TASK 5 – Low Impact Development Efforts
TRANSMITTED VIA EMAIL TO jie.shao@charlottefl.com

Date: April 2, 2009
To: Jie Shao, Planner III, Charlotte County Growth Management Department
From: Mary Anne G. Bowie, FAICP
Re: US 17 (Duncan Road) Corridor Planning Study
TASK No. 5: Low Impact Development Efforts

Introduction

Task 5 provides a description of the Low Impact Development (LID) efforts that have been accomplished around the country and those that are on-going within the state of the Florida that influence the US 17 Corridor Study Area.

LID methods seek to design sites in harmony with nature. As Ian McHarg writes in Design With Nature, "we need nature as much in the city as in the countryside...Today it is nature, beleaguered in the country, too scarce in the city, which has become precious."

Although LID concepts and techniques are new to many planners in the United States, many of these techniques have been successfully used in Europe and Asia for many years. In 1999, Prince George County Maryland County produced the first municipal LID manual. This was later expanded into a nationally distributed LID manual published in 2000. Several states have adopted LID manuals and/or requirements. The Federal government has two major documents that govern most federal efforts and a guidelines initiated by the American Society of Landscape Architects are in the review period. In Florida, LID methods are anticipated in the new State Stormwater Rules, expected to be force June 2010. Sarasota County's Preliminary LID manual, published December 2008 further champions LID best management practices.

Unintended Consequences

Although, in concept, everyone would like to have land development have the least possible impact on the natural environment, in fact current stormwater regulations have not had this effect. Instead, present land development practice often results in land being completely cleared, then filled, then dug into retention and detention stormwater ponds with enough capacity to handle the biggest rainfall events.
In fact, most rainfall events in Florida, 90% to 95% of them, are only small rainfall events, with one inch or less of water. Such small amounts of water could be easily absorbed on site through LID practices.

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Currently in most development projects, stormwater systems are designed to attenuate and treat altered hydrologic conditions that result from implementing the site plan. Plans for new development typically require the following:

- Clearing onsite vegetation.
- Disturbing and compacting native or parent soils.
- Importing and grading fill material to establish the construction base and drainage contours.
- Constructing infrastructure to facilitate drainage away from the site.
- Introducing new landscapes that require nutrient and water inputs above predevelopment conditions to thrive.

Rather than fitting the stormwater system into the predetermined site plan, LID encourages an alternative design approach that integrates existing site features that facilitate natural hydrologic functions into site planning. LID systems are designed to use and enhance predevelopment hydrologic, soil, and landscape conditions that promote on-site interception, capture, storage,treatment and infiltration of stormwater.

Development as current regulations require is beginning to be questioned. The old way of stormwater management has had a significant negative impact to our water bodies due to storm flushes carrying pollutants from streets and lawns treated with pesticides and fertilizers. The old way of stormwater management has replaced natural diverse ecosystems with suburban and urban monocultures. In the old way of stormwater management, water was sent offsite, via ponds, pipes and drainage structures, eventually reaching natural water bodies.

Land development of the future requires professionals to be sensitive to nurturing natural components rather than engineering them out of existence The new stormwater management systems, which contain innovative best management practices (BMP's) encourage rainfall to remain on site and ultimately to return to the groundwater table beneath the site, without being sent offsite.

Sustainable Site Development

Almost with one voice, various academic, government agencies and professional organizations have emerged to return land development to a spirit of designing with nature, also known as sustainable site development. Sustainable Sites are created by these methods:

- Preserving existing vegetation
- Reducing impervious surfaces
- Mitigating heat island effects
- Reducing traffic impact on site and surrounding area
- Controlling construction activity to reduce impact
- Using LID techniques to understand and manage site hydrology

Sustainable site development is achieved through the application of engineering Best Management Practices (BMPs) Many of the new stormwater approaches are BMPs for Low Impact Development, or LID. LID technology seeks to treat every raindrop as a precious water resource and manages that water on site, without creating stormwater ponds. LID BMPs include both structural and non-structural solutions for LID. Many LID components use the biological, chemical and physical processes of plant and soil interactions to filter and treat pollutants.
Together with green building methods, sustainable site development techniques lead to sustainable development which is defined as a commitment to human development within the ecological limits of the biosphere. Sustainable development includes land use policies that support: social justice, ecological balance and a sustainable economy. The BMP techniques for LID support all of these principles; most obviously, that of ecological balance.

Significant State Low Impact Development Efforts

Low Impact Design has been in existence in Asia, Europe and in some very environmentally sensitive designs in the United States for quite some time, but it was not until 1999 when Prince George County, Maryland published its LID Design Manual that the literature began to emerge. That document lead the way for many other efforts, culminating for Charlotte County in the now under development Florida State Stormwater Rule, expected to be enacted in 2010, which will impact the current Southwest Florida Stormwater Management Rules that currently implement current State Stormwater Rules. Because of the Internet, information flow has been excellent and the best approaches and techniques are gaining widespread acceptance.

Beginning in 1999, the Prince George County LID Manual, which became the National LID Manual, addressed: 1) Site Planning, 2) Hydrologic Analysis, 3) LID Integrated Management Practices, 4) Erosion and Sediment Control Considerations, and 5) LID Public Outreach Programs.

The Low Impact Development Center is a non-profit organization that has been active for ten years in advocating, educating and partnering in LID efforts. Visiting the organization's website, located at **http://www.lowimpactdevelopment.org/** provides excellent links regarding LID.

The States of Massachusetts and Michigan have also been at the forefront of LID technology, with LID demonstration centers at universities and various green roof projects. The City of Chicago has the most green roofs, a significant LID technique, of any city in the United States.

Federal Government Low Impact Design Efforts

Housing and Urban Development

In July 2003, the Housing and Urban Development (HUD) published The Practice of Low Impact Development Manual where it defined Low Impact Development (LID) as an approach to land

development that uses various land planning and design practices and technologies to simultaneously conserve and protect natural resource systems and reduce infrastructure costs. LID still allows land to be developed, but in a cost-effective manner that helps mitigate potential environmental impacts.

This document was developed as a nationwide resource in collaboration with top low impact and sustainable site development professionals and provides analysis and cost comparisons of conventional and new Low Impact Development solutions. In this document, LID terminology is used inter-changeably with the concepts of Sustainable Site design.

Several sustainable approaches to land development are included within the HUD document, including:

1.) With design pre-planning, Low Impact Development (LID) is an approach to land development that uses various land planning and design practices and technologies to simultaneously conserve and protect natural resource systems and reduce infrastructure costs.
2.) Implementing nontraditional, decentralized methods for handling storm water can significantly reduce site development costs, regional expenditures for storm water and planning, construction, and maintenance outlays while protecting the environment.
3.) Properly designed, installed, and maintained on-site wastewater treatment systems can cost effectively treat wastewater and protect the watershed from pollutant overloads.
4.) Reconsidering traditional methods for planning and accommodating pedestrian and vehicular circulation is part of a cadre of better site design techniques that can simultaneously reduce development costs, protect the environment, and create win-win situations for builders, municipalities, and residents.

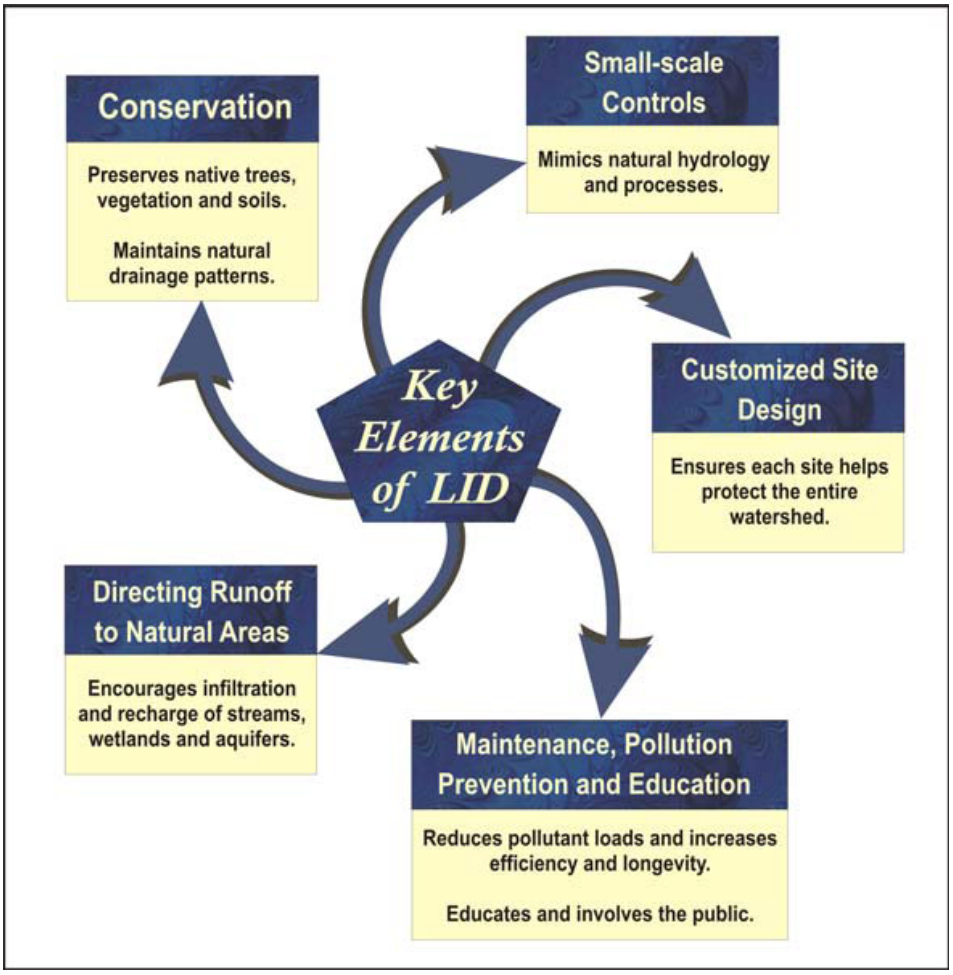
United Facilities Criteria Low Impact Development

The Department of Defense requirements for Low Impact Development were published in October 2004 and are contained within The Unified Facilities Criteria (UFC) Low Impact Development Document.

Low Impact Development (LID) is a stormwater management strategy concerned with maintaining or restoring the natural hydrologic functions of a site to achieve natural resource protection objectives and fulfill environmental regulatory requirements. LID employs a variety of natural and built features that reduce the rate of runoff, filter out its pollutants, and facilitate the infiltration of water into the ground. By reducing water pollution and increasing groundwater recharge, LID helps to improve the quality of receiving surface waters and stabilize the flow rates of nearby streams.

LID incorporates a set of overall site design strategies as well as highly localized, small-scale, decentralized source control techniques known as Integrated Management Practices (IMP's). IMP's may be integrated into buildings, infrastructure, or landscape design. Rather than collecting runoff in piped or channelized networks and controlling the flow downstream in a large stormwater management facility,

LID takes a decentralized approach that disperses flows and manages runoff closer to where it originates. Because LID embraces a variety of useful techniques for controlling runoff, designs can be customized according to local regulatory and resource protection requirements, as well as site constraints. New projects, redevelopment projects, and capital improvement projects can all be viewed as candidates for implementation of LID.



SOURCE: UNIFIED FACILITIES CRITERIA (UFC) LOW IMPACT DEVELOPMENT

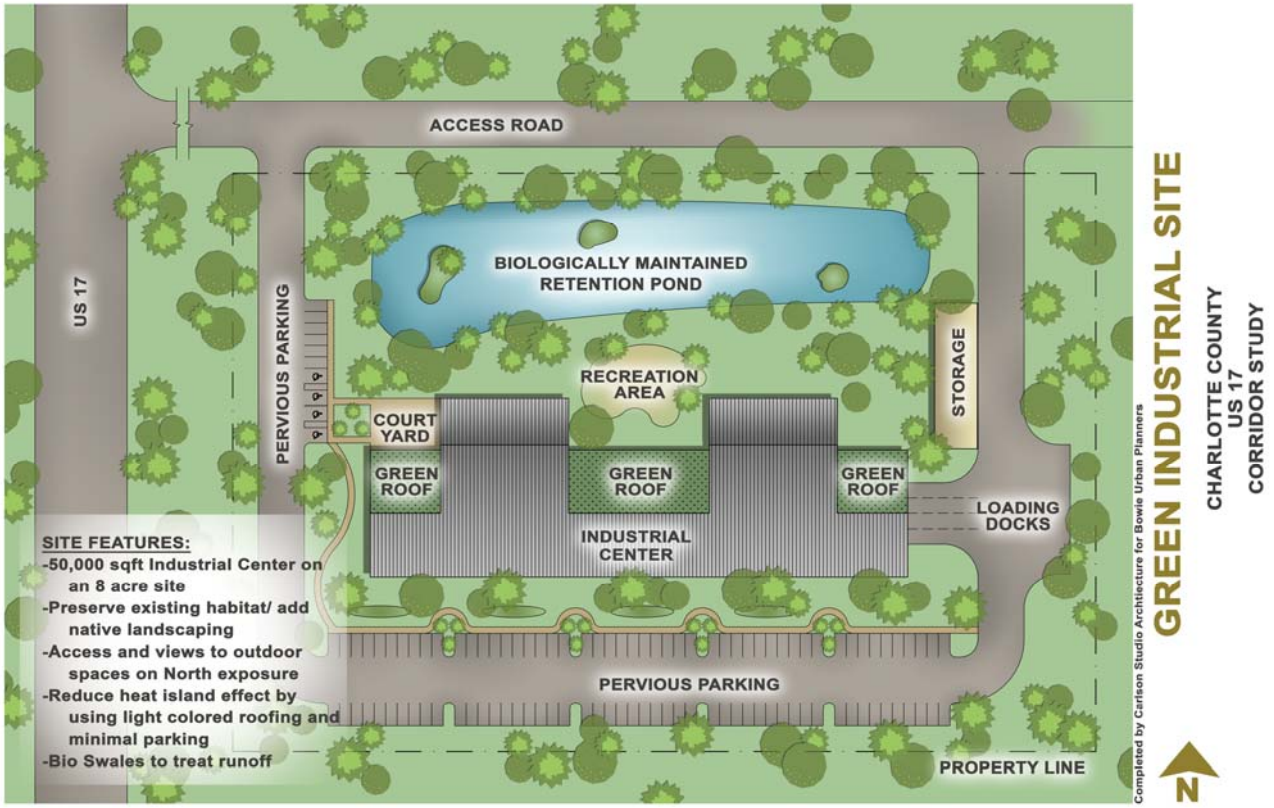
On going LID Efforts: Landscape Architects with Others

Perhaps the most impressive effort to date that is underway and available for review is The Sustainable Sites Initiative, a joint project of the **Sustainable Sites Initiative** **http://www.sustainablesites.org/**
The Sustainable Sites Initiative is an interdisciplinary effort by

- the American Society of Landscape Architects;
- the Lady Bird Johnson Wildflower Center; and
- the United States Botanic Garden

to create voluntary national guidelines and performance benchmarks for sustainable land design, construction and maintenance practices. It will become a sustainable site development standard for which individual sites will be awarded points, similar to LEED for green building construction.

The conceptual site plan illustrated below incorporates several of the LID BMP's that would be judged positively within the Sustainable Sites Initiative. Included are: green roofs, biologically maintained retention pond, pervious parking, preservation of existing habitat, native landscaping and bioswales.



On going Florida LID Efforts

On a Federal government level, Section 303(d) of the Clean Water Act (CWA) requires states to develop a list of waters not meeting water quality standards or not supporting their designated uses. Florida State Stormwater rules, implemented by the Department of Environmental Protection (DEP) are found in Florida Statutes 373 and Florida Administrative Code 40D. These rules seek to minimize the Total Maximum Daily Load of Pollutants (TMDL) that occur in water bodies, thus maintaining water quality standards. To keep Florida's water quality high, the several water management districts in the state are responsible for permitting individual land development actions.

When land development occurs in the US 17 Study Area, the South West Florida Water Management District (SWFWMD) requires that an Environmental Resource Permit (ERP) be obtained. In order to obtain an ERP, an applicant consults the ERP Permitting Information Manual, which contains best management practices which form the basis of review by SWFWMD. Contained within that document are criteria that presume to protect our water bodies. Lately, a more comprehensive "treatment train" of several methods is considered appropriate to provide even better treatment for stormwater. While conventional stormwater design typically involves constructing a single retention or detention pond to meet volume storage and pollutant control requirements for each basin, treatment train design involves constructing multiple practices in series, where each practice provides incremental benefits.

The "treatment train" approach encompasses many LID practices that are trickling into use across the state. Both the University of Florida and the University of Central Florida are assisting government agencies in analyzing and validating LID practices for Florida communities, including Sarasota County.

Sarasota County and the US 17 Study Area portion of Charlotte County are both under the jurisdiction of SWFWMD. In Sarasota County, a Preliminary Low Impact Development Manual was prepared by several consultants and a working team that included representatives from several Sarasota government agencies, the Charlotte Harbor National Estuary Program, Pinellas County and others. This manual provides technical guidance and design specifications on LID and is a supplement to other documents already in place. It is intended for use by site designers, including professionals such as stormwater design engineers, stormwater utility staff, natural resource managers, planning officials and administrators, building officials, architects, and landscape operations and maintenance professionals. This is an educational document to encourage new approaches to site design that will be more effective and more sustainable. The Sarasota LID manual notes that LID site planning extends well beyond structural stormwater controls to include guidance on the fundamental design of a development; methods for protecting water quality and minimizing runoff generation at the source; practices that use physical, biological, and geochemical processes for stormwater treatment; and innovative stormwater reuse options.

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Most if not all LID practices provide multiple stormwater, environmental, and aesthetic benefits, but it is useful to consider the entire suite of practices that might be applied in terms of their relationship to the five fundamental LID principles discussed within the manual:

1. Preserve existing site assets.
2. Minimize and control runoff generation at the source.
3. Promote infiltration.
4. Promote stormwater reuse.
5. Minimize site disturbance.

The new Florida State Stormwater Rules were initially expected to be in place in 2009, but now are expected to be in place as of 2010. No draft of the new Florida State Stormwater Rules is currently available, but through interviews, DEP has reported that the proposed new state stormwater rule will:

1. Change the way stormwater is managed.
2. Offer incentives for LID features.
3. Will replace individual rules in force in the state's five water-management districts.
4. Will require that post-development runoff measures be equal or less than pre-development for peak discharge rate, volume, recharge and pollutant loading.

In the new state stormwater rule, credit will be given for: using non-structural BMPs such as preserving vegetation and minimizing soil compaction, and incorporating green development practices, such as green roofs, pervious paving, and Florida-friendly landscaping. Credit will be taken away for: clear-cutting and connecting impervious areas.

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