Development of LID Spreadsheet Modeling Tool for Stormwater Management Plan Approval in Coastal North Carolina

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Withers & Ravenel will discuss their role in the development of a spreadsheet based stormwater modeling tool to assist in obtaining approval for Low Impact Development (LID) stormwater management plans in Southeastern North Carolina. The project is a collaborative effort between the North Carolina Coastal Federation (NCCF), Larry Coffman, the City of Wilmington, New Hanover County, and Brunswick County. As a design engineer for land development projects, Withers & Ravenel has been directly involved with the ever changing stormwater management practices in North Carolina, especially in the 20 coastal counties, where policies are being updated to protect shellfish habitats and enhance water quality. LID practices are one means to achieve high water quality standards, but until recently, very little specific local guidance was available. After receiving CWA 319 Grant funding and contributions from the three jurisdictions listed above, the NCCF spearheaded the development of LID specific stormwater design manuals and a spreadsheet based modeling tool to assist engineers and developers with the permitting and approval of LID stormwater management plans. Withers & Ravenel worked with the NCCF and the three governments to tailor the spreadsheet tool to meet the specific requirements of each jurisdiction. Recently, Withers & Ravenel has worked closely with the NC Division of Water Quality to further enhance the spreadsheet and add features specific to anticipated LID submittal requirements at the state level. The finished product combines the needs of the local jurisdictions and the state with the engineering data, resulting in a spreadsheet tool which can be used not only by engineers for site design but also by reviewers for plan approval. Beginning in 2006, stakeholder meetings in Brunswick and New Hanover counties highlighted significant obstacles in designing, permitting, and constructing LID based stormwater management plans. Although the obstacles were many, after lengthy discussions with the North Carolina Division of Water Quality, it became evident that many of the components needed for implementation of LID based stormwater designs were already in place, including design specifications for bio-retention cells, infiltration devices, filter-strips, and grassed swales. Furthermore, the sizing specifications already gave incentives, in the form of smaller BMP footprints, for infiltration type devices. The spreadsheet tool helps bridge the gap between traditional stormwater design philosophies and LID based stormwater designs. The spreadsheet tool was developed to provide an easy to use format to quantify the cumulative effect of lot by lot BMPs on flow rates and water quality for all types of development and re-development. The resulting calculations are used to determine compliance with state water quality regulations and local flood protection rules. The spreadsheet tool transforms the previously perceived qualitative LID concept into a quantitative engineered solution to stormwater management that addresses stormwater quality and quantity. This concise engineered approach will lead to a reduction in paperwork and abbreviated design and review times.