

# Benefits and Limitations of LID

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# Overview

- LID offers significant benefits for managing stormwater better & building more attractive communities
- Can LID do it all? Is it all we need to do to protect our waters & our quality of life?
- If LID can't do it all, what is the complete package?

# Benefits of LID: Performance

## Excellent flow reduction (examples)

- SEA Streets: For 2000-03 water years, all dry season and 99% of wet season flows reduced (zero discharge since 12/02)
- 6-year King County pervious pavement study: Virtually all runoff infiltrated (pavers, grasspave and gravelpave)
- Portland green roof reduced runoff 69% overall, nearly all during dry periods

Helps protect stream channels, wetlands, and habitat, and prevent flooding

# Benefits of LID: Performance

## Excellent Treatment (examples)

- U Maryland bioretention
  - Metals removal 87-97%
  - P removal good at depth. For nitrates, elevated underdrain needed
  - Hydrocarbons captured well in mulch (90%)
- King County pervious pavement
  - Very low toxic levels, many non-detectable vs. conventional asphalt (97% of samples toxic)
- German pervious pavement studies
  - Metals removal 72-98%

Helps protect water & sediment quality, aquatic life, shellfish and swimming beaches; avoiding TMDLs

# Benefits of LID: Cost Savings

Often, but not always, less expensive

- Seattle NDS Projects 34-45% less expensive (with comparable treatment)
- AHBL analyses and projects (Kensington Estates, Hylebos) show LID cheaper
- Bellingham saved 75-80% by using bioretention vs. in-ground vaults
- CMI Homes saved \$260,000 at Sultan subdivision by using pervious concrete



*Pervious concrete,  
Stratford Place, Sultan*

*Photo by Curtis Hinman*

# Benefits of LID: More attractive

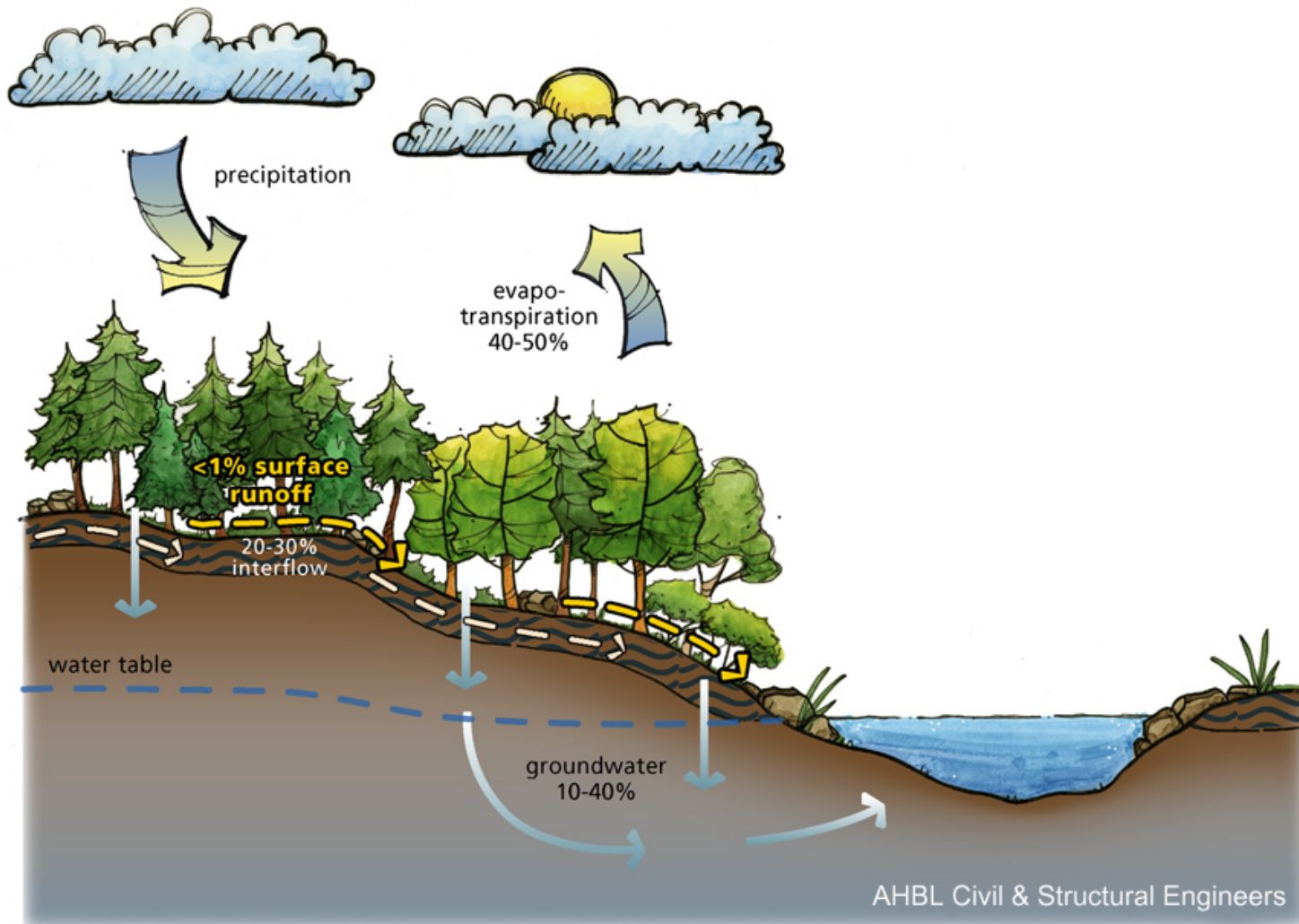


Conventional  
pond, Olympia



SEA Street,  
Seattle

# LID helps protect drinking water supplies, stream flows & wetlands



*from LID Technical  
Guidance Manual for  
Puget Sound*

## LID Offers Cost-effective Options for Redevelopment and Retrofit

- Important as most development in region occurred prior to 1990, when treatment and flow control applied.
- Important for jurisdictions with impaired waters, NPDES phase I permits, salmon recovery, shellfish restoration, sediment remediation, and/or CSO reduction

## Other Benefits

- Public safety, as studies show more narrow roads slow traffic speeds
- Economy:
  - Effective removal of bacteria protects shellfishing jobs
  - Effective treatment protects salmon fishing jobs
  - Effective treatment avoids costly restoration of waters and sediments
- Helps meet state and federal mandates

# But... LID alone is not enough!

## Key Elements to Pair with LID

- Effective growth management planning
  - Designating UGAs with appropriate densities
  - Providing sufficient buffers & setbacks in CAOs
  - Assessing how full build-out of GMA comp plan will affect natural hydrology, water quality & species
  - Incorporating measures to retain natural hydrology, such as setting goals for limiting impervious surfaces and preserving forest cover
- Watershed scale assessment, protection

# More Key Elements to Pair with LID

- Adequate minimum standards – 2005 Ecology SW manual or equivalent
- Ongoing maintenance (like conventional)
- Understand that some sites aren't suitable for infiltration (e.g., steep bluffs, very tight soils, high groundwater)
- Other elements of local, comprehensive stormwater program

# Local, Comprehensive Stormwater Program\*

- Land use planning
- Standards equal to Ecology's
- Site plan review
- Construction site inspections
- Maintenance
- Source control
- Illicit discharges & problem response
- Existing problems
- Public education & involvement
- Watershed or basin planning
- Monitoring
- Stable funding
- **Low impact development**

*\*From Puget Sound Water Quality Management Plan, 2000*

## Limitations in our Understanding of LID

- Still learning about performance
- Until more data is available, flow control credits are still best professional judgment. Might result in inadequate credits
- Still learning about longevity of systems, and setting maintenance protocols
- Need more projects, monitoring, time
- Need more training
- All paradigm shifts take time, patience

# Final Thoughts

- Many benefits of LID, and some limitations
- Limitations more a factor of need to pair LID with other key elements of a local, comprehensive stormwater program
- But... we have sufficient information to warrant moving forward swiftly with LID
- Too much at risk, and too costly, if we don't shift paradigm

# To help move forward

- Many resources available from State
- Partnership's LID Technical Assistance Project
  - More LID Local Regulation Assistance
  - Enhanced training workshops
- LID Technical Guidance Manual revision
- Extensive resources at: [www.psp.wa.gov](http://www.psp.wa.gov)
- Ecology SW Implementation Grants
  - \$18 million for LID demo, retrofits, non-SW discharges
  - \$7 million for shellfish protection, source control



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