only increases in imperviousness will occur with land use changes. The current zoning adds 900,000 square feet of impervious surface, which is approximately 0.5-percent of the City. A majority of this area is from parks and open space with low existing land use percent impervious but zoned as Public and Community Facilities with a high impervious potential. We do note that Mr. Zach Dahl with the City Planning Department indicates there are no current plans to change any existing parks or open spaces to buildings or parking lots. The proposed improvements for the City's Civic Center were analyzed and shows the percent impervious changing from 64 percent to 71-percent impervious.

GIS comparisons show potential land use changes within the City of Los Altos are minimal. The SWMM models are used to determine if there are any significant impacts from these changes to the storm drainage system in the form of increased storm runoff. It is important to note that runoff is not necessarily directly proportional to the percentage of impervious surfaces. For example, a 10 percent increase in impervious surface does not necessarily equate to a 10 percent increase in storm runoff.

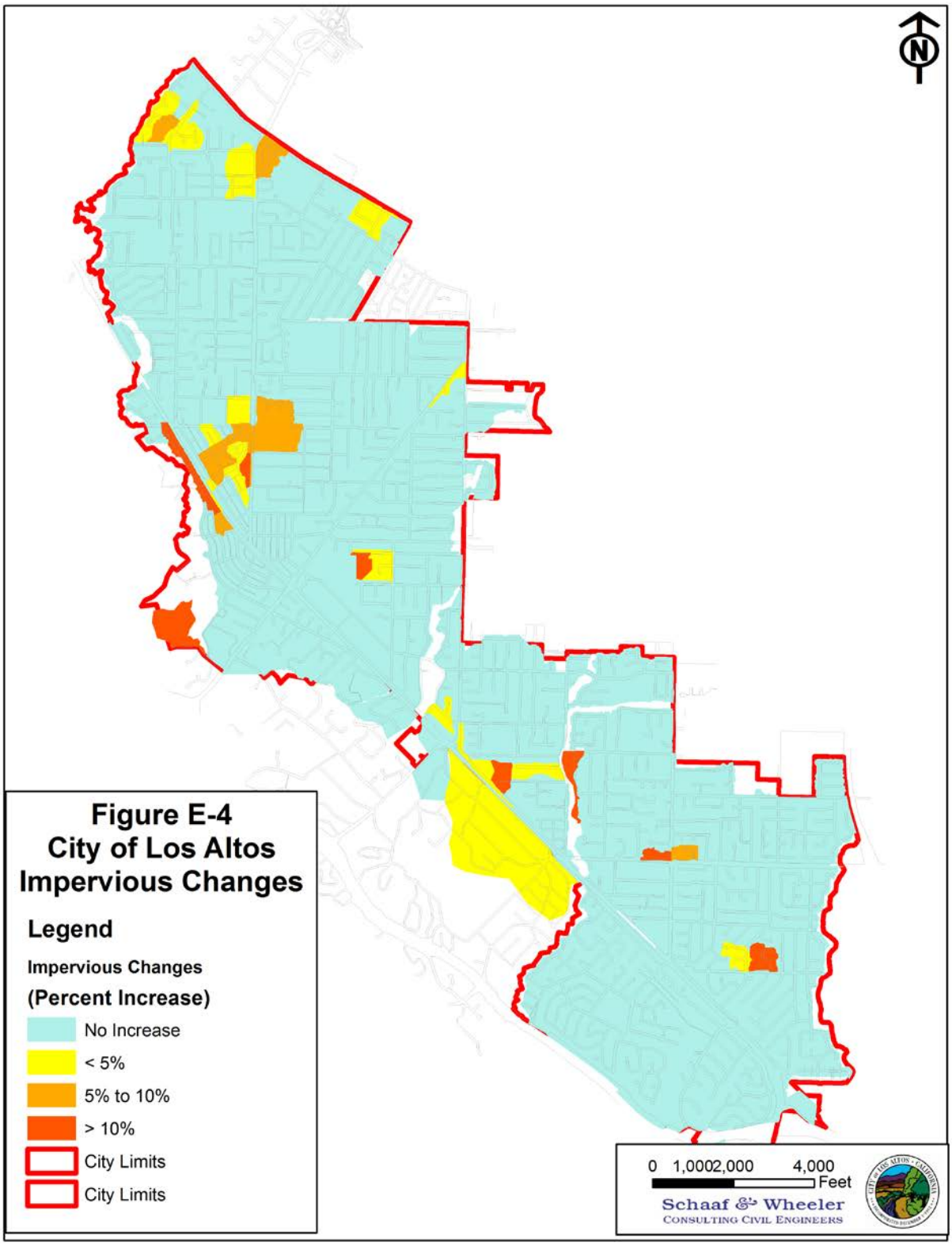
Figure E-4
City of Los Altos
Impervious Changes
Legend
Impervious Changes
(Percent Increase)
No Increase
< 5%
5% to 10%
> 10%
City Limits
City Limits
0 1,0002,000 4,000
Feet
Schaaf & Wheeler
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FEMA and SCVWD Data

The Santa Clara Valley Water District's (SCVWD) GIS, which includes creek centerlines, watershed delineations and 1-foot contour topography, was also referenced in this study. FEMA reports were referenced for creek water surface levels.

Operations and Maintenance

The City's Operations and Maintenance (O&M) section provided numerous documents, logs and worksheets including:

- FY08-09 Completed Outfall Inspection
- FY08-09 Training Log 07/-01/08 to 06/30/09
- FY09-10 Adopted Budget Dept Enterprise Funds SWMP
- FY09-10 Adopted Budget Maintenance Services SWMP
- General Fund Equipment FY08-09 SWMP
- Heavy Leaf Pickup 2008
- Rainy Day Troublespot List, Reviewed 09/01/05
- Storm Area Logs 2003-current
- Storm Drain Inlet and Outfall Inspection and Cleaning N6 J6
- Storm Drain Inlet Insp and Cleaning 2008-2009 A1 J6
- Storm Drainage Practices Survey – 04/26/06
- Street Sweeping Schedule FY2009-2010
- Streets and Roads O&M SCCURPP 2004
- Storm worksheet 2003-2004
- Urban Runoff Management Program Annual Report FY 2008-2009

Financial

Financial data being collected includes:

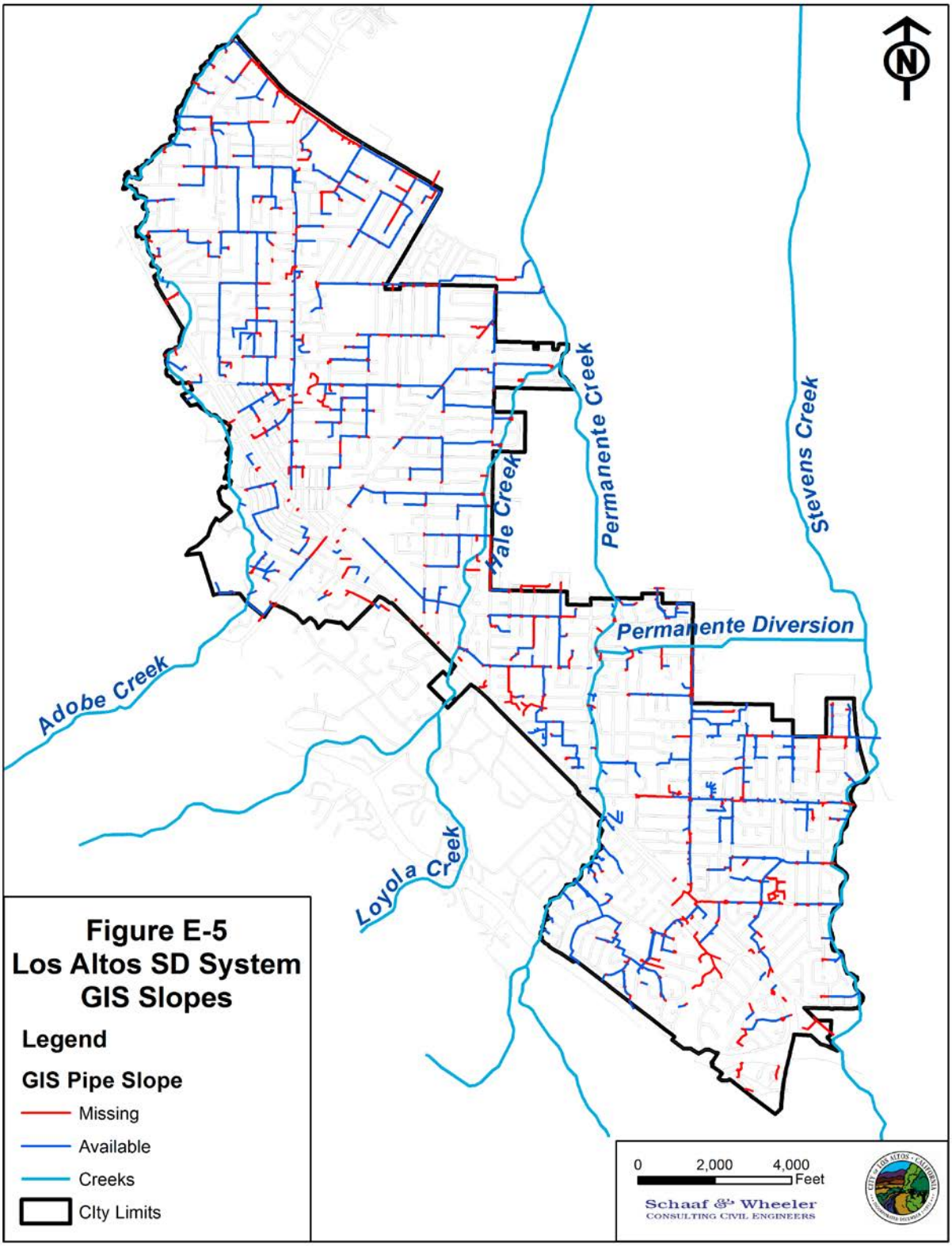
- Fiscal Year 2009/2010 Adopted Operating Budget (with notes and ancillary schedules)
- Fiscal Year 2009-2013 Adopted Capital Improvement Program (with notes and ancillary schedules)
- Fiscal Year 2008/2009 Comprehensive Annual Financial Report (with notes and ancillary schedules)
- Fiscal Year 2009/2010 Trial Balance (with year-to-date selection to be determined at point of collection)
- Fiscal Year 2009/2010 payroll data for select personnel
- Fiscal Year 2009/2010 overhead cost allocation plan
- Fiscal Year 2008/2009 Fixed Asset Report/Depreciation Schedule
- Time Studies for select activities and personnel

Data Quality

It is not known how many pipe diameters are incorrect. The City's GIS is missing 55% of pipe slopes (Figure E-5). There are no invert or rim elevations in the City's GIS database due to funding restraints. Also, portions of the 1966 SDMP data do not match as-built plans obtained from the City.

Storm Drain Tie-Ins

Figure E-6 illustrates the connections between the City of Los Altos' storm drainage network and surrounding communities. Legal agreements between the communities were researched by Schaaf & Wheeler. City of Mountain View is not aware of any existing agreements. Per a March 22, 2010 email from Jacqueline Andrews Solomon, City of Mountain View's Deputy Public Works Director, "There are not any agreements between the two cities that the folks here who would know (Bob Kagiyama and David Serge) know of."


Adobe Creek
Hale Creek
Permanente Creek
Stevens Creek
Permanente Diversion
Loyola Creek
Figure E-5
Los Altos SD System
GIS Slopes
Legend
GIS Pipe Slope
Missing
Available
Creeks
City Limits
0
2,000
4,000
Feet
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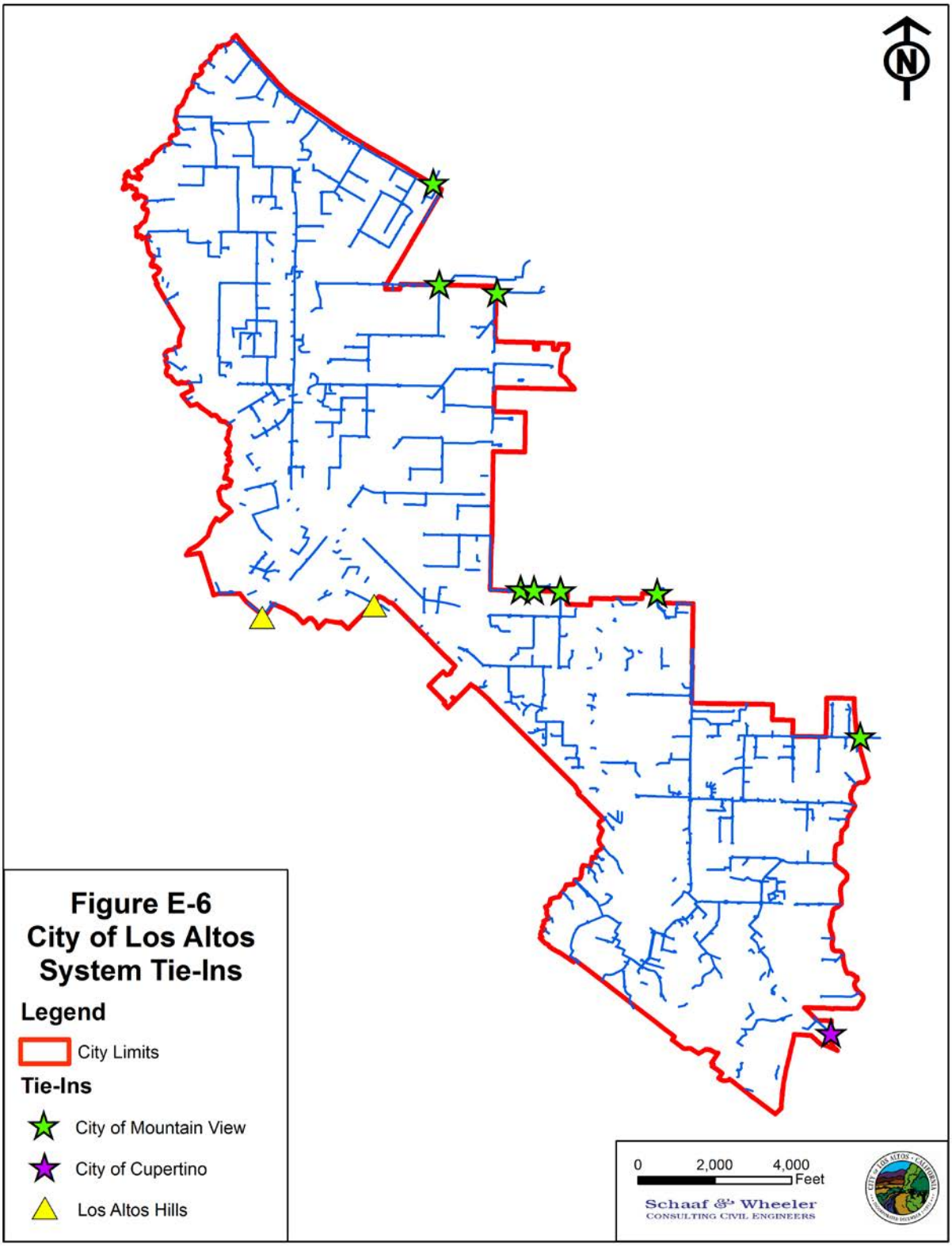


Figure E-6
City of Los Altos
System Tie-Ins
Legend
City Limits
Tie-Ins
City of Mountain View
City of Cupertino
Los Altos Hills
0
2,000
4,000
Feet
Schaaf & Wheeler
CONSULTING CIVIL ENGINEERS

Appendix F

Hydraulic Modeling System Capacity Deficiencies

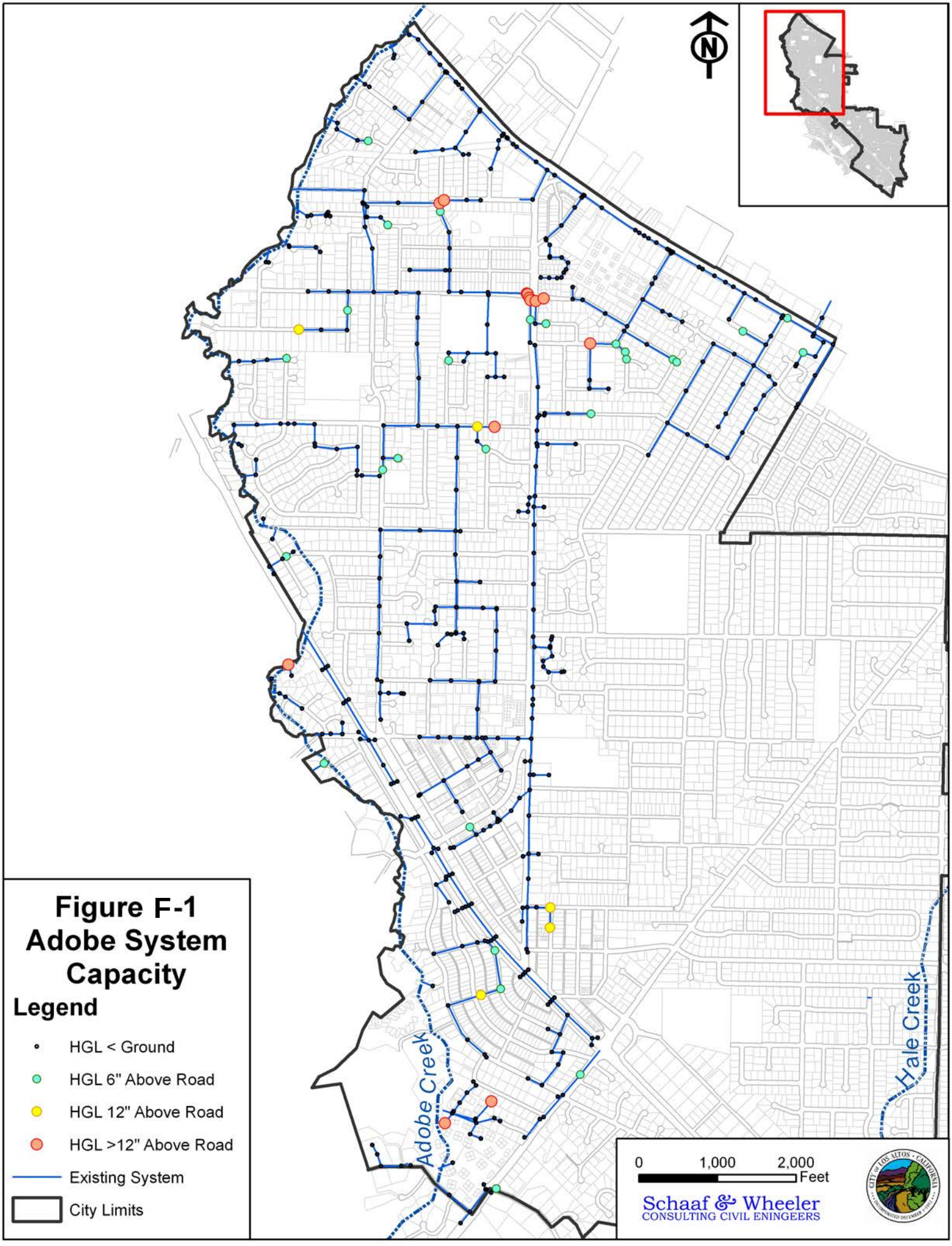
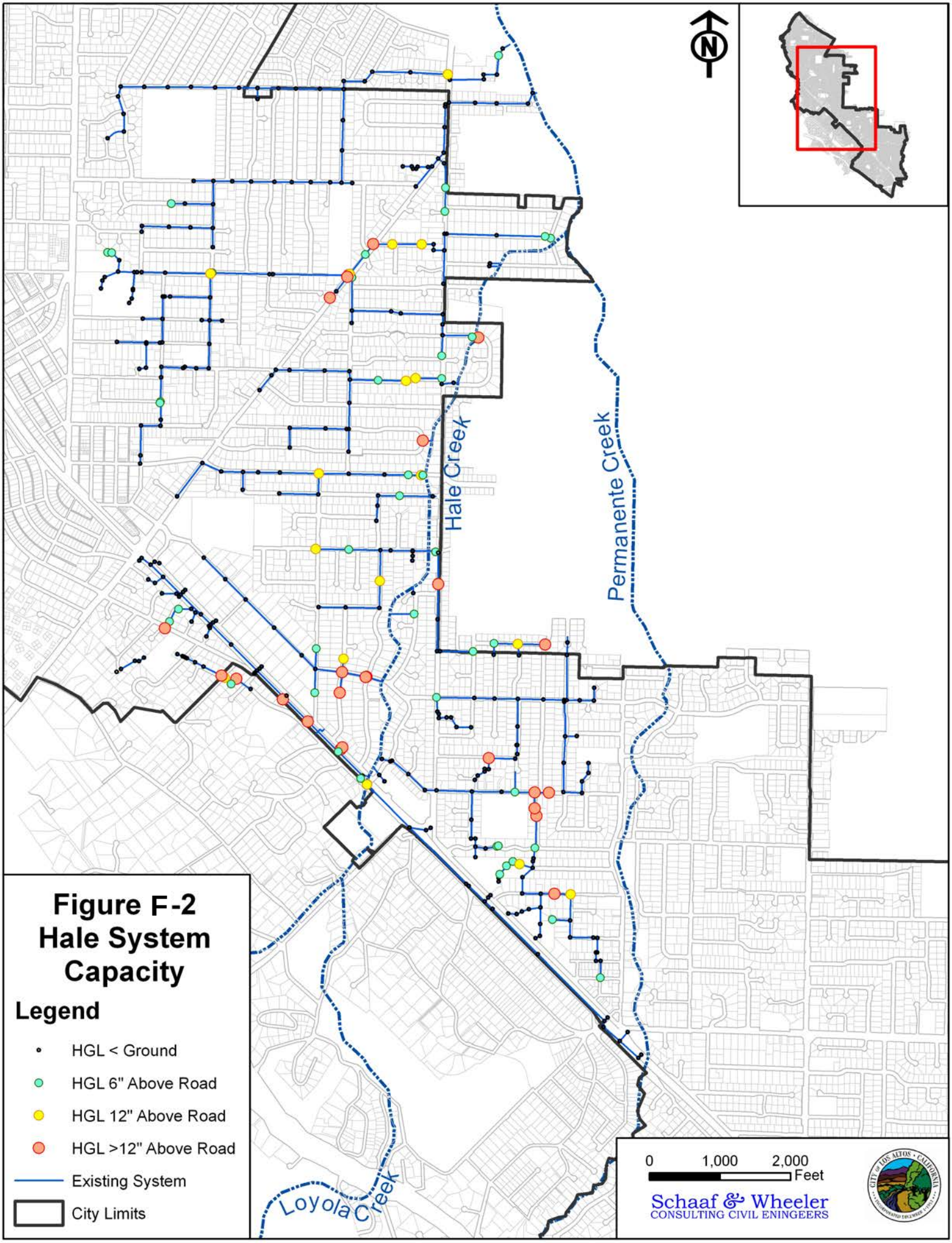
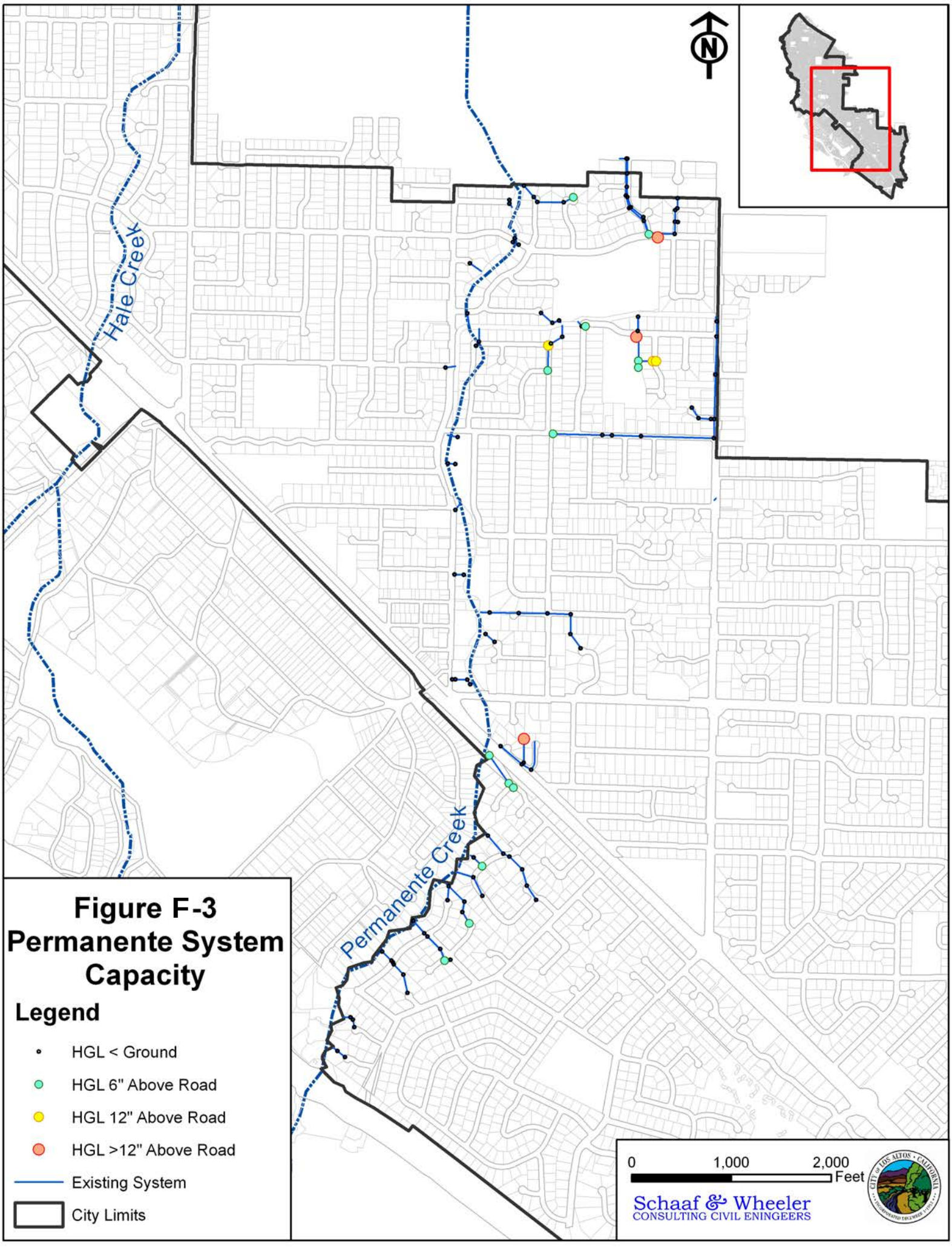
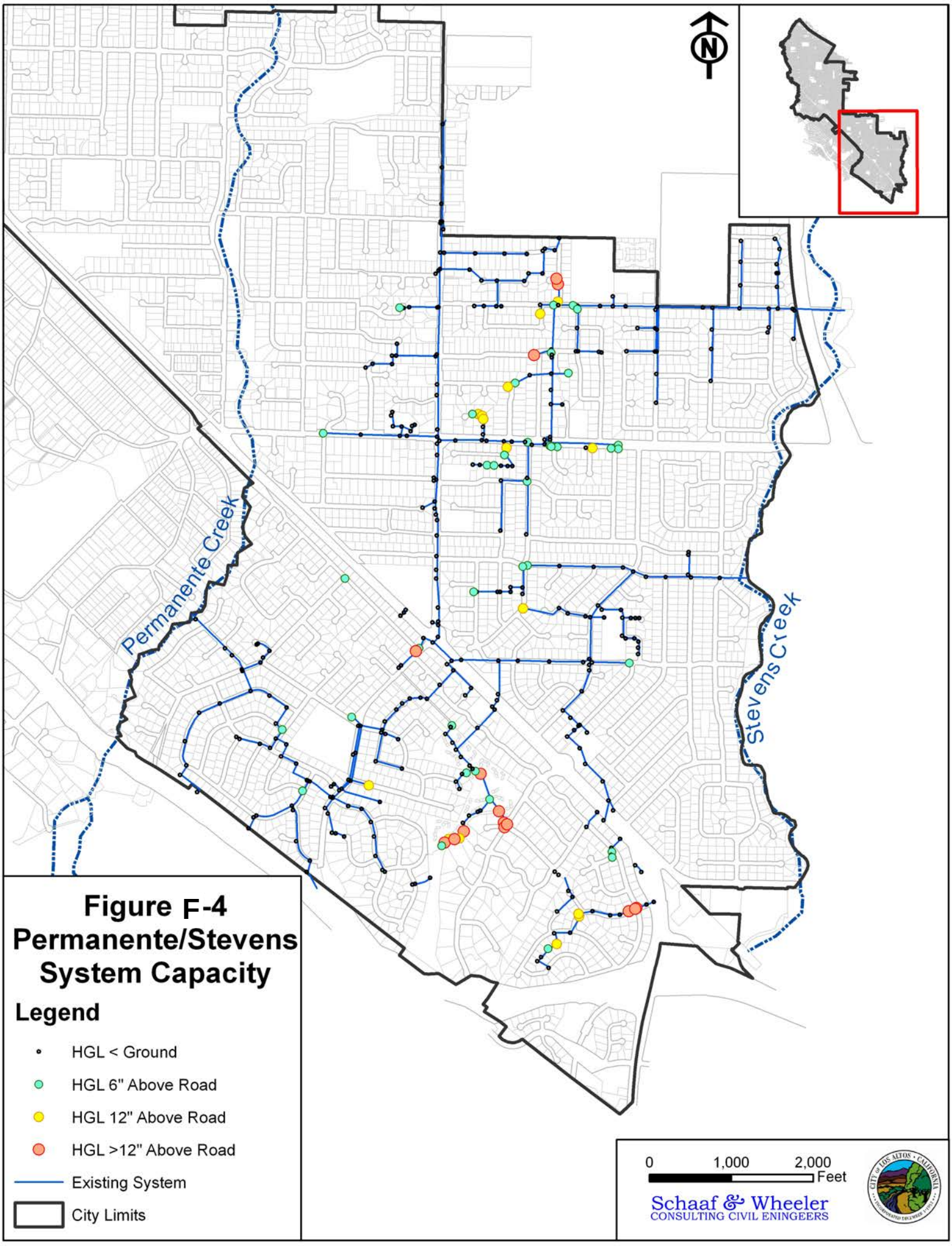
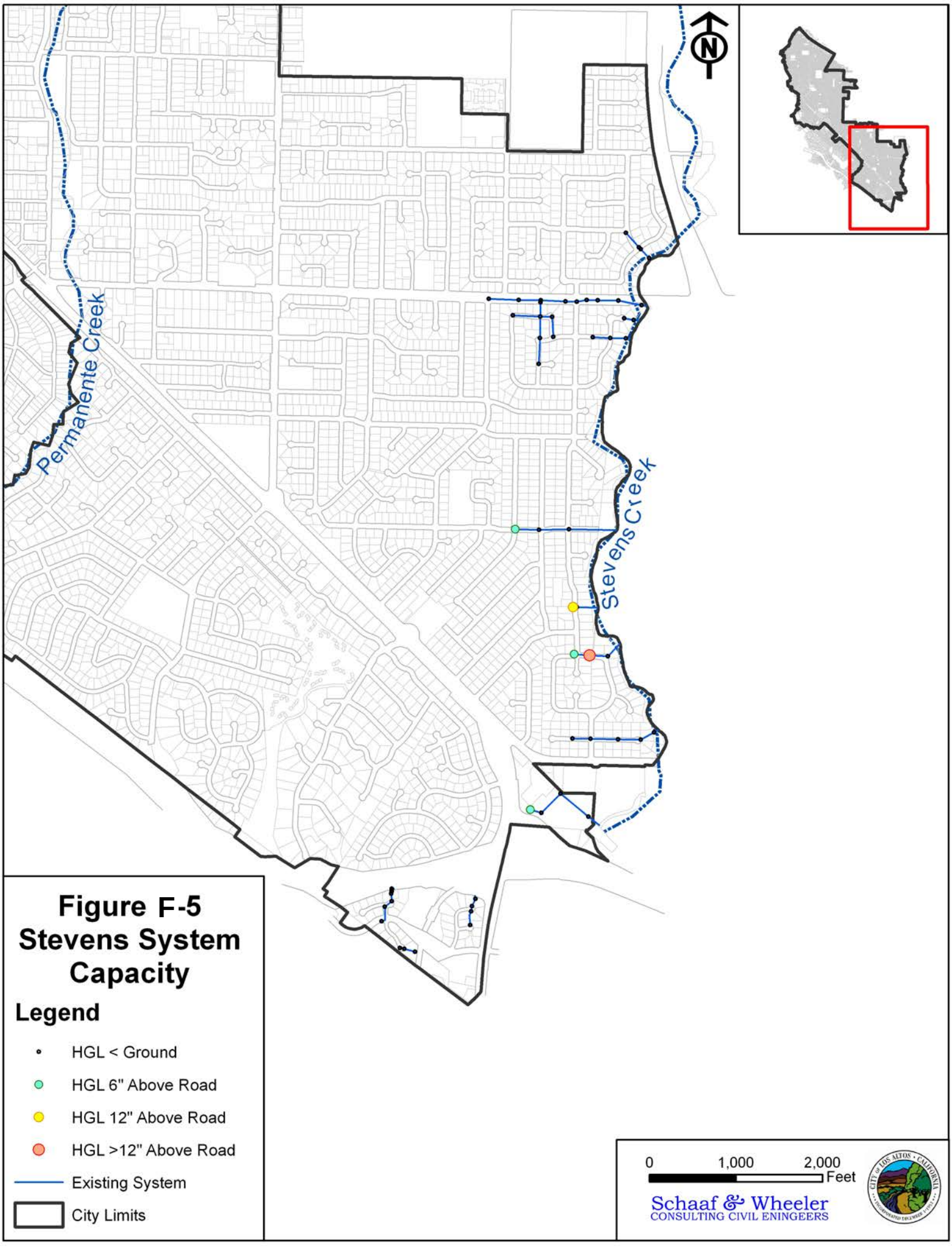


Figure F-1
Adobe System Capacity
Legend
HGL < Ground
HGL 6" Above Road
HGL 12" Above Road
HGL >12" Above Road
Existing System
City Limits
Adobe Creek
Hale Creek
0
1,000
2,000
Feet
Schaaf & Wheeler
CONSULTING CIVIL ENINGEERS
CITY OF LOS ALTOS · CALIFORNIA
INCORPORATED DECEMBER 1952


N
Hale Creek
Permanente Creek
Loyola Creek
Figure F-2
Hale System
Capacity
Legend
HGL < Ground
HGL 6" Above Road
HGL 12" Above Road
HGL >12" Above Road
Existing System
City Limits
0
1,000
2,000
Feet
Schaaf & Wheeler
CONSULTING CIVIL ENINGEERS

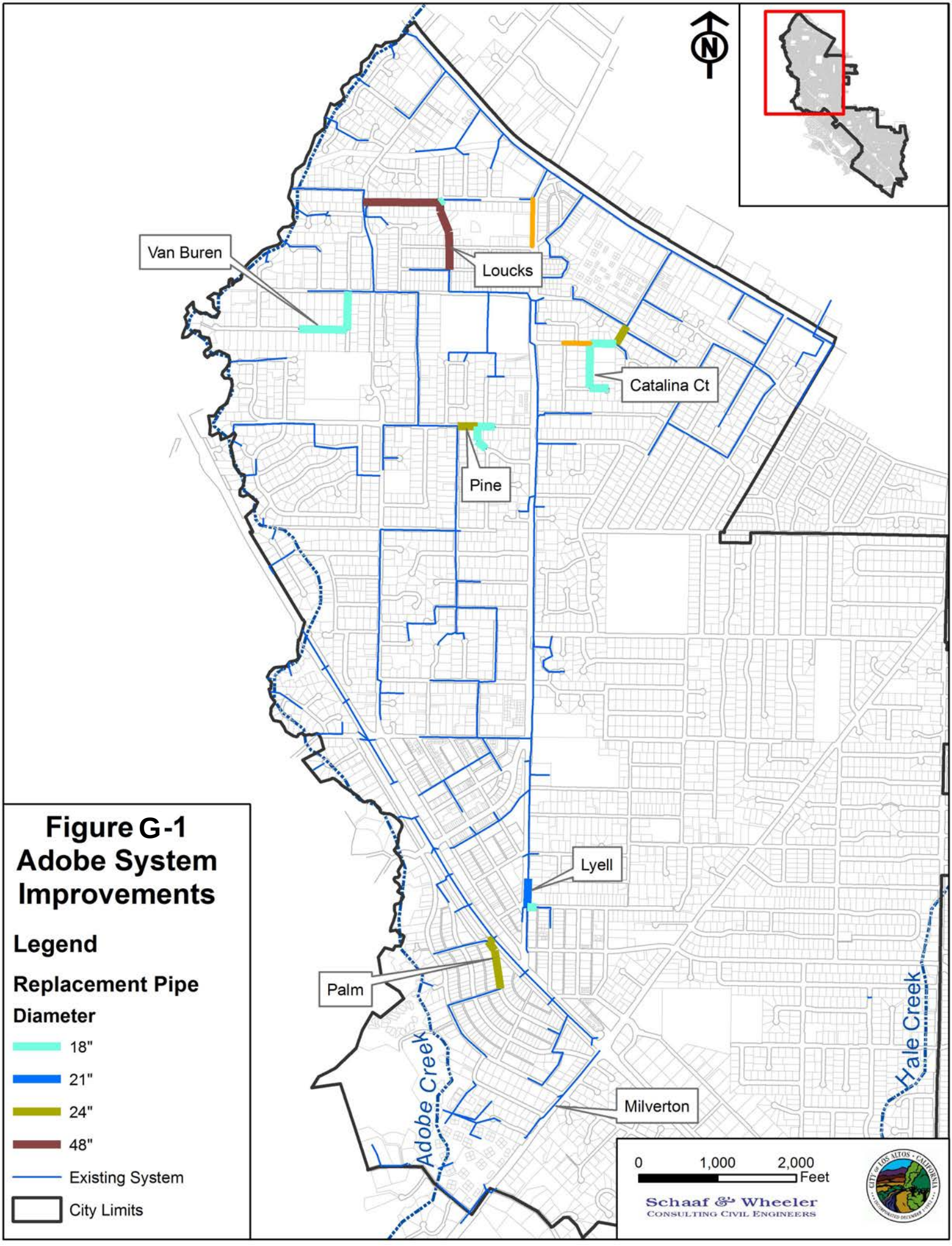

Hale Creek
Permanente Creek
N
Figure F-3
Permanente System Capacity
Legend
HGL < Ground
HGL 6" Above Road
HGL 12" Above Road
HGL >12" Above Road
Existing System
City Limits
0
1,000
2,000
Feet
Schaaf & Wheeler
CONSULTING CIVIL ENINGEERS


Permanente Creek
Stevens Creek
Figure F-4
Permanente/Stevens
System Capacity
Legend
HGL < Ground
HGL 6" Above Road
HGL 12" Above Road
HGL >12" Above Road
Existing System
City Limits
0
1,000
2,000
Feet
Schaaf & Wheeler
CONSULTING CIVIL ENINGEERS


N
Permanente Creek
Stevens Creek
Figure F-5
Stevens System
Capacity
Legend
HGL < Ground
HGL 6" Above Road
HGL 12" Above Road
HGL >12" Above Road
Existing System
City Limits
0
1,000
2,000
Feet
Schaaf & Wheeler
CONSULTING CIVIL ENINGEERS

Appendix G

Storm Drain System Capacity Improvements


Van Buren
Loucks
Catalina Ct
Pine
Lyell
Palm
Milverton
Adobe Creek
Hale Creek
N
0
1,000
2,000
Feet
Schaaf & Wheeler
Consulting Civil Engineers
Figure G-1
Adobe System
Improvements
Legend
Replacement Pipe
Diameter
18"
21"
24"
48"
Existing System
City Limits

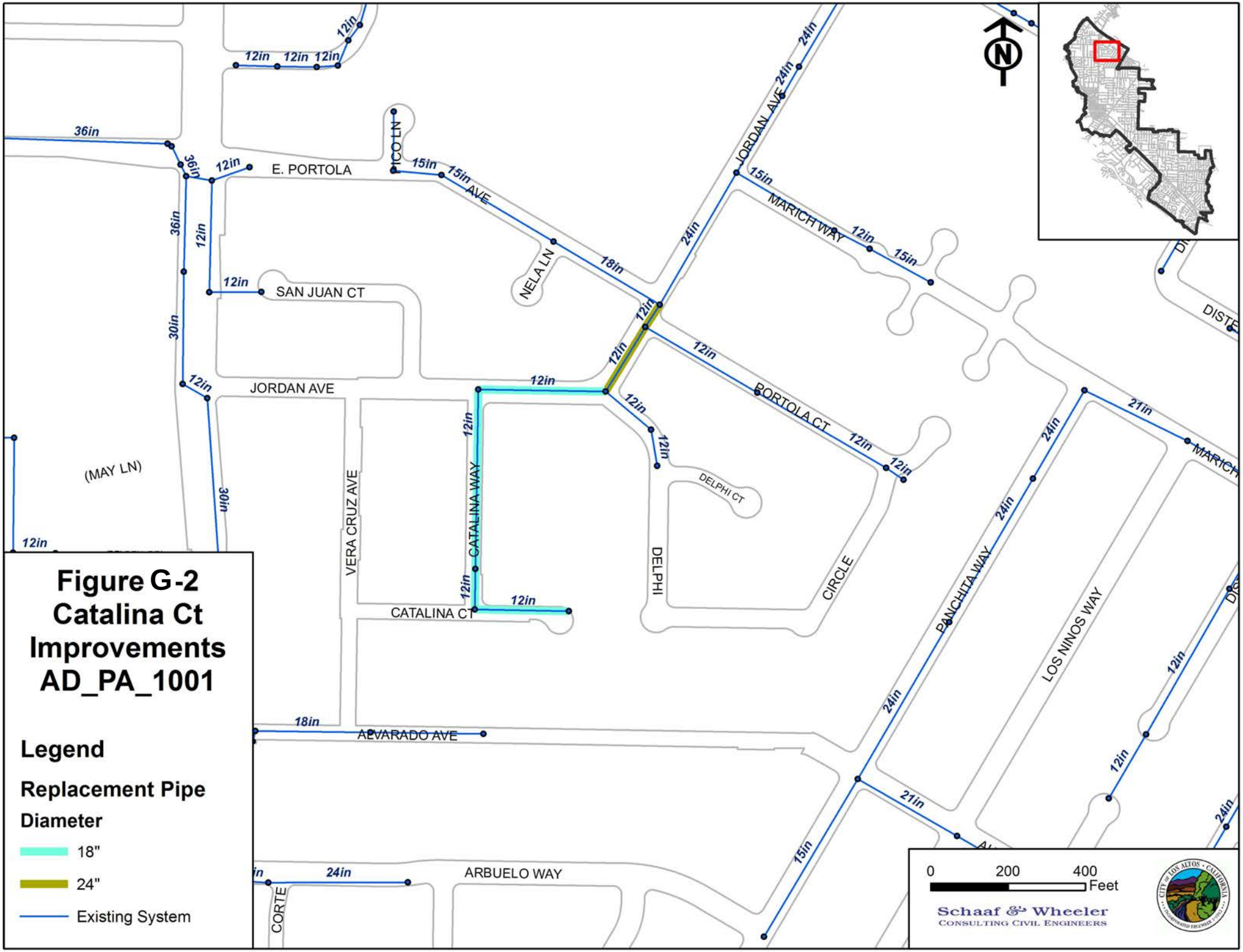


Figure G-2
Catalina Ct
Improvements
AD_PA_1001
Legend
Replacement Pipe
Diameter
18"
24"
Existing System
E. PORTOLA
JORDAN AVE
SAN JUAN CT
NELA LN
ICO LN
AVE
MARICH WAY
PORTOLA CT
DELPHI CT
DELPHI
CIRCLE
CATALINA WAY
CATALINA CT
VERA CRUZ AVE
(MAY LN)
ALVARADO AVE
ARBUELO WAY
CORTE
PANCHITA WAY
LOS NINOS WAY
0
200
400
Feet
Schaaf & Wheeler
CONSULTING CIVIL ENGINEERS

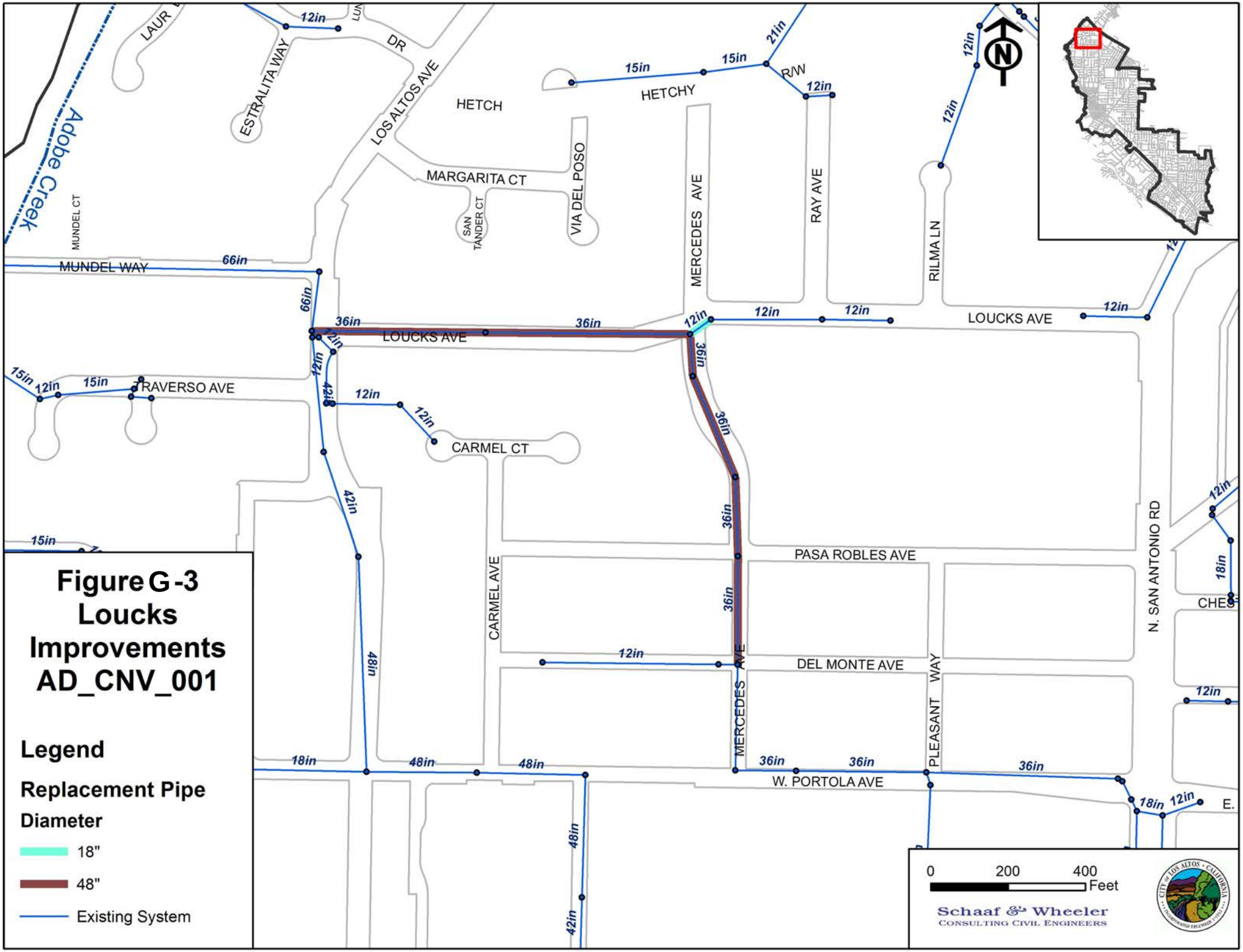


Figure G-3
Loucks Improvements
AD_CNV_001
Legend
Replacement Pipe
Diameter
18"
48"
Existing System
Adobe Creek
MUNDEL CT
MUNDEL WAY
66in
ESTRALITA WAY
LOS ALTOS AVE
HETCH
HETCHY
R/W
MARGARITA CT
SAN TANDER CT
VIA DEL POSO
MERCEDES AVE
RAY AVE
RILMA LN
LOUCKS AVE
36in
12in
15in
21in
TRAVERSO AVE
CARMEL CT
42in
48in
18in
CARMEL AVE
PASA ROBLES AVE
DEL MONTE AVE
MERCEDES AVE
PLEASANT WAY
W. PORTOLA AVE
N. SAN ANTONIO RD
0
200
400
Feet
Schaaf & Wheeler
CONSULTING CIVIL ENGINEERS

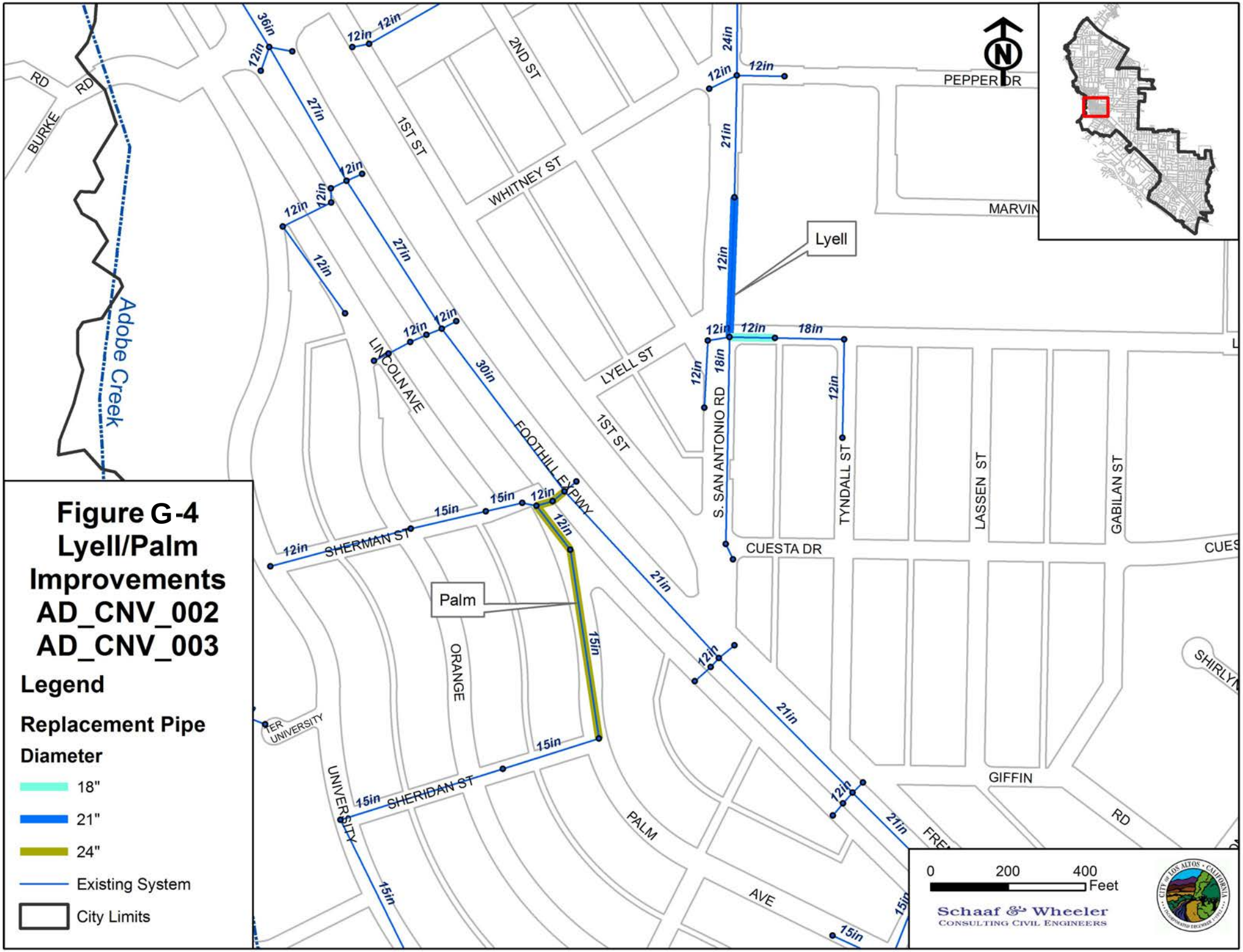


Figure G-4
Lyell/Palm
Improvements
AD_CNV_002
AD_CNV_003
Legend
Replacement Pipe
Diameter
18"
21"
24"
Existing System
City Limits
Lyell
Palm
Adobe Creek
BURKE RD
1ST ST
2ND ST
WHITNEY ST
PEPPER DR
MARVIN
LYELL ST
LINCOLN AVE
FOOTHILL EXPWY
S. SAN ANTONIO RD
TYNDALL ST
LASSEN ST
GABILAN ST
CUESTA DR
SHERMAN ST
ORANGE
UNIVERSITY
SHERIDAN ST
PALM
AVE
GIFFIN
RD
0
200
400
Feet
Schaaf & Wheeler
CONSULTING CIVIL ENGINEERS

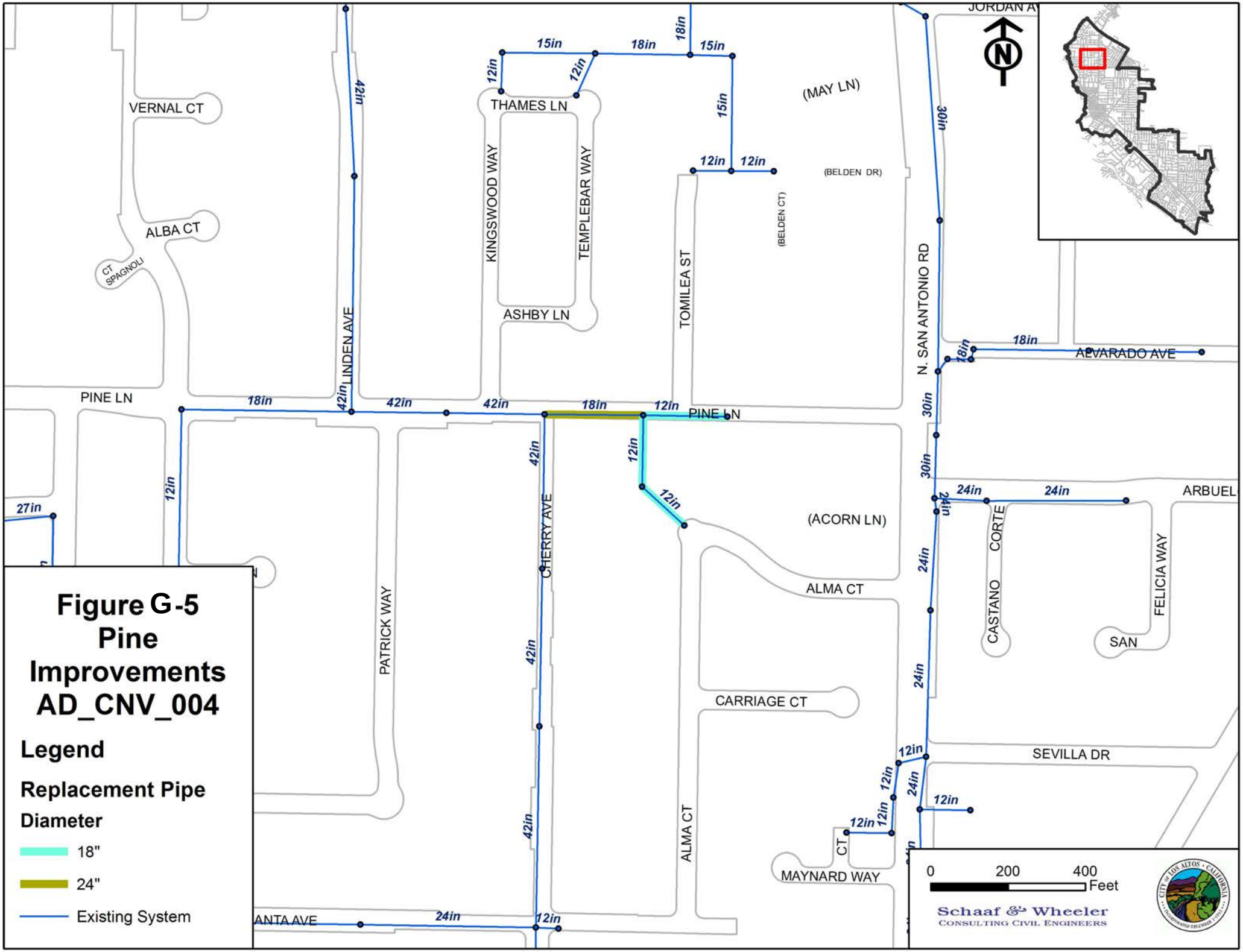
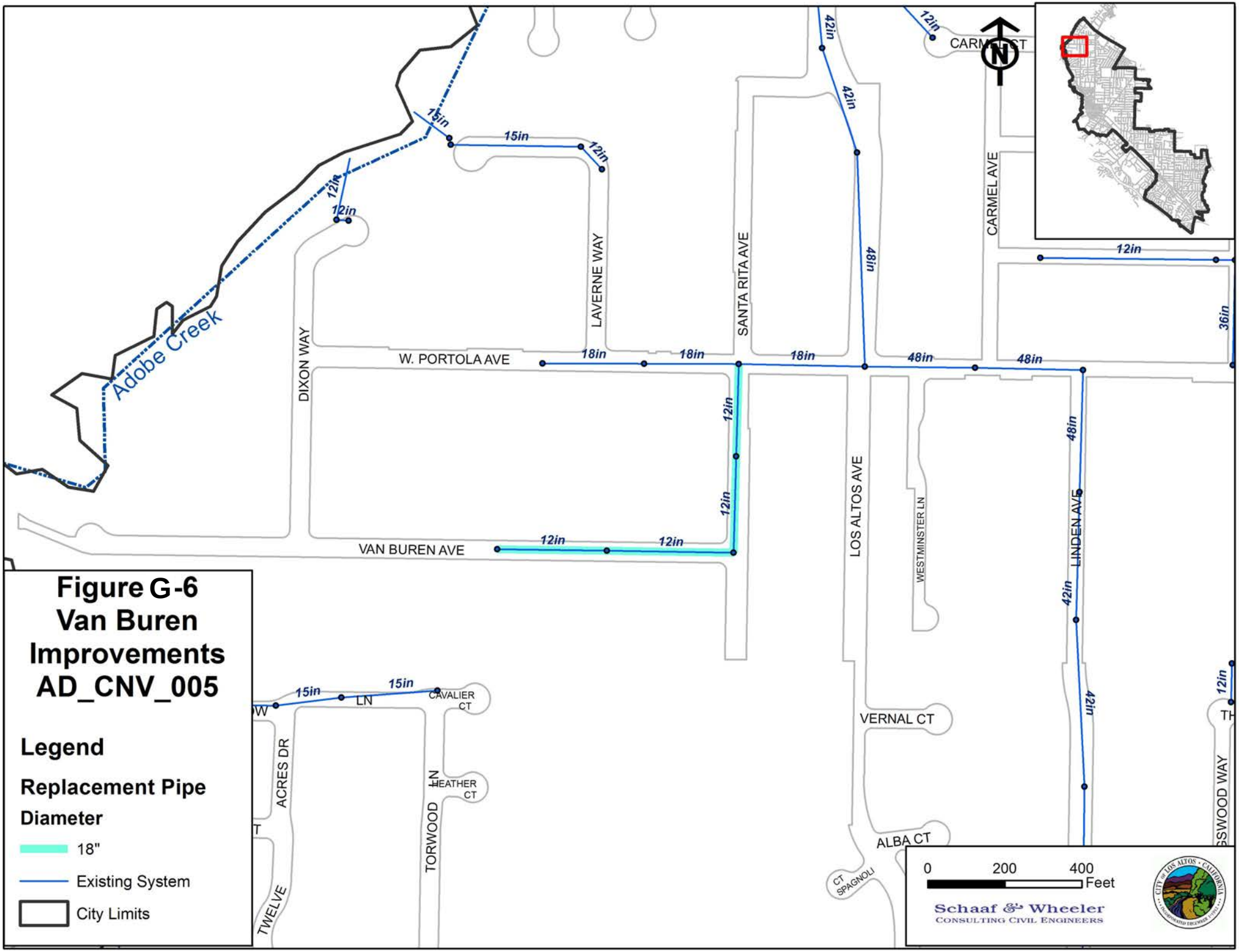
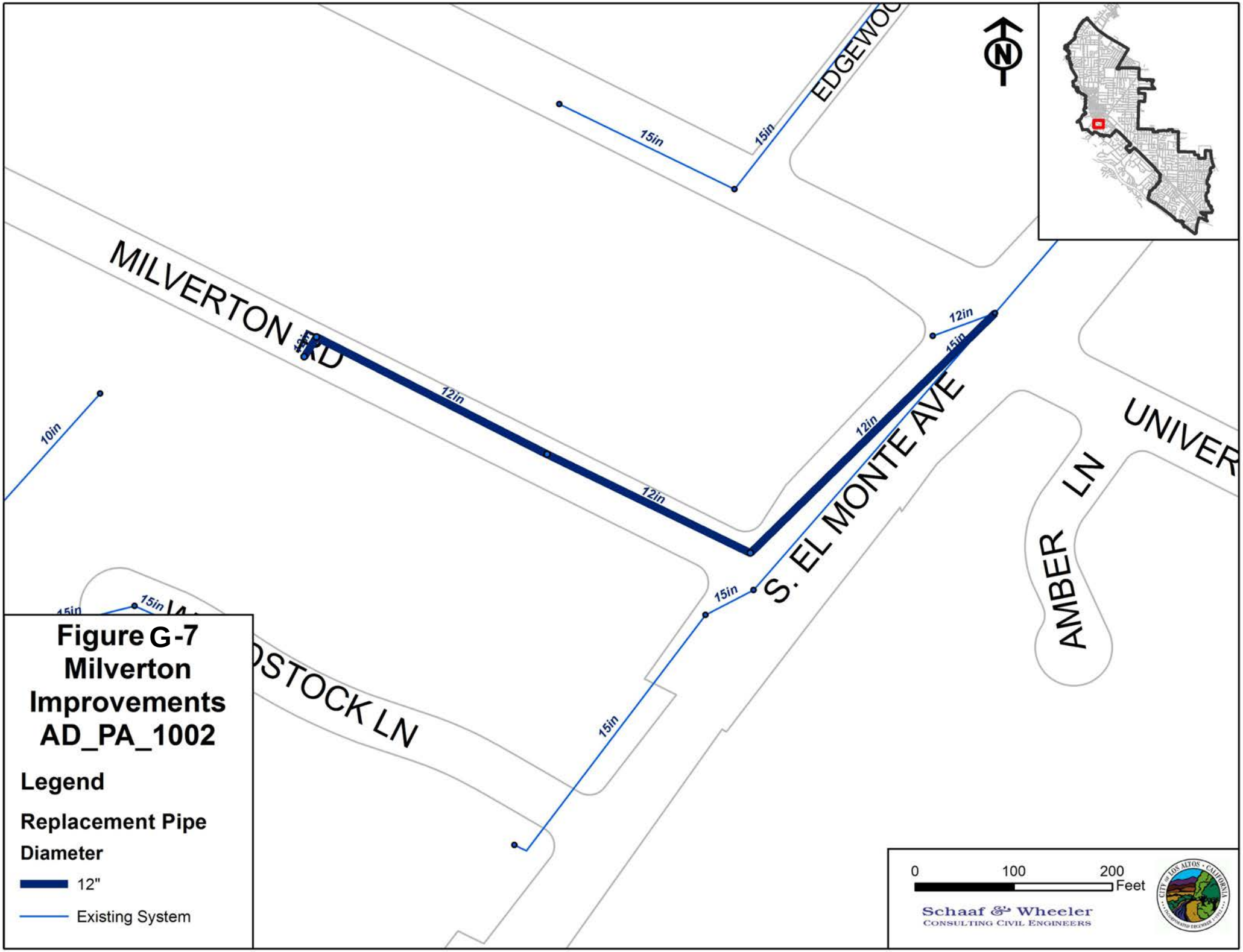
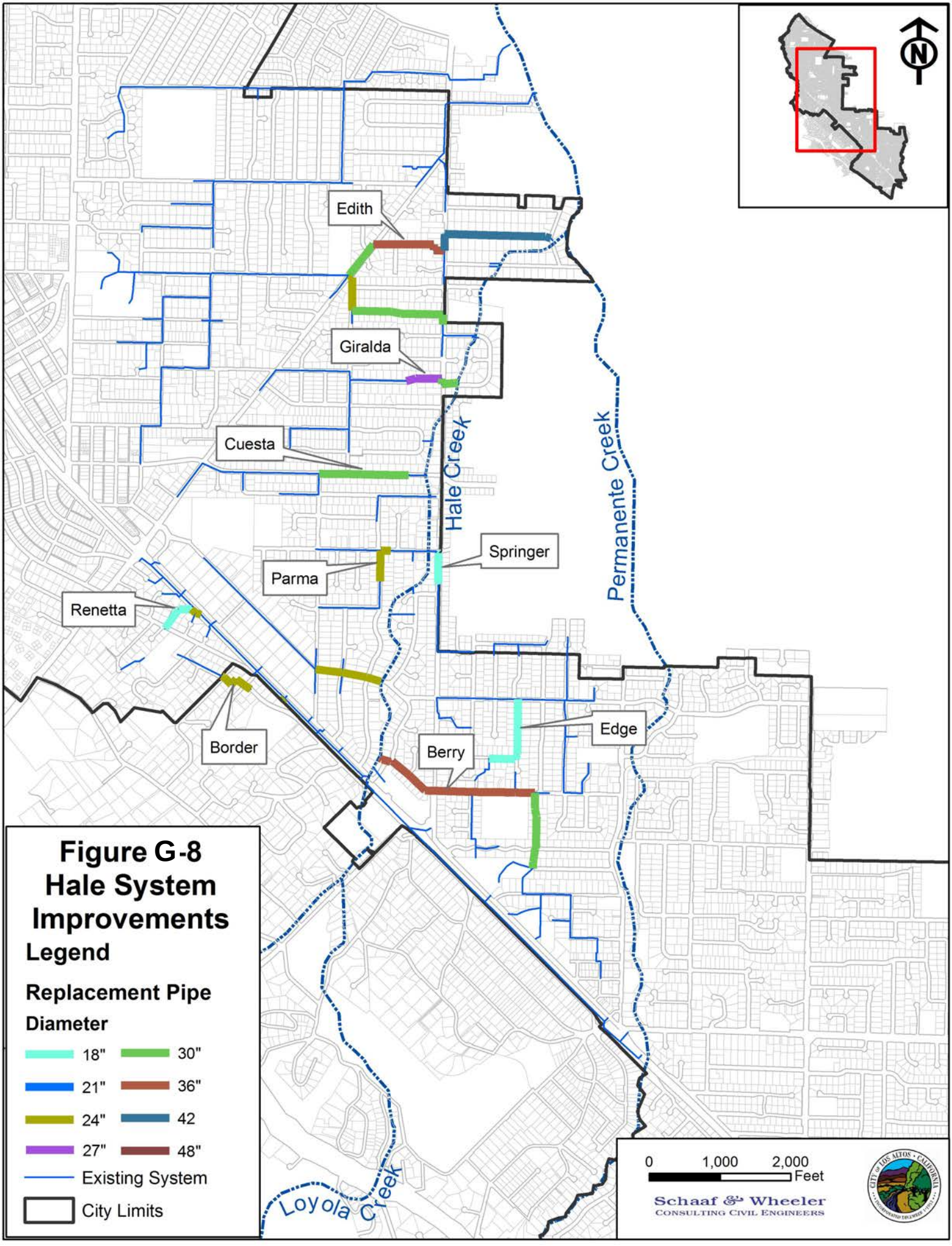


Figure G-5
Pine
Improvements
AD_CNV_004
Legend
Replacement Pipe
Diameter
18"
24"
Existing System
VERNAL CT
ALBA CT
CT SPAGNOLI
PINE LN
LINDEN AVE
THAMES LN
KINGSWOOD WAY
TEMPLEBAR WAY
ASHBY LN
(MAY LN)
(BELDEN DR)
(BELDEN CT)
TOMILEA ST
N. SAN ANTONIO RD
ALVARADO AVE
ARBUEL
CORTE CASTANO
FELICIA WAY
SAN
(ACORN LN)
ALMA CT
CHERRY AVE
PATRICK WAY
CARRIAGE CT
SEVILLA DR
MAYNARD WAY
CT
ANTA AVE
0
200
400
Feet
Schaaf & Wheeler
CONSULTING CIVIL ENGINEERS


Adobe Creek
DIXON WAY
LAVERNE WAY
SANTA RITA AVE
CARMEL AVE
W. PORTOLA AVE
VAN BUREN AVE
LOS ALTOS AVE
WESTMINSTER LN
LINDEN AVE
VERNAL CT
ALBA CT
CT SPAGNOLI
CAVALIER CT
HEATHER CT
ACRES DR
TORWOOD LN
TWELVE
15in
12in
18in
42in
48in
36in
Figure G-6
Van Buren
Improvements
AD_CNV_005
Legend
Replacement Pipe
Diameter
18"
Existing System
City Limits
0
200
400
Feet
Schaaf & Wheeler
CONSULTING CIVIL ENGINEERS


MILVERTON RD
EDGEWOO
S. EL MONTE AVE
AMBER LN
UNIVER
OSTOCK LN
15in
12in
10in
Figure G-7
Milverton
Improvements
AD_PA_1002
Legend
Replacement Pipe
Diameter
12"
Existing System
0
100
200
Feet
Schaaf & Wheeler
CONSULTING CIVIL ENGINEERS


Edith
Giralda
Cuesta
Hale Creek
Permanente Creek
Springer
Parma
Renetta
Border
Edge
Berry
Loyola Creek
Figure G-8
Hale System Improvements
Legend
Replacement Pipe Diameter
18"
30"
21"
36"
24"
42
27"
48"
Existing System
City Limits
0
1,000
2,000
Feet
Schaaf & Wheeler
CONSULTING CIVIL ENGINEERS

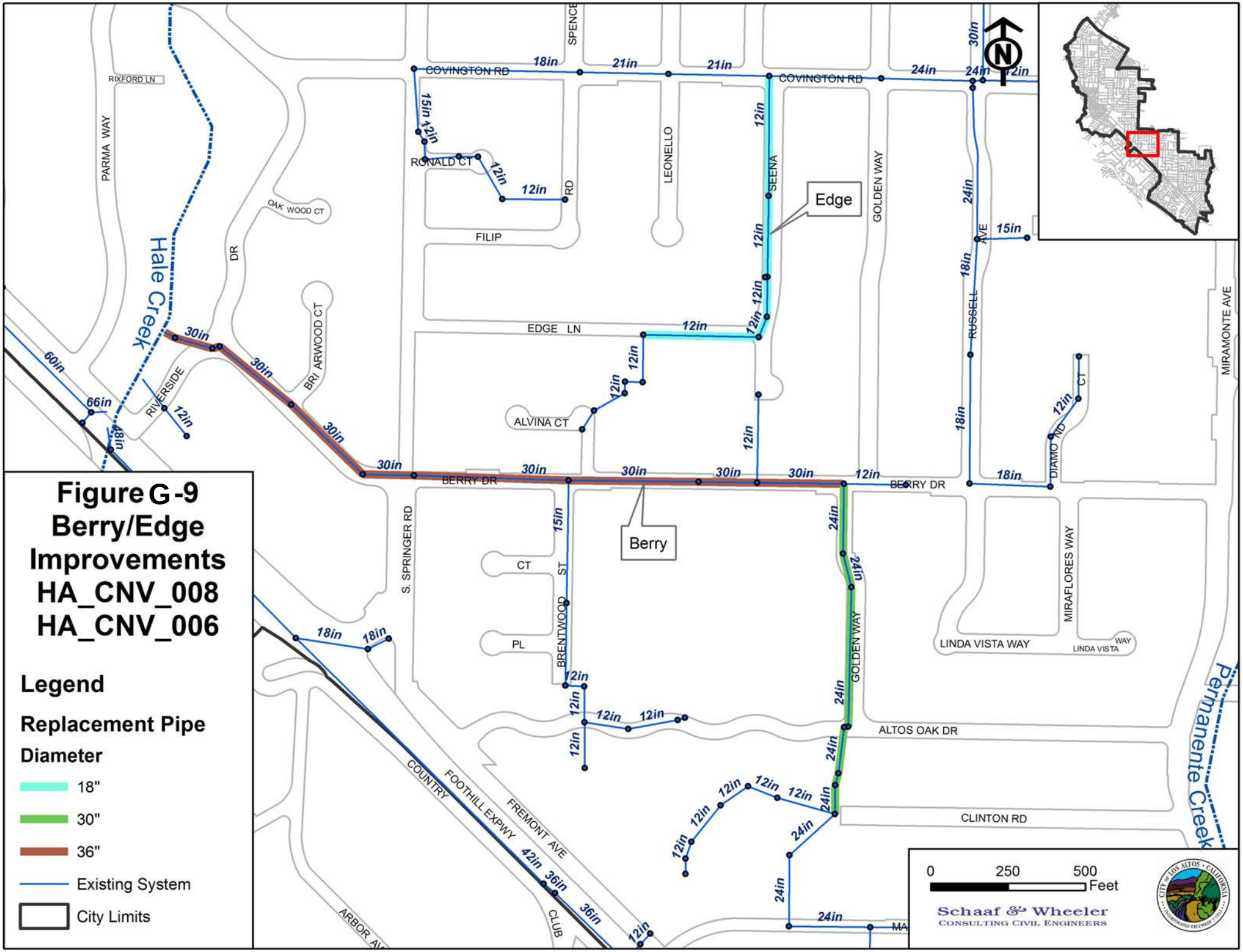
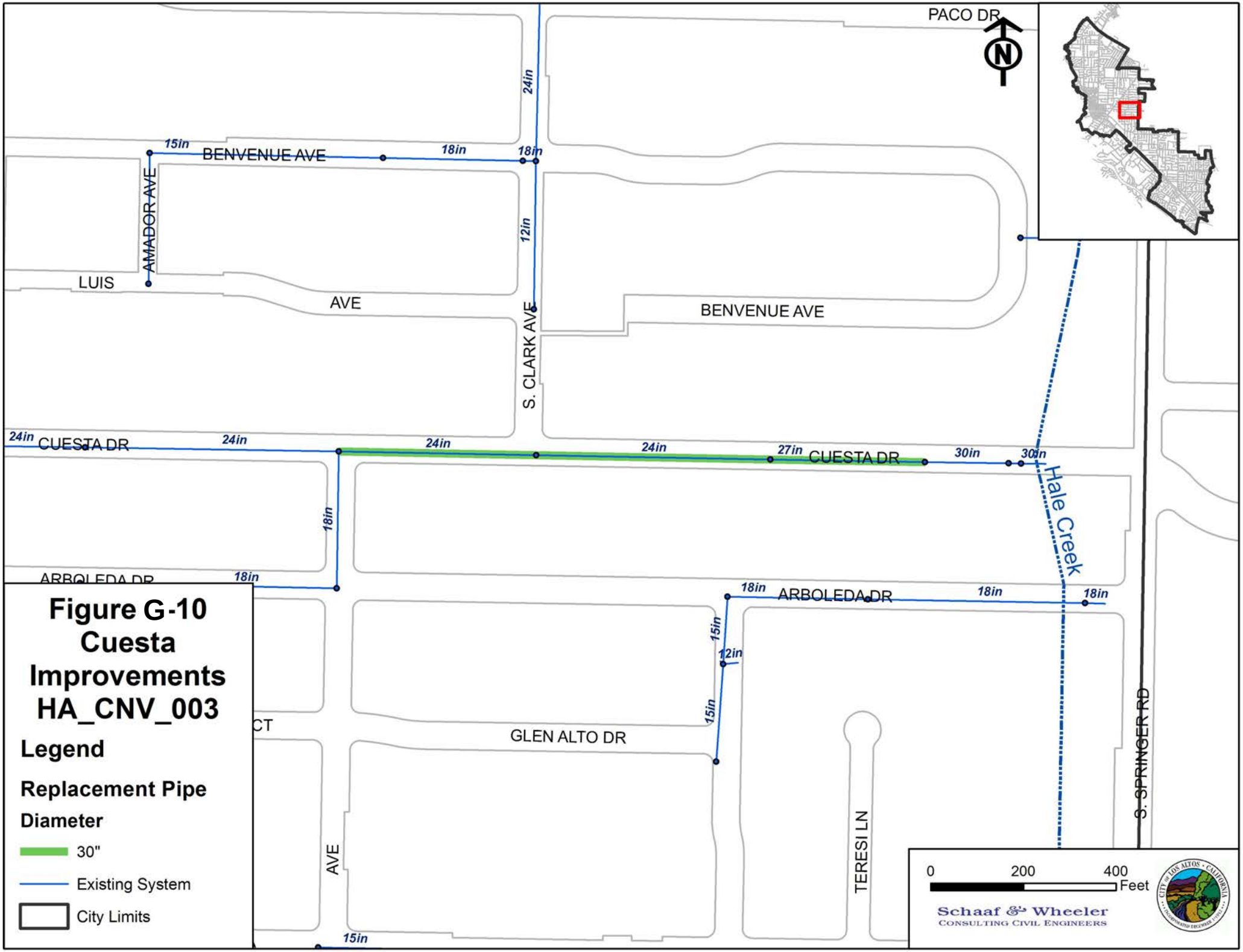


Figure G-9
Berry/Edge
Improvements
HA_CNV_008
HA_CNV_006
Legend
Replacement Pipe
Diameter
18"
30"
36"
Existing System
City Limits
Edge
Berry
COVINGTON RD
EDGE LN
BERRY DR
ALTOS OAK DR
CLINTON RD
LINDA VISTA WAY
Hale Creek
Permanente Creek
0
250
500
Feet
Schaaf & Wheeler
CONSULTING CIVIL ENGINEERS


PACO DR
N
BENVENUE AVE
AMADOR AVE
LUIS
AVE
S. CLARK AVE
BENVENUE AVE
CUESTA DR
CUESTA DR
Hale Creek
ARBOLEDA DR
ARBOLEDA DR
GLEN ALTO DR
TERESI LN
S. SPRINGER RD
15in
18in
18in
24in
12in
24in
24in
24in
24in
27in
30in
30in
18in
18in
18in
18in
18in
15in
12in
15in
15in
0
200
400
Feet
Schaaf & Wheeler
CONSULTING CIVIL ENGINEERS
Figure G-10
Cuesta
Improvements
HA_CNV_003
Legend
Replacement Pipe
Diameter
30"
Existing System
City Limits

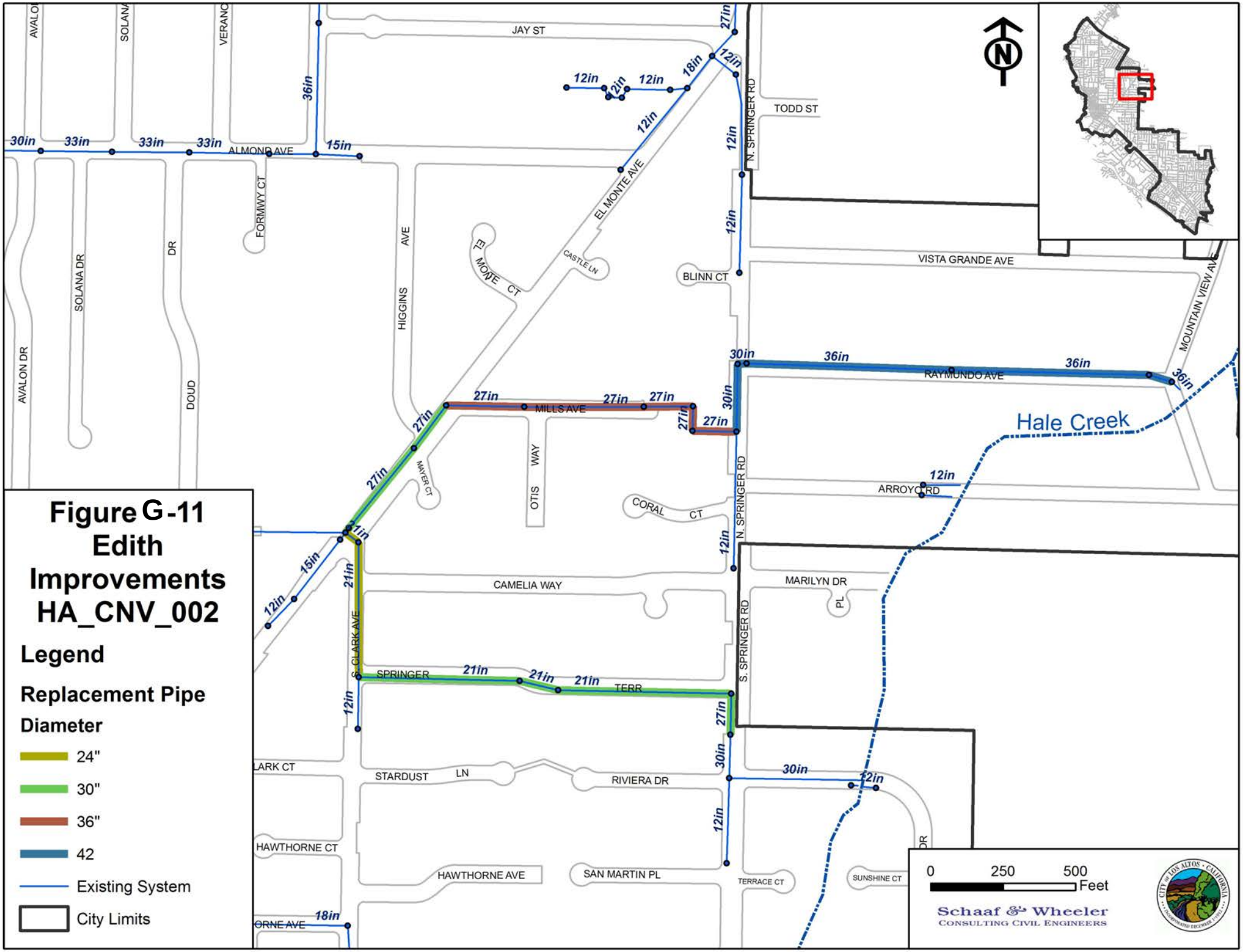
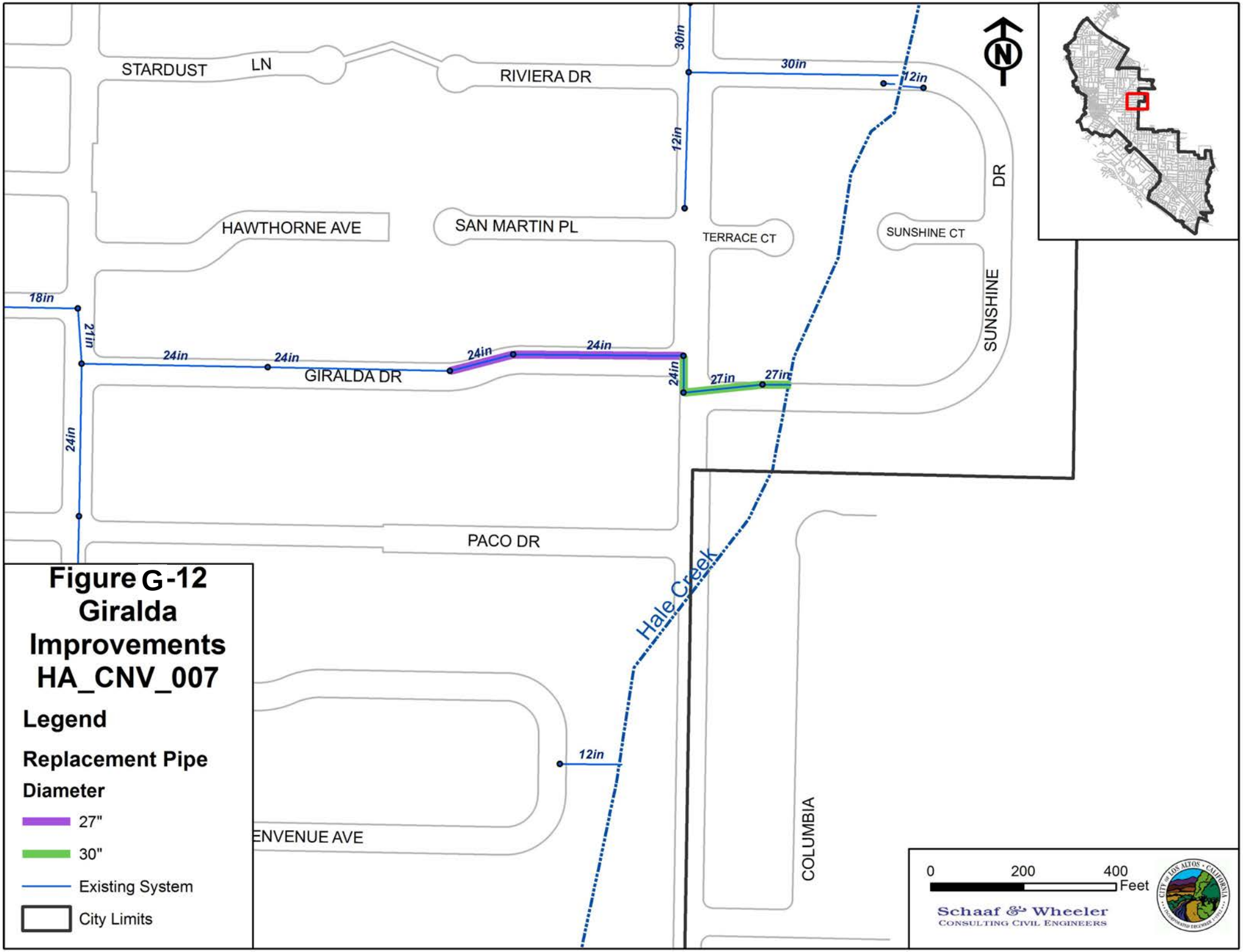


Figure G-11
Edith Improvements
HA_CNV_002
Legend
Replacement Pipe
Diameter
24"
30"
36"
42
Existing System
City Limits
JAY ST
ALMOND AVE
TODD ST
N. SPRINGER RD
EL MONTE AVE
CASTLE LN
EL MONTE CT
FORMWY CT
HIGGINS AVE
SOLANA DR
AVALON DR
DOUD DR
BLINN CT
VISTA GRANDE AVE
MOUNTAIN VIEW AVE
RAYMUNDO AVE
MILLS AVE
Hale Creek
OTIS WAY
MAYER CT
CORAL CT
ARROYO RD
CAMELIA WAY
MARILYN DR PL
S. SPRINGER RD
S. CLARK AVE
SPRINGER TERR
STARDUST LN
RIVIERA DR
HAWTHORNE CT
HAWTHORNE AVE
SAN MARTIN PL
TERRACE CT
SUNSHINE CT
0 250 500 Feet
Schaaf & Wheeler
CONSULTING CIVIL ENGINEERS


STARDUST LN
RIVIERA DR
HAWTHORNE AVE
SAN MARTIN PL
TERRACE CT
SUNSHINE CT
SUNSHINE DR
GIRALDA DR
PACO DR
Hale Creek
COLUMBIA
ENVENUE AVE
30in
12in
18in
21in
24in
27in
N
0
200
400
Feet
Schaaf & Wheeler
CONSULTING CIVIL ENGINEERS
Figure G-12
Giralda Improvements
HA_CNV_007
Legend
Replacement Pipe
Diameter
27"
30"
Existing System
City Limits

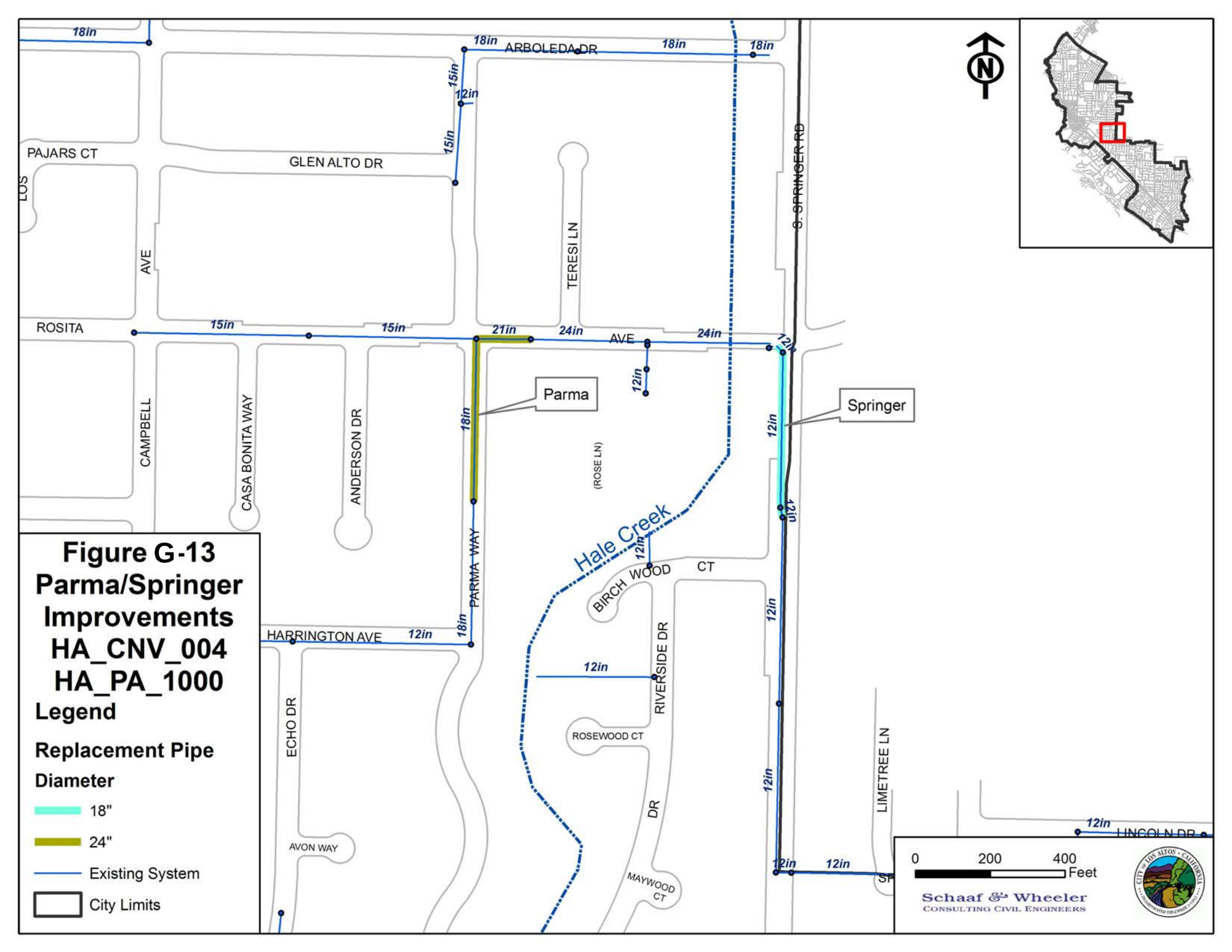


Figure G-13
Parma/Springer
Improvements
HA_CNV_004
HA_PA_1000
Legend
Replacement Pipe
Diameter
18"
24"
Existing System
City Limits
Parma
Springer
Hale Creek
ARBOLEDA DR
GLEN ALTO DR
PAJARS CT
TERESI LN
S. SPRINGER RD
ROSITA AVE
CAMPBELL AVE
CASA BONITA WAY
ANDERSON DR
(ROSE LN)
PARMA WAY
HARRINGTON AVE
BIRCH WOOD CT
RIVERSIDE DR
ROSEWOOD CT
ECHO DR
AVON WAY
MAYWOOD CT
LIMETREE LN
LINCOLN DR
18in
15in
12in
21in
24in
0
200
400
Feet
Schaaf & Wheeler
CONSULTING CIVIL ENGINEERS

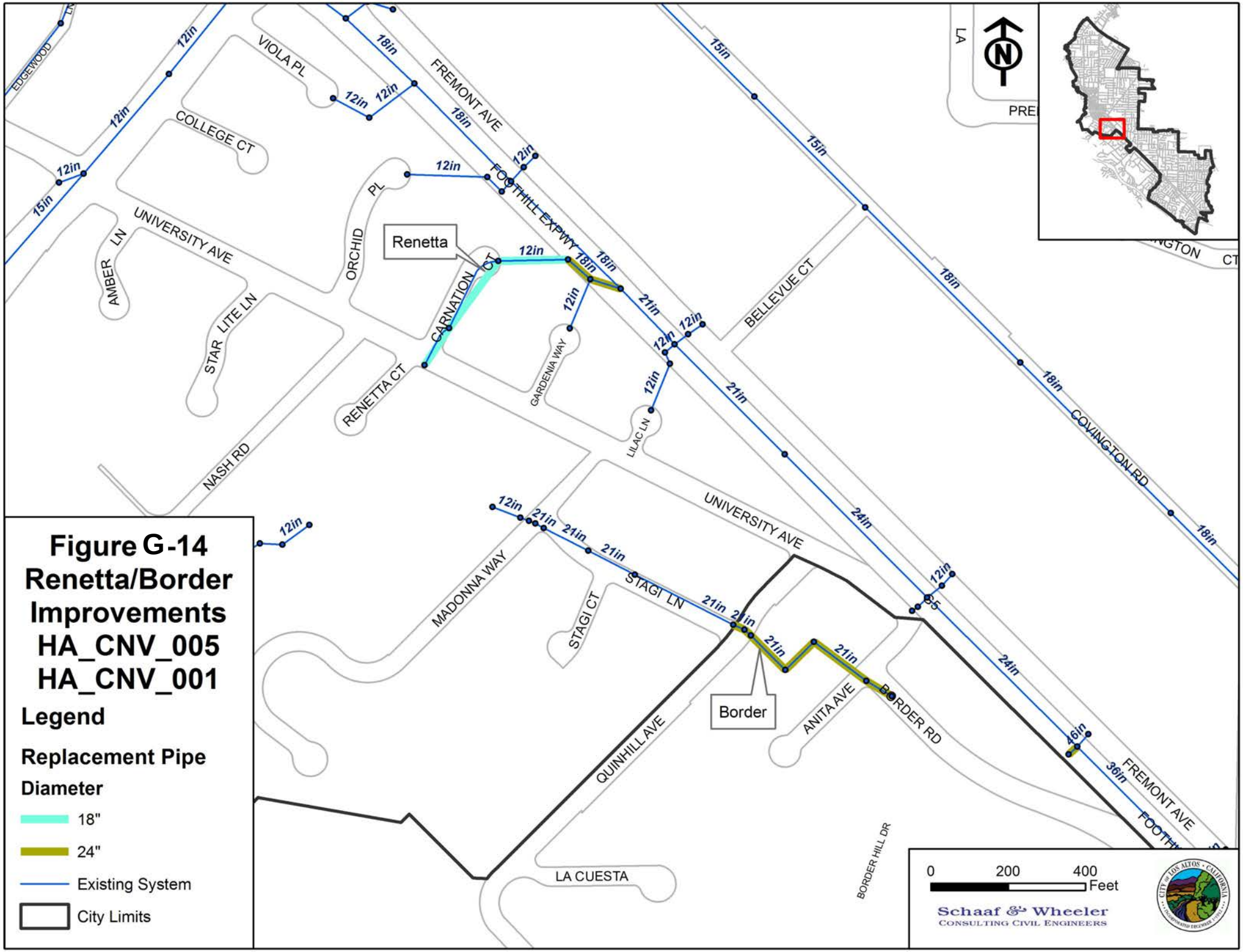
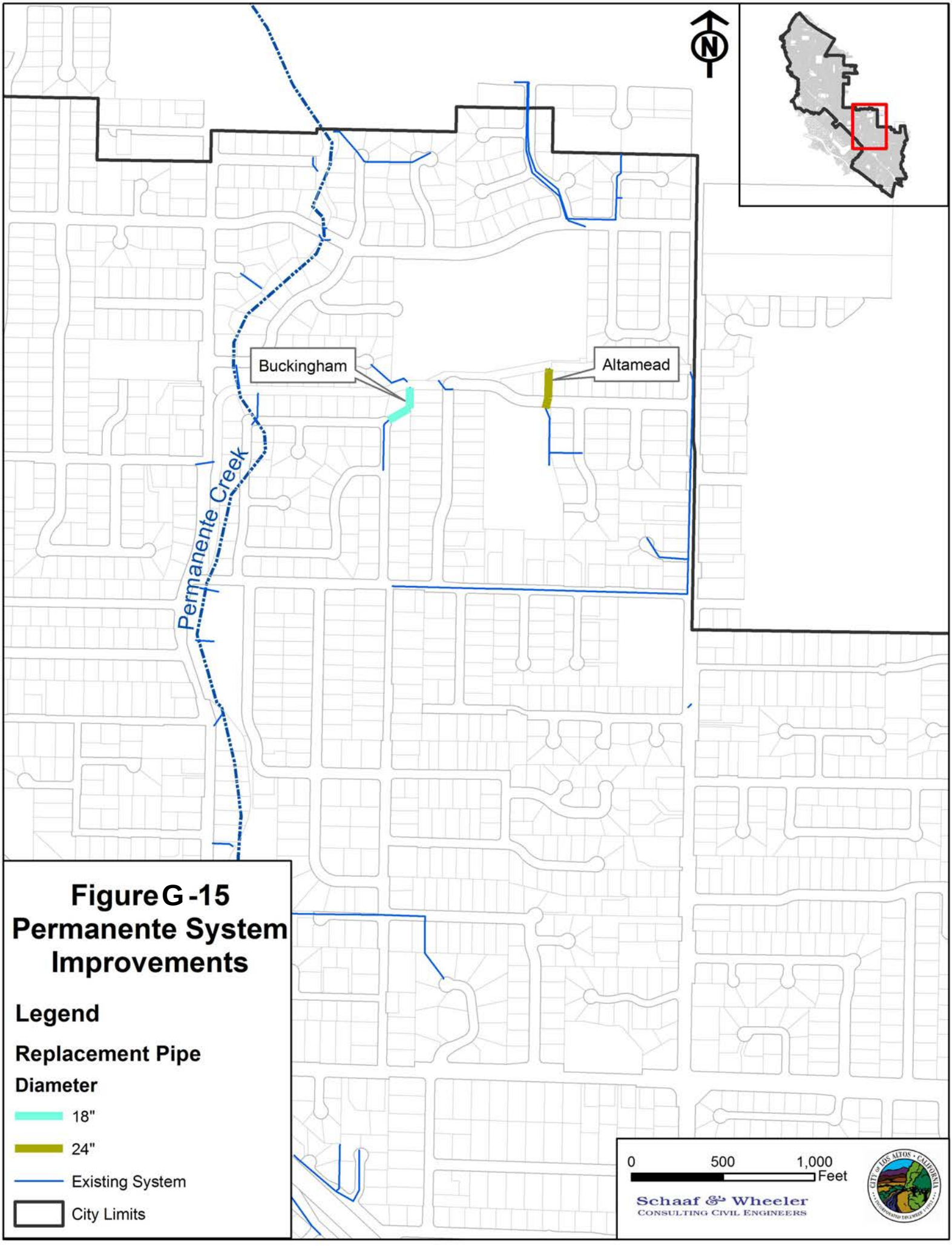


Figure G-14
Renetta/Border Improvements
HA_CNV_005
HA_CNV_001
Legend
Replacement Pipe
Diameter
18"
24"
Existing System
City Limits
Renetta
Border
FREMONT AVE
FOOTHILL EXPWY
UNIVERSITY AVE
COLLEGE CT
VIOLA PL
ORCHID PL
AMBER LN
STAR LITE LN
NASH RD
CARNATION CT
RENETTA CT
GARDENIA WAY
LILAC LN
BELLEVUE CT
COVINGTON RD
MADONNA WAY
STAGI CT
STAGI LN
QUINHILL AVE
ANITA AVE
BORDER RD
BORDER HILL DR
LA CUESTA
EDGEWOOD
0
200
400
Feet
Schaaf & Wheeler
CONSULTING CIVIL ENGINEERS


N
Buckingham
Altamead
Permanente Creek
Figure G-15
Permanente System Improvements
Legend
Replacement Pipe
Diameter
18"
24"
Existing System
City Limits
0
500
1,000
Feet
Schaaf & Wheeler
CONSULTING CIVIL ENGINEERS
CITY OF LOS ALTOS · CALIFORNIA

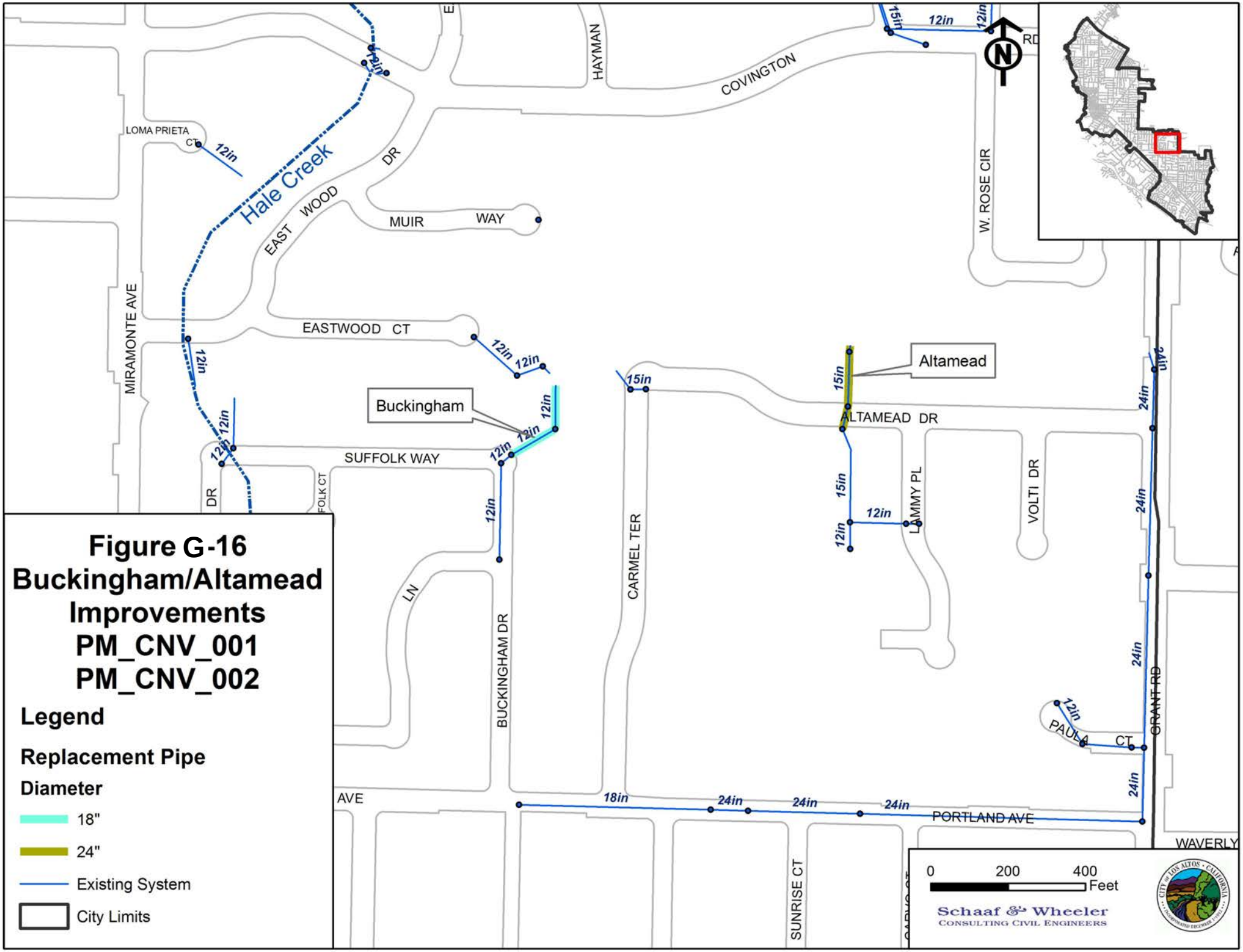
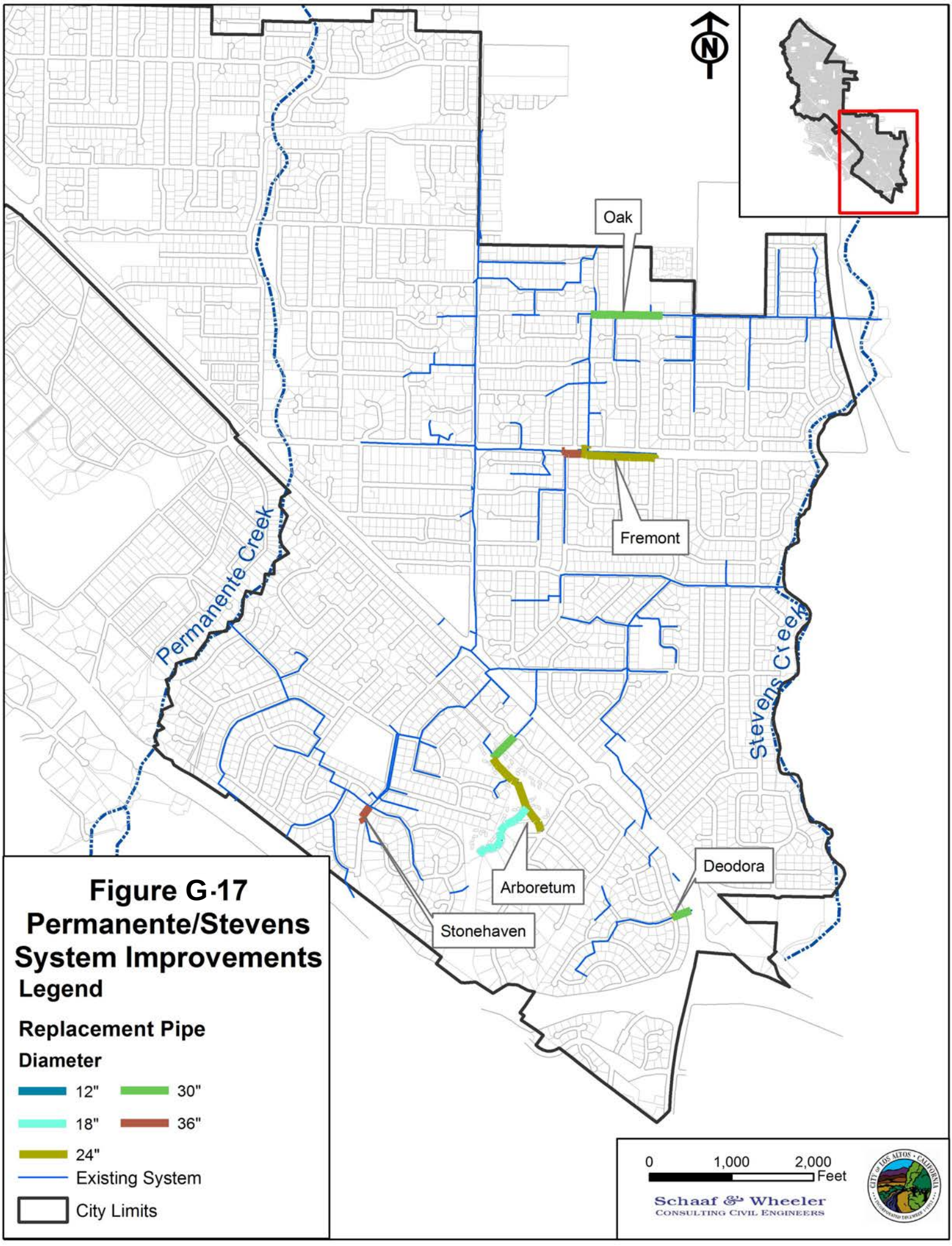


Figure G-16
Buckingham/Altamead
Improvements
PM_CNV_001
PM_CNV_002
Legend
Replacement Pipe
Diameter
18"
24"
Existing System
City Limits
Hale Creek
LOMA PRIETA CT
EAST WOOD DR
MUIR WAY
MIRAMONTE AVE
EASTWOOD CT
SUFFOLK WAY
FOLK CT
Buckingham
BUCKINGHAM DR
LN
HAYMAN
COVINGTON
W. ROSE CIR
Altamead
ALTAMEAD DR
LAMMY PL
VOLTI DR
CARMEL TER
PAULA CT
GRANT RD
PORTLAND AVE
SUNRISE CT
WAVERLY
AVE
12in
15in
18in
24in
0
200
400
Feet
Schaaf & Wheeler
CONSULTING CIVIL ENGINEERS


Oak
Fremont
Permanente Creek
Stevens Creek
Arboretum
Deodora
Stonehaven
Figure G-17
Permanente/Stevens
System Improvements
Legend
Replacement Pipe
Diameter
12"
30"
18"
36"
24"
Existing System
City Limits
0
1,000
2,000
Feet
Schaaf & Wheeler
Consulting Civil Engineers

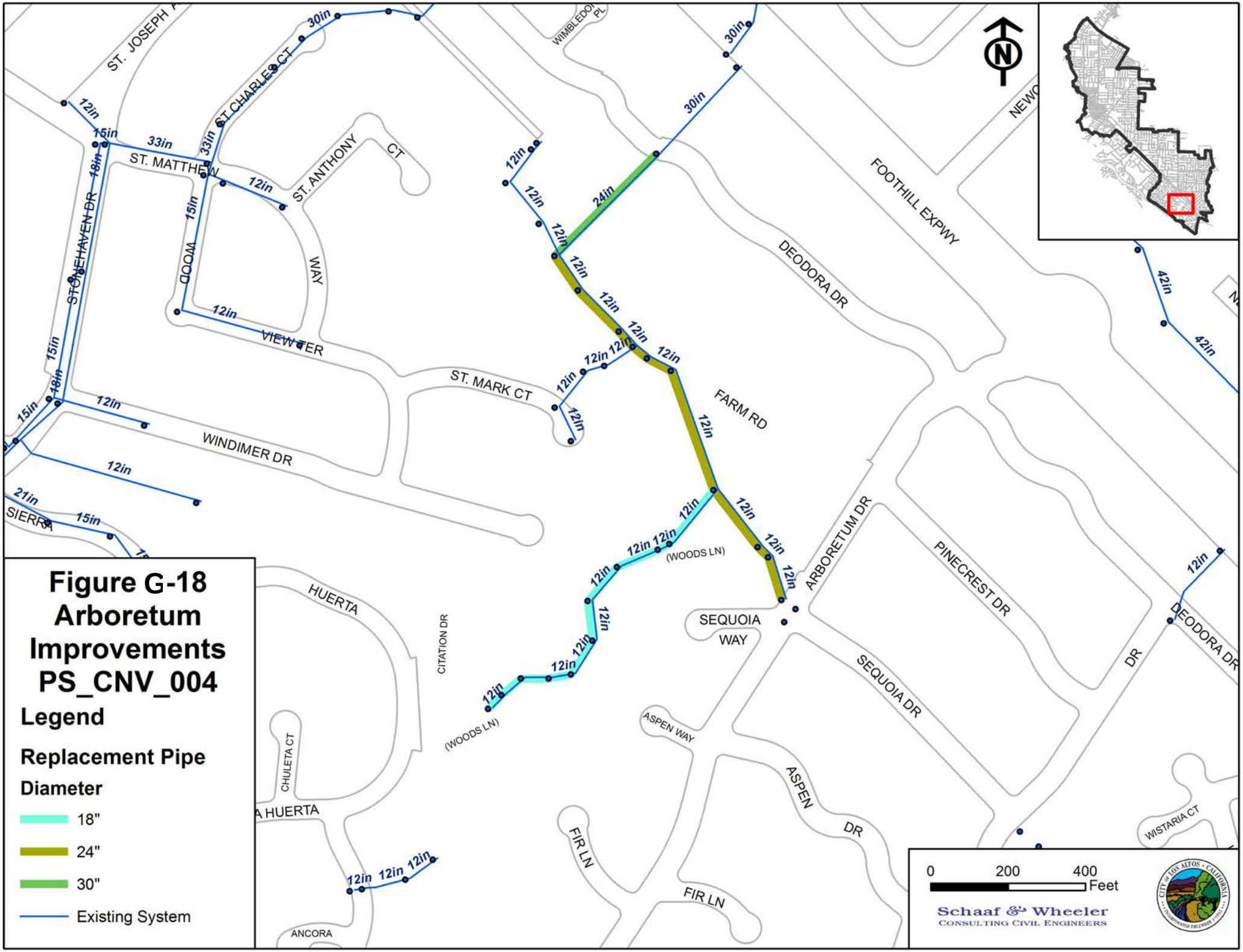


Figure G-18
Arboretum Improvements
PS_CNV_004
Legend
Replacement Pipe
Diameter
18"
24"
30"
Existing System
ST. JOSEPH
ST. CHARLES CT
ST. MATTHEW
ST. ANTHONY CT
WOOD WAY
STONEHAVEN DR
VIEW TER
ST. MARK CT
WINDIMER DR
SIERRA
WIMBLEDON PL
FOOTHILL EXPWY
DEODORA DR
FARM RD
(WOODS LN)
ARBORETUM DR
PINECREST DR
SEQUOIA WAY
SEQUOIA DR
ASPEN WAY
ASPEN DR
FIR LN
HUERTA
CITATION DR
CHULETA CT
ANCORA
WISTARIA CT
0
200
400
Feet
Schaaf & Wheeler
CONSULTING CIVIL ENGINEERS

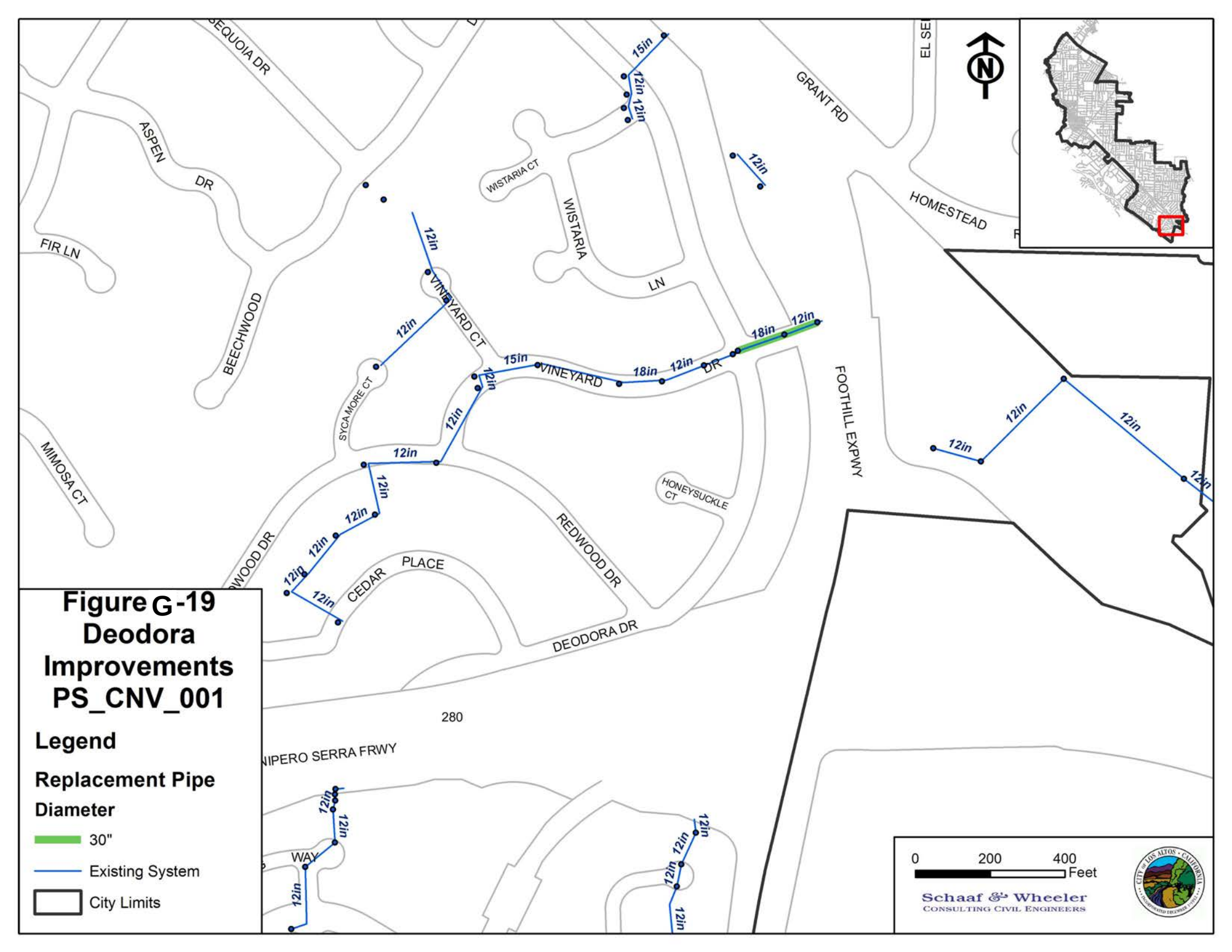


Figure G-19
Deodora Improvements
PS_CNV_001
Legend
Replacement Pipe
Diameter
30"
Existing System
City Limits
0
200
400
Feet
Schaaf & Wheeler
CONSULTING CIVIL ENGINEERS
SEQUOIA DR
ASPEN DR
FIR LN
BEECHWOOD
MIMOSA CT
WISTARIA CT
WISTARIA LN
GRANT RD
HOMESTEAD
EL SE
VINEYARD CT
SYCAMORE CT
VINEYARD DR
FOOTHILL EXPWY
HONEYSUCKLE CT
REDWOOD DR
CEDAR PLACE
DEODORA DR
280
NIPERO SERRA FRWY
WAY
15in
12in
18in

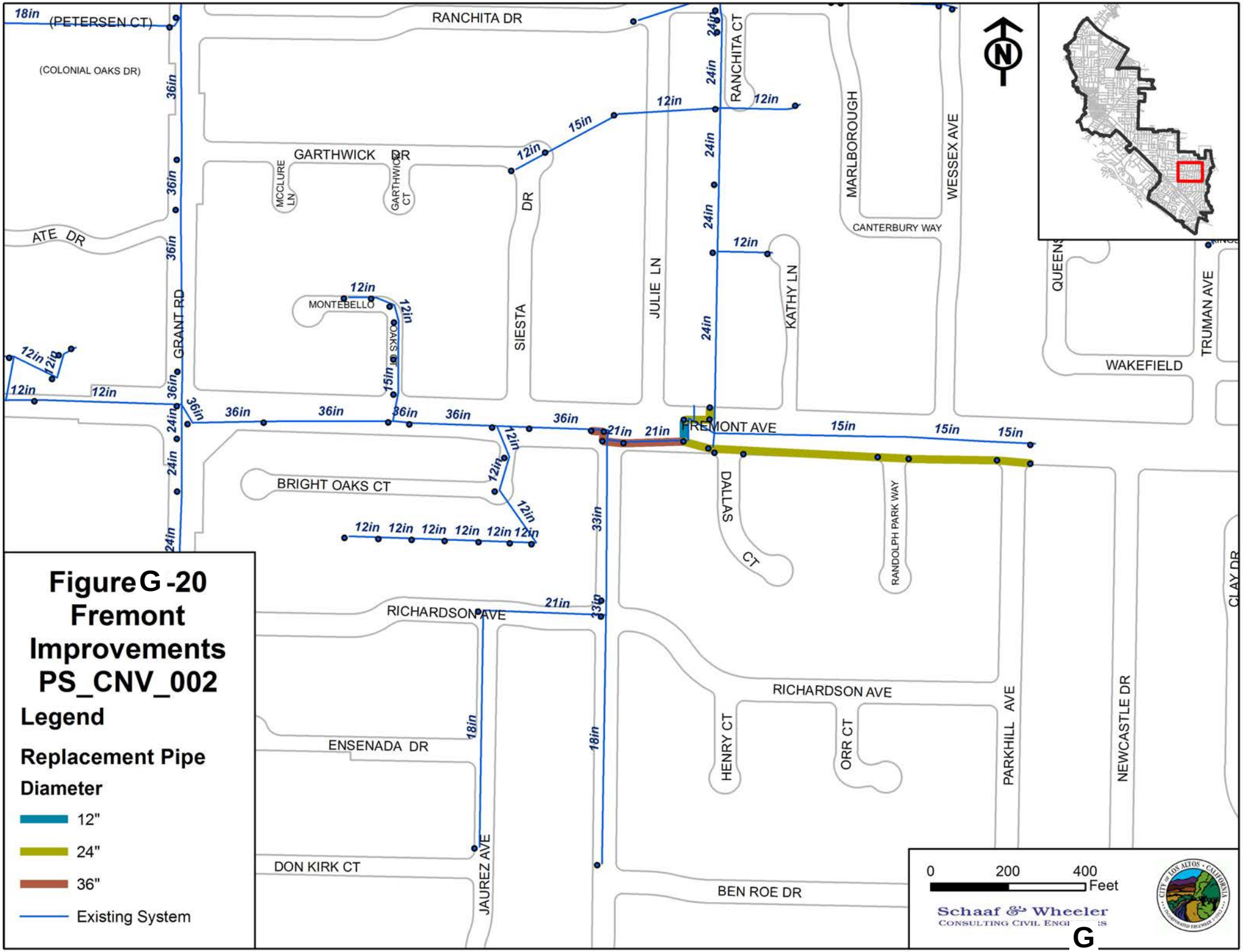


Figure G -20
Fremont Improvements
PS_CNV_002
Legend
Replacement Pipe
Diameter
12"
24"
36"
Existing System
RANCHITA DR
(PETERSEN CT)
(COLONIAL OAKS DR)
GARTHWICK DR
MCCLURE LN
GARTHWICK CT
ATE DR
GRANT RD
MONTEBELLO
OAKS CT
SIESTA DR
JULIE LN
RANCHITA CT
MARLBOROUGH
CANTERBURY WAY
WESSEX AVE
KATHY LN
QUEENS
TRUMAN AVE
WAKEFIELD
FREMONT AVE
BRIGHT OAKS CT
DALLAS CT
RANDOLPH PARK WAY
RICHARDSON AVE
ENSENADA DR
DON KIRK CT
JAUREZ AVE
HENRY CT
ORR CT
PARKHILL AVE
NEWCASTLE DR
BEN ROE DR
CLAY DR
0
200
400
Feet
Schaaf & Wheeler
CONSULTING CIVIL ENGI
G

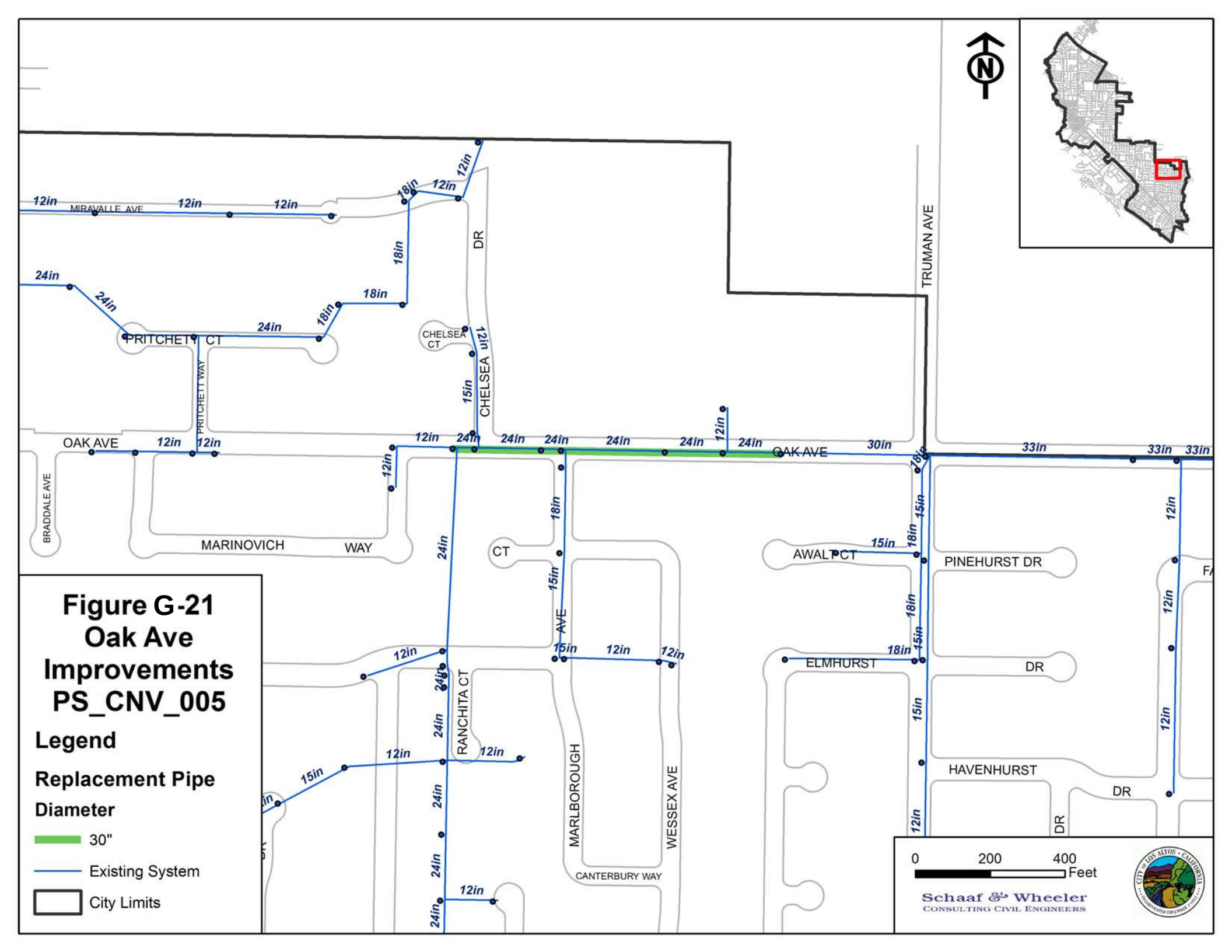


Figure G-21
Oak Ave
Improvements
PS_CNV_005
Legend
Replacement Pipe
Diameter
30"
Existing System
City Limits
MIRAVALLE AVE
PRITCHETT CT
PRITCHETT WAY
CHELSEA CT
CHELSEA DR
TRUMAN AVE
OAK AVE
BRADDALE AVE
MARINOVICH WAY
CT
AVE
AWALT CT
PINEHURST DR
ELMHURST
DR
HAVENHURST
DR
DR
RANCHITA CT
MARLBOROUGH
WESSEX AVE
CANTERBURY WAY
0
200
400
Feet
Schaaf & Wheeler
CONSULTING CIVIL ENGINEERS

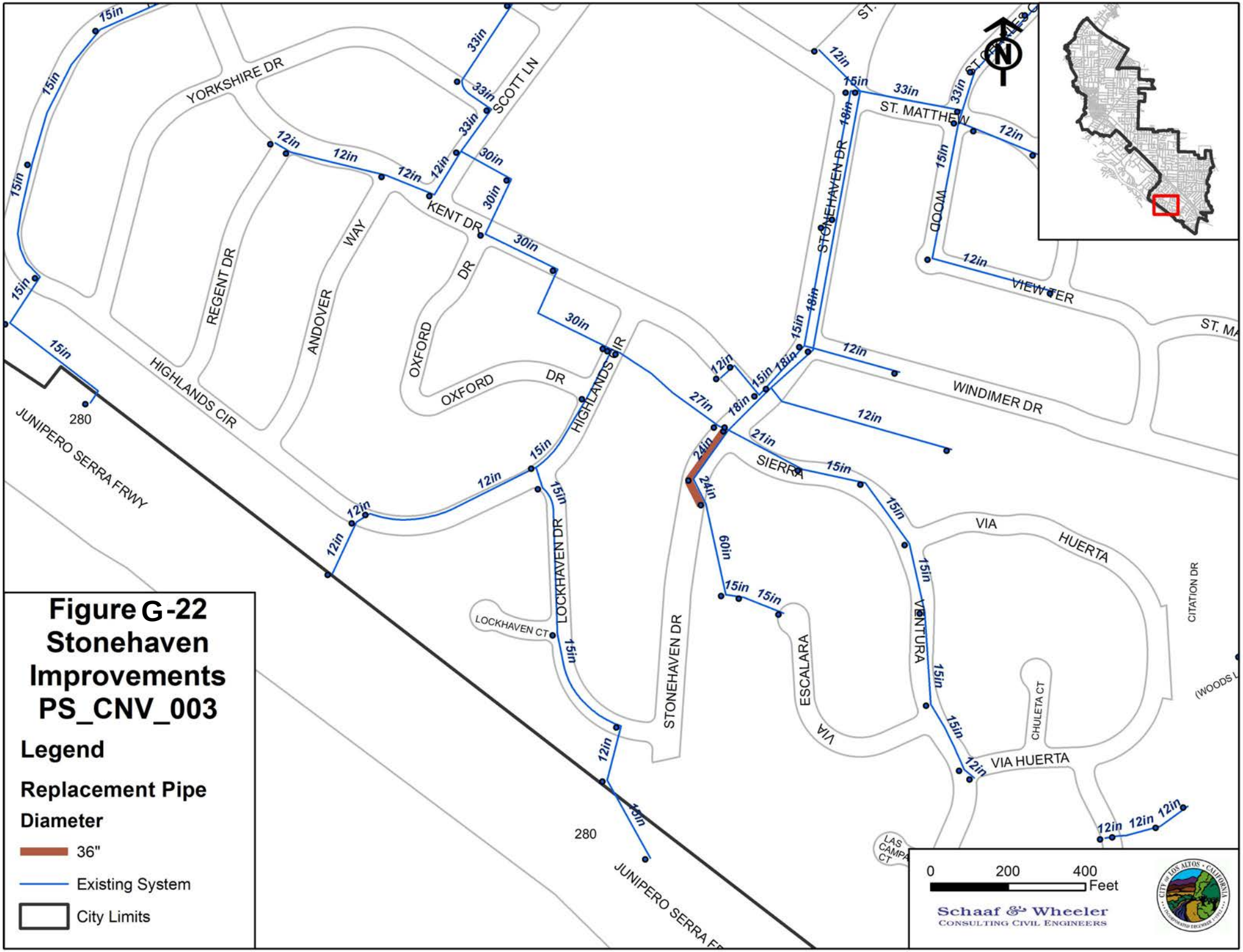


Figure G-22
Stonehaven Improvements
PS_CNV_003
Legend
Replacement Pipe
Diameter
36"
Existing System
City Limits
YORKSHIRE DR
SCOTT LN
KENT DR
REGENT DR
ANDOVER WAY
OXFORD DR
HIGHLANDS CIR
JUNIPERO SERRA FRWY
280
LOCKHAVEN DR
LOCKHAVEN CT
STONEHAVEN DR
ST. MATTHEW
WOODVIEW DR
WINDIMER DR
SIERRA
VIA HUERTA
VENTURA
ESCALARA
CHULETA CT
CITATION DR
LAS CAMPANAS CT
0
200
400
Feet
Schaaf & Wheeler
CONSULTING CIVIL ENGINEERS

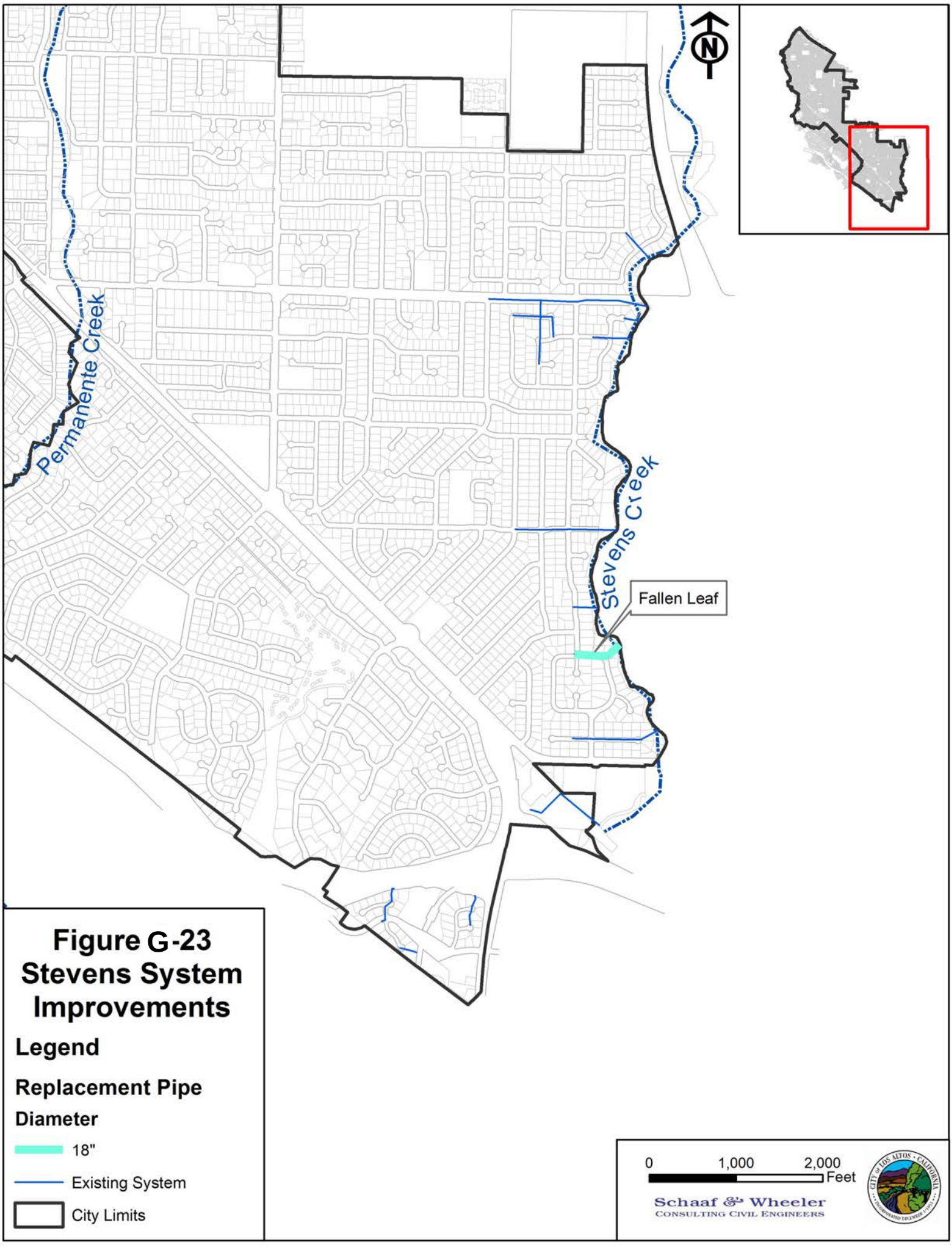


Figure G-23
Stevens System Improvements

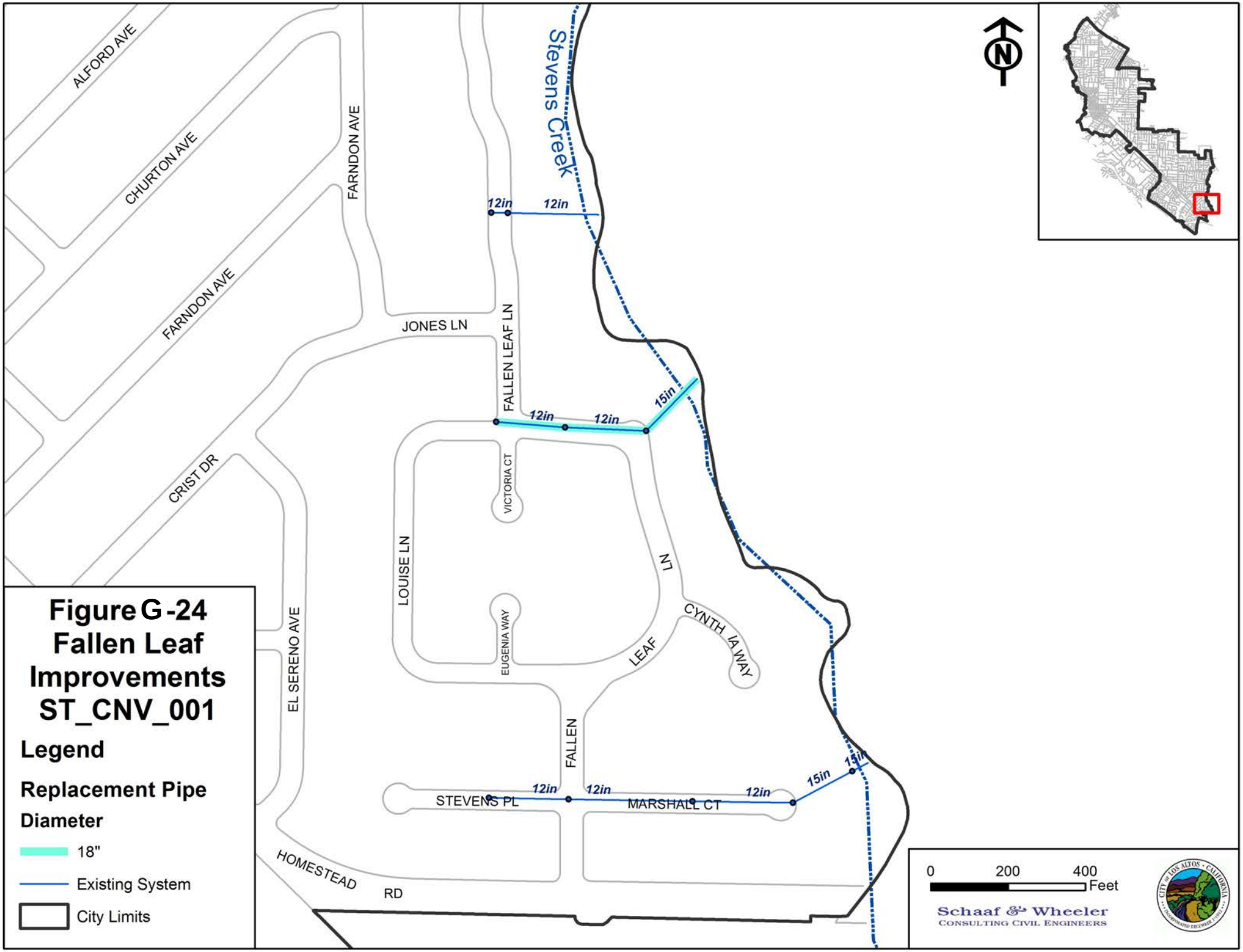
Legend

Replacement Pipe Diameter

- 18"
- Existing System
- City Limits

0 1,000 2,000 Feet

Schaaf & Wheeler
CONSULTING CIVIL ENGINEERS


ALFORD AVE
CHURTON AVE
FARNDON AVE
FARNDON AVE
CRIST DR
EL SERENO AVE
JONES LN
FALLEN LEAF LN
Stevens Creek
VICTORIA CT
LOUISE LN
EUGENIA WAY
LEAF LN
CYNTH IA WAY
FALLEN
STEVENS PL
MARSHALL CT
HOMESTEAD RD
12in
12in
12in
12in
15in
12in
12in
12in
15in
15in
Figure G-24
Fallen Leaf Improvements
ST_CNV_001
Legend
Replacement Pipe
Diameter
18"
Existing System
City Limits
0
200
400
Feet
Schaaf & Wheeler
CONSULTING CIVIL ENGINEERS

Appendix H

Capacity Improvements Detailed Cost Estimates

ADOBE CREEK DRAINAGE AREA
DETAILED COST ESTIMATE

Project	Pipe Id	Length (ft)	Diameter (in)	Pipe Unit Cost	Pipe Cost	MHs	MH Cost	Total	Outfalls	Project Cost
Catalina Ct	C2D-301_B2D-618	68.8	24	$365	$25,097	1	$13,515	$38,612		
Catalina Ct	C2D-314_C2P-312	104.9	18	$280	$29,380	1	$13,260	$42,640		
Catalina Ct	C2C-315_C2D-314	243.5	18	$280	$68,188	1	$13,260	$81,448		
Catalina Ct	C2D-303_C2D-301	196.2	24	$365	$71,628	1	$13,515	$85,143		
Catalina Ct	C2D-304_C2D-303	329.9	18	$280	$92,375	1	$13,260	$105,635		
Catalina Ct	C2P-312_C2D-304	464.7	18	$280	$130,127	2	$26,520	$156,647		
		1408			**$416,796**	**7**	**$93,330**	**$510,126**		**$510,000**
Loucks	B2D-104_B2F-101	529.5	48	$590	$312,405	1	$14,185	$326,590		
Loucks	B2D-107_B2D-104	108.8	48	$590	$64,163	1	$14,185	$78,348		
Loucks	B2D-108_B2D-107	284.0	48	$590	$167,560	1	$14,185	$181,745		
Loucks	B2D-402_B2D-108	204.6	48	$590	$120,720	1	$14,185	$134,905		
Loucks	B2D-403_B2D-402	281.0	48	$590	$165,766	1	$14,185	$179,951		
Loucks	B2F-101_B1D-308	449.1	48	$590	$264,969	1	$14,185	$279,154		
Loucks	B2F-105_B2D-104	66.2	18	$280	$18,533	2	$26,520	$45,053		
		1923				**8**		**$1,225,746**		**$1,230,000**
Lyell	F2D-505_F2D-506	56.8	18	$280	$15,896	1	$13,260	$29,156		
Lyell	F2D-506_F2D-502	362.1	21	$335	$121,310	1	$13,435	$134,745		
Lyell	F2D-509_F2D-506	117.3	18	$280	$32,844	2	$26,520	$59,364		
		536				**4**		**$223,265**		**$220,000**
Palm	F2F-519_F2F-518	39.9	24	$365	$14,545	1	$13,515	$28,060		
Palm	F2F-520_F2F-519	43.4	24	$365	$15,837	1	$13,515	$29,352		
Palm	F2F-525_F2F-520	143.4	24	$365	$52,341	1	$13,515	$65,856		
Palm	G2D-204_F2F-525	493.8	24	$365	$180,248	2	$27,030	$207,278		

Capacity Pipe Detailed Cost Estimates

		720				**5**		**$330,547**		**$330,000**
Pine	C2C-505_C2D-504	148.3	18	$280	$41,518	1	$13,260	$54,778		
Pine	C2D-501_C2D-404	255.6	24	$365	$93,276	1	$13,515	$106,791		
Pine	C2D-502_C2D-501	218.2	18	$280	$61,107	1	$13,260	$74,367		
Pine	C2D-504_C2D-501	185.4	18	$280	$51,904	2	$26,520	$78,424		
		807				**5**		**$314,360**		**$310,000**
Van Buren	B1D-611_B1D-608	239.7	18	$280	$67,124	1	$13,260	$80,384		
Van Buren	C1D-202_C1D-301	284.7	18	$280	$79,702	1	$13,260	$92,962		
Van Buren	C1D-301_C1F-302	328.7	18	$280	$92,036	1	$13,260	$105,296		
Van Buren	C1F-302_B1D-611	250.2	18	$280	$70,048	2	$26,520	$96,568		
		1103				**5**		**$375,210**		**$380,000**
Shasta										**$450,000**
									Total:	**$3,430,000**

HALE CREEK DRAINAGE AREA
DETAILED COST ESTIMATE

Project	Pipe Id	Length (ft)	Diameter (in)	Pipe Unit Cost	Pipe Cost	MHs	MH Cost	Total	Outfalls	Project Cost
Berry	I4D-103_I4O-102	38.8	36	$475	$18,440	1	$13,850	$32,290		
Berry	I4D-106_I4D-103	125.1	36	$475	$59,432	1	$13,850	$73,282		
Berry	I4D-107_I4D-106	24.7	36	$475	$11,752	1	$13,850	$25,602		
Berry	I4D-110_I4D-107	298.1	36	$475	$141,574	1	$13,850	$155,424		
Berry	I4D-115_I4D-110	323.3	36	$475	$153,563	1	$13,850	$167,413		
Berry	I4D-214_I4D-116	500.0	36	$475	$237,519	1	$13,850	$251,369		
Berry	I4D-116_I4D-115	165.7	36	$475	$78,693	1	$13,850	$92,543		
Berry	I4D-210_I4D-212	189.5	36	$475	$90,013	1	$13,850	$103,863		
Berry	I4D-212_I4D-214	420.5	36	$475	$199,752	1	$13,850	$213,602		
Berry	I4D-315_I4D-210	281.2	36	$475	$133,551	1	$13,850	$147,401		
Berry	I4D-318_I4F-317	112.5	30	$420	$47,229	1	$13,680	$60,909		
Berry	I4D-602_I4D-318	451.4	30	$420	$189,567	1	$13,680	$203,247		
Berry	I4D-603_I4D-602	13.6	30	$420	$5,691	1	$13,680	$19,371		
Berry	I4D-606_I4D-603	149.7	30	$420	$62,887	1	$13,680	$76,567		
Berry	I4D-608_I4D-606	40.0	30	$420	$16,796	1	$13,680	$30,476		
Berry	I4D-609_I4D-608	93.5	30	$420	$39,249	1	$13,680	$52,929		
Berry	I4F-317_I4D-315	226.0	30	$420	$94,924	2	$27,360	$122,284		
		3453.5			**$1,580,630**	**18**	**$247,940**	**$1,828,570**	**$25,000**	**$1,850,000**
Border	H3D-118_H3F-119	22.2	24	$365	$8,092	1	$13,515	$21,607		
Border	H3D-205_H3F-501	168.9	24	$365	$61,652	1	$13,515	$75,167		
Border	H3D-401_H3D-205	103.7	24	$365	$37,851	1	$13,515	$51,366		
Border	H3F-116_H3D-118	31.8	24	$365	$11,618	1	$13,515	$25,133		
Border	H3F-119_H3D-401	126.6	24	$365	$46,216	1	$13,515	$59,731		

Capacity Pipe Detailed Cost Estimates

Border	H3F-501_H3O-502	77.3	24	$365	$28,218	2	$27,030	$55,248		
		530.5			**$193,647**	**7**	**$94,605**	**$288,252**		**$290,000**
Cuesta	G3D-302_G3D-307	426.6	30	$420	$179,180	1	$13,680	$192,860		
Cuesta	G3D-307_G4D-101	505.6	30	$420	$212,344	1	$13,680	$226,024		
Cuesta	G4D-101_G4D-102	333.5	30	$420	$140,074	2	$27,360	$167,434		
		1265.7			**$531,598**	**4**	**$54,720**	**$586,318**		**$590,000**
Edge	H4D-516_H4D-508	387.9	18	$300	$116,382	1	$13,345	$129,727		
Edge	H4F-515_H4P-514	7.4	18	$300	$2,211	1	$13,345	$15,556		
Edge	H4P-514_H4D-516	261.6	18	$300	$78,486	1	$13,345	$91,831		
Edge	I4D-201_H4P-514	129.4	18	$300	$38,814	1	$13,345	$52,159		
Edge	I4D-203_I4F-202	373.7	18	$300	$112,119	1	$13,345	$125,464		
Edge	I4F-202_I4D-201	70.4	18	$300	$21,111	2	$26,690	$47,801		
		1230.4			**$369,123**	**7**	**$93,415**	**$462,538**		**$460,000**
Edith	E3D-301_E3F-302	185.0	30	$420	$77,692	1	$13,680	$91,372		
Edith	E3D-602_E3F-601	20.4	30	$420	$8,585	1	$13,680	$22,265		
Edith	E3D-603_E3D-602	56.3	24	$365	$20,550	1	$13,515	$34,065		
Edith	E3D-609_E3D-603	466.0	24	$365	$170,090	1	$13,515	$183,605		
Edith	E3D-609_E4D-403	555.9	30	$420	$233,461	1	$13,680	$247,141		
Edith	E3F-302_E4D-108	270.0	36	$475	$128,250	1	$13,850	$142,100		
Edith	E3F-601_E3D-301	355.6	30	$420	$149,369	1	$13,680	$163,049		
Edith	E4D-108_E4F-110	413.8	36	$475	$196,531	1	$13,850	$210,381		
Edith	E4D-112_E4D-113	84.0	36	$475	$39,914	1	$13,850	$53,764		
Edith	E4D-113_E4F-114	152.0	36	$475	$72,219	1	$13,850	$86,069		
Edith	E4D-302_E4F-301	82.6	42	$530	$43,757	1	$14,020	$57,777		
Edith	E4D-403_E4D-404	136.5	30	$420	$57,309	1	$13,680	$70,989		
Edith	E4D-404_E4D-405	598.1	30	$420	$251,185	1	$13,680	$264,865		
Edith	E4D-405_E4D-408	142.8	30	$420	$59,955	1	$13,680	$73,635		
Edith	E4F-110_E4D-112	169.3	36	$475	$80,394	1	$13,850	$94,244		
Edith	E4F-114_E4F-115	234.6	42	$530	$124,327	1	$14,020	$138,347		

Capacity Pipe Detailed Cost Estimates

Edith	E4F-115_E4D-116	31.2	42	$530	$16,547	1	$14,020	$30,567		
Edith	E4F-201_E4D-116	708.0	42	$530	$375,240	1	$14,020	$389,260		
Edith	E4F-301_E4F-201	683.0	42	$530	$362,001	2	$28,040	$390,041		
		5344.9			**$2,467,375**	**20**	**$276,160**	**$2,743,535**	**$25,000**	**$2,770,000**
Giralda	F4D-106_F4D-107	141.2	27	$390	$55,060	1	$13,600	$68,660		
Giralda	F4D-107_F4D-109	367.3	27	$390	$143,255	1	$13,600	$156,855		
Giralda	F4D-109_F4D-111	79.4	30	$420	$33,344	1	$13,680	$47,024		
Giralda	F4D-111_F4F-210	171.3	30	$420	$71,950	1	$13,680	$85,630		
Giralda	F4F-210_F4O-211	60.8	30	$420	$25,515	2	$27,360	$52,875		
		820.0			**$329,124**	**6**	**$81,920**	**$411,044**	**$25,000**	**$440,000**
Parma	G4D-402_G4D-404	146.2	24	$365	$53,352	1	$13,515	$66,867		
Parma	G4D-418_G4D-402	435.7	24	$365	$159,045	1	$13,515	$172,560		
		581.9			**$212,397**	**2**	**$27,030**	**$239,427**		**$240,000**
Renetta	G3C-408_G3O-409	182.4	18	$300	$54,720	1	$13,345	$68,065		
Renetta	H3C-101_H3C-102	118.0	18	$300	$35,406	1	$13,345	$48,751		
Renetta	H3C-102_G3C-408	227.3	18	$300	$68,190	1	$13,345	$81,535		
Renetta	H3F-503_H3O-504	38.0	24	$365	$13,870	1	$13,515	$27,385		
Renetta	G3O-409_H3O-104	90.0	24	$365	$32,850	1	$13,515	$46,365		
Renetta	H3O-104_H3S-117	55.0	24	$365	$20,075	2	$27,030	$47,105		
		710.7			**$225,111**	**7**	**$94,095**	**$319,206**		**$320,000**
Springer	I4F-402_I4P-401	111.4	18	$300	$33,429	1	$13,345	$46,774		
Springer	I4F-404_I4F-402	75.7	18	$300	$22,698	1	$13,345	$36,043		
Springer	I4F-403_I4F-402	105.5	18	$300	$31,659	2	$26,690	$58,349		
Springer	I4F-118_I4F-403	74.9	18	$300	$22,479	3	$40,035	$62,514		
		367.6			**$87,786**	**4**	**$53,380**	**$141,166**	**$25,000**	**$170,000**
									Total:	**$7,120,000**

PERMANENTE CREEK DRAINAGE AREA
DETAILED COST ESTIMATE

Project	Pipe Id	Length (ft)	Diameter (in)	Pipe Unit Cost	Pipe Cost	MHs	MH Cost	Total	Outfalls	Project Cost
Buckingham	B2D-104_B2F-101	132.0	18	$300	$39,600	1	$13,345	$52,945		
Buckingham	B2F-105_B2D-104	112.0	18	$300	$33,600	2	$26,690	$60,290		
		244				**3**		**$113,235**	**$25,000**	**$140,000**
Altamead	F2D-505_F2D-506	142.0	24	$365	$51,830	1	$13,515	$65,345		
Altamead	F2D-506_F2D-502	60.0	24	$365	$21,900	1	$13,515	$35,415		
Altamead	F2D-509_F2D-506	16.0	24	$365	$5,840	2	$27,030	$32,870		
		218				**4**		**$133,630**	**$25,000**	**$160,000**
									Total:	**$300,000**

PERMANENTE STEVENS DRAINAGE AREA
DETAILED COST ESTIMATE

Project	Pipe Id	Length (ft)	Diameter (in)	Pipe Unit Cost	Pipe Cost	MHs	MH Cost	Total	Outfalls	Project Cost
Arboritum	M6D-101_L6D-422	53.3	24	$365	$19,444	1	$13,515	$32,959		
Arboritum	M6D-104_M6D-101	47.7	24	$365	$17,407	1	$13,515	$30,922		
Arboritum	M6D-105_M6D-104	70.1	24	$365	$25,590	1	$13,515	$39,105		
Arboritum	M6D-107_M6D-105	327.7	24	$365	$119,611	1	$13,515	$133,126		
Arboritum	M6D-108_M6D-107	186.6	24	$365	$68,109	1	$13,515	$81,624		
Arboritum	M6D-111_M6D-107	179.7	18	$300	$53,922	1	$13,345	$67,267		
Arboritum	M6D-112_M6D-111	33.8	18	$300	$10,146	1	$13,345	$23,491		
Arboritum	M6D-113_M6D-112	114.5	18	$300	$34,362	1	$13,345	$47,707		
Arboritum	M6D-114_M6D-113	115.9	18	$300	$34,782	1	$13,345	$48,127		
Arboritum	M6D-115_M6D-114	103.0	18	$300	$30,888	1	$13,345	$44,233		
Arboritum	M6D-116_M6D-115	104.1	18	$300	$31,233	1	$13,345	$44,578		
Arboritum	M6D-117_M6D-116	58.1	18	$300	$17,439	1	$13,345	$30,784		
Arboritum	M6D-118_M6D-117	72.4	18	$300	$21,705	1	$13,345	$35,050		
Arboritum	M6D-119_M6D-118	65.7	18	$300	$19,713	1	$13,345	$33,058		
Arboritum	M6D-120_M6D-119	49.8	18	$300	$14,925	1	$13,345	$28,270		
Arboritum	L6D-413_L6D-420	373.2	30	$420	$156,736	1	$13,680	$170,416		
Arboritum	L6D-421_L6D-420	108.1	24	$365	$39,453	1	$13,515	$52,968		
Arboritum	L6D-422_L6D-421	150.0	24	$365	$54,765	1	$13,515	$68,280		
Arboritum	M6F-609_M6D-108	37.9	24	$365	$13,837	1	$13,515	$27,352		
Arboritum	M6F-610_M6F-609	116.0	24	$365	$42,325	2	$27,030	$69,355		
		2367.6			**$826,391**	**21**	**$282,280**	**$1,108,671**		**$1,110,000**
Deodora	M6D-614_M6D-615	16.0	24	$365	$5,829	1	$13,515	$19,344		
Deodora	M6D-615_M6D-617	132.1	30	$420	$55,465	1	$13,680	$69,145		
Deodora	M6D-617_M6O-618	93.8	30	$420	$39,383	2	$27,360	$66,743		

Capacity Pipe Detailed Cost Estimates

		241.8			**$100,678**	**4**	**$54,555**	**$155,233**		**$160,000**
Oak	J6D-211_J6D-212	58.5	30	$420	$24,553	1	$13,680	$38,233		
Oak	J6D-212_J6D-214	178.5	30	$420	$74,983	1	$13,680	$88,663		
Oak	J6D-214_J6D-218	52.9	30	$420	$22,214	1	$13,680	$35,894		
Oak	J6D-218_J6D-302	278.4	30	$420	$116,936	1	$13,680	$130,616		
Oak	J6D-302_J6D-303	154.8	30	$420	$64,999	1	$13,680	$78,679		
Oak	J6D-303_J6D-306	154.8	30	$420	$65,012	2	$27,360	$92,372		
		877.9			**$368,697**	**7**	**$95,760**	**$464,457**		**$460,000**
Fremont	23	60.0	12	$200	$12,000	1	$10,000	$22,000		
Fremont	K6D-203_K6F-202	33.2	36	$475	$15,789	1	$13,850	$29,639		
Fremont	K6D-205_K6D-203	25.1	36	$475	$11,918	1	$13,850	$25,768		
Fremont	K6D-205_K6F-206	54.5	36	$475	$25,888	1	$13,850	$39,738		
Fremont	K6F-206_K6F-207	155.3	36	$475	$73,782	1	$13,850	$87,632		
Fremont	13	90.0	24	$365	$32,850	1	$13,515	$46,365		
Fremont	14	220.0	24	$365	$80,300	1	$13,515	$93,815		
Fremont	15	80.0	24	$365	$29,200	1	$13,515	$42,715		
Fremont	16	440.0	24	$365	$160,600	1	$13,515	$174,115		
Fremont	19	65.0	24	$365	$23,725	1	$13,515	$37,240		
Fremont	20	30.0	24	$365	$10,950	1	$13,515	$24,465		
Fremont	22	70.0	24	$365	$25,550	2	$27,030	$52,580		
		1323.2			**$502,551**	**13**	**$173,520**	**$676,071**		**$680,000**
Stonehaven	M5W-201_M5D-216	120.0	36	$475	$57,000	1	$13,850	$70,850		
Stonehaven	M5D-216_M5D-207	156.0	36	$475	$74,100	2	$27,700	$101,800		
		276.0			**$131,100**	**3**	**$41,550**	**$172,650**		**$170,000**
									Total:	**$2,580,000**

STEVENS CREEK DRAINAGE AREA
DETAILED COST ESTIMATE

Project	Pipe Id	Length (ft)	Diameter (in)	Pipe Unit Cost	Pipe Cost	MHs	Cost	Total	Outfalls	Project Cost
Fallen Leaf	M7C-102_M7D-103	179.1	18	$300	$53,721	1	$13,345	$67,066		
Fallen Leaf	M7D-103_M7F-104	209.9	18	$300	$62,967	1	$13,345	$76,312		
Fallen Leaf	M7F-104_M7O-201	188.1	18	$300	$56,415	2	$26,690	$83,105		
		577			**$173,103**	**4**	**$53,380**	**$226,483**	**$25,000**	**$250,000**
									Total:	**$250,000**

Appendix I

Condition Assessment

STORM WATER MANAGEMENT MASTER PLAN

City of Los Altos

May 2010

V&A

STORM WATER MANAGEMENT MASTER PLAN

City of Los Altos

Prepared for

Schaaf & Wheeler
100 N. Winchester Blvd., Suite 200
Santa Clara, CA 95050

Prepared by

May 2010

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APPENDIX

Appendix A: Condition Assessment Field Data Sheets

1 INTRODUCTION

1.1 Background

The City of Los Altos is developing a storm water master plan to serve as a guide for future improvements and expansion of the City's storm water infrastructure. A component of the storm water master plan is to determine the condition of the existing storm water infrastructure. V&A was retained by Schaaf & Wheeler to assist with condition assessment services for storm water facilities for the City of Los Altos. The information from the condition assessment will be utilized to determine the requirements to make improvements to the existing infrastructure and to guide decisions for activities to ensure the reliability of these facilities.

The City of Los Altos incorporates a watershed area of approximately 7 square miles with 52 miles of pipe and 4 creeks. Pipe diameters range from 8 to 60 inches. Due to the hilly terrain, there are no storage ponds or pump stations within the service area. All flows in the drainage basin are directed via gravity flow through pipes to drain into the creeks which flow towards San Francisco Bay.

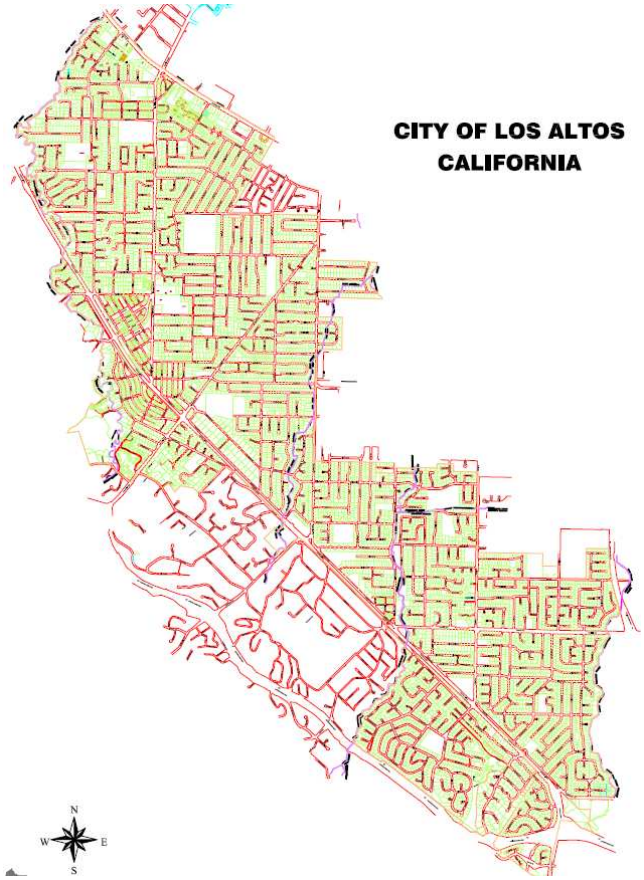


Figure 1.1. Overview of Los Altos Storm Drainage Area

The scope of the condition assessment was to identify deficient areas to determine the need for improvements. One important component of the storm water master plan is to present a methodology for conducting condition assessments and to present a program for continued assessment of the remainder of the storm water system. An assessment of the entire storm water collection system is beyond the scope of this study and would be cost prohibitive. Therefore, a representative portion of the storm system was selected to prepare the master plan. The portion of the storm water collection system identified for the condition assessment was based on areas of known deficiencies. The results of this condition assessment are included in this report and can be used to develop an on-going program for condition assessment of the remainder of the storm water collection system.

1.2 Methodology

V&A met with Schaaf and Wheeler and the City in order to determine areas for condition assessment. The City presented areas of known deficiencies within the storm water collection system based on previous maintenance issues. This provided a list of priority areas for further condition assessment. The condition assessment categorized issues based on whether the root cause was operational and maintenance related or due to physical structural deficiencies. The areas with known deficiencies are listed in Table 1-1 below.

Table 1-1
Los Altos Sewer – List of Known Issues

Item No.	Map	Area	Known Issues	V&A Actions
1	M6	Woods Ln. at Citation Dr.	Debris from hillside	
2	M6	Foothill Expressway at El Sereno Ave.	Inlet clogs with debris	
3	K6	Fremont Ave. at Grant Rd.	Inlet clogs and floods intersection	
4	M5	Ditch between Windimer and Sierra Ventura Dr.	Ditch between properties, downstream inlet fills with debris and floods house and pool	
5	L4	Madelaine Ct.		
6	L5	Robinhood Ct.		
7	H3	Covington Rd. at Hale Creek	Creek Overflow - Undersized Pipe	Condition Assessment, Pole Camera and Verification of Storm Drain Features/Measurements
8	G2	Viola Pl.	Bubbling - Debris (toys)	Condition Assessment, Pole Camera and Verification of Storm Drain Features/Measurements
9	C2	Catalina Ct.		
10	M6	Vineyard Dr. at Deodara Dr.	Does not drain	Condition Assessment, Pole Camera and Verification of Storm Drain Features/Measurements
11	C3	Distal Dr.	Plugs due to debris	Condition Assessment, Pole Camera and Verification of Storm Drain Features/Measurements
12	H5	Loma Prieta Ct.	Does not drain - Inlet too high	Condition Assessment, Pole Camera and Verification of Storm Drain Features/Measurements
13	F4	Sunshine Dr.	Northside Plugs - Unsure "which northside"	Condition Assessment, Pole Camera and Verification of Storm Drain Features/Measurements
14	J6	Ranchita Dr. at Julie	Drainage Issues - Crowned Road	
15	D2-C2	Cherry Ave.	Redwood roots in storm drains	Condition Assessment - Drive street look for trees close to storm drains and check for root intrusion
16	C3	Portola Ct. at Delphi Cir.		
17	H2	Summerhill Ave. at S. El Monte	Rocks/Debris	Condition Assessment, Pole Camera and Verification of Storm Drain Features/Measurements
18	I6	1270 Grant Ave. at Paula Ct.	Poor surface drainage	
19	J5	Heritage Ct.	No Curb and Gutter	Condition Assessment, Pole Camera and Verification of Storm Drain Features/Measurements
20	I4	Edge Ln.		Condition Assessment, Pole Camera and Verification of Storm Drain Features/Measurements

Item No.	Map	Area	Known Issues	V&A Actions
21	K6	1640 Dallas Ct.	Poor surface drainage - Low Spot	Condition Assessment, Pole Camera and Verification of Storm Drain Features/Measurements
22	L6	1975 Grant Rd. at Woodland Library		
23	N6	Cristo Rey Dr. and Kring Way		Condition Assessment, Pole Camera and Verification of Storm Drain Features/Measurements
24	M5	Trash rack and gate at 2100 Stonehavens		Condition Assessment, Pole Camera and Verification of Storm Drain Features/Measurements

Typically the list was populated based on maintenance issues such as poor drainage. Some areas identified as having poor drainage were areas where no curb and gutter, catch basins or physical drainage facilities existed. These areas were noted and the assessment was limited to observations of surface drainage and/or road grade.

For known issues with physical features, several condition assessment techniques were used. Using the City of Los Altos index maps, features were selected in close proximity to the areas where the issues had been reported. The assessment involved noting physical dimensions including grade to invert depth measurement of the structure (manholes, inlets, catch basins, etc.) and verification of inlet and outlet pipe diameter(s) and materials. Condition assessment techniques involved confined space entries, categorization and ratings of defect severity using the Vanda Index and NASSCO PACP/MACP standards. Observations were documented with digital photos, a handheld video camera or a pole-mounted zoom inspection camera.

V&A conducted field work on several dates (Jan. 19, Jan. 20, Jan. 26, Feb. 2, Feb. 10 and Mar. 9, 2010). On occasion, the field work coincided with rain events. During rain events, storm water flow prevented confined space entry access to some of the structures due to safety considerations. However, the observations made during storm events helped to find visual evidence of drainage deficiencies.

2 METHODS AND PROCEDURES

Evaluation methods are both qualitative and quantitative. Qualitative methods consisted of visual examinations and documentation with handheld video or pole-mounted zoom inspection camera. It is noted that qualitative condition assessment observations were based on the evaluator's expertise. The methods of condition assessment involved making confined space entries into some of the structures. For instances where storm water drainage features were located in high traffic areas the assessments were conducted at night to minimize disruptions to traffic.

2.1 Observations

Often, the optimal method for a structure condition assessment is a physical investigation involving a combination of visual observations, documented with digital photographs, measurement of defect area and physical tests of structural integrity. It should be noted that much of the condition assessment data is subjective and based on the evaluator's expertise.

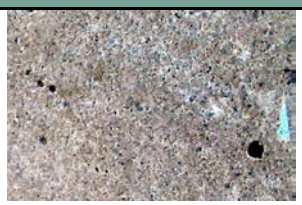
2.2 Penetration Data

Penetration measurements involve applying a consistent level of force from a chipping hammer to the concrete surface and then measuring the depth of the resulting cavity. The depth of the cavity provides qualitative data on the hardness and condition of the concrete surfaces.

2.3 Concrete Condition Rating System

V&A developed the VANDA™ Reinforced Concrete Condition Index Rating System as a means to consistently identify the condition of concrete. The concrete surfaces were rated according to Table 2-1, which summarizes this concrete rating system. The extent of the concrete damage can vary from Level 1 to Level 4, with Level 1 indicating the best case and Level 4 indicating severe damage.

Table 2-1
VANDA™ Reinforced Concrete Condition Index Rating System

Condition Rating	Description	Descriptive Photograph
Level 1	**No/Minimal Damage to Concrete** Hardness: No loss of hardness of mortar Surface: No loss of smoothness Cracking: No cracks Spalling: No spalling Reinforcing steel: Not exposed or damaged	
Level 2	**Damage to Concrete Mortar** Hardness: Some loss of hardness of mortar Surface: Small-diameter exposed aggregate Cracking: Thumbnail-sized cracks of minimal frequency Spalling: Shallow spalling of minimal frequency, no related reinforcing steel damage Reinforcing steel: May be exposed but not damaged or corroded	
Level 3	**Loss of Concrete Mortar/Damage to Reinforcing Steel** Hardness: Complete loss of hardness of mortar Surface: Larger-diameter exposed aggregate Cracking: ¼-inch to ½-inch cracks, moderate frequency Spalling: Deep spalling of moderate frequency, related reinforcing steel damage Reinforcing steel: Exposed, damaged and corroded, but can be rehabilitated	
Level 4	**Reinforcing Steel Severely Corroded/Significant Damage to Structure** Hardness: Complete loss of hardness of mortar Surface: Large-diameter exposed aggregate Cracking: ½-inch cracks or greater, high frequency Spalling: Deep spalling at high frequency, related reinforcing steel damage Reinforcing steel: Corroded or consumed, loss of structural integrity	

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2.4 NASSCO Manhole and Pipeline Assessment Condition Program (MACP & PACP)

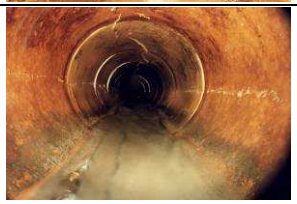
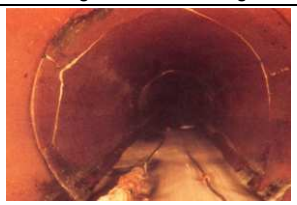
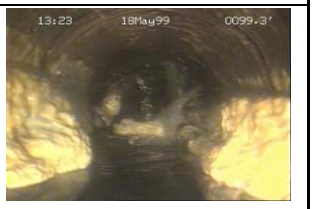
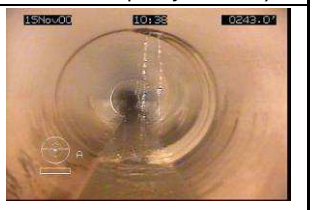
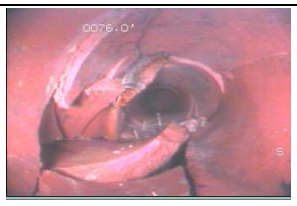
V&A utilized the National Association of Sewer Service Companies (NASSCO) Manhole/Pipeline Assessment Condition Program (MACP/PACP) format for documenting conditions. NASSCO provides guidance on the classification of sewer and storm water infrastructure for both manholes and pipelines. NASSCO has developed the MACP and PACP standardized systems in order to provide a consistent condition assessment, as well as to provide the capability to benchmark conditions to track deterioration over time. The process provides a system for identifying and documenting specific defects for manholes and pipelines. Furthermore, the documentation includes taking note of physical structure dimensions which can be valuable in developing an asset management and maintenance program and can also provide useful information for determining rehabilitation options.

Two key concepts in asset management are criticality and condition severity. Critical assets can be classified as infrastructure where costs associated with the failure are likely to be high. These are generally strategically important assets where costs of failure are driven by high construction costs associated with repairs, costly traffic delays and impacts on property owners, customers and stakeholders. Critical ratings are assigned by the owner and help to prioritize which assets are investigated. Ratings of condition severity are provided by the PACP and MACP process and assist the owner in prioritizing the assets to be considered for renovation.

The PACP and MACP process identifies the major deterioration factors and assigns a rating that is related to the likelihood of failure or collapse. Deterioration factors include surrounding soil condition, position of groundwater table, frequency of surcharge events, above ground traffic loading, methods and materials used in construction, third party damages and defects such as roots and debris. It is important to note that the condition of manholes and pipes involves many deterioration factors, both internal and external. Visual inspection can only determine the internal defects that affect the condition.

Deterioration factors are classified into categories of structural defects and operational and maintenance (O&M) defects. Defects are assigned a grade of 1 to 5 in order of increasing severity, as described in Table 2-2.

Table 2-2
NASSCO Ratings

Rating	Importance	Likelihood of Failure	Structural Rating Example	O&M Rating Example
1 Excellent	Minor defects	Failure unlikely in the foreseeable future		
2 Good	Defects that have not begun to deteriorate	Pipe unlikely to fail for at least 20 years	 Longitudinal Cracking	Fine Roots
3 Fair	Moderate defects that will continue to deteriorate	Pipe may fail in 10 to 20 years	 Multiple Fractures	 Deposits = 15% (rating based on % of capacity affected)
4 Poor	Severe defects	Pipe will probably fail in 5 to 10 years	Broken Pipe	 Infiltration – Runner (rating based on flow estimate)
5 Immediate Attention	Defect requires immediate action	Pipe has failed or will likely fail within the next 5 years	 Collapsed Pipe	Root Ball (> 50% of capacity)

* Example photos are for illustrative purposes taken from sewer system evaluations but are representative of similar defects in storm water systems.

2.5 Confined Space Entry

A confined space (Photo 2.1) is defined as any space that is large enough and so configured that a person can bodily enter and perform assigned work, has limited or restricted means for entry or exit, and is not designed for continuous employee occupancy. Title 8, Section 5158 of the California Code of Regulations provides the guidelines and rules for working in these environments. In general, the atmosphere must be constantly monitored for sufficient levels of oxygen (19.5 to 23.0%), and the absence of hydrogen sulfide (H_2S) gas, carbon monoxide (CO) gas and lower explosive limit (LEL) levels. A typical confined space entry crew has at least three members: the entrant, the attendant and the supervisor. The entrant is the individual who will be performing the work. The entrant is equipped with personal protective equipment needed to perform the job safely, including a personal 4-gas monitor (Photo 2.2). If it is not possible to maintain line-of-sight with the entrant, then more entrants are required until line-of-sight can be maintained. The attendant is responsible for maintaining contact with the entrant(s) to monitor the atmosphere on another 4-gas monitor and maintaining records of all entrants, if there is more than one. The supervisor develops the safe work plan for the job at hand.

Photo 2.1 – Confined Space Entry

Photo 2.2 – Typical Personal 4-Gas Monitor

3 SUMMARY OF DEFECTS

The purpose of the assessments was to document the condition of physical structure features and note defects that may require rehabilitation. Working from the list of known issues, V&A conducted field visits at these locations to assess conditions and note defects which impact the integrity and reliability of the storm water facilities. Most of the locations of features were as noted on the maps provided by the City. However, there were minor discrepancies with the actual location of some features.

The following subsections highlight some of the main observations made at each of the locations of known issues. Major deficiencies found during the assessments were documented with photos, handheld video, pole camera or a combination of these methods. While most of the features evaluated were in good condition, this section only presents the defects and summarizes options to address them. Full documentation of condition assessment observations is included in Appendix A.

3.1 Item 1 – Woods Lane at Citation Drive

Issue:

- The City indicated that debris from the adjacent hillside creates blockages in this area (Figure 3.2).

Action:

- V&A investigated this area on Jan. 20, 2010, using photo documentation.

Main Observations:

- There is a series of upstream check dams on the creek that are in poor condition (Photo 3.1).
- Storm water flow enters into the pipe channel and there is no debris/trash rack (Photo 3.2).
- Discussions with a local resident indicated that in the past a large tree branch had become lodged inside the pipe creating a surcharged flow condition. Backwater began to flood the low-lying areas adjacent to the townhomes (Photo 3.3).
- Physical features of the structures appeared to be new, without defects and were determined to be in good structural condition.
- Not all of the features were identified on the maps and there were slight discrepancies with the actual locations. Size information for this line was omitted from the maps, understating the size and importance of the line, which carries a large amount of flow from creeks.
- There is poor and limited access to the manhole structures.

Overall Condition Rating:

- Structural Rating = 1 (Vanda concrete condition = 1)

- O&M Rating = 3 (High probability of large debris entering into the storm water pipe creating an obstruction and causing a flooded condition)

Recommendations for Follow-up Actions:

- Consider installing a trash rack on the inlet to the storm water pipe. Otherwise, continued maintenance and cleaning of this line is suggested.
- Locate and expose all access points on the line and update maps with their actual locations.

Figure 3.1. Woods Lane at Citation Drive

Photo 3.1. Upstream check dam

Photo 3.2. Turbulence at inlet transition from box culvert to circular conduit

Photo 3.3. Drop inlet at MD6-119 where tree branch was reported to have become lodged

3.2 Item 2 – Foothill Expressway at El Sereno Avenue

Issue:

- The inlets in this area are reported to have been clogged with debris (Figure 3.2).

Action:

- V&A investigated this area on Jan. 20, 2010, using photo and handheld video documentation.

Main Observations:

- There is a low area in the offramp from Foothill Expressway near the Chevron gas station that floods due to lack of drainage or road grade (Photo 3.4).
- Water continues to pond until the height exceeds the street curb. The water then flows over the sidewalk, across the landscaping to the catch basin located at the apex of the curve for the right hand turn (Photo 3.6).
- The catch basin (Unknown J) at the south curb edge of Foothill Expressway at El Sereno Avenue does not appear on the maps (Photo 3.5).

Overall Condition Rating:

- Structural Rating = 1 (Vanda concrete condition = 1)
- O&M Rating = 2 (Water presents a potential hazardous condition to motorists and pedestrians)

Recommendations for Follow-up Actions:

- Install a curb cut, add an additional catch basin alongside the road, and/or correct the road grade to allow for proper drainage.

Figure 3.2. Foothill Expressway at El Sereno Avenue

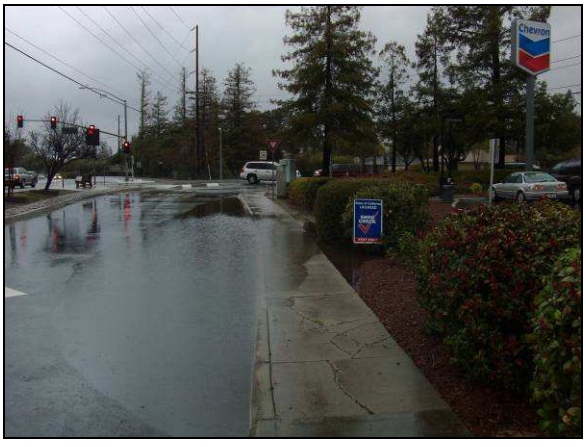


Photo 3.4. Flooding at Foothill Expressway offramp

Photo 3.5. Unidentified catch basins (Unknown J) at the apex of the right hand turn onto Homestead

Photo 3.6. Looking south at flooded area

3.3 Item 3 – Fremont Avenue at Grant Road

Issue:

- The inlets in this area are reported to become clogged and flood the intersection (Figure 3.3).

Action:

- V&A investigated this area on Feb. 2, 2010, using photo and pole mounted zoom camera video documentation.

Main Observations:

- Some of the pipe inlets into the manhole appear to be full of sediment. It is unclear if these pipes are abandoned or still in service (Photo 3.8).
- The corrugated metal pipe appears to have sustained some third-party damage (Photo 3.9).
- Minor debris was observed in some of the catch basins (Photo 3.7).

Overall Condition Rating:

- Structural Rating = 2 (Vanda concrete condition = 1; some third party damage on corrugated metal pipe, integrity in question)
- O&M Rating = 2 (Some pipes observed to be filled with debris)

Recommendations for Follow-up Actions:

- Consider CCTV inspection of the corrugated metal pipe to assess condition.
- Clean pipes to clear debris and sediment buildup.

Figure 3.3. Fremont Avenue at Grant Road

Photo 3.7. Minor debris in catch basin

Photo 3.8. Sediment and large debris (bricks) in pipe

Photo 3.9. Corrugated metal pipe deflection at crown, possible third party damage

3.4 Item 4 – Ditch between Windimer and Sierra Ventura Drive

Issue:

- The ditch in the easement between properties fills with debris causing water overflow into the backyards of some adjacent property owners (Figure 3.4).

Action:

- V&A investigated this area with the City's assistance on Feb. 10, 2010, using photo and handheld video documentation.

Main Observations:

- The upper portion of the ditch is a cage-wrapped rock retaining wall (Photo 3.10). Drainage issues were not reported in this area.
- Portions of homeowner-made retaining wall improvements are collapsing (Photo 3.11).
- Dirt from the backyard hillsides and landscaping debris blocks the water flow through the concrete ditch. Temporary piping is in place to restore drainage (Photo 3.12).

- The easement also serves as access for a sanitary sewer manhole directly adjacent to the concrete ditch (Photo 3.13).
- The outlet of the ditch enters a corrugated metal pipe and the inlet to the pipe is partially obstructed (Photo 3.14).

Overall Condition Rating:

- Structural Rating = N/A (No structural component)
- O&M Rating = 4 (Very poor access)

Recommendations for Follow-up Actions:

- Consider CCTV inspection of the corrugated metal pipe to assess condition.
- Continue rock wall long the length of the pipe or equivalent structural storm drainage chambers to keep the hillside dirt from sliding and obstructing the drainage.

Figure 3.4. Ditch between Windimer and Sierra Ventura Drive

Photo 3.10. Cage-wrapped rock retaining wall

Photo 3.11. Collapsing retaining walls along drainage ditch

Photo 3.12. Temporary piping to restore drainage under debris

Photo 3.13. Sanitary sewer manhole in concrete ditch, shared easement

Photo 3.14. Outlet to corrugated metal pipe partially obstructed

3.5 Item 5 – Madelaine Court

Issue:

- None specifically identified. Lack of drainage – Access limitations in easement (Figure 3.5).

Action:

- V&A investigated this area on Jan. 20, 2010, using photo and handheld video documentation.

Main Observations:

- Appears to have greater flow to Catch Basin L4C-607 from hillside drainage from St. Joseph Ave. towards Madelaine Court (Photos 3.15 and 3.16).
- One feature, L4D-606, in easement could not be located between the cul-de-sac and Permanente Creek.

Overall Condition Rating:

- Structural Rating = 1 (Vanda concrete condition = 1)
- O&M Rating = 2 (limited easement access and one feature not located)

Recommendations for Follow-up Actions:

- Locate storm drainage feature L4D-606.

Figure 3.5. Madelaine Court

Photo 3.15. L4C-607 catch basin

Photo 3.16. Storm water flow entering L4C-607 catch basin

3.6 Item 6 – Robinhood Court

Issue:

- None specifically identified. Lack of drainage – Access limitations in easement (Figure 3.6).

Action:

- V&A investigated this area on Jan. 20, 2010, using photo and handheld video documentation.

Main Observations:

- There are parallel lines along Robinhood Court, a 33-inch trunk line and a smaller local storm water collection system, both draining to Permanente Creek.
- There was some sediment buildup in the smaller 21-inch line. This appears to be due to shallower slopes of the storm pipes in this area (Photos 3.17 and 3.18).
- One feature, L5D-104, in easement could not to be located.

Overall Condition Rating:

- Structural Rating = 1 (Vanda concrete condition = 1)
- O&M Rating = 2 (some sediment buildup, limited easement access)

Recommendations for Follow-up Actions:

- Locate Storm Drainage Feature L5D-104.
- Clean the 21-inch line between Catch Basins L5C-108 and L5C-106.

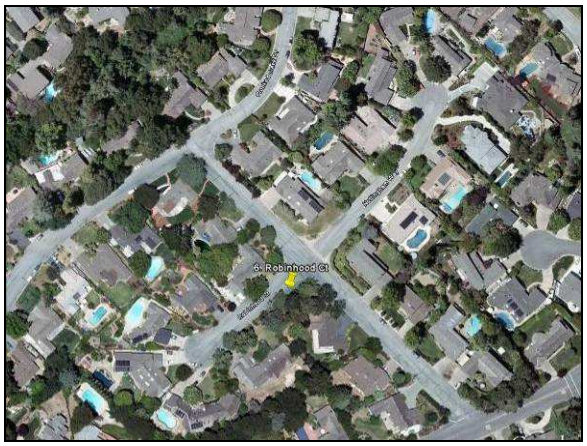


Figure 3.6. Robinhood Court

Photo 3.17. Sediment buildup in 21-inch pipe

Photo 3.18. Shallow slope causes sediment buildup and restricts flow capacity

3.7 Item 7 – Covington Road at Hale Creek

Issue:

- Creek overflows – Pipe is undersized (Figure 3.7).

Action:

- V&A investigated this area on Jan. 20, 2010, using photo and handheld video documentation.

Main Observations:

- Hale Creek upstream of Covington Rd. is a natural creek bed. Hale Creek crosses under Covington Rd. and flows out into a concrete-lined channel. The box channel under Covington Rd. appears to be undersized to handle the creek flow (Photos 3.19 and 3.20).
- The flow is scouring around the outside edges of the upstream approach to the Covington box channel (Photo 3.21).
- Storm water outfall pipes protrude into the creek bed creating possible areas for debris to collect, potentially causing obstructions to flow.

Overall Condition Rating:

- Structural Rating = 1 (Vanda concrete condition = 1)
- O&M Rating = 1

Recommendations for Follow-up Actions:

- Box channel may need to be upsized or an additional parallel channel constructed to alleviate the flow restriction.

Figure 3.7. Hale Creek at Covington Drive

Photo 3.19. Hale Creek downstream

Photo 3.20. Hale Creek downstream

Photo 3.21. Upstream structure, undermined along sides of channel – protruding outfalls

3.8 Item 8 – Viola Place

Issue:

- Drainage features overflow due to debris (toys) stuck in pipe (Figure 3.8).

Action:

- V&A investigated this area on Jan. 20, 2010, using photo and handheld video documentation.

Main Observations:

- Catch Basin G2C-609 was observed to have been covered with pine needles (Photo 3.22).
- View of the downstream pipe indicates that some debris may be obstructing the flow (Photo 3.23).

Overall Condition Rating:

- Structural Rating = 1 (Vanda concrete condition = 1)
- O&M Rating = 2 (some debris obstructing flow)

Recommendations for Follow-up Actions:

- Cleaning is recommended on the pipe between G2C-609 and G2D-610.

Figure 3.8. Viola Place

Photo 3.22. Catch Basin G2C-609 obstructed by pine needles

Photo 3.23. Downstream pipe partially obstructed with debris

3.9 Item 9 – Catalina Court

Issue:

- None specifically identified. Poor drainage (Figure 3.9).

Action:

- V&A investigated this area on Jan. 26, 2010, using photo and handheld video documentation.

Main Observations:

- Catch Basin C2C-315 was observed to have some light debris. The debris collects around the outlet pipe edges due to a protruding transition to the catch basin structure (Photo 3.24).
- Manhole C2D-314 has a 12-inch inlet from the south which is not shown on the maps. The pipe is dry, has some debris, and appears to be abandoned or no longer in service (Photo 3.26).
- Slight street surface ponding is occurring in front of 110 Catalina Court (Photo 3.25).

Overall Condition Rating:

- Structural Rating = 1 (Vanda concrete condition = 1; outlet configuration restricts flow)
- O&M Rating = 1 (some light debris)

Recommendations for Follow-up Actions:

- Catch Basin C2C-315: cut or chip out outlet pipe edges. Use mortar to round edges into a smooth transition to pipe outlet from the catch basin.
- Slight ponding in front of Catalina Court could be alleviated by installing a catch basin and utilizing what appears to be a previously abandoned 12-inch pipe.

Figure 3.9. Catalina Court

Photo 3.24. Catch Basin C2C-315, poor transition to outlet pipe

Photo 3.25. Slight street surface ponding in front of 110 Catalina Court

Photo 3.26. 12-inch dry pipe with some sediment looking upstream south – not shown on maps

3.10 Item 10 – Vineyard Drive at Deodara Drive

Issue:

- The City indicated that the intersection has poor drainage (Figure 3.10).

Action:

- V&A investigated this area on Jan. 26, 2010, and Feb. 2, 2010, using photos and handheld and pole-mounted zoom camera video documentation.

Main Observations:

- During a heavy rain downpour Manhole M6D-614 was observed surcharging due to the sudden increase in flow from multiple inlets.
- Manhole M6D-614 has multiple pipe inlets entering the structure at crossing angles. During rain events it was observed that turbulence is created with the crossing flow of multiple drop inlet pipes. The sudden increase in flow from catch basin inlets combined with the run off from the steep hillside causes the manhole to become quickly surcharged (Photo 3.27).
- The configuration of the inlets in Manhole M6D-614 causes turbulence in the structure. (Photo 3.24). One inlet also appears to enter at a lower elevation than the outlet.
- Manhole M6D-615 is incorrectly shown on the plans and is a sanitary sewer manhole.
- Manhole M6D-617 has what appears to be an abandoned pipe entering from the south.
- There is an additional manhole (Unknown G) not shown on the plans downstream from M6D-617 which receives inlet flow from the upstream piping and a drainage ditch on Foothill Expressway. This manhole is surcharged during storm events because the outlet pipe to the creek appears to have an invert lower than the creek bed, and the creek flow is obstructed downstream by vegetation.

Overall Condition Rating:

- Structural Rating = 2 (Vanda concrete condition = 1; poor design, configuration of too many inlets creates turbulence and outlet configuration restricts flow)
- O&M Rating = 1

Recommendations for Follow-up Actions:

- Downstream piping may need to be upsized or the storm system expanded to accommodate the flow in this drainage area.
- The outlet to the drainage creek needs to be modified by possibly trenching the creek bed deeper and wider so that the flow is not restricted.

Figure 3.10. Vineyard Drive at Deodara Drive

Photo 3.27. Manhole M6D-614 with multiple inlets, turbulent flows, potentially piping

Photo 3.28. Manhole M6D-617 with additional pipe from south, which appears abandoned and is not shown on the maps

Photo 3.29. Unidentified manhole (Unknown G) downstream of M6D-617 with outlet drainage to creek

Photo 3.30. Manhole downstream of M6D-617 which is surcharged due to poor outlet configuration to drainage creek bed

Photo 3.31. Outlet to creek is completely submerged

3.11 Item 11 – Distel Drive

Issue:

- This area was identified as plugging periodically due to debris (Figure 3.11).

Action:

- V&A investigated this area on Jan. 26, 2010, using photo and handheld video documentation.

Main Observations:

- The pipe downstream of Catch Basin C3C-501 had cracks at a joint.
- Structure C3C-502 had a small mortar dam at the invert of the inlet pipe, which backed up water into the upstream pipe. The catch basin had slight debris and there was some sediment buildup downstream.

Overall Condition Rating:

- Structural Rating = 1 (Vanda concrete condition = 1)
- O&M Rating = 1 (Mortar obstruction causes some debris build up)

Recommendations for Follow-up Actions:

- Clean downstream pipe.
- Remove mortar dam at inlet to C3C-502.

Figure 3.11. Distel Drive

Photo 3.32. Catch Basin C3C-501, downstream pipe with cracks

Photo 3.33. Catch Basin C3C-502, mortar dam and backup in inlet

Photo 3.34. Catch Basin C3C-502, sediment in downstream pipe

3.12 Item 12 – Loma Prieta Court

Issue:

- This area was identified as having poor drainage because the storm inlet is too high (Figure 3.12).

Action:

- V&A investigated this area on Jan. 20, 2010, using photo and handheld video documentation.

Main Observations:

- The inlet to Catch Basin H5F-404 is higher than the surrounding gutters, so large puddles form all around the end of the street. The rim-invert depth in the catch basin is only 13 inches.

Overall Condition Rating:

- Structural Rating = 1 (Vanda concrete condition = 1)

- O&M Rating = 2 (Surface ponding may result in more settling of debris)

Recommendations for Follow-up Actions:

- Lower the inlet grating of Catch Basin H5F-404 below the surrounding gutters. This may not be feasible without lowering the outlet line since the catch basin is very shallow.

Figure 3.12. Loma Prieta Court

Photo 3.35. Catch Basin H5F-404 surrounded by ponding

Photo 3.36. Large puddle at end of Loma Prieta Court

Photo 3.37. Puddles approach but cannot enter Catch Basin H5F-404

3.13 Item 13 – Sunshine Drive

Issue:

- This area was identified as plugging periodically on the north side (Figure 3.13).

Action:

- V&A investigated this area on Feb. 10, 2010, using photo and handheld video documentation.

Main Observations:

- Catch Basins F4F-212, F4F-204 and F4F-201 have inadequately sized grates and are half full of sediment (Photos 3.38 through Photo 3.44).
- Catch basins F4F-212 and F4F-201 have corrugated metal pipes. The pipes appear to be in good condition but the inlets from the catch basin are poorly constructed (Photos 3.38 through Photo 3.42).
- The pipe from catch basin F4F-204 is half full of sediment and directed upstream to discharge in to Hale Creek. When flows are elevated the creek could flow into this pipe and deposit sediment (Photos 3.43 to Photo 3.44).
- The access ramp to Hale Creek is directed upstream. When flows are elevated, the creek can begin to rise along side the access ramp and flow over the street (Photo 3.45).

Overall Condition Rating:

- Structural Rating = 2 (Vanda concrete condition = 1) Some of the corrugated metal pipes and older catch basins are in need of improvements
- O&M Rating = 3 (When creek flows are elevated pipes can become filled with debris)

Recommendations for Follow-up Actions:

- Reconstruct Catch Basins F4F-212, F4F-204 and F4F-201 to improve the flow to the outlet pipe.
- Clean pipes from F4F-212, F4F-204 and F4F-201 to remove sediment.

Figure 3.13. Sunshine Drive

Photo 3.38. Catch Basin F4F-212 undersized with protruding corrugated metal pipe outlet creating obstruction for sediment

Photo 3.39. Catch Basin F4F-212 corrugated metal pipe outlet half full of sediment

Photo 3.40. Catch Basin F4F-201 undersized

Photo 3.41. Catch Basin F4F-201 poorly constructed inlet

Photo 3.42. Catch Basin F4F-201 corrugated metal pipe outlet half full of sediment

Photo 3.43. Catch Basin F4F-204 half full of sediment

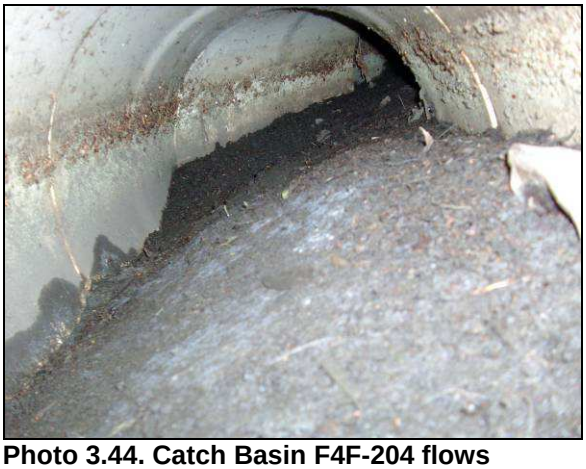


Photo 3.44. Catch Basin F4F-204 flows upstream into Hale Creek

Photo 3.45. Access ramp to Hale Creek near F4F-204. Creek flows over ramp (Sandbags)

3.14 Item 14 – Ranchita Drive at Julie Lane

Issue:

- This area was identified as having drainage issues due to crowned road (Figure 3.14).

Action:

- V&A investigated this area on Jan. 19, 2010, using photo and handheld video documentation.

Main Observations:

- Catch Basin J6C-225 does not have a sump but collects leaves that may clog the outlet.
- A local resident stated that he regularly cleans the catch basins in the area and that Ranchita Drive floods to the east of Julie Lane and Ranchita Court. This portion of the street does not have storm sewers and runoff collects in the ditches on either side of the roadway.
- Catch Basin J6F-228 could not be located.

Overall Condition Rating:

- Structural Rating = 1 (Vanda concrete condition = 1)
- O&M Rating = 1

Recommendations for Follow-up Actions:

- Add a sump to Structure J6C-225 to collect debris.
- Add storm inlets along Ranchita Drive east of Ranchita Court.

Figure 3.14. Ranchita Drive at Julie Lane

Photo 3.46. Catch Basin J6C-225 with leaves obstructing outlet

3.15 Item 15 – Cherry Avenue

Issue:

- This area was identified as having redwood tree roots in the storm drains (Figure 3.15).

Action:

- V&A investigated this area on Jan. 26, 2010, using photo documentation.

Main Observations:

- None – V&A investigated catch basins along Cherry Avenue and did not observe redwood tree roots in any of the catch basins. These lines may have already been cleaned to remove roots.

Overall Condition Rating:

- Structural Rating = 1 (Vanda concrete condition = 1)
- O&M Rating = 1 (No evidence of roots at the time of the evaluation)

Recommendations for Follow-up Actions:

- Continue cleaning program to prevent roots.

Figure 3.15. Cherry Avenue

3.16 Item 16 – Portola Court at Delphi Circle

Issue:

- No specific issues were identified (Figure 3.16).

Action:

- V&A investigated this area on Jan. 26, 2010, using photo and handheld video documentation.

Main Observations:

- The inlet to Manhole C3D-102 from C3C-103 enters the manhole facing upstream (Photo 3.47).
- The lines entering and leaving Manhole C3D-102 have about 1 inch of sediment (Photo 3.48).
- Catch Basin C3C-104 has about 3 inches of hard sediment or concrete at the outlet. This backs up flow in the catch basin but may allow debris to settle out (Photo 3.49).

Overall Condition Rating:

- Structural Rating = 1 (Vanda concrete condition = 1)
- O&M Rating = 2 (Configuration of lines and hard debris will necessitate continual cleaning)

Recommendations for Follow-up Actions:

- Reconfigure Manhole C3D-102 so that the inlets all flow in the downstream direction.
- Clean hard debris to allow better flow through the pipes

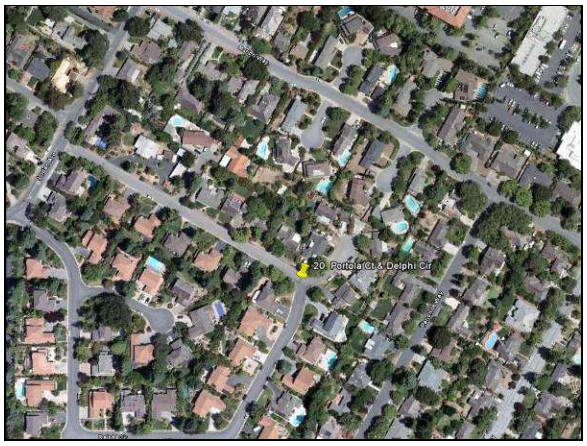


Figure 3.16. Portola Court at Delphi Circle

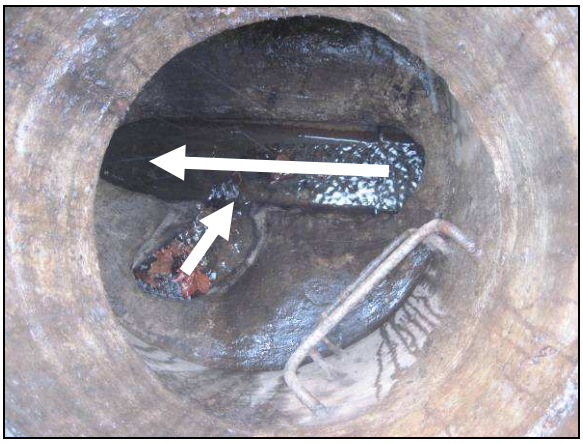


Photo 3.47. Manhole C3D-102 with inlet from C3C-103 entering in upstream direction

Photo 3.48. Outlet from Manhole C3D-102 with gravel deposits

Photo 3.49. Catch Basin C3C-104 with flow backed up

3.17 Item 17 – Summerhill Avenue at South El Monte Avenue

Issue:

- This area was identified as having rocks and debris obstructing drainage (Figure 3.17).

Action:

- V&A investigated this area on Jan. 20, 2010, and Feb. 2, 2010, using photo, handheld video, and pole mounted zoom camera documentation.

Main Observations:

- Catch Basin H2C-217 does not receive flow from H2C-218 as shown on the plans. This catch basin receives surface flow from both Summerhill and El Monte, but both gutters have low slopes which form puddles. The grating over this catch basin also collects debris, which may restrict its capacity during storm events. Moderately high amounts of flow were observed entering this catch basin during even a light rain (Photo 3.50 through Photo 3.55).

- Rocks and mud were found in the intersection adjacent to Catch Basin H2C-218, indicating potential overflow or back-up conditions at this catch basin (Photo 3.56).
- The line between Catch Basins H2C-216 and H2D-217 appears to have an obstruction or partial collapse which would restrict flow (Photo 3.57).

Overall Condition Rating:

- Structural Rating = 1 (Vanda concrete condition = 1)
- O&M Rating = 2 (Debris from the road drainage creates ponding along street. Potential obstruction in one pipe observed)

Recommendations for Follow-up Actions:

- Construct additional storm inlets at the south corner of the intersection. Surface flows from Summerhill could be intercepted before they reach the base of the incline, where the slope is flat and ponding occurs. Likewise, flows from the south along El Monte could be collected at points south of the intersection before encountering the low, flat area next to the roadway.
- Provide a larger inlet area to Catch Basin H2C-218 to reduce potential for clogging.
- Use CCTV to investigate the line between Catch Basins H2C-216 and H2D-217 to identify obstruction.

Figure 3.17. Summerhill Avenue at South El Monte Avenue

Photo 3.50. Large puddle along El Monte south of H2C-217 due to flat slope

Photo 3.51. Ponding around H2C-217 in light rain with evidence of more severe ponding

Photo 3.52. Inlet to H2C-217 with debris on grating with potential to obstruct flow

Photo 3.53. Corner adjacent to H2C-218 with evidence of flooding

Photo 3.54. Inlet to H2C-218 with potential for debris to obstruct flow

Photo 3.55. Puddling between Catch Basins H2C-218 and H2C-219

Photo 3.56. Pipe defect between H2C-216 and H2D-217 with obstruction at invert

3.18 Item 18 – 1270 Grant Avenue at Paula Court

Issue:

- This area was identified as having poor surface drainage (Figure 3.18).

Action:

- V&A investigated this area on Jan. 19, 2010, and Feb. 2, 2010, using photos and handheld and pole-mounted zoom camera video documentation.

Main Observations:

- Catch Basin I6F-401 is susceptible to being covered by debris (palm leaves from nearby trees). The catch basin has collected 3 to 4 inches of sediment and debris (Photo 3.58).
- Manhole I6D-402 has no apparent connection to I6F-401.
- Another additional manhole (Unknown F) not shown on the plans, with a cover labeled for the City of Mountain View, is present on the 24-inch line just south of I6D-402 (Photo 3.59).

Overall Condition Rating:

- Structural Rating = 1 (Vanda concrete condition = 1)
- O&M Rating = 1

Recommendations for Follow-up Actions:

- Clean Catch Basin I6F-401.

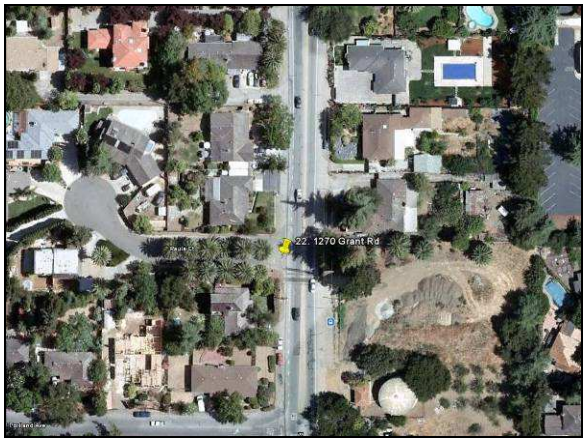


Figure 3.18. 1270 Grant Avenue at Paula Court

Photo 3.57. Accumulation of palm leaves near Catch Basin I6F-401

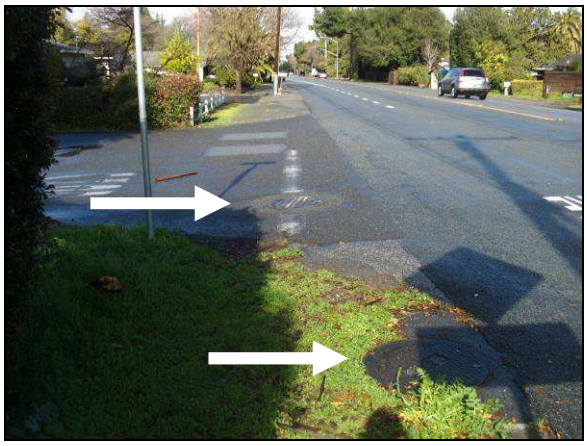


Photo 3.58. Pair of manholes at southwest corner of intersection (top—I6D-402; bottom—Unknown F)

3.19 Item 19 – Heritage Court

Issue:

- This area was identified as having no curb and gutter (Figure 3.19).

Action:

- V&A investigated this area on Jan. 19, 2010, using photo and handheld video documentation.

Main Observations:

- Could not locate Feature J5F-303 (Photo 3.60)
- Pipe downstream from J5F-302 has some debris build up (Photo 3.61).

Overall Condition Rating:

- Structural Rating = 1 (Vanda concrete condition = 1)
- O&M Rating = 2 (One feature not located. Easement in-between properties)

Recommendations for Follow-up Actions:

- Conduct CCTV to locate J5F-303
- Clean lines from J5F-301 downstream through easement to Grant Rd.

Figure 3.19. Heritage Court

Photo 3.59. Catch Basin J5F-302 – Feature J5F-303 could not be located

Photo 3.60. Some debris build up in line downstream of Catch Basin J5F-302

3.20 Item 20 – Edge Lane

Issue:

- No specific issues were identified (Figure 3.20).

Action:

- V&A investigated this area on Feb. 10, 2010, using photo documentation.

Main Observations:

- None – V&A investigated catch basins on Alvina Court and Manhole I4D-203 on Edge Lane and did not detect any major deficiencies. The storm line is in an easement preventing access for maintenance.

Overall Condition Rating:

- Structural Rating = 1 (Vanda concrete condition = 1)

- O&M Rating = 2 (The concrete cover for Manhole I4D-203 is difficult to remove)

Recommendations for Follow-up Actions:

- Replace the concrete manhole cover for I4D-203 with a standard cast iron lid.

Figure 3.20. Edge Lane

Photo 3.61. Concrete cover for Manhole I4D-203

3.21 Item 21 – 1640 Dallas Court

Issue:

- This area was identified as having poor surface drainage (Figure 3.21).

Action:

- V&A investigated this area on Jan. 19, 2010, using photo and handheld video documentation.

Main Observations:

- Slight ponding at the end of Dallas Court and an abandoned Manhole K6F-225 (Photo 3.63)

Overall Condition Rating:

- Structural Rating = N/A (No structural component)
- O&M Rating = N/A (No operational and maintenance component)

Recommendations for Follow-up Actions:

- Consider restoring storm water manhole and piping to Manhole K6F-225.

Figure 3.21. 1640 Dallas Court

Photo 3.62. Abandoned Manhole K6F-225

3.22 Item 22 – 1975 Grant Road at Woodland Library

Issue:

- No specific issues were identified (Figure 3.22).

Action:

- V&A investigated this area on Jan. 19, 2010, and Feb. 2, 2010, using photos and handheld video documentation.

Main Observations:

- Low spot for drainage along Foothill Expressway
- Catch basins were blocked with filter fabric due to construction at the library.
- Manhole L6F-117 was in good condition with only an inch of sediment. (Photo 3.64)
- Gutter Drain L6F-118 on northbound Foothill Expressway connects to Manhole L6F-117.

Overall Condition Rating:

- Structural Rating = 1 (Vanda concrete condition = 1)
- O&M Rating = 1 (Some debris may be washed into storm pipe from ditch inlet in center of Foothill Expressway)

Recommendations for Follow-up Actions:

- Consider additional inspection with CCTV camera.

Figure 3.22. 1975 Grant Road at Woodland Library

Photo 3.63. Manhole K6F-225

3.23 Item 23 – Cristo Ray Dr. and Kring Way

Issue:

- No specific issues were identified (Figure 3.23).

Action:

- V&A investigated this area on Jan. 20, 2010, using photo and handheld video documentation.

Main Observations:

- Storm water runoff comes from the cul-de-sac on Kring Way and enters the driveway for access to water tanks. The storm water lines enter an easement alongside 1460 Kring Way. The easement limits maintenance access (Photo 3.67). This line is not shown or shown incorrectly on the maps, so the manholes have been labeled A–E going downstream.
- Fast velocities and the 90-degree bend creates turbulence at the manhole downstream of N6D-502 (Unknown A, Photo 3.65).
- Sheet flow on the driveway is prevented from entering the next downstream inlet due to the cross-slope of the pavement and a small asphalt berm (Unknown B, Photo 3.64).
- At Unknown D the storm water appears to flow into a drainage ditch (Photo 3.67). The drainage ditch is covered with vegetation and debris (Photo 3.68).
- Although not shown on the City maps, the storm water system continues parallel to Interstate 280. The catch basins in this area are covered with leaves (Photo 3.70).
- As an additional note, water was observed ponding around the perimeter of the water tanks (Photo 3.71).

Overall Condition Rating:

- Structural Rating = 1 (Vanda concrete condition = 1)
- O&M Rating = 3 (Poor easement access restricts maintenance activities)

Recommendations for Follow-up Actions:

- Improve access to easement for maintenance.
- Clear catch basins of debris and improve inlet near drainage ditch.
- Inform agency with ownership over the water tanks regarding inadequate surface drainage.

Figure 3.23. Cristo Ray Dr. and Kring Way

Photo 3.64. Catch Basin Unknown B

Photo 3.65. Turbulence at Unknown A

Photo 3.66. Unknown C located in utility easement alongside water tanks

Photo 3.67. Flow into drainage ditch

Photo 3.68. Drainage ditch with leaves and debris

Photo 3.69. Catch basin not shown on maps parallel to Interstate 280 covered with leaves

Photo 3.70. Note of inadequate surface drainage around perimeter of water tanks

3.24 Item 24 – Gate at Stonehaven Drive and Sierra Ventura Drive

Issue:

- The City indicated that there were issues with debris getting stuck on the bar screen behind 2100 Sierra Ventura Drive. Also there is a gate structure located in the intersection of Stonehaven Drive and Sierra Ventura Drive which was paved over (Figure 3.24).

Action:

- V&A investigated this area with assistance from the City on Feb. 10, 2010 and Mar. 9, 2010, by confined space entry using photo documentation and handheld video documentation.

Main Observations:

- The bar screen behind 2100 Sierra Ventura often gets blocked with debris. The homeowner routinely clears the debris from the bar screen to maintain his property (Photo 3.72).
- The creek flows through a gate which provides a structure for debris to collect (Photo 3.74).

- Due to periods of elevated creek flows the homeowner added a 12-inch drainage pipe with grating from the creek to the front of the home (Photo 3.73).
- Manhole M5D-216 is not located as shown on the maps. It is located alongside the driveway to 2100 Sierra Ventura Drive in the landscaped area (Photo 3.75 and Photo 3.76).
- The pipe added by the homeowner does not connect to the City's Catch Basin M5C-208. It terminates just short in the utility lawn under shrubs adjacent to the fire hydrant (Photo 3.77 and Photo 3.78).
- The gate structure at M5D-207 is paved over (Photo 3.79).
- The Gate Structure M5D-207 was evaluated from a confined space entry proceeding upstream from Catch Basin M5F-206 (Photo 3.79). The gate, gate rails and gate stem all appear to be operational and in good/serviceable condition (Photo 3.80).
- The gate is set at 10-inches above the invert of the structure (Photo 3.81). Flow levels exceeding 10-inches will flow over the gate into the 18-inch pipe flowing north to Manhole M5D-205 (Photo 3.82).

Overall Condition Rating:

- Structural Rating = 1 (Vanda concrete condition = 1)
- O&M Rating = 3 (Access for maintenance is limited because the gate structure is paved over)

Recommendations for Follow-up Actions:

- Improve creek channel approach to bar screens to alleviate debris from blocking the bar screen.
- Remove the asphalt over the Gate Structure M5D-207 and elevate the hatch to match road grade.
- Exercise the gate periodically to ensure it is operational.
- Based on the model prediction of storm water flows, the level of the gate structure may need to be repositioned to optimize storm water flows to each outlet.

Figure 3.24. Gate at Stonehaven Drive and Sierra Ventura Drive

Photo 3.71. Bar screen behind 2100 Sierra Ventura

Photo 3.72. Additional 12-inch drainage pipe and grating improvement

Photo 3.73. Fencing and gate upstream of bar screens

Photo 3.74. View of Manhole M5D-216 looking south

Photo 3.75. View of Manhole M5D-216 looking north

Photo 3.76. 12-inch additional drainage pipe terminates under hedges near M5C-208

Photo 3.77. View of 12-inch drainage pipe under hedges

Photo 3.78. Marking paint outline of Gate Structure M5D-207

Photo 3.79. Inside of structure – Wheel for adjusting gate position

Photo 3.80. Inside of structure – View of gate position 10-inchs above invert – looking south

Photo 3.81. Inside of structure – View over gate approximately 8 foot drop to 18-inch inlet below – looking south

4 CONCLUSIONS

V&A presents the following conclusions based on the results of the condition assessments:

- The majority of the storm water infrastructure evaluated was in satisfactory condition. Many of the features such as catch basins, manholes and associated pipelines were not structurally compromised.
  - Many of the features evaluated were assigned a VANDA Level 1 rating, indicating only minimal damage to concrete surfaces.
  - Deterioration due to corrosion was determined not to be a prevalent issue. There were observations of a few corrugated metal pipes used in the storm water system. These pipes are more susceptible to corrosion. Based on the condition assessment the pipes evaluated appear to be in good condition. However, this observation is limited to vantage point and/or visibility of the zoom camera. It is recommended that additional CCTV inspection be conducted in the corrugated metal pipes to assess potential corrosion damage.
- Over 90 individual features were thoroughly documented during the condition assessment. The predominant findings were areas found to have inadequate drainage. Supplemental observations noted that some of the lines had debris and sediment build up causing the drainage issues. To a lesser extent some of the drainage issues were determined to be caused by poor initial construction and/or design.
- Access limitations for some of the areas evaluated are making routine maintenance of these facilities challenging.

5 RECOMMENDATIONS

Based on the condition assessments, V&A presents the following recommendations for the City's consideration:

- Miscellaneous improvements identified in this report for the features evaluated should be undertaken to improve serviceability and reliability of these assets.
- The City should consider contracting with a company to provide as-needed cleaning and CCTV inspection services. The contractor would supplement the existing City staff and provide additional capabilities to clean pipelines, remove obstructions and document conditions with CCTV inspection.
  - Additionally the contractor can help facilitate locating and restoring access to features which have become buried, paved over or otherwise currently inaccessible for maintenance activities.
  - A routine cleaning schedule should be established for some of the smaller diameter lines particularly where the lines are located in easements between private properties.
- It is recommended that the City continue to expand the condition assessment of storm water infrastructure using the information in this report as a guide to categorize structural and O&M defects with grade ratings of 1 to 5. Results from development of the storm water model may offer guidance to identify pipelines that are under capacity or have inadequate slopes to convey projected peak storm water flows. Such pipelines would be more critical assets and would represent the next group of areas targeted for condition assessment activities.
  - Ultimately, prioritization of additional areas for condition assessment should include a subjective evaluation of the criticality of the assets. Critical assets can be classified as those where potential external impacts (public, traffic, environmental) of failure are likely to be high. The City should investigate the criticality of the storm water infrastructure in order to evaluate costs associated with construction and potential impacts to property owners.
- Results of condition assessment documentation should be linked to the assets in the City's GIS system for benchmarking and future reference. The asset inventory can be updated based on actual field conditions.
- Where possible, efforts should be made to standardize design and construction of the drainage catch basins, manholes and associated piping to the extent possible to reduce maintenance efforts.
- Storm water collection infrastructure is a dynamic system. Conditions may be subject to change over time resulting in greater deterioration of the infrastructure. It is recommended that the system be monitored periodically to update for changes in condition. Considering the generally good condition of the assets evaluated, is it suggested that the frequency of re-evaluation be conducted on a 10 to 15-year cycle. Should conditions indicate that deterioration has advanced dramatically during this time frame; the re-evaluation interval can be adjusted to a 5-year cycle.

APPENDIX A: DESCRIPTION OF APPENDIX

Item 1 - Woods Ln at Citation Dr.

General Observations

Storm inlet near parking lot at end of Citation Dr.

Storm inlet near parking lot at end of Citation Dr.

Storm inlet near parking lot at end of Citation Dr.

Storm inlet near parking lot at end of Citation Dr.

Storm inlet near parking lot at end of Citation Dr.

Pool behind dam upstream of M6D-120

Item 1 - Woods Ln at Citation Dr.

General Observations

Check dam upstream of M6D-120

Check dam upstream of M6D-120

Check dam upstream of M6D-120

Check dam upstream of M6D-120

M6D-118?

Location: Woods Ln.
Map sheet: M6
Date: 1/20/2010
Weather: Light rain
Location code: Easement/Right of way
Surface type: Grass/dirt
Rim-invert: 9.4 ft.
Diameter/size:
Cover/grate size:
Sediment: None

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Inlet			8.6 ft.
Outlet			9.8 ft.

VANDA rating (structure): 1

Item 1 - Woods Ln at Citation Dr.

M6D-118?

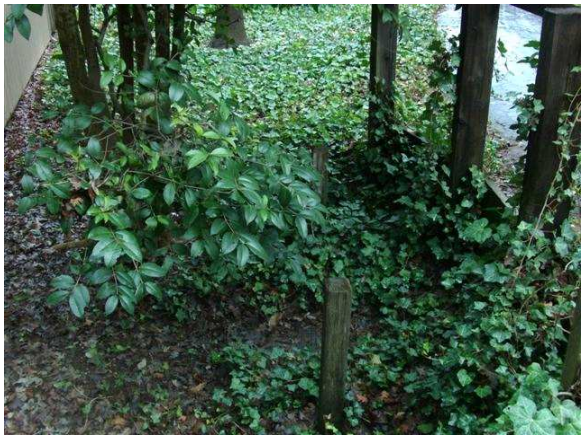
VANDA rating (pipes):

Notes:

Very high velocity; flow from creek, diverted at dam at Woods Ln. & Citation Dr.; susceptible to burial/overgrowth; resident indicated blockage and overflow several years prior.

Recommendations:

Update GIS/maps to show importance of line.



Area view showing susceptibility to burial

Plan view

M6D-119?

Location:	Woods Ln.
Map sheet:	M6
Date:	1/20/2010
Weather:	Light rain
Location code:	Easement/Right of way
Surface type:	Grass/dirt
Rim-invert:	
Diameter/size:	
Cover/grate size:	
Sediment:	
Pipe connections:	
VANDA rating (structure):	
VANDA rating (pipes):	

Notes:

Grated inlet; high-velocity flow audible; susceptible to burial/overgrowth.

Recommendations:

Item 1 - Woods Ln at Citation Dr.

M6D-119?

Area view showing susceptibility to burial

Area view showing susceptibility to burial

Unknown I

Location:	Woods Ln.
Map sheet:	M6
Date:	1/20/2010
Weather:	Light rain
Location code:	Easement/Right of way
Surface type:	Grass/dirt
Rim-invert:	
Diameter/size:	
Cover/grate size:	
Sediment:	
Pipe connections:	
VANDA rating (structure):	
VANDA rating (pipes):	

Notes:

Grated inlet; may not be directly on trunk line; high-velocity flow audible; susceptible to burial/overgrowth.

Recommendations:

Item 1 - Woods Ln at Citation Dr.

Unknown I

Area view

M6D-120?

Location:	Woods Ln. & Citation Dr.
Map sheet:	M6
Date:	1/20/2010
Weather:	Light rain
Location code:	Easement/Right of way
Surface type:	Concrete collar
Rim-invert:	
Diameter/size:	
Cover/grate size:	
Sediment:	
Pipe connections:	
VANDA rating (structure):	
VANDA rating (pipes):	

Notes:

Creek inlet from dam overflow; high-velocity, turbulent flow; no trashrack visible.

Recommendations:

Item 1 - Woods Ln at Citation Dr.

M6D-120?

Inlet above creek inlet

Inlet above creek intake showing turbulent flow

Turbulence at inlet transition from box culvert to circular conduit; no trashrack

Item 2 - Foothill at El Sereno

General Observations

Ponding on offramp from Foothill Expwy., looking north

Ponding on offramp from Foothill Expwy., looking north

Ponding on offramp from Foothill Expwy., looking south

Unknown J (catch basins)

Location:	Foothill Expwy. at El Sereno Ave.
Map sheet:	M6
Date:	1/19/2010
Weather:	Light rain
Location code:	Sidewalk
Surface type:	Grass/dirt
Rim-invert:	
Diameter/size:	
Cover/grate size:	
Sediment:	
Pipe connections:	
VANDA rating (structure):	
VANDA rating (pipes):	

Item 2 - Foothill at El Sereno

Unknown J (catch basins)

Notes:

Pair of catch basins near large ponded area; did not investigate; may not be City structures.

Recommendations:

Area view looking northwest

Area view looking north

Area view looking south

Area view looking southwest at apex of turn onto Homestead

Item 3 - Fremont and Grant

J6D-409

Location: Grant Rd. & Fremont Ave.

Map sheet: J6

Date: 2/2/2010

Weather: Dry

Location code: Main highway - Urban thoroughfare, 4 lane street, heavy traffic

Surface type: Asphalt

Rim-invert: 17.2 ft.

Diameter/size: 48 in.

Cover/grate size:

Sediment:

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Inlet A (N)	36 in.	Concrete	17.2 ft.
Inlet B (S)	24 in.	Concrete	8.7 ft.
Inlet C (SW)	12 in.	Concrete	12.2 ft.
Inlet D (W)	18 in.	Concrete	8.6 ft.
Outlet (E)	36 in.	Concrete	17.2 ft.

VANDA rating (structure): 1

VANDA rating (pipes): 1

Notes:

About 2 inches of gravel in 36-inch line downstream.

Recommendations:

Plan view

North outlet to J6D-408

Item 3 - Fremont and Grant

J6D-409

Southeast inlet

South inlet from K6D-103

Southwest inlet from K6F-101

West inlet from J5D-614

Southwest inlets

K6D-103

Location:	Grant Rd. & Fremont Ave.
Map sheet:	K6

Item 3 - Fremont and Grant

K6D-103

Date: 2/2/2010

Weather: Dry

Location code: Main highway - Urban thoroughfare, 4 lane street, heavy traffic

Surface type: Asphalt

Rim-invert: 8.1 ft.

Diameter/size:

Cover/grate size:

Sediment:

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Inlet A (S)	24 in.	Concrete	8.1 ft.
Inlet B (W)	12 in.	Concrete	7.1 ft.
Outlet (N)	24 in.	Concrete	8.1 ft.

VANDA rating (structure): 1

VANDA rating (pipes): 1

Notes:

Inlet B (12-inch line from west) is plugged.

Recommendations:

Plan view

North outlet

Item 3 - Fremont and Grant

K6D-103

South inlet

West inlet, plugged

K6F-101

Location: Grant Rd. & Fremont Ave.

Map sheet: K6

Date: 2/2/2010

Weather: Dry

Location code: Main highway - Urban thoroughfare, 4 lane street, heavy traffic

Surface type: Concrete collar

Rim-invert: 6.1 ft.

Diameter/size: 36x36 in.

Cover/grate size: 35x41 in.

Sediment:

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Outlet	12 in.	Concrete	

VANDA rating (structure): 1

VANDA rating (pipes): 1

Notes:

Recommendations:

Item 3 - Fremont and Grant

K6F-101

Plan view

Outlet

K6F-104

Location: Grant Rd. & Fremont Ave.

Map sheet: K6

Date: 2/2/2010

Weather: Dry

Location code: Main highway - Urban thoroughfare, 4 lane street, heavy traffic

Surface type: Concrete collar

Rim-invert: 4.9 ft.

Diameter/size: 35x35 in.

Cover/grate size: 35x41 in.

Sediment:

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Outlet	15 in.	Concrete	

VANDA rating (structure): 1

VANDA rating (pipes): 1

Notes:

Recommendations:

Item 3 - Fremont and Grant

K6F-104

Plan view

Outlet

J6D-408

Location: Grant Rd. & Fremont Ave.

Map sheet: J6

Date: 2/2/2010

Weather: Dry

Location code: Main highway - Urban thoroughfare, 4 lane street, heavy traffic

Surface type: Asphalt

Rim-invert: 16.9 ft.

Diameter/size:

Cover/grate size:

Sediment:

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Inlet A (NW)	12 in.	Corrugated metal, coal tar coated	4.0 ft.
Inlet B (S)	36 in.	Concrete	
Inlet C (W)	12 in.	Concrete	8.4 ft.
Outlet (N)	36 in.	Concrete	

VANDA rating (structure): 1

VANDA rating (pipes): 1

Notes:

Rough concrete in channel but no sediment.

Recommendations:

Item 3 - Fremont and Grant

J6D-408

Plan view

North outlet

Northeast inlet

South inlet

West inlet

Northeast inlet

K6D-102

Location:	Grant Rd. & Fremont Ave.
Map sheet:	K6

K6D-102

Date: 2/2/2010

Weather: Dry

Location code: Main highway - Urban thoroughfare, 4 lane street, heavy traffic

Surface type:

Rim-invert:

Diameter/size:

Cover/grate size:

Sediment:

Pipe connections:

VANDA rating (structure):

VANDA rating (pipes):

Notes:

Could not locate.

Recommendations:

K6D-133

Location: Grant Rd. & Fremont Ave.

Map sheet: K6

Date: 2/2/2010

Weather: Dry

Location code: Main highway - Urban thoroughfare, 4 lane street, heavy traffic

Surface type:

Rim-invert:

Diameter/size:

Cover/grate size:

Sediment:

Pipe connections:

VANDA rating (structure):

VANDA rating (pipes):

Notes:

Could not locate.

Recommendations:

Unknown L (catch basin)

Location: Grant Rd. & Fremont Ave.

Item 3 - Fremont and Grant

Unknown L (catch basin)

Map sheet: J6

Date: 2/2/2010

Weather: Dry

Location code: Main highway - Urban thoroughfare, 4 lane street, heavy traffic

Surface type: Concrete collar

Rim-invert: 2.6 ft.

Diameter/size: 23x35 in.

Cover/grate size: 24x41 in.

Sediment: 12 in. (leaves/dirt)

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Outlet	12 in.	Corrugated metal, coal tar coated	

VANDA rating (structure): 1

VANDA rating (pipes):

Notes:

Adjacent and connected to J6D-408 in median; upstream side of basin has about 12 inches of debris; may clog.

Recommendations:

Plan view, minor debris

Minor debris in catch basin

Unknown L (catch basin)

Outlet with deflection at crown, possible third-party damage

J6F-407

Location: Grant Rd. & Fremont Ave.

Map sheet: J6

Date: 2/2/2010

Weather: Dry

Location code: Main highway - Urban thoroughfare, 4 lane street, heavy traffic

Surface type: Asphalt

Rim-invert: 3.6 ft.

Diameter/size: 24x29 in.

Cover/grate size: 23x25 in.

Sediment:

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Inlet A (S)	12 in.	Concrete	
Inlet B (W)	10 in.	Concrete	
Inlet C (W)	10 in.	Concrete	
Outlet (E)	12 in.	Concrete	

VANDA rating (structure): 1

VANDA rating (pipes): 1

Notes:

Debris in all inlets.

Recommendations:

Item 3 - Fremont and Grant

J6F-407

Plan view

East outlet

South inlet, plugged, with debris

West inlet, south of pair, with debris

West inlet, north of pair, with debris

Item 4 - Windimer and Sierra Ventura

General Observations

Area view at 2101 Stonehaven

M5D-205

Location: Stonehaven Dr. & Kent Dr.

Map sheet: M5

Date: 1/20/2010

Weather: Light rain

Location code: Light highway (rural streets, residential neighborhood and parking areas)

Surface type: Asphalt

Rim-invert: 8.8 ft.?

Diameter/size:

Cover/grate size:

Sediment:

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Inlet A	18 in.	Concrete	
Inlet B	12 in.	Corrugated metal, coal tar coated	6.8 ft.?
Outlet	18 in.	Concrete	

VANDA rating (structure): 1

VANDA rating (pipes): 1

Notes:

Rim-invert may be incorrect; Inlet B has coal tar coating intact at invert, otherwise slight corrosion.

Recommendations:

Item 4 - Windimer and Sierra Ventura

M5D-205

Area view

Plan view

Outlet

Inlet A

Inlet B

Inlet B

Unknown N

Location: Ditch between Windimer and Sierra Ventura

Map sheet: M5

Item 4 - Windimer and Sierra Ventura

Unknown N

Date: 2/10/2010

Weather: Dry

Location code: Easement/Right of way

Surface type: Grass/dirt

Rim-invert:

Diameter/size:

Cover/grate size:

Sediment:

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Outlet	12 in.	Corrugated metal, coal tar coated	

VANDA rating (structure):

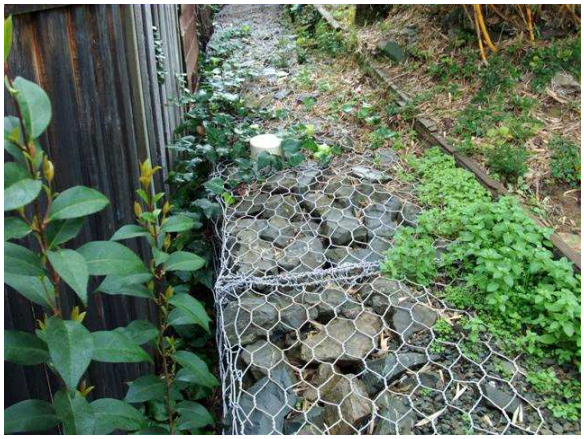
VANDA rating (pipes):

Notes:

Open concrete channel with damaged retaining walls. Channel fills with debris from hillside and yard trimmings.

Recommendations:

Stormtech chambers or rock wall as done upstream.



Cage-wrapped rock retaining wall

Typical view along ditch

Item 4 - Windimer and Sierra Ventura

Unknown N

Sanitary sewer manhole in concrete ditch; shared easement

Ditch passing below homeowner fence

Inlet to ditch from adjacent property

Retaining wall along ditch

Typical view along ditch

Collapsing retaining walls

Item 4 - Windimer and Sierra Ventura

Unknown N

Typical view along ditch

Temporary piping to restore drainage under debris

Temporary piping to restore drainage under debris

Sanitary sewer manhole in concrete ditch; shared easement

Typical view along ditch

Outlet to corrugated metal pipe with sediment/debris

Item 4 - Windimer and Sierra Ventura

Unknown N

Transition from ditch to corrugated metal pipe

Typical view along ditch

Item 5 - Madelaine Ct.

L4C-607

Location: Madelaine Ct.

Map sheet: L4

Date: 1/20/2010

Weather: Light rain

Location code: Light highway (rural streets, residential neighborhood and parking areas)

Surface type: Concrete pavement

Rim-invert: 3.5 ft.

Diameter/size: 36x36 in.

Cover/grate size: 28x37 in.

Sediment: None

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Outlet	12 in.	Concrete	

VANDA rating (structure): 1

VANDA rating (pipes): 1

Notes:

Recommendations:

Area view

As-found surface conditions

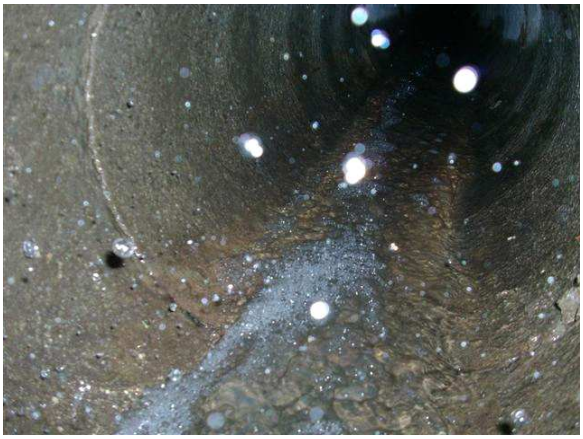
Item 5 - Madelaine Ct.

L4C-607

Grating with storm flow entering catch basin

Storm flow entering catch basin

Outlet



Outlet

Item 6 - Robinhood Ct.

General Observations

View from Robinhood Dr. up Nottingham Way

L5D-107

Location: Robinhood Ln. & Crooked Creek Dr.

Map sheet: L5

Date: 1/20/2010

Weather: Light rain

Location code: Light highway (rural streets, residential neighborhood and parking areas)

Surface type: Asphalt

Rim-invert: 6.5 ft.

Diameter/size:

Cover/grate size:

Sediment: 4-5 in. (silt/grit/sand)

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Inlet	21 in.	Concrete	
Outlet	21 in.	Concrete	

VANDA rating (structure): 1

VANDA rating (pipes): 1

Notes:

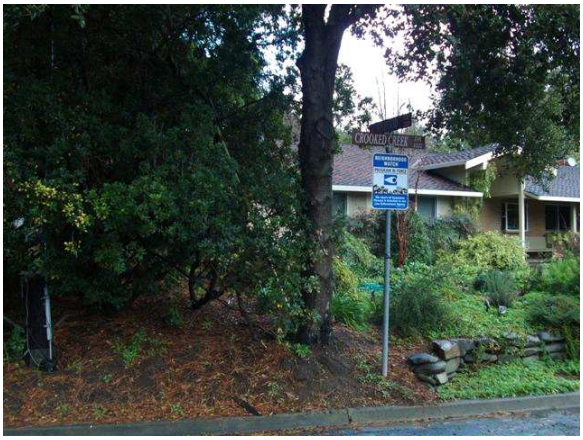
Sediment extends upstream and downstream; low velocity.

Recommendations:

Item 6 - Robinhood Ct.

L5D-107

Area view

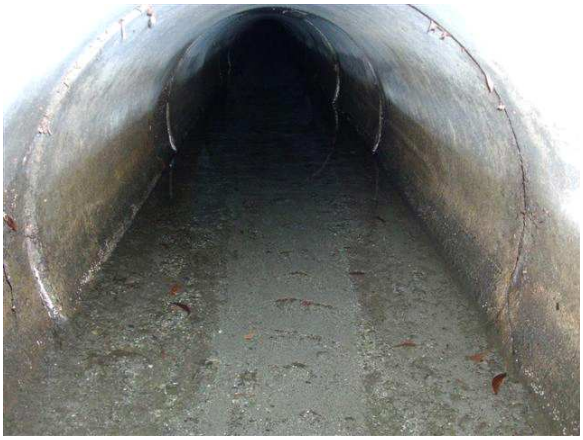


Area view at Robinhood Ln. & Crooked Creek Dr.

Plan view

Outlet with grit/gravel

Outlet



Inlet with grit/gravel

Item 6 - Robinhood Ct.

L5D-107

Inlet

L5D-112

Location: Robinhood Ln.

Map sheet: L5

Date: 1/20/2010

Weather: Light rain

Location code: Light highway (rural streets, residential neighborhood and parking areas)

Surface type: Asphalt

Rim-invert: 13.8 ft.

Diameter/size:

Cover/grate size:

Sediment: None

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Inlet	~33 in.	Concrete	
Outlet	~33 in.	Concrete	

VANDA rating (structure): 1

VANDA rating (pipes):

Notes:

Very high velocity.

Recommendations:

Item 6 - Robinhood Ct.

L5D-112

Area view

Area view looking northwest

Area view looking west, showing proximity to L5C-110

Plan view

L5C-110

Location:	Robinhood Ln. & Robinhood Ct.
Map sheet:	L5
Date:	1/20/2010
Weather:	Light rain
Location code:	Light highway (rural streets, residential neighborhood and parking areas)
Surface type:	Concrete pavement
Rim-invert:	
Diameter/size:	
Cover/grate size:	
Sediment:	
Pipe connections:	
VANDA rating (structure):	
VANDA rating (pipes):	

Item 6 - Robinhood Ct.

L5C-110

Notes:

Did not open; flowing appropriately under light rain; flow destination unknown.

Recommendations:

Area view

Curb inlet

L5C-111

Location:	Robinhood Ln. & Nottingham Ct.
Map sheet:	L5
Date:	1/20/2010
Weather:	Light rain
Location code:	Light highway (rural streets, residential neighborhood and parking areas)
Surface type:	Concrete pavement
Rim-invert:	
Diameter/size:	
Cover/grate size:	
Sediment:	
Pipe connections:	
VANDA rating (structure):	
VANDA rating (pipes):	

Notes:

Did not open; flowing appropriately under light rain; flow destination unknown.

Recommendations:

Item 6 - Robinhood Ct.

L5C-111

Area view

Curb inlet

L5C-108

Location:	Robinhood Ln. & Robinhood Ct.
Map sheet:	L5
Date:	1/20/2010
Weather:	Light rain
Location code:	Light highway (rural streets, residential neighborhood and parking areas)
Surface type:	Concrete pavement
Rim-invert:	
Diameter/size:	
Cover/grate size:	
Sediment:	
Pipe connections:	
VANDA rating (structure):	2
VANDA rating (pipes):	1

Notes:

Sediment in channel and pipes (on 21-inch line).

Recommendations:

Item 6 - Robinhood Ct.

L5C-108

Area view looking northwest

Curb inlet

Outlet

Inlet from L5C-111

Inlet transition with damage to concrete

Inlet

Item 6 - Robinhood Ct.

L5C-108

Grit and gravel in channel

Sediment buildup at outlet

Item 7 - Covington at Hale Creek

General Observations

Hale Creek at Cuesta Dr., looking north

Hale Creek at Cuesta Dr., looking south

Tree trimmings dumped by resident at Cuesta Dr. crossing of Hale Creek

Catch basin west of creek crossing on Cuesta Dr., looking west

Ponding on south side of Cuesta west of Hale Creek crossing, looking west

Ponding on south side of Cuesta Dr. west of Hale Creek crossing, looking east

Item 7 - Covington at Hale Creek

General Observations

Ponding on south side of Cuesta Dr. west of Hale Creek crossing, looking east

Storm inlet on north side of Cuesta Dr. west of Hale Creek, looking east

Ponding on north side of Cuesta Dr. east of Hale Creek crossing, looking east

Unknown K (creek)

Location:	Covington Rd. at Hale Creek
Map sheet:	H3
Date:	1/20/2010
Weather:	Light rain
Location code:	
Surface type:	
Rim-invert:	
Diameter/size:	
Cover/grate size:	
Sediment:	
Pipe connections:	
VANDA rating (structure):	
VANDA rating (pipes):	

Item 7 - Covington at Hale Creek

Unknown K (creek)

Notes:

Creek culvert may be undersized; debris gives evidence of overflow roughly at pavement height.

Recommendations:

Upstream view along creek

Downstream side of creek crossing

View downstream along creek

View downstream along creek

Inlet to culvert

Inlet to culvert

Item 7 - Covington at Hale Creek

Unknown K (creek)

Inlet to culvert

Culvert outlet

Downstream view through culvert

Inlet from gutter on Covington Rd.

Inlet from gutter on Covington Rd.

Storm inlet

Item 7 - Covington at Hale Creek

Unknown K (creek)

Inlets from gutters on Covington Rd.

Vegetation with debris showing overflow level

Vegetation in creekbed on upstream side of culvert

Item 8 - Viola Pl.

G2C-609

Location: Viola Pl.

Map sheet: G2

Date: 1/20/2010

Weather: Heavy rain

Location code: Light highway (rural streets, residential neighborhood and parking areas)

Surface type: Concrete pavement

Rim-invert: 3.1 ft.

Diameter/size: 36x36 in.

Cover/grate size: 24x36 in.

Sediment: 1-2 in. (debris)

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Outlet	15 in.	Concrete	

VANDA rating (structure): 1

VANDA rating (pipes): 1

Notes:

Inlet accumulates pine needles; pipe flows sluggishly (half full) under light rain, but a short downpour did not cause problems.

Recommendations:

Area view

As-found condition with pine needles obstructing inlet

Item 8 - Viola Pl.

G2C-609

Storm inlet after removing pine needles

Outlet partially obstructed by debris

Item 9 - Catalina Ct.

General Observations

Slight surface ponding at 110 Catalina Ct.

C2C-315

Location: Catalina Ct.

Map sheet: C2

Date: 1/26/2010

Weather: Light rain

Location code: Light highway (rural streets, residential neighborhood and parking areas)

Surface type: Concrete pavement

Rim-invert: 2.5 ft.

Diameter/size: 35x35 in.

Cover/grate size: 29x37 in.

Sediment: 6 in. (leaves)

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Outlet	12 in.	Concrete	

VANDA rating (structure): 1

VANDA rating (pipes): 1

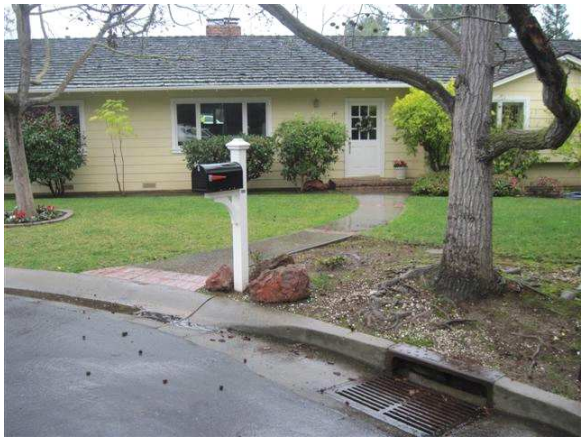
Notes:

Outlet pipe protrudes into catch basin and catches debris; about 6 inches of leaves and other debris at outlet.

Recommendations:

Item 9 - Catalina Ct.

C2C-315



Area view

Area view

Area view

Storm inlet

Poor outlet transition

Outlet

Item 9 - Catalina Ct.

C2C-315

Outlet with debris

C2D-314

Location: Catalina Way & Catalina Ct.

Map sheet: C2

Date: 1/26/2010

Weather: Light rain

Location code: Light highway (rural streets, residential neighborhood and parking areas)

Surface type: Asphalt

Rim-invert: 7.3 ft.

Diameter/size:

Cover/grate size:

Sediment:

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Inlet A (E)	12 in.	Concrete	
Inlet B (S)	12 in.	Concrete	
Outlet (N)	12 in.	Concrete	

VANDA rating (structure): 1

VANDA rating (pipes): 1

Notes:

About 0.5 in. sediment in line from Catalina Ct.; small debris downstream; inlet from south appears to be abandoned (dry dirt in line); runoff flows across street from south to manhole (could add catch basin in gutter).

Recommendations:

Item 9 - Catalina Ct.

C2D-314

Area view

Area view with runoff flowing towards manhole

Plan view

North outlet

East inlet

South inlet with debris

Item 9 - Catalina Ct.

C2D-314

Debris in south inlet

Item 10 - Vineyard at Deodara

General Observations

View north along Deodara with ponding

View north along Deodara with ponding

Fence and creekbed along Foothill Expwy., looking south

M6F-607

Location: Vineyard Dr. near Foothill Expwy.

Map sheet: M6

Date: 1/19/2010

Weather: Heavy rain

Location code: Easement/Right of way

Surface type: Grass/dirt

Rim-invert:

Diameter/size:

Cover/grate size:

Sediment:

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Outlet		Concrete	

VANDA rating (structure):

Item 10 - Vineyard at Deodara

M6F-607

VANDA rating (pipes): 1

Notes:

Creek inlet to culvert below road; also has grated inlet/catch basin from road.

Recommendations:

Area view looking northeast

Area view looking south along Foothill Expwy. drainage ditch

Leaves and debris covering inlet grating

Inlet grating with debris cleared

Item 10 - Vineyard at Deodara

M6F-607

Inlet to culvert

Downstream view inside culvert

Inlet from culvert

Structure walls

Structure walls

M6O-606

Location:	Vineyard Dr. near Foothill Expwy.
Map sheet:	M6

Item 10 - Vineyard at Deodara

M6O-606

Date: 1/19/2010

Weather: Heavy rain

Location code: Easement/Right of way

Surface type: Grass/dirt

Rim-invert:

Diameter/size:

Cover/grate size:

Sediment:

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Inlet		Concrete	

VANDA rating (structure):

VANDA rating (pipes): 1

Notes:

Creek outfall from culvert below road; creek backs up just downstream.

Recommendations:

Outfall to creek

Upstream view inside culvert

M6D-614

Location: Vineyard Dr. & Deodara Dr.

Map sheet: M6

Date: 1/19/2010

Weather: Heavy rain

Location code: Light highway (rural streets, residential neighborhood and parking areas)

Surface type: Asphalt

Rim-invert: 6.9 ft.

Diameter/size:

Item 10 - Vineyard at Deodara

M6D-614

Cover/grate size:

Sediment:

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Inlet A			5.5 ft.
Inlet B			6.4 ft.
Inlet C			7.0 ft.
Inlet D			6.0 ft.
Outlet			6.9 ft.

VANDA rating (structure):

VANDA rating (pipes):

Notes:

Invert of one inlet appears to be lower than invert of outlet.

Recommendations:

Area view looking northwest

Area view looking southeast

Plan view with turbulence from multiple inlets

Multiple inlets, causing turbulence

Item 10 - Vineyard at Deodara

M6D-614

Multiple inlets, causing turbulence

M6C-612

Location:	Vineyard Dr. & Deodara Dr.
Map sheet:	M6
Date:	1/19/2010
Weather:	Heavy rain
Location code:	Light highway (rural streets, residential neighborhood and parking areas)
Surface type:	Concrete pavement
Rim-invert:	
Diameter/size:	
Cover/grate size:	
Sediment:	
Pipe connections:	
VANDA rating (structure):	
VANDA rating (pipes):	

Notes:

Flowing appropriately under heavy rain; did not attempt to open.

Recommendations:

Item 10 - Vineyard at Deodara

M6C-612

Area view looking west

Curb inlet

M6C-611

Location:	Vineyard Dr. & Deodara Dr.
Map sheet:	M6
Date:	1/19/2010
Weather:	Heavy rain
Location code:	Light highway (rural streets, residential neighborhood and parking areas)
Surface type:	Concrete pavement
Rim-invert:	
Diameter/size:	
Cover/grate size:	
Sediment:	
Pipe connections:	
VANDA rating (structure):	
VANDA rating (pipes):	

Notes:

Flowing appropriately under heavy rain; did not attempt to open.

Recommendations:

Item 10 - Vineyard at Deodara

M6C-611

Area view looking west

Curb inlet

M6C-613

Location:	Vineyard Dr. & Deodara Dr.
Map sheet:	M6
Date:	1/19/2010
Weather:	Heavy rain
Location code:	Light highway (rural streets, residential neighborhood and parking areas)
Surface type:	Concrete pavement
Rim-invert:	
Diameter/size:	
Cover/grate size:	
Sediment:	
Pipe connections:	
VANDA rating (structure):	
VANDA rating (pipes):	

Notes:

Flowing appropriately under heavy rain; did not attempt to open.

Recommendations:

Item 10 - Vineyard at Deodara

M6C-613

Area view looking south

Curb inlet

M6C-616

Location:	Vineyard Dr. & Deodara Dr.
Map sheet:	M6
Date:	1/19/2010
Weather:	Heavy rain
Location code:	Light highway (rural streets, residential neighborhood and parking areas)
Surface type:	Concrete pavement
Rim-invert:	
Diameter/size:	
Cover/grate size:	
Sediment:	
Pipe connections:	
VANDA rating (structure):	
VANDA rating (pipes):	

Notes:

Flowing appropriately under heavy rain; did not attempt to open; connects to M6D-614.

Recommendations:

M6C-616

Area view looking northeast

Curb inlet

M6D-615

Location: Vineyard Dr. & Deodara Dr.
Map sheet: M6
Date: 1/19/2010
Weather: Heavy rain
Location code: Light highway (rural streets, residential neighborhood and parking areas)
Surface type:
Rim-invert:
Diameter/size:
Cover/grate size:
Sediment:
Pipe connections:
VANDA rating (structure):
VANDA rating (pipes):
Notes:
Could not locate.
Recommendations:

M6D-617

Location: Vineyard Dr. east of Deodara
Map sheet: M6
Date: 1/19/2010
Weather: Heavy rain
Location code: Light highway (rural streets, residential neighborhood and parking areas)

M6D-617

Surface type: Asphalt

Rim-invert: 11.7 ft.

Diameter/size:

Cover/grate size:

Sediment:

Pipe connections:

VANDA rating (structure):

VANDA rating (pipes):

Notes:

Inlet from south may be abandoned (very little flow during heavy rain).

Recommendations:

Area view looking west

Plan view during wet weather

Plan view during dry weather

Unknown G (manhole)

Location: Vineyard Dr. east of Deodara

Item 10 - Vineyard at Deodara

Unknown G (manhole)

Map sheet: M6

Date: 1/19/2010

Weather: Heavy rain

Location code: Light highway (rural streets, residential neighborhood and parking areas)

Surface type: Asphalt

Rim-invert:

Diameter/size:

Cover/grate size:

Sediment:

Pipe connections:

VANDA rating (structure):

VANDA rating (pipes):

Notes:

Combines flow from Vineyard into creek undercrossing; surcharged even in dry weather (creek elevation downstream of outfall may be higher).

Recommendations:

Area view looking northwest

Area view looking south

Unknown G (manhole)

Area view looking southwest

Plan view during wet weather, showing surcharged conditions due to creek outfall

Plan view during dry weather

Debris in and surcharged condition during dry weather due to creek outfall elevation

Debris in and surcharged condition during dry weather due to creek outfall elevation

Unknown H (outfall)

Location: Vineyard Dr. east of Deodara

Item 10 - Vineyard at Deodara

Unknown H (outfall)

Map sheet: M6

Date: 1/19/2010

Weather: Heavy rain

Location code: Easement/Right of way

Surface type: Grass/dirt

Rim-invert:

Diameter/size:

Cover/grate size:

Sediment:

Pipe connections:

VANDA rating (structure):

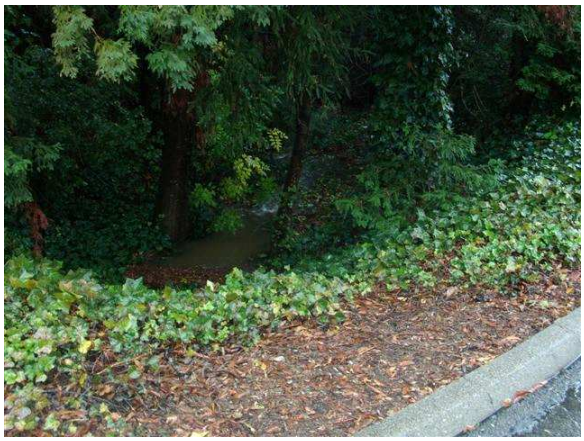
VANDA rating (pipes):

Notes:

Surcharges under heavy rain (creek elevation downstream may be higher); not visible.

Recommendations:

Clear/channelize creek to prevent surcharging.



Downstream view along creekbed

Outfall to creekbed, surcharged due to creekbed invert elevation downstream

Unknown H (outfall)

Surcharged, stagnant condition at outfall during dry weather

Item 11 - Distel Dr.

C3C-502

Location: Distel Dr.

Map sheet: C3

Date: 1/26/2010

Weather: Light rain

Location code: Light highway (rural streets, residential neighborhood and parking areas)

Surface type: Concrete pavement

Rim-invert: 3.3 ft.

Diameter/size: 36x36 in.

Cover/grate size: 29x38 in.

Sediment:

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Inlet	12 in.	Concrete	
Outlet	12 in.	Concrete	

VANDA rating (structure): 1

VANDA rating (pipes): 1

Notes:

Sediment downstream; "dam" of cement mortar at inlet backs up flow a few feet.

Recommendations:

Area view

Curb inlet

Item 11 - Distel Dr.

C3C-502

Curb inlet

Inlet grating

Outlet transition

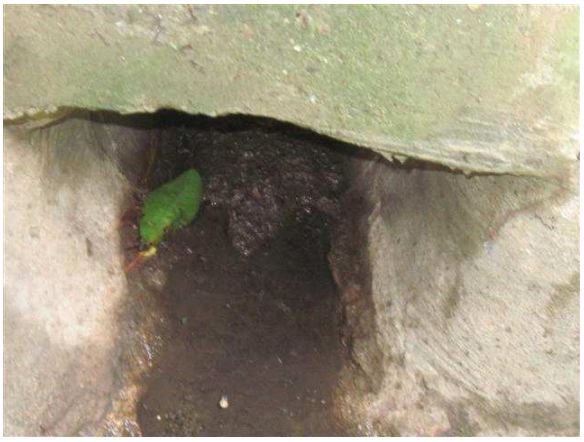
Sediment in downstream pipe

Upstream pipe

Upstream pipe with backup caused by mortar dam at inlet

Item 11 - Distel Dr.

C3C-502



Outlet

Mortar dam at inlet

Mortar dam at inlet

Mortar dam at inlet

C3C-501

Location:	Distel Dr.
Map sheet:	C3
Date:	1/26/2010
Weather:	Light rain
Location code:	Light highway (rural streets, residential neighborhood and parking areas)
Surface type:	Concrete pavement
Rim-invert:	2.4 ft.
Diameter/size:	36x36 in.
Cover/grate size:	29x37 in.
Sediment:	

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Outlet	12 in.	Concrete	

VANDA rating (structure): 1

Item 11 - Distel Dr.

C3C-501

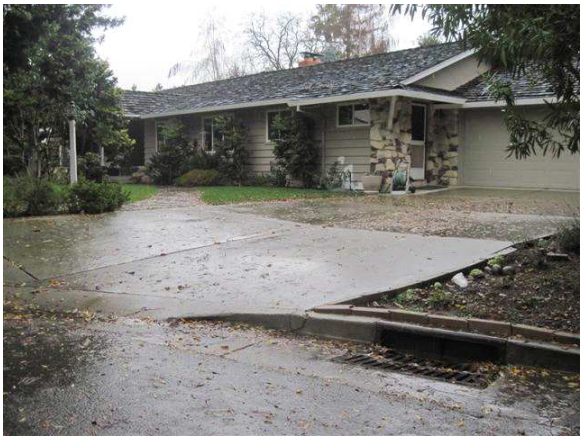
VANDA rating (pipes):

Notes:

Cracks in downstream pipe?

Recommendations:

Area view



Area view

Inlet grating

Catch basin

Item 11 - Distel Dr.

C3C-501

Downstream pipe with cracks

Item 12 - Loma Prieta Ct.

H5F-404

Location: Loma Prieta Ct.

Map sheet: H5

Date: 1/20/2010

Weather: Light rain

Location code: Light highway (rural streets, residential neighborhood and parking areas)

Surface type: Concrete pavement

Rim-invert: 1.1 ft.

Diameter/size: 24x24 in.

Cover/grate size: 17x25 in.

Sediment:

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Outlet	10 in.	Concrete	

VANDA rating (structure): 1

VANDA rating (pipes): 1

Notes:

Inlet higher than surrounding area, resulting in puddling.

Recommendations:

Ponding near curb inlet due to inlet elevation

Ponding around curb inlet due to inlet elevation

Item 12 - Loma Prieta Ct.

H5F-404

Ponding near curb inlet due to inlet elevation

Ponding near curb inlet due to inlet elevation

Ponding due to inlet elevation

Ponding around inlet due to inlet elevation

Curb inlet

Inlet grating

Item 12 - Loma Prieta Ct.

H5F-404

Downstream pipe

Outlet

Flooded cleanout adjacent to curb inlet

Ponding around curb inlet due to inlet elevation

Item 13 - Sunshine Dr.

General Observations

Hale Creek, looking upstream

Hale Creek undercrossing

F4F-212

Location: 795 Sunshine Dr.

Map sheet: F4

Date: 2/10/2010

Weather: Dry

Location code: Light highway (rural streets, residential neighborhood and parking areas)

Surface type: Asphalt

Rim-invert: 2.6 ft.

Diameter/size:

Cover/grate size: 38 in. square

Sediment: Half full of sediment

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Outlet	12 in.	Corrugated metal	

VANDA rating (structure): 1

VANDA rating (pipes):

Notes:

Corrugated metal pipe protrudes into catch basin; pipe is half full of sandy sediment.

Recommendations:

Cut pipe to make it flush with outlet wall and remove sediment.

Item 13 - Sunshine Dr.

F4F-212

Area view

Inlet grating

Catch basin with protruding outlet pipe providing obstruction for debris

Protruding outlet pipe

Downstream pipe, half-full with debris

F4F-210

Location:	794 Sunshine Dr.
Map sheet:	F4

Item 13 - Sunshine Dr.

F4F-210

Date: 2/10/2010

Weather: Dry

Location code: Light highway (rural streets, residential neighborhood and parking areas)

Surface type: Asphalt

Rim-invert: 6 ft.

Diameter/size:

Cover/grate size: 35x41 in.

Sediment:

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Inlet	24 in.	Concrete	
Outlet	27 in.	Concrete	

VANDA rating (structure): 1

VANDA rating (pipes):

Notes:

Recommendations:

Inlet grating

F4F-207

Location: 741 Sunshine Dr.

Map sheet: F4

Date: 2/10/2010

Weather: Dry

Location code: Light highway (rural streets, residential neighborhood and parking areas)

Surface type: Asphalt

Rim-invert: 1.2 ft.

Item 13 - Sunshine Dr.

F4F-207

Diameter/size:

Cover/grate size: 38 in. square

Sediment:

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Outlet	12 in.		

VANDA rating (structure): 1

VANDA rating (pipes):

Notes:

Very shallow; appears to be more recent construction.

Recommendations:

Area view

F4F-208

Location: 740 Sunshine Dr.

Map sheet: F4

Date: 2/10/2010

Weather: Dry

Location code: Light highway (rural streets, residential neighborhood and parking areas)

Surface type: Asphalt

Rim-invert:

Diameter/size:

Cover/grate size:

Sediment:

Pipe connections:

VANDA rating (structure): 1

VANDA rating (pipes):

Item 13 - Sunshine Dr.

F4F-208

Notes:

Recommendations:

Area view

F4F-201

Location: 735 Sunshine Dr.

Map sheet: F4

Date: 2/10/2010

Weather: Dry

Location code: Light highway (rural streets, residential neighborhood and parking areas)

Surface type: Asphalt

Rim-invert: 1 ft.

Diameter/size:

Cover/grate size: 12x 20 in.

Sediment: Half full of sediment

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Outlet	8 in.	Corrugated metal	

VANDA rating (structure): 1

VANDA rating (pipes):

Notes:

Very shallow; small grating pipe is half full with sediment.

Recommendations:

Replace line and catch basin.

Item 13 - Sunshine Dr.

F4F-201

Area view in driveway of 735 Sunshine Dr.

Inlet grating

Poorly constructed outlet

Outlet pipe, half-full with sediment

Adjacent property (735 Sunshine Dr.) with sandbags lining garage

F4F-204

Location:	732 Sunshine Dr.
Map sheet:	F4

Item 13 - Sunshine Dr.

F4F-204

Date: 2/10/2010

Weather: Dry

Location code: Light highway (rural streets, residential neighborhood and parking areas)

Surface type: Asphalt

Rim-invert: 1.2 ft.

Diameter/size:

Cover/grate size: 35x 41 in.

Sediment: Half full of sediment

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Outlet	12 in.	Concrete	

VANDA rating (structure): 1

VANDA rating (pipes):

Notes:

Very shallow; pipe is half full with sediment; pipe makes a bend towards the upstream direction of the channel.

Recommendations:

Area view showing proximity to Hale Creek undercrossing

Catch basin half-full with sediment

Item 13 - Sunshine Dr.

F4F-204

Outlet facing upstream into Hale Creek

Item 14 - Ranchita at Julie

J6C-225

Location: Ranchita Dr. & Julie Ln.

Map sheet: J6

Date: 1/19/2010

Weather: Light rain

Location code: Light highway (rural streets, residential neighborhood and parking areas)

Surface type: Concrete pavement

Rim-invert: 2.0 ft.

Diameter/size: 17x24 in.

Cover/grate size: 17x25 in.

Sediment:

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Outlet	12 in.	Concrete	

VANDA rating (structure): 1

VANDA rating (pipes):

Notes:

No sump, but rear of chamber catches leaves and debris; cover sits proud of frame; resident says he cleans catch basins in area and that Ranchita Dr. floods to the east.

Recommendations:

Area view

Curb inlet

Item 14 - Ranchita at Julie

J6C-225

Catch basin with debris

Outlet

J6C-226

Location: Ranchita Dr. & Ranchita Ct.

Map sheet: J6

Date: 1/19/2010

Weather: Light rain

Location code: Light highway (rural streets, residential neighborhood and parking areas)

Surface type: Concrete pavement

Rim-invert: 4.2 ft.

Diameter/size: 26x29 in.

Cover/grate size: 23x25 in.

Sediment: None

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Inlet A	24 in.	Concrete	
Inlet B	12 in.	Concrete	
Outlet	24 in.	Concrete	4.2 ft.

VANDA rating (structure): 1

VANDA rating (pipes): 1

Notes:

Recommendations:

Item 14 - Ranchita at Julie

J6C-226

Area view looking west

Plan view

Curb inlet and grating

Outlet

Inlet

J6C-227

Location:	Ranchita Dr. & Ranchita Ct.
Map sheet:	J6

Item 14 - Ranchita at Julie

J6C-227

Date: 1/19/2010

Weather: Light rain

Location code: Light highway (rural streets, residential neighborhood and parking areas)

Surface type: Concrete pavement

Rim-invert: 4.2 ft.

Diameter/size: 24x29 in.

Cover/grate size: 23x25 in.

Sediment: None

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Inlet	24 in.	Concrete	
Outlet	24 in.	Concrete	

VANDA rating (structure): 1

VANDA rating (pipes): 1

Notes:

Recommendations:

Plan view

Curb inlet

Item 14 - Ranchita at Julie

J6C-227

Inlet

J6F-228

Location:	Ranchita Ct. near Ranchita Dr.
Map sheet:	J6
Date:	1/19/2010
Weather:	Light rain
Location code:	Easement/Right of way
Surface type:	
Rim-invert:	
Diameter/size:	
Cover/grate size:	
Sediment:	
Pipe connections:	
VANDA rating (structure):	
VANDA rating (pipes):	

Notes:

Could not locate in bushes on street side of fence.

Recommendations:

CCTV to locate.

Item 15 - Cherry Ave.

General Observations

Area view at Cherry Ave. & Coronado Ave.

D2F-402

Location:	Cherry Ave. & Sylvian Way
Map sheet:	D2
Date:	1/26/2010
Weather:	Light rain
Location code:	Light highway (rural streets, residential neighborhood and parking areas)
Surface type:	Concrete pavement
Rim-invert:	
Diameter/size:	
Cover/grate size:	
Sediment:	
Pipe connections:	
VANDA rating (structure):	
VANDA rating (pipes):	
Notes:	

Recommendations:

Item 15 - Cherry Ave.

D2F-402

Area view

Catch basin with debris

D2F-401

Location:	Cherry Ave. & Sylvian Way
Map sheet:	D2
Date:	1/26/2010
Weather:	Light rain
Location code:	Light highway (rural streets, residential neighborhood and parking areas)
Surface type:	Concrete pavement
Rim-invert:	
Diameter/size:	
Cover/grate size:	
Sediment:	
Pipe connections:	
VANDA rating (structure):	
VANDA rating (pipes):	
Notes:	

Recommendations:

Item 15 - Cherry Ave.

D2F-401

Area view

D2D-403

Location:	Cherry Ave. & Sylvian Way
Map sheet:	D2
Date:	1/26/2010
Weather:	Light rain
Location code:	Light highway (rural streets, residential neighborhood and parking areas)
Surface type:	Asphalt
Rim-invert:	
Diameter/size:	
Cover/grate size:	
Sediment:	
Pipe connections:	
VANDA rating (structure):	
VANDA rating (pipes):	
Notes:	

Recommendations:

D2D-403

Area view showing proximity of D2D-403 and D2D-404

Plan view

South inlet

West outlet

D2D-404

Location:	Cherry Ave. & Sylvian Way
Map sheet:	D2
Date:	1/26/2010
Weather:	Light rain
Location code:	Light highway (rural streets, residential neighborhood and parking areas)
Surface type:	Asphalt
Rim-invert:	
Diameter/size:	
Cover/grate size:	
Sediment:	
Pipe connections:	
VANDA rating (structure):	
VANDA rating (pipes):	

Item 15 - Cherry Ave.

D2D-404

Notes:

Recommendations:

Area view

Area view showing proximity of D2D-404 and D2D-403

Plan view

East inlet

North barrel wall

South barrel wall

Item 15 - Cherry Ave.

D2D-404

D2D-423

Location:	Cherry Ave. & Coronado Ave.
Map sheet:	D2
Date:	1/26/2010
Weather:	Light rain
Location code:	Light highway (rural streets, residential neighborhood and parking areas)
Surface type:	Asphalt
Rim-invert:	
Diameter/size:	
Cover/grate size:	
Sediment:	
Pipe connections:	
VANDA rating (structure):	
VANDA rating (pipes):	
Notes:	

Recommendations:

Plan view

Drop inlet

Item 15 - Cherry Ave.

D2D-423

Barrel walls

D2D-421

Location:	Cherry Ave. & Coronado Ave.
Map sheet:	D2
Date:	1/26/2010
Weather:	Light rain
Location code:	Light highway (rural streets, residential neighborhood and parking areas)
Surface type:	Asphalt
Rim-invert:	
Diameter/size:	
Cover/grate size:	
Sediment:	
Pipe connections:	
VANDA rating (structure):	
VANDA rating (pipes):	
Notes:	

Recommendations:

Item 15 - Cherry Ave.

D2D-421

Plan view

Inlets

Inlets

Item 16 - Portola Ct. and Delphi Cir.

C3D-102

Location: Portola Ct. & Delphi Cir.

Map sheet: C3

Date: 1/26/2010

Weather: Light rain

Location code: Light highway (rural streets, residential neighborhood and parking areas)

Surface type: Asphalt

Rim-invert: 5.7 ft.

Diameter/size:

Cover/grate size:

Sediment:

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Inlet A	12 in.	Concrete	
Inlet B	12 in.	Concrete	
Outlet	12 in.	Concrete	

VANDA rating (structure): 1

VANDA rating (pipes): 1

Notes:

Inlet from C3C-103 and outlet have about 1 inch of gravel/rocks; inlet from C3C-104 has 1 inch of soft sediment; inlet from C3C-103 enters manhole facing upstream.

Recommendations:

Plan view

Outlet with gravel/rocks

Item 16 - Portola Ct. and Delphi Cir.

C3D-102

Inlet from C3C-103

Inlet from C3C-104

C3C-103

Location: Portola Ct. & Delphi Cir.

Map sheet: C3

Date: 1/26/2010

Weather: Light rain

Location code: Light highway (rural streets, residential neighborhood and parking areas)

Surface type: Concrete pavement

Rim-invert: 4.4 ft.

Diameter/size: 36x36 in.

Cover/grate size: 23x40 in.

Sediment:

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Outlet	12 in.	Concrete	

VANDA rating (structure): 1

VANDA rating (pipes): 1

Notes:

Recommendations:

Item 16 - Portola Ct. and Delphi Cir.

C3C-103

Area view looking southwest

Area view showing proximity to C3D-102

Curb inlet and grating

Catch basin

Outlet transition

Downstream pipe

C3C-104

Location:	Portola Ct. & Delphi Cir.
Map sheet:	C3

Item 16 - Portola Ct. and Delphi Cir.

C3C-104

Date: 1/26/2010

Weather: Light rain

Location code: Light highway (rural streets, residential neighborhood and parking areas)

Surface type: Concrete pavement

Rim-invert: 4.1 ft.

Diameter/size: 36x36 in.

Cover/grate size: 23x40 in.

Sediment: 3 in. (hard/concrete)

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Outlet	12 in.	Concrete	

VANDA rating (structure): 1

VANDA rating (pipes): 1

Notes:

Rim-invert measured to hard sediment/concrete in outlet.

Recommendations:

Area view

Curb inlet and grating

Item 16 - Portola Ct. and Delphi Cir.

C3C-104

Curb inlet and grating

Catch basin with flow backed up

Outlet transition

Downstream pipe

Downstream pipe

Downstream pipe

Item 17 - Summerhill at S. El Monte

H2C-219

Location: Summerhill Ave. & S. El Monte Ave.

Map sheet: H2

Date: 1/20/2010

Weather: Light rain

Location code: Main highway - Urban thoroughfare, 4 lane street, heavy traffic

Surface type: Concrete pavement

Rim-invert: 3.2 ft.

Diameter/size: 24x36 in.

Cover/grate size: 24 in.

Sediment:

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Inlet	15 in.	Corrugated metal	
Outlet	12 in.	Concrete	

VANDA rating (structure): 1

VANDA rating (pipes): 1

Notes:

Gutter inlet separated from catch basin by short length of corrugated pipe; catch basin has standard manhole cover.

Recommendations:

Area view with evidence of ponding at east corner of intersection

Curb inlet

Item 17 - Summerhill at S. El Monte

H2C-219

Interior view of curb inlet

Plan view of catch basin offset from curb inlet

Downstream pipe

H2C-218

Location:	Summerhill Ave. & S. El Monte Ave.
Map sheet:	H2
Date:	1/20/2010
Weather:	Light rain
Location code:	Main highway - Urban thoroughfare, 4 lane street, heavy traffic
Surface type:	Concrete pavement
Rim-invert:	
Diameter/size:	
Cover/grate size:	
Sediment:	
Pipe connections:	
VANDA rating (structure):	
VANDA rating (pipes):	

Item 17 - Summerhill at S. El Monte

H2C-218

Notes:

Did not open; unknown outlet direction.

Recommendations:

Area view

Curb inlet and evidence of overflow/backup

Evidence of ponding at east corner of intersection

H2C-217

Location:	Summerhill Ave. & S. El Monte Ave.
Map sheet:	H2
Date:	1/20/2010
Weather:	Light rain
Location code:	Main highway - Urban thoroughfare, 4 lane street, heavy traffic
Surface type:	Concrete pavement
Rim-invert:	3.8 ft.
Diameter/size:	24x36 in.
Cover/grate size:	24x41 in.

Item 17 - Summerhill at S. El Monte

H2C-217

Sediment: 1 in.

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Outlet	15 in.		

VANDA rating (structure): 1

VANDA rating (pipes): 1

Notes:

Does not receive flow from H2C-218; receives flow from both Summerhill and El Monte, but both gutters have low slopes which form puddles on either side of catch basin.

Recommendations:

Area view with ponding due to shallow slope

Curb inlet during light rain

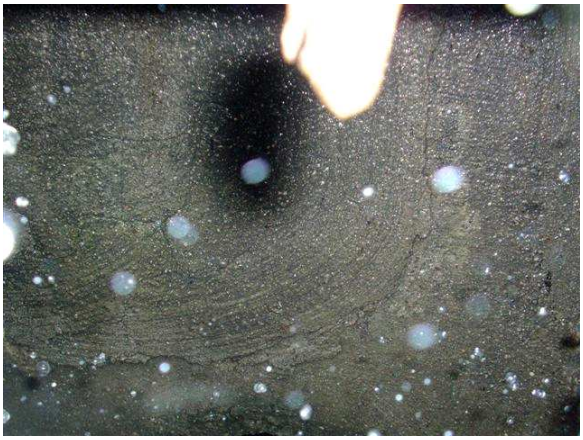
Curb inlet

Outlet

Item 17 - Summerhill at S. El Monte

H2C-217

Inlet from northeast



Catch basin wall surface

Ponding along El Monte to southwest due to shallow slope

Ponding at south corner of intersection

H2C-216

Location:	Summerhill Ave. & S. El Monte Ave.
Map sheet:	H2
Date:	1/20/2010
Weather:	Light rain
Location code:	Main highway - Urban thoroughfare, 4 lane street, heavy traffic
Surface type:	Asphalt
Rim-invert:	
Diameter/size:	
Cover/grate size:	
Sediment:	
Pipe connections:	
VANDA rating (structure):	
VANDA rating (pipes):	

H2C-216

Notes:

Did not open.

Recommendations:

Area view

Curb inlet and grating

H2D-217

Location: Summerhill Ave. & S. El Monte Ave.

Map sheet: H2

Date: 2/2/2010

Weather: Dry

Location code: Main highway - Urban thoroughfare, 4 lane street, heavy traffic

Surface type: Asphalt

Rim-invert: 6.3 ft.

Diameter/size:

Cover/grate size:

Sediment:

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Inlet A (SE)	12 in.	Concrete	
Inlet B (W)	12 in.	Concrete	
Outlet (SW)	15 in.	Concrete	

VANDA rating (structure): 1

VANDA rating (pipes):

Notes:

Line from H2C-216 may be partially collapsed upstream.

Recommendations:

Item 17 - Summerhill at S. El Monte

H2D-217

Plan view

Downstream pipe

Pipe defect between H2C-216 and H2D-217 with obstruction at invert

Inlet from southeast

Pipe defect between H2C-216 and H2D-217

Pipe defect between H2C-216 and H2D-217

Item 18 - 1270 Grant at Paula Ct.

General Observations

Slight ponding on north side of Paula Ct.

I6F-401

Location: Paula Ct. at Grant Rd.

Map sheet: I6

Date: 1/19/2010

Weather: Light rain

Location code: Light highway (rural streets, residential neighborhood and parking areas)

Surface type: Concrete pavement

Rim-invert: 5.7 ft.

Diameter/size: 35x35 in.

Cover/grate size: 23x41 in.

Sediment: 3-4 in.

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Inlet	12 in.	Concrete	5.7 ft.
Outlet	21 in.	Concrete	7.1 ft.

VANDA rating (structure): 1

VANDA rating (pipes):

Notes:

Susceptible to cover by debris (palm leaves)

Recommendations:

Item 18 - 1270 Grant at Paula Ct.

I6F-401

Area view showing debris from palm trees

Debris from palm trees near inlet

Inlet grating

Plan view

Downstream wall

Outlet transition

I6D-402

Location:	Grant Rd. at Paula Ct.
Map sheet:	I6

Item 18 - 1270 Grant at Paula Ct.

I6D-402

Date: 1/19/2010

Weather: Light rain

Location code: Light highway (rural streets, residential neighborhood and parking areas)

Surface type: Asphalt

Rim-invert: 9.9 ft.

Diameter/size: 48 in.

Cover/grate size: 24 in.

Sediment:

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Inlet	24 in.	Concrete	
Outlet	24 in.	Concrete	

VANDA rating (structure): 1

VANDA rating (pipes):

Notes:

Precast barrel (32 in. height), cone (eccentric, 36 in. height), chimney (12 in. height); connection to I6F-401 not apparent

Recommendations:

Area view looking north

Area view looking south

Item 18 - 1270 Grant at Paula Ct.

I6D-402

Plan view

Downstream pipe

Upstream pipe

Unknown F (manhole)

Location:	Grant Rd. at Paula Ct.
Map sheet:	I6
Date:	1/19/2010
Weather:	Light rain
Location code:	Light highway (rural streets, residential neighborhood and parking areas)
Surface type:	Asphalt
Rim-invert:	10.5 ft.
Diameter/size:	
Cover/grate size:	
Sediment:	
Pipe connections:	
VANDA rating (structure):	1
VANDA rating (pipes):	

Item 18 - 1270 Grant at Paula Ct.

Unknown F (manhole)

Notes:

Not shown on plans (just south of I6D-402); cover labeled for City of Mountain View; definitely connected to I6D-402

Recommendations:

Area view looking north

Area view looking south

Plan view

Item 19 - Heritage Ct.

J5F-301

Location: Heritage Ct.

Map sheet: J5

Date: 1/19/2010

Weather: Light rain

Location code: Light highway (rural streets, residential neighborhood and parking areas)

Surface type: Concrete pavement

Rim-invert: 2.2 ft.

Diameter/size: 22x23 in.

Cover/grate size: 17x25 in.

Sediment: 3 in. (grit)

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Outlet	12 in.	Concrete	2.0 ft.

VANDA rating (structure): 1

VANDA rating (pipes):

Notes:

Marked "EL 201.3"; sediment in downstream pipe.

Recommendations:

Area view

Curb inlet with grating removed

Item 19 - Heritage Ct.

J5F-301

Debris in catch basin

Downstream pipe

J5F-302

Location: Heritage Ct.

Map sheet: J5

Date: 1/19/2010

Weather: Light rain

Location code: Light highway (rural streets, residential neighborhood and parking areas)

Surface type: Concrete pavement

Rim-invert: 2.0 ft.

Diameter/size: 23x23 in.

Cover/grate size: 16x25 in.

Sediment:

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Inlet	12 in.	Concrete	~2.0 ft.
Outlet	12 in.	Concrete	2.0 ft.

VANDA rating (structure): 1

VANDA rating (pipes): 1

Notes:

About 2.5 in. of sediment (grit, sand) in upstream and downstream pipes.

Recommendations:

Item 19 - Heritage Ct.

J5F-302

Area view

Curb inlet with grating removed

Curb inlet with grating replaced

Plan view

Downstream pipe with debris backing up flow

Upstream pipe

Item 19 - Heritage Ct.

J5F-302

Upstream pipe transition

J5F-303

Location:	Heritage Ct.
Map sheet:	J5
Date:	1/19/2010
Weather:	Light rain
Location code:	Easement/Right of way
Surface type:	
Rim-invert:	
Diameter/size:	
Cover/grate size:	
Sediment:	
Pipe connections:	
VANDA rating (structure):	
VANDA rating (pipes):	

Notes:

Could not locate; homeowner at 1250 Heritage Ct. indicated its location but no evidence was found.

Recommendations:

CCTV to locate.

Item 20 - Edge Ln.

I4D-203

Location: 770 Edge Ln.

Map sheet: I4

Date: 2/10/2010

Weather: Dry

Location code: Light highway (rural streets, residential neighborhood and parking areas)

Surface type: Grass/dirt

Rim-invert: 4.5 ft.

Diameter/size: N/A opening

Cover/grate size: Concrete lid

Sediment:

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Inlet	12 in.	Concrete	
Outlet	12 in.	Concrete	

VANDA rating (structure): 1

VANDA rating (pipes):

Notes:

This manhole has a heavy concrete lid.

Recommendations:

Replace the concrete lid with a cast iron lid.

Area view

Area view

Item 20 - Edge Ln.

I4D-203

Plan view

Plan view

Pipe transition

Concrete cone and cover

I4F-202

Location: Edge Ln. & Seena Ave.

Map sheet: I4

Date: 2/10/2010

Weather: Dry

Location code: Light highway (rural streets, residential neighborhood and parking areas)

Surface type: Asphalt

Rim-invert: 3.76 ft.

Diameter/size:

Cover/grate size: 38 in. square

Sediment:

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Inlet	12 in.	Concrete	
Outlet	12 in.	Concrete	

Item 20 - Edge Ln.

I4F-202

VANDA rating (structure):

VANDA rating (pipes):

Notes:

Recommendations:

Area view

Area view

I4C-207

Location: 747 Alvina Ct.

Map sheet: I4

Date: 2/10/2010

Weather: Dry

Location code: Light highway (rural streets, residential neighborhood and parking areas)

Surface type: Asphalt

Rim-invert:

Diameter/size:

Cover/grate size:

Sediment:

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Inlet	12 in.	Concrete	
Outlet	12 in.	Concrete	

VANDA rating (structure): 1

VANDA rating (pipes):

Notes:

Appears to be fine. Steel screen added to top of catch basin inlet.

Item 20 - Edge Ln.

I4C-207

Recommendations:

Area view

Curb inlet and grating

Plan view

I4C-208

Location: 743 Alvina Ct.

Map sheet: I4

Date: 2/10/2010

Weather: Dry

Location code: Light highway (rural streets, residential neighborhood and parking areas)

Surface type: Asphalt

Rim-invert:

Diameter/size:

Cover/grate size:

Sediment:

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert

Item 20 - Edge Ln.

I4C-208

Pipe (Direction)	Diameter	Material	Rim-invert
Outlet	12 in.	Concrete	

VANDA rating (structure):

VANDA rating (pipes):

Notes:

Slight debris.

Recommendations:

Area view

Curb inlet and grating

Plan view showing minor debris

Item 21 - 1640 Dallas Ct.

K6F-225

Location: Dallas Ct.

Map sheet: K6

Date: 1/19/2010

Weather: Light rain

Location code: Light highway (rural streets, residential neighborhood and parking areas)

Surface type: Asphalt

Rim-invert:

Diameter/size:

Cover/grate size:

Sediment:

Pipe connections:

VANDA rating (structure):

VANDA rating (pipes):

Notes:

At least 18 in. of soft debris; may be abandoned.

Recommendations:

Grating removed; structure full of soft debris to at least 18 inches

Grating removed; structure full of soft debris to at least 18 inches

Item 22 - 1975 Grant at Woodland Library

L6F-117

Location: 1975 Grant Rd.

Map sheet: L6

Date: 1/19/2010

Weather: Light rain

Location code: Sidewalk

Surface type: Concrete pavement

Rim-invert: 4.2 ft.

Diameter/size: 36x36 in.

Cover/grate size: 38x38 in.

Sediment: 1 in.

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Inlet A	18 in.	Concrete	
Inlet B	12 in.	Concrete	
Outlet	18 in.	Concrete	

VANDA rating (structure):

VANDA rating (pipes):

Notes:

Inlet A drains Foothill Expressway; Inlet B from library parking lot; outlet runs SE on Grant Rd.

Recommendations:

Cover removed

Catch basin

Item 22 - 1975 Grant at Woodland Library

L6F-117

Outlet

Inlet

Unknown M

Location:	Foothill Expwy. at 1975 Grant Rd.
Map sheet:	L6
Date:	2/2/2010
Weather:	Dry
Location code:	Interstate highway, limited access artery
Surface type:	Grass/dirt
Rim-invert:	
Diameter/size:	
Cover/grate size:	
Sediment:	
Pipe connections:	
VANDA rating (structure):	
VANDA rating (pipes):	

Notes:

Flows to L6F-117 from expressway median; susceptible to burial; did not open.

Recommendations:

Item 23 - Cristo Rey and Kring Way

General Observations

Drainage ditch along Interstate 280

Culvert inlet along Interstate 280 susceptible to burial

Drainage ditch along Interstate 280, looking west

Ponding around water tanks

Catch basin near Interstate 280, covered with leaves

Catch basin near Interstate 280, covered with leaves

Item 23 - Cristo Rey and Kring Way

General Observations

Catch basin near Interstate 280, covered with leaves

Catch basin near Interstate 280

Catch basin near Interstate 280

Catch basin near Interstate 280, covered with leaves

Cleanout

Cleanout

Item 23 - Cristo Rey and Kring Way

Unknown A (manhole)

Location: Easement east of Kring Way

Map sheet: N6

Date: 1/20/2010

Weather: Heavy rain

Location code: Easement/Right of way

Surface type: Asphalt

Rim-invert: 3.8 ft.

Diameter/size:

Cover/grate size:

Sediment: None

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Inlet A (S)	12 in.	Concrete	
Inlet B (W)	12 in.	Concrete	
Outlet (N)	15 in.	Concrete	

VANDA rating (structure): 1

VANDA rating (pipes): 1

Notes:

Downstream of N6D-602; high-velocity flow from steep slope splashes against wall at 90-degree bend to outlet; very turbulent.

Recommendations:

Area view

Plan view showing turbulence

Item 23 - Cristo Rey and Kring Way

Unknown A (manhole)

Turbulence at outlet due to abrupt change in direction

Upstream pipe from west

Downstream pipe

Upstream pipe from south

Unknown B (inlet)

Location:	Easement east of Kring Way
Map sheet:	N6
Date:	1/20/2010
Weather:	Heavy rain
Location code:	Easement/Right of way
Surface type:	Concrete pavement
Rim-invert:	
Diameter/size:	
Cover/grate size:	
Sediment:	
Pipe connections:	
VANDA rating (structure):	
VANDA rating (pipes):	

Unknown B (inlet)

Notes:

Downstream of Unknown A; sheet flow along easement does not enter catch basin due to cross-slope and berm.

Recommendations:

Grating showing susceptibility to plugging

Unknown C (manhole)

Location: Easement east of Kring Way

Map sheet: N6

Date: 1/20/2010

Weather: Heavy rain

Location code: Easement/Right of way

Surface type: Grass/dirt

Rim-invert: 5.7 ft.

Diameter/size:

Cover/grate size:

Sediment:

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Inlet	15 in.	Concrete	
Outlet	15 in.	Concrete	

VANDA rating (structure): 1

VANDA rating (pipes): 1

Notes:

Downstream of Unknown B; debris in upstream pipe.

Recommendations:

Item 23 - Cristo Rey and Kring Way

Unknown C (manhole)

Area view looking north

Area view looking south

Plan view

Downstream pipe

Debris in upstream pipe

Unknown D (manhole)

Location:	Easement east of Kring Way
Map sheet:	N6

Item 23 - Cristo Rey and Kring Way

Unknown D (manhole)

Date: 1/20/2010

Weather: Heavy rain

Location code: Easement/Right of way

Surface type: Grass/dirt

Rim-invert: 6.3 ft.

Diameter/size:

Cover/grate size:

Sediment: None

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Inlet A (S)	15 in.	Concrete	
Inlet B (SW)	12 in.	Concrete	
Outlet (N)	15 in.	Concrete	

VANDA rating (structure): 1

VANDA rating (pipes): 1

Notes:

Downstream of Unknown C.

Recommendations:

Area view

Plan view

Item 23 - Cristo Rey and Kring Way

Unknown D (manhole)

Downstream pipe

Upstream pipe from south

Upstream pipe from south

Inlet from west

Pipe transition

Unknown E (inlet)

Location:	Easement east of Kring Way
Map sheet:	N6

Item 23 - Cristo Rey and Kring Way

Unknown E (inlet)

Date: 1/20/2010

Weather: Heavy rain

Location code: Easement/Right of way

Surface type: Grass/dirt

Rim-invert:

Diameter/size:

Cover/grate size:

Sediment:

Pipe connections:

VANDA rating (structure):

VANDA rating (pipes):

Notes:

Culvert inlet under mound in ditch next to I-280; susceptible to burial by debris; structure not visible (looks more like a hole in the ground).

Recommendations:

Clear/channelize ditch.

Item 24 - Trashrack and Gate at 2100 Stonehaven

General Observations

Gate in creekbed upstream (south) of 2100 Stonehaven

Gate in creekbed upstream (south) of 2100 Stonehaven

West side of creekbed in backyard of 2100 Stonehaven

Creekbed and storm inlets in backyard of 2100 Stonehaven, looking north

Creekbed and storm inlets in backyard of 2100 Stonehaven, looking north

Item 24 - Trashrack and Gate at 2100 Stonehaven

Unknown O

Location: Trash rack at 2100 Stonehaven

Map sheet: M5

Date: 2/10/2010

Weather: Dry

Location code: Easement/Right of way

Surface type: Grass/dirt

Rim-invert: 5.0 ft.

Diameter/size: N/A opening

Cover/grate size: 35x44x25 in. depth trapezoid

Sediment:

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Inlet	N/A	Creek	
Outlet	24 in.	Concrete	

VANDA rating (structure): 1

VANDA rating (pipes):

Notes:

Resident clears debris from trash rack every storm event.

Recommendations:

Trash rack

Downstream pipe

Item 24 - Trashrack and Gate at 2100 Stonehaven

Unknown O

Downstream pipe

Unknown P

Location: Trash rack at 2100 Stonehaven

Map sheet: M5

Date: 2/10/2010

Weather: Dry

Location code: Easement/Right of way

Surface type: Grass/dirt

Rim-invert: 2.3 ft.

Diameter/size: N/A opening

Cover/grate size: 40x35 in.

Sediment:

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Inlet	N/A	Creek	
Outlet	12 in.	HDPE	

VANDA rating (structure): 1

VANDA rating (pipes):

Notes:

Resident added this pipe to handle overflows of creek. The pipe runs parallel to home on driveway and terminates prior to curb.

Recommendations:

Need to tie in pipe outlet to catch basin M5C-208.

Item 24 - Trashrack and Gate at 2100 Stonehaven

Unknown P

Storm inlets in backyard of 2100 Stonehaven, looking west

Trash rack and inlet (left) built by homeowner near existing trash rack and inlet

Inlet installed by homeowner

Grating over inlet installed by homeowner

M5D-216

Location:	2100 Stonehaven (alongside driveway)
Map sheet:	M5
Date:	2/10/2010
Weather:	Dry
Location code:	Easement/Right of way
Surface type:	Grass/dirt
Rim-invert:	11.4 ft.
Diameter/size:	
Cover/grate size:	
Sediment:	

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Inlet	24 in.	Concrete	
Outlet	24 in.	Concrete	

Item 24 - Trashrack and Gate at 2100 Stonehaven

M5D-216

VANDA rating (structure): 1

VANDA rating (pipes):

Notes:

Manhole just uphill of driveway (not where map shows it to be) takes flow from creek inlet.

Recommendations:

Area view

Area view looking south

Area view

Plan view

Item 24 - Trashrack and Gate at 2100 Stonehaven

M5D-216

Plan view

M5F-206

Location: 2110/2120 Stonehaven

Map sheet: M5

Date: 2/10/2010

Weather: Dry

Location code: Light highway (rural streets, residential neighborhood and parking areas)

Surface type: Asphalt

Rim-invert: 3.6 ft.

Diameter/size:

Cover/grate size:

Sediment:

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Inlet	27 in.	Concrete	
Outlet	27 in.	Concrete	

VANDA rating (structure): 1

VANDA rating (pipes):

Notes:

Dual catch basin connected by 12-inch pipe (each catch basin is similar in construction).

Recommendations:

Item 24 - Trashrack and Gate at 2100 Stonehaven

M5F-206

Area view

Curb inlets

North of pair of inlets

South of pair of inlets

Downstream pipe

Downstream pipe

Item 24 - Trashrack and Gate at 2100 Stonehaven

M5F-206

Opening between pair of catch basins

M5C-208

Location: 2100 Sierra Ventura

Map sheet: M5

Date: 2/10/2010

Weather: Dry

Location code: Light highway (rural streets, residential neighborhood and parking areas)

Surface type: Asphalt

Rim-invert:

Diameter/size:

Cover/grate size:

Sediment:

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Outlet	12 in.	Concrete	

VANDA rating (structure): 1

VANDA rating (pipes):

Notes:

Pipe added by homeowner (12-inch HDPE) from creek terminates under hedges in lawn strip just short of catch basin M5C-208.

Recommendations:

Need to tie in pipe outlet to catch basin M5C-208.

Item 24 - Trashrack and Gate at 2100 Stonehaven

M5C-208

Area view

Curb inlet and grating

Downstream pipe

Pipe outlet near catch basin under hedge in front yard of 2100 Stonehaven

M5D-207

Location:	Sierra Ventura & Stonehaven
Map sheet:	M5
Date:	3/9/2010
Weather:	Dry
Location code:	Light highway (rural streets, residential neighborhood and parking areas)
Surface type:	Asphalt
Rim-invert:	2 ft. & 10 ft
Diameter/size:	50x 69 in.
Cover/grate size:	25x 48 in.
Sediment:	

Pipe connections:

Pipe (Direction)	Diameter	Material	Rim-invert
Inlet A (SE)	21 in.	Concrete	2.0 ft.
Inlet B (S)	12 in.	Concrete	2.0 ft.

Item 24 - Trashrack and Gate at 2100 Stonehaven

M5D-207

Pipe (Direction)	Diameter	Material	Rim-invert
Inlet C (SW)	24 in.	Concrete	2.0 ft.
Outlet A (NW)	27 in.	Concrete	2.3 ft.
Outlet B (NW)	18 in.	Concrete	10.0 ft.

VANDA rating (structure): 1

VANDA rating (pipes):

Notes:

See detailed notes; gate structure with two outlets (27-inch primary 18-inch secondary); 10-inch high weir plate on gate adjustment; paved over.

Recommendations:

Remove asphalt patch and open hatch to exercize gate. Set gate to optimize flow model.

Area view, looking northeast with access hatch outlined in white

Area view looking east

Area view looking west

Street-level view of paved-over access hatch

Item 24 - Trashrack and Gate at 2100 Stonehaven

M5D-207

Northwest outlet

Southeast 21-inch inlet

Southeast 21-inch inlet

South 12-inch inlet

Southwest 24-inch inlet

Top of gate

Item 24 - Trashrack and Gate at 2100 Stonehaven

M5D-207

Top of gate

Gate

Gate operating mechanism

Gate operating mechanism

Gate operating mechanism

Gate operating mechanism

Item 24 - Trashrack and Gate at 2100 Stonehaven

M5D-207

Outlet

V&A

Oakland
155 Grand Avenue, Suite 700
Oakland, CA 94612
510.903.6600 **Tel**
510.903.6601 **Fax**

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8220 Jones Road, Suite 500
Houston, TX 77065
713.840.6490 **Tel**
713.840.6491 **Fax**

vaengineering.com

Appendix J

Problem Area Projects Summary Sheets

Project: Summerhill Avenue at South El Monte Ave
Project Identifier: AD_PA_1000

Issue: Southeast corner of intersection floods during rain, also rocks, debris and other obstructions affect general drainage

Priority: Moderate

Cost: $200,000 and $550 annually

Plan View

Master Plan Improvements:

1. CCTV to investigate line between CB H2C-216 and H2D-217
2. Construct 2 additional CB inlets at the southeast corner of the intersection on both Summerhill Avenue and South El Monte Avenue. Improvements to consist of ~200 LF of 18" RCP and 2 CB connections

Project Summary:
The intersection of El Monte Road and Summerhill Ave has experienced drainage problems during past storms. There is a significant amount of debris and sediment along the roadway and in the drainage system from nearby hills and development.

Additional inlets on the SE corner of the intersection, where the debris in greatest, will improve roadway conditions.

Regular cleaning and maintenance of the system should also be performed to assure the system functions optimally during storm events.

Project: Catalina Court
Project Identifier: AD_PA_1001

Issue: Continually Blocked CB

Priority: Low

Cost: $740,000

Plan View

Master Plan Improvements:

1. Reshape catch basins on Catalina Ct
2. Install a new CB (if needed)
3. Upsize pipe on Catalina Ct to 18-inch RCP
4. Replace bubble system with 18-inch underground system on Catalina

Project Summary:

Catalina Court has poor drainage with ponding in front of 110 Catalina Court during rain events. The City has removed debris, including balls, on numerous occasions. Manhole C2D-314 has a 12 inch inlet from the south towards 110 Catalina that appears to be abandoned and no longer in use.

Catch basin C2C-315 was observed to have some debris buildup in the sump of the basin due to a protruding outlet pipe. The outlet pipe causes debris to collect and impedes flow thru the outlet.

Installing a catch basin on the south side of the street will eliminate ponding in front of 110 Catalina and the neighboring homes. Catch basin C2C-315 should also have the outlet pipe re-formed to make a smoother transition from basin to outlet pipe

Pipe improvement costs make up $710,000 of the total cost, with the remaining $30,000 for installation of new CB.

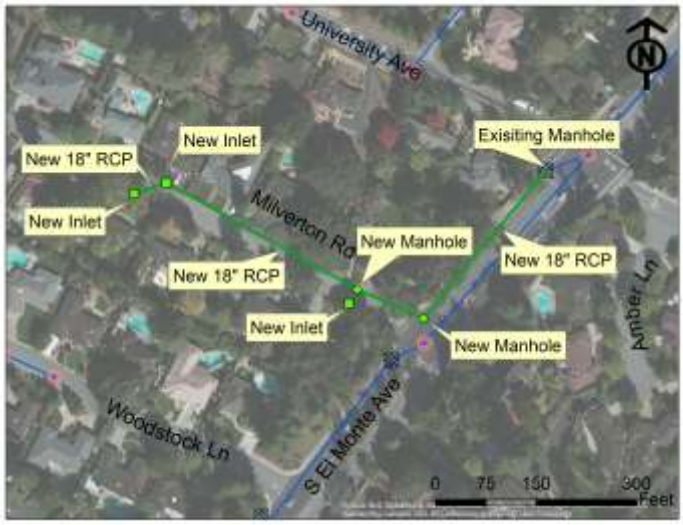
Project: Milverton Road
Project Identifier: AD_PA_1002

Issue: Poorly functioning drywells cause flooding

Priority: Moderate

Cost: $410,000

Plan View



Master Plan Improvements:

1. Add new 18" RCP line along Milverton Rd. Top of system is approximately half way between S El Monte Ave and the bend in Milverton Rd. Tie into existing system at MH G2D-608 (S El3Monte Ave at University Ave).
2. Construct 3 new inlets on Milverton Rd at the low point where flooding occurs. Drywells should be removed. Improvements consist of 772 LF of 18" RCP, 2 new MH connections, and 1 MH connection to an existing line.

Project Summary:
Milverton Rd, approximately 515 feet NW of S El Monte Rd, has experienced drainage problems. Drywells exist, but function poorly.

New inlets at the low point in Milverton Rd will improve roadway conditions by draining the street and carrying the runoff to the existing city SD system.

The proposed improvements were added to the city's SD model to determine impacts. It appears the El Monte system has capacity for the proposed improvements. The peak flow in the most downstream pipe in the El Monte system increases from 3.9 cfs to 7.1 cfs, however, the system has capacity for this addition flow.

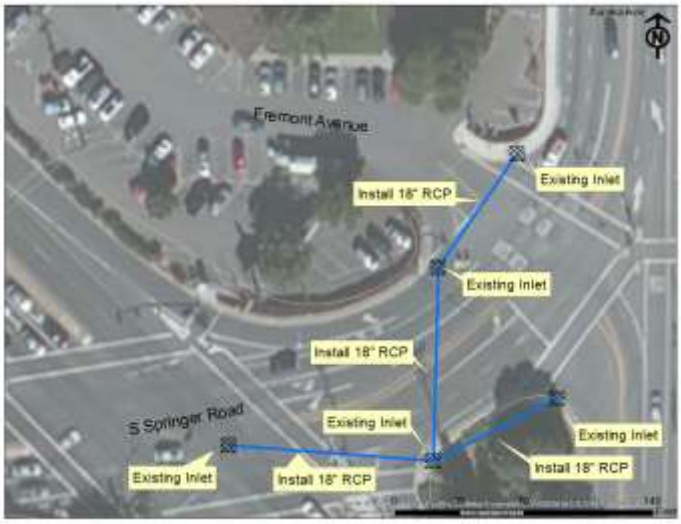
Project: S. Springer Rd near Rosita Ave
Project Identifier: HA_PA_1000

Issue: Water pooling

Priority: Moderate

Cost: $230,000

Plan View



Master Plan Improvements:

1. Replace 370 ft. 18" RCP line along Marilyn Drive and tie into existing system
2. Replace 5 MH along S Springer Rd. This includes MH I4F-118, I4F-401, I4F-402, I4F-403, and I4F-404.

Project Summary:

Springer Rd is connected to Fremont Avenue. Not much information is known about this problem area, but it was brought to attention by the City of Los Altos and O&M staff for pooling of water.

The proposed improvements were analyzed with the City's hydraulic model to determine impacts. This project is determined as a moderate priority due to ponding between 6" and 12" from a 10 year storm.

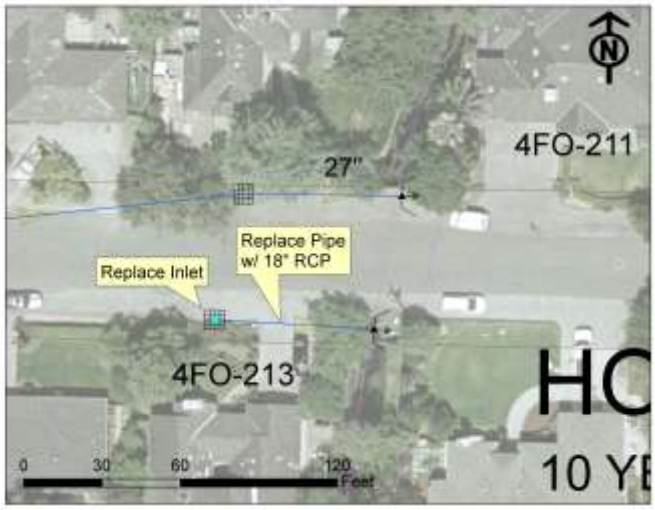
Project: Sunshine Drive
Project Identifier: HA_PA_1001

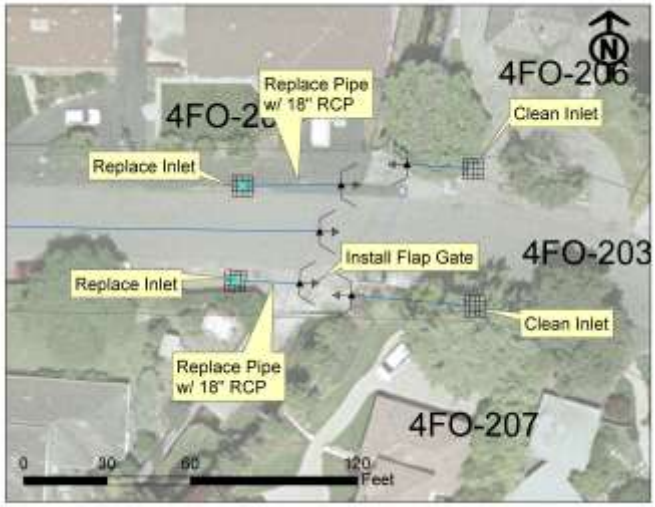
Issue: CBs plug during rainy season, CBs full of sediment, CBF4F-204 discharges in upstream direction of Hale Creek. CMP protruding into basins

Priority: Moderate

Cost: $150,000 + $550 annually

Plan View





Master Plan Improvements:

1. Reconstruct CBs F4F-21- and F4F-201 by removing corrugated metal pipe section protruding into basin.
2. Replace CMP pipes as needed.
3. Hydro jet pipes
4. Install flap gate on CB F4F-204
5. Routine maintenance during rainy season

Project Summary:
Sunshine Drive has experienced drainage problems during past storm events. CB and outlet pipes have limited conveyance due to debris and pipes in poor condition. There also appears to be a backwater issue from the Hale Creek.

CMP sections in poor condition should be replaced with RCP. Flap gates should be installed to prevent backflows. The system should be cleaned and maintained on a regular basis.

Project: Oakwood Ct
Project Identifier: HA_PA_1002

Issue: Water pooling

Priority: Moderate

Cost: $490,000

Plan View

Master Plan Improvements:

1. Add 50 ft. of new 18" RCP line along Oakwood Ct. Add 433 ft. of new 18" RCP line along Riverside Drive. Add 450 ft. of new 18" RCP line along Covington Road and tie into existing system at inlet H40-221 (Covington Road between Parma Ave and Riverside Dr).
2. Construct 1 new inlet on Oakwood Ct. Improvements consist of 933 LF of 18" RCP, 4 new CB connections, 4 new MH connections, and 1 MH connection to an existing line.

Project Summary:
Oakwood Ct is connected to Riverside Drive and Covington Rd. Not much information is known about this problem area, but it was brought to attention by the City of Los Altos and O&M staff for pooling of water.

The proposed improvements were analyzed with the City's hydraulic model to determine impacts. This project is determined as a moderate priority due to ponding between 6" and 12" from a 10 year storm.

Project: Payne Drive
Project Identifier: PM_PA_1000

Issue: Low spots without a storm drain system

Priority: High

Cost: $1,100,000

Plan View

Master Plan Improvements:

1. Add new 18" RCP line along Payne Dr and Oakhurst Ave. Upstream inlets are approximately 3-4 lots east of Oakhurst Ave on the north leg of Payne Dr, and on the SW corner of McKenzie Ave and Oakhurst Ave. Tie into existing system at MH I5D-502 (Portland Ave at Oakhurst Ave).
2. Construct 2 new inlets on Payne Dr at the low point where flooding occurs. Construct 1 new inlet on the SW corner of McKenzie Ave and Oakhurst Ave. Improvements consist of 1,370 LF of 18" RCP, 3 new CB connections, 2 new MH connections, and 1 MH connection to an existing line.

Project Summary:

Payne Drive, approximately 270 feet E of Oakhurst Ave, has experienced drainage problems. There is a low spot in the street without a formal drainage system. The corner of McKenzie and Oakhurst is also a low spot that experiences drainage problems.

New inlets at the low point on Payne Dr and at McKenzie and Oakhurst will improve drainage conditions by conveying runoff to the existing city SD system on Portland Ave.

The proposed improvements were analyzed with the City's hydraulic model to determine impacts. The drainage area to the Portland system would not be increased; however, the proposed improvements would increase the timing of runoff to the pipe network. The 10-year ponding water level at MH I5D-502 (Portland Ave at Oakhurst Ave) would increase roughly 3 inches from the proposed improvements.

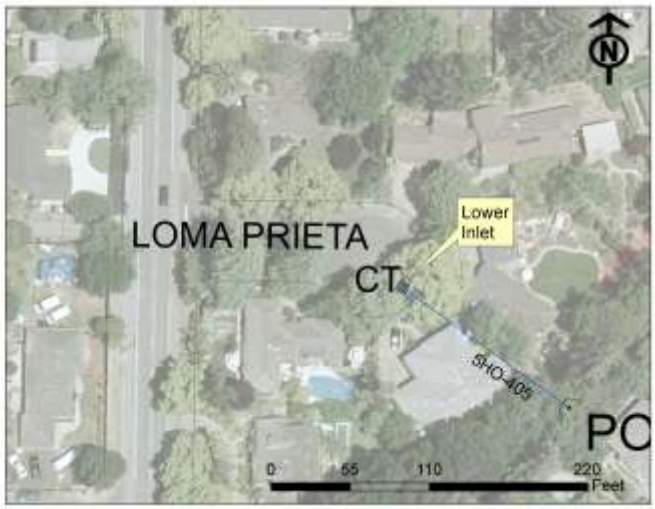
Project: Loma Prieta Court
Project Identifier: PM_PA_1001

Issue: The storm inlet is too high resulting in poor drainage

Priority: Moderate

Cost: $30,000

Plan View



Project Summary:

Loma Prieta Court experiences significant ponding after most storm events. The existing inlet in the court in not at the lowest point. Driveway entrances were graded lower causing standing water.

Lowering the existing CB and minor gutter grading should improve drainage. Alternatively, additional inlets can be added to existing low spots in the court and connected to the existing CB.

Master Plan Improvements:

1. Lower inlet grading of CB H5F-404 below the surrounding gutters

Project: 1640 Dallas Court
Project Identifier: PS_PA_1000

Issue: Slight ponding at the end of the cul-de-sac

Priority: High

Cost: $200,000

Plan View

Project Summary:

There have been drainage issues in Dallas Court. The existing drywell percolation rate is not adequate.

Replace the drywell with a CB and connect to the existing system on Fremont Ave. Add additional inlets if needed.

Master Plan Improvements:

1. Restore MH . K6F-225
2. Install new CB and connect to MH K6f-226 in Fremont Ave.

Project: Woods Lane at Citation Drive
Project Identifier: PS_PA_1001

Issue: The City has indicated that logs and debris are clogging the creek in the area

Priority: High

Cost: $220,000 and $550 annually

Plan View

Master Plan Improvements:

1. Install 36" trash rack at check dam or inlet to storm water pipe
2. Routine maintenance along creek and pipe junction

Project Summary:

There has been past drainage issues near Woods Land and Citation Drive. Debris from upstream limits the conveyance in the existing 36-inch pipeline. There is an existing drop structure upstream of the culvert inlet.

Installing a trash rack at the check dam or inlet to the 36-inch culvert will reduce debris flowing down stream. This device will need routine inspection and maintenance to assure the system functions optimally during storm events.

Project: Trash Rack at 2100 Stonehaven Dr.
Project Identifier: PS_PA_1002

Issue: Trash rack behind residence gets blocked with debris. Gate structure M5D-207 is paved over

Priority: High

Cost: $770,000

Plan View

Master Plan Improvements:

1. Improve creek channel approach to SD headwall and inlet
2. Remove asphalt over gate structure and bring hatch to grade
3. Continue routine maintenance and cleaning of trash racks behind home and exercise gate structure

Project Summary:

The drainage system along Stonehaven Drive upstream of Sierra Ventura has experienced significant drainage problems during storm events. The existing ditch enters the City drainage pipe network at a concrete headwall. There appears to be significant sediment and debris issues. The adjacent landowner has attempted to provide some additional flood protection.

We recommend replacing the headwall and culvert. A 36-inch RCP line to the existing junction box in Stonehaven is required. The new headwall should be higher and include an engineered trash rack. The ditch channel should be improved to prevent erosion.

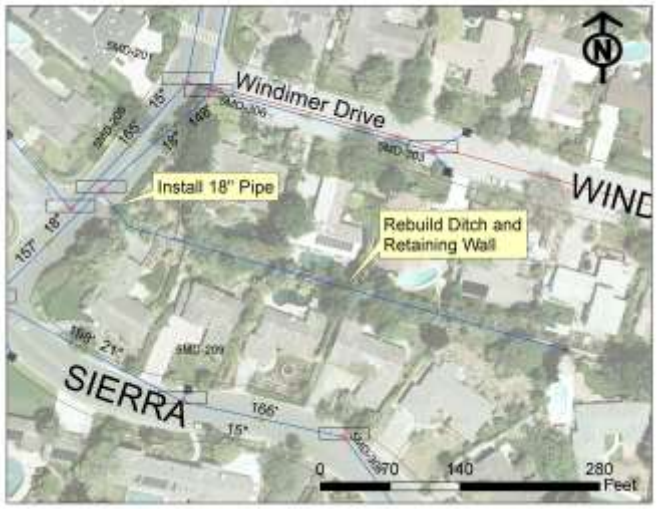
Project: Ditch between Windimer and Sierra Ventura Drive
Project Identifier: PS_PA_1003

Issue: Drainage ditch in easement fills with debris causing overflow into adjacent properties

Priority: High

Cost: $460,000

Plan View



Master Plan Improvements:

1. Install gabion rock wall throughout the entire length of the ditch
2. Rebuild ditch with constant slope
3. Repair fence
4. Replace pipe between ditch and MH with 18" RCP.

Project Summary:

The ditch between Windimer and Sierra Ventura Drive fills with debris causing flooding and overflow into the backyards of adjacent properties.

The upstream portion of the ditch has a cage-wrapped retaining wall that provides adequate conveyance in the ditch. The downstream portion of the ditch contains some home-made retaining walls that are collapsing into the ditch causing blockage.

We suggest lining the entire ditch with a gabion rock wall. This will help stabilize the neighboring properties and will limit debris from the surrounding hill.

The existing concrete channel should be repaired and reshaped as needed. A constant pitched slope will help reduce standing water and overflows.

The pipe from the ditch to the manhole in Stovehaven should be replaced with an 18-inch RCP line. The inlet structure should include a trash rack to prevent large debris from entering the storm drain network.

Project: Ranchita Drive at Julie Lane
Project Identifier: PS_PA_1004

Issue: No sump in CB. Flooding east of Julie and Ranchita , drainage issues due to a crowned road

Priority: Moderate

Cost: $110,000

Plan View

Master Plan Improvements:

1. Replace inlet CB J6C-225

Project Summary:

The area near Ranchita Drive and Julie Lane has experienced drainage problems. There is one existing inlet on the SE corner that regularly clogs with debris. The roadway grading limits drainage to the inlet.

Replace the existing inlet with a CB that includes a sump to collect debris. Regular cleaning of CB should be conducted. Adding an additional CB east of the existing inlet could also improve drainage.

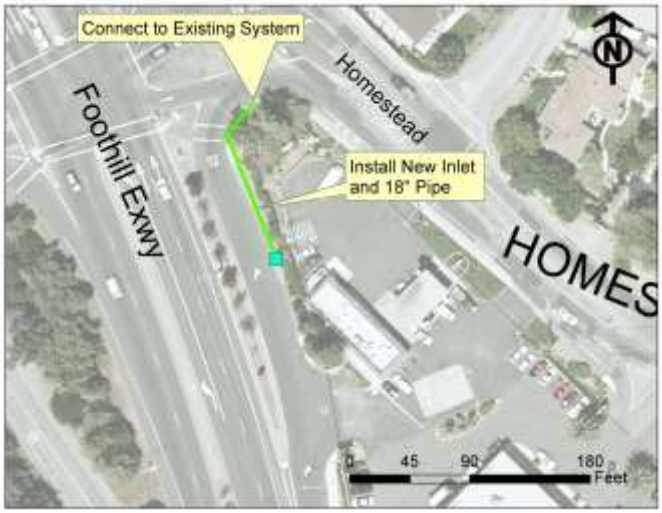
Project: Foothill Expressway at Homestead Rd
Project Identifier: ST_PA_1000

Issue: Poor drainage on offramp.

Priority: Moderate

Cost: $150,000

Plan View



Master Plan Improvements:

1. Install a new catch basin alongside the Foothill Expressway offramp, near the Chevron station.

Project Summary:

The offramp from northbound Foothill Expressway to Homestead Road routinely floods. There is a significant sag in the roadway and no storm drain system.

Install an inlet and catch basin at the sag point in the roadway. Connect to undocumented system at corner on Homestead Road.

Appendix K

Drywells

Appendix K: Drywell Information

As stated in the report, the City should develop a program to identify and confirm if the drywells located in the City of Los Altos are in fact drywells and if so confirm they are in compliance with local, state, and federal guidelines. The Regional Water Quality Control Board (RWQCB), US EPA, and the Santa Clara Valley Water District (SCVWD) all have programs that inventory and reduce impacts from drywells. The US EPA regulates drywells, also classified as Storm Water Drainage Wells, on a federal level. A Class V storm drainage well is defined as a well that "manage[s] surface water runoff (rainwater or snow melt) by placing it below the ground surface…[and] is any bored, drilled, or driven shaft, or dug hole that is deeper than its widest surface dimension, or an improved sinkhole, or a subsurface fluid distribution system." The EPA began regulating drywells due to the Safe Drinking Water Act which requires the protection of Underground Sources of Drinking Water (USDW). Drywells pose a threat to these USDWs because a wide variety of contaminants, sediments, microorganisms, metals, and more pose potential harm to water quality underground. In order to manage what water is flowing into these underground water sources, the EPA requires that each drywell be registered at no additional cost.

The SCVWD is the additional regulatory agency that oversees drywells in the City of Los Altos. The District runs a Dry Wells Program that provides assistance for the installation, destruction, and possibly reconstruction of drywells depending on current water quality of well. Since 1993, the SCVWD has required the registration of drywells deeper than 10 feet. It is suggested that the City check with SCVWD to see if their wells are registered with the District.

If the City chooses to proceed with the identification of dry wells, these are the appropriate next steps for the dry wells:

1. Verify with the SCVWD whether the dry wells are registered or not. If not, register wells with both the district and the EPA.
2. Decide whether to reconstruct well or to cap it.
3. Once that is decided, fill out well permit application for drywells. **Fee applicable.**
4. Once the permit application has been filled out, schedule a well inspection.
    a. Call the district's Well Ordinance Program Hotline at (408) 630-2660.
    b. They will give details about how to follow up regarding well sampling and application process.
5. Fill out application for either destruction or reconstruction of drywell depending on what the district decides about well.

This Appendix is informational in purpose and provides the following documents for that reason: SCVWD well applications, EPA Municipal Storm Water and Ground Water Discharge Regulations in California, detailed replacement drywell cost estimate, photos of drywells of concern, and Resolution No. 81, Statement of Policy on Sewer and Drainage Wells.

SANTA CLARA VALLEY WATER DISTRICT

Well Permit Fee Schedule
Effective: July 1, 2013
Exhibit A of Board Resolution No. 13-24

Permit Type	Permit Fee	Comment
Well Construction	**$400** per well	Applied to all devices requiring a well construction permit
Well Destruction	**$330** per well	Applied to all devices requiring a well destruction permit
Well Reconstruction	**$170** per well	Applied to all events requiring a well reconstruction permit
Closed Loop Geothermal Heat Exchange Well System	**See Below**	Based on number of wells in proposed system[1]
Exploratory Boring	**$300** per site/event	Applied per site, per continuous event
Standby Well Permit	**$300** initial **$220** extension	For all new standby permits and permit extensions (permit void after two years)
Permit Fee Refund	**70% of permit fee**	

Closed Loop Geothermal Heat Exchange Well Permit Fee Schedule[1]

Number of Wells in Proposed System	Permit Fee
1 to 5	$565
6 to 10	$750
11 to 20	$1,050
21 to 50	$1,700
51 to 100	$2,250
101 to 200	$4,500
201 to 300	$6,750
More than 300	$9,000

1 – Open loop geothermal heat exchange wells are permitted and regulated as water supply wells. One Well Construction Permit is required for each well installed.

Santa Clara Valley Water District
5750 ALMADEN EXPRESSWAY
SAN JOSE, CA 95118
(408) 265-2600

WELL INVENTORY FORM*

FC 1487 (07-16-15)

TO BE COMPLETED BY DISTRICT			
District Permit No.:	Date Issued:	Driller's Log No.:	Well Registration No.:

Well Owner:	Property Owner:	Name of Property at Well Site:
Well Owner's Mailing Address:	Property Owner's Mailing Address:	**Address of Well Site**:
City, State, Zip	City, State, Zip	City, State, Zip
Telephone No.:	Telephone No.:	Assessor's Parcel No. of **Well Site**: Book _____ Page _____ Parcel _____

Do other wells exist on the property? ☐ Yes ☐ No How many wells total currently exist? _____

Reasons for installing new well: _____

LIST ALL EXISTING WELLS AND THEIR STATUS, IF KNOWN				ENVIRONMENTAL HEALTH DEPT.
Well Registration No.:		Owner's Well No.:		☐ Well in Good Condition ☐ Well in Use ☐ Abandoned ☐ Damaged ☐ Well on Standby ☐ Well Should Be Destroyed Comments:
Permit No.:	Purpose of Well:			
Status: ☐ Active ☐ Inactive		Depth:	Casing:	
Comments:				
Do you plan to use this well? ☐ Yes ☐ No				
Comments:				
Well Registration No.:		Owner's Well No.:		☐ Well in Good Condition ☐ Well in Use ☐ Abandoned ☐ Damaged ☐ Well on Standby ☐ Well Should Be Destroyed Comments:
Permit No.:	Purpose of Well:			
Status: ☐ Active ☐ Inactive		Depth:	Casing:	
Comments:				
Do you plan to use this well? ☐ Yes ☐ No				
Comments:				
Well Registration No.:		Owner's Well No.:		☐ Well in Good Condition ☐ Well in Use ☐ Abandoned ☐ Damaged ☐ Well on Standby ☐ Well Should Be Destroyed Comments:
Permit No.:	Purpose of Well:			
Status: ☐ Active ☐ Inactive		Depth:	Casing:	
Comments:				
Do you plan to use this well? ☐ Yes ☐ No				
Comments:				
Well Registration No.:		Owner's Well No.:		☐ Well in Good Condition ☐ Well in Use ☐ Abandoned ☐ Damaged ☐ Well on Standby ☐ Well Should Be Destroyed Comments:
Permit No.:	Purpose of Well:			
Status: ☐ Active ☐ Inactive		Depth:	Casing:	
Comments:				
Do you plan to use this well? ☐ Yes ☐ No				
Comments:				

***This form must be completed and submitted with any Well Construction Application for a water supply well. Also attach a map showing all well locations with respect to property boundaries and structures.**

Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118
(408) 265-2600

WELL REACTIVATION NOTICE

FC 1236 (06-26-96)

Please complete both sides of this form.

Property Owner:	Well Owner (if different):	Name of Business/Residence at Well Site:
Property Owner Address:	Well Owner Address:	Address of Well Site:
City, State, Zip:	City, State, Zip:	City, State, Zip:
Telephone No:	Telephone No:	Telephone No:
Assessor's Parcel Number of Well Site: Book: Page: Parcel:	Well Registration No:	Date of Reactivation:

THIS SECTION TO BE COMPLETED FOR MONITORING/EXTRACTION WELLS ONLY

Consultant's Company Name (if any):	Address:
City, State, Zip:	Telephone No:
Owner's/Consultant's Well No:	Original Permit No:

Well Description:

☐ Vertical Well ☐ Dewatering Well ☐ Elevator Shaft ☐ Multiple Casing ☐ Horizontal Well ☐ Pit Well

Well Type, check all that apply:

☐ Water Producing (supply or extraction): ☐ Contamination Cleanup ☐ Agricultural ☐ Domestic ☐ Municipal & Industrial

☐ Vapor Extraction

☐ Monitoring: ☐ Inclinometer ☐ Groundwater ☐ Vadose ☐ Piezometer ☐ Interface ☐ Suction Lysimeter ☐ Seismic

☐ Injection/Infiltration: ☐ Contamination Cleanup ☐ Reclaimed Water ☐ Air Sparging

☐ Cathodic Protection

Has an Inactive/Standby Well Permit been issued for the period of time the well was not in use? ☐ Yes ☐ No

If yes, please give the most recent Inactive/Standby Well Permit No: _____ (Go to page 2)

If no, please complete the following section and page 2.

CONSULTANT/DRILLER/PUMP CONTRACTOR'S CERTIFICATION STATEMENT

1. Certify that the well head has no defects which may impair the quality water in the well or in the water-bearing formations penetrated;
2. The well head is appropriately protected to prevent injury or accidental entry by persons or animals;
3. The well head is watertight and appropriately protected to prevent the entrance of undesirable water or foreign matter;
4. The well head is watertight and appropriately protected to prevent the uncontrolled flow of water from the well;
5. The well is marked so that it can be clearly seen;
6. The area around the well is free of brush and debris;
7. The well is capable of being used for its intended purpose.

Company Name:	Address:	
City, State, Zip:	Telephone No: ( )	License No:
Signature of Driller/Pump Contract or/Consultant:	Print Name:	Date:

Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118
(408) 265-2600

WELL REACTIVATION NOTICE

FC 1236 (06-26-96)

I agree to properly maintain the well described in this permit so that:

1. The well head has no defects which may impair quality of water in the well or in the water-bearing formation penetrated;
2. The well head is appropriately protected to prevent injury or accidental entry by persons or animals;
3. The well head is watertight and appropriately protected to prevent the entrance of undesirable water or foreign matter;
4. The well head is watertight and appropriately protected to prevent the uncontrolled flow of water from the well;
5. The well is marked so that it can be clearly seen;
6. The area surrounding the well is kept clear of brush or debris.

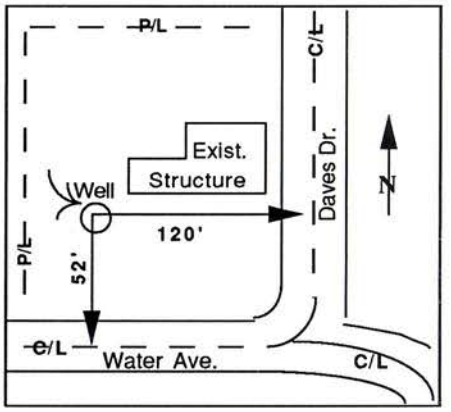
Signature of Well Owner:	Date:
Print Name:	

Site Plan

WELL LOCATION
(Draw accurately; recommend using assessor's map)

1. Sketch well location to scale, show dimensions to nearest foot.
2. Show a minimum of two dimensions at right angles. dimensions shall be from the centerline of the closest named streets, roads or highways .

EXAMPLE →



Sketch well location as described above:

Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118-3686
(408) 265-2600

WELL RECONSTRUCTION APPLICATION

▶ Please complete all information.

DISTRICT PERMIT NO.:

Well Owner:	**Property Owner**:	Name of Business/Residence at Site:
Well Owner's Mailing Address:	Property Owner's Mailing Address:	**Address of Well Site**:
City, State, Zip	City, State, Zip	City, State, Zip
Telephone No.:	Telephone No.:	Assessor's Parcel No. of **Well Site**: Book _____ Page _____ Parcel _____

☐ Well on District property/easement (See General Condition E.)

Consultant:	Drilling Company:
Address:	Address:
City, State, Zip	City, State, Zip
Telephone No.:	Telephone No.: C-57 License No.:
☐ Check if address or phone number has changed	☐ Check if address or phone number has changed

▶ **All questions below are to be completed before permit can be issued; if unknown, applicant shall make on-site investigation to determine correct answers.**

WELL INFORMATION

Well Registration No.:	Owner/Consultant Well No.:	Original Well Construction Permit No.:
Well Casing Depth:	Total Boring Depth:	Well Casing Diameter:

This Section to Be Completed for All Monitoring Wells or Extraction/Recovery Wells

Case Name/No.:	Caseworker Name:
Oversight Agency:	Caseworker Telephone No.:

WELL TYPE/USE	☐ WATER PRODUCTION	☐ MONITORING	☐ REMEDIATION	☐ DEWATERING	☐ HEAT EXCHANGE	☐ INJECTION	☐ CATHODIC PROTECTION	☐ OTHER
	☐ Agricultural ☐ Domestic ☐ Industrial ☐ Municipal	☐ GW Level ☐ GW Quality ☐ Inclinometer ☐ Vapor ☐ Other	☐ Air Sparge ☐ GW Extraction ☐ Material Emplacement ☐ Vapor Extraction ☐ Other	☐ Permanent ☐ Temporary	☐ Closed Loop ☐ Open Loop	☐ Groundwater Cleanup Reinjection ☐ Stormwater ☐ Water Supply Recharge ☐ Other		

IMPORTANT: A minimum 24-hour notice must be given to Santa Clara Valley Water District prior to installing the annular seal. Call (408) 630-2660. Please allow 10 working days to process permit application.

Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118-3686
(408) 265-2600

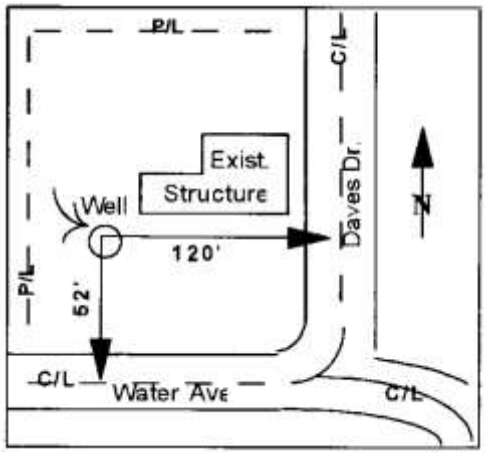
WELL RECONSTRUCTION APPLICATION

SITE PLAN

Well Location
(Draw accurately; recommend using assessor's map):

1. Sketch well location to scale; show dimensions to nearest foot.
2. Show a minimum of two dimensions at right angles. Dimensions shall be from the centerline of the closest named streets, roads, or highways.

EXAMPLE:



Sketch well location as described above:

Please allow 10 working days to process this application.

Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118-3686
(408) 265-2600

WELL RECONSTRUCTION APPLICATION

Please describe in detail the proposed reconstruction method:

SIGNATURES

I understand and agree that all work associated with this permit is required to be done in accordance with Santa Clara Valley Water District (District) Well Ordinance 90-1, the District Well Standards, and conditions of this permit (see page 4). I certify that the information given in this permit is correct to the best of my knowledge and that the signature below, whether original, electronic, or photocopied, is authorized and valid, and is affixed with the intent to be enforceable. I also certify that a right of entry/encroachment agreement has been formalized between the well owner and property owner, if parties differ.

Signature of Well Owner/Agent:	Print Name:	Date:
Signature of Property Owner/Agent:	Print Name:	Date:
Signature of Driller/Agent:	Print Name:	Date:
Signature of Consultant/Agent (if any):	Print Name:	Date:

DISTRICT USE ONLY

☐ Special Conditions: _____

_____

_____

_____

Permit Approved by:	Date:

District Permit No.:	Date Issued:	Expiration Date:	Driller's Log No.:

Please allow 10 working days to process this application.

Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118-3686
(408) 265-2600

WELL RECONSTRUCTION APPLICATION

GENERAL CONDITIONS

A. **District** (telephone 408-630-2660) **must be notified a minimum of one working day before the well reconstruction activities**. An authorized District representative must be on site to witness the reconstruction activities. This requirement may be waived by an authorized District representative. If the District waives the inspection requirement, the District may request the permittee(s) to furnish certification under penalty of perjury that the well was reconstructed in accordance with the District Well Standards and with the permit conditions.

B. This permit is valid only for the purpose specified herein. Well reconstruction methods authorized under this permit may not be changed except by written approval of an authorized District representative, and only if the District believes that such a change will result in equal or superior compliance with the District and State Well Standards (e.g., if the District representative believes that site conditions warrant such a change).

C. This permit is only valid for the Assessor's Parcel No. indicated on it.

D. If any work associated with this permit will take place on District property/easement, an encroachment or construction permit must be granted by the District's Community Projects Review Unit (telephone 408-630-2350, -2217, or -2253).

E. Within 30 days of the completion of the well reconstruction activities, the driller identified on this permit shall fully complete State of California DWR Form 188 and submit the original to the District's Well Ordinance Program.

F. The permittee(s) shall assume entire responsibility for all activities and uses under this permit and shall indemnify, defend, and hold the District, its officers, agents, and employees free and harmless from any and all expense, cost, and liability in connection with or resulting from, the granting of or exercise of this permit including, but not limited to, property damage, personal injury, and wrongful death.

G. Permittees are required to be in full compliance with Cal/OSHA California Labor Code Section 6300.

H. A current C-57 Water Well Drilling Contractor's License is required for the reconstruction of all wells.

I. Permittee, permittee's contractors, consultants, or agents shall be responsible to assure that all materials generated during drilling, well destruction, well development, pump testing, or other activities associated with this permit will be safely handled, properly managed, and disposed of according to all applicable federal, state, and local statutes regulating such. In no case shall these materials/waters be allowed to enter, or potentially enter, on- or off-site storm sewers, dry wells, or waterways. Such materials/waters shall not be allowed to move off the property where the work is being completed.

J. The driller and consultants (if applicable) shall have an active copy of their Worker's Compensation Insurance on file with the District.

K. This permit shall expire if not exercised within 180 calendar days of its approval unless an extension of the permit expiration date is granted by an authorized District representative.

L. This permit must be kept on site during all activities associated with it and shall immediately be presented to an authorized District representative upon request.

M. Permittee shall notify Underground Service Alert (USA) at 1-800-227-2600 or 811 prior to any digging.

Please allow 10 working days to process this application.

Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118-3686
(408) 265-2600

WELL DESTRUCTION APPLICATION

FC 198 (03-26-15)

► Please complete all information.

DISTRICT PERMIT NO.:

Well Owner:	**Property Owner**:	Name of Business/Residence at Site:
Well Owner's Mailing Address: City, State, Zip	Property Owner's Mailing Address: City, State, Zip	**Address of Well Site**: City, State, Zip
Telephone No.:	Telephone No.:	Assessor's Parcel No. of **Well Site**: Book _____ Page _____ Parcel _____
		☐ Well on District property/easement (See General Condition E.)

Consultant:	Drilling Company:	
Address: City, State, Zip	Address: City, State, Zip	
Telephone No.:	Telephone No.:	C-57 License No.:
☐ Check if address or phone number has changed	☐ Check if address or phone number has changed	

► **All questions below are to be completed before permit can be issued; if unknown, applicant shall make on-site investigation to determine correct answers.**

WELL INFORMATION

Well Registration No.:	Owner/Consultant Well No.:	Original Well Construction Permit No.:
Well Casing Depth:	Total Boring Depth:	Well Casing Diameter:

This Section to Be Completed for All Monitoring Wells or Extraction/Recovery Wells

Case Name/No.:	Caseworker Name:
Oversight Agency:	Caseworker Telephone No.:

WELL TYPE/USE	☐ WATER PRODUCTION	☐ MONITORING	☐ REMEDIATION	☐ DEWATERING	☐ HEAT EXCHANGE	☐ INJECTION	☐ CATHODIC PROTECTION	☐ OTHER
	☐ Agricultural ☐ Domestic ☐ Industrial ☐ Municipal	☐ GW Level ☐ GW Quality ☐ Inclinometer ☐ Vapor ☐ Other	☐ Air Sparge ☐ GW Extraction ☐ Material Emplacement ☐ Vapor Extraction ☐ Other	☐ Permanent ☐ Temporary	☐ Closed Loop ☐ Open Loop	☐ Groundwater Cleanup Reinjection ☐ Stormwater ☐ Water Supply Recharge ☐ Other		

ADDITIONAL QUESTIONS FOR WATER PRODUCING WELLS

Does the well have:	1.	Outer conductor casing?	☐ Yes	☐ No
	2.	Annular cement seal outside of casing at surface?	☐ Yes	☐ No
	3.	A S.C.V.W.D. water meter attached?	☐ Yes	☐ No

Original Drilling Method: _____

IMPORTANT: A minimum 24-hour notice must be given to Santa Clara Valley Water District prior to installing the annular seal. Call (408) 265-2607, ext. 2660. Please allow 10 working days to process permit application.

Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118-3686
(408) 265-2600

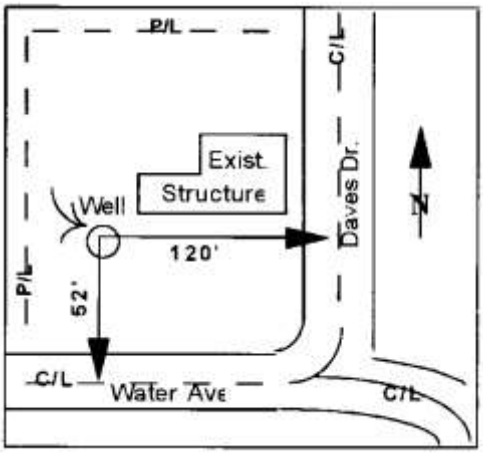
WELL DESTRUCTION APPLICATION

SITE PLAN

Well Location
(Draw accurately; recommend using assessor's map):

1. Sketch well location to scale; show dimensions to nearest foot.
2. Show a minimum of two dimensions at right angles. Dimensions shall be from the centerline of the closest named streets, roads, or highways.

EXAMPLE:



Sketch well location as described above:

Please allow 10 working days to process this application.

Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118-3686
(408) 265-2600

WELL DESTRUCTION APPLICATION

Please describe in detail, the proposed destruction method (Any well destruction in which the well casing is left in place and in which the well has a filter pack outside the casing, must be destroyed using approved neat cement grout):

SIGNATURES

I understand and agree that all work associated with this permit is required to be done in accordance with Santa Clara Valley Water District (District) Well Ordinance 90-1, the District Well Standards, and conditions of this permit (see page 4). I certify that the information given in this permit is correct to the best of my knowledge and that the signature below, whether original, electronic, or photocopied, is authorized and valid, and is affixed with the intent to be enforceable. I also certify that a right of entry/encroachment agreement has been formalized between the well owner and property owner, if parties differ.

Signature of Well Owner/Agent:	Print Name:	Date:
Signature of Property Owner/Agent:	Print Name:	Date:
Signature of Driller/Agent:	Print Name:	Date:
Signature of Consultant/Agent (if any):	Print Name:	Date:

DISTRICT USE ONLY

The District has approved the following destruction methods for the well described in this permit:

☐ Pressure Grout Method (as outlined in Standards)
NOTE: Neat cement is the only sealing material approved for pressure grouting.

☐ Drill out well to a total depth of _____ feet, with a minimum bore of _____ Inches.

☐ Clean out well casing to a total depth of _____ feet and back fill with approved sealing material (if total depth is unknown, driller must determine total depth during clean out of well). NOTE: Neat cement is the only sealing material approved for back filling gravel packed wells.

☐ Well casing must be perforated at the following depths prior to backfilling: _____

☐ Other: _____

_____

_____

Permit Approved by:	Date:

District Permit No.:	Date Issued:	Expiration Date:	Driller's Log No.:

Please allow 10 working days to process this application.

Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118-3686
(408) 265-2600

WELL DESTRUCTION APPLICATION

GENERAL CONDITIONS

A. **District** (telephone 408-265-2607, ext. 2660) **must be notified a minimum of one working day before the placement of the well destruction sealing materials**. An authorized District representative must be on site to witness the destruction activities. This requirement may be waived by an authorized District representative. If the District waives the inspection requirement, the District may request the permittee(s) to furnish certification under penalty of perjury that the well was destroyed in accordance with the District Well Standards and with the permit conditions.

B. This permit is valid only for the purpose specified herein. Well destruction methods authorized under this permit may not be changed except by written approval of an authorized District representative, and only if the District believes that such a change will result in equal or superior compliance with the District and State Well Standards (e.g., if the District representative believes that site conditions warrant such a change).

C. This permit is only valid for the Assessor's Parcel No. indicated on it.

D. This permit may be voided if it contains incorrect information. If the permit is voided after work has begun, the well or boring that is being destroyed under this permit may be required to be reconstructed in accordance with District and State Well Standards.

E. If any work associated with this permit will take place on District property/easement, an encroachment or construction permit must be granted by the District's Community Projects Review Unit (telephone 408-265-2607, ext. 2350, 2217, or 2253).

F. Within 30 days of the completion of the well destruction activities, the driller or consultant identified on this permit shall fully complete State of California DWR Form 188 and submit the original to the District's Wells and Water Production Unit.

G. The permittee(s) shall assume entire responsibility for all activities and uses under this permit and shall indemnify, defend, and hold the District, its officers, agents, and employees free and harmless from any and all expense, cost, and liability in connection with or resulting from, the granting of or exercise of this permit including, but not limited to, property damage, personal injury, and wrongful death.

H. Permittees are required to be in full compliance with Cal/OSHA California Labor Code Section 6300.

I. A current C-57 Water Well Drilling Contractor's License is required for the destruction of all wells.

J. Permittee, permittee's contractors, consultants, or agents shall be responsible to assure that all materials generated during drilling, well destruction, well development, pump testing, or other activities associated with this permit will be safely handled, properly managed, and disposed of according to all applicable federal, state, and local statutes regulating such. In no case shall these materials/waters be allowed to enter, or potentially enter, on- or off-site storm sewers, dry wells, or waterways. Such materials/waters shall not be allowed to move off the property where the work is being completed.

K. The driller and consultants (if applicable) shall have an active copy of their Worker's Compensation Insurance on file with the District.

L. This permit shall expire if not exercised within 180 calendar days of its approval unless an extension of the permit expiration date is granted by an authorized District representative.

M. If the well approved to be destroyed under this permit is a monitoring well, associated with an investigation/cleanup overseen by a regulatory agency, the proposed well destruction must be approved by the person with regulatory authority over the investigation/cleanup.

N. This permit must be kept on site during all activities associated with it and shall immediately be presented to an authorized District representative upon request.

O. Permittee shall notify Underground Service Alert (USA) at 1-800-227-2600 or 811 prior to any digging.

Please allow 10 working days to process this application.

United States
Environmental
Protection Agency

Region 9 Ground Water
Office (WTR-9)

draft
month 2002

Municipal Storm Water and Ground Water Discharge Regulations in California

Inside:

- **Do I need to get a Permit?**
- **How do I Comply?**

GUIDELINES FOR RULE AUTHORIZATION

1. All wastes are managed.
2. Dilution is not a method of treatment.
3. All disposal points are known.
4. All receiving waters are known.
5. Safe operation of well(s) is assured with routine inspection, maintenance and monitoring.
6. Close wells which cannot demonstrate compliance.

According to the 1996 National Water Quality Inventory, a biennial summary of State surveys of water quality, approximately 40 percent of surveyed U.S. waterbodies are impaired by pollution and do not meet water quality standards. A leading source of this impairment is polluted runoff. To reduce the impacts of polluted runoff, the Environmental Protection Agency (EPA) Storm Water program has developed a series of rules for municipalities and construction sites, requiring prevention of contamination of runoff, and retention of runoff where possible.

Urban and construction-related runoff has been documented to contain numerous substances known to have toxic or pathogenic properties, such as motor vehicle fluids, pesticides, heavy metals, and fecal coliform. Spilled fuel, solvents, waste oil, paints, and other maintenance fluids pose a risk to the environment but may be especially harmful if they enter someone's drinking water supply. Small amounts of some substances may cumulatively degrade an aquifer, if a significant proportion of contaminated runoff is percolated to the water table.

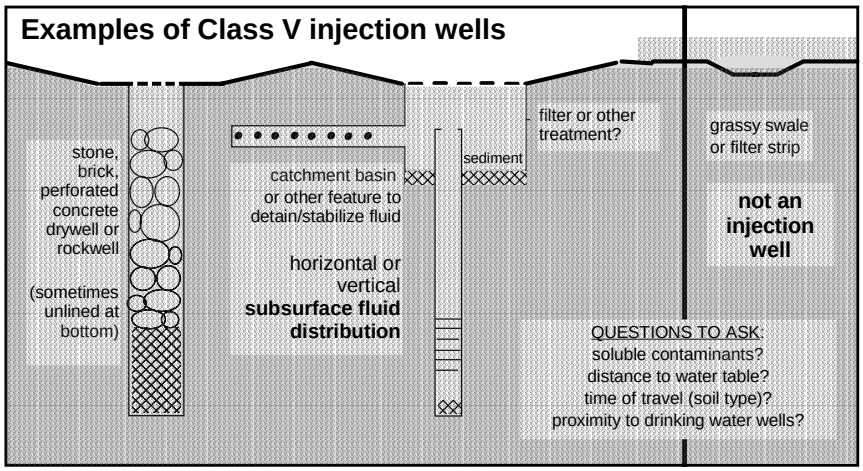
The percolation of contaminated runoff can cause unacceptable consequences to ground water resources. To prevent the trading of pollution from surface water to ground water, EPA Region 9 has prepared this fact sheet for municipalities contemplating the use of injection wells as a means of managing storm water.

The UIC regulations were promulgated to regulate subsurface disposal of fluids through drains, pipes, and other constructed conveyances that are intended to permanently emplace fluid below ground surface. Drywells, unlined sumps, seepage pits, and infiltration galleries are some of the terms used to describe the subcategory of injection wells known as shallow Class V injection wells. Municipalities who utilize injection wells as a means of storm water management need to be cognizant of the regulations applicable to this practice.

Storm water wells can be a community asset or liability. One incident of contamination could cause millions of dollars of damage to the public water system and to the local economy. Complying with the regulation may be as simple as reporting the number of wells you operate. Implementing additional management measures could prevent pollution and protect precious water resources.

What is a Class V injection well?

STORM WATER MANAGEMENT DEVICES



All percolation, deep or shallow, poses some environmental risk. Best management practices, pretreatment, and exposure to the elements all have a role in reducing storm water conntaminants, but they provide no guarantee. Storm water programs can't eliminate risk, but they can significantly reduce it.

What are the requirements in California for owners and operators of Class V injection wells?

1. Submit an Inventory Form to EPA for all Class V injection wells. The inventory form registers the ownership and liability for the wells and notes their approximate location. Complying with the inventory requirement means you are "authorized by rule" to continue injecting unless EPA requires more information, a permit, or closure of your well(s). For a copy of the inventory form, contact EPA Region 9. *40 CFR 144.26*

2. Respond to requests for additional information about your well(s). If EPA suspects that your well(s) may be threatening an underground source of drinking water, it may require you to further investigate the location and use of your well(s) relevant to area aquifers and land uses. *40 CFR 144.27*

3. If requested by EPA, apply for and comply with an injection permit. *40 CFR 144.25*

4. Close any wells that are suspected or likely to cause contamination of underground sources of drinking water. 40 *CFR part 144.89*

5. No owner or operator shall construct, operate, maintain, convert, plug, abandon, or conduct any other injection activity in a manner that allows the movement of fluid containing any contaminant into underground sources of drinking water, if the presence of that contaminant may cause a violation of any drinking water regulation under 40 CFR part 142 or may otherwise adversely affect the health of persons. *40 CFR 144.12*

...FROM THE REGULATIONS

(Injection) Well means: A bored, drilled, or driven shaft whose depth is greater than the largest surface dimension; or, a dug hole whose depth is greater than the largest surface dimension; or, an improved sinkhole; or, a subsurface fluid distribution system.

Subsurface fluid distribution system means an assemblage of perforated pipes, drain tiles, or other similar mechanisms intended to distribute fluids below the surface of the ground. *40 CFR 144.3*

DO I NEED A PERMIT?

EPA is the direct implementation agency for Class V injection wells in California. This means that they have the responsibility for collecting inventory data and determining which wells pose a risk that warrants further federal action, up to and including closure of endangering wells. The EPA office in San Francisco collects and maintains a database of all submitted inventory information.

Currently EPA does not have any permits for municipal storm water injection wells in California. This fact sheet is the first step in alerting municipalities of their legal obligations. Factors influencing EPA's decision to require a permit could include whether or not area ground water is a drinking water supply; its hydrogeologic susceptibility; land use practices and population density; or any documented contamination incidents linked to storm water injection wells.

Although California does not have delegation for the UIC program (like the NPDES program), the Water Code enables the Regional Water Quality Control Boards to prepare Waste Discharge Requirements for any discharge that may impair beneficial uses of waters of the state.

Local governments may set standards that are more stringent than EPA regulations.

Evaluating Storm Drain Failure

Injection/infiltration contaminates receiving ground water or surface water. Possible causes: receives human or animal waste, or chemical waste, through normal road use or illicit disposal. Constructed in a manner that there is inadequate time of travel between the "bottom" of the injection well/infiltration device and the receiving water body. Not maintained, so that heavily contaminated sediment from dry weather flow is flushed to the water table when wet season begins. Constructed hydrogeologically close to water body (inadequate setbacks.)

Clogs/doesn't percolate. Possible causes: Not maintained, clogged with solids. Illicit use for grease trap, waste oil or other viscous substance disposal. Constructed in soils with percolation rates less than 0.5 minutes per inch. Heavy clay, silty, or saturated soils. Constructed with too little setback to other fluid sources such as septic systems, leaking sewer lines, or "losing" streams (where surface water recharges ground water.)

IF AN INJECTION WELL NEEDS TO BE CLOSED:

The regulations specify minimum requirements for closure of an injection well: §144.89. You must plug or otherwise close the well in a manner that complies with the prohibition of fluid movement standard in §144.12 and summarized in §144.82(a). If the Regional Water Quality Control Board or other local agency has more stringent closure requirements, you should comply with those requirements as well. You must dispose or otherwise manage any soil, gravel, sludge, liquids, or other materials removed from or adjacent to your well in accordance with all applicable Federal, State, and local regulations and requirements, as in §144.82 (b).

EPA Region 9 requires that site characterization and closure of shallow injection wells where hazardous or toxic materials may be present be overseen and approved by a hazardous materials regulator from the local or state government (or EPA) and be performed by a qualified environmental professional.

Federal closure guidance is available. Contact EPA Region 9's Ground Water Office (see back page for numbers.)

Best Management Practices

Standard program elements recommended for storm drains leading to surface waters include:

- Public education and public involvement
- Illicit discharge detection and elimination
- Construction/post-construction site runoff control
- Pollution prevention/Good housekeeping

The same concepts apply to ground water discharges; **the cleaner the runoff, the safer the disposal.** Additional considerations for protecting underground sources of drinking water should be based on the value and vulnerability of the resource.

Is ground water a source of drinking water, through wells or through discharge to a surface water body that is tapped? Has the area been designated as a wellhead protection area, sole source aquifer, or source water area by the public water system?

Structural BMPs:

EPA has no design requirements for storm water injection wells that inject into or above the water table. Deeper injection through and below drinking water supply aquifers generally requires a permit to insure mechanical integrity and pollution prevention.

Shallow infiltration is generally environmentally safer than deep, but it is no guarantee that contamination will be prevented.

Pretreatment is needed where soluble contaminants are a concern. Sedimentation and absorbent materials may not remove dissolved pesticides, solvents, and some motor vehicle fluids.

Every injection well and infiltration device should be accessible for routine inspection and maintenance.

Non-structural BMPs

Evaluate the soils, geology, and water table. Develop an understanding of how much water can safely be land-applied to reflect natural recharge patterns. Account for other sources of infiltration that might affect subterranean flow and cause "breakouts" in low spots, or landslides.

Establish setbacks that provide sufficient time of travel in unsaturated soils for pollutant removal (and/or capture if materials spill occurs.)

Map all injection wells/infiltration devices; keep design and maintenance records for each one. Layer maps with land uses, sewer maps, and other data that might influence drainage system performance.

Assess regional or watershed impacts from injected/infiltrated fluid through monitoring programs. Depending on the proximity of drained areas to drinking water wells, collaborate with drinking water suppliers to analyze raw well water quality for early detection of runoff impacts.

For more information:

EPA National Stormwater NPDES program:
http://cfpub.epa.gov/npdes/stormwater/swfinal.cfm?program_id=6 **or**
http://www.epa.gov/npdes/menuofbmps/

BMPs specifically for ground water:
http://www.epa.gov/reg3wapd/uic/pdf/stormwater.pdf

Drinking Water Source Protection BMPs:
http://www.epa.gov/safewater/protect/swpbmp.html

For 1999 EPA summary of stormwater injection practices nationally:
http://www.epa.gov/safewater/uic/classv/volume3.pdf

For EPA's Environmental Technology Verification (ETV) project, which is testing stormwater treatment technologies:
http://www.epa.gov/etv/index.htm

California State Water Resources Control Board website: www.swrcb.ca.gov

To obtain EPA inventory form, write to EPA at the return address below, or forms can be emailed: send email to janes.elizabeth@epa.gov

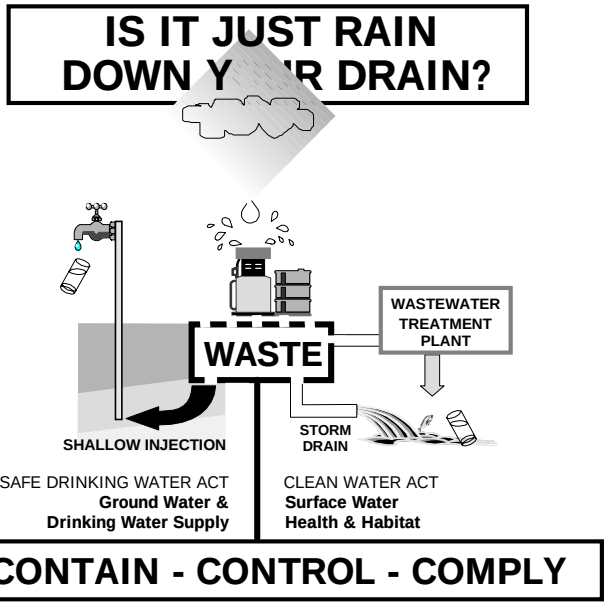
Questions about this guidance?
Call (415) 972-3537

WHAT IF IT'S NOT THE DEPARTMENT'S INJECTION WELL?

Injection wells on private property (except for those strictly intended for roof runoff, or less than 2000 gpd sewage treatment) are subject to these regulations. Injection wells have been used at certain facilities to evade sewer pretreatment restrictions and other discharge limits. If you know or suspect of ground water problems arising from illicit (or hazardous) injection wells, please call the number above or your local/county hazardous materials agency. City departments are also recommended to seek their own authority to require abatement of such systems.

U.S. Environmental Protection Agency, Region 9
Underground Injection Control Program (WTR-9)
75 Hawthorne Street
San Francisco, California 94105-3109
OFFICIAL BUSINESS - PENALTY FOR PRIVATE USE $300

**FIRST CLASS MAIL
U.S. POSTAGE
PAID
U.S. EPA
Permit No. G-35**



DISCLAIMER: The statements in this document are intended solely as guidance. This document is not intended, nor can it be relied upon, to create any rights enforceable by any party in litigation with the United States. EPA or the program Primacy Agency may decide to follow the guidance provided in this document, or to act at variance with the guidance based on its analysis of the specific facts presented. This guidance may be revised without public notice to reflect changes in EPA's approach to implementing the authorities discussed in the document or to clarify and update text.

Drywell Detailed Cost Analysis

Address	Street	Number of DW's	Inlets	MHs	Pipe (ft)	MH & Inlet Cost	Pipe Cost	Watershed
501	Alicia Way	1	1	3	397.11	$25,018	$59,567	Adobe
486	Alicia Way	1	1	0	80.27	$25,018	$83,648	Adobe
	Alicia Way				***477***	***$50,035***	***$143,214***	**Adobe**
624	Distel Drive	1	1	1	112.34	$11,673	$16,851	Adobe
625	Distel Drive	1	1	0	52.13	$11,673	$32,490	Adobe
	Distel Drive				***164***	***$23,345***	***$49,341***	**Adobe**
650	Milverton Road	1	1	0	50.58	$18,345	$101,094	Adobe
651	Milverton Road	1	1	0	326.13	$18,345	$85,920	Adobe
690	Milverton Road	1	1	3	394.80	$18,345	$44,440	Adobe
	Milverton Road				***772***	***$55,035***	***$231,453***	**Adobe**
123	Yerba Santa Avenue	1	1	1	48.00	$18,345	$14,399	Adobe
100	Yerba Santa Avenue	1	1	1	2.37	$18,345	$712	Adobe
	Yerba Santa Avenue				***50***	***$36,690***	***$15,111***	**Adobe**
1270	Grant Road	1	1	1	7.00	$18,345	$2,100	Perm/Stevens
1240	Grant Road	1	1	1	5.34	$18,345	$1,602	Perm/Stevens
	Grant Road				***12***	***$36,690***	***$3,702***	**Perm/Stevens**
1475	Oakhurst Avenue	1	1	1	274.60	$42,811	$219,564	Perm/Stevens
1245	Payne Drive	1	1	1	344.13	$22,793	$90,388	Perm/Stevens
1240	Payne Drive	1	1	0	37.72	$22,793	$101,704	Perm/Stevens
1194	Payne Drive	1	1	2	570.00	$29,466	$137,184	Perm/Stevens
1140	Payne Drive	1	1	5	844.52	$16,121	$51,684	Perm/Stevens
1215	Payne Drive	1	1	0	60.00	$16,121	$38,768	Perm/Stevens
	Payne Drive				***2130.97***	***$150,105***	***$639,291***	**Perm/Stevens**
	Dallas Court	1	1	3	314.63	$45,035	$94,390	Perm/Stevens
50	Pepper Drive	1	1	1	199.28	$18,345	$59,784	Adobe

160	Pine Lane	1	1	1	46.27	$18,345	$13,880	Adobe
	Loucks	1	1	1	108.82	$18,345	$32,647	Adobe
707	Edge Lane	1	1	3	604.89	$45,035	$181,468	Hale
40	Hawthorne Avenue	1	1	2	450.98	$31,690	$135,294	Hale
662	Oakwood Court	1	1	5	932.54	$71,725	$279,763	Hale
1868	Parma Way	1	1	4	720.65	$58,380	$216,194	Hale
		25	***25***	***40***	***10592.15***	***$658,800***	***$2,095,532***	

** This cost estimate does not include a contingency.

Milverton Rd.

650 Milverton Rd. (angled towards El Monte Rd.)

651 Milverton Rd.

Milverton Rd. facing El Monte Rd.

- **no drains/inlets/ etc are visible**

690 Milverton Rd.

50 Pepper Drive

facing Eleanor Ave.
inlet under car

50 Pepper Dr. (cont.)

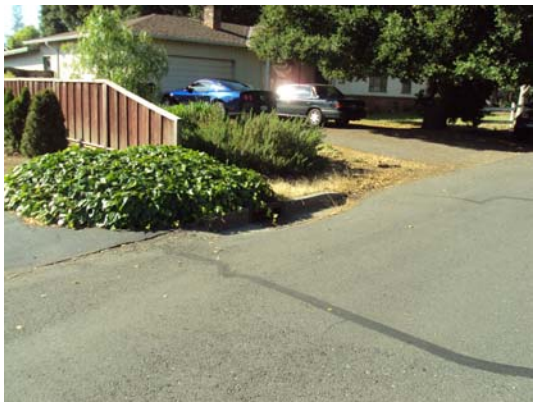
40 Hawthorne Ave

Alicia Way

485 Alicia Way

486 Alicia Way

501 Alicia Way



Distel Dr.

624 Distel Dr.

625 Distel Dr. (end of the drive)

Close-up of drain at the end of the drive

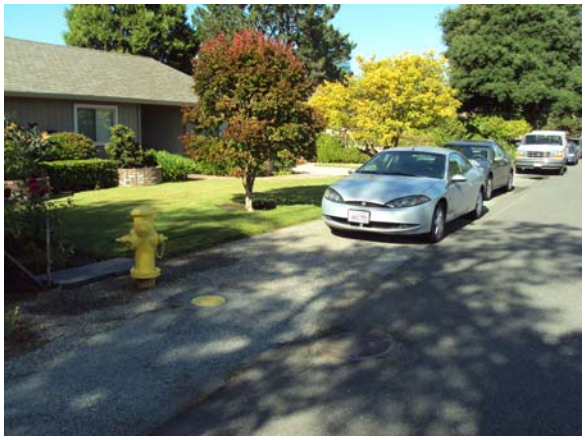
160 Pine Lane

160 Pine facing Patrick Way

160 Pine facing the corner of Cherry Ave.

Yerba Santa Ave.

100 Yerba Santa Ave.



Corner of Cherry Ave and Yerba Santa Ave. – house number 123 not visible.

Loucks Ave

Corner of Loucks and Mercedes Ave. angled towards El Camino

Loucks and Mercedes – facing N. San Antonio Rd.

707 Edge Lane

707 Edge Lane.

Corner of Edge and S. Springer Rd

Completely covered with grasses, plants.

(below) 707 Edge Ln.

Oakwood Ct.

662 Oakwood Ct

Property line 668 and 662 Oakwood Ct.

1868 Parma Way (?)

***number on house not visible**

Payne Drive

1245 Payne Dr.

1245 Payne Dr. (walking towards Heritage Cr.)

1240 Payne Dr.

1215 Payne Dr.

(to the side is a close- up of 1215 Payne)

1194 Payne Dr.

1140 Payne Dr.

(close-up)

1475 Oakhurst Ave.

Oakhurst towards Payne

Grant Rd.

1240 Grant Rd.

1240/1230 Grant Rd.

1240/1250 Grant Rd.

1270 Grant Rd.

1270 Grant Rd, corner with Paula Ct.

Dallas Ct.

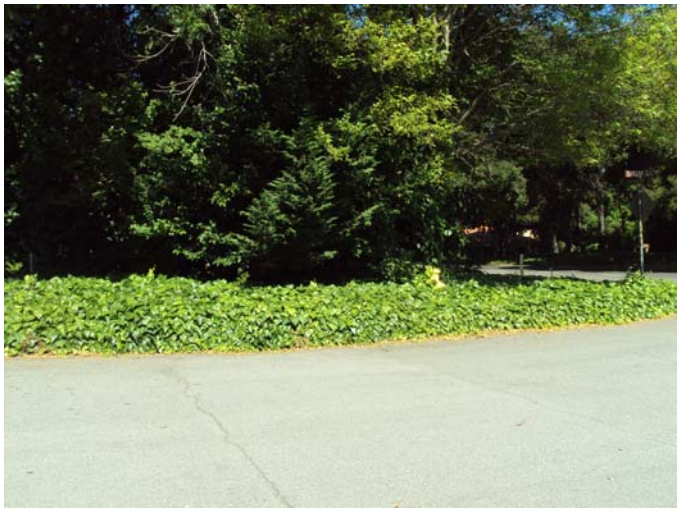
end of Court

End of Court

Court facing Fremont Rd.

Inlet at 1640 Dallas Ct.

Ct. to Fremont



Court at the corner of Fremont Rd.

RESOLUTION NO. 81

STATEMENT OF POLICY ON SEWER AND DRAINAGE WELLS

BE IT RESOLVED, that this Regional Water Pollution Control Board disapproves the construction and use of wells for the purpose of disposing of effluent from septic tanks or surface runoff from streets or highways except where such wells discharge into a formation which at no time will contain ground water fit for domestic, agricultural, or industrial use.

JOHN S. LONGWELL
Chairman

December 20, 1951

I, John B. Harrison, hereby certify that the foregoing is a true and correct copy of Resolution No. 81 and adopted by the Regional Water Pollution Control Board of Region No. 2, at its regular meeting on December 20, 1951.

JOHN B. HARRISON
Executive Officer
Regional Water Pollution Control
Board No. 2

EXPLANATION OF BOARD POLICY
AND
RESOLUTION NO. 81, STATING THE BOARD'S POLICY ON SEWER AND DRAINAGE WELLS

The use of wells for the purpose of disposing of effluent from septic tanks or for disposing of surface runoff from streets or highways, has for some time been a matter of study and investigation by this Board. As the result of such studies and investigations the Board has, with certain exceptions, become greatly concerned over the continuation of such practices. Some of the reasons for this concern are as follows:

a. The underground waters have been and will continue to be a most important source of supply for domestic, agricultural and industrial use. The economy of the Region is to a large extent built around the use of these underground waters. It is, therefore, essential that the basins and the water therein be protected against any conditions that might impair their use as a source of water supply.

b. Wells used for disposal of septic tank effluent or the disposal of surface runoff from streets or highways by-pass the normal processes of nature which occur at or near the surface of the soil. Plants take up water and dissolved substances through their root systems. Transpiration, evaporation, and capillary action are also at work. A conventional septic tank with a properly designed and constructed leaching field laid out horizontally near the surface of the ground permits the application of septic tank effluent over a relatively large area without imposing any appreciable pressure and, except for periods when the soil is saturated, the waste is retained in the surface soil in which surface phenomena are able to exert their beneficial influence. On the other hand, wells of the type under consideration discharge within a relatively small area and under a pressure head or potential pressure head which injects waste into sub-surface strata rapidly and unchanged in chemical quality.

c. It is not practicable to control the quality of septic tank effluent or street drainage nor to eliminate dissolved chemical substances or liquids which, if permitted to enter the ground water, would deny use of such water for domestic purposes because of taste, odor, or unpalatability. For similar reasons ground water pollution has occured due to the introduction of chemical substances which rendered it unfit for irrigational and higher industrial uses.

d. The only practical method of controlling underground water pollution is by preventing it in the first place. Unlike surface pollution which is susceptible of detection and correction in its early stages, underground water pollution is not usually noticed until the damage is done and rapid abatement of such underground water pollution is impractical.

e. Underground water pollution affects not only the water itself but the underground storage basin as well. The impracticability of flushing out such a storage basin or separating one portion of it from another by construction of dams or otherwise cleaning it up is readily apparent. The damage, once done, may be long lasting or permanent.

f. Pollution of underground waters and the storage basin itself may continue for years without being detected. Relatively small quantities of some pollutants may be introduced to underground waters by such wells over a long period of time and eventually cause cumulative damage of large proportions.

g. Wells discharging effluent from septic tanks or surface runoff from streets and highways may cause pollution of underground basins regardless of whether the ground water is at present well below the bottom of such wells. The ground water may rise during cycles of higher precipitation or due to the discharging of water of satisfactory quality into the underground basin through properly controlled percolation beds or recharge wells. The underground basins should, therefore, be maintained in good condition at all times to permit their probable future use for water storage. The use of such controlled recharging practices will undoubtedly increase in the future as the demand for more underground water storage increases.

With the purpose in mind of protecting and preserving the quality of the underground waters in this Region from pollution, the Board has adopted the following resolution:

* * *

RESOLUTION NO. 81

STATEMENT OF POLICY ON SEWER AND DRAINAGE WELLS

BE IT RESOLVED, that this Regional Water Pollution Control Board disapproves the construction and use of wells for the purpose of disposing of effluent from septic tanks or surface runoff from streets or highways except where such wells discharge into a formation which at no time will contain ground water fit for domestic, agricultural, or industrial use.

JOHN S. LONGWELL
Chairman

December 20, 1951

I, John B. Harrison, hereby certify that the foregoing is a true and correct copy of Resolution No. 81 and adopted by the Regional Water Pollution Control Board of Region No. 2, at its regular meeting on December 20, 1951.

JOHN B. HARRISON
Executive Officer
Regional Water Pollution Control
Board No. 2

* * *

Appendix L

SCVURPPP Work Plan

Santa Clara Valley
Urban Runoff
Pollution Prevention Program

March 2015

FY 2015-2016 Work Plan

Sections 1-16

Program, Co-permittee, and Regional Activities

Campbell • Cupertino • Los Altos • Los Altos Hills • Los Gatos • Milpitas • Monte Sereno • Mountain View • Palo Alto
San Jose • Santa Clara • Saratoga • Sunnyvale • Santa Clara County • Santa Clara Valley Water District

SECTION 1

INTRODUCTION

INTRODUCTION

This document contains a Work Plan for the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP or Program) and its Co-permittees for fiscal year (FY) 2015-2016. Actions described in the Work Plan are intended to serve as and in support of implementation tasks required by the Municipal Regional Stormwater NPDES Permit (MRP) for the San Francisco Bay Area. The Work Plan was developed in coordination with the development of the Program's FY 2015-2016 approved[1] budget and is consistent with the level of effort represented by the budget items. The Work Plan is for internal Program use[2].

The Work Plan includes clearly defined actions, responsibilities and schedules to be implemented by the Co-permittees in each individual jurisdiction and collectively through Program area-wide activities, as well as through collaborative efforts being coordinated by Phase I stormwater programs as part of Bay Area Stormwater Management Agencies Association (BASMAA). The Work Plan was developed to include new, expanded or redirected efforts required by the MRP, which was adopted October 14, 2009 and became effective December 1, 2009. Additionally, to the extent possible, it includes tasks associated with requirements anticipated in the reissued MRP.

The Program's FY 2015-2016 Work Plan is comprised of the following components:

1) Work Plan Tables for each MRP Provision; and,
2) FY 2015-2016 Program Budget Summary.

The MRP Provision Work Plan Tables include a description of all actions required for each MRP provision, organized by sub-provision (e.g., C.3) of the MRP. The tables include a goal statement for each sub-provision, the proposed action(s), implementation schedule and completion dates, and whether actions will be implemented at the Program level, Co-permittee level, and/or coordinated at the Regional level[3]. In this way, the Program's Work Plan can serve as a Co-permittee work plan or assist Co-permittees in developing their own more refined work plans. Please note that the numbering of the actions in the Work Plan tables does not always begin at #1 and/or numbers are skipped to remain consistent with numbering in tables from previous FY Work Plans.

The implementation schedules are shown by shaded cells for the four quarters of FY 2015-2016. Completion dates presented in **bold** are due dates specified in the MRP, and dates presented in *italics* are internal due dates based on the MRP-required completion dates. The format allows Co-permittees to quickly identify when actions/tasks should be underway; the date to expect the completion of Program and/or Regional (BASMAA) product(s); and, dates when Co-permittee products are required to be completed.

[1] The SCVURPPP Management Committee approved the FY 15-16 budget on December 18, 2014. Contact the Program Manager and/or key staff Dr. Adam Olivieri, P.E. (awo@eoainc.com), Ms. Jill Bicknell, P.E. (jcbicknell@eoainc.com) and Mr. Chris Sommers (csommers@eoainc.com) regarding any questions.

[2] Formal submission of the Work Plan to the Water Board and approval by the Water Board staff is not required by the MRP, however, it is valuable for Program budgeting and management.

[3] Table Legend: "X" = will implement at this level (Program or Co-permittee); "A" = assist with or develop guidance for implementation. Co-permittee assistance with a Program- or regional-level activity can consist of participation in ad hoc task groups or committees, review and approval of products, and/or sponsoring projects of regional benefit.

SECTION 2

MUNICIPAL OPERATIONS

Santa Clara Valley Urban Runoff Pollution Prevention Program

Provision C.2 - Municipal Operations

MRP Sub-Provision/Goal/Action	Program	Co-permittee	Regional	FY 15-16 Q1	FY 15-16 Q2	FY 15-16 Q3	FY 15-16 Q4	Completion Date (Unless Noted)[1]	Applicable Sub-provision
C.2.a. Street and Road Repair and Maintenance									
Goals: Develop and implement appropriate BMPs at street and road repair and/or maintenance sites to control debris and waste materials during road and parking lot installation repaving or repair maintenance activities, such as those described in the CASQA Handbook for Municipal Operations.									
Actions –									
a.1. Implement existing/modified Street and Road Repair and Maintenance BMPs		X						**Ongoing**	a.ii.(1)&(2)
a.3. Report on implementation of and compliance with street and road repair and maintenance BMPs in each Annual Report.	A	X						**9/15/2015**	a.iii.
C.2.b. Sidewalk/Plaza Maintenance and Pavement Washing									
Goal: Implement, and require to be implemented, BMPs for pavement washing, mobile cleaning, pressure wash operations in such locations as parking lots and garages, trash areas, gas station fueling areas, and sidewalk and plaza cleaning, which prohibit the discharge of polluted wash water and non-stormwater to storm drains.									
Actions –									
b.1. Implement existing/modified Sidewalk/Plaza Maintenance and Pavement Washing BMPs.		X						**Ongoing**	b.i.
b.4. Report implementation and compliance with these BMPs in the Annual Report.	A	X						**9/15/2015**	b.ii.
C.2.c. Bridge and Structure Maintenance and Graffiti Removal									
Goal: Implement appropriate BMPs to prevent polluted stormwater and non-stormwater discharges from bridges and structural maintenance activities directly over water or into storm drains. Implement BMPs for graffiti removal that prevent non-stormwater and wash water discharges into storm drains.									
Actions –									
c.1. Implement existing/modified Bridge Structure Maintenance and Graffiti Removal BMPs.		X						**Ongoing**	c.ii.(1)(2)(3)
c.3. Report implementation and compliance with these BMPs in the Annual Report.	A	X						**9/15/2015**	c.iii.

[1] Completion dates in bold are specified in MRP. Dates in italics are internal deadlines based on MRP requirements.Key: X = Implementation lead. A = assist or develop guidance for implementation.FY 15-16 Work Plan - C.2

Provision C.2 - Municipal Operations

MRP Sub-Provision/Goal/Action	Program	Co-permittee	Regional	FY 15-16 Q1	FY 15-16 Q2	FY 15-16 Q3	FY 15-16 Q4	Completion Date (Unless Noted)[1]	Applicable Sub-provision
C.2.d. Stormwater Pump Stations									
Goal: Prevent the discharge of water with low dissolved oxygen (DO) from pump stations, and explore the use of pump stations for trash capture and removal to protect beneficial uses of receiving waters.									
Actions –									
d.5. Inspect and collect DO data from applicable pump stations.		X						**Ongoing since July 2010**	d.ii.(2)
d.6. Implement appropriate management actions, as required, at pump stations whose discharges have DO levels at or below 3 mg/l.		X						**Ongoing**	d.ii.(3)
d.9. Maintain records of inspection, maitenance and implementation of corrective actions. Submit to WB upon request.	A	X						**Ongoing**	d.iii.
C.2.e. Rural Public Works Construction and Maintenance									
Goal: Implement BMPs for erosion and sediment control during and after construction or maintenance activities on rural roads, particularly adjacent to or within stream channels or wetlands. Provide training to rural roads maintenance staff at least twice within the permit term.									
Actions –									
e.1. Implement existing/modified Rural Public Works BMPs.		X						**Ongoing**	e.ii.(1) & (2)
e.4. Provide training to public works maintenance staff at least twice within Permit term (need for training in FY 15-16 to be determined).	A	X						**Twice during the Permit term (dates TBD) .** *Previous trainings 10/3-4/2011 and 11/3-4/2013.*	e.ii.(4)
e.5. Report implementation and compliance with BMPs, including reporting on increased maintenance in priority areas, in the Annual Report.	A	X						**9/15/2015**	e.iii.

[1] Completion dates in bold are specified in MRP. Dates in italics are internal deadlines based on MRP requirements.Key: X = Implementation lead. A = assist or develop guidance for implementation.FY 15-16 Work Plan - C.2

Provision C.2 - Municipal Operations

MRP Sub-Provision/Goal/Action	Program	Co-permittee	Regional	FY 15-16 Q1	FY 15-16 Q2	FY 15-16 Q3	FY 15-16 Q4	Completion Date (Unless Noted)[1]	Applicable Sub-provision
C.2.f. Corporation Yard BMP Implementation									
Goal: Develop and implement site specific Stormwater Pollution Prevention Plans (SWPPPs) for corporation yards.									
Actions –									
f.1. Continue to assist with corporation yard BMPs and SWPPPs.	A							**Ongoing as needed**	f.ii.
f.2. Conduct inspections of each corporation yard annually, between September 1 and September 30.		X						**Annually, Sept**	f.ii.(2)
f.3. Report results of inspections and any follow-up actions in the Annual Report.		X						**9/15/2015**	
C.2.g. General Assistance									
Goal: Provide general assistance and guidance for implementing Provision C.2.									
Actions-									
g.1 Continue to provide guidance on BMP implementation, monitoring, data management, and reporting. Administer and participate in the Municipal Maintenance AHTG.	X							**Ongoing as needed**	a.,b.,c.,e.

[1] Completion dates in bold are specified in MRP. Dates in italics are internal deadlines based on MRP requirements.Key: X = Implementation lead. A = assist or develop guidance for implementation.FY 15-16 Work Plan - C.2

SECTION 3

NEW DEVELOPMENT AND REDEVELOPMENT (C.3)

Santa Clara Valley Urban Runoff Pollution Prevention Program

Provision C.3 - New Development and Redevelopment

MRP Sub-Provision/Goal/Action	Program	Co-permittee	Regional	FY 15-16 Q1	FY 15-16 Q2	FY 15-16 Q3	FY 15-16 Q4	Completion Date (Unless Noted)[1]	Applicable Sub-provision
C.3.a. New Development and Redevelopment Performance Standard Implementation									
Goals: Update current legal authority, development review and permitting, environmental review, training, and outreach to address new C.3. requirements, and continue to implement. Encourage all projects not regulated by Provision C.3., but that are subject to the Permittees' planning, building, development, or other comparable review, to include adequate source control and site design measures.									
Actions –									
a.3. Continue to evaluate potential water quality effects and identify appropriate mitigation measures when conducting environmental reviews, such as under CEQA.		X						**Completed 12/1/2009; ongoing**	a.i.3
a.4. Conduct/attend Annual C.3. Workshop to train staff on C.3. requirements.	X	X						**Annually**	a.i.4
a.5. Provide training/assistance to internal department staff on C.3. requirements as appropriate	A	X						**As needed**	a.i.4
a.9.1. Continue updates to the C.3 Handbook and other guidance, based on experience with implementation of LID requirements, and updates to outreach flyers as needed.	X	A						***Ongoing; Update completed April 2012; Completed additional updates in April 2015***	a.iii.
a.10 Conduct a workshop or focus part of the Annual C.3 workshop on C.3 requirements and design of LID site measures for development community.	X	A						*TBD*	

[1] Completion dates in bold are specified in MRP. Dates in italics are internal deadlines based on MRP requirements.Key: X = Implementation lead. A = assist or develop guidance for implementation.FY 15-16 Work Plan - C.3

Santa Clara Valley Urban Runoff Pollution Prevention Program

Provision C.3 - New Development and Redevelopment

MRP Sub-Provision/Goal/Action	Program	Co-permittee	Regional	FY 15-16 Q1	FY 15-16 Q2	FY 15-16 Q3	FY 15-16 Q4	Completion Date (Unless Noted)[1]	Applicable Sub-provision
C.3.b. Regulated Projects									
Goal: Implement requirements for different categories of new development or redevelopment projects regulated under C.3.									
Actions –									
b.3.1 Participate in and chair the BASMAA Development Committee (assume 12 meetings during FY 15-16) to oversee development of regional MRP products and share information about C.3 implementation strategies and experience.	X	X	A					*Ongoing as needed*	b.iii.
b.3.2 Provide staff support to Co-permittee development of local GI plans and implementation of GI projects, including development of scoping plan as guidance for development of GI plans; providing model documents and examples; conducting educational/outreach meetings for Co-permittee department staff; and developing standard specifications. A work plan for this task will be developed and forwarded to the BATG and C.3 AHTGs prior to initiating.	X	X	A					*6/30/16 (schedule TBD)*	b.iii.
b.4 Provide staff support to Co-permittee implementation of local green streets projects. Task includes participation in the Prop 84-funded GreenPlan Bay Area Technical Advisory Committee (assume 2 meetings during FY 15-16) and assistance as needed to facilitate application of the GIS tool GreenPlan-IT to two watersheds in Santa Clara County. Program staff time represents part of the in-kind match for SCVURPPP/San Jose.	X	X						**Ongoing as needed**	b.v.1 and 2
b.4.1 Participate in BASMAA discussions of regional guidelines and funding issues for green streets projects, and review regional products and reports on behalf of SCVURPPP. Manage and represent SCVURPPP at the MRP 2.0 Steering Committee's Green Infrastructure (GI) Work Group and other regional GI meetings (assume 8 meetings during FY 15-16).								**Ongoing as needed**	
b.5.1 Continue to provide guidance and assistance with annual reporting of C.3. information.	A	X						**Annually (9/15/2015)**	b.v.1

[1] Completion dates in bold are specified in MRP. Dates in italics are internal deadlines based on MRP requirements.Key: X = Implementation lead. A = assist or develop guidance for implementation.FY 15-16 Work Plan - C.3

Provision C.3 - New Development and Redevelopment

MRP Sub-Provision/Goal/Action	Program	Co-permittee	Regional	FY 15-16 Q1	FY 15-16 Q2	FY 15-16 Q3	FY 15-16 Q4	Completion Date (Unless Noted)[1]	Applicable Sub-provision
b.6. Continue to assist Co-permittees with implementation of C.3 and LID on projects, including assistance with questions on specific projects and LID applicability and feasibility criteria, and other technical support and presentations. Continue to assist with the C3PO AHTG and work group meetings and action items.	X							*Ongoing*	b.i. & ii.
C.3.c. Low Impact Development									
Goal: Reduce runoff and mimic a site's predevelopment hydrology by minimizing disturbed areas and impervious cover and then infiltrating, storing, detaining, evapotranspiring, and/or biotreating stormwater close to its source. Develop guidance, criteria, procedures and specifications for implementing the new LID requirements.									
Actions –									
c.1. Require all Regulated Projects to treat 100% of C.3.d. runoff with LID measures, onsite or at a joint treatment facility, unless infeasibility is demonstrated.		X						**Ongoing beginning 12/1/2011 (12/1/2012 for public projects)**	c.i.2.b.
C.3.d. Numeric Sizing Criteria for Stormwater Treatment Systems									
Goal: To ensure that stormwater treatment systems constructed for Regulated Projects meet the appropriate hydraulic sizing criteria.									
Actions –									
d.1. Continue using the numeric sizing criteria for Regulated Projects.	A	X						**12/1/2009,** *ongoing*	d.i.
d.2. Continue implementing guidelines on using infiltration devices.	A	X						**12/1/2009,** *ongoing*	d.iv.

[1] Completion dates in bold are specified in MRP. Dates in italics are internal deadlines based on MRP requirements.Key: X = Implementation lead. A = assist or develop guidance for implementation.FY 15-16 Work Plan - C.3

Provision C.3 - New Development and Redevelopment

MRP Sub-Provision/Goal/Action	Program	Co-permittee	Regional	FY 15-16 Q1	FY 15-16 Q2	FY 15-16 Q3	FY 15-16 Q4	Completion Date (Unless Noted)[1]	Applicable Sub-provision
C.3.e. Alternative Compliance									
Goal: To allow a Regulated Project to treat a portion of runoff with LID measures at an offsite project in the same watershed or pay an in-lieu fee to a regional project.									
Actions –									
e.2. Apply LID Treatment Reduction Credit to Special Projects as needed.	A	X						**12/1/2011;** *Ongoing*	C.3.e.ii
e.4. Track and report Special Projects to the Water Board on ~~March 15 and~~ September 15 of each year.	A	X						**9/15/2015**	c.3.e.vi.
C.3.f. Alternative Certification of Stormwater Treatment Systems									
Goal: Allow a qualified third party reviewer to certify the adequacy of design of stormwater treatment measures (per C.3.d. and f.).									
Actions –									
C.3.g. Hydromodification Management (HM)									
Goal: Implement final HM requirements on applicable Regulated Projects, to protect receiving streams from increase in runoff peak flows, volumes and durations.									
Actions –									
g.2. Implement new HM requirements at applicable Regulated Projects. Program staff provide guidance on implementation of HM requirements, including use of the Bay Area Hydrology Model to size HM facilities.	A	X						**Ongoing since 12/1/2009**	g.i.
g.3. Report information on approved HM Projects per C.3.b.v. and C.3.g.iv.	A	X						**Annually since 9/15/10**	g.iv.

[1] Completion dates in bold are specified in MRP. Dates in italics are internal deadlines based on MRP requirements.Key: X = Implementation lead. A = assist or develop guidance for implementation.FY 15-16 Work Plan - C.3

Provision C.3 - New Development and Redevelopment

MRP Sub-Provision/Goal/Action	Program	Co-permittee	Regional	FY 15-16 Q1	FY 15-16 Q2	FY 15-16 Q3	FY 15-16 Q4	Completion Date (Unless Noted)[1]	Applicable Sub-provision
C.3.h. Operation and Maintenance of Stormwater Treatment Systems									
Goal: Implement an Operation and Maintenance (O&M) Verification Program to ensure the proper O&M of installed treatment control BMPs.									
Actions –									
h.1. Continue to implement a BMP O&M Verification Program. Program staff continue to assist with implementation of BMP O&M verification programs.	A	X						*Ongoing*	h.i.
h.3. Provide the list of newly installed stormwater treatment systems and HM controls to the County Vector Control District and Water Board by October 1 of each year.	X	A						**Annually (10/1/2015)**	h.ii., h.iv.
h.6. Continue to maintain and update a database of Regulated Projects that have installed stormwater treatment systems and HM controls.	A	X						*Ongoing since 2003*	h.ii.
h.10. Provide training for O&M inspectors and landscape maintenance staff and facility managers, as part of the C.3 or construction workshops.	X	A						*Spring/Summer 2015*	h.ii.
h.11 Provide updated guidance on O&M for LID treament measures as needed.	X	A						*Ongoing*	h.ii
C.3.i. Required Site Design Measures for Small Projects and Detached Single-Family Home Projects									
Goal: Require small projects to implement LID site design measures.									
Actions –									
i.4 Require development project applicants to implement requirements for site design measures for single family homes and small projects, and update outreach materials and other resources (such as standard specifications) as needed.	A	X						*Ongoing since Dec 2012*	C.3.i

[1] Completion dates in bold are specified in MRP. Dates in italics are internal deadlines based on MRP requirements.Key: X = Implementation lead. A = assist or develop guidance for implementation.FY 15-16 Work Plan - C.3

SECTION 4

INDUSTRIAL AND COMMERCIAL SITE CONTROL

Santa Clara Valley Urban Runoff Pollution Prevention Program

Provision C.4 - Industrial and Commercial Site Control

MRP Sub-Provision/Goal/Action	Program	Co-permittee	Regional	FY 15-16 Q1	FY 15-16 Q2	FY 15-16 Q3	FY 15-16 Q4	Completion Date (Unless Noted)[1]	Applicable Sub-provision
C.4.a. Legal Authority for Effective Site Management									
Goals: Establish sufficient legal enforcement authority to obtain effective stormwater pollutant control on industrial sites.									
Actions –									
a.1. Implement existing/revised legal authority.		X						**Ongoing**	a.i
C.4.b. Industrial and Commercial Business Inspection Plan (Inspection Plan)									
Goal: Develop and implement an inspection plan that will serve as a prioritized inspection work plan.									
Actions –									
b.1. Update and maintain a list of industrial and commercial facilities that could cause or contribute to pollution of stormwater runoff.	A	X						**Annually**	b.ii
b.2. Review existing inspection plans and update annually to include list of facilities to be inspected, priorities, mechanism to include newly opened businesses, and frequency of inspections.	A	X						**Annually**	b.ii
b.3. Implement current/revised inspection plans as appropriate.		X						**Ongoing**	b.ii
b.3.1. For each facility identified, maintain a database with the address, description of activity or pollutant source, inspection priority, frequency, and coverage under General Permit.	A	X						**Ongoing**	b.ii
b.4 Report list of all industrial and commercial facilities requiring inspections	A	X						**9/15/2015**	b.iii
b.5 Continue identifying PCBs and PCB-containing equipment during inspections.		X						**Ongoing**	C.12.a.iii
C.4.c. Enforcement Response Plan (ERP)									
Goal: Have an ERP that will serve as a reference document for inspection staff to take consistent actions to achieve timely and effective compliance from commercial and industrial site operators.									
Actions –									
c.3. Maintain adequate records to demonstrate compliance and appropriate follow-up enforcement responses for facilities inspected per the ERP.	A	X						**Ongoing**	c.ii.(4)

[1] Completion dates in bold are specified in MRP. Dates in italics are internal deadlines based on MRP requirements.Key: X = Implementation lead. A = assist or develop guidance for implementation.FY 15-16 Work Plan - C.4

Santa Clara Valley Urban Runoff Pollution Prevention Program

Provision C.4 - Industrial and Commercial Site Control

MRP Sub-Provision/Goal/Action	Program	Co-permittee	Regional	FY 15-16 Q1	FY 15-16 Q2	FY 15-16 Q3	FY 15-16 Q4	Completion Date (Unless Noted)[1]	Applicable Sub-provision
c.4 As needed and directed, modify and maintain database developed by the Program and used by individual Co-permittees.	X	A						**Completed 4/1/2010, Ongoing as needed**	
c.5. Report summary of inspection activities in Annual Report.	A	X						**9/15/2015**	c.iii
C.4.d. Inspections									
Goal: Conduct inspections according to Inspcetion Plan and ERP									
Actions-									
d.1 Conduct inspections to observe; 1) appropriate BMPs, 2) evidence of unauthorized discharges, illiticit connections, and potential dischares to stormwater, 3) noncompliance with Permittee ordinances, and 4) verification of coverage under Industrial General Permit	A	X						**Ongoing**	d.ii
d.2 Maintain adequate records of inspections	A	X						**Ongoing**	d.ii
d.3. Submit inspection data and results in the Annual Report each year.	A	X						**9/15/2016**	d.iii
C.4.e. Staff Training									
Goal: Provide focused training for inspectors annually, as required by the MRP									
Actions –									
d.1. Annually provide inspectors with focused training.	X	A						*Annually*	d.ii
d.2. Include training dates, training topics and percentage of inspectors attending the training in the Annual Report	A	X						**9/15/2015**	d.iii

[1] Completion dates in bold are specified in MRP. Dates in italics are internal deadlines based on MRP requirements.Key: X = Implementation lead. A = assist or develop guidance for implementation.FY 15-16 Work Plan - C.4

SECTION 5

ILLICIT DISCHARGE DETECTION AND ELIMINATION

Santa Clara Valley Urban Runoff Pollution Prevention Program

Provision C.5 - Illicit Discharge Detection and Elimination

MRP Sub-Provision/Goal/Action	Program	Co-permittee	Regional	FY 15-16 Q1	FY 15-16 Q2	FY 15-16 Q3	FY 15-16 Q4	Completion Date (Unless Noted)[1]	Applicable Sub-provision
C.5.a. Legal Authority									
Goals: Establish sufficient legal enforcement authority to prohibit and control illicit discharges and escalate stricter enforcement to achieve compliance.									
Actions –									
a.1. Implement current/revised legal authority.		X						**Ongoing**	a.ii.
C.5.b. Enforcement Response Plan (ERP)									
Goal: Have an ERP that will serve as a reference document for inspection staff to take consistent actions to achieve timely and effective abatement of illicit discharges.									
Actions – No actions for FY 14-15; all actions completed in FY 09-10.									
C.5.c. Spill and Dumping Response, Complaint Response, and Frequency of Inspections									
Goal: Provide a central contact point for Permittee staff and the public for spill and dumping complaints and response. At a minimum, the cental contract point shall include a phone number. As feasible, a user friendly web reporting form should be included.									
Actions –									
c.1. Have a central contact point including a phone number for complaints and spill reporting, and publicize this number to both internal Permittee staff and the public	A	X						**Completed 7/1/2010**	c.i
c.1.1 Update Permittee website with central contact point to report spills and dumping.		X						**Complete by 6/30/16**	c.ii
c.2. Complete and maintain spill/dumping response flow chart and phone tree or contact list for internal use that shows the various responsible agencies and their contacts, including who would be involved in illicit discharge incident response that goes beyond the Permittees immediate capabilities.	A	X						**Ongoing, Completed 7/1/2010**	c.1, c.ii
c.3. Submit: 1) spill and dumping phone number and, if used, web address 2) screen shot of Permittee's website showing central contact point, and 3) discussion of how the phone number and if used, web address is being publicized.	A	X						**9/15/2016 and 9/15/2019**	c.iii.

[1] Completion dates in bold are specified in MRP. Dates in italics are internal deadlines based on MRP requirements.Key: X = Implementation lead. A = assist or develop guidance for implementation.FY 15-16 Work Plan - C.5

Santa Clara Valley Urban Runoff Pollution Prevention Program

Provision C.5 - Illicit Discharge Detection and Elimination

MRP Sub-Provision/Goal/Action	Program	Co-permittee	Regional	FY 15-16 Q1	FY 15-16 Q2	FY 15-16 Q3	FY 15-16 Q4	Completion Date (Unless Noted)[1]	Applicable Sub-provision
C.5.d Control of Mobile Sources									
Goal: Establish oversight and control of pollutants associated with mobile business sources									
Actions –									
d.4 Use an outreach and education strategy (e.g. distrubtion of education materials) for outreach to mobile businesses operating within the Permittee's jurisdiction.	A	X						**Ongoing**	d.ii.(c)
d.5 Inspect mobile businesses as needed, on a complaint basis or as part of the commercial facility inspection plan.		X						**Ongoing**	d.ii.(d)
d.6. Cooperate regionally in implementing programs for mobile businesses, including sharing of mobile business inventories, BMP requirements, enforcement action information, and education, coordinating with BASMAA as appropriate.	A	A	X					**Ongoing**	d.ii.2.
d.7. Report implementation of minimum standards and BMPs for mobile businesses and their enforcement strategy in each Annual Report.	A	X						**9/15/2015**	d.iii.
C.5.e. Municipal Separate Storm Sewer System (MS4) Map Availability									
Goal: Make the maps of MS4 available									
Actions –									
e.1 Make maps of MS4 publicly available, either electronically or in hard copy, through a single point of contact.	A	X						**Completed 7/1/2010**	f.ii
e.1.1 Publicize availability of MS4 map through directories and websites	A	X						Ongoing	f.ii
e.2. Discuss how maps are made available to the public and how they are publicized (in 2016 and 2019 Annual Reports	A	X						**9/15/16 and 9/15/19**	f.iii.

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Santa Clara Valley Urban Runoff Pollution Prevention Program

Provision C.5 - Illicit Discharge Detection and Elimination

MRP Sub-Provision/Goal/Action	Program	Co-permittee	Regional	FY 15-16 Q1	FY 15-16 Q2	FY 15-16 Q3	FY 15-16 Q4	Completion Date (Unless Noted)[1]	Applicable Sub-provision
C.5.f. Tracking and Case Follow-up									
Goal: To log and track follow-up, response to, and resolution of discharges reported to the complaint/spill system									
Actions –									
f.1 Provide template Excel tabular system and update database, as directed.	X	A						*Completed FY 09-10*	
f.2. Create and maintain water quality spill and discharge complaint tracking and follow-up information in an electronic database or equivalent tabular system. Update Program database as needed.	A	X						**Completed 4/1/2010; ongoing maintenance as needed**	f.ii.
f.3. Report relevant data (as required Provision C.5.d.iii) in each Annual Report.	A	X						**9/15/2015**	f.iii.
C.5.g. Staff Training									
Goal: Provide focused training for inspectors annually (Note: Annual training not required in MRP but identifed as need by Co-permittees)									
Actions –									
g.1. Annually provide staff with focused training. Combine training with Industrial Inspector training.	X	A						***Annually***	

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SECTION 6

CONSTRUCTION SITE CONTROL

Santa Clara Valley Urban Runoff Pollution Prevention Program

Provision C.6 - Construction Site Control

MRP Sub-Provision/Goal/Action	Program	Co-permittee	Regional	FY 15-16 Q1	FY 15-16 Q2	FY 15-16 Q3	FY 15-16 Q4	Completion Date (Unless Noted)[1]	Applicable Sub-provision
C.6.a. Legal Authority for Effective Site Management									
Goals: Have adequate legal authority to address new C.6. requirements, and continue to implement.									
Actions – no actions for FY 15-16; all actions completed .									
C.6.b. Enforcement Response Plan (ERP)									
Goal: Have an Enforcement Response Plan (ERP) that will serve as a reference document for inspection staff to take consistent actions to achieve timely and effective compliance.									
b.1. Revisions / updates, as needed, to ERP based on Regional Board comments or changes in co-pernittee procedures.	A	X						*Ongoing, as needed*	b.ii.
C.6.c. Best Management Practices Categories									
Goal: Require all construction sites to have specific, and seasonally- and phase-appropriate, effective BMPs in 6 categories: 1) erosion control, 2) run-on and run-off control, 3) sediment control, 4) active treatment systems (as needed), 5) good site management and 6) non-stormwater management.									
Actions –									
c.1. Provide outreach pieces on six BMP categories and other outreach as needed, working collaboratively with BASMAA.	A	A	X					*Ongoing, as needed*	c.ii.
C.6.d. Plan Approval Process									
Goal: Have adequate development review and permitting procedures to address new C.6 requirements including review of erosion control plans for consistency with local requirements, appropriateness and adequacy of proposed BMPs for each site before issuance of grading permits.									
Actions –									
d.3. Provide educational materials to site operators and developers.		X						**Ongoing**	d.ii.3

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Santa Clara Valley Urban Runoff Pollution Prevention Program

Provision C.6 - Construction Site Control

MRP Sub-Provision/Goal/Action	Program	Co-permittee	Regional	FY 15-16 Q1	FY 15-16 Q2	FY 15-16 Q3	FY 15-16 Q4	Completion Date (Unless Noted)[1]	Applicable Sub-provision
C.6.e. Inspections									
Goal: Implement a construction site inspection program to ensure compliance with local ordinances and effectiveness of BMPs.									
Actions –									
e.1. Notify all site developers and/or owners disturbing one acre or more of soil to prepare for the upcoming wet season.		X						*Ongoing, 9/1/2015*	e.ii.1
e.3. Conduct monthly inspections during the wet season for sites disturbing one acre or more of land, hillside projects, and high priority sites.		X						**Annually during wet season**	e.ii.2
e.8. Track all inspections in an electronic database or tabular format.		X						**Begin 12/1/2009, ongoing**	e.ii.4
e.9. Summarize inspection information in Annual Reports	A	X						**9/15/2015**	e.iii
e.11. Continue to assist Co-permittees with inspection and enforcement issues, data collection efforts, data management, and reporting, as needed.	X	A						*Ongoing*	e.ii.& e.iii
C.6.f. Staff Training									
Goal: Provide training or access to training for staff conducting construction site stormwater inspections. The MRP requires training at least every other year.									
Actions –									
f.1. Provide training to construction inspectors and internal department staff on C.6 requirements as appropriate.	X	X						**Annually**	f.ii
f.2. Report on training topics covered, dates of training, and the percentage of inspectors attending each training in each Annual Report.	A	X						**9/15/2015**	f.iii

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SECTION 7

PUBLIC INFORMATION AND OUTREACH

Santa Clara Valley Urban Runoff Pollution Prevention Program

Provision C.7 - Public Information and Outreach

MRP Sub-Provision/Goal/Action	Program	Co-permittee	Regional	FY 15-16 Q1	FY 15-16 Q2	FY 15-16 Q3	FY 15-16 Q4	Completion Date (Unless Noted)[1]	Applicable Sub-provision
C.7.a. Storm Drain Inlet Marking									
Goals: To mark, inspect and maintain at least 80% of municipally-maintained storm drain inlets with no dumping message or equivalent once per 5-year permit cycle, and to require inlet marking by project developers of newly approved, privately maintained streets.									
Actions –									
a.1. Mark, inspect and/or maintain markings of at least 80 percent of municipality-maintained storm drain inlets to ensure they are legibly labeled with a no dumping message or equivalent, once per permit term.		X						**Ongoing**	a.ii
a.2. For newly developed, privately maintained streets, require inlet marking by the project developer upon construction and maintenance of markings through the development maintenance entity. Verify markings prior to acceptance of the project.		X						**Ongoing**	a.i.
C.7.b. Advertising Campaigns									
Goal: Participate in or contribute to advertising campaigns on trash/litter in waterways and pesticides with the goal of significantly increasing overall awareness of stormwater runoff pollution prevention messages and behavior changes in target audience.									
Actions –									
b.1. Continue to implement the Watershed Watch Campaign to raise awareness about stormwater pollution prevention, trash in waterways, and reducing the impact of urban pesticides. Program staff will work with AdManor (Watershed Watch Campaign consultant) to implement the Campaign.	X	A						**Ongoing**	b.i.
b.1.1. Continue to provide funding for a regional advertising campaign on litter, such as the Be the Street Campaign or the City of San Jose's outreach campaign with the Earthquakes Soccer Team.	A	X	X					**Ongoing**	b.i

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Provision C.7 - Public Information and Outreach

MRP Sub-Provision/Goal/Action	Program	Co-permittee	Regional	FY 15-16 Q1	FY 15-16 Q2	FY 15-16 Q3	FY 15-16 Q4	Completion Date (Unless Noted)[1]	Applicable Sub-provision
C.7.c. Media Relations – Use of Free Media									
Goal: Participate in or contribute to a media relations campaign. Maximize use of free media/media coverage with the objective of significantly increasing overall awareness of stormwater pollution prevention messages and associated behavior change in target audiences, and to achieve public goals.									
Actions –									
c.1. Participate in the BASMAA Media Relations Campaign to conduct a minimum of six pitches per year at the county-wide program, regional, and/or local levels. Local media relations will be conducted as needed through Watershed Watch Campaign implementation.	A	A	X					**Ongoing**	c.i., c.ii.
c.2. Report on the details of each media pitch, such as the media, date, and content of the pitch conducted each year.	X		X					**9/15/2015**	c.iii.
C.7.d. Stormwater Point of Contact									
Goal: Create and maintain a point of contact (phone number or website) to provide the public with information on watershed characteristics and stormwater pollution prevention alternatives									
Actions –									
d.1. Continue to maintain and publicize the Watershed Watch website (maintained by AdManor with input from Program staff) and the SCVURPPP and Watershed Watch hotlines (maintained by Program staff).	X	A						**Ongoing**	d.i., ii.
d.2. Continue to maintain and publicize Co-permittee phone numbers for reporting illegal dumping.	A	X						**Ongoing**	d.i., ii.
d.3. Continue to maintain and publicize the BASMAA Baywise website.	A	A	X					**Ongoing**	
C.7.e. Public Outreach Events									
Goal: Participate in and/or host events (e.g., community events, street fairs and farmers markets) to reach a broad spectrum of the community with both general and specific stormwater runoff pollution prevention messages.									
Actions –									
e.1. The Program will annually participate in 8 outreach events and collect data on participation. Co-permittees and AdManor will help with staffing. Co-permittee may conduct additional outreach events locally.	X	X						**Ongoing**	e.i., ii.

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Provision C.7 - Public Information and Outreach

MRP Sub-Provision/Goal/Action	Program	Co-permittee	Regional	FY 15-16 Q1	FY 15-16 Q2	FY 15-16 Q3	FY 15-16 Q4	Completion Date (Unless Noted)[1]	Applicable Sub-provision
e.2. Develop and print brochures and other outreach materials as needed. Coordinate with Admanor as needed.	X	A						**As needed**	
e.3. In the Annual Report, provide details of each outreach event, data on participation, and assess the effectiveness of efforts.	X	X						**9/15/2015**	e.iii.
C.7.f. Watershed Stewardship Collaborative Efforts									
Goal: Support watershed stewardship collaborative efforts of community groups (e.g., the Santa Clara Basin Watershed Management Initiative, and "friends of creek" groups). Coordinate with existing groups to further stewardship efforts.									
Actions –									
f.1. Program will continue to participate in and support WMI activities including Steering Committee, Zero Litter Initiative, Land Use Subgroup and Product Action Subgroup. Co-permittees may continue to participate in and/or support the WMI and/or support other local creek groups or watershed councils.	X	A						**Ongoing**	f.i., ii.
f.1.1. Participate in and Chair the Land Use Subgroup if activated. Develop outreach pieces as needed and assist in implementing the Annual C.3. Workshop.	X	A						**Ongoing**	
f.1.1 Host and maintain WMI website.	X	A						Beginning 7/1/15, Ongoing	f.i., ii.
f.2. In each Annual Report, provide the level of effort, describe support given, activities implemented and evaluation of effectiveness.	X							**9/15/2015**	f.iii.
C.7.g. Citizen Involvement Events									
Goal: Individually or collectively support citizen involvement events, as required by C.7.g.ii., Table 7.2, which provide the opportunity for citizens to directly participate in water quality and aquatic habitat improvement, such as clean-up events, volunteer monitoring, community grants, etc.									
Actions –									
g.1. Program will continue to support creek cleanups by providing funding to advertise the 2015 National River Clean-up Day. The Program will also support programs at Alviso Education Center by continuing to fund a full-time interpretive specialist position at the Alviso Education Center to conduct the Watershed Watchers Program. Co-permittees may conduct additional activities locally.	X	X						**Ongoing**	g.i., ii.

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Provision C.7 - Public Information and Outreach

MRP Sub-Provision/Goal/Action	Program	Co-permittee	Regional	FY 15-16 Q1	FY 15-16 Q2	FY 15-16 Q3	FY 15-16 Q4	Completion Date (Unless Noted)[1]	Applicable Sub-provision
g.2. In each Annual Report, provide details of each citizen involvement event and evaluate the effectiveness of outreach.	X	X						**9/15/2015**	g.iii.
C.7.h. School-Age Children Outreach									
Goal: Implement outreach activities designed to change specific behaviors and/or increase awareness in school-age children (K through 12), with the objective of significantly increasing their overall awareness of stormwater and/or watershed message(s) and to cause behavior change(s).									
Actions –									
h.1. Continue to sponsor ZunZun school assemblies at elementary schools in Santa Clara Valley, and assess effectiveness of efforts.	X	A						**Ongoing**	h.i., ii.
h.2. Conduct outreach to school-age children through the Watershed Watchers Program at the Alviso Education Center and other local (Co-permittee) outreach programs, and assess effectiveness of efforts.	X	X						**Ongoing**	h.i., ii.
h.3. In each Annual Report, provide the level of effort, spectrum of children reached, methods used and effectiveness evaluation.	X	X						**9/15/2015**	h.iii.
C.7.i. Outreach to Municipal Officials									
Goal: To conduct outreach to municipal officials and increase overall awareness of stormwater and/or watershed message(s) among regional municipal officials.									
Actions –									
i.1. Make presentations to City/County managers, public works and planning officials, at least once per permit cycle, and assist Co-permittees with outreach materials as needed.	X	X						**Ongoing**	i.i.

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SECTION 8

WATER QUALITY MONITORING

Santa Clara Valley Urban Runoff Pollution Prevention Program

Provision C.8 - Water Quality Monitoring

MRP Sub-Provision/Goal/Action	Program	Co-permittee	Regional	FY 15-16 Q1	FY 15-16 Q2	FY 15-16 Q3	FY 15-16 Q4	Completion Date (Unless Noted)[1]	Applicable Sub-provision
C.8.a. Compliance Options									
Goals: Define Monitoring Collaborative through a Regional Monitoring Collaborative (RMC) Work Plan; provide documentation to Water Board by July 1, 2010 confirming whether monitoring will be conducted individually or through monitoring collaborative; develop the tools necessary to effectively conduct creek status monitoring (per MRP requirements) and insure data quality; and, manage all aspects of water quality monitoring required by the MRP.									
Actions –									
a.9 Manage all aspects of SCVURPPP water quality monitoring required by Provision C.8 of the MRP	X							*Ongoing*	all
a.10 Continue participating in the BASMAA Regional Monitoring Coalition (RMC) on behalf of the Program including active participation and leadership in RMC workgroup meetings, review and comments on RMC products, and managing review of RMC products by Co-permittees	X	A						*Ongoing*	all
C.8.b. SF Bay Monitoring RMP									
Goal: Financially contribute to and participate in the San Francisco Estuary Regional Monitoring Program for Water Quality (RMP).									
Actions –									
b.1 Financially contribute to the San Francisco Estuary Regional Monitoring Program for Water Quality (RMP)	X							**Annually**	b.
b.2. On behalf of BASMAA, participate in RMP steering and technical review committees, and workgroups	X		X					*Ongoing*	b.
C.8.c. Creeks Status Monitoring									
Goal: Conduct creek status monitoring (per MRP requirements), including field work, sample collection and processing, and laboratory analyses in coordination with other participants of the BASMAA Regional Monitoring Coalition (RMC).									
Actions –									
c.6. Prepare for creek status monitoring, including equipment and field supply preparation, site reconnaissance, and final site selection.	X	A						*Ongoing*	c.ii
c.7. Conduct wet weather water toxicity monitoring.	X							**Winter FY 15-16**	c.ii
c.8. Conduct biological assessments, monitor chlorine, continuous general water quality (sondes), bedded sediment toxicity and pollutants, CRAM, and water column toxicity monitoring.	X	A						**Spring/ Summer 2016**	c.ii

[1] Completion dates in bold are specified in MRP. Dates in italics are internal deadlines based on MRP requirements.Key: X = Implementation lead. A = assist or develop guidance for implementation.FY 15-16 Work Plan - C.8

Santa Clara Valley Urban Runoff Pollution Prevention Program

Provision C.8 - Water Quality Monitoring

MRP Sub-Provision/Goal/Action	Program	Co-permittee	Regional	FY 15-16 Q1	FY 15-16 Q2	FY 15-16 Q3	FY 15-16 Q4	Completion Date (Unless Noted)[1]	Applicable Sub-provision
C.8.d. Monitoring Projects									
Goal: Conduct monitoring projects: stressor/source identification, BMP effectiveness investigation, Geomorphic project.									
Actions –									
d.7 Continue conducting a follow-up/investigative monitoring project in Upper Penitencia creek to determine the potential causes of biological conditions observed via creek status monitoring.	X	A						*Ongoing*	d.i
C.8.e. Pollutants of Concern & Long-Term Trends Monitoring									
Goal: Assess inputs of Pollutants of Concern to the Bay from local tributaries and urban runoff, assess progress toward achieving wasteload allocations for TMDLs and help resolve uncertainties associated with loading estimates for these pollutants.									
Actions –									
e. 1 - Small Tributaries Loading:									
vii. Continue conducting POC monitoring at Guadalupe River and Pulgas Creek pumpstation (San Mateo County) stations at a level equal to approximately 33% of the overall regional costs associated with POC loads monitoring, using methodologies and sites described in the BASMAA RMC Multi-Year Plan.	X		X					**Ongoing, began October 2012**	e.i
e.2 - Long-Term Trends Monitoring:									
i. Track implementation of SWAMP's Statewide Pollutant Trends (SPoT) program to ensure compliance with MRP provision C.8.e. Prepare alternative strategy should SWAMP monitoring not sufficiently comply with MRP requirements.	X		X					*Ongoing*	e.ii
C.8.f. Citizen Monitoring									
Goal: Encourage citizen monitoring and incorporate applicable stakeholder information and comments into data analyses and reporting.									
Actions –									
f.1. Encourage Citizen Monitoring through coordination with existing monitoring groups (e.g., Stevens-Permanente Watershed Council).	X	X						**Ongoing**	f.i
f.2. Make monitoring plans and reports available to citizens and stakeholders for comment.	X							**Ongoing**	f.ii
f.3. Provide technical support to the Stevens-Permanente Watershed Council's Volunteer Monitoring and Assessment Program.	X	A						*Ongoing*	f.i

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Santa Clara Valley Urban Runoff Pollution Prevention Program

Provision C.8 - Water Quality Monitoring

MRP Sub-Provision/Goal/Action	Program	Co-permittee	Regional	FY 15-16 Q1	FY 15-16 Q2	FY 15-16 Q3	FY 15-16 Q4	Completion Date (Unless Noted)[1]	Applicable Sub-provision
C.8.g. Reporting									
Goal: Report on monitoring activities, results, conclusions and next steps consistent with MRP requirements.									
Actions –									
g.2. Develop and submit electronic creek status monitoring data to Water Board.	X							**1/15/2016**	
g.3. Develop and submit Urban Creeks Monitoring Report to Water Board.	X	A	X					**3/15/2016**	
C.8.h. Monitoring Protocols and Data Quality									
Goal: Coordinate and manage the programs quality assurance program and data management system for all Program-collected monitoring data									
Actions –									
h.1. Enter collected creek status monitoring data collected into the Program's information management system	X							*Ongoing*	
h.2. Conduct quality assurance procedures on creek status monitoring data.	X							*Ongoing*	
h.3. Manage POC Monitoring Subcontractor (SFEI) on data quality assurance procedures and information management	X		X					*Ongoing*	

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SECTION 9

PESTICIDES TOXICITY CONTROL

Santa Clara Valley Urban Runoff Pollution Prevention Program

Provision C.9 - Pesticides Toxicity Control

MRP Sub-Provision/Goal/Action	Program	Co-permittee	Regional	FY 15-16 Q1	FY 15-16 Q2	FY 15-16 Q3	FY 15-16 Q4	Completion Date (Unless Noted)[1]	Applicable Sub-provision
C.9.a. Maintain and Implement IPM Policy or Ordinance and Standard Operating Procedures									
Goal: To maintain an IPM Policy or Ordinance and written standard operating procedures (SOPs) for pesticide use that ensure implementation of the IPM policy or ordinance and require municipal employees and contractors to adhere to the IPM standard operating procedures.									
Actions –									
a.1. Require municipal employees and contractors to adhere to the IPM Policy/Ordinance and standard operating procedures.		X						**Ongoing**	a.i
a.2 Annually, Permitteess shall certify that they are implementingto the IPM Policy/Ordinance and standard operating procedures.	A	X						**9/15/2016**	a.iii (1)
a.3. Report on IPM implementation by showing trends in quantities and types of pesticide used, and suggest reasons for increases in use of pesticides that threaten water quality.	A	X						**9/15/2015**	b.ii.(1)
a.3. Annually, provide brief description of a minimum of three IPM actions implemented in the reporting yar, focusing to the extent possible on new or enhanced actions taken	A	X						**9/15/2016**	b.ii(2)
a.4. Maintain pesticide application standard operating procedures and submit upon request..		X						**Ongoing**	b.ii.(3)
C.9.b. Training of Municipal Employees									
Goal: To ensure that all municipal employees who, within the scope of their duties, apply or use pesticides that threaten water quality are trained in IPM practices and the Permittee's IPM policy. Training frequency not explicit in MRP, but annual training recommended.									
Actions –									
b.1. Ensure that all municipal employees who, within the scope of their duties, apply or use pesticides that threaten water quality are trained in IPM practices and the Permittee's IPM policy, receive annual training.	A	X						**Ongoing**	b.i
b.2. Annually, report on the percentage of municipal employees who apply pesticides and have received training in IPM Policy/SOPs within the last year	A	X						**9/15/2015**	b.ii.(1)
b.3 In the Annual Report, briefly describe the type of training (tailgate, external agency etc.)	A	X						**9/15/2016**	b.ii. (1)

[1] Completion dates in bold are specified in MRP. Dates in italics are internal deadlines based on MRP requirements.Key: X = Implementation lead. A = assist or develop guidance for implementation.FY 15-16 Work Plan - C.9

Provision C.9 - Pesticides Toxicity Control

MRP Sub-Provision/Goal/Action	Program	Co-permittee	Regional	FY 15-16 Q1	FY 15-16 Q2	FY 15-16 Q3	FY 15-16 Q4	Completion Date (Unless Noted)[1]	Applicable Sub-provision
c.3. Compile training materials (e.g., course outline, date, attendees) for submittal to Water Board upon request.	A	X						**As needed**	c.ii.(2)
C.9.c. Require Contractors to Implement IPM									
Goal: To hire IPM-certified contractors and include contract specifications requiring contractors to implement IPM no later than July 1, 2010.									
Actions –									
c.1. Hire IPM-certified contractors or include contract specifications requiring contractors to implement IPM. Include evidence of compliance in each annual report.	A	X						**Ongoing, starting FY 15-16**	c.i
c.2. Provide guidance on potential future MRP requirements for Permitees to "observe contractor activities to verfiy full implementation of IPM techniques, or at a minimum, evaluate the lists of pesticides and amounts of active ingredients use."	A	X						**Ongoing, starting FY 15-16**	c.ii.
c.3 Provide guidance on potential future MRP requirements regarding Permittees "stating how contractor complaince with IPM policies was verfied and any actions taken or needed to correct contractor performance."	X	A						**9/15/2016**	c.iii
C.9.d. Interface with County Agriculture Officials									
Goal: To maintain regular communications with county agricultural commissioners (or other appropriate State and/or local agencies) to get input and assistance on urban pest management practices and use of pesticides and use of pesticides; inform them of water quality issues related to pesticides; report violations of pesticides regulations (e.g., illegal handling) associated with stormwater management.									
Actions –									
d.1. Maintain communication with County Agricultural Commissioner's office to inform them of water quality issues related to pesticides and obtain their input and assistance on urban pest management practices and use of pesticides.	X	A						**Ongoing**	d.i
d.2. Report any violations of pesticide regulations (e.g., illegal handling) associated with stormwater management to the Ag. Commissioner.	A	X						**Ongoing**	d.ii

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Provision C.9 - Pesticides Toxicity Control

MRP Sub-Provision/Goal/Action	Program	Co-permittee	Regional	FY 15-16 Q1	FY 15-16 Q2	FY 15-16 Q3	FY 15-16 Q4	Completion Date (Unless Noted)[1]	Applicable Sub-provision
d.3.Report on improper pesticide usage reported to County Ag. Commissioner and follow-up actions to correct violations.	A	X						**9/15/2015**	d.ii
d.3. In the Annual Report, briefly describe each of the three types of communications with County Ag. Commissioner and follow-up actions to correct violations.	A	X						**9/15/2016**	d.ii
C.9.e. Track and Participate in Relevant Regulatory Processes									
Goal: Track and participate in relevant regulatory processes (may be done jointly with other Permittees, such as through CASQA or BASMAA and/or the Urban Pesticide Pollution Prevention project).									
Actions –									
e.1. Participate in CASQA Pesticides Subcommittee meetings, develop response letters to proposed regulations (as needed), participate in UP3.	X	A						**Ongoing**	e.
e.2. Report participation in relevant regulatory processes and list information submitted. Participation may be an individual or regional effort.	X	A						**9/15/2015**	e.ii
C.9.g. Evaluate Implementation of Source Control Actions Relating to Pesticides									
Goal: Evaluate the effectiveness of control measures implemented, attainment of TMDL targets, and identify improvements needed.									
Actions –									
No actions in FY 15-16 (all completed in FY 13-14)									

[1] Completion dates in bold are specified in MRP. Dates in italics are internal deadlines based on MRP requirements.Key: X = Implementation lead. A = assist or develop guidance for implementation.FY 15-16 Work Plan - C.9

Santa Clara Valley Urban Runoff Pollution Prevention Program

Provision C.9 - Pesticides Toxicity Control

MRP Sub-Provision/Goal/Action	Program	Co-permittee	Regional	FY 15-16 Q1	FY 15-16 Q2	FY 15-16 Q3	FY 15-16 Q4	Completion Date (Unless Noted)[1]	Applicable Sub-provision
C.9.e. Public Outreach									
Goal: To develop and implement public outreach related to reducing pesticide use and encouraging private landscpare irrigation management that minimizes pesticide runoff.									
Actions –									
e.1. Conduct outreach to consumers at the point of purchase; provide targeted information on proper pesticide use and disposal, potential adverse impacts on water quality, and less toxic methods of pest prevention and control; and participate in and provide resources for the "Our Water, Our World" program or a functionally equivalent pesticide use reduction outreach program. Provide feedback on the regional OWOW Program.	X	A	A					**Ongoing**	e.ii (1)
e.2. In the Annual Report, provide a reference to the OWOW report that summarizes regional point-of-purchase outreach actions.	X	X	A					**9/15/2015**	e.iii
e.3. Conduct outreach to residents who use or contract for structural pest control. Provide tips for hiring structural pest control.	X	X	A					**Ongoing**	e.ii (2)
e.4 In the Annual Report, describe outreach to residents who contract for structural pest control or provide a reference to a report that summarizes this effort	X		A						e.iii
e.5 Continue to support the Santa Clara Countywide Eco-Gardens Program through Work Group meetings and provide content for the Eco-Gardener website, as needed. Budget for this task is available under Provision C.7 budget.	X	A						**Ongoing**	
e..6. Work with DPR, county agricultural commissioners, UC-IPM, BASMAA, Urban Pesticide Committee, EcoWise Certified Program (or other functionally equivalent certification program), Bio-integral Resource Center and/or others to promote IPM and IPM certification programs to pest control professionals	X	A	X					**Ongoing**	*e.* ii (3)

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Provision C.9 - Pesticides Toxicity Control

MRP Sub-Provision/Goal/Action	Program	Co-permittee	Regional	FY 15-16 Q1	FY 15-16 Q2	FY 15-16 Q3	FY 15-16 Q4	Completion Date (Unless Noted)[1]	Applicable Sub-provision
e.7. Continue to support the Green Gardener Training Program for professional landscape workers focused on integrated pest management and techniques that protect water quality	X	A						*Ongoing*	*e.* ii (3)
e.8. In each Annual Report, describe regional participation and reference a report that summarizes outreach to pest control operators (PCOs) and landscapers and/or describe local PCO outreach efforts.	X	A	A					**9/15/2015**	e.iii
C.9.f. Track and Participate in Relevant Regulatory Processes									
Goal: Track and participate in relevant regulatory processes (may be done jointly with other Permittees, such as through CASQA or BASMAA and/or the Urban Pesticide Pollution Prevention project).									
Actions –									
f.1. Participate in CASQA Pesticides Subcommittee meetings, develop response letters to proposed regulations (as needed), participate in UP3.	X	A						**Ongoing**	e.
f.2. Report participation in relevant regulatory processes and list information submitted. Participation may be an individual or regional effort.	X	A						**9/15/2015**	e.ii
C.9.g. Evaluate Implementation of Source Control Actions Relating to Pesticides									
Goal: Evaluate the effectiveness of control measures implemented, attainment of TMDL targets, and identify improvements needed.									
Actions –									
g.1. Evaluate the effectiveness of source control measures implemented and the attainment of pesticide concentration and toxicity targets for water and sediment from monitoring data. Identify improvements to existing control measures and/or additional control measures, if needed, to attain targets with an implementation time schedule. Summarize findings in FY 18-19 Annual Report	X	A						**9/15/2019**	g.ii.

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SECTION 10

TRASH LOAD REDUCTION

Santa Clara Valley Urban Runoff Pollution Prevention Program

Provision C.10 - Trash Load Reduction

MRP Sub-Provision/Goal/Action	Program	Co-permittee	Regional	FY 15-16 Q1	FY 15-16 Q2	FY 15-16 Q3	FY 15-16 Q4	Completion Date (Unless Noted)[1]	Applicable Sub-provision
C.10.a. Short-Term Trash Load Reduction									
Goals: To develop and implement a Short-Term Trash Load Reduction Plan, including a baseline loads assessment and load reduction tracking method.									
Actions –									
a.1- Short-Term Trash Loading Reduction Plan:									
No actions in FY 15-16 (all completed in FY 11-12)									a.iii.
a.2. Baseline Loading Estimates:									
No actions in FY 15-16 (all completed in previous FYs)									a.iii.
a.3 - Load Reduction Tracking Method									
v. Provide work plan to the Trash and Budget AHTGs prior to task implementation.	X								a.iii.
vi. Conduct pilot on-land visual assessments in trash management areas within each Permittee's jurisdictional area.	X	A						*Ongoing*	a.iii.
vii. Develop and maintain a data management system to manage on-land assessment information.	X	A						*Ongoing*	a.iii.
a.4 - Minimum Trash Full Capture Device Installation									
iii. Identify locations and select types of full capture treatment devices that will be installed.	A	X						*Ongoing*	a.iii.
vi. Continue managing the database of Full Trash Capture devices to assist with O&M verification inspection reporting and effectiveness analysis.	X							*Ongoing*	a.iii.
vi. Provide guidance and training in coordination with C.2 - Municipal Operations.	X	A	A					*Ongoing*	a.iii.

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Santa Clara Valley Urban Runoff Pollution Prevention Program

Provision C.10 - Trash Load Reduction

MRP Sub-Provision/Goal/Action	Program	Co-permittee	Regional	FY 15-16 Q1	FY 15-16 Q2	FY 15-16 Q3	FY 15-16 Q4	Completion Date (Unless Noted)[1]	Applicable Sub-provision
C.10.b. Trash Hot Spot Selection and Cleanup									
Goal: To identify and clean up trash hot spots annually to achieve the multiple benefits of beginning to reduce the trash deposited at these sites and to learn more about the sources and patterns of trash loading.									
Actions –									
b.9. Cleanup Trash at Final Trash Hot Spots to a level of "no visual impact" at least one time per year .		X						*Ongoing*	b.i.
b.10. Submit trash assessment data to SCVURPPP staff.		X						*Ongoing*	b.iii.
b.11. Populate FY 14-15 annual report tables with Co-permittee trash assessment data.	X							*8/15/2015*	b.i.
b.12. Provide on-going management of the hot spot database, compile assessment data and develop summary report.	X	A						*Ongoing 9/15/2015*	b.iii.
C.10.c. Long-Term Trash Load Reduction									
Goal: To develop a Long-Term Trash Load Reduction Plan and implementation schedule to attain a 70% and 100% Trash Load Reduction									
Actions –									
vi. Provide technical assistance to Co-permittees in implementing long-term trash load reduction plans.	A	X						*Ongoing*	
C.10.d. Reporting									
Goal: To provide a summary of trash load reduction actions in each Annual Report.									
Actions –									
d.7. Provide updates to trash generation, full capture treatment area, and management area maps and guidance as needed.	X	A						*Ongoing*	

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Santa Clara Valley Urban Runoff Pollution Prevention Program

Provision C.10 - Trash Load Reduction

MRP Sub-Provision/Goal/Action	Program	Co-permittee	Regional	FY 15-16 Q1	FY 15-16 Q2	FY 15-16 Q3	FY 15-16 Q4	Completion Date (Unless Noted)[1]	Applicable Sub-provision
Zero Litter Initiative (ZLI)									
Goal: To assist Management Committee in providing coordination as the ZLI defines and implements its work plan.									
Actions –									
1. Provide on-going support to ZLI in developing and implementing work plan tasks.	X	A						*Ongoing*	

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SECTION 11

MERCURY CONTROLS

Santa Clara Valley
Urban Runoff
Pollution Prevention Program

Provision C.11 - Mercury Controls

MRP Sub-Provision/Goal/Action	Program	Co-permittee	Regional	FY 15-16 Q1	FY 15-16 Q2	FY 15-16 Q3	FY 15-16 Q4	Completion Date (Unless Noted)[1]	Applicable Sub-provision
C.11.a. Mercury Collection and Recycling Implemented throughout the Region									
Goals: To promote , facilitate, and/or participate in collection and recycling of mercury containing devices and equipment at the consumer level (e.g., thermometers, thermostats, switches, bulbs).									
Actions –									
a.1. See C.12.a									
a.2. Report mercury collection and recycling efforts, including an estimate of the mass of mercury collected using a standard annual reporting format and guidance provided by the Program.	X	X						**9/15/2015**	a.ii
C.11.b. Monitor Methylmercury									
Goals and Actions –									
See C.8.e.									
C.11.c. Pilot Projects To Investigate and Abate Mercury Sources in Drainages, Including Public Rights-Of-Way, and Stormwater Conveyances with Accumulated Sediment that Contains Elevated Mercury Concentrations.									
Goals and Actions -									
See C.12.c.									
C.11.d. Pilot Projects to Evaluate and Enhance Municipal Sediment Removal and Management Practices									
Actions -									
See C.12.d.									
C.11.e. Conduct Pilot Projects to Evaluate On-Site Stormwater Treatment via Retrofit									
Goals and Actions -									
See C.12.e.									
C.11.f. Diversion of Dry Weather and First Flush Flows to Publicly Owned Treatment Works (POTWs)									
Goals and Actions -									
See C.12.f.									

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Santa Clara Valley *Urban Runoff* Pollution Prevention Program

Provision C.11 - Mercury Controls

MRP Sub-Provision/Goal/Action	Program	Co-permittee	Regional	FY 15-16 Q1	FY 15-16 Q2	FY 15-16 Q3	FY 15-16 Q4	Completion Date (Unless Noted)[1]	Applicable Sub-provision
C.11.g. Monitor Stormwater Mercury Pollutant Loads and Loads Reduced									
Goal: To develop and implement a monitoring program to quantify mercury loads and loads reduced through source control, treatment and other management measures as required by C.8.f.									
Actions –									
C.11.h. Fate and Transport Study of Mercury in Urban Runoff									
Goal: To conduct or cause to be conducted studies aimed at better understanding the fate, transport, and biological uptake of mercury discharged in urban runoff to San Francisco Bay and tidal areas.									
Actions –									
h.5 Through participation in the RMP Contaminant Fate and Transport; Exposure and Effects; and Sources, Pathways and Loadings Work Groups, support RMP Pilot/Special study proposals designed to better understand the fate, transport, and biological uptake of mercury discharged in urban runoff to San Francisco Bay and tidal areas.	A	A	X					*Ongoing*	
C.11.i. Development of a Risk Reduction Program Implemented Throughout the Region.									
Goal and Actions -									
See C.12.i									
C.11.j. Development of a mercury allocation-sharing scheme									
Goal: To develop an equitable mercury allocation sharing scheme in consultation with CalTrans to address the CalTrans facilities in the program area, and report the details to the Water Board.									
Actions –									
j.3. Continue to track and participate in a regional project to develop a wasteload allocation sharing method with CalTrans.	A	A	X					*Ongoing*	j.ii

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SECTION 12

POLYCHLORINATED BIPHENYLS (PCBs) CONTROLS

Santa Clara Valley
Urban Runoff
Pollution Prevention Program

Provision C.12 - Polychlorinated Biphenyls (PCBs) Controls

MRP Sub-Provision/Goal/Action	Program	Co-permittee	Regional	FY 15-16 Q1	FY 15-16 Q2	FY 15-16 Q3	FY 15-16 Q4	Completion Date (Unless Noted)[1]	Applicable Sub-provision
C.12.a. Implement Project throughout Region to Incorporate PCBs and PCB-Containing Equipment Identification into Existing Industrial Inspections									
Goals: Train municipal industrial building inspectors to identify, in the course of their existing inspections, PCBs or PCB-containing equipment. Incorporate PCB identification into industrial inspection programs. Training frequency not explict in MRP.									
Actions –									
a.3. Incorporate PCB identification into industrial inspection programs.		X						**Ongoing**	a.i.
a.4. Where inspectors identify PCBs or PCB-containing equipment during inspections, document incident in inspection report and refer to appropriate regulatory agencies (e.g., county health departments, Department of Toxic Substances Control, California Department of Health Services, and the Water Board), as necessary.		X						**Ongoing**	a.ii.
a.5. Report on on-going training of inspection staff on how to identify PCBs or PCB-containing equipment while conducting industrial facility inspections.		X						**9/15/2015**	a.iii
C.12.b. Conduct Pilot Projects to Evaluate Managing PCB-Containing Materials and Wastes during Building Demolition and Renovation (e.g., Window Replacement) Activities									
Goal: To evaluate potential presence of PCBs at construction sites, current material handling and disposal regulations/programs (e.g., municipal ordinances, RCRA, TSCA) and current level of implementation, and evaluate effectiveness and feasibility of proposed revisions to demolition materials handling and incorporation of new permitting requirements into existing municipal demolition permitting process.									
Actions –									
b.1. If required by MRP 2.0, assist Permittees in addressing MRP 2.0 requirements associated with implementing controls in buildings demolished/renovated in the Santa Clara Valley that likely contain PCBs.	X	A	X					*Ongoing*	b.ii.1.

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Santa Clara Valley
Urban Runoff
Pollution Prevention Program

Provision C.12 - Polychlorinated Biphenyls (PCBs) Controls

MRP Sub-Provision/Goal/Action	Program	Co-permittee	Regional	FY 15-16 Q1	FY 15-16 Q2	FY 15-16 Q3	FY 15-16 Q4	Completion Date (Unless Noted)[1]	Applicable Sub-provision
C.12.c. Pilot Projects to Investigate and Abate On-land Locations with Elevated PCB Concentrations, Including Public Rights-of-way, and Stormwater Conveyances with Accumulated Sediments with Elevated PCBs Concentrations.									
Goal: To investigate PCB sources in or to storm drain systems at five locations and conduct abatement in portions of drainages, in conjunction with Water Board and appropriate agencies.									
Actions –									
c.1. Develop a work plan for review by the POC and Budget AHTGs as anticipated via MRP administrative draft.	X	A						*TBD*	
c.2 Begin conducting up to three property investigation and abatement projects (similar to the Leo Avenue project) consistent with the MRP 2.0 schedule. Tasks will include beginning the records review and inspection portions of these projects, compiling existing information, and begin developing a PCB referral of the Northrup Grumman property (Sunnyvale) to the Water Board .	X	A						**TBD**	
C.12.d. Conduct Pilot Projects to Evaluate and Enhance Municipal Sediment Removal and Management Practices									
Goal: To jointly evaluate ways to enhance PCBs load reduction benefits of operation and maintenance activities that remove or manage sediment. To implement these management practices at a pilot scale in five drainages during this permit term. To document the knowledge and experience gained through pilot implementation. To quantify and report the amount of PCBs loads reduced or avoided resulting from implementation of these measures.									
Actions –									
No tasks are planned for this fiscal year.									
C.12.e. Conduct Pilot Projects to Evaluate On-Site Stormwater Treatment via Retrofit									
Goal: To implement on-site treatment projects at the pilot scale in ten locations during this permit term. To document the knowledge and experience gained through pilot implementation.									
Actions –									
No tasks are planned for this fiscal year.									

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Santa Clara Valley Urban Runoff Pollution Prevention Program

Provision C.12 - Polychlorinated Biphenyls (PCBs) Controls

MRP Sub-Provision/Goal/Action	Program	Co-permittee	Regional	FY 15-16 Q1	FY 15-16 Q2	FY 15-16 Q3	FY 15-16 Q4	Completion Date (Unless Noted)[1]	Applicable Sub-provision
C.12.f. Diversion of Dry Weather and First Flush Flows to POTWs									
Goal: To implement the pilot diversion of dry weather or first flush stormwater flows from 5 pump stations to POTWs and document the knowledge and experience gained through pilot implementation.									
Actions –									
No tasks are planned for this fiscal year.									
C.12.g. Estimate PCB and Mercury Load Reductions									
Goal: Develop or revise existing PCB and Mercury load reduction accounting method to demonstrate progress toward MRP load reduction milestones and progress towards TMDL waste load allocations.									
Actions –									
g.1. Develop a work plan for review by the POC and Budget AHTGs.	X	A	X					*TBD*	
g.2. In collaboration with BASMAA partners, begin developing a more robust and refined load reduction assessment methodology to allow for load reduction estimates to be estimated adequately and presented to Water Board staff and other stakeholders. Program staff will review existing methods being used/developed by other Permittees in California, refine the current methods included in IMR, and begin developing guidance, processes, tools and platforms for tracking, managing and reporting PCB and mercury control measure implementation and estimated load reductions.	X	A	X					**TBD**	
C.12.h. Fate and Transport Study of PCBs in Urban Runoff									
Goal: To conduct or cause to be conducted studies aimed at better understanding the fate, transport and biological uptake of PCBs discharged in urban runoff.									
Actions –									
h.3 Through participation in the RMP Contaminant Fate and Transport; Exposure and Effects; and Sources, Pathways and Loadings Work Groups, support RMP Pilot/Special study proposals designed to better understand the fate, transport, and biological uptake of PCBs discharged in urban runoff to San Francisco Bay and tidal areas.	A		X					*Ongoing*	h.ii

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Santa Clara Valley Urban Runoff Pollution Prevention Program

Provision C.12 - Polychlorinated Biphenyls (PCBs) Controls

MRP Sub-Provision/Goal/Action	Program	Co-permittee	Regional	FY 15-16 Q1	FY 15-16 Q2	FY 15-16 Q3	FY 15-16 Q4	Completion Date (Unless Noted)[1]	Applicable Sub-provision
C.12.i. Development of a Risk Reduction Program Implemented throughout the Region									
Goal: Develop and implement or participate in effective programs to reduce PCB-related risks to humans and quantify the resulting risk reductions from these activities.									
Actions –									
i.4. Report on progress in Annual Report.	A		X					**9/15/2015**	i.iii.
i.5. Continue to track and participate in a regional project to manage human health risks from PCBs in Bay fish consumed by humans	X	A	X					*Ongoing*	i.ii
i.5. Continue to implement the Program's Work Plan for outreach to residents likely to consume locally-caught fish. Continue working with the Alviso Education Center to utilize various education and outreach products.	X	A						**Ongoing**	i.ii
C.12.j. Development of a PCB allocation-sharing scheme									
Goal: To develop an equitable mercury/PCB allocation sharing scheme in consultation with CalTrans to address the CalTrans facilities in the program area, and report the details to the Water Board.									
Actions –									
See C.11.j	A	A	X					*Ongoing*	j.ii
C.12.k. Participate in the Clean Watersheds for a Clean Bay Grant Project									
Goal: Participate and provide match to BASMAA's Clean Watershed for Clean Bay Project									
Actions –									
k.1. Actively participate in BASMAA's Clean Watersheds for a Clean Bay (CW4CB) project funded by the USEPA and intended to assist permittees in complying with Tasks C.12c, C.12.d, C.12e, and C.12i (CW4CB Match)	X	X	X					*Ongoing*	

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Santa Clara Valley Urban Runoff Pollution Prevention Program

Provision C.12 - Polychlorinated Biphenyls (PCBs) Controls

MRP Sub-Provision/Goal/Action	Program	Co-permittee	Regional	FY 15-16 Q1	FY 15-16 Q2	FY 15-16 Q3	FY 15-16 Q4	Completion Date (Unless Noted)[1]	Applicable Sub-provision
C.12.l. Leo Avenue Watershed Pilot Implementation Planning and Tracking									
Goal: Identify and as needed, refer PCB source properties and provide follow up assistance to the City of San Jose									
Actions –									
k.1.Coordinate with the City of San Jose and the Water Board on property referrals and other PCB/mercury reduction actions in the Leo Avenue watershed.	X							*Ongoing*	
C.12.m. Other Old Industrial Area Information Collection and Characterization									
Goal: Provide a more robust understanding of PCB sources and contributions to the Bay impairment.									
Actions –									
No tasks are planned for this fiscal year.									
C.12.n. Moderate Opportunity Area Information Collection and Integration with Green Infrastructure Planning									
Goal: Provide a more robust understanding of PCB sources and contributions to the Bay impairment.									
Actions –									
n.1.Assist Co-permittees in better delineating watershed areas that likely have moderate contributions of PCBs and mercury to stormwater and are likely to undergo significant redevelopment or reconstruction in the near future. Identify these moderate opportunity areas to assist in both the consideration of incorporating pollutant reduction strategies/designs into these redevelopment/retrofit projects and the estimation of pollutant load reduction benefits associated with these projects.	X	A						*TBD*	

[1] Completion dates in bold are specified in MRP. Dates in italics are internal deadlines based on MRP requirements.Key: X = Implementation lead. A = assist or develop guidance for implementation.FY 15-16 Work Plan - C.12

SECTION 13

COPPER CONTROLS

Santa Clara Valley Urban Runoff Pollution Prevention Program

Provision C.13 - Copper Controls

MRP Sub-Provision/Goal/Action	Program	Co-permittee	Regional	FY 15-16 Q1	FY 15-16 Q2	FY 15-16 Q3	FY 15-16 Q4	Completion Date (Unless Noted)[1]	Applicable Sub-provision
C.13.a. Manage Waste Generated from Cleaning and Treating of Copper Architectural Features, Including Copper Roofs, during Construction and Post-Construction.									
Goals: To establish local ordinance authority to prohibit the discharge of water to storm drains generated from the installation, cleaning, treating, and washing of the surfaces of copper architectural features, including copper roofs.									
Actions –									
a.4. Require the use of appropriate BMPs when issuing building permits or equivalent process.		X						**Ongoing since FY 11-12**	a.ii
a.5. Educate installers and operators on appropriate BMP implementation.		X						**Ongoing since FY 11-12**	a.ii
a.6. Enforce against non-compliance as needed.		X						**Ongoing since FY 11-12**	a.ii
a.7. Certify legal authority to prohbit the discharge of water to storm drains generated from the installation, cleaning, treating, and washing of the surfaces of copper architectural features, including copper roofs. (2016 AR only)	A	X						**9/15/2016**	a.iii
a.8 Report how copper architectural features are addressed trhough the issuance of building permits (2016 AR only)	A	X						**9/15/2016**	a.iii
a.9 Report annually on permitting and enforcement activities.	X	A						**9/15/2015**	a.iii
C.13.b. Manage Discharges from Pools, Spas, and Fountains that Contain Copper-Based Chemicals									
Goal: Establish the legal authority to prohibit discharges to storm drains from pools, spas, and fountains that contain copper-based chemicals.									
Actions –									
b.1. Through a local ordinance either: 1) require installation of a sanitary sewer discharge connection for pools, spas, and fountains, including connection for filter backwash, with a proper permit from the POTWs; or 2) require diversion of discharge for use in landscaping or irrigation.		X						***Ongoing***	b.ii

[1] Completion dates in bold are specified in MRP. Dates in italics are internal deadlines based on MRP requirements.Key: X = Implementation lead. A = assist or develop guidance for implementation.FY 15-16 Work Plan - C.13

Santa Clara Valley Urban Runoff Pollution Prevention Program

Provision C.13 - Copper Controls

MRP Sub-Provision/Goal/Action	Program	Co-permittee	Regional	FY 15-16 Q1	FY 15-16 Q2	FY 15-16 Q3	FY 15-16 Q4	Completion Date (Unless Noted)[1]	Applicable Sub-provision
b.2. Certify that legal authority exixts to prohibit discharges to storm drains from pools, spas, and fountains that contain copper-based chemicals (2016 AR only)	A	X						**9/15/2016**	b.iii
a.8 Report how copper containing discharges from pools, spas and fountains are addressed through the issuance of building permits (2016 AR only)	A	X						**9/15/2016**	b.iii
a.9 Report annually on permitting and enforcement activities .	X	A						**9/15/2016**	b.iii
C.13.c. Industrial Sources									
Goal: To ensure industrial facilities do not discharge elevated levels of copper to storm drains by ensuring, through industrial facility inspection, that proper BMPs are in place.									
Actions –									
c.1. Identify facilities likely to use copper or have sources of copper and include them in revisions to your inspection program plans.	A	X	A					**6/30/2011**	c.ii.(1)
c.2. Train inspectors to identify copper sources and proper BMPs (synonymous with Task C.4.d.2) .	X	A						*5/5/2011*	c.ii.(2)
c.3. Ensure that proper BMPs are in place at industrial facilities with copper sources to minimize discharge of copper to storm drains, including consideration of roof runoff that might accumulate copper deposits from ventilation systems on-site.		X						*Ongoing*	c.ii.(3)
c.4. Highlight copper reduction results in the industrial inspection component in the C.13 portion of each Annual Report .	A	X						**9/15/2015**	c.iii

[1] Completion dates in bold are specified in MRP. Dates in italics are internal deadlines based on MRP requirements.Key: X = Implementation lead. A = assist or develop guidance for implementation.FY 15-16 Work Plan - C.13

SECTION 14

POLYBROMINATED DIPHENYL ETHERS (PBDE), LEGACY PESTICIDES AND SELENIUM

Santa Clara Valley Urban Runoff Pollution Prevention Program

Provision C.14 - Polybrominated Diphenyl Ethers (PBDE), Legacy Pesticides and Selenium

MRP Sub-Provision/Goal/Action	Program	Co-permittee	Regional	FY 15-16 Q1	FY 15-16 Q2	FY 15-16 Q3	FY 15-16 Q4	Completion Date (Unless Noted)[1]	Applicable Sub-provision
C.14.a. Control Program for PBDEs, Legacy Pesticides, and Selenium.									
Goals: Work with the other municipal stormwater management agencies in the Bay Region to implement a plan (PBDEs/Legacy Pesticides/Selenium Plans) to identify, assess, and manage controllable sources of PBDEs, legacy pesticides, and selenium found in urban runoff, if any.									
Actions –									
a.10. Provide follow-up on next steps regarding these pollutants.	X		X					*Ongoing*	a.vii.

1 Completion dates in bold are specified in MRP. Dates in italics are internal deadlines based on MRP requirements.Key: X = Implementation lead. A = assist or develop guidance for implementation.FY 15-16 Work Plan - C.14

SECTION 15

EXEMPTED AND CONDITIONALLY EXEMPTED DISCHARGES

Santa Clara Valley Urban Runoff Pollution Prevention Program

Provision C.15 - Exempted and Conditionally Exempted Discharges

MRP Sub-Provision/Goal/Action	Program	Co-permittee	Regional	FY 15-16 Q1	FY 15-16 Q2	FY 15-16 Q3	FY 15-16 Q4	Completion Date (Unless Noted)[1]	Applicable Sub-provision
C.15.a. Exempted Non-stormwater Discharges (Exempted Discharges)									
Goals: Have the legal authority, training, and outreach to address new C.15. requirements, and continue to implement discharge prohibitions.									
Actions –									
a.1. Allow the non-stormwater discharges listed in Provision C.15.a.i, unless they are identified as sources of pollutants to receiving waters, in which case they shall be addressed as conditionally exempted discharges.		X						**Ongoing**	a.ii
C.15.b. Conditionally Exempted Non-Stormwater Discharges									
Goal: Implement BMPs, notification, monitoring and reporting requirements for categories of conditionally exempted non-stormwater discharges regulated under C.15.b.									
Actions –									
b.2.1 Update the Program's Conditionally Exempted Discharges Report as needed.	X	A						As needed	b.i-b.vi
b.3. Work through BASMAA to address major issues related to compliance with C.15., as needed.	X	A						TBD	b.i-b.vi
b.4. To address discharges from individual residential car washing, conduct outreach to residents about BMPs for car washing as part of PIP program under C.7.	A	X						**Ongoing**	b.iv
b.5. Keep records of the authorized major discharges of dechlorinated pool, hot tubs spa and fountain water to the storm drain, including BMPs employed.		X						**Ongoing**	b.v.
b.6. To address discharges from irrigation water, landscape irrigation and lawn or garden watering, promote water conservation, IPM/less toxic pest control, use of drought tolerant native vegetation, and improved irrigation practices as part of general PIP and pesticide user outreach. Conduct outreach to residents about BMPs as part of PIP program under C.7.	A	X						**Ongoing**	b.vi
b.7. Implement Illicit Discharge Enforcement Response Plan for ongoing, large volume landscape irrigation runoff in conjunction with the Co-permittee's existing Illicit Discharge Control Program.	A	X						**Ongoing**	b.vi

[1] Completion dates in bold are specified in MRP. Dates in italics are internal deadlines based on MRP requirements.Key: X = Implementation lead. A = assist or develop guidance for implementation.FY 15-16 Work Plan - C.15

Santa Clara Valley Urban Runoff Pollution Prevention Program

Provision C.15 - Exempted and Conditionally Exempted Discharges

MRP Sub-Provision/Goal/Action	Program	Co-permittee	Regional	FY 15-16 Q1	FY 15-16 Q2	FY 15-16 Q3	FY 15-16 Q4	Completion Date (Unless Noted)[1]	Applicable Sub-provision
C.15.c. General Assistance									
Goal: Provide general assistance and guidance in implementing Provision C.15.									
Actions-									
c.1. Provide guidance on BMPs and reporting for various types of discharges. Assist Co-permittees with data collection efforts, data management, and reporting, as needed.	X	A						**Ongoing**	b.i-b.vi
c.2. Continue to assist Co-permittees identify and characterize potential new categories of discharges that could request an MRP exemption.	X	A						*TBD*	b.i-b.vi
c.3. Continue to assist Co-permittees with implementation of the Water Utility O&M Discharge Pollution Prevention Plan and tracking the development of the Regional Water Utility General Permit	A	X						*Ongoing*	b.iii.

[1] Completion dates in bold are specified in MRP. Dates in italics are internal deadlines based on MRP requirements.Key: X = Implementation lead. A = assist or develop guidance for implementation.FY 15-16 Work Plan - C.15

SECTION 16

FINAL BUDGET REPORT: FISCAL YEAR 2015-2016

Santa Clara Valley Urban Runoff Pollution Prevention Program
FY 2015-2016 Work Plan

SCVURPPP Total FY 2015-2016 Budget

Budget Summary

Item	Budget
Operational Group	
1. Program Management (EOA)	$695,894
2. Fiscal Agent (City of Sunnyvale)	$50,000
3. Legal Services (MOFO)	$120,000
4. CASQA Dues	$17,500
5. BASMAA Fee	$88,000
6. WERF Member Dues	$8,000
7. Contingency (MOA Requires 10 %of Operating Group)	$0
8. RMP Fee	$194,361
9. CPSC Fee	$1,000
10. MOA Initiate MC Internal Review (see FY 13-14 Budget)	0
Subtotal Operational Group	**$1,174,755**
Projects Group – Permit Compliance Tasks	
Regulatory Assistance	$529,633
Performance Standards	$2,742,921
Sub-total Project Group	**$3,272,554**
Total FY 15-16 Budget	**$4,447,309**

Note: MC approved budget on December 14, 2014 (see budget package for assumptions).

APPENDIX A

RESPONSE TO CO-PERMITTEE COMMENTS

Program Staff Responses to Comments on SCVURPPP Draft FY 2015-2016 Work Plan

C.3. New Development and Redevelopment

C.3.a/C.3.c: The Program should consider providing a workshop for the development community (e.g., private engineering firms) on C.3 requirements and design of LID site measures.

A task was added to conduct a workshop as requested or focusing a portion of the Annual C.3 workshop towards the development community.

C.3.a.8.1: Add "ongoing" to completion date column.

Requested edit was made

C.3.b.3.2: Add "development of standard specifications" to the list of items that Program staff will support for GI plan development

Requested edit was made

C.3.h: Consider hosting a training workshop on identifying and maintaining LID treatment systems for landscape maintenance staff and facility managers (municipal and private). Can be done as an add-on or special session of the Annual C3 Workshop, but has a specific target audience that is different from typical workshop audiences.

Requested edit was made

C.5 – Illicit Discharge Detection and Elimination

C.5.e.4: Please clarify language. Unclear what is supposed to happen here. If we are supposed to distribute educational materials to mobile businesses when responding to a compliant, then it should simply say so.

The task was edited to read "Conduct outreach to mobile businesses operating within the Permittee's jurisdiction, such as distribution of BMP brochures to mobile businesses when responding to a complaint".

C.7 – Public Information and Outreach

C.7.h.3: Typo "use" should be "used"

Requested edit was made

C.7.i.1: Co-permittee box should have an X in it

Requested edit was made

C.8 – Water Quality Monitoring

C.8.c.8: Please designate an "A" in the Co-permittee box

Requested edit was made

C.8.g.3: Please consider an "A" in the Co-permittee box here since they review and comment prior to submittal

Requested edit was made

C.9 – Pesticide Toxicity Reduction

C.9.b.1: Recommend deleting the phrase "receive annual training" at the end of the section to maintain consistency with permit language

Requested edit was made

C.9.c.3: X and A appear reversed. It seems like the primary responsibility for this action lies with the Co-permittees. Program provides guidance in the annual report.

Requested edit was made

C.9.c: This section has been updated to reflect the requirements in the Admin Draft of MRP 2.0. This section should reflect existing MRP requirements: if the Admin Draft requirements remain and are adopted, Co-permittees would likely need to amend municipal code/policies to comply. Program may need to support that with guidance on how to effectively oversee contractor compliance. Reporting would be Co-permittee led with assistance from Program.

Tasks were revised in this section to indicate that the Program will "provide guidance on potential future MRP requirements for Co-permittees" as needed.

C.10. Trash Reduction

C.10.a.4.vi: What is the purpose of Program developing and maintaining list of FTC devices for O&M verification and effectiveness reporting outside of the Co-permittees maintenance programs and documentation? I would not want to create additional reporting and data management on our maintenance staff.

The purpose of this task is to continue populating the Program's existing database on full capture devices, locations and types, and treatment areas. Additionally, as part of the model O&M verification program, we plan to develop a simple tracking database to allow Permittees to track maintenance and inspection of these devices consistent with MRP 2.0 requirements. Some Permittees may choose to use their own tracking systems already in place, but others have expressed a need for such a database (spreadsheet). The task description was edited to this affect.

C.10: We'll need to consider how we do O&M for systems other than small and large full trash capture devices (i.e., C.3/GI) and way want to expand our draft documents to include this consideration.

Agreed. We will work with the AHTG to incorporate these concepts as the MRP 2.0 requirements become clearer.

C.12 PCB Controls

C.12.b. Co-permittees should be involved in this task (it's listed as assist Co-permittees, but Co-permittee box didn't have an "X"). Also, I think that this should be a place holder task and specify that work plan will be developed based on final requirements and timing of MRP 2.0.

Agreed. An "X" was added to Co-permittee box. Also the language "As required by MRP 2.0" was added.

C.12.c.1: Missing action assignments

"X" was added to Program and "A" to Co-permittee.

C12.d,e,f: Please state when tasks were completed

Tasks are planned for completion in FY 2014-15.

C.12.i.5: New regulations say "3000" individuals must be reached. Will that be tracked by Program or Co-permittees?

Tracking under the new MRP will be discussed with Co-permittees, but please note that the statement "potential to reach 3000 individuals annually ....likely consumers" applies to ALL MRP Co-permittees, and that the Program will need to develop an approach to sample & estimate the likely consumers.

C.12.i.5: Should be C.12.i.6? "S" a typo?

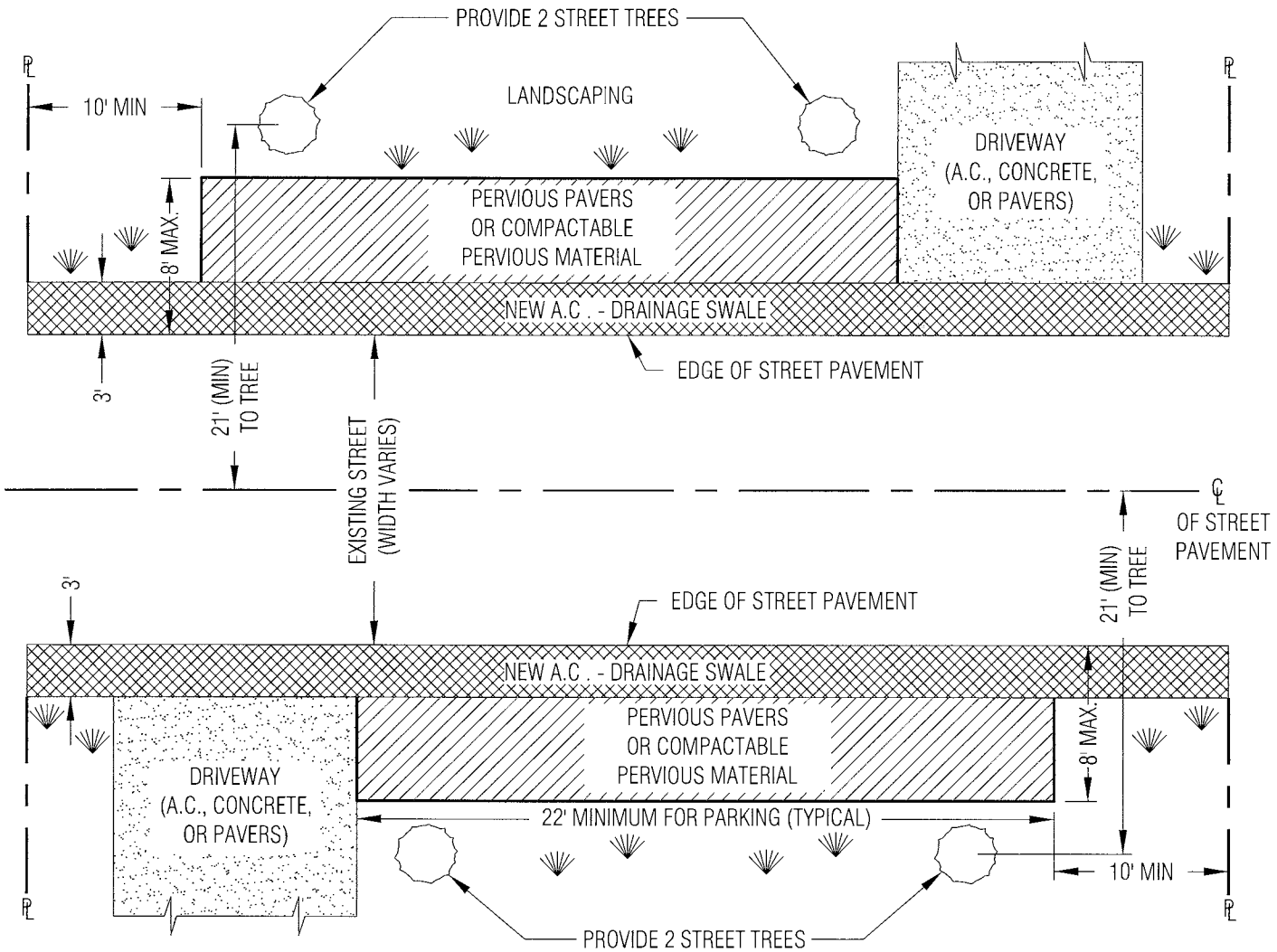
Correct. Change was made.

C.12.k.1: Consider softening language to reflect our intention to work with businesses first rather than jumping to referral for all properties. X or A in Co-permittees column.

The requested text was added.

Appendix M

Shoulder Paving



PLAN VIEW

NOTES:

1. **IF THE STREET PAVEMENT WIDTH IS 36 FEET OR GREATER,** NO SHOULDER IMPROVEMENTS ARE PERMITTED WITH THE EXCEPTION OF LANDSCAPING AND IRRIGATION.
2. POLICY DOES NOT APPLY FOR REPAIRS, RESEALING, AND REPAVING IN KIND OF EXISTING SHOULDERS, NOR DOES IT REQUIRE THAT SHOULDERS MUST BE PAVED.
3. THE SHOULDER OF A NEWLY CONSTRUCTED OR 50% OR GREATER SQUARE FOOTAGE REMODELED RESIDENCE IS REQUIRED TO BE BROUGHT INTO COMPLIANCE WITH THIS POLICY.

LEGEND:

- A.C. ASPHALT CONCRETE
- ℄ PROPERTY LINE
- ℄ CENTERLINE
- EXISTING OR NEW LANDSCAPING
- STREET TREE (NEW OR EXISTING)
- NEW PERMEABLE SURFACE
- NEW A.C. - DRAINAGE SWALE

Approved: _____ City Engineer 1/4/10 Date

CITY OF LOS ALTOS · CALIFORNIA · INCORPORATED DECEMBER 1, 1952

REVISION	
Description	Date

ENGINEERING DIVISION

SHOULDER PAVING POLICY

SU-20

Appendix N

Photos

Appendix: Photographs

Arboretum Dr. 3
Berry Ave. to Golden Way 4
Carnation Ct. 5
Catalina Ct. 6
Covington Rd. 7
Cristo Rey Pl. 9
Cuestra Dr. and Gabilan St. 10
Cuestra Dr. 11
Dallas Ct. 12
Delphi Ct. 13
Deodora Dr., closest intersection is Wimbledon Pl. 14
Distel Dr. 15
Edge Ln. to Seena Ave. 16
El Sereno Ave. and W. Homestead Way 18
Fallen Leaf Ln. 19
Fremont Ave., near Manor Way 20
Giralda Dr. and Sunshine Dr. 21
Grant Rd. near Foothill Expy. 22
Heritage Ct. 23
W. Homestead Rd. and Fallen Leaf Ln. 24
Jordan Ave. 25
Julie Ln. & Ranchita Dr. 27
Loma Prieta Ct. 28
Loucks Ave. to N. San Antonio Rd. to El Camino Real 29
Madeline Ct. 30
Manor Way 31
Mercedes Ave. to Loucks Ave. to Los Altos Ave. to Carmel Ct. 32
Milverton Rd. 34
N. Springer Rd. to Ramundo Ave. 35
Oak Ave. 37
Oakwood Ct. 39
Parma Way & Rosita Ave. 40
Paula Ct. 41
Payne Dr. 42
Pepper Dr. 43
Pine Ln. 44
Ranchita Ct. 45
Robin Hood Dr. 46
S. El Monte Ave. to O'Keefe Ln. 47
S. San Antonio Rd. 48
S. Springer Rd. 49
S. Springer Rd. & Rosita Ave. 50
Santa Rita Ave. to W. Portola Ave. 52
Shasta St. 53
Sierra Ventura Dr. and Stonehaven Dr. 54

Springer Tr. to Mills Ave. 55
Stagi Ln., Quinhill Ave., Anita Ave., & Border Rd. 57
Summerhill Ave. and S. El Monte Ave. 58
Sunshine Dr. 59
Tyndell St. 60
Vineyard Dr. and Deodora Dr. 61
Viola Pl. 62
W. Edith & N. San Antonio Rd. 63

Arboretum Dr.

Facing northeast on the corner of.
Sequoia Dr & Arboretum Dr.

Close-up of inlet (previous picture)

Facing northwest on the corner of
Sequoia Dr.& Arboretum Dr.

Facing west, looking uphill at
Sequoia Dr.

Facing north on Arboretum Dr. towards
Foothill Expy.

Berry Ave. to Golden Way

Facing east at the intersection of
Riverside Dr. & Berry Ave.

Facing south on the corner of
S. Springer Rd. & Berry Ave.

Facing southwest on Berry Ave.,
near the intersection with Brentwood St.

Facing northeast on Berry Ave.

Facing southeast on Berry Ave.,
looking at Golden Way

Facing southeast on Golden Way,
near Altos Oaks Dr.

Carnation Ct.

Facing east on University Ave.,
near the corner of Catalina Ct.

Facing northeast on Carnation Ct.

Facing northeast on Carnation Ct.

End of Carnation Ct.

Facing southwest on Carnation Ct.
towards University Ave.

Catalina Ct.

Facing east at the end of Catalina Ct.

Fast east, drain under truck in previous picture

Facing southeast at the end of Catalina Ct.

Facing north at the end of the Ct.

Facing west on Catalina Ct. towards Vera Ave.

Covington Rd.

Facing east on Covington Rd., creek.

Facing east on Covington Rd., drain on the south side of creek.

Facing east on Covington Rd., drain on the north side of creek.

Intersection of Covington Rd. & Echo Dr.

Facing northwest, drain on Covington Rd. near the intersection with Campbell Ave.

Facing east on Campbell Ave. looking down Covington Rd.

Facing north, drain on the corner of Campbell Ave. & Covington Rd.

Facing northwest on Covington Rd.

Facing south on corner of Covington Rd. & Parma Way.

Cristo Rey Pl.

Facing south on Cristo Rey Pl.

Construction near inlet

Inlet at bottom of Cristo Rey Pl.

Facing north on Cristo Rey Pl.

Cuestra Dr. and Gabilan St.

Facing southwest at the intersection of Gabilan St. & Cuestra Dr.

Facing northwest at the intersection of Gabilan St. & Cuestra Dr.

West of Gabilan St. on Cuestra Dr., inlet (facing north)

West of Gabilan St. on Cuestra Dr., inlet (facing south)

Facing west at the intersection of Gabilan St. & Cuestra Dr.

Cuestra Dr.

Facing west on Cuestra Dr. towards Campbell Ave.

Facing west on Cuestra Dr. at the intersection with Campbell Ave.

Facing west, after the intersection with Campbell Ave.

Facing east, at the intersection of Campbell Ave. & Cuestra Dr.,

Facing south looking down Campbell Ave.

Dallas Ct.

Facing south, looking into Dallas Ct.

Inlet hidden by ivy,
inlet not visible in
the picture to the left.

Facing east, at the intersection of
Fremont Ave. & Dallas Ct.

Facing north on Dallas Ct. towards
Fremont Ave.

Delphi Ct.

Facing southeast at the end of Delphi Ct.

Facing west towards Delphi Cir.

Facing west at the intersection with Delphi Cir. & Delphi Ct.

Facing east looking into the Ct.

Facing southwest at the corner

Facing northwest at the corner

Deodora Dr., closest intersection is Wimbledon Pl.

Facing south east on Deodora Dr.
(inlet in front of the silver car)

Inlet

Inlet

Facing northwest on Deodora Dr.

Distel Dr.

Facing northeast at the end of Distel Dr.

Facing southwest, from the end of Distel Dr.

Facing east on Distel Dr.

Facing west on Distel Dr.

Facing east at the end of Distel Dr., water tank

Facing northeast at the end of Distel Dr.

Edge Ln. to Seena Ave.

Facing west on Edge Ln. to S. Springer Rd.

Edge Ln. Puddles

Facing east on Edge Ln. to Seena Ave.

On Edge Ln., SD access off to side

Facing north on Seena Ave.

Facing north on Seena Ave.

Facing west, inlet in front of house

Close-up of previous picture

Facing northwest at the corner of Seena Ave. & Covington Rd.

Facing northeast at the corner of Seena Ave. & Covington Rd.

Close-up of drain on the northeast corner of Seena Ave. & Covington Rd.

El Sereno Ave. and W. Homestead Way

Facing north, view of El Sereno Ave.

Facing northeast down W. Homestead Rd.(towards Fallen Leaf Ln.)

Facing south down W. Homestead Rd., after the turn off from Foothill Expy.

Facing southwest, looking at Foothill Expy.

Inlet close-up. on the turn-off from Foothill Expy. to W. Homestead Rd.

Fallen Leaf Ln.

Facing west at the corner of
Fallen Leaf Ln. & Louise Ln.

Facing north at the intersection of
Fallen Leaf Ln. & Louise Ln.

Facing east at the intersection of
Fallen Leaf Ln.. & Victoria Ct.

Facing east at the corner of
Fallen Leaf Ln.

Inlet is between two houses (under truck),
at the bottom of hill seen directly above.

Facing west, looking up the hill
from the inlet shown to the left.

Fremont Ave., near Manor Way

Facing north on Fremont Ave.

Facing north on Fremont Ave.

Facing east on Fremont Ave.

Facing west on Fremont Ave.

Giralda Dr. and Sunshine Dr.

Facing east on Giralda Dr.,
several potholes on street

Facing west on Giralda Dr.

Facing northeast, drain on
corner of Giralda Dr.

Facing east on the corner
of Sunshine Dr. & S. Springer Rd.

Facing northeast, creek & a drain
on Sunshine Dr.

Facing southeast, creek & a drain
on Sunshine Dr.

Grant Rd. near Foothill Expy.

Facing south on Grant Rd.
towards Foothill Exwy.,
with a turnoff for Grant Rd. to the left.

Facing northeast on Grant Rd.,
there is a slight downward slope

Close-up of vegetation in picture above.
Possible drain, very busy street.

Ditch near the turnoff from
Foothill Exwy. to Grant Rd.

Heritage Ct.

Facing north looking at the end of Heritage Ct.

Facing south, looking out from the end of Heritage Ct.

Facing west on Heritage Ct.

Facing east on Heritage Ct.

W. Homestead Rd. and Fallen Leaf Ln.

Facing north on W. Homestead Rd. looking at Fallen Leaf Ln..

Facing northeast at Fallen Leaf Ln. & W. Homestead Rd.

Facing west looking at W. Homestead Rd. from Homestead Cir.

Facing south, view of Homestead Cir.

Facing south, view of Homestead Cir. from Fallen Leaf Ln.

Jordan Ave.

Facing north on Catalina Way at
the intersection with Jordan Ave.

Facing northeast at the corner
of Catalina Way & Jordan Ave.

Facing east at the corner of
Catalina Way & Jordan Ave.

Facing north at the intersection of
Catalina Way & Jordan Ave., drain

Facing east, Jordan Ave.,
turn-off on right is for Delphi Cir.

Facing southeast, inlet at
Delphi Cir. & Jordan Ave.

Facing southwest on Jordan Ave.
towards Delphi Cr.

Facing northeast on Jordan Ave.
at the intersection with Portola Ct.
(right side) & E. Portola Ave. (left
side)

Facing southwest at Jordan Ave.
& Portola Ct.

Facing northeast at Jordan Ave.
& E. Portola Ave.

Julie Ln. & Ranchita Dr.

Facing west at the Julie Ln. & Ranchita Dr. intersection (looking down Ranchita Dr.)

Facing south on Julie Ln.

Close-up of inlet

Facing west on Ranchita Dr.

Facing east on Ranchita Dr.

Loma Prieta Ct.

Facing west, from the end of Loma Prieta Ct.

Drain at the end of Loma Prieta Ct.

Court view from drain, only slightly sloped

Loucks Ave. to N. San Antonio Rd. to El Camino Real

Facing northeast on Loucks Ave., inlet near shopping center

Facing northeast, corner of Loucks Ave. & N. San Antonio Rd., inlet in front of gas stataion

Facing north, at the corner of Loucks Ave. & N. San Antonio Rd.

Facing north on N. San Antonio Rd.

Facing south, looking down N. San Antonio Rd. from El Camino Real

Madeline Ct.

End of Madeline Ct.

Facing northeast, drain between 2 houses

Drain from the previous picture - full of leaves

Facing southeast looking out of Madeline Ct.

Manor Way

Facing north on Manor Way

Facing west on Manor Way

Facing east on Manor Way

Mercedes Ave. to Loucks Ave. to Los Altos Ave. to Carmel Ct.

Facing north, Mercedes Ave.

Facing north, Del Monte Ave. & Mercedes Ave. intersection

Facing northwest, Paso Robles Ave. & Mercedes Ave. intersection

Facing south, intersection at Loucks Ave. & Mercedes Ave.

Facing northwest, drain at the corner of Loucks Ave. & Mercedes Ave.

Facing southeast, drain at the corner of Loucks Ave. & Mercedes Ave.

Facing southwest on Loucks Ave.

Facing west on Loucks Ave.

Facing west, nearing the intersection of Loucks Ave. & Los Altos Ave.

Facing west, end of Loucks Ave.

Facing southeast on Los Altos Ave., near the corner of Loucks Ave.

Facing west, end of Carmel Ct.

Milverton Rd.

Facing southeast on Milverton Rd. towards S. El Monte Rd.

Facing northwest on Milverton Rd.

Side view of the street, facing southeast

Side view of the street, facing northwest

N. Springer Rd. to Ramundo Ave.

Facing west on drain on N. Springer Rd.

Facing north on N. Springer Rd. intersects with Raymundo Ave.

Facing northwest on drain opposite the turnoff for Raymundo Ave.

Facing east on Raymundo Ave.

A drain and inlet on Raymundo Ave.

Facing northeast near the intersection Raymundo Ave. & Mtn. View Ave.

Facing south on Mtn. View Ave. of Ave.

Facing east, creek on Mtn. View Ave.

Facing west, creek on Mtn. View Ave.

Oak Ave.

Facing south on Marlborough Ave.

Facing southeast, walking eastbound on Oak Ave.

Facing east, walking eastbound on Oak Ave.

Facing north, after the school

Facing northwest on Oak Ave., after the water tank

On Oak Ave., facing southwest

On Oak Ave., facing northeast

Facing southwest on Oak Ave.

Facing south, at the
corner of Ravenswood Dr.

Facing north, at the
corner of Ravenswood Dr.

Facing east at the end of
Oak Ave. Drain at right

Oakwood Ct.

Facing northwest from the end of Oakwood Ct. to Riverside Dr.

Facing southeast from Riverside Dr. to Oakwood Ct.

Facing south in Oakwood Ct.

Facing north in Oakwood Ct.

Parma Way & Rosita Ave.

Facing west on Parma Way

Facing east on Parma Way

Facing east on Rosita Ave., at the intersection of Parma Way & Rosita Ave.

Facing west on Rosita Ave.

Paula Ct.

Facing east, from Paula Ct. to Grants Rd.

Facing southeast on Paula Ct.

Facing east, to Grant Rd.

Facing west, Paula Ct. from Grant Rd.

Payne Dr.

Facing east on Payne Dr.
towards Palton Dr.

Facing west on Payne Dr.
towards Oakhurst Ave.

Storm drain on Payne Dr.

Pepper Dr.

Facing north on Pepper Dr., inlet and close-up

Facing south on Pepper Dr., inlet and close-up

Facing west, intersection of
Pepper Dr. & S. San Antonio Rd.

Facing east on Pepper Dr.

Pine Ln.

Facing east, Pine Ln. &Cherry Ave.

Facing east, on Pine Ln. towards N. San Antonio Rd.

Facing east, on Pine Ln. closer to Tomilea Ct.

Facing southeast on Pine Ln., near Tomilea Ct., drain opposite the Ct.

Facing southwest on Pine Ln. drain

Facing west, on Pine Ln towards Cherry Ave.

Ranchita Ct.

Facing west in Ranchita Ct.

Facing north, towards Ranchita Dr.

Facing west, on Ranchita Dr.

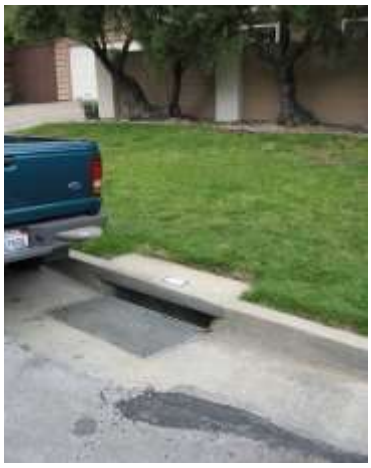
Facing west, inlet between 2 houses

Facing south, Ranchita Ct., from Ranchita Dr.

Robin Hood Dr.

Facing southeast down Robin Hood Dr. There are 2 inlets, one by the truck & one directly opposite that.

Facing southwest on Robin Hood Dr.



Facing southeast on Robin Hood Dr.

Facing northwest on Robin Hood Dr. towards Crooked Creek Dr.

S. El Monte Ave. to O'Keefe Ln.

Facing southeast, O'Keefe Ln. to S. El Monte Ave.

Facing southwest, huge puddles on the side of the street on O'Keefe Ln.

Facing northwest on O'Keefe Ln.

Facing northeast on O'Keefe Ln.

S. San Antonio Rd.

Facing north on S. San Antonio Rd.

Facing northwest on S. San Antonio Rd., before intersection with Lyell St.

Facing south on S. San Antonio Rd., at the Lyell St. intersection

Facing southeast on S. San Antonio Rd., at the Lyell St. intersection

Facing north on S. San Antonio Rd., after Lyell St. intersection

Facing south on S. San Antonio Rd., after Lyell St. intersection

S. Springer Rd.

Facing southwest at the intersection of S. Springer Rd. & Fremont Ave. & Foothill Exwy.

Drain on corner

Facing southeast on Fremont Ave. from S. Springer Rd.

Facing north on S. Springer Rd.

Facing south at Fremont Ave

Corner of Fremont Ave &Altos Oak Dr.

S. Springer Rd. & Rosita Ave.

Facing east, at the intersection of.
S. Springer Rd & Rosita Ave.

Facing southeast, creek access

Close-up of previous picture

Facing south, creek

Facing north, creek access

Facing north
on S. Springer Rd.

Facing south on S. Springer Rd.

Facing north on S. Springer Rd.

Facing north on S. Springer Rd.

Facing east on S. Springer Rd., inlet

Facing west on S. Springer Rd., inlet

Santa Rita Ave. to W. Portola Ave.

Facing west on Van Buren Ave. before turning to Santa Rita Ave.

Facing northwest at the intersection of Santa Rita Ave. & W. Portola Ave.

Facing west on Los Altos Ave., drains on the south side of the intersection

Facing west onLos Altos Ave, drain from previous picture

Facing north on Lost Altos Ave.

Facing south on Los Altos Ave.

Shasta St.

Facing northeast at the end of Shasta St., turns into alley.

Alley after end of Shasta St large & lots of puddles

Facing southeast towards 1st St. from the end of Shasta St.

Facing northwest to alley

Facing north at the end of Shasta St. Puddles drain behind the fence

Possibly a drain under all the leaves, water naturally moves here

Sierra Ventura Dr. and Stonehaven Dr.

Facing west on Stonehaven Dr.

Drains from previous picture

One drain is completely full of leaves.

Facing southeast on Sierra Ventura Dr.

Facing southeast on Sierra Ventura Dr.

Facing east, near Kent Dr.

Springer Tr. to Mills Ave.

Facing south on S. Springer Rd.

Facing east on S. Springer Rd., inlet hidden by ivy

Facing north at the intersection of Springer Tr.& S. Springer Rd.

Facing northwest N. El. Monte Ave. & S. Clark Ave. intersection

Facing northwest on N. El Monte Ave.

Facing south, S. Clark Ave. from N El Monte Ave.

Facing south, drain on El Monte Ave.

Facing southeast at the corner of Mills Ave.and Otis Way

Facing east a the end of Mills Ave

Facing north on Mills Ave

Facing south on Mills Ave

Stagi Ln., Quinhill Ave., Anita Ave., & Border Rd.

Facing southeast on the corner of Stagi Ln. & Quinhill Ave.

Facing northwest, other side of Stagi Ln.,- Anita Ave & Border Rd. intersection.

Facing southeast, Border Rd.

Facing northwest, drain blocked

Facing southeast, ditches continue down Border Rd.

Summerhill Ave. and S. El Monte Ave.

Facing northwest, Summerhill Ave. & S. El Monte Rd.

Corner of Summerhill Ave. & S. El Monte Rd.

Facing southwest, S. El Monte Ave. to 280

Facing northwest, directly across from Summerhill Ave.

Facing southwest on S. El Monte Rd.

Facing northeast on S. El Monte Rd

Sunshine Dr.

Facing east on Sunshine Dr.

Facing west on Sunshine Dr.

Facing southeast, creek on Sunshine Dr.

Facing northeast, opposite creek

Tyndell St.

Facing west at the Lyell St. & Tyndall St. intersection

Facing south on Tyndall St.

Facing southwest on Tyndall St,

Facing southeast on Tyndall St.

Facing south on Tyndall St.

Facing north on Tyndell St.

Vineyard Dr. and Deodora Dr.

Facing west on Vineyard Dr.

Facing west on Vineyard Dr.
(inlet pictured at left)

Facing west on Vineyard Dr.,
(opposite the previous picture)

Facing southwest on Deodora Dr.

Facing northeast on Vineyard Dr.

Inlet from previous picture

Viola Pl.

Facing southeast at the end of Viola Pl.

Facing northwest, from Viola Pl. to S. El Monte Ave.

Facing southeast on Viola Pl.

Facing northeast on Viola Pl.

W. Edith & N. San Antonio Rd.

Facing south looking at the corner of 4th St.& W. Edith Ave.

Facing east at the corner of 4th St.& W. Edith Ave.

Facing northeast on W. Edith Ave.

Facing south on W. Edith Ave. (opposite previous picture)

Facing east on W. Edith Ave.

Facing east, park on W. Edith Ave. and N. San Antonio Rd.

Facing southwest, intersection with Main St & W. Edith Ave

Facing north, N. San Antonio Rd.

Facing west, looking at W. Edith Ave