

C.3. Workshop: Track 1 – Basic C.3. Topics
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Overview of Stormwater Treatment Requirements

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**Santa Clara Valley Urban Runoff
Pollution Prevention Program**



Presentation Overview

- Why Regulate Stormwater Quality?
- Regulatory Framework
- Municipal Stormwater Program Components
- New Development and Redevelopment Requirements
- Hydromodification Control
- Low Impact Development
- Future Trends

Why Regulate Stormwater Quality?

- “The rapid conversion of land to urban and suburban areas has profoundly altered how water flows during and following storm events, putting higher volumes of water and more pollutants into the nation’s rivers, lakes and estuaries.”
- “Urban stormwater is estimated to be the primary source of impairment for 13% of assessed rivers, 18% of lakes, and 32% of estuaries”... (Urban areas cover 3% of land mass of U.S.)

Source: The National Academy of Sciences,
“Urban Stormwater Management in the
United States”, 2008

Effects of New Development



Stormwater Pollutants of Concern

- Sediment
- Metals (mercury, copper, zinc, lead)
- Petroleum hydrocarbons
- Pesticides
- Trash
- Nutrients (N,P)
- Bacteria
- Flow



Regulatory Framework

- US EPA – Clean Water Act
 - National Pollutant Discharge Elimination System (NPDES) Permits
 - Required for all municipal, industrial and commercial facilities that discharge wastewater or stormwater directly from a point source into a water of the United States
 - Can be individual or general
 - Municipal separate storm sewer system (MS4) permits consist of two types:
 - Phase I (pop. > 100,000 or urban area)
 - Phase II (small MS4s not covered by Phase I and “non-traditional” facilities)

Regulatory Framework

■ Cal/EPA - State Water Resources Control Board

- Implements NPDES program in California
- Oversees nine Regional Water Quality Control Boards
- Issues General Permits:
 - General Construction Permit
 - General Linear Construction Permit
 - General Industrial Permit
 - General Municipal Phase II Permit

Regulatory Framework

- Regional Water Quality Control Boards are responsible for:
 - Individual Municipal Phase I Stormwater Permits (many are county-wide)
 - Wastewater Treatment Plant Permits
 - Individual Industrial Permits
 - Compliance with General Permits by permittees in their regions

Municipal Stormwater Program Requirements

- Prohibit non-storm water discharges to storm drains and watercourses
- Reduce pollutants in storm water to the “maximum extent practicable” using Best Management Practices (BMPs)
- Not cause or contribute to violations of water quality standards

Phase I Municipal Program Elements

*To Control Urban Runoff Pollutants,
Local Efforts Focus On:*

- Illicit Connection and Illegal Dumping Identification and Elimination
- Industrial/Commercial Discharge Control
- Public Information and Participation
- Public Agency Activities
- New Development and Construction
- Pollutants of Concern
- Monitoring

Current New and Redevelopment Requirements – Bay Area “C.3.”

- Group 1 projects (> 1 acre impervious surface) – require source control, site design, treatment BMPs, and in some cases, flow control measures
- Group 2 projects (> 10,000 sq.ft. impervious surface) – require source control, site design, treatment BMPs
- Stormwater treatment BMPs must be designed using specific sizing criteria based on volume and flow rate
- Implement Hydromodification Management Plan (HMP) to control increases in peak, volume and duration of runoff from certain Group 1 projects

Current New and Redevelopment Requirements – Bay Area “C.3.”

Current Exemptions:

- Single family home, not part of larger common plan of development
- Sidewalks, bicycle lanes, trails, bridge accessories, guardrails, and landscape features
- Interior remodels
- Routine maintenance and repair
- Projects within ½ mile of transit station, brownfield redevelopment, and low income housing projects if impracticality and severe economic burden established

New and Redevelopment Requirements – Bay Area, cont.

Local Agency Responsibilities:

- Develop and implement BMP Operation & Maintenance (O&M) verification programs
- Revise conditions of approval, design standards, General Plans, and environmental review processes
- Conduct inspections during and post-construction
- Submit annual reports on implementation at approved projects and inspection data

Volume-Based BMP Sizing Criteria

Volume-based BMPs – Structures that detain a volume of stormwater for a period of time, treating the stormwater primarily through settling and infiltration.

Sizing Criteria:

- The maximized stormwater capture volume as determined by the WEF/ASCE Manual of Practice (approx. 85th percentile 24-hour storm event)
- The volume representing 80% capture of the annual runoff volume, based on the CASQA BMP Handbook methodology.

Flow-Based BMP Sizing Criteria

Flow-based BMPs – Systems that remove pollutants from a moving stream of water by filtration, infiltration, and/or biological processes.

Sizing Criteria:

- 10% of the 50-year peak flowrate;
- Runoff produced by 2 times the 85th percentile hourly rainfall intensity; OR
- Runoff produced by a rainfall intensity of 0.2 inches/hour

What is Hydromodification?



- Change in the runoff hydrograph from an area due to development
- Can cause increased creek/channel erosion downstream

Hydromodification Control (continued)

- Effects of land development on the site runoff hydrograph:
 - Less infiltration / evapotranspiration
 - More surface runoff (increased volume)
 - Runoff leaves the site faster (increased peak flows)
 - Runoff occurs more often (increased duration)
 - Runoff conveyed directly to creek (increased connectivity)

Hydromodification Control Requirements

- Increases in runoff peak flow, volume, and duration shall be managed for projects of a certain size, where such increased flow and/or volume can cause increased erosion of creek beds and banks...
- Flow controls are required to limit post-project peak flows, volumes and durations to pre-project condition, for a specified range of flows
- Does not apply to projects that do not increase erosion potential downstream (e.g., if project drains to hardened channel or tidal zone, or does not increase impervious surface)

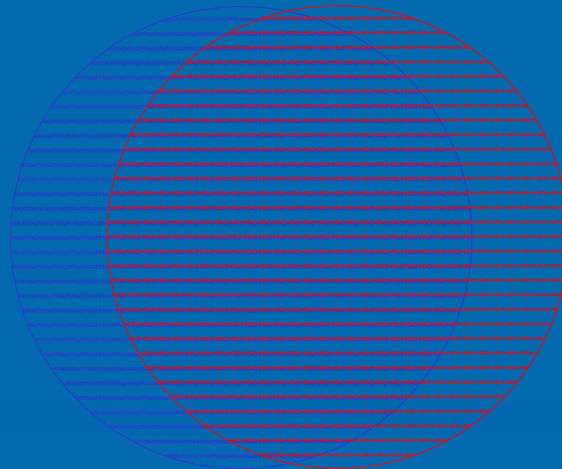
Low Impact Development



“Innovative approach to stormwater management in which an attempt is made to duplicate the hydrologic regime of the undeveloped watershed.”

"LID" vs. "Site Design"

LID:
Onsite BMPs
Regional Planning
Smart Growth

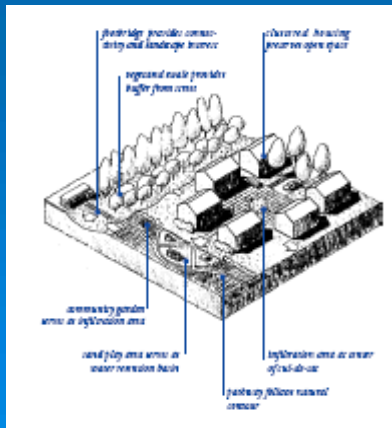


Site Design:
Onsite BMPs
Site Planning
Conservation

* For the purposes of this workshop,
LID = Site Design

LID/Site Design Concepts:

1. Define development envelope and protected areas
2. Minimize directly connected impervious areas
3. Maximize permeability
4. Maximize choices for mobility
5. Use drainage as a design element



Santa Clara Valley Urban Runoff Program Site Design Award Winners



**Permeable Pavers,
Palo Alto/Stanford
Community Playing
Fields**



**Natural Detention Area,
Willow Glen Reflections,
San Jose**

**Landscaped
Detention Area,
Alum Rock Library,
San Jose**



Santa Clara Valley Urban Runoff Program Site Design Award Winners



**Vegetated Bioswale,
Tully Library, San Jose**



**Pervious Concrete
Parking Lot,
Congregation Sinai,
San Jose**

**Pervious Paving Connected
to Roof Drains,
361-369 California Ave,
Palo Alto**



Future Trends

- Bay Area Municipal Regional Permit
 - Consolidates 6 Phase 1 municipal permits into one regional permit
 - Major Changes to C.3. Requirements:
 - Threshold of 5,000 SF impervious surface for four land use types in 2 years
 - Site design requirements for small projects that create/replace >2,500 SF impervious surface
 - LID requirements for BMP selection
 - Water Board notification for vault based systems?
 - Ten green streets pilot projects
 - Schedule: Potential adoption Sept/Oct 2009?

LID “Movement” in California

- State Water Resources Control Board - new policy on Sustainable Water Resources Mgmt and others
- Ocean Protection Council – LID Resolution
- California Coastal Commission – LID trainings
- U.C. Davis Office of Water Programs – trainings, research, outreach
- California Stormwater Quality Association (CASQA) – trainings, guidance
- California Water and Land Use Partnership (CA WaLUP) – coordination, outreach
- Environmental NGOs (NRDC and others) – promoting requirements for LID in permits

Questions?



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