

Low Impact Development from DENR's Perspective

Presented by:

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The Department's primary mission is to protect North Carolina's environment and natural resources.



What we don't want to see is this:

The cumulative effect of a sustained discharge from multiple developments within a watershed causing severe stream bank erosion and low base flow.



Conventional Stormwater Management



Photo: NCSU-BAE

Why treat stormwater runoff if you can eliminate it?

Low Impact Development Alternatives

Protect North Carolina's Environment and Natural Resources

LID utilizes engineered systems to:

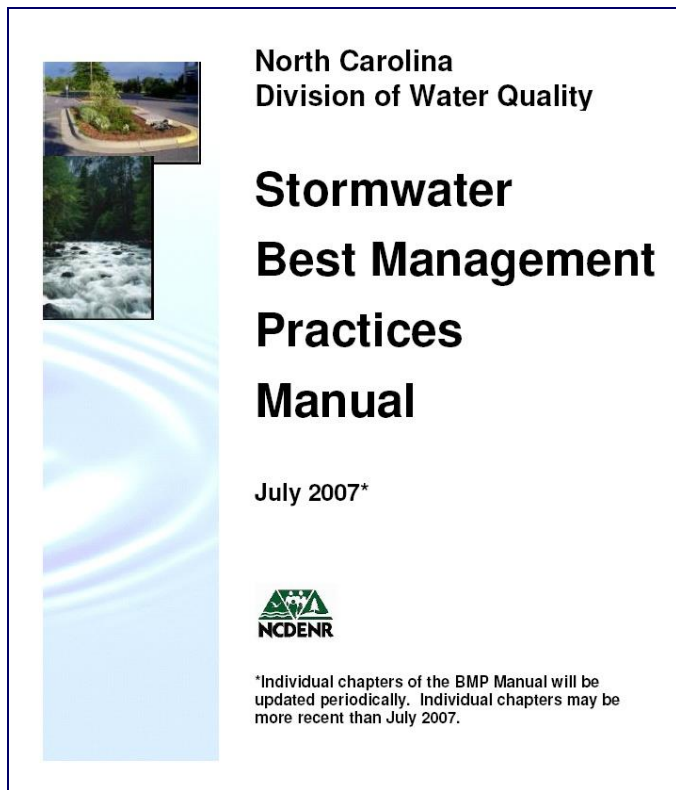
- Infiltrate, evaporate and reuse stormwater runoff
- Promote pollutant removal through biological processes
- Restore stream base flows - protecting vital habitats
- Recharge drinking water sources
- Restore a watershed's hydrologic and ecological functions by mimicking the pre-development hydrology

DENR's First Fundamental Principle: Philosophy

In its essence, DENR is a service organization. Whether managing parks and zoos or issuing permits, agency personnel must always be a resource of invaluable public assistance, rather than a bureaucratic obstacle of resistance.

Fundamental Principle: Philosophy

Be a resource of invaluable public assistance



More choices for BMPs that reduce stormwater runoff, including:

- Disconnected Impervious Surface
- Rainwater Harvesting
- Green Roofs
- Bioretention
- Infiltration
- Permeable Pavement

Fundamental Principle – Philosophy

Be a resource of invaluable public assistance

Storm-EZ **Step 1: Application Form** **Project Name** **Designer Name & Firm** **NC DENR**

Project Information

Project Name: _____ Date: _____
 Project address: _____ Lot: _____
 City, ZIP: _____ Lang: _____
 Direction to project: _____ County: _____
 River basin: _____ Coastal / Noncoastal: _____
 Receiving stream(s): _____
 Stream class(es): _____
 Surface water area (ac): _____ Coastal wetland area (ac): _____
 Total property area (ac): _____ Total project area (ac): _____

Project characteristics: LID Drain to an affluve stormwater system
 (check all that apply) Low density Within 575' of Saltwater ORW
 High density Within 5 miles of a public airport

Briefly summarize how the stormwater runoff will be treated: _____

Permit Information

Status of application: _____ Status of construction: _____

Other permits needed: Sedimentation & erosion control 404 permit / 401 certification
 (check all that apply) CAMA major permit Related wetland permit
 Threatened & endangered species NPDES Industrial stormwater permit

If an application for this project has been previously returned, provide the original project number and previous name of the project: _____

Provide the permit type, number and issue date for any permit that have already been obtained for this project: _____

If claiming vested rights, then identify (and attach) the supporting documents and approval dates:
 Approval of site-specific development plan or PUD → Approval date: _____
 Valid building permit → Issue date: _____
 Other → Date: _____

Local jurisdiction for building permit: _____
 Point of contact: _____ Phone number: _____

Contact Information

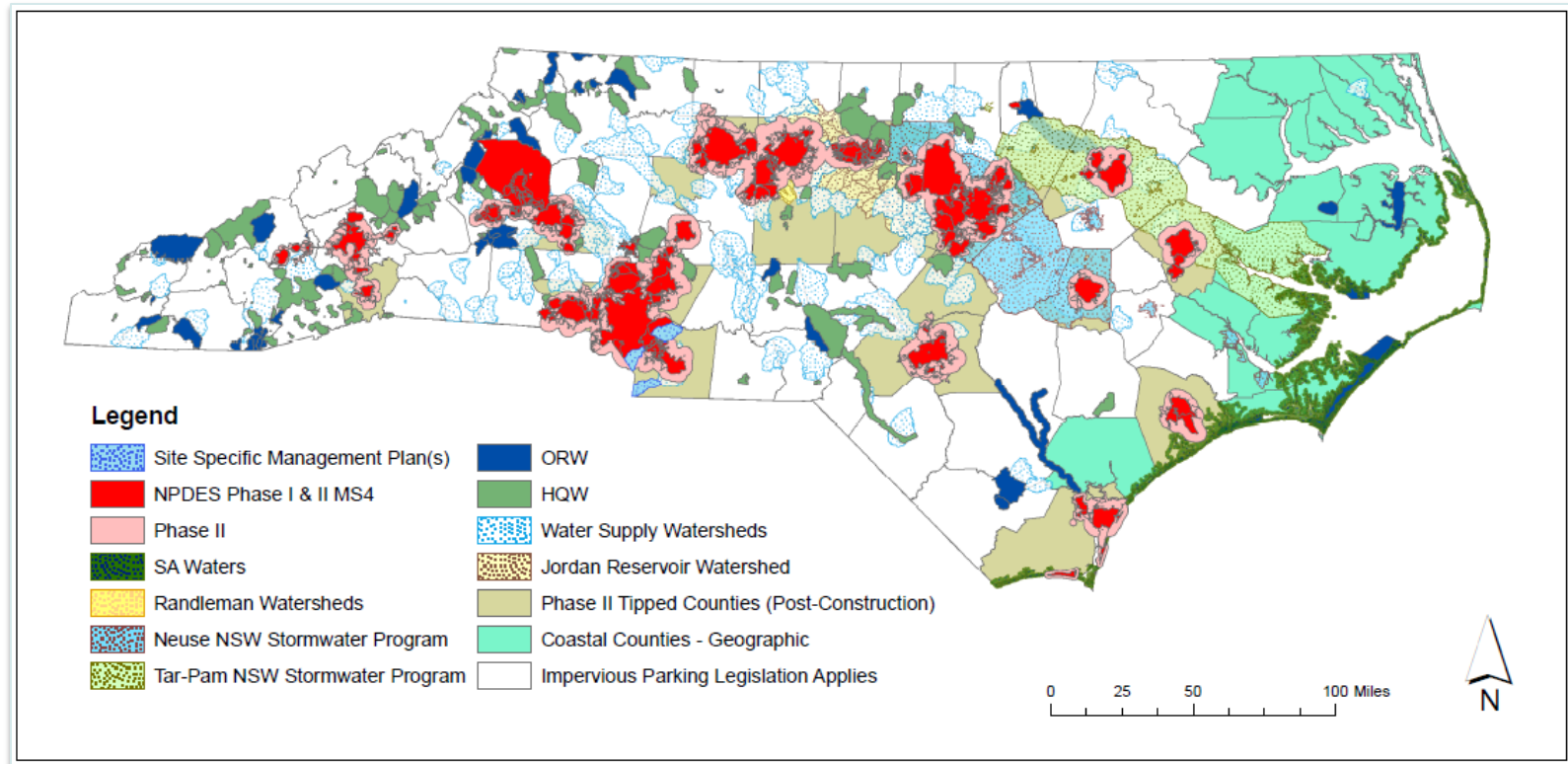
Applicant and Title: _____ Status: _____

Storm-EZ

- Excel permitting tool
- Developed by Hunter Freeman, PE with Withers & Ravenel
- User inputs data about pre- and post-development land uses and BMPs

Fundamental Principle – Philosophy

Be a resource of invaluable public assistance



An LID approach meets all state implemented stormwater programs.

Fundamental Principle: Philosophy

LID works everywhere – whether it's for:

- New development, redevelopment, or retrofits
- Public roads
- Commercial, industrial, or residential sites
- Ultra-urban or rural developments
- High density or low density projects



DENR's Second Fundamental Principle: Economics

The agency will be continually cognizant that an economic cost/benefit analysis is an integral component of DENR's public service endeavor.

Fundamental Principle: Economics

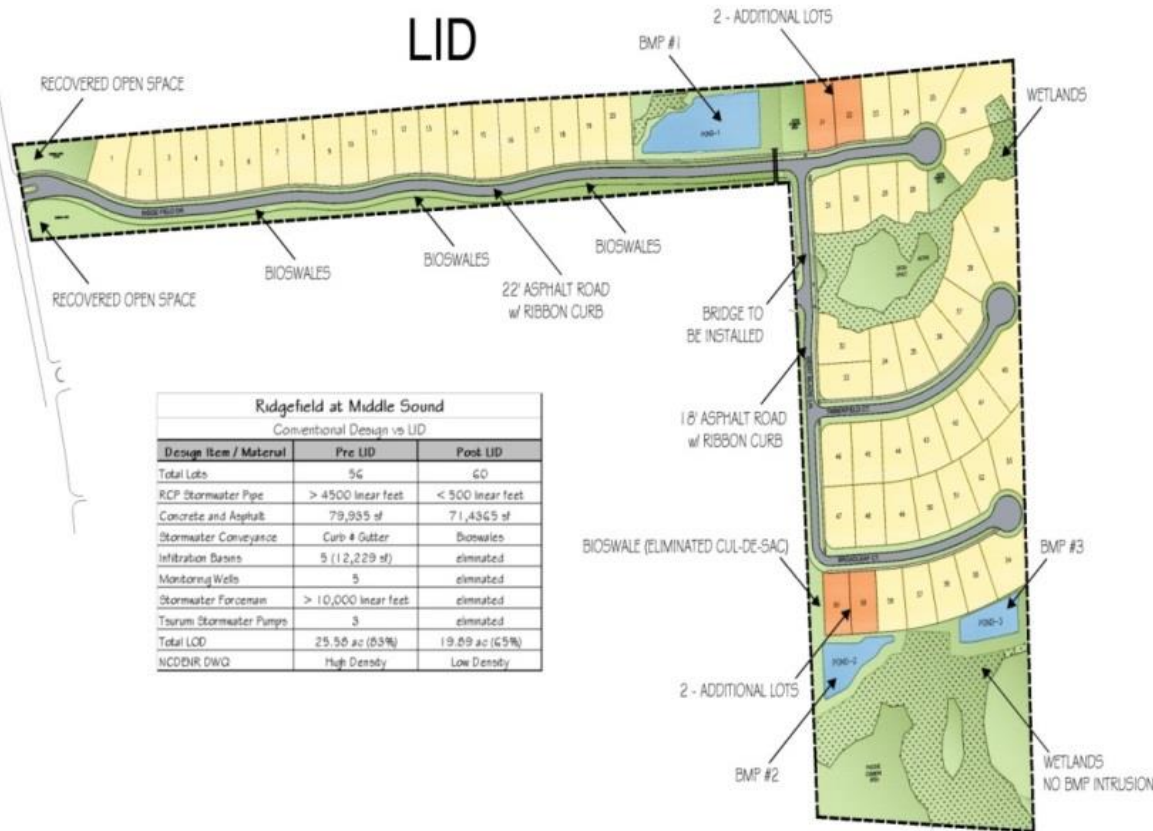
- As a voluntary program, LID is a choice that offers alternatives
- Economic benefits of LID are based on case studies across North Carolina



CONVENTIONAL



LID



Ridgefield at Middle Sound
Conventional Design vs LID

Design Item / Material	Pre LID	Post LID
Total Lots	56	60
RCP Stormwater Pipe	> 4500 linear feet	< 500 linear feet
Concrete and Asphalt	79,955 sf	71,434 sf
Stormwater Conveyance	Curb & Gutter	Bioswales
Infiltration Basins	5 (12,229 sf)	eliminated
Monitoring Wells	5	eliminated
Stormwater Force Main	> 10,000 linear feet	eliminated
Tsurum Stormwater Pumps	3	eliminated
Total LOD	25.56 ac (63%)	19.89 ac (45%)
NCDEH DWG	High Density	Low Density



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Fundamental Principle: Economics

- Small BMPs instead of a large, costly collection, conveyance & treatment system
- Reduced stormwater pipe 89%
- Eliminated 9,000 ft of curb & gutter
- Eliminated 5 infiltration basins
- Saved \$1 million in grading costs
- Gained 4 lots



Fundamental Principle: Economics

LID Practices improve aesthetics
and increase marketability & value



Stormwater BMPs can be amenities, not eyesores.

Fundamental Principle: Economics

LID Practices:

- Cost less to mobilize equipment and manpower during construction
- Don't rely on heavy or specialized equipment for installation or maintenance
- If one stormwater control measure fails there is less impact on water quality



DENR's Third Fundamental Principle: Science

All decisions are made with a respect and understanding that environmental science is quite complex, comprised of many components, and most importantly, contains diversity of opinion. In this regard, all public programs and scientific conclusions must be reflective of input from a variety of legitimate, diverse and thoughtful perspectives.

(Water quality benefits are based on scientific research & case studies reflective of input from a variety of legitimate, diverse and thoughtful perspectives as discussed this morning.)

LID - Joint Statement of Support

- Business Alliance for A Sound Economy
- N.C. Coastal Federation
- Wilmington-Cape Fear Homebuilders Association
- Bill Hunt, Professor & Extension Specialist, Bio & Ag Engineering, NC State University.
- Brunswick County Cooperative Extension Service
- Cape Fear Green Building Alliance
- New Hanover County Cooperative Extension Service
- Burrows Smith, River Bluffs Development Corporation
- David Newsome, Crystal Coast Engineering
- Gary J. McCabe, PE, Red Line Engineering, PC
- Jordan Building Co.
- Ward Shore Builders
- West Fourth Landscape Architecture, P.A.
- Tetra Tech

DENR's Mission Statement: The Outcome

A collaborative stewardship among the citizens, government regulators and the business community will maintain and enhance North Carolina's environment and natural resources for the benefit and enjoyment of everyone living in or visiting our great state.

DENR's Mission Statement: The Outcome

LID - Joint Statement of Support

DENR joins the Business Alliance for a Sound Economy, Wilmington-Cape Fear Homebuilders Association, N.C. Coastal Federation, development professionals, academia and local and state government agencies that have collaborated to promote the voluntary use of LID.



OR



Questions?

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