

CREDITS

weeHouse - Alchemy Architects

Client: Varies. Drawings represent the Desutter residence.

Location: Varies. Drawings represent Moab, UT.

Architect

Geoffrey Warner, AIA

Photos

All from Alchemy Architects unless otherwise noted.

ACKNOWLEDGEMENTS

Carnegie Mellon University's School of Architecture students have prepared this precedent study under the guidance of Professor John Folan as part of the Urban Design Build Studio in the fall of 2011.

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weeHouse

1	INTRODUCTION & OVERVIEW
2	PROCESS
3	FINISHED PRODUCT
4	CONCLUSION

Alchemy Architects is an architectural and interiors practice based in St. Paul, Minnesota. Their work spans both commercial and residential clients and is known for its inventive use of materials. Alchemy Architects maintains a collaborative workshop in order to experiment with and fabricate important elements of its design—a hands-on approach that is evident in the finished product.



Geoffrey Warner, AIA
Founder – Alchemy Architects
M. Arch – University of Minnesota- Twin Cities



Scott Ervin
Managing Partner and Designer – Alchemy Architects



Alchemy Architects introduced the weeHouse to provide a “harmonious blend of site, building, and community” for their wide range of clients. To do this, Alchemy concentrated on a number of factors for the designs of their homes. These include factory-made, sturdy, flexible, and sustainable. The latter is its mainstay for daily work, which has been recognized nationally in a variety of publications, including *Dwell*, *Interior Design*, and *The New York Times*.

Alchemy focuses on the possibilities of the weeHouse. They have been used for both commercial and residential structures including cabins, single-family homes, and offices. And they provide a number of options for the owners in the design phase. While they are prefabricated and factory-made, they are also extremely customizable and unique to every owner.

The weeHouse has been just as much about marketing as it has been about architecture. While not “cheap,” Alchemy markets their homes as affordable. As illustrated by the images on the opposite page, they try very hard to relate to the client, both current and prospective. One way they implement this is by utilizing flashy images, paired with buzz words such as “Better,” “Smarter,” and “Cooler” with more architectural terms “Greener” and “Flexible.” This allows them to relate to a broad range of clients with varying architectural interest and knowledge. The other is by creating a brand with the weeHouse. Their website has multiple domain names, including www.alchemyarch.com and www.weeHouse.com. Their other work is completely secondary to this branded identity. They even turned their most popular weeHouse image into a logo to further implement this branding strategy.



branding



buzz words

<p>Better HIGH QUALITY</p>	<p>Cheaper AFFORDABLE ATTRACTIVE</p>	<p>Faster QUICK DELIVERY</p>	<p>Easier SIMPLIFIED OPTIONS STREAMLINED DESIGN</p>
<p>Smarter EFFICIENT DESIGN</p>	<p>Greener SUSTAINABILITY</p>	<p>Cooler ARCHITECT- DESIGNED PREMIUM BRANDS</p>	<p>Flexible SITE ADAPTABLE</p>

website



- About Alchemy
- weeHouse
- Photo Galleries
- weeHouses
- Interiors
- Houses
- ARTifacts



<p>SALE! weeSmall \$59,000 *WEST COAST ONLY</p>	<p>SALE! X-House \$99,000 *WEST COAST ONLY</p>	<p>weeHouse © Prefab</p>	<p>Pre-owned weePorch for \$25,000!</p>
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literature

weeHouse. Or not-so-weeHouse.

weeHouses are natural choices for... [text continues]

Design Process

weeHouses are designed in the following ways:

Customization... [text continues]

EFFICIENCY

The greenest square foot is the one you don't build.

weeHouse Small 400 sq ft
weeHouse 28A Tall 1100 sq ft
weeHouse 38B Pair 1400 sq ft
weeHouse X 2349 sq ft

CUSTOMIZING + IDEAS

Why Customize?

creating a 'wee' identity.

OVERVIEW



EVALUATION

PROCESS

weeHouses are built on a streamlined schedule that far surpassed standard building practices. This happens with simultaneous construction in a factory and on site.

SITE

The weeHouses are precisely placed to take advantage of site condition. The simple design allows for variation due to sites of all types.

COST

Each stage prior to living in your weeHouse has various costs associated with it. These can be divided into Included, not included, and optional, and all greatly affect the over cost of the weeHouse.

weeHouse

1	INTRODUCTION & OVERVIEW
2	PROCESS
3	FINISHED PRODUCT
4	CONCLUSION

weeHouse

DESIGN } SITEWORK
FABRICATION }

MONTHS

1-2

3-4

5-

Typical Custom ARCHITECTURE

DESIGN — C O N

DELIVERY — BUTTON-UP

6 — 7-8 — 9-10 — 12+ —

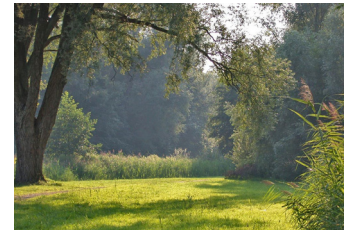
S T R U C T I O N —

design.

A strong focus of the weeHouse is personalization. From model configurations to materials, and site to budget, the Alchemy team can assist the client in getting the home of their dreams. Because their clientele range from “school teachers to philanthropists,” customization plays an integral role in making weeHouses affordable. The simple spatial organization and structure allow this type of design workflow to become possible. As options change, so do the prices of the homes. Alchemy works closely with its clients to find the best options by implementing a smooth design process, streamlined production, and simple installation.

In the end, the client must be happy with the weeHouse, and the environment it was set in. The home is the most intimate and personal space we inhabit, and the weeHouses accentuate that. Alchemy is trying to bring a big house feel in a smaller, more efficient package.

build *your* wee.



Site Selection

With weeHouses available all over the continental United States, site possibilities are almost endless, and is a vital part of the design process. While Alchemy architects does not choose the property for each house, they help to determine the best location for each project on a specified property. They greatly consider context and environment to masterfully site each and every weeHouse.



Studio
\$79,000 – \$89,000



Pair
\$185,000 – \$209,000



Tall
\$175,000 – \$199,000



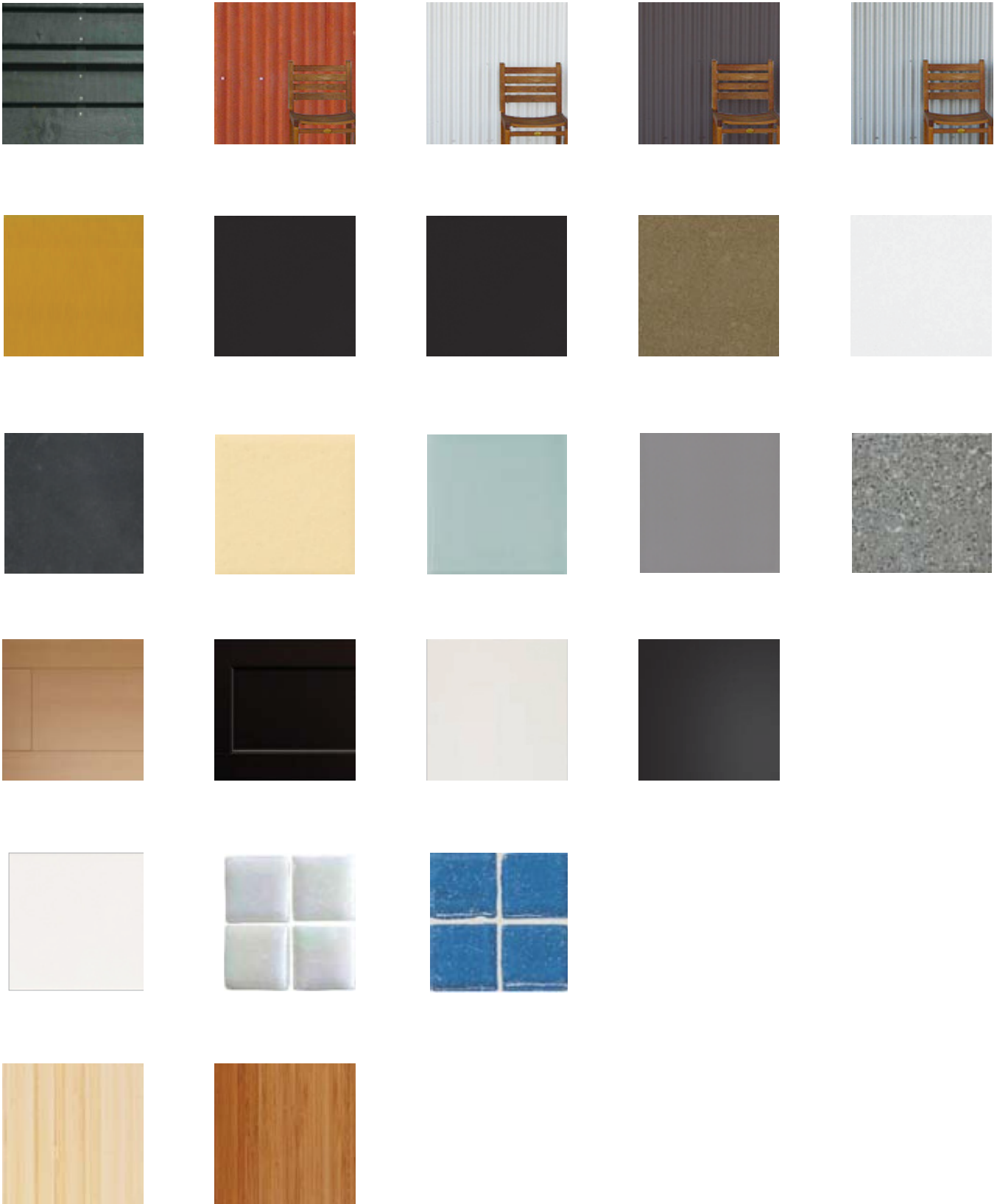
Foursquare
\$270,000 – \$315,000



Custom Design
\$ Varies

Base Model and Configuration

The weeHouse is extremely versatile and can be configured in a wide variety of ways. Alchemy defined four basic configurations as base models to help clients decide what works best for their needs. However, Alchemy also makes every effort to make a completely unique house for every client, despite the similar starting points.



As part of Alchemy's dedication to customization of their product, the weeHouses have an extensive material palette to choose from. These include different interior and exterior finishes, appliances, millwork, and kitchens.

Material Options

_____ siding

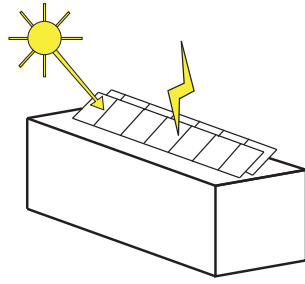
_____ countertops

_____ stone and tile

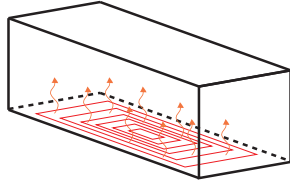
_____ millwork

_____ additional bath tile

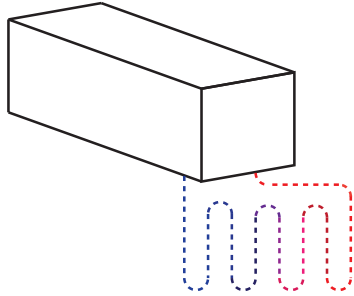
_____ wood flooring



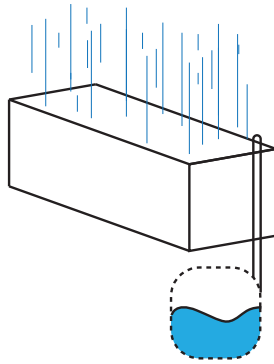
_____ 1



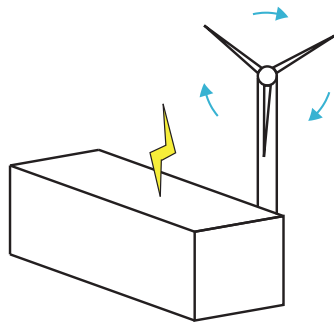
_____ 2



_____ 3



_____ 4



_____ 5

There are a number passive elements that the weeHouse can take advantage of if the site conditions allow. Taking advantage of these elements will ultimately reduce the heating and cooling load of the house, while reducing water usages.

Environmental Systems

1 Photovoltaic Panels

If the site is open and sunny for the majority of the year, photovoltaic panels can be a great asset in reducing the electrical costs of the weeHouse. The flat roof of the weeHouse makes installation simple, and keeps maintenance to a minimum.

2 Hydronic Floor Heat

A series of tubes that are placed under the floor are pumped with hot water. During the winter, this hot water warms the floor of the entire house, thereby warming the residents and the spaces.

3 Geothermal Heat

Using the thermal energy generated from the Earth, the weeHouse can heat water and/or generate electricity by using a series of pipes that weave in and out of the ground.

4 Greywater Management

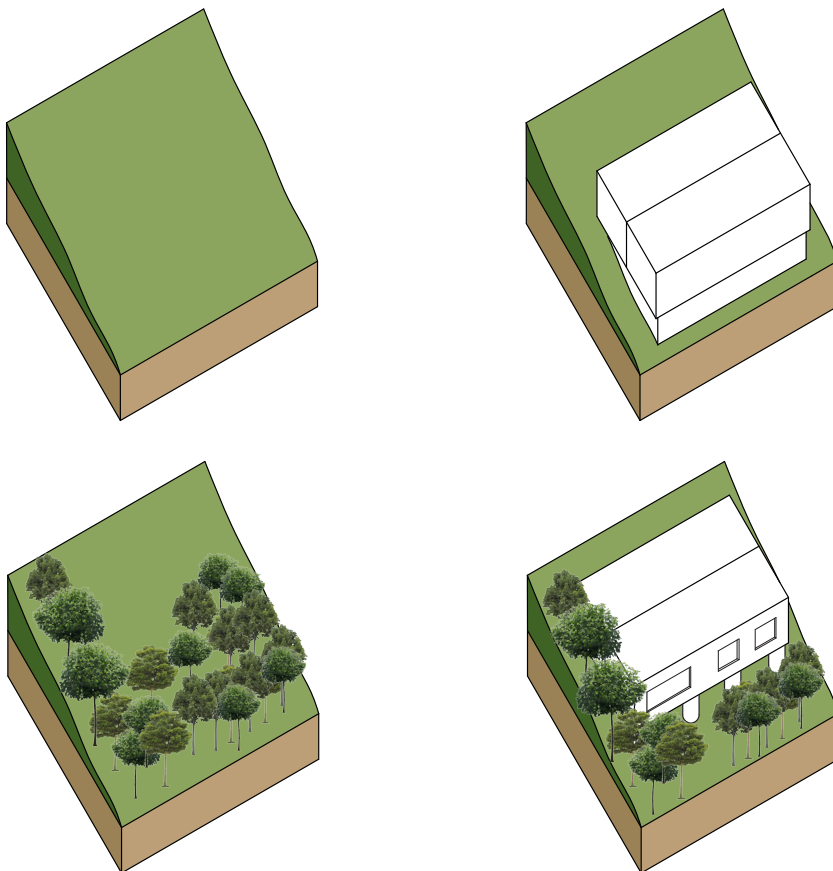
A system of gutters and pipes collect rainwater into a reservoir for greywater treatment. The large surface area for the roof maximizes the amount of rainwater that it collects to be used for flushing, watering vegetation and even for cooking (with proper filtering techniques).

5 Wind Power

If there are high wind velocities in the site, it may prove advantageous to place wind towers that can produce electricity for storage, or for immediate use.

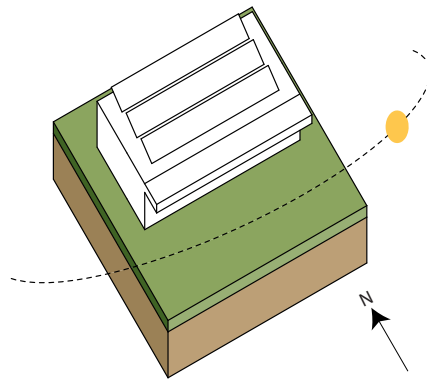
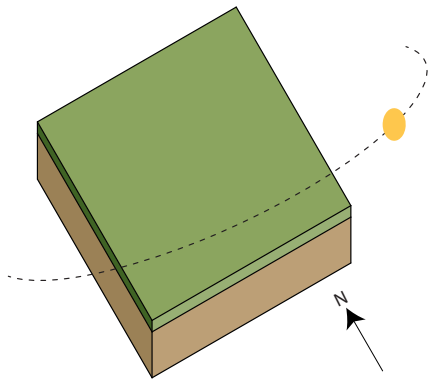
weeHouses employ a simple architecture with a strong approach to site. Just as customization allows each individual client to choose personal aspects and configurations of the houses, the architects at Alchemy personally site the houses based on various site conditions. This is especially important because of the vast area that Alchemy services, which expands across and beyond the continental United States. Varying landscapes and climates call for varying design approaches. Many of these conditions influence change the design of the house, while others may utilize existing site conditions to address climate issues.

adapting the weeHouse.

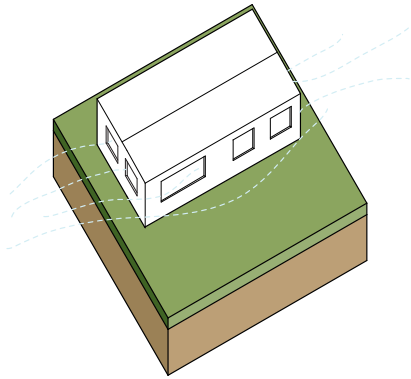
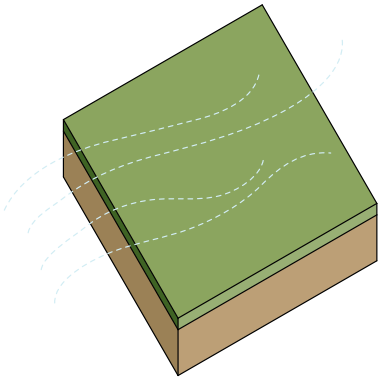


Sloped landscapes can be addressed by adapting the foundation of the weeHouse. This is done either by adding a masonry or concrete basement level, or by using pillars. Additional approaches can include decks and ramps.

landform

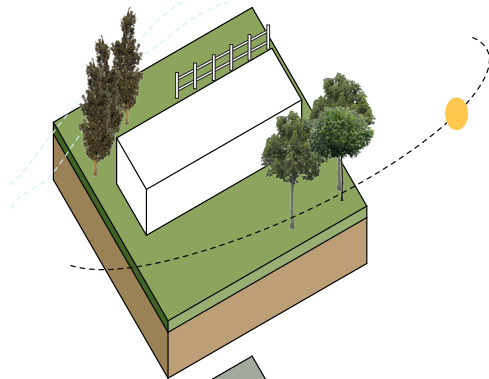
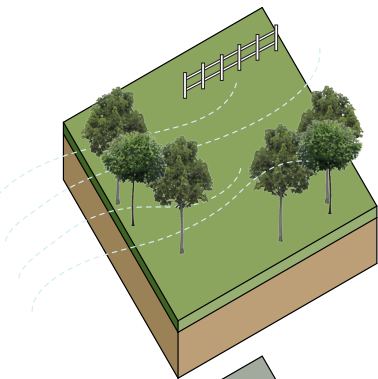


In climates where vegetation cannot be employed, shading can be addressed by custom shading elements, including louvres, canopies, and overhangs. To further address the sunlight, weeHouses are designed to attach solar panels to the roof to alleviate energy costs.

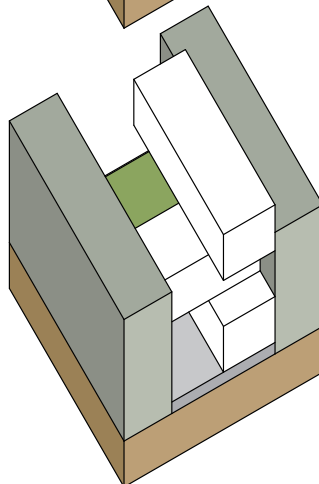
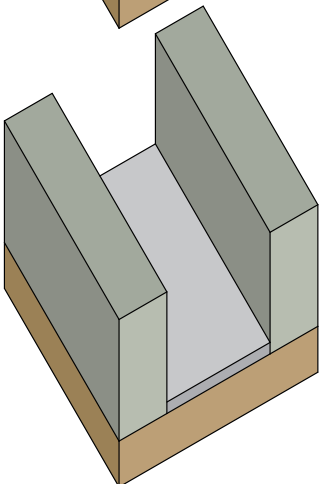


Hot and dry climates also need proper ventilation to keep clients comfortable. Proper placements of windows on the weeHouses allow for cross ventilation across the home.

climate



Rural properties can typically utilize vegetation to address climate issues because of the larger amount of land available. Low, dense trees can act as screens against the wind, and be positioned to allow wind in the warmer months. Trees can also be used to shade the house from the sun in these warmer months.



Where space may not be available, the weeHouse can be configured to allow views and increased floor space within an urban context.

context



what's included in the price?

Standard Items

Base Cost of House
 Appliances: Stove top, Oven, Refrigerator/Freezer,
 Dishwasher, Washer and Dryer
 Low-E Andersen Windows and Doors
 EPDM Rubber Roofing Membrane
 Weathering Steel Siding
 Fiberglass Insulation
 200 AMP Electrical Panel (prewired)
 Recessed Lighting
 Flooring: living spaces
 Flooring: bathrooms + kitchen + entry + stairs
 IKEA Cabinetry - Entire house
 IKEA Cabinetry and Accessory installation fee
 Perimeter Curtain Track
 Counters
 Kitchen Sink
 Plumbing Fixtures in Kitchen and Bath(s)
 Bathroom Accessories

Fees

Project Fee for weeHouse standard
 Factory Coordination

what else do I need to pay for?

Standard Items

State Sales Tax

Fees

Contractor Coordination; on-site and preliminary (as needed)
 Factory Visit Inspection (travel and accommodations)
 Set Day (travel and accommodations)

what else can I get?

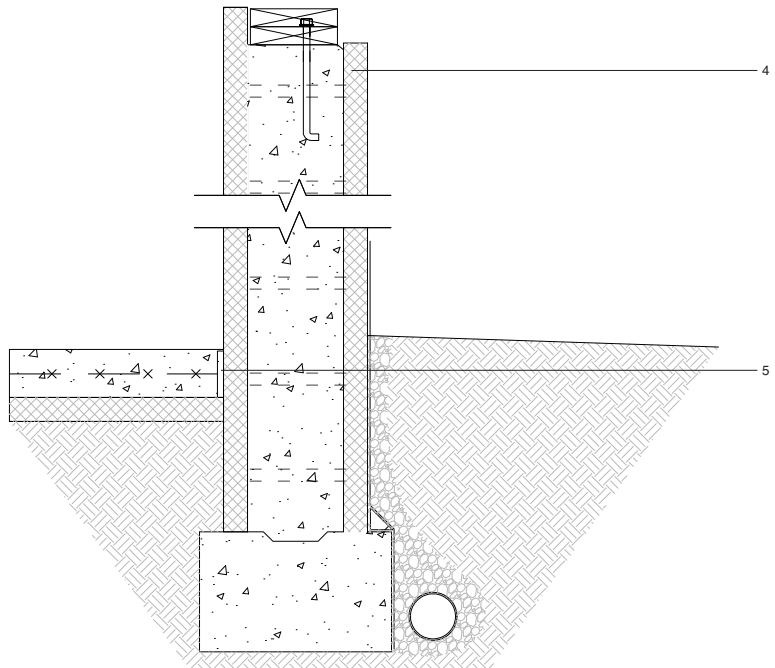
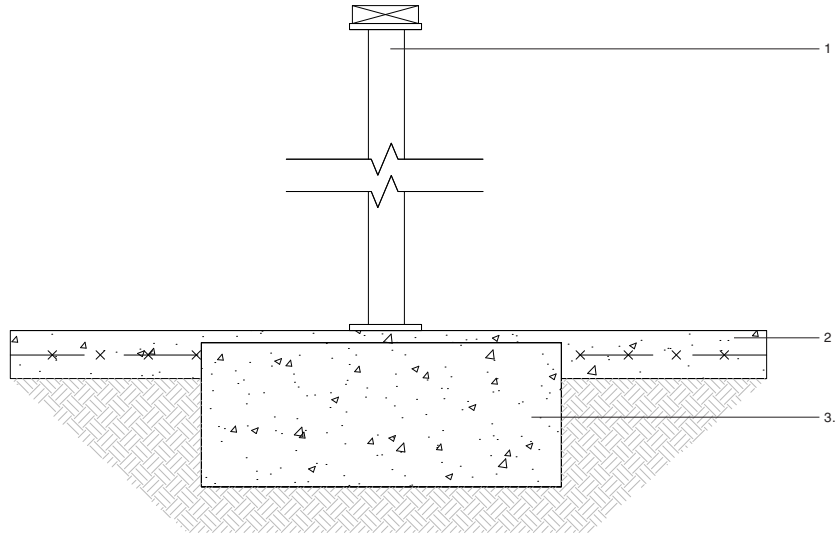
Options/Upgrades

In-Floor Heat	\$5-10/square ft
Spray Foam Insulation	\$7k-\$15k
Roof Overhangs	\$100/linear ft
LED Lights	\$200 ea
Corncrib Siding	varies
Cabinetry Upgrades	varies
Wood Wrap on Walls and/or Ceilings	varies
Glass Tile in Shower	\$800
Ceiling Fans	varies

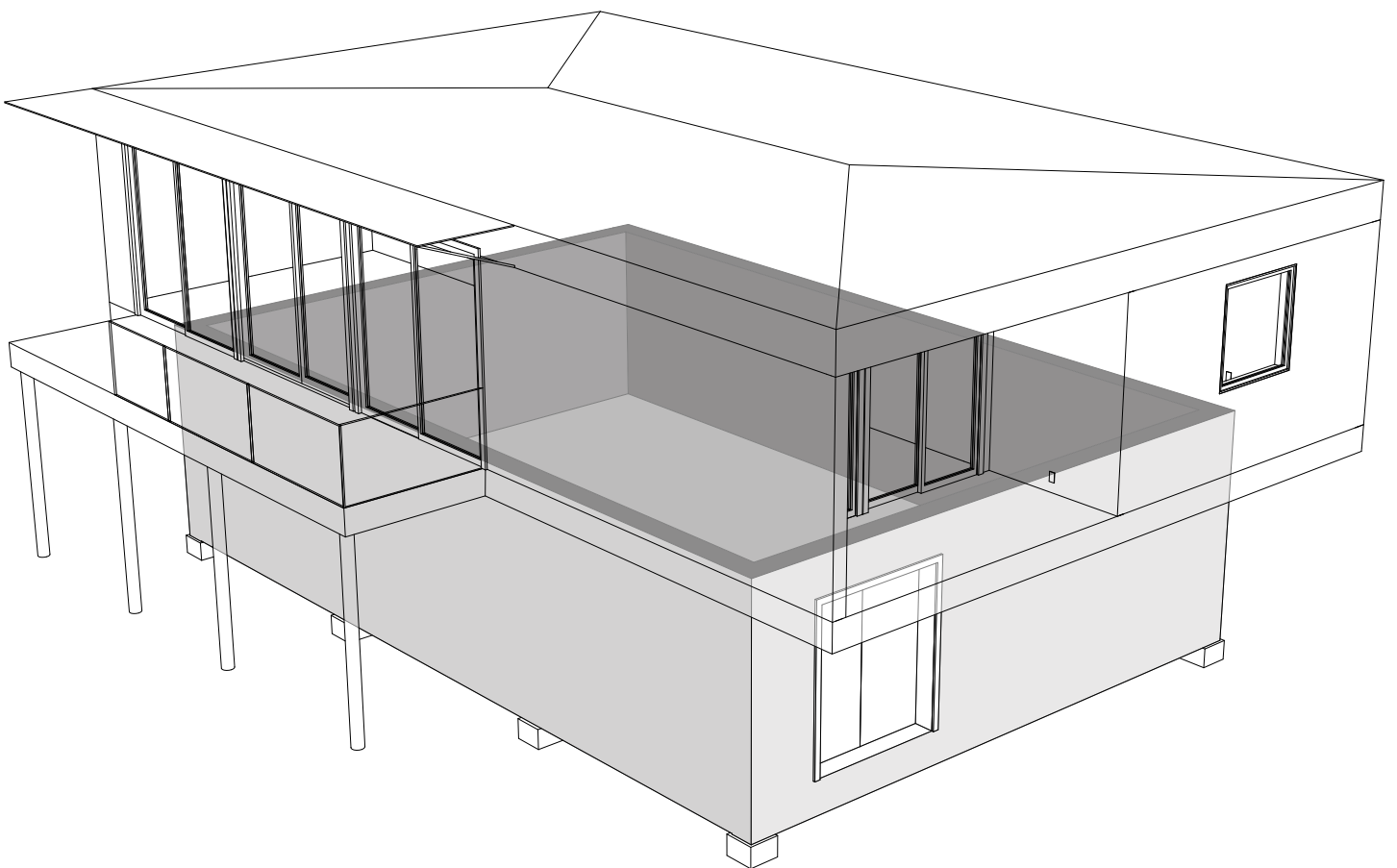
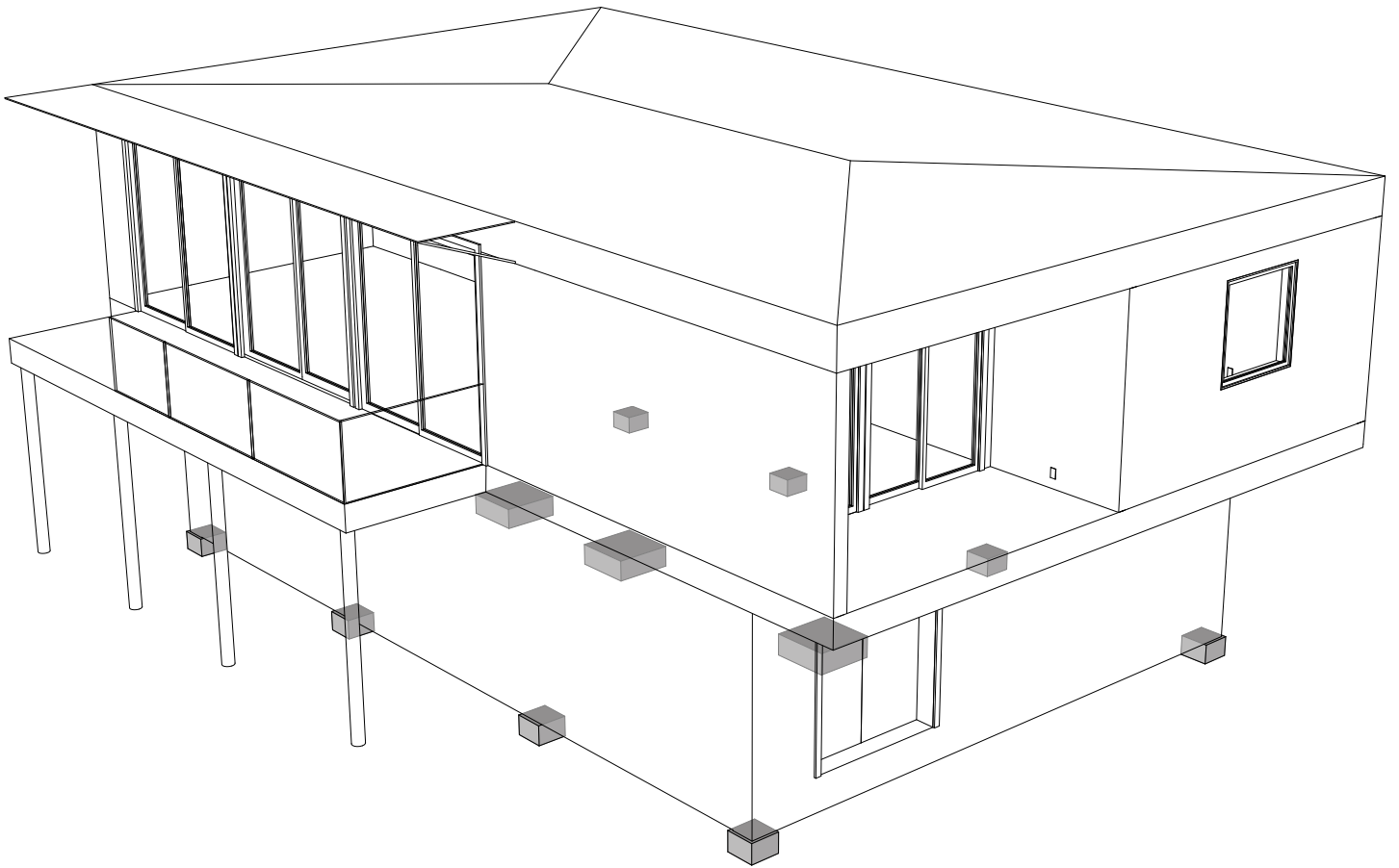


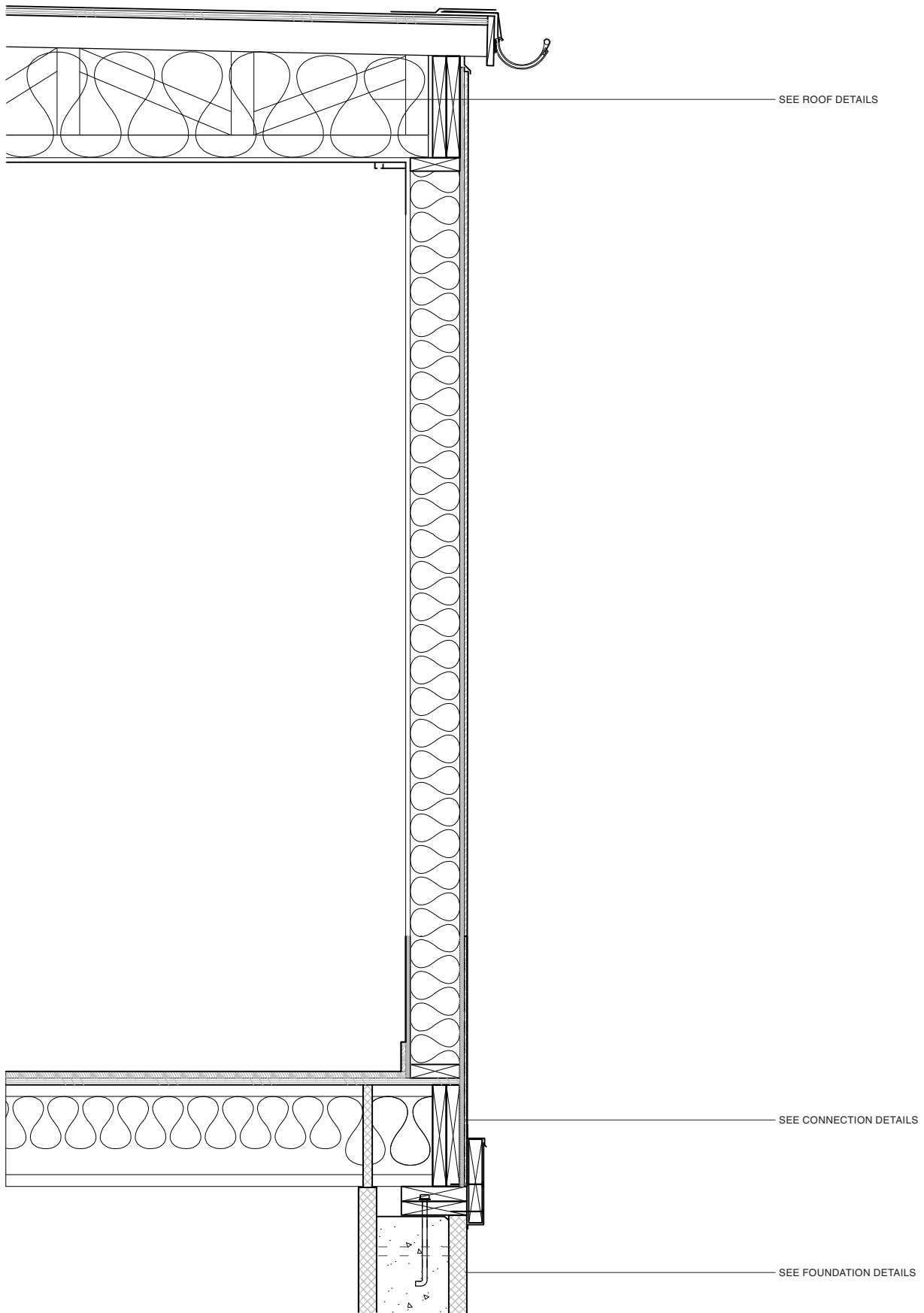


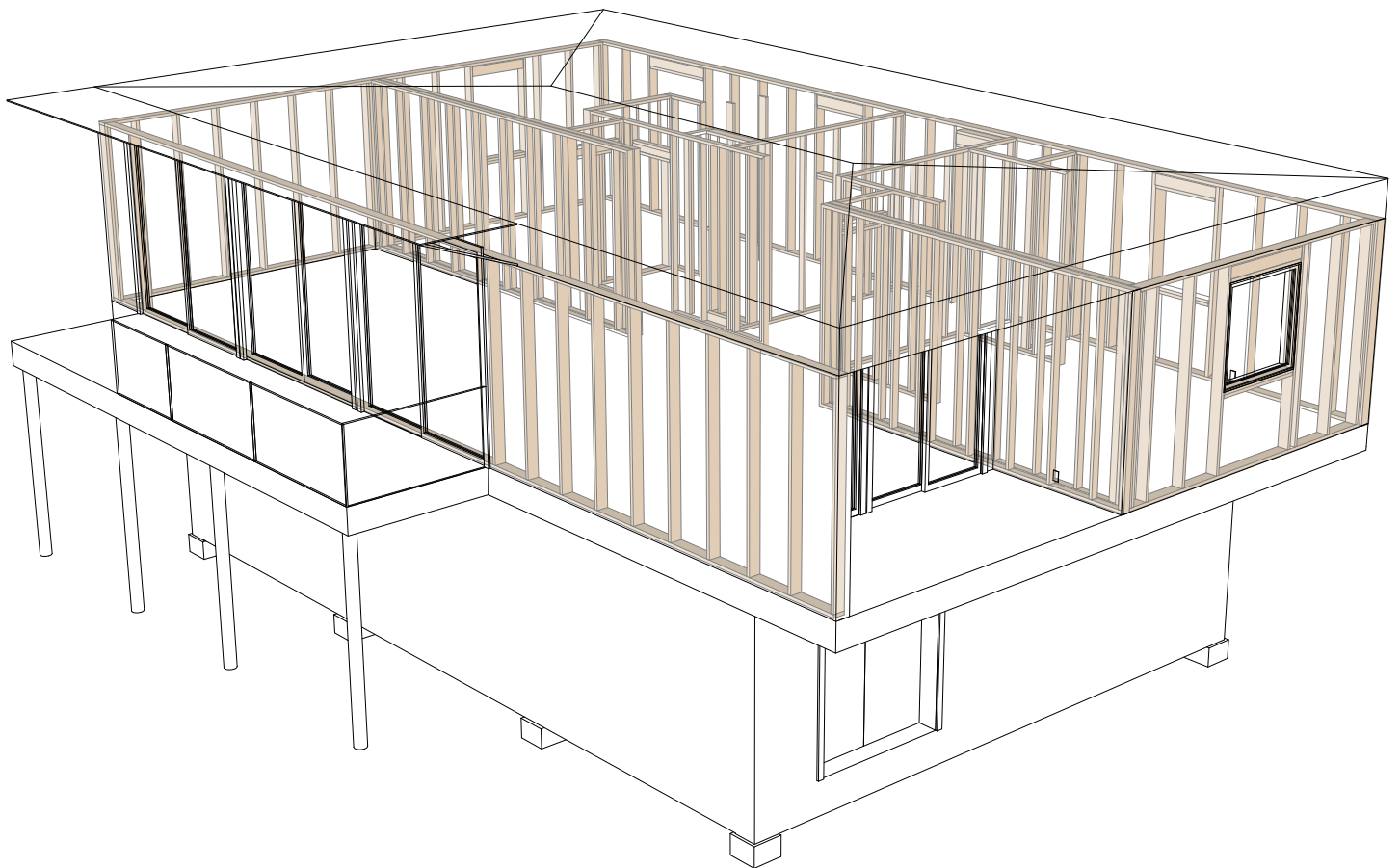
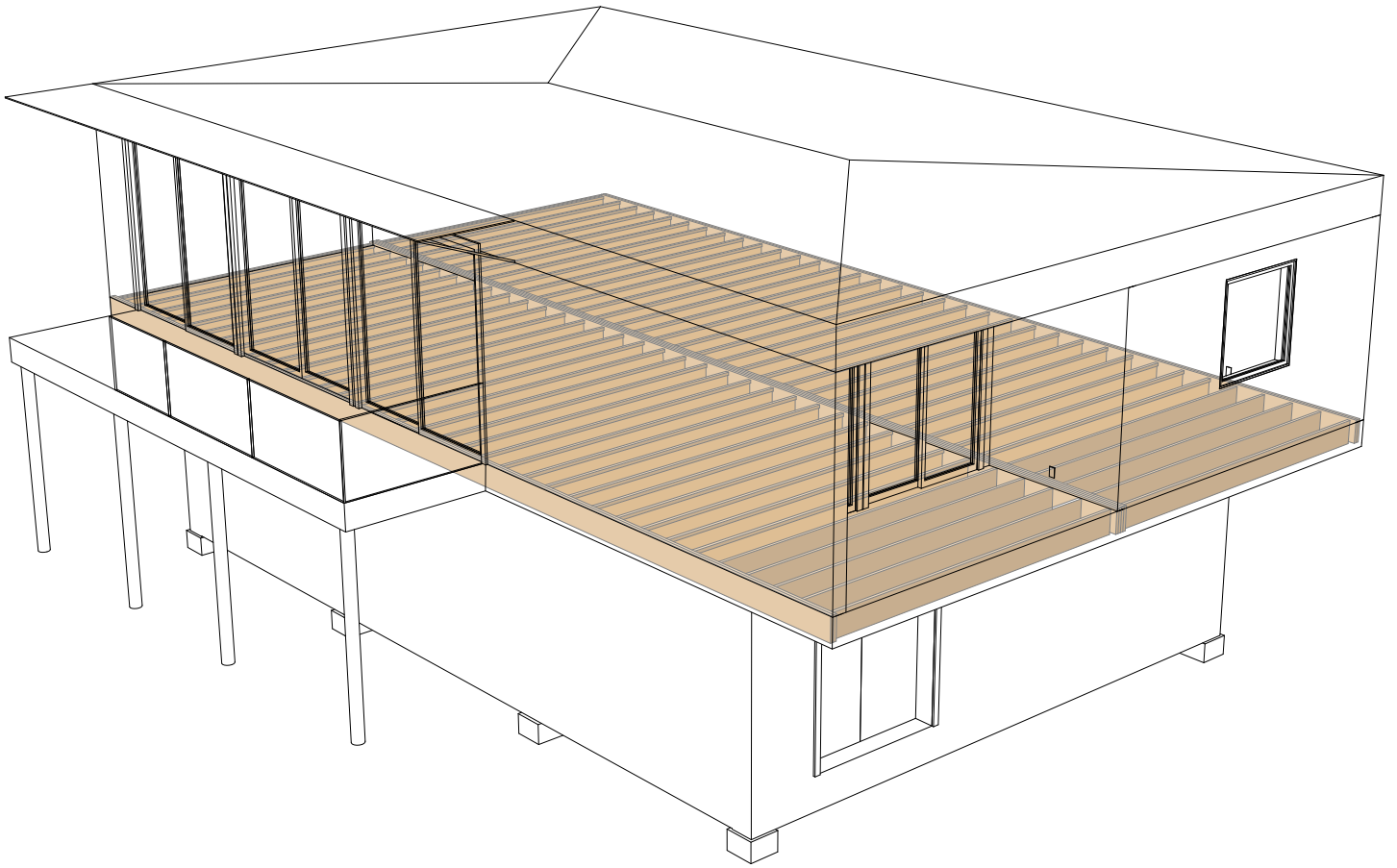
fabrication &
sitework.

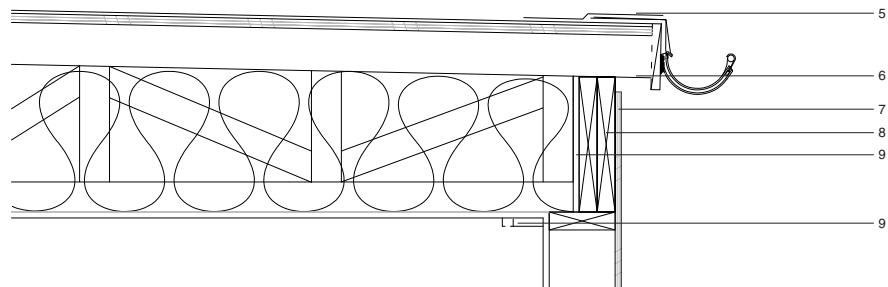
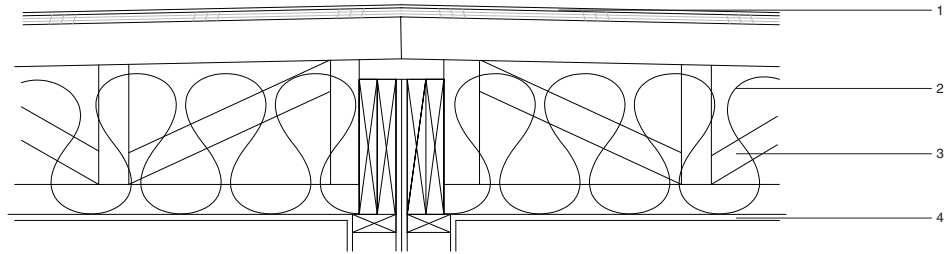


1. 3" LALLY COLUMN
2. 4" REINFORCED CONCRETE SLAB OVER 6 MIL. POLY V.B.
3. CONCRETE FOOTING FOR LALLY COLUMNS
4. 12" ICF FOUNDATION WALL
5. BACKER ROD AND SEALANT OVER COMPRESSIBLE JOINT FILLER

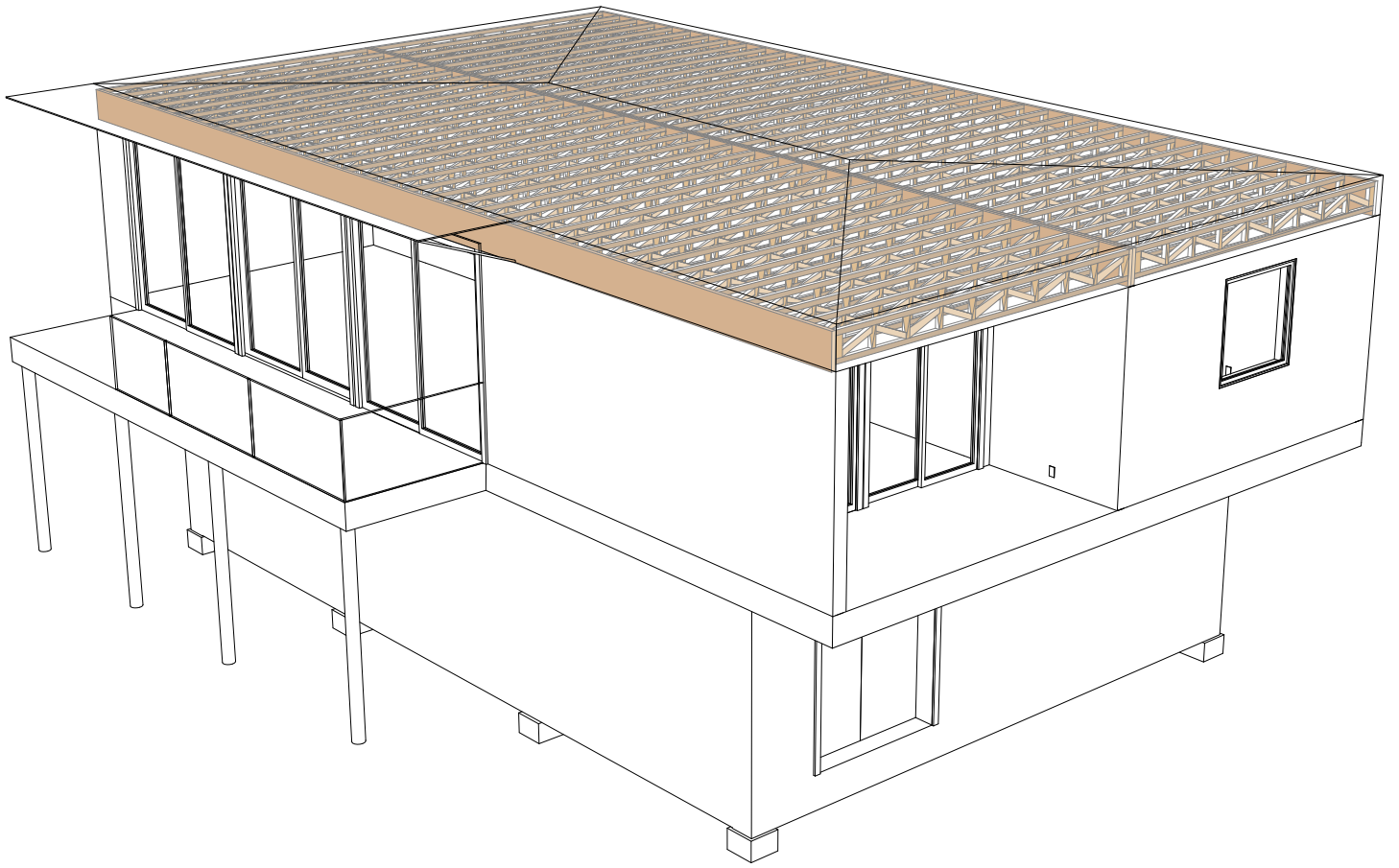








1. EPDM RUBBER MEMBRANE OVER 1/2" HIGH DENSITY ROOF FIBERBOARD
2. R=38 BATT INSULATION
3. FLAT TRUSSES WITH BLOCKING TO CREATE PITCHED ROOF
4. 5/8" GYPSUM BOARD
5. FLASHING
6. 2" VENT
7. CORRUGATED METAL
8. RIM JOIST
9. CURTAIN TRACK





what's included in the price?

Fees

Contractor Coordination; on-site and preliminary (as needed)
 Factory Visit Inspection (travel and accommodations)
 Set Day (travel and accommodations)

what else do I need to pay for?

Subcontracting

Engineering	\$3K-\$5K
Set Crew	\$2K-\$5K
Crane	\$2K-\$5K

Pre-delivery

Site Survey	varies
Soils Report	varies
Geotechnical, percolation, septic, etc.	varies
Local Permits: water, septic, variance, etc.	varies
Clearing/ Demolition	varies
All excavating, backfill, grading	\$10K-\$20K
Foundation: Piers/ Stem wall/ Full Basement	\$7K-\$25K
Route utilities to be hooked up under module	\$2K-\$5K
Well	\$7K-\$15K
Septic	\$7K-\$30K
Decks	\$20-25/square ft
Install Hose Bibs (exterior faucet)	\$200

Button-Up

Exterior siding patch at module seams	~\$500
Check and adjust interior doors and casings and trim	~\$100
Plumbing – water and septic	\$800-\$1500
Electrical – Connect Electrical panel to Main	\$800-\$1500
Provide and install tankless boiler	\$1000-\$1500
Supply and install heating and cooling utilities	\$3K-\$8K
Patch drywall at any transport cracks	\$200-\$500
Provide and install railings	varies
Install exterior and interior surface mounted lights	\$50-\$200
Hang mirrors in bathroom	~\$100
Provide and install wood stove	~\$3800
Install exterior overhang brackets	~\$600
Seam EPDM roofing membrane	\$200-\$1000
Finish any vent boots through EPDM membrane	\$100-\$500
Additional interior painting	varies
Install custom doorbell and house numbers	~\$75
Gutters (optional)	~\$10/lin.ft.
General Contractor Fee	varies

what else can I get?

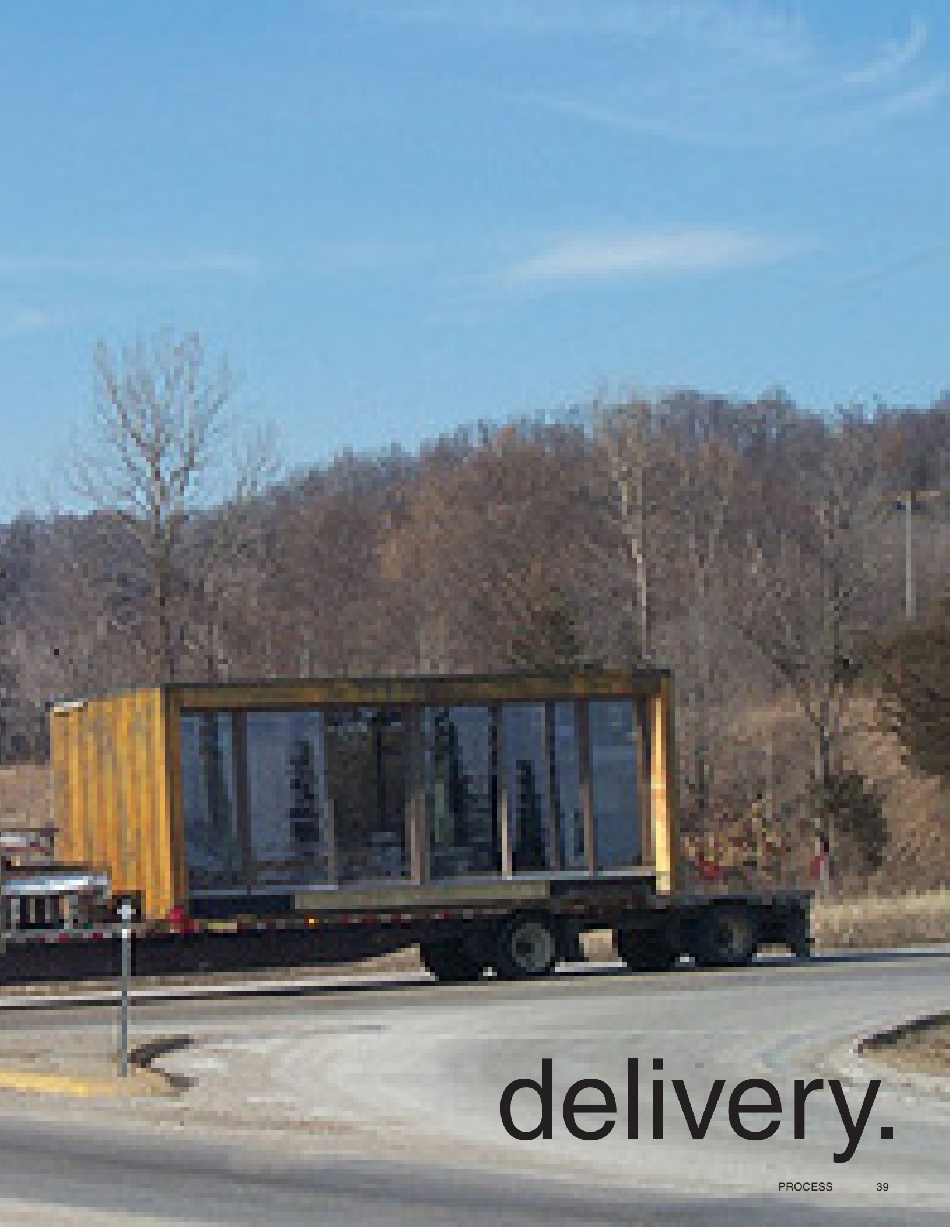
Subcontracting

Additional Design Services

Options/Upgrades

Garages	\$25K-\$50K
Carport	\$7K-\$12K
Driveway	\$6 PSF
Landscaping: Fences, Retaining walls, Pools	varies
Solar Electric	\$10/watt
Solar Hot Water	varies
Green Roof	varies
Grey water recovery / Irrigation system	varies
Geothermal Heat system	\$30K-\$40K





delivery.



One truckload is approximately 62' of module, so combinations of modules that add up to 62' and less will save on shipping expenses. The standard widths are 14' to deal with roadway requirements. Modified weeHouse modules can be made up to 16' wide. weeHouse modules can be placed side x side for wider homes.



Transportation from the factory runs approx. \$7-9 per truck/per mile; typically this includes various over-the-road fees and permits. Prices may vary due to the fluctuations in fuel prices and highway surcharges.



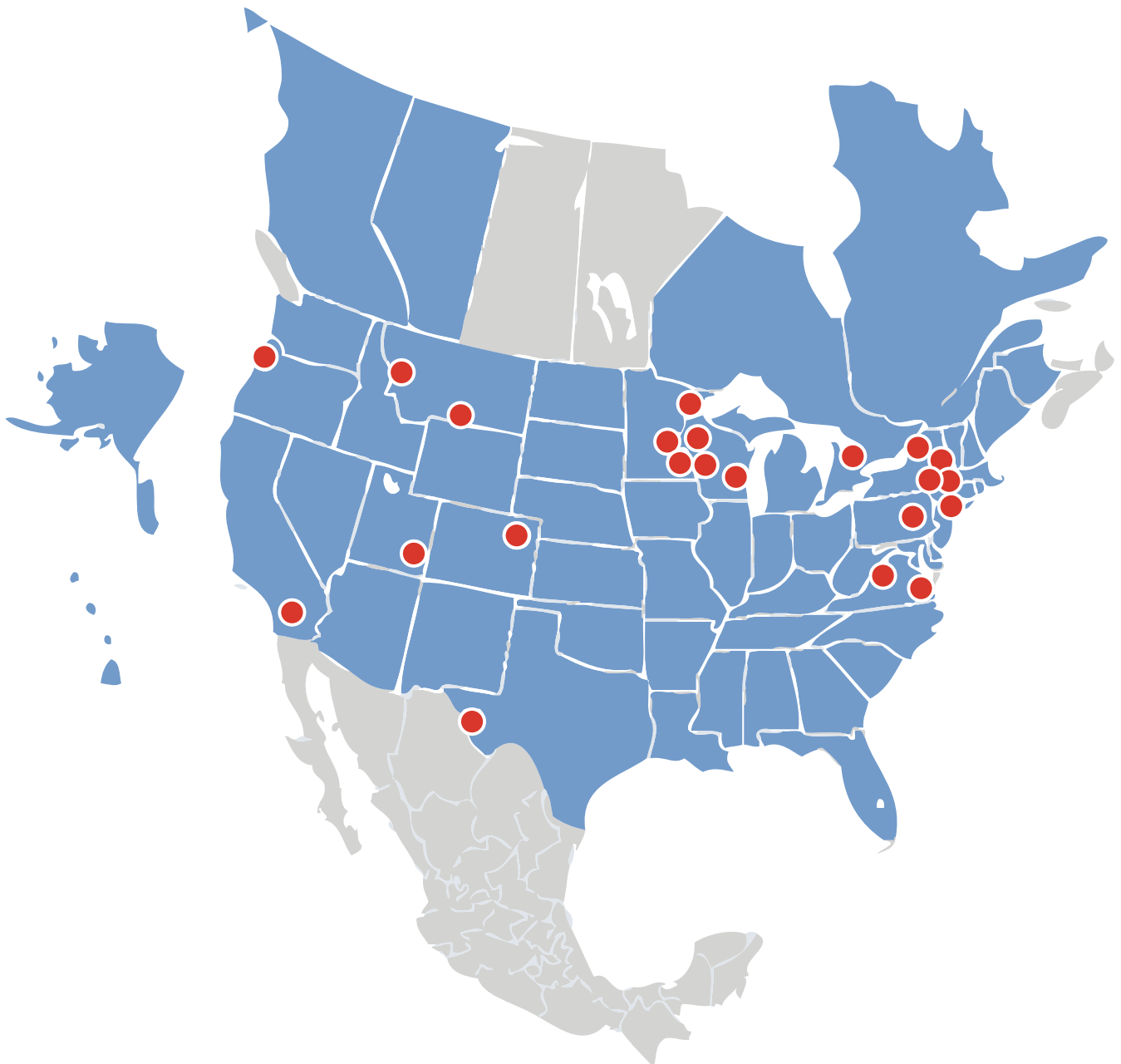
Modules weigh roughly 600 pounds per lineal foot. The ground must be firm enough to support the weight of the loaded crane and there must be adequate area for the crane's stabilizations arms.



weeHouses can be delivered to every state, including Hawaii and Alaska. Some states including Texas and Oklahoma have guidelines that create more up-front permitting work (thus cost) to get a modular home permitted.

Alaska and Hawaii: There are additional shipping fees, and also land transportation fees as with a continental weeHouse. Shipping is by volume, but previous quotes have ranged from \$12K - \$20K per module.

- Area of Delivery
- Existing weeHouses





what's included in the price?

Shipping

Carrier Charge
Pilot Cars
State Seals
Road Permit

what else do I need to pay for?

Fees

Contractor Coordination; on-site and preliminary (as needed)
Factory Visit Inspection (travel and accommodations)
Set Day (travel and accommodations)

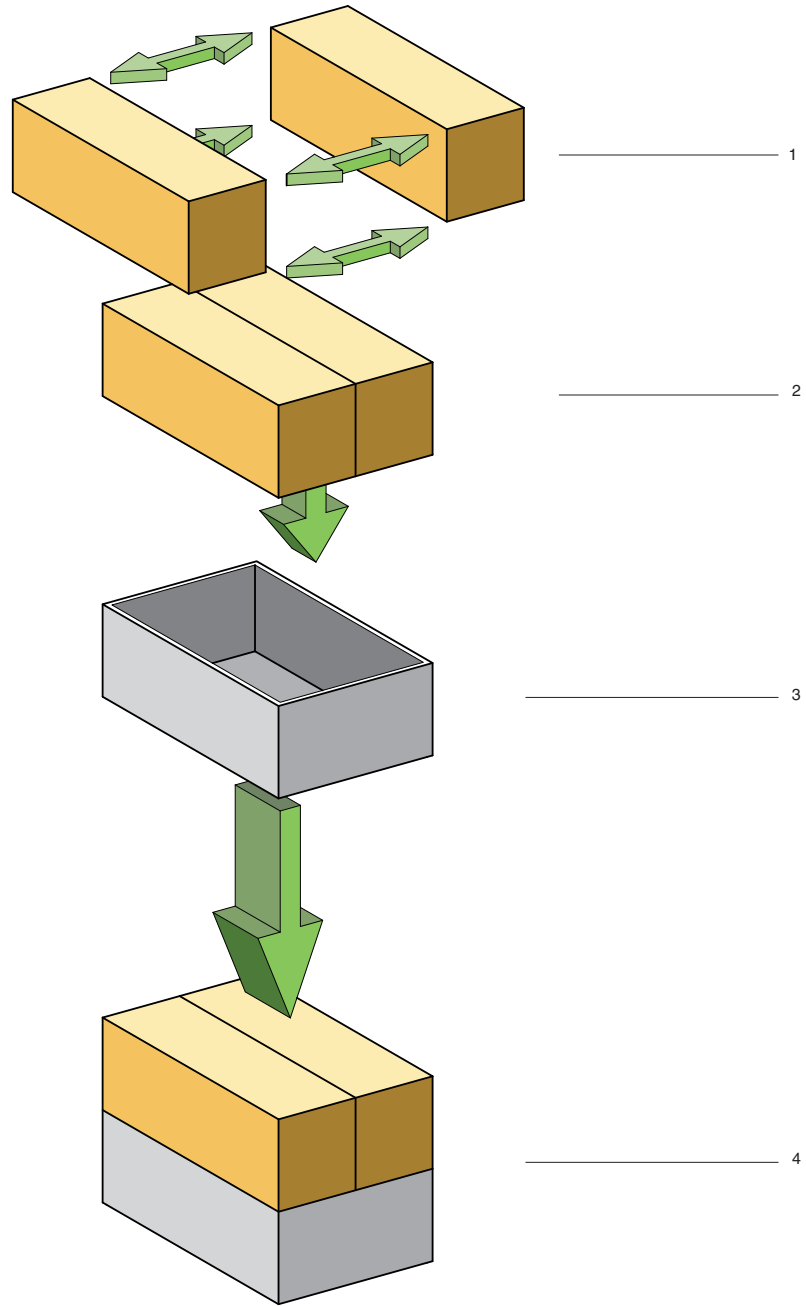
Shipping

Freight: Trucking Charge MILES X \$8.00





assembly.

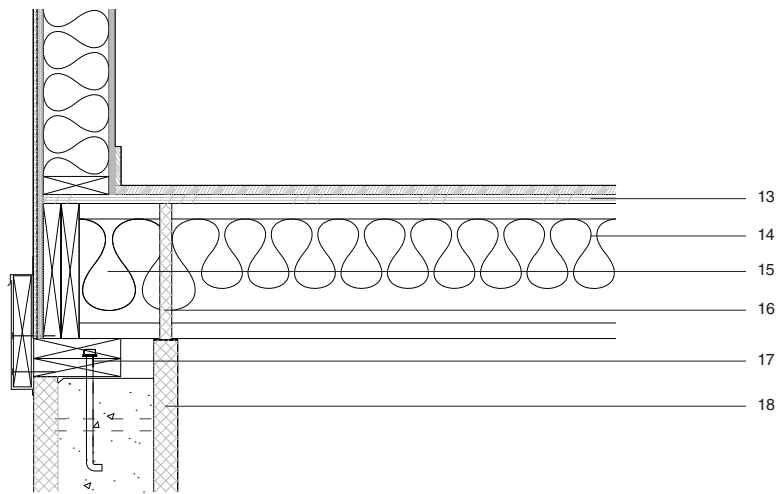
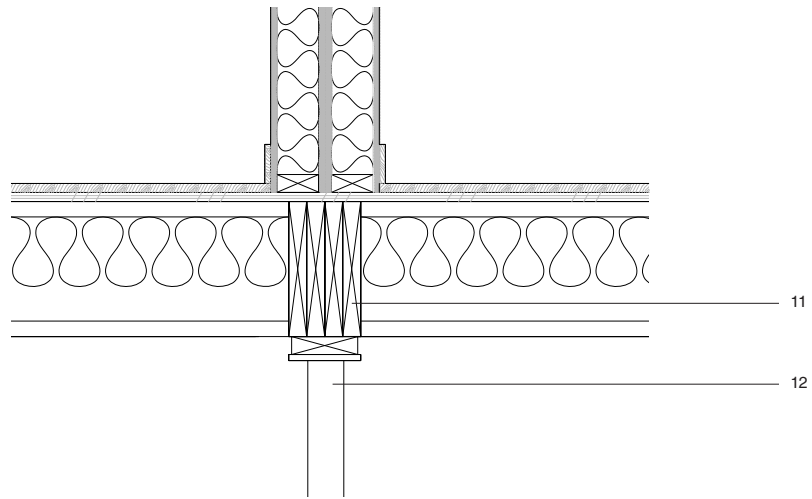
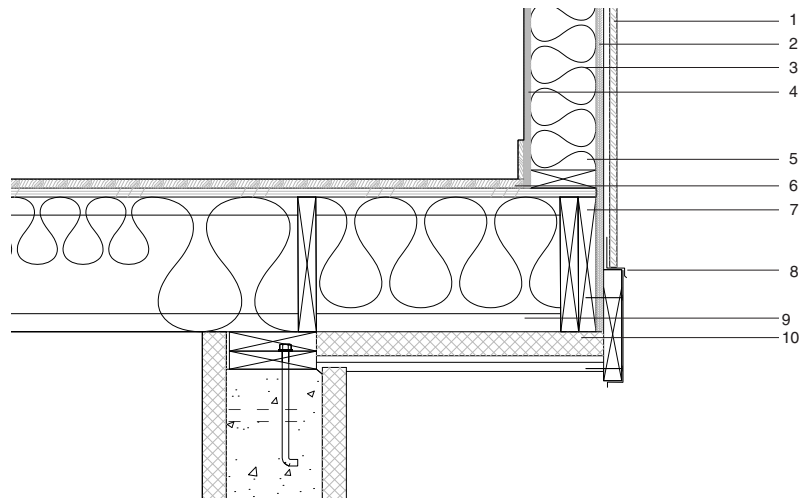


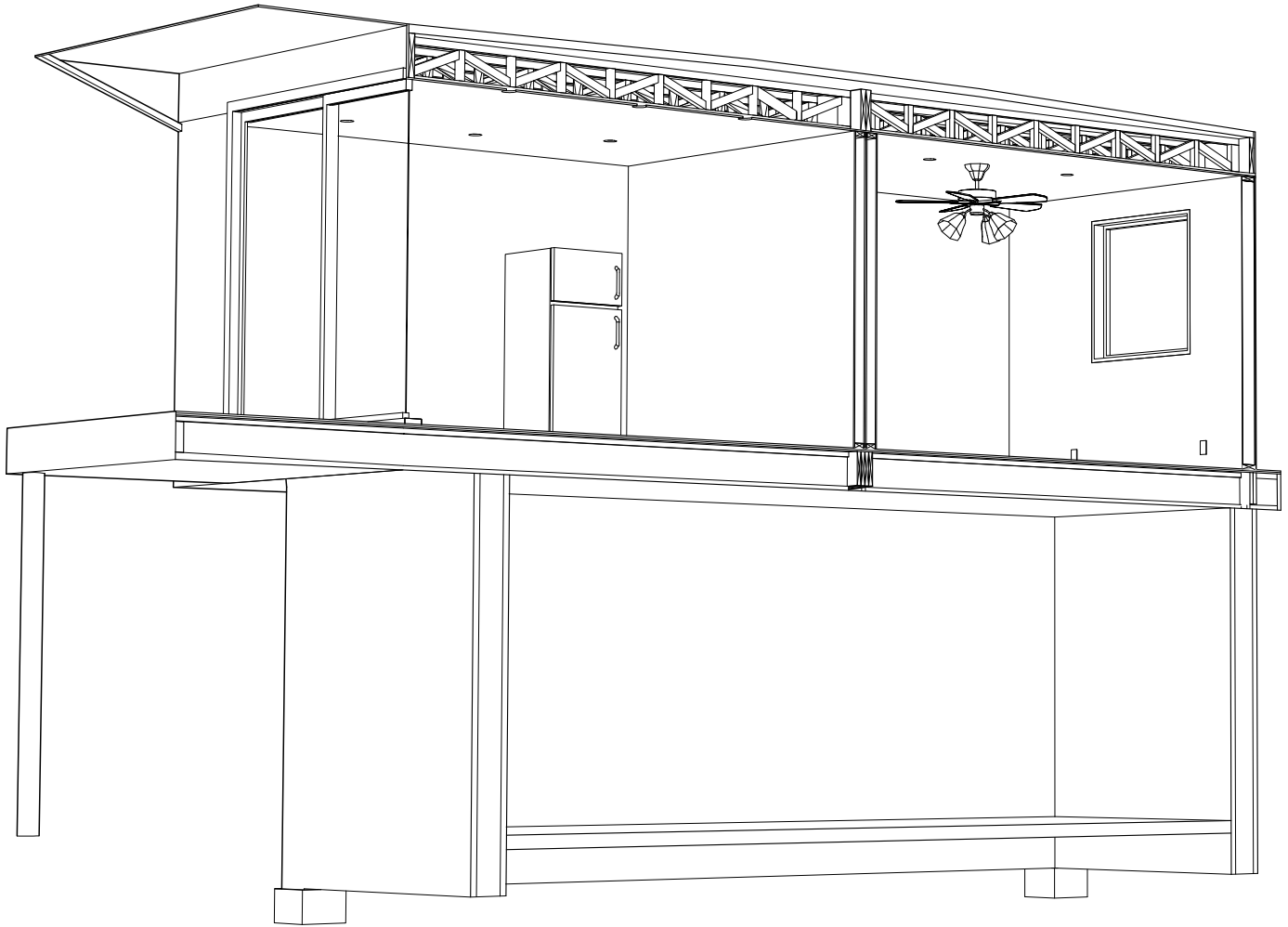
- 1 The customized weeHouse is built in modular trailer-like units. These units are constructed individually in an environment controlled facility.

- 2 Once they have been built, they are transported onto the site. These units are built to fit in together to create a weeHouse.

- 3 During the construction of the modular units, a crew on-site prepares the foundation. By the time the modular units are ready, so is the foundation.

- 4 Once on the site, the weeHouse is placed onto the foundation. With some touching up, a weeHouse is born.





1. CORRUGATED METAL SHEETS WITH WEATHER WRAP
2. 1/2" OSB
3. R-19 BATT INSULATION
4. 1/2" GYPSUM BOARD
5. 2X6 WOOD FRAME CONSTRUCTION
6. 3/4" BAMBOO FINISHED FLOOR
7. 2X12 DOUBLE RIM JOIST
8. FLASHING
9. 12" WEB JOIST
10. 2" RIGID INSULATION
11. DOUBLE RIM JOIST CONTINUOUS TOP AND BOTTOM
12. 3" LALLY COLUMN
13. 3/4" TONGUE AND GROOVE OSB GLUED AND SCREWED TO JOISTS
14. R=19 BATT INSULATION
15. R=30 INSULATION
16. RIM JOIST RIGID INSULATION
17. SILL GASKET WITH ANCHOR BOLTS
18. 12" IFC FOUNDATION WALL

Concept II Flush Ceiling Fan

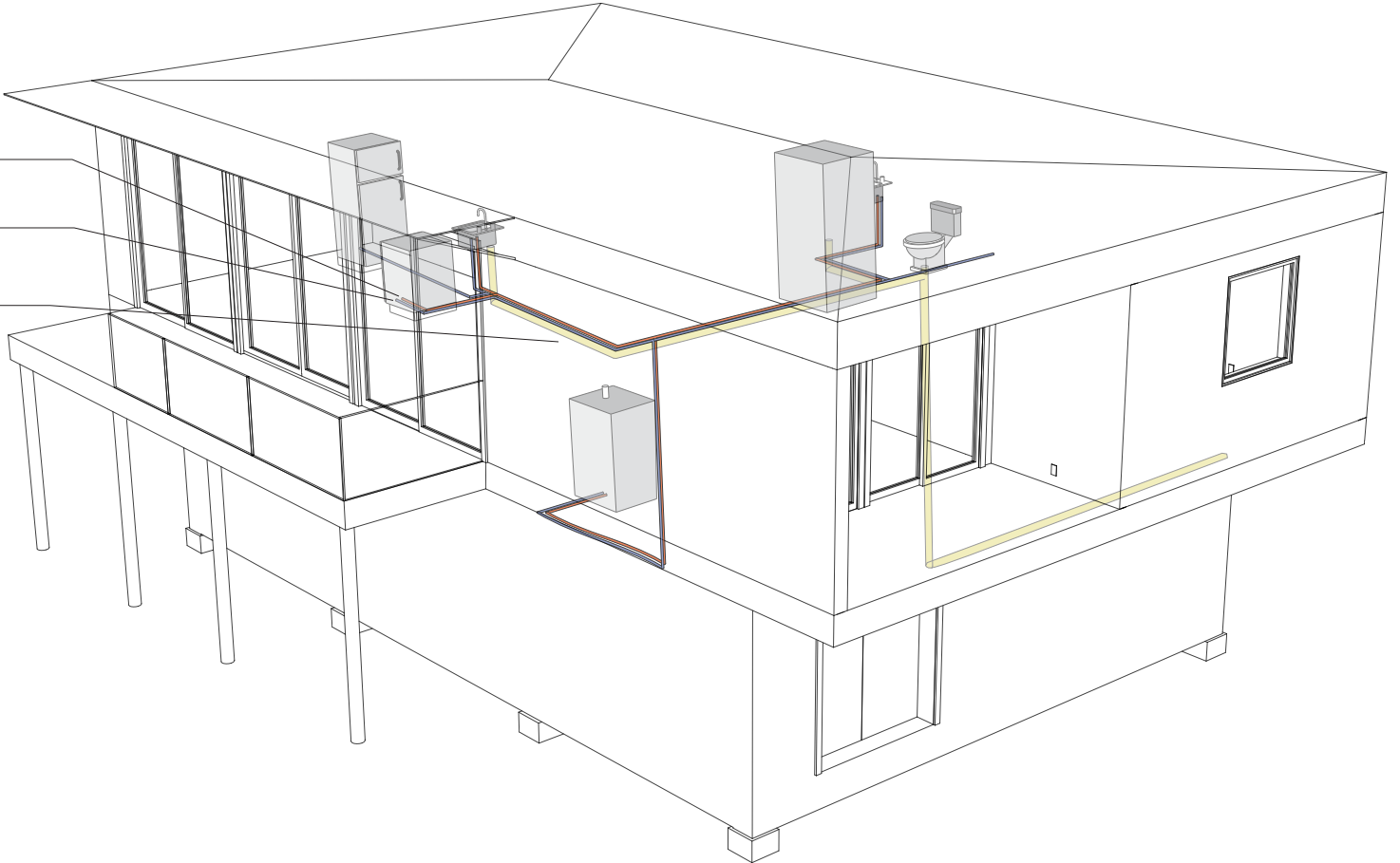
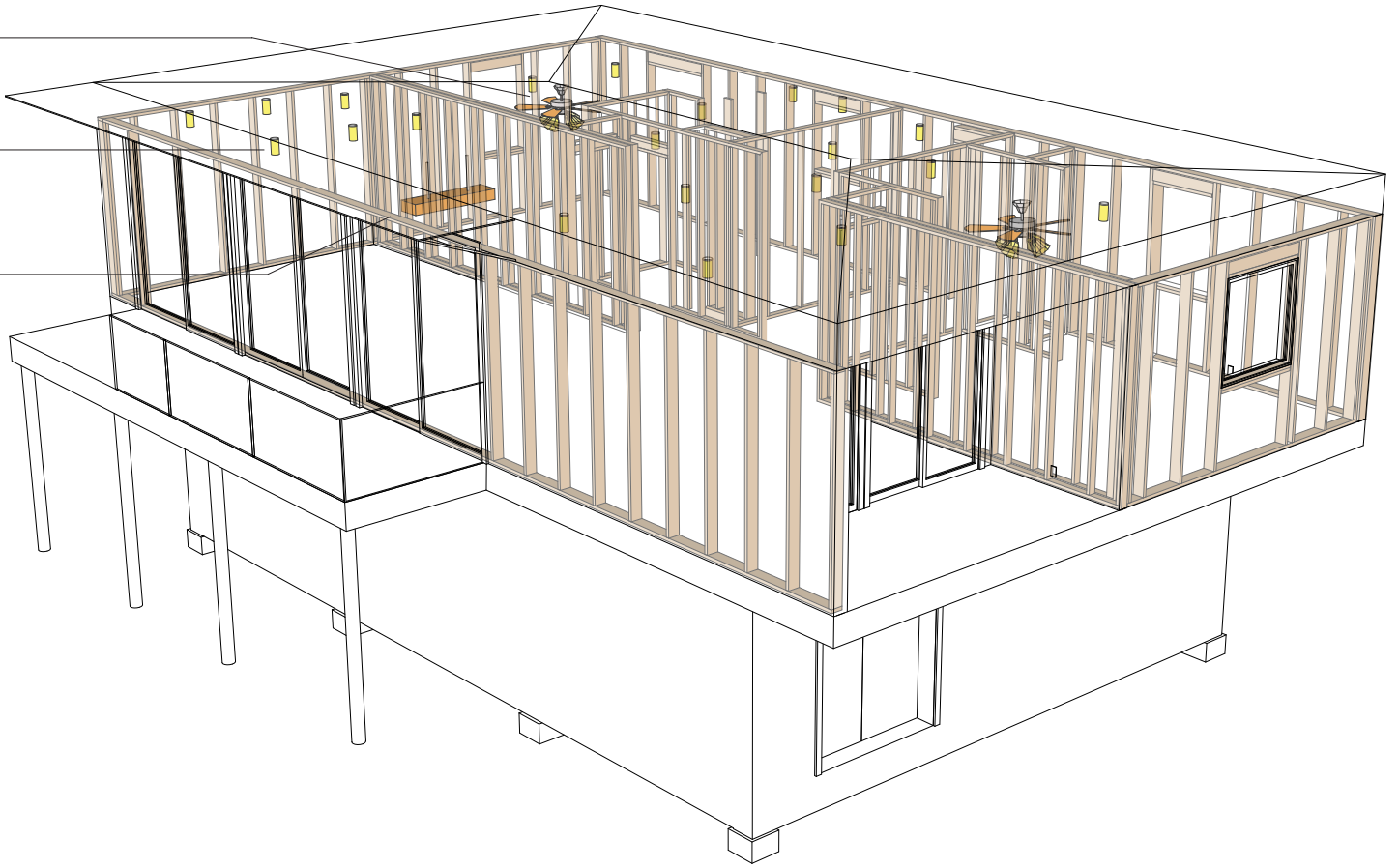
4 1/2" Recessed Can Lighting

Kitchen light (Provided by owner)

1/2" Copper Pipe for Hot Water

1/2" Copper Pipe for Cold Water

2" Pipes for Waste Water





what else do I need to pay for?

Fees

Contractor Coordination; on-site and preliminary (as needed)
 Factory Visit Inspection (travel and accommodations)
 Set Day (travel and accommodations)

Button-Up

Exterior siding patch at module seams	~\$500
Check and adjust interior doors and casings and trim	~\$100
Plumbing – water and septic	\$800-\$1500
Electrical – Connect Electrical panel to Main	\$800-\$1500
Provide and install tankless boiler	\$1000-\$1500
Supply and install heating and cooling utilities	\$3000-\$8000
Patch drywall at any transport cracks	\$200-\$500
Provide and install railings	varies
Install exterior and interior surface mounted lights	\$50-\$200
Hang mirrors in bathroom	~\$100
Provide and install wood stove	~\$3800
Install exterior overhang brackets	~\$600
Seam EPDM roofing membrane	\$200-\$1000
Finish any vent boots through EPDM membrane	\$100-\$500
Additional interior painting	varies
Install custom doorbell and house numbers	~\$75
Gutters (optional)	~\$10/lin.ft.
General Contractor Fee	varies

weeHouse

1	INTRODUCTION & OVERVIEW
2	PROCESS
3	FINISHED PRODUCT
4	CONCLUSION

Desutter Residence Moab, UT

Geography

Moab is tucked away in the heart of the beautiful red rock canyon country of southeastern Utah. Moab is characterized by the nature that surrounds it, including Arches and Canyonlands National Parks and the Moab Slickrock Trail. In addition, it is only miles from the Colorado River. It plays host to the thousands who visit southeastern Utah to take advantage of the area's great recreational opportunities. It is also home to 4,779 residents according to the 2000 Census.

Climate

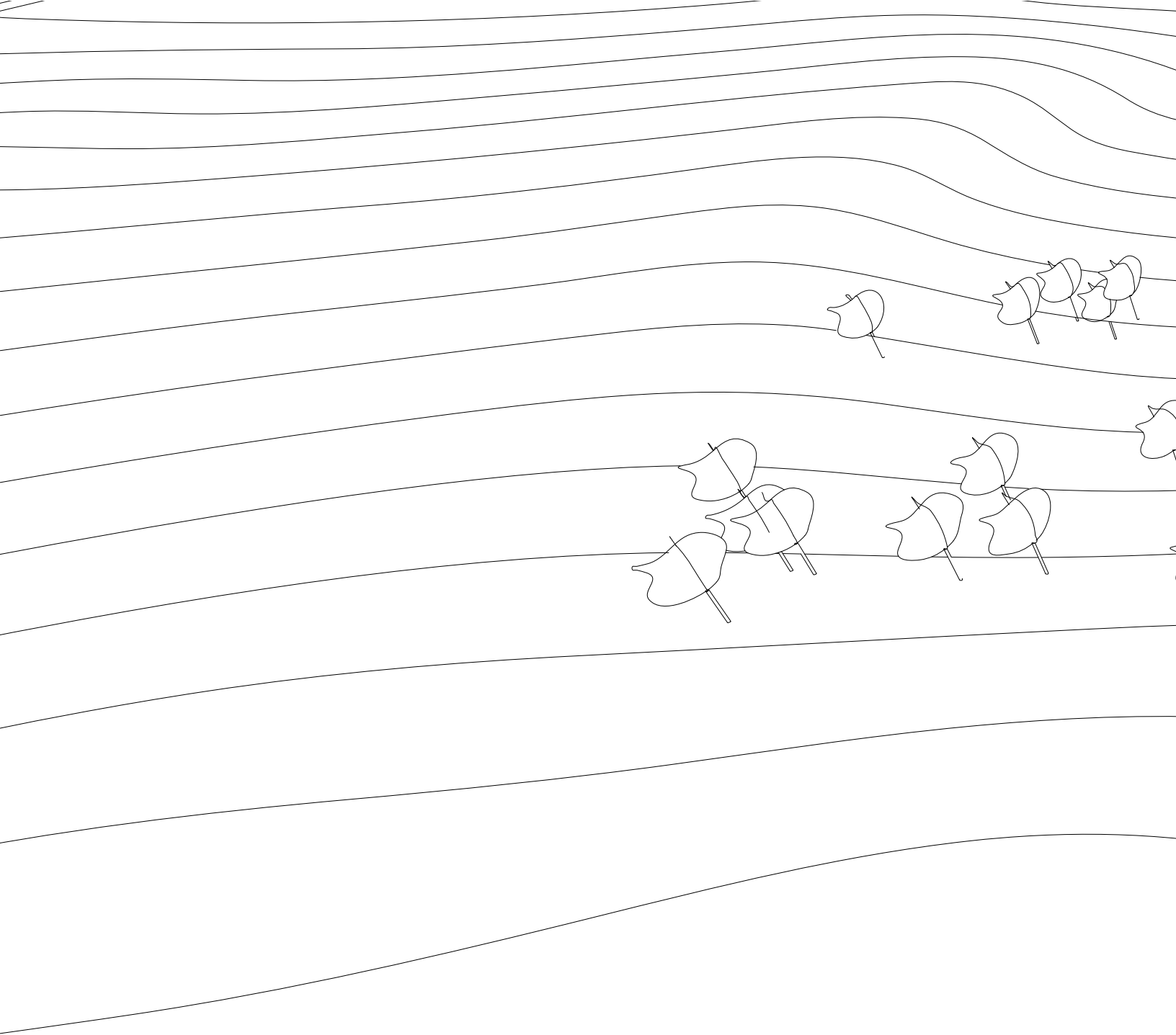
Moab has an arid climate characterized by hot summers and cool winters, with precipitation evenly spread over the year (usually less than one inch per month).

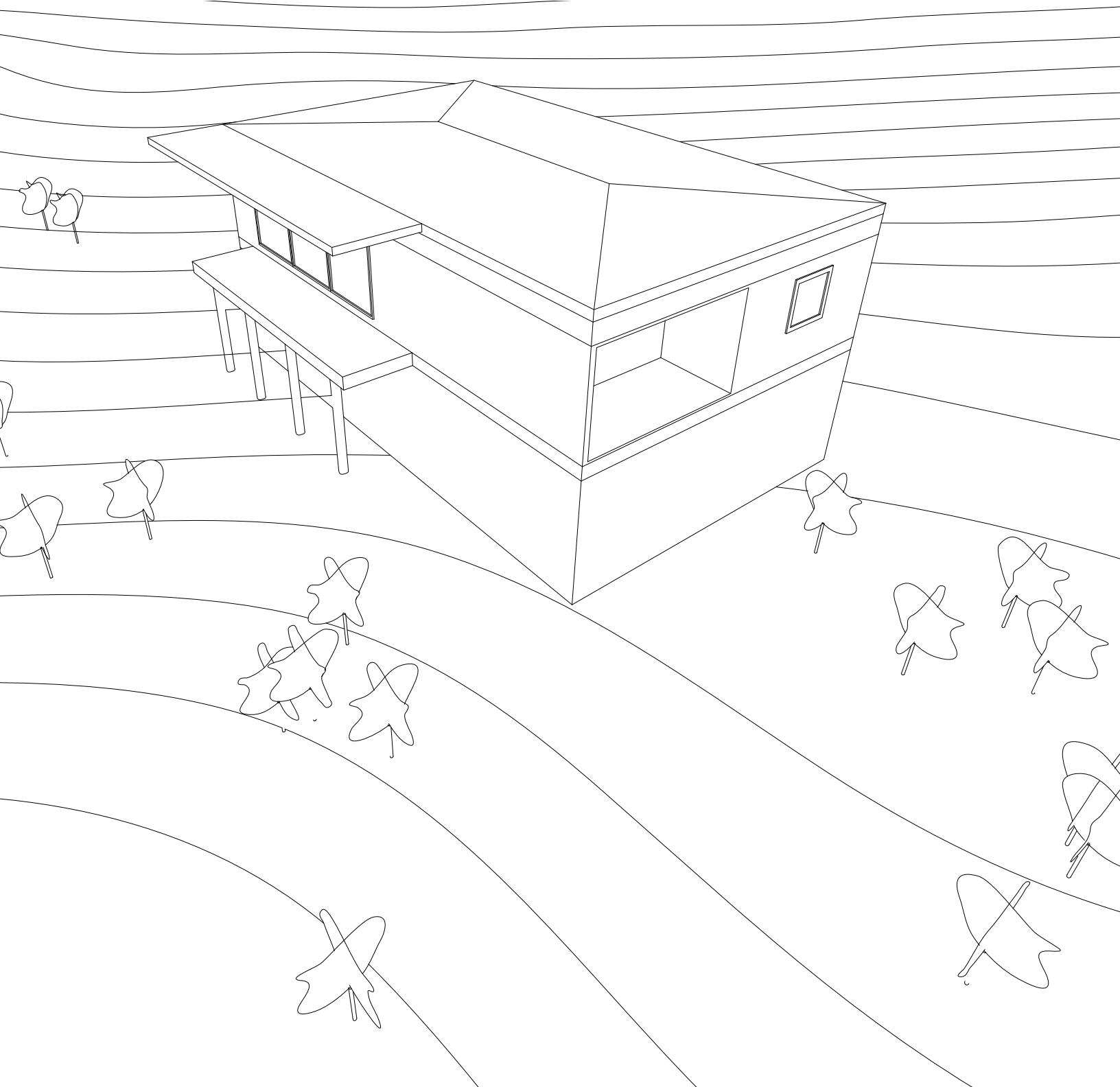
Environmental consideration

This house was designed to be "off the grid," meaning it does not get electricity because it is so far from the established infrastructure of Moab. For this reason, the house needed to employ crafty building placement and include a number of environmental upgrades, including solar panels and a rain water collection tank.

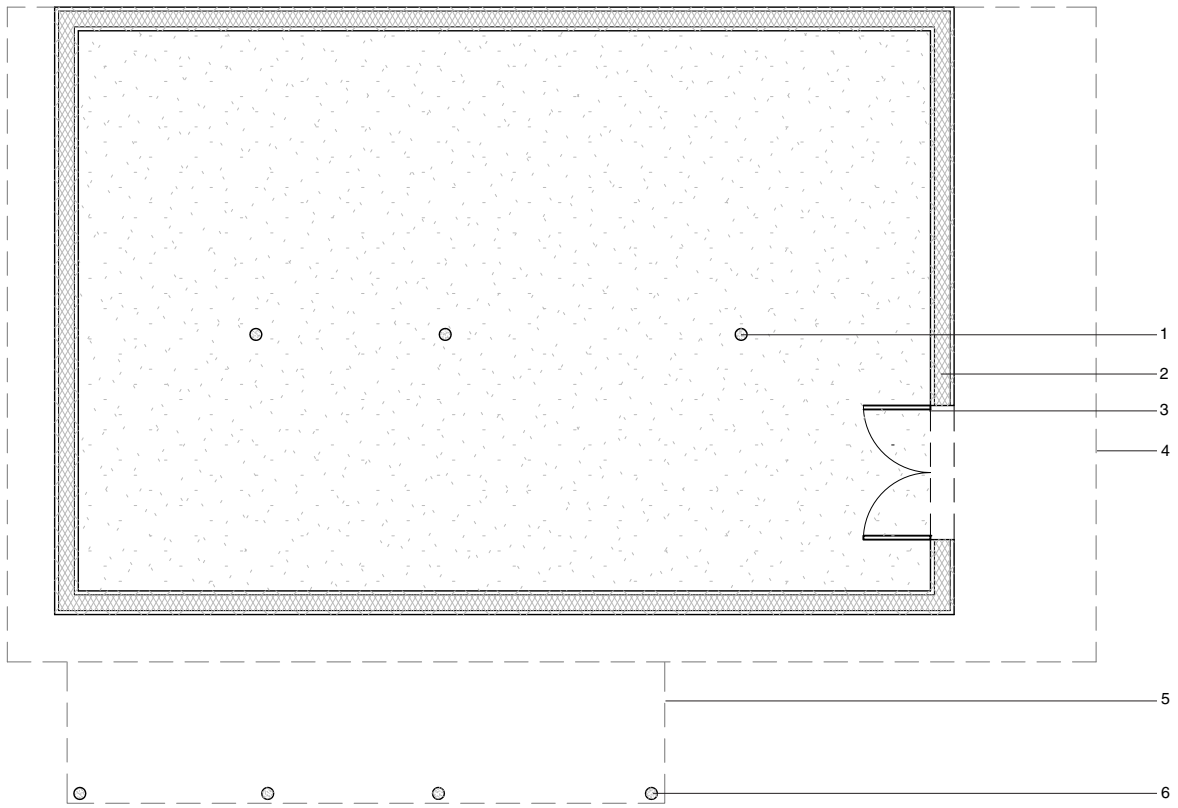








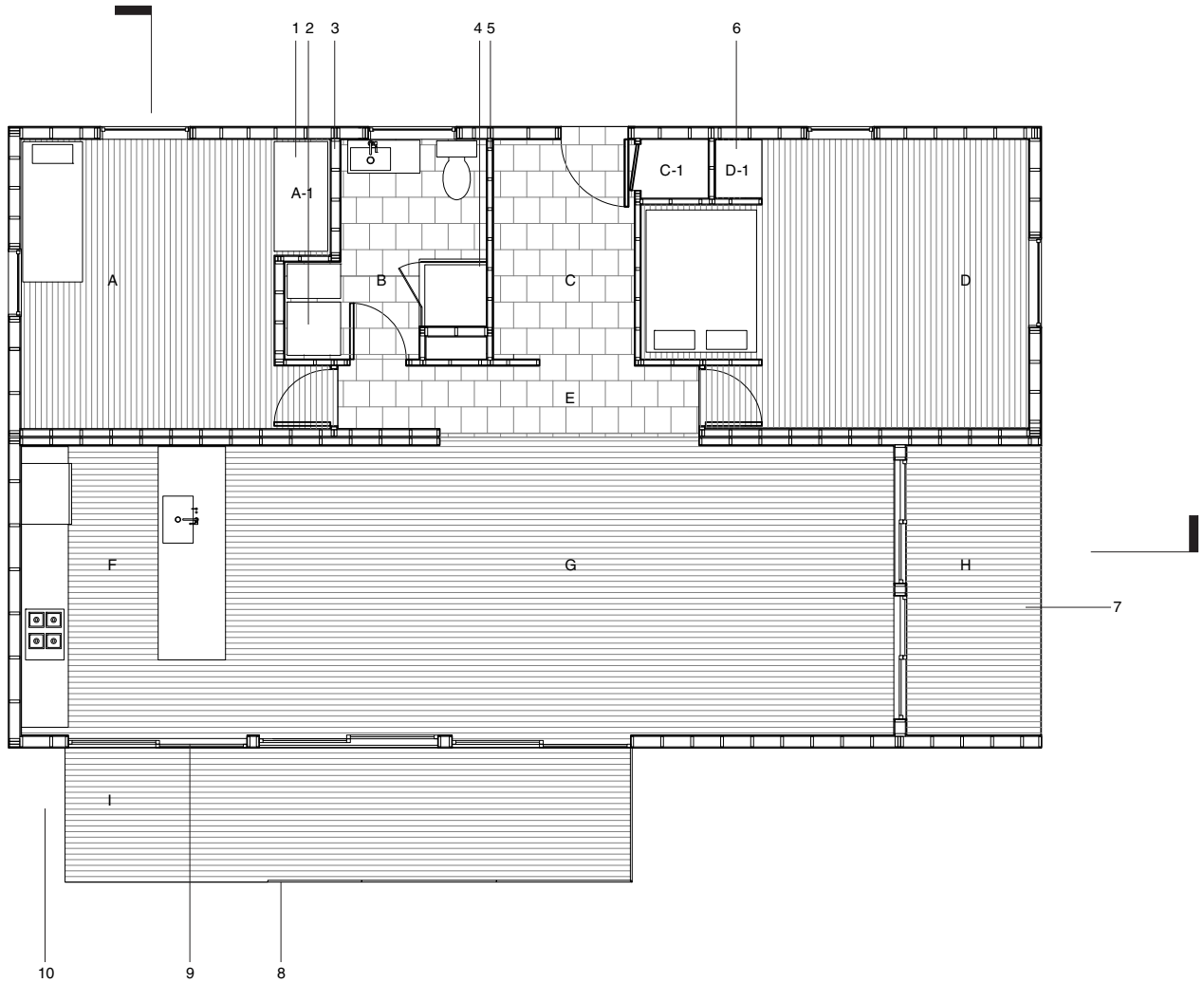
FINISHED PRODUCT



1 PLAN: GROUND FLOOR
1/8"=1'0"

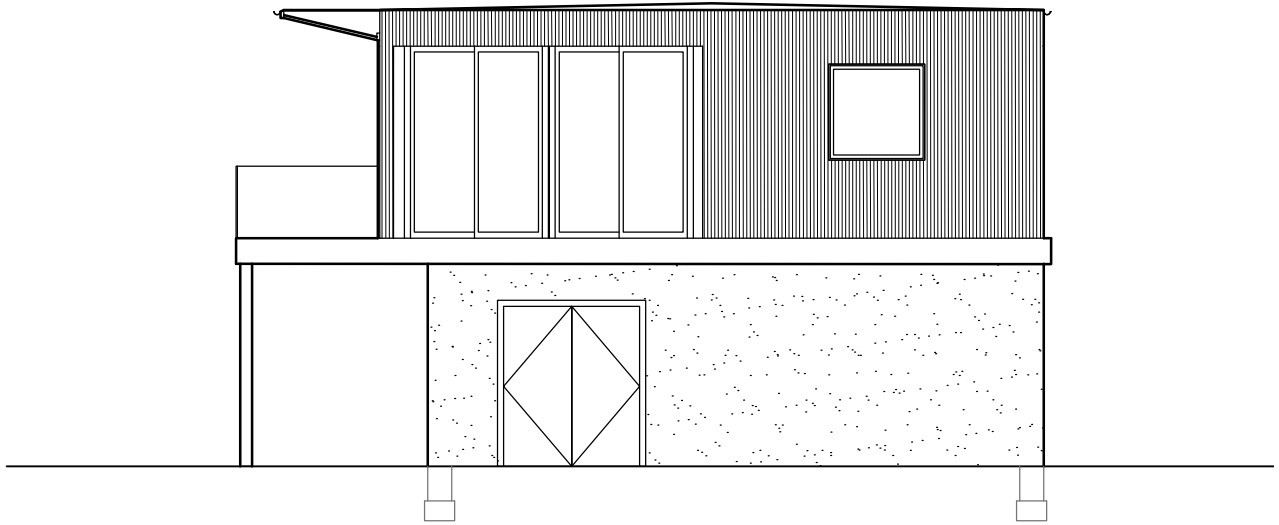
1. STEEL LALLY COLUMNS
2. 12" ICF FOUNDATION WALL
3. 72" X 80" STEEL ACCESS DOOR
4. CANTILEVER ABOVE
5. TREATED WOOD FRAME DECK
6. TREATED WOOD COLUMNS



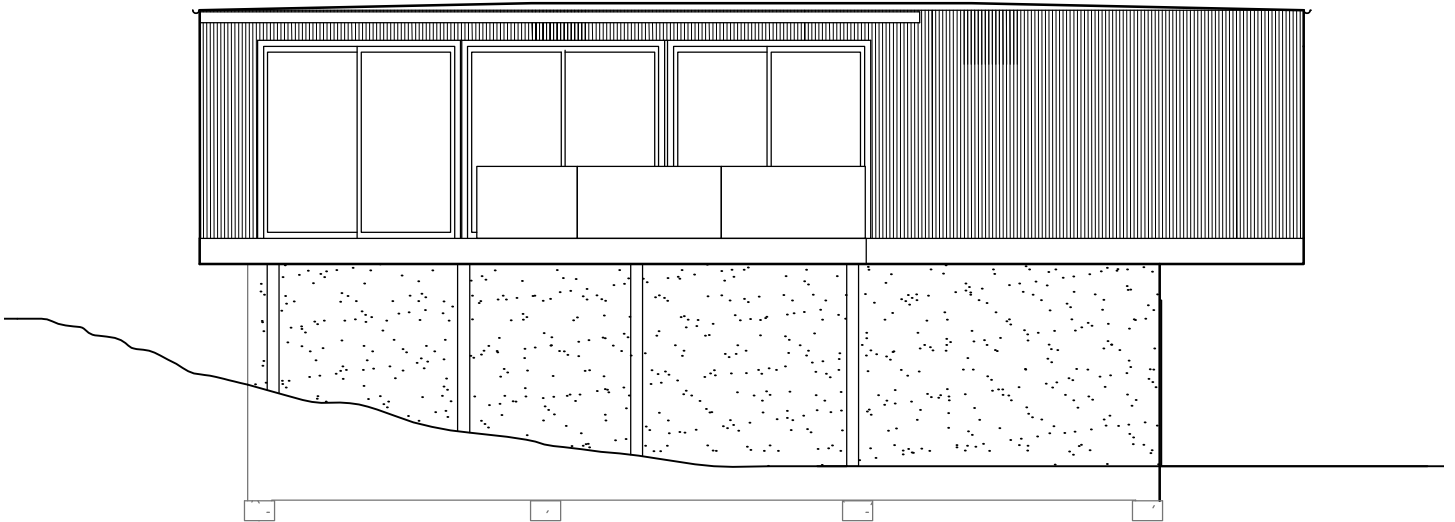


2 PLAN: FIRST FLOOR
1/8"=1'0"

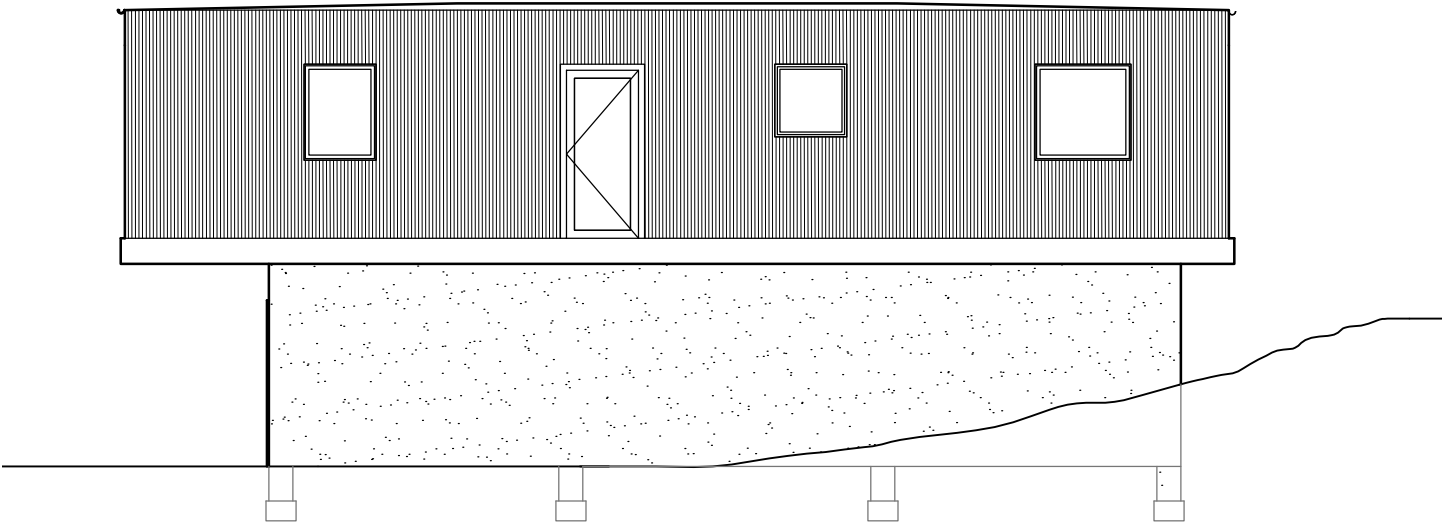
- | | |
|--|-----------------------------|
| 1. MILLWORK CLOSET | A. BEDROOM 1, 153 sq. ft. |
| 2. WASHER/DRYER UNITS | A-1. CLOSET, 13 sq. ft. |
| 3. 5 1/2" STUD WALL | B. BATHROOM, 70 sq. ft. |
| 4. 3' x 3' SHOWER TRAY | C. VESTIBULE, 108 sq. ft. |
| 5. 3 1/2" STUD WALL | C-1. CLOSET, 8 sq. ft. |
| 6. MILL WORK CLOSET | D. BEDROOM 2, 195 sq. ft. |
| 7. 5/4" IPE DECKING OVER 2X
TREATED STRUCTURE | D-1. CLOSET, 5.5 sq. ft. |
| 8. RAIL FOR DECK | E. HALL, 46 sq. ft. |
| 9. 32" X 81" GLASS SLIDING DOORS | F. KITCHEN, 91 sq. ft. |
| 10. STEPS FROM DECK TO GRADE | G. LIVING ROOM, 385 sq. ft. |
| | H. PORCH, 77 sq. ft. |
| | I. DECK, 151 sq. ft. |



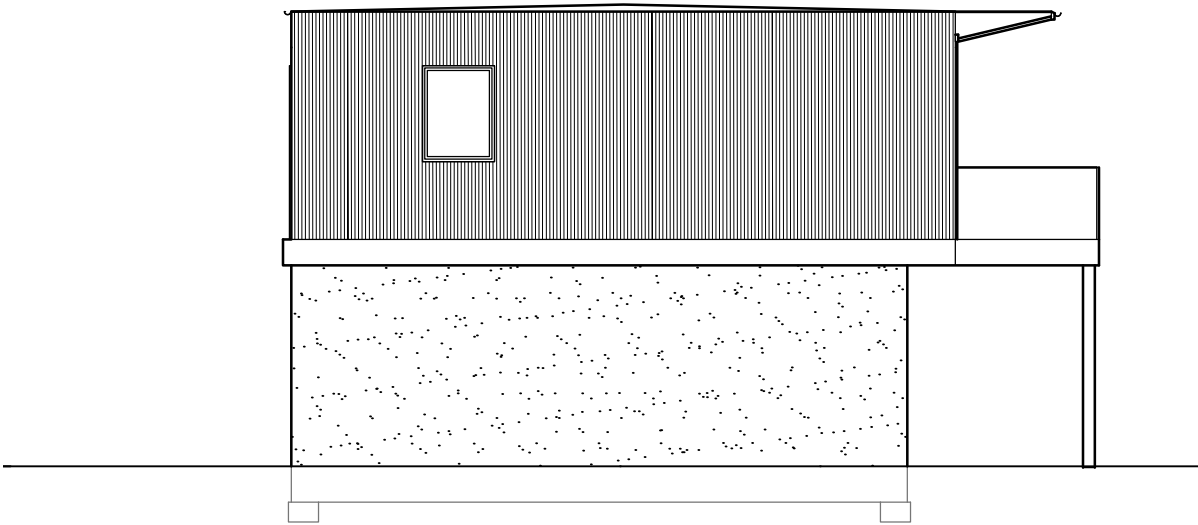
1 ELEVATION: EAST
1/8"=1'0"



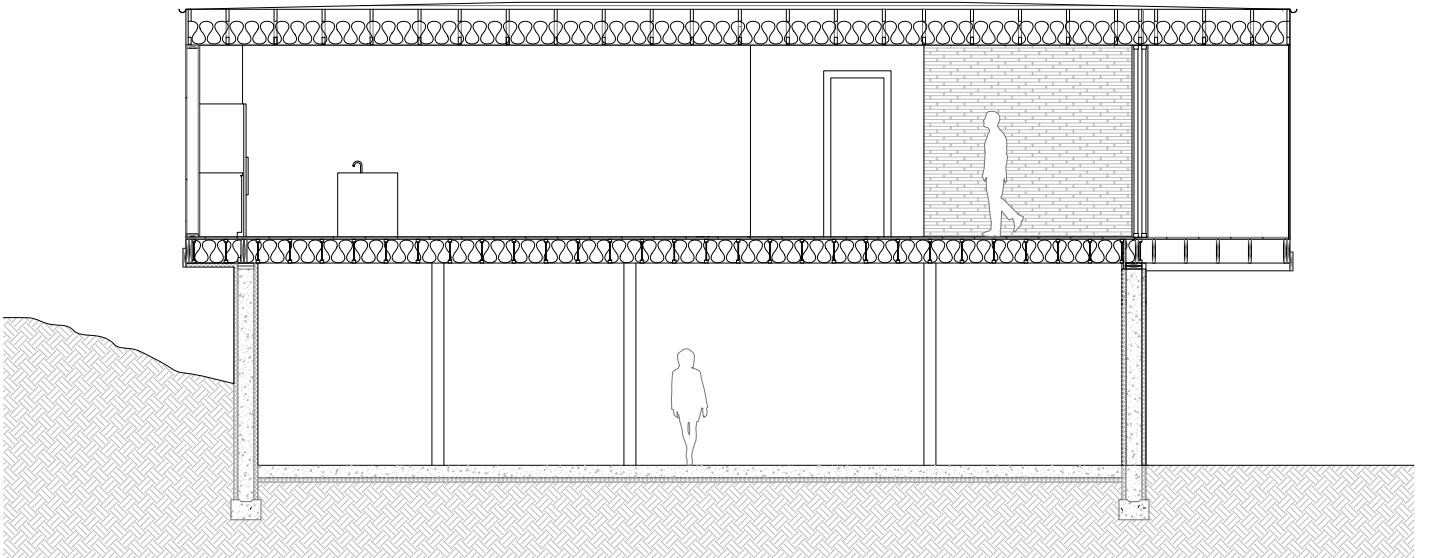
3 ELEVATION: SOUTH
1/8"=1'0"



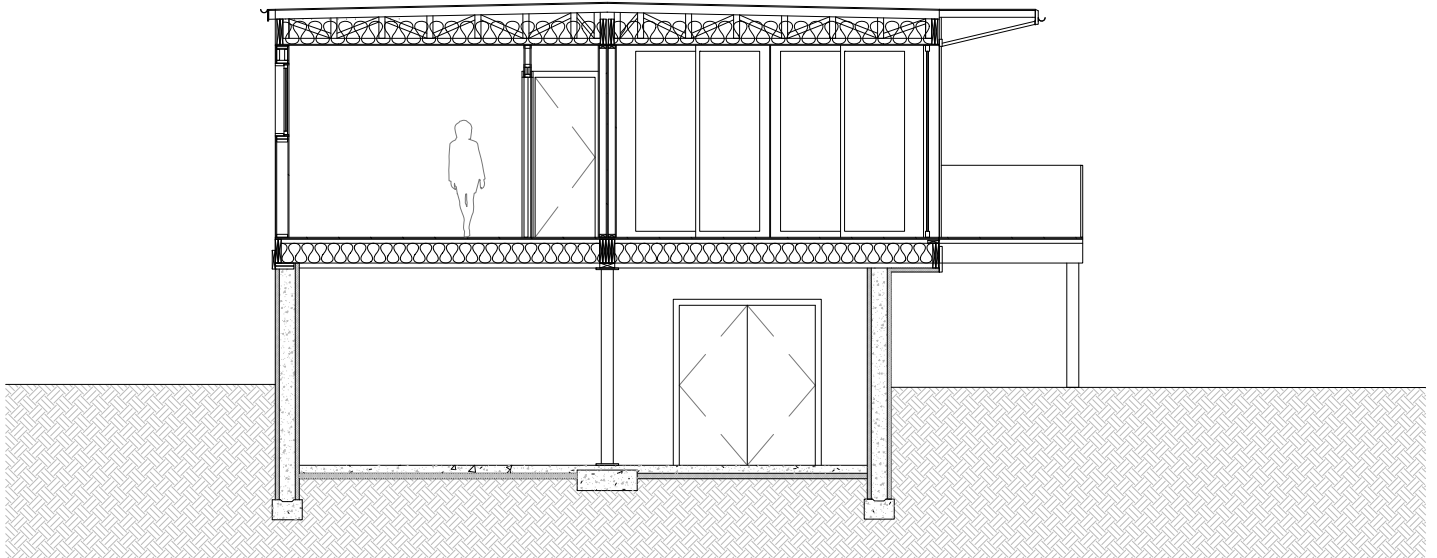
2 ELEVATION: NORTH
1/8"=1'0"



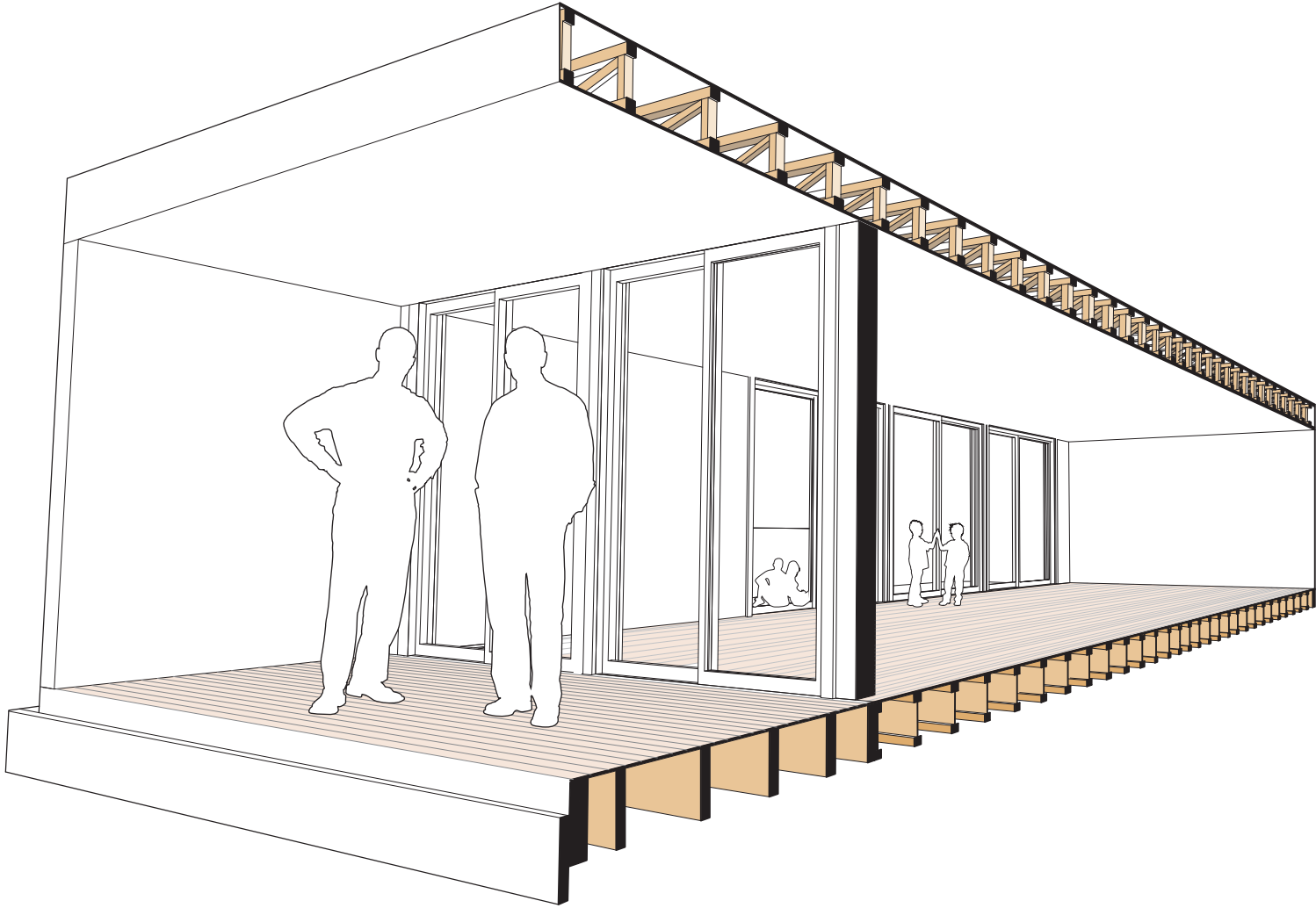
4 ELEVATION: WEST
1/8"=1'0"



3 SECTION
1/8"=1'0"



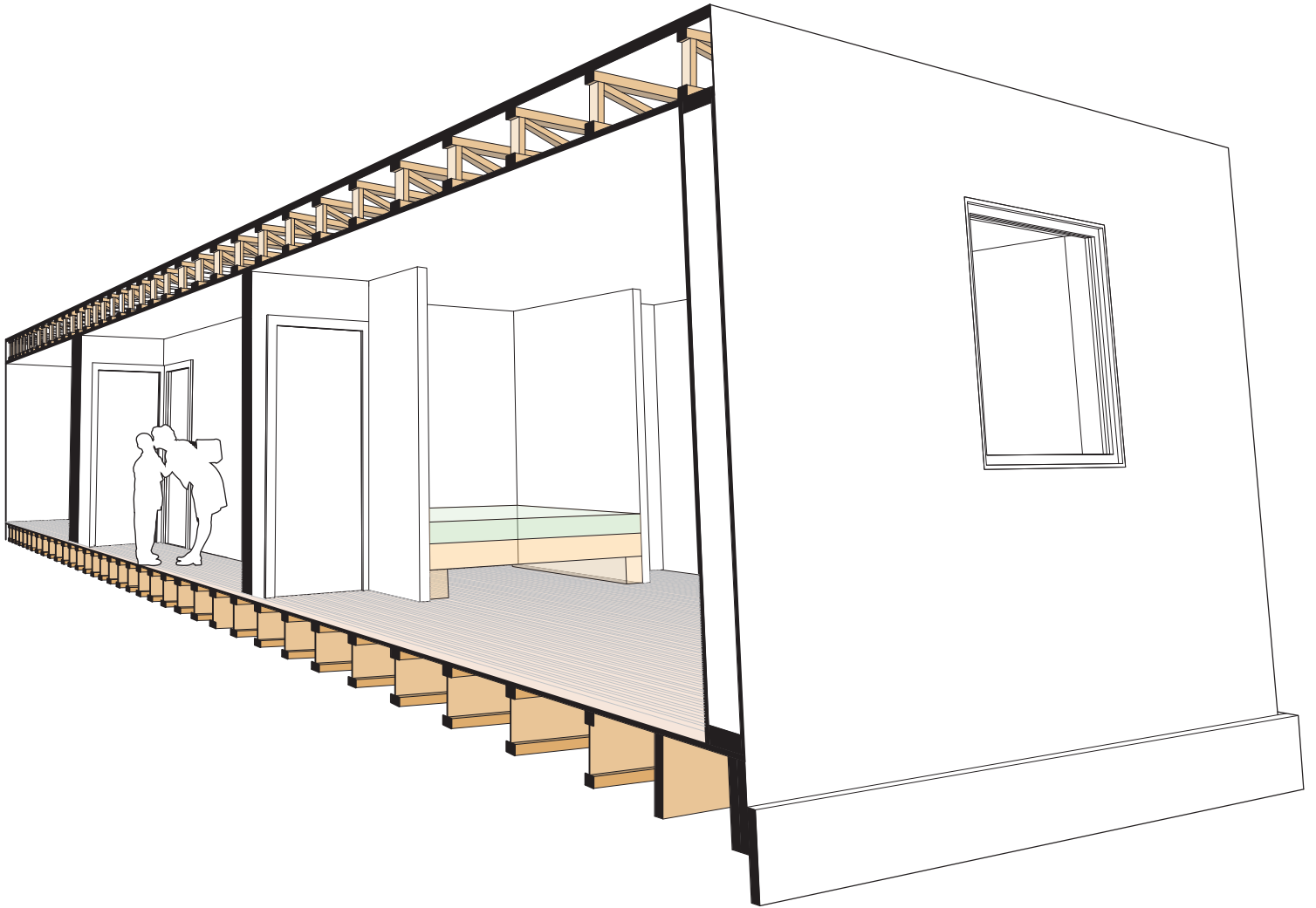
4 SECTION
1/8"=1'0"



MODULE 1:

FLEXIBLE SPACE

ENTERTAINMENT. FAMILY. VIEW.

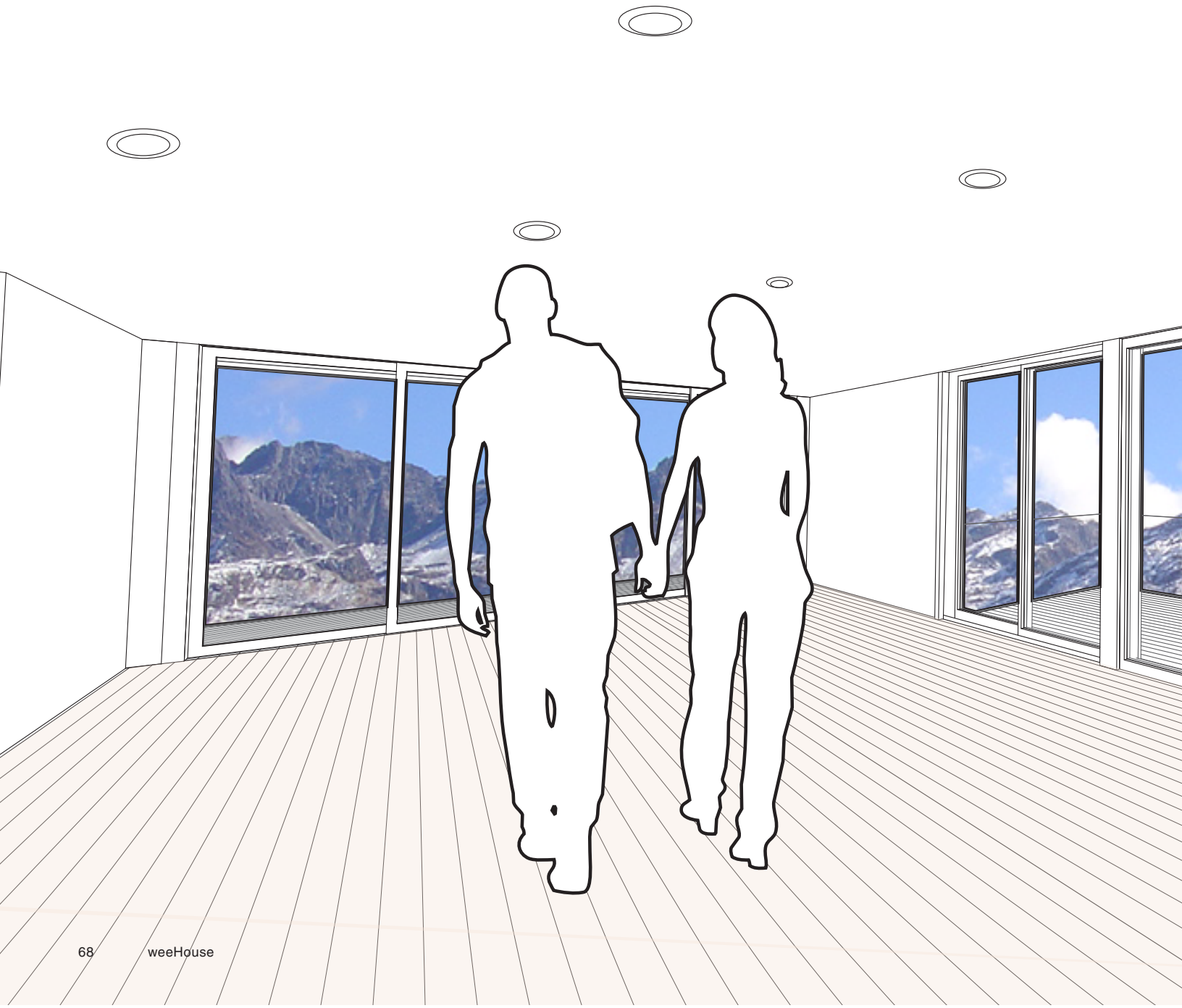


MODULE 2:

PRIVATE SPACE

REST. UTILITY. ALONE. PRIVATE.

One of Alchemy Architects greatest strengths with the weeHouse is their ability to situate it in the given site to maximize scenic views and take advantage of the natural conditions forces of the site. Because of its modularity, all of the fixtures in the weeHouse are standard units. This gies birth to glazed facades like the one below that are broken into three parts- each being a standard size and unit.





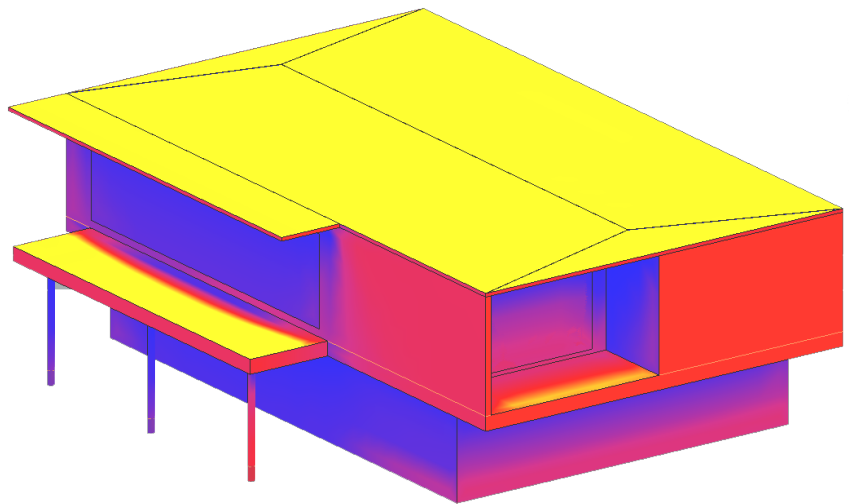
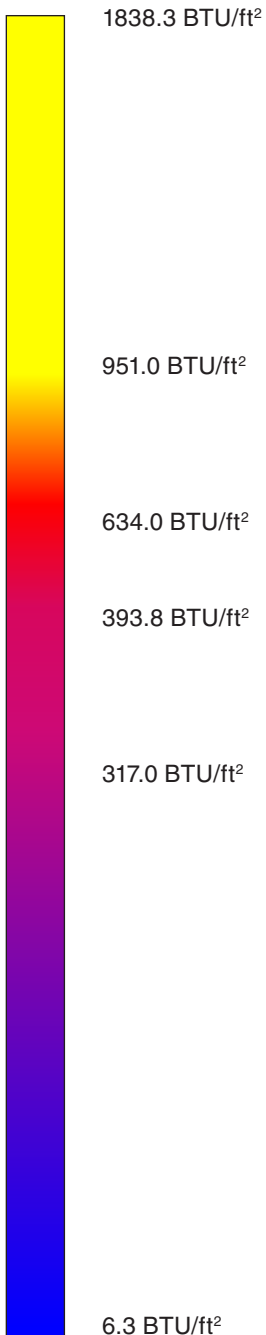
an inside look.



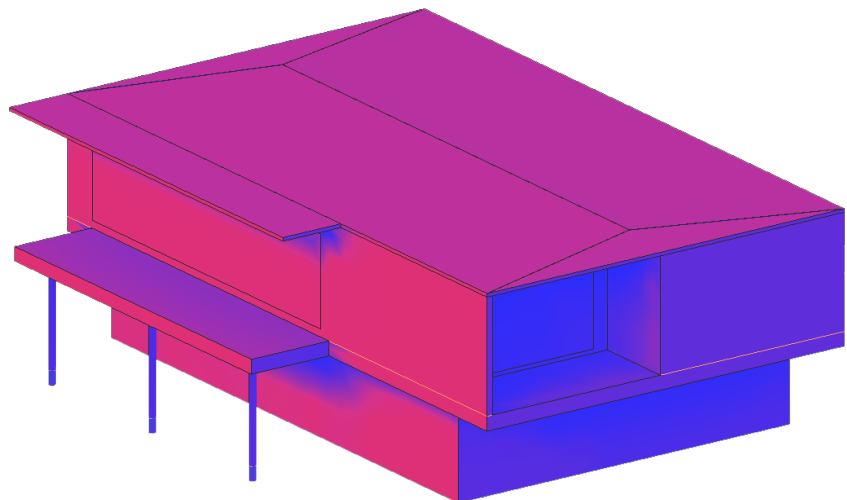
1. KITCHEN INTERIOR
2. BEDROOM 1 INTERIOR
3. BATHROOM INTERIOR
4. KITCHEN INTERIOR

In the summer, we can see that there is a significant heat gain on the horizontal surfaces. The Yellow surfaces represent a BTU/ft² of up to 1800 BTU/ft². In these diagrams, the colors represent how much heat/energy (BTU- British Thermal Unit) a given surface area (ft²) has received throughout the day- in this case, the day being on the summer solstice. The effectiveness of the overhang and side walls of the two porches represented is clearly represented here. The blue and purple shades show the BTU difference between its neighboring surfaces. In the large porch, there is an approximate 300 BTU/ft² difference between the shades surfaces and non-shaded surfaced.

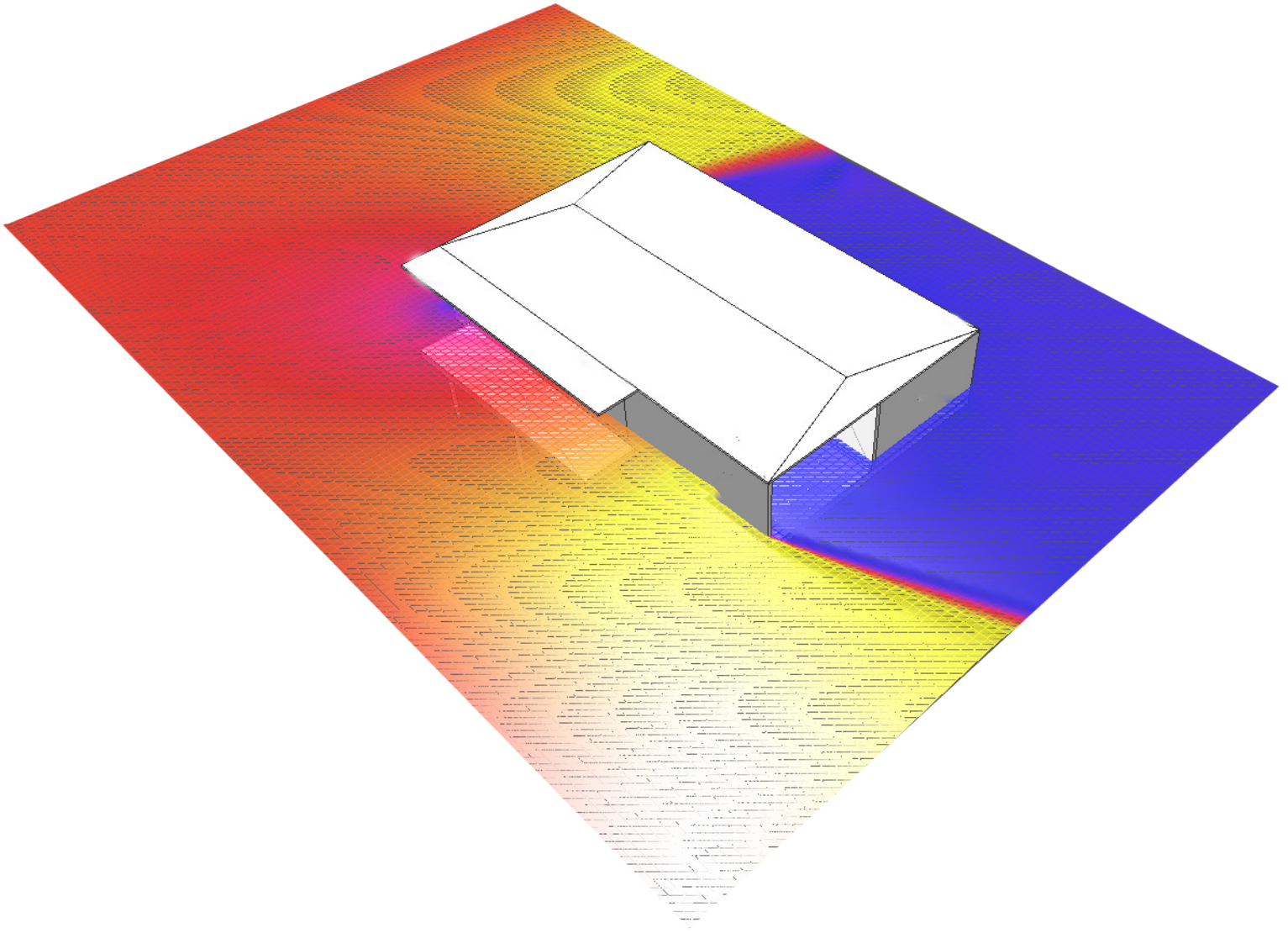
During the winter, the story is a bit different. The difference in temperature is limited to a smaller range and the low winter sun angles allow the previously shades spaces to receive the warmth of the sun. Similar to the summer, the flat roof of the weeHouse absorbs the most heat throughout the day.



DAY AVERAGE: SUMMER SOLSTICE



DAY AVERAGE: WINTER SOLSTICE



The weeHouse is situated in a relatively flat piece of land and is elevated above the shrubbery on the site. In Mesa, Utah, the prevailing wind blows from the South-West all year around. This makes passive ventilation very advantageous and simple to take utilize of in the weeHouse. In response to the South-Western prevailing winds, the weeHouse has multiple sliding doors on the South-West facade and minimal windows on the Western facade (to reduce air-draft during the winter).

weeHouse

1	INTRODUCTION & OVERVIEW
2	CONSTRUCTION & ASSEMBLY
3	SPECIFIC CASE STUDY
4	CONCLUSION

the weeHouse

After evaluating the weeHouse on a variety of levels, from structural and mechanical systems, to materials, and to use of space, there are very clear advantages and disadvantages to the weeHouse. They can be summarized as follows:

Cost

When it comes to the weeHouse, you get what is advertised- a box. It is up to the client to pay for additional changes and services to make their weeHouses unique. While the base cost for a weeHouse unit is \$79,000, an average cost for a weeHouse is estimated around _____ if costs for subcontracting was the same cost as Alchemy's projection and only a few minor upgrades were made to the base model. The costs advertised by Alchemy can be far from the price actually needed to construct the houses. One of the argest factors to increase this cost is the many upgrades available to the house. Contractor fees also play a large role in determining the final cost.

Process

The truly positive aspect of the weeHouses is the process. The houses can be made at such a high speed because of the dual activities happening in order to get them built. Despite the customization opportunities which may normally slow a design process down, the weeHouses can be done quickly and effectively.

Performance

For a such a small box, the weeHouse is not as efficient as it could be. In regards to material, many changes could have be made to limit the cost. The foundation is insulated on both inside and the outside, which s wastefu; of an expensive building material. While insulation is necessary here for optimal performance, it can be reduced and be just as effective. Also, the trusses for the ceiling are wasteful as well. Alternative solutions could be used to support the roof. Alchemy's approach to environmental design can help offset these costs using passive solutions and reducing heating/cooling loads (which is a large advantage to their design approach), but measures should be taken to improve the integrity and performance of the structure itself.



weeHouse

