The Creation of a Low Impact Development Manual for Coastal South Carolina

Samantha Bruce[1], Kathryn Ellis[2], April Turner[1], Blaik Keppler[2], S.C. Sea Grant Consortium[1], S.C. DNR/ACE Basin NERR[2], Charleston, S.C.

National Estuarine Research Reserve System Science Collaborative

For more information please contact:

Blaik Keppler
Coastal Training Program
SCDNR/ACE Basin NERR
PO Box 12559
217 Fort Johnson Rd.
Charleston, S.C. 29422
KepplerB@dnr.sc.gov
(843) 953-9024

April Turner
Coastal Communities Program
S.C. Sea Grant Extension
287 Meeting Street
Charleston, S.C. 29401
April.Turner@scseagrant.org
(843) 953-2093

ACE Basin National Estuarine Research Reserve

North Inlet - Winyah Bay National Estuarine Research Reserve

DNR

Sea Grant S.C. Sea Grant Consortium

Center for Watershed Protection

Background:

Although low impact development (LID) has become the norm in some parts of the country, its application is relatively limited in coastal South Carolina. Barriers to LID implementation include concerns about cost, maintenance, codes/ordinances and South Carolina's unique coastal conditions, specifically the shallow water table, tidal influence and soils. Few, if any, resources exist for developers, landscape architects, and engineers who may be interested in implementing LID in coastal South Carolina as opposed to installing traditional stormwater systems.

Overall Goal: Create a low impact development planning and design guide specific to coastal South Carolina, and provide associated tools and technical training that target information-related barriers to the implementation of LID practices on the community, neighborhood, and site scale.

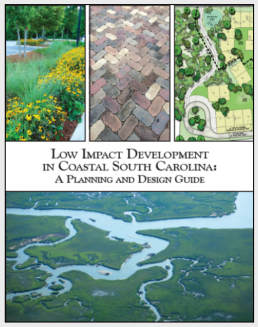
Low Impact Development (LID) is an integrated, comprehensive approach to land development or redevelopment that works with nature to manage stormwater as close to its source as possible by using techniques that promote storage, infiltration, evaporation, and treatment of runoff (US EPA, 2014).

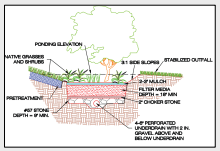
Methods:

- Initial working group established (2008).
- Formal and informal needs assessment conducted within both private and public sector (2011).
- Funding was secured and project team and advisory committee were formed (2012).
- Preliminary workshop hosted with stakeholder groups to introduce them to the project and recruit technical advisors and professionals willing to provide feedback throughout the process; surveys/informal discussions were used in follow-up (January 2013).
- Outline and preliminary drafts developed from specialty knowledge base of project team and advisory committee.
- Two researcher roundtable workshops provided technical advice specifically related to coastal conditions (April 2013) and climate change (September 2013).
- Intended user workshop tested and validated the newly designed LID tools, design specifications, planning guidance and case studies (January 2014).
- Information synthesized and draft guidance updated.
- Draft circulated for additional feedback from technical advisors (spring 2014).
- Editing and formatting completed to publish final document (summer 2014).
- Trainings held on using the new guidance to implement LID in coastal South Carolina (October 2014).

Access the manual online:
http://northinlet.sc.edu/LID

Results:





Left: Cover of the manual. Above: Example specification for bioretention. Below: Table of Contents reflects the information found within the document.

Low Impact Development in Coastal South Carolina: A Planning and Design Guide

TABLE OF CONTENTS

Chapter 1: Introduction to Low Impact Development in Coastal South Carolina 1-1
1.1 Introduction to LID 1-1
1.2 Benefits of LID 1-3
1.3 Coastal Features and LID 1-15
1.4 References 1-22

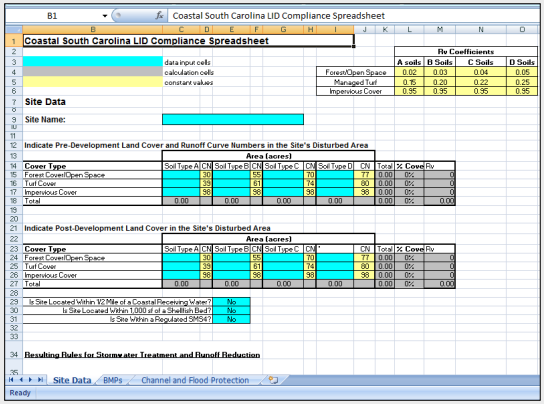
Chapter 2: Strategies for Local Governments 2-1
2.1 Getting Ready for Low Impact Development 2-1
2.2 Applicable Regulations and Requirements for LID 2-1
2.3 Regional Planning Strategies 2-6
2.4 Neighborhood Planning Considerations for Coastal SC 2-24
2.5 Regulatory Strategies 2-30
2.6 References 2-34

Chapter 3: Conservation Principles and Neighborhood Site Design for LID 3-1
3.1 Introduction to Conservation Principles and Neighborhood Site Design 3-1
3.2 Conservation of Natural Areas 3-4
3.3 Neighborhood Site Design Considerations 3-24
3.4 References 3-52

Chapter 4: Guide to Stormwater Best Management Practices 4-1
4.1 Introduction 4-1
4.2 Bioretention 4-11
4.3 Permeable Pavement Systems 4-43
4.4 Stormwater Infiltration 4-64
4.5 Green Roofs 4-83
4.6 Rainwater Harvesting 4-97
4.7 Impervious Surface Disconnection 4-119
4.8 Open Channel Systems 4-128
4.9 Stormwater Filtering Systems 4-155
4.10 Dry Detention Practices 4-166
4.11 Wet Detention Ponds 4-179
4.12 Stormwater Wetlands 4-196

Low Impact Development in Coastal South Carolina: A Planning and Design Guide

Chapter 5: Local Case Studies 5-1
Appendix A. Compliance Calculator Guidance A-1
Appendix B. Infiltration Testing B-1
Appendix C. Soil Compost Amendment C-1
Appendix D. Water Quality Volume Peak Discharge D-1
Appendix E. Coordinating Erosion and Sediment Control With LID Planning E-1
Appendix F. Maintenance Checklists F-1
Appendix G. Adapting Stormwater Management for Climate Change G-1
Appendix H. Stormwater Statutes and Regulations H-1



Above: The compliance calculator is an add-on tool to use in conjunction with the planning and design guide. The customized spreadsheet is intended to be used by engineers to calculate site runoff, evaluate BMPs most effective for a given site, and determine if additional measures may be needed to guarantee channel and flood protection in the event of 2-, 10-, 25-, and 100-year storms.

Challenges:

1. Gaining a consensus on what to include and meeting stakeholder needs.
2. Packaging and delivering a vast amount of information.
3. Developing a tool that addresses the needs of many different regulatory structures and is applicable to each.
4. Acknowledging future unknowns and incorporating climate change.

Next Steps:

The online version of this planning and design guide will be updated as information changes. To encourage the use of the planning and design guide, a hard copy will be distributed to each South Carolina coastal community as part of the initial public campaign. Steps will be taken to secure funding in order to provide individual trainings for communities who would like to adopt and implement the practices found within the manual.

Acknowledgments:

This publication was made possible through financial support from the National Estuarine Research Reserve System Science Collaborative, a partnership of the National Oceanic and Atmospheric Administration and the University of New Hampshire. Additionally, a large number of professionals along the coast volunteered their time and expertise as technical advisers for the creation of this LID Manual and were a great asset to this project. Many thanks go to the project team, the advisory committee and the technical advisers who made this project a success.