

Final Project Report

**IPRO 497-371
Sustainable Landscape Design at the Rice Campus
Spring 2005**

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Introduction

Sustainability can most generally be defined as *meeting the needs of today without compromising the needs of tomorrow*. This definition is more specific in regards to landscape design. A sustainable landscape is a design that is attractive, functional, manageable, environmentally sound, and cost effective. The goal of IPRO 371 is to introduce sustainability to the landscape of IIT's Rice Campus.

Background

In 1991, the Rice Campus opened following the generous gift of 19 acres of land in Wheaton, Illinois from the Rice Foundation. The Rice Campus offers a plethora of educational options through the Center for Professional Development. It serves as a facility for many corporate functions by day and offers courses to students by night. In this way, the Rice Campus serves both businesses and citizens of Wheaton and the surrounding communities.

The development and improvement of the landscape at the Rice Campus is beneficial to IIT and the community of Wheaton. These improvements must be made for two reasons. First, the Rice Campus landscape is significantly underdeveloped. Since it resides on 19 acres of land inside a larger community, the community and IIT stand to gain if the land surrounding the Rice Campus is improved. Second, a more impressive landscape will make the building a more attractive venue for holding corporate events. As such, it will be a bigger asset to IIT.

A sustainable landscape plan will not only improve the look of the Rice Campus, but, in the long run, it will reduce the costs associated with the landscape. Many companies and individuals develop new landscapes every day. When these landscapes are not properly planned or implemented, the cost of maintenance can be staggering. A sustainable landscape is a landscape that will improve the environment and reduce labor costs. Sustainable landscapes accomplish this by properly managing environmental resources, such as rain water, and by installing plants appropriate to the situation.

The situation also presents the opportunity for IIT to take a leadership role in the community. By introducing elements of sustainable landscape, rain water management and other environmentally friendly initiatives into their landscape, the Rice Campus will provide a role model for landscapes throughout the community to follow. Outside of Wheaton, this landscape initiative could also help influence other colleges to start doing their part to protect and improve their landscape.

Purpose

The objectives of IPRO 371 were to plan, design, and implement a sustainable landscape for the Rice Campus of the Illinois Institute of Technology. The main focus of the team for its first semester was to develop a sustainable landscape design, and to gather feedback on the proposed plan.

Research Methodology

T = Tuesday, R = Thursday, F = Friday

Class Meeting	Due to Team	Due to IPRO/DuPage County	Agenda
T - 3/8			Scheduling, Task Delegation
R - 3/10			Don LaBrose
T - 3/15	Spring Break		
R - 3/17			
T - 3/22	All application requirements, Mid-Term Progress Report		Review completed application materials, Mid-Term Review Session
R - 3/24		Mid-Term Progress Report	Finalize application materials
T - 3/29		Design Report Application to DuPage County	
R - 3/31			
T - 4/5			
R - 4/7			Danielle Green (EPA)
T - 4/12	Draft of Final Project Report		Review Project Report
R - 4/14	Website Design and Abstract		Review Website and Abstract
T - 4/19	Poster Design and PowerPoint Presentation		Review Poster and PowerPoint
R - 4/21		Website, Poster, Abstract	
T - 4/26		PowerPoint Presentation	
R - 4/28			
F - 4/29		I PRO Day Conference	
T - 5/3			I PRO Debriefing
R - 5/5		Final Project Report and CD	

Assignments

Our team of 12 members was originally divided into three focus groups to research and gather information relevant to sustainable landscape design at the Rice Campus. These three groups focused on research, polling, and analysis. The polling group developed a feedback questionnaire that was distributed to students, staff, administration, and neighbors of the Rice Campus. The research group gathered specific information about the site including a topographical survey, regional maps, and photographs of the current conditions. The analysis group reviewed and explored different topical areas of design that are relevant to sustainable landscapes: filter strips, green roofs, rain gardens, porous pavers, and stream restoration.

Members:

- Polling - Brett Padberg, Sachin Girish Pradhan, William Walker
- Research - Robert Dawe, James Lewan, Yi Meng, Jay Shah, Cyril Tay, Maeran Uhm
- Analysis – Noah Birch, Nicholas Champion, Zachary Mark

Application Assignments and IPRO Tasks

The Conceptual Design Report Application Requirements of the DuPage County Water Quality Improvement Program include a general narrative description of the existing condition including the condition of the stream reach or local watershed. Other parts of the application are a narrative describing the proposed remedial solution(s) and potential benefits, and how the project achieves those benefits.

To complete these steps, team members have divided into three groups. These groups are:

Application Assignments:

Prairie Creation - Robert Dawe and Zachary Mark

Stream Restoration - James Lewan, Yi Meng, Jay Shah, and Cyril Tay

Stormwater Management - Nicholas Campion, Brett Padberg, Maeran Uhm

In addition to the application assignments, team members were responsible for tasks related to the operations of the IPRO. These tasks included rotating roles at each meeting of our team for the first seven weeks of the semester. These roles included a facilitator, a secretary, a constructive conflict promoter, a coordinator, and a reflector. These roles served to foster a constructive atmosphere and develop team-building skills. After the seventh week, our IPRO decided to reassign these roles and designate a team leader to facilitate the meetings and to oversee the overall progress of the team. In addition, a secretary was assigned to monitor and report the team's progress consistently. Other IPRO tasks were assigned to fulfill other duties set forth by and to communicate with the IPRO office.

IPRO Tasks:

Rotating Roles – All team members

Team Leader – Noah Birch

Secretary – Maeran Uhm

Yahoo Groups Facilitator - Sachin Girish Pradhan

Website Administrators - Nicholas Campion and Zachary Mark

IPRO Liaison - Jay Shah

Representatives at Team Leadership Seminars – Noah Birch and Nicholas Campion

Tasks to be Completed after Midterm

- Finalize the analysis and narrative descriptions of the current conditions
- Finalize the project plan and design
- Organize the narrative descriptions into a single comprehensive document for the application
- Prepare project estimates – schedule, costs, and funding
- Develop plan view of the conceptual design at a maximum of 1" = 100' scale
- Prepare IPRO Deliverables
 - Project Abstract
 - Web Site Design
 - PowerPoint Presentation
 - IPRO Day Exhibit/Poster
 - IPRO Team Presentation
 - IPRO Team CD-ROM
 - Final Project Report
 - IPRO Team Information

Obstacles

IPRO371 did not meet the March 29 deadline for submission to the DuPage County Water Quality Improvement Program. To design an effective landscape, it is necessary to build in additional time researching the possible design elements for sustainable landscape and to develop a design plan that is most appropriate for the Rice Campus in Wheaton. With more time to research and develop a plan, IPRO 371 will be able to create a sustainable landscape at the IIT Rice Campus that will be a model for other sites.

Results

- Researched topical areas of design: soil erosion, run off, rain gardens, stream restoration, pervious pavement, local fauna, year-round flora, green roofs, and a general cost analysis
- Photographed current conditions
- Conducted a topographical survey of the site
- Obtained regional maps for the application
 - Location map showing approximate location of the proposed work
 - FEMA regulatory flood plain map depicting the project location
 - DuPage County wetland reference map depicting the project location
- Established a website to begin uploading and logging the work of IPRO 371
<http://www.iit.edu/~ipro371s05/>
- Developed a comprehensive list of the project stakeholders
- Prepared a polling questionnaire, distributed polls to stakeholders at the Rice Campus, and began the collection and analysis of polls
- Interviewed Joe Buri, Vice President of the IIT Facilities Department, to learn about the administrative and financial aspects of proposing landscape changes at the IIT campus
- Reviewed the Dupage County Stormwater and Flood Plain Ordinance

- Interviewed Don LaBrose, Fisheries Biologist of the DuPage County Forest Preserve District, to learn about the biological impacts and best management practices of sustainable landscape design
- Participated in the IPRO Teamwork Effectiveness Project
- Successful IPRO Day experience
 - 1st Place in Sustainability and Engineering Design Track
 - 2nd Place overall for exhibit
 - 4th Place overall for presentation

Conclusions and Recommendations

The landscaping at the Rice Campus is not sustainable. It requires a significant input of energy and fails to reduce environmental impacts. With proper technique, however, this trend of environmental neglect can be reversed. A few ideas that can be implemented to make the campus more sustainable are as follow:

Install **porous pavers** in the reduced parking lot and landscape with trees and **rain gardens**

Create a **prairie** to filter and absorb water more effectively than the current lawn

Use **meanders** to adjust the course of the stream and **riffles** to promote aquatic life

Develop a **riparian buffer** system to filter water and prevent erosion and incorporate **soil bioengineering**

Use **native vegetation** to reduce maintenance

Use **porous asphalt** in locations where porous pavers would not be used

Consider developing an **oak savannah** on the site

Consult the Morton Arboretum for expertise and donations during the implementation

References

IPRO 371 Website

<http://www.iit.edu/~ipro371s05/>

Native Vegetation

http://www.prairieresto.com/seed_mixes.htm#Mixed%20height

<http://www.mortonarb.org/>

http://www.hort.purdue.edu/ext/sources_IN_wildflowers.html

<http://www.inhs.uiuc.edu/~kenr/prairietable2.html>

<http://www.inhs.uiuc.edu/~kenr/tallgrass.html>

Stream Restoration

<http://www.iwla.org/sos/restoration.html>

<http://www.harrington-hoyle.com/urbanstream.htm>

<http://www.fish.washington.edu/naturemapping/water/1fldricc.html>

Riffles and Riparian Buffers

<http://www.greenworks.tv/stormwater/riparianbuffer.htm>
http://www.dnr.state.oh.us/water/pubs/fs_st/stfs21.htm
http://www.dnr.state.oh.us/water/pubs/fs_st/stfs22.htm

Bioengineering

<http://collections.ic.gc.ca/streams/tech/S-fascines.html>
<http://www.harrington-hoyle.com/bioeng.htm>
<http://www.riparianbuffers.umd.edu/fact/FS729.html>
http://www.dnr.state.oh.us/water/pubs/fs_st/stfs14.htm

Porous Pavers

http://www.lid-stormwater.net/permeable_pavers/permpavers_benefits.htm
<http://www.epa.state.il.us/water/watershed/publications/nps-pollution/>
<http://www.toolbase.org/tertiaryT.asp?TrackID=&CategoryID=1323&DocumentID=2160>
http://nemo.uconn.edu/case_studies/alumni_park_ct_cs.htm
<http://www.rivercenter.uga.edu/research/stormwater/bmps.html>
<http://www.invisiblestructures.com/>
<http://permapave.com.au/products/pavers.htm>

Rain garden Research

<http://www.sustland.umn.edu/>
<http://www.bluestem.ca/landscape-uses.htm>
<http://www.raingardens.org/Index.php>
<http://www.mninter.net/~stack/rain/>
<http://www.raingardennetwork.com/>
<http://www.appliedeco.com/RainGardens.cfm>
<http://raingarden.il.gov/action.htm>
<http://www.montgomerycountymd.gov/mc/services/dep/rainscapes/harvest.htm>

Ordinance Research

<http://www.bmpdatabase.org/index.htm>
<http://www.wheaton.il.us/Government/City-Opera/>
http://www.dupageco.org/stormwater/generic.cfm?doc_id=1658
<http://www.epa.gov/ost/stormwater/>

Acknowledgements

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