

# An Elemental Study in Conservation: A Ceramic Artists' Retreat on Virginia's Rappahannock River

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Master of Architecture  
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Stephanie Burcham (b.1990)  
*Plates, 2019*

Wood-fired earthenware clay



Stephanie Burcham (b.1990)  
*Cylinders*, 2019

Wood-fired earthenware clay

## An Elemental Study in Conservation: A Ceramic Artists' Retreat on Virginia's Rappahannock River

STEPHANIE BURCHAM

### Abstract

In the process of developing my thesis, I wanted to let go of the contemporary way of thinking about the relationship between architecture and sustainability, which lately tends to be through a lens of applied technology and a baseline understanding of building code that assumes the structure will be designed around an HVAC system that runs 24/7/365 and windows that will never open. I found it difficult to shed that habit, as the first sketches I produced showed massive amounts of insulation in the walls (which again, assumes that the interior air is mechanically conditioned). I thought about how long air conditioning has been a factor in culture today. Just one generation ago, young people were growing up in homes that didn't have air conditioning, or if they did, it was space-based, cooling whatever room happened to be occupied. Certainly, the generation before the previous did not live in a culture where air conditioning was an assumed part of building design. We're now spending more time huddled in our air conditioned homes, which is harmful to our health, distorting the way in which our bodies naturally acclimatize to changing weather. Air conditioning was once considered a luxury expense, and now is practically, or actually, illegal to be without.

In addition to the relationship between architecture and air, I also thought about water. Where do we get our potable water from and how? Is the way we currently collect, filter, distribute, receive, use, and dispose of water the best practice for keeping our rivers and aquifers healthy and clean? What about the way we heat our buildings? Every apartment I've lived in the city of Richmond, VA has had at least one fireplace, and they are all bricked up. My current apartment has two chimneys, one in the living room and one in the bedroom, both of which have been long forgotten when the building was hooked up to gas heat. I look around the skyline of my neighborhood and see hundreds of unused chimneys. Is that progress? Is the technology we have now to heat homes more efficient, able to provide more comfort, or better for our environment than what we had used for staying warm in the winter for thousands of years?

Lastly, I thought about the relationship between architecture and landscape, especially in regard to plants and animals with which we share our habitat. Not just the native plants and animals that happen to be around us, but also the plants and animals we choose to cultivate and raise. I also think architecture also has a place in the reconsideration of our culture's relationship with food, which is to say, our relationship with the earth, our source of food. I was adamant that the site I chose, and the way in which I created architecture on it, would have a positive impact on both the people who visit, and the local ecosystem.

In order to stay focused on my concept of what sustainability is for the future of architecture, rather than what society tells me sustainability should be, I framed my argument around the four elements: air, water, fire and earth. As I dove into developing a program and designing structure and landscape, I used these elements as a framework, my own baseline for what good, comfortable, and environmentally responsible architecture should be.



Stephanie Burcham (b.1990)  
*Tea Bag Rests*, 2019

Wood-fired earthenware clay

## An Elemental Study in Conservation: A Ceramic Artists' Retreat on Virginia's Rappahannock River

STEPHANIE BURCHAM

General Audience Abstract

How can I redefine conservation through site and architectural design? I'm going to test a new way to think about environmentally responsible design by designing an off-grid habitat and systems sensitive artists' retreat in a place that not only has personal meaning to me, a popular getaway spot for Richmond, VA locals, but is currently under threat of 85,000 acres of groundwater-contaminating natural gas fracking in adjacent counties, a thousand acre nearby bald eagle habitat-destroying golf resort development, and irresponsible but difficult to change agricultural practices allowing rampant overgrowth of algae and bacteria severely undermining the health of the river's ecosystem.

The program I chose to investigate also has personal meaning to me, and is usually considered an unsustainable practice: ceramic art. I began learning ceramics my first semester of graduate school and quickly became hooked. However, I noticed many fossil fuel dependent energy and water-intensive practices that were considered quite normal at the studios I worked in at the time. However, the longer I was exposed to ceramics and the more studios I visited, I found more people that approached their making methodology through a conservational lens. They were able to teach me their methods and over time I learned how to properly reclaim clay and use limited and recycled water in the process of making pots and cleaning up the studio. There are still many more aspects of the art to study and perfect, some of which I begin to tackle in my thesis design.

Merging the retreat nature of the site and its needs for an intervention to achieve a greater potential for human and environmental health, preserving and protecting the river for its beauty, health, retreat and recreational purposes, and my growing interest in the usually wasteful and environmentally irresponsible art form of ceramics-making launched a thesis level investigation into how to both live in a community that satisfies our basic needs as humans and make this type of art I've been drawn to recently in a responsible way.



Stephanie Burcham (b.1990)  
*Bowl 1, 2019*

Wood-fired earthenware clay

### Acknowledgments

Thank you to my irreplaceable committee members, Marcia, Scott and Paul, for your thoughtful comments and valuable feedback this year as I honed my research and discovered my thesis. I don't know what would have happened if I had been left to my own devices... well... we have some idea. I have to thank also my family, especially my parents, for continuing to answer the phone even though you knew I'd be no fun at all, sleep-deprived, stressed and strung out over this project. And for supporting me at my thesis defense. A big thanks to Brad and Terri, my bosses at Baskervill, for lifting my spirits towards the end by welcoming me back into the office fold.



Stephanie Burcham (b.1990)  
*Mug 1 with Coffee, 2019*

Wood-fired earthenware clay

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# I. THE THREATENED RAPPAHANNOCK

I began my thesis investigation with a site I hold close to my heart; a site I know can be improved through thoughtful intervention and changes in human habit. This place, Naylor's Beach, VA, located on the Rappahannock River, the longest free-flowing river in Virginia, is a popular getaway spot for Richmond, VA locals, myself included. A family-oriented campground and public boat ramp is nestled in the center of a small, stable community of both year-round occupied and second homes to families that live their winter and week-day lives in Richmond. This community is currently under several (human-caused and human-preventable) threats.

## ONE

Eighty-five thousand acres have been leased by a Texas-based oil company for future groundwater-contaminating natural gas fracking in four adjacent counties. This particular threat to clean drinking water was the catalyst for American Rivers, a non-profit environmental advocacy group, to list the Rappahannock as the fifth most endangered river in the United States in 2017. (American Rivers)

## TWO

A thousand acre golf resort development is slated for construction only a few miles from the site. This resort will not only wipe out one of the most important bald eagle habitats on the East Coast, but from the very outset of construction, was victim to a major lawsuit brought by Virginia's attorney general and the Department for Environmental Quality for repeated and serious environmental violations.

## THREE

Lastly, and probably the issue presented here that is most difficult to reverse through architecture and design, not to mention policy, are irresponsible agricultural practices allowing rampant overgrowth of algae and bacteria severely undermining the health of the river's ecosystem.

These three issues are certainly not the only current threats to the Rappahannock. Others include aquifer overuse, septic tank leakage, wastewater treatment and factories, air pollution, and stormwater runoff. In my research, I try to identify ways in which architecture and good design can act as a learning resource for the Naylor's Beach community in how to create habitable space in a way that harnesses our natural resources in a sustainable way, touching the earth lightly in order to preserve the health of the river, as both environmental habitat and human playground.

View of the sunset across the Rappahannock from a Naylor's Beach residence.

PHOTO BY STEPHANIE BURCHAM

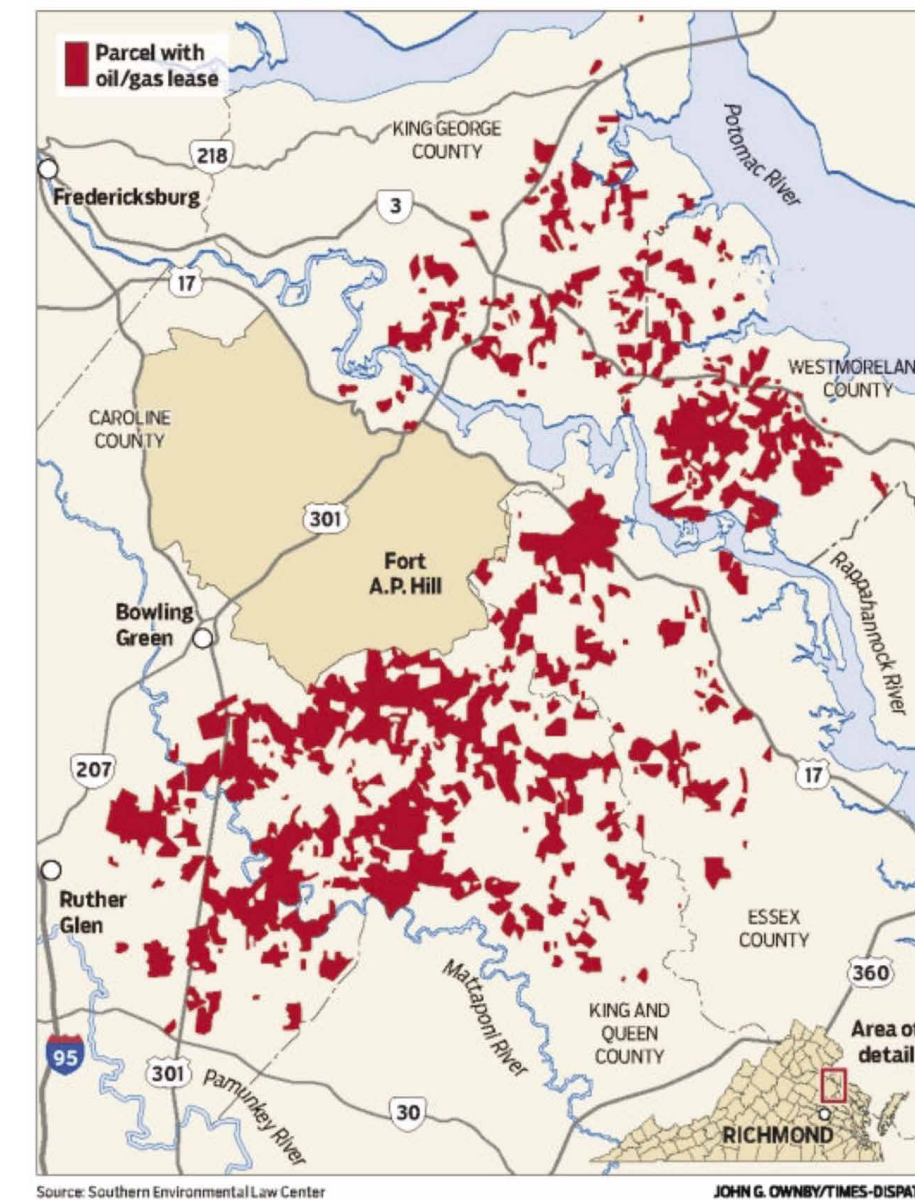


Driving over Cat Point Creek bridge toward the Naylor's Beach community.

PHOTO BY DEBBIE BURCHAM

## FRACKING

Eighty-five thousand acres in four counties - Westmoreland, Essex, Caroline, and King and Queen - have been leased by a Texas-based company for future oil and gas exploration and hydraulic fracturing ("fracking"). King George County, which was originally part of this group, passed a land use ordinance to prevent fracking within the municipality. Richmond County, home to Naylor's Beach, not part of the leased land set aside for fracking, also voted unanimously to ban gas drilling and



fracking from their community in November of 2017. Friends of the Rappahannock calls this "an incredible victory," citing that the decision to protect the local drinking water, river, economy, and infrastructure from the negative impacts of fracking "sends a clear message that [the communities of Richmond County and the Northern Neck] value a clean and healthy river." (Moncure, Richard, et al.)

The residents of this region, standing up to the powerful natural gas industry, are the only barrier between the industry and its potential to destroy clean drinking water for millions of people. American Rivers, a non-profit environmental advocacy group, listed the Rappahannock as the fifth most endangered river in the United States in 2017 due to the threat fracking posed to the health of the Potomac Aquifer. According to American Rivers, "developing natural gas in this area would require drilling through the Potomac Aquifer, which supplies drinking water to three million people in Virginia's Coastal Plain and Tidewater regions. The Virginia legislature and local municipalities must maintain and, where necessary, establish strong natural gas regulations and zoning to protect communities, river health and clean water." (American Rivers).

The City of Tappahannock, the closest town to the site, uses three deep wells, groundwater from the Potomac Aquifer, to supply clean drinking water to its residents.

Natural gas is often touted for being a "cleaner" energy source than coal, and has outpaced coal exponentially in consumption over the past decades in the United States. However, natural gas is still a fossil fuel, a non-renewable energy source. Releasing it from the earth is devastating to the natural environment and detrimental to human health. Peer-reviewed studies link fracking chemicals to respiratory and neurological problems; cancer; endocrine disruption, infertility, and birth defects. With today's technology, we have the ability to obtain energy sustainably, and with more demand for sustainably sourced energy, we as consumers, have the power to drive down costs, especially as we consider the full, actual costs of continuing to rely on fossil fuels. (Davis, Kristin, et.al.)

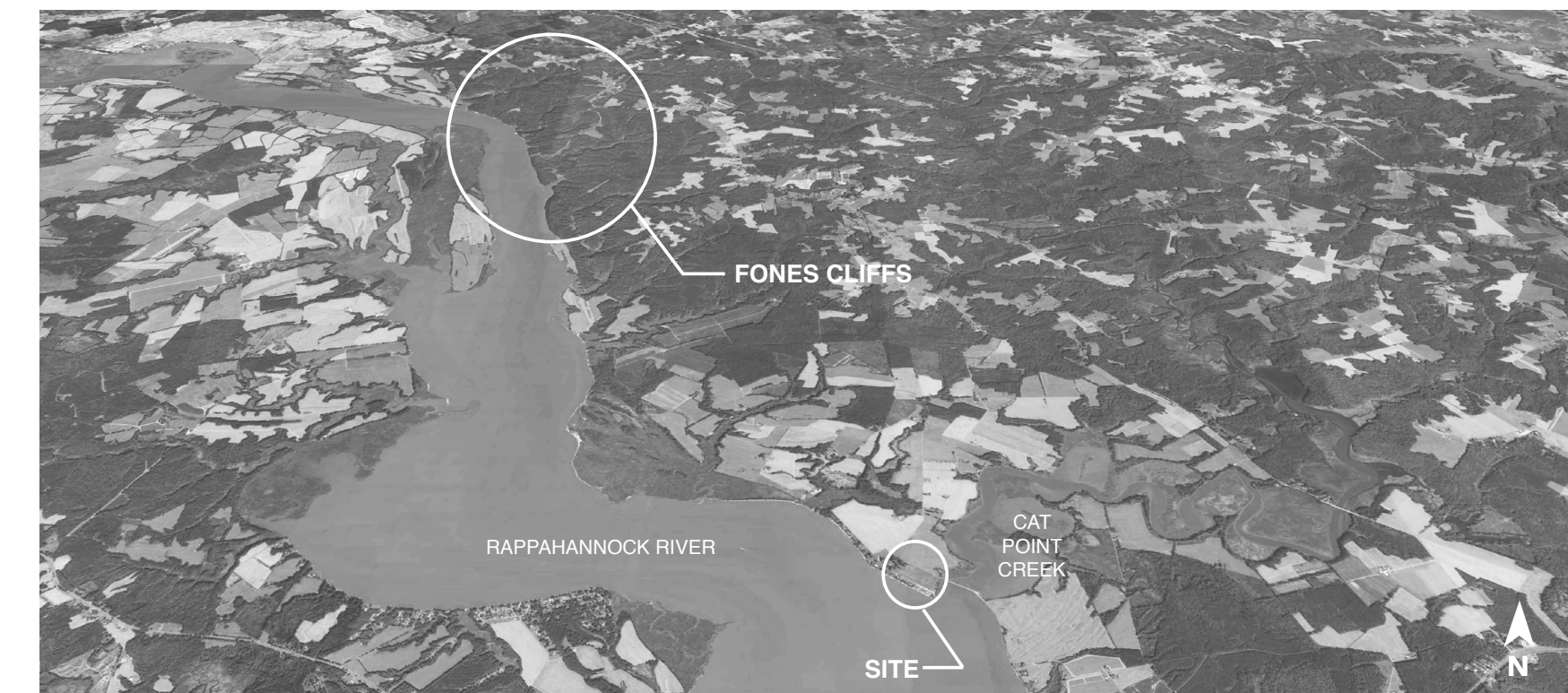


## INSENSITIVE DEVELOPMENT

Only a few miles from the site is one of Canada and the United States' East Coast's largest breeding area, migration destination, and nursery for young Bald Eagles. Thousands of eagles, breeding and non-breeding, use the site annually. Some eagles are born at Fones Cliffs, some come here from the farthest reaches of the East Coast of North America, Labrador to Florida. Bryan Watts, writing for the Center for Conservation Biology, states that since 1990, records have shown more than 40 young eagles have been raised on this site, and as long as suitable habitat remains, eagles will continue to nest in the area. (Davis, Kristin, et.al.)

In 2016, Richmond County changed the zoning of this site to allow for the planning and future development of a thousand acre golf course resort. In the fall of 2018, the developer, after many promises to preserve and respect the environmental habitat, began clearing the trees illegally prior to obtaining a permit and implementing the proper stormwater management control. A large storm swept through the area, and due to the cleared trees and poor runoff control, a massive landslide destroyed a segment of the Cliffs and caused sediment runoff into the river. The county issued a stop-work order and Virginia's attorney general and the Department for Environmental Quality issued a lawsuit against developer Virginia True for repeated and serious environmental violations. The project is currently at a standstill. Shortly after, the landowner adjacent to the thousand acre parcel decided to sell to The Conservation Fund, which will eventually hand over control to the U.S. Fish and Wildlife Service, instead of building the 200 unit high rise condominiums he had planned for the 250 acre property. (The Free-Lance Star).

This development blunder serves as a vivid reminder for architects to value the earth upon which we build and its inhabitants, human, avian, or otherwise. W.G. Clark writes in his essay Replacement, "At the necessary juncture of culture and place, architecture seeks not only minimal ruin of landscape but something more difficult: a replacement of what was lost with something that atones for the loss. In the best architecture this replacement is through an intensification of the place, where it emerges no worse for human intervention, where culture's shaping of the place to specific use results in a heightening of the beauty of the landscape. In these places we seem worthy of existence."



"An eagle makes an alewife his dinner in the crook of a creek along Cat Point Creek off the Rappahannock River"

PHOTO BY BILL PORTLOCK / CHESAPEAKE BAY FOUNDATION



## NITROGEN POLLUTION

Nitrogen pollution is a big problem for the health of our rivers. Excess nutrients fuel algae growth, creating blooms of oxygen poor water, and forming dead zones in the Chesapeake Bay. Nitrogen pollution also causes murky waters and the depletion of underwater grasses, a primary signal of river and bay health. Almost half (forty-five percent, according to the Chesapeake Bay Program) of the nitrogen pollution in the Chesapeake Bay is caused by agricultural runoff. (Chesapeake Bay Foundation). This includes both animal manure and crop fertilizers and pesticides that both wash off land during periods of heavy rain and directly into the river, and soak into the soil, contaminating groundwater. It takes years, or even decades, for contaminated groundwater to find its way back into the water cycle. (Baltimore Sun).

The corn and soy fields surrounding Naylor's Beach are part of this problem. They contribute both to direct runoff of nutrients and groundwater contamination. These fields are also part of a larger political and cultural issue - the fact that corn and soy monoculture production is subsidized by the government - and thus is a giant mechanism driving the way in which our food is produced. If we were to re-think how we feed society, then these monocultures wouldn't even need to exist, and wouldn't be dependent on outside chemical intervention to thrive, and the midwest could support free-roaming cattle on grasslands similar to the way it did before we shot all the buffalo for sport and subdivided the land into a privately-owned grid system. Forty-seven percent of soy and sixty percent of corn is used only to feed livestock, which helps also to perpetuate factory farming for creatures that evolved to eat grass. Corn requires more nitrogen fertilizer than any other crop. The GMO corn seed itself contains insecticide poison to protect itself from insects, but this poison is also washed into nearby bodies of water and kills aquatic insects, putting the aquatic food chain at risk. (Good, Kate). Corn and soy fields are also responsible for the clear cutting of forests, even in the Amazon, the lungs of the earth, where the problem persists, fueled by American demand for cheap meat.

For my project, I want to take at least one of the corn and soy fields near Naylor's Beach out of this environmentally damaging food production cycle and elevate its status so that it can accommodate habitat for humans, animals, and plants without causing damage to the surrounding ecosystem.

Corn and soy field adjacent to site.

PHOTO BY STEPHANIE BURCHAM



Stephanie Burcham (b.1990)  
*Vases, 2019*

Wood and salt-fired earthenware clay

## II.

# PROJECT DEVELOPMENT + SITE

For the project site, I selected a corn and soy field near Naylor's Beach because of its adjacency to the existing homes and existing campground, and its proximity to the river. It is a site that is both under-utilized as far as community resources and dangerously toxic to the health of the Rappahannock in its current state. I left the campground in its existing state and all of the houses of the Naylor's Beach community existing to remain. I worked around these existing features to create a place that strives to unify them.

The goal of this project was to create a comfortable and inviting place for the community, and from which the community could learn about architecture's relationship to the environment and how we, as a society, can alter our living habits to help save the planet from the devastating effects of climate change.

On the following pages, my process from early sketches to final site plan is documented, with each major element explained in detail.



SITE PLAN

# EXISTING CONDITIONS

I chose this particular corn and soy field near Naylor's Beach for my site because of its adjacency to the existing homes and existing campground, and its proximity to the river. Including the campground, the site is about 40 acres in size. It is both under-utilized as far as community resources and dangerously toxic to the health of the Rappahannock in its current state. Both primary wind direction and solar orientation are shown in the diagrams overlaid onto the satellite image, representing the earth, as well as photographs taken from various locations around the site. The 100 year flood is shown with a light blue line and shading, while the 500 year flood is shown with a dark blue line and shading.





SITE

**2016 TORNADO AFTERMATH**  
AERIAL DRONE IMAGE LOOKING SOUTHEAST

This is an aerial view of the site taken a few days after a tornado ripped through the community of Naylor's Beach February 25, 2016. The southeast half of the site is shown to the left of the row of homes. The Rappahannock River is located at the right of the image, and Cat Point Creek, a tributary to the Rappahannock, is shown in the background. Tornadoes are not common in this area, but increasingly volatile weather patterns have become more frequent as global temperatures rise.

Architects have a responsibility to create structures that protect its inhabitants, that can be adaptable, resilient and responsive to an unpredictable climate. In rural areas, that may mean designing structures that are less reliant on utility-provided electricity-dependent systems or are completely self-sustaining.

Drone Footage by Andrew Mayers

NAYLORS BEACH VA TORNADO AFTERMATH  
Published on Feb 27, 2016  
<https://www.youtube.com/watch?v=RJVyCTdql>

# EARLY SKETCHES

Left: This sketch is an early site plan concept for when the site wasn't in its final location. This site is still at Naylor's Beach, but at the far north west corner, where the row of houses ends. I was nervous about encroaching into the corn and soy field, but eventually abandoned this site because it didn't make sense to tear down two residences and probably a handful of trees to build on land that wouldn't necessarily benefit from this change.

Right: Early conceptual site plans of the site in its final location. The top image still shows an unfocused design idea with very little formal thought behind the location of buildings, that prioritized circulation and access over other ideas.

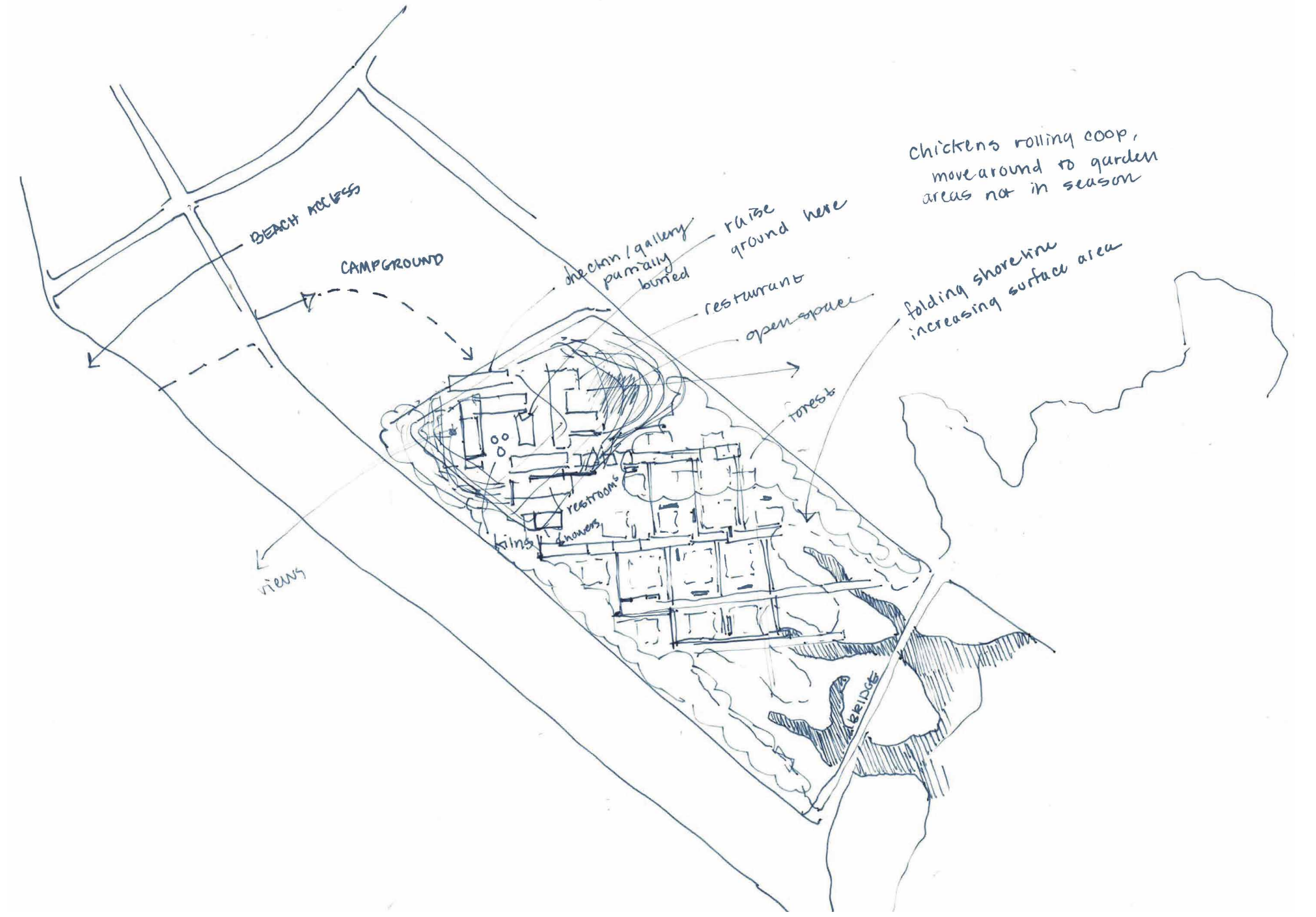
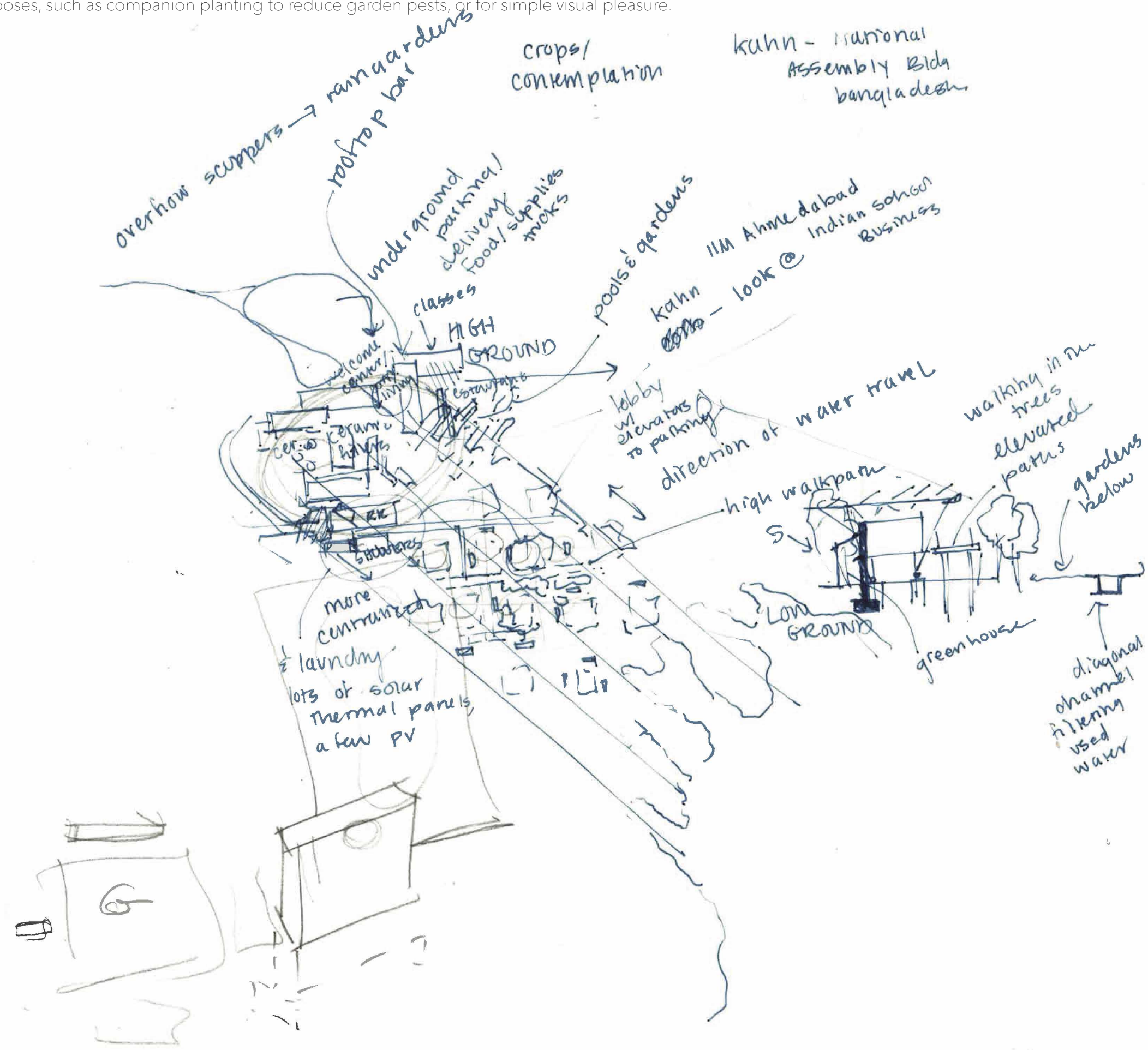


- some all bunnies for students
- mix of single / double cabins
- cabin studio complex for private work (professors)
- large shared drawing painting studios
- photography ceramics printmaking woodshop / pottery-making
- central bathroom complex
- central kitchen / living areas
- showroom
- healthy vegetable garden chicken coop?



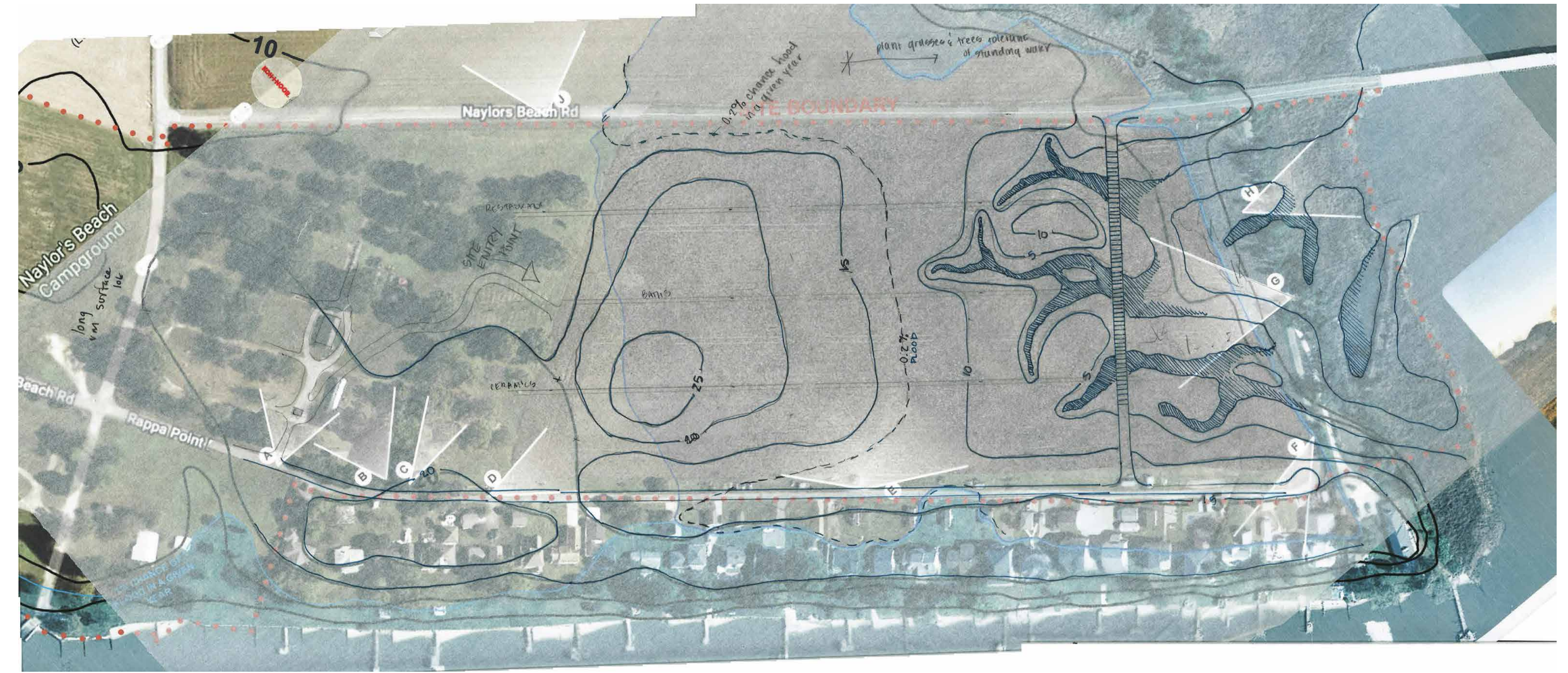
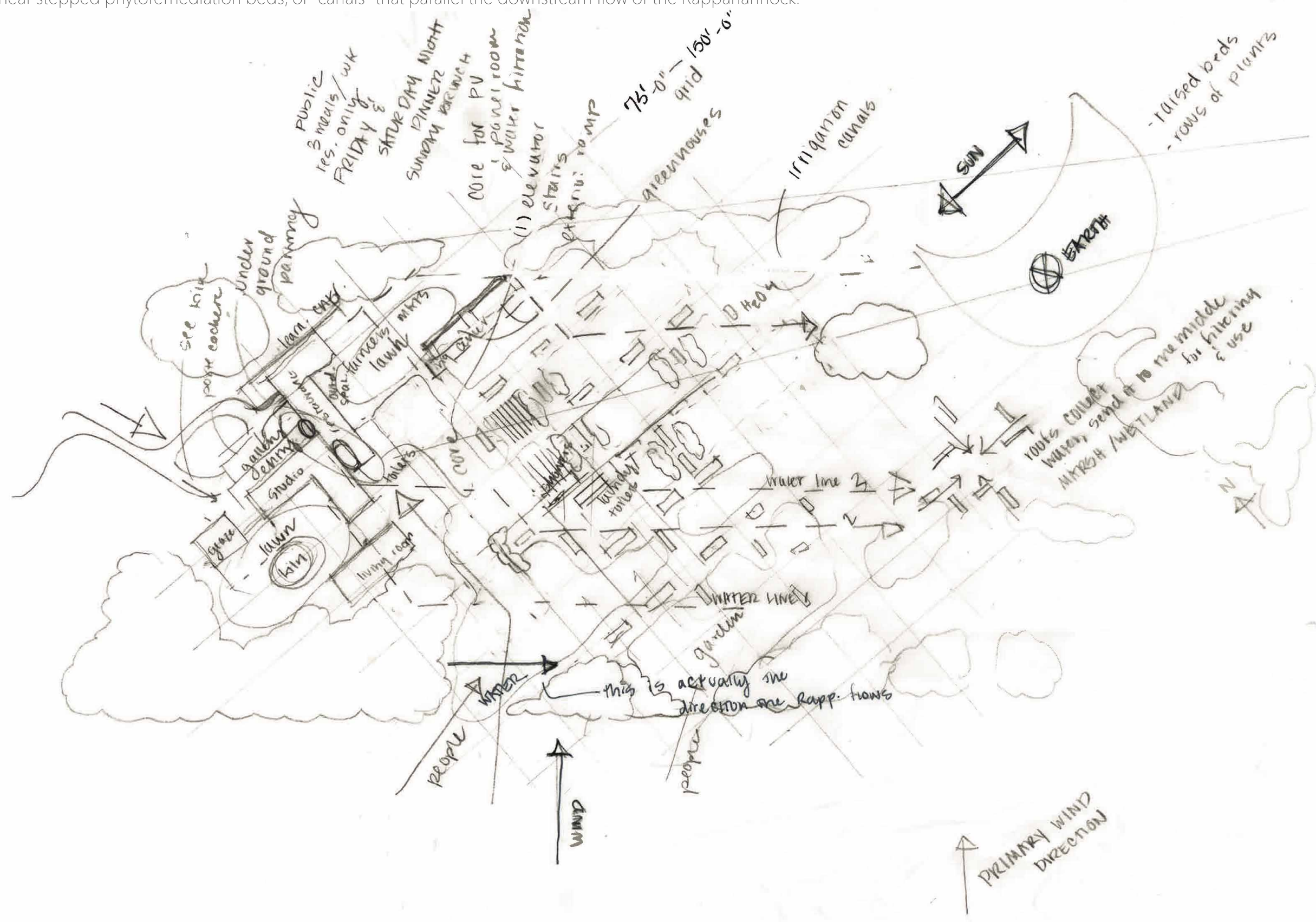
SITE PLAN | EARLY SKETCHES

In the next set of sketches, I begin to think formally about the site, placing the more permanent public buildings on the high ground and organizing the less permanent structures, what would become the residential cabins, into a pattern of cloister-type arrangements around a central kitchen, or "potoger," garden. Potoger gardens are french kitchen gardens that include mostly fruits, vegetables, and herbs, however ornamental plants can also be found among the edible varieties, for both practical purposes, such as companion planting to reduce garden pests, or for simple visual pleasure.

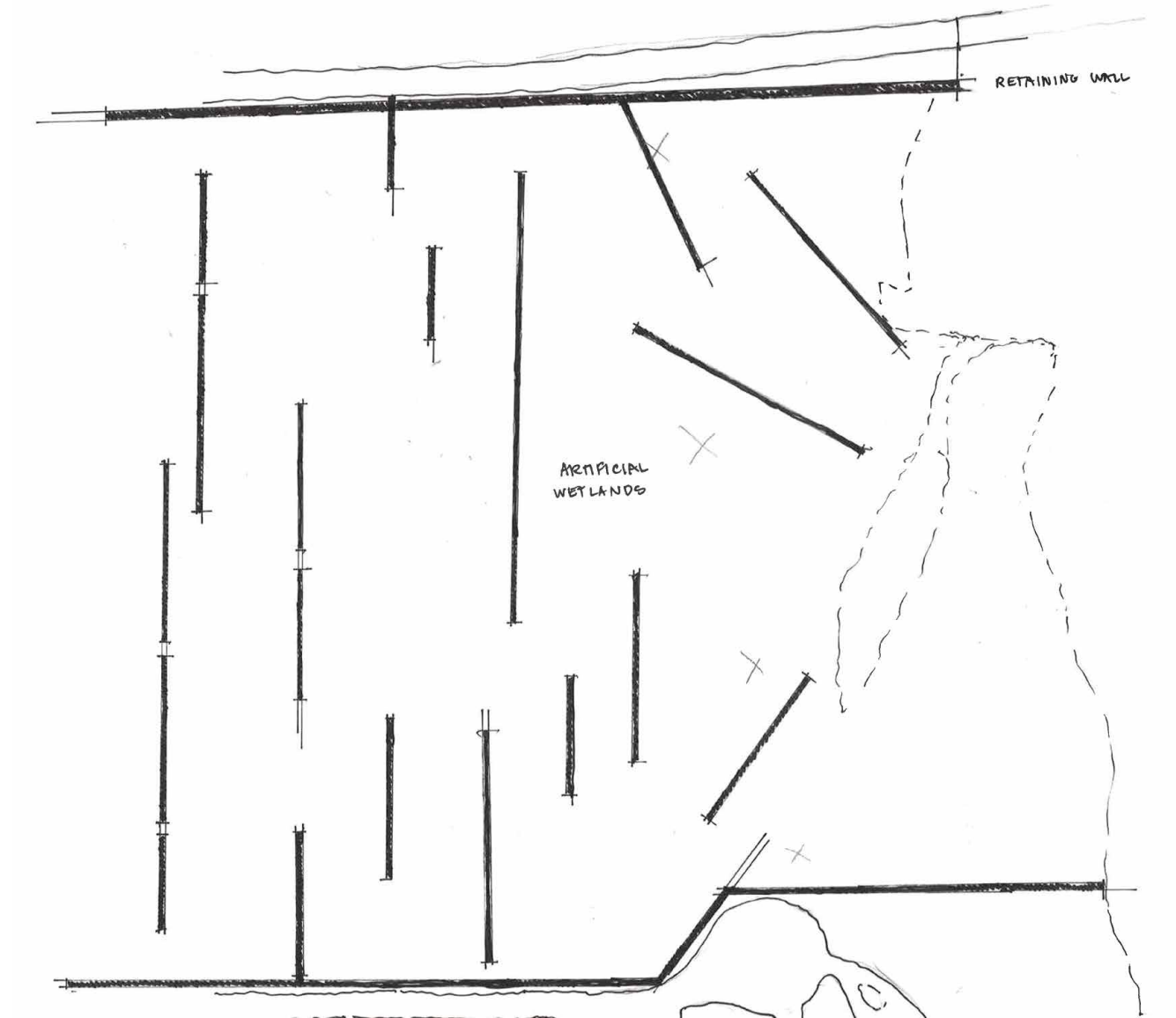


SITE PLAN | EARLY SKETCHES

Here, I have used a grid based on the lot widths of the Naylor's Beach community homes, and overlaid it onto the site. It was important to me that this development intervention feel spatially like it's part of the community, by subtly alluding to the existing spatial relationship of the homes already on the site. In this sketch I also think about how the four elements have primary directions, and how the site plan should respond to these inherent directions. The direction of the earth is straight out of the page, while fire follows the rising and setting sun. Because the sun is so primary in how buildings can heat or provide shade, the cardinal orientation of the grid is important because it allows the structures to react to it, the ultimate fire, the energy source. The primary wind direction is blowing across the site perpendicular from the river. I also begin to explore in this sketch having the on-site used water, or greywater, be treated and then released from the site back into the river in linear stepped phytoremediation beds, or "canals" that parallel the downstream flow of the Rappahannock.



Early thoughts on how to improve and increase the wetlands, and what to do with the earth excavated from the site.

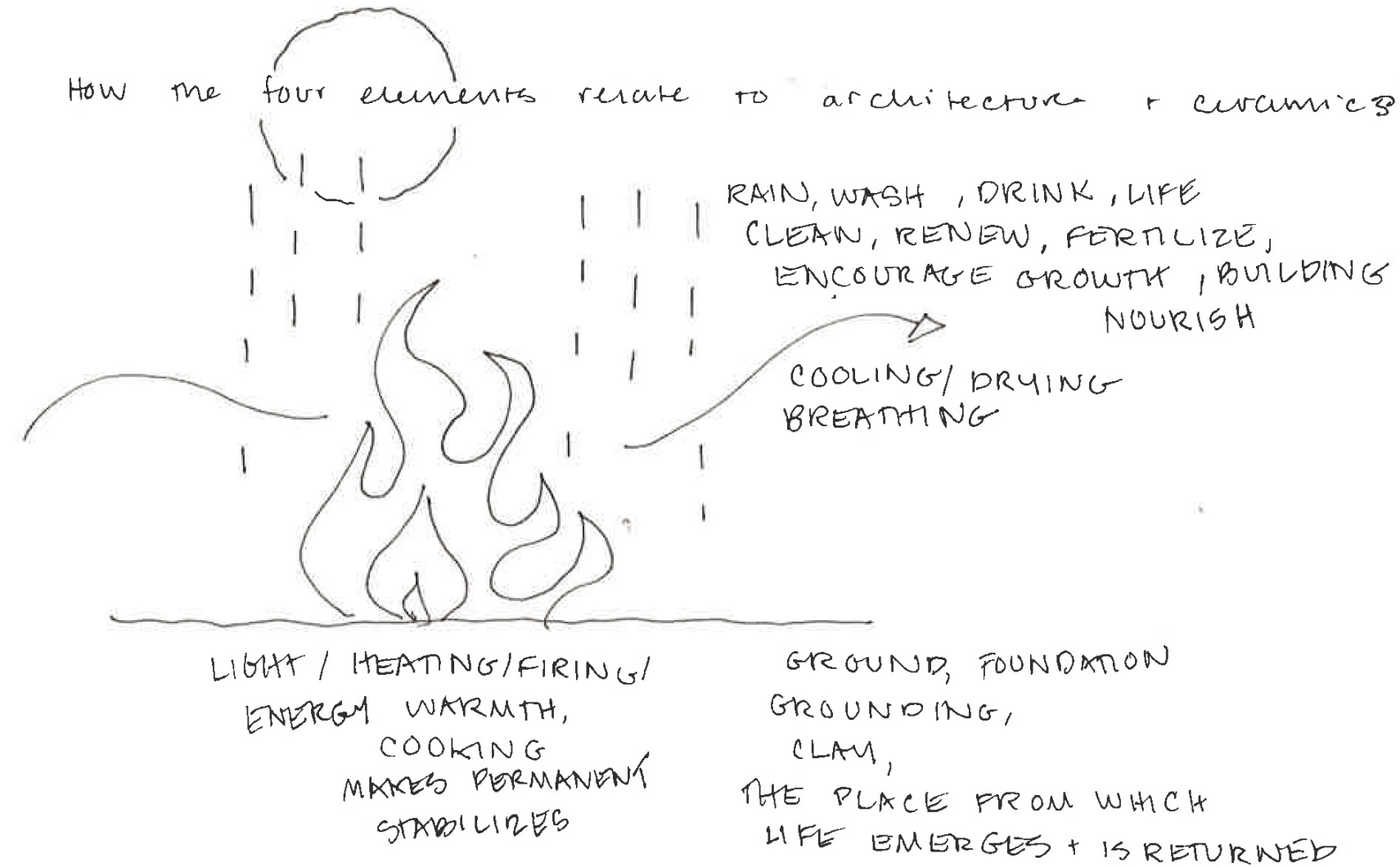


# FOUR ELEMENTS

The four elements as they relate to both ceramics, architecture and landscape. Here, I begin to draw relationships between the program and the process of making ceramics, which is not so different from thinking about the process of creating architecture.

4 ELEMENTS: earth, air, water, fire

How the four elements relate to architecture + ceramics?



The ceramics you make, fire, use, are going to be on this earth much much longer than you will be. Take great care in how you form these objects because future societies will come to <sup>judge</sup> judge us based on what <sup>we</sup> leave behind. Just as we should care for the earth itself as it has been here for many years before <sup>our ancestors</sup> ourselves and will continue to give life to our children, grandchildren and their children in years to come.

## WATER

ARCHITECTURE: COLLECT, DISTRIBUTE, USE, DISPERSE  
CERAMICS: CREATE, MIX, RECONSTITUTE

- RAIN
- RIVER
- WASH
- DRINK
- CLEAN
- RENEW
- FERTILIZE
- QUENCH
- FRESH
- FLOOD
- SPLASH
- PLAY
- AQUIFER
- REPLENISH
- CREATE
- BOIL
- FREEZE
- DRAIN

ARCHITECTURE: ENERGY, HEAT, HEARTH  
CERAMICS: BISQUE, VITRIFY, GLAZE, ASH

## FIRE

- LIGHT
- HEAT
- ENERGY
- WARMTH
- KILN
- HEARTH

ARCHITECTURE: COOLING,  
VENTILATION, BREATHE

## AIR

- CERAMICS: DRY
- COOLING
  - DRYING
  - WIND
  - BREEZE
  - BREATHE
  - OXYGEN

## EARTH

ARCHITECTURE: FOUNDATION  
CERAMICS: ORIGIN

- GROUND
- STABILITY
- FOUNDATION
- CLAY
- FERTILITY
- NUTRIENTS
- GROWTH
- BIRTH
- DEATH
- REBIRTH

# SITE PLAN | EARLY SKETCHES

Left: What does it mean to retreat? How can architecture respond to the human need to feel removed from everyday pressures? I studied some sacred architecture, progression of entry, etc to discover how to design a calm, quiet, inviting space where one would feel safe to relax and recharge.

Right: The fire elements are shown in bright red in this sketch. My main thought here was to have rammed earth chimneys as primary elements within the landscape. The use of earth as a building material being very primal and elemental, and also the source of ceramic pottery. I was inspired by the permanence of the chimneys as an element, an extension of the earth and a marker of human presence on the earth. Oftentimes, on my journey to Naylor's Beach from Richmond, I'll see these chimneys in the landscape, standing tall long after the building around them has crumbled.



A lone chimney in the landscape.

PHOTO BY STEPHANIE BURCHAM

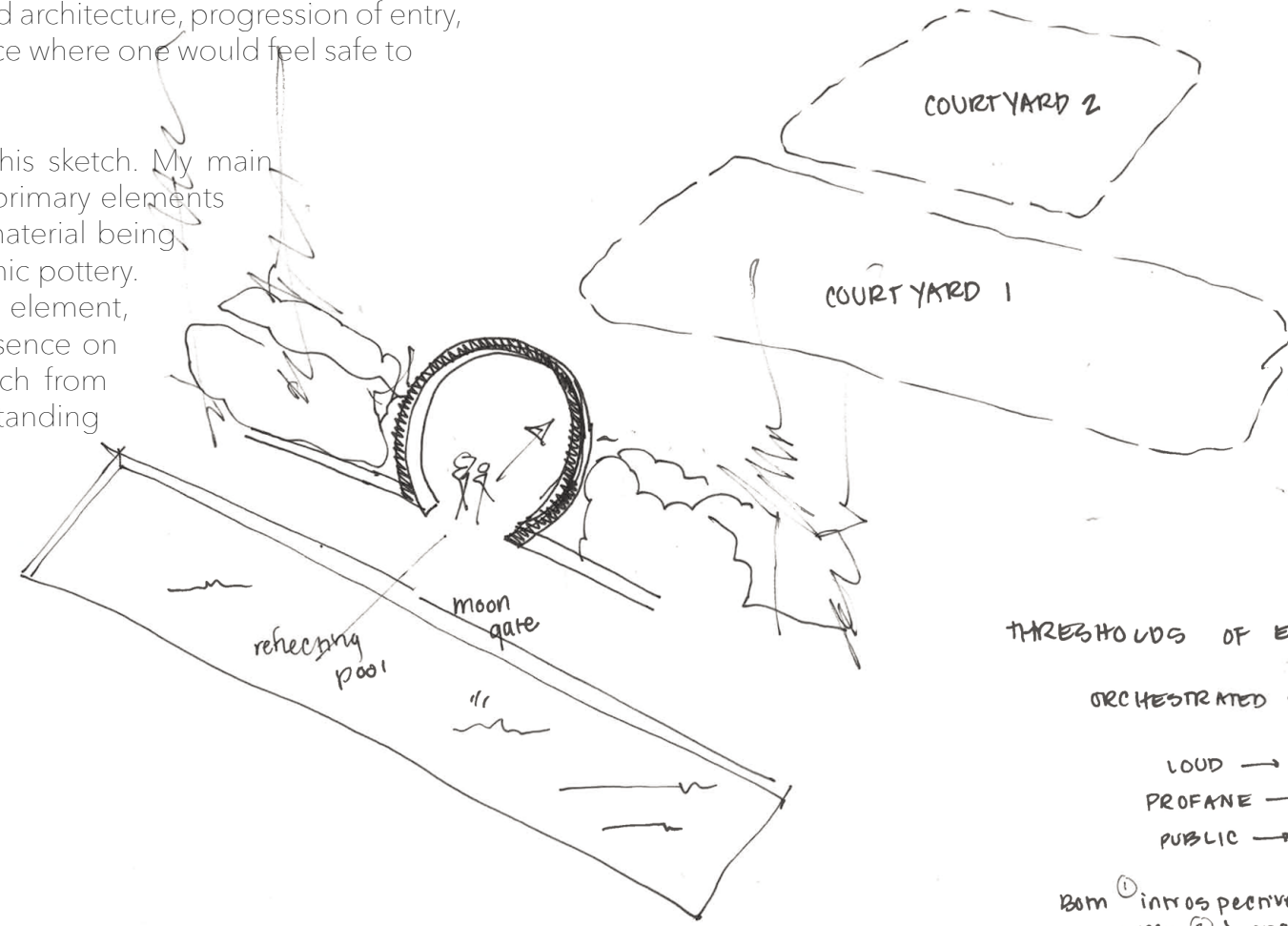


image of the alhambra — literal reflection pool & greenery in a courtyard roots pointing inward, sky above breathe to move inside & out

sound of moving water  
smell of aromatic plants

texture, screens that filter light

la tourrette — green roof  
occupiable spaces under the buildings  
darkness w/ highly directed light  
moving up or down, directed physically  
bend to enter, once inside, height to the heavens  
altar @ the highest place

tai — reflecting pool  
the use of reflecting pools in society's sacred places  
gll memorial, Lincoln memorial, Art Museum

forecourt, progression of removal from the public sphere to the sanctuary of inner spaces  
through these spaces you shed the walls & the identities, the theater, the acts of everyday life & ultimately find yourself at the core

ronchamp — dark, dramatic light  
japanese screens

mindful japanese architecture  
art of tea drinking, tea rooms, gardens, temples  
quiet beauty, intentional design  
removing peripheral noise

summer — under kivas field chapel  
Thom crown E. Fay Jones

Spiral stair to naming  
large rock under a tree canopy w/ a view

DRAMATIC & contemplative spaces

## THRESHOLDS OF ENTRY

### ORCHESTRATED SEQUENCE

LOUD → QUIET  
PROFANE → SACRED  
PUBLIC → PRIVATE

Both ① introspective, mindful, contemplative spaces ② & spaces that blur the boundary between inside & outside  
③ spaces that allow for observation, respect & gratitude for community, nature & the environment around us

containing themselves  
civility

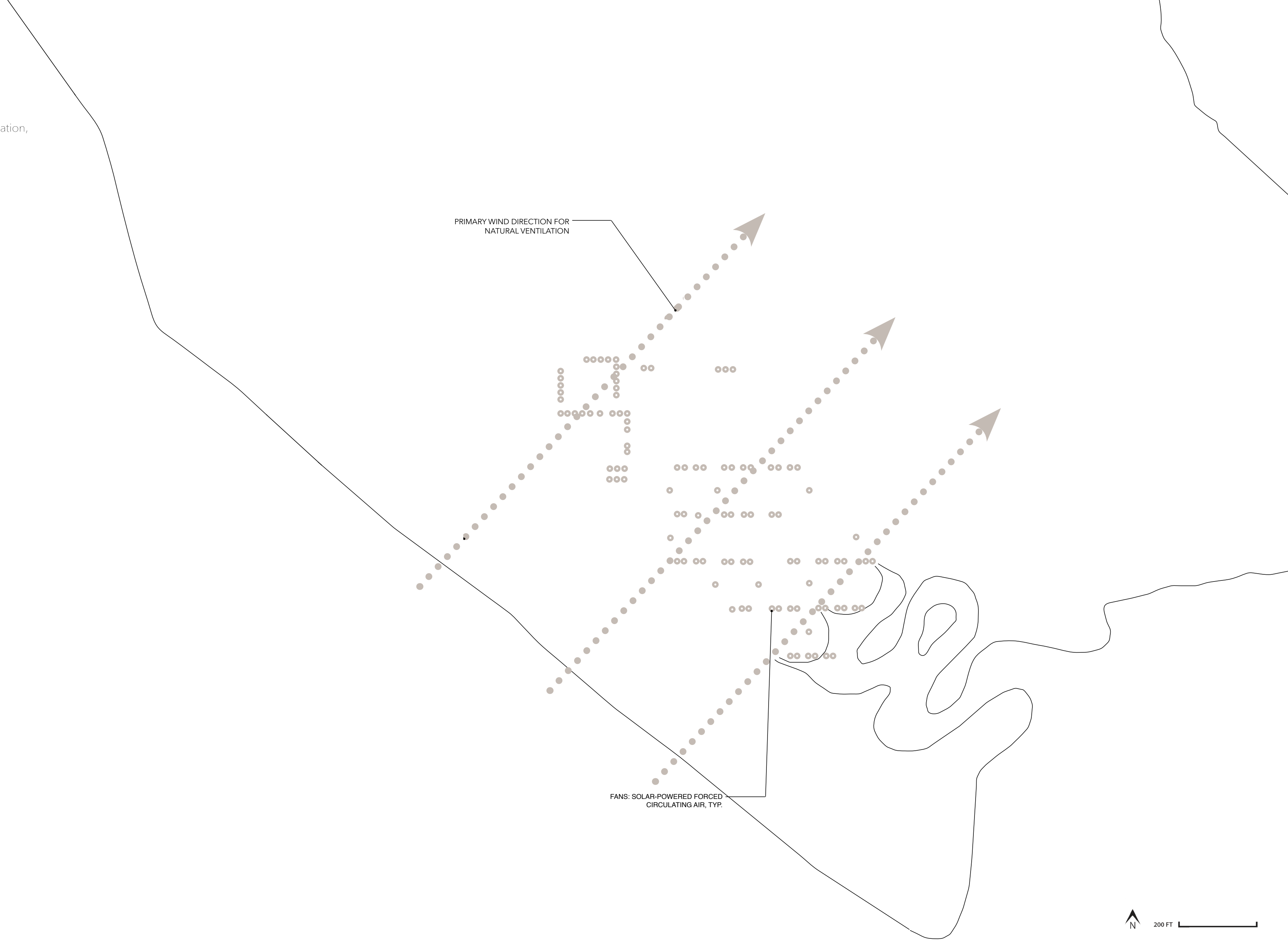
## SPA DESIGN

both introspective & exospective spaces



# AIR

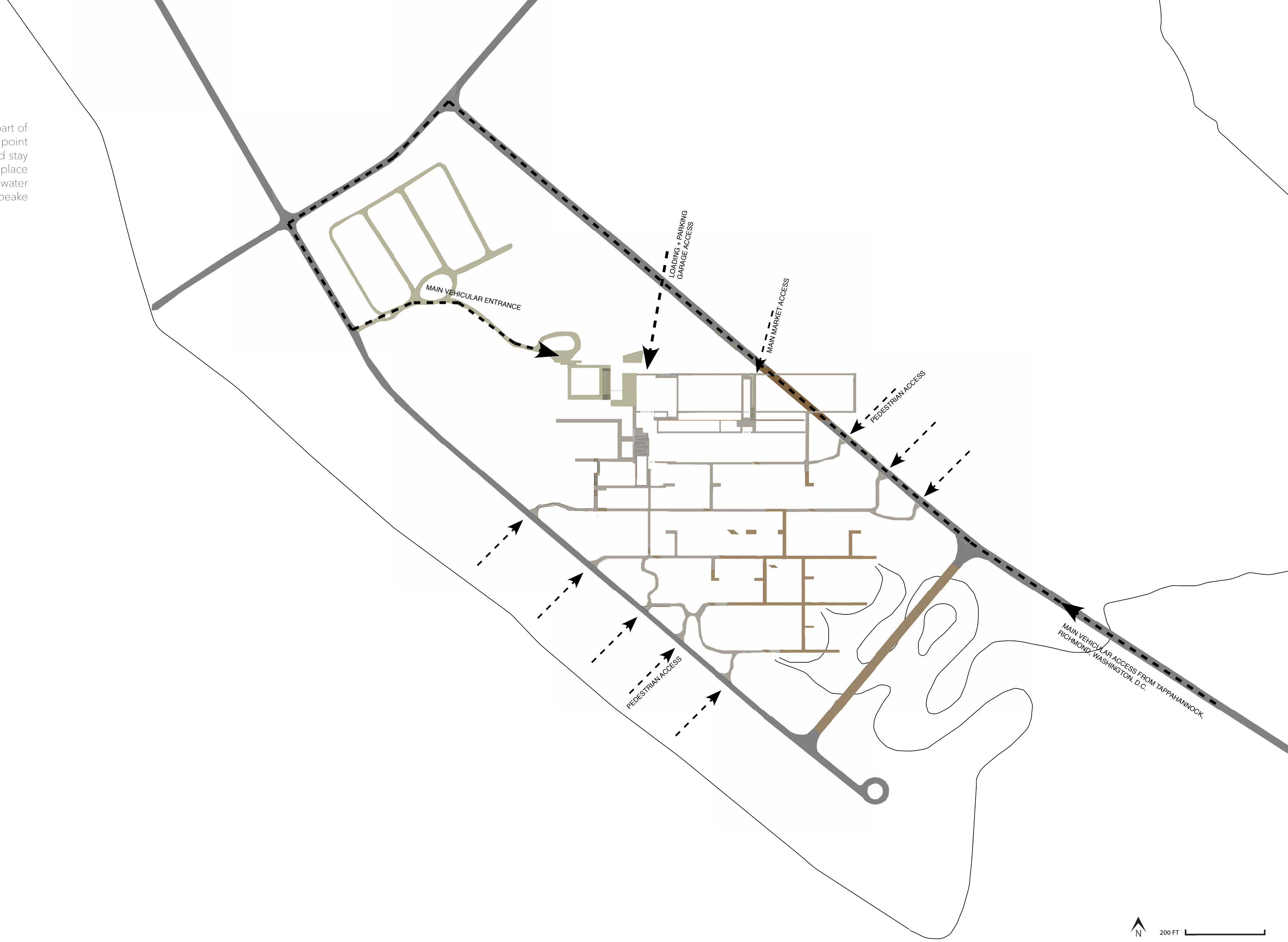
A diagrammatic look at air circulation on site. The large arrows are the primary wind direction, the force for natural ventilation, and the smaller circles are solar-powered fans, for hot days with limited cooling breeze.



DIAGRAMMATIC SITE PLANS

# CIRCULATION

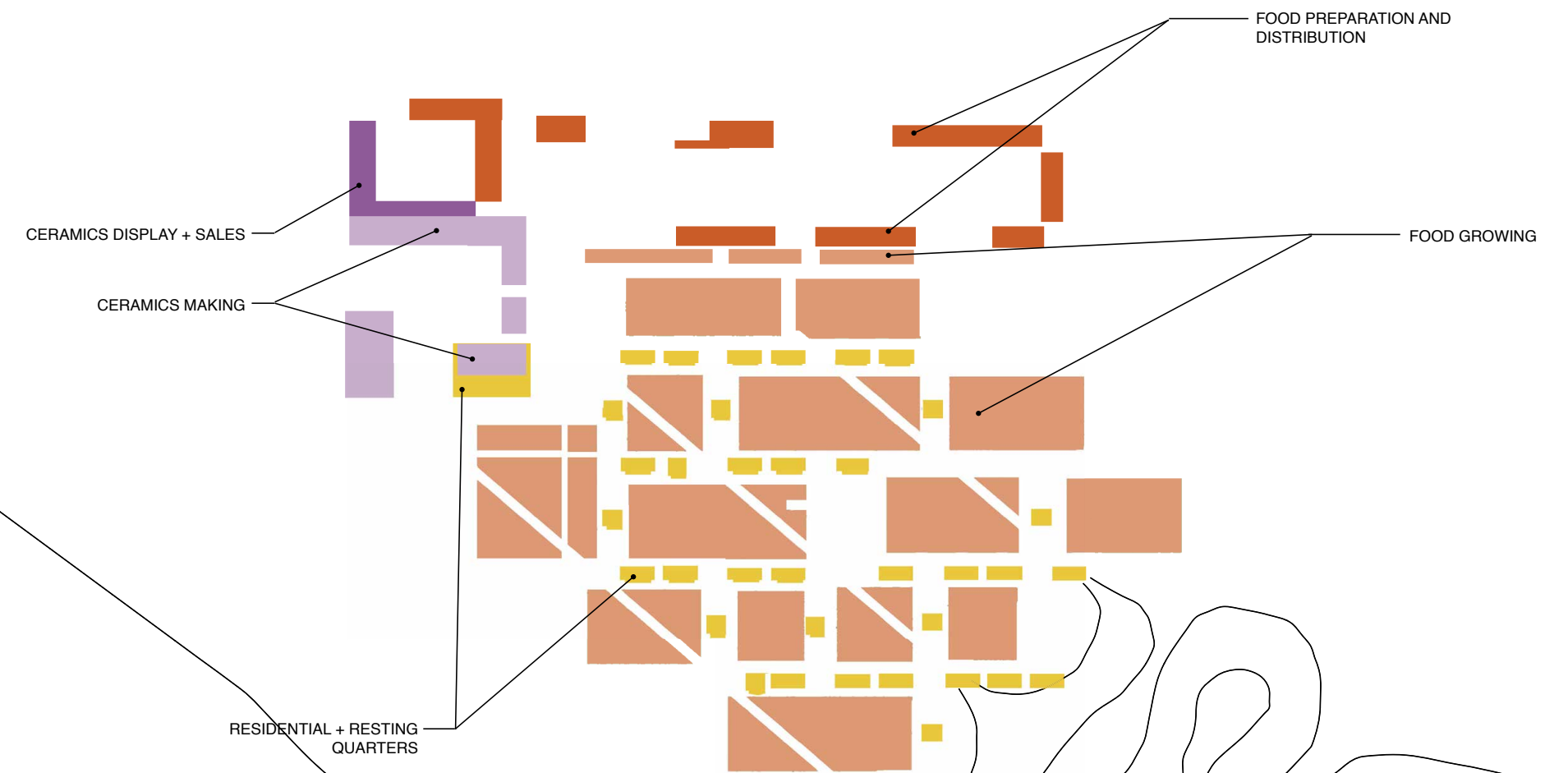
This diagram shows vehicular and pedestrian movement on the site. As this is a rural site, most people who are not part of the Naylor's Beach community or already visiting on the campground, will be arriving by car. The main vehicular entry point is from Cat's Point Creek, at the southeast corner of the site. The idea behind the retreat is that people will come and stay for a weekend, a week, or even longer without the need to re-exit and re-enter by vehicle. Food, entertainment, and a place to stay will all be provided. Where possible, I used permeable materials for paths and hardscaping as part of my stormwater management approach to prevent runoff, which is responsible for 17 percent of the nitrogen pollution in the Chesapeake Bay (Chesapeake Bay Foundation).



DIAGRAMMATIC SITE PLANS

# PROGRAM

Ceramics buildings are shown in purple, food buildings and gardens are shown in red, and residential buildings are shown in yellow. What's interesting about this diagram is how very little relative space humans need to sleep compared to how much community and working space we need, and then how those spaces compare to the large quantity of space we need to grow and prepare our food. On an urban lot, that space is offsite, but is still proportionally very large compared to living and working space, especially if the food consumed is a standard American diet. Growing the crops to feed animals raised for consumption uses far more land than simply growing food we can consume directly, which is the strategy I am proposing here. In fact, "if 2 billion of the world's wealthier people ate 40 percent less meat, it could [reduce the use of grasslands used to feed livestock] by an area twice the size of India." (Fothergill, Alastair, et al.)



# EARTH

One of the primary goals in selecting this 40 acre site to develop as part of my thesis was to treat the earth with more respect than it has been given in recent decades since it was converted into food production for CAFOs, or concentrated animal feeding operations. Factory farming, a method of feeding the exponentially increasing human population was only invented in the 1960s, but it has quickly become ubiquitous and seemingly inescapable (Lin, Doris). According to the Food and Agriculture Organization of the United Nations (FAO), factory farming is responsible for eighteen percent of global greenhouse gas emissions (Humane Society of the United States). In eliminating this corn and soy field, and as part of the retreat, I thought about an alternative and more sustainable food source for students, locals, and visitors, so I created potoger gardens within the site design, allowing the earth to provide a healthy variety of food for its inhabitants. In reimagining the landscape, I added as many native trees back to the site as I could, filling in all the spaces that weren't planned lawn or gardens. Reforestation is incredibly important to give back habitat to local plants and animals, including the Bald Eagle, provide shade to create cool microenvironments on the site to escape to when it gets warm in the summer, mitigate carbon dioxide in the atmosphere, and so that the large root systems can slow runoff and stabilize the soil, preventing pollutants from reaching the river. I also wanted to be thoughtful about which areas of the were intentionally "lawn," or grass that requires mowing to maintain, so I intentionally centralized the lawn space, creating a shared gathering and play space for the community.

## REFORESTATION

Why use/ incorporate agricultural land near Naylor's Beach into my site?

because 47% of soy and 60% of corn is used for livestock consumption.

- high greenhouse gas emissions
- extreme water use & land exploitation, air pollution
- polluted runoff - fertilizers, pesticides
- clear-cutting rainforests, deforestation
- 33% of arable land on the planet is used to produce livestock feed

### CORN

- Corn (produced in monocultures) requires more nitrogen fertilizer and pesticides than any other crop
- reduces soil fertility b/c of limited crop rotation
- chemical fertilizer runoff causes algae overgrowth, depleting the water's oxygen and creating dead zones

GMO corn itself contains toxins intended to kill pest insects. When pollen or other parts of the plant are washed into various bodies of water the insect populations in these ecosystems are affected. Since insects are essential to aquatic food webs, many other species are also put at risk.

- cornfields consume over 4 billion gallons of freshwater each year in the US.
- one acre of corn is responsible for using an average 60 gallons of fossil fuels for production & distribution

### SOYBEANS

deforestation to make room for soy plantations accounts for 15-20% of all human caused greenhouse gas emissions

soy production causes soil compaction, exhausting the soil of its nutrients and value to the ecosystem. In the late 1990s over 100,000 hectares (250,000 acres) of land in Bolivia was abandoned because of soybean damage. 530 gallons of water is needed to produce 2lbs of soybeans

onegreenplanet.org

Shubhendu Sharma - How to grow a forest really fast

Forest from nothing, left to its own devices - 600-1000 yrs  
human planted forest - 100 years

Dr. Akira Miyawaki method - mature, native forest 10 years

2014 TED talk "How to grow a tiny forest anywhere"

- ↑ groundwater aquifer recharge
- ↑ biodiversity plants & animals

## NATIVE TREES EASTERN VIRGINIA

loblolly pine 90'-110' H, 2'-3' D  
habitat: old fields, sandy soil where water table is close to surface, borders of swamps & imperfectly drained sites.

- \* common nesting site for ospreys & bald eagles
- ♀ - black willow (swamp willow) } along streams, wet areas
- weeping willow (naturalized)
- river birch 70'-80' } stream bank reforestation / erosion control

- ♀ - american hornbeam 20'-30'
- swamp chestnut oak 60'-80'
- southern red oak 60'-80'-100'
- pin oak 50'-70'
- hackberry 40'-60'
- red mulberry 30'-60'

- ♀ - sweetbay (swamp magnolia) 20'-30' H
- ♀ - sassafras (open woods, abandoned fields) 20'-40'
- sweetgum 60'-90'
- sycamore 80'-100' → 150'
- red maple 90'

- ♀ - flowering dogwood 20'-30' } Forest understory
- black gum 40'-60' → 100'
- ♀ - common persimmon 20'-60'
- green ash (swamp ash) 60'-70' } can grow on sites that are flooded up to 40% of the growing season

### wetlands

grasses:  
cattails  
rice cutgrass  
fox sedge  
soft rush  
sweet flag  
wool grass

forbs:  
cardinal flower  
morning glory  
water plantain  
blue lobelia  
jewel weed  
seedbox  
willow herb  
swamp aster  
joe pye weed  
boneset

shrubs:  
winterberry  
southern arrowwood  
silky dogwood  
button bush  
swamp rose

## HYDROPHYTES

Riverine wetlands  
emergent wetlands -  
mossy grasses  
scrub-shrub <20' H

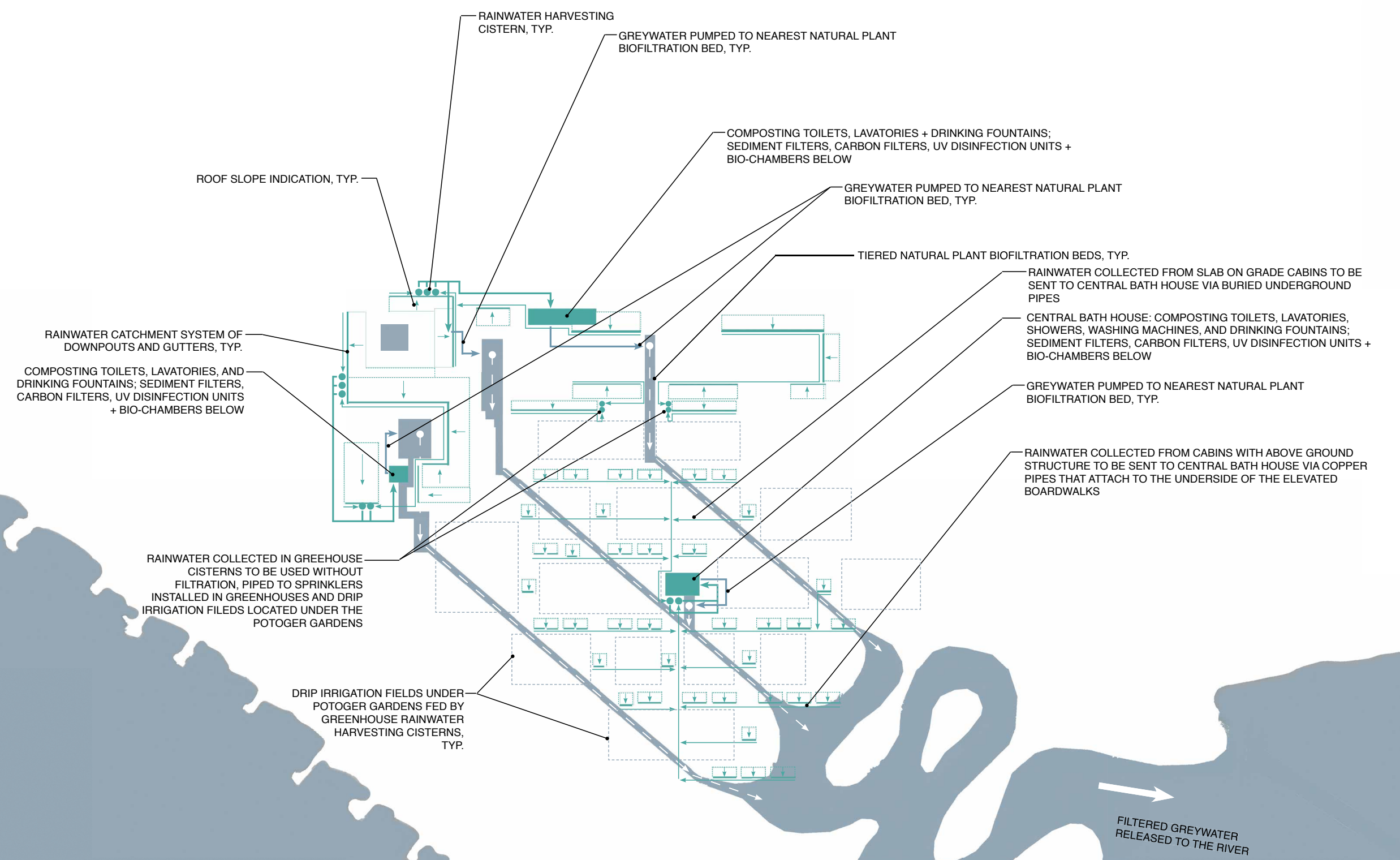
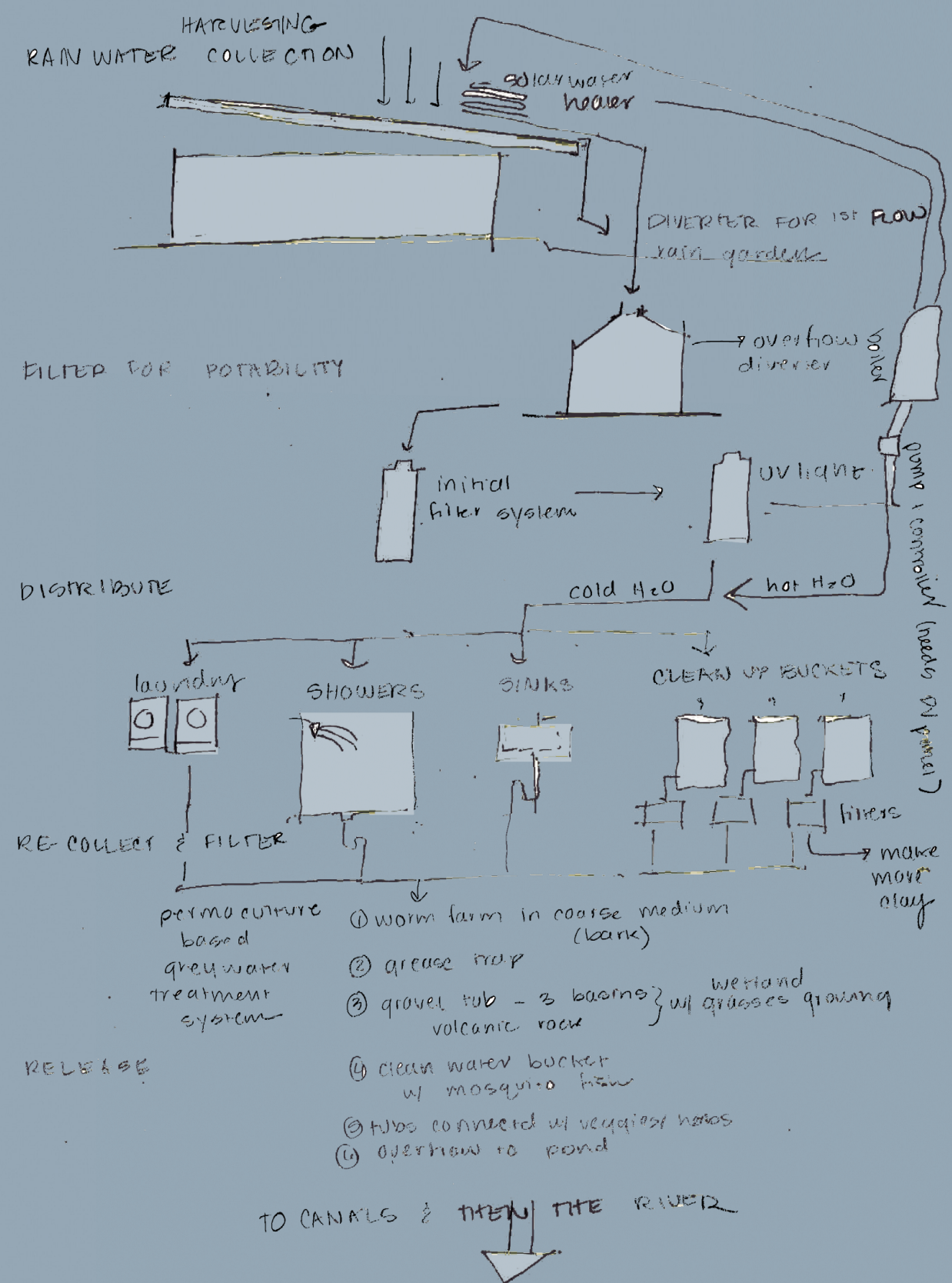


## SITE: ~40 ACRES

- 1) 10 1/2 acres reconstructed wetlands 25% of the site
- 2) ~50% of the site reforested
- 3) remaining 25% carefully designed
  - lawns for recreation & public gathering
  - gardens for food & pleasure
  - rooftops for gathering solar energy & water
  - permeable walkways
  - greywater filtering beds, canals to ensure that nothing that leaves the site is harming the quality of the river ecosystem

# WATER

This project became a reason for me to really explore where potable water comes from and where it goes. The rural site I chose is not connected to a municipal water or sewer system, which is fine considering that discharge from wastewater treatment facilities contributes to 19 percent of nitrogen pollution in the Chesapeake Bay (Chesapeake Bay Foundation). I also found that water levels in wells are being affected by two nearby paper mills that are lowering the aquifer for many miles around them which is causing land subsidence and salt water infusion into the aquifer. In addition, many residential wells in this area are being overdrawn at a rate faster than water released into the septic field can recharge the aquifer. Leaky septic tanks and septic drain fields also contaminate groundwater, delivering pollution to our rivers, which is responsible for 4 percent of nitrogen pollution in the Chesapeake Bay (Chesapeake Bay Foundation). These diagrams show rainwater collection and filtration, distribution through the site, and then phytoremediation as natural greywater treatment. The long length of the stepped phytoremediation beds, or "canals," ensure maximum treatment and visibility of the process throughout the site. Also, the physical connection of the river and constructed wetlands to the canal allows the tide to rise into the end of the canal itself and becomes a powerful visual reminder that the water we dispose of, and whatever is in it, does eventually end up in the river.



DIAGRAMMATIC SITE PLANS

# EARTH+FIRE

The new topography is shown in pancake layers, with darker layers representing higher ground; each layer represents the sloped ground increase of 5'-0". The red boxes shown in the diagram represent photovoltaic roof systems, an energy source drawn from the sun. Most of the public space is heated with both wood stoves and radiant floor slabs. The radiant heat is provided via solar heated water routed in small pipes in the floor. This type of heat is very efficient, keeping the heat close to the human needing it. Wood stoves also provide radiant heat, and because the wood-fired kilns on the site use wood as a fuel source, it is readily available to stoke both the public space stoves and the residential stoves. The solid orange boxes represent earth coming up vertically perpendicular to the earth's surface. These are the rammed earth chimneys. Their solar orientation, on the south side of the cabins, helps them store heat from the sun during the day in their mass and slowly release it at night. The mass of the chimneys is also used in tandem with the wood stoves, helping temper intolerable high temperature swings inside the space.



ILLUSTRATIVE SITE PLAN

# PROPOSED PLAN

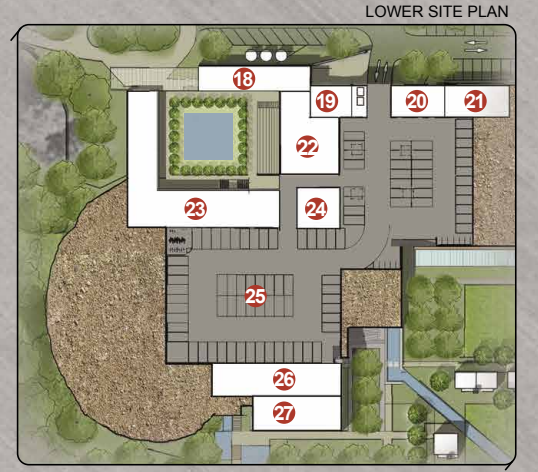
All the elemental strategies diagrammed in the previous pages are layered together to create the final proposed site plan.

### SITE PLAN

- 1 MAIN ENTRANCE AND PORTE COCHERE
- 2 MARKET + VISITOR PARKING: REINFORCED TURF SURFACE
- 3 RESTAURANT
- 4 VISITOR'S CENTER + ELEVATORS
- 5 RESTROOMS + CLEAN DRINKING WATER ACCESS + INDOOR MARKET
- 6 FARMERS MARKET LAWN
- 7 COVERED OPEN AIR FARMERS MARKET STALLS
- 8 EVENT PAVILION
- 9 CERAMICS STUDIO
- 10 GREENHOUSE, TYP.
- 11 PAVILION + GREENHOUSE STORAGE SHED
- 12 KILN SHED
- 13 STUDIO RESTROOMS
- 14 POTAGER "KITCHEN" GARDENS: RAISED BEDS, PLANTED ROWS, ETC.
- 15 CABIN: TYPICAL DOUBLE UNIT
- 16 CABIN: SINGEL ACCESSIBLE UNIT
- 17 RESTROOM + SHOWER + LAUNDRY + CLEAN DRINKING WATER ACCESS

### LOWER SITE PLAN

- 18 GENERAL STORE: CERAMICS SUPPLIES + GENERAL NEEDS
- 19 LOADING DOCK + ELEVATORS
- 20 PV BATTERIES AND ELECTRICAL
- 21 COMPOSTING TOILET BIOCHAMBER ACCESS
- 22 ROOT CELLAR
- 23 GALLERY
- 24 GALLERY + STUDIO STORAGE
- 25 TEACHER + STUDENT PARKING: 100 CAR PARKING GARAGE + BIKE LOCKERS
- 26 RAINWATER FILTRATION AND PUMP ROOM
- 27 COMMUNITY LIVING ROOM



Cat Point Creek

Rappahannock River

Cat Point Creek



Stephanie Burcham (b.1990)  
*Bowl 2, 2019*

Wood-fired earthenware clay

### III. PUBLIC SPACE

Public space in the context of this project is the studio and gallery areas, restaurant, convenience store, and farmer's market. I designed the gallery as a check-in destination for student residents. There is a covered porte-cochere drop off that leads directly into the gallery, so you can be checked in by friendly gallery staff and then peruse the collection before you head off to find your cabin. This space can also function as a drop-off point for restaurant go-ers as well. Between the gallery and restaurant, I've located a small convenience store that will provide toiletries and essentials for guests, campers at the campground, and residents of Naylor's Beach. In addition to normal supplies and food items, the store will also carry clay, tools and other supplies necessary for the studio classes. Nestled between this convenience store, the restaurant and the root cellar is a loading dock to bring in the supplies and additional foods not grown on site, and to take out the trash and recycling.

The gallery, convenience store and restaurant bound the first "relaxation" courtyard to help visitors de-stress from daily life and enter the retreat. A reflecting pool surrounded by shade trees is located in the center of the courtyard. At the far end of the courtyard near the restaurant is stepped seating adjacent to a grand stair for outdoor classes or simply to lounge upon at your leisure.

The ceramics studios are also designed around a courtyard with a central greywater filtration bed for dirty water disposal that begins the series of natural greywater filtration beds that eventually lead to Cat Point Creek, the Rappahannock River and the Chesapeake Bay. This, more private courtyard, creates a sense of community and occupies the highest, most sacred, ground on the site. Clay art is unique in that it changes at every step in the process of making, such that you can't 100% predict the final outcome, so when you bring your pot to the kiln it represents a sacrifice to the gods of fire and earth that your pot will emerge from the flames as beautiful as you hope to expect. The courtyard design also maximizes visual line of site both to the kilns as a safety feature, and to highlight the water collection from the roofs.

There is one bath house for the gallery and studios that provides water for all of the students. At the start of a day of making pottery, you must go retrieve all the water you think you will need for that session in your own personal bucket. Rather than having running water readily available, having to physical carry, or wheel, all the water you will use for making for the day or for a single sitting is a restructuring of the normal east coast mindset toward potable water, a reminder that you are using a precious resource; it's a mental awareness challenge. At the end of a making session, the clay will settle to the bottom of the bucket, and clean water will form on top, ready to be used in the next session. When the buckets get sufficiently full with clay, that wet slop is emptied into a plaster bowl, which absorbs any excess water and allows for the scrap clay to be wedged into a workable condition again.

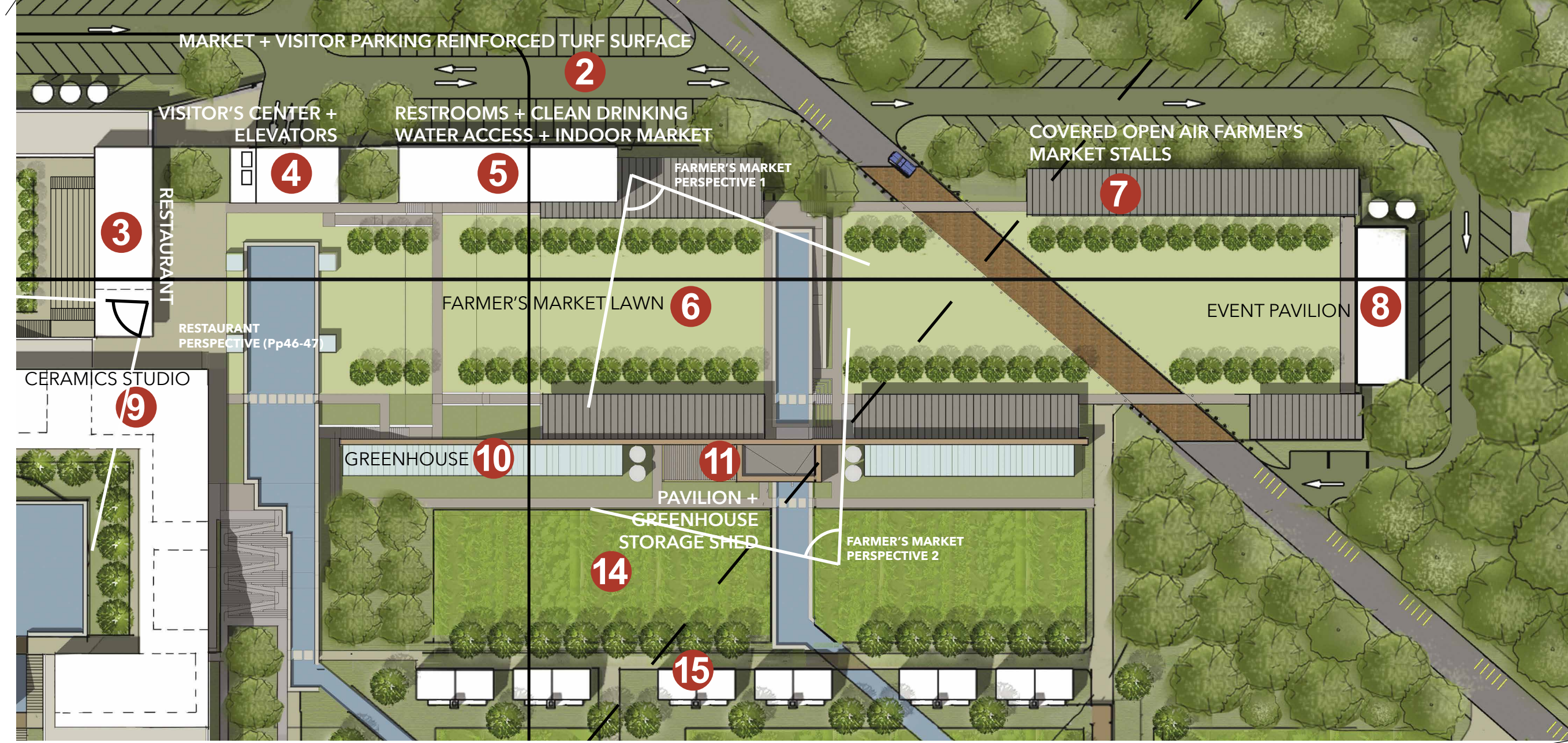
The gallery and studios are designed using long, thin floor plates, and high ceilings to optimize natural light and ventilation. Clay dust is an irritant and the silica in clay is a carcinogen when particles are inhaled so working with clay requires excellent ventilation. The large awning style doors also enliven a rich indoor-outdoor space, taking advantage of maximum floor area on acceptable weather days. The interior of the space is also designed to be easily re-arrangeable for whatever is needed for future classes or workshops, or more or less students. A storage space for excess equipment and furniture is located on the lower level.

The construction of the public space uses rammed earth walls for the lower level, to symbolize a heaviness, a strong connection to the earth, while the upper levels are heavy timber structure with wood sheathing and cladding, and standing seam metal roofs.

CONCEPTUAL IDEAS

# FARMER'S MARKET

I love how farmer's markets bring communities together on a Saturday morning. I also appreciate how, even in today's supermarket society, you can still interact with the people who grew the food you are about to consume. In this area of the project, I combined a public lawn space with a farmer's market to create a real community gathering space that has the potential to be alive with families on the weekends, buying and selling excess food from the potogger gardens on site, crafts, pottery, and gathering for outdoor live concerts and events. I extended the lawn and market over the main road which allows for a glimpse into the action as you may be driving or biking past. The restaurant is located strategically at the highest point of the market, in a prominent position at the head of the "table" so to speak. This also helps with geolocation, in case a visitor may be trying to go to the restaurant from another town for the first time, you will drive by it and notice it from the main road before you have to make a series of turns to find parking.



Below is a view of the farmer's market stalls, that on the weekends would be filled with produce, crafts, pottery and other goods for sale. In the background, just visible, is an opening in the rammed earth site wall, used as a heat sink for the greenhouses and a delineation between public space and residential space, that will lead to a small pavilion for contemplation and a shady escape from the summer sun.



FARMER'S MARKET PERSPECTIVE 1

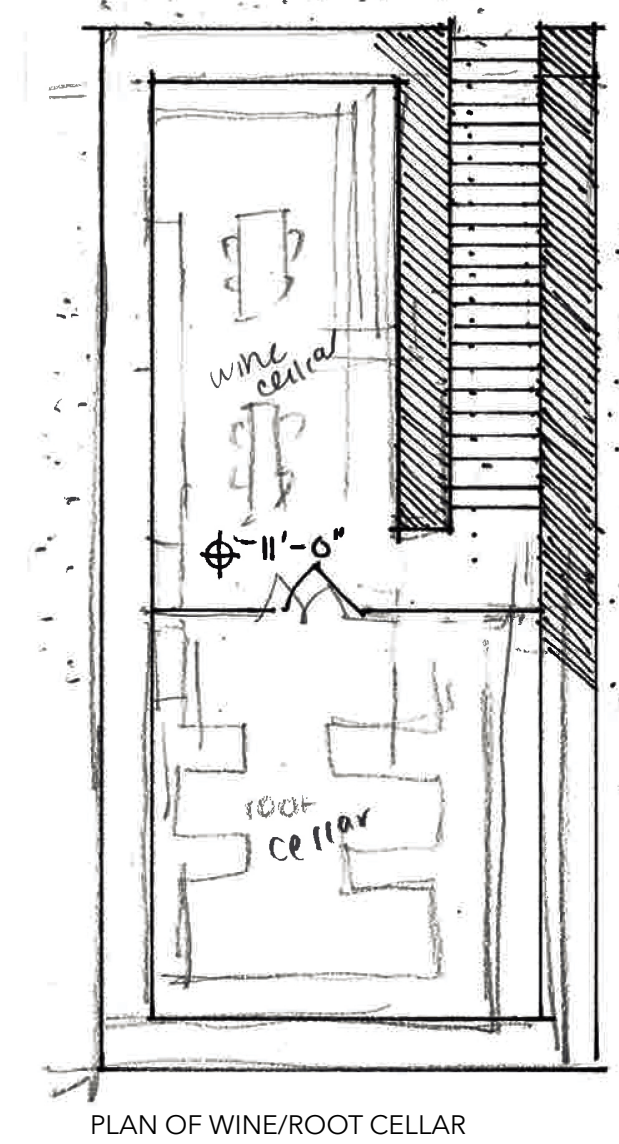
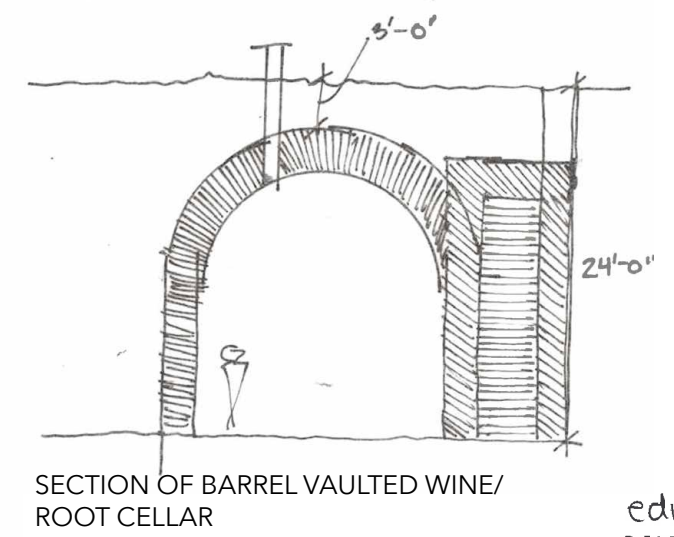
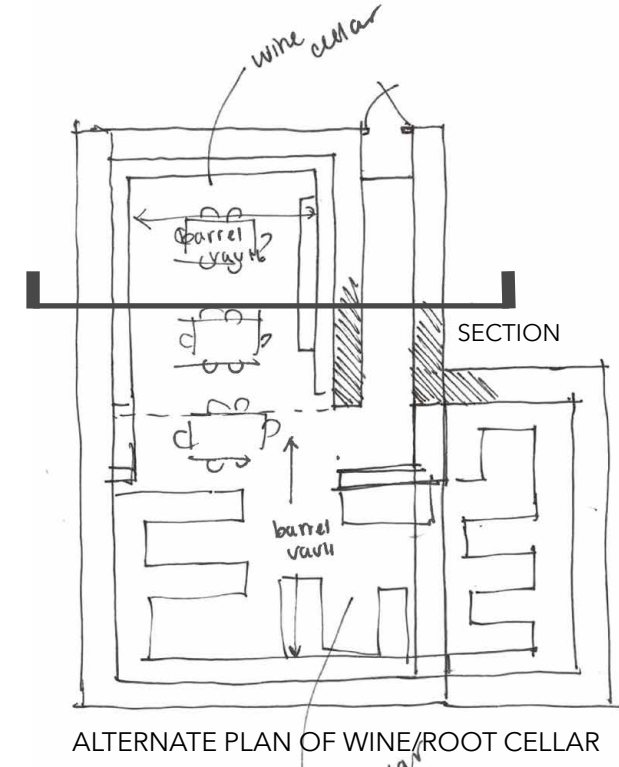
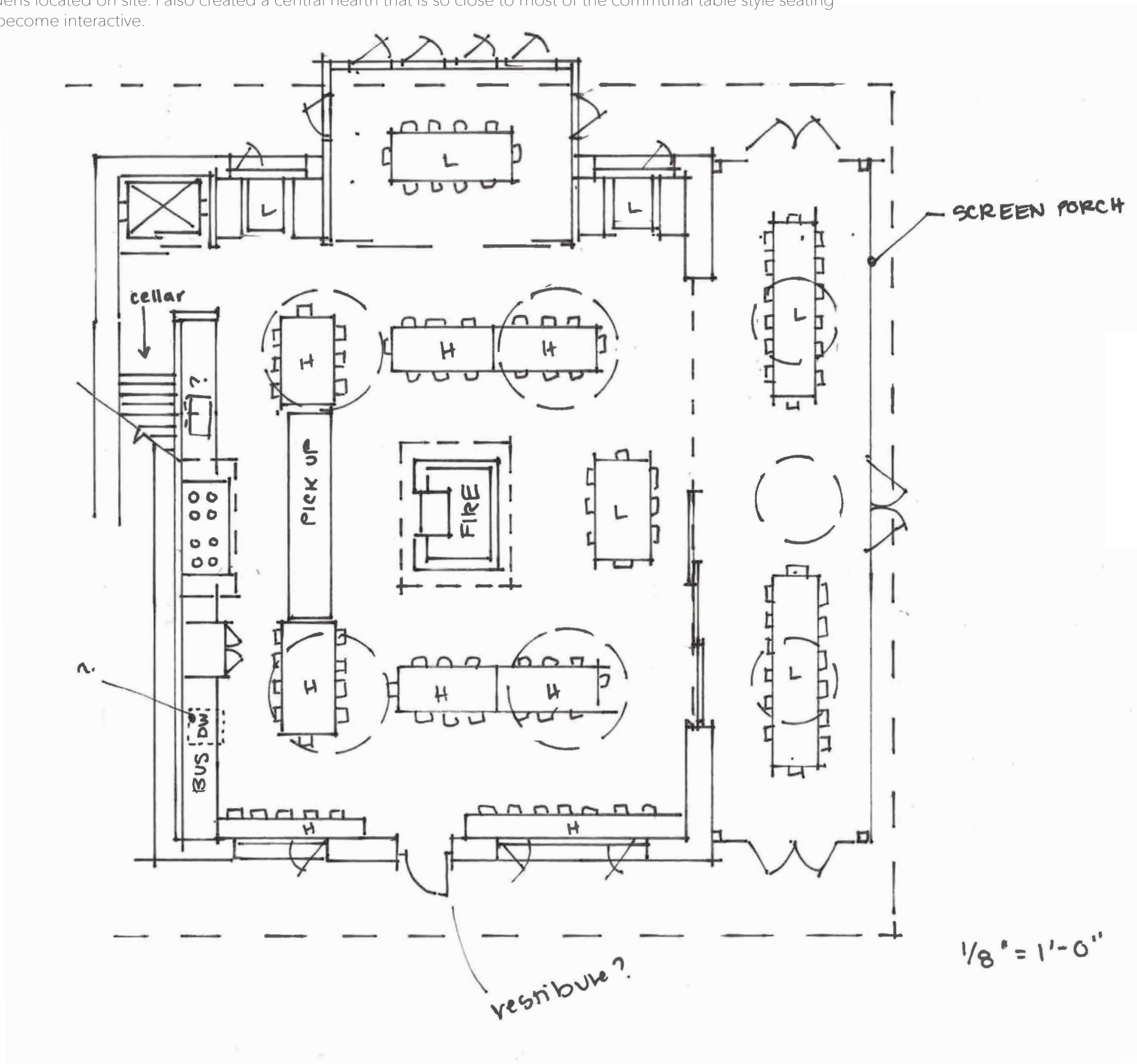
This perspective below shows a view of the pavilion from the residential side of the site. This is the beginning of one of the greywater phytoremediation "canals," which use plants to remove toxins from water that has been used on the site. This particular canal, one of three, would be mostly used for greywater from the greenhouses and the farmer's market bath house. The view below is representative of only the architectural design. The canal would be full of soil, grasses and plants, and during heavy rains, the water collected on the low slope roof of the pavilion would rush out of the decorative scupper, creating a waterfall effect into the canal below. The fenced in area to the left of the pavilion would be used for gardening supplies, landscape maintenance and storage for the greenhouses.



FARMER'S MARKET PERSPECTIVE 2

# RESTAURANT + DINING

The on-site restaurant was never fully developed, but conceptually, I thought about Michael Pollan's book "Cooked" which identifies ways in which we prepare food by categorizing them by the four elements. Air as baking, fire as grilling, water as boiling, and earth as fermentation. For this restaurant, I wanted to highlight those different ways of cooking, especially the fire element as that would be the most visible method. I designed an open kitchen concept so that all the cooking is completely visible. Instead of massive walk in coolers, I created a root cellar for storage of harvested fruit and vegetables from the potager gardens located on site. I also created a central hearth that is so close to most of the communal table style seating that it could become interactive.



**KITCHEN/ RESTAURANT DESIGN**

Sitka & Spruce Seattle, WA

educate people ← open design - can watch the cooking

PRIMAL

Multi-use gathering/meeting space

events

open hearth cooking?

Et Che Bar Chicago

Maydan D.C.

Imperial Portland

tandoori oven

clay walls

2 people run the fire full time

only dinner

root cellar / wine cellar

w/ in root cellar

below frost line

humidity

ventilation

chopping tables for veggies

Shorten distance between the consumer & the source of the food

other ways of preservation—

picking, salting

canning

you basically only need a refrigerator for storing animal products

PERSPECTIVE

# RESTAURANT + DINING



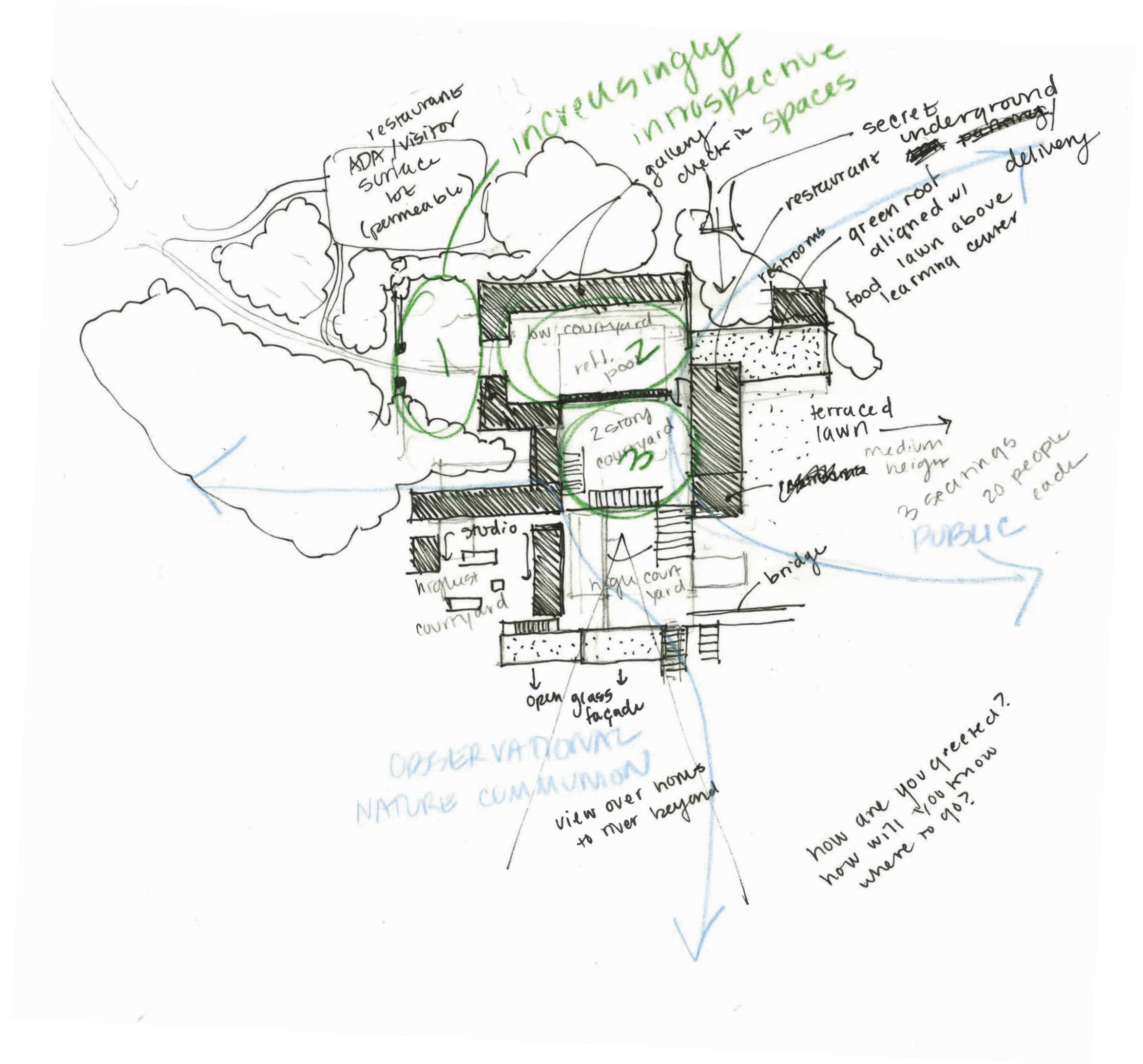
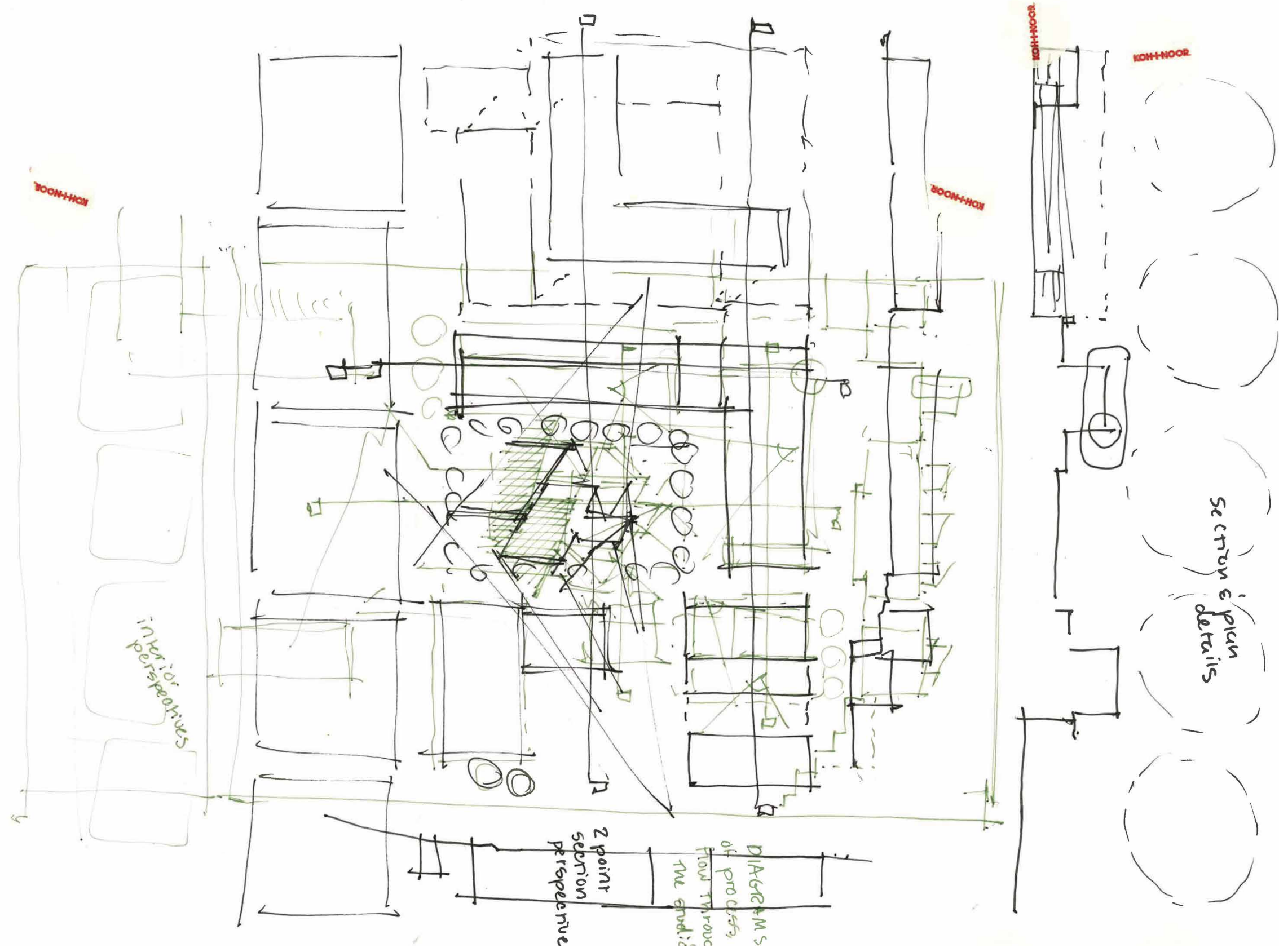
SITE ORIENTATION

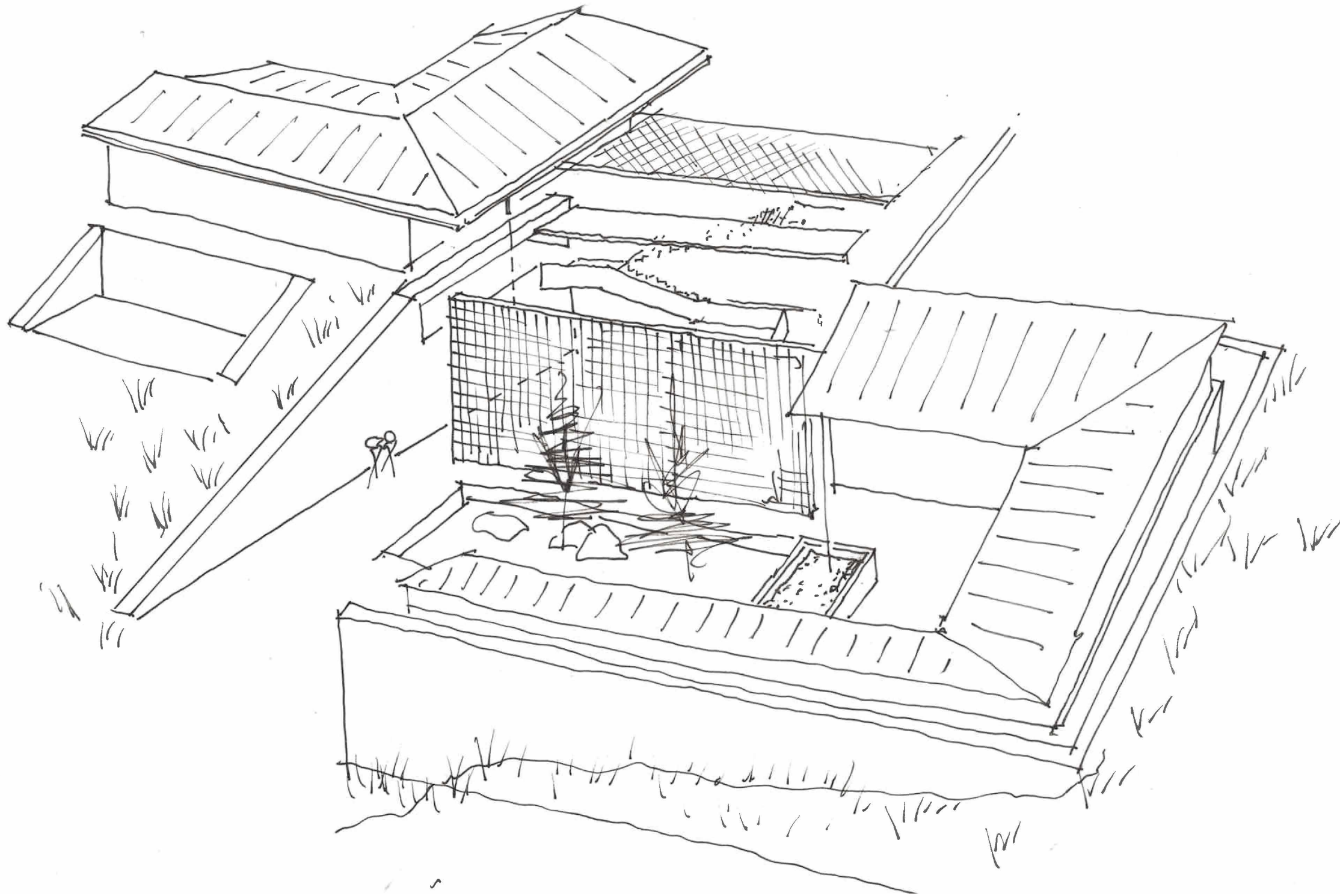
# GALLERY + CERAMIC STUDIO

Right: Enlarged site plan view of gallery and ceramics studio.



# EARLY SKETCHES





CERAMICS STUDIO

Program

- 1 Gallery / welcome center / check in
  - 2 + program mentioned page 7
- except:
- kick wheels in view of electric
  - no heat lamp / fan drying tables/area
  - only provide 1-2 janitors sinks
  - use buckets / trash cans instead for cleaning up like ACC
  - no electric or gas kiln
- maybe provide (1) for accessibility / dider students
- 3 communal restrooms w/ compostable system
  - 4 communal living room large
- led lighting / natural ventilation

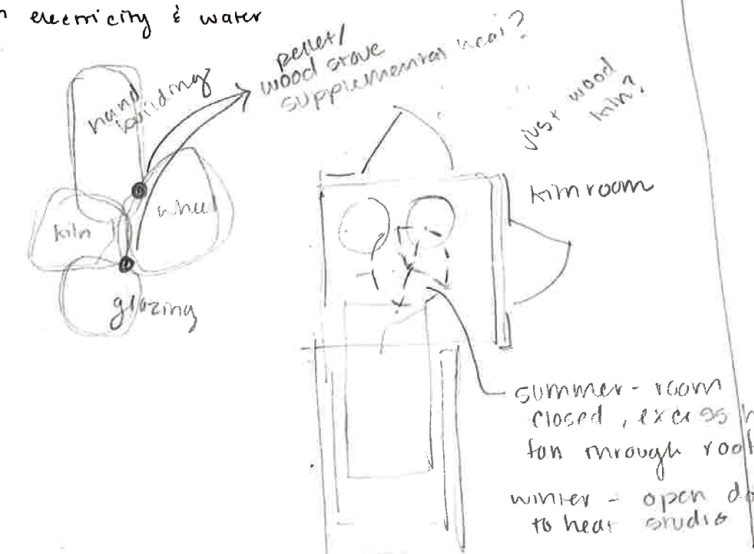
Other considerations

- how to provide natural vent. in winter w/ wood stoves?
- Wet clean-up → what kind of flooring can withstand this?
- concrete? → hard to recycle @ end of life, pile of rubble
- hard on your feet

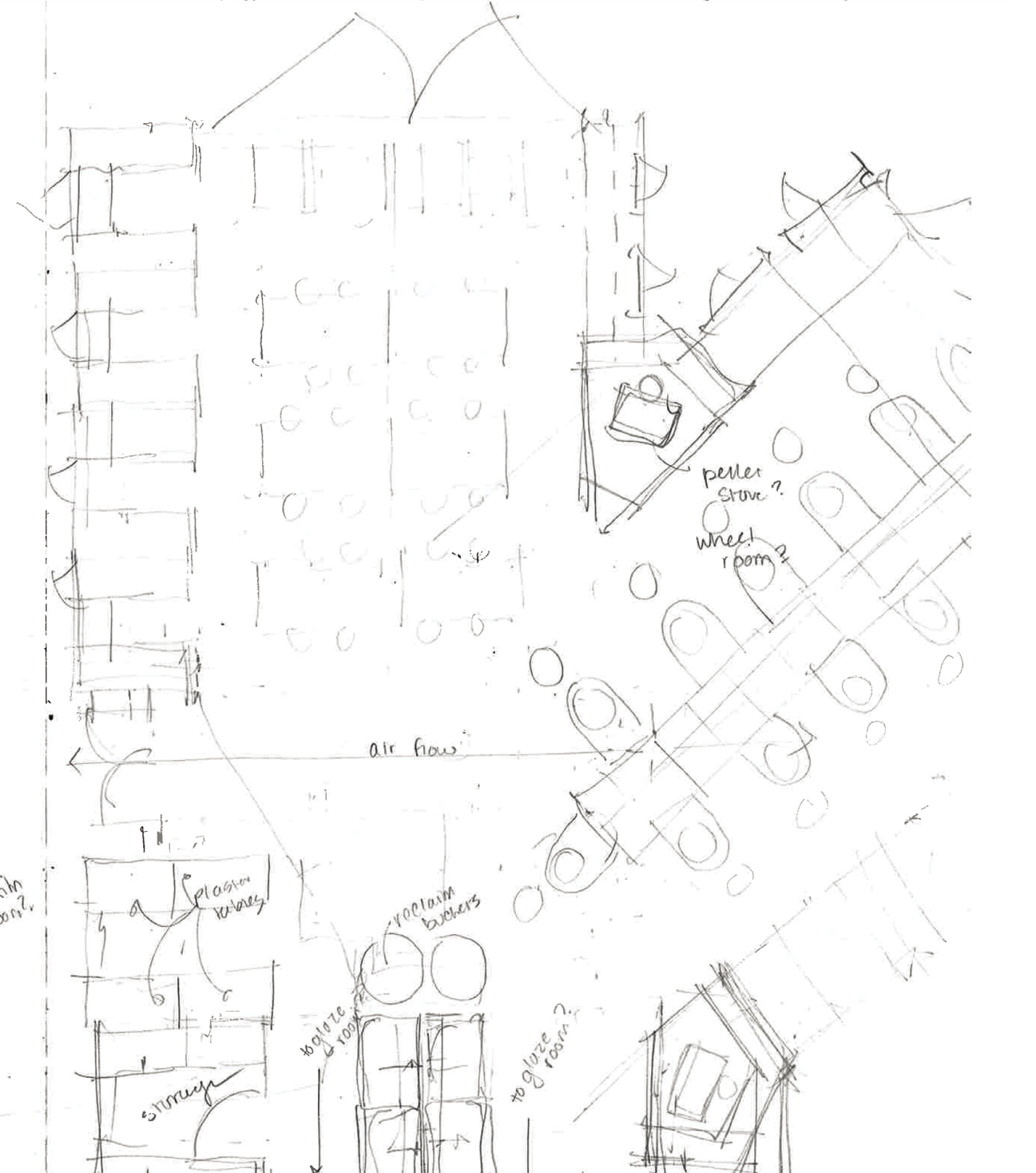
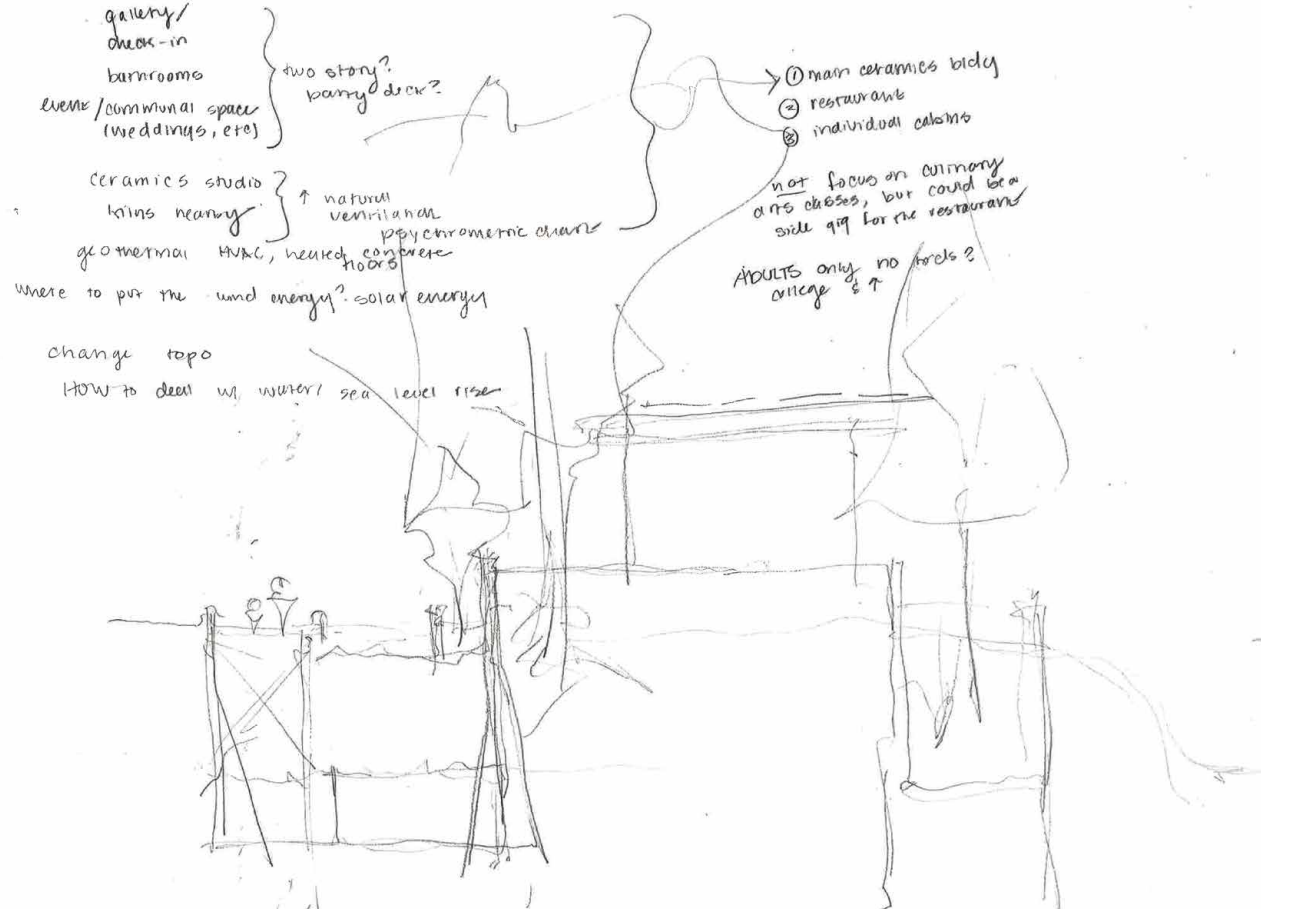
CERAMICS

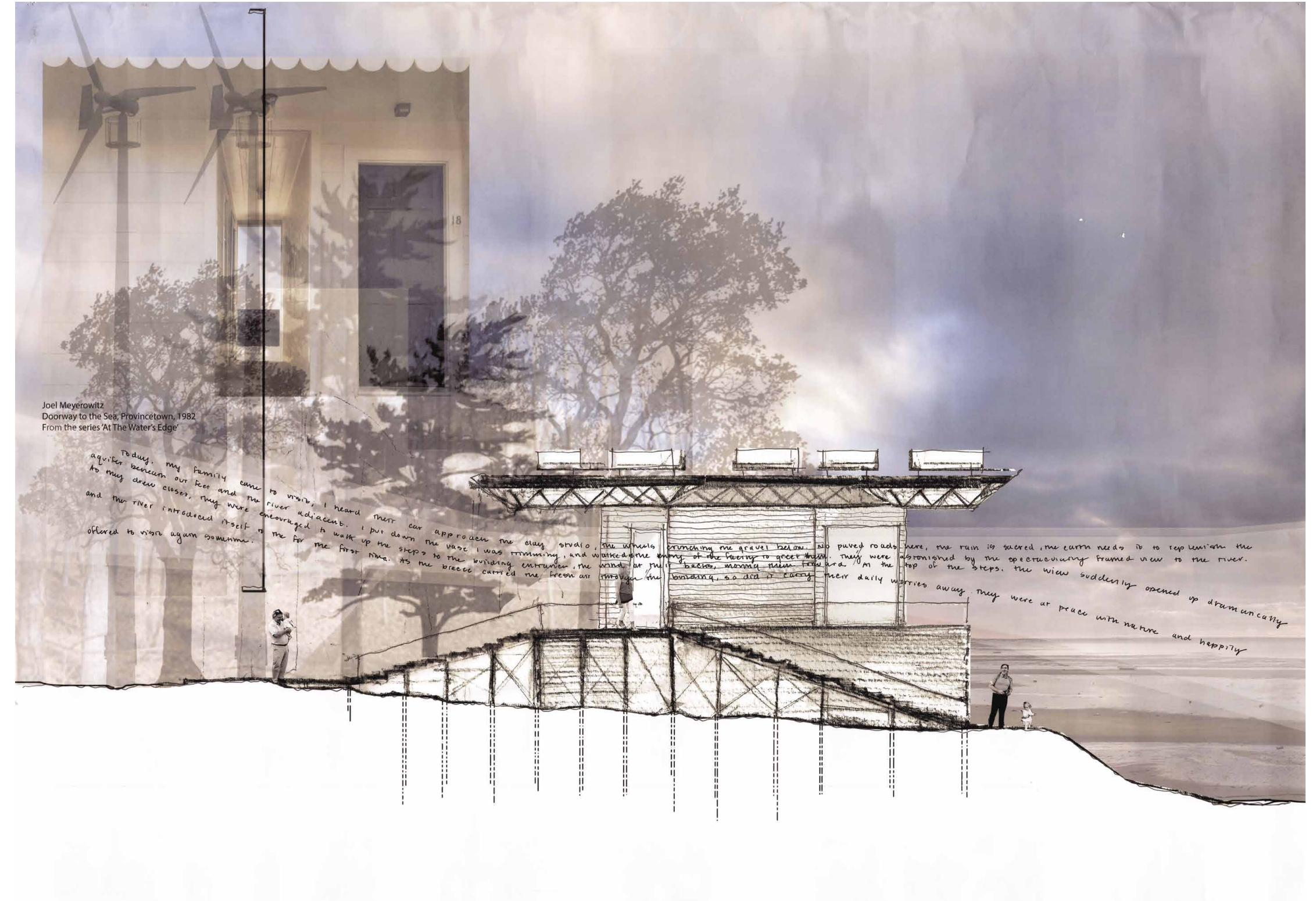
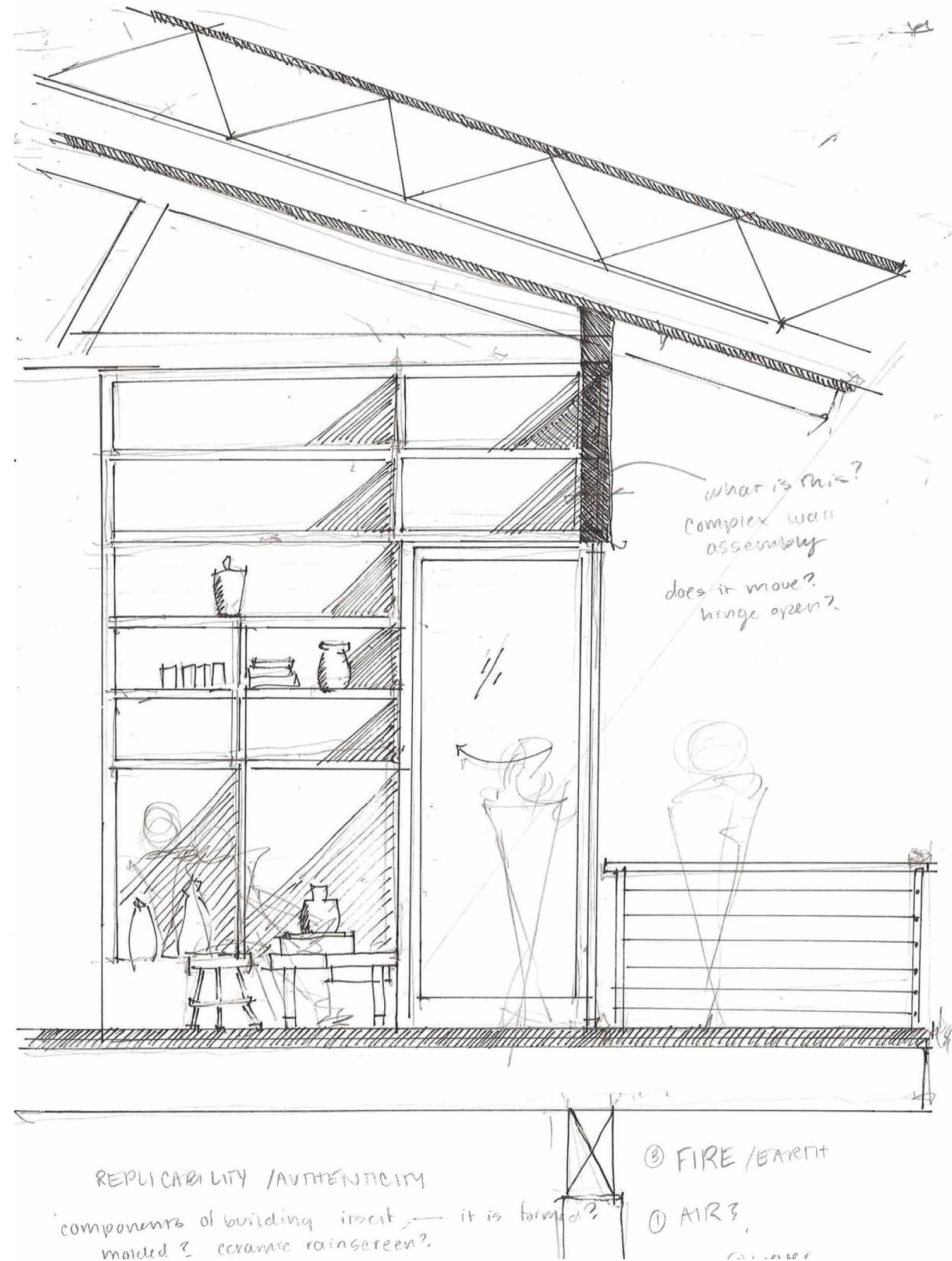
- work area (communal)
  - 4-6 large tables covered in canvas for hand-building
  - storage / shelves / cubbies for individual use, drying greenware, etc.
  - plaster tables for drying wet, used reclaim clay
  - reclaim buckets
  - box clay storage / slip storage, buckets
  - multiple deep work sinks for cleaning tools, etc.
  - storage closer for supplies
  - large area w/ electric hookup for pottery wheels (15-20) for class purposes
  - music / speakers in walls / ceilings
  - slab roller heat lamp drying table
- \* copy this at a smaller scale for individual artists that wish to have private work areas (about 3-4 private study)
- glaze area
  - glaze tables, easily cleaned surface
  - glaze bucket storage (rolling carts?)
  - storage closet for glazes & supplies
  - rolling shelves to transport to kilns
  - large shelves for storage of pieces before / after firing
  - near each other
- kiln room
  - gas (reduction) kiln & kiln shelf / riser storage
  - electric (oxidation) kiln & "
  - rolling carts
- \* only provide one kiln room
- \* exterior kilns? wood-fired kiln? bonfire type or raku kilns?

special considerations - how to get heat out of kiln room  
 does the kiln room have to be inside? constant temp?  
 high draw on electricity & water



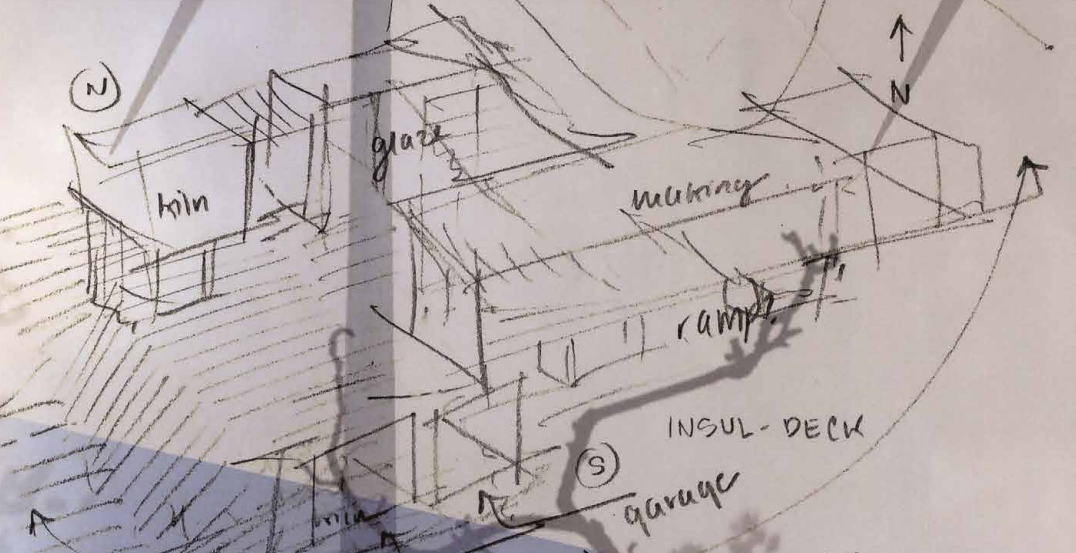
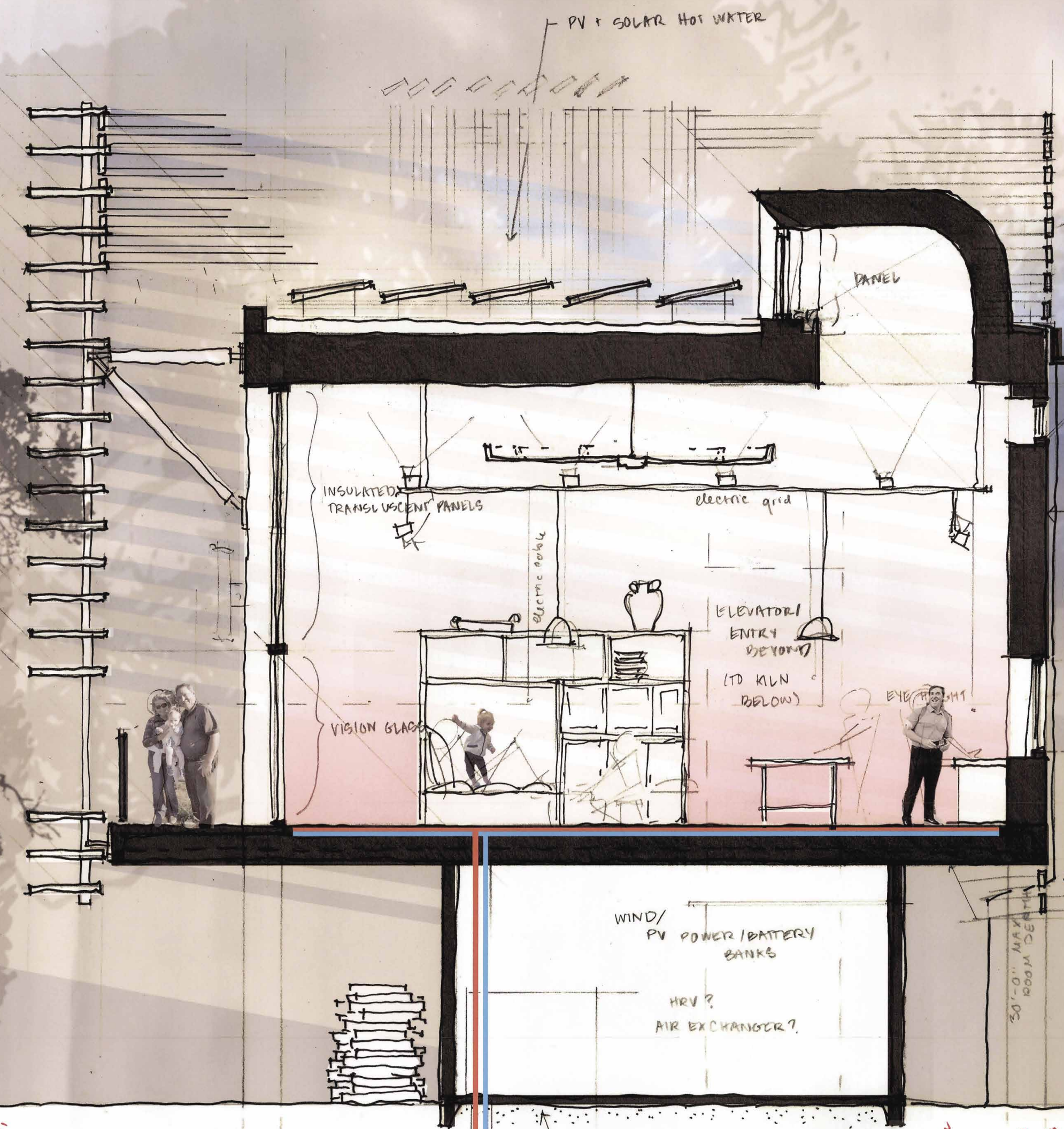
MAIN BUILDING / CLUSTER OF BLDGS.







SHOW WINTER SUN



artificially raise the ground?

(2) Sky stream 2.7 wind turbine  
1000 kWh / month  
(1) kiln 20 kWh  
400 kWh / month

SKWH 1027  
(7 cubic feet)  
11520 watts  
11.52kw  
8-10 hours to fire  
116kwh total

Solar panels  
100 sqft of roof per kW?  
of a solar system

Energy Department (NREL)  
PV Watts calculator

battery bank! amp hours?  
1100Ah

5kwh / m<sup>2</sup> / day?  
20° tilt (from south?)

65" x 39" 300 watts average

evenly sl of roof space  
15 watts

fire a kiln twice per week  
250kwh / wk x 4 = 1000kwh  
1250 to fire

100kwh battery

24kwh = 500amp hours  
Ah

(4) 130 Ah lithium ion batteries

It was finally firing day, this day in December. The leaves had all fallen and the potters had just completed some of their best works. We invited our families to gather for the big event. Today we celebrate the earth and the power of fire. Of warmth. From the interior of the studio, we could see the kiln being loaded with logs from fallen trees in the local area, stored under the building in a protected area to dry over the last several months. We were warm inside behind our thick, insulated walls. The sun streamed through the exterior shading device when it would have been blocked in the summer keeping us cool, but now it happily keeps us warm.



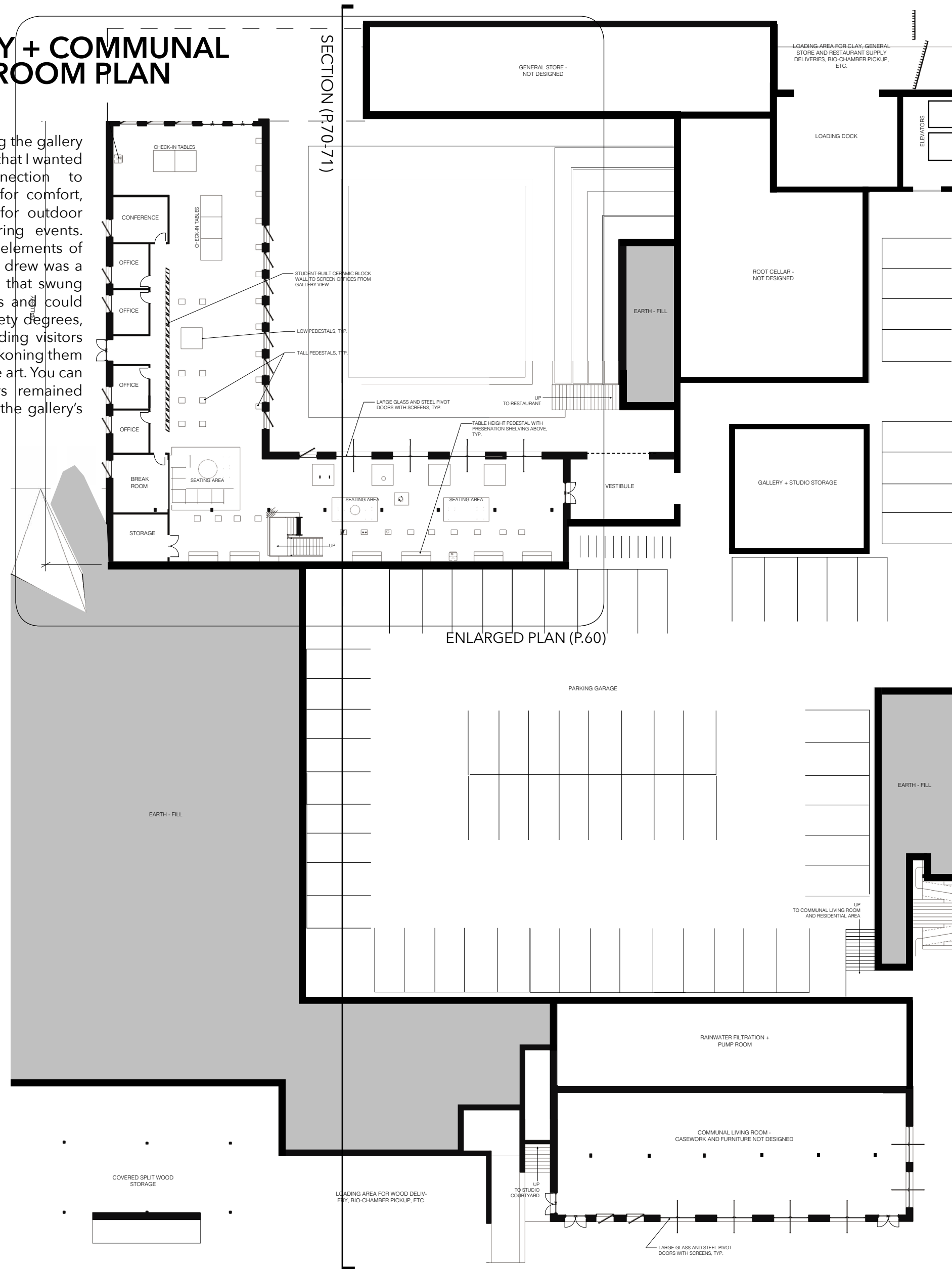
Beneath our feet, the floor radiates warmth from the earth. Geothermal heat, if heat is lost too quickly to the tall ceilings, we can turn on the fan to recirculate it back to the human occupied level. The tall ceilings allow the heat to rise away from the working potters in the summer, and in the winter, by heating the floors rather than providing forced air from above, we are also working with nature to provide a comfortable space to occupy. The potters and their families happily enjoy each other's company and talk about the excitement of the works that they've created being fired in the kiln from within the warm comfortable space of the building interior.

forced air from above, we are also working with nature to provide a comfortable space to occupy. The potters and their families happily enjoy each other's company and talk about the excitement of the works that they've created being fired in the kiln from within the warm comfortable space of the building interior.

# GALLERY + COMMUNAL LIVING ROOM PLAN

LOWER LEVEL

I began exploring the gallery design knowing that I wanted a strong connection to outdoor space, for comfort, enjoyment and for outdoor art displays during events. One of the first elements of the gallery that I drew was a large pivot door that swung on a central axis and could stay open at ninety degrees, thus literally guiding visitors outdoors, or beckoning them inside to view the art. You can see those doors remained in the design at the gallery's lower north wall.



ENLARGED PLAN (P.60)

ENLARGED PLAN (P.62)

ENLARGED PLAN (P.64)

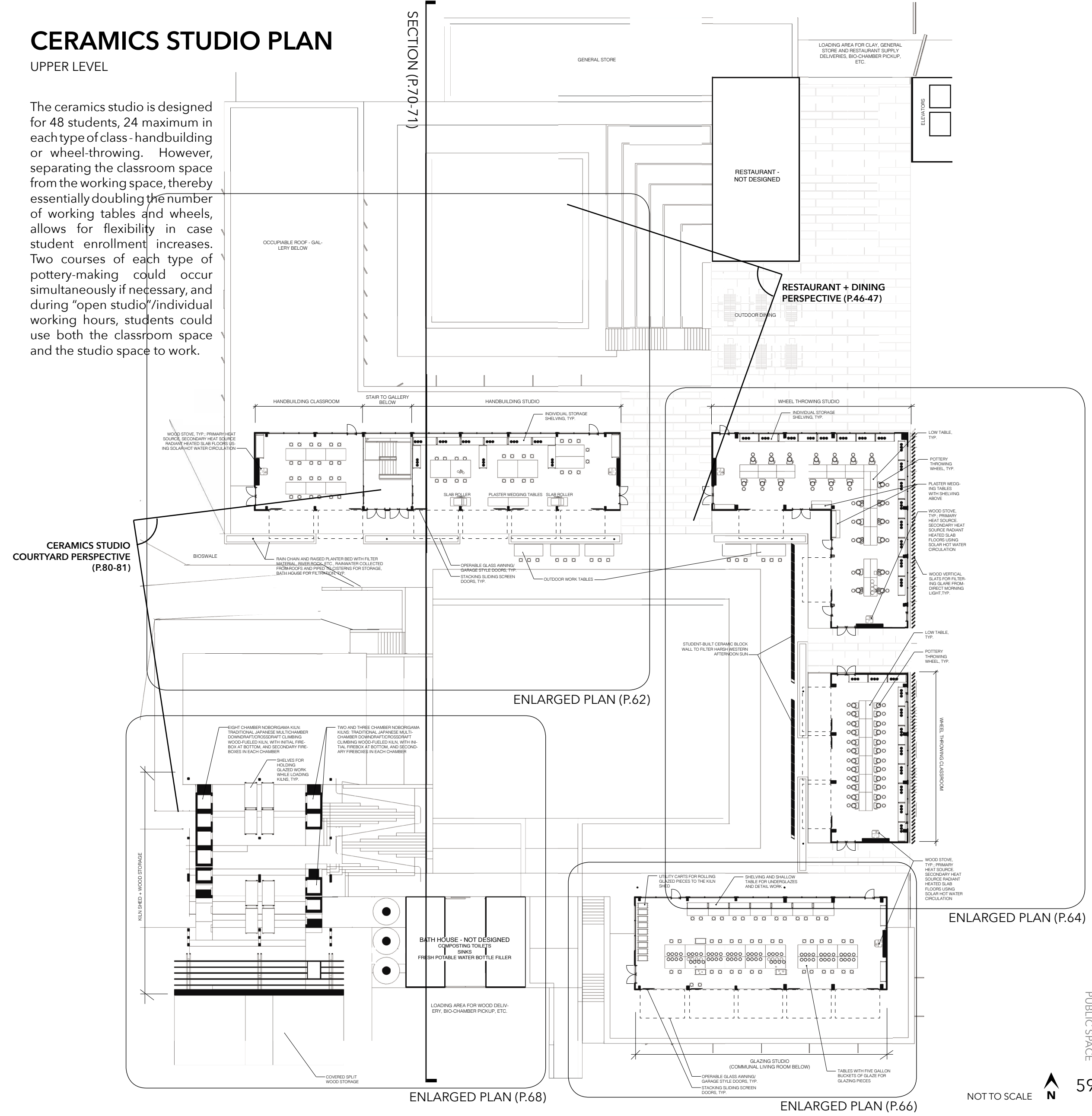
ENLARGED PLAN (P.66)

ENLARGED PLAN (P.68)

# CERAMICS STUDIO PLAN

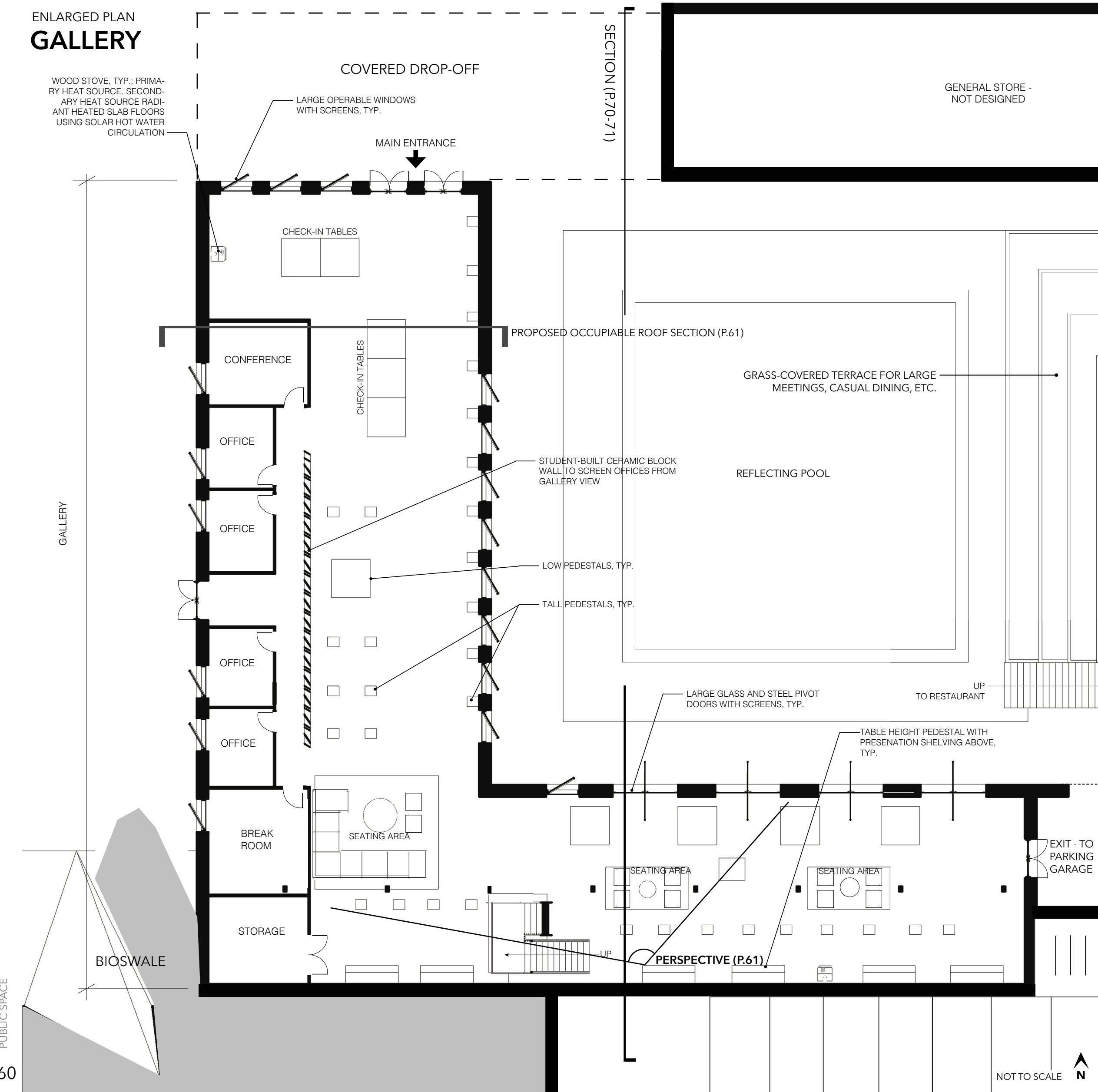
UPPER LEVEL

The ceramics studio is designed for 48 students, 24 maximum in each type of class - handbuilding or wheel-throwing. However, separating the classroom space from the working space, thereby essentially doubling the number of working tables and wheels, allows for flexibility in case student enrollment increases. Two courses of each type of pottery-making could occur simultaneously if necessary, and during "open studio"/individual working hours, students could use both the classroom space and the studio space to work.

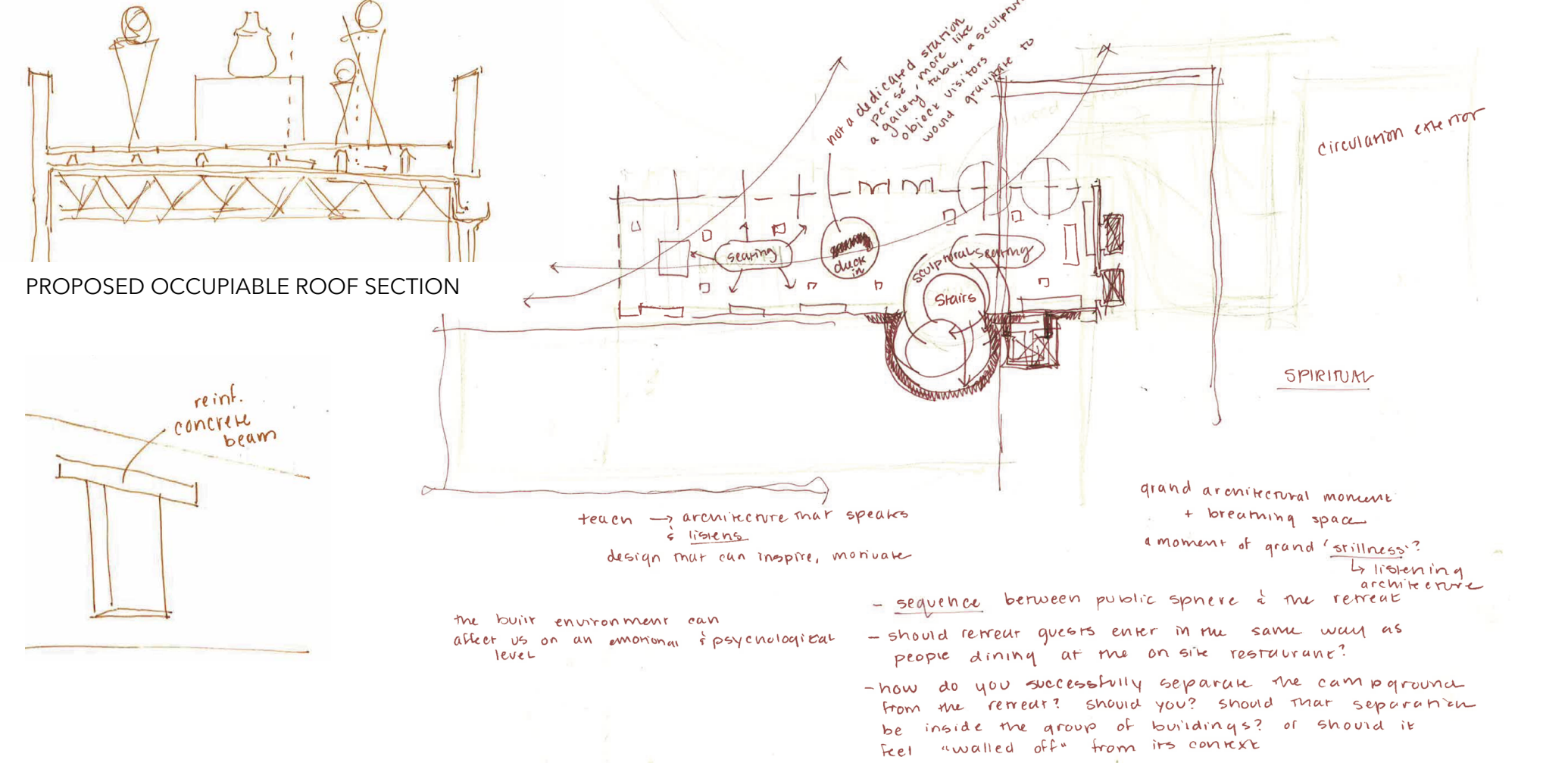


ENLARGED PLAN  
**GALLERY**

WOOD STOVE, TYP.: PRIMARY HEAT SOURCE. SECONDARY HEAT SOURCE RADIANT HEATED SLAB FLOORS USING SOLAR HOT WATER CIRCULATION



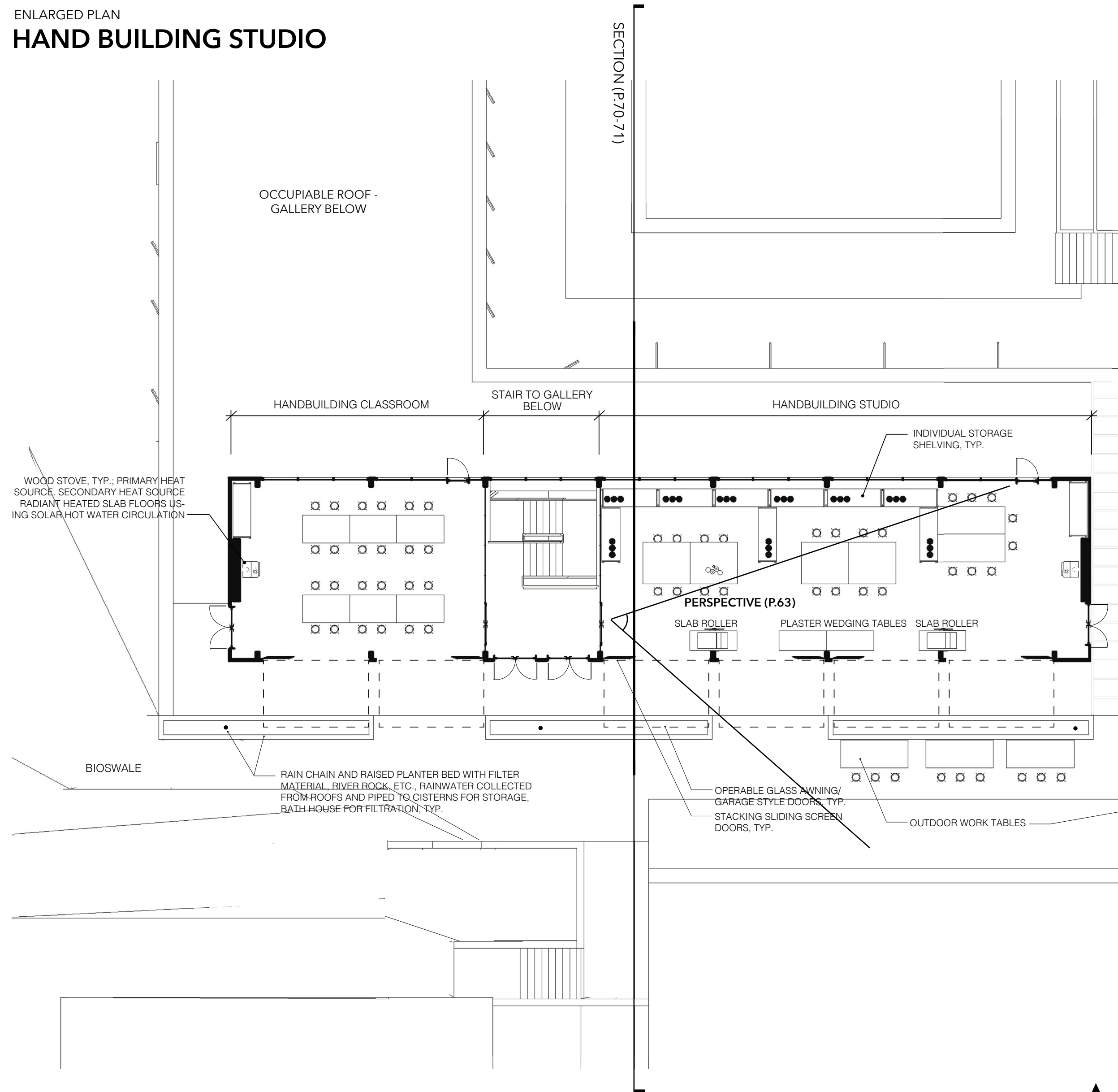
rooftop gallery



Perspective of proposed gallery



ENLARGED PLAN  
**HAND BUILDING STUDIO**

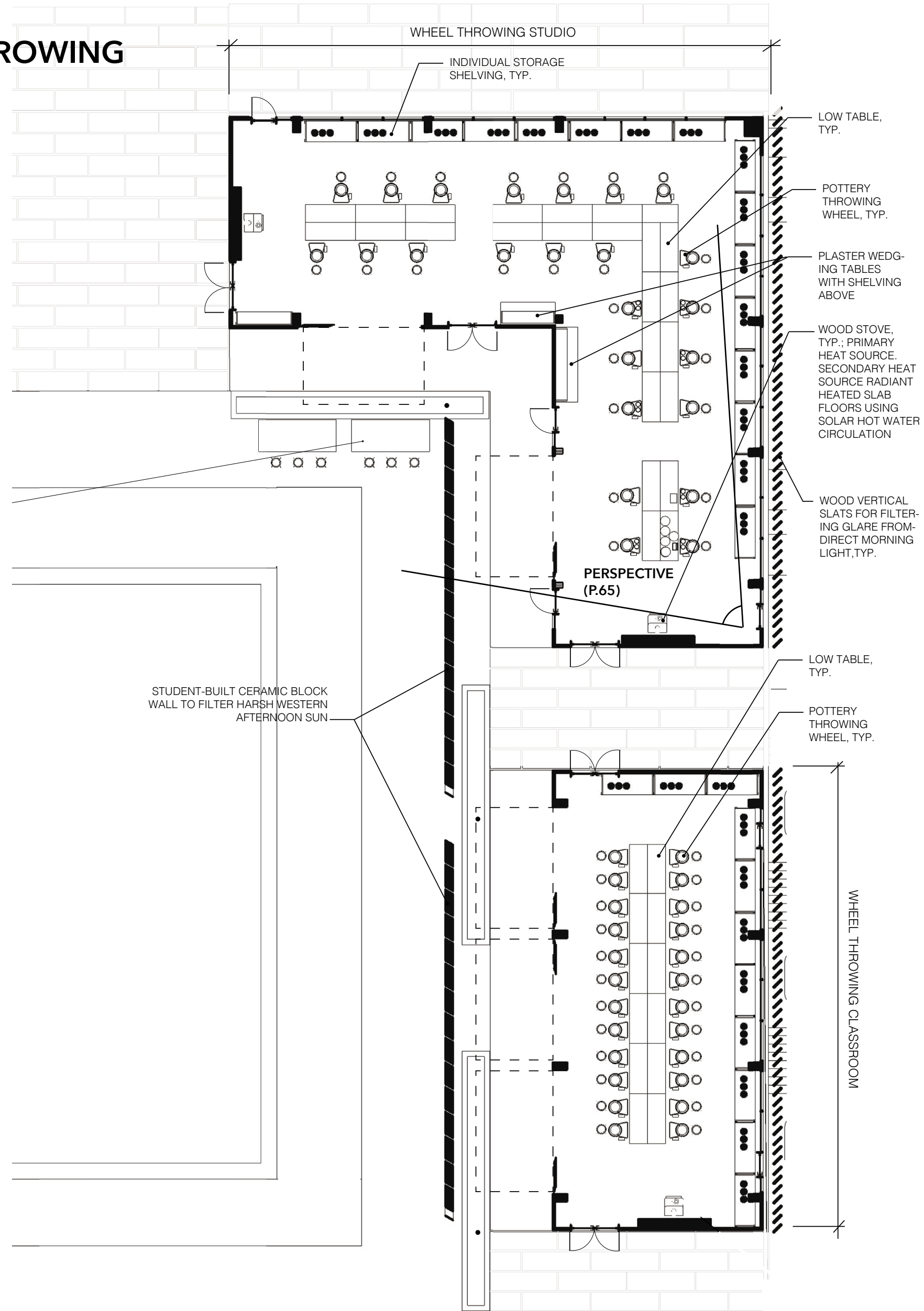


View of hand building studio at Alexandria Clay Coop.  
 PHOTO BY STEPHANIE BURCHAM



Perspective of proposed hand building studio

ENLARGED PLAN  
**WHEEL THROWING  
 STUDIO**



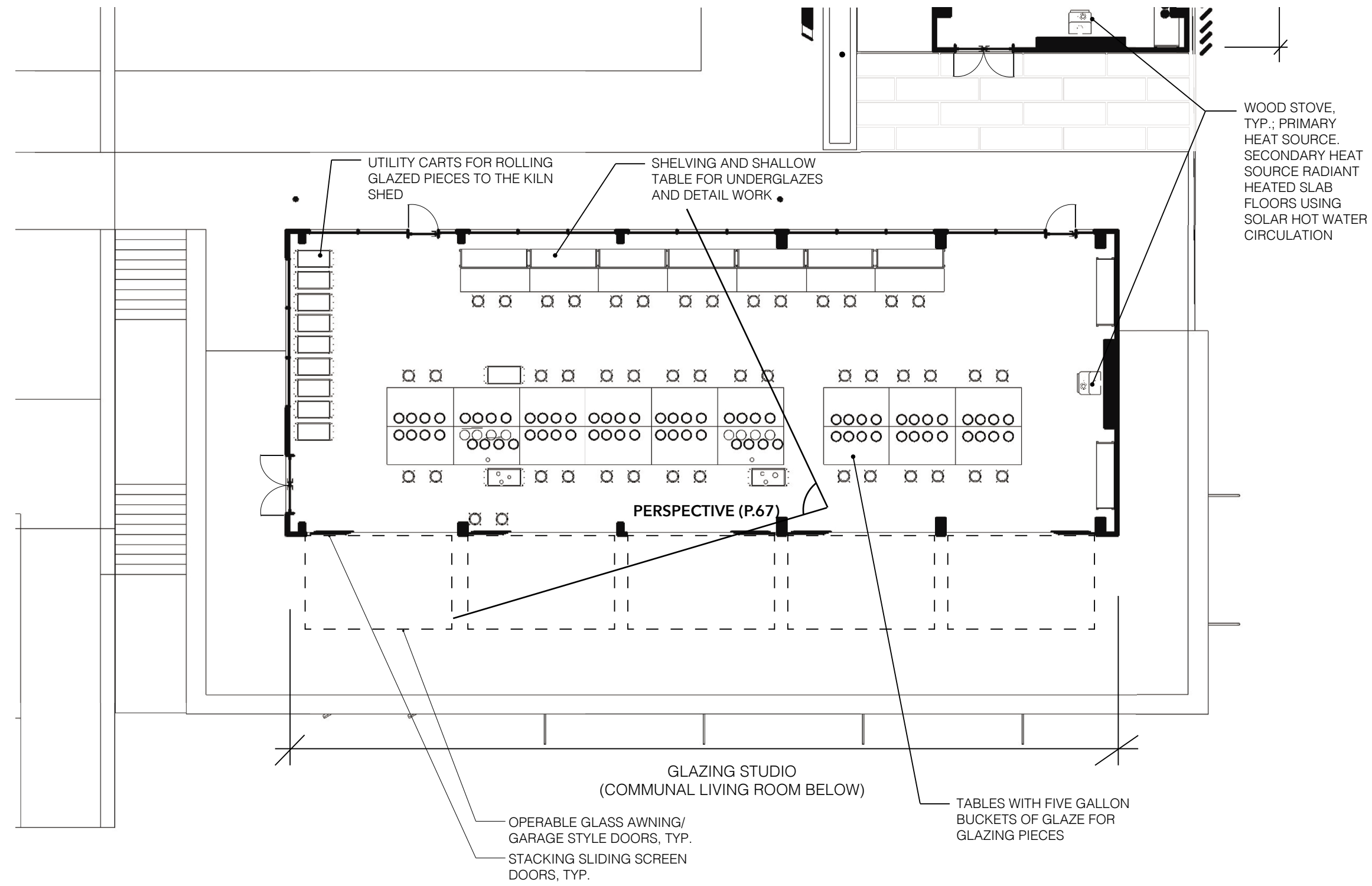
View of upstairs wheel throwing studio at Alexandria Clay Coop.  
 PHOTO BY STEPHANIE BURCHAM



Perspective of proposed wheel throwing studio

ENLARGED PLAN  
**GLAZING STUDIO**

The glazing studio footprint was designed to accommodate all 48+ students simultaneously. The way that wood-fired kilns work, especially kilns as large, or many-chambered, as is proposed, is that each student would have to fill so many cubic feet of space for the kiln to fire properly. Which normally means there is a mad rush to glaze all the pieces that you have that are ready to glaze right up until the moment the kiln doors are bricked closed. Also, there are very few wood kilns in Virginia, so local artists from all over the state would likely bring their own pieces to fire with the group here for a small fee. It's very difficult to transport glazed pottery without chipping or otherwise damaging the unfired glazed surface, so all outside artists would have to glaze on site, further increasing the demand for space in the glazing studio.



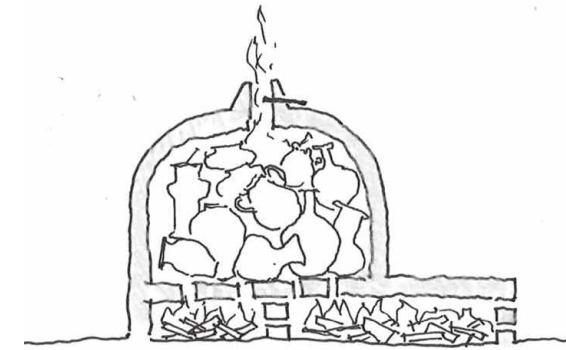
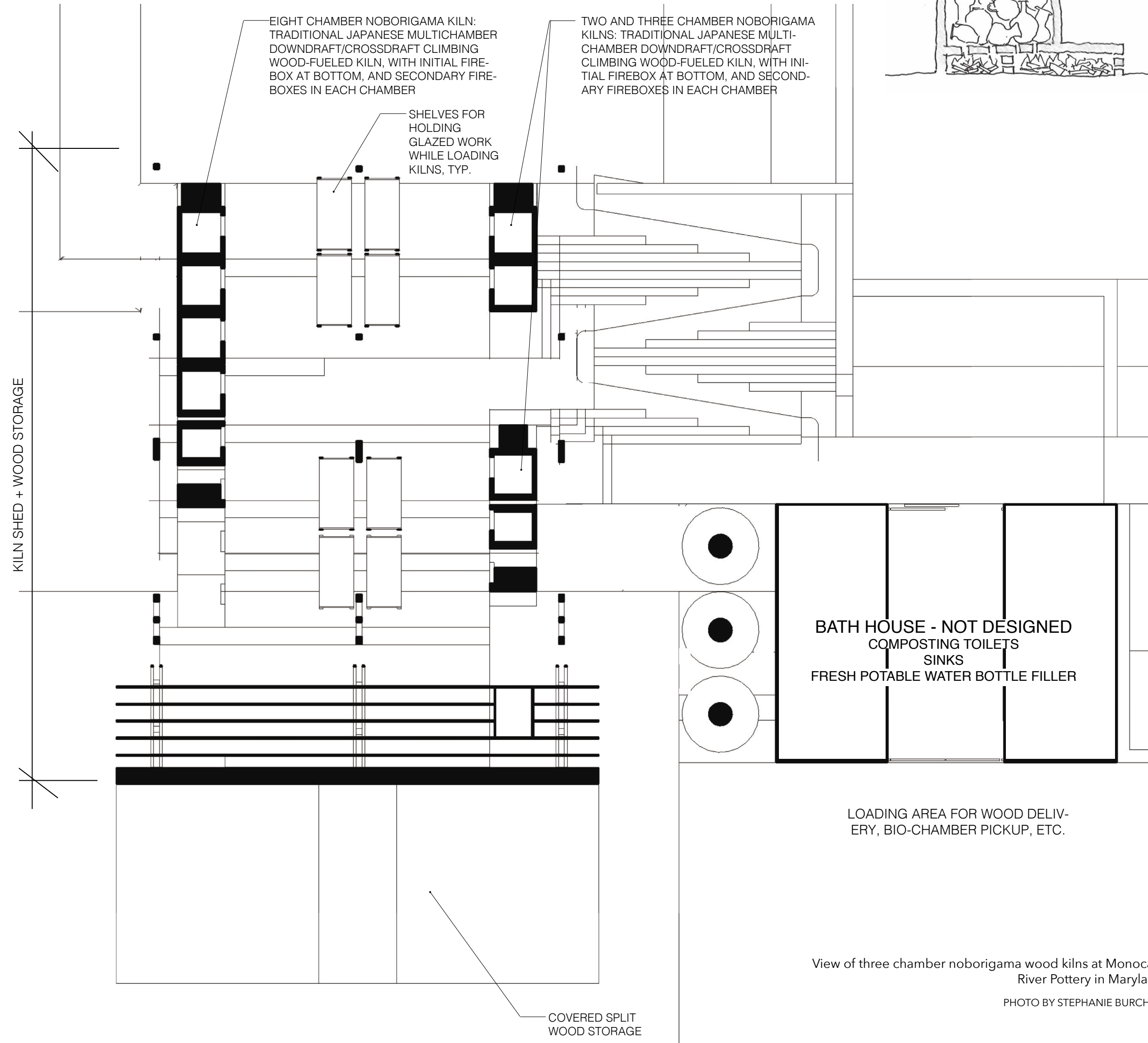
View of glazing studio at Monocacy River Pottery in Maryland.  
 PHOTO BY STEPHANIE BURCHAM



Perspective of proposed glazing studio




ENLARGED PLAN  
KILNS



View of three chamber noborigama wood kilns at Monocacy River Pottery in Maryland.

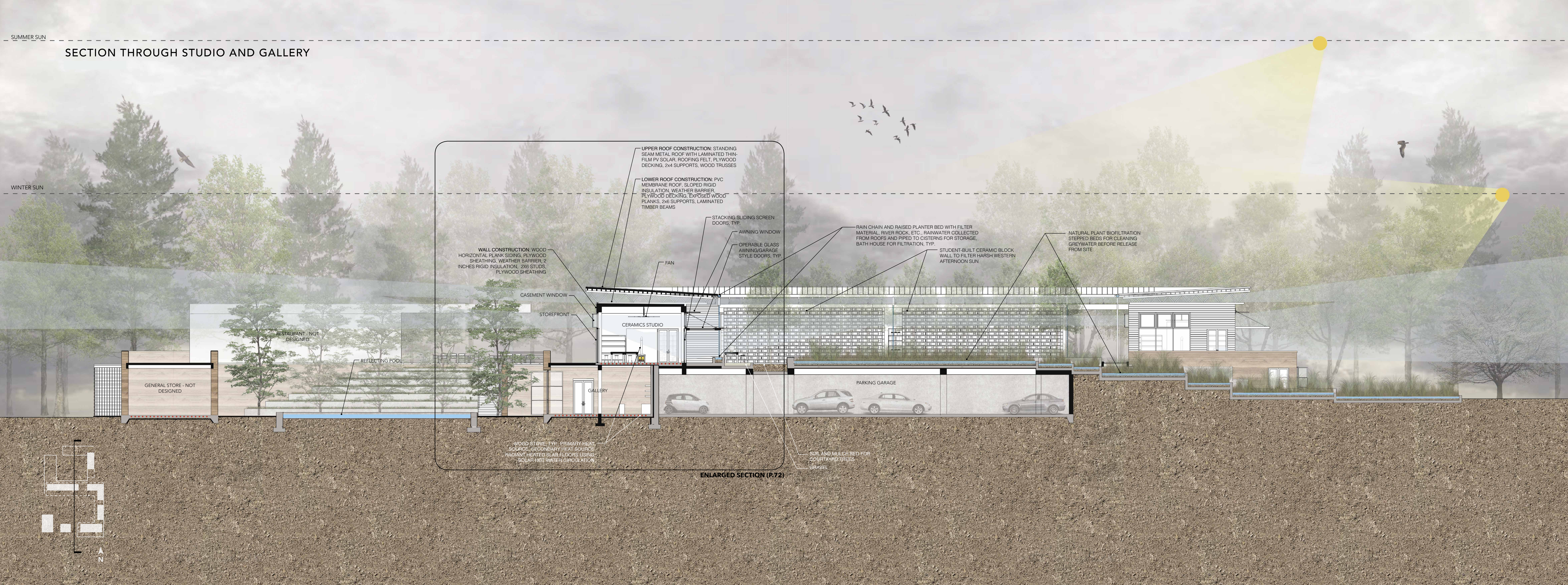
PHOTO BY STEPHANIE BURCHAM

NOT TO SCALE 

SUMMER SUN

# SECTION THROUGH STUDIO AND GALLERY

WINTER SUN



UPPER ROOF CONSTRUCTION: STANDING SEAM METAL ROOF WITH LAMINATED THIN-FILM PV SOLAR, ROOFING FELT, PLYWOOD DECKING, 2x4 SUPPORTS, WOOD TRUSSES

LOWER ROOF CONSTRUCTION: PVC MEMBRANE ROOF, SLOPED RIGID INSULATION, WEATHER BARRIER, PLYWOOD DECKING, EXPOSED WOOD PLANKS, 2x6 SUPPORTS, LAMINATED TIMBER BEAMS

WALL CONSTRUCTION: WOOD HORIZONTAL PLANK SIDING, PLYWOOD SHEATHING, WEATHER BARRIER, 2 INCHES RIGID INSULATION, 2x6 STUDS, PLYWOOD SHEATHING

STACKING SLIDING SCREEN DOORS, TYP.

AWNING WINDOW

OPERABLE GLASS AWNING/GARAGE STYLE DOORS, TYP.

RAIN CHAIN AND RAISED PLANTER BED WITH FILTER MATERIAL, RIVER ROCK, ETC., RAINWATER COLLECTED FROM ROOFS AND PIPED TO CISTERNS FOR STORAGE, BATH HOUSE FOR FILTRATION, TYP.

NATURAL PLANT BIOFILTRATION STEPPED BEDS FOR CLEANING GREYWATER BEFORE RELEASE FROM SITE

STUDENT-BUILT CERAMIC BLOCK WALL TO FILTER HARSH WESTERN AFTERNOON SUN

FAN

CASEMENT WINDOW

STOREFRONT

CERAMICS STUDIO

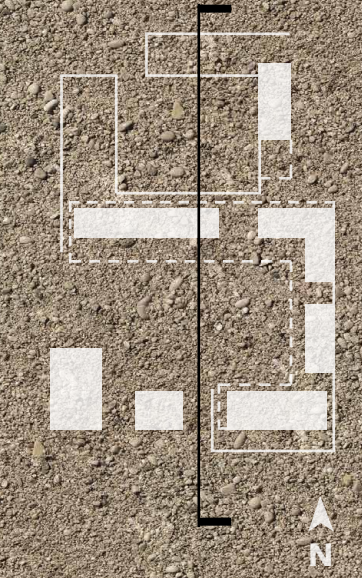
GALLERY

WOOD STOVE, TYP. PRIMARY HEAT SOURCE. SECONDARY HEAT SOURCE RADIANT HEATED SLAB FLOORS USING SOLAR HOT WATER CIRCULATION

SOIL AND MULCH BED FOR COURTYARD TREES

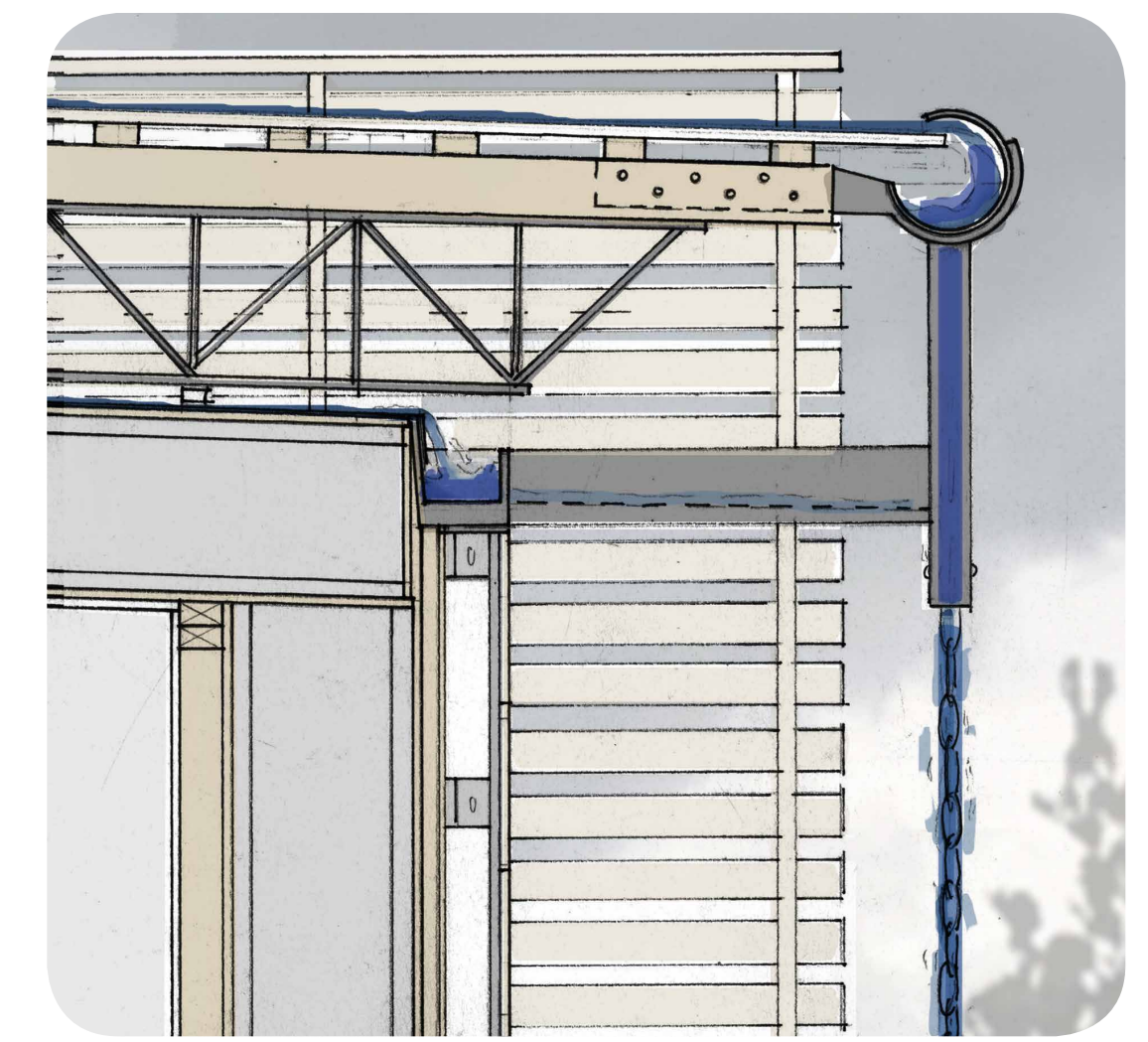
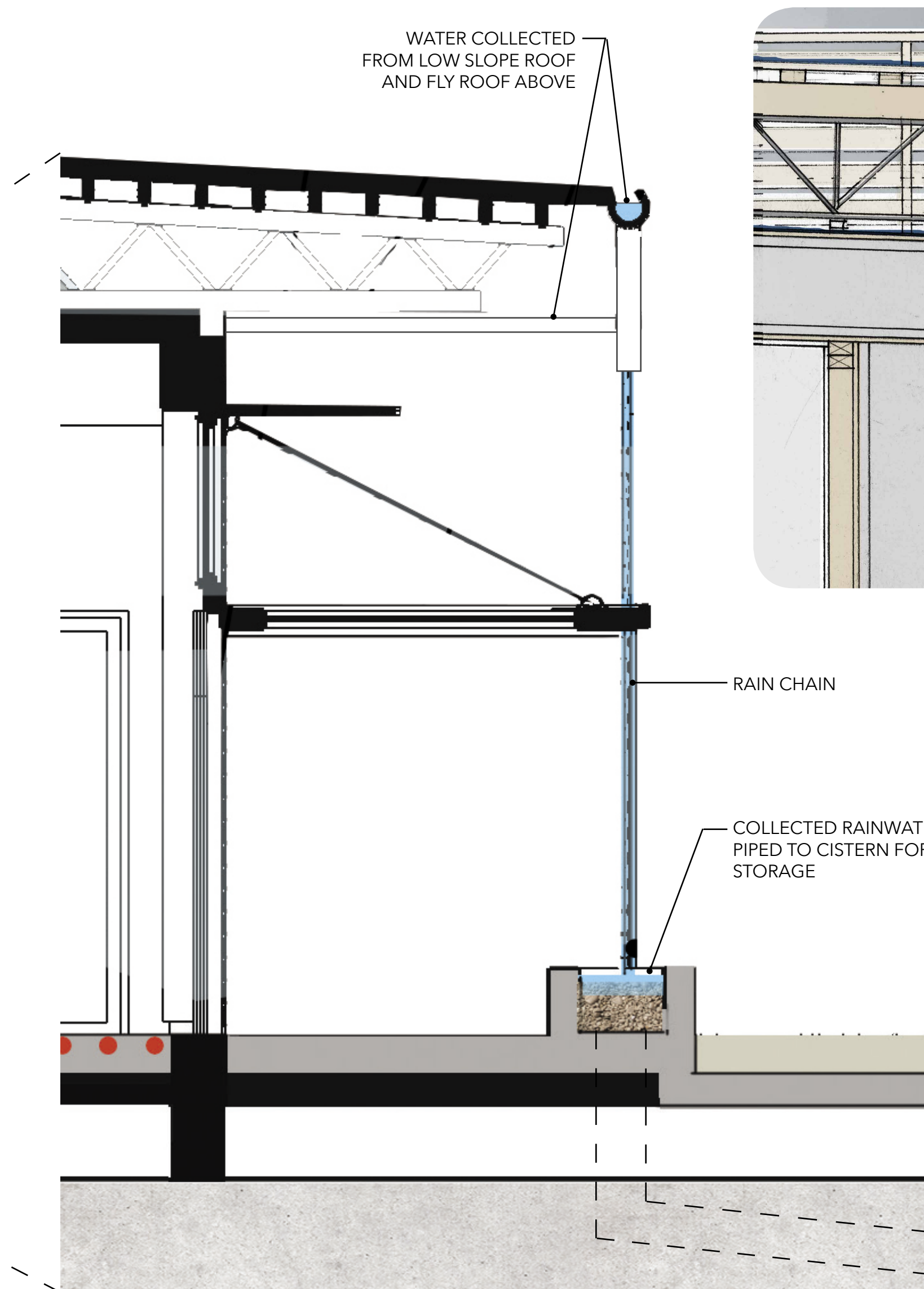
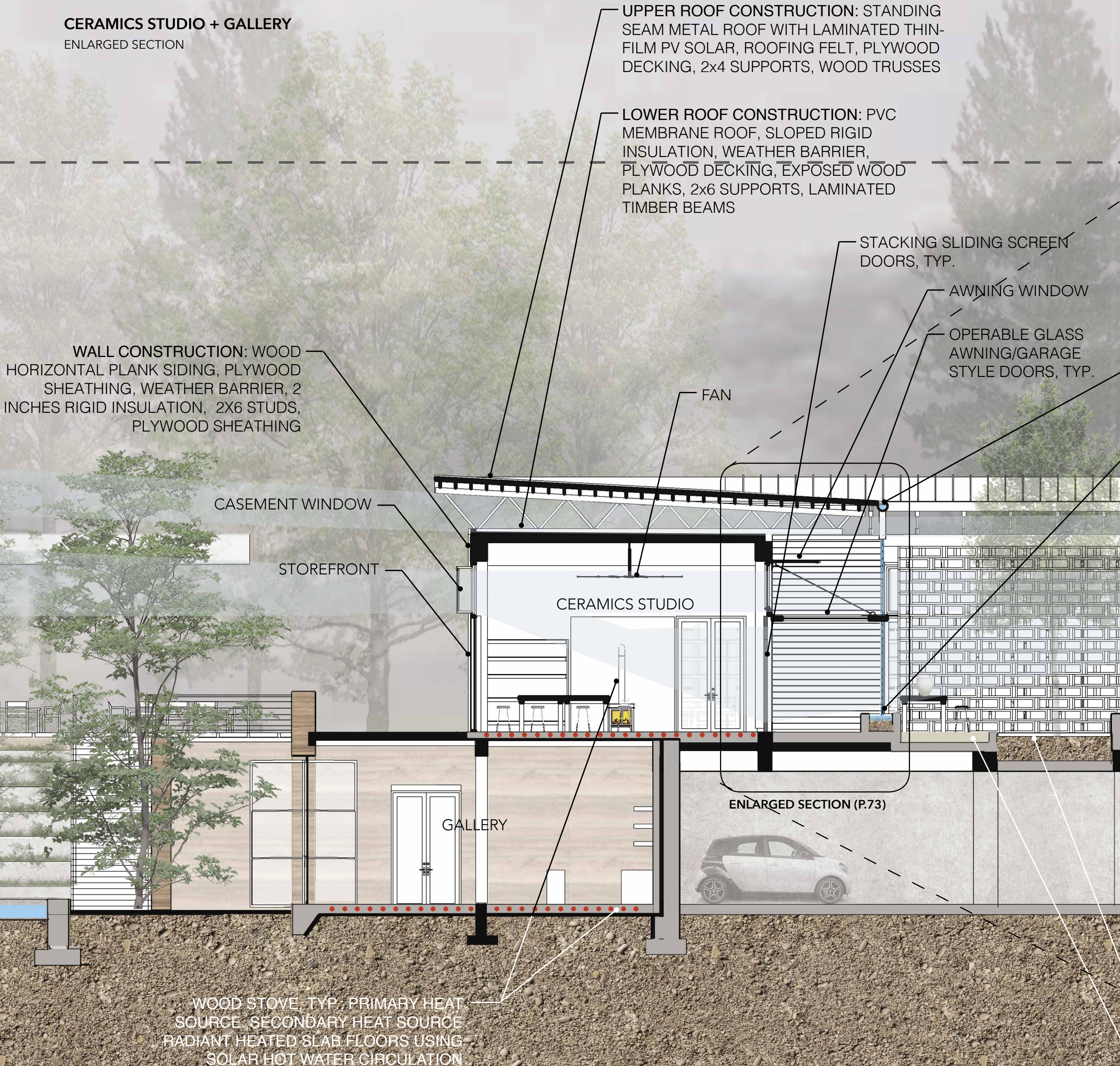
GRAVEL

ENLARGED SECTION (P.72)

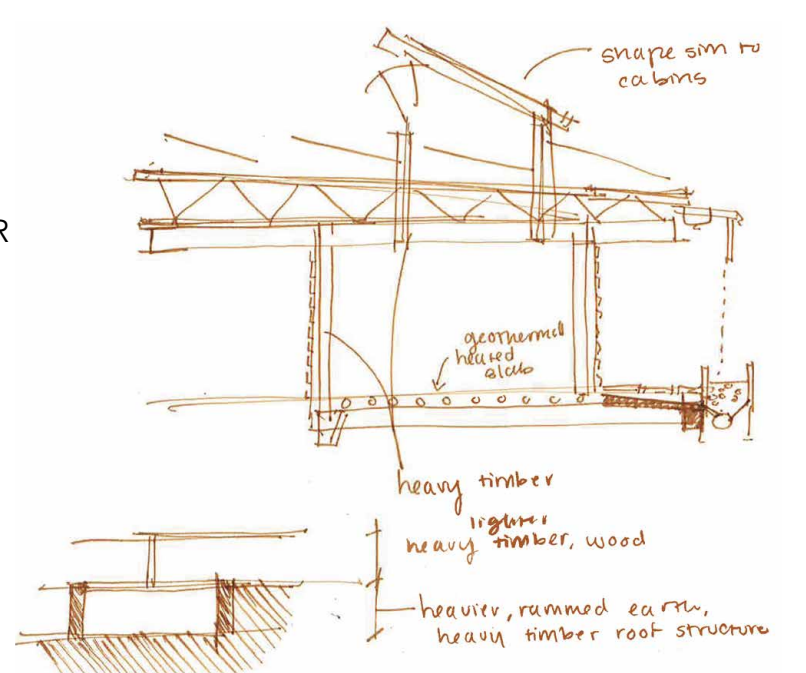


A  
N

**CERAMICS STUDIO + GALLERY**  
ENLARGED SECTION

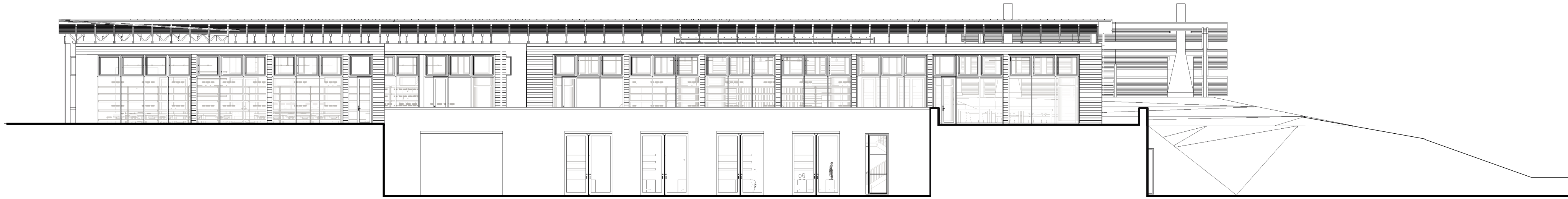


EARLY SKETCH OF FLY ROOF IDEA



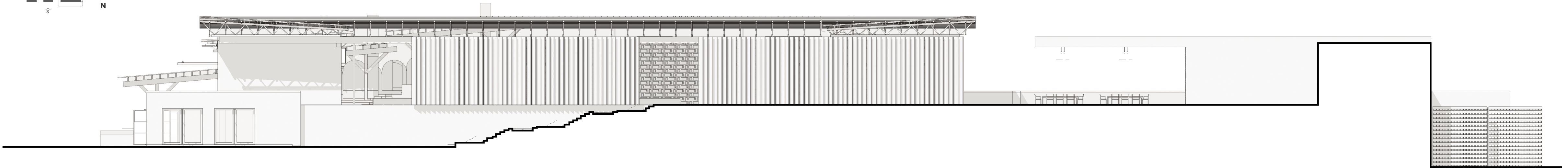
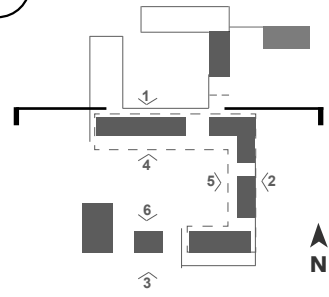
EARLY SKETCH OF FLY ROOF IDEA, WITH SKYLIGHT LIGHT WELLS, AND RAINWATER COLLECTION CONCEPT. The light wells were removed in later iterations due to unnecessarily complicating the roof structure because there is already plenty of natural light available.

# ELEVATIONS



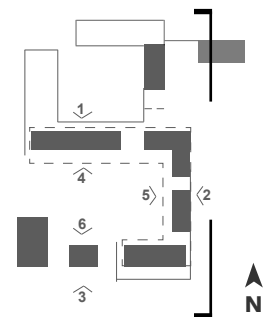
1 NORTH ELEVATION

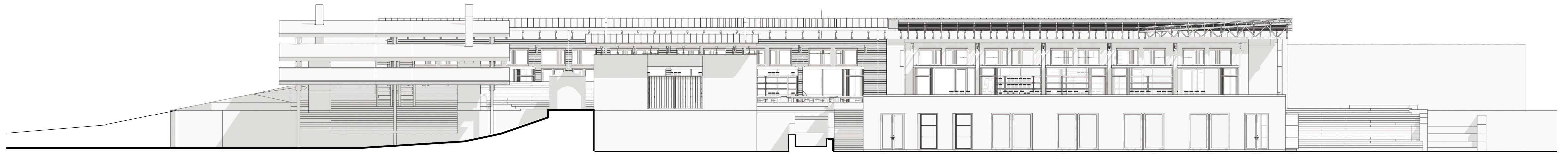
NOT TO SCALE



2 EAST ELEVATION

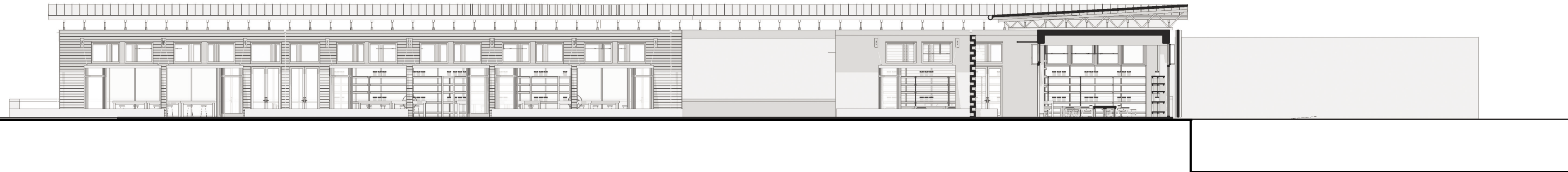
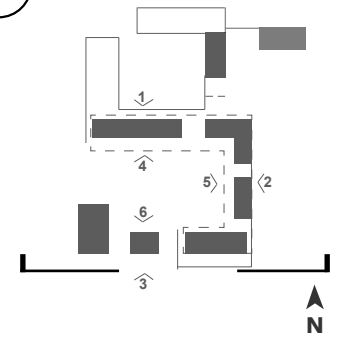
NOT TO SCALE





3 SOUTH ELEVATION

NOT TO SCALE



4 SOUTH COURTYARD ELEVATION

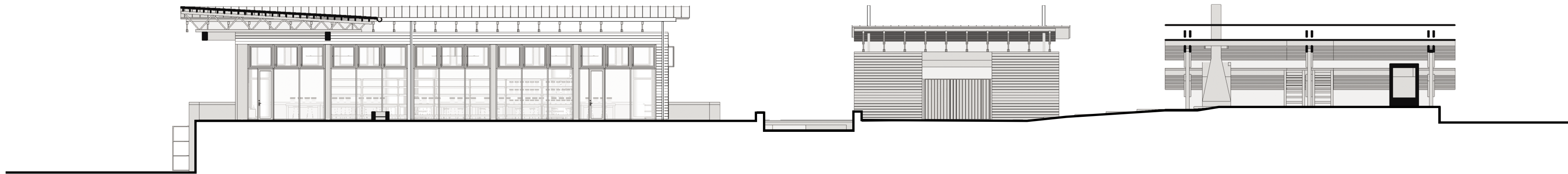
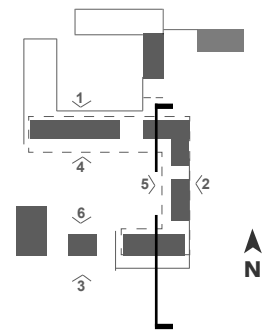
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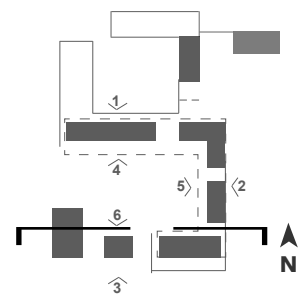
5 WEST COURTYARD ELEVATION

NOT TO SCALE



6 NORTH COURTYARD ELEVATION

NOT TO SCALE



PERSPECTIVE

# CERAMIC STUDIO COURTYARD





Stephanie Burcham (b.1990)  
*Pitcher*, 2019

Wood-fired earthenware clay

## IV.

# RESIDENTIAL CABIN DESIGN

There are just over 50 cabins on the site for students, instructors, live-in maintenance, gardeners, and administration. Assuming 40 of the cabins are for resident students, that allows for two classes (wheel-throwing and hand-building) to run simultaneously with about 20 students each. The studio spaces are designed for a 25 student maximum, which encourages residents of Naylor's Beach and vacationers at the campground to also sign up for classes.

The cabins are based on two primary floor plan types - a typical double unit and a single accessible unit. The duplex allows two single units to share a common wall and rammed earth chimney. The accessible unit is designed for two people to share. If one person is wheelchair bound, a spouse or assistant can help navigate the complex if necessary. There is more closet space provided and a larger lounge space than provided in the typical unit.

There are three types of cabins in section, based on where the cabin is located on the site, and how the site slopes toward Cat Point Creek. The two cabin types on higher ground, closest to the ceramics studio, are designed for use all year round. The cabins farthest from the ceramics studio are designed to be used during the summer only, as their design maximizes cross ventilation and does not provide a heat source. This approach works quite well assuming there will be a higher number of students interested in coming to the riverside retreat when the weather is warm.

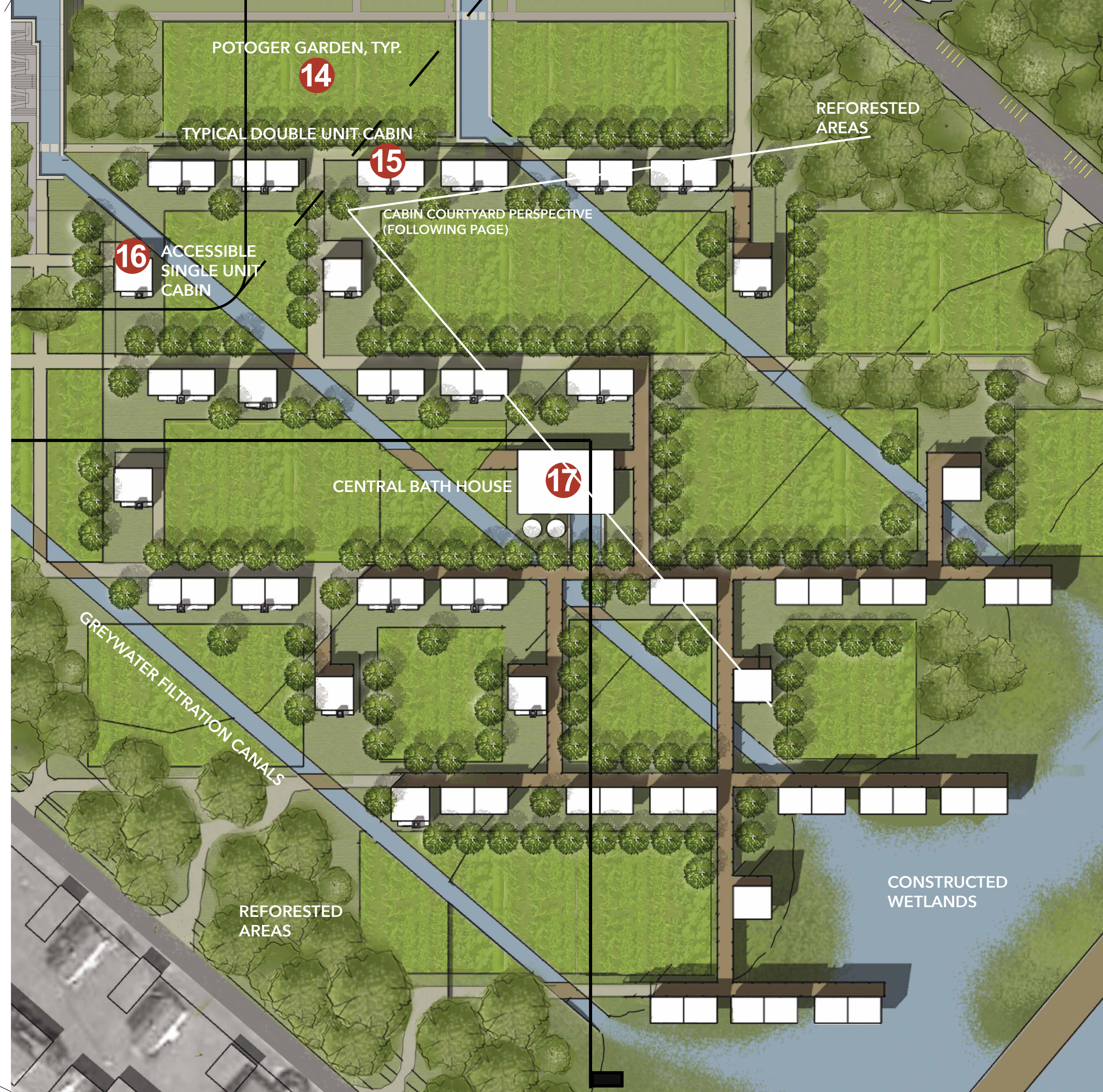
None of the cabins have air conditioning and the all season cabins are heated by fire, wood stove specifically. The cabins have plenty of daylight from large windows, and at night, LED lights can be turned on with the energy stored in the photovoltaic system batteries. Large ceiling fans pull stale hot air up and out of the cabins at night and pull in cool night air from the open windows. All the windows are screened to prevent insects from getting inside. Rainwater is collected on the metal roofs and sent by pipe to the central bath house to be filtered and used for sinks, laundry, and showers. Toilets to be compostable.

No running water is provided in the cabins, just like what is required of you at the studio, you must carry the water you think you will need in the evenings from taps at the bath house to your individual cabin via provided vessel.

The cabins are constructed with a wood frame structure, wood sheathing, and wood exterior cladding. The standing seam metal roof is sloped to shed rainwater, snow, and so that the photovoltaic system is at the most efficient angle to the sun to collect energy. The all-season cabins have rammed earth fireplaces that are both practical and symbolize a solid connection to the earth. I wanted to keep the design as simple as possible, using mostly traditional building methods and understandable parts, so that local builders are capable of building these cabins, and would be able to understand the design.

## RESIDENTIAL SPACE SITE ORIENTATION

The cloister-like residential spaces form small communities within the larger community. Each "courtyard" is its own potoger garden, a place for community gathering, tending to the plants, and general enjoyment. As the ground level begins to fall toward the constructed wetlands, the cabins remain at the same elevation, an elevation just above the 500 year flood plain, keeping all the residences safe from rising flood waters. The constructed wetlands and reforested areas of the site should also act as a natural sponge to help reduce the impact of flooding from storms.

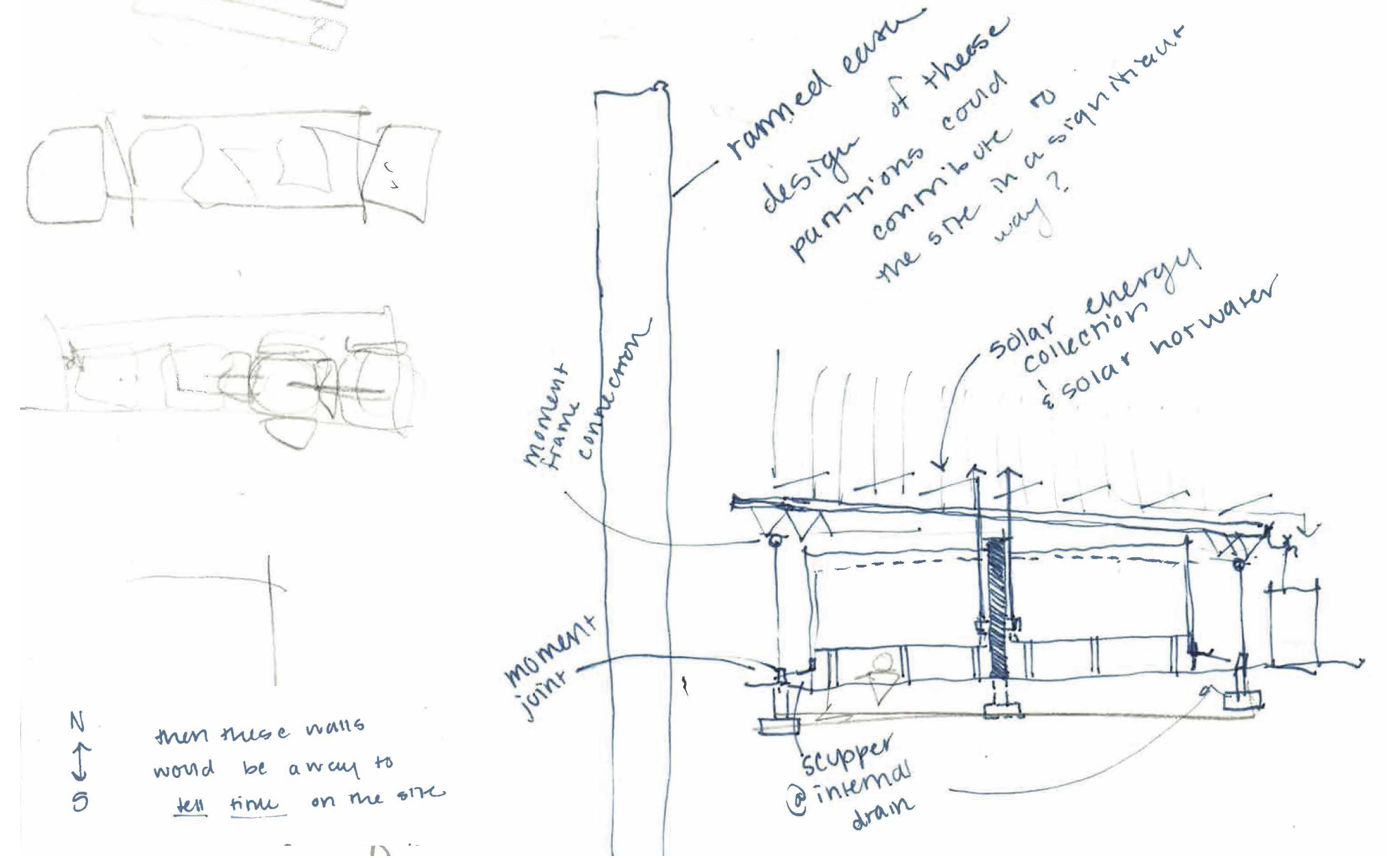
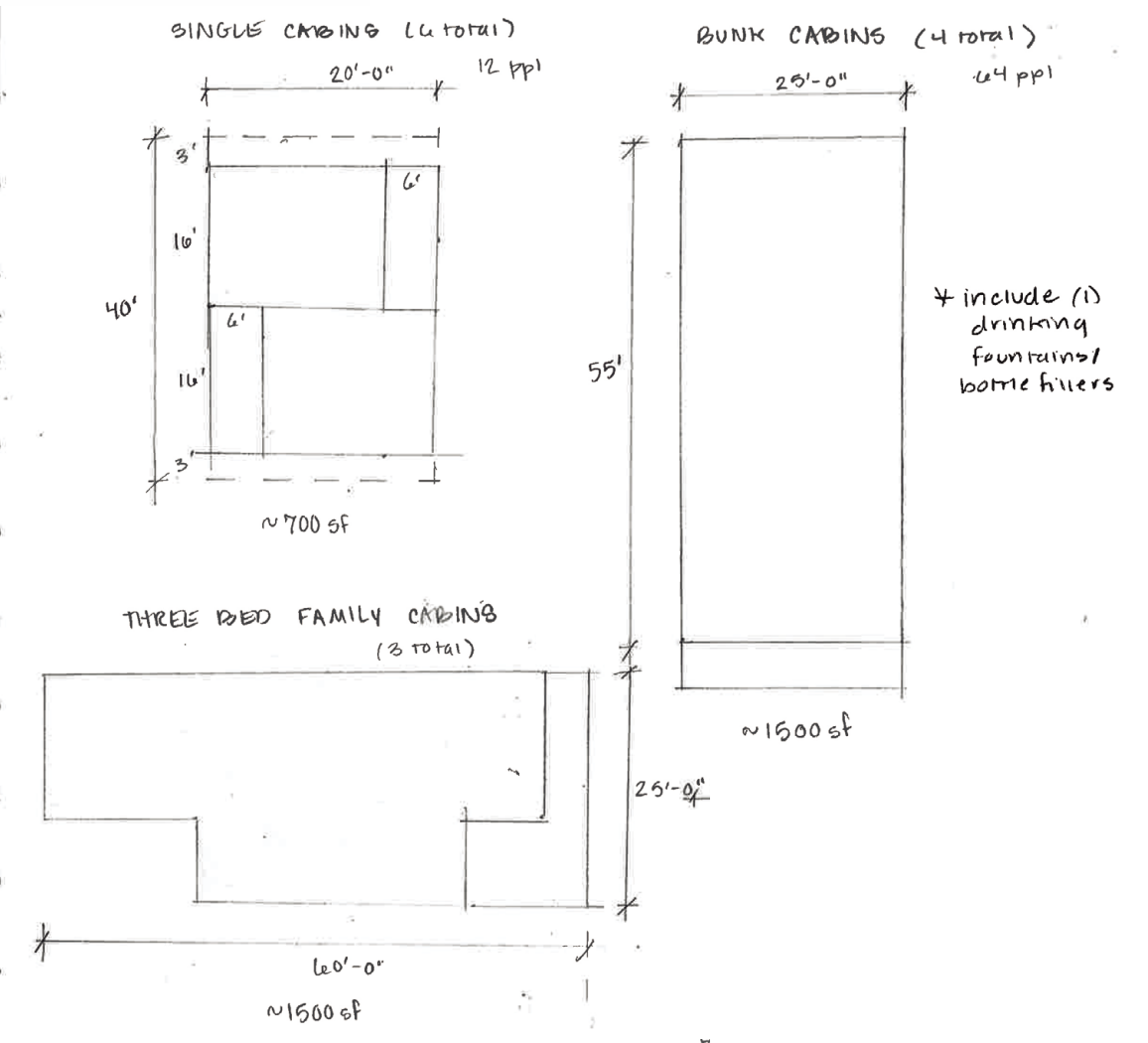
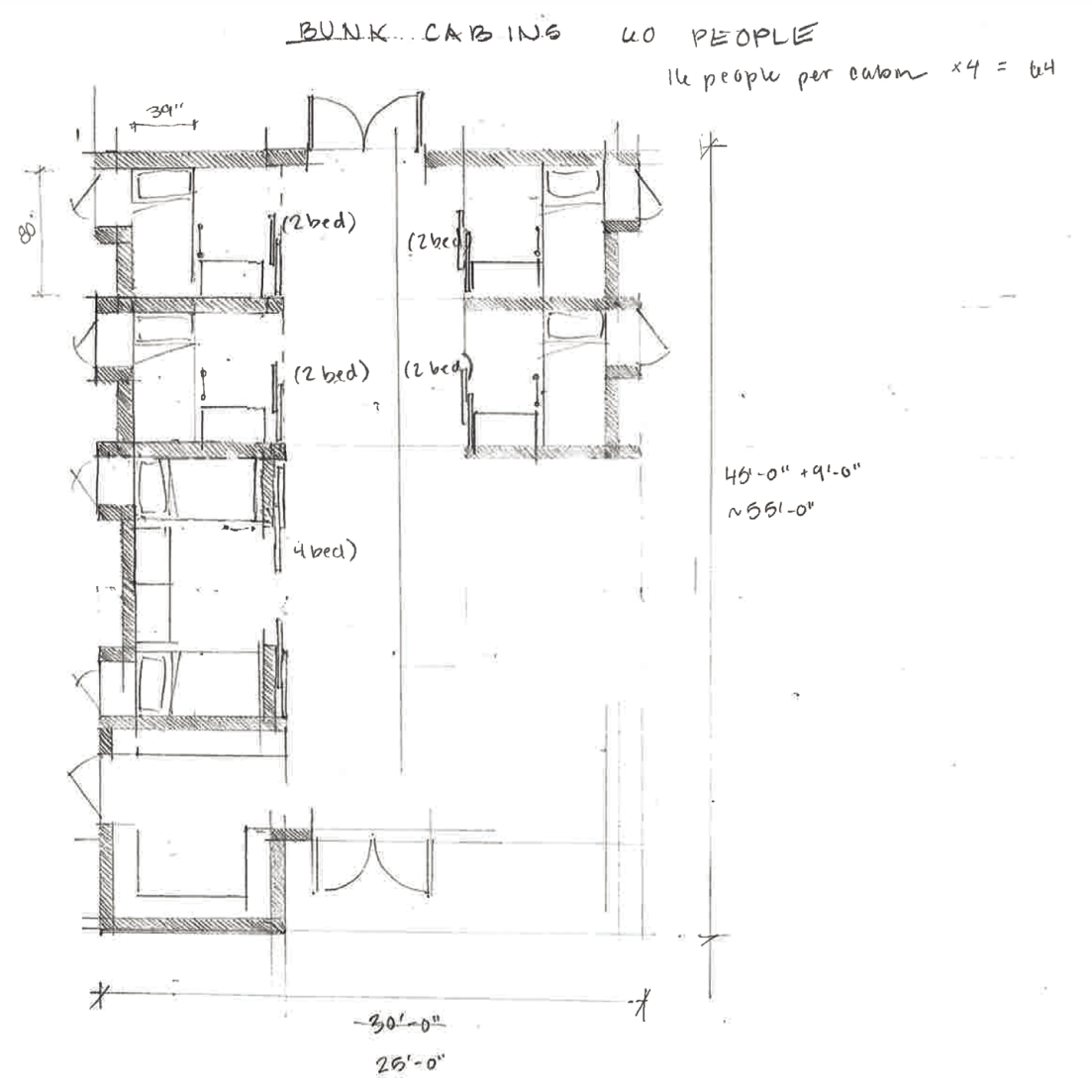
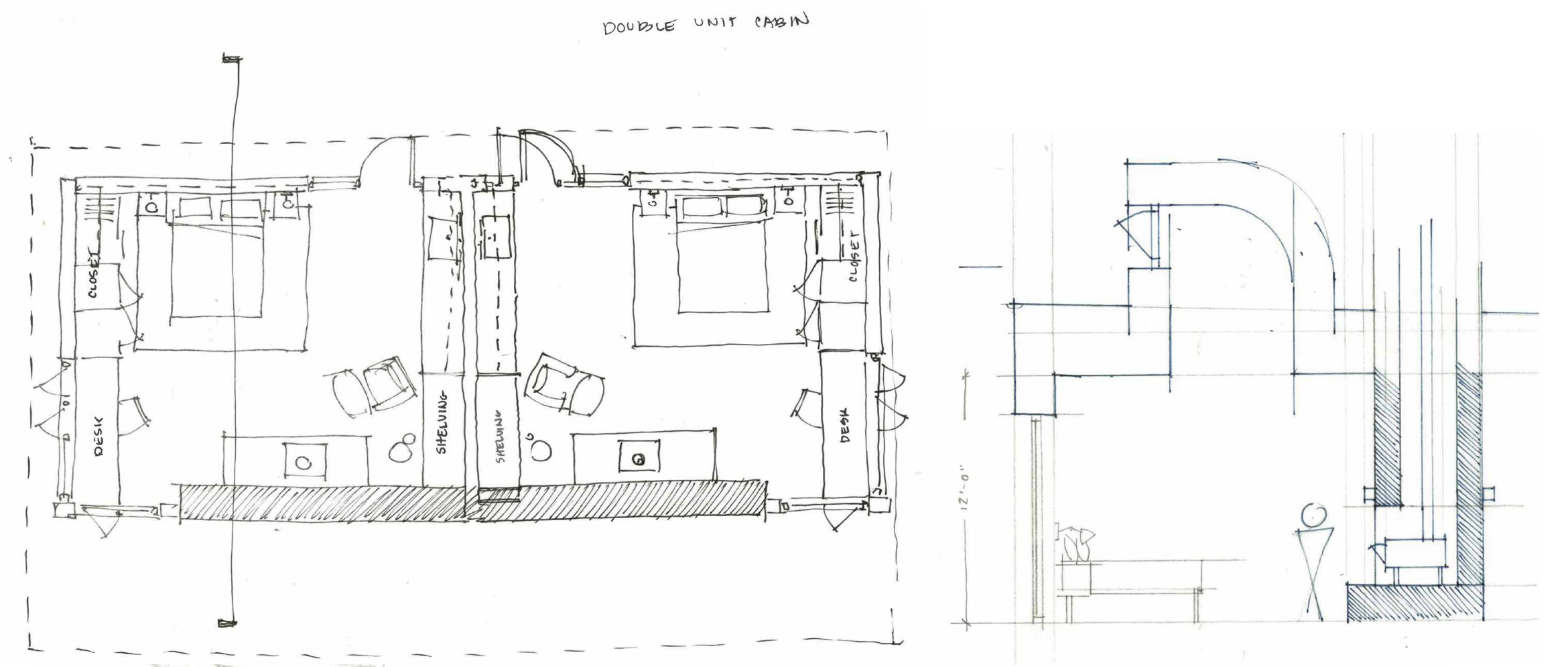
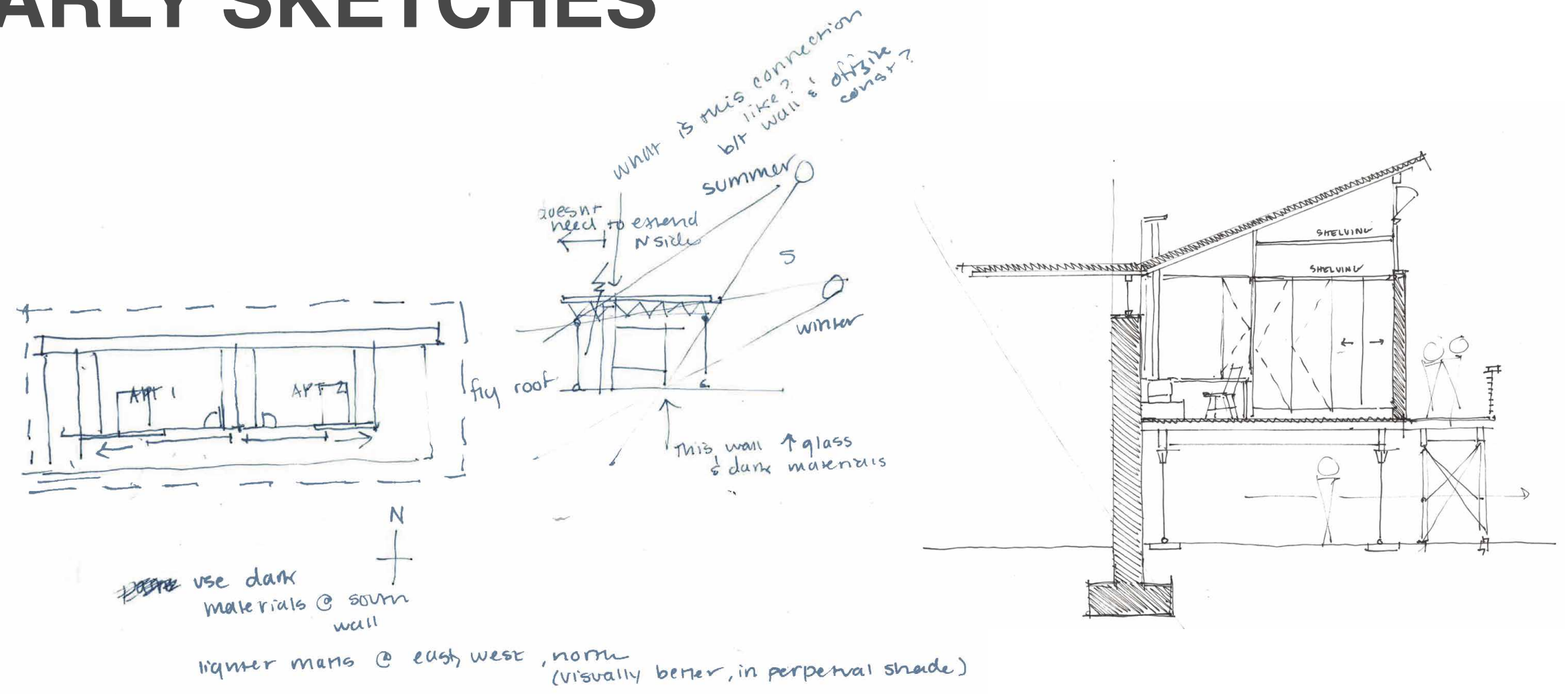


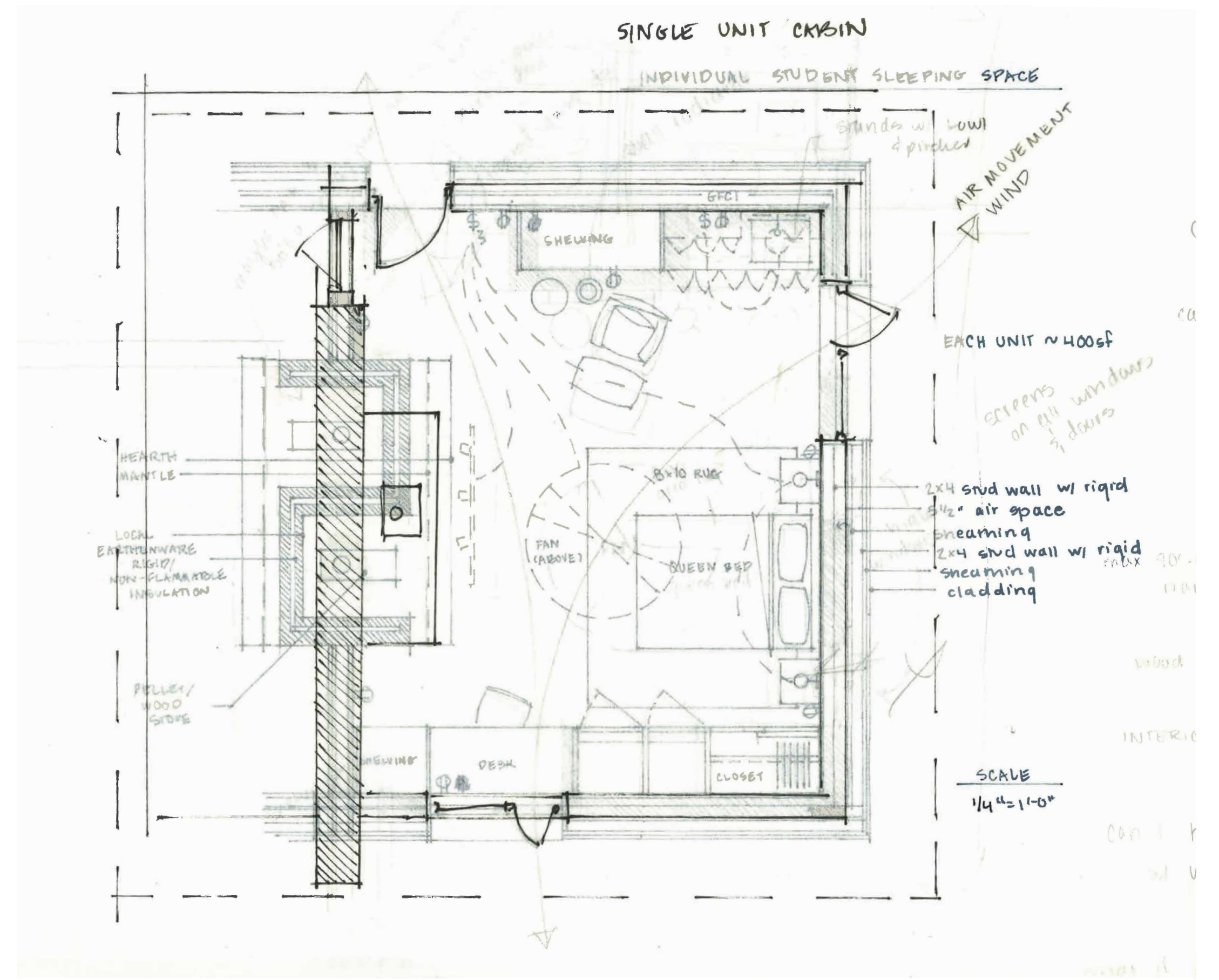
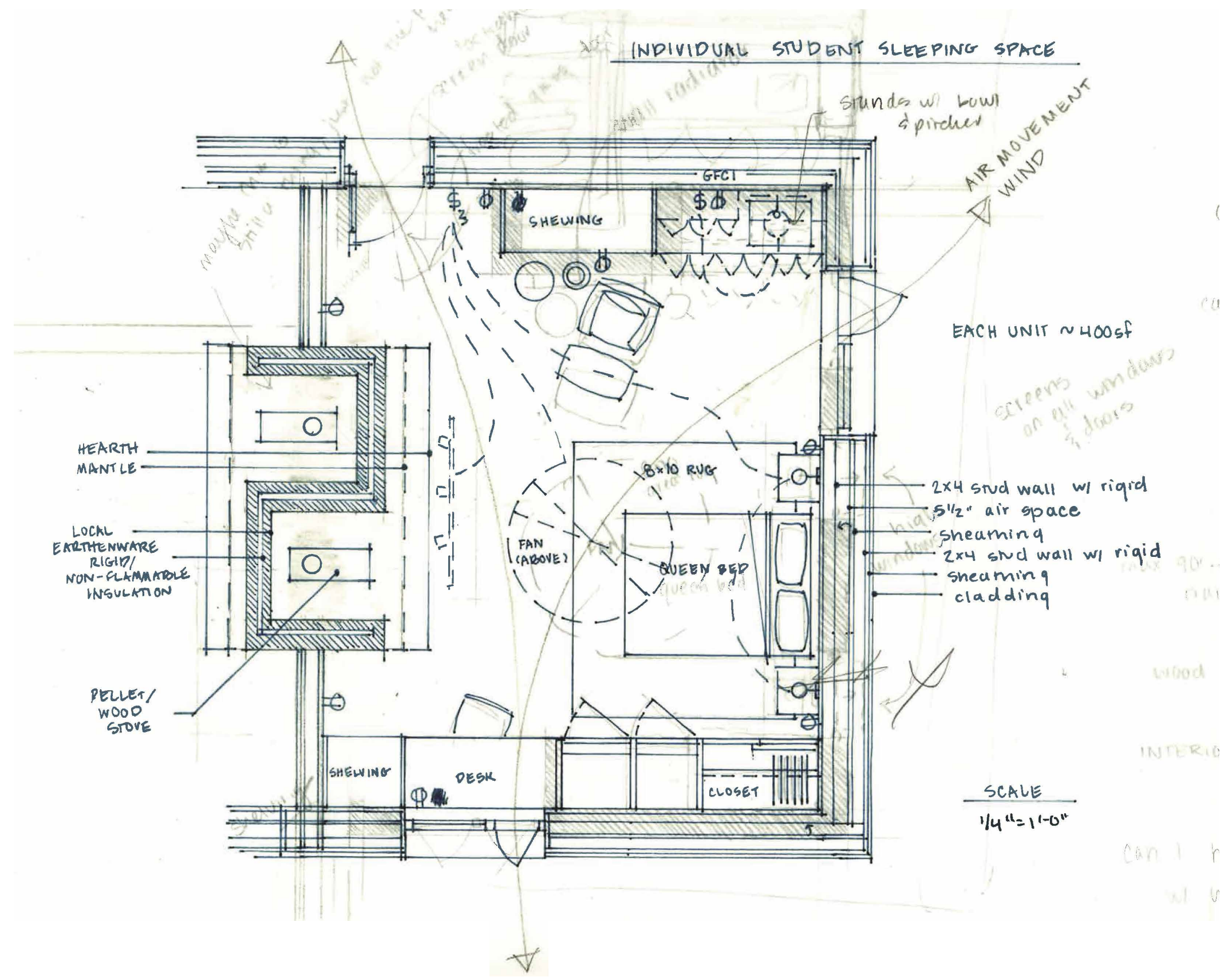
PERSPECTIVE

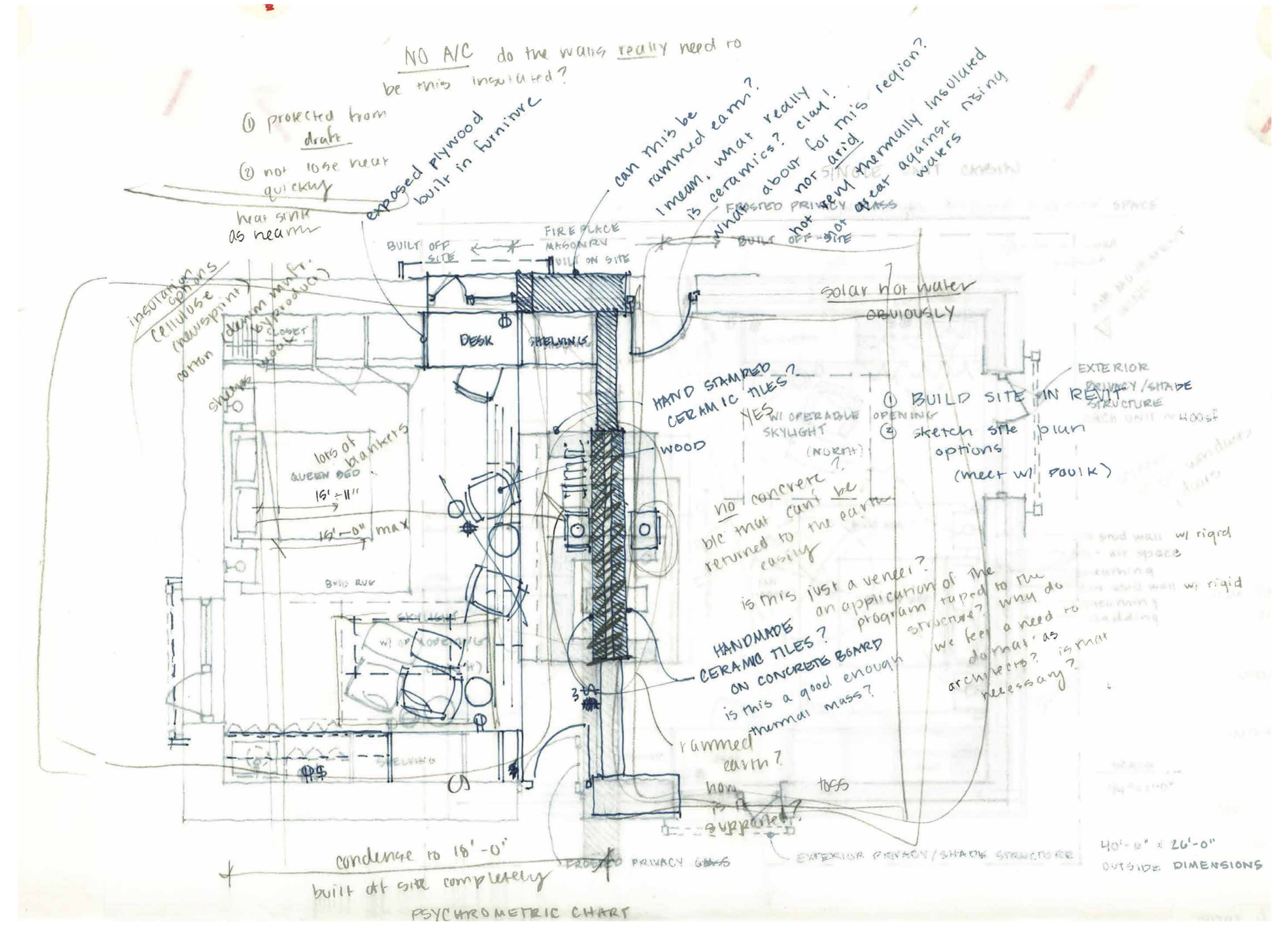
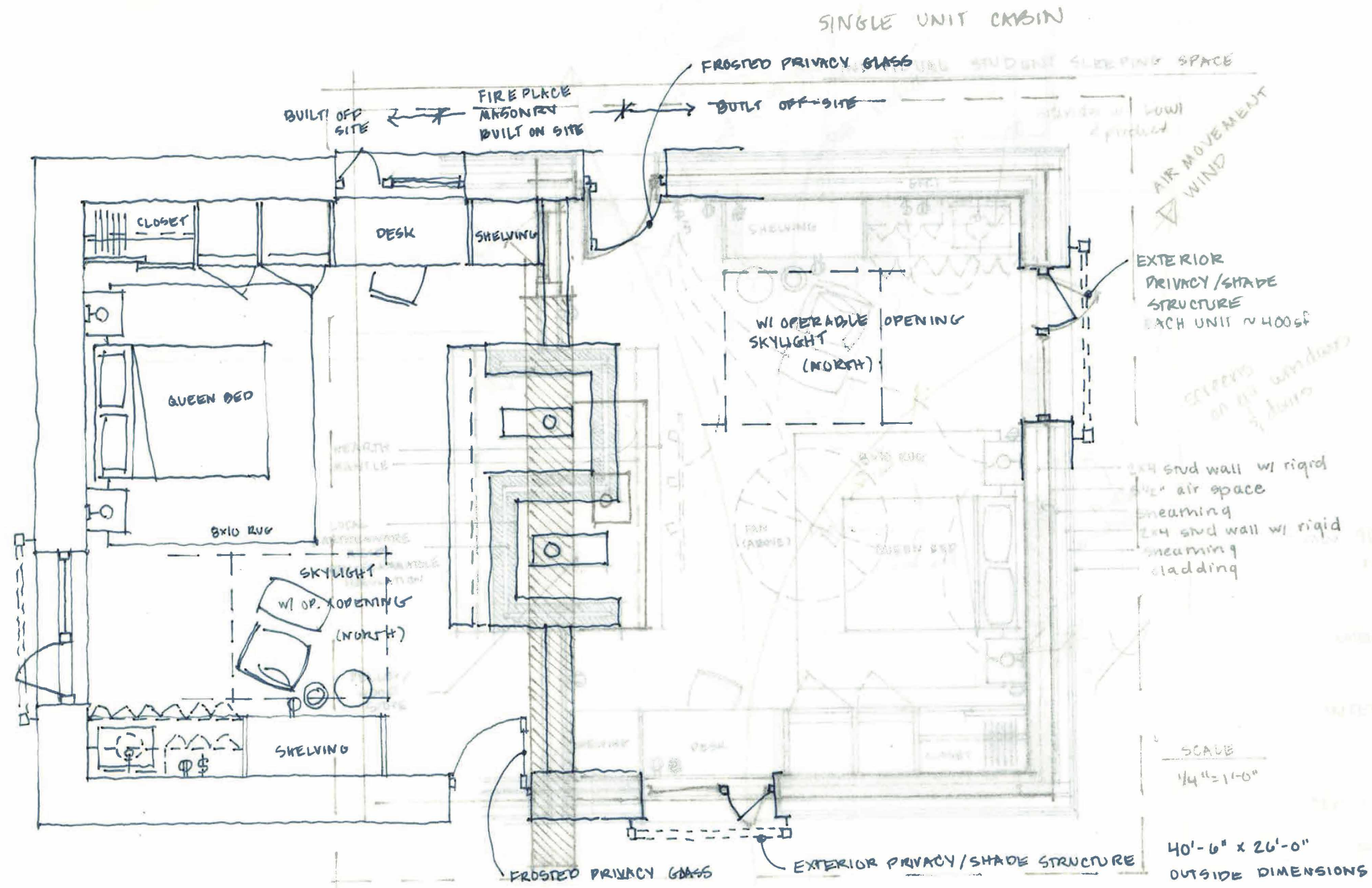
# CABIN COURTYARD



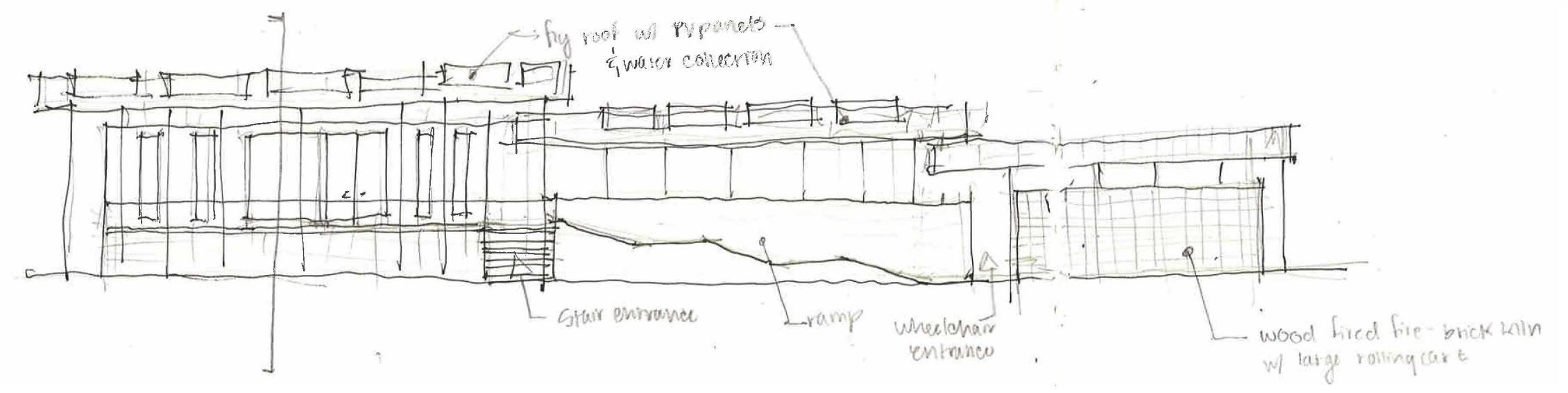
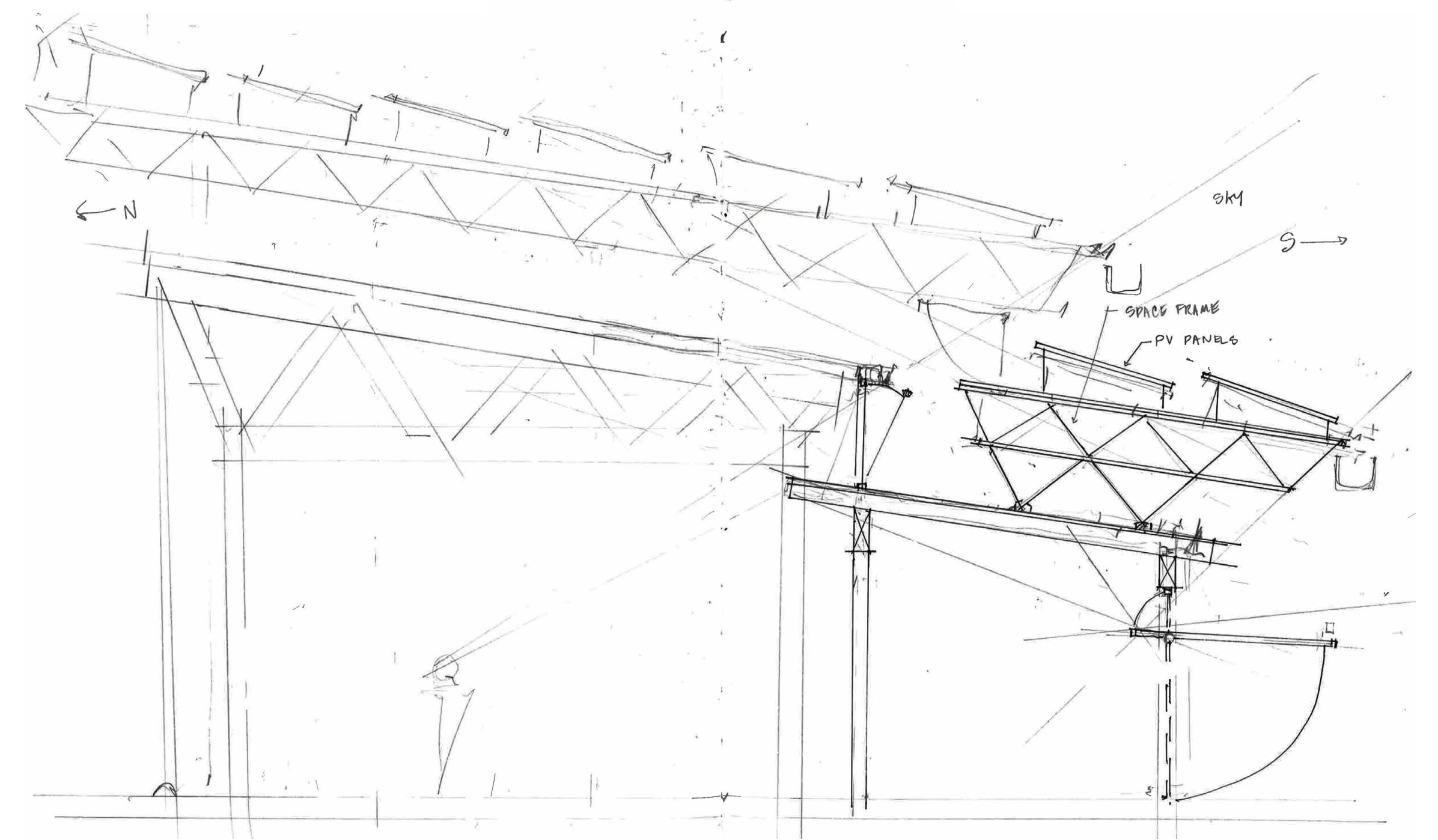
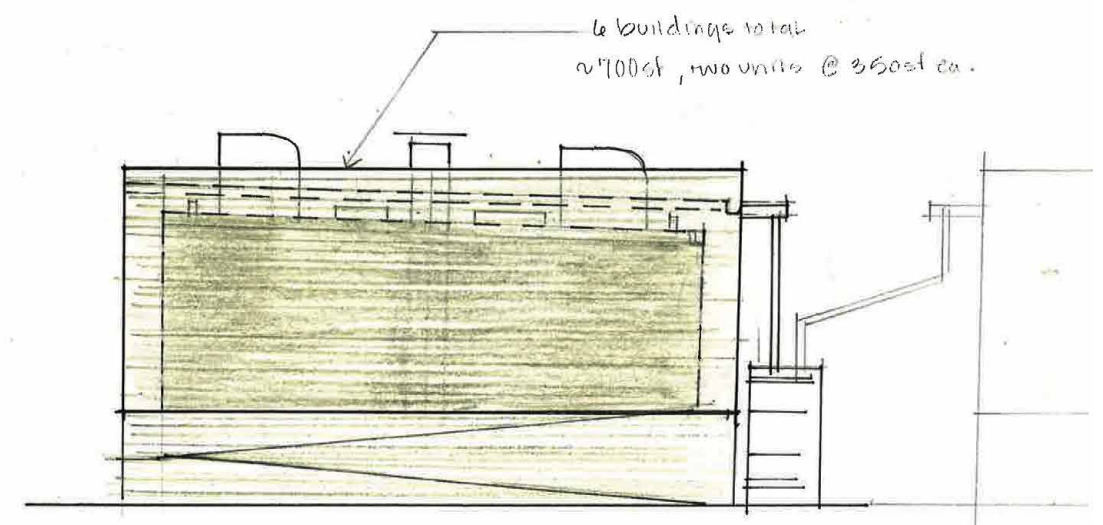
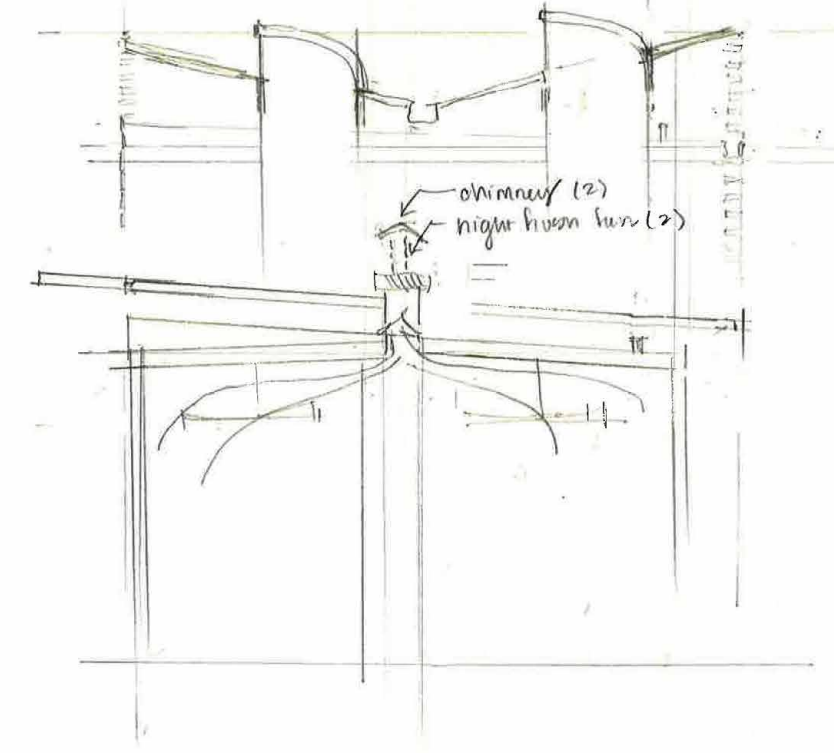
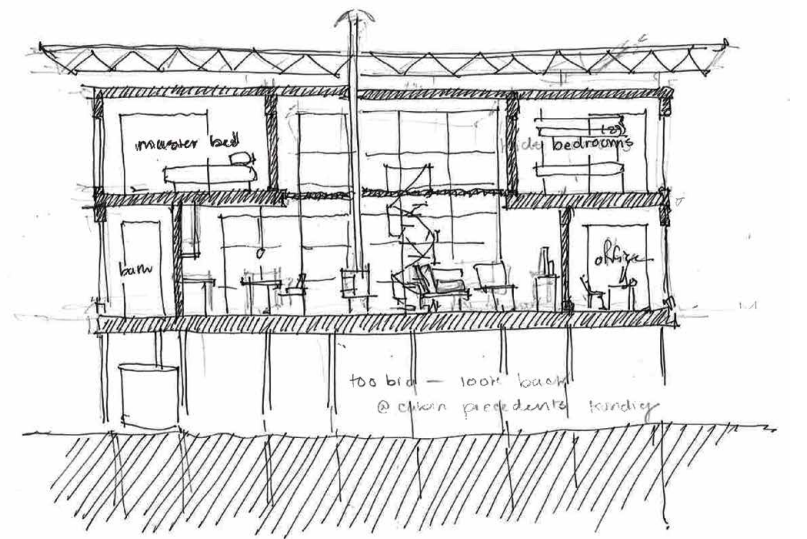
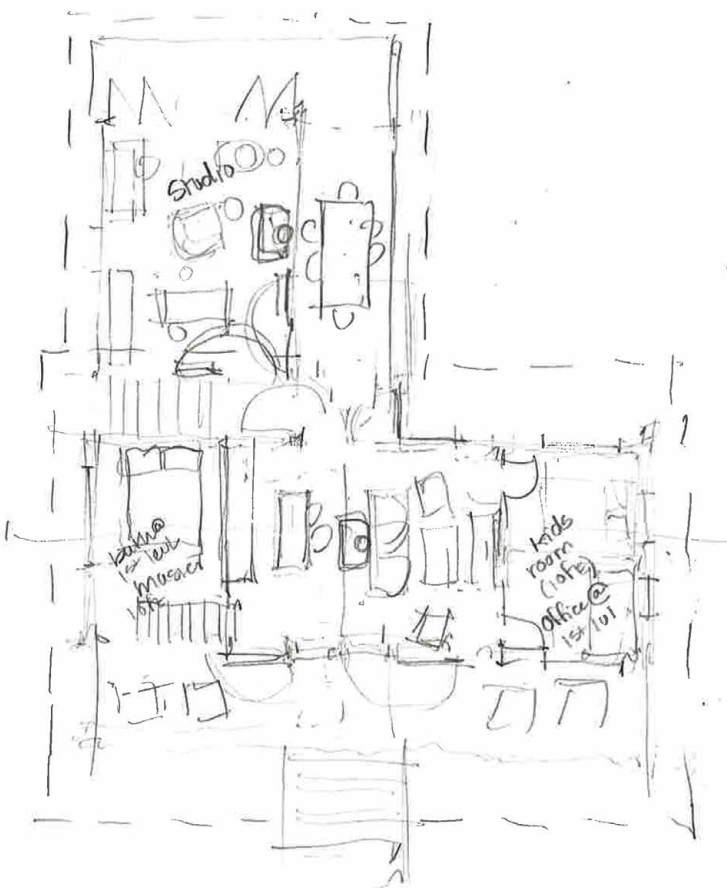
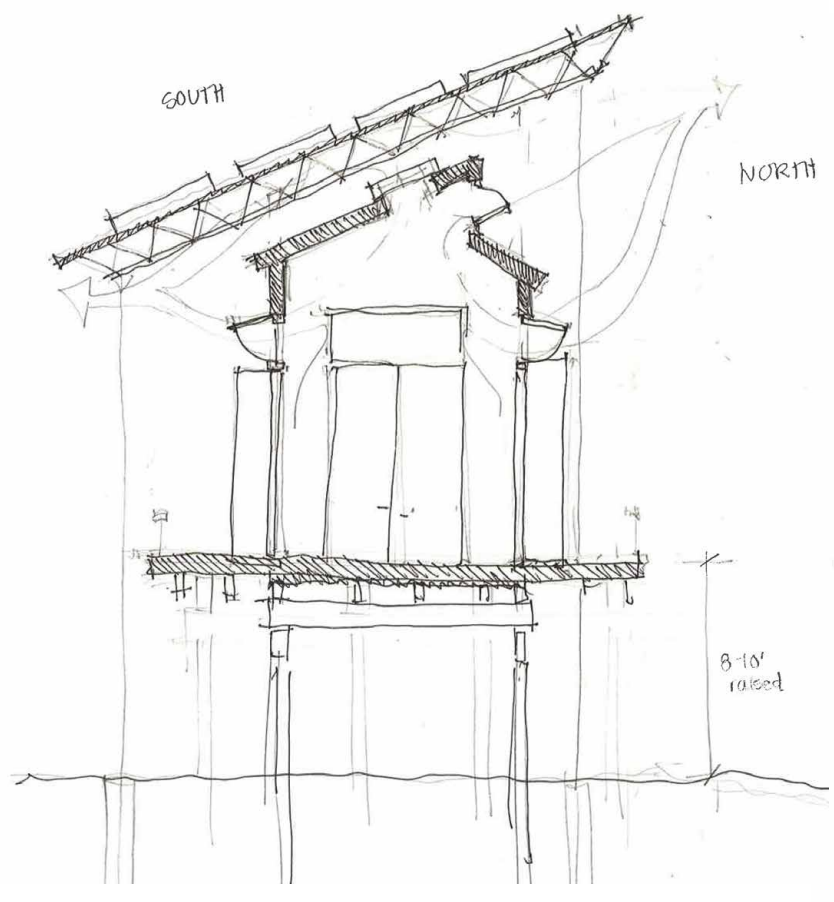
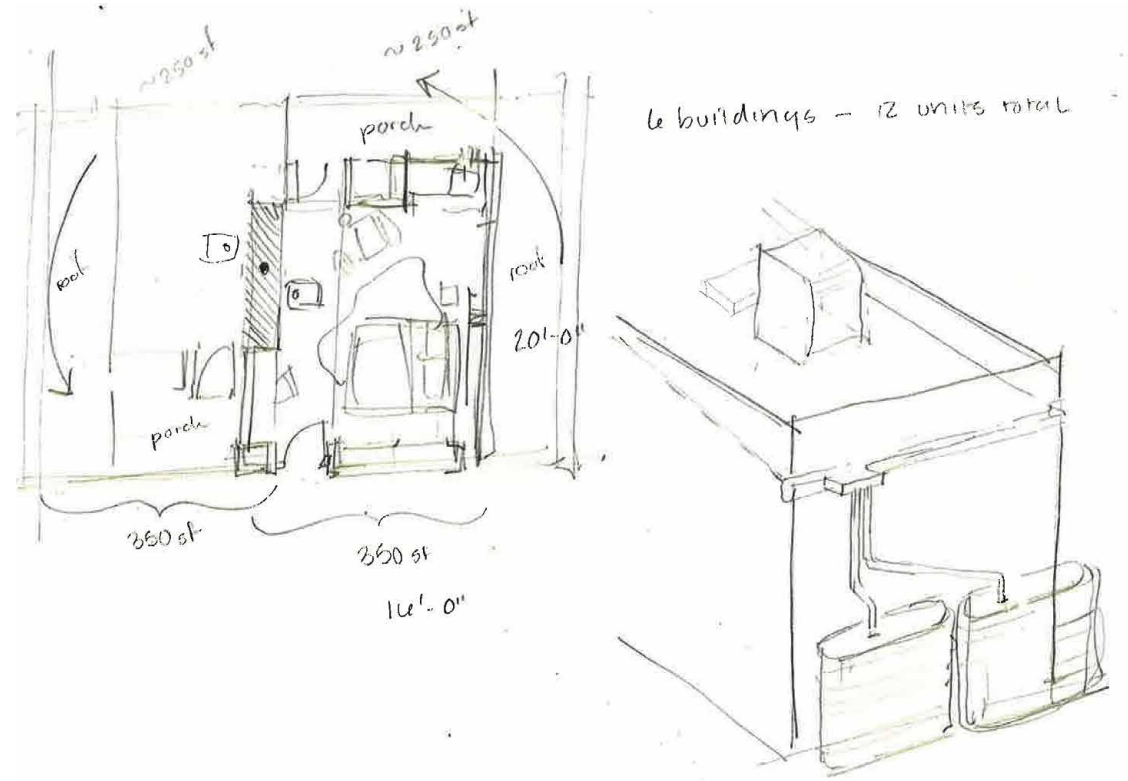
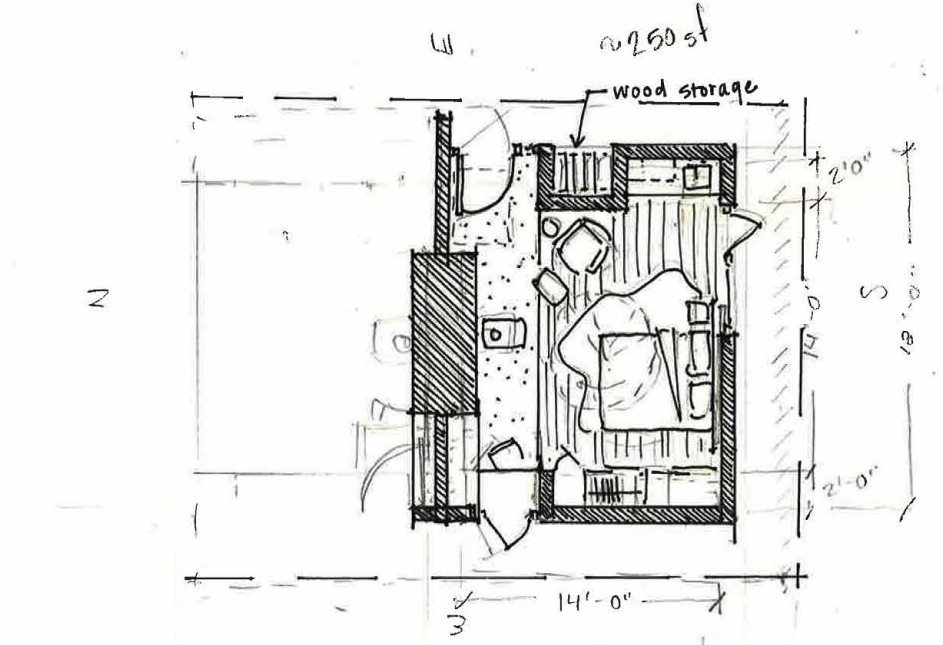
# EARLY SKETCHES







Olson Kundig Gulf Islands cabin  
 UVA lawn dorm rooms  
 Virginia historic state quarters  
 Gullah - Beecher architecture



60 people - 15 people in (2) classes per day ONE BED ROOM CABINS per studio

studio spaces based on 20 person max capacity

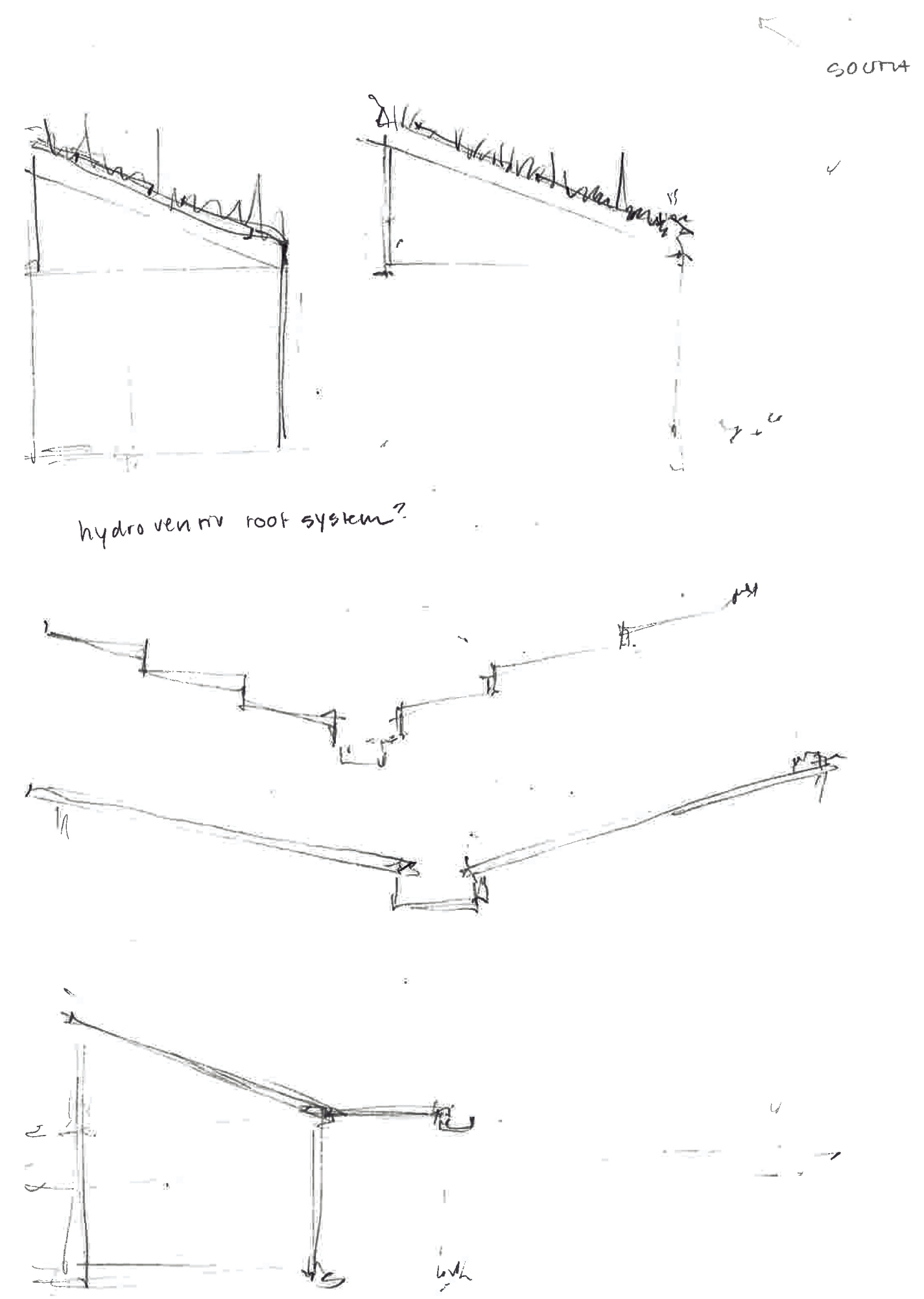
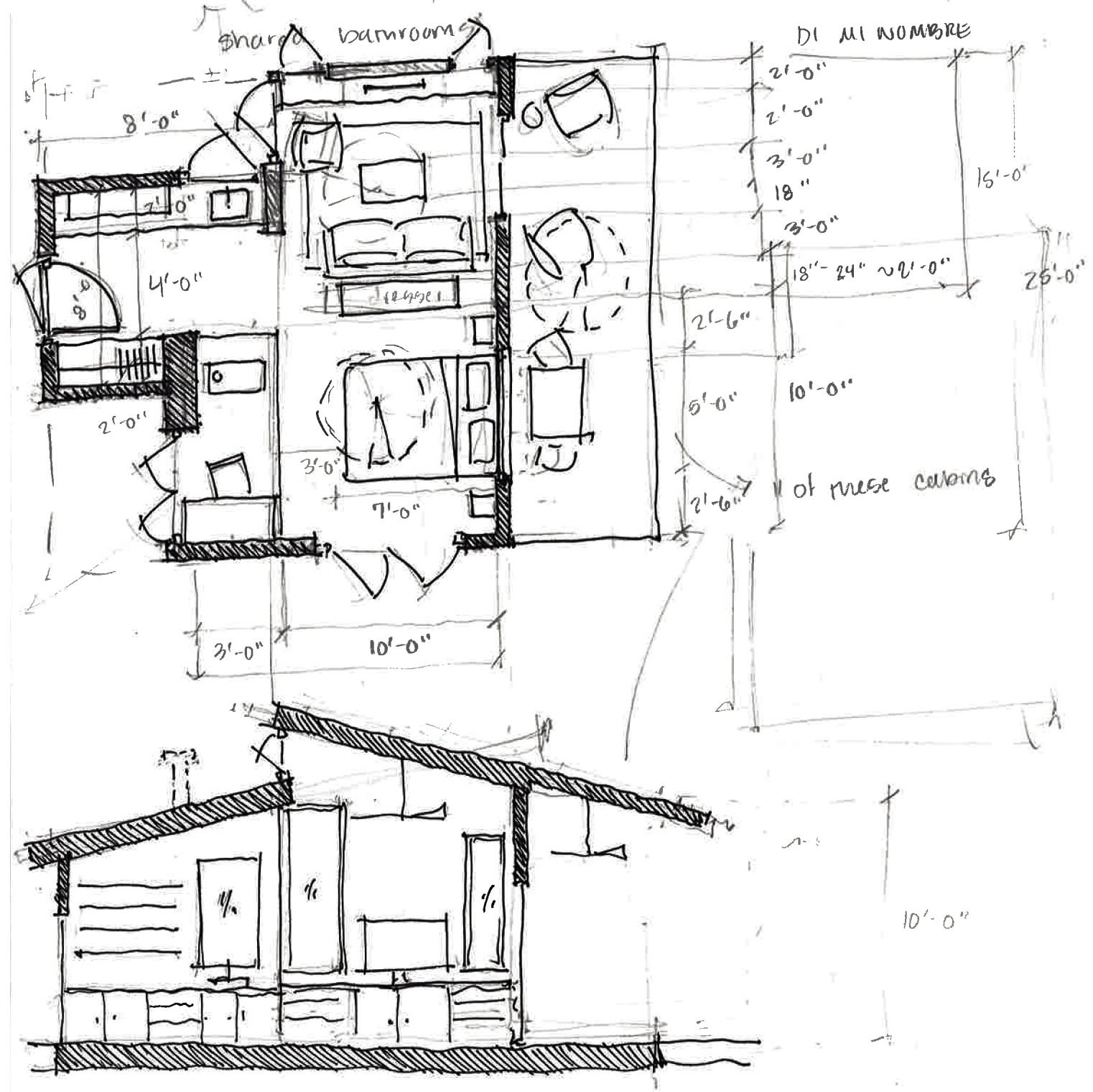
I 60 people in summer bunk cabins

II 14 large 4 season cabins

3 2 (3 bedroom) family size their own bathrooms 2 ea.

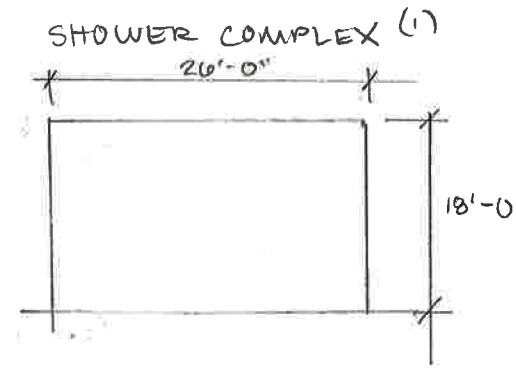
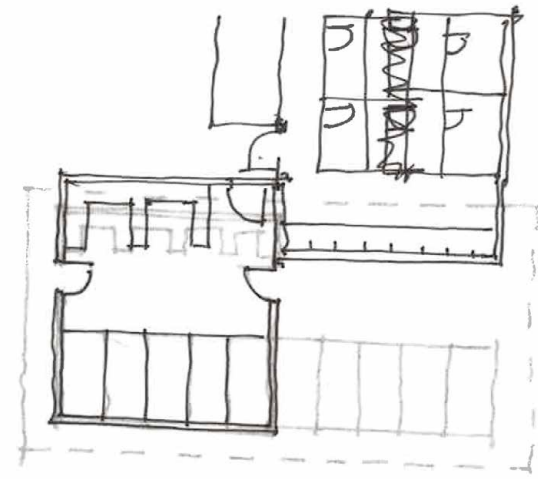
4 1 single or couple occupancy (one-bed) (professors/ TAs)

11 7 STAFF CABINS, other than professors one bedroom 7 staff full time



# BATH HOUSE CONCEPTUAL SKETCHES

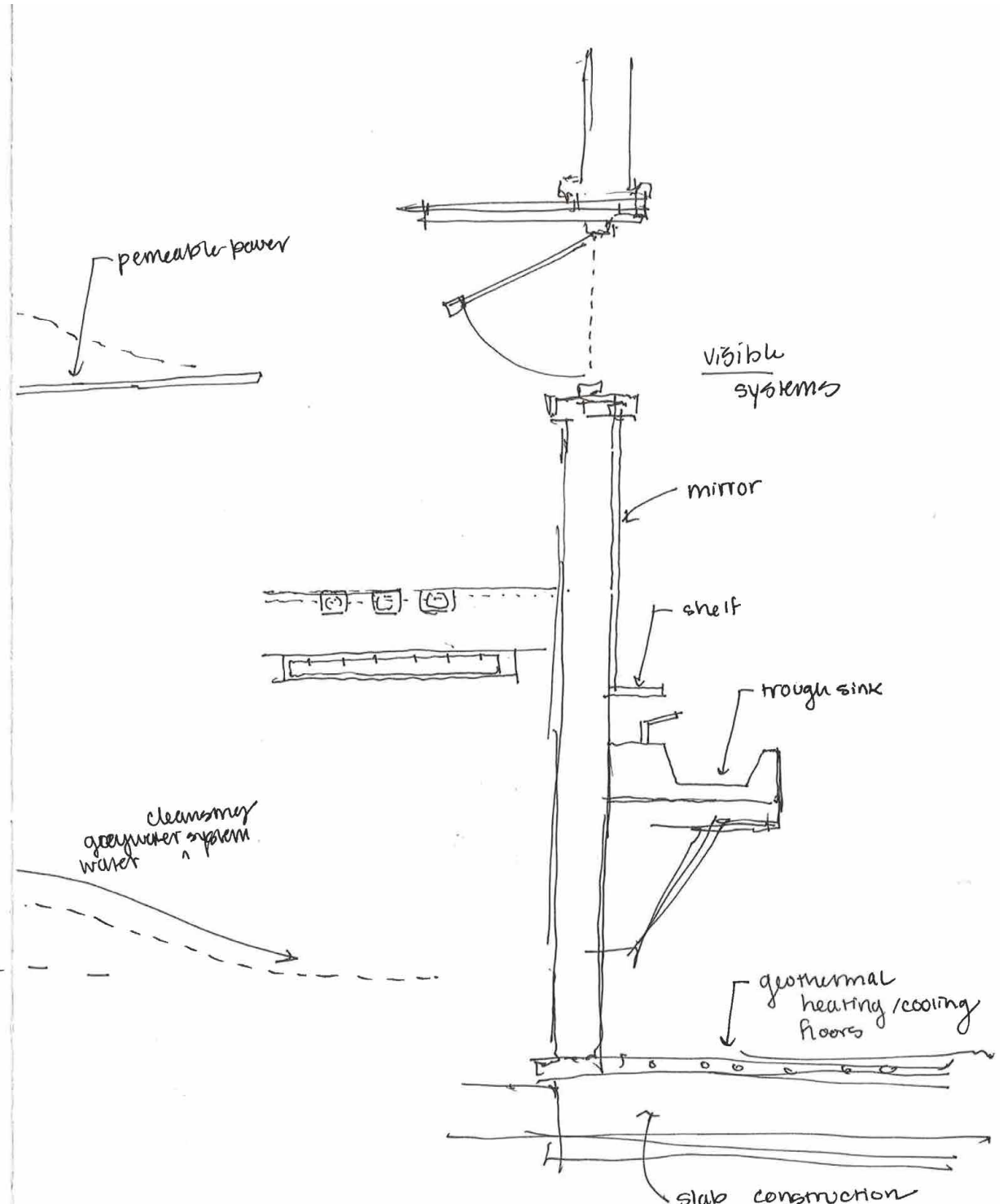
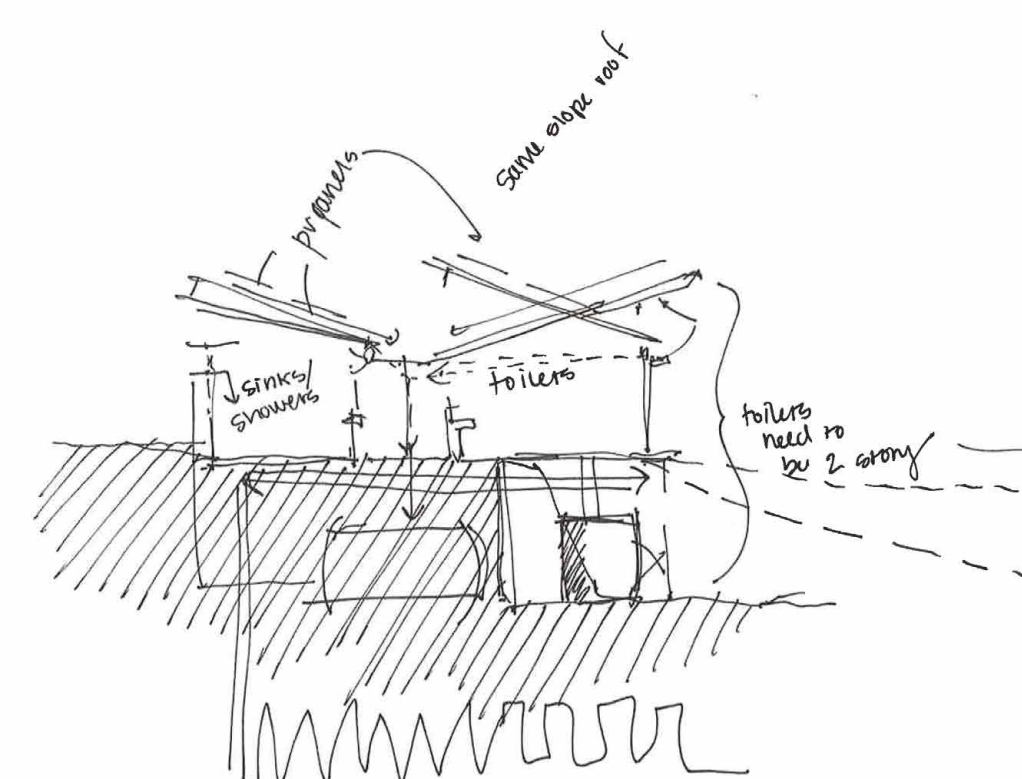
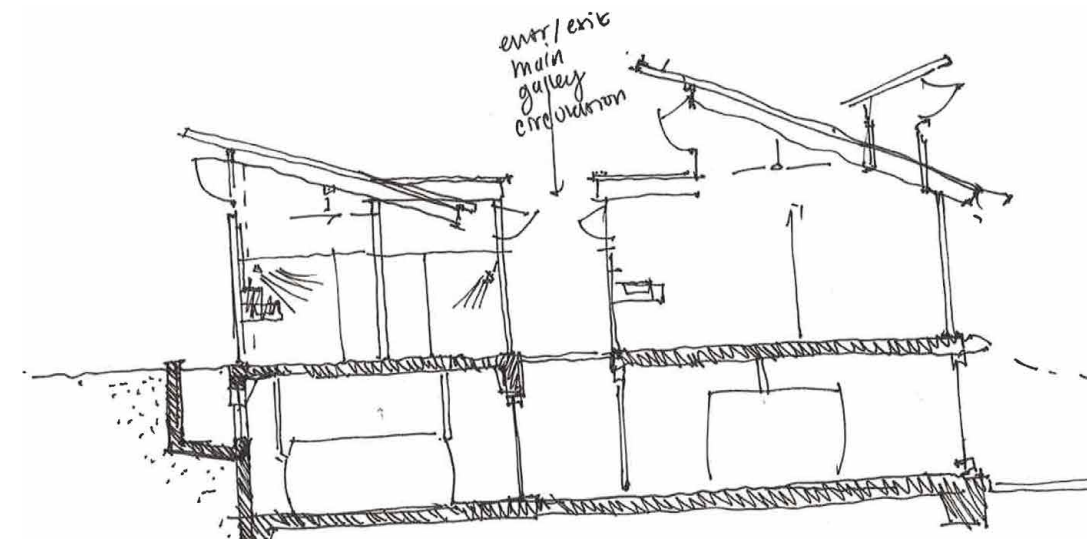
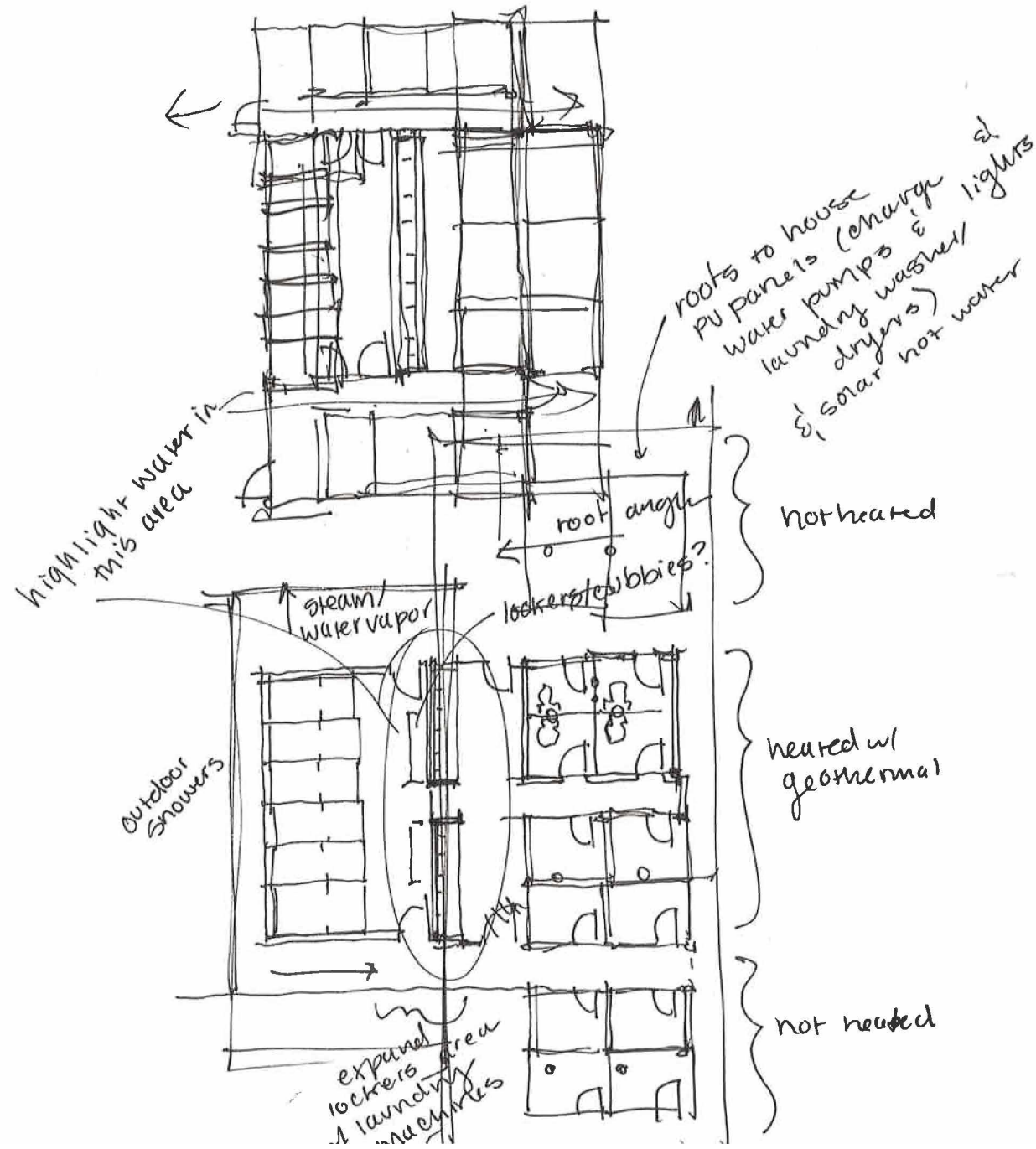
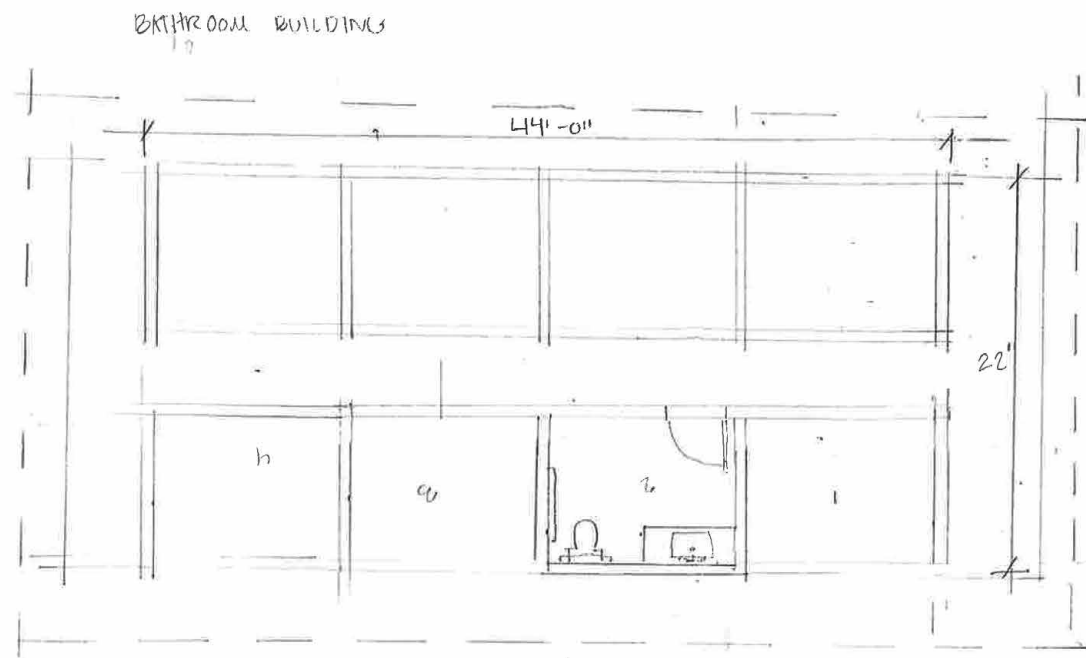
There are three bath houses on the site, one for the restaurant and farmer's market, one for the ceramics studio and gallery, and one for residential cabins. Having centralized bath houses makes it easy to consolidate and route the water collected from the roofs to a centralized filtration system. Also, because the toilets provided will be compostable, having a centralized location for large bio-chambers is less maintenance than replacing individual compostable toilet units on a more frequent basis.



BATH ROOM COMPLEX 76 people "dormitories" 65% women 35% men  
24 male / 50 female

WCs	1 per 10	3 male / 5 female	} 8 total WCs	all gender neutral
laus	1 per 10	3 male / 5 female		
showers	1 per 8	10 showers		
drinking fountains	1 per 100	1 total min		

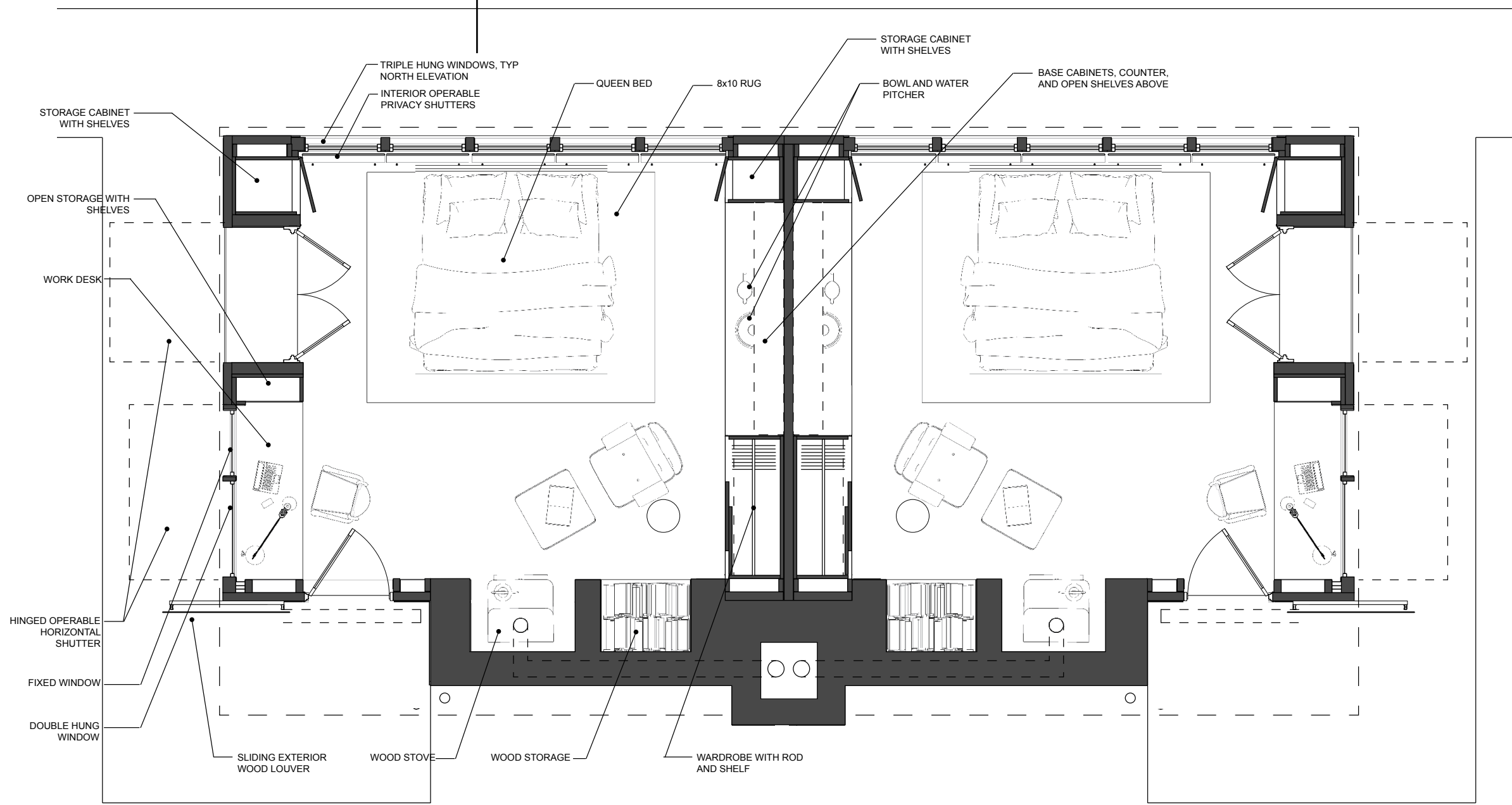
4/8 accessible



**TYPICAL DOUBLE UNIT CABINS**

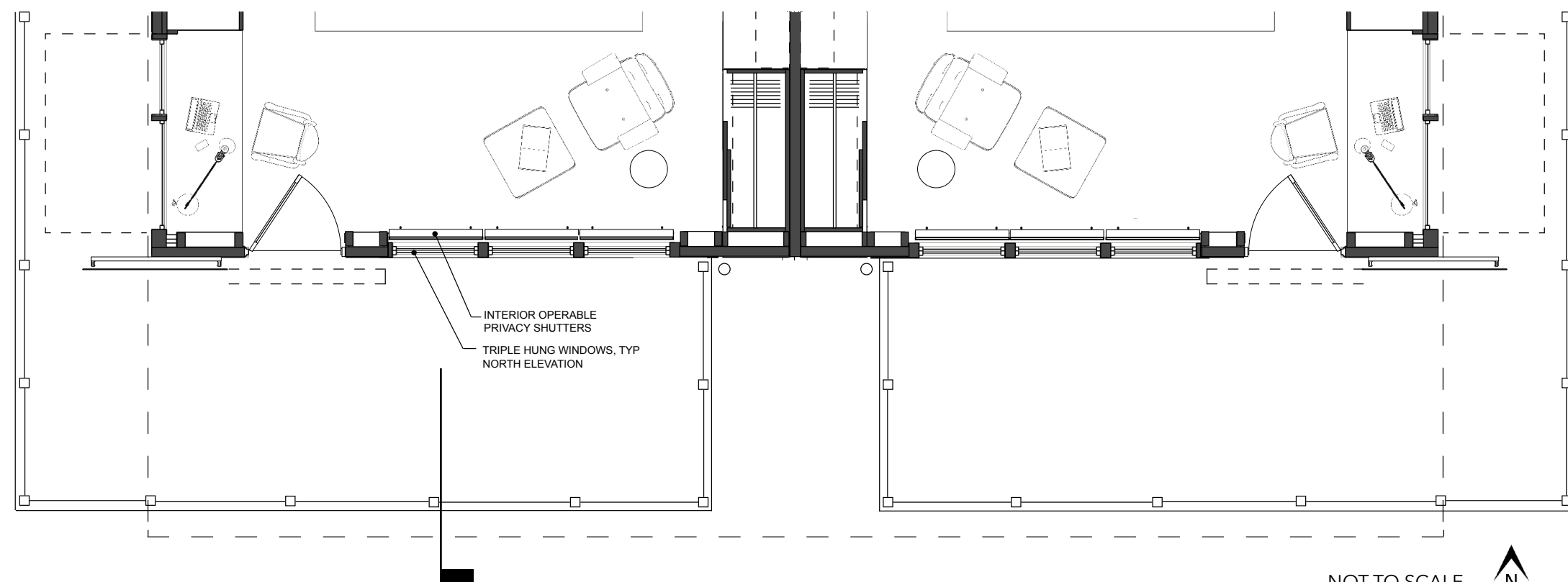
**ALL SEASON CABINS**  
SLAB ON GRADE + 5'-0" ELEVATED CABINS

SECTIONS, P.104-105



**SUMMER CABINS**  
10'-0" ELEVATED CABINS

\*PLAN IS THE SAME AS ABOVE EXCEPT FOR SOUTH ELEVATION AS SHOWN BELOW

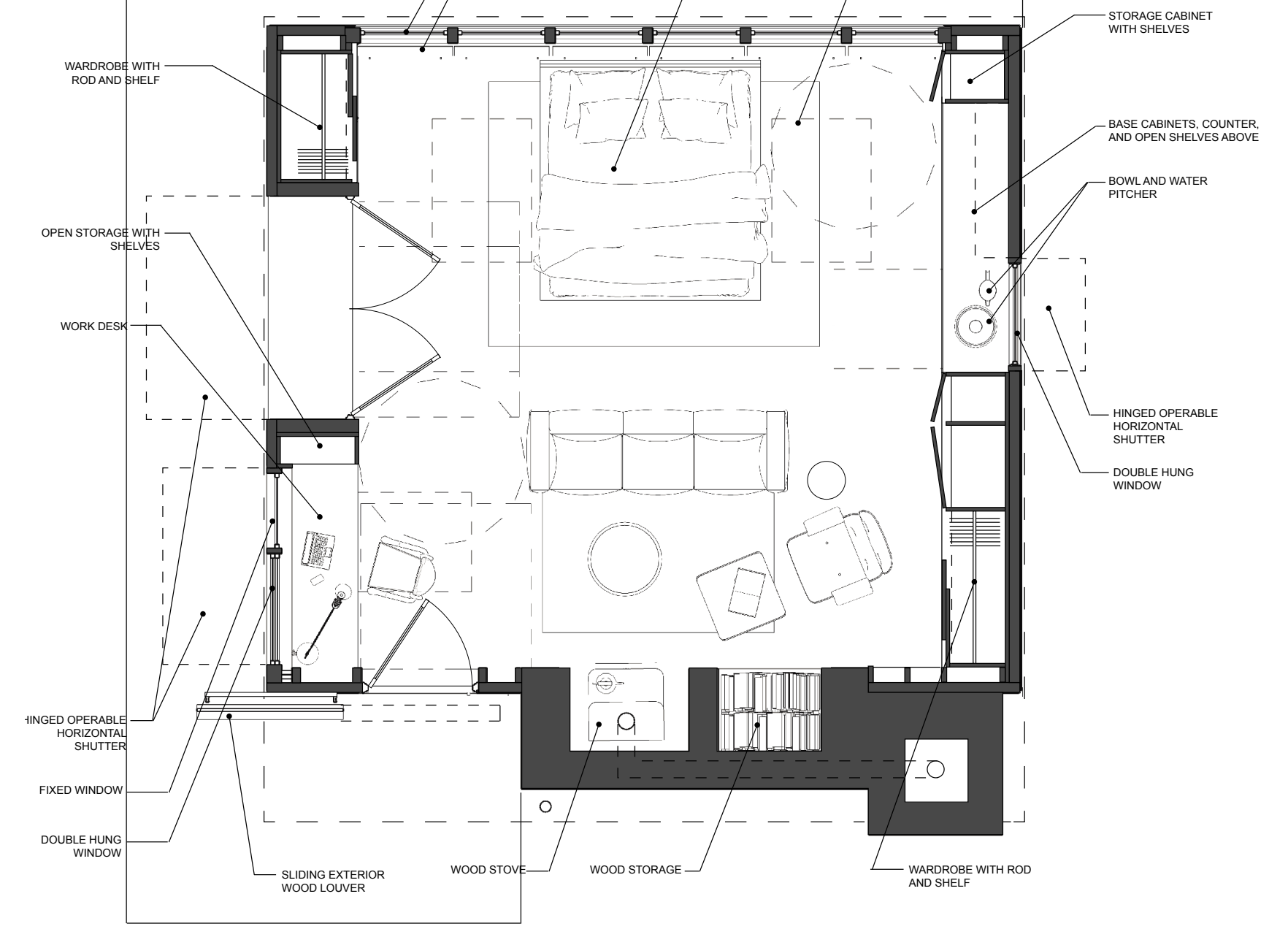


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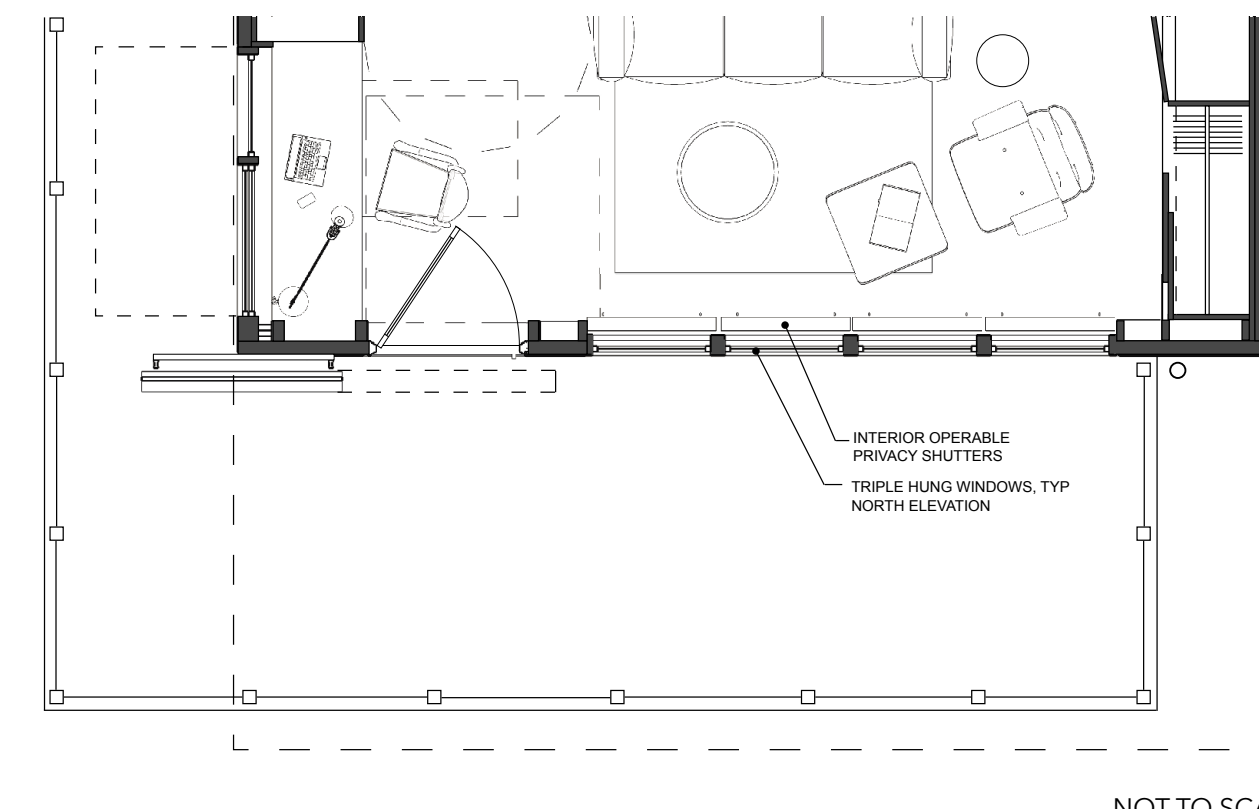
**SINGLE UNIT ACCESSIBLE CABINS**

**ALL SEASON CABINS**  
SLAB ON GRADE + 5'-0" ELEVATED CABINS



**SUMMER CABINS**  
10'-0" ELEVATED CABINS

\*PLAN IS THE SAME AS ABOVE EXCEPT FOR SOUTH ELEVATION AS SHOWN BELOW



NOT TO SCALE



# ALL SEASON CABINS

SLAB ON GRADE

\*SECTION OF TYPICAL DOUBLE UNIT

NOT TO SCALE

5'-0" ELEVATED

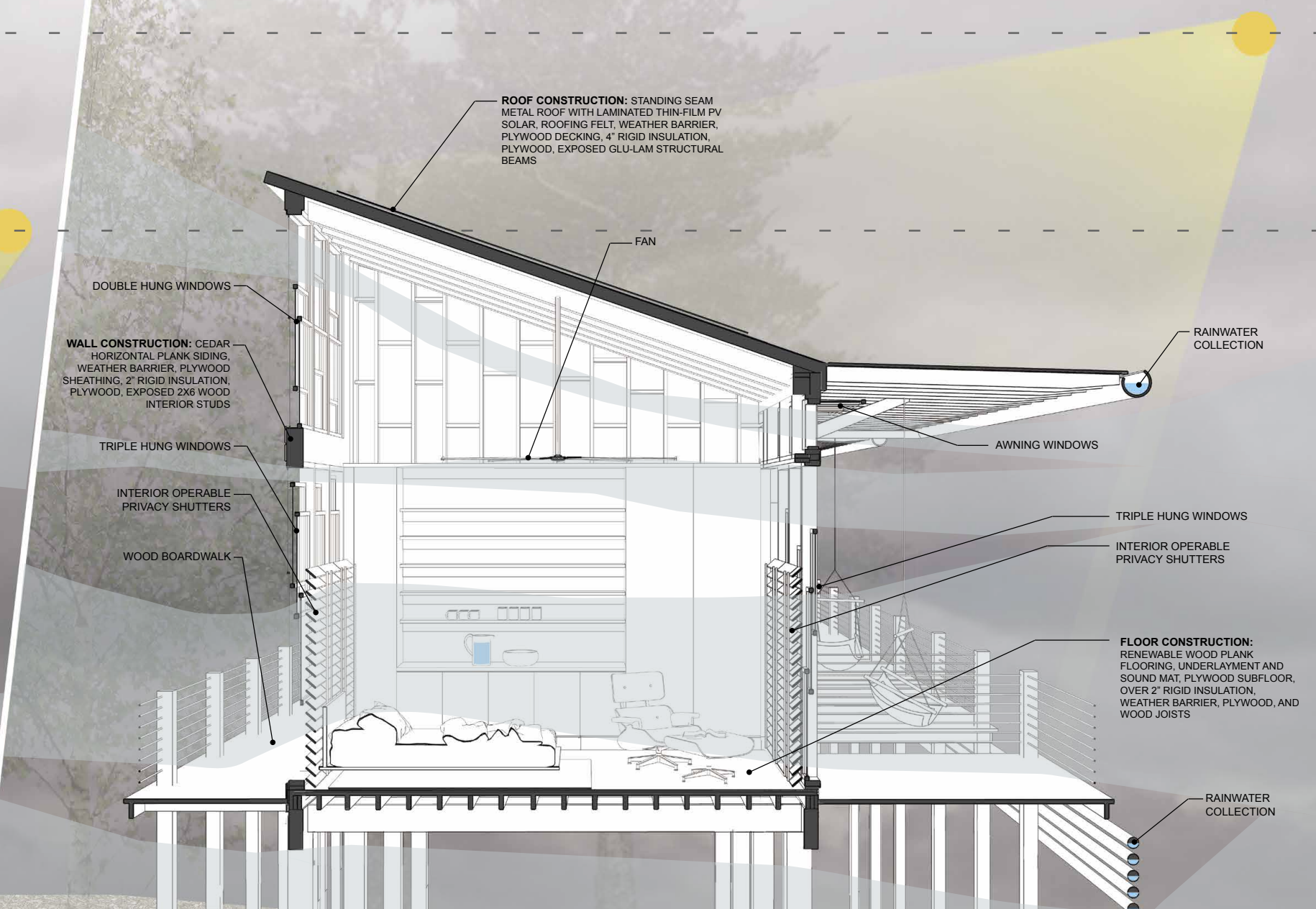
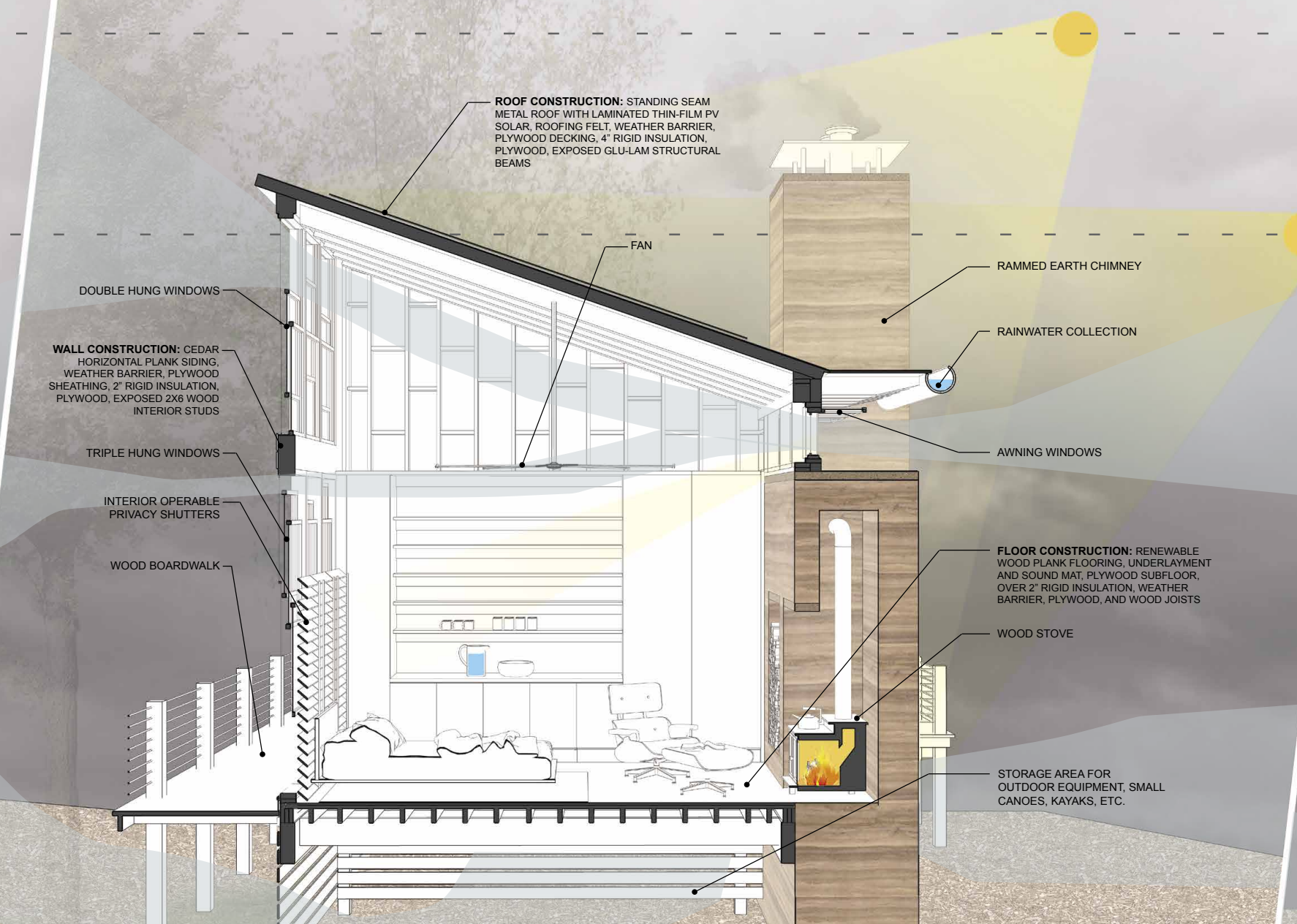
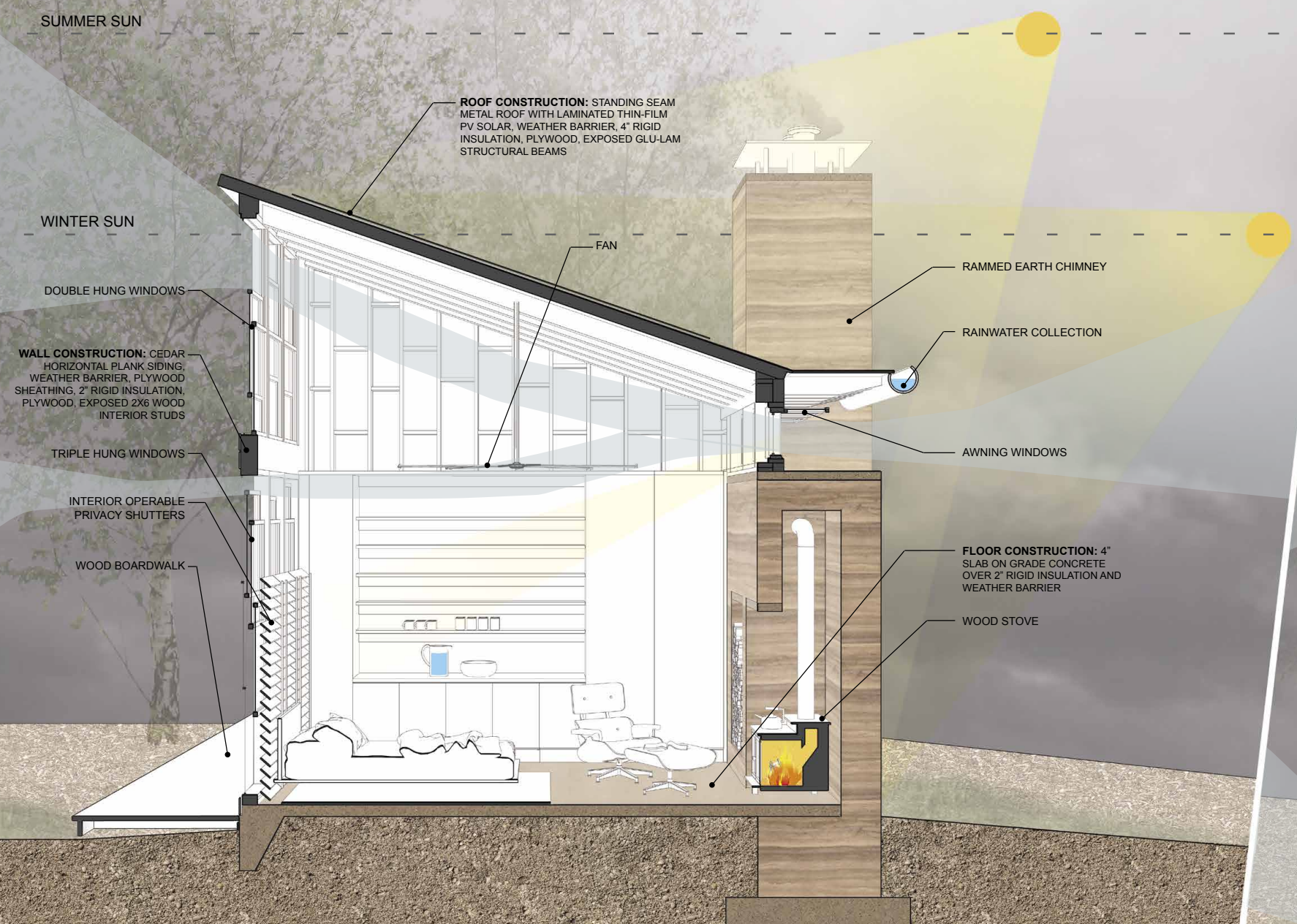
\*SECTION OF TYPICAL DOUBLE UNIT

# SUMMER CABINS

10'-0" ELEVATED

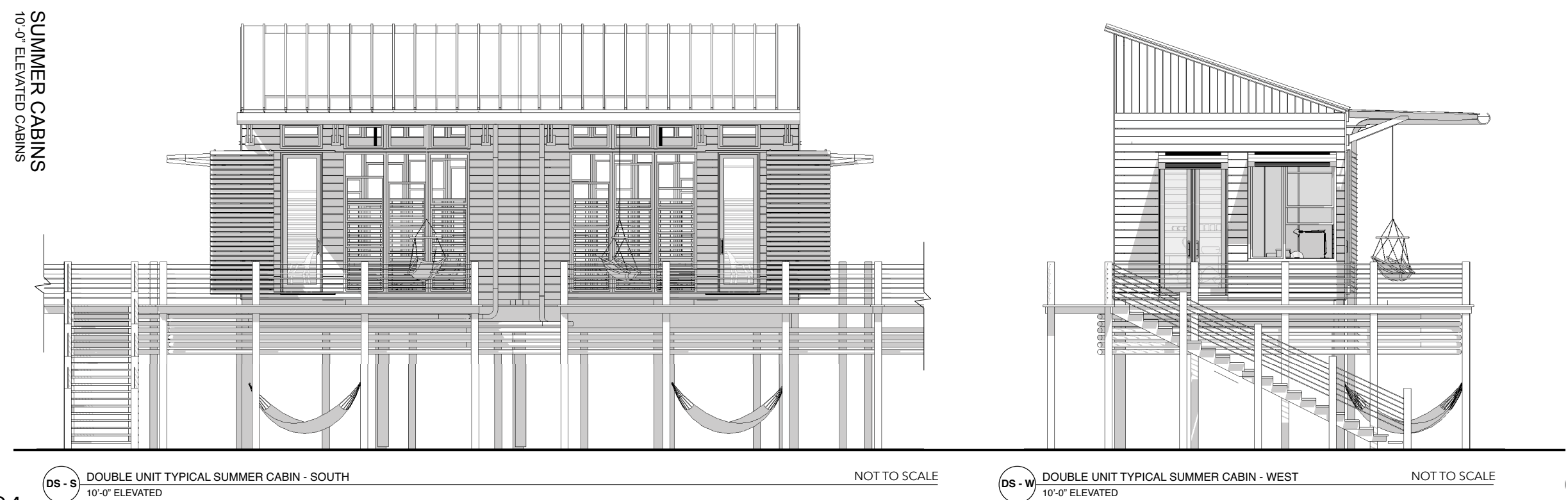
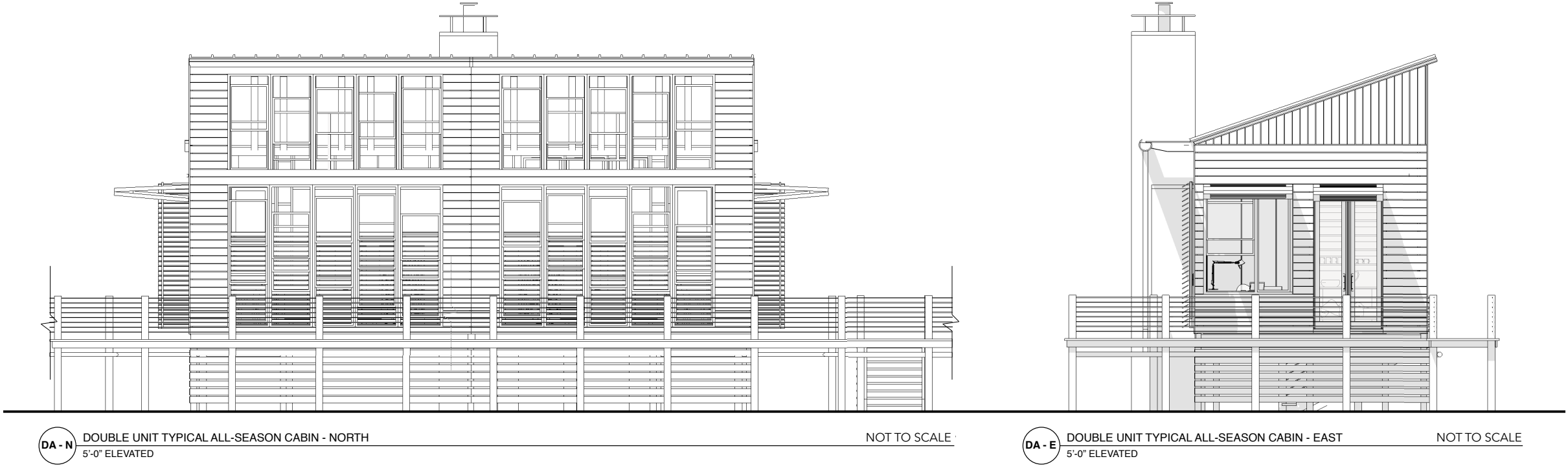
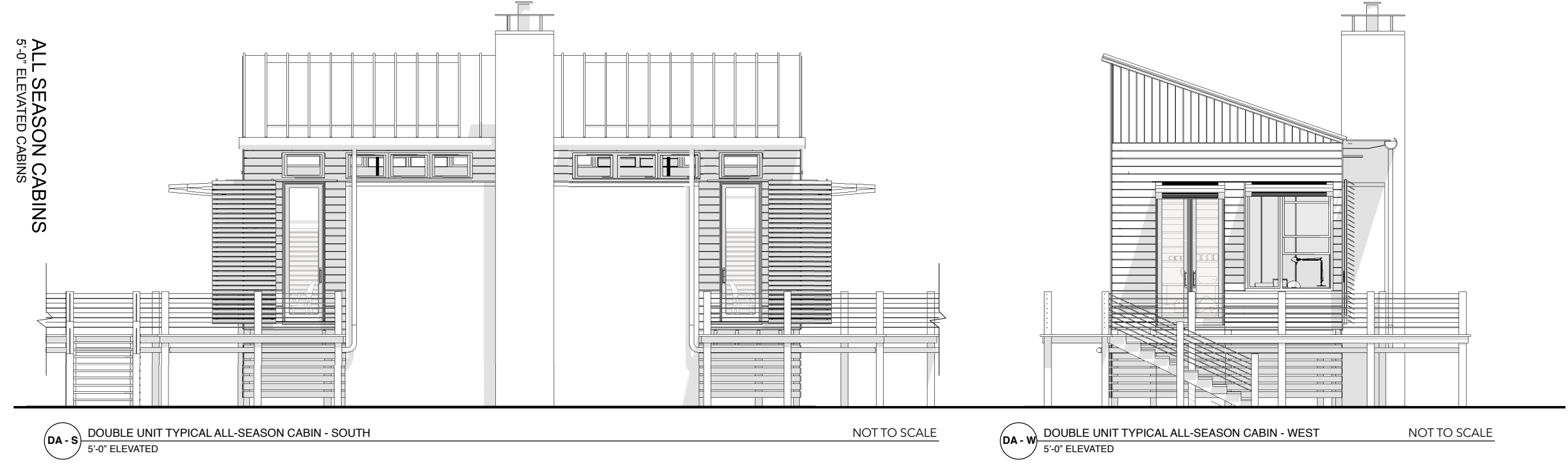
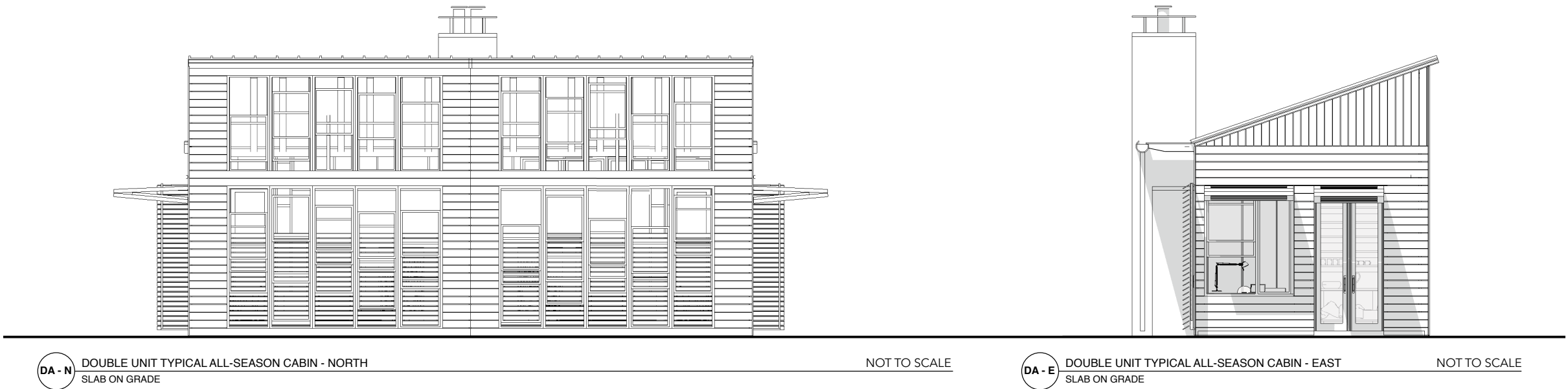
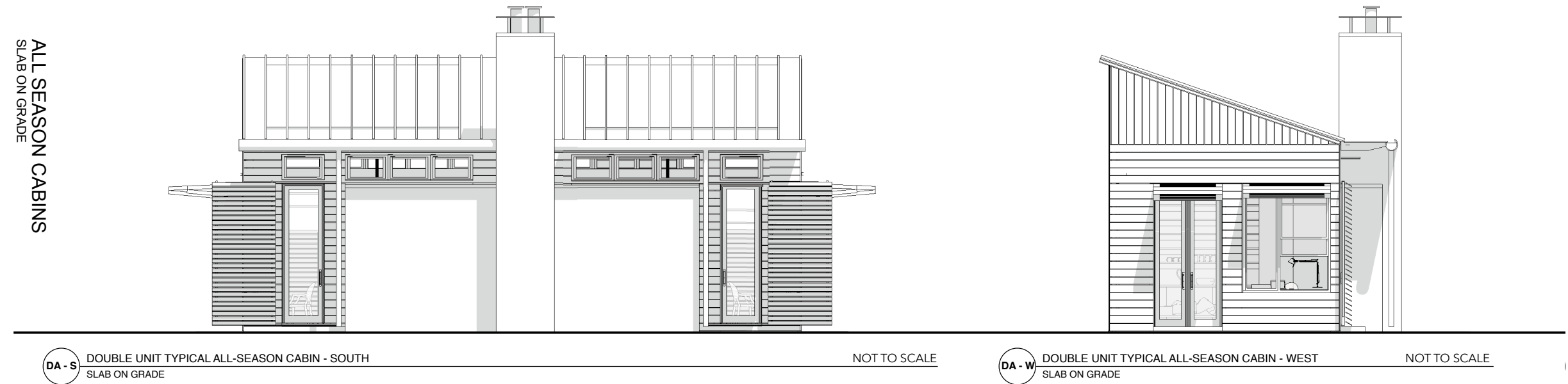
\*SECTION OF TYPICAL DOUBLE UNIT

NOT TO SCALE



**DOUBLE UNIT TYPICAL CABINS**

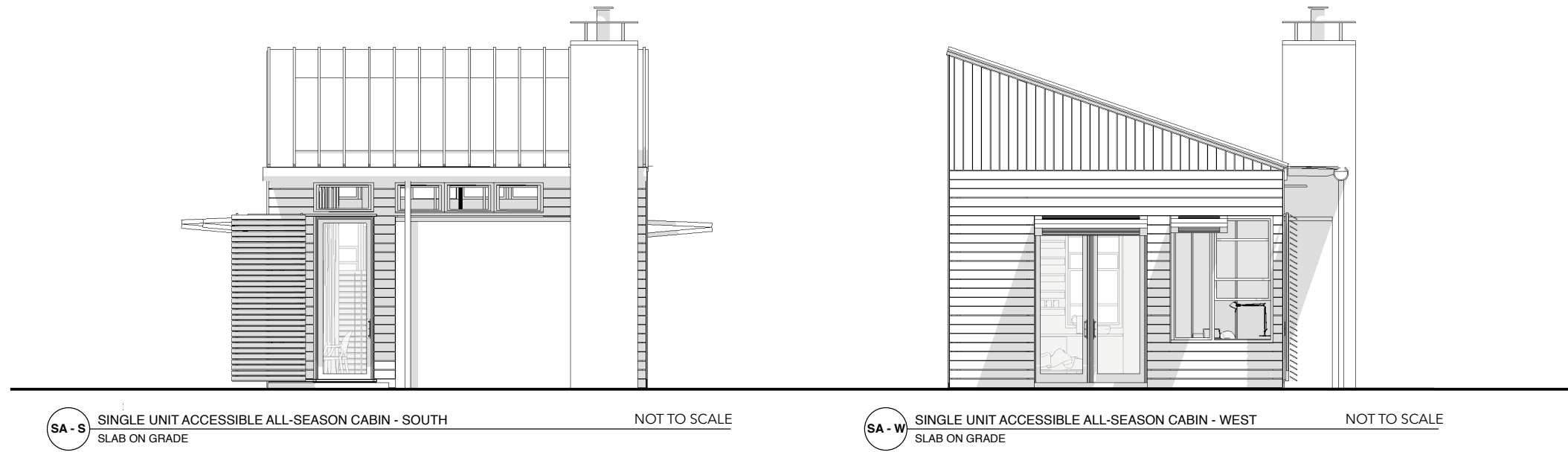
ELEVATIONS



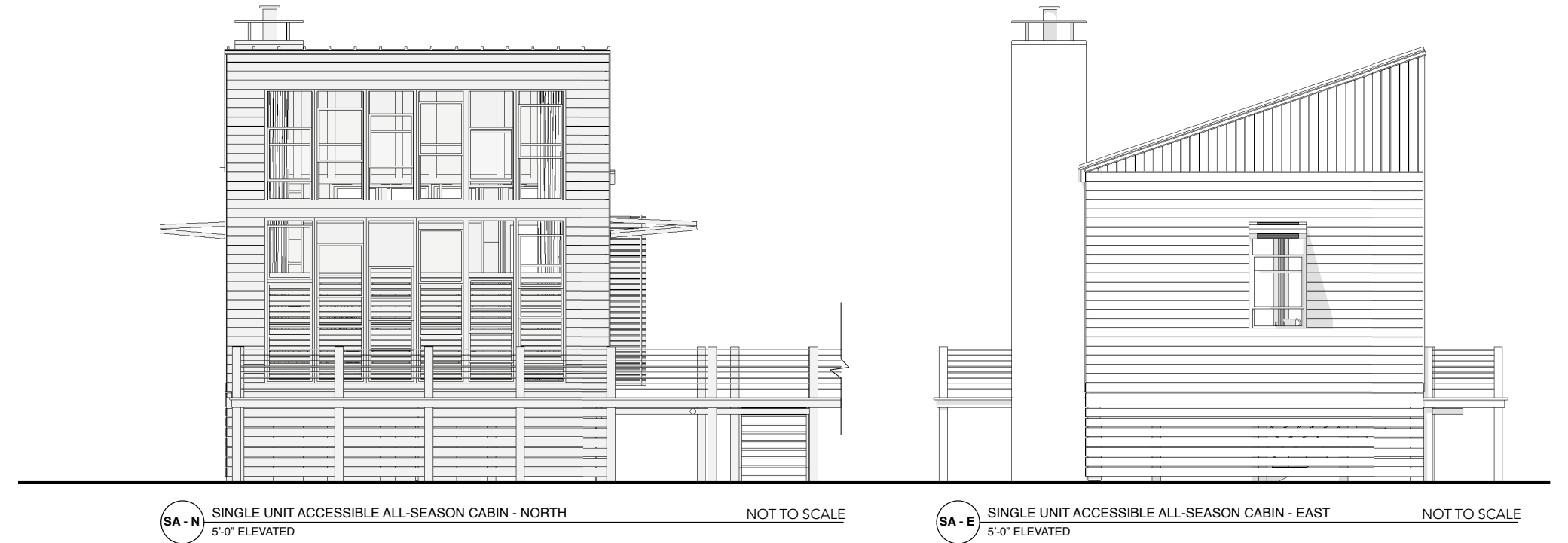
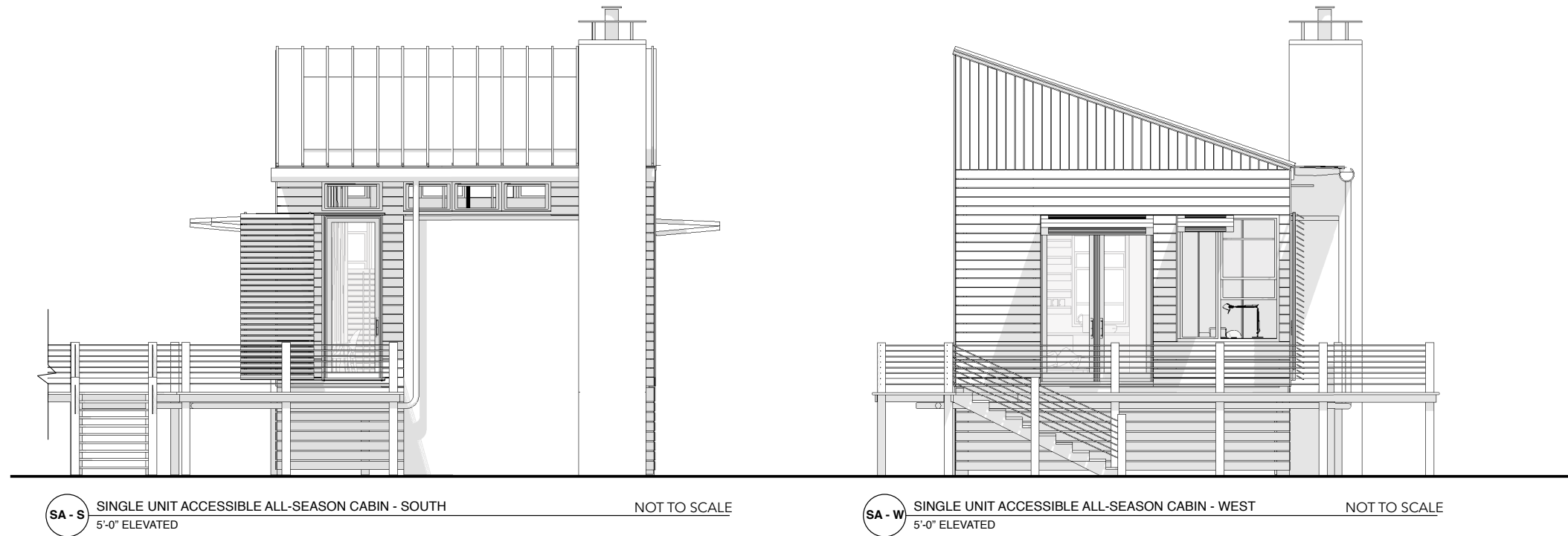
**SINGLE UNIT ACCESSIBLE CABINS**

ELEVATIONS

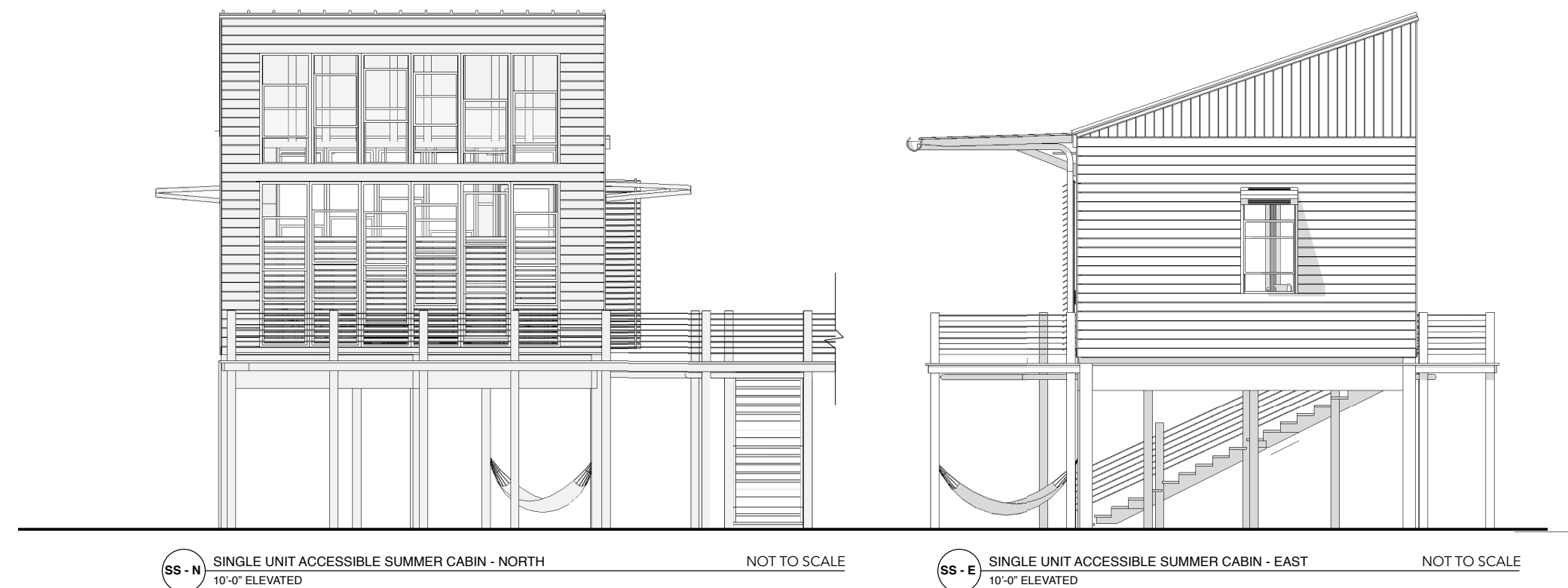
ALL SEASON CABINS  
SLAB ON GRADE



ALL SEASON CABINS  
5'-0" ELEVATED CABINS



SUMMER CABINS  
10'-0" ELEVATED CABINS



PERSPECTIVE

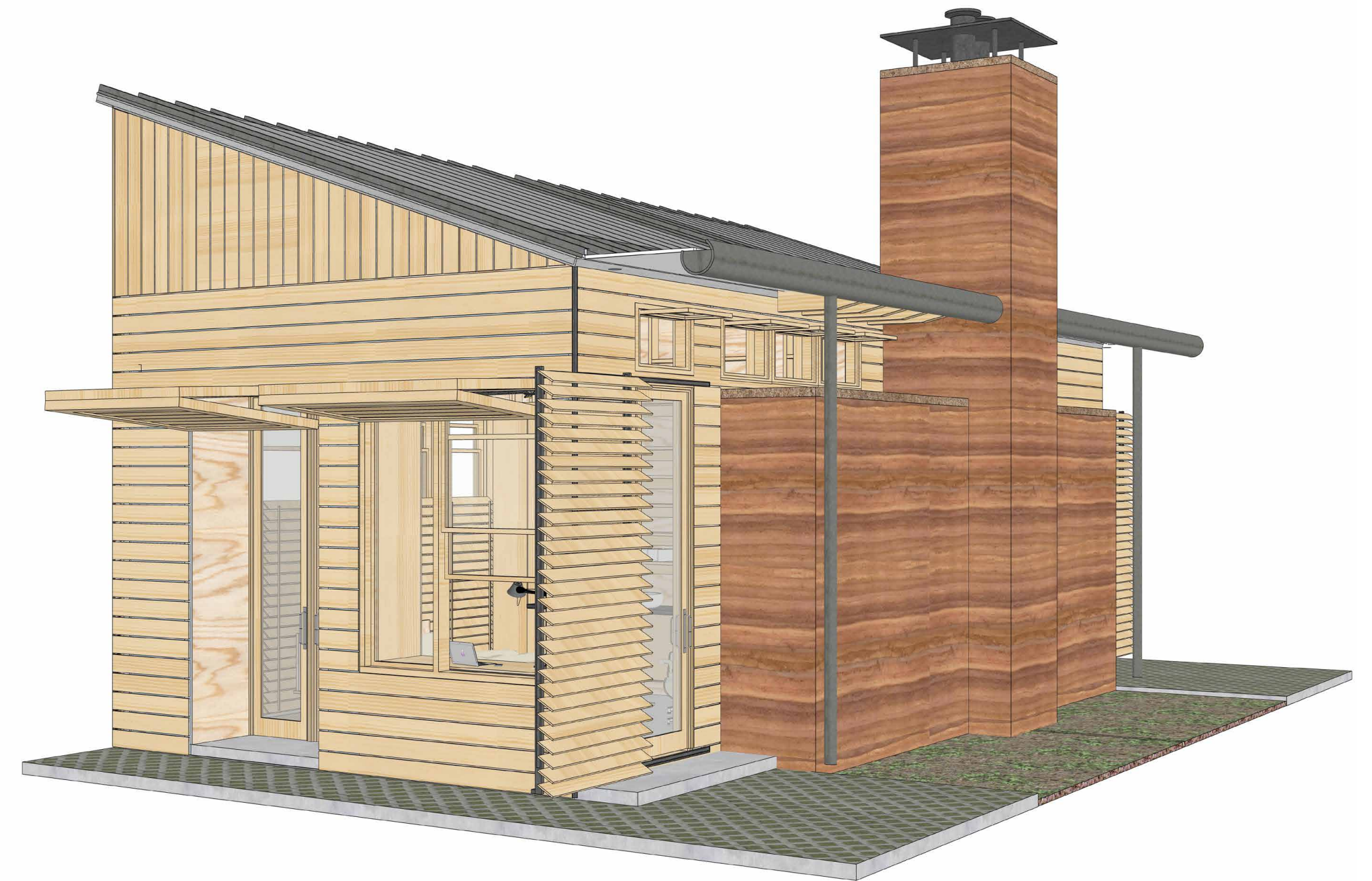
# ALL SEASON CABINS

SLAB ON GRADE + 5'-0" ELEVATED CABINS





**ALL SEASON CABIN PERSPECTIVE**  
SLAB ON GRADE  
NORTH AND WEST ELEVATIONS



**ALL SEASON CABIN PERSPECTIVE**  
SLAB ON GRADE  
SOUTH AND WEST ELEVATIONS



**ALL SEASON CABIN PERSPECTIVE**  
5'-0" ELEVATED  
NORTH AND WEST ELEVATIONS

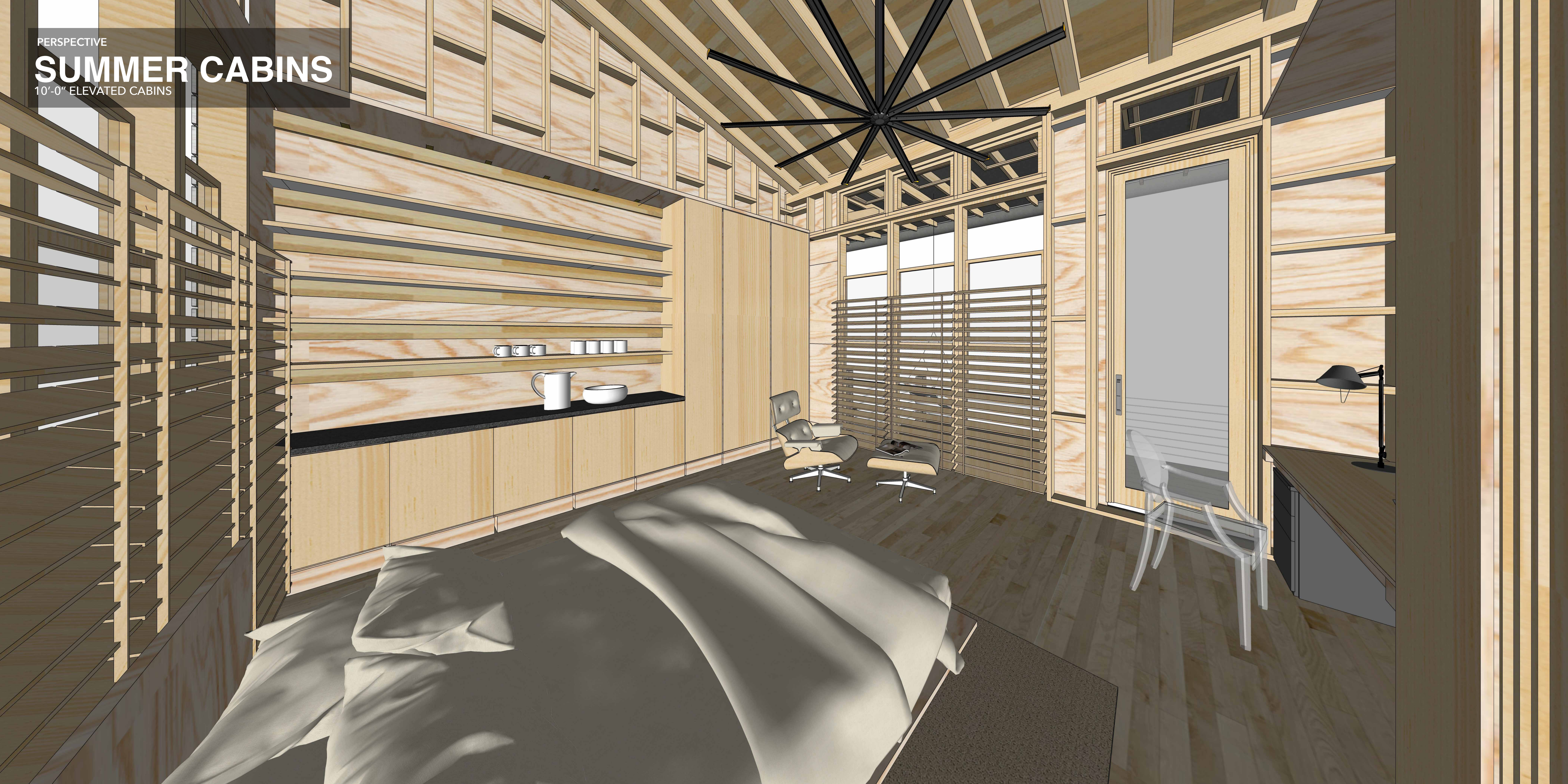


**ALL SEASON CABIN PERSPECTIVE**  
5'-0" ELEVATED  
SOUTH AND WEST ELEVATIONS

PERSPECTIVE

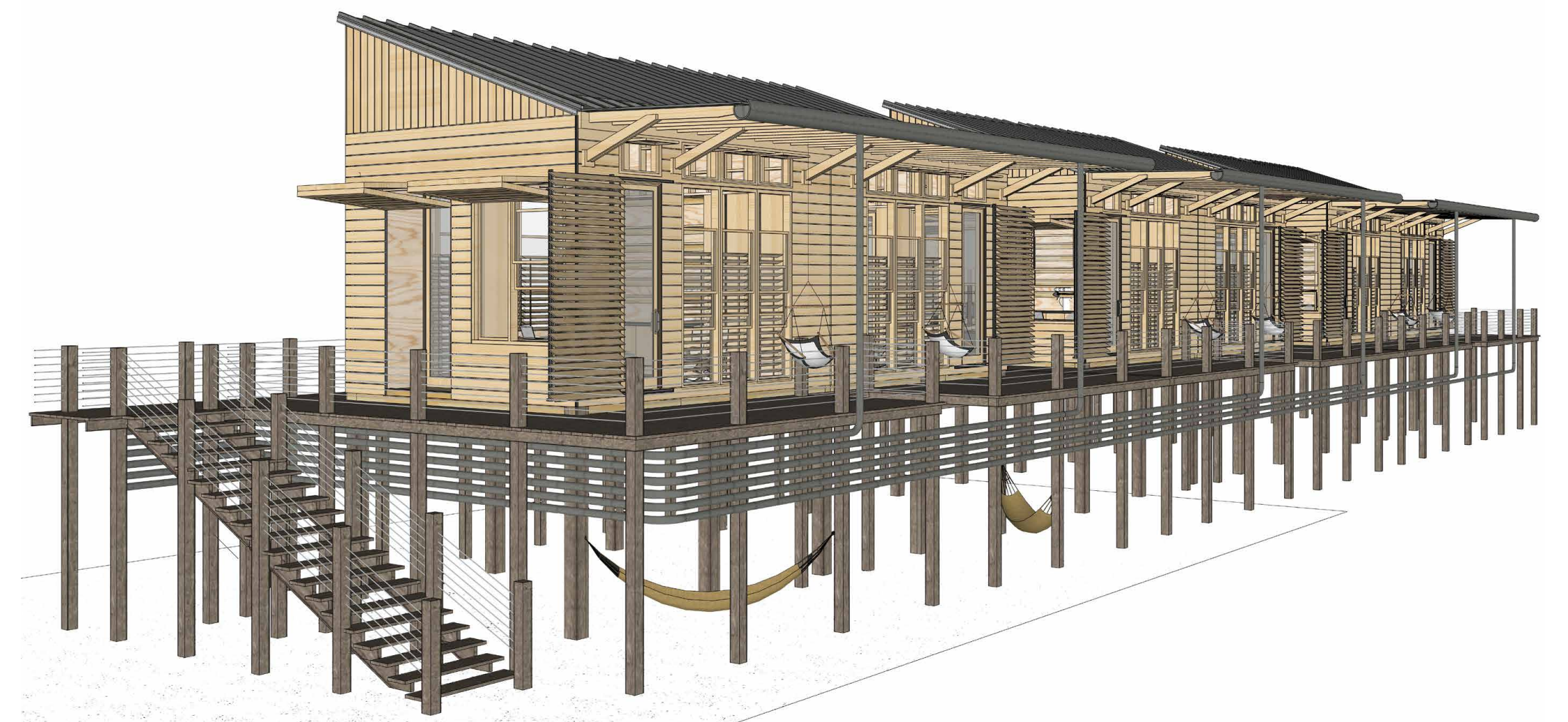
# SUMMER CABINS

10'-0" ELEVATED CABINS





**SUMMER CABIN PERSPECTIVE**  
10'-0" ELEVATED  
NORTH AND WEST ELEVATIONS



**SUMMER CABIN PERSPECTIVE**  
10'-0" ELEVATED  
SOUTH AND WEST ELEVATIONS

## Summary

This project began from an idea about how changing the collective American attitude toward our living habits could have a huge impact on not only the global climate change crisis, but also on local ecosystems like the Rappahannock River, and right down to our own personal health and well-being. I believe architects have an essential role to play in re-imagining a future sustainable, resilient, and adaptable built environment.

Throughout the course of my thesis, I investigated a concept of the future of conservation in architecture at a handful of scales ranging from a 40 acre site plan to section details of a fly roof gutter and downspout system. The thread that kept the project together was framing my argument around the four elements: air, water, fire and earth.

### AIR

Instead of the current accepted practice of highly insulated walls and interior air refrigeration, I studied the wind patterns across the site and harnessed nature to provide a cooling breeze through every part of the designed structure. Refrigerants are harmful greenhouse gases, in addition to the energy it takes to operate air conditioning systems, and for healthy children and adults, completely unnecessary for daily life. In fact, air conditioning may be contributing to our overall poor health.. It's hard to tell how comfortable the designed spaces will actually be in the summertime without building them and spending some time there, but the proposed landscape strategies and architectural devices that provide shade and pull in fresh cool air while displacing the warm, stale air were mainstays for centuries in the American Mid-Atlantic and will be extremely useful again for future sustainable design thinking for this region of the country..

### WATER

On the American East Coast, we have generally become accustomed to using water on demand without regard for where it came from, the filtration process it had to go through before it reached us, and where it will go after we use it. Over the course of this year, I studied the efficiency and sustainability of well and septic systems around the Rappahannock River watershed compared to water treatment facilities and sewer systems, and on-site water collection and greywater phytoremediation. I found that both energy-intensive municipal wastewater treatment facilities and septic tanks and drain fields contribute a large amount of nitrogen pollution to the Chesapeake Bay. The least harmful and most efficient option for my rural site was to use the roofs to passively collect rainwater, filter it on-site to potable standards, use it sparingly, and then dispose of it through natural plant phytoremediation. I kept this process as visible as possible at the site, building, and human user scale so that students and visitors remain conscious of how much water they're using. I also provided composting toilets which do not use potable water or greywater for toilet flushing, neither do they necessitate blackwater treatment. The compost generated by the breakdown of human waste can be used safely as soil in the landscape.

### FIRE

I considered the sun as a fire element, arranging the buildings on the site to respond to the daily rotation of the earth relative to the sun. The roofs of the buildings are also outfitted with photovoltaic systems and solar water heating. This hot water is used at the sinks, showers, and laundry, and also routed in pipes within the slab flooring to provide radiant heat in the winter. Fire is used for all the on-site heating needs - keeping warm inside during the winter months, cooking food, and in the pottery kilns, to "fire" the students' clay art pieces. Creating heat with electricity draws much too heavily on the provided photovoltaic system. In order to keep that system small, I'm relying on the energy on the sun to provide basic electrical needs such as powering the ceiling fans and nighttime interior lighting. Fire is also used in conjunction with earth at

the rammed earth chimneys. The mass of the south facing chimneys collects heat from the sun during the day and releases it slowly at night. The warm microclimate around the chimneys also allows for more typically southern grown fruit trees to thrive against the wall in espalier-style.

### EARTH

For the earth element, I thought about how to both design the landscape and use building materials (and pottery clay) in a way that has a positive impact on the environment, local ecosystem, and human health. In eliminating this corn and soy field, and as part of the retreat, I thought about where the students and visitors would get their food from, so I created potoger gardens within the site design, allowing the earth to provide a bountiful, and healthful, variety of food for its inhabitants. In reimagining the landscape, I added as many native trees back to the site as I could, filling in all the spaces that weren't planned lawn or gardens. Reforestation is incredibly important to give back habitat to local plants and animals, including the Bald Eagle, provide shade to create cool microenvironments on the site to escape to when it gets warm in the summer, mitigate carbon dioxide in the atmosphere, and so that the large root systems can slow runoff and stabilize the soil, preventing pollutants from reaching the river. Finally, I used permeable materials for hardscaping as part of my stormwater management approach to prevent runoff. I also wanted to represent the earth in the building materials selected for construction. I tried to use materials in their most natural state. I designed rammed earth walls and heavy timber structure, with wood framing, sheathing, and cladding. These materials are either permanent, or can be recycled or returned to the earth in a natural way at the end of their useful life.

I believe that if we are educated in how our living habits are affecting the health of the planet, and our own health, we will be open to changing those habits and creating simple architecture that harnesses the air, water, fire and earth to support all of our needs and the quality of our ecosystem around us.



Stephanie Burcham (b.1990)  
*Candlesticks, 2019*

Wood-fired earthenware clay



Stephanie Burcham (b.1990)  
*Mug 2*, 2019

Wood-fired earthenware clay

## Conclusion

I've been interested in the intersection between architecture, landscape, food, politics, ethics, and how to prevent and reverse global warming since I took a January term course during my undergraduate education at the University of Virginia called "Food and Politics." I'm pretty sure I received a *quite* mediocre grade in that class, but the material has stuck with me probably more than any other course in those four years. Among other activities, like watching Food, Inc., we read Omnivore's Dilemma, written by Michael Pollan, and visited Joel Salatin's Polyface Farm. It was so cold the day we toured Polyface with Joel, it took me hours to thaw out in a warm bath in the shared common room toilets at my dorm, but looking back, that day altered the path of my life, and hopefully the course of my career if I'm so lucky as to create and take opportunities for myself that will fulfill my desire to make real waves in the design and construction industry. I realized that day that the common, accepted way of doing things, like concentrated animal feeding operations, doesn't have to be the Way in which Things are Done. Joel takes cues from traditional farming methods, coupled with his own quirky ideas, to create a cleverly divergent template for alternative farming, a template many young farmers, his apprentices or otherwise, have used to create farms of their own.

I want to help spearhead a revolutionary re-imagination of architecture and common building practices similar to the way in which Joel has reimagined meat production. Through my research, I've found alternative methods for supplying potable water, treating greywater, dealing with human waste, providing heat to stay warm when it's cold outside, and ways to cool off when it's hot. I've researched how to create warm and cool microenvironments, how it's more efficient and more sustainable to attempt to warm the human body itself rather than the entire building that the human occupies. (Think about the historic practice of heating water bottles and placing them under the sheets just before bedtime). I've learned how to harness the breeze, and protect buildings from potential floods. I've learned to conserve first, by reducing water and energy consumption, and then figure out how to meet that lower demand. I've also learned that as a society, we've become unnecessarily dependent on air conditioning, which has thrown off our natural mechanisms to acclimatize to changing weather patterns and seasons. Current building standards underestimate the body's incredible ability to tolerate a wide range of temperatures and humidities.

Through educated observation, I've also realized that most of the buildings under construction today, regardless of whether or not they are LEED certified, designed to Passive House standards, or the latest, greatest building codes, are not resilient at all. In the face of climate change, unpredictable weather, aging water infrastructure, shrinking access to fresh water, decreasing fossil fuel reserves, unpredictable future energy prices or rolling blackouts, many of these buildings would be completely uninhabitable if forced to continue operating without access to the power grid or municipal water. The structures of our society *have* to be able to continue to provide comfortable shelter in the face of an uncertain future. Continuing to build in the accepted way with the current American attitude toward construction and development- do it cheap, fast, and flip it for a profit - will only result in our buildings quickly being abandoned and destroyed in the face of adversity. Because of the game to design and build the cheapest structure that meets minimum building codes, we need convincing incentives and radical legislative change as soon as possible in order for owners and developers to begin to build sustainable, resilient structures. In my future career, I will fight for that change and share my knowledge with anyone I can along the way.



Stephanie Burcham (b.1990)  
Vase 1, 2019

Wood-fired earthenware clay

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