Gathering Under a Green Umbrella: Collaborative Rainwater Harvesting at the University of Arizona

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ABSTRACT

The Parasol Club is a student-run, collaborative group focusing on sustainable resource use at the University of Arizona (UA), especially rainwater harvesting. The group’s fundamental idea is that, as a land-grant university in an arid environment, UA should serve as a learning laboratory for the development and demonstration of techniques for sustainable use of water and energy. Parasol’s success is due largely to its collaborative model in which students work closely with facilities staff, faculty, and administrators to identify sites, gather materials and labor, and bring projects to fruition. Completed projects serve as a testament to the effectiveness of the collaborative model. As the group has demonstrated the power of institutional collaboration at the university, its circle has widened to include members of several academic departments, additional facilities staff, and university administrators. New campus projects are planned, and the group has extended its reach to work with Tucson primary schools and neighborhood organizations on rainwater harvesting projects. This paper discusses Parasol’s model as an example for collaborative infrastructure and project development at an institutional level.

Keywords: Collaborative Infrastructure, Collaborative Technologies, Environmental Technologies, Project Development, Sustainable Technologies

INTRODUCTION

Aridity is a fact of life in Arizona, yet water scarcity has long been inadequately taken into account in the architectural and landscape design processes of public and private water users (DeCook, 1983). The need to plan for water scarcity will likely only grow in importance with the continued growth of human populations in the region and the prospect that climate change could further deplete conventional water sources such as the Colorado River and its principal reservoir, Lake Mead (Barnett & Pierce, 2008; Barnett & Pierce, 2009; Rajagopalan, Nowak, et al., 2009) and underground aquifers (Glennon, 2002). Rainwater has the potential to serve as a “new” source of water in the region, yet has so far been an underutilized resource, in part because knowledge of water harvesting is not widely disseminated in the United States.
Based on an EPA study finding that the volume of rain falling on the metropolitan Tucson area annually is approximately equal to annual municipal residential water use (Phillips, Riley, et al., 2005), Parasol members identified a clear need for research and education on the topic.

As an institution of higher education in an arid environment, the University of Arizona should be ideally situated to assume a leadership role in the design and implementation of water harvesting systems on campus and the close involvement of students in both the design and implementation phases. Yet until 2005 the opportunity to create a learning laboratory for more sustainable water management techniques had not been taken advantage of at the university level. Few water harvesting techniques had been employed on campus, and the few that had were not integrated into university curriculum materials.

In 2005 three UA students and Dr. James J. Riley of the UA Department of Soil, Water and Environmental Science saw an urgent need for campus leadership on water issues, believing that well-managed harvested rainwater has the potential to replace a significant percentage of groundwater pumping for landscaping and other non-potable uses at the university, decreasing the university’s draw on threatened groundwater reserves and thus potentially reducing the magnitude of land subsidence in the Tucson Basin (DeCook, 1983; Chater, 2003; Daigger, 2009).

The University of Arizona Comprehensive Campus Plan (University of Arizona, 2003), approved by the Arizona Board of Regents, stated clear objectives for the sustainable management of limited land and water resources at the university, yet these objectives remained purely hypothetical, with specific techniques for sustainable, efficient resource management still in need of development (University of Arizona, 2003). In 2005 the Parasol student club was formed specifically to meet the need for development and modeling of rainwater management techniques for application on the UA campus and to familiarize a broader segment of the local population with possible approaches. A further stated goal of the Parasol club was to integrate hands-on sustainable resource use and conservation projects into the UA curriculum.

In order to achieve and institutionalize its broad objectives, the Parasol club envisioned a broad model of collaboration between UA students, faculty, and facilities staff (see Figure 1). The group sought explicitly to develop a network of collaborative working relationships that would be critical to any individual project’s realization and the gradual fulfillment of the group’s overarching goals. Early steps included meetings with faculty members in several departments with interest in water management on campus and sustainable design. These departments included Soil, Water and Environmental Science, Plant Sciences, Anthropology, and Landscape Architecture. Meetings were also held with university administrators, campus planners, and facilities staff members to seek their involvement and support. A key early success of the group was placement of a student member on the UA Surface Water Working Group (SWWG), a group responsible for development of the campus stormwater management plan and the surface water design standards for new construction projects.

**The Aerospace and Mechanical Engineering Project (2006):**

In the fall 2005 semester, Parasol club member Chester Phillips and Dr. Riley co-authored a successful USGS 104B grant to fund an initial project on campus and develop curriculum materials for an upper division undergraduate and graduate level course in rainwater harvesting within the SWES department. In spring 2006, working closely with several faculty members and facilities staff, the Parasol club broke ground on a project at the Aerospace and Mechanical Engineering (AME) building.

The project included a passive rainwater harvesting design that modified the existing landscaping to form a series of linked earthen rainwater harvesting basins below downspouts on the south side of the AME building where
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