Practical Aspects of LID Program Implementation at the Local Level:
Stafford County, VA

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Stafford County Background
- Population +/-110,000
- Suburb of DC-Fast Growing
- NPDES Phase II Community
- CBPA Community

History/Background
- Stafford County revised its Stormwater Management Ordinance in March of 2003 to include Low Impact Development practices as an option for complying with the water quality, stream channel erosion, and flooding technical criteria of the County Ordinance.
- The Low Impact Development Design Strategies and LID Hydrologic Design Manuals prepared by Prince George’s County, Maryland for EPA were adopted by reference as the design criteria, hydrologic analysis, and computational procedures LID stormwater management design plans.

History/Background cont.
- In June 2003, to remove hurdles and provide incentives for LID projects, the County amended its Subdivision and Zoning Ordinances.
- In spite of these incentives, over the next year the County received very few LID projects. Some bioretention and infiltration facilities were proposed, mostly on commercial developments. In most instances these practices were added to conventional stormwater design plans to comply with water quality requirements.

History/Background cont.
- In June 2004, the County amended the Stormwater Management Ordinance to require that the stormwater management concept plan shall utilize LID site planning to the maximum extent practicable. In addition, stormwater runoff from parking lots is required to be treated by infiltration facilities or bioretention filtering systems. Consequently, LID became the first option for stormwater management in Stafford County and all new development projects are required to evaluate the use of LID before opting for conventional stormwater management.

History/Background cont.
- Consequently, the County has recently approved design plans for several projects that utilize LID practices and there are many more currently in the development review process.
- The County is currently working on revisions to its Stormwater Management Design Manual to provide policies and design guidance for LID stormwater management plans. The County has convened a committee of developers, engineers, VDOT and the Friends of the Rappahannock (local advocacy group) to assist with this process.
County Code Specifics

County SWM Ordinance in 2003 includes the following on LID

1. Low-impact development sites

2. The use of low-impact development site planning and integrated management practices shall be encouraged to control stormwater runoff at the source to closely approximate predevelopment runoff conditions.

3. Low-impact development stormwater management design plans developed consistent with the requirements of this subsection shall satisfy the water quality and quantity performance criteria of subsections (b), (c), and (d).

4. Design criteria, hydrologic analysis, and computational procedures for low-impact development stormwater management design plans shall be those of the low-impact development design manuals.

5. Low-impact development stormwater management design plans shall not conflict with existing state or Stafford County laws, ordinances, regulations or policies.

6. Storm drainage easements shall be recorded to identify the locations of integrated management practices on lots or parcels. The property owner shall not remove or structurally alter integrated management practices without prior written approval from the program administrator.

7. Stormwater runoff from parking lots shall utilize stormwater management infiltration facilities and/or stormwater management filtering systems. These shall be placed within or near the parking lot islands.

County Code Specifics

County SWM Code amended in 2004 to require that LID be “evaluated” for all new development sites.

“The stormwater management concept plan shall utilize to the maximum extent practicable low-impact development site planning in accordance with the low-impact development design manuals.”

County Code “Incentives” Specifics

LID IMP facilities allowed on building lots
Subdivisions that provide “engineered vegetated swales” may waive curb and gutter requirements with lots larger than 10,000 square feet
Allow landscaping for IMP facilities in required parking lot landscaping areas.
Landscaping in IMPs may count towards landscaping requirements in County Zoning Ordinance

LID Demonstration Project

Project consists of 2 bioretention areas and 1 Filterra unit constructed at the County Administration Center.
The facilities provide limited water quality treatment and demonstration facilities for prospective developers and engineers.
Pictured is the Filterra unit.

LID Demonstration Project

County Fleet Parking Lot Bioretention Area

So You’ve Adopted LID in your code! What Happens Now?

Lots of Questions?
Lots of Policy Issues?
Lots of Technical Questions?
AND, As always, lots of plans to review and approve
Need to Develop Additional Guidance

• County began the process to update its Stormwater Management Design Manual to help address questions related to LID Implementation

Implementation Issues and Questions

• The following slides detail issues and questions that the County has received concerning the requirements for LID techniques for Stormwater Management.

Issues and Questions cont.

• The Stafford County Stormwater Management Ordinance requires the implementation of Low Impact Development to the “maximum extent practicable” for Stormwater Concept Plans.
  • One major question has been how to define/address meeting the “maximum extent practicable” requirement.

Issues and Questions cont.

• Locating LID facilities in public (VDOT) rights-of-way
  • Conflicts with other utilities (i.e. cable, telephone, gas, electricity etc.)

Issues and Questions cont.

• Constraints
• Poor Soils
• Steep Slopes
• High Water Table

Issues and Questions cont.

• Longer plan review times
• Resolution of issues that arise during plan review
Issues and Questions cont.

- The County also requires that parking lot runoff be treated with filtration/infiltration facilities.
- This requirement can be difficult to implement on projects that already have BMPs and on redevelopment projects.

Issues and Questions cont.

- Use of LID techniques must be evaluated before the site is designed.
- LID more difficult to implement on projects that are already designed.

Issues and Questions cont.

- Sequence of construction
- LID facilities constructed by developer or builder

Issues and Questions cont.

- Underdrains - Required or not?
- Soil infiltration rates
- Underdrain location in bioretention/filters
- Retention vs. Detention storage in bioretention/filters

Issues and Questions cont.

- Easements
- Can IMPs cross property lines?
- Fences
- Maintenance Access

Issues and Questions cont.

- Setbacks from buildings
- Setbacks from wells and septic fields
Issues and Questions cont.
- Proper construction
- Contractor education
- Bioretention/filtration soil mixture
- Erosion control during construction
- Construction oversight by design engineer/as-built plan preparer

Issues and Questions cont.
- Maintenance
- Maintenance
- Maintenance

LID Implementation Observations
- Developers are reluctant to propose LID Stormwater Management plans fearing longer review times and concerns about uncertainties with construction and long term function and maintenance
- Development projects should employ LID techniques as the first stage of site planning. New development projects that do not utilize LID techniques as the first step in site planning are sometimes problematic.
- VDOT does not allow IMPs within State right-of-ways. Therefore road runoff must be diverted out of the road ditches and treated on private or open space lots.

LID Implementation Observations
- There are fewer issues to deal with on commercial sites with LID as opposed to residential sites. In commercial projects, bioretention can be located in parking lot landscaping areas, maintenance responsibility is more defined, and VDOT issues are less of a factor.
- The LID computation procedure can result in large storage volumes making LID very expensive. This is evident in large lot subdivisions where roads contribute the majority of the impervious cover and runoff. Developers evaluate stormwater costs on a cost per lot basis. How much should cost factor into determining “maximum extent practicable?”

LID Implementation Observations
- Most contractors and inspection staff are unfamiliar with the installation of LID practices. This can cause difficulty during construction and make construction bids more expensive than anticipated. Training courses on construction and maintenance of LID practices are also difficult to find.
- LID practices require engineer oversight during installation and precise grading to function as designed.

Current Status
- County has approved a number of SWM Concept and SWM Design Plans that utilize LID for Stormwater Management
- County in the final stages of updating SWM Design Manual to address technical and policy issues on LID
- Recent slowdown in local building economy has slowed construction of residential projects that utilize LID.