

Roadblocks To Change

- **Mind Set / Why Change?**
- **Leadership (lack of)**
- **Lack of Understanding**
- **Misinformation**
- **Perceived Problems**
 - **Costs / Operation / Maintenance / Flooding**
- **Inflexible Regulations**
- **People (building officials / consultants)**
- **Training / Education (consultants / officials / public)**
- **Inflexible Politicians / Professionals**
 - **Obligations / Cultural / Policies / Belief Systems)**

Roadblocks To Change

- Competition with Conventional Technology
- Consultant's economic model
 - They just figured out how to design ponds!
- Analytical tools can not analyze LID
- It's new
 - Need for Research and Data

LID and the Regulations

- **Building Code (Site Plan Requirements)**
 - **Design Standards and Specifications**
 - **Level of Data and Investigations Required**
 - **Transportation**
 - **Grading**
 - **Sediment Control**
 - **Stormwater Management (Quality / Quantity)**
 - **Well and septic**
 - **Special Soils and Slopes**
 - **Environmental (Critical Areas, wetland, forest, etc.)**

Low Impact Development

- Technology Based
 - Built Environment
 - Building Codes
 - Design Standards and Details
 - Building Officials
 - Numerous Options
- Land Use / Growth / Conservation
 - Local Issue

Implementation Process

- **Agent for Change (Responsible Party)**
- **Technology Development**
- **Government Multi-Disciplinary Workgroup**
 - **Problems / Principles / Plans / Permit Process**
 - **Codes / Manuals / Specifications**
- **Stakeholder Workgroup**
 - **Awareness / Goal Setting / Problem Solving**
- **Workshops (Specific / Joint)**
- **Demonstration Projects**
- **Continuous Assessment and Evaluation**

Implementation of LID New Development

- **Awareness / Education and Training**
 - **Government (Local, State & Federal)**
 - Policy Makers
 - Planners
 - Reviewers
 - Inspectors
 - **Building Community**
 - Consultants
 - Developers
 - Builders
 - Contractors
 - Lending Institutions
 - Property Owners / Managers

LID Implementation

Retrofit Existing Development

- **Government by Example**
 - **Capital Improvement Program**
 - **Restoration Projects (EPA 319 Grants / Corps of Engineers)**
 - **Facility and Infrastructure Maintenance Programs**
 - **Revitalization Programs (Streetscapes)**
 - **Brownsfields**
 - **New Facility Construction**
 - **Redevelopment Codes**

LID Implementation

Retrofit Existing Development

- **Other Institutions (Entities with / Programs with Resources)**
 - Environmental Groups
 - Business Associations
 - Churches
 - Private Property Owners
 - DOT
 - DOD
 - HOA's
 - Media
 - Developer Participation
 - Community Policing Programs

Maintenance

- Most planning control measures need no maintenance:
 - Clustering
 - Site fingerprinting
 - Imperviousness reduction
 - Imperviousness disconnection
 - Preservation of open areas
 - Tree preservation
 - Minimization of soil compaction
 - Preservation of riparian buffers
 - Wetland protection & enhancement
 - Open road drainage
 - Strategic grading
 - Pollution prevention
 - Public education
 - Fertilizer and pesticide reduction

Maintenance

- Bioretention/Planters/Green Roofs
 - Landscaping O&M
- Permeable pavement
 - Vacuum sweeping
- Reinforced turf / Grassed swales / Filter strips
 - Mowing
- Infiltration practices (trenches, dry wells)
 - Replacement of surficial layer if infiltration capacity decreases
- Rain cisterns
 - Periodic inspection
 - Drainage
- Amended soils / turf replacement
 - None

What People Like About LID

“Chagrin River Watershed Partners”

- Can be done by Individuals
- Reconnect people to the water
- Increased property values
- Filters pollutants in the uplands
- Less permits
- Looks better (aesthetics)
- Safer
- Increased infiltration
- Water quality benefits
- Satisfies NPDES Phase II
- Mimics pre-development hydrology
- Increases groundwater recharge
- Decrease runoff temperatures
- Focus on restoring functions
- Cost reductions
- Control with landscaping
- Creates more habitats
- Smaller roads = slower traffic
- Cumulative benefits
- Multifunctional landscaping
- Greater Protection of wetlands
- Owner buy-in
- Less liability
- Greater retrofit opportunities
- Win/win

The Issues with LID

- Difficult to calculate effects
- Need specifications
- Ponding in yards / mosquitoes?
- Property owner education
- Use with septic systems?
- Long term sustainability
- New ideas meet resistance
- Professional development
- Need for Research
- Heavy metals in soils
- Pollutant disposal
- Use with clay soils
- Training and manpower
- Function in cold climates
- Regional variation
- Banks don't lend to new ideas
- How to market it?
- Legal issues
- Concrete lobby powerful
- Start-up cost of new regs.
- Loss of land to buffers
- Need for variance process
- Ground water contamination?
- Small pipes more maintenance
- Invest in new technology
- Monitoring / Modeling

Suggested Next Steps

- Want more LID design forums
- Need more detailed forums
- Need community education
- Need homeowner guidelines
- Educate building community
- Write into master plans
- Adapt to local conditions
- Create a web page for users
- Make it a required seminar for builders
- Need for LID watershed plans
- More meetings on implementation
- Voluntary implementation guide
- Need examples of deed restrictions
- Need demonstration projects
 - residential / commercial
- Test analytical assumptions
- Research on regional differences
- Urban retrofit guidance
- Invest in Technology!

Challenges to LID Implementation

- Regulators must approve new approaches
 - New road standards
 - Clustering
- Professionals must change their designs standards
- Life cycle cost of BMPs must be considered
- Reviewers must have procedures in place and be trained in LID
- Developers must recognize the validity and marketability of LID
- The public must become more educated in stormwater management
- Research is needed on LID controls
- Need suitable models