DEVELOPMENT AND REMODELING PROJECTS

Storm Water Best Management Practices

Chapter 6 of the Best Management Practices Manual for the City's Storm Water Management Program

Planning Department
Public Works Department
809 Center Street, Santa Cruz, CA 95060

Revised March 2012
Initial Publication: March 8, 2004
Authorized by Municipal Code Chapter 16.19

TABLE OF CONTENTS

Background.....2

Applicability 2

State of CA Construction Activities Storm Water General Permit.....……3

Part I

Low Impact Development (LID)…….……..…..4

Storm Water and LID Assessment Checklist……..……7

Part II

Best Management Practices:

1. Peak Storm Water Runoff Discharge Rates.....……9
2. Conserve Natural Areas 9
3. Protect Slopes and Channels.....9
4. Provide Storm Drain System Stenciling and Signage.....10
5. Properly Design Material Storage Areas 10
6. Properly Design Trash Storage Areas.....10
7. Properly Design Parking Lot Areas 11
8. Minimize Storm Water Pollutants of Concern.....11
9. Structural and Treatment Control BMPs 12
10. Provide Proof of Ongoing BMP Maintenance.....12
11. Additional Requirements For Restaurants and Food Processing/Manufacturing Facilities Including Wineries.....14
12. Additional Requirements For Retail Gasoline Outlets and Other Fueling Areas.....14
13. Additional Requirements For Automotive Repair Shops 15
14. Additional Requirements For Commercial and Industrial Developments Equal to or Greater Than 1 Acre.....17
15. Waiver.....17
16. Limitation on Use of Infiltration BMPs.....17

City Contacts 17

Appendices

Appendix A: Definitions.....18

Appendix B: Resources and References.....19

Appendix C: Examples of Best Management Practices 20

Appendix D: Unit Basin Storage Volume Sizing Curves-For Design of Wet Ponds and Extended Detention Basins……..……...21

Appendix E: Maintenance Agreement……..……23

STORM WATER BEST MANAGEMENT PRACTICES FOR DEVELOPMENT AND REMODELING PROJECTS

BACKGROUND

State and federal storm water regulations require development and remodeling projects in the City to incorporate design standards and Best Management Practices (BMPs) in order to reduce storm water pollution and minimize the potential for erosion. The City developed these mandatory BMPs, based on the minimum design standards from Attachment 4 of the State of California General Permit for Discharges of Storm Water from Small Municipal Separate Storm Sewer Systems (State Storm Water General Permit), in order to reduce storm water pollution from development and remodeling projects. Low Impact Development (LID) design BMPs are also included so that, once developed or redeveloped, a site may retain and infiltrate as much rainwater as possible-ideally comparable to the predevelopment conditions. Both pollution prevention and LID BMPs should be addressed during the project's initial planning process to ensure that they are incorporated into a project's design from the beginning.

APPLICABILITY

1. All development and remodeling projects must comply with the Low Impact Development requirements in Part #1 of these BMPs. This applies to ALL projects including residential (including single and duplex dwellings), commercial, and industrial projects.

2. Multi-Family Housing Developments of 3 to 9 units: All new construction projects are subject to Part 1. Also, all new construction projects are subject to Part 2, Section 6 "Properly Design Trash Storage Areas" although exemptions to specific items may be granted.

3. Any new development and remodeling project that falls into one of the following categories must comply with ALL the requirements in Part #1 and Part #2 of these BMPs:

- ***Hillside Residences*** *(Includes single-family homes, apartments, condos, townhouses, and mobile homes)*
- ***Housing Developments of 10 or more units*** *(Includes single or multi-family homes, apartments, condos, townhouses, and mobile homes)*
- ***Automotive Repair Shops***
- ***Retail Gasoline Outlets***
- ***Restaurants, Grocery Stores, and Food Processing/Manufacturing Facilities including Wineries***
- ***Parking lots*** *5,000 square feet or more in size, or with 25 or more parking spaces & potentially exposed to storm water runoff*
- ***Commercial and Industrial Developments*** *Equal to or Greater Than 1 Acre*
- ***All development and redevelopment projects per Attachment 4*** *from the State Storm Water General Permit*

4. All development and remodeling projects adjacent to a river, creek or wetland shall comply with the requirements specified in the City-wide Creeks and Wetlands Management Plan. In addition, no City development projects on City-owned property shall be permitted within 30 feet of a wetland without an approved project-specific Habitat Management Plan and a Site-specific Water Quality Management Plan.

State Storm Water General Permit for Construction and Land Disturbances Activities

Please be aware that the State of California requires that **construction sites equal to or greater than one acre or less than one acre but part of a larger common plan of development or sale** to obtain coverage under the state's Construction Activities Storm Water General Permit. The landowner is responsible for filing a Notice of Intent (NOI) with the State Regional Water Quality Control Board (RWQCB) and for developing a Storm Water Pollution Prevention Plan (SWPPP) prior to commencement of any soil disturbing activities. For more information about the Construction Activities Storm Water General Permit, please refer to the State Water Quality Control Board website at:

http://www.swrcb.ca.gov/stormwtr/construction.html.

Therefore, **in order to obtain a construction or building permit from the City** for a construction site that falls into this category, an applicant must provide the City with proof of coverage under the state's Construction Activities Storm Water General Permit. Proof of coverage shall include a copy of the letter of receipt and Waste Discharger Identification (WDID) number issued by the State Water Quality Control Board (SWQCB) that acknowledges the property owner's submittal of a complete Notice of Intent (NOI) package. Therefore, please allow sufficient time for the RWQCB/SWQCB to process your NOI package prior to applying for a construction or building permit from the City.

STORM WATER BEST MANAGEMENT PRACTICES

PART 1: Storm Water LID Requirements

Low Impact Development (LID)

Intent

Low Impact Development (LID) design aims to mimic the pre-project site hydrology as well as to protect water quality. The goals include retaining and infiltrating as much rainwater as possible onsite--comparable to the predevelopment conditions.

Good LID design incorporates site planning, low impact development (LID) design, and structural practices to achieve performance objectives. Project applicants should first utilize site planning and site design (non-structural) methods to disperse and infiltrate runoff from impervious surfaces. This can reduce or eliminate the runoff volume for which structural BMPs (e.g., bio-retention facilities) may be needed. Lastly, once LID goals are achieved, pollutant controls must be also be considered. The mandatory LID requirements for development or remodeling projects are listed below.

LID Implementation Requirements

Tier 1- Single family and duplex residential dwelling projects must comply with the Sections #1-4 and are exempted from Sections # 5-6 below.

Tier 2- Projects without surface parking modifications (except for those required for emergency vehicle access, ADA accessibility, passenger and freight loading zones, and other incidental parking functions) and projects designed with total lot coverage with permanent structures must comply with Sections #1-4 and may request an exemption from meeting the requirements in Sections #5-6 below.

If an exemption is granted, the project shall instead implement LID to the extent practicable on the site. Requests for an exemption must be accompanied by a written description of LID methods to be implemented along with an explanation of why other LID methods are not possible or feasible at the site. Requests must be submitted to Public Works Engineering.

Tier 3- All other projects must comply with the Sections #1-6 below.

1. Site Planning

1) LID design principles must be incorporated in the site planning and design process from the beginning and should include the steps below:

a) Design project layout and drainage to capture, slow, store, and/or infiltrate runoff on-site to the extent possible. Runoff peak flow and volume from a site should mimic the predevelopment conditions to the extent possible.

b) Optimize site layout by applying the following design principles:

i. Conserve natural areas, as described in Part II, Section 2, and preserve riparian areas and wetlands. Set back requirements specified in the City's Creeks and Wetlands Management Plan/Ordinance must also be met.

ii. Minimize the amount of impervious surfaces. Limit the overall amount of pavement and roofs by designing compact structures, smaller parking lots (smaller stalls and more efficient lanes) and indoor or underground parking. Substitute landscaping for pavement to the extent possible.

iii. Detain and retain runoff throughout the site.

iv. Use drainage as a design element. Vegetated buffers, depressed landscape areas, rain gardens, and bio-retention facilities can serve as both effective LID measures and attractive site amenities or focal points.

c) Assess site characteristics and integrate them into the project design in ways that help minimize environmental impacts. Examples of site features that may be used include: protected areas, riparian areas, setbacks, and topographic features. Evaluate soil types and drainage in order to evaluate the site's potential to infiltrate or retain storm water runoff.

2. Pervious Surfaces

1) Use pervious pavements to offset the amount of increased post-project impervious surface area where possible and appropriate.

2) Use crushed aggregate, turf block, unit pavers, pervious concrete, or pervious asphalt in place of impervious concrete or asphalt paving where appropriate.

3. Disperse and Infiltrate Runoff

1) Disperse runoff to adjacent pervious areas to the extent slopes, soils, and available area allow. Generally the impervious: pervious ratio should not exceed 2:1.

2) Direct roof downspouts to landscaped areas or bio-swales in lieu of hard piping to the street or storm drain system where possible. This can be a simple and effective method, particularly for residential sites, to implement LID and treat storm water runoff. Downspouts should be directed sufficiently away from a building's foundation to a landscaped area that can absorb the water.

3) Grade paved areas to sheet flow to adjacent landscaped areas or bio-swales where appropriate.

4. Checklist for Project Applicants

1) Please complete the "Storm Water and LID Assessment" checklist (on pages 7-8) and submit it with your project application.

5. LID Structural Controls To Mitigate Storm Water Impacts

When storm water goals can not been achieved with site planning, pervious surfaces, and LID design methods, then one or more storm water structural controls must be implemented as follows:

1) Runoff from impervious surfaces that is not dispersed or infiltrated using LID site design methods should be directed to LID structural controls such as bio-retention facilities, planter boxes, or other LID facilities that retain, store, infiltrate, evapotranspirate, and/or reuse runoff. In most cases, bio-retention facilities are the preferred method. Above-ground visible control facilities are generally easier to inspect and maintain.

2) Where native soils are clay, structural facilities should be designed with under drains where appropriate in order to properly convey treated storm water to the storm drain system.

3) Structural controls must be designed appropriately to control/reduce the remaining runoff volume (and flow rate). Sizing of these facilities should meet requirements for structural treatment controls (see Part II, Section 9).

6. Vegetated Systems- Identify Plant Species & Plant List

1) If you are installing one or more vegetated systems, such as a bio-filtration system, bio-swale or rain garden, please provide a list of all plant types/species that will be used in each vegetated system. Please attach a plant list with your landscape plans.

LID Guidance Manuals and References

Please refer to Part 2, Appendix B, for a list of references which may provide guidance to implementing LID locally.

Storm Water and LID Assessment Checklist
Development or Remodel Projects

Project applicants must provide the following information:

Project Address: _____

Project Type: ☐ Residential ☐ Commercial ☐ Industrial

Project is a: ☐ New development ☐ Remodel

Project description _____

_____

Property Size and Impervious Area:

Property size: _____ square feet (sq ft)

Pre-project impervious surface area: ……_____sq ft

Amount of impervious surface area that will be replaced: .....____sq ft

Amount of new impervious surface area that will be created: …..____sq ft

Post-project impervious surface area: ……_____sq ft

Increase in amount of impervious surface area due to project: ……..…_____sq ft

1. Please list the site planning and LID design measures proposed to minimize the amount of storm water runoff in the table below:

Site Planning Measures	**Description/Location**
1.	
2.	
3.	
4.	
Site LID Design Measures	**Description/Location**
1.	
2.	
3.	
4.	

2. If the project is implementing one or more LID structural controls (required for certain projects), please complete the table below:

Proposed LID Measures/Structural Controls*	**Square Footage of Impervious Area Draining To This Facility (LID Measure/Control)**
1.	
2.	
3.	

*Please indicate the location of these items on an attached draft project plan map.

3. If applicable, please indicate any other proposed treatment systems to control runoff rates or treat storm water pollutants in the table below:

Proposed Treatment Systems*	**Flow Control**	**Targeted Storm Water Pollutants**	**Square Footage Draining To This System**
1.			
2.			
3.			

*Please indicate the location of each of these items on an attached project plan map.

4. If a drainage study was conducted for your project, please indicate the projected amounts of post-project storm water runoff that will be discharged to the City storm drain system after implementation of all the measures listed above. If applicable, please attach a geotechnical letter or report.

Flow volume: _____ Flow rate: _____ Peak flow duration: _____

5. Person or company submitting this information:

Name: _____

Address: _____

Phone: _____

Email: _____

Signature: _____ Date: _____

Please submit the completed checklist to: Aaron Becker, Engineering Associate
By mail: City of Santa Cruz, 809 Center Street, Room 201, Santa Cruz, CA 95060
By email: abecker@cityofsantacruz.com
Telephone: 831-420-5176

STORM WATER BEST MANAGEMENT PRACTICES

PART 2: Storm Water BMP Requirements

1. Peak Storm Water Runoff Discharge Rates

a) Peak storm water runoff discharge rates shall not exceed the estimated pre-development rate if this will result in increased potential for downstream erosion.

b) Storm water runoff resulting from the project must be minimized. Sediment loading in storm water runoff may not be increased above pre-construction levels.

c) The City may require that structural devices, such as sediment basins and filtration devices, or system controls, such as swales and retention basins, be installed or implemented to minimize storm water runoff and to prevent additional sediment loadings. This will be determined on a case-by-case basis as appropriate, or as specified in an adopted area plan or wetlands management plan.

2. Conserve Natural Areas

If applicable, the following items are required and must be implemented in the site layout during the subdivision design and approval process:

a) Concentrate or cluster development on portions of a site while leaving the remaining land in a natural undisturbed condition.

b) Limit clearing and grading of native vegetation at a site to the minimum amount needed to build lots, allow access, and provide fire protection.

c) Maximize trees and other vegetation at each site by planting additional vegetation, clustering tree areas, and promoting the use of native and/or drought tolerant plants.

d) Promote and preserve natural vegetation by using parking lot islands and other landscaped areas.

e) Preserve riparian areas and wetlands.

3. Protect Slopes and Channels

Project plans must include the following to decrease the potential of slopes and/or channels from eroding and impacting storm water runoff:

a) Convey runoff safely from the tops of slopes and stabilize disturbed slopes.

b) Utilize natural drainage systems to the maximum extent practicable.

c) Stabilize permanent channel crossings.

d) Plant slopes with native or drought tolerant vegetation, as appropriate.

e) Install energy dissipaters, such as riprap, at the outlets of the new storm drains, culverts, conduits, or channels that enter unlined channels in accordance with applicable specifications to minimize erosion, with the approval of all agencies with jurisdiction.

4. Provide Storm Drain System Stenciling and Signage

Storm drain stencils are highly visible source controls that are typically placed directly adjacent to storm drain inlets. The stencil shall consist of a brief statement prohibiting the dumping of improper materials into the storm drain system. Graphical icons, either illustrating anti-dumping symbols or images of receiving water fauna (i.e. native fish), are effective supplements to the anti-dumping message. All storm drain inlets and catch basins within the project area must be stenciled with prohibitive language (such as: *No Dumping–Drains To Bay*) and/or graphical icons to discourage illegal dumping. Signs and prohibitive language or graphical icons, which prohibit illegal dumping, must be posted at public access points along channels and creeks within the project area. Legibility of stencils and signs must be maintained.

5. Properly Design Material Storage Areas

Improper storage of materials outdoors may provide an opportunity for toxic compounds, oil and grease, heavy metals, nutrients, suspended solids, and other pollutants to enter the storm water conveyance system. If project plans include a material storage area(s), the following is required:

a) If the storage area may contain materials with the potential to contaminate storm water, the area must be located indoors. The floor must be constructed of material sufficiently impervious to contain leaks and spills.

b) Tallow drum storage areas must be located indoors.

6. Properly Design Trash Storage Areas

A trash storage area refers to an area where a trash receptacle or receptacles (dumpsters) are located for use as a repository for solid wastes. All trash storage areas, except those at a single-family residence, must meet the following requirements:

a) The trash storage area must have drainage from adjoining roofs and pavement diverted around the area.

b) The trash storage area must be screened or walled to prevent off-site transport of trash.

c) The trash storage area shall have a roof to prevent storm water from entering.

d) The trash storage area shall be paved and impervious to leaks and spills.

e) Storm drains are prohibited in a trash storage area.

f) The trash storage area must have a drain to the sanitary sewer so that wastewater from the cleaning of this area may be drained to the sanitary sewer unless exempted by the Department of Public Works.

g) The trash storage area must be large enough to accommodate projected amounts of both refuse and recyclable materials.

7. Properly Design Parking Lot Areas

Parking lots may accumulate oil, grease, and water insoluble hydrocarbons from vehicle drippings and engine system leaks. In order to limit oil contamination and minimize the offsite transport of pollutants from motor vehicles, the following is required:

a) Reduce impervious land coverage of parking areas.

b) One or more effective LID Best Management Practice (BMP) must be installed to infiltrate runoff and reduce pollutant discharges in all parking lots except those that receive runoff from retail gasoline outlets. A bio-retention facility (including an under-drain in clay soils) is an example of a preferred LID BMP method for parking lots.

c) Parking lots require an LID BMP method (such as bio-retention) or other effective structural BMP (such as media filtration) to be installed to treat runoff. For parking lots that will be heavily used, the treatment system must meet the requirements in Section 10. Heavily used parking lots are considered associated with one of the following: fast food outlets, lots with 25 or more parking spaces, sports event parking lots, shopping malls, grocery stores, and discount warehouse stores. If an underground vault is installed, the treatment system should include media filtration.

d) Ensure adequate operation and maintenance of treatment systems, particularly sludge and oil removal, and system fouling and plugging prevention control.

8. Minimize Storm Water Pollutants of Concern

Storm water runoff from a site has the potential to contribute oil and grease, suspended solids, metals, gasoline, pesticides, and pathogens to the storm drain system. A new development or redevelopment site must be designed to minimize, to the maximum extent practicable (MEP), the introduction of pollutants of concern that may result in significant impacts to the storm drain system. A pollutant of concern is a pollutant that exhibits one or more of the following characteristics:

- a current or past impact on the beneficial uses of a receiving water,
- elevated levels of the pollutant are found in sediments of a receiving water and/or have the potential to bio-accumulate in organisms therein, or
- the potential discharge amount of the pollutant is at a concentration or load considered potentially toxic to humans or flora and fauna.

Therefore, the most appropriate Best Management Practice (BMP), or combination of BMPs, must be selected and included in the project design in order to reduce pollutant loadings to the Maximum Extent Practicable.

LID features and facilities are the most effective and robust means of removing pollutants that associate with fine particles during treatment, including pollutants of concern, and should be used as a first choice. To the extent LID is not feasible (see Part 1) treatment by media filtration may be used. Wet ponds may be considered in special circumstances and where there is assurance of adequate maintenance by the property owner.

9. Structural and Treatment Control BMPs

Where applicable or appropriate, the City may require that project plans include a structural or treatment control BMP, or a combination of BMPs, to reduce potential pollutant loadings in storm water runoff to the maximum extent practicable. The structural or treatment control BMP shall be designed to keep runoff at pre-development rates and to keep storm water from flowing onto adjacent sites. A structural or treatment control BMP may be used alone or in combination with another BMP, subject to approval by the City.

Structural or treatment control BMPs may include, but are not limited to, the following:

a. infiltration systems (e.g. dry well, infiltration trench or basin)
b. retention/detention systems (wet ponds)
c. biological or vegetative systems (e.g. bio-retention)
d. media filtration systems

Project plans shall include the details of any and all BMPs such as the location, size, and hydraulic calculations that show how the BMP meets City requirements. Project plans shall also include a signed certification from a licensed Civil Engineer or Architect registered in the State of California that the proposed Structural or Treatment Control BMP(s) meet the design standards criteria established herein.

All required structural or treatment control BMPs must meet the following requirements:

a) The BMP shall be an above ground system whenever possible. An underground system may be proposed if it can be demonstrated that above ground treatment is inferior or impractical due to extreme space limitations, excessive cost, or another limiting factor.

b) The BMP shall be located on-site and in an area where it can be easily inspected and maintained at all times. In addition, long-term BMP inspection and maintenance is required (see Section 14).

c) The BMP shall incorporate either a volumetric or flow based treatment control design standard, or both, as identified below to mitigate (infiltrate, filter or treat) storm water runoff:

1) <u>Volumetric Treatment Control BMP</u>

(i) The 85th percentile 24-hour runoff event determined as the maximized capture storm water volume for the area, from the formula recommended in Urban Runoff Quality Management, WEF Manual of Practice No. 23/ASCE Manual of Practice No. 87, (1998); or

(ii) The volume of annual runoff based on unit basin storage water quality volume, to achieve 80 percent or more volume treatment by the method recommended in the California Storm Water Best Management Practices Handbook–Industrial & Commercial, (2003) (see Appendix D for Unit Basin Storage Volume Sizing Curves); or

(iii) The volume of runoff produced from a historical-record based reference 24-hour rainfall criterion for "treatment" that achieves approximately the same reduction in pollutant loads achieved by the 85th percentile 24-hour runoff event.

2) Flow Based Treatment Control BMP

(i) The flow of runoff produced from a rain event equal to at least two times the 85th percentile hourly rainfall intensity for the area; a flow produced by steady-state rainfall of 0.2 inches per hour may be used; or

(ii) The flow of runoff produced from a rain event that will result in treatment of the same portion of runoff as treated using volumetric standards above.

3) Limited Exclusion

Restaurants and retail gasoline outlets, where the land area for development or redevelopment is less than 5,000 square feet, are excluded from Section 12 (c) only.

d) If project plans include a vegetated bio-retention system, as a control BMP, the system should be sized to a minimum 4% of the effective directly connected impervious area.

e) BMP control facilities must be designed to drain in a manner/speed that will not enable the harboring of mosquitoes.

10. BMP Maintenance Agreement

If a structural or treatment control BMP is required, the property owner shall be responsible for inspection and maintenance of the BMP in order to ensure that it functions properly over the long-term. As part of the project application, the property owner shall agree in a signed statement entitled "**Maintenance Agreement,**" which is included in Appendix E, to the following conditions:

1. To inspect and maintain the BMP on a schedule, at a minimum of once per year, by **October 1st**, or more as necessary in order to retain the required capacity.
2. For residential properties, if the BMP is located in a common area that will be maintained by a homeowner's association, the homeowner's association shall be responsible for the inspection and maintenance.
3. To provide proof of inspection and maintenance to the City of Santa Cruz, Department of Public Works, Engineering Division, at 809 Center Street, Room 201, Santa Cruz, CA 95060. Proof of inspection and maintenance shall be submitted by **December 1st** annually.
4. To ensure that, if the property is sold, transferred, or leased to another person or entity, the sales, transfer, or lease agreement is conditioned so that the recipient assumes responsibility for Conditions 1-3 above and this condition. The first deed transfer or any lease agreements shall include the details of these requirements and information about the BMP such as the following: a) BMP location; b) how and when to perform the necessary inspections and maintenance; and c) how to send proof of inspection and maintenance to the City. The transfer of this information shall also be required with any subsequent sale of the property.

11. Restaurants and Food Processing/Manufacturing Facilities Including Wineries-Additional Requirements

a) Properly Design Equipment and Accessory Wash Areas
Project plans must include an area for the washing/steam cleaning of equipment and accessories including floor mats. The wash area must be:

a) Self-contained, equipped with a grease trap or interceptor, and properly connected to the sanitary sewer. Food processing/manufacturing facilities including wineries may be exempted from this specific requirement by the Department of Public Works.

b) If the wash area is to be located outdoors, it must be covered, paved, have secondary containment, and be connected to the sanitary sewer.

c) Whether located inside or outdoors, the wash area drain shall have a screen to retain particles larger than one-half inch in order to prevent the discharge of these particles to the sanitary sewer.

b) Location and Design of Grease Interceptors, Trash Enclosures, and/or Wash Areas Relative to Storm Drain Inlets
If project plans include an outdoor grease interceptor, trash enclosure, or wash area, these areas shall be located and designed in such a manner that an accidental overflow, blockage, leak, or spill cannot discharge or runoff into a storm drain inlet. Project design shall incorporate proper sloping, berming, and/or channeling.

12. Retail Gasoline Outlets and Other Fueling Areas-Additional Requirements

The fueling area shall be properly designed to minimize the potential for gasoline, oil and grease, solvents, car battery acids, and coolants to reach the storm drain system. Project plans for a fueling area must include the following:

a) The fuel dispensing area must be covered with an overhanging roof structure or canopy. The canopy's minimum dimensions must be equal to or greater than the area within the grade break. The canopy must not drain onto the fuel dispensing area, and the canopy downspouts must be routed to prevent drainage across the fueling area.

b) The fuel dispensing area must be paved with Portland cement concrete (or equivalent smooth impervious surface approved by the City). The use of asphalt concrete is prohibited.

c) The fuel dispensing area must have a 2% to 4% slope to prevent "ponding," and must be separated from the rest of the site by a grade break that prevents run-on of storm water to the maximum extent practicable.

d) At a minimum, the concrete fuel dispensing area must extend 6.5 feet (2.0 meters) from the corner of each fuel dispenser, or the length at which the hose and nozzle assembly may be operated plus 1 foot (0.3 meter), whichever is less.

13. Automotive Repair Shops- Additional Requirements

a) Properly Design Repair and Maintenance Bays

Design plans for repair and maintenance bays must include the following:

1) Repair and maintenance bays must be located indoors.
2) Floor drains connected to the sanitary sewer or storm drain system are prohibited.

b) Properly Design Vehicle and Equipment Wash Areas

Project plans must include an area for the washing and/or steam cleaning of vehicles and equipment. This wash area design must include the following:

1) If only washing is conducted (not steam cleaning), the wash area must be self-contained and equipped with a clarifier or other pretreatment system (i.e. interceptor). The pretreatment system must be properly connected to either the sanitary sewer, as permitted by the Department of Public Works, or to a recycling system, holding tank, or some other type of "zero discharge" system.
2) If steam cleaning is conducted or if the wash area will be used for engine or parts cleaning, the wash area must be self-contained and all drains directed to a closed-loop recycling system or a holding tank for disposal off-site. If no drains are installed, then the area must be bermed or sloped and trenched (with no exit) to allow for the capture and collection of the wastewater. No wastes, including rinse water, from any engine or parts cleaning may be discharged to the sanitary sewer or storm drain system.
3) The wash pad area must be sloped and bermed to prevent discharge to the storm drain and to prevent excess storm water from running to the wash pad drain. The wash pad must be covered.

c) Properly Design Loading/Unloading Dock Areas

Loading dock areas must include the following in order to minimize the potential for spills to be quickly transported to the storm drain system:

1) Cover loading dock areas or design drainage to minimize run-on and runoff of storm water.
2) Direct connections to a storm drain from depressed loading docks (truck wells) are prohibited.

d) Properly Design Fueling Areas

Project plans for an automotive repair shop or other type of vehicle service facility with a fueling area must include the following:

1) The fuel dispensing area must be covered with an overhanging roof structure or canopy. The canopy's minimum dimensions must be equal to or greater than the area within the grade break. The canopy must not drain onto the fuel dispensing area, and the canopy downspouts must be routed to prevent drainage across the fueling area.
2) The fuel dispensing area must be paved with Portland cement concrete (or equivalent smooth impervious surface approved by the City). The use of asphalt concrete is prohibited.

3) The fuel dispensing area must have a 2% to 4% slope to prevent "ponding," and must be separated from the rest of the site by a grade break that prevents run on of storm water to the extent practicable.

4) At a minimum, the concrete fuel dispensing area must extend 6.5 feet (2.0meters) from the corner of each fuel dispenser, or the length at which the hose and nozzle assembly may be operated plus 1 foot (0.3 meter), whichever is less.

14. Commercial and Industrial Developments Equal to or Greater Than 1 Acre- Additional Requirements

a) Loading/Unloading Dock Areas

To minimize the potential for material spills to be quickly transported to the storm water conveyance system, the following design criteria are required:

1) Cover loading dock areas or design drainage to minimize run-on and runoff of storm water.

2) Direct connections to storm drains from depressed loading docks (truck wells) are prohibited.

b) Repair/Maintenance Bays

Project plans for repair and/or maintenance bays must include the following:

1) Repair/maintenance bays must be located indoors.

2) Floor drains connected to the sanitary sewer or the storm drain systems are prohibited.

c) Vehicle or Equipment Wash Areas

Project plans must include an area for washing or steam cleaning of vehicles and equipment. The area must be:

1) If only washing is conducted (not steam cleaning), the wash area must be self-contained and equipped with a clarifier or other pretreatment system (i.e. interceptor). The pretreatment system must be properly connected to either the sanitary sewer, as permitted by the Department of Public Works, or to a recycling system, holding tank, or some other type of "zero discharge" system.

2) If steam cleaning is conducted or if the wash area will be used for engine or parts cleaning, the wash area must be self-contained and all drains directed to a closed-loop recycling system or a holding tank for disposal off-site. If no drains are installed, then the area must be bermed or sloped and trenched (with no exit) to allow for the capture and collection of the wastewater. No wastes, including rinse water, from any engine or parts cleaning may be discharged to the sanitary sewer or storm drain system.

3) The wash pad area must be sloped and bermed to prevent discharge to the storm drain and to prevent excess storm water from running to the wash pad drain. The wash pad must be covered unless exempted by the Department of Public Works.

15. Waiver

A waiver from the requirements may be obtained from the City (Department of Public Works or Building Department) if impracticability for a specific property can be established. A waiver of impracticability shall be granted only when all other Structural or Treatment Control BMPs have been considered and rejected as infeasible. Recognized situations of impracticability include: (i) extreme limitations of space for treatment on a redevelopment project, (ii) unfavorable or unstable soil conditions at a site to attempt infiltration, and (iii) risk of ground water contamination because a known unconfined aquifer lies beneath the land surface or an existing or potential underground source of drinking water is less than 10 feet from the soil surface. Any other justification for impracticability must be separately petitioned by the City and submitted to the Central Coast Regional Water Quality Control Board (RWQCB) for consideration. The RWQCB may consider approval of the waiver justification or may delegate the authority to approve a class of waiver justifications to the RWQCB EO. The supplementary waiver justification becomes recognized and effective only after approval by the RWQCB or the RWQCB EO. A waiver granted by the City to any development or redevelopment project may be revoked by the RWQCB EO for cause and with proper notice upon petition.

16. Limitation on Use of Infiltration BMPs

Three factors significantly influence the potential for storm water to contaminate ground water. They are (1) pollutant mobility, (2) pollutant abundance in storm water, and (3) soluble fraction of pollutant. The risk of contaminating groundwater may be reduced by the pretreatment of storm water. A discussion of limitations and guidance for infiltration practices is contained in *Potential Groundwater Contamination from Intentional and Non-Intentional Stormwater Infiltration, Report No. EPA/600/R-94/051, USEPA (1994).* In addition, the distance of the groundwater table from the infiltration BMP may also be a factor determining the contamination risk. A water table distance separation of ten feet depth in California presumptively poses negligible risk for storm water not associated with industrial activity or high vehicular traffic.

Site-specific conditions must be evaluated when determining the most appropriate BMP. Additionally, monitoring and maintenance must be provided to ensure groundwater is protected and the infiltration BMP is not rendered ineffective by overload. This is especially important for infiltration BMPs for areas of industrial activity or areas subject to high vehicular traffic [25,000 or greater average daily traffic (ADT) on main roadway or 15,000 or more ADT on any intersecting roadway]. In some cases, pretreatment may be necessary.

For more information, please contact:

Department of Public Works:

Aaron Becker, Engineering Associate, at (831) 420-5176

Suzanne Healy, Environmental Projects Analyst, at (831) 420-5131

Department of Planning and Community Development:

Planning Information at (831) 420-5416

Mark Ellis, Chief Building Official, at (831) 420-5127

APPENDIX A
Definitions

“Best Management Practice (BMP)” means any program, technology, process, operational methods or measures, or engineered systems, which when implemented prevent, control, remove, or reduce pollution.

“Development” means land disturbing activities requiring a permit; structural development, including construction or installation of a building or structure; remodels; expansions; creation of impervious surfaces; and land subdivision.

“Directly Connected Impervious Area (DCIA)” means the area covered by a building, impermeable pavement, and/ or other impervious surfaces, which drains directly into the storm drain without first flowing across permeable land area (e.g. lawns).

“Directly Discharging” means outflow from a drainage conveyance system that is composed entirely or predominantly of flows from the subject property, and not commingled with the flows from adjacent lands.

“Hillside” means a slope greater than 30 % percent.

“LID” means low impact development.

"Remodeling Project" means any construction project that includes or is due to any of the following: a) an increase in 500 square feet or 50% or more of a facility's existing square footage, which ever is less; b) remodeling of 50% or more of a facility's existing square footage; c) tenant improvements of 50% or more of the building’s existing square footage; d) intensification (change) of a facility's use; or e) the addition of 1,000 square feet or more of impervious surface area on an already developed site. Remodeling projects do not include routine maintenance activities.

“Source Control BMP” means any schedule of activities, structural devices, prohibitions of practices, maintenance procedures, managerial practices or operational practices that aim to prevent storm water pollution by reducing the potential for contamination at the source.

“State of California Design Standards” means the design standards specified in the State Water Quality Control Board Storm Water General Permit, Attachment #4, to WQ Order No. 2003-0005-DWQ, Section B, Design Standards, April 2003.

“Structural BMP” means any structural facility designed and constructed to mitigate the adverse impacts of storm water and urban runoff pollution. The category may include both Treatment Control BMPs and Source Control BMPs.

“Treatment Control BMP” means any engineered system designed to remove pollutants by simple gravity settling of particulate pollutants, filtration, biological uptake, media adsorption or any other physical, biological, or chemical process.

APPENDIX B

Resources and References

RESOURCES	HOW TO GET A COPY
LID Guidance Manuals and References	
CASQA California LID Portal	CA Storm Water Quality Association: http://www.casqa.org
Central Contra Costa County Stormwater C.3 Guidebook 5th Edition	Central Contra Costa County: http://www.cccleanwater.org/c3-guidebook.html
City of Watsonville Low Impact Development Best Management Practice Design Guidance for Hydromodification Management and Storm Water Quality	City of Watsonville http://www.ci.watsonville.ca.us/
Slow It. Spread It. Sink It! A Homeowner's Guide to Greening Storm Water Runoff	Santa Cruz Resource Conservation District: http://www.rcdsantacruz.org/media/brochures/pdf/HomeDrainageGuide.v25.pdf
Steps for Successful LID Design	Low Impact Design Initiative (2010), UC Davis Extension, Center for Land Use and Natural Resources; and Central Coast Regional Water Quality Control Board, Storm Water Division
Storm Water Quality Manual for Development Projects in Marin County (Version 6, Feb 2008)	Marin County Storm Water Pollution Prevention Program: http://mcstoppp.org/acrobat/GuidanceforApplicantsv_2-5-08.pdf
Other References	
Start at the Source (1999) Discussion of permeable pavements and alternative driveway designs	Bay Area Stormwater Management Agencies Association (510) 286-1255
California Storm Water Best Management Practices Handbook for New Development and Redevelopment	CA Storm Water Quality Association: http://www.casqa.org

APPENDIX C

Examples of Best Management Practices (BMPs)

The following are examples of BMPs that can be used for minimizing runoff and the introduction of pollutants to the storm water conveyance system:

- Roof runoff/downspouts directed to landscaping. Use erosion control measures, such as splash blocks and energy dissipaters, where necessary.
- Runoff from impervious surfaces (e.g. concrete patios) directed to landscaping. Use erosion control measures where necessary.
- Permeable materials or pavers for private sidewalks, driveways and spillover parking areas
- Landscaping strips adjacent to sidewalks, driveways, and parking lots
- Curb cuts in parking lots to allow runoff to drain to landscaping
- Biological or vegetative systems such grassy or vegetated swales
- Bio-retention facilities that allow runoff to seep through a soil mix (with under-drain in clay soils)
- Green roof
- Retention/detention basins
- Dry detention basins
- Infiltration trenches and basins (in areas where soils are suitable)
- Media filtration units or treatment systems
- Constructed wetlands

Preferably design vegetated systems with native plants and/or plants needing minimal amounts of water during the dry season. Wet systems should be designed in a manner that do not enable the proliferation of mosquitoes.

APPENDIX D

Unit Basin Storage Volume Sizing Curves
For Design of Wet Ponds and Extended Detention Basins

Design Storm Volume Calculation

Hydrologic calculations for design of volumetric-based storm water quality BMPs shall be in accordance with the procedures set forth herein.

Calculation Procedure:

1. Review the area draining to the proposed BMP. Determine the percentage of Directly Connected Impervious Area (DCIA), the drainage area that is considered impervious. Impervious area includes paved areas, roofs, and other developed, non-vegetated areas. Non-vegetated, compacted soil areas shall be considered an impervious area.

2. Figure B-1 provides a direct reading of Unit Detention Basin Storage Volumes required for 80% annual capture of runoff based on the percentage of Directly Connected Impervious Area (DCIA) on the site. Enter the vertical axis of Figure 1 with the percentage DCIA. Move horizontally across Figure 1 until the line is intercepted. Move vertically down Figure 1 from this point until the horizontal axis is intercepted. Read the Unit Basin Storage Volume along the horizontal axis.

3. The basin volume or basic volume of the BMP is then calculated by multiplying the Unit Basin Storage Volume by the BMP's drainage area. Due to the mixed units that result (e.g., acre-inches, acre-feet) it is recommended that the resulting volume be converted to cubic feet for use during design.

Example Use of Unit Basin Storage Volume Curves Sizing a Dry Detention Basin

Determine the drainage area for the BMP, A_t.
Example: 10 acres.

Determine the area of impervious surfaces in the drainage area, A_i.
Example: 6 acres.

Calculate the percentage of imperious, Percent Impervious = $(A_i/ A_t)*100$
Example: Percent Impervious = $(A_i/ A_t)*100$ = (6 acres/10 acres)*100 = 60%

Determine the Unit Basin Storage Volume for 80% Annual Capture, V_u using Figure 1.
Interpolate between curves, if necessary.
Example: For DCIA = 0.60, the Detention Basin Storage Volume, V_u = 0.032 acre-feet/acre.

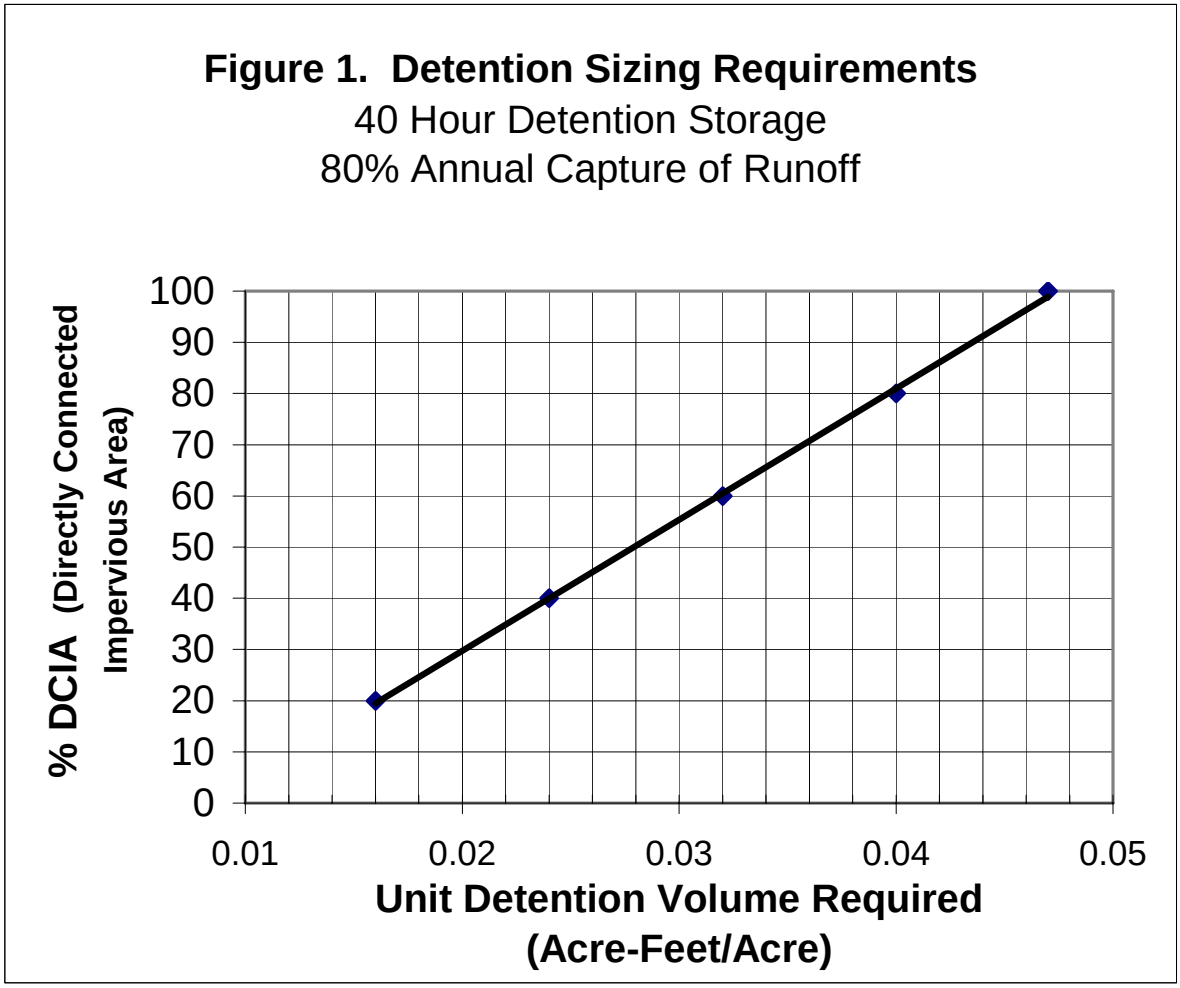
Calculate the volume of the basin, V_b, where $V_b = V_u * A_t$.

Example: V_b = (.032 acre-feet/acre)(10 ac)= .32 acre-feet

To convert to cubic feet, multiply by (43,560 ft^2 / ac):

(.32 acre-feet) (43,560 ft^2 /acre) = 13,939 ft^3.

Solution: Size the dry detention basin for 13,939 ft^3 (.32 acre-feet) and 40-hour drawdown.



Appendix E

Maintenance Agreement Regarding Maintenance of Structural or Treatment Control Best Management Practices (BMPs)

for: Address _____ *APN#* _____

I, _____, being the owner of the real property, APN No. _____, which is located at _____, Santa Cruz, California, consents and agrees to inspect and maintain any and all structural or treatment control Best Management Practices (BMPs) a minimum of once per year prior to **October 1** on the subject property. The structural or treatment control BMPs on the subject property include(s): _____
_____.

I agree to send a letter that provides proof of inspection and maintenance to the City of Santa Cruz Department of Public Works prior to December 1 of each year. Proof of inspection and maintenance shall include a log of inspection and maintenance dates for the past year, and receipts if conducted by a hired service. The log should also indicate any significant observations or repairs made. **The proof of inspection and maintenance should be sent to: Environmental Projects Analyst, Department of Public Works, City of Santa Cruz, 809 Center Street, Room 201, Santa Cruz, CA 95060.**

In the event that the property is sold, transferred, or leased, the obligations hereby imposed on the property owner shall be assumed by subsequent property owners and lessees. To this end, property owner, in any deed transferring an ownership interest in the property or in any lease agreement for the property, shall include a term by which the subsequent property owner or lessee acknowledges his or her understanding of the obligations imposed by this agreement and expressly agrees to accept and assume responsibility for complying with all said obligations imposed by this agreement.

In addition, I will provide printed information to the new property owner or lesee regarding proper BMP inspection and maintenance frequency and methods. The information shall accompany the first deed transfer. This information shall include the following:

(1) a description of any and all storm water structural or treatment control BMPs;
(2) a map of the property indicating the BMP locations; and
(3) a description of how inspections and necessary maintenance can be performed.

The transfer of this information shall also be required with any subsequent sale of the property.

I have read the above agreement and understand it.

Owner:_____ Date:_____
Owner Address: _____ Phone: _____
_____ Email: _____