



# IPRO 311



Sustainability Branding and  
Development for the IIT Campus



# What is IPRO 311?

- Begun in the Spring of 2008 with the purpose of enhancing the image of IIT as a sustainable campus and institution
- Several ideas for “greeninstallations” proposed for future projects
- Current term has two goals, moving beyond the greeninstallation concept:
  - Design projects aimed at enhancing sustainability
  - Using the design projects as a model to determine what best improves IIT’s image and stimulates interest in sustainability and green technology



# Overarching Goals

Goal: Design of Sustainability Image for the IIT Campus, Students, and Research Program

- Survey
  - Soliciting feedback from the IIT community (here & IPRO day)
  - Online surveys to solicit opinions from wider community
- Academy
  - Scholarship-providing academy to promote sustainability developments
- Competition
  - Design competition to develop sustainable concepts and projects
- Seminar
  - Sustainability leaders in industry and academia lecture and discuss projects and developments



# Who is IPRO 311?

Goal: Design of Sustainability Image for the IIT Campus, Students, and Research Program

- Permeable Paving
  - Philip Korol (Arch.)
  - Ashley Ono (Arch.)
  - Ji Ae Park (Arch.)
- Heating & Energy
  - Elliot Barlow (Aero. Eng.)
  - Michael Chamales (Mat. Sci.)
  - Anne Nadler (Mech. Eng.)
- Green Walls
  - Praisna Gupta (Arch.)
  - Yunseok Song (Elec. Eng.)
- Solar Workstation
  - Abraham Contreras (Arch.)
  - Niels De Vita (Arch.)
  - Muhammad Ishaq (Psych.)
  - Richard King (Comp. Eng.)
  - Adam Stultz (Biomed. Eng.)

Faculty: Nancy Hamill

Faculty Assistant: Rae Mindock

# Permeable Paving Subgroup

## The Problem

There are severe water drainage issues on the IIT Campus.



## The Solution

Permeable Paving can solve water drainage issues and can assist in creating a Sustainable Image for the IIT Campus.



**Subgroup Members: Ashley Ono, Phil Korol, Ji Ae Park**

# Work to Date...



**CAMPUS MASTER PLAN**

 PHOTO-LINKED DAMAGE ZONE	 PARKING - GOOD CONDITION
 PARKING - SEVERE DAMAGE	 EXISTING BUILDINGS
 PARKING - MODERATE DAMAGE	 GREEN AREAS
 PARKING - MINOR DAMAGE	 CAMPUS PROPERTY LINE



Permeable Concrete



Permeable Asphalt



Recycled Rubber Pavement



Interlocking Concrete Blocks w/  
Grass

These types of permeable pavement may be implemented in Chicago's harsh winter weather. The main differences are in cost, material, and installation methods.

*ISSUES TO CONSIDER...*

- Rain water, which collects pollutants, is absorbed into the ground, instead of running into sewers and retention ponds.
- Permeable pavement has a longer life span.
- The reservoir course must be below the frost line to avoid frost heave
- Pavement must be vacuumed/cleaned at least four times a year to prevent clogging.
- Sand or ice may not be used for de-icing because they may cause clogging.

# Future Plans

The Permeable Paving Subgroup

plans to provide:

- A Phase Plan
- A Master Plan that includes:
  - Mies' Sidewalk Plan
  - Specific paving methods and materials
  - A Project Budget
  - Branding Ideas
- Provide all necessary information for next semester's class to implement Phase 1



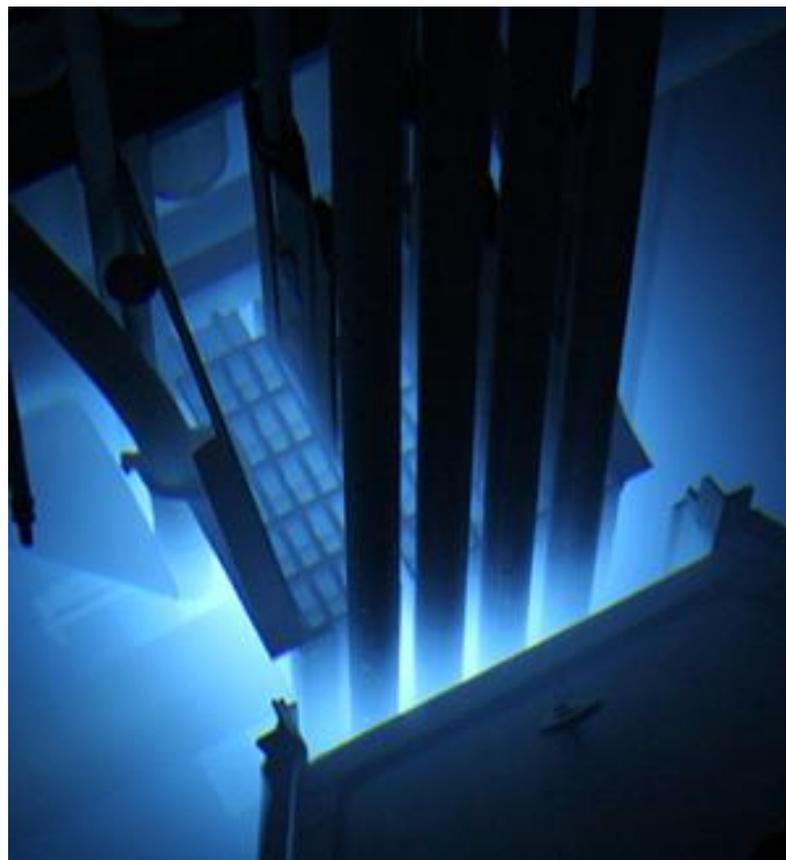
ILLINOIS INSTITUTE  
OF TECHNOLOGY





# Nuclear Power

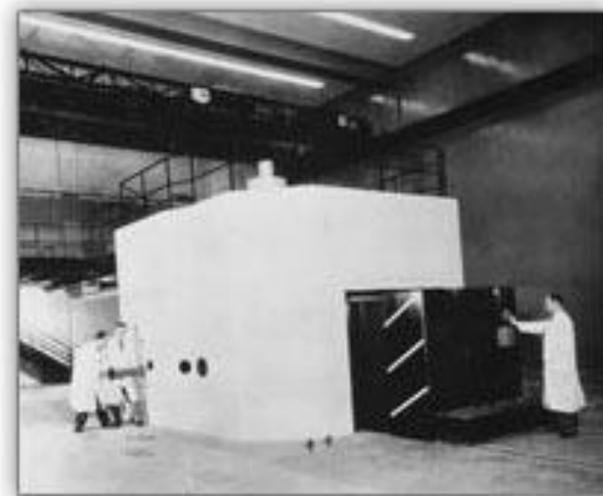
- Implement a Nuclear Reactor
- Research Nuclear Advancement Program
- Clean Energy
- Promotion of Green Economic Future
- Lead Industry in Nuclear Waste Reduction and Recycling





# Present Course of Action

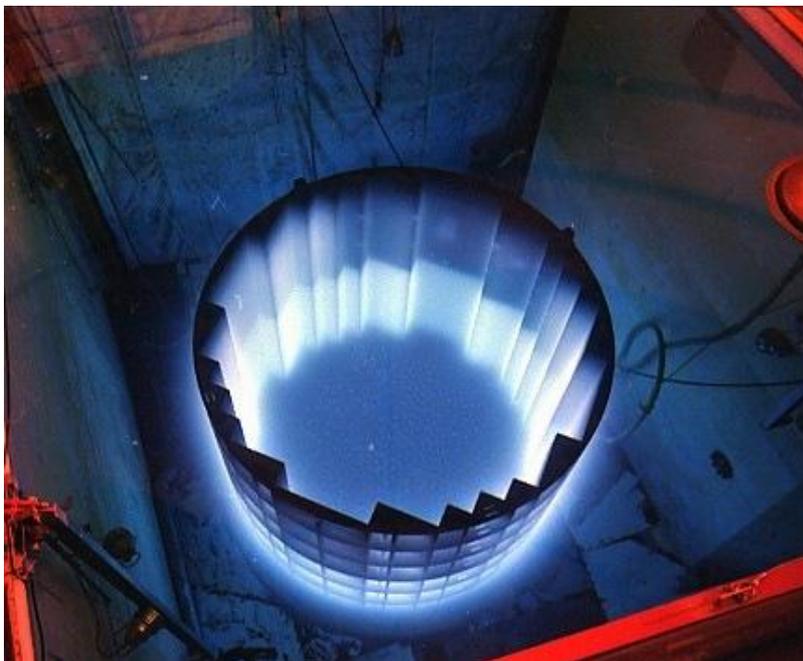
- Determining Type of reactor most suitable for IIT
- Obtain projected costs, capabilities of small scale reactors
- Ensure city and NRC restrictions are followed
- In contact with:
  - NRC at Exelon Nuclear, Braidwood Station, IL
  - Jere Jenkins, North Carolina Nuclear Engineering
  - Tom Newton, MIT Nuclear Engineering
  - General Electric and Toshiba Corp, Nuclear Reactor Production Companies.



The infamous nuclear reactor.  
Approach at your own risk.



# Steps Necessary

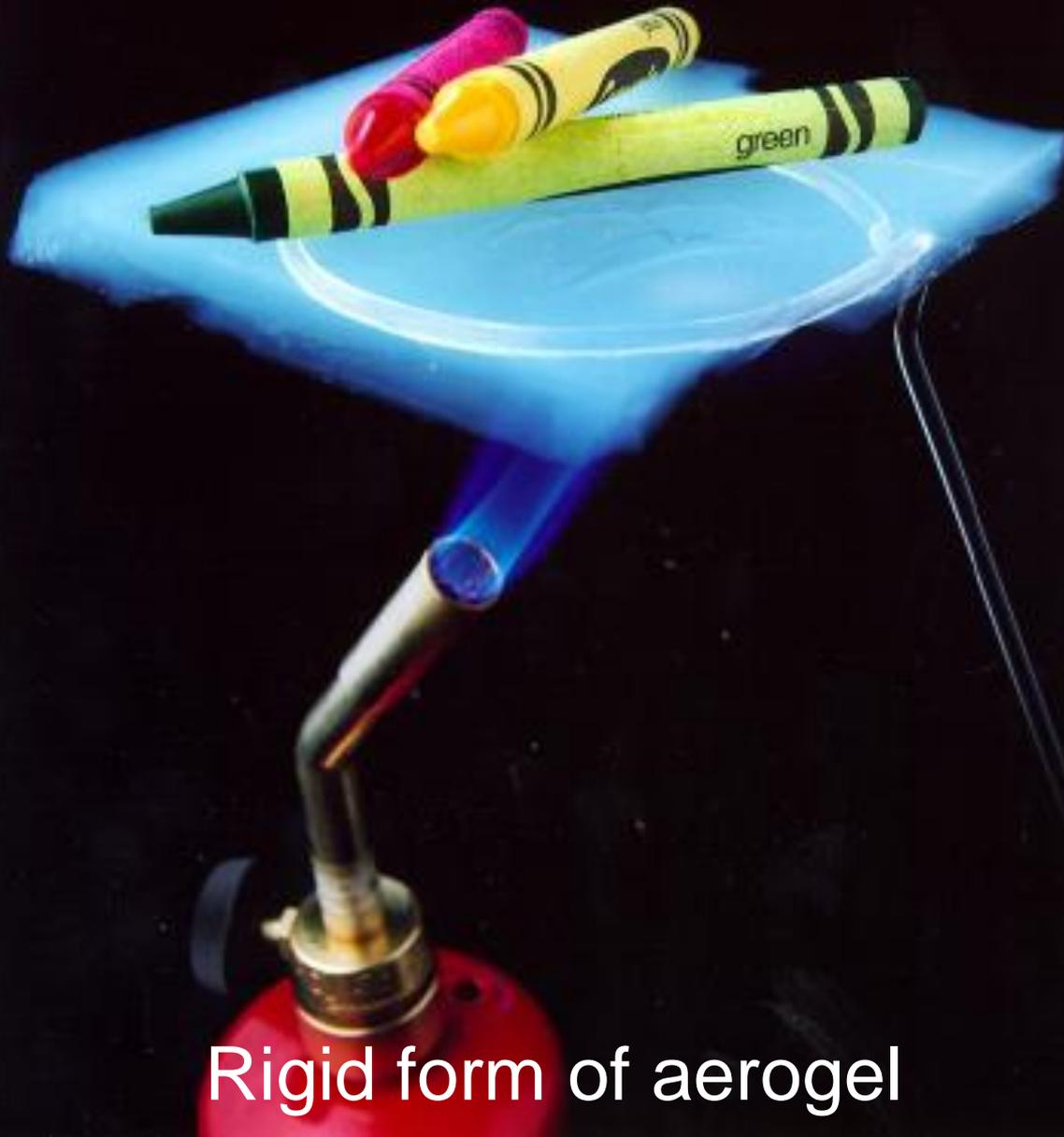


- Strict Following of Nuclear Regulation Commission Guidelines, Title 10
- Obtain License, NUREG-1537
- Approval from NRC
- Secure Proper Housing and Containment of Reactor on Campus
- Obtain Proper Funding



# Insulating IIT

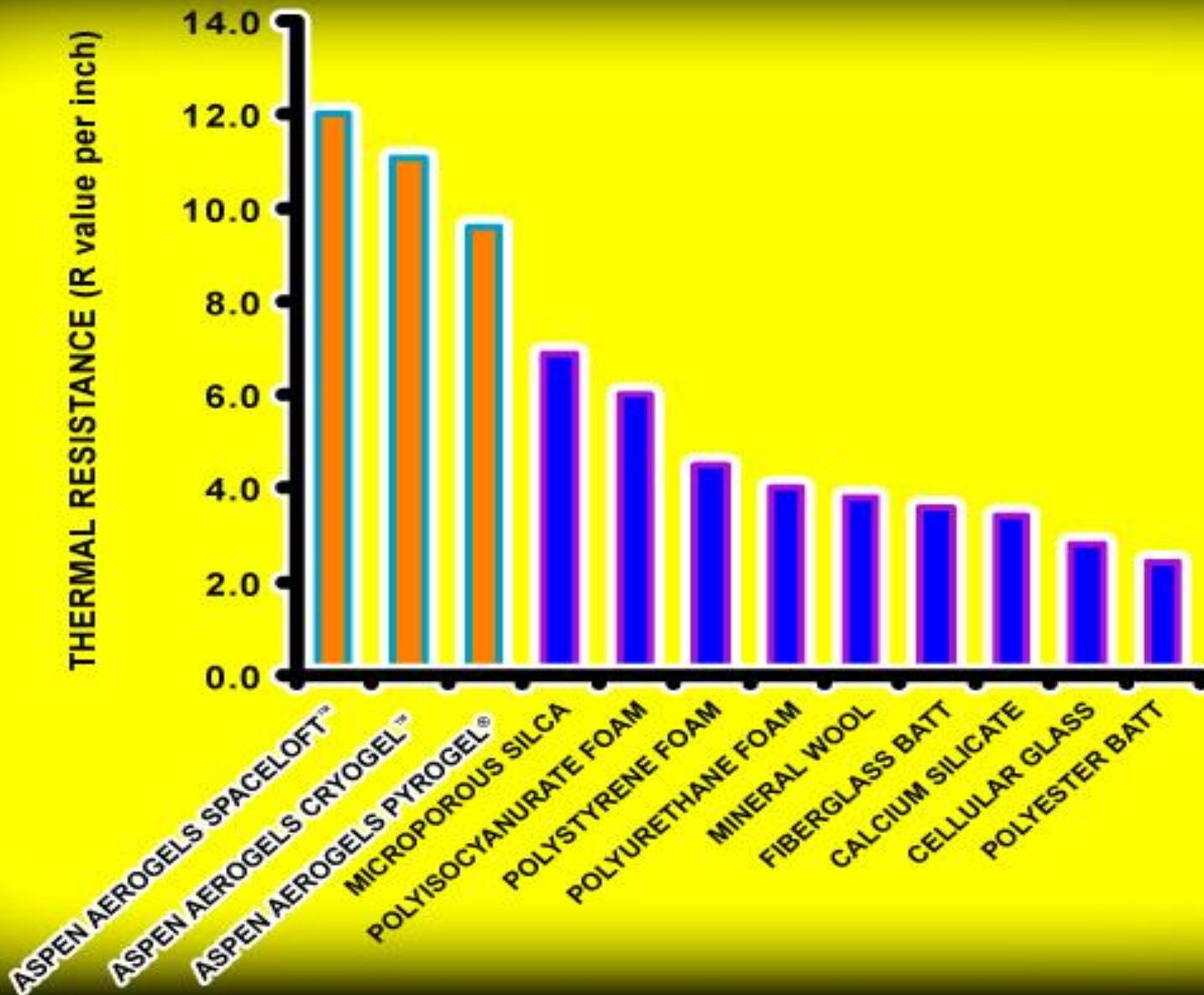
- Buildings on campus have little to no insulation
- Inefficient heating and cooling of buildings costs IIT money
- Brick buildings such as E1 can benefit greatly from improved wall insulation
- Aerogel is the answer to IIT's insulation issues
  - Best insulating material available today
  - Versatile nano-material
  - Enormous surface area produces its amazing properties
  - More than 3X as insulating as fiberglass



Rigid form of aerogel



**Aerogel blanket material**



Thermal resistance (expressed as R-value per inch) for different insulation materials at ambient temperature and pressure.



- **Insulating capabilities of structures such as Galvin Library can be enhanced by using a thermal coating**
- **Steel conducts outside temperature directly into the building**
- **For this application Supertherm paint may be applied to I-beams**
  - **Paint consists of three ceramic layers**
  - **Two layers heat reflective**
  - **Third layer is a dead space between paint surface**
  - **One coat is R-19**
- **Model to display insulating properties will be made**



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## GREEN WALL TECHNOLOGY

### Objectives

1. To carry forward the conceptual ideas of the previous IPRO group and take them a step further with specific research and design strategies
2. To understand the IIT master plan and identify the locations that can be prospective sites for Green Wall Installations
3. To develop a primary budget scheme for the installation of green walls on campus to visualize the expected funds that might be required
4. To create a themed experience using green solutions that unify the campus and enhance its visibility from the neighborhood
5. To build an eco-friendly, self-sustained project that promotes general awareness of sustainability in the university



## GREEN WALL TECHNOLOGY

### Project Progress

1. The team began research on green wall technologies identifying its advantages, its manufacturers / vendors and its various types.
2. The team explored the IIT campus to identify the prospective locations for green wall installations by photographing and video taping the campus from different entries and studying the solar pattern on campus.

### Project Prospect

- The team will design appropriate green walls that will be installed on the campus along with incorporating the IIT marketing strategies.
2. The team will provide a budget estimate, a comprehensive research booklet, a set of drawings of the IIT master plan and graphic representations of the green wall designs for the future IPRO team.



## GREEN WALL TECHNOLOGY

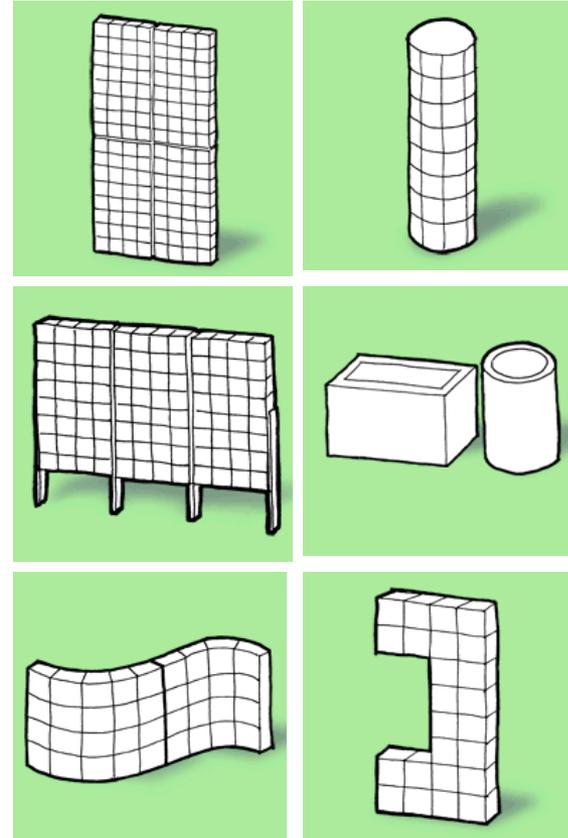
### Research

#### Advantages of using Green Walls:

- building protection
- heat island mitigation
- energy savings
- clean air + CO<sub>2</sub> fixation
- sound insulation

#### Types of Green Wall installations:

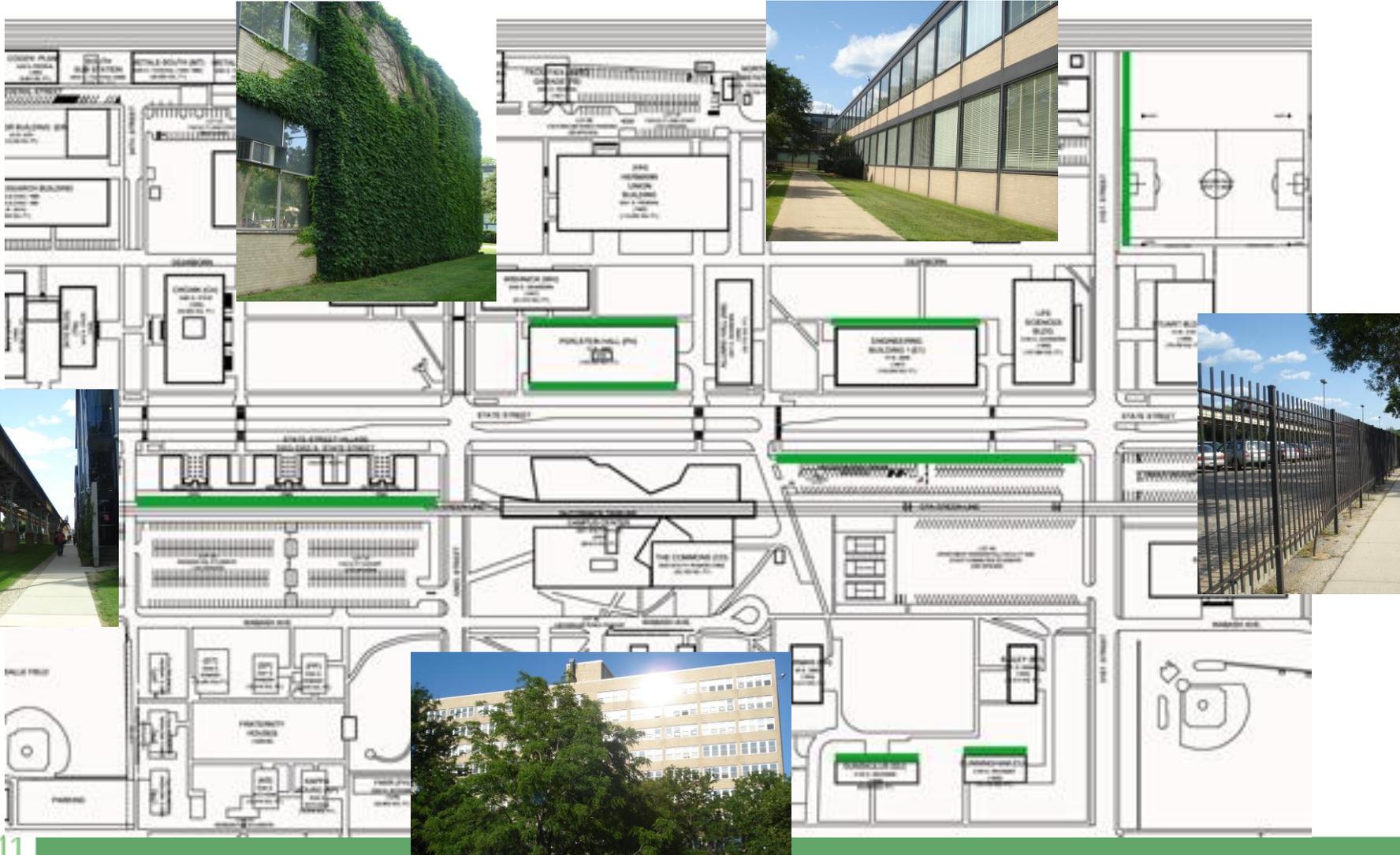
- wall mounted/hung trellis panels
- free standing trellis fence
- curved trellis modules
- column trellis
- planter
- custom





## GREEN WALL TECHNOLOGY

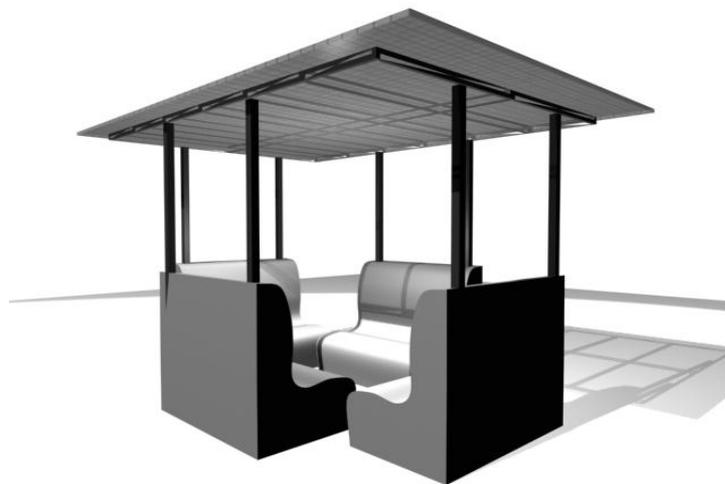
### Possible green wall locations





# Solar Work Station

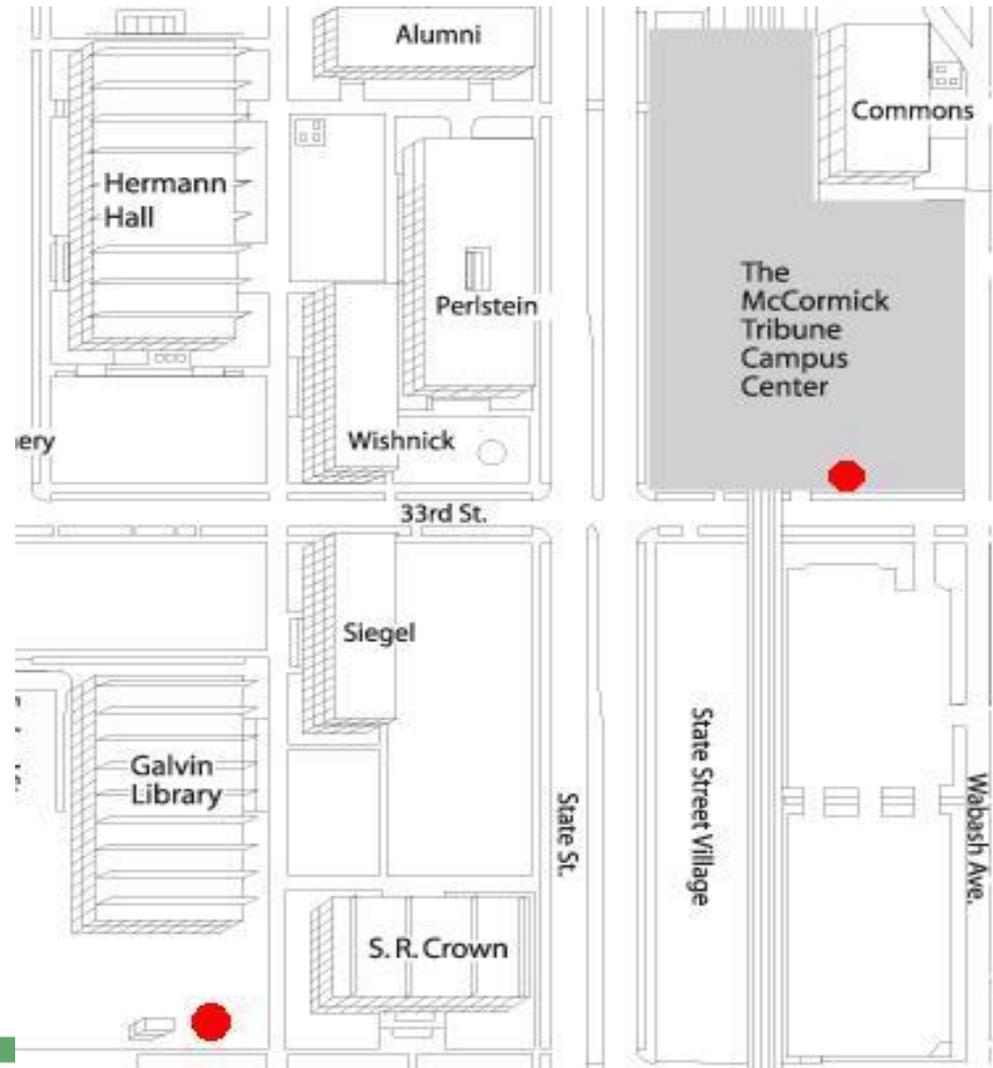
- Purpose:
  - Provide an outdoor sustainable workstation to showcase IIT's commit to the environment. Designed to provide 24/7 power to a maximum of 4 laptops while providing protection against the elements
- Location
- Materials
- Marketing



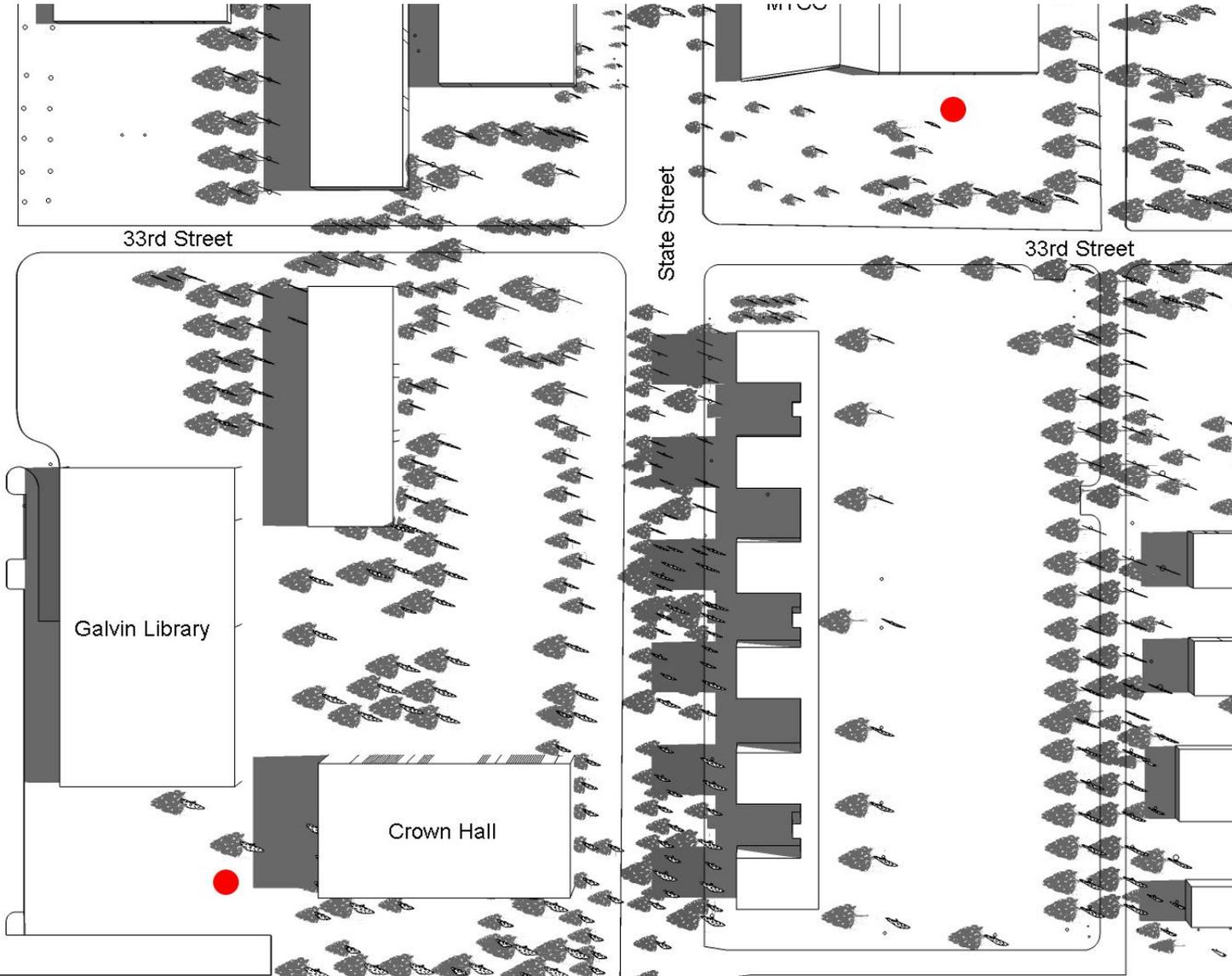


# Location

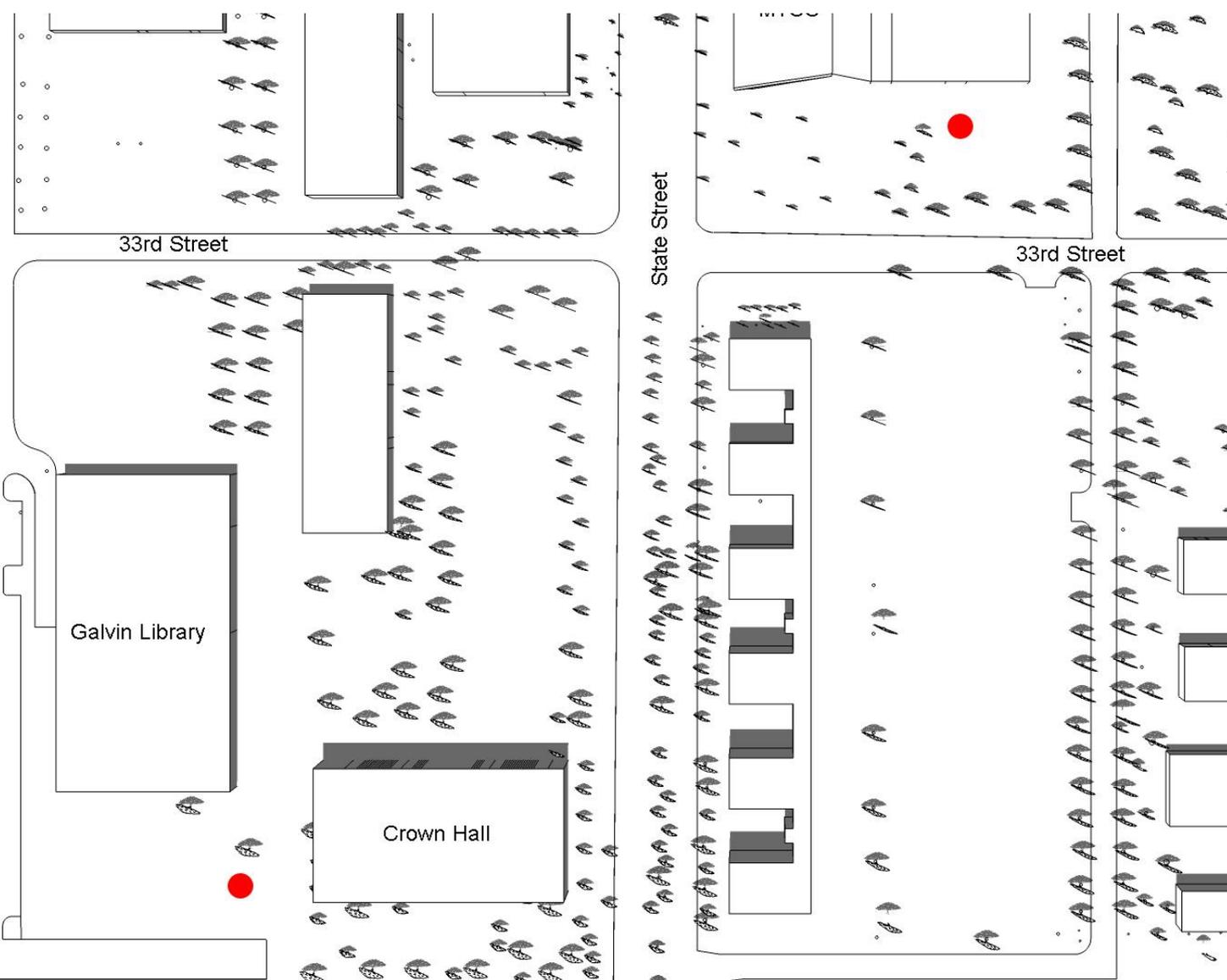
- 2 potential locations
  - Outside MTCC
  - South Lawn of Library



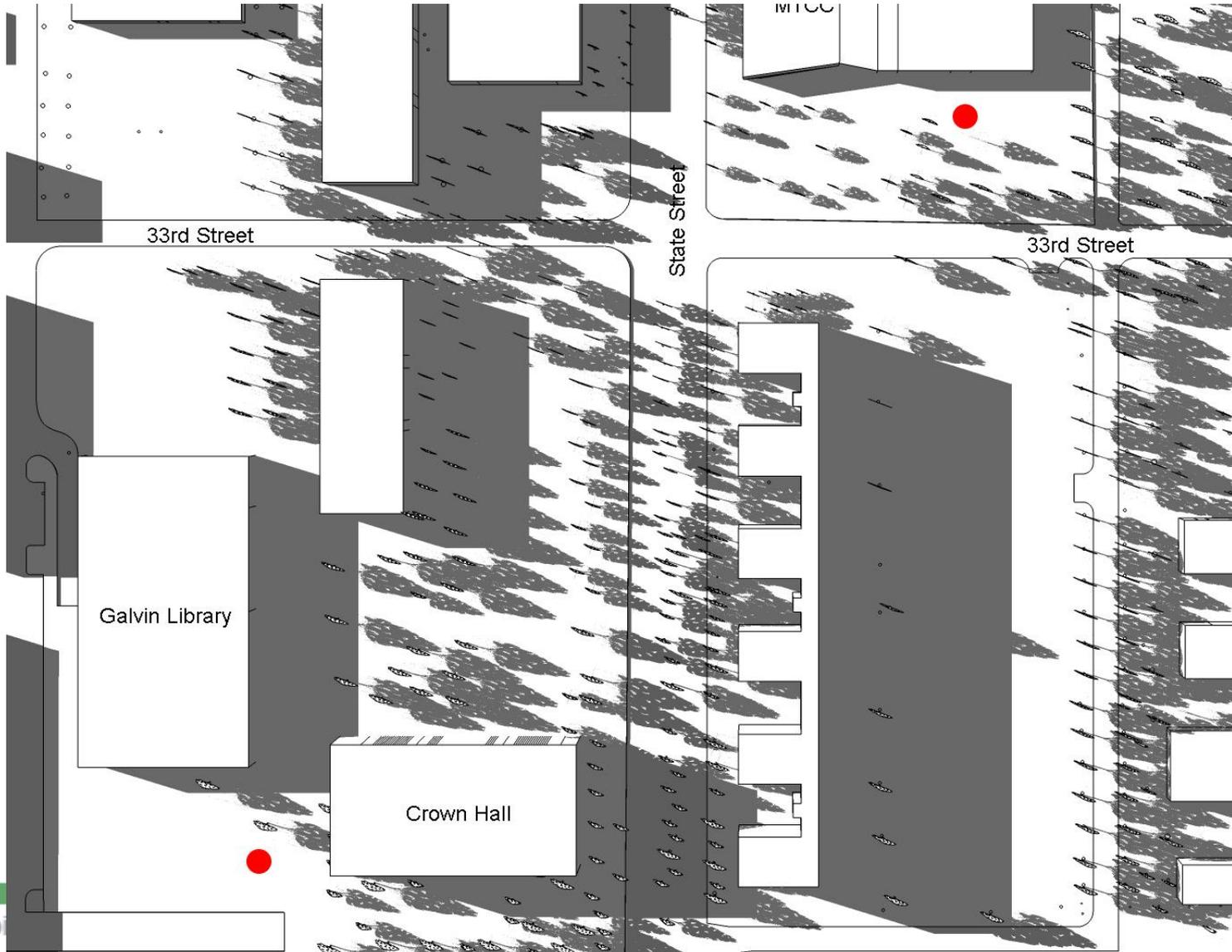
# Shadows at 7am



# Shadows at Noon



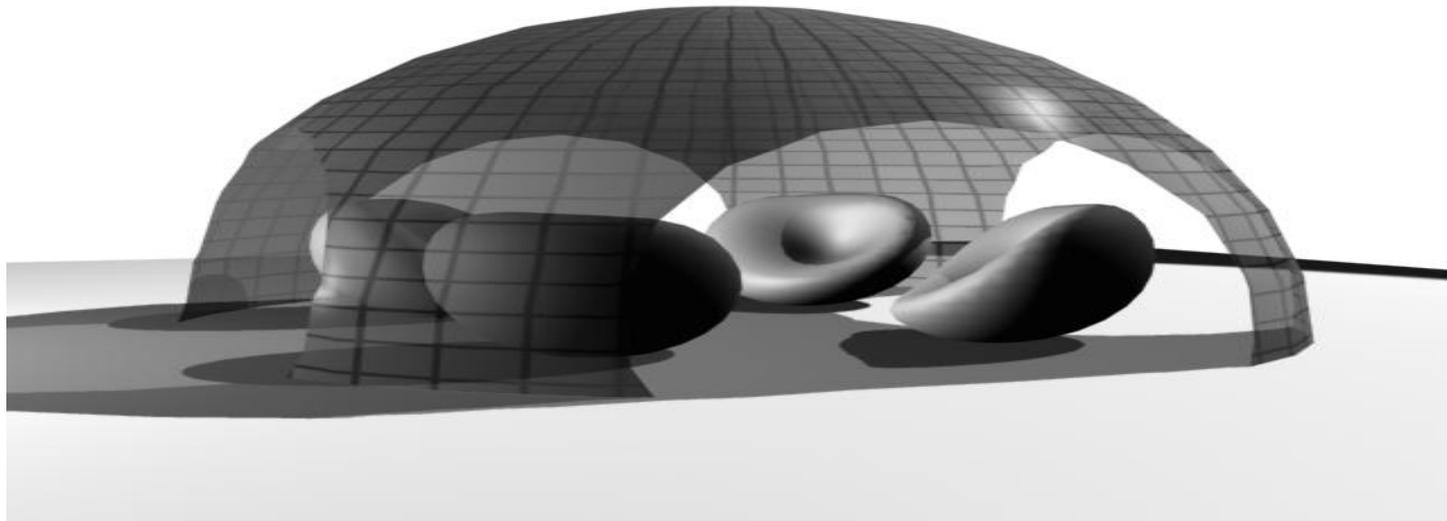
# Shadows at 6pm





# Materials & Design

- Concrete
- 1000W from Solar Panels
- Gel Type Battery
- Both Off/On Grid design





# Marketing

- Illinois Solar School provides \$10,000 grant for K-12 school that implement 1KW of Solar Power

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



- Questions?
- Fragen?
- ¿Preguntas?
- 问题？