Low Impact Development Demonstration & Validation at a Southeastern Army Installation

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SEC. 438
STORM WATER RUNOFF REQUIREMENTS FOR FEDERAL DEVELOPMENT PROJECTS

“The sponsor of any development or redevelopment project involving a Federal facility with a footprint that exceeds 5,000 square feet shall use site planning, design, construction, and maintenance strategies for the property to maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of flow.”

Wow! This is a really high hurdle…and it seems to conflict with 100+ years of drainage practice.
Principles of Low Impact Development (LID)

- EISA, Section 438 and other Army guidance promotes LID approaches over more traditional approaches for stormwater management.
- Manage stormwater close to where precipitation lands.
- Maintain or restore pre-development hydrology, reduce runoff volume and peak runoff rates and reduce potential transport of pollutants to receiving waters.
- Widely proven in nonmilitary applications.
- One limit to mass Army adoption has been lack of demonstrations while combating a perception of increased costs.
Low Impact Development (LID)

principles in a nutshell

Conservation
Preserves native trees, vegetation and soils.
Maintains natural drainage patterns.

Small-scale Controls
Mimics natural hydrology and processes.

Directing Runoff to Natural Areas
Encourages infiltration and recharge of streams, wetlands and aquifers.

Customized Site Design
Ensures each site helps protect the entire watershed.

Key Elements of LID

Maintenance, Pollution Prevention and Education
Reduces pollutant loads and increases efficiency and longevity.
Educates and involves the public.
But, ERDC and the Corps have already addressed the question!
(Before Section 438 was published)

Public Works Technical Bulletin 200-1-36
30 September 2005

Sustainable Stormwater Storage Alternatives for Army Installations

• Describes basic LID practices
• Many graphics showing techniques
• Relates to SPiRiT guidance, but LEED® adaptable

PWTB 200-1-36

Public Works Technical Bulletin 200-1-62
1 October 2008

Low Impact Development for Sustainable Installations: Stormwater Design and Planning Guidance for Development within Army Training Areas

• Emphasizes non-cantonment training facilities
• Photos and graphics
• Shows possible LEED® credits

PWTB 200-1-62

Easiest technique is to search for PWTB by number
Representative technologies

- Bioretention cells
- Permeable pavement
- Bioswales
- Rain gardens
- Others
LID Examples
Project Emphasis

- Protect jurisdictional wetlands
- Address and mitigate impact on installation wetlands
- Implement corrective actions for outfalls which can degrade water quality and fill in wetlands
- Support Clean Water Act
- Original intent to upgrade structure, control runoff volume and reduce velocity of stormwater discharge
- Utilize LID with conventional approaches as needed
- Bioretention facilities, modifications to discharge channels, infiltration swales
- Expected results: filtration of metals and surfactants, reduction in quantity of runoff, improved quality of runoff
- Options for groundwater recharge
- Conduct demonstrations, monitor, collect data.
Proposed to collect water from downspouts and send to rain garden
Proposed site for rain garden infiltration area
Street runoff
Open lateral trench

Storm sewer collector
Temporary Barracks
Culvert filled with sediment and sand
HOWEVER!
Focus Change

- State inspection prompted emphasis on one site
- Upstream tenant had constructed detention basin with inadequate design
- Also nearby landfill cap washout.
- Result – major erosion problem.
This is the start of the problem
30 inch drain from tenant’s retention basin
Siltation threatens wetland area
Planning a Solution

- Selecting possible treatments
- Evaluating tenant’s catchment outfall structure
  - Outlet non-functional
  - Redesign for staged release
- Reality check
Step infiltration – a preferred approach
Summary

- LID testbed demo needed validation for wetland protection
- Overcome by high priority problem
- Solutions must be compatible
  - Appropriate to magnitude of problem
  - Compatible with environmental setting
Questions, Comments?

Contact information or for additional information or resources

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