

Portfolio

MAITREY PRAJAPATI

I believe in a sensitivity that is inspired by nature to shape emotional spatial experiences. I celebrate the vivid and unrestrained complexity of cities and human social lives.



PROJECTS

- 1 Trussed Anomalies
- 2 Produce_Collaborate_Perform
- 3 Harvest Village
- 4 Liminal Thresholds

research Experiencing Palladio

research Photography

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01

TRUSSED ANOMALIES

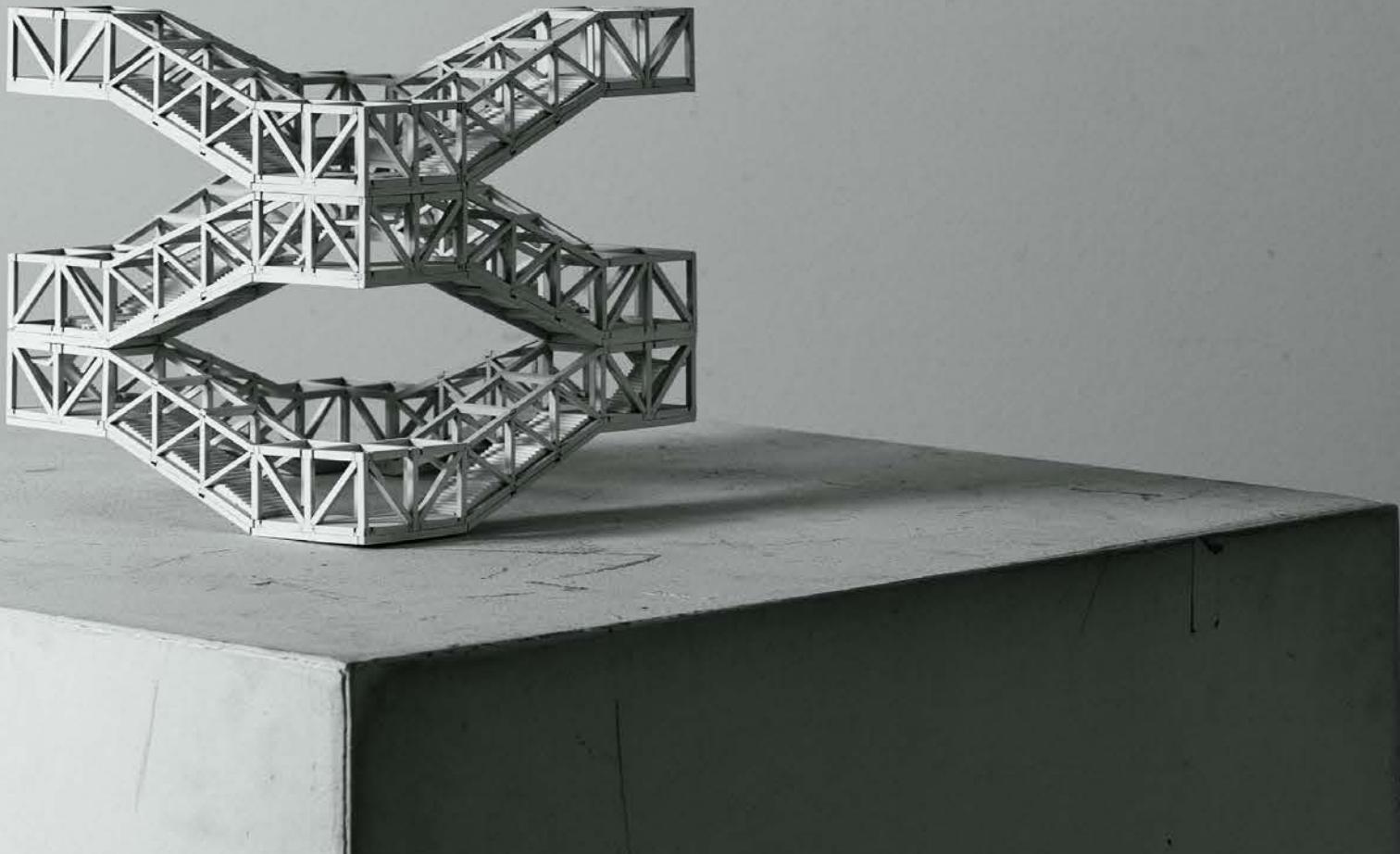
instructor Dr. Masoud Akbarzadeh

premise Implement circular design processes to minimize construction waste and maximize resource reuse through structural efficiency

This project aims to investigate innovative methods of design, assembly, and disassembly of prefabricated parts that meet the functional requirements of a mid-rise building. The assembly evolves progressively to ensure the structural integrity of the building and consider environmental factors of the site.

Long span trusses are studied and devised as a schematic language that can then be deployed at multiple scales. This structural paradigm seamlessly adapts to the evolving programmatic exigencies of the building – spanning entire floors, condensing into conduits, or orchestrating the building's arterial circulation system. Embracing **parametric flexibility**, these trusses metamorphose to accommodate a multiplicity of functional imperatives. The innate modularity of individual elements, coupled with the overarching massing strategy, engenders a realm of possibilities for design catered towards disassembly and subsequent repurposing.

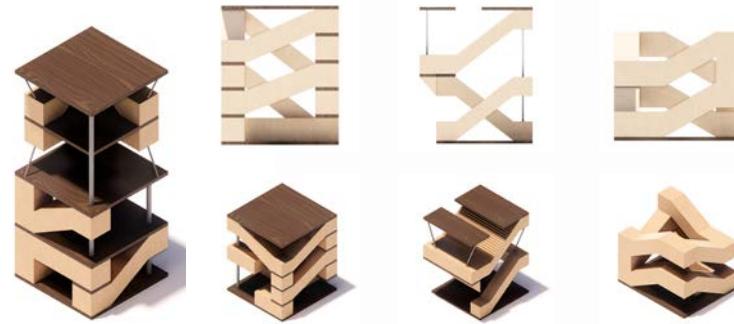
Team: Clara Shim



keywords highrise _ strutural analysis _ efficiency

MODULAR SYSTEMS AS SPATIAL GENERATORS

Originating from the elementary logic of the box truss, the structural module is reconceived as a generative system capable of articulating three-dimensional space through iterative reinterpretation. By encoding operations such as stacking, twisting, and rotational displacement into a set of modular algorithms, the system evolves into a spatial framework that adapts across vertical progression. These parametric manipulations allow the truss to not be merely structural, but a formal and organizational driver. The inherent modularity enables a spectrum of spatial conditions while anticipating future scenarios of disassembly, reconfiguration, and reuse.

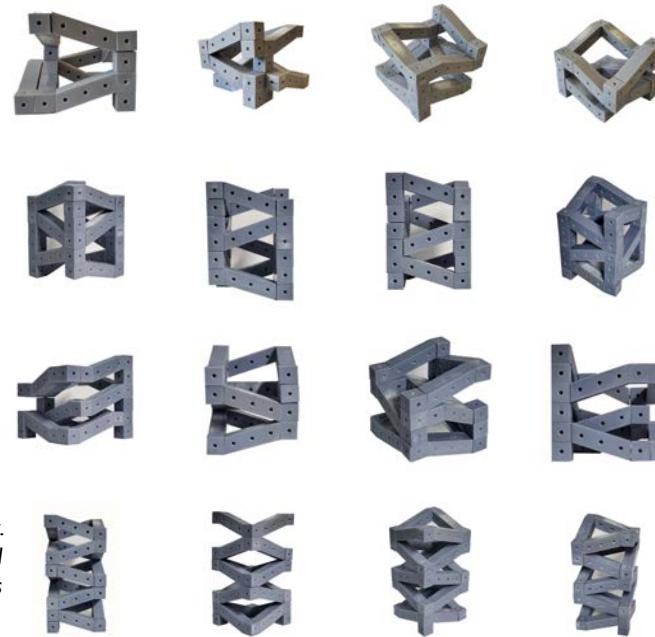


PROGRAMMATIC MATRIX

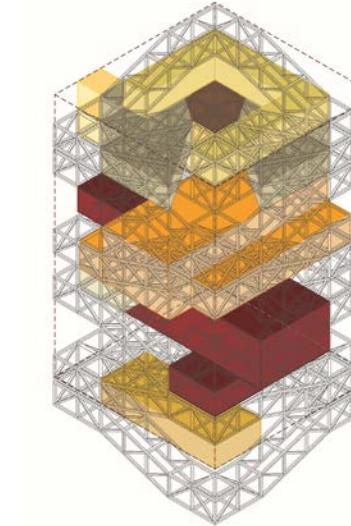


PLATE STACKING AND CIRCULATION STUDIES

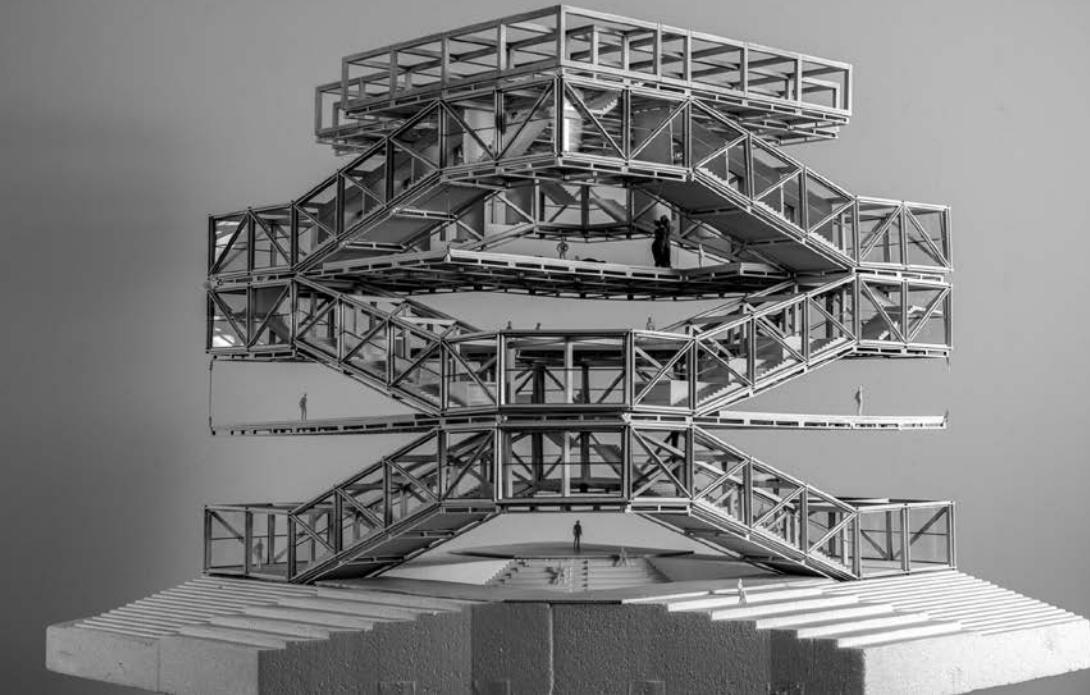
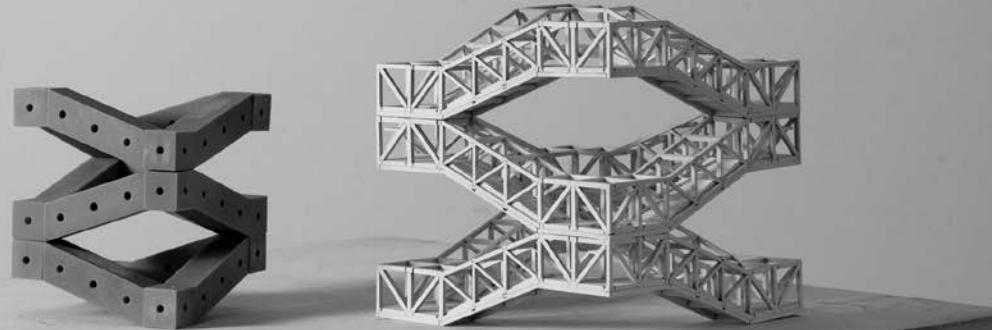




PHYSICAL STUDIES: Modular iterations on truss stability. Once the basic dimensional truss module was decided upon, we used a printed a kit-of-parts to generate forms that are stable and have the ability to rise vertically.

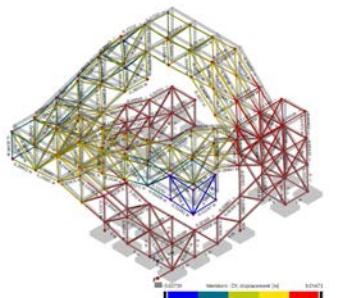
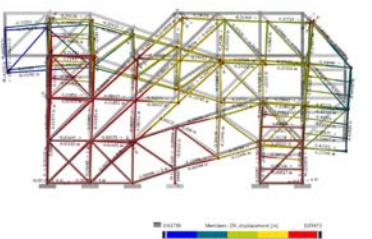
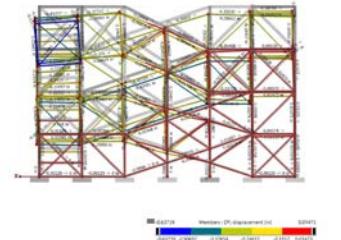
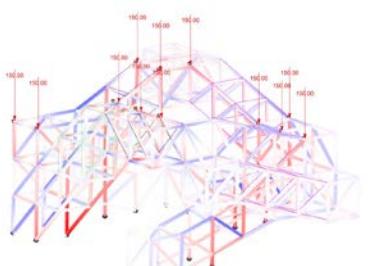
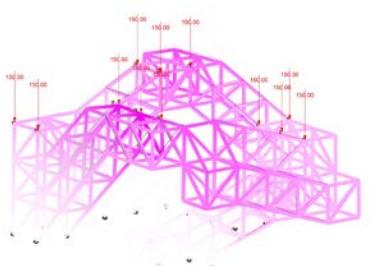
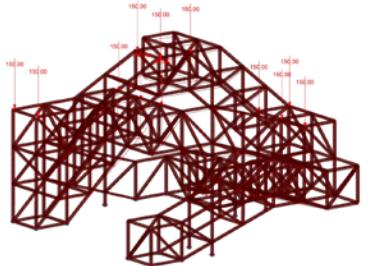


Suspended between the trusses are open floors that allow for changing dimensions of rooms and enclosed spaces, offering future programmatic flexibility as well as outdoor spaces, balconies and atria of varying character.

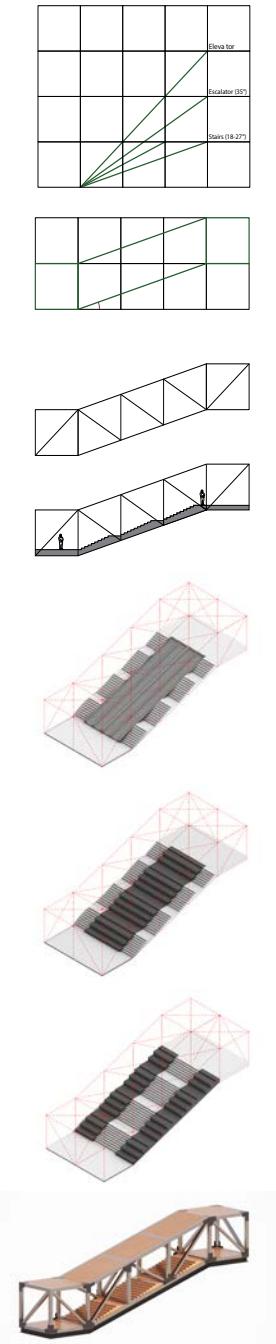


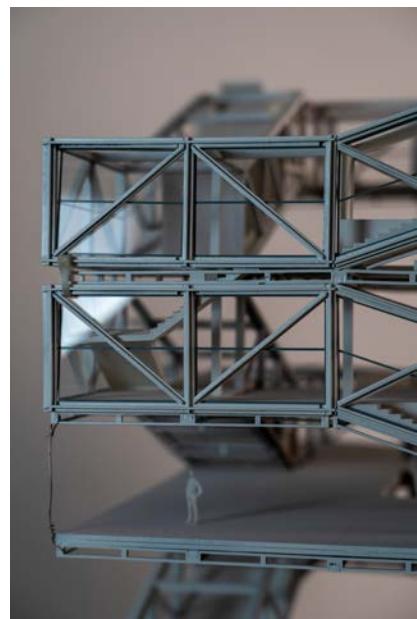
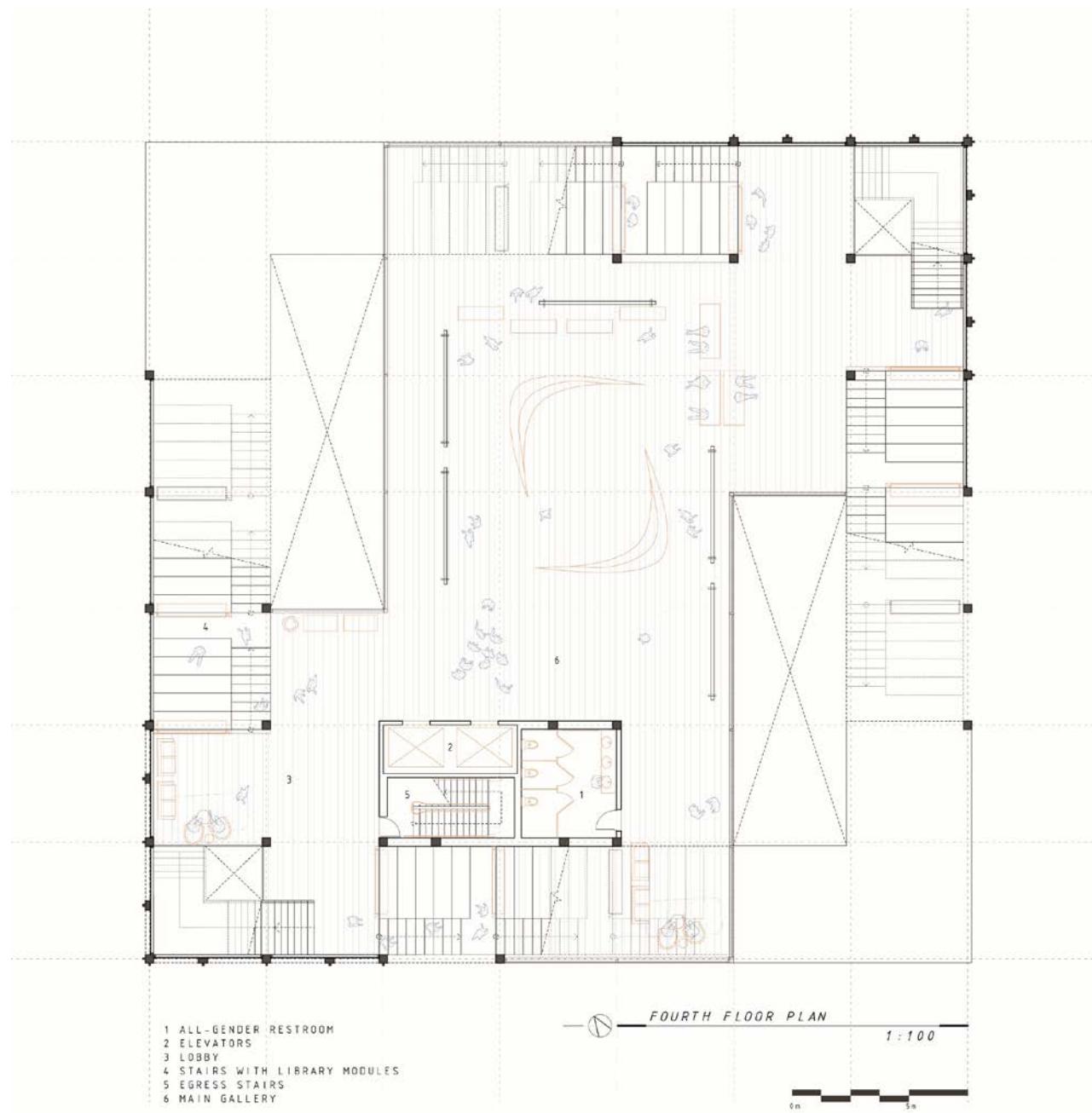
ITERATIVE STRUCTURAL ANALYSES

Deflection and axial stress analysis of each design option was instrumental in the process, allowing for a final structure that is highly efficient in material use and structural efficiency. Geometric conditions led to varying load characteristics, and truss members were selected accordingly.

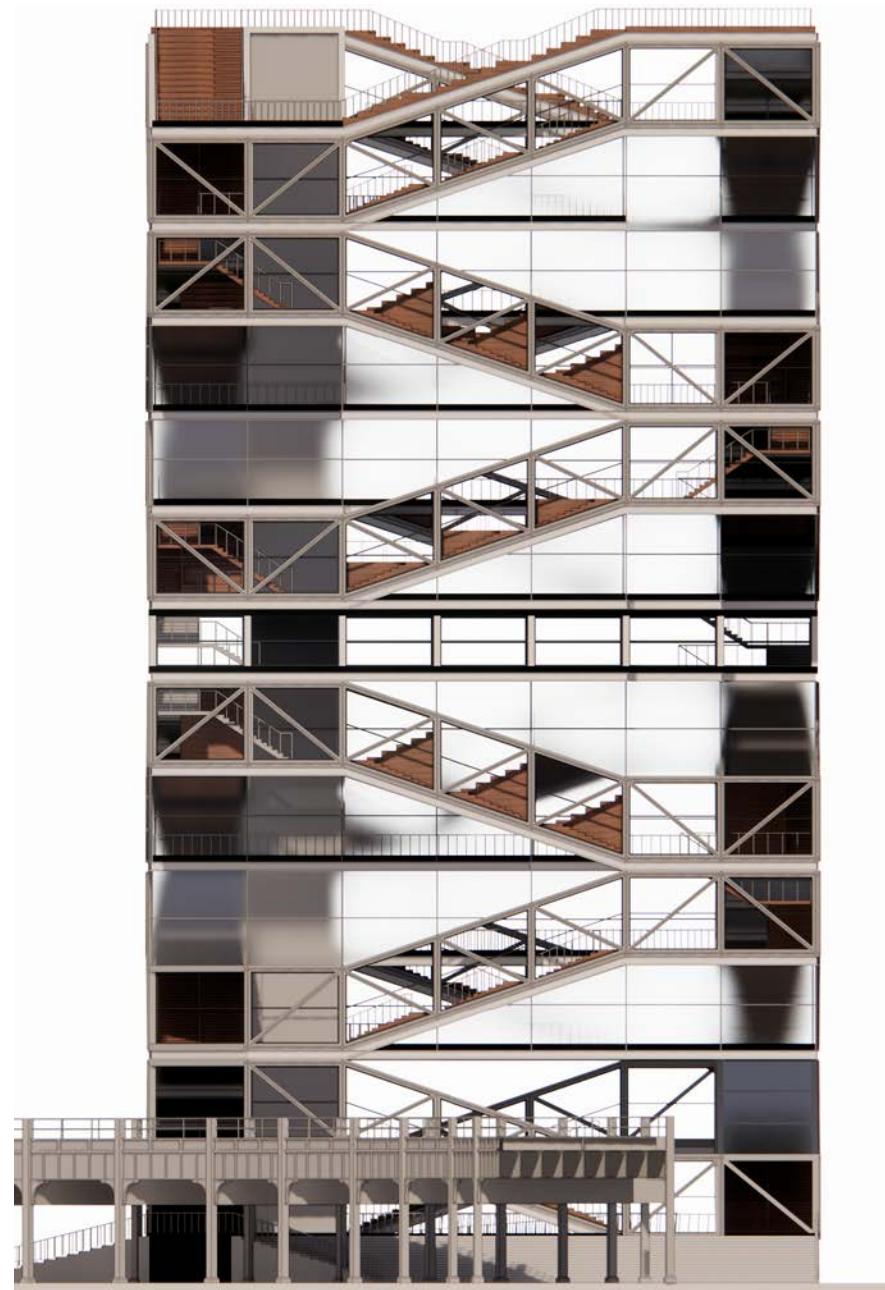


Max. Displacement	4.64 cm
Material	HSS16x16x3/4 Grade 50
Loading	Gravity + 1800 kN (400 kg.f/sq.m. pressure)

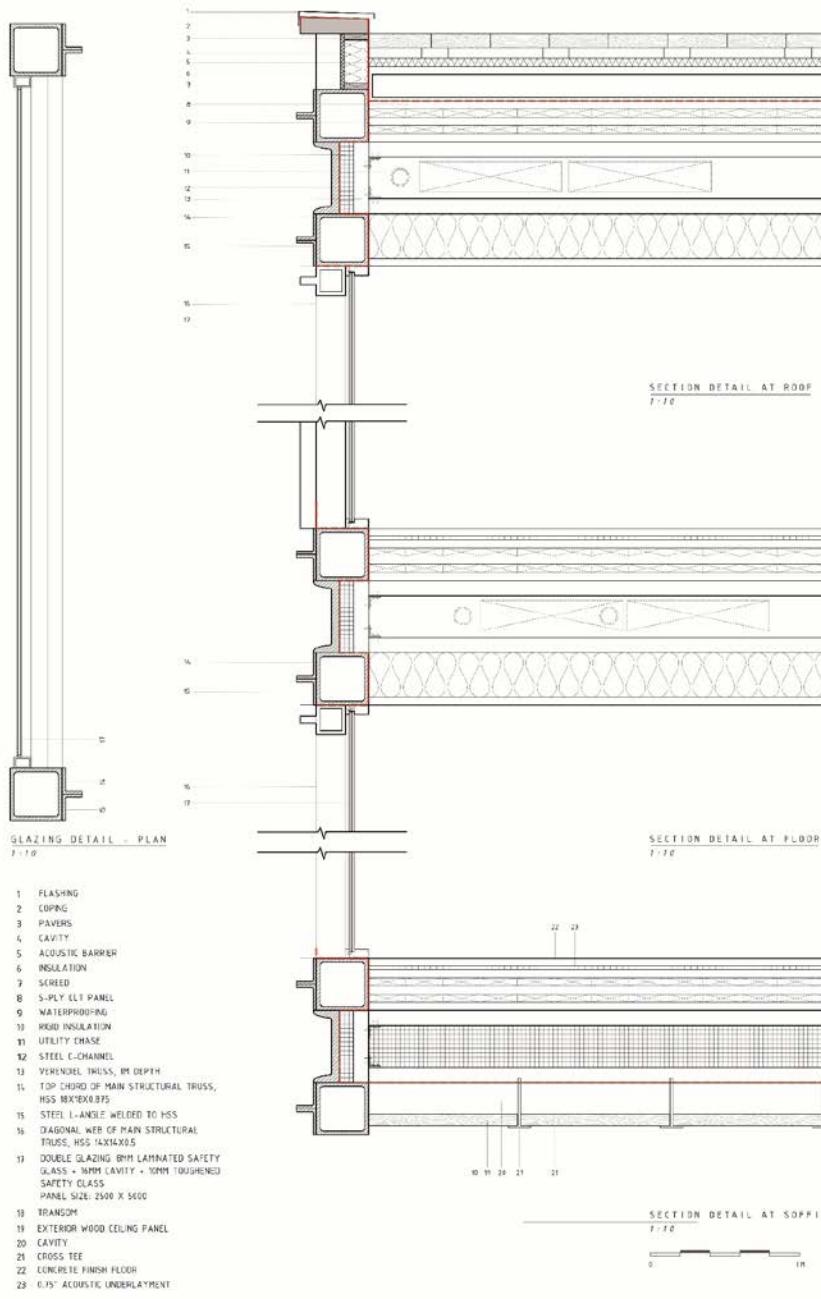




MODEL PHOTOS



ELEVATION: The facade is characterised by structural trusses clad in translucent glass. The rest of the spaces are enclosed in panels and partition walls that span between the floor plates.



02

PRODUCE_
COLLABORATE_
PERFORM_

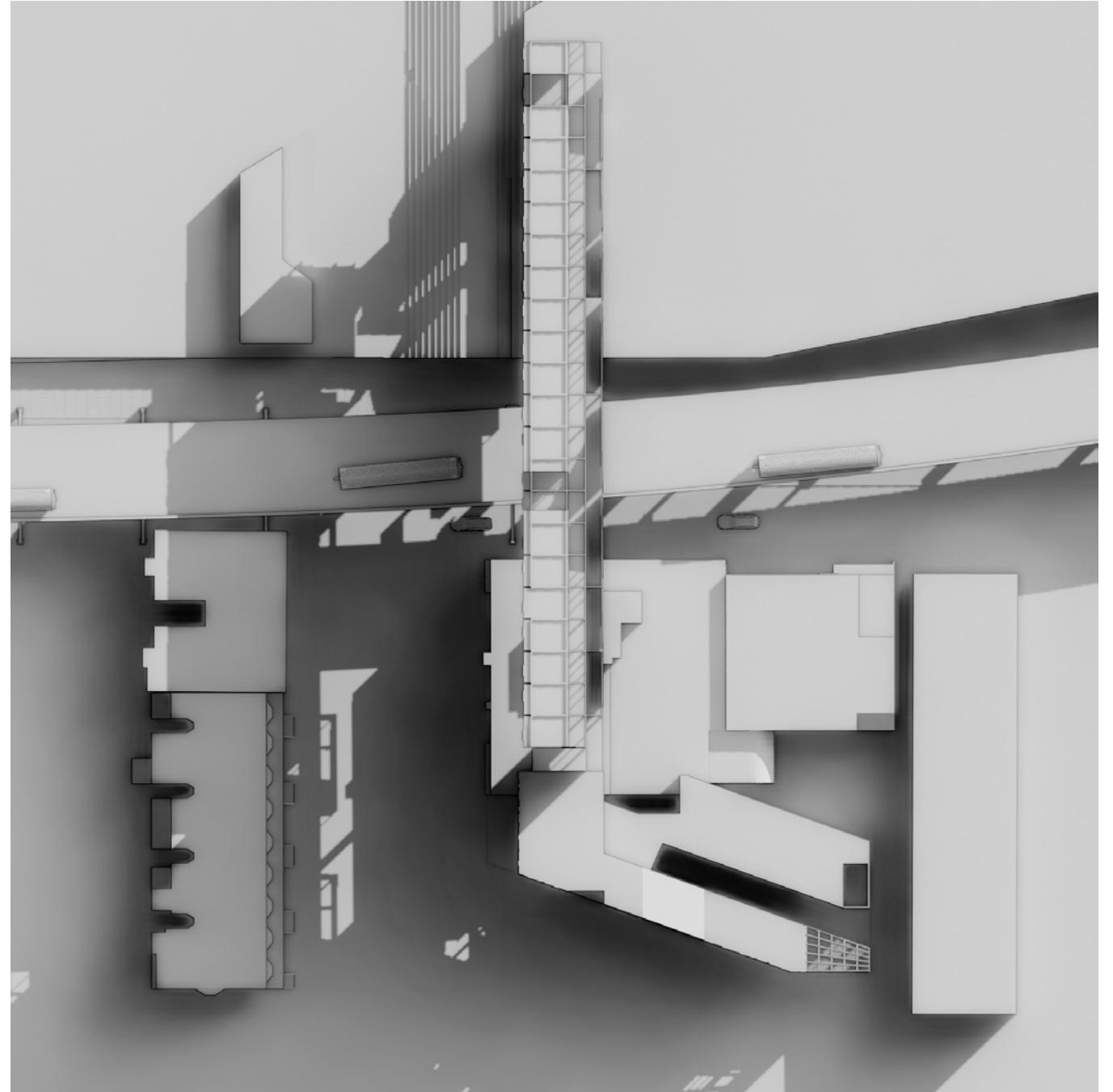
instructor Scott Erdy

premise performative social space set in a community of residential musicians and artists

Some of the liveliest experiences happen in spaces of communal intersectionality – spaces that support multiple people and multiple uses, spaces that can adapt to ever increasing vagaries of social life. Public plazas allow for fluid connections between commerce, community programming and engaging social spaces. This project attempts to situate one such public plaza in the vicinity of the Bandstand studio. Through reinvigorating the rich history of music and dance at the band stand studio, the space now functions as a multi-purpose venue where regular dances take place. The musicians residing in the compound will have a chance to showcase their music throughout the plaza and in the dance studio, integrating them into the surrounding community.

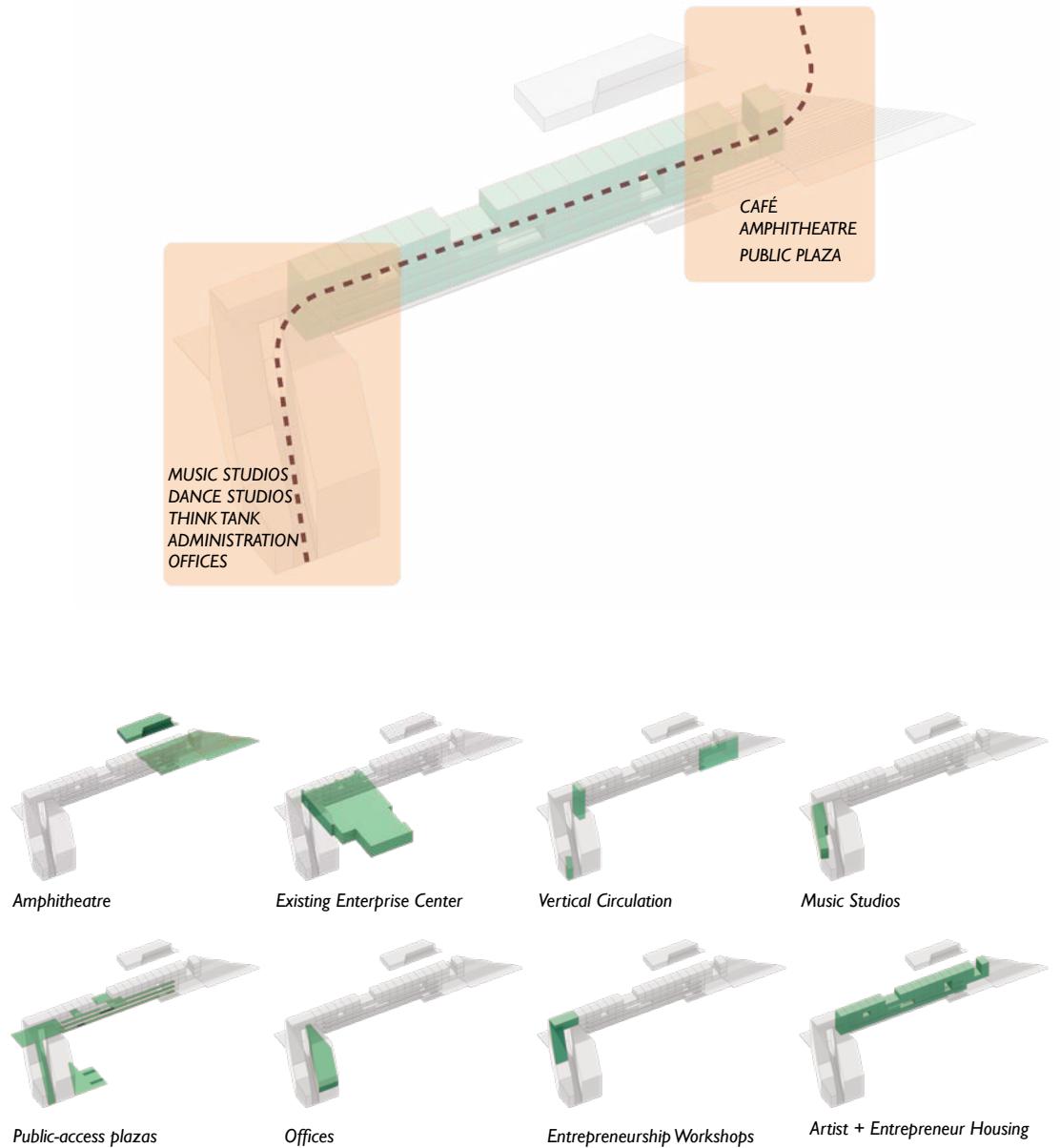
This gradual diffusion of privacy allows the neighbourhood to peek in and thus begin to engage with the artistic and entrepreneurial ventures of the Enterprise Center and the Bandstand studio. On a broader scale, there is an attempt to develop a more cohesive neighbourhood by providing small public plazas for a livelier street-scape and better access to economic opportunities and artistic expression. Community spaces are a reflection of the character of a city, and it is in those fleeting moments of interpersonal connections that urban stories and memories are made.

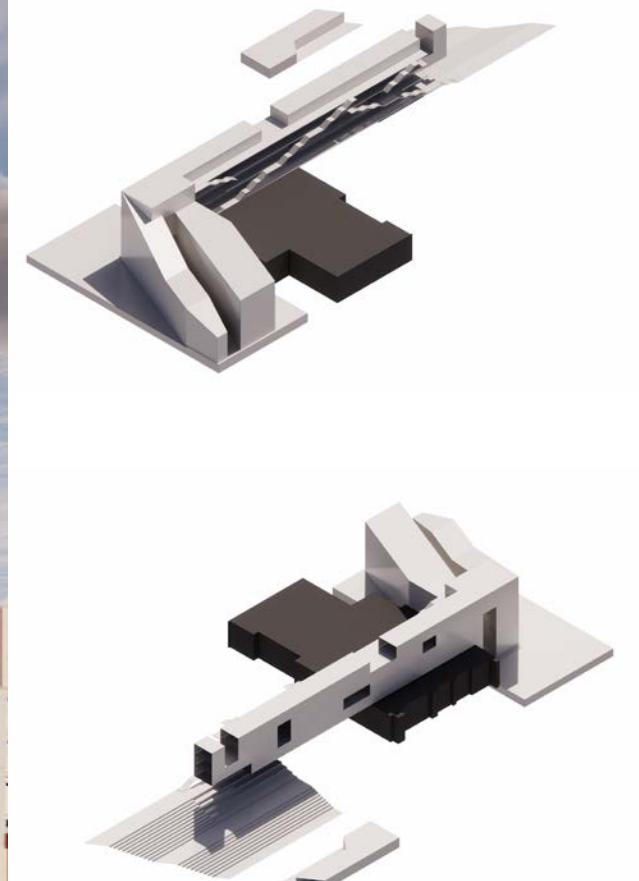
keywords housing – public commons

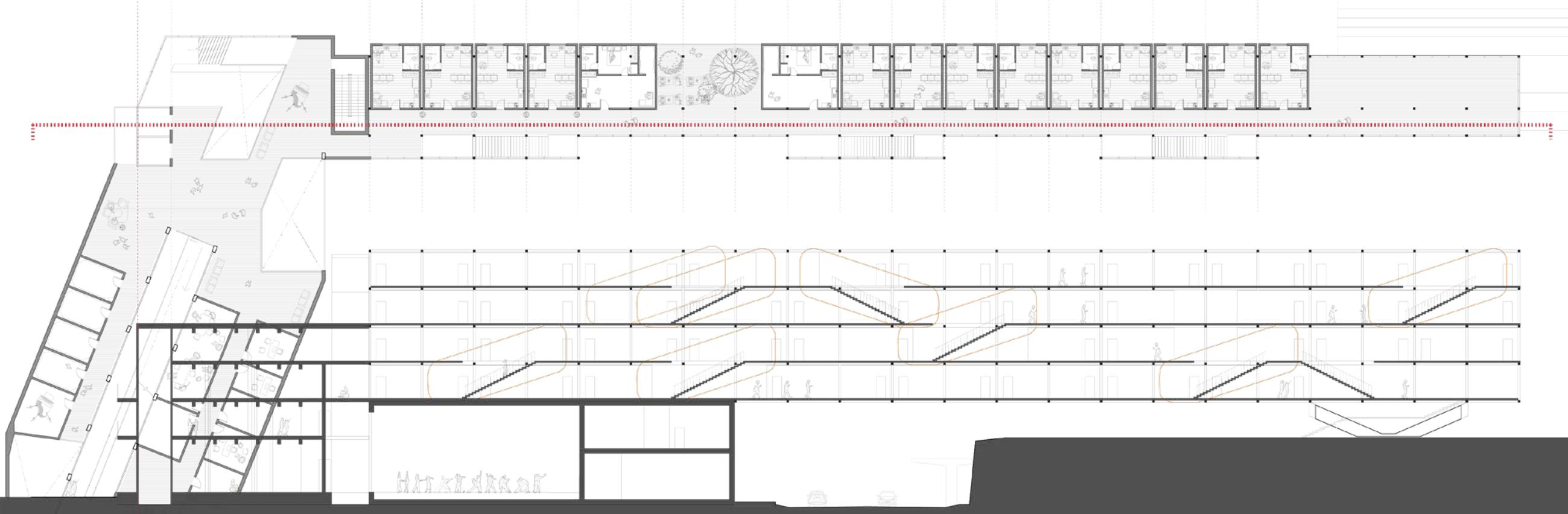


BRIDGING THE COMMUNITY

Market Street imposes a perceptual and physical rift between through West Philadelphia. This project was a good opportunity to intervene by deploying an inhabitable bridge that leads into a public amphitheater - a gestural way of reclaiming the street. The passage through the suspended floor not only affords sweeps views of Philadelphia, but becomes a spatial instrument of public engagement with the new Bandstand.







BUILDING SECTION THROUGH HOUSING AND DANCE STUDIOS
HOUSING WING ANALYTIQUE



PERFORMATIVE SOCIAL SPACE GROUND FLOOR PLAN

The building proposal is a suggestion of movement – metaphorically and formally. This movement through the building and the site takes the form of both a semi-private interiority, and a public exteriority. Existing pedestrian routes are carved out from the massing to create a “storefront lane” for curious onlookers on their way to the nearby grocery store – they can peek in and watch the artists working in their music studios.

03

HARVEST VILLAGE

instructor John Becker, Mary Rogero

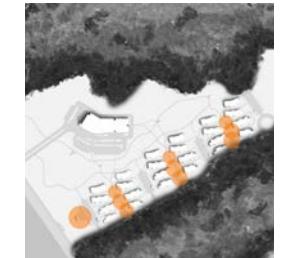
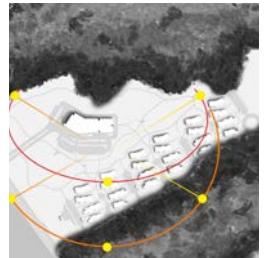
premise Master-plan and design for an attached housing neighbourhood as a part of an educational regenerative rural community

Harvest Village is a Net-Zero energy ecological community located adjacent to the former Maude Marshall elementary school, forming a part of the broader proposal to build an educational co-living community in the outskirts of Oxford, Ohio. The master plan for our project envisions a synergistic relationship between the housing and the school as an integrative and holistic experience for students, faculty and residents alike. This unique connection will be strengthened by an innovative pollinator prairie, planted with a diverse mix of native flowers and grasses, enriching the greater ecosystem of the surrounding community by sustaining native birds, bee population essential to food production, and a dynamic butterfly habitat. The attached housing community is specifically designed to be energy efficient, reduce embodied carbon and promote effective and efficient water use. Our team designed a variety of housing sizes to encourage a diverse mix of community members interested in experiencing engaged community living in a regenerative landscape environment.

This project was a collaborative effort and the author was the leader of the design team consisting of 14 students. Along with general project management, the author's role focused on production of detailed sections, energy analysis, and architectural design.

keywords housing – community architecture – conservation

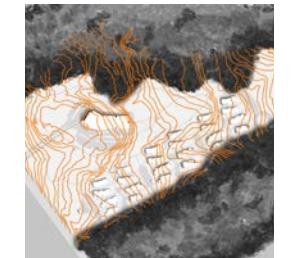




SUN

HARDSCAPES

PUBLIC SPACES



PATHS AND NODES

WIND

TOPOGRAPHY



FULL PROPOSAL WITH HOUSING COMMUNITY AND SCHOOL





COMMUNITYWIDE PV SUMMARY

Unit	Angle	Effective EUI	Load (kWh/	System Size for year 1 (Panels)	System Size for Year 25 (Panels)
IB	30	17.29	4525	3.45 kW (10)	3.725 kW
IBA	30	16.32	4825	3.725 kW	3.81 kW (11)
2B	30	12.86	6500	4.83 kW (14)	5.175 kW
2BA	30	11.09	8150	6.21 kW (18)	6.555 kW
3B	30	14.63	8400	6.21 kW (18)	6.55 kW (19)

3 BEDROOM PV BREAKDOWN

8,407 kWh/Year

System output range from 7,702 to 8,332 kWh per year this location.

Month	Solar Radiation (kWh/m ² /day)	AC Energy (kWh)	Value (\$)
January	3.02	482	40
February	4.18	593	49
March	4.48	694	58
April	5.64	802	66
May	5.89	843	70
June	6.22	846	70
July	6.26	875	73
August	6.29	873	72
September	5.59	767	64
October	4.61	670	56
November	3.47	524	43
December	2.72	438	36
ANNUAL	4.86	8,407	\$697

ACHIEVING NET-ZERO

Harvest Village's electrical needs will be primarily solved by unit-specific PV systems and a small micro-grid. The PV systems are localized on the southern gables of each of the specific units scattered around the community. We carefully selected the SunPower X21-345 for its high energy density (19.11 W/ft²) and increased output at the end of its 25 year warranty (91.75%). An array for each of the unique unit types was sized according to the expected panel production during the 25th year to ensure the system's optimal capacity. In order to ensure its overall resilience, the panels themselves make up a larger micro-grid, where excess energy output from the panels can be stored in batteries and offset increased energy loads on cloudy days or in the event of a significant natural disaster, providing a more resilient, fully renewable power source for the community.

LOCATION:

Weather Data Source: Lat, Lon: 39.49, -84.7 (1.4mi)

Latitude: 39.49 N

Longitude: 84.7 W

PV SYSTEM SPECIFICATIONS:

DC System Size: 6 kW

Module Type: Standard

Array Type: Fixed (Open Rack)

Array Tilt: 30°

Array Azimuth: 180°

System Losses: 12.74%

Inverter Efficiency: 96%

DC to AC Size Ratio: 1.2

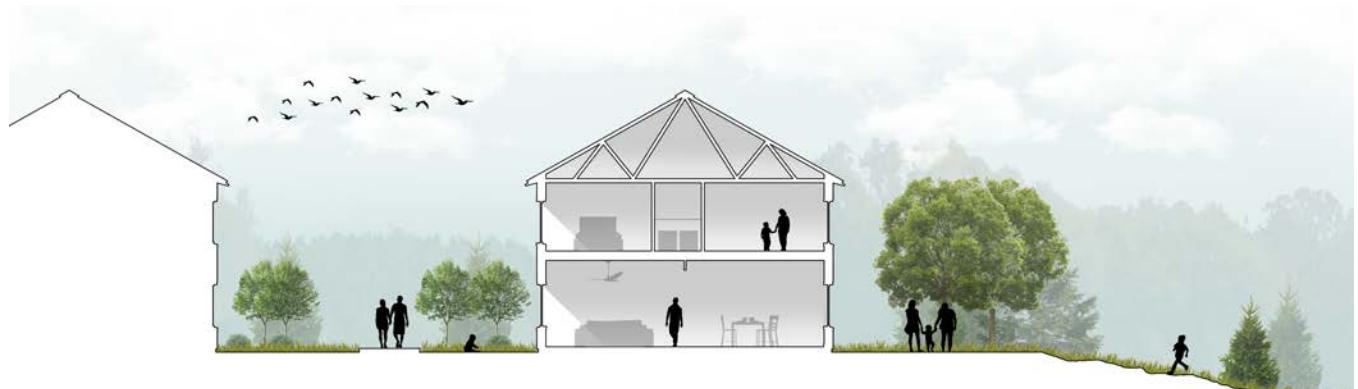


ECONOMICS:

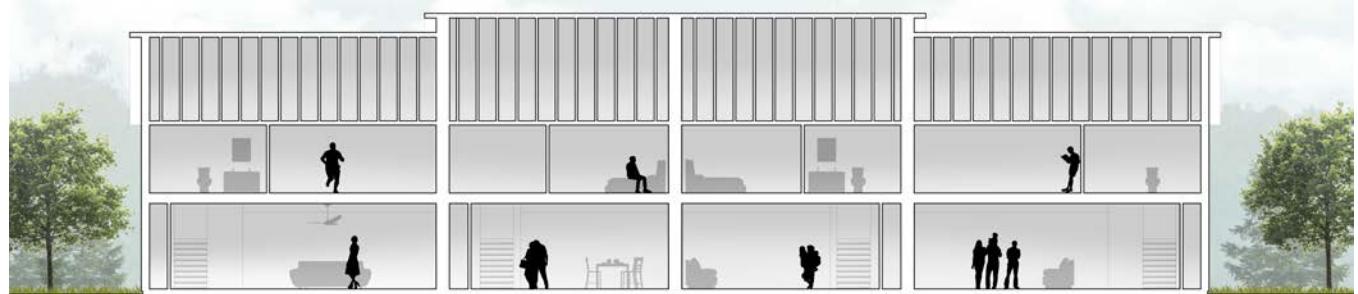
Average Retail Electricity Rate: 0.083

PERFORMANCE METRICS:

Capacity Factor: 16.0%



SECTION THROUGH A 3 BEDROOM UNIT



SECTION THROUGH A 4-UNIT RESIDENTIAL BLOCK



ELEVATION

DETAIL SECTIONS

CONTROL LAYERS

In addition to being the team-leader, my role was to produce the detailed wall sections. This is the most important part of building operation and construction in Net Zero Passive House homes.

Unit fire separation walls are unique conditions that require proper air sealing to ensure indoor air quality and general comfort through compartmentalization. In our enhanced wall system, air sealing is ensured through the use of capillary breaks and sill gaskets along the bottom of the gypsum boards at the foundation and membrane air sealing tape at the second floor and roof bearing condition. Exceptional insulation values are utilized at all structural components to ensure a tight, efficient envelope. Additionally, the goal of integrating high energy performance with a vernacular aesthetic greatly affected the air and water sealing technique.

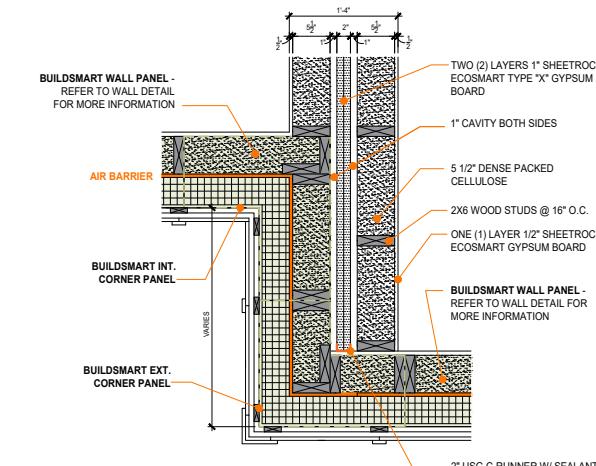
PASSIVE HOUSE CRITERIA:

Foundation Insulation: R-20

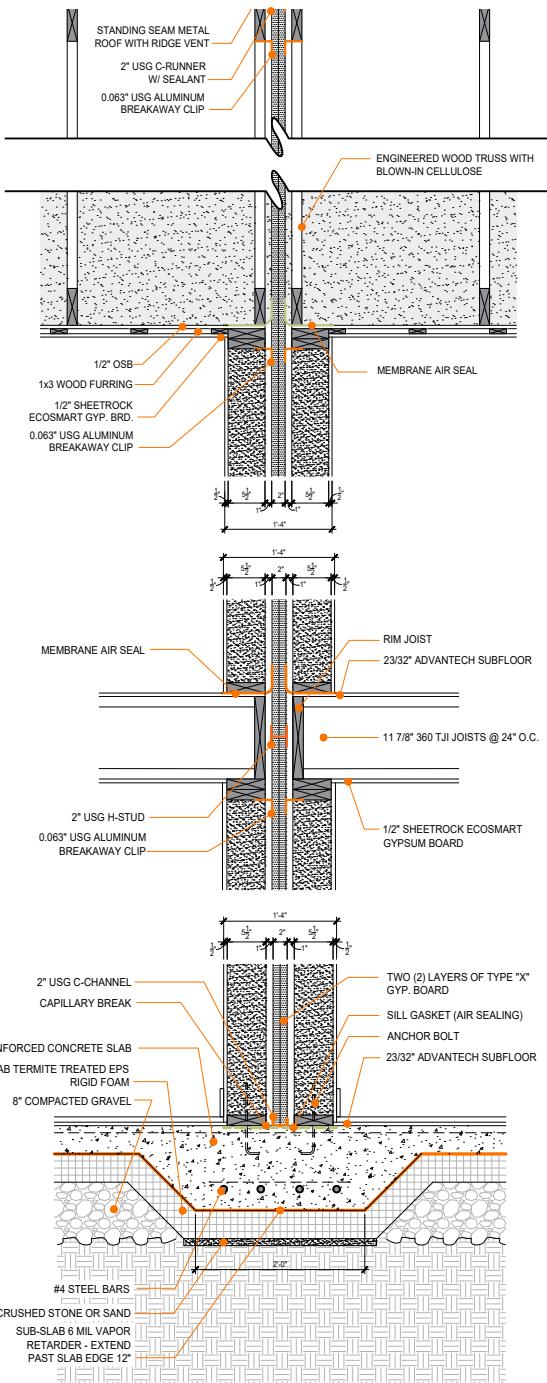
Wall Insulation: R-34

Roof Insulation: R-43

Air Tightness: 0.06ft² @ 50 Pa



EXTERIOR WALL : PLAN DETAIL



SEPARATION WALL: SECTION

COMMUNITY SPACES

FOSTERING AN ECOLOGICALLY SUSTAINABLE WAY OF LIVING



04

LIMINAL THRESHOLDS

instructor Ryan Palliser

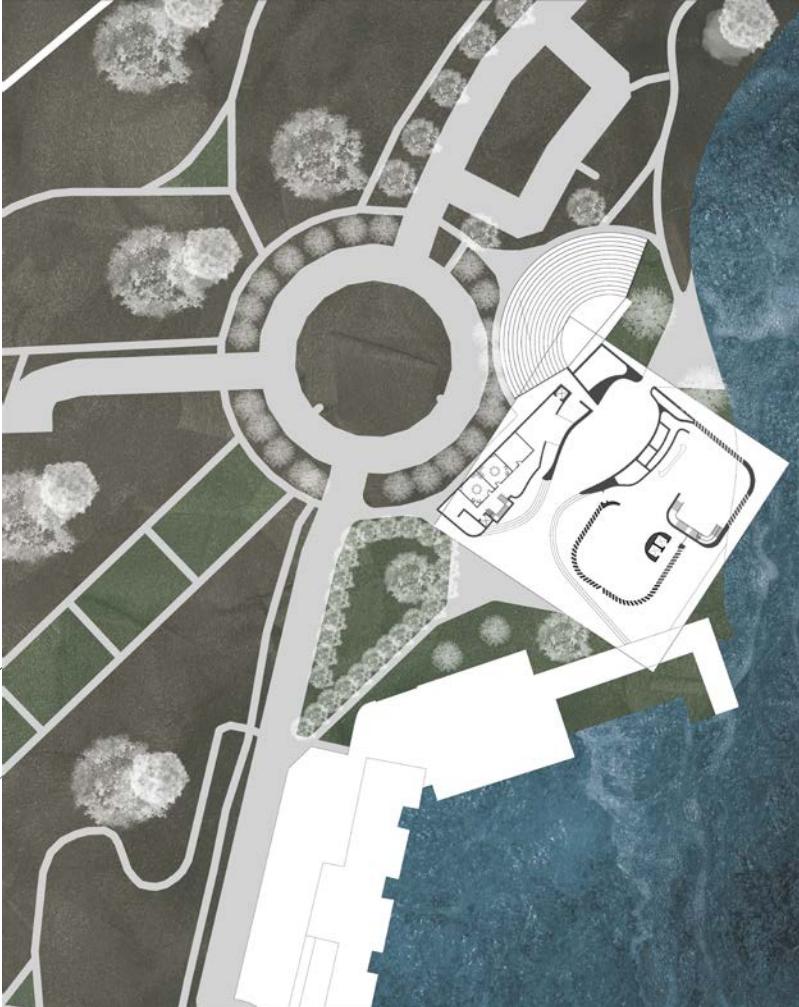
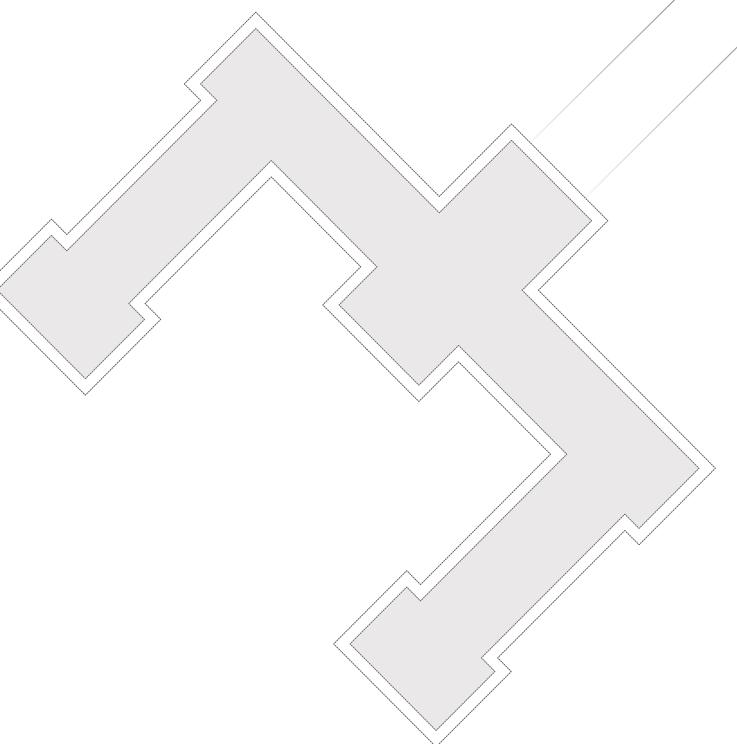
premise An addition to the Philadelphia Museum of Art in Philadelphia, USA, addressing issues of museum identities and de-colonization.

This is a museum unfurled. Stripped of the facades of inadmissible walls and looming columns, this is an institution that attempts to rationalize the experience of engaging with art. Unlike its neighbour - The Philadelphia Museum of Art - this institution strives to be a locus of interactions between holistic community engagements and accessible art. This locus takes the form of the open-to-sky oculus, which is the thematic centre of the whole complex.

The entry promenade pays an homage to the lively, vibrant streets of Philadelphia, which belong to everyone from all the walks of life. Education and art are treated as mutually evolving and co-existing entities, and the spaces that hold these functions are visually connected for anyone who strolls through, while providing people the agency to engage only as much as they wish to. These forms evolve from the over-arching roof – appendages of a central whole, but take on their own distinct identities as they move farther towards the entrance. There's a disintegration of the facade that allows for transparency, and this must be emblematic of any institution that might attempt to respectfully serve the varied communities of a city like Philadelphia.

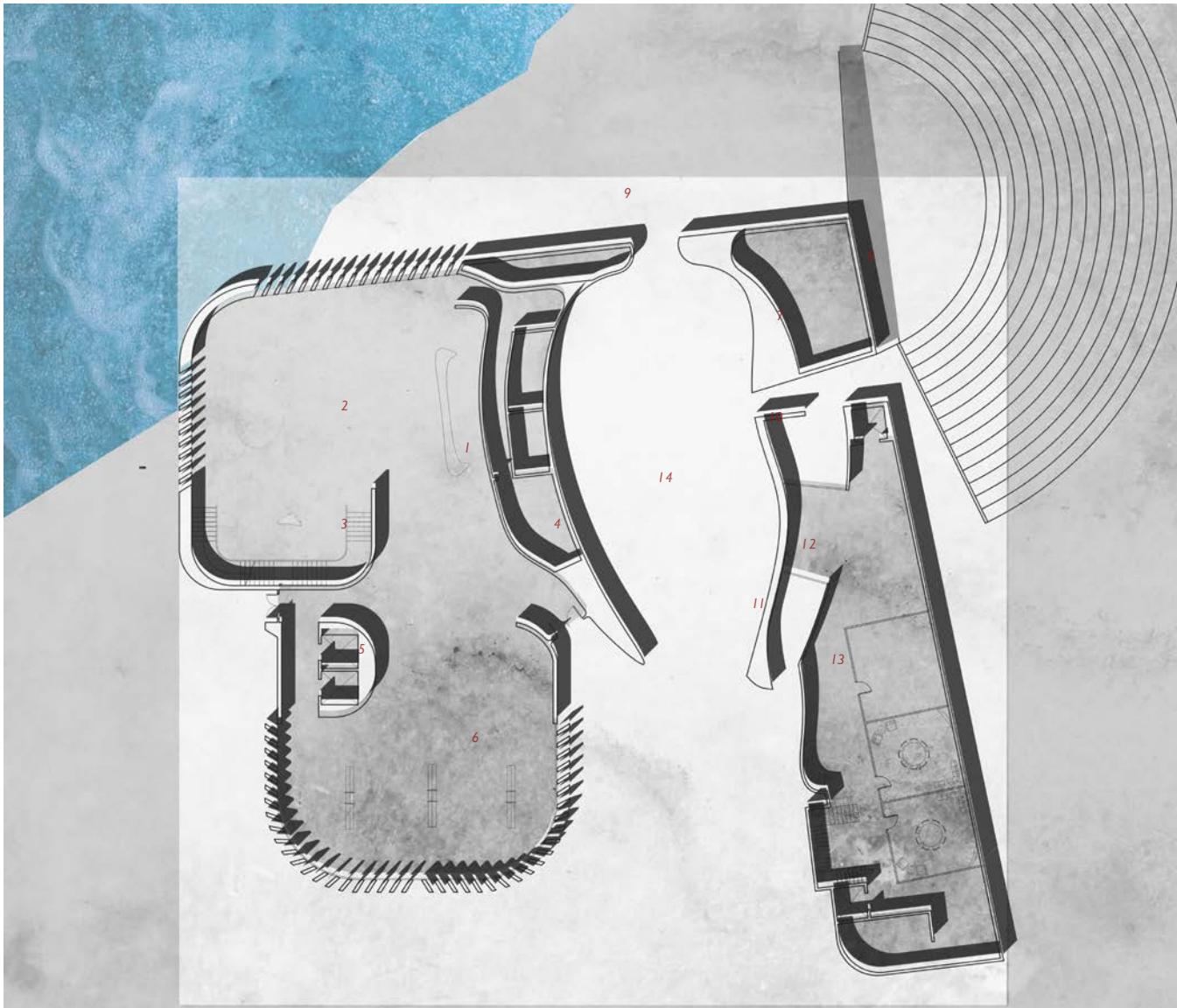
A museum doesn't have to be an Acropolis on a hill. It's a walk down the street, accessible, familiar, and inclusionary.

keywords museum_institutional_social



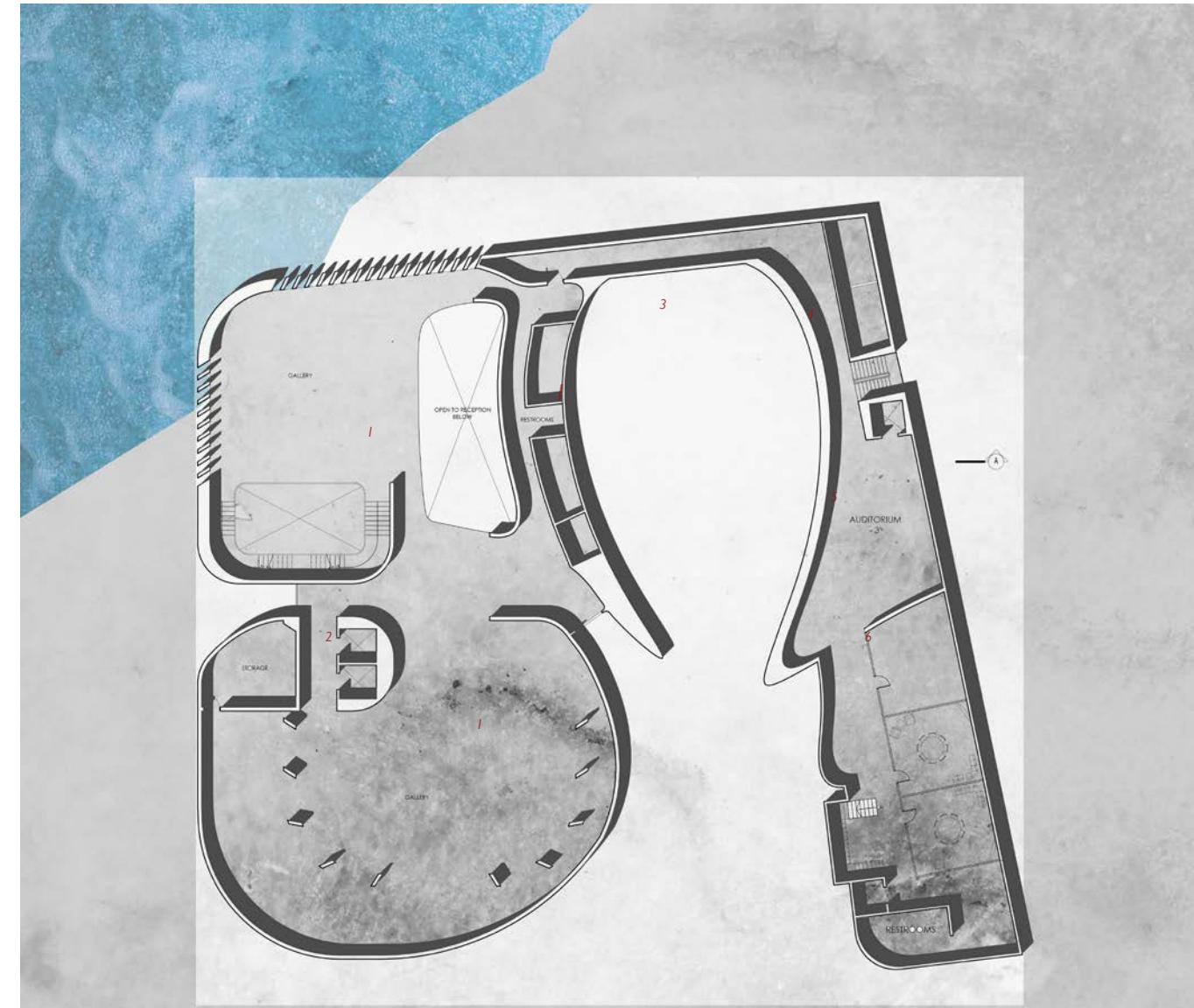
SITE CONTEXT





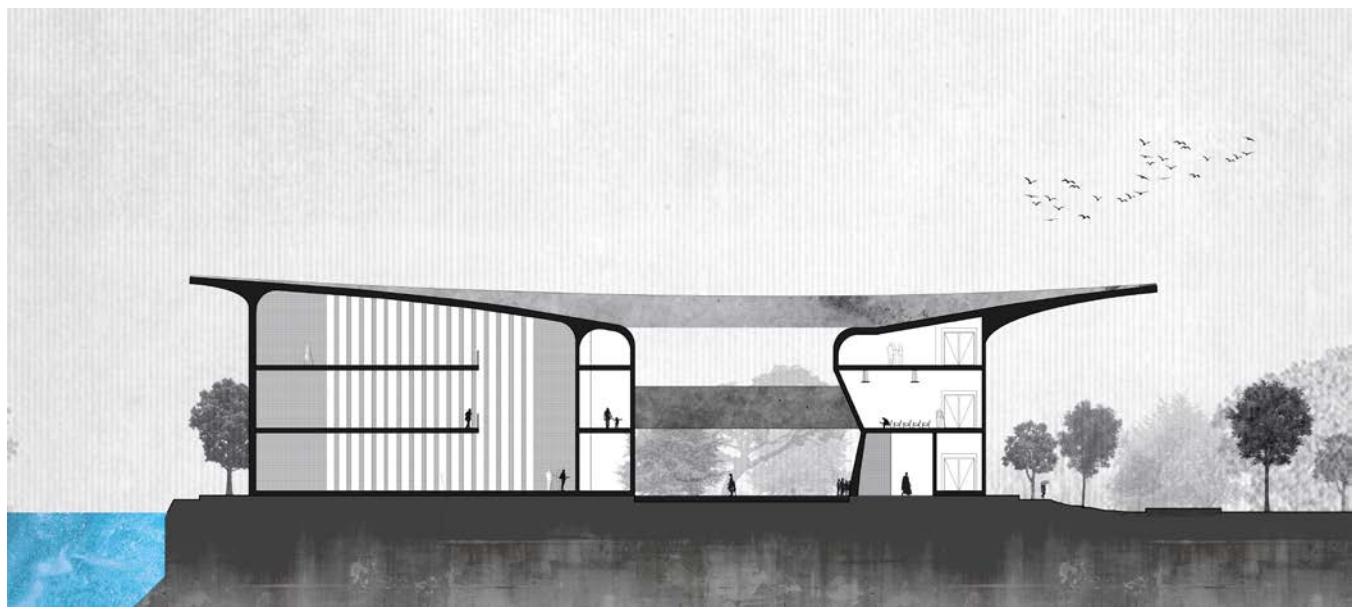
GROUND FLOOR PLAN

1 museum lobby	5 elevator lobby	9 courtyard	13 classrooms
2 sculpture lounge	6 gallery A	10 passageway	14 oculus
3 stairwell	7 staging area	11 forecourt	
4 bathroom	8 amphitheatre	12 reception	

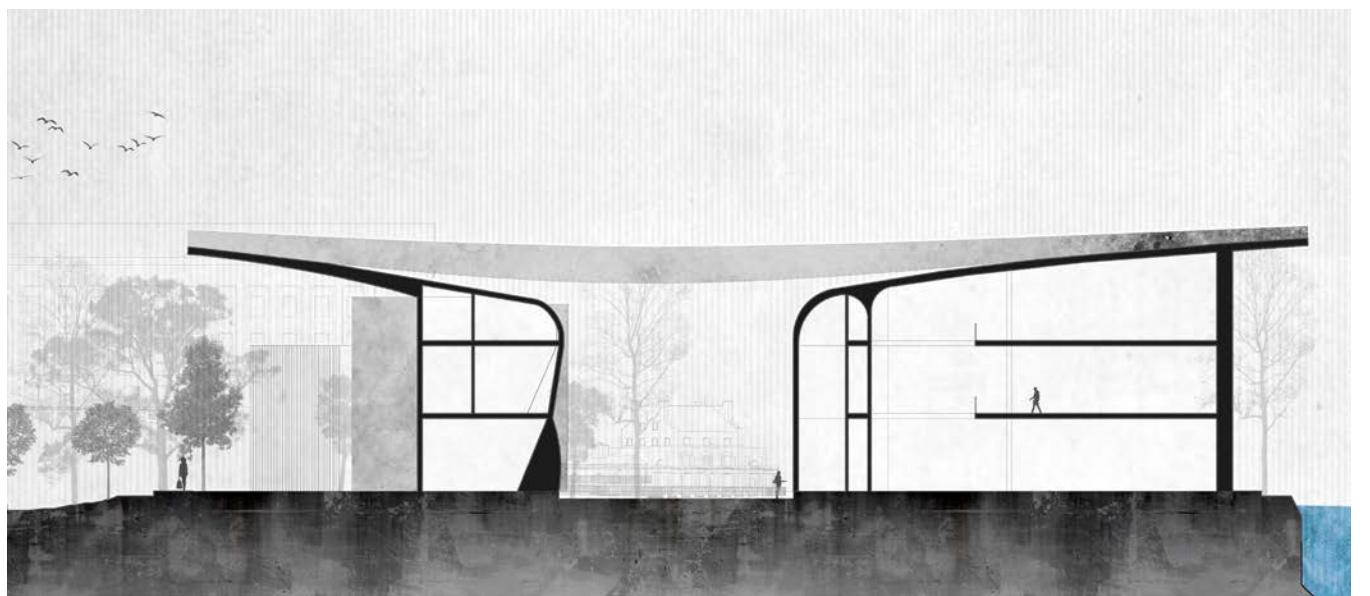


FIRST FLOOR PLAN

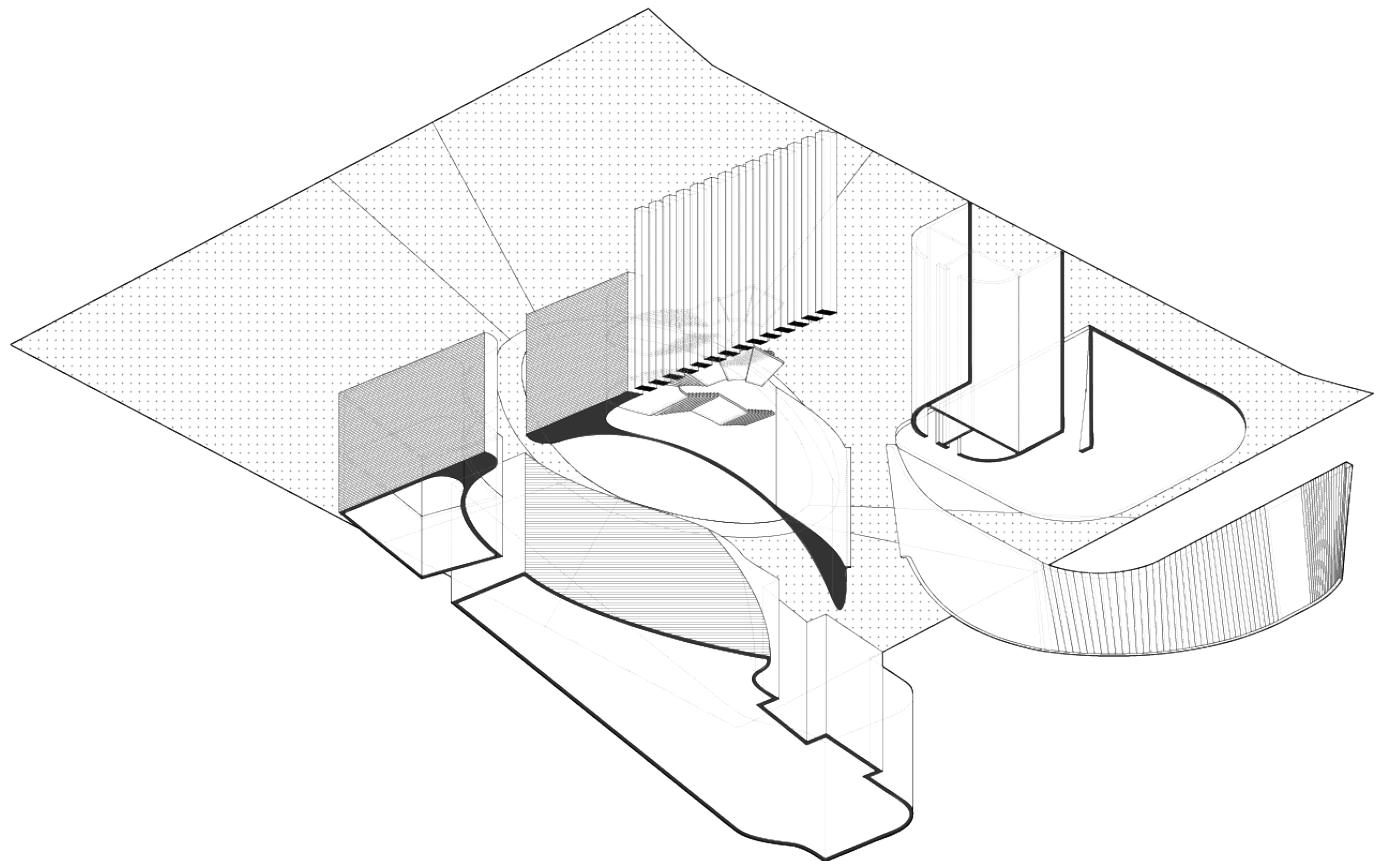
1 galleries	5 lecture hall
2 storage	6 reading rooms
3 walkway (restricted access)	
4 offices	



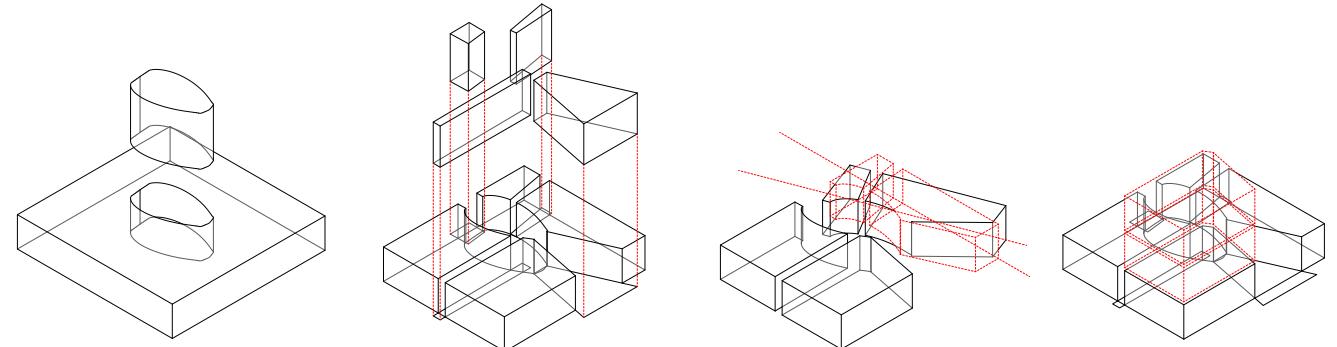
SECTION TOWARDS THE RIVER



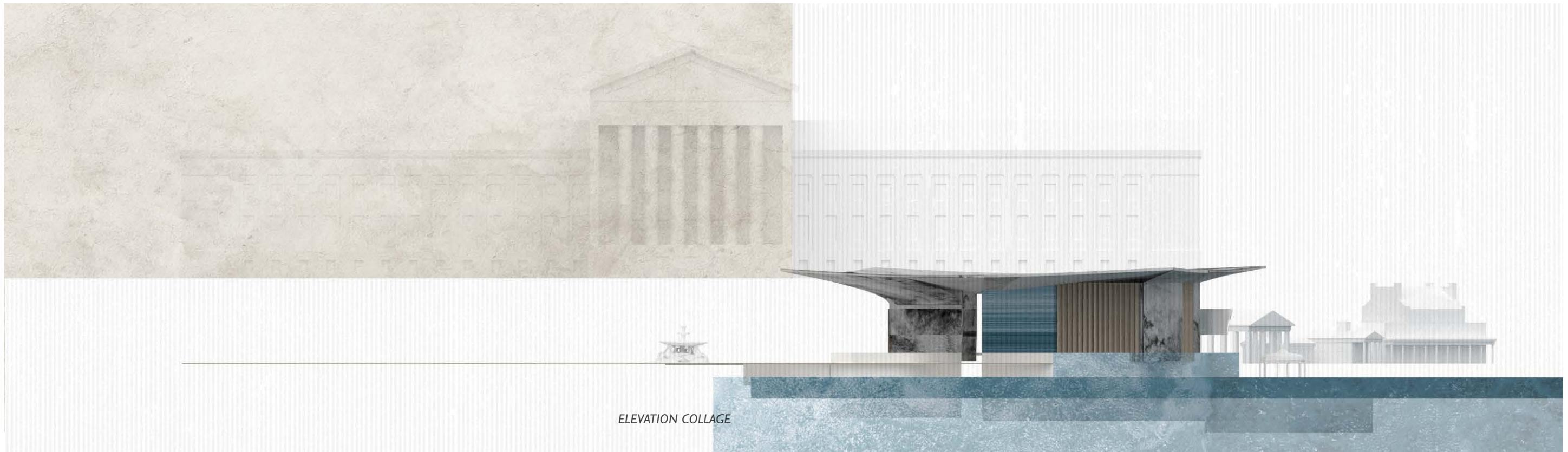
SECTION TOWARDS THE PMA AND FAIRMOUNT WATERWORKS



CHOISY AXONOMETRIC



MORPHOLOGY



ELEVATION COLLAGE

05

EXPERIENCING PALLADIO

advisor Dr. Patrizio Martinelli

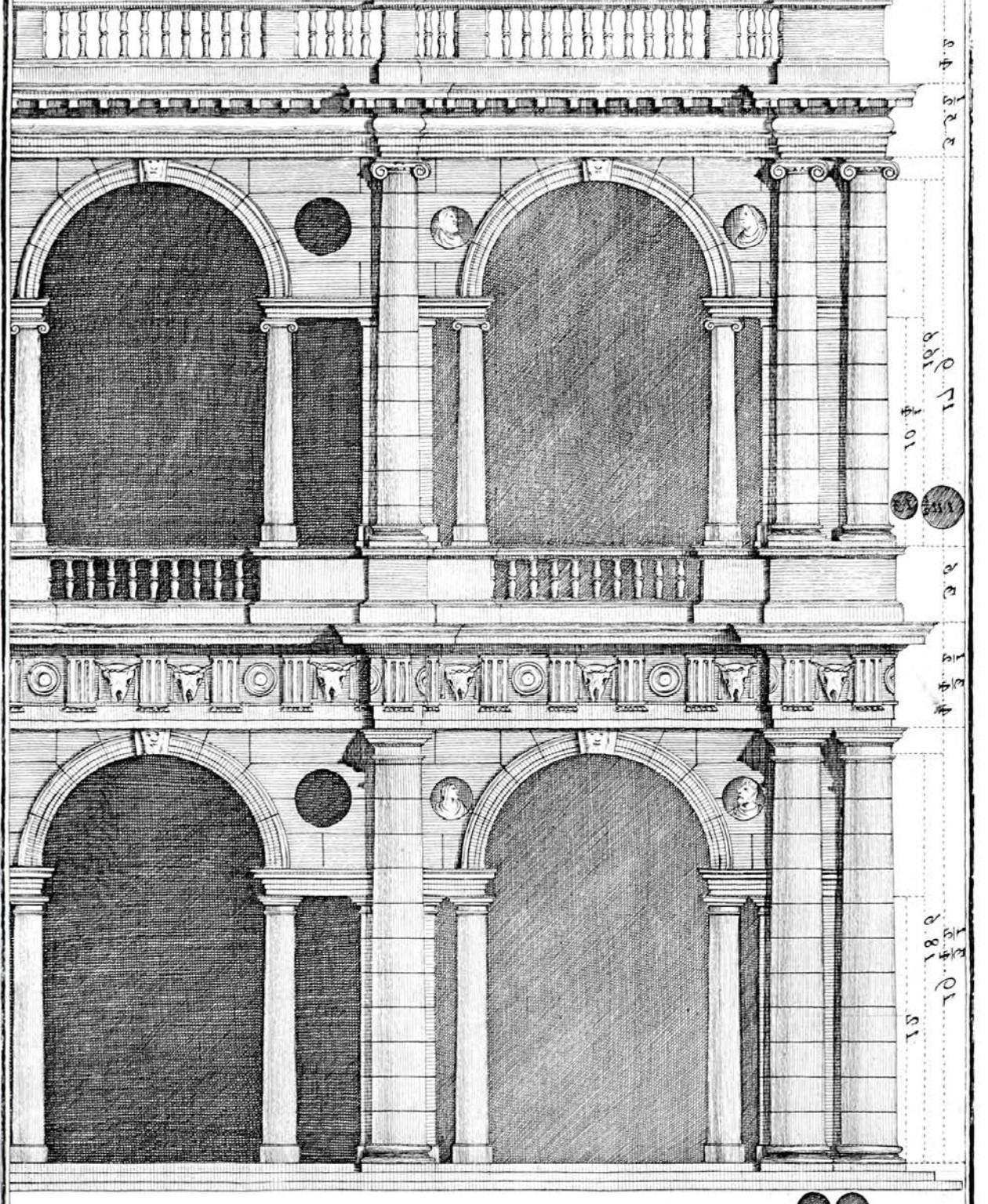
descrip. A theoretical analysis and phenomenological representation of Palladian architecture as a part of USS research grant

Andrea Palladio has been one of the most influential architects of all time, and also has been the most studied. Palladio's simplicity has a certain maturity of elegance. It feels that the extraneous elements are so carefully edited out that what remains is a perfection of exacting composition in an urban canvas.

My research argues that Palladio's work is undoubtedly a reflection and a function of the place that it is situated in. This phenomenological approach necessitated something other than the traditional frontal and orthographic architectural projection in which Palladio's work has always been represented.

Palladio's buildings can be understood as a composition of layered elements, strategically placed to form a cohesive whole. Thus, the medium of collage emerges as an appropriate tool for translating theoretical explorations of Palladio into practice. The overlapping of fragmented elements in a disjointed manner parallels the way the brain processes and stores information, as well as how visual perception operates. Collage serves as a means to represent the experience of a place beyond traditional modes of architectural representation, capturing the spatial and perceptual complexity of lived experience.

keywords historical analysis – phenomenology – research



PHENOMENOLOGICAL ANALYSIS AND EXPERIENTIAL DESIGN
REPRESENTATION OF BUILDINGS THROUGH COLLAGES



PALAZZO BARBARO

Most of the Palladian city-palaces are not afforded a front view, so they are experienced perspectively from narrow streets. It is here that Palladio's sophistication of facade design and proportions come into play - some things seem larger than what they are, curved surfaces appear straight, trapezoidal rooms become spatially rectangular. Vicenza cannot be experienced without Palladio, and vice-versa.



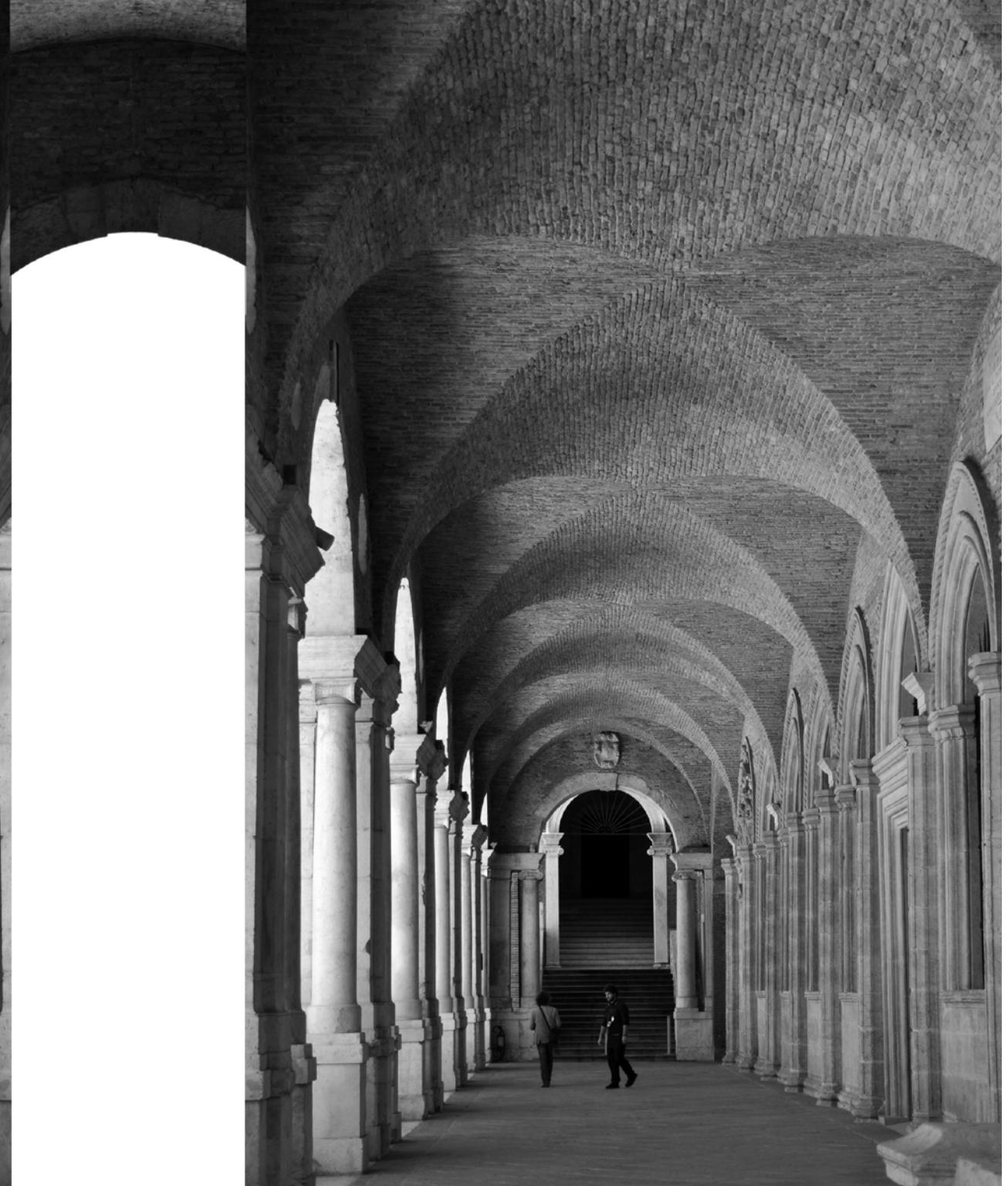
VILLA ALMERICO CAPRA 'LA ROTONDA'

Most of Palladio's villas are set deep within farmland, not facing city streets but open fields. Here, his architecture is shaped by function, orientation, and scale – service wings frame vistas, proportions balance utility with grandeur, and the buildings mediate between domestic life and agricultural labor.



VILLA FOSCARI 'LA MALCONTENTA'

The layering of photos, drawings, and elements from each distinct building is dictated not only by what is actually present, but also by my own experience on the site. This experiential approach seeks to situate these seminal works of architecture in a contemporary context viewed through the lens of a student looking up to Palladio, inasmuch as Palladio once looked up to Vitruvius.



06

PHOTOGRAPHY

advisor Brent Wahl

descrip. *Architectural Photography, Portraiture and Photo-journalism undertaken during coursework at UPenn and working at the Daily Pennsylvanian.*

