JOSHUA ADAM
PARKER

PORT-
FOLIO

~~2007 - 2017~~

M. ARCH., SYRACUSE UNIVERSITY SCHOOL OF ARCHITECTURE (SUSOA)

B.S. ELECTRICAL ENGINEERING, UNIVERSITY OF WASHINGTON (UW)

GSS CERTIFICATION, INSTITUTE OF ADVANCED ARCHITECTURE OF CATALONIA (IAAC)

CV

EXPERIENCE

2015-17
SENIOR ARCHITECT, RESEARCHER
OPEN ARCHITECTURE, BEIJING

Built in-house design tools and CAD plugins using Python and Java. Constructed a form-finding pipeline in Grasshopper for structural optimization of subterranean Art Museum in Qinhuangdao. Developed paneling algorithm and design explorer utilizing constraint satisfaction (CSP) methods. Implemented a set of evolutionary algorithms in RhinoScript for biologically-inspired mass housing research project.

2014-15
SENIOR ARCHITECTURAL DESIGNER
AEDAS, BEIJING

Developed a 3D massing tool to optimize shape and orientation of building elements based on environmental and building data. Wrote automation scripts in Python to facilitate integrated and continuous workflows. Delivered specifications, drawings and documentation on award-winning projects and international competitions. Provided senior-level project management and creative coordination of multi-disciplinary teams.

2009-14
COMPUTATIONAL DESIGN CONSULTANT
INGAME, NODE, OPEN ARCHITECTURE, ETC.

Built a standalone Java tool for Tsinghua University Energy Center that generates 3D spatial configurations based on occupancy, usage and daylight patterns. Developed a set of embedded Python scripts for rapid design iteration of modular green roof system used in design of a zero-energy airship hanger in Anhui. Developed a Java utility using Processing libraries for converting imported audio files into a formal system of interlocking volumes for Baotou residential tower.

2008-09
FRONT-END DEVELOPER
FREELANCE, SHENZHEN/HONG KONG/BEIJING

Designed/developed openarch.com, a mobile-first bilingual website built with Drupal 8, JavaScript, Twig, Sass, and Gulp. Implemented front-end of flash-based web application for building interactive data-rich presentations. Prototyped a semantic research platform with Semantic MediaWiki templating functions, CSS, and HTML, which supports collaborative publication, annotation and curation of written works.

2004-07
GRADUATE TEACHING ASSISTANT
SYRACUSE UNIVERSITY, SYRACUSE, NY

Led tutorial sessions and assisted with instruction of graduate and undergraduate level courses including Digital Design and Fabrication (CAD/CAM), Structures I & II, and Advanced Building Systems (ABS).

EDUCATION

UNIVERSITY OF WASHINGTON
B.S. IN ELECTRICAL ENGINEERING

Recipient of Outstanding Thesis Prize for work in embedded systems. Coursework included OOP in C++, Algorithms in C, Computational Theory and Complexity, Computer Organization, Digital Circuits, Embedded Systems, Calculus, Probability, Set Theory, Discrete Mathmatics. In-major GPA: 3.5.

SYRACUSE UNIVERSITY
MASTER OF ARCHITECTURE (MARCH I)

Recipient of Graduate Research & Creative Work Grant, Robert W. Cutler Travel Scholarship, and DIPA Travel Grant. Contributed to (De)Central Park, 2nd place entry in Off the Wall Competition. Participated in Florence Program and Architecture and Urbanism in China. Specialized in Computational Design and Interaction.

CONTINUED EDUCATION

Design Computing (IaaC GSS Program), Javascript Design Patterns (Udacity), Adv. Software Construction in Java (MIT/edX), REST APIs with Flask and Python (Udemy), Python for Research (Harvard/edX), Artificial Inteligence* (Columbia / edX), Deep Learning*, Andrew Ng (deeplearning.ai/Standford/Coursera), etc.

ACADEMIC HONORS

Graduate Research & Creative Work Grant
Robert W. Cutler Travel Scholarship
DIPA Travel Grant
Off the Wall Competition, 2nd place*
SUSOA Graduate Merit Scholarship
GMC TA Scholarship(s)
UWEE Most Outstanding Senior Project
*contributing member of design team

TECHNOLOGIES

JavaScript, Vuejs, Vue-Router, Vuex, HTML, CSS, Sass, Gulp, npm, Webpack, Git, etc.

Python, Pytest, Virtualenv, Flask, MySQL, PostgreSQL, SQLAlchemy, JSON, REST APIs

Numpy, Pandas, Matplotlib, D3.js, P5.js, Anaconda,

Photoshop, Illustrator, Rhino, Grasshopper, RhinoScript, Autocad, Revit, Dynamo, Ecotect, Processing

Previous experience with Java. Actively learning C#.

PROJ-ECTS

2016

01
SEASIDE ARTSPACE, BEJING
senior architect and computational designer, OPEN Architecture

02
SKY CITY, PHASE 5, WUHAN
computational designer, OPEN Architecture

SHENZHEN NEW MUSEUM, SHENZHEN
senior architect and video editor, OPEN Architecture

03
OPENARCH.COM
web designer/developer, OPEN Architecture

2015

OPEN REACTION, CHICAGO ARCH. BIENNALE, CHICAGO
design/technical advisor for multimedia exhibition, OPEN Arch.

04
SOYEA SOFTWARE PARK, HANGZHOU
lead designer and project manager, Aedas

GUO FU SHACI CULTURAL PLAZA, CHONGQING
senior designer, Aedas

2014

TAICHUNG HIGHWEALTH OFFICE PROJECT, TAICHUNG
lead designer and project manager for concept phase, Aedas

MAOTIAN HECHUAN JIANBO CITY RENOVATION, CHONGQING
senior designer, Aedas

05
WEST COAST COMMERCE, HAIKOU
senior designer, Aedas

06
CHINA INVESTMENT SECURITIES PLAZA, SHENZHEN
senior designer, Aedas

2013

07
THREAD BARE, TOOL FOR NON-LINEAR PRESENTATION AND EXHIBITION
researcher, interaction designer, web developer

08
ARCHIVE ONE, SEMANTIC RESEARCH PLATFORM
researcher, interaction designer, web developer

2012

09
PROTO-HABITAT, COLLECTIVE HOUSING RESEARCH PROJECT
lead researcher, computational designer

10
ZHUHAI PORT PAVILION
lead architectural designer, computational designer

2011

NETWORK CITY, 22@, BARCELONA
researcher

2ND RING 2049 MOBILE THEATER, BEIJING
animator and video editor, OPEN Architecture

ENERGY CENTER, SHENZHEN
adv. design consultant and computational designer, OPEN Arch.

OPEN NATURE, SZHK BI-CITY BIENNALE, SHENZHEN
media artist and video editor, OPEN Architecture

11
UPLIFT AIRSHIP HANGER, AN HUI
lead designer, OPEN Architecture

NET DRAGON COMMUNE, CHANGLE
adv. design consultant for early concept stage, OPEN Arch.

12
JAZZ TOWERS, BAOTOU
facade consultant, computational designer, OPEN Architecture

LAGOS RESORT, LAGOS
facade consultant, computational designer, OPEN Architecture

2010

EXHIBITION PAVILION, BAOTOU
design consultant, OPEN Architecture

OPENARCH.COM
web design/developer, OPEN Architecture

JIAOMEN CITY CENTRAL, NANSHA
project designer, NODE Architecture Urbanism

GUANGXI MUSEUM, NANNING
project designer, NODE Architecture Urbanism

2009

EGONG VILLAGE RENOVATION, SHENZHEN
project designer, NODE Architecture Urbanism

SHENZHEN INTERNATIONAL SCHOOL, SHENZHEN
project designer, NODE Architecture Urbanism

YUANZHI CREATIVE PARK, SHENZHEN
project designer, NODE Architecture Urbanism

CHENJIACI PLAZA, GUANGZHOU
project designer, NODE Architecture Urbanism

YANGJIANG URBAN PLAN, YANGJIANG
project designer, NODE Architecture Urbanism

NANTOU PARK, GUANGZHOU
project designer, NODE Architecture Urbanism

2006

BETWEEN THOUGHTS, NEW ORLEANS
researcher, co-auther

CONFLUX FESTIVAL, BROOKLYN, NY
researcher, interaction designer

13
(DE)CENTRAL PARK, NEW YORK, NY
researcher, interaction designer

Below: High resolution tablet layouts. From left to right, project gallery, project listing, and project page..

Mobile-first responsive site for OPEN Architecture to showcase projects and publish multimedia, news and events. Site was built with Drupal 8, JavaScript, Twig, Sass, NPM and Gulp. All content generallized as relational nodes and cross-linked to related content by project type, date, tag, etc. Image handling as well as layout is fully responsive with 6 breakpoints for device optimized experiences with minimal compositions and careful use of white space and gridlines to acheive simple/clean layouts that don't get in the way of the content.

OPEN ARCH .COM

PROJECT SCOPE: OFFICE WEBSITE | COLLABORTORS: OPEN ARCHITECTURE, LI HU, WENJING HUANG | ROLE: WEB DESIGN / DEVELOPEMENT, UI/UX, INTERACTION DESIGN | CONTRIBUTION: DESIGN AND DEVELOPED WEBSITE WITH WEEKLY PROGRESS REVIEWS WITH LI HU AND WENJING.

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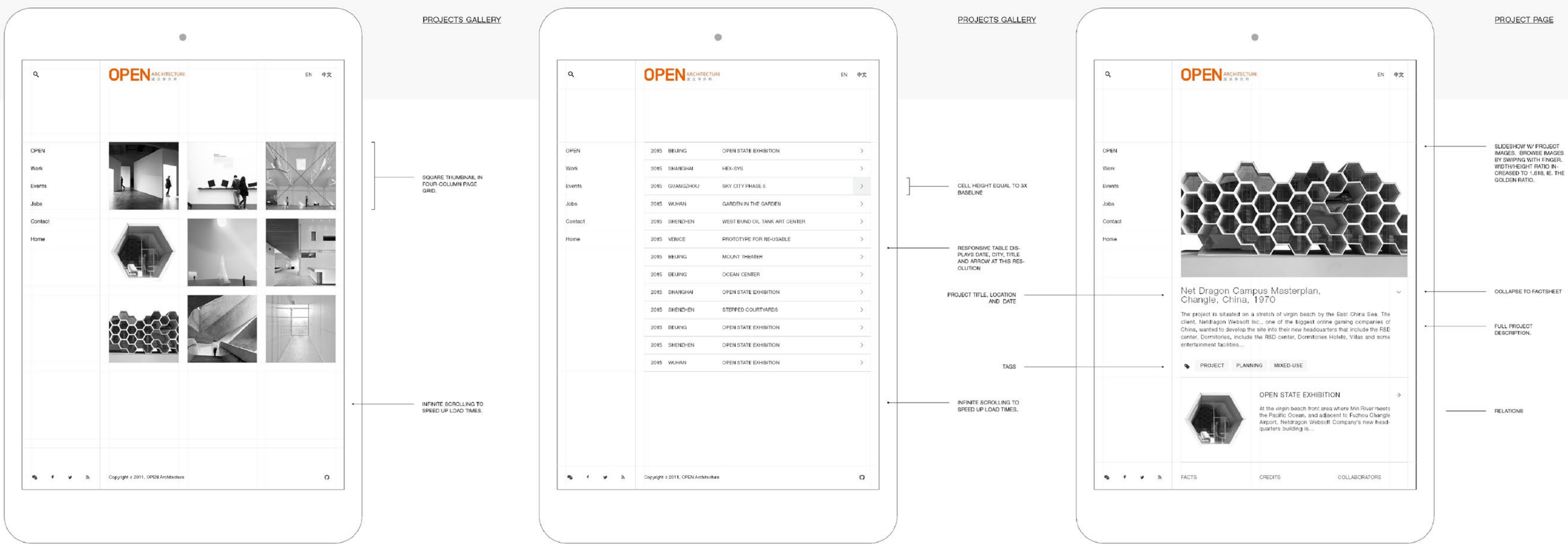
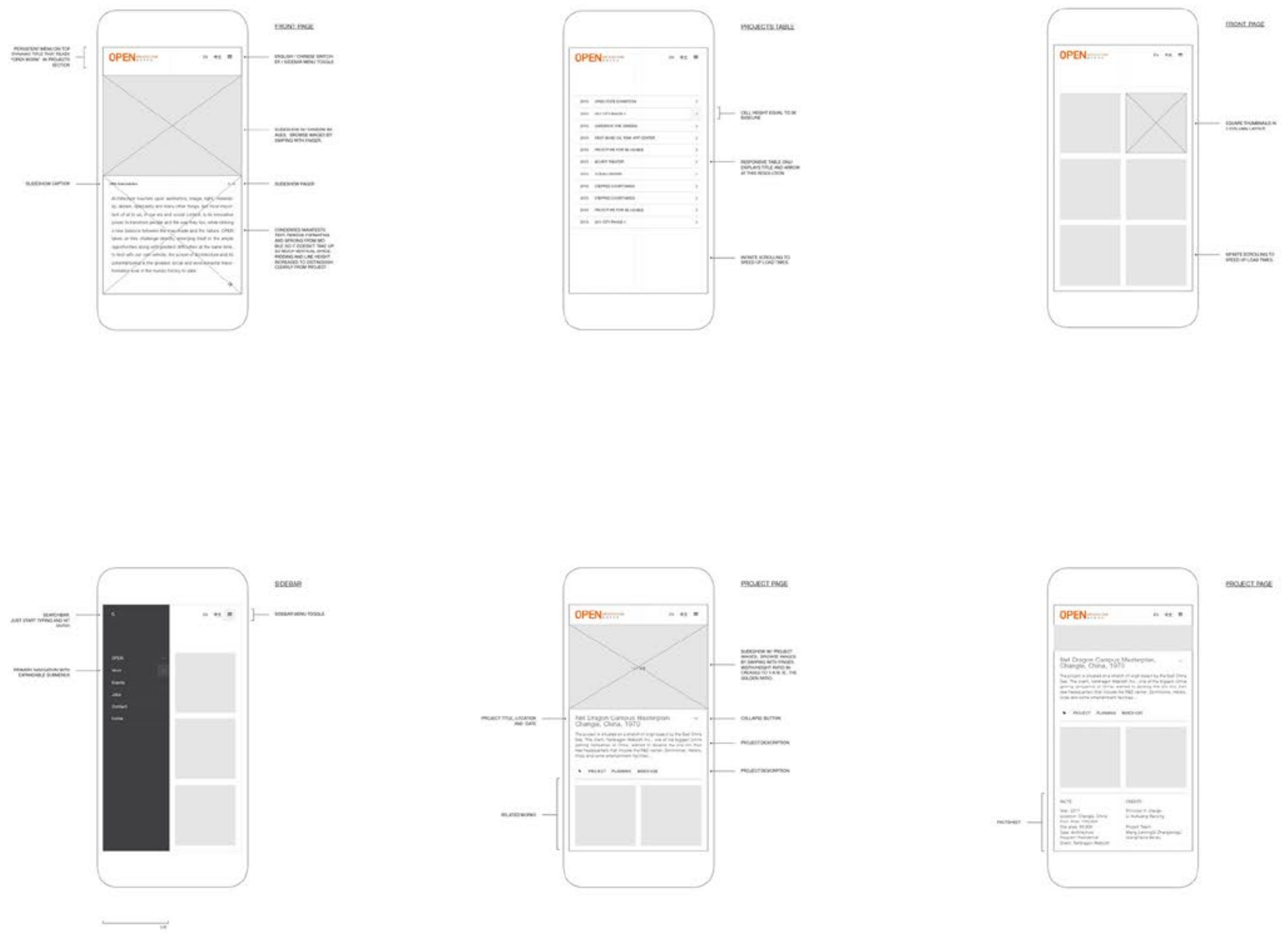
03

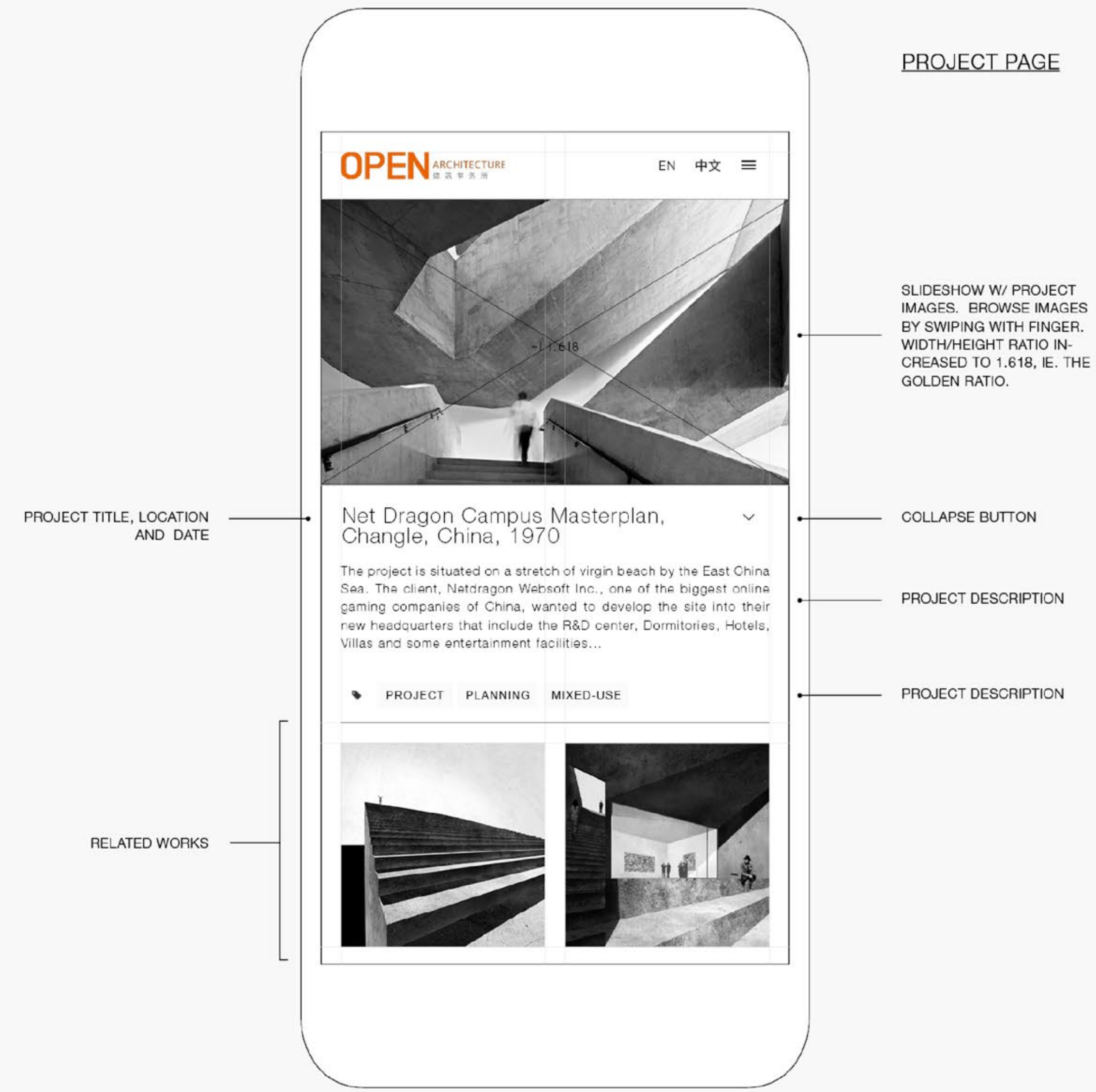


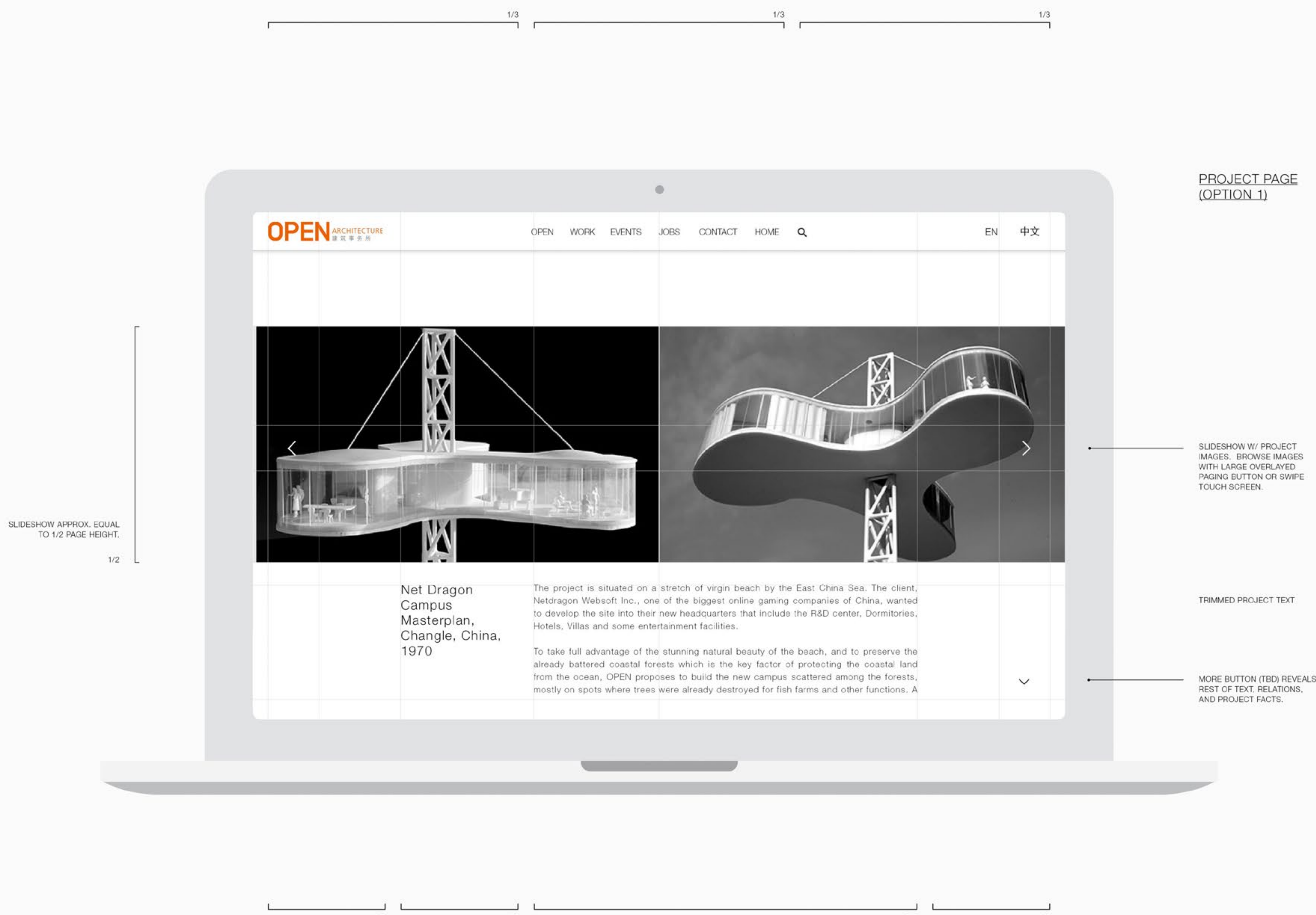


Typical project page, shown opposite, with gesture-enabled image slideshow that automatically goes fullscreen when device is rotated to landscape. Image handleing ishigh optimized to device resolution, loading minimum-sized image for sufficient quality. Slideshow is followed by project description, tags, and then relationed content. Smaller thumbnails and short description of content related by project below. At bottom, dynamicly generated lists of awards and related events, and finally a fact sheet, with project details, collaboration credits and team members listed by role. Menu button shown in upper right, but has moved to a lower right fixed position for improved ergonomics, while language switcher and night mode remain in the retractable title bar as shown.

Opposite: Project page shown with swipe-enabled slideshow, collapsable content, and related works.

Below: Mobile layouts.

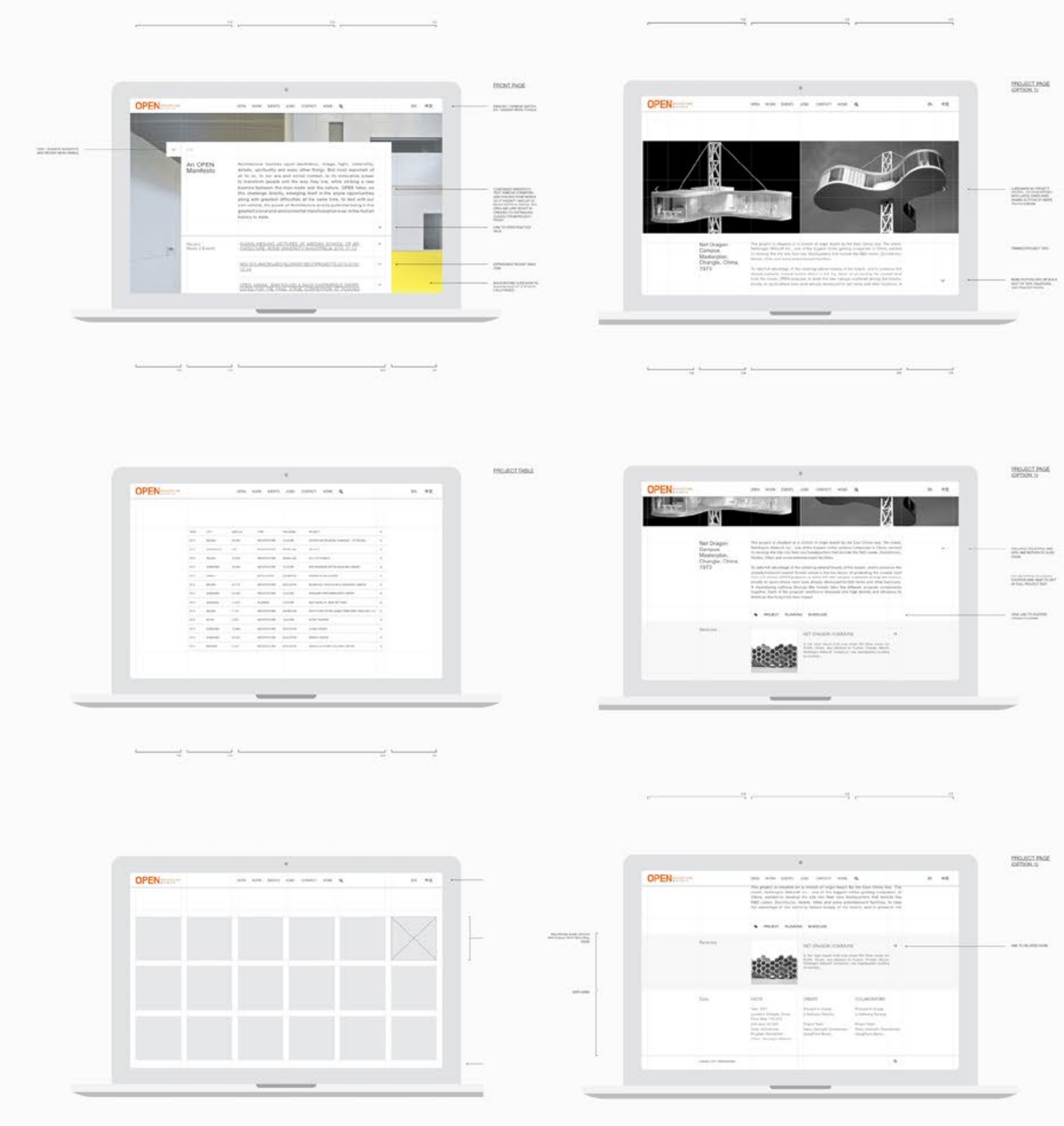




Left: Typical project content item page.
Opposite: From left to right, front page, events listing, project listing, and tabular listing of projects.

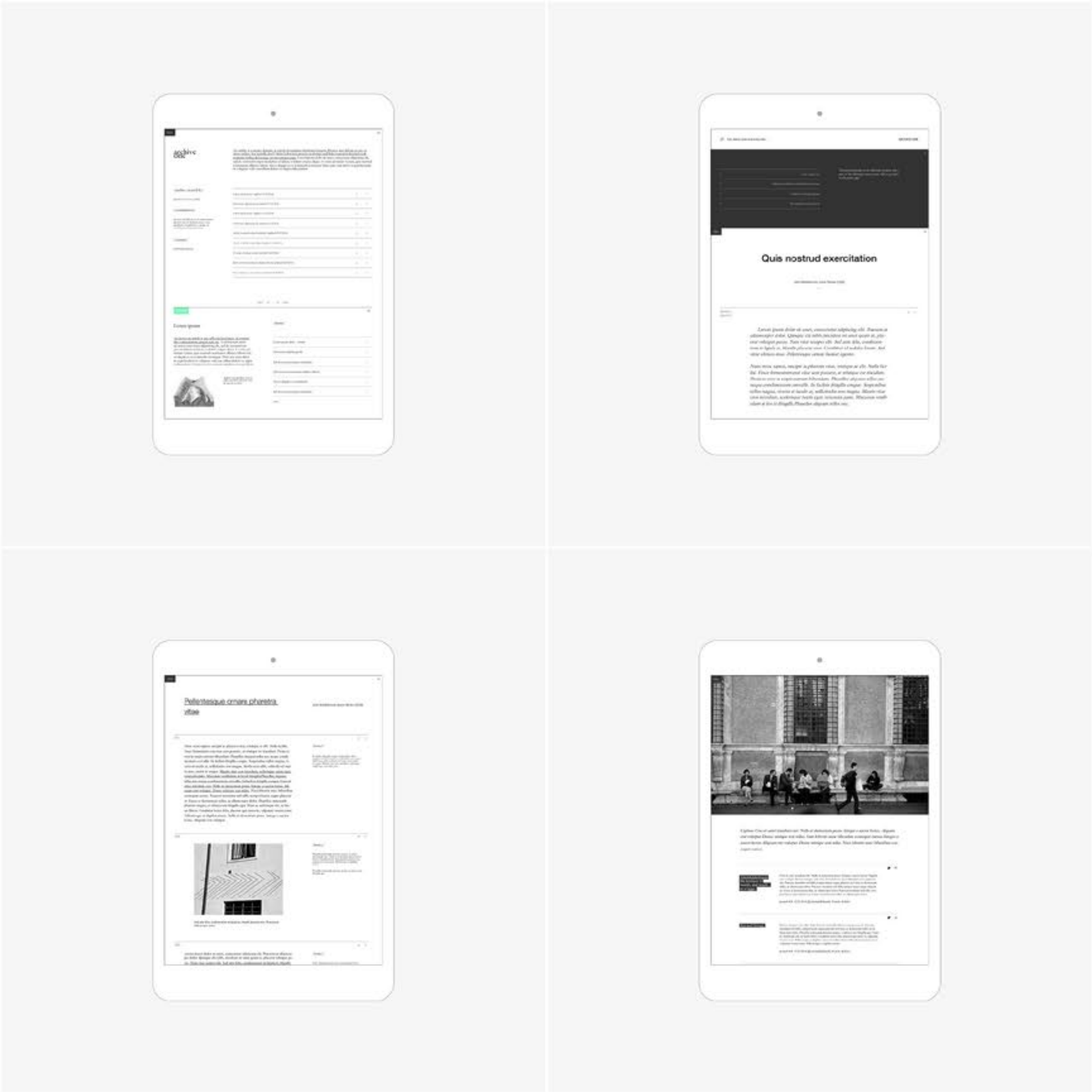
03

Fullscreen responsive layouts utilized full width of screen for wide-format slideshows that display two images at a time and 6-column image gallery that displays 24 images at a time and automatically load aditional images on scroll.

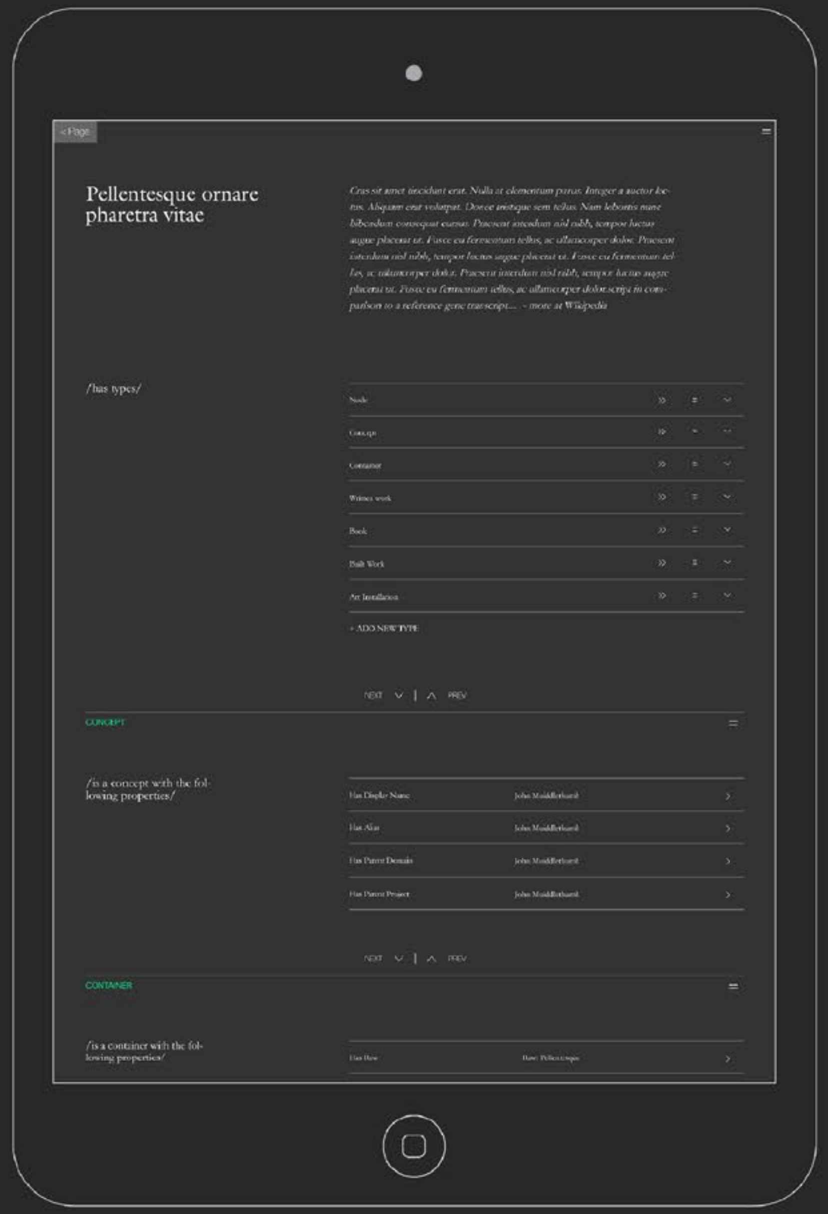


PROJECT SCOPE: MIXED-USE SOFTWARE PARK, HANGZHOU, CHINA
ROLE: SENIOR ARCHITECTURAL DESIGNER, TEAM LEADER
CONTRIBUTION: CONCEPT DESIGN, URBAN STRATEGY, MODELING & RENDERING

Research platform for collaborative writing/ annotation and reference management. Built on sematic mediaweb principles. Structured relationships are pulled out of page, as separate page or sub-object. this allow you to define relations between concepts on any page, not just the subject. this also allows for complex relations, beyond sub pred obj, perhap sub pred obj prep, or maybe add source information about the fact (ie according to). By sourcing fact you also resolve the problem of competing assignments, actually you encourage them, ie. x=y according to this article, x=z, according to that article. The practical value is added flexability, fewer dependencies. The essay may now have multiple representations or none at



Left: Typical tablet layouts for collections, reading, annotation, and discussion page types.



Sempad is built on top of powerful open-source collaborative and semantic web frameworks. MediaWiki is a free software open source wiki software written in PHP. Semantic MediaWiki (SMW) is a free, open-source extension to MediaWiki that lets you store and query data within the wiki's pages. Archive also, relies heaviliy on Semantic Forms, an extension to MediaWiki that allows users to add, edit and query data using forms. These tools comprise a powerful framework for semantic knowledge management that Archive is built on top of as a layer of abstraction, and data structure. However, while Mediawiki + Semantic media wiki (MW+SMW) provides a powerful framework, Archive is an atypical application of it.

Above: Meta page type with inverted color scheme. Dispays categorized listing of concept semantics and contained items and relations.

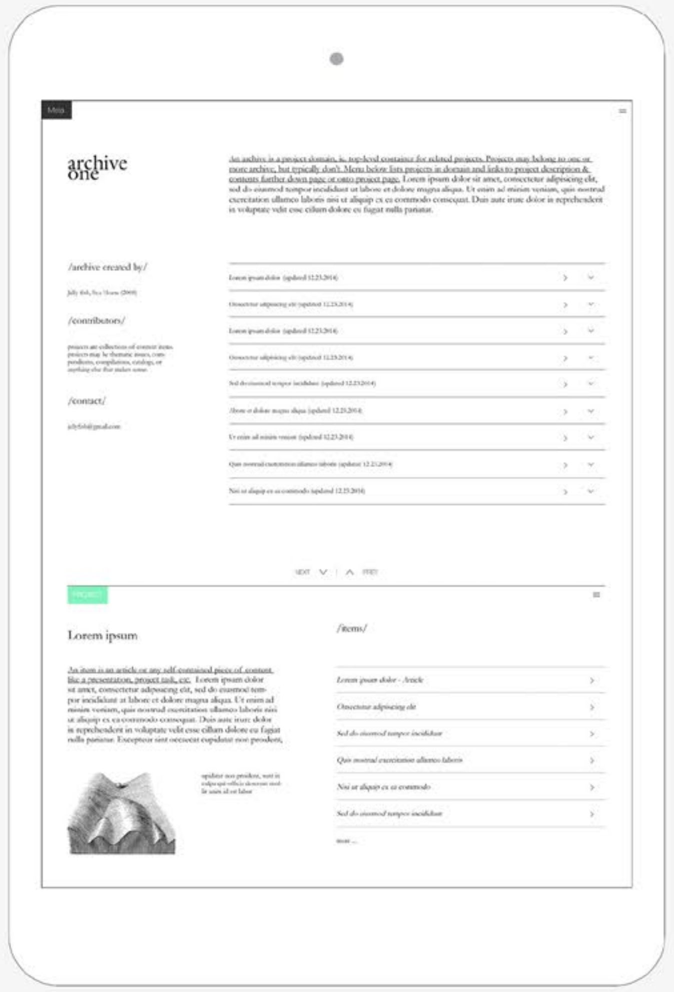
1. Hui Yuk (2013, May 22). Archivist Manifesto. Retrieved from http://www.metamute.org/editorial/lab/archivist-manifesto

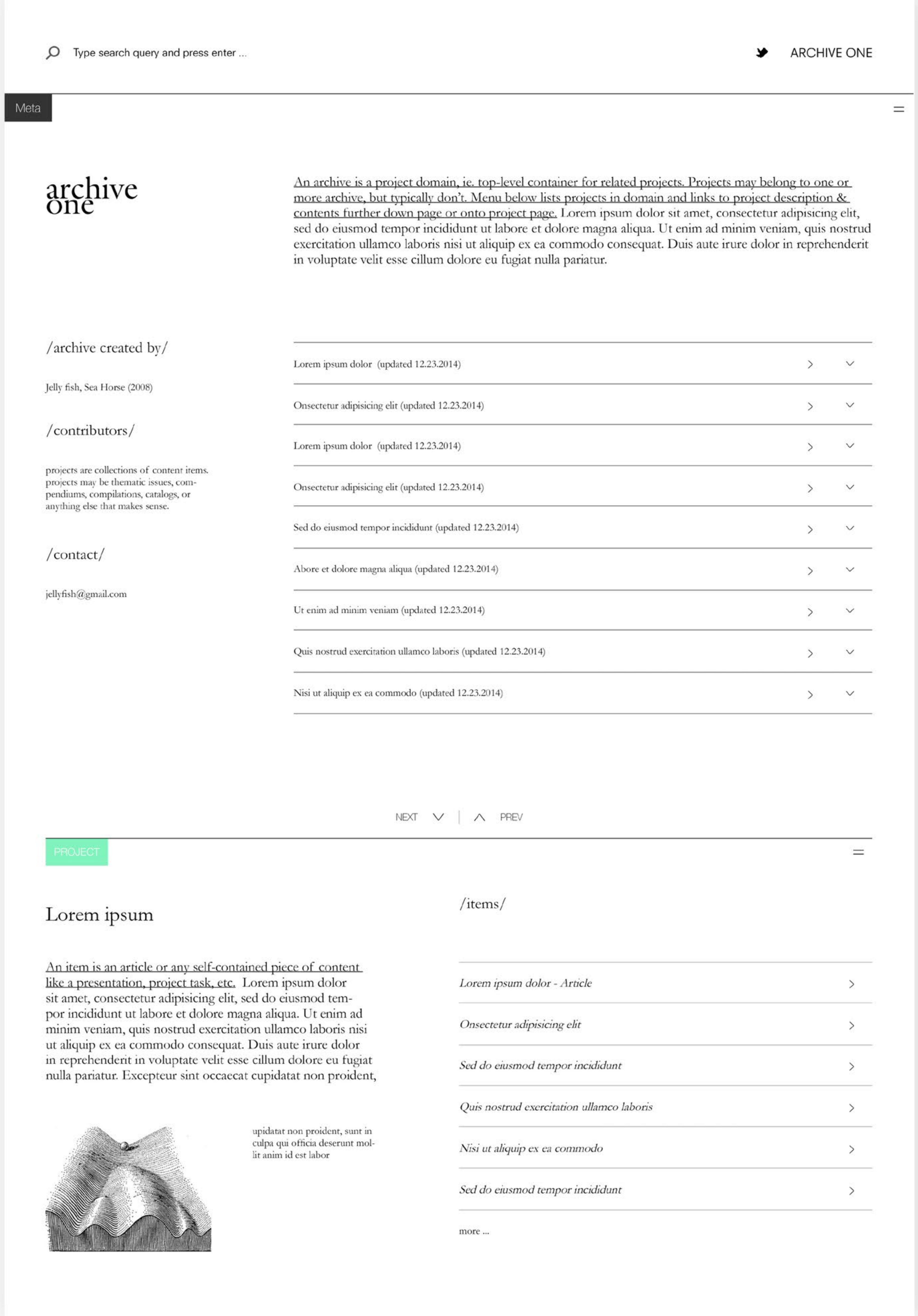
all. Content is related semantically to the essay(concept), but does not duplicate the essay properies(author, publisher, etc.), so there is no syncronization issue when properties are added or changed. In my particular application, I am decomposing texts into many smaller pieces and in some cases recomposing them. A very simple example would be taking an excerpt from one essay and using it as a quotation in another without duplicating it. This requires that I create a new page(or subobject) for the excerpt(with its very own content page) and transclude it into both locations: back into the original and into the new.

Without a clear separation of concept from content I would have to carefully keep track of what semantic information is transferred, ie. the excerpt should have the same author as the original essay but not the new. This is managable with selective transclusion, but it gets real messy way fast and requires duplication of structured data. By making the conceptual distinction between concept and content, this all goes away, I just transclude the content, which points back to the concept, a container of highly structured data.

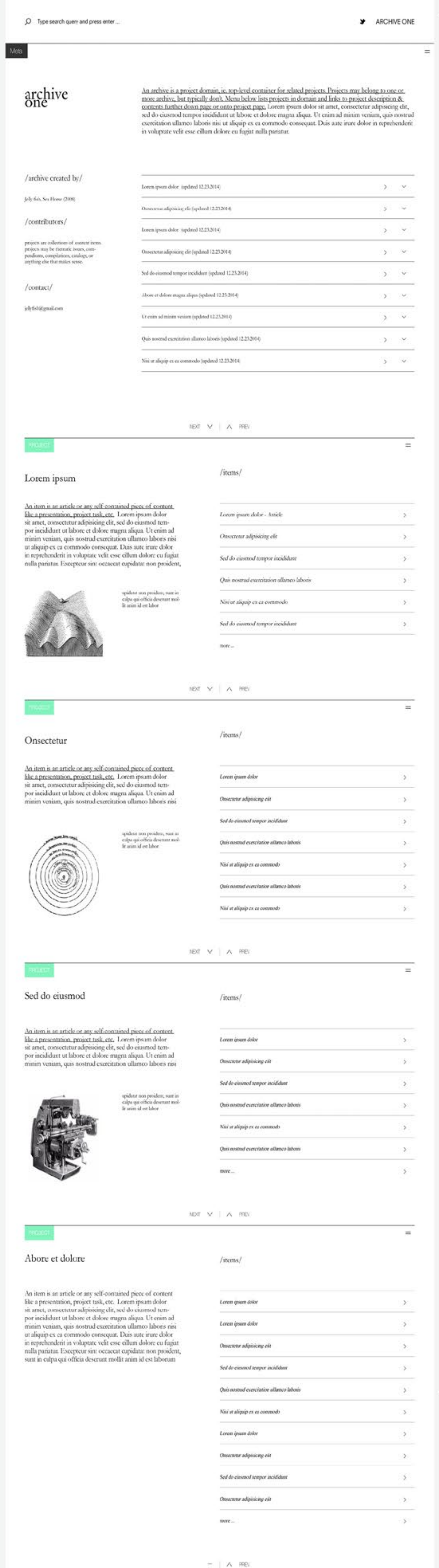
Site has two basic types of pages: articles (content - unstructured/annotated bodies of text) and topics (containers for structured data) Topics have types, ie. property sets. And articles link to topics. Topics then relate articles, by aggregating references to given topic. So using the example of an essay. There would be a page titled “Some essay”. “Some essay” would have an author, publisher, publicate date, etc. It would also have a property, “content” or smth, that links to a page titled “Content:Some essay”, which contains nothing but the annotated body of text. There is an ontological argument for this kind of conceptual division. It goes like this: “Some essay” is not a body of text, it is a concept, ie. a name that signifies something real. The textual content then is then an instance of representation. Accordingly, the properties, author, publisher, etc. belong to the concept not the content. In other words, “Some essay” “has a”, rather than “is a” particular body of text.

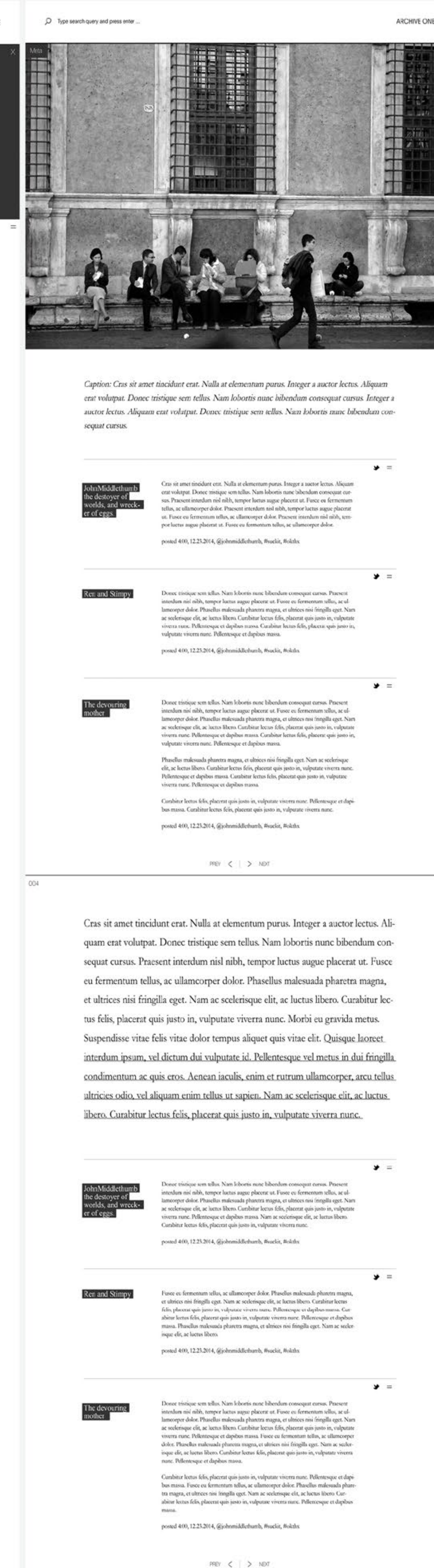
08

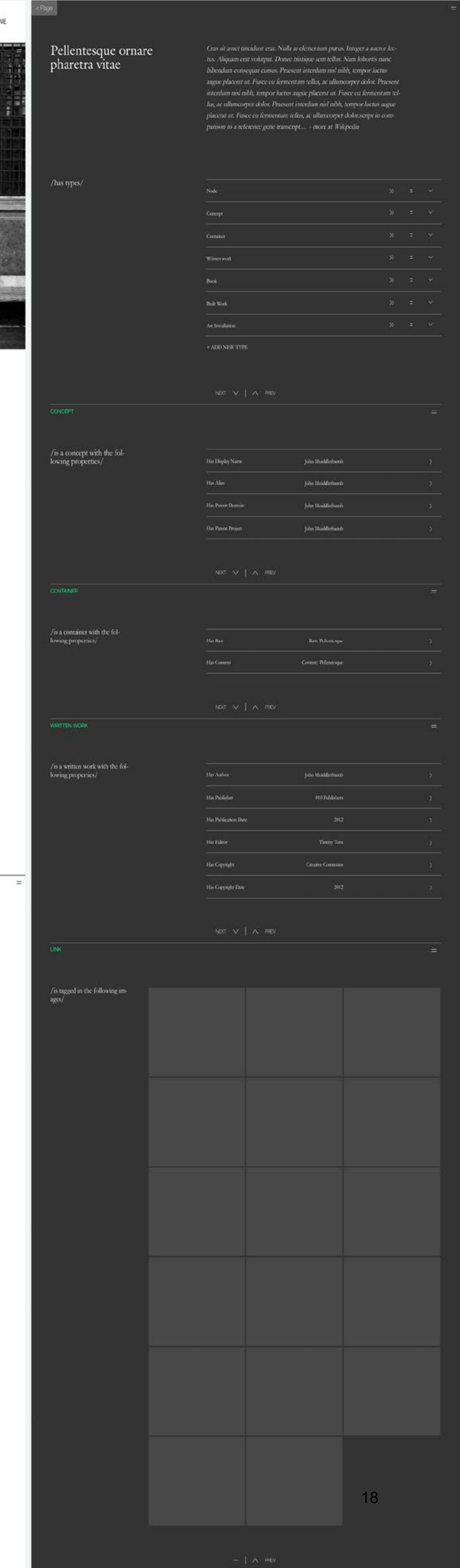




Page views/types. From left to right: collections, reading, annotation, discussion, and metadata or semantics.



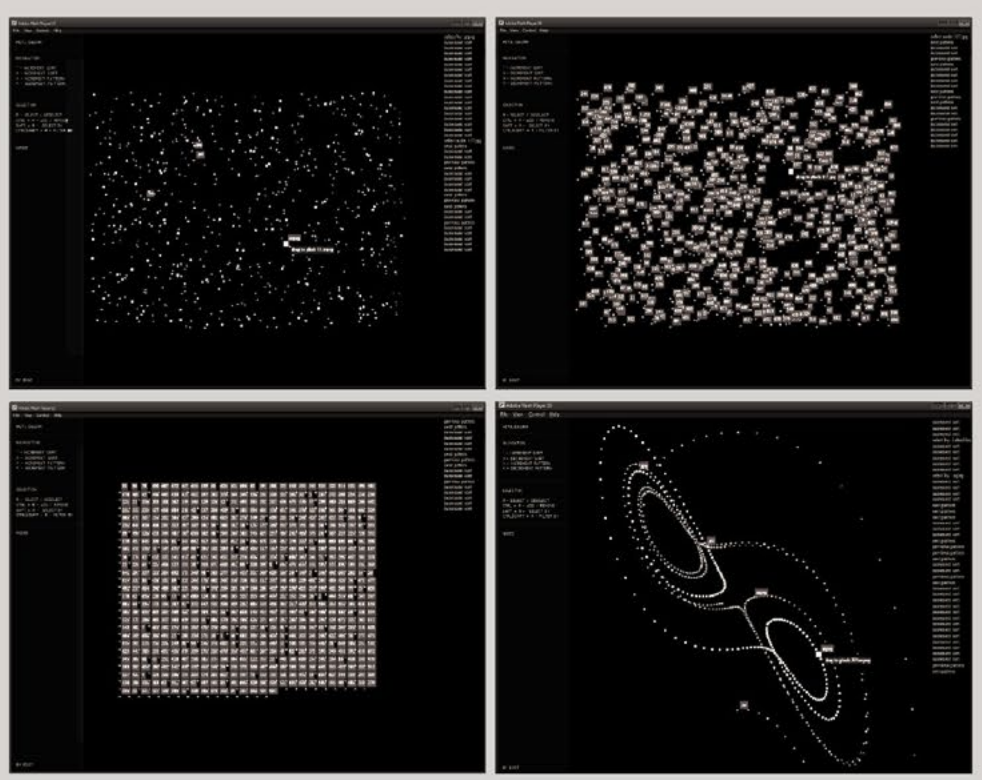




PROJECT SCOPE: APPLICATION FOR BUILDING MIXED-MEDIA NARRATIVE EXPERIENCES FOR PRESENTATION AND EXHIBITION
ROLE: DESIGNER / DEVELOPER
CONTRIBUTION: UI DESIGN, WEB APPLICATION DEVELOPMENT

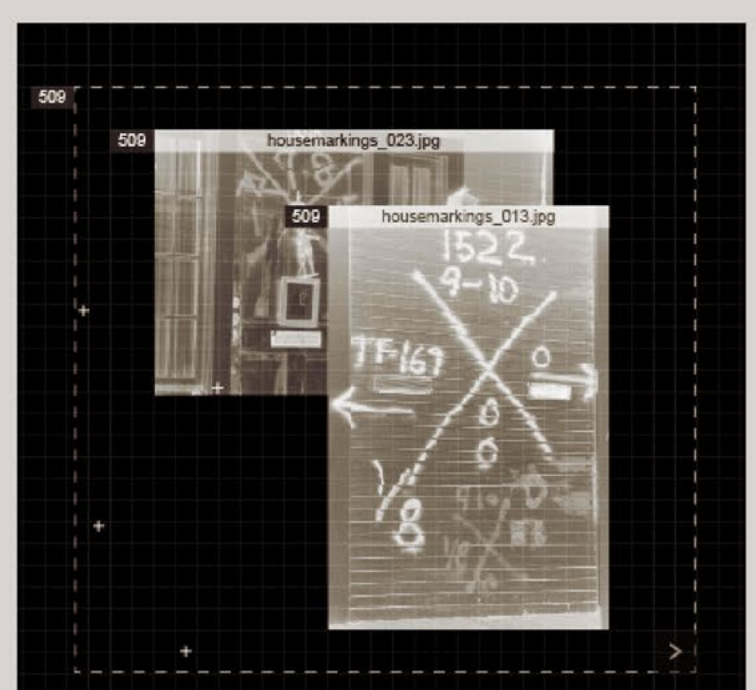
Prototype for a data-driven explorer for visual presentation. This project addresses the immediate and practical need for a presentation format better suited to meet needs of architects and visual designers, who typically come from culture of physical pinups, and are now underwhelmed and frustrated by limitations of reductive slide-based (powerpoint) and single-canvas (prezi) presentation formats. In contrast, pinUp encourages use of multiple canvases and multiple threads of visual narrative, and in this way it is uniquely multi-scalar and non-linear in format, and tactile in spirit. The project's initial aim is to design and develop minimal working prototype, which will serve as proof of concept and test bed for subsequent develop cycles. The ultimate goal of this project is the development of a web-based client that will allow users to quickly build interactive mixed-media narrative experiences for presentation and exhibition of mostly visual content.

THREAD BARE



Left: Screenshots of working protype illustrating basic filter/sort-based navigation of metadata.

Opposite: concept image



Right: Content items can be grouped and nested.

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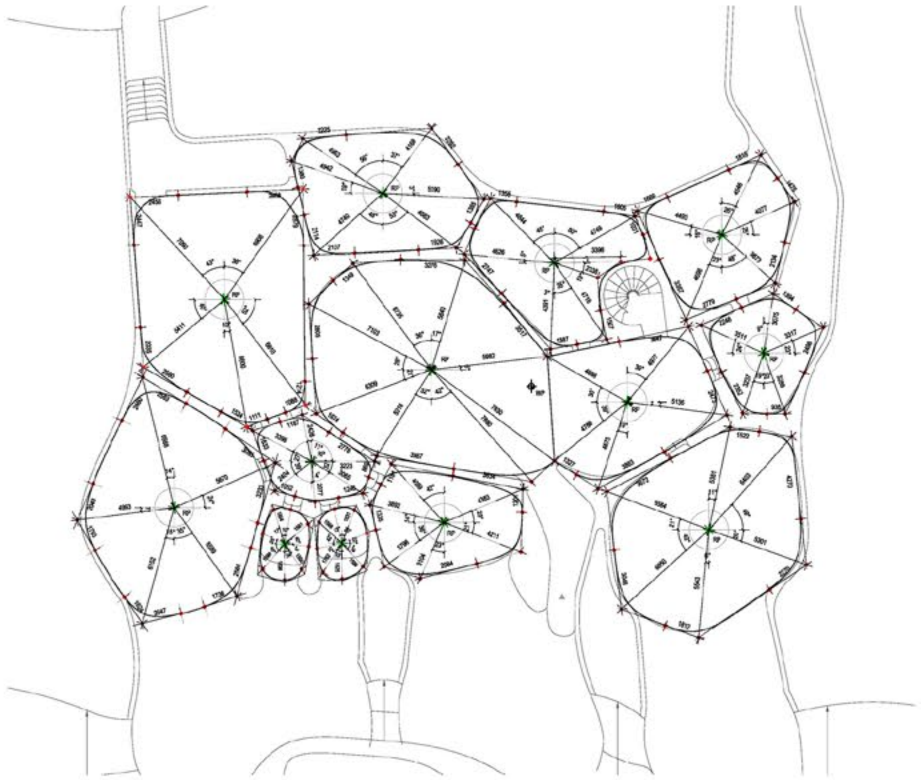
06



01

On a quiet beach along the coast of Bohai Bay in northern China, OPEN designed two art spaces: one hidden in the sand dunes; one rising out of the sea. A long walkway stretching in between connects the sand and the sea, the art and the people. The two spaces create a silent dialogue by the sea.

The Dune Space, currently under construction, represented a particular structural problem: How to construct and optimize irregular shell geometries to withstand distributed vertical load, and how to understand the relationship between design decisions and optimized form.

Working closely with structural engineers we developed a methodology and toolset for analyzing and optimizing form so we can explore design space iteratively, optimizing geometry and adjusting for physical constraints in real-time. Implemented in Python, Grasshopper, and Kangaroo.

The project broke ground January of this year and recently won the Iconic Awards 2017- Best of Best in Concept Category. It is the highest honor of this award organized by the German Design Council.

20

16

PROJECT SCOPE: ARCHITECTURAL DESIGN
ROLES: SENIOR ARCHITECT, COMPUTATIONAL DESIGNER
COLLABORTORS: OPEN ARCHITECTURE, LI HU, WENJING HUANGE
CLIENT: TIANXINGJIUZHOU REAL ESTATE DEVELOPMENT CO.
STATUS: UNDER CONSTRUCTION

DUNE ARTSPACE

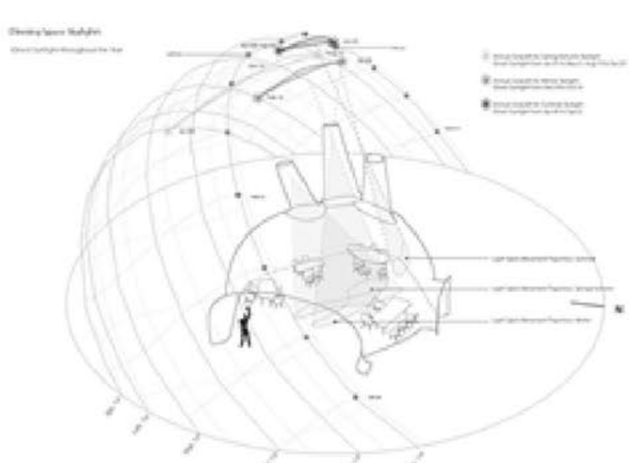
Top Left: Cell sizing diagram
Spread: Photo of 3d-printed model.

images courtesy of OPEN Architecture

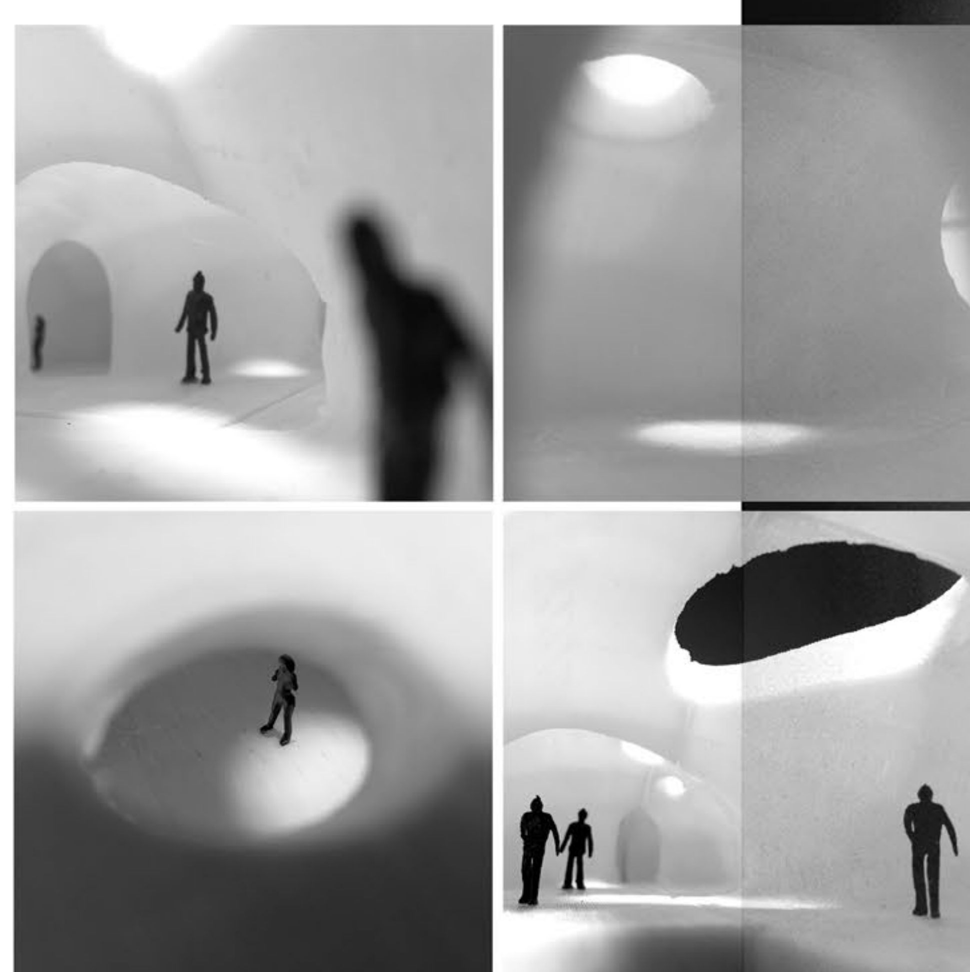
On a quiet stretch of beach along the coast of Bohai Bay in northern China, OPEN designed two art spaces: one hidden in the sand dunes, like mysterious caves; one rising out of the sea, like a solitary piece of rock. A long walkway stretching in between connects the sand and the sea, the art and the people. The two spaces create a silent dialogue by the sea.

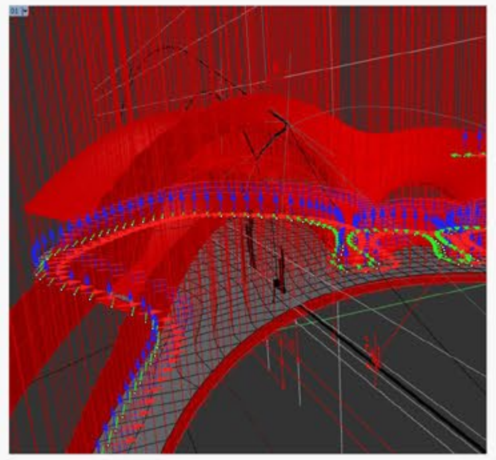
The Dune Space, currently under construction, represented a particular structural problem: How to construct and optimize irregular shell geometries to withstand distributed vertical load, and how to understand the relationship between design decisions and optimized form. Working closely with structural engineers we developed a methodology and toolset for analyzing and optimizing form so we can explore design space iteratively, optimizing geometry and adjusting for physical constraints in real-time. Implemented in Python, Grasshopper, and Kangaroo.

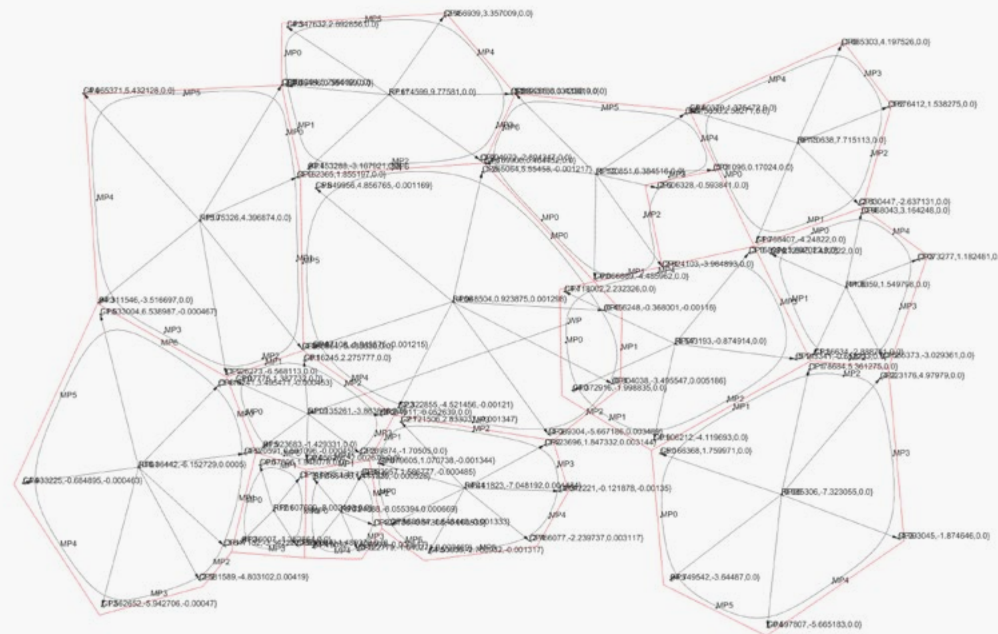
The project broke ground January of this year and recently won the Iconic Awards 2017- Best of Best in Concept Category. It is the highest honor of this award organized by the German Design Council.



Opposite: photos of 3d-printed massing model.
Above: Diagram showing the relationship between sun path and light cones.

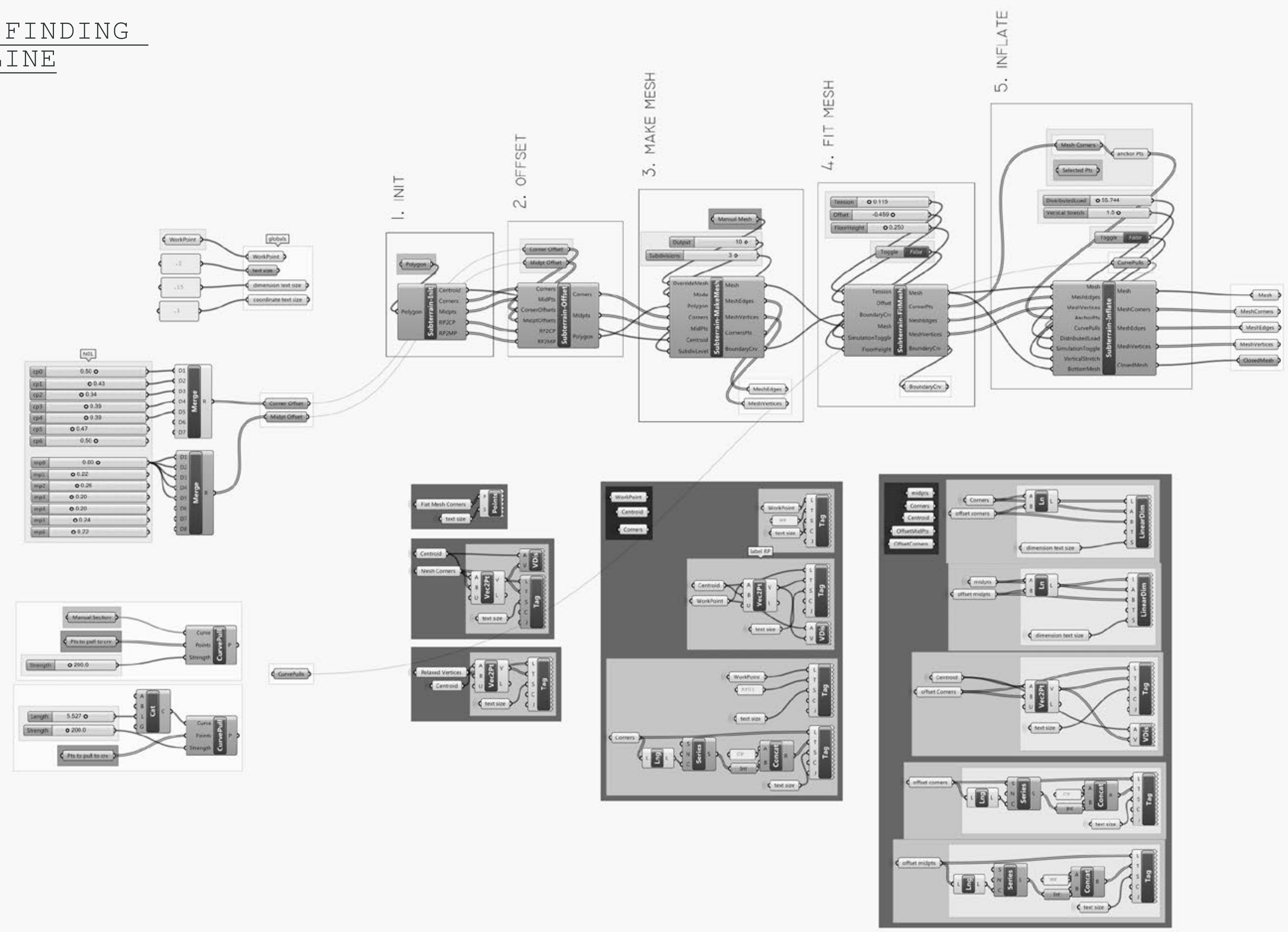


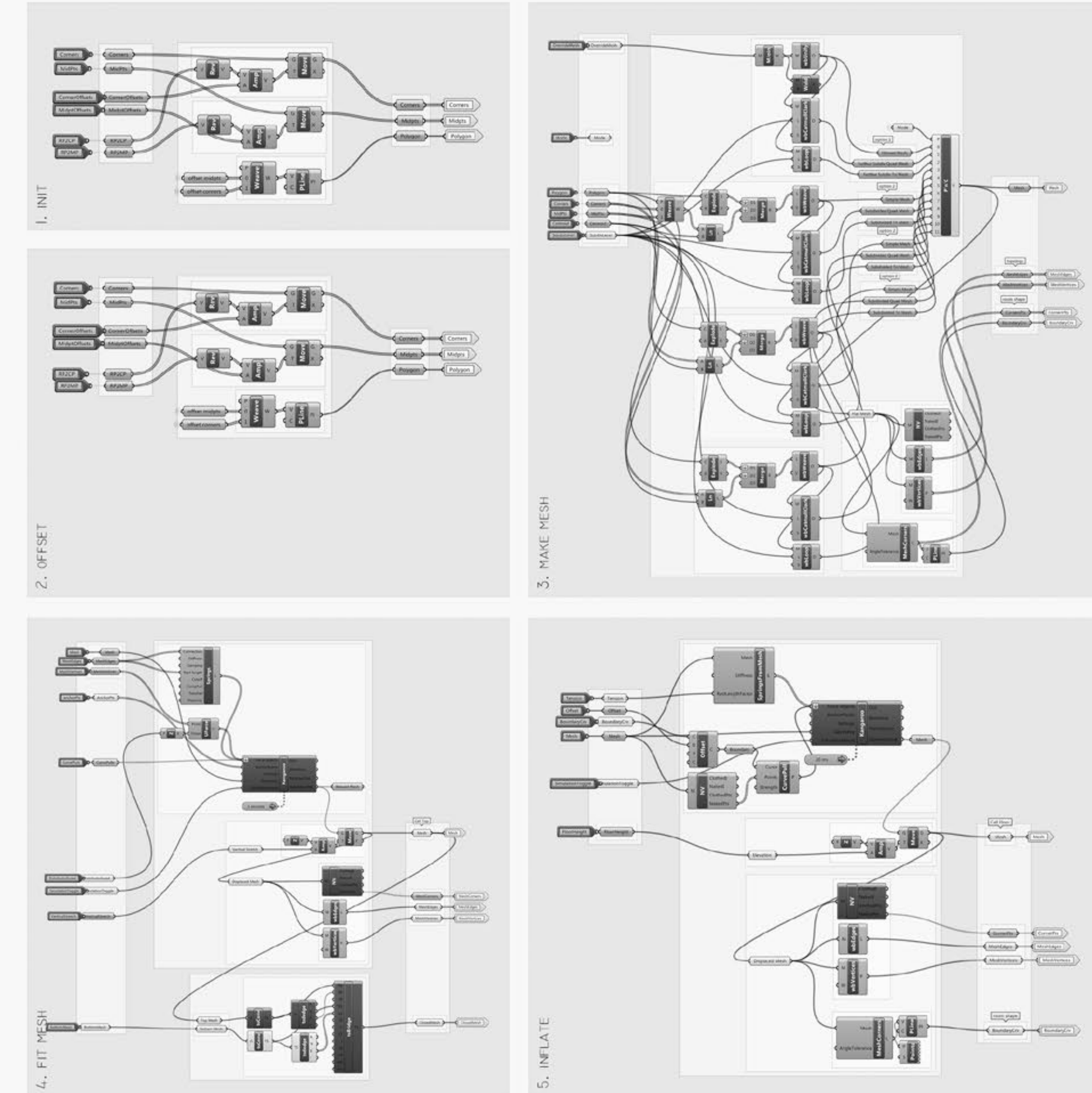




Computational description of inflated Cell from polygon boundry condition representing neighboring cells.
Left: Cell network and boundaries.

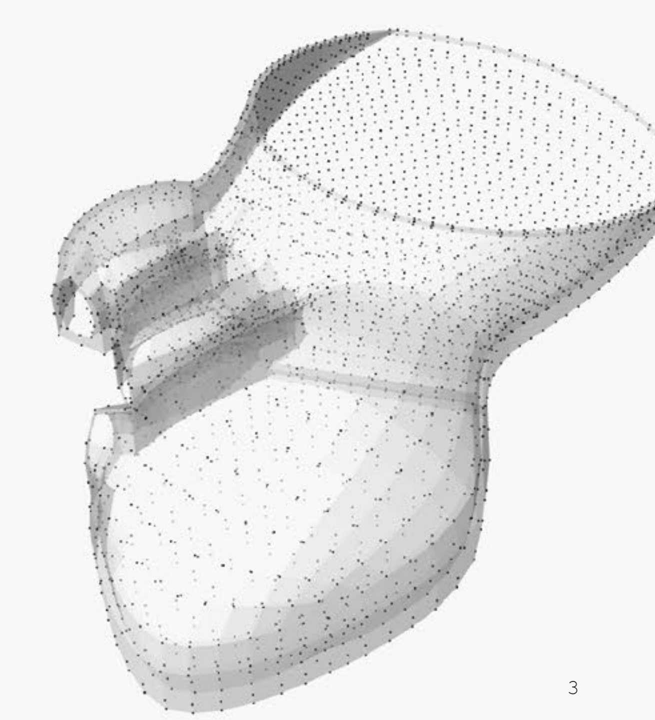
FORM-FINDING PIPELINE



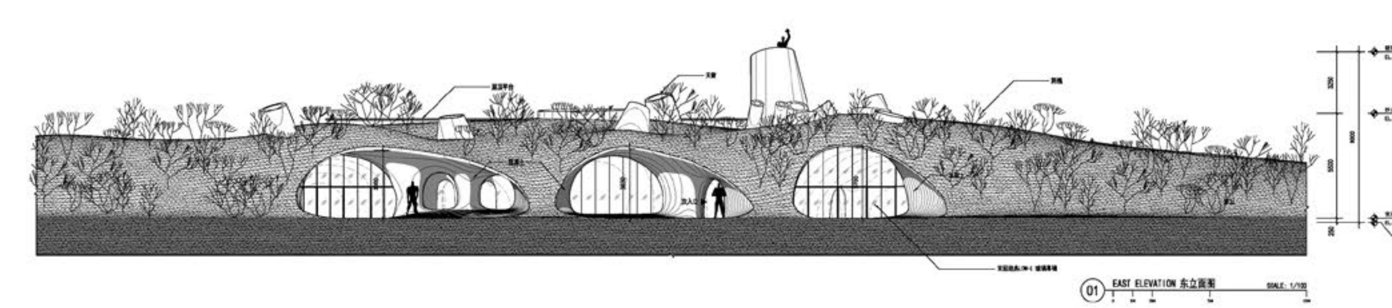


Left: Grasshopper cluster definitions

Computational description of model segement. Form-finding procedure optimizes for volume and structure using Kangaroo. Model is then handed off to engineers for further optimization and sizing using finite element analysis.



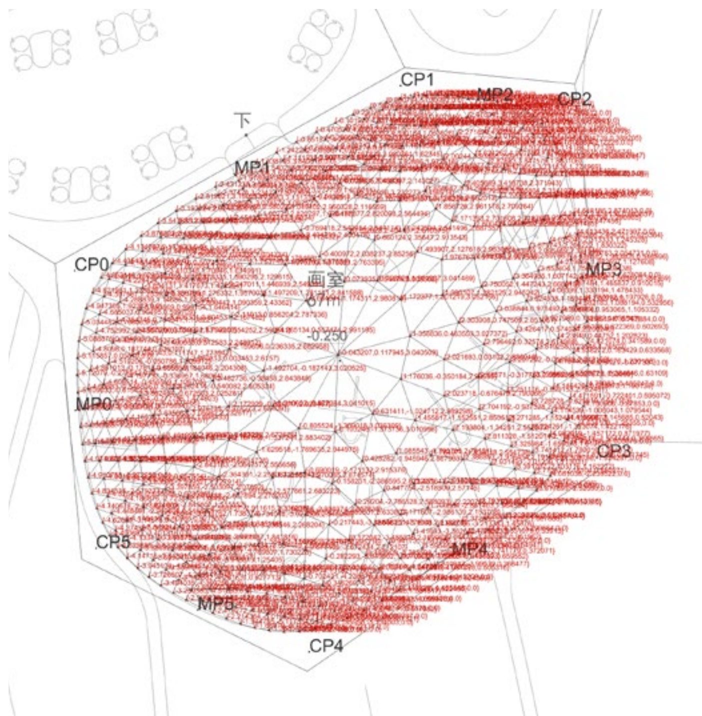
Edges blur. walls receed. spaces expand and contract in turn with the the waves, while soft cones direct light, tracking the movement of the sun and the passage of time, and creating temperal and spatial moments of contrast, pulling your attension toward shifting focal points, where sculpture and installations find opportunities for at times dramatic and other times subdued expression.

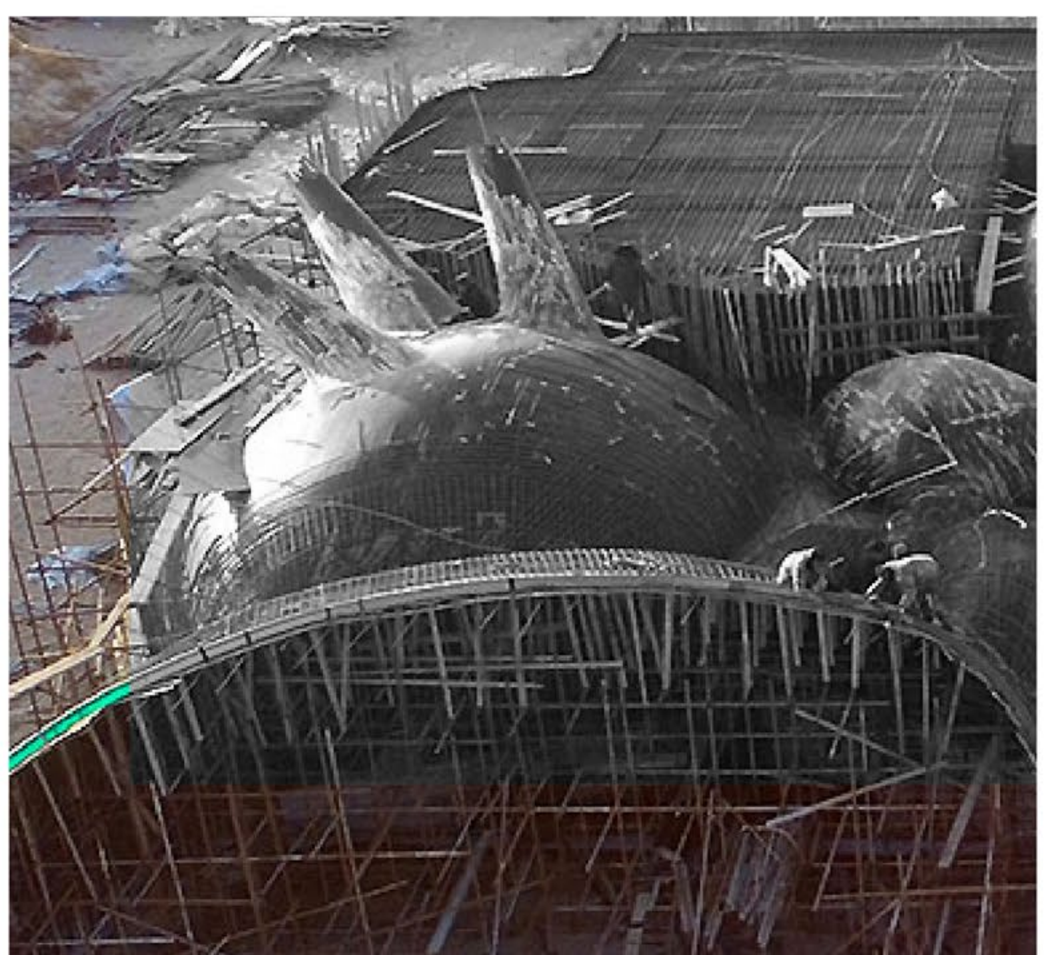


East Elevation facing Bohai beachfront.

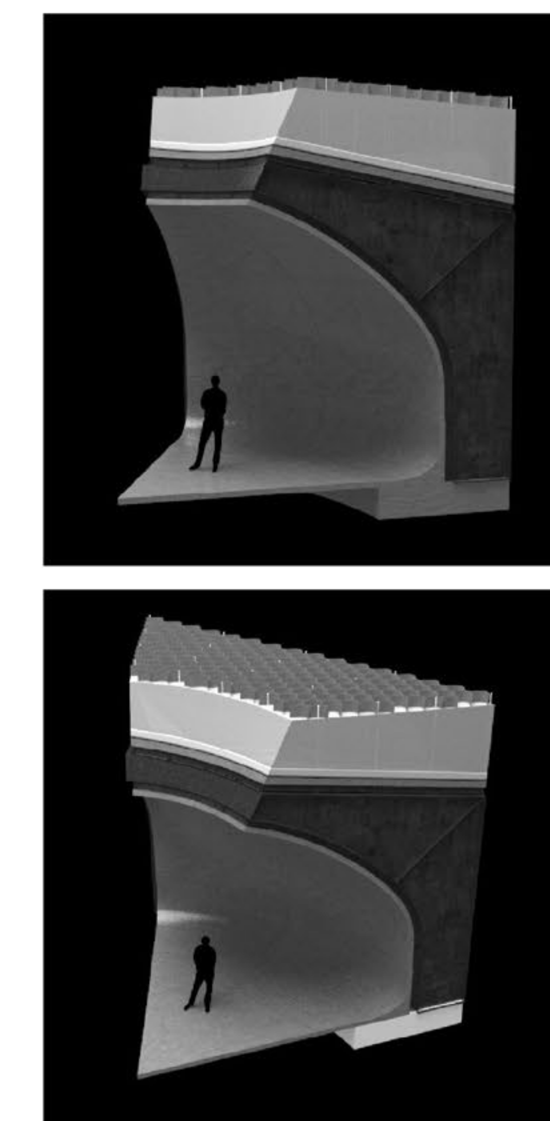
Opposite: View inside northeast exhibition space.

Top: Photos of physical model.





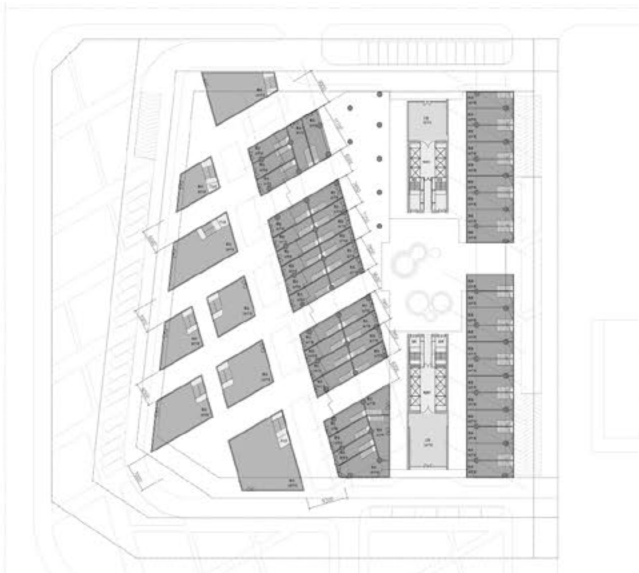
Dune Art Museum topped out this January. The wooden formwork for thin shell cast-in-place concrete reveals the structure of this building. When the building structure is completed, sand will be put back in between and on top of the "art cells", and dune's original state will be restored. Except for the skylights, openings and a viewing platform that appear floating in the sands, the building will quietly disappear in the dunes by the sea.



Above: Construction photos of northeast half of museum with large opening facing beach, along with east enterance to provide beach access from lobby.

Left: Construction photo of southeast cluster.

Above: Sectional model illustrating candidate building system with load carried by steel substructure. Final building system, seen in construction photos, did away with substructure in favor of fully self-supporting reinforced concrete shell carrying self as well as distributed vertical load of sand.



WEST COAST COMMERCE

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Above: bird's eye rendering

text and images courtesy of Aedas
more at http://www.aedas.com/en/architecture

05

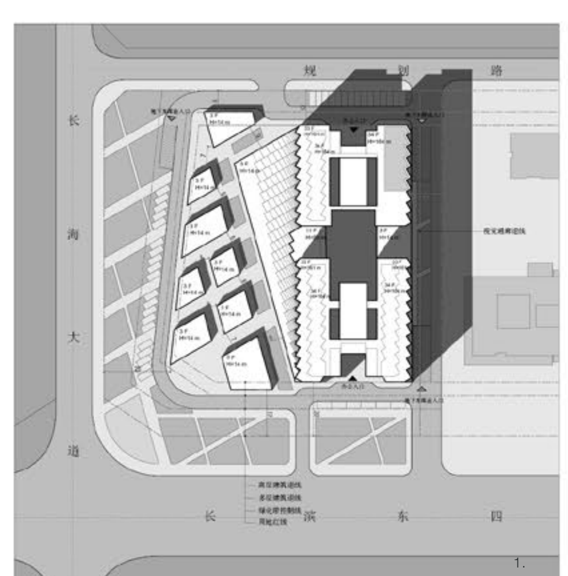
Proposal for high-rise tower in haikou to be used for home and small office loft spaces. Building form was largely informed by local environmental and urban situation, passive heating cooling strategies effective in subtropic climate, prevailing wind direction, and shifting view condition. Dividing the tower in to two vertical slabs separated by large open-air gap created opportunity for open-air corridors and vertical air shaft for heat disipation and cross ventilation. It also provided starting point for responsive building form, that could be structurally solved with traditional column/slab system by treating tower as two roughly square towers. Pulling base outward, we create a terracing condition and large interior atriiums space. View & light analysis revealed a condition where in optimal unit orientation shifted from southwest at the base to north-west above 100m where views of the sea became accessible. Accordingly, units below 100 orient to the south-west, and those above orient to the northwest. Facade expresses this shift, by gradually rotating toward the northern sea.

PROJECT SCOPE: DESIGN CONCEPT FOR SOHO TOWER, HAIKOU, CHINA
COLLABORTORS: LDI AND STRUCTURE CONCULTANT
ROLE: SENIOR DESIGNER
CONTRIBUTION: CONCEPT/SCHEMATIC DESIGN, FORM-FINDING, COMPUTATIONAL DESIGN

Raised canopy extends the length of the street creating partial weather protection, and an interactive surface for led display, further activating retail street and creating a dramatic lighting effect that speaks to high-tech orientation of software park. Louvers with integrated PVC panels ares are installed on roof to collect solar energy and mitigates electrical load of towers. Application of high performance solar shading devices on outer facade glazing provide layer of solar protection, while redirecting diffuse light into building reducing reliance on electric lighting.

rendered views show facade incrementally shifts in response to unit orientation.

Left: From left to right, site plan, functional floorplan and section.



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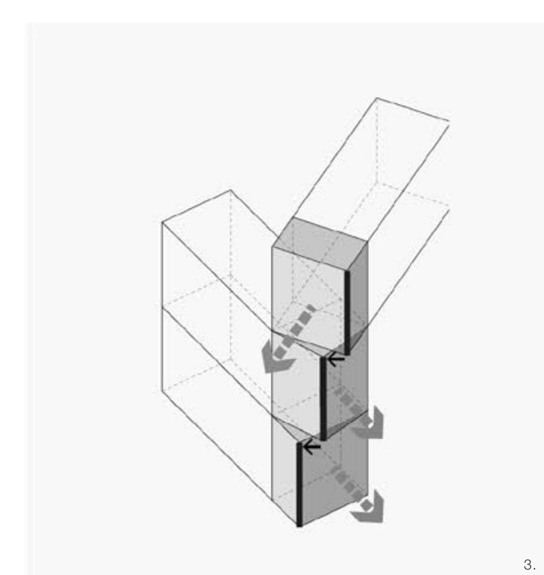
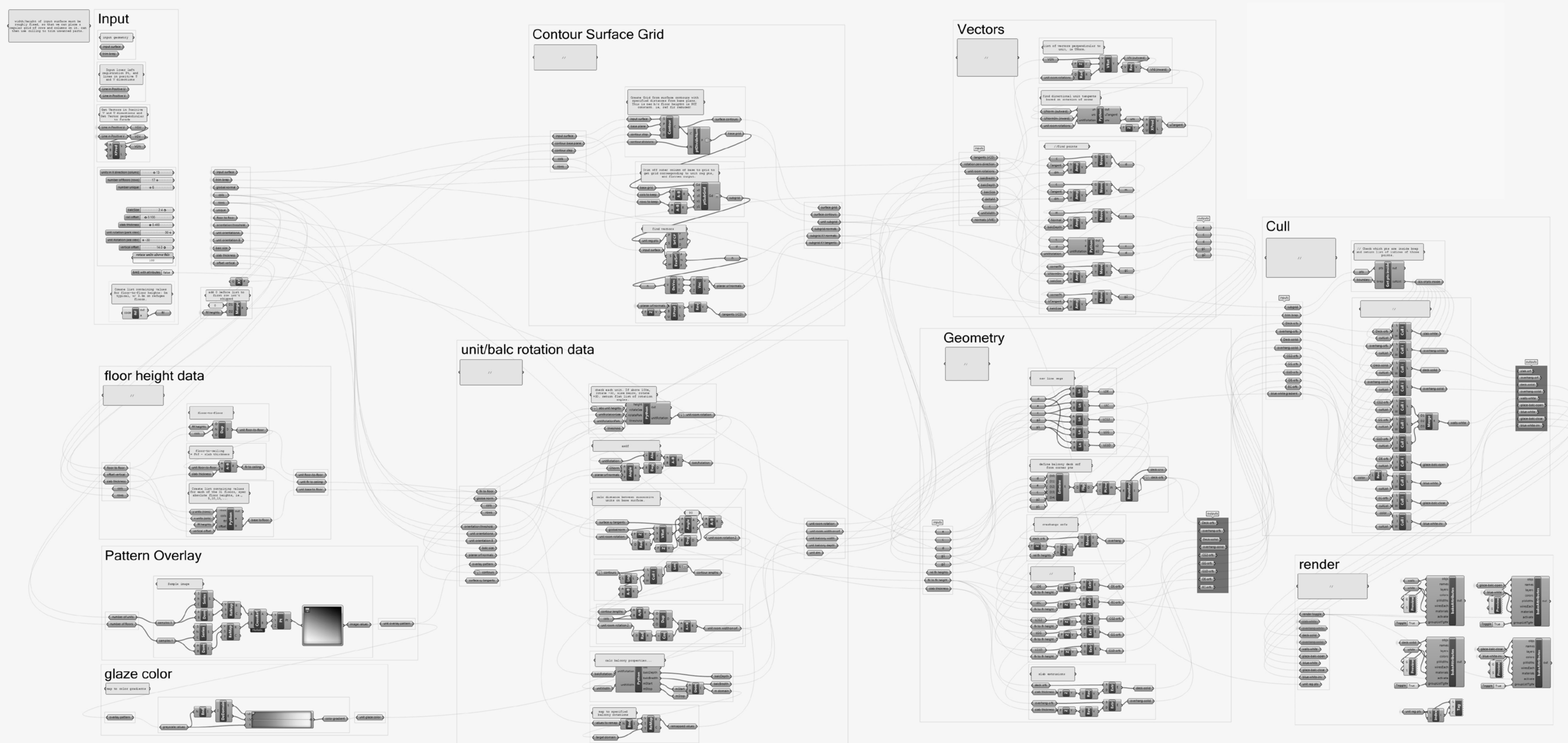
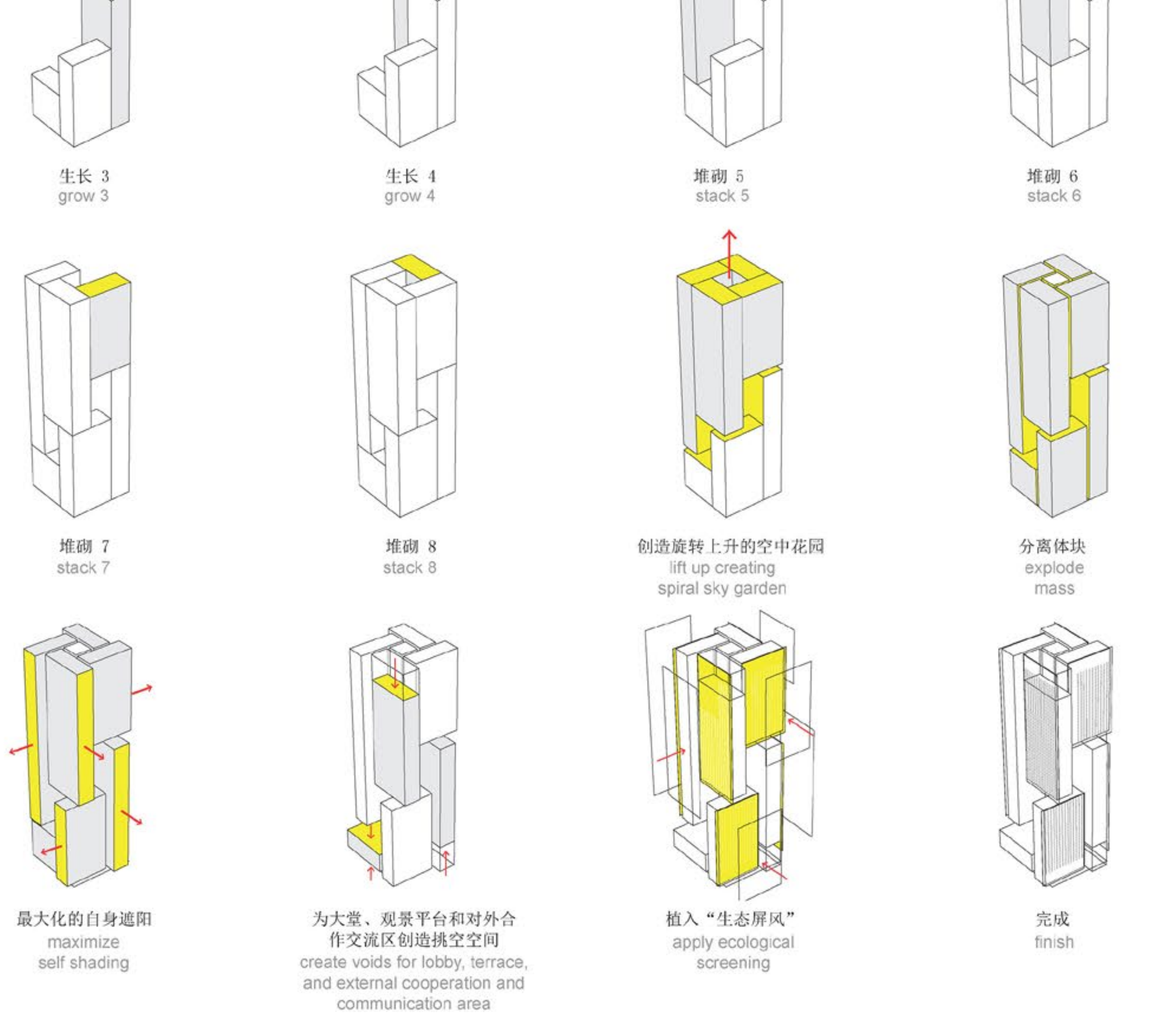


Full grasshopper definition used to generate building mass





06

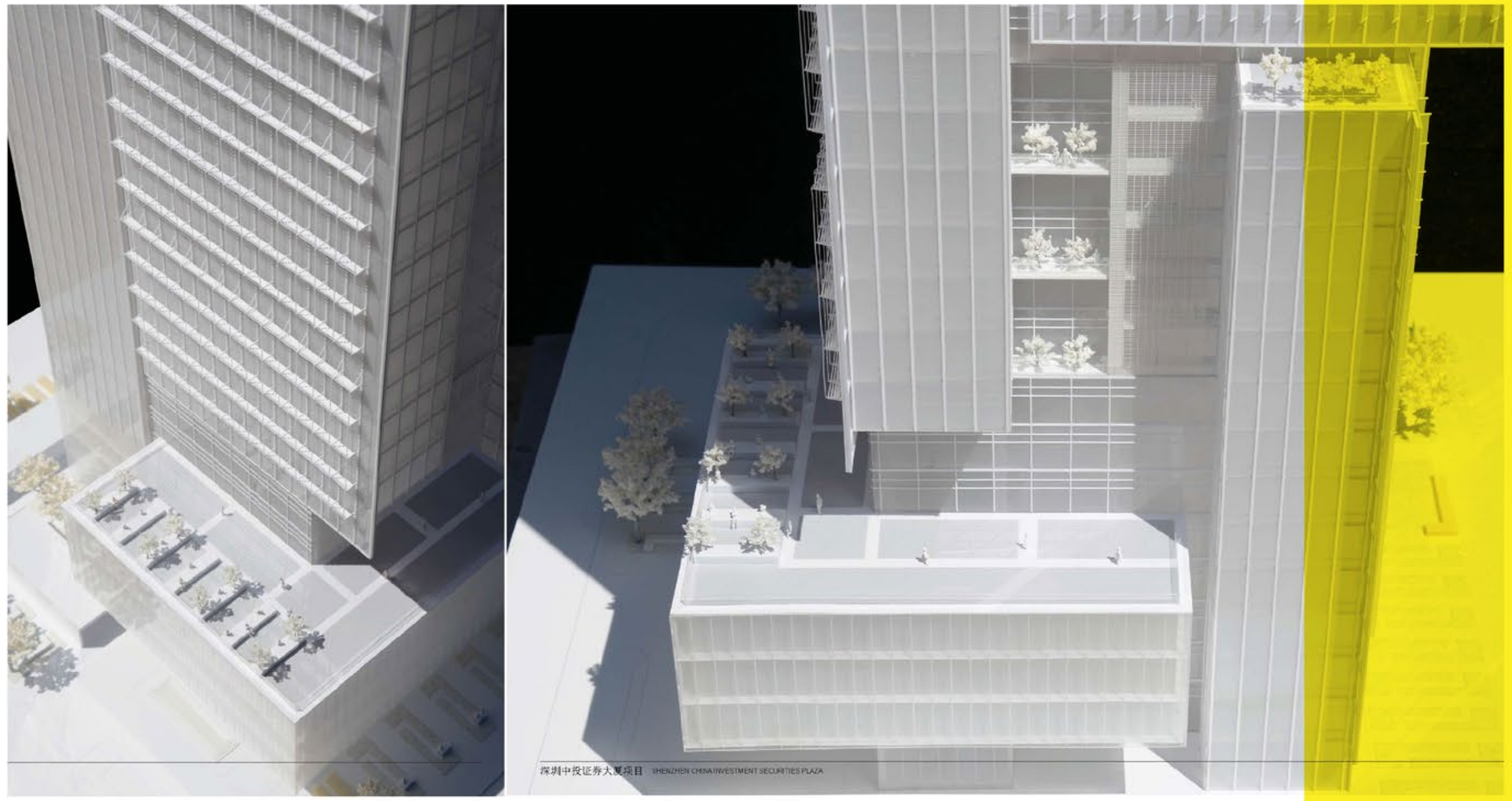
At once a symbol of traditional chinese values and simple depiction of rotational movement, the fan-shaped pattern created by rotating a slender 3-to-1 rectatangle around a point becomes a powerful generator of dynamic form, a rich cultural symbol, as well as modern icon that provides the tower with a singular identity looking both forward to a sustainble future of perpetual change, and backwards to traditional chinese values of balance and harmony. This high-rise urban project aspires for quality and sustainability at every stage of the building life cycle in order to reduce the environmental impact of the building by optimising the efficient use of energy, water, and other resources. Developing the building vertically will create the great chance to give precious free public space back to the city. A green park with trees, fountains and shading canopies will provide tourists with fresh and natural areas to relax and get some rest from the summer heat. A continuous spiral series

Left: Photo of physical model showing 1 of 4 sky gardens.

Top: Formation diagram illustrating how mass was manipulated into final form.

CHINA INVESTMENT SECURITIES PLAZA

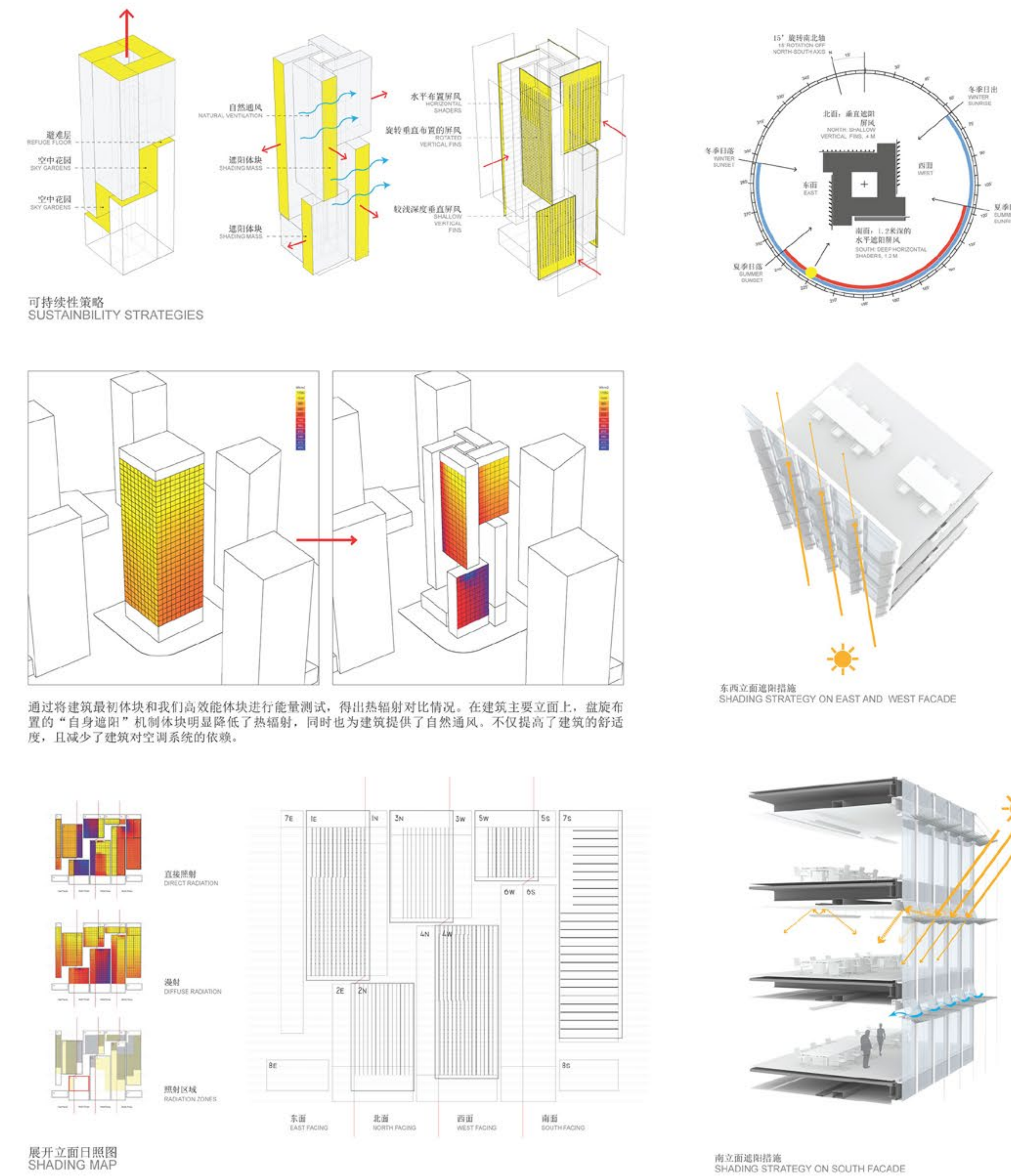
PROJECT SCOPE: DESIGN COMPETITION, MIXED-USE HIGH-RISE OFFICE TOWER
ROLE: SENIOR DESIGNER, AEDAS
CONTRIBUTION: CONCEPT/SCHEMATIC DESIGN



Above: Photos of physical model showing commercial volume and outdoor green public spaces.

Right: Rendered street view, illustrates application of responsive vertical fins and horizontal shaders.

Below: Elevations.

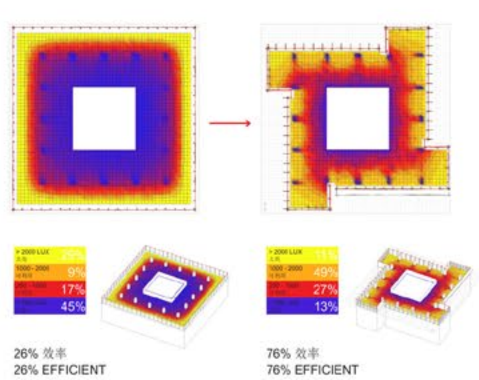


Self-shading mechanism of spirally arranged massing blocks results in significantly reduced heat gain from primary building surfaces, while also providing opportunities for natural air ventilation. The result is improved comfort levels with less reliance on air conditioning. North facing windows receive low early morning and late afternoon sun from the east and west. South facing windows receive high mid-day sun from the south. Accordingly, north facing windows benefit most from shallow vertical fins. South facing windows utilize large overhangs. East and west faces utilize vertical fins rotated toward the north to block early morning and late afternoon sun.

Above: Sustainability, passive energy, and shading features

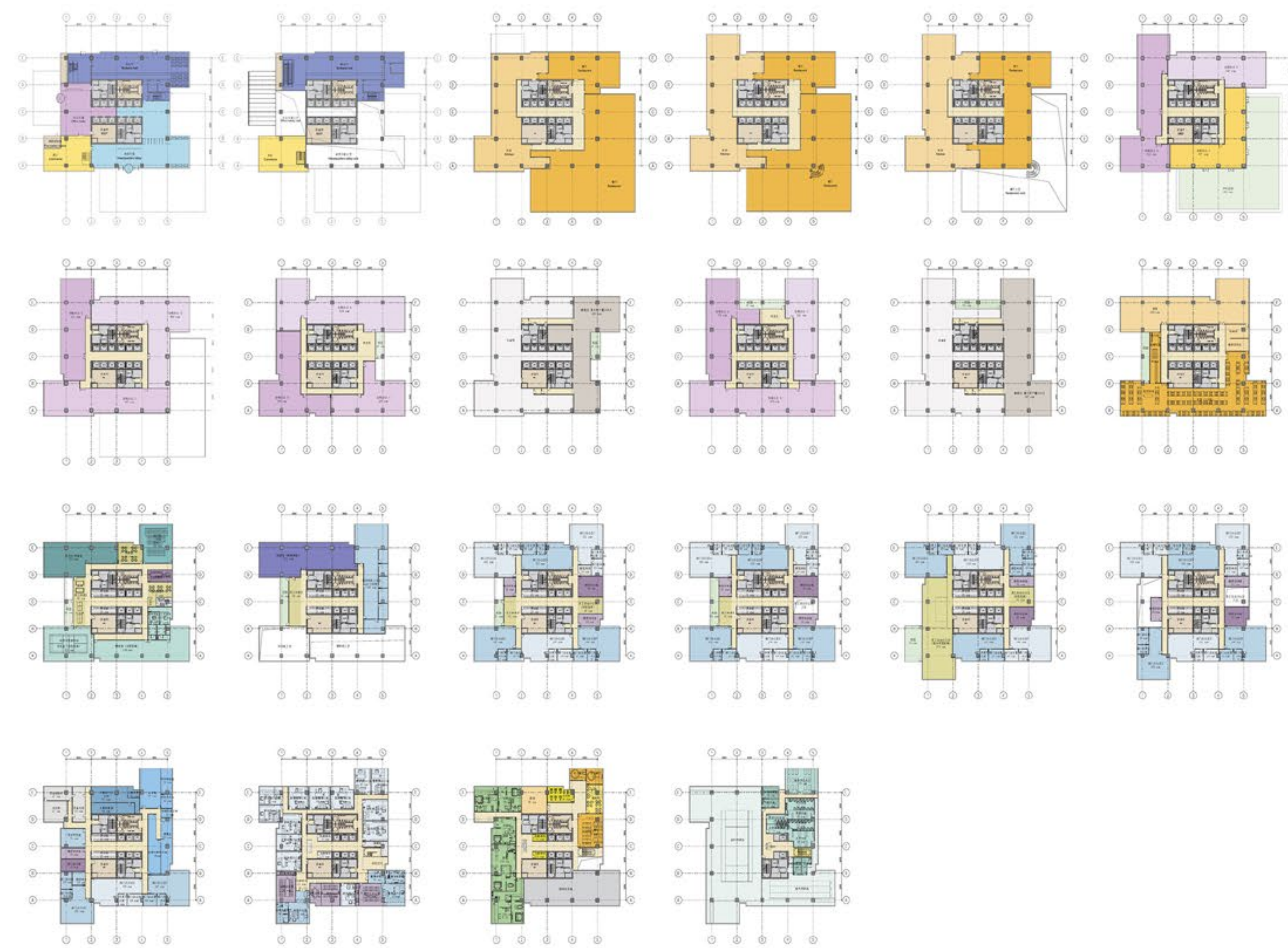
34 floors comprised of 22 unique floorplans and three functional zones that correspond to public-dominated commercial spaces on the lower 5 floors, offices on floor 6 - 22, and headquarters on upper 10 floors. Total floor area just exceeds 75,000 sqm and an average floor area ration of 13.4.

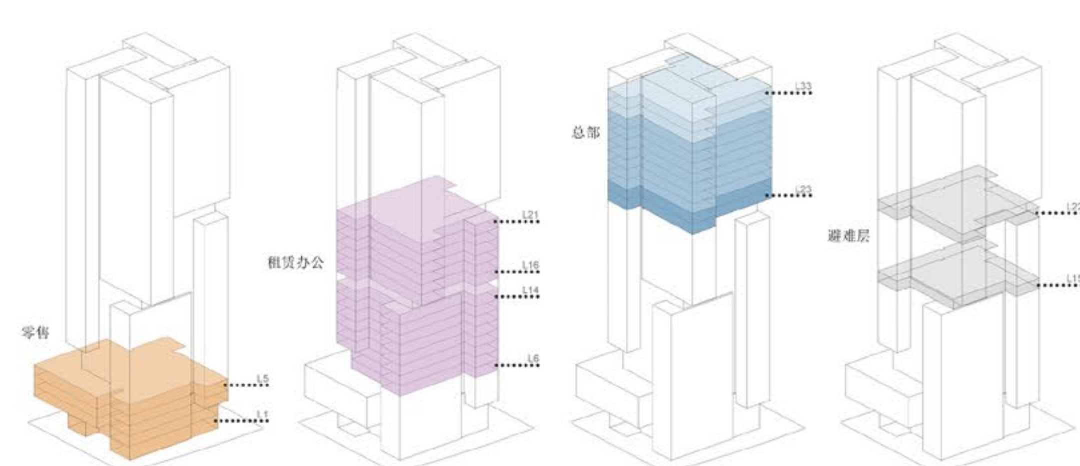
Facade-to-core depth of thin massing blocks and application of shading devices to block direct light while redirecting diffuse light deep into building results in reduced electricity load and significantly improved interior lighting from natural day light, improved comfort levels, less eye



Above: Natural Light Penetration comparative analysis.

Right: Typical Floorplan permutations.
Bottom: 3 Vertically Stacked Functional Regions





首层为中投证券营业部，并分别设置双层挑空大尺度的总部办公大堂和租赁办公大堂，3至5层为高端商业和餐饮。

Retail occupies the first 5 floors with space for large lobby on the ground floor. 3nd to 5nd floor as a high-end commercial and restaurant .

6-14层，16-21层为可租赁的高端商务办公

Rental offices occupy floors 6 through 14 and 16 through 21.

11层总部位于塔楼的顶部区域，23层为员工生活服务区，24层为公司文化活动区/公共区，对外合作交流区域布置在顶上两层

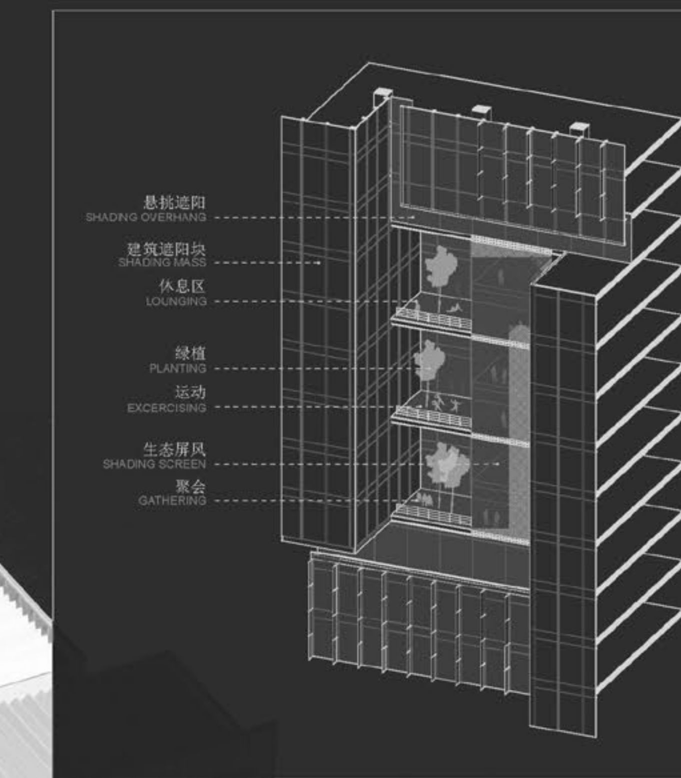
Headquaters are located on the top 11 floors of the tower, with life service zone on the 23nd and 24th floor for external cooperation and communication area on the top two floors.

15和22层为避难层

Refuge floors are located on floors 15 and 22.

Below: Photo of physical model.

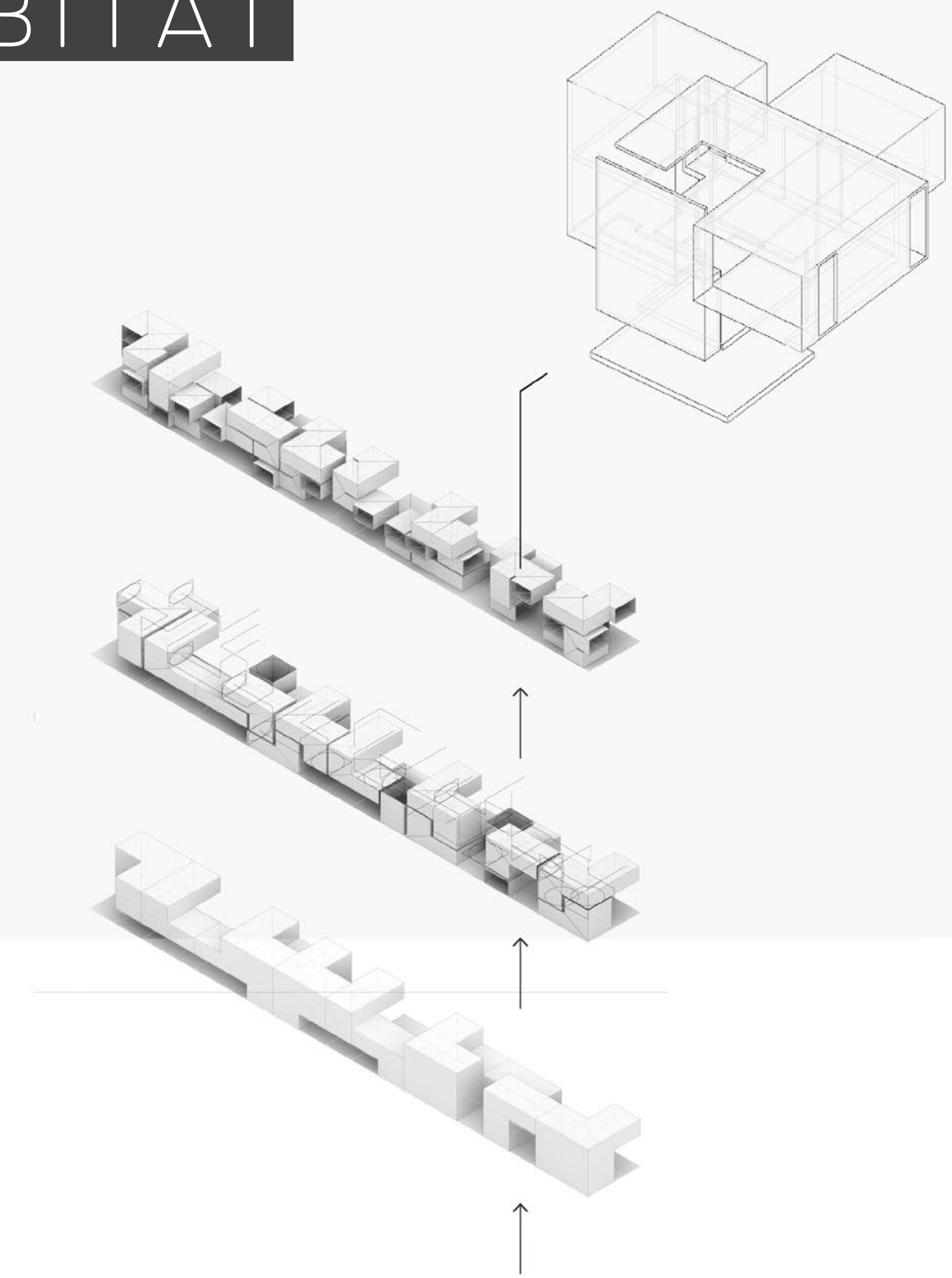
Right: Diagram of 1 of 4 Vertical Sky Gardens, controlled micro-climates with trees and other plantings to provide natural shading and fresh air.



Left: Test massing after application of simple CA nearest-neighboor algorithm. Example of first stage organization which serves as initial condition of subsequent stages in pipeline.

Opposite: Incremental refinement of basic massing by embedded building intelligent into fitness function of weak evolutionary algorithm.

PROTO HABITAT



09

Research project initiated by OPEN Architecture proposal for Netdragon commune At the virgin beach front area where Min River meets the Pacific Ocean, and adjacent to Fuzhou Changle Airport, Netdragon Websoft Company's new headquarters building is currently under construction, embedded in it, the grand visions for the future of the company. Nearly 700 employees and their families will move from the center of Fuzhou city to this new campus. A 50,000m² land which used to be an eel farm will become their new living quarters. This is a very interesting and young community of people. Their work is to create wonderful virtual worlds that entertain millions of people. In real life and on this land of their new dreams, they need a unique living area and a brand new collective life style.

The Netdragon Village project is an architectural experiment investigating how to restructure relationships between people and nature, and also relationships amongst people themselves. The project seeks to create a ecological habitat for the future at a comparatively low cost.

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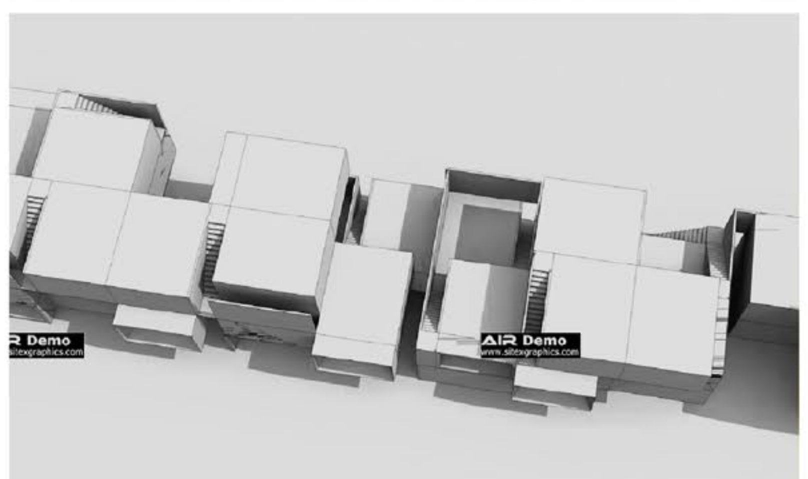
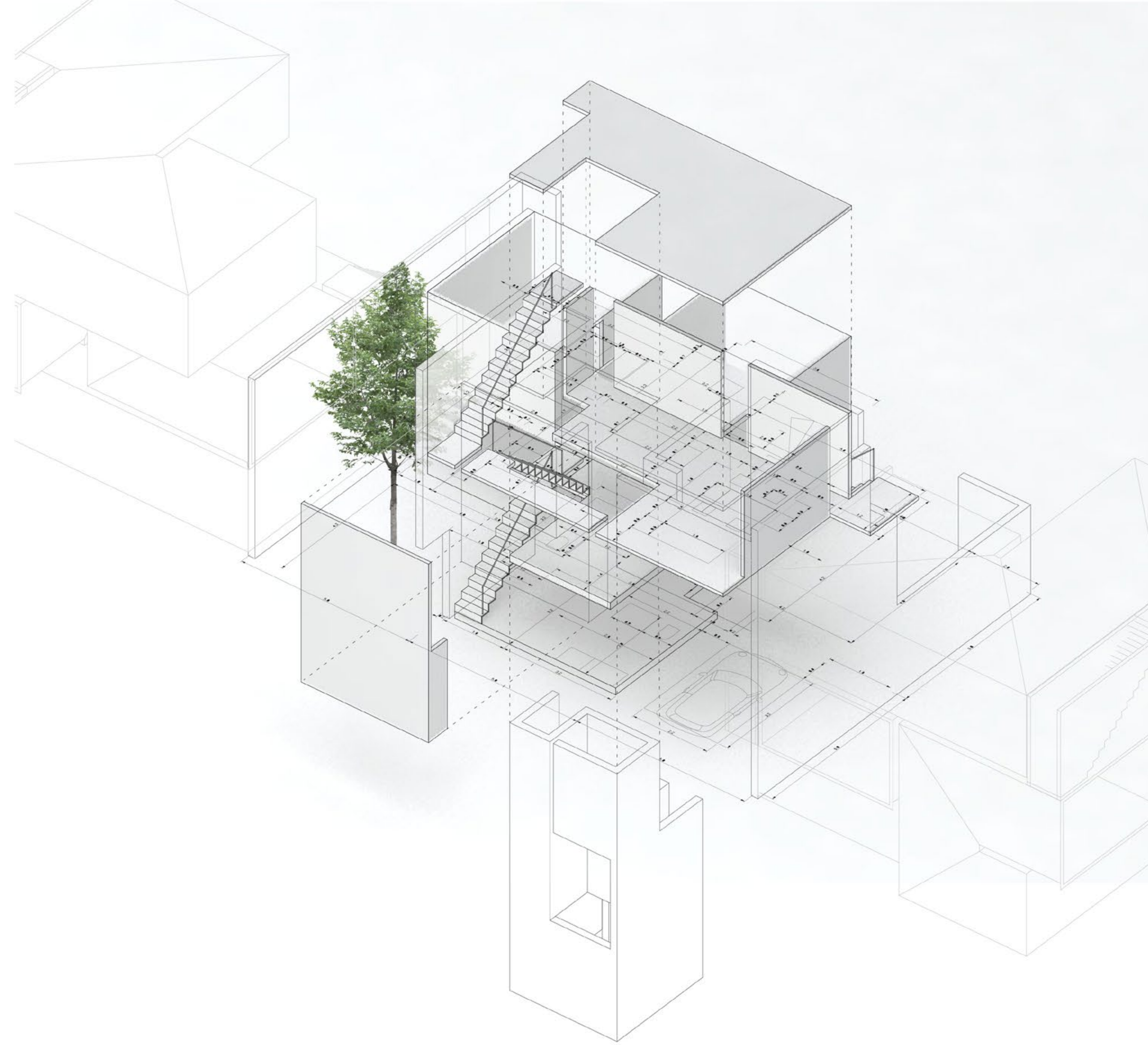
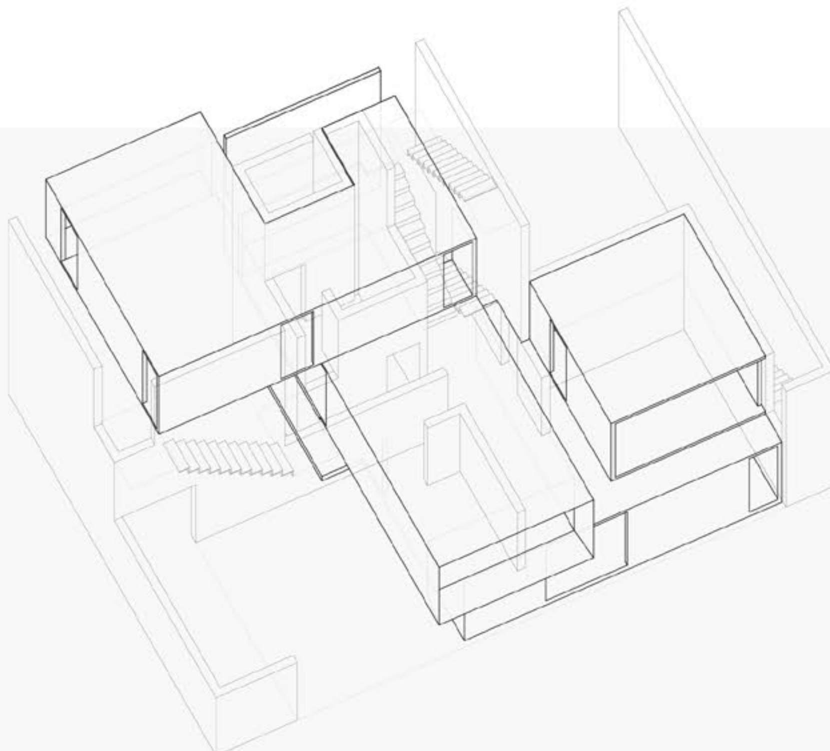
PROJECT SCOPE: COLLECTIVE HOUSING SYSTEM
ROLE: LEAD DESIGNER, RESEARCHER
COLLABORTORS: OPEN ARCHITECTURE, LI HU



The algorithm, initially implemented in rhinoscript, can be divided into three isolated stages. The first distributes cellular mass according a CA logic and optimizer that adjusts massing for circulation paths and other encoded constraints like site, topographic features, etc. The first stage requires as input an initial massing condition as cellular automata procedes as incremental refinement.[1] First stage is also responsible for constructing a cell network, ie. each cell maintains state and keeps track of neighbooring cells. This network is passed to stage two along with further building constraints like program, floor-space allocation, etc. The second stage subdivides single-cell mass into multi-cell clusters or linked cell chains. This is accompolished by establishing an initial condition of randomly placed conditional units and defining a fitness function that evaluates the placement and situation of the unit and simply discards losers and ignores winners. This is a weak genetic optimization algorithm that is more brute force than anything else, but it does find solutions in reasonable amount of time. The final stage embeds building intellegence into cell clusters, places utility core, and adapts unit to basic building constrains... All stages are intended to be a guided meta-design processes, in which designers participate in real time by making subjective decisions and feeding them back into the system.

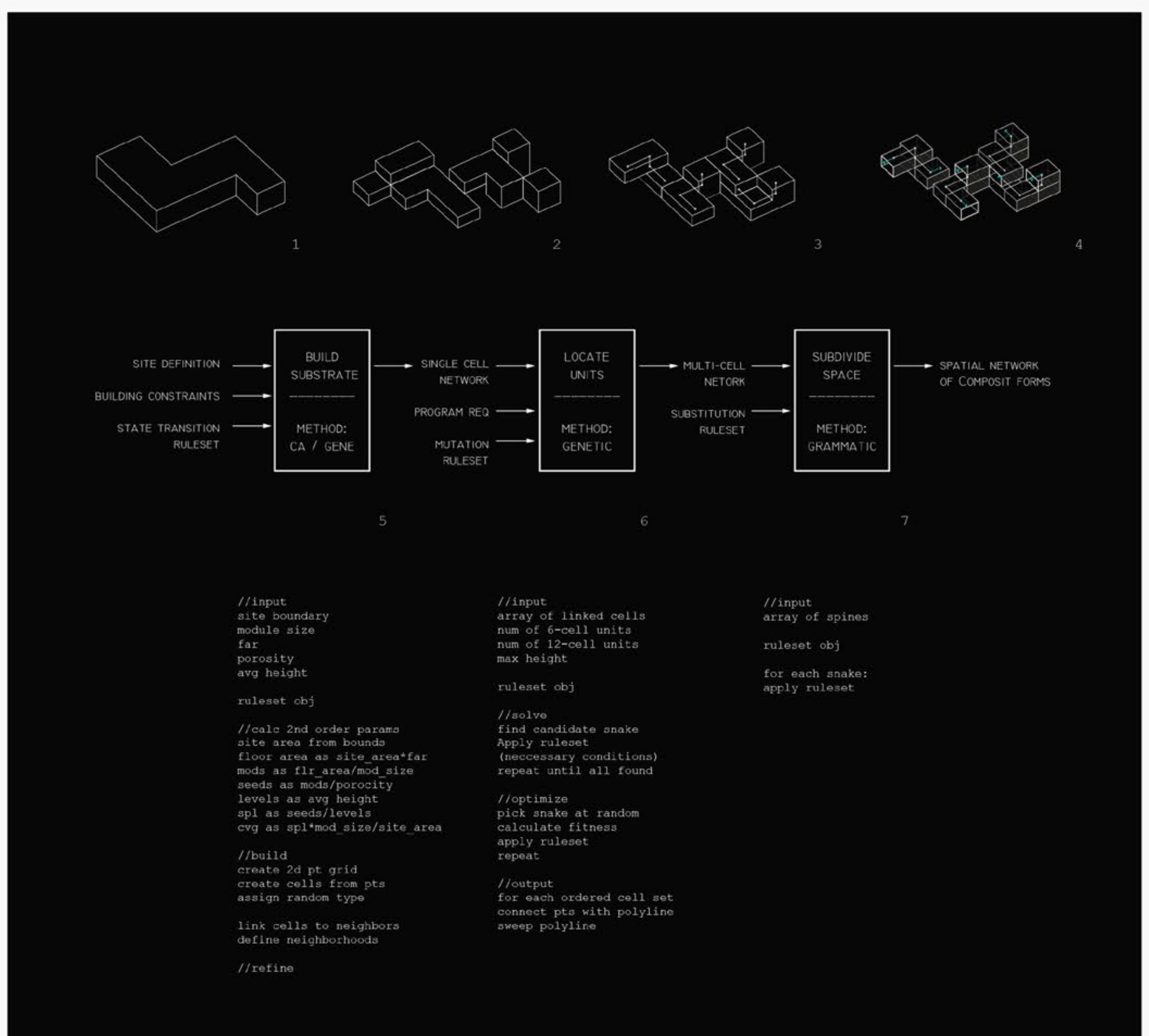


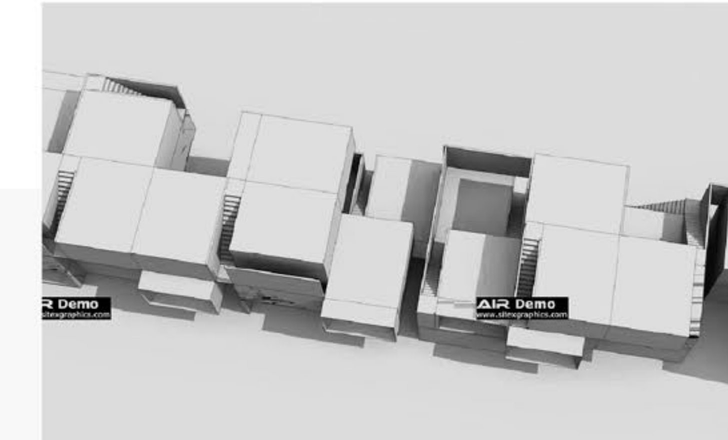
Above: Exploded axonometric of 10x units case study.
Opposite: Process renderings and floorplan of case study.



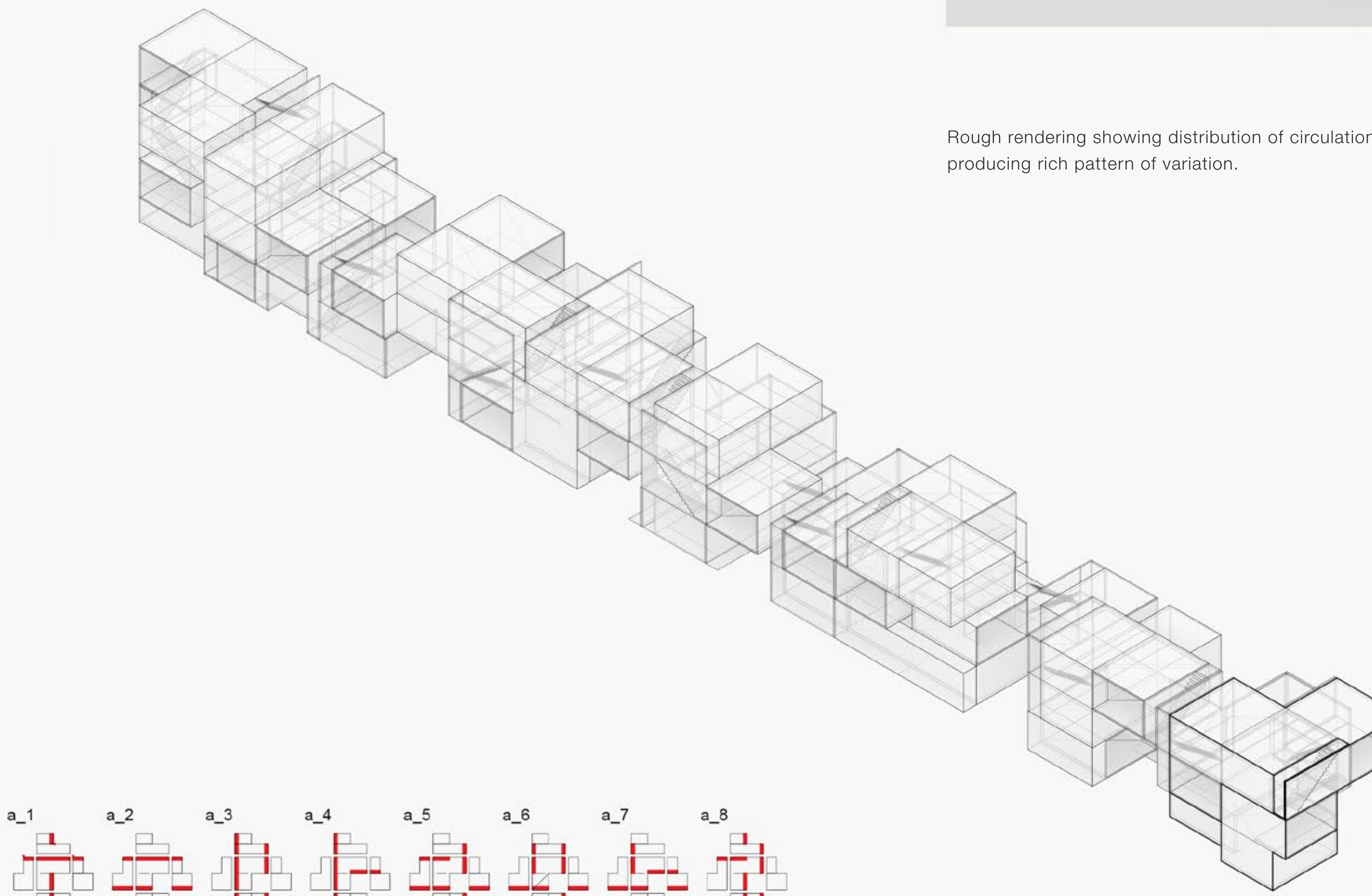
Left: Axonometric of singe unit after application of shape grammar.

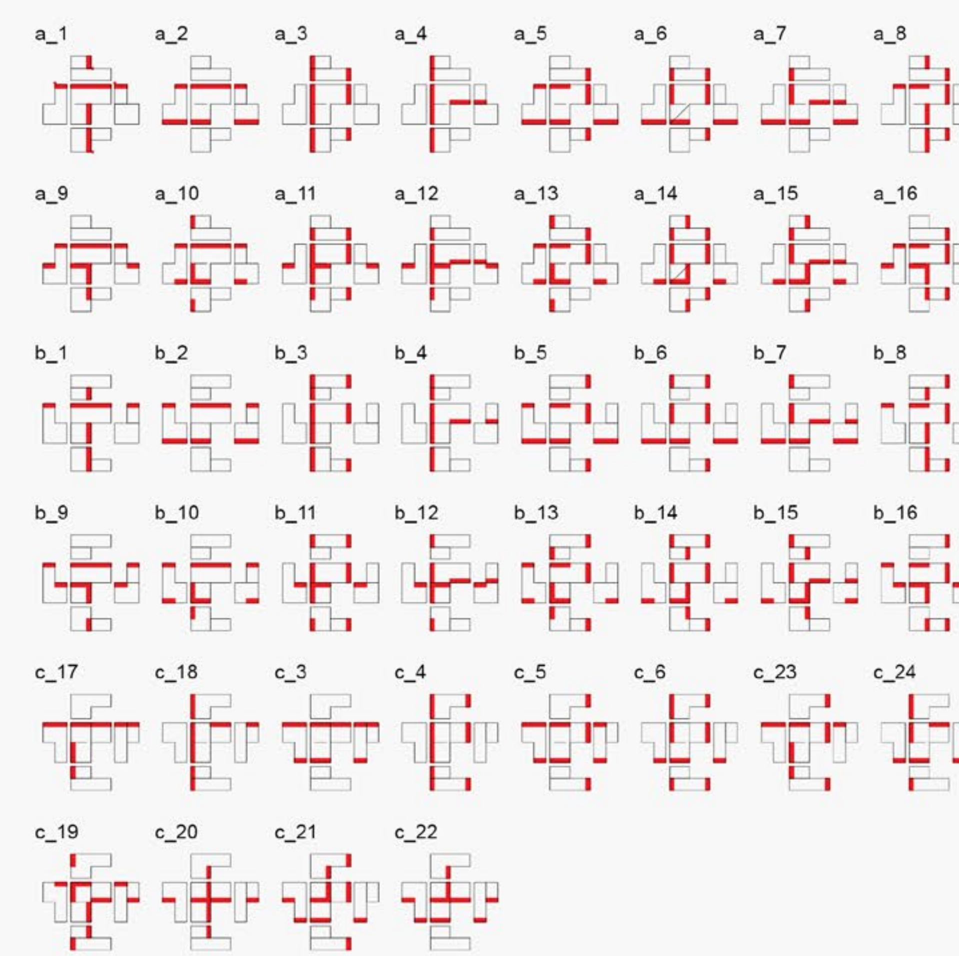
Below: Generative pipeline comprised of three discrete modules for distributing cellular mass, locating optimized units, and subdividing and configuring unit-level spaces.



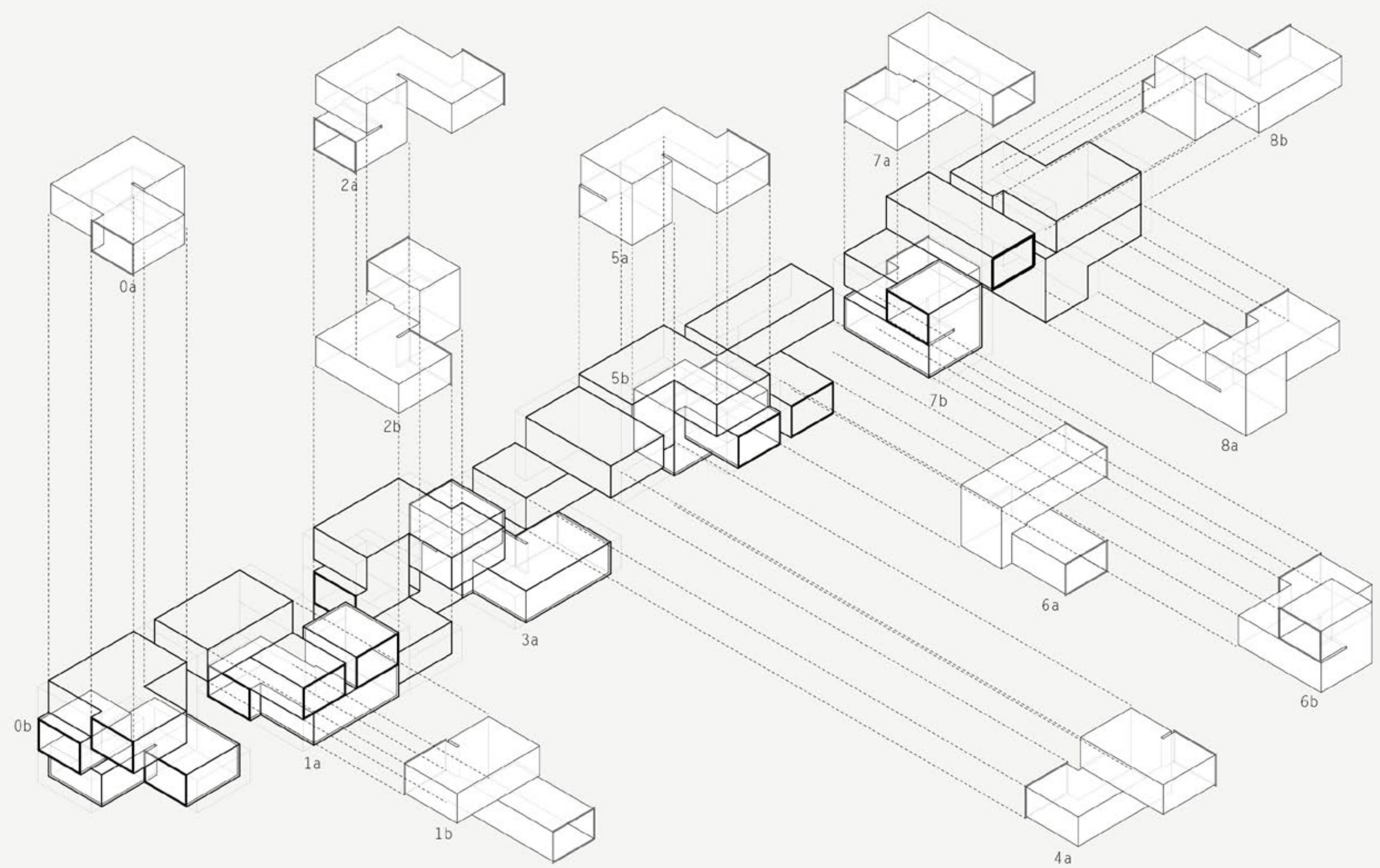


Rough rendering showing distribution of circulation and cell types producing rich pattern of variation.



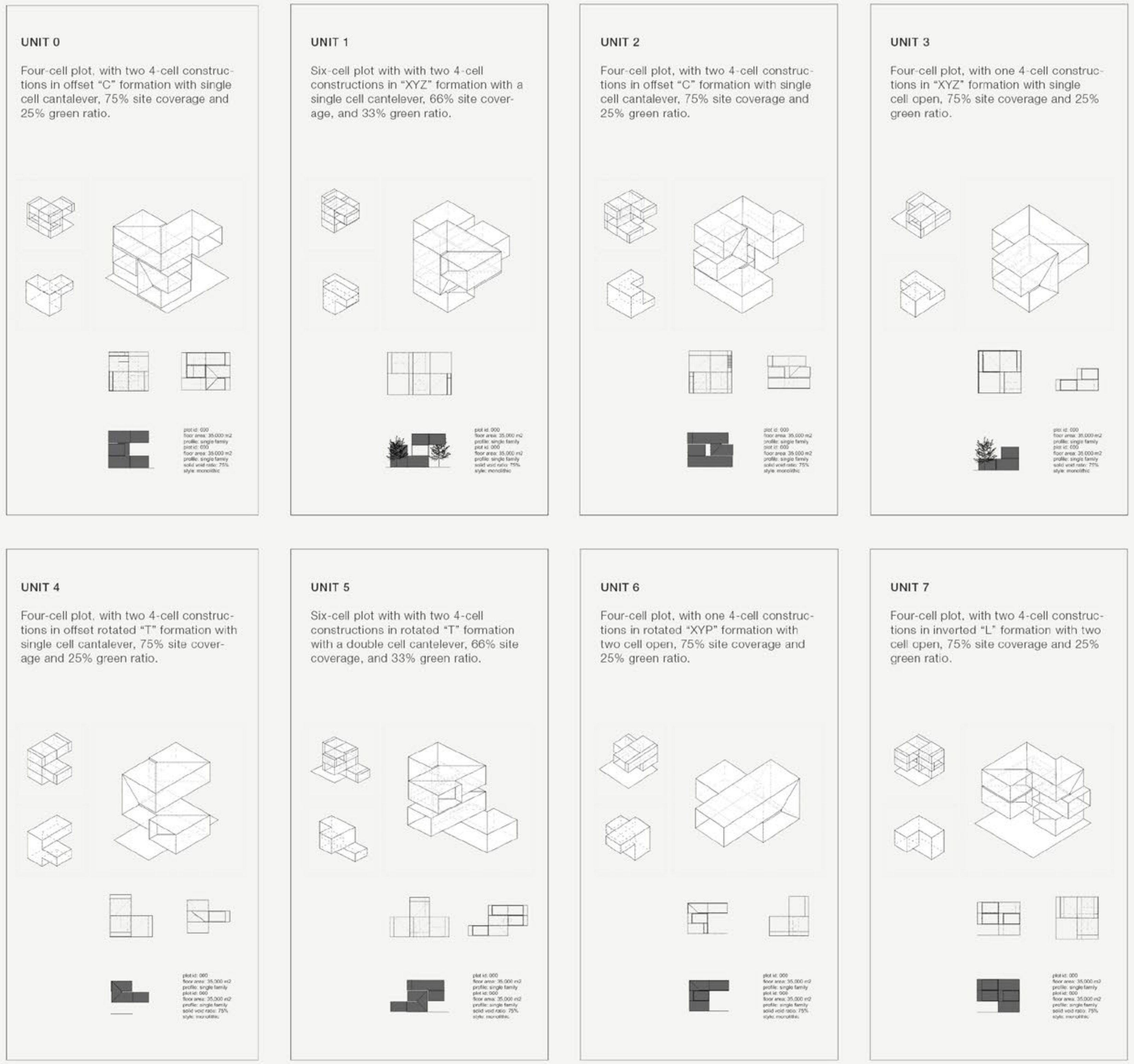


Above: Axonometric of 10-unit case study.
Left: Circulation analysis of permissible circulation paths for 4-cell unit permutations.



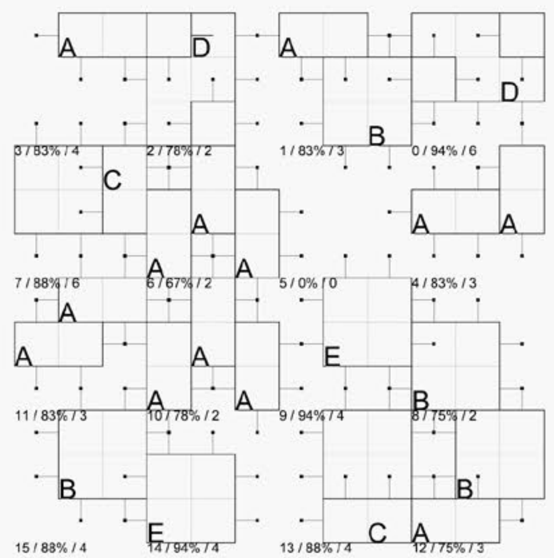
Above: Explosion of units generated for 10-cell case study. Note 3 unique cell states, but 16 unique 4-cell pieces that combine to form 8 living units with form and circulations result from context and circulation.

Opposite: Massing profile cataloging the 8 living units.

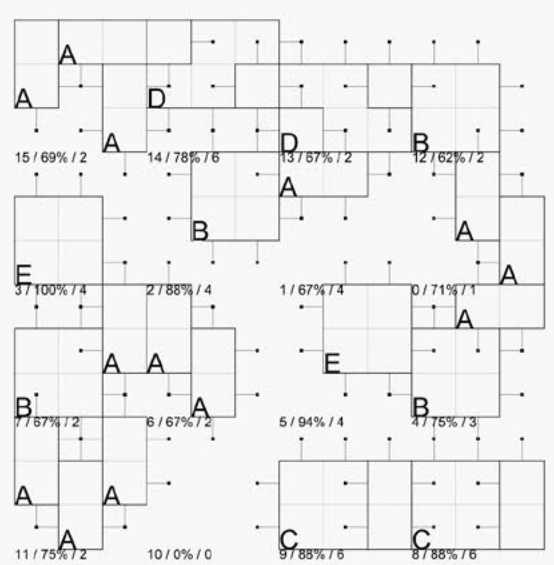


Above: Permissible states of 2-6 cell units
Opposite: self-organized arrangement of approximately 100 four-cell housring units.

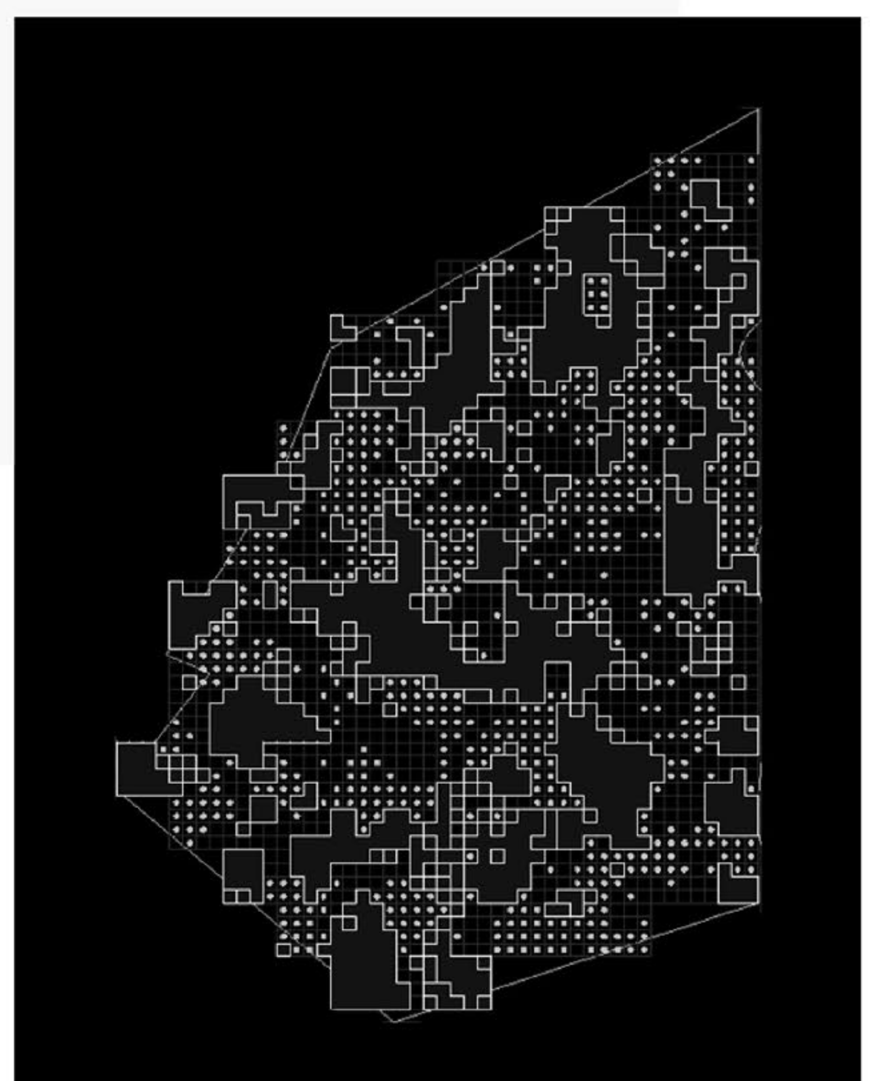
Below: Floorplans of 2-6 cell units.



Cell Dimensions: 4.5m x 4.5m x 3m
A count: 1
AA count: 2
AAA count: 2
B count: 2
BA count: 2
C count: 2
D count: 2
E count: 2
EA count: 0
F count: 0
FA count: 0
Min % exposed per unit: 50%
Min south faces per unit: 1
Avg % exposed per unit: 78.125
Avg south faces fer unit: 3.25

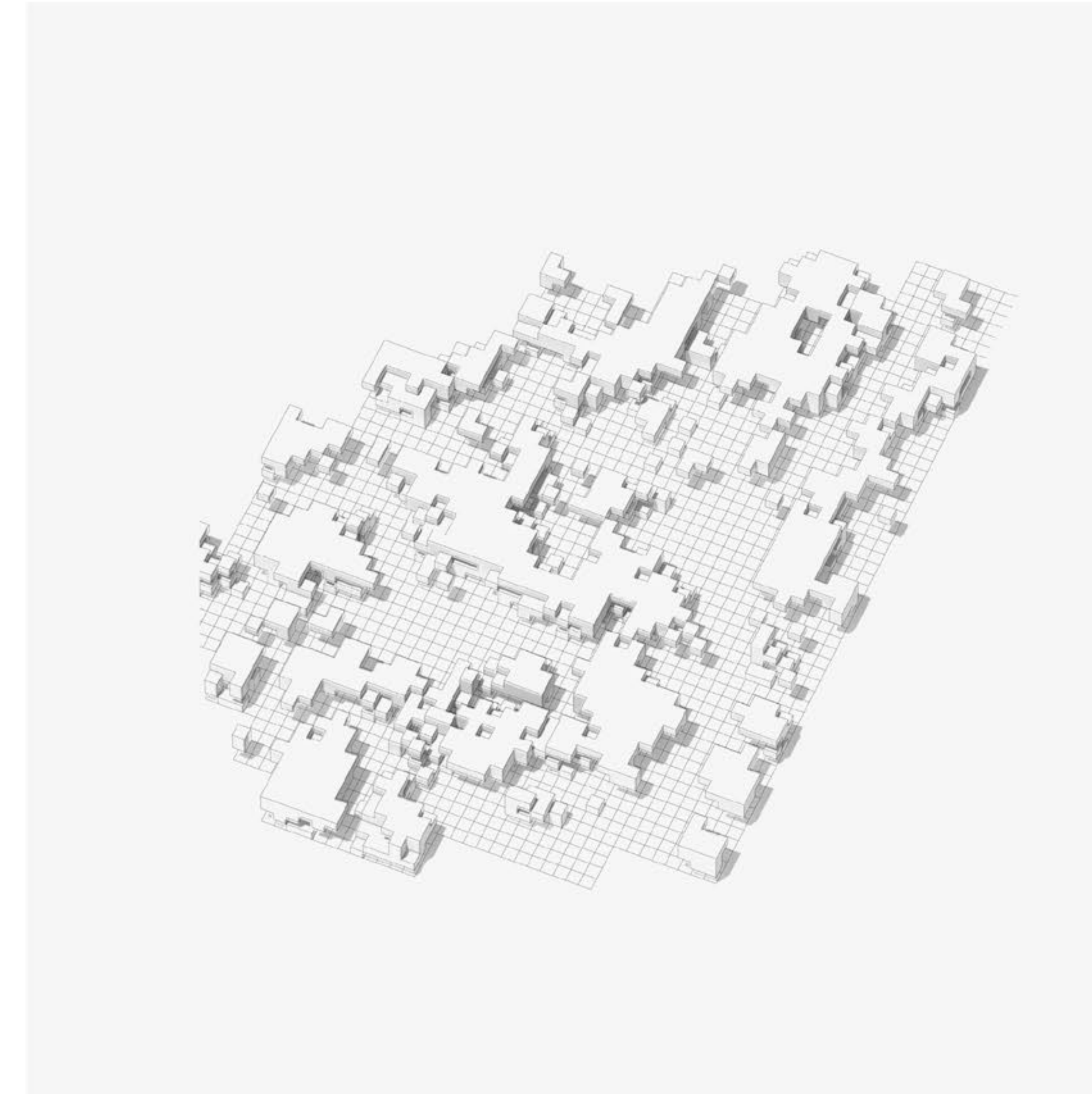


Cell Dimensions: 4.5m x 4.5m x 3m
A count: 1
AA count: 2
AAA count: 2
B count: 2
BA count: 2
C count: 2
D count: 2
E count: 2
EA count: 0
F count: 0
FA count: 0
Min % exposed per unit: 50%
Min south faces per unit: 2
Avg % exposed per unit: 72.0920138888889
Avg south faces fer unit: 3.125



Above: Sensible unit study

Rignt: 100 unit massing after stage 1 distribution of Cells.

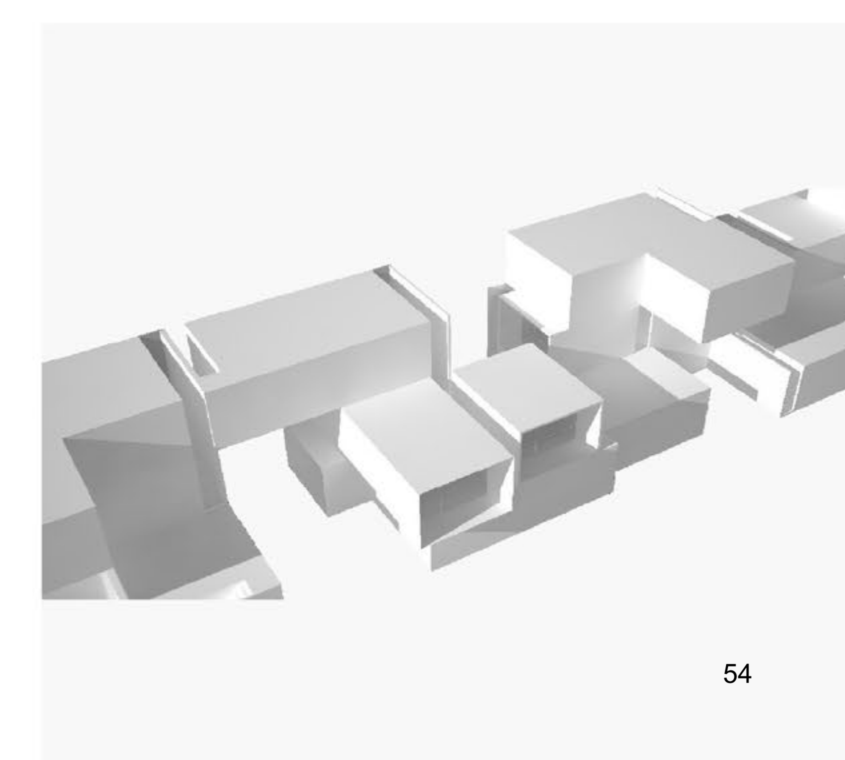


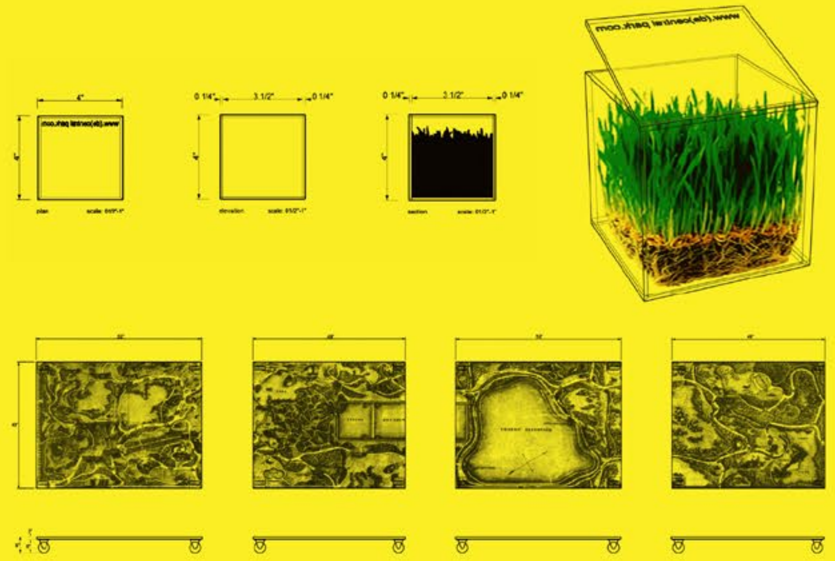
SELF-ORGANIZATION

Left: 100 unit massing after stage 1 distribution of Cells according to CA nearest-neighbor logic.

Sensible unit study informed optimization protocols after “dumb” massing logic distributes mass typicall according to topographic pattern logic. In order for units to further respond to localized context, they collect information about neighboring cells, establish relation to street and utility grids, as well as environmental data regarding, e.g., solor exposure. They can then iteratively self-organize and compete according to weak genetic algorithm that optimizes fitness. Particular function chosen for pattern and fitness intended to be provided by user or client application. Initial 10 and 100 cell experiments implement simple nearest-neighbor pattern logic to distribute mass onto the site, and then a stochastic packing algorithm to distribute units. Finally, simple shape grammer satisfying basic circulation and subdivision of space.

Rignt: Massing to provide context for 100 unit massing above.





right: diagram of box and dollies
opposite: dispersion senarios

PROJECT SCOPE: DESIGN COMPETITION, FACADE INSTALLATION
ROLE: CONCEPT, INTERACTION DESIGN
COLLABORTORS: WILSON DAY, SAI SINBONDIT, THEODORE BROWN

03

(DE)CENTRAL PARK

15,000 Boxes, 4"x4"x4", will be located on four dollies placed parallel to the Lubin House facade. Central Park dirt excavated during The Gates installation, will be placed in each box - a piece of the park. To be taken by any passerby, The Boxes will be dispersed throughout the region, collected or discarded. The non-biodegradable material will be cycled into daily life constantly relocating (de)central park.

The 7,500 Boxes and four dollies will remain outside Lubin House until they are removed by residents, visitors, police, vandals, vagrants, or employees. www.decentralpark.com (launched 01.01.05, address in each box), will interactively facilitate the tracking of each box.

TRACKING & MAPPING: Each box is labeled with a unique alphanumeric identifier and website address: www.decentralpark.com. This identifier along with anonymous address is submitted on the website, and entered into a database with a timestamp. A given box is reentered any number of times as it is given away, forgotten, found again, and passed along deliberately and incidentally. Each time it is resubmitted with another address and unique timestamp, a fixed point in time and space is defined. The collection of all geospatial points for a given box characterizes its discrete path. All paths define the dispersion pattern of the boxes and decentralization of the park.

text by Theodore Brown

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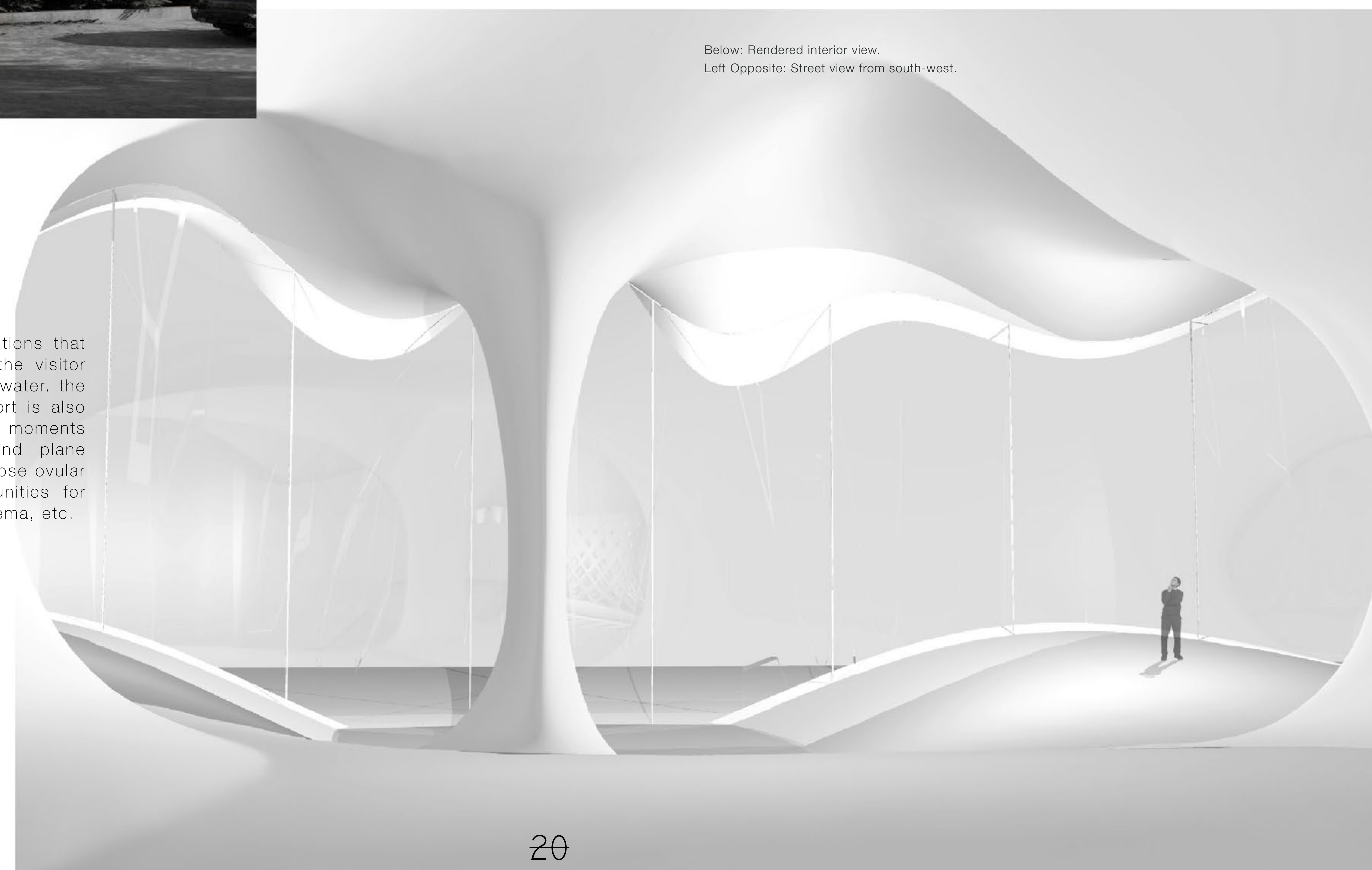
ZHUHAI PORT PAVILION

PROJECT SCOPE: ARCHITECTURAL DESIGN OF CITY PLANNING MUSEUM
ROLE: LEAD DESIGN CONSULTANT FOR INGAME ARCHITECTURE
COLLABORTORS: INGAME ARCHITECTURE, YANG ZHANG
CONTRIBUTION: CONCEPT/SCHEMATIC DESIGN, COMPUTATIONAL DESIGN, DESIGN DEVELOPMENT
CLIENT: ZHUHAU PORT AUTHORITY

Below: Rendered interior view.
Left Opposite: Street view from south-west.



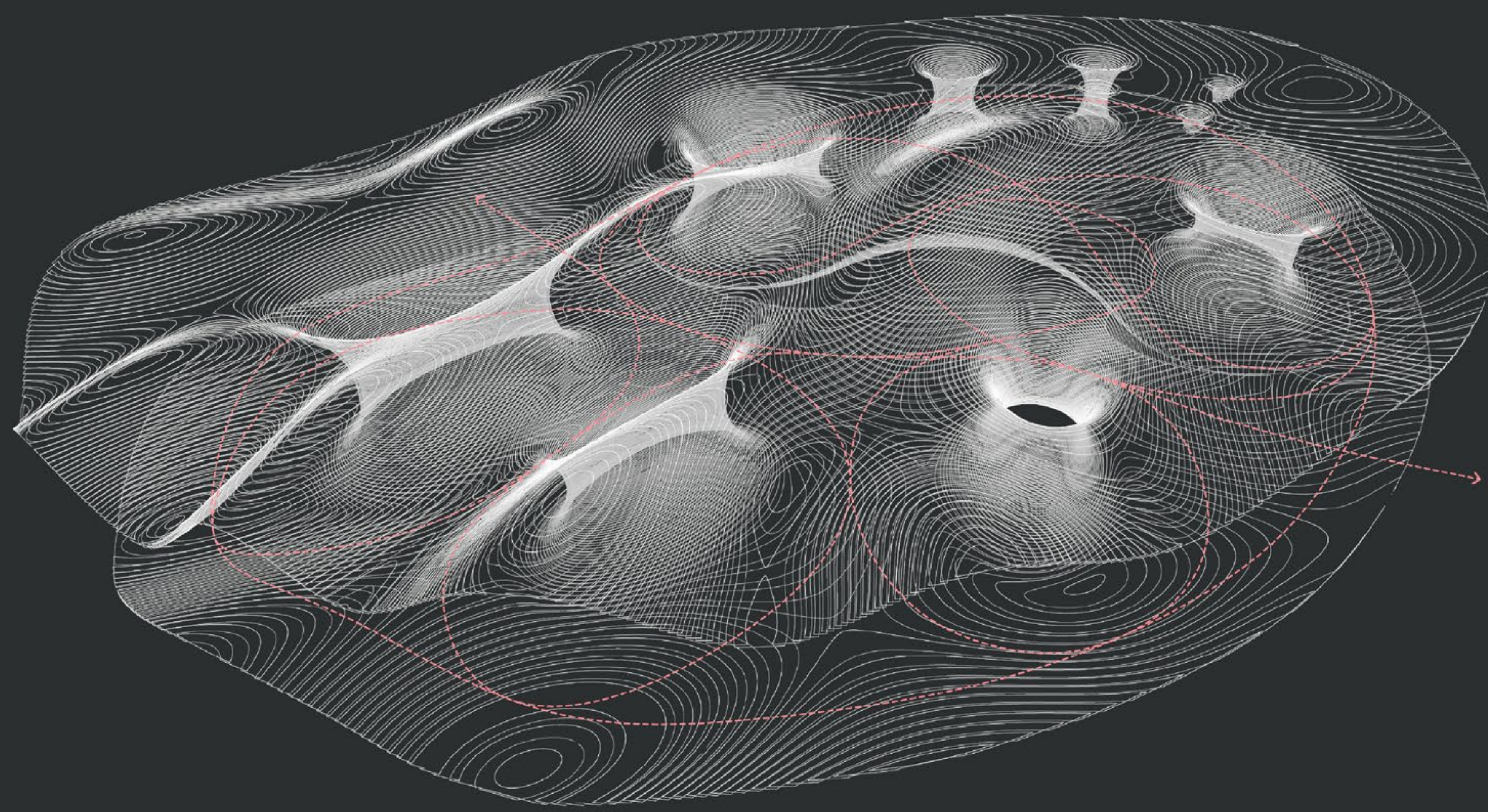
10

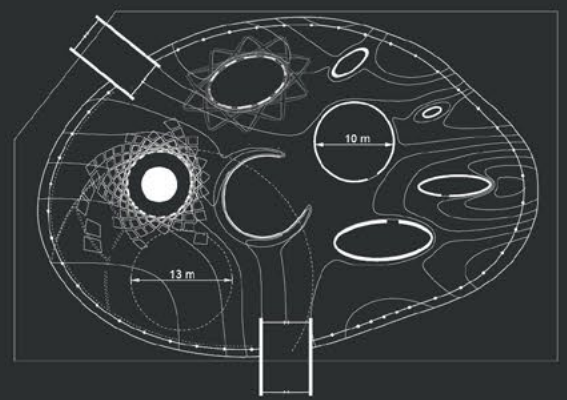
Pavilion to Showcase the 5-10 year development plan for the 7 port areas in Zhuhai. The plan of Gaolan Port is at the center of the display with the Wanshan Port being a supplementary. Requirements include dark rooms with circular model spaces 15m and 4.5m in diameter, Large display wall, cinema, lounge and general public space. Design to invoke the ocean and port and Zhuhai's position as a international port. Project asked for a formal response to “sea and port”. Continuous free-form surface provide language and medium to produce spaces evokative of flowing sea water while guiding people through continuous sequences of soft expansions and contractions that serve as exhibition space. the visitor experience is of being underwater. the language and meaning of port is also incorporated to describe moments where the undulating ground plane connects with ceiling to enclose ovular spaces that become oportunities for office space, bathrooms, cinema, etc.

20

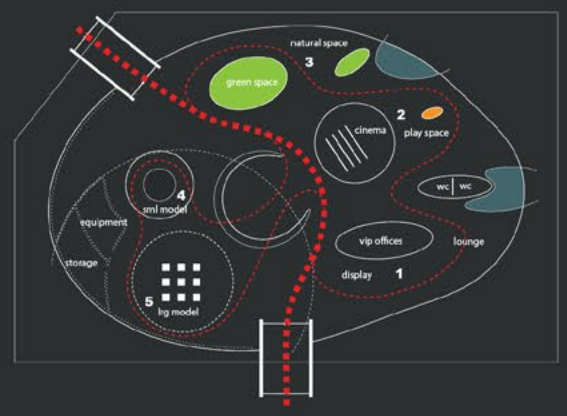
16

Program was divided into two groups. For the most part public activity space, lounge and exhibition occupies the main intersticial space. Remaining program: offices, bathroom, cinema, dark rooms, etc. occupies ovular spaces created by surface deformations. Design was a process of placing circular program in plan, taking the centers, and radius, as location and size of surface ports. A port pulls ground and roof planes together, effectively disturbing the surface as it self adjusts according to structural criteria. The surface, in turn, pulls back stretching and elongating the circles, creating ovular spaces. The cumulative effect of all ports is a heavily undulated surface pair. The frequency and amplitude of irregular waveforms depends on incremental spacing of ports and ground ceiling height.





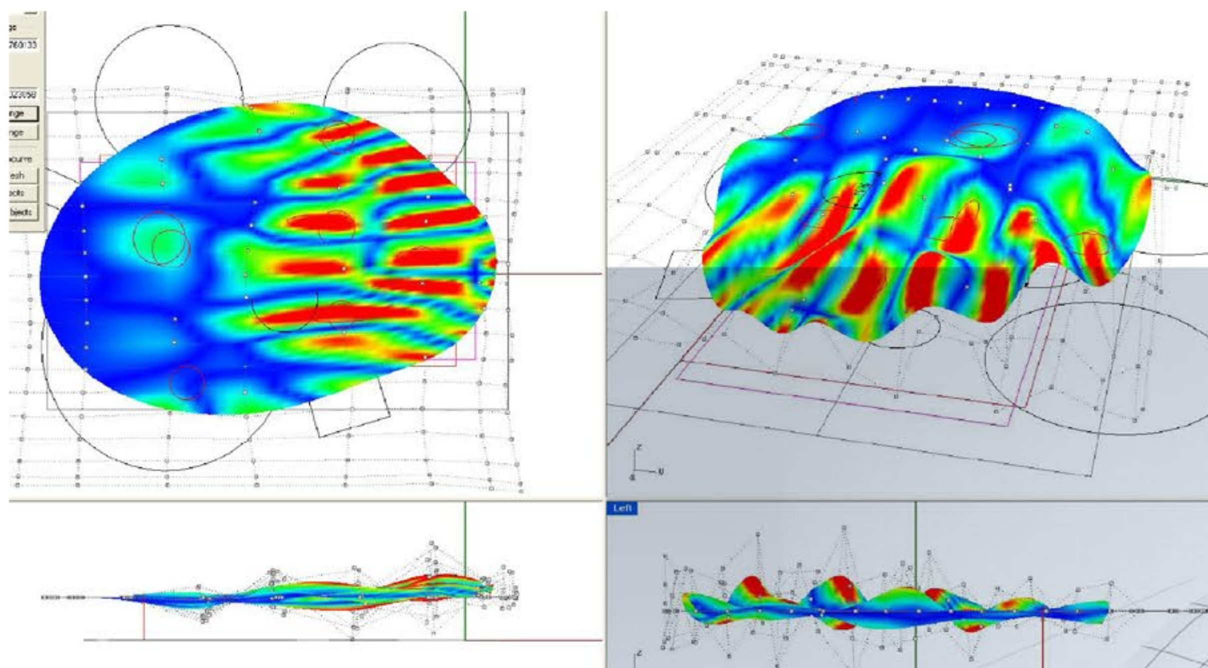
CONTOUR

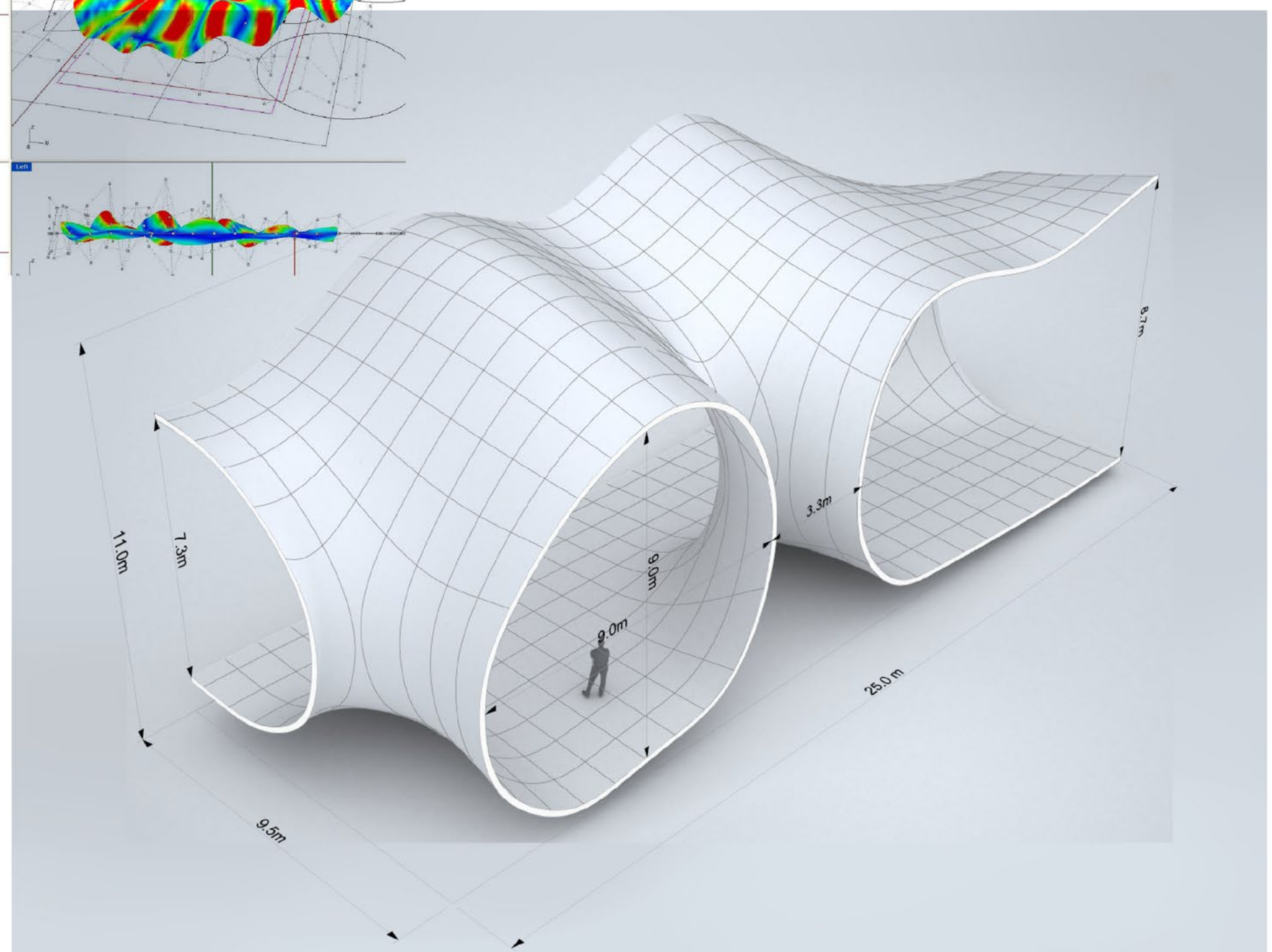


CIRCULATION

Program was divided into two groups. For the most part public activity space, lounge and exhibition occupies the main intersticial space. Remaining program: offices, bathroom, cinema, dark rooms, etc. occupies ovular spaces created by surface deformations. Design was a process of placing circular program in plan, taking the centers, and radius, as location and size of surface ports. A port pulls ground and roof planes together, effectively disturbing the surface as it self adjusts according to structural criteria. The surface, in turn, pulls back stretching and elongating the circles, creating ovular spaces. The cumulative effect of all ports is a heavily undulated surface pair. The frequency and amplitude of irregular waveforms depends on incremental spacing of ports and ground ceiling height.

Left: Sectioned axon showing scale and formwork.
Below: Curvature analysis, blue indicating areas of minimal curvature, and red, areas of maximum.

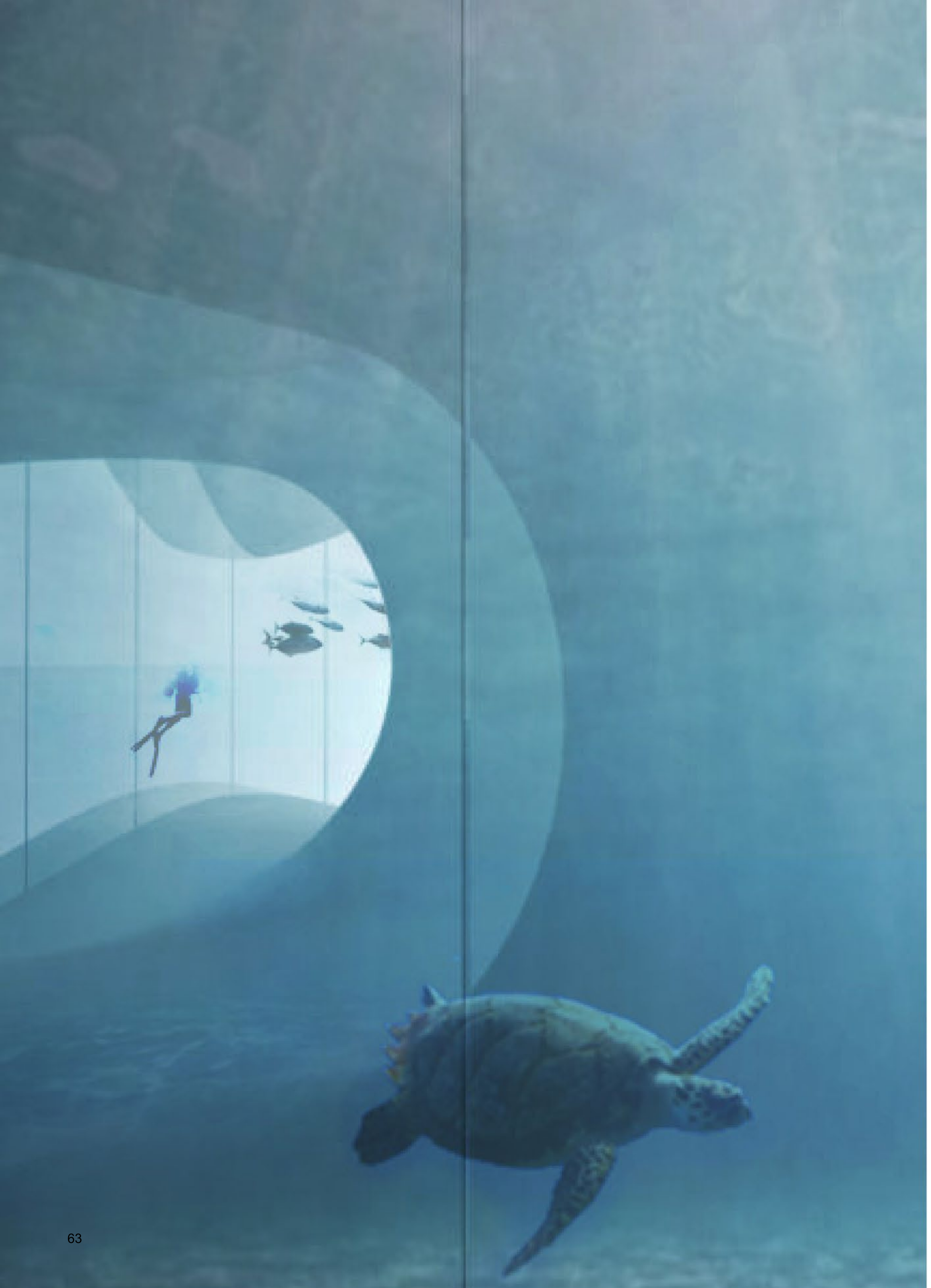




The thin-shell structure is realizable with reinforced concrete shells and plywood formwork. This has proved to be an economical and efficient solution used by free-form structures in recent years, most notably by Mutsuro Sasaki working in collaboration with Toyo Ito. Of particular relavance as design and structural precident was the Kakamigahara Crematorium. Based on design precidents and structural heristics, we can anticipate surface thickness of 200 mm. This creates an exceptionaly thin and light structure (see img below). The large overhang is additionally supported by steel columns that interupt otherwise continuous glass infill that wraps the structure at the edge minus an offset that also varies according to structural requirments.

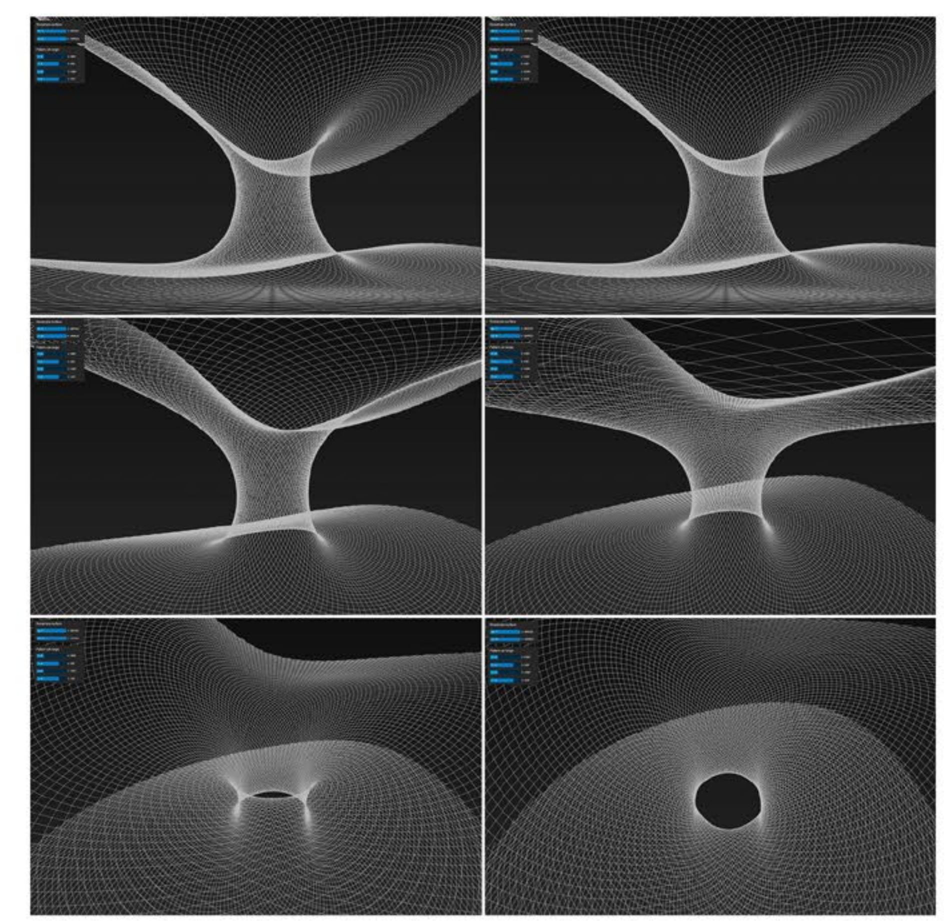
The structure would require variable reinforcement to support the distributed vertical load of approximately 1 KN/m2, as well as the horizontal wind and seismic loads. The arragement of reinforcement can by determined with calculus-based optimization software, which calculates incremental compression and bending forces along surface, then produces a reinforcemnt map. According to Sasaki, the ideal construction solution also includes steel plates to better hold the form and counter the loss of rigidity due to cracking. He describes a “hybrid construction of steel plates and cncreete”. Plates would act both as formwork for concrete and then fixed in place for a hybrid cross section.

Left: Sectioned axon showing scale and formwork.
Below: Curvature analysis, blue indicating areas of minimal curvature, and red, areas of maximum.



A custom paneling tool was built with java/processing using open source geometry library (igeo, by Saturo Sugihara) to interogate form and explore the possibility of perforating the shell in places to create visual and physical access through vertical surfaces. Tool defines a uv diagrad and maps performation patterns onto surface using simple algorithms and exposing design parameters and enable real-time collaborative use by architects and engineers.

Steel ribbed construction technique was also considerred as alternative approach that offerers formal and material opportunities. White freeform surfaces have a tendency to look realy great in the computer and not-so-good in the world. This is because its very easy for the eye to detect surface flaws and hard to build perfectly. Ribbed construction offers the opportunity to panelize the surface with rich textures while giving the surface a grain that reinforces the form, making it easy to read. See images below and left.



Opposite: Concept Rendering expressing client's desire for evokative space of sea and port.

Right: screenshots from custom software application used to explore form and paneling.

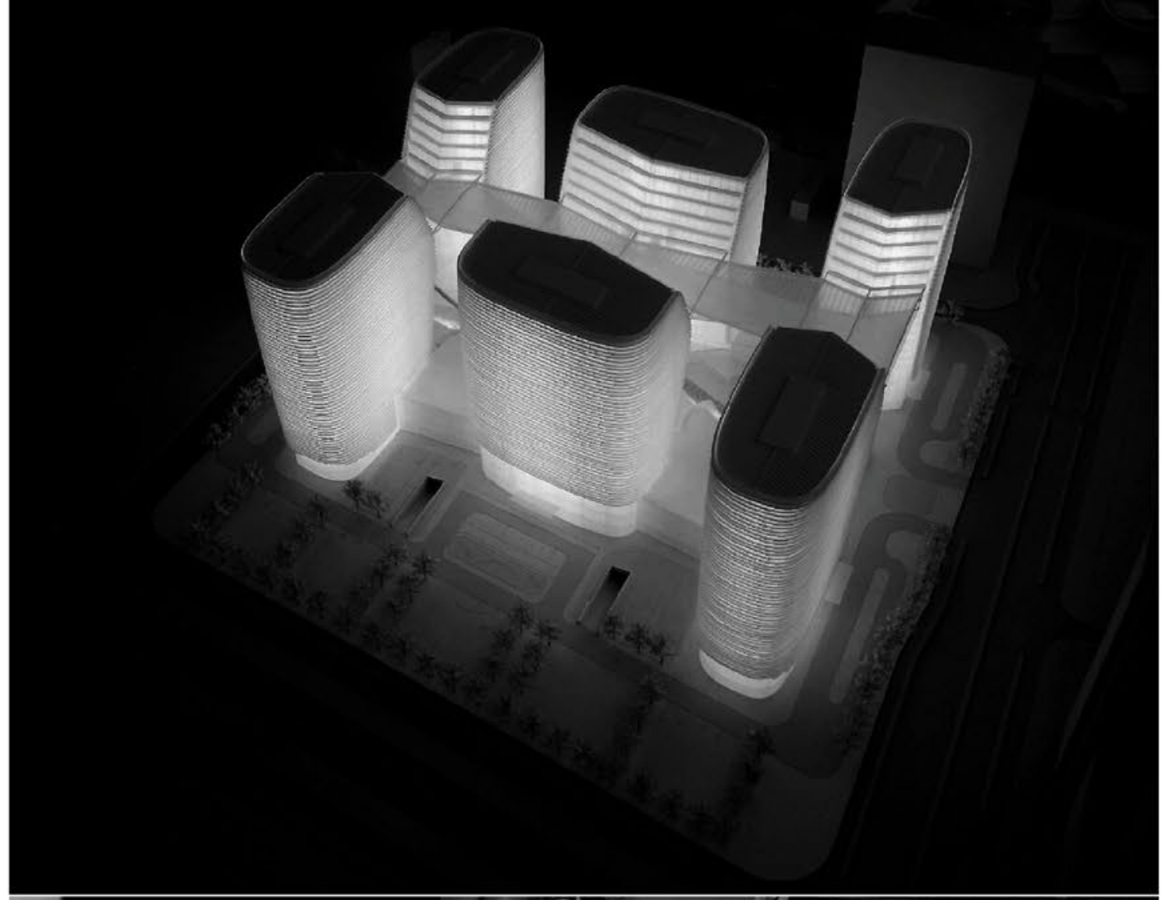
20

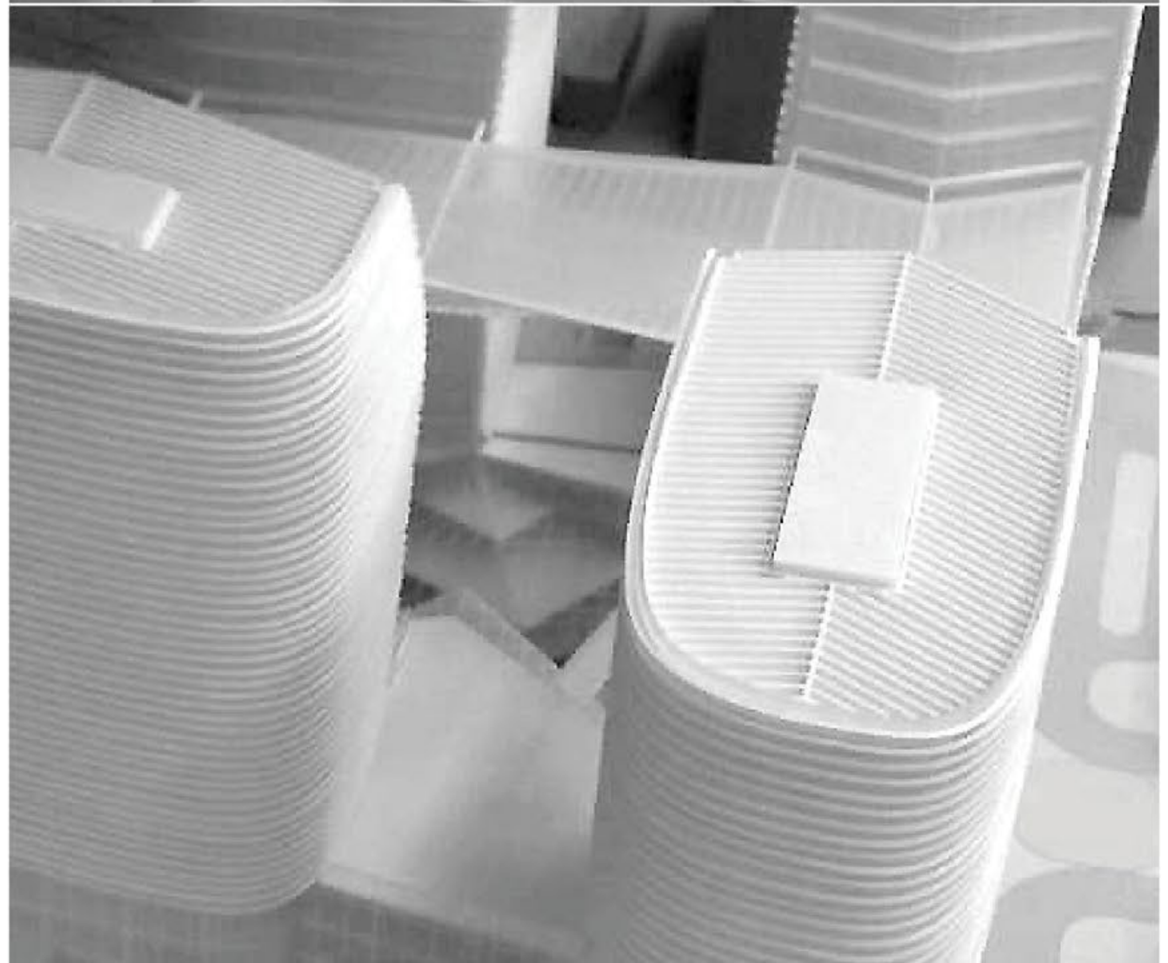
16

Mixed use software park to include space for office, hotel, and outdoor retail park in Hangzhou. By connecting key public entry points on the east and west of the site, we create a large retail street cuts throught the length of the site. This responds to existing traffic flows and activates new ones creating an internal negative space for commercial and leasure activities. By pusing tower volume back in three places we create hexagonal negative space that enclosed the internal street, while also creating opportunities for terracing on the top of the tower and retail levels. By pulling tower volume forward we then create hexagonal negative space in plan the creates a dynamic internal space that opens into plazas and closes into sculptural streets. this also opens up street plazas to increased levels of natural light. By pusing ground plane down with exposed valuable retail fronts on basement levels to internal street, while strengthening the negative space defined and creating highly dynamic 3-dimenstion experience for shopping moving along the street.

05

PROJECT SCOPE: ARCHITECTURAL DESIGN OF MIXED-USE SOFTWARE PARK IN HANGZHOU, CHINA
ROLE: SENIOR ARCHITECTURAL DESIGNER
CONTRIBUTION: CONCEPT DESIGN, URBAN STRATEGY, MODELING & RENDERING
CLIENT: HANGZHOU SOYEA



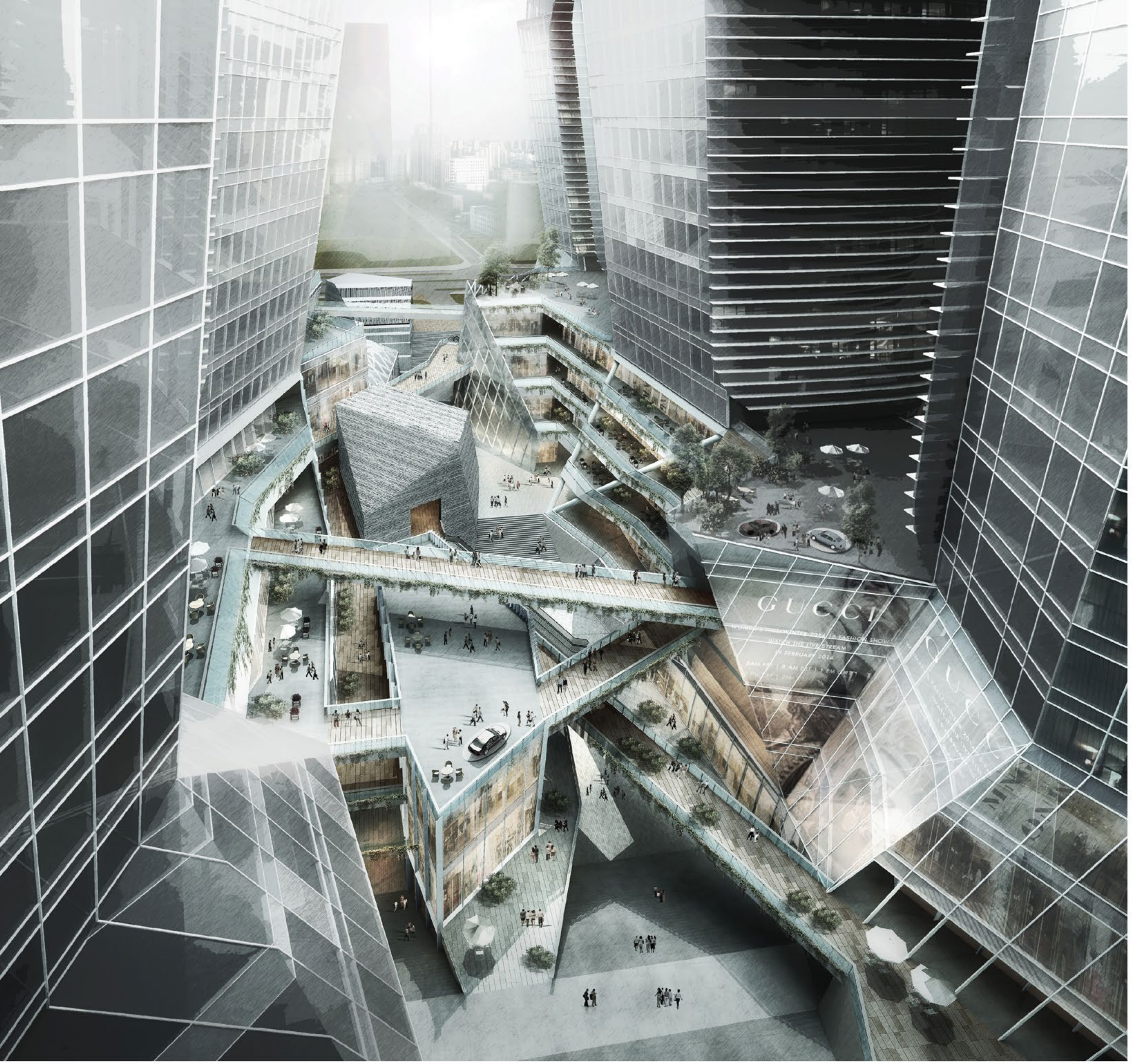


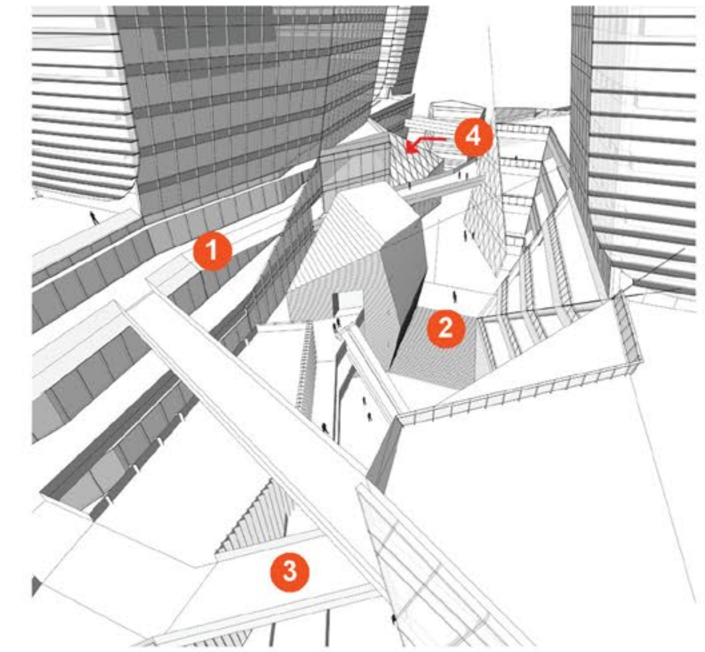
left: photos of physical model

text and images courtesy of Aedas
more at http://www.aedas.com/en/architecture

HANGZHOU SOYEA SOFTWARE PARK

AEDAS

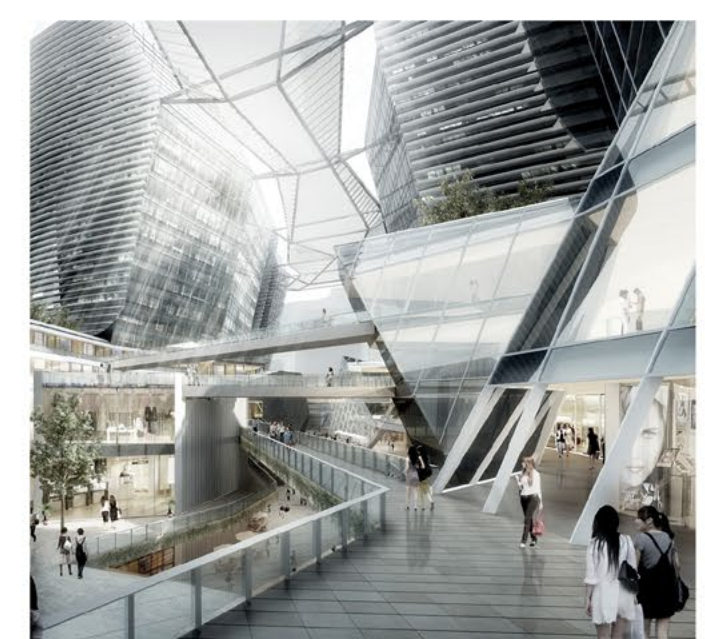


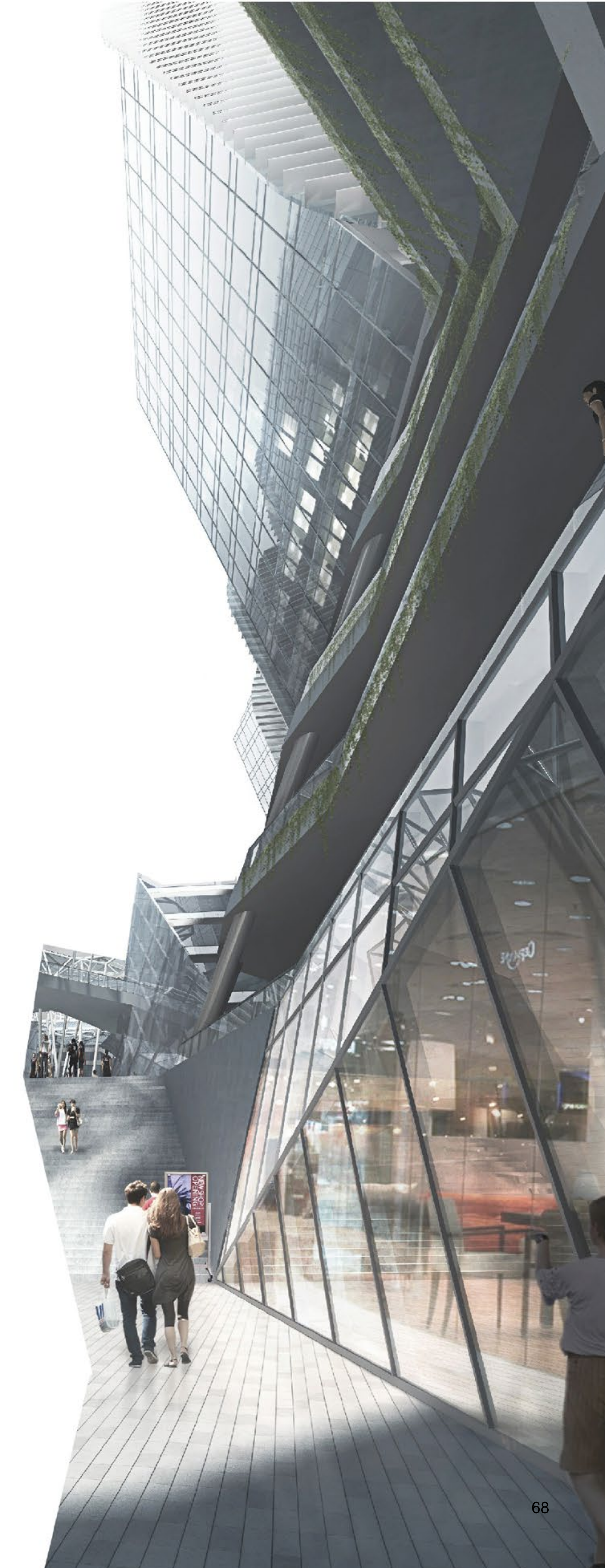


Retail levels are terraced creating rich and playful sculptural spaces with covered and open-air green break-out spaces for public seating that overlook internal street and establish dramatic bridging opportunities that facilitate closed retail loops on all retail levels. Offices and hotel are also terraced on upper floor levels creating balconies for internal sky gardens that are stepped back to recieve natural light.

above: public space features
opposite: rendering of commercial street

text and images courtesy of Aedas
more at http://www.aedas.com/en/architecture





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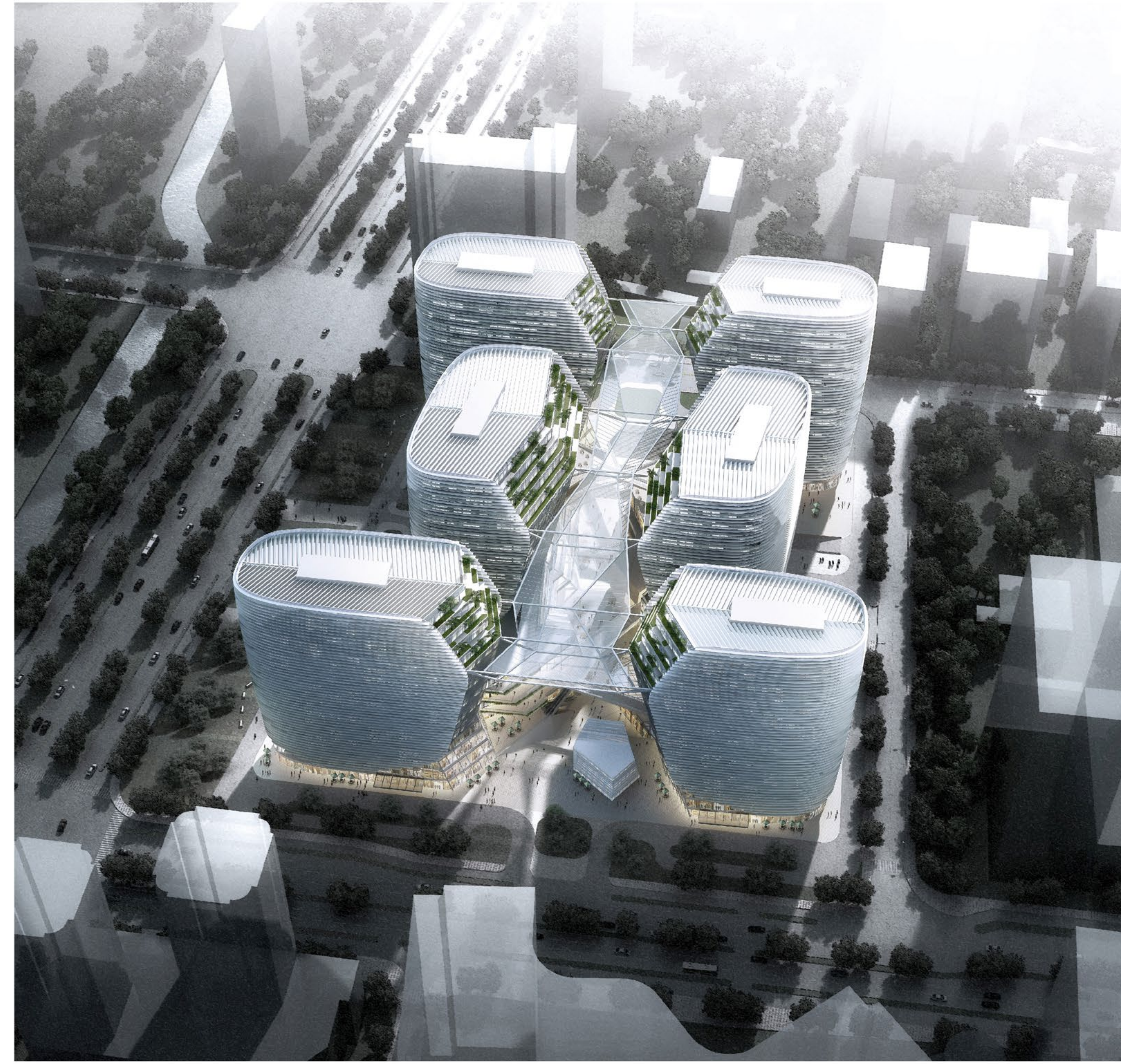
above: massing strategy
opposite: rendering of commercial street

text and images courtesy of Aedas
more at http://www.aedas.com/en/architecture



OPEN ARCHITECTURE, BEIJING

CHINESE ACADEMY OF BUILDING RESEARCH (CABR)

PROJECT SCOPE: DESIGN COMPETITION FOR AIRSHIP HANGER IN ANHUI, CHINA
ROLE: LEAD DESIGNER CONSULTANT FOR OPEN
CONTRIBUTION: CONCEPT/SCHEMATIC DESIGN, FORM-FINDING, COMPUTATIONAL DESIGN
COLLABORTORS: OPEN ARCHITECTURE, CHINESE ACADEMY OF BUILDING RESEARCH (CABR), LI HU (PRINCIPAL IN CHARGE), HU BOJI

UPLIFT AIRSHIP HANGER

Layers of earth are thrust upward by the geological process of uplift exposing a spatial pocket in the earth for airship operations while generating unexpected oportunities for secondary function as form becomes manifest as a “natural” landform that integrates with site both visually and systemically as a member of a self-sustaining networked ecology of tree-covered mountains and landscapes.

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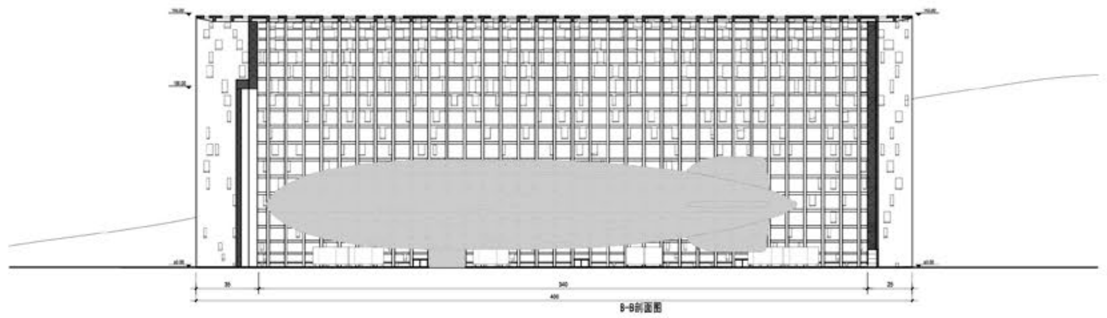
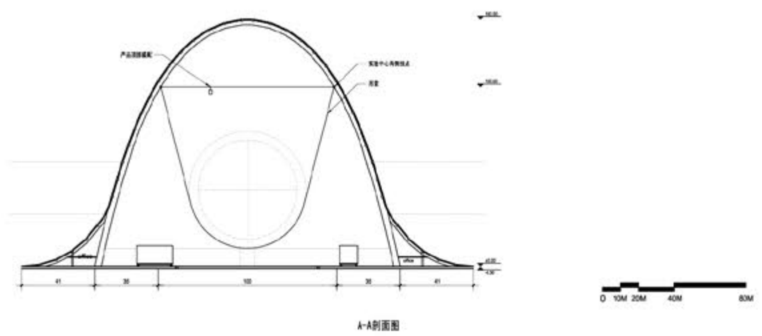
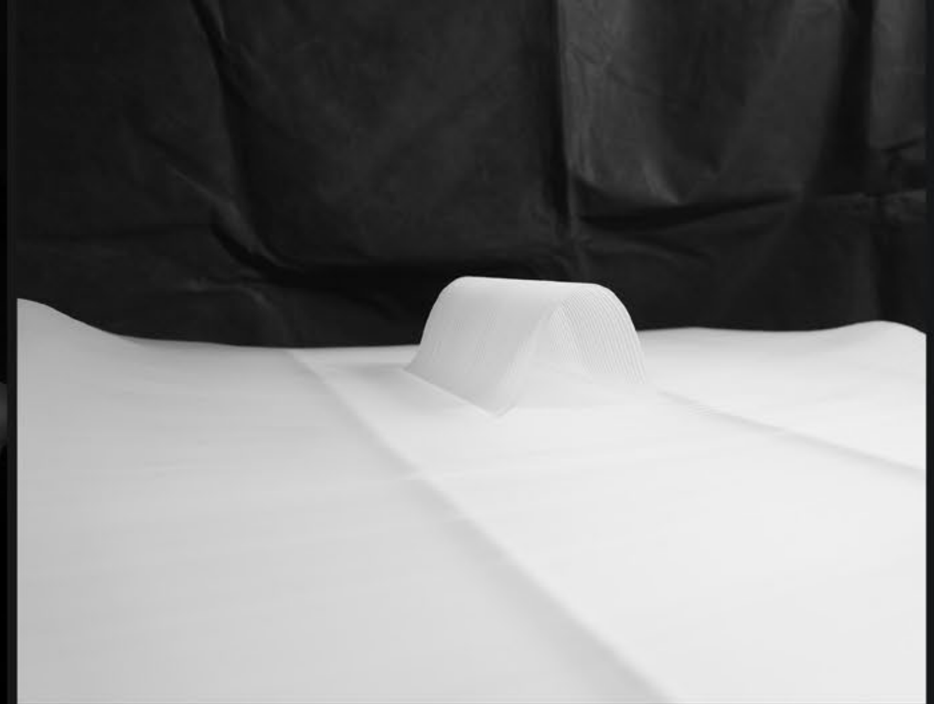
View from inside hanger with main hanger doors open and airship in forground.

images courtesy of OPEN Architecture
more at http://openarch.com/task/1454





Spread: Rendered view of hanger occupied by airship.
Top: Sections.

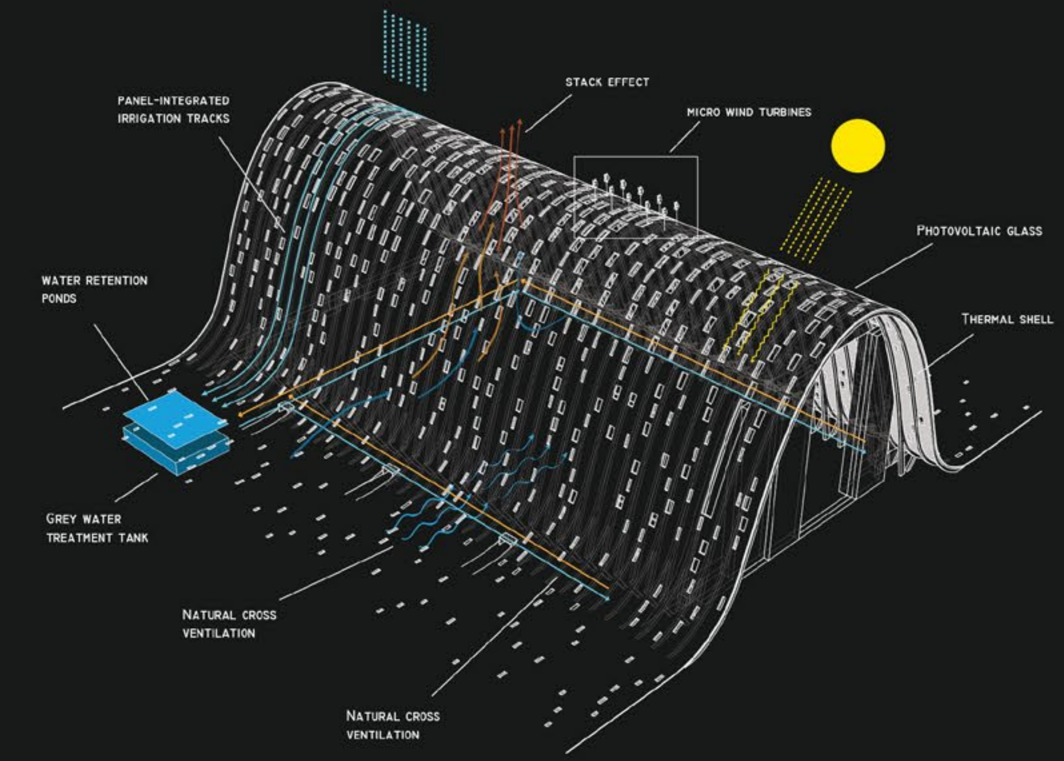


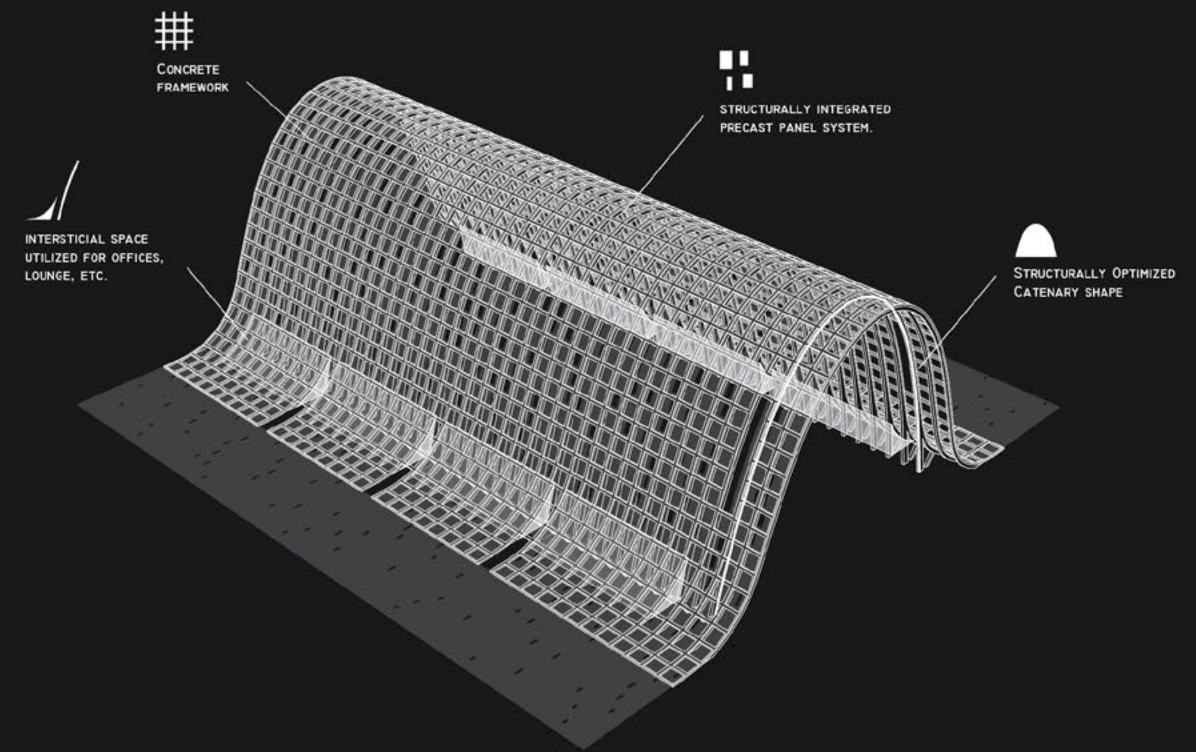
Top: Photos of physical concept models and night rendering.

Prefabricated concrete frame and panel system realizes an innovative and fully integrated structural skin that carries vertical loads of structure, roof instalations and ceiling crane while oposing lateral forces with highly optimized shape that minimizes material while expressing the combined effi ciency of structure, economy and form.

Primary structure consists of 64 concrete ribs that are arrayed along the length, and which follows catenary curve. This hightly efficient form allowed us to minimize material and cost, while supporting an exceptionally thin and light-weight skin. It was important that the skin be expressed as lifting up and not visually oppress the space below so this apparent lightness was critically important architectural criteria met with structural intellegence.

Lateral support beams run the length of the structure, stabalize it against lateral forces and establish gridded framework for prefabriacted panels and integrated energy systems. Framework and panel system comprise the structural skin, which follows catenary form of load-bearing ribs and peals away at base to express itself as a continuation of the ground plan, ie. layer of earth lifted up from it. This separation of skin from primary structure also creates an interstitial space that runs the lenth of the hanger to be occupied by offices, storage and secondary program.

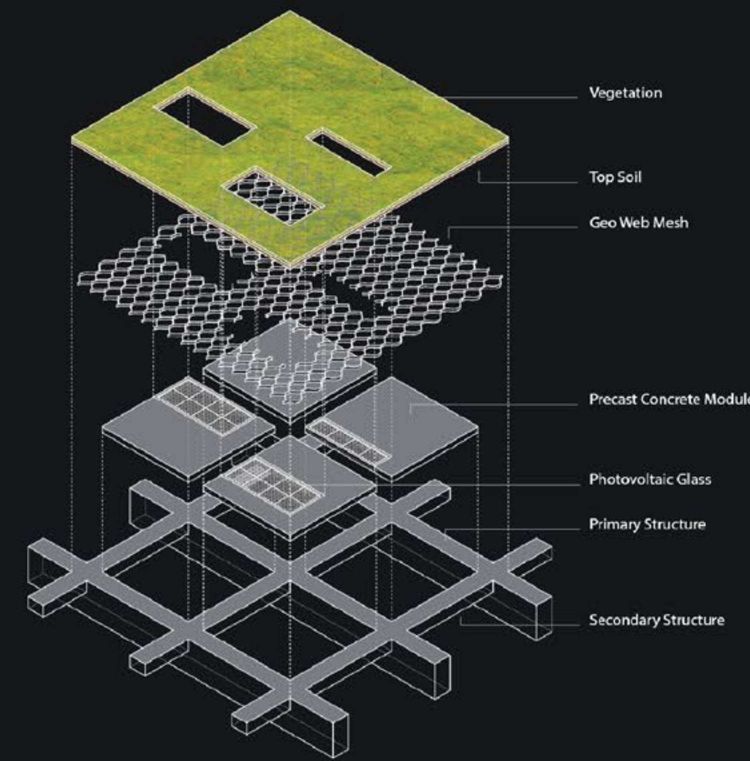




Left-Top: Diagram of passive energy features.

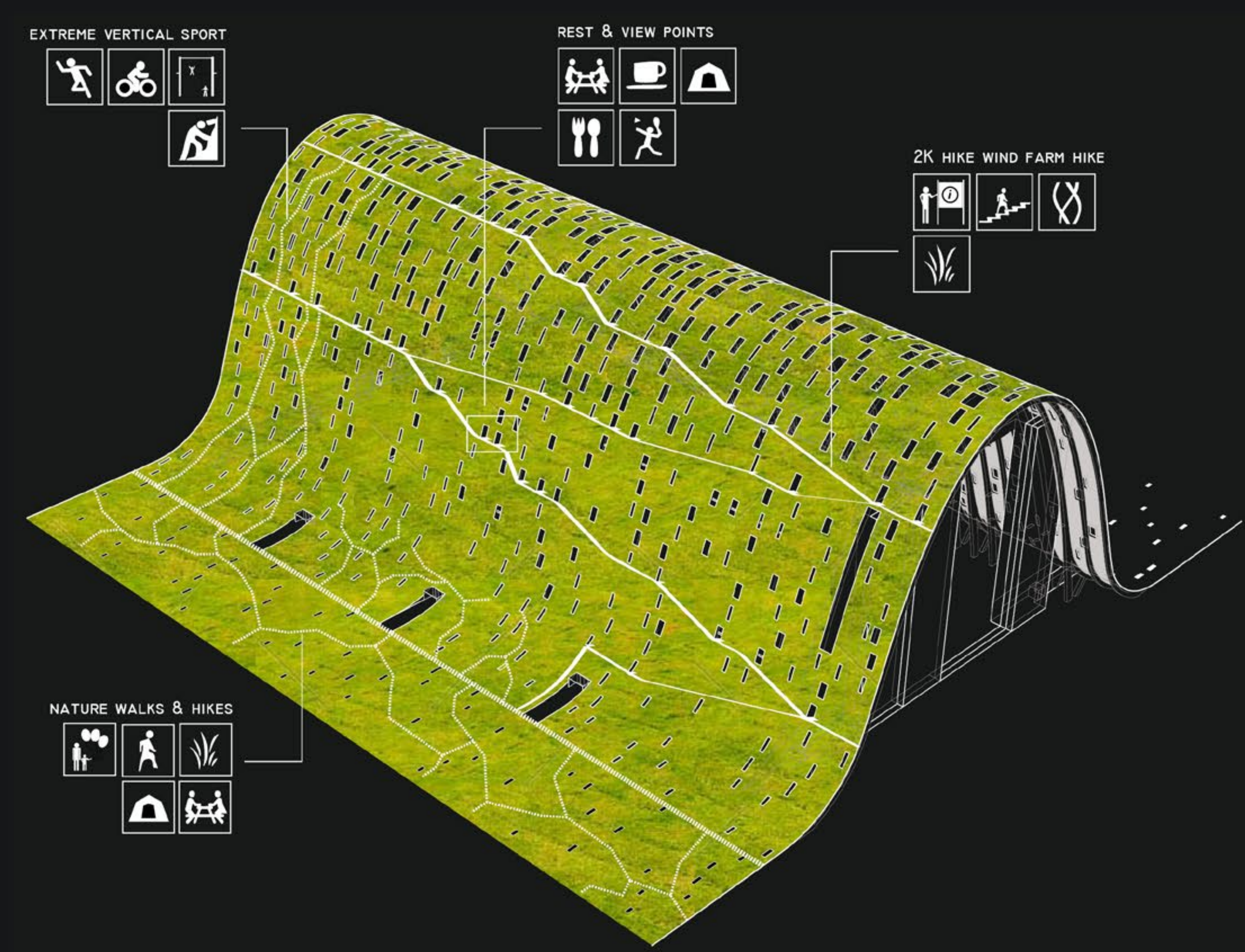
Left-Bottom: Simple structural framework minimizes costs while permitting a highly differentiated and modular system of cuts and openings.

Flexible and highly effi cient structural framework minimizes maintenance and construction costs while permitting a highly differentiated and modular system of cuts and openings that modulate natural light, facilitate ventilation and rain water management, as well as generate suffi cient energy to realize a zero mainanence green roof and fully integrated building system that produces all of the energy it consumes.

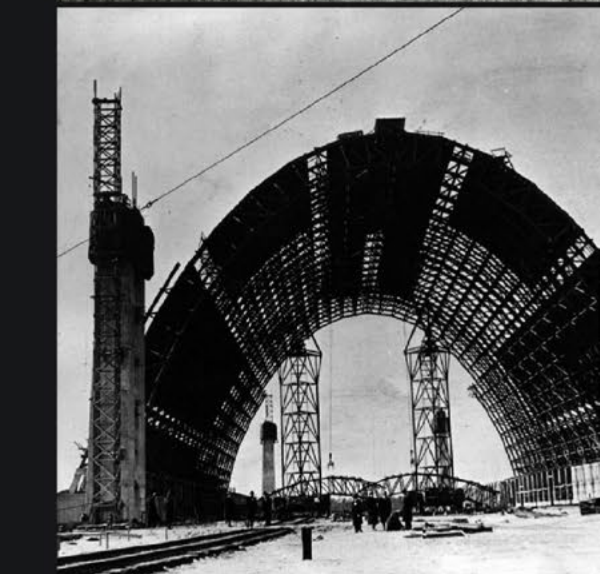


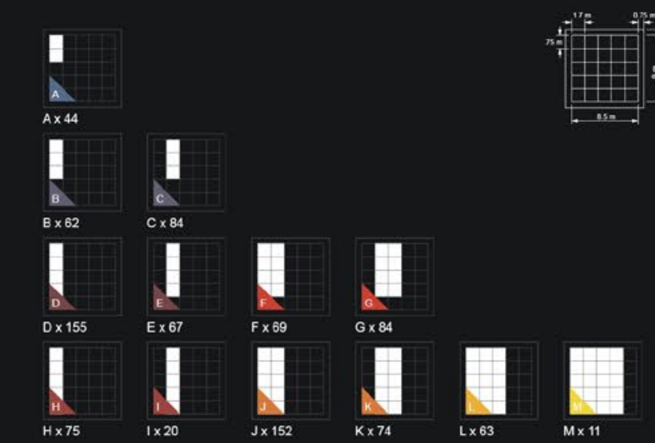
Right: Diagramatic detail of building system layers.

Below: programatic diagram of greenroof. program is mapped on to surface according



Right: Early precident of aircraft hanger taking advantage of cantenary form realized with ribbed structure, in this case, trusses.



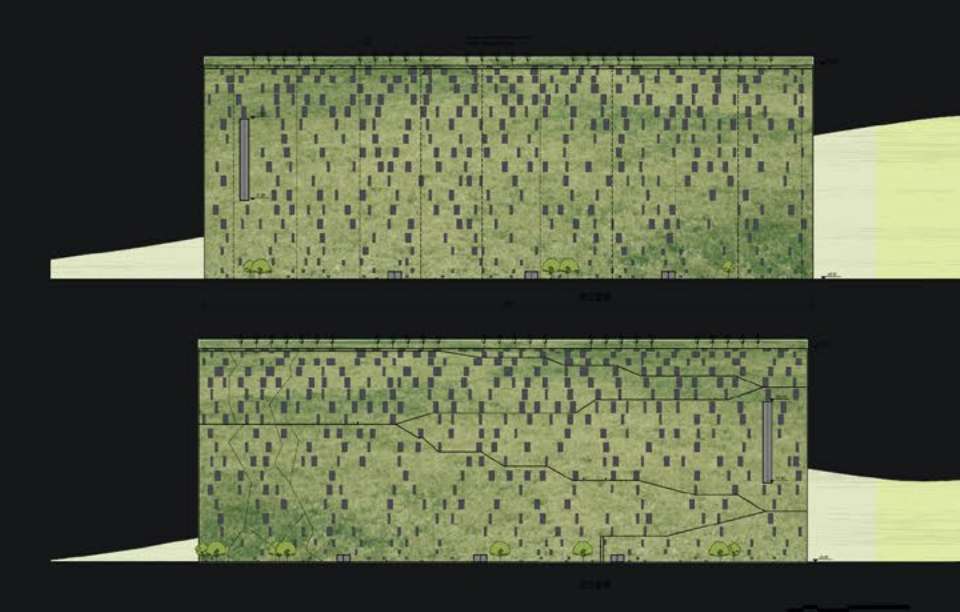


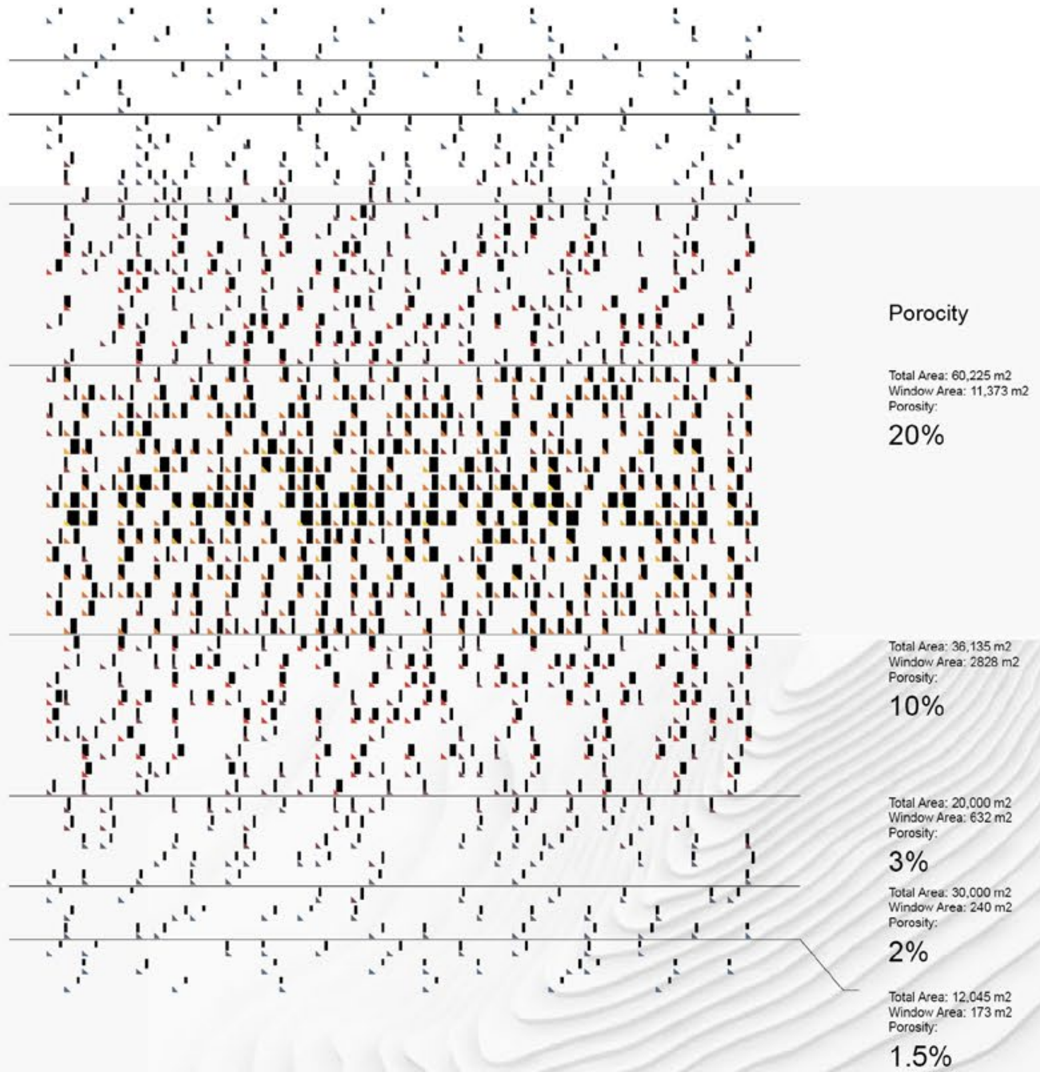
Structure at ends also frame the hanger doors, consisting of four segments, which run along tracks, supported by truss at the top and in ground at the bottom. As doors open they penatrate the skin, where ommissions of laterial supports in the framework can be seen. This did not compromise structure as framework was sufficiently redundant to allow for the ommission of beams in places where door penetrates skin.

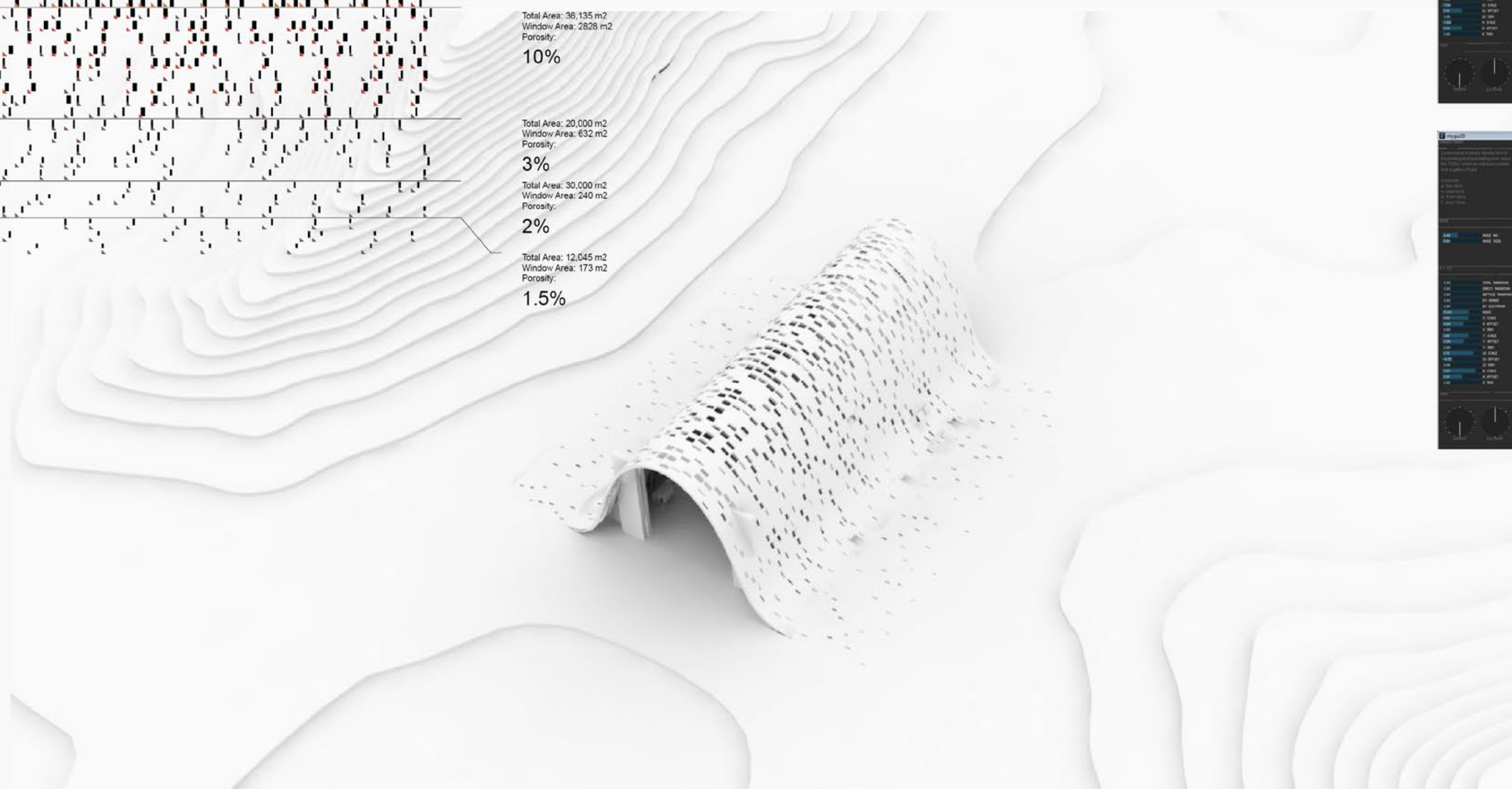
Using solar analysis software we determined the annual direct and indirect exposure of each panel. This data informed the arrangment of solar collection, diffuse light control and green roof programing. Modulation of light was acheived with 13 discrete panels types, which permit direct and diffuse light to penetrate skin. Penetration pattern responds most directly to solar profile and grade, and is then adjusted to satisfy programatic mapping of recreational trails, activity patches, and maintenance tracks.

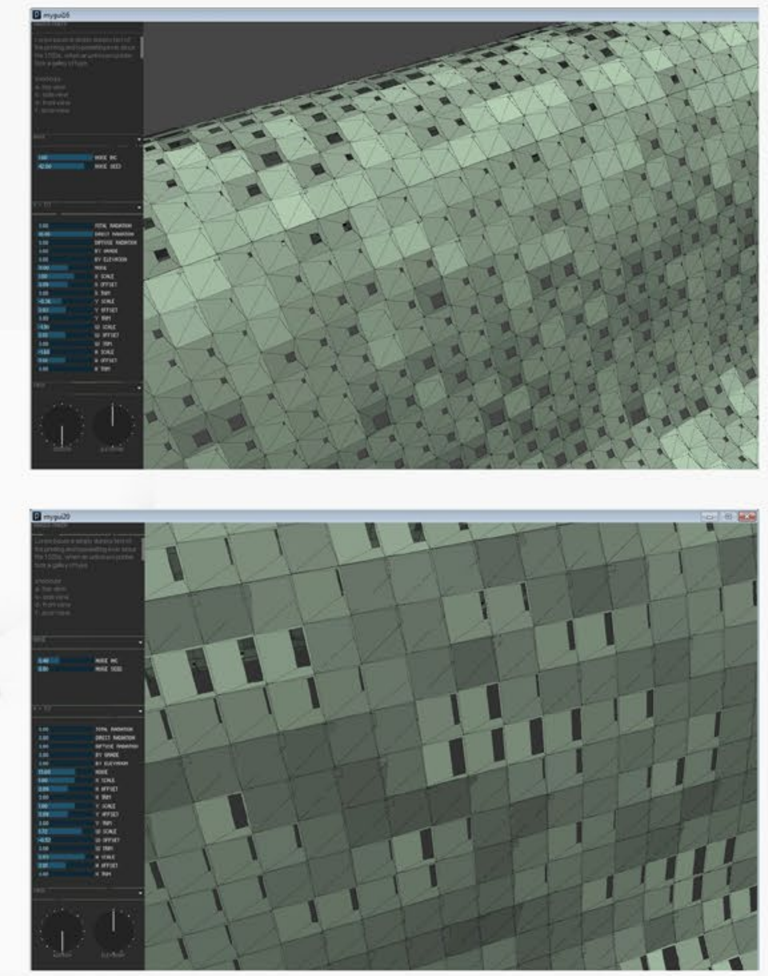
Above: Modules and encoding sceme based on solar exposure and program mappings.

Right: Building elevations.









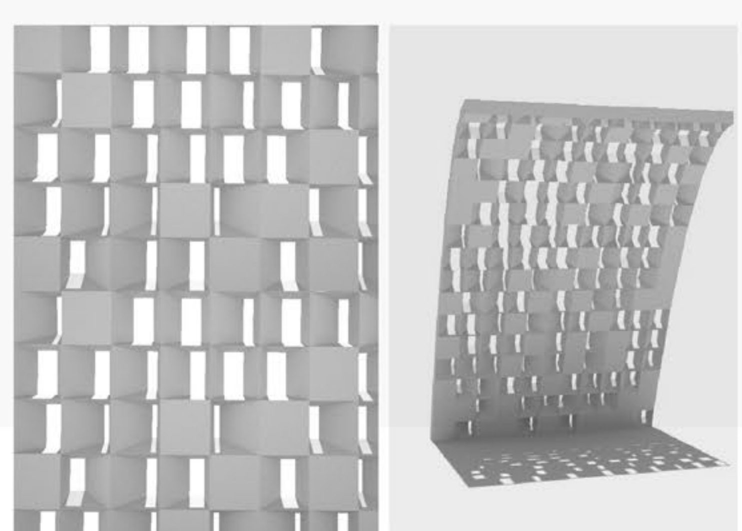
Left: Custom software tool built with Java to explore design space constrained by solar data and lighting requirements.

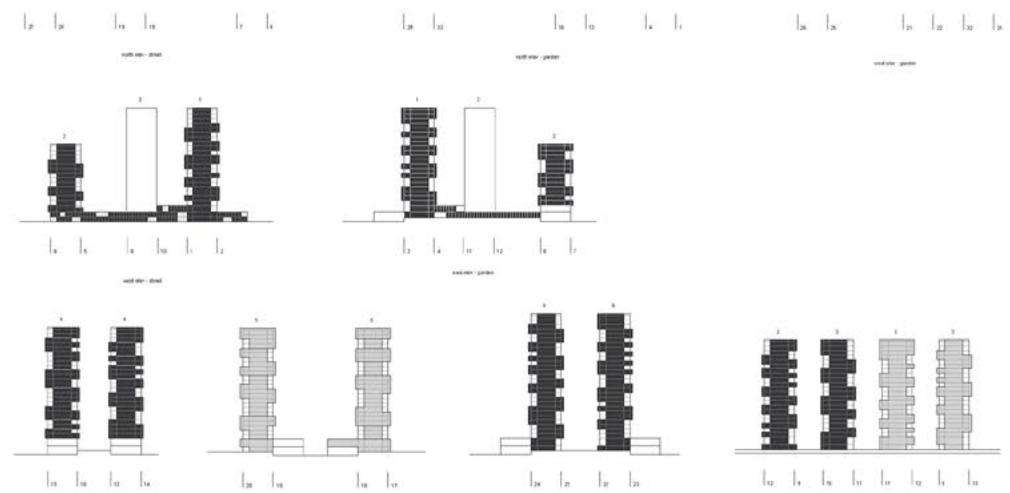
Indigenous trees and ground cover are specified for landscape at the base and provide shading for trail network that extends outward and up the structure from the base, connecting greenroof ecology and public park services with surrounding forest and hills. Trees extend partway up structure, and ground covers the entire surface. Top soil and grass is supported by ecoweb mesh installed on top of structural skin.

Interior lighting requirements are met during day with system of cuts and opening in the skin. This also produces a controlled and highly dramatic lighting effect that registers time of day and quality of natural light. During night artificial lights produce a light pattern on the exterior skin.

Custom software tool was developed to search design space specified by parameters describing the panelized system of cuts and opening to meet lighting requitements and expore lighting effects in real-time. Alternate system of apperatures, shown above, produce slight more dynamic expression of light control that better registered the relationship between skin and environment, however effect came at a cost: added conmplexity to the prefabriced paneling system.

Top: Mapping modules on to unrolled surface.
Spread: Massing model to provide real-time feedback on performation pattern.
Right: Detail model of segment .





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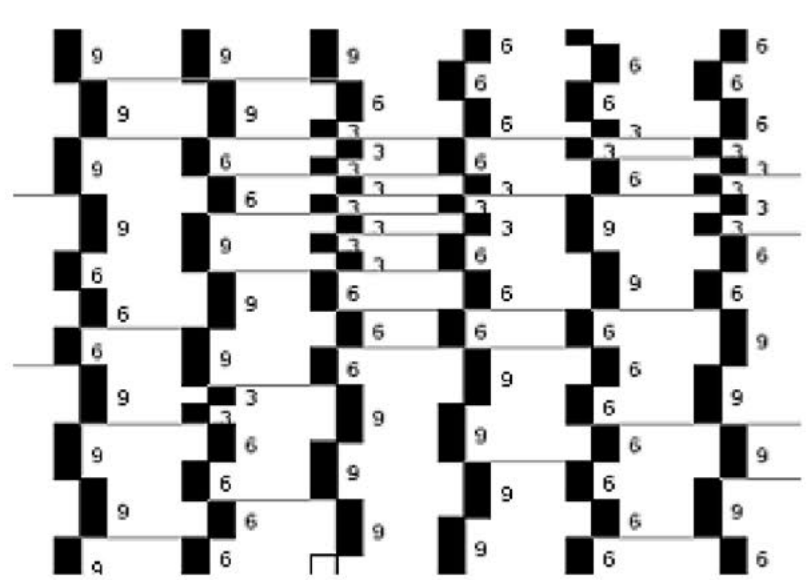
PROJECT SCOPE: ARCHITECTURAL DESIGN OF RESIDENTIAL TOWERS IN BAOTOU
ROLES: CONSULTANT, COMPUTATIONAL DESIGNER FOR OPEN ARCHITECTURE
CONTRIBUTION: FACADE DESIGN, TOOL DEVELOPMENT
COLLABORTORS: OPEN ARCHITECTURE, LI HU, HUANG WENJING, QI ZHENGDONG
CLIENT: RAYCOM REAL ESTATE LTD.

Jazz Towers is one of the many urban typologies within the BTCBD City of Plazas. The project responds to issues of gated development by placing a horizontal commercial perimeter block to surround the ten vertical residential towers, which allows both protection and accessibility. An open plaza harnessed by the horizontal band and on the roof of ground floor parking structure is inserted in the center. It provides public space for the residents on a higher 'ground', as well as linking to the social network of open spaces of the master plan.

left: photos of physical model

text and images courtesy of Aedas
more at http://www.aedas.com/en/archi-tecture



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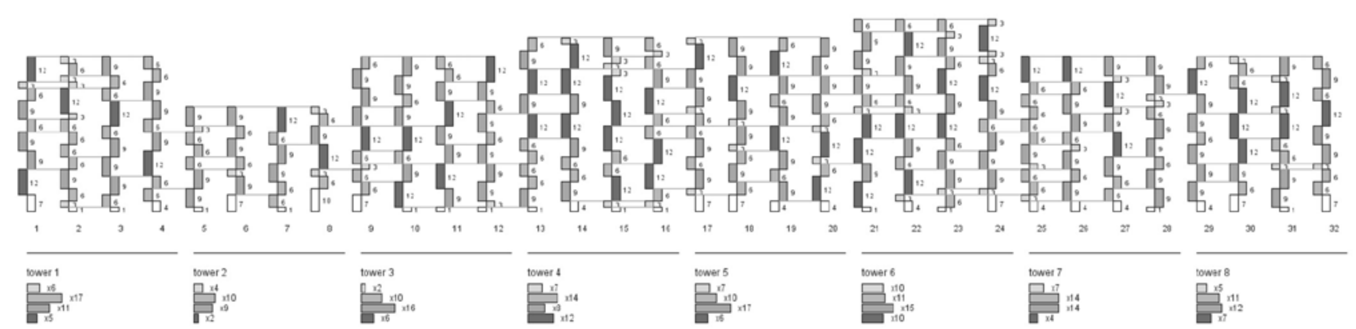
octaves: 3
falloff: 0.5
sample rate: 4
amplitude: 5
seed: 11



source: the state were in, radio dept
sample rate: 96000 Hz
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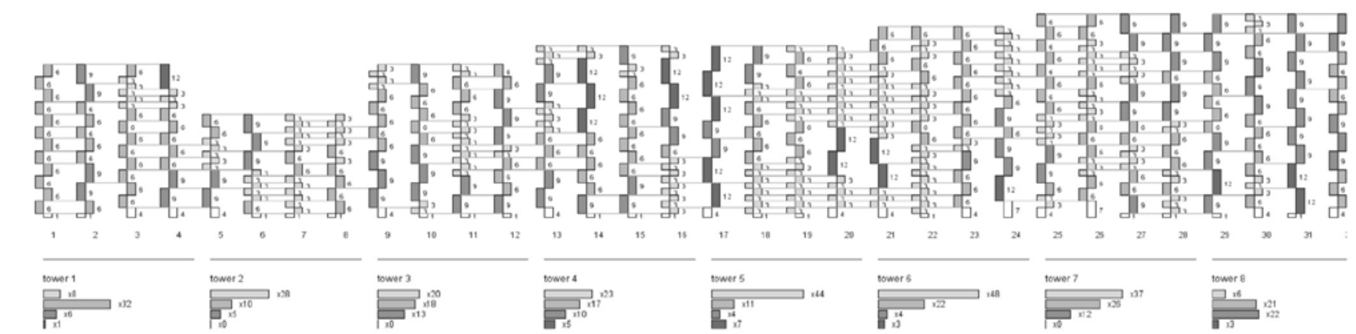
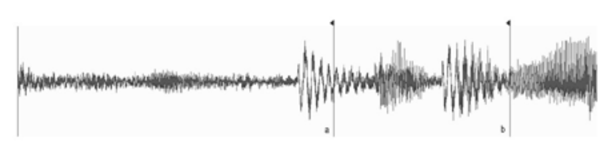
noise weight: 0.6
median 1.0
standard dev: 2.5
buffer size: 3





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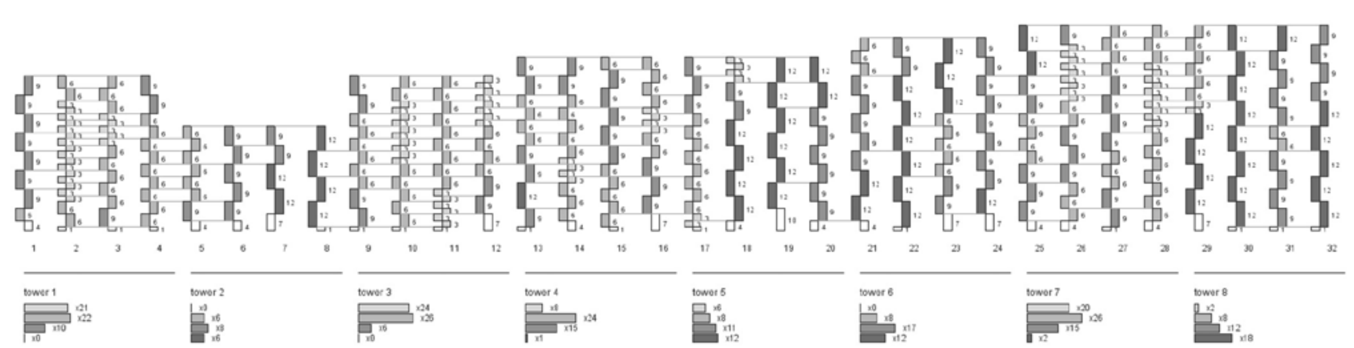

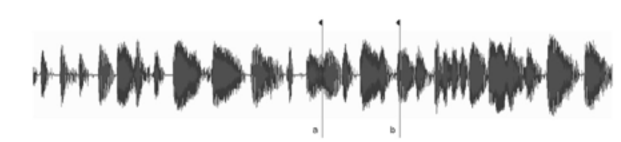

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amplitude: 8.0
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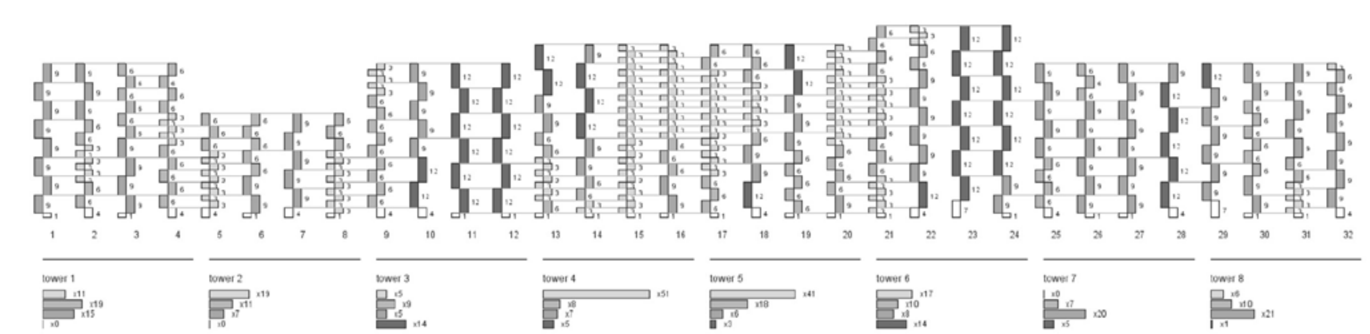

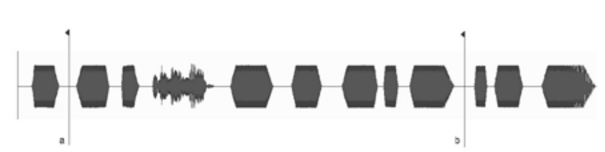

source: robot speaking
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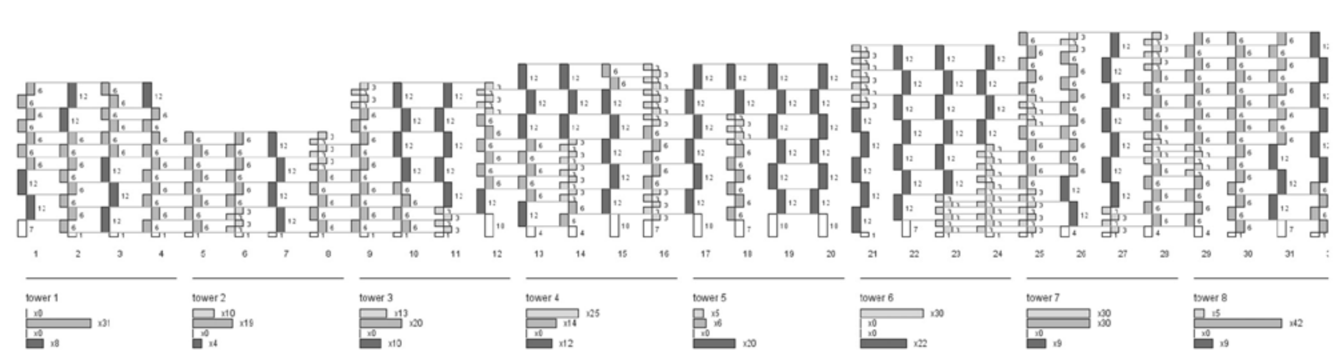
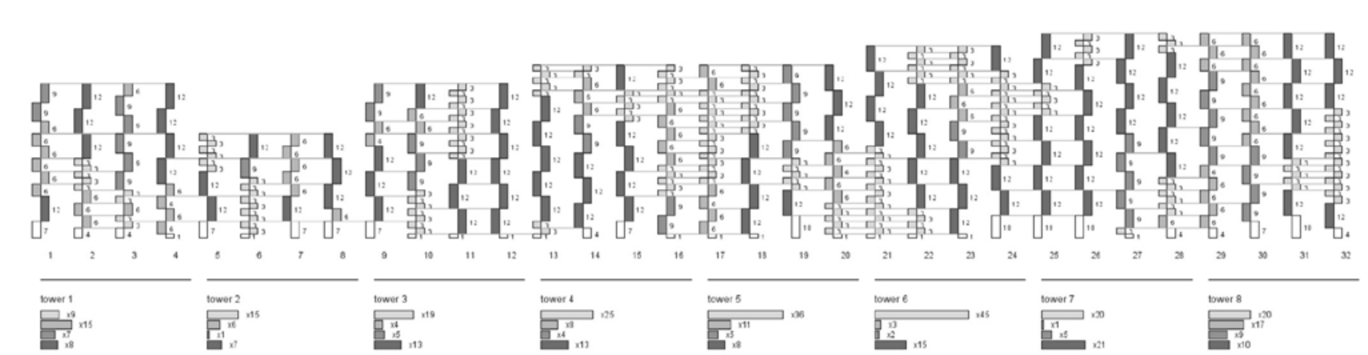
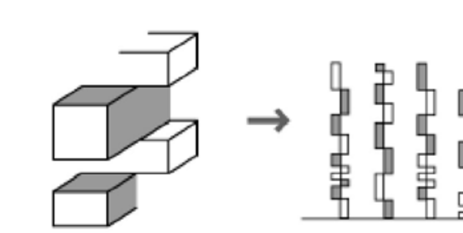
frame rate: 30
clip weight: 1
noise weight: 0
median 2.5
standard dev: 17.5
buffer size: 10



source: Thelonius Monk, Functional
sample rate: 48000 Hz
frame rate: 30
clip weight: 0.75
noise weight: 0.25
median 2.5
standard dev: 7.5
buffer size: 10





above: massing strategy
spread: visualized output of script

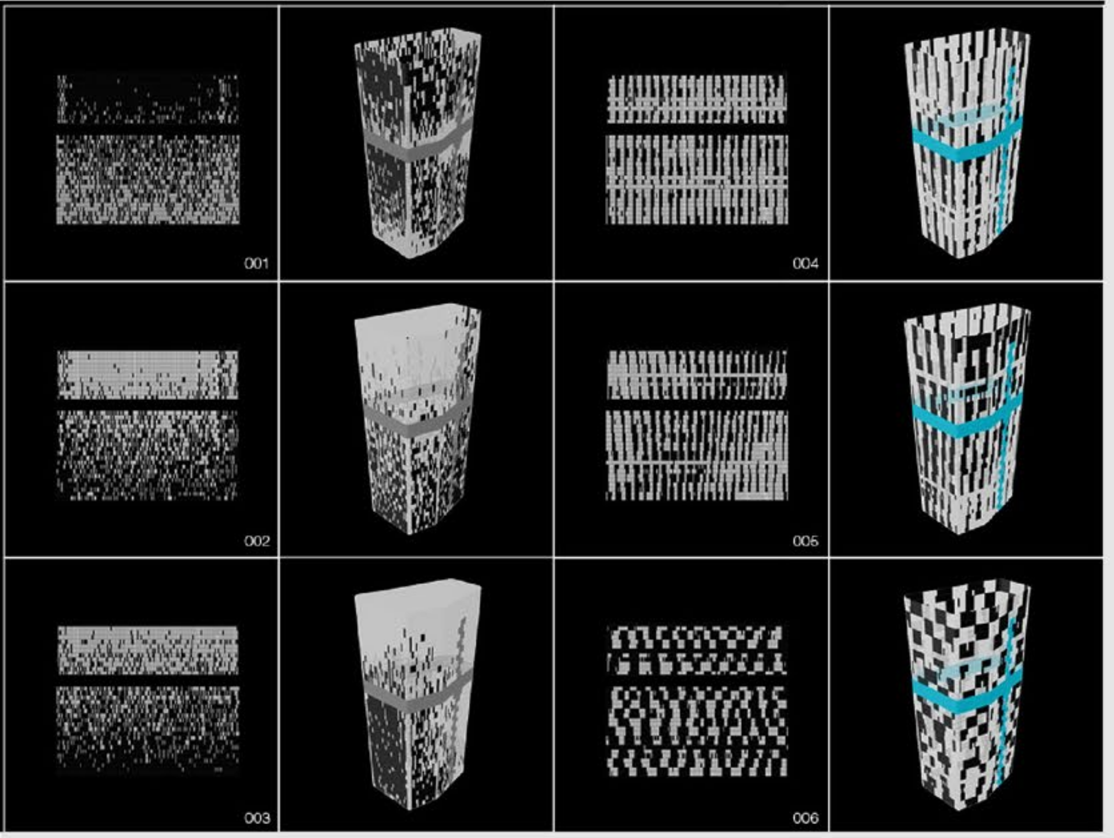
A utility script was developed using Java and the Processing Sound library to convert sound waves into a interlocking building form for use in Jazz Towers, an urban building typology inspired by Jazz music, where interlocking corners cantilever out and extend upward with dimensions related to the resampled and processed harmonic sound waves, as well as supporting architectural functions.

South and West Elevations

The towers, measured 18m x 18m with central cores, are proposed with open plan for flexible unit layouts. The corners of the towers cantilever out 1.5m to provide each space with its own unique perspective increasing connection from the interior space to the city. Inspired by the spontaneous yet systematic structure of Jazz music, the cantilever view-boxes are composed on the elevations of the towers through parametric calculation of Jazz musical sound wave. The musical rhythmic façade allows spacio-temporal movement by placing strategic architectonic elements in space to influence human moving and visual patterns. When one meandering around the "Towers of Interlocking Views", it evokes a sequence of harmonic spaces as well as the dynamic and free energy of urban life.

South and West Elevations

Spread: Rendered street view from west enterance.
Top: Site Plan



PROJECT SCOPE: ARCHITECTURAL DESIGN OF HIGHRISE MIXED USE COMPLEX IN WUHAN.
ROLES: CONSULTANT, COMPUTATIONAL DESIGNER
CONTRIBUTION: FACADE DESIGN, TOOL DEVELOPMENT
COLLABORTORS: OPEN ARCHITECTURE, LI HU, HUANG WENJING, QI ZHENGDONG

Wuhan Sky City integrates 3 key elements: urban village, skyscraper, and parks. The urban village introduces new cultural, commercial, and leisure amenities to Wuhan. Its intimate scale and dynamic massing are inspired by the historical Hankou downtown urban fabric. It invites the communities around to come in, while connecting the high-rise inhabitants with the neighborhood and the city.

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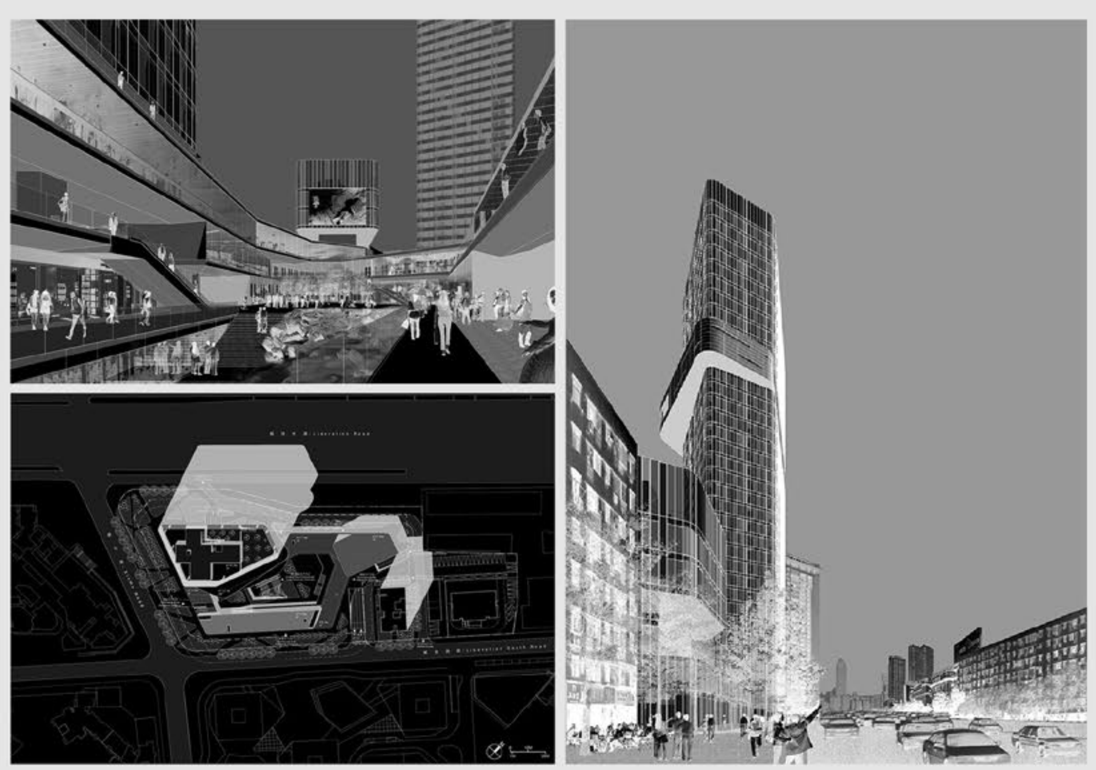
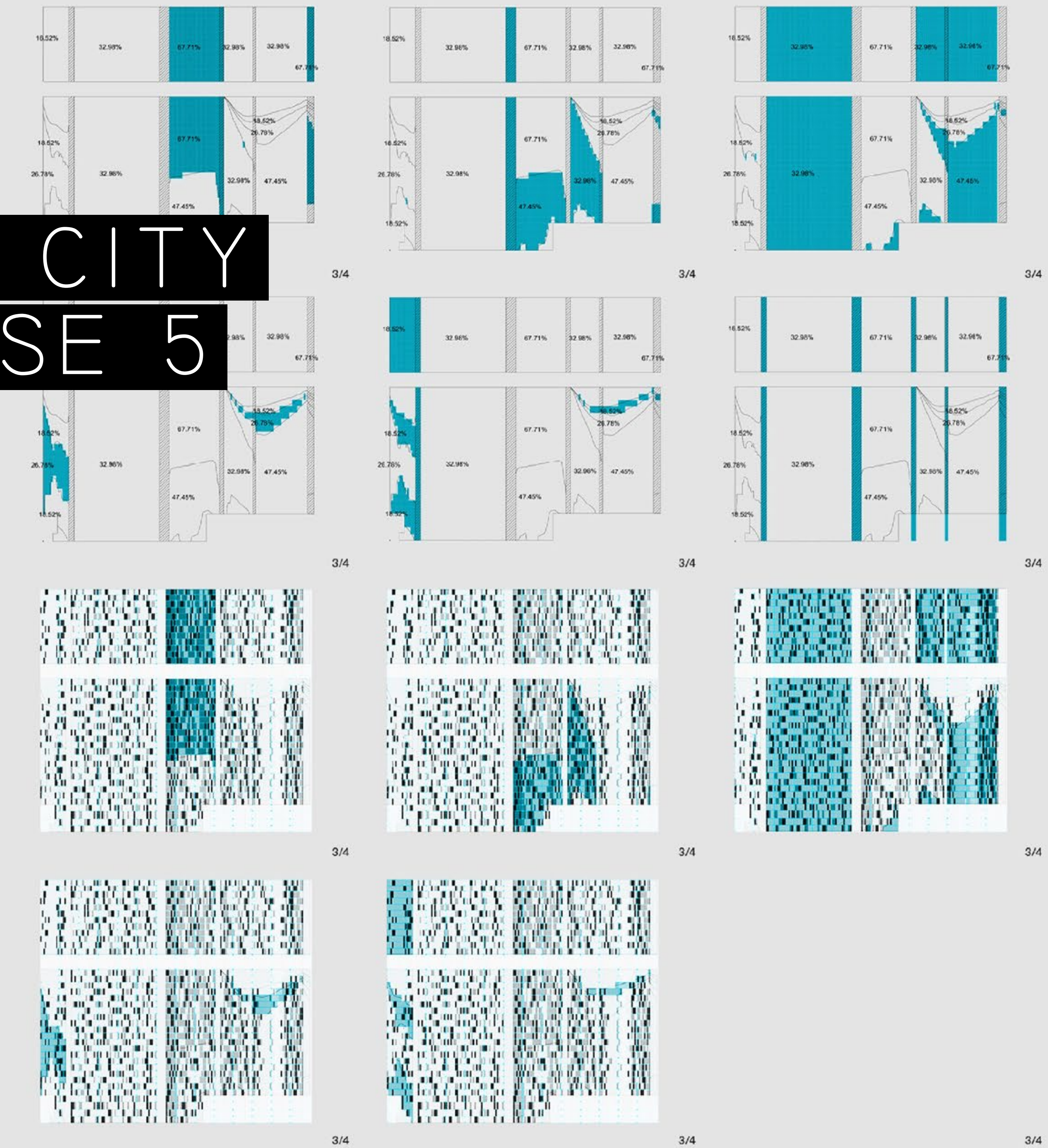


Siteplan showing main tower and podium.
text and images courtesy of OPEN Architecture

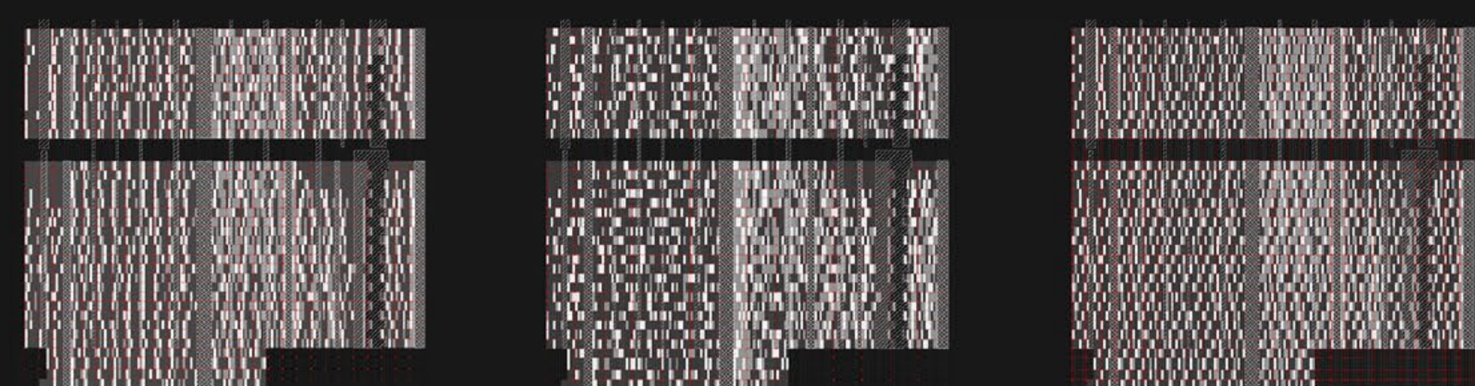
SKY CITY PHASE 5



Visualization of constrainded regions of unrolled facade along with a candidate pattern overlay.

An active Facade was intended to modulate heating/cooling load on building by intelligent distribution of panel types designed to filter solar radiation at the expense of natural light. Engineering team provided data from surface analysis of direct and indirect solar exposure. This was translated into set of surface constraints on the facade along with other building information that constrains the permissible set of panel types for a given region on the facade (location of rooms, untilities, corners, etc.). Of course we didn't want a deterministic procedure, we wanted to explore patterns within a constrained design space. The constraint satisfaction problem (CSP) required application of AI and combinatoric search methods. Implemented in Python using GHPython Plugin for Grasshopper.

Target shading coefficients were provided by engineering team and assigned to regions of the facade in order to optimize natural lighting and minimize load placed on active heating/cooling system. But in-order to realize consistent natural lighting levels, we had to subdivide the facade into segments that could roughly approximate room divisions to apply target values to. Further constraints we placed on actual partition lines, building corners, etc. Still, within validated space, there was plenty of room for design exploration.



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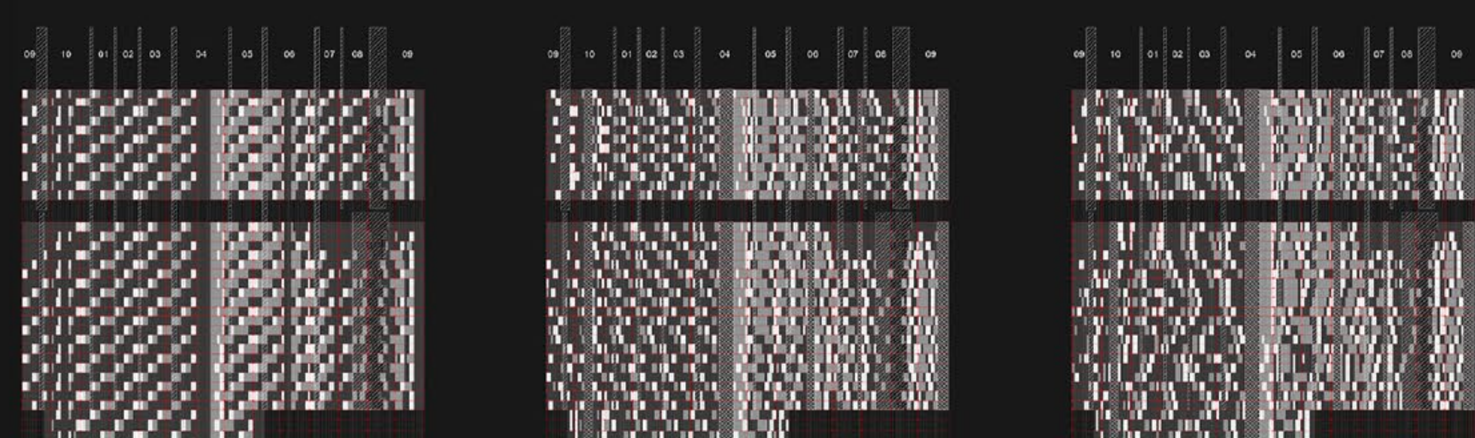

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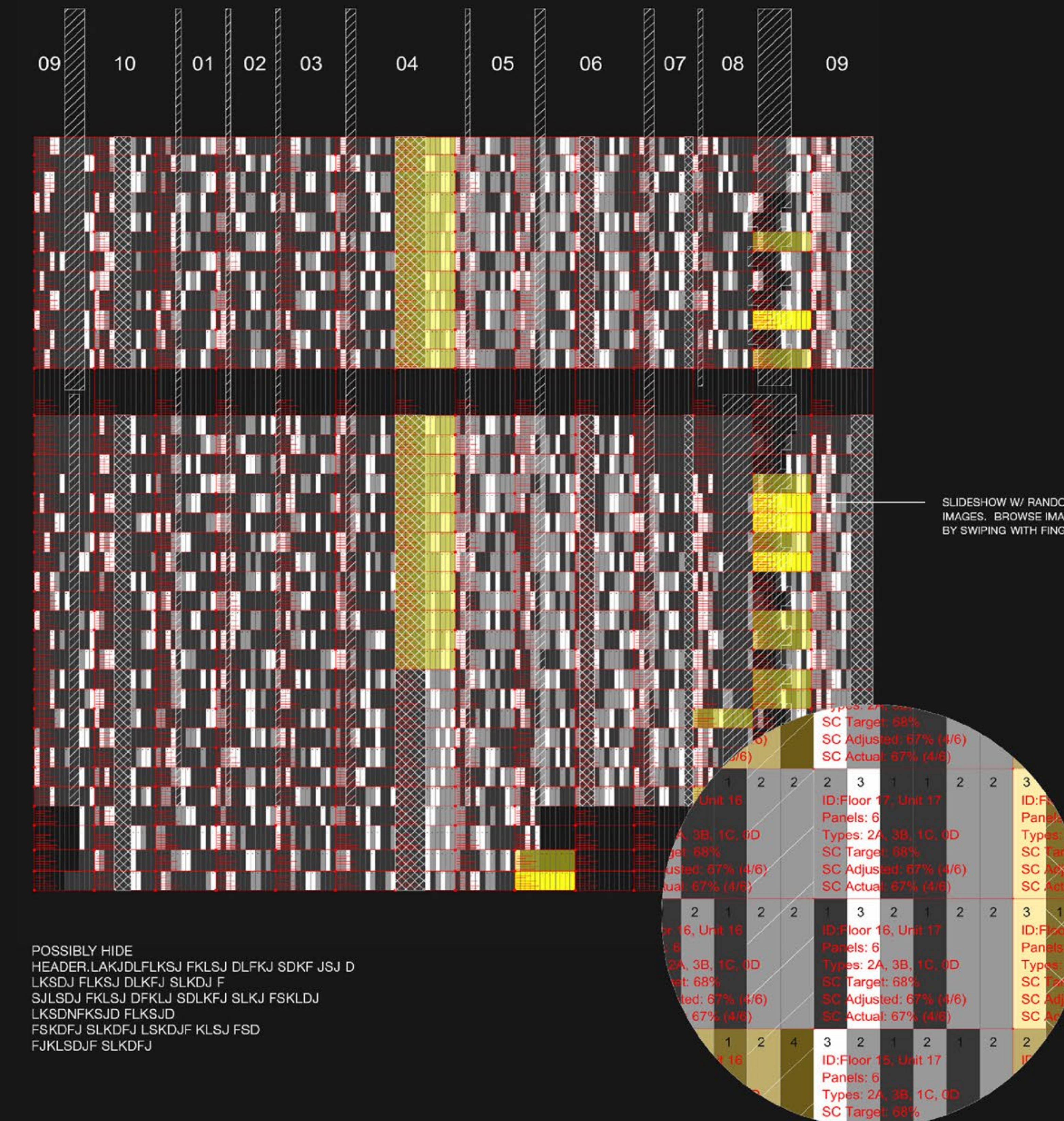
Above: A Random subset of six candidate patterns selected from validated design space.



POSSIBLY HIDE
HEADER.LAKJDLFLKSJ FKLSJ DLFKJ SDKF JSJ D
LKSDJ FLKSJ DLKFJ SLKDJ F
SJLSDJ FKLSJ DFKLJ SDLKFJ SLKJ FSKLDJ
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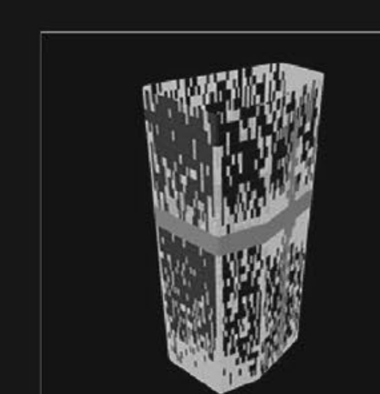
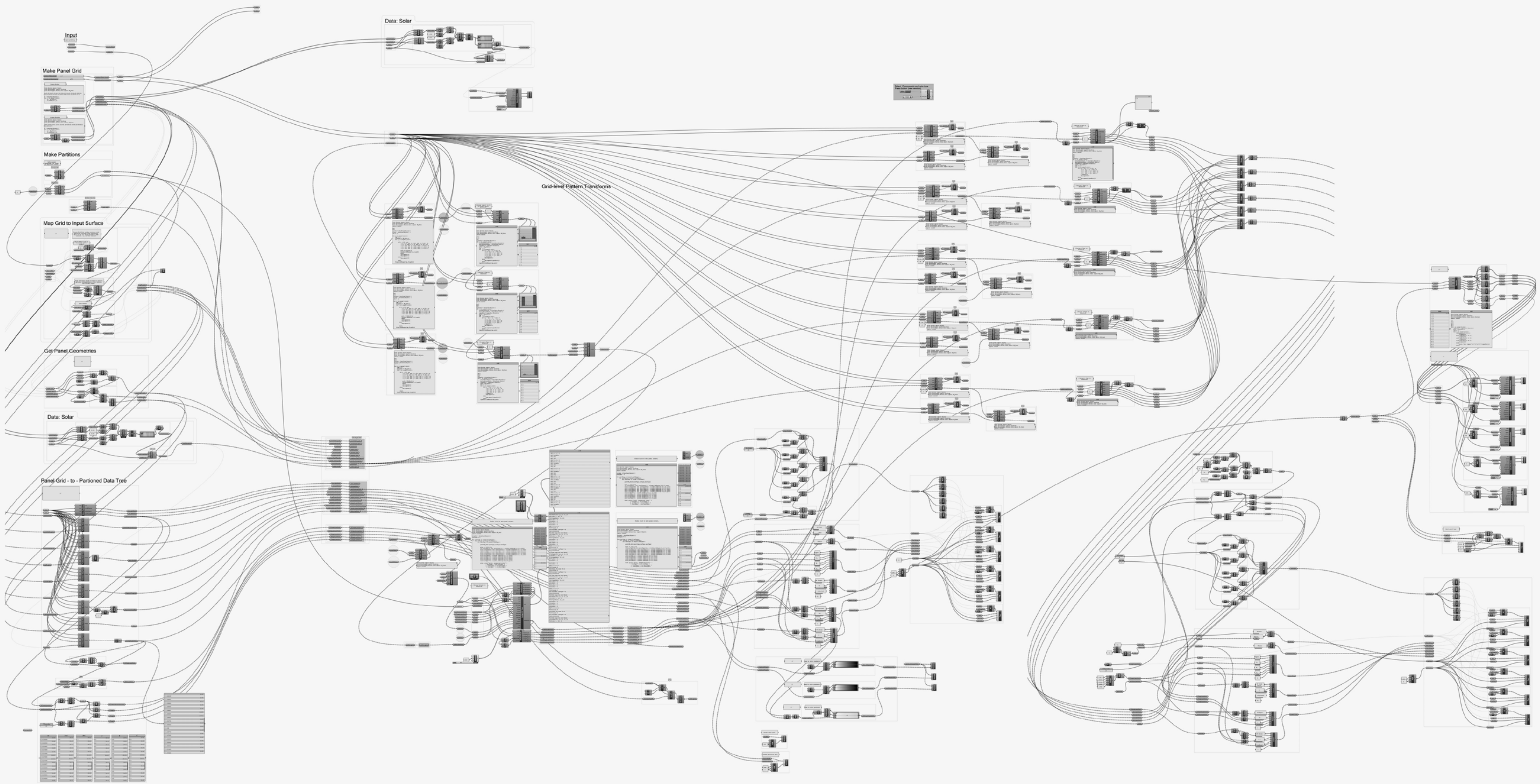
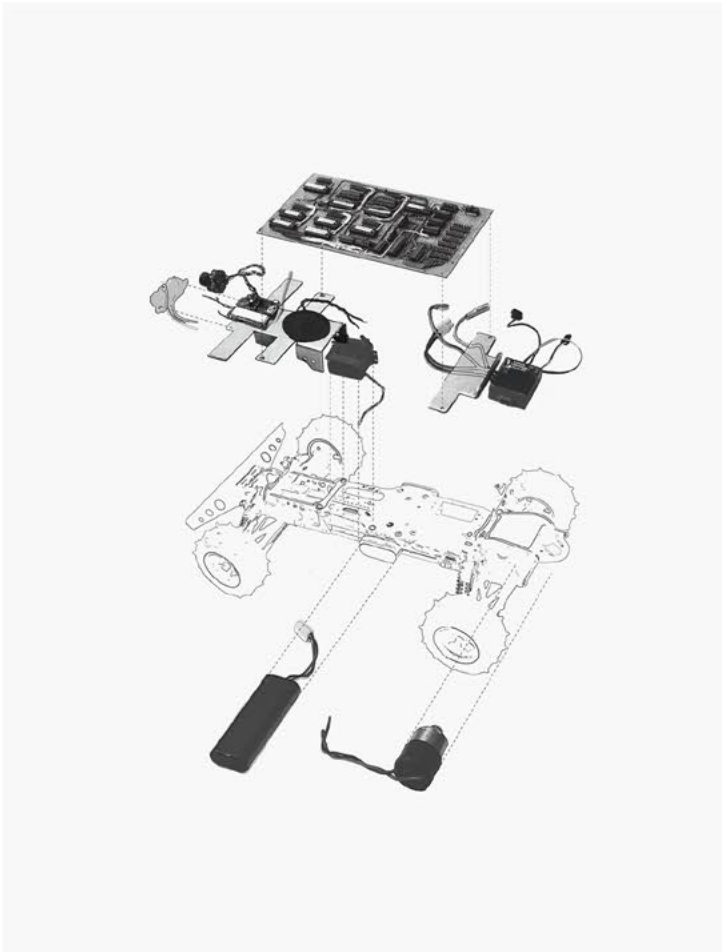


Automated validation at the panel, room and region level, with failing sections highlited yellow. Validation modules analyze and visualize performance criteria and provide data feedback for realtime adjustment. Can zoom in to see composit types and data for problem spots at room and panel group level. Data shows:

1. location
2. number panel in group
3. type break down
4. target shading for group
5. target adjusted for group size
6. actual shading acheived

Full grasshopper definition used to generate valid designs and map pattern onto 3-dimensional surface





PROJECT SCOPE: PROTYPE FOR RESEARCH PROJECT
ROLES: CONCEPT DEVELOPMENT, COMPONENT DESIGN AND BOARD LAYOUT FOR MAIN CONTROLLER
TEAM MEMBERS: KEVIN LARSSON, MATT ZOBEL, JAMES PECKOL (ADVISOR)

BEING THERE

"Sensors of all kinds are now becoming tiny, inexpensive, and network-enabled, and they are increasingly being integrated into very large-scale sensing systems"2 and mobilized by robotic devices. The Miami police currently uses small flying drones manufactured by Honeywell as "an extra set of eyes"3 And the US Army in a 41 million deal with BAE, a British Defense Company, is currently developing robobugs, an army of miniature robots modeled after spiders, dragonflies, and other insects to "provide enhanced awareness for soldiers, by extending their eyes and ears."4

As wireless bandwidth increases, and embedded and mobilized sensing systems become available to the consumer, William Mitchell warns of a schizophrenic mode of existence akin to being at the "focal point of a global personal panopticon."5 where we are surveying and being surveyed at all times. The same way telephones "stretch our speech production and reception system around the globe and multiplies its points of presence,"6 remote sensing extends, augments, and proliferates our remaining four senses.

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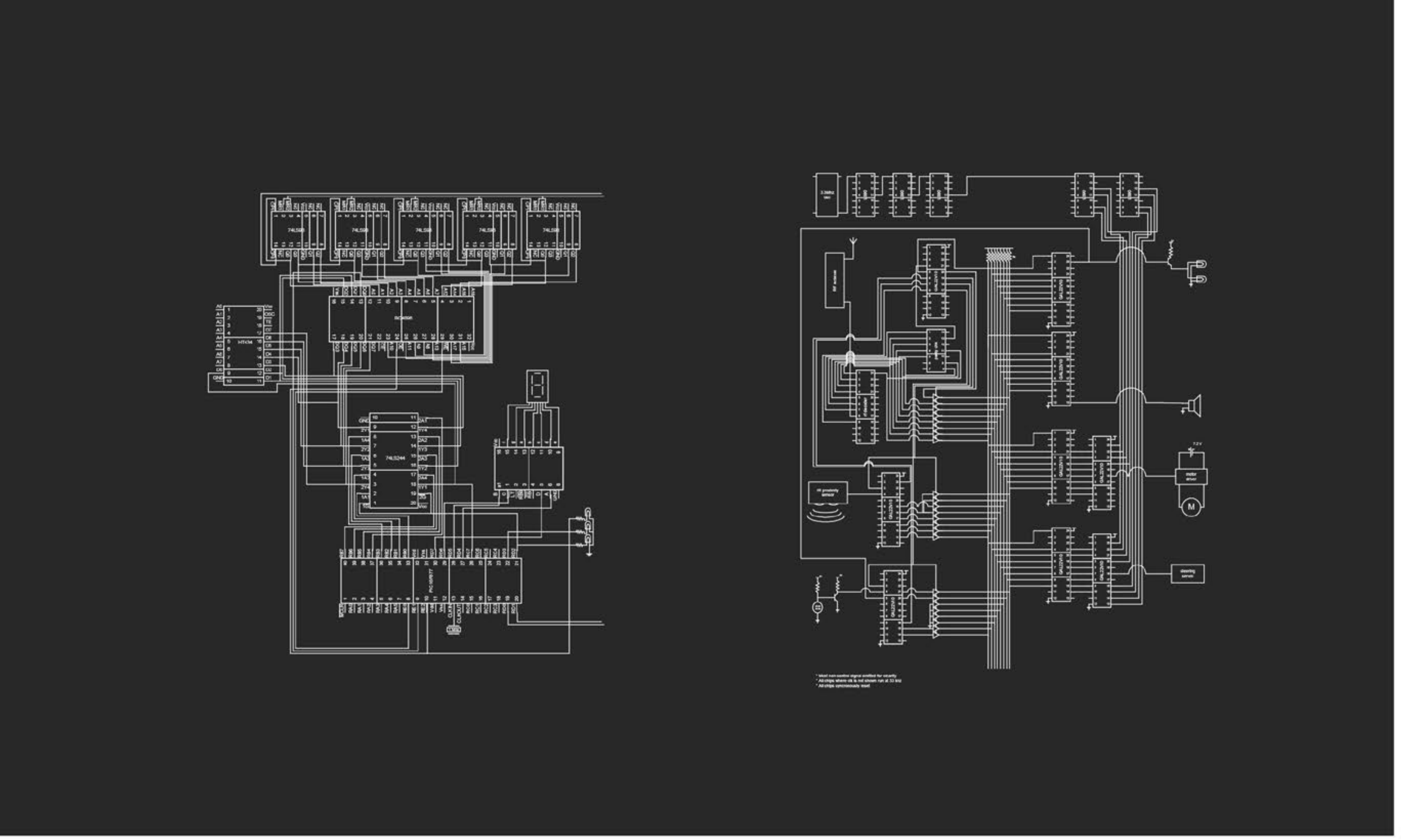
2. William J. Mitchell, The Cyborg Self and the Networked City, (MIT Press: Cambridge Massachusettes 2003) 30

3. Juan Villalba, Miami police department spokesman

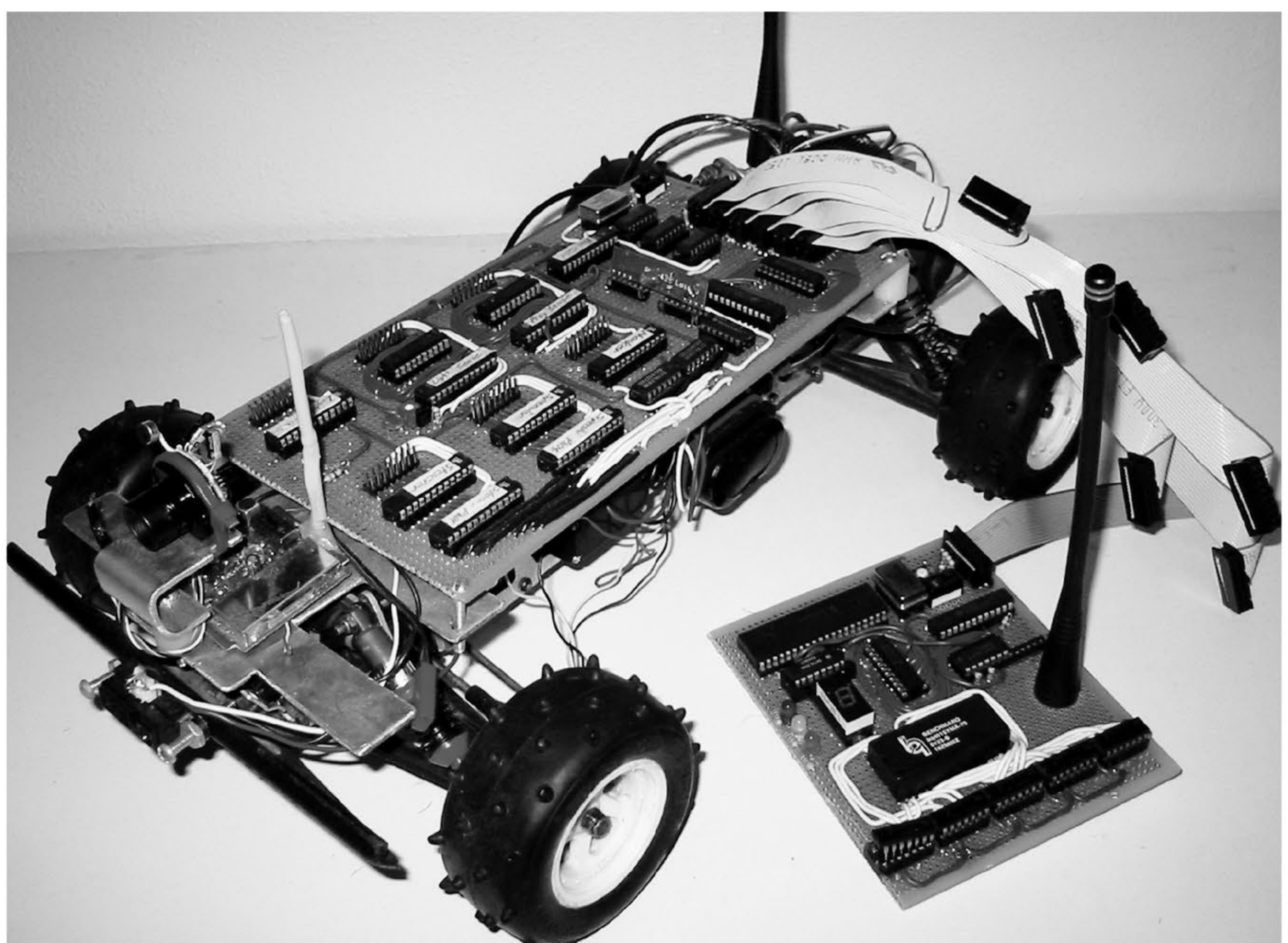
4. Steve Scalera, program manager in an interview with British Daily News

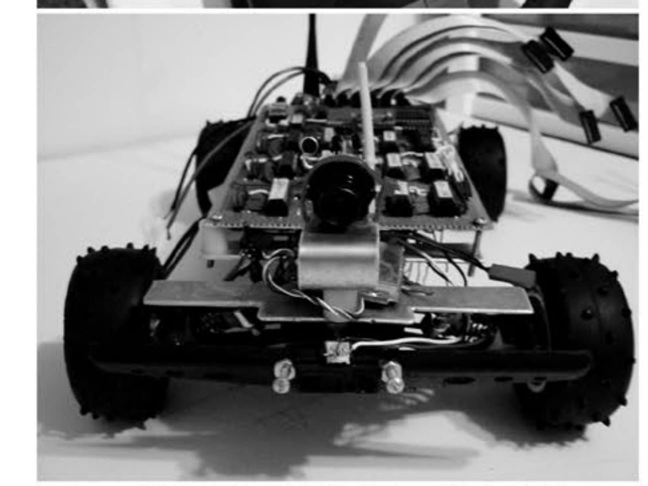
5. Mitchell, x

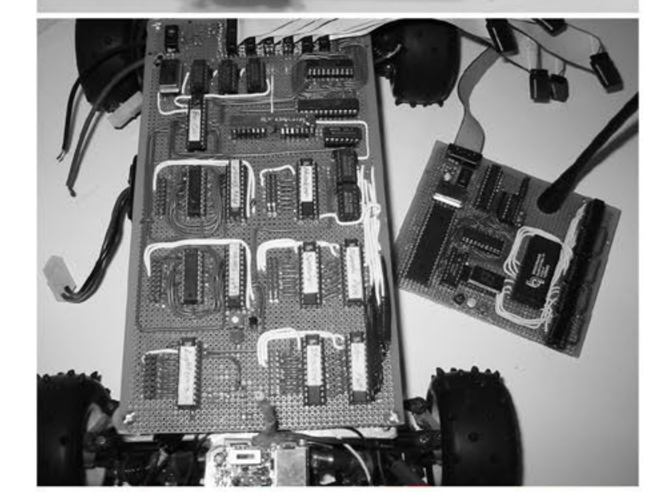
6. ibid., x



1. main board schematic
2. control board schematic





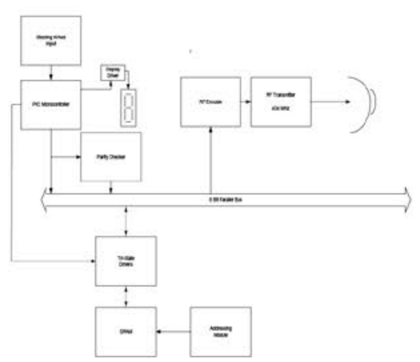


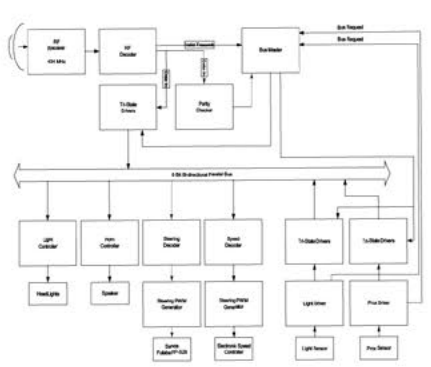
How will this mobilization of the senses effect the way people are social and the way society inhabits space? And of interest is how will public space as a physical construct of architecture and urbanism participate in this new form of engagement? The digital revolution of the late 20th century and early 21st century has already transformed social engagement. "People no longer expect social and communal exchanges in the urban and public space... People may physically be in these public spaces but they remain isolated."7 Even in populated public space the mobile phone is the dominate form of communication. Real social engagement is now electronically mediated and remote, taking place in the office or on the bus with a mobile device. This erosion of the physicality of social structures has led some to claim that public space as a physical construct no longer exists. At the very least we can must concede that public space and community are no longer localized and strictly physical. This has affected a dematerialization of self, but also represents a potential for liberated forms of interaction. "Dematerialization delivers us from servitude to places and things – and, it undermines the regime of physicality."8

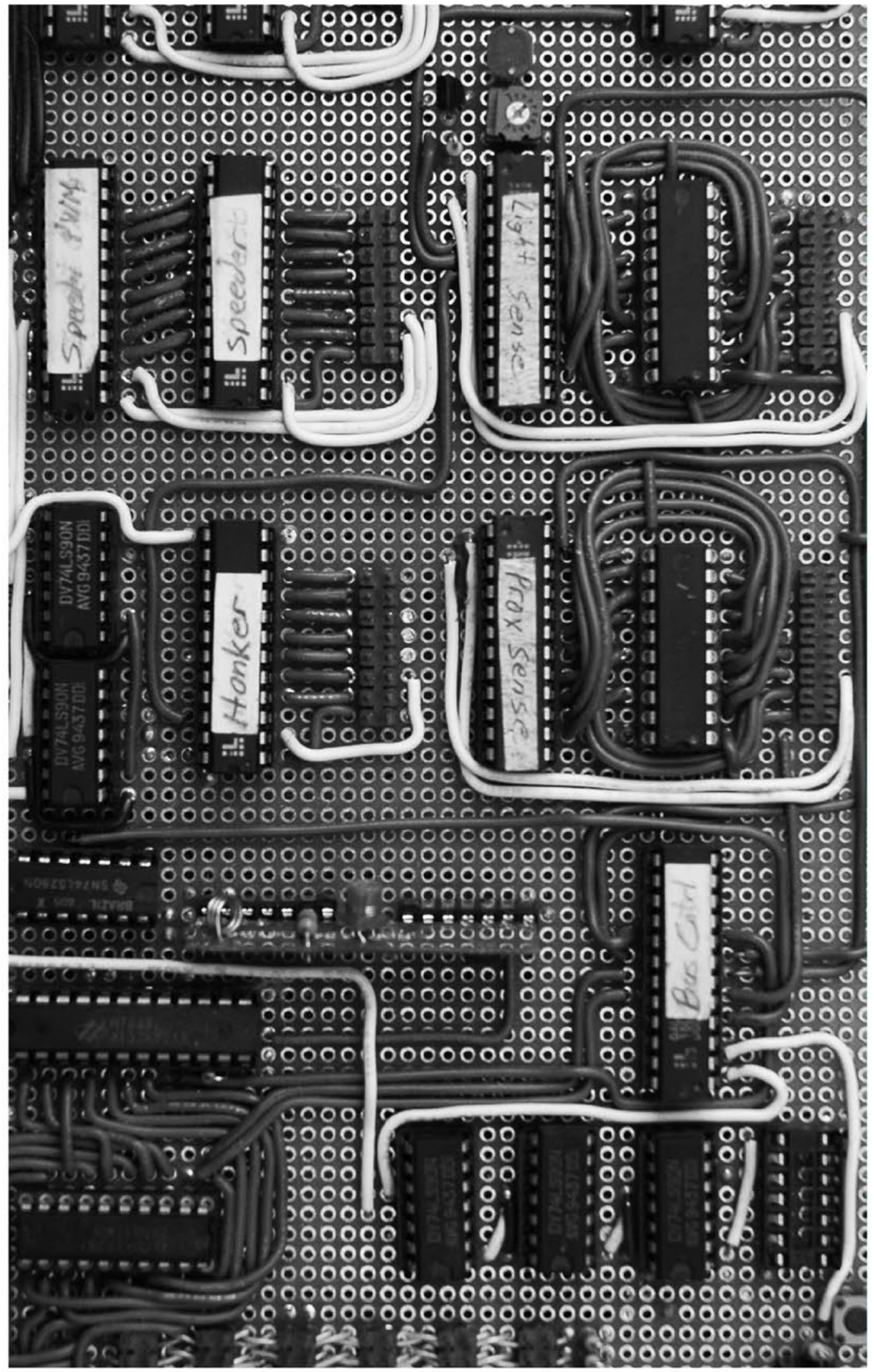
7. Noriyuki Tajima, "Tokyo Catalyst: Shifting Situations of Urban Space," Perspecta 38: Architecture After All (2006): 84.

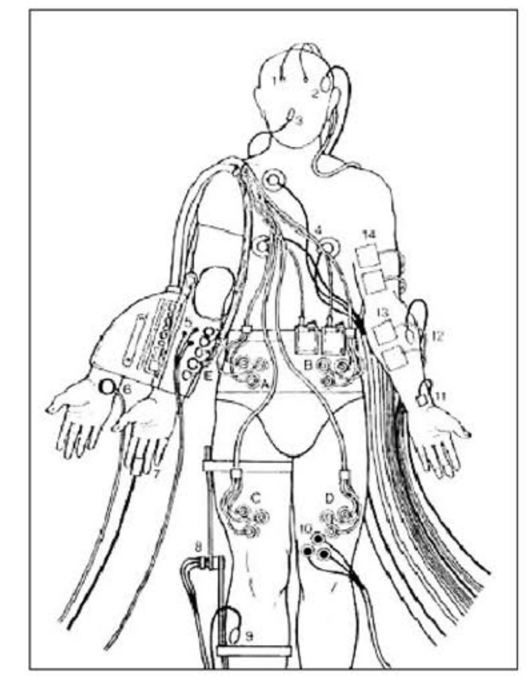
8. Mitchell, 84

Board for main modules in the user interface circuit which handles all data coming in from the user and sends it off to the RF transmitter. The other main module receives the incoming data from the RF receiver, light sensor, and proximity sensor. Using these signals it can control the steering, horn, lights, and motor. The user also has a real-time video feed for manual remote control. The steering wheel sends data to a PIC microcontroller, which will be the main control unit on the user side of the system. A digital readout of the current gear and well as status lights will be present. SRAM is available to record input and collect data. The car responds to commands by the user via RF communication.









Robotic extension of self within this 21st century context begs important questions: what is the relationship between the real, virtual and remote? Does the mobilization of the senses effect a virtual extension of self into the physical world? That is, if the ubiquity of wireless communication represents a dematerialization of the physical self then does the mobilization of remote sensing systems constitute a virtual re-materialization, and does it represent a further detachment or re-engagement with the physical environment? Furthermore, how does it affect the nature of "being there" as a perceiving subject, and how should phenomenal space adapt to a fragmentation and proliferation of the senses?

Above: Stelarc "Amplified Body". Illustration from www.stelarc.com.au