

2008 Conference Program

August 3–7, 2008
Orlando World Center Marriott Resort
Orlando, Florida, USA
www.StormCon.com

- The World's Largest Stormwater Conference and Exposition
- One- and Two-Day, Accredited, Pre-Conference Workshops on Critical Techniques
- CPSWQ, CPESC, and CISEC Certification Reviews and Exams



StormCon[®]
The North American Surface Water Quality Conference & Exposition

See Registration Form on Last Page



Dear *StormCon* Participant,

Welcome to our seventh annual *StormCon* conference and exposition.

Is it seven years already? Our first program on Marco Island, FL in August of 2002 seems so very long ago. Though much has changed in the industry in seven years, one common theme, or mission if you will, continues to prevail: the need and passion of this community of like-minded professionals from throughout the country to make our water resources safe, and a source of national pride not only for ourselves, but for future generations. I see and hear it year after year and it is what drives us to strive to offer you a program that will help you achieve these very important goals.

If this is your first *StormCon*, you'll discover a diverse community of like-minded professionals you can count on for solutions to your unique challenges. You'll also find *StormCon's* pace will allow you the time to do and see everything you want.

This year there are new pre-conference workshops thoroughly addressing the areas of advanced BMP design, post-construction stormwater inspection, and the integration of stormwater programs with TMDLs into the watershed management plan. We are also pleased to again offer the BMPs panel discussion and EPA Q&A session covering stormwater program developments. The workshop component of the program is the most comprehensive stormwater educational curriculum available anywhere.

If you prefer to further enhance your stormwater credentials, you may want to arrive early and take one of three accredited certification workshops in the areas of stormwater and erosion control: Certified Professional in Storm Water Quality (CPSWQ), Certified Inspector of Sediment and Erosion Control (CISEC), or the Certified Professional in Erosion and Sediment Control (CPESC).

We look forward to continuing to be your premier source of unbiased information, and playing a key role in your community's evolution by ensuring that *StormCon* offers you the resources you need to meet the tough challenges you face every day.

Enjoy your time in Orlando.

Sincerely,

A handwritten signature in black ink, appearing to read 'Steve Di Giorgi'. The signature is stylized and written in a cursive-like font.

Steve Di Giorgi
StormCon Director

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StormCon '08

Join your colleagues and the nation's leading industry experts at the seventh annual *StormCon*, the world's largest stormwater conference. You will learn the most current techniques and practices for meeting your stormwater compliance challenges from people with practical, hands-on experience.

The EPA's National Pollutant Discharge Elimination System (NPDES) Phase I and Phase II permit programs impact 6,000 communities. To meet these regulations, municipal professionals, state and federal government officials, consultants, developers, engineers, and vendors need training that covers a wide range of techniques, tools, and knowledge areas.

StormCon is the premier source of NPDES compliance training in all aspects of stormwater management for municipalities, consultants, highway and heavy construction contractors, developers, regulated industries, and special sites, such as ports and airports.

New pre-conference full day workshops will address the critical areas of integrating stormwater programs with watershed management plans, advanced BMP design, and post-construction stormwater inspection, maintenance, and repair. *Details p.6*

Program Tracks

Details p.13

- **BMP Case Studies:** Structural and nonstructural best management practices to achieve water-quality goals
- **The Construction Site and Stormwater:** BMPs and compliance strategies to prevent erosion and sedimentation and to meet permit requirements
- **Low-Impact Development:** Infiltration, bioretention, and other techniques to maintain or mimic predevelopment hydrology
- **Research and Testing of BMPs/Technical Issues:** Comparing BMP performance, evaluating testing protocols, and more
- **Stormwater Program Management:** Regulatory compliance, funding, public education and outreach
- **Water-Quality Monitoring:** Monitoring and sampling techniques, modeling practices, watershed assessments

DON'T MISS

- The opening general session Tuesday, August 5 at 8 a.m. with guest keynote speaker *Details p.5*
- The fabulous opening gala reception on Tuesday, August 5 from 6 p.m. to -8 p.m. and our relaxed networking luncheons, breaks, and cyber cafés *Details p.5*

Conference Schedule

Sunday, August 3, 2008

Registration Open	7:30 a.m. – 5:00 p.m.
Pre-Conference Certified Professional in Storm Water Quality (CPSWQ) Review Course	8:30 a.m. – 4:30 p.m.
Pre-Conference Certified Professional in Erosion and Sediment Control (CPESC) Review Course	8:30 a.m. – 4:30 p.m.
Pre-Conference Certified Inspector of Sediment and Erosion Control (CISEC) Training Modules 1–3	8:30 a.m. – 4:30 p.m.
NEW Pre-Conference Workshop <i>Integrating Stormwater Programs with TMDLs and Watershed Management Plans</i>	8:30 a.m. – 4:30 p.m.
Pre-Conference Two-Day Workshop—Part 1 <i>Stormwater Compliance in SWPPP Preparation and Construction Site Inspections</i> (Sunday and Monday)	8:30 a.m. – 4:30 p.m.
Pre-Conference Two-Day Workshop—Part 1 <i>Low-Impact Development: Introduction, Applications, and Technical Implementation</i> (Sunday and Monday)	8:30 a.m. – 4:30 p.m.

Monday, August 4, 2008

Registration Open	7:30 a.m. – 5:00 p.m.
Pre-Conference Certified Professional in Storm Water Quality (CPSWQ) Exam	8:30 a.m. – 1:30 p.m.
Pre-Conference Certified Professional in Erosion and Sediment Control (CPESC) Exam	8:30 a.m. – 1:30 p.m.
Pre-Conference Certified Inspector of Sediment and Erosion Control (CISEC) Training Module 4 and Exam	8:30 a.m. – 4:30 p.m.
Pre-Conference Two-Day Workshop—Part 2 <i>Stormwater Compliance in SWPPP Preparation and Construction Site Inspections</i> (Sunday and Monday)	8:30 a.m. – 4:30 p.m.
Pre-Conference Two-Day Workshop—Part 2 <i>Low-Impact Development: Introduction, Applications, and Technical Implementation</i> (Sunday and Monday)	8:30 a.m. – 4:30 p.m.
NEW Pre-Conference Workshop <i>Advanced BMP Design, Installation, and Maintenance: New Generation Stormwater Treatment Practices</i>	8:30 a.m. – 4:30 p.m.
NEW Pre-Conference Workshop <i>Advanced Post-Construction Stormwater Inspection, Maintenance, and Repair</i>	8:30 a.m. – 4:30 p.m.
NEW Pre-Conference Workshop <i>Advanced BMP Design, Installation, and Maintenance: Large Municipal Projects</i>	8:30 a.m. – 4:30 p.m.
Pre-Conference Workshop <i>BMP Selection, Inspection, and Maintenance</i>	8:30 a.m. – 4:30 p.m.
Pre-Conference Workshop <i>EPA Presents Post-Construction, LID, and Smart Growth as Stormwater BMPs</i>	8:30 a.m. – 4:30 p.m.
Speaker Ready Room Open	9:00 a.m. – 5:00 p.m.
Press Room Open	9:00 a.m. – 5:00 p.m.
Exhibit Hall Setup	9:00 a.m. – 6:00 p.m.
NEW EPA Stormwater Regulations 101	6:00 p.m. – 7:30 p.m.

Tuesday, August 5, 2008

Registration Open	7:00 a.m. – 5:00 p.m.
Opening General Session Coffee Service	7:30 a.m. – 8:15 a.m.
Opening General Session/Keynote Speaker	8:00 a.m. – 9:00 a.m.
Speaker Ready Room Open	9:00 a.m. – 5:00 p.m.
Press Room Open	9:00 a.m. – 5:00 p.m.
Cyber Cafés Open	9:00 a.m. – 12:15 p.m.
.....	1:15 p.m. – 6:00 p.m.
Exhibit Hall Open	9:00 a.m. – 12:15 p.m.
.....	1:15 p.m. – 6:00 p.m.
Workshop Sessions	10:00 a.m. – 11:30 a.m.
.....	2:15 p.m. – 3:45 p.m.
.....	4:30 p.m. – 6:00 p.m.
Luncheon	12:15 p.m. – 1:15 p.m.
Afternoon Refreshment Break	3:30 p.m. – 4:15 p.m.
Opening Gala Reception	6:00 p.m. – 8:00 p.m.

Wednesday, August 6, 2008

Registration Open	8:00 a.m. – 5:00 p.m.
BMPs and the Bigger Picture Panel Discussion	8:00 a.m. – 9:30 a.m.
Press Room Open	9:00 a.m. – 5:00 p.m.
Speaker Ready Room Open	9:00 a.m. – 5:00 p.m.
Cyber Cafés Open	9:00 a.m. – 12:15 p.m.
.....	1:15 p.m. – 6:00 p.m.
Exhibit Hall Open	9:00 a.m. – 12:15 p.m.
.....	1:15 p.m. – 6:00 p.m.
Workshop Sessions	10:00 a.m. – 11:30 a.m.
.....	2:15 p.m. – 3:45 p.m.
.....	4:30 p.m. – 6:00 p.m.
Luncheon	12:15 p.m. – 1:15 p.m.
Afternoon Refreshment Break	3:30 p.m. – 4:15 p.m.

Thursday, August 7, 2008

EPA News Update and Q&A Session	8:00 a.m. – 9:30 a.m.
Registration Open	9:00 a.m. – 12:15 p.m.
Speaker Ready Room Open	9:00 a.m. – 12:15 p.m.
Press Room Open	9:00 a.m. – 12:15 p.m.
Exhibit Hall Open	9:00 a.m. – 12:45 p.m.
Cyber Cafés Open	9:00 a.m. – 12:45 p.m.
Workshop Sessions	10:00 a.m. – 11:30 a.m.
.....	12:30 p.m. – 2:00 p.m.
Exhibit Hall Dismantle	12:30 p.m. – 4:00 p.m.

This is a preliminary schedule and subject to change.

StormCon thanks our 2008 sponsors for their support:



For information on sponsorship opportunities, contact Steve Di Giorgi at 805-682-1300, ext. 129, or by e-mail at stevedg@forester.net.

Opening General Session Coffee Service Tuesday, August 5, from 7:30 a.m. to 8:15 a.m., Crystal Ballroom

Hosted by:



Don't miss *StormCon's* inspiring keynote speaker and opening general session. Grab your morning coffee courtesy of Hydro International and be ready for something extraordinary to happen in the Crystal Ballroom!

Opening General Session/Keynote Speaker, Crystal Ballroom Tuesday, August 5, from 8:00 a.m. to 9:00 a.m.

Hosted by:



Keynote Speaker
Robert F. Kennedy Jr.

Join us Tuesday, August 5 from 8:00 a.m.–9:00 a.m. in the Crystal Ballroom for a truly memorable opening general session hosted by AbTech Industries.

As senior attorney for the Natural Resources Defense Council, chief prosecuting attorney for the Hudson Riverkeeper, and president of the Waterkeeper Alliance, Robert F. Kennedy Jr. is a leading figure in the protection of our nation's waters. His reputation as a resolute defender of the environment stems from a litany of successful legal actions against governments and companies who have failed to comply with the Clean Water Act. Mr. Kennedy was named one of *Time* magazine's "Heroes for the Planet" for his success in helping Riverkeeper lead the fight to restore the Hudson River. The group's achievement helped spawn more than 160 Waterkeeper organizations across the globe.

Mr. Kennedy is also a clinical professor and supervising attorney at Pace University School of Law's Environmental Litigation Clinic and is co-host of Ring of Fire on Air America Radio.

Cyber Cafés Open all day during exhibit hall hours in the Palms Ballroom

Hosted by:



Stay in touch with your e-mail, news, and stormwater Web sites in our highly interactive *StormCon* Cyber Cafés. These networking areas are provided exclusively for you by Bio Clean Environmental, Modular Wetlands, Envirotraxx, and Wallingford Software. Conveniently located in the Palms Ballroom, the Cyber Cafés have become the



center of conference activity. Have some coffee, catch up with colleagues, and enjoy the energy of our comfortable, spacious cafés.

Luncheons Tuesday, August 5, and Wednesday, August 6, from 12:15 p.m. to 1:15 p.m., Crystal Ballroom

Hosted by:

Tuesday, August 5

Wednesday, August 6



You must experience to believe *StormCon's* luncheons! Delicious sit-down lunches on Tuesday and Wednesday graciously sponsored by BaySaver Technologies and Contech Stormwater Solutions allow you to leisurely dine and meet with colleagues. The workshop sessions are closed during the luncheons so you can take full advantage of this conference highlight and networking opportunity. The luncheons are included with your registration.

Afternoon Refreshment Breaks Tuesday, August 5, and Wednesday, August 6, from 3:30 p.m. to 4:15 p.m., Exhibit Hall

Hosted by:

Tuesday, August 5

Wednesday, August 6



Join us each day for our terrific afternoon refreshment breaks hosted by Cultec and Rinker Materials in the exhibit hall. You will have a limitless supply of unbelievable refreshments! A great time to chat with vendors, colleagues, and compare conference notes.

Opening Gala Reception Tuesday, August 5, from 6:00 p.m. to 8:00 p.m. in the Crystal Ballroom

Hosted by:



You are cordially invited to the industry's most happening event. Our hosted buffet reception generously hosted by StormTrap includes live music, passed hors d'oeuvres, carving stations, and much more. Complimentary non-alcoholic beverages and cash bars are provided. You do not want to miss this favorite *StormCon* tradition! Admission is complimentary with your conference badge.

BMP Panel Discussion and EPA Update Sessions

NEW! EPA Stormwater Regulations 101 Monday, August 4, 6 p.m. to 7:30 p.m.

Nikos Singelis, USEPA senior program analyst, will review what you need to know about NPDES Phase II to have a compliant program if you are a municipality, contractor, or regulated industry.

BMPs and the Bigger Picture Panel Discussion

Wednesday, August 6,
8:00 a.m. to 9:30 a.m.

Hear about the trends shaping best management practices from the nation's stormwater movers and shakers. Arrive early to secure a great seat at this extremely popular event.



Panelists

Andrew Reese (moderator), P.E., vice president, AMEC Earth & Environmental, Nashville, TN

William F. Hunt, Ph.D., P.E., assistant professor, biological and agricultural engineering, North Carolina State University, Raleigh

Robert Roseen, Ph.D., P.E., director and assistant research professor, Stormwater Center, University of New Hampshire, Durham

Nikos Singelis, senior program analyst, USEPA, Office of Wastewater Management, Washington, D.C.

Tom Schueler, coordinator, Chesapeake Stormwater Network, founder of the Center for Watershed Protection, MD

EPA News Update and Q&A Session with Nikos Singelis

Thursday, August 6,
8:00 a.m. to 9:30 a.m.

Nikos Singelis, senior program analyst with the USEPA Office of Wastewater Management, will give an update on new developments in EPA stormwater programs and answer your questions. Consultant and instructor Shirley Morrow will provide insights learned from training more than 4,000 contractors for Wal-Mart. Don't miss this chance to hear the latest regulatory news firsthand and speak with an EPA representative about your stormwater program concerns! Complimentary with your conference badge.



Pre-Conference

NEW Integrating Stormwater Programs with TMDLs and Watershed Management Plans

Full-Day Workshop

Sunday, August 3, 2008

8:30 a.m. – 4:30 p.m.

0.5 Continuing Education Unit

Course Description

Stormwater program managers are faced with increasing pressure to accommodate and address a wide variety of issues related to water resource protection and restoration. USEPA and state water quality agencies have been moving toward a stronger role for stormwater programs in addressing total maximum daily loads established for impaired waters, and local watershed organizations and state programs advocate strongly for more involvement in their efforts.

This workshop will explore the sometimes confusing array of regulatory and non-regulatory water resource initiatives involving stormwater programs, and focus on how stormwater managers can improve consistency between their activities and those included in stormwater TMDLs and watershed management plans. Staff from Tetra Tech's stormwater and modeling groups will present information on assessment, planning, and management complete with detailed information on how to quantify existing pollutant loads and the benefits expected from proposed management practices. Material covered in the workshop will range from intermediate to advanced, with an array of case studies on various approaches for modeling current conditions and the performance of individual and multiple BMPs.

The workshop is intended for managers of medium and large-sized stormwater programs. Consultation and group discussions on issues raised by participants will be included.

Course Outline

Welcome and Introductions

- Workshop objectives
- The need for an integrated stormwater/watershed/TMDL approach

The Process and the Product: Water Resource Planning and Management

- Statutory and regulatory issues related to water resource management
- TMDLs, stormwater programs, and watershed planning
- Watershed characterization, problem identification and plan development

Identifying Local Challenges to Integrating TMDLs and Stormwater Programs

- Facilitated discussion — let's hear your war stories!
- What's working, what's not, what's

hard, and what's easy

- How an integrated stormwater/TMDL watershed management approach works

Tools for Identifying and Evaluating TMDLs and Existing Pollutant Loads

- Sources of key assessment information and water-quality data
- Online assessment tools: Enviromapper, STORET, and others
- Simple spreadsheets and the range of modeling options
- Accessing models and addressing data requirements

Approaches for Quantifying BMP Performance and Expected Load Reductions

- Interpreting TMDLs and watershed plans to identify stressors and sources
- Linking parameters of concern with appropriate management practices
- Quantifying projected performance of structural and nonstructural BMPs
- Online and other tools for quantifying BMP performance

Lessons from the Field: Examples and Case Studies on Stormwater and TMDLs

- Using flow and load duration curves to identify point vs. nonpoint sources
- Integrating stormwater and water resource protection programs
- A site evaluation tool for characterizing current conditions and BMP impacts
- Quantifying the benefits of multiple site/watershed BMPs through modeling

Where Do I Begin?

- Facilitated group discussion on specific local stormwater and TMDL issues
- Identification of resources and tools for getting started
- Review of key topics of the workshop
- Adjournment

Instructors

John Kosco, senior engineer, Tetra Tech, Inc. John Kosco has over 14 years of experience working on stormwater and nonpoint-source projects. He manages Tetra Tech's work supporting the USEPA's stormwater program and is assisting state departments of transportation in Washington, Michigan, and Colorado in the development and implementation of their stormwater management programs. Kosco has led onsite evaluations of over 100 stormwater Phase I permit programs, is an experienced trainer, and is the author of several guidance documents and manuals on stormwater management, including the *Stormwater Construction Inspection Guide for the Minnesota Pollution Control Agency*. John has a BS in agricultural engineering from Penn State University and a master's degree

in environmental engineering from George Washington University.

Trevor Clements, director of watershed management services, Tetra Tech, Inc.

Trevor has over 24 years of experience in watershed assessment and management planning. He has managed and facilitated numerous watershed planning projects involving technical and policy advisory groups, including major water supply protection efforts for Falls Lake, Cane Creek Reservoir, Jordan Lake, Mountain Island Lake, Randleman Lake, and most recently, Lake Maumelle in Arkansas. In addition to his substantial contributions to the *Handbook for Developing Watershed Plans to Restore and Protect our Waters*, he is the lead author of *Framework for a Watershed Management Program* (WERF, 1996).

Barry Toning, director of applied research, Tetra Tech, Inc.

Barry has provided technical and training support for the USEPA's stormwater and watershed management programs.

Steve Carter, water resources engineer, Tetra Tech, Inc.

Steve has more than ten years of experience in a wide range of watershed, surface water, and other model applications.

Pre-Conference

Stormwater Compliance in SWPPP Preparation and Construction Site Inspections

Two-Day Workshop

Sunday, August 3,

and Monday, August 4, 2008

8:30 a.m. – 4:30 p.m.

1.0 Continuing Education Unit

Course Description

Regardless of which side of the silt fence you're on—inspections or compliance management—this course will arm you with a thorough understanding of stormwater pollution prevention plan (SWPPP) preparation, a systemized approach, proper documentation, and how to be certain that a site is in compliance. Taught by the consultant who established the USEPA-approved certified stormwater professional training program for Wal-Mart Stores, Inc. and trained more than 4,000 of Wal-Mart's contractors, this is a course that everyone in stormwater management should take to get a handle on this often-misunderstood area. This workshop is the gold standard for construction-site SWPPP management.

The two areas this class will cover include knowing the general permit well enough to prepare a compliant SWPPP and making sure you understand what needs to be inspected to keep the SWPPP and the site in compliance at all times. Special attention will be given to

common pitfalls that result in bad inspections. For example, one of the easiest things to be in compliance with on a construction site is the paperwork, yet this is still an area of opportunity for improvement.

Course Outline

Day One: Preparing a SWPPP That Is in Compliance With the General Permit

- I. The regulations
- II. The forms
- III. Text
- IV. Site map and detail sheet
- V. Design do's and don'ts

Day Two: Inspecting a Construction Site to Make Sure It Is in Compliance

- I. The regulations
- II. Inspection protocol (do's and don'ts)
- III. Inspecting the paperwork
- IV. Inspecting BMPs
- V. How to write up the inspection
- VI. The risks of non-compliance

Instructor

Shirley D. Morrow, CPESC, environmental scientist, vice president, Stormwater USA

Shirley Morrow has worked in the erosion and sediment control industry for over 14 years. She prepared the USEPA-approved certified stormwater professional training program for Wal-Mart Stores, Inc. under a consent order with the USEPA, and conducted approximately 100 classes to certify over 4,000 superintendents, project managers, and construction managers with Wal-Mart. As a consultant she has prepared over 100 SWPPPs for construction activities in over 30 states. She has also provided expert investigations and research in erosion and sediment control for litigation projects. Morrow has been interviewed in Stormwater magazine and has served on the board of the International Erosion Control Association.

Pre-Conference

Low-Impact Development: Introduction, Applications, and Technical Implementation
Two-Day Workshop

Sunday, August, and Monday, August 4, 2008
8:30 a.m. – 4:30 p.m.

1.0 Continuing Education Unit

Course Description

Low-impact development (LID) is an innovative approach to stormwater management with a new philosophical foundation, a new set of principles, new practices, and a new process for site design. LID promises to better meet receiving-water goals in a more economically and ecologically sustainable manner. LID utilizes

source control while maintaining or creating a hydrologically functional landscape that mimics natural watersheds' hydrologic functions (volume, frequency, recharge, and discharge).

By integrating LID into site design you can replicate the natural sponge and pollutant assimilative capacity. A developed site can be designed to be a much more functional part of the watershed with intelligent use of LID practices and principles.

This workshop will provide an in-depth introduction to the economic benefits, ecological goals, planning techniques, design principles, analytical methodologies, and implementation strategies and monitoring results of LID techniques for urban stormwater management. Attendees will gain a thorough technical understanding of how to apply integrated LID management practices to meet local watershed protection and water resources restoration protection goals and regulatory requirements.

The course will cover the five basic management, planning, and design principles of LID: 1) conserve vital ecological/natural resources (trees, streams, wetlands, drainage courses); 2) minimize impacts at the site level by reducing imperviousness, conserving natural resources/ecosystems, maintaining natural drainage courses, reducing use of pipes, and clearing and grading; 3) maintain the predevelopment time of concentration by strategically routing flows to maintain travel time and control discharge; 4) provide runoff storage measures and dispersed controls uniformly throughout the landscape with the use of a variety of small decentralized detention, retention, and filtration practices such as bioretention, open swales, amended soils, and flatter grades; and 5) implement effective public education and incentive programs to encourage property owners to use pollution prevention measures and maintain on-lot landscape management practices.

Course Outline

- Comprehensive overview of LID's unique philosophy, principles, practices, and processes
- Discussion of a watershed's ecological processes vital to protecting receiving waters
- Establishing ecologically based watershed management and site design goals and objectives
- Understanding the technical, practical, and economic limitations of LID and conventional BMPs
- Planning, design, construction, and maintenance guidelines for LID practices
- Discussion of available analytical tools and models for LID
- The use of LID for urban retrofit to address total maximum daily loads,

combined sewer overflows, source water protection, and restoring urban waters

- LID program implementation strategies for local governments
- How LID can meet the National Pollutant Discharge Elimination System permit requirements
- Roadblocks to implementation
- Overview of monitoring results
- Demonstrate and discuss LID's applications to unique and diverse geology, hydrology, and ecosystems

Instructor

Larry Coffman, president, Stormwater Services

Larry Coffman has over 30 years of experience in stormwater management, flood control, watershed planning and restoration, and public outreach and education. He is a pioneer of bioretention or "rain gardens" and is considered one of the nation's leading experts on LID technology. He has taught LID courses across the nation, authored numerous papers and articles, and is a member of American Society of Civil Engineers' Urban Water Resources Research Council and the Water Environment Federation Stormwater Technical Advisory Committee. Coffman developed the practices known as low-impact development techniques in 1990 as the associate director of resources and planning for Environmental Resources in Prince George's County, MD. Coffman adapted techniques from a variety of long-established fields and invented new techniques to specifically meet the challenges of municipal stormwater management.

Pre-Conference

NEW Advanced BMP Design, Installation, and Maintenance: New Generation Stormwater Treatment Practices

Full Day Workshop

Monday, August 4, 2008

8:30 a.m. – 4:30 p.m.

0.5 Continuing Education Unit

Course Description

An interactive, hands-on workshop to develop and adapt effective design specifications for the new generation of stormwater treatment practices specifically geared toward local stormwater managers and design consultants. Participants will learn state of the art, innovative stormwater practices and will leave the workshop with customized design specifications that will work effectively in their communities.

The workshop will also focus on improving design standards and specifications for four innovative stormwater treatment practices: soil conservation, bioretention, dry swales, and linear wetlands. The morning will focus on key adaptations to make them work effectively, given local terrain, climate, water-quality objectives and development

Pre-Conference Full-Day and Two-Day Workshops

conditions, present the research and experience that has shaped the new generation designs, and present a basic design template for local use. The afternoon will feature an interactive discussion on how to troubleshoot the specifications to ensure proper installation and future maintenance. Participants are encouraged to bring their laptops and end the day crafting customized new designs to implement in their community.

Course Outline

- The do's and don'ts of crafting stormwater design specifications from someone who has made just about every mistake
- The latest science on soil conservation, bioretention, dry swales, and linear wetlands
- The missing link: the construction sequence and a realistic maintenance program
- One size does fit all — key tips for adapting STP designs to work in the demanding conditions present in your community
- Four new base templates for innovative STPs
- The balance between being prescriptive versus being flexible
- Plan review, construction inspection, and maintenance inspection checklists
- Interactive work session to develop your own customized design specifications

Instructor

Tom Schueler, coordinator, Chesapeake Stormwater Network

Tom Schueler has more than 25 years of experience in practical aspects of stormwater practices to protect and restore urban watersheds. Tom founded the Center for Watershed Protection, and has recently launched the Chesapeake Stormwater Network. This new organization's mission is to improve on the ground implementation of more sustainable stormwater management and environmental site design practices in each of the 1,300 communities and seven states in the Chesapeake Bay Watershed. Tom has written or co-written more than a dozen local and state stormwater engineering design manuals, and developed or refined the first design specifications for bioretention, wet ponds, constructed wetlands, filtering systems, and dry swales.

Pre-Conference

NEW *Advanced Post-Construction Stormwater Inspection, Maintenance, and Repair*

Full-Day Workshop

Monday, August 4, 2008

8:30 a.m. – 4:30 p.m.

0.5 Continuing Education Unit

Course Description

This comprehensive full-day workshop will cover the diverse areas of maintaining post-construction stormwater management facilities, inspection protocol, maintenance requirements of infrastructure, and various BMPs. Repair issues and implementing a multi-site inspection and maintenance program will also be covered.

Post-construction stormwater BMPs have been required to be constructed for several decades. However, until recently, the inspection and maintenance of these facilities has been a relatively dormant issue. The lack of maintenance and repair actions can cause stormwater facilities to become a liability, public hazard, and point-source of pollution. The result can be detrimental to the environment and have negative financial impacts for property owners, managers, and municipalities. As regulatory prioritization and enforcement of maintenance issues vary significantly, owners and managers of stormwater infrastructure are beginning inspection and maintenance programs for varied reasons. This workshop explores the need for maintenance and offers an insider's look at the various elements of a stormwater inspection, maintenance, and repair program. A wide variety of pertinent issues are reviewed, including design purpose of devices, inspection and maintenance procedures, and alternative approaches.

Course Outline

1. Can inspection and maintenance programs be avoided? A look into the reasons for programs including regulatory requirements and best practices for infrastructure management
2. Design intent of various practices. We look at the purpose behind the design of various BMPs and how they influence inspection and maintenance procedures
3. Field identification. A review of infrastructure and various types of BMPs including: conveyance systems, above ground facilities, below ground facilities, and proprietary devices
4. Inspections. We discuss pertinent aspects of inspections and programs including intervals, protocol, and procedures
5. Routine maintenance. A look at the intervals and procedures to follow for routine maintenance
6. Repairs. A review of common repairs and how to avoid them by inspection and routine maintenance.
7. The other approach: Reactive.
8. Who can do the work, including inspection, maintenance, and repairs.

Instructor

Theodore E. Scott, P.E., CPESC, president, T.E. Scott & Associates, Inc., managing member of Stormwater Maintenance, LLC

A practicing professional engineer, Mr. Theodore Scott has over 20 years of experience in site and stormwater management design. His experience with most aspects of land improvement design coupled with a specialization in stormwater management provides a unique insight into current trends in oversight, design, maintenance, and construction. As owner of Stormwater Maintenance, LLC, a construction firm dedicated to maintaining, repairing, and constructing stormwater management systems, his firm provides services throughout the Mid-Atlantic and Northeast regions with clients ranging from small businesses to *Fortune 500* corporations.

Guest Speaker (Tentative)

Matthew Foster, P.E., Lowe's Companies
An owner's perspective: *'The challenges of implementing a national multi-site program.'*

Pre-Conference

NEW *Advanced BMP Design, Installation, and Maintenance: Large Municipal Projects*

Full-Day Workshop

Monday, August 4, 2008

8:30 a.m. – 4:30 p.m.

0.5 Continuing Education Unit

Course Description

This interactive workshop will focus on theory, design criteria and the decision making process for selecting and designing advanced treatment BMPs to address pollutants of concern from urban stormwater runoff.

Municipalities, DOTs and developers are required to address post-construction stormwater runoff from new development and redevelopment that disturbs one or more acres. As runoff flows over areas altered by development, it picks up harmful sediment and chemicals such as oil and grease, pesticides, heavy metals, and nutrients (e.g., nitrogen and phosphorus). The best way to mitigate stormwater impacts from new development is to use practices to treat, store, and infiltrate runoff onsite before it can affect water bodies downstream. In many communities, receiving water bodies on the 303 (d) list and the subsequent development of TMDLs has forced the consideration of specific BMPs to address the receiving waters pollutants of concern. This one-day course presents a comprehensive view of stormwater management with an emphasis on the current design practice for treatment BMPs. Design procedures for several BMPs are presented, including infiltration, media filters, and treatment trains. Attendees will get an in-depth understanding of how to design, construct, and operate advanced treatment BMPs.

Course Outline

1. Introduction
2. Brief overview of stormwater

- management
3. Brief overview of the regulatory framework
 4. Understanding hydromodification
 5. Understanding pollutants of concern (POC)
 6. Design criteria—water quality volume
 7. Design criteria—water quality flow
 8. Common treatment BMPs
 9. Advanced treatment BMPs
 10. Selecting the appropriate BMP for site specific POCs
 11. Design of infiltration BMPs
 12. Design of sand filter BMPs
 13. Design of treatment trains
 14. Construction of treatment BMPs
 15. Operation and maintenance of treatment BMPs
 16. Closing

Instructor

James Sullivan, P.E., project manager, Metcalf & Eddy / AECOM

Mr. James Sullivan is a project manager with considerable experience in facilities planning, conceptual design, final design, and construction management of large municipal and civil engineering projects. For the last decade, he has focused on wet weather engineering and drainage design, with particular attention to stormwater treatment to address site-specific water-quality objectives. He has designed numerous stormwater treatment BMPs, including advanced pilot studies in California as well as BMPs for large municipal projects in the Northeast. He holds a bachelor of science and a master of science in civil engineering from the University of Massachusetts—Lowell. He currently resides in Connecticut.

Pre-Conference

BMPs: Selection, Inspection, and Maintenance

Full-Day Workshop

Monday, August 4, 2008

8:30 a.m. – 4:30 p.m.

0.5 Continuing Education Unit

Course Description

Selecting the right best management practices (BMPs) is crucial for achieving water-quality goals, but understanding the array of choices and the conditions in which different BMPs are most effective can seem overwhelming. This comprehensive workshop guides program managers and engineers through the criteria necessary to make good selections. It begins with a discussion of pollutant sources and types and an overview of pollutant removal mechanisms. Thirty-three types of BMPs are covered in detail—from ponds, alum injection systems, and constructed wetlands to different types of media filters, inlet devices, buffer strips, hydrodynamic devices, and more. A section on selection criteria gives participants a wide-ranging list of considerations for making the best choices, including not only the type of pollutants, but

also pollutant removal efficiency, available space, groundwater level, soil type, and maintenance costs. The workshop also includes discussions of first flush, monitoring of BMPs, total maximum daily loads (TMDLs), and the role of low-impact development practices. Modeling of pollutant loading and pollutant removal calculations for BMPs and treatment trains are provided, along with a new method for design of pre- versus post-pollutant loadings. Stormwater reuse, along with case studies, are discussed. An in-depth look at BMP inspections and maintenance will also be given.

Course Outline

1. Pollutant types and sources
2. Pollutant impacts
3. Pollutant removal mechanisms
4. Selecting structural best management practices (BMPs)
 - a. Discussion of thirty-three types of BMPs
 - b. How they work
 - c. Constraints on operations
 - d. Measuring performance
 - e. Modeling
 - f. Treatment trains
 - g. Design for pre- versus post-pollutant loadings
5. Stormwater reuse
6. Inspecting BMPs
 - a. Policy and process issues
 - b. Field inspection
7. BMP maintenance

Instructors

Gordon England, P.E., D.WRE, GPI Southeast, Inc.

Gordon England has over 27 years of experience in stormwater management, in both the public and private sectors. His experience includes stormwater master plans, modeling, stormwater utility creation and management, and grant acquisition. His 10 years as lead engineer with the Brevard County Stormwater Utility in Florida and tenure as senior engineer for the Bahamian Ministry of Works, gave him a thorough understanding of municipal operations and perspectives. He is a recognized leader in the selection and design of innovative stormwater BMPs and serves as an editorial advisor to *Stormwater* magazine and on several task committees for the Environmental Water Resources Institute.

Stuart Stein, P.E., D.WRE, president of GKY & Associates, Inc.

Stuart Stein has over 20 years of experience in stormwater management and water resources engineering, including watershed management plans, stormwater and drainage studies, BMP design and analysis, TMDLs, and flood studies. He has coauthored several publications, including the Federal Highway Administration's popular *Evaluation and Management of Highway Runoff Water*

Quality, and its Urban Drainage Design Manual, Hydraulic Engineering Circular No. 22. He currently teaches stormwater management to State DOTs nationwide, serves as principal investigator for the FHWA Hydraulics Research Laboratory, and assists a number of municipalities with their NPDES stormwater programs.

Stein serves on the faculty of Virginia Tech, where he teaches urban hydrology and environmental hydrology. He served as chair of the American Society of Civil Engineers' (ASCE) National Stormwater Infrastructure Committee, chair of the ASCE TMDL Evaluation Task Committee, and vice chair of the ASCE BMP Testing Program Task Committee.

Pre-Conference

EPA Presents Post-Construction, LID, and Smart Growth as Stormwater BMPs

Full-Day Workshop

Monday, August 4, 2008

8:30 a.m. – 4:30 p.m.

0.5 Continuing Education Unit

Course Description

Communities across the country are working hard to build comprehensive stormwater management programs that meet the goals of the National Pollutant Discharge Elimination System (NPDES) Phase II regulations. Perhaps the most challenging aspect of this program is the post-construction minimum measure that focuses on permanent stormwater controls installed on newly developed or redeveloped land.

In addition to the basic challenges of getting a municipal post-construction program up and running, there are new and emerging techniques that have the potential to significantly improve the environmental effectiveness of these programs. Development is a major threat to our watersheds due to the increases in impervious surfaces associated with our current patterns of growth. There is compelling evidence that low-impact development or better site design techniques that seek to manage stormwater at the site and focus on maximizing infiltration can significantly reduce the impact of stormwater pollution from individual sites. To make these municipal post-construction programs truly effective, the USEPA is finding that we also need to raise our focus from individual sites up to the neighborhood and watershed levels. Smart growth seeks to examine development patterns at the macro level and come up with better solutions—solutions that result in many benefits, including improved water quality, reduced air pollution, and better quality of life.

Pre-Conference Workshops/CPSWQ Certification Program

The goal of this workshop is to help those involved with local stormwater management build stormwater programs that will result in real improvements to local rivers, lakes, and coastal waters. Municipalities can build much more effective programs by incorporating LID and smart growth ideas into their programs, ordinances, master plans, and guidance documents.

Course Outline

- Overview of post-construction requirements, LID, and smart growth
- Making the link between the site and the watershed — smart growth as a BMP
- Watershed planning exercise
- You get what you ask for: site-based stormwater criteria
- Site planning exercise
- Tools for developing a post-construction program

Instructors

Nikos Singelis, senior analyst, USEPA, Office of Wastewater

Nikos Singelis is a senior program analyst with the US Environmental Protection Agency (USEPA). He is the stormwater project manager and the lead for many of the USEPA's NPDES stormwater activities. He has been with the agency for over 19 years and served in a variety of positions, mostly implementing various aspects of the Clean Water Act. Singelis has been with the NPDES program for six years and has established a national training program for municipal stormwater managers, developed guidance and technical materials to help municipal stormwater managers implement the requirements of the CWA, and implemented a national outreach campaign to increase compliance with the NPDES requirements for construction sites. He has a bachelor's degree from Ohio University and master's degree in public administration from American University.

Lisa Nisenson, policy analyst, Tetra Tech, Inc.

Lisa Nisenson has over 15 years of experience working on smart growth professionally and as a citizen activist. She previously worked for the Development, Community, and Environment Division in the USEPA's Office of Policy, focusing on growth and water policy, including development of "Using Smart Growth Techniques as Stormwater Best Management Practices," as well as numerous articles for stormwater and planning journals. Her current work as a consultant focuses on developing multi-objective zoning and ordinance language to meet environmental, transportation, and economic goals. Nisenson graduated from Meredith College with a BS in biology and earned a master's degree in education administration at Harvard University.

John Kosco, principal engineer, Tetra Tech, Inc.

John Kosco has over 14 years of experience working on stormwater and nonpoint-source projects. He manages Tetra Tech's work supporting the USEPA's stormwater program and is assisting state departments of transportation in Washington, Michigan, and Colorado in the development and implementation of their stormwater management programs. Kosco has led onsite evaluations of over 100 stormwater Phase I permit programs, is an experienced trainer, and is the author of several guidance documents and manuals on stormwater management, including the *Stormwater Construction Inspection Guide for the Minnesota Pollution Control Agency*. John has a BS in agricultural engineering from Penn State University and a master's degree in environmental engineering from George Washington University.

David Hirschman, senior water resources specialist, Center for Watershed Protection

David Hirschman joined the Center for Watershed Protection staff in 2005. Prior to his Center employment, Dave Hirschman worked in the public and private sectors on stormwater and water resources topics. Most recently, he worked for Biohabitats of Virginia, specializing in innovative stormwater management, wetlands, and water resources planning. He also served as water resources manager for Albemarle County, VA for over 11 years. He was responsible for the development of a stormwater management program, including authoring a stormwater ordinance and design guidance, coordinating plan review and construction inspection efforts, and undertaking stream assessments and stormwater master planning. Dave Hirschman has taught water resources and environmental courses at the University of Virginia and Virginia Tech. He has a BA in biology from Duke University and a master's degree in urban and regional planning from Virginia Tech.

Pre-Conference

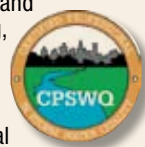
Certified Professional in Storm Water Quality (CPSWQ)

Certification Course: Sunday, August 3, 8:30 a.m. – 4:30 p.m.

Certification Exam: Monday, August 4, 8:30 a.m. – 1:30 p.m.

Certified Professional in Storm Water Quality

is a designation that provides evidence of qualifications in stormwater management principles and methods. CPSWQ certification is available to those who have the educational training, demonstrated expertise, and experience in computing, analyzing, and evaluating stormwater quality. You can become a certified stormwater professional



or just take the review session on Sunday, August 3, to brush up on your skills and take the exam at a later date. Either way, you will have a full-day review session and the opportunity to take the certification exam on Tuesday/Monday, August 4.

Registration Instructions

- 1) To register for the full-day review session complete the registration form in this program or at www.StormCon.com. You may register for the review session and elect not to take the exam at this time. See www.cpesc.org for future exam dates.
- 2) To take the review course and certification exam, complete the registration form in this program or online at www.StormCon.com and also submit an application for eligibility to the certifying organization, the Certified Professional in Erosion and Sediment Control (CPESC). **You must have a letter of approval from CPESC to take the CPSWQ exam.**

CPSWQ Exam Application Deadline. The CPESC review committee needs seven weeks to evaluate your information and confirm your eligibility to sit for the exam. **Your materials must be received by June 2, 2008, to allow enough time.**

For further information about exam application, eligibility, and fees, contact:

David Ward

CPESC

Ph: 828-655-1600

Fx: 828-655-1622

E-mail: info@cpesc.org

Web site: www.cpesc.org

Address: 49 State Street

Marion, NC 28752-4020

Instructor

Michael Alberson, REA, CPESC, CPSWQ, ESSWI, senior environmental engineer, Geosphere/CEL, Inc.

Your instructor for the Exam Review Session is Michael Alberson, who has over 33 years of experience in environmental sciences, with emphasis in air quality, water quality, stormwater pollution prevention, visual impact, biology, and EIR preparation. He is also a certified Stormwater Pollution Manager for Caltrans and participates yearly as an instructor at *StormCon* and our Regional *StormCon* Workshop Programs.

Pre-Conference

Certified Professional in Erosion and Sediment Control (CPESC)

Certification Course: Sunday, August 3,
8:30 a.m. – 4:30 p.m.
Certification Exam: Monday, August 4,
8:30 a.m. – 1:30 p.m.

Certified Professional in Erosion and Sediment Control

CPESC is a designation that provides evidence of qualifications in erosion and sediment control management principles and methods. CPESC certification is available to those who have demonstrated expertise, experience in controlling erosion and sedimentation, and meet certification standards. You can become a certified erosion and sediment control professional or just take the review session on Sunday, August 3, to brush up on your skills and take the exam at a later date. Either way, you will have a full-day review session and the opportunity to take the certification exam on Monday, August 4



Registration Instructions

- 1) To register for the full-day review session complete the registration form in this program or at www.StormCon.com. You may register for the review session and elect not to take the exam at this time. See www.cpesec.org for future exam dates.
- 2) To take the review course and certification exam complete the registration form in this program or online at www.StormCon.com and also submit an application for eligibility to the certifying organization, the Certified Professional in Erosion and Sediment Control (CPESC). **You must have a letter of approval from CPESC to take the CPESC exam.**

CPESC Exam Application Deadline. The CPESC review committee needs seven weeks to evaluate your information and confirm your eligibility to sit for the exam. **Your materials must be received by June 2, 2008, to allow enough time.**

For further information about exam application, eligibility, and fees, contact:

David Ward
CPESC
Ph: 828-655-1600
Fx: 828-655-1622
E-mail: info@cpesc.org
Web site: www.cpesec.org
Address: 49 State Street
Marion, NC 28752-4020

Instructor

Jeff Hoilman, P.E., CPESC, CPSWQ, project manager, ARCADIS, Chattanooga, TN

Jeff Hoilman is a licensed professional civil engineer with 15 years of experience in the design and application of best management practices. Hoilman works for ARCADIS in Chattanooga, TN as the transportation stormwater manager and is active in erosion and sediment control activities related to state DOT projects. He is involved in the preparation of stormwater pollution prevention plans (SWPPP), erosion control plans, erosion prevention and sediment control (EPSC) inspections, and quality assurance of best management practices (BMPs) on active construction sites. He is also a member of the American Society of Civil Engineers (ASCE), Soil Water Conservation Service (SWCS), and the International Erosion Control Association (IECA).

Pre-Conference

Certified Inspector of Sediment and Erosion Control (CISEC)

Training Modules 1–3: Sunday, August 3,
8:30 a.m. – 4:30 p.m.

Training Module 4 and Certification Exam:
Monday, August 4, 8:30 a.m. – 4:30 p.m.

Certified Inspector of Sediment and Erosion Control

StormCon is pleased to offer the sediment and erosion control inspection certification training modules and exam. If you are an experienced construction site inspector, you can take the next professional step by becoming CISEC certified to show your distinction in the field.



The CISEC certification will:

- Demonstrate comprehensive knowledge in the principles and practices of sediment and erosion control and their applicability to development of discharge permit documents
- Demonstrate the necessary skills to observe onsite and offsite conditions that impact the quality of stormwater discharges from active construction sites
- Demonstrate the ability to inspect installed best management practices and their ongoing maintenance to determine if the mitigation measures will minimize the discharge of sediment and other pollutants from active construction sites
- Demonstrate the ability to communicate and report on their inspection of active construction sites as to whether compliance issues may exist with federal, state and/or local discharge permit regulations

Registration Instructions

- 1) To register for training modules 1–4 on Sunday, August 3, and Monday, August

4, complete the registration form in this program or at www.StormCon.com. You may register for the review session and elect not to take the exam at this time. See www.cisecinc.org for future exam dates.

- 2) **To attend training modules 1–4 and to take the certification exam**, complete the registration form in this program or online at www.StormCon.com and also submit an application for eligibility to the certifying organization. To download an application for eligibility PDF visit: www.cisecinc.org/id1.html. **You must have a letter of approval from CISEC to take the CISEC exam.**

CISEC Exam Application Deadline.

The CISEC review committee needs 30 days to evaluate your information and confirm your eligibility to sit for the exam. **Your materials must be received by CISEC no later than July 4, 2008, to allow enough time.**

For further information about exam application, eligibility, and fees, contact:

CISEC, Inc.
P.O. Box 188
Parker, CO 80134
Ph: 720-235-2783
Fx: 303-841-6386
E-mail: cisec_inc@yahoo.com
Web site: www.cisecinc.org

Instructors

Tina R. Evans, P.E., HydroDynamics, Inc.

Since earning her bachelor of science degree with specialties in civil and mechanical engineering from the Colorado School of Mines in 1999, Evans has worked for HydroDynamics, Inc. She completes drainage analysis, assists in developing sediment and erosion control plans, provides inspection services, and develops drawings of sediment and erosion control measures for manuals and plans.

Dale D. Hoffman, KB Home

Dale Hoffman is a workplace compliance manager for KB Home, a top-five homebuilder. His primary responsibilities include inspecting his company's job sites to ensure that EPA regulations are followed, safety measures are in place, and stormwater compliance is adhered to. He has conducted several training courses for his company, and his certifications include OSHA safety trainer and CISEC stormwater trainer.

Conference Workshop Schedule at a Glance/Room Locations

Monday, August 4

6:00 p.m. – 7:30 p.m.

EPA Stormwater Regulations 101 Anaheim-Atlanta-Boston

Tuesday, August 5

10:00 a.m. – 11:30 a.m.

BMPs Track Crystal G1

Construction-Site Track Crystal E-F

LID Track Crystal G2

Research & Testing Track Crystal K-L-M

Stormwater Program Management Track I Crystal A-B-C

Stormwater Program Management Track II Anaheim-Atlanta-Boston

Water-Quality Monitoring Track Crystal N-P-Q

Tuesday, August 5

2:15 p.m. – 3:45 p.m.

BMPs Track Crystal E-F

LID Track Crystal G2

Research & Testing Track I Crystal K-L-M

Research & Testing Track II Crystal G1

Stormwater Program Management Track I Crystal A-B-C

Stormwater Program Management Track II Anaheim-Atlanta-Boston

Water-Quality Monitoring Track Crystal N-P-Q

Tuesday, August 5

4:30 p.m. – 6:00 p.m.

BMPs Track Crystal G1

Construction-Site Track (90-minute presentation) Crystal G2

LID Track Crystal E-F

Research & Testing Track Crystal K-L-M

Stormwater Program Management Track I Crystal A-B-C

Stormwater Program Management Track II Anaheim-Atlanta-Boston

Water-Quality Monitoring Track Crystal N-P-Q

Wednesday, August 6

8:00 a.m. – 9:30 a.m.

BMPs and the Bigger Picture Panel Discussion Crystal G2

10:00 a.m. – 11:30 a.m.

BMPs Track Crystal G1

Construction-Site Track Crystal E-F

LID Track Crystal G2

Research & Testing Track Crystal K-L-M

Stormwater Program Management Track I Crystal A-B-C

Stormwater Program Management Track II Anaheim-Atlanta-Boston

Water-Quality Monitoring Track Crystal N-P-Q

Wednesday, August 6

2:15 p.m. – 3:45 p.m.

BMPs Track Crystal G1

Construction-Site Track Crystal E-F

LID Track Anaheim-Atlanta-Boston

Research & Testing Track I Crystal K-L-M

Research & Testing Track II (90-minute presentation) Crystal G2

Stormwater Program Management Track Crystal A-B-C

Water-Quality Monitoring Track Crystal N-P-Q

Wednesday, August 6

4:30 p.m. – 6:00 p.m.

BMPs Track Crystal G1

LID Track I Crystal G2

LID Track II (90-minute presentation) Anaheim-Atlanta-Boston

Research & Testing Track Crystal K-L-M

Stormwater Program Management Track Crystal A-B-C

Water-Quality Monitoring Track Crystal N-P-Q

Thursday, August 7

8:00 a.m. – 9:30 a.m.

EPA News Update and Q&A Session Crystal G2

10:00 a.m. – 11:30 a.m.

BMPs Track Crystal G1

Construction-Site Track Crystal E-F

LID Track Crystal G2

Research & Testing Track I Crystal K-L-M

Research & Testing Track II (90-minute presentation) Crystal N-P-Q

Stormwater Program Management Track Crystal A-B-C

Thursday, August 7

12:30 p.m. – 2:00 p.m.

BMPs Track Crystal G1

LID Track Crystal G2

Research & Testing Track Crystal K-L-M

Stormwater Program Management Track Crystal A-B-C

Water-Quality Monitoring Track Crystal N-P-Q

Program Tracks

BMP Case Studies: "B" course numbers

Structural and nonstructural best management practices to achieve water-quality goals.

The Construction Site and Stormwater: "C" course numbers

BMPs and compliance strategies to prevent erosion and sedimentation and to meet permit requirements.

Low-Impact Development: "L" course numbers

Infiltration, bioretention, and other techniques to maintain or mimic predevelopment hydrology.

Research and Testing of BMPs/Technical Issues: "R" course numbers

Comparing BMP performance, evaluating testing protocols, and more.

Stormwater Program Management: "P" course numbers

Regulatory compliance, funding, public education and outreach.

Water-Quality Monitoring: "Q" course numbers

Monitoring and sampling techniques, modeling practices, watershed assessments.

This is a preliminary schedule and subject to change.

Tuesday, August 5

8:00 – 9:00 a.m.

Opening General Session/Keynote Speaker - Crystal Ballroom

Hosted by:



Don't miss the exciting opening session keynote address in the Crystal Ballroom. Grab your coffee and get your seat for the conference kick-off. *For details see p.5*

Coffee service courtesy of:



Tuesday, August 5

10:00 – 11:30 a.m.

**BMPs Track
Crystal G1**

10:00 – 10:30 a.m.

B11. Linear Project Stormwater Management on State Highway 130
John Ortlieb – Raba-Kistner Infrastructure, Inc., Kyle, TX
Steve Funderburg – Raba-Kistner Infrastructure, Inc., Austin, TX

Once construction began on the 49-mile Highway 130 project in Texas, it became clear that the stormwater pollution prevention plan, prepared without knowledge of site conditions, was inadequate. It called for sediment control fence around 90% of the project—expensive for such a large area, and ineffective because of lowered grade conditions resulting from highway construction. Modifications to the SWPPP included installing rock filter dams along the edges of the right of way at locations of permanent outfalls, placing topsoil berms along the right of way to store topsoil and direct runoff to the rock filter dams, and creating sediment basins at outfalls.

10:30 – 11:00 a.m.

B12. Cost-Effective Methods for Erosion and Sediment Control: Management of a Large-Scale Linear Transportation Project in the Arid Southwest
Cody Lechleitner – CDM, Helena, MT
Elizabeth Ralston – CDM, Helena, MT

Erosion and sediment control in arid environments is difficult with short growing seasons and microburst weather patterns. This case study examines stormwater pollution prevention plan management for an 85-mile linear transportation project adjacent to a flood-prone desert wash. It includes assessment of temporary BMPs, alternatives to traditional BMPs, analysis of methods for establishing permanent vegetation, and alternative methods of permanent stabilization.

11:00 – 11:30 a.m.

B13. Meeting Watershed Management Plan Objectives Through Partnerships and Highway Retrofit Stormwater Controls
Andy Jordan – North Carolina Department of Transportation, Raleigh, NC

The North Carolina Department of Transportation, North Carolina Division of Water Quality, and Mecklenburg Storm Water Services partnered in the McDowell Creek Watershed to identify and construct stormwater controls. At a project site along Interstate 77, an innovative tiered filtration basin was constructed in the highway right of way to treat highway runoff. The partnership approach, design, construction, and water-quality benefits are detailed.

**Construction-Site Track
Crystal E-F**

10:00 – 10:30 a.m.

C11. Temporary Barriers as BMPs: Are They Effective or Just a Costly Illusion?
Jerald S. Fifield – HydroDynamics, Inc., Parker, CO

On almost any construction site you can find silt fence, straw bales, fiber rolls, or geosynthetic barriers around inlets. Contractors install these temporary sediment control BMPs with the understanding that designers have selected them to meet EPA's mandate, yet often, their effectiveness is minimal. Although erosion control BMPs are continually tested for effectiveness, few temporary sediment control measures undergo similar scrutiny, partly because of the difficulties of collecting meaningful data while dynamic construction activities occur. This presentation provides a scientific and engineering assessment on the effectiveness of temporary sediment control BMPs to remove suspended particles from runoff waters, with the goal of understating limitations

of structural mitigation measures and providing practical guidelines for designers, regulatory personnel, and contractors. Emphasis is on temporary BMPs to contain, treat, or filter runoff, such as 6-inch-high barriers placed in front of inlets and 12-inch-and-higher barriers installed within drainage channels.

10:30 – 11:00 a.m.

C12. Design and Construction of a Test Bed for Erosion and Sediment Control BMP Testing
Manoj Chopra – University of Central Florida, Orlando, FL

A full-scale test apparatus at the University of Central Florida has been designed to monitor and document the erosion and sediment control performance of various BMPs under different slope, soil, and rainfall conditions. Test beds, 30 feet by 8 feet, contain soil with a depth of 1 foot, and a rainfall simulator delivers up to 20 inches of rainfall per hour. No device had existed capable of delivering such a high intensity of rainfall. The design of the apparatus and planned testing of BMPs, including silt fence, geomembranes, and turf reinforcement mats, are discussed. AASHTO tests will also be conducted to characterize the different soils placed in the erosion test beds.

**LID Track
Crystal G2**

10:00 – 10:30 a.m.

L11. LID, LEED, and Site Design: Simpler Than You Think
Lloyd A. Ntuk – Patton Harris Rust & Associates, Chantilly, VA

Although risk aversion adds predictability, stability, and efficiency to the design and construction process, reluctance to change traditional practices has also impeded widespread voluntary adoption of LID principles. As water-quality requirements become more stringent and standards shift toward sustainable site planning, engineers and stormwater managers are faced with implementing LID strategies at the design level. This presentation considers how simply altering the hydrologic functionality of certain common development features allows design of sustainable sites that are practical and cost effective and that measure up to water-quality standards. Techniques include site grading, bioretention, and pervious pavement. The presentation compares

estimated construction costs, discusses issues of constructability, and shows how LID strategies satisfy some of the requirements of the Leadership in Energy and Environmental Design (LEED) rating system.

10:30 – 11:00 a.m.

L12. Demystifying LEED Stormwater Credits

Christopher Zalapi – Green Building Services Inc., Orlando, FL

With demand for green buildings on the rise, design and construction teams find themselves in the often unfamiliar position of complying with requirements for LEED certification. In particular, Sustainable Sites credits 6.1 and 6.2 (stormwater quantity and quality control) present challenges to the uninitiated. Using several case studies, this presentation fills the gap between the stated LEED criteria and what a stormwater professional actually needs to do to achieve these credits. It also demonstrates how the next step in stormwater management will move beyond the code minimum approach. Design strategies are presented that use natural features of the site, resulting in better water quality and less infrastructure cost.

11:00 – 11:30 a.m.

L13. Effective Sustainable Stormwater for LEED

Ted Blahnik – Williams Creek Consulting, Indianapolis, IN
Neil Myers – Williams Creek Consulting, Indianapolis, IN

Integrating stormwater into the landscape not only provides for LEED credit points, but also improves the triple bottom line through improved ecology, economics, and social equity. Case studies are presented showing techniques for achieving maximum LEED credit points for stormwater. A research and technology park, a creative technology center, and a mixed-use development illustrate the diversity of projects in which innovative designs can be used. Even with land constraints and little topography, good design can allow for an integrated approach.

**Research & Testing Track
Crystal K-L-M**

10:00 – 10:30 a.m.

R11. Comparison of Pervious Concrete and Porous Asphalt Pavement Performance for Stormwater Management in Northern Climates

Kristopher Houle – University of New Hampshire Stormwater Center, Durham, NH
Robert Roseen – University of New Hampshire Stormwater Center, Durham, NH

In northern climates, runoff from standard pavements has varying seasonal effects on the surrounding environment: elevated temperatures in summer, and chloride-laden runoff in winter and spring because of deicing practices. Use of pervious pavements for parking lots in new and redevelopment projects can mitigate these impacts. This study presents findings from two pervious pavements; a pervious concrete and a porous

asphalt parking lot. Hydraulic and water-quality performance, resistance to freeze-thaw, reduced thermal impacts, and salt-reduction capabilities are examined. Data are based on several years of monitoring and are compared to conventional dense-mix asphalt.

10:30 – 11:00 a.m.

R12. Pervious Asphalt: A Case Study of Impacts on Stormwater Volume and Pollutant Load

Amy Post – Symbiont, West Allis, WI

Seeking to evaluate the appropriateness of using pervious pavement on city-owned parking lots, Milwaukee retrofitted one city lot with pervious asphalt. Stormwater samples were collected from both the pervious asphalt and a control section of conventional asphalt; the goal was to measure reductions in stormwater flow rate and pollutant load, and to assess the potential for groundwater contamination resulting from the use of pervious asphalt. Except for gas range organics and total copper, statistical analyses determined verifiable increases and decreases in mean pollution concentration from the conventional to the pervious asphalt for all measured pollutants at a 5% significance level. Potential explanations for and implications of the results are discussed and suggestions for future research are presented.

11:00 – 11:30 a.m.

R13. Stormwater Management in California: The Changing Paradigm

Daniel Wible – Cahill Associates, West Chester, PA
Susan McDaniels – Cahill Associates, West Chester, PA
Andrew Potts – Cahill Associates, West Chester, PA

California's natural water resources are insufficient to meet the demands of its residents. The governor has declared two major actions: recharging the aquifers and building more reservoirs. Recharging aquifers is difficult with so many impervious surfaces existing. This presentation shows that porous pavement, a more sustainable approach to managing stormwater, is already being employed on a small scale throughout the state. Various types of porous surfaces are discussed, along with design challenges, lessons learned, and monitoring results.

**Stormwater Program Management
Track I
Crystal A-B-C**

10:00 – 10:30 a.m.

P11. Yes! You, Too, Can Control Your (Permitted) Fate

Pam Acre – City of Northglenn, CO
Jill Platt-Kemper – City of Aurora, CO

For more than 10 years, Colorado's Phase I and II municipal stormwater permit holders reacted to regulations and state guidance on their own, even when issues crossed municipal boundaries and a coordinated response would have been appropriate. Many ad-hoc watershed groups were formed from 1990 onward, with several becoming more formalized

and providing a more cohesive approach to dealing with regulations. A statewide organization, the Colorado Stormwater Council, was established in 2006 to act as a forum for permit holders, enabling exchange of technical information, representing members at regulatory hearings, educating members, and aiding in development and implementation of local and regional stormwater programs. The council's trials, tribulations, pitfalls, and successes are presented.

10:30 – 11:00 a.m.

P12. Surviving the NPDES Annual Report Audit

Diane Waters – City of Miami, FL

With the advent of the National Pollutant Discharge Elimination System (NPDES) program in 1990, municipalities, counties, departments of transportation, and others began to be held accountable for their management of stormwater quality. The annual report and annual report audit are the main ways these organizations demonstrate their accountability. For organizations with limited resources, this audit can seem like a dreaded gauntlet to be run rather than a helpful assessment tool for improving stormwater programs. This presentation offers practical guidance on what makes a good annual report, and how to prepare it (seeking auditor's comments on the previous year's report, for example), and on how to prepare personnel and organize documents for the actual day of the audit.

11:00 – 11:30 a.m.

P13. Negotiating the New Phase I MS4 Permit in Arizona: Reducing Disagreement to the Maximum Extent Practicable

Lisa Spahr – Engineering & Environmental Consultants Inc., Phoenix, AZ

In March 2007, the Arizona Department of Environmental Quality issued a draft Phase I MS4 permit for the city of Phoenix, with a schedule calling for public notice by April 15, as ADEQ was under pressure from the USEPA to get all Phase I permits in place quickly. This presentation outlines the ensuing discussion and negotiations between the Phase I coalition and ADEQ, including such issues as how to apply a regulatory system designed for temperate climates to the desert, the status of the EPA's delegation of NPDES permitting authority to the state of Arizona, and how to apply the definition of "Waters of the US" (under its narrowest interpretation, the argument could be made that Arizona has but one traditionally navigable water, the Colorado River; but a broad interpretation makes many streets in Phoenix and Tucson jurisdictional waters).

**Stormwater Program Management
Track II
Anaheim-Atlanta-Boston**

10:00 – 10:30 a.m.

P14. Funding Compliance: NPDES Programs and Funding Methods

Henrietta Locklear – AMEC Earth & Environmental, Inc., Raleigh, NC
Trina Ozer – AMEC Earth & Environmental,

Inc., Raleigh, NC

Stormwater utilities are a more stable method of financing stormwater programs than using general fund dollars. But does funding a program through user fees lead to a more effective and compliant program? This study examines a sample of communities under NPDES regulation and how their funding mechanisms relate to compliance with the NPDES permits. As more NPDES Phase II programs are audited, this issue is coming into sharper focus. The most common compliance gaps for communities surveyed are analyzed in this study.

10:30 – 11:00 a.m.

P15. Stormwater Utility Rate Study for Palmetto, FL

Gordon England – Stormwater Solutions, Cocoa Beach, FL

Palmetto, FL, faced funding deficiencies for its maintenance program as well as imminent total maximum daily load (TMDL) mandates. An analysis of the city's stormwater utility program recommended changes to the enabling ordinance based upon recent case law, increased utility rates, and a mitigation policy to increase program funding and equitability. Using Palmetto as the example, this presentation shows how to develop a spreadsheet tool to calculate budgetary needs of a stormwater program in terms of maintenance, capital improvements, NPDES permits, and TMDLs.

11:00 – 11:30 a.m.

P16. Financially Based Asset Management for Stormwater Systems

Russ Watson – Mactec Engineering and Consulting, Kennesaw, GA

Aging infrastructure is common, and stormwater infrastructure is often unseen and underappreciated until it stops functioning. This presentation focuses on the need to view stormwater assets in financial terms and to establish a baseline for required funding levels based on measured business-case justification. By converting stormwater assets into financial terms and employing a proven engineering management system approach to quantifying asset condition, organizations can clearly demonstrate a cost-benefit ratio for improving their stormwater systems. Case studies are included, and a working demonstration of an EMS application is presented.

**Water-Quality Monitoring Track
Crystal N-P-Q**

10:00 – 10:30 a.m.

Q11. Beaufort County Bacteria Source Tracking Efforts

Dan Ahern – Beaufort County Stormwater Utility, Beaufort, SC

Christine Villarreal – GEL Engineering, Charleston, SC

Bob Gross – Beaufort County Stormwater Utility Board, Beaufort, SC

More than 60% of Beaufort County is open water or tidal wetlands. Most of the tidal waters are classified as shellfish harvesting waters, and some are restricted due to fecal coliform readings. The county has a major monitoring effort underway to establish existing impairments in areas targeted for water-

quality controls, perform long-term trend monitoring, address BMP efficiencies, and determine sources of fecal coliform. Gene biomarkers for humans and other mammals are being used on a rotating basis. The presentation will detail lessons learned and the usefulness of bacterial source-tracking methods for stormwater programs.

10:30 – 11:00 a.m.

Q12. Compliance With Bacteria Standards: Ubiquity, Persistence, and Other Conspiracy Theories

Dustin Bambic – AMEC Earth & Environmental, Nashville, TN

An astonishing number of the nation's waterways are categorized as impaired by bacteria, and closure of recreational areas in response has great economic impacts. Unfortunately, in most cases the sources of bacteria are not identified. However, several studies of water bodies with elevated bacteria levels have found no excess health risk. In addition, evidence shows bacteria can persist and even grow in sediments and other media, making it difficult to identify fecal sources. Nonetheless, until regulatory agencies develop new bacteria standards, the currently used coliform bacteria tests are the easiest, cheapest, and most epidemiologically relevant approach. This presentation reviews the scientific literature relating to this conundrum, including epidemiological studies, investigations of bacteria regrowth and persistence, and recently developed rapid bacteria identification technologies.

11:00 – 11:30 a.m.

Q13. A Cost-Effective Method for Assessing Fecal Contamination in Florida Tributaries

Cheryl Wapnick – PBS&J, Jacksonville, FL

Chris Staley – University of South Florida, Tampa, FL

Florida has 226 water bodies that do not meet state water-quality standards for fecal coliform contamination. A methodology for assessing the sources of fecal pollution was developed for Duval County. A decision-tree approach was used, based on a toolbox of microbial source-tracking methods, including several library-independent methods. Test results, together with extensive review of infrastructure mapping, historical monitoring, and land-use data provided information needed for a weight-of-evidence assessment of the contribution of potential sources. The county's effort demonstrated that detailed review of existing data is necessary to effectively guide field reconnaissance and sampling. Use of GIS and historical data is especially important, given the high costs associated with MST analyses. The approach offers a useful and relatively inexpensive tool that can be used throughout the state.

Tuesday, August 5

2:15 – 3:45 a.m.

**BMPs Track
Crystal E-F**

2:15 – 2:45 p.m.

B21. Rebirth of an Urban Stream: Daylighting the North Branch of Jordan Creek in Springfield, MO

Todd Wagner – City of Springfield, MO

Boxed-in during the 1970s to prevent flooding in Springfield, MO, the North Branch of Jordan Creek outgrew its capacity and overtopped the box in the summer of 2000. Alternatives were considered to achieve 100-year flood protection: either constructing additional box cells or using an open system/greenway. Initial construction costs were similar for either option, but long-term maintenance would be lower for the open system, which would also provide community benefits. Funded through a voter-approved bond issue, the \$2.5 million award-winning project was completed in two phases. It includes more than 5,000 native prairie grasses, wetland plants, and wildflowers and a greenway trail, and all adjacent properties have been removed from the FEMA floodplain.

2:45 – 3:15 p.m.

B22. Integrating Stream Restoration and Stormwater Wetlands for Comprehensive Restoration of the Ecological Functions of an Urban Riparian Corridor

Jason Doll – Stantec Consulting, Raleigh, NC

Brad Fairley – Stantec Consulting, Raleigh, NC

A complex TMDL has been developed for the Neuse River estuary mandating a 30% reduction in nitrogen loads from 1998 levels. When the town of Cary, NC, undertook a road-widening project, resulting in unavoidable impacts to 260 feet of one of the river's tributaries, it restored 2,000 feet of stream on city-owned land upstream of the project—providing onsite mitigation for the road project and an additional 1,750 feet of stream restoration credit to be used for future projects. Completed in 2004, the restoration incorporates 14 BMPs including four types of wetlands to remove nitrogen from the watershed. Effectiveness of the project is being determined by comparing three years of post-construction water-quality data with a year of preconstruction data.

3:15 – 3:45 p.m.

B23. The Opportunities and Challenges of Installing Structural Stormwater Controls Within a New Development Project in an Urban Environment

Laura Larsen – RBF Consulting, Irvine, CA

A large multi-use development in southern California was evaluated for mitigating pollutants and addressing TMDL objectives. Incorporating many land uses (residential, commercial, golf course, transportation, educational, and park), each with different pollutants of concern, the project drains to water bodies listed as impaired for sediments, metals, pesticides, and nutrients. The presentation covers scenarios that are being considered, including low-impact development techniques throughout the development, large regional structural BMPs installed at downstream locations, and structural BMPs installed throughout the development. It examines the siting and sizing

of various structural BMPs.

LID Track Crystal G2

2:15 – 2:45 p.m.

L21. *The Economics of LID*

Scott Sonnenberg – *Eco-Design & Engineering Ltd., Plain City, OH*

Getting approval to use low-impact development techniques in communities that have not yet seen or approved them is not always easy. One of the main obstacles is convincing owners, municipal regulators, and others that LID systems are economical and can be maintained. This presentation includes several economic studies from actual projects where the owners, construction managers, or design consultants approved use of LID. Projects include a 45-acre suburban hospital site, a 119-acre high school site, and miles of new roads serving a new 1,500-acre development.

2:45 – 3:15 p.m.

L22. *Seattle Public Utilities' Natural Drainage System and Bioretention Swale Facilities: Maintenance and Associated Costs*

Drena Donofrio – *Seattle Public Utilities, Renton, WA*

Maintenance is key to the success of bioretention and natural drainage system facilities. What are the maintenance requirements for these systems, and what are the associated life-cycle costs? Seattle Public Utilities is developing maintenance guides for these facilities. SPU has four levels of service based on the goals and requirements of an individual system, and the manuals include corresponding checklists for both vegetation and swale infrastructure; elements include weeding, watering, mulching, erosion and sediment control, pruning, replacing dead plants, and monitoring and observation for three years after installation. This presentation discusses the levels of service, vegetation costs, hardscape and infrastructure costs, overall life-cycle costs, and key performance indicators.

3:15 – 3:45 p.m.

L23. *Low-Impact Development: Easy on the Environment, Easy on the Budget: A Case Study of Minnesota Target Stores*

Chris Carda – *Westwood Professional Services, Eden Prairie, MN*

Four Target Stores sites constructed between 2003 and 2006 in the Minneapolis-St. Paul region were studied. One featured a conventional, open stormwater pond; the other three used a variety of LID treatment solutions including water-quality manholes, filtration systems, underground detention and infiltration, and biofiltration basins. The study focused on all discernable costs associated with stormwater treatment, including land, construction, annual maintenance, and life-cycle (replacement) costs. Based on these sites, the various LID solutions are ranked in order of cost.

Research & Testing Track I Crystal K-L-M

2:15 – 2:45 p.m.

R21. *Effect of Conventional and LID Strategies on the Statistical Characteristics of Site Runoff Quantity and Quality: Which Technologies Return Runoff to Predevelopment Characteristics?*

Thomas Ballestero – *University of New Hampshire, Durham, NH*

A common metric in hydrologic studies is the flow duration curve—the probability distribution of observed flows. When comparing flow duration curves between pre development and post-development site conditions, this powerful graphical device can be used to identify and discriminate undesirable consequences. This probability distribution includes the maximum, median, and minimum flow, as well as other statistics such as variance and skew. For this presentation, data is presented comparing parking lot runoff and the subsequent effluent from various conventional systems and LID technologies for the following real-time measured variables: flow, temperature, pH, conductivity, and dissolved oxygen. The importance of the data and comparison through probability distributions is in recognizing how stormwater management practices can be designed to return the runoff and water-quality characteristics from developed sites to predevelopment characteristics.

2:45 – 3:15 p.m.

R22. *How Does Drought Affect BMP Performance?*

John Moll – *CrystalStream Technologies, Lawrenceville, GA*

The year 2007 was a disaster in Georgia, as drought literally dried up water resources. CrystalStream realized it had a field laboratory of devices, some with seven-year track records of pollutant removal that could yield important new data about how reduced rainfall and extended time periods between events affected performance. Questions explored: Does lack of rainfall allow pollutants to build up on impervious surfaces? Does the material eventually mobilize in subsequent events and essentially “catch up,” or is it removed by other means such as wind? Does dying vegetation expose more soil to erosion so that the sediment load increases? Does less flow into a device produce less resuspension of small particles and less leaching? Do long periods of no flow allow sediments already captured to consolidate and become armored against resuspension?

3:15 – 3:45 p.m.

R23. *An Analysis of Stream Restoration Post-Construction Monitoring in North Carolina*

Kenneth Carper – *WK Dickson & Co., Inc., Raleigh, NC*

North Carolina's Ecosystem Enhancement Program (EEP) is a state-run mitigation banking program that has resulted in significant progress in stream and wetland restoration. The EEP requires post-construction monitoring to document that restoration projects maintain geomorphic stability and remain biologically functional. This presentation describes the five-year post-construction monitoring cycle for restoration sites. It includes data from a range of ecosystems, including outer coastal plain, upper coastal plain, lower and upper piedmont, and Appalachian foothills. Measurable outcomes included are stream cross-section data, bed profiles, benthic microinvertebrate collection, wetland hydroperiods, and vegetation survivorship.

Research & Testing Track II Crystal G1

2:15 – 2:45 p.m.

R24. *End of the Field Day: Differences in Laboratory Test Protocols for Assessing the Pollutant Removal Capabilities of Stormwater Separators*

Kwabena Osei – *Hydro International, Portland, ME*

Use of proprietary systems for stormwater treatment is increasing and regulators grapple with how to assess them. Field testing has been the method of choice, but it presents many obstacles outside the control of the researcher. Laboratory testing addresses many of these uncertainties and allows devices to be evaluated under the same conditions, but differences in laboratory test protocols can have significant bearing on test results that are sometimes overlooked. This presentation examines two protocols for testing separators in the lab—the direct and indirect test methods—and presents results from testing on a device using the two protocols. For the same sediment gradation and flow rate, a difference of more than 20% in removal efficiency is possible. Results show that the direct test method is more consistent, conservative, and representative of the removal efficiencies expected for treatment separators.

2:45 – 3:15 p.m.

R25. *Testing Stormwater BMPs*

Brad Gianotti – *BaySaver Technologies, Inc., Mount Airy, MD*

The large number of BMP designs on the market makes it increasingly difficult to test removal efficiency using one single test method. An overview of the variety of testing methodologies in use is presented. The EPA has compiled a BMP guidance manual for monitoring BMP removal efficiency. Although it does not set removal efficiency standards, it does give guidelines as to how testing should be properly conducted. The manual is compared to a few methods currently in use. Federal and state agencies should begin constructing a consistent standard for testing BMPs using the EPA guidance as a building block.

3:15 – 3:45 p.m.

R26. *Separating the Wheat From the Chaff*

Heather Tetreault – Contech Stormwater Solutions, Scarborough, ME

Hydrodynamic stormwater treatment devices operate through controlled hydraulics, directing incoming water to promote the settling and retention of suspended solids. Although the internal hydraulics in a structure remain the same, the stormwater conveyance infrastructure can vary considerably from site to site and among testing facilities, potentially influencing the results of BMP performance evaluations. Existing test protocols offer limited guidance on the design and construction of test apparatus. A series of tests were performed according to the New Jersey Department of Environmental Protection laboratory test procedure to examine the influence of test apparatus on BMP performance analysis. Specifically, the influence of varying the distance at which the test surrogate for sediment removal is introduced in to the influent pipe that was studied.

**Stormwater Program Management Track I
Crystal A-B-C**

2:15 – 2:45 p.m.

P21. *Overview of a Successful Stormwater Infrastructure Maintenance and Repair Program*

Bill Pruitt – Charlotte Storm Water Services, Charlotte, NC

A key element of Charlotte Storm Water Services' success has been the ability of its Maintenance and Repair Program to make point repairs to the minor drainage infrastructure in response to citizens' requests for service. The problem must be caused or contributed to by runoff from a publicly maintained street, and the program follows a "worst first" approach in prioritizing work. The program has consistently provided good results, generally on private properties, relying on "donated" permanent storm drainage easements, staff-developed solutions, and "work partnering" construction contracts using private sector contractors. Accomplishments include maintaining the drainage system through constructed repairs, reducing sediment and other pollutant loading to streams, and mapping storm drain outfalls.

2:45 – 3:15 p.m.

P22. *Assessment and Maintenance of Stormwater Management Facilities: Policy and Program Impacts for MS4 Operators*

Doug Moseley – GKY & Associates, Inc., Chantilly, VA

Stuart Stein – GKY & Associates, Inc., Chantilly, VA

Ensuring proper operation and maintenance of post-construction stormwater management facilities and BMPs is a large component of local stormwater programs. This presentation explores

issues associated with municipal stormwater facility assessment, inspection, and maintenance, including potential impacts of new regulations. It also highlights policy decisions that programs will likely need to address, including approaches to publicly and privately owned and/or maintained stormwater infrastructure, level-of-service and equity issues, potential liability, logistical issues, inspection reports, enforcement, and education.

3:15 – 3:45 p.m.

P23. *Development of DelDOT's Stormwater BMP Inspection Program*

Peter Mattejat – KCI Technologies, Inc., Laurel, MD
Bruce Thompson – KCI Technologies, Inc., Newark, DE

The Delaware Department of Transportation maintains stormwater infrastructure throughout the state and has recently developed a BMP inspection program. Protocol and inspection parameters have been developed, as well as a scoring schema that provides an overview of a BMP's performance and guidance for remedial actions. The program is helping DelDOT identify and prioritize maintenance, repair, and retrofit needs. Inspection results also are used to identify BMPs as candidates for water-quality enhancement as part of watershed restoration.

**Stormwater Program Management Track II
Anaheim-Atlanta-Boston**

2:15 – 2:45 p.m.

P24. *Tools for Effective Post-Construction Program Management*

David Hirschman – Center for Watershed Protection, Charlottesville, VA

Of the six minimum Phase II measures, post-construction is perhaps the most complex and difficult to implement. It involves integration with a community's planning efforts, a strong regulatory foundation, high-quality design guidance, a process to review plans, and procedures to ensure BMPs are installed correctly and maintained over time. The Center for Watershed Protection, working in conjunction with the EPA and Tetra Tech, has produced national guidelines on developing effective post-construction programs. The CWP has developed customizable tools to help local stormwater managers, including a post-construction program self-audit checklist, a program and budget planning tool, a post-construction model ordinance, codes and ordinance worksheet, a BMP manual builder tool, a series of checklists for general and BMP-specific plan review, and more.

2:45 – 3:15 p.m.

P25. *Stormwater Program Management in North Carolina Today: The Top Findings*

Glenn Barnes – Environmental Finance Center, University of North Carolina, Chapel Hill

A survey of 160 jurisdictions across North Carolina that are managing stormwater using structural

BMPs is used to identify the top trends. What are local governments doing well? What needs improvement? The survey looks at whether the jurisdictions are following the regulations; whether stormwater maintenance and enforcement are being handled in-house or by outside parties; how jurisdictions are paying for their stormwater programs; how they are tracking where BMPs are located; whether BMPs are inspected regularly and what happens when problems are discovered; and what program characteristics influence the success of stormwater operations. Bivariate correlations in the data are reported, such as the effect of the age of a program on its operations.

3:15 – 3:45 p.m.

P26. *Determining When to Begin Addressing Stormwater Management in the Project Development Process*

Seshadri Iyer – URS Corporation, Virginia Beach, VA

Mark McCabe – URS Corporation, Columbus, OH

From transportation to municipal or commercial projects, the question of when to begin incorporating stormwater management into the project development process arises again and again. This presentation looks at several ways to assess project planning and design milestones to determine where stormwater fits in, such as using the 30, 70, and 90% complete drawing rule; including stormwater management BMP selection and evaluation as part of the preliminary drainage design (erosion and sediment) control process; designing erosion and sediment basins with permanent flow controls that can be used when the basins are converted to post-construction BMPs; incorporating stormwater management decisions into the project planning process so that LID controls can be considered; sizing permanent stormwater management basins to accommodate ultimate planned development while designing for interim needs; and others. A decision tree is presented to aid designers in the proper selection and design of stormwater management controls.

**Water-Quality Monitoring Track
Crystal N-P-Q**

2:15 – 2:45 p.m.

Q21. *The Noise of the Landscape: A Statistical Methodology for Establishing Background Constituent Concentrations in Stormwater Samples*

Khalil Abusaba – Brown and Caldwell, Walnut Creek, CA

Bruce Gallaher – Los Alamos National Laboratory, Los Alamos, NM

Los Alamos National Laboratory has conducted weapons research, testing, and manufacturing dating back to World War II. The laboratory is located on a series of mesas and arroyos carved out of ancient volcanic formations and containing many ephemeral

streams. Natural erosion from wind and weather leads to elevated suspended loads during flashy rainfall events characteristic of the high desert region, making it difficult to distinguish between the human-caused constituent discharges from the laboratory facility and natural background loads of constituents such as aluminum, copper, lead, zinc, and radionuclides that are part of the mineral assemblage of native volcanic tufts (radium, thorium, and uranium). A methodology consisting of two complementary statistical approaches has been developed to characterize stormwater data as either background or above background. The methodology is being applied to set priorities for BMP implementation in the laboratory's complex watershed management program.

2:45 – 3:15 p.m.

Q22. Strategies to Comply With Stringent Zinc Limitations in Stormwater

Jaya Zyman-Ponebshek – URS Corporation, Austin, TX

Andrew Judd – URS Corporation, Austin, TX

An organic-chemical manufacturing facility in southeast Texas has a permit to discharge treated process wastewater and stormwater directly to a receiving stream via various outfalls. Like many other chemical plants, the facility has many galvanized structures, resulting in higher than normal concentrations of zinc and aluminum in stormwater runoff. Because of elevated zinc concentrations in samples submitted in the permit renewal application, the permitting agency imposed much stricter zinc limits than those allowed under the multi-sector stormwater general permit, and compliance would have been very difficult and costly. Strategies the facility explored included replacement or coating of galvanized surfaces, rerouting runoff away from these surfaces, zinc removal treatment, and eliminating or increasing the zinc limit in the permit through a site-specific regulatory demonstration.

3:15 – 3:45 p.m.

Q23. Polycyclic Aromatic Hydrocarbons in Stormwater Runoff From Sealcoated Pavements
Alison Watts – University of New Hampshire, Durham, NH

Sealcoat is commonly applied to driveway and parking lot pavements to protect and enhance the appearance of the surface, but coal tar-based sealcoats contain up to 20% PAHs by weight. Asphalt-based sealcoat has much lower concentrations of PAHs. Of particular interest is the persistence and release rate of PAHs in each class of sealcoat. The University of New Hampshire Stormwater Center applied coal tar- and asphalt-based sealcoats to separate areas of a university parking lot and collected and monitored runoff from the two sections, as well as from an unsealed control area. Initial runoff from both sealcoated areas exceeded EPA's recommended limits but concentrations decreased rapidly over the first month. Monitoring will continue until 2009.

Tuesday, August 5

4:30 – 6:00 p.m.

**BMPs Track
Crystal G1**

4:30 – 5:00 p.m.

B31. Underground Detention: Out of Sight and Out of Mind, Until...

Theodore Scott – Stormwater Maintenance LLC, Hunt Valley, MD

This case study describes an encounter with an underground stormwater detention facility that had not been inspected or maintained for years. Consisting of corrugated metal pipe with concrete weir structures to manage peak discharge, it had a section of pipe with a completely clogged low-flow orifice and standing water to the top of the weir. Once unclogged and drained, the facility had sediment, trash, and debris to depths of 4 feet. Removal included use of a vacuum truck with jetting capabilities. Maintenance was further complicated by poorly constructed access. This example illustrates common problems of maintenance, construction, and access that designers, contractors, and maintenance personnel must address.

5:00 – 5:30 p.m.

B32. Water Quality Evaluation of the Impacts of Aeration on Deep and Shallow Wet Detention Systems in Southwest Florida

Tim Denison – Johnson Engineering, Fort Myers, FL

David Ceilley – Florida Gulf Coast University, Fort Myers, FL

Florida limits the depth of wet detention systems so anaerobic conditions do not occur in the water column or pond sediments, and some counties require ponds more than 12 feet deep to have aerators to prevent low dissolved oxygen (DO) or stratification. This two-part study evaluated differences in the water quality of wet detention ponds of various depths under aerated and non-aerated conditions, and also examined whether aeration affected stratification. Results showed that DO levels near the top of the water column in both aerated and non-aerated ponds remained consistently high, and that only the non-aerated ponds were affected by stratification. Differences in water quality were also affected by the presence or lack of flow.

5:30 – 6:00 p.m.

B33. Boeing Regional Water-Quality Facility

Michael Fowler – Brown and Caldwell, Raleigh, NC

Tom McCausland – City of Gresham, OR

Jim Hansen – Brown and Caldwell, Portland, OR

John van Staveren – Pacific Habitat Services, Portland, OR

The Boeing Company donated 14 acres of vacant land to Gresham, OR, in exchange for a waiver of onsite stormwater quality treatment requirements for

development on the remaining 21 acres. The city, which had been seeking locations for treatment facilities, used the site to construct a regional facility to treat runoff from 1,000 acres of residential, commercial, and industrial development. The facility also provides spill containment capacity—necessary because of the industrial development and high-traffic corridors in the contributing drainage area—and provides natural resource enhancements and educational and recreational opportunities.

**Construction-Site Track: 90-minute presentation
Crystal G2**

4:30 – 6:00 p.m.

C30. New Tools From the Environmental Protection Agency

Nikos Singelis – USEPA, Washington, DC

John Kosco – Tetra Tech, Inc., Fairfax, VA

Mike Novotny – Center for Watershed Protection, Ellicott City, MD

David Hirschman – Center for Watershed Protection, Charlottesville, VA

This 90-minute session focuses on new tools and developments from the US Environmental Protection Agency (EPA).

Urban BMP Performance Tool. The EPA has developed a new, Web-based tool to provide easy access to hundreds of studies of BMP performance. Users can search for performance information by pollutant or BMP type and can access summaries of high-quality BMP performance studies. This presentation introduces the tool and discusses the “three keys to assessing BMP performance.”

New Post-Construction Manual. The EPA and the Center for Watershed Protection have developed a comprehensive guide to help municipalities develop and implement their stormwater management programs. It covers subjects from design criteria and standards to plan review to inspections and enforcement. It also discusses opportunities for integrating green infrastructure, low-impact development, and smart growth into local programs and requirements.

New Stormwater Permits. The EPA has issued a new multi-sector general permit for industrial stormwater and is finalizing a new construction general permit. This presentation outlines the improvements and new provisions of both permits, including clearer BMP requirements, better linkages to water-quality standards and TMDLs, and more.

**LID Track
Crystal E-F**

4:30 – 5:00 p.m.

L31. Replicating Natural Runoff Through Retention and Dissipation

Randel Lemoine – Symbiotic Ventures LLC, Twin Lake, MI

This technical presentation demonstrates the interrelationship of retention volume and dissipation rate using the TR-55 method and continuous simulation. During the initial moments of rainfall, no runoff occurs; rainfall is retained through adsorption,

absorption, and depression storage on various surfaces and dissipated through infiltration. The processes of retention and dissipation continue after runoff begins. Modifying the TR-55 runoff equation by substituting the retention volume (inches) and dissipation rate (inches per day) for the value of S, a continuous simulation of rainfall versus runoff can be performed using 30 or more years of 24-hour precipitation data. A plot of the results assuming presettlement conditions provides a runoff pattern. A similar simulation is performed for post-development conditions, with the combination of storage volume and dissipation rate varied until the runoff pattern closely matches the presettlement pattern. The resulting combination of retention volume and dissipation rate form the design parameters for various BMPs such as rain gardens, infiltration facilities, and reuse storage tanks.

5:00 – 5:30 p.m.

L32. Design of Bioretention Cells: Integrated Volume- and Flow-Based Hydrologic Analysis

Luis Parra-Rosales – Adams Engineering, Carlsbad, CA

Many design manuals consider bioretention cells an efficient BMP for pollutant removal, but most design and sizing guidelines are based on general dimensions and soil properties regardless of the hydrology of the site. This study allows a proper hydraulic design based on specific hydrology, soil properties, perviousness, and size of the contributing area to more accurately determine the size of a bioretention cell, its ponding depth, and ultimately, the total amount of volume treated.

5:30 – 6:00 p.m.

L33. The Hydraulic and Water-Quality Performance of a Subsurface Gravel Wetland for Stormwater Management

Robert Roseen – University of New Hampshire Stormwater Center, Durham, NH

Long used in wastewater management, subsurface gravel wetlands have recently shown exceptional performance for stormwater as well. The University of New Hampshire Stormwater Center designed and constructed a subsurface gravel wetland and has monitored it since 2004 along with a range of other devices; the wetland is routinely the top performer for water-quality improvements and storm-volume reduction. The design of the system and monitoring results are presented. The results of two pilot gravel wetlands installed for the New Hampshire Department of Transportation will also determine whether they will be included in future designs to minimize pollutant loading to impaired waters as part of a planned highway expansion.

Research & Testing Track Crystal K-L-M

4:30 – 5:00 p.m.

R31. Effectiveness of Commercial Stormwater Pollution Management Practices: Environmental Technology Verification Program

James Bachhuber – Earth Tech, Madison, WI
The USEPA Environmental Technology Verification Program has conducted standardized testing of commercial-ready products for treatment of urban stormwater pollution. Since 2002, nine devices have been tested and verification reports published. At this point there are no plans to test additional devices. This presentation summarizes the program, explains its monitoring protocol and how it was developed, and provides results of the reports published to date. It also provides information on the challenge of conducting field monitoring and guidance on how to interpret information in the reports.

5:00 – 5:30 p.m.

R32. Development and Application of a Stormwater BMP Performance Database

Lisa Fraley-McNeal – Center for Watershed Protection, Ellicott City, MD
Scott Crafton – Virginia Department of Conservation and Recreation, Richmond, VA

The Center for Watershed Protection has been maintaining the National Pollutant Removal Performance Database, which compiles and analyzes pollutant-removal performance of stormwater BMPs from studies across the country. The database has recently been updated with new studies. This presentation shows practical applications of the database and how it has been used to develop compliance calculations, LID credits, and enhanced BMP design standards. It also cautions about widespread use of the median removal efficiency, which can lead to design standards that aim toward the middle range of BMP performance and results in mediocre-performing BMPs in the ground; designing to achieve the 75th percentile removal efficiency calculated in the database, rather than the median, is recommended.

5:30 – 6:00 p.m.

R33. Do Automatic Samplers Suck?

John Pedrick – Contech Stormwater Solutions, Portland OR
Gretchen Tellessen – Contech Stormwater Solutions, Portland OR

Most BMP evaluation protocols call for collection of flow-paced runoff samples, which often require use of automatic samplers. These samplers' ability to collect larger particles is a much-debated topic; it has been suggested that they cannot accurately collect particles larger than 500 microns. A review of field performance data reveals that automatic samplers can collect particles of this size and larger. Information presented focuses on the ability of the ISCO 6712 sampler to collect representative stormwater samples with particle sizes ranging from 10 to 1,000 microns. Sampler location, methodology, and sample analysis are discussed. Grab samples from the same location are used as a reference point for benchmark concentrations and percent recovery.

Stormwater Program Management Track I Crystal A-B-C

4:30 – 5:00 p.m.

P31. The Application of GIS and H&H Tools in the Development of the Calumet-Sag Detailed Watershed Plan

Phillip Blonn – CH2M Hill, Chicago, IL
Jonathan Grabow – Metropolitan Water Reclamation District of Greater Chicago, IL

This presentation summarizes the broad application of GIS-based tools for hydrologic and hydraulic model data development used to support the Calumet-Sag Detailed Watershed Plan. The plan identifies projects to address intercommunity stormwater-related problems in the 151-square-mile watershed, which includes 27 municipalities and some unincorporated areas. The H&H model data development tools—ArcHydro, GeoHMS, and GeoRAS—have been used to support plan development. ArcHydro uses digital elevation model LiDAR data to delineate sub-watersheds; GeoHMS helps develop hydrologic parameters such as curve number, time of concentration, and basin topology. GeoRAS supports model creation using GIS and vertical data from a digital terrain model, facilitating creation of geometric data for hydraulic modeling.

5:00 – 5:30 p.m.

P32. Potential Pollutant Hot-Spot Identification and Prioritization Using GIS: A Tool for Stormwater Quality Management

Jenny Gaus – City of Kirkland, WA
Erin Nelson – Parametrix, Bellevue, WA

With 82% of the city developed before stormwater treatment requirements, Kirkland, WA, relies on redevelopment and retrofitting to improve the quality of stormwater entering receiving waters. The city has developed a GIS-based methodology for identifying potential pollutant hot spots and prioritizing locations for water-quality treatment and source-control efforts. It evaluated five common urban pollutants, assigned pollutant-loading values to 10 land-use categories and four street-traffic volumes, and created a 1-acre grid system in which each cell was assigned a single concentration for each pollutant based on weighted averages by land-use type. A cumulative pollutant map was also developed. Possible treatment locations are prioritized according to proximity to sensitive water bodies, existing treatment, number of potential pollutants, and total area of pollution-generating impervious surfaces.

5:30 – 6:00 p.m.

P33. MS4 Modeling of Complex Storm Drain Systems (1D and 2D Methods)

Michael Crenshaw – Half Associates, Inc., Fort Worth, TX

Fort Worth, a Phase I city, has embarked on an ambitious plan to identify, analyze, and develop a strategy to address flooding problems. This presentation discusses the use of complex storm drain modeling. Elements of each of the city's watershed planning studies include a physical condition assessment, extensive data collection, detailed modeling of the enclosed storm drain system, and analysis of overland or open channel flooding. Relevant data are gathered into an ESRI ArcGIS database, and analysis of the enclosed storm drain is performed using SWMM5 and

InfoWorksCS software. The goal is to develop stable, fully dynamic stormwater conveyance models that include complex overland flows, surcharging inlets and manholes, and sump ponding conditions. Detailed modeling provides greater confidence and cost-benefits in proposed solutions.

Stormwater Program Management Track II Anaheim-Atlanta-Boston

4:30 – 5:00 p.m.

P34. *When Superfund and NPDES Programs Collide: What's Next in Stormwater and Sediment Quality Management*

Dana deLeon – City of Tacoma, WA

Todd Thornburg – Anchor Environmental LLC, Portland, OR

Contaminated bottom sediments were remediated in the Thea Foss Waterway in Tacoma, WA, in an \$88 million Superfund effort. The waterway is in a highly urbanized basin, and chemicals continue to be conveyed to it via stormwater runoff, aerial deposition, marinas, and groundwater seeps. Tacoma, in consultation with the EPA and the Washington Department of Ecology, developed a stormwater monitoring a source-control program for the municipal storm drains entering the waterway to help provide long-term protection of bottom sediment quality. Source controls, monitoring efforts, and computer modeling to predict the cumulative impacts of source reductions on future conditions are presented, along with methods for evaluating the need for and identifying future source controls.

5:00 – 5:30 p.m.

P35. *Sustainable Stormwater Program Management for Multi-Site Facilities*

Erika Janifer – Malcolm Pirnie, Arlington, VA

Phase II stormwater regulations were developed primarily for small, contiguous municipalities. However, universities, military installations, airports, and other institutions that have multiple, physically disconnected facilities are also governed by the regulations. Dissimilar stormwater infrastructures, development patterns, pollution sources, and personnel present challenges for the compliance manager. This case study shows how Northern Virginia Community College, with six campuses regulated under one NPDES permit, developed its stormwater management program. Each campus consists of similar educational buildings, parking lots, and landscaped areas, but each has a separate facility management team and educational focus—from automobile repair shops to chemical labs to fertilized athletic fields. The stormwater program provides guidance and a manual for all six campuses.

5:30 – 6:00 p.m.

P36. *Recovery of Disaster-Impacted Stormwater Systems*

Bruce French – Florida Division of Emergency Management, Tallahassee, FL

Widespread erosion in a watershed caused by hurricanes severely affects permitted stormwater management systems. Governments and private non-profit groups often qualify for federal and state financial assistance immediately after a Presidential Disaster Declaration. Stormwater ponds and drainage system restoration are eligible projects within the long-term recovery phase. This presentation examines components of a stormwater management system and the grant process that public works departments and engineers should be aware of in order to benefit from disaster recovery assistance.

Water-Quality Monitoring Track Crystal N-P-Q

4:30 – 5:00 p.m.

Q31. *Using Storm Event Samplers to Calibrate the Watershed Loading Model for Use in the Development of the Lake Jessup TMDL*

Joe Walter – PBS&J, Orlando, FL

Using measured storm event sampling data injects the reality of site conditions into an otherwise academic pollutant-loading exercise. Even though not all sites fit as well as anticipated with the measured data, key insights into the nature of the watershed are revealed from those that do not. Having a calibrated model for use in TMDL development also brings credibility to the process and gives stakeholders tangible proof of their allocations. A sampling and water-quality analysis project in Seminole County, FL, is detailed in this presentation. The project's goal was to quantify flows and water quality of runoff conveyed by tributaries to Lake Jessup. Data quality control, evaluation methodology, and calibration results are presented.

5:00 – 5:30 p.m.

Q32. *Monitoring for Successful TMLL Development*

Lyndon Gyurek – City of Edmonton, AB

Liliana Malesevic – City of Edmonton, AB

Successful total maximum loading limits (TMLL) establishment and predictive computer model development rely on good science in linking pollutant sources to in-stream water quality. TMLLs are often developed using limited data that do not provide detailed information on trends and problems in the watershed. A case study is presented for the North Saskatchewan River reach that includes discharges from Edmonton, a wastewater treatment plant, and several industrial dischargers. Monitoring objectives, review of station locations, and a summary of collected data are included, along with a review of how this monitoring led to development of a successful water-quality model and in-stream thresholds to define the maximum amount of material that can be released by the city of Edmonton without detriment to the health of aquatic life in the river.

5:30 – 6:00 p.m.

Q33. *Experiences With the Development of the Los Angeles River Metals TMDL Coordinated Monitoring Plan: The Long and Winding River*

Penny Weiland – City of Los Angeles Watershed Protection Division, Los Angeles, CA
Seth Carr – City of Los Angeles Watershed Protection Division, Los Angeles, CA

The Los Angeles Regional Water Quality Control Board developed a TMDL to address impairments from cadmium, copper, lead, selenium, and zinc for the Los Angeles River and tributaries. The LA River watershed drains an area of 843 square miles containing 41 cities, as well as the County of Los Angeles and the California Department of Transportation. The TMDL required these 43 entities to develop a coordinated monitoring plan. Each jurisdiction must show compliance from areas serviced by storm drains and meet applicable wasteload allocations for both dry and wet weather. Monitoring locations were chosen at the base of each jurisdiction, including some intermediate drainage area locations to show phased compliance. Details of the TMDL and the process of crafting the monitoring plan are presented.

Wednesday, August 6

8:00 – 9:30 a.m.

BMPs and The Bigger Picture Panel Discussion Crystal G2

Listen to some of the best minds in stormwater address your questions and debate burning issues. For details see page 5.

10:00 – 11:30 a.m.

BMPs Track Crystal G1

10:00 – 10:30 a.m.

B41. *Failure to Flourishing: A Successful Hillside Remediation*

Eric Woodhouse – Landscape Development, Valencia, CA

Tiffany Leo – Landscape Development, Norco, CA

Heavy rains led to erosion and structural failure of hillsides in California. The slides caused a high-pressure natural gas line to break, and the gas ignited and caused a 20-acre brush fire. This presentation details the steps to mitigate the area cost-effectively and ensure no further erosion damage occurred, including slowing and redirecting runoff, installing temporary spillways, installing straw wattle check structures in low-flow ditches and coir matting in higher-flow areas, and revegetating for long-term stability.

10:30 – 11:00 a.m.

B42. *Post-Fire Erosion Control, Flood Mitigation, and Burn Area Recovery: Griffith Park, City of Los Angeles*

Stephen Caruana – Kleinfelder, Beaverton, OR

David Johnson – Kleinfelder, Diamond Bar, CA

The 2007 Griffith Park fire in Los Angeles burned 840 acres on steep, rugged terrain. Recovery included assessing geologic hazards and using the RUSLE model to characterize areas of the park subject to surface erosion. The restoration plan addressed public safety, restoration of native and

threatened plants, and improved animal habitat. A GIS database helped in project coordination and implementing post-fire erosion control measures.

11:00 – 11:30 a.m.

B43. Everglades Restoration: The Use of Regional BMPs

Richard Gibney – HDR Engineering, Inc., Tampa, FL
Caroline Masek – HDR Engineering, Inc., Tampa, FL

A key project in the Comprehensive Everglades Resoration Program is the C-44 Reservoir and Stormwater Treatment Area project, which implements BMPs on a regional scale to remove pollutants from waters leaving Lake Okeechobee heading toward the Indian River Lagoon. This presentation examines the tools used in evaluating the hydrology, hydraulics, and water quality of flows in the C-44 canal system and the simulation models used to evaluate flows and loads and to assess the operations of the C-44 project.

**Construction-Site Track
Crystal E-F**

10:00 – 10:30 a.m.

C41. SWPPP Compliance on the Construction Site: Case Studies and Lessons Learned

Katherin Steinbacher – KSPE Consultants, Lawrence, KS

Many owners (public and private), operators, and constructors are misinformed and confused about their liabilities and responsibilities regarding stormwater pollution prevention and erosion control on the construction site. This presentation offers knowledge on creating and implementing a compliance system for stormwater pollution prevention, including a basic outline for developing a compliance plan for the construction phase of a project; liabilities and responsibilities of individual project team members; design of the SWPPP; application for relevant permits; installation, inspection, and maintenance of BMPs; field inspection and reporting practices; and coordination with regulating agencies. Emphasis is on maintaining satisfactory compliance while controlling project costs and ensuring timelines of project completion. Examples from various public and private construction projects are included.

10:30 – 11:00 a.m.

C42. Alternative Strategies to Achieve SWPPP Compliance

Adrienne Boer – PBS&J, Austin, TX

This case study of an energy company, which contracts the construction of its transmission lines, illustrates how installation of erosion control BMPs was becoming more costly, with little accountability by the contractors, to maintain compliance with regulations. In many cases, too many BMPs were installed, driving up costs, or too few were installed, risking stormwater violations. When given a site plan, many contractors followed it exactly, regardless of evolving site conditions. The company ultimately

changed its stormwater compliance strategy, developing the SWPPP onsite with the assistance of an environmental inspector as construction was getting underway and achieving buy-in from the contractor into the process. The result was more accurate pricing and bids and greater compliance.

11:00 – 11:30 a.m.

C43. A Construction Stormwater Management Program: Reducing Risk Proactively While Achieving Compliance With the Construction General Permit

Steve Burgos – Brown and Caldwell, Boise, ID

After facing stormwater compliance issues on a city-owned construction site, Meridian, ID, developed a Construction Storm Water Management Program to become fully compliant with the Construction General Permit and reduce future risk of noncompliance. This presentation outlines the program, including development of specific, achievable, and measurable goals; a step-by-step approach to apply to each construction project to define expectations for contractors; a city-specific inspection form; a rating system to develop a quarterly compliance report for each project, allowing trend analysis of compliance issues on each site; a checklist for use in reviewing and approving SWPPPs; and a tailored training curriculum.

**LID Track
Crystal G2**

10:00 – 10:30 a.m.

L41. Low-Impact Development: The Fort Stewart Experience

John G. Smith – Oak Ridge National Laboratory/UT Battelle, Oak Ridge, TN

The Department of Defense controls millions of acres of land for which it must act as an environmental steward, including meeting stormwater requirements. Many facilities, including Fort Stewart in southeast Georgia, have incorporated LID practices into existing construction projects, facility upgrades, and planned developments. This presentation highlights some of the experiences and lessons learned from Fort Stewart, which should be useful for others incorporating LID techniques, particularly at facilities where existing infrastructure is extensive and has been in place for many years.

10:30 – 11:00 a.m.

L42. Riparian Buffer Benefits and Kansas City, MO's Stream Setback Ordinance

Scott Schulte – Patti Banks Associates, Kansas City, MO

Jeffrey Henson – Black & Veatch Corporation, Kansas City, MO

Patricia A. Elbert Noll – City of Kansas City, MO

Kansas City, MO, is conducting a comprehensive overhaul of its wet-weather programs, development code, and environmental practices. The city's stream setback ordinance is a key component of these efforts. The city has been systematically evaluating

stream quality and quantifying the relationship between riparian buffers and stream quality, using this base of information to develop LID policies. The question inevitably arises, "How much riparian buffer is enough, and how does a setback ordinance respect property rights?" This presentation describes the city's stream-assessment results, its ordinance provisions, and how the program compares to others. It provides recommendations for developing and adopting stream setback ordinances.

11:00 – 11:30 a.m.

L43. How LID Measures Won the Day in a Southern California Commercial Redevelopment Project

Daniel Apt – RBF Consulting, Irvine, CA

To comply with city and county requirements for industrial/commercial developments, LID techniques were employed in a hospital redevelopment project, including a green roof, bioretention areas, bioretention planter boxes, and porous asphalt. The advantages of each BMP and the reasons for their use are presented, along with a discussion of pollutants of concern, sub drainage areas that needed to be treated, sizing of the BMPs, operations and maintenance, and costs. The presentation shows how the LID measures compare to traditional treatment controls considered for the project.

**Research & Testing Track I
Crystal K-L-M**

10:00 – 10:30 a.m.

R41. Low-Impact Development Site Design: Separating the Possible From the Impossible

Theodore Scott – T.E. Scott & Associates, Inc., Hunt Valley, MD

Since its inception, LID has been heralded as the emerging answer to the issue of managing stormwater runoff from developed areas. Many questions remain about applying the wide variety of practices LID encompasses. Is the original design intent of LID—to replicate pre development hydrologic conditions—truly possible? Until recently, no efficient means existed to compute the effects of LID site designs or to verify or challenge designs claiming to be "LID." This presentation introduces software that calculates the effects of applying individual LID practices to real-world design problems, using TR-55 as a basis for determining hydrologic effects of the practices. Intended to be used as an on-the-boards design tool for applying LID practices in any combination, it helps the designer determine if hydrologic criteria can be met as a design progresses. An actual design example is presented, illustrating significant differences between applying individual LID techniques and actually adhering to the original LID site-design methodology.

10:30 – 11:00 a.m.

R42. Evaluation of Various Pond Performances and Designs During Wet-Weather Conditions

Jason Maldonado – PBS&J, Houston, TX

Catherine Elliott – Harris County Flood Control District, Houston, TX

The Harris County Flood Control District has initiated a program to uniformly and consistently evaluate the effectiveness of stormwater treatment systems for nonpoint-source pollution. The information will be used to modify and update design criteria and improve the use of BMPs. Two monitoring studies are underway, one for the Beltway 8 Stormwater Quality Treatment System and Wetlands Mitigation Bank and one for a detention facility. Key provisions of the monitoring plan and activities, as well as results through June 2008, are presented.

11:00 – 11:30 a.m.

P43. *Is It Wet or Is It Dry? When Your Basin Doesn't Know What It Wants to Be*

David Athey – URS Corporation, Wilmington, DE
Bryan Pariseault – URS Corporation, Wilmington, DE
Chris Hamilton – URS Corporation, Wilmington, DE

Detention ponds and basins are a critical part of the drainage infrastructure but, once constructed, often do not perform as planned: for example, wet ponds that do not retain their designed water elevation or dry basins that stay moist long after they should have discharged all their contents. There is a wealth of information about which type of facility should be used under particular circumstances, including soil types, drainage areas, and depth to bedrock, but these are not always taken into account during design. Some failures can be attributed to substandard construction or lack of maintenance. Solutions vary, and it may not always be best to try to restore a facility to its originally designed function; it may be advantageous to convert a dry basin to a wet pond, for instance, or a pond to an infiltration basin. Because these ponds and basins already exist, their restoration or conversion is one of the more economical methods we have to improve system performance.

Stormwater Program Management Track I Crystal A-B-C

10:00 – 10:30 a.m.

P41. *Addressing Stormwater-Source TMDLs in Stormwater Management Programs: A Look at a New National Handbook for Improving Programmatic Connections to Promote Better Implementation*

Kellie DuBay – Tetra Tech, Inc., Cleveland, OH
Bob Newport – US Environmental Protection Agency, Region 5, Chicago, IL
Christy Williams – Tetra Tech, Inc., Fairfax, VA

Differences between the TMDL program, which expresses stormwater wasteload allocations numerically, and the NPDES program, through which TMDL implementation occurs and which often express stormwater requirements as best management practices, create challenges for regulatory agencies and stormwater permittees. This presentation highlights recent efforts by the EPA to better understand the programmatic challenges and to

identify options for improving the connection between TMDLs and NPDES permits. A new handbook is being developed that will serve as a guide for developing wasteload allocations, TMDL implementation plans, and NPDES permit requirements.

10:30 – 11:00 a.m.

P42. *TMDLs and Watershed Management: What Are the Options for Stormwater Treatment? Los Angeles Region* *Anna Lantin – RBF Consulting, Irvine, CA*

The Los Angeles area has more than 500 water bodies listed as impaired because of pollutants associated with urban runoff. Challenges the regulated community face in complying with TMDLs include the feasibility of available technology to meet water-quality standards, implementation of structural and non-structural BMPs, availability of land in a highly urbanized environment, and funding. An evaluation of the Los Angeles Ballona Creek TMDLs indicates compliance may be achievable through a combination of structural controls including infiltration devices, source controls, and public education campaigns. The evaluation also looks at regional solutions with a cost-shared approach with stakeholder partners.

11:00 – 11:30 a.m.

P43. *Using Criteria Adjustments and Use Attainability Analyses to Address Bacteria Impairments and TMDLs in Freshwater Urban Streams*

Michael Bloom – PBS&J, Houston, TX

The USEPA's national freshwater criterion to protect human health in recreational waters was developed from studies of full-body-contact swimmers at lake beaches—not streams—yet is applied to all streams. This has led to many listings and TMDLs for urban streams that exceed the lake-derived criterion. The fate and transport of bacteria in streams, as well as the recreational activities occurring there, may be different from those at swimming beaches on lakes. Stormwater managers discharging to streams with bacteria concentrations that exceed the criterion face TMDLs that frequently require very large and potentially unachievable load reductions. This presentation describes the regulatory framework for adjusting or refining surface-water-quality standards (both uses and criteria) that drive the TMDL process, explains technical and policy issues related to altering the designated use of a water body from swimming to boating, and illustrates how a use attainability analysis can be used to refine water-quality goals and the TMDL process.

Stormwater Program Management Track II Anaheim-Atlanta-Boston

10:00 – 10:30 a.m.

P44. *"No Net Increase" of Sediment and Nutrients: How Can We Get There?*

John Kosco – Tetra Tech, Inc., Fairfax, VA

A Chesapeake Bay Program directive acknowledged the need to control nutrient and sediment loads from new development and urged a prevention- and preservation-oriented approach that encourages environmentally sensitive development practices. A task group is looking into ways to achieve this through such means as low-impact development, impervious cover limits, forest and buffer preservation, and stormwater techniques like infiltration and use of natural site features. Key principles include infiltrating stormwater onsite where possible, capturing and reusing stormwater where practical, designing practices to provide evapotranspiration of stormwater, providing detention and retention to reduce rate and volume, and providing treatment to remove pollutants.

10:30 – 11:00 a.m.

P45. *Stormwater Management for the Wastewater Organization*

Andrew Reese – AMEC Earth & Environmental, Inc., Nashville, TN

Consolidation of water organizations is occurring in the US, driven by mixed-media regulatory mandates, ability to trade pollutants, and a general shift to regarding stormwater as a resource rather than a nuisance. As a result, some wastewater organizations are taking on stormwater management responsibilities. A comprehensive stormwater management plan has complexities that differ from those of wastewater management: for example, stormwater is a provisional, not an operational system; stormwater is tied to land use; it has a maximum extent practicable rather than a numeric discharge standard where nonpoint sources of pollution are key; and operation of stormwater has historically been based on land, rather than system ownership. The implications on how organizations are structured and how they operate are profound. This presentation examines the implications of these differences and provides case studies of sanitary organizations making the transition to stormwater.

11:00 – 11:30 a.m.

P46. *A Water and Wastewater Engineer Retools for Stormwater*

David Todd – CEI Engineering Associates, Inc., Bentonville, AR

Comparing significant aspects of stormwater treatment to traditional means of treating water and wastewater, this presentation compares treatment goals and discusses the changing nature of stormwater. The unpredictability of stormwater flows, with large variations in contaminant load and the question of how much to treat, are compared with the relatively stable flow rate and quality of both water and wastewater. The variety of treatment systems used in stormwater and the heavy reliance on vendor-based systems is discussed, along with the "newness" of stormwater treatment: Stormwater will be in 30 or 40 years where wastewater treatment is now. The presentation also focuses on transferring lessons learned from water and wastewater engineering to stormwater treatment

Water-Quality Monitoring Track Crystal N-P-Q

10:00 – 10:30 a.m.

Q41. *Water-Quality Monitoring and Stormwater BMP Treatment Effectiveness*

Neal Shapiro – *City of Santa Monica, CA*
Lawrence M. Magura – *Black & Veatch, Lake Oswego, OR*

Santa Monica, CA, has completed three major offline urban runoff pollution mitigation projects for three of its 13 sub-watersheds. Two are vortex screening primary treatment of all dry-weather and most wet-weather flows followed by a year-round dry-weather (low-flow) diversion to the sanitary sewer. The third is a gross and soluble pollutants BMP treatment train. All three sub-watersheds drain into the Santa Monica Bay, a major southern California water body and economic engine for the region. This presentation shares the results of water-quality analyses, including data for a number of major pollutants commonly found in urban runoff such as bacteria, oil and grease, heavy metals, and organic chemicals.

10:30 – 11:00 a.m.

Q42. *Tale of Two Cities: Urban Runoff Pollutant and Source Elimination Parallel Approaches for Two San Diego Municipalities*

Rosanna Lacarra – *PBS&J, Encinitas, CA*
Kim Godby – *City of Coronado, CA*

The cities of Del Mar and Coronado, CA, independently evaluated their dry-weather flows and arrived at similar conclusions regarding pollutant sources and the need to address them. An overview of data collected over five years is presented, including how the sources were identified and eliminated. The cities had some differing approaches that proved successful, demonstrating that effective source-control BMPs can be implemented in various ways. The five-year data evaluation also identifies remaining urban runoff flows and their links to other common trends in urban runoff discharges in San Diego County, many caused by landscape over-irrigation.

11:00 – 11:30 a.m.

Q43. *The Quality of Stormwater in Venice Lagoon*

Giorgio Ferrari – *Magistrato Alle Acque (Ministry of Public Works), Venice, Italy*
Elisabetta Tromellini – *Magistrato Alle Acque, Venice, Italy*

The Venice lagoon, Italy's largest transition ecosystem, has severe pollution of its water and sediments caused by industrial activities, including petrochemicals, shipping, power plants, and refineries. Discharges to the lagoon are regulated, and a monitoring campaign was conducted in 2007 at 30 different sites that were potential pollutant sources. Parameters sampled included suspended solids, nutrients, organic matter, inorganic contaminants and metals, volatile

organic compounds, pesticides, PAHs, PCBs, and others. The results clearly demonstrated that the contamination of stormwater is influenced by the type of activity, and in general the contamination degree of the first flush is not always higher than that of the second runoff, indicating that it is not enough to collect and treat only the first flush but that the whole runoff should be treated by adopting specific treatment systems according to site characteristics.

Wednesday, August 6

2:15 – 3:45 p.m.

BMPs Track Crystal G1

2:15 – 2:45 p.m.

B51. *Street Sweeping as a BMP for Pollution Load Reduction*

Michael Schaefer – *City of Norfolk, VA*
Lamont Curtis – *PB Americas, Norfolk, VA*

The city of Norfolk has added a condition in its draft Phase I permit that the city track and report the total lane miles and tonnage of street sweepings, and that it sample the material to determine its composition and estimate the pollutant load reduction that can be attributed to street sweeping operations. The city outfitted its street sweeping equipment with passive GPS units and overlaid the data on GIS maps to provide real-time data for sweeping times and coverage. The data were used to adjust the areas and daily lane miles of sweeping to increase efficiency.

2:45 – 3:15 p.m.

B52. *The City of Los Angeles Meets Trash TMDLs Compliance With Catch Basin Inserts and Opening Covers*

Alfredo Magallanes – *City of Los Angeles Sanitation-Watershed Protection Division, Los Angeles, CA*
Morad Sedrak – *City of Los Angeles Sanitation-Watershed Protection Division, Los Angeles, CA*

The city of Los Angeles, under two "trash TMDLs," must reduce its trash contribution to the Los Angeles River and Ballona Creek and Wetlands by 10% each year for a period of 10 years. Its strategy for complying is based on a two-pronged approach: implementing institutional measures like public outreach, street sweeping, catch basin cleaning, and installing structural trash-control devices in the storm drain system. Pilot studies compared catch basin inserts and opening screen covers to determine their effectiveness. The city has far exceeded established milestones for trash reduction.

3:15 – 3:45 p.m.

B53. *Downspout Disconnection in Baltimore*

Julie Tasillo – *Center for Watershed Protection, Ellicott City, MD*

Rooftops of many single-family homes and other buildings in Baltimore are directly connected to the

storm drain system or drain to impervious surfaces. Disconnecting downspouts from the system, if done on a large scale, can significantly reduce peak runoff volumes and pollutant loads entering the city's rivers and streams. A disconnection program, modeled on similar efforts in Portland, OR, is introducing financial incentives for school and community groups to assist in disconnecting downspouts in targeted neighborhoods.

Construction-Site Track Crystal E-F

2:15 – 2:45 p.m.

C51. *Use of Independent Environmental Monitors to Facilitate Compliance*

Steve Hurt – *McCormick Taylor, Inc., Baltimore, MD*

For several years, independent environmental monitors in Maryland have supported permitting agencies in reviewing project designs and tracking environmental compliance during and after construction. The process has been especially useful for fast-tracked projects, and it has allowed permitting agencies to make effective use of their limited staffing to focus on critical issues as they develop rather than on routine project review activities. Qualified monitoring staff range from professional engineers to environmental scientists to experienced construction personnel. The presentation covers qualifications of a good monitor, matching appropriate staff to the needs of a particular project, and maintaining consistent staffing throughout the life of the project.

2:45 – 3:15 p.m.

C52. *Public Enforcement of Contractor Compliance: Sharing the Burden of Erosion Control Inspection*

Greg Fries – *City of Madison, WI*

Jeff Mazanel – *Short Elliott Hendrickson, Inc., Appleton, WI*

Permitting agencies often lack the resources to effectively conduct site inspections using their own staff, but two other parties can help in the process: the permittee and the public. In 2006, one city began requiring all submittals for construction site erosion control and stormwater management permits in electronic format to ease handling and information sharing. It requires each permittee to conduct self-inspections weekly and after rainfalls and to enter the inspection results into a publicly accessible Internet database. Filed erosion control reports for each active permitted construction project are available to the public, and questions or complaints about a project can be immediately sent to the permit holder and permitting agency.

3:15 – 3:45 p.m.

C53. *Introduction to the CESSWI Program*

Jimmy Eanes – *Paradigm Engineering, Lewisville, TX*

The Certified Erosion, Sediment, and Storm Water Inspector program is designed to help enhance water quality by improving the process of inspecting

the installation and maintenance of construction and post-construction BMPs. The program, administered by CPESC, Inc., identifies individuals with the experience, knowledge, and education to effectively observe and report the adequacy of these practices in meeting requirements of the USEPA NPDES stormwater permitting program and other international agencies' programs. This presentation outlines the goals and requirements of the program.

LID Track Anaheim-Atlanta-Boston

2:15 – 2:45 p.m.

L51. *Integrating Urban Trees With Stormwater Management*

Randy Neprash – Bonestroo and Minnesota Cities Stormwater Coalition, St. Paul, MN

A multi-agency collaborative effort is underway to integrate trees with stormwater management. The initiative extends beyond just canopy interception and results in greater numbers of healthier urban trees, along with significant stormwater treatment and volume-reduction benefits. The presentation describes the strategic framework, including credits from tree BMP implementation, design standards for engineers and landscape architects, and integration of trees as BMPs for TMDLs, nondegradation, transportation projects, and MS4 cities.

2:45 – 3:15 p.m.

L52. *Influence of Soils on Low-Impact Development*

Richard Lucera – RBF Consulting, Carlsbad, CA

Implementing infiltration BMPs in new developments or retrofit situations can present a host of challenges related to cost, technical effectiveness, and potential for unintended adverse impacts. This presentation seeks to identify and dispel common misinformation relating to infiltration practices, and to identify a short list of critically influencing geotechnical and pervious-soil factors that should be considered during the project planning stages. Several case studies demonstrate the degree to which these factors affect achieving desired water-quality objectives.

3:15 – 3:45 p.m.

L53. *Watershed Master Planning: Application of Low-Impact Development to Mountainous Environments*

Kurt Golembesky – Brown and Caldwell, Raleigh, NC

Marshall Taylor – Brown and Caldwell, Raleigh, NC

Cathy Ball – City of Asheville, NC

A reach of Ross Creek near Asheville, NC, was categorized as biologically impaired on the state's 2000 303(d) list. Stormwater issues

within the watershed include localized flooding, slope and streambank erosion, and degraded water quality. Most of the upper reaches of the watershed have steep slopes, while the lower portion is highly developed. A study to address current and future water-quality problems, and to identify means to remove Ross Creek from the impaired list, began in 2007, including an analysis of LID principles already in place. The study indicated that a steep-slope development ordinance and a stormwater ordinance developed with public involvement would be particularly effective measures for the study area.

Research & Testing Track I Crystal K-L-M

2:15 – 2:45 p.m.

R51. *Coupling the Variability of Stormwater Loadings and Best Management Practices Performance for Receiving Waters*

Jong-Yeop Kim – University of Florida, Gainesville, FL

The in-situ performance of BMPs remains largely unknown; their effectiveness is generally based on computer model studies or tests performed under controlled conditions. It is important to implement a statistical approach and methodology to evaluate the uncertainty of treatment performance of BMPs that is significantly affected by the variability of stormwater loading parameters such as flow rate, particle size, and concentration. A robust and detailed database of catchment-specific frequency distribution of flows and statistics of particle size distribution at each given flow rate is presented. With the developed particle separation model for a BMP of interest and frequency distribution of influent hydrologic and granulometric loads, the statistical assessment of a tested BMP in terms of particle removal capability is provided.

2:45 – 3:15 p.m.

R52. *Computational Fluid Dynamics and BMPs: Reality or Hydro-Fantasy?*

Sean Pathapati – University of Florida, Gainesville, FL

Control of rainfall-runoff particulate pollutant loads is challenging, in part because of the wide gradation of particulates, complex geometries of many unit operations, and variable flow rates. This study applies the principles of computational fluid dynamics to predict the particle clarification behavior of systems subject to dilute multiphase flows within computationally reasonable limits to an acceptable degree of accuracy. We can examine BMPs as fundamental unit operations and processes and learn that they are not "black boxes," but systems amenable to the basic laws of physics.

3:15 – 3:45 p.m.

R53. *Watershed Models for Stormwater Management and BMP Evaluation: Review and Evaluation for Better Selection and Application*

Deva Borah – Woolpert, Inc., Portsmouth, VA
Jamie H. Weist – Woolpert, Inc., Portsmouth, VA

Watershed models are useful to interpret, quantify, and assess complex natural processes such as runoff from precipitation, erosion of upland soil, sedimentation, and contamination of water. Models are also useful to evaluate alternative land uses and BMPs for solving or alleviating flooding, excessive erosion, sedimentation, and water-quality problems. Many models have been developed; how do we know we're using the right one? This presentation outlines a set of model-selection criteria to help choose and apply stormwater and BMP evaluation models for specific applications. Direction toward combining strengths of the existing models and developing more comprehensive, accurate, and efficient ones is also provided.

Research & Testing Track II: 90-minute presentation Crystal G2

2:15 – 3:45 p.m.

R50. *Pollutants and Performance Protocols Panel Discussion*

John Moll – CrystalStream Technologies, Lawrenceville, GA

Panelists to be announced

This panel discussion on dissolved versus gross pollutants and sediment size, led by John Moll, examines the concept of a two-tier system for water-quality performance protocols. Recent research has shown that many dissolved pollutants and nutrients are contained in gross pollutants such as trash and debris, and that a large percentage of the constituents we want to remove from stormwater runoff are attached to particles of 125 microns and larger. Some standards, however, place more emphasis on very small particles, which are thought to be more readily bioavailable. A system tailored to handle one protocol might therefore bypass higher flows to be able to handle the small material. Are small-particle-based protocols actually causing harm to the environment—straining out gnats while pterodactyls wash unabated downstream? Researchers and testers will discuss this and other issues.

Stormwater Program Management Track Crystal A-B-C

2:15 – 2:45 p.m.

P51. *Look Before You Leap: Developing Policies for Stormwater User Fee Implementation*

Prabha Kumar – Black & Veatch Corporation, Philadelphia, PA

Joanne Dahme – Philadelphia Water Department, Philadelphia, PA

Is your utility ready to take the stormwater user fee plunge? User fees can provide a viable source of stormwater financing and an equitable mechanism for cost recovery. But there are many complexities that often overwhelm utilities establishing fees for the first time; for example, stormwater runoff cannot be measured, and surrogate measures such as parcel-impervious areas need to be used to establish fees. This presentation discusses key policy issues that utility managers need to address before implementing fees, using case studies from Philadelphia and Wilmington, DE, as examples. Topics include impervious area estimation, exemptions, payment and enforcement, stormwater credits, and appeals.

2:45 – 3:15 p.m.

P52. Implementing a Utility-Funded Stormwater Management Program: Lessons Learned

Chadd Hodkinson – Malcolm Pirmie, Inc., Lansing, MI

John Trujillo – City of Newark, OH

Two years ago Newark, OH, successfully created a stormwater utility to fund its stormwater management program. Two previous attempts to develop a utility had been opposed by city leaders or rejected by voters, but faced with long-standing stormwater problems and budgetary challenges, the city learned from its previous efforts and took a fresh look at the process. Some of the lessons addressed here: citizens can drive a utility's success or failure; rates must be based on real data as well as sound and equitable logic; the need for stormwater funding must be clearly demonstrated; and perception of the utility as a "rain tax" is a death blow. Flexibility has been an important part of the process; for example, the originally recommended rate was implemented at a reduced level with a plan for a gradual increase over time, and the city had to adjust priorities and goals accordingly.

3:15 – 3:45 p.m.

P53. Retooling Ann Arbor's Stormwater Utility to Address Changing Legal Precedents

Thomas McMurtrie – City of Ann Arbor, MI
John Aldrich – Camp Dresser & McKee, Inc., Cleveland, OH

Since the early 1980s, Ann Arbor, MI, has used a stormwater utility to fund construction and maintenance of stormwater facilities. The utility's relatively simple billing formula did not have an appeals process and did not deal with stormwater charges to all properties. A recent Michigan supreme court ruling defined how governmental funding can be used for stormwater-related projects. To meet the new ruling, the city had to perform a comprehensive cost-of service evaluation to identify the necessary capital, operational, and administrative needs of its stormwater program; define specific services it will provide to meet those needs; and establish appropriate criteria and policies for feasible alternative levels of service. A key element was accurately categorizing different parcels within the city into rate-structure tiers based on their contribution of stormwater to the conveyance

system, as well as establishing a method to assess charges for commercial and industrial customers.

**Water-Quality Monitoring Track
Crystal N-P-Q**

2:15 – 2:45 p.m.

Q51. Quantifying the Bias in Sediment Concentration Monitoring in Transportation Runoff

George Fowler – University of New Hampshire, Durham, NH

The accuracy of sediment concentration and particle size distribution monitoring depends on the monitoring method used. This study examines sediment loads in parking lot runoff using four methods: total suspended solids (TSS), suspended sediment concentration (SSC), nephelometric turbidity units (NTU), and a LISST StreamSide that monitors real-time sediment concentration (RSC). In addition, a large total capture sample was retained during the sampling period. From this total capture, an actual sediment mass and corresponding concentration for each event is compared with the sediment loads predicted by the four methods. Results provide insight for developing guidelines for measuring sediment concentrations and removal efficiency standards.

2:45 – 3:15 p.m.

Q52. UIC Stormwater Discharge Monitoring

Rod Struck – City of Portland, OR
Mary Stephens – City of Portland, OR

Portland, OR, has approximately 9,000 underground injection control (UIC) systems that collect stormwater from public rights of way and discharge it to the subsurface. For a substantial portion of the city, UICs are the only form of stormwater disposal. UICs are an essential element of street-side swales and "green street" applications, and they preclude the need to increase capacity of piped stormwater infrastructure that eventually discharges to surface water bodies. To protect groundwater as a drinking water resource, the city is required to monitor stormwater entering city-owned UICs throughout the 10-year term of its water pollution control facility permit. The monitoring strategy and results are presented; samples are collected five times between October and May at locations representative of the spatial distribution of the UICs and of two permit-defined traffic-flow categories. Samples are analyzed for total and dissolved metals, volatile organic compounds, PAHs, phthalates, pentachlorophenol, and selected herbicides and pesticides.

3:15 – 3:45 p.m.

Q53. Stormwater Quality Trends in Salt Lake County, Utah

Karen Nichols – Stantec Consulting, Inc., Salt Lake City, UT

Stormwater sampling has been conducted since 1992 throughout the urbanized Salt Lake County area. This presentation reviews a compilation and statistical analysis of the results. Topics include first flush, land-use-specific trends, and seasonal trends. The presentation summarizes sampling methodology and provides statistics on event mean concentrations, land-use-specific average concentrations, pollutograph sampling results and comparisons, relationships between total suspended solids and total phosphorus, and trend analyses. Salt Lake areas data area also compared to those of other Western and intermountain communities.

Wednesday, August 6

4:00 – 6:00 p.m.

**BMPs Track
Crystal G1**

4:30 – 5:00 p.m.

B61. Identifying Pathogen Sources, Transport Dynamics, and Mitigation Strategies in a US/Mexico Transborder Watershed

William Lewis – University of California, Santa Barbara, CA

The flow of impaired waters from the Tijuana River on the US-Mexico border has been the focus of transborder negotiations since the 1960s. Nonpoint-source pollution, including pathogens, sediment, and trash, have posed human health risks and caused environmental and economic damage on both sides of the border. This study focuses on Los Laureles Canyon in the highly urbanized city of Tijuana, identifying sources, transport mechanisms, and fate of pathogens. The Watershed Analysis Risk Management Framework model was used to assess pathogen movement through the watershed and inform a strategy to reduce pathogen loads using BMPs appropriate in this challenging environment.

5:00 – 5:30 p.m.

B62. Treatment of Stormwater-Borne Bacteria on Bradford Beach, Milwaukee, WI

Bernie Michaud – Earth Tech, Madison, WI

Beach closures because of high bacteria levels are frequent in many coastal communities. Milwaukee County is reducing bacterial loading from stormwater by treating outfalls that discharged stormwater directly onto beach sand. The approach includes seven infiltration basins on the beach, a bioretention system for a parking lot, three rain gardens, a rerouted storm sewer, and antibacterial inlet filters. Continuous simulation modeling indicates stormwater-borne bacteria can be reduced by up to 90%, and ongoing field monitoring is being used to verify results.

5:30 – 6:00 p.m.

B63. Nutrient Removal From Stormwater Being Managed Using Select Media

Marty Wanielista – Stormwater Management Academy, Orlando, FL

A mixture of media including tire crumb is being used to remove nitrogen and phosphorus from stormwater in the lab and in full-scale field applications. The mix has been applied to pervious pavements, green roofs, and effluent from wet detention ponds. Examples, research results, and toxicology results from various media mixes are presented.

**LID Track I
Crystal G2**

4:30 – 5:00 p.m.

L61. Managing Wet-Weather With Green Infrastructure

Greg Voigt – US Environmental Protection Agency, Washington, DC

In 2007, the USEPA, Natural Resources Defense Council, National Association of Clean Water Agencies, Low Impact Development Center, and Association of State and Interstate Water Pollution Control Authorities signed a statement of intent to develop and implement a strategy to research and promote green infrastructure technologies to manage wet-weather issues. The strategy addresses seven broad areas and aims to promote green infrastructure as a viable alternative to traditional stormwater management techniques. This presentation outlines the strategy and reports on the partnership's projects.

5:00 – 5:30 p.m.

L62. Green Metrics and Stormwater Management Design

Christina Muzquiz – T.E. Scott & Associates, Inc., Hunt Valley, MD

Theodore Scott – T.E. Scott & Associates, Inc., Hunt Valley, MD

The proliferation of green, sustainable, or integrated stormwater management metrics is a challenge for stormwater management design professionals. Various state design manuals, LEED, and other sources establish benchmarks that have implications for how and when stormwater management or site design enters the design process. Projects are affected by many factors: how committed a client is to a particular set of metrics, buffer requirements, existing topography, and state and country code requirements. Through three case studies, this presentation explores different sustainability metrics, with emphasis on how they intersect with and inform the stormwater management design process and designed product.

5:30 – 6:00 p.m.

L63. Preparing a Valid Pollution Loading Analysis

Steven Trinkaus – Trinkaus Engineering LLC, Southbury, CT

This presentation explains the variables and methods used in preparing a valid pollutant loading analysis to calculate annual loads from any type of development for both current and future conditions. It also provides an understanding of treatment system removal rates and the application of removal rates to the calculated pollutant loads. It includes an overview of how conventional and low-impact development treatment systems remove pollutants from runoff and demonstrates, on a sample site, how to apply appropriate pollutant removal rates for single and multiple treatment systems.

**LID Track II: 90-minute presentation
Anaheim-Atlanta-Boston**

4:30 – 6:00 p.m.

L60. The Impervious Cover Model Revisited and New Strategies to Defeat It

Tom Schueler – Chesapeake Stormwater Network, Baltimore, MD

Impervious cover is the root of the stormwater problem. Since it was first proposed in 1994, the Impervious Cover Model has attracted considerable attention, and nearly 200 research studies have tested its basic hypothesis that the behavior of urban stream indicators can be predicted on the basis of percent impervious cover in their contributing watersheds. This presentation reviews 75 recent published research efforts on the ICM, describes some of the new caveats and limitations to its application, and shows how it has been extended for small estuaries, lakes, and wetlands. The presentation also summarizes the limited scientific record that has shown that conventional stormwater management practices have had limited to no capability to modify the predictions of the ICM. It considers the broader management implications and challenges that the ICM poses for local stormwater program managers, regulators, and designers.

A new stormwater paradigm is proposed to mitigate the impact of impervious cover that relies on runoff reduction from the roof to the stream to replicate predevelopment hydrology. In greenfield settings, this new environmental site design (ESD) approach involves a sequence of practices including conservation of natural features, maximization of forest canopy, conservation of native soils and contours, minimization of impervious cover, capture of rooftop runoff, front-yard bioretention, dry swales, linear wetlands, and stream buffer management. A slightly different ESD prescription is recommended for commercial sites and highly urban watersheds. The presentation features several communities and states that are actively working to implement the ESD approach and presents a research protocol to determine if the widespread application of ESD can really defeat the ICM model in suburban, urban, and ultra-urban watersheds.

**Research & Testing Track
Crystal K-L-M**

4:30 – 5:00 p.m.

R61. Identification of Phosphorus in Highway Stormwater Runoff Originated From Engine Oil

Masoud Kayhanian – University of California, Davis, CA

Highway stormwater runoff contains constituents generated from vehicle operation, such as trace metals, petroleum hydrocarbons, PAHs, and possibly phosphorus. Leaked engine oils may add significant amounts of phosphorus-containing compounds, and source-reduction can play an important role in highway runoff BMP treatment in terms of both cost and removal efficiency. This study analyzed organic markers distinctively associated with commonly used engine oils and computed the contribution of engine oils to elevated levels of phosphorus in stormwater. To verify the usefulness of these compounds as tracers of the engine-oil component in runoff, resistance of marker compounds to photodegradation was also measured. The results as well as practical examples of computing phosphorus concentration are presented.

5:00 – 5:30 p.m.

R62. Statistical Evaluation of BMP Effectiveness in Reducing Stormwater Runoff-Induced Dissolved Oxygen Impairment in the Mermentau River Basin

Zhiqiang Deng – Louisiana State University, Baton Rouge, LA

H. Chowdhary – Louisiana State University, Baton Rouge, LA

The Mermentau River Basin in southwestern Louisiana is 57% cropland, and runoff contains high loadings of pathogens, nutrients, sediments, and other oxygen-consuming substances. About 95% of the basin's water bodies are not fully supporting their designated uses. Since 1990, a variety of BMPs have been implemented, but their effectiveness is largely unknown. Using 26 years of water-quality monitoring data from the basin, this presentation outlines a statistical approach to tracking diverse nonpoint sources and evaluating the effectiveness of implemented BMPs in reducing stormwater runoff-induced dissolved oxygen impairment.

5:30 – 6:00 p.m.

R63. Transport and Partitioning of Source Area Rainfall-Runoff Nutrients

Christian Berretta – University of Genova, Italy

This presentation describes a Florida Department of Environmental Protection project examining source area transport, partitioning, and in-situ control of nutrients and particulate matter. It is

hypothesized that sustainable control requires an in-situ approach that includes hydrologic restoration. The source area watershed is a 400-square-meter urban paved Gainesville parking lot catchment to establish the coupled interaction between hydrologic, chemical, and particulate matter in rainfall runoff. Rainfall and runoff were examined separately. Results indicate that both loads and event concentrations from the catchment were significant for nutrients and to a lesser extent for particulate matter.

Stormwater Program Management Track Crystal A-B-C

4:30 – 5:00 p.m.

P61. City of Dallas Stormwater Management Program Update
Erick Thompson – Dallas Public Works & Transportation, Dallas, TX
Lindsay Svadbik – Dallas Public Works & Transportation, Dallas, TX

In August 2006, a federal judge entered a consent decree between the USEPA, the state of Texas, and the city of Dallas addressing several environmental management issues. The decree made headlines with its \$800,000 fine and \$1.2 million in supplemental environmental projects. This presentation provides an overview of the decree and a status report, and offers suggestions for other municipalities to keep in mind to avoid compliance issues, focusing on some of the actions underway in Dallas such as employee retention and training, information management systems and technology, and general organizational development. Enhancements such as inspection data entry, equipment to support illicit discharge detection, and a complaint tracking database are also covered.

5:00 – 5:30 p.m.

P62. Defining, Establishing, and Maintaining a Security Screening Methodology for Public Education/ Outreach and Public Participation/ Involvement BMPs
Olivia Williams – URS Corporation, Denver, CO

The requirement for public education and public involvement can present a security concern if methods for screening information for public dissemination are not defined. Environmental compliance specialists are not typically involved in security assessments of information before it is distributed to the public, and security specialists and information technology personnel are not usually familiar with environmental compliance requirements at high-risk areas or facilities that hold stormwater permits. An analysis of several federal facilities reveals a need to identify the security requirement of sites and manage stormwater compliance within those restrictions. This does not mean

that all relevant information cannot be shared; but environmental compliance personnel should establish guidelines and procedures to ensure that both security and environmental compliance are maintained.

5:30 – 6:00 p.m.

P63. It's Time to Play Good Housekeeping and Pollution Prevention Jeopardy!

Lori Gates – Christopher Burke Engineering, Indianapolis, IN

Many regulated MS4s must provide their permitting authority with written documentation that their employees have been trained in good housekeeping and pollution prevention practices and have been provided annual refresher sessions. Lack of staff training is commonly cited during program evaluations. Providing this training doesn't have to be a painful process, even though municipal employees often don't like to take mandatory training. Tips and techniques are presented for delivering the message in a fun, creative, and effective way using "non-classroom materials."

Water-Quality Monitoring Track Crystal N-P-Q

4:30 – 5:00 p.m.

Q61. Modeling Streambank Stability to Evaluate Stream-Corridor Restoration Designs in the Brush Creek (North) Watershed

Samuel Darkwah – Carollo Engineers, Overland Park, KS

Urbanization has disturbed many streams in this Kansas City, MO, watershed, and sediments eroded from streambanks are a leading source of stream impairment. Integrated and comprehensive models have been developed to evaluate new restoration designs and the long-term response of restored stream-riparian corridors. A simple classification based on HEC-RAS computer model results is being used to identify unstable stream reaches, and HEC-RAS and the USDA CONCEPTS model are used to evaluate stream-corridor restoration designs.

5:00 – 5:30 p.m.

Q62. Monitoring Streambank Erosion Rates in Gwinnett County, GA

Jill Stachura – Brown and Caldwell, Atlanta, GA

A ongoing study in rapidly growing Gwinnett County, GA, is quantifying streambank erosion rates to improve predictions from simulations. Better predictions will assist the county in selecting measures to improve stream health. Fifty stream sites were monitored. Researchers recorded physical characteristics such as channel cross-section measurements, Rosgen stream classification, approximate bank full width and height measurements, pebble count,

and percent of unvegetated bank. Sampling of bank soil for bulk density and other data were also collected and used to calculate erosion and sediment production rates; data are also used for model calibration. Results from two years of erosion monitoring have generally supported assumptions used during the modeling process.

5:30 – 6:00 p.m.

Q63. Cost Benefits as Incentives for use of LID Stormwater Management for Mitigating Impacts of Climate Change

Robert Roseen – University of New Hampshire Stormwater Center, Durham, NH

Thomas Ballesterio – University of New Hampshire Stormwater Center, Durham, NH

James Houle – University of New Hampshire Stormwater Center, Durham, NH

This study presents information on estimates of impacts from climate change, in support of programs to adapt civil infrastructures and LID ordinances as a tool for addressing impacts from development in a setting where municipal stormwater infrastructure is already stressed. An economic case is made for the ability of LID to mitigate impacts from both existing development and through redevelopment strategies, and to limit impacts from future development in the climate change context. Lessons are presented from municipalities that have successfully adopted LID approaches. This presentation draws connections between local government land use policies and their resilience to climate change.

Thursday, August 7

8:00 – 9:30 a.m.

EPA News Update and Q&A Session with Nikos Singelis - Crystal G2

Nikos Singelis, senior program analyst, USEPA Office of Wastewater Management will provide an update on new developments in USEPA stormwater programs. *For details see page 5.*

Thursday, August 7

10:00 – 11:30 a.m.

**BMPs Track
Crystal G1**

10:00 – 10:30 a.m.

B71. Washtenaw County Rain Gardens

Harry Sheehan – Washtenaw County Drain Commissioner, Ann Arbor, MI

In 2004, the Washtenaw County Drain Commissioner received a grant to develop 20 rain gardens in a densely populated Michigan watershed. Objectives

were to pilot a rain garden outreach strategy that counted on property owners to build and maintain their rain gardens in exchange for design, construction, and plant materials; to provide the equivalent detention of the first flush of runoff from a 1-acre parking lot in these 20 rain gardens; and to assess the cost of detention per unit volume. Results of the program are presented; so far, 40 gardens have been installed and more are planned.

10:30 – 11:00 a.m.

B72. Using Rainwater to Grow Livable Communities: Lessons From Municipal Leaders in Implementing Green Infrastructure

Jane Kulik – *Wenk Associates, Inc., Denver, CO*
Martina Keefe Frey – *Tetra Tech, Inc., Portland, OR*

This WERF-funded study examined the experiences of 12 communities of various sizes across the US—some with a long track record of using green infrastructure and others just starting out—to identify practical “lessons learned” and determine the political, social, and cultural factors that influence why some communities can implement such projects more successfully than others. Topics investigated include the roles of municipal leaders, interagency coalitions, highly visible pilot projects, the importance of measurements and metrics that can be used to improve future projects, and the importance of multiple-benefit projects that not only address stormwater, but also provide visual, recreational, or habitat benefits.

11:00 – 11:30 a.m.

B73. Stormwater Management Using Pervious Pavement in Colorado

Jennifer Keyes – *Wright Water Engineers, Inc., Denver, CO*

Although local criteria exist for pervious pavement and other infiltration-based BMPs, these practices have not been widely used in the Denver area, and few monitoring data have been collected to evaluate their effectiveness. Soil permeability, freeze-thaw considerations, and sanding and snow-removal practices are concerns. This presentation reviews selected installations, provides monitoring results for one site that incorporates several different infiltration practices, and recommends refinements to current monitoring methods.

Construction-Site Track Crystal E-F

10:00 – 10:30 a.m.

C71. Erosion Control in Mountain Environments: Case Studies for Proactive Planning Efforts

Bill Granger – *SE Group, Bellevue, WA*
Dan Roscoe – *SE Group, Bellevue, WA*

Mountainous environments present unique challenges to designing, implementing, and maintaining effective erosion control practices. Project development in these environs often occurs in headwater systems that are highly responsive to ground disturbances and slight changes in surface hydrology. Varying gradients and the seasonal nature of the system also contribute to the problem. Bringing an erosion control professional into the process early, before the development of the stormwater pollution prevention plan, can help obtain agency buy-in on the SWWPPP and reduce permit review times. Several case studies are presented illustrating erosion control practices on construction projects.

10:30 – 11:00 a.m.

C72. Sediment and Control in a Coastal Community Adjacent to Outstanding Resource Waters

Gregg Eckstein – *Town of Bluffton, SC*
Jeff McNesby – *Town of Bluffton, SC*

Bluffton, SC, is located along the May River in the southern coastal part of the state. The river is one of the last tidally influenced outstanding resource waters in the state and hosts the last remaining commercial shellfish factory in South Carolina. Bluffton is also one of the country's fastest-growing communities. To address the pollution and runoff from construction activities, the town has created an aggressive sediment and erosion control inspection program, performing an average of 275 site inspections per month on its 110 active construction projects. The inspection team consists of only two part-time inspectors and an inspection coordinator. However, because of better site management by developers, enforcement actions have dropped from 50% of all inspections when the program was first put in place to only 5%.

11:00 – 11:30 a.m.

C73. Numeric Effluent Limitations for Construction Stormwater: The Time Has Come

Janelle Robbins – *Waterkeeper Alliance, Irvington, NY*

This presentation outlines a proposal by the Natural Resources Defense Council and Waterkeeper Alliance for the USEPA's coming construction stormwater effluent limitation guideline. Under this proposal, an EPA-issued guideline for the active construction phases of development would feature a numeric effluent limit of 50 NTU for all discharges from discrete onsite conveyances and a narrative limit prohibiting any visible discharge of sediment from the site. These limits can be achieved by applying environmental site design and active construction phasing, using erosion and sediment control practices, implementing practices to remove fine particle from stormwater discharges, and employing trained site agents and inspectors. Twenty-three states now have some kind of numeric sediment criteria. Recommendations for addressing post-construction pollution are also presented.

LID Track Crystal G2

10:00 – 10:30 a.m.

L71. Industrial Low-Impact Development

Ross Dunning – *Kennedy/Jenks Consultants, Federal Way, WA*

The port of Tacoma and its tenants are subject to new regulatory requirements for construction and post-construction stormwater management. The Port is planning substantial development projects that will include redevelopment of almost 600 acres of industrial property. Parameters of particular concern for most port facilities include zinc, copper, TSS, and turbidity. Because of the ubiquitous presence of these pollutants in the developed environment, many facilities cannot achieve NPDES-defined benchmark levels with source-control BMPs alone. The Port is developing a strategy to address this during the design phase of the project, requiring use of infiltration and bioretention practices as far as practicable at the redevelopment sites. Innovative designs incorporating LID treatment will be presented, along with water-quality data.

10:30 – 11:00 a.m.

L72. Retrofitting Green: An Innovative Industrial Case Study

Tatiana Hernandez – *Tetra Tech, Inc., Chicago, IL*

As part of an ambitious effort to make Chicago the greenest city in the nation, the city selected an abandoned warehouse and incinerator brownfield site to convert into a chemicals and electronics recycling facility—the first of its kind to incorporate LID and green design. Half of the stormwater on the 2-acre site drained to the city's overloaded combined sewer system and the other half directly to the Chicago River. The site was regarded so that the entire area drains through LID and pollution-reduction BMPs and eventually to the river. LID practices include bioswales, shallow treatment swales, cisterns, a green roof, and an underground infiltration and detention system. Stormwater monitoring is being conducted to determine the effectiveness of these practices, and the city is pursuing LEED certification for the site.

11:00 – 11:30 a.m.

L73. IFAW Case Study: Application of Low-Impact Development Strategies to Brownfield Restoration on Cape Cod, MA

James Royce – *Stephen Stimson Associates, Falmouth, MA*

The proposed location for the 40,000-square-foot headquarters for the International Fund for Animal Welfare is a 5-acre brownfield site in Cape Cod—at the heart of a coastal region, an aquifer recharge area, and one of the largest

tourist destinations in New England. This presentation discusses the constraints and opportunities the site presented and details the site design, including bioswale and basin design; rain gardens and parking lot infiltration basins; soil specifications and profiles; planting design for microclimate control; and onsite soil testing, amendment, and development of planting media for various landscape typologies.

Research & Testing Track I Crystal K-L-M

10:00 – 10:30 a.m.

R71. *Field Assessment of a New Stormwater Antimicrobial System*

Rodolfo Manzone – *AbTech Industries, Scottsdale, AZ*

This presentation features empirical data from third-party testing organizations involved in experimental investigation of an antimicrobial treatment technology, SmartSponge. Alden Laboratories; NAMSA, a medical-device testing company; and California State University, Fullerton, developed empirical hydraulic information for the implementation of the technology in engineered applications, evaluated its hydraulic capacity, and performed other testing. Several hypothetical sizing examples are demonstrated. Based on the data, a sizing matrix for the specification of the SmartSponge was developed.

10:30 – 11:00 a.m.

R72. *What's Needed to Approve BMPs: A Case Study in Georgia*

Mark Risse – *University of Georgia, Athens, GA*

A case study highlights the need for standardized testing methods for erosion control technologies. The University of Georgia conducted testing on the SiltSaver belted strand retention fence to determine its suitability for use in Georgia, comparing it with traditional type C silt fence. ASTM standard methods were used to evaluate flow-through and sediment removal efficiency using three different site-specific soils; results are presented. Additional tests were conducted using variations of the ASTM standard; while these tests showed similar trends, they provided improved data over the ASTM test methods and were easier to implement. Testing also indicated that the design of the supporting apparatus was sufficient to withstand overtopping with water, although the material did not meet Georgia DOT requirements for tensile strength. Although no testing program can provide results to prove an application will function under all field conditions, testing indicates BSRF is an effective alternative to standard type C silt fence. The procedures used in the evaluation should benefit others looking for ways to evaluate materials consistently.

11:00 – 11:30 a.m.

R73. *Research on Stormwater Pollutant Removal Effectiveness of Compost Filter Socks*

Britt Faucette – *Filtrex International, Decatur, GA*

Recent experiments by the USDA Agricultural Research Service evaluated the performance of compost filter socks in reducing stormwater runoff flow transport of sediment and soluble pollutants, compared to traditional sediment control barriers like silt fence. Testing methods and results are presented. Results showed compost filter sock and silt fence removal efficiencies for TSS, total solids concentration, turbidity, and total and soluble phosphorous concentration and load were similar. When polymers were added to the compost filter socks, removal efficiencies increased for sediment and soluble phosphorous. The USDA-ARS has conducted follow-up studies involving removal of nitrogen, bacterial pathogens, and heavy metals, and these results are also presented.

Research & Testing Track II: 90-minute presentation Crystal N-P-Q

10:00 – 11:30 a.m.

R74. *Everything You Wanted to Know About Stormwater Media But Were Afraid to Ask: I. Adsorption and II. Filtration*

John Sansalone – *University of Florida, Gainesville, FL*

Media used for stormwater treatment can provide very different results for a constituent of interest—in this study, phosphorus and metals as either dissolved or particulate pollutants. This study compares the adsorption of six different common media. Results clearly illustrate that the understanding of adsorptive and filtration mechanisms and quantitative media performance are critical precursors for any media applications and success. In addition, the ability of a media to retain adsorbed pollutants between maintenance cycles is critical in stormwater systems. In other words, the pollutant should not be leached or desorbed from media under conditions that the media is subjected to in a stormwater BMP.

Media systems should not be applied without primary treatment or possibly secondary treatment that can be quantified, and that provides control and conditioning for media influent. Media applications without such upstream pretreatment have a long history of documented failure from the wastewater industry. For in-situ systems, this can be facilitated with engineered soil systems or in-situ systems accepting source-area runoff, for in-situ conditions such as paved areas that can combine LID and engineered media systems.

Ultimately, the knowledge of the hydrology (and creation of hydrologic restoration), treatment mechanisms for particles and phosphorus (or metals), and the interactions between hydrology and geochemistry and the maintenance cycle of such systems are critical to success or failure of these media systems. Results indicate that selected common stormwater media such as perlite have almost no adsorption capacity, while engineered media can have capacity that is literally hundreds to thousands of times greater than traditional media such as filter sand.

Stormwater Program Management Track

Crystal A-B-C

10:00 – 10:30 a.m.

P71. *Mitigation Not Litigation for Compliance*

J.P. Johns – *McGill Associates, Greenville, SC*
Jason Gillespie – *McGill Associates, Greenville, SC*

In 2006, attempting to bring a developer back into compliance for a water-quality violation, the Town of Highlands asked McGill Associates for assistance. McGill Associates approached the developer and offered mitigation assistance in lieu of excessive monetary penalties. In response to a notice of violation from the North Carolina Division of Water Quality, a stream restoration mitigation plan was developed. The design used techniques that were simple and understandable to a general contractor and that could easily be modified or refined in the field by the designer or contractor based on site conditions encountered during construction. It also incorporated materials that were readily available on site. Many options are available to a municipality to achieve corrective actions to problems identified during inspections, including non-traditional ones; in this case the town acted as the facilitator to gain compliance while allowing the state agency to act as the authoritative “heavy hand.” The site is now in compliance and has become a positive addition to the community.

10:30 – 11:00 a.m.

P72. *Fast-Tracking a Stormwater Management Program*

Dave Briglio – *MACTEC Engineering, Inc., Kennesaw, GA*

Kershaw County, SC, along with other regulated small MS4s, had to develop, implement, and enforce a stormwater management plan on a tight schedule or face penalties. MACTEC worked with the county to accomplish this within a 90-day time frame. Challenges included drafting a stormwater management ordinance; including a town into the program; and dealing with the fact that the county had no staff available to assign to the new program. A series of workshops including key county staff members were used to develop the program; conclusions of each workshop were summarized in technical memoranda, which were summarized to ensure all issues were addressed. The county successfully met the deadline and has retained MACTEC to execute the program until it can build its staff to an operational level.

11:00 – 11:30 a.m.

P73. *City of Los Angeles Water Quality Compliance Master Plan for Urban Runoff*

Reza Iranpour – *City of Los Angeles Water Protection Division, Los Angeles, CA*
Huub HJ Cox – *City of Los Angeles Watershed*

Protection Division, Los Angeles, CA
Richard Meyerhoff – CDM, Los Angeles, CA
Shahram Kharaghani – City of Los Angeles
Watershed Protection Division, Los Angeles, CA

An overview of the Los Angeles plan is presented, a high-level planning tool with strategic guidelines for urban runoff management to meet current and future water-quality standards and other regulatory mandates. Although the primary objective is attaining water-quality standards, urban runoff management interfaces with many other city policies, including groundwater recharge, sustainability, and green infrastructure. Development of initiative and recommended action items of the plan are described.

Thursday, August 7

12:30 – 2:00 a.m.

BMPs Track Crystal G1

12:30 – 1:00 p.m.

B81. A Regional Stormwater Treatment Approach: Regional Retrofitting Opportunities Study, Orange County, CA

Daniel Apt – RBF Consulting, Irvine, CA

Regional structural treatment controls are an important tool for compliance, but retrofit locations are often hard to come by in urban environments. A study in Orange County, CA, identified locations where regional stormwater treatment control retrofits were possible. The presentation explores approaches to identifying sufficient land close to existing drainage systems, including assessing existing flood control channels and adjacent infrastructure, using a GIS model to identify possible locations, and field reconnaissance.

1:00 – 1:30 p.m.

B82. Stormwater Retrofitting Strategies for Quality and Flood Protection in Martin County, FL

E. Scott Webber – Martin County Office of Water Quality, Stuart, FL
Gregory S. Nolte – Martin County Office of Water Quality, Stuart, FL

Before 1998, Martin County's Stormwater Program performed as-needed repairs to failing infrastructure and minimal maintenance of major drainage ways; 11,000 acres of the county had been developed without any water-quality treatment. A stormwater master plan identified 80 projects, and a capital improvement program was developed and funded through ad valorem taxes, opening the door for additional funding from federal and state grant and loan programs. Details and costs of many of the county's projects are presented.

1:30 – 2:00 p.m.

B83. Urban Stormwater Retrofits: A Case Study in a CSO Community

Thomas Fitzgerald – Wiley & Wilson, Inc.,
Lynchburg, VA

Case studies and performance data on seven years of urban stormwater retrofits in Lynchburg, VA, are presented. The projects are part of a long-term combined sewer overflow control program. Program criteria, implementation strategy, design procedures, construction management, and operational performance of extended detention facilities, vegetated swales, infiltration areas, subsurface detention, and in-pipe flow and pollutant management devices are presented. Work in infill and redevelopment areas includes BMP retrofits in high-density development that had lacked proper stormwater drainage.

LID Track Crystal G2

12:30 – 1:00 p.m.

L81. Bay Meadows Phase II: Integrated Urban Stormwater Management

Grant McInnes – Arup, San Francisco, CA
Rowan Roderick Jones – Arup, San Francisco, CA
Manish Dalia – Arup, San Francisco, CA

San Mateo, CA, has adopted stringent stormwater management guidelines based on state and local design manuals, but has not yet implemented these measures on a large scale. The Bay Meadows Phase II project will be a flagship project for the city, the first development to integrate low-impact development designs into the city's urban streetscape. Three levels of stormwater treatment are provided: a 1-acre wet pond that provides detention storage for a 100-year rainfall event and water-quality treatment for the entire 83-acre development, bioinfiltration planters integrated within the urban streetscape on major streets, and treatment within individual parcel blocks.

1:00 – 1:30 p.m.

L82. Higher Density: The Ultimate BMP

Randel Lemoine – Symbiotic Ventures LLC, Twin Lake, MI
John S. Jacob – Texas A&M University System, Houston, TX
Lisa Nisenson – Nisenson Consulting, Sarasota, FL

Impervious surfaces are a principal source of pollutants in urban runoff and the primary cause of downstream flooding and bank erosion; reducing them can be considered a best management practice. When analyzed from a neighborhood perspective of impervious area per land-use type (dwellings, parking spaces, commercial and office floor space), higher-density communities have less unit impervious area than lower-density ones, resulting in less runoff and less pollutant loading. If the units of community interaction found in a high-density community were dispersed over a larger low-density area, total impervious area could be a magnitude of 10 times greater. Municipal policies and zoning regulations are needed that recognize environmental benefits of and encourage high-density developments with a well-balanced mix of uses.

1:30 – 2:00 p.m.

L83. Application of Integrated Storm Water Techniques to Master Planned Communities

David Hunter – City of Denton Water Utilities Department, Denton, TX
Deborah Viera – City of Denton Water Utilities Department, Denton, TX

Master planned communities typically are large developments with long build-out periods; their size and scope presents challenges to local governments in protecting water quality during and after development. Denton, TX, is working with a planned \$850 million mixed-use development on 400 acres to mitigate potential stormwater impacts with integrated management practices, including bioretention areas and wetlands to promote removal of nutrients, solids, and heavy metals.

Research & Testing Track Crystal K-L-M

12:30 – 1:00 p.m.

R81. Particle Separation Modeling of a Hydrodynamic Separator

Jong-Yeop Kim – University of Florida, Gainesville, FL

Development of mathematical models for the performance of stormwater BMPs has been scarce, in part because the flow patterns of particles and liquids are so complex. For any model to have reliable results, a calibration and verification process is needed, but this is hard to achieve due to the lack of reliable data. Extensive field treatment test results are presented here for a range of hydrodynamic separators. The procedural methodology is presented to develop a particle separation efficiency model for HS systems using cumulative distribution functions and PSE databases generated by physical treatment field tests. This study demonstrates that the experimental results of particle separation efficiency for hydrodynamic separators as a function of particle size at each tested flow rate can be modeled using two-parameter cumulative gamma distribution for the overall unit. This developed PSE model provides continuous 3-D surface response with particle size and flow rate as the two independent variables. Modeled continuous performance curves follow the measured PSE points across the range of tested flow rates for a range of HS systems tested.

1:00 – 1:30 p.m.

R82. Hydrodynamic Heartache: What We Can Learn From a Decade of Performance Data

Derek Berg – Contech Stormwater Solutions, Scarborough, ME

Hydrodynamic separators' small footprint and performance claims of effective total suspended solids removal make them attractive options. However, some field studies have called into question their effectiveness for TSS removal.

A comprehensive review of independent field monitoring studies concluded that in-field performance often falls short of regulatory targets. Reducing operating rates is a logical means of improving system performance, but investigation of hydrodynamic separators installed in three unique geographies demonstrates that the operating rate per unit area treated has increased in recent years, likely driven by competitive pressure and loosely defined sizing criteria. We must reconsider how hydrodynamic systems are sized and where they fit in the stormwater toolbox. Reliance on them for end-of-pipe treatment should be discouraged and consistent sizing criteria applied. Sized appropriately, they effectively capture coarse solids, trash, debris, and oil, suiting them for the first component of a treatment train.

1:30 – 2:00 p.m.

R83. Calculating Headloss in Manufactured Stormwater BMPs

Greg Williams – Monteco Research & Development, Mississauga, ON

Jim Mailloux – Alden Research Laboratory, Holden, MA

Chris Murray – Monteco Research & Development, Mississauga, ON

Calculation of energy grade line and hydraulic grade line is critical to proper design and analysis of stormwater drainage systems. Determining these values within a system requires knowledge of the various losses created by pipes, bends, and access structures. This study's goal is to provide designers with information to assess the effect of manufactured BMPs on headloss in piping systems. A headloss coefficient calculated from the data can be used as a standard technique for determining headloss for any device, allowing the BMP to be treated similarly to any other element in the piping system.

Stormwater Program Management Track Crystal A-B-C

12:30 – 1:00 p.m.

P81. S.L.A.P.: An Innovative Approach to Illicit Discharge Detection and Elimination Management

Mounir Minkara – City of Chattanooga, TN
Rebecca Robinson, City of Chattanooga, TN

Chattanooga, TN, developed the Sewer Lateral Assessment Program (S.L.A.P.) to identify and mitigate pathogen sources within urban watersheds. The multifaceted approach involves testing and repair of public and private sewer lines, beginning with smoke testing of the lines; public involvement; and water-quality monitoring. S.L.A.P. also provides funding to qualified homeowners to replace private service laterals discovered to be defective during smoke testing. Surface-water sampling and optical brightener analysis are conducted to gauge the program's

effectiveness and guide investigators to potential sources of illicit discharge. S.L.A.P. not only identifies pathogen sources but also provides a mechanism by which private residents can actively improve water quality.

1:00 – 1:30 p.m.

P82. Lessons From the Field: Illicit Discharge Detection in Municipal Separate Storm Sewer Systems, From Discovery to Removal

Scott Reynolds – Tetra Tech, Inc., Lansing, MI
Daniel Christian – Tetra Tech, Inc., Lansing, MI

Lessons learned from more than 16 years of an illicit discharge detection program are presented, including an overview of the process: field crews walk the open storm drains, inventorying and examining municipal and private outfalls and collecting samples for laboratory analysis. In 2006, a special tool was added to help field crews: Sable, a 15-month-old German Shepherd mix, was trained to help locate illicit connections to storm sewer systems. Based on common connections found during previous investigations, Sable was initially trained to locate typical residential sewage and surfactants. In his first year, Sable investigated more than 100 outfalls, manholes, and catch basins. The ability to pre-screen dry-weather flows with a detection canine reduces the need for return visits and multiple sampling.

1:30 – 2:00 p.m.

P83. IDDE Case Study: Success Stories

Rick Fuller – City of Tacoma, WA

Tacoma, WA's Illicit Discharge Detection and Elimination (IDDE) Program has been under development for 10 years, applying innovative and cost-effective techniques to investigate, isolate, and eliminate sources of stormwater pollution. Case studies are used to illustrate the program's techniques, including a case of a storage tank discharging diesel to Superfund waters and a grease-trap-cleaning company that was discharging its disposal load into the storm conveyance system. Laboratory results and legal actions necessary to bring about change are included.

Water-Quality Monitoring Track Crystal N-P-Q

12:30 – 1:00 p.m.

Q81. Using Monitoring Data, Modeling Approaches, and Cost-Based Management Scenarios to Create a Municipal Watershed Protection Plan for Hickory Creek

Kenneth Banks – City of Denton, TX

During land development, municipal watershed managers must balance protecting environmental

resources with facilitating development. It can be difficult to express the benefits of watershed management goals in a way easily understood by municipal decision makers. The rapidly growing city of Denton, TX, has for several years monitored surface-water loadings of various contaminants of concern and has created a watershed protection plan for the Hickory Creek Watershed. The plan calls for evaluating and prioritizing sub-watersheds, then evaluating management strategies for their potential to reduce pollutant loadings versus overall cost. Information can be used to estimate the most cost-effective approaches, determining how much pollutant loads can be reduced per dollar spent, targeting areas of the watershed for management efforts, and examining how water-quality credits can be traded within large developments.

1:00 – 1:30 p.m.

Q82. Large MS4 Monitoring: A Watershed Approach

John Hart – Malcolm Pirnie, Fort Worth, TX

Using a watershed monitoring approach can provide better data than outfall monitoring regarding the quality of stormwater discharging from MS4s within the watershed. Outfall-based monitoring programs capture water-quality data in a hit-and-miss fashion and provide only an indication of what can be expected from a particular land use type. Watershed monitoring protocols for determining event mean concentration are discussed, including sampling approach, collection, and analysis.

1:30 – 2:00 p.m.

Q83. Stormwater Monitoring Efforts and Results From the North Central Texas Regional Stormwater Quality Monitoring Program

Jason Maldonado – PBS&J, Houston, TX

Keith Kennedy – North Central Texas Council of Governments, Arlington, TX

Members of the North Central Texas Council of Governments have established a Regional Storm Water Management Coordinating Council composed of MS4 operators. The council oversees cooperatively funded regional activities to support MS4 programs in the Dallas-Fort Worth area, including a regional monitoring program. The programs' goal is to establish baseline data on wet-weather flows in receiving streams to determine long-term water-quality trends, define BMP criteria, and evaluate BMP effectiveness. Grab and composite samples are collected from small tributary stream sites across the area. The program differs from traditional MS4 monitoring, in which each MS4 operator characterizes runoff from stormwater samples taken at outfalls of single land-use watersheds, in that it aims to characterize wet-weather flows from in-stream monitoring sites of larger, mixed land-use watersheds. Current baseline data are presented.

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Exhibit Hall Layout



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Sunday, August 3, Review Course, 8:30 a.m. – 4:30 p.m.
Monday, August 4, Exam, 8:30 a.m. – 1:30 p.m.
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Sunday, August 3, 8:30 a.m. – 4:30 p.m. (Part 1)
Monday, August 4, 8:30 a.m. – 4:30 p.m. (Part 2)
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Low-Impact Development: Introduction, Applications, and Technical Implementation

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Monday, August 4, 8:30 a.m. – 4:30 p.m.
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BMP Selection, Inspection, and Maintenance

Monday, August 4, 8:30 a.m. – 4:30 p.m.
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EPA Presents Post-Construction, LID, and Smart Growth as Stormwater BMPs

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Full Conference Package (2.5 days): Tuesday, August 5; Wednesday, August 6; and Thursday, August 7, 2008

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Speaker/Sponsor/Exhibitor \$395.00

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