Stormwater Issues

Volume and Energy

Non-Point Source

Trash & Debris

Long ago in a land far far away….

State-of-the-art

State-of-the-Art Land Use Planning: Traditional New Development (TND)

The Future of the Urban America

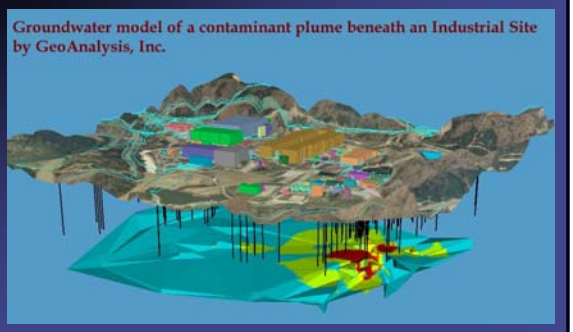
Basic Guiding LID Principles

1. Functional conservation of natural areas (where there are natural areas to be preserved)
2. Minimize development impacts
3. Maintain site runoff peak rate
4. Use integrated management practices
5. Implement pollution prevention, proper maintenance and public education programs

LID Foundation

- Water Balance (Volume an… Based)
- "Customized" sou… …ol structural and non-structura… …s for targeted watershe… …gement and community deve…

Process and Performance



Courtesy Geoanalysis

Today

- Moving towards Tributary Strategies
- Loadings and Limits (303d)
- Watershed Based Approaches
- Multimedia (Air, Surface, Ground)
- Costs and Predictability unknown

Paradigm Shifts

- Watersheds to **Ecosystems**
- Flow Centric to **Volume Centric**
- Centralized Control to **Decentralized Control**
- Uni-functional to **Multifunctional**
- Impact Reduction to **Functional Restoration**
- Good Drainage to **Functional Drainage**
- One Size Fits All to **Unique Design**
- Unsustainable to **Sustainable**

Buildings as systems

Transition from Stormwater Management to Infrastructure Management and Community Development

Decentralized Flexibility addresses the "Gap"

- Provide new capacity
- Preserve and restore existing capacity
- Pay as you go with minimal disruption to local economy and infrastructure
- Adaptive Management (Functional Research and Development)

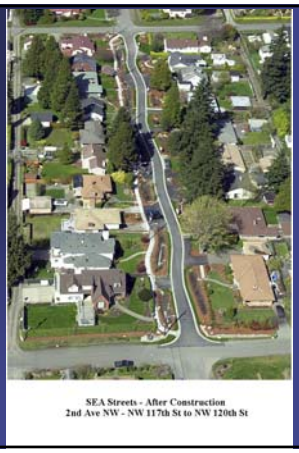
Delivery of Services!!!!

Current Research Projects

- WERF Decentralized (CSO Driver)
- NCHRP 25-20 (Transportation Driver)
- Green Highways Initiative (Watershed Driver)
- DOD LID Demonstration Projects (Infrastructure Driver)
- ASCE Database

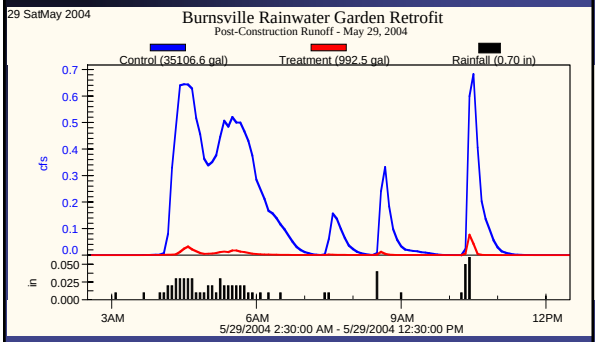
Reduced Impervious Area

- 11% less impervious area than standard street improvement

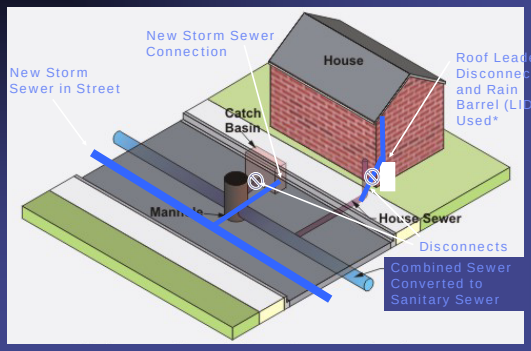


Appearance = Acceptance

Burnsville, MN



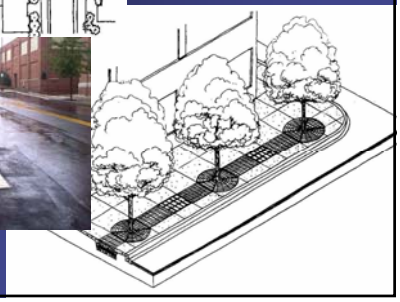
Separation Plan in CSO 006 Area (Est. Cost = $3,900/private property)



*No Extension on Private Property Required (May Result in 10-50% savings).

SHA Mt. Ranier Gutter Filters Integrated into Streetscape

Sustainable Transportation

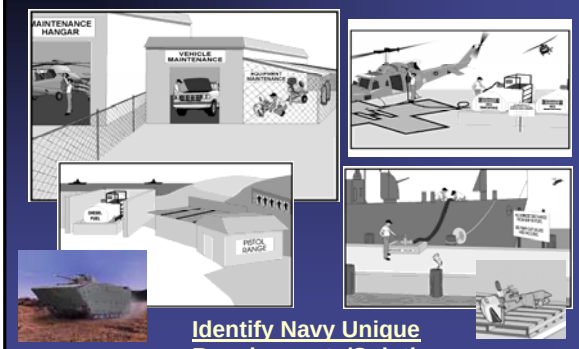


Anacostia Waterfront
Transportation Architecture Design Standards

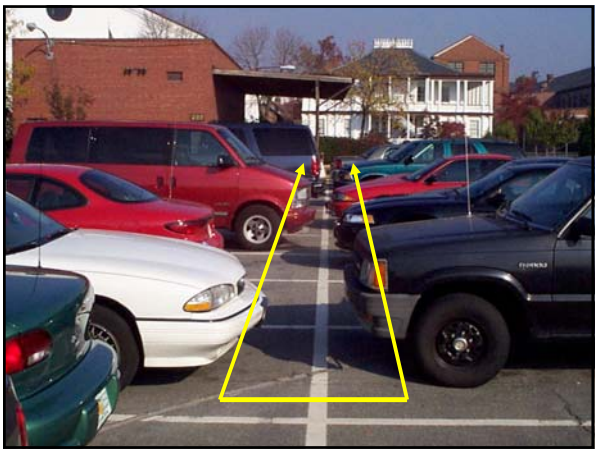
District of Columbia
District Department of Transportation
Infrastructure Project Management Administration

Green Highways Initiative

Partnership Approach



Identify Navy Unique Requirements/Solutions



United States Navy Yard

Modified DC Sandfilter: ESTCP Project San Diego

Substance	Concentration in Runoff ug/L	Concentration in Runoff Water ug/L	Multi-Sector Permit Requirement ug/L
Aluminum	1400	390	750
Cadmium	65	15	15.9
Chromium	15	ND	
Copper	1800	550	64
Iron	1950	660	1000
Lead	145	44	82
Zinc	3100	710	117