SDAPA Luncheon Program: Regional Stormwater Permit

Issued by: California Regional Water Quality Control Board, San Diego Region
Tentative Order No. R9-2013-0001, NPDES No. CAS 0109266

February 22, 2013
Moderator
Renée Yarmy – Programs Co-Chair for the San Diego Section of the American Planning Association and Lead Sustainability Planner for Cardno TEC, Inc.

Speakers
Christine A. Sloan, CPESC, QSD – Christine is the Program Coordinator for the County of San Diego’s Watershed Protection Program, Development and Construction group and Chair of the San Diego Copermittee’s Land Development Workgroup.

Jo Ann Weber – Jo Ann is the Program Coordinator for the County of San Diego’s Watershed Protection Program and co-chair of the San Diego Copermittees’ Regional Monitoring Workgroup.

Scott Taylor, P.E., D.WRE – Scott is a national leader in hydrology and stormwater management and is responsible for managing the $4.5 million County and Copermittee MS4 Permit implementation program. Scott is a Senior Vice President of RBF Consulting and manager of the Carlsbad office.
Agenda

• Permit Process Overview and Structure (Christine Sloan)

• Integrating Water Quality and HMP Requirements into Development (Scott Taylor)

• Monitoring & Water Quality Improvement Plan Development (Jo Ann Weber)
Section E.3
Development Planning

Christine A. Sloan, County of San Diego
Watershed Protection Program
### San Diego Permit Process Overview

<table>
<thead>
<tr>
<th>Dates</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>April 6, 2012</td>
<td>Administrative Draft Permit released</td>
</tr>
<tr>
<td>April 25, 2012</td>
<td>Administrative Draft Permit Workshop</td>
</tr>
<tr>
<td>June – September, 2012</td>
<td>6 Focused Meetings</td>
</tr>
<tr>
<td>September 14, 2012</td>
<td>Administrative Draft comments due</td>
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<tr>
<td>October 31, 2012</td>
<td>Tentative Order R9-2013-0001 released</td>
</tr>
<tr>
<td>November 13, 2012</td>
<td>Regional Board Hearing</td>
</tr>
<tr>
<td>December 12, 2012</td>
<td>Regional Board Hearing Continuance</td>
</tr>
<tr>
<td>January 11, 2013</td>
<td>Tentative Order comments due</td>
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<tr>
<td>March or April 2013</td>
<td>Planned Regional Hearing date</td>
</tr>
</tbody>
</table>

Current MS4 Permit Structure

- 3 Distinct Permits
- 3 Principal Permittees

Map showing areas including Orange, Riverside, San Diego, and Mexico.
### 5 Riverside County Copermittees

<table>
<thead>
<tr>
<th>City of Murrieta</th>
<th>County of Riverside</th>
</tr>
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<tbody>
<tr>
<td>City of Temecula</td>
<td>City of Wildomar</td>
</tr>
<tr>
<td>Riverside County Flood Control &amp; Water Conservation District</td>
<td></td>
</tr>
</tbody>
</table>

### 13 Orange County Copermittees

- City of Aliso Viejo
- City of Dana Point
- City of Laguna Beach
- City of Laguna Hills
- City of Laguna Woods
- City of Lake Forest
- City of Mission Viejo
- City of Rancho Santa Margarita
- City of San Clemente
- City of San Juan Capistrano
- City of San Juan Capistrano
- County of Orange
- Orange County Flood Control District

### 21 San Diego County Copermittees

<table>
<thead>
<tr>
<th>City of Chula Vista</th>
<th>City of Poway</th>
</tr>
</thead>
<tbody>
<tr>
<td>City of Coronado</td>
<td>City of San Diego</td>
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<tr>
<td>City of Del Mar</td>
<td>City of San Marcos</td>
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<tr>
<td>City of El Cajon</td>
<td>City of Santee</td>
</tr>
<tr>
<td>City of Encinitas</td>
<td>City of Solana Beach</td>
</tr>
<tr>
<td>City of Escondido</td>
<td>City of Vista</td>
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<tr>
<td>City of Imperial Beach</td>
<td>County of San Diego</td>
</tr>
<tr>
<td>City of La Mesa</td>
<td>Regional Airport Authority</td>
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<tr>
<td>City of Lemon Grove</td>
<td>San Diego Unified Port District</td>
</tr>
<tr>
<td>City of National City</td>
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</table>
**Combined Region 9 MS4 Permit**

- **Development Planning**
  - Priority Development Project categories
  - Retention
  - Hydromodification
    - Naturally occurring
    - Compensate for loss of sediment supply
  - Alternative Compliance

<table>
<thead>
<tr>
<th>Region</th>
<th>Permit</th>
<th>Section/Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orange</td>
<td>R9-2009-0002</td>
<td>F.1. / 28-48</td>
</tr>
<tr>
<td>Riverside</td>
<td>R9-2010-0016</td>
<td>F.1. / 27-47</td>
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<tr>
<td>Combined w/ SD</td>
<td>R9-2013-0001</td>
<td>E.3. / 73-90</td>
</tr>
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</table>
Change in Priority Development Projects (PDPs) Categories

Residential
• 10-units to 10,000 square feet impervious

Commercial & Industrial
• 1 acre to 10,000 square feet impervious

Driveways (new)
• 5,000 square feet impervious

Source: Section E.3.b.(2) Page 76, F-85
New PDP Exemptions

• New sidewalks, bike lanes, trails using LID
• Retrofit alleys, streets, roads as Green Streets
• New/re-development of Single Family Residential
  o LEED Certified, or
  o Pre-approved BMP

Source: Section E.3.b.(3) Page 77, F-86
Low Impact Development

Create a Hydrologically Functional Lot

Source: Haywood Community College
New Retention Standard

• Each PDP Retain & Treat
  o Retain 85\textsuperscript{th} percentile storm event (~1”)
  o Or treat and use Alternative Compliance (mitigation) for volume not retained

Source: Section E.3.c.(1) Pages 78-79, F-86-88
Retention Examples

- Rain (The ON button)
- Conveyance (gutters, downspouts)
- Pretreatment (screen filters, first-flush)
- Storage (cistern)
- Distribution (to irrigation system)
Hydromodification Changes

• Pre development = naturally occurring
• Compensate for the loss of sediment supply
• Or use Alternative Compliance (mitigation)

• Loss of Exemptions
  o No increase in peak flows
  o Lagoon
  o Stabilized Conveyance
  o Highly Urbanized
  o Urban to Stabilized

Source: Section E.3.c.(2)  Pages 79-80
Hydromodification

Before Development

After Development

Increase in:
- Imperviousness
- Drainage Slope
- Direct Runoff

Decrease in:
- Evapotranspiration
- Recharge
- Base Flow

Flow Rate

Hydrologic Responses to Development
- increased rates of flow
- increased flow volumes

Source: SCCWRP
New Alternative Compliance

• Same watershed
• Result in greater overall water quality benefit
• Project Types
  - Onsite Biofiltration
  - LEED Certified Redev
  - Watershed Planned
  - Regional BMPs
  - Retrofitting
  - Habitat Rehabilitation
  - Water Supply Augmen
  - Proposed Alternatives

• Within 4 years of occupancy of first project

Source: Section E.3.c.(3) Pages 80-85
Other items

• BMP Design Manual replaces SUSMP
  o 18 months from adoption

• Grandfathering (prior lawful approval)
  o 18 months from adoption

• Inspect prior to building occupancy

• Verify maintenance annually in perpetuity

Source: Section E.3.d. Pages 86-90
San Diego Copermittee Comments

• Add driveways to list of potential exemptions
• Manage roadways differently than development
• Allow alternative performance requirements based on scientific data via WQIP process
• Replace pre-development with pre-project
• Remove HMP requirements when draining to a concrete flood control channel
• Include previously approved HMP exemptions
• Allow Alternative Compliance within 8 years of occupancy of first project.

San Diego County Comments

• Detention instead of Retention
  o Retention requires larger BMPs,
  o 2 to 12 fold cost increase,
  o Lacks scientific review of environmental impacts.

• Alternative Compliance
  o Request to be administered by Regional Board

• Sediment Supply
  o Lacks scientific validation and methods

Next Steps

- Release of Revised Tentative Order
- Regional Board Hearing for Adoption (Spring 2013)
- Upon adoption, 18 Months to implement:
  - Local ordinances
  - HMP
  - BMP Sizing Calculator
  - WQIP
  - Alternative Compliance
  - BMP Design Manual
    - SWMPs
    - LEED Guidance
    - Green Streets Guidance
    - SFR Exemption BMPs
    - LID Handbook
Integrating Water Quality and HMP Requirements into Development

Scott Taylor, P.E., D. WRE, RBF Consulting
Bioretention – The New Standard

• Soil and plant-based retention or filtration device: Biofiltration/Bioretention

• Removal Mechanism
  o physical
  o biological
  o chemical
Bioretention along Streets
Flow Through Planters
Bioretention Facility

Flow Through Planter Box
Bioretention – Parking Lots
Commercial Installation
Design Guidelines

• Design storage area to accommodate the WQV with a maximum of 12” of ponding
• Offline design is preferred (surface entrance/exit the same)
• Soil Matrix: 50% sand (ASTM C-33), 20% compost, 30% soil (max 5% clay content, porosity 0.25, 1.5 to 3% organic matter)
• Depth to GW: 2’ with underdrain, 10’ without
• Depth of soil matrix: 2.5 to 4 feet
Design Guidelines (Con’t)

- Storage area below the underdrain is required for nitrate removal (1 foot deep min).
- Underdrain — 4” PVC perforated pipe (Sch 40), two should be used that join at a 6” dia pipe – slope 0.5% or greater.
- Use a graded gravel filter bed: perforated pipe surrounded by a pea gravel diaphragm (1/4” to 1/2” dia, 6” thick) surrounded by stone 1/2” to 1.5” in diameter.
Design Guidelines (Con’t)

• Volume within the soil matrix and gravel area may be computed and used to reduce the facility surface storage area/depth.

• Use 30% void area in soil and rock for volume calculation

• Can add dead storage below the underdrain to accommodate hydromodification or other mitigation requirements
<table>
<thead>
<tr>
<th>Device</th>
<th>Phosphorus</th>
<th>TKN</th>
<th>Metals</th>
<th>Sediment</th>
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</thead>
<tbody>
<tr>
<td>Infiltration Trench</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
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<tr>
<td>Infiltration Basin</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Rain Barrel</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Porous Pavement</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
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<tr>
<td>Bioretention</td>
<td>70-85%</td>
<td>55-65%</td>
<td>90-95%</td>
<td>90-95%</td>
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<tr>
<td>Green Roof</td>
<td>Ukn</td>
<td>Ukn</td>
<td>90-95%</td>
<td>90-95%</td>
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<tr>
<td>Media Filter</td>
<td>40-50%</td>
<td>50-60%</td>
<td>70-80%</td>
<td>80-90%</td>
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<tr>
<td>Wet Pond</td>
<td>0-50%</td>
<td>40-50%</td>
<td>60-90%</td>
<td>20-90%</td>
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<tr>
<td>Swale</td>
<td>Input</td>
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<td>80-90%</td>
<td>70-80%</td>
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<td>EDB</td>
<td>30-40%</td>
<td>10-20%</td>
<td>60-70%</td>
<td>70-80%</td>
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<tr>
<td>Wet Vault</td>
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<td>10-20%</td>
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<tr>
<td>Vegetated Strip</td>
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<td>Input</td>
<td>70-80%</td>
<td>60-70%</td>
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<tr>
<td>Vortex Separator</td>
<td>Minimal</td>
<td>Minimal</td>
<td>Minimal</td>
<td>60% of 50 micron</td>
</tr>
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</table>
What it Means for Development

• In general, for surface water, developments are now responsible for:
  • Water quality
  • Hydromodification
  • 100-year mitigation
• To meet these obligations, the applicant can:
  • Use bioretention for water quality
  • Detention for hydromodification and 100-year mitigation
  • Or, bioretention only
• Cost and Space
  • $7 – $15/sq. foot for bioretention
  • 4 – 10% of land area for bioretention
Issues with Bioretention/Landscape Practices

• Loss of Developable Land
• Long-term Sustainability
• Need for research
• Property owner education
• Water Use
• Ponding in yards (mosquitoes)
• Inspection and maintenance
Case Study – Commercial Building

- Cucamonga Valley Water District *Frontier Project*
- 0.7 acre development site
- 14,400 S.F. building
  - Office Space
  - Meeting Facilities
  - Public Demonstration Space
- Courtyards
- Walkways & Sidewalks
- Landscaped Areas
Drivers

• Permit Requirements Including:
  • Water Conservation
  • Water Quality
  • Hydrologic Condition of Concern
The Selected Approach

Rainwater Harvesting

• Meet Goals of:
  ◦ Water Conservation
  ◦ Groundwater Recharge

• Meet Irrigation Needs
• Runoff Reductions
• Pollutant Removal

Low Impact Development

• Runoff Reduction
• Pollutant Removal
LID & Water Harvesting Measures

• Green Roof
• Porous Pavement
• Decomposed Granite
• Bioretention/Rain Garden
• Cistern/Rain Tank (Water Harvesting)
• Underground Infiltration Device
Green Roof

[Images of green roof installations and schematic diagram showing layers of planting, soil/media mix, drainage tray/root barrier, waterproofing membrane/insulation, and structural support.]
Green Roof

Specifications:

• Extensive (18 inches of soil media)
• Partial roof coverage
• Bitumen waterproof membrane
• Plants: Aloe, Hesperaloe
• Soil mix: 25% topsoil, 25% compost, 50% sand
• Green roof area: 55% reduction in annual runoff

Costs:

• $50,000 (1,614 sf: $30 per square foot)
Porous Concrete

- Porous Concrete selected due to: LEED Heat Island Effect Credit
- Runoff Coefficient 0.1
- Cost - $50,000 (1300 S.F. - $38 per square foot)
**Decomposed Granite Walkways**

- Runoff Coefficient – 0.5
- Depth of 1.5 inches
- Cost $30,000 (4235 sq ft. $7 per square foot)
Bioretention/RainGarden

Specifications:

• 8 inches of soil media
• Plants: Lamb’s Ears, Senecio, Echeveria, Blue Fescue
• Soil mix: 50% sand, 20% compost, 30% soil
• Under drain
• Costs - $12 per square foot
Cistern/ Rain Tank

- Xeres
- Capacity 1,600 gallons (6,056 ltrs)
- Irrigation needs
- Cost: $40,000
Underground Infiltration Device

Atlantis® Infiltration Tank
Atlantis® Infiltration Tank

• 100% Pollutant Removal
• 90% Void Space
  • Smaller footprint than aggregate trenches
• Capacity: 7,200 Cubic Feet (6,164 cf = 5 year event Pre/Post)
• Cost: $98,000
Project Notes

- LID & water harvesting must be presented early in the design process.
- Early coordination in the site design process:
  - Coordination with architects & contractor throughout the construction process.
- LID & Water Harvesting integrated to:
  - Meet water quality requirements.
  - Meet hydromodification requirements.
  - Assist in irrigation needs and groundwater recharge.
Monitoring & Water Quality Improvement Plan Development

Jo Ann Weber, County of San Diego
Watershed Protection Program
Watershed-Oriented Permit

“Develop Water Quality Improvement Plans [for each Watershed Management Area] that guide the Copermittees’ jurisdictional runoff management program implementation efforts towards achieving the outcome of improved water quality in MS4 discharges and receiving waters.”

Opportunity: Direct limited resources to focus on highest priority water quality problems, Total Maximum Daily Loads, etc.

Challenge: Potentially multiple, divergent priorities for jurisdictions in more than one watershed.
Focus on Water Quality Outcomes

The new paradigm …

Action Oriented  ➔  Outcome Oriented
Adaptive Management Areas of Permit: Long-Term vs. Annual Processes

- Data / Findings
- Priorities/Targets
- Strategies
- Schedules
- RWQCB approval

Long-Term Planning (WQIP)

• Refining BMPs/Programs
  • RWQCB approval

Long-Term Adaptation ( Permit Cycle)

Annual Review and Adaptation (Where Appropriate)

Assessment (Evaluate and Learn)

Implementation (JRMP) (Group Monitoring)
Water Quality Improvement Plan

RWQCB’s vision to develop a strategic “road map” for each of 9 San Diego watersheds:

- Can’t do everything everywhere with limited resources
- Focus on priorities developed with stakeholder input and RWQCB approval
- Extended the philosophy to monitoring through Focus Meetings
Adaptive Management

WQIP adapted at least once every 3 years based on:
- Progress toward achieving water quality improvement
- Water quality monitoring data
- San Diego Water Board and public recommendations

JRMP adapted every year based on:
- Measureable reductions of non-stormwater discharges and pollutants in stormwater
- Program efficiency
- San Diego Water Board and public recommendations

Opportunity: Direct resources towards their best use.

Challenges:
- Difficult to show change in water quality over short time period.
- Mechanics of adaptive management are not well defined.
Water Quality Improvement Plan

- Identify water quality priorities through monitoring data and other sources
- Develop interim and final numeric goals
- Develop water quality improvement strategies and implement through jurisdictional runoff management program
- Develop integrated monitoring & assessment program
- Conduct Iterative approach & Adaptive Management Process
Water Quality Improvement Plan Schedule

After adoption of Permit:

• Within 6 months — submit priority water quality conditions & numeric goals for RWQCB & public review

• Within 9 months — submit water quality improvement strategies & schedules
Adaptive Management Areas of Permit: Monitoring Program

**Concept:** Develop Monitoring Plan as part of each Water Quality Improvement Plan to provide information needed to answer management questions & support effective adaptive management.

**Monitoring Elements:**
- Receiving Water Conditions
- MS4 Discharges – Non-stormwater & stormwater
- Sources/Pollutant Generating Activities
- BMP Studies/Program Assessments

**Example:** Increase efficiencies in IDDE Programs with observational methods (or other strategies); monitoring includes activities beyond water quality sampling.

**Action Items:**
- Structure initial requirements according to above in Section II.D.
- Coordinate strategic monitoring & assessment program as a part of the WQIPs.
**Purpose & Phasing of Monitoring**

**Purpose:**
- Provide program managers with needed information to support effective adaptive management

**Phasing:**
- **Pre WQIP (transitional period)** – Parts of 2007 Permit & also ramping up of stormwater conveyance system monitoring
- **Post WQIP** – Develop Monitoring & Assessment Program (MAP) to support WQIP priorities
Receiving Water Monitoring
(Condition Assessment)

Discharge Monitoring
(Cause or Contribute)

Source ID Monitoring
(Source Prioritization)

BMP + Special Studies

Analysis/ Interpretation

Management Questions

Are conditions in the receiving waters protective, or likely to be protective, of beneficial uses?

What is the relative urban runoff contribution to the receiving water problem(s)?

What are the sources of urban runoff that contribute to receiving water problem(s)?

What additional information is needed for stormwater programs to be effective in reducing urban runoff contributions to receiving water problems?

Assessment Questions

Are receiving water conditions improving by implementation of WQIPs?

Are WQIPs effective in prohibiting non-stormwater discharges?

Are WQIPs reducing stormwater pollutants to the MEP?

Are sources & pollutant generating activities well characterized?

Do BMPs effectively reduce discharges of pollutants from high priority sources?
## Discharge Prohibitions

“Non-storm water discharges into and from MS4s are prohibited” except ...

<table>
<thead>
<tr>
<th>Discharge Category</th>
<th>Exemption Condition</th>
</tr>
</thead>
</table>
| 1. Uncontaminated pumped groundwater  
  Foundation/footing drains and crawl spaces  
  Water line flushing and main breaks                                           | Covered under another NPDES permit.                                                 |
| 2. Air conditioning condensate  
  Individual residential car washing  
  De-chlorinated swimming pool discharges  
  Firefighting discharges                                                          | BMPs specified and/or required to be developed.                                    |
| 3. Diverted stream flows  
  Rising ground waters  
  Uncontaminated groundwater infiltration  
  Flows from riparian habitats and wetlands  
  Discharges from potable water sources                                           | Only disallowed if identified as a source of pollutants to receiving waters.      |
Key Purposes of Monitoring SDRWQCB Focus Meetings

• Effectively prohibit non-stormwater discharges to MS4s (stormwater conveyances)
• Reducing pollutants in stormwater to the Maximum Extent Practicable
• Address improvements in physical, chemical & biological conditions in receiving waters from implementing Water Quality Control Plan
Holistic Approach

• Share common goal: clean water
• Search for the correct balance of monitoring to *inform* implementation and to demonstrate *accountability*
Questions and Answers

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