



American Planning Association
California Chapter
San Diego

Making Great Communities Happen

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

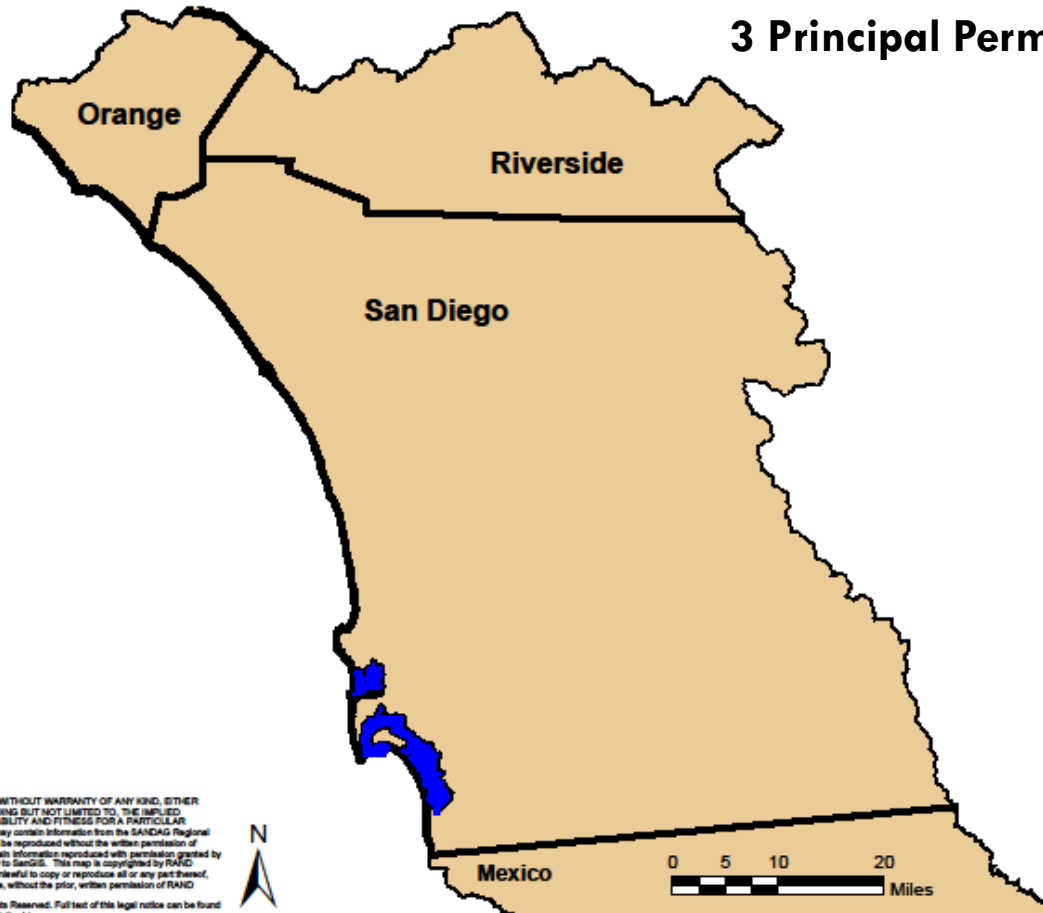
Christine A. Sloan, County of San Diego
Watershed Protection Program

San Diego Permit Process Overview

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

Current MS4 Permit Structure

3 Distinct Permits
3 Principal Permittees



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5 Riverside County Copermittees

City of Murrieta

County of Riverside

City of Temecula

City of Wildomar

Riverside County Flood Control & Water Conservation District

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

City of Chula Vista

City of Poway

City of Coronado

City of San Diego

City of Del Mar

City of San Marcos

City of El Cajon

City of Santee

City of Encinitas

City of Solana Beach

City of Escondido

City of Vista

City of Imperial Beach

County of San Diego

City of La Mesa

Regional Airport Authority

City of Lemon Grove

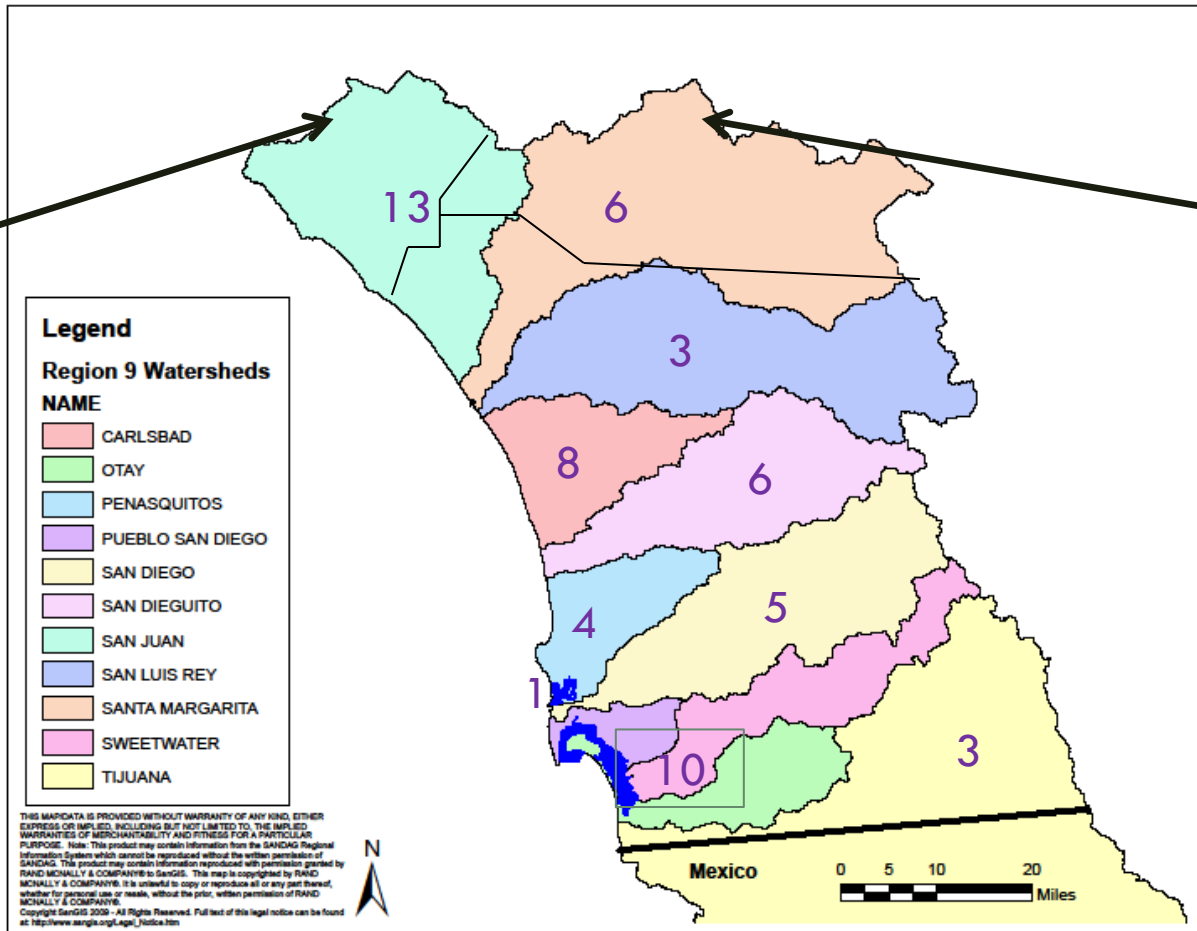
San Diego Unified Port District

City of National City

Proposed MS4 Permit Structure

Orange
County

Riverside
County



Combined Region 9 MS4 Permit

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

Region	Permit	Section/Page
Orange	R9-2009-0002	F.1. / 28-48
Riverside	R9-2010-0016	F.1. / 27-47
Combined w/ SD	R9-2013-0001	E.3. / 73-90

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



New PDP Exemptions

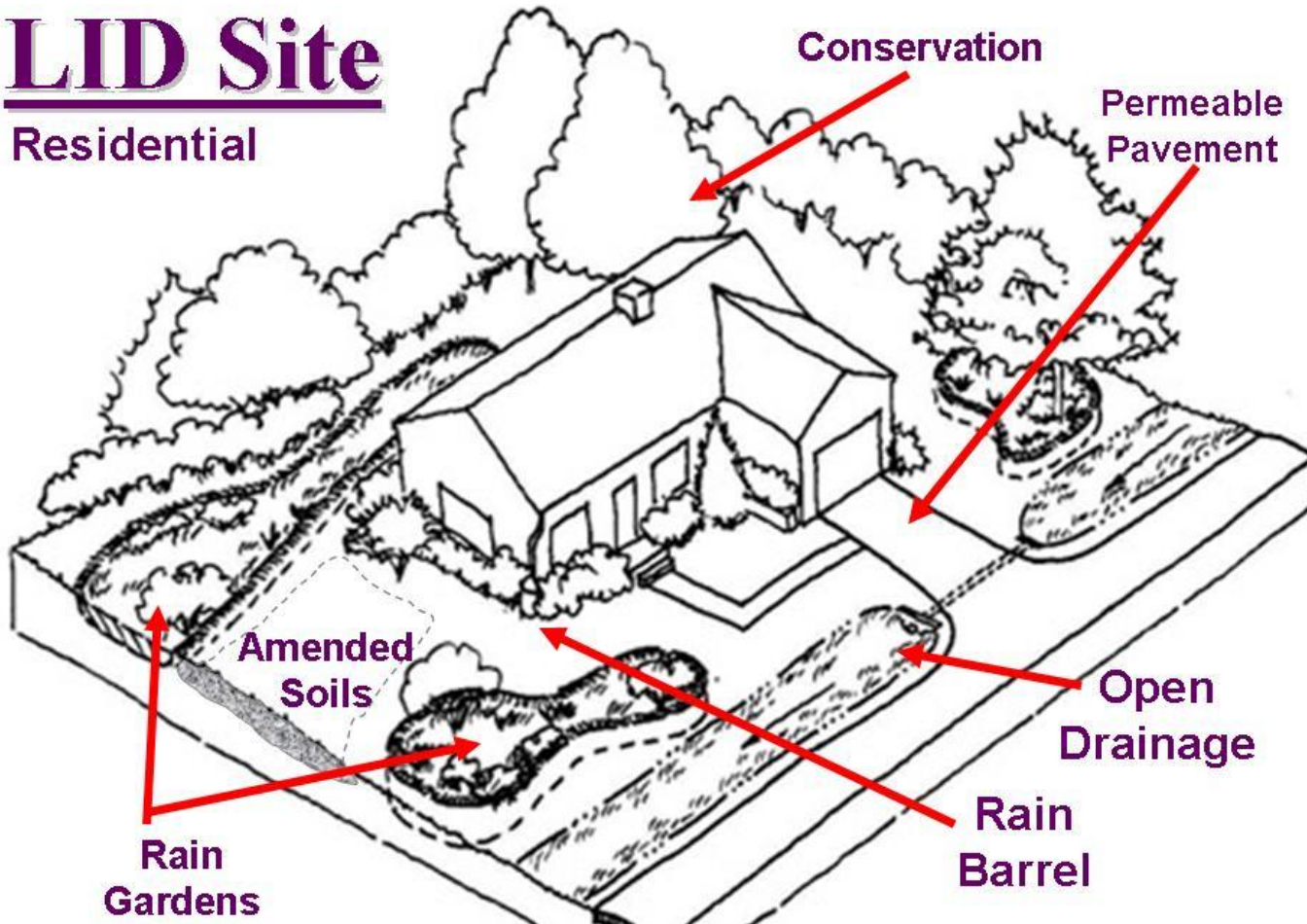
- New sidewalks, bike lanes, trails using LID
- Retrofit alleys, streets, roads as Green Streets
- New/re-development of Single Family Residential
 - LEED Certified, or
 - Pre-approved BMP



Low Impact Development

LID Site

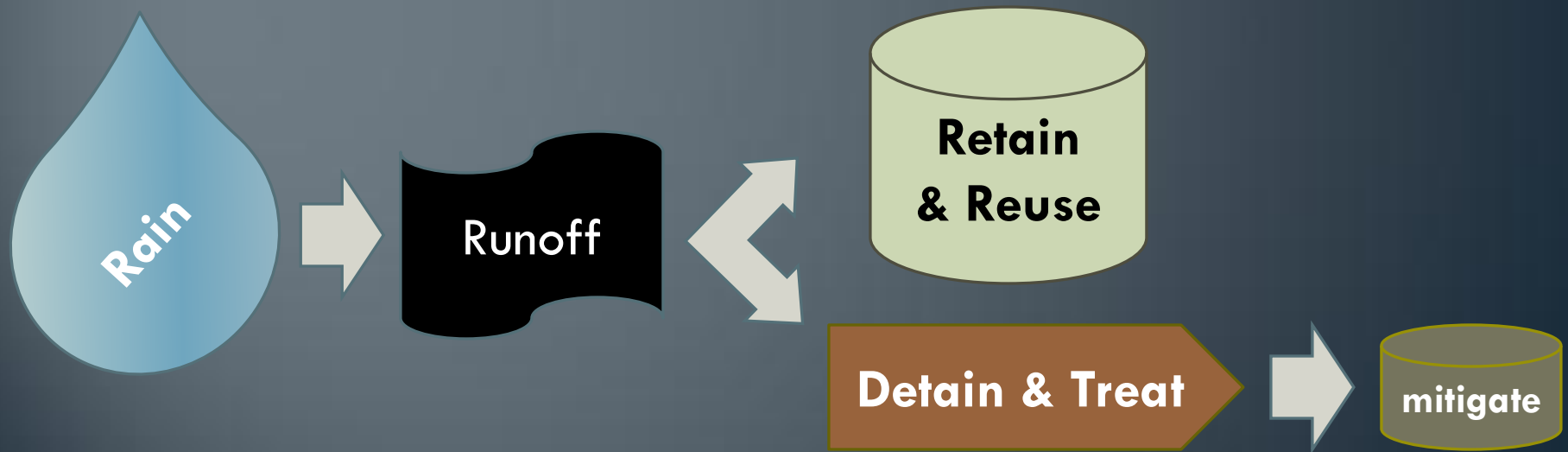
Residential



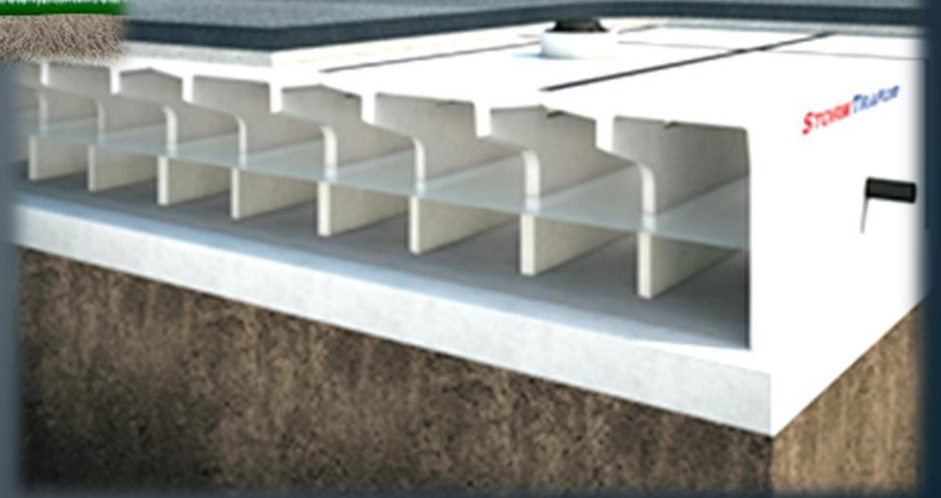
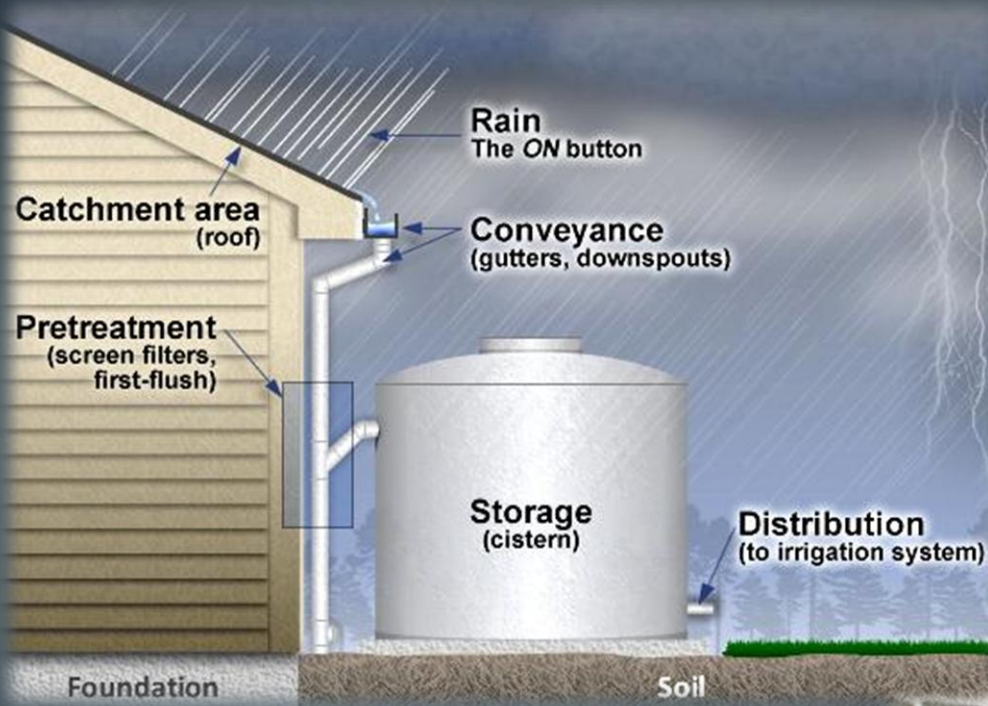
Create a Hydrologically Functional Lot

New Retention Standard

- Each PDP Retain & Treat
 - Retain 85th percentile storm event (~1")
 - Or treat and use Alternative Compliance (mitigation) for volume not retained



Retention Examples

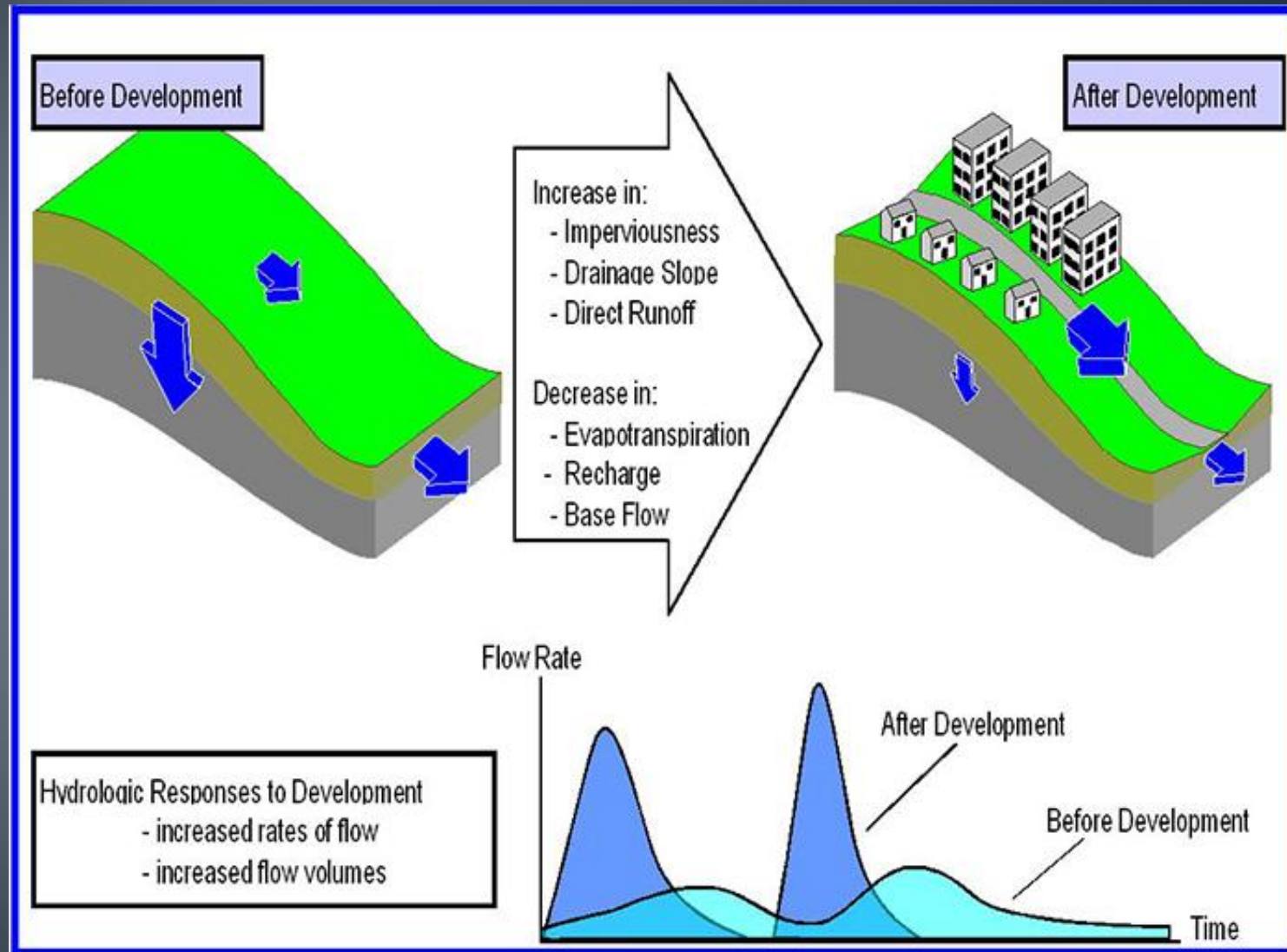


Hydromodification Changes

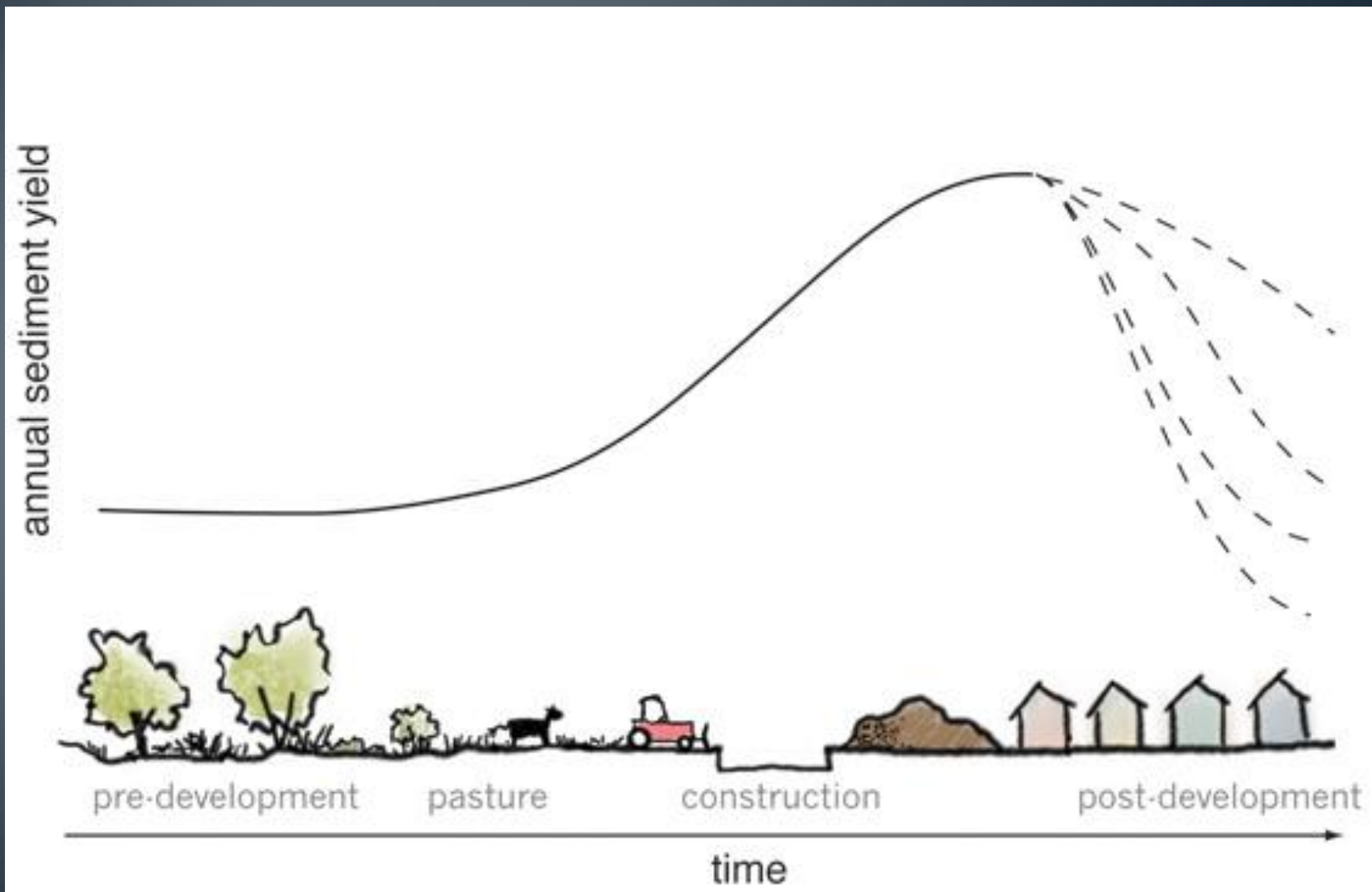
- Pre development = naturally occurring
- Compensate for the loss of sediment supply
- Or use Alternative Compliance (mitigation)
- Loss of Exemptions
 - No increase in peak flows
 - Lagoon
 - Stabilized Conveyance
 - Highly Urbanized
 - Urban to Stabilized



Hydromodification



HMP Sediment Supply



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

Other items

- BMP Design Manual replaces SUSMP
 - 18 months from adoption
- Grandfathering (prior lawful approval)
 - 18 months from adoption
- Inspect prior to building occupancy
- Verify maintenance annually in perpetuity

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
 - Retention requires larger BMPs,
 - 2 to 12 fold cost increase,
 - Lacks scientific review of environmental impacts.
- Alternative Compliance
 - Request to be administered by Regional Board
- Sediment Supply
 - 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
 - physical
 - biological
 - chemical

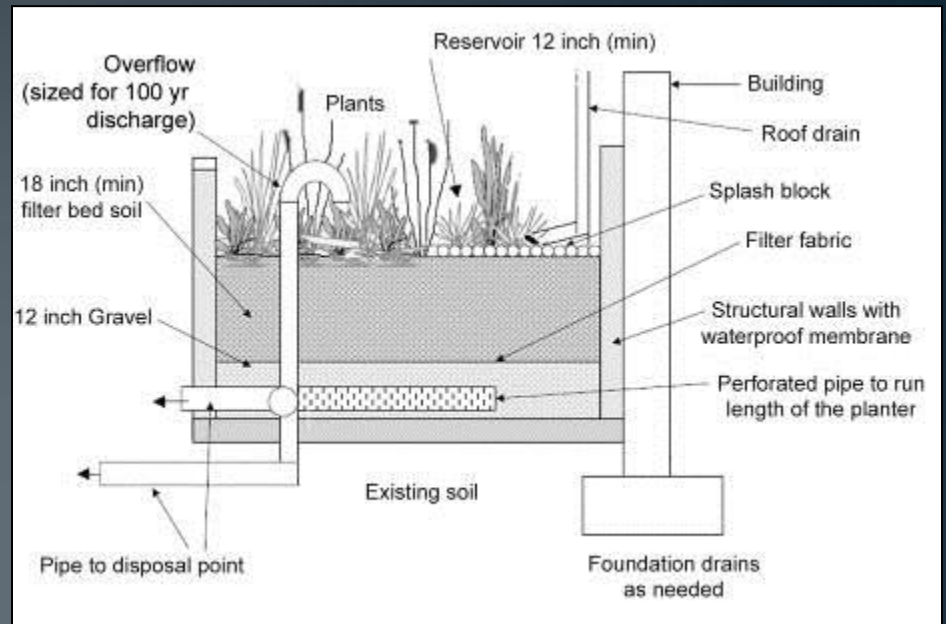
Bioretention along Streets



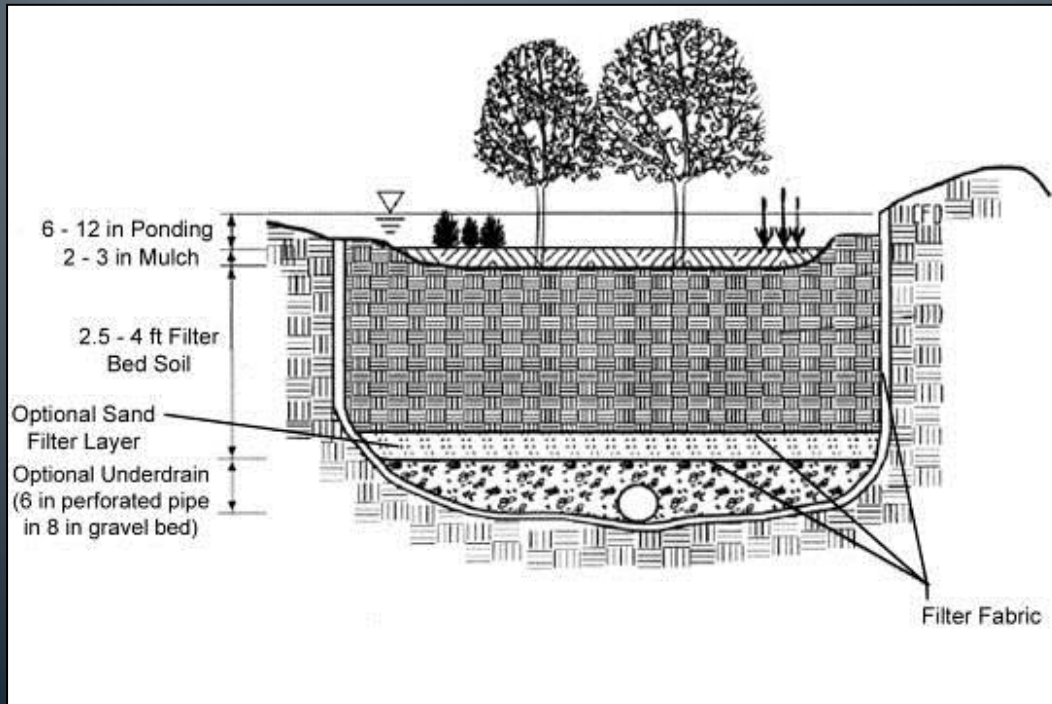
Flow Through Planters



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

Performance

Device	Phosphorus	TKN	Metals	Sediment
Infiltration Trench	100%	100%	100%	100%
Infiltration Basin	100%	100%	100%	100%
Rain Barrel	100%	100%	100%	100%
Porous Pavement	100%	100%	100%	100%
Bioretention	70-85%	55-65%	90-95%	90-95%
Green Roof	Ukn	Ukn	90-95%	90-95%
Media Filter	40-50%	50-60%	70-80%	80-90%
Wet Pond	0-50%	40-50%	60-90%	20-90%
Swale	Input	60-70%	80-90%	70-80%
EDB	30-40%	10-20%	60-70%	70-80%
Wet Vault	30-40%	10-20%	60-70%	70-80%
Vegetated Strip	Input	Input	70-80%	60-70%
Vortex Separator	Minimal	Minimal	Minimal	60% of 50 micron



What it Means for Development

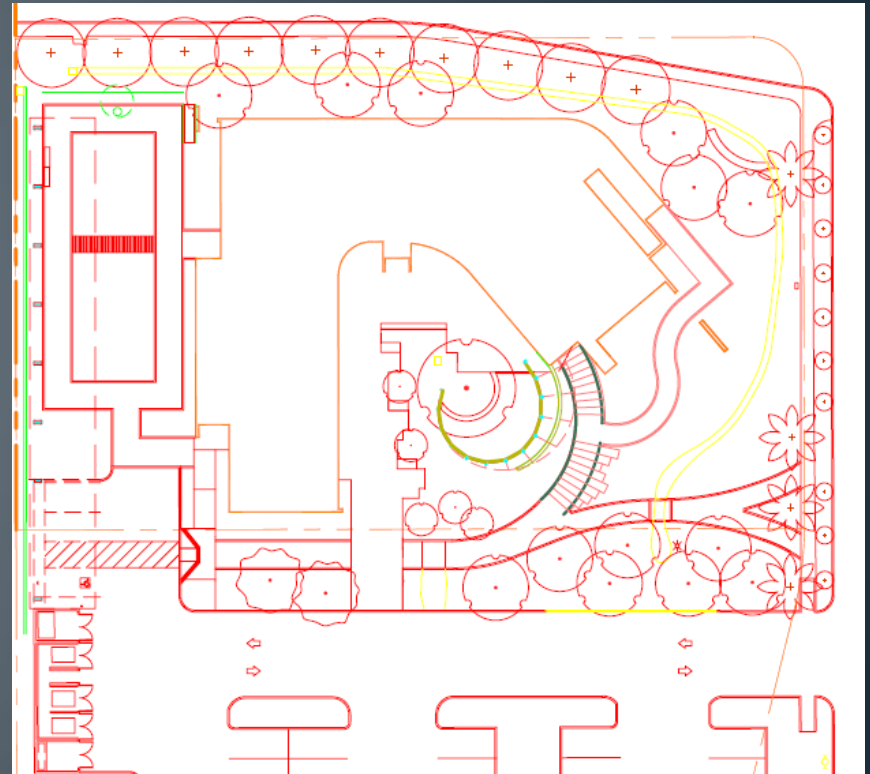
- In general, for surface water, developments are now responsible for:
 - Water quality
 - Hydromodification
 - 100-year mitigation
- To meet these obligations, the applicant can:
 - Use bioretention for water quality
 - Detention for hydromodification and 100-year mitigation
 - Or, bioretention only
- 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

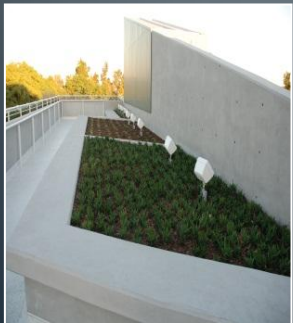
- Meet Goals of:
 - Water Conservation
 - Groundwater Recharge
- Meet Irrigation Needs
- Runoff Reductions
- Pollutant Removal

Low Impact Development

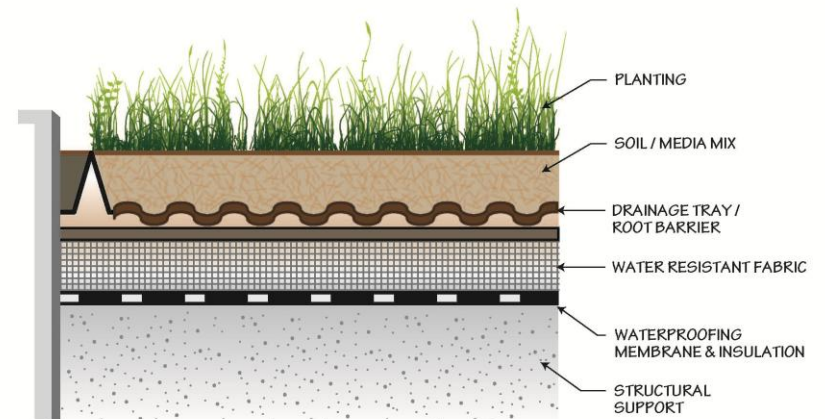
- Runoff Reduction
- Pollutant Removal

LID & Water Harvesting Measures

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



Green Roof



Green Roof

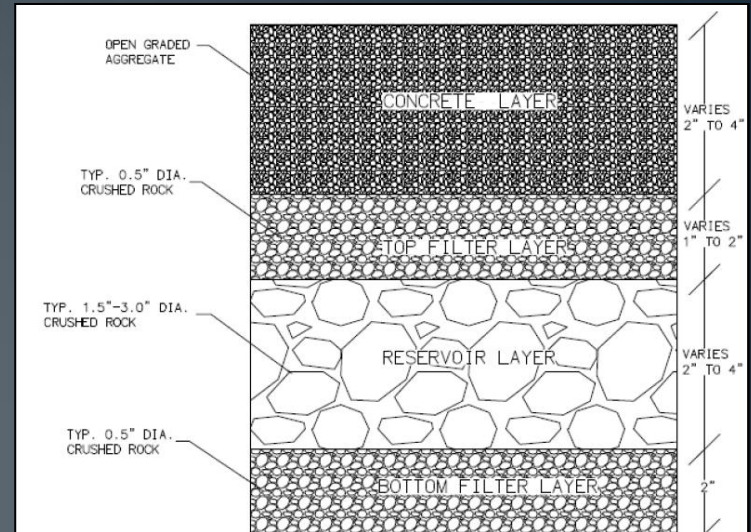
Specifications:

- 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



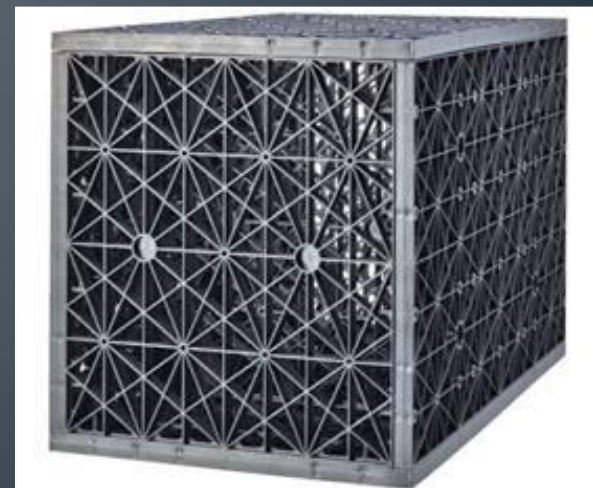
Cistern/ Rain Tank



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

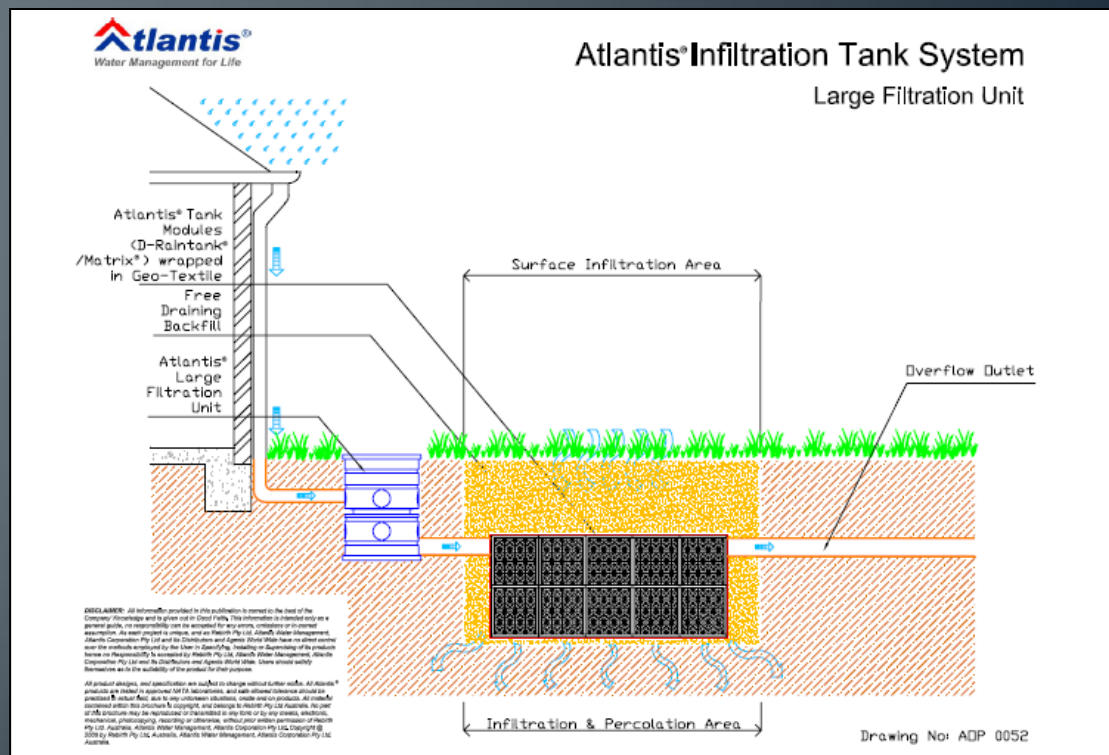


Underground Infiltration Device Atlantis® Infiltration Tank



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

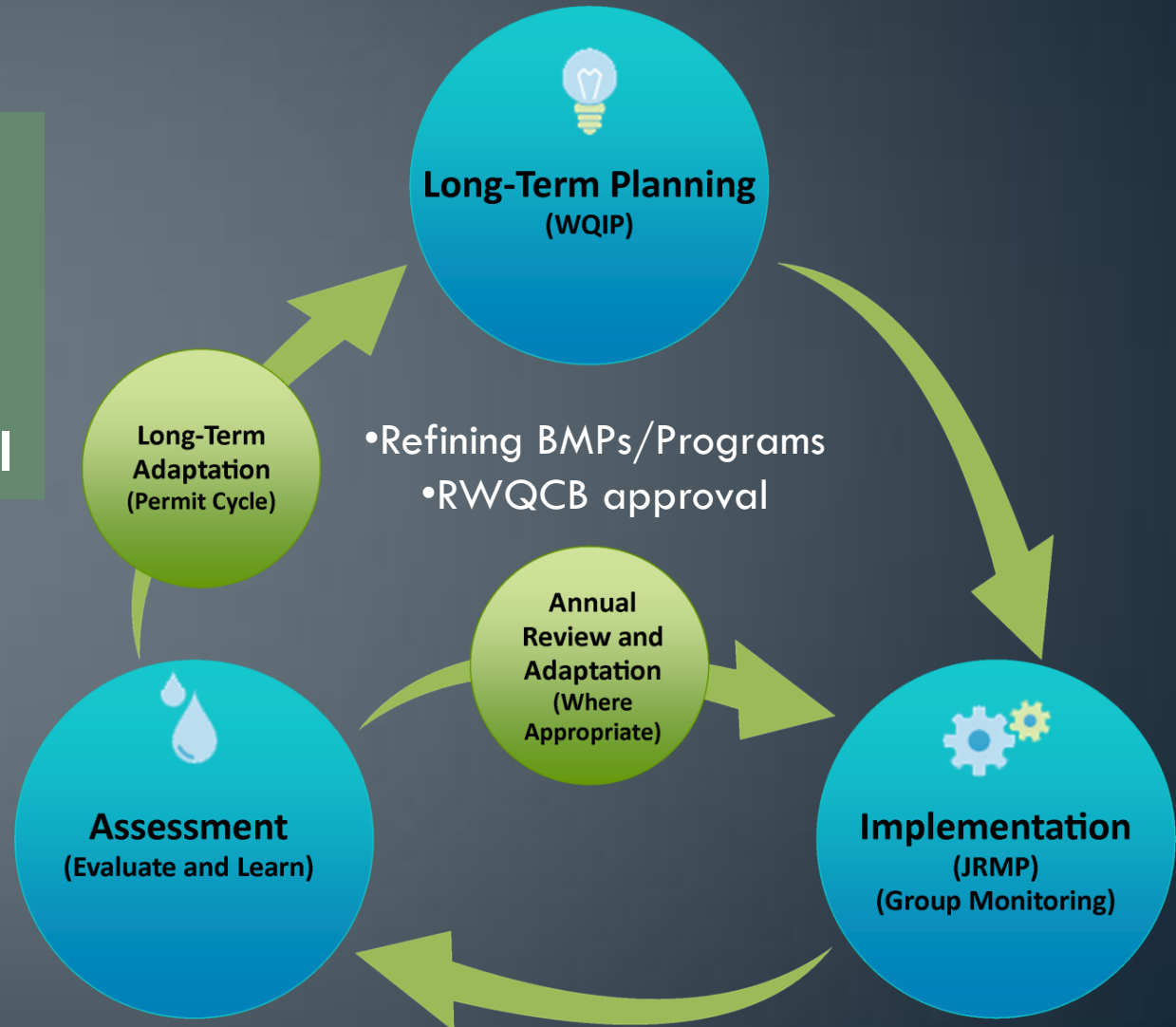


Outcome Oriented



Adaptive Management Areas of Permit: Long-Term vs. Annual Processes

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



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

Management Questions

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

What is the extent and magnitude of the current or potential receiving water problem(s)?

Are conditions in the receiving waters getting better or worse?

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?

Adaptive Management Actions/Recommendations

Receiving Water Monitoring
(Condition Assessment)

Discharge Monitoring
(Cause or Contribute)

Source ID Monitoring (Source
Prioritization)

BMP + Special Studies

Analysis/ Interpretation

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 ...

Discharge Category	Exemption Condition
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 Practical
- 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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