City of Millbrae

621 Magnolia Avenue, Millbrae, CA 94030

September 27, 2018

Mr. Bruce H. Wolfe
Executive Officer
San Francisco Bay Regional Water Quality Control Board
1515 Clay Street, Suite 1400
Oakland, CA 94612

Subject: **City of Millbrae**
FY 2017/18 Annual Report

Dear Mr. Wolfe:

This letter and Annual Report with attachment is submitted by the City of Millbrae pursuant to Permit Provision C.17.a of the Municipal Regional Stormwater NPDES Permit (MRP), Order R2-2015-0049, NPDES Permit No CAS612008 issued by the San Francisco Bay Regional Water Quality Control Board. The Annual Report provides documentation of compliance activities conducted during FY 2017/18 and related accomplishments.

Please contact me at (650) 259-2347 regarding any questions or concerns.

Very truly yours,

Khee Lim
Director of Public Works

City of Millbrae
FY 2017/18 ANNUAL REPORT

Certification Statement

"I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage 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."

Signature of Duly Authorized Representative:

Khee Lim, Director of Public Works	09-27-2018
Name and Title	Date

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Section **Page**

Section 1 – Permittee Information

SECTION I. BACKGROUND INFORMATION

Background Information					
Permittee Name:	City of Millbrae				
Population:	21,600				
NPDES Permit No.:	CAS612008				
Order Number:	R2-2015-0049				
Reporting Time Period (month/year):	July 2017 through June 2018				
Name of the Responsible Authority:	Khee Lim			**Title:**	Deputy City Manager
Mailing Address:	621 Magnolia Avenue				
City:	Millbrae	**Zip Code:**	94030	**County:**	San Mateo
Telephone Number:	650-259-2347		**Fax Number:**		650-697-8158
E-mail Address:	klim@ci.millbrae.ca.us				
Name of the Designated Stormwater Management Program Contact (if different from above):				**Title:**	
Department:					
Mailing Address:					
City:		**Zip Code:**		**County:**	
Telephone Number:			**Fax Number:**		
E-mail Address:					

Section 2 - Provision C.2 Reporting Municipal Operations

Program Highlights and Evaluation

Highlight/summarize activities for reporting year:

Summary:

During the Fiscal Year 2017/2018 the City of Millbrae has maintained its active involvement in and commitment to providing the best possible protection of our storm water system through daily observance of BMPs, observance and maintenance of trash hot spots, and active participation in meetings of the SMCWPPP Municipal Maintenance Subcommittee.

Refer to the C.2 Municipal Operations section of the SMCWPPP FY 16-17 Annual Report for a description of activities implemented at the countywide and/or regional level.

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

Place a **Y** in the boxes next to activities where applicable BMPs were implemented. If not applicable, type **NA** in the box and provide an explanation in the comments section below. Place an **N** in the boxes next to activities where applicable BMPs were not implemented for one or more of these activities during the reporting fiscal year, then in the comments section below provide an explanation of when BMPs were not implemented and the corrective actions taken.

Y	Control of debris and waste materials during road and parking lot installation, repaving or repair maintenance activities from polluting stormwater
Y	Control of concrete slurry and wastewater, asphalt, pavement cutting, and other street and road maintenance materials and wastewater from discharging to storm drains from work sites.
Y	Sweeping and/or vacuuming and other dry methods to remove debris, concrete, or sediment residues from work sites upon completion of work.

Comments:

None

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

Place a **Y** in the boxes next to activities where applicable BMPs were implemented. If not applicable, type **NA** in the box and provide an explanation in the comments section below. Place an **N** in the boxes next to activities where applicable BMPs were not implemented for one or more of these activities during the reporting fiscal year, then in the comments section below provide an explanation of when BMPs were not implemented and the corrective actions taken.

Y	Control of wash water from pavement washing, mobile cleaning, pressure wash operations at parking lots, garages, trash areas, gas station fueling areas, and sidewalk and plaza cleaning activities from polluting stormwater
Y	Implementation of the BASMAA Mobile Surface Cleaner Program BMPs

Comments:

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

Place a **Y** in the boxes next to activities where applicable BMPs were implemented. If not applicable, type **NA** in the box and provide an explanation in the comments section below. Place an **N** in the boxes next to activities where applicable BMPs were not implemented for one or more of these activities during the reporting fiscal year, then in the comments section below provide an explanation of when BMPs were not implemented and the corrective actions taken.

Y	Control of discharges from bridge and structural maintenance activities directly over water or into storm drains
Y	Control of discharges from graffiti removal activities
Y	Proper disposal for wastes generated from bridge and structure maintenance and graffiti removal activities
Y	Implementation of the BASMAA Mobile Surface Cleaner Program BMPs for graffiti removal
Y	Employee training on proper capture and disposal methods for wastes generated from bridge and structural maintenance and graffiti removal activities.
Y	Contract specifications requiring proper capture and disposal methods for wastes generated from bridge and structural maintenance and graffiti removal activities.

Comments:
None

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

Does your municipality own/maintain rural[1] roads:		**Yes**	X	**No**

If your answer is **No** then skip to **C.2.f**.

Place a **Y** in the boxes next to activities where applicable BMPs were implemented. If not applicable, type **NA** in the box and provide an explanation in the comments section below. Place an **N** in the boxes next to activities where applicable BMPs were not implemented for one or more of these activities during the reporting fiscal year, then in the comments section below provide an explanation of when BMPs were not implemented and the corrective actions taken.

	Control of road-related erosion and sediment transport from road design, construction, maintenance, and repairs in rural areas
	Identification and prioritization of rural road maintenance based on soil erosion potential, slope steepness, and stream habitat resources
	No impact to creek functions including migratory fish passage during construction of roads and culverts
	Inspection of rural roads for structural integrity and prevention of impact on water quality
	Maintenance of rural roads adjacent to streams and riparian habitat to reduce erosion, replace damaging shotgun culverts and excessive erosion
	Re-grading of unpaved rural roads to slope outward where consistent with road engineering safety standards, and installation of water bars as appropriate
	Inclusion of measures to reduce erosion, provide fish passage, and maintain natural stream geomorphology when replacing culverts or design of new culverts or bridge crossings

Comments including listing increased maintenance in priority areas:

[1]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.

C.2.f. ►Corporation Yard BMP Implementation

Place an **X** in the boxes below that apply to your corporations yard(s):

	We do not have a corporation yard
	Our corporation yard is a filed NOI facility and regulated by the California State Industrial Stormwater NPDES General Permit
X	We have a **Stormwater Pollution Prevention Plan (SWPPP)** for the Corporation Yard(s)

Place an **X** in the boxes below next to implemented SWPPP BMPs to indicate that these BMPs were implemented in applicable instances. If not applicable, type **NA** in the box. If one or more of the BMPs were not adequately implemented during the reporting fiscal year then indicate so and explain in the comments section below:

X	Control of pollutant discharges to storm drains such as wash waters from cleaning vehicles and equipment
X	Routine inspection prior to the rainy seasons of corporation yard(s) to ensure non-stormwater discharges have not entered the storm drain system
X	Containment of all vehicle and equipment wash areas through plumbing to sanitary or another collection method
X	Use of dry cleanup methods when cleaning debris and spills from corporation yard(s) or collection of all wash water and disposing of wash water to sanitary or other location where it does not impact surface or groundwater when wet cleanup methods are used
X	Cover and/or berm outdoor storage areas containing waste pollutants

Comments:

Regarding the SWPPP BMPs, the City of Millbrae Corporation Yard is situated within the City of Millbrae Water Pollution Control Plant and all discharges of storm water originating on the grounds of the Millbrae Water Pollution Control Plant are regulated by Order No. R2-2013-0037, NPDES No. CA0037532 and coverage under Statewide Industrial Storm Water Permit (NPDES General Permit No. CAS000001) is not required. All discharges to the drainage system are directed to the Millbrae Water Pollution Control Plant for treatment.

If you have a corporation yard(s) that is not an NOI facility, complete the following table for inspection results for your corporation yard(s) or attach a summary including the following information:

Corporation Yard Name	Corp Yard Activities w/ site-specific SWPPP BMPs	Inspection Date[2]	Inspection Findings/Results	Date and Description of Follow-up and/or Corrective Actions
City of Millbrae Corp Yard	N/A	9/17/2017	*Corporation Yard is clean- BMPs Observed; *All stormwater discharges originating on	

[2] Minimum inspection frequency is once a year during September.

			the grounds of the corporation yard are directed into the headworks of the Water Pollution Control Plant.	

Section 3 - Provision C.3 Reporting New Development and Redevelopment

C.3.b.iv.(2) ►Regulated Projects Reporting

Fill in attached table **C.3.b.iv.(2)** or attach your own table including the same information.

C.3.e.iv. ►Alternative or In-Lieu Compliance with Provision C.3.c.

Is your agency choosing to require 100% LID treatment onsite for all Regulated Projects and not allow alternative compliance under Provision C.3.e.?		**Yes**	X	**No**
Comments (optional):				

C.3.e.v ► Special Projects Reporting

1. In FY 2017-18, has your agency received, but not yet granted final discretionary approval of, a development permit application for a project that has been identified as a potential Special Project based on criteria listed in MRP Provision C.3.e.ii.(2) for any of the three categories of Special Projects (Categories A, B or C)?	X	**Yes**		**No**
2. In FY 2017-18, has your agency granted final discretionary approval to a Special Project? If yes, include the project in both the **C.3.b.iv.(2)** Table, and the **C.3.e.v.** Table.	X	**Yes**		**No**

If you answered "Yes" to either question,

1) Complete Table C.3.e.v.
2) Attach narrative discussion of 100% LID Feasibility or Infeasibility for each project.

See Table C.3.2.e.v

C.3.h.v.(2) ► Reporting Newly Installed Stormwater Treatment Systems and HM Controls (Optional)

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

See attached Table **C.3.h.v.(2)** for list of newly installed Stormwater Treatment Systems/HM Controls

C.3.h.v.(3)(a) –(c) and (f) ► Installed Stormwater Treatment Systems Operation and Maintenance Verification Inspection Program Reporting

Site Inspections Data	Number/Percentage
Total number of Regulated Projects (including offsite projects, and Regional Projects) in your agency's database or tabular format at the end of the previous fiscal year (FY16-17)	**0**
Total number of Regulated Projects (including offsite projects, and Regional Projects) in your agency's database or tabular format at the end of the reporting period (FY 17-18)	**0**
Total number of Regulated Projects (including offsite projects, and Regional Projects) for which O&M verification inspections were conducted during the reporting period (FY 17-18)	**0**
Percentage of the total number of Regulated Projects (including offsite projects, and Regional Projects) inspected during the reporting period (FY 17-18)	**0%**[3]

C.3.h.v.(3)(d)-(e) ► Installed Stormwater Treatment Systems Operation and Maintenance Verification Inspection Program Reporting

Provide a discussion of the inspection findings for the year and any common problems encountered with various types of treatment systems and/or HM controls. This discussion should include a general comparison to the inspection findings from the previous year.

Summary:

There were fourteen (14) inspections of single family residential homes during FY 2017-2018. These are reported as 0 in the previous table because these were single family residents and were NOT regulated projects.

All inspections were complete during FY 2017-2018. During FY 2016-29017 4 single family residential homes were inspected. The previous year 4 inspections should have been reported as 0 as these were NOT regulated projects.

The City's inspection program is working as designed. No issues were found during this reporting period from July 1, 2017 to June 30, 2018. There were 14 single family residential inspections approved or constructed during this reporting period.

Provide a discussion of the effectiveness of the 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 program).

Summary:

The City's inspection program is working as designed. No issues were found during this reporting period from July 1, 2017 to June 30, 2018. There were 14 Regulated Projects approved or constructed during this reporting period.

C.3.h.v.(4)► Enforcement Response Plan

Does your agency have an Enforcement Response Plan for all O&M inspections of stormwater treatment measures?	X	**Yes**		**No**

If No, explain:

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

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.

Summary:

BASMAA prepared standard specifications in four fact sheets regarding the sign design measures listed in Provision C.3.i, as a resource for Permittees. We have modified local ordinances/policies/procedures and forms/checklists to require all applicable projects approved after December 1, 2012 to implement at least one of the site design measures listed in Provision C.3.i.

C.3.j.i.(5)(d) ► Green Infrastructure Outreach

On an annual basis, provide a summary of your agency's outreach and education efforts pertaining to Green Infrastructure planning and implementation.

Summary:

City of Millbrae has reached out to local community and school district to participate in the FlowsToBay High School Green Infrastructure Contest. The Millbrae City Council adopted Resolution No. 17-30 approving the City of Millbrae Green Infrastructure Work Plan on June 27, 2017. Copy of the Resolution No. 17-30 is attached.

Please refer to the SMCWPPP FY 17-18 Annual Report for a summary of outreach efforts implemented at the countywide level.

C.3.j.ii.(2) ► Early Implementation of Green Infrastructure Projects

On an annual basis, submit 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. Include the following information:

- A summary of planning or implementation status for each public and private green infrastructure project that is not also a Regulated Project as defined in Provision C.3.b.ii. (see C.3.j.ii.(2) Table B - Planned Green Infrastructure Projects).
- 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 (see C.3.j.ii.(2) Table A - Public Projects Reviewed for Green Infrastructure).

Background Information:

Describe how this provision is being implemented by your agency, including the process used by your agency to identify projects with potential for green infrastructure, if applicable.

The City utilizes the BASMAA guidance to identify and review potential green infrastructure projects.

Summary of Planning or Implementation Status of Identified Projects: N/A

See attached Tables C.3.j.ii.(2)-A and C.3.j.ii.(2)-B for the required information

C.3.j.iii.(2) ► Participate in Processes to Promote Green Infrastructure

On an annual basis, report on the goals and outcomes during the reporting year of work undertaken to participate in processes to promote green infrastructure.

Please refer to the SMCWPPP FY 17-18 Annual Report for a summary of efforts conducted to help regional, State, and federal agencies plan, design and fund incorporation of green infrastructure measures into local infrastructure projects, including transportation projects.

C.3.j.iv.(2) ► Tracking and Reporting Progress

On an annual basis, report progress on development and implementation of methods to track and report implementation of green infrastructure measures and provide reasonable assurance that wasteload allocations for TMDLs are being met.

Please refer to the SMCWPPP FY 17-18 Annual Report for a summary of methods being developed to track and report implementation of green infrastructure measures.

C.3.b.iv.(2) ►Regulated Projects Reporting Table (part 1) – Projects Approved During the Fiscal Year Reporting Period

Project Name Project No.	Project Location[3], Street Address	Name of Developer	Project Phase No.[4]	Project Type & Description[5]	Project Watershed[6]	Total Site Area (Acres)	Total Area of Land Disturbed (Acres)	Total New Impervious Surface Area (ft^2)[7]	Total Replaced Impervious Surface Area (ft^2)[8]	Total Pre-Project Impervious Surface Area[9](ft^2)	Total Post-Project Impervious Surface Area[10](ft^2)
Private Projects											
Millbrae Serra Station (TOD 1)	200 El Camino Real, 150 Serra Avenue and 100 California Drive, Millbrae, CA	Millbrae Serra Station LLC	Approved by PC/CC.Under Design Review.	West of BART: Building C-1: (office, retail and public parking) at 100 California Drive. Building R-1: (residential and public parking) at 200 El Camino Real. Building R-2: (residential, retail and public parking) at 150 Serra Ave.	Green Hills Creek	3.53	3.53	0	13,799	13,799	13,799
Gateway at Millbrae Station (TOD 2)	200 North Rollins Road, Millbrae, CA. (Cross streets: Millbrae Ave, North Rollins Road, Camino Millennia, Aviador Ave.)	Republic Millbrae LLC	Approved by PC/CC. Under Design Review.	East site of BART: a. Site 5A - a six-story building with 151,583 square feet of offices on the top three floors over three levels	Green Hills Creek	4.7	4.7	0	203,952	203,952	203,952

[3]Include cross streets
[4]If a project is being constructed in phases, indicate the phase number and use a separate row entry for each phase. If not, enter "NA".
[5]Project Type is the type of development (i.e., new and/or redevelopment). Example descriptions of development are: 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.
[6]State the watershed(s) in which the Regulated Project is located. Downstream watershed(s) may be included, but this is optional.
[7]All impervious surfaces added to any area of the site that was previously existing pervious surface.
[8]All impervious surfaces added to any area of the site that was previously existing impervious surface.
[9]For redevelopment projects, state the pre-project impervious surface area.
[10]For redevelopment projects, state the post-project impervious surface area.

C.3.b.iv.(2) ►Regulated Projects Reporting Table (part 1) – Projects Approved During the Fiscal Year Reporting Period

Project Name Project No.	Project Location[3], Street Address	Name of Developer	Project Phase No.[4]	Project Type & Description[5]	Project Watershed[6]	Total Site Area (Acres)	Total Area of Land Disturbed (Acres)	Total New Impervious Surface Area (ft^2)[7]	Total Replaced Impervious Surface Area (ft^2)[8]	Total Pre-Project Impervious Surface Area[9](ft^2)	Total Post-Project Impervious Surface Area[10](ft^2)
				of parking, with 22,534 square feet of ground floor retail; b. Site 5B - 300 market rate housing units and 20 units affordable to moderate-income persons, in a seven-story building with parking on the first two floors and 13,749 square feet of ground floor retail; c. Site 6A - 80 affordable units in a five-story building; and Site 6B - a 164-room hotel and 7,840 square feet of ground floor retail in a five-story building.						
30 Hermosa	30 Hermosa (El Camino Real and Hermosa)	Moshe Dinar	Approved	Four-story, 9 Unit Condominium.	Green Hills Creek	0.18	0.18	0	8,194	8,194	8,194

C.3.b.iv.(2) ►Regulated Projects Reporting Table (part 1) – Projects Approved During the Fiscal Year Reporting Period

Project Name Project No.	Project Location[3], Street Address	Name of Developer	Project Phase No.[4]	Project Type & Description[5]	Project Watershed[6]	Total Site Area (Acres)	Total Area of Land Disturbed (Acres)	Total New Impervious Surface Area (ft^2)[7]	Total Replaced Impervious Surface Area (ft^2)[8]	Total Pre-Project Impervious Surface Area[9](ft^2)	Total Post-Project Impervious Surface Area[10](ft^2)
480 El Camino Real	480 El Camino Real, (El Camino Real and Hermosa)	Moshe Dinar	Design Review	Four-story, 9 Unit Apartment Building	Green Hills Creek	0.13	0.13	0	5.807	5,807	5,807
Public Projects											
None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Comments:

All storm water runoff from the project shall be collected and treated prior to conveying the runoff into any existing storm drain system. Developer shall comply with the San Mateo County Water Pollution Prevention C3 requirements in particularly the Site Design Measures, Treatment Measures and Hydromodification Management Plan.

C.3.b.iv.(2) ►Regulated Projects Reporting Table (part 2) – Projects Approved During the Fiscal Year Reporting Period (private projects)

Project Name Project No.	Application Deemed Complete Date[11]	Application Final Approval Date[12]	Source Control Measures[13]	Site Design Measures[14]	Treatment Systems Approved[15]	Type of Operation & Maintenance Responsibility Mechanism[16]	Hydraulic Sizing Criteria[17]	Alternative Compliance Measures[18/19]	Alternative Certification[20]	HM Controls[21/22]
Private Projects										
480 El Camino Real	11/8/17	PC Recommended Approval to CC on 12/18/17.	Properly designed trash storage areas; storm drain stenciling or signage; efficient landscape irrigation systems	Minimize impervious surfaces; conserve natural areas, including existing trees or other vegetation, and soils; construct sidewalks, walkways, and/or patios with permeable surfaces	Flow through planter, bio-retention facility, infiltration basin,	O&M agreement with private landowner.	TBD	N/A	TBD	HM required. Measures TBD, reviewed and approved by City Engineer.
30 Hermosa	3/21/16	Approved by the Planning Commission and City Council on July 26, 2015.	Properly designed trash storage areas; storm drain stenciling or signage; efficient landscape irrigation systems	Minimize impervious surfaces; conserve natural areas, including existing trees or other vegetation, and soils; construct sidewalks, walkways, and/or patios with permeable surfaces	Flow through planter, bio-retention facility, infiltration basin.	O&M agreement with private landowner; O&M agreement with homeowners' association; O&M by public entity,	TBD	N/A	TBD	HM required. Measures TBD, reviewed and approved by City Engineer.
TOD #1 (Millbrae Serra Station)	2017	Approved by PC/CC in 2018 Under Design Review.	Properly designed trash storage areas; storm drain stenciling or signage; efficient landscape irrigation systems	Minimize impervious surfaces; conserve natural areas, including existing trees or other vegetation, and soils; construct	Rainwater harvesting/reuse infiltration	O&M agreement with private landowner; O&M agreement with homeowners'	TBD	N/A	TBD	HM required. Measures TBD, reviewed and

[11]For private projects, state project application deemed complete date. If the project did not go through discretionary review, report the building permit issuance date.
[12]For private projects, state project application final discretionary approval date. If the project did not go through discretionary review, report the building permit issuance date.
[13]List source control measures approved for the project. Examples include: properly designed trash storage areas; storm drain stenciling or signage; efficient landscape irrigation systems; etc.
[14]List site design measures approved for the project. Examples include: minimize impervious surfaces; conserve natural areas, including existing trees or other vegetation, and soils; construct sidewalks, walkways, and/or patios with permeable surfaces, etc.
[15]List all approved stormwater treatment system(s) to be installed onsite or at a joint stormwater treatment facility (e.g., flow through planter, bioretention facility, infiltration basin, etc.).
[16]List the legal mechanism(s) (e.g., O&M agreement with private landowner; O&M agreement with homeowners' association; O&M by public entity, etc…) that have been or will be used to assign responsibility for the maintenance of the post-construction stormwater treatment systems.
[17]See Provision C.3.d.i. "Numeric Sizing Criteria for Stormwater Treatment Systems" for list of hydraulic sizing design criteria. Enter the corresponding provision number of the appropriate criterion (i.e., 1.a., 1.b., 2.a., 2.b., 2.c., or 3).
[18]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.v.(1)(m)(i) for the offsite project.
[19]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.v.(1)(m)(ii) for the Regional Project.
[20]Note whether a third party was used to certify the project design complies with Provision C.3.d.
[21]If HM control is not required, state why not.
[22]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).

C.3.b.iv.(2) ►Regulated Projects Reporting Table (part 2) – Projects Approved During the Fiscal Year Reporting Period (private projects)

Project Name Project No.	Application Deemed Complete Date[11]	Application Final Approval Date[12]	Source Control Measures[13]	Site Design Measures[14]	Treatment Systems Approved[15]	Type of Operation & Maintenance Responsibility Mechanism[16]	Hydraulic Sizing Criteria[17]	Alternative Compliance Measures[18/19]	Alternative Certification[20]	HM Controls[21/22]
				sidewalks, walkways, and/or patios with permeable surfaces	and Evapotranspiration. If the LID measures are infeasible, biotreatment measures shall be used for stormwater treatment: Flow-through planters, tree well filters and media filters	association; O&M by public entity,				approved by City Engineer.
TOD #2 (Gateway at Millbrae Station)	2017	Approved by PC/CC 2018. Under Design Review	Properly designed trash storage areas; storm drain stenciling or signage; efficient landscape irrigation systems	Minimize impervious surfaces; conserve natural areas, including existing trees or other vegetation, and soils; construct sidewalks, walkways, and/or patios with permeable surfaces	Biotreatement cells (31% of area)	O&M agreement with private landowner;	TBD	Mechanical filter (69% of area))	TBD	HM required. Measures TBD, reviewed and approved by City Engineer.

C.3.b.iv.(2) ►Regulated Projects Reporting Table (part 2) – Projects Approved During the Fiscal Year Reporting Period (public projects)

Project Name Project No.	Approval Date[23]	Date Construction Scheduled to Begin	Source Control Measures[24]	Site Design Measures[25]	Treatment Systems Approved[26]	Operation & Maintenance Responsibility Mechanism[27]	Hydraulic Sizing Criteria[28]	Alternative Compliance Measures[29/30]	Alternative Certification[31]	HM Controls[32/33]
Public Projects										
None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Comments:
There were no regulated public projects to report for FY 2017-2018

[23]For public projects, enter the plans and specifications approval date.
[24]List source control measures approved for the project. Examples include: properly designed trash storage areas; storm drain stenciling or signage; efficient landscape irrigation systems; etc.
[25]List site design measures approved for the project. Examples include: minimize impervious surfaces; conserve natural areas, including existing trees or other vegetation, and soils; construct sidewalks, walkways, and/or patios with permeable surfaces, etc.
[26]List all approved stormwater treatment system(s) to be installed onsite or at a joint stormwater treatment facility (e.g., flow through planter, bioretention facility, infiltration basin, etc.).
[27]List the legal mechanism(s) (e.g., maintenance plan for O&M by public entity, etc.) that have been or will be used to assign responsibility for the maintenance of the post-construction stormwater treatment systems.
[28]See Provision C.3.d.i. "Numeric Sizing Criteria for Stormwater Treatment Systems" for list of hydraulic sizing design criteria. Enter the corresponding provision number of the appropriate criterion (i.e., 1.a., 1.b., 2.a., 2.b., 2.c., or 3).
[29]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.v.(1)(m)(i) for the offsite project.
[30]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.v.(1)(m)(ii) for the Regional Project.
[31]Note whether a third party was used to certify the project design complies with Provision C.3.d.
[32]If HM control is not required, state why not.
[33]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).

C.3.h.v.(2). ►Table of Newly Installed[34] Stormwater Treatment Systems and Hydromodification Management (HM) Controls (Optional)

Fill in table below or attach your own table including the same information.

Name of Facility	Address of Facility	Party Responsible[35] For Maintenance	Type of Treatment/HM Control(s)
None	N/A	N/A	N/A

NOTE: There were no regulated newly installed stormwater treatment systems facilities to report for FY 2017-2018. There were 14 single family residential sites inspected.

[34] "Newly Installed" includes those facilities for which the final installation inspection was performed during this reporting year.
[35] State the responsible operator for installed stormwater treatment systems and HM controls.

C.3.e.v.Special Projects Reporting Table

Reporting Period – July 1 2017 - June 30, 2018

Project Name & No.	Permittee	Address	Application Submittal Date[36]	Status[37]	Description[38]	Site Total Acreage	Gross Density DU/Acre	Density FAR	Special Project Category[39]	LID Treatment Reduction Credit Available[40]	List of LID Stormwater Treatment Systems[41]	List of Non-LID Stormwater Treatment Systems[42]
Millbrae Serra Station (TOD #1)	Millbrae Serra Station LLC	200 El Camino Real, 150 Serra Avenue and 100 California Drive, Millbrae, CA	6/17/16	Approved by PC/CC. Under Design Review.	West side of BART-TOD development 450 residential, 299 sf office, 13,500 sf retail and below grade parking	13,799 sq. ft. (3.53 acres)	238.6	5.61	C	80%	Rainwater harvesting/reuse · Infiltration and· Evapotranspiration.	If the LID measures are infeasible, biotreatment measures shall be used for stormwater treatment: Flow-through planters, tree well filters and media filters
Gateway at Millbrae	Republic Millbrae LLC	200 North Rollins	5/22/16	Approved by PC/CC.	East side of BART:	203,952 sq. ft.	122.3 lf density	The current FAR	C	80%	Biotreatment cells	Mechanical filter (69% of area))

[36]Date that a planning application for the Special Project was submitted.
[37] Indicate whether final discretionary approval is still pending or has been granted, and provide the date or version of the project plans upon which reporting is based.
[38]Type of project (commercial, mixed-use, residential), number of floors, number of units, type of parking, and other relevant information.
[39] For each applicable Special Project Category, list the specific criteria applied to determine applicability. For each non-applicable Special Project Category, indicate n/a.
[40]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.
[41]**:** List all LID stormwater treatment systems proposed. For each type, indicate the percentage of the total amount of runoff identified in Provision C.3.d. for the Special Project's drainage area.
[42]List all non-LID stormwater treatment systems proposed. 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.

Station (TOD #2)		Road, Millbrae, CA		Under Design Review.	a. Site 5A - a six-story building with 151,583 square feet of offices on the top three floors over three levels of parking, with 22,534 square feet of ground floor retail; b. Site 5B - 300 market rate housing units and 20 units affordable to moderate-income persons, in a seven-story building with parking on the first two floors and 13,749 square feet of ground floor retail; c. Site 6A - 80 affordable units in a	(4.7 acres)	is calculated on a lot by lot basis, the residential density is 119 du/ac on site 5B and 147 du/ac on site 6A (or 124.2 du/ac combined). If you calculated density by the entire development site, the density is 41.7 du/ac.	numbers by site: Site 5A: 2.20 5B: 2.82 6A: 2.56 6B: 1.85			(31% of area)	

					five-story building; and d. Site 6B - a 164-room hotel and 7,840 square feet of ground floor retail in a five-story building.							

Special Projects Narrative

Millbrae Serra Station (TOD #1)

Onsite development will incorporate storm water treatment and detention facilities to limit post development flows to pre-development flows as required by the City of Millbrae, Part II - Technical Provisions for Public Works Construction, and the San Mateo County C.3 Technical Guidance Manual.

LID stormwater treatment will be sized in accordance with the MRP requirements (approximately 4% of impervious area). As the Project is a Transit Oriented Development special project, it qualifies for non-LID treatment.

Onsite development will incorporate storm water treatment and detention facilities to limit post-development flows to pre-development flows as required by the City of Millbrae, Part II - Technical Provisions for Public Works Construction, and the San Mateo County C.3 Technical Guidance Manual. The stormwater detention will be provided in the stormwater treatment areas (flow-through planters) by the 6-inches of ponding depth. Detention will be provided for a design storm with a 10-year recurrence interval in accordance with the City requirements. See Attachments 6 and 7 for the Existing and Proposed (respectively) Impervious Areas Exhibits.

LID stormwater treatment will be provided by the flow through planters at the podium level. The planters will be sized in accordance with the MRP requirements (approximately 4% of impervious area) but the locations of the flow through planters have not been finalized. As the Project is a Transit Oriented Development special project, it qualifies for non-LID treatment. Therefore, mechanical treatment vaults will be installed in the basement. The locations of the mechanical treatment vaults have not been finalized. Tree filters will be installed in California Drive to also provide treatment.

(Please see attached Stormwater Management Plan for more details)

Gateway at Millbrae Station (TOD #2)

There is an existing storm drain network within the area, including a line that runs under the Highline Canal, beneath Garden Lane pedestrian paseo, and a 12-inch storm drain beneath Aviador Avenue. Proposed development within the TOD #2 project site includes construction of a new internal storm drain network and the installation of various bio treatment areas and storm drain manhole media filter inserts. Numerous bio treatment areas would be located within the

eastern portion of the site with new storm drains connecting these facilities to the existing storm drain system. Bioretention planters are also proposed on Site 58.

(Please see attached Stormwater Management Plan for more details)

C.3.j.ii.(2) ► Table A - Public Projects Reviewed for Green Infrastructure

Project Name and Location[43]	Project Description	Status[44]	GI Included?[45]	Description of GI Measures Considered and/or Proposed or Why GI is Impracticable to Implement[46]
SRTS and GI Pilot Project, Almenar and Taylor	Install curb extensions at the intersection of Alemnar and Taylor	Beginning planning and design phase	YES	Bio-retention inside curb extensions

C.3.j.ii.(2) ► Table B - Planned and/or Completed Green Infrastructure Projects

Project Name and Location[47]	Project Description	Planning or Implementation Status	Green Infrastructure Measures Included
San Anselmo Ave. Green Street Project	Green Street on San Anselmo Avenue	Planning	Bio-retention and curb extension

[43] List each public project that is going through your agency's process for identifying projects with green infrastructure potential.
[44] Indicate status of project, such as: beginning design, under design (or X% design), projected completion date, completed final design date, etc.
[45] Enter "Yes" if project will include GI measures, "No" if GI measures are impracticable to implement, or "TBD" if this has not yet been determined.
[46] Provide 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. If review of the project indicates that implementation of green infrastructure measures is not practicable, provide the reasons why green infrastructure measures are impracticable to implement.
[47] List each planned (and expected to be funded) public and private green infrastructure project that is not also a Regulated Project as defined in Provision C.3.b.ii. Note that funding for green infrastructure components may be anticipated but is not guaranteed to be available or sufficient.

Section 4 – Provision C.4 Industrial and Commercial Site Controls

Program Highlights and Evaluation
Highlight/summarize activities for reporting year:

Summary:

The County of San Mateo Health System (County Environmental Health, or CEH) notified Cities in an April 3, 2017 letter of its intent to terminate stormwater inspection agreements with the 17 Cities on December 31, 2017 due to staffing and cost concerns. As of January 1, 2018, the City is responsible for conducting all stormwater business facility inspections. To reflect the City's current stormwater inspection program we have updated the following materials: The City of Millbrae SW ERP, BIP, and Industrial & Commercial SW Facility List. We continue participate in Countywide Program's CII Subcommittee which is held once a quarter. The City received an NOV from the RWB on August 2, 2017 and responded October 6, 2017. Staff attended training – see C.4.e.iii.

C.4.b.iii ► Potential Facilities List (i.e., List of All Facilities Requiring Stormwater Inspections)

List below or attach your list of industrial and commercial facilities in your Inspection Plan to inspect that could reasonably be considered to cause or contribute to pollution of stormwater runoff.

Our Facilities List for storm water was updated in June 2018. See attached "Facilities List"

C.4.d.iii.(2)(a) & (c) ►Facility Inspections

Fill out the following table or attach a summary of the following information. Indicate your reporting methodology below.

	X	Permittee reports multiple discrete potential and actual discharges as one enforcement action.
		Permittee reports the total number of discrete potential and actual discharges on each site.

	Number
Total number of inspections conducted (C.4.d.iii.(2)(a))	197
Violations, enforcement actions, or discreet number of potential and actual discharges resolved within 10 working days or otherwise deemed resolved in a longer but still timely manner (C.4.d.iii.(2)(c))	41

Comments:

Nine enforcement actions took longer than 10 days or otherwise deemed resolved in a timely manner.

Autozone #3307 was inspected by County on October 25, 2017. Inspection resulted in Verbal Warning for trash and debris found in storm drain and in parking lot. Notified City after ten day follow-up.

Re-inspection by City on November 7, 2017 resulted in a Warning Notice. Compliance achieved and issue resolved on November 17, 2017.

Chicken Pho You was scheduled for County inspection on July 11, 2017. Initial inspection revealed tallow bin over flowing with grease. Staff did not allow consent for inspection by County. County notified City of Millbrae.
Inspection by the City of Millbrae on July 21, 2017 resulted in Warning Notice for tallow bin conditions.
Compliance achieved and issue resolved on July 31, 2017.

Chipotle Mexican Grill #934 was inspected by the City on July 27, 2017. Inspection revealed tallow bin lid requiring replacement. Notice of Violation was issued after August 8, 2017 follow-up for failure to obtain replacement.
Compliance achieved and issue resolved on August 22, 2017.

Hu Bei Restaurant was inspected by City on October 10, 2017. Inspection resulted in Warning Notice for not having tallow bin secondary containment. Used oil & grease flowed from bin onto pavement.
Follow-up inspection on January 30, 2018 revealed no secondary containment. Warning Notice sent.
Follow-up inspection on February 20, 2018 revealed no secondary containment. 1st Notice of Violation sent.
Follow-up inspection on April 3, 2018 revealed no secondary containment. 2nd Notice of Violation sent.
Follow-up inspection on May 1, 2018 revealed secondary containment obtained. City staff steam cleaned the area. Compliance achieved.

O' Reilly Auto Parts was inspected by County on October 25, 2017 for trash and debris within storm drain. Did not comply within ten days.
O' Reilly Auto Parts was re-inspected by County on November 7, 2017 and alerted the City of Millbrae about the case.
Re-inspection by the City of Millbrae resulted in a Warning Notice. Did not comply within ten days, Notice of Violation sent.
Re-inspection on November 21, 2017 resulted in compliance.

San Francisco Water Dept. (SFPUC) was inspected by County on August 1, 2017 for trash debris in storm drain and potential for oil spill to reach the storm drain. Re-inspected on August 11, 2017 to find staff were continuing cleanup of the storm drain and oil spill. Complete compliance achieved on August 15, 2017.

Suzanne's Cake & Pastry was inspected by the City on April 25, 2018. Inspection resulted in Verbal Warning for cardboard cluttered and stored inappropriately in back alley. Compliance achieved and issue resolved on May 10, 2018.

Zen Peninsula was inspected by the City on September 26, 2017. Inspection resulted in Warning Notice for tallow bin having dried oil and grease on outside of bin. Compliance achieved and issue resolved on October 11, 2017.

C.4.d.iii.(2)(b) ►Frequency and Type of Enforcement Conducted

Fill out the following table or attach a summary of the following information.

	Enforcement Action (as listed in ERP)[48]	Number of Enforcement Actions Taken
Level 1	Verbal Warning	30
Level 2	Written Warning	20
Level 3	Notice to Comply	0
Level 4	Legal Action	0
Total		50

C.4.d.iii.(2)(d) ► Frequency of Potential and Actual Non-stormwater Discharges by Business Category

Fill out the following table or attach a summary of the following information.

Business Category[49]	Number of Actual Discharges	Number of Potential Discharges
Automotive	0	6
Food Preparation – Restaurants	0	31
Food Service Establishments – Other	1	3
Gas Station	0	1
Retail – General	1	3
Industrial	1	2
Radiotelephone Communications	0	1

C.4.d.iii.(2)(e) ►Non-Filers

List below or attach a list of the facilities required to have coverage under the Industrial General Permit but have not filed for coverage:

There were no industries identified as non-filers during scheduled inspections during this fiscal year.

[48]Agencies to list specific enforcement actions as defined in their ERPs.
[49]List your Program's standard business categories.

C.4.e.iii ►Staff Training Summary

Training Name	Training Dates	Topics Covered	No. of Industrial/ Commercial Site Inspectors in Attendance	Percent of Industrial/ Commercial Site Inspectors in Attendance	No. of IDDE Inspectors in Attendance	Percent of IDDE Inspectors in Attendance
Stormwater Inspector Training Workshop	February 28, 2018	Facility Stormwater Inspection Basics. C4 and C5 Inspections. 3 Case Studies	1 City and 2 EOA	50% - Millbrae 100% - EOA		
Cal/EPA Basic Inspector Training Online	January – February 2018	Overview of CalEPA Boards, Departments and local agencies, environmental law, environmental science, the role of the environmental inspector and basic field health and safety	2 EOA	100%		
Inspector Calibration	January 31, 2018	Inspectors conducted joint inspections in the field and discussed results documented in Inspection Forms	2 EOA	100%		

Comments:
This includes training for City of Millbrae Inspector and Supervisor. Also includes training for EOA inspectors.

Section 5 – Provision C.5 Illicit Discharge Detection and Elimination

Program Highlights and Evaluation
Highlight/summarize activities for reporting year:

Provide background information, highlights, trends, etc.

Summary:

Summary: Continued participation in the SMCWPPP CII Subcommittee. Refer to the C.5 Illicit Discharge Detection and Elimination section of the SMCWPPP FY 17-18 Annual Report for description of activities at the countywide or regional level. Our ERP was update in June 2018. The City of Millbrae continues its Downtown beatification project requiring all businesses to keep their area clean. As anticipated, we may have an increase in C5 related issues as this will be our formal way of investigating these potential and or actual illicit charges to the storm sewer system.

C.5.c.iii ►Complaint and Spill Response Phone Number

Summary of any changes made during FY 17-18:

No change

C.5.d.iii.(1), (2), (3) ►Spill and Discharge Complaint Tracking

Spill and Discharge Complaint Tracking (fill out the following table or include an attachment of the following information)

	Number
Discharges reported (C.5.d.iii.(1))	5
Discharges reaching storm drains and/or receiving waters (C.5.d.iii.(2))	2
Discharges resolved in a timely manner (C.5.d.iii.(3))	4

Comments:

Complaints received by the City Millbrae are directed to appropriate staff. Depending on category of discharge (new construction/building permit required, encroachment permit required, public works, Do-It-Yourself work, pool, illegal dumping, etc.), multiple responders may be necessary. In most cases if the incident happens during business hours the environmental compliance inspector will respond. The City of Millbrae WPCP Source Control staff will perform any required follow-up written communication, billing, and tracking. Reports that are unsubstantiated in the field are not reported and discharges that are prevented from reaching storm drains/receiving waters are reported as potential.

One discharge was resolved after the ten-day period. Not resolved within a timely manner.

Notice of Violation was sent after the ten-day period. Follow-up inspection revealed compliance within ten days of NOV.

Section 6 – Provision C.6 Construction Site Controls

C.6.e.iii.(3)(a), (b), (c), (d) ►Site/Inspection Totals

Number of active Hillside Sites (sites disturbing < 1 acre of soil requiring storm water runoff quality inspection) (C.6.e.iii.3.a)	**Number of High Priority Sites (sites disturbing < 1 acre of soil requiring storm water runoff quality inspection)** (C.6.e.iii. 3.c)	**Number of sites disturbing ≥ 1 acre of soil** (C.6.e.iii.3.b)	**Total number of storm water runoff quality inspections conducted (include only Hillside Sites, High Priority Sites and sites disturbing 1 acre or more)** (C.6.e.iii. 3.d)
#14	#14 projects located on hillsides – all residential	0 sites of 1 acre or more	67 inspections were performed at the 14 sites between October 2017 and April 2018.
Comments: There were 67 site visits for SWPPP/BMPs at a total of 14 qualifying sites.			

C.6.e.iii.(3)(e) ►Construction Related Storm Water Enforcement Actions

	Enforcement Action (as listed in ERP)[50]	**Number Enforcement Actions Issued**
Level 1[51]	0	0
Level 2	0	0
Level 3	0	0
Level 4	0	0
Total	**0**	**0**

[50]Agencies should list the specific enforcement actions as defined in their ERPs.
[51]For example, Enforcement Level 1 may be Verbal Warning.

C.6.e.iii.(3)(f), ►Illicit Discharges

	Number
Number of illicit discharges, actual and those inferred through evidence at hillside sites, high priority sites and sites that disturb 1 acre or more of land (C.6.e.iii. 3.f)	0

C.6.e.iii.(3)(g) ► Corrective Actions

Indicate your reporting methodology below.

X	Permittee reports multiple discrete potential and actual discharges as one enforcement action.
	Permittee reports the total number of discrete potential and actual discharges on each site.

	Number
Enforcement actions or discrete potential and actual discharges fully corrected within 10 business days after violations are discovered or otherwise considered corrected in a timely period (C.6.e.iii. .3.g)	0

Comments: NO ILLICIT DISCHARGES

C.6.e.iii.(4) ►Evaluation of Inspection Data

Describe your evaluation of the tracking data and data summaries and provide information on the evaluation results (e.g., data trends, typical BMP performance issues, comparisons to previous years, etc.).

Description: Sites in Compliance, and maintained as such.

C.6.e.iii.(4) ►Evaluation of Inspection Program Effectiveness

Describe what appear to be your program's strengths and weaknesses, and identify needed improvements, including education and outreach.

Description:

Problem with ensuring SWPPI/BMP inspections are performed monthly. Our Building Inspector has large daily workload, making it difficult to visit High Priority sites monthly where those sites have not requested any building inspections. False assumption of the County's Program that City Building Inspectors are routinely at any given site at least once every 30 days. For example: after a drywall inspection the next inspection would be a Final – there is a lot of construction activity between drywall and final - which may occur over a number of months, without requiring a building inspection.

C.6.f.iii ►Staff Training Summary

Training Name	Training Dates	Topics Covered	No. of Inspectors in Attendance
CALBIG – ICC Chapter	October 11, 2017	2017 Stormwater Requirements at Construction Sites	2

Section 7 – Provision C.7. Public Information and Outreach

C.7.b.i.1 ►Outreach Campaign

Summarize outreach campaign. Include details such as messages, creative developed, and outreach media used. The detailed outreach campaign report may be included as an attachment. If outreach campaign is being done by participation in a countywide or regional program, refer to the separate countywide or regional Annual Report.

Summary:

Local: Advertised the City's Environmental Programs, including for workshops, events and water pollution prevention program information through a variety of outlets. Articles were placed in the franchised garbage/recycling hauler's quarterly residential newsletters. Notices were included on the City's website, Facebook, Twitter and NextDoor on the high school Flows to Bay contest, cigarette butt litter, household battery recycling, rain barrel rebates, proper medicine disposal, signing up for the Flows to Bay e-newsletter, and workshops; messages were included in utility billings (reaches approximately 6,300 resident/business customers); library displays were installed; and newspaper ads were also included in the local newspaper in September 2017 for Pollution Prevention Week and Coastal Cleanup Week. Public service announcements were also aired on a variety of topics. In addition, BASMAA's Our Water, Our World Campaign was supported.

Regional: See Section 7 and Section 9 of the SMCWPPP FY 17-18 Annual Report for a description of outreach campaign activities conducted at the countywide level.

C.7.c. Stormwater Pollution Prevention Education

Local: No change.

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

Describe general approach to event selection. Provide a list of outreach materials and giveaways distributed.
Use the following table for reporting and evaluating public outreach events

See Section 7 of the SMCWPPP FY 17-18 Annual Report for a description of public outreach and citizen involvement events activities conducted at the countywide level.

Event Details	**Description** (messages, audience)	**Evaluation of Effectiveness**
Provide event name, date, and location. Indicate if event is local, countywide or regional. Indicate if event is public outreach or citizen involvement.	Identify type of event (e.g., school fair, creek clean-up, storm drain stenciling, farmers market etc.), type of audience (school children, gardeners, homeowners etc.) and outreach messages (e.g., Enviroscape presentation, pesticides, stormwater awareness)	Provide general staff feedback on the event (e.g., success at reaching a broad spectrum of the community, well attended, good opportunity to talk to gardeners etc.). Provide other details such as: • 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
Local: Coastal Cleanup Day, September 16, 2017, Citywide	Held a local litter cleanup event. Citizens and students helped with the citywide cleanup of the Bay, various parks, trails, alleys, and City streets; audience: general public and students; outreach on litter prevention, proper disposal of household hazardous waste and general environmental education.	Approximately 135 participants attended and collected 1.5 yards of trash, 1 yard of organics and 192 gallons of recyclables at 14 sites in the City (included paper, cardboard and organics); distributed approximately 150 handouts. In addition, a local school with 100 students held a cleanup a day prior and collected 0.5 yards of litter.
Local: Water-Wise Landscape Design Workshop, December 1, 2017, Library	Native Plant/Water-Wise workshop; audience: gardeners and homeowners; outreach on planting natives to reduce water and chemical use.	Reached gardeners and homeowners; there were 30 attendees; distributed a variety of water conservation and water pollution prevention brochures, distributed approximately 100 handouts.

Local: Rainwater Harvesting & Graywater Reuse Workshop, March 14, 2018, Library	Rainwater harvesting and graywater reuse workshop; audience homeowners; outreach on the benefits of harvesting rainwater to save water and reduce runoff.	Reached homeowners; there were 30 attendees; distributed a variety of water conservation and water pollution prevention brochures, distributed approximately 90 handouts. Raffled a rain barrel system.
Local: Earth Day Tabling, April 19, 2018, Downtown	Staffed a table in the Downtown area; audience: general public and students; outreach on water pollution prevention and general environmental education.	Reached general public; approximately 150 people stopped by the table; distributed approximately 300 handouts.
Local: Arbor & Earth Day/Litter Cleanup, April 28, 2018 Citywide	Held a local litter cleanup and planted trees. Citizens and students helped with the citywide cleanup of various parks, trails, alleys, and City streets; audience: general public and students; outreach on litter prevention, proper disposal of household hazardous waste and general environmental education.	There were 165 participants who cleaned up at 12 sites. Volunteers collected 2 yards of trash, 97 gallons of recyclable cans and bottles, and ½ yards of compostables (included paper, cardboard and organics). Distributed approximately 300 handouts.
Local: Design It Yourself Native Plant Workshop, May 23, 2018, Library	Water-Wise landscape design workshop; audience: gardeners and homeowners; focus on water landscape designs which use sustainable gardening measures.	Reached gardeners and homeowners; 52 attended; distributed approximately 200 handouts.

C.7.e. ►Watershed Stewardship Collaborative Efforts

Summarize watershed stewardship collaborative efforts and/or refer to a regional report that provides details. Describe the level of effort and support given (e.g., funding only, active participation etc.). State efforts undertaken and the results of these efforts. If this activity is done regionally refer to a regional report.

Evaluate effectiveness by describing the following:

- Efforts undertaken
- Major accomplishments

Summary:

Regional: See Section 7 of the SMCWPPP FY 17-18 Annual Report for a description of watershed stewardship collaborative efforts conducted at the countywide level.

C.7.f. ►School-Age Children Outreach

Summarize school-age children outreach programs implemented. A detailed report may be included as an attachment.

Use the following table for reporting school-age children outreach efforts.

Regional: See Section 7 of the SMCWPPP FY 17-18 Annual Report for a description of school-age children outreach efforts conducted at the countywide level.

Program Details	Focus & Short Description	Number of Students/Teachers reached	Evaluation of Effectiveness
Provide the following information: Name Grade or level (elementary/ middle/ high)	Brief description, messages, methods of outreach used	Provide number or participants	Provide agency staff feedback. Report any other evaluation methods used (quiz, teacher feedback etc.). Attach evaluation summary if applicable.
Local: Water Conservation School Assembly Program, 2017-2018 school year, K-5 grades	Provided school assembly programs to the K-5 schools performed by EarthCapades; focus on water conservation and also included information on water pollution prevention and litter prevention.	1,510 grade school students	Performers conducted a survey to teachers and received positive results.
Local: Classroom presentations, 2017-2018 school year; elementary school grade students, K-5 grades	Met with Green Team students at Taylor Middle School, presented to a High School classroom, the County of San Mateo, Office of Sustainability	200 students	

	conducted classroom presentations on reducing waste, recycling and composting for 1st-5th graders at local schools, the franchised hauler conducted presentations to students as part of two fieldtrips. Provided handouts to all students. In addition, provided handouts to schools throughout the year and for Earth Day.		
Local: Earth Day Movie, Pre-K-5 grades, April 20	Teamed up with the Library to show an environmental movie for Earth Day. Provided a variety of educational handouts.	20 (including parents)	

Section 9 – Provision C.9 Pesticides Toxicity Controls

C.9.a. ►Implement IPM Policy or Ordinance

Is your municipality implementing its IPM Policy/Ordinance and Standard Operating Procedures?	X	**Yes**		**No**

If no, explain:

Report implementation of IPM BMPs by showing trends in quantities and types of pesticides used, and suggest reasons for increases in use of pesticides that threaten water quality, specifically organophosphates, pyrethroids, carbamates fipronil, indoxacarb, diuron, and diamides. A separate report can be attached as evidence of your implementation.

Trends in Quantities and Types of Pesticide Active Ingredients Used[52]

Pesticide Category and Specific Pesticide Active Ingredient Used	**Amount**[53]					
	FY 15-16	**FY 16-17**	**FY 17-18**	**FY 18-19**	**FY 19-20**	**FY 20-21**
Organophosphates		0	0			
Active Ingredient Chlorpyrifos		0	0			
Active Ingredient Diazinon		0	0			
Active Ingredient Malathion		0	0			
Pyrethroids (see footnote #57 for list of active ingredients)		0	0			
Active Ingredient Type X		0	0			
Active Ingredient Type Y		0	0			
Carbamates		0	0			
Active Ingredient Carbaryl		0	0			
Active Ingredient Aldicarb		0	0			
Fipronil		0	0			
Indoxacarb	Reporting not required in FY 15-16	0	0			

[52]Includes all municipal structural and landscape pesticide usage by employees and contractors.
[53]Weight or volume of the active ingredient, using same units for the product each year. Please specify units used. The active ingredients in any pesticide are listed on the label. The list of active ingredients that need to be reported in the pyrethroids class includes: metofluthrin, bifenthrin, cyfluthrin, beta-cyfluthrin, cypermethrin, deltamethrin, esfenvalerate, lambdacyhalothrin, and permethrin.

Diuron	Reporting not required in FY 15-16	0	0			
Diamides	Reporting not required in FY 15-16	0	0			
Active Ingredient Chlorantraniliprole		0	0			
Active Ingredient Cyantraniliprole		0	0			

IPM Tactics and Strategies Used:

- Use of non-chemical strategies such as monitoring, mowing weeds, mulching.
- Removal of plants that require frequent pesticide applications.
- Replacing invasive plants with natives. Convert Millbrae City Hall Landscape to Xeriscape.
- Use of baits and traps instead of broadcast pesticides.

C.9.b ►Train Municipal Employees

Enter the number of employees that applied or used pesticides (including herbicides) within the scope of their duties this reporting year.	5
Enter the number of these employees who received training on your IPM policy and IPM standard operating procedures within this reporting year.	5
Enter the percentage of municipal employees who apply pesticides who have received training in the IPM policy and IPM standard operating procedures within this reporting year.	100%

Type of Training:

PAPA Seminars, Davis online Educational hours, and daily tailgate training before start of work shift.

C.9.c ►Require Contractors to Implement IPM

Did your municipality contract with any pesticide service provider in the reporting year, for either landscaping or structural pest control?	X	**Yes**		**No**
If yes, did your municipality evaluate the contractor's list of pesticides and amounts of active ingredients used?	X	**Yes**		**No,**

If your municipality contracted with any pesticide service provider, briefly describe how contractor compliance with IPM Policy/Ordinance and SOPs was monitored

Parks Superintendent verified that contractor is following the City's IPM policy by Inspecting monthly reports and reviewing list of pesticides and active Ingredients used, meeting with contractor to obtain City staff approval before using pesticides.

C.9.d ►Interface with County Agricultural Commissioners

Did your municipality communicate with the County Agricultural Commissioner to: (a) get input and assistance on urban pest management practices and use of pesticides or (b) inform them of water quality issues related to pesticides,		Yes	X	No

If yes, summarize the communication. If no, explain.

See Section 9 of the SMCWPPP FY 17-18 Annual Report for summary of communication with the San Mateo County Agricultural Commissioner. Parks Superintendent meets yearly with County Agricultural Commissioner to renew the San Mateo County Materials Permit and the County Agricultural Commissioner performs yearly inspection in Millbrae.

Did your municipality 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.		**Yes**	X	**No**

If yes, provide a summary of improper pesticide usage reported to the County Agricultural Commissioner and follow-up actions taken to correct any violations. A separate report can be attached as your summary.

C.9.e.ii (1) ►Public Outreach: Point of Purchase

Provide a summary of public outreach at point of purchase, and any measurable awareness and behavior changes resulting from outreach (here or in a separate report); **OR** reference a report of a regional effort for public outreach in which your agency participates.

Summary:

Local: Outreach was conducted to the community on alternatives to using pesticides and on the proper disposal of hazardous waste, including at workshops and throughout the reporting year in newsletters, public service announcements on the local cable station, and postings on the website and social media. OWOW related materials are distributed at City facilities.

Regional:

Regional: See Section 9 of the SMCWPPP FY 17-18 Annual Report for a description of point of purchase public outreach efforts conducted at the countywide level and regionally.

C.9.e.ii (2) ►Public Outreach: Pest Control Contracting Outreach

Provide a summary of outreach to residents who use or contract for structural pest control and landscape professionals); **AND/OR** reference a report of a regional effort for outreach to residents who hire pest control and landscape professionals in which your agency participates.

Summary:

See Section 9 of the SMCWPPP FY 17-18 Annual Report for a summary of outreach to residents who hire pest control and landscape professionals.

C.9.e.ii.(3) ►Public Outreach: Pest Control Operators

Provide a summary of public outreach to pest control operators and landscapers and reduced pesticide use (here or in a separate report); **AND/OR** reference a report of a regional effort for outreach to pest control operators and landscapers in which your agency participates.

Summary:

See Section 9 of the SMCWPPP FY 17-18 Annual Report for a summary of pest control operators and landscapers to reduce pesticide use.

C.9.f ►Track and Participate in Relevant Regulatory Processes

Summarize participation efforts, information submitted, and how regulatory actions were affected; **AND/OR** reference a regional report that summarizes regional participation efforts, information submitted, and how regulatory actions were affected.

Summary:

During FY 17-18, we participated in regulatory processes related to pesticides through contributions to the Countywide Program, BASMAA and CASQA.

Section 10 - Provision C.10 Trash Load Reduction

C.10.a.i ► Trash Load Reduction Summary

For population-based Permittees, provide the overall trash reduction percentage achieved to-date within the jurisdictional area of your municipality that generates problematic trash levels (i.e., Very High, High or Moderate trash generation). Base the reduction percentage on the information presented in C.10.b i-iv and C.10.e.i-ii. Provide a discussion of the calculation used to produce the reduction percentage

Trash Load Reductions	
Percent Trash Reduction in All Trash Management Areas (TMAs) due to **Trash Full Capture Systems** (as reported C.10.b.i)	73.1%
Percent Trash Reduction in all TMAs due to **Control Measures Other than Trash Full Capture Systems** (as reported in C.10.b.ii)[54]	10.3%
Percent Trash Reduction due to **Jurisdictional-wide Source Control Actions** (as reported in C.10.b.iv)	10.0%
Subtotal for Above Actions	**93.4%**
Trash Offsets (Optional)	
Offset Associated with Additional Creek and Shoreline Cleanups (as reported in C.10.e.i)	0.0%
Offset Associated with Direct Trash Discharges (as reported in C.10.e.ii)	0.0%
Total (Jurisdictional-wide) % Trash Load Reduction through FY 2017-18	**93.4%**

Discussion of Trash Load Reduction Calculation:

The City attained and reported 92.8% trash load reduction (including trash offsets) in its FY 16-17 Annual Report. During FY 17-18, the City continued to implement a robust trash control measure program. This helped the City maintain and increase its trash load reduction above the mandatory 70% trash load reduction requirement included in the MRP. The total (jurisdiction-wide) percent trash load reduction in FY 17-18 is 93.4% (including trash offsets). The most recent version of the City's Baseline Trash Generation Map can be downloaded at URL:

http://www.flowstobay.org/content/municipal-trash-generation-maps

[54] See Appendix 10-1 for changes between 2009 and FY 17-18 in trash generation by TMA as a result of Full Capture Systems and Other Measures.

C.10.a.ii.b ► Trash Generation Area Management - Identification of Private Drainages >10,000 ft²

State (Y/N) if your agency completed Permit Provision C.10.a.ii.b. If Yes, attach a map (or other record) or provide a website link to a map (or other record) of the location of lands >10,000 ft² (in Very High, High, and Moderate trash generation areas) that are plumbed directly to the Permittee's storm drain systems, including trash control status of these areas. If No, provide explanation of why the provision was not completed and the estimated date when the provision will be completed.

Did your agency complete Permit Provision C.10.a.ii.b?	**x**	**Yes**		**No**		**NA**

If No, provide explanation and estimated completion date:

Not applicable

Description of the process used to identify applicable areas and their trash control status:

The City worked through SMCWPPP to identify the location of land areas >10,000 ft² in very high, high, and moderate trash generation areas (as depicted on the City's baseline trash generation map) that are plumbed directly to the City's MS4. In summary, applicable land areas were identified using existing data/information and a combination of desktop analyses and field visits. Land areas <10,000 ft², or areas identified as low trash generating on the City's baseline trash generation maps, or are currently treated by full capture systems were excluded from the analysis. The preliminary trash control status of these land areas were identified by conducting virtual (desktop) on-land visual trash assessments (OVTAs). For a complete description of the methods and process used to identify applicable land areas and their trash control status, please see the SMCWPPP FY 17-18 Annual Report.

URL link to Map:

http://www.flowstobay.org/content/municipal-trash-generation-maps

C.10.a.iii ► Mandatory Trash Full Capture Systems

Provide the following:

1) Total number and types of full capture systems (publicly and privately-owned) installed prior to FY 17-18, during FY 17-18, and to-date, including inlet-based and large flow-through or end-of-pipe systems, and qualifying low impact development (LID) required by permit provision C.3.
2) Total land area (acres) treated by full capture systems for population-based Permittees and total number of systems for non-population based Permittees compared to the total required by the permit.

Type of System	# of Systems	Areas Treated (Acres)
Installed Prior to FY 17-18		
Connector Pipe Screens (Public)	37	64.2
Hydrodynamic Separators (Private)	4	3.3
Gross Solids Removal Device (GSRD) (Public)	2	594.3
Installed in FY 17-18		
None		
Total for all Systems Installed To-date	**43**	**661.7**
Treatment Acreage Required by Permit (Population-based Permittees)		**20**
Total # of Systems Required by Permit (Non-population-based Permittees)		**N/A**

*Areas treated include jurisdictional and non-jurisdictional lands (e.g., public K-12 schools and colleges, and freeways)

C.10.b.i ► Trash Reduction - Full Capture Systems

Provide the following:

1) Jurisdictional-wide trash reduction in FY 17-18 attributable to trash full capture systems implemented in each TMA;
2) The total number of full capture systems installed to-date in your jurisdiction;
3) The percentage of systems in FY 17-18 that exhibited significant plugged/blinded screens or were >50% full when inspected or maintained;
4) A narrative summary of any maintenance issues and the corrective actions taken to avoid future full capture system performance issues; and
5) A certification that each full capture system is operated and maintained to meet the full capture system requirements in the permit.

TMA	Jurisdiction-wide Reduction (%)	Total # of Full Capture Systems	% of Systems Exhibiting Plugged/Blinded Screens or >50% full in FY 17-18	Summary of Maintenance Issues and Corrective Actions
1	29.6%	43	0%	The City of Millbrae staff clean the trash capture devices periodically throughout the year. There are 2 scheduled events. The first one happens in May typically after our rainy weather pattern has cleared to blue skies and the second scheduled event is usually late September/early October prior to winter. If inclement weather is expected, then the crew will check the devices prior to the storm and usually after the event has passed.
2	10.1%			
3	17.4%			
4	5.7%			
5	6.1%			
6	0%			
Total	**73.1%***			

Certification Statement:

The City of Millbrae certifies that a full capture system maintenance and operation program is currently being implemented to maintain all applicable systems in a manner that meets the full capture system requirements included in the permit.

*The total jurisdiction-wide reduction reported for full capture systems includes 4.3% reduction for treatment of 26.5 acres of non-jurisdictional public K-12, college and university school land areas.

C.10.b.ii ► Trash Reduction – Other Trash Management Actions (PART A)

Provide a summary of trash control actions other than full capture systems or jurisdictional source controls that were implemented within each TMA, including the types of actions, levels and areal extent of implementation, and whether actions are new, including initiation date.

TMA	Summary of Trash Control Actions Other than Full Capture Systems
1	**Partial Capture Devices (Implemented Post MRP)** In August 2012, the City installed 15 United Stormwater Clean Screen III Partial-Capture Treatment devices (USW-2) in TMA #1 with funding provided through the San Francisco Bay-area Wide Trash Capture Demonstration Project administered by San Francisco Estuary Partnership (SFEP). Devices are currently maintained at a frequency of 2 times per year with additional cleaning on an as-needed basis for wet weather events.
1	**Improved Trash Bin/Container Management (Implemented Post MRP)** In an effort to eliminate the overflowing of public garbage cans and reduce litter in the downtown area, the City has been continually revising the garbage collection schedule to increase the frequency of collection for identified public garbage cans and decrease collection for garbage cans in other areas that do not need as much service. In addition, tenants located upstairs from some of the businesses in the downtown area that were identified as not having garbage service, were contacted and informed to start service. In addition, the City has continued to purchase Big Belly solar garbage compacting containers for the downtown area to place in the most impacted areas. These containers hold much more waste and prevent overflow and the placement of large bags of garbage from households and businesses. The Big Belly garbage containers that have been placed near high profile areas, including Peet's Coffee, Starbucks, the Post Office and Library have successfully reduced can overflow and litter issues. The City of Millbrae has purchased and installed 27 Big Belly devices since 2014 and are spread throughout our downtown. On a regular basis, City staff contacts businesses and residents identified as placing their garbage in the public garbage cans in the downtown and in other areas and checks to see if they have garbage collection service. They are asked to sign-up for garbage service if needed and for both situations instructed to not use the public garbage cans. A related effort includes distributing reusable travel mugs to reduce the use of single-use paper cups which have contributed to overflowing public garbage cans. Over 500 reusable travel mugs were distributed in 2013 and by early 2014 a total of 1,000 travel mugs will have been distributed. In another downtown location, City staff members worked with the Post Office to place an additional recycling container inside for unwanted mail/mixed paper for public use to reduce the amount of paper placed in the public garbage container out front. Outreach has been conducted to identify the companies distributing bundles of newspapers and leaving them in front of stores to reduce the potential for the newspapers to end up as litter.
1	**On-Land Clean-ups (Implemented Post MRP)** Beginning in 2012, Millbrae began an annual citywide Earth/Arbor day trash clean-up effort that addresses 12 sites throughout the city, including Trash management Area #1 in its entirety. This activity is led by City staff and quantification of trash recovered is retained by City staff.

	Coastal Cleanup Day, September 16, 2017 Approximately 135 participants attended and collected 1.5 yards of trash, 1 yard of organics and 192 gallons of recyclables at 14 sites in the City (included paper, cardboard and organics). In addition, a local school with 100 students held a cleanup a day prior and collected 0.5 yards of litter. **Arbor & Earth Day, April 29, 2018** There were 165 participants who cleaned up at 12 sites. Volunteers collected 2 yards of trash, 97 gallons of recyclable cans and bottles, and ½ yards of compostables (included paper, cardboard and organics)
1	**Street Sweeping (Implemented Post MRP)** The City of Millbrae's street sweeping schedule includes daily sweeping of the Downtown area. Parking enforcement prior to the MRP included parking enforcement for sweeping along Broadway, from Millbrae Avenue to Taylor Blvd. However, in FY 13/14t he City installed additional parking enforcement signs along Broadway from Taylor Blvd. to Meadow Glen in order to encompass all of Broadway with mandatory car removal for daily street sweeping.
1	**Downtown Garbage Cans and Litter Prevention (Implemented Post MRP)** The City continued to focus on improving the cleanliness of the downtown in an effort to reduce litter and pollution to our waterways. A new Business Cleanup Program was started and a collaboration formed with the Chamber of Commerce, the City's franchised hauler, South San Francisco Scavenger Company, and the Peninsula Chinese Business Association. Efforts included sending an educational courtesy letter to all businesses in three languages outlining good business practices and citing relevant codes. City staff followed up with businesses that were not compliant with the City's regulations. The second phase included conducting outreach to businesses and business patrons to use the receptacles and not litter cigarette butts. A poster was created and posted in business windows showing proper disposal and included that fines could be issued. Follow-up was conducted to some of the restaurants where employees are littering cigarette butts. Additional measures included working with SSF Scavenger to have drivers close commercial dumpster lids after emptying to prevent wind-blown litter and to inform drivers to pick up trash that falls while emptying. In addition, the City coordinated with SSF Scavenger to identify and monitor overflowing dumpsters and cart lids at businesses, to evaluate that all businesses have garbage collection service garbage and to ensure businesses have the right levels of service. The City continued to contact restaurants where there were litter issues from open lid dumpsters. A regional litter reduction flyer was adapted and translated into Chinese language to educate businesses on keeping container lids closed and not to overflow carts and dumpsters, as well encourage cleaning up of outside areas. This flyer is provided to all new businesses during the business license application process. In addition, the City continued to purchase Big Belly solar compacting garbage and recycling containers for the downtown and other areas. These containers hold much more waste and prevent overflow and the placement of large garbage bags from households and businesses in them. The Big Belly garbage containers have successfully reduced overflow and litter issues. **Cigarette Butt Receptacles** The City purchased additional cigarette butt receptacles and is placing them in identified hot spot areas in the downtown and elsewhere.

	Other Efforts Other efforts included participating in the regional Litter Roundtable meetings to develop and implement programs to reduce litter. The Single-use Carryout Bag Ordinance has resulted in a significant reduction in plastic bag litter. A total of 9,000 reusable bags have been distributed to the community to encourage reuse and to reduce the use of disposal bags and associated litter. The Sustainable Food Service Ware Ordinance has eliminated the use of polystyrene food ware and associated litter.
2	**<u>On-Land Clean-ups (Implemented Post MRP)</u>** Beginning in 2012, the City of Millbrae began an annual citywide Earth/Arbor day trash clean-up effort that addresses 12 sites throughout the City, including approximately 21 acres of TMA #2 in the Green Hills Park and Green Hills School vicinity. This activity is led by City staff and quantification of trash recovered is retained by City staff. **Coastal Cleanup Day, September 16, 2017** Approximately 135 participants attended and collected 1.5 yards of trash, 1 yard of organics and 192 gallons of recyclables at 14 sites in the City (included paper, cardboard and organics). In addition, a local school with 100 students held a cleanup a day prior and collected 0.5 yards of litter. **Arbor & Earth Day, April 29, 2018** There were 165 participants who cleaned up at 12 sites. Volunteers collected 2 yards of trash, 97 gallons of recyclable cans and bottles, and ½ yards of compostables (included paper, cardboard and organics) **<u>Partial Capture Treatment Devices (Implemented Post MRP)</u>** In August 2012 the City installed 3 Partial-Capture USW-2 devices in the retail and commercial area of TMA #2, bordering El Camino Real, with funding provided through the San Francisco Bay-area Wide Trash Capture Demonstration Project administered by San Francisco Estuary Partnership (SFEP). Devices are currently maintained at a frequency of two times per year with additional inspection and maintenance conducted, as necessary after storms. To date, the City has not experienced any issues or problems with these devices. **<u>Improved Trash Bin/Container Management (Implemented Post MRP)</u>** In an effort to eliminate overflowing public trash bins and to reduce litter within the Downtown area associated with TMAs #1 and #2, the City revised the collection schedule to increase the collection frequency for identified public trash bins and decrease collection for trash bins in other areas that do not need as much service. The City has installed Big Belly solar operated trash compactors to replace conventional garbage cans in areas where the trash cans used to overflow. Also, on a regular basis, City staff contacts businesses and residents identified as using public trash bins within the Downtown and other areas to determine if they have trash service. If they do not have trash service, both are asked to sign-up for service, and instructed not to use public trash bins. Additional measures included working with SSF Scavenger to have drivers close commercial dumpster lids after emptying to prevent wind-blown litter and to inform drivers to pick up trash that falls while emptying. In addition, the City coordinated with SSF Scavenger to identify and monitor overflowing dumpsters and cart lids at businesses, to evaluate that all

	businesses have garbage collection service garbage and to ensure businesses have the right levels of service. The City continued to contact restaurants where there were litter issues from open lid dumpsters.
	A regional litter reduction flyer was adapted and translated into Chinese language to educate businesses on keeping container lids closed and not to overflow carts and dumpsters, as well encourage cleaning up of outside areas. This flyer is provided to all new businesses during the business license application process. In addition, the City continued to purchase Big Belly solar compacting garbage and recycling containers for the downtown and other areas. These containers hold much more waste and prevent overflow and the placement of large garbage bags from households and businesses in them. The Big Belly garbage containers have successfully reduced overflow and litter issues. Outreach is also being done to identify companies who distribute bundles of newspapers in front of stores to reduce the potential for the newspapers to end up as litter. Additionally, the City of Millbrae installed a Gross Solids Removal Device in September 2015 which treats 108.6 acres in Millbrae composing of areas within Trash management Areas 2 & 3. **Other Efforts** Other efforts included participating in the regional Litter Roundtable meetings to develop and implement programs to reduce litter. The Single-use Carryout Bag Ordinance has resulted in a significant reduction in plastic bag litter. A total of 9,000 reusable bags have been distributed to the community to encourage reuse and to reduce the use of disposal bags and associated litter. The Sustainable Food Service Ware Ordinance has eliminated the use of polystyrene food ware and associated litter
3	**On-Land Clean-ups (Implemented Post MRP**) Beginning in 2012, the City of Millbrae began an annual citywide Earth/Arbor day trash clean-up effort that addresses 12 sites throughout the City, including the portion of TMA #3 that fronts El Camino Real between Helen Drive and Millbrae Avenue. This activity is led by City staff and quantification of trash recovered is retained by City staff. Additionally the City of Millbrae installed a Gross Solids Removal Device in September 2015 which treats 108.6 acres in Millbrae composing of areas within Trash management Areas 2 & 3.
4	**On-Land Clean-ups (Implemented Post MRP)** Beginning in 2012, the City of Millbrae began an annual citywide Earth/Arbor day trash clean-up effort that addresses 12 sites throughout the City, including the Taylor Middle School/Millbrae Recreation Center and Mills High School Areas in TMA #4. This activity is led by City staff and quantification of trash recovered is retained by City staff. Also, in FY 14/15, the City began its Quarterly on-land trash pick-ups in TMA#4. Each area encompassed in TMA#4 was addressed by crews that collected and quantified the trash. The City will conduct these activities on a biannual frequency going forward. **Coastal Cleanup Day, September 16, 2017** Approximately 135 participants attended and collected 1.5 yards of trash, 1 yard of organics and 192 gallons of recyclables at 14 sites in the City (included paper, cardboard and organics). In addition, a local school with 100 students held a cleanup a day prior and collected 0.5 yards of litter.

	Arbor & Earth Day, April 29, 2018 There were 165 participants who cleaned up at 12 sites. Volunteers collected 2 yards of trash, 97 gallons of recyclable cans and bottles, and ½ yards of compostables (included paper, cardboard and organics)
5	**Street Sweeping (Implemented Post MRP)** In August 2015 Millbrae increased the street sweeping schedule to 3 times a week on Adrian Road to relieve that area of trash build up in the curb and street. To date we have seen continued success in our effort.
5	**Partial Capture Devices (Implemented Post MRP)** In August 2012, the City installed 3 partial capture USW-2 devices in TMA#5 on Adrian Road with funding provided through the San Francisco Bay-area Wide Trash Capture Demonstration Project administered by San Francisco Estuary Partnership (SFEP). Devices are currently maintained at a frequency of two times per year with additional inspection and maintenance conducted, as necessary after storms. To date, the City has not experienced any issues or problems with these devices.
6	**On-Land Clean-ups (Implemented Post MRP)** Beginning in 2012, the City of Millbrae began an annual citywide Earth/Arbor day trash clean-up effort that addresses 12 sites throughout the City, including Skyline Boulevard, which is included within TMA #6. This activity is led by City staff and quantification of trash recovered is retained by City staff. **Coastal Cleanup Day, September 16, 2017** Approximately 135 participants attended and collected 1.5 yards of trash, 1 yard of organics and 192 gallons of recyclables at 14 sites in the City (included paper, cardboard and organics). In addition, a local school with 100 students held a cleanup a day prior and collected 0.5 yards of litter. **Arbor & Earth Day, April 29, 2018** There were 165 participants who cleaned up at 12 sites. Volunteers collected 2 yards of trash, 97 gallons of recyclable cans and bottles, and ½ yards of compostables (included paper, cardboard and organics)

GUIDANCE - C.10.b.ii ► Trash Reduction – Other Trash Management Actions (PART A)

Summary of Trash Control Measures Other than Full Capture Devices: (Do not delete this section)

- **Street Sweeping:** Include a description of any enhancements or new actions implemented after the MRP 1.0 effective date (i.e., December 2009). Identify portions of the TMA where enhanced street sweeping (i.e., increased sweeping frequency) and parking enforcement above 2009 levels was implemented.
- **On-land Cleanup:** Include a description of on-land cleanup activities that began after the MRP 1.0 effective date (i.e., December 2009) and continued into FY 17-18, including any enhancements or new actions implemented in FY 17-18. Describe if these actions are Permittee or volunteer-led.
- **Partial Capture Devices:** Provide a description of devices installed after the MRP 1.0 effective date (i.e., December 2009). Describe the level of maintenance conducted per device types.
- **Storm Drain Inlet Cleaning:** Describe storm drain inlet maintenance activities implemented after the MRP 1.0 effective date (i.e., December 2009) and continued in FY 17-18, including any enhancements or new maintenance activities implemented in FY 17-18. For new/enhanced actions, include the number of inlets where enhanced maintenance occurred, and the increased frequency of maintenance.
- **Uncovered Loads:** Describe activities designed to reduce trash from uncovered loads that began after the MRP 1.0 effective date (i.e., December 2009) and continued in FY 17-18, including any enhancements or new actions implemented in FY 17-18. Describe the types of actions implemented including new or redirected enforcement efforts to increase the focus towards new or enhanced actions.
- **Anti-littering and illegal dumping enforcement activities:** Describe anti-littering and illegal dumping enforcement activities began after to the MRP 1.0 effective date (i.e., December 2009) and continued in FY 17-18, and any enhancements or new actions implemented in FY 17-18. Include any new or redirected enforcement efforts to increase the focus towards new or enhanced actions. Describe the number of citations or other correction actions accomplished this year, and compare with previous years. Indicate how anti-littering and illegal dumping enforcement records are kept, and how they may be retrieved for audit.
- **Improved Trash Bin/Container Management:** Describe activities designed to improve trash bin/container management that began after the MRP1.0 effective date (i.e., December 2009) and continued in FY 17-18, and any enhancements or new actions implemented in FY 17-18. Include any new or redirected efforts to increase the focus towards these new or enhanced actions.
- **Other Types of Actions:** Describe activities designed after the MRP effective date (i.e., December 2009) and continued in FY 17-18, and any enhancements or new (post December 2009 effective date) actions implemented in FY 17-18.

C.10.b.ii ► Trash Reduction – Other Trash Management Actions (PART B)

Provide the following:

1) A summary of the on-land visual assessments in each TMA (or control measure area), including the street miles or acres available for assessment (i.e., those associated with VH, H, or M trash generation areas not treated by full capture systems), the street miles or acres assessed, the % of available street miles or acres assessed, and the average number of assessments conducted per site within the TMA; and
2) Percent jurisdictional-wide trash reduction in FY 17-18 attributable to trash management actions other than full capture systems implemented in each TMA; OR
3) Indicate that no on-land visual assessments were performed.

If no on-land visual assessments were performed, check here **and state why:** [X]

Explanation: No OVTAs were conducted in TMAs #1 and 6 in FY 17/18 because there is limited street length available for assessments.

TMA ID or (*as applicable)* Control Measure Area	**Total Street Miles[55] or Acres Available for Assessment**	**Summary of On-land Visual Assessments[56]**			**Jurisdictional-wide Reduction (%)**
		Street Miles or Acres Assessed	**% of Available Street Miles or Acres Assessed**	**Avg. # of Assessments Conducted at Each Site[57, 58]**	
1	0.24	0.00	0.0%	0.0	0.0%
2	1.36	0.60	44.4%	6.7	5.3%
3	0.70	0.35	50.3%	5.5	0.0%
4	0.89	0.22	24.6%	5.5	5.0%
5	0.20	0.20	100.0%	7.0	0.0%
6	0.02	0.00	0.0	0.0	0.0%
	Total	**1.35**	**-**	**-**	**10.3%**

[55] Street miles are defined as the street lengths and do not include curbs associated with medians.
[56] Assessments conducted between July 2016 and July 2018 are assumed to be representative of trash levels in FY 17-18 and were therefore used to calculate the jurisdictional-wide reductions reported in this section.
[57] Each assessment site is roughly 1,000 feet in length.
[58] Based on analyses conducted as part of the BASMAA *Tracking California's Trash* project (BASMAA 2017) funded by the State Water Resources Control Board, the optimal number of assessment events to detect an improvement from baseline trash levels at a site is between 4 and 6 per site.

C.10.b.iv ► Trash Reduction – Source Controls

Provide a description of each jurisdictional-wide trash source control action implemented to-date. For each control action, identify the trash reduction evaluation method(s) used to demonstrate on-going reductions, summarize the results of the evaluation(s), and estimate the associated reduction of trash within your jurisdictional area. Note: There is a maximum of 10% total credit for source controls.

Source Control Action	Summary Description & Dominant Trash Sources and Types Targeted	Evaluation/Enforcement Method(s)	Summary of Evaluation/Enforcement Results To-date	% Reduction	Total Reduction Credit (%)
Single-Use Bag Ordinance	The Single-Use Carryout Bag Ordinance (No 742), adding section 6.50 to the Millbrae Municipal Code, was adopted at the February 14, 2012 City Council meeting and started on September 1, 2012, which prohibits the use of single-use carryout plastic bags and the distribution of free paper bags at retail stores, including grocery stores, supermarkets, convenience stores, drug stores, clothing stores, and other retail stores. Stores are allowed to distribute paper bags that contain a minimum of 40 percent post-consumer recycled content for a minimum charge of $0.10 for each point-of-sale paper bag. The stores retain the charge for the bags. The Ordinance does not apply to protective types of bags, including for meat, produce, and bakery items. The businesses exempt from the Ordinance include food vendors, such as restaurants and take-out food establishments; dry cleaners; and non-profit charitable reuse organizations. The City continued to distribute reusable cloth shopping bags made from 100 percent post-consumer recycled plastic bottles to Millbrae residents and has distributed over 8,000 reusable bags to date. Outreach was conducted pre and post implementation of the Ordinance to the businesses and community. Outreach materials were provided by the City to businesses for employees and customers, including customer fact sheets, window posters and cash register	On behalf of all SMCWPPP Permittees, the County of San Mateo conducted assessments evaluating the effectiveness of the single use plastic bag ban in municipalities within San Mateo County. Assessments conducted by the County included audits of businesses and surveys of customer bag usage at many businesses in San Mateo County. Additionally, the number of complaints by customers was also tracked by the County. The results of assessments conducted by these cities are assumed to be representative of all SMCWPPP Permittees, given the consistency between the scope, implementation, and enforcement of the	On behalf of all SMCWPPP Permittees, the County of San Mateo conducted assessments evaluating the effectiveness of the single use plastic bag ban in municipalities within San Mateo County. Assessments conducted by the County included audits of businesses and surveys of customer bag usage at many businesses in San Mateo County. Additionally, the number of complaints by customers was also tracked by the County. The results of assessments conducted by these cities are assumed to be representative of all SMCWPPP Permittees, given the consistency between the scope, implementation, and enforcement of the ordinances among the municipalities	7%	10%

C.10.b.iv ► Trash Reduction – Source Controls

Provide a description of each jurisdictional-wide trash source control action implemented to-date. For each control action, identify the trash reduction evaluation method(s) used to demonstrate on-going reductions, summarize the results of the evaluation(s), and estimate the associated reduction of trash within your jurisdictional area. Note: There is a maximum of 10% total credit for source controls.

	tent cards. A variety of outreach was conducted to the community, including website postings, public service announcements on the local cable station, educational displays at City facilities and the Library, newsletter articles and a utility bill message, and a workshop was held for the community. Outreach cable station, educational displays at City facilities and the Library, newsletter articles and a utility bill message, and a workshop was held for the community. Outreach was also conducted to the schools, City employees, commissions and committees. Reusable shopping bags were handed out pre and post of the Ordinance at events and workshops, and at public areas to inform the community of the Ordnance. New businesses were informed during the businesses license application process and followed up by staff to ensure compliance. New businesses are required to fill out an Acknowledgement and Verification Form that they understand and will comply with the regulations. One business had a site visit inspection and was provided information for complying with the regulations; the business switched to compliant bags. No citations were issued. Businesses are required to maintain records for three years for the charge on paper bags. You can find a copy of the ordinance online at http://www.ci.millbrae.ca.us/index.aspx?page=409	ordinances among the municipalities			
Expanded Polystyrene Food Service Ware Ordinance	The City of Millbrae adopted Ordinance NO. 717 adding section 6.40 to the Millbrae Municipal code prohibiting the use of polystyrene foam and solid disposable food service ware requiring the use of biodegradable, compostable, reusable or recyclable food service ware by food vendors in the City. Prior to the implementation of this ordinance, the City provided outreach to the existing affected businesses in the City in the form of a letter dated October 18th, 2007 (attached). The City also	Although the City of Millbrae has adopted and implemented an ordinance prohibiting the distribution of EPS food ware by food vendors, evaluations of the effectiveness of the	Results of assessments that are representative of the City, but were conducted by the cities of Los Altos and Palo Alto, indicate that City's ordinance is effective in reducing EPS food ware in stormwater discharges.	**5%**	

C.10.b.iv ► Trash Reduction – Source Controls

Provide a description of each jurisdictional-wide trash source control action implemented to-date. For each control action, identify the trash reduction evaluation method(s) used to demonstrate on-going reductions, summarize the results of the evaluation(s), and estimate the associated reduction of trash within your jurisdictional area. Note: There is a maximum of 10% total credit for source controls.

	meets with each new affected business prior to the opening of the business in order to inform them of the specific requirements of this ordinance. The City also provides multiple informative notices and handouts to these businesses (attached) and requires that the business owners sign an acknowledgment form (attached), affirming that they understand the requirements set forth by this ordinance. Annual check-ups are conducted, however most enforcement efforts are complaint driven. Ordinance No 717 was passed on October 9th, 2007, effective January 1st, 2008 (attached). Link to ordinance: http://www.ci.millbrae.ca.us/Modules/ShowDocument.aspx?documentid=395	ordinance have not yet been conducted. For the purpose of estimating trash reductions in stormwater discharges associated with the ordinance, the results of assessments conducted by the cities of Los Altos and Palo Alto were used to represent the reduction of trash associated with the City's ordinance. Assessments conducted by these cities were conducted prior to and following the effective date of their ordinances, and include audits of businesses and/or assessments of EPS food ware observed on streets, storm drains and local creeks. The results of assessments conducted by these cities are assumed to be representative of the effectiveness of the City's ordinance because the implementation (including enforcement) of the City's ordinance is similar to the City of Los Altos' and Palo Alto's.	This conclusion is based on the following assessment result - an average of 95% of businesses affected by the ordinance are no longer distributing EPS food ware post-ordinance. Based on these results, the estimated average reduction of EPS food ware in stormwater discharges is 90%. Assuming EPS food ware is 6% of the trash observed in stormwater discharges, the City concludes that there has been a 5% (i.e., 6% x 90%) reduction in trash in stormwater discharges as a result of the ordinance.		

C.10.b.v ► Trash Reduction – Receiving Water Monitoring

Report on the progress of developing and testing your agency's trash receiving water monitoring program.

Guidance:

In FY 17-18, the City began implementing the BASMAA regional Trash Monitoring Program Plan that was approved by the Water Board's Executive Officer. Implementation included preparing for and conducting qualitative assessments and quantitative monitoring in receiving water locations in San Mateo County. Implementation occurred through the City's participation in the San Mateo Countywide Water Pollution Prevention Program (SMCWPPP). Additional information on accomplishments in FY 17-18 can be found in the Trash Receiving Water Monitoring Progress Report included in the SMCWPPP FY 17-18 Annual Report.

C.10.c ► Trash Hot Spot Cleanups

Provide the FY 17-18 cleanup date and volume of trash removed during each MRP-required Trash Hot Spot cleanup during each fiscal year listed. Indicate whether the site was a new site in FY 17-18.

Trash Hot Spot	New Site in FY 17-18 (Y/N)	FY 17-18 Cleanup Date(s)	Volume of Trash Removed (cubic yards)				
			FY 2013-14	FY 2014-15	FY 2015-16	FY 2016-17	FY 2017-18
MIL01	N	5/8/2018	0.01	0.02	0.02	0.01	0.01

C.10.d ►Long-Term Trash Load Reduction Plan

Provide descriptions of significant revisions made to your Long-term Trash Load Reduction Plan submitted to the Water Board in February 2014. Describe significant changes made to primary or secondary trash management areas (TMA), baseline trash generation maps, control measures, or time schedules identified in your plan. Indicate whether your baseline trash generation map was revised and if so what information was collected to support the revision. If your baseline trash generation map was revised, attach it to your Annual Report.

Description of Significant Revision	Associated TMA
In FY 15-16, consistent with all MRP Permittees, all public K-12 schools, college and university parcels were made non-jurisdictional on the City's baseline trash generation maps. Under California Government Code Sections 4450 through 4461, the construction, modification, or alternation of facilities and/or structures on these parcels are under the jurisdiction of the California Division of State Architect and not the City. The public right-of-way (e.g., streets and sidewalks) surrounding these parcels remain as jurisdictional on the City's baseline trash generation maps. The City's revised baseline trash generation map was included as Appendix 10-2 in the Fy 15-16 Annual Report.	**4**

C.10.e. ► Trash Reduction Offsets (Optional)

Provide a summary description of each offset program implemented, the volume of trash removed, and the offset claimed in FY 17-18. Also, for additional creek and shoreline cleanups, describe the number and frequency of cleanups conducted, and the locations and cleanup dates. For direct discharge control programs approved by the Water Board Executive Officer, also describe the results of the assessments conducted in receiving waters to demonstrate the effectiveness of the control program. Include an Appendix that provides the calculations and data used to determine the trash reduction offset.

Offset Program	Summary Description of Actions and Assessment Results	Volume of Trash (CY) Removed/Controlled in FY 17-18	Offset (% Jurisdiction-wide Reduction)
Additional Creek and Shoreline Cleanups (Max 10% Offset)	N/A	N/A	N/A
Direct Trash Discharge Controls (Max 15% Offset)	N/A	N/A	N/A

Appendix 10-1. Baseline trash generation and areas addressed by full capture systems and other control measures in Fiscal Year 17-18. [59]

TMA	2009 Baseline Trash Generation (Acres)					Trash Generation (Acres) in FY 17-18 After Accounting for Full Capture Systems					Jurisdiction-wide Reduction via Full Capture Systems (%)	Trash Generation (Acres) in FY 17-18 After Accounting for Full Capture Systems and Other Control Measures					Jurisdiction-wide Reduction via Other Control Measures (%)	Jurisdiction-wide Reduction via Full Capture AND Other Control Measures (%)
	L	M	H	VH	Total	L	M	H	VH	Total		L	M	H	VH	Total		
1	0	33	44	0	77	66	5	6	0	77	29.6%	66	5	6	0	77	0.0%	29.6%
2	0	65	14	0	79	46	24	9	0	79	10.1%	60	16	3	0	79	5.3%	15.7%
3	7	75	20	0	102	72	24	6	0	102	17.4%	72	19	11	0	102	0.0%	17.4%
4	0	73	0	0	73	35	38	0	0	73	5.7%	65	8	0	0	73	5.0%	10.7%
5	3	41	1	0	45	36	9	0	0	45	6.1%	36	9	0	0	45	0.0%	6.1%
6	1,501	1	0	0	1,502	1,501	1	0	0	1,502	0.0%	1,501	1	0	0	1,502	0.0%	0.0%
Totals	1,511	288	79	0	1,878	1,756	101	21	0	1,878	73.1%*	1,800	58	20	0	1,878	10.3%	83.4%

*The total jurisdiction-wide reduction reported for full capture systems includes 4.3% reduction for treatment of 26.5 acres of non-jurisdictional public K-12, college and university school land areas.

[59] Due to rounding, total acres and percentages presented in this table may be slightly different than the sum of the acres/percentages in the corresponding rows/columns (e.g., differ by 1 acre or 0.1%).

Section 11 - Provision C.11 Mercury Controls

C.11.a ► Implement Control Measures to Achieve Mercury Load Reductions
C.11.b ► Assess Mercury Load Reductions from Stormwater

See the SMCWPPP FY 2017-18 Annual Report for updated information on:

- Documentation of mercury control measures implemented in our agency's jurisdictional area for which load reductions will be reported and the associated management areas;
- A description of how the BASMAA Interim Accounting Methodology[60] was used to calculate the mercury load reduced by each control measure implemented in our agency's jurisdictional area and the calculation results (i.e., the estimated mercury load reduced by each control measure);
- Supporting data and information necessary to substantiate the load reduction estimates; and
- 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

See the SMCWPPP FY 2017-18 Annual Report for information on the quantitative relationship between green infrastructure implementation and mercury load reductions, including all data used and a full description of models and model inputs relied on to establish this relationship.

C.11.e ► Implement a Risk Reduction Program

A summary of countywide and regional accomplishments for this sub-provision are included in the SMCWPPP FY 2017-18 Annual Report.

[60]BASMAA 2017. Interim Accounting Methodology for TMDL Loads Reduced, Version 1.0. Prepared for BASMAA by Geosyntec Consultants and EOA, Inc., September 19, 2016.

Section 12 - Provision C.12 PCBs Controls

C.12.a ► Implement Control Measures to Achieve PCBs Load Reductions
C.12.b ► Assess PCBs Load Reductions from Stormwater

See the SMCWPPP FY 2017-18 Annual Report for:

- Documentation of PCBs control measures implemented in our agency's jurisdictional area for which load reductions will be reported and the associated management areas;
- A description of how the BASMAA Interim Accounting Methodology[61] was used to calculate the PCBs load reduced by each control measure implemented in our agency's jurisdictional area and the calculation results (i.e., the estimated PCBs load reduced by each control measure);
- Supporting data and information necessary to substantiate the load reduction estimates; and
- For Executive Officer approval, any refinements, if necessary, to the measurement and estimation methodologies to assess PCBs load reductions in the subsequent permit.

C.12.c ► Plan and Implement Green Infrastructure to Reduce PCBs Loads

See the SMCWPPP FY 2017-18 Annual Report for information on the quantitative relationship between green infrastructure implementation and PCBs load reductions, including all data used and a full description of models and model inputs relied on to establish this relationship.

C.12.e ► Evaluate PCBs Presence in Caulks/Sealants Used in Storm Drain or Roadway Infrastructure in Public Rights-of-Way

A summary of countywide and regional accomplishments for this sub-provision is included in the SMCWPPP FY 2017-18 Annual Report.

[61]BASMAA 2017. Interim Accounting Methodology for TMDL Loads Reduced, Version 1.0. Prepared for BASMAA by Geosyntec Consultants and EOA, Inc., September 19, 2016.

C.12.f ►Manage PCB-Containing Materials and Wastes During Building Demolition Activities So That PCBs Do Not Enter Municipal Storm Drains

A summary of countywide and regional accomplishments for this sub-provision is included in the C.12 PCBs Controls section of the SMCWPPP FY 2017-18 Annual Report.

Does your agency plan to seek exemption from this requirement?		**Yes**	X	**No**

C.12.g.►Fate and Transport Study of PCBs: Urban Runoff Impact on San Francisco Bay Margins

A summary of countywide and regional accomplishments for this sub-provision are included in the SMCWPPP FY 2017-18 Annual Report.

C.12.h ►Implement a Risk Reduction Program

A summary of countywide and regional accomplishments for this sub-provision are included in the SMCWPPP FY 2017-18 Annual Report.

Section 13 - Provision C.13 Copper Controls

C.13.a.iii.(3) ►Manage Waste Generated from Cleaning and Treating of Copper Architectural Features

Provide summaries of permitting and enforcement activities to manage waste generated from cleaning and treating of copper architectural features, including copper roofs, during construction and post-construction.

Summary:

During construction, municipal construction stormwater inspectors are responsible for identifying copper architectural features and if appropriate BMPs are implemented. Any issues noted are documented and enforcement actions recorded in the Provision C.6 inspection records. Post-construction municipal illicit discharge inspectors are responsible for responding to, investigating and identifying illegal discharge of wash water from washing copper architectural features. Any enforcement actions or reported discharges are recorded in the Provision C.5 inspection records. The SMCWPPP "Requirements for Architectural Copper" Fact Sheet is made available to the public, construction inspectors and illicit discharge inspectors on the SMCWPPP website (www.flowstobay.org/files/newdevelopment/flyersfactsheets/ArchitecturalcopperBMPs.pdf). Inspectors are made aware of the concerns with copper architectural features at SMCWPPP Training Workshops and internal municipal trainings.

C.13.b.iii.(3) ►Manage Discharges from Pools, Spas, and Fountains that Contain Copper-Based Chemicals

Provide summaries of any enforcement activities related to copper-containing discharges from pools, spas, and fountains.

Summary:

The City of Millbrae requires all pools discharges to the sanitary sewer system.

The City of Millbrae did not have any enforcement activities related to copper-containing discharges from pools, spas, and fountains in this reporting period from July 1, 2017 to June 30, 2018.

C.13.c.iii ►Industrial Sources Copper Reduction Results

Based upon inspection activities conducted under Provision C.4, highlight copper reduction results achieved among the facilities identified as potential users or sources of copper, facilities inspected, and BMPs addressed.

Summary: The City of Millbrae does not have any industrial facilities identified as potential users of copper that were inspected this reporting period from July 1, 2017 to June 30, 2018.

Section 15 -Provision C.15 Exempted and Conditionally Exempted Discharges

C.15.b.vi.(2) ► Irrigation Water, Landscape Irrigation, and Lawn or Garden Watering

Provide implementation summaries of the required BMPs to promote measures that minimize runoff and pollutant loading from excess irrigation. Generally the categories are:

- Promote conservation programs
- Promote outreach for less toxic pest control and landscape management
- Promote use of drought tolerant and native vegetation
- Promote outreach messages to encourage appropriate watering/irrigation practices
- Implement Illicit Discharge Enforcement Response Plan for ongoing, large volume landscape irrigation runoff.

Summary:

Regional: Refer to the C.3 New Development and Redevelopment, C.7. Public Information and Outreach and C.9. Pesticide Toxicity Control sections of the SMCWPPP FY 2017-18 Annual Report.

Local: Outreach is conducted through newsletters, workshops, rain barrel rebates, displays, utility bill messages, public announcements on the local cable station, website and social media postings, and distribution of brochures (local and Countywide materials) to encourage efficient irrigation to minimize runoff, to use less or no toxic pest management measures and for landscape management, and to plant native and drought tolerant plants. Additional outreach efforts are included in C.7.

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MEMORANDUM

Date: November 21, 2016 **BKF Job Number:** 20130038-10
Deliver To: City of Millbrae
From: Craig Smith, BKF Engineers

Subject: **Millbrae Serra Station TOD#1 – Storm Drain Memorandum**

Purpose

The purpose of this memorandum is to investigate offsite and onsite storm flows affecting the proposed Millbrae Serra Station TOD#1 project on the west side of the Millbrae BART/Caltrain station in Millbrae, California (City).

Background

- The San Francisco Bay Area Rapid Transit (BART) District – Proposed Airport Extension - Hydrology and Drainage Report prepared by Bay Area Transit Consultants and dated June, 1997, correctly described the storm drainage area (Green Hills Creek) and storm drain facilities related to the Project Site. This report is referred to as the "BART Hydro Report" henceforth and an excerpt related to the Green Hills drainage area can be found in Attachment 1. Record drawings were obtained for the San Francisco Airport Extension Millbrae Station project (2003) (see Attachment 2) which show some as-built information which differs from the design information in the BART Hydro Report.
- 100-year discharge at the Southern Pacific Transportation Company (SPTCo) track is reported as 930 cubic feet per second (cfs) in the Flood Insurance Study (FIS) report (FEMA, 1981) plus 93 cfs in the 66-inch line from Hermosa Avenue gives a total flow of 1,023 cfs. These flows were taken from the BART Hydro Report.
- There are eight (8) 54-inch pipes under the SPTCo tracks that discharge to High Line Canal and were constructed to accept the 100-year storm event during the SFO Airport Extension project.
- High Line Canal, the Old Bayshore culvert/gate structure and the conveyance of storm flows under the SPTCo tracks will be adjusted in the future to account for Sea Level Rise (SLR). These improvements will be the responsibility of BART, City of Millbrae and SPTCo.
- Onsite development will incorporate storm water treatment and detention facilities to limit post development flows to pre-development flows as required by the City of Millbrae, Part II - Technical Provisions for Public Works Construction, and the San Mateo County C.3 Technical Guidance Manual.
- LID stormwater treatment will be sized in accordance with the MRP requirements (approximately 4% of impervious area). As the Project is a Transit Oriented Development special project, it qualifies for non-LID treatment.

Existing Conditions

The Project Site encompasses approximately 3.8 acres in the City of Millbrae and lies between Millbrae Bart/Caltrain Station to the east and El Camino Real and Serra Avenue to the west. Currently, the site is occupied by a nursing home, lumber yard, vacant land, and several commercial buildings.

Proposed Conditions

The proposed project is a re-development project that will replace the existing improvements with approximately 145,500 square feet of impervious area in the form of three buildings over three stories of underground parking using podium construction. The project will include residential units, office area and retail space as well as streets, walkways, and paved courtyards.

Drainage Area

Per the Millbrae Station Area Specific Plan (MSASP) (2016) and the BART Hydro Report, the Project Site is located near the downstream end of the Taylor Boulevard sub-drainage area of the Green Hills Creek drainage area (see Attachment 3 – Green Hills Drainage Area Exhibit). The Green Hills Creek drainage area covers an area of approximately 1.5 square miles of the City between Junipero Serra Freeway on the west and the SPTCo tracks on the east. Green Hills Creek is contained in an underground concrete conduit through the urbanized area of the City.

Upstream Drainage Systems

Per the BART Hydro Report, Green Hills Creek is conveyed via a storm drain trunk line (11 by 4 foot box culvert) through the Project Site (near the north end of the site) and under the Caltrain/BART rail tracks (via eight (8) 54-inch pipes) into High Line Canal to the east of the development which connects directly to San Francisco Bay. High Line Canal has a floodgate to prevent high tides from backing up into the canal (Old Bayshore culvert/gate structure). A portion of the Green Hills drainage area is serviced by two other trunk storm drains, both of which originate at inlets located in the Green Hills Country Club (Country Club). One storm drain picks up flow from the Country Club and various street inlets through the City. It then becomes a 42-inch storm drain that comes down Center Street, crosses the existing SPTCo/BART tracks, continues down Spruce Street and then discharges into the Lomita Canal. The second storm drain begins at the Country Club and then crosses the existing SPTCo tracks in a 66-inch reinforced concrete pipe (RCP) near Hermosa Avenue. This 66-inch pipe then makes a 90-degree turn to the south, parallels the SPTCo tracks on the east side (west side of the BART alignment) and discharges into Highline Canal via an 11 by 4-feet box culvert (see Attachment 2: BART San Francisco Airport Extension Line, Trackwork and Systems drawing number 4EC552 Rev 3. The 66-inch line has been highlighted for clarity). This 11 by 4-feet box culvert is not the same culvert conveying the Green Hills Creek mentioned above.

The 11 by 4-feet box culvert conveying Green Hills Creek does not have sufficient capacity for the 100-year event storm flow. Overland storm water flows from the Green Hills Creek drainage area collect at El Camino Real and then flow through the lumber yard to the lowest point of the drainage area which occurs at the surface drainage inlet structure at the north-east corner of the Project Site. See Attachment 4 – MSASP Exhibit for overland flow paths, box culvert location, MSASP extents.

In addition to the Green Hills Creek 11 by 4-feet box culvert, there is a 24-inch line, which drains an area from Hermosa Avenue to the north, runs along Hemlock Street, passes under the SPTCo tracks and connects to twin 18-inch pipes about 40-feet upstream from the High Line Canal. The twin 18-inch pipes pass under the High Line Canal and connect to a 33-inch pipe laid under the High Line Canal at a junction located about 105-feet downstream from the existing canal headwall. The BART Hydro Report states that the 24-inch line and twin 18-inch lines are buried quite deep and "this would imply that the City of Millbrae pump located at the SFIA pump station along Highway 101 probably assists in reducing flooding in the low areas along Hemlock Avenue. We therefore recommend that the existing two 18-inch lines and the 24-inch line be left in place so that existing capacity and operation of the storm drains along Hemlock Avenue are not changed after BART construction is completed." The 24-inch line along Hemlock Avenue can be found on Attachment 2 and Attachment 4.

Downstream Drainage Systems

The Corps of Engineers (1984) presented a 100-year highest estimated tide (HET) of 6.8 MSL (mean sea level) as detailed in the BART Hydro Report. The BART Hydro Report assumed that no overflow of the canal banks would occur in the backwater analysis of the High Line Canal even though long stretches of the canal bank are at elevation (El.) 8.7 to 8.5 (NGVD). Therefore, the Bart Hydro Report water surface elevation of 9.4 NGVD (12.2 NAVD 88) is conservative. Performance of the cross drainage under the SPTCo tracks was based on the degree of flooding above the local ground level on the west side of the tracks. The local low spot on the west side of the tracks is at El. 8.7 NGVD. As this is lower than the water surface elevation in High Line Canal (9.4 NGVD) it can be assumed that some flooding would occur. The BART Hydro Report analysis calculated the flood elevation on the west side of the SPTCo tracks as El. 10.58 (1929 NGVD). This corresponds to 13.33 using the 1988 NAVD datum.

Section 5.5 of the Bart Hydro Report addresses "Flooding on the West Side of the SPTCo Tracks". The calculated water surface elevation on the west side of the tracks is El. 10.58 (NGVD 1929) which is higher than the local ground level of El. 9 to El. 8.5 in the rear yards of homes on Hemlock Avenue. The BART Hydro Report claims that flooding was improved by the SFO Airport Extension project as the cross drainage capacity was increased. BKF has not confirmed these claims.

FEMA Information

It should be noted that FEMA does not show the Project Site in the 100-year flood zone. Table 9 in the Flood Insurance Study for San Mateo County (2015) gives the 1-Percent Annual Chance stillwater elevation at Millbrae as elevation 9.6 (NAVD88) (see Attachment 5). This is considerably lower than the 100-year flood elevation calculated in the BART Hydro Report (13.33 NAVD88). The proposed Project Site will have zero net fill in the FEMA 100-year flood zone.

Existing Storm Water Flows

The existing 100-year storm flow through the Project Site, as calculated in the BART Hydro Report, is 1,023 cfs. BKF calculated the existing 11 by 4-feet box culvert to have a capacity of 715 cfs due to onsite survey and storm drain investigations suggesting a longitudinal slope of 1% (the BART Hydro Report gave a capacity of 508 cfs which relates to a 0.5% longitudinal slope). In addition, the 66-inch pipe at Hermosa

Ave has a capacity of 93 cfs and the 24-inch line, which drains Hemlock Street from Hermosa Avenue south to the 18-inch lines under the High Line Canal has an estimated capacity of 12 cfs. Therefore, the remaining flow would be conveyed as overland flow (203 cfs) through the lumber yard to the existing inlet structure at the north-east corner of the Project Site.

Municipal Regional Permit (MRP) and City of Millbrae Requirements

Onsite development will incorporate storm water treatment and detention facilities to limit post-development flows to pre-development flows as required by the City of Millbrae, Part II - Technical Provisions for Public Works Construction, and the San Mateo County C.3 Technical Guidance Manual. The stormwater detention will be provided in the stormwater treatment areas (flow-through planters) by the 6-inches of ponding depth. Detention will be provided for a design storm with a 10-year recurrence interval in accordance with the City requirements. See Attachments 6 and 7 for the Existing and Proposed (respectively) Impervious Areas Exhibits.

LID stormwater treatment will be provided by the flow through planters at the podium level. The planters will be sized in accordance with the MRP requirements (approximately 4% of impervious area) but the locations of the flow through planters have not been finalized. As the Project is a Transit Oriented Development special project, it qualifies for non-LID treatment. Therefore, mechanical treatment vaults will be installed in the basement. The locations of the mechanical treatment vaults have not been finalized. Filterra tree filters will be installed in California Drive to also provide treatment.

The Project Site lies outside the areas subject to Hydromodification Practices (HMP) as per the HM Control Area Map (revised March 27, 2009) (see Attachment 8). The stormwater from the site discharges into High Line Canal which is a hardened channel.

Proposed Storm Drain Improvements

<u>California Drive</u>

The proposed development will require relocation and upsizing of the existing storm drain box culvert and the addition of a proposed surface drainage inlet structure at the north-east corner of the site as well as a reinforced concrete box culvert (RCBC No. 1) (see Attachment 9 – Storm Drain Exhibit). The proposed 16 by 4-feet box culvert (RCBC No. 2) and inlet structure will be connected to the existing culvert and pipes under the Caltrain/BART rail tracks. The existing 54-inch pipes discharging to High Line Canal have sufficient capacity to carry the 100-year storm event (per the BART Hydro Report). The BART Hydro Report identified that the 100-year flood elevation is 13.33 (NAVD88). The Millbrae Serra Station TOD basement garage entry/exit ramps on California Drive will be graded to provide 12 inches of freeboard to this 100-year flood elevation.

The 16 by 4-feet box culvert will have a longitudinal slope of 1% and a capacity of 1,030 cfs (this exceeds the 100-year recurrence storm flow). Due to the upstream culvert being undersized (11 by 4-feet), some stormwater will still overflow from the culvert system upstream and flow overland to the existing local low point in El Camino Real. The local low point in El Camino Real coincides with the proposed intersection with California Drive. A 5 by 4-feet box culvert will be constructed under the gutter along the northern side of California Drive. Multiple inlets will allow the overland flow to enter the underground 16 by 4-feet

box culvert which has capacity for the full 1,030 cfs flow. Therefore, California Drive will be drivable for emergency vehicles and public access purposes.

Serra Avenue

Serra Ave will be regraded to a valley gutter at the center line. Serra Ave will drain through the proposed underground garage to California Drive via four 12-inch pipes (see Attachment 10 for calculations). These 12-inch pipes will be maintained by the Millbrae Serra Station owner.

Onsite Storm Drain System

The onsite storm drain system (roof drains, gutters, vertical conductors or leaders and horizontal storm drains for primary drainage) will be sized based on a storm of 60 minutes duration and 100-year return period in accordance with section 1101.11 of the California Plumbing Code. The design of the proposed residential and commercial buildings has not been brought to a level to coordinate the exact locations and improvements needed for the storm water treatment areas on the podium deck or onsite storm drain system. The design of these elements cannot move forward until the mechanical and plumbing consultants are brought on board during the construction documents preparation stage. The podium deck will be graded so that storm water flows during larger storm events will release overland at the stairs and other low points at the edge of the podium. These overland flows will be conveyed in California Drive to the proposed surface drainage inlet structure at the north-east corner of the site. Onsite stormwater treatment facilities will be sized to comply with the Municipal Regional Stormwater NPDES Permit.

Conclusion

The Millbrae Serra Station project proposes to replace the existing 11 by 4-feet box culvert with a 16 by 4-feet box culvert (within the Project Site). This will increase the capacity of the culvert system within the Project Site. The Project does not propose to improve the 11 by 4-feet box culvert upstream of the Project Site. The upstream 11 by 4-feet box culvert will still be undersized for the 100-year storm event and stormwater will overflow and become overland flow in El Camino Real. The Project proposes to collect the overland flow in California Drive via a proposed 5 by 4-feet box culvert and multiple catch basin inlets. The proposed 16 by 4-feet box culvert has capacity for the 100-year flow from the Green Hills drainage area.

Per the FEMA Flood Insurance Study (2015), the Project Site is outside the 100-year flood zone. BKF has not verified FEMA's findings.

In accordance with City requirements, the Project proposes to detain the difference in runoff for the 10-year storm event and treat the stormwater runoff to the rate required by the MRP.

ATTACHMENTS:

- Attachment 1 – Excerpt from San Francisco Bay Area Rapid Transit (BART) District – Proposed Airport Extension Hydrology and Drainage Report prepared by Bay Area Transit Consultants and dated June, 1997 - Green Hills Creek Drainage Facilities (pages 5-1 to 5-9).
- Attachment 2 – San Francisco Airport Extension Millbrae Station project (2003) record drawings
- Attachment 3 – Green Hills Drainage area Exhibit
- Attachment 4 – MSASP Exhibit
- Attachment 5 – FEMA Flood Insurance Study – Table 9
- Attachment 6 – Existing Impervious Areas
- Attachment 7 – Proposed Impervious Areas
- Attachment 8 – HM Control Area Map
- Attachment 9 – Storm Drain Exhibit
- Attachment 10 – Storm Drain Calculations

5. GREEN HILLS CREEK DRAINAGE FACILITIES

5.1 General Description

The Green Hills Creek basin drains an area of approximately 1.5 square miles in the City of Millbrae between Junipero Serra Freeway on the west and the SPTCo tracks on the east as illustrated on Figure 5-1. Green Hills Creek is contained in an underground concrete conduit through the urbanized area of the City of Millbrae. It presently crosses under the existing SPTCo tracks at Station 139+60 in a 4-foot high by 11-foot wide culvert that discharges into the upstream end of the High Line Canal. The High Line Canal then conveys the creek to San Francisco Bay.

Part of the drainage area is serviced by two other storm drains, both of which originate at inlets located in the Green Hills Country Club. One storm drain picks up flow from the country club and various street inlets through Millbrae. It then becomes a 42-inch storm drain that comes down Center Street, crosses the proposed BART alignment at Station 179+60, continues down Spruce Street, and then discharges into the Lomita Canal. The second storm drain begins at the Green Hills Country Club, and crosses the proposed BART alignment in a 66-inch RCP near Hermosa Avenue at Station 157+60. This 66-inch line then makes a 90 degree turn to the south, parallels the existing SPTCo tracks on the east side, and discharges into the High Line Canal just east of the present canal headwall. Development of a conceptual layout for the modifications required for the cross-drainage structure for Green Hills Creek to meet BART drainage criteria is presented below.

5.2 Existing Facilities

5.2.1 Drainage at Station 139+60

Green Hills Creek crosses the existing SPTCo tracks in a 4-foot high by 11-foot wide culvert that is S-shaped in plan view. This S shape has historical significance, and is a result of the fact that when improvements were made in the Green Hills conduit, the culvert was threaded through an existing SPTCo bridge opening under the tracks which was located somewhat farther north than the present head end of the High Line Canal. The culvert was laid through the old bridge, most probably to avoid interruption in SPTCo service, turned to the south, and followed the old earthen alignment prior to entry to what is now the High Line Canal. The old bridge opening was subsequently backfilled after the completion of the culvert. The bridge is still in place, buried in the SPTCo railway embankment, and will be a factor that must be considered in the construction of new facilities (Kirker, 1965).

In addition to the Green Hills culvert, there is a 24-inch line which drains an area from Hermosa Avenue to the north, runs south along Hemlock Street, passes under the SPTCo tracks, and

connects to a twin 18-inch RCP about 40 feet upstream from the High Line Canal. The twin 18-inch lines pass under the High Line Canal and, in turn, connect to a 33-inch pipe laid under the High Line Canal at a junction located about 105 feet downstream from the existing canal headwall (Kirker 1965 construction drawing- Sheet 13 of 20).

There is a 12-inch RCP which picks up several local drainage inlets on the west side of the SPTCo tracks that also discharges into the High Line Canal.

5.2.2 Existing 33-inch Line and Existing Millbrae Pumping Station

The 33-inch line under the High Line Canal continues downstream to a pumping station located adjacent to Highway 101. This pumping station is part of the San Francisco International Airport Pumping Station for Lomita Creek described in Section 6 for the San Felipe-Lomita Canal Area. It contains two 50,000 gpm pumps operated by the San Francisco International Airport and a 125 horsepower pump operated by the City of Millbrae. The pumps operated by the SFIA pump water from the Lomita Canal into the High Line Canal.

The 33-inch pipe picks up some local drainage enroute to the pumping station, beginning with a 12-inch line at the beginning of the 33-inch line that drains City of Millbrae property to the north of the High Line Canal. The second inflow to the 33-inch line is at the Aviador Avenue culvert, where local street drains are connected by 12-inch and 15-inch lines to the 33-inch pipe at a manhole located approximately 20 feet downstream of Aviador Avenue. The third connection is located at the pumping station near Highway 101, where an 18-inch line which drains part of the freeway and an undefined local area connects to the 33-inch line at a manhole. At this point the 33-inch pipe makes a right angle bend and turns into the pumping station, where the City of Millbrae operates a 125 hp pump (source: Telephone Notes - Tom Coletti, Maintenance Department, City of Millbrae) that discharges flow from the 33-inch line into the High Line Canal. Calculations indicate that the pump capacity is about 50 cfs for our assumed design head conditions for the 100-year flow in the High Line Canal. Although none of these downstream connections to the 33-inch line will be affected physically by BART construction, they are described here to indicate that it is neither desirable nor feasible to abandon this line.

5.2.3 High Line Canal

The High Line canal has a total length of 3200 feet from the headwall on the east side of the SPTCo tracks to the outfall in San Francisco Bay. The cross section is concrete lined with a base width of 12 feet and 2H:1V side slopes. The canal invert at the SPTCo headwall is El. 1.6 (Kirker 1965 drawings). The top of the canal bank is El 9.9 at the SPTCo headwall. The original design hydraulic grade line (HGL) at the beginning of the canal was El. 8.9. The design basis for the canal capacity and freeboard is not known but appears to be about Q_{25} or Q_{50}. The design water surface elevation in San Francisco Bay was El. 6.25 (Kirker, 1965), which

corresponds to a HET, but not the 100-year HET of 6.8 as determined by the Corps of Engineers (1984).

The slope of the High Line Canal is 0.0026 from the headwall to Aviador Avenue, 0.00354 from Aviador Avenue to the culvert under Highway 101, and 0.00057 between the Highway 101 Culvert and the Old Bayshore culvert/gate structure where the canal discharges into San Francisco Bay.

5.3 Hydrology for Green Hills Basin

5.3.1 100-Year Peak Discharge for Design

Our calculated Q_{100} discharge at the SPTCo tracks was 993 cfs. This is in good agreement with the 930 cfs given in the FIS report (FEMA, 1981). We adopted the FEMA (1981) value for the hydraulic calculations performed for this study. Although we agree with the FEMA (1981) study with respect to the magnitude of the 100-year peak storm discharge, we do not agree that the 100-year flood can pass through the existing area without some flooding. The FEMA maps do not show that there are any areas to the west of the SPTCo tracks in this vicinity that are affected by the 100-year storm. Our calculations show that the existing facilities do not have the capacity to convey the 100-year storm runoff under the existing SPTCo tracks without some flooding on the west side of the tracks. The principal cause of the difference between the FEMA (1981) flood levels and those determined in this study is that FEMA (1981) assumed a Mean Higher High Water (MHHW) in San Francisco Bay of El. 3.8 MSL, whereas we assumed a 100-year HET of El. 6.8 MSL as determined by the Corps of Engineers in 1984, a value which was determined after the completion of the 1981 FEMA study. Consequently, some improvements to the cross-drainage will be required.

Our calculations indicate that the capacity of the existing 42-inch line that crosses the SPTCo tracks at Center and Spruce Streets is about 27 cfs. This flow does not enter the High Line Canal. Since the capacity of the 66-inch line from Hermosa Avenue is estimated at about 93 cfs, the estimated 100-year peak inflow to the High Line Canal is 930 + 92 = 1023 cfs.

5.3.2 High Line Canal Backwater Study

A backwater analysis was conducted for the High Line Canal using HECRAS (the U. S. Army Corps of Engineers (1995) standard computer program for calculation of gradually-varied flow in open channels) to determine the tailwater elevation required for design of the new cross-drainage facilities. The inflow at the head end of the canal is 1023 cfs, and consists of 930 cfs from Green Hills Creek plus 93 cfs from the 66-inch Hermosa line. Additional inflows to the canal between the beginning and the outlet into San Francisco Bay were based on the pumping capacities of the City of Millbrae and SFIA pumps at the pump station near Highway 101 for a total canal discharge downstream of the SFIA pumping station of 1297 cfs. The tailwater at the

discharge in San Francisco Bay was assumed as equal to the 100-year high estimated tide (HET) of 6.8 feet MSL (Corps of Engineers, 1984). In addition to the Aviador Avenue culvert, there is a culvert at the Bayshore freeway, and there is a tide gate structure located at the Old Bayshore highway. No data were available for the tide gates but they are assumed similar to those on El Portal Canal in Burlingame, based on a telephone discussion with Tom Coletti, City of Millbrae Maintenance Supervisor.

Losses were computed through the gates and the culverts, and for the entire length of the canal. Manning's n for the High Line Canal was assumed at 0.016. There are a few local drainage inlets from properties along the canal. These are not significant for analysis of conditions with Q_{100} in the canal, and no allowance was made for them. The canal banks are generally 2 or more feet above local ground level, so that surface drainage normally does not enter the canal by flowing over the canal banks.

The result of the backwater analysis showed that the water surface elevation was El. 9.4 at the present beginning of the canal. Weir flow over the bridges did not occur, nor was there any bank overflow from the canal itself, based on the original canal bank elevations as given in the design drawings. However, the project topography (Towill, 1994) indicates spot elevations along the canal lower than original design level, and it is apparent that the water surface profile as developed above would overflow the existing canal in several places. Between the headwall and Aviador Avenue for example there are long stretches at El 8.7 to 8.5. The project topography shows elevations of 9.6 on the south bank and 9.2 on the north bank, at the location where the new headwall is proposed.

Overflow of the canal banks would tend to reduce the computed flow and water surface elevation in the canal. No outflow along the banks was assumed in the analysis to be conservative, and to avoid a complicated analysis that does not appreciably affect the results at the canal headwall. Consequently, we conclude that the elevation of the water surface at the beginning of the High Line Canal to be used in design of BART facilities is El. 9.4.

5.4 Cross Drainage, Conceptual Design

5.4.1 Analysis for Conduit Size

Our calculations show that the existing 4-foot x 11-foot RBC discharging to the High Line Canal is inadequate to handle the 100-year flood. It appears that the 4-foot high by 11-foot wide box culvert which drains most of the Green Hills Basin will be under pressure from the El Camino Real drainage inlet to the SPTCo tracks. Assuming that the 4 foot x 11 foot culvert is running at capacity for this distance gives a computed Q_{100} of 508 cfs. The 66-inch pipe at Hermosa Avenue has an estimated capacity of 93 cfs, and the 24-inch line, which drains Hemlock Street from Hermosa Avenue south to the 18-inch lines under the High Line Canal, has an estimated capacity of 12 cfs. For Q_{100} conditions, these conduits were assumed flowing full. Deducting

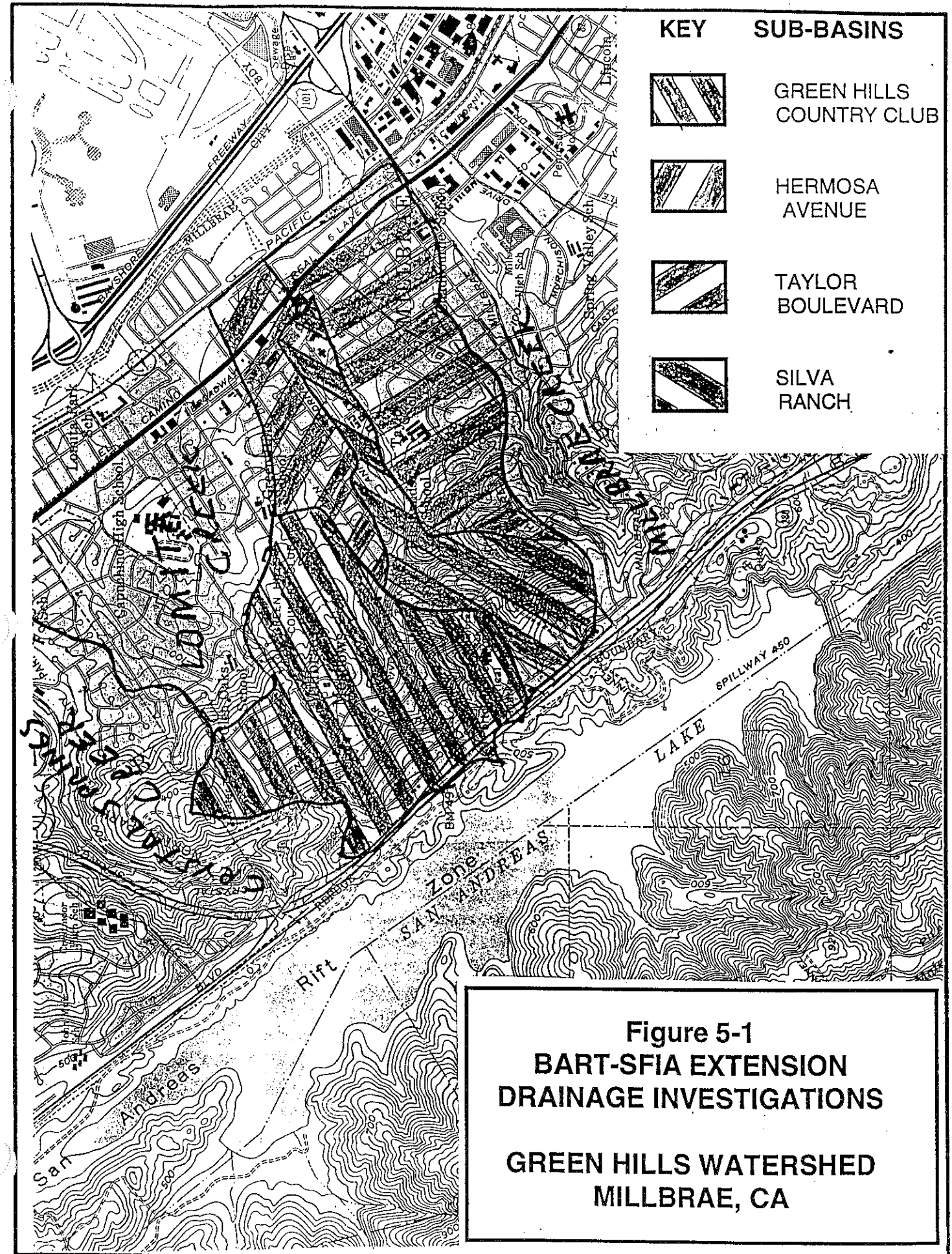


Figure 5-1
BART-SFIA EXTENSION
DRAINAGE INVESTIGATIONS

GREEN HILLS WATERSHED
MILLBRAE, CA

these flows from the estimated Q_{100} of 1023 cfs results in a total of 410 cfs that will flow overland to the SPTCo tracks under the 100-year conditions. Thus, additional capacity is required for the drainage facilities under the existing SPTCo tracks and proposed BART alignment. A conceptual layout for these facilities is shown on Figure 5-2.

The new facilities will incorporate the existing 4-foot x 11-foot conduit as far as is practicable. These facilities consist of a new drainage inlet box located to the west of the SPTCo tracks, a set of nine 50-inch culverts and the existing 4-foot x 11-foot box. An additional 4 foot x 11 foot box culvert conveys the flows from the relocated 66-inch line from Hermosa Avenue. It was assumed that jacking of pipes will be required under the existing SPTCo tracks. Final layout and dimensions will be determined in final design. The concept shown here is for purposes of determining feasibility and the hydraulic capacity necessary to convey the 100-year peak storm discharge of 1023 cfs safely under the BART alignment without exacerbating flood conditions in the City of Millbrae in this area. We assumed a Manning n of 0.014 for determining the capacity of the new concrete box culverts and pipes. For the existing 4 foot x 11 foot box culvert, we used a value of n equal to 0.016. The Manning's n used for the polyethylene-lined pipe was 0.011.

Performance of the design was based on the degree of flooding above the local ground level on the west side of the SPTCo tracks. This area has a local low spot of El. 8.7, which is lower than the computed 100-year water surface elevation in the High Line Canal (El 9.4). Consequently, some flooding will occur on the west side of the tracks with the 100-year flood. The analysis showed that a water surface elevation in the inlet box of El. 10.46 is required to convey the 100-year peak storm discharge through the culverts under the proposed BART alignment. This is 1.8 feet higher than the crest of the inlet collector box, which must be set at or below the local minimum local ground elevation at El. 8.7. Calculations with a submerged weir crest around three sides of the inlet box gives a computed water level at El 10.58 feet on the west side of the SPTCo tracks.

The inlet box should be provided with a safety fence. An 8-foot high steel bar fence located 15 feet away from the crest with 1-inch bars 8 inches on centers should be satisfactory, and minimize potential clogging during a major storm. Cyclone fencing is not recommended because it clogs easily with debris. A clear approach and combination erosion protection slab is recommended for about 15 feet on the weir approach sides. The fence can be located at the beginning of this slab, away from the crest.

The headwall for the High Line Canal will have to be relocated to accommodate the proposed W2 track. We have assumed that the headwall will have to be located about 30 feet from the centerline of the W2 track, as shown on Figure 5-2. This relocation can be integrated into the construction of a new transition section into the High Line Canal that will be required to accommodate the new drainage facilities.

5.4.2 Canal Transition

The conceptual layout shown on Figure 5-2 with nine 50-inch and two 4-foot x 11-foot culverts requires a headwall width of about 90 feet. The flow at the outlet into the transition at this face must contract to the existing canal width of 12 feet. Due to the low velocity of the discharge from the culverts, the hydraulic design of the transition need not be greatly concerned with form losses. However, the limited space between the Millbrae Station Platform and tunnel portal will prevent a transition design centered on the canal. A skewed transition will be necessary. Velocities at the culvert exit are about 1.4 ft/sec, and increase to about 4.75 ft/sec at the canal section. A transition length of 150 feet is shown on Figure 5-2, but this value can be reduced in final design. The canal will require reconstruction over the transition reach.

5.4.3 Relocation of Existing Facilities

Several existing storm drainage facilities in the vicinity of the existing 4-foot x 11-foot RBC will be combined into the new storm drainage facilities. A portion of the 4-foot x 11-foot RBC will be integrated into the new facility, and parts of it will have to be removed. The existing twin-18-inch pipes leading to the 33-inch line below-the-canal pipe may also have to be removed, depending on the depth at which the pipe is buried. We do not have sufficient information to determine if this line is low enough to permit construction of the new facility over it. Similarly, the 24-inch line which drains Hemlock Avenue will either be routed into the drainage inlet on the west side of the SPTCo tracks, or if it is buried deep enough, will remain in place. We recommend that these two lines remain in place if at all possible because they do appear to be buried quite deep. This would imply that the City of Millbrae pump located at the SFIA pump station along Highway 101 probably assists in reducing flooding in the low areas along Hemlock Avenue. We therefore recommend that the existing two 18-inch lines and the 24-inch line be left in place so that existing capacity and operation of the storm drains along Hemlock Avenue are not changed after BART construction is completed. If they cannot be left in place, replacement facilities will require a careful study will be required to ensure that replacement facilities do not adversely affect the current drainage on Hemlock Avenue.

The 66-inch line from Hermosa Avenue will have to be relocated to accommodate BART construction. In addition, an underpass has been proposed for Hillcrest Avenue that will require re-routing of this line around the underpass if this option is selected. One solution is to relocate the 66-inch line to the west of the SPTCo tracks, and join this line with the new facility at the inlet box on the west side of the SPTCo tracks. Relocation of the 66-inch Hermosa line to the inlet box may present some pipe clearance problems. There is little vertical space available for this pipe along an alignment that terminates in the north wall of the inlet box. The alternative shown on Drawings C286 and C287 is to relocate the 66-inch line in between the BART and SPTCo tracks, and then pass under the BART tracks at Green Hills Creek and into the High Line Canal in a new 4 foot x 11 foot box culvert. The old 4 foot x 11 foot box culvert would be re-

routed along side the new 4 foot x 11 foot RCB which conveys the flow from the 66-inch Hermosa Line.

The existing 66-inch line is a pressure conduit from at least El Camino Real to the High Line Canal. The additional length and bends required to relocate this line will increase the head losses. If long radius bends are used as shown on C287, then the additional head losses are small, and can be compensated for by simply pressurizing a little more of the existing conduit upstream from the BART alignment. Consequently, it is not necessary to increase the pipe size to compensate for the additional head losses.

There is a potential problem with getting enough cover for this pipe. It should be noted that the crown of the existing 66-inch pipe is exposed for a significant part of the run between Hermosa and the outlet in the High Line Canal. Thus, exposing the crown of the pipe on the new alignment may be a viable alternative as well. This problem will have to be addressed in final design. Alternatives might include the use of elliptical pipe to reduce the vertical height of the conduit.

5.5 Flooding on the West Side of the SPTCo Tracks

The calculated water level on the west side of the SPTCo track, El 10.58, is higher than the local ground level of El. 9 to El. 8.5 in the back yards of homes on Hemlock Avenue located to the north of the proposed inlet box for the new drainage facilities. The available project topography for Hemlock Avenue is limited in extent to the backyards on the east side of the street and about half of the structures. The San Mateo County maps only show 10 foot contours. Based on the County maps, it appears that Hemlock Avenue is about El. 16 at its lowest point at the southern end, so any anticipated flooding will likely be confined to the row of houses with back yards abutting the SPTCo on the east side of Hemlock Avenue.

If these same flood conditions were applied to pre-project conditions, this low area would be flooded to a greater depth than with the project because there is presently insufficient drainage capacity to convey the 100-year peak storm runoff across the SPTCo tracks. For existing conditions, the SPTCo tracks control the flooding elevations to the west of the SPTCo tracks. The elevation of the SPTCo tracks is at about El. 11.6 at the cross-drainage conduit, with a low point about 600 feet south at El. 11.3. Allowing 0.4 feet for the track height, the expected flood elevation to the west side of the SPTCo tracks is at least El. 11.7. Since the computed flood level for the proposed BART facilities is El. 10.58, the BART construction results in a slight improvement in the local drainage and a reduction in the flooding potential for this area. In this case, it was necessary to slightly reduce the existing flood elevation to prevent flood waters from entering the Millbrae Station through the SPTCo trackway and to maintain the flood level at or slightly below existing conditions so that the BART facilities do not exacerbate any local drainage problems.

5.6 BART Flood Wall

The headwall at the beginning of the High Line Canal must connect with the flood barrier around the BART tracks to prevent flooding of the low-lying BART tracks which have been set at a grade elevation of El. 9.5 through the Millbrae Station area. It is essential that the flood barrier completely enclose the BART tracks from the portal at Station 140 +50, just north of the Millbrae Station south around the end of the tail tracks and back to the portal. Any floodwater that finds its way onto the tracks in this area would also enter the portal at Sta. 140+50 and flood the subway. The flood barrier should be set at El. 12.75 or higher. Portions of the flood barrier are the BART structures themselves, such as the shared platform in the Millbrae Station. Where there is no other barrier, it will be necessary to construct a flood wall up to El. 12.75. The flood walls and other structures must join to the portal to provide a continuous barrier encircling the Millbrae Station and tail tracks areas to prevent flooding of the BART trackway and subway.

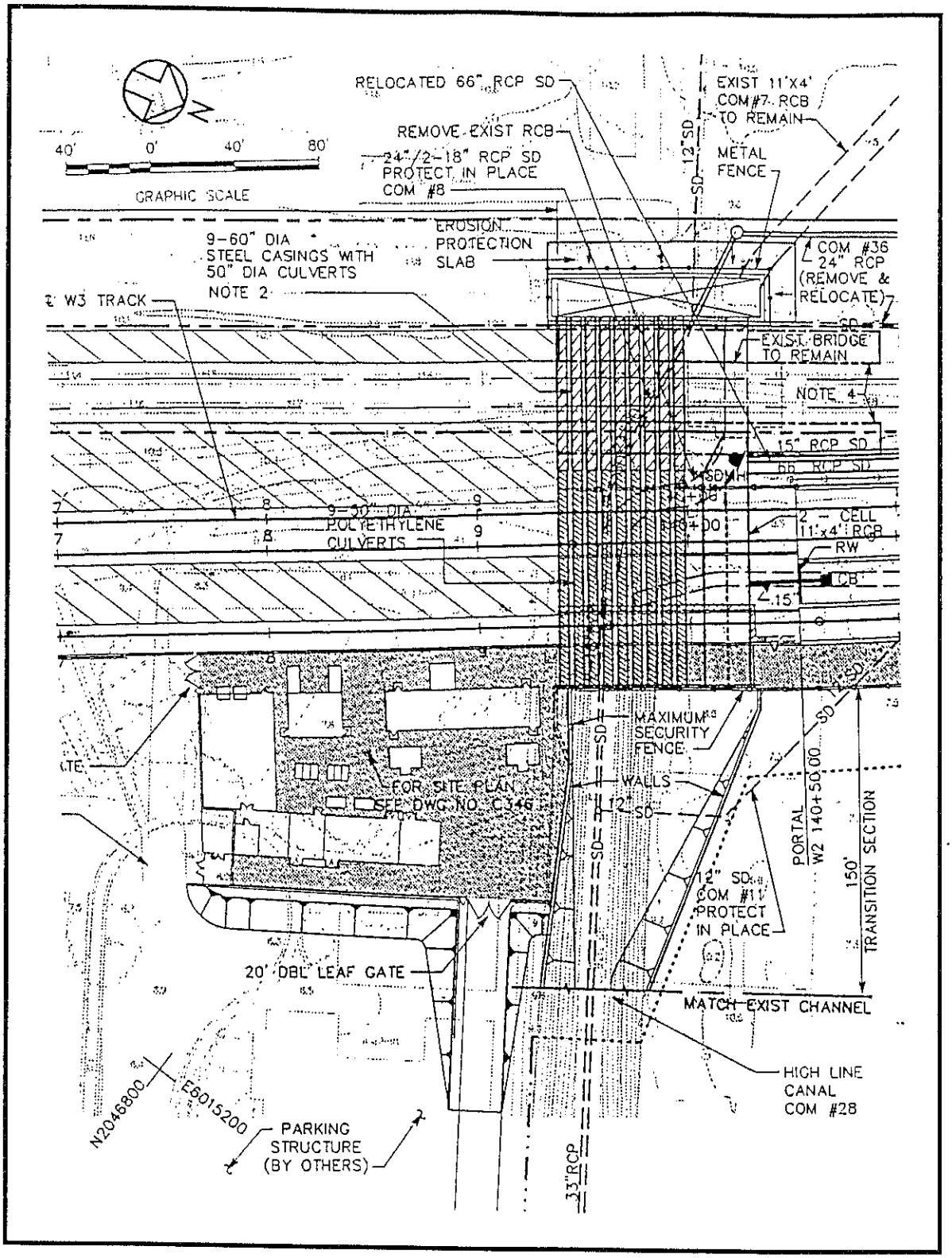
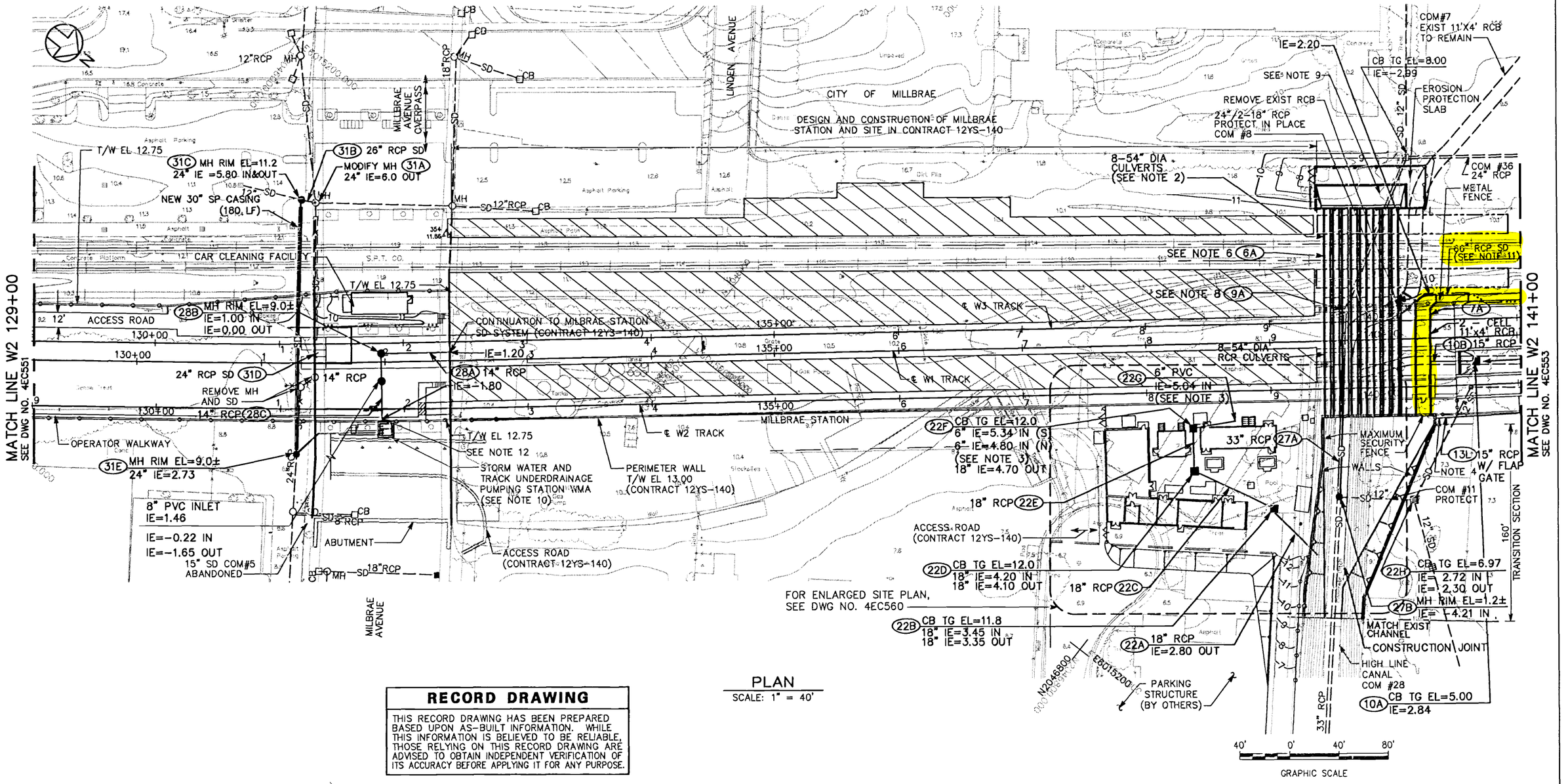


Figure 5-2 Green Hills Creek Cross-Drainage Facility, Conceptual Layout

NOTES

1. SEE DWG NO. 4EC543 FOR ADDITIONAL NOTES.
2. INSTALL 54" RCP, CLASS V, UNDER CALTRAIN TRACKS USING THE PIPE RAMMING METHOD.
3. SEE MODULE 13 WORK PACKAGE 3B FOR CONTINUATION OF CABLE TRENCH DRAIN.
4. TERMINATE 15" SD AT WALL OF HIGH LINE CANAL (OUTLET IE=2.50). REFER TO DWG NO. 4EC579 FOR DETAIL.
5. NOT USED.
6. REFER TO DWG NO. 4EC557 FOR ADDITIONAL DETAILS.
7. SEE GENERAL CIVIL DRAWINGS FOR SITE LAYOUT AND PAVING PLANS.
8. REMOVE EXIST CATCH BASIN AS REQUIRED AND CAP. REFER TO DWG NO. 4EC572 FOR DETAIL.
9. SEE DWG NO. 4EC573 FOR DETAILS OF INLET STRUCTURE AND TRANSITION STRUCTURE.
10. FOR UNDERDRAIN SYSTEM AND DRAINAGE BETWEEN CALTRAIN AND BART, SEE UNDERDRAIN DRAWINGS.
11. PROVIDE 16' WIDE BY 8" DEPTH CONCRETE SLAB OVER 66" RCP SD TO PROTECT PIPE FROM VEHICULAR LOADING. SLOPE TO CONFORM TO AREA GRADING PLAN. SLAB TO EXTEND FROM W2 STA 140+30 TO 147+50. SLAB IS NOT SHOWN ON PLAN SOUTH OF W2 STA 147+50 FOR CLARITY. SEE CROS SECTIONS DWGS 4EC565 TO 4EC567 FOR DETAILS.
12. CONNECT TO CB ON THE UNDERDRAIN SYSTEM. SEE UNDERDRAIN PLAN FOR DETAIL.



PLAN
SCALE: 1" = 40'

RECORD DRAWING

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1	26FE02	KS			REVISED PER CN#134
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0	07AP00				ISSUED FOR CONSTRUCTION FOR WMI SITE ONLY

DESIGNED BY V. TJIA
DRAWN BY V. TJIA
CHECKED BY J. PUN
IN CHARGE J. PUN
DATE 18NO2003

ORIGINAL DRAWING BEARS THE REGISTERED PROFESSIONAL ENGINEER SEAL No. 35305 AND SIGNATURE OF: JAMES T. PUN

SAN FRANCISCO BAY AREA RAPID TRANSIT DISTRICT

HNTB CORPORATION
MANNA CONSULTANTS, INC.
SUBMITTED ORIGINAL SIGNED BY: S. A. WHITAKER

TUTOR-SALIBA/SLATTERY
APPROVED ORIGINAL SIGNED BY: E. D. RITCHIE

SAN FRANCISCO AIRPORT EXTENSION LINE, TRACKWORK, AND SYSTEMS
SITE GRADING & DRAINAGE PLAN
W2 129+00 TO W2 141+00

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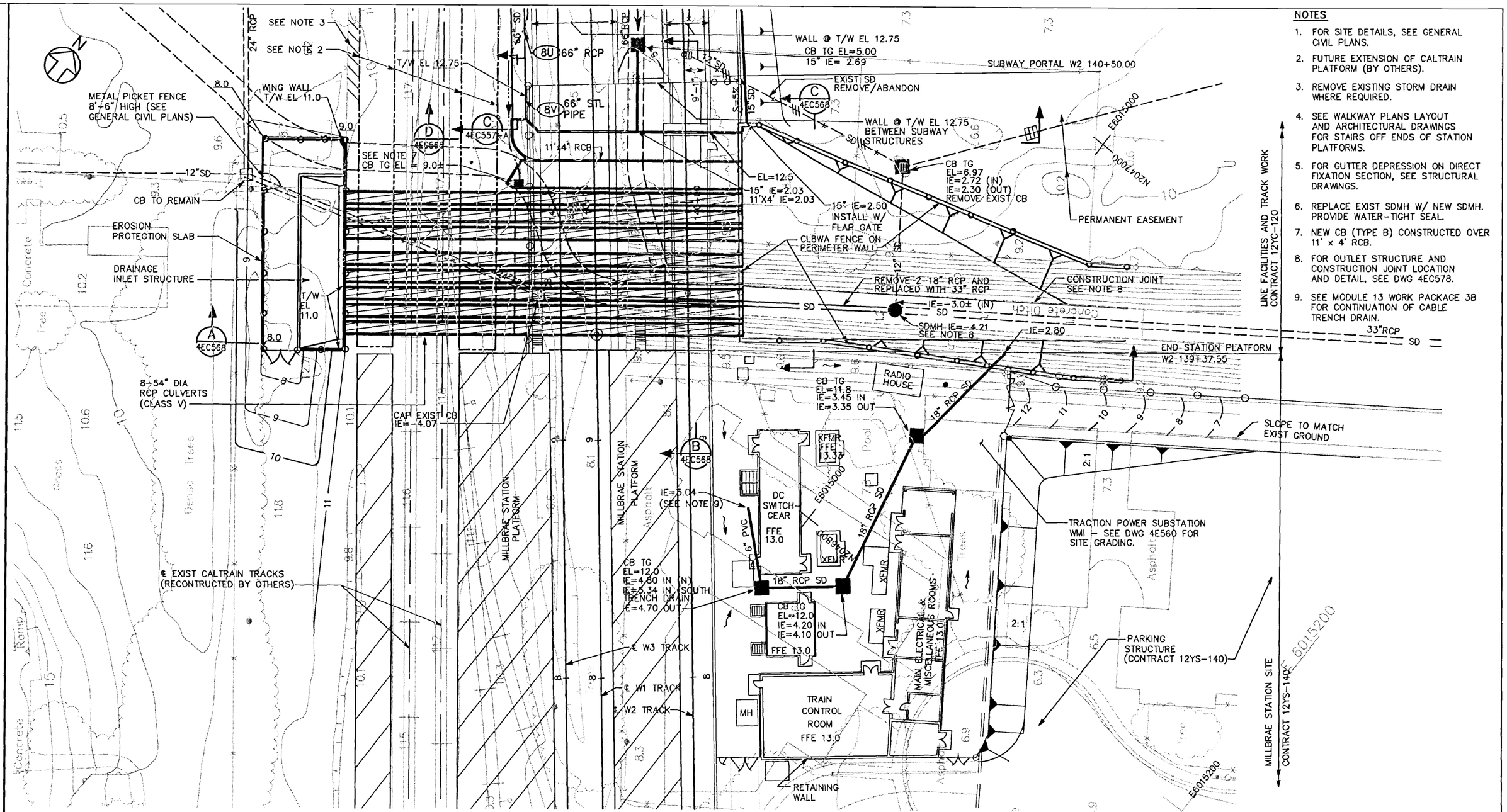

NOTES

1. FOR SITE DETAILS, SEE GENERAL CIVIL PLANS.
2. FUTURE EXTENSION OF CALTRAIN PLATFORM (BY OTHERS).
3. REMOVE EXISTING STORM DRAIN WHERE REQUIRED.
4. SEE WALKWAY PLANS LAYOUT AND ARCHITECTURAL DRAWINGS FOR STAIRS OFF ENDS OF STATION PLATFORMS.
5. FOR GUTTER DEPRESSION ON DIRECT FIXATION SECTION, SEE STRUCTURAL DRAWINGS.
6. REPLACE EXIST SDMH W/ NEW SDMH. PROVIDE WATER-TIGHT SEAL.
7. NEW CB (TYPE B) CONSTRUCTED OVER 11' x 4' RCB.
8. FOR OUTLET STRUCTURE AND CONSTRUCTION JOINT LOCATION AND DETAIL, SEE DWG 4EC578.
9. SEE MODULE 13 WORK PACKAGE 3B FOR CONTINUATION OF CABLE TRENCH DRAIN.

PLAN

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20' 0' 20' 40'
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0	07AP00				ISSUED FOR CONSTRUCTION FOR WMI SITE ONLY

DESIGNED BY V. TJIA
DRAWN BY V. TJIA
CHECKED BY J. PUN
IN CHARGE J. PUN
DATE 18N02003

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SUBMITTED ORIGINAL SIGNED BY: S. A. WHITAKER

TUTOR-SALIBA/SLATTERY
APPROVED ORIGINAL SIGNED BY: E. D. RITCHIE

SAN FRANCISCO AIRPORT EXTENSION LINE, TRACKWORK, AND SYSTEMS
SITE GRADING & DRAINAGE PLAN
MILLBRAE STATION – NORTH

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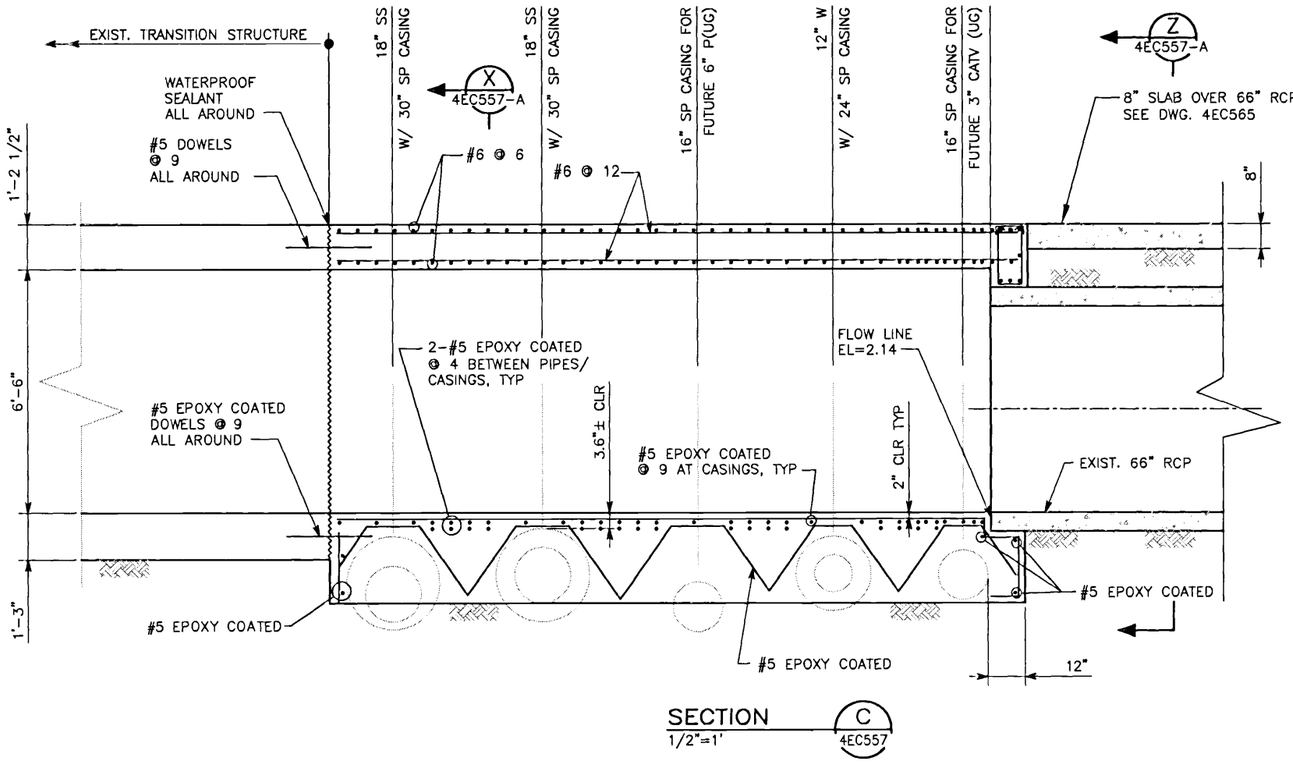

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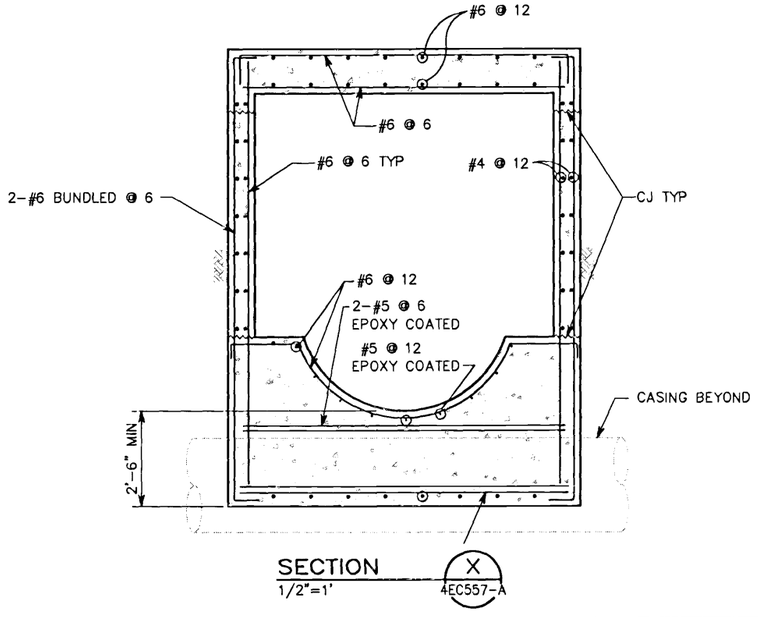

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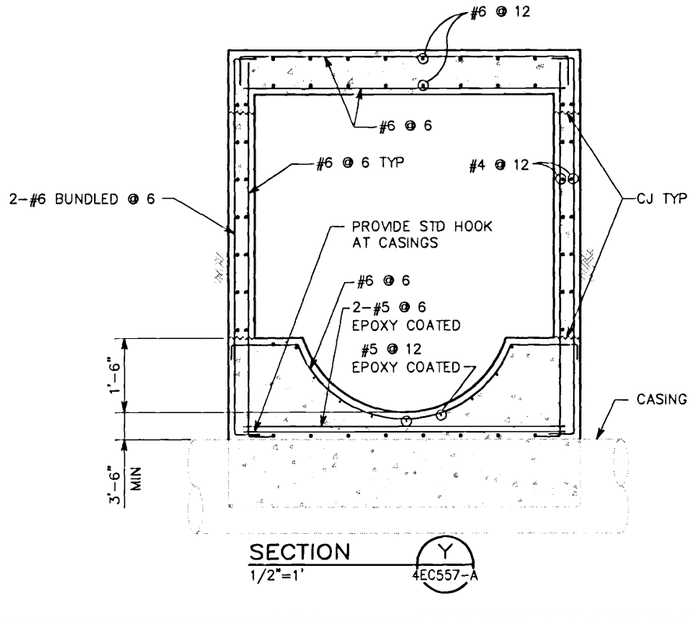

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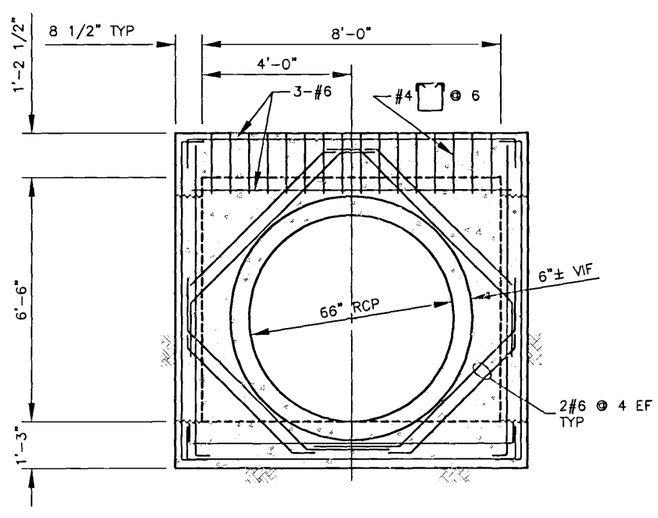

SECTION Z
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NOTE:
SEE DWG 4DU302 FOR CROSSING UTILITIES.

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DESIGNED BY M. KLEIN
DRAWN BY J. WEINER
CHECKED BY T. ANTARAMIAN
IN CHARGE F. ADIKARA
DATE 31MY2003

ORIGINAL DRAWING BEARS THE REGISTERED PROFESSIONAL ENGINEER SEAL No. C39375 AND SIGNATURE OF: FELIX K. ADIKARA

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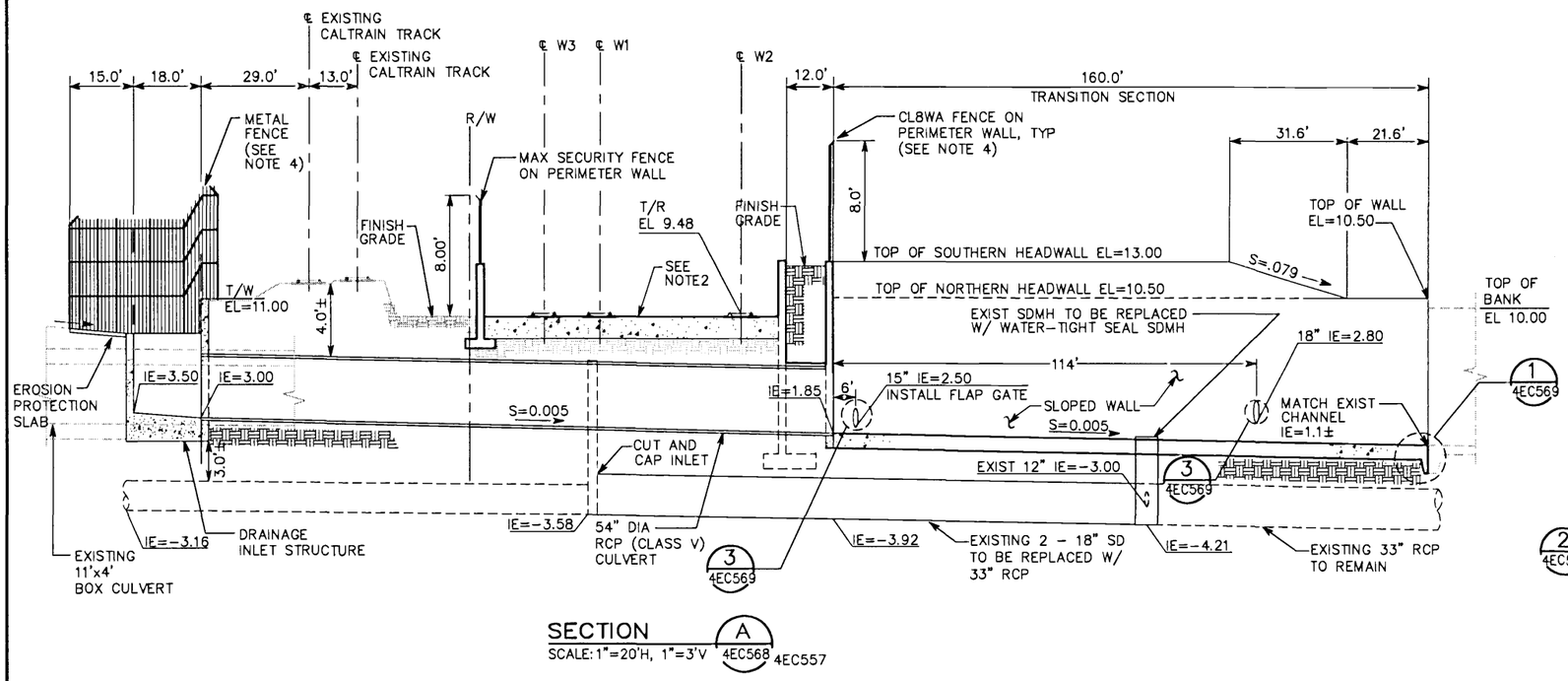
MANNA CONSULTANTS, INC.
SUBMITTED ORIGINAL SIGNED BY: S. A. WHITAKER

TUTOR-SALIBA/SLATTERY
APPROVED ORIGINAL SIGNED BY: E. D. RITCHIE

SAN FRANCISCO AIRPORT EXTENSION
LINE, TRACKWORK, AND SYSTEMS
DRAINAGE DETAIL
SYSTEM 1

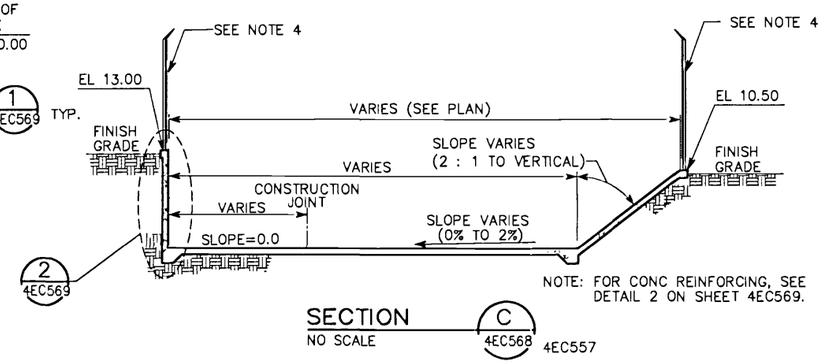
CADD FILE NO W4EC557-A1	CADD DATE 30MY2003
SCALE 1/2"=1'-0"	
CONTRACT NUMBER 12YC-120	ACTIVITY CODE
DWG NO 4EC557-A	REV 1 PAGE NO 1480



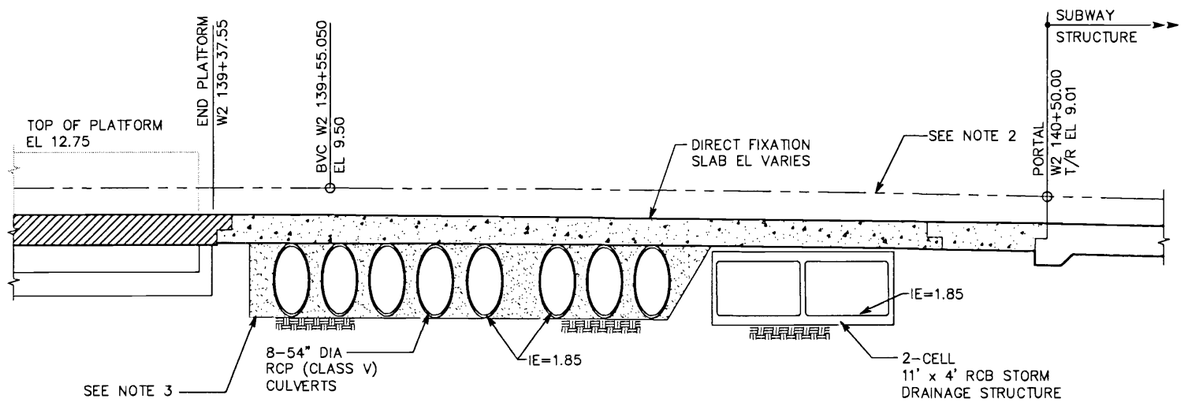
SECTION A
SCALE: 1"=20'H, 1"=3'V 4EC568 4EC557

NOTES

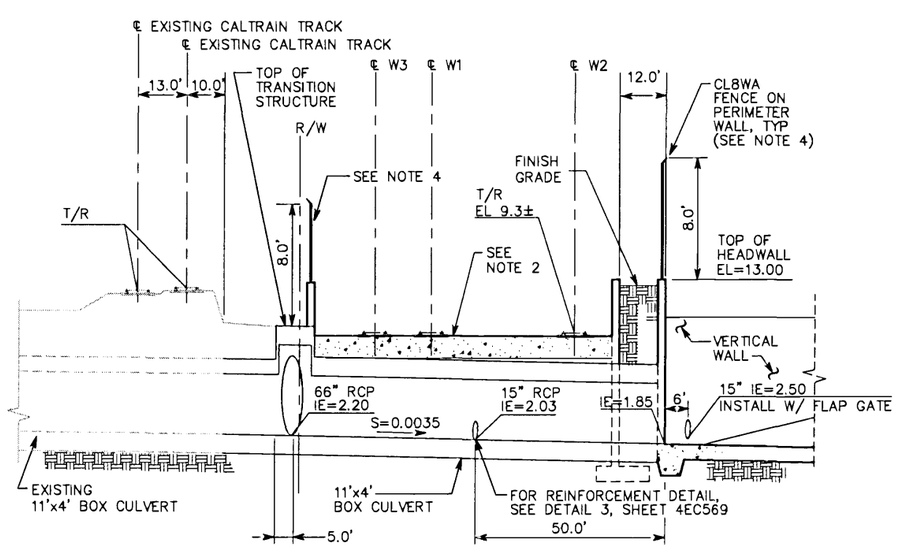
1. SEE DWG NO. 4EC543 FOR ADDITIONAL NOTES.
2. CONNECT DIRECT FIXATION SLAB DRAINAGE TO SUBWAY DRAINAGE. SEE STRUCTURAL PLANS FOR DEPRESSED GUTTER LOCATIONS AND DETAILS.
3. PROVIDE LEAN CONCRETE OR CONTROLLED DENSITY FILL TO SUPPORT STRUCTURES OVER CULVERTS.
4. SEE GENERAL CIVIL PLANS FOR FENCE LOCATIONS AND DETAILS.



SECTION C
NO SCALE 4EC568 4EC557



SECTION B
SCALE: 1"=10'H, 1"=5'V 4EC568 4EC557



SECTION D
SCALE: 1"=20'H, 1"=5'V 4EC568 4EC557

RECORD DRAWING

THIS RECORD DRAWING HAS BEEN PREPARED BASED UPON AS-BUILT INFORMATION. WHILE THIS INFORMATION IS BELIEVED TO BE RELIABLE, THOSE RELYING ON THIS RECORD DRAWING ARE ADVISED TO OBTAIN INDEPENDENT VERIFICATION OF ITS ACCURACY BEFORE APPLYING IT FOR ANY PURPOSE.

REV	DATE	BY	SUB	APP	DESCRIPTION
1	31MY03	KJ	HL	EC	RECORD DRAWING
0	19MY00				ISSUED FOR CONSTRUCTION

DESIGNED BY V. TJIA
DRAWN BY V. TJIA
CHECKED BY J. PUN
IN CHARGE J. PUN
DATE 31MY2003

ORIGINAL DRAWING BEARS THE REGISTERED PROFESSIONAL ENGINEER SEAL No. 35305 AND SIGNATURE OF: JAMES T. PUN

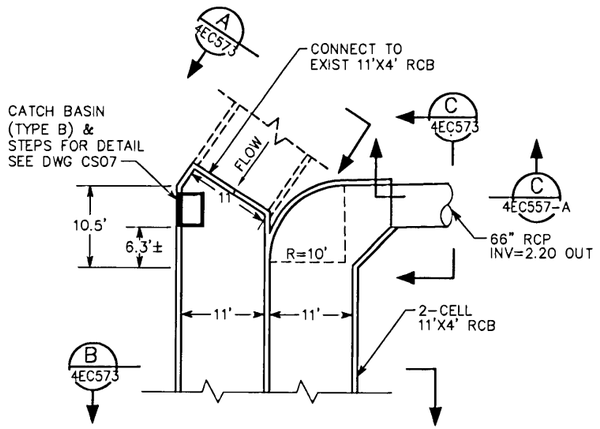
SAN FRANCISCO BAY AREA RAPID TRANSIT DISTRICT

HNTB CORPORATION
MANNA CONSULTANTS, INC.
SUBMITTED ORIGINAL SIGNED BY: S. A. WHITAKER

TUTOR-SALIBA/SLATTERY
APPROVED ORIGINAL SIGNED BY: E. D. RITCHIE

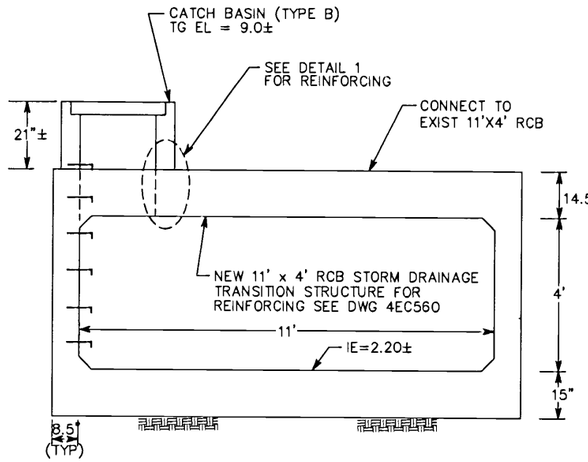
SAN FRANCISCO AIRPORT EXTENSION
LINE, TRACKWORK, AND SYSTEMS
DRAINAGE DETAILS
OUTLET STRUCTURE
MILLBRAE STATION - NORTH (1 OF 2)

CADD FILE NO	CADD DATE
W4EC5681	30MY2003
SCALE AS SHOWN	
CONTRACT NUMBER 12YC-120	ACTIVITY CODE
DWG NO 4EC568	REV 1 PAGE NO 49



TRANSITION STRUCTURE

SCALE: 1"=10'



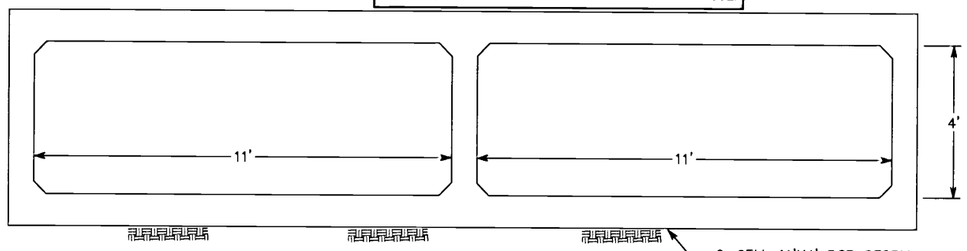
SECTION

SCALE: 1"=2'

A 4EC573

RECORD DRAWING

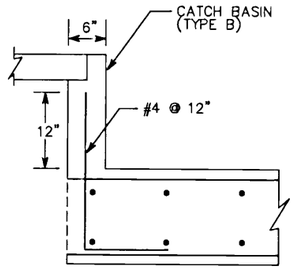
THIS RECORD DRAWING HAS BEEN PREPARED BASED UPON AS-BUILT INFORMATION. WHILE THIS INFORMATION IS BELIEVED TO BE RELIABLE, THOSE RELYING ON THIS RECORD DRAWING ARE ADVISED TO OBTAIN INDEPENDENT VERIFICATION OF ITS ACCURACY BEFORE APPLYING IT FOR ANY PURPOSE.



SECTION

SCALE: 1"=2'

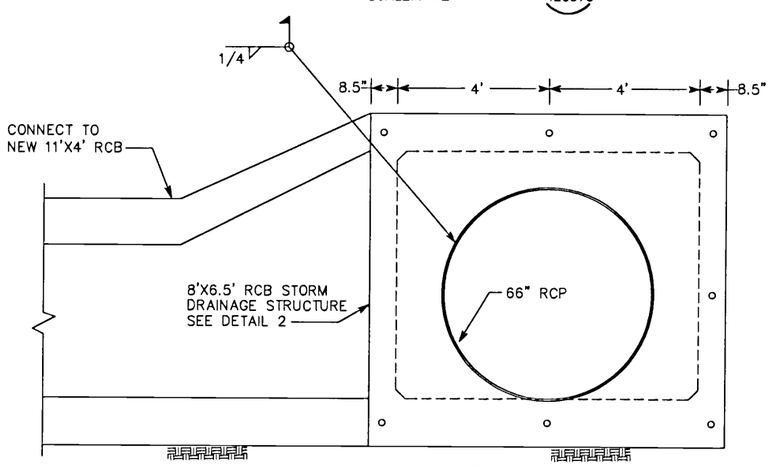
B 4EC573



DETAIL

SCALE: 1"=2'

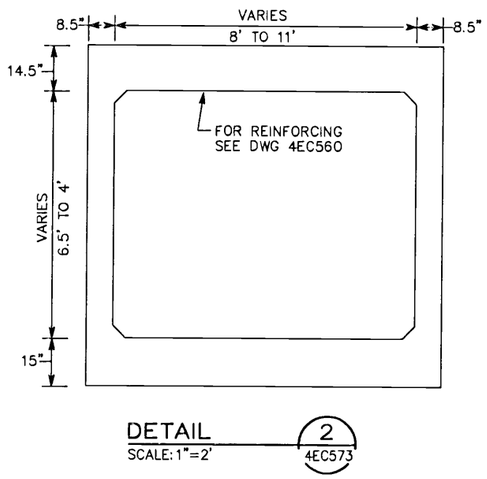
1 4EC573



SECTION

SCALE: 1"=2'

C 4EC573



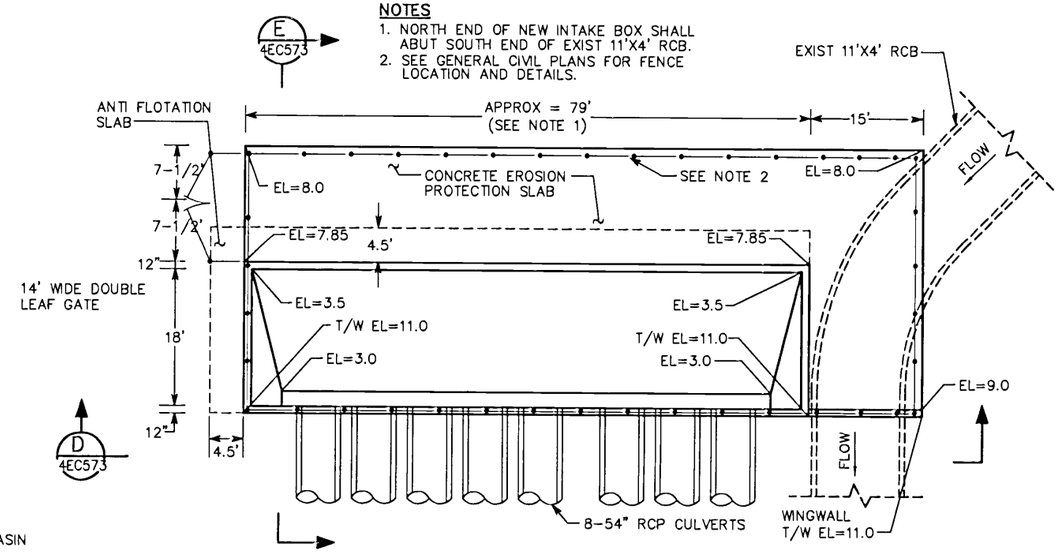
DETAIL

SCALE: 1"=2'

2 4EC573

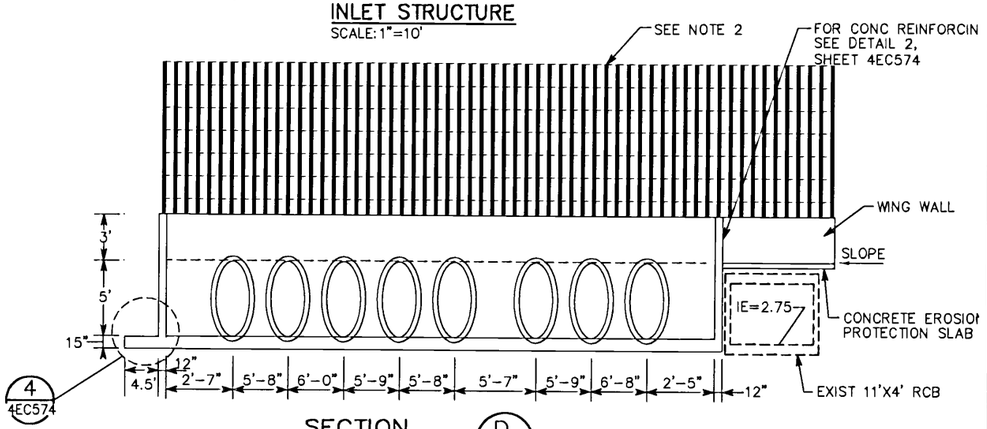
NOTES

1. NORTH END OF NEW INTAKE BOX SHALL ABUT SOUTH END OF EXIST 11'X4' RCB.
2. SEE GENERAL CIVIL PLANS FOR FENCE LOCATION AND DETAILS.



INLET STRUCTURE

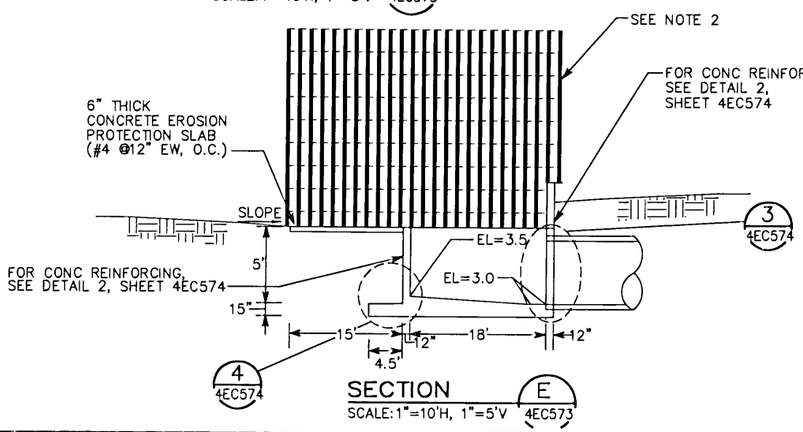
SCALE: 1"=10'



SECTION

SCALE: 1"=10'H, 1"=5'V

D 4EC573



SECTION

SCALE: 1"=10'H, 1"=5'V

E 4EC573

REV	DATE	BY	SUB	APP	DESCRIPTION
2	31MY03	KE	WHE	BL	RECORD DRAWING
1	06NOOO				REVISED PER UTILITY AS-BUILT
0	19MY00				ISSUED FOR CONSTRUCTION

DESIGNED BY V. TJIA
DRAWN BY V. TJIA
CHECKED BY J. PUN
IN CHARGE J. PUN
DATE 31MY2003

ORIGINAL DRAWING BEARS THE REGISTERED PROFESSIONAL ENGINEER SEAL No. 35305 AND SIGNATURE OF: J. T. PUN

SAN FRANCISCO BAY AREA RAPID TRANSIT DISTRICT

HNTB CORPORATION MANNA CONSULTANTS, INC.

SUBMITTED ORIGINAL SIGNED BY: S. A. WHITAKER

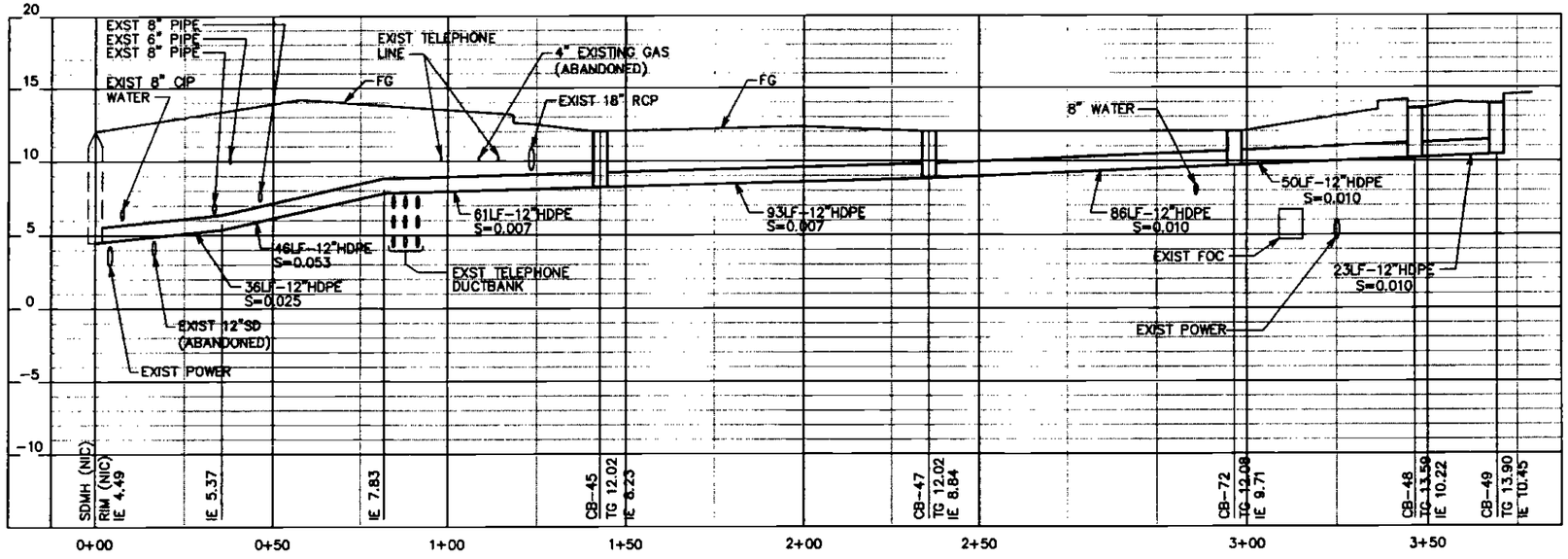
TUTOR-SALIBA/SLATTERY

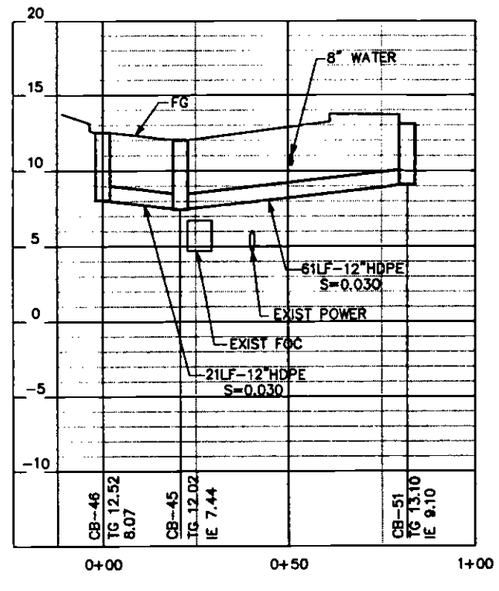
APPROVED ORIGINAL SIGNED BY: E. D. RITCHIE

SAN FRANCISCO AIRPORT EXTENSION LINE, TRACKWORK, AND SYSTEMS

DRAINAGE DETAILS INLET STRUCTURE SYSTEM 6

CADD FILE NO	CADD DATE
W4EC5732	30MY2003
SCALE AS SHOWN	
CONTRACT NUMBER 12YC-120	ACTIVITY CODE
DWG NO 4EC573	REV 2 PAGE NO 1496





NOTES:

1. FOR GENERAL NOTES, ABBREVIATIONS AND LEGEND, SEE DWG NOS. C001 THRU C003.
2. PIPE SLOPES SHALL CONTINUE TO CENTER OF MANHOLES, CATCH BASINS & DRAIN INLETS (TYPICAL FOR DWG NOS. C231 TO C237).

PROFILE A C231 C221
1"=20'H, 1"=5'V

PROFILE B C231 C221
1"=20'H, 1"=5'V

PROFILE N C231 C224
1"=20'H, 1"=5'V

PROFILE C C231 C221
1"=20'H, 1"=5'V

HALF SIZE

RECORD DRAWING

THIS RECORD DRAWING HAS BEEN PREPARED BASED UPON AS-BUILT INFORMATION. WHILE THIS INFORMATION IS BELIEVED TO BE RELIABLE, THOSE RELYING ON THIS RECORD DRAWING ARE ADVISED TO OBTAIN INDEPENDENT VERIFICATION OF ITS ACCURACY BEFORE APPLYING IT FOR ANY PURPOSE.

REV	DATE	BY	SUB	APP	DESCRIPTION
5	31JL02				RECORD DRAWING
4	30JL01	NR	GC	JC	REV AS SHOWN
3	25JN01	NR	GC	JC	REV AS SHOWN
2	25MY01	NR	GC	DL	RE-ISSUED PER CN 54
1	15MR01	NR	GC	DL	REV PER CN 54
0	08MR00				ISSUED FOR CONSTRUCTION

DESIGNED BY R. PIPKIN
DRAWN BY R. PIPKIN
CHECKED BY S. GIADONE
IN CHARGE S. GIADONE
DATE 31JL2002

ORIGINAL DRAWING BEARS THE REGISTERED PROFESSIONAL ENGINEER SEAL No. 56955 AND SIGNATURE OF: STEPHEN G. GIADONE

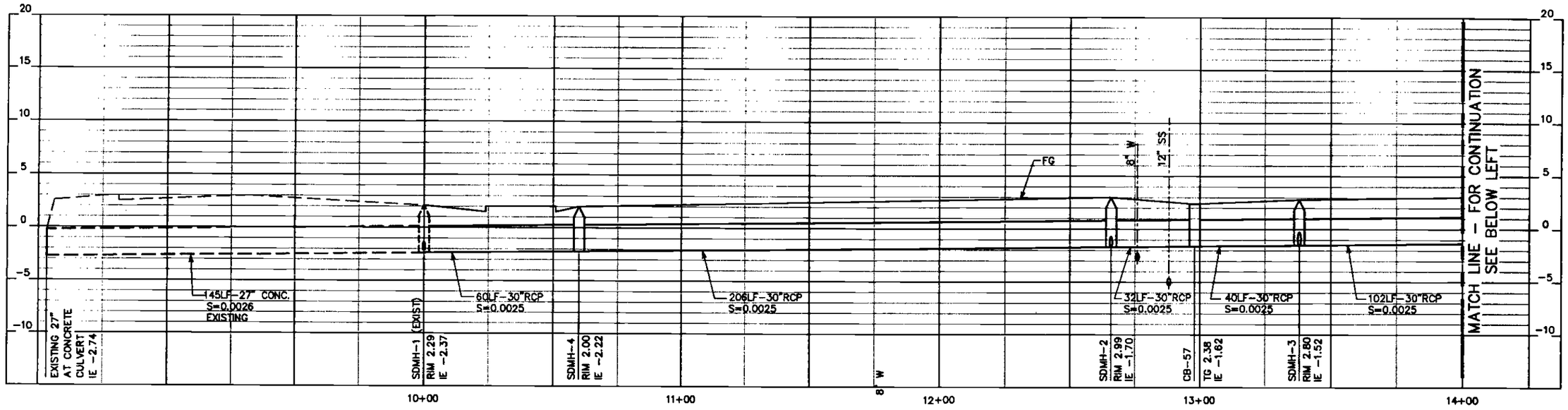
SAN FRANCISCO BAY AREA RAPID TRANSIT DISTRICT

SVERDRUP CIVIL, INC — SUBMITTED ORIGINAL SIGNED BY: GALEN HEYDER

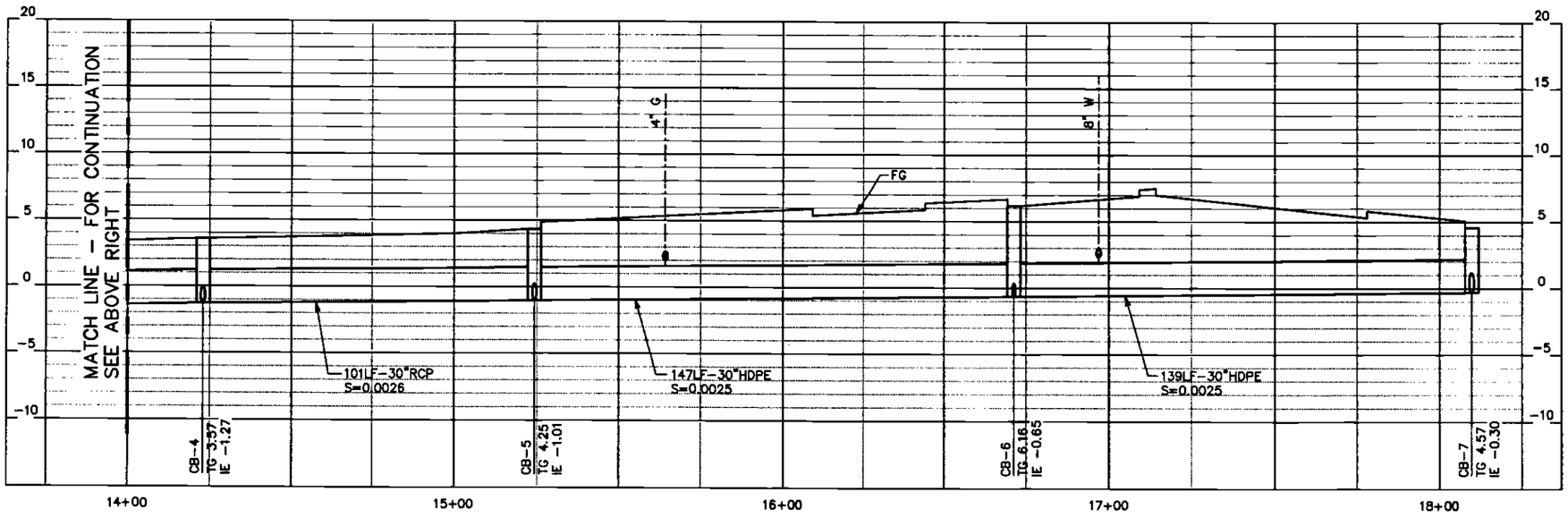
SVERDRUP / CONCO A JOINT VENTURE — APPROVED ORIGINAL SIGNED BY: DON LIBBEY

SAN FRANCISCO AIRPORT EXTENSION
MILLBRAE STATION
DRAINAGE PROFILES
SHEET 1 OF 8

CADD FILE NO WFEC2315	CADD DATE 01JL2002
SCALE AS NOTED	
CONTRACT NUMBER 12YS-140	ACTIVITY CODE
DWG NO C231	REV 5 PAGE NO 57



PROFILE 1"=20'H, 1"=5'V — C232 — C223; C224



PROFILE 1"=20'H, 1"=5'V — C232 — C223; C224

NOTES:

1. FOR GENERAL NOTES, ABBREVIATIONS AND LEGEND, SEE OWG NOS. C001 THRU C003.

HALF SIZE

RECORD DRAWING

THIS RECORD DRAWING HAS BEEN PREPARED BASED UPON AS-BUILT INFORMATION. WHILE THIS INFORMATION IS BELIEVED TO BE RELIABLE, THOSE RELYING ON THIS RECORD DRAWING ARE ADVISED TO OBTAIN INDEPENDENT VERIFICATION OF ITS ACCURACY BEFORE APPLYING IT FOR ANY PURPOSE.

REV	DATE	BY	SUB	APP	DESCRIPTION
1	19FE02				RECORD DRAWING
0	08MR00				ISSUED FOR CONSTRUCTION

DESIGNED BY A. LEUNG
DRAWN BY F. FEICKERT
CHECKED BY F. YUAN
IN CHARGE S. GIADONE
DATE 19FE2002

ORIGINAL DRAWING BEARS THE REGISTERED PROFESSIONAL ENGINEER SEAL No. 58955 AND SIGNATURE OF: STEPHEN G. GIADONE

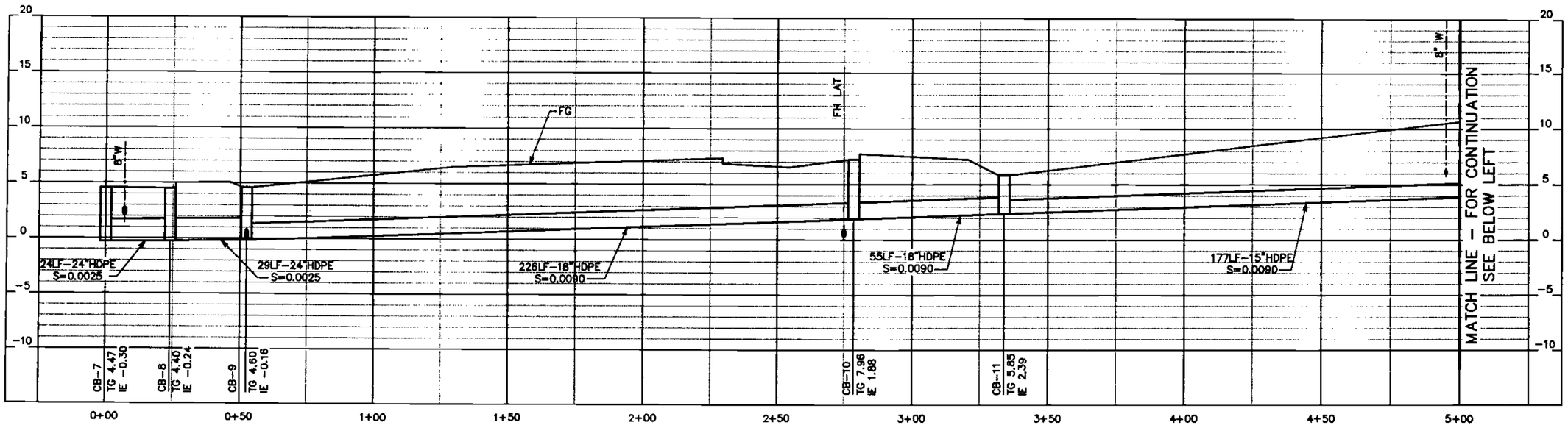
SAN FRANCISCO BAY AREA RAPID TRANSIT DISTRICT

SVERDRUP CIVIL, INC — SUBMITTED ORIGINAL SIGNED BY: GALEN HEYDER

SVERDRUP / CONCO A JOINT VENTURE — APPROVED ORIGINAL SIGNED BY: DON LIBBEY

SAN FRANCISCO AIRPORT EXTENSION
MILLBRAE STATION
DRAINAGE PROFILES
SHEET 2 OF 8

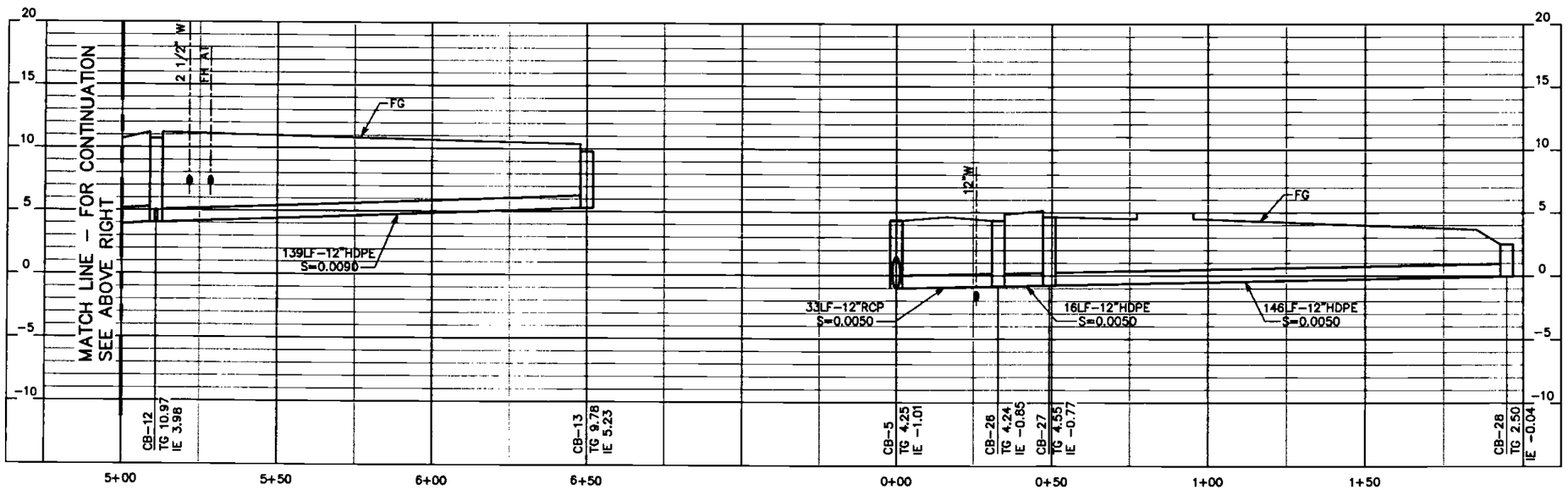
CADD FILE NO WFEC2321	CADD DATE 21AU2002
SCALE AS NOTED	
CONTRACT NUMBER 12YS-140	ACTIVITY CODE
DWG NO C232	REV 1 PAGE NO 58



PROFILE
1"=20'H, 1"=5'V
(D / C233) C222; C223

NOTES:

1. FOR GENERAL NOTES, ABBREVIATIONS AND LEGEND, SEE DWG NOS. C001 THRU C003.



PROFILE
1"=20'H, 1"=5'V
(D / C233) C222; C223

PROFILE
1"=20'H, 1"=5'V
(G / C233) C224

HALF SIZE

RECORD DRAWING

THIS RECORD DRAWING HAS BEEN PREPARED BASED UPON AS-BUILT INFORMATION. WHILE THIS INFORMATION IS BELIEVED TO BE RELIABLE, THOSE RELYING ON THIS RECORD DRAWING ARE ADVISED TO OBTAIN INDEPENDENT VERIFICATION OF ITS ACCURACY BEFORE APPLYING IT FOR ANY PURPOSE.

REV	DATE	BY	SUB	APP	DESCRIPTION
1	19FE02				RECORD DRAWING
0	08MR00				ISSUED FOR CONSTRUCTION

DESIGNED BY A. LEUNG
DRAWN BY F. FEICKERT
CHECKED BY S. GIADONE
IN CHARGE S. GIADONE
DATE 19FE2002

ORIGINAL DRAWING BEARS THE REGISTERED PROFESSIONAL ENGINEER SEAL No. 58955 AND SIGNATURE OF: STEPHEN G. GIADONE

SAN FRANCISCO BAY AREA RAPID TRANSIT DISTRICT

SVERDRUP CIVIL, INC — SUBMITTED ORIGINAL SIGNED BY: GALEN HEYDER

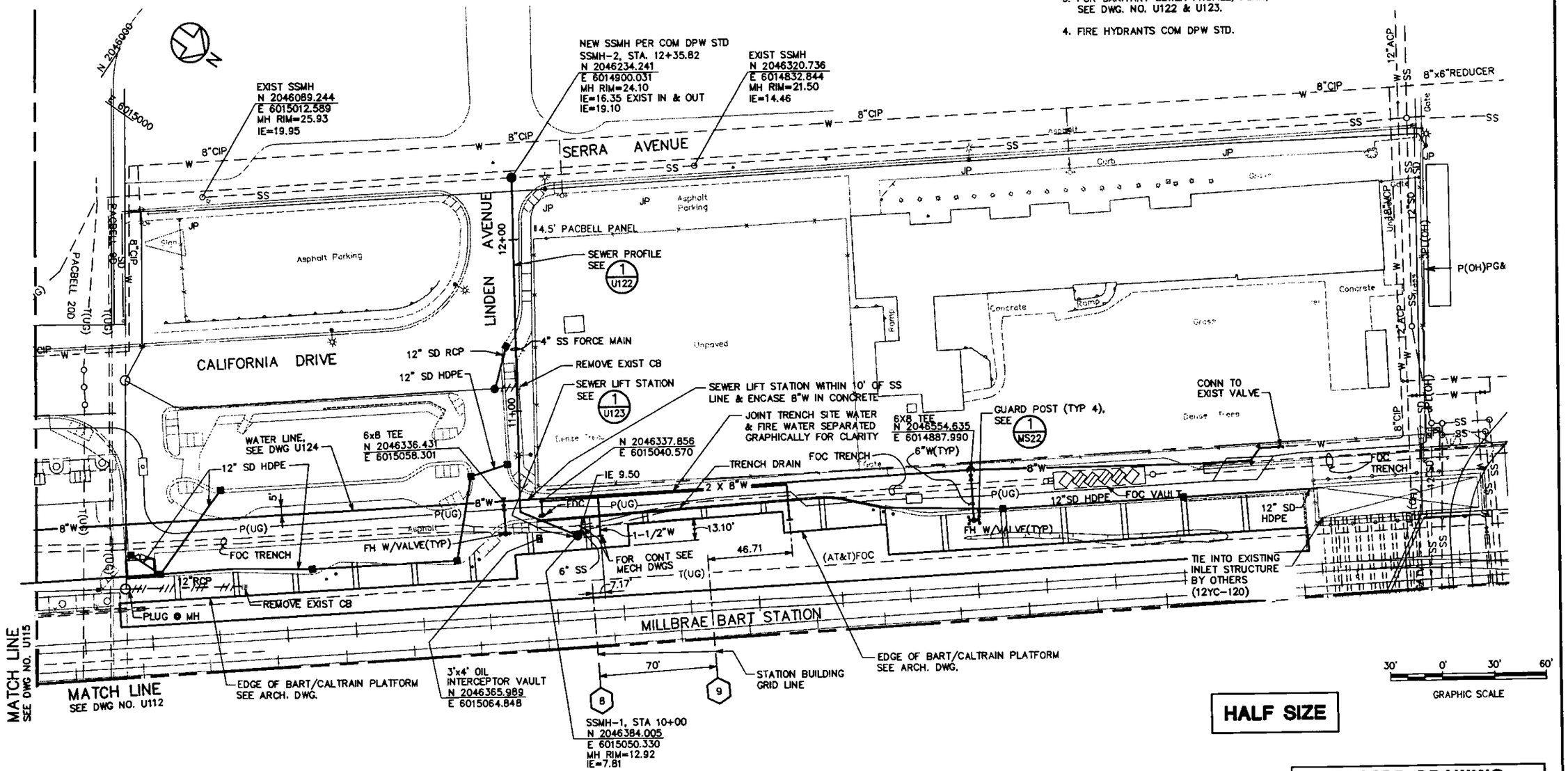
SVERDRUP / CONCO A JOINT VENTURE — APPROVED ORIGINAL SIGNED BY: DON LIBBEY

SAN FRANCISCO AIRPORT EXTENSION
MILLBRAE STATION
DRAINAGE PROFILES
SHEET 3 OF 8

CADD FILE NO	CADD DATE
WFEC2331	21AU2002
SCALE: AS NOTED	
CONTRACT NUMBER: 12YS-140	ACTIVITY CODE
DWG NO: C233	REV / PAGE NO: 1 / 59

NOTES:

1. FOR GENERAL NOTES, ABBREVIATIONS AND SYMBOLS, SEE DWG NOS. U001 THRU U002 (TYP).
2. FOR ADDITIONAL STORM DRAINAGE INFORMATION SEE DWG NO. C221.
3. FOR SANITARY SEWER PROFILE, PLAN, AND SECTION SEE DWG. NO. U122 & U123.
4. FIRE HYDRANTS COM DPW STD.



HALF SIZE

RECORD DRAWING

THIS RECORD DRAWING HAS BEEN PREPARED BASED UPON AS-BUILT INFORMATION. WHILE THIS INFORMATION IS BELIEVED TO BE RELIABLE, THOSE RELYING ON THIS RECORD DRAWING ARE ADVISED TO OBTAIN INDEPENDENT VERIFICATION OF ITS ACCURACY BEFORE APPLYING IT FOR ANY PURPOSE.

REV	DATE	BY	SUB	APP	DESCRIPTION
3	04MR03				RECORD DRAWING
2	18MR02	NR	GC	JC	REV AS SHOWN
1	25JN01	NR	GC	JC	REV PER CN 68
0	25MY01				ISSUED FOR CONSTRUCTION

DESIGNED BY R. PIPKIN
DRAWN BY R. PIPKIN
CHECKED BY G. CASTLETON
IN CHARGE G. CASTLETON
DATE 04MR2003

ORIGINAL DRAWING BEARS THE REGISTERED PROFESSIONAL ENGINEER SEAL No. 17350 AND SIGNATURE OF: GARY A. CASTLETON

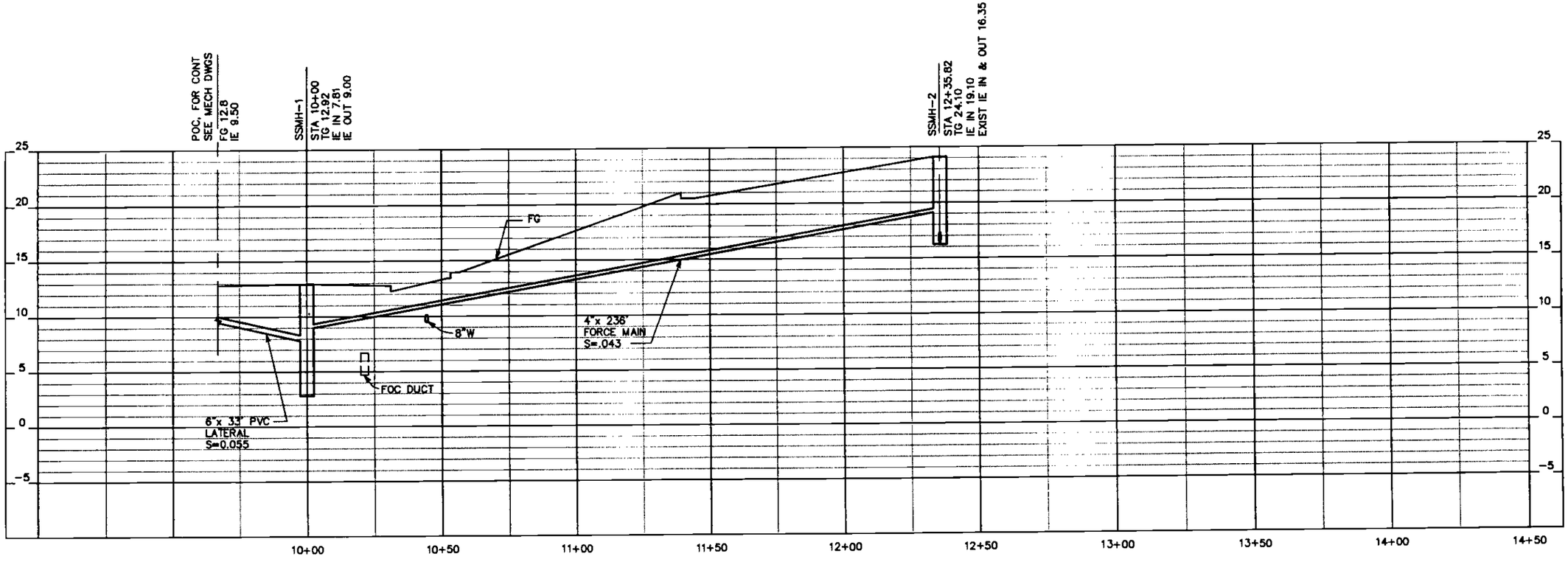
SAN FRANCISCO BAY AREA RAPID TRANSIT DISTRICT

SVERDRUP CIVIL, INC — SUBMITTED ORIGINAL SIGNED BY: GALEN HEYDER

SVERDRUP / CONCO A JOINT VENTURE — APPROVED ORIGINAL SIGNED BY: JERRY CONDON

SAN FRANCISCO AIRPORT EXTENSION
MILLBRAE STATION
COMPOSITE PLAN
OF UTILITY REARRANGEMENTS
SHEET 1 OF 6

CADD FILE NO	CADD DATE
WFEU1113	04MR2003
SCALE 1"=30'	
CONTRACT NUMBER 12YS-140	ACTIVITY CODE
DWG NO U111	REV 3 / PAGE NO 103



PROFILE – SANITARY SEWER (1 / U122 / U111)
SCALE: 1"=20'H, 1"=5'V

NOTES:

1. FOR GENERAL NOTES, ABBREVIATIONS AND LEGEND, SEE DWG NOS. C001 THRU C003.

HALF SIZE

RECORD DRAWING

THIS RECORD DRAWING HAS BEEN PREPARED BASED UPON AS-BUILT INFORMATION. WHILE THIS INFORMATION IS BELIEVED TO BE RELIABLE, THOSE RELYING ON THIS RECORD DRAWING ARE ADVISED TO OBTAIN INDEPENDENT VERIFICATION OF ITS ACCURACY BEFORE APPLYING IT FOR ANY PURPOSE.

REV	DATE	BY	SUB	APP	DESCRIPTION
1	19FE02				RECORD DRAWING
0	25JN01				ISSUED FOR CONSTRUCTION

REV	DATE	BY	SUB	APP	DESCRIPTION

DESIGNED BY R. PIPKIN
DRAWN BY R. PIPKIN
CHECKED BY S. GIADONE
IN CHARGE G.CASTLETON
DATE 19FE2002

ORIGINAL DRAWING BEARS THE REGISTERED PROFESSIONAL ENGINEER SEAL No. C 17350 AND SIGNATURE OF: GARY A. CASTLETON

SAN FRANCISCO BAY AREA RAPID TRANSIT DISTRICT

SVERDRUP CIVIL, INC — SUBMITTED ORIGINAL SIGNED BY: GALEN HEYDER

SVERDRUP / CONCO A JOINT VENTURE — APPROVED ORIGINAL SIGNED BY: JERRY CONDON

SAN FRANCISCO AIRPORT EXTENSION
MILLBRAE STATION
UTILITIES PROFILES
SHEET 2 OF 2

CADD FILE NO WFEU1221	CADD DATE 21AU2002
SCALE AS NOTED	
CONTRACT NUMBER 12YS-140	ACTIVITY CODE
DWG NO U122	REV 1 PAGE NO 110

GREEN HILLS DRAINAGE AREA

AREA = 960 ACRES
Q_{100} = 993 CFS

*CALCULATED AS PART OF BART HYDRO REPORT

BKF 100+ YEARS
ENGINEERS . SURVEYORS . PLANNERS
255 SHORELINE DR., SUITE 200
REDWOOD CITY, CA 94065
(650) 482-6300
www.bkf.com

MILLBRAE SERRA STATION TOD
ATTACHMENT 3
GREEN HILLS DRAINAGE AREA EXHIBIT

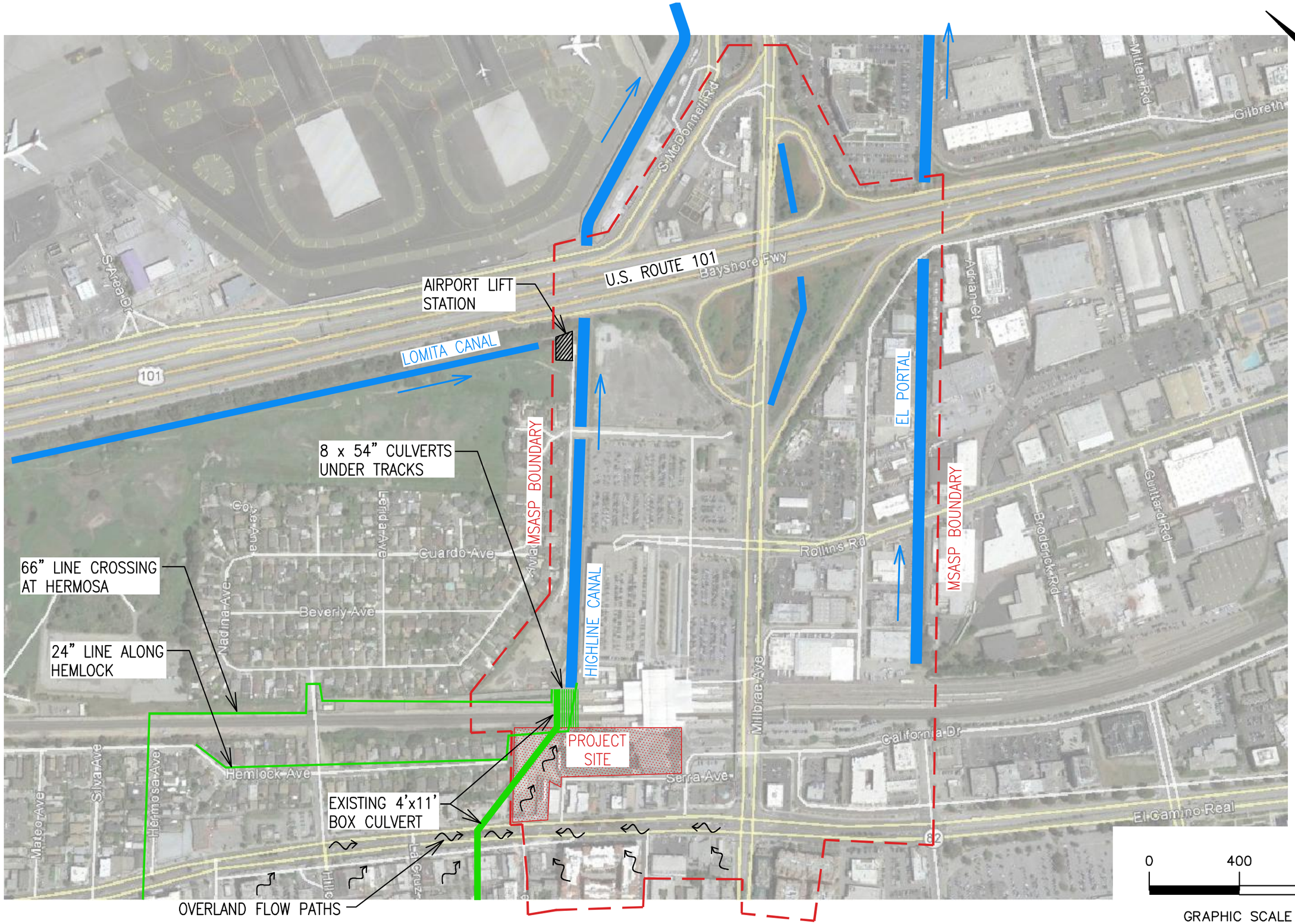
SAN MATEO COUNTY CALIFORNIA
MILLBRAE

No.	Revisions

Date 11/11/16
Scale 1"=1000'
Design DJL
Drawn CHS
Approved RH
Job No 20130038

Sheet Number:
ATT-3
OF

DRAWING NAME: K:\Eng13\130038\DWG_Tentative Map\mehydro.dwg
PLOT DATE: 11-21-16 PLOTTED BY: wort



DRAWING NAME: K:\Engl3\130038\DWG\Tentative Map\mshydro.dwg
PLOT DATE: 11-18-16 PLOTTED BY: wort

BKF 100+ YEARS
255 SHORELINE DR., SUITE 200
REDWOOD CITY, CA 94065
(650) 482-6300
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MILLBRAE SERRA STATION TOD
ATTACHMENT 4
MSASP EXHIBIT
SAN MATEO COUNTY
CALIFORNIA
MILLBRAE

No.	Revisions

Date 11/1/16
Scale 1"=400'
Design DA
Drawn GKB
Approved RH
Job No 20130038

Sheet Number:
ATT-4
OF

Table 9 – Summary of Stillwater Elevations

Flooding Source and Location	Elevation (feet NAVD88)* 10-Percent Annual Chance	2-Percent Annual Chance	1-Percent Annual Chance	0.2-Percent Annual Chance
SAN FRANCISCO BAY				
At South San Francisco	8.9	9.2	9.3	9.6
At Millbrea	9.0	9.5	9.6	9.9
At Burlingame	9.2	9.6	9.7	10.0
At Redwood Shores	9.3	9.6	9.7	10.0
At Redwood Creek	9.0	9.4	9.5	9.8
At Marsh Road/Bayshore Freeway Interchange (East Redwood City)	9.5[4]	9.7[4]	10.2[3]	10.2[4]
At Willow Road	[1]	[1]	10.3	[1]
10,030 feet south of Dumbarton Bridge	[1]	[1]	10.4	[1]
At San Francisquito Creek	9.8[3]	10.0[3]	10.4[5]	10.5[3]
PACIFIC OCEAN				
Sharp Park State Beach	7.6	8.0	8.0	8.4
San Pedro Valley	7.6	8.0	8.0	8.4
Miramar Beach (at Arroyo de en Medio)[2]	7.4	7.4	7.8	8.0
Martins Beach	7.4	7.7	7.8	8.0
Central Lagoon[8,9]				
Entire lagoon	[1]	[1]	1.9	[1]
Marina Lagoon[6,8]				
Entire lagoon	[1]	[1]	2.5	[1]
Redwood Shores Lagoon[7,8]				
Entire lagoon	[1]	[1]	2.8	[1]

**Rounded to the nearest tenth of a foot*

[1] Data not available

[2] Taken from City of Half Moon Bay FIS dated June 3, 1986 (Reference 21)

[3] Taken from City of Menlo Park FIS revised April 21, 1999 (Reference 58)

[4] Taken from San Mateo (Unincorporated Areas) FIS dated August 5, 1986 (Reference 59)

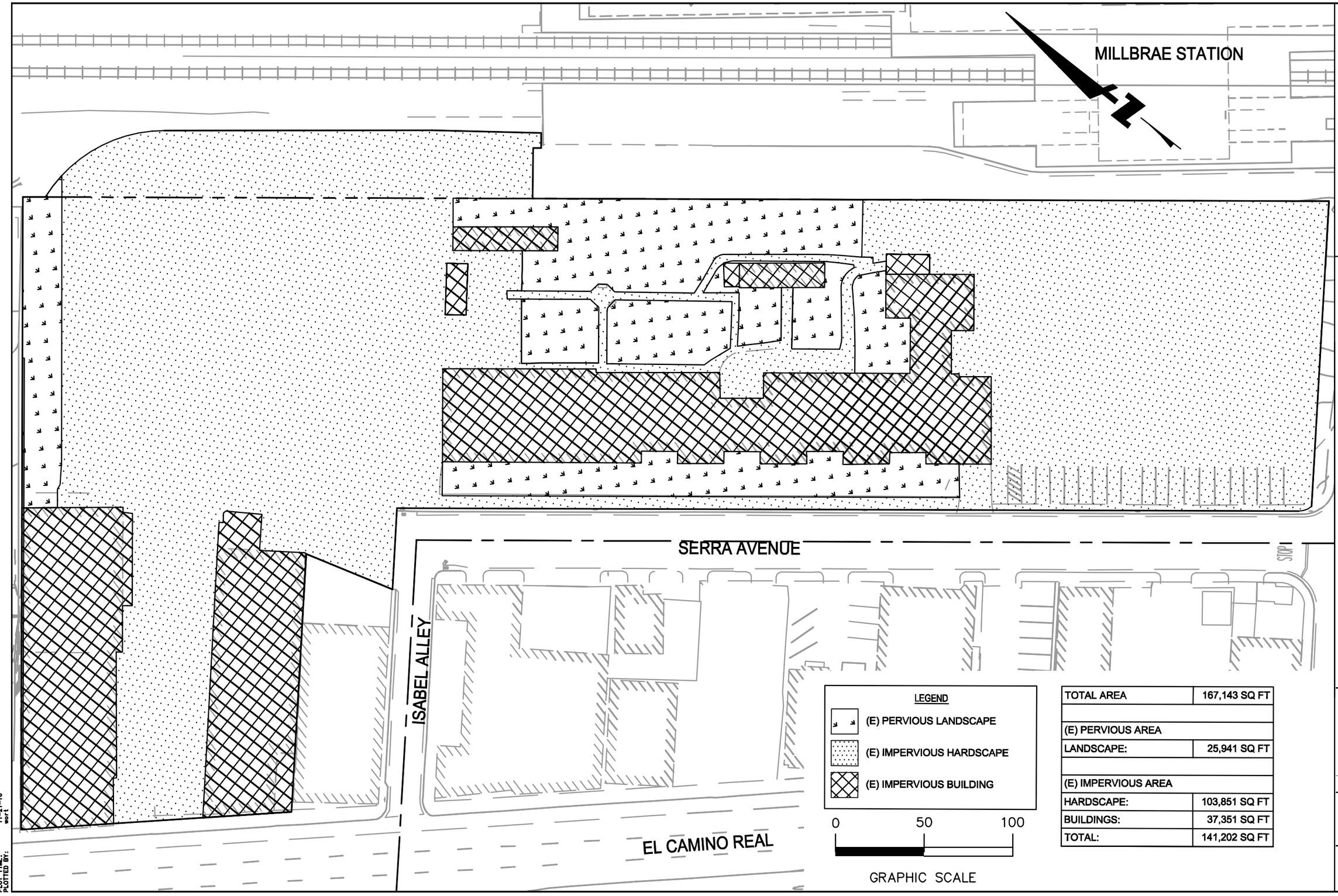
[5] Taken from East Palo Alto FIS revised August 23, 1999 (Reference 60)

[6] Elevation is rounded to 3 feet on FIRM panels

[7] Mapped as Zone A on FIRM panels

[8] 1% Annual Chance Flood Discharge Contained in Lagoon notes have been added to the FIRM panels

[9] Elevation is rounded to 2 feet on FIRM panels



TOTAL AREA	167,143 SQ FT
(E) PERVIOUS AREA	
LANDSCAPE:	25,941 SQ FT
(E) IMPERVIOUS AREA	
HARDSCAPE:	103,851 SQ FT
BUILDINGS:	37,351 SQ FT
TOTAL:	141,202 SQ FT

BKF
255 SHORELINE DR
SUITE 200
REDWOOD CITY, CA 94065
650-482-6300
650-482-6399 (FAX)

EXISTING IMPERVIOUS AREAS ATTACHMENT 6

MILLBRAE SERRA STATION TOD #1

SAN MATEO COUNTY CALIFORNIA

MILLBRAE

Revisions

No.	

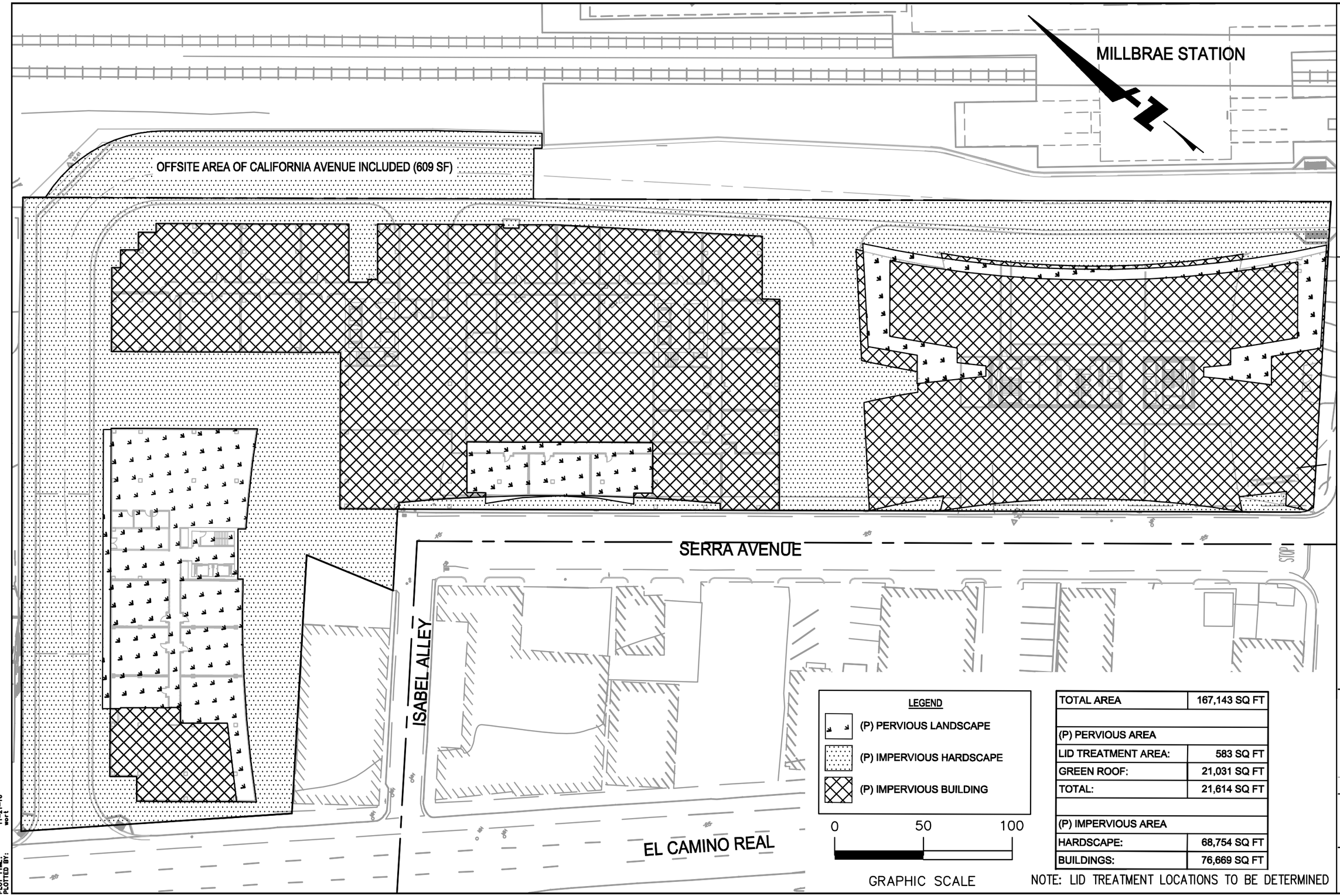
Date: 11/16/16
Scale: 1"=50'
Design: D.A.
Drawn: CW
Approved: RH
Job No: 20130036

Drawing Number:

ATT-6

1 OF 1

DRAWING NAME: K:\Engl3\130036\DWG_Tentative Map\Base Files\SMCP.dwg
PLOT TIME: 11-21-16
PLOTTED BY: wort



TOTAL AREA	167,143 SQ FT
(P) PERVIOUS AREA	
LID TREATMENT AREA:	583 SQ FT
GREEN ROOF:	21,031 SQ FT
TOTAL:	21,614 SQ FT
(P) IMPERVIOUS AREA	
HARDSCAPE:	68,754 SQ FT
BUILDINGS:	76,669 SQ FT

NOTE: LID TREATMENT LOCATIONS TO BE DETERMINED

255 SHORELINE DR
SUITE 200
REDWOOD CITY, CA 94065
650-482-6300
650-482-6399 (FAX)

BKF | Engineers | Planners

PROPOSED IMPERVIOUS AREAS
ATTACHMENT 7
MILLBRAE SERRA STATION TOD #1

SAN MATEO COUNTY, CALIFORNIA

MILLBRAE

No.	Revisions

Date: 11/18/16
Scale: 1"=50'
Design: D.L.
Drawn: CW
Approved: RH
Job No: 20XXXX

Drawing Number:
ATT-7
1 OF 1

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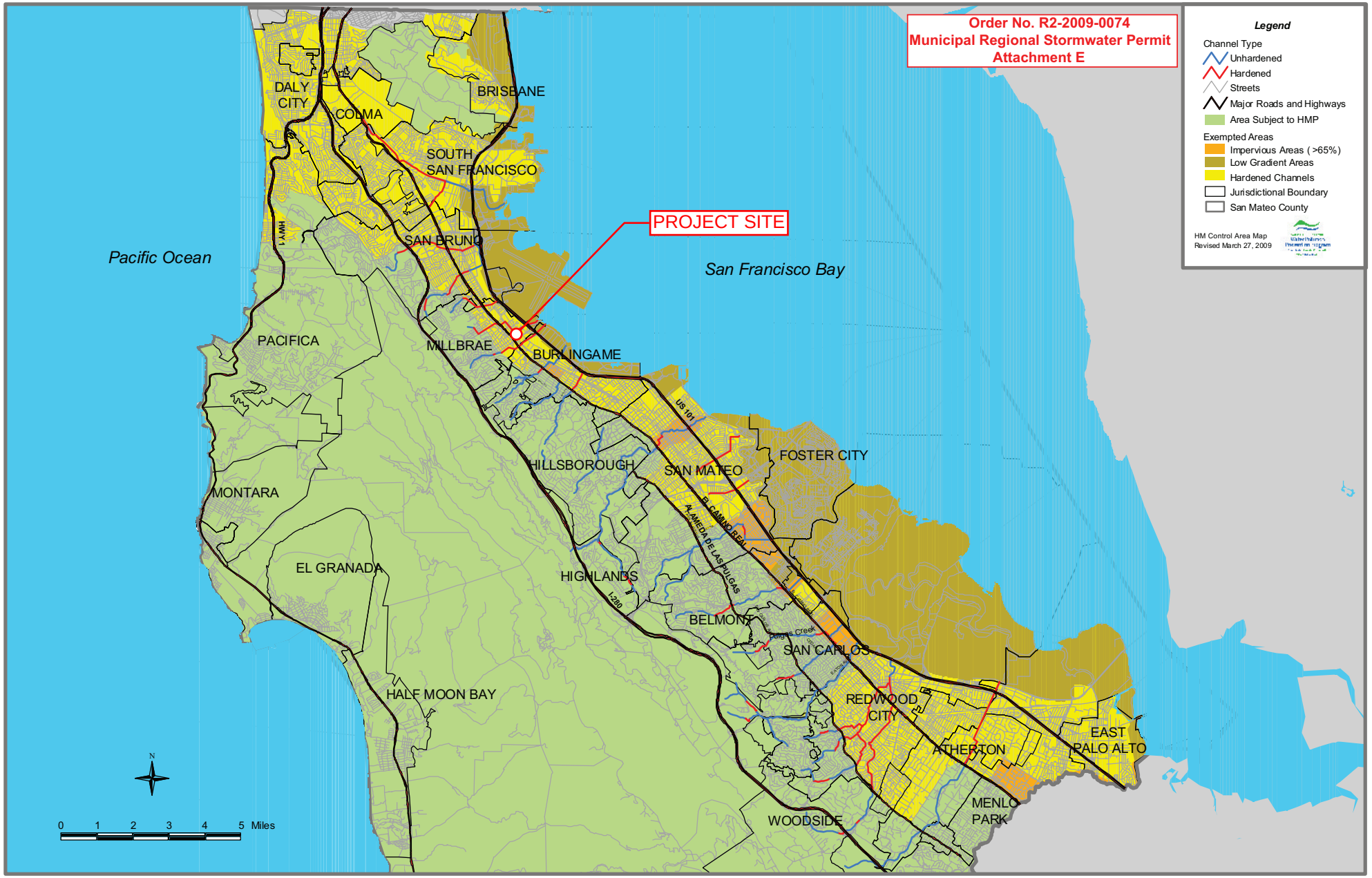
PLOT TIME: 11-21-16
PLOTTED BY: wort



ATTACHMENT 8 - HM CONTROL AREA MAP

MILLBRAE STATION

REINFORCED CONCRETE BOX CULVERT No. 1

FILTERRA TREE WELL FILTER 4'X6'

SURFACE DRAINAGE INLET STRUCTURE

EROSION CONTROL APRON

SDMH
RIM 12.50

REINFORCED CONCRETE BOX CULVERT No. 2

FILTERRA TREE WELL FILTER 4'X8'

4'X16' CULVERT
S=1%

CALIFORNIA DRIVE

SDMH

4'X60' STORMWATER DISTRIBUTION BOX FOR 4'X16' CULVERT CONNECTION TO (8)54" CULVERTS
RIM 14.85
INV 5.00

RECONNECT (E)SD LATERAL INTO BOX CULVERT

RELOCATE (E)SDCB
RIM 14.37
INV 9.64

RELOCATE (E)SDCB
RIM 14.28
INV 10.93

(E)TD

SDMH W/ DEWATERING PUMP
RIM 15.10
INV IN 1.50
INV OUT 10.00

CALIFORNIA DRIVE

SD CONNECTION, 8' X 6' NON-LID TREATMENT VAULT AT GARAGE LEVEL

SD CONNECTION, 8' X 6' NON-LID TREATMENT VAULT AT GARAGE LEVEL

(4)12" SD PIPES; S=0.5% PIPES HANGING UNDER 12" (ASSUMED) P1 SLAB; FF=+14 REFER TO VTM-10 FOR SECTION

EXISTING 11'x4' BOX CULVERT TO BE RELOCATED TO CALIFORNIA DRIVE

BLDG H-2

BLDG C-1

SD CONNECTION, 8' X 6' NON-LID TREATMENT VAULT AT GARAGE LEVEL

CB
GR 14.60
INV IN 10.00
INV OUT 6.00

POINT OF CONCENTRATION
Q_{100} = 10.31 CFS

TIE INTO EXISTING 4'X11' CULVERT
RIM 15.80
INV 8.80±

SDMH

SERRA AVENUE

12" STORM DRAIN

SDMH
RIM 26.12

4'X5' BOX CULVERT WITH (5)COMBINATION INLETS AT GRADE

BLDG H-1

ISABEL ALLEY

CB
GR 15.00
INV 10.35

LINDEN AVENUE

(E)4'X11' CULVERT
RIM 20.33
TOP 14.73
INV 10.63

SERRA AVENUE DRAINAGE
AREA = 124,833 SF (2.87 AC)
C_{100} = 1.00
i_{100} = 3.60 IN/HR
TIME OF CONCENTRATION = 10 MIN

EL CAMINO REAL

SDCB
RIM 20.00

REPLACE (E)CB W/ SDMH
RIM 19.10

0 60 120

GRAPHIC SCALE

BKF 100+ YEARS
ENGINEERS . SURVEYORS . PLANNERS
255 SHORELINE DR., SUITE 200
REDWOOD CITY, CA 94065
(650) 482-6300
www.bkf.com

MILLBRAE SERRA STATION TOD
ATTACHMENT 9
STORM DRAIN EXHIBIT
SAN MATEO COUNTY, CALIFORNIA
MILLBRAE

No.	Revisions

Date 11/21/18
Scale 1"=60'
Design DJL
Drawn CHS
Approved RH
Job No. 20302SS

Sheet Number:
ATT-9
OF

DRAWING NAME: K:\Eng13\13003B\DWG_Tentative Map\mshydro.dwg
PLOT DATE: 11-21-18
PLOTTED BY: wort

ENGINEERS . SURVEYORS . PLANNERS

Redwood City Office
255 Shoreline Drive, Suite 200
Redwood City, CA, 94065
Tel 650.482.6300
Fax 650.482.6399

Discharge Calculations for 100-year Event
Serra Avenue Storm Drain System

Project Address: Millbrae Serra Station TOD #1
BKF Job No: 20130038
Date: 11/10/16
Calcs By: CHS

Basis of Calculations: City of Millbrae, Part II, Technical Provisions for Public Works Construction (Section 6)

Intensity (I):

Tc [min]=	10	Time of Concentration [10 min]
I [in/hr] =	3.60	Intensity per Table 10 in Section 6 of the Technical Provisions

Existing Area (A):

Impervious Area [ft^2] =	124833	100%
Pervious Area [ft^2] =	0	0%
Total Area [sf] =	124833	
Total Area [ac] =	2.87	

Runoff Coefficient (C):

C = 0.90

Runoff Coefficient (C) {100-year}:

C =	0.90
F =	1.25
C_{100} =	1.00

Discharge (Q_{100}):

$Q_{100} = CIA*F$

Q_{100} [cfs]=	10.31

BKF Engineers
255 Shoreline Drive, Suite 200
Redwood City, CA 94065

Table 1
Serra Avenue Flow-bypass Calculations
The following spreadsheet is used for calculating flow based on the energy slope in a pipe flowing full.

Existing 100-year storm peak flow	10.31 cfs	
Pipe Length	200 lf	
Pipe O.D. (Nominal)	12 in	Cast iron
Pipe I.D.	11.98 in	

downstream control					ENERGY							
13.33	DIAMETER		PARTIAL DEPTH		PIPE SLOPE		FLOW	VELOCITY	AREA	PERIMETER	HYDRAULIC RADIUS	
HGL upstream	(feet)	(inches)	(feet)	(inches)	(feet/foot)	ROUGHNESS	(cfs)	(fps)	(sq.ft.)	(feet)	(feet)	A * R^(2/3)
14.50	1.00	11.98	1.00	11.98	0.0059	0.012	2.94	3.8	0.78	3.1	0.25	0.3
15.00	1.00	11.98	1.00	11.98	0.0084	0.012	3.51	4.5	0.78	3.1	0.25	0.3
15.50	1.00	11.98	1.00	11.98	0.0109	0.012	4.00	5.1	0.78	3.1	0.25	0.3
16.00	1.00	11.98	1.00	11.98	0.0134	0.012	4.44	5.7	0.78	3.1	0.25	0.3

4 pipes flow capacity 17.8 cfs

Preliminary
Stormwater Management Plan for

Gateway at Millbrae Station
Transit Oriented Development

Republic Millbrae, LLC

Millbrae, CA

Prepared By:

1570 Oakland Road San Jose, CA 95131

FEBRUARY 1, 2017

TABLE OF CONTENTS

SECTION 1 – PROJECT DESCRIPTION

PROJECT ADDRESS & APN

Address: 200 North Rollins Road, Millbrae, CA 94030
APN: 24-18-1, 2, 5, 10-25, 27 and 30

CONTACT INFORMATION

Republic Millbrae, LLC
Republic Family of Companies
Kelly Erardi, Senior VP of Forward Planning
84 W. Santa Clara Street #600
San Jose, CA 95113
(408) 292-1601

PROJECT DESCRIPTION

The project will consist of a mixed-use, transit oriented development (TOD) located at Millbrae Avenue and Rollins Road in Millbrae, California. The approximately 12.9 Acre site includes four proposed development sites 5A, 5B, 6A and 6B plus a replacement BART parking area.

Site 5A will consist of a new 6-story at-grade structure. The ground floor will consist of both retail and parking. The upper floors will have office space.

Site 5B will consist of a new 7-story structure. The ground floor will consist of leasing office, amenity rooms, retail and parking. The upper floors will have residential units.

Site 6A will consist of a new 4-story Veterans Housing building with surface parking, and a potential dog park.

Site 6B will consist of a new extended stay hotel with a restaurant and surface parking.

GEOTECHNICAL INFORMATION

A Geotechnical Engineering Study was prepared for the site by Cornerstone Earth Group, dated June 13, 2014. The report describes the subsurface soils as undocumented fill underlain by young estuarine and older alluvial soils to a maximum explored depth of 80 feet. Site 5A is blanked by about 4.5 to 8.5 feet of undocumented fill. Site 5B has 3.5 to 6 feet of undocumented fill. Site 6A has 7 to 9 feet of undocumented fill and Site 6B has 4 to 6.5 feet of undocumented fill.

PERVIOUS / IMPERVIOUS SURFACE AREA DATA

Total Site Area – 17.6 acres
Disturbed Area – 13.0 acres +/-
New Impervious Surface Area – 3.8 acres
Replaced Impervious Surface Area – 8.0 acres
Total Impervious Area – 16.4 acres

POLLUTANTS OF CONCERN

The potential pollutants of concern for this project are oil and grease, sediments, pesticides, trash, total petroleum hydrocarbons, metals, PAHs, PCB, pH, and surfactants.

STORMWATER MANAGEMENT FACILITIES AND PRACTICES

The Stormwater Treatment Plan (see Exhibits) illustrates the stormwater management concept for the project. The Plan incorporates mechanical filter units and biotreatment cells for the treatment of runoff from impervious surfaces such as roofs, walkways, roadways, driveways and parking lots. The biotreatment cells filter pollutants as the runoff percolates downward through the surface plant material and subsurface sandy loam soil layer in the cell. The filtered runoff is collected at the bottom of the cell in a perforated PVC under drain pipe, which conveys the water to the storm drain system.

The landscaped portions of the site are considered Self Treating Areas. Unlike the bioretention cells, they do not require numerically-sized treatment controls or under drain pipes, and rely on infiltration into the underlying soil for pollutant removal. These areas do not contain impervious surface areas, and consequently do not require numerically-sized treatment controls.

Generally, the landscape areas in this project are not large enough to make self-retaining treatment areas feasible.

NUMERIC SIZING CRITERIA

There are a total of five biotreatment cell drainage management areas (DMAs) and one mechanical treatment filter vault. The bioretention cells and the treatment vault have been sized using the flow design method specified in the San Mateo Countywide Water Pollution Prevention Program's C.3 Handbook.

SOURCE CONTROLS

Pollutant Source Controls to be implemented with the project include storm drain labeling, beneficial landscaping, covered dumpster areas that drain to sanitary sewer, and maintenance activities (parking lot sweeping and catch basin cleaning).

COST ESTIMATES

The construction cost for the proposed biotreatment cells is estimated at approximately $65 per square foot. A summary is provided below.

Biotreatment Cell	***Size (sq. ft)***	***Cost ($65 per sq. ft.)***
B1	1,380	89,708
B2	1,877	122,005
B3	556	36,170
B4	747	48,567
B5	199	12,935
B6	1,000	65,000
Grand Total	***5,663***	***$ 374,385***

OPERATION & MAINTENANCE

Following construction of the project, Millbrae Republic, LLC will assume maintenance responsibilities for the proposed stormwater treatment controls at the site. The following maintenance activities and schedule are based on the recommendations provided in the California Stormwater BMP Handbook – New and Redevelopment.

- The primary maintenance requirement for biotreatment areas is that of inspection and repair or replacement of the treatment area's components. Generally, this involves nothing more than the routine periodic maintenance that is required of any landscaped area. Plants that are appropriate for the site, climatic, and watering conditions should be selected for use in the biotreatment cell. Appropriately selected plants will aid in reducing fertilizer, pesticide, water, and overall maintenance requirements. Biotreatment system components should blend over time through plant and root growth, organic decomposition, and the development of a natural soil horizon. These biologic and physical processes over time will lengthen the facility's life span and reduce the need for extensive maintenance.

- Routine maintenance should include a biannual health evaluation of the trees and shrubs and subsequent removal of any dead or diseased vegetation (EPA, 1999). Diseased vegetation should be treated as needed using preventative and low-toxic measures to the extent possible. BMPs have the potential to create very attractive habitats for mosquitoes and other vectors because of highly organic, often heavily vegetated areas mixed with shallow water. Routine inspections for areas of standing water within the BMP and corrective measures to restore proper infiltration rates are necessary to prevent creating mosquito and other vector habitat. In addition, biotreatment BMPs are susceptible to invasion by aggressive plant species such as cattails, which increase the chances of water standing and subsequent vector production if not routinely maintained.

- In order to maintain the treatment area's appearance, it may be necessary to prune and weed. Furthermore, mulch replacement is suggested when erosion is evident or when the site begins to look unattractive. Specifically, the entire area may require mulch replacement every two to three years, although spot mulching may be sufficient when there are random void areas. Mulch replacement should be done prior to the start of the wet season.

- Accumulated sediment and debris removal (especially at the inflow point) will normally be the primary maintenance function. Other potential tasks include replacement of dead vegetation, soil pH regulation, erosion repair at inflow points, mulch replenishment, unclogging the under drain, and repairing overflow structures. There is also the possibility that the cation exchange capacity of the soils in the cell will be significantly reduced over time. Depending on pollutant loads, soils may need to be replaced within 5-10 years of construction (LID, 2000).

BIOTREATMENT MAINTENANCE SCHEDULE	
Activity	*Schedule*
• Re-mulch void areas • Treat diseased trees and shrubs	As needed
• Water plants daily for two weeks	At project completion
• Inspect soil and repair eroded areas • Remove litter and debris	Monthly
• Remove and replace dead and diseased vegetation	Twice per year
• Add additional mulch • Replace tree stakes and wire	Once per year

SECTION 2 - FORMS

SAN MATEO COUNTYWIDE
Water Pollution
Prevention Program

CITY/COUNTY OF _____
_____ Dept.
Address_____
Phone _____
website_____

C.3 and C.6 Development Review Checklist

Municipal Regional Stormwater Permit (MRP)
Stormwater Controls for Development Projects

Project Information

I.A **Enter Project Data** *(For "C.3 Regulated Projects," data will be reported in the municipality's stormwater Annual Report.)*

Project Name: Millbrae BART Station Case Number:

Project Address & Cross St.: 200 North Rollins Rd Millbrae, CA 94030

Project APN: 24-18-1,2,5,10 through 25,27,30 Project Watershed:

Applicant Name: Republic Millbrae LLC (Kelly Erardi) **I.A.4** Slope on Site: 1 %

Applicant Phone: (408) 292-2200 Applicant Email Address: kerardi@republic-urban.com

Development type: (check all that apply)

- ☐ Single Family Residential: A stand-alone home that is not part of a larger project.
- ☐ Single Family Residential: Two or more lot residential development.[1] # of units: _____
- ☒ Multi-Family Residential # of units: 321
- ☒ Commercial
- ☐ Industrial, Manufacturing
- ☒ Mixed-Use # of units: _____
- ☐ Streets, Roads[2], etc.
- ☐ 'Redevelopment' as defined by MRP: creating, adding and/or replacing exterior existing impervious surface on a site where past development has occurred.

I.A.1

- ☒ **'Special land use categories'** as defined by MRP: (1) auto service facilities[3], (2) retail gasoline outlets, (3) restaurants, (4) uncovered parking area (stand-alone or part of a larger project)
- ☐ Institutions: schools, libraries, jails, etc.
- ☐ Parks and trails, camp grounds, other recreational
- ☐ Agricultural, wineries
- ☐ Kennels, Ranches
- ☒ Other, Please specify: Hotel

Project Description[4]: A Concept Mixed Use Master Plan of City of Millbrae properties easterly of the existing BART station. The primary stage of the proposed project will include civil due diligence work related to identifying existing infrastructure, property encumbrances such as easements and potential impacts on future development. Secondly, tasks to assist client is obtaining government approvals for a specific Plan Amendment and Planned Development Rezoning (Phase 1).

(Also note any past or future phases of the project.)

I.A.2 Total Area of Site: 17.6 acres

I.A.3 Total Area of land disturbed during construction (include clearing, grading, excavating and stockpile area): 12.9 acres.

I.A.5 Certification:
I certify that the information provided on this form is correct and acknowledge that, should the project exceed the amount of new and/or replaced impervious surface provided in this form, the as-built project may be subject to additional improvements.

☒ Attach Preliminary Calculations ☐ Attach Final Calculations ☐ Attach copy of site plan showing areas

[1] Common Plans of Development (subdivisions or contiguous, commonly owned lots, for the construction of two or more homes developed within 1 year of each other) are not considered single family projects by the MRP.
[2] Roadway projects creating 10,000 sq.ft. or more of contiguous impervious surface are subject to C.3 requirements if the roadway is new or being widened with additional traffic lanes.
[3] See Standard Industrial Classification (SIC) codes here
[4] Project description examples: 5-story office building, industrial warehouse, residential with five 4-story buildings for 200 condominiums, etc.

Name of person completing the form: Martin Deforge Title: Senior Civil Engineer

Signature: Date:

Phone number: 408-487-2200 Email address:mdeforge@hmhca.com

I.B Is the project a "C.3 Regulated Project" per MRP Provision C.3.b?

I.B.1 Enter the amount of impervious surface[5] Retained, Replaced and/or Created by the project:

Table I.B.1 Impervious[5] and Pervious Surfaces

Type of Impervious[5] Surface	I.B.1.a Pre-Project Impervious[5] Surface (sq.ft.)	I.B.1.b Existing Impervious[5] Surface to be Retained[6] (sq.ft.)	I.B.1.c Existing Impervious[5] Surface to be Replaced[6] (sq.ft.)	I.B.1.d New Impervious[5] Surface to be Created[6] (sq.ft.)	I.B.1.e Post-Project Impervious[5] Surface (sq.ft.) (=b+c+d)
Roof area(s)	149,998	149,998	-	164,885	314,883
Impervious[5] sidewalks, patios, paths, driveways, streets	303,217	49,931	215,198	-	265,129
Impervious[5] uncovered parking[7]	264,028	-	136,195	-	136,195
Totals of Impervious Surfaces:	717,243	199,929	351,393	164,885	716,207
I.B.1.f - Total Impervious[5] Surface Replaced and Created ***(sum of totals for columns I.B.1.c and I.B.1.d)*****:**				**516,278**	

Type of Pervious Surface	Pre-Project Pervious Surface (sq.ft.)				Post-project Pervious Surface (sq.ft.)
Landscaping	75,082				53,400
Pervious Paving	-			**I.B.1.e.1:**	-
Green Roof	-				-
Totals of Pervious Surfaces:	75,082				53,400
Total Site Area (Total Impervious[5]+Total Pervious=**I.A.2**)	769,607				769,607

I.B.2 Please review and attach additional worksheets as required below using the Total Impervious Surface (IS) Replaced and Created in cell I.B.1.f from Table I.B.1 above and other factors:

	Check all that apply:	Check One Yes	Check One No	Attach Worksheet
I.B.2.a	Does this project involve any earthwork? If YES, then Check Yes, and Complete Worksheet A. If NO, then go to I.B.2.b	☒	☐	A
I.B.2.b	Is **I.B.1.f** greater than or equal to 2,500 sq.ft? If YES, then the Project is subject to Provision C.3.i. - complete Worksheets B, C & go to I.B.2.c. If NO, then Stop here - go to I.A.5 and complete Certification or ask municipal staff for Small Project Checklist.	☒	☐	B, C
I.B.2.c	Is the total Existing IS to be Replaced (column **I.B.1.c**) 50 percent or more of the total Pre-Project IS (column **I.B.1.a**)? If YES, site design, source control and treatment requirements apply to the whole site. Continue to I.B.2.d If NO, these requirements apply only to the impervious surface created and/or replaced. Continue to I.B.2.d	☒	☐	
I.B.2.d	Is this project a Special Land Use Category (**I.A.1**) and is **I.B.1.f** greater than or equal to 5,000 sq.ft? If YES, project is a Regulated Project. Fill out Worksheet D. Go to I.B.2.f. If NO, go to I.B.2.e	☒	☐	D
I.B.2.e	Is **I.B.1.f** greater than or equal to 10,000 sq.ft? If YES, project is a C.3 Regulated Project - complete Worksheet D. Then continue to I.B.2.f. If NO, then skip to I.B.2.g.	☒	☐	D
I.B.2.f	Is **I.B.1.f** greater than or equal to 43,560 sq.ft? If YES, project may be subject to Hydromodification Management requirements - complete Worksheet E then continue to I.B.2.g. If NO, then go to I.B.2.g.	☐	☒	E
I.B.2.g	Is **I.A.3** greater than or equal to 1 acre? If YES, check box, obtain coverage under the CA Const. General Permit & submit Notice of Intent to municipality - go to I.B.2.h. If NO, then go to I.B.2.h. For more information see: www.swrcb.ca.gov/water_issues/programs/stormwater/construction.shtml	☒	☐	
I.B.2.h	Is this a Special Project or does it have the potential to be a Special Project? If YES, complete Worksheet F - then continue to I.B.2.i. If NO, go to I.B.2.i.	☒	☐	F
I.B.2.i	Is project a High Priority Site? (Determined by the Municipality. High Priority Sites can include those located in or within 100 feet of a sensitive habitat, an Area of Special Biological Significance, a body of water, or **starting 7/1/16** on sites disturbing >=5,000 ft^2 with slopes >=15% (see **I.A.4**) (or per municipal criteria/map) and are subject to monthly inspections from Oct 1 to April 30.) If YES, complete section G-2 on Worksheet G - then continue to I.B.2.j. If NO, then go to I.B.2.j	☐	☒	G
I.B.2.j	For Municipal Staff Use Only: Are you using Alternative Certification for the project review? If YES, then fill out section G-1 on Worksheet G. Fill out other sections of Worksheet G as appropriate. See cell **I.B.1.e.1** above - Is the project installing 3,000 square feet or more of pervious paving? If YES, then fill out section G-3 on Worksheet G. Add to Municipal Inspection Lists (C.3.h)	☐ ☐	☐ ☐	G

[5] Per the MRP, pavement that meets the following definition of pervious pavement is NOT an impervious surface. Pervious pavement is defined as 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 Provision C.3.

[6] "Retained" means to leave existing impervious surfaces in place, unchanged; "Replaced" means to install new impervious surface where existing impervious surface is removed anywhere on the same property; and "Created" means the amount of new impervious surface being proposed which exceeds the total existing amount of impervious surface at the property.

[7] Uncovered parking includes the top level of a parking structure.

Worksheet A

C6 – Construction Stormwater BMPs

Identify Plan sheet showing the appropriate construction Best Management Practices (BMPs) used on this project:
(Applies to all projects with earthwork)

Yes	Plan Sheet	Best Management Practice (BMP)
☒		Control and prevent the discharge of all potential pollutants, including pavement cutting wastes, paints, concrete, petroleum products, chemicals, wash water or sediments, rinse water from architectural copper, and non-stormwater discharges to storm drains and watercourses.
☒		Store, handle, and dispose of construction materials/wastes properly to prevent contact with stormwater.
☒		Do not clean, fuel, or maintain vehicles on-site, except in a designated area where wash water is contained and treated.
☒		Train and provide instruction to all employees/subcontractors re: construction BMPs.
☐		Protect all storm drain inlets in vicinity of site using sediment controls such as berms, fiber rolls, or filters.
☐		Limit construction access routes and stabilize designated access points.
☐		Attach the San Mateo Countywide Water Pollution Prevention Program's construction BMP plan sheet to project plans and require contractor to implement the applicable BMPs on the plan sheet.
☐		Use temporary erosion controls to stabilize all denuded areas until permanent erosion controls are established.
☐		Delineate with field markers clearing limits, easements, setbacks, sensitive or critical areas, buffer zones, trees, and drainage courses.
☐		Provide notes, specifications, or attachments describing the following: ▪ Construction, operation and maintenance of erosion and sediment controls, include inspection frequency; ▪ Methods and schedule for grading, excavation, filling, clearing of vegetation, and storage and disposal of excavated or cleared material; ▪ Specifications for vegetative cover & mulch, include methods and schedules for planting and fertilization; ▪ Provisions for temporary and/or permanent irrigation.
☐		Perform clearing and earth moving activities only during dry weather.
☐		Use sediment controls or filtration to remove sediment when dewatering and obtain all necessary permits.
☐		Trap sediment on-site, using BMPs such as sediment basins or traps, earthen dikes or berms, silt fences, check dams, soil blankets or mats, covers for soil stock piles, etc.
☐		Divert on-site runoff around exposed areas; divert off-site runoff around the site (e.g., swales and dikes).
☐		Protect adjacent properties and undisturbed areas from construction impacts using vegetative buffer strips, sediment barriers or filters, dikes, mulching, or other measures as appropriate.

Worksheet B

C3 - Source Controls

Select appropriate source controls and identify the detail/plan sheet where these elements are shown.

Yes	Detail/Plan Sheet No.	Features that require source control measures	Source Control Measures (Refer to Local Source Control List for detailed requirements)
☒		Storm Drain	Mark on-site inlets with the words "No Dumping! Flows to Bay" or equivalent.
☒		Floor Drains	Plumb interior floor drains to sanitary sewer[8] [or prohibit].
☒		Parking garage	Plumb interior parking garage floor drains to sanitary sewer.[8]
☒		Landscaping	▪ Retain existing vegetation as practicable. ▪ Select diverse species appropriate to the site. Include plants that are pest- and/or disease-resistant, drought-tolerant, and/or attract beneficial insects. ▪ Minimize use of pesticides and quick-release fertilizers. ▪ Use efficient irrigation system; design to minimize runoff.
☒		Pool/Spa/Fountain	Provide connection to the sanitary sewer to facilitate draining.[8]
☒		Food Service Equipment (non-residential)	Provide sink or other area for equipment cleaning, which is: ▪ Connected to a grease interceptor prior to sanitary sewer discharge.[8] ▪ Large enough for the largest mat or piece of equipment to be cleaned. ▪ Indoors or in an outdoor roofed area designed to prevent stormwater run-on and run-off, and signed to require equipment washing in this area.
☒		Refuse Areas	▪ Provide a roofed and enclosed area for dumpsters, recycling containers, etc., designed to prevent stormwater run-on and runoff. ▪ Connect any drains in or beneath dumpsters, compactors, and tallow bin areas serving food service facilities to the sanitary sewer.[8]
☐		Outdoor Process Activities [9]	Perform process activities either indoors or in roofed outdoor area, designed to prevent stormwater run-on and runoff, and to drain to the sanitary sewer.[8]
☐		Outdoor Equipment/ Materials Storage	▪ Cover the area or design to avoid pollutant contact with stormwater runoff. ▪ Locate area only on paved and contained areas. ▪ Roof storage areas that will contain non-hazardous liquids, drain to sanitary sewer[8], and contain by berms or similar.
☐		Vehicle/ Equipment Cleaning	▪ Roofed, pave and berm wash area to prevent stormwater run-on and runoff, plumb to the sanitary sewer[8], and sign as a designated wash area. ▪ Commercial car wash facilities shall discharge to the sanitary sewer.[8]
☐		Vehicle/ Equipment Repair and Maintenance	▪ Designate repair/maintenance area indoors, or an outdoors area designed to prevent stormwater run-on and runoff and provide secondary containment. Do not install drains in the secondary containment areas. ▪ No floor drains unless pretreated prior to discharge to the sanitary sewer.[8] ▪ Connect containers or sinks used for parts cleaning to the sanitary sewer.[8]
☐		Fuel Dispensing Areas	▪ Fueling areas shall have impermeable surface that is a) minimally graded to prevent ponding and b) separated from the rest of the site by a grade break. ▪ Canopy shall extend at least 10 ft. in each direction from each pump and drain away from fueling area.
☒		Loading Docks	▪ Cover and/or grade to minimize run-on to and runoff from the loading area. ▪ Position downspouts to direct stormwater away from the loading area. ▪ Drain water from loading dock areas to the sanitary sewer.[8] ▪ Install door skirts between the trailers and the building.
☐		Fire Sprinklers	Design for discharge of fire sprinkler test water to landscape or sanitary sewer.[8]
☐		Miscellaneous Drain or Wash Water	▪ Drain condensate of air conditioning units to landscaping. Large air conditioning units may connect to the sanitary sewer.[8] ▪ Roof drains from equipment drain to landscaped area where practicable. ▪ Drain boiler drain lines, roof top equipment, all wash water to sanitary sewer.[8]
☐		Architectural Copper Rinse Water	▪ Drain rinse water to landscaping, discharge to sanitary sewer[8], or collect and dispose properly offsite. See flyer "Requirements for Architectural Copper."

[8] Any connection to the sanitary sewer system is subject to sanitary district approval.

[9] Businesses that may have outdoor process activities/equipment include machine shops, auto repair, industries with pretreatment facilities.

Worksheet C

Low Impact Development – Site Design Measures

Select Appropriate Site Design Measures *(Required for C.3 Regulated Projects; all other projects are encouraged to implement site design measures, which may be required at municipality discretion.) Projects that create and/or replace 2,500 – 10,000 sq.ft. of impervious surface, and stand-alone single family homes that create/replace 2,500 sq.ft. or more of impervious surface, must include* ***one of Site Design Measures a through f*** *(Provision C.3.i requirements).*[10] *Larger projects must also include applicable Site Design Measures g through i. Consult with municipal staff about requirements for your project.*

Select appropriate site design measures and Identify the Plan Sheet where these elements are shown.

Yes	Plan Sheet Number	
☐		a. Direct roof runoff into cisterns or rain barrels and use rainwater for irrigation or other non-potable use.
☒		b. Direct roof runoff onto vegetated areas.
☒		c. Direct runoff from sidewalks, walkways, and/or patios onto vegetated areas.
☒		d. Direct runoff from driveways and/or uncovered parking lots onto vegetated areas.
☐		e. Construct sidewalks, walkways, and/or patios with pervious or permeable surfaces. Use the specifications in the C3 Technical Guidance (Version 4.1) downloadable at www.flowstobay.org/newdevelopment.
☐		f. Construct bike lanes, driveways, and/or uncovered parking lots with pervious surfaces. Use the specifications in the C3 Technical Guidance (Version 4.1) downloadable at www.flowstobay.org/newdevelopment.
☒		g. 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.
☐		h. Conserve natural areas, including existing trees, other vegetation and soils.
☒		i. Minimize impervious surfaces.

Regulated Projects can also consider the following site design measures to reduce treatment system sizing:

Yes	Plan Sheet Number	
☐		j. Self-treating area (see Section 4.2 of the C.3 Technical Guidance)
☐		k. Self-retaining area (see Section 4.3 of the C.3 Technical Guidance)
☐		l. Plant or preserve interceptor trees (Section 4.1, C.3 Technical Guidance)

[10] See MRP Provision C.3.a.i.(6) for non-C.3 Regulated Projects, C.3.c.i.(2)(a) for Regulated Projects, C.3.i for projects that create/replace 2,500 to 10,000 sq.ft. of impervious surface and stand-alone single family homes that create/replace 2,500 sq.ft. or more of impervious surface.

Worksheet D

C3 Regulated Project - Stormwater Treatment Measures

Check all applicable boxes and indicate the treatment measure(s) included in the project.

Yes	
☒ Attach Worksheet F and Calculations	Is the project a **Special Project**?[11] If yes, consult with municipal staff about the need to evaluate the feasibility and infeasibility of 100% LID treatment. Indicate the type of non-LID treatment to be used, the hydraulic sizing method[12], and percentage of the amount of runoff specified in Provision C.3.d that is treated: Non-LID Treatment Measures: — Hydraulic sizing method[12] — % of C.3.d amount of runoff treated ☒ Media filter — ☐2.a ☐2.b ☒2.c — 100% ☐ Tree well filter — ☐2.a ☐2.b ☐2.c — ____%
☐	Is the project using infiltration systems? The MRP no longer requires the use or analysis of the feasibility of infiltration, but infiltration systems are encouraged and may be beneficial depending on the project. Indicate the infiltration measures to be used, and hydraulic sizing method: Infiltration Measures: — Hydraulic sizing method[12] ☐ Bioinfiltration[13] — ☐1.a ☐1.b ☐2.c ☐3 ☐ Infiltration trench — ☐1.a ☐1.b ☐ Other (specify):
☐	Is the project harvesting and using rainwater? The MRP no longer requires the use or analysis of the feasibility of rainwater harvesting, but it rainwater harvesting and use is encouraged and may be beneficial depending on the project." Rainwater Harvesting/Use Measures: — Hydraulic sizing method[12] ☐ Rainwater Harvesting for indoor non-potable water use — ☐1.a ☐1.b ☐ Rainwater Harvesting for landscape irrigation use — ☐1.a ☐1.b
☒	Is the project installing biotreatment measures? Indicate the biotreatment measures to be used, and the hydraulic sizing method: Biotreatment Measures: — Hydraulic sizing method[12] ☒ Bioretention area — ☐2.c ☐3 ☐ Flow-through planter — ☐2.c ☐3 ☐ Other (specify): _____

A copy of the long term Operations and Maintenance (O&M) Agreement and Plan for this project will be required. Please contact the NPDES Representative of the applicable municipality for an agreement template and consult the C.3 Technical Guidance at www.flowstobay.org for maintenance plan templates for specific facility types.

[11] Special Projects are smart growth, high density, or transit-oriented developments with the criteria defined in Provision C.3.e.ii.(2), (3) or (4) (see Worksheet F).

[12] Indicate which of the following Provision C.3.d.i hydraulic sizing methods were used. Volume based approaches: 1(a) Urban Runoff Quality Management approach, or 1(b) 80% capture approach (recommended volume-based approach). Flow-based approaches: 2(a) 10% of 50-year peak flow approach, 2(b) 2 times the 85th percentile rainfall intensity approach, or 2(c) 0.2-Inch-per-hour intensity approach (recommended flow-based approach – also known as the 4% rule). Combination flow and volume-based approach: 3.

[13] See Section 6.1 of the C.3 Technical Guidance for conditions in which bioretention areas provide bioinfiltration.

Worksheet E

Hydromodification Management

E-1 Is the project a Hydromodification Management[14] (HM) Project?

E-1.1 Is the total impervious area increased over the pre-project condition?

- ☐ Yes. Continue to E-1.2
- ☐ No. The project is NOT required to incorporate HM Measures.
  Go to Item E-1.4 and check "No."

E-1.2 Is the site located in an HM Control Area per the HM Control Areas map (Appendix H of the C.3 Technical Guidance)?

- ☐ Yes. Continue to E-1.3
- ☐ No. Attach map, indicating project location. The project is NOT required to incorporate HM Measures.
  Skip to Item E-1.4 and check "No."

E-1.3 Has an engineer or qualified environmental professional determined that runoff from the project flows only through a hardened channel or enclosed pipe along its entire length before emptying into a waterway in the exempt area?

- ☐ Yes. Attach map of facility. Go to Item E-1.4 and check "Yes."
- ☐ No. Attach map, indicating project location. The project is NOT required to incorporate HM Measures.
  Skip to Item E-1.4 and check "No."

E-1.4 Is the project a Hydromodification Management Project?

- ☐ Yes. The project is subject to HM requirements in Provision C.3.g of the Municipal Regional Stormwater Permit.
- ☐ No. The project is EXEMPT from HM requirements.

- ➢ If the project is subject to the HM requirements, incorporate in the project flow duration control measures designed such that post-project discharge rates and durations match pre-project discharge rates and durations.
- ➢ The Bay Area Hydrology Model (BAHM) has been developed to help size flow duration controls. See www.bayareahydrologymodel.org. Guidance is provided in Chapter 7 of the C.3 Technical Guidance.

E-2 Incorporate HM Controls (if required)

Are the applicable items provided with the Plans?

Yes	No	NA	
☐	☐	☐	Site plans with pre- and post-project impervious surface areas, surface flow directions of entire site, locations of flow duration controls and site design measures per HM site design requirement
☐	☐	☐	Soils report or other site-specific document showing soil type(s) on site
☐	☐	☐	If project uses the Bay Area Hydrology Model (BAHM), a list of model inputs and outputs.
☐	☐	☐	If project uses custom modeling, a summary of the modeling calculations with corresponding graph showing curve matching (existing, post-project, and post-project with HM controls curves), goodness of fit, and (allowable) low flow rate.
☐	☐	☐	If project uses the Impracticability Provision, a listing of all applicable costs and a brief description of the alternative HM project (name, location, date of start up, and entity responsible for maintenance).
☐	☐	☐	If the project uses alternatives to the default BAHM approach or settings, a written description and rationale.

[14] Hydromodification is the change in a site's runoff hydrograph, including increases in flows and durations that results when land is developed (made more impervious). The effects of hydromodification include, but are not limited to, increased bed and bank erosion of receiving streams, loss of habitat, increased sediment transport and/or deposition, and increased flooding. Hydromodification control measures are designed to reduce these effects.

Worksheet F
Special Projects

Complete this worksheet for projects that appear to meet the definition of "Special Project", per Provision C.3.e.ii of the Municipal Regional Stormwater Permit (MRP). The form assists in determining whether a project meets Special Project criteria, and the percentage of low impact development (LID) treatment reduction credit. Special Projects that implement less than 100% LID treatment must provide a narrative discussion of the feasibility or infeasibility of 100% LID treatment. See Appendix J of the C.3 Technical Guidance Handbook (download at www.flowstobay.org) for more information.

F.1 "Special Project" Determination *(Check the boxes to determine if the project meets any of the following categories.)*

Special Project Category "A"

Does the project have ALL of the following characteristics?

- ☐ Located in a municipality'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[15];
- ☐ Creates and/or replaces 0.5 acres or less of impervious surface;
- ☐ Includes no surface parking, except for incidental parking for emergency vehicle access, ADA access, and passenger or freight loading zones;
- ☐ Has at least 85% coverage of the entire site by permanent structures. The remaining 15% portion of the site may be used for safety access, parking structure entrances, trash and recycling service, utility access, pedestrian connections, public uses, landscaping and stormwater treatment.

☐ No (continue) ☐ Yes – Complete Section F.2 below

Special Project Category "B"

Does the project have ALL of the following characteristics?

- ☐ Located in a municipality'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[20];
- ☐ Creates and/or replaces more than 0.5 acres of impervious area and less than 2.0 acres;
- ☐ Includes no surface parking, except for incidental parking for emergency access, ADA access, and passenger or freight loading zones;
- ☐ Has at least 85% coverage of the entire site by permanent structures. The remaining 15% portion of the site may be used for safety access, parking structure entrances, trash and recycling service, utility access, pedestrian connections, public uses, landscaping and stormwater treatment;
- ☐ Minimum density of either 50 dwelling units per acre (for residential projects) or a Floor Area Ratio (FAR) of 2:1 (for commercial projects) - mixed use projects may use either criterion. **Note Change on 7/1/16[16]**

☐ No (continue) ☐ Yes – Complete Section F-2 below

Special Project Category "C"

Does the project have ALL of the following characteristics?

- ☒ At least 50% of the project area is within 1/2 mile of an existing or planned transit hub[17] or 100% within a planned Priority Development Area[18];
- ☒ The project is characterized as a non-auto-related use[19]; and
- ☒ Minimum density of either 25 dwelling units per acre (for residential projects) or a Floor Area Ratio (FAR) of 2:1 (for commercial projects) - mixed use projects may use either criterion. **Note Change on 7/1/16[16]**

☐ No (continue) ☐ Yes – Complete Section F-2 below

---

[15] And built as part of a municipality's stated objective to preserve/enhance a pedestrian-oriented type of urban design.

[16] **Effective 7/1/16**, the MRP establishes definitions for "Gross Density"(GD) & FAR. GD 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." 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.

[17] "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. (A bus stop with no supporting services does not qualify.)

[18] A "planned Priority Development Area" is an infill development area formally designated by the Association of Bay Area Government's / Metropolitan Transportation Commission's FOCUS regional planning program.

[19] Category C specifically excludes stand-alone surface parking lots; car dealerships; auto and truck rental facilities with onsite surface storage; fast-food restaurants, banks or pharmacies with drive-through lanes; gas stations; car washes; auto repair and service facilities; or other auto-related project unrelated to the concept of transit oriented development.

F.2 LID Treatment Reduction Credit Calculation

(If more than one category applies, choose only one of the applicable categories and fill out the table for that category.)

Category	Impervious Area Created/Replaced (sq. ft.)	Site Coverage (%)	Project Density[16] or FAR[16]	Density/Criteria	Allowable Credit (%)	Applied Credit (%)
A			N.A.	N.A.	100%	
B				Res ≥ 50 DU/ac or FAR ≥ 2:1	50%	
				Res ≥ 75 DU/ac or FAR ≥ 3:1	75%	
				Res ≥ 100 DU/ac or FAR ≥ 4:1	100%	
C				**Location credit (select one)[20]:**		
				Within ¼ mile of transit hub	50%	50%
				Within ½ mile of transit hub	25%	
				Within a planned PDA	25%	
				Density credit (select one):		
				Res ≥ 30 DU/ac or FAR ≥ 2:1	10%	
				Res ≥ 60 DU/ac or FAR ≥ 4:1	20%	20%
				Res ≥ 100 DU/ac or FAR ≥ 6:1	30%	
				Parking credit (select one):		
				≤ 10% at-grade surface parking[21]	10%	
				No surface parking	20%	
				TOTAL TOD CREDIT =		70%

F.3 Narrative Discussion of the Feasibility/Infeasibility of 100% LID Treatment:

If project will implement less than 100% LID, prepare a discussion of the feasibility or infeasibility of 100% LID treatment, as described in Appendix K of the C.3 Technical Guidance.

F.4 Select Certified Non-LID Treatment Measures:

If the project will include non-LID treatment measures, select a treatment measure certified for "Basic" General Use Level Designation (GULD) by the Washington State Department of Ecology's Technical Assessment Protocol – Ecology (TAPE). Guidance is provided in Appendix K of the C.3 Technical Guidance (download at www.flowstobay.org).[22]

[20] To qualify for the location credit, at least 50% of the project's site must be located within the ¼ mile or ½ mile radius of an existing or planned transit hub, as defined on page 1, footnote 2. 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. To qualify for the PDA location credit, 100% of the project site must be located within a PDA, as defined on page 1, footnote 3.

[21] The at-grade surface parking must be treated with LID treatment measures.

[22] TAPE certification is used in order to satisfy Special Project's reporting requirements in the MRP.

Worksheet G
(For municipal staff use only)

G-1 **Alternative Certification:** Were the treatment and/or HM control sizing and design reviewed by a qualified third-party professional that is not a member of the project team or agency staff?

☐ Yes ☐ No Name of Reviewer _____

G-2 **High Priority Site:** High Priority Sites can include those located in or within 100 feet of a sensitive habitat, an Area of Special Biological Significance (ASBS), a body of water, or **starting 7/1/16** on "hillside projects" disturbing >=5,000 sq.ft. of land and with steep slopes (of >=15% - see cell **I.A.4** - or as identified by municipal criteria or map). These sites are subject to monthly inspections from Oct 1 to April 30. See MRP Provision C.6.e.ii.(2).

.

☐ Yes ☐ No If yes, then add site to Staff's Monthly Rainy Season Construction Site Inspection List

G-3 **Inspections of Sites with Pervious Paving: Starting 7/1/16**, Regulated projects that are installing 3,000 sq.ft. or more of pervious paving (see cell **I.B.1.e.1**) (excluding private-use patios in single family homes, townhomes, or condominiums) must have the paving system inspected by the jurisdiction upon completion of the installation and the site must be added to the jurisdiction's list of sites needing inspections at least once every five years – see provision C.3.h. Pervious pavement systems include pervious concrete, pervious asphalt, pervious pavers and grid pavers etc. and are described in the C3 Technical Guidance (Version 4.1) downloadable at: www.flowstobay.org/newdevelopment.

☐ Yes ☐ No If yes, then add site to Staff's Lists for Inspections at the end of Construction and O&M.

Operations and Maintenance (O&M) Submittals

G-4 Stormwater Treatment Measure and/HM Control Owner or Operator's Information:

Name:_____

Address:_____

Phone:_____ Email:_____

- *Applicant must call for inspection and receive inspection within 45 days of installation of treatment measures and/or hydromodification management controls.*

The following questions apply to C.3 Regulated Projects and Hydromodification Management Projects.

		Yes	No	N/A
G-4.1	Was maintenance plan submitted?	☐	☐	☐
G-4.2	Was maintenance plan approved?	☐	☐	☐
G-4.3	Was maintenance agreement submitted? (Date executed:_____)	☐	☐	☐

- *Attach the executed maintenance agreement as an appendix to this checklist.*

G-5 **Annual Operations and Maintenance (O&M) Submittals (for municipal staff use only):**

For C.3 Regulated Projects and Hydromodification Management Projects, indicate the dates on which the Applicant submitted annual reports for project O&M:

_____

G-6 **Comments (for municipal staff use only):**

_____

_____

_____

_____

_____

G-7 NOTES (for municipal staff use only):

Section I Notes:_____

Worksheet A Notes:_____

Worksheet B Notes:_____

Worksheet C Notes:_____

Worksheet D Notes:_____

Worksheet E Notes:_____

Worksheet F Notes:_____

G-8 Project Close-Out (for municipal staff use only):

		Yes	No	NA
8.1	Were final Conditions of Approval met?	☐	☐	
8.2	Was initial inspection of the completed treatment/HM measure(s) conducted? (Date of inspection:_____)	☐	☐	☐
8.3	Was maintenance plan submitted? (Date executed:_____)	☐	☐	☐
8.4	Was project information provided to staff responsible for O&M verification inspections? (Date provided to inspection staff:_____)	☐	☐	☐

G-9 Project Close-Out (Continued -- for municipal staff use only):

Name of staff confirming project is closed out:_____

Signature:_____ Date:_____

Name of O&M staff receiving information:_____

Signature:_____ Date:_____

SECTION 3 – SPECIAL PROJECTS NARRATIVE

Special Projects Narrative

The project has been designed as a high density mixed-use, transit oriented development. There is limited landscape area but the project will be enhanced by containerized landscaping in the pedestrian corridor and on the exposed podium deck area of the site 6B residential building. Ground level plantings between and within parking areas and around the perimeter of the project is provided to reduce imperviousness. Capture and re-use of runoff for irrigation is infeasible due to insufficient demand onsite, and site constraints make capture and re-use for toilet flushing infeasible (lack of available space for cisterns or storage tanks, utility conflicts).

LID Credits

The project meets all of the following criteria, qualifying it for LID credits under Category C (Transit Oriented Development Projects) of the Special Projects provisions of the Municipal Regional Permit:

- *Within ½ mile of a existing transit hub*
- *Characterized as a non auto-related land use project;*
- *Achieves a residential density of at least 25 DU/AC or a Floor Area Ratio (FAR) of 2:1 for commercial projects (mixed-use projects may use either criteria)*

The LID Treatment Reduction Credit includes 50% for location since the project is located within ¼ mile of the existing BART & Caltrain station. The project's density of approximately greater than 60 DU/AC and/or FAR of greater than 4:1 qualifies for a 20 Density credit of 20%. The project has surface parking so no further credits are available. The total credit is therefore 70%.

LID Treatment

Opportunities for the use of LID treatment controls are limited for runoff generated by the project. Existing retained impervious surfaces such as roads and parking areas occupy approximately 26% of the project site. Proposed impervious improvements such as buildings, roads, walkways, parking lots, etc. will occupy over 71% of the site area. Biotreatment cells are the most feasible options for LID treatment controls but there is limited room for these types of treatment. Were feasible, roof runoffs from the buildings will be conveyed through disconnected downspouts to biotreatment cells located at ground level adjacent to buildings. Some parking areas are proposed to be surface drained to adjacent biotreatment areas.

Non-LID Treatment

Mechanical treatment will be provided to areas which cannot be designed to drain to landscaping. Runoff from these areas of the site will be collected and conveyed through storm drain lines to manholes fitted with media filter units. To ease in maintenance, one centrally located treatment vault is being provided to house the media filter units. The treated water from this will flow to the existing City

storm drain in Aviador Avenue. The impervious surface area treated by media filters will be no more than the 70% of the total impervious area of the site allowed by the LID credits.

Alternative Compliance

There are currently no known offsite LID treatment measures or facilities existing within this watershed that are available for utilization by the project, either by providing treatment capacity or allowing for payment of an in-lieu fee. Therefore, the use of Alternative Compliance options, as specified in Section C.3.e. of the Municipal Regional Permit, is not feasible.

SECTION 4 – NUMERIC SIZING CRITERIA

Numeric Sizing

LID Treatment

Biotreatment areas are currently sized using the combination flow method as specified in the San Mateo Countywide Water Pollution Prevention Program's C.3 Handbook. See Appendix A for calculations.

Alternative sizing methods such as the flow or volume design method will be investigated when construction drawings are prepared.

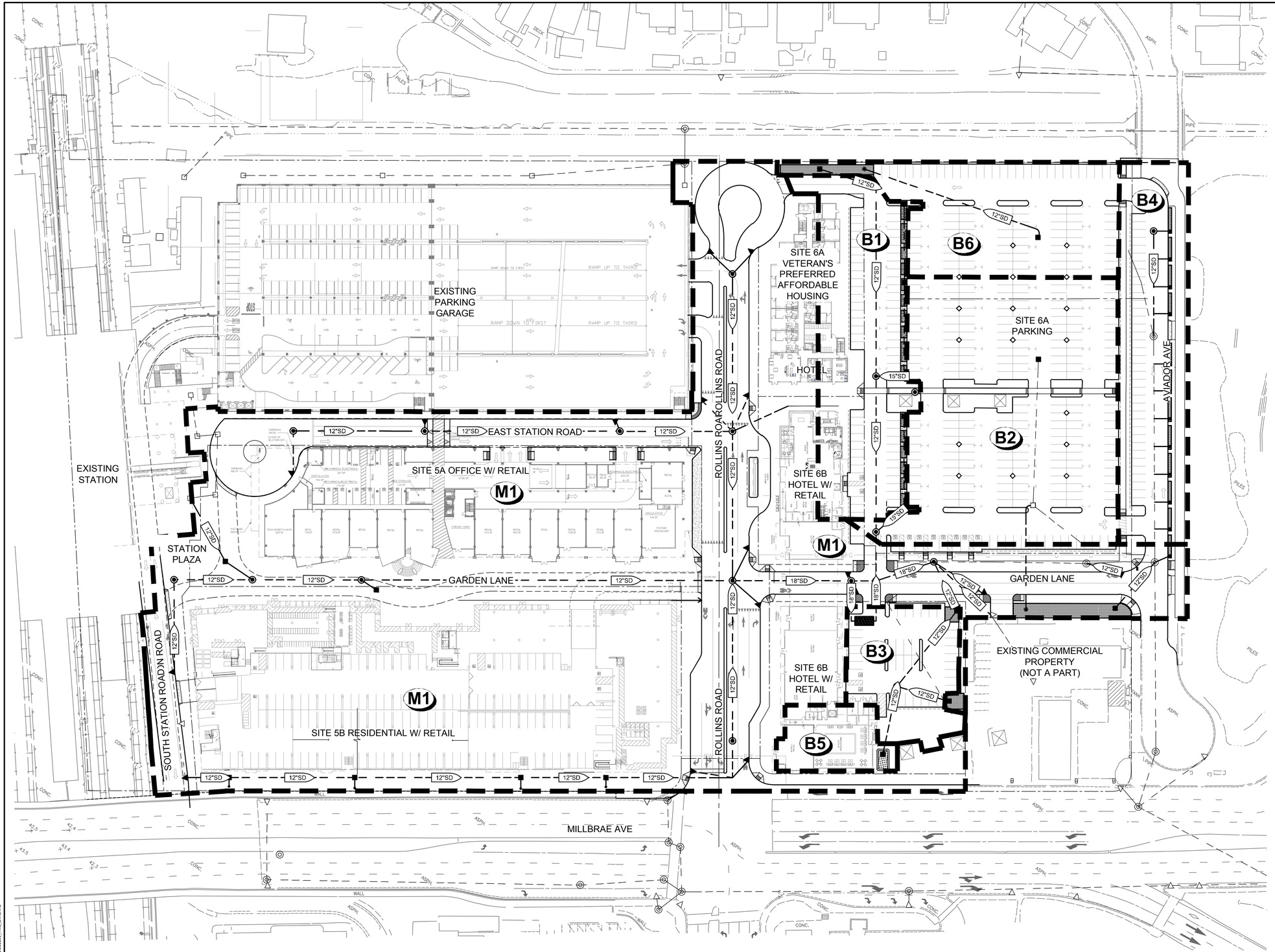
Non-LID Treatment

Media Filters are designed using the flow design method as specified in the San Mateo Countywide Water Pollution Prevention Program's C.3 Handbook. See Appendix B for calculation.

The treatment filters specified will be certified for "Basic" General Use Level Designation (GULD) by the Washington State Department of Ecology's Technical Assessment Protocol – Ecology (TAPE) per the guidance provided in Appendix K of the San Mateo Countywide Water Pollution Prevention Program's C.3 Handbook.

APPENDIX A

STORMWATER CONTROL PLAN



LEGEND

- PROJECT BOUNDARY
- STORM DRAIN PIPE
- STORM DRAIN PIPE (EXISTING)
- STORM DRAIN MANHOLE
- MEDIA FILTER MANHOLE
- STORM DRAIN MANHOLE (EXISTING)
- CURB INLET
- CURB INLET (EXISTING)
- CATCH BASIN
- CATCH BASIN (EXISTING)
- MEDIA FILTER DRAINAGE AREA (M)
- BIOTREATMENT CELL DRAINAGE AREA (B)
- POTENTIAL BIOTREATMENT CELL LOCATION
- POTENTIAL MODULAR BIOTREATMENT CELL LOCATION

LID TREATMENT REDUCTION CREDITS:

CATEGORY C (TRANSIT ORIENTED DEVELOPMENT)

50% FOR PROJECT LOCATION (¼ MILE TO TRANSIT HUB)

20% FOR DENSITY (FAR GREATER THAN 4:1 OR DU/ACRE GREATER THAN 60)

NO MINIMIZED SURFACE PARKING CREDIT

BIOTREATMENT SIZING

DMA	NEW OR CREATED IMPERVIOUS SURFACE	REQUIRED BIO-TREATMENT AREA
B1	33,000 SQ FT	1,029 SQ FT
B2	60,000 SQ FT	1,872 SQ FT
B3	13,248 SQ FT	413 SQ FT
B4	17,890 SQ FT	558 SQ FT
B5	6,517 SQ FT	177 SQ FT
B6	31,489 SQ FT	982 SQ FT

PERCENTAGE OF AREA TREATED WITH LID = 31%

DMA	NEW OR CREATED IMPERVIOUS SURFACE	TREATMENT METHOD
M1	360,176 SQ FT	MEDIA FILTER

PERCENTAGE OF AREA TREATED WITH NON LID = 69%

0 25 50 100

1 INCH = 50 FEET

S:\PROJECTS\3862000\PLI\TENTATIVE MAP\PLOT DRAWINGS\3862000_TM6_SW.DWG

REPUBLIC MILLBRAE LLC

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REVISIONS

No.	Description	Date
1	PER CITY COMMENTS	08/26/16
2	PER CITY COMMENTS	02/01/17

GATEWAY AT MILLBRAE

MILLBRAE BART STATION | MILLBRAE, CA USA

TENTATIVE MAP

STORMWATER CONTROL PLAN

PRELIMINARY AND TENTATIVE. NOT FOR CONSTRUCTION.

ALL DIMENSIONS SUBJECT TO CHANGE.

PROJECT NO. 3862.00

ISSUE DATE 06.24.2016

SHEET NO. **TM.6.a**

PARCEL NO.

Worksheet for Calculating the Combination Flow and Volume Method

Instructions: After completing Section 1, make a copy of this Excel file for each Drainage Management Area within the project. Enter information specific to the project and DMA in the cells shaded in yellow. Cells shaded in light blue contain formulas and values that will be automatically calculated.

1.0 Project Information

1-1	Project Name:	GATEWAY AT MILLBRAE
1-2	City application ID:	
1-3	Site Address or APN:	
1-4	Tract or Parcel Map No:	
1-5	Rainfall Region	6
1-6	Region Mean Annual Precipitation (MAP)	20.10
1-7	Site Mean Annual Precipitation (MAP)	20

The calculations presented here are based on the **combination flow and volume sizing method** provided in the Countywide Program's C.3 Technical Guidance, Version 4.0. The steps presented below are explained in Section 5.1 of the Guidance, applicable portions of which are included in this file, in the sheet named "Guidance from Chapter 5".

Click here for map

1-8 ***MAP adjustment factor is automatically calculated as:*** 1.00

(The "Site Mean Annual Precipitation (MAP)" is divided by the MAP for the applicable rain gauge, showin in Table 5-3, below.)
Refer to the map in Appendix C of the C.3 Technical Guidance to identify the Rainfall Region for the site.

2.0 Calculate Percentage of Impervious Surface for Drainage Management Area (DMA)

2-1 Name of DMA: B1

For items 2-2 and 2-3, enter the areas in square feet for each type of surface within the DMA.

	Type of Surface	Area of surface type within DMA (Sq. Ft.)	Adjust Pervious Surface	Effective Impervious Area
2-2	Impervious surface	33,000	1.0	33,000
2-3	Pervious surface		0.1	0
	Total DMA Area (square feet) =	33,000		

2-4 ***Total Effective Impervious Area (EIA)*** 33,000 **Square feet**

3.0 Calculate Unit Basin Storage Volume in Inches

Table 5-3. Unit Basin Storage Volumes in Inches for 80 Percent Capture Using 48-Hour Drawdowns, based on runoff coefficient

Region	Station, and Mean Annual Precipitation (Inches)	Runoff Coefficient of 1.0
1	Boulder Creek, 55.9"	2.04"
2	La Honda, 24.4"	0.86"
3	Half Moon Bay, 25.92"	0.82"
4	Palo Alto, 14.6"	0.64"
5	San Francisco, 21.0"	0.73"
6	San Francisco airport, 20.1"	0.85"
7	San Francisco Oceanside, 19.3"	0.72"

3-1 ***Unit basin storage volume from Table 5-3:*** 0.85

(The coefficient for this method is always 1.0, due to the conversion of any landscaping to effective impervious area.)

3-2 ***Adjusted unit basin storage volume:*** 0.85 **Inches**

(The unit basin storage volume [Item 3-1] is adjusted by applying the MAP adjustment factor [Item 1-8].)

3-3 ***Required Capture Volume (in cubic feet):*** 2,338 **Cubic feet**

(The adjusted unit basin sizing volume [Item 3-2] is multiplied by the DMA EIA [Item 2-4] and converted to cubic feet)

4.0 Calculate the Duration of the Rain Event

4-1	Rainfall intensity	0.2	**Inches per hour**
4-2	Divide Item 3-2 by Item 4-1	4.25	**Hours of Rain Event Duration**

5.0 Preliminary Estimate of Surface Area of Treatment Measure

5-1	4% of DMA EIA (Item 2-4)	1,320	**Square feet**
5-2	Area 25% smaller than Item 5-1 (i.e., 3% of DMA EIA)	990	**Square feet**
5-3	Volume of treated runoff for area in Item 5-2	1,753	**Cubic feet** (Item 5-2 * 5 inches per hour * 1/12 * Item 4-2)

6.0 Initial Adjustment of Depth of Surface Ponding Area

6-1	Subtract Item 5-3 from Item 3-3	584	**Cubic feet** (Amount of runoff to be stored in ponding area)
6-2	Divide Item 6-1 by Item 5-2	0.59	**Feet** (Depth of stored runoff in surface ponding area)
6-3	Convert Item 6-2 from feet to inches	7.08	**Inches** (Depth of stored runoff in surface ponding area)

6-4 If ponding depth in Item 6-3 meets your target depth (recommend 6"), skip to Item 8-1. If not, continue to Step 7-1.
(Note: Overflow outlet elevation should be set based on the calculated ponding depth.)

7.0 Optimize Size of Treatment Measure

7-1	Enter an area larger than Item 5-2	**1029.358632**	**Sq.ft.** (enter larger area if you need less ponding depth.)
7-2	Volume of treated runoff for area in Item 7-1	**1,823**	**Cubic feet** (Item 7-1 * 5 inches per hour * 1/12 * Item 4-2)
7-3	Subtract Item 7-2 from Item 3-3	**515**	**Cubic feet** (Amount of runoff to be stored in ponding area)
7-4	Divide Item 7-3 by Item 7-1	**0.50**	**Feet** (Depth of stored runoff in surface ponding area)
7-5	Convert Item 7-4 from ft. to inches	**6.00**	**Inches** (Depth of stored runoff in surface ponding area)

7-6 If the ponding depth in Item 7-5 meets target, stop here. If not, repeat Steps 7-1 through 7-5 until you obtain target depth.
(Note: Overflow outlet elevation should be set based on the calculated ponding depth.)

8.0 Surface Area of Treatment Measure for DMA

8-1	Final surface area of treatment	**1,029**	**Square feet** (Either Item 5-2 or final amount in Item 7-1)

Worksheet for Calculating the Combination Flow and Volume Method

Instructions: After completing Section 1, make a copy of this Excel file for each Drainage Management Area within the project. Enter information specific to the project and DMA in the cells shaded in yellow. Cells shaded in light blue contain formulas and values that will be automatically calculated.

1.0 Project Information

1-1	Project Name:	GATEWAY AT MILLBRAE
1-2	City application ID:	
1-3	Site Address or APN:	
1-4	Tract or Parcel Map No:	
1-5	Rainfall Region	6
1-6	Region Mean Annual Precipitation (MAP)	20.10
1-7	Site Mean Annual Precipitation (MAP)	20

The calculations presented here are based on the **combination flow and volume sizing method** provided in the Countywide Program's C.3 Technical Guidance, Version 4.0. The steps presented below are explained in Section 5.1 of the Guidance, applicable portions of which are included in this file, in the sheet named "Guidance from Chapter 5".

Click here for map

1-8 ***MAP adjustment factor is automatically calculated as:*** **1.00**

(The "Site Mean Annual Precipitation (MAP)" is divided by the MAP for the applicable rain gauge, showin in Table 5-3, below.)
Refer to the map in Appendix C of the C.3 Technical Guidance to identify the Rainfall Region for the site.

2.0 Calculate Percentage of Impervious Surface for Drainage Management Area (DMA)

2-1 Name of DMA: **B2**

For items 2-2 and 2-3, enter the areas in square feet for each type of surface within the DMA.

	Type of Surface	Area of surface type within DMA (Sq. Ft.)	Adjust Pervious Surface	Effective Impervious Area
2-2	Impervious surface	60,000	1.0	60,000
2-3	Pervious surface		0.1	0
	Total DMA Area (square feet) =	60,000		

2-4 ***Total Effective Impervious Area (EIA)*** **60,000** **Square feet**

3.0 Calculate Unit Basin Storage Volume in Inches

Table 5-3. Unit Basin Storage Volumes in Inches for 80 Percent Capture Using 48-Hour Drawdowns, based on runoff coefficient

Region	Station, and Mean Annual Precipitation (Inches)	Runoff Coefficient of 1.0
1	Boulder Creek, 55.9”	2.04"
2	La Honda, 24.4”	0.86"
3	Half Moon Bay, 25.92”	0.82"
4	Palo Alto, 14.6”	0.64"
5	San Francisco, 21.0”	0.73"
6	San Francisco airport, 20.1”	0.85"
7	San Francisco Oceanside, 19.3”	0.72"

3-1 ***Unit basin storage volume from Table 5-3:*** **0.85**
(The coefficient for this method is always 1.0, due to the conversion of any landscaping to effective impervious area.)

3-2 ***Adjusted unit basin storage volume:*** **0.85** **Inches**
(The unit basin storage volume [Item 3-1] is adjusted by applying the MAP adjustment factor [Item 1-8].)

3-3 ***Required Capture Volume (in cubic feet):*** **4,250** **Cubic feet**
(The adjusted unit basin sizing volume [Item 3-2] is multiplied by the DMA EIA [Item 2-4] and converted to cubic feet)

4.0 Calculate the Duration of the Rain Event

4-1	Rainfall intensity	0.2	**Inches per hour**
4-2	Divide Item 3-2 by Item 4-1	4.25	**Hours of Rain Event Duration**

5.0 Preliminary Estimate of Surface Area of Treatment Measure

5-1	4% of DMA EIA (Item 2-4)	2,400	**Square feet**
5-2	Area 25% smaller than Item 5-1 (i.e., 3% of DMA EIA)	1,800	**Square feet**
5-3	Volume of treated runoff for area in Item 5-2	3,188	**Cubic feet** (Item 5-2 * 5 inches per hour * 1/12 * Item 4-2)

6.0 Initial Adjustment of Depth of Surface Ponding Area

6-1	Subtract Item 5-3 from Item 3-3	1,063	**Cubic feet** (Amount of runoff to be stored in ponding area)
6-2	Divide Item 6-1 by Item 5-2	0.59	**Feet** (Depth of stored runoff in surface ponding area)
6-3	Convert Item 6-2 from feet to inches	7.08	**Inches** (Depth of stored runoff in surface ponding area)

6-4 If ponding depth in Item 6-3 meets your target depth (recommend 6"), skip to Item 8-1. If not, continue to Step 7-1.
(Note: Overflow outlet elevation should be set based on the calculated ponding depth.)

7.0 Optimize Size of Treatment Measure

7-1	Enter an area larger than Item 5-2	**1632.000264**	**Sq.ft.** (enter larger area if you need less ponding depth.)
7-2	Volume of treated runoff for area in Item 7-1	**2,890**	**Cubic feet** (Item 7-1 * 5 inches per hour * 1/12 * Item 4-2)
7-3	Subtract Item 7-2 from Item 3-3	**1,360**	**Cubic feet** (Amount of runoff to be stored in ponding area)
7-4	Divide Item 7-3 by Item 7-1	**0.83**	**Feet** (Depth of stored runoff in surface ponding area)
7-5	Convert Item 7-4 from ft. to inches	**10.00**	**Inches** (Depth of stored runoff in surface ponding area)

7-6 If the ponding depth in Item 7-5 meets target, stop here. If not, repeat Steps 7-1 through 7-5 until you obtain target depth.
(Note: Overflow outlet elevation should be set based on the calculated ponding depth.)

8.0 Surface Area of Treatment Measure for DMA

8-1	Final surface area of treatment	**1,632**	**Square feet** (Either Item 5-2 or final amount in Item 7-1)

Worksheet for Calculating the Combination Flow and Volume Method

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1.0 Project Information

1-1	Project Name:	GATEWAY AT MILLBRAE
1-2	City application ID:	
1-3	Site Address or APN:	
1-4	Tract or Parcel Map No:	
1-5	Rainfall Region	6
1-6	Region Mean Annual Precipitation (MAP)	20.10
1-7	Site Mean Annual Precipitation (MAP)	20

The calculations presented here are based on the **combination flow and volume sizing method** provided in the Countywide Program's C.3 Technical Guidance, Version 4.0. The steps presented below are explained in Section 5.1 of the Guidance, applicable portions of which are included in this file, in the sheet named "Guidance from Chapter 5".

Click here for map

1-8 ***MAP adjustment factor is automatically calculated as:*** 1.00

(The "Site Mean Annual Precipitation (MAP)" is divided by the MAP for the applicable rain gauge, showin in Table 5-3, below.)
Refer to the map in Appendix C of the C.3 Technical Guidance to identify the Rainfall Region for the site.

2.0 Calculate Percentage of Impervious Surface for Drainage Management Area (DMA)

2-1 Name of DMA: B3

For items 2-2 and 2-3, enter the areas in square feet for each type of surface within the DMA.

	Type of Surface	Area of surface type within DMA (Sq. Ft.)	Adjust Pervious Surface	Effective Impervious Area
2-2	Impervious surface	13,248	1.0	13,248
2-3	Pervious surface		0.1	0
	Total DMA Area (square feet) =	13,248		

2-4 ***Total Effective Impervious Area (EIA)*** 13,248 **Square feet**

3.0 Calculate Unit Basin Storage Volume in Inches

Table 5-3. Unit Basin Storage Volumes in Inches for 80 Percent Capture Using 48-Hour Drawdowns, based on runoff coefficient

Region	Station, and Mean Annual Precipitation (Inches)	Runoff Coefficient of 1.0
1	Boulder Creek, 55.9"	2.04"
2	La Honda, 24.4"	0.86"
3	Half Moon Bay, 25.92"	0.82"
4	Palo Alto, 14.6"	0.64"
5	San Francisco, 21.0"	0.73"
6	San Francisco airport, 20.1"	0.85"
7	San Francisco Oceanside, 19.3"	0.72"

3-1 ***Unit basin storage volume from Table 5-3:*** 0.85

(The coefficient for this method is always 1.0, due to the conversion of any landscaping to effective impervious area.)

3-2 ***Adjusted unit basin storage volume:*** 0.85 **Inches**

(The unit basin storage volume [Item 3-1] is adjusted by applying the MAP adjustment factor [Item 1-8].)

3-3 ***Required Capture Volume (in cubic feet):*** 938 **Cubic feet**

(The adjusted unit basin sizing volume [Item 3-2] is multiplied by the DMA EIA [Item 2-4] and converted to cubic feet)

4.0 Calculate the Duration of the Rain Event

4-1	Rainfall intensity	0.2	**Inches per hour**
4-2	Divide Item 3-2 by Item 4-1	4.25	**Hours of Rain Event Duration**

5.0 Preliminary Estimate of Surface Area of Treatment Measure

5-1	4% of DMA EIA (Item 2-4)	530	**Square feet**
5-2	Area 25% smaller than Item 5-1 (i.e., 3% of DMA EIA)	397	**Square feet**
5-3	Volume of treated runoff for area in Item 5-2	704	**Cubic feet** (Item 5-2 * 5 inches per hour * 1/12 * Item 4-2)

6.0 Initial Adjustment of Depth of Surface Ponding Area

6-1	Subtract Item 5-3 from Item 3-3	235	**Cubic feet** (Amount of runoff to be stored in ponding area)
6-2	Divide Item 6-1 by Item 5-2	0.59	**Feet** (Depth of stored runoff in surface ponding area)
6-3	Convert Item 6-2 from feet to inches	7.08	**Inches** (Depth of stored runoff in surface ponding area)

6-4 If ponding depth in Item 6-3 meets your target depth (recommend 6"), skip to Item 8-1. If not, continue to Step 7-1.
(Note: Overflow outlet elevation should be set based on the calculated ponding depth.)

7.0 Optimize Size of Treatment Measure

7-1	Enter an area larger than Item 5-2	**413.2512251**	**Sq.ft.** (enter larger area if you need less ponding depth.)
7-2	Volume of treated runoff for area in Item 7-1	**732**	**Cubic feet** (Item 7-1 * 5 inches per hour * 1/12 * Item 4-2)
7-3	Subtract Item 7-2 from Item 3-3	**207**	**Cubic feet** (Amount of runoff to be stored in ponding area)
7-4	Divide Item 7-3 by Item 7-1	**0.50**	**Feet** (Depth of stored runoff in surface ponding area)
7-5	Convert Item 7-4 from ft. to inches	**6.00**	**Inches** (Depth of stored runoff in surface ponding area)

7-6 If the ponding depth in Item 7-5 meets target, stop here. If not, repeat Steps 7-1 through 7-5 until you obtain target depth.
(Note: Overflow outlet elevation should be set based on the calculated ponding depth.)

8.0 Surface Area of Treatment Measure for DMA

8-1	Final surface area of treatment	**413**	**Square feet** (Either Item 5-2 or final amount in Item 7-1)

Worksheet for Calculating the Combination Flow and Volume Method

Instructions: After completing Section 1, make a copy of this Excel file for each Drainage Management Area within the project. Enter information specific to the project and DMA in the cells shaded in yellow. Cells shaded in light blue contain formulas and values that will be automatically calculated.

1.0 Project Information

1-1	Project Name:	GATEWAY AT MILLBRAE
1-2	City application ID:	
1-3	Site Address or APN:	
1-4	Tract or Parcel Map No:	
1-5	Rainfall Region	6
1-6	Region Mean Annual Precipitation (MAP)	20.10
1-7	Site Mean Annual Precipitation (MAP)	20

The calculations presented here are based on the **combination flow and volume sizing method** provided in the Countywide Program's C.3 Technical Guidance, Version 4.0. The steps presented below are explained in Section 5.1 of the Guidance, applicable portions of which are included in this file, in the sheet named "Guidance from Chapter 5".

Click here for map

1-8 ***MAP adjustment factor is automatically calculated as:*** **1.00**

(The "Site Mean Annual Precipitation (MAP)" is divided by the MAP for the applicable rain gauge, showin in Table 5-3, below.)
Refer to the map in Appendix C of the C.3 Technical Guidance to identify the Rainfall Region for the site.

2.0 Calculate Percentage of Impervious Surface for Drainage Management Area (DMA)

2-1 Name of DMA: **B4**

For items 2-2 and 2-3, enter the areas in square feet for each type of surface within the DMA.

	Type of Surface	Area of surface type within DMA (Sq. Ft.)	Adjust Pervious Surface	Effective Impervious Area
2-2	Impervious surface	17,890	1.0	17,890
2-3	Pervious surface		0.1	0
	Total DMA Area (square feet) =	17,890		

2-4 ***Total Effective Impervious Area (EIA)*** **17,890** **Square feet**

3.0 Calculate Unit Basin Storage Volume in Inches

Table 5-3. Unit Basin Storage Volumes in Inches for 80 Percent Capture Using 48-Hour Drawdowns, based on runoff coefficient

Region	Station, and Mean Annual Precipitation (Inches)	Runoff Coefficient of 1.0
1	Boulder Creek, 55.9"	2.04"
2	La Honda, 24.4"	0.86"
3	Half Moon Bay, 25.92"	0.82"
4	Palo Alto, 14.6"	0.64"
5	San Francisco, 21.0"	0.73"
6	San Francisco airport, 20.1"	0.85"
7	San Francisco Oceanside, 19.3"	0.72"

3-1 ***Unit basin storage volume from Table 5-3:*** **0.85**

(The coefficient for this method is always 1.0, due to the conversion of any landscaping to effective impervious area.)

3-2 ***Adjusted unit basin storage volume:*** **0.85** **Inches**

(The unit basin storage volume [Item 3-1] is adjusted by applying the MAP adjustment factor [Item 1-8].)

3-3 ***Required Capture Volume (in cubic feet):*** **1,267** **Cubic feet**

(The adjusted unit basin sizing volume [Item 3-2] is multiplied by the DMA EIA [Item 2-4] and converted to cubic feet)

4.0 Calculate the Duration of the Rain Event

4-1	Rainfall intensity	0.2	**Inches per hour**
4-2	Divide Item 3-2 by Item 4-1	4.25	**Hours of Rain Event Duration**

5.0 Preliminary Estimate of Surface Area of Treatment Measure

5-1	4% of DMA EIA (Item 2-4)	716	**Square feet**
5-2	Area 25% smaller than Item 5-1 (i.e., 3% of DMA EIA)	537	**Square feet**
5-3	Volume of treated runoff for area in Item 5-2	950	**Cubic feet** (Item 5-2 * 5 inches per hour * 1/12 * Item 4-2)

6.0 Initial Adjustment of Depth of Surface Ponding Area

6-1	Subtract Item 5-3 from Item 3-3	317	**Cubic feet** (Amount of runoff to be stored in ponding area)
6-2	Divide Item 6-1 by Item 5-2	0.59	**Feet** (Depth of stored runoff in surface ponding area)
6-3	Convert Item 6-2 from feet to inches	7.08	**Inches** (Depth of stored runoff in surface ponding area)

6-4 If ponding depth in Item 6-3 meets your target depth (recommend 6"), skip to Item 8-1. If not, continue to Step 7-1.
(Note: Overflow outlet elevation should be set based on the calculated ponding depth.)

7.0 Optimize Size of Treatment Measure

7-1	Enter an area larger than Item 5-2	**558.0501586**	**Sq.ft.** (enter larger area if you need less ponding depth.)
7-2	Volume of treated runoff for area in Item 7-1	**988**	**Cubic feet** (Item 7-1 * 5 inches per hour * 1/12 * Item 4-2)
7-3	Subtract Item 7-2 from Item 3-3	**279**	**Cubic feet** (Amount of runoff to be stored in ponding area)
7-4	Divide Item 7-3 by Item 7-1	**0.50**	**Feet** (Depth of stored runoff in surface ponding area)
7-5	Convert Item 7-4 from ft. to inches	**6.00**	**Inches** (Depth of stored runoff in surface ponding area)

7-6 If the ponding depth in Item 7-5 meets target, stop here. If not, repeat Steps 7-1 through 7-5 until you obtain target depth.
(Note: Overflow outlet elevation should be set based on the calculated ponding depth.)

8.0 Surface Area of Treatment Measure for DMA

8-1	Final surface area of treatment	**558**	**Square feet** (Either Item 5-2 or final amount in Item 7-1)

Worksheet for Calculating the Combination Flow and Volume Method

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1.0 Project Information

1-1	Project Name:	GATEWAY AT MILLBRAE
1-2	City application ID:	
1-3	Site Address or APN:	
1-4	Tract or Parcel Map No:	
1-5	Rainfall Region	6
1-6	Region Mean Annual Precipitation (MAP)	20.10
1-7	Site Mean Annual Precipitation (MAP)	20

The calculations presented here are based on the **combination flow and volume sizing method** provided in the Countywide Program's C.3 Technical Guidance, Version 4.0. The steps presented below are explained in Section 5.1 of the Guidance, applicable portions of which are included in this file, in the sheet named "Guidance from Chapter 5".

Click here for map

1-8 ***MAP adjustment factor is automatically calculated as:*** 1.00

(The "Site Mean Annual Precipitation (MAP)" is divided by the MAP for the applicable rain gauge, showin in Table 5-3, below.)
Refer to the map in Appendix C of the C.3 Technical Guidance to identify the Rainfall Region for the site.

2.0 Calculate Percentage of Impervious Surface for Drainage Management Area (DMA)

2-1 Name of DMA: B5

For items 2-2 and 2-3, enter the areas in square feet for each type of surface within the DMA.

	Type of Surface	Area of surface type within DMA (Sq. Ft.)	Adjust Pervious Surface	Effective Impervious Area
2-2	Impervious surface	6,517	1.0	6,517
2-3	Pervious surface		0.1	0
	Total DMA Area (square feet) =	6,517		

2-4 ***Total Effective Impervious Area (EIA)*** 6,517 **Square feet**

3.0 Calculate Unit Basin Storage Volume in Inches

Table 5-3. Unit Basin Storage Volumes in Inches for 80 Percent Capture Using 48-Hour Drawdowns, based on runoff coefficient

Region	Station, and Mean Annual Precipitation (Inches)	Runoff Coefficient of 1.0
1	Boulder Creek, 55.9"	2.04"
2	La Honda, 24.4"	0.86"
3	Half Moon Bay, 25.92"	0.82"
4	Palo Alto, 14.6"	0.64"
5	San Francisco, 21.0"	0.73"
6	San Francisco airport, 20.1"	0.85"
7	San Francisco Oceanside, 19.3"	0.72"

3-1 ***Unit basin storage volume from Table 5-3:*** 0.85

(The coefficient for this method is always 1.0, due to the conversion of any landscaping to effective impervious area.)

3-2 ***Adjusted unit basin storage volume:*** 0.85 **Inches**

(The unit basin storage volume [Item 3-1] is adjusted by applying the MAP adjustment factor [Item 1-8].)

3-3 ***Required Capture Volume (in cubic feet):*** 462 **Cubic feet**

(The adjusted unit basin sizing volume [Item 3-2] is multiplied by the DMA EIA [Item 2-4] and converted to cubic feet)

4.0 Calculate the Duration of the Rain Event

4-1	Rainfall intensity	0.2	**Inches per hour**
4-2	Divide Item 3-2 by Item 4-1	4.25	**Hours of Rain Event Duration**

5.0 Preliminary Estimate of Surface Area of Treatment Measure

5-1	4% of DMA EIA (Item 2-4)	261	**Square feet**
5-2	Area 25% smaller than Item 5-1 (i.e., 3% of DMA EIA)	196	**Square feet**
5-3	Volume of treated runoff for area in Item 5-2	346	**Cubic feet** (Item 5-2 * 5 inches per hour * 1/12 * Item 4-2)

6.0 Initial Adjustment of Depth of Surface Ponding Area

6-1	Subtract Item 5-3 from Item 3-3	115	**Cubic feet** (Amount of runoff to be stored in ponding area)
6-2	Divide Item 6-1 by Item 5-2	0.59	**Feet** (Depth of stored runoff in surface ponding area)
6-3	Convert Item 6-2 from feet to inches	7.08	**Inches** (Depth of stored runoff in surface ponding area)

6-4 If ponding depth in Item 6-3 meets your target depth (recommend 6"), skip to Item 8-1. If not, continue to Step 7-1.
(Note: Overflow outlet elevation should be set based on the calculated ponding depth.)

7.0 Optimize Size of Treatment Measure

7-1	Enter an area larger than Item 5-2	**177.2624285**	**Sq.ft.** (enter larger area if you need less ponding depth.)
7-2	Volume of treated runoff for area in Item 7-1	**314**	**Cubic feet** (Item 7-1 * 5 inches per hour * 1/12 * Item 4-2)
7-3	Subtract Item 7-2 from Item 3-3	**148**	**Cubic feet** (Amount of runoff to be stored in ponding area)
7-4	Divide Item 7-3 by Item 7-1	**0.83**	**Feet** (Depth of stored runoff in surface ponding area)
7-5	Convert Item 7-4 from ft. to inches	**10.00**	**Inches** (Depth of stored runoff in surface ponding area)

7-6 If the ponding depth in Item 7-5 meets target, stop here. If not, repeat Steps 7-1 through 7-5 until you obtain target depth.
(Note: Overflow outlet elevation should be set based on the calculated ponding depth.)

8.0 Surface Area of Treatment Measure for DMA

8-1	Final surface area of treatment	**177**	**Square feet** (Either Item 5-2 or final amount in Item 7-1)

Worksheet for Calculating the Combination Flow and Volume Method

Instructions: After completing Section 1, make a copy of this Excel file for each Drainage Management Area within the project. Enter information specific to the project and DMA in the cells shaded in yellow. Cells shaded in light blue contain formulas and values that will be automatically calculated.

1.0 Project Information

1-1	Project Name:	GATEWAY AT MILLBRAE
1-2	City application ID:	
1-3	Site Address or APN:	
1-4	Tract or Parcel Map No:	
1-5	Rainfall Region	6
1-6	Region Mean Annual Precipitation (MAP)	20.10
1-7	Site Mean Annual Precipitation (MAP)	20

The calculations presented here are based on the **combination flow and volume sizing method** provided in the Countywide Program's C.3 Technical Guidance, Version 4.0. The steps presented below are explained in Section 5.1 of the Guidance, applicable portions of which are included in this file, in the sheet named "Guidance from Chapter 5".

Click here for map

1-8 ***MAP adjustment factor is automatically calculated as:*** 1.00

(The "Site Mean Annual Precipitation (MAP)" is divided by the MAP for the applicable rain gauge, showin in Table 5-3, below.)
Refer to the map in Appendix C of the C.3 Technical Guidance to identify the Rainfall Region for the site.

2.0 Calculate Percentage of Impervious Surface for Drainage Management Area (DMA)

2-1 Name of DMA: B6

For items 2-2 and 2-3, enter the areas in square feet for each type of surface within the DMA.

	Type of Surface	Area of surface type within DMA (Sq. Ft.)	Adjust Pervious Surface	Effective Impervious Area
2-2	Impervious surface	31,489	1.0	31,489
2-3	Pervious surface		0.1	0
	Total DMA Area (square feet) =	31,489		

2-4 ***Total Effective Impervious Area (EIA)*** 31,489 **Square feet**

3.0 Calculate Unit Basin Storage Volume in Inches

Table 5-3. Unit Basin Storage Volumes in Inches for 80 Percent Capture Using 48-Hour Drawdowns, based on runoff coefficient

Region	Station, and Mean Annual Precipitation (Inches)	Runoff Coefficient of 1.0
1	Boulder Creek, 55.9"	2.04"
2	La Honda, 24.4"	0.86"
3	Half Moon Bay, 25.92"	0.82"
4	Palo Alto, 14.6"	0.64"
5	San Francisco, 21.0"	0.73"
6	San Francisco airport, 20.1"	0.85"
7	San Francisco Oceanside, 19.3"	0.72"

3-1 ***Unit basin storage volume from Table 5-3:*** 0.85

(The coefficient for this method is always 1.0, due to the conversion of any landscaping to effective impervious area.)

3-2 ***Adjusted unit basin storage volume:*** 0.85 **Inches**

(The unit basin storage volume [Item 3-1] is adjusted by applying the MAP adjustment factor [Item 1-8].)

3-3 ***Required Capture Volume (in cubic feet):*** 2,230 **Cubic feet**

(The adjusted unit basin sizing volume [Item 3-2] is multiplied by the DMA EIA [Item 2-4] and converted to cubic feet)

4.0 Calculate the Duration of the Rain Event

4-1	Rainfall intensity	0.2	**Inches per hour**
4-2	Divide Item 3-2 by Item 4-1	4.25	**Hours of Rain Event Duration**

5.0 Preliminary Estimate of Surface Area of Treatment Measure

5-1	4% of DMA EIA (Item 2-4)	1,260	**Square feet**
5-2	Area 25% smaller than Item 5-1 (i.e., 3% of DMA EIA)	945	**Square feet**
5-3	Volume of treated runoff for area in Item 5-2	1,673	**Cubic feet** (Item 5-2 * 5 inches per hour * 1/12 * Item 4-2)

6.0 Initial Adjustment of Depth of Surface Ponding Area

6-1	Subtract Item 5-3 from Item 3-3	558	**Cubic feet** (Amount of runoff to be stored in ponding area)
6-2	Divide Item 6-1 by Item 5-2	0.59	**Feet** (Depth of stored runoff in surface ponding area)
6-3	Convert Item 6-2 from feet to inches	7.08	**Inches** (Depth of stored runoff in surface ponding area)

6-4 If ponding depth in Item 6-3 meets your target depth (recommend 6"), skip to Item 8-1. If not, continue to Step 7-1.
(Note: Overflow outlet elevation should be set based on the calculated ponding depth.)

7.0 Optimize Size of Treatment Measure

7-1	Enter an area larger than Item 5-2	**982.2268016**	**Sq.ft.** (enter larger area if you need less ponding depth.)
7-2	Volume of treated runoff for area in Item 7-1	**1,739**	**Cubic feet** (Item 7-1 * 5 inches per hour * 1/12 * Item 4-2)
7-3	Subtract Item 7-2 from Item 3-3	**491**	**Cubic feet** (Amount of runoff to be stored in ponding area)
7-4	Divide Item 7-3 by Item 7-1	**0.50**	**Feet** (Depth of stored runoff in surface ponding area)
7-5	Convert Item 7-4 from ft. to inches	**6.00**	**Inches** (Depth of stored runoff in surface ponding area)

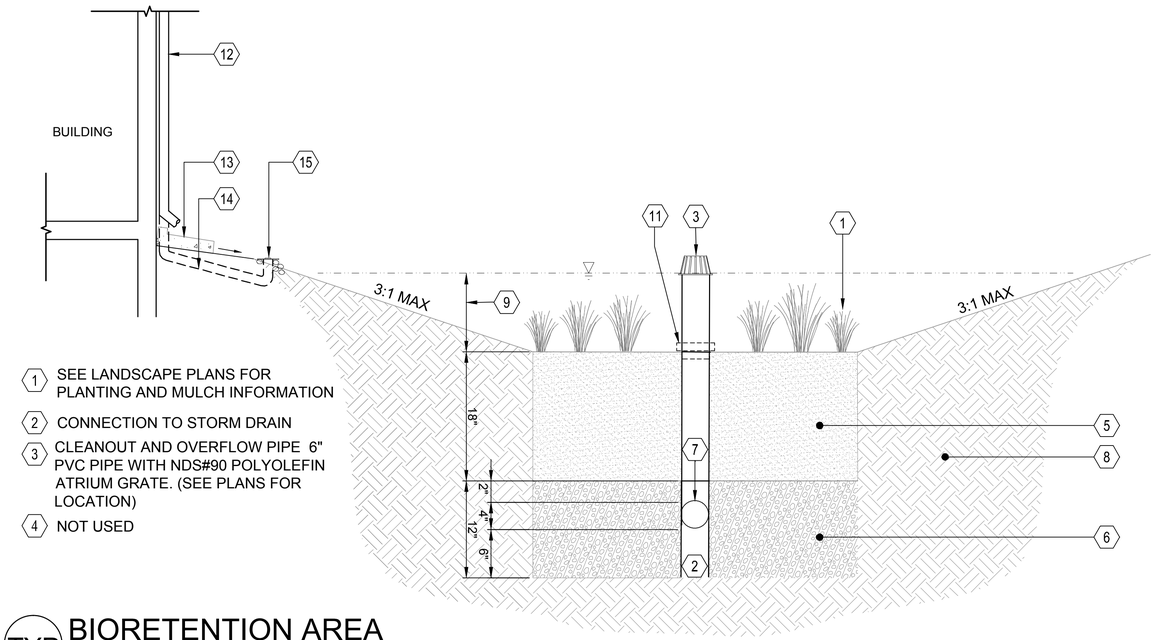
7-6 If the ponding depth in Item 7-5 meets target, stop here. If not, repeat Steps 7-1 through 7-5 until you obtain target depth.
(Note: Overflow outlet elevation should be set based on the calculated ponding depth.)

8.0 Surface Area of Treatment Measure for DMA

8-1	Final surface area of treatment	**982**	**Square feet** (Either Item 5-2 or final amount in Item 7-1)

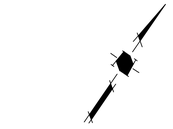
APPENDIX B

TREATMENT CONTROL DETAILS



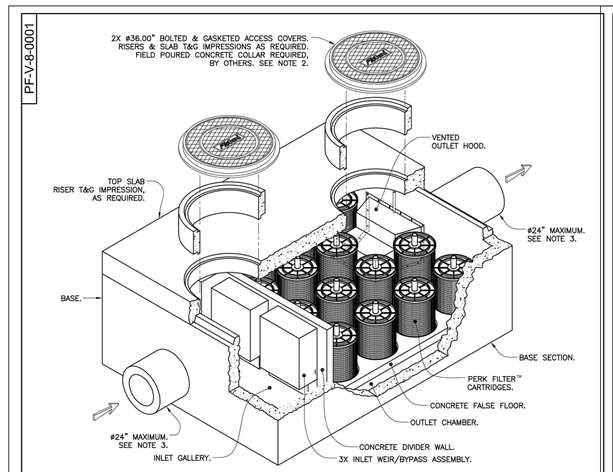
1. SEE LANDSCAPE PLANS FOR PLANTING AND MULCH INFORMATION
2. CONNECTION TO STORM DRAIN
3. CLEANOUT AND OVERFLOW PIPE 6" PVC PIPE WITH NDS#90 POLYOLEFIN ATRIUM GRATE. (SEE PLANS FOR LOCATION)
4. NOT USED
5. BIORETENTION SOIL MIX CONSISTING OF A SANDY LOAM WITH AN INFILTRATION RATE OF 5" TO 10" PER HOUR (MINIMUM 18" DEPTH). SEE APPENDIX L IN THE CLEAN WATER PROGRAM C.3 HANDBOOK FOR MORE INFORMATION.
6. CLASS II PERMEABLE ROCK PER CALTRANS SPECIFICATIONS (12" MIN DEPTH)
7. 6" PERFORATED PVC SUBDRAIN (PERF-ALL-AROUND OR STANDARD DRAIN PIPE WITH DRAIN HOLES INSTALLED DOWN).
8. NATIVE SOIL OR CERTIFIED COMPACTED SUBGRADE
9. 6" TO 12" PONDING DEPTH.
10. NOT USED
11. CLEANOUT BEYOND WITH CAP AT FINISHED GRADE
12. ROOF LEADER
13. ALTERNATIVE SPLASH BLOCK, SEE PLAN
14. STORMDRAIN PIPE, SEE PLAN FOR SIZE
15. ALTERNATIVE BUBBLE-UP WITH COBBLE STONES, SEE PLAN

TYP **BIORETENTION AREA**
NOT TO SCALE



1 INCH = 60 FEET

Catridge Count / Vault Size Calculations		Q=ciA		ft^2-acres	2.296E-05
Area	A	322070.5	ft^2	7.39474	acres
Runoff coefficient	c	0.9			
rainfall intensity	i	0.2	inch/hour		
treatment flow rate	Qc	0.04	cfs	per filter	
System flow	Qm	1.331053	cfs		
Number of cartridges		34	filters		



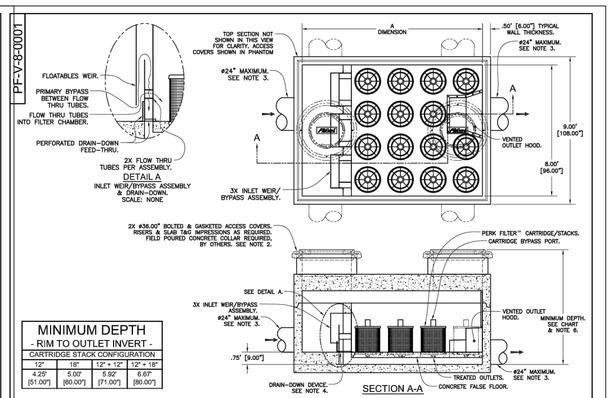
Notes:

1. Precast concrete structure shall be manufactured in accordance with ASTM Designation C857 and C858.
2. Filter system shall be supplied with traffic rated (H20) bolted & gasketed Ø36" circular access covers with risers as required. Shallow applications may require configurations with (H20) bolted & gasketed square/rectangular access hatches. Field poured concrete collars required, by others.
3. Inlet & outlet pipe(s) (Ø 24" maximum) may enter device on all three sides of the inlet & outlet chambers respectively.
4. Inlet chamber shall be supplied with a drain-down device designed to remove standing water between storm events.
5. For depths less than specified minimums contact Oldcastle® Stormwater Solutions for engineering assistance.

Perk Filter™
8' Wide Concrete Vault
Six to Thirty One Cartridges / Stacks
Media Filtration

Oldcastle® Stormwater Solutions
7321 Southpark Plaza, Suite 200 | Littleton, CO | 80120 | Ph: 800.579.8819 | oldcastlestormwater.com

DRAWING NO.	REV	ECO	DATE	SHEET
PF-V-8-0001	F	ECO-0122 JPR 10/3/14	JPR 7/8/08	SHEET 1 OF 2



MINIMUM DEPTH
- RIM TO OUTLET INVERT -

CARTRIDGE STACK CONFIGURATION			
12"	18"	12" + 12"	12" + 18"
4.25" [51.00"]	5.00" [60.00"]	5.92" [71.00"]	6.67" [80.00"]

8' VAULT
TREATMENT FLOW RATES, TOTAL FLOW CAPACITIES & MAXIMUM HEAD LOSS

CARTRIDGE STACK QUANTITY	A DIMENSION - LENGTH - (ID FEET)	CARTRIDGE STACK CONFIGURATION							
		12"		18"		12" & 12"		12" & 18"	
		TREATMENT FLOW RATE (GPM / CFS)	TOTAL FLOW CAPACITY (CFS)	TREATMENT FLOW RATE (GPM / CFS)	TOTAL FLOW CAPACITY (CFS)	TREATMENT FLOW RATE (GPM / CFS)	TOTAL FLOW CAPACITY (CFS)	TREATMENT FLOW RATE (GPM / CFS)	TOTAL FLOW CAPACITY (CFS)
6	7	72 / 0.16	8.6	108 / 0.24	12.7	144 / 0.32	14.5	180 / 0.40	19.3
7	7	84 / 0.19	8.6	126 / 0.28	12.8	168 / 0.37	14.5	210 / 0.47	19.4
8	9	96 / 0.21	8.6	144 / 0.32	12.8	192 / 0.43	14.6	240 / 0.53	19.5
9	9	108 / 0.24	8.6	162 / 0.36	12.8	216 / 0.48	14.6	270 / 0.60	19.5
10	9	120 / 0.27	8.7	180 / 0.40	12.9	240 / 0.53	14.7	300 / 0.67	19.6
11	9	132 / 0.29	8.7	198 / 0.44	12.9	264 / 0.59	14.7	330 / 0.74	19.7
12	11	144 / 0.32	8.7	216 / 0.48	12.9	288 / 0.64	14.7	360 / 0.80	19.7
13	11	156 / 0.35	8.8	234 / 0.52	13.0	312 / 0.70	14.8	390 / 0.87	19.8
14	11	168 / 0.37	8.8	252 / 0.56	13.0	336 / 0.75	14.9	420 / 0.94	19.9
15	11	180 / 0.40	8.8	270 / 0.60	13.1	360 / 0.80	15.0	450 / 1.00	19.9
16	13	192 / 0.43	8.8	288 / 0.64	13.1	384 / 0.86	15.0	480 / 1.07	20.0
17	13	204 / 0.45	8.9	306 / 0.68	13.2	408 / 0.91	15.1	510 / 1.14	20.1
18	13	216 / 0.48	8.9	324 / 0.72	13.2	432 / 0.96	15.1	540 / 1.20	20.1
19	13	228 / 0.51	8.9	342 / 0.76	13.2	456 / 1.02	15.2	570 / 1.27	20.2
20	15	240 / 0.53	9.0	360 / 0.80	13.3	480 / 1.07	15.2	600 / 1.34	20.3
21	15	252 / 0.56	9.0	378 / 0.84	13.3	504 / 1.12	15.3	630 / 1.40	20.3
22	15	264 / 0.59	9.0	396 / 0.88	13.4	528 / 1.18	15.3	660 / 1.47	20.4
23	15	276 / 0.61	9.0	414 / 0.92	13.4	552 / 1.23	15.4	690 / 1.54	20.5
24	18	288 / 0.64	9.0	432 / 0.96	13.4	576 / 1.28	15.4	720 / 1.60	20.5
25	18	300 / 0.67	9.1	450 / 1.00	13.5	600 / 1.34	15.5	750 / 1.67	20.6
26	18	312 / 0.70	9.1	468 / 1.04	13.5	624 / 1.39	15.5	780 / 1.74	20.7
27	18	324 / 0.72	9.1	486 / 1.08	13.6	648 / 1.44	15.6	810 / 1.80	20.7
28	18	336 / 0.75	9.2	504 / 1.12	13.6	672 / 1.50	15.6	840 / 1.87	20.8
29	18	348 / 0.78	9.2	522 / 1.16	13.6	696 / 1.55	15.7	870 / 1.94	20.9
30	18	360 / 0.80	9.2	540 / 1.20	13.7	720 / 1.60	15.8	900 / 2.01	20.9
31	18	372 / 0.83	9.2	558 / 1.24	13.7	744 / 1.66	15.8	930 / 2.07	21.0
MAXIMUM HEAD LOSS		1.7 FEET		2.3 FEET		2.9 FEET		3.5 FEET	

Perk Filter™
8' Wide Concrete Vault
Six to Thirty One Cartridges / Stacks
Media Filtration

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DRAWING NO.	REV	ECO	DATE	SHEET
PF-V-8-0001	F	ECO-0122 JPR 10/3/14	JPR 7/8/08	SHEET 2 OF 2

REPUBLIC MILLBRAE LLC

REPUBLIC MILLBRAE LLC
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(408) 292-1601

1570 Oakland Road
San Jose, CA 95131
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REVISIONS

No.	Description	Date
1	PER CITY COMMENTS	08/26/16
2	PER CITY COMMENTS	02/01/17

GATEWAY AT MILLBRAE

MILLBRAE BART STATION | MILLBRAE, CA USA

TENTATIVE MAP

STORMWATER CONTROL DETAILS

PRELIMINARY AND TENTATIVE. NOT FOR CONSTRUCTION.

ALL DIMENSIONS SUBJECT TO CHANGE.

PROJECT NO. 3862.00
ISSUE DATE 06.24.2016
SHEET NO. **TM.6.b**
PARCEL NO.

S:\PROJECTS\3862\00\PLI\TENTATIVE MAP\PLOT DRAWINGS\3862\00_TMS_SW.DWG