

Scope Change Request: Element House

Project Name: Element House at the Energy Farm

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Project Summary

The 2007 Solar Decathlon house returned to Champaign Urbana for installation at the University Energy Farm. Funds were initially secured from the Chancellor's office for its transportation, placement on a permanent foundation, utility hook ups, and inspection of current systems to ensure safe working order. SSC was gracious in their funding to provide for upgrades necessary to complete the house, including the electrical wiring, re-design and construction of the solar array, lighting, HVAC updates and monitoring equipment. The primary goal of this project was to have a fully functioning net positive energy demonstration building.

As the team and contracted engineering firm investigated ways to permanently install the solar array on the roof, evidence of water penetration was revealed. The marriage wall of one of the three modules of which the house was comprised had rotted to such an extent that it had lost its structural integrity. The cost of replacing the decayed module, under the terms and conditions of prevailing wage rates, as opposed to a student orientated research endeavor, would have pushed the project way over budget.

Following a meeting on August 26th 2014 to discuss U14073: Engineering Bioscience Institute 2007 Solar Decathlon House Relocation and Parking Project, a unanimous decision was made by the relocation team that it would be cost prohibitive to replace the damaged module and instate the Element House at the Energy Farm on Race St. in Urbana.

In the time following this decision, the team has been investigating alternate uses for the resources from the Element House to achieve the renewable energy objectives, and teaching/student engagement activities that were proposed in the original application to the SCC. To date architecture students in Arch 576 have pursued numerous options of installing the original solar panels from the Element House in different contexts both at the Energy Farm and close to the main campus. (see figures 2-3, and additional material by request). In recent weeks the relocation team met with a non-profit organization, which has a tangential affiliation to the Uofl through University Extensions. Prosperity Gardens have expressed an interest in making use of the two modules of the Element house that are still structurally sound.

The following options are presented to the SSC committee for consideration and discussion.

Option 1: - With the approval of the City of Champaign The Element House will be relocated at E North St and N Walnut under a loan agreement between the University of Illinois and Prosperity Gardens. (See figure 1) The solar panels would be installed as part of this relocation and help to establish a one-acre site of urban vegetable gardening. Funding from SSC would still be used toward the installation of the panels to satisfy the power needs of the building. While this building is located off campus the project will remain strongly tied to student interests, academic learning opportunities and outreach activities into the underserved communities of Champaign. Prof. Mark Taylor will be conducting a Design Studio Arch 571 focused on the architectural needs at E North St and N Walnut in the spring of 2015 with the view to conduct a Design Build studio in that location in the summer of 2015. Prosperity Gardens has during its short life as a non-profit established numerous links to classes at the UofI both in the Departments of Engineering and Fine and Applied Arts. It's mission is to educate, and create awareness of food poverty issues and address them in very practical ways.

Option 2: - Professor Taylor has also reached out to FAA-IT who have expressed an interest in acquiring a number of solar panels for installation at their building off the South Quad (see figures 2 and 3) to help power the electrical vehicles they use on campus to deliver computer related parts and services. An application to SSC of a similar nature had been made in the past, however it was not realized due in part to some issues related to parking. In the current proposal the team believe these issues could be overcome.

The team's preference would be to receive approval from the Student Sustainability Committee for Option 1 so the solar panels would remain with the Element House. If neither option 1 or 2 are approved by the SSC the approved funding will be returned to the committee.

Original Project Timeline

Contractor work	08/01/2014 - 08/15/2014
Solar installation	08/01/2014 - 09/01/2014
Instrumentation / Monitoring Installation	12/01/2014 - 04/01/2014
Final report	12/01/2014 - 12/15/2014

Revised Project Timeline

Revised design by student class project:	01/01/2015 - 03/01/2015
Student class engagement with F&S/ city planning / engineering / project pricing	03/01/2015 - 04/15/2015
Submit project and updated budget for SSC review	04/15/2015
Construction	06/01/2015 - 07/01/2015
Monitoring and performance evaluation	07/01/2015 - 10/01/2015
Final Report Submitted	12/01/2015

Original Project Budget
\$44,300 Initial Budget

Revised Project Budget

To be determined based upon feedback from the SSC on acceptable change in scope request.

Original Project Objectives

The primary goal of this project was to have a fully functioning net positive energy demonstration building. To attain this goal, student groups were to take on the design, construction, and monitoring tasks, as they were fit to complete.

Upgrades to the mechanical systems were required to bring the Element House up to code by addressing the following deficiencies:

- Rewire interior electrical and convert PV system to grid tie,
- Re-design and re-install the solar array,
- Upgrade to higher efficiency lighting and HVAC systems,
- Install monitoring equipment.

Revised Project Objectives

The objective to produce electrical power from a sustainable resource remains the same. Engaging students in the design of an appropriately sized pv system, and structure to support the solar array has already been undertaken, and will continue to progress. The revision is to find a suitable location to install the existing assets the 36 solar panels that were originally installed on the Element House. At this stage the Relocation Team seeks approval for a change of scope to proceed with one of the following options:

Option 1: The solar panels to remain with the two serviceable modules of the Element House, as it is transferred via a long term loan agreement between Prosperity Gardens, a non-for-profit community garden project in Champaign, and the University of Illinois.

Option 2: The installation of a PV array in close proximity to FAA's IT support building (building # 18 south east corner – see supporting docs.) primarily to charge battery powered vehicles that transport staff and IT equipment to the various buildings occupied by FAA.

Reason for Scope Change

Following a meeting on August 26th 2104 to discuss U14073: Engineering Bioscience Institute 2007 Solar Decathlon House Relocation and Parking Project, a unanimous decision was made by the relocation team that due to the deterioration of one of the 3 modules that the Element house is comprised of, it would be cost prohibitive to instate the Element House as originally intended at the Energy Farm on Race St. in Urbana.

This decision was made by a team including the following participants:
James Sims (Engineer Capital Planning UIUC),
Craig Grant (Assoc.. Dir. Campus Code Compliance and Fire),
David Wickersheimer SE (MSA)
Eric Peterson (Architect-Team Leader at MSA),
Timothy Mies (Dep. Op. Dir. EBI),
Mark Taylor (Assist. Prof. Architecture)

Supporting Figures:

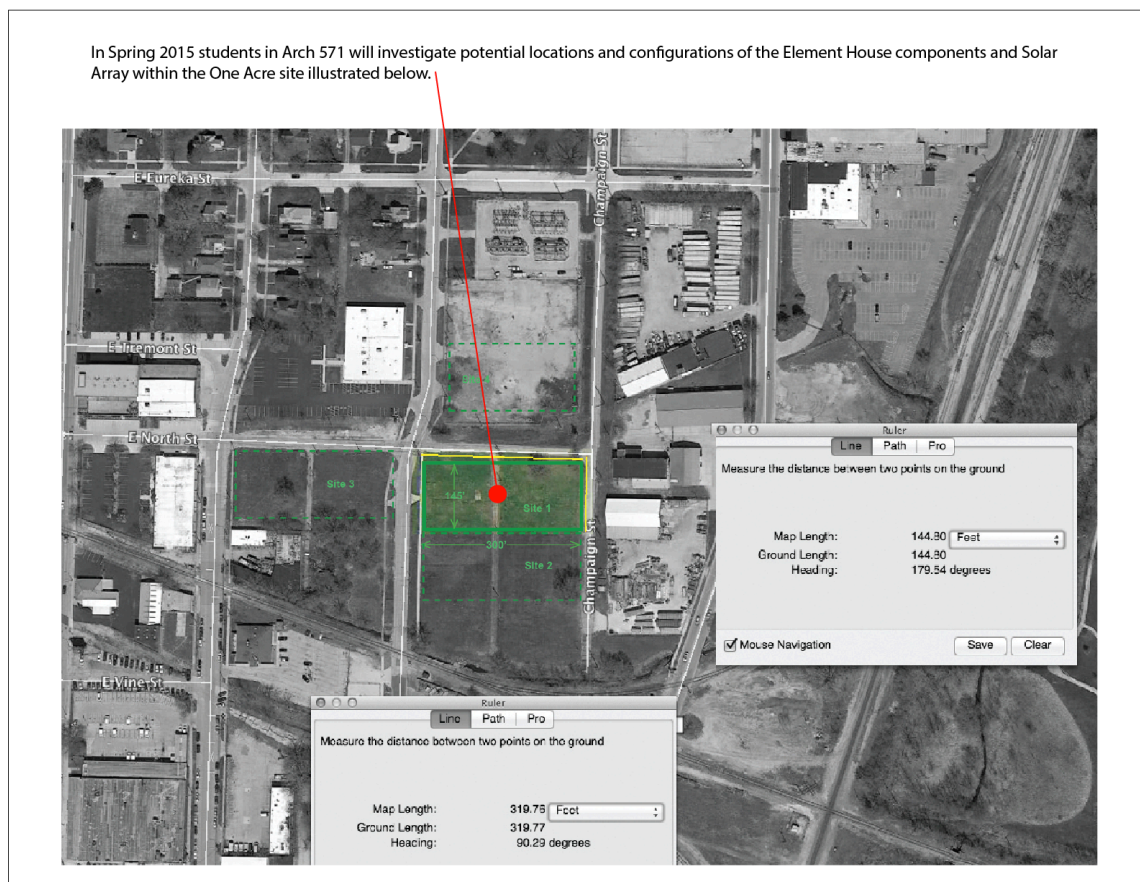


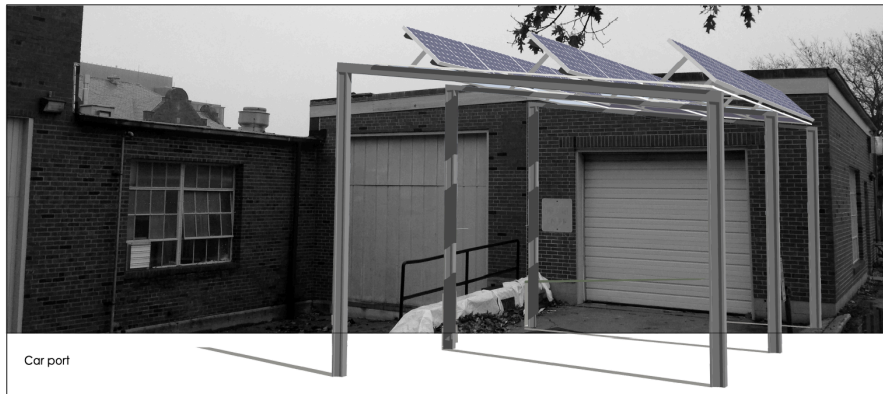
Figure 1: (Option 1) Solar Panels to remain with the Element House.



Visual Representation of solar panels installed on the roof of building #18 (garage at south east corner).
By Tingting Peng (Arch 576 - Fall 2014)



Figure 2: (Option 2a) Solar Panels to be repurposed on the roof of building #18 to power FAA – IT electrical vehicles.



Visual Representation of solar panels installed on a purpose built structure adjacent to building #18 (garage at south east corner).
By Tingting Peng (Arch 576 - Fall 2014)



Figure 3: (Option 2b) Solar Panels to be repurposed on purpose built structure adjacent to building #18 to power FAA – IT electrical vehicles.