TABLE OF CONTENTS

The Coastal Green Developer Program was developed as a collaborative effort between the Coastal Georgia Regional Development Center (CGRDC) and the Georgia Department of Natural Resources' (GDNR) Coastal Non-Point Source Pollution Management Program that seeks to reduce water pollution by providing funding, program development, and technical assistance for a range of activities that implement non-point source management measures. Green Growth Guidelines (G^3) was created in support of this program to promote the implementation of low impact development practices in coastal Georgia. The statements, findings, conclusions, and recommendations are those of the authors and do not necessarily reflect the views of NOAA, GDNR, and CGRDC.

The production team for the first edition of G^3 includes: **Tara R. Merrill**, Project Manager and Principal Author; **Matthew R. Baker**, Lead Designer; **H. Patrice Cook**, Spatial Analyst & Image Creator; **Dan Fischer, Mark Mobley, Jay Maupin, Matt Renault, Maryanna Vo, Tre Wilkins, Alec Metgzer and many other members of the technical and administrative staff of EMC Engineering Services, Inc.**, Environmental, Civil, Hydraulic Engineering; **Jess D. Henderson**, Research and Development; **Mark Reavis and Ben G. Whitley**, Financial and Market Analysis; and **Susan Humpheries and Kathy Hart**, Review Editing.

Thanks to the members of the development community for many interesting ideas and discussions that profoundly influenced the outcome of the project. Thanks to all those who took the time and effort to provide comments and constructive suggestions on the draft versions of the document, especially input from agencies and supporting programs including the GDNR Environmental Protection, Pollution Prevention Assistance and Coastal Resources Divisions, and Earth Craft Solutions and Southface Energy Institute. Special thanks to Chere Peterson of Petrus UTR and many others for sharing and contributing information. Finally, thanks to those who expressed serious commitment and determination in bringing G^3 to a successful completion. This document reflects their hard work, innovative thinking, and steadfast motivation for the protection of Georgia's coastal resources.

GDNR acknowledges and thanks the following persons and their organizations for their thoughtful review of this document:

Denise Grabowski – Lott + Barber Architects, Savannah, Georgia
Brian Holland – Southface Energy Institute, Atlanta, Georgia
Gene Oliver – Coastal Soil and Water Conservation District (formerly)
Julie Vann – GDNR, Environmental Protection Division (formerly)

Green Growth Guidelines was made possible through a grant provided by the National Oceanic and Atmospheric Administration and administered by the GDNR.

The purpose of *Green Growth Guidelines Program* is to demonstrate how low impact development ("LID") strategies can result in significant positive impacts on the environment while providing superior outcomes both socially and economically. *Green Growth Guidelines* outlines the environmental, social, and economic benefits from use of LID strategies when compared to today's conventional development approach. This guide's main objectives are to:

- Demonstrate how site fingerprinting and sensitive land planning can identify and protect natural resources,
- Provide developers with instructions on how to build with minimal impact to the environment,
- Compare low impact and conventional residential subdivision designs to show economic and environmental benefits of LID,
- Demonstrate alternative stormwater drainage solutions that protect the quality of receiving waterbodies, and
- Introduce various soft engineering techniques used to protect and stabilize coastal stream banks from erosion.

The overall goal of this manual is to show how a thorough understanding of a site can facilitate designing within the context of the landform and, thereby, reduce impacts on the environment. This approach provides measurable economic benefits by increasing profitability through higher initial low sales and a cost savings in both installation of infrastructure and on-going maintenance.

To exemplify how these strategies and techniques can be applied in this area, an undeveloped tract of land was selected in coastal Georgia as the model site. This 188-acre site, referred to as the "Tupelo Tract", contains natural resource obstacles typical of this region including freshwater streams, wetlands, and critical habitat. In addition, the site is immediately upstream of a large system of tidal marshes, beaches, and creeks. The tract is strategically located along a main thoroughfare with accessible infrastructure, zoned for residential development, and in close proximity to recreational, civic, and commercial facilities making it ideal for residential development. This tract serves as an

example of how development can be planned and designed to conserve more land and improve water quality on-site and downstream.

Chapter 1

Chapter 1 takes the Tupelo Tract though a low impact land planning process called "site fingerprinting". Using GIS and GPS technology, the site's features are mapped and natural resources designated as "conservation areas". This information, displayed in the form of generated maps defines the "buildable area" and essentially becomes the "base map" for planning future development. This process identifies environmental issues early in the development process, which facilitates effective resource protection.

Chapter 2

Chapter 2 uses low impact design principles to create two conceptual development plans for the Tupelo Tract. These two non-conventional plans are known as the "Community Preserve" and the "Village" and both highlight development techniques known as compact building - which uses smaller lots to maximize developable area while preserving natural resources. This chapter also compares the two land plans to conventional development with respect to economic, environmental, and social benefits. As consumers become more educated about the effects of sprawl, demand for these non-conventional developments is increasing, as is reflected in recent market studies. Our analysis revealed that these properties also have a higher initial lot value, faster appreciation, lower infrastructure cost per lot, and higher tax generation than conventional development. While numerous design possibilities exist for a given site, the economic and environmental objectives tend to be consistent: achieve greater project success and cost savings through simple yet intelligent LID strategies.

Chapter 3

Chapter 3 explores a range of multi-functional stormwater drainage techniques and is the core of what is traditionally known as LID. These techniques mimic the pre-development hydrologic function of the site by encouraging natural processes that detain and filter pollutants from stormwater runoff. The goal is to increase biologic activity by providing more surface area with which the stormwater comes in contact, thus allowing stormwater to be treated by natural processes inherent to an undisturbed site. Research indicates that densely wooded sites, with their attendant layers of vegetation and porous

topsoil, act as a sponge and provide effective stormwater treatment. LID systems are generally distributed throughout the site, which controls and treats runoff at its source reducing the effects of downstream non-point source pollution. In addition, this approach is often less expensive to construct and maintain compared to conventional systems.

Chapter 4

Chapter 4 demonstrates bio-engineered solutions for streambank stabilization, especially steep, sandy bluffs along coastal streams that are particularly susceptible to wind and water erosion. Various natural solutions are recommended that preserve the aesthetical and ecological quality of the stream and its banks. The use of native vegetation is strongly encouraged, as this method tends to promote the accretion of sediments reversing the effects of erosion. Most importantly, the use of non-invasive practices maintains essential aquatic habitat for creatures using these areas to live, feed, and reproduce.

This guide strives to make the green growth process an appealing and more readily accepted model for the rapid development facing this region. Balancing inevitable development demands and natural resource protection are essential to achieving better water quality in the region. Adopting low impact planning and development strategies for our coastal region achieves this balance. With creativity, determination, and support for these efforts, coastal Georgia can create and maintain healthy, vibrant communities that ensure economic vitality while retaining a healthy environment.