DO YEON KIM

selected works 2023-2024

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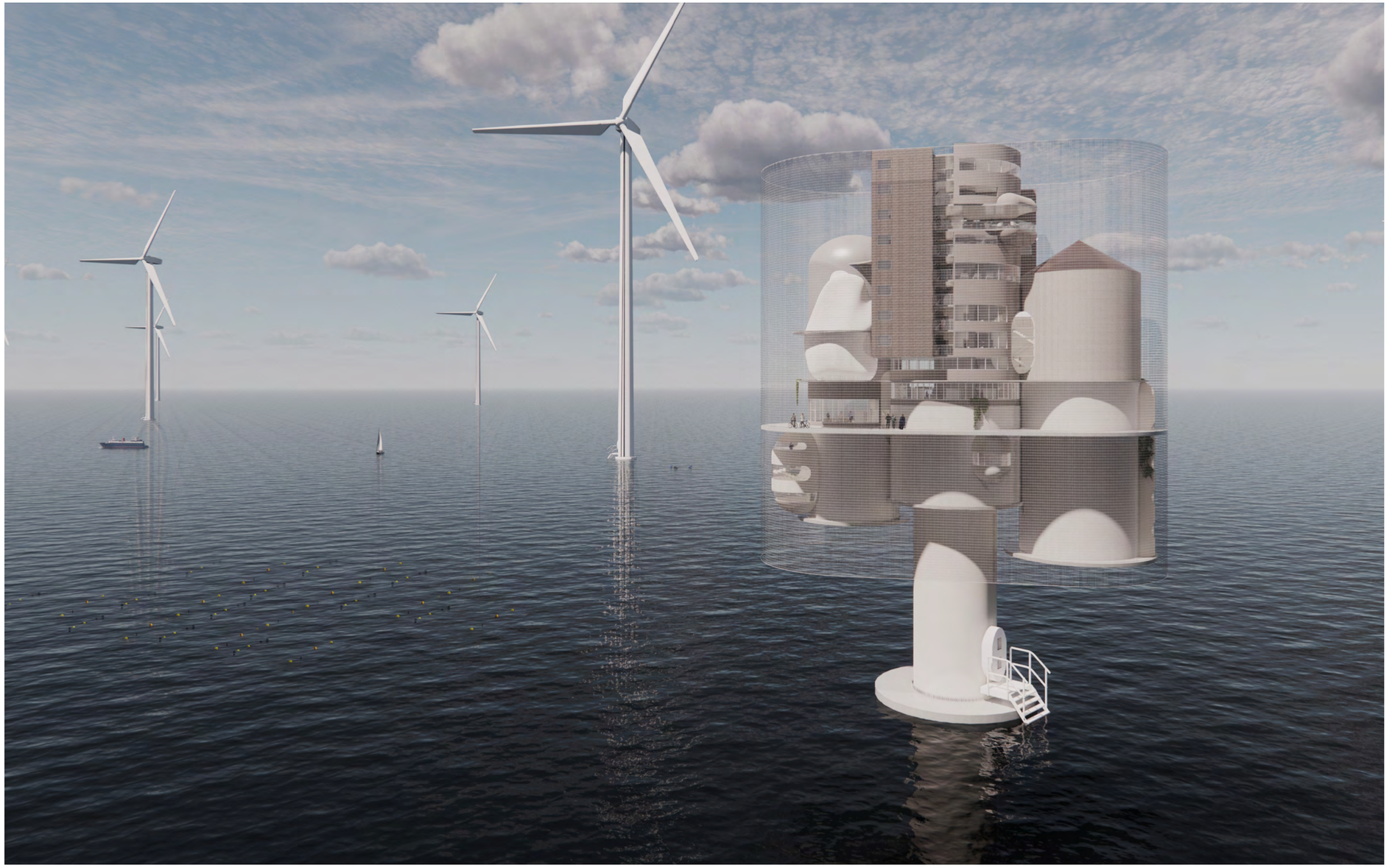
Columbia University
GSAPP MSAAD

01 KELP CITY

Summer 2023 | Architecture Design Studio (GSAPP)
New York, United States
Offshore Substation
Individual Work
Instructor | Dan Wood (WORK.ac)

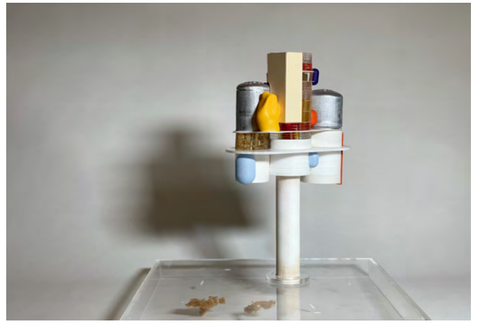


Electrical infrastructure with public spaces become "neighborhood-amenity" in the form of a substation or transformer, designed not to hide behind walls or disguised as "simply technology" but rather celebrated as an integral part of what makes the city run and – as well – what is working to allow this city and state to be carbon-free for 2050. Once that happens, the world will look different.

What are the new ways in which electrical infrastructure can be expressed and experienced in this future?

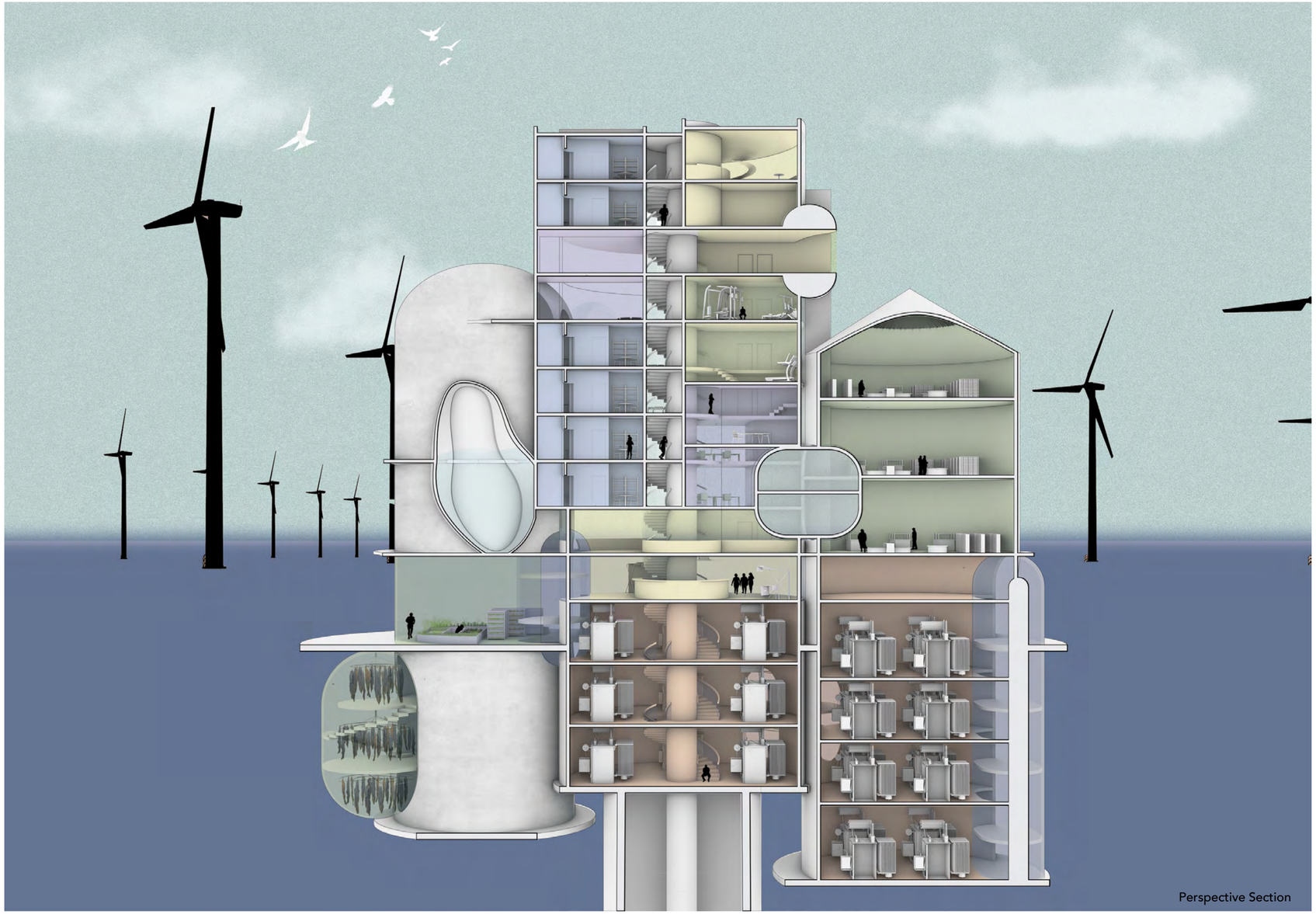
Concept collage image

Challenging the traditional narrative of invisibility, the Kelp City redefines substation by transforming it from a hidden utility into a celebrated cornerstone of urban vitality and sustainability. Drawing on the concept of unveiling, the Kelp City makes the intangible element a tangible part of the community experience. It transforms urban infrastructure into a living narrative of energy, sustainability, and community interaction, turning the once invisible into an integral, celebrated part of the urban fabric.

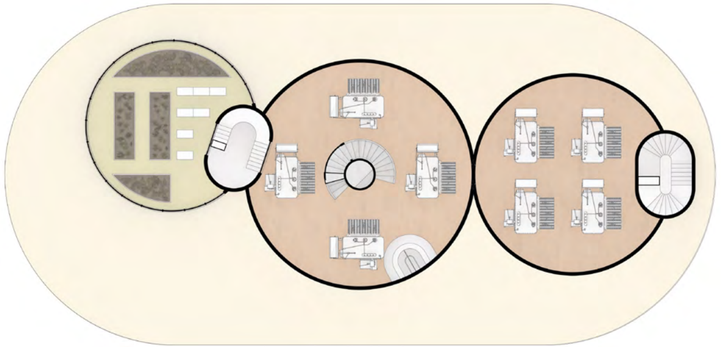


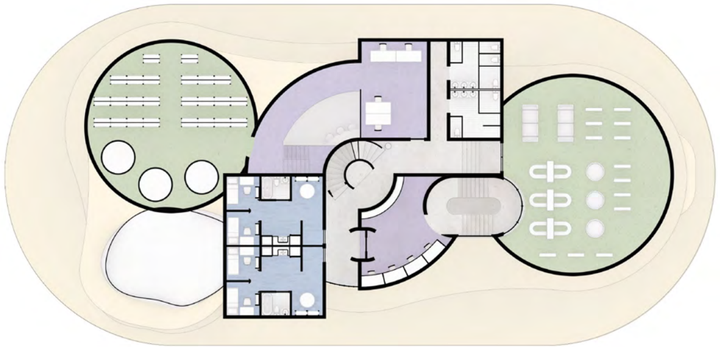
Physical model Image

PVC, Museum board, Acrylic, Wire mesh, 3d print materials



Perspective Section



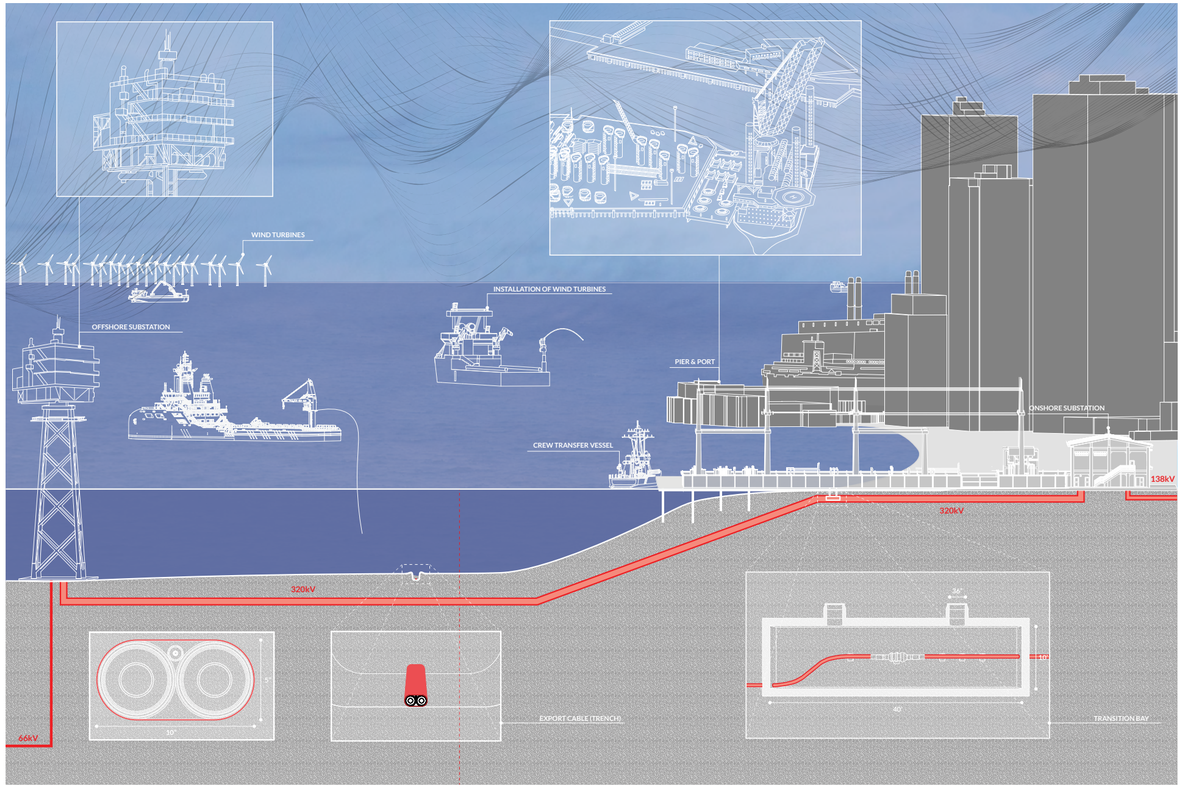


Floor plans (1st, 4th)

substation community residential kelp related office

Exterior View

Interior View



Research for 'The Shore' of wind power with Minjeong Song

New York Harbor (17C)

Although New York is relatively new to wind power, ports and piers in the region have a long history. Throughout history, developing ports and piers in NYC has been closely tied to the city's economic growth, trade, and transportation needs.

1.2.1 HISTORY SHORE

New York Harbor (1789)

In the colonial era, small wharves and piers were constructed along the waterfront to accommodate trade and commerce. The Port of New York became vital for shipping goods and supplies between the American colonies and Europe.

AAD SUMMER 2023 - DAN WOOD
A NEW ARCHITECTURE OF INVISIBILITY 1.2.2

Port of East River (1851)

In the 19th century, significant advancements were made in port infrastructure in NYC. The construction of the Erie Canal connected New York City to the Great Lakes region, establishing an extensive inland waterway network. This development enhanced NYC's position as an important port and facilitated the transportation of goods between the Midwest and the Atlantic coast.

1.2.3 PRESENT WIND

Port of Hudson River (1932)

The industrialization of the United States in the late 19th and early 20th centuries further developed ports and piers in NYC. Steamships facilitated the growth of international trade, and increased industrialization led to greater demand for port facilities. Extensive piers were constructed along the Hudson River, East River, and Upper New York Bay to handle the growing volume of maritime activities.

Battery Park (1950s)

In 1921, the Port Authority of New York and New Jersey was established and played a significant role in modernizing port facilities, improving transportation links, and fostering trade and economic growth.
In the mid-20th century, NYC revolutionized the shipping industry by constructing container terminals with advanced cranes, storage facilities, and intermodal connections. This transition increased efficiency and enabled the handling of large volumes of cargo.

AAD SUMMER 2023 - DAN WOOD
A NEW ARCHITECTURE OF INVISIBILITY 1.2.4

There has been a recent trend in utilizing the waterfront areas of New York City in different ways. Many abandoned industrial piers have been repurposed or reconstructed for entertaining, cultural, and commercial activities.

Piers at the Hudson River Waterfront (1954 / 2009)

1.2.5 HISTORY SHORE

AAD SUMMER 2023 - DAN WOOD
A NEW ARCHITECTURE OF INVISIBILITY 1.2.6

Pier 55 has been transformed into Little Island, a unique entertainment venue. Little Island was designed by Thomas Heatherwick of Heatherwick Studio, with landscape design by MNLA. The landscape provides a visually surprising and inspiring experience as visitors walk across the park.

Little Island (Pier 55)

2.2.1 PRESENT WIND

Pier 1

Pier 1 is the largest among the park piers. It features expansive lawns and a playground at its northern edge.

Chelsea Piers (Pier 63)

Pier 3 opened in 2018 and is the final pier converted into parkland. The surrounding hardscaped area provides space for small events, performances, and unprogrammed play.
Pier 3 incorporates hedges of varying sizes, creating an exploratory maze of picnic tables, mirrored games, and historic elements salvaged from the park, such as bollards, cleats, and excavated railroad tracks.

AAD SUMMER 2023 - DAN WOOD
A NEW ARCHITECTURE OF INVISIBILITY 2.2.2

Installation of Wind Turbines Vessels

Specialized installation vessels are used to transport and install wind turbines at offshore sites. They play a crucial role in safely and efficiently installing the turbines on their foundations. These vessels can have lengths of 100 meters (328 feet) or more and have substantial deck space and lifting capacity to handle the heavy components of wind turbines.

2.2.3 PRESENT WIND

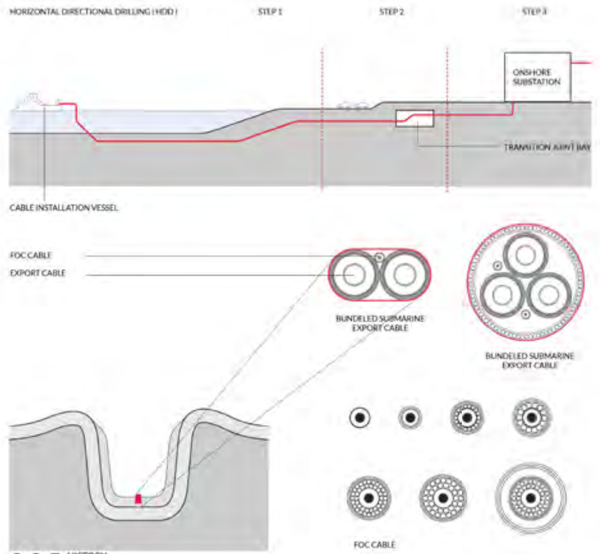
Cable Installation Vessels

Cable installation vessels in offshore wind power systems can vary in size depending on the specific requirements of the project. These vessels are responsible for the installation of submarine cables that connect the wind turbines to the offshore substation and eventually to the onshore grid. They have lengths ranging from 80 to 150 meters (262 to 492 feet) and are equipped with specialized cable-laying equipment and storage systems.

Crew Transfer Vessels (CTVs)

Crew transfer vessels (CTVs) are used to transport personnel, including maintenance technicians, engineers, and project personnel, to and from the offshore wind farm. They are typically high-speed craft designed for efficient crew transfers. CTVs can have lengths ranging from 15 to 30 meters (49 to 98 feet) and can carry 10 to 30 passengers.

AAD SUMMER 2023 - DAN WOOD
A NEW ARCHITECTURE OF INVISIBILITY 2.2.4



2.2.5 HISTORY SHORE

The submarine export cables will be buried to a target burial depth of 3 to 6 ft (0.9 to 1.8 m) below the seabed outside of federally maintained areas.
To make the cable sea-to-shore connection, we use either open cut trenching or horizontal directional drilling (HDD) to lay the export cable under the seabed and beach area.
HDD is used to install cables in ducts under sensitive coastal and nearshore habitats, such as shorelines as well as man-made infrastructure such as bulkheads and roadway crossings. HDD can also be used to cross under major infrastructure, including railroads and highways.
Trenching (cutting) is used on seabed containing hard materials not suitable for jetting or plowing. For those areas containing hard materials, the trenching machine mechanically cuts through the hard materials using a chain or wheel cutter fitted with picks or teeth. The cutter creates a trench that the submarine export cable is laid into, and backfill is mechanically returned to the trench using a backfill plow.

AAD SUMMER 2023 - DAN WOOD
A NEW ARCHITECTURE OF INVISIBILITY 2.2.6

The SBMT (Substation and Base Maintenance Terminal) located in Brooklyn has been designated as the point of connection between the offshore and onshore components of the windfarm system EMPIRE 1. In considering the zoning of the SBMT, various political, environmental, and social requirements have been taken into account.
Firstly, the SBMT has been planned not only as a space for vessel maintenance and settlement but also as an onshore substation. This multifunctional design demonstrates the high value placed on the SBMT as a shore, capable of fulfilling both port and substation roles.
Historical properties in the former Brooklyn context have also been considered, ensuring that the SBMT does not negatively impact the existing landscape and historic sites.
Additionally, the social context of the surrounding area has been taken into account. The facilities around the port have been examined to ensure that the SBMT not only serves as a port but also provides community facilities and services to the local residents.
The evaluation process has incorporated the inclusion of parks and recreational resources. This indicates that the port and pier, in addition to their role in the wind power system, possess the potential to serve as community spaces for residents by integrating entertainment functions and open areas. This recognition of the SBMT's potential value and its role in shaping the future of the shore is evident.

SBMT

3.2.1 FUTURE WIND

AAD SUMMER 2023 - DAN WOOD
A NEW ARCHITECTURE OF INVISIBILITY 3.2.2

AGRE is planning to support a Science and Technology program for underserved youth at the Variety Boys and Girls Club of Queens. The new state-of-the-art Technology and Media Center will become a focal point for educating Astoria's youth. The investment in curriculum development of a science and technology training program will help provide inclusive early education opportunities to local youth over the long-term, an important element of the workforce development pipeline needed to access the renewable energy jobs that are coming to New York.
Beacon Wind will bring an important new source of renewable power to a neighborhood marked by its industrial past, and now, community access to world class education on offshore wind through the Variety Boys and Girls Club. These classes will provide opportunities to underserved communities to obtain family-sustaining careers. Milestones like this are only possible due to New York's favorable environment for investment and business, and we are excited for many positive developments to come.

ASTORIA

3.2.3 FUTURE WIND

AAD SUMMER 2023 - DAN WOOD
A NEW ARCHITECTURE OF INVISIBILITY 3.2.4

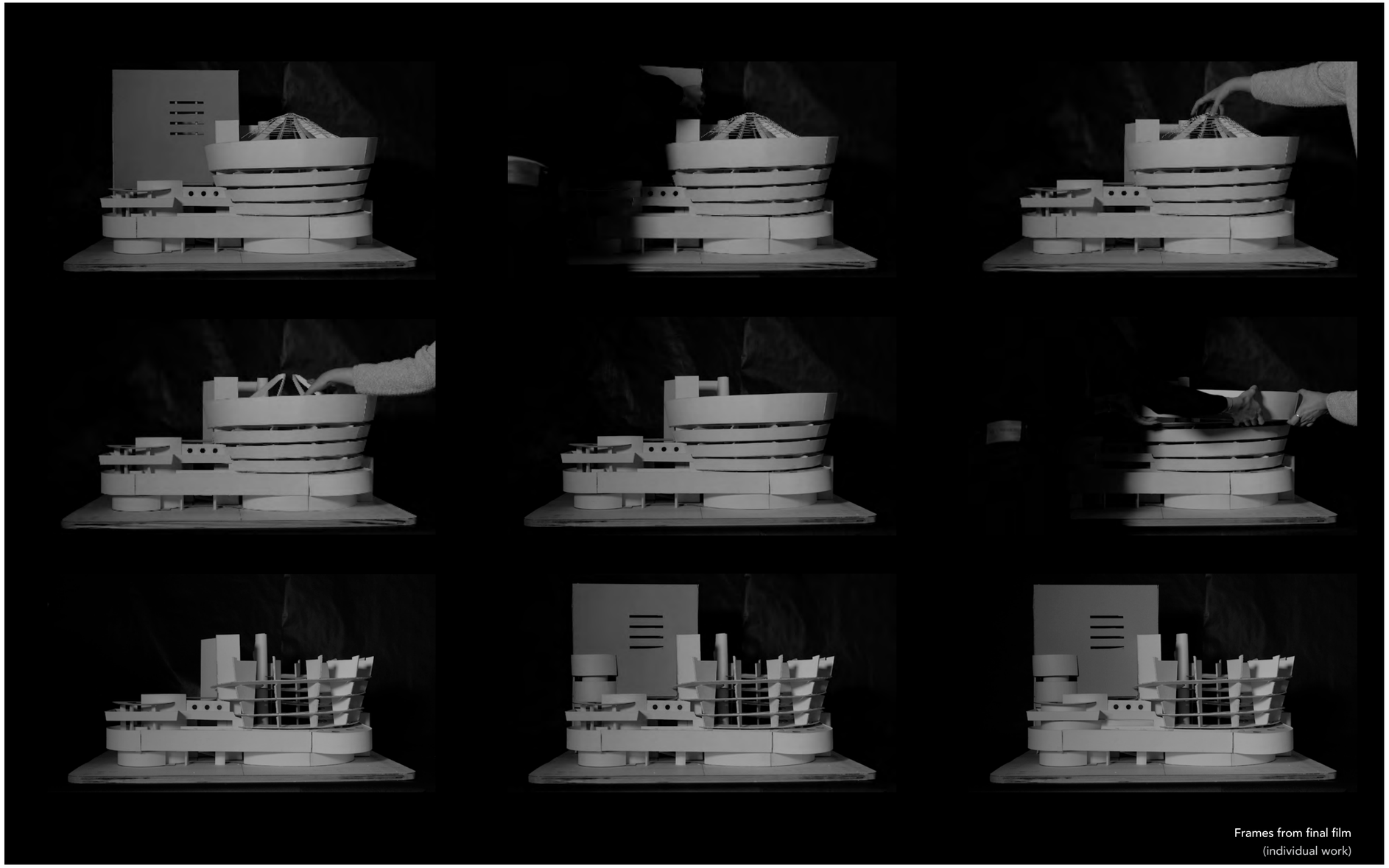
Research for 'The Shore' of wind power with Minjeong Song

02 LIGHT, WALK, ART

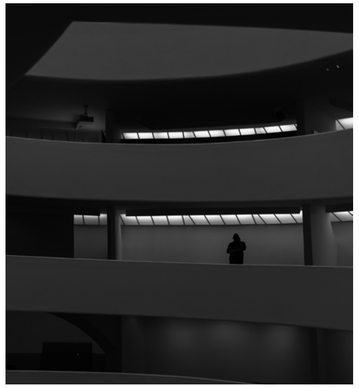
Fall 2023 | Adv V: Architecture Design Studio (GSAPP)
Guggenheim Museum Intervention
Instructor | Jing Liu (SO-IL)
Team work | Abdullah Maddan, Sonam Sherpa, Jungyeon Yang, Mohamad Ismail
Role | 3D modeling (Rhino), Model making (Laser cut, 3D print)

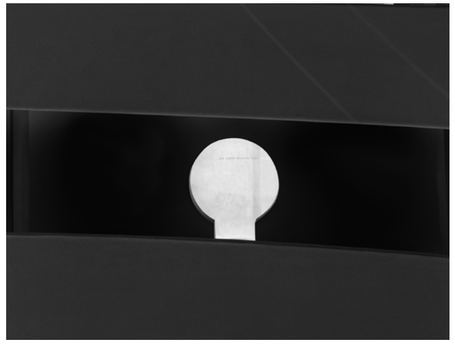
The current state of the Museum offers an opportunity to study the past ideas and materials objectively, contemplate the current merits and future potentials, learn from the old mistakes, and arrive at a meaningful, radical and impactful transformation. We should reuse as much as possible in imaginative ways such as in the wondrous worlds of kintsugi, spolia, and metamorphosis.

We should trace the subtle imprints time has left in its architecture, pick out from the shattered pieces those sharing a kinship, imagine a Coming Community that is "just a little different".

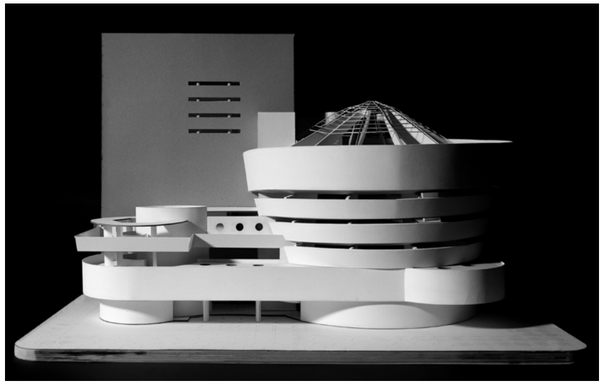


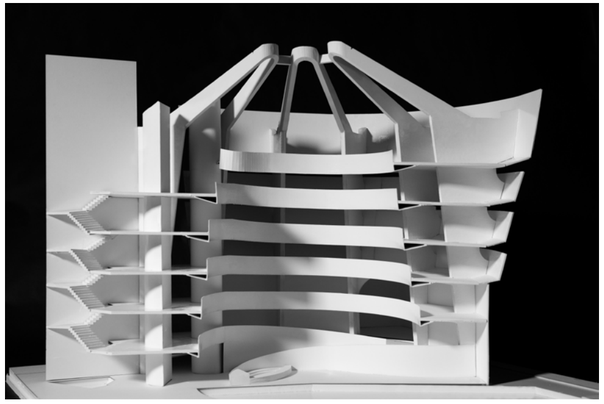
Frames from final film
(individual work)



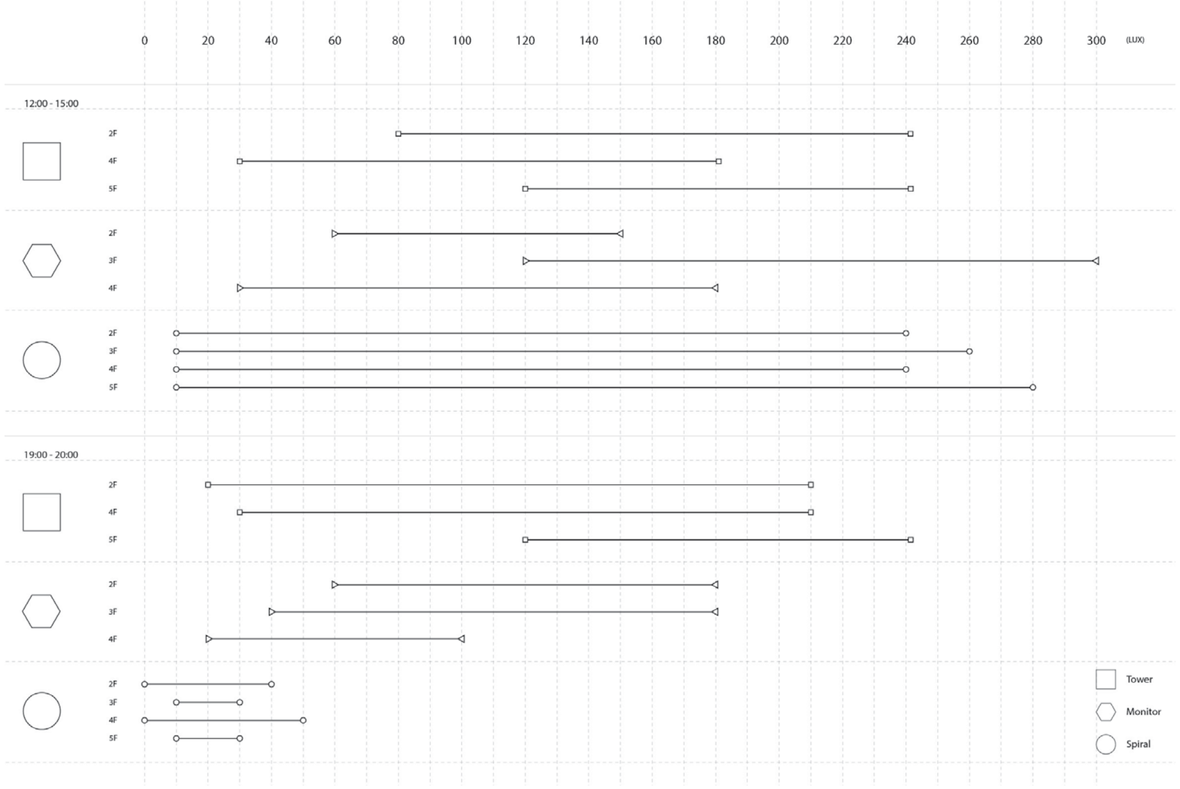


Inverted light
(Concept images)

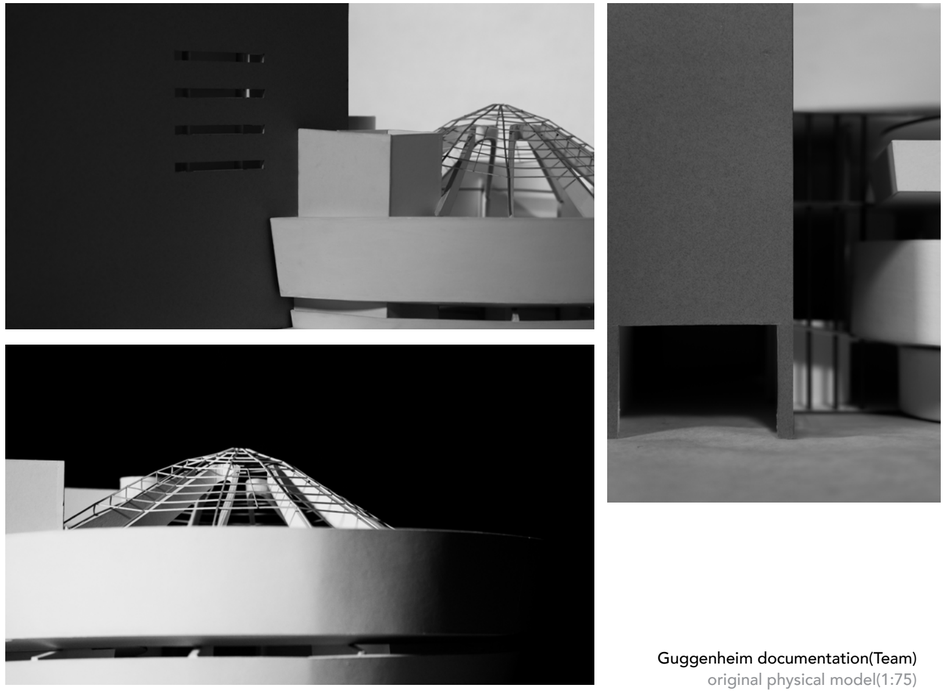




Original physical model
1:75 and 1:50

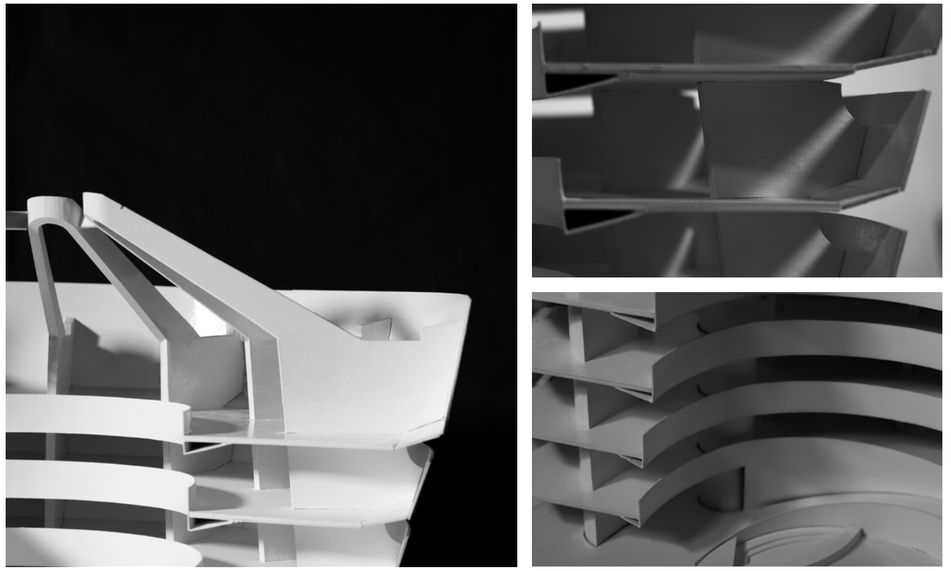


Illumination diagram
(Existing condition of Guggenheim)



Guggenheim documentation(Team)
original physical model(1:75)

Interior images (enscape)

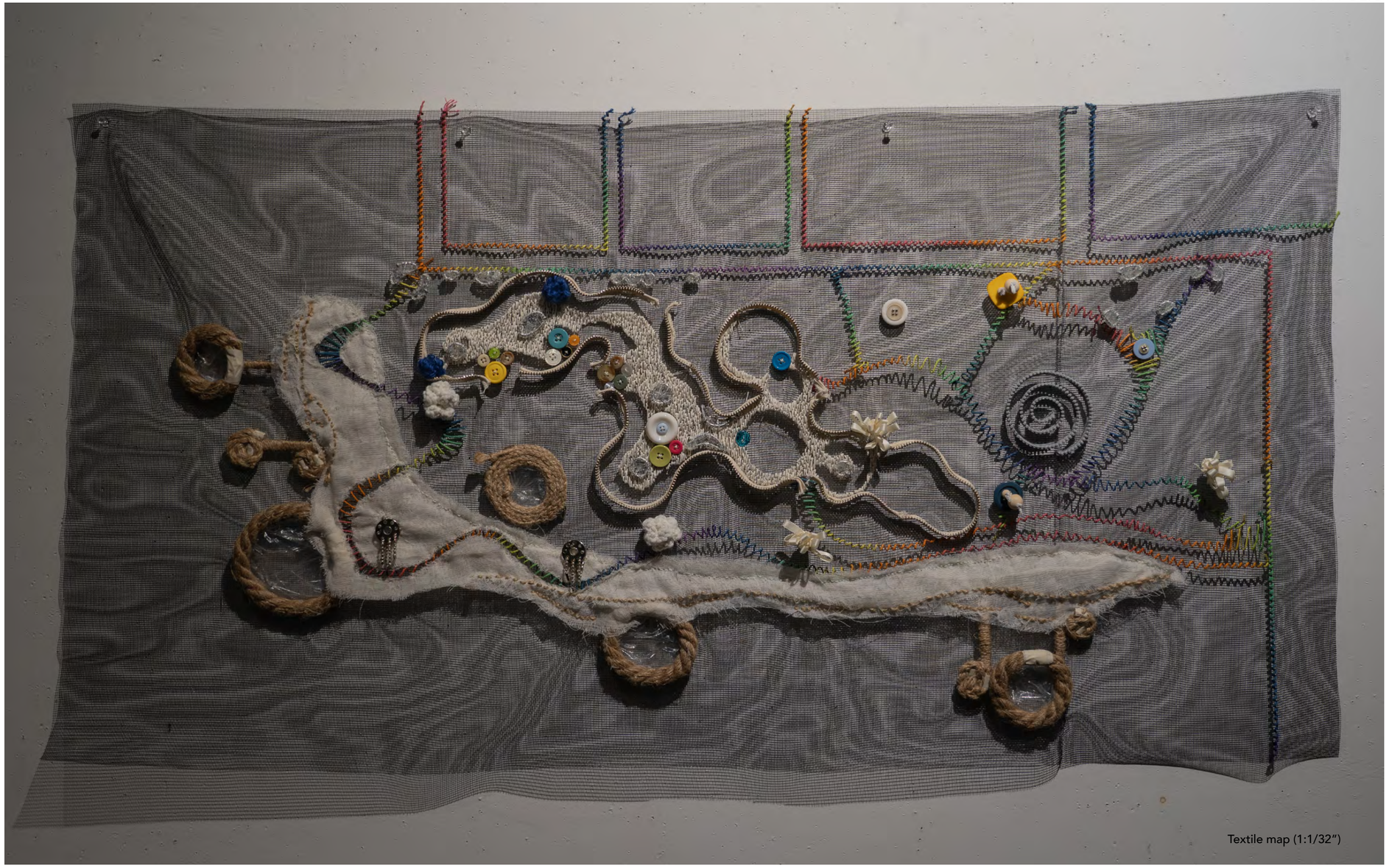


Guggenheim documentation
sectional physical model (1:50)

03 A STREET FULL OF STATIONS

Spring 2024 | Adv VI: Architecture Design Studio (GSAPP)
Dis/Abling Architecture: States of Play
Instructor | Irina Verona, Jennifer Carpenter, Jerron Herman
Team work | Jungyeon Yang
Role | 3D modeling (Rhino), Model making (Laser cut, 3D print)

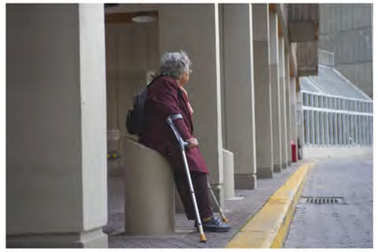
In an era dominated by the pursuit of efficiency, this project introduces a series of “Stations” strategically integrated into environments characterized by continuity. These designated pause spaces foster inclusivity and accommodate a broad spectrum of needs. Employing sensory experiences in design principles, these stations provide respites and enable meaningful interactions, emphasizing that accessibility should not be compromised for speed. By challenging efficiency metrics, our approach ensure that each user experiences comfort and dignity in navigation.



Textile map (1:1/32”)

The '15-Minute City' Isn't Made for Disabled Bodies

By prioritizing speed and efficiency over accessibility, the popular urban planning model neglects the mobility needs of those who can't afford to live in dense neighborhoods.



For those with a mobility disability, access to fixed-route transit is a priority. *Photographer: Education Images/Universal Images Group Editorial via Getty Images*

By Anna Zivarts
April 22, 2021 at 2:34 PM EDT

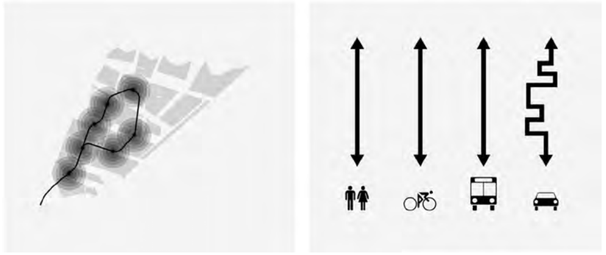
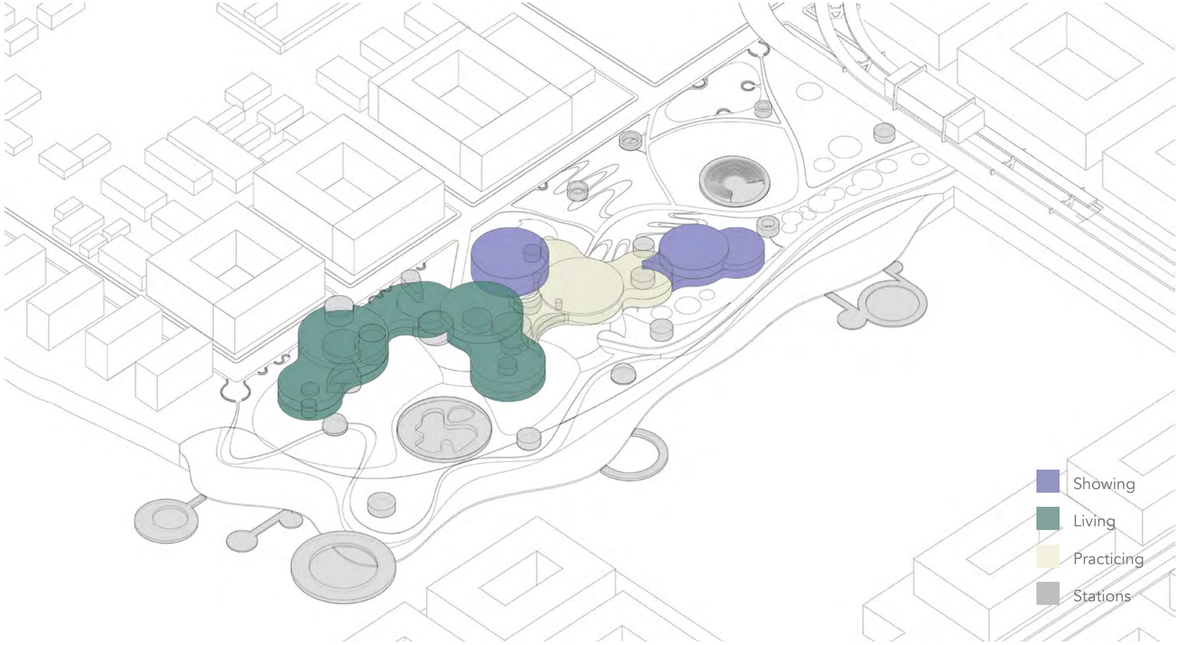


Diagram from Cobe
https://www.cobe.dk/



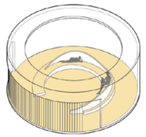
Program Diagram

Base Map (1:1/32")

a. Indoor Rest

a-1. Bench

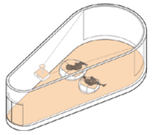
a-2. Sight Seeing



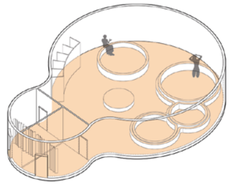
a-3. Sun Room

a-4. Drinking Fountain

b. Indoor Activities

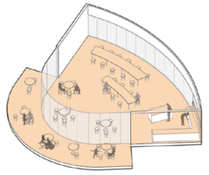


b-1. Small Theather

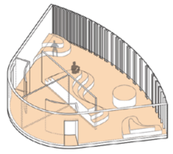


b-2. Spa

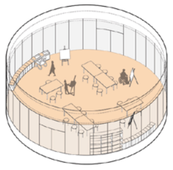
b-3. Mini Black Box



b-4. Shared Kitchen



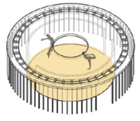
b-5. Sauna



b-6. Drawing Studio

c. Outdoor Rest

c-1. Fabric Pavilion

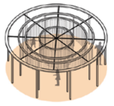


c-2. Meditation Room

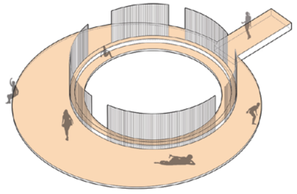
c-3. Greenhouse Dome

d. Outdoor Play

d-1. Mirror Maze

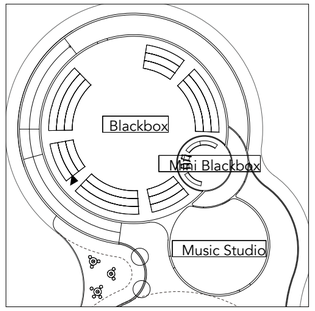


d-2. Sound Pavilion



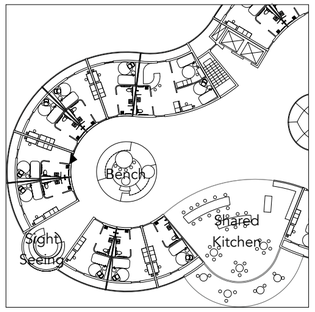
d-3. Harbour Bath

Station catalogue



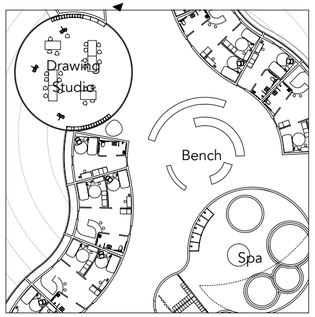
Detail plan and Perspective

Blackbox and Mini blackbox



Detail plan and Perspective

Residential and Shared kitchen



Detail plan and Perspective

Spa and Drawing studio

Physical model images (1:1/32")

Textile map on Actual model

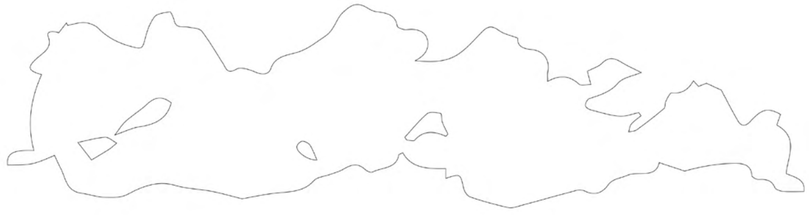
04 UNITY GROVE KINDERGARTEN

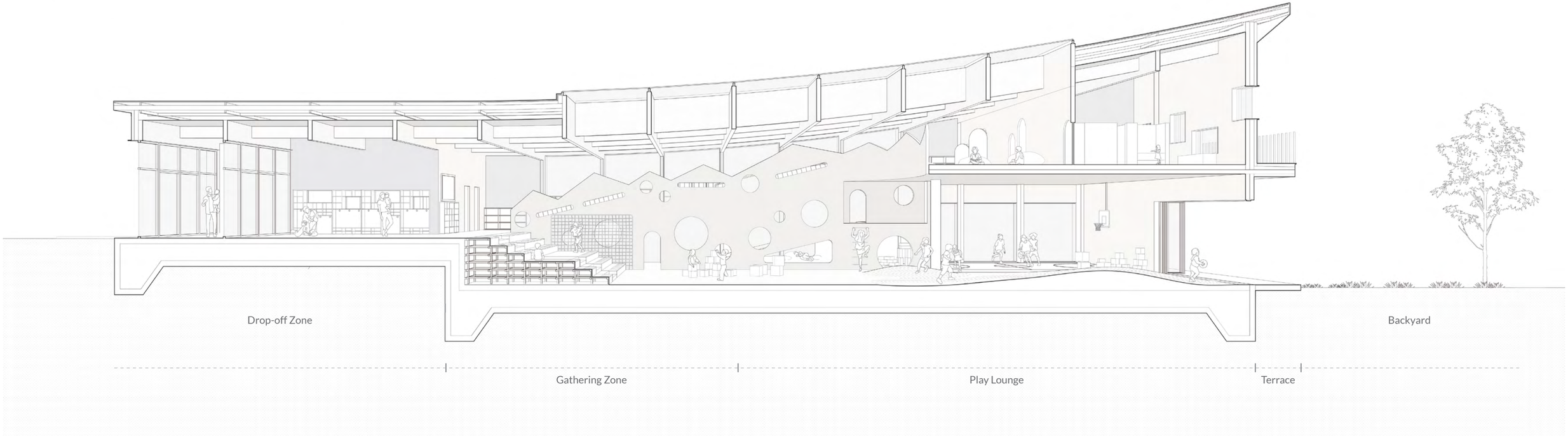
Fall 2023
Seoul, South Korea
Elective Course, Designing Space for Children (GSAPP)
Team work w/ Mingyeong Choi, Jungyeon Yang (Role | Designing, Drawing, Rendering)
Instructor | Anna Knoell (LTL Architects)

How can sustainable and eco-friendly materials affect a child's experience of a space, especially their cognitive and physical development?

Developing an understanding about the way material decisions affect the interior and exterior environments where children learn and grow is important. We focused on how these materials can be assembled to engage with children's sense of curiosity and tactile exploration while balancing issues of health, safety and care.

When designing a space for children, considering the process of children commuting is crucial. A welcoming drop-off zone, a central gathering area connects seamlessly into a play zone and an outdoor backyard. This layout, coupled with large windows for natural light and ventilation, especially suits Seoul's varied climate, ensuring a space that is safe, engaging, and conducive to children's cognitive and physical development.





Perspective Section

Materials

Interior

CLT

Plywood

Cork Flooring

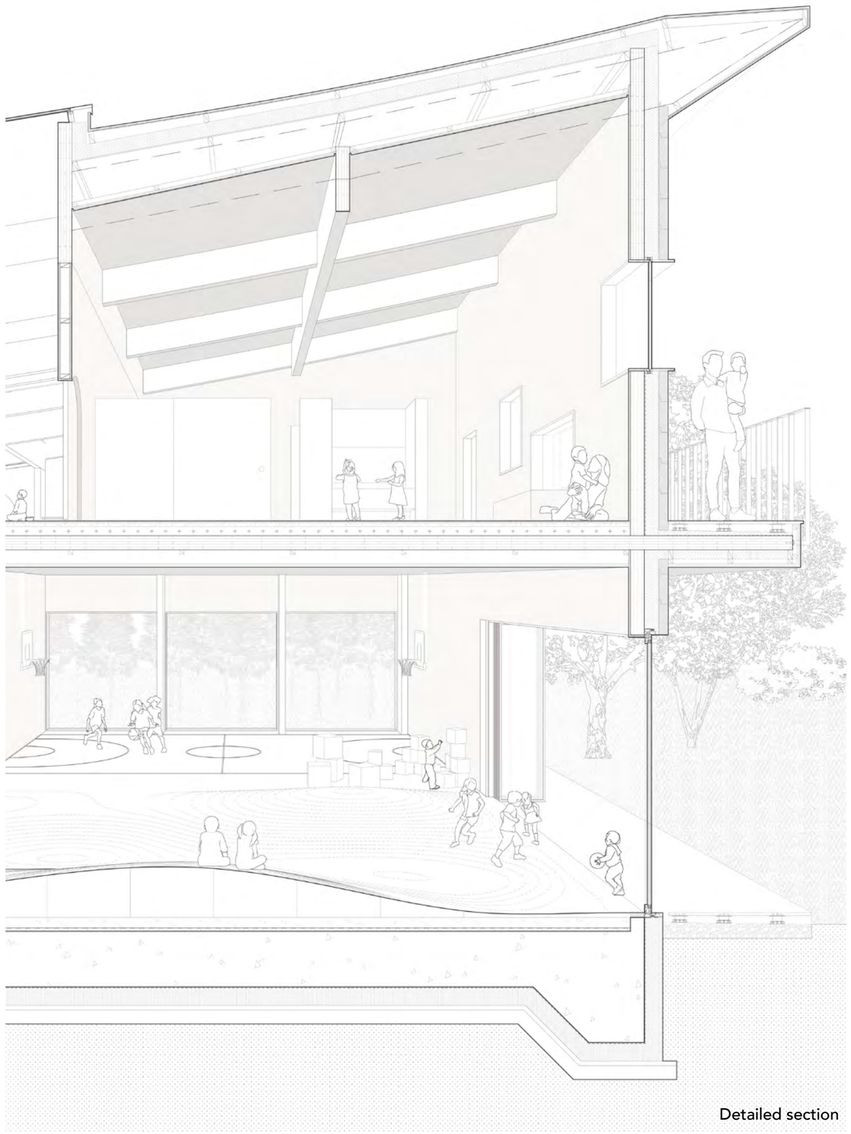
Wood Fiber Insulation

Exterior

Cork Exterior Cladding

Zinc Roofing System

Wood Deck Pedestrial



Detailed section

Interior View (enscape)

CLT frame structure is adapted with a waffle ceiling to make a big open area in the center of the kindergarten. Wood fiber insulation is used as an external insulation system and both plywood and cork are used for finishing materials to make a cozy and welcoming atmosphere.

Active programs such as a basketball court and cork mound where children learn social skills is planned at the play lounge, which is new type of transitional space connecting indoor and outdoor. On the second floor, classrooms which is closed space compared to the first floor are planned to help children concentrate on their own works.

05 RAMMED EARTH RECIPE

Spring 2024
Elective Course, Material Kitchen (GSAPP)
Individual work
Instructor | Lola Ben-Alon (The Materials Lab)

The foundation of rammed earth structure lies in the precise balance of its soil components: sand, clay, silt, and aggregate. The optimal mix consists of about 70-80% sand and aggregate, 10-15% silt, and 8-10% clay.

This composition ensures adequate compaction while maintaining the necessary binding properties, providing a solid, cohesive structure. The ideal mix proportion is crucial for achieving the desired strength and durability.

Booklet

Sand
provides structure, acts as the skeleton and crucial for the mix's stability and bulk

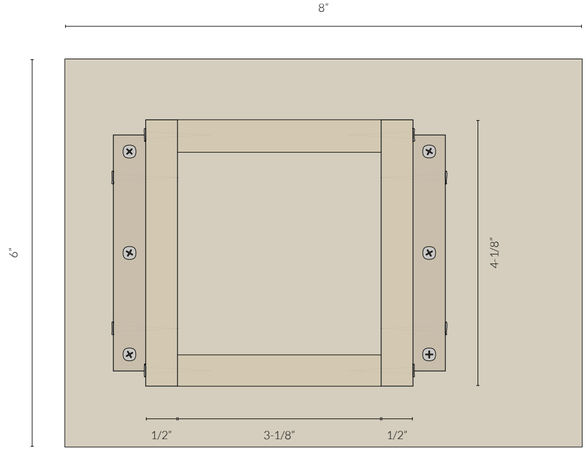
Clay
acts as a natural binder and offers cohesiveness to support the structure's integrity

Silt
enhances the mix's compactability but with finer particles and fills the gaps between sand and clay.

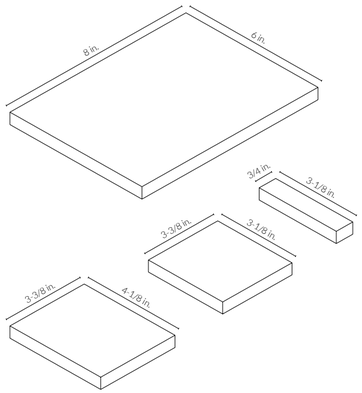
Aggregate
introduces additional strength by improving the mix's resistance to compressive forces.

Designing

the formwork based on the desired dimensions of the rammed earth cube.



Measuring

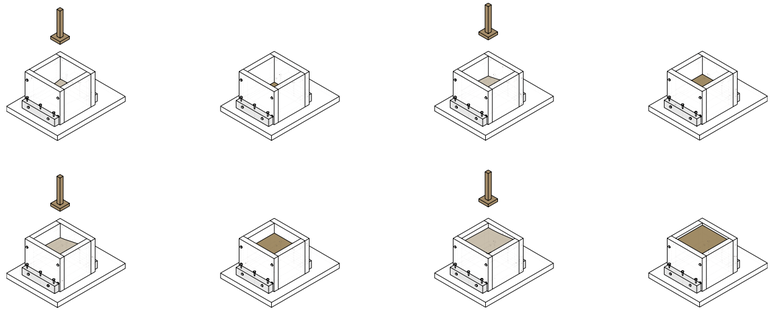


Assembling

the formwork panels to ensure they are securely fastened to withstand
the compaction process.

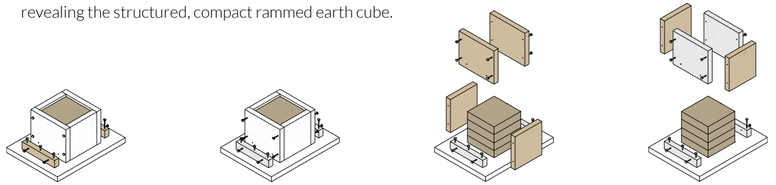
Layering

the soil mix within the formwork
with each layer compacted thoroughly before adding the next.



Dismantling

the formwork post-compaction
revealing the structured, compact rammed earth cube.



#01 Aggregate from used sand

Shape: Angular, Round mixed
Texture: Smooth, Rough mixed
Size: 1/4 in. to 1 in.
Color: vary from Beige to Dark Gray

#02 Recycled Concrete Aggregate (RCA)

Shape: Angular
Texture: Rough, Sharp
Size: 1/4in. to 3/4 in.
Crushed 7-3/4 in. x 2-1/4 in. x 3-3/4 in.
Concrete Brick
Color: Light Gray
Purchased Location: Home Depot ($1.41 X 1ea)

#03 Crushed Granite

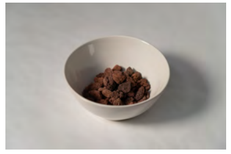
Shape: Angular
Texture: Rough
Size: 1/4in. to 1/2 in.
Color: Dark Gray
Purchased Location: Amazon ($17.09/ 10 lb X 1ea)

Aggregate Selection

#04 Limestone

Shape: Angular
Texture: Smooth, Soft
Size: 1/4 in. to 3/4 in.
Color: Light-colored
Purchase location: Amazon ($12.99 / 0.5 lb X 5ea)

#05 Volcanic Rock



Shape: Angular
Texture: Rough, Porous
Size: 1/4in. to 3/4 in.
Color: Dark Red
Purchased location: Amazon ($17.99 /10 lb X 1ea)

#06 Glass Rock

Shape: Angular
Texture: Glossy, Slippery
Size: 1/8 in. to 1/2 in.
Color: Colored or Clear
Purchase location: Amazon ($24.99/ 10 lb X 1ea)

Aggregate Selection

#03-15% Cube

#04-20% Cube

#05-20% Cube

#05-15% Cube

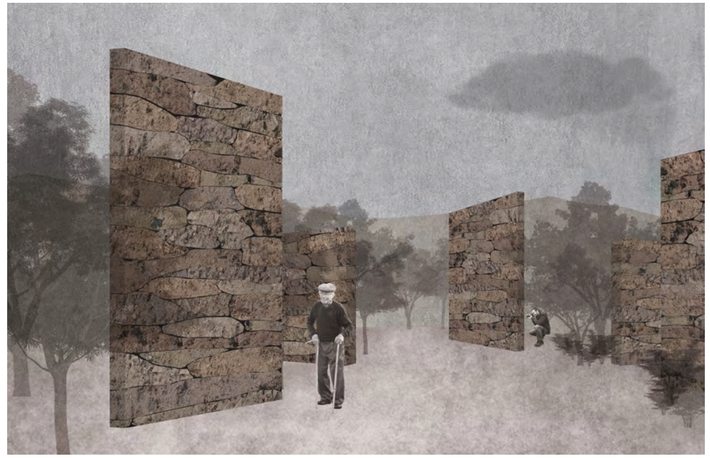
#02-20% Cube

#06-20% Cube

#01 Cube

#06-15% Cube

#03-20% Cube



Final collage images