

# **REY ELLIOT HERNANDEZ GABRIEL**

**MS Architecture at Cal Poly  
Design Portfolio**



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# UNDER SHADES AND BETWEEN OPENINGS

Master's Research Project

Wood Design

Design Build

Circularity



## A solar-responsive flat beam grillage reciprocal frame (RF) canopy system with bi-level members and mortise-and-tenon joinery

### KEY EXPLORATIONS

Form-finding, Morphological Analysis, Solar Radiation Analysis, Iterative Design, Architectonics, Digital Fabrication, Design for Assembly and Disassembly

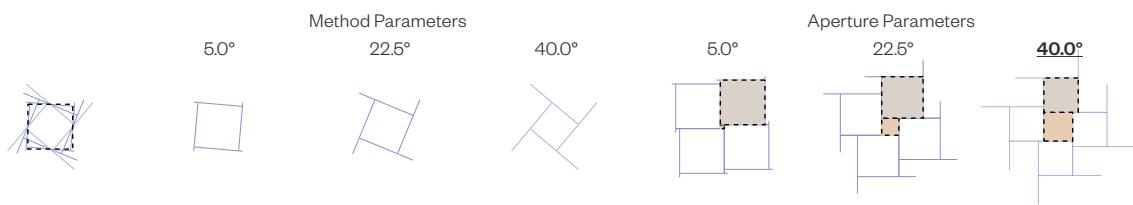
Reciprocal frame structures - self-supporting space structures composed of interdependent linear and planar elements - have widely been studied due to its unique structural dynamics that allow it to span long distances via a network of short members. Most studies on reciprocal frame systems, though, focus on the generative and formal qualities of the system, and analyses of its structural properties.

The research project explores the design of reciprocal frame systems through an understanding of its climate-responsive qualities, focusing on geometric behavior in relation to shade quality. Informed by this investigation, the project culminated in the development of a flat beam grillage canopy system of interlocking bi-level engineered wood members connected primarily via friction joinery.

The resulting project was optimized to allow for simplified production, and ease of assembly, disassembly, and reuse. The nature of reciprocal frame systems and the optimized prototype module reflects on the inherent circularity advantages of reciprocal frames that would provide benefit in a timber-oriented future.

### Morphological Studies: Form + Shading

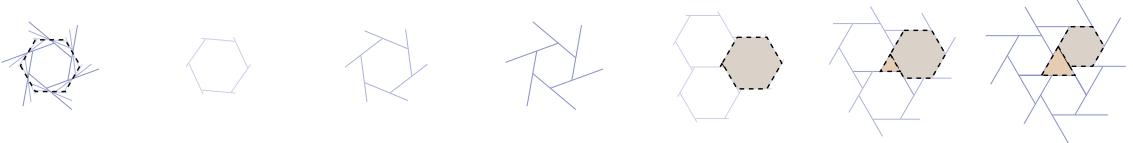
#### Square Form Rotation



#### Triangle Form Rotation



#### Hexagon Form Rotation



#### Shield Form Alternate Translation

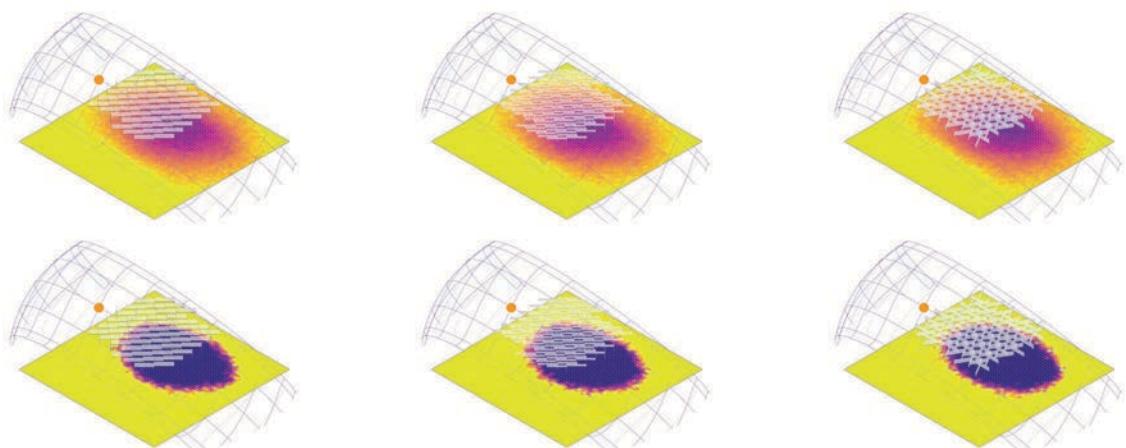


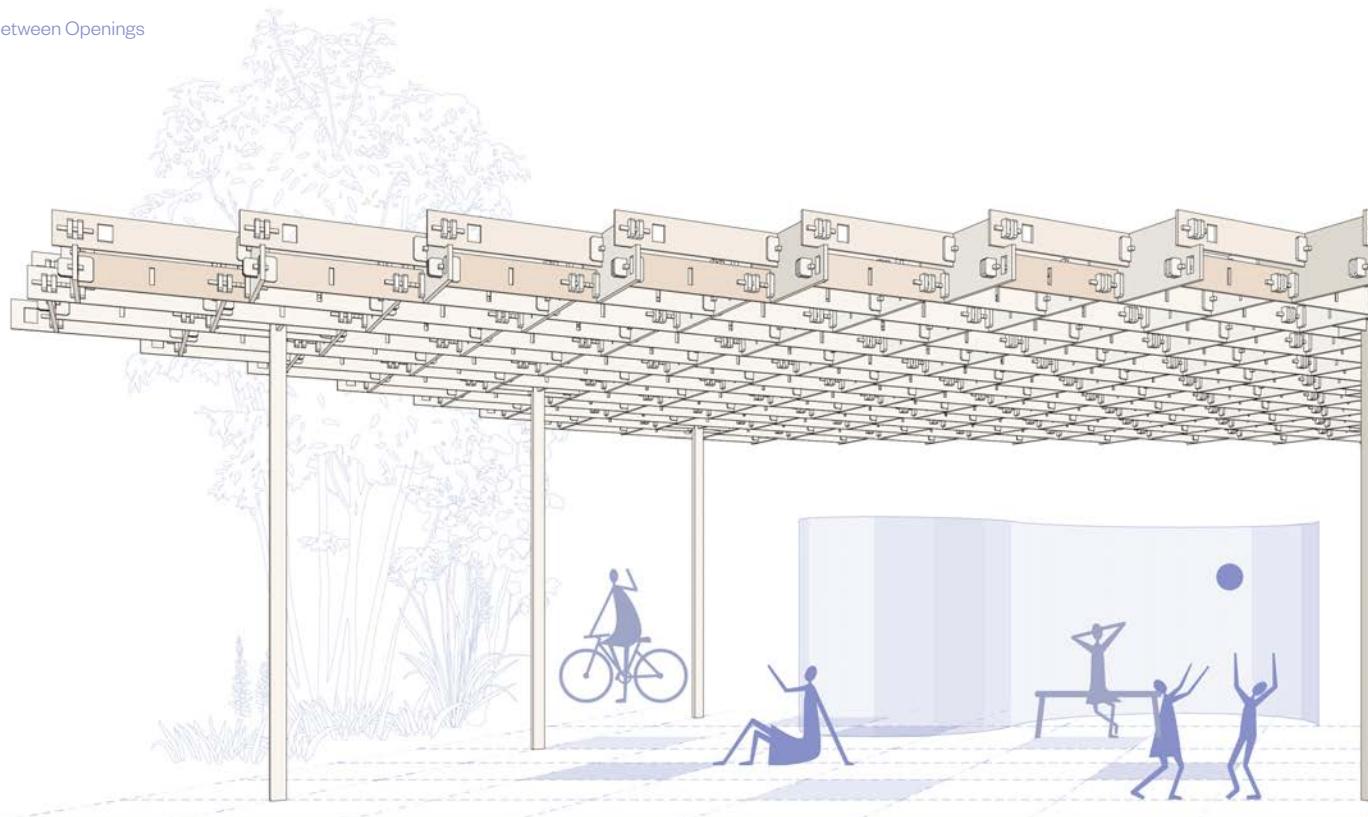
### Comparative Analysis: Physical Form (3D Print)



### Comparative Analysis: Total Solar Exposure

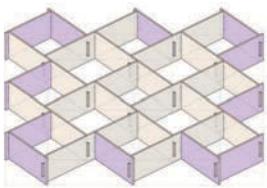
#### Shade Intensity Distribution



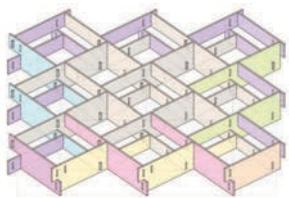


### Module Development & Optimization

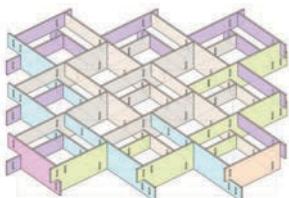
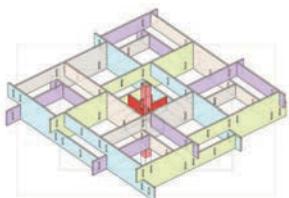
Square Form



Bi-Level Iteration A (9 Member Types)

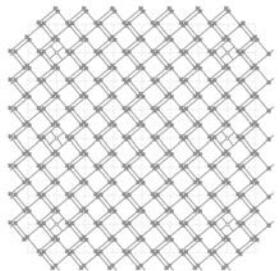
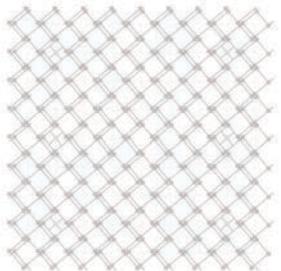
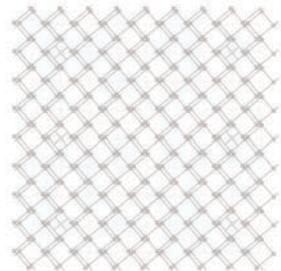


Bi-Level Iteration B (7 Member Types)

**Bi-Level Iteration C (5 Member Types)**

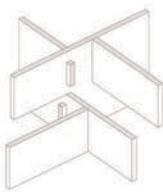
#### Bi-Leveling

Approach developed for the project that translates the panels as split-level members following a layering of larger and smaller apertures, which results in increased shading distribution and stability

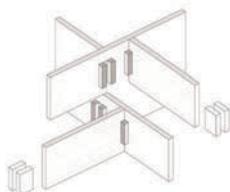


### Connection Development

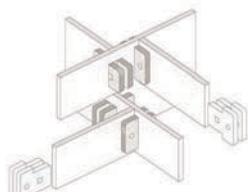
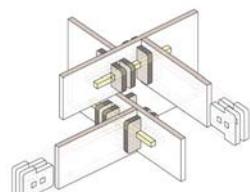
Simple Mortise and Tenon



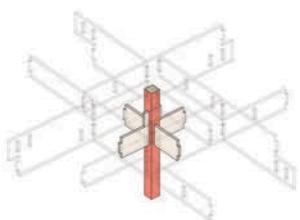
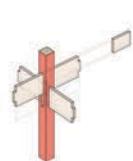
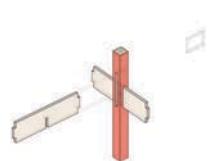
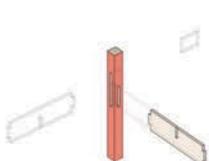
Double Wedge

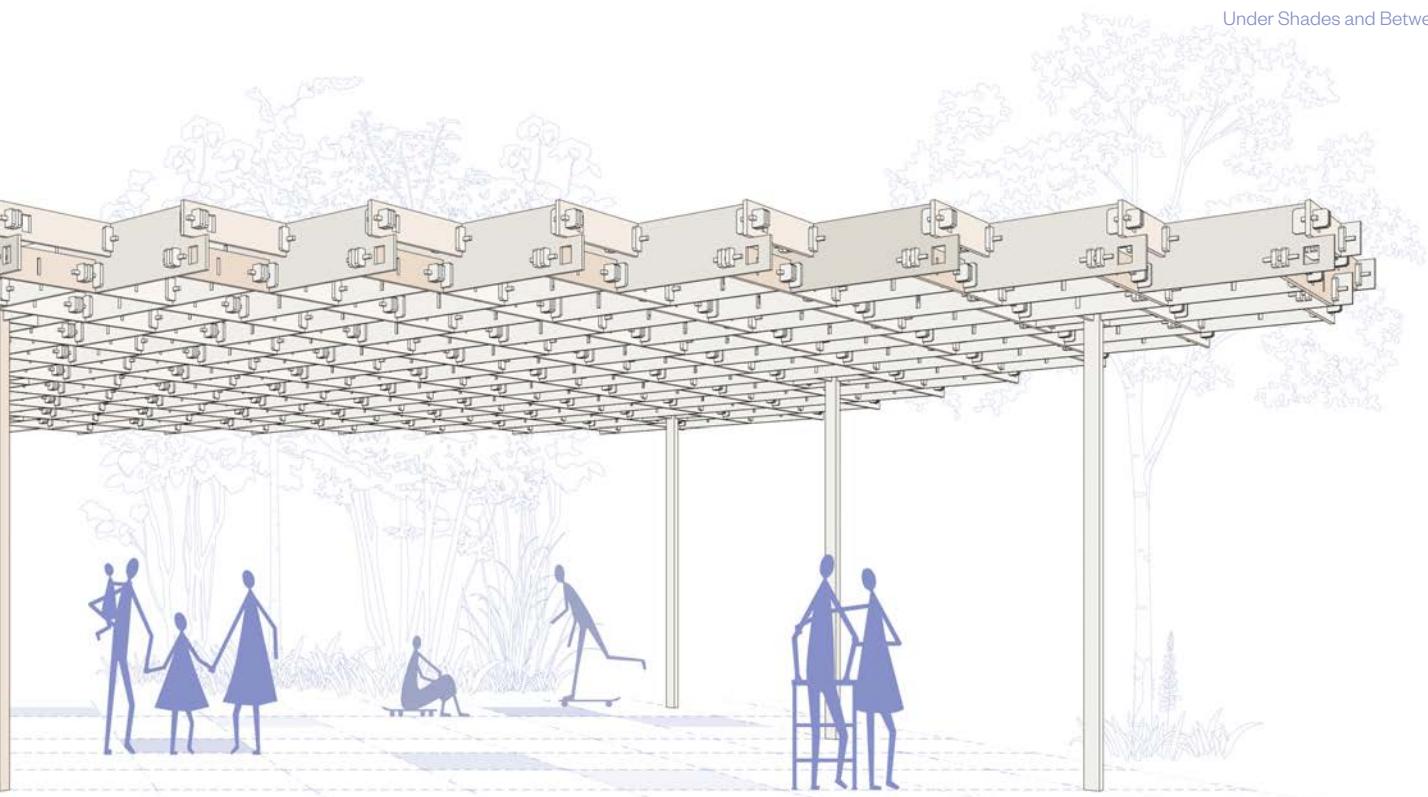


Double Wedge with Pin &amp; Dowel

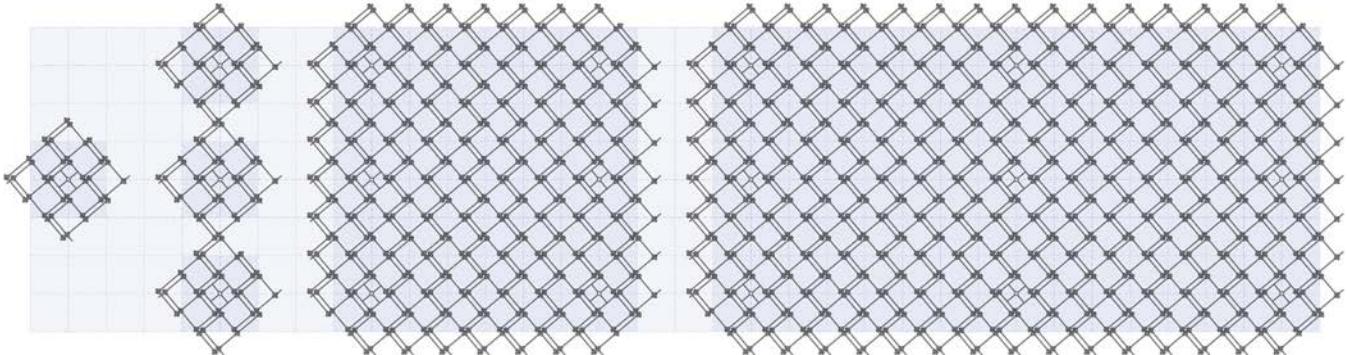
**Double Pinned Double Wedge**

### Column Development - Castle Joint Approach

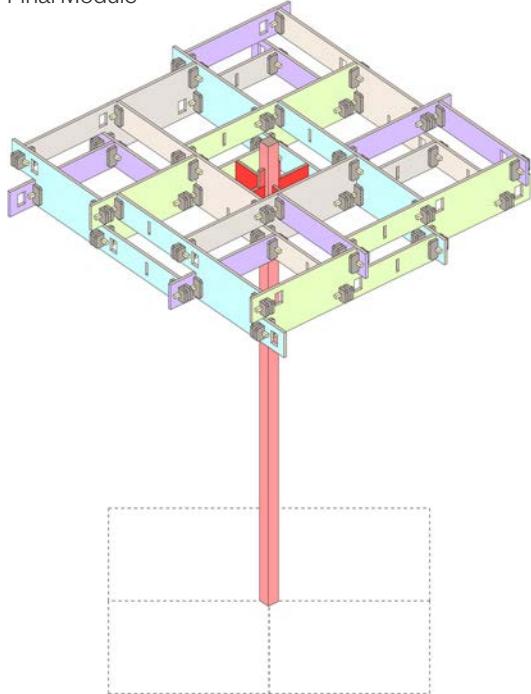




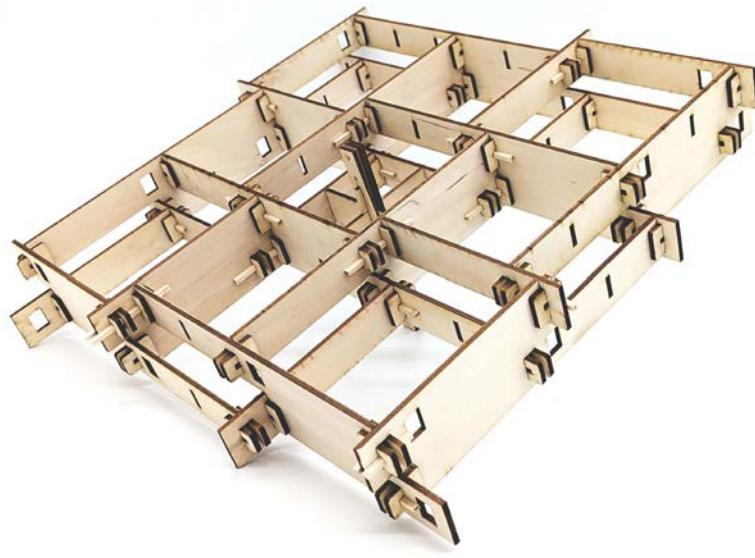
Scalability Diagram



Final Module



Study Model - 1/8 Scale (Laser Cut)



**Digital Fabrication**

CNC milling, laser cutting, and 3D printing were all utilized in the iteration and actualization of the study models and the half-scale proof of concept module due to the exacting nature of friction fit reciprocal frame systems



# JAKARTA MIXED-USE PROPOSALS

Professional Work **CALLISORTKL**

Tall Buildings

Mixed-Use

Iconic



Rendering by Visualization Consultant

## Option 01 - Monoliths of Heritage

1 of 2 schemes that I developed for the project.  
Client eventually decided to select Option 5.

**DESIGN TEAM**

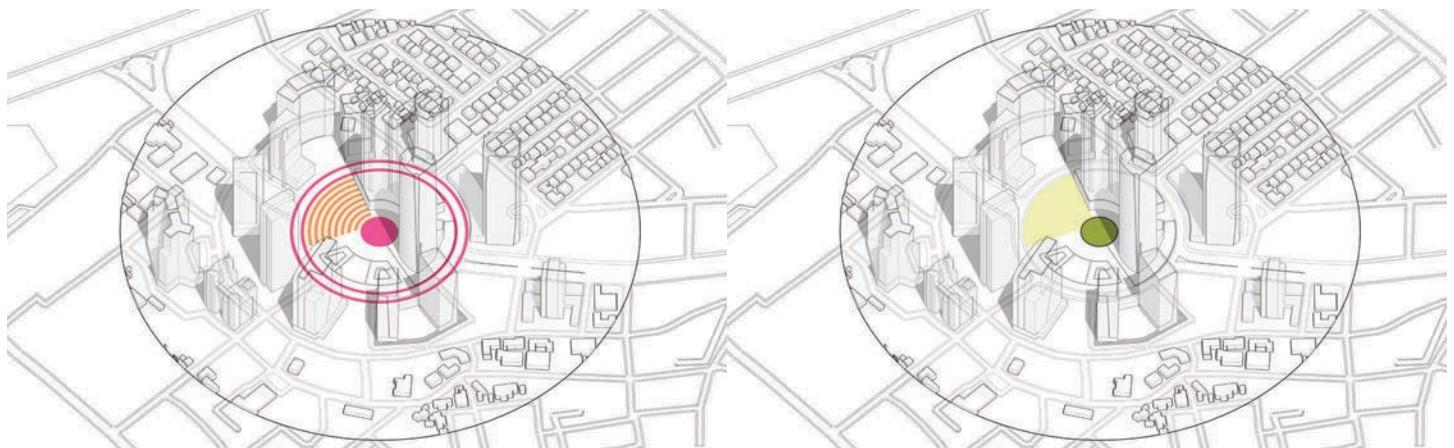
Andrew Liu, AIA (Lead)  
 Rey Elliot Gabriel; Ma. Angelica Gonzales;  
 Emilio Ella; Paula Perlado

**KEY CONTRIBUTIONS**

Design & Planning of 2/5 schemes;  
 Development of Urban Concept; Conceptual Write-up (all schemes); Design Diagrams (all schemes); Design Research; Context Analysis; Area Tabulations

Located at the heart of Jakarta's CBD, the project brief called for the development of an iconic 300-meter high mixed-use tower that integrates four programs - retail, office, hotel, and serviced apartments. Part of the core of a circumferential development, the project brief also asked the team to integrate the public level by including the central open area into the design proposal.

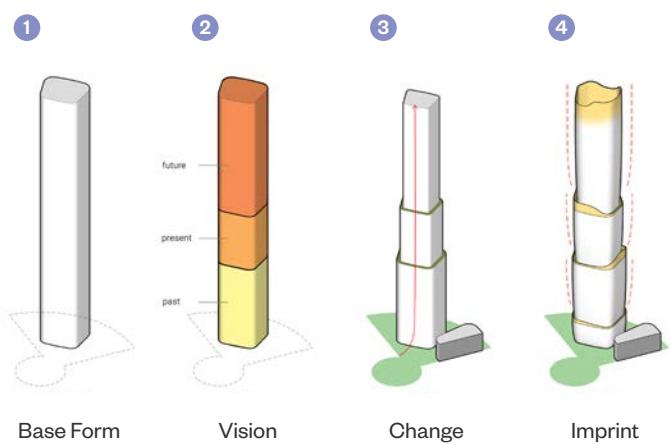
The brief resulted into a concept presentation that included five design schemes. With the client's vision of an iconic tower - the highest in the client's estate - the team developed options reflective of Indonesian culture, with the idea being a landmark project not just for the client and for the city. The proposal also presented an urban concept that aimed to activate the public sphere, with the ground level opening up potentials for greater access and interactivity for the public - providing the site's surrounding context a much needed pedestrian experience.

**Urban Concept - MK Pulse**

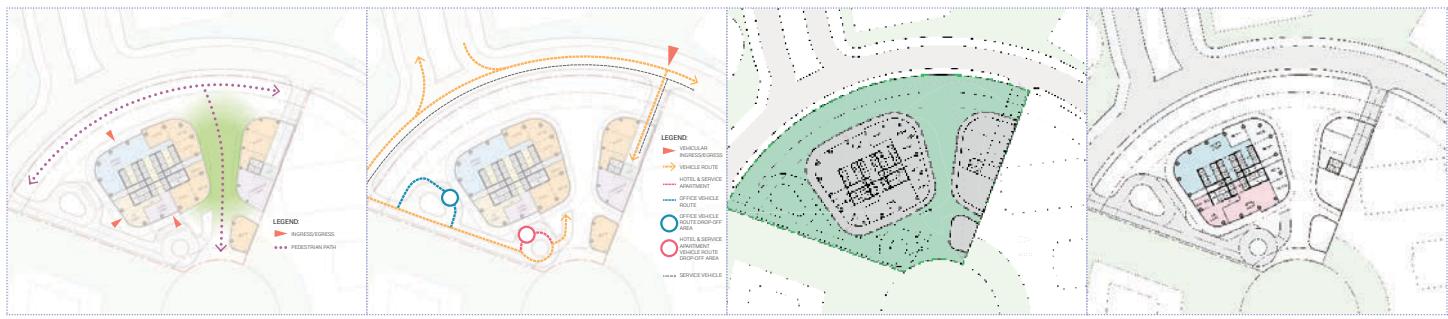
Given Jakarta's highly fraught history with terror, most high-rise developments around the site area have shunned their podium levels from the public realm and streetscape - cutting their presence, hindering the potential for dynamic pedestrian opportunities. Provided with the liberty of utilizing the park core, the design took the opportunity of reinvigorating the pedestrian life throughout the area by welcoming public activity at the ground level and enabling a sense of porous access from the exterior street scape to the core park via the project's porous ground level treatment.



Rendering by Visualization Consultant

**Monoliths of Heritage**

Conceived as a monument to Jakarta's narrative and identity, the design is composed of three artifact volumes representing Past, Present, and Future. Anchored in Indonesia's historical context and imagery, the abstracted composition is inspired by the nation's unique and layered archaeological and cultural legacy - a celebration of its historical foundations - from prehistoric megaliths to Majapahit terracottas. The concept translates to a stacked composition of varying heights and scales. The form conveys a progression amongst three temporal masses, denoting a chronological transition from its past towards its future.

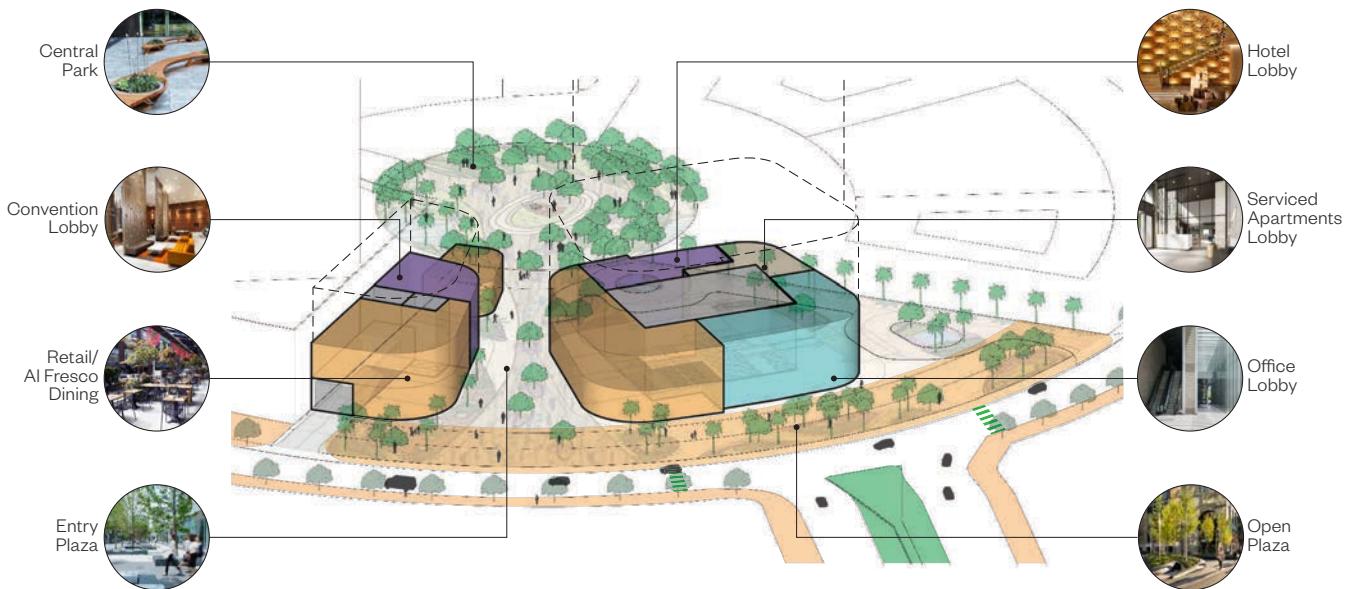
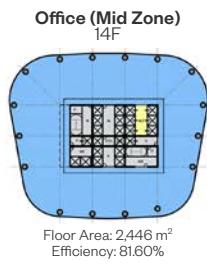
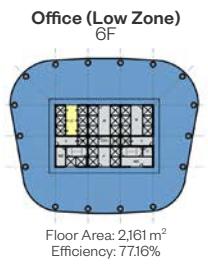
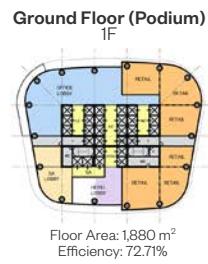
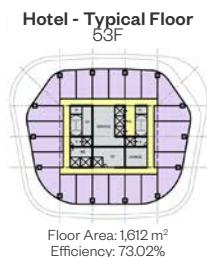
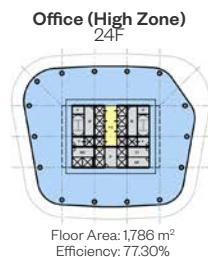
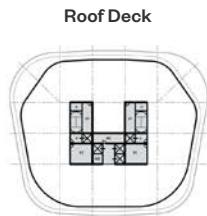
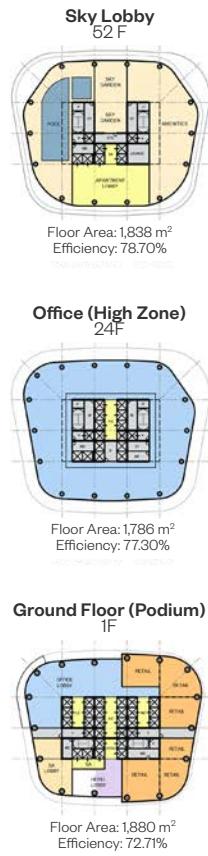
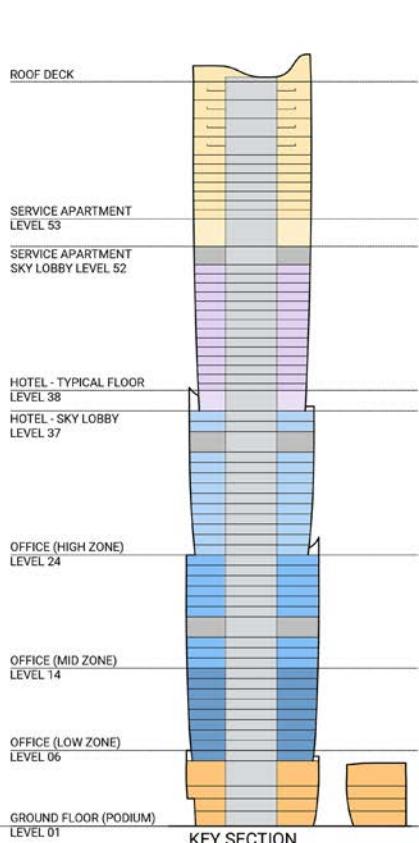


Pedestrian Diagram

Vehicular Access Diagram

Green Area Coverage

Site Area Coverage





# SOM TALL BUILDINGS COLLABORATORY

## Academic Work

Tall Buildings   Mixed-Use   Work + Play

### DESIGN TEAM

Rey Elliot Gabriel, MS ARCH  
Gabrielle Favro, MS ARCE  
Robert Hardwick, MS ARCE

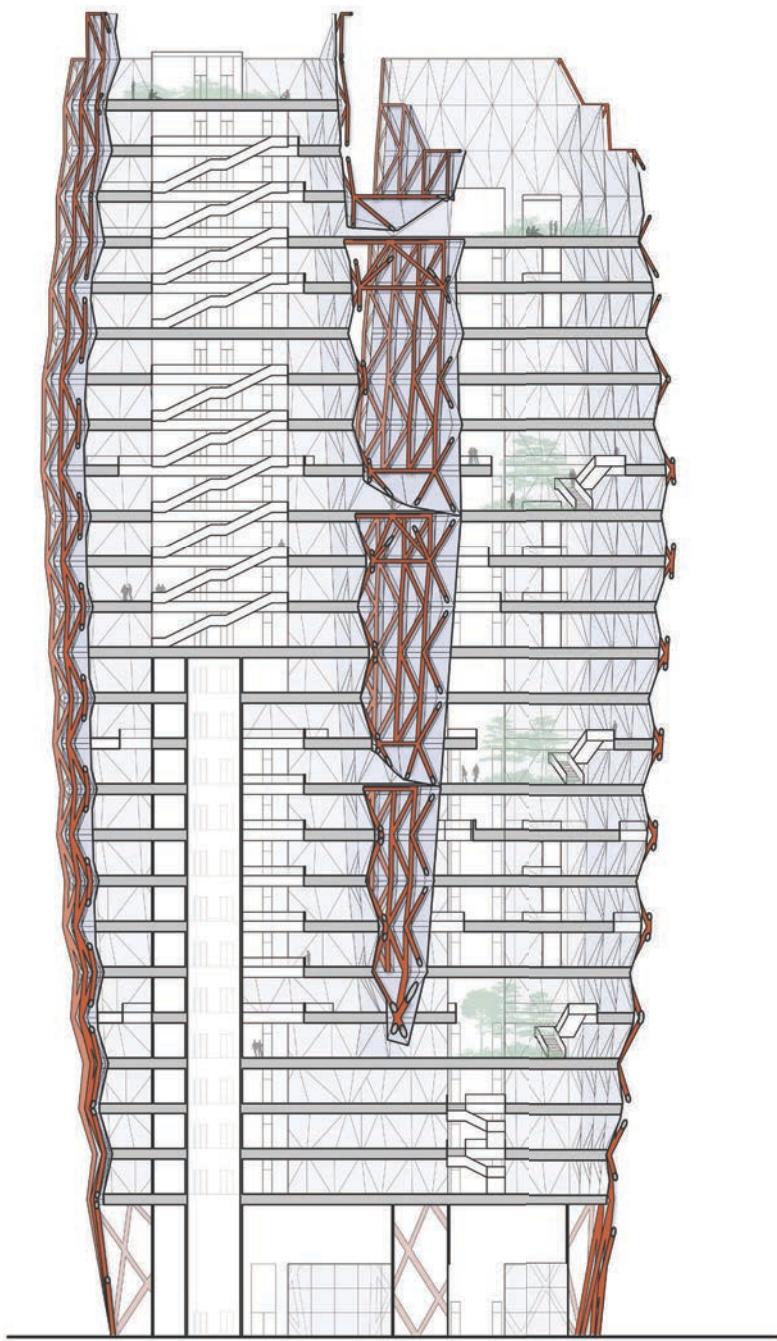
### KEY CONTRIBUTIONS

Form Finding, 3D Modeling, Renderings  
Spatial Planning, Functional Programming,  
Architectural Diagrams & Drawings

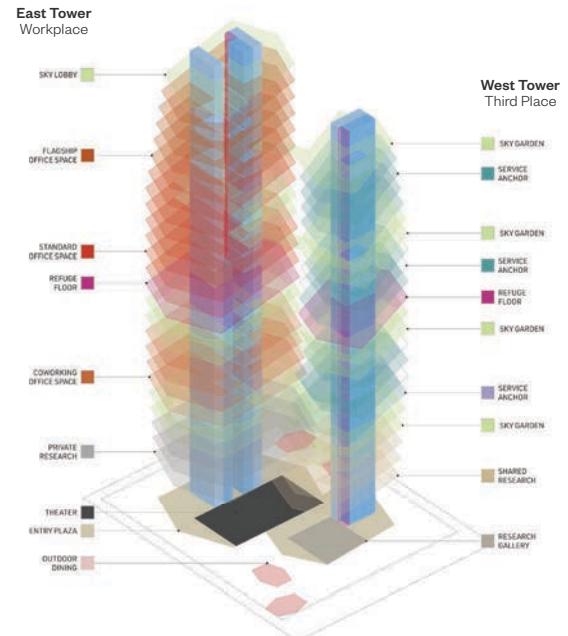
With two interconnected towers supported by a diagrid exoskeleton, Symb(ii), sited in the Potrero Power Station Redevelopment in SF, takes inspiration from the kelp-otter relationship in the Pacific. Reflecting a shift in how we work, the design pays careful attention on imagining inspired workspaces that foster community and engagement.

The east tower accommodates office and research spaces, while the west is established as a third place, providing inviting spaces for people to spend their time in. Sky bridges and sky gardens connect the two, allowing stunning views of the San Francisco city skyline and bay. In welcoming a variety of uses, the towers foster community both among workers and the wider neighborhood.

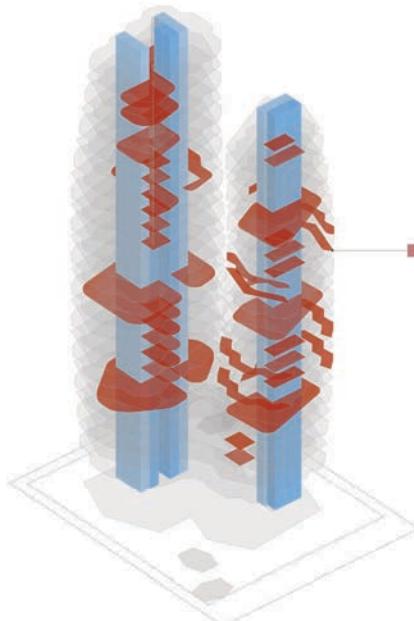
The design celebrates the surrounding context by using architecturally exposed structural steel in corten finish. The diagrid system provides both gravity and lateral support without relying on a central core for stability. This system allows for a formal twist gesture that redirects the western winds, maximizes views with angular floor plates, and provides column-free interiors. The diagrid structure is constructed using standard-length steel pipes and a suite of casted steel nodes.



Section



Program Diagram



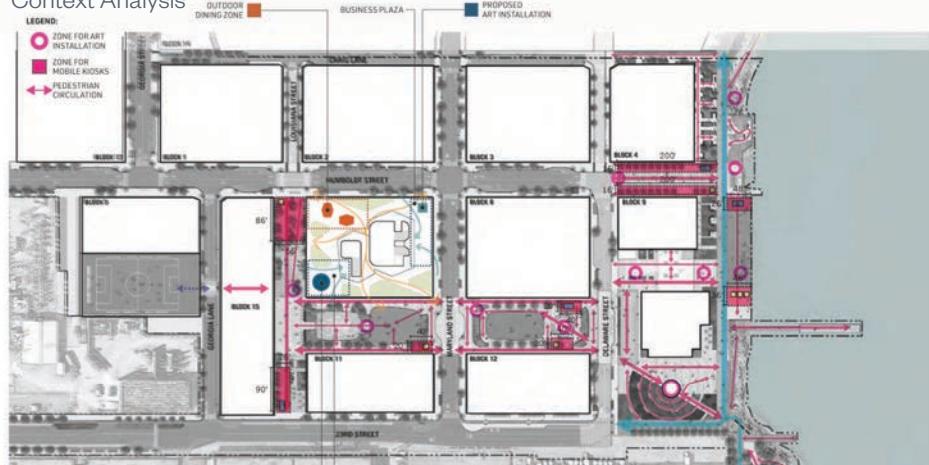
Carve Out Diagram



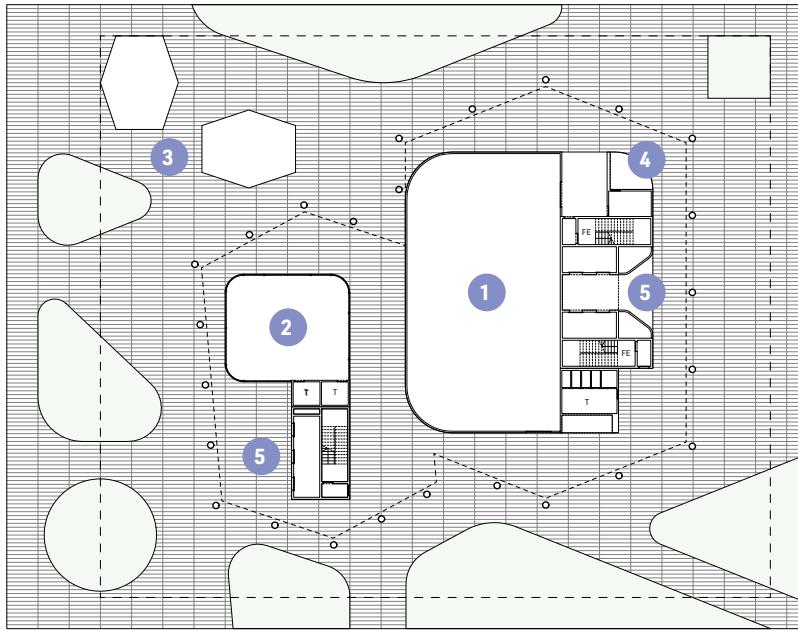
### Legend

- 1** Theater
- 2** Research Gallery
- 3** Outdoor Dining
- 4** Front Desk
- 5** Elevator Lobby
- 6** Standard Office Space
- 7** Recreation Center

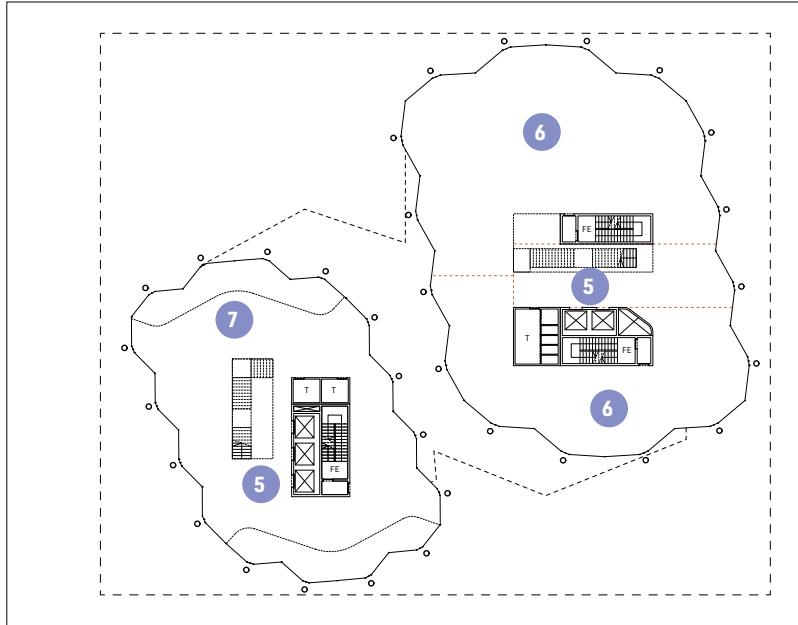
### Context Analysis



### Ground Floor Plan

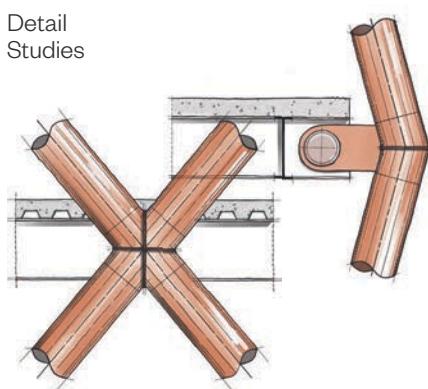


### Mid-Level Floor Plan

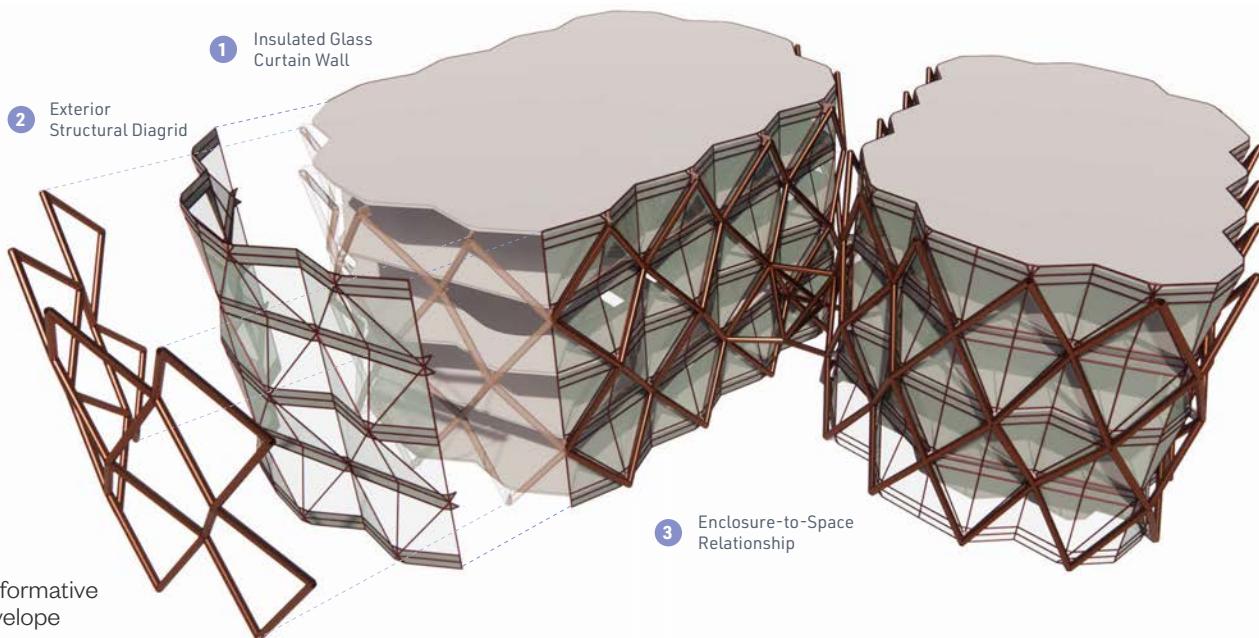




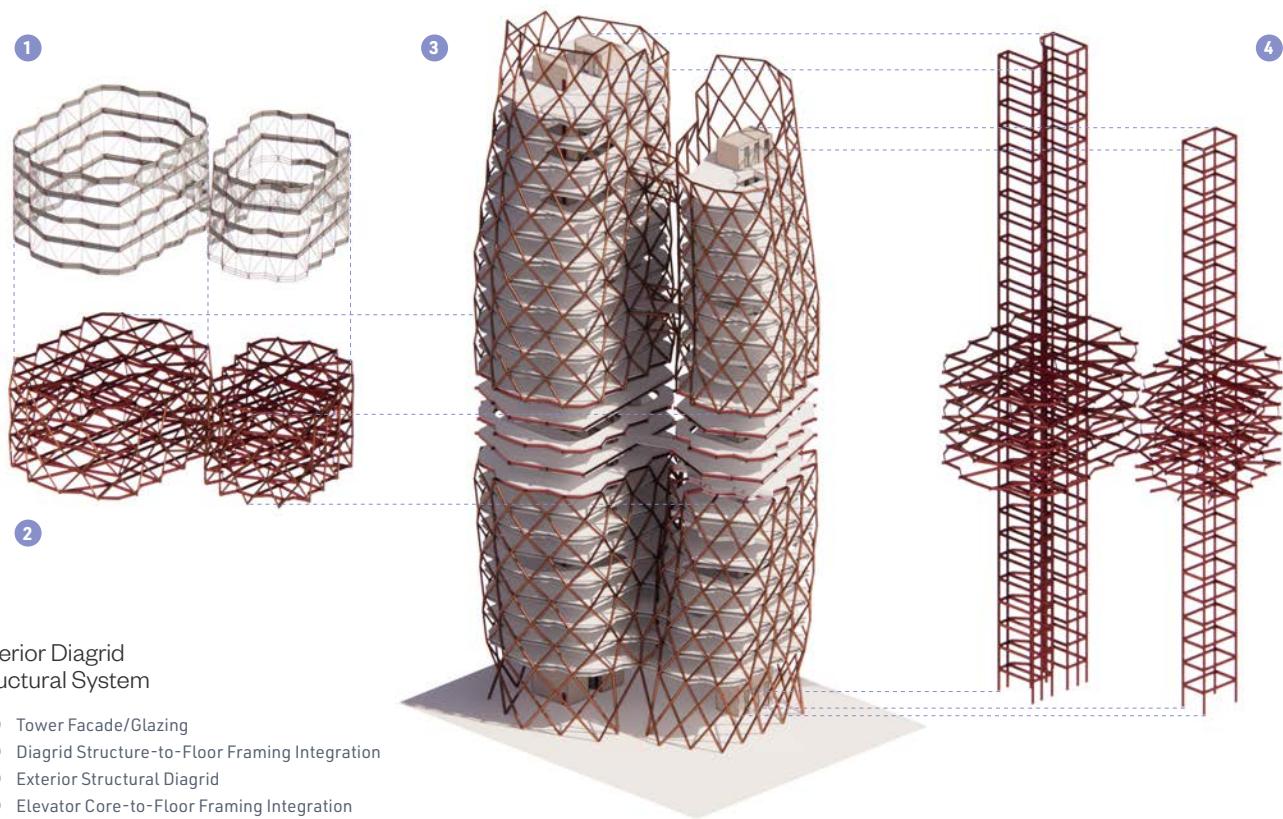
Study Model



The diagrid system provides both gravity and lateral support without relying on a central core for stability. This system also allows for a formal twist gesture that redirects the western winds, maximizes views with angular floor plates, and provides column-free interiors. The diagrid structure uses standard-length steel pipes enjoined by a suite of casted steel nodes.

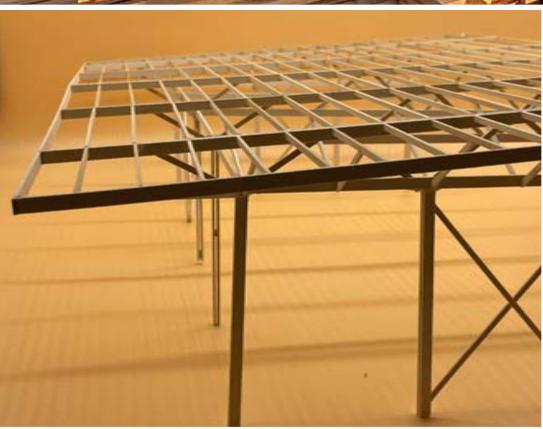


Performative Envelope



Exterior Diagrid Structural System

- ① Tower Facade/Glazing
- ② Diagrid Structure-to-Floor Framing Integration
- ③ Exterior Structural Diagrid
- ④ Elevator Core-to-Floor Framing Integration



# TANZANIA DESIGN + BUILD STUDIO

## Academic Work

Public Interest   Social Good   Civic

### DESIGN + BUILD TEAM

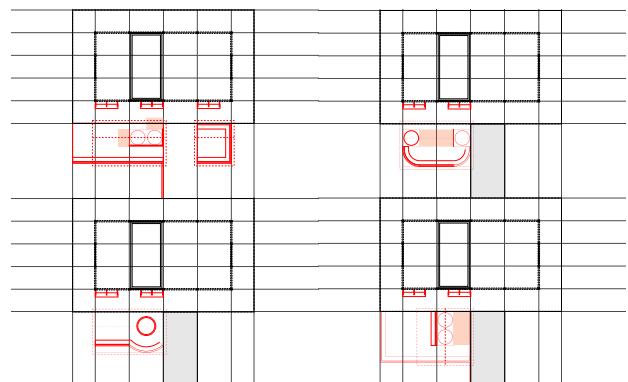
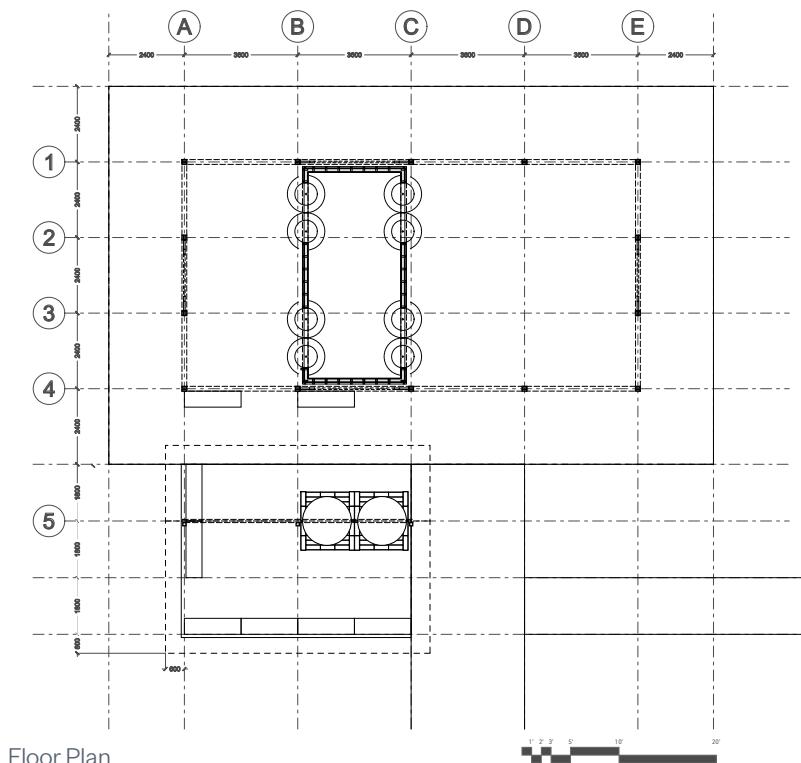
Rey Elliot Gabriel; Julia Clough; Salim Niazi;  
Hannah Cho; Ben Stewart; Ian McConnell;  
Matthew Chung

### KEY CONTRIBUTIONS

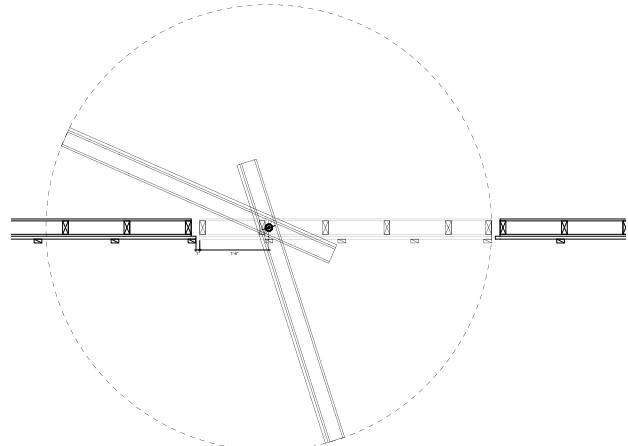
Architectural Design, Construction Drawings,  
Furniture Design, Prototyping & Detailing

The Same' Polytechnic College is a vocational training institution in the United Republic of Tanzania currently under construction. It aims to provide educational opportunities for Tanzanians with the goal of increasing human capital. The Tanzania Design + Build is a studio that regularly develops and constructs additions and improvements on the site.

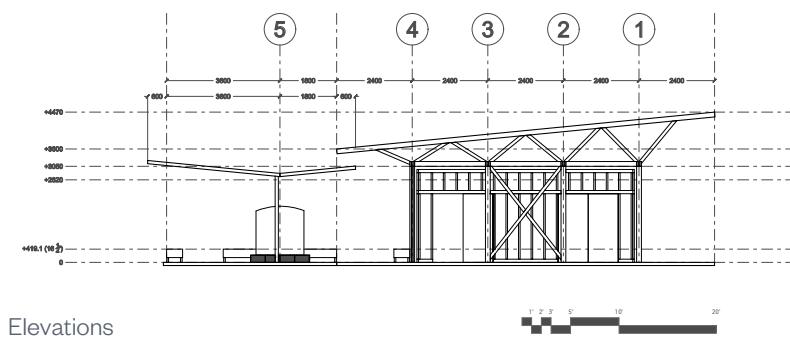
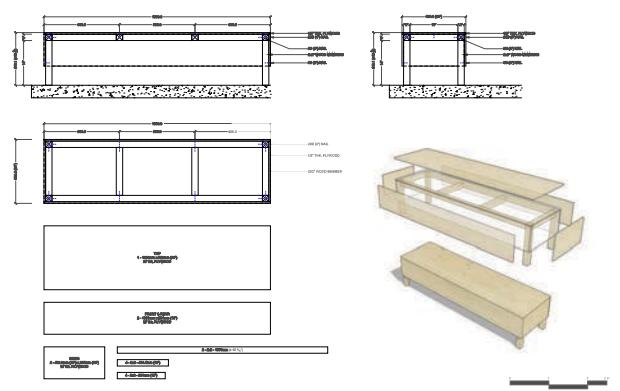
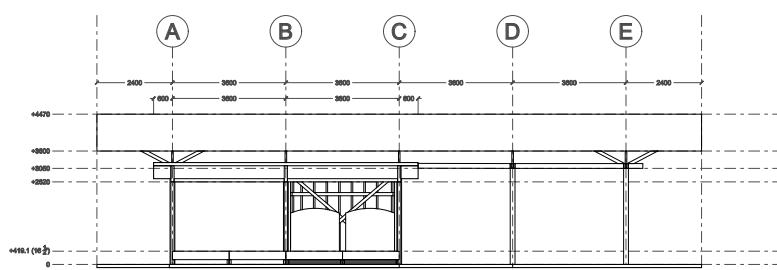
The 2023 edition of the studio called for the development of a facade system for the existing roof canopy that can foster indoor-outdoor functions. It also called for the development of a rainwater harvesting structure that can be used by the community. The primary approach used by the designers is to develop spaces that affords a variety of conditions. This included the development of pivot partitions that allow enclosed spaces to open up. The rainwater harvesting station was also designed as place of socialization, developing an engaging space and affording modular furniture. The design-build studio focused primarily on prototyping and iterative approaches into the design. High level of constraints were set, highly considering the construction material culture and methodologies in Same, Tanzania. The constraints set then allowed for creative approach using simple materials, innovating with local technologies in mind.



Rainwater Pavilion Studies



Pivot Door Detail



Elevations

1' 2' 3' 5' 10' 20'

Furniture Detail

# CHENGDU RESIDENTIAL DEVELOPMENT

Professional Work CALLISORTKL

Tall Buildings

Residential

Luxury



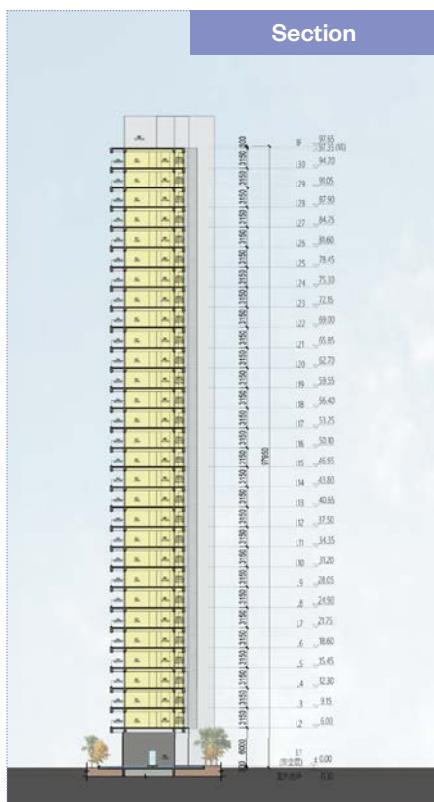
This project has completed construction as of January 2022.

## DESIGN TEAM

Andrew Liu, AIA (Lead)  
Rey Elliot Gabriel; Ma. Angelica Gonzales;  
John Philip Cosme; Andre Oliver Perez;  
Michael Xavier Tizcon; Greg Khoo

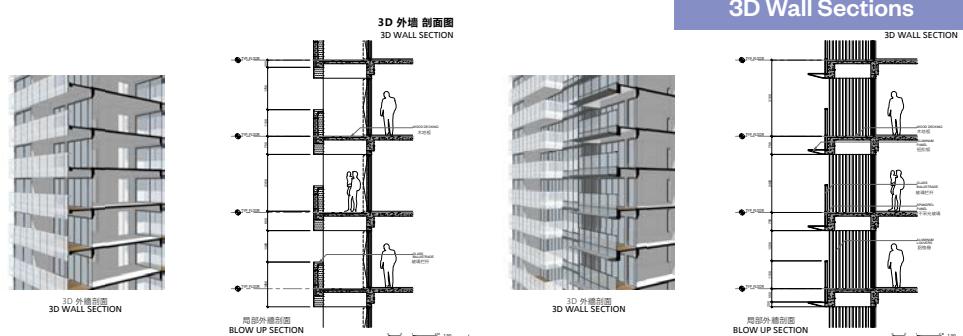
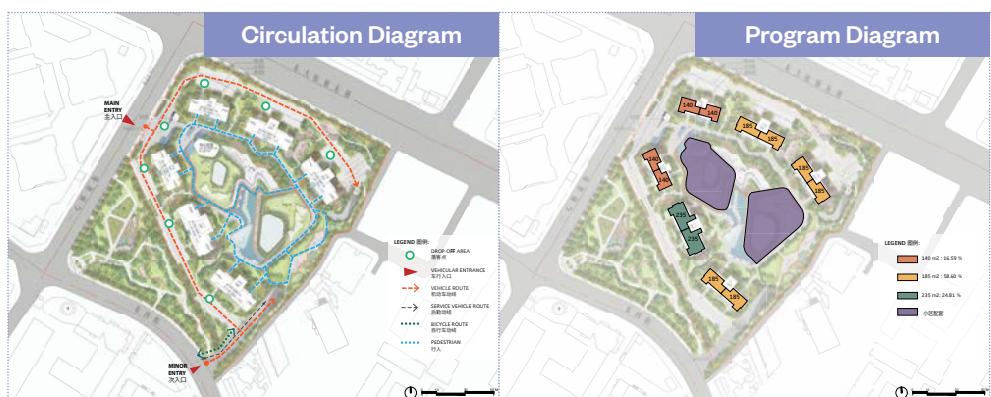
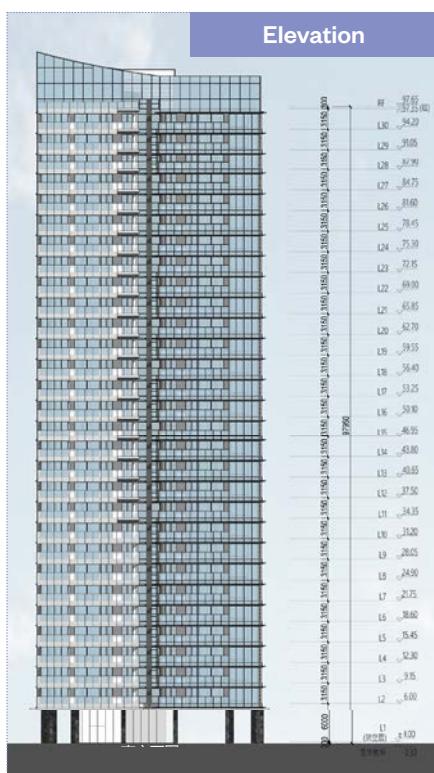
## KEY CONTRIBUTIONS

Schematic Design Drawings, Design Research, Context Analysis, 3D Modeling, Presentation Design



Focusing on a concept of compact vertical neighborhoods, the project is planned and designed as a series of six residential towers arranged at cascading heights. The towers are strategically positioned on the site to gravitate towards a central amenity park. Crafted as an urban oasis, the approach addresses and responds to the high density and fine grain of the surrounding context.

Flanked by higher towers and low-rise residential neighborhoods that offer uninviting views, the design reorients the proposed community towards a central park by which the towers, users, and all activities can gravitate. To preserve a greater area for landscape, the amenity component is carved from the ground level. Water features are integrated to the landscape to introduce an interactive and inviting element to the main social component.



# FEASIBILITY STUDY OF HOUSING DEV'T.

## Academic Work

Mixed-Use    Code Analysis    Business Dev.

## DESIGN + BUILD TEAM

Rey Elliot Gabriel; Ruishan Feng; Martin Brem

## KEY CONTRIBUTIONS

Module Development, Form Finding, Installation, Documentation

The brief called for the analysis and programmatic development of an actual vacant parcel in the City of San Luis Obispo, with the goal of proposing a development that actualizes a site's full potential based on code and zoning regulations, as well as a conceptual premise.

Located in 251 Pacific St. - a unique corner lot surrounded by service commercial, F&B and specialty recreational retail, the development connects with the community by developing an engaging commercial presence focused on dining and entertainment. Affordable units are integrated to the residential levels to allow greater development potential. A terraced mass was conceived as response to the regulatory limits while providing users high quality of life through generous balconies that come with the overall massing.

## RISE AT THE PACIFIC

### TERRACED BALCONIES



### DINING ALLEY



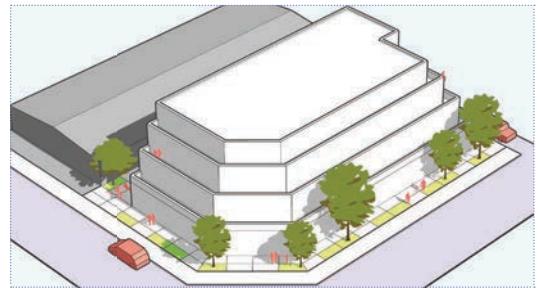
### FOOD HALL



### RECREATIONAL ANCHOR



Discover (slo)w living at Rise at the Pacific. Unwind in a trendy food hall, have some fun in an arcade, and savor moments in our inviting alfresco areas - whether in the dining alley or terraced balconies. Make your mark and welcome home.



## DEVELOPMENT CONTROLS

C-S-MU Zone Classification Service Commercial - Mixed-Use

Mixed-use overlay means the mix of residential and non-residential units is required, whereas it would be at the owner's decision otherwise. Mixed-use (MU) overlay zone to a property may include establishing a higher height limit than the underlying zone to effectively accommodate a residential component.

Source: SLO Municipal Code 17.58.010

Lot Area: 0.35 acres (15246.0 ft<sup>2</sup>)

Max Residential Density<sup>a</sup>: 24 DUs/acre  
24 DUs/acre x 0.35 acres = 8.4 DUs

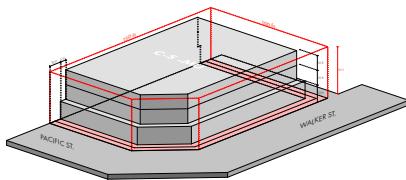
Max Building Height<sup>b</sup>: 35 ft.  
12 ft. height for ground floor  
10 ft. height for the other floors

Maximum Lot Coverage: 76%  
75% of 15246.0 ft<sup>2</sup> = 11434.5 ft<sup>2</sup> max

Maximum Floor Area Ratio<sup>c</sup>: 1.5  
1.5 x 15246.0 ft<sup>2</sup> = 22869 ft<sup>2</sup> max  
Source: SLO Municipal Code 17.36.020

Setbacks: Corner Lot - Street Side  
5 ft. setback for parking lots and signs  
10 ft. setback for heights ≤ 20 ft.  
15 ft. setback for heights > 20 ft.

Setbacks: Interior Side and Rear  
No setbacks unless adjacent to zone  
with min. setback requirements



## AFFORDABLE HOUSING INCENTIVES

Density bonus for percentage of low-income units

50% density bonus with 24% dedicated low-income units  
Source: SLO Municipal Code 17.140.040

### Standard incentives for mixed-use projects

Up to 20% increase in maximum allowable floor area ratio

Up to 20% increase in maximum height requirements

Up to 20% reduction in minimum parking requirements

Source: SLO Municipal Code 17.140.050

California Government Code Title 7 Sec. 65915.7

Max Residential Density<sup>b</sup> (w/ incentives): 12.6 from 8.4

Max Building Height<sup>b</sup> (w/ incentives): 42 ft. from 35 ft.  
4 storeys

Max Floor Area Ratio<sup>b</sup> (w/ incentives): 1.8 from 1.5  
27,442.8 ft<sup>2</sup>

## RESIDENTIAL UNIT MIX

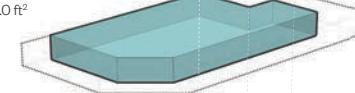
Studio Unit	5 (2 low-income units)	2.5 DUs
2BR Unit	7 (2 low-income units)	7.0 DUs
	2	3.0 DUs
<b>TOTAL</b>	<b>14 Units</b>	<b>12.5 DUs</b>
		Source: SLO Municipal Code 17.700.040

## PARKING CALCULATIONS

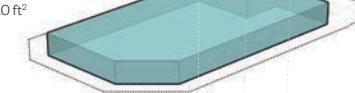
Multi-Unit Residential	20 BRs @ 0.75/BR	15.0
Guest	14 units @ 1/5 units	3.0
Restaurant	3000 ft <sup>2</sup> @ 1/100 ft <sup>2</sup>	30.0
Commercial	4900 ft <sup>2</sup> @ 1/200 ft <sup>2</sup>	24.5
Initial Total		72.5
<b>TOTAL</b>	w/ 20% reduction incentive	<b>58.0</b>

## DEVELOPMENT PROGRAM

### 4F Residential (10 ft.)



### 3F Residential (10 ft.)

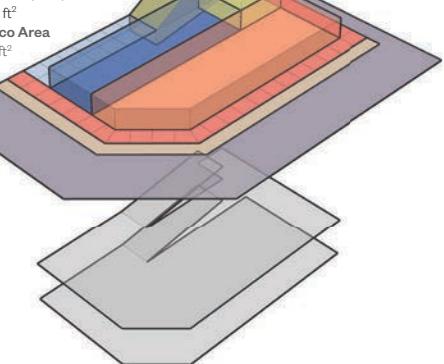


### 2F Residential (10 ft.)



Circulation  
1900.00 ft<sup>2</sup>  
Commercial  
Recreation (12 ft.)  
4900.00 ft<sup>2</sup>

### Restaurant (12 ft.)



## PROFORMA ANALYSIS

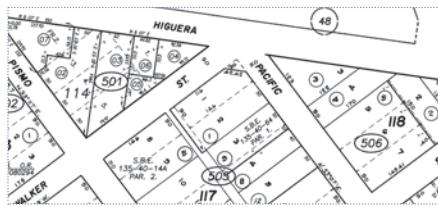
Expenses	Sales	Overall Profit/Loss
Site Costs: \$ 1,121,858.00	Commercial: \$ 5,487,000.00	Net Revenue: \$ 13,740,800.00
Soft Costs: \$ 927,290.00	Market Units: \$ 8,323,000.00	Net Expenses: \$ 11,885,605.00
Hard Costs: \$ 8,197,000.00	Affordable: \$ 654,000.00	
Financing: \$ 1,638,957.00	Broker Fees: \$ -723,000.00	<b>NET PROFIT \$ 1,855,195.00</b>
<b>TOTAL \$ 11,885,605.00</b>	<b>TOTAL \$ 13,740,800.00</b>	<b>GROSS REVENUE 13.50%</b>

### Parking Requirements

58 x 400 ft<sup>2</sup> = 23200.0 ft<sup>2</sup>  
2 x Basement Parking (9 ft.)  
23600.0 ft<sup>2</sup> (2 x 11800.00 ft<sup>2</sup>)

### TOTAL LOT COVERAGE

±10008.0 ft<sup>2</sup> (± 66%)  
**TOTAL FLOOR AREA**  
± 27390.0 ft<sup>2</sup> (< 27442.8 ft<sup>2</sup>)



# PRESENTATIONS & PITCH DECKS

Professional Work **CALLISONRTKL**  
 Marketing   Communications   Representation

## KEY EXPLORATIONS

Research, Presentation Design, Marketing

## Designing for the New Normal

**Master Suite 1**  
 A en suite master bedroom with corner views, a walk-in closet, and sitting area.

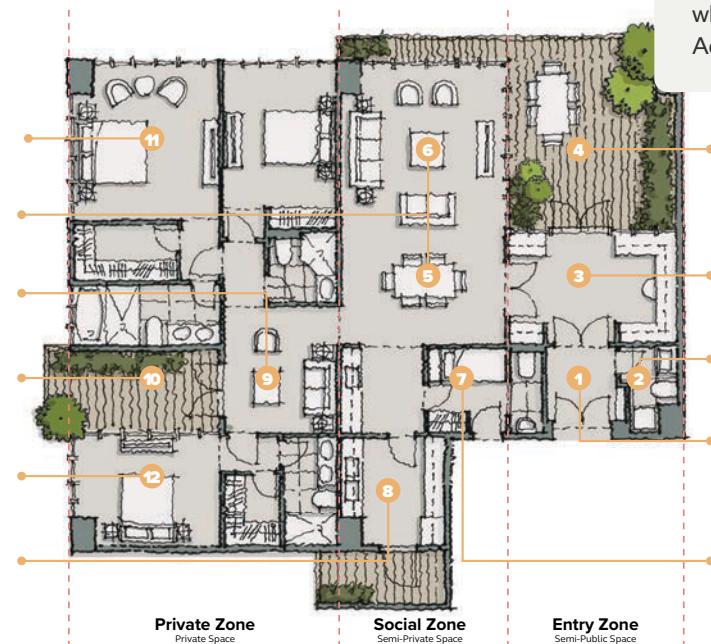
**Social Area**  
 A centrally-located living and dining area that is integrated to the main outdoor deck and accessible from all key areas

**Flexible Space**  
 A central flexible area accommodating the private zone, capable of hosting a variety of uses.

**Garden Balcony**  
 An outdoor area dedicated for use of the unit's residents

**Master Suite 2**  
 A en suite bedroom adjacent to the unit's garden balcony. It comes with a walk-in closet.

**Open & Connected Kitchen**  
 A well-equipped galley kitchen that is easily accessible to the unit's social space



### Presentation Sketch

Worked on the unit layout sketch, which I then post-processed in Adobe Photoshop.

#### Outdoor Deck

Large outdoor area fostering indoor-outdoor integration, can accommodate a number of guests for events or parties

#### Apartment Foyer

Can house multiple functions (e.g. home library, office, or even an indoor garden)

#### Entry Powder Room

A powder room for guests, it can also serve immediate washing functions.

#### Entry Vestibule

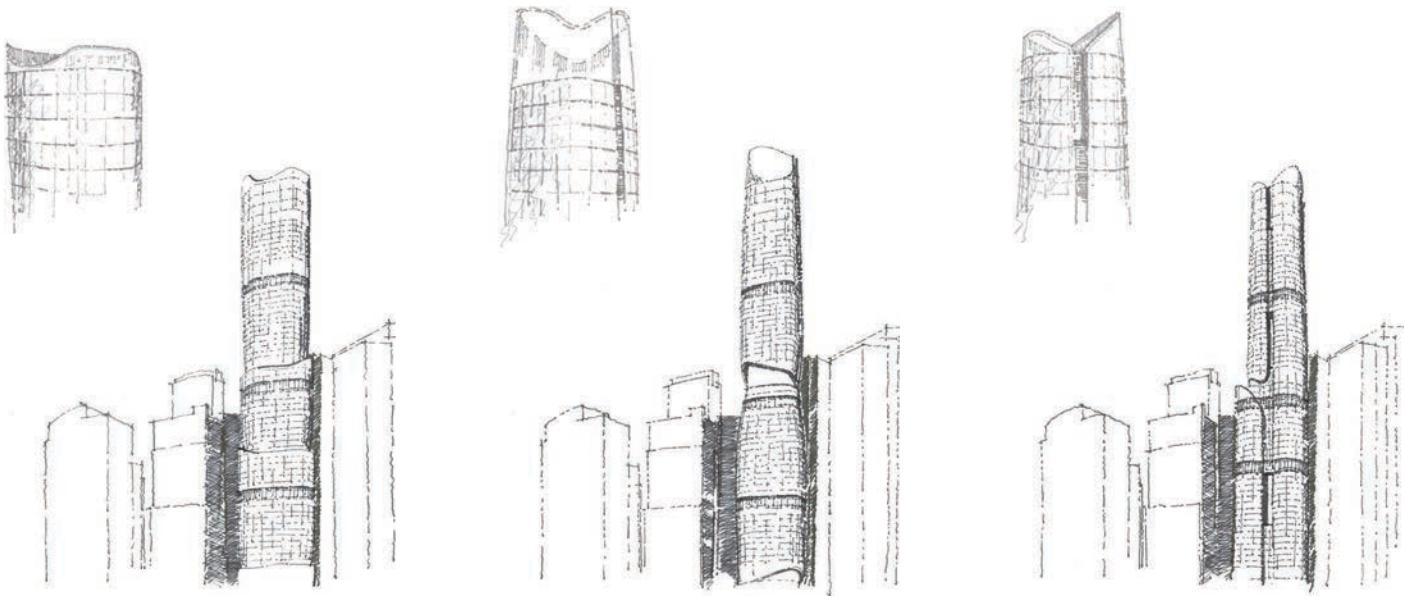
Unit Buffer to Public Zone  
Disinfection and Delivery Receiving Area

#### Maid's Quarters

Service quarters with dedicated service entry and own bathroom

### Iteration Sketches

A series of sketches that visually reflect the various iterations for the Jakarta Mixed-Use project



**Thank you for taking a  
look at my portfolio! I look  
forward to discussing  
opportunities with you.**