2017-2018 Design-Build

Black Shed
32343

Black Shed is a design-build project set in the Palouse, a rural farming area in the Pacific Northwest. The challenge was to design and build a storage space for historical artifacts on the grounds of a 19th century farmhouse, which is now a museum and archive of pioneer history. Budgetary constraints meant that the project needed to be self-built, so students became able to effectively present the project not only to the client, but also to potential donors. They also developed a deeper understanding of the cultural and architectural history of the region, and they acquired the ability to use this understanding in responding to the site context. Above all, the students experienced and learned about the interaction among design, construction, costs, and schedule. The Black Shed design-build project benefited students not only in terms of gaining rich knowledge in design and construction, but also in terms of experiencing the joy of designing and making architecture together with limited resources as pioneers of the American West did historically. The project represents a pilot program for design-build community outreach in the architecture curriculum, and because of the client's satisfaction with the results of the project, another design-build project is planned starting summer 2018.

PROJECT DESCRIPTION

The site of the 12'x18' Black Shed is in the Palouse, a farming region in southeastern Washington and north central Idaho known for its vast landscape of rolling hills. The original site was developed by a homestead family in the late 19th century. In addition to their farmhouse built in 1885, the site hosts an 1876 log cabin, 1884 curio cabin, and 1889 barn. These historical self-built buildings are the products of families, friends, and communities, and exhibit the history of their lifestyles and culture.

The farmhouse, curio cabin, and log cabin were registered as a National Historical and Century Ranch site in 2004. The farmhouse functions as a non-profit museum and archive of 135 years of pioneer history in the Palouse. We were approached to design and build a shed to satisfy the museum's urgent need for more space to store historical artifacts. Eleven fourth year architecture students took on this project in Fall 2015. Eight students remained in the program as graduate students and completed the project in Spring 2017.

In the pre-design stage, the students researched the history and culture of the site and existing buildings, the local region, the site conditions, building materials, and the client's needs. The students worked on concepts and building design individually, and once the design direction was agreed after numerous discussions the client, the students started to work on specific tasks of the project. The students selected a project leader who would oversee the project and plan the project schedule. Project tasks were divided among the students and included structural analysis, material research, communication with the client and community, fundraising, scheduling, cost estimating, detailing, construction methods and communication with the fabrication lab, and budgeting. Progress, results, and questions were discussed in weekly meetings facilitated by the project leader. The students were evaluated based on how successfully they initiated and executed their assigned tasks and roles.

Due to budgetary constraints, the project needed to be self-built, which offered the students a tremendous amount of experiential learning about the interaction among design, construction, cost and schedule. Understanding the project constraints provided a framework within which the students could explore and come up with creative design and construction detail solutions. Also, to move the project forward, the students made significant efforts for fundraising and requesting material donations. Through these efforts, the students also learned how to effectively present the project to architecture firms, local communities, and university alumni. These presentations and feedback enabled the students to understand the project more deeply and to articulate the needs of the project.

Black Shed brought not only a rich experience of design and construction to the students and the community, but also the pure joy of designing and making architecture together with limited resources as people in this rural area did in the past.

The Palouse region is a rich farming area of 3,000 square miles encompassing parts of southeastern Washington and north central Idaho.

SITE PLAN with HISTORICAL BUILDINGS

Black Shed (2017)

Log Cabin (1876)

Farmhouse (1885)

Curio Cabin (1884)

Barn (1889)

SITE and HISTORICAL PHOTOGRAPHS

The 12'x18' shed was built on a gentle slope between two trees where a cellar used to stand between American linden and honey locust trees. The historical photographs were valuable resources for both inspiration and research.

top: Site photo

bottom: Historical photo showing log cabin and curio cabin

DESIGN PROCESS

Sketches and models were used not only to represent but also to generate ideas. They were also valuable tools for communication.
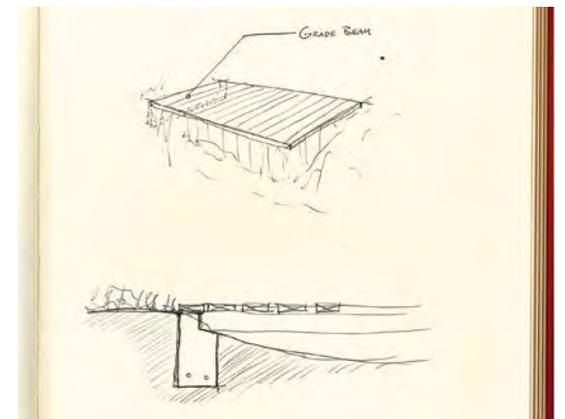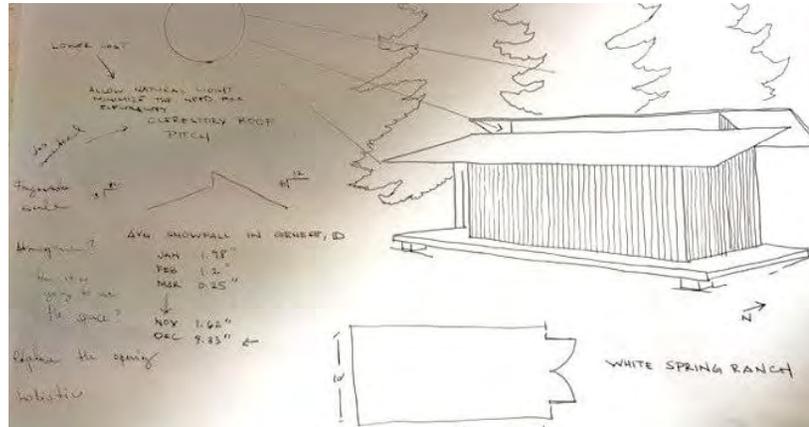
EXTERIOR VIEW

In responding to the site conditions, a 7'x18'-6" deck was built in front of the shed to access the front door. The deck, which faces an open area surrounded by the existing buildings, also provides opportunities to be used as a stage for community events.


South elevation

North elevation

North elevation w/ door open
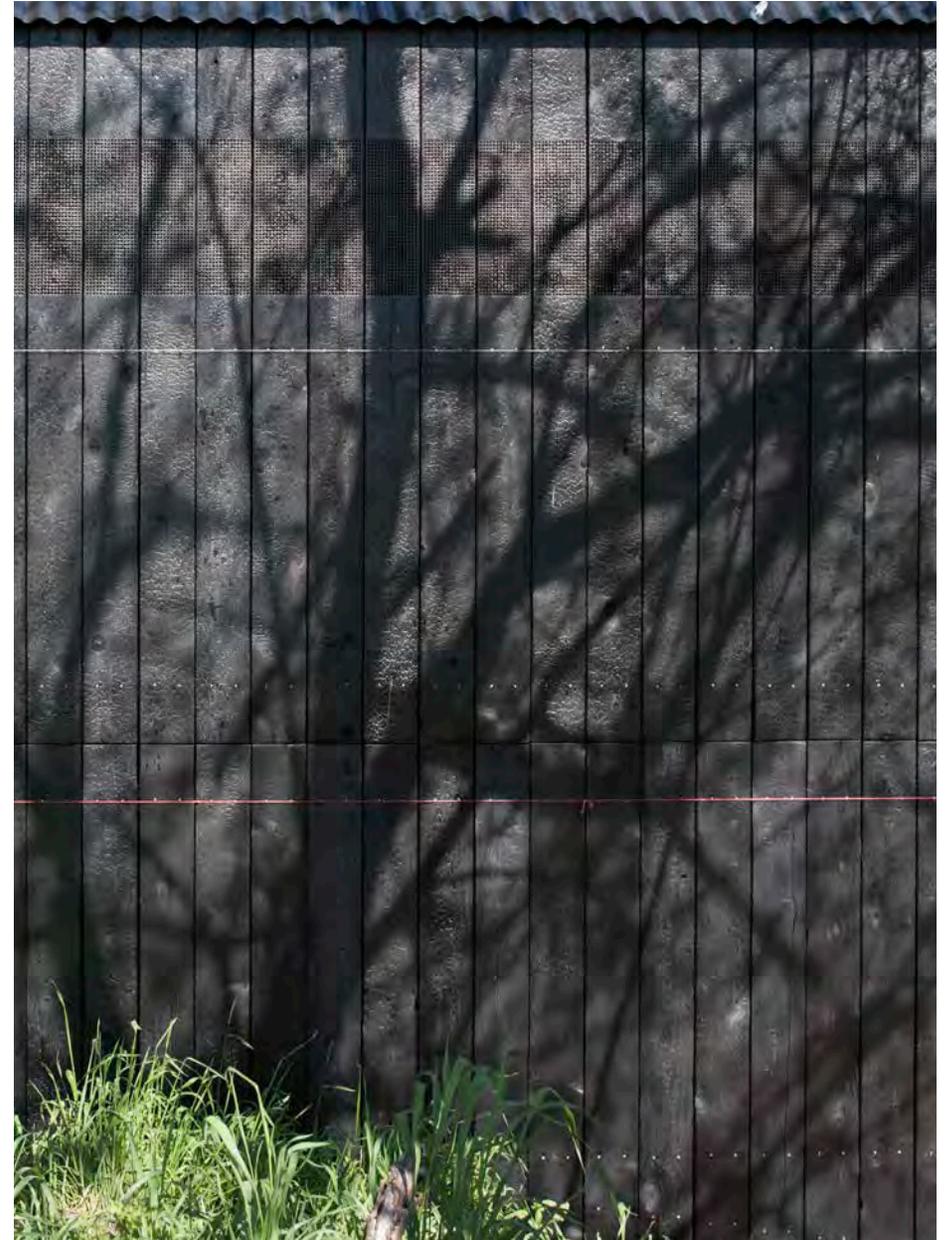
West elevation reflecting a shadow of honey locust

INSPIRATION for INTERIOR LIGHT

Bringing natural light into the shed was one of the crucial elements of the project as there is no utility access to the shed. Local agricultural buildings such as barns and timber grain elevators became an inspiration for the design.
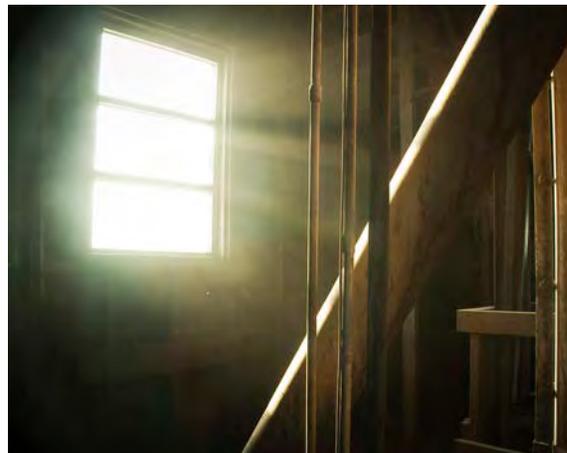

top: Interior image of barn on site

bottom left: Interior image of grain elevator

bottom right: Interior image of barn near site

LIGHT HOLE STUDY

Instead of installing a picture window, abstracted light was invited into the space by making small holes in the walls. Different sizes of holes were tested for their spatial effects in a model and full scale mock-ups.
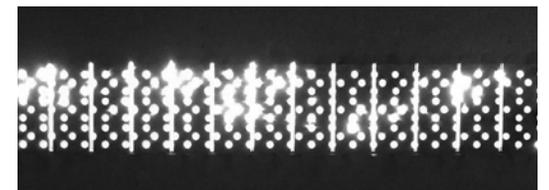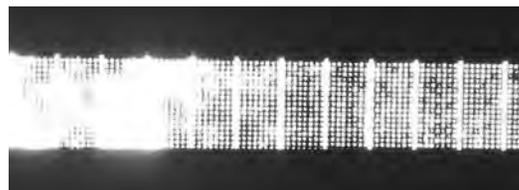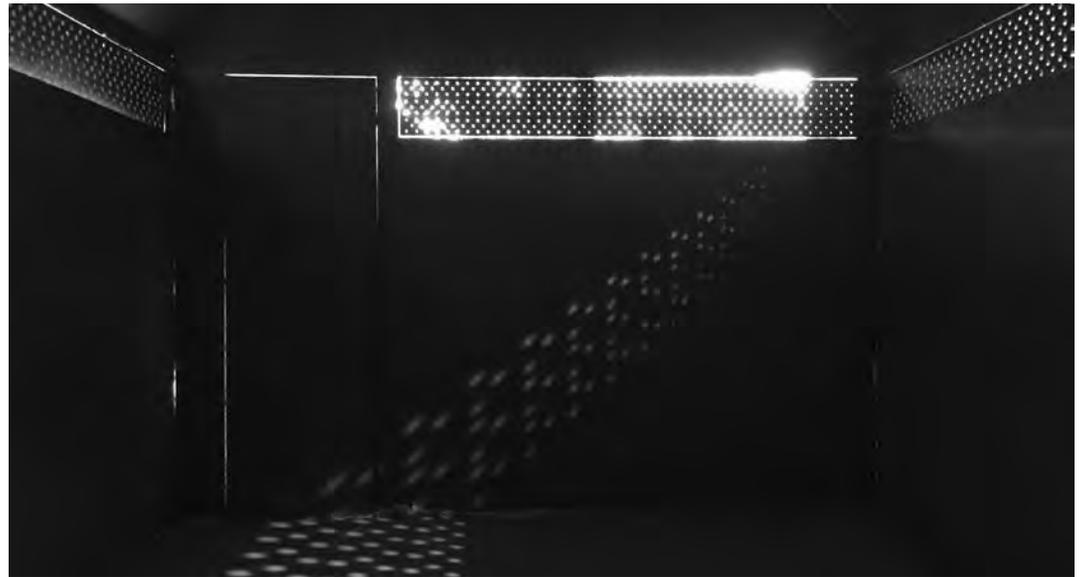

top: Model to test light conditions

center: Interior view of model

bottom: Images of light patterns generated by different hole sizes and numbers

EXTERIOR CHARRED WOOD

Testing for light holes revealed that smaller holes would create more evenly distributed ambient light in the interior space. More than 80,000 5mm holes were milled in the exterior walls.
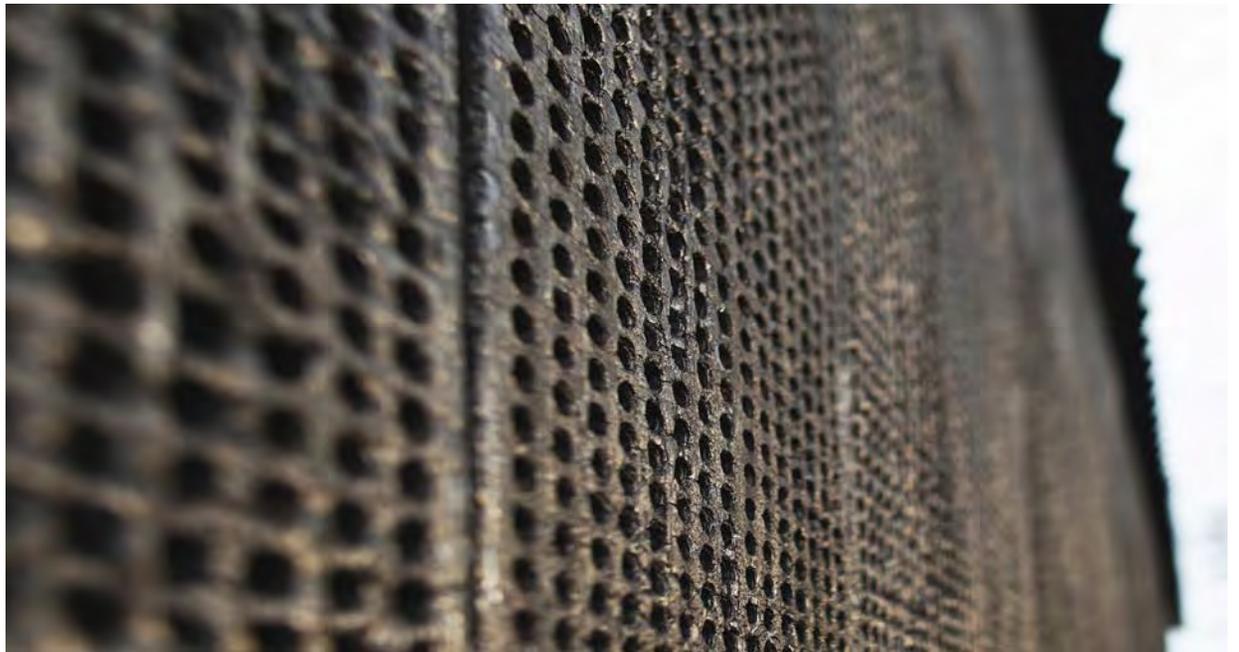
top: Milling holes with CNC

bottom: Close-up view of charred wood siding with holes

INTERIOR VIEW

When the exterior light comes into the space through the holes, the exterior environment around the shed is reflected through the light. For example, during the winter, when there are no leaves on the trees next to the shed, white light from outside fills the interior space. In late spring, the light on the east and west sides where there are trees enters as green light through the young leaves. Ambient light in the shed reflects the outside environment through the color of light.

INTERIOR VIEW

North-East-South-West interior elevation image showing color reflections from outside

## LIGHT and COLOR

American linden tree next to Black Shed

Interior corner image of green light reflecting through leaves outside shed

Ridge
15'-1 1/4"

Loft
9'-1 3/4"

Finish Floor
0'-0"

Deck
-2'-0"
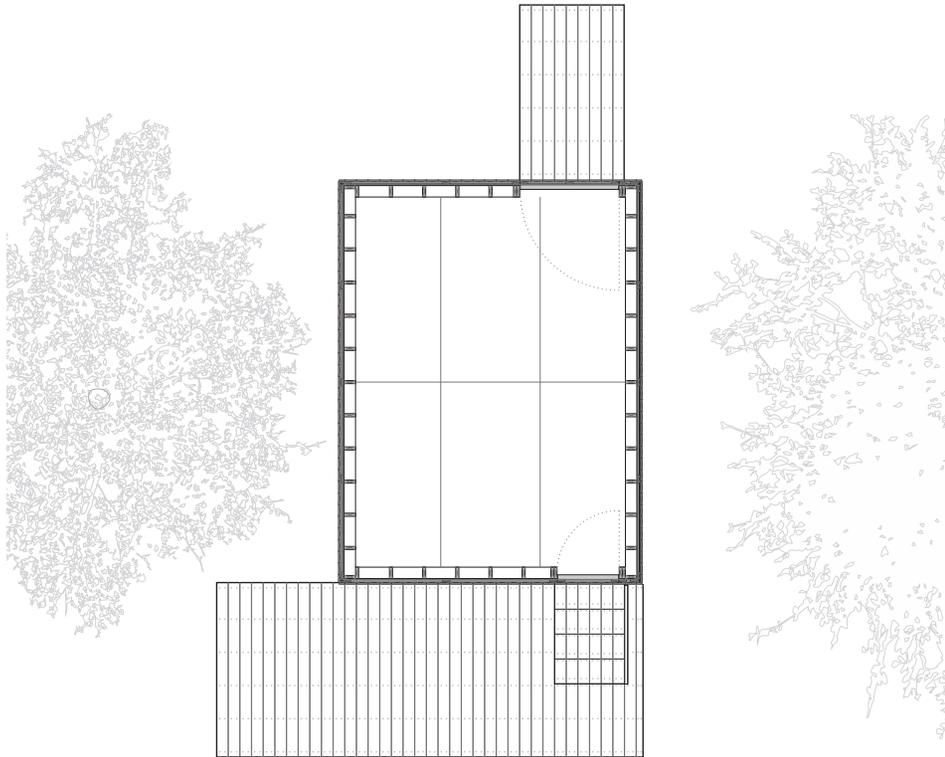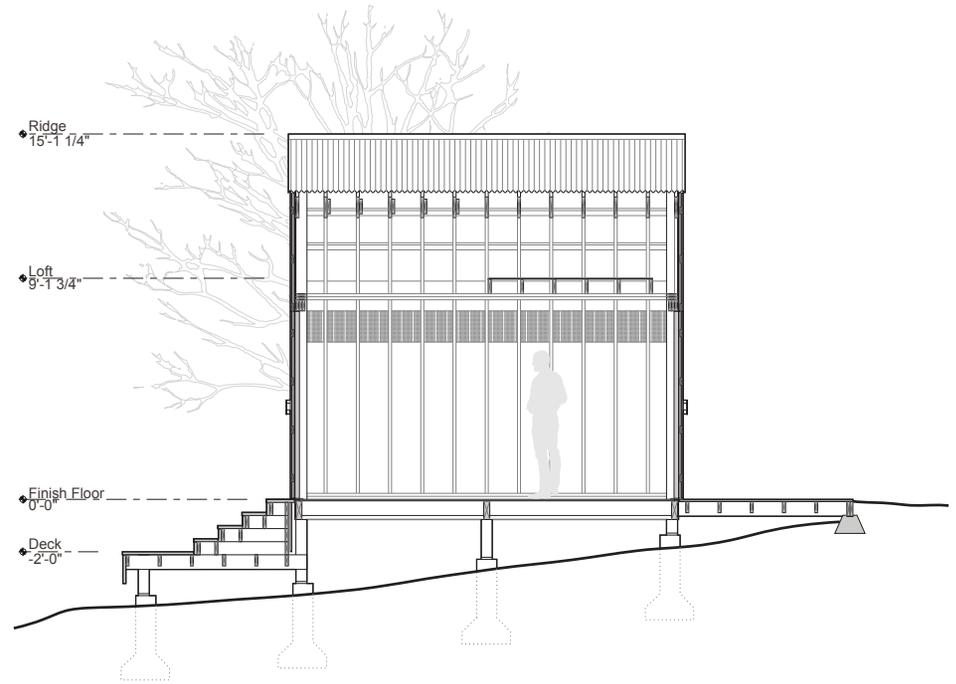
Plan   Section

DRAWINGS

Front elevation

Ridge
15'-1 1/4"

Finish Floor
0'-0"

Deck
-2'-0"
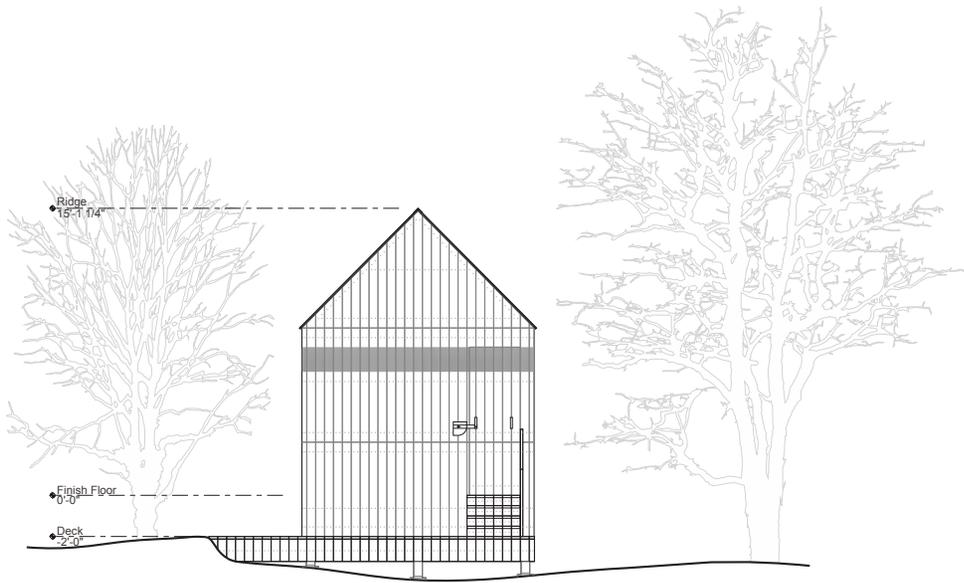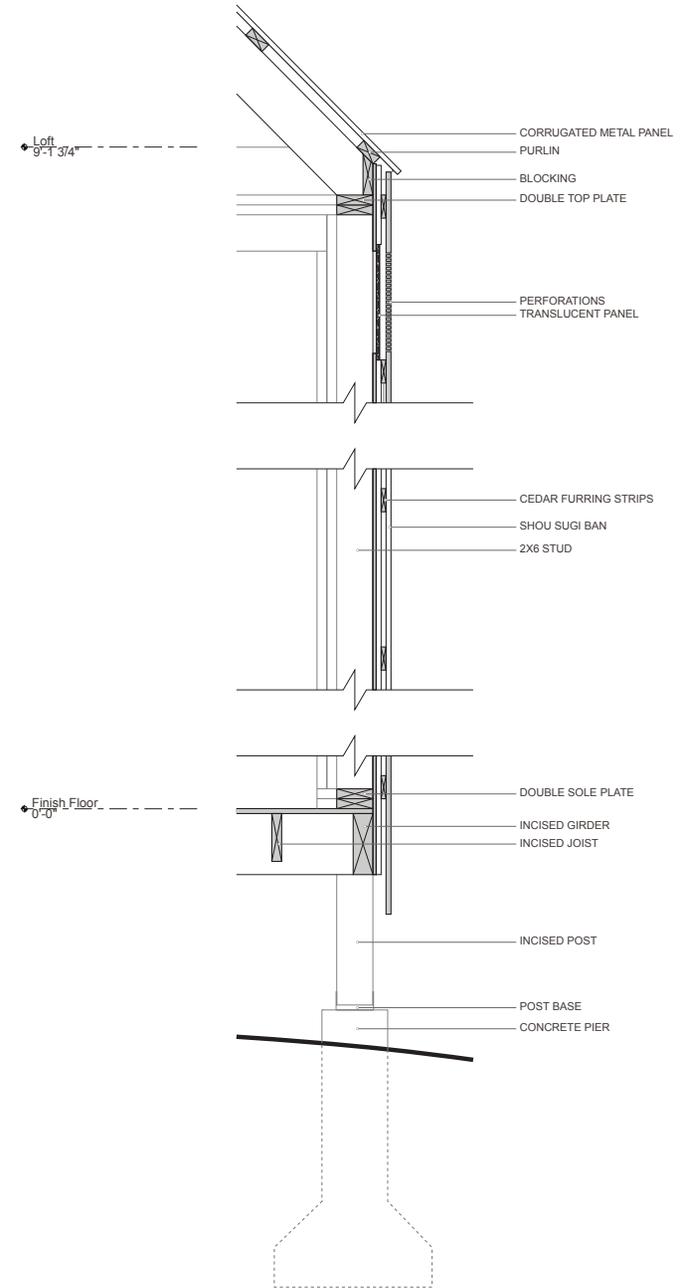
Rainscreen wall section

Loft
9'-1 3/4"

CORRUGATED METAL PANEL
PURLIN
BLOCKING
DOUBLE TOP PLATE

PERFORATIONS
TRANSLUCENT PANEL

CEDAR FURRING STRIPS
SHOU SUGI BAN
2X6 STUD

Finish Floor
0'-0"

DOUBLE SOLE PLATE
INCISED GIRDER
INCISED JOIST

INCISED POST

POST BASE
CONCRETE PIER

DOOR DETAIL

Front door
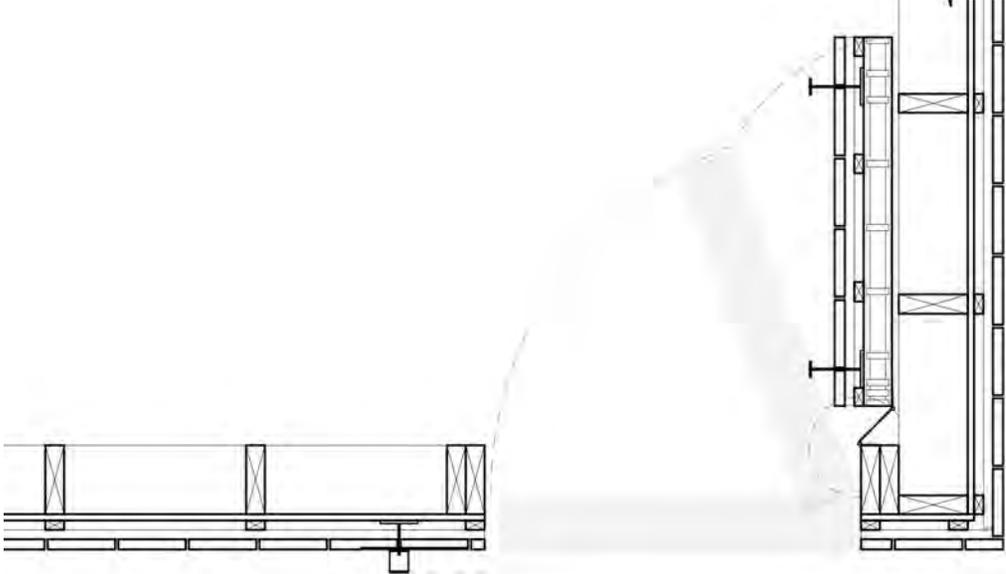
Plan detail of double-hinge system

Latch and handles

CHARRED WOOD

Charred wood, a centuries old Japanese technique, was selected as a finish for the rainscreen exterior wall siding because of its low maintenance requirements and its unique appearance, which fits in the context of the project.