Team Name: Green Future
Project Name: Double Barrel

Project Summary

The Independence Heights neighborhood is Historically significant in that it was the first Incorporated black municipality in Texas (19010). The Neighborhood was subsequently incorporated into the City of Houston and most recently, sustained significant damage from Hurricane Ike in 2008. This net zero ready home was designed to provide an affordable, high performance, small Footprint home for low-income families in an area that needs it the most.

Relevance of Project to the Goals of the Competition

The purpose of the competition is to extend the reach of building science both in the University curriculum as well as in the profession. Our team has taken that impetus several steps further by applying Passive House methodologies to a hot & humid climate, pioneering the Certified Passive House Consultant training in a Historically Black College & University (HBCU), and designing an affordable net zero ready home for a historically significant, low-income neighborhood.

Design Strategy and Key Points

In order to make the home affordable, we knew that we had to keep the size of the home small, yet comfortable and modern. The design was further constrained by the historically narrow and deep lots in Independence Heights. Our team began with the recently completed PHIUS+ 2015 BEopt optimized design criteria for our climate and then made adjustments based on the recommendations of our industry partners. To keep the design contextual and respond to community feedback, the design is inspired by the vernacular 'shotgun' homes of the south.

Project Data

- Houston, Texas
- Climate 2A
- 1,567 SF (max)
- 3 Bedrooms, 2 Baths, 2 Story
- HERS 36 prior to photovoltaic system HERS -9 after photovoltaic
- $72 prior to photovoltaic system

Technical Specifications

- Wall Insulation = R-30 (PH Upgrade is to R-33)
- Foundation Insulation = R-30 (PH Upgrade is to R-48)
- Roof Insulation = R-47 (PH Upgrade is to R-55)
- Window Performance = U-0.15, SHGC-0.25
- HVAC specifications = SEER-23 (cooling), HSPF 10.5 (heating)

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Industry Partners

We will be working with our team of industry partners to ensure that our final design is market-ready. Our industry partners are as follows:

- **Architend:** assistance with Certified Passive House Design.
- **Tend Building:** assistance with Certified Passive House Construction.
- **Tegrity Homes:** assistance with construction Cost analysis.
- **PSL Integrated Solutions:** assistance with HERS modeling.
- **GreeNexus Consulting:** assistance with LEED for Homes and other sustainable measures.
- **PassivScience:** assistance with WUFI-Passive modeling.
- **English & Associates:** assistance with Low Impact Development design Matrix Structural Engineers: assistance with structural design.
- **Living Paradigm CDC:** assistance with Community Input, Site and Affordability Cost Analysis.

Systems

The framing system is Advanced Framing. Mechanical Systems include, ductless mini-split for air conditioning, an ERV for ventilation, and dedicated dehumidification

Project Approach

Our 4th year design studio has been focused on developing small, net zero infill housing for the Independence Heights neighborhood. With community feedback the best design was selected at the end of the Fall semester and further developed for the Race to Net Zero Competition. The home is designed for Passive House Institute US certification. This work will be guided through our Net Zero Energy Design II course, which is the Certified Passive House Consultant Training curriculum.

Team Members

Alexis Borman: Bachelor of Science in Architecture, May 2016

Chris Brown: Bachelor of Science in Architecture, May 2016

Desirae Price: Bachelor of Science in Architecture, May 2016

Graciela Tendilla: Bachelor of Science in Architecture, May 2017

Sean Benson: Bachelor of Science in Architecture, Dec 2016

Taylor Hudson: Bachelor of Science in Architecture, May 2016

Devonta Magee: Bachelor of Science in Architecture, Aug 2016

Yasmine Parker: Bachelor of Science in Architecture, Bachelor of Science in Construction Science, May 2017