Preliminary
Stormwater Control Plan

DANVILLE HOTEL SITE

APNS 208-023-003, 004, 008, 009 & 024
TOWN OF DANVILLE, CONTRA COSTA COUNTY, CALIFORNIA

Updated: February 28, 2011

Prepared For:

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Prepared By:

cbg Carlson, Barbee & Gibson, Inc.
CIVIL ENGINEERS • SURVEYORS • PLANNERS

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Exhibit J

TABLE OF CONTENTS

TABLE OF CONTENTS

APPENDIX

EXHIBITS

I. PROJECT SETTING

A. Project Name, Location and Description

The Danville Hotel project site is located in the Town of Danville, Contra Costa County, California and encompasses APN's 208-023-003, 004, 008, 009 & 024. The proposed project site is approximately 1.2 acres. The Danville Hotel Site is a redevelopment project of existing retail, office, and restaurant uses. The proposed project will maintain the integrity of the two existing historic structures along the Hartz Avenue street frontage and redevelop the remainder of the site with a combination of retail and restaurant uses as well as second story residential condominium units above the ground floor commercial space. An at-grade covered parking structure is proposed to serve the residential component of the project.

B. Existing Site Conditions

Currently the site is developed with existing structures serving retail, restaurant, office and personal service uses. Conventional asphalt and concrete cover the parking lot that serves these commercial structures. The site is nearly completely covered by impervious materials. The project site, inclusive of those portions of the abutting public right-of-way anticipated to be disturbed by project construction activity, contains 53,060 square feet of impervious areas and 3,464 square feet of pervious areas. The site is bordered by Railroad Ave. to the southwest, Prospect Ave. to the northwest, Hartz Ave. to the northeast, and Short Street (a previously abandoned public street) to the southeast. Exhibit 1 depicts existing site conditions.

The Danville Hotel project site is part of the moderate climate of the San Francisco Bay Area Region. Annual temperature patterns are typical of coastal areas. Mean annual precipitation is approximately 22.5 inches. Precipitation is evenly distributed throughout the fall, winter, and spring but is very low in the summer. Moisture occurring in the summer is generally from the coastal fog.

The project is on relatively level land sloping approximately 1% from south to north. The site is surrounded by urban development with geologic features not significantly impacting the site. The site contains Hydrologic Group C soils.

The Town of Danville lies within the San Ramon Creek watershed, part of the larger Walnut Creek watershed. The proposed redevelopment of the Danville Hotel project site will not impact this watershed. Existing conditions at the site are mostly impervious with no stormwater quality management improvements or treatment practices in place. With the redevelopment of the Danville Hotel Site stormwater quality treatment measures and flow control facilities will be implemented, improving the quality of the stormwater that has historically drained from the site to San Ramon Creek.

The project site is within the existing FEMA Flood Zone X (i.e., an area that is determined to be outside the 100- and 500-year floodplains), areas determined to be outside the floodplain, as depicted on the FEMA Flood Insurance Rate Map Community Panel 06013C0453F & 06013C0434F, dated June 16, 2009.

C. Compliance with Municipal Regional Permit (MRP) C.3 Guidelines

The proposed project includes the redevelopment of a previously developed site. The proposed project will result in a slight increase in the amount of impervious area. Exhibit 2 depicts the proposed site conditions. Table 1 outlines the existing and proposed impervious areas.

Table 1 - Impervious Areas

Row	Impervious Areas	Area Size
1	Existing Impervious Areas	53,060 sf
2	Existing Impervious Areas to be Demolished With Project Construction	49,555 sf
3	Proposed Impervious Areas to be Reestablished Within Impervious and Pervious Areas to be Demolished	50,507 sf
4	Post-Project Construction Impervious Areas	54,012 sf

The project is subject to compliance with both the treatment and flow control guidelines within the MRP C.3 requirements, as follows:

1. **Treatment**

The proposed project will alter more than 50% of the existing impervious surfaces. Also, the existing site does not include stormwater treatment measures. Therefore, per Table 1.1 of the County's Guidebook, this project is required to include treatment measures for the entire site.

2. **Flow Control**

The proposed project increases the amount of impervious area by 952 square feet. Also, the project is larger than one acre. Therefore, the project is subject to the hydrograph modification management (i.e., flow control) requirements of the MRP. Pursuant to the MRP, the existing developed site conditions will be used as a baseline for the determination of the pre- and post-project runoff conditions and to define the required volume of the flow control facilities. Appendix D is the March 10, 2009 Contra Costa County Water Program – C.3 Implementation Work Group memorandum entitled "Guidance on Flow Control for Development Projects on Sites that are Already Partially Developed". The Flow Control memorandum outlines the approach for compliance for projects involving sites similar to the Danville Hotel project.

D. Constraints and Opportunities for Stormwater Control

The following are the site-specific underlying constraints affecting the selection of treatment and flow control facilities for the project as well as underlying constraints that serve to limit opportunities to reduce imperviousness and incorporate facilities into the site and landscape design.

1. **Constraints**

a. *High Intensity Land Use* – This project site is within the Town of Danville's downtown area. Existing land development patterns present within the downtown area, including the project site, are at a high intensity, with the majority of the individual sites comprising the downtown area covered by either by structures, pedestrian gathering areas, and/or parking lot paving. The proposed project's development objectives

will require a duplication of the high amount of impervious areas currently present at the project site. There are limited open space areas, existing or proposed, that could be utilized either as site aesthetic landscape features or as storm water control facilities.

b. *Drainage System* – The project site drainage is currently collected by a system of pipes and field inlets, ultimately connecting to the storm drain trunk lines located in Railroad Avenue and Prospect Avenue. The project will maintain pre-project drainage patterns by connecting to the same existing storm drain trunk line facilities. The proposed project will not increase peak drainage discharges to the existing storm drain system.

c. *Low Impermeable Soils* – The project site is underlain by soils classified as Hydrologic Soil Group C. Group C soils have low natural percolation rates with limited potential for direct infiltration of storm water.

d. *Heavy Pedestrian Traffic* – The project site is located within the Town of Danville's downtown area. The area includes retail, restaurant, office, and other commercial uses as well as public uses that generate heavy pedestrian traffic, including an adjacent weekly farmers market. The mix of uses dictates the provision of a extensive network of impervious pedestrian walkways.

2. Opportunities

a. *Landscape Amenities and Open Space* – The proposed site plan does not include large landscape amenities or open space buffers that could be utilized as locations for Integrated Management Practice (IMP) facilities. Hence, the project must use more compact methods of treatment. The project grading and storm drainage schemes will need to ensure impervious areas are directed to these compact treatment areas.

b. *Underground Storage* – Outside of building footprints, all but 2,512 square feet of the proposed post-construction development area is planned as impervious material, largely consisting of pavement or concrete surfaces associated with parking and pedestrian uses. With the exception of the parking lot, these surfaces can be underlain with underground storage facilities, such as a series of pipes or vaults, to provide the necessary volume capacity to ensure post-project runoff peaks and durations do not exceed pre-project conditions and to achieve the requisite compliance with MRP flow control requirements.

II. LOW IMPACT DEVELOPMENT DESIGN STRATEGIES

A. Optimization of Site Layout

1. Limitation of Development Envelope

The project site is approximately 1.2 acres (inclusive of those portions of the abutting public right-of-way anticipated to be disturbed by project construction activity). With such a limitation of space and the in-fill nature of the project, a constrained building envelope beyond current conditions is not feasible.

2. Minimization of Imperviousness

The project would lead to the redevelopment of an existing mixed-use complex located within the core of the Danville downtown area. This project's development objectives would serve to roughly double the size of the existing mixed use complex. The project's development objectives would inherently result in the provision of an extensive amount of ground level, pedestrian oriented commercial uses, consistent with that present on the surrounding and neighboring properties. In order to accomplish these development objectives, the development envelope is proposed at a high intensity, leading to in excess of 97% impervious surface areas in a post-construction state.

3. Using Drainage as a Design Element

Landscape areas within the proposed project are limited to flow through planter boxes or tree wells. IMP's will be implemented within many of these landscaped amenities. Some of the flow through planters will be raised with seat walls on the edges adjacent to pedestrian areas to promote gatherings in these open areas and to maximize their value as site amenities. Other planters will be level with the adjacent surfaces in order to maximize that amount of stormwater runoff treated and to avoid interference with the retail businesses' display windows.

B. Use of Permeable Pavements

Due to the impermeable nature of the underlying soils, pervious surfaces would require increased depths of base course and inclusion of a sub-drain system. These measures would increase the cost of development by an order of magnitude of two- to three-fold, making this design alternative infeasible. Furthermore, the treatment benefit provided by these permeable surfaces has not been proved successful to the Town of Danville.

Therefore, this Preliminary Stormwater Control Plan assumes that these surfaces will be constructed as impervious. Alternative pervious surfaces may be revisited during the final design process to determine if can be designed in a manner to enhance their viability.

C. Direct Runoff to Integrated Management Practices

The site layout plan for the proposed project includes a site grading and storm drainage scheme designed to maximize the amount of site runoff that is directed to landscaped areas which will be designed as IMP's. The roof drainage will generally be routed via roof leaders to flow-through planters which will be located directly adjacent to each structure. The runoff from pedestrian surfaces will typically be directed to a landscape area that will be constructed as flush flow through planter box. The project's proposed grading and storm drainage design will allow drainage to flow into, through, and out of the IMP facilities by gravity flow.

III. DOCUMENTATION OF DRAINAGE DESIGN

The following outlines the stormwater management facilities within the project site necessary to comply with the applicable C.3 guidelines.

The project site design and its stormwater features have benefitted from an iterative review process by the Danville Development Services Department. The proposed stormwater management plan outlined below is reflective of input secured through that review. The plan balances the constraints of the site, the land use planning objectives for the site, and the MRP C.3 requirements.

The stormwater management plan for compliance with treatment and flow control requirements is described below:

A. Treatment

1. On-Site Facilities

The proposed project will integrate flow-through planter boxes into the site plan which will be designed as water quality treatment only planters. These IMP's utilize compact landscape areas that are proposed adjacent to the various building elevations. They will either be raised and encompassed by seat walls or will be flush with the adjacent ground surfaces. Exhibit 3 depicts the proposed locations of the raised and flush flow through planters. Appendix C depicts the conceptual cross sections of the flow through planters. The site plan is only able to provide a certain amount of area for the flow through planters while providing the other project features. The required treatment area of the entire site is 2,160 square feet. The site will provide a mix of raised and flow-through planters within the project totaling 1,168 square feet in aggregate interior planter area. This amount of planter treatment area equates to 54% of the project's required treatment area. Appendix A provides Treatment Area Calculations for the project.

2. Off-Site Facilities

In order to provide the remaining 46% of the required treatment areas, the project is proposing to utilize the "Alternative or In-Lieu Compliance" provisions outlined in Section C.3.e of the MRP. These provisions allow for compliance to be achieved providing LID treatment at an off-site location or the payment of in-lieu fees. The project may implement an off-site treatment project at one of many locations within the same watershed or pay an in-lieu fee should the Town adopt a fee ordinance prior to issuance of building and/or grading permits for this project. Through discussions with Town staff the project is currently proposing the Alternative Compliance be achieved through implementing one of the following items. These have been prioritized and are listed in the order that the project will pursue to implement though the final design stage.

a. *Off-Site Treatment at the Town's Railroad Ave Parking Lot* – The project would construct LID treatment measures equal to the amount of required treatment area that is not accomplished on-site to the proposed project. The Town's Railroad Ave Parking Lot is an ideal location because it is directly across the street from the proposed project, within the same sub-watershed and currently does not have any treatment measures. The required off-site treatment area that would be implemented in this parking lot is 992 square feet. This will provide treatment benefit to approximately 24,800 square feet of existing impervious areas currently not being treated. This would be accomplished by converting existing landscape areas and/or parking stalls into treatment facilities. Exhibit 4 depicts a conceptual schematic of the off-site treatment areas proposed to be implemented in this parking lot.

As directed by Section C.3.e, this off-site project must be constructed by the end of the construction of the proposed project. If an extension of time is necessary, for each additional year, up to a maximum of three years, after the end of construction of the proposed project, the treatment area provided by the off-site project must increase by an additional 10%

beyond the initially calculated off-site required treatment area. Further time extensions may be pursued upon demonstration that a good faith effort to complete the off-site improvements has been made.

b. *In-Lieu Fee* – Under the In-Lieu Fee option, the project proponent's would pay a fee determined to be equivalent to the estimated cost of constructing on-site or off-site treatment facilities. Specifically, this in-lieu fee would cover the monetary amount necessary to provide for the design and construction of the remaining off-site treatment area at a Regional Project. The Regional Project must achieve a net environmental benefit.

At the time of this report, the Town of Danville has not adopted an in-lieu fee ordinance identifying their preferred Regional Projects.

c. *Off-Site Treatment at the Alternative Site* – This is similar to the first alternative except that the off-site treatment would be constructed at another location. This other location could include another downtown parking lot, roadway drainage projects and/or within the Interstate 680 Town Park-n-Ride facility. All these other sites, and any other potential off-site treatment site proposed in the future, must be within the same watershed as the Danville Hotel project site. The same timeframe provisions as the first alternative would apply to any other off-site location selected.

B. Flow Control

The proposed project must comply with the flow control requirements of the C.3 Guidebook. Despite the project site being in excess of one acre in size, the proposed project would only increase total impervious area by 952 square feet in comparison to the existing impervious areas conditions present at the site. The existing site conditions are to be used as the baseline when estimating pre-project storm drainage flows peaks and durations. The project proposes to

implement a consistent approach to compliance with flow control requirements as those outlined in the Contra Costa County Water Program C.3 Implementation Work Group memorandum entitled "Guidance on Flow Control for Development Projects on Sites that are Already Partially Developed". This memo is enclosed as Appendix D.

HMP Option 1 set forth in that memorandum, which documents the approach to be taken where there is no net increase of impervious area, applies to the majority of the proposed site. The existing site impervious areas total 53,060 square feet. The redevelopment of these areas with proposed impervious surfaces does not increase pre-project storm drainage peaks and durations and complies with the flow control standards.

For the portion of the existing site that is proposed to be changed from a previous surface status to an impervious surface status, HMP Option 2 applies. The additional impervious areas of 952 square feet must be mitigated with flow control facilities. The project can provide the necessary storm water storage capacity to match pre-project peaks and durations by either constructing the raised flow-through planter boxes with adequate surface area and sub-surface storage capacity or by constructing a series of underground storm water storage pipelines. The project will select the preferred flow control facility between these two options during the final design stage. Preliminary reviews indicate that either option can be readily implemented given the size of the project area and the proposed project layout and relationship to surrounding storm drain trunk line facilities. Appendix B provides the Flow Control Volume calculations for the project, demonstrating the required volume of the flow control facilities that can be accomplished in either raised flow through planter boxes or underground pipelines. Exhibit 5 depicts the proposed preliminary locations of the alternative flow control facilities within the site.

IV. SOURCE CONTROL MEASURES

The proposed project will create few potential sources of stormwater pollution. Sources to be controlled include but are not limited to:

SOURCES AND SOURCE CONTROL BMP'S

Potential Source of Runoff Pollutants	Permanent Source Control BMP's	Operational Source Control BMP's
Onsite storm drain inlets	Mark all accessible onsite inlets with the words "No Dumping! Flows to Creek" or approved equivalent language. Detail location of all onsite storm drain inlets on Stormwater Control Plan Drawings.	Maintain and periodically replace inlet markings as needed. Provide stormwater pollution prevention information to new site owners, lessees, or operators. Include the following in lease agreement "Tenant shall not discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains." Inlets and pipes conveying stormwater to BMPs shall be inspected and maintained as part of the Project Operation and Maintenance Plan.
Interior floor drains and elevator shaft sump pumps	Interior floor drains and elevator shaft sump pumps shall be plumbed to drain directly to the sanitary sewer system.	Inspect and maintain drains to prevent blockages and overflows.
Need for future indoor or structural pest control	Project construction drawings shall incorporate features that discourage entry of pests.	Provide Integrated Pest Management (IPM) information to owners, lessees, and operators.

Potential Source of Runoff Pollutants	Permanent Source Control BMP's	Operational Source Control BMP's
Landscape/outdoor pesticide use	Final project landscape plans shall reflect the following: Design that minimizes need for irrigation; minimizes runoff; promotes surface infiltration where appropriate; and details the use of planting material that minimizes the amount of fertilizers and pesticides that are needed. Where landscaped areas are used to retain or detain stormwater, project landscape plans shall specify the use of plants that are tolerant of saturated soil conditions. Project landscape plans shall detail use of plantings appropriate to site soils, slopes, climate, sun, land use, air movement, ecological consistency, and plant interactions. Detail locations of stormwater treatment and hydrograph modification management BMPs on Stormwater Control Plan Drawings.	Maintain landscaping using minimum or no pesticides. Provide Integrated Pest Management information to new owners, lessees and operators. See applicable BMPs in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks www.babmphandbooks.com
Water features (fountains)	Where architectural water features are incorporated, plumb such features directly to the sanitary sewer system.	Inspect and maintain drains to prevent blockage and overflows.

Potential Source of Runoff Pollutants	Permanent Source Control BMP's	Operational Source Control BMP's
Refuse areas	Within project construction drawings, provide design details of the proposed enclosed trash/recycling area depicted for use at the mid-block location of the project's Short Street frontage. Install and maintain signs posted on, or near, dumpsters with the words "Do not dump hazardous materials here" or approved equivalent language. Document that the number, type and size of project trash and recycling bins have been determined adequate by the solid waste purveyor. Trash/recycling area shall be plumbed to the sanitary sewer system.	State how the following will be implemented: • Provide adequate number of receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit / prevent dumping of liquid or hazardous wastes. Post "no hazardous materials" signs. • Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on-site.
Roofing, gutters, and trim.	Do not utilize roofing, gutter, or architectural trim materials made of copper or other unprotected metals that would leach into the storm water runoff.	
Plazas, sidewalks, and parking lots.		Plazas, sidewalks, and parking lots shall be swept regularly to prevent the accumulation of litter and debris. Debris from pressure washing shall be collected to prevent entry into the storm drain system. Washwater containing any cleaning agent or degreaser shall be collected and discharged to the sanitary sewer and not discharged to a storm drain.

Potential Source of Runoff Pollutants	Permanent Source Control BMP's	Operational Source Control BMP's
Fire Sprinkler Test Water	Provide means to drain fire sprinkler test water to sanitary sewer system.	See note in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stromwater Quality Handbooks at www.cabmphandbooks.com
Food Service	Building construction drawings shall detail the location (indoors or in a covered outdoor area) and features of any designated cleaning area to be used by a food service tenant (e.g., floor sink or other areas for cleaning floor mats, containers, and equipment). Construction drawings shall detail that cleaning areas shall be connected to a grease interceptor before discharging to sanitary sewer system. Describe the items to be cleaned in these facilities and document the proposed sizing is adequate to handle the largest items that are envisioned needing to be cleaned.	See the brochure, "Water Pollution Prevention Tips to Protect Water Quality and Keep Your Food Service Facility Clean." Provide site owners and food service lessees and operators copy of the above brochure.
Air Conditioning	Air conditioner condensation shall be directed to landscaped areas or plumbed to the sanitary sewer.	
Interior floor drains	Interior floor drains and elevator shaft pumps shall be plumbed to the sanitary sewer system.	Inspect and maintain drains to prevent blockages and/or overflows that could result in drainage being diverted to the storm drainage system.

Potential Source of Runoff Pollutants	Permanent Source Control BMP's	Operational Source Control BMP's
Enclosed parking structure.	Floor drains serving the enclosed parking structure shall be plumbed to the sanitary sewer system, Grades of flat work established in proximity to the entry of the enclosed parking structure shall be designed to prevent stormwater drainage from entering the structure.	Inspect and maintain drains to prevent blockages and/or overflows that could result in drainage being diverted to the storm drainage system.

V. FACILITIES MAINTENANCE REQUIREMENTS

A. Ownership and Responsibility for Maintenance in Perpetually

As part of the C.3 stormwater requirements, municipalities must verify stormwater treatment and flow-control facilities are functional and are maintained to perform as intended by their intended design. An Ownership Association, including representatives from all proposed parcels, shall be formed by the project sponsor (i.e., by Castle Companies, Inc.). This Ownership Association shall have the responsbilitiy for maintenance and scheduled replacement of the on-site storm water treatment and storage facilities in perpetuity.

Castle Companies, Inc. shall submit, with the application for building permits, a draft Stormwater Facilities Operation and Maintenance Plan including detailed maintenance requirements and a maintenance and replacement schedule. An operations and maintenance agreement acceptable to the Danville Engineering Division amongst all members of the Ownership Association shall be recorded. This agreement shall clearly state the requirements of inspecting and maintaining the stormwater treatment and storage facilities and insure all costs associated with the perpetual inspection, operation and maintenance, administration, and reporting of these facilities are paid for by the property owners within the Ownership Association.

B. Summary of Maintenance Requirements for Each Stormwater Facility

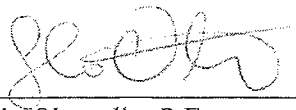
Flow-thru planters require routine maintenance to prevent a diminishment in their rates of infiltration, insure unobstructed flow, prevent erosion, and keep plants healthy and the engineered soil biologically active. Flow control vaults, such as underground pipelines, require routine maintenance to insure unobstructed flow through the orifice and to remove trash and silt deposited over time by stormwater entering the system.

Typical maintenance requirements of stormwater facilities include:

- Inspection of inlets for channels, exposure of soils, and other evidence of erosion.
- Replenishment of all erosion control measures necessary.
- Inspect outlets to ensure that planter has not clogged or that excessive erosion has not inhibited flow.
- Inspection of facility side slopes for evidence of erosion.
- Observe percolation in treatment areas to verify design percolation rates are met (i.e., whether a 48 hour percolation window is exceeded).
- Till or replace engineered soil in treatment areas where design percolation rates are not met.
- Examine all vegetation to insure it is healthy and dense enough to provide filtering. Replenish mulch as necessary, remove fallen leaves and debris and prune large shrubs and trees. Replace dead plants and remove noxious and invasive vegetation.
- Prune, mow, remove fallen leaves and replenish mulch as necessary.
- Confirm irrigation is adequate but not excessive.
- Remove any invasive plants that might be present.
- Abate any potential vectors by filling holes in the ground in infiltration planters and insuring there are no areas where water stands longer than 48 hours following a storm. If mosquito larvae are present and persistent, contact the Contra Costa Mosquito and Vector Control District for information and advice. Mosquito larvicides shall be applied only when absolutely necessary and then, only by a licensed individual or contractor.

VI. CERTIFICATION

The selection, sizing, and preliminary design of stormwater treatment BMPs and other control measures in this plan meet the requirements of Regional Water Quality Control Board Order R2-2003-0022 and subsequent amendments.



3/1/2011

Angelo Obertello, P.E.
RCE# 64345 Expires 06/30/2011

Date

Appendix A
Treatment Area Calculations

Carlson, Barbee
& Gibson, Inc.
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February 28, 2011
Job No.: 1525-000

TREATMENT AREA CALCULATIONS
Danville Hotel
Danville, California

I. Calculate Required Total IMP Area, for treatment only, for the entire proposed site.

Using Table 4-7

$Total_{REQ}$ IMP Area = Impervious Areas x 0.04

Impervious Areas =	54,012 SF *(Entire Site)*
Hydrologic Soil Group =	C
Flow Through Planter Sizing Factor =	0.04

Total IMP Area = 54,012 SF x 0.04

$Total_{REQ}$ IMP Area = 2,160 SF

II. Identify Proposed On-Site IMP Areas *(See Exhibit 3)*

Raised Flow Through Planters =	462 SF
Flush Flow Through Planters =	706 SF

Proposed On-Site IMP Area = 1,168 SF 54% of Site

III. Identify Proposed Off-Site IMP Areas

Provide Treatment Areas Off-Site Equivalent to Off-Site IMP Area *(See Exhibit 4)*

(Per the alternative or in-lieu compliance requirements in Section C.3.e of the 2009 MRP)

Proposed Off-Site IMP Area = 992 SF 44% of Site

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Project Name: Danville Hotel
Project Type: Treatment Only
Location: Danville, CA
APN: N/A
Drainage Area: 56524 sf
Mean Annual Precipitation: 22.5 in

IV. Areas Draining to IMPs

IMP Name: IMP1 (Soil Type: C)

IMP Type: Flow-Through Planter
Soil Type: C

DMA Name	DMA Area (sq ft)	Post-Project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor
DMA1	32,600	Conventional Roof	1.00	32,600
DMA2	21,412	Concrete or Asphalt	1.00	21,412
			Total	54,012
			Area	

IMP Sizing			
IMP Sizing Factor	Rain Adjustment Factor	Minimum Area or Volume	Proposed Area or Volume
0.040	1.000	2,160	1,168 *

* REMAINING 992 SF TO BE PROVIDED OFF-SITE OR THROUGH AN IN-LIEU FEE.

Appendix B
Flow Control Volume Calculations

RAISED FLOW THROUGH PLANTER ALTERNATIVE

Project Name: Danville Hotel
Project Type: Treatment and Flow Control
Location: Danville, CA
APN: N/A
Drainage Area: 952 sf
Mean Annual Precipitation: 22.5 in

IV. Areas Draining to IMPs

IMP Name: IMP1 (Soil Type: C)

IMP Type: Flow-Through Planter
Soil Type: C

DMA Name	DMA Area (sq ft)	Post-Project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor
DMA1	952	Conventional Roof	1.00	952
			Total	952

IMP Sizing	IMP Sizing Factor	Rain Adjustment Factor	Minimum Area or Volume	Proposed Area or Volume
Area	0.060	0.916	52	135
Surface Volume	0.050	0.916	44	68
Subsurface Volume	0.066	0.916	58	135
Maximum Underdrain Flow (cfs)				0.00
Orifice Diameter (in)				0.24

HMP OPTION 2 FOR INCREASE TO IMPERVIOUS AREAS ONLY

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February 28, 2011
Job No.: 1525-000

FLOW CONTROL VOLUME CALCULATIONS
Underground Pipeline Alternative
Danville Hotel
Danville, California

I. The following are preliminary calculations to identify the approximate required volume of the proposed flow-control facilities as underground pipelines.

A. Compare Pre-Project and Post-Project Impervious Area

Pre-Project Impervious Area = 53,060 SF *(See Exhibit 1)*
Post-Project Impervious Area = 54,012 SF *(See Exhibit 2)*

1.7% Increase

B. Calculate Required Flow Control Volume

- For an area equivalent to the pre-project impervious areas (53,060 SF) utilize Flow Control Option 1.
- For the increase in impervious area, use Flow Control Option 2 to calculate the required volume.

Use Equation 4-5

$$\text{IMP Required Volume} = \left(\begin{matrix}\text{DMA Square}\\ \text{Footage}\end{matrix} \times \begin{matrix}\text{DMA Runoff}\\ \text{Factor}\end{matrix}\right) \times \left(\begin{matrix}\text{IMP Sizing}\\ \text{Factor}\end{matrix}\right) \times \left(\begin{matrix}\text{Rain Adjustment}\\ \text{Factor}\end{matrix}\right)$$

DMA Area = 952 SF *(Increase to Impervious Area Only)*
DMA Runoff Factor = 1 *(ROBF of Concrete)*
IMP Sizing Factor = 0.152 *(Table 4-8 V_2 for Vault, Soil Group C)*
Rainfall Adjustment Factor = Equation 4-8

$$\text{Rain Adjustment} = \frac{-0.0022 \times (22.5 - 20.2) + 0.06}{0.06}$$

$$\frac{-0.0051 + 0.06}{0.06} = 0.92$$

$$\text{IMP Required Volume} = [(952)\,(1)] \times [(0.152)\,(0.92)]$$

Required IMP Volume = 133 CF

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C. Calculate Provided Flow Control Volume

Assume 45 LF of 24" Pipe *(See Exhibit 5)*

$V = 45 \times \pi (1)^2$

Provided Volume = 141 CF

Provided Volume = 141 CF > Required Volume = 133 CF ✓ Okay

Appendix C
Conceptual Flow Through Planter Details

Carlson, Barbee & Gibson, Inc.
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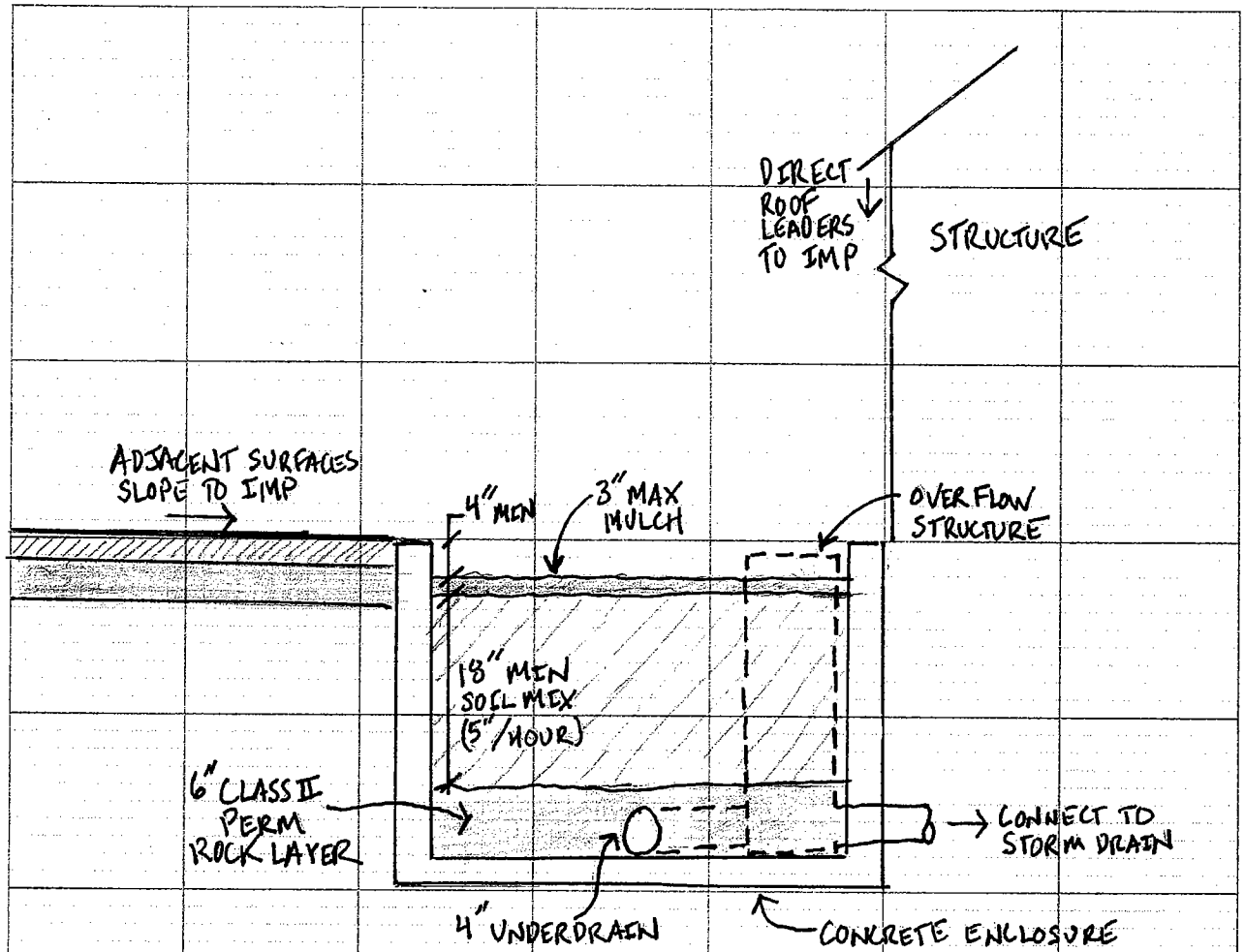
Project Name: DANVILLE HOTEL
Job #: 1525
Date: 2/15/11
By: AJO



FLUSH FLOW THROUGH PLANTER

N.T.S.

TREATMENT ONLY

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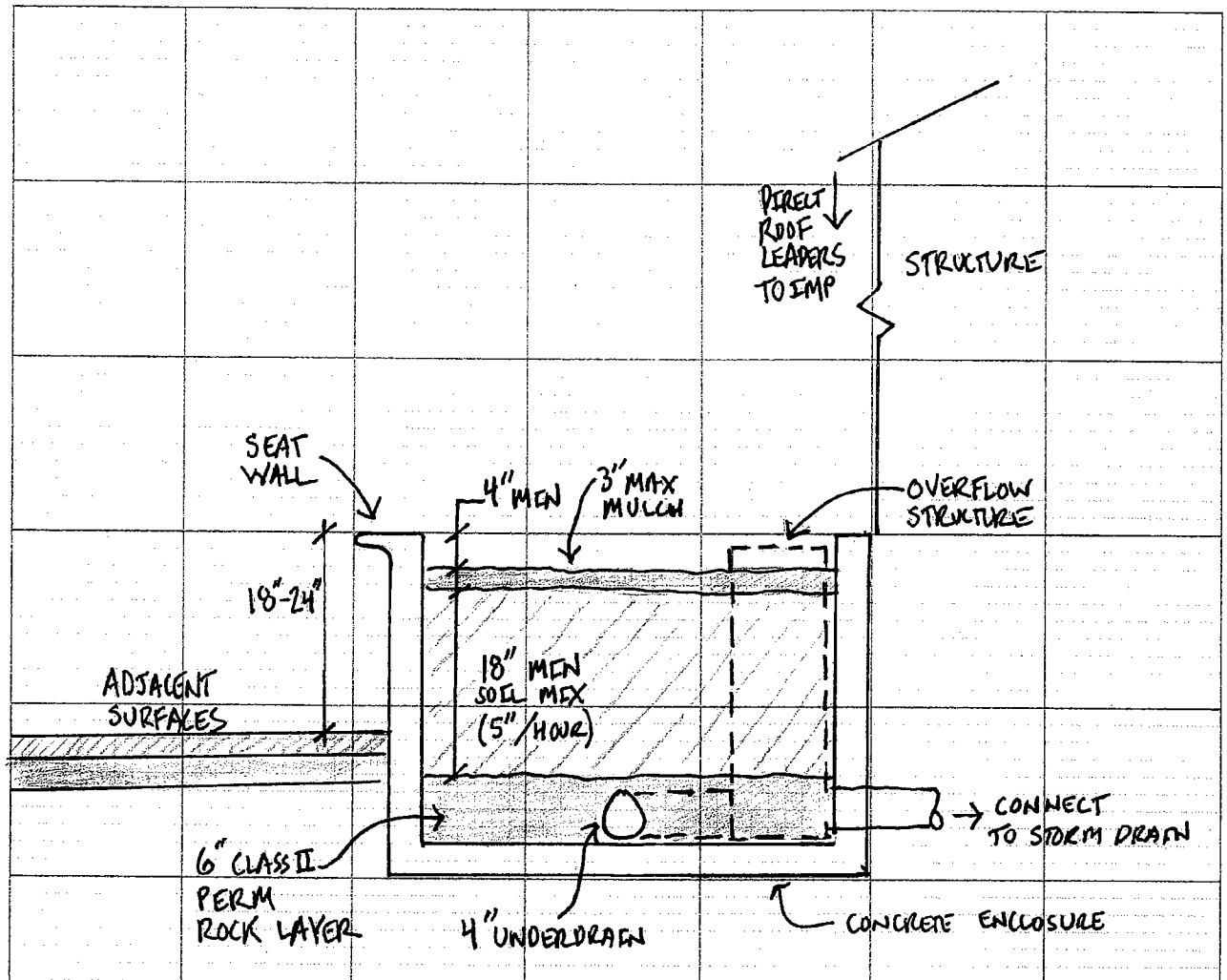
Project Name: DANVILLE HOTEL
Job #: 1525
Date: 2/15/11
By: AJO



RAISED FLOW THROUGH PLANTER

N.T.S.

TREATMENT ONLY

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Project Name: DANVILLE HOTEL
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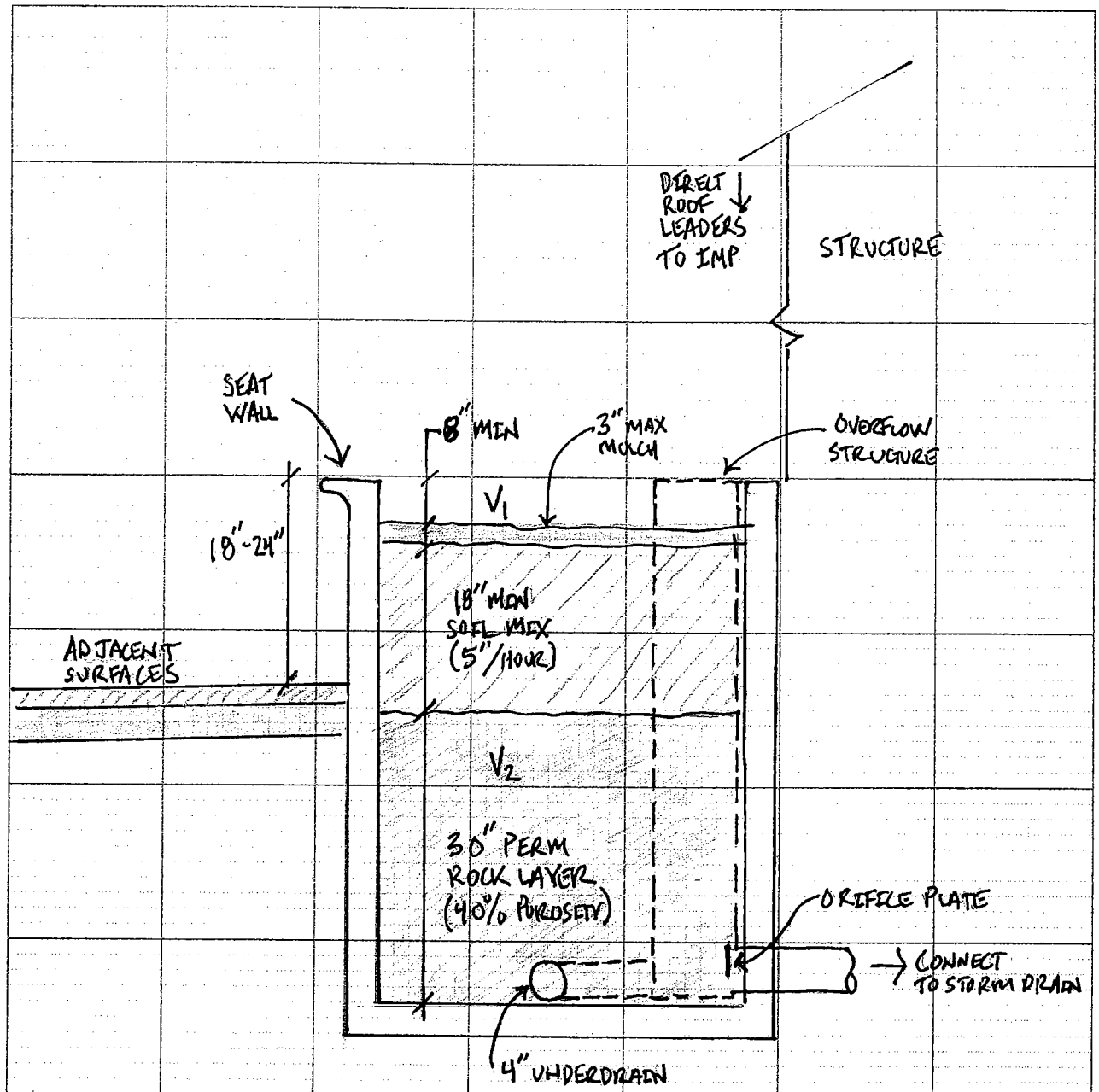

RAISED FLOW THROUGH PLANTER

N.T.S.

TREATMENT AND FLOW CONTROL

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Appendix D
Guidance on Flow Control Memorandum

TECHNICAL MEMORANDUM

To: **Contra Costa Clean Water Program**
C.3 Implementation Work Group

From: Dan Cloak

Subject: Guidance on Flow Control for Development Projects on Sites that are Already Partially Developed

Date: 10 March 2009

Introduction

This memorandum describes and illustrates a rationale for applying the NPDES permit flow-control standard in situations where the site to be developed is already partially impervious, and the total impervious area is to be increased compared to the current condition of the site.

In Regional Water Board Order R2-2006-0050, the flow-control standard is to:

"...ensure estimated post-project runoff peaks and durations do not exceed estimated pre-project peaks and durations if increased stormwater runoff peaks or durations could cause erosion or other significant effects on beneficial uses."

Under Option 1 for compliance with the flow-control standard, an applicant:

"...may compare the project design to the pre-project condition and show the project will not increase impervious area and also will not facilitate the efficiency of drainage collection and conveyance."

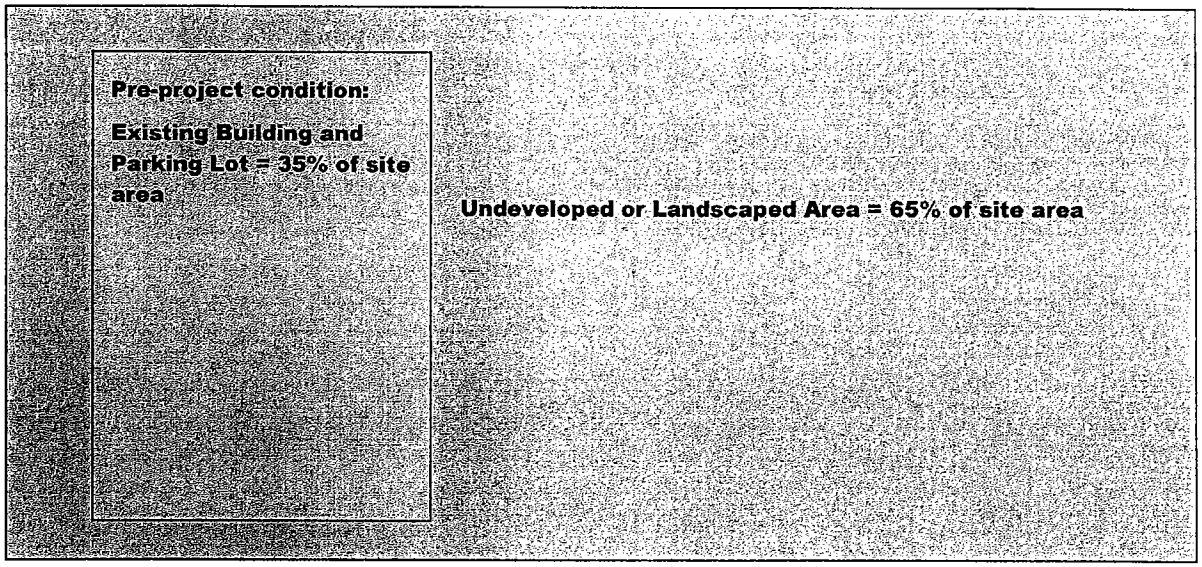
Under Option 2 for compliance with the flow-control standard, an applicant:

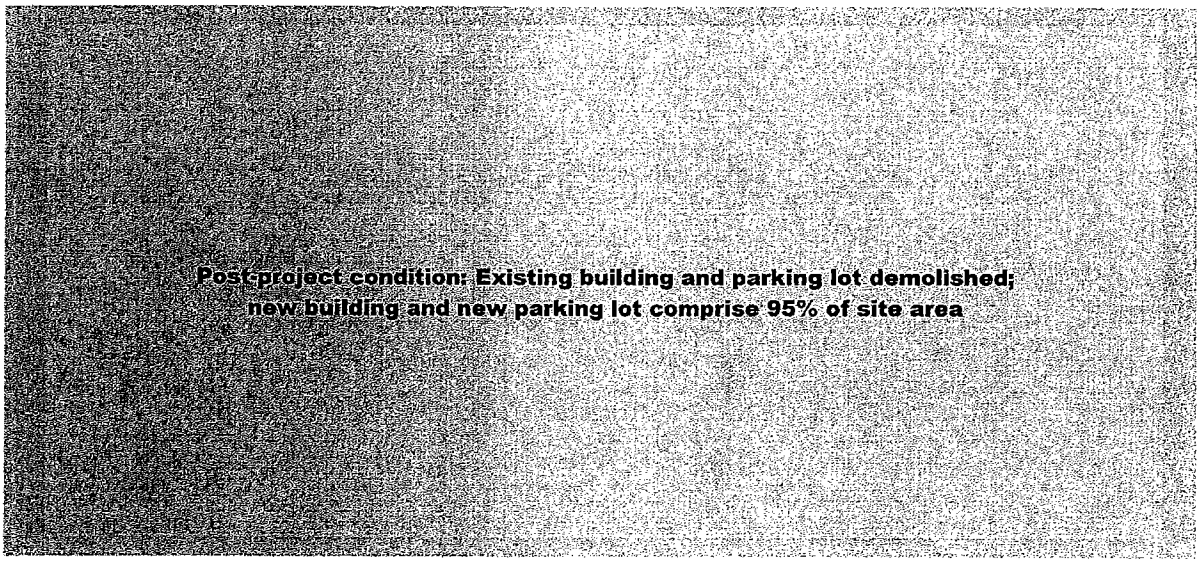
"...may select and size IMPs to manage hydrograph modification impacts, using the design procedure, criteria, and sizing factors specified in the Contra Costa Clean Water Program's *Stormwater C.3 Guidebook.*"

For development projects on sites that are already partially developed, the following question may arise: May an applicant demonstrate compliance under Option 1 for the previously developed portions of the site, and demonstrate compliance under Option 2 (or perhaps Option 3, site-specific continuous simulation modeling) for the as-yet undeveloped portions of the same site?

Example

Consider a 10-acre site which is currently 35% impervious. The applicant proposes to demolish and replace the existing impervious portion of the site and also to build additional impervious area, bringing the total impervious area to 95% of the site area. Flow-control requirements apply to the entire site.





In this example, can the applicant be allowed to match the hydrology of the pre-project condition, including the previous site imperviousness?

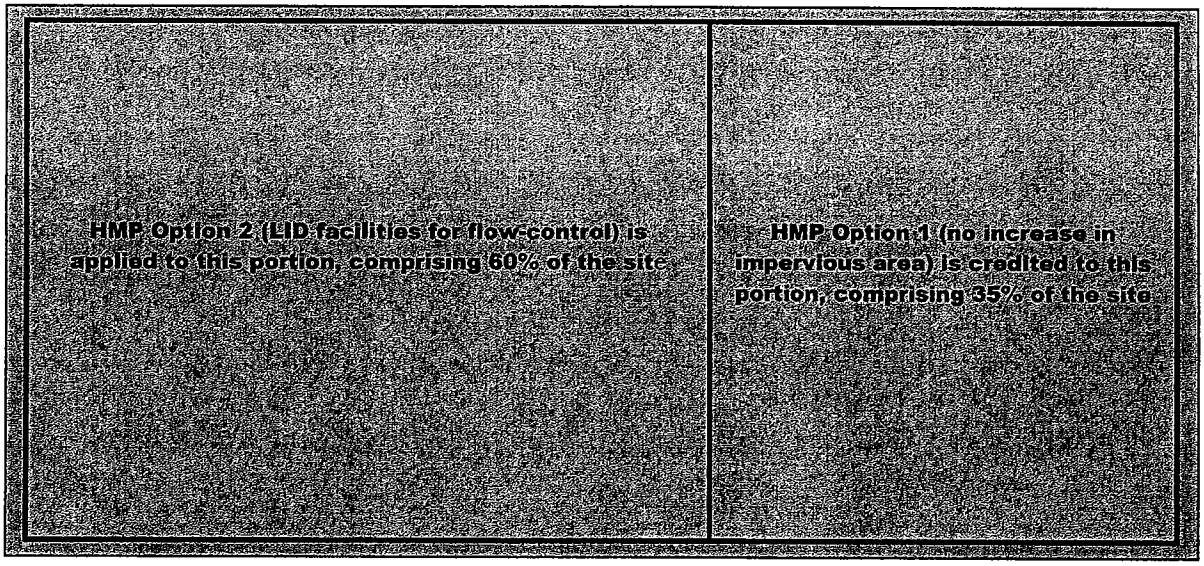
Rationale

The standard requires that estimated post-project runoff peaks and durations *from the site as a whole* do not exceed estimated pre-project peaks and durations.

Consider two cases:

Case 1: The previously existing imperviousness could be accounted for by considering the two portions of the site separately: One portion is to redevelop the existing impervious area, and the other portion is to develop portions of the remaining existing landscaped area. Option 1 for compliance with the flow control standard could apply to the first portion and Option 2 to the second portion.

Case 2: Equivalently, the two options could be assigned in the same proportions to different areas of the site, while having the same effect on overall site runoff:



In either case, the NPDES permit standard is met: For the site as a whole, runoff will not exceed pre-project peaks and durations.

If the applicant were to create a model and simulate and compare runoff from the site in its pre-project and post-project condition (Option 3 for compliance with the flow-control standard), the result would be the same.

Guidance

Where the pre-project condition of the site is partially impervious, Copermittees may consider the following alternatives, all of which comply with the flow-control standard in the NPDES permit:

1. Require LID facilities designed for treatment-and-flow-control for all impervious areas created or replaced. This is a conservative approach.
2. Allow an amount of impervious area not to exceed the previously existing impervious area to drain to LID facilities designed for treatment only, and require the remaining impervious area drain to LID facilities designed for treatment and flow control. This is also a conservative approach, as the treatment-only facilities also provide substantial flow-control.
3. In rare cases, as described in "Selection of Stormwater Treatment Facilities" on page 16 of the Fourth Edition of the *Stormwater C.3 Guidebook,* an applicant may propose to use higher-rate facilities such as "tree-box" biofilters or cartridge filters. In such a case, the applicant could allow a total amount of impervious area not to exceed the previously existing impervious area to drain to these higher-flow-rate treatment facilities and require the remaining impervious area drain to LID facilities designed for treatment and flow-control. The applicant would also need to demonstrate the portion of the drainage system tributary to higher-flow-rate treatment facilities does not "facilitate the efficiency of drainage collection and conveyance" when compared to the pre-project condition.

Exhibits

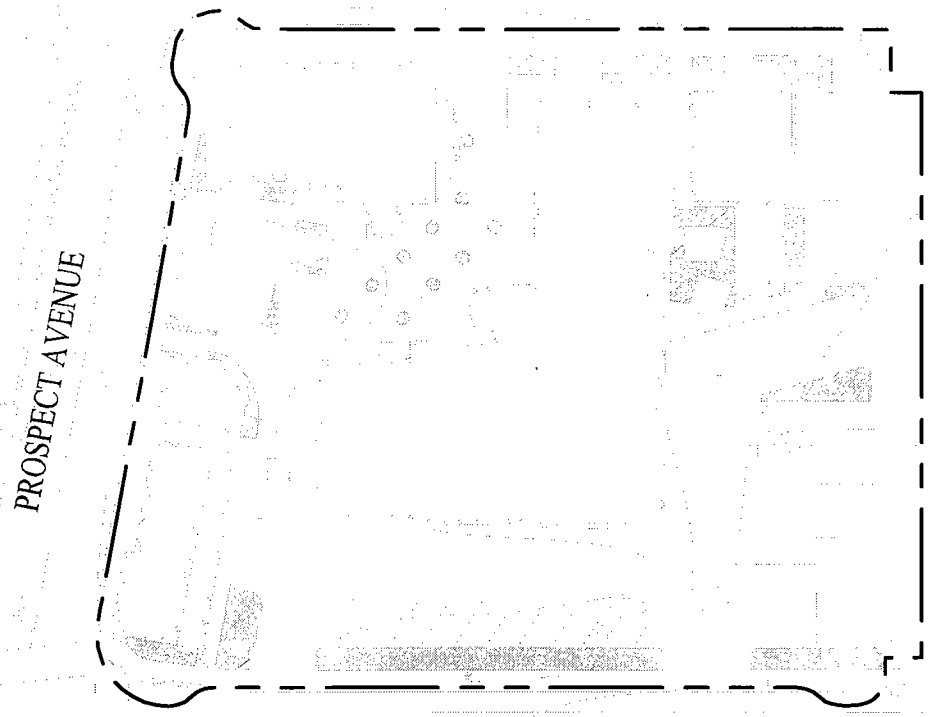


EXHIBIT 1
EXISTING CONDITION
IMPERVIOUS AREAS
DANVILLE HOTEL

TOWN OF DANVILLE CONTRA COSTA COUNTY CALIFORNIA

DATE: FEBRUARY 11, 2011 SCALE: 1" = 60'

EXISTING

DESCRIPTION	AREA (SF)±
PERVIOUS	3,464
IMPERVIOUS	53,060
TOTAL	56,524

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SAN RAMON, CALIFORNIA 94583
(925) 866-0322
FAX (925) 866-8575
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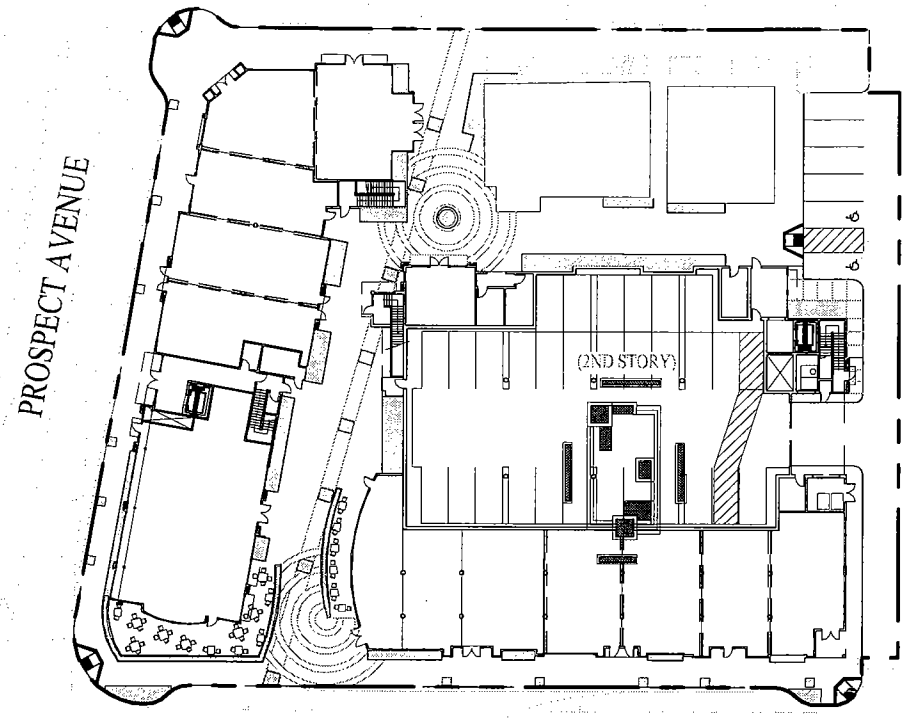
HARTZ AVENUE



RAILROAD AVENUE

PROPOSED

DESCRIPTION	AREA (SF)±
PERVIOUS	2,512
IMPERVIOUS	54,012
TOTAL	56,524

EXHIBIT 2
PROPOSED CONDITION
IMPERVIOUS AREAS
DANVILLE HOTEL

TOWN OF DANVILLE CONTRA COSTA COUNTY CALIFORNIA

DATE: FEBRUARY 11, 2011 SCALE: 1" = 60'

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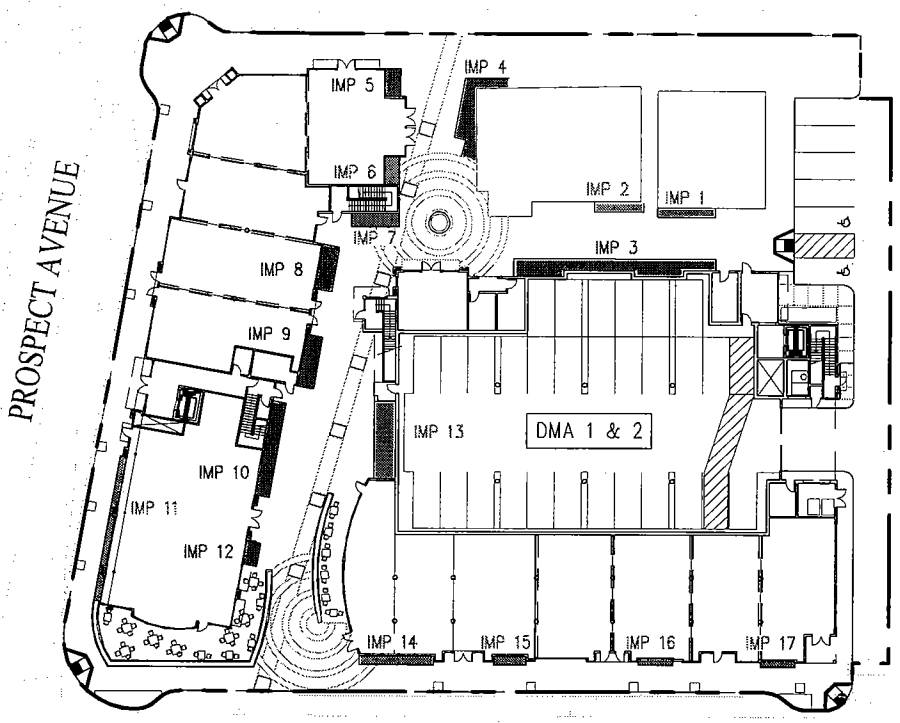
HARTZ AVENUE



RAILROAD AVENUE

TREATMENT AREAS

DESCRIPTION	AREA (SF)±
PROPOSED (FLUSH)	706
PROPOSED (RAISED)	462
PROPOSED ON-SITE	1,168 (54%)
PROPOSED OFF-SITE	992 (46%)
REQUIRED	2,160

EXHIBIT 3
PROPOSED ON-SITE
TREATMENT AREAS
DANVILLE HOTEL

TOWN OF DANVILLE CONTRA COSTA COUNTY CALIFORNIA

DATE: FEBRUARY 15, 2011 SCALE: 1" = 60'

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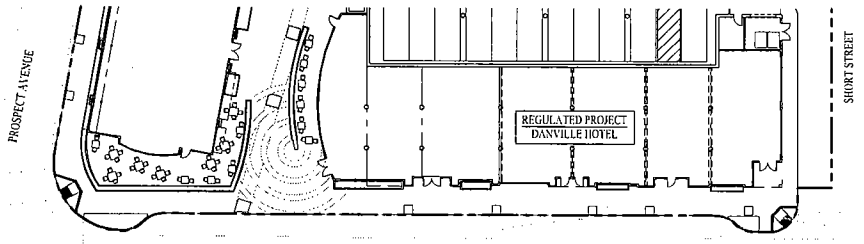
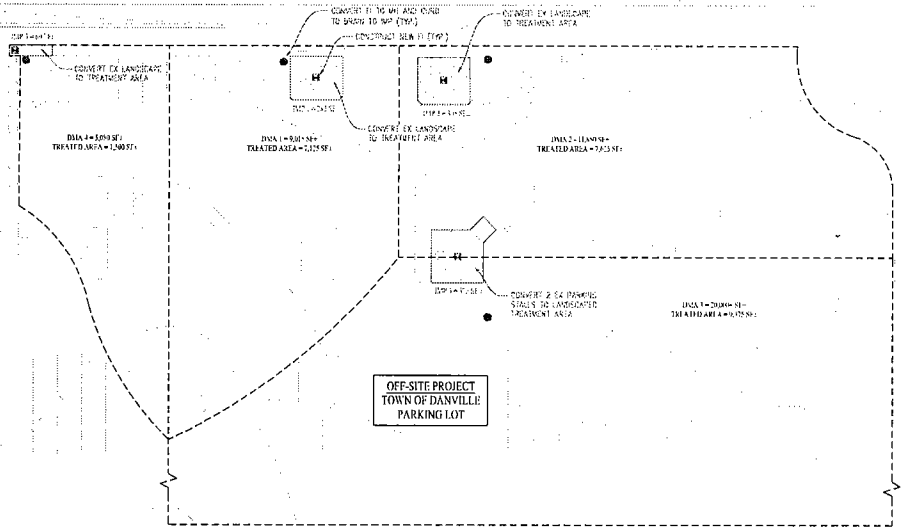


RAILROAD AVENUE



OFF-SITE TREATMENT AREAS

DESCRIPTION	AREA, SF±	TREATED AREA (4%), SF±
IMP 1	285	7,125
IMP 2	305	7,625
IMP 3	375	9,375
IMP 4	60	1,500
TOTAL	1,025	25,625
REQUIRED	992	24,800

EXHIBIT 4
CONCEPTUAL OFF-SITE
TREATMENT AREAS
DANVILLE HOTEL

TOWN OF DANVILLE CONTRA COSTA COUNTY CALIFORNIA

0' 20' 60' 80'

SCALE: 1" = 20' DATE: FEBRUARY 14, 2011

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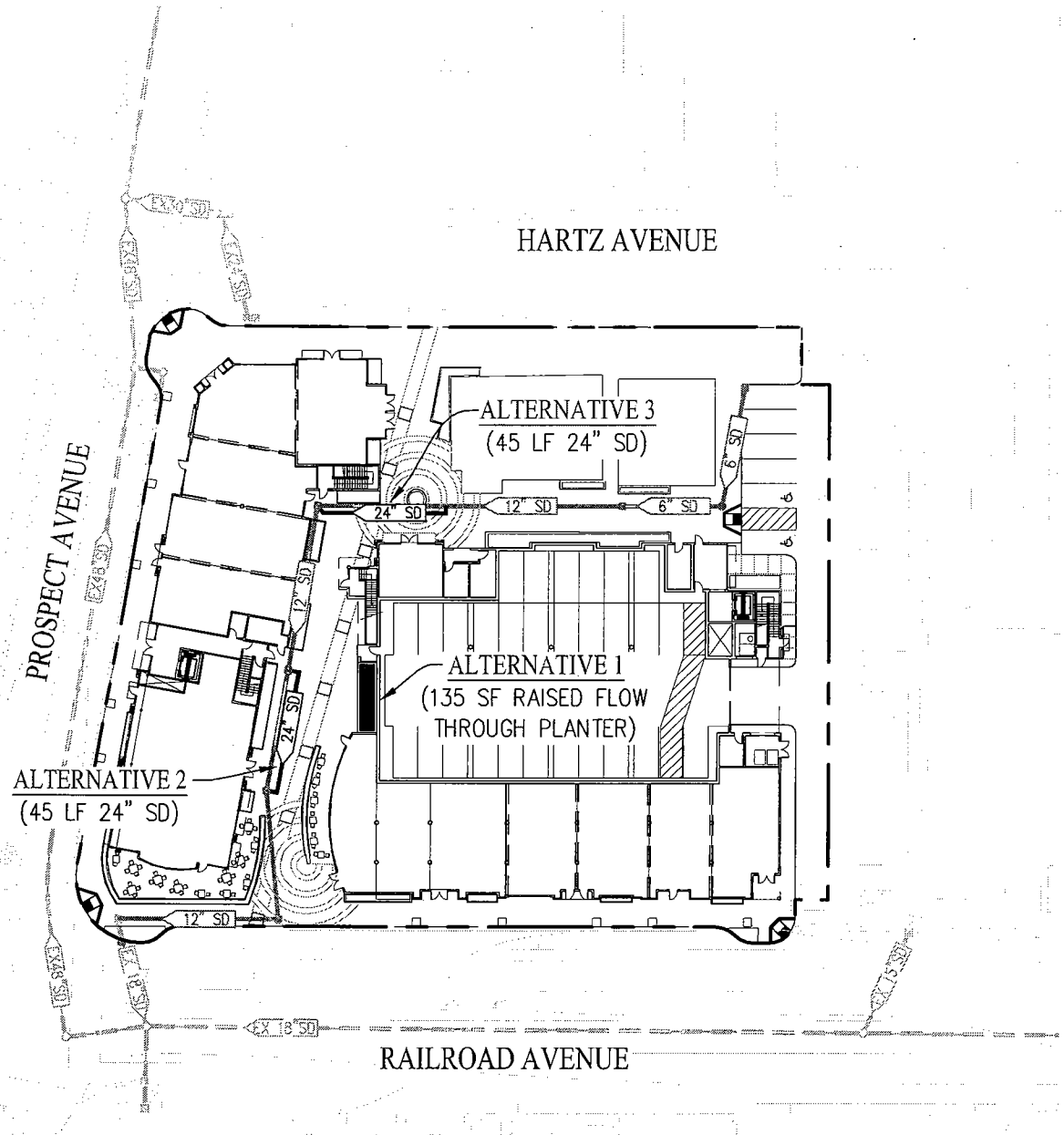

EXHIBIT 5
FLOW CONTROL FACILITIES
ALT LOCATIONS
DANVILLE HOTEL

TOWN OF DANVILLE CONTRA COSTA COUNTY CALIFORNIA

DATE: FEBRUARY 15, 2011 SCALE: 1" = 60'

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Carlson, Barbee
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CIVIL ENGINEERS • SURVEYORS • PLANNERS

March 2, 2011
Job No.: 1525-000

MEMORANDUM

TO: Kevin Gailey – Town of Danville
Chris McCann – Town of Danville

FROM: Angelo J. Obertello, P.E., LEED AP, Project Manager

CC: Michael Stella – Town of Danville
Steve Garrett – Castle Companies

SUBJECT: Responses to Comments for the Preliminary Stormwater Control Plan
Danville Hotel
Danville, California

The following are responses to the comments in your February 26th memo:

Comment 1. Michael Stella, Senior Engineer will need to check the HMP detention calculations to verify that they are correct in the SCP. Michael will be out of the office at mandatory training until Thursday, March 2, 2011 so his comments will not be forthcoming until late next week or early the following week.

Response: *We will address any additional comments once they are available.*

Comment 2. The width of IMP-11 does not seem to be sized to properly function. This may be the case for other planters if they are similar in size.

Response: *IMP 11, 16 and 17 are proposed to be flow-through planters providing treatment only and are less than 2 feet wide. The C.3 Guidebook does not indicate a minimum width for this type of facility. We understand that the final design will need to demonstrate that these facilities can function properly. The roof downspouts, plantings and overflow structures will need to be carefully placed to ensure the drainage is adequately dispersed and treated within the planter. These details will be addressed during the final design.*

Comment 3. Verification needs to be supplied from the landscape architect that appropriate plants (which are consistent with the plant list in the C.3. Guidebook) can be provided for the proposed planters' – given the planter sizes, shapes and locations.

Response: *We will coordinate with the Landscape Architect to ensure the proposed plantings within the flow-trough planters are consistent with the C.3 Guidebook. The plantings will also be selected to ensure they are appropriate for the planter shapes and locations.*

Comment 4. The IMP calculator for Treatment and Flow Control uses a Flow-Through-Planter as the IMP Type - it should be a "Cistern" for these calculation purposes. If the changeover affects the results the alternate results need to be forwarded to the Town.

Response: *There a 2 alternative methods of providing the necessary HMP storage to meet the flow control requirements for the project. These alternatives are presented in the report and include either constructing IMP 13 as a flow-through planter providing both treatment and flow control, or constructing an underground tank (series of buried pipelines). The calculations supporting the first alternative utilize the IMP sizing calculator for a flow-through planter and specify both treatment and flow control requirements. These calculations demonstrate the required surface and sub-surface volumes in order to comply with the flow control requirements. IMP 13 would be constructed consistent with the flow-through planter "Treatment and Flow Control" detail included in Appendix D of the Preliminary SWCP. This detail demonstrates the sub-surface volume is provided by the voids within a 30-inch deep section of Class II drain rock. There is no cistern as part of this system and therefore, the calculations do not need to be updated.*

Comment 5. The ponding depth detailed in the IMP drawings is not consistent with the C.3. Guidebook recommendations. The ponding depth needs to be deepened to match the Guidebook. The detail needs to be corrected and a note needs to be added to specify that the soil mix to be used will align with the recommended mix called out in the most current version of the C.3 Guidebook at the time of construction.

Response: *Please see enclosed Pages 79 & 80 from the C.3 Guidebook. These outline the recommended design parameters for a flow-through planter in a treatment only condition. These parameters indicate that a 4-inch depth to the planter surface is acceptable when adjacent to walkways. We have proposed the treatment only planter surfaces be 4-inches deep because they are typically adjacent to walkways.*

The soil mix will be identified on the construction details within the final design documents. We will include a note on those details indicating the soil mix must align with the recommendations of the current version of the C.3 Guidebook at the time of construction.

Comment 6. The entries in Rows 2 and 3 of Table 1 of the Plan need to be recalculated. Pursuant to comments from Chris McCann, Cleanwater Program Coordinator, Row 2 entry "Existing Impervious Areas to be Demolished With Project Construction" should be the entry for Row 1 less the footprint for the portions of the historic structures to be retained and the existing landscape areas (largely along Hartz Avenue) that will be retained (i.e., total should be the actual square footage of that portion of impervious surface area that is to be taken down to dirt). This may be the number cited (i.e., "49,555 sf") – but it isn't clear. Pursuant to comments from Chris, Row 3 entry "Proposed Impervious Areas to be Added After Demolition" should be the amount of impervious surfaces to be built back upon the area cited in Row 2. Working off the two CBG exhibits tabulating "Existing" and "Proposed" Impervious Areas, it would intuitively seem that the entry into Row 3 should be 960 square feet larger than the entry in Row 2 as the demolition work will put back into the area taken down to bare dirt (which is both impervious and pervious area – totaling larger than the entry in Row 2) a total of 960 net additional impervious surface.

Response: *The proposed site plan increases the amount of impervious areas by 952 sf as compared to existing site conditions. We have updated Table 1 to provide the appropriate areas for each row as requested.*

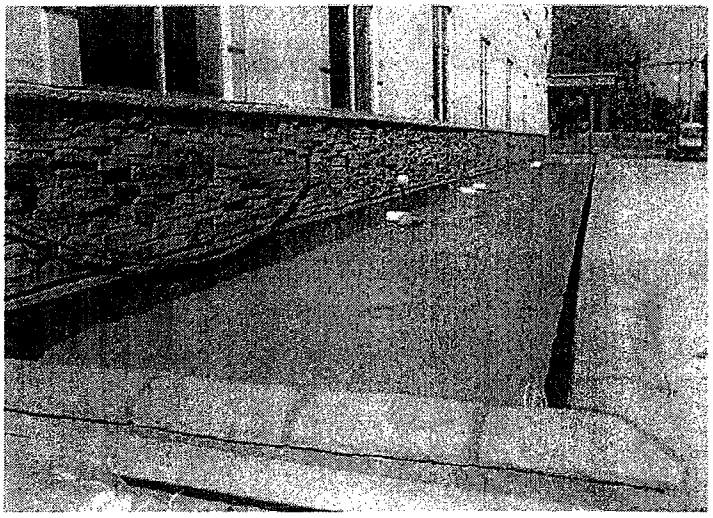
Comment 7. Row 4 would seem to need to be 54,020 sf - if it is to be 960 sf larger than the entry in Row 1 (to align with the two CBG exhibits tabulating "Existing" and "Proposed" Impervious Areas).

Response: *The proposed site plan increases the amount of impervious areas by 952 sf to a total of 54,012 sf. Table 1 has been updated accordingly.*

Comment 8. The detail provided for the flush planter indicates a 4" ponding depth where the standard specifications for these types of facilities call for a 6" ponding depth – being 2 inch" freeboard and 4"ponding depth. Detail should be modified to match the standard specifications. [Note: Preliminary Landscape Plans for project provide a more detailed planter detail. CBG should contact Samantha Haimovitch with Gates + Associates so landscape planter "details" can be coordinated.]

Response: *Please see the response to comment (5) above. We will coordinate final details of the flow-through planters with Gates and Associates during the final design stage of the project.*

Flow-through Planter



Planter prior to planting

Flow-through planters treat and detain runoff without allowing seepage into the underlying soil. They can be used next to buildings and on slopes where stability might be affected by adding soil moisture.

Flow-through planters typically receive runoff via downspouts leading from the roofs of adjacent buildings. However, they can also be set in-ground or fit into terraces and receive sheet flow from adjacent paved areas.

Flow-through planters may be used where facilities are located on upper-story plazas, adjacent to building foundations, where seasonal high groundwater would be within 10 feet of the facility, where mobilization of pollutants in soil or groundwater is a concern, and where potential geotechnical hazards are associated with infiltration.

5th Edition

The restriction on where flow-through planters may be used applies to sites subject to treatment-only requirements as well as those subject to treatment-plus-flow-control requirements.

Pollutants are removed as runoff passes through the soil layer and is collected in an underlying layer of gravel or drain rock. A perforated-pipe underdrain must be connected to a storm drain or other discharge point. An overflow outlet conveys flows which exceed the capacity of the planter.

► CRITERIA

Treatment only. For development projects subject only to runoff treatment requirements, the following criteria apply:

Best Uses

- Management of roof runoff
- Next to buildings or on building plazas
- Dense urban areas
- Where infiltration is not desired

Advantages

- Can be used on or next to structures and on slopes
- Versatile
- Can be any shape
- Low maintenance

Limitations

- Can be used only on sites with "C" and "D" soils
- Requires underdrain
- Requires 3-4 feet of head

CONTRA COSTA CLEAN WATER PROGRAM

Stormwater C.3 Guidebook

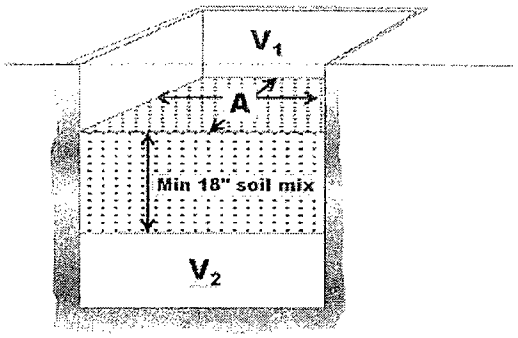
www.cccleanwater.org

Parameter	Criterion
Soil mix depth	18 inches minimum
Soil mix	See Appendix 3
Soil mix surface area	0.04 times tributary impervious area (or equivalent)
Surface reservoir depth	6" minimum; may be sloped to 4" where adjoining walkways.
Underdrain	Required. Perforated pipe (PVC SDR 35 or approved equivalent) embedded in gravel ("Class 2 permeable" recommended), connected to storm drain or other accepted discharge point.

Treatment and flow control. In addition to the treatment requirements above, the flow-through planter must be designed to meet the minimum surface area (A), surface volume (V_1), and subsurface volume (V_2) calculated using the sizing factors and Equation 4-5. In addition, the planter underdrain must be equipped with an orifice or other device to limit flow to that calculated by Equation 4-10 or 4-11. A suggested outlet design is on page 83.

▶ DETAILS

Configuration. In a vertical-sided box-like planter for treatment-and-flow-control with the minimum surface area A, the minimum surface volume V_1 can be achieved with an overflow height of 10" (12" total height of walls with 2" of freeboard). The minimum subsurface volume V_2 can be achieved with a gravel (Class 2 permeable) depth of 30". This combination results in a planter approximately 5' high. The planter height can be reduced by incorporating void-creating structures into a shallower Class 2 permeable layer or by increasing the planter area so that the minimum V_2 is achieved.



Parameters for flow-through planters for treatment and flow-control: A, V1, and V2

The planter must be level. To avoid standing water in the subsurface layer, set the perforated pipe underdrain and orifice as nearly flush with the planter bottom as possible.

Inlets. Protect plantings from high-velocity flows by adding rocks or other energy-dissipating structures at downspouts and other inlets.

Soil mix. The required soil mix is similar to a loamy sand. It must maintain a minimum percolation rate of 5" per hour