What is this project?

We are planning for the current and future housing needs for Delta Tau Delta Fraternity here on campus. We are focusing on how to bring our housing style to one that is environmentally conscious for the standards of the coming years.

Why are you doing this?

We think it is important to not merely move forward passively, but to do so with purpose and intention. The student driven format of the I Pro has given a ground up approach to planning the future of a piece of campus in a way that has educational merit.

So What’s the approach?

We started thinking big, but wanted to end with a realistic and tangible project. Our thinking as a group is tiered to give us long-term and short-term solutions.

What has the group learned through the project?

All the teammates learned something a little different because of how we broke up the project. We are all more grounded about issues that pertain to housing and sustainability. We ended up working with many professionals that were able to share their expertise with us. The firsthand interaction gave insight into the real world that many of us as architects and engineers are going to have to work in.

Team Members

Joshua Bradley, Civil Engineering
Noah Cahan, Architecture
Daniel Dobbin, Mathematics
Jake Dohm, Architecture
Jeffrey Hallenbeck, Architecture
Kent Hoffman, Architecture
Davyd Jordan, Architecture
Woong-Kyo Lee, Aerospace Engineering
Brad Strandquist, Civil Engineering
Nathan Wasisath, Architecture

I-Pro 311
Renovating, Rethinking, and Greening the future of Greek housing at IIT

Professor

Nancy Hamill

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http://ipro.iit.edu/
Current Building Information

- Year Built: 1959 – 1961
- Materials: Masonry and Steel Construction
- Planned Occupancy: 40
- Square Feet: 14,044 (two floors and basement)
- Architectural style: Modern

Energy Consumption

- Natural gas usage: (avg. 2007 2008 year)
  - Heating load: 8,663 therms
  - Base Load: 4,487 therms
  - Total: 13,151 therms
  - Equivalent Co2 Emissions: 70 tons
- Electricity usage: (avg. 2007 2008 year)
  - Total: 119,770 KWH
  - Equivalent Co2 Emissions: 83 tons

Contributing Factors to Excessive Energy Use

- Total Envelope R-Value 3.45
- Air Leaks
- Uninsulated Pipes and Water storage tanks
- Occupancy Habits
- Atmospheric Boiler Designed for 80% Efficacy
- Many Appliances / Personal Electronics
- Mechanical Control System

Other Building Analysis

- Ventilation Strategies
- Livability and Comfort
- Programmatic Change for Today’s Use

Proposed Building Solution

The tiered solutions allows us to prioritize and organize by cost, time, importance and progression

Tier one

- Air sealing
- Insulating
- Insulating blinds
- Occupant sensors for lights
- Replace inefficient light fixtures
- Apply reflective roof coating
- Occupancy habits

Tier Two

- Reorganize space
- New boiler controls
- Green roof
- Replace windows
- Insulate ext. walls
- Computerized energy monitoring
- Solar thermal water heating
- Photovoltaic panels

Tier Three

- Reorganize space for interior atrium and third floor.

Retrofit Calculations for Insulating

By insulating the roof to R-38 and insulating 250’ of currently uninsulated pipe, the house will save an estimated 31% on yearly natural gas consumption. This will cost $8,830 and have a payback of about 2 years. The quick payback and low cost of insulating the pipe is because we will do the job ourselves.

Tracking Savings

We are following our energy usage to see what improvement we will make. We are able to compare our savings year to year because we normalized the data with actual weather information from our region.