

## Watershed BMP Implementation Strategy Options

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This alternative approach would emphasize localized Best Management Practices (BMPs) designed to reduce the volume or delay the peak flow of stormwater runoff leaving a site, such as a residential or commercial lot. Ideally stormwater runoff would be reduced to pre-development levels. At a minimum the BMPs would ensure that future development would not cause increases in flow in the main creek channels.

Three implementation options are considered for watershed BMPs, and the advantages and disadvantages of each implementation option are discussed, with one implementation option selected for inclusion in combined scenario development and costing.



### Background

Development of land generally increases the volume and peak of stormwater runoff because of the impervious or semi-impervious land cover that replaces the natural land cover. Examples include deforestation, addition of structures, driveways, parking lots, and even lawns and other landscaping if any soil compaction has occurred or less pervious soils have been used as fill or bedding.

Numerous jurisdictions across the U.S. have implemented runoff management programs which have focused on reducing or preventing flooding caused by new development. Within California, the State Water Resources Control Board (SWRCB) has adopted sustainability as a core value for all California Water Boards' activities and programs. Low Impact Development (LID) is one approach adopted by the Water Boards which incorporates techniques, tools, and materials to control the amount of runoff from developed sites by reducing impervious surface areas, increasing infiltration, and improving runoff water quality. LID uses site design and storm water management to maintain a site's pre-development runoff rates and volumes. The goal of LID is to mimic a site's predevelopment hydrology by using design techniques that infiltrate, filter, store, evaporate, and detain runoff close to the source of rainfall<sup>1</sup>.

The ten LID practices promoted by the SWRCB include:

- Bioretention & Rain Gardens
- Rooftop Gardens
- Sidewalk Storage
- Vegetated Swales, Buffers & Strips; Tree Preservation
- Roof Leader Disconnection
- Rain Barrels and Cisterns
- Permeable Pavers
- Soil Amendments
- Impervious Surface Reduction & Disconnection
- Pollution Prevention & good Housekeeping

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<sup>1</sup> [http://www.swrcb.ca.gov/water\\_issues/programs/low\\_impact\\_development/index.shtml](http://www.swrcb.ca.gov/water_issues/programs/low_impact_development/index.shtml)

Not all LID practices or specific BMPs may be applicable to every situation or location. Attachment 1 lists advantages and disadvantages of various BMPs, and includes qualitative relative cost comparisons (Table 5-6). Table 5-7 of Attachment 1 indicates the maintenance considerations and arid/semi-arid region suitability of various management practices. For example, Table 5-7 notes that grassy swales are of limited use in arid and semi-arid regions (because of the likelihood of the grass dying off). Alternatively sand filters, filtration basins and Extended detention dry ponds are noted as being preferred in arid and semi-arid climates.

### **Potential BMP Implementation Strategies**

Three watershed BMP implementation strategies were considered as part of the Calleguas Creek IWPP Phase II Management Strategy Study. They are:

1. **Require BMPs in Newly Developed Land** – this would maintain post-development flow rates and volumes at pre-development levels. This strategy has been carried forward for analysis and costing of combined alternative approaches.
2. **Require BMPs in All Newly Developed Land, and to Permitted Improvements** – this would reduce post-development flows to rates and volumes below pre-development levels.
3. **Retrofit BMPs to a Percentage of Existing Land** – this would have the same effect as strategy number 2.

#### Strategy 1 - Require BMPs in Newly Developed Land

Significant progress has already been made in adopting this strategy within Ventura County. Attachment 2 describes how LID principles have been incorporated into the Ventura County National Pollution and Discharge Elimination System (NPDES) Phase 1 April 2008 draft permit requiring that all new development and redevelopment integrate low impact development principles into project design. Specifically, the updated April 2009 draft permit includes the following statement:

Each permittee shall require all New Development and Redevelopment projects identified in subpart 5.E.II to implement hydrologic control measures, to prevent accelerated downstream erosion and to protect stream habitat in natural drainage systems. The purpose of the hydrologic controls is to minimize changes in post-development hydrologic storm water runoff discharge rates, velocities, and duration. This shall be achieved by maintaining the project's pre-development storm water runoff flow rates and durations.<sup>2</sup>

Because the concept of maintaining post-development flow rates and volumes at pre-development levels within Ventura County for a 2-year return-period event has reached draft regulation status, this approach is considered to be the most realistic, and has been carried forward into the analysis and costing of combined alternative approaches in the Calleguas Creek IWPP Phase II Management Strategy Study. Although it's true that capturing the incremental  $Q_{100}$  flow would require substantially greater storage than capturing the  $Q_2$  flow, the concept is the same,

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<sup>2</sup> California Regional Water Quality Control Board, Los Angeles Region, Waste Discharge Requirements for Storm Water (Wet Weather) and Non-Storm Water (Dry Weather) Discharges from the Municipal Separate Storm Sewer Systems within the Ventura County Watershed Protection District, County of Ventura and the Incorporated Cities therein, May 29, 2008, p 54. This document available from the following web site: [www.waterboards.ca.gov/losangeles/water\\_issues/programs/stormwater/municipal/ventura\\_ms4/](http://www.waterboards.ca.gov/losangeles/water_issues/programs/stormwater/municipal/ventura_ms4/)

Important considerations of this strategy include:

- Time of implementation is immaterial because BMPs are implemented at the same rate the land is being developed.
- Peak flows will not be reduced below current levels.
- Maintenance responsibility and proper maintenance enforcement are critical factors.
- The current draft permit addresses the 2-year return period flow, and not the 100-year return period flow.

### Strategy 2 - Require BMPs in All Newly Developed Land, and to Permitted Improvements

In addition to the benefits of Strategy 1, this strategy reduces flows below pre-development levels. Permitted improvements may not in themselves increase site runoff, but the requirement for runoff reduction linked to permits would reduce runoff in already-developed portions of the watershed where the potential for reductions are otherwise limited. Building permits sought for improvements to existing parcels (which may include other potential criteria, such as the nature of intended work) would trigger the need to implement one or more BMPs on the property that would reduce the peak stormwater runoff as much as reasonably possible.

Important considerations include:

- Time of implementation is immaterial for newly developed land because BMPs are implemented at the same rate the land is being redeveloped.
- Time of implementation is important for the permit-triggered BMP implementation, and there is no certainty as to how much flow peaks can ultimately be reduced beyond the current peak flows.
- Flows can be reduced below current levels with this scenario, but reduction beyond current peak flows cannot be accurately quantified because the reduction in flows is linked to building permits and building cycles.
- Maintenance responsibility and proper maintenance enforcement are critical factors.

### Strategy 3 - Retrofit BMPs to a Percentage of Existing Land

The objective of this strategy is to reduce the runoff peaks and volumes as much as possible through watershed-wide implementation of BMPs. BMP retrofits would be targeted where required and where most beneficial, and would be expected to be voluntary and to involve one or more incentive programs for property owners.

Important considerations include:

- This scenario assumes retrofitting existing land, and land owners would need some incentive to achieve acceptance of the BMP retrofits.
- Time of implementation is important because peak flow reductions would only be significant with significant BMP implementation. The ultimate flow reduction would depend upon how widely and where the BMPs are implemented.

- Flows can be reduced below current levels with this scenario, and greater flow reductions can be achieved with more aggressive BMP implementation.
- Maintenance responsibility and proper maintenance enforcement are critical factors.

**ATTACHMENT 1**  
**ADVANTAGES AND DISADVANTAGES OF VARIOUS BMPs**

Excerpt From

**NATIONAL MANAGEMENT MEASURES TO CONTROL  
NONPOINT SOURCE POLLUTION FROM URBAN AREAS**

ATTACHMENT 2  
VENTURA COUNTY NATIONAL POLLUTION AND  
DISCHARGE ELIMINATION SYSTEM (NPDES) PHASE 1  
DRAFT PERMIT LID REQUIREMENT REVIEW

Excerpt From

A REVIEW OF LOW IMPACT DEVELOPMENT POLICIES:  
REMOVING INSTITUTIONAL BARRIERS TO ADOPTION