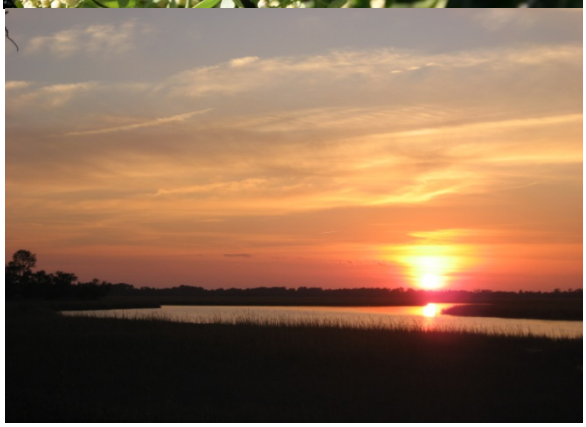

SUSTAINABLE DEVELOPMENT IN COASTAL SOUTH CAROLINA

March 10th – 11th ~ Technical College of the Lowcountry, Beaufort SC

We thank the following event partners for their generous support:

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Cover Photo attributes:
Live oak, monarch butterfly and sunset view: Kim Counts, SC DNR
Charleston, SC - stormwater ponds aerial: George Steele, SC DNR

A New Kind of Development: Paying For and Promoting Sustainable Development

Andrew Westbrook

Project Director
UNC Environmental Finance Center
Chapel Hill, NC

As communities implement stormwater management programs in compliance with MS4 permits under NPDES Phase II, the discussion about the most effective and efficient ways to mitigate stormwater runoff has evolved. Different management approaches frequently involve tradeoffs between the level of public versus private effort required. Achieving the appropriate balance is essential for effective stormwater management systems, and the primary balancing tool is stormwater utility fee setting. This talk will cover the ways in which communities can use fees and incentives to both pay for public services and incentivize private efforts to most effectively mitigate stormwater runoff.

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Lessons from the Past and Plans for the Future

Christina Lathrop
Dix.Lathrop and Associates

The post WWII boom led to very efficient mass housing development patterns. Typical patterns include a mass graded site, cleared vegetation, saved wetland areas, and graded and sodded retention and detention ponds. The above has resulted in sites and communities with heavy soil compaction, high clay, silt and low nutrient content in surface soils. Typical landscape treatments following construction completion include a sod lawn and irrigation, resulting in a high level of nutrient heavy runoff draining to stormwater ponds and offsite natural areas.

A community developed as described above has huge implications relative to the nutrient load on the natural watershed. The development pattern described above, if continued and compounded, will have and is having a long-term detrimental effect on our watersheds and the ability of the watershed to assure protection and propagation of a balanced, indigenous population of shellfish, fish and wildlife.

There must be a paradigm shift. Development patterns must change to provide a long-term solution to the above problem. Low Impact Development (LID) and light imprint practices will result in a development pattern that is not detrimental to the watershed. A strategic approach must be implemented to achieve the above.

LID practices must be integral at the onset of the land plan. The design team (landscape architect, horticulturalist, planner, civil engineer, architect and developer) can work together to create economically feasible densities, working around functional areas that serve to filter storm water runoff, while providing for wonderful, usable open space. The existing canopy and lay of the land is preserved. Existing on site watersheds are honored and followed. Planning strategies include the preservation of water, right plant, right place landscape practices, and the preservation of existing vegetation and introduction of canopy to reduce grassed areas.

The overall community vision must be established to achieve the above. A holistic approach is utilized for the development. Individual home design parameters need to be established for landscapes, and should include environmentally friendly guidelines addressing water efficiency, proper fertilization, mulching, providing for wildlife, managing yard pests, and on lot filtration of stormwater. The design of homes should meet sustainable design guidelines (i.e. USGBC or FGBC), promoting the use of sustainable materials, and designed for efficient energy use and high air quality.

The above will result in a community aesthetic and ideal that is extremely marketable, achieves appropriate, economically viable densities, saves on underground infrastructure costs, works with the existing character of the land, and is environmentally responsible to the regional watershed.

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Leveling the Playing Field for Innovation

Mike Novotney
Center for Watershed Protection

This presentation will introduce an integrated approach to natural resource protection, stormwater management and site design that puts innovative stormwater management practices, such as better site design and low impact development practices, on a level playing field with more conventional stormwater management practices, such as wet and dry ponds.

More often than not, the stormwater management practices used to meet existing stormwater management regulations are conventional "end-of-pipe" practices, such as wet and dry ponds. Many innovative stormwater management practices, such as low impact development practices, which have proven themselves effective at reducing stormwater runoff rates, volumes and pollutant loads on development sites, are not even considered during the site planning and design process. There are a number of reasons for this, but some of the blame has to be given to the regulations themselves and the "capture and treat" approach to stormwater management that they promote.

This presentation will discuss the Center for Watershed Protection's most recent efforts in coastal Georgia, Virginia and Delaware to revise existing stormwater management regulations and promote an integrated, green infrastructure-based approach to natural resource protection, stormwater management and site design that emphasizes the use of innovative stormwater management practices, such as better site design and low impact development practices, during the site planning and design process. At the heart of these efforts is the runoff reduction concept, which puts innovative stormwater management practices on a level playing field with conventional stormwater management practices, such as wet and dry ponds.

Useful Resources

Georgia Coastal Stormwater Supplement
http://www.mpcnaturalresources.org/water-resources/georgia-storm-water.html

Technical Memorandum: The Runoff Reduction Method
http://www.cwp.org/Resource_Library/Center_Docs/SW/RRTechMemo.pdf

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Sustainability Grounded in Community Fabric

Tommy Linstroth
Melaver Company

Sustainability is a buzzword tossed around with great frequency at any number of initiatives. But having sustainability embedded into the fabric of a community charts a path towards a long-term shift to a more economically prosperous and healthier community with a higher quality of life for residents. Linstroth will discuss the current state of the environment and demonstrate how local communities can have a significant impact on such large scale issues as climate change and water availability by holistically adopting sustainability programs rather than taking a piece-meal approach.

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Light Imprint: A Handbook & Toolbox for Implementing Sustainability and Community Design

Thomas E. Low
Principal and Director of Town Planning, DPZ & Co

Participants will be introduced to the concept of Light Imprint Urbanism; differentiate methods used for Light Imprint development from other methodologies (such as Low Impact practices); will understand how over 60 LI tools are organized using select variables; use the Light Imprint to calibrate appropriate stormwater management tools for their projects; and, analyze savings realized from the use of LI techniques with a sixty-tool matrix, searchable database, and case studies.

Light Imprint developed out of the need for a new ecological solution that is compatible with successful urban design. It is a planning and development strategy that emphasizes compact, mixed-use, pedestrian-oriented design, and environmental efficiency. At the same time, this stormwater management system reduces the anticipated infrastructure costs of a community. Light Imprint is based on transect-based environmental metrics not found in other strategies. Elaborating on this sustainable approach to urbanism, a group of urban designers, passionate about sustainability, have published the *Light Imprint Handbook: Integrating Sustainability and Community Design*. In the handbook, the transect-based matrix organizes over sixty tools and resources in a simple, useful form.

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Stormwater and Planning Working Together

Dan Ahern
Beaufort County Stormwater Program Manager

The presentation will stress the need for coordination between stormwater management controls and planning. It will focus on two activities that recently were conducted in Beaufort County.
The first was a county/municipal effort between stormwater and planning to evaluate the link between stormwater and land use. The benefits and lessons learned will be shared. The second was a recent case of stormwater nitrogen reduction requirements and the need to coordinate with planning to make sure that the new requirements are properly understood and coordinated before proposing. A description of issues raised that would have been eliminated by upfront coordination. The benefits of this effort will be shared.

Biography

Dan Ahern has been Manager of Beaufort County Stormwater Utility since July 2007.
This utility serves a coastal county in South Carolina with strong local support for maintaining its water resources. The utility has approximately forty personnel addressing stormwater issues in the county and supporting efforts in four municipalities in the county.
He is a professional engineer in Georgia and South Carolina with degrees in Civil and Environmental Engineering. Dan retired from the US Environmental Protection Agency after 35 years where he managed the Southeast Region's Pollution Prevention Program. He is also retired from the US Army.

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The Economics of Sustainability:
Willingness to Pay for the Benefits of LID

Fred J. Hitzhusen
Professor, Environmental and Natural Resource Economics, Ohio State University

This presentation provides a general overview of the basic economic notions that underlie the benefits of low impact development (LID): willingness-to-pay (WTP) and willingness-to-accept compensation (WTA). It also summarizes the specific extra- and non-market estimation methods utilized by environmental and natural resource economists to estimate WTP and WTA values more holistically. Several examples of LID environmental economic benefits that have been estimated by OSU environmental economists are presented, selected methods are then applied to a specific case involving a proposed restoration of the Muskingum River Corridor in S.E. Ohio, and conclusions are drawn. Finally, implications for policy are suggested for a broad range of LID projects. This presentation is intended as an introduction to and overview of non-market valuation and its relevance to LID, not as a comprehensive treatment of this large and expanding field.

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Smart Growth and the Financial Aspects of Sustainable Design

John Thomas
Sustainable Design Consultants, Inc.

With the steady advancement of development pressures in the Southern US over the past decades and the anticipated growth yet to come, water resource protection has become a high priority for communities across the nation and with the current cycle of droughts, it has become particularly important in the Southern US. Add to this the economic issues facing communities throughout the country and it quickly becomes evident that the old way of designing and developing in the south is no longer economically or environmentally sustainable. Sustainable design encompasses many areas of the site design approach. Smart Growth Communities, Sustainable site design, Low Impact Development, Storm Water Mitigation and Water Quality enhancement measures are all proven measures that can help to mitigate the negative effects of growth.

Sustainable Design Consultants, Inc. carefully plans its projects while employing a wide variety of construction techniques and storm water best management practices (BMPs) to retain more storm water on site, force percolation back into surrounding soils and greatly reduce the need for dangerous and unsightly storm water detention ponds. The detention facilities that may be needed are typically much smaller and are designed as shallow lagoons with plantings to enhance aesthetics and water quality improvement through the actual removal and conversion of a majority of the pollutants in the runoff, which renders these pollutants harmless and non-toxic.

Storm water treatment can be achieved through the use of such measures as bio-basins and rain gardens, bio-swales, creation of fresh water wetlands, filter berms and the use of permeable paving in lieu of impervious surfaces. Such steps, properly designed and implemented, can reduce actual storm water runoff by 50% or more and in some instances can eliminate the need for detention basins entirely. While the initial benefit from a cost perspective can be a reduction in conventional site construction costs by 20% to 30%, the long term benefits can be a significant reduction in maintenance costs and a postponement or even elimination of costly storm water improvements necessitated by continued development. This session will focus on the planning and economic issues associated with growth and use project examples to illustrate some solutions that communities can embrace. Mr. Thomas will also give an overview of sustainable design methods that his firm employs.

Biography

John Thomas, President of Sustainable Design Consultants, Inc. has been actively involved in sustainable site design for 35 years and designed and constructed his first storm water lagoon system in 1989. Mr. Thomas has experience working in 10 states, over 50 different cities and municipalities as well as 3 foreign countries and is frequently a featured speaker on these issues at professional organizations and conferences around the country.

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Economic, Water Quality and Water Supply Benefits of Sustainable Development

Jeff Gowdy
J. Gowdy Consulting

This presentation will pull mainly from the report that Gowdy created for the Lawrence Bros, LLC, developers of Morgan Park Place in Nashville, TN. The title of the report is "A Study: Economic, Water Quality, and Water Supply Benefits of Sustainable Real Estate Development in Middle Tennessee." The report creates a business case to demonstrate the economic and ecological benefits of sustainable real estate development in the middle Tennessee region. In terms of ecological benefits, this report focuses on water quality and water supply benefits.

The following is a list of development and building activities that are included in the business case.

- Irrigation Systems (Drip system, rain sensor, moisture sensor)
- Erosion Control (Landscaping/Vegetation)
- Sediment Control (Silt Fencing)
- Stormwater Control (Rain gardens, gravel pits, and pervious pavement)
- Kitchen Equipment (Dishwashers)
- Laundry Equipment (Washing machines)
- Plumbing (Tankless Water Heater)
- Efficient Energy Sources (higher SEER HVAC)

The list of activities represents the development and building activities that primarily affect water quality and water supply, as determined by the author and the report's recipients. It is noted that other development and building activities can also have an effect on either or both water quality and water supply. Further research into these additional activities is acknowledged as a possibility and is recommended.

The business case presented in this report is primarily based upon a comparison between development and building practices considered to be "standard" and development and building practices that were conducted at Morgan Park Place. The comparison of standard practices to the practices at Morgan Park Place is based upon primary financials, e.g. purchase price, expected fines. The comparison does not include some financials, e.g. time-based tax credits. It is noted that other financials affect the comparison but not at the magnitude that primary financials do. Further research into these secondary financials is acknowledged as a possibility and is recommended.

For this case study, which focused specifically on the Morgan Park Place development, Lawrence Bros., LLC and New Urban Construction were both the developer and the builder.

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Regulations and Incentives: Barriers to LID in the Lowcountry

Lisa Vandiver
University of South Carolina, Department of Environmental Health Sciences

Developers, engineers and regulatory agencies have recently been considering the use of alternative stormwater management strategies, such as Low Impact Development (LID) practices (e.g., bioretention swales and pervious pavement), to address the water quality issues associated with stormwater runoff. LID practices have been proven to be effective in reducing runoff rates and retaining stormwater pollutants; however, these studies have been conducted in areas outside of the southeast coast and may not apply to regional soils and shallow water tables. In addition to the lack of regional data, perceptions of LID practices, regulatory obstacles, design requirements, lack of engineering and/or construction expertise, and economics have also been identified as reasons for the limited implementation of LID practices along the Southeast coast. This study was conducted to identify the technical, implementation process, and perception obstacles in the selection and use of LID practices to fulfill the stormwater management requirements of this region.

Twenty decision-makers along the process map (e.g. developer, public/private-sector engineer, public/private-sector land planner, architect, contractor/supplier, and state/local regulatory staff) were identified, through snowball sampling, and interviewed to verify and further refine technical, implementation process, and perception obstacles in the selection and use of LID practices along the South Carolina coast. The interviews were analyzed and summarized to serve as the basis of a workshop conducted in January 2009, *Stormwater Management in Coastal SC: A Focus on Stormwater Ponds and Low Impact Development (LID) Practices,* and provide a forum for decision-makers to exchange ideas and utilize a collaborative approach to assessing the opportunities and obstacles for implementing Low Impact Development (LID) practices as well as options for improving stormwater pond design.

This presentation serves as a culmination of the research that will identify the informational, regulatory, and educational needs of stormwater professionals regarding both traditional and alternative stormwater management technologies. This information will also provide options for addressing the weaknesses associated with these stormwater management strategies. Ultimately, this information will serve to assist coastal communities and decision makers in making decisions regarding the selection and implementation of stormwater management strategies.

Biography

Lisa Vandiver is a PhD candidate in the Environmental Health Sciences Department at the University of South Carolina. In 2005, she received her Masters from the Environmental Studies program at the College of Charleston. There she researched the application of vegetated buffers in residential settings along the South Carolina Coast. Currently she is analyzing the implementation of Low Impact Development Practices (LIDs) in the development of Oak Terrace Preserve in North Charleston.

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Getting LID in the Ground Through Local Government Regulations and Incentives

Christy Perrin
Watershed Education for Communities and Officials (WECO)

How are local governments getting low impact development in the ground in their communities? As you will hear in this presentation, local governments are employing a range of methods to encourage, entice, and require LID as a tool to protect natural resources while their community grows or redevelops. Christy will share strategies she learned while co-authoring North Carolina's soon-to-be-released LID Manual, facilitating community discussions about LID, and reviewing ordinances for local governments in North Carolina. She will also present some fundamental principles that are necessary for making progress on LID, and will provide some tools to help bring LID into your community.

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Regulations and Incentives: Lessons Learned in the Upstate

Erika Hollis
Urban Rivers Project Associate, Upstate Forever

This presentation will provide a brief overview of the recently awarded EPA Targeted Watershed Grant entitled "Market-Based Mechanisms for Promoting Low-Impact Development, Mitigating Legacy Stormwater Discharges, and Restoring Urban Floodplains in the Saluda-Reedy Watershed, SC". The Saluda-Reedy Watershed is located in one of the fastest growing regions in the nation. Located at the foothills of the Blue Ridge Mountains in the northwest corner of South Carolina extending southeast to the shores of Lake Greenwood it encompasses 1,400 miles of perennial streams. Due to its desirable location, climate, and diverse economic base the watershed has been experiencing a steady increase in population, which is projected to continue for years to come. As a result, land use changes have and will continue to have a significant impact on the water resources of the region.
The grant components that will be discussed are the Stormwater Banking Program (SBP) and the Floodplain Restoration Bank (FRB). The main objective of each of these is to create market-based programs that will provide incentives to developers in return for their participation in one of the banks. Each bank will have some criteria that a new development will have to meet in order to participate. However, this presentation will focus on the potential incentives for developers and the lessons learned so far – why some incentives won't work in this area and what you should look for to determine if they would be successful (or not) in your area.

Biography

Erika Hollis is an Urban Rivers Project Associate with Upstate Forever. Before joining Upstate Forever in 2008, Erika most recently worked as a Watershed Manager for the Juniata Watershed in Central Pennsylvania. Prior to that, Erika spent five years as an Associate Researcher at the Great Lakes Water Institute (GLWI) studying the impacts of bacterial pollution on Lake Michigan and associated tributaries in Milwaukee, Wisconsin.

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Case Study: Recent Projects in Beaufort County – Is it Stormwater Ordinances or Market Forces that Drive LID?

Eric Paul Walsnovich
WK Dickson & Company

This presentation will provide insight to the question posed above through a review of the following questions. Is it possible for a stormwater ordinance to help:

1. The project designer efficiently and effectively design the management system to be acceptable to the developer; the reviewing agencies; and the community?

2. The developer to bring economic growth and business development into a community, and maintain their bottom line?

3. Public agencies to effectively and efficiently implement, control, and police stormwater management systems?

4. Provide information to other public agencies to use as a template or model to help implement their own effective runoff control measures?

5. Educate the public about their natural environments and resources?

Biography

Eric is W.K. Dickson's Program Manager for Land Planning and Landscape Architecture in the Urban Design Group. The Urban Design Group is made up of planners, landscape architects and engineers that provide professional services in sustainable design, site design and development, landscape architecture, parks and recreation, structural engineering and land planning.

Having particular interest in projects requiring sustainable site design and high-end, custom design and technical detailing for public and private clientele, Eric's significant completed projects include, the LEED Silver rated Barn at Fallingwater in Mill Run, PA and the LEED Silver rated HGTV Green Home in Hardeeville, SC. As well as, the award winning residential community projects Overlook at Battery Creek and Pinckney Retreat, both located in Beaufort, SC. A graduate of the Pennsylvania State University with a B.S. in Landscape Architecture, Eric brings to his clients a career of creating beautiful and functional landscapes that offer engaging experiences for every visitor.

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Case Study: Towards Water Neutrality in Project Planning & Site Design

Milt Rhodes
New Urban Water Works

The concept of water neutrality is about balancing the future demands of water with available supplies. Making a commitment to minimize added stresses on potable supplies by looking for ways to incorporate efficiency, innovative design, and alternative uses is a major part of this aspirational goal. Stormwater management must become a more integrated and engaging practice for any plan working toward water neutrality. Engineering, environmental design, and landscape architecture all play a key role in this part of sustainable site design.

Recent drought experiences have many pursuing rainwater harvesting strategies in order to achieve a level of on-lot self-sufficiency. Rainwater harvesting elements such as cisterns, first flush diverters, and water butts share a common history with many of our contemporary stormwater management practices, yet they aren't often viewed as components of a strategy in site-wide management. While site oriented stormwater management elements are designed with the expressed intention of minimizing downstream impacts associated with concentrated or polluted flows in order to meet regulatory requirements, rainwater harvesting elements at the lot and building scale can accomplish many of our stormwater management objectives while providing an available local non-potable water resource. Lessons from communities without regular potable water supplies can teach us ways to combine the practice of rainwater harvesting and stormwater management. Some American communities have already instituted practices requiring rainwater harvesting elements as part of new developments in part to minimize the demands on regional potable supplies. Some communities have also begun to invest in reuse of treated wastewater as a means of maintaining adequate water supply. In 2008, North Carolina allowed the practice of rainwater harvesting as stormwater management to become another important tool in the stormwater management toolbox.

A recent project in Chapel Hill, North Carolina using newly instituted provisions from the NC Division of Water Quality for rainwater harvesting as part of a stormwater management system provides an example of how an innovative rainwater harvesting and conventional conveyance, collection, and storage network has allowed for the reduction of water runoff from the site, lessened peak flows, yet enabled an increase in urban land efficiency while enabling building occupants to be less dependent on imported water supplies and in part work toward water neutrality at the site.

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Case Study: Oak Terrace Preserve – Water Quality and Water Quantity Considerations

Elias Deeb
Noisette Company

In just two years, the City's Oak Terrace Preserve neighborhood development has moved to the forefront of 'green', sustainable residential developments in the United States.

The physical improvements are evident: To date, Oak Terrace Preserve has 34 homes completed and occupied, with 10 pending sales under contract. Eighteen homes are available for sale. Over 50 lots have been sold and approximately 70 are under contract to the local Builder Team. The neighborhood's native landscaping, highlighting 400 preserved trees, was completed. Elsewhere, signage, pocket parks, pervious paved alleys and Flexipave perimeter sidewalks were completed in developed areas.
Also completed in 2008, Oak Terrace Preserve's Bioswales and Rainwater Management Systems are the first of their kind in South Carolina, and are the focus of environmentalists and builders throughout the nation.

Despite the economic crisis that hit the mortgage and credit markets late in 2008, increasing interest in Oak Terrace Preserve was reflected in regional and national media coverage. The neighborhood brought unprecedented recognition to North Charleston. In December, Green Builder magazine of Cincinnati, Ohio, the largest 'green' industry magazine of its type in the nation, named Oak Terrace Preserve as one of its "Home of the Year" awards, the ***only neighborhood in the nation chosen for this honor.***
Earlier, in July, *Cottage Living* magazine, a sister publication of Southern Living, picked North Charleston as one of its 'top ten' communities for 2008. Oak Terrace Preserve was a major reason that the City received this honor. In many ways, Oak Terrace Preserve has brought a new sense of hope to North Charleston. Today, there are younger families and children settling in Oak Terrace Preserve. Oak Terrace Preserve has been pivotal in attracting developments like the up-and-coming Mixson and Hunley Waters neighborhoods, and reflects improvements that are destined to revitalize the historic neighborhoods of North Charleston.

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Day 1 Workshop: Light Imprint: A Handbook & Toolbox for Implementing Sustainability and Community Design

Thomas E. Low
Principal and Director of Town Planning, DPZ & Co

Participants will be introduced to the concept of Light Imprint Urbanism; differentiate methods used for Light Imprint development from other methodologies (such as Low Impact practices); will understand how over 60 LI tools are organized using select variables; use the Light Imprint to calibrate appropriate stormwater management tools for their projects; and, analyze savings realized from the use of LI techniques with a sixty-tool matrix, searchable database, and case studies.

This session studies the foundations of Light Imprint, explores existing and on-the-boards designs, and engages attendees in an actual design process. A Light Imprint project walking tour is optional.

First, there will be an overview of the Light Imprint tool set and matrix. The use of the *Light Imprint Handbook* and the interactive database at the website, www.lightimprint.org <http://www.lightimprint.org>, will be demonstrated. The website includes an easy-to-use interactive database that allows municipal staffs, land planners, architects, property owners, environmentalists, development teams, engineers, and land conservationists to select different variables. These variables include soil hydrology, slope condition, climate, urban to rural transect zones, initial costs, and long term maintenance factors. Once variables are submitted to the database, a customized pallet of tools specific to the project's needs appears. This valuable database will provide a simple solution to session participants who are overwhelmed by the massive surge of green information.

Next, there will be a presentation of case studies of Light Imprint developments. The case studies will show how they are designed to use natural drainage, traditional engineering infrastructure, and infiltration practices. The case studies will illustrate how these tools are used collectively at the sector, neighborhood, and block scale. This tool set offers a range of environmental benefits, while significantly lowering construction and engineering costs. Light Imprint is not limited to a single approach for environmentally sensitive development. Rather, it offers a set of context-sensitive design solutions that ultimately work together on the community level.

The final practicum - time permitting - will be a hands-on design of a Light Imprint overlay of a site. This will allow attendees to participate in creating an overlay strategy they can apply as a design approach in their own communities. During the interactive process, they will learn actual field performance, costs, and lessons learned developing cutting edge Light Imprint communities. Interaction with the audience is welcome, especially while creating the hands-on design overlay.

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Day 1 Workshop: Developing an LID Manual

Jill Stewart, SC Department of Health and Environmental Control, Bureau of Water
Dan Hitchcock, Clemson University – Baruch Institute
Christy Perrin, NC State University – WECO
Katie Giacalone – Clemson University – Carolina Clear

This interactive forum is designed to give conference attendees the opportunity to contribute to the development of an LID manual for coastal South Carolina. The goals of the workshop are (1) to develop an outline for an LID manual, (2) to identify individuals or agencies as contributors to the manual, and (3) to propose a timeline for the work to be completed. The experiences from the recent creation of an LID manual in North Carolina will be shared with the group. Regulatory and technical guidance for manual development for South Carolina will be provided, including the benefits and challenges of LID in coastal areas. A case study may be presented to focus the conversation on specific aspects of LID. Contributions by workshop participants will be highly beneficial to the successful creation of an LID manual and will be integral to its usefulness. Anyone interested in contributing to this document and to the process of its development is encouraged to attend. The workshop will be structured in a panel format to facilitate and engage discussion among participants.

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Day 1 Workshop: **FlexiPave Demonstration**

Arthur B. Schirmer
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This event is designed to provide developers, engineers, contractors, planners, researchers, regulatory staff, municipal officials, and public works staff with an opportunity to learn about the fundamentals of Flexi-Pave as an alternative to conventional concrete practices. Flexi-Pave is a rubber paving surface pervious to stormwater that is derived from recycled tires. An informative seminar will be the focus of this workshop. Schirmer will have FlexiPave samples on hand so participants can get a feel for the material.

With recent ordinances requiring pervious cover, and the desire to lower the amount of impervious surface at the sites, FlexiPave serves as another option for surface paving. This material is used for both parking and walkway surfaces and has been used as the surface for the sidewalks at Oak Terrace Preserve in Charleston, SC.

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Day 2 Workshop: On The Ground Experience: Sustainable Site Design for Water Resources Preservation and Protection

John Thomas, Sustainable Design Consultants, Inc.
Elias Deeb, Noisette Company
Allen Ward, Ward Edwards

This afternoon workshop will focus on four projects, and will give you detailed information from professionals with on the ground experience. Pickle Factory Lofts and Okatie Village, which is in the planning stage, Oak Terrace Preserve, where site work is ongoing, and Pinckney Retreat where site work is complete. Speakers will discuss success and complications from their experience in the planning, regulatory, and implementation processes. This session will also include a field trip to the Pickle Factory Lofts and Pinckney Retreat to view the sites.

Sustainable design cannot be as economically and successful applied as an afterthought, but instead must be an integral part of the original planning process for any site. The goal initially is to preserve as much of the pre-developed hydrological cycle as possible and preserve critical areas of the site to not only enhance the aesthetics of the site, but to also minimize the impacts of grading and storm water on the site in order to protect water quality and deliver a project that is sustainable and long lasting. This approach can foster a sense of pride in the community and deliver state of the art facilities for their long term enjoyment.

John Thomas, from Sustainable Design Consultants, Inc. will cover the planning of Okatie Village and Pinckney Retreat. They employ a wide variety of construction techniques and storm water best management practices (BMPs) in order to retain more storm water on site, force percolation back into surrounding soils and greatly reduce the need for storm water detention ponds. The detention facilities that may be needed are typically much smaller and are designed as shallow lagoons with plantings to enhance aesthetics and water quality improvement through the actual removal and conversion of a majority of the pollutants in the runoff, which renders these pollutants harmless and non-toxic. Storm water treatment can be achieved through the use of such measures as bio-basins and rain gardens, bio-swales, creation of fresh water wetlands, filter berms and the use of permeable paving in lieu of impervious surfaces. Such steps, properly designed and implemented, can reduce actual storm water runoff by 50% or more and in some instances can eliminate the need for detention basins entirely. A secondary benefit of bio-infiltration areas is that they normally do not require irrigation since they periodically receive rain water to sustain the plant growth, which is normally native material that is accustomed to local rainfall events.

Elias Deeb, from the Noisette Company will cover the planning and implementation of Oak Terrace Preserve. They have used a diverse set of design methods in which to preserve the natural resources of the site, while ensuring a healthy life for those living in the neighborhood. All homes are EarthCraft certified, which guarantees the highest quality standards in site planning and home design, energy system efficiency, lighting and appliances, building materials, water usage and waste management, indoor air quality, and builder operations such as recycling methods. In addition, hundreds of massive oaks, magnolias, and other old-growth trees have been kept as natural features. These trees were preserved through an in-depth inventory and management process, as well as allowing siting of houses to account for tree location. A stormwater treatment train was employed in order to address not only the quantity of water, but the quality of water that flows off the neighborhood. Bioswales, backyard

rain gardens, permeable alleys and walkways, and pocket parks have all been used in this unique stormwater management system.

Allen Ward, from Ward Edwards, will present information on the Pickle Factory Lofts, a re-development project located in the City of Beaufort. As is the case with any re-development project, there were many obstacles and challenges that had to be faced in order to bring the site into compliance with the current local storm water quality treatment standards, as well as the stricter LEED standards. There are currently no storm-water collection or treatment facilities on the site. Existing storm water runoff from the site simply sheet-flows from the site toward the adjacent railroad right-of-way and to the marshes of Battery Creek less than a quarter mile away. Discussion will allow the seminar attendees to express ideas on handling storm water treatment for the project. Information will focus on the barriers current regulations and codes present when applied to redevelopment projects. Ward Edwards will provide tools and strategies that help them to not only meet those codes, but to also produce sustainable, quality developments that are the essence of *Building Healthy Communities*.

Field Trip: Following presentation, attendees will take a short field trip to the Pickle Factory site and Pinckney Retreat, which showcases many LID approaches.

Pickle Factory Lofts is a multifamily redevelopment project located in the City of Beaufort. The 1.14 acre site is located in the well established Hermitage single family residential neighborhood near the Technical College of the Lowcountry. The existing site contains a multi-story masonry warehouse constructed around 1920 that was originally intended for use as a vegetable packing plant. The building has served many purposes since its construction including being used as a sail factory and most notably a pickle factory. For the past 20 years, the building has been effectively abandoned, fallen into disrepair, and become a nuisance to the surrounding residential neighborhood. The current owner has proposed to restore the building and convert it to multifamily apartments/lofts, a use that is more fitting to the residential neighborhood. The intent is to preserve a historic structure using sustainable, green building practices and turn a community liability into an asset. The project is seeking LEED Certification under the USGBC green building program.

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Day 2 Workshop: **Coastal Stormwater Supplemental Guidance**

Courtney Reich, Ecological Planning
Dan Hitchcock, Clemson University – Baruch Institute
Lisa Vandiver, University of South Carolina
Mike Novotney, Center for Watershed Protection

The Coastal Stormwater Supplement to the Georgia Stormwater Management Manual is the result of the State of Georgia's efforts to address the federally-established "management measures" related to watershed (natural resource) protection and the control of post-construction stormwater runoff from new and existing development. It provides guidance on using environmentally-sensitive better site planning and design practices, small-scale low impact development practices and more traditional stormwater management techniques to manage post-construction stormwater runoff and help protect coastal Georgia's unique and vital natural resources from the negative impacts of land development and nonpoint source pollution.

The objective of this Coastal Stormwater Supplement is to provide communities located within Georgia's 24-county coastal region with comprehensive guidance on watershed protection and the control of post-construction stormwater runoff from new and existing development. It provides a wealth of information on how the valuable aquatic and terrestrial resources of coastal Georgia can be protected through an integrated approach to natural resource protection and post-construction stormwater management that makes use of environmentally-sensitive better site planning and design techniques and innovative stormwater management practices, as well as more traditional stormwater management techniques. Communities located in Coastal Georgia are should use this Coastal Stormwater Supplement as a valuable resource in their efforts to develop or enhance their local post-construction stormwater management programs.

This workshop will provide participants with insight into GA's Coastal Stormwater Supplement and various perspectives on how best to organize such a reference manual for SC.

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Day 2 Workshop: **Policy and Site Evaluation Tools**

Abby Hall, U.S. Environmental Protection Agency
Hunter Freeman, Withers & Ravenel Engineering

This workshop will outline the incremental steps communities can take to establish a comprehensive green infrastructure program, both in terms of changing specific policies and in changing larger internal policies and standard practice for capital projects and land use planning. The workshop will go over EPA's Water Quality Scorecard, which includes 5 sections and over 200 different policies that include plans, incentives, regulations and ways to remove barriers from existing codes and ordinances. Local policies, such as landscaping and parking requirements or street design criteria, should complement strong stormwater standards and make it easier for developers to simultaneously meet various local requirements. Local regulations that should be reviewed may be controlled and enforced by a number of different local government agencies, including parks and recreation, public works, planning, environmental protection, utilities and transportation. This session will review how to use the Water Quality Scorecard to improve coordination of codes and ordinances to support green infrastructure practices and better land use policies.

The workshop will also include multiple discussions relating to how LID plans might be incorporated into the permit approval process. It is easy to add language for a Low Impact Development requirement to a stormwater ordinance, but actually defining what makes a site LID is often overlooked.

During the workshop we will go through an example of the North Carolina LID calculation spreadsheet, which quantifies the impact of LID devices and documents how a plan might comply with specific North Carolina coastal stormwater regulations. Then we will discuss a draft version of a site plan evaluation ranking method and the criteria being used to measure success. The ranking system is a work in progress but will hopefully become the key element of determining if a site should be considered LID or not. Both tools are aimed at identify those sites which use the natural landscape to its maximum extent, while allowing for complete flexibility in design methods.

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