

What is low impact development

A land development approach that works with nature to manage stormwater according to a simple set of principles. LID attempts to build urban landscapes that keep rainfall local to the immediate area, providing valuable water for trees and other vegetation that can then provide shade and beautify neighborhoods. LID can work on small scales – houses, businesses, streets – or at the watershed level, helping cities manage their supply of stormwater and treat it as valuable resource.

LID can be low-tech and simply involve cutting a curb to let stormwater from the street water plants in the public right of way. Or it can involve more complex underground water channeling, digital sensor equipment, and water storage technologies.

LID is effective, economical, flexible, valuable, multifunctional, systems- oriented, and sensible.²

Why is it important

Conventional stormwater management, called *grey infrastructure*, including pipes, gutters, tunnels, culverts, basins, and pumps can cause stormwater to pick up pollutants including fertilizers, pesticides, oil, chemicals, pet waste, garbage, and pathogens which eventually empty into waterways, riparian areas, and creek beds. This nonpoint source pollution is one of the worst culprits for water pollution in Arizona. By keeping stormwater local, LID can reduce water pollution and help restore the health of Arizona's waters.

LID can save money and help cities struggling with shrinking budgets or deficits.

Why is now the time

LID is currently at a critical juncture for arid climates. The techniques evolved in wetter climates and desert cities have been slower to adopt them. But LID is uniquely equipped to deal with many of the problems encountered in hot, dry places. The urban heat island (UHI) is a well-studied phenomenon in the Phoenix region that has raised minimum night time temperatures by 11⁰ in only fifty years.⁴ LID is well-positioned to contribute to urban forest cover and can motivate the removal of dark-colored heat sinks like asphalt that exacerbate heat island.

Recently, Phoenix and Mesa's infrastructure could not keep up with record rainfall and other cities are already adding infrastructure to handle the uncertainties of climate change. LID can relieve stress on existing infrastructure and avoid costly upgrades.

Where does low impact development work

"LID Works Everywhere!" – EPA. It can used for residential, commercial, public and private areas, small spaces and large properties.

LID Principles¹

- ✓ Keep water close to the source
- ✓ Preserve landscape features
- ✓ Minimize imperviousness
- ✓ Create functional, appealing site drainage
- ✓ Treat stormwater as a resource rather than waste
- ✓ Reduce impact of built areas
- ✓ Promote natural movement of water
- ✓ Protect ecologic and hydrologic functionality
- ✓ Encourage sustainable stormwater practices



LID Techniques for the Desert³

- ✓ Curb Cuts
- ✓ Vegetated Swales
- ✓ Bio-retention Basins
- ✓ Permeable Paving
- ✓ Constructed Wetlands
- ✓ Infiltration Drainfields
- ✓ Green roofs
- ✓ Cisterns



1. EPA. (2013). Low Impact Development (LID). Retrieved December 6, 2014, from <http://water.epa.gov/polwaste/green>
 2. Holz, T. (2001, April 1). NRDC: Stormwater Strategies - Chapter 12. Retrieved December 6, 2014, from <http://www.nrdc.org/water/pollution/storm/chap12.asp>
 3. Logan Simpson Design, Inc. (2014). Low Impact Development Tool Kit. August 8th draft
 4. Guido, Z. (2008). Urban Heat Island: Raising City Temperatures. Retrieved from <http://www.southwestclimatechange.org/impacts/people/urban-heat-island>

Photo Credits
 1. Logan Simpson
 2. City of Mesa
 3-4. AZ Central

"LID will convert stormwater to a resource that supports the creation of a high-quality, sustainably built environment"

Mesa in Action!

Water Use It Wisely Partner
Sustainable Cities Network
2012 Parks Bond Program
WIFA Grant
LID Toolkit!

People

"People won't care until the Colorado River is a political issue."

"The group in Mesa is progressive: we want to be ahead of the curve."



Economic

"It is more cost effective to implement LID."

"LID can be cheaper and less risky to reverse."

"The ROI argument is a pretty easy sell at Mesa."

Education

"With improved communication, LID will be more effective in the long term."

"Do we do a good job of cascading? The verdict is out on that."

"Education of the public is critical. What is the value of water?"

"Often people are not even aware that we have implemented cost-effective LID solutions that are working."

Recommendations

- Implement contractual risk sharing for parties responsible for LID implementation. Equitable risk sharing between developers, contractors and city personnel encourages experimentation and pilot projects, builds trust, and reduces both real and perceived risks for low impact development.
- Maintenance and research surfaced as huge concerns. Make landscape training and funds for monitoring and research available through a green revolving fund (in-house or EPA state fund), Clean Water Act grants, or a standard project fee.
- Ensure that everyone knows what a difference LID makes by having plaques with before and after visuals and LID benefits at all project sites. Start to create a LID map for Mesa showing the slow transformation.

Institutional

codes & regulations
strong private property rights

"Arid climates still need significant research."

Social

highly manicured landscapes
residents only care when it floods

Technical

permeable pavement has bad reputation
high-tech is too expensive

Risk

personal career risk
departmental risk



Economic

lack of long track record
missing total costs for grey infrastructure