OCCHIOLISM

noun

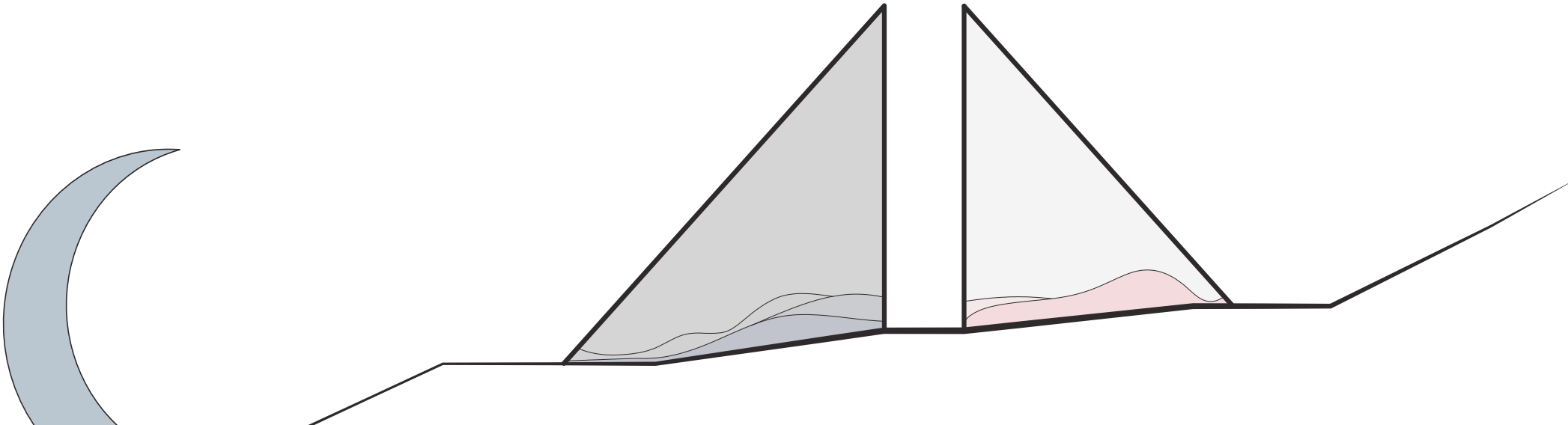
'the awareness of the smallness of your perspective'

Isaac Cantu-Backhaus

Fourth Year, B.F.A. Interior Architecture
University of North Carolina at Greensboro

Katherine Tardif

First Year, M. Architecture
University of Colorado at Denver



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MEET THE TEAM!

ISAAC BACKHAUS

'I would rather have questions that can't be answered than answers that can't be questioned.' -Richard Feynman

Hometown : **Chapel Hill, NC**
Favorite Song : **Chanel, Frank Ocean**
Years I peaked: **High School**
Favorite Pastimes: **D&D, Sketching and Journaling**

When I was first introduced to the design world I held a mindset of unhealthy competition. My first semester in a "real" architecture course I was readily available to do anything to get on top, to win. Over the course of my program this was steadily drained from me, I began to see the value that others bring, I began to open up and accept my own flaws. I was humbled by the talent of those around me and it was the most important shift of my career. It allowed me to take in the expertise and opinions of those who work with me, removing my tunnel vision of competition and instead channeling it into having fun with design and loving what I do.

I've never considered myself to be someone with any wild hobbies - I love to be comfortable. To me a perfect day would be lounging in a hammock, reading, and eventually falling asleep. Every week I look forward to playing in a campaign with my old friends in a game of Dungeons and Dragons, its something that keeps us connected even in different cities. The ability to be present in a moment and happy is something I value over anything. This is something that I will carry with me throughout my life.

KATHERINE TARDIF

'On the other side of your fear is your freedom.' - Jen Sincero

Hometown : **Raleigh, NC**
Favorite Song : **Free Bird, Lynyrd Skynryd**
Childhood Dream Job : **Astronaut**
Adjective of Choice : **Jazzed**

My early studio days consisted of second-guessing my design choices and becoming bogged down whenever I received any feedback that wasn't "This is the best design I've ever seen!" I was continually heartbroken because I struggled to seperate my feelings towards my work from the work itself. It was my third year in the program when a shift occurred in me and I realized that the people giving me feedback care about my project and want to help it evolve into the best it can be. Every new perspective on a project elevate the work to a new level and when I realized this, the world of design truly opened up for me.

Backpacking is my favorite 'afterschool activity.' It allows me to step outside my little bubble into the big, beautiful world providing me the space I need to reflect. This space lets me breath fresh air into every aspect of my life - design, relationships, personal growth. The skills I learn in the backcountry give me the confidence to embark on any new endeavor I have, whether it's a new project, city or journey. My next big endeavor - moving across the U.S. to pursue my Master's of Architecture this fall at the University of Colorado, Denver and although I'm nervous, I am mostly jazzed to adapt to a new environment and grow not only in knowledge but personally as well.

isaac bodhi backhaus

ACADEMIC & VOLUNTEER

UNC Greensboro Interior Architecture 2016 - present
interior and exterior building design
creation of material and furniture spec sheets
use and proficiency of design software

Volunteer Construction 2018
building sustainable homes for low income households

Arboreum Care and Maintenance 2018
gardening and upkeep of greensboro arboreum

Campus Building Restoration 2018
design and fabrication of interior furnishings

Obama Presidential Campaign 2008 - 2012
voter registration & campaign signage
voter registration & door-to-door advocacy

WORK HISTORY

Regina Andrew Design 2017 - 2018
sales and assistant at furniture market

Computer Assisted Making 2017 - present
laser pattern design and cutting
vinyl design and cutting
3d design and printing
textile design and printing

West Elm 2017 - present
sales and design associate
design of showrooms
redesign projects for residential and commercial interiors

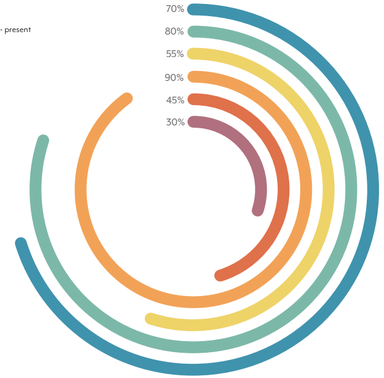
SOCIAL & CULTURAL

Almost Champion 2015
4th of july pie eating contest 2nd place

Team Strategy Games 2012 - 2018
collaboration & communication skills building

SKILLS & EXPERTISE

- google sketchup 70%
- revit 80%
- autocad 55%
- illustrator 90%
- rhino 45%
- photoshop 30%



KATHERINE TARDIF

EDUCATION

University of Colorado at Denver — *AUG. 2020 - MAY 2023*
Denver, CO
Master's of Architecture

University of North Carolina at Greensboro — *AUG. 2015 - MAY 2020*
Greensboro, NC
Bachelor of Arts in Interior Architecture

Barcelona, Spain — *MAY - JUNE 2017*
Study Abroad Experience

EMPLOYMENT / INTERNSHIPS

Main Street Fellow — *JAN. - MAY 2020*
Center for Community-Engaged Design - Greensboro, NC
Conduct archival research and develop work write-ups
Work on a team to design historic facades for store fronts and upper level apartments including color pallettes, lighting, and signage
Assess and document building conditions, in the field

Textile Design Intern — *JAN. - MAR 2020*
Anna Elisabeth / Greenhouse Fabrics - High Point, NC
Train through multiple departments of the company
Assist with an array of hands-on projects, including show room and High Point Furniture Market displays
Shoot and edit new content for website product images and social media

Outdoor Adventures Supervisor — *MAY 2018 - MAY 2020*
Department of Recreation and Wellness at UNC-Greensboro - Greensboro, NC
Mentor fellow staff members and enforce policies in the daily operations at the rock climbing wall, resource and rental center
Provide a high quality of customer service for patrons
-American Red Cross CPRO and First Aid Certification (May 2019 - May 2021)

Outdoor Adventures Trip Leader — *AUG. 2018 - MAY 2020*
Department of Recreation and Wellness at UNC-Greensboro - Greensboro, NC
Lead, manage, and create various types of outdoor trips including backpacking, canoeing, rock climbing and horseback riding
-Wilderness First Aid Certification (March 2019 - March 2021)

EMPLOYMENT / INTERNSHIPS (CONT'D)

Gold Leadership Challenge Assistant — *JAN. 2018 - MAY 2018*
Office of Leadership and Civic Engagement at UNC-Greensboro - Greensboro, NC
Communicated with Gold Leadership Challenge teams and participants to keep schedule
Brainstormed to develop new stratigies to improve the challenge
Organized documentation required for the challenge

Spartan Guide — *AUG. 2017 - OCT. 2018*
Office of Undergraduate Admissions at UNC-Greensboro - Greensboro, NC
Guided prospective students and families on tours
Assisted Admissions Office with various school events
Served as the face of campus

INVOLVEMENT

Research Assistant — *MAY 2019 - NOV. 2019*
Department of Interior Architecture at UNC-Greensboro - Greensboro, NC
Conducted research to determine design elements that contribute to crime rates in and around UNC-Greensboro's campus
Utilized Virtual Reality, NeuroSky Mindwave, and SpaceSyntax technologies
Attended SoCon Undergraduate Research Forum in November 2019 to present findings

Teaching Assistant — *JAN. 2018 - MAY 2019*
Department of Interior Architecture at UNC-Greensboro - Greensboro, NC
Assisted first year students with their studio course
Created learning resources for current and future students
Provided feedback after the course for future improvements

Computer Aided Making Volunteer — *AUG. 2017 - MAY 2018*
Department of Interior Architecture at UNC-Greensboro - Greensboro, NC
Trained in usage of laser cutter, vinyl cutter, 3d printer and sewing machines
Assisted students with usage of design-related machines

RECOGNITION

2nd Place Award Thomas Undergraduate Research and Creativity Expo — *MAY 2020*
Undergraduate Research, Scholarship and Creativity Office at UNC-Greensboro - Greensboro, NC
Research project investigating the subconscious reactions to areas on campus, Utilized virtual reality and a brain wave imaging device (Neurosky
Research Mentor: Asha Kutty, Research Partner: Margarito Martinez

SITE SELECTION : LOW DESERT

The world is rife with unique and hidden beauty which sometimes lies lurking below a harsh and unforgiving surface. The deserts of this planet exemplify this. What appears to be a hostile and barren landscape, devoid of life, actually embodies delicate, beautiful, and resilient varieties of life. The intense dichotomy that envelops this region is not only found between the perception and reality of the desert, but also within the climate, resources, and ecosystem.

Occhiolism resides within the low Sonaran desert, specifically located at 32.2480° N, 112.9161° W, in Southwestern, AZ. Due to the various dichotomies that exist in the desert, this project embodies the dance between them. The hot and the cold, the day and night, the summer and winter, the harsh and the soft, the perception of what the desert appears to be and reality of what it is, even life and death. The structure relates to these juxtapositions through various forms – the exterior structure versus the interior space (portraying harsh and soft respectively), the day chamber (pointing East) and the night chamber (pointing West) (portraying day and night, hot and cold).

There are also special features that help visitors ground themselves in where they are in the moment, to stay present. This includes the glow during the summer solstice along with a wide view of the desert landscape (in the day chamber), the opportunity to stargaze (in the night chamber) and the feature walls in both chambers. The summer solstice glow occurs in the day chamber at noon on the longest day of the year when the sun hits an altitude of 78 degrees and an azimuth of 138 degrees and shines through two openings, penetrating a crystal prism, producing a hazy rainbow diffusion throughout the space. It completely captivates and transforms, but only at noon on the longest day of the year (June 21). The night structure has a one-way glass positioned at the top half of the pyramid so travelers can stargaze at night, free from light pollution. The feature walls depict the topography of the Sonoran Desert in both geometric and organic forms and the shelter also points true North allowing visitors the chance to orient themselves.

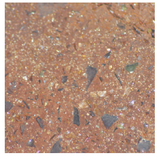
The dance between dichotomies exists both in the low desert and **Occhiolism**, venture further to discover what more the souls these hold.

EXTERIOR RENDERING

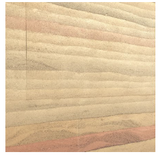
NARRATIVE : MATERIALS, COLLABORATION

MERCURY GLASS

FERROCK



RAMMED EARTH



SANDSTONE

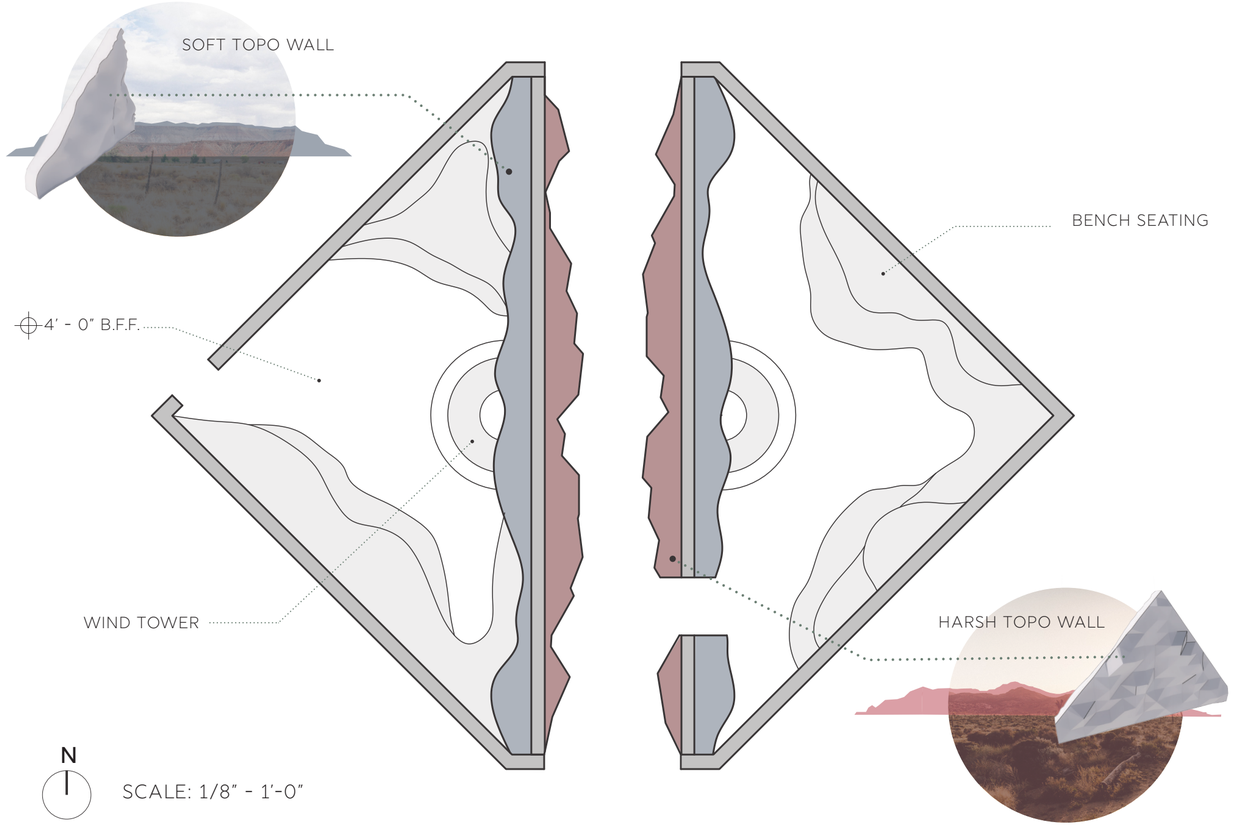
Since the low desert can get to scorching temperatures, the exterior façade is clad with mercury glass and stained one-way, 2 layered ultraviolet protective glass. These were selected due to their high albedo, where the mercury glass reflects light and heat away from the structure, keeping the interior a cool respite from the desert heat. The exterior of the one-way glass is reflective and stained to match the mercury glass (keeping the exterior flush) where from the interior, visitors can look out onto the desert.

The geometric wall is made from a material called ferrock. This is an environmentally-friendly concrete-like alternative (see pg. 16 for material sustainability). The geometric shape would be achieved by utilizing a computer numerical code (CNC) router to cut, with the pieces being moved on-site. The interior topographical wall is made from rammed earth which is dirt and water tamped down very tightly in molds, it would be made to be curved through a wooden mold.

The last material used is sandstone which makes up the seating and interior walls of both structures. The frame for the building would be 3d printed using ferrock.

The estimate build/setup time would take approximately 3 weeks total. The first week and a half would consist of building all the parts off-site, the last half of the second week would be transporting to the location and the third week would be setup. Once all the parts were on site, the structure would rise quickly.

Collaboration is **essential** for the success of this design. Architects, designers, and the community come together in the early stages to design the structure based on what the community is looking for. Since the sun and stars are such important elements of the design, astrologists will help calculate the sun path and stargazing techniques for some of the design features. Once designs are finalized, they would need to be reviewed by engineers to assess stability and structure involving the feature wall and building angle. After plans are approved, various people and trades come into play for the fabrication process. Sandstone craftsmen, glass artisans, digital designers and fabricators would each have their hand in the process. The creation of ferrock would be a community event as glass particles would be needed for the mixture. The community can gather and collect glass trash left in the Sonoran Desert to be processed down for the ferrock. By the time the shelter is completed, many different hands would have played key roles in realizing the final design.



TECHNICAL PLAN DRAWING

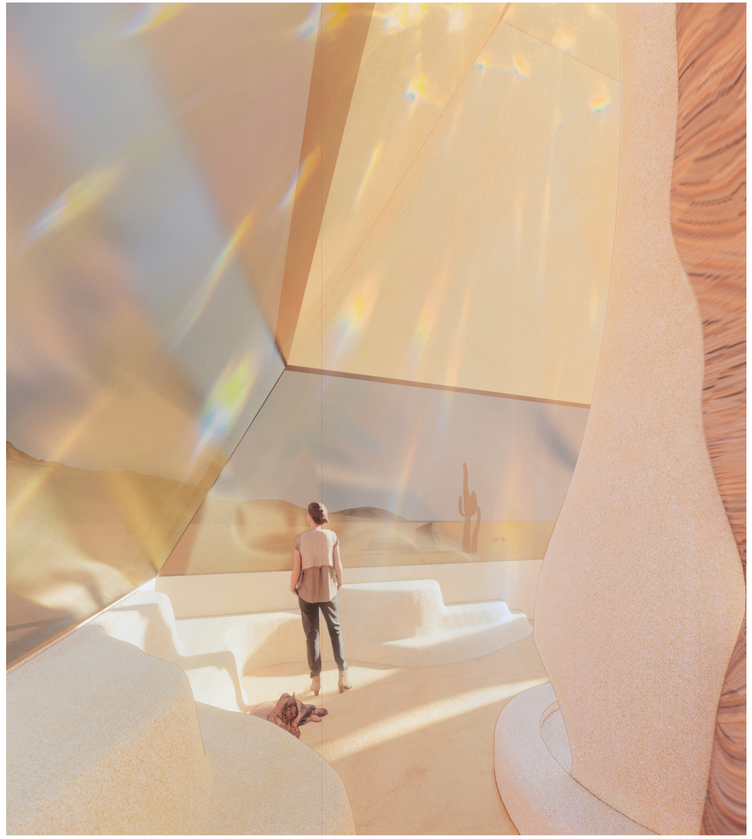
NARRATIVE : TRAVELER EXPERIENCE

Occhiolism is a place for sanctuary, reflection, and shelter. Designed and created to allow wanderers a chance to reflect on the desert and experience all its dichotomies, while still providing a comfortable place to take refuge from the harsh elements. Travelers can experience the shelter as an active or passive environment, journeying around and through it, discovering new perspectives or laying back and relaxing on the topographical benches (which are sculpted to sit, lay or lounge back).

Upon first approaching the structures, their 20' height imposes itself upon the desert, the reflective glass shining as a beacon to weary travelers. When closer, the imperfections in the sheen surface make their way to the naked eye, sandstorms and weather having taken their toll. The jagged ferrock wall nestles itself between the two structures, inviting visitors to walk between them and discover a single opening. It lies hidden, the entrance to the first of two structures, the day chamber. Playful leveled benches wrap around a simple stone cold fireplace encouraging creative seating and relaxation. A band of one-way glass flows around the room, allowing guests to look out onto the desert landscape. Travelers experience a cool breeze silently moving through the room, as the hidden openings above the cold fireplace funnel in air from the outside.

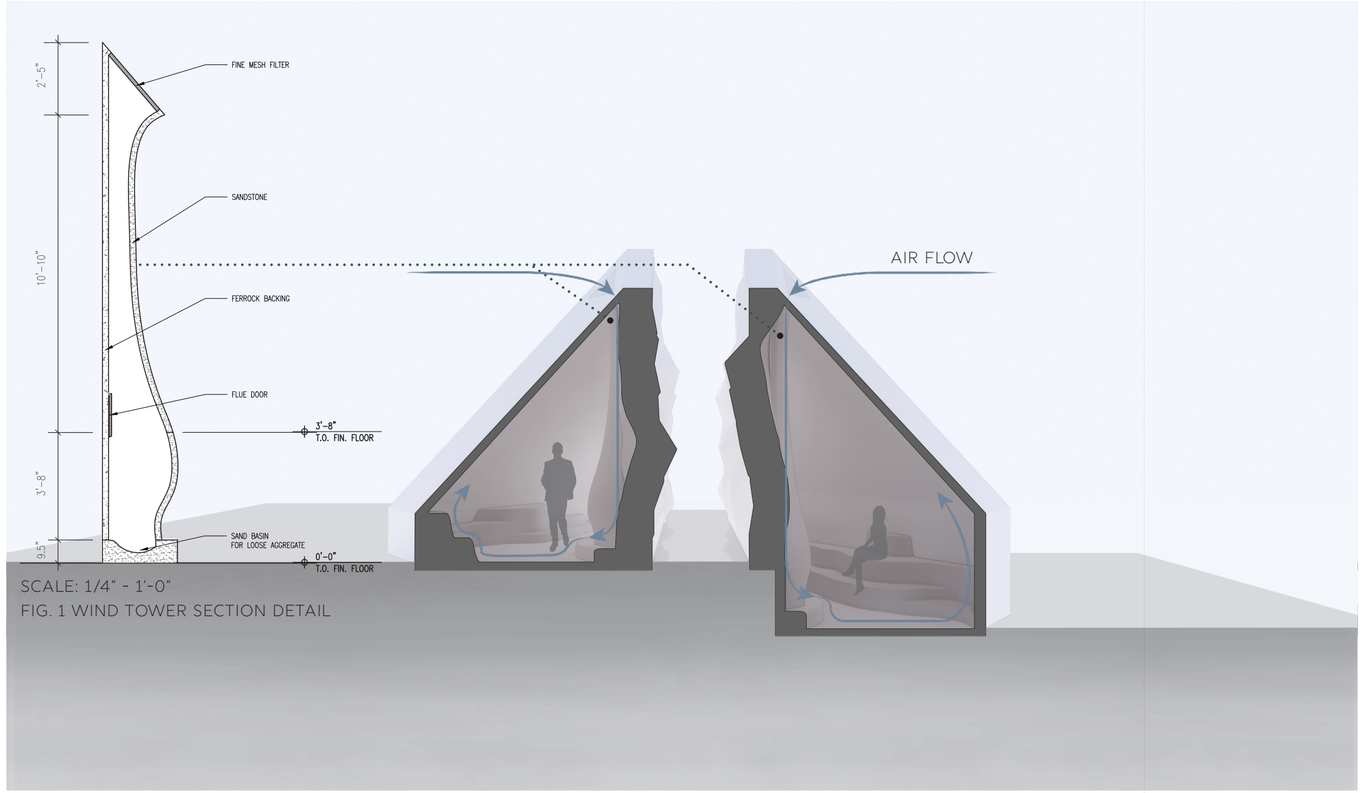
The second structure entrance opens in the back, a hidden passage down a hill that leads to the first chamber's twin, the night chamber. The playful and multi-leveled seating is now replaced by soft angled benches, ideally proportioned for a traveler to lay, rest and reflect before continuing. The high walls block the open desert landscape, drawing visitors' eyes upward to the hidden skylight towering above you. Those who stay longer are encouraged to relax on a bench, staring out to the vibrant stars, free of light pollution.

In the day chamber, guests can experience the cool environment while looking out through the one sided glass onto the desert landscape. In the night chamber, visitors can lay back in the warmth and stargaze through the one-sided glass cap. Both chambers can be used during either time of day but are optimal and special during their respective times. The rainbow diffusion that occurs at noon on the summer solstice in the day chamber is just one more unique experience that visitors can enjoy - but only on that single day at for a few minutes!



DAY CHAMBER

NIGHT CHAMBER



SECTIONAL PERSPECTIVE

NARRATIVE : CLIMATE

The desert poses some harsh conditions, the main concern being the heat, which can reach temperatures of up to 110°F. In this shelter, this is addressed through three main considerations. First is the material selection. Since the exterior is clad with a material with a high albedo and low thermal retention, most, if not all the heat from the sun is reflected away from the shelter.

The structures are also kept constantly cooled by the wind chimneys, also known as malqaf wind catchers or towers, which require no mechanical components (a traditional Iranian building technique, see Fig. 1). The wind towers capture the air at a higher elevation, redirecting it downward into the chambers, then circulating out through small ventilation holes. This passive cooling technique uses constant airflow to keep the temperature lower within a small area. The wind towers extend to an elevation of 20 feet, for their height helps prevent sand, dirt and various aggregate from entering the structure (there is an additional filter at the base to catch any miscellaneous debris that does find its way into the tower).

Lastly, the night chamber is partially sunken down into the earth 4 feet to allow for additional protection and respite from the heat. At night there is a new reality in the desert - where the temperatures can drop drastically. The shelter is able to maintain warmth through the sandstone interior that constantly absorbs and retains heat throughout the day allowing for a warmer space at night. There is a flue door near the bottom of the wind chimneys that can shut to 'turn off' the wind flow into the spaces.

In addition, there are pull out drawers below the bench seating that stores safety equipment such as first aid supplies, extra water, thermal wraps, and various emergency equipment if visitors were to need it.

NARRATIVE : TECHNOLOGY, SUSTAINABILITY

3D PRINTING

CNC ROUTING

FERROCK POURING

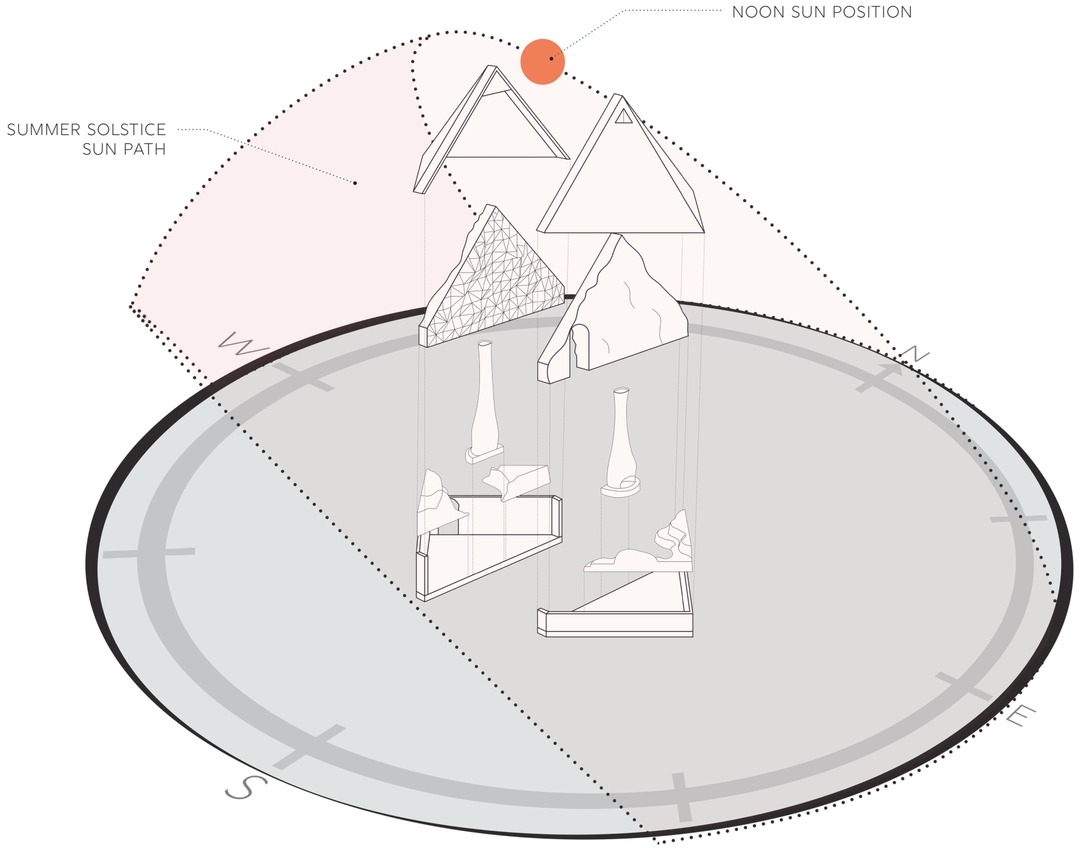
EARTH RAMMING

There are various types of technologies implemented in the construction and use. During fabrication, the frames of the structures are 3d printed ferrock, and the geometric topographical walls are CNC routed. The shelter also has two types of passive techniques that don't require anything mechanical but still fall under the 'technology' category: the wind tower passive cooling and the thermal passive heating.

One big question that still needs to be answered - sustainability. This is addressed solely through designing a self-sufficient, mechanical-free structure. The best emissions are no emissions, which is why this structure is built to interact with the environment rather than against it. Essentially, the structure does the work. The materials selected contribute to one large proponent of how the shelter is built environmentally friendly to reduce the building carbon footprint.

The mercury glass exterior is made from recycled materials. Ferrock is used for the structure and geometric topographical wall. This material is a concrete-like, environmentally friendly alternative that is carbon negative. It is made from waste steel dust (recycled from the steel industry, and is normally thrown out), silica from ground up glass (collected from the litter in the desert, recycled and ground down), and other various recycled particles. Once the mixture dries and hardens, it absorbs carbon dioxide, making it carbon negative. The interior topographical wall is made from rammed earth which is dirt and water tamped down very tightly in molds. The last material used is sandstone which makes up the seating and interior walls of both structures. This material has a low carbon footprint because it uses a very small percentage of the energy needed to create man-made stone (such as concrete or brick). Additionally, there is no chemical waste in the production process and all water used to produce the stone is recycled and reused.

In addition to materials, the heating and cooling methods that allow for a comfortable space to enjoy do not require any equipment and do not produce any emissions.



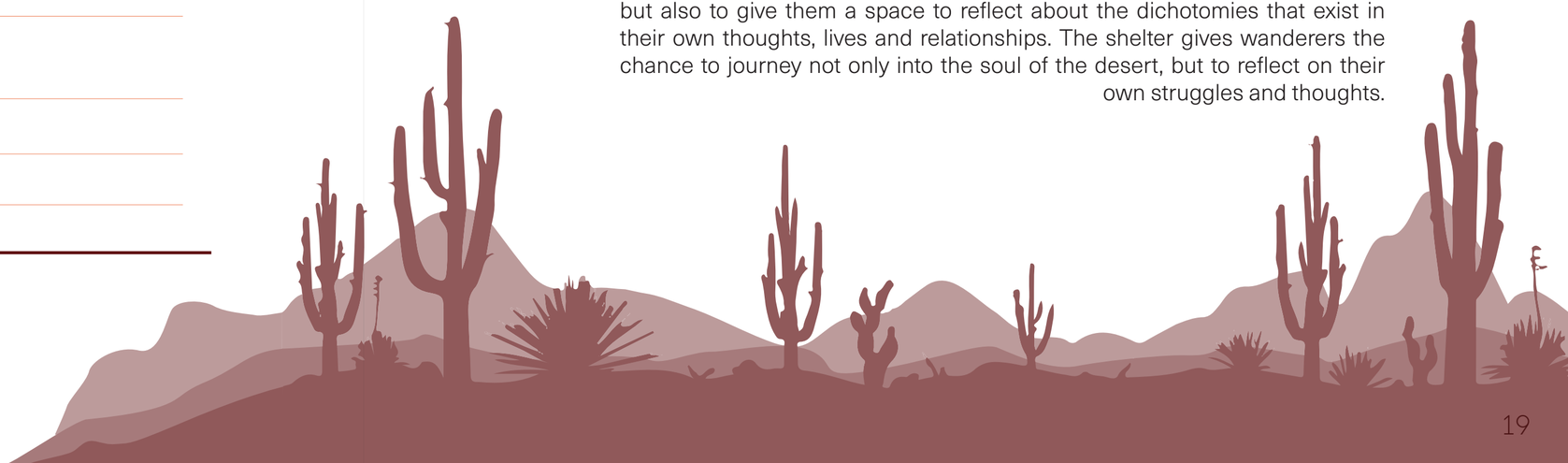
EXPLODED AXONOMETRIC SUN PATH

NARRATIVE : BUDGET

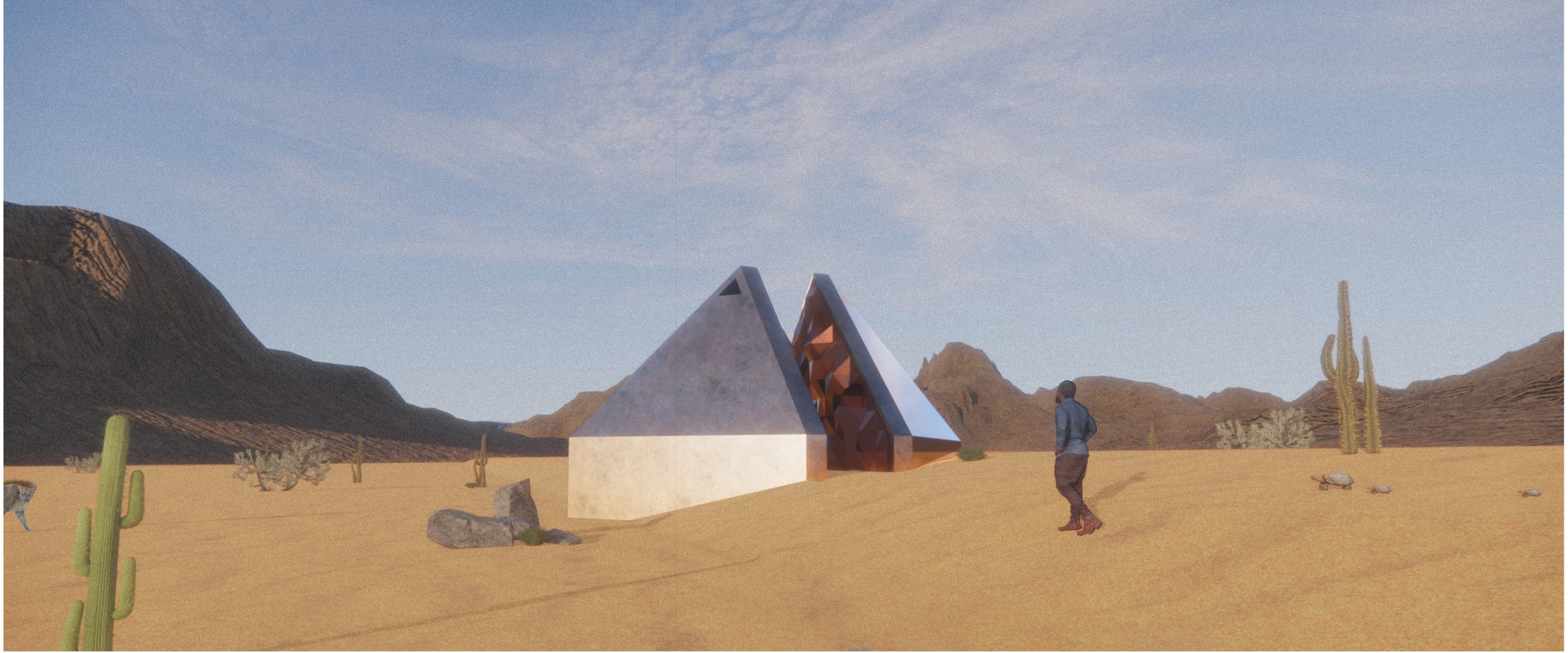
Use	Material	Amount
Excavate Sub-Earth Base, Build Retaining Walls	- - -	$25,500
3d Printed Structure	Ferrock	$10,000
Exterior Facade	Mercury Glass (with recycled materials), One-sided glass	$9,000 $5,500
CNC Routed Geometric Topographic Wall	Ferrock	$12,550
Curved Topographic Wall	Rammed Earth	$10,000
Bench Seating	Sandstone	$8,950
Wind Towers	Sandstone	$10,550
		$92,050

CONCLUSION

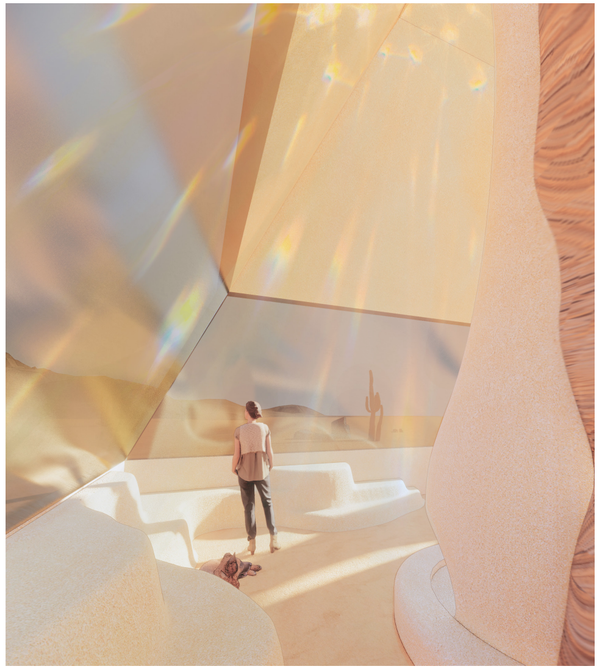
The desert is a harsh place, with a delicate soul. **Occhiolism** is not only intended to provide travelers a place to seek shelter but a place to give thought to the soul of the desert. The intention for this space was to give visitors the opportunity to experience these dichotomies in the desert and the dance between them, but also to give them a space to reflect about the dichotomies that exist in their own thoughts, lives and relationships. The shelter gives wanderers the chance to journey not only into the soul of the desert, but to reflect on their own struggles and thoughts.



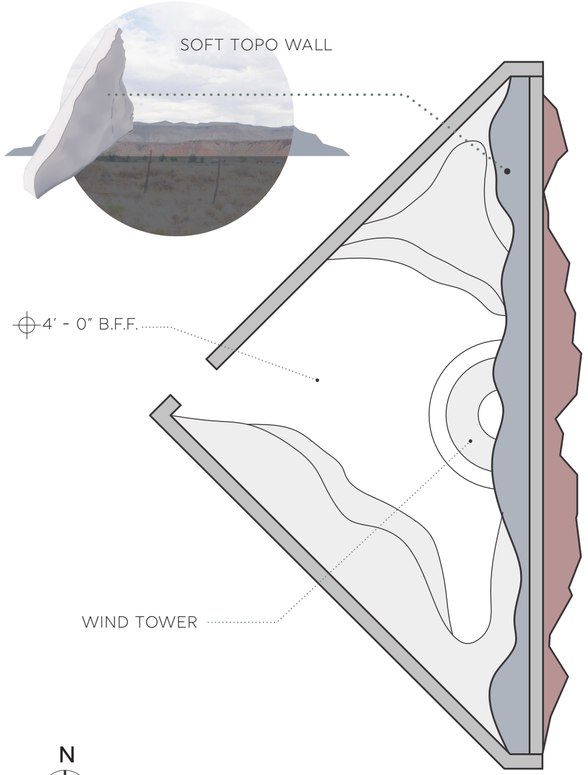
GALLERY



EXTERIOR RENDERING



DAY CHAMBER



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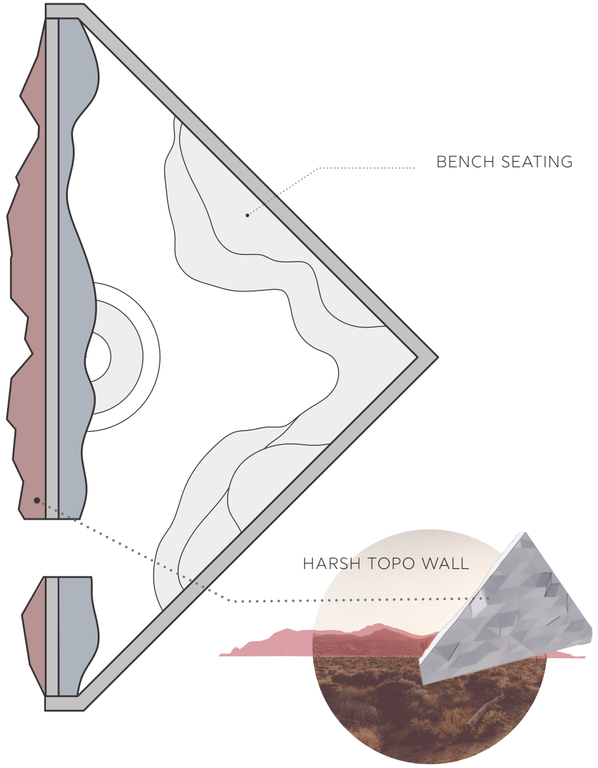
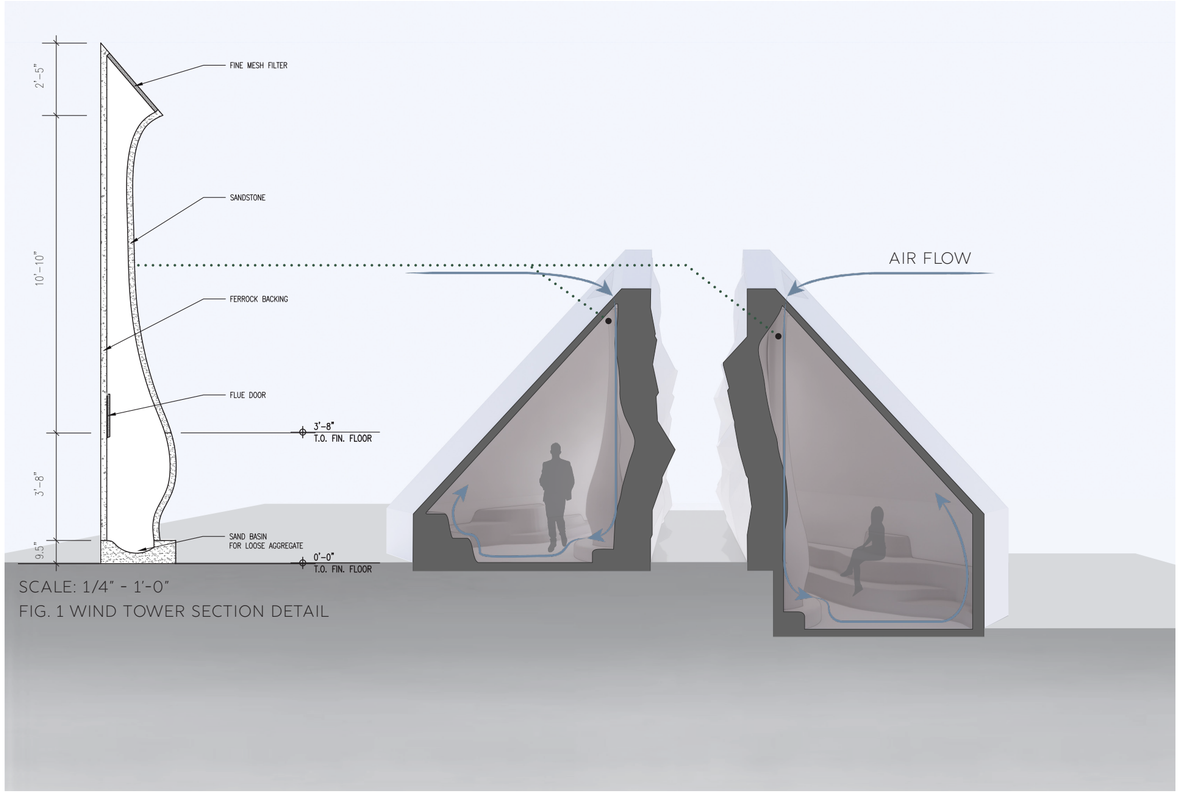
SCALE: 1/8" - 1'-0"

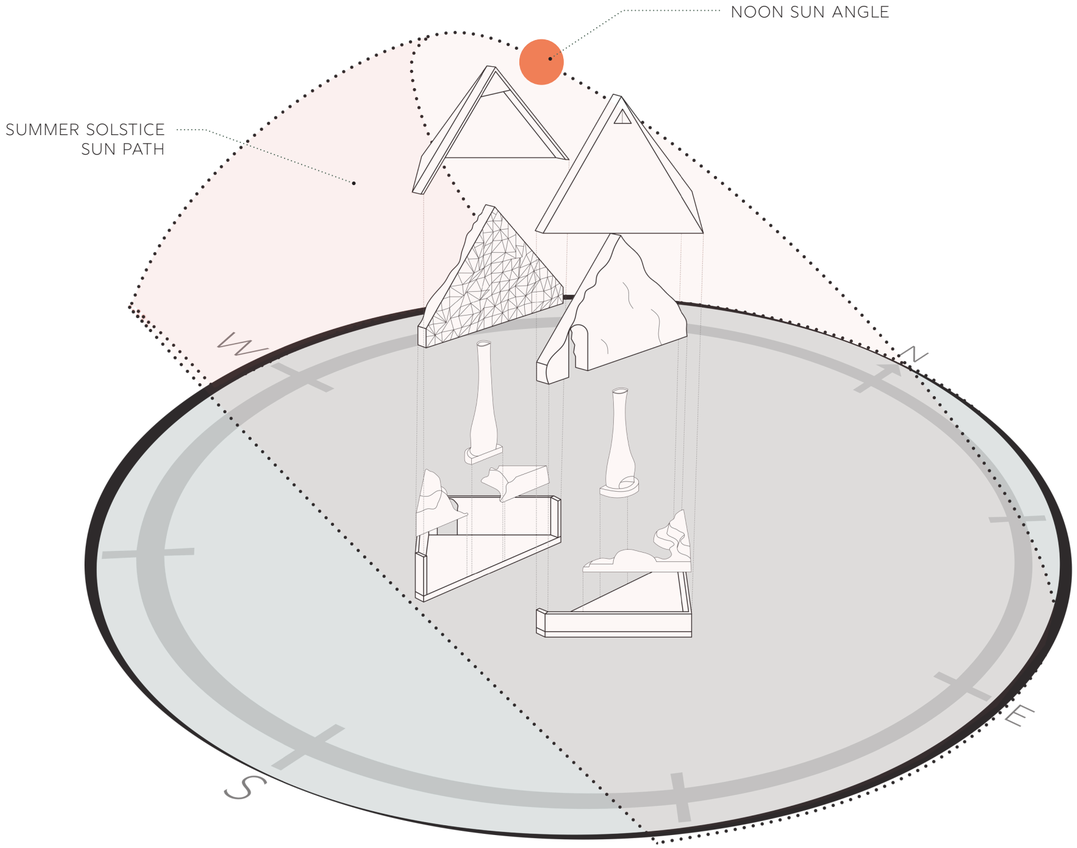


TECHNICAL PLAN DRAWING

NIGHT CHAMBER



SECTIONAL PERSPECTIVE



EXPLODED AXONOMETRIC SUN PATH