

# The Hygge House: Design-Build as a Model for Interdisciplinary and Integrative Architectural Education

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University-based design-build programs have greatly expanded over the past two decades.<sup>1</sup> While there are diverse pedagogical motivations, most center on design-build as an opportunity to expose architectural students to construction and to help them “realize what is involved in taking architecture from a drawing to a building.”<sup>2</sup> With the ever-increasing reliance on digital tools and the related dissociation between the tools of architectural production and the physical act of building, construction experience becomes even more critical in contemporary architectural education. The converse is also true. If there is educational value in exposing architecture students to construction, then there is complementary value in exposing construction management students to the design process. This is an underappreciated opportunity within the pedagogical discourse on university-based design-build programs. Design-build, properly conceived, can be a

model for interdisciplinary collaboration—between architects, builders, construction managers, and building science experts—that prepares students for future leadership in professional practice.

In the spring of 2020, our university piloted a new model for an interdisciplinary design-build program. Run through the Building and Construction Technology Program (BCT), the course brought together four advanced students from the BCT program and four advanced students from the Department of Architecture to design and build a tiny house. The instructor team was led by the owner of a local construction firm that is a recognized regional leader in high-performance, energy-efficient residential construction, along with support from one faculty member from the BCT program and one faculty member from the Department of Architecture.



Figure 1. Collaborative Design Process. Photograph by author.



Figure 2. Physical mock-up with studio pin-up boards to test scale and layout of the floor plans. Photograph used with permission.



Figure 3. Plans + Elevations. The Hygge House is designed to inspire a feeling of contentment in a small space. Image by author and student team.



Figure 4. Testing panelized construction joints. Photograph by author.

The primary design phase was conducted over an immersive two-week January term. The students were charged with designing and building an energy efficient tiny house with a large porch to serve as an ancillary stage at a local music festival while also showcasing energy efficient building strategies. Beyond these minimal requirements, the instructors gave the students wide latitude to interrogate and re-define the program and scope per their own priorities. To facilitate this exercise in collaborative *problem seeking*, the class brought in a variety of professionals and experts to give presentations and run short workshops on a host of issues related to housing, social justice, and sustainable building. This included representatives from Habitat for Humanity, the chief of staff and assistant director of planning for two local municipalities, an expert on Living Building Challenge material specifications, a nationally recognized leader in co-housing, multiple local architects specializing in energy-efficient design and housing, and two building scientists. Drawing on the wide range of perspectives and entry points provided by these visitors, the students mapped out a decision space and worked to define their own priorities for the project. And, importantly, they did not address these issues *a priori* but rather through design. They began to design while engaged in these conversations and used their work to probe critical questions: how big is big enough? What are the trade-offs between cost and performance? What's the relationship between energy efficiency and carbon impact? How valuable is flexibility? What's the balance between replicability and individuality? In this way, the

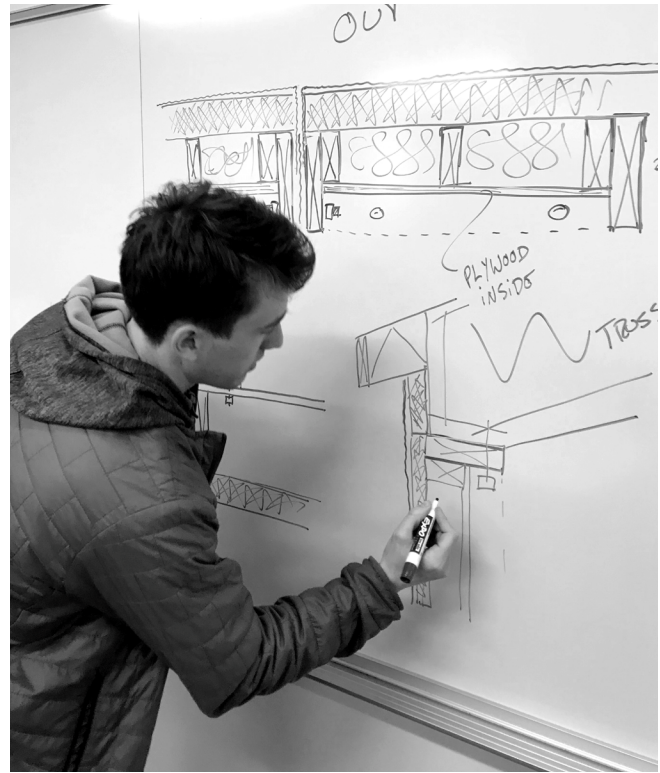


Figure 5. Whiteboarding details & assemblies. Photograph by author.

collaborative student-led process echoed Ackerman's notion of design-build as an "alternative – and even subversive" practice that "effects the education of architects [and, in this case, builders] philosophically, pragmatically, and ethically."<sup>3</sup>

The students elected to design a low-carbon, net-zero energy, 300 square foot accessory dwelling unit (ADU) that could take advantage of recent revisions to multiple local zoning ordinances, which now allow ADUs. The students saw this as a way to have an impact on local housing issues, while also putting forward a model for replicable, affordable, net-zero housing that could be successful in a wide range of contexts. The proposed design – deemed the Hygge House – is a modest and efficient studio-style dwelling unit designed to inspire a feeling of contentment in a rather small space. To enhance the unit's potential impact and appeal, the students designed this studio-style unit to be a basic module that could potentially be expanded to an either one- or two-bedroom dwelling unit in order to meet different or changing occupant needs.

In addition to emphasizing the importance of interdisciplinary collaboration during the design process, the studio also highlighted the value of an integrative approach to design. This kind of approach is particularly valuable for teaching net-zero energy and low-carbon design, which benefit from an integrated design process and close collaboration between building professionals. Following the initial programming and basic layouts, the students divided into two-person teams to

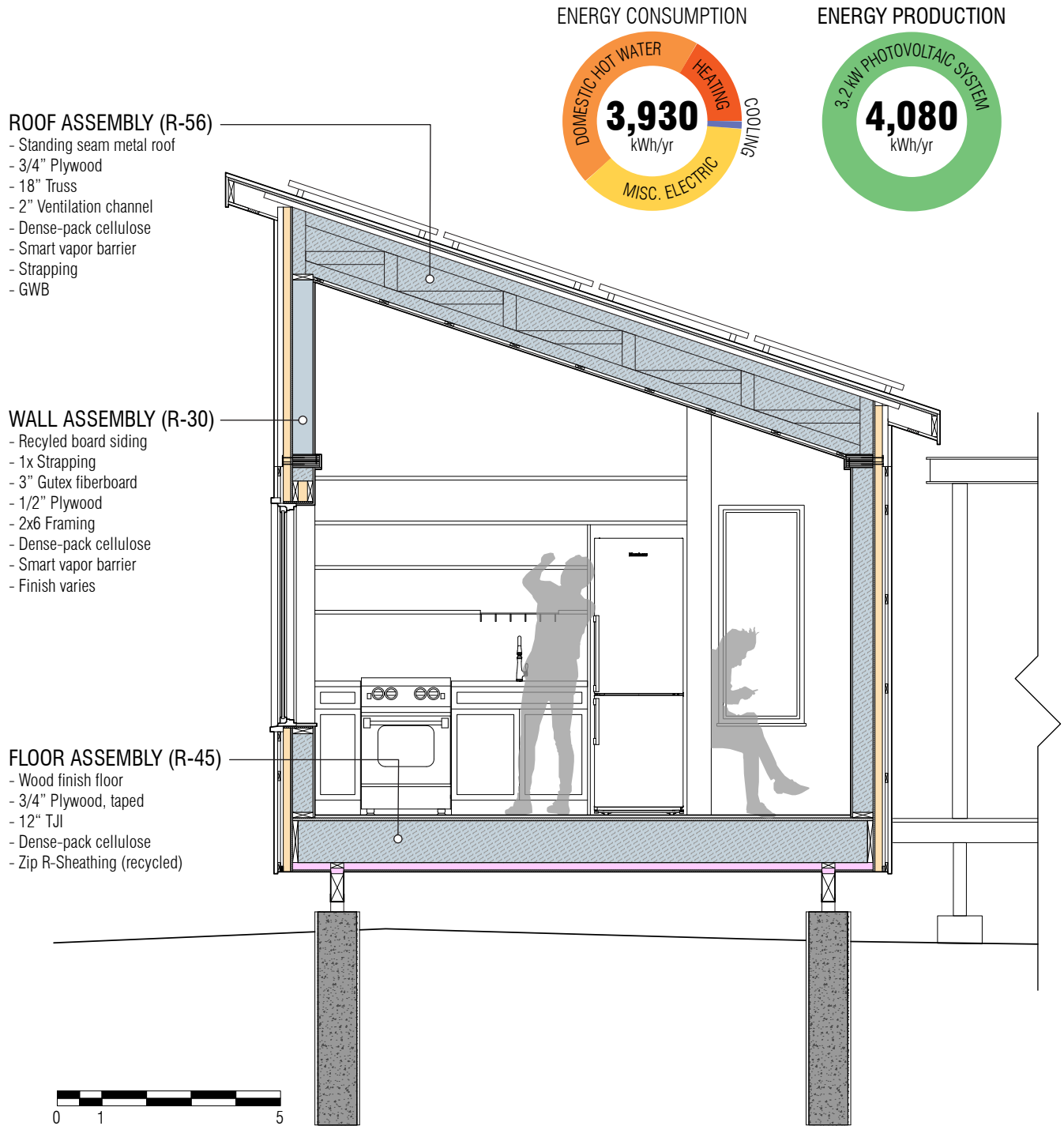


Figure 6. Building Section, Assemblies, & Energy Performance. The Hygge House features a super-insulated envelope constructed of low-carbon materials. With a 3.2 kW photovoltaic system, the house will be net-zero energy. Image by author and student team.



Figure 7. Exterior materials feature recycled wood and reflect the local vernacular & agricultural architecture. Image by Jake Radack.

work on key aspects of the design: envelope and assemblies, energy and carbon modelling, material specifications, and mechanical and electrical systems. Instead of tackling each of these aspects one at a time in a linear way, the students worked on them concurrently. The teams convened once or twice daily to coordinate their work and create a near constant feedback loop between interrelated components of the designs. This process allowed students to learn first-hand how interconnected the different aspects of a building can be. They learned, for instance, how a decision about insulation can impact the energy model which impacts the mechanical systems selection. In this way, the studio showcased how design-build programs can model a highly integrative design process, and in so doing, can challenge both the hierarchy between architectural studio design courses and technical coursework typically found in architecture programs and the implicit hierarchy between architects and other professionals and trades in professional practice.

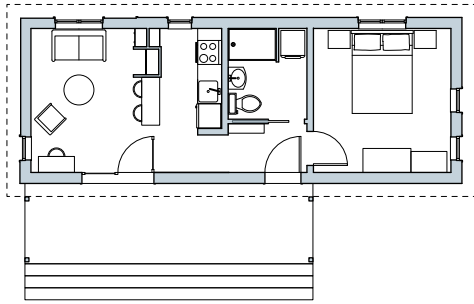
Due to COVID restrictions, the build phase remains on hold until the 2021-2022 academic year. While the success of this approach will depend in part upon the performance of the completed building, the desirability of the house within the ADU market, and upon the students' educational outcomes and impact on their professional aspirations, the design phase itself offers insights into the value of design-build as a model for interdisciplinary and integrative education for architects and building professionals.

## ACKNOWLEDGEMENTS

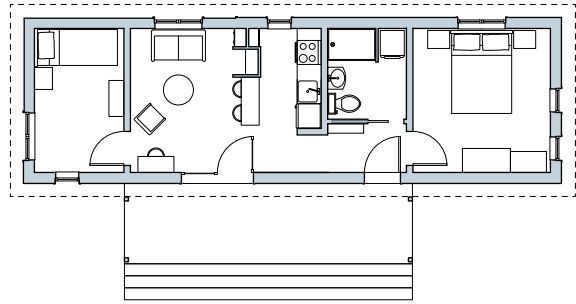
We would like to express our gratitude to Kent Hicks for his indefatigable energy and enthusiasm in proposing and leading this course. We'd also like to thank the many local professionals who volunteered their time and expertise in supporting the team. Finally, we also owe thanks to the exceptionally committed group of students: Sophie Ashley, Adam Chartier, Abigail Fowler, Richard Inkoom, Andrew Jones, Nate Lumen, Jake Radack, and Sam Schale.

## ENDNOTES

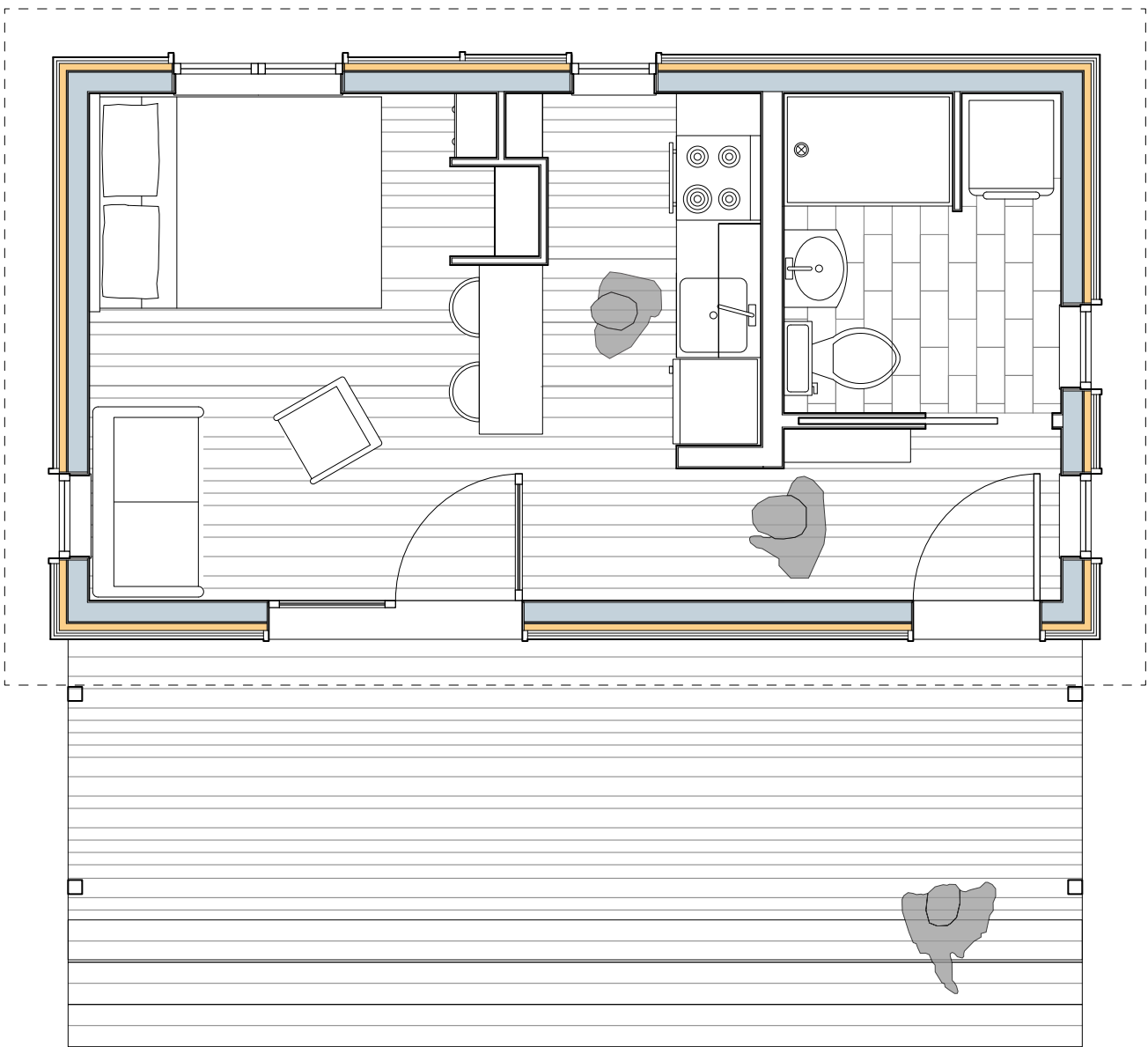
1. This growth is demonstrated by the number of journal articles, conference presentations, and journal editions devoted to design-build. For an overview of academic design-build programs see Vincent B. Canizaro, "Design-build in Architectural Education: Motivations, Practices, Challenges, Successes, and Failures," *International Journal of Architectural Research* 6, no. 3 (2012): 20-36. See also *The Journal of Architectural Education* 55, no. 3 (2002): pp 3-62; *The Journal of Architectural Education* 60, no. 2 (2006): pp 3-62; Jori Erdman et al, "Designing/Building/Learning," *JAE* 55, no. 3 (2002): pp. 174-179; J. Kinnard and B. Goodwin (Eds), *Rebuilding: Proceedings from the 98th ACSA Annual Meeting*. Washington D.C.: Association of Collegiate Schools of Architecture (2010). Jori Erdman, "Hands-On: The Pedagogy of Design/Build," *Proceedings of the 2006 Building Technology Educators Symposium, University of Maryland* (2006): 79-80.
2. Canizaro 2012, p. 2.
3. Jennifer Ackerman, "Crafting Production: Design Build as Alternative Practice." *Journal of Architectural Education* 71, no. 3 (2017): 73-81. <https://doi.org/10.1080/10464883.2017.1260925>



One-Bedroom Expansion



Two-Bedroom Expansion



Core Studio Dwelling Unit



Figure 8. The core dwelling unit is designed for easy expansion to either one- or two-bedroom units. Images by author and student team.