Best Suited Low Impact Development Features for the City of Phoenix Landscape

Danielle Jordan – Intern, Maggie Messerschmidt – The Nature Conservancy, Christine DeMyers – DCDC Mentor
Internship for Science-Practice Integration

Background

Although Phoenix, AZ is located in an arid environment, it suffers from stormwater runoff and flooding during extreme storm events because of its urban infrastructure. Low impact development (LID) features can be used to maximize infiltration and retention rates of stormwater runoff and flooding. The goal of this study is to identify LID features and locate areas in Phoenix to place those features to maximize these rates and mitigate flooding and runoff.

Research Questions

1. What low impact development features are suitable to mitigate runoff and flooding for the City of Phoenix?
2. Where can we use low impact development features to maximize infiltration and retention rates in order to reduce runoff and flooding in the City of Phoenix?

Methods

Literature review to determine LID features appropriate for Phoenix, AZ.

Researched news stories from major flooding/runoff events to determine 4 locations.

Determined flood zone for locations with Flood Control District of Maricopa County Floodplain maps.

Determined the zoning code for each location from the City of Phoenix website.

Determined which LID features are appropriate for locations and outline those areas.

Results

LID Type | Infiltration or Retention - I or R | Scale
----------|----------------------------------|------
Permeable (porous) pavement | I and R | Local
Green roofs | I and R | Local
Downspout Disconnection | I and R | Local
Rainwater Harvest System | I and R | Local
Planters/tree box filter | I and R | Local
Vegetated swale/buffer | I and R | Local
Infiltration trench/basin | I and R | Local
Rain gardens | I and R | Local
Green Street (Curb Cuts, etc.) | I and R | Local
Bioretention basins | I and R | Local
Detention Pond (Dry) | I and R | Catchment
Vegetated swale/buffer | I and R | Catchment

Appropriate LID Features

- Porous Pavement
- Curb Cuts
- Bioretention basins
- Infiltration trench/basin
- Vegetated swale/buffer
- Rain gardens
- Green Street
- Planters/tree box filters

Red Lining – Potential implementation areas

- Flood Zone X = Moderate flood hazard or 0.2% annual chance flood

Collaborative Potential

- The City of Phoenix has a Tree and Shade Master Plan with the goal to achieve an average of 25% shade canopy coverage for the entire city by 2030. In the future, this research could be used as a way to add to the overall tree canopy.
- Currently, The Nature Conservancy is in collaboration with the City of Phoenix and other organizations with regards to a LID Catchment Study. This study has the potential to be used in that study and furthering research.

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