



427 GREENHOUSE

Design-Build 200SF Greenhouse for Hydroponics / Andover, MA / 2020
AFTERHOURS Design Collaborative

Small yet mighty: While modest in size, the 200 SF building is rich in terms of its design, detailing, materiality, and execution. The modest scale of the project allowed it to serve as a testing ground for the budding design-build team’s emerging ideas and philosophy related to design and construction, including durability vs. mutability, design for deconstruction, material and tectonic expression, hierarchy of detail, craft, humanistic detailing, formal gesture, elemental forms, and material efficiency.

In plan, the building can be understood as a response to several factors: 1) Size: a 200sf maximum area is set by the local zoning ordinance; 2) Orientation: starting from an ideal east-west orientation, the structure was rotated to sit parallel to the eastern property line at a location with favorable solar access to the southwest and west; 3) Material: the length and rhythm of the building is predicated on a 4ft module dictated by the width of the polycarbonate skin panels, requiring no rip cuts to the panels. The ordered planimetric system is broken only at the southeast entry where an extended brick half-wall, bench, and rough-paved patio provide a welcoming gesture.

In section, the structure reflects design priorities related to solar gain and passive thermal, utility/function, weather protection, and constructability. At this latitude, a south-facing wall pitched at 45° is optimal for direct solar gain. This was increased to 65° to accommodate the stucture’s orientation toward the south-west and provide adequate head room on the interior. The height of the south-west front wall is set by the length of a standard 10ft polycarbonate panel, requiring no cuts in-field. To simplify framing, the ridge joint is a perfect 90°. Rafter ties help to rigidize the roof structure while also providing an “upper deck” for seedling growth and lighting/ utilities. Where head room is limited along the west wall, a planter bed is provided for traditional growing.

Perhaps the most striking aspect of the structure is the masonry, which illustrates the desire to explore ideas related to durability/mutability, design for deconstruction, craft, texture, time, and memory. The masonry was conceived of as a chassis - a bold, solid base that would support and long out-live the light wood frame and polycarbonate shell above. Framing modules were assembled exclusively using wood screws and are subsequently bolted to the chassis via anchors set into the masonry. If alterations or adaptations are needed, these strategies would allow the complete skin and wood frame to be disassembled in a day and reused. The masonry, on the other hand, will remain, gaining richness, texture, and telling a story year-by-year as it weathers and ages.

Respecting the nature of the material, the double-wythe construction is expressed - like found ruins - as a series of discrete elemental forms: a low u-shaped wall at the front, a high back wall broken by a narrow vertical slot signifying a transition from exterior to interior, a prismatic brick bench. The back wall serves as organizing datum, orienting the structure toward the southern sun and guiding visitors along its axis, while also helping with thermal modulation. Sunlight from the south and west warms the wall throughout the day, heat that is later released to modulate the temperature at night. During the warmer months, the masonry acts as a heat sink, helping to prevent overheating on the interior. A variation on the Flemish bond (header-stretcher-stretcher-header) is used to increase strength of the 4ft-high wall and as an expression of craft and care. Header bricks are set 3/4” out of plane, providing the thermal benefits of increased surface area for heat exchange while also creating a playful texture on both sides of the wall akin to those found amongst the plants that the building will house.

Years

Design 2020

Construction 2020

Client

Private

Design

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Construction

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Contributors

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