

**2012 EPA REGION 6 MS4 STORM WATER CONFERENCE**  
**TECHNICAL PRESENTERS**  
**TECHNICAL PRESENTATION DESCRIPTIONS**

**NOTICE TO USERS**

This document is intended to be used in combination with the Conference Agenda.

The document provides information for the day of the course, the title of the course, the level of technical instruction (Basic, intermediate and advanced), the name(s) of the Instructor, the objectives of the technical course, the technical course content and a biography of the instructor(s). The information attached will provide you with Technical Course information in order for you to make decisions on Technical Courses of interest and need to you.

To use this document effectively, refer to the Conference Agenda to find the topic/name of the course you are interested in, then, scroll through the provided Technical Courses listed below. Courses are in order of Course listing on agenda from date/time (reading from left to right).

**Tuesday, June 26, 2012**

**Title: Incorporating Stormwater Quality and Multi-Use Features Into a Neighborhood Regional Detention Facility**

**Level: Intermediate**

**Instructors:** Tim Whitefield, P.E., CFM (Jacobs Engineering), Don McChesney, P.E., CFM (City of Fort Worth), Steve Eubanks, P.E., CFM (City of Fort Worth), Linda Young, P.E. (City of Fort Worth), Chad Simmons, P.E. (City of Fort Worth/CH2MHill)

**Objectives:**

1. Discuss how water quality elements were incorporated into the design of this regional storm water detention facility.
2. Discuss what was required to add multi-function elements (and access) to the facility, from a design and cost standpoint.
3. Discuss maintenance requirements and partnership between City of Fort Worth and Fort Worth ISD.

**Content:**

The Eastern Hills neighborhood, located east of downtown Fort Worth, was originally developed in the 1950's and 1960's. A drainage improvement study conducted by Jacobs Engineering Group Inc. (Jacobs) for the City of Fort Worth revealed the need for extensive storm drain improvements, including a regional storm water detention basin located on one of the few open space parcels in the watershed. The proposed basin is located adjacent to an elementary school and a high school, and is owned by the Fort Worth ISD. The decision was made to enlarge the basin to accommodate an athletic field that the FWISD can use the majority of the time, while the City and the neighborhood get the benefits of flood risk reduction without the disruption that could be caused during the installation of a large storm drain relief line. The City of Fort Worth is funding the design and construction of the \$2.25 million basin from the revenue collected through its storm water utility fee, and the FWISD will grant the City a drainage easement for the basin and its appurtenances. Both entities will share maintenance responsibilities, with the City responsible for major maintenance and the school district handling minor maintenance such as mowing and irrigation. The facility features a full-size athletic field, suitable for football or soccer practices. The field will be irrigated and have an under-drain system to allow it to dry quickly and reduce maintenance. The field is elevated above concrete flumes that will carry low flows to the outlet, which is sized to allow storms with relatively low intensity to pass through without inundating the playing surface. The slopes of the basin will be terraced for seating and aesthetics, and access will be provided in accordance with the Americans with Disabilities Act. The basin will be secured by fencing, and lit for safety and additional security. In addition to reducing flood potential within the Eastern Hills neighborhood, the basin incorporates features that improve the storm water runoff quality in the neighborhood. Upstream of the basin, runoff collected from one set of street inlets will first pass through a trash and sediment collector built into a manhole to help keep the facility free of trash, debris, and sediment. The majority of runoff will enter the basin from an upstream channel, which diverts flows to an off-line sediment and filter pond to intercept the "first-flush" flows, remove trash, debris, and sediment.

**Biography:** Mr. Whitefield is a project manager and water resources engineer with Jacobs Engineering Group in Fort Worth, Texas. He has a Bachelor of Science in Hydrology and Water Resources from Tarleton State University and a Master of Engineering in Civil Engineering from the University of Texas at Arlington, specializing in water resources. He has ten years of professional experience, specializing in hydrologic and hydraulic modeling in support of municipal watershed studies, channel restoration and erosion control designs, FEMA flood insurance mapping studies, municipal master drainage plans, land development and road way plans.

Tuesday, June 26, 2012

**Title: Mitigating Trash and Sediment in Reservoirs by the Coanda Effect**

**Level: Advanced**

**Instructors:** Steven E. Esmond, P.E., Robbin Webber

**Objectives:** 1: Removal of debris, sediment, nutrients, and metals using Coanda-Effect technology. 2: Watershed analysis, water quality impacts, and the economics of mitigating sediment in urban runoff. 3: Evaluation of lake sediment buildup rates and removal costs.

**Content:** Coanda-Effect technology was pioneered in the United States by the US Bureau of Reclamation, and has been certified by the California Water Board to provide “full capture” removal of trash and debris from urban runoff. A recent study conducted near Lake Ray Hubbard demonstrated the added value of Coanda screens to also capture sediment. Mass balance calculations indicate that the sediment capture rate is almost identical to the annual buildup of sediment in the lake. This paper explores the economics of preventing sedimentation in reservoirs, versus removing sediment after it has already accumulated. In addition, this study quantified the seasonal loadings of nutrients, metals, and bacteria, for both total loadings and for the fraction that was adsorbed onto sediment particulates. Mitigating these pollutants provided a measureable benefit to receiving water quality. A full scale test facility was built adjacent to Lake Ray Hubbard, and was evaluated between June 2009 and March 2011. Sediment and debris capture rates were monitored on a seasonal basis. The combined annual capture coefficient was 194 lb per acre per year. Sediment capture within the particle size less than 5.0 mm comprised 35 percent of the total load. Significant quantities of nutrients, metals, and bacteria in this fraction were removed, resulting in benefits to downstream water quality. Approximately 35 percent of the total nitrogen and 29 percent of the total phosphorus was retained on the sediment, while nutrient load and the fraction adsorbed onto sediment varied seasonally. Capture coefficients were determined for nitrogen, phosphorus, arsenic, cadmium, copper, lead, nickel, zinc, and fecal coli form bacteria. Coanda-Effect technology demonstrated the potential to remove 30 percent of total nitrogen and 10 percent of total phosphorus loadings in the watershed. An economic analysis is presented for the removal of both debris and sediment, including initial capital costs and annual maintenance costs. The cost of sediment removal and disposal per acre per year and in dollars per ton of sediment removed, are compared with bulk removal and conventional dredging costs. Implementation costs throughout the watershed are discussed.

**Biography:** Steven E. Esmond, P.E. is Vice President of Coanda, Inc. Throughout his career as a civil engineer, he has designed storm water infrastructure for a number of major US cities. Prior to joining Coanda, he was a consulting engineer, serving as Vice President for Brown and Caldwell, Business Unit Manager for AECOM, and was self-employed for 17 years. He holds BS and MS degrees in civil engineering from Texas A&M University. Mr. Esmond’s technical specialties include storm water and wastewater. Robbin Webber is Street Superintendent for the City of Rowlett, Texas. Throughout his career, Mr. Webber has been involved in the operation of MS4 facilities, and maintaining compliance with regulatory storm water programs.

**Tuesday, June 26, 2012**

**Title: Implementation Process of an iSWM Post Construction Ordinance**

**Level: Intermediate**

**Instructors:** Mike Wayts, P.E., CFM (FNI), Lesley Brooks, P.E., CFM (FNI), Ben McWhorter, EIT (FNI)

**Objectives:**

1. Learn how to develop a flexible yet thorough post construction ordinance that can be customized for your city.
2. Learn ways to involve stakeholders in the process of the implementation of a post construction manual and ordinance
3. Learn different paths that other cities have taken to implement their post construction ordinance.

**Content:**

(See Objectives)

**Biography:**

Mike Wayts, P.E., and CFM: Mike Wayts is the Stormwater Group Manager at FNI and a firm Principal. Mr. Wayts has 15 years of experience specializing in drainage and storm water management including municipal engineering, floodplain management, disaster assistance, infrastructure analysis and design, hydrologic and hydraulic studies, and storm water master plans. Mr. Wayts has assisted multiple cities across north Texas in the development and implementation of storm water manuals and ordinances and recently in helping them to meet the post construction requirements of their MS4 permits. Mr. Wayts was a project engineer for the development of NCTCOG's iSWM Regional Stormwater Design Criteria which integrates both storm water quantity and quality issues and is utilized as a tool for municipalities to implement at a local and regional level to assist in development of storm water ordinances and practices.

Lesley Brooks, P.E., and CFM: Lesley Brooks is a Project Engineer in FNI's Stormwater Group. Ms. Brooks has worked for several years on the iSWM manual for both the regional manual for NCTCOG and the Dallas ISWM manual project for the city. She has also played an integral role on the Grand Prairie, Garland, Frisco, Duncanville and Plano ordinance updates utilizing iSWM concepts.

Tuesday, June 26, 2012

**Title:** City of Oklahoma City's Public Outreach Program

**Level:** Basic

**Instructors:** Raymond L. Melton

**Objectives:**

1. Starting a Public Outreach Program.
2. Working with other agencies, schools and the public.
3. Funding the program and keeping it moving forward.

**Content:** The Storm Water Quality Public Outreach program includes a number of different elements reflecting a wide variety of water quality-related programs. Workshops are held regularly to promote Best Management Practices (BMPs) to reduce pollution runoff into the community waterways. BMP workshops address construction projects, industrial businesses, and homeowners. SWQ also provides school and volunteer programs including School Smart, Adopt-A-City-Street and Curbs-to-Creeks. In addition, SWQ actively participates in environmental events such as Earth Day, Science Fest, OKC Beautiful, Kids Camp and Garden Festivals. The outreach program teams up with numerous groups on projects including departments within the City of Oklahoma City, Oklahoma City Community Foundation, Oklahoma Department of Environmental Quality, OSU-OKC John E. Kirkpatrick Horticulture Center, OSU Extension, Natural Resources Conservation Services, Oklahoma Conservation Commission, Oklahoma Blue Thumb, Oklahoma County Conservation District and the Central Oklahoma Storm Water Alliance.

**Biography:** Raymond Melton is the Environmental Protection Manager for the City of Oklahoma City. He graduated with a Bachelor of Science Degree from the University of Central Oklahoma. He has been with the City of Oklahoma City since 1993, working in the Storm Water Quality Division since 1995. In 2005 he was named the Storm Water Quality Manager. Training includes 40 HAZWOPER, Environmental Crimes investigating, Homeland Security Training, Preparing for and Responding to Terrorism, and the National Fire Academy Hazmat Incident Command training, Certified Stormwater Inspector and Certified Professional in Erosion and Sediment Control.

Tuesday, June 26, 2012

Title: City of Fort Worth Floatables and Sediment Control Pilot Study

Level: **Intermediate**

Instructors: Aiza Jose, PhD, PE, LEED AP

**Objectives:**

- Share information obtained in implementation of this pilot project's effectiveness for removing floatables and sediment from storm water
- Gain understanding of how selected BMP's are being used as part of strategy to prevent drainage system blockages
- Understand operational and financial requirements related to implementation of these BMPs • Show how the pilot project is being used as part of larger public education program.

**Content:** The City of Fort Worth has launched a pilot study to test the efficiency and feasibility of various structural Best Management Practices (BMPs) for the control of floatables/trash/sediment materials at several locations. The purpose of the pilot study is to identify practical methods to minimize the City of Fort Worth's pollutant discharge to its Municipal Separate Storm Water System (MS4). Through the implementation of the pilot study, the City is seeking methods to improve the management of the storm water network by reducing system blockages and related maintenance while minimizing pollution reaching creeks and lakes. Because of the limited experience with the use and operation of structural BMPs in the area, the City is testing and monitoring the operation of selected BMPs during a period of two years. The data collected will help determine the efficiency of the selected BMPs, assess maintenance requirements (e.g. labor, equipment, etc), and quantify and classify pollutants removed. This information will provide the City and other municipalities in the region insights on the applicability, efficiency, and operability of these devices for reducing trash, sediment and other pollutants before reaching the storm water network and natural water bodies. Six different areas were selected for inclusion in the pilot study. Suitable BMPs have been installed at targeted locations selected based on experience, watershed size, land use, pedestrian and vehicular traffic and partnership opportunities. Detailed operation and maintenance protocols were developed to incorporate manufacturer's recommendation, and/or lessons learned by others with experience implementing the BMPs. One of the objectives of the pilot study is to fine tune these protocols so that efficient strategies are developed. The pilot project will also serve as an outreach instrument for informing the public of the adverse impacts of storm water pollution and options for reducing pollution, and as a partnership opportunity with other stakeholders including public and private entities to promote water quality efforts at the watershed level.

**Biography:** Aiza José-Sanchez, PhD, PE, LEED AP, has 18 years of engineering experience focused on the management of diverse environmental and natural resources projects. She is experienced in the management and execution of the environmental permitting projects; development of programs for the management of storm water for Municipal Separate Storm Sewer Systems (MS4) under the Phase I and Phase II NPDES Rules; storm water compliance for construction projects (SW3P, NOI, NOT, CSN, inspection and corrective action), development of pilot testing for implementation of structural BMPs for storm water quality programs, and inter-agency coordination for the implementation of beginning- and end-of-pipe structural BMPs and development of adequate and consistent water quality indicators for the monitoring of installed BMPs.

Tuesday, June 26, 2012

Title: LID and Rainwater Harvesting Strategies for the Urban Environment

Level: [Intermediate](#)

Instructors: Adam P. Sapp, PE Regional Regulatory Director CONTECH Construction Products Inc.

**Objectives/Content:**

This presentation will provide an overview of Low Impact Development and Green Infrastructure concepts, explore the basics of rainwater harvesting including example layouts and key components, and highlight the various underground storm water management strategies that can augment LID designs along with the latest research and performance expectations for these practices.

**Biography:** Adam Sapp, PE, is the Regional Regulatory Director for CONTECH's South Central and Atlantic Regions. Prior to this position, he served as Area Vice President of the South Central Region, Region Manager for Pennsylvania, New Jersey and Delaware and was a Stormwater Consultant for CONTECH's Stormwater Solutions products. Adam earned his B.S. degree in Civil Engineering Technology from the University of Pittsburgh.

Tuesday, June 26, 2012

**Title: Breaking Barriers on Environmental Education Funding**

**Level: Intermediate**

**Instructors:** Daya Dayananda, Luz Locke

**Objectives:**

Breaking Barriers on Environmental Education

Finding Resources and creating bridges for Outreach

Implementing Public Involvement Programs

**Content:** With the global economical situation touching every resident, business, non-profit and government entity, programs to help the environment and satisfy MS4 permit requirements are affected. Communities have to juggle their way to an effective outreach program by breaking barriers on environmental education, finding resources and creating bridges for outreach and implementing public involvement programs. Without sufficient economical and human resources and to be able to teach a diversified population, regarding background, beliefs, language or level of education, requires creativity. The MS4 team from Pasadena has broken barriers with a bilingual, innovative, cooperative and consistent program, implementing successfully this essential part of their MS4 activities. Pasadena's Environmental Team has taken the task to defeat the circumstances by taking extraordinary measures to succeed in their pursuit of environmental consciousness and habit change among area residents and visitors. Activities, innovative tools and programs have been used to break barriers and even though measuring results is difficult in this type of campaign, detailed documentation of these amazing efforts helped to trace effectiveness. Among those tools are bilingual skits, videos, books, mascots, events, presentations, posters, coloring books, flyers, give-a-ways, adopting programs, cooperative efforts with other organizations, communities, TV, newspaper, radio, website, face book, and all possible type of media platform. While population diversity can be a barrier at the time of targeting education, it also can be a positive variant when utilizing motivational interests from different backgrounds. What was considered negative factors became the spark that ignited creativity and motivation to find resources and cooperation. Programs were organized by the MS4 team, but the credit should go also to other supporting organizations, and to stakeholders who listened and participated. The glue of this outreach environmental program is the common goal to be achieved and the honesty in the achievement process. The big success of the team is a group of small triumphs in different fronts of education and public involvement. It has been a hard task and there is still a long ways to go; this consistent movement against ignorance and damaging behavior is in continuous development. We will present the tools, activities, resources and programs our City has created and used successfully, as well as the results and effectiveness of efforts to facilitate the task of those who are embarked in the same noble mission.

**Biography:**

Daya R. Dayananda, Assistant Director of Public Works. Daya has served in his current position since 2006. Prior to that, he was the Assistant City Engineer for City of Pasadena (from 2003 to 2006). He began his career with City of Pasadena in 2003 and has been with the City since last 9 years. Prior to his experience with the City, he has worked as an engineering consultant, to City of Houston's Greater Houston Wastewater Program from 1994 to 1999. He continued to assist City of Houston in their wastewater division on various projects till 2003 before joining City of Pasadena. Mr. Daya Dayananda holds a PhD from South Dakota School of Mines & Technology, Rapid City, South Dakota (1993). He obtained his Masters degree in Water Resources Engineering from Bangalore University, India (1988 - 1990) and obtained his Bachelor's degree in Civil Engineering from the same university (1983 - 1988). Mr. Daya Dayananda is licensed Professional Engineer from State of Texas (since 1998) and is also a Certified Floodplain Manager (since 2005). He was awarded the "Floodplain Manager of the Year 2008" from the Texas Floodplain Management Association (TFMA).

Luz Locke, Environmental Educator and Activity Coordinator for the MS4 Permit and CRS Program

Luz has been in this position since 2006. Prior to that, Luz worked for different engineering companies in Colombia, Jamaica and the US. She was a CAD System Specialist and Advisor for the Coffee, Nickel, bauxite, plastics and Petroleum Industry for 9 years. Parallel to her work, she has been an active volunteer for the environment since 2005. Luz studied at San Jacinto College, University of Houston and received a Bachelor Degree in Civil Engineering from the University of Santo Tomas in Bogota, Colombia in 1981. Luz is a Flood Plain Manager and has been recognized by the Texas Floodplain Management Association for her flood awareness efforts in the region.

**Tuesday, June 26, 2012**

**Title: Illicit Discharge Program - San Antonio Water System**

**Level: Intermediate**

**Instructors:** Martin Miller, REM

**Objectives:**

Overall Summary of the Illicit Discharge Program in San Antonio - What works and why - Identification methods - Staff and Equipment

**Content:** An overall summary of the program in San Antonio. Discuss the routine work in a Phase I city. How we investigate discharges and complaints. How we tackle corrective actions and the interrelationship with the other monitoring and inspection programs (Industrial Inspections, Sanitary Sewer Overflow program, Dry Weather Field screen points and Construction Site Runoff).

**Biography:** Martin Miller is currently the Industrial Compliance Supervisor for the San Antonio Water System. Martin has worked in Storm Water and Wastewater Pretreatment Management for 24 years and is a Registered Environmental Manager.

Tuesday, June 26, 2012

**Title: PWNA Cosmetic Cleaning BMPs for the EPA's Model Ordinance**

**Level: Intermediate**

**Instructors:** Robert Hinderliter

**Objectives:**

1. Meet the MS4-NPDES Requirements for Cosmetic Cleaning.
2. How to develop BMPs for Cosmetic Pressure Power Washing for jurisdictions that are rational, reasonable, and logical at almost no cost to the municipality with a high level of compliance.
3. Provide a CD/DVD with model workshops, handouts, presentations, and videos for each jurisdiction to copy and modify for their particular requirements.

**Content:**

The basic objective is to provide a guide to meet your MS4-NPDES Permit Requirements for Cosmetic Pressure Power Washing. There is a large variation between cost of implementation, effectiveness, and public acceptance of Cosmetic Cleaning Ordinances. Ordinances of Houston, San Antonio, Fort Worth, Oklahoma City, BASMAA (Bay Area Stormwater Management Agencies Association) have been in effect for over 15 years and the cost and impact on the MS4s will be presented.

**Biography:** Robert Hinderliter graduated from Oklahoma State University with a BS and MS in Mechanical Engineering, after 7 years as an Aircraft Engineer and Jet Pilot he started his own Mobile Power Wash Company in Fort Worth Texas. He became active in the development of Cosmetic Pressure Power Washing Regulations in 1992 with the founding of Power Washers of North America ([www.pwna.org](http://www.pwna.org)), initially to address Cosmetic Cleaning Environmental Regulations. He has conducted numerous seminars for Municipal, State, and Federal Regulators, workshops on Cosmetic Cleaning Regulations, and spoken at StormCon, EPA Region 6 MS4 Conferences.

Tuesday, June 26, 2012

Title: Use of voluntary Stormwater Fee Credit Program for encouraging storm water sensitive practices

Level: **Intermediate**

Instructors: Gerald McChesney, Aiza Jose

**Objectives:**

1. Describe Fort Worth's storm water credit system
2. Describe the city's proactive approach to identify developments designed/constructed/operated using sensitive storm water practices for their recognition through financial incentives, with the objective of further streamlining the credit application process, refining design standards, and increasing public awareness on the use of such practices
3. Describe the use of the credit program to encourage and supplement inspection and maintenance of private BMPs
4. Discuss current efforts to streamline credit application procedures and further refine design criteria for storm water sensitive practices
5. Describe how the credit program is being used as part of larger outreach effort to inform the public about storm water pollution impacts and opportunities for low impact development design
6. Describe how the City is encouraging developed sites and Industrial sources to maintain compliance through self policing

**Content:** In 2010 Fort Worth adopted a voluntary storm water fee credit program that provides up to 40% storm water fee reductions to encourage development sites to incorporate storm water BMP's into site design as well as operation and maintenance activities. These incentives address storm water quality treatment, trash control, student education, maintenance practices and an annual self-inspection program for industrial sites and private structural BMP's. In spite of these significant economic incentives, however, the program did not attract significant interest on the part of developers or property owners due the lack of general knowledge, lack of experience in applying storm water BMP's in the general area, and the additional cost of applying for the credits. In response, the City of Fort Worth is taking a proactive approach of promoting credits by working with institutional developments to reach the larger engineering community and to showcase selected existing sites that may qualify for credits based on existing design or through low cost retrofit improvements. A consultant work program is being used to identify sites, evaluate credit opportunities; schedule workshop's and educates the general public through the media. For the most part, the City has been working with schools and churches with large sites that generate high storm water fees, and include green areas that can incorporate BMPs to achieve a given water quality goal. The City has also been working with private home owner associations to provide a credit for improved maintenance and inspection practices for privately owned BMP's. Historically, these BMP's have not been inspected or maintained even though required to do so legally. In a similar credit program, the City provides a credit for industrial users who meet or exceed annual reporting requirements mandated by Federal law. Both of these credits are based on the notion that compliance can often be better accomplished through incentives than through enforcement actions. Through the implementation of these projects, the City hopes to refine and streamline the procedures and standards of the Stormwater Credit Fee policy, including adoption of more precise water quality standards and developing practical analytical tools for evaluating storm water quality benefits that can be applied quickly to a broad variety of BMP's.

**Biography:** Don McChesney, PE is the Stormwater Program Engineering Manager, a position he has held since Fort Worth established a storm water utility in 2006. Prior to this, Don held a broad spectrum of municipal and consulting engineering positions in various locations including four years in Venezuela, where he met his wife. Don is a registered Professional Engineer in Texas and holds bachelors and masters degrees from the University of Texas at Arlington.

Aiza José-Sanchez, PhD, PE, LEED AP, has 18 years of engineering experience focused on the management of diverse environmental and natural resources projects. She is experienced in the management and execution of the environmental permitting projects; development of programs for the management of storm water for Municipal Separate Storm Sewer Systems (MS4) under the Phase I and Phase II NPDES Rules; storm water compliance for construction projects (SW3P, NOI, NOT, CSN, inspection and corrective action), development of pilot testing for implementation of structural BMPs for storm water quality programs, and inter-agency coordination for the implementation of beginning- and end-of-pipe structural BMPs and development of adequate and consistent water quality indicators for the monitoring of installed BMPs.

Tuesday, June 26, 2012

Title: The History of Inlet Protection

Level: [Intermediate](#)

Instructors: Tom Schneider

Objectives:

Content:

Biography:

Tuesday, June 26, 2012

Title: Multi-sector Industrial Inspection Program

Level: **Advanced**

Instructors: Martin Miller, REM

**Objectives:**

Summary of San Antonio's Industrial Inspection Program - How we perform inspections

Working with the industry and the local TCEQ office

Inspection flow chart

**Content:**

This presentation would show an overall summary of how a Phase I city performs their permit obligations by inspecting Industrial facilities regulated under the TCEQ multi-sector Industrial permit. Course topics include Inspections, data collection, reporting and the process. Also provided is a quick view of the flow chart and how we consistently treat facilities. This course will outline how we work with the regulated facilities to gain compliance and the overlap with our Industrial Pretreatment Program.

**Biography:**

Martin Miller has worked with SAWS and the City of San Antonio for 24 years. Supervise a staff of ten inspectors implementing a variety of programs for compliance purposes. Martin is a Registered Environmental Manager.

**Notes:**

SAWS has been awarded 2nd in the nation for our Storm Water Program (2003) and our Pretreatment Program (2002).

**Tuesday, June 26, 2012**

**Title: EPA Region 6 Pesticide General Permit and the Storm Water Program**

**Level: Basic**

**Instructors:** Jenelle Hill

**Objectives:** Information forthcoming

**Content:** Information forthcoming

**Biography:**

Jenelle Hill

Life Scientist, EPA Region 6

Jenelle Hill has worked for the Agency since July, 2009 and currently is the Pesticides General Permit Coordinator, the Waters of the U.S. Coordinator, the Environmental Justice Coordinator, a NPDES Individual Permit Writer, a Municipal Separate Storm Sewer System Permit Writer and the Endangered Species Consultation Assistant Coordinator for the NPDES Technical Permits Branch in EPA Region 6. Ms. Hill has earned a Bachelor of Science and a Master of Natural Resource Development from Texas A&M University.

Tuesday, June 26, 2012

**Title: Special Challenges Encountered at Linear Construction Projects**

**Level: Intermediate**

**Instructors:** Joe Don Willingham, PE

**Objectives:**

1. Discuss Linear Construction Projects
2. Discuss approaches to erosion and sediment control problems unique to linear projects
3. Discuss inspection issues with linear projects

**Content:**

The basic objective is to discuss approaches for regulators to take in inspecting and providing technical assistance at linear construction projects. Linear construction projects are commonly encountered in municipalities and states. They include the construction of water and wastewater lines, the laying of power and communications lines, and the building of roads, streets and highways. Linear construction projects present inspectors, as well as the owners and contractors, with unique challenges when attempting to provide inspection and regulation of these activities. In an effort to address storm water compliance at these sites, the Oklahoma Department of Environmental Quality (ODEQ) has embarked upon an ambitious program to inspect transportation projects throughout the state. Through this process, inspectors have become familiar with the unique issues faced by the owners and contractors of these projects when installing BMPs and conducting inspections. In this presentation, I will discuss the things I've seen implemented, what seems to work and what doesn't, common problem areas I've encountered, and recommendations for MS4s as they inspect projects like these. The Presentation will be given by Joe Don Willingham, Industrial Wastewater Enforcement, Water Quality Division, ODEQ.

**Biography:**

Joe Don Willingham is a Registered Professional Engineer and serves as the Stormwater Enforcement District Engineer for southeastern Oklahoma. He joined the Water Quality Division of ODEQ in November 1999. He served as the Stormwater Enforcement Engineer for the State until 2002. Prior to joining ODEQ, Joe Don worked in the Oil and Gas Exploration and Production industry and the Refining and Petrochemical industry. He received a Bachelor's of Science in Chemical Engineering from the University of Oklahoma in 1991.

**Tuesday, June 26, 2012**

**Title:** Analysis of Impaired Waters for Multi-Sector General Permit Compliance

**Level:** **Intermediate**

**Instructors:** Author Derek Senter, Co-Author Betsi Chatham,

**Objectives:**

1. Regulatory Compliance
2. Educate Industrial Sector
3. Utilize GIS Technology for Watershed Management

**Content:**

Abstract Since 2001, the Texas Pollutant Discharge Elimination System Multi-Sector General Permit has provided authorization for point source discharges of storm water associated with industrial activity. In 2011, the general permit included more comprehensive requirements regarding discharges to impaired water bodies and impaired water bodies with Total Maximum daily Load (TMDL) Requirements. As an MS4 operator, the City of Fort Worth took on the task of performing a comprehensive evaluation of the impaired water bodies within the MS4 and has chosen Geographic Information Systems to set the foundation. First and foremost, the evaluation not only provides City inspectors with detailed accurate information necessary to perform a comprehensive investigation, but it also has provided assistance to industries in understanding and implementing these new standards. It also supports the education of these industries to promote regulatory compliance and provide a higher level of awareness of their potential to impact already impaired surface waters. Lastly, this analysis facilitates the comparative evaluation of known water body impairments to industrial facility and local storm water quality monitoring data in a geospatial format to locate priority watersheds for targeted education and further evaluation to improve storm water quality.

**Biography:**

Biography Author Derek Senter, CHMM 10 years experience in the Environmental Industry Bachelor of Science, Abilene Christian University Certified Hazardous Materials Manager (CHMM)

Co-Author Betsi Chatham, GISP 18 years of Environmental GIS experience Bachelor of Arts, Arizona State University Master of Applied Geography, Southwest Texas State University

**Tuesday, June 26, 2012**

**Title:** Public Education-Online Training Experiences in a Regulatory Environment

**Level:** **Basic**

**Instructor:** Jimmy Eanes, Education Director-IECA

**Content:**

If you are responsible for implementing the Public Education and Outreach phase of your storm water management plan, you will want to attend this course....especially if you are considering online education. Jimmy Eanes will share some the lessons learned from implementing online education for the past five years with IECA. Topics covered will be, understanding the cruciality of using online/internet content for public education, identifying effective ways to get what you want out of your online education and evaluating your online education programs.

Tuesday, June 26, 2012

**Title: Developing and Modeling of a Passive Flocculent Injection System for Turbidity Reduction in Storm Water Runoff**

**Level: Advanced**

**Instructors:** Jason Vogel, Ph.D., P.E.

**Objectives:**

1. Learn the basics of flocculation chemistry
2. Learn about current techniques and BMPs that utilize flocculation for turbidity reduction and sediment control.
3. Learn about an experimental system developed by Oklahoma State University for flow-based, passive injection and mixing of flocculent in construction site runoff.

**Content:**

The course will begin by explaining current sediment control devices and the basic processes involved with flocculation. From there we will discuss current flocculation methods for reducing turbidity in construction site runoff. From there will be extensive discussion of an innovative apparatus developed by OSU to passively inject a controlled rate of flocculent into runoff for predictable, effective turbidity reduction. We will also discuss modeling techniques for predicting flocculation using this apparatus.

**Biography:**

Dr. Jason Vogel, P.E., is an Assistant Professor and Stormwater Specialist in the Department of Bio-systems and Agricultural Engineering. Dr. Vogel currently leads the Stormwater research and extension team at OSU. Before joining OSU in December 2009, he worked for the U.S. Geological Survey in Lincoln, Nebraska for seven years, conducting water quality research. He got his Ph.D. from OSU in 2001 in Bio-systems and Agricultural Engineering, and also has degrees from Texas A&M and the University of Nebraska.

Tuesday, June 26, 2012

**Title: Quality Assurance for Stormwater Monitoring and Program Management**

**Level: Intermediate**

**Instructors:** Richard Smith

**Objectives:**

1. Learn the Quality Assurance requirements in EPA regulations, policy and guidance, and General Permits.
2. Learn QA concepts for data integrity, and the proper applicability of QA to overall program management.
3. Learn how to start a practical QA program for storm water permit compliance.

**Content:**

This presentation will provide a description of the important concepts in storm water Quality Assurance (QA). As Phase II storm water programs become more complex, there is an increasing need to ensure data integrity and program management efficiency. Not only must "hard data" (such as field and laboratory measurements) have good QA, but information processing is also critically important. A good QA program must include proper calibration and use of equipment and provide employee training. Stormwater data will be scrutinized not only by your permitting authority, but by local citizens, city management, and news media as well. Stormwater data must stand up to challenges made during enforcement actions. A variety of measurement and sample collection procedures will be discussed, including the strengths and weaknesses of each. Types of field forms and sample custody forms will be presented. Written Standard Operating Procedures (SOPs) will be emphasized. QA requirements in General Permits and EPA regulations will be discussed. QA terminology, concepts and EPA guidance will also be presented, along with recommendations on how to start a practical QA program.

**Biography:**

B.S. Biology, Oklahoma State University (1978) and M.S. Environmental Science, University of Tulsa (1984) Richard worked with Williams Brothers Engineering Company (1978-82) supporting water quality permits. He was employed by the US Army Corps of Engineers (1982-83) where he monitored lake water quality while finishing his Master's degree. Richard worked from 1983-86 as an environmental lab analyst with the Tulsa City-County Health Department. In 1986 he became Assistant City Manager and Public Works Director for the City of Bixby, Oklahoma. In 1989 Richard moved to INCOG where he continues to perform various water quality studies relating to wastewater discharges, impairment assessments, and stream conservation. Since 2006, Richard has been the manager of INCOG's Environmental and Engineering Services Division. Richard also manages INCOG's Green Country Stormwater Alliance, a coalition of about half of Oklahoma's Phase II permitted municipalities. Richard was an Adjunct Instructor in Chemistry with Tulsa Community College for 13 years. He was a 10 year Board member of the Oklahoma Clean Lakes and Watersheds Association. In January 2007, Richard was elected as a Board member of the Tulsa Area Conservation Foundation.

Wednesday, June 27, 2012

Title: SUSTAIN Model-Albuquerque Study

Level: **Basic-Intermediate**

Instructors: Nelly Smith, Dr. Taimur Shaikh

Objectives:

Content:

A watershed-based MS4 permitting approach is being applied in the Middle Rio Grande-Albuquerque Urbanized Area using the System for Urban Stormwater Treatment and Analysis INtegration model (SUSTAIN). The study will establish baseline hydrology and water quality loads, identify the critical condition for management, formulate stormwater management objectives based on local design standards, and test the sensitivity of optimized results to different formulations of the management objectives. The SUSTAIN modeling system integrates watershed modeling capabilities, BMP process simulation, and BMP cost representation within the context of a cost-benefit optimization framework. The model will be used to evaluate complex decisions about green infrastructure selection and placement, performance, and costs for meeting both flow and/or water quality targets.

Biography:

**Nelly Smith, USEPA**

Nelly Smith has a master's degree in Chemical Engineering from the *University of South Alabama*. Nelly worked for the *Alabama Department of Environmental Management (ADEM)* as a Remedial Project Manager for both the Superfund and the Resource Conservation Recovery Act (RCRA) programs for five years. Since 2006, she has worked for the *Environmental Protection Agency (EPA) Region 6* in the Water Quality Standard, Non-point Source, and the National Pollutant Discharge Elimination System (NPDES)/Stormwater management programs. She is currently leading a watershed based permit pilot in the Middle Rio Grande, New Mexico initiated by the EPA Head Quarter - Office of Water

**Dr. Taimur Shaikh, USEPA.**

Dr. Shaikh currently works for the Region VI Water Quality Protection Division within the United States Environmental Protection Agency (USEPA). He functions as the Total Maximum Daily Load (TMDL) coordinator responsible for the State of Arkansas. Additionally, he provides modeling expertise and support to the National Pollutant Discharge Elimination System (NPDES) Permitting and TMDL Branch. For example, his responsibilities include water quality modeling in support of the Western Outer Continental Shelf/Texas Territorial Seas Oil and Gas Permitting. Before joining the USEPA, Dr. Shaikh worked for the Kentucky Division for Air Quality as the supervisor of the Air Toxics section. Dr. Shaikh holds a Ph.D. for the University of Kentucky in inorganic chemistry and a B.S. in chemistry from the University of Central Arkansas.

**Wednesday, June 27, 2012**

**Title: Effluent Limits Guidelines: Dallas Case Study**

**Level: Intermediate**

**Instructors:** Susan G. Alvarez

**Objectives:**

1. Provide background on in-stream sediment carrying capacity and its importance to the ELG process;
2. Provide effluent monitoring data from Dallas area construction project that used passive BMPs;
3. Discuss lessons learned through this particular case study

**Content:**

The basic objective is to provide information from a Dallas case study in monitoring Total Suspended Sediment (TSS) and Turbidity from a 70-acre construction site located immediately adjacent to a stream. Background information on stream processes including sediment carrying capacity, as well as monitoring methods for TSS and turbidity are provided. This case study illustrates the ability to meet the anticipated ELG criterion for turbidity using passive BMPs. Monitoring data were obtained from a construction site that had been put into enforcement because of measureable sediment discharges during construction. These data demonstrate that when properly implemented and maintained, it is possible to meet the anticipated turbidity criterion with passive BMPs. Lessons learned from this site and suggested recommendations for local ELG implementation are also provided.

**Biography:** Susan Alvarez is the Senior Program Manager in the City of Dallas' Trinity Watershed Management Department. She is primarily responsible for compliance and enforcement under the City's MS4 Permit, and coordinates related program activities across 15 different city departments. She received a Bachelor of Science in Civil Engineering from Rice University back in the dark ages, and is a registered Professional Engineer and Certified Floodplain Manager.

**Wednesday, June 27, 2012**

**Title: Pervious Concrete, A Stormwater Solution**

**Level: Intermediate**

**Instructors:** A. Vance Pool

**Objectives:**

National Ready Mixed Concrete Association Continuing Education Series Concrete Solutions to Storm Water Runoff Program Title: Concrete Solutions to Storm Water Runoff Program Number: PCP101 Provider Name: National Ready Mixed Concrete Association Length: 1 hour Credits: 1 LU Hours (for architects), 1 PDH or 0.1 CEUs (for engineers) Health, Safety and Welfare: Yes Learning Objectives: This program provides an introduction to pervious concrete pavement as a solution to reducing storm water runoff from building sites. Attendees will learn what pervious concrete pavement is, its engineering properties and construction techniques. Pervious concrete pavement is considered a best management practices by EPA and is a recommended solution to reducing runoff in the LEED Green Building Rating System. Pervious concrete pavement is ideal for parking areas, sidewalks, patios, tennis courts, roads and driveways. Facilitator Qualifications: All NRMCA program facilitators are trained to deliver this program under the AIA/CES guidelines. They have considerable experience in concrete construction and are qualified to provide technical support on design and construction issues. Method of Delivery: Facilitators use a PowerPoint presentation to deliver the program. The program can be delivered in an architect's or engineer's office, at a conference, and at association meetings.

**Content:**

This course covers both basic and intermediate level knowledge on pervious concrete's role in storm water management. Real world examples up to 30 years old will be cited. The basic knowledge needed to feel comfortable utilizing pervious concrete as well as numerous online resources will be cited. Current economic trends which support sustainable construction will also be presented.

**Biography:**

Vance has been involved with the construction industry in some form or another since summer work finishing concrete and framing houses in the mid 1970's. He graduated with a degree in architecture from Georgia Tech and has held numerous technical positions in locations across the U.S. Vance has been employed by leading cement, ready mix, admixture, fiber and building materials companies and has spoken on numerous topics related to sustainability, concrete and the construction industry in five countries and numerous states in his three decades of industry experience. Vance now serves as the Senior Director, National Resources for the National Ready Mixed Concrete Association (NRMCA) where he assists leading owners, contractors, developers and specifiers from the construction industry enhance their triple bottom line regarding sustainability, profitability and social ramifications of major building programs primarily in the Southwest U.S. as well as national and internationally. NRMCA does so utilizing state of the art construction technologies, technology transfer, specifications, marketing, partnering, change management, the leveraging of technology and business process improvement strategies. Vance is committed to the sustainable building movement having been carbon negative for over 20 years.

**Wednesday, June 27, 2012**

**Title: EPA Audits and Inspections of MS4's, "The Phone Call (what to do)"**

**Level: Basic**

**Instructors:** Diana McDonald, EPA

**Objectives:** To give audience an idea of how an MS4 audit or inspection is conducted and the difference between the two.

**Content:** Will walk through how an MS4 should prepare for an audit or inspection of the Stormwater Management Program and compliance with the permit and what to expect when you get "THE PHONE CALL".

**Biography:**

**Wednesday, June 27, 2012**

**Title: TMDL and Stormwater Regulations and Policy: Recent Developments and their Implications for Permit Holders**

**Level: Intermediate**

**Instructors:** Michael F. Bloom, PE, CFM, BCEE Geosyntec Consultants, Inc.

**Objectives:**

1. Understand difference between technology based effluent limits and water quality based effluent limits in National Pollutant Discharge Elimination System permits.
2. Review major policy and regulatory developments in the total maximum daily load programs and in municipal storm water permitting since 1996.
3. Explore potential implications of recent and pending changes on municipal storm water programs.

**Content:**

The modern Clean Water Act, enacted in 1972, established the National Pollutant Discharge Elimination System permitting system and created a framework for developing and imposing effluent limits on such permits. In 1987, municipal storm water was added to the program. Since that time regulators, engineers, consultants, and permit holders have strived to address storm water pollutant discharges using a variety of approaches, regulatory structures and policies. In 1996 EPA published its Interim Storm Water Permitting Approach, which described how water quality based effluent limits would be placed into storm water permits. That document indicated that water quality based effluent limits need not be numeric. In the 2001 and 2007 General Accountability Office reports found that neither the cost nor effectiveness of the storm water permitting program initiated in the 1990's could be determined by the Environmental Protection Agency (EPA). In 2002, EPA issued a policy memorandum that described the relationship between total maximum daily loads (TMDLs) and storm water permits and which was generally consistent with EPA's 1996 Interim Storm Water Permitting Approach. In 2007 EPA published a report describing a variety of state practices for developing and implementing TMDL's in storm water permits. In 2008, EPA published TMDLs to Stormwater Permits Handbook, a 193 page manual for TMDL staff and permit writers. In 2008 the National Research Council published Urban Stormwater Management in the United States. It was a critical review of EPA's storm water permitting program and it included numerous recommendations to improve the program. As a direct result of the NRC report, in 2009, EPA initiated an information collection process from regulated entities to support a rule-making to address new development, retrofitting of existing development and retention requirements (flow/volume control). In 2010 EPA published their MS4 Permit Improvement Guide, which includes guidance to permit writers on how to write more stringent, clear, specific, measureable, and enforceable provisions in small MS4 permits. Later in 2010, EPA issued a significantly revised TMDL-MS4 memorandum, which called for a more detailed assessment of MS4 load sources and the development and imposition of numeric water quality based effluent limits where feasible. A number of municipal organizations and state regulatory agencies expressed a high degree of concern about the revised memorandum, and EPA indicated that it was considering whether to rescind, revise, or reissue the document. Presentation will review key elements of each item noted above and provide insight regarding potential impacts to MS4 operators.

**Biography:**

Michael Bloom is an Associate in the Water and Natural Resources Practice of Geosyntec Consultants, Inc. Geosyntec Consultants conducts environmental engineering and planning to manage storm water and surface water quality and restore contaminated properties. The firm employs 900 engineers and scientists in 40 offices in the United States and overseas. Michael received a BS in Mechanical Engineering from Syracuse University and a MS in Environmental Engineering from Drexel University. Michael moved to Houston in 1998. Michael is a Certified Floodplain Manager, a Board Certified Environmental Engineer, and a Registered Professional Engineer in Texas and seven other states. He has 20 years of environmental engineering experience. He is chair of the Watershed Management Committee of the Water Environment Association of Texas and he serves on the storm water committee of the National Association of Flood & Stormwater Management Agencies (NAFSMA). Michael chairs the Greater Houston Partnership's Water Issues Subcommittee and he serves on GHP's Stormwater Management Subcommittee. He is former chair of the Stormwater Quality Committee of the Houston Council of Engineering Companies. Michael assists federal, state, and local entities with storm

water quality management and compliance issues including low impact development, storm water quality management program development and implementation, watershed restoration planning and implementation, ambient water quality monitoring, and system effectiveness monitoring.

**Wednesday, June 27, 2012**

**Title: Construction Entrance Sediment Control Devices-a Case Study in the Metro Los Angeles Area**

**Level: Basic**

**Instructors: Williams, Crenshaw**

**Content:**

Stabilizing construction entrance BMP's are intended to help minimize sediment tracked off site by vehicles exiting a construction site. In the Metro Los Angeles area, the typical crushed stone pads did not prove effective and were not meeting acceptable standards of preventing sediment from being deposited on roadways adjacent to construction site. As an alternative to crushed stone pads, track-out plates were placed. Track-out plates work by removing dirt and debris from vehicle tires passing across the devices and are typically placed where job site access/egress roads join public streets. Currently, track-out plates are being used on virtually every construction site. Uses vary from temporary placement on job sites to permanent installations for certain land uses such as rock quarries, waste transfer stations, landfills, scrap yards and recycling facilities. In the metro Los Angeles area, track-out plate systems have proven to be an effective BMP to help prevent debris track-out problems and PM10 dust Abatement.

**Wednesday, June 27, 2012**

**Title: Phase II MS4 Evaluations: Lessons from Oklahoma**

**Level: Intermediate**

**Instructors:** Carrie J. Evenson, PhD.; Wayne T. Craney, P.E.

**Objectives:**

1. Discuss Phase II MS4 evaluations in general
2. Discuss the evaluation process as conducted in Oklahoma
3. Discuss lessons learned through those evaluations

**Content:**

The basic objective is to discuss what Oklahoma has learned through its evaluation of the Phase II MS4 programs across the state. Oklahoma's Phase II Stormwater General Permit, OKR04, became effective on February 8, 2005. Forty-three Phase II MS4s are currently permitted under this general permit. In order to determine the status of program development and implementation, provide technical assistance, and develop productive, cooperative working relationship with MS4 program managers across the state, Oklahoma Department of Environmental Quality (ODEQ) began conducting program evaluations in 2007. By the end of 2012, ODEQ will have evaluated all of the permitted Phase II MS4s. Through this process, ODEQ has learned many lessons, both about the process of conducting evaluations as well as how the Phase II requirements are being implemented throughout the state. In this presentation, we will discuss the things we have learned, common problem areas we have encountered, areas in need of improvement and implementation trends we have observed, and recommendations we have for MS4s as they prepare for the evaluation process.

**Biography:**

Carrie Evenson is an Environmental Programs Specialist IV in the Industrial Wastewater Enforcement Section of the Oklahoma Department of Environmental Quality (ODEQ). She serves as the District Representative for the northwest portion of the state. She also acts as a backup for Stormwater Enforcement staff as needed and has lead the way in developing the MS4 evaluation forms and procedures currently in use by ODEQ. She received her Bachelor's of Science degree in Environmental Science in May 1999, graduating with Special Distinction, and her doctoral degree in Environmental Science in May 2004 from the University of Oklahoma. She has worked for ODEQ for seven years.

Wayne T. Craney is a Registered Professional Engineer in Iowa and Oklahoma and serves as the Engineering Manager for the Industrial Wastewater Enforcement Section of the Oklahoma Department of Environmental Quality (ODEQ). He joined the Water Quality Division of ODEQ in June 1993. He served as a District Engineer in the Public Water Supply Enforcement Section from 1993 to 1996 before being promoted to his current position in November 1996. Prior to joining ODEQ, Wayne served as a Commissioned Officer in the U.S. Public Health Service for 30 years (1963-1993). He received a Bachelor's of Science in Civil Engineering from Iowa State University in 1962, a Master's of Science in Sanitary Engineering from Washington State University in 1969, and a Masters of Business Administration from Oklahoma City University in 1975. In 2007, Wayne received the "Outstanding Engineer in Management" award from the Oklahoma Society of Professional Engineers.

**Wednesday, June 27, 2012**

**Title: Funding Your Stormwater Management Program**

**Level: Intermediate**

**Instructors:** Howard Redfearn

**Objectives:**

Overview of typical budget processes Making the most of the funds you do have Exploration of outside sources of funding and how they can be used to meet the needs of an SWMP

**Content:**

This course will include a general overview of budgeting procedures and then cover several ways to maximize funds. This can be done by reviewing the staff and actions from other departments, cooperating with other communities to get the biggest bang for your buck, and simplifying content delivery to engage audiences while still delivering your message. The context for this section will be using the experience we have gained over the last 5 years to look forward to the upcoming MS4 permit and what it may take in additional funding requirements to comply with the new permit. The last section of this course will include a review of outside funding sources. This will include FEMA backed grants, State backed grants and the revolving loan program, and looking at ways to expand a storm water utility program to ensure the utility fee is assessed equitably and fairly.

**Biography:**

Howard Redfearn Stormwater Manager City of Mansfield Howard Redfearn graduated with a Bachelor's of Science in Kinesiology from UNT in 2001 and received his Master's of Science in Environmental Science from UNT in 2005. He has been in the erosion and sediment control field as a local regulator for almost 7 years. He has been the Stormwater Manager for the City of Mansfield since November 2005. Responsibilities include overseeing the construction inspection program, implementing illicit discharge detection and elimination program, storm water infrastructure maintenance program, coordinating with other departments regarding surface water quality protection, and responding to citizen complaints regarding drainage issues. He is active in the local storm water community through the Regional Stormwater Management Coordinating Council at the North Central Texas Council of Governments.

**Wednesday, June 27, 2012**

**Title: Using Bermuda Grass for Erosion Control**

**Level: Basic**

**Instructors:** Brad Flack

**Objectives:**

- 1) Why Bermuda grass is effective for Erosion Control
- 2) How to install Bermuda grass properly
- 3) What is involved in the maintenance of Bermuda grass

**Content:**

Concrete/ hardscaped slopes on ponds are very costly, which is why many choose more cost effective vegetative slopes. However, erosion in a vegetative detention pond or channel is the single largest expense to repair. But by selecting the correct grass, installing it correctly, having a good understanding of how to feed it and properly maintain it, the costly erosion repairs can be significantly reduced if not eliminated. This presentation covers why Bermuda grass is so powerful in reducing erosion on slopes, how to properly install it and how to correctly maintain it. It dives into plant anatomy, and Nitrogen, Phosphorous and Potassium deficiencies, how to recognize them and correct them. This will also cover methods of site preparation that will yield more efficient, higher productivity and lower cost turf establishment.

**Biography:**

I started out in 2004 learning Storm Water doing detention pond and drainage channel rehab, repair and installation. I then worked in the management of on-going maintenance of ponds and channels with over 1,000 acres under management in the Greater Houston area. Since then I have been working with customers for over 8 years handling the renewal of their permits, managing their inspections, and coordinating underground interceptor cleanouts. In 2011 I earned my CESSWI.

Title: Low Impact Development and Rainwater Harvesting Strategies for the Urban Environment

**Wednesday, June 27, 2012**

**Title: Developing and Utilizing a Comprehensive GIS Based MS4 Map**

**Level: Intermediate**

**Instructors:** Author Elizabeth Young, GISP, Co-Author Brad Daugherty

**Objectives:**

1. Explore methods to develop a comprehensive GIS based MS4 map
2. Understand how GIS is utilized to track MS4 outfalls, controls, and BMPs
3. Understand how GIS is utilized to plan and track maintenance activities that effect water quality

**Content:**

The City of Fort Worth has embarked upon the challenge to locate and map all storm water assets. The goal is to create a complete and comprehensive GIS representing the open and enclosed storm water system allowing the City of Fort Worth to better manage storm water runoff while protecting the environment and providing the highest quality of life for all residents. While many cities currently face this same challenge and are working toward a similar goal, Fort Worth has chosen to use technology to create a database that exceeds the detail and accuracy of most storm water databases. The database not only stores the typical asset information but attached to each asset will be detail attribute information for modeling, photos for all surface features, links to plans and plats, detailed information on water quality devices, as well as condition videos available for assets. In addition to the benefits gained from a detailed GIS in the regular maintenance, management, and modeling of a storm water system, the data is being used to manage the City's inlet marking program, inlet cleaning program, CCTV program and activities related to controls and BMPs. The presentation will focus on the overall methods used to develop the comprehensive GIS and how it is being utilized to meet the responsibilities set forth in the TPDES permit.

**Biography:**

Author Elizabeth Young, GISP 17 years of GIS Experience Bachelor of Science, Environmental Earth Resources, and Texas Christian University

Co-Author Brad Daugherty 14 years of GIS experience Bachelor of Science, Renewable Natural Resources, Texas A&M University Master of Science, Forestry, Texas A&M University

**Wednesday, June 27, 2012**

**Title: Design Challenges of a Porous Pavement BMP Study Area**

**Level: Intermediate**

**Instructors:** Daniel Applegate, P.E., Fouad Jaber, PhD.

**Objectives:**

- 1) The design and implementation of porous pavement into site development applications.
- 2) Impacts of designing multiple storm water BMPs in series to minimize storm water pollutants as well as reducing the size of detention ponds.
- 3) Share initial pollutant removal findings of each pavement material.

**Content:**

Texas A&M University AgriLife Research & Extension and Alan Plummer Associates, Inc. are on a mission to demonstrate that storm water quality can be efficiently, economically, and aesthetically improved to meet the requirements of an ever-increasing environmentally sensitive and regulatory landscape. The research project, which is currently under construction with anticipated completion by May 2012, is located at their Dallas Campus will include the use of several storm water best management practices (BMP) to improve storm water quality. Each BMP has been designed to be routinely monitored by the University to accurately quantify pollutant removal and determine BMP efficiency. These storm water BMPs are planned to be integrated into a planned parking lot expansion at the campus. This paper addresses both the design considerations that were used and the monitoring plan that is proposed to assess the efficiency of the BMPs. The parking lot is designed with five alternative pavement materials including the typically used hot mix asphalt concrete (HMAC), porous concrete, porous asphalt, grass pavers, and permeable interlocking concrete pavers. Each pavement material will be utilized for three parking spaces with a separate under drain system to collect and monitor discharge pollutant levels. The parking lot will consist of five replications of each pavement material and has been designed to provide uniform drainage basin areas for each material type to provide a spatially proportionate data comparison. In order to avoid overflow drainage from affecting other pavement material, an overflow is provided for each material which drains into a bioswale within the parking median. The bioswale has been designed for storm water treatment as well. These swales drain into a small detention area located within the median to provide additional flood storage. It should be noted that porous paving is not intended to be used in high traffic areas as traffic affects the integrity and the life of each material. Typical impervious concrete pavement is used for traffic lanes between parking areas to accommodate these traffic demands.

**Biography:**

Daniel Applegate, P.E. is a graduate of Texas A&M University with a B.S. in Agricultural Engineering and is a registered professional engineer in the State of Texas and Washington. Daniel has over 12 years of experience in municipal engineering experience focusing on storm water management including conveyance, detention pond, erosion control, and low-impact development (LID) as well as the design of the first regional reclaimed water system in North Texas. Daniel is a technical committee member of the ASCE Technical Committee for Sustainable Design of Pipeline and has coauthored several papers for publication.

Title: Development and Modeling of a Passive Flocculent Injection System for Turbidity Reduction in Stormwater Runoff

Dr. Fouad Jaber is an assistant professor and integrated water resources management extension specialist with Texas A&M AgriLife Extension located at the Texas AgriLife Research and Extension Center at Dallas. Dr. Jaber received his Ph.D. in Agricultural and Biological Engineering from Purdue University with emphasis in Natural and Environmental Resources Engineering. He also holds an M.S. degree in Irrigation, a B.S. in agriculture from the American University of Beirut. Before joining he was also a post-doctoral research associate at the Agricultural and Biological Engineering Department of the University of Florida. He has published 12 refereed journal articles and 26 conference proceedings papers in addition to extension publications and governmental reports. His focus at the Dallas Center is that of conducting research and extension programs related to storm water management, stream restoration, and non-point source pollution management from the urban environment and water quality studies. Dr. Jaber is currently managing research programs with funding greater than \$1.2M.

**Wednesday, June 27, 2012**

**Title: Operation and Maintenance of LID Facilities**

**Level: Intermediate**

**Instructors:** Jennifer Walker

**Objectives:** You've Built it Now What? Operation, Maintenance, and Functionality of Green Infrastructure for Sustainable Stormwater Management

**Content:** With the continued and increasing use of green infrastructure or Low Impact Development (LID) to meet local and state requirements as well as the public's desire for more environmentally-sensitive developments, the need for effective operation and maintenance programs is more critical than ever. Although maintenance programs have been inconsistent with traditional stormwater infrastructure, a common concern regarding green infrastructure is whether and how it functions in the long-term. This session addresses typical operation and maintenance requirements for various LID Integrated Management Practices (IMPs) as well as anticipated life-cycles and long-term and annual operation and maintenance costs. A case study and operation and maintenance plan and associated long-term maintenance costs is also presented.

**Biography:** Jennifer J. Walker, P.E., D.WRE, CFM, QSD, PRINCIPAL

Walker, President of Watearth, Inc. is one of the first 500 engineers to receive the Diplomate, Water Resources Engineer certification (D.WRE). Walker has a Masters in Civil Engineering, is a Certified Flood Plain Manager, and is a licensed Professional Engineer in multiple states. Walker is a nationally-recognized leader in Low Impact Development (LID), water quality, and hydrology/hydraulics. Walker's water quality and LID experience includes criteria, training, master plans, modeling/analysis, and design for projects ranging from small-scale sites to transportation, military, federal, commercial, public works, and watershed-wide projects. She has reviewed, evaluated, and investigated LID policies, criteria, and hundreds of projects nationwide and is well-versed in the latest research, monitoring, and customization of LID and BMP designs.

- Ahead of the curve in integrating Water Quality, LID, and H/H
- Adept at solving complex and politically-sensitive issues
- Significant hands-on experience in modeling, construction, and maintenance of LID
- Highly sought-after national seminar instructor
- Trained Thousands of Engineers through ASCE, CASQA, and FMA

**REPRESENTATIVE NATIONWIDE STORMWATER COURSES (INSTRUCTOR)**

- Advanced Low Impact Design for Sustainable Stormwater Management
- Advanced Detention Routing: Improving Operation and Effectiveness
- Analysis of Green Infrastructure: Easy-to-Implement Methods
- Curve Number and Vegetative Techniques to Manage Stormwater Sustainably
- Economics and Benefits of Low Impact Development
- Engineered Bioretention and Rain Gardens Design
- Stormwater Quality BMPs That Work
- Sustainable Stormwater Hydrology
- You've Built it Now What: O&M for Green Infrastructure

**EDUCATION**

Masters in Civil Engineering (Water Resources). University of Houston.

Permaculture Designer's Certificate (Sustainable Development + Water).

Bachelor of Science in Civil Engineering (Environmental + Water). Kansas State University.

**Wednesday, June 27, 2012**

**Title: Hydrologic Information Systems for Watershed Management in the South Central United States.**

**Level: Basic**

**Instructors:** John A. McEnergy, Ph.D., P.E., CFM Assistant Professor of Water Resources The University of Texas at Arlington  
Department of Civil Engineering

**Objectives:**

1. Identify the spectrum of near-time water quantity/quality information now available through emerging data sharing systems.
2. Provide instruction by live demonstration of steps for accessing online data servers.
3. Discuss applicability of this data to storm water problems and methods for partnering to provide new information.

**Content:**

This session will focus on the use of newly emerging systems to share and access near-time data pertinent to storm water and watershed management. This introductory-level course is appropriate for individuals, government and nongovernment program managers and staff interested in leveraging online information and data to support watershed analysis, planning and management. Live demonstration will be provided of internet based informational tools. The lesson will outline the spectrum of data available, applicability of this data to storm water problems and also methods for partnering to provide new information. Technology to measure and record hydrologic data has improved dramatically in recent years. Advancements have been accomplished through the efforts of several organizations, including key Federal agencies; the Environmental Protection Agency, the NWS, the U.S. Geological Survey (USGS), the U.S. Army Corps of Engineers (USACE), and the Natural Resource Conservation Service. However, much existing data has not been readily available for public access or transferable among the agricultural, engineering and scientific communities. Data are often recorded and archived in a variety of different formats and perhaps not published at all. To meet the needs of decision makers and managers in all sectors of water resources, several federal agencies initiated an effort known as Integrated Water Resources Science and Services (IWRSS). This requires the partnership of not only federal water agencies, but also State and regional entities working toward an integrated framework to provide a seamless suite of water resources information. As a pilot project of the IWRSS initiative, The University of Texas at Arlington and the National Weather Service (NWS) –have partnered to establish a hydrologic information server to ingest, archive, and disseminate hydrologic information such as hourly precipitation from the West Gulf River Forecast Center (WGRFC) and Arkansas-Red Basin River Forecast Center (ABRFC). Those data are maintained using a Standard Query Language server and are made available for public access in a standard format. The server now includes near-time observations of precipitation, stream discharge, and lake level and storage volume across much of the south central region. This course will introduce attendees to the kinds of water quantity and quality data available from this UTA server and a federated network of similar hydrologic information servers. Discussion will include alternative forms of rainfall information; physical gages, Nexrad radar and the proposed North Texas CASA radar network. The session will include demonstration of online tools for access of this information. The workshop will conclude with points for sharing and adapting information from this system for specific needs.

**Biography:**

Dr. John McEnergy has expertise in water resources, hydrology, hydraulics and numerical modeling. His research includes the hydraulics of open channel river flows over sediment bed forms in a recirculating flume, and cross-validated results from the physical experiment with numerical and mathematical models of the same domain. As a visiting researcher with the National Weather Service Office of Hydrologic Research he collaborated on development of flood forecasts tools including unsteady river flow models and coupled contaminant transport models. In addition, he has many years of experience as a consulting engineer in the fields of hydraulics, hydrology and storm water drainage. He is currently leading a collaborative project with the National Weather Service to develop a regional hydrologic data exchange network and serves on National, State and Regional committees for hydrologic and hydraulic science.

**Wednesday, June 27, 2012**

**Title: Southeast Texas Stormwater Quality BMP Database**

**Level: Intermediate**

Instructors: Robert Snoza, Catherine Elliott

**Objectives:**

Stormwater quality BMP regional management Automated BMP evaluation methods Local implementation of International BMP Database

**Content:**

The International BMP Database is a coalition project supported by the Water Environment Research Foundation (WERF), American Society of Civil Engineers (ASCE) Environmental and Water Resources Institute (EWRI), United States Environmental Protection Agency (USEPA), Federal Highway Administration (FHWA) and the American Public Works Association (APWA) that aids communities and industries with Best Management Practice (BMP) selection and performance monitoring. The long-term goal of the database is to gather sufficient technical design and performance monitoring and reporting information to improve BMP selection and design so that local storm water problems can be effectively addressed. The International BMP Database website currently allows users to select BMPs on a map through a BMP Mapping Tool and to generate portable document format (pdf) data reports. The current version of the database is distributed as a downloadable Microsoft Access database. All available database-related products and reports have been produced by the database team and are available in static pdf format. In 2001, Harris County Flood Control District (the District) retained Atkins to develop and implement a regional BMP monitoring program, including monitoring protocols based on guidance prepared for the International BMP Database. Monitoring data has been collected using the protocol at seven HCFCD storm water facilities that incorporate various BMPs. Results include precipitation, flow rates, aliquot timing, laboratory data (grab and composite), and in-situ data. In 2007, the District retained Atkins, WWE, and Geosyntec to help the District define a custom user interface for the International BMP Database, so that users could produce reports and plots in real time from a locally implemented version of the International BMP Database via an internet browser. The Southeast Texas Stormwater Quality BMP Database is currently in final testing and HCFCD plans to have the application live by Spring 2012. The application will provide a centralized, local management tool for assessing the appropriateness of BMPs under a variety of site conditions and includes data storage capabilities not currently found in the International BMP Database. Following successful implementation, the web-based user interface application will be made available to WERF and the rest of the International Stormwater BMP Database team for implementation in their hosting environment. The PowerPoint presentation will provide an overview of the database and the user interface functions. Screen shots of the interface and example reports produced using its functionality will also be included in the presentation. If possible, a live demonstration of the Southeast Texas Stormwater Quality BMP Database will be conducted during the session. In addition to providing details about HCFCD's BMP Database, the course will also provide background information about the International BMP Database and the BMP effectiveness monitoring protocol.

**Biography:**

Catherine Elliott, Catherine is the Manager of the Stormwater Quality Department for Harris County Flood Control District. She has been employed by the District for over 25 years. She has extensive experience in municipal storm water quality management, MS4 permit compliance activities, storm water management program development and implementation, stream restoration activities and other related water quality issues and research. Catherine may be reached at (832) 256-2039 or [catherine.elliott@hcfcd.org](mailto:catherine.elliott@hcfcd.org).

Robert E. Snoza, is the Stormwater Quality Monitoring project manager for the Harris County Flood Control District (HCFCD) Environmental Services Division (ESD). Mr. Snoza currently manages both ambient and wet-weather water quality monitoring projects for HCFCD, including ongoing turbidity and indicator bacteria assessments. He provides additional oversight and management of HCFCD revegetation and regional BMP database projects as well as construction general permitting for HCFCD construction projects. Mr. Snoza has been with the HCFCD since 2003. Mr. Snoza holds a Bachelors of Arts Degree in geography from California State University, San Bernardino. Robert may be reached at (713) 316-48459 or [robert.snoza@hcfcd.org](mailto:robert.snoza@hcfcd.org).

**Wednesday, June 27, 2012**

## **Title: Designing Sediment Controls for Effluent Limit Guidelines**

**Level:** [Intermediate](#)

Instructors: Thomas W. Schneider, CPESC

### **Objectives:**

1. Address the current challenges of Effluent Limit Guidelines on construction sites
2. Identify site conditions affecting the performance of sediment control
3. Develop a sediment control design by TR-55 rain event modeling, use of USGS Soil Survey website and soil loss models

### **Content:**

We all understand that the new Effluent Guideline Limits will be a fundamental change in construction storm water permit compliance. Currently we are compelled to meet a permit requirement of maximum extent practical which is an idea that we are trying to achieve. With the ELG requirement we will be held to a hard performance standard. In other words we need to achieve the numeric goal or we fail. There will be no more wiggle room for the regulated or the regulator. Both entities will be looking for the same ELG outcome. The result will be the practice of designing an inadequate sediment control plan and relying on the storm water inspectors and contractors to correct the plan after each rain event is coming to an end.

This course will identify the site conditions that will affect the performance of the sediment control. By knowing and understanding how the site conditions affect the sediment control you can account for these conditions and develop a sediment control design that will meet the ELG limits. In addition to covering the site conditions that will affect the sediment control design we will be instructed by a NRCS representative on how to operate the USGS soil survey website, and a brief overview TR-55 rain event modeling. We will go over soil loss models and which is the correct model for sediment control design on construction sites.

### **Biography:**

As Head of Storm Water Compliance at Stormcon, L.L.C., Tom Schneider brings 23 years of experience and extensive training in storm water regulations focusing on construction site erosion and sediment control. Mr. Schneider works directly with local, state, and federal agencies as well as working one on one with clients to develop and implement storm water programs that will fit their needs. In the past, Mr. Schneider has been invited to testify in front of congressional subcommittees in regard to NPDES issues.

Workshops taught by Mr. Schneider across the state of Texas include:

- Inlet protection
- Inspector training
- Erosion and sediment control selection,
- Sediment control design and
- How to implement a storm water program at your company

In addition, Mr. Schneider has the following accreditations:

SCIECA President

CPESC

SCIECA Board Member

IECA Member

SBCA Government Relations Committee

STEP Member

**Wednesday, June 27, 2012**

**Title: Aransas County Integrated Stormwater Management Program: Focused Watershed BMP Planning Process for NPS Section 319 Grant**

**Level:** Intermediate

**Instructors:** Linda D. Pechacek, P.E.

**Objectives:**

1. Update on the implementation of the Aransas County's Integrated Stormwater Management Program
2. Focused watershed planning process for Section 319 NPS grant
3. Application of Constraints and Opportunities when selecting alternative design features and components

**Content:**

Aransas County is a unique coastal area located outside the urbanized area whose citizens want to sustain and improve the quality of life in the County. Central to these desires is the protection of the environment and unique aquatic ecosystem from uncontrolled storm water releases and nonpoint source pollution. In 2008 with broad citizen support, the County initiated its planning process for storm water management that included quantity, quality and ecological aspects. An update of the implementation of the Aransas County Stormwater Management Program will be presented along with a targeted discussion of the BMP selection and design consideration process that identifies the guiding principles, the engineering and environmental analysis and approach, the constraints and the opportunities for a BMP and bank stabilization plan proposed for Tule Creek watershed under a Section 319 NPS grant.

**Biography:**

Ms. Pechacek, P.E., received a BSCE in 1985 and a MSCE in 1993 from the University of Houston. Ms. Pechacek's practice in water resources includes both engineering and environmental science disciplines. Her chosen areas relate to both quantity and quality aspects of storm water runoff, including applications that develop or enhance management tools for public sector clients. The tools may be applicable to program management, project management, or the resolution of regulatory issues. Ms. Pechacek's technical background includes storm water permit and compliance evaluations, field procedures and processes related to data collection, verification and relevance, storm water quality modeling and urban drainage/hydrology. Her consulting work integrates/optimizes storm water quality control solutions.

**Title: Legacy Pollutants in Fort Worth's Urban Lakes**

**Level: Basic**

**Instructors:** Clarence W. Reed, City of Fort Worth

**Objectives:**

- 1) Define what are legacy pollutants?
- 2) Identify how fish tissue get contaminated?
- 3) Describe some mitigation options for legacy pollutants.

**Content:**

This presentation provides a history of the problem of legacy pollutants in the City of Fort Worth's urban lakes, and the efforts of the City, State, and EPA to better understand the issue and bring these lakes back to a fishable condition. In 1995, the Texas Department of Health issued fish consumption bans on three small lakes in Fort Worth due to elevated levels of legacy pollutants such as chlordane and PCBs. These lakes were subsequently placed on the State's 303(d) list. These lakes were included in a fish tissue study by the Texas Commission on Environmental Quality (TCEQ) and a sediment project by the United States Geological Survey (USGS) in 1999-2000. Together, these studies assessed fish tissue contaminant levels and described historical trends in the occurrence of selected legacy pollutants. The basis for developing these projects was to assist TCEQ staff in preparing a Total Maximum Daily Load (TMDL) for Legacy Pollutants. The City of Fort Worth, committed to investigating water quality conditions in its impaired urban waterways, received a grant from the Environmental Protection Agency and developed a study by which to investigate pollution sources and mitigation options for these impaired lakes. This project was designed to supplement and expand upon the TCEQ/USGS projects mentioned above. While certain elements stood alone, others were dependent upon the findings of the TCEQ/USGS studies. The ultimate goal of the City project was to determine if there are cost effective options that can be utilized to return urban water bodies affected by legacy pollutants to a "fishable" condition. When the City issued its final report in 2006, all three lakes remained under a consumption ban. However; since that time, fish tissue contaminant levels in two of the lakes have dropped sufficiently for the fish consumption bans to be rescinded.

**Biography:**

Clarence has been employed by the city of Fort Worth for 15 years, most of that time with the environmental management division's water quality group. He is currently the program manager for the city's environmental regulatory compliance group and Household Hazardous Waste collection facility.

**Title: Low impact development practices for heavy clay soils: Design, construction and performance**

**Level:** Intermediate

**Instructors:** Fouad Jaber, Ph.D. Assistant Professor and Extension Specialist Biological and Agricultural Engineering Dept. Texas Agrilife Extension Service, Texas A&M University System.

**Objectives:**

Benefits of Low impact development practices (bio-retention, rainwater harvesting, green roofs, permeable parking and sustainable detention ponds) Design requirements in heavy clay soil area Expected performance of LID practices in clay areas with regard to volume reduction and water quality treatment

**Content:**

Low impact development is being adopted as an alternative to conventional storm water structures in most of the US. In areas with heavy clay soils such as the Black land Prairie ecosystem, the efficiency and the cost of using LIDs has been questioned due to the low infiltration capacity of the soils. Appropriate techniques to design and construct LID practices in clay soil including bio-retention, rainwater harvesting, green roofs, permeable parking and sustainable detention ponds will be discussed in this presentation. The performance of these LID practices will also be presented from Data collected from LID practices in Dallas, TX.

**Biography:**

Dr. Fouad Jaber is an assistant professor and integrated water resources management extension specialist with Texas A&M AgriLife Extension located at the Texas AgriLife Research and Extension Center at Dallas. Dr. Jaber received his Ph.D. in Agricultural and Biological Engineering from Purdue University with emphasis in Natural and Environmental Resources Engineering. He also holds an M.S. degree in Irrigation, a B.S. in agriculture from the American University of Beirut. Before Joining He was also a post-doctoral research associate at the Agricultural and Biological Engineering Department of the University of Florida. He has published 12 refereed journal articles and 26 conference proceedings papers in addition to extension publications and governmental reports. His focus at the Dallas Center is that of conducting research and extension programs related to storm water management, stream restoration, and non-point source pollution management from the urban environment and water quality studies. Dr. Jaber is currently managing research programs with funding greater than \$1.2M.

**Title: MS4 Annual Reports in the Houston Region**

**Level:** Basic

**Instructors:** Rachel Powers

**Objectives:**

- 1) Identify common practices for Phase II MS4s
- 2) Learn how Phase II MS4s have collaborated to meet permit requirements
- 3) Learn about creative solutions by MS4 operators to permit requirements

**Content:**

H-GAC requested and received copies of annual reports from over 100 Phase II MS4 operators in the greater Houston region. The presentation will summarize an analysis of those annual reports, with information about common practices, collaboration opportunities, and creative solutions. Discussion will be couched from the perspective of how MS4s can contribute to lowering bacteria levels in streams that TCEQ has listed as impaired.

**Biography:**

Rachel Powers joined the Houston-Galveston Area Council (H-GAC) as a Senior Environmental Planner in March of 2008. She manages the development and implementation of a plan to address bacteria impairments in waterways in the Houston region. Prior to joining H GAC, Rachel conducted outreach related to maintenance activities for the Harris County Flood Control District for six years. She has extensive experience working as a program manager and environmental educator. Rachel received her B.A. from Rice University and her MBA from University of Phoenix.

## **Title: Watershed Modeling of LID Facilities**

**Level: Intermediate**

Instructors: Jennifer Walker

**Objectives:** Modeling Watershed Benefits of Green Infrastructure for Various Levels of Development

**Content:** The modeling for this project is based on a GIS-based Low Impact Development (LID) Siting Tool developed for the San Francisco Bay region. While standard decision tables often indicate various LID tools are applicable for certain physical characteristics, few recognize the varying degrees of applicability. The GIS database and decision support system uses fuzzy logic to determine areas suitable for the following Green Infrastructure techniques within the region: Bioretention, Vegetated Swales, Permeable Pavement, Stormwater Wetlands, and Wet Ponds. The site selection tool includes: depths to groundwater, depths to bedrock, slopes, liquefaction risk, soil type, land use, impervious cover, and buffers from contaminated sites. The EPA SWMM model is used to estimate the benefits of wide-scale LID implementation on 20- to 25-percent of the land area within a relatively undeveloped (less than 30% impervious cover) three-square mile watershed as well as overall watershed impacts on the entire Sonoma Creek watershed. A comparison scenario is analyzed for the 10-year, 48-hour design storm event for the same watershed with 60-percent impervious cover. Bioretention, Vegetated Swales, and Permeable Pavement are applied across the watershed and analyzed for Type B and Types C and D soil categories.

**Biography:** Jennifer J. Walker, P.E., D.WRE, CFM, QSD, PRINCIPAL

Walker, President of Watearth, Inc. is one of the first 500 engineers to receive the Diplomate, Water Resources Engineer certification (D.WRE). Walker has a Masters in Civil Engineering, is a Certified Flood Plain Manager, and is a licensed Professional Engineer in multiple states. Walker is a nationally-recognized leader in Low Impact Development (LID), water quality, and hydrology/hydraulics. Walker's water quality and LID experience includes criteria, training, master plans, modeling/analysis, and design for projects ranging from small-scale sites to transportation, military, federal, commercial, public works, and watershed-wide projects. She has reviewed, evaluated, and investigated LID policies, criteria, and hundreds of projects nationwide and is well-versed in the latest research, monitoring, and customization of LID and BMP designs.

- Ahead of the curve in integrating Water Quality, LID, and H/H
- Adept at solving complex and politically-sensitive issues
- Significant hands-on experience in modeling, construction, and maintenance of LID
- Highly sought-after national seminar instructor
- Trained Thousands of Engineers through ASCE, CASQA, and FMA

### **REPRESENTATIVE NATIONWIDE STORMWATER COURSES (INSTRUCTOR)**

- Advanced Low Impact Design for Sustainable Stormwater Management
- Advanced Detention Routing: Improving Operation and Effectiveness
- Analysis of Green Infrastructure: Easy-to-Implement Methods
- Curve Number and Vegetative Techniques to Manage Stormwater Sustainably
- Economics and Benefits of Low Impact Development
- Engineered Bioretention and Rain Gardens Design
- Stormwater Quality BMPs That Work
- Sustainable Stormwater Hydrology
- You've Built it Now What: O&M for Green Infrastructure

### **EDUCATION**

Masters in Civil Engineering (Water Resources). University of Houston.

Permaculture Designer's Certificate (Sustainable Development + Water).

Bachelor of Science in Civil Engineering (Environmental + Water). Kansas State University.







