The Business Case for Low Impact Development
Key Elements of LID

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

Small-scale Controls
Mimics natural hydrology and processes.

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

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

Maintenance, Pollution Prevention and Education
Reduces pollutant loads and increases efficiency and longevity.
Educates and involves the public.

40% evapotranspiration
10% runoff
25% shallow infiltration
25% deep infiltration
21% shallow infiltration
21% deep infiltration
38% evapotranspiration
20% runoff
35% evapotranspiration
30% evapotranspiration

Natural Ground Cover
10%-20% Impervious Surface

35%-50% Impervious Surface
75%-100% Impervious Surface

Fig. 3.21 — Relationship between impervious cover and surface runoff. Impervious cover in a watershed results in increased surface runoff. As little as 10 percent impervious cover in a watershed can result in stream degradation. Source: Corbett, Restoration: Principles, Processes, and Practice (1998). By the Federal Interagency Stream Restoration Working Group (FISRWG) (15 Federal agencies of the U.S.)
Red = Pervious Surfaces
Blue = Impervious Surfaces
Green = Vegetation

Land Cover Phoenix 2010
Tucson 1965

Tucson 2011
Economics of Asphalt

- 52% of Arizona’s roads are in poor or mediocre condition

- Tucson “has identified an $850 million backlog in street maintenance.”

- Arizona’s gas tax of 19 cents per gallon has not been increased in 22 years.

- Motor vehicle crashes cost Arizona $4 billion per year ($833 per person)
Economics of Water

- AZ needs **$7.4 billion** in drinking water infrastructure in the next 20 years.
- AZ needs **$5.2 billion** in wastewater infrastructure in the next 20 years
- Wells around Tucson are drying up
- “A number of costs associated with stormwater protection are not readily available” – City of Tucson
Financial Aspects of LID

- $1 investment in urban forest can return $2.23
- Shaded asphalt can last from 10-25 years longer
- Economies of scale – LID should actually get cheaper over time
- Few reports quantify the economic benefits that LID can provide
Tucson in Action

• Passed Green Streets Policy unanimously in May of 2013
• Tucson has raised water prices
• 50% rain harvesting requirement for commercial properties
• LID working group
Envision Rating System

1. **Quality of Life**
   - Purpose, Community, Wellbeing

2. **Leadership**
   - Collaboration, Management, Planning

3. **Resource Allocation**
   - Materials, Energy, Water

4. **Natural World**
   - Siting, Land & Water, Biodiversity
The Business Case Evaluator (BCE)
Sustainable Net Present Value

The first curve is the Direct Financial NPV (only including Direct costs and benefits).

The second curve, (S-NPV) incorporates all costs and benefits, including economical, societal and environmental impacts.
Blue Moon Community Garden

“Gardening is the highest art form. It uses all 5 senses.”
Blue Moon Community Garden

**Sustainable Net Present Value**

- **Sustainable NPV**
- **Direct Financial NPV**

\[ \text{Sustainable NPV} = \$-296,000 \]
Blue Moon Community Garden

Project Division of Benefits

- Recreational Use Value
- Flood Risk Value
- Change in Property Values - Resident Portion
- Change in Property Values - Gov's Portion
- Heat Stress Mortality
- CO2 Emissions
- Air Pollution

62%
Conclusions

- BCE is progress and will be more valuable once automated and online (AutoCase)

- Social value is still not captured. Social return on investment or other measures need more acceptance and implementation

- Non-market valuations are still not a big part of decision making. Even economic benefits are not often counted

- More high-tech solutions have much longer paybacks and more maintenance concerns
Scott Avenue Revitalization

“What downtown could become”
Scott Avenue Revitalization

Sustainable Net Present Value

$210,000

ASU School of Sustainability

City of Tucson
Scott Avenue Revitalization - Benefits

Project Division of Benefits

- Flood Risk Value
- Change in Property Values - Resident Portion
- Change in Property Values - Gov's Portion
- Heat Stress Mortality
- CO2 Emissions
- Air Pollution

85%
Conclusions

 Without comprehensive financial data, urban forest becomes the greatest economic benefit to residents

 Benefits like increased property values may be undervalued

 Need to know the true costs of conventional stormwater mgmt.
Recommendations

 Implement a life-cycle-costing project framework for Tucson
  - Hybrid approach that integrates S-ROI

 Start with standardized financial documents that capture project information up front. Use streamlined permitting in exchange.

 Work with upcoming AutoCase revisions to form an arid climate specific comparison calculator.
  - Convincing conventional vs. LID standards scenario tools are in high demand
Thank you