



Stormwater Symposium 2012

July 18 – 20, 2012
Sheraton Baltimore City Center
Baltimore, Maryland, USA



This conference is held by the Water Environment Federation in cooperation with Chesapeake Water Environment Association, American Rivers, and Water Environment Research Foundation.

July 18, 2012

Dear Colleague,

On behalf of the Chesapeake Water Environment Association and the Water Environment Federation, we would like to welcome you to Baltimore and the Inaugural Stormwater Symposium.

This Symposium reflects the growing importance of stormwater in our profession's continuing focus on improving water quality in our nation's waters. In this, the 40th Anniversary of the Clean Water Act, we find ourselves facing new challenges in advancing the state-of-the-art of water quality protection and improvement. This Symposium has been developed with our vision to expand the focus of the event to communicate the importance of stormwater management as part of the integrated water environment and the value of stormwater management approaches in the 21st Century Infrastructure systems. As you review the Symposium's program, you will see an impressive listing of workshops and technical presentations that address the wide range of topics associated with stormwater management – topics that range from regulatory initiatives and drivers to success stories of where communities and utilities have successfully implemented 21st Century stormwater Infrastructure systems and programs. We are certain you will come away with an increased understanding of innovative and cost-effective approaches to manage stormwater that will enhance the natural and built environment.

While you are here in "Charm City" please take advantage of this wonderful location. The Inner Harbor is only blocks away and during the summer there is usually something going on every day. Camden Yards, home of the Baltimore Orioles, is within walking distance (unfortunately, the O's are out of town during the Symposium). In addition, you simply MUST partake in Maryland's delicacy – Blue Crab. Whether it be steamed crabs or crab cakes, a trip to Baltimore isn't complete without Blue Crab!!

Enjoy your stay in Baltimore and Thank you for participating in this inaugural event.

Wing Tam and Larry Jaworski
Conference Co-Chairs

REDUCE YOUR CARBON FOOTPRINT IN BALTIMORE



Supporting WEF's ongoing mission to support sustainable programming, we would like to ask conference attendees to please consider their carbon footprint as you travel to, stay in, and depart from Baltimore and WEF's Stormwater Symposium.

It's no surprise that Baltimore was ranked as the 10th most sustainable city by *Sustainlane* in 2008. Recent statewide and city initiatives show a government commitment to making the city Cleaner and Greener!

Consider alternative transportation:

The backbone of any great city is transportation. That's why Baltimore has introduced the Charm City Circulator (CCC), a fleet of 21 free shuttles that travel three routes in Baltimore City.

The CCC services residents, downtown employees, students and tourists and anyone else who wishes to ride. The shuttle is intended to reduce congestion and greenhouse gas pollution by offering a convenient, reliable and eco-friendly form of public transportation. So rather than a taxi after attending a full day of technical sessions enjoy a free ride downtown on CCC!

Dine at local farm-to-table restaurants:

Take a vibrant city, an active farmers' market scene and an abundance of seafood from the Chesapeake Bay. Add a heaping helping of adventurous, talented chefs who know exactly what to do with the region's bounty, and you've got Downtown Baltimore: a foodie nirvana with excellent farm-to-table dining options. Celebrate the summer harvest by experiencing farm-to-table dishes at many Downtown Restaurants. This guide offers a selection of restaurants where you can sample Maryland's freshest flavors at every meal.

Aldo's Ristorante Italiano

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www.aldositaly.com/

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(410) 545-5112
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TABLE OF CONTENTS

Reduce your Carbon Footprint in Baltimore.....	2
Federation Officers and Staff	4
Conference Committee	5
Registration.....	7
Speaker and Moderator Information	7
Reception and Meal Functions	8
Continuing Education.....	9
Proceedings	9
Sponsorship Information	10
Technical Tour	11
Workshops	12
Opening General Session.....	14
Technical Program.....	15
Speaker and Moderator Directory.....	40
Upcoming Education and Training Events.....	44
Sessions At-A-Glance.....	45

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REGISTRATION

All events are held in the Sheraton Baltimore City Center.

The Registration Desk is located in the **Promenade Area** and will be open at the following times:

Hours:

Wednesday, July 18	7:00am – 5:00pm
Thursday, July 19	7:00am – 5:00pm
Friday, July 20	7:00am – 5:00pm

SPEAKER AND MODERATOR INFORMATION

All session speakers, moderators and assistant moderators are required to sign in at the Registration Desk.

Speaker/Moderator/Assistant Moderator Breakfast – International DF

All speakers must attend the speaker breakfast. If you are unable to attend, please notify your session moderator.

Speakers, moderators and assistant moderators shall attend the breakfast briefing. A light breakfast will be provided as part of the briefing. The Speaker Breakfast schedule is as follows:

<u>Thursday July 19</u>	7:00am – 8:00am
*Sessions 1 through 25	

NETWORKING BREAKS

Networking Breaks – Promenade Area

The Networking Breaks will be held:

Thursday, July 19
9:30am – 9:45am and 3:15pm – 3:30pm

Friday, July 20
9:30am – 9:45am and 3:15pm – 3:30pm

RECEPTION AND MEAL FUNCTIONS

Networking Reception – Liberty AB

The Networking Reception will be held in Liberty AB. It is your opportunity to renew acquaintances, and make new contacts.

Thursday, July 19
5:00pm - 6:30pm

Sponsored by **Malcolm Pirnie, the Water Division of ARCADIS**

Luncheon – International DF

Lunch will be complimented by two engaging presentations from Dr. Bob Summers, Secretary of the Maryland Department of the Environment. Dr. Summers will discuss various stormwater-related issues facing stormwater professionals in Maryland and other Chesapeake Bay states. Our other presentation from Shamar Bibbins, Senior Political Associate at Green for All, will discuss the relationship between green infrastructure and green jobs. This topic is the focus of a report titled “Water Works: Rebuilding Infrastructure, Creating Jobs, Greening the Environment”, which was released last year by Green For All.

Lunch will be provided for all full conference and daily registrants. Please advise us as soon as possible if you have any special dietary requirements. The luncheon will be held:

Thursday, July 19
12:15pm - 1:45pm

Sponsored by **Straughan Environmental**

New York City Water Protection Ticketed Breakfast – Hopkins

Tickets for this event are available at the registration desk for \$35

Friday, July 20
7:00am – 7:45am

Join us the morning of Friday, July 20th for an interesting overview of the multifaceted long-term Watershed Protection Program the City of New York has developed to enhance and maintain water quality in its three upstate watersheds; the Catskill, Delaware and Croton.

CONTINUING EDUCATION

EDUCATION CREDITS

Participants who attend the conference and accurately document their participation will be issued continuing education credits. For technical sessions WEF will award Professional Development Hours (PDHs) at a rate of 1.0 PDH for every hour of participation. For workshops, WEF will award Continuing Education Units (CEUs) at a rate of 1.0 CEU for 10 hours of participation. Please note that conference attendees are responsible for exploring continuing education requirements in their state to ensure that WEF credits are accepted by the appropriate authority.

To receive the certificate, attendees must be mindful of the following:

- Receive a signed initial from a room monitor at each session you attend. Each room monitor will check the appropriate boxes on the form when you enter and leave from a session room;
- Return CEU/PDH form to staff at the conclusion of the conference;
- Have ID (Photo ID required) verified at Registration Desk;
- Request for CEU/PDH form signed by staff.

The certificates will be mailed 8-10 weeks after the conclusion of the conference.

PROCEEDINGS

Conference proceedings, consisting of manuscripts for each presentation, are now produced on USB drives. Full conference and daily registrants will receive the proceedings at the registration desk at the time of badge pickup or onsite registration.

Copies of proceedings may be ordered after the conference at the member rate of \$75 USD; nonmember rate of \$115 USD, plus shipping and handling. All orders will be processed immediately after conclusion of the conference. You may call 1-800-666-0206. Ask for Stock Number CPSW 1207.

SPONSORSHIP INFORMATION

We would like to thank the following sponsoring companies for their contributions to the symposium and program.



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The Water Division of ARCADIS

www.arcadis-us.com

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Thursday Luncheon

TOUR

Tour tickets are available for this event at \$35, which can be purchased at the registration desk.

Tour: Behind the Scenes at the National Aquarium in Baltimore

Wednesday, July 18

4:00pm – 6:30pm

2.5 Contact Hours

Please note: The bus will begin to load at 3:50pm. Participants will meet in the main lobby area near the registration desk for loading and drop off. The bus will depart promptly at 4:00pm.

The start of the tour will include a technical lecture by Andy Aiken, an environment engineer specializing in design and operation of aquatic life support systems in zoos and public aquaria. Mr. Aiken will lecture on how aquatic life support systems differ from industrial, municipal and domestic water treatment systems. He and his staff will then lead a tour of the aquarium's life support systems which process more than 24 million gallons a day. Processes utilized include sand filtration for particulate removal and nitrification, foam fractionation for DOC reduction and disinfection, autotrophic sulfur-based denitrification, ozone contact for disinfection & TOC reduction, gas exchange for CO₂ removal, reverse osmosis and CO₂ injection for alkalinity and pH reduction, among others.



WORKSHOP A

Workshop A: Methods To Meet New Construction Site Stormwater Quality Requirements

Wednesday, July 18
8:00am – 5:00pm

Room: International A
0.6 CEUs

- 8:00am Introduction**
Purpose of course, environmental issues, advanced BMPs for sediment control.
- 8:15am Polymers: Relevant Chemistry and Applications for Water Quality**
Basic polyacrylamide chemistry, others (e.g. polyDAC, chitosan), applications in water treatment, reactions with constituents (clay, organic matter), sediment chemistry effects.
- 9:00am Erosion Control Enhancement with PAM**
How PAM can help with erosion control with different products, including straw, blankets, and hydromulch. What rates to use and methods of application.
- 10:00am Break**
- 10:30am Toxicology 101: Determining Risks and Benefits of Turbidity Controls**
Key elements of real and perceived risks of chemical flocculation relative to suspended sediment and turbidity. Getting comfortable with chemical treatments.
- 11:00am Testing Soils and Sediment**
We will bring example soils for the class to conduct jar tests of different polymers. Do not bring your own soil – it is illegal to transport soil across state lines because of the chance of transporting diseases or insects along with the soil. Our soils will be sterilized prior to transport.
- 12:00pm Lunch**
- 1:00pm Passive Dosing Approaches for PAM**
How to adjust and combine different products with PAM to get the flocculation you need. Wattles, pipes, powder, logs, and more!
- 2:00pm Active Dosing Systems**
Pumped water can be treated in many different ways, from simple and inexpensive to portable water treatment plants.
- 2:30pm Calculations:**
Basic conversions and units, Passive Dosing Calculations, Active Dosing Calculations.
- 3:00pm Break**
- 3:30pm Group Work:**
Design Plans for Construction Sites, Cost Estimation, Presentation of Plans
- 5:00pm Adjourn**

WORKSHOP C

Workshop C: Making Green Infrastructure More Sustainable With Envision, the Sustainable Infrastructure Rating System

Wednesday, July 18
1:30pm – 5:00pm

Room: International C
0.3 CEUs

- 1:30pm** **Green Infrastructure**
Denise Nelson, *Greeley and Hansen*
- 1:55pm** **Introduction to the Institute for Sustainable Infrastructure and Envision**
Bill Wallace, *Wallace Futures Group, LLC*
- 2:25pm** **Life Cycle Analysis for Low Impact Development**
Rob Traver, *Villanova University*; Kevin Flynn, *AKRF*
- 2:50pm** **Q&A,**
Denise Nelson, *Greeley and Hansen*
- 3:00pm** **Break**
- 3:30pm** **Envision – Social and Economic Credits**
Peter Binney, *Merrick & Company*
- 3:55pm** **Envision– Environmental Credits**
Donal Barron, John Lenti, *Greeley and Hansen*
- 4:20pm** **Project Considerations**
Denise Nelson, *Greeley and Hansen*
- 4:30pm** **Agency Considerations**
Jeff DuVal, *Alexandria Renew Enterprises*
- 4:45pm** **Q&A and Closing**
Denise Nelson, *Greeley and Hansen*
- 5:00pm** **Adjourn**

OPENING GENERAL SESSION

Thursday, July 19
8:00am - 9:30am

Room: International BC
1.5 PDHs

- 8:00am Welcome Remarks
Larry Jaworski, Wing Tam, Conference Co-Chairs
- 8:05am CWEA Welcome
Ted DeBoda, *CWEA President*
- 8:10am Matt Bond, *WEF President*
- 8:15am Official Speaker (*Invited*)
- 8:30am Nancy Stoner, *Environmental Protection Agency*
- 8:45am Al Foxx, *Director of DPW, City of Baltimore*
- 8:50am Panel Discussion
- Larry Jaworski, *Brown and Caldwell*
 - Robert Traver, *Villanova University*
 - Kim Burgess, *City of Baltimore*

TECHNICAL PROGRAM

Session 01: Stormwater Design: What's Current?

Thursday, July 19
9:45am - 11:15am

Room: International A
1.5 PDHs

Moderators: Timothy Hare, *CH2M HILL*
Patti Jones, *K. Bealer Consulting, Inc.*

- 1A 9:45am The State of the Practice in Stormwater Design: A Guide to the 2012 WEF/ASCE Manual of Practice for Design of Urban Stormwater Controls**
D. Medina, ATKINS; C. Pomeroy, University of Utah; J. Aldrich, CDM Smith; R. Pitt, University of Alabama; S. Clark, Pennsylvania State University; S. Apfelbaum, Applied Ecological Services, Inc.; W. Frost, KCI Technologies, Inc.; G. Minton, Resource Planning Associates; V. Roach, CDM Smith; T. Ballestero, University of New Hampshire; M. Barrett, University of Texas; A. Tyagi, CH2M HILL; L. Regenmorter, CDM Smith; C. Jones, URS; S. Rangarajan, New York City Department of Environmental Protection
- 1B 10:15am Costs and Benefits of Green Infrastructure Compared to Conventional Design**
D. Christian, Tetra Tech; L. Hair, R. Goo, US Environmental Protection Agency; J. Kosco, A. Thomas, V. Novaes, Tetra Tech
- 1C 10:45am Optimizing Bioretention Media to Treat Emerging Contaminants**
S. E. Clark, Penn State Harrisburg; R. Pitt, University of Alabama
- 11:15am Session Adjourns**
- Alternate Providing Municipal Separate Storm Sewer Systems in the Chesapeake Bay Watershed With Access to Water Quality Trading Programs**
E. Branosky, J. Talberth, C. Jones, E. Gray, World Resources Institute

TECHNICAL PROGRAM

Session 02: Green Urban Case Studies

Thursday, July 19
9:45am - 11:15am

Room: International B
1.5 PDHs

Moderators: Sriniv Vallabhaneni, *CDM Smith*
Paul Costa, *RJN Group*

- 2A 9:45am Not So Strange Bedfellows: The Role of Stormwater in the Franklin, Tennessee Integrated Water Resources Plan**
D. Mason, CDM Smith
- 2B 10:15am Core Elements of Green Infrastructure Programs for CSO Control**
C. Hufnagel, Tetra Tech; S. Struck, Geosyntec
- 2C 10:45am Cost Effective LID Design and Construction for a Large Scale Commercial Development in Greenland, New Hampshire**
B. Potvin, A. Turner, Tetra Tech; R. Roseen, T. Ballesterro, J. Houle, University of New Hampshire
- 11:15am Session Adjourns**

TECHNICAL PROGRAM

Session 03: Stormwater Controls

Thursday, July 19
9:45am - 11:15am

Room: International C
1.5 PDHs

Moderator: Karthik R. Manchala, *ATKINS*

- 3A 9:45am Urban Stormwater BMP Performance and Cost-Effectiveness**
M. Baker, M. Doneux, Capitol Region Watershed District
- 3B 10:15am New Bioretention Filter Media Modified With Metal-Silica Hybrid Materials for Enhanced Remediation of Stormwater Runoff Pollutants**
H. Yang, ABS Materials, Inc.; Z. Harvey, The College of Wooster; P.L. Edmiston, ABS Materials, Inc. & The College of Wooster
- 3C 10:45am Monitoring Performance of Green Infrastructure Source Controls in New York City**
J. McLaughlin, New York City Department of Environmental Protection; S. Mehrotra, Hazen and Sawyer; W. Leo, HDR-HydroQual; M. Jones, Hazen and Sawyer
- 11:15am Session Adjourns**
- Alternate Metals Removal Performance by Three Proprietary Technologies for Stormwater From Boatyard Maintenance Facilities**
C. Milesi, D. Metallo, W. Taylor, Cardno TEC Inc.

TECHNICAL PROGRAM

Session 4: Stormwater Regulations and Restoration of the Chesapeake Bay: Walk a Mile in My Shoes

**Thursday, July 19
11:15am - 12:00pm**

**Room: International A
0.75PDH**

Moderators: Dan Medina, *ATKINS*

Stormwater retrofits are a major component of the latest stormwater regulations in urbanized areas of the Chesapeake Bay. Regulators tout the new regulations as indispensable to meet the Bay TMDLs. Facing staggering price tags in the billions of dollars, the regulated community seeks cost-effective approaches and assurances that they will help restore the Bay. In this session, panelists from regulated municipalities and regulatory agencies switch sides and share new insights on how to get the job done.

This panel discussion brings together regulators and regulated municipalities in a lively discussion of shared problem-solving. Each side will take a walk in the other side's shoes. Regulators will provide their insights into how, if they were a county agency, they might comply with TMDL rules. Directors from regulated municipalities will provide their approach, if they were a regulator, on how they might manage TMDLs in stormwater discharges to improve water quality. The discussion will include the lessons learned from Florida, arguably the most successful state program for TMDL implementation, the science behind nutrient removal, challenges in implementing projects, creative synergies among water sector agencies, and how to measure improvements.

Panelist Include:

Dave Tomasko, *ATKINS*

Jay Sakai, *Maryland Dept. of the Environment*

David Johnson, *Virginia Dept. of Conservation and Recreation*

Ron Bowen, *Public Works, Anne Arundel County*

Randy Bartlett, *Public Works, Fairfax County*

Luncheon – International DF

Please join us for the luncheon held in International DF from 12:15pm – 1:45pm.

TECHNICAL PROGRAM

Session 05: Road to Clean Water

Thursday, July 19
11:15am - 12:00pm

Room: International B
1.0 PDH

Moderator: Robin Kirschbaum, *HDR | HydroQual*

5A 11:30am District of Columbia Department of Public Works Street Sweeping Program Evaluation

H. Clemm, District of Columbia Department of Public Works; E. Janifer, Malcolm Pirnie, the Water Division of ARCADIS

5B 11:50am Removal of Heavy Metals From Urban Stormwater Using Pervious Concrete

A. Weidner, A. Kney, Lafayette College; M. Suleiman, Lehigh University; D. Ridinger, Lafayette College

12:00pm Session Adjourns

Luncheon – International DF

Please join us for the luncheon held in International DF from 12:15pm – 1:45pm.

TECHNICAL PROGRAM

Session 06: Cutting-Edge Research

Thursday, July 19
1:45pm - 3:15pm

Room: International A
1.5 PDHs

Moderators: Lisa Jeffrey, *Brown & Caldwell*

- 6A 1:45pm **Grey vs. Green Infrastructure Evaluation: What Is the Most Cost Effective Solution?**
A. Hutton, Malcolm Pirnie, the Water Division of ARCADIS
- 6B 2:15pm **Nutrient Removal Performance of Advanced Bioretention Systems: Results From Three Years of Mesocosm Studies**
W. Lucas, M. Greenway, Griffith University
- 6C 2:45pm **Soil Moisture Balance in Bioretention Systems**
B.M. Wadzuk, R.G. Traver, Villanova University
- 3:15pm **Session Adjourns**

TECHNICAL PROGRAM

Session 07: Stormwater Data

Thursday, July 19
1:45pm - 3:15pm

Room: International B
1.5 PDHs

Moderators: James A. Bachhuber, *AECOM*
Angel Luke, *Teledyne Isco*

- 7A 1:45pm Laboratory and Field Studies of Soil Characteristics of Proposed Stormwater Bioinfiltration Sites**
R. Sileshi, R. Pitt, *University of Alabama*, S. Clark, *Penn State Harrisburg*;
C. Christian, *City of Tuscaloosa, AL*
- 7B 2:15pm Improving Upon Decades of Poor-Quality Solids Data in Urban Stormwater Through Use of an Automated Depth-integration Sample Collection System**
W. Selbig, *USGS - Wisconsin Water Science Center*, R. Bannerman,
Wisconsin Department of Natural Resources
- 7C 2:45pm Ultra-Urban Baseflow and Stormflow Concentrations and Fluxes in a Watershed Undergoing Restoration (WS263)**
K. Belt, *USDA Forest Service*; W. Stack, *Center for Watershed Protection*; R. Pouyat, *USDA Forest Service*; K. Burgess, *Baltimore City DPW*; P. Groffman, *Cary Institute of Ecosystem Studies*; W. Frost, *KCI Technologies, Inc.*; S. Kaushal, *University of Maryland*
- 3:15pm Session Adjourns**

TECHNICAL PROGRAM

Session 08: Area Low Impact Development (LID)

Thursday, July 19
1:45pm - 3:15pm

Room: International C
1.5 PDHs

Moderator: Eric Harold, *Malcolm Pirnie, the Water Division of ARCADIS*

- 8A 1:45pm Birch Bay Watershed Action Plan: Linking Low Impact Development With Improved Critical Areas Management**
D. Atchison, CH2M HILL; P. Gill, Whatcom Co.; M. Clancy, A. Merrill, ESA
- 8B 2:15pm Integrated Watershed Restoration To Achieve Local and Chesapeake Bay Wasteload Allocations**
T. Brown, Biohabitats, Inc.; M. Curtis, Montgomery County Department of Environmental Protection
- 8C 2:45pm Advanced 2-D Modeling for Flood Reduction Studies and Storm Drain Master Planning**
C. Diaz, R. Jorgensen, GHD
- 3:15pm Session Adjourns**

TECHNICAL PROGRAM

Session 09: Public Outreach

Thursday, July 19
3:30pm - 5:00pm

Room: International A
1.5 PDHs

Moderator: Grace A. LeRose, *City of Richmond DPU*

- 9A 3:30pm Green Up DC – DC’s Web Site for Stormwater, Energy and Solar Evaluations by Property Owners**
J. Guillaume, *District of Columbia Department of the Environment*,
B. Taylor, *CRITIGEN*; L. van der Tak, *S. Stoppenhagen, CH2M HILL*
- 9B 4:00pm Right-sizing a LID Rebate Program for a Small Jurisdiction**
S. Philbin, *City of Rockville, MD*
- 9C 4:30pm Synergy in Public Communication or How Stray Dogs, Invasive Species and 8th Graders Can Improve Your Outreach Efforts**
G. Stokes, J. Minor, *City of Richmond Department of Public Utilities*
- 5:00pm Session Adjourns**

Networking Reception – Liberty AB

Immediately following the conclusion of this session, please join us for the Networking Reception held in Liberty AB from 5:00pm – 6:30pm.

TECHNICAL PROGRAM

Session 10: Storm Statistics

Thursday, July 19
3:30pm - 5:00pm

Room: International B
1.5 PDHs

Moderator: Paul Costa, *RJN Group*

- 10A 3:30pm Stormwater Control Measure Implementation Guidance and Tracking Tool**
M. Jones, Hazen and Sawyer
- 10B 4:00pm Detecting Illicit Connection to Stormwater: A Primer on Statistics and Fecal Indicators**
D. Markowitz, K. Hogan, Malcolm Pirnie the Water Division of ARCADIS
- 10C 4:30pm Gauge Adjusted Rainfall information From Baltimore County for Real-time Forecast of Hurricane Rainfall**
G. Jacquet, RHEA; J. Plymale, RJN Group, Inc.; P. Stevens, ADS Environmental Services
- 5:00pm Session Adjourns**

Alternate Integrating Stormwater Runoff Quantity and Quality Requirements in a Coastal County
B. Wagner, CDM Smith; R. Klink, D. Ahern, Beaufort County Public Works

Networking Reception – Liberty AB

Immediately following the conclusion of this session, please join us for the Networking Reception held in Liberty AB from 5:00pm – 6:30pm.

TECHNICAL PROGRAM

Session 11: MS4 Permitting and Codes

Thursday, July 19
3:30pm - 5:00pm

Room: International C
1.5 PDHs

Moderators: Paul Hlavinka, *MDE*
Mark Charles, *City of Rockville, MD*

- 11A 3:30pm Cost-Effective Compliance With Stormwater Regulations: How Optimization Can Help**
T. Saravanapavan, G. Zhang, *Tetra Tech*; M. Voorhees, *U.S. Environmental Protection Agency Region I*; A. Parker, *Tetra Tech*
- 11B 4:00pm Major Developments in MS4 Permitting: The Chesapeake Bay Watershed Experience**
C. Pomeroy, P. Calamita, L. Ochsenhirt, *AquaLaw PLC*
- 11C 4:30pm National Overview of the Municipal Separate Storm Sewer System (MS4) Program: Status and Progress**
H. Galavotti, R. Herbert, *U.S. Environmental Protection Agency*; J. Pittman, C. Montague-Breakwell, *ORISE Fellows, EPA*; J. Kosco, M. Frey, *Tetra Tech*
- 5:00pm Session Adjourns**

Networking Reception – Liberty AB

Immediately following the conclusion of this session, please join us for the Networking Reception held in Liberty AB from 5:00pm – 6:30pm.

TECHNICAL PROGRAM

Session 12: MS4 - No Rubber Stamps Here

Friday, July 20
8:00am - 9:30am

Room: International A
1.5 PDHs

Moderators: Fernando Pasquel, *Michael Baker Jr. Inc.*

- 12A 8:00am Making Green Infrastructure Greener: Sustainability Rating for the Design and Construction of Stormwater Infrastructure**
D. Nelson, Greeley and Hansen
- 12B 8:30am Numeric Action Levels: The New Driver for Stormwater Programs in Southern California**
K. Ashby, Larry Walker Associates; R. Boon, County of Orange, CA
- 12C 9:00am The Challenge of Documenting the Effectiveness of MS4 Programs: Moving Toward Quantifying Pollutant Load Reduction From the MS4 Program**
H. Galavotti, U.S. Environmental Protection Agency; J. Kosco, Tetra Tech
- 9:30am Session Adjourns**

Alternate The Next Generation Permit
C. Sotelo, State Water Resources Control Board

TECHNICAL PROGRAM

Session 13: Get the Public Involved

Friday, July 20
8:00am - 9:30am

Room: International B
1.5 PDHs

Moderator: Mark Charles, *City of Rockville, MD*

- 13A 8:00am **Using Customized GIS Tools to Support a Diverse Stakeholder Group in Regional Watershed Improvement Planning**
S. Ciavola, R. Gordon, *AECOM*; T. Aspinwall, *USACE*
- 13B 8:30am **Maintenance Matters: How Montgomery County Is Improving Stormwater Facility Maintenance Through Public Outreach**
M. B. Hess, *URS Corporation*; C. Ciarametaro, A. Stevens, *Montgomery County Department of Environmental Protection*
- 13C 9:00am **Stop the Rain Drain: Community Outreach To Promote Downspout Redirection in Urban Neighborhoods**
E. Beckman, K. McCarthy, *Capitol Region Watershed District*
- 9:30am **Session Adjourns**

TECHNICAL PROGRAM

Session 14: Funding Issues

Friday, July 20
8:00am - 9:30am

Room: International C
1.5 PDHs

Moderator: Julie Moore, *Stone Environmental, Inc.*

- 14A 8:00am **Jackson, Michigan Stormwater Utility: Addressing Michigan's Stormwater Utility User Fee Requirements**
V. Cooperwasser, Tetra Tech
- 14B 8:30am **Why Would Anyone Try To Create a Stormwater Utility in the Midst of a Recession? A Case Study in Salem, Oregon**
R. Chandler, City of Salem, Oregon
- 14C 9:00am **Building the Basis for Sustainable Stormwater Financing: A User Fee Discussion Prequel**
Z. Henderson, Woodard & Curran; E. Eckl, WaterWords thatWork, LLC
- 9:30am **Session Adjourns**

Alternate **Stormwater Utility Districts: A Case Study From Western New York**
S. Rybarczyk, Wendel Companies; E. Eckl, Water Words That Work, LLC

TECHNICAL PROGRAM

Session 15: More Cutting-Edge Research

Friday, July 20
9:45am - 11:15am

Room: International A
1.5 PDHs

Moderators: Brett Emmons, *Emmons & Olivier Resources*
Lisa Franke, *JMT*

- 15A 9:45am A Bioretention and Rainwater Harvesting Demonstration Project at Gwinnett County Department of Water Resources' Central Facility, Lawrenceville, Georgia**
A. Narayanan, Brown and Caldwell; C. Graham, Gwinnett County Department of Water Resources; J. Herr, Brown and Caldwell; P. Wright, Gwinnett County Department of Water Resources; L. Hawks, Brown and Caldwell
- 15B 10:15am Deicing Salts' Effects on Engineered Bioretention Soils**
S. Kakuturu, S. Clark, Penn State Harrisburg
- 15C 10:45am Stormwater Reuse Opportunities and Effects on Urban Infrastructure Management; Review of Practices and Proposal of WinSLAMM Modeling**
L. Talebi, R. Pitt, University of Alabama; S. Clark, Penn State Harrisburg
- 11:15am Session Adjourns**

TECHNICAL PROGRAM

Session 16: Examining the Cost of Green

Friday, July 20
9:45am - 11:15am

Room: International B
1.5 PDHs

Moderators: Brian G. Marengo, *CH2M HILL*
Christopher Tabor, *Hazen and Sawyer*

- | | | |
|------------|----------------|--|
| 16A | 9:45am | A Detailed Look at Costs Associated With Green Stormwater Controls
<i>N. Ellwood, CDM Smith</i> |
| 16B | 10:15am | Accounting For Uncertainty In Determining the Economic Value Of Green Infrastructure Investments
<i>C. Behr, HDR HydroQual; F. Montalto, Drexel University</i> |
| 16C | 10:45am | Developing Sustainable Stormwater Programs Using Sustainable Financing Options
<i>M. Gregory, AMEC</i> |
| | 11:15am | Session Adjourns |

TECHNICAL PROGRAM

Session 17: Remediation Stories

Friday, July 20
9:45am - 11:15am

Room: International C
1.5 PDHs

Moderator: Liz Scheessele, *Timmons Group*

- 17A 9:45am **Western Michigan University MS4 Compliance Planning for a Phosphorus TMDL**
M. Kieser, K.B. Boyer, *Kieser & Associates, LLC*
- 17B 10:15am **Volunteer Post-Construction Monitoring of Stormwater Attenuation in a Regenerative Step Pool Storm Conveyance System Retrofit**
H.E. Flores, *Anne Arundel County Government*; S. Hornor, *Anne Arundel Community College*; R.M. O'Banion, *Limno Tech*; K. Neidhardt, *B.C.E.*
- 17C 10:45am **A Case Study: Meeting Numeric Stormwater Criteria at a Foundry Site Through Model Application**
J. Bachhuber, *AECOM*
- 11:15am **Session Adjourns**

TECHNICAL PROGRAM

Session 18: The New Stormwater Paradigm

Friday, July 20
11:30am - 12:15pm

Room: Liberty AB
1.0 PDH

Moderator: Larry Coffman, *Stormwater Services*

The stormwater field has gone through a number significant shifts over the last half-century. Prior to development of the Clean Water Act (CWA) and the NPDES program, the focus of stormwater management was on the efficient collection and conveyance of stormwater runoff from urbanized landscapes. Over time, flooding impacts from urbanization became apparent, which led to the use of peak-shaving ponds and other peak attenuating structures to reduce localized and downstream flooding and destructive impacts to infrastructure.

Largely based upon the results of the National Urban Runoff Program (NURP) the focus on stormwater management widened to include removal of pollutants along with peak runoff reductions as reflected in the NPDES Phase I stormwater program, which regulated urban stormwater for the first time under the CWA. The Phase II program significantly increased the number of municipalities and utilities required to regulate stormwater discharges.

In the decade since the Phase II program was implemented, it is evident that urban stormwater impacts continue to grow. The 2009 report by the National Resource Council (NRC) highlighted many of shortcomings of the current technical and regulatory approaches to manage stormwater runoff, which has beckoned the most recent shift in stormwater management to focus on hydrological integrity, onsite retention and infiltration-based practices. The focus of this panel will be on this shift that we call the "New Stormwater Paradigm".

Panelists Include:

Chris Kloss, U.S. *Environmental Protection Agency*
Larry Liebesman, *Holland and Knight*
Ted Scott, *Stormwater Maintenance, LLC*

TECHNICAL PROGRAM

Session 19: The Urban Forest Is Broken: Rethinking Street Trees As Urban Infrastructure

Friday, July 20
11:30am - 12:15pm

Room: International B
1.0 PDH

Mature trees, one of the oldest yet effective and economical stormwater management techniques in existence, can contribute significantly to urban stormwater management and also provide many other benefits, such as cleaner air and water, and reducing the heat island effect.

These benefits increase greatly with increasing tree size and are especially needed in large cities where it is often most difficult to provide trees with the conditions they need to grow to their mature size.

This session will explain the different processes by which trees provide stormwater management, as well as the magnitude of stormwater benefits possible with trees, compared to herbaceous vegetation, supported by the latest research and case studies. Common concerns about using trees for stormwater, including studies of the causes of tree roots intruding into pipes, methods to avoid root intrusion into pipes, and how to eliminate pavement heaving caused by tree roots will be discussed.

Speakers Include:

Peter MacDonagh, *Kestrel Design Group*
Thomas Smiley, *Bartlett Lab and Clemson University*
Dave Bloniarz, *USDA Forest Service Urban Natural Resource Institute*

Alternate Regenerative Stormwater Conveyance Provides Needed Treatment for Runoff Volume, Peak Discharge, and Quality Control for New Development or Retrofitting Underserved Watersheds
J. Berg, *Biohabitats, Inc.*; K. Underwood, *Underwood & Associates, Inc.*

TECHNICAL PROGRAM

Session 20: Urban Case Studies in Green Infrastructure

Friday, July 20
1:45pm - 3:15pm

Room: International A
1.5 PDHs

Moderator: Bruce Jones, *Greenstone Engineering*

- 20A 1:45pm** **Los Angeles' Innovative Clean and Green Approach**
W. Tam, S. Kharaghani, A. Hagekhalil, S. Nikaido, M. Sadeghi,
LA Sanitation, City of Los Angeles
- 20B 2:15pm** **Lessons Learned on the Hartford, Connecticut**
Green Capitols Project
V. Roach, S. Landgren, CDM Smith
- 20C 2:45pm** **Green Infrastructure Planning and Implementation in Camden, New**
Jersey
C. Obropta, J. Bergstrom, C. Higgins, H. Chyun, Rutgers Cooperative
Extension Water Resources Program
- 3:15pm** **Session Adjourns**

TECHNICAL PROGRAM

Session 21: Stormwater Innovation

Friday, July 20
1:45pm - 3:15pm

Room: International B
1.5 PDHs

Moderators: Daniel V. Markowitz, *Malcolm Pirnie, the Water Division of ARCADIS*
Henry Manguerra, *Michael Baker Jr., Inc.*

- 21A 1:45pm** **The City of Auburn, Alabama's Outfall Reconnaissance Inventory Program – A Low Cost and Effective MS4 Best Management Practice**
D. Ballard, City of Auburn Water Resource Management Department
- 21B 2:15pm** **Streets or Basements? Where Do You Prefer Your Stormwater?**
*S. Sticklen, Donohue & Associates; R. Carr, O'Brien & Gere;
M. Castaneda, Village of Lincolnwood, Illinois*
- 21C 2:45pm** **Prioritizing Localized Stormwater Capture for Water Supply and Water Quality Benefits**
*C. Chang, T. Johnson, Water Replenishment District of Southern California; M. Hanna, Geosyntec Consultants; M. Antos, Council for Watershed Health; S. Luce, Santa Monica Bay Restoration Commission;
W. Tam, City of Los Angeles, Bureau of Sanitation*
- 3:15pm** **Session Adjourns**

TECHNICAL PROGRAM

Session 22: Making Parks More Green

Friday, July 20
1:45pm - 3:15pm

Room: International C
1.5 PDHs

Moderator: Jane McDonough, AECOM

- 22A 1:45pm** **Everyone Wins: A Stormwater Retrofit in a Public Park**
L. Soukup, City of Rockville, MD
- 22B 2:15pm** **The Peck Park Canyon Enhancement Project: Managing Stormwater
Runoff in an Urban Park Setting**
*K. Okuda, J. Saldin, S. Garawi, City of Los Angeles, Bureau of
Engineering; S. Kharaghani, W. Tam, City of Los Angeles, Bureau of
Sanitation; M. Argente, J. Fussel, S. Carter, E. Angeles, Tetra Tech*
- 22C 2:45pm** **A Case Summary of Green Infrastructure: Pilot Projects and
Opportunities**
*C. Ranck, J. Mirgeaux, RW Armstrong; B. Masbaum, Citizens Water,
D. Clark, RW Armstrong*
- 3:15pm** **Session Adjourns**

Alternate **The U.S. Botanic Garden – Sustainability Through Stormwater Capture and
Reuse**
*P. DeBarry, NTM Engineering, Inc.; J. Euclide, J. Reichert, B. Haag, Entech
Engineering, Inc.; R. Mims, U.S. Botanic Garden; J. Kadri, R. Goo, Oceans, and
Watersheds*

TECHNICAL PROGRAM

Session 23: Silt Stories

Friday, July 20
3:30pm - 5:00pm

Room: International A
1.5 PDHs

Moderator: John Kosco, *Tetra Tech*

- 23A 3:30pm Highlights of EPA's 2012 Construction General Permit**
J. Bauer, E. Farris, G. Schaner, U. S. Environmental Protection Agency
- 23B 4:00pm Mitigating Stormwater Impacts to Lake Tahoe: Lessons Learned From the Big Blue Basin**
S. Schuster, CDM Smith
- 23C 4:30pm Erosion and Sediment Control Planning: Using E&S Inspections, Evaluations, and BMP Design To Plan Facility Nonpoint Source Pollution Reductions**
S. Paul, B. Waller, Naval Facilities Engineering Command (NAVFAC) Washington; D.O. Seward, N. Vance, AECOM
- 5:00pm Session Adjourns**

TECHNICAL PROGRAM

Session 24: Keep It Out of the Sewer

Friday, July 20
3:30pm - 5:00pm

Room: International B
1.5 PDHs

Moderator: Eissa Haj-Hamad, *Mckissack & Mckissack*

- 24A 3:30pm** **The Effects of Stormwater Infiltration on the Treatability of Emerging Contaminants in Conventional Wastewater Treatment Systems**
K. Goodson, R. Pitt, University of Alabama; S. Subramaniam, Miles College; S. Clark, Penn State Harrisburg
- 24B 4:00pm** **Reducing Pollutant Loads From Philadelphia's Combined Sewer System With Green Stormwater Infrastructure**
M. Vanaskie, J. Smullen, R. Rajan, M. Maimone, CDM Smith; M. Cammarata, Philadelphia Water Department
- 24C 4:30pm** **Case Study of an Integrated Blue and Green Roof System on a 100-Year Old Structure**
J. Cass, L. Bendernagel, S. Mehrotra, D. Thompson, Hazen and Sawyer, N. Pendharkar, Osborne Association
- 5:00pm** **Session Adjourns**

TECHNICAL PROGRAM

Session 25: Vigilance in Monitoring and Maintenance

Friday, July 20
3:30pm - 5:00pm

Room: International C
1.5 PDHs

Moderators: Grace LeRose, *City of Richmond DPU*
David Burns, *CARDNO TEC*

- 25A 3:30pm Estimating Total Phosphorus Using a Continuous Surrogate Approach**
J. Riddle, B. Hammond, M. Long, D. Sahoo, *Woolpert*
- 25B 4:00pm Key Steps to Planning a Sustainable Preventative Maintenance Program for Local Governments' Public and Private Stormwater Management Facilities**
H. Gewandter, *City of Rockville, MD*
- 25C 4:30pm A Regionally-calibrated Approach to 'Channel Protection Controls'— How Meeting New Stormwater Regulations Can Improve Stream Stability and Protect Urban Infrastructure**
R. Hawley, *Sustainable Streams, LLC*
- 5:00pm Session Adjourns**

SPEAKER AND MODERATOR DIRECTORY

S. Ali Abbasi, *EA Engineering, Science, & Technology, Inc.*, **Session 18 Moderator**

Karen Ashby, *Larry Walker Associates, Inc.*, **12B**

Tricia Aspinwall, *U.S. Army Corps of Engineers*, **13A**

Dustin Atchison, *CH2M HILL*, **8A**

James A. Bachhuber, *AECOM*, **Session 7 Moderator, 17C**

Daniel Ballard, *City of Auburn, Alabama*, **21A**

Roger Bannerman, *Wisconsin DNR*, **7B**

Donald Barron, *Greeley and Hansen, Workshop C*

Randy Bartlett, *Public Works, Fairfax County*, **4E**

Jeremy Bauer, *U.S. Environmental Protection Agency*, **23A**

Elizabeth Beckman, *Capital Region Watershed District*, **13C**

Christopher Behr, *HDR | HydroQual*, **16B**

Kenneth Belt, *USDA Forest Service*, **7C**

Joe Berg, *Biohabitats, Inc.*, **Session 19 Alternate**

Jeremiah Bergstrom, *Rutgers Cooperative Extension Water Resources Program*, **20C**

Dave Bloniarz, *USDA Forest Service Urban Natural Resource Institute*, **Session 19 Panelist**

Matt Bond, *Water Environment Federation*, **OGS**

Richard Boon, *County of Orange*, **12B**

Ron Bowen, *Public Works, Anne Arundel County*, **4D**

Evan Branosky, *World Resource Institute*, **Session 1 Alternate**

Ted Brown, *BioHabitats*, **8B**

David Burns, *CARDNO TEC*, **Session 25 Moderator**

Kim Burgess, *City of Baltimore*, **OGS**

Jennifer Cass, *Hazen and Sawyer*, **24C**

Robert Chandler, *Salem Public Works*, **14B**

Cathy Chang, *Water Replenishment District of Southern California*, **21C**

Mark Charles, *City of Rockville, MD*, **Session 11 and 13 Moderator**

Dan Christian, *Tetra Tech*, **1B**

Marlou Church Gregory, *AMEC Environment and Infrastructure*, **16C**

Suzanne Ciavola, *AECOM*, **13A**

Shirley Clark, *Penn State Harrisburg*, **1C, 15B**

Hallie Clemm, *DC Public Works*, **5A**

Larry Coffman, *Stormwater Services*, **Session 18 Moderator**

Vic Cooperwasser, *Tetra Tech*, **14A**

Paul Costa, *RJN Group*, **Session 2 and 10 Moderator**

Paul DeBarry, *NTM Engineering, Inc.*, **Session 22 Alternate**

SPEAKER AND MODERATOR DIRECTORY

Ted DeBoda, *Chesapeake Water Environment Association*, **OGS**

Mark Doneux, *Capital Region Watershed District*, **3A**

Jeffrey F. DuVal, *Alexandria Renew Enterprises*, **Workshop C**

Eric Eckl, *Water Words That Work*, **14C, Session 14 Alternate**

Nancy Ellwood, *CDM Smith*, **16A**

Brett H. Emmons, *Emmons & Olivier Resources*, **Session 15 Moderator**

Jeffrey Euclide, *Entech Engineering, Inc.*, **Session 22 Moderator**

Hala Flores, *Anne Arundel County Government*, **17B**

Kevin Flynn, *AKRF*, **Workshop C**

Al Foxx, *DPW, City of Baltimore*, **OGS**

Lisa Franke, *JMT*, **Session 15 Moderator**

Holly Galavotti, *U.S. Environmental Protection Agency*, **11C, 12C**

Heather Gewandter, *City of Rockville, MD*, **25B**

Kenya Goodson, *University of Alabama*, **24A**

Jenny Guillaume, *Watershed Protection*, **9A**

Eissa Haj-Hamad, *Mckissack & Mckissack*, **Session 24 Moderator**

Ben Hammond, *Woolpert*, **25A**

Mark Hanna, *GeoSyntec Consultants*, **21C**

J. Timothy Hare, *CH2M HILL*, **Session 1 Moderator**

Eric Harold, *Malcolm Pirnie, the Water Division of ARCADIS*, **Session 8 Moderator**

Laurie J. Hawks, *Brown and Caldwell*, **15A**

Robert Hawley, *Sustainable Streams, LLC*, **25C**

Zach Henderon *Woodard & Curran*, **14C**

Melissa Hess, *URS*, **13B**

Caitrin Higgins, *Rutgers Cooperative Extension Water Resource Program*, **20C**

Paul Hlavinka, *MDE*, **Session 11 Moderator**

Carol Hufnagel, *Tetra Tech*, **2B**

Aaron Hutton, *ARCADIS*, **6A**

Guy Jacquet, *Kisters Group*, **10C**

Erika Janifer, *Malcolm Pirnie, the Water Division of Arcadis*, **5A**

Larry Jaworski, *Brown and Caldwell*, **OGS**

Lisa Jeffrey, *Brown & Caldwell*, **Session 6 Moderator**

David Johnson, *Virginia Dept of Conservation and Recreation*, **4C**

Patti Jones, *K. Bealer Consulting, Inc.*, **Session 1 Moderator**

Bruce Jones, *Greenstone Engineering*, **Session 20 Moderator**

Matthew Jones, *Hazen and Sawyer*, **3C, 10A**

SPEAKER AND MODERATOR DIRECTORY

Rick Jorgensen, *GHD*, **8C**

Mark Kieser, *Kieser & Associated LLC*,
17A

Robin Kirschbaum, *HDR | HydroQual*,
Session 5 Moderator

Chris Kloss, *U.S. Environmental Protection Agency*, **Session 18 Panelist**

Arthur Kney, *Lafayette College*, **5B**

John Kosco, *Tetra Tech*, **Session 23 Moderator**

Scott Landgren, *CDM Smith*, **20B**

John Lenti, *Greeley and Hansen*,
Workshop C

Grace A. LeRose, *City of Richmond DPU*,
Sessions 9 and 25 Moderator

Larry Liebesman, *Holland and Knight*,
Session 18 Panelist

William Lucas, *Terrasolve LLC*, **6B**

Angel Luke, *Teledyne Isco*, **Session 7 Moderator**

Peter MacDonagh, *The Kestrel Design Group, Inc.*, **Session 19 Panelist**

Karthik R. Manchala, *ATKINS*, **Session 3 Moderator**

Henry Manguerra, *Michael Baker Jr., Inc.*,
Session 21 Moderator

Brian G. Marengo, *CH2M HILL*, **Session 16 Moderator**

Daniel Markowitz, *Malcolm Pirnie, the Water Division of ARCADIS*, **10B, Session 21 Moderator**

David Mason, *CDM Smith*, **2A**

Melanie McCaleb, *NC State University*,
Workshop A

Jane McDonough, *AECOM*, **Session 22 Moderator**

Richard Mclaughlin, *North Carolina State University*, **Workshop A**

Dan Medina, *ATKINS*, **1A, Session 4 Moderator**

Sandeep Mehrotra, *Hazen and Sawyer*,
24C

James Minor, *City of Richmond, VA*, **9C, Session 14 Moderator**

Denise Nelson, *Greely and Hansen*, **12A, Workshop C**

Ryan O'Banion, *Limno Tech*, **17B**

Kendrick Okuda, *City of Los Angeles*, **22B**

Fernando Pasquel, *Michael Baker Jr. Inc.*,
Session 12 Moderator

Shannon Philbin, *City of Rockville, MD*, **9B**

Robert Pitt, *University of Alabama*, **7A**

Jeff Plymale, *RJN Group*, **10C**

Christopher Pomeroy, *AquaLaw PLC*, **11B**

Brian Potvin, *Tetra Tech*, **2C**

Chris Ranck, *RW Armstrong & Associates*,
22C

Derek Ridinger, *Lafayette College*, **5B**

Scott Rybarczyk, *Wendel*, **Session 14 Alternate**

SPEAKER AND MODERATOR DIRECTORY

Jay Sakai, *Maryland Dept. of the Environment*, **4B**

Liz Scheessele, *Timmons Group*, **Session 17 Moderator**

Stefan Schuster, *CDM Smith*, **23B**

Ted Scott, *Stormwater Maintenance, LLC*, **Session 18 Panelist**

Bill Selbig, *USGS - Wisconsin Water Science Center*, **7B**

Thomas Smiley, *Bartlett Lab and Clemson University*, **Session 19 Panelist**

Christine Sotelo, *State Water Resources Control*, **Session 12 Alternate**

Lise Soukup, *City of Rockville, MD*, **22A**

Amy Stevens, *Montgomery County, MD*, **13B**

Patrick Stevens, *ADS Environmental Services*, **10C**

Stephen Sticklen, *Donohue & Associates*, **21B**

Gay Stokes, *City of Richmond, VA*, **9C**

Nancy Stoner, *U.S. Environmental Protection Agency*, **OGS**

Christopher W. Tabor, *Hazen and Sawyer*, **Session 16 Moderator**

Leila Talebi, *University of Alabama*, **15**

Wing Tam, *City of Los Angeles Bureau of Sanitation*, **20A**

Bruce Taylor, *CRITIGEN*, **9A**

William Taylor, *Cardno TEC*, **Session 3 Alternate**

Dave Tomasko, *ATKINS*, **4A**

Robert Traver, *Villanova University*, **OGS, 6C, Workshop C**

Srini Vallabhaneni, *CDM Smith*, **Session 2 Moderator**

Laurens Van Der Tak, *CH2M HILL*, **9A**

Matthew Vanaskie, *CDM Smith*, **24B**

Natasha Vance, *AECOM*, **23C**

Bridget Wadzuk, *Villanova University*, **6C**

Richard Wagner, *CDM Smith*, **Session 10 Alternate**

Bill Wallace, *Wallace Futures Group, LLC*, **Workshop C**

Austin Weidner, *Lafayette College*, **5B**

Hanbae Yang, *ABS Materials Inc*, **3B**

Guoshun Zhang, *Tetra Tech*, **11A**

UPCOMING EDUCATION AND TRAINING EVENTS

EWA/WEF/JSWA Specialty Conference on Cutting-Edge Technologies and Best Practices on Sewerage

July 26 – 27, 2012

Kobe City, Japan

www.gesuikyou.jp/conference/english

WEFTEC 2012

September 29 – October 3

New Orleans, Louisiana

www.weftec.org

Disinfection and Public Health 2013

February 23 – 26

Indianapolis, Indiana

www.wef.org/Disinfection

Residuals and Biosolids 2013

May 5 – 8

Nashville, Tennessee

www.wef.org/ResidualsBiosolids

Energy & Water 2013

May 6 – 9

Nashville, Tennessee

www.wef.org/energy

Collection Systems 2013

June 9 – 12

Sacramento, California

www.wef.org/CollectionSystems

SESSIONS AT-A-GLANCE

Session #	Session Title	Credits	Room
WEDNESDAY			
Workshop A	Methods To Meet New Construction Site Stormwater Quality Requirements	0.6 CEUs	International A
Workshop C	Making Green Infrastructure More Sustainable with Envision, the Sustainable Infrastructure Rating System	0.3 CEUs	International C
Tour	Behind the Scenes at the National Aquarium in Baltimore	2.5 Contact Hours	
THURSDAY			
OGS	Opening General Session	1.5 PDHs	International BC
Session 1	Stormwater Design: What's Current?	1.5 PDHs	International A
Session 2	Green Urban Case Studies	1.5 PDHs	International B
Session 3	Stormwater Controls	1.5 PDHs	International C
Session 4	Stormwater Regulations and Restoration of the Chesapeake Bay: Walk a Mile in My Shoes	0.75 PDHs	International A
Session 5	Road to Clean Water	1.0 PDHs	International B
Session 6	Cutting-Edge Research	1.5 PDHs	International A
Session 7	Stormwater Data	1.5 PDHs	International B
Session 8	Area Low Impact Development (LID)	1.5 PDHs	International C
Session 9	Public Outreach	1.5 PDHs	International A
Session 10	Storm Statistics	1.5 PDHs	International B
Session 11	MS4 Permitting and Codes	1.5 PDHs	International C
FRIDAY			
Session 12	MS4 - No Rubber Stamps Here	1.5 PDHs	International A
Session 13	Get the Public Involved	1.5 PDHs	International B
Session 14	Funding Issues	1.5 PDHs	International C
Session 15	More Cutting-Edge Research	1.5 PDHs	International A
Session 16	Examining the Cost of Green	1.5 PDHs	International B
Session 17	Remediation Stories	1.5 PDHs	International C
Session 18	The New Stormwater Paradigm	1.0 PDHs	Liberty AB
Session 19	The Urban Forest Is Broken: Rethinking Street Trees As Urban Infrastructure	1.0 PDHs	International B
Session 20	Urban Case Studies in Green Infrastructure	1.5 PDHs	International A
Session 21	Stormwater Innovation	1.5 PDHs	International B
Session 22	Making Parks More Green	1.5 PDHs	International C
Session 23	Silt Stories	1.5 PDHs	International A
Session 24	Keep It Out of the Sewer	1.5 PDHs	International B
Session 25	Vigilance in Monitoring and Maintenance	1.5 PDHs	International C

NOTES

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