

Protecting Florida's Water Quality: Identifying and Overcoming Barriers to Implementation of Low Impact Development (LID) Practices

Summary of Findings Report to UF Water Institute

by

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State laws in Florida for protection of water quality extends stormwater permitting well beyond the threshold required by federal law. Florida implements state water-quality protections through various statutes and rules, including the Environmental Resource Permit (ERP) programs of Florida's water management districts. The ERP programs require many proposed private development projects to secure permits that include review of their proposed stormwater systems. Both the federal permitting and Florida's ERP programs contain stricter regulatory requirements for proposed systems in an area with existing water quality violations. For example, state laws and regulations forbid approval of permits that cause or contribute to a water quality violation. Therefore, three main levels of stormwater treatment are required and assumed to be met based on specified engineering criteria; 80% reduction in pollutants, 95% reduction in pollutants, and no additional pollutant discharge. The level of treatment is based on the designated use classification of the downstream receiving water body.

These assumptions of pollutant removal efficiencies were mostly developed early in Florida's regulation of stormwater and were based largely on *sediment* removal efficiencies. However, the majority of Florida's impaired waters and TMDLs today stem from nitrogen and phosphorous pollution. As many of Florida's waterways became more polluted as development boomed in Florida, many suspected that the treatment assumptions based on the specified engineering standards were not actually being reached for nitrogen and phosphorous. Research sponsored by Florida's Department of Environmental Protection (FDEP) and released in 2007 confirmed that the regulatory engineering standards in Florida regulations *were not* achieving the assumed pollutant removal efficiencies for the key pollutants of nitrogen and phosphorous.¹ Additionally, regulatory design requirements for conventional stormwater basins only required that peak discharge conditions be attenuated post vs. pre development and that changes in total volume discharge are not regulated in most areas. Therefore, although flooding concerns are often successfully addressed, reduced infiltration into the ground can mean that development decreases recharge of the Floridan aquifer on which most new development depends for its water.

Thus, the Florida stormwater regulatory program that represented a progressive leap forward in the 1980s is now part of the problem. In response, FDEP is developing a new, state-wide stormwater rule that accounts for the lower treatment efficiencies for nitrogen and phosphorous delivered by standard, centralized stormwater facilities. The new state-wide stormwater rule will need to contain some low-impact development (LID) stormwater management techniques since stormwater research has demonstrated that the

¹ Harvey H. Harper & David M. Baker, Environmental Research & Design, Inc., Evaluation of Current Stormwater Design Criteria within the State of Florida (June 2007).

only way to guarantee 80%, 95%, and 100% removal of additional nitrogen and phosphorous pollution added by a stormwater system is to retain an equivalent percentage of the stormwater volume and provide.

LID therefore has a significant contribution to make in Florida by helping us clean up our stormwater and by promoting greater infiltration of water to recharge important groundwater resources.

I. Perceptions and Barriers Related to LID in Florida

LID is not a new phenomenon. While the phrase “low-impact development” may be relatively new, many of the techniques were already being discussed and advocated in research conducted in the 1970s. So what has kept LID techniques from being more widely implemented before Florida reached the crisis point it has now reached in water quality and quantity? A survey of Florida developers, professionals, and local government officials into the perceptions and attitudes about LID sheds light on perceptions as to the barriers to LID adoption (Table 1).

Table 1. The response when asked “Based on your experiences and perspective, what do you feel are the main challenges to successful implementation of LID practices in your County?”(n =

Acceptance/Changing Status Quo/Overcoming Apathy to Promote Behavior Change	25%
Regulatory/Permitting Barriers	23%
Education & Awareness	21%
Cost and/or Lack of and Misguided Incentives	18%
Technical Training & Implementation	5%
Other	3%
Compliance and Enforcement	2%
Maintenance	2%

Thus, the survey of professionals—primarily engineers—suggests that the greatest obstacle to greater implementation to LID is the existing status quo and apathy. The second most important obstacle identified was regulatory problems. Barely making the list of barriers were compliance and enforcement as well as maintenance. Respondents overwhelmingly identified “Education, Outreach, and Marketing to Promote Awareness”

as the most important strategy to overcome the barriers identified (Table 2), and “Real examples that work/case studies” as a need to complete future LID projects (Table 3).

Table 2. Response when asked “*What do you feel are the most important strategies and/or next steps for overcoming these challenges?”* (n =

Education, Outreach, and Marketing to Promote Awareness	35%
Regulatory/Permitting/Code Changes that Allow for LID	18%
Offer Incentives, Monetary and Otherwise	14%
Participation, Communication, and Cooperation among Stakeholders	11%
Fundamental Shift in Thinking/Change the Status Quo/Leadership	9%
Research/Data Collection/Demonstration Projects	8%
Technical Training/Design Requirements	3%
Other	3%

Table 3. Response when asked “*What do you need in your role to complete or approve an LID project?*” (n =

Real Examples that Work / Case Studies	26%
Example Code Language	21%
Training in LID Design	16%
Additional Training in LID Principles	13%
Available Material (hardware)	12%
Training in Material Installation	8%
Other	3%

In addition, regulatory officials at the state level expressed great interest in adopting LID but are concerned with long-term operation and maintenance (O&M) as well as

compliance and enforcement issues. O&M of LID systems does present greater challenges than conventional, centralized stormwater systems. Conventional systems are assumed to be operating properly as long as the stormwater basin is properly maintained through removal of sediments, removal of trash, maintenance of proper vegetation, and mowing if a dry basin. LID systems are more diverse and more research is needed in the proper O&M.

Assuming we understand the O&M procedures necessary to ensure the functional integrity of LID approaches, how to ensure compliance with appropriate O&M measures and take enforcement action when necessary remains a question. The importance of this issue should not be underestimated. For example, in the 1980s, Florida's stormwater regulatory system allowed the LID technique of swales to be used in the backyards of houses in residential developments as part of stormwater systems. After a few years, however, it became apparent that many homeowners in such developments did not understand the importance of the swale in the back yard, and many homeowners began to fill the swales. Homeowners often cited concerns such as mosquitoes and snakes, desire to use the space for other uses, just an aversion to potentially seeing water ponding in the swale immediately after a rain event.

As with these swales, the LID focus on decentralization and small-scale treatment of stormwater as close as possible to its source could lead to LID on individual private parcels. Having learned their lesson in the 1980s through loss of swales, regulators are often hesitant to approve swales and other LID methods in some instances,² especially if they are located on private property rather than on common land owned by a homeowners' association (HOA).³ Regulators prefer to see all stormwater facilities on HOA-owned land because this makes it clear that the HOA is the responsible entity and that individual property owners do not have the right to make modifications. While HOAs do not have a perfect track record for O&M of standard stormwater systems, they do at least present a single entity against whom to take enforcement action, usually based on a violation related to one or very few conventional stormwater basins within a development.

LID, because of its decentralized nature, complicates the situation. With integrated LID, a development that may have contained one or very few conventional stormwater basins may now have hundreds of different LID elements spread across the landscape. Instead of a basin or two, compliance review would involve looking at all of the LID elements in the landscape. In addition to the resources necessary to conduct such an operation, regulators expressed concern that if such elements appear on private property, they might lack the legal right to conduct inspection and maintenance activities.

From a strictly legal perspective—as will be addressed below—this does not present a great hurdle. The greater issues are the practical ones: Who has the resources to conduct

² Current regulations in some of Florida's five water management districts do allow for permitting of certain LID techniques. *See, e.g.* Thomas Ruppert, *supra* note -----.

³ Florida law provides for both homeowners' associations (Chapter 720, Florida Statutes) and condominium associations (Chapter 721, Florida Statutes).

O&M, monitoring, and enforcement activity on the vast number of distinct LID elements that might contribute to the stormwater system in even a single development? How does one ensure that the entity responsible for monitoring and enforcement has the resources to fulfill this responsibility? Would an HOA with the legal rights and obligation to monitor and enforce also have the practical desire to effectively carry out this obligation? HOAs historically have worried more about green lawns, the color of houses, and whether someone parks a truck in their driveway than about environmental and state regulatory concerns. Regulators fear that this historical focus of HOAs may make them ill-suited for the responsibilities related to LID stormwater systems.

Thus, the perceptions of engineers, developers, and other professionals that regulatory and permitting barriers are a problem is correct. However, these same professionals may not fully understand the *reasons* for the regulatory barriers. Regulators do not need more education on LID to accept it; they want assurances of effective O&M and monitoring and enforcement of whatever system they permit. Yet the professionals surveyed barely noticed or mentioned O&M or compliance and enforcement as barriers to LID. Regulators lack the resources to conduct O&M or monitor and enforce hundreds if not thousands of LID elements spread across new residential developments. Thus, promotion of LID requires development of strategies that address O&M, compliance, and enforcement concerns of regulators.

Additional deliverables that were completely or at least in-part due to support from this Water Institute funding

Presentations to date:

- *Identifying and Overcoming Barriers to Implementation of Low Impact Development Practices in Florida* - delivered at 2008 Water Institute Symposium
- *Understanding and Overcoming Legal and Administrative Barriers to LID: A Florida Case Study* - To be delivered at the 2008 International Low Impact Development (LID) Conference in Seattle, Washington

Ongoing collaborations to date:

- The Program for Resource Efficient Communities (PREC) has an ongoing Local Government Workshop about water quality and integration of Low Impact Development practices. Survey results collected during this project have helped guide that effort which has now expanded from counties only within the St. Johns River Water Management District to include at least some counties in all the water management districts. Funding support for those programs from FDEP, WMDs and local Governments for the past two years is approximately \$100,000

Publications to date:

- *Proceedings* of the ASCE/EWRI 2008 International Low Impact Development (LID) Conference to be printed in 2008

Proposals to date:

- Environmental Services Exchange: Evaluating Water Resources Management and Land Use Decision Making at the Agricultural-Urban Interface – USDA CSREES - \$399,401
- Low Impact Development Demonstration and Research at Hastings: Reengineering of IFAS Research Facilities – SJRWMD - \$4,935,000