EVALUATING SUSTAINABLE LANDSCAPES IN THE ARID SOUTHWEST

Kaylee R. Colter, Chris A. Martin
College of Letters and Sciences, Arizona State University, 6073 S. Backus Mall, Mesa, AZ 85212

INTRODUCTION
In the summer of 2014 a Case Study Investigation was conducted to highlight the achievements of two sustainably designed parks. The focus of each profile was to develop Performance Benefits that evaluate and quantify the benefits of the sustainable features. Generated from a combination of data provided by the designers and data collected over the summer research project, each gives insight on how design translates to reality. A selection of benefits are provided here, the full case study profiles can be accessed online at: www.landscapeperformance.org

CIVIC SPACE PARK
PHOENIX, AZ

ENVIRONMENTAL
Collects and infiltrates up to 9,587 cu ft of water per storm event in underground chambers located on-site. Water collected in the chambers is infiltrated into the hardscape surfaces and 4.7°F cooler than typical landscape surfaces and 4.7°F cooler than typical landscape surfaces measured at mid-day. Turf also positively contributes to heat island mitigation reaching a temperature of only 67.2°F on summer evening.

SOCIAL
Provides a location for an average of 43 free community events from each year including movie screenings, concerts, art galleries, and wellness events such as community yoga.

ENVIRONMENTAL
Reduces air temperatures at mid-day hardscapes surface temperatures by 23.4°F by providing shade with the use of broadleaf trees and shade structures.

ENVIRONMENTAL
Provides a stable base for paved materials as well improved conditions for tree root growth.

SOCIAL
Attracts and averages of 559 visitors on a weekday morning, in the low summer season of summer. Of these, 63% engaged in social activities.

DOUBLES THE PRODUCTIVITY (RATE OF PHOTOSYNTHESIS) OF TREES PLANTED WITHIN HARDCORE AREAS BY UTILIZING STRUCTURAL SOIL TO EXPAND THE EFFECTIVE ROOT ZONE.

This project utilized structural soil for the many trees planted in hardscapes plazas. When properly installed structural soil provides a stable base for paved materials as well improved conditions for tree root growth. The research team measured the net leaf gas exchange fluxes (net atmospheric carbon sequestration or photosynthesis) of trees planted within landscape, hardstands, and structural soil. The rate of photosynthesis was 6.4 μmol/m²/s for trees planted in landscape, 9.9 μmol/m²/s for trees planted in typical hardscapes, 18.6 μmol/m²/s for trees in structural soil.

REDUCES HARDSCAPE SURFACE TEMPERATURES

Temperatures of various surface types under live, hard, and no shade were measured mid-day in June with an infrared thermometer. Hardscapes surfaces such as concrete, asphalt and stabilized decomposed granite had much lower temperatures when under the shade of a tree or structure. The large shade structure helped to keep temperatures on the playground below 82°F. Artificial turf was the hottest surface and is cooled with a timed sprinkler system.

ENVIRONMENTAL
Saves 88% of potable water use for irrigation, when compared to an established baseline, by utilizing a native plant palette that does not require long-term irrigation.

SOCIAL
Attracts an average of 32 visitors on a weekend morning, in the low season of summer. Of these, an average of 9% engaged in optional activities and 72% of these were also engaged in social activities.

ENVIRONMENTAL
Provides habitat with 16 species of arthropods observed in addition to nectar, small, ants, snakes, and birds.

CIVIC SPACE PARK

PHOENIX, AZ

EVALUATING SUSTAINABLE LANDSCAPES IN THE ARID SOUTHWEST

Kaylee R. Colter, Chris A. Martin
College of Letters and Sciences, Arizona State University, 6073 S. Backus Mall, Mesa, AZ 85212

INTRODUCTION
In the summer of 2014 a Case Study Investigation was conducted to highlight the achievements of two sustainably designed parks. The focus of each profile was to develop Performance Benefits that evaluate and quantify the benefits of the sustainable features. Generated from a combination of data provided by the designers and data collected over the summer research project, each gives insight on how design translates to reality. A selection of benefits are provided here, the full case study profiles can be accessed online at: www.landscapeperformance.org

CIVIC SPACE PARK

PHOENIX, AZ

ENVIRONMENTAL
Captures and infiltrates 100% of on-site stormwater generated from a 100-year/24-hr storm event. The park also manages runoff from several upstream developments, with the ability to store 49.5 ac ft.

SOCIAL
Attracts and averages of 559 visitors on a weekday morning, in the low summer season. Of these, 63% engaged in social activities.

ENVIRONMENTAL
Reduces energy consumption on-site by 97% by utilizing energy efficient fixtures when compared to the lowest cost alternative fixture.

ENVIRONMENTAL
Manages stormwater run-on from the surrounding watershed, with the ability to infiltrate 49.5 ac ft stormwater in vegetated detention basins.

REDUCES HARDSCAPE SURFACE TEMPERATURES

Temperatures of various surface types under live, hard, and
no shade were measured mid-day in June with an infrared thermometer. Hardscapes surfaces such as concrete, asphalt and stabilized decomposed granite had much lower temperatures when under the shade of a tree or structure. The large shade structure helped to keep temperatures on the play

Acknowledgments
Funding for the Case Study Investigation was provided by the Landscape Architecture Foundation. Additional support was provided by SmithGroupJJR, Floor Associates, AECOM, the City of Scottsdale, and the City of Phoenix.

EXPRESSIONS IN THE ARID SOUTHWEST

EVALUATING SUSTAINABLE LANDSCAPES IN THE ARID SOUTHWEST

Kaylee R. Colter, Chris A. Martin
College of Letters and Sciences, Arizona State University, 6073 S. Backus Mall, Mesa, AZ 85212

INTRODUCTION
In the summer of 2014 a Case Study Investigation was conducted to highlight the achievements of two sustainably designed parks. The focus of each profile was to develop Performance Benefits that evaluate and quantify the benefits of the sustainable features. Generated from a combination of data provided by the designers and data collected over the summer research project, each gives insight on how design translates to reality. A selection of benefits are provided here, the full case study profiles can be accessed online at: www.landscapeperformance.org

CIVIC SPACE PARK

PHOENIX, AZ

ENVIRONMENTAL
Captures and infiltrates 100% of on-site stormwater generated from a 100-year/24-hr storm event. The park also manages runoff from several upstream developments, with the ability to store 49.5 ac ft.

SOCIAL
Attracts and averages of 559 visitors on a weekday morning, in the low summer season. Of these, 63% engaged in social activities.

ENVIRONMENTAL
Reduces energy consumption on-site by 97% by utilizing energy efficient fixtures when compared to the lowest cost alternative fixture.

ENVIRONMENTAL
Manages stormwater run-on from the surrounding watershed, with the ability to infiltrate 49.5 ac ft stormwater in vegetated detention basins.

REDUCES HARDSCAPE SURFACE TEMPERATURES

Temperatures of various surface types under live, hard, and
no shade were measured mid-day in June with an infrared thermometer. Hardscapes surfaces such as concrete, asphalt and stabilized decomposed granite had much lower temperatures when under the shade of a tree or structure. The large shade structure helped to keep temperatures on the play

Acknowledgments
Funding for the Case Study Investigation was provided by the Landscape Architecture Foundation. Additional support was provided by SmithGroupJJR, Floor Associates, AECOM, the City of Scottsdale, and the City of Phoenix.