

PROJECT

## VERTICAL CAMPUS

TYPE

COMPETITION

LOCATION

LOS ANGELES, CA

DATE

2010

Los Angeles has everything, but takes advantage of little. Its towers, its streets, its people all exist disengaged from the beauty and moderation of its natural surroundings. This project reunites the current condition back to its surroundings. It serves as an island, woven into a troubled fabric. Self-sufficient in energy, community, programmatic functions and ecologically, the building is a mast against which the city can grow. The Vertical Campus incorporates mixed-use residential, commercial, garden, and civic spaces with a major transportation hub and diverse energy generation infrastructures. Spanning over the heavily channeled LA River, the base of the building folds infrastructure of hydroelectric energy generation into the circulation paths [pedestrian, bike, vehicular, bus, subway, train] and community programs threading and interlocking with the neighboring context. It bridges physical and social barriers through a spatial and programmatic reconnection uniting through multi-level connections of residential, commercial, and community. The technology of nature and the intrinsic ecosystems that exist so readily in the Mediterranean climate of Los Angeles, allows for the collaboration of man and nature to produce a comprehensive ecosystem through the variable layers of the Vertical Campus.



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PROJECT  
**VERTICAL CAMPUS**

Vertical Campus

**SUSTAINABLE COMMUNITIES THROUGH VERTICAL DENSITY**

Los Angeles has everything, but takes advantage of little. Its towers, its streets, its people all exist disengaged from the beauty and moderation of its natural surrounds. Instead they subscribe to generic urbanism, generic building typologies, and generic approaches to urbanization. The opportunity for climate, topography, context, and natural amenity to engage the city is missed. This project reunites the current condition back to its surroundings. It serves as an island, woven into a troubled fabric. Self-sufficient in energy, community, programmatic functions and ecologically, the building is a mast against which the city can grow.

The Vertical Campus is a superimposition of inter-related systems. The Vertical Campus incorporates mixed-use residential, commercial, garden, and civic spaces with a major transportation hub and diverse energy generation infrastructures. Emerging from the fabric of the horizontal city, they pull vertically, re-orienting to engage climate, community, and context. Rescaling this segment of urban fabric toward the human experience the tower engages urbanity, the river and the localities of community through its position and form. Spanning over the heavily channelled LA River, the base of the building folds infrastructure of hydroelectric energy generation into the circulation paths (pedestrian, bike, vehicular, bus, subway, train) and community programs threading and interlocking with the neighboring context. This project seeks a balance within its neighborhood encouraging a link between the vertical density of downtown and the surrounding malnourished residential zones through a more pedestrian and public experience throughout the day and night. It bridges physical and social barriers through a spatial and programmatic reconnection resulting through multi-level connections of residential, commercial, and community.

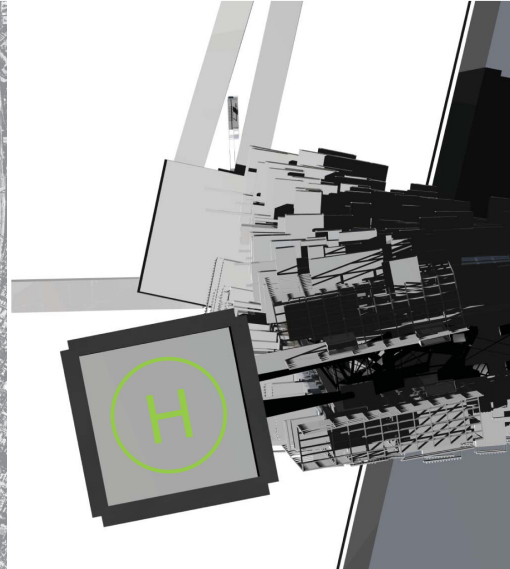
The Vertical Campus was designed with the notion of rethinking environment, building systems, programmatic deployment, energy, circulation, connectivity and growth within a dense urban fabric. The horizontal mentality turned vertical extends an interior/exterior relationship of the suburban "zoo density" to aggregate with a greater sense of scale, place and community in a vertical configuration.

Through the mixing of two diverse neighborhoods and classes of the city, the tower serves as a stitch pulling the edges of the river back together. The new bridge for the city is a living one. The impregnation of the tower with the responsibilities of density, function and community, but also energy production define an independence and social power to the tower. Sustainable technologies deployed include: [1] wind turbines for capturing the ocean breezes, [2] hydroelectric turbines for harnessing and damming the LA river (allowing for runoff water reclamation for irrigation as well as control water movement through the larger ecosystem of the LA River system), [3] vertical [bio-electric algae energy walls] and horizontal [productive vegetable and flower] gardens, [4] rainwater collection systems that when filtered by plants and soils and then generates oxygen and hydrogen [Hyper performance Facade channels rain water into designated rain water storage, where ultraviolet light filament-powered by thin film photovoltaic on the surface purifies the water], and [5] solar panel walls that produce electricity [twisting and rotating to engage the dominant sightlines], the tower introduces energy producers into the city, a place of historic energy consumption.

In this urban high rise form, the production of food and energy are developed as gardens, interfaced with the activities and responsibilities of daily life. Embraced, enhanced, and articulated as formal compositions equal in aesthetic potential to their energy production, the formalization of infrastructure is celebrated. The technology of nature and the intrinsic ecosystems that exist so readily in the Mediterranean climate of Los Angeles, allows for the collaboration of man and nature to produce a comprehensive ecosystem through the variable layers of the Vertical Campus.



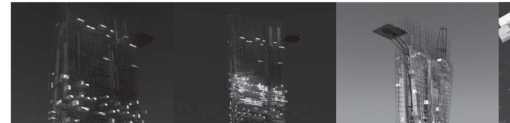
SITE PLAN: DOWNTOWN LA - RIVER



ROOF PLAN: ILLUSTRATING RESPONSIVE SITE FIGURE TWIST AND LAMINATED ORGANIZATIONAL STRUCTURE



VIEW LOOKING WEST



NIGHT VIEW - RESIDENTIAL UNITS NIGHT VIEW - EVENT SPACE ACTIVE TOP OF TOWER

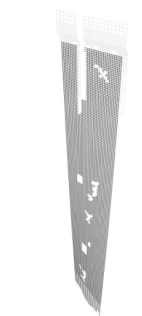
**Elements**

Each of the layers was systematized - developing a series of rules that optimize and self-organizing both functionally and formally. The aggregation of these systems then generated a series of intertwining moments for interdependency and lateral optimization. The collective aggregation unifies the commitments of energy, society, and function. The propose intervention is a system with the following components:



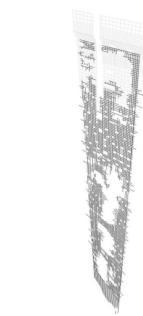
**PRIMARY SEISMIC STRUCTURE**

Due to the unique seismic requirements of Los Angeles, the main structural element of the tower celebrates this condition. This triangulated steel element defines the tower's form. As a steel cross-braced super-structure, the figure provides the primary shape of the tower. The density of the triangulation accelerates at the base of the tower increasing the concentration and density to respond to the structural forces. This irregular rhythm of the bracing and nesting acts as a dynamic element within the project to provide the primary language of the tower as an infrastructural element upon which the other elements attach.



**SECONDARY STRUCTURE - INNER**

The outer limitations of the secondary structural element takes adopt the form of a simple grid structure. Various forms of boxes and elements that make up the tower are placed on the grid. This secondary structure defines the inner public streets, forming the primary seismic structure and defining a threshold from super-structural to localized structure.



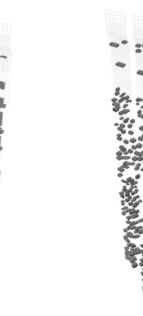
**SECONDARY STRUCTURE - OUTER**

Adaptible Equilibrium Orientation (both local and super-structural) introduces rotation into the pavilion and the tower as a whole. To benefit from the local geometry of the base (determined by the urban fabric) to the more natural orientation of light and geography (determined by contextual natural production/conditions). The twist allows for the tower to adapt to the local conditions with different structural and infrastructural functions. Residential and office spaces are the most private spaces, with ecological life between people and nature are provided. Cultural space is for the social network and interactions in between neighbors and community members.



**FLOOR PLATES**

The variable visual and infrastructural porosity of the facade system illustrates the diverse communities of public and private users. As a systematized infrastructure, there is a room for expansion and development. The density of the structure moves from the super-structural elements frame (by contextual natural production/conditions). The twist allows for the tower to adapt to the local conditions with different structural and infrastructural functions. Residential and office spaces are the most private spaces, with ecological life between people and nature are provided. Cultural space is for the social network and interactions in between neighbors and community members.



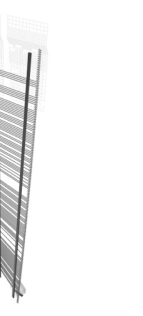
**PROGRAM MODULES**

Each cell is divided into two distinct zones: balanced with interior and exterior allocations. These two interacting spaces maintain their independent characters, but through their interplay allow for a tertiary reading of their structure. While diverse in amenity and that spatial module and dimension, a modular system evolves a "casual" character, permitting adaptation and growth to allow for diverse local conditions and unique combinations in their vertical aggregation. This each level plan is unique, but all of them are under the control of the project. Cultural space is for the social network and interactions in between neighbors and community members.



**CIRCULATION**

Extending from the infrastructure of the new transit hub at the base, all bus and vehicular traffic transition to a vertical pedestrian movement. The emergency stairs and elevator cores weave through the center zone allowing for efficient location and establish themselves as landmarks on the horizontal level. Diverse localized escalators, inclined moving sidewalks, and localized elevators allow for a more ceremonial movement based on the zoning of the tower as a whole.



**HORIZONTAL PRODUCTIVE GARDENS**

These horizontal vegetation platforms serve as productive gardens for the community. Designated as allotment gardens for the occupants of the Vertical Campus, these dispersed gardens would provide space for fruit, flower and vegetable crops producing an urban farm able to provide for the residents. Beyond their functional capacity, they serve as park-like spaces for retail and recreation. These gardens would be irrigated by the captured rainwater and reclaimed grey water of the project.



**VERTICAL HANGING GARDENS**

The vertical gardens use draping vegetation to oxygenate the air and act as sun-shade devices. Primarily made up of vines and other climbing plants, their position and density provide an overall green color to the tower. Like the Horizontal Gardens, these are also irrigated by the captured rainwater and reclaimed grey water of the project.



**WATER COLLECTION**

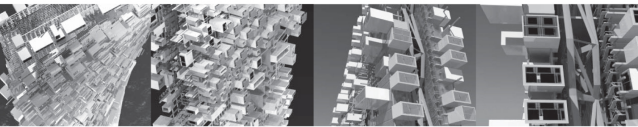
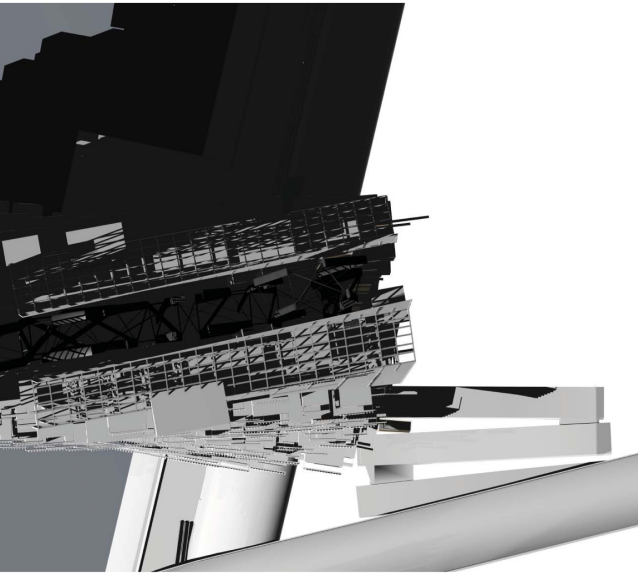
The facade of the building is a hyper-efficient and rigorous structure that provides thermal mass for insulation and operable solar shades and louvers for the diverse programs. In-filled soils in vertical and horizontal gardens, with traditional vegetable, herb, and flower gardens as well as hydroponic algae farms offer both visual and inhabitable ground to both local and regional communities. Purified water is delivered and stored in designated water storage at different levels for daily use from the water reservoir located at the base of the tower (filled and maintained from filtering the hydroelectric runoff from the LA River).



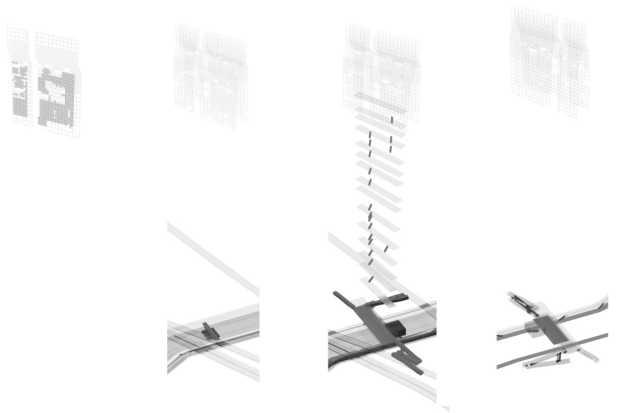
**WIND TOWER**

The wind tower and the tower as a whole are designed to provide a more ceremonial movement based on the zoning of the tower as a whole. Cultural space is for the social network and interactions in between neighbors and community members.

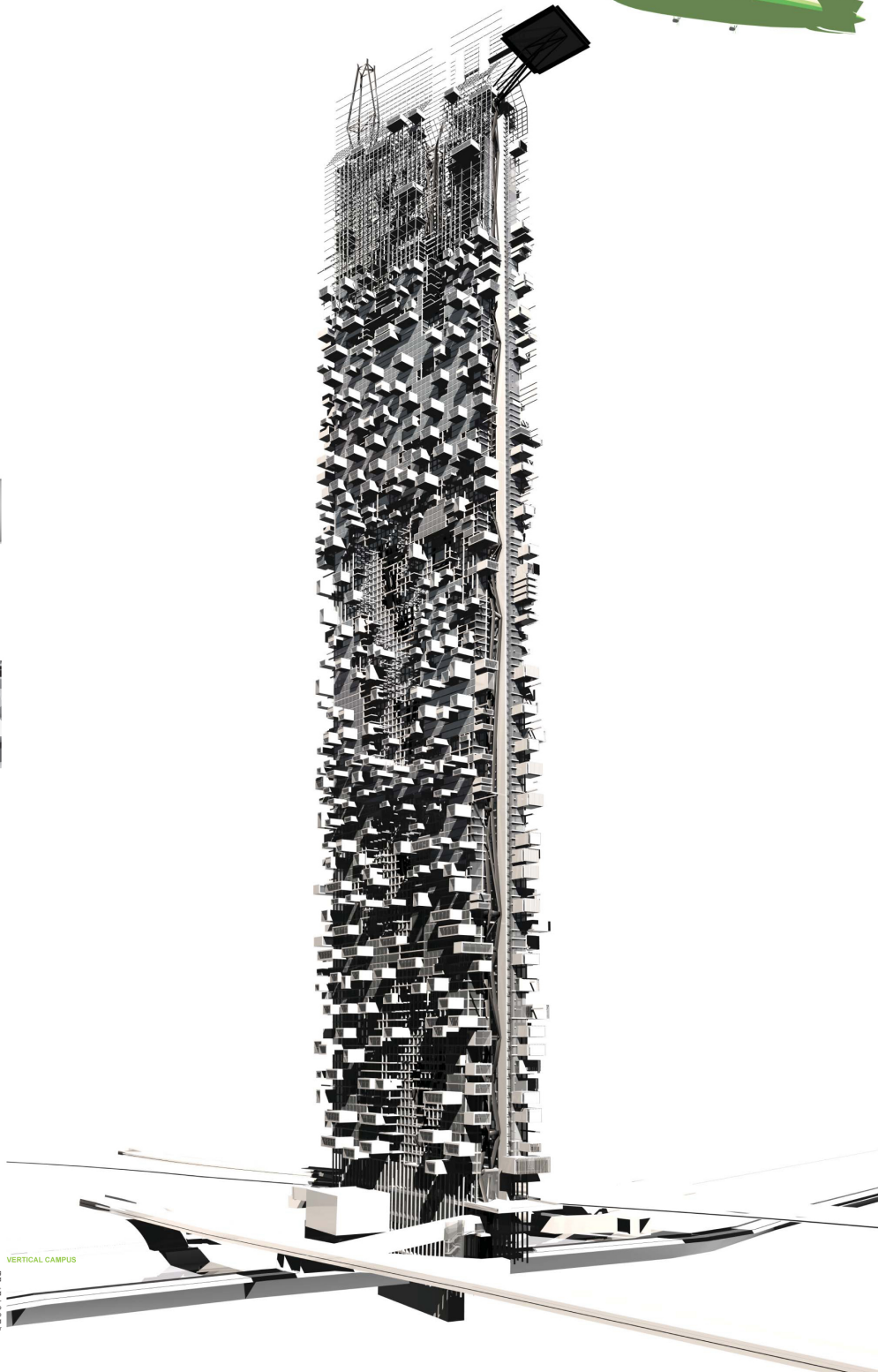




VIEW OF TWISTING SITE RESPONSE VARIABLE INFILL UNITS LAMINATED SECTION INDIVIDUAL ADAPTIVE UNITS



ROBINES - POWER WATER TURBINES - POWER STREET LEVEL LOCAL CIRCULATION METRO TRANSIT CIRCULATION



VERTICAL CAMPUS

Robines are placed on the top one-third of the structure to produce electrical power not only for the project but also to provide enough excess energy for 15 other buildings. The turbines would rotate axially to respond to the constant oceanic breeze, creating a unique vertical basin eco-system.

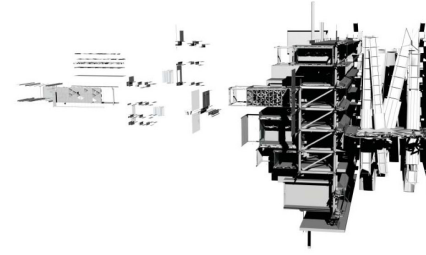
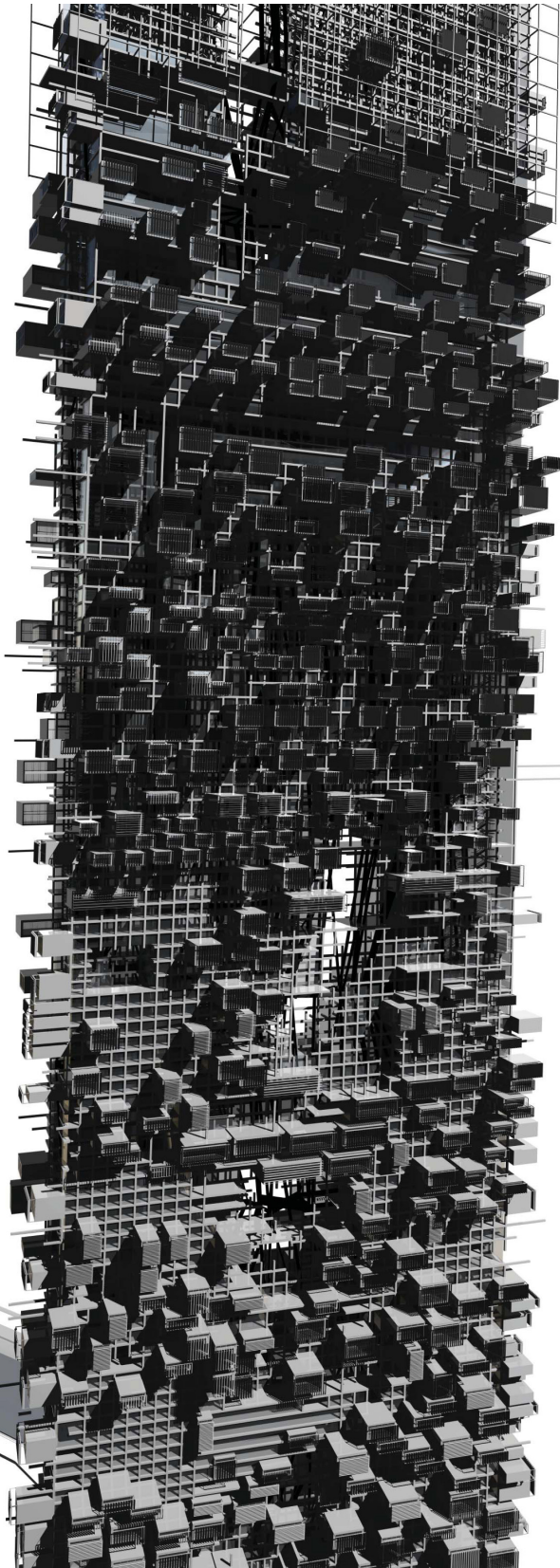
Located at the base of the tower is a dam structure that creates a localized eco-system. Embedded within this dam structure are a series of water turbines that are used to generate hydroelectric power for the Vertical Campus and also produce a surplus fed back into the city power grid. The dam structure would provide a localized point of water management for the entire L.A. River, permitting the river basin to fill and thus provide Los Angeles with a more responsible river. The dam structure would generate an anterior lake providing a unique wildlife habitat. A fishery would be apart of the element, providing another food source for the campus.

The entire ground level of the project weaves into the street grid and neighborhood circulation systems integrating and reconnecting their flow. The circulation paths linking the subterranean parking structure with walkways and paths and extend across, through and upward into the Vertical campus connected the fabric physically and ceremonially. The extension of this network through the gardens of the tower produce a public vertical park, food and a transit opportunity.

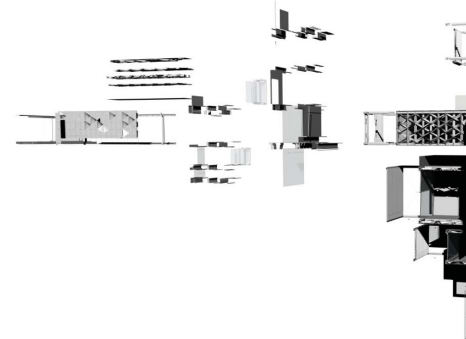
The vertical Campus serves as a transit hub, connecting to existing infrastructures through the rooftop Helipad that would serve not only helicopters, but also dirigibles, providing a rural and light connection to the sky and nearby LAX. Both Hope Airport in Burbank, a metro station and bus transfer station (woven into the base of the tower) that would connect the tower to the rest of the greater Los Angeles area public transit and light rail; and a hovercraft station that would begin to open up the river as a transit opportunity.



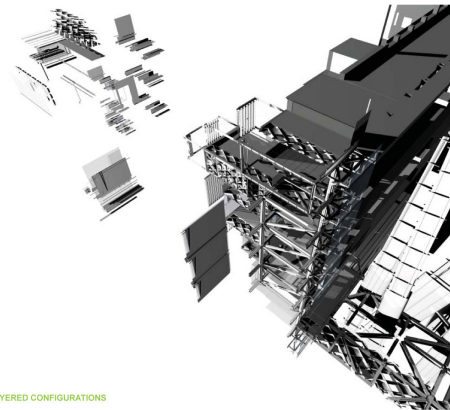
PROJECT  
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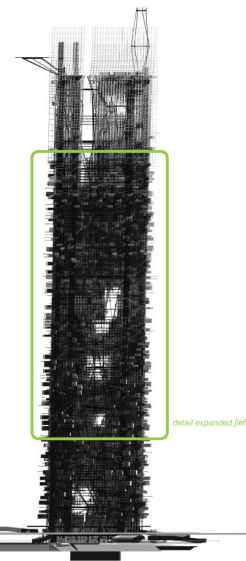
SECTIONAL DETAIL



EXPLODED COMPONENTS



LAYERED CONFIGURATIONS

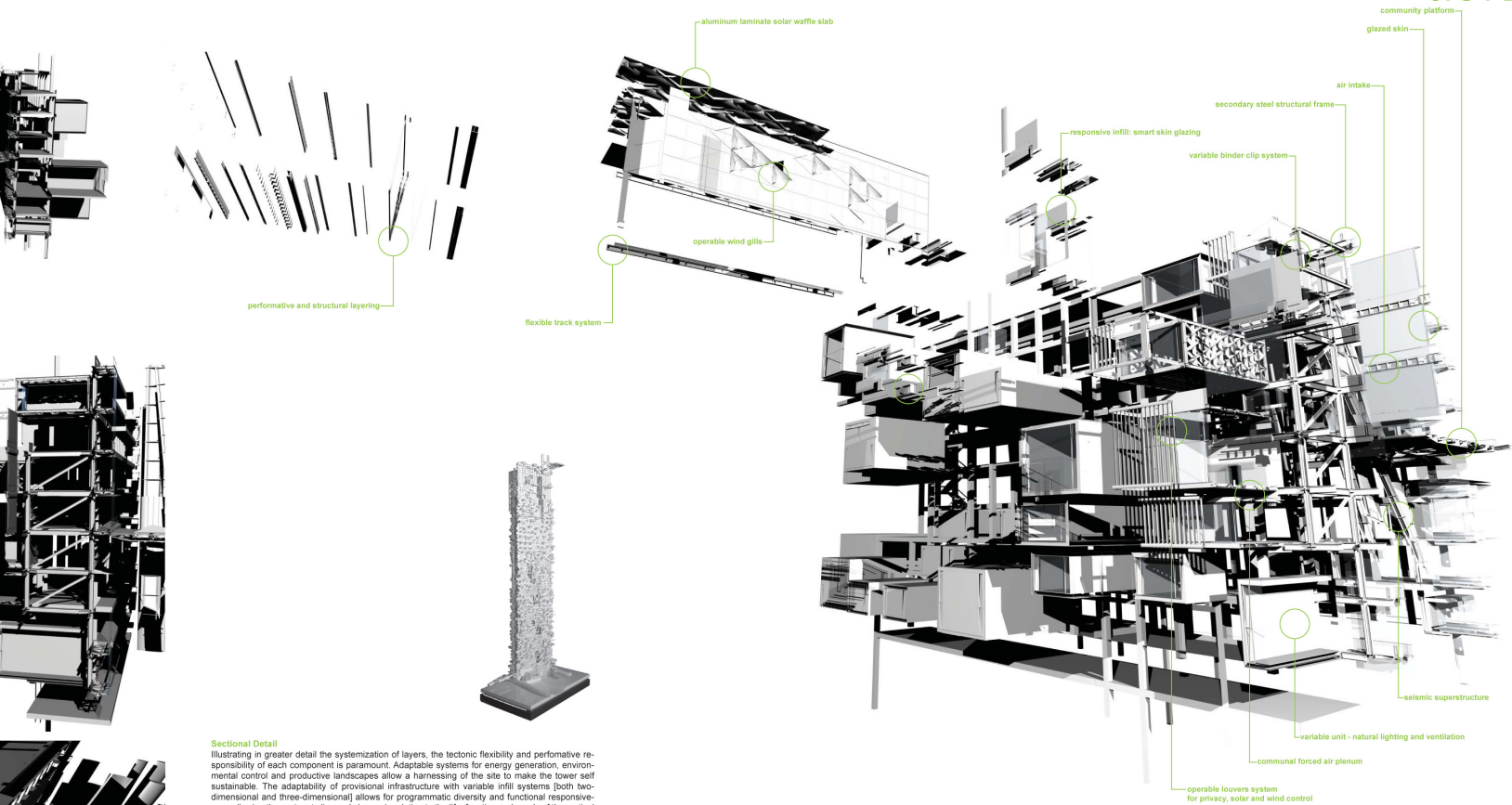


SOUTH ELEVATION  
DETAIL OF FACADE FIELD



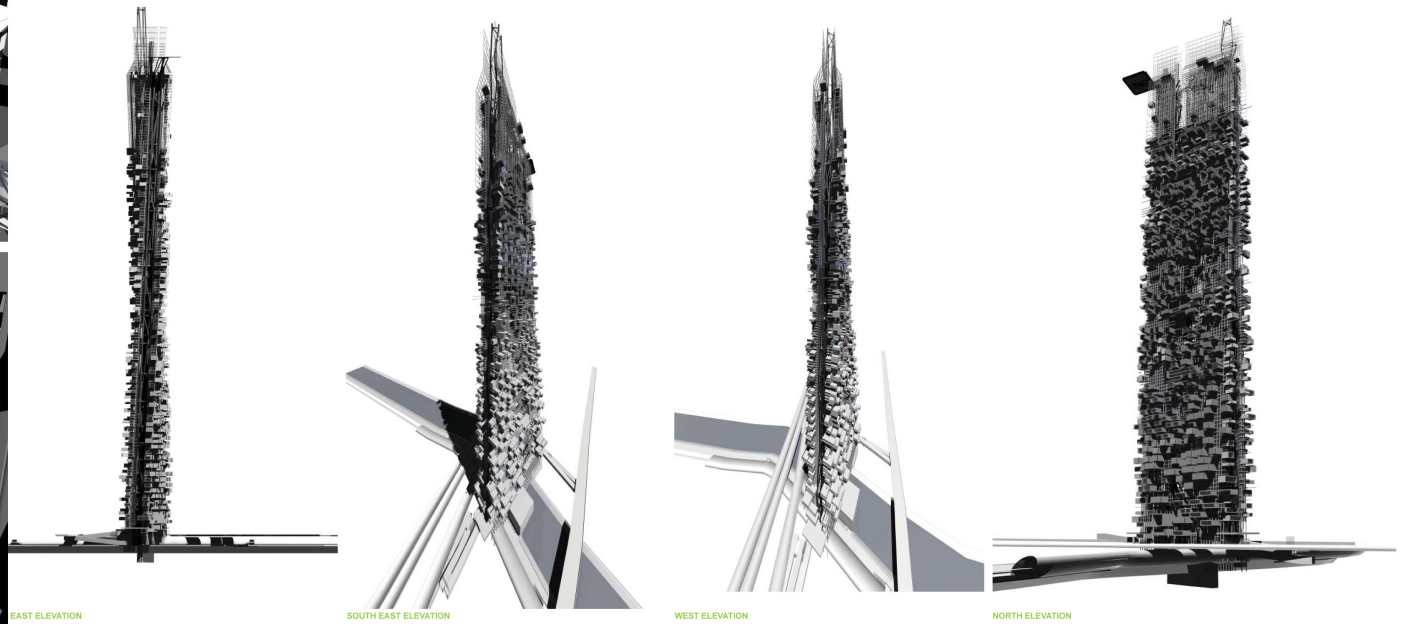
VIEW THROUGH RESPONSIVE SKIN LAYERS





**Sectional Detail**

Illustrating in greater detail the systemization of layers, the tectonic flexibility and performative responsibility of each component is paramount. Adaptable systems for energy generation, environmental control and productive landscapes allow a harnessing of the site to make the tower self sustainable. The adaptability of provisional infrastructure with variable infill systems [both two-dimensional and three-dimensional] allows for programmatic diversity and functional responsiveness allowing the system to live and change in relation to the life, function and needs of the vertical community. The localized tectonic solutions exist within the collective systems of the whole; thus the part determines the legibility of the total composition, privileging performance and experience over form.



EAST ELEVATION

SOUTH EAST ELEVATION

WEST ELEVATION

NORTH ELEVATION