Aggie B.L.U.E.print Laboratories: Building Lasting University Environments A Multi-Disciplinary Teaching Opportunity



Galen Newman¹, Jun-Hyun Kim¹, Ming-Han Li¹, Michael A. Arnold^{2*}, and Kung-Hui Chu³

¹Assistant Professor, Assistant Professor, and Professor and Associate Department of Landscape Architecture and Urban Planning, Texas A&M University, College Station, TX 77843-3137 ²Professor and Associate Department Head, Department of Horticultural Sciences, Texas A&M University, College Station, TX 77843-2133 ³Associate Professor, Department of Civil Engineering, Texas A&M University, College Station, TX 77843-3136

Abstract

Planning strategies emphasizing stormwater management, such as It was decided due to ease of approval for the raingarden plantings in The Low Impact Development (LID), are increasingly utilized in sustainable TAMU Gardens and Greenways area (http://gardens.tamu.edu/gardens/) design/development, minimizing the impact of impervious land cover. LID and access to assistance from SSC (campus grounds maintenance group) is an innovative approach treating stormwater at the source, using compared to the more time consuming space utilization approval process uniformly distributed facilities such as stormwater collection devices, at the second location on central campus to focus initial efforts at the filtering systems, and water reuse mechanisms. This project seeks to TAMU Gardens and Greenways during the first year (Fig. 1). educate and train students in LID alternatives to traditional stormwater Figure 1 management through hands-on outdoor classroom activities involving development, installation, monitoring, management, and evaluation of stormwater management designs within interactive test plots. Two sites AM THE GARDENS on the Texas A&M University (TAMU) campus are being developed, one in **TEXAS A&M UNIVERSITY** which the primary challenge is runoff from building roofs and the other entails management of a large parking lot and turfgrass area effluent. Tasks are being carried out by students across three colleges (agriculture, architecture and engineering), including the Landscape Architecture and Urban Planning, Horticultural Sciences, Civil Engineering, and Biological and Agricultural Engineering departments. Provisions for solutions to complex hydrologic issues are being explored, assessed, and showcased as outdoor labs and interactive public exhibitions. Landscape Architecture and Urban Planning students are providing the designs, Horticultural Sciences students are providing plant materials suggestions, propagating and growing plants for the project, and Engineering students are planning monitoring and environmental quality measurements. The three year project employs long-term involvement in hands-on learning activities by an estimated 300 or more students per year and will result in solutions to two long-term water management problems on the Texas A&M University campus. Project objectives, plans and current accomplishments will be addressed. This work was funded by a Texas A&M University Tier One Program (TOP) Grant. Figure 1. Tentative map of the new TAMU Gardens and Greenway. The overlaid red

Objectives

General benefits of this project are to raise awareness of hydrological Three year project with first year progress including academic year 2015-2016: issues and to demonstrate the feasibility of widespread implementation Fall Semester 2015 and to educate a new generation of practitioners in LID applications.

Several objectives are sought to achieve this overarching focus:

- Strategically implement a set of structural and non-structural LID facilities on each test site and link their core functions through education, research, and demonstration provided by outdoor classrooms.
- Operationalize the construction, performance measurement and long term monitoring of each site assessing the impact of LID treatment versus non-treatment as an educational mechanism for students.
- Integrate innovative technologies for survey taking, real-time data display via the web, data sharing/streamlining, public marketing and program evaluation.



Texas A&M System

Introduction



oval indicates the location of the planned raingarden in the highly visible Event Lawn and Entrance Plaza.

Materials and Methods

- Planning meetings and materials acquisition.
- Woody plant wish lists developed by undergraduate Woody Landscape Plant (HORT 306) and graduate Plants for Landscape Design (HORT 608) students

Spring Semester 2016

- Additional herbaceous plant lists developed by undergraduate Landscape Plant Materials (HORT 308) and graduate Plants for Landscape Design II (HORT 609) students.
- Plant propagation begun by students in Plant Propagation (HORT 326) and previously listed HORT 308 and HORT 609 students (Fig. 2)
- Plant production moved to new HortTREC (Horticulture Teaching Research & Extension Center) featuring state of the art nursery & greenhouse facilities (Fig. 2)
- Undergraduate (LAND 321) and graduate (LAND 602) students in landscape architecture begin design processes

Summer Semester 2016

- Growing plants in earnest, quarter acre of containers grown by students/faculty HORT 485 Special Problem.
- Landscape Architecture students and faculty develop design details and begin acquisition of environmental monitoring equipment

Table 1

Students from multiple courses and disciplines have been involved in the project thus far bringing a diversity of perspectives.

Year Semeste	r Course	Number of students
2015 Fall	HORT 306 Woody Landscape Plants	53
	HORT 608 Plants for Landscape Design	16
2016 Spring	HORT 308 Landscape Plant Materials	46
	HORT 609 Plants for Landscape Design II	7
	HORT 326 Plant Propagation	51
	LAND 321 Landscape Design IV	30
	LAND 602 Landscape Arch. Design Application	15
2016 Summer	HORT 485 Special Problems in Horticulture	1
	HORT 691 Research	1
	LAND 691 Research	1
	Unenrolled participants	2
Total number of students participating in academic year 2015-2016		223

Figure 2



Figure 2. Examples of involved students (A), plant production (B), construction drawing (C) and volunteer participation (D).

Conclusions

Strong progress is occurring with multidisciplinary efforts to install raingardens as a component of the low impact development at the new TAMU Gardens and Greenways. Plans for the next phase include continued plant production, design finalization, site installation and pre-installation and post-installation monitoring of runoff water quality on the site. Dissemination of information at meetings and via website is planned as well as initiation of the second raingarden site to be located in central campus. Currently, an estimated 223 Students (Table 1) have actively participated in this high impact learning project with more to come in the new academic year. This work was funded by a Texas A&M University Tier One Program (TOP) Grant and conducted in part in facilities supported by Hatch Funds from the National Institute of Food and Agriculture (NIFA).